

# Air Quality Analysis Report

## EXECUTIVE SUMMARY

- The Council and the pro-closure narrative are unequivocally erroneous in their assertions that air quality along Walton St has “improved” or that Lamppost 18 records/collates sufficient NO<sup>2</sup> data. **The data and other ignored factors highlight the unscientific nature of their very flawed argument.** Only one “diffusion tube” has measured very basic NO<sup>2</sup> data for the whole of the wider Jericho/Walton St area, and only 12 readings for each of 2017 & 2018.<sup>1</sup> Neither has there been any equally important comparative measure of ozone or particulate matter data.
- **Lamppost 18’s diffusion tube is in fact marked in the wrong location** on Oxford Air Quality’s map. Its data is reflective of an entirely different section of Walton St, requiring entirely different interpretation. **This means that Walton Street was doing very well with levels well under current WHO targets, without Local Authority intervention.**
- Instead, **Local Authority intervention has exacerbated and increased traffic and pollution emissions.** The closure of the southern end of Walton Street has been an inappropriate and ill-thought out response based on zero scientific data.
- **The closure of the south end of Walton Street has only “cleared traffic” from one-fifth of the entire length of Walton Street.** It has left the remaining majority – four-fifths – of Walton Street under increased pressure from existing and *intensified chaotic* traffic.
- In other words, one-fifth of Walton Street will have significantly reduced air pollution; the majority four-fifths will have either the same or intensified air pollution. **Closing one-fifth of the short south section of Walton Street has not reduced but chaotically increased, traffic and emissions for four-fifths of the street (“driving the long way round”).** There is no baseline data beyond the ATC on Walton Street in the vicinity of Richmond Road.
- Oxford City Council’s own *2018 Local Air Quality Annual Status Report* states that, at the 71 sites monitored using diffusion tubes in 2017-18, “the majority of the increases and decreases in air pollution levels were within the margin of error of the monitoring method (between 1-2 µg/m<sup>3</sup>), which means that the **NO<sup>2</sup> levels measured at those locations in 2018 cannot be considered statistically significant**”.
- Lamppost 18 only has 12 single data measure points for each of the 12 months of 2017-2018 – with **no correlating particulate matter data; no correlating comparative data from the year before or after; and no comparative data from across Walton St’s arterial web** of capillary roads.
- **This is very, very basic data from just one single diffusion tube across a large socio-ecological area, not the detailed and reliable data from a properly considered survey.**
- This rudimentary data **does not carry enough scientific or statistical weight to draw any closure justifications** – there is no reliable, consistent, comparative or conclusive body of data *for* Jericho to determine the “true” pollution situation *about* Jericho.
- **A single diffusion tube can never capture a true scientific picture of this complex human ecology.**
- This very basic data invalidates the pro-closure argumentation – the 2017 & 2018 µg/m<sup>3</sup> readings are **already well below the regulatory annual objective of 40 µg/m<sup>3</sup> level.** The ill-thought out closure of one short stretch of Walton St also takes into no consideration many other emissions reducing/exacerbating factors or seasonal and ecological factors across the whole area, and those factors’ nuanced significances to their correlate areas.

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<sup>1</sup> The council Air Quality team have refused to release the 2019 NO<sup>2</sup> data before the annual publication data of June 2020 (written communication)

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## THE UNIQUE QUALITIES OF JERICO, AN URBAN VILLAGE

- Jericho<sup>2</sup> is an extraordinary little place – an urban quarter, an urban village – with its own distinct set of historic and contemporary characteristics, sitting with its vibrant charisma within a city centre. Jericho has long had, and still has, a thriving and dynamic socio-economic hub comprising an interdependent community of residents, independent businesses, workers and visitors.
- Everywhere city centres are dying<sup>3</sup>. It is astonishing, illogical and inhumane that Oxford County and City Councils' actions to – randomly and without solid scientific evidence or analysis – shut down one end of Walton St, has very efficiently communicated its shocking lack of technical intellect, sense or sensibility about basic socio-economic survival. Not a single councillor has shown concern to the *democratic majority* of the Jericho community raising their alarm. The Council has effectively attempted to cut it off rather than learn from and harness the extensive knowledge and experience that the local Jericho community has about the life and survival of their distinct and historic quarter.
- The wider Jericho area is like a maze, a web, comprising a unique set of characteristics across two dozen interconnected and interdependent streets. It also comprises a broad socio-demography of residents, workers, businesses and visitors. Walton St is an important arterial road with capillary roads – the area is like a web of veins comprising 11 linking streets (many narrow): Worcester Pl, Richmond Rd, Walton Crescent, Little Clarendon St, Great Clarendon St, Cardigan St, Cranham St, Observatory St, Adelaide St, Plantation Rd, Juxon St). Walton Street also connects to another 10 streets feeding into Kingston Road and connecting to Woodstock Rd and St Giles, associating those residents' direct uses to Walton St.
- The barriers constitute a socio-economic embolism. The blocking of the Walton St artery forced upon Jericho has not reduced the blood flow but sent it on a longer journey: longer vehicular journeys emit more pollution. Cut off an artery and for a while blood moves around. After a while part of the circulatory system just dies off. Walton St and all its interconnected and interdependent roads are a circulatory system that feeds the tiny sustainable economic hub of Jericho, alongside its residential hub – both are reliant upon each other. It seems bizarre that the Council want to cut it off rather than learn from it.
- Across the social sciences, considerable research has been undertaken for decades on areas such as “degrowth”, “rights to the city” and “reimagining the city”. For instance, like many scholars, Professor Cathy Parker<sup>4</sup> and co-Chair of the Institute of Place Management (IPM) which leads the UK Government's *High Streets Task Force*, has long argued that a configuration of practices (accessibility, self-organisation, reproduction and conviviality) infuses urban life with non-capitalist processes and logics, promoting a more humane consideration of the spatial dimensions for more equitable ways of living. Given Oxford Councils are located in and tasked with managing a city eminent for renowned scientific expertise, one wonders how the Councils are managing to ignore the plethora of scholarly expertise to let Oxford City Centre die.
- Everyone in Jericho cares about and wants clear air; no one wants to live in a polluted environment. The socio-demographics of Jericho indicate that a good part of the population have children, suffer from a wide range of health conditions, are “key workers” (NHS, social services etc), are both local and outlying patients

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<sup>2</sup> I use “Jericho” to denote traditional Jericho and “wider Jericho” for the contemporary usage of all the capillary roads and wards connected to and leading into Jericho.

