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# **Classification of UK zones against European Air Quality Directive Assessment Thresholds (2008/50/EC and 2004/107/EC)**

**Five-year review (2006-2010)**

**December 2013**



Llywodraeth Cymru  
Welsh Government



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Version Number	Date Published	Changes Made	Author
1	17 <sup>th</sup> December 2013	-	Emily Connolly

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# Introduction

Article 5 of the Air Quality Directive (AQD)<sup>1</sup> specifies the requirement of Member States to assess defined air quality zones against assessment thresholds determined by Section A of Annex II of the Directive. Paragraph 2 of Article 5 requires this assessment to be reviewed at least once every five years. These requirements are also specified under Article 4, para.6 of the Fourth Daughter Directive (DD4)<sup>2</sup> for metals (arsenic, cadmium and nickel) and PAHs, using benzo[a]pyrene (B[a]P) as the marker.

This document represents a five year review of UK zones against those assessment thresholds covering the period 2006-2010. This is the first stage in a process to determine the number of monitoring sites required in the national network for assessment under the Directives.

The assessment uses a combination of measured data from the UK's national networks<sup>3</sup> and national air quality models<sup>4,5</sup> to determine which category each zone falls into relative to the assessment thresholds – below the Lower Assessment Threshold ('<LAT'), between the Lower and Upper Assessment Threshold ('LAT-UAT') or above the Upper Assessment Threshold ('>UAT'). The Assessment Thresholds are specified for each pollutant metric in Annex II of the AQD and DD4 and are summarised in Table 1 and Table 2, respectively.

**Table 1 Assessment Thresholds prescribed in Annex II of the Air Quality Directive**

Pollutant	Metric	LAT	UAT
Sulphur Dioxide (SO <sub>2</sub> )	24-hr mean	50 µg m <sup>-3</sup> (3 allowed)	75 µg m <sup>-3</sup> (3 allowed)
	Winter mean*	8 µg m <sup>-3</sup>	12 µg m <sup>-3</sup>
Oxides of Nitrogen (NO <sub>x</sub> )	Annual mean*	19.5 µg m <sup>-3</sup>	24 µg m <sup>-3</sup>
Nitrogen Dioxide (NO <sub>2</sub> )	1-hr mean	100 µg m <sup>-3</sup> (18 allowed)	140 µg m <sup>-3</sup> (18 allowed)
	Annual mean	26 µg m <sup>-3</sup>	32 µg m <sup>-3</sup>
Particulate Matter (PM <sub>10</sub> )	24-hr mean	25 µg m <sup>-3</sup> (35 allowed)	35 µg m <sup>-3</sup> (35 allowed)
	Annual mean	20 µg m <sup>-3</sup>	28 µg m <sup>-3</sup>
Particulate Matter PM <sub>2.5</sub>	Annual mean	12 µg m <sup>-3</sup>	17 µg m <sup>-3</sup>
Lead	Annual mean	0.25 µg m <sup>-3</sup>	0.35 µg m <sup>-3</sup>
Benzene	Annual mean	2 µg m <sup>-3</sup>	3.5 µg m <sup>-3</sup>

<sup>1</sup> Directive 2008/50/EC (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:152:0001:0044:EN:PDF>)

<sup>2</sup> Directive 2004/107/EC (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0107:EN:NOT>)

<sup>3</sup> UK-AIR website: <http://uk-air.defra.gov.uk/networks/>

<sup>4</sup> Brookes et al (2011) [http://uk-air.defra.gov.uk/reports/cat09/1204301513\\_AQD2010mapsrep\\_master\\_v0.pdf](http://uk-air.defra.gov.uk/reports/cat09/1204301513_AQD2010mapsrep_master_v0.pdf)

<sup>5</sup> Walker et al (2011) [http://uk-air.defra.gov.uk/reports/cat09/1204301510\\_dd42010mapsrep\\_v0.pdf](http://uk-air.defra.gov.uk/reports/cat09/1204301510_dd42010mapsrep_v0.pdf)

Carbon Monoxide (CO)	8-hr mean	5 mg m <sup>-3</sup>	7 mg m <sup>-3</sup>
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\* applicable in ecosystem areas only

**Table 2 Assessment Thresholds prescribed in Annex II of the Fourth Daughter Directive**

Pollutant	Metric	LAT	UAT
Arsenic (As)	Annual mean	3.6 ng m <sup>-3</sup>	2.4 ng m <sup>-3</sup>
Cadmium (Cd)	Annual mean	2 ng m <sup>-3</sup>	3 ng m <sup>-3</sup>
Nickel (Ni)	Annual mean	10 ng m <sup>-3</sup>	14 ng m <sup>-3</sup>
Benzo[a]pyrene (B[a]P)	Annual mean	0.4 ng m <sup>-3</sup>	0.6 ng m <sup>-3</sup>

In addition to these assessment thresholds, an examination of ozone concentrations relative to the Long Term Objectives for health and vegetation has been made (summarised in Table 3) over the five year period.

