Appendix A

Chuckery PM_{10} Air Quality Action Plan

WORKING DRAFT FOR COMMENT

Version 1.3

Pollution Control
Engineering & Transportation Services
Walsall Metropolitan Borough Council
2nd Floor Civic Centre
Darwall Street
Walsall
WS1 1DG

Contact:	**John Grant - Scientific Manager**
Telephone:	**01922 652277**
Email:	**pollutioncontrol@walsall.gov.uk**
Fax:	**01922 623234**

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Executive Summary

E.1 As part of the Local Air Quality Management (LAQM) process, Walsall Metropolitan Borough Council identified an area within Chuckery, Walsall that exceeded the 24 hour (daily) Air Quality Objectives (AQO) for PM_{10} particles as in 2006.

E.2 Resulting from this, the Council declared an air quality management area (AQMA) in 2007 for the purpose of achieving the relevant air quality objective. Following declaring the AQMA, the Council has a statutory duty to prepare an Air Quality Action Plan (AQAP) which sets outs measures designed to improve air quality.

E.3 During 2007 and 2008 however, there were no further exceedances of the 24 hour PM_{10} air quality objective. Given this the Council has sought guidance from the Department for Environment, Food and Rural Affairs (DEFRA) on the need to prepare an AQAP and a Further Assessment report on air quality. Notwithstanding compliance with the AQO, DEFRA have confirmed that the Council should compile an AQAP if only to report the measures that have been taken to reduce PM_{10} and confirm future measures (including monitoring) that are still being implemented, and undertake a Further Assessment which need not be a complex report. The Council is of the understanding that this situation will prevail until such time as the AQMA is rescinded.

E.4 This AQAP recognises that, based on monitoring information available to the Council, Chamberlin & Hill Castings Ltd. is likely to have been a key source of industrial PM_{10} emissions. The company carries out ferrous founding operations involving the operation of Part A2 ferrous foundry processes, regulated by the Council for Integrated Pollution Prevention and Control (IPPC) pursuant to the Environmental Permitting (England and Wales) Regulations 2007 (as amended).

E.5 Improvement measures implemented at Chamberlin Hill, coupled with changes to operational practices over the course of 2007 and 2008, have coincided with reported compliance with AQOs.

E.6 Given current compliance with AQOs, it is proposed to continue air quality monitoring work until at least 2012.

E.7 Work towards a Further Assessment report has commenced and it is intended that this will be compiled after December 2009. It will seek to provide information on source apportionment of PM_{10} as far as is practicable, in order to update and refine the AQAP as needed and aid the targeting of any necessary further improvement measures.

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1. Introduction

1.1 In 2004 the Council commenced a study of air quality in the vicinity of Chamberlin & Hill Castings Ltd. ferrous foundry, located off Chuckery Road, Chuckery, Walsall. Detailed Assessments of air Quality in respect of lead and PM_{10} were prepared in September 2005[1] and March 2007[2] respectively.

1.2 In respect of lead, it was concluded that it was not necessary to declare an AQMA. Concerning PM_{10} however, results for the 2006 calendar year had shown 70 exceedances of the 24 hour PM_{10} AQO of 50 μgm^{-3} . Consequently it was decided there was a need to declare an air quality management area within Chuckery in a locality to the north-west of Chamberlin & Hill Castings Ltd., situated on Chuckery Road. The company's operations involve the operation of a Part A2 ferrous casting, regulated by the Council for Integrated Pollution Prevention and Control (IPPC) pursuant to the Environmental Permitting (England and Wales) Regulations 2007 (as amended).

