
Short-term public exposure to high levels of NO & NO₂: some applications of millisecond analyzers

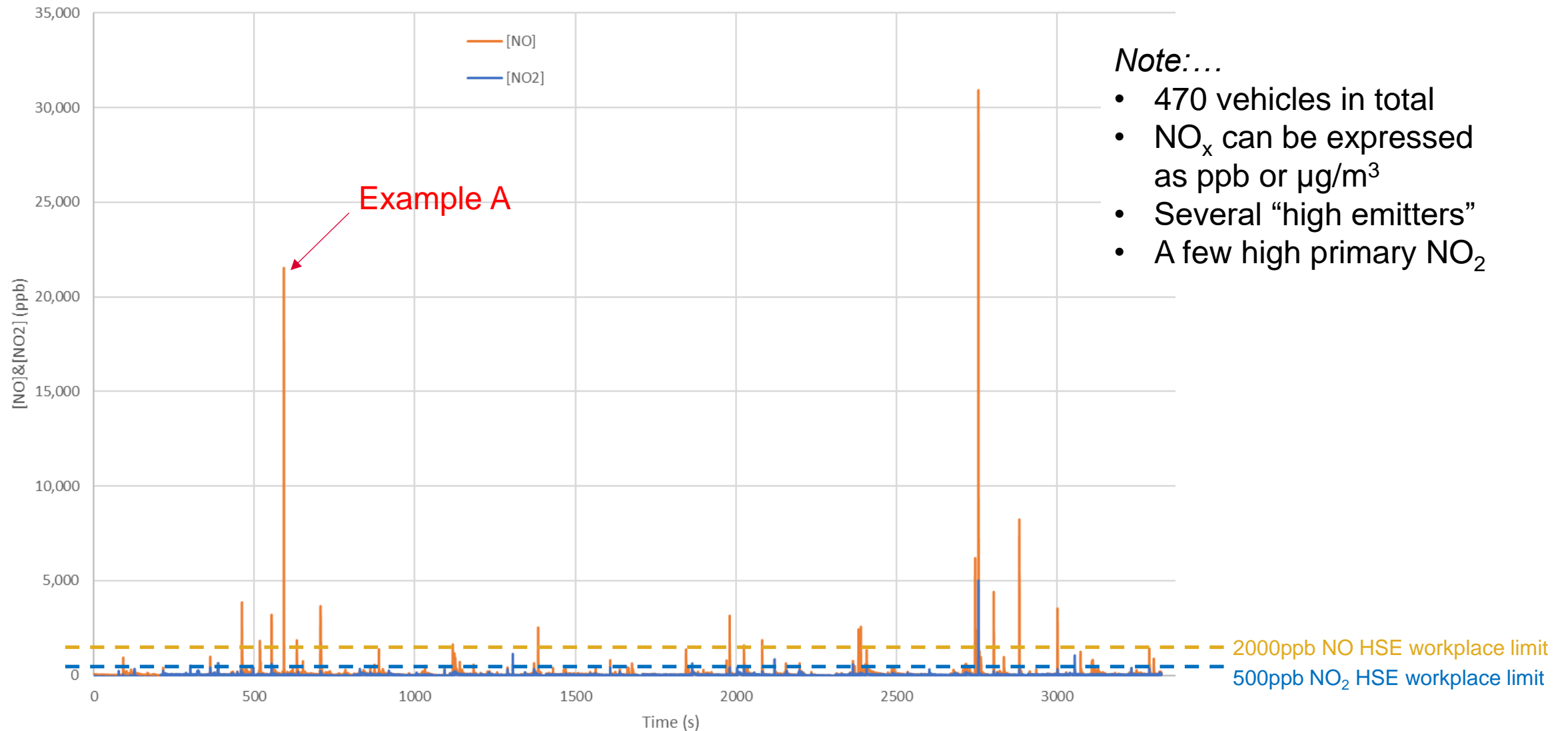


Mark Peckham, Caed Knight & Jamie Parnell

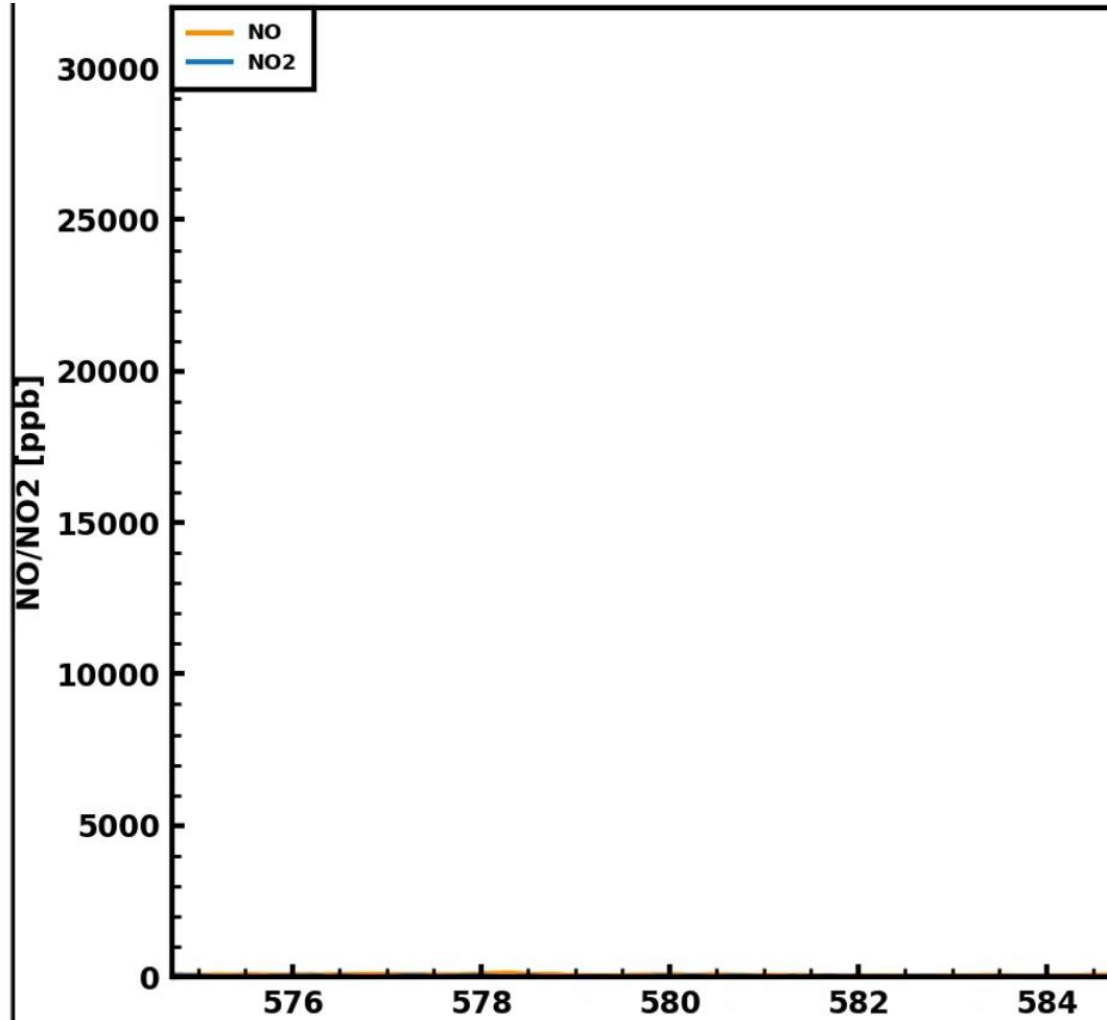
Roadside instantaneous NO_x measurements



Typical 1 hour data set



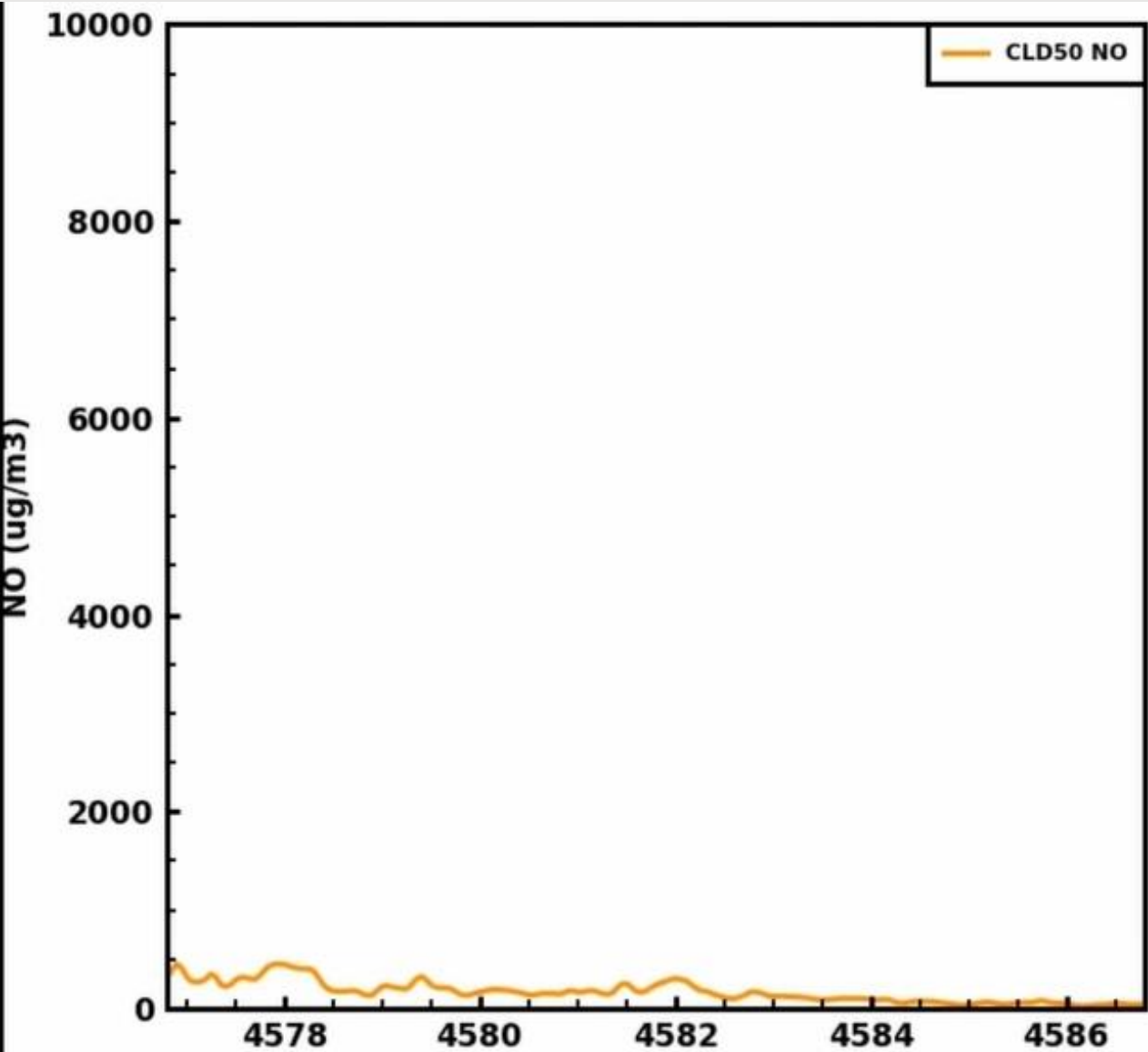
Example A



ANPR Example A

443.36	12/12/2022	CK64SVD	100	17	36	6	United Kingdom	1	CK64SVD	Taxed	01/11/2023		Valid	MINI	2014	1499	109	PETROL	FALSE	SILVER	M1	Euro 5	25/11/2014			2 AXLE RIG
446.49	12/12/2022	YP66UEB	100	16	35	6	United Kingdom	1	YP66UEB	Taxed	01/11/2023		Valid	VOLVO	2016	1969	149	DIESEL	FALSE	BLUE	M1	Euro 6	12/10/2020			2 AXLE RIG
457.37	12/12/2022	CE17DLF	99	18	37	6	United Kingdom	1	CE17DLF	Taxed	01/03/2023		Valid	PEUGEOT	2017	1560	90	DIESEL	FALSE	GREY	M1	Euro 6	07/03/2017			2 AXLE RIG
460.31	12/12/2022	ST67KZD	99	18	37	6	United Kingdom	1	ST67KZD	Taxed	01/02/2023	30/11/2023	Valid	MITSUBISI	2017	1998	41	HYBRID EL	FALSE	BLACK	M1	Euro 6	17/02/2019			2 AXLE RIG
