

SLOUGH BOROUGH COUNCIL

REPORT TO: Neighbourhoods and Community Services Scrutiny Panel

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PART I **FOR COMMENT AND CONSIDERATION**

SLOUGH LOCAL AIR QUALITY AND LOW EMISSION STRATEGY

1. **Purpose of Report**

The purpose of the report is to respond to Members concerns regarding air quality within Slough and the harm air pollution is causing local residents and in particular with respect to mortality rates. The following specific questions have been posed:

- 1) Can you please provide details of Slough's air quality management zones?
- 2) Is the air quality improving or getting worse?
- 3) Has any consideration been given to making Slough a low emission zone?
- 4) With the Royal College of Physicians estimating that air pollution contributes to around 40,000 deaths a year in the UK, is there any estimate of how many such deaths occur in Slough?
- 5) How do air quality zones affect planning, both within and outside the Borough. I have in mind the North Pole gravel extraction application to South Bucks. How firmly can and should we deal with a South Bucks application that routes 200 diesel HGVs through an air quality management zone?
- 6) Speed humps; the Government seems to have suggested that they can add to pollution and that consideration should be given to their removal in polluted areas. How might this affect Slough?

2. **Recommendation**

The Panel is requested to note the report.

3. **The Slough Joint Wellbeing Strategy, the JSNA and the Five Year Plan**

3a. **Slough Joint Wellbeing Strategy Priorities**

The Low Emission Strategy currently being developed will contribute towards improving local air quality, reducing road transport emissions and raising

awareness of the effects of poor air quality. The Low Emission Strategy will support the following SJWS priorities:

Priorities:

- Increasing life expectancy by focusing on inequalities
- Improving mental health and wellbeing

Air quality indicators and the Public Health Outcome Framework indicator for fraction mortality attributable to particulate air pollution are reported within the Joint Strategic Needs Assessment that supports the Joint Wellbeing Strategy Priorities.

3b. **Five Year Plan Outcomes**

The Low Emission Strategy will contribute to the five year plan outcomes.

- *Outcome 2: Our people will become healthier and will manage their own health, care and support needs.*

The Low Emission Strategy will devise a communication campaign in collaboration with Public Health to promote awareness of poor air quality, to promote awareness of the Councils air pollution alert system (Airtex), and provide advice and support to vulnerable people to reduce their exposure to poor air quality. In addition, it will promote healthier alternative forms of sustainable transport that will improve health and wellbeing and reduce exposure to high levels of air pollution.

- *Outcome 3: Slough will be an attractive place where people choose to live, work and visit.*

The Low Emission Strategy will promote the acceleration of ultra low emission vehicles, electric vehicle infrastructure, and sustainable travel as well as undertaking a feasibility assessment, if necessary, for implementing a Clean Air Zone/s within Slough to reduce air pollution.

4. **Other Implications**

(a) Financial

There are no financial implications relating to this report.

(b) Risk Management

There are no identifiable risks associated with this report.

(c) Human Rights Act and Other Legal Implications

There are no legal or Human Rights Act implications relating to this report.

(d) Equalities Impact Assessment

There is no identified need to complete an EIA for this report.

5. **Supporting Information**

- 5.1 This report attempts to address several important questions raised by Members on the NCS panel with regards to air quality within Slough. Poor air quality is the largest environmental risk to public health in the UK, with high NO₂ levels exacerbating the impact of pre-existing health conditions, especially for the elderly and children.

Slough AQMAs

- 5.2 The Air Quality Management Areas within Slough are registered on the DEFRA website <https://uk-air.defra.gov.uk/aqma/> and SBC Website <http://www.slough.gov.uk/pests-pollution-and-food-hygiene/air-quality-reports.aspx> and more detailed maps are enclosed with this report (Appendix A). The AQMAs were declared in 2005 (AQMA 1 and 2) and 2011 (AQMA 3 and 4) and an quality action plan was adopted in 2012. To date, no new AQMAs have been declared and none of the AQMAs have been revoked there is a need to amend the AQMA 3 to extend 300m east along Bath Road. The new air quality order for the extension will be completed in 2017. Slough's AQMAs have been declared due to breaches of the annual mean concentrations for nitrogen dioxide (NO₂).