Figure 1 Regional Geography

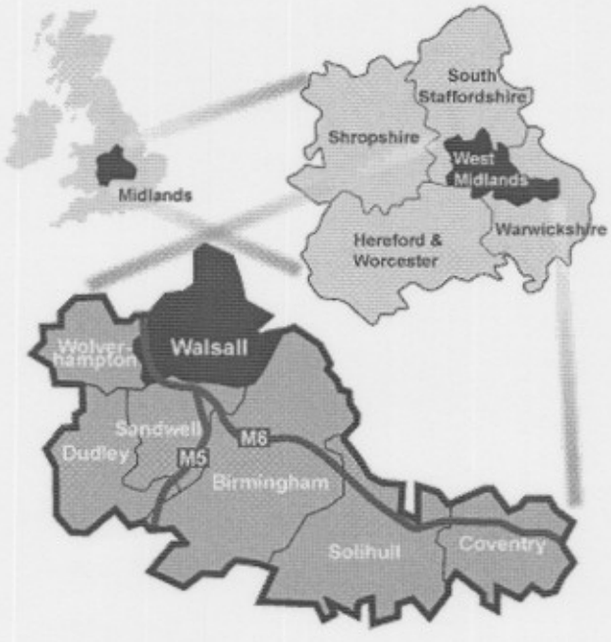
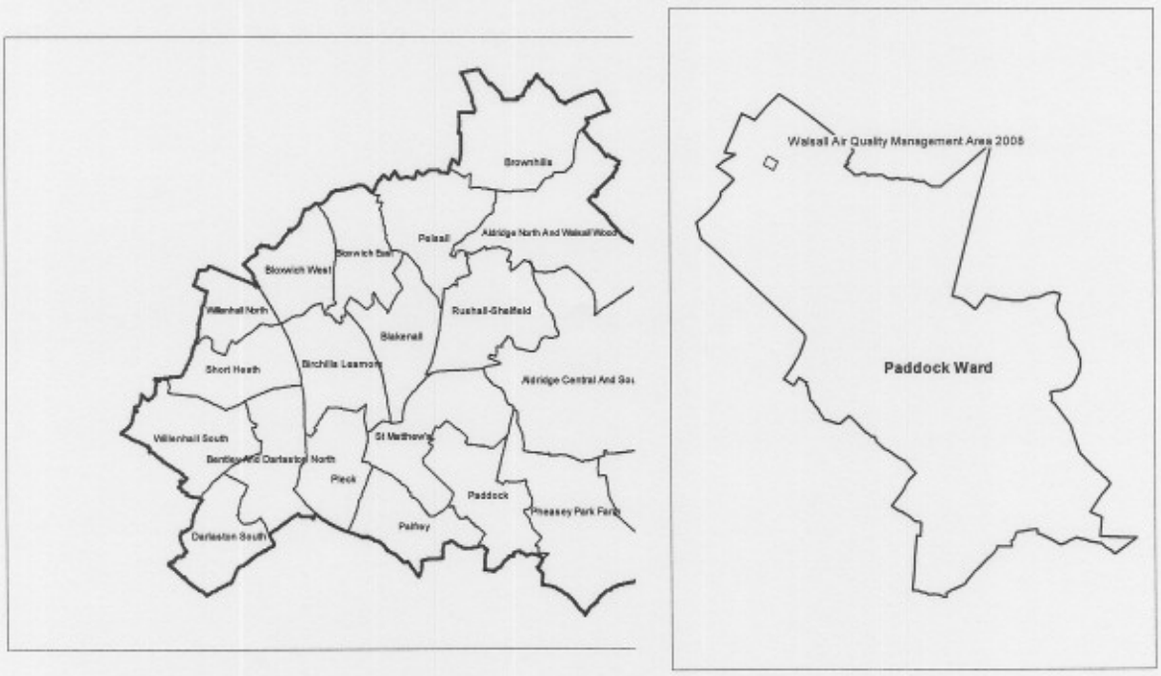


Figure 2 Local Geography



1.3 To inform the process of delineating an AQMA boundary and to establish the extent of PM_{10} impact(s) arising primarily due to fugitive emissions from Chamberlin & Hill's iron founding operations, the Council initially approximated this by using a 'modelled' scenario, employing Cambridge Environmental Research Consultants' (CERC) ADMS-Urban Version 2.0 programme. The rationale was to examine the foundry's potential zone of PM_{10} influence as part of a screening exercise, accepting that the basis for this does not include a well defined emission point or set of emission points.

1.4 Clearly in undertaking this exercise there had to be a number of assumptions, not least as the prediction inputs do not relate solely to contained sources (and hence well established behaviour of pollutants that can be accurately described by a given mathematical model.) To place this into context, whilst the behaviour of pollutants is reasonably well understood, the emission rates remain unknown, hence contour plots in the Detailed Assessment[2] were not assigned specific values.