463.41	12/12/2022	DP19RLV	99	19	60	5	United Kingdom	1	DP19RLV	Taxed	01/04/2023		Valid	VAUXHAL	2019	1398	130	PETROL	FALSE	GREY	M1	Euro 6d	31/12/2020			2 AXLE RIG
466.78	12/12/2022	NCS7WSL	100	18	35	6	United Kingdom	1	NCS7WSL	Taxed	01/03/2023		Valid	FIAT	2007	1242	133	PETROL	FALSE	BLUE	M1	Euro 4	14/03/2012			2 AXLE RIG
470.08	12/12/2022	Y487PNK	100	19	36	6	United Kingdom	1	Y487PNK	Taxed	01/09/2023		Valid	CITROEN	2001	1868	0	DIESEL	FALSE	WHITE	N1	Euro 2	29/09/2022			2 AXLE RIG
473.49	12/12/2022	CA18PZJ	100	19	36	6	United Kingdom	1	CA18PZJ	Taxed	01/09/2023		Valid	VOLKSWA	2018	999	108	PETROL	FALSE	BLUE	M1	Euro 6	21/08/2018			2 AXLE RIG
476.16	12/12/2022	WX67YFR	99	20	74	4	United Kingdom	1	WX67YFR	SORN			No details	MERCEDES	2017	2143	221	DIESEL	FALSE	WHITE	N1	Euro 6	01/10/2018			2 AXLE RIG
479.19	12/12/2022	AK65YBB	100	19	53	6	United Kingdom	1	AK65YBB	Taxed	01/11/2023		Valid	AUDI	2016	1598	93	DIESEL	FALSE	GREY	M1	Euro 6	15/11/2021			2 AXLE RIG
