XRE comments on the new WHO Air Quality Guidelines, published 22nd September 2021

Expansion of Bristol Airport to 12mppa – Planning Appeal
PINS Ref APP/D0121/W/20/3259234

1.0 Introduction

We refer to paragraph 2.1 of Ms Beth's proof of evidence that referenced Policy CS26 entitled *Ensuring Safe and Healthy Communities.*

2.0 The WHO Guidelines

2.1 The introductory paragraph of the covering letter with the WHO guidelines states: '*The new WHO Global Air Quality Guidelines provide clear evidence of the damage air pollution inflicts on human health, at even lower concentrations than previously understood. The guidelines recommend new air quality levels to protect the health of populations, by reducing levels of key air pollutants, some of which also contribute to climate change.*'

2.2 The WHO guidelines (at https://apps.who.int/iris/handle/10665/345329) cover excess exposure to the following pollutants; Particulate Matter ($PM_{2.5}$ and PM_{10}), Ozone ($O_{3)}$, Nitrogen Dioxide ($NO_{2)}$, Sulfur Dioxide ($SO_{2)}$ and Carbon Monoxide (CO).

2.3 The WHO guidelines are said to be *'qualitative health-based recommendations for air quality management'*. It is also stated that '*exceedance of these guidelines is associated with important risks to public health'*.

3.0 Comparison of BAL's measured and predicted levels of pollutants with WHO guidelines

3.1 BAL has submitted evidence throughout this inquiry concerning measured and predicted levels of three of these pollutants: $PM_{10,}$ $PM_{2.5,}$ $NO_{2.}$ The purpose of this paper is to compare the figures for these three pollutants in the BAL figures with the WHO guidelines.

3.2 The new WHO annual guideline figures for recommended maximum exposure (at page xvii of the report) are as follows:

- 5 micrograms per cubic metre of $PM_{2.5}$
- 15 micrograms per cubic metre of PM_{10}
- 10 micrograms per cubic metre of NO_2

3.3 BAL's figures for their own measurement of these pollutants show that they exceed these figures at the vast majority of their own measuring sites. Examples of these measurements exceeding the WHO guidelines are:

3.3.1 **$PM_{10.}$**

The BAL Environmental Statement (Table 8.6 at page 11 of CD2.05.19) shows that the WHO guidelines for PM_{10} have been exceeded for every year since 2012 and the average is 19 micrograms per cubic metre (against the WHO guidelines recommended figure of 15).

In the BAL 2019 Operating Report (at CD14.07 Table 18 page 26) the PM_{10} average figure is stated to be 17.7 micrograms per cubic metre (as against the WHO recommended guidelines of 15.00).

3.3.2 **$PM_{2.5}$**

In the Environmental Statement Addendum (CD2.20.1 Table 7.3 page 104) it can be seen that the $PM_{2.5}$ recorded averages 9.62 micrograms per cubic metre as against the WHO recommended guidelines of 5.00.

3.3.3 **NO_2**

The BAL Environmental Statement (Table 8.4 at page 10 of CD2.05.19) considers the average NO_2 figures from the various monitoring stations maintained by BAL from 2011 to 2017 (the last year when the figures are given). 19 out of the 20 average figures are above the new guidelines and 9 out of the 20 are more than double the new guidelines.

In the BAL 2019 Operating Report (at CD14.07 Figure 10 page 27) BAL records the NO_2 average real-time reading. This exceeds the recommended level in the WHO guidelines, in every documented month. The average figure is 16.6 micrograms per cubic metre (as against the WHO guidelines of 10.00).

The BAL Environmental Statement Addendum (CD2.20.1 Table 7.1 page 100) considers the predicted mean environmental concentrations (PEC) of NO_2 for the 12mppa scenario. Table 7.1 shows that all measurements of NO_2 are more than double the guidelines of 10.00 micrograms per cubic metre and the average is 24.67.

4.0 Health outcomes

4.1 The health impact of these pollutants are also considered in the WHO Guidelines. which looks at 'cause specific mortality outcomes'.

4.2 The health impact of **$PM_{2.5}$**. The evidence for potential links with the considered pollutants is considered from multiple research studies at page 77 of the WHO guidelines. The evidence linking $PM_{2.5}$ and poor health outcomes is rated 'high' for links with circulatory and lung cancer mortality and 'moderate' for non-malignant respiratory mortality.

4.3 The health impact of **PM_{10}**. The evidence for the health outcomes arising from excessive exposure to PM_{10} is considered at page 91 of the WHO guidelines. The evidence is rated 'high' for links between PM_{10} and respiratory mortality and lung cancer mortality and 'moderate' for links with Ischemic Heart Disease (IHD) mortality.

4.4 The health impact of **NO_2**. The evidence for the health outcomes arising from excessive exposure to NO_2 is considered at page 114 of the WHO guidelines. The evidence is rated 'high' for links with Chronic Obstructive Pulmonary Disease and 'moderate' for non-malignant respiratory mortality and acute lower respiratory mortality.