

Bus SCR Retrofit

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Transport for London



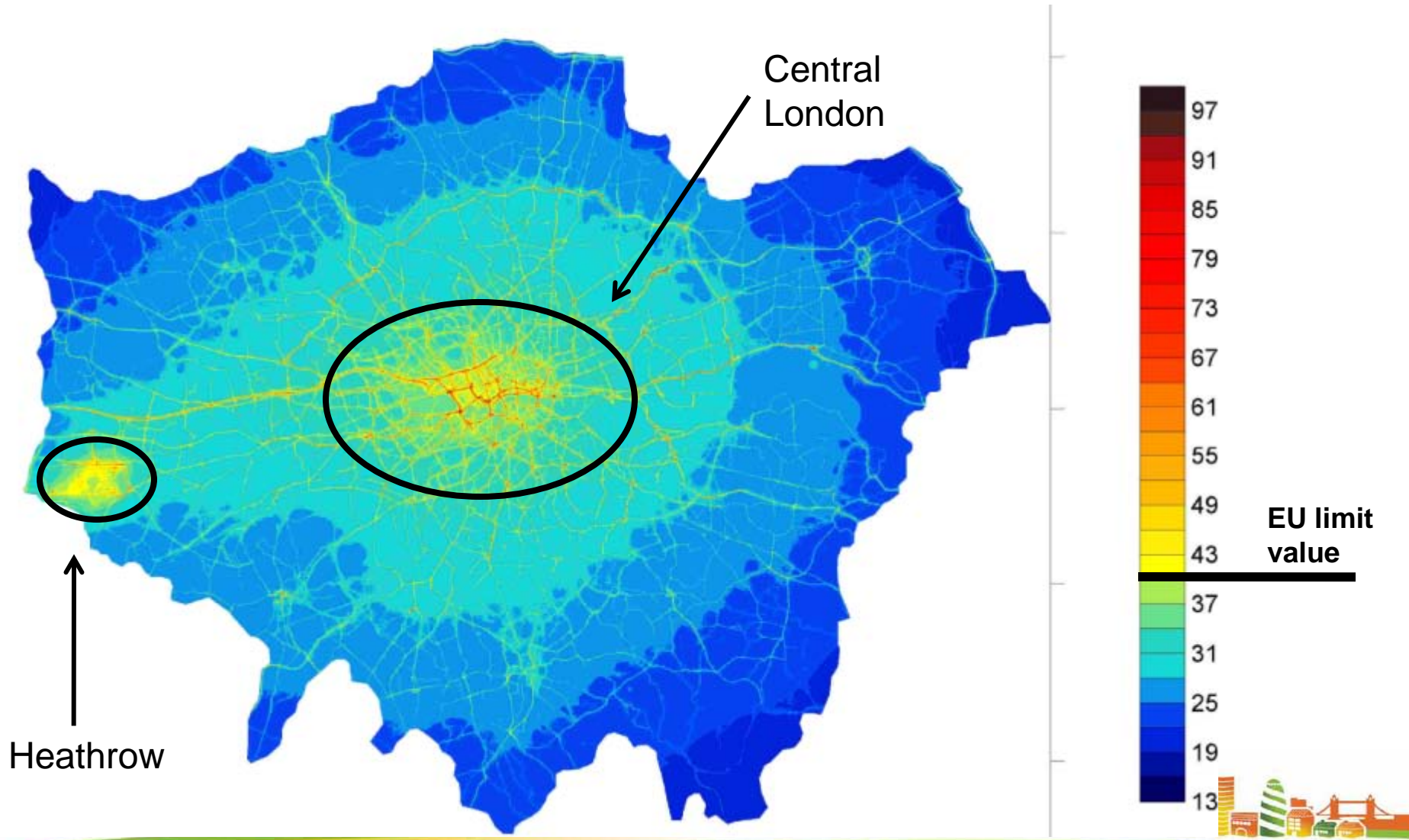
Bus Retrofit

NOx Abatement Retrofit

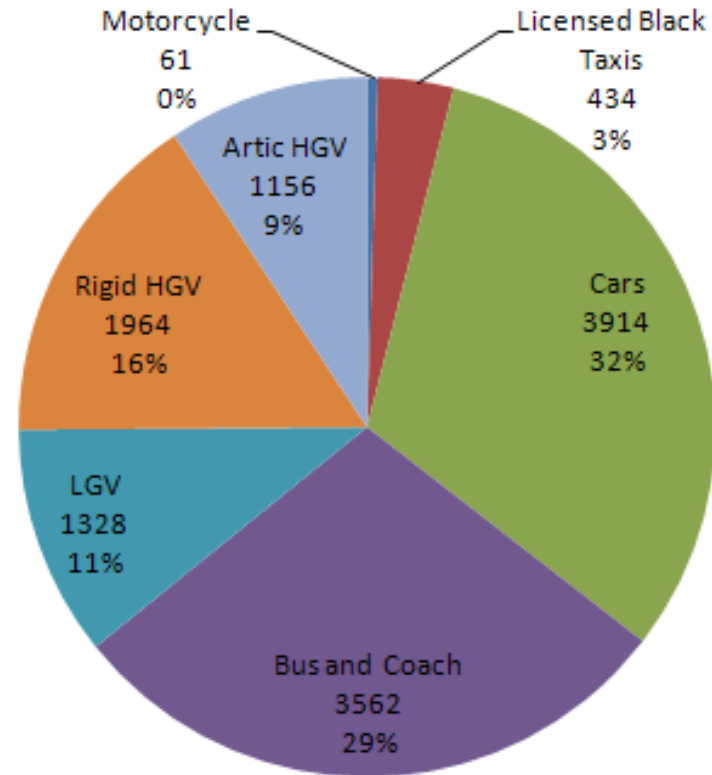
