2019 Air Quality Annual Status Report (ASR)

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

24th June 2019

Local Authority Officer	Samuel Hoskins
Department	Public Protection
Address	Addenbrooke House, Ironmasters Way, Telford, TF3 4NT
Telephone	01952 381818
E-mail	sam.hoskins@telford.gov.uk
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Executive Summary: Air Quality in Our Area

Telford and Wrekin Council have undertaken an annual status report which reviews all relevant data obtained through diffusion tube monitoring during the 2018 monitoring period. This review has shown that overall, air quality within the borough of Telford and Wrekin shows very good compliance with the National Air Quality Objectives (NAQO) and European Directive limit and target values as shown in Appendix E.

Historically, Telford and Wrekin Council have been able to monitor air quality through data provided by Ironbridge Power Station, however, this is no longer possible as the powers station was decommissioned in December 2015. To fulfil our statutory duties under Part IV of the Environment Act 1995, in 2016 we introduced a new air quality strategy which involved the use of passive diffusion tubes in 20 locations across the borough in order to monitor concentrations of NO_2. The main focus being road traffic sources.

After reviewing the results from 2016, we were able to identify two areas within the borough, namely Watling Street (B5061 junction) and Coach Central, where air quality was notably poorer than the rest of the borough. The data gathered during 2016 identified no exceedances of the NAQO, however Telford and Wrekin Council are committed to ensuring that a pragmatic approach to air quality review is continued. This review identified the need to implement further monitoring in these locations to obtain a more detailed assessment of air quality.

In 2017, we installed an additional nine diffusion tubes around these two locations in order to better understand the extent of poorer air quality in these locations i.e. whether it was discrete or widespread. In light of this review, we identified another two locations of notably poorer air quality at Mill Bank and Watling Street/Regent Street junction which are two of the roads intersecting the Watling Street (B5061 junction).

The data acquired in 2018 continues to show that the air quality throughout the borough is relatively stable as previous years monitoring has shown. The highest NO_2 concentrations observed were again at the Watling Street/Regent Street junction and

Mill Bank area. Although we had no exceedances of the NAQO, we recognise that further monitoring at these locations is necessary.

Air Quality in Telford and Wrekin

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

The borough of Telford and Wrekin is a predominantly rural area on the north-eastern edge of Shropshire. The borough has a population of 170, 200 (2016 estimate, Office for National Statistics) covering 29,000 hectares with its major settlement being Telford, which incorporated the existing towns of Dawley, Madeley, Oakengates and Wellington upon its construction as a 'new town'.

The main sources of air pollution in Telford and Wrekin are emissions from busy roads. The M54 traverses the borough across the main central urban area, and the majority of the main roads within the borough are also focussed in this area, including the A41, the A518, the A5, A442, A4169, and the A4640.

There are 12 Part A2 processes and 59 part B processes (including petrol filling stations, dry cleaners and mobile plant) within the borough. There is a main railway line traversing the centre of the borough, as well as an unused rail freight terminal.

Table 1.1 below outlines the work undertaken so far, the conclusions of the reports, and the summaries of any further action.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Table 1.1 – Summaries of Reports

Year	Outcomes	Summaries
1998	PR	Prediction of exceedances
1999	PR	Prediction of exceedances
2000	USA	Not significantly affected by emissions (CO, Benzene, 1,3-Butadiene, Pb, SO_2, PM_{10}); any breaches will be negligible
2001	PR	Prediction of exceedances
2002	PR	Declaration of AQMA
2003	USA	Exceedances of SO_2 from Ironbridge Power Station, and of NO_2 from road traffic emissions in Ironbridge Gorge. Review of AQMAs determined there would be no exceedances by 2005.
2004	PR	Detailed assessment of NO_2 and SO_2 from Ironbridge Power Station and vehicular traffic. Objectives will be met in 2005 so no further work is necessary.
2005	PR	No exceedances of relevant air quality objectives, Revocation of AQMA
2006	USA	No exceedances of relevant air quality objectives
2007	PR	No exceedances of relevant air quality objectives
2008	PR	No exceedances of relevant air quality objectives
2009	USA	No exceedances of relevant air quality objectives
2011	PR	No exceedances of relevant air quality objectives (includes data from 2010)
2012	USA	No exceedances of relevant air quality objectives
2013	PR	No exceedances of relevant air quality objectives
2014	PR	No exceedances of relevant air quality objectives
2015	USA	No exceedances of relevant air quality objectives
2016	ASR	No exceedances of relevant air quality objectives
2017	ASR	No exceedances of relevant air quality objectives
2018	ASR	No exceedances of relevant air quality objectives

Telford and Wrekin do not have any AQMAs. Telford and Wrekin have an air quality strategy, it ensures that air quality is given the significance it deserves and enshrines the Council's commitment to air quality review and management.

Actions to Improve Air Quality

Telford and Wrekin Council is committed to ensuring that the air quality within our borough remains wholesome, as previous monitoring has indicated.

Additional monitoring and Traffic Management Measures

In 2017, the Council introduced additional diffusion tubes at four locations that represent relevant exposure in close proximity to Coach Central near the town centre where NO_2 concentrations were identified as some of the highest in the borough.

After liaising with DEFRA, we understood that the individual diffusion tube located at Coach Central in 2016 monitoring did not represent relevant exposure based the NAQO. These additional four monitoring locations were Withywood Drive, Lawnswood, Deercote (top) and Deercote (bottom). Further monitoring in these locations show that relevant exposure is well below the NAQO NO_2 Annual Mean Concentration of 40 µg/m^3 (Appendix E). As a result, it has been decided that the four diffusion tubes in this area are going to be removed in 2020 with no further review or measures deemed necessary at these locations. This will allow for resources to be focused at priority locations.

At this time, a further five diffusion tubes were introduced on each of the roads that intersect the B5061 Junction by Watling Street, Wellington. This was to support the pre-existing monitoring location Watling Street (Outside Swan) which was introduced in 2016. These locations were Mill Bank, Holyhead Road, Watling Street, Dawley Road and Watling Street/ Regent Street Junction (Appendix D). This decision was made as 2017 NO_2 concentrations raised concern. We have now obtained further data from these monitoring locations which identified Mill Bank and Watling Street/ Regent Street Junction, two of the roads that intersect this junction, as having the highest NO_2 levels within the borough. Although the NAQO was not exceeded, this has prompted the Council to take further action.

