



Urban and Rural Metals and PAH Networks: Assessment of Siting Criteria

**Report to the Department for Environment, Food
and Rural Affairs, Scottish Government, Welsh
Assembly Government and the DoE in N. Ireland**

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Executive summary

The sites currently in the UK's Urban Metals Network, Rural Metals Network and PAH Network have been assessed for compliance with the requirements of the fourth Daughter Directive (Directive 2004/107/EC, DD4). This places requirements on site location and sampling criteria, which must be met by all sites used to ensure the UK's compliance with the Directive

Of the sites in the network as of March 2012 and several which have yet to be commissioned into the network, three have been identified as not fully meeting the requirements. These are:

- Cardiff Llandaff
- London Cromwell Road 2
- Sheffield Brinsworth

An assessment against the Air Quality Directive siting criteria (which varies slightly from DD4) has shown that these criteria do not result in any change to site compliance compared with using the DD4 criteria.

The reasons for non-compliance are described and recommendations provided.

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1 Introduction

Air quality Directive 2004/107/EC (the 'fourth Daughter Directive', DD4) for ambient air quality and cleaner air for Europe prescribes the need for assessment of metal and PAH concentrations across the UK. DD4 defines the siting criteria for monitoring sites for arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air on a macro- and micro scale. This document summarises a review of the current network sites against these requirements and identifies sites that are not compliant. The primary purpose of the review is to assess sites against the DD4 criteria but an effort has been made to assess them against the current AQD criteria given the anticipation that the AQD and DD4 could be consolidated into a single Directive in the near future with common siting criteria. Recommendations for any required further monitoring will be addressed by the forthcoming Monitoring Regime Assessment report for the 4th Daughter Directive.

Over time, local site conditions do change, for example new buildings, vegetation or industrial development. Some sites have been discontinued, replaced or relocated, or have been upgraded as required. It is therefore important to review site compliance with the Directive criteria on a regular basis.

The DD4 Target Values (TVs) are in force at all locations in a Member State, but assessment against the TVs is not required at certain locations listed in Annex III, i.e. where the public have no access, where occupational health and safety legislation is applicable, and on the carriageway or central reservation of roads.

The Directive refers to sites located near roads as traffic-orientated. Historically, in the UK, sites close to significant roads as "Roadside" (2-10 metres from the kerb) or "Kerbside"-within 1 metre of the kerb. These definitions have no status in the Directive, but are frequently reflected in the site nomenclature.

2 Directive Requirements

2.1 Background

The nationwide measurement of 'heavy metals' in ambient air began in the late 1970s, and in 1980 was developed into several national networks, aimed at different metals and different emissions sources. These networks were rationalised into the current UK Heavy Metals Monitoring Network in 2003. The Urban Network is currently managed by NPL, and the Rural Network by CEH. The Urban Metals Network¹ and the Rural Metals Network² are both described in detail on their respective web pages.

The polycyclic aromatic hydrocarbon (PAH) Network, which has operated since 1991, currently monitors the ambient concentrations of PAHs in the UK atmosphere by sampling PAHs at 31 sites across England, Wales, Scotland and Northern Ireland. The PAH Network has strong links with the Toxic Organic Micro Pollutants (TOMPs) Network, which monitors at fewer sites – six in total. These TOMPs sites also provide samples to be analysed for the PAHs allowing the assessment of PAHs at 34 sites. These TOMPs sites are not aimed at ensuring compliance with the Directive and are not assessed here. The background monitoring sites at Auchencorth Moss and Harwell provide data to ensure the UK complies with the EMEP monitoring requirements. Banchory, Yarner Wood, Heigham Holmes and Lough Navar also provide data to OSPAR. The PAH Network is described on the web³.

Several of the sites considerably pre-date the relevant Directives, and have been retained in the network to provide long-term information on air quality, and therefore may not meet the current requirements. A more thorough history is given in Air Pollution in the UK: 2010⁴.

