IN THE HIGH COURT OF JUSTICE **CLAIM NO: CO/1508/2016**

QUEEN'S BENCH DIVISION (ADMINISTRATIVE COURT)

BETWEEN

THE QUEEN

on the application of

CLIENTEARTH (No. 2)

Claimant

-and-

SECRETARY OF STATE FOR THE

ENVIRONMENT, FOOD AND RURAL AFFAIRS

Defendant

- and -

(1) MAYOR OF LONDON

(2) SCOTTISH MINISTERS

(3) WELSH MINISTERS

(4) SECRETARY OF STATE FOR TRANSPORT

Interested Parties

ANNEXES TO CLIENTEARTH'S SKELETON ARGUMENT

ANNEX 1: GLOSSARY

AQP	Air Quality Plan, required by Article 23 of the Directive.
CAZ	Clean Air Zone. These are geographically defined areas, in which only vehicles complying with defined emissions standards will be permitted for use, without paying a charge, by virtue of national and local regulations. Additional regulatory measures may also be applied to regulate vehicles within the CAZ (Overview Document, Part 3.5 §§74-84) **[A/1/11/179]**.
COMEAP	The Committee on the Medical Effects of Air Pollutants. Comprised of scientific experts on air pollution, it provides independent advice to government departments and agencies on how air pollution impacts on health.

Conformity Factor	The permitted margin of discrepancy between the emissions from a vehicle under real driving conditions and the legally required emission limit. Expressed as the ratio of the emissions under real driving conditions to the emission limit as tested in the laboratory.
COPERT	"Computer Program to calculate Emissions from Road Transport". It is a software tool used to calculate air pollutant and greenhouse gas emissions from road transport.
Defra	Department for Environment, Food and Rural Affairs.
DfT	Department for Transport.
Euro standards	A series of progressively more stringent emission standards for a range of harmful pollutants, laid down by EU regulations. Numbered 1-6 for light duty vehicles and I-VI for heavy duty vehicles. The latest and most stringent standard is Euro 6/VI.
HDVs	Heavy duty vehicles (>3.5 tonnes), including lorries, coaches and buses.
HGVs	Heavy goods vehicles (i.e lorries)
IMG	Inter Ministerial Group for Clean Growth – a cross-departmental Group established in 2015 to discuss air quality issues and policies and the development of the AQP, chaired by Oliver Letwin MP and attended by the SoS as well as officials from numerous departments (NS1, §54) **[A/2/28/854]**.
LAQM	Local Air Quality Management. A system established under the *Environment Act 1995* and associated regulations, under which all local authorities in England, Wales and Scotland are required to regularly review and assess air quality in their areas against objectives for several pollutants of particular concern for human health
LEZ	Low Emission Zone. A term formerly used by Defra and local authorities, denoting a geographically defined zone limiting entry of vehicles which do not meet defined emissions standards. A LEZ has been in place in London since 2008. ClientEarth understands these to be very similar to CAZs. Defra understands these to be more limited than CAZs (which may include ancillary measures).
LDVs	Light duty vehicles, such as passenger cars, taxis and vans.
LGVs	Light goods vehicle (i.e. vans)
Low Emission Strategy	A package of measures to help mitigate the transport impacts of development. The primary aim is to accelerate the uptake of low emission fuels and technologies in and around the development site.

NAEI	National Atmospheric Emissions Inventory. A national database, operated by Ricardo E&E (external consultants) for Defra, which estimates the current levels and trends in emissions of different air quality pollutants and greenhouse gases to support the assessment of impacts on the environment and human health.
NO_x	Oxides of nitrogen, which comprise: nitric oxide (NO) and nitrogen dioxide (NO_2). Road transport is estimated to be responsible for about 50% of total emissions of NOx.
NO_2	Nitrogen dioxide, a combustion gas which is understood to be harmful to human health.
PCM	Pollution Climate Mapping model – developed by the consultants Ricardo and used by Defra to model projections of NO_x emissions.
PM	Particulate matter.
$PM_{2.5}$	PM with a diameter less than 2.5 micrometres (µm).
PM_{10}	PM with a diameter less than 10µm.
RDE	Real-world Driving Emissions. This refers to the level of emissions arising from real-world driving conditions, assessed through on-road driving, using portable emissions measurement equipment, as opposed to the usual method of testing vehicles under laboratory conditions on a rolling road. 'RDE' also refers to the standard of testing of diesel vehicles which simulates those conditions. An EU-wide agreement was reached on the introduction of RDE in October 2015, requiring new *models* registered from 2017 to meet the Euro 6 emission limits under RDE tests (known as Euro 6c) The tests will apply to all new *cars* from 2019. For Euro 6 diesel cars, the permitted margin of exceedance (or 'conformity factor') is 2.1 for the years 2017-2019 and 1.5 for 2020-2021.
TERM	Transport Emissions Roadmap. Air Quality programme developed by Transport for London in 2014 to achieve compliance with the Directive by 2020. **[NS1/1/69-122]**
ULEV	Ultra-low Emission Vehicle.
ULEZ	Ultra-Low Emission Zone. This is a LEZ which will be introduced in London, covering the central congestion charging zone. It is to be delivered by 2019/2020 (the Mayor is currently consulting on whether to introduce this in 2019) (Overview Document, 3.7, §§125-131) **[A/1/11/187-188]**.

VCA Vehicle Certification Agency. UK national agency charged with testing vehicles produced in the UK and certifying them against a number of standards (including emissions standards).

VED Vehicle Excise Duty. An annual fiscal charge applied to cars based on their emissions of grams of CO_2 per kilometre. It is designed to discourage motorists from purchasing and using vehicles with high CO_2 emissions.