The actions taken so far at the B5061 Junction have included Intelligent Traffic Management through the introduction of intelligent signalling and also anti-idling signage (Table 2.2). The introduction of the intelligent signalling aims to improve traffic flow at the junction by allowing the traffic lights to prioritise the roads at the intersection with the most traffic. This is to allow smoother traffic flow and reduce the amount of time vehicles spend in this location. The aim of the anti-idling signage is to

encourage motorists to turn off their engines whilst stationary at the junction in a bid to reduce preventable emissions. It is hoped this will change motorist's behaviour.

These measures have not long been introduced and monitoring results from these locations are still fluctuating annually which does not provide any solid evidence of improvements of NO_2 concentrations in this location as a direct result of such measures. Annual trends are available in Table A.2 in Appendix A. We aim to continue to monitor at these locations to understand if the measures introduced are having any long-term impact.

Schemes and funding

The Council have taken measures to encourage the use and make more accessible public transport as an alternative to private vehicle use. The Council have worked with owners of Telford Shopping Centre and secured Local Enterprise Partnership Growth Deal funding which has been used to fund a new bus station at Telford Shopping Centre which is now nearly completed.

Funding has also been used to install new bus shelters with seating at Telford Central train station and a new footbridge from the train station over Queensway into the centre to encourage the use of Telford rail infrastructure. Recent rail passenger data has shown an increase of people using rail to travel at the three stations within the borough, a percentage growth of 2.05% in total (2016/17 and 2017/18 figures).

Bus usage has however declined with 3.9 million passenger journeys across the borough in 2018 compared with 4.3 million in the previous year. This was typical throughout the country.

The Council also have a Cycling and Walking Strategy which was implemented in September 2017. The strategy was introduced in recognition of Telford's walking and cycling infrastructure and to encourage residents and those who use the borough for work to make use of such by promoting the health benefits of cycling and walking. It is intended to support the vision of the overarching Local Transport Plan for 2011-

2026. The strategy can be accessed via http://www.telford.gov.uk/downloads/file/7995/cycling_and_walking_strategy

The implementation of the action plan of this Cycling and Walking strategy will also assist with the delivery of the borough's Local Transport Plan for 2011-2026 and by encouraging more people to take regular exercise will contribute to people in Telford and Wrekin enjoying healthier, happier and longer lives.

Cabinet adopted the Ultra-low vehicle emission strategy in August 2018 which sets out how the Council will support and encourage growth in the ULEV market. The strategy's action plan will guide priorities and funding to those measures that are considered to be the most effective methods to encourage and support ULEVs.

Conclusions and Priorities

Monitoring data from 2018 has shown overall that air quality in relation to NO_2 concentrations is fairly stable, with only slight increases of mean NO_2 concentrations observed across the majority of monitoring locations (Table A.2). However, this is nothing of particular concern with 2017 data showing an overall decrease in NO_2 concentrations in comparison to 2016 data. We have to appreciate that NO_2 concentrations are not completely stable and do fluctuate slightly year to year due to many influencing factors i.e. weather conditions and road use.

Although this year we have had no exceedances of the NAQO, we are making progress in identifying areas of poorer air quality within the borough through air quality review. Telford and Wrekin's main priorities for the coming year are to continue diffusion tube monitoring for NO_2. The Council will continue to take a pragmatic approach in addressing any further locations identified to have poorer air quality and where necessary liaise with DEFRA. The main aims are;

- To introduce new monitoring locations and extend existing which have shown air quality to be poorer;
- To be forward thinking and address areas of poorer air quality when identified.

This however does present challenges. The first being the identification of new monitoring locations and where resources would be most effectively focused. We aim to work with our Highways Department and Planning Department to assess road traffic data and areas of new development. This is to enable us to identify new relevant receptors and sources of air pollution.

The Council will only continue to review air quality in current locations where NAQO are being, or are likely to be exceeded for example at Mill Bank. On review, the monitoring locations with consistently low NO_2 concentrations will be discontinued from further monitoring to allow for resources to be focused effectively.

Local Engagement and How to get involved

For further information please see the information on Telford and Wrekin's website:

http://www.telford.gov.uk/info/20150/pollution/104/air_quality

Or contact us by phone on 01952 381818

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List of Tables

1 Local Air Quality Management

This report provides an overview of air quality in Telford and Wrekin during 2018-19. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely to be an exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Telford and Wrekin Council do not have any AQMAs. However, since the continuation of monthly diffusion tube monitoring, two locations within the borough were identified as areas of concern which made the Council consider the future possibility of declaring an AQMA and devising an Air Quality Action Plan (AQAP) if actions are not taken to manage air quality or those not taken are effective. Again, the Council have taken a pragmatic approach to address this through the introduction of further monitoring efforts and Traffic Management Measures. Monitoring to review the effectiveness of these measures are ongoing.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
N/A	N/A	N/A	N/A	N/A

2.2 Progress and Impact of Measures to address Air Quality in Telford and Wrekin

Conclusions that have been brought forward from last year's appraisal and actioned in this ASR

Defra's appraisal of last year's ASR concluded the following;

1. **DEFRA** – The formatting of the report does not fully adhere to the format within the ASR Template, which makes the content within the report difficult to follow. Table 2.2 appears twice.

   T&WC – We have ensured the ASR format has been followed during the administrational process. Table 2.2 has only be included once.

2. **DEFRA** – There is significant unnecessary detail added towards the end of the report.

   T&WC – We have been careful to ensure the report is concise whilst being comprehensive.

3. **DEFRA** – The Table of Contents is confusing, for instance there is no detailed QA/QC provided on P15. Page 15 is a further contents / index page under Appendix C. The relevance of this material is doubtful, and is not required within a standard ASR report.

   T&WC – We have ensured that each section of the report are accounted for in the Table of Contents and that any irrelevant material is not included.