In order to ensure the UK's compliance with the EU air quality Directives, it is important that monitoring stations are sited according to the specified requirements prescribed (Directive 2004/107/EC, Annex III).

Sites are defined by the following categories:

Background	Places representative of exposure of the general urban population
Traffic	At least 25 metres from the edge of major junctions and no more than 4 metres from the centre of nearest traffic lane
Industrial	Site in residential area downwind of specific source

In addition, the area surrounding the site is also described as urban, suburban, or rural.

2.2 Macroscale Requirements

The macroscale siting requirements are defined for protection of human health. These requirements are intended to ensure that sites are representative of the areas in which they are located, are not unduly affected by specific processes (except for industrially focussed sites), and are typical of areas where the population may be exposed for a significant time.

¹ Urban Metals Network: <http://uk-air.defra.gov.uk/networks/network-info?view=metals>

² Rural Metals Network: <http://uk-air.defra.gov.uk/networks/network-info?view=rm>

³ PAH Network: <http://uk-air.defra.gov.uk/networks/network-info?view=tomps>

⁴ Air Pollution in the UK: 2010: http://uk-air.defra.gov.uk/library/annualreport/viewonline?year=2010_issue_2

The Directive defines the requirements as follows:

The sites of sampling points should be selected in such a way as to:

- provide data on the areas within zones and agglomerations where the population is likely to be directly or indirectly exposed to the highest concentrations averaged over a calendar year;*
- provide data on levels in other areas within zones and agglomerations which are representative of the exposure of the general population;*
- provide data on deposition rates representing the indirect exposure of the population through the food chain.*

Sampling points should in general be sited so as to avoid measuring very small micro-environments in their immediate vicinity. As a guideline, a sampling point should be representative of air quality in surrounding areas of no less than 200 m² at traffic-orientated sites, at least 250 m × 250 m at industrial sites, where feasible, and several square kilometres at urban-background sites.

Where the objective is to assess background levels the sampling site should not be influenced by agglomerations or industrial sites in its vicinity, i.e. sites closer than a few kilometres.

Where contributions from industrial sources are to be assessed, at least one sampling point shall be installed downwind of the source in the nearest residential area.

Where the background concentration is not known, an additional sampling point shall be situated within the main wind direction. In particular where Article 3(3) applies the sampling points should be sited such that the application of BAT can be monitored.

Sampling points should also, where possible, be representative of similar locations not in their immediate vicinity.

Where appropriate they should be co-located with sampling points for PM₁₀.

2.3 Microscale Requirements

The microscale requirements are intended to ensure that the measurements made at each site are representative of that location, and no local adverse conditions will compromise the integrity of the data. The requirements are defined as:

In so far as is practicable, the following shall apply:

- the flow around the inlet sampling probe should be unrestricted, without any obstructions affecting the airflow in the vicinity of the sampler (normally some metres away from buildings, balconies, trees and other obstacles and at least 0,5 m from the nearest building in the case of sampling points representing air quality at the building line);*
- in general, the inlet sampling point should be between 1,5 m (the breathing zone) and 4 m above the ground. Higher positions (up to 8 m) may be necessary in some circumstances. Higher siting may also be appropriate if the station is representative of a large area;*
- the inlet probe should not be positioned in the immediate vicinity of sources in order to avoid direct intake of emissions unmixed with ambient air;*
- the sampler's exhaust outlet should be positioned so that recirculation of exhaust air to the sample inlet is avoided;*

— *traffic-orientated sampling points should be at least 25 metres from the edge of major junctions and at least 4 m from the centre of the nearest traffic lane; inlets should be sited so as to be representative of air quality near the building line;*

— *for the deposition measurements in rural background areas, the EMEP guidelines and criteria should be applied as far as practicable and where not provided for in the Annexes.*

The Directive recognises that practical constraints such as power supplies, security, safety and planning may be taken into account. These factors are frequently the dominant factor in deciding where monitoring sites can be located, and monitoring cannot always be carried out at the most favourable location. Sites located in existing buildings very often have the sample inlet mounted on the wall of the building, thus limiting the angle of airflow around the inlet, but this does not necessarily mean the site is unrepresentative. Compromises are inevitable but these should not be allowed to overly degrade data quality. Regular review of site suitability is necessary, and Defra will continue to manage this in the future. The Directive requires that site location reviews are carried out regularly, and it is intended that this process will address this requirement. LSOs are also encouraged to report anything that might affect the measurements from the site.

