Impact of COVID-19 on LAQM

IAPSC 2021

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Bio

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Max is a Principal Air Quality Consultant, having joined AECOM in 2017 after nearly 5 years at Bureau Veritas, where he worked shortly after finishing a degree in Geography at the University of Southampton.

Professionally, Max works mainly in the field of local air quality management and compliance assessment. As a result, over the course of his career he has gained extensive experience developing, interpreting and applying technical guidance.

His interests outside of work are related to all things active, from marathon running to hacking his way round a golf course.

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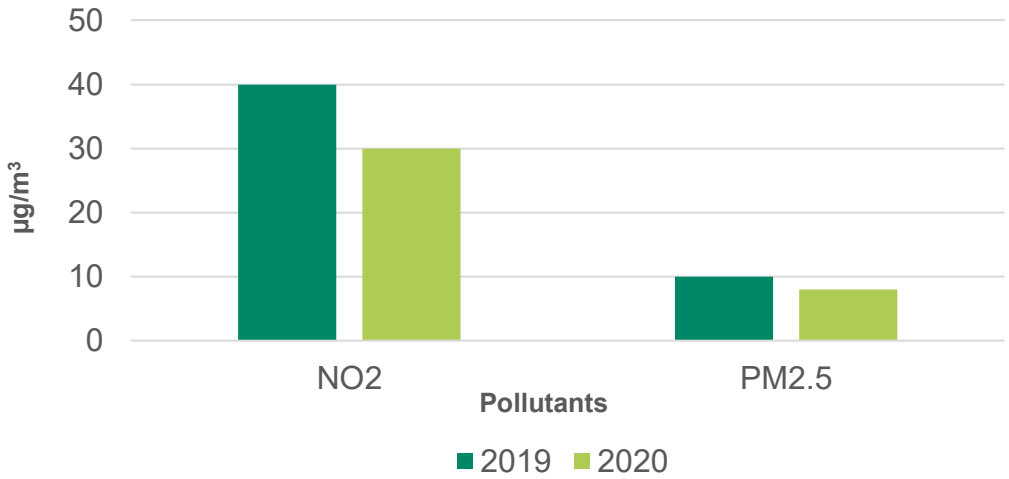
Context

Outlining the background to the issues, and their perceived impacts on the LAQM regime

Pandemic Lockdown Impacts on Air Quality

- DfT data suggests reductions in vehicle traffic of up to ***70%*** were experienced across the UK in initial 2020 lockdown, relative to pre COVID-19 levels
- AQEG estimated that during the initial lockdown period in 2020, NO_2 annual mean concentrations were between ***20 and 30% lower*** relative to pre-pandemic levels, which represents an absolute reduction of between ***10 to 20µg/m³***
- Changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local and regional sources, often from well beyond the UK. AQEG estimated that $PM_{2.5}$ concentrations during the initial lockdown period were between ***2 to 5µg/m³ lower*** relative to those that would be expected under normal conditions.



Anticipated Impacts on LAQM

As well as the impacts on air quality itself, it was feared the pandemic would cause issues with the usual cycle of the LAQM regime itself, including:

- Officer availability;
- Delays to LAQM reporting;
- Status of Air Quality Management Areas (AQMAs) and Air Quality Action Plans (AQAPs);
- Impacts on 2020 monitoring data and how data may be used;
- Diffusion tube bias adjustment; and
- LAQM tools and data quality.

Solutions

Solutions suggested and taken forward

Solutions and Responses

- Survey of LA officers undertaken in early 2021
- Consideration given to the technical implications of the responses
- Deadline exemptions granted where requested
- AQMA and AQAP processes retained
- Bespoke COVID-19 Guidance delivered
- Updated ASR/APR templates provided, including section to discuss COVID-19 impacts
- Including Impact Matrix to describe and compare →
- Additional data processing tools also prepared

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
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Impacts

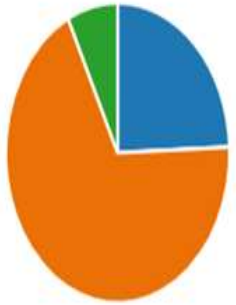
How has it played out?