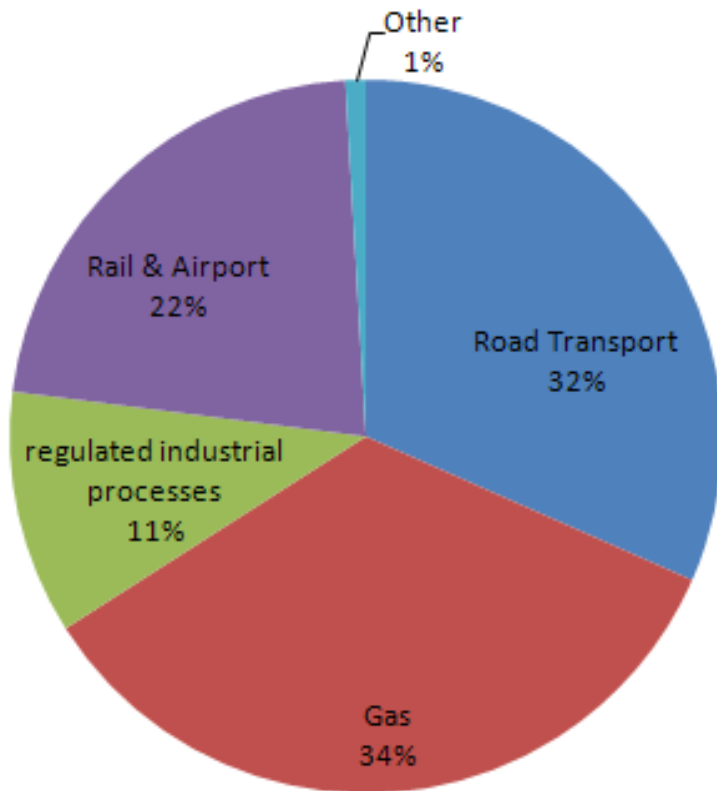
- £5million funding has been secured from the Department for Transport and has been match funded by TfL to retrofit 900 Euro III buses with Selective Catalytic Reduction (SCR) Equipment.