3 Site assessments

3.1 Fourth Daughter Directive (2004/107/EC)

The process of assessing the site compliance used the following inputs:

- Site criteria assessed at QA/QC audits carried out by staff.
- Information available on the specific network websites (and the AURN site information website, for collocated sites), including maps and photographs
- Google Earth, useful for determining distances to roads, junctions, etc and general topography and urban layout
- Specific information including photographs supplied by the lead contractors for the networks concerned.

Each site was then considered individually against the DD4 requirements, and those not compliant are listed below:

Site	Site type	Reason for noncompliance	Comments
Cardiff Llandaff	Urban traffic	Site on major road junction	Location not representative of area
London Cromwell Road 2	Urban traffic	Site on major road junction	Location not representative of area
Sheffield Brinsworth	Urban Industrial	Sampling head ~0.5m from building wall and under the eaves of the roof	Sampling likely to be compromised

There are several Industrial sites in the networks and in some cases sites are situated upwind and downwind of the relevant industrial process. Where this is not the case (e.g. for Port Talbot Margam), modelled concentrations are used for the background contribution.

The Manchester Wythenshawe monitoring site is located along the northern slip road of Junction 4 of the M56. However since the Directive offers no guidance on how to delimit a 'junction' and the monitoring station is located more than 25 m from both the motorway carriageway and the crosscutting road (Simonsway), an argument can be made that this site is compliant. For this reason the site has been assessed as compliant in this document.

3.2 Air Quality Directive (2008/50/EC)

An assessment was also made against Air Quality Directive (AQD) macroscale and microscale siting criteria where this differed from the DD4 criteria. This assessment is to highlight any sites that might be deemed non-compliant if, as a result of the AQD review in 2013, the AQD and DD4 are consolidated into a single Directive in which the AQD siting criteria is adopted.

The differences between the siting criteria in the two Directives are only slight. The box below shows examples of these differences:

DD4 siting criteria	AQD siting criteria
Traffic orientated stations must be at least 4m from the centre of the nearest traffic lane (microscale siting criteria)	Traffic orientated stations must be no more than 10m from the kerbside (microscale siting criteria)
Traffic orientated stations must be representative of at least 200m ² (microscale siting criteria)	Traffic orientated stations must be representative of at least 100m road length (microscale siting criteria)
unrestricted flow around the sample inlet	unrestricted flow around the sample inlet in at least 270° arc

The assessment against the Air Quality Directive siting criteria has shown that these criteria do not result in any change to site compliance compared with using the DD4 criteria.

4 Recommendations

It is important that the UK monitoring networks meet the requirements of DD4. The UK will shortly be undertaking a full and up to date assessment of the number and types of sites required for compliance with DD4 and will review whether the three non-compliant sites listed here are necessary or surplus to requirements.

It is recommended that these findings are confirmed by the individual network providers and subsequently that a decision is made by Defra on whether to continue these non-compliant sites.

Based on Defra's decision, these findings will be incorporated into the Monitoring Regime Assessment process to determine the required number of monitoring sites by zone and highlight the excess/shortfall in monitoring for each zone.

It is recommended that a regular review of site compliance across the metals and PAH networks is undertaken on behalf of Defra on a time table to be agreed in consultation with Defra and the network providers.

