THIRD WAVE LOCAL AUTHORITIES – TARGETED FEASIBILITY STUDY TO DELIVER NITROGEN DIOXIDE CONCENTRATION COMPLIANCE IN THE SHORTEST POSSIBLE TIME

Bolsover District Council

Further information on the content of each section is set out in the guidance.

Part 1: Understanding the problem

Introduction

Bolsover District Council (the Council or BDC) has one road link (census ID: 28528) projected to have an exceedance annual mean Air Quality Standard of 40µg/m³. The road link under consideration is a section of the A38, from its junction with the M1 motorway to the edge of the Council boundary just east of the junction with the B6406. This road link is managed by the Council's Highways Team. The road link of concern to BDC runs to the edge of the Council area, following this the A38 continues into Ashfield District Council (ADC) area. Ashfield District Council are also required to undertake a targeted Feasibility study on the A38 relating to one road link (census ID 7353), which is next to link 28528. As any actions from the targeted feasibility study will affect the traffic in both Council areas, the Councils will work together when undertaking the feasibility study.

Figure 1 details the A38 PCM exceedance stretch, whilst Figure 2 illustrates a section of the A38 PCM exceedance stretch.



Figure 2 – View of A38 Westbound from Census ID 28528 (E 446303, N 357262) taken 25/04/18 @ 15.37



This targeted feasibility study therefore aims to characterise the air quality issue and identify measures which could reduce the concentration of NO₂ on the A38 PCM exceedance stretch as quickly as possible, with the principal objective of bringing forward compliance in the shortest possible time.

PCM Findings

The results from the PCM show that the road link is projected to have the following annual mean NO_2 concentrations, with compliance with the annual mean Air Quality Standard of $40\mu g/m^3$ achieved in 2021.

- 48µg/m³ in 2017;
- 45µg/m³ in 2018;
- 43µg/m³ in 2019;
- 40.3µg/m³ in 2020;
- 38µg/m³ in 2021.

Compliance could therefore be achieved if NO₂ concentrations are reduced by at least $5\mu g/m^3$ in 2018, or $3\mu g/m^3$ in 2019.

The PCM data shows that in 2015, the source contributors to total NO_x concentration on this road link were as illustrated in Figure 3.





The PCM based NO_x source apportionment would suggest that 26% of the total NO_x concentration is attributable to regional and urban background sources (including traffic), whilst the remaining 74% is associated with local road traffic sources. Of this 74%, HGVs have been identified to be the principal source, contributing 33% of the total NO_x. Diesel cars are also observed to contribute a sizable proportion at 21%, petrol cars comparatively contribute significantly less at only 5%. Diesel LGVs contribute 15% of the total. Buses are predicted to contribute less than 1% of the

total NO_x concentration.

The PCM utilises traffic data from the DfT traffic counts to define the corresponding vehicle emissions for input on each modelled road link. For PCM Census ID 28528, the traffic data from corresponding DfT count point (ID 28528 - E 445544, N 356437) has been applied. The DfT traffic data for the year 2015 was based upon an estimate calculated using the 2014 manual count, whereby trained enumerators count traffic by vehicle type over a 12 hour period. This raw data is then combined with information from a network of ATCs to calculate a series of annual average daily flows (AADF) with associated fleet composition.

Figure 4 shows the traffic composition at DfT count point ID 28528 for the 2015 year, for which a total AADF of 41,709 was recorded with a HDV proportion of 9.1%, whilst the general AADF trend at this location since the year 2000 is provided in Figure 5. In addition to showing the AADF trend for count point ID 28528, count point ID 7353 in neighbouring Ashfield District Council is also shown in Figure 5. It can be seen that since 2000 there has been a general trend of traffic numbers increasing each year at both count points.







Figure 5 – AADF Trend since the year 2000 on the A38 as defined on DfT count point ID 28528 and 7353

Local Information

Local Context

The A38 is a dual carriageway which links the M1 motorway to Sutton-in-Ashfield and then on to Mansfield. The portion of the A38 to be considered in the study would be characterised as rural although some of the land close to the road is undergoing redevelopment as either large scale light industrial units or large scale commercial and leisure facilities.

Current industrial sites consist of the Castlewood Business Park to the south of the A38 (located in BDC), Berristow Lane Industrial Estate to the north of the A38 (BDC) and South Fulwood Industrial Estate to the north of the A38 (located in Ashfield District Council). Both these sites include businesses who operate freight consolidation facilities and so contribute to a significant number of HGV movements on the A38.

The East Midlands Designer Outlet is a leisure and retail facility located to the south of the A38 in the BDC area. In addition to this an application has recently been submitted for a large mixed-use development located at Cartwright Lane, South Normanton. The proposed development will form part of a 'hybrid' planning application, seeking full planning permission for retail and hotel use at the site frontage and outline permission for employment use at the rear of the application site. The proposed development would include an access road to the nearby roundabout between Berristow Lane and Cartwright Lane. An air quality assessment has been undertaken in relation to the development which found air quality impacts to be negligible. However the Council have now indicated further air quality studies are required as the assessment did not satisfactorily consider the impacts on the A38.

In March 2016 junction improvements were completed on the slip roads of the M1/A38 junction. The improvements enabled vehicles to more quickly get onto the M1 from the A38 reducing congestion and traffic queue lengths on the A38. It is assumed that these improvements have not been considered in the 2015 PCM model, and so it is possible if these completed junction improvements are considered, compliance with the Air Quality Standard could occur earlier.

Local Monitoring

As the A38 PCM exceedance stretch has not been previously highlighted through the LAQM regime to be of concern with regards to exceedances of the annual mean NO₂ Air Quality Strategy (AQS) objective, only a single diffusion tube monitoring location (Tube 22) is located within the study area.

It is worth noting that the diffusion tube has been located as per the requirements of LAQM regime to enable the provision of pollutant exposure at the location of a relevant receptor. This is standard practice for LAQM purposes to indicate pollutant concentrations at sensitive receptors. The requirements receptors in this study differ slightly in that they refer to areas of public access at a distance 4 metres from the road edge in line with the Air Quality Directive 2008.

Upon receiving notification of the requirement to undertake the targeted feasibility study the Council commissioned three further diffusion tubes across the study area (Tubes 50, 51 and 52). Although it is accepted that the feasibility study will be required to be submitted prior to a full annual average at these new locations being available, it was considered a useful exercise to provide an indication of current NO₂ concentration levels for this study. Should the exceedances of the NO₂ annual mean predicted by the PCM be observed, these new monitoring locations will also provide useful data to monitor progress towards compliance.

Figure 6 illustrates diffusion tube monitoring undertaken by the Council in the study area.



Table 1 provides details of the monitoring undertaken in the study area. Recorded NO₂ concentrations at monitoring location 22 were observed to be well below the $40\mu g/m^3$ annual mean for 2015, 2016 and 2017. The monitored concentration at diffusion tube 22 is observed to be consistent across the three years not showing any upward or downward trend.

Table	1 –	Council	Monitoring	Locations
-------	-----	---------	------------	-----------

п	Receptor	x	v	Annual	Mean NO ₂ (µ	ıg/m³)
	Neceptor	~		2015	2016	2017
22	37 Berristow Place	446245	357257	26.3	26.4	26.0
50	Derbyshire Hotel	445515	356406			
51	Premier Inn	445574	356504	Monitoring (Commissione 2018	d in March
52	Slip Road	445968	357119			

The nearest AURN monitoring location is Chesterfield Roadside located approximately 17km to the north west. Although it may be possible to use this site for model verification this would not be the preferred approach due to the distance from the study area and the difference in context between the AURN site and the study location.

The Council previously operated an automatic analyser at an urban background location approximately 2 km to the west of the study area. The analyser was decommissioned at the end of 2015. Table 2 below provides annual mean NO₂ data for the automatic analyser for year 2011 to 2015. The recorded annual mean NO₂ is observed to be well below 40 μ g/m³ air quality objective for all years between 2011 and 2015 and shows a generally decreasing trend. This data may be considered useful to provide a background NO₂ concentration for future dispersion modelling studies.

Table 2 – Council Monitoring Locations

П	Receptor	x	v	Ar	nnual M	lean NC	D₂ (µg/n	n³)
	Neceptor	^		2011	2012	2013	2014	2015
South Normanton	Urban Background	444185	356361	20.2	21.8	21.3	18.7	16.4

ANPR Survey

For the purpose of this study, the Council, in partnership with ADC have undertaken an Automatic Number Plate Recognition (ANPR) survey which was carried out along the A38 PCM exceedance stretch. The survey comprised of a 72-hour period from Friday 15th June 2018 to Sunday 17th June 2018 inclusive. Data was collected in both directions (Northbound and Southbound) providing the petrol/diesel/electric split, fleet composition, Euro classification, traffic flows and diurnal profile of vehicles on the A38.

The additional local information was used to inform a local dispersion modelling exercise undertaken in ADMS-Roads, outputs from which will provide updated source apportionment results to be used to better direct possible measures. It is proposed that the model will be verified using monitoring data collected at diffusion tube 22 monitoring location, complimented if possible by further monitoring data from the Council.

The ANPR survey location is illustrated in figure 7. Two ANPR cameras were installed on the B6406 flyover passing over the A38. In addition, Manual Classified Count (MCC) cameras were also installed at the same direction to capture total traffic flow and to quantify the capture rate of the ANPR data.



Figure 7 – ANPR Survey Location

Total Traffic Flows

The 24-hour total AADF obtained for the 15th, 16th, and 17th of June 2018 were 19,189, 12,873 and 11,931 respectively for the northbound link, and 24,507, 18,255 and 15,593 respectively for the southbound link. For inclusion within the roads dispersion model, the data from the ANPR survey has been used specifically for the A38 northbound and southbound carriageways (either site of the sliproads leading up to/down from the B6406).

For the remainder of the A38 exceedance stretch DfT traffic count data has been used for the two PCM links (28528 and 7353) in conjunction with a diurnal profile and Euro Classifications calculated from combining the data from the northbound and southbound ANPR data.

Fleet Composition

Figure 8 shows the fleet composition along the A38 at the survey location, fleet compositions are provided for the combined 2-way flow calculated from the ANPR survey in addition to the separate northbound and southbound flows. Cars were found to account for the highest % of the total fleet for each link, followed by LGVs and Rigid/Articulated HGVs. When comparing the northbound and southbound links the southbound link has 6% more Cars within the vehicle fleet and 4% less Articulated HGVs, this would suggest that more HGVs are travelling towards Sutton-in-Ashfield and Mansfield rather than in the reverse direction towards the M1.





Petrol and Diesel Split

Figure 9, Figure 10 and Figure 11 illustrate the Petrol and Diesel Splits for Cars and LGVs based upon the ANPR survey data. The survey results identified that car fleets for the northbound and southbound links are similar, and that all LGV vehicles were found to be diesel fuelled.











Euro Composition

Figure 12, Figure 13 and Figure 14 show the default national Euro proportions relative to the local Euro proportions derived from the ANPR survey data for the A38, for the Car fleet. The survey data show that Petrol and Diesel Cars are predominantly comprised of Euro 4, 5 and 6 class vehicles. The ANPR survey has presented a similar Euro Composition split to the national assumed fleet, with Euro 5 class for both Petrol Cars and Diesel Cars very similar.

Figure 12 – Euro Proportions for Diesel and Petrol Cars: A38 Combined

Petrol Car	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1	•	
2Euro 1		0.00
3Euro 2	0.01	0.00
4Euro 3	0.11	0.04
5Euro 4	0.23	0.30
6Euro 5	0.34	0.35
7Euro 6	0.20	0.19
7Euro 6c	0.12	0.12
Diesel Car	Default Euro Proportions	User Euro Proportions
Dicker our	2017 - England (not London)	2017 - England (not London)
1Pre-Euro 1		
A.R. 4		-
2Euro 1	•	
2Euro 1 3Euro 2	- 0.00	0.00
2Euro 1 3Euro 2 4Euro 3	0.00 0.06	0.00
2Euro 1 3Euro 2 4Euro 3 5Euro 4	0.00 0.06 0.19	0.00 0.20 0.20 0.20 0.20 0.20 0.20 0.20
2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5	- 0.00 0.06 0.13 0.40	0.00 0.02 0.20 0.41
2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5 7Euro 6	0.00 0.06 0.13 0.40 0.22	0.00 0.02 0.20 0.43 0.23
250001 36002 46003 55004 65005 76005 76006	0.00 0.06 0.19 0.40 0.22 0.13	0.00 0.02 0.20 0.43 0.22 0.22

Figure 13 – Euro Proportions for Diesel and Petrol Cars: A38 Southbound

Petrol Car	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1		
2Euro 1	-	0.0
3Euro 2	0.01	0.0
4Euro 3	0.11	0.04
5Euro 4	0.23	0.30
6Euro 5	0.34	0.30
7Euro 6	0.20	0.13
7Euro 6c	0.12	0.1
Diesel Car	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1		
OF the A		

1Pre-Euro 1		-
2Euro 1	-	-
3Euro 2	0.00	0.00
4Euro 3	0.06	0.01
SEuro 4	0.13	0.20
6Euro 5	0.40	0.44
7Euro 6	0.22	0.22
7Euro 6c	0.13	0.13
7Euro 6d	0.00	-

Figure 14 – Euro Proportions for Diesel and Petrol Cars: A38 Northbound

Petrol Car	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1		
2Euro 1	-	0.00
3Euro 2	0.01	0.00
4Euro 3	0.11	0.04
5Euro 4	0.23	0.30
6Euro 5	0.34	0.3
7Euro 6	0.20	0.15
7Euro 6c	0.12	0.12
Diesel Car	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1		
2Euro 1		
3Euro 2	0.00	0.00
4Euro 3	0.06	0.02
5Euro 4	0.19	0.2
6Euro 5	0.40	0.43
7Euro 6	0.22	0.2
7Euro 6 7Euro 6c	0.22	0.2

Figure 15, Figure 16 and Figure 17 show the default national Euro proportions relative to the local Euro proportions derived from the ANPR survey data for the A38, for the LGV fleet. The survey data show that Petrol LGVs Euro proportions are less

varied when compared to the national assumed fleet. The Euro proportions for Diesel LGVs from the survey show a high Euro 5 contribution than, but a lower Euro 6 contribution when compared to the national assumed fleet.