Survey Responses

19. During 2020, has Covid-19 impacted the data capture of your continuous monitoring?

More Details Insights

Yes	10
No	28
Maybe / Not Sure	3



12. During 2020, has Covid-19 impacted the data capture of your diffusion tube monitoring?

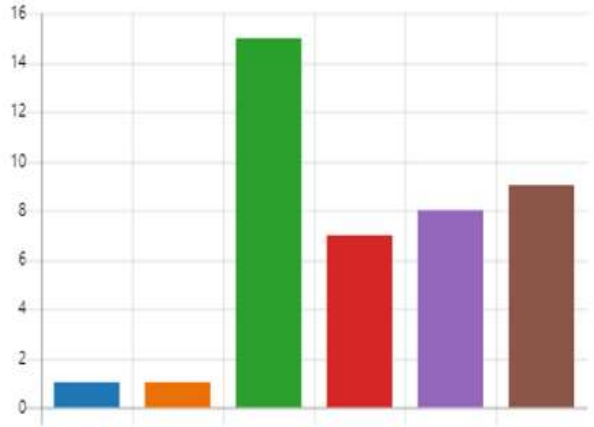
More Details Insights

Yes	34
No	31
Maybe / Not Sure	3

27. Subjectively, what impact has Covid-19 had on your 2020 continuous monitoring programme?

More Details

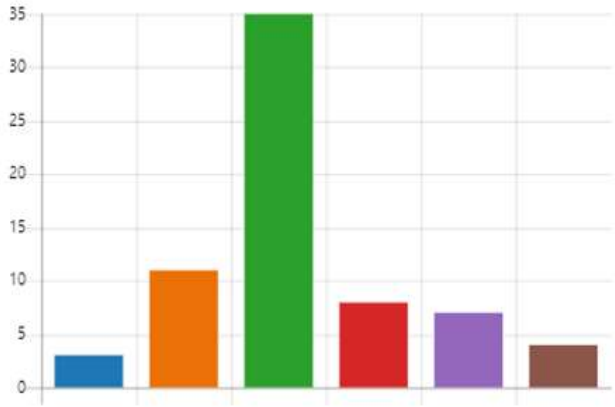
Very large	1
Large	1
Small	15
Very Small	7
Negligible	8
No impact	9