5 Acknowledgements

The authors would like to thank the individual network providers for their on-going support in compiling the relevant metadata and helpful discussion in assessing the monitoring stations against the Directive criteria, specifically:

- David Butterfield and Richard Brown (NPL) - Urban Metals and PAH Networks
- Heath Malcolm (CEH) – Rural Metals Network

Appendices

Appendix 1: Site Classifications (by network)

Appendix 2: Site compliance summary: DD4

Appendix 3: Assessment methodology

Appendix 1

Site classifications (by network)

Rural Metals

Site code	Site name	Latitude	Longitude	Area Type	Station Type
GB0048R	Auchencorth Moss	55.79231	-3.24315	Background	Rural
GB0091R	Banchory	57.07663	-2.53489	Background	Rural
GB0855A	Beacon Hill	52.72199	-1.23229	Background	Rural
GB0853A	Cockley Beck	54.40349	-3.16137	Background	Rural
GB0854A	Cwmystwyth	52.35244	-3.80532	Background	Rural
GB0886A	Detling	51.30888	0.584133	Background	Rural
GB0036R	Harwell	51.57088	-1.32514	Background	Rural
GB0017R	Heigham Holmes	52.72715	1.614805	Background	Rural
GB1009R	Inverpolly	58.03138	-5.07221	Background	Rural
GB0006R	Lough Navar	54.44777	-7.88713	Background	Rural
GB0856A	Monkswood	52.40358	-0.23656	Background	Rural
GB1011R	Penallt	51.78083	-2.69273	Background	Rural
GB0858A	Wytham Wood	51.77033	-1.33243	Background	Rural
GB0013R	Yarner Wood	50.59756	-3.71621	Background	Rural

Urban Metals

Site code	Site name	Latitude	Longitude	Area Type	Station Type
GB0567A	Belfast Centre	54.59965	-5.928833	Urban	Background
GB_PONT_BR	Brecon Road	51.726513,	3.843442	Urban	Industrial
GB0369A	Cardiff Llandaff	51.488197	-3.228471	Urban	Traffic
GB0984A	Cardiff Rumney	51.508779	-3.122754	Urban	Background
GB0985A	Chadwell St Mary	51.48196	0.370213	Urban	Background
GB0986A	Dartford Bean	51.423874	0.288708	Urban	Background
GB0002R	Eskdalemuir	55.313342	-3.206873	Rural	Background
GB0695A	London Cromwell Road 2	51.495483	-0.178709	Urban	Traffic
GB0382A	London Marylebone Road	51.52253	-0.15461	Urban	Traffic
GB0743A	London Westminster	51.49467	-0.131931	Urban	Background
GB0370A	Manchester Wythenshawe	53.384383	-2.277087	Urban	Traffic
GB1003A	Motherwell South	55.77659	-3.975921	Urban	Background
GB_PONT_TT	Pontardawe Tawe Terrace	51.720007	-3.847216	Urban	Industrial
GB0980A	Redcar Normanby	54.54597	-1.146501	Urban	Background
GB0977A	Redcar ¹	54.610735	-1.0733	Suburban	Background
GB0877A	Runcorn Weston Point	53.32623	-2.747128	Urban	Industrial
GB0792A	Sheffield Brinsworth	53.410345	-1.384261	Urban	Industrial
GB0615A	Sheffield Centre	53.37772	-1.473306	Urban	Background
GB0981A	Swansea Coedgwilym	51.701679	-3.87401	Urban	Background
GB0979A	Swansea Morriston	51.66173	-3.92171	Urban	Traffic
GB0983A	Walsall Bilston Lane	52.583131	-2.042801	Urban	Background
GB0382A	Walsall Centre	52.579534	-2.00856	Urban	Industrial