484.43	12/12/2022	CV17LNK	100	19	32	6	United Kingdom	1	CV17LNK	Taxed	01/02/2023		Valid	VOLKSWA	2017	1197	109	PETROL	FALSE	WHITE	M1	Euro 6	18/02/2022			2 AXLE RIG
487.73	12/12/2022	TW57SON	100	19	40	6	United Kingdom	1	TW57SON	Taxed	01/04/2023		Valid	MERCEDES	2018	2143	142	DIESEL	FALSE	BLACK	M1	Euro 6	16/08/2022			2 AXLE RIG
491.33	12/12/2022	J15MLT	99	19	40	6	United Kingdom	1	J15MLT	Taxed	01/11/2023		Valid	KIA	2019	1598	130	DIESEL	FALSE	WHITE	M1	Euro 6d	04/11/2022			2 AXLE RIG
493.9	12/12/2022	CN15CDZ	100	20	57	6	United Kingdom	1	CN15CDZ	Taxed	01/06/2023		Valid	PEUGEOT	2015	2198	229	DIESEL	FALSE	WHITE	N1	Euro 5b	22/06/2015			2 AXLE RIG
497.18	12/12/2022	SC54JCX	100	19	56	6	United Kingdom	1	SC54JCX	Taxed	01/01/2023		Valid	NISSAN	2005	1240	143	PETROL	FALSE	SILVER	M1	Euro 3	23/01/2022			2 AXLE RIG
514.93	12/12/2022	PN52YWL	100	19	47	3	United Kingdom	1	PN52YWL	Taxed	01/10/2023		Valid	AUDI	2002	1781	226	PETROL	FALSE	SILVER	M1	Euro 3	25/07/2022			2 AXLE RIG
527.97	12/12/2022	J888PLS	100	19	63	6	United Kingdom	1	J888PLS	Taxed	01/08/2023	30/04/2023	Valid	LAND ROV	2017	1999	125	DIESEL	FALSE	BLACK	M1	Euro 6	24/08/2021			2 AXLE RIG