1.5 PM_{10} was thus treated as emanating from a 7m tall cuboidal fugitive source defined by the foundry's building perimeter, emitting PM_{10} evenly over a five-sided surface without thermal buoyancy or efflux velocity associated with the emission.

1.6 Accepting the parameters used, using predominant southerly wind component data this gave an initial indication that Chuckery Primary School was potentially not as severely affected as residential premises immediately surrounding the foundry along its northern boundary.

1.7 This modelling work was further refined by incorporating discrete point sources, using emission concentration data where available, and treating the fugitive emissions as discrete area sources associated with buildings at building roof height (Figure 3). This yielded a more refined contour plot as shown in Figure 4.

Figure 3 Refined PM_{10} Model Inputs – Chamberlin & Hill Castings Ltd.

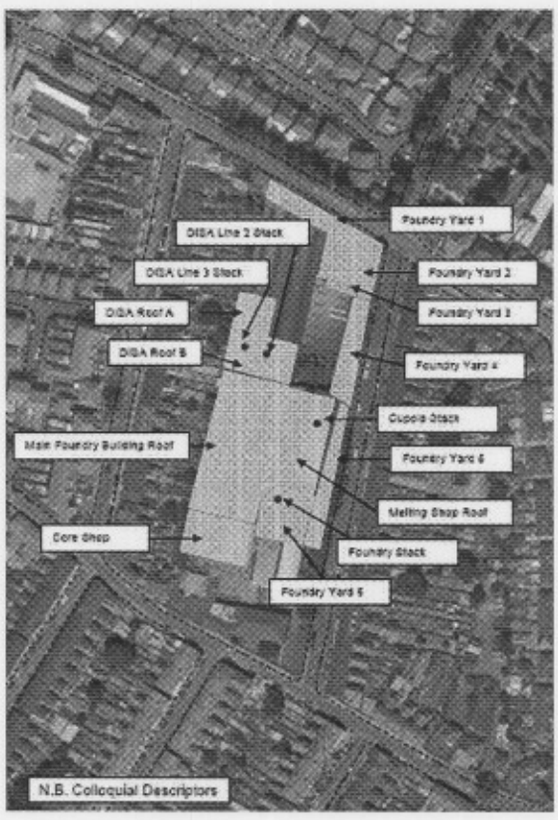


Figure 4 Refined PM_{10} Area of Predicted Influence

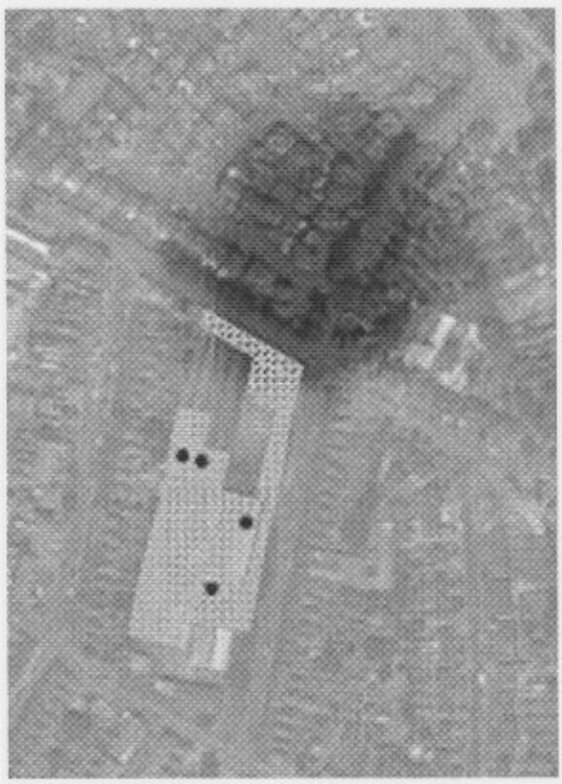


Figure 5 Walsall Air Quality Management Area 2008

2. Air Quality Action Planning in Walsall

2.1 Action planning is an essential part of the local air quality management process, providing a practical opportunity for improving air quality in areas where review and assessment has shown that national measures will be insufficient to meet one or more of the air quality objectives. An air quality action plan should ideally include the following:

- Quantification of the source contributions to the predicted exceedances of the limit values. This allows the action plan measures to be effectively targeted;
- Evidence that all available options have been considered on the grounds of cost and feasibility;
- How the council will use its powers and also work together with others in pursuit of the relevant air quality objectives;
- Clear timescales within which the authority and other organisations propose to implement the measures contained in the plan;
- Quantification of the expected impacts of the proposed measures and, where possible, an indication as to whether these will be sufficient to meet the objectives; and
- How the local authority intends to monitor and evaluate the effectiveness of the plan.