Is Air Quality Improving in Slough?

- 5.3 Air quality trends shall only be considered over a minimum 5 year period to average out any poor performing years due to inclement weather conditions and pollution episodes outside of the region. A comparison of 2015 air quality data with 2011 air quality data indicates a slight improvement in air quality concentrations for nitrogen dioxide at the majority of diffusion tube sites (22 sites located within Slough AQMAs). The average reduction as an arithmetic reduction in percentage terms ranges from (1 to 5%). Currently only two sites within the Brands Hill AQMA (AQMA 2) show a slight increase in air quality concentrations in percentage concentration terms of (0.5 and 1%). More detailed information relating to air quality monitoring and trends is covered within the Annual Status Report 2016. (<http://www.slough.gov.uk/pests-pollution-and-food-hygiene/air-quality-reports.aspx>).
- 5.4 Early analysis of the ratified NO₂ concentrations in 2016 for slough indicates a slight increase in pollution levels when compared with 2015 data. However, the trend analysis has yet to be completed and will be reported within the Annual Status Report 2017 that will be published soon. Particulate (PM₁₀ concentrations) have also showed a slight improvement between 2011 and 2015 at each monitoring station but these sites lie outside our AQMAs. PM_{2.5} concentrations are well below UK air quality objectives and EU limits. In order to meet National Air Quality Standards, at all diffusion tube sites, a reduction of between (2.5 and 55%) in concentrations is required, within Slough's AQMAs. It should be noted that diffusion tube measurements carry an accuracy $\pm 25\%$.

Air Quality Modelling and Low Emission Zones (Clean Air Zones)

5.5 SBC has undertaken air quality modelling (Appendix B figures show the air quality modelling maps 2014) to look at the impact on NO₂ levels by improving the European Emission Standards¹ of conventional vehicle technologies and also through the replacement of conventional vehicles with alternative technologies such as electric. The scenario modelling showed:

- The introduction of electric or Euro VI Standard buses would have a noticeable impact on NO₂ levels in the Town Centre (AQMA 4)
- Improving Heavy Goods Vehicles (HGV), Light Goods Vehicle (LGV) and bus emissions to a Euro VI Standard would have a significant impact on NO₂ levels at Brands Hill (AQMA 2)
- Simply switching diesel cars to petrol would have a most significant impact in all the AQMAs.

The modelling will require a further updating to take account of new emission factors and to support a feasibility study into potential for implementation of clean air zones within Slough in order to reduce concentrations below the national air quality objectives.

5.6 Government air quality modelling use their Pollution Climate Mapping approach to report compliance with the UK's EU Directive (2008/50/EC) requirements to report on the concentrations of particular pollutants in the atmosphere. <https://uk-air.defra.gov.uk/research/air-quality-modelling?view=modelling>.

5.7 The Government published its UK Plan for tackling roadside nitrogen dioxide concentrations in July 2017. Slough was not identified as an authority required to take further action to improve air quality. The draft strategy published in May 2017 suggested Slough will be compliant with the EU Directive requirement for annual mean concentrations of nitrogen dioxide by 2020. <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>. SBC did raise representations to advise we felt based on our ongoing monitoring and forecasted traffic growth Slough will not be compliant with EU limits by 2020.

Slough's principal approach to poor air quality (2017-2025)

5.8 The following principal approaches are recommended to improve air quality within Slough:

5.8.1 Improved air quality monitoring data within Sloughs AQMAS (2017-2019). Three new air quality monitoring stations have been installed within AQMA 2 (Brands Hill), AQMA 3 (Tuns Lane) and AQMA 4 (Town Centre) and are currently been commissioned and tested. These sites should become fully operational before the end of 2017. These air quality monitoring stations will significantly improve the accuracy of our monitoring data (accuracy \pm 10%) and allow for more detailed trend analysis. Two existing monitoring stations within Pippins School, Colnbrook and Chalvey Transfer Station will be replaced with new air quality monitors by 2019.