<sup>3</sup> The Guardian research <https://www.theguardian.com/cities/ng-interactive/2019/jan/30/high-street-crisis-town-centres-lose-8-of-shops-in-five-years>; “The Crisis in Retailing” <https://www.retailresearch.org/retail-crisis.html>; BBC News analysis <https://www.bbc.co.uk/news/business-51094109>; Professor Cathy Parker, UK Government *High Streets Task Force* <https://www.gov.uk/government/news/new-task-force-to-help-revitalise-high-streets-and-town-centres>; “ghost towns” <https://www.bbc.co.uk/news/business-47307865>; George Monbiot on “dying Oxford” <https://www.oxfordmail.co.uk/news/17520031.george-monbiot-launches-twitter-rant-dying-oxford/>.

<sup>4</sup> Lloveras, Javier and Quinn, L and Parker, C (2018) Reclaiming Sustainable Space: A Study of Degrowth Activists. *Marketing Theory*, 18 (2). pp. 188-202.

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using these NHS practices, schools, elderly and disabled residents. Having clean air is central to peoples' concerns about their quality of life in Jericho, and that of the next generations.

- Jericho's residents and traders are the "real stakeholders" who have every good reason to protect Jericho's survival. These are the population that deserves and should be given priority consultation in an inclusive and caring manner – not the "interest groups" who have posed as "key stakeholders". They are not a considerable number living in the area. Yet they have substantially managed to "influence" the Councils' decisions to close Walton Street. Neither has a single one of these persons or Councillors bothered to see the data for what it is – astonishingly feeble and inaccurate. Yet these "don't choke Jericho" narratives have become extremely persuasive on Council decisions and councillors themselves. Likewise, neither have the Councils made any effort to engage inclusively with and prioritise the "real stakeholders" – those with residential and working lives directly related to the area and who are taxpayers directly financing local authority infrastructure of the area. Instead, the council has directly and explicitly excluded the *real* stakeholders and leant their ears to external voices who have no "stakeholding" whatsoever in the area. The only voices the local authority has heard are "stakeholders" who have little to do with the everyday life and economy of the area and are nothing more than "interest groups".
- Likewise, the Councils' decision to launch an entirely undemocratic form of consultation that constitutes nothing more than "structural violence" upon its citizen-residents: closing a road, inviting support/objections to be submitted to their online portal, of which none are public during the consultation period. Moreover, it is clear the Councils has attempted to make the decision to close the road and use the consultation responses to modify the road closure to ensure its permanency.
- If the Councils wish to positively enable and secure a socio-economic hub's successful survival, it should reopen the road and start again – *properly*. Any consultation with the **real stakeholders** of Jericho and Walton St should be from a very different starting point, not the "structurally violent", chaotic, confusing and undemocratic action of a local authority suddenly closing a random part of a street off.
- Instead, a *properly inclusive* consultation should be started with the *real stakeholders* that first measures traffic and pollution on every street across the area and survey all the different uses and needs of the real stakeholders – the full range of "base-line data". When this data has been collated, analysed and shared with the real stakeholders, options for traffic calming measures and related measures should be researched and explored *with* the community. They should then have the final decision on what is best to protect and secure their own area's successful sustainability as a unique residential-economic "urban village".

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## 1. The problem of Lamppost 18's location

The Oxfordshire Air Quality website<sup>5,6</sup> locates Lamppost 18 “diffusion tube” opposite the Worcester College car park gates, on the far south side of Walton St with the Ordnance Survey codes (Site DT73: OS 450960, 206590).

However, we have visually located Lamppost 18 outside the Blavatnik building much further up Walton Street (yellow arrow, approx. OS 450838, 206970).

Lamppost 18 data does not capture and reflect air quality at the far south stretch (now closed off/“quiet”) of Walton Street. The data instead reflects a mid-point of the full length of Walton St - a busy locus reflecting the socio-economic hub of Jericho. Moreover, this means traffic – and its emissions – will have only diminished for the short south section of 147.86 metres from Worcester Place corner towards the barriers. This stretch has effectively become a dead-end private car park for residents along that stretch. In so doing, not only has traffic *not reduced* along the remaining *majority* length of 723.77 metres of Walton St from the Worcester Place corner up to the start of Kingston Road, it will have either stayed the same or possibly increased due to the barriers closing off an arterial exit/entry. Consideration must also be given to the chaos caused by a sudden, ill-thought out road closure – residents engaged in citizen science observations have also recorded a considerable increase in dangerous multi-point turns and increased traffic pressure on the very narrow alternative roads in and out of Jericho, as well as new rat-run patterns from drivers reaching the barrier signs, then diverting down Worcester Place and through the residential streets of Jericho. Moreover, what might have been a vehicle making a single pass through the area now has to turn and leave the way it came – creating a second pass through the area and thus emitting a second quantity of polluting emissions.

**Conclusion 1:** The closure of Walton Street has only “cleared traffic” from one-fifth of the entire length of Walton Street. It has left the remaining majority – four-fifths – of Walton Street under increased pressure from existing and intensified chaotic traffic. In other words, one-fifth of Walton Street will have significantly reduced air pollution, but the majority four-fifths will have either the same or intensified air pollution. Closing one-fifth of the closed end of Walton Street did not reduce, but increased, traffic and emissions for four-fifths of the street.

The pro-closure narrative is erroneous in its assertions that air quality along Walton St has improved and that Lamppost 18 accurately reflects pollution on the south side of Walton Street. It unequivocally does not and highlights the unscientific nature of that flawed argument.

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<sup>5</sup> <https://oxfordshire.air-quality.info/>.