**Table 3 Ozone Long Term Objectives prescribed in Annex VII Section C of the Air Quality Directive**

Pollutant	Metric	LTO
O <sub>3</sub>	8-hr mean	120 µg m <sup>-3</sup> (for health)
O <sub>3</sub>	AOT40	6000 µg m <sup>-3</sup> .h (for vegetation)

A 75% data capture threshold was used for all monitoring data to ensure that the concentrations were an adequate representation across a full year and therefore minimised seasonal bias before being incorporated into an assessment across five years. Modelled data from UK's Pollution Climate Mapping (PCM) models has also been used. These provide estimates of pollution concentrations at background locations at a 1x1km resolution and road link specific estimates for approximately 9000 major urban roads in the UK. Both measured and modelled data have been used to determine the assessment threshold status of zones separately. The worst case status (i.e. representing the highest concentrations of either measured or modelled) has then been allocated for each zone.

## Assessment Threshold Status by Zone

Table 4 shows the status of each UK zone and agglomeration according to the assessment thresholds set out in the AQD for each pollutant metric for the period 2006-2010. Table 5 shows the same information by zone for DD4 pollutants.

**Table 4 Summary of Assessment Threshold status by pollutant/metric for each UK zone (2006-2010) (AQD pollutants)**

Zone code	Zone name	SO <sub>2</sub> 24hr	SO <sub>2</sub> ecosystem areas	NO <sub>x</sub> ecosystem areas	NO <sub>2</sub> 1hr	NO <sub>2</sub> annual	PM <sub>10</sub> 24hr	PM <sub>10</sub> annual	PM <sub>2.5</sub> annual	Pb annual	Benzene annual	CO max8hr	Ozone (LTO)
UK0001	Greater London Urban Area	<LAT	---	---	>UAT	>UAT	>UAT	>UAT	<LAT	<LAT	LAT-UAT	<LAT	>LTO
UK0002	West Midlands Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0003	Greater Manchester Urban Area	<LAT	---	---	>UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0004	West Yorkshire Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0005	Tyneside	<LAT	---	---	>UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0006	Liverpool Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0007	Sheffield Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0008	Nottingham Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0009	Bristol Urban Area	<LAT	---	---	>UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0010	Brighton/Worthing/Littlehampton	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0011	Leicester Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0012	Portsmouth Urban Area	<LAT	---	---	<LAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0013	Teesside Urban Area	<LAT	---	---	>UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0014	The Potteries	<LAT	---	---	LAT-UAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0015	Bournemouth Urban Area	<LAT	---	---	<LAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0016	Reading/Wokingham Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0017	Coventry/Bedworth	<LAT	---	---	<LAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0018	Kingston upon Hull	<LAT	---	---	<LAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0019	Southampton Urban Area	LAT-UAT	---	---	LAT-UAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0020	Birkenhead Urban Area	<LAT	---	---	<LAT	>UAT	LAT-UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0021	Southend Urban Area	<LAT	---	---	<LAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO

Zone code	Zone name	SO <sub>2</sub> 24hr	SO <sub>2</sub> ecosystem areas	NO <sub>x</sub> ecosystem areas	NO <sub>2</sub> 1hr	NO <sub>2</sub> annual	PM <sub>10</sub> 24hr	PM <sub>10</sub> annual	PM <sub>2.5</sub> annual	Pb annual	Benzene annual	CO max8hr	Ozone (LTO)
UK0022	Blackpool Urban Area	<LAT	---	---	<LAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0023	Preston Urban Area	<LAT	---	---	<LAT	>UAT	LAT-UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0024	Glasgow Urban Area	<LAT	---	---	>UAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0025	Edinburgh Urban Area	<LAT	---	---	LAT-UAT	>UAT	LAT-UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0026	Cardiff Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0027	Swansea Urban Area	<LAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0028	Belfast Metropolitan Urban Area	LAT-UAT	---	---	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0029	Eastern	<LAT	<LAT	LAT-UAT	LAT-UAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0030	South West	<LAT	<LAT	<LAT	>UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
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UK0033	North West & Merseyside	<LAT	<LAT	<LAT	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0034	Yorkshire & Humberside	LAT-UAT	<LAT	>UAT	LAT-UAT	>UAT	>UAT	>UAT	<LAT	<LAT	>UAT	<LAT	>LTO
UK0035	West Midlands	<LAT	<LAT	LAT-UAT	<LAT	>UAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0036	North East	<LAT	<LAT	<LAT	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	LAT-UAT	<LAT	>LTO
UK0037	Central Scotland	LAT-UAT	<LAT	<LAT	LAT-UAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	LAT-UAT	<LAT	>LTO
UK0038	North East Scotland	<LAT	<LAT	<LAT	LAT-UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0039	Highland	<LAT	<LAT	<LAT	LAT-UAT	>UAT	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0040	Scottish Borders	<LAT	<LAT	<LAT	>UAT	>UAT	<LAT	<LAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0041	South Wales	LAT-UAT	<LAT	<LAT	LAT-UAT	>UAT	>UAT	>UAT	<LAT	<LAT	LAT-UAT	<LAT	>LTO
UK0042	North Wales	LAT-UAT	<LAT	LAT-UAT	<LAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO
UK0043	Northern Ireland	LAT-UAT	<LAT	<LAT	<LAT	>UAT	>UAT	LAT-UAT	<LAT	<LAT	<LAT	<LAT	>LTO