NO₂ Exceedences of EU Limit Value in 2015

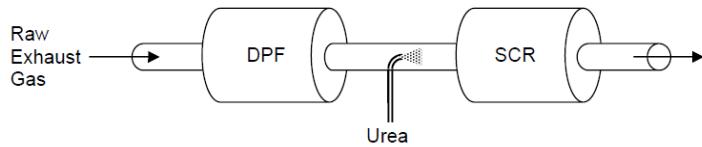


Modelled Road Transport Sources of NOx Emissions in London in 2015

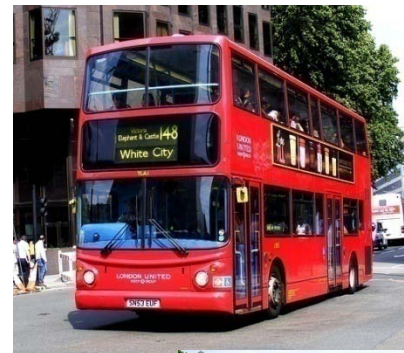
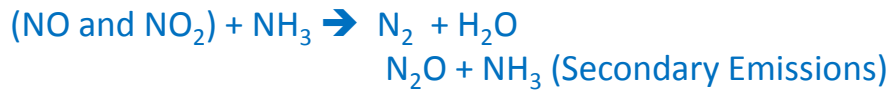