<sup>6</sup> See also Government technical guidelines: [https://uk-air.defra.gov.uk/library/reports?report\\_id=399](https://uk-air.defra.gov.uk/library/reports?report_id=399)

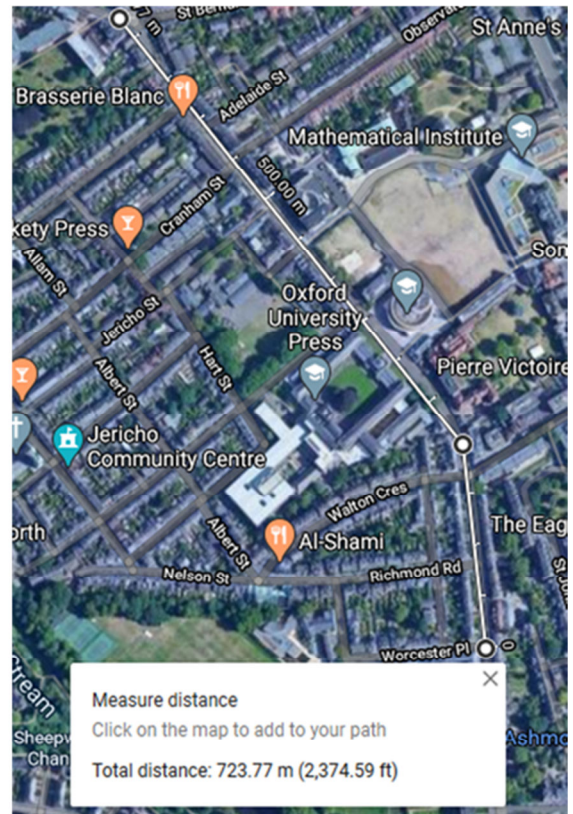
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Incorrect location of Lampost 18



Correct location of Lampost 18 (yellow arrow)



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## 2. The problem with Lamppost 18's diffusion tube

Lamppost 18 is only a "diffusion tube". The Air Quality website says:

Monitoring Passive diffusion tube [...] is a simple and relatively inexpensive device consisting of a plastic tube which can be attached to street furniture (e.g. a street light) allowing a sample of air to be collected (over a recorded exposure period) by diffusion into the sampler. The tubes are sealed and then sent off for quantitative analysis. They give a good **general indication of average** pollutant levels.

There is **no** "Automatic real-time monitor", which offers far more accurate data. The Air Quality website states: "This produces high-resolution measurements over short averaging period e.g. 15 minutes. The air sample is analysed on-line and in real-time. This method offers continuous data, which identifies peaks and troughs during a short period e.g. 24 hours."

The website then says, "Combining [both] these methods gives us a huge amount of data to understand what is happening with the Air Quality throughout the year."

However, the Jericho/Walton St wider area has never had both methods – only one diffusion tube (in the wrong location).

Moreover, in Oxford City Council's 2018 Local Air Quality Annual Status Report, it states on page 22:<sup>7</sup>

Monitoring of NO<sup>2</sup> cannot be undertaken at every location on a continuous basis. The City Council therefore makes the most efficient use of available resources by **implementing a rotational system on a percentage of monitoring sites every year**, ensuring such sites are **covered on average every 2 to 3 years**. One important aspect of monitoring is to be able to demonstrate trends in air quality over long time periods. In order to do so, the City Council continues monitoring at a number of the same sites year on year, so that the results reported can provide a strong basis for showing trends that are independent of location.

This means that there is no Jericho/Walton St data prior to 2017 or after 2018. And there is no consistent, reliable, conclusive data monitoring for the whole of Jericho. All we have is "general" data across 12 single-data points for each 12 months of 2017 and 2018 only.

Oxford City Council's Air Quality website also contains a document *Air Quality Factsheet 1: How to interpret air quality data*<sup>8</sup> in which it makes clear:

If you have air quality monitoring data for a specific location, and you want to use it to assess the status of air quality at that location, it is extremely important that you make sure that you do the **right comparison between the data** that you have and the available limit values for the specific pollutant that you are interest in **so that your conclusions can be considered valid**. For example, if you want to see if your location is in breach of the 1-hour limit value for NO<sup>2</sup> (200 µg/m<sup>3</sup>), you need to have a minimum of one hour of valid air quality measurements. If you want to understand if a location is in breach of the annual mean, you will need **a minimum of 12 months of air quality data**. Air quality limit values are measured as means, so **comparing results that are measured at different timescales** (ex: comparing one minute data against an hourly or annual mean limit value) will not provide you with a picture of whether or not a site is in breach of air pollution limits.

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<sup>7</sup> [https://www.oxford.gov.uk/info/20298/air\\_quality\\_data/1216/air\\_quality\\_annual\\_status\\_reports](https://www.oxford.gov.uk/info/20298/air_quality_data/1216/air_quality_annual_status_reports)

<sup>8</sup> [https://www.oxford.gov.uk/download/downloads/id/6688/air\\_quality\\_fact\\_sheet\\_1\\_-\\_how\\_to\\_interpret\\_aq\\_data.pdf](https://www.oxford.gov.uk/download/downloads/id/6688/air_quality_fact_sheet_1_-_how_to_interpret_aq_data.pdf)

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This again shows that the use of a single diffusion tube (which is also in the wrong location on Walton St) providing data over 2 years (2017 & 2018) does not provide a 'true' picture of air quality in the area.

What it does show, however, is that at the actual location of Lamppost 18's diffusion tube records NO<sup>2</sup> levels far below the acceptable limit. And this actual location is at a mid-point on Walton St, recording a good, 'busy' point of traffic movement – the air quality **is not bad**. Of course a zero reading would be ideal, but that would be achieved only with traffic reduction methods **across the whole area, not just one end** of Walton Street.