Figure 15 – Euro Proportions for Diesel and Petrol LGVs: A38 Combined

Petrol LGV	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1	•	
2Euro 1	0.00	
3Euro 2	0.03	
4Euro 3	0.11	0.5
5Euro 4	0.20	
6Euro 5	0.34	
7Euro 6	0.32	0.50
7Euro 6c		
Diesel LGY	Default Euro Proportions	User Euro Proportions
	2017 - England (not London)	2017 - England (not London)
1Pre-Euro 1	2017 - England (not London)	2017 - England (not London)
1Pre-Euro 1 2Euro 1	2017 - Esgisad (sot Losdos) 0.00	2017 - England (not London)
1Pre-Euro 1 2Euro 1 3Euro 2	2017 - Ekgiská (kot Lokdok) 0.00 0.01	2017 - England (not London)
1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3	2017 - Ekgiskd (kot Lokdok) 0.00 0.01 0.05	2017 - England (not London)
1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4	2017 - Ekgiskd (bot London) 0.00 0.01 0.05 0.20	2017 - England (not London)
1Pro-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5	2017 - Ekgiskd (bot Lokdob) 0.00 0.01 0.05 0.20 0.41	2017 - England (not London) 0.0 0.11
1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5 7Euro 6	2017 - Ekgiská (köt Lökdök) 0.00 0.01 0.20 0.20 0.41 0.33	2017 - England (not London) 0.0 0.1(0.5) 0.5)
1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5 7Euro 6 7Euro 6c	2017 - Ekgiská (köt Lökdök) 0.00 0.01 0.20 0.41 0.33	2017 - England (not London) 0.0 0.14 0.54

Figure 16 – Euro Proportions for Diesel and Petrol LGVs: A38 Southbound

Petrol LGY	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1	-	-
2Euro 1	0.00	
3Euro 2	0.03	
4Euro 3	0.11	0.71
5Euro 4	0.20	0.24
6Euro 5	0.34	0.05
7Euro 6	0.32	
7Euro 6c		
	Default Face Propertiese	Have Free Descentions
Diesel LGY	2017 - England (not London)	2017 - England (not London)
Diesel LGY 1Pre-Euro 1	2017 - England (not London)	2017 - England (not London)
Diesel LGY 1Pre-Euro 1 2Euro 1	2017 - Esgland (not London)	2017 - England (not London)
Diesel LGV 1Pre-Euro 1 2Euro 1 3Euro 2	2017 - England (not London) 	2017 - England (not London)
Diesel LGV 1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3	2017 - England (not London) 	2017 - England (not London)
Diesel LGV 1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4	2017 - England (not London) 0.00 0.01 0.05 0.22 0.22 0.22 0.22 0.22 0.22 0.22	2017 - England (not London)
Diesel LGY 1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 3 5Euro 4 6Euro 5	2017 - England (not London) 0.00 0.01 0.05 0.20 0.20 0.21	2017 - England (not London)
Diesel LGY 1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5 7Euro 6	2017 - Esgland (not London) 0.00 0.01 0.02 0.20 0.41 0.03	2017 - England (not London)
Diesel LGV 1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5 7Euro 6 7Euro 6c	2017 - England (not London) 0.00 0.01 0.02 0.20 0.20 0.33 	2017 - England (not London) 2017 - England (not London) 0.02 0.21 0.23 0.28 0.28 0.28 0.28 0.28
Diesel LGY 1Pre-Euro 1 2Euro 1 3Euro 2 4Euro 3 5Euro 4 6Euro 5 7Euro 6 7Euro 6c 7Euro 6c 7Euro 6d	2017 - England (not London) 	2017 - England (not London) 2017 - England (not London) 0.02 0.02 0.21 0.43 0.28

Figure 17 – Euro Proportions for Diesel and Petrol LGVs: A38 Northbound

Petrol LGV	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1	•	
2Euro 1	0.00	
3Euro 2	0.03	
4Euro 3	0.11	
SEuro 4	0.20	0.23
6Euro 5	0.34	
7Euro 6	0.32	0.7
7Euro 6c		
Diesel LG¥	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro 1		
2Euro 1	0.00	
3Euro 2	0.01	
4Euro 3	0.05	0.02
SEuro 4	0.20	0.20
6Euro 5	0.41	0.43
7Euro 6	0.33	0.23
7Euro 6 7Euro 6c	0.33	0.23

Figure 18, Figure 19 and

Figure **20** show the default national Euro proportions relative to the local Euro proportions derived from the ANPR survey data for the A38, for the HGV fleet. The survey data show that for both Rigid and Articulated HGVs, the Euro 4 and Euro 5 proportions are higher, and the Euro 6 proportions are lower for the survey when compared to the national assumed fleet.

Figure 18 – Euro Proportions for Rigid and Articulated HGVs: A38 Combined

Rigid HGY	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro I		
2Euro I		0.00
3Euro II	0.01	0.00
4Euro III	0.09	0.02
5Euro IV	0.08	0.16
6Euro V_EGR	0.07	0.12
7Euro V_SCR	0.20	0.36
8Euro VI	0.55	0.34
9Euro II SCRRF	-	
10Euro III SCRRF		
11Euro IV SCBBE		
12Euro V EGR + SCRRF	- Note: No amissions factors available for HGV SCRRF (Refrofits)	therefore standard Euro class emissions factors will be assumed even if
Artic HGY	Note: No emissions factors available for HGV SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London)	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London)
Artic HGY 1Pre-Euro I	Note: No emissions factors available for HDV SCRRF (Refrofits)	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London)
Artic HGY 1Pre-Euro I 2Euro I	Note: No amissions factors available for HGV SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London) .	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London)
Artic HGY Pre-Euro I 2Euro I 2Euro I	Note: No emissions factors available for HGV SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London) . 0.00	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London)
Artic HGY Artic I GY IPre-Euro I 2Euro I 3Euro II 4Euro II	Note: No amissions factors available for HGV SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London)	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0
Artic HGY Artic HGY 1Pre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV	Note: No amissions factors available for HSV-SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London) 0.00 0.02 0.02	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0
Artic HGY Artic HGY IPre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 5Euro IV 5Euro IV 5Euro IV 5Euro V	Note: No emissions factors available for HGV-SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London)	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0
Artic HGY Artic HGY Pre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 6Euro V_SCR	Note: No emissions factors available for HGV'SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London)	therefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Artic HGY Artic HGY Pre-Euro I 2Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 6Euro V_EGR 7Euro V_SCR 8Euro VI	- Note: No emissions factors available for HGV SCRRF (Refrofits)	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Artic HGY Artic HGY IPre-Euro I 2Euro I 2Euro I 4Euro II 4Euro II 5Euro IV 6Euro V_EGR 7Euro V_SCR 8Euro VI 3Euro V	Note: No amissions factors available for HGN'SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London) Default Euro Proportions 0.00 Default Euro Proportions 0.02 Default Euro Proportions 0.02 Default Euro Proportions 0.03 Default Euro Proportions 0.02 Def	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
Artic HGY Artic HGY Pre-Euro I Euro I Euro II Euro II Euro II Euro II Euro IV Euro V Euro V Euro V Euro II SEuro II Euro Euro II EURO EURO EURO	Note: No emissions factors available for HGV-SCRRF (Refrofits)	herefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Artic HGY I2Euro V EGR • SCRRF Artic HGY IPre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 6Euro V_EGR TEuro V_SCR 8Euro VI 9Euro II SCRRF 10Euro II SCRRF 10Euro VSCRF	Note: No emissions factors available for HGV SCRRF (Refrofits) Default Euro Proportions 2017 - England (not London) Default Euro Proportions 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	therefore standard Euro class emissions factors will be assumed even if User Euro Proportions 2017 - England (not London) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.

Figure 19 – Euro Proportions for Rigid and Articulated HGVs: A38 Southbound

Rigid HGY	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)
1Pre-Euro I	•	
2Euro I	-	-
3Euro II	0.01	0.00
4Euro III	0.03	0.02
5Euro IV	0.08	0.15
6Euro V_EGR	0.07	0.12
7Euro V_SCR	0.20	0.36
8Euro VI	0.55	0.34
9Euro II SCRRF		-
10Euro III SCRRF		-
11Euro IV SCBBE		
12Euro V EGR + SCRRF	Note: No emissions factors available for HGV SCRRF (Refrofit	;) therefore standard Euro class emissions factors will be assumed even if f
Artic HGY	Note: No emissions factors available for NGV SCRRF (Refrofit Default Euro Proportions 2017 - England (not London)	-) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London)
Artic HGY 1Pre-Euro I	Note: No emissions factors available for NGV SCRRF (Refrofit Default Euro Proportions 2017 - England (not London)) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London)
Artic HGY 1Pre-Euro I 2Euro I	Note: No emissions factors available for HGV SCRRF (Refrofit Default Euro Proportions 2017 - England (not London) -) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) -
Artic HGY Pre-Euro I 2Euro I 2Euro I 2Euro I	Note: No emissions factors available for HGV SCRRF (Refrofit Default Euro Proportions 2017 - England (not London) - - 0.00) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London)
Artic HGY Artic IGY IPre-Euro I 2Euro I 3Euro II 4Euro II	Note: No emissions factors available for NGV SCRRF (Refrolit Default Euro Proportions 2017 - England (not London) - - 0.00 0.02) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) - - - 0.01
Artic HGY Pre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV	Note: No emissions factors available for NGV SCRRF (Refront Default Euro Proportions 2017 - England (not London) 0.00 0.02 0.03) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) - - - - 0.01
Artic HGY Artic HGY IPre-Euro I SEuro II SEuro II SEuro II SEuro III SEuro IV SEuro IV SEuro IV SEuro IV	Note: No emissions factors available for HGV SCRRF (Refrofit Default Euro Proportions 2017 - England (not London)) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) - - - - - - - - - - - - - - - - - - -
Artic HGY Artic HGY Pre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 6Euro V_SCR	Note: No emissions factors available for HGV SCRRF (Refroit Default Euro Proportions 2017 - England (not London) - - 0.00 0.02 0.03 0.06 0.18) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London)
Artic HGY Artic HGY Pre-Euro I 2Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 6Euro V_EGR 7Euro V_SCR 8Euro VI	Note: No emissions factors available for NGV SCRRF (Refroit Default Euro Proportions 2017 - England (not London)) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) - - - - - - - - - - - - - - - - - - -
Artic HGY Artic HGY Pro-Euro I 2Euro I 2Euro I 4Euro II 4Euro II 5Euro IV 6Euro V_EGR 7Euro V_SCR 8Euro VI 9Euro IV 9Euro IV 9Euro VI 9Euro VI 9Euro VI 9Euro VI 9Euro IV 9Euro IV	Note: No emissions factors available for HGV SCRRF (Refrontit Default Euro Proportions 2017 - England (not London) 0.00 0.02 0.03 0.06 0.18 0.72) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) - - - - - - - - - - - - - - - - - - -
Artic HGY Artic HGY Pre-Euro I Euro I Euro II Euro II Euro II Euro IV Euro V Euro V Euro V Euro V Euro V Euro ISCRRF Euro V Euro II Euro III Euro II Euro II E	Note: No emissions factors available for HGV SCRRF (Refrontit Default Euro Proportions 2017 - England (not London)) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) 0.01 0.05 0.06 0.06 0.01 0.01 0.01 0.01
Artic HGY IPre-Euro I 2Euro I 3Euro II 4Euro III 5Euro IV 6Euro V_EGR 7Euro V_SCR 8Euro II SCRRF 10Euro VISCRF 11Euro VSCRF	Note: No emissions factors available for HGV SCRRF (Refrontit Default Euro Proportions 2017 - England (not London)) therefore standard Euro class emissions factors will be assumed even if f User Euro Proportions 2017 - England (not London) - - - - - - - - - - - - - - - - - - -

Figure 20 – Eu Northbound	igure 20 – Euro Proportions for Rigid and Articulated HGVs: A38 Iorthbound			
Rigid HG¥	Default Euro Proportions 2017 - England (not London)	User Euro Proportions 2017 - England (not London)		
1Pre-Euro I				
2Euro I	-	0.00		
3Euro II	0.01	0.00		
4Euro III	0.09	0.02		
5Euro IV	0.08	0.14		