4. **DEFRA** – What would be more helpful, would be if details on QA/QC were provided as requested in the last appraisal report.

   T&WC – We have strived to provide this information in this year's ASR.

5. **DEFRA** – There is minimal detail on QA/QC, annualisation, and no details of laboratory used, or examples of calculations.

   T&WC – All such details have now been included in this year's ASR.

6. **DEFRA** – The map showing siting of current diffusion tube locations, does not label sites, so results cannot be linked to the maps, please address this in future reports.

T&WC – We have provided map locations for each monitoring location which can be referenced against the data tables.

7. **DEFRA** – The results of monitoring for the first full year show most results are significantly below objective levels. For this reason, the Council may wish to re-evaluate the siting locations for future years, as a means of establishing sites with relevant exposure close to pollution hotspot locations.

   T&WC – We have undergone a review of monitoring locations and have since removed locations where we have no concern. We have also introduced new monitoring locations to enable us to determine spread at locations identified as having poorer air quality. We are going to again review all locations before the 2020 monitoring period.

8. **DEFRA** – The document should only contain the information set out by the requirements of TG-16 and follow the report structure set out in Annual Status Report (ASR) for England (excluding London), available at: https://laqm.defra.gov.uk/review-and-assessment/report-templates.html.
   While informative, the document provides too much commentary on topics such as legislative context/drivers. Scientific drivers, authoritative body statements. This information is important but it is not contextualised for the ASR. Additionally it introduces a level of noise into the latter sections of the report that is unnecessary.

   T&WC – Legislative and scientific drivers/context have only been referenced where necessary to support the information and data submitted.

9. **DEFRA** – Efforts should be made to clearly communicate the steps (and measures) the local authority is taking to address PM2.5 concentrations in the appropriate sections of the report. Also reference should be made to Public Health Outcomes Framework within the appropriate section of the report.

   T&WC – Although we do not currently monitor for $PM_{2.5}$ concentrations, we do take steps through other Public Protection functions to address such pollutants. We have made effort to communicate these more clearly within this ASR.

Progress and Impact of Measures to address Air Quality

Telford and Wrekin Council has taken forward measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. This year has seen the introduction of anti-idling signage at Watling Street (B5061 junction).

Telford and Wrekin Council expect the following measures to be completed over the course of the next reporting year:

- To Identify new monitoring locations and extend monitoring at existing locations where the NAQO are being or are likely to be exceeded such as Mill Bank and to establish significant trends;
- To cease monitoring at locations where the NAQO are not likely to be exceeded;
- To tackle areas where poorer air quality is identified using appropriate measures and to monitor current measures introduced.

The intended impact of these measures is to ensure a pragmatic approach is being taken by the Council to review air quality. As the Council only re-introduced monitoring using diffusion tubes in 2016, the data we have so far is not extensive and has been focused where deemed appropriate at that time, which has since been extended. Telford is a rapidly changing town with a number of new major developments. We therefore need to assess the impact these changes are having within our borough and to ensure that air quality remains wholesome and not just compliant with the NAQO.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Ironbridge Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	Telford and Wrekin Council	Fully Implemented	Fully Implemented	Amount of people using the service	N/A	The scheme is completed and is being well used.	N/A	The Ironbridge park and ride scheme aims to lower the amount of vehicle movements within the Ironbridge Gorge. In 2018, 3,456 passengers used the service.
2	Telford and Wrekin Council Journey Share	Alternatives to private vehicle use	Car & lift sharing schemes	Telford and Wrekin Council	Fully Implemented	Fully Implemented	Amount of people using the service	N/A	The scheme is completed and is being well used.	N/A	NO LONGER OPERATES
3	Sustainable Traffic Management Plan	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Telford and Wrekin Council	The plan has been completed and a grant has been received to implement the plan.	This is being implemented in a staged approach	N/A	N/A	So far the project has implemented the Southwater Shared Space scheme.	Implemented	The Sustainable Traffic Management Plan aims to reduce the impact of vehicle movements on air quality by introducing schemes such as shared space schemes etc.
4	Watling Street Signal Upgrades	Traffic Management	Traffic Signals and Technology	Telford and Wrekin Council	Fully Implemented	Fully Implemented	Reduction in NO_2 emissions	N/A	The improvements to traffic signals to link these together and be more demand responsive is currently being delivered	Implemented	Aim is to allow more efficient vehicle movement at the Watling Street Junctions to reduce engine idling

5	Coach Central	Traffic Management	Re-allocation of road space	Telford and Wrekin Council	Early stage development	Not started	Reduction in NO_2 emissions	N/A	Early consideration through CTAAP	Not identified	Potential for further traffic reduction along Coach Central in order to reduce vehicle emissions.
6	Watling Street Traffic Management signs	Traffic Management	Road Signs – Anti-idling	Telford and Wrekin Council	Early Stage Development	Not Started	Reduction in NO_2 emissions	N/A	Signs to promote drivers to turn off their engines whilst waiting at traffic lights	Now implemented	Aims to reduce engine idling.

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

$PM_{2.5}$ emissions are regulated by the Council through various legislative frameworks. This includes the LAPPC and LA-IPPC regimes under the provisions of The Environmental Permitting (England and Wales) Regulations 2016 and smoke control zones under the Clean Air Act 1993. More information about Telford and Wrekin's smoke control zones is available here http://www.telford.gov.uk/info/20358/pollution/1038/smoke_control_zones/2

Last year's DEFRA background maps for Telford and Wrekin indicate an average level of 7.18µm^3 which is well below the limit values of 40µm^3. However, Telford and Wrekin Council are committed to lowering the levels of $PM_{2.5}$ and have strived to continue with initiatives i.e. Iron Bridge Park and Ride that we hope will have an impact on $PM_{2.5}$ emissions. Over the next 12 months we will continue to liaise with our Public Health and Highways colleagues to develop further schemes and strategies which will aim to lower levels of $PM_{2.5}$ within the borough.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Telford and Wrekin Council currently do not have any automatic monitoring sites.