5.8.2 Low Emission Strategy for Slough (2017-2025). We are developing a Low Emission Strategy which will be published and adopted towards end of

¹ <https://www.dieselnet.com/standards/eu/ld.php>

2017. The principal aim of the strategy is to reduce air pollution emissions from road transport sources, as these contribute significantly to poor air quality in Slough. A particular emphasis within the strategy is accelerating the uptake of ULEV (ultra low emission vehicles). We will be consulting internally and externally on this strategy.

- 5.8.3 **Clean Air Zones for Slough (2021 onwards)**. In line with the new Transport Strategy currently being developed as part of the Local Plan process, the Low Emission Strategy (LES) and the Government Clean Air Zone (CAZ) framework, we will look at the feasible implementation of a Clean Air Zone (CAZ) covering the Borough from 2021, subject to annual mean concentrations of nitrogen dioxide (NO₂) breaching EU limits in 2020. The CAZ will require both buses and taxis to meet the latest European Emission Standards (Euro 6/VI) through the taxi licensing regime and Road Traffic Regulation Conditions, respectively. We will also look at setting a Euro 6/VI Standard for vans and lorries, enforced by automatic number plate recognition (ANPR) cameras. We will consult with local transport operators and businesses as part of the CAZ feasibility study. If feasible the CAZ would require both 'Full Council' and 'Secretary of State for Transport' approval before it could be implemented.

Health Impacts of poor air quality

- 5.9 The Committee on the medical Effects of Air Pollutants (COMEAP) advises the government on all matters concerning health effects of air pollutants. As more and more epidemiological studies are undertaken and reported worldwide into the effects of air pollutants the level of academic knowledge increases too as does the statistical analysis and estimating for mortality and morbidity effects. <https://www.gov.uk/government/groups/committee-on-the-medical-effects-of-air-pollutants-comeap>
- 5.10 It is estimated that the health impact of NO₂ in the UK accounts for 23,000 (9,500 – 38,000) premature deaths (see Table 1), while the combined impact of NO₂ and particulate matter (PM_{2.5}) in the UK is estimated to cause 44,750 to 52,500 attributable deaths per annum, with an annual cost to society of £25.3bn to £27.9bn².

Table 1 – Estimated health impact of NO₂ in the UK (2013 data)

	Central (2.5%)	Low (1%)	High (4%)
Annual equivalent attributable deaths	23,500	9,500	38,000
Annual Social Cost	£13.3bn	£5.3bn	£21.4bn

- 5.11 Studies show that the adverse health effects from short and long-term exposure to air pollution include:

² Tackling nitrogen dioxide in our towns and cities, UK overview document, DEFRA, December 2015,

- Increase in deaths from cardiovascular and respiratory diseases (COMEAP³)
- Increase in coronary events, including myocardial infarction and ischaemic heart disease⁴
- Increase in low birth weight babies (<2500g)⁵
- Increase in childhood asthma development and wheeze⁶
- Inhibits neurological development in children⁷ (it is thought that particulates pass through the olfactory system into the brain where they prevent normal synapse development)
- Inhibits lung function in children, permanently affecting lung capacity⁸

5.12 The World Health Organisation (WHO) classifies diesel exhaust emissions as carcinogenic to humans with evidence linking air pollution with a range of cancers⁹ (lung and bladder in particular). The particulate matter that is of concern to human health is PM₁₀ and below (See Appendix C Figure 7 Particle size relative to human hair). These are particulates that are 10µm or less in diameter.

Slough's Health Impacts of poor air quality

5.13 SBC Public Health has looked at the likely health impact of air pollution in Slough to inform the development of the LES in 2015¹⁰. The report looked at the prevalence of key ill-health indicators and pollution levels in Slough, particularly impacts arising from particulate pollution. It is expected that data on the impact of NO₂ in each local authority area will be published (in next few years) and we will update our assessment of the impact of air pollution on health. The impact of fine particulates (PM_{2.5}) on the health of the residents of Slough is shown in Table 2, below.