0.07

0.20

0.55

~~~~

|                      | note no emporar factors dranable for that obtain (      | terrorito) diererore standard Earo class emissions ractors nur be assamed erem n |
|----------------------|---------------------------------------------------------|----------------------------------------------------------------------------------|
|                      |                                                         |                                                                                  |
| Artic HGY            | Default Euro Proportions<br>2017 - England (not London) | User Euro Proportions<br>2017 - England (not London)                             |
| 1Pre-Euro I          | -                                                       | -                                                                                |
| 2Euro I              | •                                                       | -                                                                                |
| 3Euro II             | 0.00                                                    |                                                                                  |
| 4Euro III            | 0.02                                                    | 0.01                                                                             |
| SEuro IV             | 0.03                                                    | 0.04                                                                             |
| 6Euro V_EGR          | 0.06                                                    | 0.07                                                                             |
| 7Euro V_SCR          | 0.18                                                    | 0.20                                                                             |
| 8Euro VI             | 0.72                                                    | 0.68                                                                             |
| 9Euro II SCRRF       | •                                                       |                                                                                  |
| 10Euro III SCRRF     | •                                                       | -                                                                                |
| 11Euro IV SCRRF      | •                                                       |                                                                                  |
| 12Euro V EGR + SCRRF | •                                                       |                                                                                  |
|                      |                                                         |                                                                                  |

# Figure 21,

6Euro V\_EGR

7Euro V\_SCR

9Euro II SCRRF 10Euro III SCRRF 11Euro IV SCRRF 12Euro V EGR + SCRRF

8Euro VI

Figure 22 and Figure 23 show the default national Euro proportions relative to the local Euro proportions derived from the ANPR survey data for the A38, for the Bus and Coach fleet. The survey data show that for Bus and Coaches, the Euro 4 proportions are far higher, and the Euro 5 and Euro 6 proportions are lower for the survey when compared to the national assumed fleet.

# Figure 21 – Euro Proportions for Buses and Coaches : A38 Combined

0.12 0.36

0.35

| Buses                | Default Euro Proportions<br>2017 - England (not London) |                                        | User Euro Proportions<br>2017 - England (not London) |
|----------------------|---------------------------------------------------------|----------------------------------------|------------------------------------------------------|
| 1Pre-Euro I          |                                                         | •                                      |                                                      |
| 2Euro I              |                                                         | •                                      |                                                      |
| 3Euro II             | 0.03                                                    |                                        | 0.02                                                 |
| 4Euro III            | 0.13                                                    |                                        | 0.02                                                 |
| 5Euro IV             | 0.10                                                    |                                        | 0.35                                                 |
| 6Euro V_EGR          | 30.0                                                    |                                        | 0.06                                                 |
| 7Euro V_SCR          | 0.25                                                    |                                        | 0.13                                                 |
| 8Euro VI             | 0.40                                                    |                                        | 0.3                                                  |
| 9Euro II SCRRF       |                                                         | •                                      |                                                      |
| 10Euro III SCRRF     |                                                         | •                                      |                                                      |
| 11Euro IV SCRRF      |                                                         | •                                      |                                                      |
| 12Euro V EGR + SCRRF |                                                         |                                        |                                                      |
|                      | Note: Emissions factors (scaled) are available for Du   | s SCRRF (Retrofits) therefore user det | ined fleet may be used                               |
| Concher              | Default Euro Proportions                                |                                        | User Euro Proportions                                |
| Goacaes              | 2017 - England (not London)                             |                                        | 2017 - England (not London)                          |
| 1Pre-Euro I          |                                                         |                                        |                                                      |
| 2Euro I              |                                                         | •                                      |                                                      |
| 3Euro II             | 0.03                                                    | i                                      | 0.03                                                 |
| 4Euro III            | 0.13                                                    | ;                                      | 0.0                                                  |
| 5Euro IV             | 0.10                                                    |                                        | 0.3                                                  |

0.08

0.40

| Joint | Air | Quality | Unit |
|-------|-----|---------|------|
|-------|-----|---------|------|

6Euro V\_EGR 7Euro V\_SCR 8Euro VI

3Euro II SCRRF 10Euro III SCRRF 11Euro IV SCRRF 12Euro V EGR + SCRRF

Coaches

| igure 22 – Euro Proportions for Buses and Coaches: A38 Southbound |                                                         |                                                      |  |
|-------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------|--|
| Buses                                                             | Default Euro Proportions<br>2017 - England (not London) | User Euro Proportions<br>2017 - England (not London) |  |
| 1Pre-Euro I                                                       |                                                         | •                                                    |  |
| 2Euro I                                                           | · · · · · · · · · · · · · · · · · · ·                   | 0.00                                                 |  |
| 3Euro II                                                          | 0.03                                                    | 0.0                                                  |  |
| 4Euro III                                                         | 0.13                                                    | 0.02                                                 |  |
| SEuro IV                                                          | 0.10                                                    | 0.2                                                  |  |
| 6Euro V_EGR                                                       | 0.00                                                    | 0.08                                                 |  |
| 7Euro V_SCR                                                       | 0.25                                                    | 0.24                                                 |  |
| 8Euro VI                                                          | 0.40                                                    | 0.40                                                 |  |
| 3Euro II SCRRF                                                    |                                                         |                                                      |  |
| 10Euro III SCRRF                                                  |                                                         |                                                      |  |
| 11Euro IV SCRRF                                                   |                                                         |                                                      |  |
| 12Euro V EGR + SCRRF                                              |                                                         |                                                      |  |

| 1Pre-Euro I          | -    | -    |
|----------------------|------|------|
| 2Euro I              | -    | 0.00 |
| 3Euro II             | 0.03 | 0.01 |
| 4Euro III            | 0.13 | 0.02 |
| SEuro IV             | 0.10 | 0.25 |
| 6Euro V_EGR          | 0.08 | 0.08 |
| 7Euro V_SCR          | 0.25 | 0.24 |
| 8Euro VI             | 0.40 | 0.40 |
| 9Euro II SCRRF       | -    | -    |
| 10Euro III SCRRF     | -    | -    |
| 11Euro IV SCRRF      |      | -    |
| 12Euro V EGR + SCRRF | -    | -    |
| 1                    |      |      |
|                      |      |      |

Figure 23 – Euro Proportions for Buses and Coaches: A38 Northbound

0.06

0.19

0.35

| Buses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | User Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pre-Euro I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pre-Edior                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| +Euro III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Euro IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro V_EGR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Furo VI SCB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro (_oot)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro II SCRRF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro III SCRRF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Furo IV SCODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro V EGR + SCRRF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Note: Emissions factors (scaled) are available for Bus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SCRRF (Retrofits) therefore user defined fleet may be used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| oaches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | User Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| re-Euro I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| lura l                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| uro II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Curo III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| uro IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| uro V_EGR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| uro V_SCR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| uro VI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| inter II SCODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| uro II SURRE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro III SCRRF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Euro IV SCRRF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LUID Y EUR + SURRE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>gure 24</b> , Figure<br>lative to the local<br>r the Full Hybrid                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Furo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>gure 24</b> , Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority<br>ars, the majority<br>ars <b>the majority</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>Proportions for Full Hybr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>Proportions for Full Hybr<br>Default Euro Proportions<br>2017 - England (sot London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| igure 24, Figure<br>elative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>Proportions for Full Hyb<br>Default Euro Proportions<br>2017 - England (sot Loadon)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hyb<br>Default Euro Proportions<br>2017 - England (sot London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hybr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>Proportions for Full Hyb<br>Default Euro Proportions<br>2017 - England (not London)<br>0.00<br>0.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hybe<br>Default Euro Proportioes<br>2017 - England (not London)<br>0.00<br>0.03<br>0.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gure 24, Figure<br>lative to the local<br>r the Full Hybrid<br>ars, the majority<br>gure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>Proportions for Full Hybr<br>Default Euro Proportions<br>2017 - England (sot London)<br>0.03<br>0.03<br>0.03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| igure 24, Figure<br>elative to the local<br>r the Full Hybrid<br>ars, the majority of<br>ars, the majorit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hybe<br>Default Euro Proportions<br>2017 - England (not London)<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | the default national Euro proportion for the ANPR survey data for the Award of the Award on the ANPR survey data for the Award on the ANPR survey data for the Award on the Award on the ANPR survey data for the Award on the Anne survey data for the Award on the Award on the Anne survey data for the Award on the Awar |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority of<br>igure 24 – Euro<br>ombined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hyb<br>Default Euro Proportices<br>2017 - England (sot London)<br>0.00<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38<br>User Euro Proportions<br>2017 - England (not London)<br>Cafult distribution based on postor cars                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority of<br>ars, the majori                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>and the vehicles were Euro<br>and the vehicles for Full Hybe<br>Derew distributes based on petro cars<br>Default Euro Proportions<br>2017 - England (not London)<br>Cafewir distribution based on patro cars<br>Default Euro Proportions<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.00<br>0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38<br>User Euro Proportions<br>2017 - England (not London)<br>User Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority of<br>ars, the majority of<br>ars, the majority of<br>all Hybrid Petrol Car<br>re-Euro 1<br>and 5<br>and 5<br>and 6<br>and 7<br>and | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hybe<br>Default Euro Proportions<br>2017 - England (not London)<br>Codewit distribution based on parted care<br>Default Euro Proportions<br>2017 - England (not London)<br>Default Euro Proportions<br>2017 - England (not London)<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.03                                                    | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38<br>Defend defendence data and defendence<br>User Euro Proportions<br>2017 - England (and London)<br>Colour defendence data and defendence<br>User Euro Proportions<br>2017 - England (and London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority of<br>igure 24 – Euro<br>ombined<br>Il Hybrid Petrol Car<br>re-Euro 1<br>suro 3<br>uro 6<br>uro 6<br>uro 6<br>c                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hyb<br>Default Euro Proportions<br>2017 - England (not London)<br>0.00<br>0.03<br>0.23<br>0.33<br>0.33<br>0.33<br>0.33<br>0.33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38<br>User Euro Proportions<br>2017 - England (not London)<br>Colour distribution based on parted care<br>User Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority of<br>ars, the majori                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>of the vehicles were Euro<br>of the vehicles dere Euro<br>Proportions for Full Hybe<br>Default Euro Proportions<br>0.000<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0.030<br>0. | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38<br>Correct distribution based on performance<br>User Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| igure 24, Figure<br>elative to the local<br>or the Full Hybrid<br>ars, the majority of<br>ars, the majori                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25 and Figure 26 show<br>Euro proportions derived f<br>fleet. The survey data sho<br>of the vehicles were Euro<br>of the vehicles were Euro<br>Proportions for Full Hyb<br>Default Euro Proportions<br>2017 - England (not London)<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | the default national Euro proporti<br>rom the ANPR survey data for the A<br>w that for Full Hybrid Petrol and Die<br>5 and Euro 6.<br>rid Petrol and Diesel Cars : A38<br>User Euro Proportions<br>2017 - England (not London)<br>User Euro Proportions<br>2017 - England (not London)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