540.32	12/12/2022	V40VVO	99	19	36	5	United Kingdom	1	V40VVO	Taxed	01/02/2023		Valid	VOLVO	2019	1969	133	DIESEL	FALSE	WHITE	M1	Euro 6d	12/02/2020			2 AXLE RIG
542.39	12/12/2022	CK65CYZ	100	19	47	5	United Kingdom	1	CK65CYZ	Taxed	01/09/2023		Not valid	VAUXHAL	2015	1229	125	PETROL	FALSE	RED	M1	Euro 5	30/09/2015			2 AXLE RIG
547.42	12/12/2022	JR29555	100	17	72	3	United Kingdom	1	JR29555	Taxed	01/04/2023		Valid	PORSCHE	2005	3189	324	PETROL	FALSE	SILVER	M1	Euro 3	10/11/2016			2 AXLE RIG
550.84	12/12/2022	CP05OKE	99	19	52	3	United Kingdom	1	CP05OKE	Taxed	01/08/2023		Valid	FORD	2005	1998	201	DIESEL	FALSE	BLUE	M1	Euro 3	06/09/2020			2 AXLE RIG
553.66	12/12/2022	KJ18CKF	99	16	63	2	United Kingdom	1	KJ18CKF	Taxed	01/10/2023		Valid	MITSUBISI	2018	2442	196	DIESEL	FALSE	BLACK	N1	Euro 6	18/10/2021			2 AXLE RIG
556.4	12/12/2022	WO15BSY	100	19	44	3	United Kingdom	1	WO15BSY	Taxed	01/01/2023		Valid	AUDI	2015	1395	109	PETROL	FALSE	WHITE	M1	Euro 5	16/01/2020			2 AXLE RIG