PAH

Site code	Site Name	Latitude	Longitude	Area Type	Station Type
GB0002R	Auchencorth Moss	55.79216	-3.2429	Rural	Background
GB0743A	Ballymena	54.8616	-6.25087	Urban	Background
GB0702A	Birmingham Tyburn	52.51172	-1.83058	Urban	Background
GB0567A	Bolsover	53.25637	-1.29708	Urban	Background
GB0706A	Cardiff Lakeside	51.51241	-3.16934	Urban	Background
GB0839A	Derry Brandywell	54.99234	-7.33213	Urban	Background
GB0641A	Edinburgh St Leonards	55.94559	-3.18219	Urban	Background
GB0369A	Glasgow Centre	55.85773	-4.25516	Urban	Background
GB0036R	Harwell	51.57108	-1.32528	Rural	Background
GB0004R	Hazelrigg	54.01364	-2.7754	Rural	Background
GB0014R	High Muffles	54.33494	-0.80855	Rural	Background
GB0700A	Hove	50.83659	-0.18298	Urban	Background
GB0568A	Kinlochleven	56.71476	-4.95442	Urban	Background

Site code	Site Name	Latitude	Longitude	Area Type	Station Type
GB0705A	Leeds Millshaw	53.76611	-1.57862	Urban	Background
GB0583A	Lisburn Dunmurry High School	54.53793	-6.01402	Suburban	Background
GB0615A	Liverpool Speke	53.34633	-2.84433	Urban	Background
GB0695A	London Brent	51.58977	-0.27622	Urban	Background
GB0682A	London Crystal Palace Parade	51.42469	-0.07551	Urban	Traffic
GB0382A	London Marylebone Road	51.52253	-0.15461	Urban	Traffic
GB0849A	Lynemouth 2	55.21136	-1.53674	Suburban	Industrial
GB0091R	Middlesbrough	54.5693	-1.22087	Urban	Industrial ²
GB0048R	Newcastle Centre	54.97825	-1.61053	Urban	Background
GB0841A	Newport	51.6012	-2.97728	Urban	Background
GB0708A	Port Talbot Margam	51.58395	-3.77082	Urban	Industrial
GB0745A	Royston	53.60028	-1.43945	Urban	Industrial
GB0370A	Salford Eccles	53.48481	-2.33414	Urban	Industrial
GB0847A	Scunthorpe Low Santon	53.59583	-0.59724	Urban	Industrial
GB0660A	Scunthorpe Town	57.58633	-0.63713	Urban	Industrial
GB0777A	South Heindley	53.61194	-1.40084	Urban	Industrial
GB0017R	Stoke Ferry	52.55985	0.506147	Rural	Background
GB0792A	Swansea Cwm Level Park	51.64584	-3.93945	Urban	Background
GB0013R	Weybourne	52.95049	1.122017	Rural	Background

1. Location provisional at time of writing
2. Middlesbrough is classified Industrial for PAH but Background for other pollutants at the site (AURN)

Appendix 2

Site compliance summary: DD4

Rural Metals

Site code	Site name	Compliant with Annex III Section II: Macroscale	Compliant with Annex III Section III: Microscale	Comments
GB0048R	Auchencorth Moss	Yes	Yes	
GB0091R	Banchory	Yes	Yes	
GB0855A	Beacon Hill	Yes	Yes	
GB0853A	Cockley Beck	Yes	Yes	
GB0854A	Cwmystwyth	Yes	Yes	
GB0886A	Detling	Yes	Yes	
GB0036R	Harwell	Yes	Yes	
GB0017R	Heigham Holmes	Yes	Yes	
GB1009R	Inverpolly	Yes	Yes	
GB0006R	Lough Navar	Yes	Yes	
GB0856A	Monkswood	Yes	Yes	
GB1011R	Penallt	Yes	Yes	
GB0858A	Wytham Wood	Yes	Yes	
GB0013R	Yarner Wood	Yes	Yes	