Figure 25 – Euro Proportions for Full Hybrid Petrol and Diesel Cars: A38

#### Southbound

|                        | Denote a second state of perior cars                    | because any reason based on perior cars              |
|------------------------|---------------------------------------------------------|------------------------------------------------------|
| Full Hybrid Petrol Car | Default Euro Proportions<br>2017 - England (not London) | User Euro Proportions<br>2017 - England (not London) |
| 1Pre-Euro 1            | -                                                       | -                                                    |
| 4Euro 3                | 0.00                                                    |                                                      |
| SEuro 4                | 0.03                                                    | 0.02                                                 |
| 6Euro 5                | 0.23                                                    | 0.26                                                 |
| 7Euro 6                | 0.32                                                    | 0.37                                                 |
| 7Euro 6c               | 0.30                                                    | 0.35                                                 |

| Fall Discal Habrid Car | Default Euro Proportions    | User Euro Proportions       |
|------------------------|-----------------------------|-----------------------------|
| i un bieser nybrid Gar | 2017 - England (not London) | 2017 - England (not London) |
| 6Euro 5                | 0.13                        | 0.56                        |
| 7Euro 6                | 0.37                        | 0.19                        |
| 7Euro 6c               | 0.43                        | 0.25                        |
| 7Euro 6d               | -                           |                             |

# Figure 26 – Euro Proportions for Full Hybrid Petrol and Diesel Cars: A38 Northbound

|                        | person discrimination passes on perior cars             | because any measurement of perior cars               |      |
|------------------------|---------------------------------------------------------|------------------------------------------------------|------|
| Full Hybrid Petrol Car | Default Euro Proportions<br>2017 - England (not London) | User Euro Proportions<br>2017 - England (not London) | )    |
| 1Pre-Euro 1            |                                                         |                                                      | -    |
| 4Euro 3                | 0.00                                                    |                                                      |      |
| 5Euro 4                | 0.03                                                    |                                                      | 0.02 |
| 6Euro 5                | 0.23                                                    |                                                      | 0.25 |
| 7Euro 6                | 0.32                                                    |                                                      | 0.38 |
| 7Euro 6c               | 0.30                                                    |                                                      | 0.36 |
|                        |                                                         |                                                      |      |

| Full Diesel Hybrid Car | Default Euro Proportions<br>2017 - England (not London) | User Euro Proportions<br>2017 - England (not London) |
|------------------------|---------------------------------------------------------|------------------------------------------------------|
| 6Euro 5                | 0.13                                                    | 0.50                                                 |
| 7Euro 6                | 0.37                                                    | 0.22                                                 |
| 7Euro 6c               | 0.43                                                    | 0.29                                                 |
| 7Euro 6d               | -                                                       | · · ·                                                |

**Diurnal Profiles** 

Figure 27, Figure 28 and

**Figure 29** illustrates the diurnal profiles for the A38 from the ANPR survey completed, changes in traffic flows at each hour throughout the day on 15th (Friday), 16th (Saturday), and 17<sup>th</sup> (Sunday) June 2018 have been plotted. The a.m. and p.m. peaks, inter-peak and off-peak periods are clearly visible on the Friday, whilst the profile on the Saturday and Sunday show a characteristic single peak later in the day (with the Sunday exhibiting a lower flow than the Saturday).

#### Figure 27 – Diurnal Traffic Flows: A38 Combined





#### Local Dispersion Modelling

A local dispersion modelling study was undertaken to assess annual mean NO<sub>2</sub> concentrations across the A38 PCM exceedance stretch, with 2017 taken to be the baseline year. The ADMS-Roads model (version 4.1.1) and the Emissions Factors Toolkit (EFT version 8.0.1.a) were used for the purposes of the study, with traffic data used as input to the model derived from a combination of available sources, including:

- 2017 DfT traffic count data (AADF and fleet composition);
- June 2018 ANPR survey data (AADF, fleet composition, Euro composition and diurnal profile); and
- 2018 speed data from a Bluetooth journey time survey completed on the A38 between the 26<sup>th</sup> of June and the 5<sup>th</sup> of July.

Meteorological data from a representative station is required by the dispersion model. 2017 meteorological data from the Nottingham/Watnall weather station, approximately 30km northwest from the PCM exceedance stretch, has been used in this assessment.

Annual mean NO<sub>2</sub> concentrations were predicted for the 2017 baseline scenario across the following receptor groups:

- Receptors 4m from the kerb of the A38 PCM exceedance stretch (246 receptors to facilitate direct comparison against the PCM model predictions referred to as 'PCM receptors'); and
- The reference point used in this study for demonstrating compliance is 4m from the carriageway. From a public health perspective BDC consider that the relevant locations are the places where the public would be exposed such as footpaths etc. (which does not necessarily fit with the 4m criteria of this study). BDC have therefore identified eight additional receptor locations based on locations where the public have access to be added to the model and these are included in the report to give context to the potential health risk. Details of these receptors can be found in Table A.4 of Annex 1 with

their locations illustrated in Figure A5 of Annex 1. These receptors are referred to as BDC specific receptors.

All receptors were included at a height of 2m.

Details of the discrete receptors, traffic data, background concentrations, meteorological data and the verification process can be found in Annex1.

#### Results

#### PCM Receptors

Full results for PCM receptors can be found in Annex3. 246 PCM receptors were modelled along the A38 PCM exceedance stretch, 155 receptors were located within BDC and 91 were located within ADC. Of these, 46 receptors within BDC were predicted to have NO<sub>2</sub> concentrations above  $40\mu g/m^3$  in 2017. The maximum predicted concentration at a PCM receptor was located within the central reservation between the A38 exit and entrance arms of the Pinxton Interchange roundabout. The model predicted NO<sub>2</sub> concentration at this receptor (R174) was  $60.2\mu g/m^3$ .

In comparison with the PCM modelled results it appears there is a discrepancy with regards to the annual mean NO<sub>2</sub> concentrations being predicted along the PCM exceedance stretch. The local dispersion model results are reporting much higher NO<sub>2</sub> concentrations which suggest compliance for the 28528 link will not necessarily be met by 2021.

Figure 30 and Figure 31 below details the locations of the residential and PCM receptors which are exceeding the NO<sub>2</sub> annual mean AQS objective, the black hatches show a receptor that has exceeded the NO<sub>2</sub> annual mean objective.





BDC specific receptors

Full results for BDC specific receptors can be found in Annex3. Eight BDC specific receptors were modelled along the A38 PCM exceedance stretch. Of these eight receptors two were predicted to have NO<sub>2</sub> concentrations above  $40\mu g/m^3$  in 2017. Both these receptors are located on the short stretch of footpath between Carter Lane East and where it crosses the M1 roundabout (SH-A and SH-B as shown in Figure A5 of Annex 1). The model predicted NO<sub>2</sub> concentration at receptors SH-A and SH-B was 51.8 $\mu g/m^3$  and 46.7 $\mu g/m^3$  respectively.

#### **Source Apportionment**

To help inform the development of measures listed in Part 2 of the Targeted Feasibility Study, source apportionment for the entire A38 link for the different road traffic categories has been undertaken. Table 3 and Figure 32 show results for the source apportionment exercise based on the modelled discrete receptors for the modelled baseline year of 2017.

Source apportionment results have been calculated for three different selections of the modelled receptors:

1. Average across all modelled receptors – This provides an average at all modelled receptors and so is useful when considering possible measure to

test and adopt. It will however understate road NO<sub>x</sub> concentrations in problem areas;

- Average across all receptors with NO<sub>2</sub> Concentration greater than 40µg/m<sup>3</sup> This provides an average at receptors exceeding the AQS objective. This provides an indication of source apportionment in areas known to be a problem and so would hopefully show greater results when testing and adopting measures; and
- 3. At the receptor with maximum road NO<sub>x</sub> Concentration Provides the NO<sub>x</sub> source apportionment at the receptor with the highest predicted road NO<sub>x</sub> concentration. This is likely to be in the area of most concern and so a good place to test and adopt measure. Any gains predicted by measures are however likely to be greatest at this location and so would not represent gains across the whole modelled area.

When considering the average NO<sub>x</sub> concentration across all modelled receptors, road traffic accounts for 42.1µg/m<sup>3</sup> (60.4%) of 69.7µg/m<sup>3</sup>. Of this 42.1µg/m<sup>3</sup>, Cars account for the most (25.5%) of any of the vehicle types. LGVs and HGVs also account for a relatively high proportion of the overall predicted NO<sub>x</sub> concentration at 16.5% and 17.7%.

When considering the average  $NO_x$  concentration at receptors with an  $NO_2$  concentration greater than  $40\mu g/m^3$ , road traffic accounts for  $57.5\mu g/m^3$  (62.8%) of  $91.5\mu g/m^3$ . Of this  $57.5\mu g/m^3$ , HGVs account for the most (27.2%) of any of the vehicle types. Cars also account for a high proportion of the overall predicted  $NO_x$  concentration at 22.0%.

At the receptor with the maximum road NO<sub>x</sub> concentration (Receptor 174 located within the central reservation between the A38 exit and entrance arms of the Pinxton Interchange roundabout), road traffic accounts for  $91.8\mu g/m^3$  (72.9%) of 125.8 $\mu g/m^3$ . Of this 125.8 $\mu g/m^3$ , HGVs account for the most (33.3%) of any of the vehicle types. Cars are the second highest contributor to the overall predicted NO<sub>x</sub> concentration at 31.3 $\mu g/m^3$  of NO<sub>x</sub> representing 24.9% of the overall predicted NO<sub>x</sub> concentration.

Figure 8 shows that HGVs make up a small proportion of the fleet on the A38 exceedance stretch, compared to the total number of cars a small number of HGVs travelling on the link are shown to contribute to a significant amount of the total  $NO_x$  concentration.

| Results                                            | All<br>Vehicles | Car                 | LGV     | HGV     | Bu<br>s | Motorcyc<br>le | Backgrou<br>nd |  |  |
|----------------------------------------------------|-----------------|---------------------|---------|---------|---------|----------------|----------------|--|--|
| Average Across All Modelled Receptors              |                 |                     |         |         |         |                |                |  |  |
| NO <sub>x</sub> Concentration<br>(μg/m³)           | 42.0            | 17.7                | 11.5    | 12.3    | 0.4     | 0.1            | 27.6           |  |  |
| Percentage of Total NO <sub>x</sub>                | 60.3            | 25.5                | 16.5    | 17.7    | 0.6     | 0.1            | 39.7           |  |  |
| Percentage Contribution<br>to Road NO <sub>x</sub> | 100.0           | 42.2                | 27.4    | 29.3    | 1.0     | 0.1            | -              |  |  |
| Average Across All Location                        | ons With NC     | D <sub>2</sub> Cond | entrati | on Grea | ter Tha | an 40µg/m³     |                |  |  |

#### Table 3 – Source Apportionment Results

| NO <sub>x</sub> Concentration<br>(μg/m³)           | 57.5                 | 20.2  | 12.0     | 24.9   | 0.4     | 0.0 | 34.0 |
|----------------------------------------------------|----------------------|-------|----------|--------|---------|-----|------|
| Percentage of Total NO <sub>x</sub>                | 62.8                 | 22.0  | 13.1     | 27.2   | 0.5     | 0.0 | 37.2 |
| Percentage Contribution<br>to Road NO <sub>x</sub> | 100.0                | 35.1  | 20.9     | 43.2   | 0.8     | 0.1 | -    |
| At Location With Maximum                           | Road NO <sub>x</sub> | Conce | ntration | (Recep | tor 174 | 4)  |      |
| NO <sub>x</sub> Concentration<br>(µg/m³)           | 91.8                 | 31.3  | 17.7     | 41.9   | 0.7     | 0.1 | 34.0 |
| Percentage of Total NO <sub>x</sub>                | 72.9%                | 24.9  | 14.1     | 33.3   | 0.6     | 0.0 | 27.1 |
| Percentage Contribution<br>to Road NO <sub>x</sub> | 100.0%               | 34.2  | 19.3     | 45.7   | 0.8     | 0.1 | -    |

# Figure 32– Pie Charts Showing Source Apportionment Results



Τ



#### Local Dispersion Modelling Results - Summary

The discrete receptor modelled concentrations suggest there is a greater problem than originally predicted by the PMC national model. In comparison with the PCM results, the local dispersion modelling has predicted much higher NO<sub>2</sub> concentrations suggesting compliance will not necessarily be met by 2021. As a consequence, JAQU have validated the local dispersion modelling exercise and have concluded that it provides for an accurate reflection of the air quality along the A38 PCM exceedance stretch. The Council therefore consider that the findings from the local dispersion modelling exercise supersede the PCM national model predictions, thereby providing for a revised baseline air quality position along Census ID 28528, i.e. the annual mean NO<sub>2</sub> concentration results from the local dispersion model predictions. It has also been agreed that the projected local dispersion modelling results should form the basis of assessing whether any measures will help to bring forward compliance.