558.37	12/12/2022	CF62FDC	99	17	86	2	United Kingdom	1	CF62FDC	Taxed	01/07/2023		Valid	FORD	2012	1560	114	DIESEL	FALSE	BLACK	M1	Euro 5a	05/04/2017			2 AXLE RIG
561.1	12/12/2022	FG57KOW	99	17	59	1	United Kingdom	1	FG57KOW	Taxed	01/04/2023		Valid	AUDI	2007	1986	164	DIESEL	FALSE	BLUE	M1	Euro 4	18/04/2012			2 AXLE RIG
563.17	12/12/2022	CK13KRN	99	16	51	1	United Kingdom	1	CK13KRN	Taxed	01/05/2023		Valid	MITSUBISI	2013	1590	137	PETROL	FALSE	BROWN	M1	Euro 5	31/05/2013			2 AXLE RIG
567.34	12/12/2022	BD69FBZ	99	18	81	3	United Kingdom	1	BD69FBZ	Taxed	01/01/2023		No details	VOLKSWA	2020	1498	117	PETROL	FALSE	SILVER	M1	Euro 6d	19/02/2020			2 AXLE RIG
569.85	12/12/2022	CE66YCG	100	19	46	4	United Kingdom	1	CE66YCG	Taxed	01/09/2023		Valid	SKODA	2016	1968	115	DIESEL	FALSE	GREY	M1	Euro 6	25/09/2019			2 AXLE RIG
572.18	12/12/2022	BV64NLX	99	18	45	2	United Kingdom	1	BV64NLX	Taxed	01/06/2023		Valid	VAUXHAL	2015	1598	172	PETROL	FALSE	WHITE	M1	Euro 5	18/06/2015			2 AXLE RIG