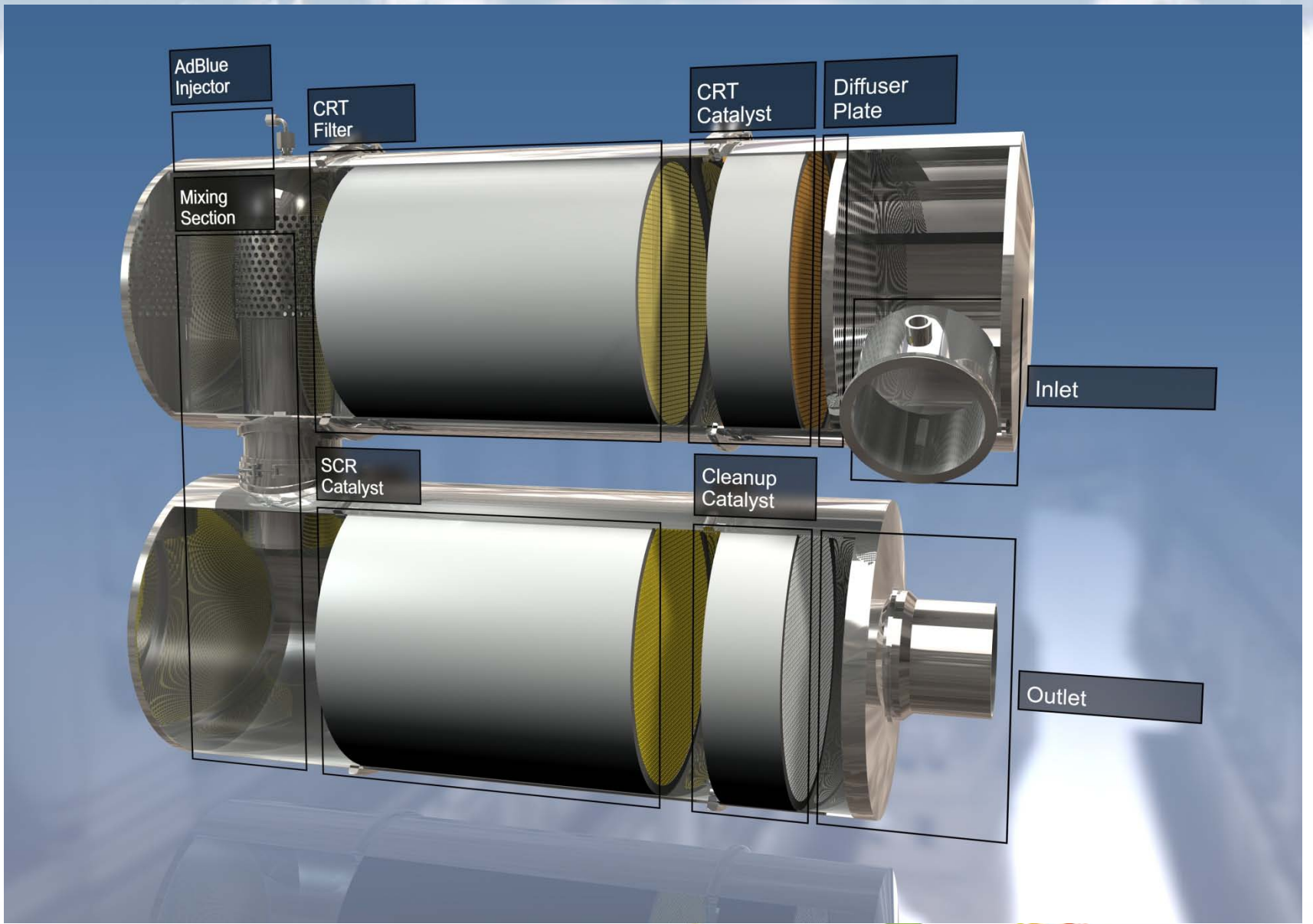
NOx Abatement Retrofit

£10 million funding (DfT/TfL) to retrofit 900 Euro 3 buses with SCR



NOx reacts with ammonia over the catalyst and reduces it to nitrogen and water



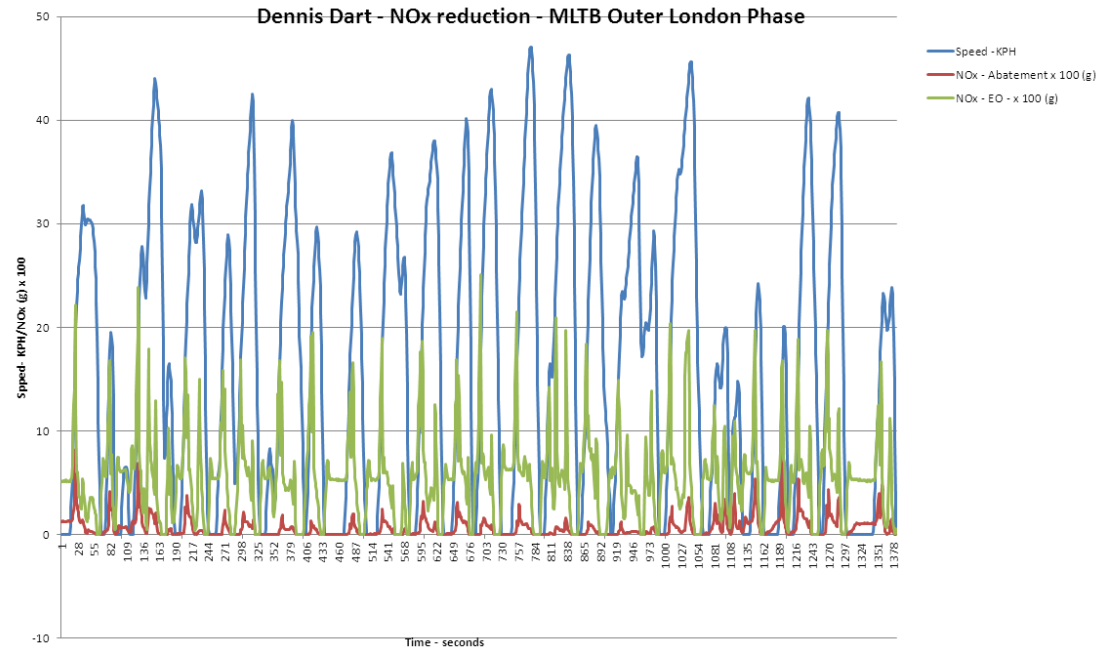


SCR Emissions Test Results

Eminox:- 88% NOx Reduction achieved on both the Denis Dart and Volvo Double Deck

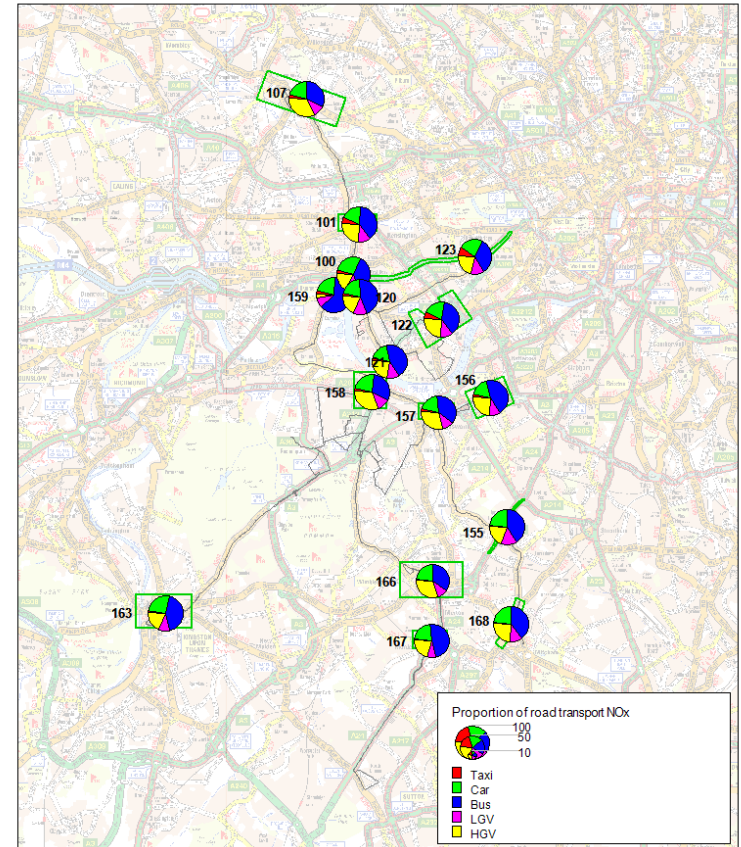
Test No 11762/63, 822/23/24		Baseline Test	
Date	15/11/11 & 1/12/11	NOx	NO ₂
Units:	g/km	g/km	g/km
Analyser:	Bag	FTIR	FTIR
Phase 1	Outer London	10.49	0.49
Phase 2	Inner London	18.43	0.84
Combined result		12.72	0.59

Test No 11775, 11827 & 829		With NOx Abatement Device	
Date	17/11/11 & 2/12/11	NOx	NO ₂
Units:	g/km	g/km	g/km
Analyser:	Bag	FTIR	FTIR
Phase 1	Outer London	1.12	0.21
Phase 2	Inner London	2.38	0.42
Combined result		1.47	0.27
Change vs Baseline		-88.4%	-54.6%



SCR Roll-out

- The first buses will be retrofitted by the end of Summer 2012 and all 900 buses will be fitted by March 2014.
- Routes for retrofit were chosen based on both:
 - Routes that pass through areas of high NO₂ concentrations and where buses are a large contributor to vehicle NO_x Emissions
 - Routes that have the longest contract end date so that benefits are realised over a sufficient time period (3 year target)
 - Routes that operate Euro III Dart, Trident and Volvo buses