3.1.2 Non-Automatic Monitoring Sites

Telford and Wrekin Council undertook non- automatic (passive) monitoring of NO_2 at 25 sites during 2018. Table A.1 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 6 years with the air quality objective of 40µg/m^3.

The full 2018 dataset of monthly mean values is provided in Appendix B. Rows highlighted in **red** are locations not monitored in 2018. This is due to previous years monitoring data showing consistently low NO_2 concentrations in relation to NAQO.

3.2.1 Particulate Matter (PM_{10})

Currently, Telford and Wrekin Council do not monitor for PM10 or $PM_{2.5}$.

3.2.2 Particulate Matter ($PM_{2.5}$)

Currently, Telford and Wrekin Council do not monitor for PM_{10} or $PM_{2.5}$.

15.1.4 **Sulphur Dioxide (SO2)**
Currently, Telford and Wrekin Council do not monitor for PM10 or $PM_{2.5}$

Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT1	Newport Car Park TF10 7DS	Urban background	374616	319182	NO_2	NO	3.1	2.60	NO	2.52
DT2	Barrack Lane TF10 9ER	Urban background	373115	316587	NO_2	NO	5.13	2.06	NO	2.34
DT3	Oxlip Close TF2 8RT	Urban background	371301	313583	NO_2	NO	5.45	1.60	NO	2.46
DT4	Richmond Avenue TF2 7EF	Urban background	369553	312682	NO_2	NO	6.35	1.34	NO	2.68
DT5	New Road Wrockwardine Wood TF2 7AA	Urban background	369922	312224	NO_2	NO	13.2	0.1	NO	2.40
DT6	Horton Road TF2 6PD	Urban background	368627	312855	NO_2	NO	4.24	0.40	NO	2.57
DT7	Sommerfield Road TF1 5DP	Urban background	368380	312211	NO_2	NO	18.07	1.77	NO	2.36
DT8	Mercia Drive TF1 6YJ	Urban background	366161	312304	NO_2	NO	15.30	0.50	NO	2.48
DT9	Apley Avenue TF1 3PN	Urban background	364997	312434	NO_2	NO	41.42	2.50	NO	2.40
DT10	Watling Street (outside the Swan) TF1 2NH	Urban background	365825	311094	NO_2	NO	5.36	2.26	NO	2.54
DT11	Manor Rise TF1 2ND	Urban background	366723	310821	NO_2	NO	11.27	2.42	NO	2.40

DT12	Mossey Green Way TF2 0DL	Urban background	368594	310130	NO_2	NO	25.04	1.46	NO	2.44
DT13	Shifnal Road TF2 9NN	Urban background	371226	309402	NO_2	NO	32.98	1.48	NO	2.47
DT14	Checkley Lane TF2 9UD	Urban background	371343	311136	NO_2	NO	16.77	1.00	NO	2.59
DT15	Newdale/Lawley Junction TF4 2SG	Urban background	367412	308780	NO_2	NO	11.22	1.00	NO	2.54
DT16	Dudmaston TF3 2DG	Urban background	370900	308536	NO_2	NO	7.10	0.50	NO	2.51
DT17	Coach Central TF3 4JQ	Urban centre	369817	308676	NO_2	NO	238.9	1.28	NO	2.66
DT18	Boscobel Close TF3 1QQ	Urban background	370949	306311	NO_2	NO	7.69	1.75	NO	2.45
DT19	Waverley TF7 5LU	Urban background	368941	304766	NO_2	NO	4.27	0.49	NO	2.33
DT20	Kemberton/Madeley TF7 4BH	Urban background	370016	304570	NO_2	NO	23.52	1.89	NO	2.43
DT21	Watling Street TF1 2NH	Urban background	366008	311056	NO_2	NO	10.64	1.42	NO	2.34
DT22	Mill Bank TF1 2NH	Urban background	365825	311089	NO_2	NO	2.83	1.24	NO	2.36
DT23	Holly Head Rd TF1 2NH	Urban background	365822	311033	NO_2	NO	20	1.57	NO	2.36
DT24	Dawley Rd TF1 2NH	Urban background	365927	311017	NO_2	NO	7.75	1.55	NO	2.38
DT25	Watling Street/ Regent Street Junction TF1 2NH	Urban background	366084	311065	NO_2	NO	4.43	3.88	NO	2.42
DT26	Deercote (top) TF3 2BQ	Urban background	370122	308620	NO_2	NO	24.2	48.55	NO	2.47
DT27	Deercote (bottom) TF3 2BQ	Urban background	370243	308516	NO_2	NO	30.3	42.64	NO	2.46
DT28	Withywood Drive TF3 2HT	Urban background	369488	308324	NO_2	NO	7.35	49.44	NO	2.37
DT29	Lawnswood TF3 2HS	Urban background	369517	308242	NO_2	NO	19.2	48.26	NO	2.30

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	Bias-adjusted NO_2 Annual Mean Concentration (µg/m^3) * (3)					
					2013	2014	2015	2016	2017	2018
DT1 (Newport Car park)	Urban	Diffusion Tubes	91.70	91.70	No Data	No Data	No Data	18.9	19.78	21.63
DT2 (Barrack Lane)	background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	24.56	17.16	18.15
DT3 (Oxlip Close)	Urban	Diffusion Tubes	100	**N/A**	No Data	No Data	No Data	13.89	17.13	
DT4 (Richmond Avenue)	background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	16.55	15.07	16.95
DT5 (New Road)	Urban	Diffusion Tubes	100	91.70	No Data	No Data	No Data	17.89	16.01	17.46
DT6 (Horton Road)	background	Diffusion Tubes	91.70	91.70	No Data	No Data	No Data	16.68	15.55	17.40
DT7 (Sommerfield Road)	Urban	Diffusion Tubes	100	91.70	No Data	No Data	No Data	19.08	18.33	20.36
DT8 (Mercia Drive)	background	Diffusion Tubes	100	**N/A**	No Data	No Data	No Data	13.96	12.24	
DT9 (Apley Avenue)	Urban	Diffusion Tubes	91.70	91.70	No Data	No Data	No Data	24.24	23.9	25.58
DT10 (Watling Street) outside swan	background	Diffusion Tubes	91.70	91.70	No Data	No Data	No Data	34.62	32.46	33.87
DT11 (Manor Rise)	Urban	Diffusion Tubes	100	**N/A**	No Data	No Data	No Data	15.61	23.49	
DT12	background	Diffusion Tubes	83.33	91.70	No Data	No Data	No Data	30.14	38.22	28.47