575.45	12/12/2022	EO67DZK	99	18	46	2	United Kingdom	1	EO67DZK	Taxed	01/07/2023		Valid	FORD	2017	1995	182	DIESEL	FALSE	WHITE	N1	Euro 6	29/06/2022			2 AXLE RIG
579.29	12/12/2022	GL66WKH	100	19	50	4	United Kingdom	1	GL66WKH	Taxed	01/01/2023		Valid	FORD	2016	998	99	PETROL	FALSE	BLUE	M1	Euro 6	21/01/2022			2 AXLE RIG
584.43	12/12/2022	HN67YXS	100	19	52	3	United Kingdom	1	HN67YXS	Taxed	01/06/2023		Valid	RENAULT	2017	2298	207	DIESEL	FALSE	WHITE	N1	Euro 6	06/06/2022			2 AXLE RIG
587.94	12/12/2022	DX70XKG	100	19	81	6	United Kingdom	1	DX70XKG	Taxed	01/11/2023		No details	NISSAN	2020	2299	184	DIESEL	FALSE	BLACK	N1	Euro 6d	30/11/2020		1	2 AXLE RIG
592.53	12/12/2022	CE22HVM	99	19	47	5	United Kingdom	1	CE22HVM	Taxed	01/03/2023		No details	SKODA	2022	999	115	PETROL	FALSE	BLUE	M1	Euro 6d	25/03/2022			2 AXLE RIG
595.38	12/12/2022	VE13TCK	100	19	35	6	United Kingdom	1	VE13TCK	Taxed	01/06/2023		Valid	VOLKSWA	2013	999	103	PETROL	FALSE	BLUE	M1	Euro 5	07/07/2015			2 AXLE RIG