ANNEX 2:

FACTUAL BACKGROUND

1. In this Annex, ClientEarth sets out the factual background disclosed in the materials provided by the Defendant ("**the SoS"**).

A. The 2011 AQP

2. As noted at §§45-46 of ClientEarth's Skeleton Argument, the relevant limit values for nitrogen dioxide (NO_2) concentrations in the air were first introduced by EU law in 1999 and to be achieved by 2010, yet the most recent figures - in 2013 – demonstrate that the UK remained in breach in 38 out of 43 zones across the country. The SoS's previous AQP, the subject of the *ClientEarth No.1* proceedings, was published in September 2011.

3. In support of its previous AQP, Defra assessed a number of options across a five-year time period, assuming that the UK would be granted an extension by the Commission (pursuant to Article 22 of the Directive). In a Regulatory Impact Assessment prepared in January 2011 **[NS1/1/1-50]**, Defra noted that "[n]*ormal fleet improvements would deliver slower progress than if Government intervened*" **[NS1/1/1].** Defra was also aware of the limitations of the Euro standards, recording that "[t]*he effectiveness of the emission control technologies is a notable risk with evidence of* [sic] *previous standards have underperformed*" **[NS1/1/2]** (see also §107 **[NS1/1/33]**). Indeed, this was identified as one of the main reasons for "*widespread difficulties in achieving NO_2 limit values*" across the EU (§6) **[NS1/1/8]**.

4. The final 2011 AQP proposed a number of different measures designed to reduce air pollution. This included a commitment to investigate a national framework for Low Emission Zones ("**LEZs**"), which were seen as a "*cost efficient means of achieving significant reductions in NO_2 levels/concentrations*" (NS1, §45) **[A/2/28/854]**. However, Defra failed to develop a national framework, and consequently very few LEZs were in fact introduced across the UK between 2011 and 2015.

B. *ClientEarth No. 1* & Defra action in 2014/2015

ClientEarth No. 1

5. ClientEarth's claim for judicial review of the 2011 AQP was filed on 28 July 2011. The SoS conceded that the UK was in breach of the Directive, but asserted that no further judicial intervention was necessary. At first instance, Mr Justice Mitting concluded that the UK could "*simply admit its breach and leave it to the Commission to take whatever action the Commission thinks right by way of enforcement*"[1]. Following its initial judgment on 1 May 2013 in *ClientEarth No.1*, the Supreme Court decided to grant declaratory relief. It held that "*on the basis of concessions made on behalf of the respondent, the appellant is entitled to a declaration that the United Kingdom is in breach of its obligations to comply with the nitrogen dioxide limits provided for in art 13 of* [the] *Directive*" ([2013] 2 All ER 928, pp.930a-c at [2] per Lord Carnwath JSC). The Court referred a number of questions to the CJEU on the proper interpretation of the Directive and the role of national courts in providing effective remedies where a Member State was in breach, as in the case of the UK.

Commission proceedings

6. Meanwhile, on 20 February 2014, the Commission launched infraction proceedings against the UK relating to the 2011 AQP, on the basis that the UK had failed to carry out its obligations under the Directive (NS1, §21) **[A/2/28/847-848]**. It has also brought infraction proceedings against a number of other Member States on similar grounds (NS1, §26) **[A/2/28/848]**. The threat of the UK being penalised motivated Defra to examine new measures to ensure compliance with the Directive. As noted by Ms Smith, in April 2014 the UK committed to presenting the European Commission ("**the Commission**") with a revised AQP by the end of 2015 (NS1, §21) **[A/2/28/848]**.

7. In an internal Briefing Note dated 31 March 2014, officials noted that "*the issues* [raised by the infraction proceedings] *are complicated and there is no silver bullet which will, on its own, ensure compliance*" (§7) **[NS1/1/52]**. They also made clear their expectation that the

[1] *ClientEarth (No. 1)*, [2011] EWHC 3623 (Admin); [2012] 1 C.M.L.R. 47, p.1392 at [12]. The Court of Appeal adopted the same view ([2012] EWCA Civ 897; [2013] Env. L.R. 4, p.100 at [22] per Laws LJ).

Commission would not push for fines until 2020, based on a statement it had made in its Clean Air for Europe Programme **[NS1/1/52]** (see also, NS1, §27) **[A/1/28/849]**.

8. In reality, in its 2013 Communication[2], the Commission emphasised that:

> "2.2 […]
> The ongoing substantial breaches of air quality standards can be resolved in the short to medium term by effective implementation of existing EU legislation, notably on emissions from light-duty diesels […]
>
> 2.2.4[…] Policy should focus rather on achieving compliance with existing air quality standards by 2020 at the latest, and on using a revised NEC Directive to bring down pollution emissions in the period to 2030. Such emission reductions will in turn drive down background concentrations across Europe, bringing major benefits for public health and ecosystems". (emphasis added)

As is clear from later exchanges in February 2015, Defra officials were aware that the Commission's 'indication' was "*not something that can be legally relied upon*", even if it was "*a date we are basing some of our internal thinking on*" (see **[NS1/1/213]**).

9. In July 2014, Defra had begun gathering information and preparing proposals to improve the future projections of NO_2. In a '*Note on Air Pollution*' prepared for the Prime Minister on 16 July 2014, officials emphasised that "*significant further action will be needed in order to ensure compliance*" (§12) including through measures such as LEZs, retrofitting vehicles, a scrappage scheme and fiscal measures to steer consumers towards low emission vehicles **[NS1/1/60-61]**.