Table 2 - Baseline population, modelled population-weighted mean concentrations and estimated effects on annual mortality in 2010 of anthropogenic PM_{2.5} air pollution¹¹

Area	Population age 25+	Deaths age 25+	Mean annual PM _{2.5} (µg/m ³)	Attributable fraction	Attributable deaths age 25+	Associated life-years lost
London	5,330,600	47,998	12.7	7.2	3,389	41,404
East Midlands	3,087,200	40,806	10.1	5.7	2,314	24,016
West Midlands	3,714,533	50,110	10	5.7	2,837	29,897
East	4,042,900	51,211	9.9	5.6	2,844	29,096
South East	5,884,600	74,124	9.7	5.5	4,034	41,729
Yorkshire and the Humber	3,584,267	48,534	9.3	5.3	2,567	26,636
North West	4,733,000	67,871	8.9	5.1	3,427	35,855
South West	3,705,633	52,000	8.2	4.7	2,389	23,779
North East	1,795,267	26,090	8.1	4.6	1,199	12,336
England	35,878,000	458,743	9.9	5.6	25,002	264,749
Slough Unitary Authority	84,700	744	12.1	6.8	51	714

³ <https://www.gov.uk/government/groups/committee-on-the-medical-effects-of-air-pollutants-comeap>

⁴ Cesaroni, BMJ, 2014

⁵ Pederson, Lancet, 2013

⁶ Takenoue, Paediatrics Int, 2012

⁷ Jordi Sunyer, CREAL, PRBB group leader, 18 June 2014

⁸ <http://www.escapeproject.eu>

⁹ http://www.iarc.fr/en/media-centre/iarcnews/pdf/pr221_E.pdf

¹⁰ Report on the likely health impact of air pollution in Slough to inform the LES, SBC, Public health, October 2015

¹¹ <http://www.phoutcomes.info/public-health-outcomes-framework#page/3/gid/1000043/pat/6/par/E12000008/ati/102/are/E06000039/iid/30101/age/230/sex/4>

- 5.14 The preliminary SBC report on the impact of air pollution on health assessed rates of morbidity and mortality for certain illnesses broken down at ward level (Appendix D) contains the relevant data.
- 5.15 The SBC Public Health Report states – “although above findings regarding air pollution and respiratory and cardiovascular health in Slough are suggestive of a general pattern of a disease surrounding areas with poor air quality, it is very difficult to draw direct inferences from these data alone. This is due to multiple confounding factors associated both with disease burden and with poor air quality, such as smoking prevalence, socioeconomic deprivation, etc.
- 5.16 However, given established evidence on the health effects of air pollution, the high levels of pollution in some localities and the wide disparity in cardiovascular and respiratory health across the borough, it is clear that improving air quality in the most affected areas could play an important role in increasing quality of life for people with respiratory disease and reducing Slough’s health inequalities in the long term. This may also offer important economic benefits, in terms of reduced hospital admissions and deaths prevented.
- Adverse health effects of air pollution, particularly those resulting from PM and NO₂, are well established both internationally and in the UK.
 - Robust methods of quantifying the national and local impact of air pollution, and likely impact of reductions in air pollution, have been developed and implemented at a local level.
 - Air quality in Slough is worse than the England average, with very high levels of pollutants concentrated around major roads and transport hubs. Several localities in the borough are exposed to levels of NO₂ that exceed levels recommended by the European Commission.
 - Slough is disadvantaged by a poor respiratory and cardiovascular health profile, with a burden of disease that is higher than expected rates based on regional and national averages.
 - Slough also is affected by large geographical inequalities in respiratory and cardiovascular health, which correlate roughly with areas of high air pollution.
 - The proportion of overall deaths in Slough that can be attributed to particulate air pollution is estimated at 6.8% in 2010 (the estimate was 5% in 2015 but this figure does fluctuate year on year). This is higher than the South East region and England as a whole, and is more comparable to London.
 - Reducing air pollution in the borough provides an important opportunity to reduce the attributable burden of disease and possibly to reduce health inequalities.
 - Established infrastructure for measuring air quality in Slough is an important asset that could facilitate research to evaluate the impact of the Low Emissions Strategy on air quality and health outcomes. This project may be possible with adequate academic and financial support in the medium to long term and would make an important contribution to the evidence base in this area”.
- 5.17 While levels of particulate pollution across the region meet EU Limit Values, there are significant health benefits in reducing particle levels as low as possible. The Public Health Outcomes Framework includes fine particulates (PM_{2.5}) as an indicator for health and SBC is committed to working in partnership with Public Health to continue to reduce levels.