34. Subjectively, what impact has Covid-19 had on resourcing your LAQM statutory duties during 2020?

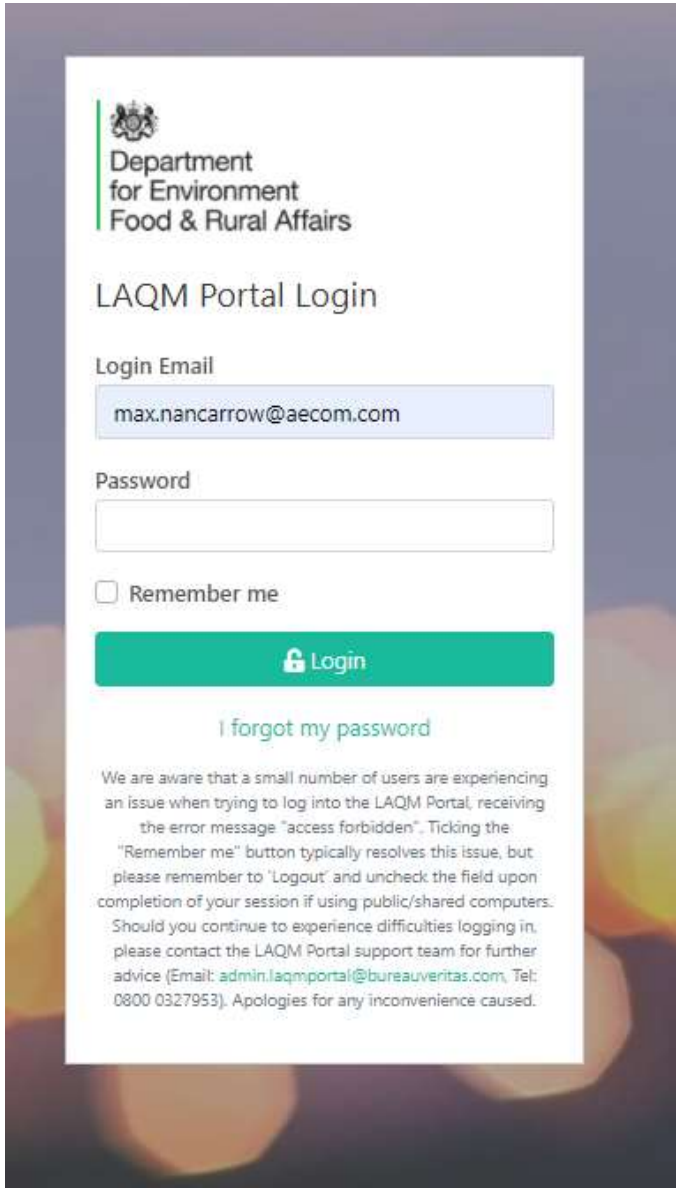
More Details Insights

Very large	3
Large	11
Small	35
Very small	8
Negligible	7
No impact	4



Deadlines & Submissions

- Majority of reporting done to a similar timescale to previous years
- Currently a total of 74% 2021 reports submitted, and 84% 2020 reports
- But versus same time last year, number of submitted reports is actually slightly up (69% last year), indicating LAs are doing better this year
- Last year, 32% reports submitted on time, this year 35% (taking into account extensions)
- A total of 80 extensions to deadlines granted, usually due to lack of officer time. Less than half of those that have requested extensions now submitted
- Still challenges in getting all reports returned. COVID doesn't appear to have affected this too much



COVID-19 Guidance

- The COVID-19 Supplementary Guidance was released in April 2021 detailing how LAs should treat 2020 reporting
- Generally applied, with LAs filling in the voluntary COVID sections, often in considerable detail
- Affords an opportunity for LAs to consider the impacts of specified levels of traffic reductions, if both are recorded in their areas
- The guidance on AQMAs and AQAPs has been applied well by LAs, with decisions based around the context of previous years plus 2020, instead of 2020 in isolation.
- AQAPs were often delayed, especially in London. Re-focus on these in 2022

Covid-19 Supplementary Guidance for Local Air Quality Management Reporting in 2021 v1

Impact Matrix Responses

- Very few ‘Large’ impacts reported, generally
- Indicates a resilient response to the pandemic
- Larger impacts, where seen, tended to be with reduced diffusion tube data capture, and a lack of progression with AQAP measures / delay to new plans

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Tools and Data Quality

- Additional LAQM data processing tools released to help standardise processes (annualisation and data processing tools)
- Partly in response to COVID, but knock-on benefits longer term
- LA data generally reporting lower concentrations, similar to the extent AQEG reported (20-25%) for NO_2
- PM concentrations largely stable, with minor decreases likely not directly related to COVID

- Appendix A within the COVID-19 supplementary guidance contains details on the potential impacts on all LAQM Tools.

Impact Rating	Description
Negligible	Little to no impact and/or easy to address
Small	An impact worth caveating but unlikely to affect overall conclusions
Large	Potentially a large impact on reported concentrations and/or conclusions

- The majority of tools have negligible or small impacts associated with them. However, there are larger impacts for background map concentrations and the Emissions Factors Toolkit

Tools and Data Quality (Cont.)

- Bias factors tended to be slightly lower (especially local factors), likely related to the lower concentrations monitored.
- More studies returned than initially feared, but down on last year.