10. In September 2014, the Mayor of London published his "*Transport Emissions Roadmap*" ("**TERM**"), which identified a range of measures, including tightening of the existing LEZ and the introduction of an Ultra-low Emission Zone ("**ULEZ**") in central London, required to potentially achieve compliance with the Directive in London by 2020 **[NS1/1/69-122]** (see FFS1, §31) **[A/2/18/460]**. At the same time, the Department for Transport ("**DfT**") predicted that by 2020 40% of diesel cars would still be operating under old emissions standards (the so-called 'Euro 5' standard) **[NS1/1/126]**.

[2] Communication from the Commission to European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a Clean Air Programme for Europe (COM(2013) 918 final), 18 December 2013, §§2.2 and 2.2.4.

11. In November 2014, external consultants, Ricardo E&E (formerly Ricardo AEA) ("**Ricardo**"), produced a 'Rapid Evidence Review' for Defra **[NS1/5/144-229]**, investigating possible policies which could be used to ensure compliance with the Directive (NS1, §§70-73) **[A/2/28/860-861]**. The Review concluded that "[t]*raffic management and access control measures are a much more direct set of measures to physically remove the source of the air pollution problem* [….though] *they can be expensive to implement* […and] *politically unpopular if not handled sensitively with considerable consultation and engagement*" (§3). Ultimately, the consultants concluded that "*none of these measures* [i.e. the range of measures examined] *on their own are likely to be sufficient to solve air pollution problems* […] *an integrated, comprehensive and potentially radical package of measures will be needed to generate real improvements in air quality*" (§5) **[NS1/5/147]**.

12. At the same time, as noted below (Annex 3, §54 below), Ricardo advised Defra that a number of projection scenarios should be modelled for future air quality, given the growing evidence that emissions standards were not having the anticipated reduction on emissions **[NS1/5/364]**.

13. The CJEU delivered its judgment in *ClientEarth No. 1* on 19 November 2014 (see §18 below).

14. In December 2014, following receipt of Ricardo's analysis, Defra officials concluded that "*the evidence is clear that diesel vehicles are the primary cause of roadside pollution and if we are to be successful we must implement policies that both deliver alternatives and drive their uptake*" **[NS1/1/194]**.

15. In early February 2015, Defra requested information from local authorities **[NS1/5/118-128]** regarding their planned measures designed to reduce NO_2 concentrations in their areas. At the same time, it assessed a range of potential air quality measures and identified pricing (i.e. the adoption of fiscal instruments acting on vehicle/fuel purchase), LEZs and vehicle scrappage as well as measures to accelerate the uptake of low emission vehicles as the most valuable and effective **[NS1/1/210-212]**. The assessment concluded that "[i]*t is clear from the literature a package of measures is commonly implemented, for example a* [LEZ] *can be implemented alongside policies on vehicle retrofitting, vehicle scrappage schemes, grant funding to accelerate the uptake of low emission vehicles and fuels*" **[NS1/1/211]**.

16. As to the timeframe for compliance, officials were "*basing some of* [their] *internal thinking*" on compliance by 2020, although they were aware that the requirement imposed by the Directive was for compliance ""*in the shortest possible time" rather than "2020 by the latest"* **[NS1/1/213]**. At the time, Defra's assessments were based on the introduction of 30 LEZs, i.e. "*one for each infraction zone forecast to be in non-compliance in 2020*" as well as a sizeable scrappage scheme targeted at diesel cars **[NS1/1/367]**.

17. However, further research and preparation of the AQP was put on hold in light of the impending elections in 2015 – officials noted that "[t]*he main thing that will affect* [the UK's] *infraction risk is the appetite of the post Election Government to take substantive action on air quality*" **[NS1/1/262]**.

Judgments of the CJEU and the Supreme Court

18. The CJEU delivered its judgment in <u>*ClientEarth No. 1*</u> on 19 November 2014. It emphasised that the requirement in Article 13(1), §2 for the NO_2 limit value "*not to be exceeded*" amounted to "*an obligation to achieve a certain result*" (at [30]). It went on to find that in cases of breaches of Article 13, a Member State was obliged to produce an AQP which *"complies with certain requirements"* (at [45]) – namely:

> "57 As regards <u>the content of the plan</u>, it follows from the second subparagraph of Article 23(1) of Directive 2008/50 that, <u>while Member States have a degree of discretion in deciding which measures to adopt, those measures must, in any event, ensure that the period during which the limit values are exceeded is as short as possible</u>.
>
> 58 […] it is for the national court having jurisdiction, should a case be brought before it, to take, with regard to the national authority, any necessary measure, such as an order in the appropriate terms, so that the authority establishes the plan required by the directive in accordance with the conditions laid down by the latter" (emphasis added)

19. Upon the return of <u>*ClientEarth No.1*</u> to the Supreme Court on 29 April 2015, the Court concluded that in light of the CJEU's judgment Mitting J's "*position is clearly untenable* […]. *That makes clear that, regardless of any action taken by the Commission, enforcement is the responsibility of the national courts*" ([2015] 4 All ER 724, p.733b-c at [28] per Lord Carnwath JSC). The Court granted a mandatory order requiring a compliant plan to be produced by 31 December 2015, in order to leave the "*new Government* […] *in no doubt as to the need for immediate action to address this issue*" (p.733j at [31]).

C. Preparation of the AQP

20. As noted by Dr Holman, "*it is clear from the evidence that Defra initially considered a wide range of measures for inclusion in the AQP, reflecting a range of scenarios of likely future levels of NOx emissions*", however "*during the course of the preparation of the AQP and discussions with other government departments, the wider range of measures, outside London, was whittled down to one: CAZs in five cities, none of which address pollution from diesel cars*" (CH2, §§8-9) **[A/2/14]**.