2.2 It is essential that the implementation of the AQAP is closely monitored, and that it is incorporated into other strategic and corporate functions to maximise improvements in air quality.

2.3 In this instance however, current compliance with the relevant AQO renders the standardised approach as unsuitable.

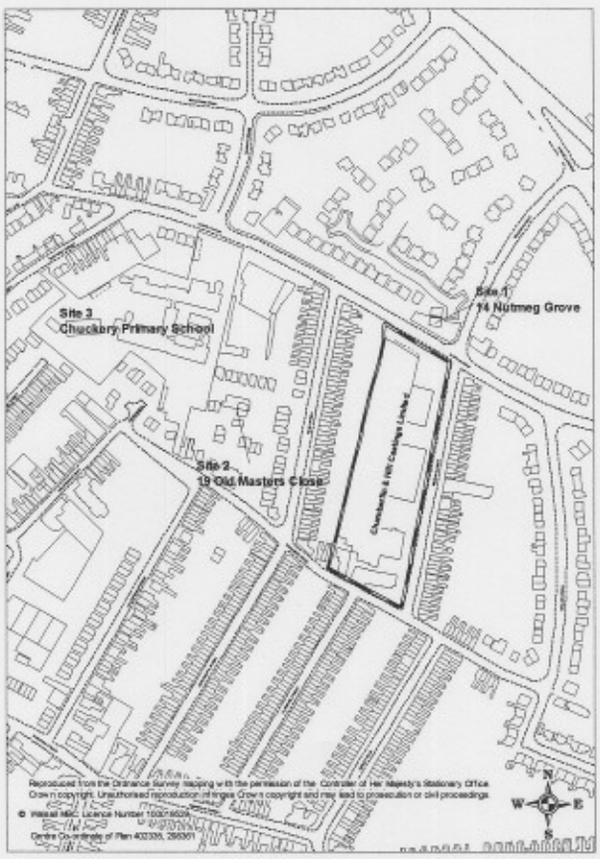
3. Air Quality Monitoring – PM_{10}

3.1 An initial study of PM_{10} levels was carried out over a period of one and a half years, commencing in February 2004. The main finding of this study concluded that levels of PM_{10} were below daily and annual air quality objectives.

3.2 A second, more streamlined continuation study commenced in December 2005 using the following monitoring sites having regard to the location of Chamberlin & Hill Castings Ltd. :

Site 1	Downwind	- 14 Nutmeg Grove
Site 2	Upwind	- NOT PM_{10}
Site 3	West	- Chuckery Primary School

Figure 6 Location of PM_{10} Monitoring Sites



3.3 Results from gravimetric continuous monitors for calendar years 2006 to 2008 inclusive are presented in Table 1.

Table 1 PM_{10} Monitoring Results, μgm^{-3} Concentration

	Calendar Year					
	2006		2007		2008	
Monitoring Site	**Mean**	**No. Days > 50**	**Mean**	**No. Days > 50**	**Mean**	**No. Days > 50**
Site 1 - 14 Nutmeg Grove	35.4	70	25.4	34	23.3	22
Site -3 Chuckery Infants School	n/a	n/a	21.6	13	20.7	14

4. Source Apportionment

4.1 In order to effectively target the measures within any AQAP, relative contributions of different source types (typically traffic, industrial and background sources) need to be determined. The results from this can then be used to help assess the effectiveness of different control options and which of one or more source types need to be addressed.

4.2 Atmospheric particulate matter consists of a wide range of materials arising from a variety of sources. These may be solid or liquid particles that range in size and have complex chemical compositions.