(Mossey Green Way)										
DT13 (Shifnal Road)	Urban	Diffusion Tubes	100	83.30	No Data	No Data	No Data	25.46	18.55	23.98
DT14 (Checkley lane)	background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	21.46	21.58	22.05
DT15 (Newdale/Lawely Junction)	Urban	Diffusion Tubes	91.70	83.30	No Data	No Data	No Data	17.17	32.02	19.66
DT16 (Dudmaston)	background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	18.3	16.84	18.29
DT17 (Coach Central)	Urban	Diffusion Tubes	91.70	91.70	No Data	No Data	No Data	36.35	27.02	37.04
DT18 (Boscobel Close)	background	Diffusion Tubes	100	**N/A**	No Data	No Data	No Data	16.22	26.12	
DT19 (waverly)	Urban	Diffusion Tubes	100	83.30	No Data	No Data	No Data	13.35	17.91	14.34
DT20 (Madeley)	Background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	17.13	17.03	22.91
DT21 (Watling Street)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	No Data	23.49	25.81
DT22 (Mill Bank)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data N	No Data	No Data	38.22	**42.15**
DT23 (Holly Head Rd)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	No Data	18.55	20.46
DT24 (Dawley Road)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	No Data	21.58	23.88
DT25 (Watling street/regent street junction)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	No Data	32.12	33.87
DT26 (Deercote top)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	No Data	16.01	17.47
DT27 (Deercote bottom)	Urban background	Diffusion Tubes	100	91.70	No Data	No Data	No Data	No Data	16.18	17.78
DT28 (Withywood Drive)	Urban background	Diffusion Tubes	100	66.66	No Data	No Data	No Data	No Data	10.60	13.02

DT29 (Lawnswood)	Urban background	Diffusion Tubes	100	83.30	No Data	No Data	No Data	No Data	10.11	12.62

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**. The single exceedance at Mill Bank has not been distance corrected to the nearest relevant receptor and does not represent relevant exposure.

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

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year. **Locations highlighted in red were not monitored in 2018 due to consistently low NO_2 concentrations.**

(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.

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2018

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.93) (1)	Distance Corrected to Nearest Exposure (2)
DT1 (Newport Car park)	20.26	24.16	26.41	No data	19.18	17.48	19.77	19.90	23.76	26.36	31.05	27.60	23.26	21.63	21.0
DT2 (Barrack Lane)	18.06	18.56	23.45	No data	16.65	15.53	20.38	17.44	17.91	21.75	23.46	21.57	19.52	18.15	15.9
DT3 (Oxlip Close)															
DT4 (Richmond Avenue)	21.85	20.37	21.46	No data	13.69	12.89	12.21	12.32	14.24	19.24	27.72	24.54	18.23	16.95	14.9
DT5 (New Road)	20.56	21.48	23.84	No data	19.60	18.58	12.72	11.37	12.42	20.19	26.08	19.74	18.78	17.46	12.9
DT6 (Horton Road)	21.95	23.93	19.06	No data	15.39	11.36	12.37	13.30	15.72	20.26	29.26	23.30	18.71	17.40	15.8
DT7 (Sommerfield Road)	20.35	20.87	26.62	No data	20.54	13.26	18.44	16.07	18.27	26.86	37.05	22.64	21.90	20.36	16.7
DT8 (Mercia Drive)															

DT9 (Apley Avenue)	20.45	25.95	28.54	No data	27.91	25.40	24.21	20.57	23.50	30.07	45.42	30.69	27.51	25.58	13.5
DT10 (Watling Street) outside swan)	27.39	34.70	42.45	No data	36.72	33.86	37.46	29.63	33.04	36.87	52.61	35.94	36.42	33.87	28.6
DT11 (Manor Rise)															
DT12 (Mossey Green Way)	27.06	31.91	35.60	No data	27.71	22.82	28.36	23.81	28.44	35.46	42.97	32.70	30.62	28.47	18.0
DT13 (Shifnal Road)	27.70	28.06	33.76	No data	No data	16.83	22.58	17.36	23.50	29.32	32.34	26.48	25.79	23.98	17.6
DT14 (Checkley lane)	21.96	27.94	28.79	No data	24.87	21.55	19.62	16.31	16.09	22.23	37.57	23.98	23.71	22.05	14.9
DT15 (Newdale/Lawely Junction)	23.09	24.83	26.20	No data	17.27	15.45	17.26	15.95	20.18	26.08	25.18	No data	21.15	19.66	13.8
DT16 (Dudmaston)	18.19	23.23	25.97	No data	22.51	18.48	14.27	12.30	13.43	21.42	30.34	16.30	19.67	18.29	14.6
DT17 (Coach Central)	36.51	41.19	41.26	No data	34.66	28.50	42.23	36.26	43.56	44.87	47.46	41.68	39.83	37.04	No relevant exposure
DT18 (Boscobel Close)															
DT19 (waverly)	17.21	18.35	19.11	No data	12.77	10.93	No data	8.93	9.86	16.33	22.87	18.01	24.64	22.91	17.1
DT20 (Madeley)	24.46	28.13	27.32	No data	23.36	22.38	20.51	18.87	20.79	25.98	32.86	26.41	15.43	14.34	11.7
DT21 (Watling Street)	23.68	28.89	31.77	No data	28.01	23.79	25.21	22.52	25.80	30.75	34.40	30.55	27.76	25.81	19.1
DT22	37.83	39.09	49.38	No data	47.24	37.64	50.19	37.59	43.95	49.75	61.43	44.62	45.33	42.15	36.6