Timeframe for compliance

21. The approach taken by Defra was to identify a timeframe in which compliance had – in its view - to be achieved and to work back from that date. So, for instance, in their initial advice to the SoS and the Parliamentary Under-Secretary of State with responsibility for air quality, Rory Stewart MP, on 14 May 2015 Defra officials explained that they had "*used projected exceedances in 2020 as the basis for defining the worst areas. This is based on our understanding that 2020 is likely to be the earliest the EU will move to fines*" (emphasis added) **[NS1/1/536]**. They acknowledged that "[b]*ased on* [their] *most optimistic projections we would need to implement LEZs in 6 major cities to deliver compliance outside London by 2020*".

22. The Secretaries of State for Transport and Defra met on 18 June 2015. Officials recorded their view that "*there is flexibility over where the financial impacts might fall, but* […] *we should look to implement these actions over the next 5 years*" **[NS1/2/83]**. Officials nevertheless were aware that the selection of a particular timeframe for practical reasons was not what was required by the Directive (see the internal emails dated 20 July 2015 **[NS1/2/149]** noting that "[w]*e have had to model a fixed point in time (2020) for practical reasons, but if we get too attached to aiming for that date* […] *there are significant risks around how we are seen to interpret shortest possible time*").

23. On 21 July 2015, at the first meeting of the Inter Ministerial Group for Clean Growth ("**IMG**")[3], Ministers noted that "*the Directive calls for Government to set out their view of the 'shortest possible time' and that* [] *doesn't have to be 2020.* [Oliver] *Letwin* [Chancellor of the Duchy of Lancaster] *was sceptical about how much the Commission would really do in*

[3] An inter-departmental group considering air quality issues and policies – see NS1, §54 **[A/2/28/855-856]**.

light of other events. This was a hugely helpful step forward" **[NS1/2/181]**. Defra's response to questions from HMT on 18 August 2015 illustrated this approach, noting that "[t]*he spend does not have to be over 2 years; 9 years is more realistic given that London does not need to be in compliance until 2025*" **[NS1/3/74]**.

24. The draft agenda for the 2nd Clean Growth IMG on 8 September 2015 recorded that "*scenarios should consider how to interpret 'shortest possible time' for compliance, based on costs and feasibility of action*" (emphasis added) **[NS1/3/138]**. At that meeting, Ministers concluded that "[t]*here is a short term problem to deal with – in developing a plan that would place us on a credible pathway to compliance on air quality targets, which would satisfy the supreme court and Commission. In agreeing this plan HMG would need to consider carefully what the* "shortest possible time" *is in terms of when the UK would need to become compliant (the EU's stipulation), i.e. whether this is 2020 or sometime after, given the significant challenges*" **[NS1/3/140]** (emphasis added).

Scale of the challenge to achieve compliance

25. In the preparation of the AQP, the consistent view of Defra and DfT officials was that substantial measures were required in order to ensure compliance with the Directive. Nevertheless, the core scenario which Defra selected ("**2015 AQP**") in May 2015 to model the likely NO_2 levels in 2020, 2025 and 2030 was viewed as the "*best option*" despite its optimism and the "*uncertainties and range of possible outcomes*", in particular "*doubts cast on the COPERT factors by DfT*" **[NS1/1/527-528]**. As noted below (Annex 3, §§58-59), the 2015 AQP scenario assumed that the relevant conformity factors for the Euro 5 standard would be 3.6 and for Euro 6 would be 2.8 **[NS1/1/526]**. Recent figures have shown that a conformity factor of over 6 for Euro 6 would have been more accurate (CH2, §99 **[A/2/31/997]** and Exhibit CH2/E (§§5.21 and 5.24) **[A/2/36/1108-1109]**). This most closely resembles the scenario proposed by DfT at the time (scenario F), and which led to much more pessimistic predictions: 34 zones would not be compliant by 2020 **[NS1/1/527-528]**.

26. Defra's initial view of the likely scenarios of emissions levels as well as action needed for compliance was clearly identified in May 2015: (i) the "*most optimistic projection*" required LEZs in 6 major cities outside London to deliver compliance by 2020, (ii) a "'*most likely' scenario*" would include "*wider LEZ use in 16 cities outside London* […] *and a*

package of wider national measures […such as] *scrappage or tax measures*" and (iii) a scenario giving "*'high confidence' of compliance*" would include LEZ in "*21 cities with more stringent requirements, supported by wider national incentives*" **[NS1/1/536-537]** (see also NS1, §147) **[A/2/28/884]**.

27. Defra's and DfT's plans were shared to a group of officials from a number of departments in June 2015 **[NS1/2/35a-k]**, and later to the IMG in July 2015 **[NS1/2/141a-o]**. They emphasised the importance of the assumption that the Euro 6 standard would be effective and that the introduction of 7 CAZs was seen as the "*Minimum*" option**.**

28. As of 26 June 2015, Defra and DfT's Secretaries of State were of the joint view that the UK faced "*a significant delivery challenge*" and proposed "*a framework of* [CAZs] *targeting voluntary uptake in around 20 of our most polluted towns and cities*" **[NS1/2/101].** Moreover, they estimated that "*9 of the zones may need to cover all vehicles*" although the proposal was to "*initially exclude*[] *cars and vans* […until] *we are confident of the real world performance of the emissions standard*" **[NS1/2/102]**. However, officials recognised that the proposal did not "*feel* "proportionate" – *not enough proactive steps* [were] *being taken to address the issue, rather leaving it up to LAs to decide whether they want to take our offer*" **[NS1/2/104]**.