# Part 2: Developing a long list of measures for addressing the exceedances

This section should provide a long list of possible measures to be considered for each road link. Local authorities should consider the source apportionment set out in part 1.

The NO<sub>x</sub> source apportionment presented in Part 1 of this study has been taken in to account when developing a long list of measures for addressing the exceedances. This showed that HGVs and diesel cars are the biggest local transport contributors to NO<sub>x</sub> concentrations on the A38.

A long list of measures follows, some of these interventions would be designed to increase capacity and reduce congestion to benefit the operation of the highway network. The main benefits will include improvements to journey times, improved capacity and through flow at junctions. In terms of air quality benefits, these improvements will allow reductions in car idling time and the resultant reductions of NO<sub>x</sub> and NO<sub>2</sub> emissions at junctions in this locality.

#### **Potential Measures**

- Car Club Targeted provision of additional electric car club vehicles.
- Promotion of Rail complimented by Station Accessibility Audits Promotional activity through campaigns. Accessibility Audits carried out at main stations.
- Implementation of Public Transport Infrastructure Improvements -Implementation of Public Transport Infrastructure RTI, enhanced shelters, raised kerbs, bus priority etc.
- Workplace Capital Grant Scheme Capital grants to encourage the use of sustainable travel modes, such as, cycle storage, lockers and showers.

- Getting about campaign and dedicated travel website Area wide behaviour change campaign, travel website providing journey planning advice, Area Cycle / Bus maps, promotional activity on-going etc.
- Parking enforcement Decriminalised parking powers secured, parking enforcement officers target hotspots. CCTV camera car enforces at school zig-zags and bus stop clearways.
- Multi modal / operator smartcard ITSO compliant smartcard. Backed up with promotional campaigns, bus info via Getting about website etc.
- Behaviour change campaigns to reduce single occupancy car trips Commuter Challenge, Bike Week, Walk to School Month, etc.
- Car Share Promotion of Car Share and Car Share Week.
- Transition Travel Choices Campaign Campaign to target travel behaviour change for those going through key transition in life, i.e. changing jobs, moving house, etc.
- Promotion of sustainable development Work with Development Control team to support development designed to minimise reliance on private car.
- No idling campaign Promote no idling campaign at main junctions.
- Job Seeker Travel Scheme Working with Job centres to promote cycling through bike voucher scheme and training.
- Apprentice Travel Scheme Assisting apprentices' access employment and learning through sustainable travel.
- Taxi Licencing Work towards "greening" taxi fleet through specifying low emission vehicles including EV's.
- Closure and relocation of public access points re-routing of public footpaths and open spaces to locations away from exceedance area.
- Freight and Delivery Management measures Quiet or out of hours delivery, Freight Partnerships between companies, and Delivery and Service plans.

# Part 3: Assessing deliverability/feasibility and delivering a short list

For each of the measures identified in part 2, local authorities should set out an assessment of deliverability including how long it would take to deliver each measure and whether it is practicably feasible to deliver. Based on this assessment of deliverability and feasibility, the local authority should develop a short list of measures to take forward to part 4 of the report.

#### New measures

In this section we consider whether any of the potential measures presented in Part 2 of this study are practically deliverable in time to be able to bring forward compliance on the A38 exceedance stretch. As discussed in Part 1 above, the road link of relevance on the A38 exceedance stretch (ID 28528) is projected to become compliant in 2021 so any measure would, as a minimum, need to be deliverable, at the latest, by the end of 2020 to be able to bring forward compliance.

#### Measures rejected due to deliverability issues

The original list in Part 2 contained several measures which could be potentially delivered to achieve compliance. After careful consideration, the following have been rejected due to deliverability issues:

*Car Club* (No.1) – As Bolsover is rural in nature, the Car Club scheme would likely encounter accessibility issues and as a potential consequence scheme providers may be reluctant to invest in the area. On this basis, it is believed that introducing a Car Club scheme within Bolsover would not help achieve compliance in the shortest time possible.

Promotion of Rail complimented by Station Accessibility Audits (No. 2) - The estimated amount of vehicular traffic as a result of journeys to and from nearby train stations on the A38 exceedance stretch is thought to be insignificant, therefore measures targeting these demographics in using alternative forms of transport are likely to be ineffective in achieving compliance in the shortest time possible. In addition, the journeys taken by private cars on the identified link which could be replaced with rail is estimated to be insignificant.

*Implementation of Public Transport Infrastructure Improvements* (No. 3) - Buses contribute less than 1% of total NO<sub>2</sub> concentrations found on the A38 exceedance stretch, therefore improvements to public transport and associated infrastructure would likely have a minimal impact on achieving compliance.

*Workplace Capital Grant Scheme* (No. 4) - Grants to fund infrastructure to promote sustainable travel modes such as cycle storage, lockers and showers isn't feasible to deliver on the A38 corridor. The effects of implementing such schemes would not cause specific short term air quality benefits along the A38 exceedance stretch.

*Parking enforcement* (No. 6) - Introduction of parking enforcement on the corridor isn't feasible and would likely have an insignificant impact on achieving compliance. Parking on the A38 is not a common occurrence and as a consequence does not contribute to a large proportion of NO<sub>2</sub> concentrations on these links.

*Multi modal / operator smartcard* (No. 7) – Currently, the A38 exceedance stretch does not have any public transportation stops as evidenced by the minimal (<1%) contribution buses have to NO<sub>2</sub> concentrations on the link. Therefore, any measures focussing on the uptake of public transport would likely have an insignificant air quality benefit on the A38 exceedance stretch.

*Transition Travel Choices Campaign* (No. 10) – The target demographic is believed to be minimal, and it is therefore expected that this measure would not likely an impact on the number of vehicles using the A38 and consequently NO<sub>2</sub> concentrations.

*No idling campaign* (No.12) – Due to the relatively free flowing nature of the traffic on the A38 exceedance there are not normally many opportunities for idling. Therefore measures which target idling behaviour will be ineffective in reducing NO<sub>2</sub> concentrations on the A38 exceedance stretch.

Job Seeker Travel Scheme (No. 13) – The A38 is a busy road which is not designated for cyclists and does not currently have any public transportation links, therefore measures which incentivise the use of alternative modes of transport for communing are likely to be ineffective in reducing NO<sub>2</sub> concentrations on the A38 exceedance stretch.

Apprentice Travel Scheme (No. 14) – The A38 is a busy road which is not designated for cyclists and does not currently have any public transportation links, therefore measures which incentive the use of alternative modes of transport for communing are likely to be ineffective in reducing NO<sub>2</sub> concentrations on the A38 exceedance stretch.

*Taxi Licencing* (No. 15) – It is not believed that taxis make up a significant portion of the vehicle fleet on the A38, and so any changes to taxi licencing are only likely to have a minimal impact on reducing  $NO_2$  concentration on the A38 exceedance stretch.

*Closure and relocation of public access point* (No. 16) - No viable re-routing options available at most sensitive locations of exceedance. Not likely to improve air quality. An avoidance measure rather than an active improvement measure.

#### Shortlisted measures

We have included six of the measures from our long list in Part 2 onto our shortlist to take forward to Part 4, reflecting the measures which can be delivered sufficiently quickly, which are practically feasible, and which we believe are the most likely to bring forward compliance on both road links identified. Each of these measures has been assessed in terms of practical deliverability taking into account factors such as the amount of time each will likely take to implement, whether there is sufficient space for the necessary infrastructure to be built, and any other practical limitations that would allow these measures to bring forward compliance. Compared to the long listed measures that have been discounted on feasibility grounds, we consider the following measures to be the most likely to bring forward compliance in the shortest possible time. Our shortlisted measures are:

#### Potential new measures

- Getting about campaign and dedicated travel website (No. 5) Improvements to the accessibility of the <u>Council run travel dedicated website</u> is relatively easy to implement, and is effective in promoting sustainable transport. Currently, as there is no cycling or public transportation infrastructure along the A38 exceedance stretch, the air quality benefits this measure could deliver is expected to be minimal. However, this measure could have wider benefits across the district, and could be effective in the future if any cycling or public transport infrastructure were to be constructed along the A38 exceedance stretch.
- Behaviour change campaigns to reduce single occupancy car trips (No. 8) - Journeys made on the A38 corridor consist of a large proportion of commuters accessing nearby key employment sites within single occupancy private vehicles. Therefore, measures which target commuter's behaviour

could have an impact on the A38 corridor achieving compliance in reduced timescales

- Car Share (No. 9) Journeys made on the A38 corridor consist of a large proportion of commuters accessing nearby key employment sites within single occupancy private vehicles. Therefore, measures which target commuter's behaviour will have a significant effect on the A38 corridor achieving compliance in the shortest time possible. The use of a car share scheme, assisted by nearby employers can be implemented in a short period and should reduce vehicular trips on the network.
- **Promotion of sustainable development (No. 11)** Currently, there are no public transportation stops or cycling paths along the A38 exceedance stretch. Therefore, in order to achieve compliance in the shortest time possible, infrastructure which encourages the uptake of sustainable forms of transport needs to be constructed along this exceedance stretch to reduce the dependency of private vehicles. However, as this will require substantial funding and infrastructure, Bolsover District Council will investigate other existing public transportation routes within the area which can offer an effective alternative to those using a private vehicle on the A38 exceedance stretch.
- Freight and delivery management measure (No. 17) HGVs account for 33% of the total NO<sub>x</sub> on the A38 exceedance stretch, therefore measures which target this category of vehicles would be effective in reducing NO<sub>2</sub> concentrations on the A38 exceedance stretch in the quickest time possible.
- Working with local business on nearby industrial estates (No. 18) As industrial estates dominate land use surrounding the A38 exceedance stretch and make up a proportion of vehicles on the corridor, measures which target these vehicles could be effective in reducing NO<sub>2</sub> concentrations in the quickest time possible.

Refer to Annex 2 for the Measures Matrix which provides further details with regards to the decisions made to scope out or include certain measures to help bring forward compliance.

# Part 4: Evidencing the short listed measures to identify options that could bring forward compliance

In this section, local authorities should set out the likely effectiveness of the shortlisted measures in bringing forward compliance. Local authorities should assess each option against the Primary Critical Success Factor.

From the completion of Part 3 above a shortlist of six measures has been taken forward to the Part 4 stage of the Target Feasibility Study, these are:

• **Measure 5** - Getting about campaign and dedicated travel website - Area wide behaviour change campaign, travel website providing journey planning advice, Area Cycle / Bus maps, promotional activity on-going etc.

- **Measure 8** Behaviour change campaigns to reduce single occupancy car trips Commuter Challenge, Bike Week, Walk to School Month, etc.
- Measure 9 Car Share Promotion of Car Share and Car Share Week.
- **Measure 11** Promotion of sustainable development Work with Development Control team to support development designed to minimise reliance on private car.
- **Measure 17** Freight and Delivery Management measures Quiet or out of hours delivery, Freight Partnerships between companies, and Delivery and Service plans.
- **Measure 18** Working with local business on the industrial estates to promote and implement low emission/no emission vehicles and the implementation of low emission and no emission infrastructures.

These measures had been taken forward as they have been initially assessed as the most likely measures to positively effect NO<sub>2</sub> concentrations along the exceedance link and to help achieve compliance in the fastest time possible. It is worth noting that the assessment of these measures has only been undertaken in the study area around the two identified PCM links. It is likely that any proposed measures would be more effective in facilitating changes to vehicles if considered on a more regional scale along the A38 Corridor between the M1 and Mansfield.

Each measure will impact the existing traffic fleet that passes on the A38, the impact upon the fleet has been identified over three areas:

- Impact on Road Traffic Flow A change in the number of a certain vehicle type within the total number of vehicles for the road link, reducing numbers within the vehicle type and also affecting the percentage mix of vehicle types.
- Impact on Vehicle Fleet Composition (Engine Type and/or Euro Standard) Upgrading the fleet composition within a vehicle fleet to show a greater proportion of the fleet are lesser polluting vehicles, therefore reducing the overall emissions from the fleet.
- Impact on Average Vehicle Speed Changing the speeds of vehicles passing through the road link by alleviating congestion to allowing traffic to become more free-flowing or imposing a certain speed limit that matches a certain emission bracket for the majority of polluting vehicles.

# **Measures Testing**

The 2017 baseline dispersion modelling (presented in Part 1), suggest NO<sub>2</sub> concentrations reported along the PCM exceedance stretch are greater than previously predicted by the PCM model. The local dispersion modelling has been accepted by JAQU in place of the PCM predictions, and therefore forms a revised baseline position with regards to air quality along the PCM exceedance stretch. The dispersion model was run in future years to ascertain when compliance will likely be achieved. Traffic inputs were factored to each future year using the relevant Trip End Model Presentation Program (TEMPro) factors. TEMPro is a modelling tool designed to allow users to look at the growth in trip ends, using actual and forecast data supplied by the DfT. The following growth factors were applied to adjust the 2017 flows:

• 2017 to 2018 using a growth factor of 1.0099;

- 2017 to 2019 using a growth factor of 1.02005;
- 2017 to 2020 using a growth factor of 1.03005;
- 2017 to 2021 using a growth factor of 1.0401;
- 2017 to 2022 using a growth factor of 1.04765; and
- 2017 to 2023 using a growth factor of 1.0552.