598.34	12/12/2022	PK65UJN	100	19	51	5	United Kingdom	1	PK65UJN	Taxed	01/09/2023		Valid	NISSAN	2015	1461	103	DIESEL	FALSE	WHITE	M1	Euro 5b	13/10/2017			2 AXLE RIG
610.72	12/12/2022	VE16XAT	99	17	73	2	United Kingdom	1	VE16XAT	Taxed	01/02/2023		Valid	NISSAN	2016	1598	128	DIESEL	FALSE	BLACK	M1	Euro 6	21/02/2022			2 AXLE RIG
612.39	12/12/2022	YG18JYR	99	19	87	2	United Kingdom	1	YG18JYR	Taxed	01/11/2023		Valid	MINI	2018	1499	109	PETROL	FALSE	GREY	M1	Euro 6	07/11/2019			2 AXLE RIG
616.56	12/12/2022	YR11XAM	100	18	60	5	United Kingdom	1	YR11XAM	Taxed	01/06/2023		Valid	VAUXHAL	2011	1398	129	PETROL	FALSE	GREY	M1	Euro 5	09/06/2016			2 AXLE RIG
623.9	12/12/2022	WO21XYP	100	20	39	6	United Kingdom	1	WO21XYP	Taxed	01/08/2023		No details	AUDI	2021	0	0	ELECTRIC	FALSE	BLACK	M1	Euro 6d	21/07/2021			2 AXLE RIG
639.22	12/12/2022	NV63LDZ	100	19	57	5	United Kingdom	1	NV63LDZ	Taxed	01/01/2023		Valid	NISSAN	2014	1198	129	PETROL	FALSE	BLUE	M1	Euro 5	22/01/2018			2 AXLE RIG
640.95	12/12/2022	LE17HNG	100	19	57	5	United Kingdom	1	LE17HNG	Taxed	01/03/2023		Valid	VAUXHAL	2017	1398	118	PETROL	FALSE	GREY	M1	Euro 6	15/06/2022			2 AXLE RIG