Urban Metals

Site code	Site name	Compliant with Annex III Section II: Macroscale	Compliant with Annex III Section III: Microscale	Comments
GB0567A	Belfast Centre	Yes	Yes	
GB_PONT_BR	Brecon Road			
GB0369A	Cardiff Llandaff	Yes	No	Too close to complex junction
GB0984A	Cardiff Rumney	Yes	Yes	
GB0985A	Chadwell St Mary	Yes	Yes	
GB0986A	Dartford Bean	Yes	Yes	
GB0002R	Eskdalemuir	Yes	Yes	
GB0695A	London Cromwell Road 2	Yes	No	Too close to complex junction
GB0382A	London Marylebone Road	Yes	Yes	
GB0743A	London Westminster	Yes	Yes	

Site code	Site name	Compliant with Annex III Section II: Macroscale	Compliant with Annex III Section III: Microscale	Comments
GB0370A	Manchester Wythenshawe	Yes	Yes	Poor siting, within the boundary of M56 motorway ~10m from centre of lane. Understood to be legacy of Lead in Petrol network
GB1003A	Motherwell South	Yes	Yes	
GB_PONT_TT	Pontardawe Tawe Terrace	Yes	Yes	Site not yet installed March 2012
GB0980A	Redcar Normanby	Yes	Yes	
GB0977A	Redcar*	Yes	Yes	
GB0877A	Runcorn Weston Point	Yes	Yes	
GB0792A	Sheffield Brinsworth	Yes	No	
GB0615A	Sheffield Centre	Yes	Yes	
GB0981A	Swansea Coedgwilym	Yes	Yes	
GB0979A	Swansea Morriston	Yes	Yes	
GB0983A	Walsall Bilston Lane	Yes	Yes	
GB0382A	Walsall Centre	Yes	Yes	

PAH

Site code	Site Name	Compliant with Annex III Section II: Macroscale	Compliant with Annex III Section III: Microscale	Comments
GB0002R	Auchencorth Moss			
GB0743A	Ballymena			
GB0702A	Birmingham Tyburn			
GB0567A	Bolsover	Yes	Yes	
GB0706A	Cardiff Lakeside	Yes	Yes	
GB0839A	Derry Brandywell	Yes	Yes	
GB0641A	Edinburgh St Leonards	Yes	Yes	
GB0369A	Glasgow Centre	Yes	Yes	
GB0036R	Harwell	Yes	Yes	
GB0004R	Hazelrigg	Yes	Yes	Site ~400m from M6 motorway; long-term site
GB0014R	High Muffles	Yes	Yes	
GB0700A	Hove	Yes	Yes	
GB0568A	Kinlochleven	Yes	Yes	
GB0705A	Leeds Millshaw	Yes	Yes	

Site code	Site Name	Compliant with Annex III Section II: Macroscale	Compliant with Annex III Section III: Microscale	Comments
GB0583A	Lisburn Dunmurry High School	Yes	Yes	
GB0615A	Liverpool Speke	Yes	Yes	
GB0695A	London Brent	Yes	Yes	
GB0682A	London Crystal Palace Parade	Yes	Yes	
GB0382A	London Marylebone Road	Yes	Yes	
GB0849A	Lynemouth 2	Yes	Yes	
GB0091R	Middlesbrough	Yes	Yes	
GB0048R	Newcastle Centre	Yes	Yes	
GB0841A	Newport	Yes	Yes	
GB0708A	Port Talbot Margam	Yes	Yes	
GB0745A	Royston	Yes	Yes	
GB0370A	Salford Eccles	Yes	Yes	
GB0847A	Scunthorpe Low Santon	Yes	Yes	
GB0660A	Scunthorpe Town	Yes	Yes	
GB0777A	South Heindley	Yes	Yes	
GB0017R	Stoke Ferry	Yes	Yes	
GB0792A	Swansea Cwm Level Park	Yes	Yes	
GB0013R	Weybourne	Yes	Yes	

Appendix 3

Assessment Methodology

Example-Sheffield Centre

Sheffield Centre is situated in an open area in Queens Square Court. It is situated in a pedestrian precinct surrounded by shops and offices off Charter Row.. The site environment is shown in Figure A1, and a photograph of the site in Figure A2:

Figure A1: Aerial Photograph of the area (courtesy Google Earth)