**Conclusion 2:** This all means that Lamppost 18 only has 12 single data measure points for each of the 12 months of 2017 and 2018 only – with no correlating particulate matter data; no correlating comparative data from the year before or the two years after (2019 to current; and no comparative data from across Walton St's arterial web of capillary roads. This is very, very basic data from just a diffusion tube, not the detailed and reliable data from an automatic real-time monitor. This data does not carry enough scientific or statistical weight – there is **no** reliable, consistent, comparative or conclusive body of data *for* Jericho to determine the "true" pollution situation *about* Jericho. It therefore is not certainly not enough to base any "big decisions" or declarative "assumptions" about air quality across the whole of Jericho and its residential arterial connecting roads. Jericho is not *just* Walton Street, and Walton Street is not *just* a single road devoid and divorced of anything else. All the roads are geographically, economically and socially interconnected and interdependent. A single diffusion tube can never capture a true scientific picture of this complex human ecology. This very weak, basic data again reiterates that it simply does not provide enough reliable scientific data and is being used very badly and being misrepresented by the pro-closure narrative and the Council's 'justification' text in their ETRO documents.

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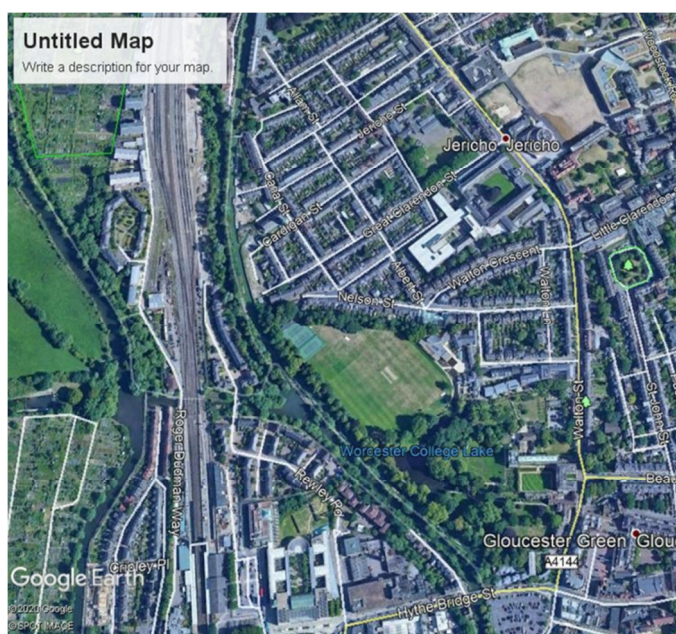
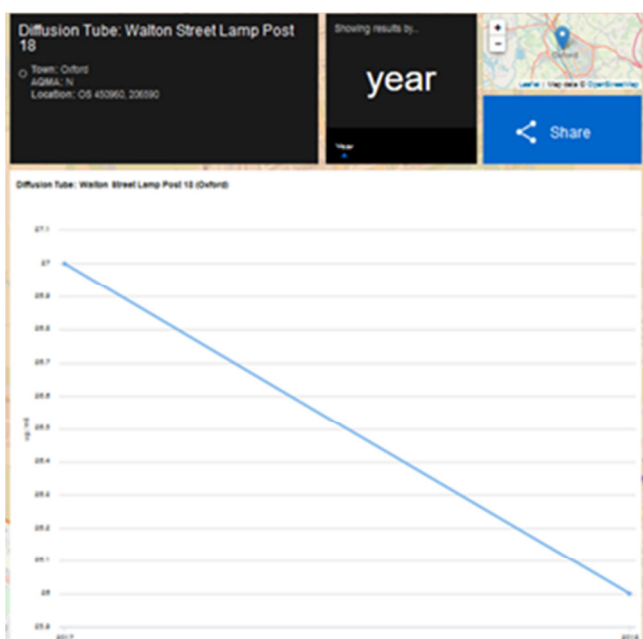
## 3. The problem of Lamppost 18's data

The basic 2017 & 2018 data for NO<sup>2</sup> (nitrogen dioxide) is exactly that – basic. It provides no “reliable base-line data” across a wide area to build up a clear picture of all traffic and therefore, its emissions. This basic data is most certainly not enough to make any *informed scientific analysis*, nor for declarative assumptions of “high pollution” in the Jericho area.

Furthermore, not only does it show a slight decline of 1 µg/m<sup>3</sup>:

- Annual mean NO<sup>2</sup> in 2017 is **27 µg/m<sup>3</sup>**
- Annual mean NO<sup>2</sup> in 2018 is **26 µg/m<sup>3</sup>**

It also shows that the NO<sup>2</sup> level is well below the official UK national “annual objective for NO<sup>2</sup> set at 40µg/m<sup>3</sup>”. While a zero µg/m<sup>3</sup> reading is the ideal scenario for everyone, it takes time to achieve this – not a sudden ill-though out closure of one end of a long street.



Online data graph of NO<sub>2</sub> from 2017-18 for Lamppost 18

Furthermore, as visible in the above satellite map images, the closed stretch of Walton St is close to the large green open space of Worcester College. The closed road simply drives existing traffic “the long way round”, **emitting more pollution**. This is significant: this short closed area of Walton St will enable quicker dispersion of NO<sup>2</sup> with the many trees trapping particulate matter. In contrast, the rest of Walton St is in a densely built up area with much less airflow to disperse emissions and less green space to absorb carbon, give oxygen and trap particulate matters. Lamppost 18 – and therefore its basic 2017-2018 data – is also in this location of less airflow – yet the NO<sup>2</sup> levels are low.

The Air Quality team also clarified to the author:

Question: in your experience, what sort of things could have raised the 2018's NO<sup>2</sup> to the 30's µg/m<sup>3</sup> between the winter months of Jan-March and Oct-Dec, yet April to Sept stayed in the low 20's µg/m<sup>3</sup>?