**Table 5 Summary of Assessment Threshold status by pollutant/metric for each UK zone (2006-2010) (DD4 pollutants)**

Zone code	Zone name	Arsenic (As)	Cadmium (Cd)	Nickel (Ni)	B[a]P
UK0001	Greater London Urban Area	<LAT	<LAT	<LAT	LAT-UAT
UK0002	West Midlands Urban Area	<LAT	LAT-UAT	LAT-UAT	>UAT
UK0003	Greater Manchester Urban Area	<LAT	<LAT	<LAT	LAT-UAT
UK0004	West Yorkshire Urban Area	<LAT	<LAT	<LAT	LAT-UAT
UK0005	Tyneside	<LAT	<LAT	<LAT	LAT-UAT
UK0006	Liverpool Urban Area	<LAT	<LAT	<LAT	LAT-UAT
UK0007	Sheffield Urban Area	<LAT	<LAT	LAT-UAT	LAT-UAT
UK0008	Nottingham Urban Area	<LAT	<LAT	<LAT	LAT-UAT
UK0009	Bristol Urban Area	<LAT	<LAT	<LAT	<LAT
UK0010	Brighton/Worthing/Littlehampton	<LAT	<LAT	<LAT	<LAT
UK0011	Leicester Urban Area	<LAT	<LAT	<LAT	<LAT
UK0012	Portsmouth Urban Area	<LAT	<LAT	<LAT	<LAT
UK0013	Teesside Urban Area	<LAT	<LAT	<LAT	>UAT
UK0014	The Potteries	<LAT	<LAT	<LAT	>UAT
UK0015	Bournemouth Urban Area	<LAT	<LAT	<LAT	<LAT
UK0016	Reading/Wokingham Urban Area	<LAT	<LAT	<LAT	<LAT
UK0017	Coventry/Bedworth	<LAT	<LAT	<LAT	<LAT
UK0018	Kingston upon Hull	<LAT	<LAT	<LAT	<LAT
UK0019	Southampton Urban Area	<LAT	<LAT	<LAT	<LAT
UK0020	Birkenhead Urban Area	<LAT	<LAT	<LAT	<LAT
UK0021	Southend Urban Area	<LAT	<LAT	<LAT	<LAT
UK0022	Blackpool Urban Area	<LAT	<LAT	<LAT	<LAT
UK0023	Preston Urban Area	<LAT	<LAT	<LAT	<LAT
UK0024	Glasgow Urban Area	<LAT	<LAT	<LAT	<LAT
UK0025	Edinburgh Urban Area	<LAT	<LAT	<LAT	<LAT
UK0026	Cardiff Urban Area	<LAT	<LAT	<LAT	LAT-UAT
UK0027	Swansea Urban Area	<LAT	<LAT	>UAT	>UAT
UK0028	Belfast Metropolitan Urban Area	<LAT	<LAT	<LAT	>UAT



Zone code	Zone name	Arsenic (As)	Cadmium (Cd)	Nickel (Ni)	B[a]P
UK0029	Eastern	<LAT	<LAT	>UAT	<LAT
UK0030	South West	LAT-UAT	<LAT	<LAT	>UAT
UK0031	South East	LAT-UAT	<LAT	<LAT	>UAT
UK0032	East Midlands	LAT-UAT	<LAT	LAT-UAT	>UAT
UK0033	North West & Merseyside	LAT-UAT	<LAT	<LAT	>UAT
UK0034	Yorkshire & Humberside	>UAT	<LAT	<LAT	>UAT
UK0035	West Midlands	LAT-UAT	<LAT	<LAT	>UAT
UK0036	North East	<LAT	<LAT	<LAT	>UAT
UK0037	Central Scotland	<LAT	<LAT	<LAT	>UAT
UK0038	North East Scotland	<LAT	<LAT	<LAT	>UAT
UK0039	Highland	<LAT	<LAT	<LAT	>UAT
UK0040	Scottish Borders	LAT-UAT	<LAT	<LAT	LAT-UAT
UK0041	South Wales	<LAT	<LAT	>UAT	>UAT
UK0042	North Wales	<LAT	<LAT	<LAT	>UAT
UK0043	Northern Ireland	<LAT	<LAT	<LAT	>UAT