29. In a paper produced around this time, Defra's proposals consisted of 20 CAZs, including 10 concerning all vehicles (i.e. including cars) **[NS1/2/141g]**. Defra continued to identify three alternative scenarios: a "*minimum*" of 7 CAZs, a "*medium*" range of 13 CAZs and the "*ideal*" scenario of 19 CAZs **[NS1/2/141o]**. Other departments noted that other than CAZs, Defra's plans for consultation included "*measures introduced since the baseline year of 2013*" such that the "*majority of measures* […] *have already been announced*" **[NS1/2/184]** (see also §6 of the internal email on 21 July 2015 **[NS1/2/209]**: "*the national plan mostly focuses on existing and planned measures*").

30. At the first IMG on 21 July 2015, officials from other departments expressed concerns about possible "*impacts on motorists and the [motor] industry*" **[NS1/3/140]**. As a result of these concerns (see, e.g. §1 of the Briefing to Anna Soubry MP dated 17 August 2015 **[NS1/3/69]**), by August 2015, Defra had concluded that achieving compliance could be "*done without a scrappage scheme*" and it was "*credible to address the problem without low*

emission zones for cars so long as enough is done to tackle other diesel vehicles especially in Leeds and Birmingham" **[NS1/3/3-4]**. However, it recognised that "*taking a 6 English city approach* [meant] *we are bearing more risk on the other zones outside of these*". Officials identified "*a number of local schemes in place which combined with the increased drive for national fleet turnover will help mitigate some of this risk*" **[NS1/3/4]**. Defra's revised plans on 6 August 2015 recommended that access restrictions for diesel vehicles should be introduced in the six "*key cities*" of London, Nottingham, Derby, Birmingham, Leeds and Southampton – these were the "*minimum number that need to be addressed to bring the UK into compliance*" **[NS1/3/77]**. This proposal envisaged vehicle access restrictions for cars in Birmingham and Leeds **[NS1/3/17 and 19]**.

31. Ultimately, Defra – supported by the Department for Transport ("**DfT**") - recommended a plan to other Ministers (including HMT) which consisted of CAZs in five cities other than London, as well as endorsing the Ultra-Low Emission Zone ("**ULEZ**") proposed by the Mayor of London for introduction in the city in 2020 (see letter of 3 September 2015 **[NS1/3/190-191a])**. This was the proposal included in the public consultation, launched on 12 September 2015.

32. However**,** Defra's view was that "*the current plan represented the back stop option to tackle air quality which has already been pared back considerably*" **[NS1/3/168]**. Indeed this view persisted until late September 2015, when the introduction of 7 CAZs was seen as the "*Minimum*" option, "*extremely unlikely to deliver compliance by 2020*" **[NS1/3/335-337]**. An internal note to the Prime Minister recorded that the draft AQP was still "*very much a draft*" which did "*not even begin to tackle the fundamental question of how we might help people to shift away from diesel cars*", and noted that it may be necessary to "*consider a bigger diesel scrappage scheme and look at the balance between diesel and petrol in the tax system*" **[NS1/3/353-354]**.

33. In October 2015, Defra conducted further modelling of different scenarios after it received the results of its initial modelling exercise from Ricardo. These demonstrated that if the Euro 6 and Euro 6c standards were not effective, a substantial number of CAZs would be needed **[NS1/4/81-86]**. When officials were asked about the possible impact of local measures, they indicated that it was not possible to model this as it

"*requires a range of local information, and more detailed modelling*" **[NS1/4/13]** (see NS1, §§49 and 66) **[A/2/28/855 and 859]**.

34. Other departments continued to have reservations, based on the implications for local authorities, commercial vehicles, the potential '*anti-diesel*' message to the UK car industry and the proposed costs (see the summary at **[NS1/3/129]**). HMT, in particular, gave only conditional approval to the publication of the draft AQP, emphasising that "*measures included in the final Plan provide the least cost path to compliance*" (see the letter from Damian Hinds to George Osborne and Oliver Letwin) **[NS1/5/349-351]**. This reflected the Chancellor of the Exchequer's skepticism about "*the need for a big new package in general*" **[NS1/5/353]**.

35. DfT officials noted that "*LEZs are unpopular with local authorities, and risk significant cost for business and consumers. But are the cheapest way to deliver health benefits*" **[NS1/3/151]**. They also stressed that "[t]*here is significant uncertainty about the analytical basis of the package. Work is being done quickly, and with a number of assumptions*". **[NS1/3/210]**.

Limitation of policy options for cost and political reasons

36. From the first IMG, Her Majesty's Treasury ("**HMT**") emphasised that consideration of the full range of policy options needed to take account of "*affordability and cost-effectiveness – with any spending having to be bid for through the upcoming Spending Review in the context of shrinking budgets*" **[NS1/2/174]**. Moreover, "[a]*ll proposals need*[ed] *to be mindful of the wider context of fiscal consolidation* […] *in order to meet the fiscal target of delivering a surplus in 2019-20*" **[NS1/2/175]**. Accordingly, HMT considered that "*a proportionate approach to infraction*" needed to be taken, which consisted of the "*minimum package required to meet the AQ infraction and supreme court case*" **[NS1/2/174 and 176]**.