Answer: NO and NO<sup>2</sup> concentrations generally follow a typical seasonal variation for urban areas with the highest concentrations occurring during the winter months. The highest levels of these primary pollutants tend to occur in the winter months, when emissions may be higher, and periods



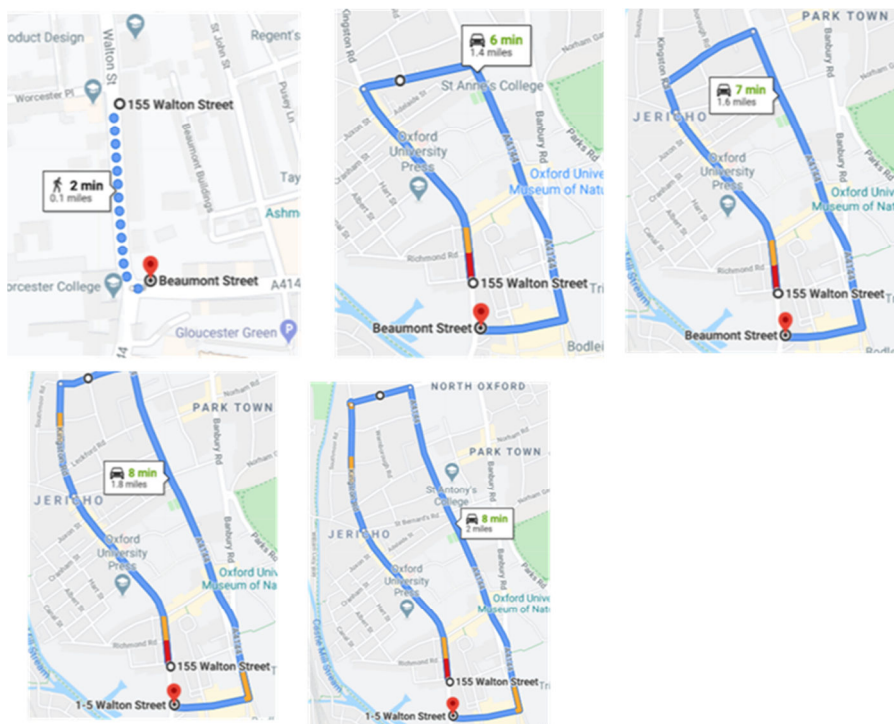
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of cold, still weather reduce pollutant dispersion, leading to pollutant entrapment. During the summer months, the amount of sun and higher temperatures promotes a natural vertical recirculation of air, which leads to a bigger dilution and hence lower concentrations.

Second Answer: you will not be able to draw any valid conclusions by comparing [the month-by-month readings between 2017 & 2018].<sup>9</sup> The only comparable figure is the annual mean. Air pollution is highly dependent on weather, so any monthly mean results that you compare between 2017 and 2018 won't be telling you much, as any particular month might have been very different from one year to the other. For example, if one January was significantly more cold than the other, you will expect concentrations to be higher; but that doesn't necessarily mean that air pollution is getting worse at that location due to traffic etc. It just means that due to weather, the very same air pollution was emitted but had less chance to disperse.

Notably, in the last 2 years Jericho's canal has been subjected to Network Rail cutting swathes of woodland that runs the full length along the canal stretch in order to widen its tracks. This means we have lost a rich arboreal asset – decimating a natural environment and wildlife that should act as an emissions-neutralising, oxygen-giving, carbon-absorbing and particulate-trapping corridor of woodland.

An important issue that has arisen from the closure of one end of Walton St is that the closure has significantly reduced traffic *only on that short stretch* and increased traffic taking "the long way round". Ironically, residents living on that short stretch who support the pro-closure petition are effectively pumping out their vehicle emissions along a far longer car journey...their own emissions are increased in the faces of the rest of the area's residents. The council also placed a road sign instructing drivers reaching the St Bernard's Rd roundabout to use St Margaret's Rd to exit to Woodstock Rd.



Miles	.1	1.4	1.6	1.8	2
CO <sub>2</sub> g/mile	35.3	494.2	564.8	635.4	706
NOx g/mile	6.3	141.75	163.8	182.7	201.6

These figures are based on average vehicles.

CO<sub>2</sub> produced by petrol vehicles  
NOx produced by diesel vehicles

Diesel vehicles account for 1 in 3 vehicles. These vehicles on average currently produce 800mg/km of NO<sub>2</sub> in towns, against the agreed limit of 80mg/km

Calculations kindly provided by Jericho citizen scientist

<sup>9</sup> In other words, this means one cannot compare March 2017 to March 2018, or Spring 2017 to Spring 2018 and so forth.

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**Conclusion 3:** This very basic data invalidates the pro-closure argumentation – the 2017 & 2018 NO<sup>2</sup> µg/m<sup>3</sup> readings are **already well below** the regulatory annual objective of 40 µg/m<sup>3</sup> level. The council refuse to release the 2019 data before the annual report publication date of June 2020. The ill-thought out closure of one short stretch of Walton St also takes into no consideration many other emissions reducing/exacerbating factors – including seasonal and ecological variances across the whole area, and those factors’ nuanced significances to their correlate areas.

Both the pro-closure supporters and the council are together forcing significantly longer journeys and higher emissions. These higher emissions are being forced upon a higher number of residents – a minority benefit while a majority suffer. This is very much reflected in the successful residents-led petition (Jericho Connections) which comprises a full majority of total Jericho residents, compared to the pro-closure petition which has little *local* aggregate support.

None of this bears any relation to the council’s own ETRO justifications that it seeks to reduce traffic and pollution. Instead, it has closed a road to benefit a minority and significantly increased traffic and pathogenic emissions upon a majority. The council’s action is poisoning the air for a majority residential area.