Table 4 details the concentrations at the worst-case receptor (R174) between 2017 (baseline year) and 2023 (the year compliance is achieved), in the absence of any intervention measures being implemented. The receptor is located at grid reference point 445455, 356334, which is located off the exit arm of the Pinxton Interchange roundabout to the A38 and is within the central reservation between the A38 exit and entrance arms.

| Year | Annual Mean NO <sub>2</sub><br>Concentration (µg/m <sup>3</sup> ) | Year | Annual Mean NO <sub>2</sub><br>Concentration (μg/m <sup>3</sup> ) |
|------|-------------------------------------------------------------------|------|-------------------------------------------------------------------|
| 2017 | 60.2                                                              | 2021 | 45.1                                                              |
| 2018 | 56.4                                                              | 2022 | 41.7                                                              |
| 2019 | 52.5                                                              | 2023 | 39.0                                                              |
| 2020 | 48.7                                                              |      |                                                                   |

| Table 4 – | Model | results | for all | years | without | measures |
|-----------|-------|---------|---------|-------|---------|----------|
|-----------|-------|---------|---------|-------|---------|----------|

It can be seen that assuming no measures are implemented, compliance will not be achieved until 2023. Further modelling and assessment was then carried out to determine the ability for the implementation of the above short-listed measures to bring forward compliance from 2023. For each measure, a quantification of the potential improvements associated to the measure has been identified based on similar identified schemes that have been implemented across the UK. The impact upon the fleet, as discussed above, has been split into three areas (impact on road traffic flow, vehicle fleet composition and average vehicle speed).

In addition, to assessing against the Primary Critical Success Factor (PCSF), an initial quantification of annual NO<sub>x</sub> emissions (kg/yr) has been completed for each individual measure to estimate possible NO<sub>x</sub> reductions. To complete this quantification the Emissions Factors Toolkit (EFT) v8.0.1a has been used. The annual NO<sub>x</sub> emissions in 2018 for the two A38 road links, without any of the recommended measures in place has been calculated as **7,907kg/yr** for 7353, and **6,440kg/yr** for 28528.

The impact of each measure and the estimated annual NOx emissions (kg/yr) is shown below.

Measures 5, 8 and 11

#### Impact on Road Traffic Flow:

2% reduction for each measure in total car numbers.

It would be anticipated that each of the measures 5, 8 and 11 will gradually reduce the

number of vehicles on the roads through on-going education and wider awareness of alternative modes of transport. Improving public transport routes to make them more effective will reduce the number of people relying on private vehicles. Diesel and petrol cars are the highest contributors to NO<sub>x</sub> emissions along the PCM exceedance stretch so an increase uptake of alternative transport options should help reduce NO<sub>x</sub> emissions.

Studies by Stopher et al, 2009 and Davies, 2012 have shown that soft measures aimed at altering behavioural changes can reduce car-as-drive trips by between 5 - 15%. A 2% reduction in car traffic flows has been applied to the PCM exceedance stretch to conservatively assess the impact. The combined impact of Measures 5, 8 and 11 is 6%.

#### Impact on Vehicle Fleet Composition:

No impact from these measures.

A combination of Measure 5, 8 and 11 will help to bring about overall behavioural change in the District.

The measure targets a modal shift from private car usage to either the use of personal sustainable transport such as walking or cycling, or to increased use of public transport. Fleet composition is not specifically targeted through this measure as the aim is to reduce the number of private cars rather than improve the fleet composition.

It should be noted though that if there is an increase in the frequency of bus journeys being taken and the existing bus fleet needs to be updated and expanded upon, this presents an opportunity for more efficient and less polluting vehicles to be introduced into the fleet.

# Impact on Average Vehicle Speed:

No impact from these measures.

A combination of Measure 5, 8 and 11 will help to bring about overall behavioural change in the District.

The measure has been proposed to reduce the number of private vehicles within the traffic fleet on the local roads. The majority of the section of the A38 in question is free flowing, there is only congestion at the junction with the M1. Therefore it is not thought vehicle speeds will be noticeably affected by the implementation of this measure.

# Estimated Maximum NO<sub>x</sub> Annual Emissions (with measure):

For each measure with a 2% reduction in car numbers:

2018: Link 7353 - 7,849kg/yr - Reduction of 58kg/yr,

2018: Link 28528 - 6,586kg/yr - Reduction of 58kg/yr

2019: Link 28528 - 6,113kg/yr - Reduction of 1794kg/yr

2020: Link 28528 - 5,677kg/yr - Reduction of 2230kg/yr

2021: Link 28528 - 5,128kg/yr - Reduction of 2779kg/yr

Measure 9

# Impact on Road Traffic Flow:

Car traffic flow reduced by 105 vehicles.

Car club members typically reduce their annual household mileage and car ownership. According to one study completed by Cairns and Harmer (<u>https://como.org.uk/why/</u>), 30.6% of those surveyed reduced their car ownership after joining a car club. Therefore, the impact on traffic flow whilst positive may not be of a level which will achieve the PCSF, depending on who chooses to join the scheme.

There is expected to be an overall reduction of cars on the roads. For each vehicle introduced as part of the club car, 10.5 vehicles are estimated to be removed from the road. This is dependent on uptake of the scheme and the number of cars available in the programme. For the purposes of this study it has been conservatively estimated that there will be 10 car club cars used along the PCM exceedance stretch and therefore a reduction in traffic on both road links by 105.

#### Impact on Vehicle Fleet Composition:

No impact from measure.

Car Clubs substitute private vehicles with electric vehicles or low emission vehicles. Car Club cars will be the latest Euro standards.

Will likely alter the Euro standard composition on the road. However, the change in composition is unlikely to be substantial as the change will be small compared to the number of other cars on the road. It is estimated that 75% of the traffic along the PCM exceedance stretch are cars/taxis. Nonetheless, 21% of total NO<sub>x</sub> emissions are currently associated with diesel cars. A reduction in diesel cars on the roads will be evident which will have some impact on NO<sub>x</sub> emissions.

Based on the assumption of introducing 10 car club cars, the shift in fleet composition is not likely to aid achievement of the PCSF and so has not been assessed.

#### Impact on Average Vehicle Speed:

No impact from measure.

Average speeds along the PCM exceedance stretch will likely increase due to the reduction in number of cars as the uptake of Car Club membership increases. Increase in speed will be associated with a reduction in congestion on the road. Change in speed however is unlikely to aid achievement of the PCSF and so has not been assessed.

# Estimated Maximum NO<sub>x</sub> Annual Emissions (with measure):

2018: 7353 - 7897kg/yr - Reduction of 10kg/yr,

2018: Link 28528 - 6635kg/yr - Reduction of 9kg/yr

2019: Link 28528 - 6161kg/yr - Reduction of 1746kg/yr

2020: Link 28528 - 5722kg/yr - Reduction of 2185kg/yr

2021: Link 28528 - 5227kg/yr - Reduction of 2680kg/yr

Measure 17

#### Impact Upon Road Traffic Flow:

No impact from measure.

The promotion of out of hours deliveries/collections would help alleviate congestion and peak pollutant concentrations at peak traffic periods during the day. Moving delivery/collection times should allow the vehicles to travel at a more constant speed, reducing periods of acceleration and deceleration. This should reduce emissions overall across the day.

Local businesses would need to be engaged early to assist with implementing the measure as there may be ramifications for them based upon cost, staffing and insurance. The council could take a lead by example approach implementing the measure for council fleet vehicles. This could then be used as a template for local businesses. Initially a review of deliveries/collections should be completed and for it to be identified whether any deliveries/collections could be completed outside of peak hours.

Since 2015, the Mayor on London retiming deliveries programme has helped more than 500 London businesses retime their deliveries outside peak hours.

HGVs and vans make up around 35% of all road-based NOx emissions in Greater London. Congestion is a major contributor and using off-peak times when roads are less congested is helping to reduce the environmental impacts of HGVs.

#### Impact on Vehicle Fleet Composition:

No impact from measure.

The measure is designed to change the numbers of HGVs on the A38 throughout the day. It is not thought that changes in the fleet composition following implementation of measure 17 are likely to aid achievement of the PCSF and so have not been assessed.

#### Impact on Average Vehicle Speed:

Possible slight increase in traffic speeds during peak hours.

The measure is designed to change the numbers of HGVs on the A38 throughout the

day. Due to less vehicles being on the road at peak times an increase of speed may be experienced within the traffic fleet due to the roads being less congested.

#### Measure 18

#### Impact on Road Traffic Flow:

5% reduction in the total number of HGVs.

Due to the number of commercial premises located just off the A38 the number of HGVs as a proportion of the total fleet travelling on the A38 is high. Businesses should undertake a review of their vehicle fleets and their vehicle movements to assist in identification of efficiencies to enable a reduction in the total number of vehicle movements being undertaken.

The number of HGV trips can be assessed so that deliveries/collections, where applicable are completed only when there is a full consignment. Where a HGV is not required, a smaller LGV vehicle may be used to complete the delivery/collection reducing the overall number of HGVs travelling on the A38.

Within London the courier firm UPS is currently upgrading its entire central London fleet to run on electric power. This will equate to 170 trucks operating in central London being run on electric power rather than conventional diesel engines. This development hopes to be instrumental in enabling electric vehicles to be deployed at scale in cities tackling air quality challenges.

#### Impact on Vehicle Fleet Composition:

Removal of older Euro Class I, II and III vehicles and adding their fleet proportions to the Euro Class VI.

Due to the number of commercial premises located just off the A38 the number of HGVs as a proportion of the total fleet travelling on the A38 is high. Businesses should undertake a review of their vehicle fleets and their vehicle movements to enable a shift to less polluting vehicles to be undertaken.

A review of the vehicle fleet owned by business may identify older, more polluting vehicles can be replaced by more efficient, less polluting vehicles. The council can aid in this process by providing details on the benefits of replacing certain vehicles within a fleet based upon both cost and environmental aspects.

#### Impact on Average Vehicle Speed:

No impact from measure.

The measure has been designed to influence both the number of HGVs and the fleet composition of vehicles. It is not thought that the measure will result in changes to speeds which will aid achievement of the PCSF.

#### Estimated Maximum NO<sub>x</sub> Annual Emissions (with measure):

2018: 7353 - 7,632kg/yr - Reduction of 275kg/yr,

2018: Link 28528 - 6,384kg/yr - Reduction of 260kg/yr

2019: Link 28528 - 6,000kg/yr - Reduction of 1907kg/yr

2020: Link 28528 - 5,617kg/yr - Reduction of 2290kg/yr

2021: Link 28528 - 5,160kg/yr - Reduction of 2747kg/yr

A summary of the estimated reductions can be seen in Table 5, and the prediction reduction in annual NO<sub>x</sub> emissions is provided in Table 6 below. The 2018 baseline annual emissions are presented in addition to the annual emissions for each subsequent year where the PCM model has predicted the road link to be in exceedance. For measures 5, 8 and 11 a 2% reduction in total car numbers has been assessed, for measure 9 a reduction of 105 in total car numbers has been assessed, and for measure 18 a 5% reduction in HGV numbers has been applied in addition to an upgrade to the HGV fleet.

| Measure No. | Description                             | Estimated Reduction                                                 |
|-------------|-----------------------------------------|---------------------------------------------------------------------|
| 5           | Behavioural Change                      | 2% reduction in cars                                                |
| 8           | Behavioural Change                      | 2% reduction in cars                                                |
| 9           | Car Clubs                               | 105 cars removed from the road                                      |
| 11          | Promotion of Sustainable<br>Development | 2% reduction in cars                                                |
| 18          | Working with local Businesses           | 5% reduction in HGV numbers<br>Removing Euro I, II and III vehicles |

| Table <sup>J</sup> | 5 _ | Estimated | Reductions  | from | Pronosed | Measures    |
|--------------------|-----|-----------|-------------|------|----------|-------------|
| I able             | J – | Lounated  | Neuluclions |      | FIUPUSEU | ivicasui cs |

#### Table 6 – Annual NO<sub>x</sub> Emissions

|                           |              | Annual NO <sub>x</sub> Emissions (kg/yr) |                     |                       |       |       |  |  |  |  |  |
|---------------------------|--------------|------------------------------------------|---------------------|-----------------------|-------|-------|--|--|--|--|--|
| Road Link 2018<br>Baselin | 2018         | Maagura Number                           |                     | Emission with Measure |       |       |  |  |  |  |  |
|                           | Baseline     | Measure Number                           | 2018                | 2019                  | 2020  | 2021  |  |  |  |  |  |
|                           |              | 5, 8 or 11                               | 6,586               | 6,113                 | 5,677 | 5,128 |  |  |  |  |  |
| 28528<br>(Bolsover)       | 6,644        | 9                                        | 6,635               | 6,161                 | 5,722 | 5,227 |  |  |  |  |  |
|                           |              | 18                                       | 6,384               | 6,000                 | 5,617 | 5,160 |  |  |  |  |  |
|                           |              | 5, 8 or 11                               | 7,849               | -                     | -     | -     |  |  |  |  |  |
| 7353<br>(Ashfield)        | 7,907        | 9                                        | 7,897               | -                     | -     | -     |  |  |  |  |  |
|                           |              | 18                                       | 7,632               | -                     | -     | -     |  |  |  |  |  |
| The road link             | < 7353 has b | been predicted by the                    | PCM model to achiev | e compliance within 2 | 019   |       |  |  |  |  |  |

The dispersion model was run to take into consideration the best case scenario, i.e. the implementation of all proposed measures in combination. The traffic flows and Euro compositions were amended based on the assumed cumulative improvements associated with the above measures. Assuming all 5 shortlisted measures are implemented in combination, it is estimated there will be a 6% reduction of cars on the road (measures 5, 8 and 11), a further reduction of 105 cars on the road (measure 9), a 5% reduction of HGVs on the road (measure 18) and a decrease of Euro I, II and III HGVs (measure 18).

Upon completion of the quantification of the predicted impacts from the selected measures, JAQU advised that the predicted % reduction in vehicle numbers may be unrealistic. Following the comments provided by JAQU, the estimated reductions produced by the measures were revised and are presented in Table 7.