4.3 PM_{10} as a size fraction comprises the mass of particles that pass through a sampler inlet with a 50% efficiency at 10 micrometres (μm). A good approximation to describe PM_{10} is the mass of particles (in the atmosphere) with a diameter of less than 10 μm. This size range includes what is termed as the 'coarse fraction' of the measured particle mass concentration.

4.4 A source apportionment study has not been completed to date as presently there have been no exceedances of an AQO since 2006. Notwithstanding, DEFRA have required that this AQAP is prepared in accordance with statutory requirements, which includes appropriate consultation. Work in support of source apportionment has now commenced, and this will be duly reported in a Further Assessment on the proviso that the AQMA remains in place.

5. Required Level of Reduction in PM_{10}

5.1 Before identifying the options available to improve air quality, it is practice to determine the overall level of improvement required. This is typically stated in micrograms per cubic metre concentration ($\mu g/m^3$) as the difference between the total predicted concentration and the relevant AQO and expressed in terms of concentration units or as a percentage.

5.2 Albeit this AQAP has been produced, presently there is currently no actual requirement for the level of PM_{10} to be reduced to meet an AQO.

5.3 The Council is aware that over the course of 2009 Chamberlin & Hill Castings Ltd. have not operated at full production capacity, which coincides with an economic down-turn both in the U.K. and worldwide.

5.4 Additionally, since 2007 Chamberlin & Hill Castings Ltd. have implemented a series of hard engineering measures to improve pollution control across the foundry. These were notified to DEFRA in 2007 and are detailed in Section 6.

6. Proposed Actions

6.1 In March 2009 the Council notified DEFRA of the following measures that had been implemented at Chamberlin & Hill Castings Ltd. :

i. Automated water suppression installed on main sand plant together with automated closing systems on sand mixing plant (October 2007).

ii. Oily scrap is no longer used as cupola feedstock (January 2008).

iii. Automated casting lines no longer vented direct to atmosphere, being ducted to a bag filtration unit (April 2008).

iv. Alkaline phenolic moulding is no longer carried out (June 2008).

v. Ducting of Maxamatic carousel casting line to main foundry bag filtration plant (February 2009).

6.2 Supplementary to this, it was known at that time that further improvement measures were tentatively planned, including :

vi. Ducting of sand plants (Nos. 1 and 2) (building) to an internally venting Torrit filtration plant.

vii. 'Sealing' of sand plant (Nos. 1 and 2) building.

6.3 In respect of points vi and vii, the sand plant building has since been ducted to an internally venting filtration unit, and

6.4 Furthermore, additional extraction ductwork has been installed at strategic locations around sand plants Nos. 1 and 2 which is in-turn served by filtration plant.

6.5 In light of this and PM_{10} monitoring data post 2006, and subject to continued availability of resources and suitable facilities, the Council intends to continue its current air quality monitoring strategy at least until 2012.

6.6 Following completion of PM_{10} monitoring for the 2009 calendar year, the Council will prepare a Further Assessment report on PM_{10}.

6.7 This Air Quality Action Plan will be reviewed following completion of PM_{10} air quality monitoring after each calendar year, or otherwise as deemed appropriate in regard to changes to operations at Chamberlin & Hill Castings Ltd.

6.8 The Council notes that Chamberlin & Hill Castings Ltd is presently undergoing certification to the ISO14001 Environmental Management System and is utilising the process in order to reassess the company's effect on the environment, through the identification of significant aspects and setting objectives and targets in order to continually improve their environmental performance. Certification is scheduled to be achieved by the end of 2009.

7. Commentary

7.1 Following declaration of the AQMA, for the years 2007 and 2008 the said air quality objective has not been exceeded, and during this period a range of improvements have been made at Chamberlin & Hill Castings Ltd. The Council is also aware that pollution trends can take a number of years to establish, and conclusions should not automatically be drawn from a limited data set.

7.2 The Council previously identified in its Detailed Assessment of Air Quality Report Number 7[2], that low-level fugitive and/or contained emission sources were likely to impact on residencies situated to the north-west of the foundry site. This coincided with the breach of the daily (24 hour) PM_{10} objective recorded at the location of our continuous monitoring station.