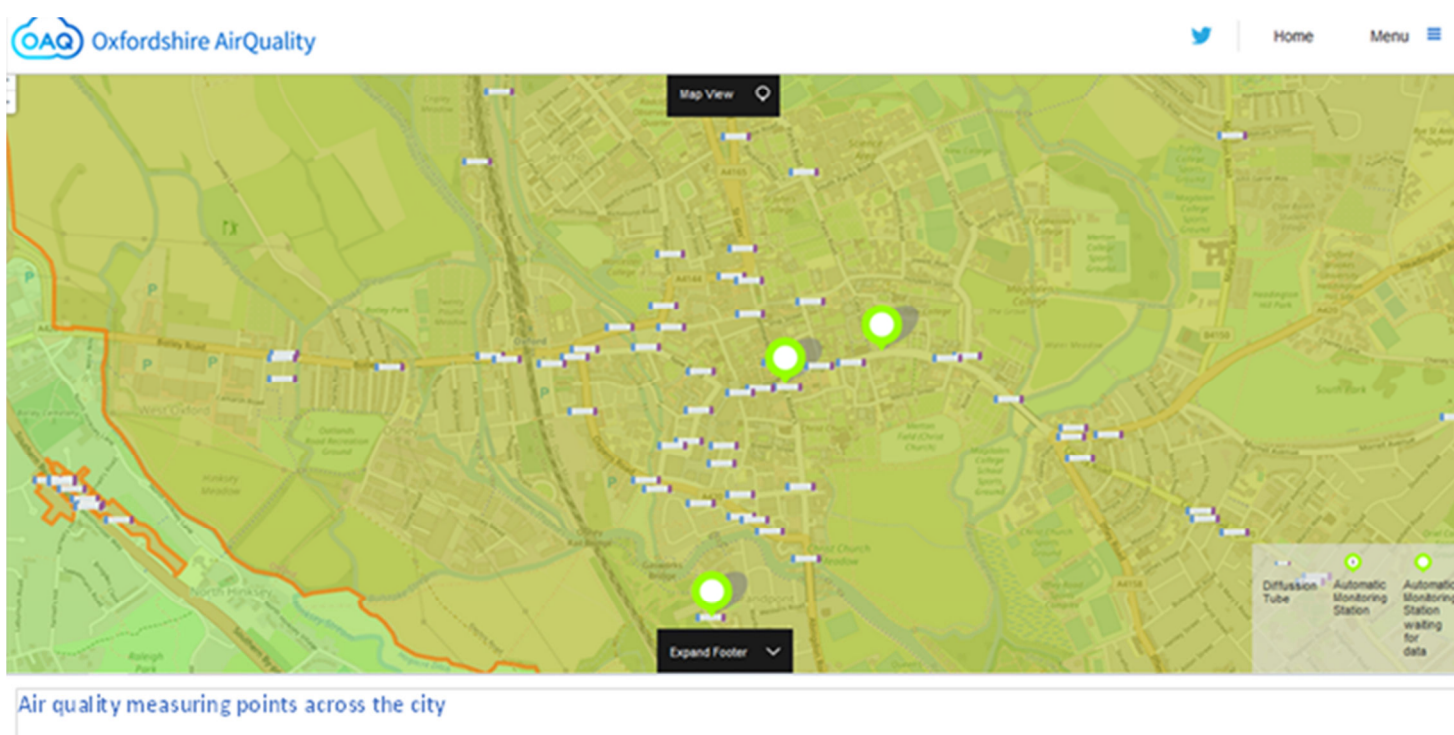
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### 4. Background information: Oxford City Council's 2018 Local Air Quality Annual Status Report<sup>10</sup>

[Author's note: I have selected the relevant sections below from this report]

In Oxford City Council's "2018 Local Air Quality Annual Status Report" (published in June 2019), the following is stated by the council:

- Nitrogen Dioxide (NO<sup>2</sup>) has been monitored by the use of automatic continuous monitors and passive monitoring (diffusion tubes) in 2018
  - o Non-automatic monitoring using diffusion tubes took place at 72 locations [Author's note: only one is on Walton Street]
  - o Automatic monitoring is only in 3 city centre locations
- Ozone (O<sup>3</sup>) is only measured at one station on St Ebbes Street.
- Airborne Particulate Matter (PM10 and PM2.5) is only measured by automatic continuous monitors at two locations: St Ebbes and Oxford High Street.



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- Several studies suggest that **there are in fact no 'safe' levels of air pollution** and that **governments should therefore be aiming for the lowest possible air pollution levels.**<sup>11</sup>

- The city of Oxford, in common with many urban areas throughout the United Kingdom, is subject to poor air quality, particularly in areas with high levels of road traffic. In the city, nitrogen dioxide (NO<sup>2</sup>) continues to be the pollutant of most concern, and transport is the most significant source of emissions of oxides of nitrogen (NO+NO<sup>2</sup>), commonly called NO<sub>x</sub>. **Traffic accounts for 75% of emissions.**

<sup>10</sup> There are four such reports found in this link, for 2015, 2016, 2017 and 2018. Only 2018 contains the Walton Street diffusion tube.

[https://www.oxford.gov.uk/info/20298/air\\_quality\\_data/1216/air\\_quality\\_annual\\_status\\_reports](https://www.oxford.gov.uk/info/20298/air_quality_data/1216/air_quality_annual_status_reports)

<sup>11</sup> See the UK Government's 2019 Clean Air Strategy <https://www.gov.uk/government/publications/clean-air-strategy-2019>

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- The process of review and assessment of air quality in Oxford has been taking place since 1999. In 2010, the whole of the city of Oxford was declared as an Air Quality Management Area (AQMA) and an Air Quality Action Plan (AQAP) was adopted by the Council in 2013.

## Appendix E: Summary of Air Quality Objectives in England

Table E 1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>1</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>2.5</sub> ) <sup>2</sup>	25 µg/m <sup>3</sup>	Annual Mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean
Ozone (O <sub>3</sub> )	100 µg/m <sup>3</sup> not to be exceeded over 10 days a year	8-hour mean

- Air Quality has **significantly improved over the period 2008-2018** in the city of Oxford. Over this period, we have seen **declines of 37% in NO<sup>2</sup> levels and of 25% in Particulate Matter (PM10) levels** in the places where air quality is monitored.

- The majority of the reductions observed over the above period have to do **mainly with significant changes in traffic emissions**. The introduction of a Low Emission Zone (LEZ) for buses in the city in 2014 and the retrofit of several buses to cleaner Euro VI engines (which achieve an estimated 99.5% reduction in NOx emissions compared to Euro V), have contributed to these improvements.