37. HMT placed a number of restrictions on Defra and DfT's proposed plans:

    37.1. <u>Financial restrictions:</u> In early September 2015, HMT had made clear that "*gaining agreement to spend in this area will be very difficult*" **[NS1/3/267]**. By 9 October 2015, DfT and Defra were proceeding on the basis that HMT's "*starting position is zero based funding*" **[NS1/4/34]**. HMT's assessment during the 2015

Spending Review emphasised the need for the "*minimum set of actions required to meet compliance*", and identified that the package with the least costs for central government would include mandatory CAZs introduced from 2017/2018 **[NS1/4/63-80]**. Following the Spending Review, HMT "*reduced the Defra bid for air quality funds*" (see §5 of the DfT submission at **[NS1/5/5]**), and made clear that there was an absolute limitation on the funding available to Defra to support the AQP **[NS1/4/440-447].** Even though additional measures, beyond five mandated CAZs, were required in Birmingham and Leeds to ensure compliance with the Directive by 2020, HMT did not provide the additional funding to the levels requested for these **[NS1/4/334]** and it refused to further support such as "*get*[ting] *into subsidies for SMEs and vans*" **[NS1/4/357]**.

37.2. Mandatory CAZs: HMT was clear that mandation of CAZs in the five cities outside London was necessary, to reduce the impact on Central Government funds and to ensure the efficacy of CAZs (see, e.g. **[NS1/4/63-80]**). Defra accordingly concluded that "*mandation for the six cities in combination with limited incentives appears likely to be the best balance of political risk, financial risk, and outcome risk*" **[NS1/4/185]**. However, HMT also emphasised that the final AQP should contain no reference to the "*possibility of mandating local action beyond Clean Air Zones (CAZs) in the five relevant cities*" **[NS1/5/66-67]**.

37.3. The use of fiscal measures: HMT rejected the proposal to adjust Vehicle Excise Duty ("**VED**") to discourage drivers from purchasing diesel cars with higher NO_x emissions **[NS1/3/226-227]**. The Chancellor considered that an increase of the duty applied to existing diesel cars would be "*very unpopular with both motorist* [sic] *and car manufacturers*" **[NS1/3/226]** and therefore should not be explored.

38. Ultimately, the AQP published for consultation on 12 September 2015 and sent for clearance by other departments on 3 December 2015 **[NS1/5/8-9]** was heavily revised in the light of these constraints. It was approved in this amended form, at a final IMG meeting on 8 December 2015 **[NS1/5/15-21]**.

Diesel Cars

39. In the early period of development of the AQP, Defra was considering and recommending that cars be included for the most serious areas in exceedance (e.g. "*Birmingham, Leeds and London*" - email of 8 June 2015 **[NS1/2/43]**). DfT officials also recognised that "[t]*he cheapest (if not publicly or politically acceptable) ways of meeting air quality concerns are to get people out of polluting diesels; or in specific areas, run roads at lower speeds – but this isn't what we're setting out here*" **[NS1/2/143]**. In its Update on the final air quality plan consultation on 7 September 2015, Defra maintained that "*national modelling indicates that it may be necessary to include some form of restrictions on all vehicles including cars to deliver compliance in 2020*" for Birmingham and Leeds **[NS1/2/195 and 197]**. However, Defra did not propose access restrictions on cars "*as the plan will push for early and effective emission standards for Euro 6 vehicles*".

40. At the same time, DfT's analysis concluded that given the uncertainties "[i]*n the absence of evidence of a step change in NO_X reduction* [after Euro 6, there] *may be a case for excluding all diesels from LEZ*" **[NS1/3/153]**.

41. The results of Defra's modelling process confirmed that even with the more optimistic figures reliant upon Euro 6 standards, "*Birmingham and Leeds both are not compliant* [by 2020] *without some action on cars*" **[NS1/4/23]**.

42. The primary concern with the introduction of CAZs which regulated cars was the anticipated political reaction – officials noted that "*as well as the public I would expect more business to complain on loss of custom grounds*" **[NS1/4/132]**. Further, the effect of the inclusion of cars has been said by the SoS to amount to "*imposing a substantial cost burden on individuals, which hits the poorest hardest*"(Grounds, §77(f) **[A/1/9/139-140]**); (NS1, §185(a)) **[A/2/28/893]**. However, in its evidence paper for the Spending Review, Defra noted that "*it is likely that higher income groups would face a disproportionately high share of the cost*" **[NS1/5/324]** of implementing its proposed AQP given their increased access to vehicles, and such groups would also have more opportunities to minimise this cost and more ability to purchase a compliant vehicle.

43. This can be contrasted with the recognised greater adverse impact of poor air quality upon protected groups, "*with vulnerable individuals (for example, the young and old, and*

some people with disabilities" **[NS1/4/80]**, and the fact that there may be "*a differential pollution impact*[] *by race*" given that "*non-compliant cities are more ethnically diverse than other parts of the UK*". This is also recognised by the Mayor of London's analysis, that the "*effects of poor air quality are felt disproportionately by London's vulnerable communities, in particular the poorest residents and those from black and minority ethnic groups because* [they] *tend to live nearer to busy roads and in areas which are more densely populated*" (FFS1, §10) **[A/2/18/455]**.

Modelling

44. Annex 3 below explains Defra's approach to modelling. Throughout the preparation of the AQP, Defra's officials as well as their external consultants expressed reservations about the reliability of the evidence fed into the model, in light of uncertainties concerning future emissions levels. Moreover, even by 25 November 2015 - after the public consultation had been closed and immediately prior to the publication of the AQP - the IMG was being told that "*modelling is not complete*" **[NS1/4/440]**.

ANNEX 3:
MODELLING

45. Defra has emphasised that its modelling was considered "*fit for purpose*" (WS NS1, §33). However, Defra's officials have consistently accepted that "*there are major uncertainties around the modelling*" **[NS1/2/44]**. Indeed, this has been a common theme throughout Defra's planning since 2011, in particular, whether the Euro standards were going to be effective measures to reduce emissions levels.