645.89	12/12/2022	CE67AYS	100	18	48	2	United Kingdom	1	CE67AYS	Taxed	01/03/2023		Valid	BMW	2017	1995	127	DIESEL	FALSE	WHITE	M1	Euro 6	06/10/2022			2 AXLE RIG
649.19	12/12/2022	YP70LOJ	98	19	35	2	United Kingdom	1	YP70LOJ	Taxed	01/10/2023		No details	FORD	2020	1995	164	DIESEL	FALSE	GREY	N1	Euro 6d	19/10/2020			2 AXLE RIG
689.7	12/12/2022	LD15FRN	99	17	59	1	United Kingdom	1	LD15FRN	Taxed	01/01/2023		Valid	CITROEN	2015	998	95	PETROL	FALSE	GREY	M1	Euro 5	20/01/2021			2 AXLE RIG
691.54	12/12/2022	CA15CFK	99	19	64	2	United Kingdom	1	CA15CFK	Taxed	01/07/2023		Valid	SUZUKI	2015	1242	116	PETROL	FALSE	RED	M1	Euro 5	03/08/2017			2 AXLE RIG

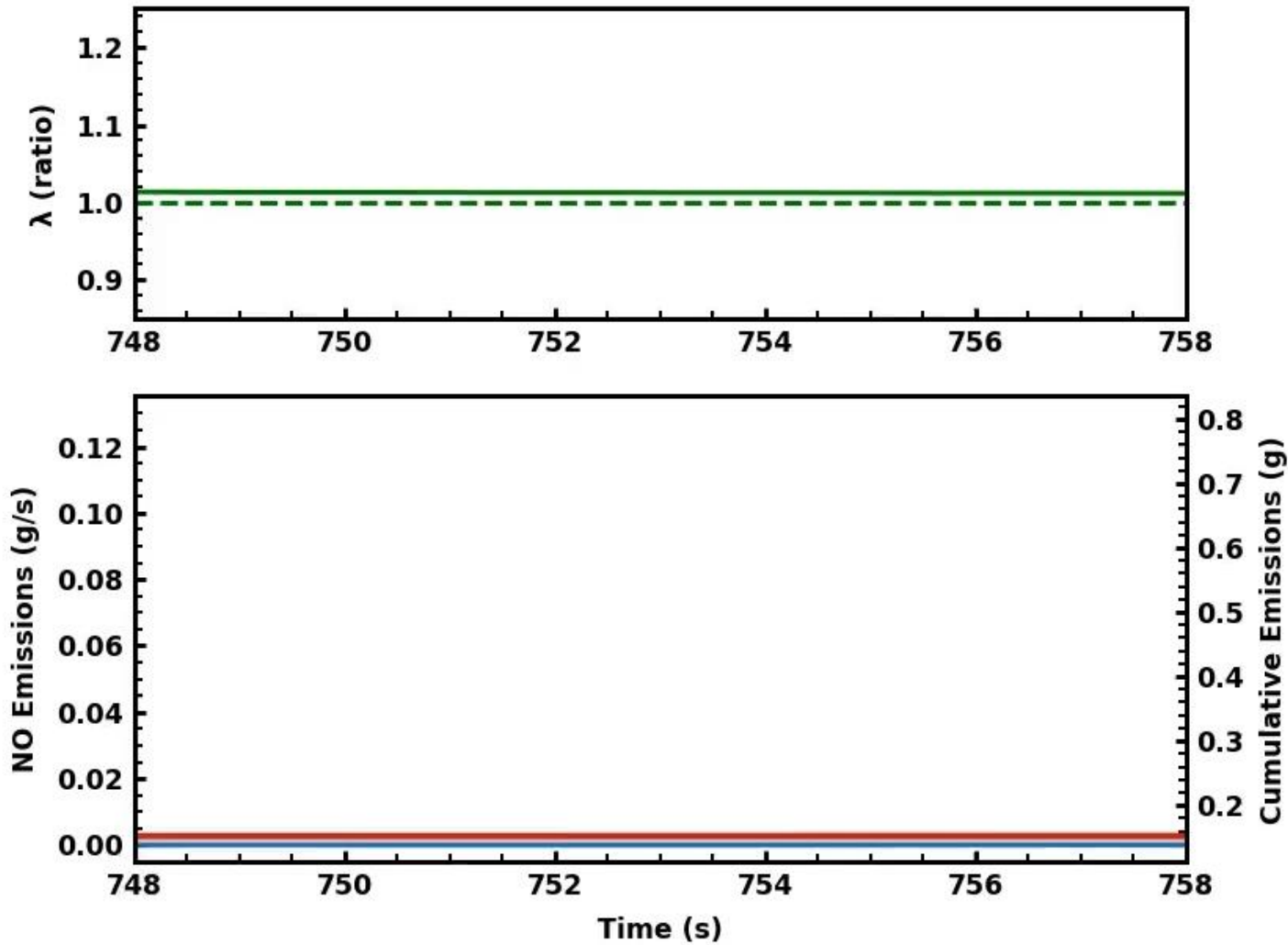
Chase study of bus stop manoeuvre



Measurement from tailpipe



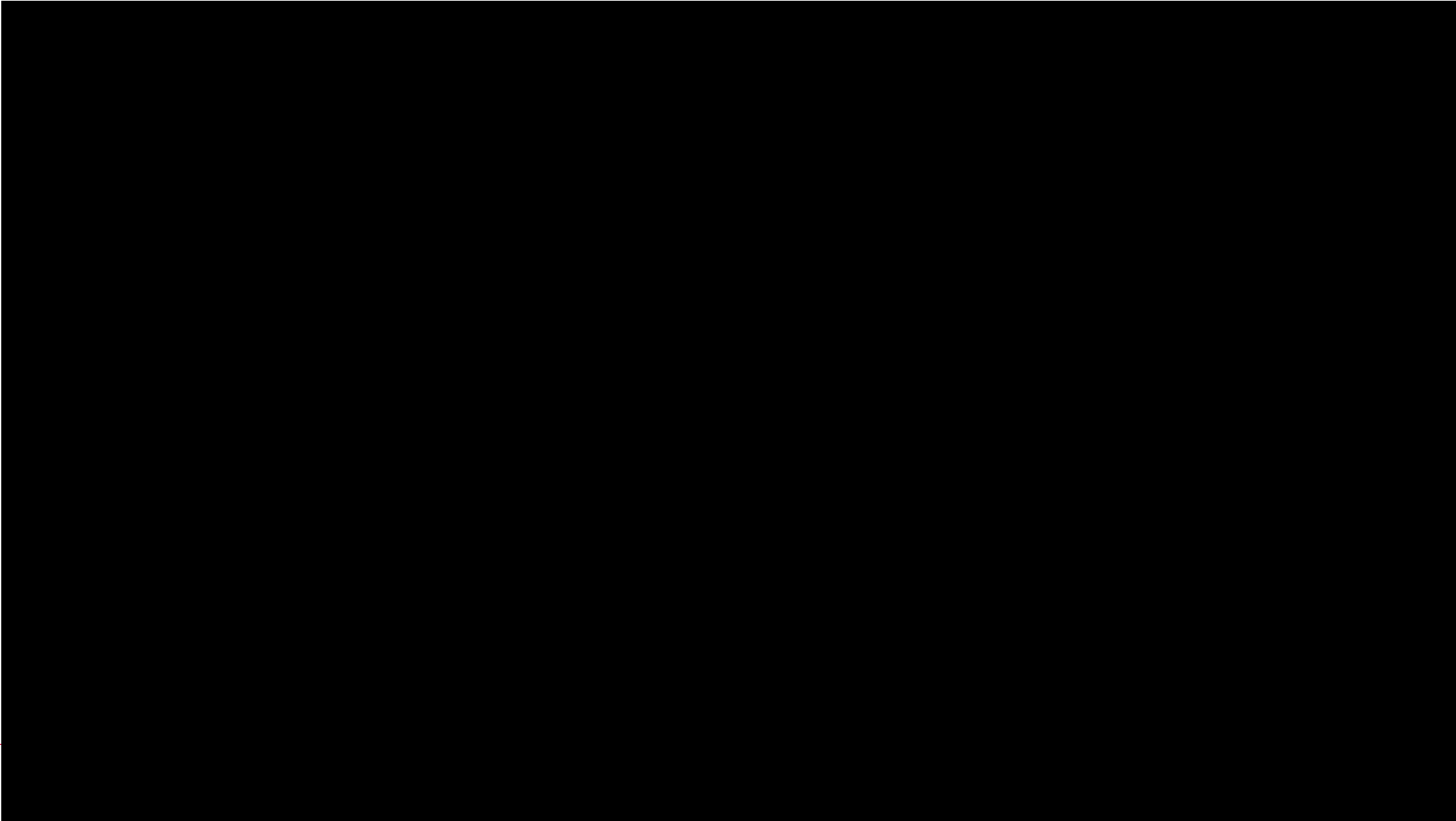
Swiss Cottage tailpipe NO_x from plug-in hybrid



The effect of speed bumps on NOx



Cyclist NOx exposure





Thank you

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