- **Oxford City Council monitored air quality at a total of 72 sites in 2018**. A total of 71 sites were monitored using diffusion tubes and three sites

using continuous monitoring. In two locations air quality was measured using both monitoring techniques.

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- Analysis of air quality data for 2018 show that **the majority of monitoring sites in Oxford continue to improve**. However, the results also show that the rate at which these reductions are taking place seems to have **slowed down in comparison with the previous monitoring year**, and that in some areas of the city, air pollution appears to have plateaued.
- At sites where NO<sup>2</sup> was monitored in both 2017 and 2018, 50% showed improvements in air quality; 20% measured the same levels as the previous year and 30% showed slight increases in NO<sup>2</sup> values. However, the majority of the increases and decreases in air pollution levels **were within the margin of error of the monitoring method** (between 1-2 µg/m<sup>3</sup>), **which means that the NO<sup>2</sup> levels measured at those locations in 2018 cannot be considered statistically significant**.
- Four locations in the city monitored exceedance of the annual mean legal limit value for NO<sup>2</sup> in 2018. This is down from a total of 17 sites just five years ago. In 2018, results also show that PM10 levels reduced in Oxford by 3% and PM2.5 reduced by 9%.
- In addition, analysis of NO<sup>2</sup> concentrations at the two urban background sites (AURN Oxford St Ebbes Primary School and Lenthal Road allotments) seem to indicate a slight increase of urban background levels in Oxford in 2018.
- **Urban background sites** are located away from major roads, which mean that they are not dominated by local, single pollution sources, but rather **by a combination of sources of a much wider area** (e.g. traffic, energy systems, general combustion sources, agriculture, industry, windblown pollution, etc.)

# Air Quality Analysis Report

Page iv :

- Whilst the air pollution **decreases observed throughout 2018** mean that everyone living in or visiting Oxford is now breathing cleaner air than at any given time over the last decade, there is still much that needs to be done. We **need to ensure that air quality levels continue to reduce significantly throughout the city**, and that Oxford's air is not just cleaner, but safer to breathe.

Pages viii : Conclusions and Priorities

The results of the monitoring work carried out by Oxford City Council in 2018 show the following:

1. The **annual mean Air Quality Strategy (AQS) objective for NO<sup>2</sup> is 40 µgm-3**. This objective was met for the second consecutive year at all our automatic monitoring sites: AURN Oxford Centre Roadside, Oxford High Street, and Oxford St. Ebbes. In 2018, Oxford Centre roadside registered an annual mean for NO<sup>2</sup> of 39 µgm-3, Oxford High Street an annual mean of 38 µgm-3, and Oxford St. Ebbes an annual mean of 15 µgm-3. **The results obtained attest for the continuous downward trend that has been observed at those sites since 2012**, with the introduction of the Low Emission Zone.

2. Diffusion tube results show that the annual mean AQS objective of 40 µgm-3 for NO<sup>2</sup> was exceeded at four of the 72 monitoring locations in 2018. This is the same result as that seen in 2017. The locations where the annual mean NO<sup>2</sup> limit value was exceeded in 2018 are: St. Clements Street/The Plain, George Street, Cutteslowe Roundabout and High Street.

3. The AQS **hourly mean objective for NO<sup>2</sup> is 200 µgm-3**, with no more than 18 exceedances allowed each year. Only one exceedance of this value was recorded in 2018. An NO<sup>2</sup> hourly mean of 213.1 µgm-3 was observed at 7am on the 26th November, at AURN Oxford Centre Roadside (St Aldates). This pollution spike was attributed to a vehicle which was in operation in front of the monitoring location. This objective was achieved at all our automatic monitoring sites in 2018.

4. There were five new locations where air pollution was monitored in 2018: Quarry Road, **St Gilles'**, St Clements Street East, **Roger Dudman Way** and **William Lucy Way**. **None of these five locations experienced exceedances of the annual mean limit value for NO<sup>2</sup>.**

5. Half of the sites where air quality was monitored in 2017 registered air quality improvements in 2018. Twenty percent of the sites measured the exact same levels of NO<sup>2</sup> as was measured in the previous year, and 30% of the sites showed slight increases in the NO<sup>2</sup> values measured in 2018 compared to 2017. However, **it is important to highlight that the vast majority of the observed increases and decreases were only of 1-2 µgm-3, which are well within the error margin of the monitoring method. This means that the NO<sup>2</sup> levels measured at those locations in 2018 cannot be considered statistically significant.**

**In Appendix A "Monitoring Results" (page 38):**

*[Author's note: "DT73" is Walton Street]*

**Table A 2 – Details of non-automatic monitoring sites [selected for Jericho relevance]**

<b>DT73</b>	Walton Street LP18	Roadside	450960	206590	NO2	YES	1	1	NO	2.5
<b>DT75</b>	Roger Dudman Way	Roadside	450306	206897	NO2	YES	0	0.5	NO	2.5
<b>DT78</b>	William Lucy Way	Urban B.	450378	207135	NO2	YES	3	20	NO	2
<b>DT76</b>	St Gilles	Roadside	451226	206504	NO2	YES	0	2	NO	2.5
<b>DT45</b>	Worcester St.	Roadside	450942	206424	NO2	YES	2	2	NO	3
<b>DT46</b>	Beaumont St.	Kerbside	451167	206519	NO <sub>2</sub> <sup>13</sup>	YES	2	1	NO	3

# Air Quality Analysis Report

**Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2017 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2013	2014	2015	2016	2017
DT 73	Walton Street (lamp post 18)	Passive	100	100	NM	NM	NM	NM	27
DT45	Worcester Street	Passive	92	92	54	52	50	51	38
DT46	Beaumont Street	Passive	92	92	42	43	44	45	31

No measuring for St Giles, Roger Dudman or William Lucy.