46. In considering the parties' submissions on modelling, there are a number of significant facts which the Court should bear in mind:
    46.1. The reliability and limitations of the model used by Defra and its external consultants, particularly in its streamlined form, is acknowledged by the Government's own experts;
    46.2. The model's reliance upon COPERT emission factors has a particular significance, as it presents a significantly optimistic and indeed unrealistic prediction of future emissions levels;
    46.3. Defra knowingly selected a highly optimistic scenario of future emissions levels, when other more likely scenarios had also been modelled and should have been used; and
    46.4. Defra's modelling was only updated to a limited extent as emerging evidence demonstrated the accuracy of more pessimistic predictions, prior to publication of the AQP.

47. The modelling exercise undertaken must be seen in the context of a duty to ensure compliance.

48. The impact of the choice of data fed into the model on the AQP, and why it is so critical and flawed in relation to Defra's justification of the AQP can be illustrated by Table 1 at §59 below.

49. As is explained in more detail below, the key factor in the future projections of NO_2 concentrations is the levels of NOx emitted by diesel cars. Defra chose a scenario for the model with conformity factors 2.8 times higher than the legal emission limit

required by the Euro 6 standard. This then gave rise to the need for 5 CAZs. However, if emission levels were assumed to be 4 times higher than the Euro 6 emission limit, then 14-18 CAZs would be needed. In fact the most recent evidence from the Department of Transport (CH2, §99 **[A/2/31/997]**) suggests that a more accurate figure is on average over six times higher than the Euro 6 emission limit, so even more CAZs (or other additional measures) will be needed.

Defra's PCM Model

50. Defra relies upon the Pollution Climate Mapping ("**PCM**") model developed by external consultants, Ricardo (SoS' Grounds, §22) **[A/1/9/119-120]**. This, in turn, relies upon the estimates of NOx emissions generated by the **"***Computer Program to calculate Emissions from Road Transport*" ("**COPERT**"). However, there are limitations to this model, as is reflected in the position of the Mayor of London (and Transport for London), who rely instead upon a different model developed by King's College London which provides a "*more granular level of detail*", including showing "*more roads*" (FFS1, §83) **[A/2/18/477]**.

51. As noted in the SoS's Detailed Grounds, the PCM is said to "*provide projections for five-year intervals"* (Grounds, §26) **[A/1/9/120]**. Ms Smith has claimed that "*it is not possible to demonstrate in the projections when within that 5-year period a measure would take effect*" (NS1, §62) **[A/2/28/858]**. However, it is clear that the modelling of an additional year between 2015 and 2020 (2018) was contemplated by Defra and its consultants (see (CH2, §87) **[A/2/31/994]** and **[NS1/1/226]**). This was not pursued, as officials believed it would "*not* [be] *useful to the analysis* […,] *would add extra complexity and would jeopardise meeting the deadline*" **[NS1/1/249]**. However, noted by the Ms Fletcher-Smith (on behalf of the Mayor of London) "[i]*t is technically possible to assess compliance in years other than simply 2020 and 2025*" (FFS1, §85) **[A/2/18/477]**.

52. Mr Dickens, in contrast, characterises the use of five-year projections as a "*pragmatic approach*" which has developed "*as a matter of routine for a number of years*" (RD1, §§43-44) **[A/2/30/950]**. The primary reason for not commissioning further research appears to have been the cost of further modelled years (RD1, §43). However, as Ms Fletcher-Smith emphasises "[i]*f further measures are implemented by 2020, although compliance may*

not be achieved in that year, it may well be the case that the measures accelerate compliance before 2025 e.g. in 2023" **[A/2/18/477]**.

Reliance upon COPERT factors

53. The SoS has emphasised her view that the COPERT factors are "*consistent with the international guidelines for emission inventory compilation (outlined in the EMEP/EEA guidebook) and is therefore considered the best available evidence*" (RD1, §40) **[A/2/30/949]**. However, it is clear that the SoS has been aware of the doubts underlying these factors since the beginning of preparations of the AQP.

54. In November 2014, Ricardo discussed which scenarios to model with Defra, and advised that one such scenario would be the position following the entry into force of the Euro 6c standard "*because including Euro 6c will make it easier to demonstrate compliance in the AQ plans. We think it might be overly conservative to exclude this community* [i.e. EU] *measure* […o]*therwise we will need national or local measures to fill a much bigger gap in 2020 and 2025*" **[NS1/5/364]**. However, in relation to the Euro 6 standard the consultants noted at that stage that there was "*some emerging real world testing evidence, which shows large conformity factors for Euro 6. So overall this scenario leads to high emissions and concentrations in 2020 but still big declines from 2020*".

55. Similarly, in a report produced on 3 March 2015, Ricardo noted initial evidence had shown "*some remarkable evidence among the performance of the initial stage of Euro 6 diesel passenger cars* [….] *the average on-road emission levels of NO_x were estimated at 7 times the type approval limit for Euro 6 vehicles*" **[NS1/1/270]**. In other words, "[t]*he assumptions on the emissions performance of the two stages of Euro 6 will have significant impact on the resulting total NO_x emissions from road transport in future years*" **[NS1/1/280]**.

56. Prior to proposing the measures to be included in the AQP, Defra officials recorded that "*there would be a substantial impact on the UK total NOx emissions by 2030 if Euro 6 vehicle emissions do end up closer to a CF of 5* [rather] *than COPERT's estimate of 2.8*" **[NS1/2/19]**. The initial policy papers presented to other departments emphasised that "[e]*early evidence indicates Euro 6 diesel is underperforming*" and that this "*introduces significant uncertainty in the projections*" **[NS1/2/35c].** Accordingly, Defra anticipated

that "*action in 16-20 zones*" would be needed to be "*confident of compliance in 2020 (outside London)*".