 Table 7 – Revised Estimated Reductions from Proposed Measures Following JAQU

 Comments

| Measure No. | Description                             | Estimated Reduction                                                   |  |  |  |
|-------------|-----------------------------------------|-----------------------------------------------------------------------|--|--|--|
| 5           | Behavioural Change                      | 1% reduction in cars                                                  |  |  |  |
| 8           | Behavioural Change                      | 1% reduction in cars                                                  |  |  |  |
| 9           | Car Clubs                               | 53 cars removed from the road                                         |  |  |  |
| 11          | Promotion of Sustainable<br>Development | 1% reduction in cars                                                  |  |  |  |
| 18          | Working with local Businesses           | 2.5% reduction in HGV numbers<br>Removing Euro I, II and III vehicles |  |  |  |

The dispersion model was run for the final year of predicted non-compliance, 2022, to determine whether implementation of all the measures would bring forwards compliance to 2022 from the projected year of compliance of 2023.

Table 8 presents a comparison of the annual mean NO<sub>2</sub> concentration predicted at the worst case PCM receptor (R174) if no measures are implemented, if all measures are implemented based on the original vehicle reductions, and if all measures are implemented following comments by JAQU for 2017 and 2022.

# Table 8 – Annual Mean NO<sub>2</sub> Concentrations at the Worst Case PCM Receptor (R174) With and Without All Measures Implemented

|      | Annual N | lean NO <sub>2</sub> Concentration     | n (µg/m³)                            |  |
|------|----------|----------------------------------------|--------------------------------------|--|
| Year | Baseline | With All Measures (initial reductions) | With All Measures<br>(JAQU comments) |  |
| 2017 | 60.2     | -                                      | -                                    |  |
| 2018 | 56.4     | -                                      | -                                    |  |
| 2019 | 52.5     | -                                      | -                                    |  |
| 2020 | 48.7     | -                                      | -                                    |  |

| 2021 | 45.1 | -    | -    |
|------|------|------|------|
| 2022 | 41.7 | 40.7 | 41.2 |

It can be seen that compliance will not be bought forward even if all the shortlisted measures were to be implemented (either reduction scenario). This suggests that even if the estimated reductions predicted for each individual measure are still considered to be overly ambitious, the ability to bring forward compliance is minimal and is unlikely to bring about improvements to the overall NO<sub>2</sub> concentrations along the PCM exceedance stretch. This would suggest that a greater list of measures is required in order to accelerate compliance of NO<sub>2</sub> along the A38 Census ID 28528.

When considering future year predictions at BDC specific receptors, it was predicted that all eight receptors would be compliant using the baseline data by 2021. This is in agreement with the original JAQU screening prediction using the PCM model. It was found that similar to the results for PCM receptors, compliance will not be bought forward from 2021 even if all the shortlisted measures were to be implemented (either reduction scenario).

Annex 3 provides model concentration results predicted at all PCM and BDC specific receptors for each of the baseline year and with measures scenarios.

# Part 5: Setting out a preferred option

In this section, local authorities should set out a summary of their preferred option to bringing forward compliance (where such measures exist). Where new measures have been identified that could bring forward compliance, local authorities should also assess a range of Secondary Critical Success Factors in order to identify the preferred option.

Bolsover District Council (the Council, BDC) has one road link (census ID: 28258) projected to have an exceedance of the annual mean NO<sub>2</sub> Air Quality Standard of  $40\mu g/m^3$ . The road link under consideration is the stretch of the A38 that runs from the junction with, to where the A38 meets the district boundary that is shared with Ashfield District Council (ADC). The Ashfield stretch of the A38 is managed by Nottinghamshire County Council (NCC), with the BDC section managed by the Derbyshire County Council. The projected exceedance within BDC continues from the Pinxton Interchange roundabout on Junction 28 of the M1, across the district boundary with ADC until it reaches the junction with the B6023.

In order to determine a more accurate local position on compliance with the annual mean NO<sub>2</sub> limit value, the Council undertook a local Automatic Number Plate Recognition (ANPR) survey and associated local dispersion modelling exercise, in order to provide an improved insight in to the air quality along the A38 PCM exceedance stretch.

The ADMS-Roads model (version 4.1.1) and the Emissions Factors Toolkit (EFT version 8.0.1.a) were used for the purposes of the dispersion modelling study, with traffic data used as input to the model derived from a combination of available sources. Details of the model inputs, the model verification process and the model predicted annual mean NO<sub>2</sub> concentration results can be found in Annex 1.

Annual mean NO<sub>2</sub> concentrations were predicted at 246 PCM receptors across both BDC and ADC for a 2017 baseline scenario. The maximum annual mean NO<sub>2</sub> concentration at a PCM receptor along the A38 PCM exceedance stretch within BDC (Census ID 28258) was predicted to be  $60.2\mu g/m^3$  (PCM receptor R174). In comparison with the PCM modelled results, the local dispersion modelling results suggest there is a discrepancy with regards to the annual mean NO<sub>2</sub> concentrations predicted along the PCM exceedance stretch, with the PCM model predicting  $48\mu g/m^3$  along the A38 PCM exceedance stretch in 2017 (Census ID 28258).

The Joint Air Quality Unit (JAQU) have validated the local dispersion modelling exercise and have concluded that it provides for an accurate reflection of the air quality along the A38 PCM exceedance stretch (Census ID 28258). The Council therefore consider that the findings from the local dispersion modelling exercise supersede the PCM model predictions, thereby providing for a revised baseline air quality position along Census ID 28258, i.e. the annual mean NO<sub>2</sub> concentration results from the local dispersion model replace the PCM model predictions.

On this basis, Part 1 of the Targeted Feasibility Study concluded that there is a much greater problem than initially thought and compliance against the annual mean EU limit value of  $40\mu g/m^3$  is unlikely to be achieved by 2021, as predicted by the PCM model. Further dispersion modelling was carried out to ascertain the new predicted year of compliance based on the revised 2017 baseline findings. It was determined that compliance would now not be achieved until 2023.

As detailed in Table 1, three further diffusion tube monitoring locations were installed along the A38 exceedance stretch in March 2018. Once full 2018 concentration data is available for these monitoring locations these can be further used to confirm the current NO<sub>2</sub> concentrations experienced close to the A38 exceedance stretch and also provide additional verification points for the built dispersion model.

Due to the local dispersion modelling results predicting non-compliance until 2023 there is evidently further work to be completed regarding the identified A38 exceedance stretch. It is however not possible for this work to be done robustly within the constrained timescales of this study.

It has been shown that the combined impacts of the measures considered in this study will not change the first year of compliance from 2023. The Council will therefore be seeking further guidance from JAQU in relation to developing a number of measures aimed at reducing NO<sub>2</sub> concentrations on the A38 exceedance stretch to accelerate compliance from the now accepted year of 2023. As a greater number of years now exist until compliance is predicted the Council will be able to re-visit the long list of measure in order to consider options which were not available to be considered due to the compliance time constraints.

# **Annex 1: Model Inputs – Additional Information**

#### **Meteorological Data**

Meteorological data from a representative station is required by the dispersion model. 2017 meteorological data from the Nottingham/Watnall weather station, approximately 30km northwest from the PCM exceedance stretch, has been used in this assessment. A wind rose for the weather station for the year 2017 is shown in Figure A.1.

Figure A.1 – Wind Rose for Nottingham/Watnall Meteorological Data 2017



Most dispersion models do not use meteorological data if they relate to calm winds conditions, as dispersion of air pollutants is more difficult to calculate in these circumstances. ADMS-Roads treats calm wind conditions by setting the minimum wind speed to 0.75m/s. It is recommended in LAQM.TG(16) that the meteorological data file be tested within a dispersion model and the relevant output log file checked, to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedances. LAQM.TG(16) recommends that meteorological data should have a percentage of usable hours greater than 85%. If the data capture is less than 85% short-term concentration predictions should be expressed as percentiles rather than as numbers of exceedances. 2017 meteorological data from Nottingham/Watnall includes 8478 lines of usable hourly data out of the total 8,760 for the year, i.e. 96.8% usable data. This is therefore suitable for the dispersion modelling exercise.

#### **Traffic Inputs**

The ADMS-Roads assessment incorporates numbers of road traffic vehicles, vehicle speeds on the local roads and the composition of the traffic fleet. The traffic data for this assessment has been derived from the Department for Transport (DFT) Traffic Counts website and an ANPR survey completed on the PCM exceedance stretch on the 15<sup>th</sup>, 16<sup>th</sup> and 17<sup>th</sup> of June 2018.

Traffic speeds were calculated from a Bluetooth journey time survey that is in operation on the PCM exceedance stretch and also based on speed limits across the road network. However, where appropriate, the speeds have been reduced to simulate queues at junctions, traffic lights and other locations where queues are known to be an issue. Traffic speeds have been assumed to be consistent across all the modelled scenarios.

The Emissions Factor Toolkit (EFT) version 8.0.1.a, made available through the Huddle portal has then been used to determine vehicle emission factors for input into the ADMS-Roads model; these are based upon the traffic data inputs.

Details of the traffic flows used in this assessment are provided in Table A.1 and Table A.2, and the modelled roads are presented in Figure A.2.

#### **Background Monitoring Data**

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution. The data sets include annual average concentration estimates for  $NO_x$  and  $NO_2$  using a base year of 2015. The model used is semi-empirical in nature; it uses the National Atmospheric Emissions Inventory (NAEI) emissions to model-predict the concentrations of pollutants at the centroid of each 1km grid square, but then calibrates these concentrations in relation to actual monitoring data.

In order to avoid duplication of the road source contribution from Trunk A Roads in the modelling and assessment process, it is first necessary to remove these source sectors from the overall background concentration reported. Whilst relatively straightforward to make this adjustment for NO<sub>x</sub>, the process is more complicated for NO<sub>2</sub> as the relationship between NO<sub>2</sub> and NO<sub>x</sub> is not linear, therefore the NO<sub>2</sub> Adjustment for NO<sub>x</sub> Sector Removal Tool has been used.

An urban background monitoring station used to be located within the grounds of Glebe Junior School, monitoring ceased at this location in 2016. In 2015 the annual mean NO<sub>2</sub> concentration observed at the Glebe Junior School monitor was  $16.4\mu g/m^3$ . This is comparable to the Defra background map concentration of  $14.5\mu g/m^3$ , which has been used within the verification process.

#### Table A.1 – Traffic Data used in the ADMS-Roads Assessment: 2017 DfT Data

| Link Name                                                                                                                   |                                  | 2017                         |                                         |                                       |                      |                    |         |  |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------|-----------------------------------------|---------------------------------------|----------------------|--------------------|---------|--|
|                                                                                                                             | AADT                             | DT % Car % LGV % HC          |                                         | % HGV                                 | % Bus and Coach      | % Motorcycle (kph) |         |  |
| A38 PCM Exceedance Stretch: Link 7353                                                                                       | 44,186                           | 75.42                        | 15.18                                   | 8.58                                  | 0.20                 | 0.62               | 16 - 71 |  |
| A38 PCM Exceedance Stretch: Link 28528                                                                                      | 42,651                           | 73.07                        | 16.21                                   | 10.18                                 | 0.14                 | 0.40               | 16 - 71 |  |
| Note 1: Speeds have been reduced to simulate queues at june<br>Note 2: A weighted average speed for the links has been calc | ctions, traffic<br>ulated from t | lights and c<br>the Bluetoot | other locations wh<br>h journey time su | nere queues are k<br>irvey completed. | nown to be an issue. |                    |         |  |

#### Table A.2 – Traffic Data used in the ADMS-Roads Assessment: 2018 ANPR Survey Data

|                   |        | 2018               |                    |       |                |                |                       |                     |                                   |                                   |                         |                |
|-------------------|--------|--------------------|--------------------|-------|----------------|----------------|-----------------------|---------------------|-----------------------------------|-----------------------------------|-------------------------|----------------|
| Link Name         | AADT   | %<br>Petrol<br>Car | %<br>Diesel<br>Car | % LGV | % Rigid<br>HGV | % Artic<br>HGV | % Bus<br>and<br>Coach | %<br>Motorcycl<br>e | % Full<br>Hybrid<br>Petrol<br>Car | % Full<br>Hybrid<br>Diesel<br>Car | %<br>Battery<br>EV Cars | Speed<br>(kph) |
| A38<br>Southbound | 22,340 | 34.59              | 45.22              | 13.53 | 3.61           | 0.71           | 0.34                  | 0.09                | 1.71                              | 0.08                              | 0.13                    | 69             |
| A38 Northbound    | 17,250 | 30.90              | 43.23              | 13.40 | 5.23           | 5.16           | 0.28                  | 0.06                | 1.56                              | 0.06                              | 0.12                    | 71             |

Note 1: For all other vehicle contributions within the Alternative Technology option within the EFT, the percentage contribution is 0% - Taxi (black cab), Full Hybrid Petrol Car, FCEV Cars, E85 Bioethanol Cars, LPG Cars, Full Hybrid Petrol LGV, Plug-In Hybrid Petrol LGV, Battery EV LGV, FCEV LGV, E85 Bioethanol LGV, LPG LGV, B100 Rigid HGV, B100 Artic HGV, B100 Bus, CNG Bus, Biomethane Bus, Biogas Bus, Hybrid Bus, FCEV Bus and B100 Coach

Note 2: A weighted average speed for the links has been calculated from the Bluetooth journey time survey completed.

#### Figure A.2 – Modelled Roads



#### **Modelled Receptors**

The PCM receptors shown in Table A.3 have been located in line with JAQU and AQD guidance, 4m distance from each road link along the exceedance stretch, 25m from any major junction, representative of a 100m stretch of the exceedance link and were measured at a height of 2m. All modelled receptors are presented in Table A.3 and are presented in Table A.4 – Bolsover District Council Specific Receptors