**Table A 3 – Annual mean NO<sub>2</sub> monitoring results**

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
DT73	Walton Street LP18	Passive	100	100	NM	NM	NM	27	26
DT75	Roger Dudman Way	Passive	50	50	NM	NM	NM	NM	20
DT78	William Lucy Way	Passive	42	42	NM	NM	NM	NM	22
DT76	St Gilles	Passive	100	100	NM	NM	NM	NM	33
DT45	Worcester St.	Passive	92	92	52	50	51	38	37
DT46	Beaumont St.	Passive	100	100	43	44	45	31	31

**Table A 4 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2018**

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.89) <sup>*</sup> and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
DT73	30	35	36	26	27	23	19	22	27	30	38	32	28.7	26	
DT75	20	28	32	19	25	20	NR	NR	NR	NR	NR	NR	24.1	20	
DT78	NR	NR	NR	NR	NR	NR	15	21	17	NR	23	28	20.8	22*	
DT76	41	35	40	37	30	27	48	39	37	42	37	38	37.5	33	
DT45	NR	46	45	40	45	40	43	39	43	44	38	40	42.1	37	34
DT46	39	38	40	35	31	25	33	33	33	32	35	37	34.3	31	

Table for 2017 data (provided by Air Quality team via email)<sup>12</sup>

													Annual mean (error margin)														
Walton Street													Raw mean	Bias factor													
LP18													61	64	29	25	30	26	21	22	29	29	33	26	32.9	0.83	Adjusted with 95% CI 27 (26-30)

<sup>12</sup> The reason why the 2017 data is “separate” from the report was explained by the Air Quality team in email communication to the author as: “we have started incorporating the monthly mean averages on the AQAS report for the first time last year, due to specific recommendation from DEFRA to do so. That is the reason why we don’t have it included in the 2017 report.”

# Air Quality Analysis Report

## Data analysis for above Jericho & related-area:

The above very basic data collected in the NO<sup>2</sup> annual mean to be 27 µg/m<sup>3</sup> in 2017 and 26 µg/m<sup>3</sup> in 2018. This shows that NO<sup>2</sup> on Walton Street has been consistently far lower than the key 'congestion streets' of St Giles (DT76), Worcester St (DT45) and Beaumont St (DT46). Walton Street is also well below the national objective of 40 µg/m<sup>3</sup>.

## Data gathering/methodology limitations:

1. On page 60 the report states  
Annualisation  
The annual mean NO<sup>2</sup> has been also annualised for all the cases where diffusion tube annual data capture was below 75%, following the specific annualisation procedure described on LAQM (TG16).  
In 2018, diffusion tube results were annualised at 3 locations:
  - William Lucy Way
  - Roger Dudman Way
  - Churchill Drive/Old Road

This means that we cannot use any data from William Lucy & Roger Dudman Way's. Therefore, for the entire area, we only have Lampost 18 on Walton Street to rely on, which only provides 12 single data-points for 2 years.

However, the Air Quality team informed the author via email:

Question: Am I correct in understanding that this diffusion tube will be on a 2/3year rotation, so there is definitely no data for me to see for 2019 to present?

Answer: Although annual mean NO<sup>2</sup> in previous years at this location have always showed levels significantly below the 40ug/m<sup>3</sup> limit value, we have decided to keep this location in the 2019 monitoring campaign, so you will have an annual mean for 2019 at this location – the new report will be published on our website before the end of June/July 2020

2. On page 57 the report also notes  
On the 1st July 2018, All Souls College in Oxford carried out building work for a 6 month period to the facades of their main building, directly above the location of the council's automatic roadside monitoring station of Oxford High Street. The proposed works involved the replacement of several damaged ashlar and weatherings with new limestone, the dismantling and re-installation of an existing old chimney, and the stonework cleaning of High Street elevation.  
  
During the entire construction period the monitoring station was enclosed inside the scaffolding and hence completely protected from the outdoor environment, due to a plastic sheet installed around the scaffolding to protect members of the public from exposure to dust from the construction site.  
  
The monitoring station was left running during the first 3 months **but had eventually to be shut down, as continued exposure to dust resulting from the construction work were damaging the monitoring instruments and the air conditioning unit.**

## Air Quality Analysis Report

Checking the new Blavatnik School's construction timeframe, it was well before the Lamppost 18 data. However, the new construction at Somerville College carries a correlative timeframe to potential affect Lamppost 18's diffusion tube.

- From Blavatnik website – done before the above 2018 air quality data:

- Construction started in September 2013; completed in November 2015.
- Capacity to host up to up to 550 students, faculty, staff and guests.
- The 'Window to the world' above the entrance is the largest double glazed single pane of glass in Europe (10.5m x 3.2m).
- Access to natural light and air everywhere in the building.
- Exceeds building regulation guidelines for accessibility: 12 wheelchair users can be accommodated in the building at any one time.
- Expected to consume 49% less energy in comparison to existing UK buildings of the same size and use (see below).
- 107 photovoltaic panels.
- 500m<sup>2</sup> green roof.

- From Somerville college <sup>13</sup>:

£11.5m Catherine Hughes building, fronting onto Walton Street, 68 student bedrooms, work started Jan 2018, opened October 2019. Built by Oxford-based contractor Beard – 15m tall structural frame of the Catherine Hughes Building is constructed from cross-laminated timber panels, fabricated off-site and hoisted into position with the use of a tower crane. This method of construction permitted a reduction in deliveries to the site by 80 per cent compared to more traditional methods.

Note also that Somerville are planning a **new building**: “Somerville has ambitious plans for a new building to house the Oxford India Centre for Sustainable Development” and “located on Oxford University's Radcliffe Observatory Quarter, opposite the new Blavatnik School of Government. As well as providing world-class research facilities, the building will include significant public space: it will include a theatre, high-tech conference facilities, an exhibition space and a space for performances or rehearsals”.

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<sup>13</sup> <https://www.oxfordmail.co.uk/news/17920531.11m-somerville-college-student-accommodation-block-oxford-now-complete/> ; <https://www.some.ox.ac.uk/about-somerville/the-catherine-hughes-building/> ; <https://www.oxfordmail.co.uk/news/16957200.crane-vital-part-somerville-college-construction-project/> ; <https://www.some.ox.ac.uk/research/oxford-india-centre/new-building/>