57. At the beginning of the consultation period, DfT was aware that "*COPERT is now widely held to underestimate road vehicle emissions by a considerable margin, both for Euro 5 and Euro 6*" **[NS1/3/307 and 309-310]**. By 12 October 2015, the Cabinet was also being briefed on this basis (see **[NS1/4/43]**), namely that emerging findings from "*real world testing by independent experts* [..] *suggest emissions for Euro 6 are significantly higher than previously thought. With a conformity factor of 4 early modelling estimates that 23 zones would be non-compliant in 2020*". (emphasis added)

Defra's modelled scenarios

58. As noted above, the core scenario (which assumed a conformity factor of 2.8) selected by Defra in May 2015 and used in the final AQP ("**2015 AQP**") to model the likely NO_2 levels in 2020, 2025 and 2030 was optimistic and viewed as the "*best option"* despite the "*uncertainties and range of possible outcomes*", in particular "*doubts cast on the COPERT factors by DfT*" **[NS1/1/527-528]**. 2015 AQP assumed that the relevant conformity factors for the Euro 5 standard would be 3.6 and for Euro 6 would be 2.8 **[NS1/1/526]**. Recent figures have shown that a conformity factor of over 6 for both Euro 5 and Euro 6 would have been more accurate (CH2, §99 **[A/2/31/997]**). This most closely resembles the scenario proposed by DfT in May 2015 (Scenario F) **[NS1/1/527-528]**.

59. Dr. Holman identifies that Defra also carried out sensitivity analysis, on the assumption that the conformity factor for Euro 6 would be 5 (see (CH2, §§89-99) **[A/2/31/995-997]** and **[NS1/1/545]**). The results of this exercise were a substantial increase of the number of non-compliant zones from 8 to 30 in 2020 **[NS1/2/18-19]**. Indeed, Defra and other departments considering the issue after the consultation were aware of the emerging evidence and the effect this would have: "*an additional 22 ones may be non-compliant in 2020*" **[NS1/4/309]**. Dr Holman identifies this as a much more plausible 'Alternative Scenario' modelled by Defra, which has been borne out by recent testing. The closest scenarios modelled by Ricardo in October 2015 for the purposes of identifying the number of CAZs required for compliance suggests at least between 14-18 CAZs **[NS1/4/81 and 84]**.

Table 1:
Effect of Diesel Vehicle Conformity Factors on Predicted Compliance with NO_2 limit values in 2020

Scenario	Date	Euro 5 & Euro 6 Conformity Factors	Euro 6c Conformity Factor	Zones in breach in 2020/Number of CAZs needed	Class DCAZs (cars) needed	Ref
2011AQP	07/ 2014	4.1 & 3.3	Assumes no RDE agreement	28 zones	not modelled	**[NS1/1/526-527]**
2015 AQP	19/10/ 2015	3.6 & 2.8	Assumes no RDE agreement	6 CAZs	3 CAZ D	**[NS1/4/81]**
Alternative Scenario/ Sensitivity Test	05/ 2015	3.6 & 5	Assumes no RDE agreement	30 zones	not modelled	**[A/1/12/281]** **[NS1/1/545]**
Scenario #11	19 /10 / 2015	3.6 & 4	1.5 (from 2017)	14 CAZs	3 CAZ D	**[NS1/4/84]**
Scenario #12	19/10/ 2015	3.6 & 4	2.8 (from 2017)	18 CAZs	6 CAZ D	**[NS1/4/84]**

Updated Modelling

60. Finally, following revelations from the United States' Environmental Protection Agency ("**EPA**") in September 2015, it emerged that Volkswagen ("**VW**") had fitted its diesel cars with equipment or software designed to mask the level of emissions in test conditions (so-called "*defeat devices*") ((CH1, §61.3) **[A/2/14/420]** and (CH2, §§68-71) **[A/2/31/991-992]**).

61. Further to a request by the Prime Minister, DfT launched an investigation into the issue of 'defeat devices' as well as emissions testing more generally. Other departments were being briefed on the basis that this "*will conclude around the same time as the AQ is published*" (see the internal HMT submission for the 2015 Spending Review on 16 October 2015 **[NS1/4/65]**). However, the AQP was not adjusted to incorporate any preliminary findings of that investigation.

62. Mr Dickens explains that "*Defra has not made a formal assessment*" of the impact of real driving emissions or the VW scandal, although Defra considers that its impact is likely to be very small (RD1 §15) **[A/2/31/942]**. As Dr Holman notes, Defra's estimates/modelling in light of the 'defeat device' issue **[NS1/4/255-256]** suggest that there may be a significant impact on emissions levels, which requires further testing (CH2, §71) **[A/2/31/991-992]**.

63. In her most recent Witness Statement ("**NS2**"), Ms Smith explains that Defra has <u>not</u> modelled the results of the DfT's findings concerning real-world emissions, except to apply these to the baseline year, 2013 (NS2, §31) **[A/2/38/pp.12-13]**. The results of Ricardo's modelling of 2013 is that there is "*no change in zone compliance status*" although there is a "*very small increase in the total length exceeding*" and "*more zones show a small increase in the max in zone than show a small decrease*" **[NS1/5/367].** This is because the reference year model (i.e. 2013) is calibrated using measured data. The impact on future NO_2 levels, when the impact of the new emission data would be greater, was not modelled.

Conclusion

64. In light of these features, Dr Holman concludes that Defra has "*relied on overly optimistic modelling and* [] *had it used more realistic assumptions about the emissions from diesel vehicles, far more zones would be predicted to be in breach of the limit values in 2020"* (CH2, §89) **[A/2/31/995]**.