| Receptor ID | Х      | Y      | Receptor ID | Х      | Y      |
|-------------|--------|--------|-------------|--------|--------|
| SH-A        | 445473 | 356315 | SH-E        | 445758 | 356872 |
| SH-B        | 445485 | 356370 | SH-F        | 445877 | 356939 |
| SH-C        | 445530 | 356453 | SH-G        | 445951 | 357122 |
| SH-D        | 445558 | 356512 | SH-H        | 446237 | 357245 |

#### Figure A.3 and Figure A.4.

Table A.3 – PCM Receptors

| Receptor ID | X      | Y      | Receptor ID | Х      | Y      |
|-------------|--------|--------|-------------|--------|--------|
| R1 – ADC    | 446779 | 357345 | R33 – BDC   | 446008 | 357148 |
| R2 – ADC    | 446761 | 357341 | R34 – ADC   | 447103 | 357351 |
| R3 – ADC    | 446467 | 357291 | R35 – ADC   | 446992 | 357334 |
| R4 – ADC    | 446393 | 357281 | R36 – ADC   | 446953 | 357329 |
| R5 – BDC    | 445705 | 356751 | R37 – ADC   | 446785 | 357308 |
| R6 – BDC    | 445662 | 356679 | R38 – ADC   | 446766 | 357307 |
| R7 – BDC    | 445606 | 356580 | R39 – ADC   | 446579 | 357280 |
| R8 – BDC    | 445561 | 356500 | R40 – ADC   | 446471 | 357262 |
| R9 – BDC    | 445541 | 356466 | R41 – ADC   | 446400 | 357251 |
| R10 – BDC   | 445497 | 356389 | R42 – BDC   | 445735 | 356734 |
| R11 – BDC   | 445475 | 356359 | R43 – BDC   | 445691 | 356662 |
| R12 – BDC   | 445467 | 356353 | R44 – BDC   | 445636 | 356563 |
| R13 – ADC   | 446331 | 357269 | R45 – BDC   | 445591 | 356484 |
| R14 – BDC   | 446132 | 357175 | R46 – BDC   | 445572 | 356448 |
| R15 – BDC   | 446111 | 357163 | R47 – BDC   | 445525 | 356369 |
| R16 – BDC   | 446048 | 357125 | R48 – BDC   | 445461 | 356331 |
| R17 – BDC   | 446020 | 357106 | R49 – ADC   | 446340 | 357235 |
| R18 – BDC   | 445965 | 357060 | R50 – BDC   | 446034 | 357089 |
| R19 – BDC   | 445892 | 356989 | R51 – BDC   | 445979 | 357044 |
| R20 – BDC   | 445808 | 356912 | R52 – BDC   | 445946 | 357016 |
| R21 – BDC   | 445819 | 356929 | R53 – BDC   | 445907 | 356975 |
| R22 – BDC   | 445831 | 356945 | R54 – BDC   | 445886 | 356953 |
| R23 – BDC   | 445868 | 356990 | R55 – BDC   | 445860 | 356924 |
| R24 – BDC   | 445903 | 357028 | R56 – BDC   | 445811 | 356857 |
| R25 – BDC   | 445966 | 357087 | R57 – BDC   | 445881 | 356978 |
| R26 – BDC   | 446000 | 357117 | R58 – BDC   | 445914 | 357016 |
| R27 – BDC   | 446050 | 357151 | R59 – BDC   | 445977 | 357074 |

| Receptor ID | X      | Y      | Receptor ID | X      | Y      |
|-------------|--------|--------|-------------|--------|--------|
| R28 – BDC   | 446144 | 357215 | R60 – BDC   | 446058 | 357136 |
| R29 – BDC   | 446123 | 357207 | R61 – BDC   | 446109 | 357167 |
| R30 – BDC   | 446096 | 357195 | R62 – BDC   | 446137 | 357182 |
| R31 – BDC   | 446061 | 357179 | R63 – BDC   | 446069 | 357165 |
| R32 – BDC   | 446034 | 357163 | R64 – BDC   | 446042 | 357149 |
| R65 – BDC   | 446017 | 357135 | R106 - ADC  | 446938 | 357367 |
| R66 – BDC   | 445976 | 357109 | R107 – ADC  | 446797 | 357348 |
| R67 – BDC   | 445809 | 356917 | R108 – ADC  | 446770 | 357344 |
| R68 – BDC   | 445803 | 356845 | R109 – ADC  | 446733 | 357336 |
| R69 – ADC   | 446987 | 357373 | R110 – ADC  | 446639 | 357320 |
| R70 – ADC   | 446947 | 357369 | R111 – ADC  | 446520 | 357301 |
| R71 – ADC   | 446929 | 357366 | R112 – ADC  | 446431 | 357286 |
| R72 – ADC   | 446704 | 357332 | R113 – ADC  | 446363 | 357274 |
| R73 – ADC   | 446574 | 357310 | R114 – BDC  | 445729 | 356792 |
| R74 – BDC   | 445518 | 356429 | R115 – BDC  | 445684 | 356715 |
| R75 – BDC   | 445496 | 356387 | R116 – BDC  | 445634 | 356629 |
| R76 – BDC   | 445481 | 356366 | R117 – BDC  | 445584 | 356540 |
| R77 – BDC   | 445454 | 356347 | R118 – BDC  | 445551 | 356483 |
| R78 – ADC   | 446294 | 357260 | R119 – BDC  | 445530 | 356448 |
| R79 – BDC   | 446111 | 357163 | R120 – BDC  | 445507 | 356408 |
| R80 – BDC   | 445931 | 357031 | R121 – BDC  | 445489 | 356377 |
| R81 – BDC   | 445968 | 357123 | R122 – BDC  | 445478 | 356362 |
| R82 – BDC   | 445760 | 356851 | R123 – BDC  | 445470 | 356356 |
| R83 – BDC   | 445751 | 356834 | R124 – BDC  | 445460 | 356350 |
| R84 – BDC   | 446232 | 357244 | R125 – BDC  | 445448 | 356344 |
| R85 – BDC   | 446197 | 357233 | R126 – ADC  | 446312 | 357265 |
| R86 – BDC   | 446172 | 357223 | R127 – BDC  | 446146 | 357182 |
| R87 – ADC   | 446935 | 357326 | R128 – BDC  | 446122 | 357169 |
| R88 – ADC   | 446709 | 357298 | R129 – BDC  | 446099 | 357157 |
| R89 – BDC   | 445549 | 356410 | R130 – BDC  | 446068 | 357138 |
| R90 – BDC   | 445526 | 356371 | R131 – BDC  | 446035 | 357116 |
| R91 – BDC   | 445486 | 356346 | R132 – BDC  | 445993 | 357083 |
| R92 – BDC   | 445476 | 356339 | R133 – BDC  | 445813 | 356920 |
| R93 – ADC   | 446303 | 357225 | R134 – BDC  | 445825 | 356937 |
| R94 – BDC   | 446142 | 357157 | R135 – BDC  | 445850 | 356967 |
| R95 – BDC   | 445841 | 356897 | R136 – BDC  | 445885 | 357009 |
| R96 – BDC   | 445804 | 356847 | R137 – BDC  | 445916 | 357041 |
| R97 – BDC   | 446011 | 357103 | R138 – BDC  | 445983 | 357101 |
| R98 – BDC   | 445794 | 356830 | R139 – BDC  | 446025 | 357134 |
| R99 – BDC   | 445783 | 356814 | R140 - BDC  | 446075 | 357166 |
| R100 - ADC  | 446246 | 357202 | R141 – BDC  | 446134 | 357211 |
| R101 – BDC  | 446212 | 357189 | R142 – BDC  | 446110 | 357201 |
| R102 - BDC  | 446192 | 357179 | R143 – BDC  | 446079 | 357187 |
| R103 – BDC  | 446169 | 357165 | R144 – BDC  | 446047 | 357171 |
| R104 – ADC  | 447042 | 357381 | R145 – BDC  | 446021 | 357155 |

| Receptor ID | X      | Y      | Receptor ID | X      | Y      |
|-------------|--------|--------|-------------|--------|--------|
| R105 – ADC  | 446967 | 357371 | R146 – BDC  | 445988 | 357135 |
| R147 – BDC  | 445956 | 357115 | R188 – BDC  | 445994 | 357088 |
| R148 – BDC  | 445765 | 356858 | R189 – BDC  | 446035 | 357120 |
| R149 – BDC  | 445756 | 356842 | R190 – BDC  | 446084 | 357151 |
| R150 - ADC  | 446262 | 357253 | R191 – BDC  | 446123 | 357174 |
| R151 – BDC  | 446215 | 357239 | R192 – BDC  | 446146 | 357186 |
| R152 – BDC  | 446183 | 357228 | R193 – BDC  | 446086 | 357173 |
| R153 – BDC  | 446158 | 357218 | R194 – BDC  | 446055 | 357157 |
| R154 – ADC  | 447048 | 357343 | R195 – BDC  | 446029 | 357142 |
| R155 – ADC  | 446972 | 357332 | R196 – BDC  | 445997 | 357122 |
| R156 – ADC  | 446944 | 357328 | R197 – BDC  | 445965 | 357102 |
| R157 – ADC  | 446802 | 357310 | R198 – BDC  | 445799 | 356899 |
| R158 – ADC  | 446776 | 357306 | R199 – BDC  | 445799 | 356837 |
| R159 – ADC  | 446738 | 357303 | R200 – BDC  | 445788 | 356822 |
| R160 – ADC  | 446644 | 357290 | R201 – ADC  | 446276 | 357212 |
| R161 – ADC  | 446525 | 357271 | R202 – ADC  | 446229 | 357195 |
| R162 – ADC  | 446435 | 357256 | R203 – BDC  | 446203 | 357184 |
| R163 – ADC  | 446369 | 357244 | R204 – BDC  | 446181 | 357172 |
| R164 – BDC  | 445758 | 356775 | R205 – ADC  | 447098 | 357389 |
| R165 – BDC  | 445713 | 356698 | R206 – ADC  | 447275 | 357409 |
| R166 – BDC  | 445664 | 356613 | R207 – ADC  | 447362 | 357424 |
| R167 – BDC  | 445613 | 356524 | R208 – ADC  | 447103 | 357351 |
| R168 – BDC  | 445581 | 356466 | R209 – ADC  | 447367 | 357391 |
| R169 – BDC  | 445560 | 356429 | R210 – ADC  | 447361 | 357424 |
| R170 – BDC  | 445537 | 356391 | R211 – ADC  | 447449 | 357438 |
| R171 – BDC  | 445490 | 356351 | R212 – ADC  | 447506 | 357445 |
| R172 – BDC  | 445480 | 356342 | R213 – ADC  | 447555 | 357456 |
| R173 – BDC  | 445468 | 356335 | R214 – ADC  | 447619 | 357470 |
| R174 – BDC  | 445455 | 356328 | R215 – ADC  | 447681 | 357490 |
| R175 – ADC  | 446321 | 357230 | R216 – ADC  | 447703 | 357499 |
| R176 – BDC  | 446155 | 357163 | R217 – ADC  | 447738 | 357509 |
| R177 – BDC  | 446079 | 357120 | R218 – ADC  | 447280 | 357376 |
| R178 – BDC  | 446047 | 357099 | R219 – ADC  | 447367 | 357392 |
| R179 – BDC  | 446006 | 357067 | R220 – ADC  | 447454 | 357406 |
| R180 – BDC  | 445926 | 356996 | R221 – ADC  | 447510 | 357412 |
| R181 – BDC  | 445896 | 356964 | R222 – ADC  | 447562 | 357424 |
| R182 – BDC  | 445872 | 356938 | R223 – ADC  | 447626 | 357438 |
| R183 – BDC  | 445850 | 356910 | R224 – ADC  | 447691 | 357459 |
| R184 – BDC  | 445826 | 356877 | R225 – ADC  | 447715 | 357468 |
| R185 – BDC  | 445807 | 356852 | R226 – ADC  | 447747 | 357479 |
| R186 – BDC  | 445898 | 356997 | R227 – ADC  | 447242 | 357404 |
| R187 – BDC  | 445927 | 357029 | R228 – ADC  | 447318 | 357416 |
| R229 – ADC  | 447405 | 357431 | R238 – ADC  | 447324 | 357384 |
| R230 – ADC  | 447478 | 357442 | R239 – ADC  | 447411 | 357399 |
| R231 – ADC  | 447530 | 357450 | R240 – ADC  | 447482 | 357409 |

| Receptor ID                                       | X                | Y      | Receptor ID | Х      | Y      |  |  |
|---------------------------------------------------|------------------|--------|-------------|--------|--------|--|--|
| R232 – ADC                                        | 447587           | 357463 | R241 – ADC  | 447537 | 357418 |  |  |
| R233 – ADC                                        | 447649           | 357480 | R242 – ADC  | 447594 | 357431 |  |  |
| R234 – ADC                                        | 447691           | 357495 | R243 – ADC  | 447659 | 357449 |  |  |
| R235 – ADC                                        | 447721           | 357504 | R244 – ADC  | 447703 | 357464 |  |  |
| R236 – ADC                                        | 447751           | 357514 | R245 – ADC  | 447730 | 357473 |  |  |
| R237 – ADC                                        | 447247           | 357371 | R246 – ADC  | 447762 | 357484 |  |  |
| Note 1 – All receptors modelled at a height of 2m |                  |        |             |        |        |  |  |
| BDC – Bolsover District Council                   |                  |        |             |        |        |  |  |
| ADC – Ashfield [                                  | District Council |        |             |        |        |  |  |

 Table A.4 – Bolsover District Council Specific Receptors

| Receptor ID | X      | Y      | Receptor ID | X      | Y      |
|-------------|--------|--------|-------------|--------|--------|
| SH-A        | 445473 | 356315 | SH-E        | 445758 | 356872 |
| SH-B        | 445485 | 356370 | SH-F        | 445877 | 356939 |
| SH-C        | 445530 | 356453 | SH-G        | 445951 | 357122 |
| SH-D        | 445558 | 356512 | SH-H        | 446237 | 357245 |

Figure A.3 – Receptor Locations: North



Figure A.4 – Receptor Locations: South



Figure A.5 – Receptor Locations: Bolsover District Council Specific



# Verification

For model verification, the diffusion tube data presented in Table A.5 has been used. The only monitoring location on the A38 exceedance stretch was DT22, therefore this has been the only monitoring location used within the verification.

The verification of the modelling output was performed in accordance with the guidance provided in Chapter 7 of LAQM.TG(16).

For the verification and adjustment of  $NO_x/NO_2$ , the annual mean concentration for DT22 in 2017 was used as presented in Table A.5.

Table A.5 below shows an initial comparison of the monitored and unverified modelled NO<sub>2</sub> result for the year 2017, in order to determine if verification and adjustment was required.

| Table A.5 – Comparison on Unverified Modelled and Monitored NO <sub>2</sub> Concentration | ions |
|-------------------------------------------------------------------------------------------|------|
|-------------------------------------------------------------------------------------------|------|

| Site ID | Background NO₂<br>(µg/m³) | Monitored total NO₂<br>(µg/m³) | Unverified Modelled<br>total NO <sub>2</sub> (µg/m <sup>3</sup> ) | % Difference<br>(modelled vs.<br>monitored) |  |
|---------|---------------------------|--------------------------------|-------------------------------------------------------------------|---------------------------------------------|--|
| DT22    | 14.5                      | 26.0                           | 21.1                                                              | -18.9                                       |  |

The model was under predicting at the monitoring location and no further improvement of the modelled results could be obtained on this occasion. Model adjustment was therefore carried out to allow for improvements in the results.

Model adjustment needs to be undertaken based on NO<sub>x</sub> and not NO<sub>2</sub>. NO<sub>x</sub> concentrations were derived from the monitored NO<sub>2</sub> diffusion tube results used for verification. These calculations were undertaken using a spreadsheet tool available from the LAQM website. Table A.6 provides the relevant data required to calculate the model adjustment based on regression of the modelled and monitored road source contribution to NO<sub>x</sub>.

Table A.6 – Data Required for Adjustment Factor Calculation

| Site ID | Monitored<br>total NO₂<br>(µg/m³) | Monitored<br>total NO <sub>x</sub><br>(µg/m³) | Background<br>NO₂ (μg/m³) | Background<br>NO <sub>x</sub> (µg/m³) | Monitored<br>road<br>contribution<br>NO <sub>2</sub> (total -<br>background)<br>(µg/m <sup>3</sup> ) | Monitored<br>road<br>contribution<br>NO <sub>x</sub> (total -<br>background)<br>(µg/m <sup>3</sup> ) | Modelled road<br>contribution<br>NO <sub>x</sub> (excludes<br>background)<br>(µg/m <sup>3</sup> ) |
|---------|-----------------------------------|-----------------------------------------------|---------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| DT22    | 26.0                              | 45.6                                          | 14 5                      | 23.3                                  | 11.5                                                                                                 | 22.3                                                                                                 | 12.5                                                                                              |

As only a single verification point is present it is not possible to undertake linear regression. The ratio of the monitored road NO<sub>x</sub> contribution to the modelled road NO<sub>x</sub> contribution at DT22 is 1.789. Verification therefore gives an adjustment factor for the modelled results of 1.789.

Table A.7 below illustrates the adjusted modelled NO<sub>2</sub> concentrations plotted against monitored NO<sub>2</sub> concentrations. A verification factor of 1.789 was used to adjust the model results.

Table A.7 – Adjustment Factor and Comparison of Verified Results against Monitoring Results

| Site ID | Ratio of<br>monitored road<br>contribution<br>NO <sub>x</sub> / modelled<br>road<br>contribution<br>NO <sub>x</sub> | Adjustment<br>factor for<br>modelled road<br>contribution<br>NO <sub>x</sub> | Adjusted<br>modelled road<br>contribution<br>NO <sub>x</sub> (µg/m³) | Adjusted<br>modelled total<br>NO <sub>x</sub> (including<br>background<br>NO <sub>x</sub> ) (µg/m <sup>3</sup> ) | Modelled total<br>NO <sub>2</sub> (based<br>upon empirical<br>NO <sub>x</sub> / NO <sub>2</sub><br>relationship)<br>(µg/m <sup>3</sup> ) | Monitored<br>total NO₂<br>(μg/m³) | %<br>Difference<br>(adjusted<br>modelled<br>NO <sub>2</sub> vs.<br>monitored<br>NO <sub>2</sub> ) |
|---------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------|
|         |                                                                                                                     |                                                                              |                                                                      |                                                                                                                  |                                                                                                                                          |                                   |                                                                                                   |
| DT22    | 1.79                                                                                                                | 1.789                                                                        | 22.3                                                                 | 45.6                                                                                                             | 26.0                                                                                                                                     | 26.0                              | 0.0                                                                                               |

# Annex 2: Supporting information for parts 3 and 4 - Available on request

Annex 3: Model results – Available on request