Figure A2: Photograph of Sheffield Centre Site



Considering each point of the Directive given in Section 2.1 in turn:

Macroscale Requirements

(a) Sampling points directed at the protection of human health shall be sited in such a way as to provide data on the following:

The sites of sampling points should be selected in such a way as to:

— provide data on the areas within zones and agglomerations where the population is likely to be directly or indirectly exposed to the highest concentrations averaged over a calendar year;

— provide data on levels in other areas within zones and agglomerations which are representative of the exposure of the general population;

— provide data on deposition rates representing the indirect exposure of the population through the food chain.

The site is surrounded by residential and commercial premises, where people could reasonable expect to spend many hours at a time. The site is situated well within the Sheffield City area, and local air quality will be influenced by a variety of activities and processes. Given the central location, pollution levels can be expected to be amongst the highest in the area, without the influence of any specific source. Pollution at the site is unlikely to affect the food chain.

The site is classified as an Urban Background site.

(b) Sampling points should in general be sited so as to avoid measuring very small micro-environments in their immediate vicinity. As a guideline, a sampling point should be representative of air quality in surrounding areas of no less than 200 m² at traffic-orientated sites, at least 250 m x 250 m at industrial sites, where feasible, and several square kilometres at urban-background sites.

(c)

The site is in an open environment, but not focussed specifically on traffic-related or industrial emissions. It is sufficiently far from the road to ensure this.

(c) Where the objective is to assess background levels the sampling site should not be influenced by agglomerations or industrial sites in its vicinity, i.e. sites closer than a few kilometres

As in (a) above, the measured pollution is from all urban sources in the city area. This is an area of many square kilometres.

(d) Where contributions from industrial sources are to be assessed, at least one sampling point shall be installed downwind of the source in the nearest residential area. Where the background concentration is not known, an additional sampling point shall be situated within the main wind direction. In particular where Article 3(3) applies, the sampling points should be sited such that the application of BAT can be monitored.;

Not applicable in this case

(e) Sampling points should also, where possible, be representative of similar locations not in their immediate vicinity. Where appropriate they should be co-located with sampling points for PM₁₀.

The site is typical of the Sheffield centre area; a mixture of commercial and residential properties, some open space and major roads nearby. PM₁₀ is also measured at this site.

Microscale Requirements

The following guidelines should be met as far as practicable:

— the flow around the inlet sampling probe should be unrestricted, without any obstructions affecting the airflow in the vicinity of the sampler (normally some metres away from buildings, balconies, trees and other obstacles and at least 0,5 m from the nearest building in the case of sampling points representing air quality at the building line);

The sampling inlet has been checked regularly at QA/QC audits, and is configured in line with these requirements. It is and free from obstructions for 360 degrees, but with some shielding to the south-east due to a building 20 metres away.

- in general, the inlet sampling point shall be between 1.5 metres (the breathing zone) and 4 metres above the ground. Higher positions (up to 8 metres) may be necessary in some circumstances. Higher siting may also be appropriate if the station is representative of a large area,*

The inlet is approximately 5 metres from the ground.

- the inlet probe should not be positioned in the immediate vicinity of sources in order to avoid the direct intake of emissions unmixed with ambient air,*

Although an urban site, the sample inlet is adequately positioned away from any specific local sources (such as vehicles)

- the sampler's exhaust outlet shall be positioned so that recirculation of exhaust air to the sampler inlet is avoided,*
-

The sampler is designed so as to avoid sampling the exhaust

- traffic-orientated sampling points should be at least 25 metres from the edge of major junctions and at least 4 m from the centre of the nearest traffic lane; inlets should be sited so as to be representative of air quality near the building line;*

As described above, the site is 20m from the kerb but is not traffic-oriented. The vent from the cabin is not close to the sample inlet.

— for the deposition measurements in rural background areas, the EMEP guidelines and criteria should be applied as far as practicable and where not provided for in the Annexes.

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