Diffusion Tube Bias Adjustment Factors 09/21 Issue of the Spreadsheet					
			New (09/21) Update		
Laboratory	Method	Number of Studies 2020	No. Studies VLY	2020 Factor	Change in Factor VLY
Aberdeen Scientific Services	20% TEA in water	7	1	0.78	-0.03
Edinburgh Scientific Services	50% TEA in acetone	5	-1	0.85	0.00
Glasgow Scientific Services	20% TEA in water	9	-2	0.95	0.08
Gradko	20% TEA in water	27	-4	0.81	-0.10
Gradko	50% TEA in acetone	22	-7	0.84	-0.05
Lambeth Scientific Services	50% TEA in acetone	10	1	0.96	0.05
Milton Keynes Council	20% TEA in water	4	2	0.83	-0.01
SOCOTEC Didcot	20% TEA in water	6	-6	0.74	-0.03
SOCOTEC Didcot	50% TEA in acetone	24	-18	0.76	0.01
SOCOTEC Glasgow	20% TEA in water	1	0	0.79	0.00
SOCOTEC Glasgow	50% TEA in acetone	1	0	0.79	0.04
Somerset County Council	20% TEA in water	10	1	0.85	0.02
South Yorkshire Air Quality Samplers	50% TEA in acetone	1	-2	0.77	-0.24
Staffordshire Scientific Services	20% TEA in water	15	-2	0.85	-0.08
Tayside Scientific Services	20% TEA in water	1	0	0.75	-0.05
Number of Studies Included		**143**	-37		

Future

What is to come..

Modelling

- Road traffic dispersion modelling potentially to become a contentious issue, should become more prevalent in coming years as assessment years ‘catch up’
- Using LAQM tools such as BG maps, which assume pre-covid trends, may not perform as expected
- Implications for verification and impact assessment
- 2020 not excluded, provided parameters are adjusted. Sensitivity recommended

2019 Based Verification

2019 NO_2 Monitored Concentration: 50 µg/m³

2019 NO_2 Background: 28 µg/m³

2019 Monitored Road NO_x: 46.6 µg/m³

2019 Modelled Road NO_x: 28 µg/m³

2025 Background: 23 µg/m³

2025 Modelled Road NO_x ‘Do Minimum’: 21 µg/m³

2025 Modelled Road NO_x ‘Do Something’: 22.5 µg/m³

2019 Verification Factor: 1.66

2025 Adjusted Modelled Road NO_x DM: 34.9 µg/m³

2025 Adjusted Modelled Road NO_x DS: 37.4 µg/m³

NO_2 µg/m³ impact in 2025:

Future ‘Do Minimum’ (without measure / scheme)	Future ‘Do Something’ (with measure / scheme	Impact
40.2	41.4	1.1

2020 Based Verification

2020 NO_2 Monitored Concentration: 42 µg/m³

2020 NO_2 Background: 27 µg/m³

2020 Monitored Road NO_x: 30.6 µg/m³

2020 Modelled Road NO_x: 26.5 µg/m³

2025 Background: 23 µg/m³

2025 Modelled Road NO_x ‘Do Minimum’: 21 µg/m³

2025 Modelled Road NO_x ‘Do Something’: 22.5 µg/m³

2020 Verification Factor: 1.15

2025 Adjusted Modelled Road NO_x DM: 24.2 µg/m³

2025 Adjusted Modelled Road NO_x DS: 26.0 µg/m³

NO_2 µg/m³ impact in 2025:

Future ‘Do Minimum’ (without measure / scheme)	Future ‘Do Something’ (with measure / scheme	Impact
35.2	36.1	0.8

Environment Act 2021

- Tighter requirements and greater enforcement on AQAPs
- Official Air Quality Partners to be designated; first authority are National Highways
- Targets/objectives being looked at through secondary legislation, but at least two are required by October 2022, probably around $PM_{2.5}$
- Hesitancy around too stringent a target
- Review the Air Quality Strategy at least every five years
- More funding made available for AQ Grant and supporting community engagement
- Greater powers around smoke control and fuel sales
- Introduces a new power for the government to “compel vehicle manufacturers to recall vehicles and non-road mobile machinery if they are found not to comply with the environmental standards that they are legally required to meet”
- Role of Office for Environmental Protection will be integral

Thank you.

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