(Mill Bank)															
DT23 (Holly Head Rd)	22.08	25.53	17.00	No data	21.31	20.51	18.52	15.77	16.85	24.19	33.77	26.67	22.01	20.46	14.2
DT24 (Dawley Road)	24.26	21.33	29.87	No data	26.53	22.78	26.00	19.18	21.86	28.85	36.08	25.79	25.68	23.88	18.7
DT25 (Watling street/regent street junction)	30.64	32.94	40.02	No data	35.26	34.29	35.70	28.66	33.04	40.63	53.83	35.61	36.42	33.87	33.0
DT26 (Deercote top)	19.34	23.11	21.94	No data	11.86	12.67	14.44	13.39	15.73	21.60	30.19	22.51	18.79	17.47	22
DT27 (Deercote bottom)	19.92	No data	24.70	No data	17.47	14.17	14.11	13.20	16.18	20.73	27.42	23.31	19.12	17.78	19.9
DT28 (Withywood Drive)	16.11	13.15	15.70	No data	11.40	10.44	9.09	No data	No data	No data	19.93	16.32	14.01	13.02	22.6
DT29 (Lawnswood)	15.38	16.30	14.64	No data	10.55	9.78	9.34	No data	9.54	14.15	20.18	15.84	13.57	12.62	15.2

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

With reference to Local Air Quality Management Technical Guidance (TG16) February 2018, the Bureau Veritas and Air Quality Consultants NO_2 fall off with distance from roads calculator was used to distance correct the bias adjusted data (DEFRA, 2018). This was undertaken through the application of kerb distances from the measurements made and relevant receptors and using the estimated 2018 Background Air Pollution Maps for Telford and Wrekin and applying the bias adjusted 2018 annual mean data.

Only one monitoring location (Withywood Drive) captured less than 75% data during the 2018 monitoring period. In total a 66% data capture was achieved. The location has been monitored for a period of two years where the bias adjusted data has been 10.60 µg/m3 in 2017 and 13.02 µg/m3 in 2018 at the monitoring location and 22.6 µg/m3 at the nearest relevant receptor. Similar low concentrations have also been captured at other nearby monitoring locations such as Lawnswood and Deercote. It was decided that as the NO_2 levels at this location are considerably below the NAQO, annualisation would not be applied as it would not have made any considerable effect on this result. This location will not be monitored during 2020 due to these low concentrations.

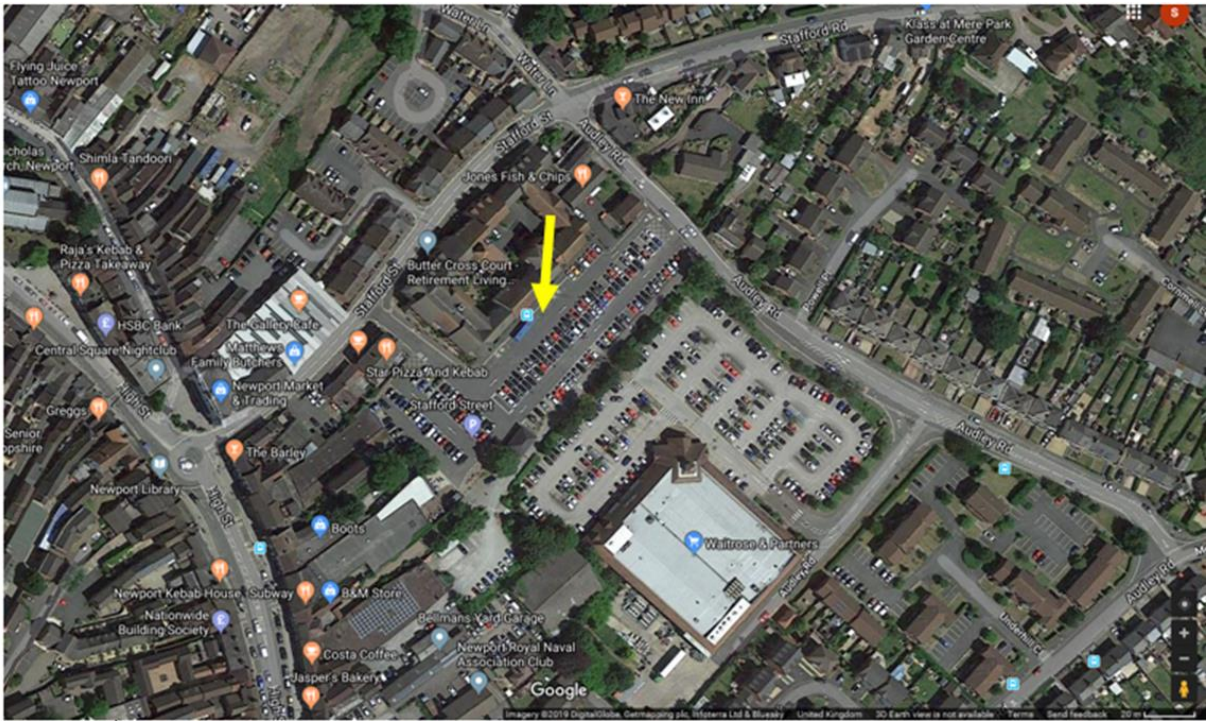
Telford and Wrekin Council currently do not undertake any dispersion modelling as we have not identified any locations where modelling would be of benefit i.e. to declare an AQMA.

The bias adjustment factor used to adjust the 2018 raw data was the National Diffusion Tube Bias Adjustment Factor for Gradko 20% TEA in water available on spreadsheet version number 03/19. The Bias Adjustment Factor (A) (Cm/Dm) for this tube type is 0.93 which has been applied to this year's raw data. This is available here https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html.

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

Below are aerial photographs taken from Google Maps showing the location of each monitoring location indicated by the yellow arrow. Locations that have not been monitored in 2018 have not been included.