Economic cost of poor air quality and concept of damage costs

5.18 The mortality and morbidity effects of exposure to poor air quality can be translated into an economic cost to society. It is estimated that air pollution imposes a cost of £16 billion¹² per year in the UK. HM Treasury together with DEFRA have developed guidance¹³ on how to quantify the economic impact that policies, plans and projects have on air quality. The guidance uses annual “damage costs” to quantify the impact of different pollutants from different sectors. Transport accounts for the most significant economic impact on air quality with an average “cost” of £44,430 and £25,252 per tonne of emissions for particulate matter (PM) and Oxides of Nitrogen (NOx) respectively. This impact is even greater in urban areas, for example in urban conurbations the damage cost associated with transport rises to £107,965 and £61,365 per tonne for PM and NOx respectively.

5.19 *Cemex Application North Pole Road*

SBC was consulted in October 2016 as a neighbouring authority by Buckinghamshire County Council (BCC) regarding an application to extract 2 million tonnes of sand and gravel, back filling with inert waste and restoration over a 9 year period at Land north of North Park Road, Ritchings Park, South Bucks. The application was made in September 2016.

5.20 In November 2016 SBC objected to the scheme on two grounds:

- Impact on the Borough highways arising from a peak of 226 daily movements of HGVs (113 in/113 out)
- Impact on air quality at key receptors (i.e. residential properties) within the Brands Hill Air Quality Management Area where air quality levels currently exceed the EU Limit Value for nitrogen dioxide (NO₂)

5.21 Following meetings with SBC in early 2017, the applicant (Cemex) and BCC, the highways issues, including vehicle routing, were resolved with the applicant also agreeing to pay £750,000 contribution to SBC for further highways improvements through a Section 278 agreement. The Air quality issues required additional modelling and assessment.

5.22 The Environmental Impact Assessment (EIA) included an assessment of current and predicted future air quality at key receptors in the Brands Hill AQMA both with and without the scheme. Using descriptors for significance of impacts taken from the Institute of Air Quality Management (IAQM) Air Quality Planning Guidance (2015), the EIA stated that the impact of the scheme would be ‘negligible’ at all key receptors in the AQMA. All receptors were predicted to experience annual NO₂ levels well below the EU Limit Value by scheme commencement in 2019.

5.23 Air quality modelling is not a precise science and is highly dependent on the emission factors used within the model and the assumptions around improvements in background air pollution. A key issue is that Government projections for how quickly emission improvements of the national vehicle fleet will materialize are considered over-optimistic. The applicant’s EIA (and 2

¹² <https://www.gov.uk/guidance/air-quality-economic-analysis>

¹³ [Valuing impacts on air quality: Supplementary Green Book guidance, HM Treasury and DEFRA, May 2013](#)

subsequent technical notes required by SBC) did include sensitivity analysis to demonstrate what the predicted levels would be without the modelled emission improvements. For the 17 receptor locations modelled, most were predicted to have either 'negligible' or 'slight' impacts, with impacts at 3 receptors described as 'moderate' where a maximum 0.5 $\mu\text{g}/\text{m}^3$ increase (from 41.8 to 42.3 $\mu\text{g}/\text{m}^3$) was predicted (**EU Limit Value is 40 $\mu\text{g}/\text{m}^3$**). The EIA describes this sensitivity analysis as overly pessimistic.