Contributions to Vehicle NO_x Emissions in Putney

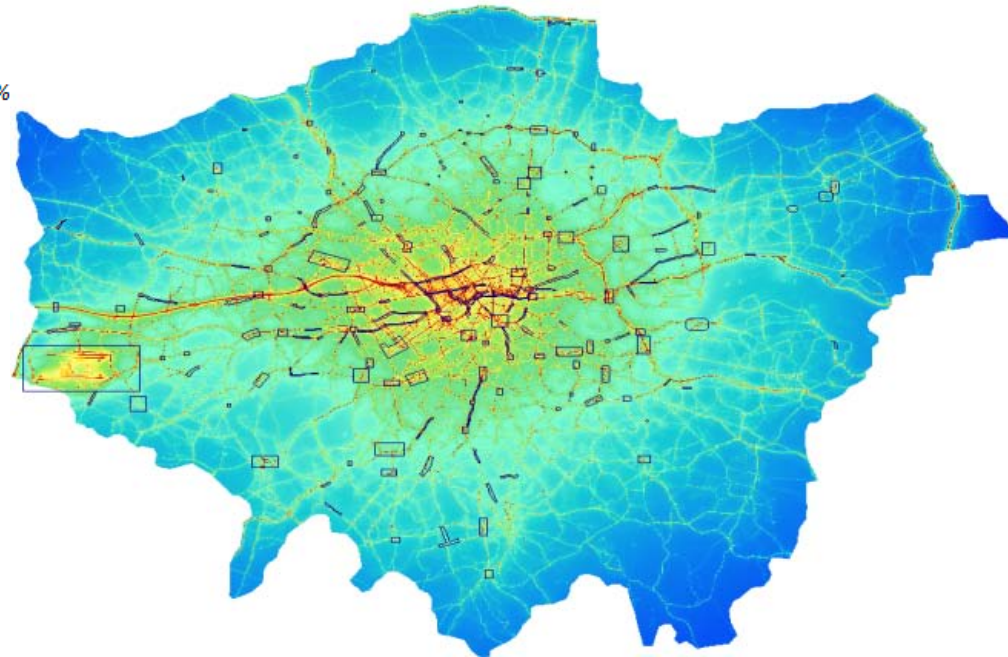


Focus Area Prioritisation

APPENDIX A – Euro 3 routes ranked by number of intersections with significant FAs

Rank (i): Rank in descending order "Number of FAs >50%", "Number of FAs > 60% and "Number of FAs >70%"

Route IDs	Number of FAs >50%	Number of FAs >60%	Number of FAs >70%?	Rank (i)
59	6	3	0	1
159	6	2	1	2
176	5	3	1	3
242	5	2	1	4
X68	5	2	0	5
243	5	2	0	6
1	4	3	1	7
68	4	2	0	8
8	4	1	1	9
91	4	1	0	10
109	4	1	0	11
55	3	2	1	12
6	3	2	1	13
188	3	2	0	14
168	3	2	0	15



NO2 Focus Areas



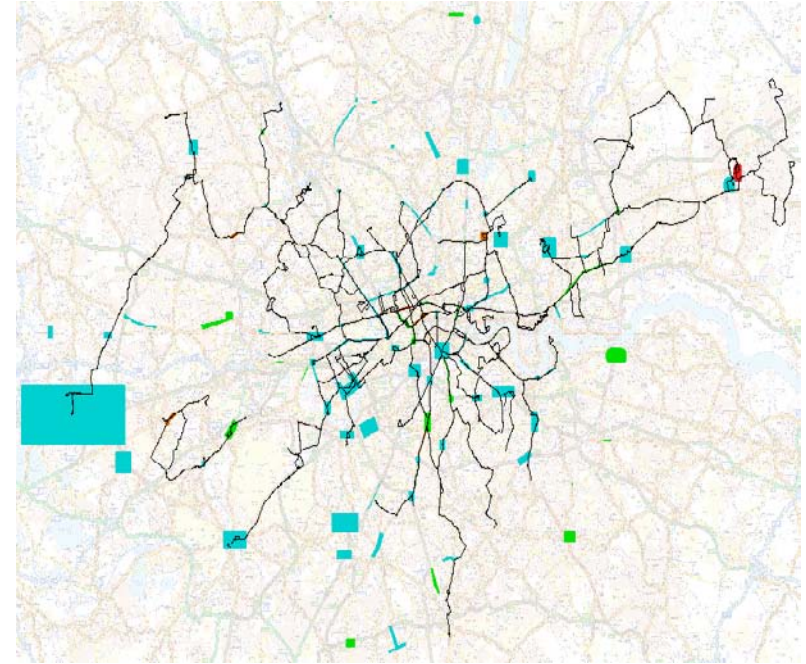
SCR Roll-out with contractual considerations

APPENDIX B: Euro 3 routes ranked by number of intersections with significant FAs and contract end date

Table ordered by *Rank Final*: The ascending order of *Rank (i)* + *Rank (ii)*

Rank (ii): Rank based on contract end date. Later dates ranked more favourably than older dates

Route IDs	Number of FAs >50%	Number of FAs >60%	Number of FAs >70%	Rank (i)	Extended contract end date	Rank (ii)	Rank Final
X68	5	2	0	5	Apr-18	13	1
68	4	2	0	8	Apr-18	14	2
128	2	1	1	26	Oct-19	1	3
159	6	2	1	2	Dec-17	28	4
172	2	2	0	19	Mar-18	16	5
9	2	1	0	29	Sep-18	6	6
390	1	1	1	32	Sep-18	7	7
193	1	1	1	33	Sep-18	8	8
6	3	2	1	13	Dec-17	29	9



Route Selection