DT1 Newport Car Park

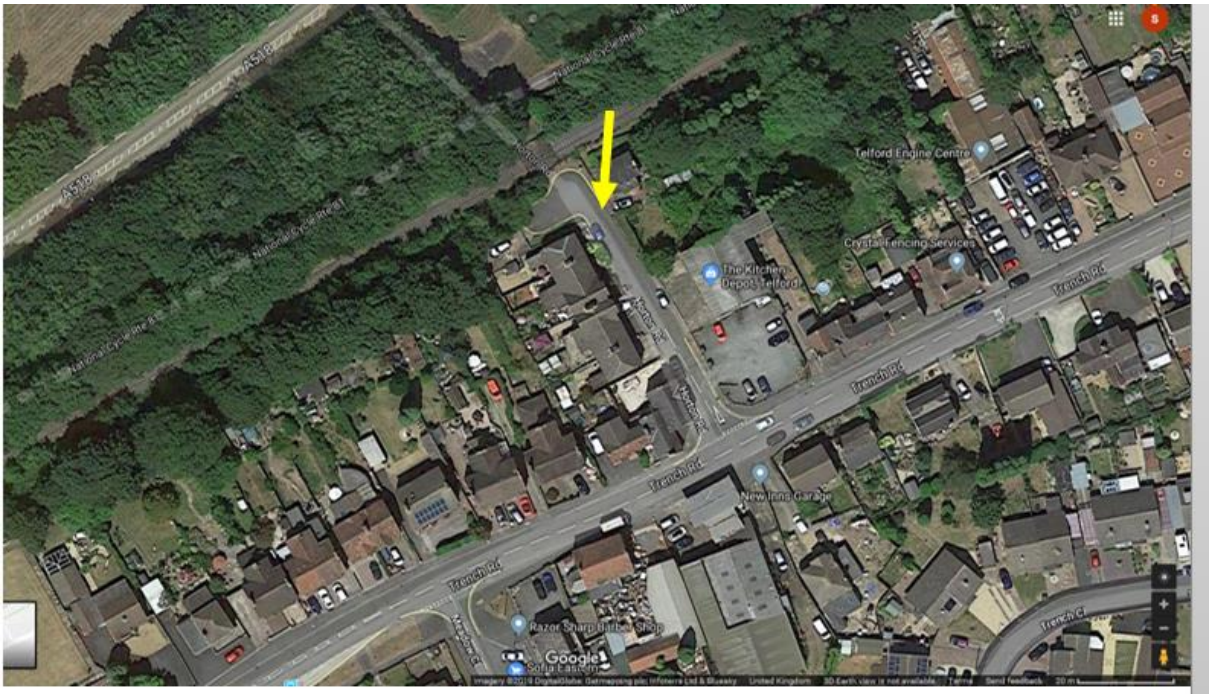


DT2 Barrack Lane

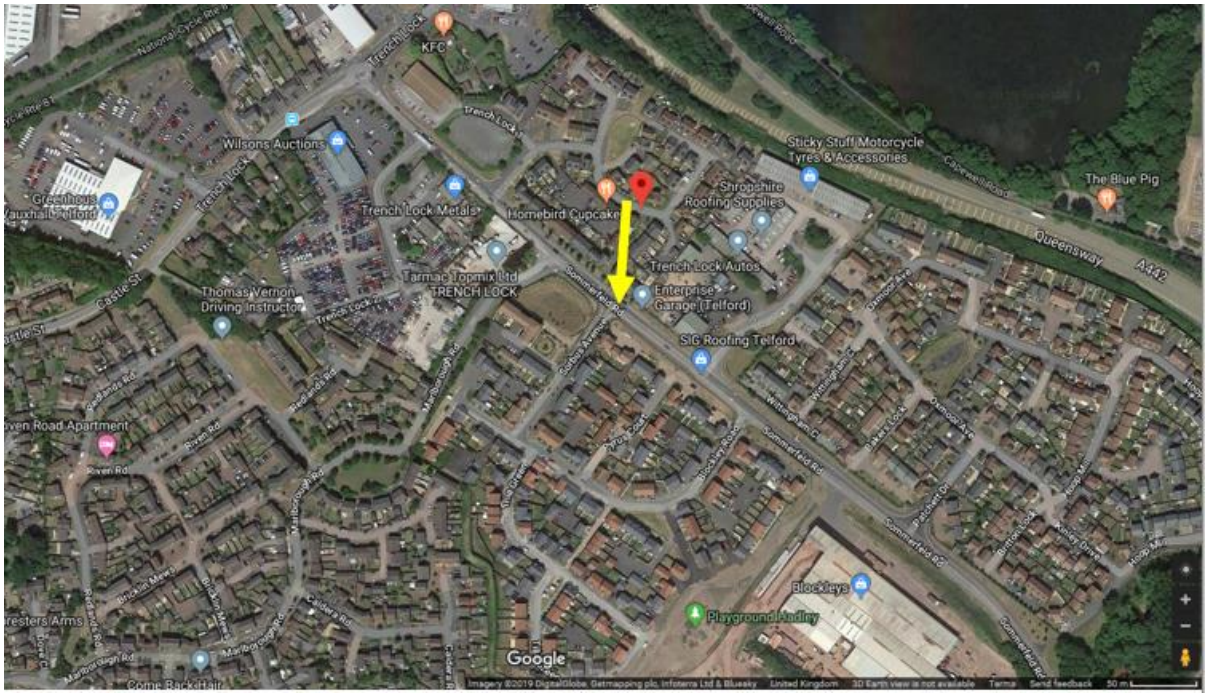
DT4 Richmond Avenue

DT5 New Road

DT6 Horton Road



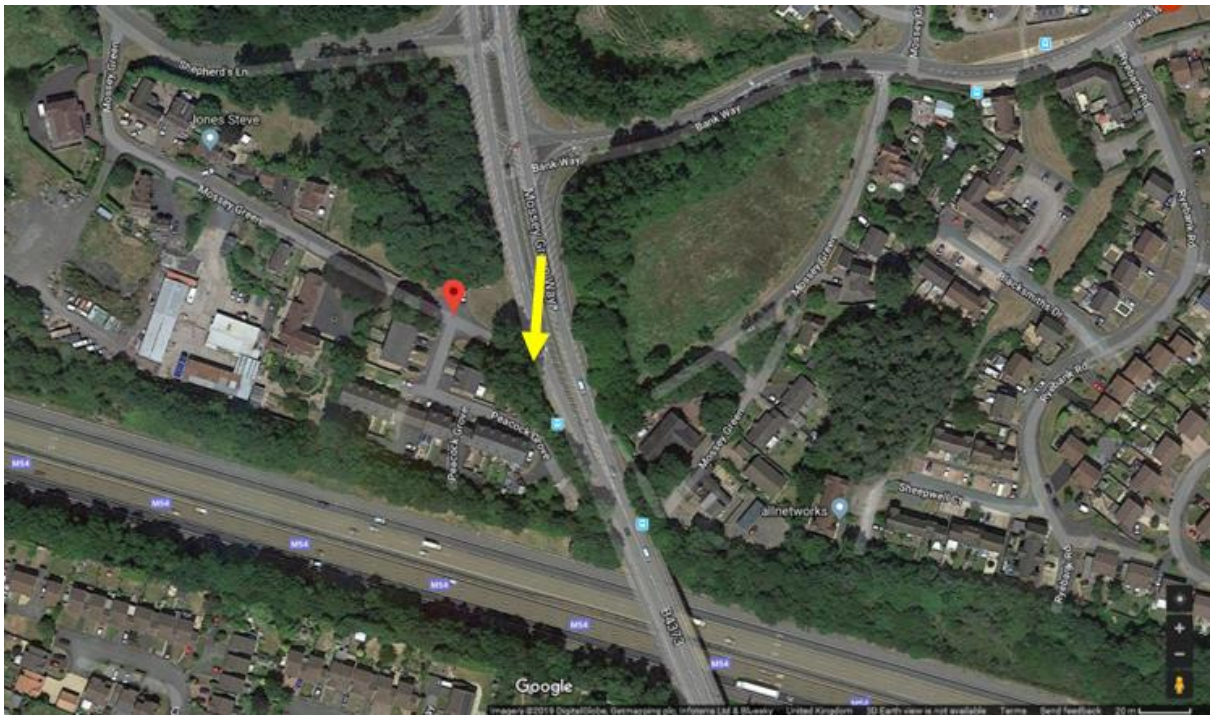
DT7 Sommerfield Road



DT9 Apley Avenue

DT10 Watling Street (outside swan)

DT12 Mossey Green Way



DT13 Shifnal Road

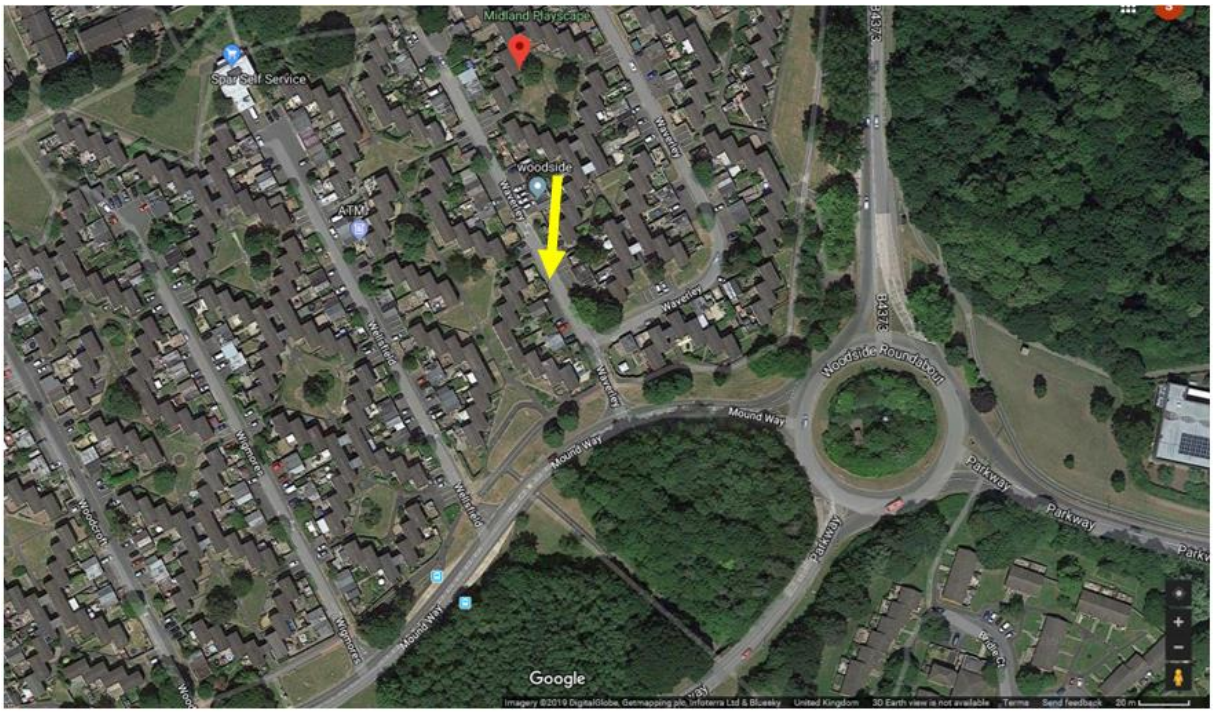
DT14 Checkley Lane

DT15 Newdale/Lawley Junction

DT16 Dudmaston

DT17 Coach Central

DT19 Waverly



DT20 Madeley

DT21 Watling Street

DT22 Mill Bank

DT23 Holyhead Road

DT24 Dawley Road

DT25 Watling street/regent street junction

DT26 Deercote (top)

DT27 Deercote (bottom)

DT28 Withywood Drive

DT29 Lawnswood

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan – A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NAQO	National Air Quality Objectives
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
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
SO_2	Sulphur Dioxide
ULEV	Ultra-low-emission-vehicles

References

Department for Environment Food & Rural Affairs (DEFRA) (2018) *Part IV of the Environment Act 1995 Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management Technical Guidance (TG16) February 2018* [Accessed 1st June 2019] Available at: https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

Department for Environment Food & Rural Affairs (DEFRA) (2019) *National Diffusion Tube Bias Adjustment Factor Spreadsheets* [Accessed 02nd June 2019] Available at: https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html.