5.24 While there is uncertainty over the accuracy of the air quality modelling SBC, Environmental Quality Team, felt that a precautionary approach should be adopted and that any increase in concentrations will hinder SBC efforts to improve air quality in the Borough. While the EIA focusses on impacts in relation to the EU Limit value, it should be recognized that increases in air pollution below the Limit Value can still have an impact on health.

5.25 Meetings with SBC, the applicant and BCC looked at measures that could be used to either mitigate and off-set the impact of the development on air quality. It was agreed that all HGVs should comply with European Emission Standard VI (the latest standard) from scheme opening. It is acknowledged that Euro VI produces significant emission improvement in real-world driving conditions. Figure 1 shows the Euro Emission Standards for HGVs and Figure 2 shows how HGVs with different Euro Standards perform in real-world testing.

Figure 1 – Euro Emission Standards for HGVs

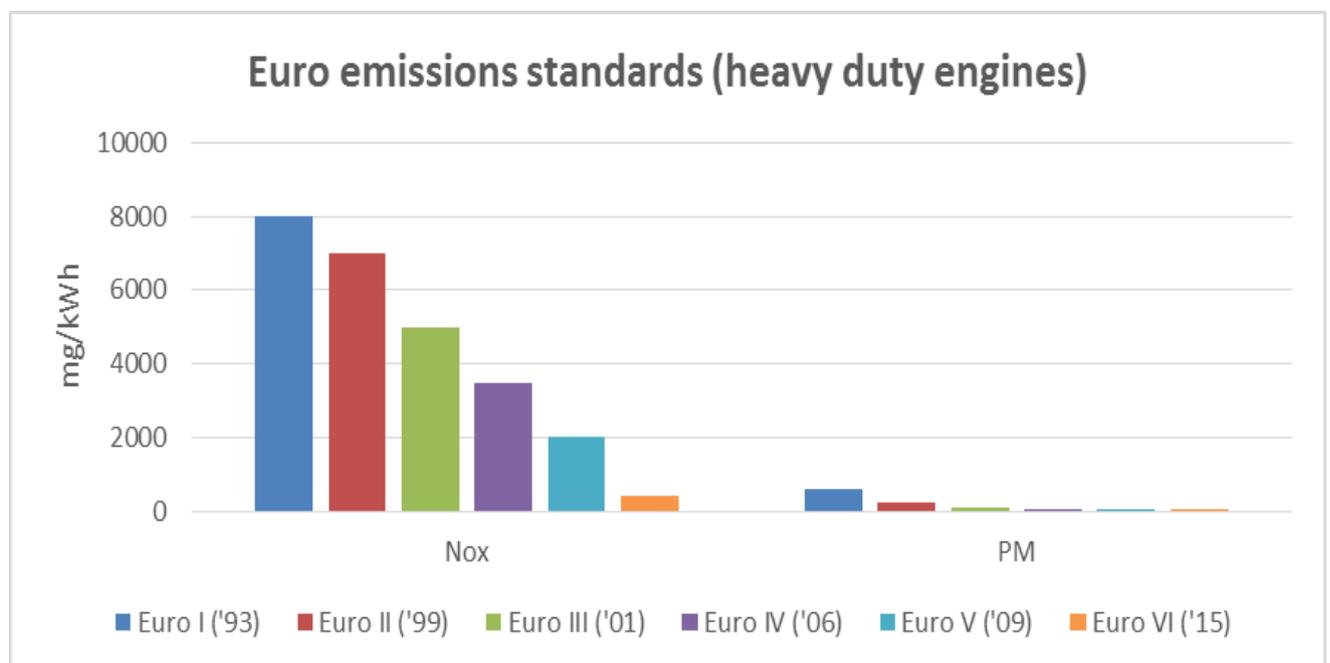
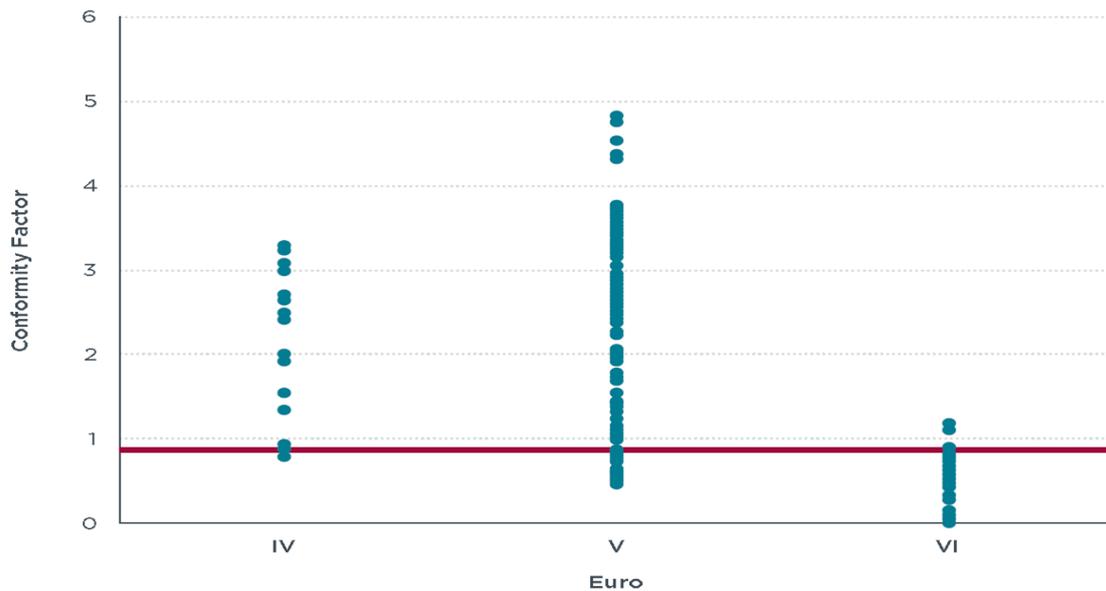


Figure 2 - Performance of heavy duty engines against Euro standards



- 5.26 Additionally, the applicant agreed to compensate SBC for the impact on air quality and damage costs of £50,000 were awarded, to be used to provide EV infrastructure for ultra-low emission vehicles. (Slough has the 3rd highest number of plug-in vehicle registrations by local authority in the Country, with over 3,000 registered vehicles).
- 5.27 Based on the AQ assessments carried out and the mitigation proposed it was considered unlikely that an objection on air quality grounds alone could be sustained at planning inquiry and the objection to the scheme on air quality grounds were removed.

Speed Humps and AQMAs in Slough

- 5.28 There is some indicative evidence that speed humps in urbanised areas with high volume of traffic and narrow roads has the potential to increase NO_x emissions. However, in Slough the NO₂ concentrations are dictated by high levels of road traffic volume on our A roads A4, A335 and A412 and M4. We have no speed humps on these roads and hence there no consideration should be given to removing speed humps on the basis of improving air pollution.

6. **Comments of Other Committees**

The low emission strategy, following an internal and public consultation, will be presented to the Overview and Scrutiny Panel and Cabinet for approval towards end of 2017.

7. **Conclusion**

This report addresses a series of questions, posed by the NCS, relating to air quality within Slough. The report also reports on the development of a low emission strategy to address poor air quality in Slough.

8. **Appendices Attached**

- 'A' - AQMA Maps
- 'B' - Air Quality Modelling Maps 2014
- 'C' - PM10 and Small Particles
- 'D' - Public Health Mortality Maps 2019-2013

9. **Background Papers**

Annual Status Report 2016 (<http://www.slough.gov.uk/pests-pollution-and-food-hygiene/air-quality-reports.aspx>)