7.3 This Action Plan has been in recognition of the requirement of the Council to work towards air quality objectives under Part IV of the Environment Act 1995 (as amended) and relevant regulations made under that Part. It is subject to a statutory consultation process that will commence following ratification of the draft Action Plan by the Council's Cabinet.

7.4 Further technical detail on PM_{10} monitoring will be included in the Council's Further Assessment report on air quality during 2010.

References

1. Walsall Metropolitan Borough Council. Detailed Assessment of Air Quality Report No. 4 of 7. Lead – Chamberlin & Hill plc. Walsall Foundry, Chuckery. September 2005.

2. Walsall Council. Detailed Assessment of Air Quality Report Number 7 of 7. Fine Particles (PM10) – Chuckery, Walsall. March 2007.

3. Walsall Council Chuckery Air Quality Reports at:

   http://www.walsall.gov.uk/index/environment/pollution/air_quality/air_quality_in_chuckery.htm

Appendix 1

Informative - Overview of Air Quality Review and Assessment

A1.1 The Environment Act 1995 Part IV (as amended) introduced a new regime in the United Kingdom requiring local authorities to review air quality in their areas on an annual basis, and as part of a three year cycle of reporting to central government. This is to ensure that objectives are met relating to seven (of eight in total) key air pollutants set out in The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

A1.2 The objectives specified in the Strategy are fundamentally designed to protect human health and are assessed in areas of relevant exposure, namely where people are regularly exposed to, and may be affected by, air pollution. The pollutants for which Air Quality Objectives (AQOs) have been set and that local authorities are obliged to assess relate to:

- 1,3 – Butadiene
- Benzene
- Carbon Dioxide, CO
- Lead, Pb
- Nitrogen Dioxide, NO_2
- Particles (PM_{10})
- Sulphur Dioxide, SO_2

A1.3 A further objective relating to ozone is also included, although this is a long-range pollutant and is seen as a national, rather than a local problem that is to be dealt with by central government.

A1.4 As part of the three year cycle local authorities must produce an Updating and Screening Assessment (USA) for their area. If the USA identifies places where air quality objectives are not likely to be met by a target date, it is then necessary for a Detailed Assessment to be undertaken

for the given pollutant(s) and as required to declare an Air Quality Management Area (AQMA).

A1.5 Thereafter, a Further Assessment within 12 months of an AQMA declaration is required, and an AQAP has to be produced setting out how the local authority will work towards meeting air quality objectives.

A1.6 In addition to this, local authorities also have to produce air quality Progress Reports in years when either a USA or Detailed Assessments are not compiled.

Local Issues in Walsall

A1.7 Walsall MBC is a relatively large urban local authority, with a population of c.253,000 spread over an area of approximately 10,250 hectares (equivalent to about 40 square miles). It has a relatively high population density of c. 24.4 persons per hectare, which is not evenly distributed, and consequently features high density populations in and around urban centres.

A1.8 The borough town of Walsall is located centrally in the UK and is surrounded by six other local authorities, namely Lichfield District Council to the north; Birmingham City Council to the east and south east; Sandwell Metropolitan Borough Council to the south; Wolverhampton City Council to the west; and South Staffordshire Council and Cannock Chase District Council to the north west.

A1.9 Walsall town centre is surrounded by a ring road incorporating five major radial roads. In addition, the heavily trafficked M6 motorway located to the west of the town centre runs north west to south east through the Borough.

A1.10 Walsall also has 22 industrial emissions sources which are classed as 'significant', 13 of which are A1 installations regulated by the Environment Agency, and 9 of which are A2 installations regulated by the Council under the

Environmental Permitting (England and Wales Regulations) 2007 (as amended).

Air Quality Review and Assessment in Walsall

A1.11 In April 1999 Walsall Council published its First Stage review and assessment of air quality involving the identification of significant sources of air pollution within and surrounding the borough, reviewing the levels of air pollutants for which prescribed standards and objectives have been set, and estimating the likely future levels.

A1.12 The First Stage confirmed that the air quality objectives for butadiene, benzene and carbon monoxide would be achieved by the required deadlines, and that a second and third stage review and assessment would be required in relation to lead, nitrogen dioxide, sulphur dioxide and PM_{10} to identify any existing or likely exceedances of air quality objectives by deadlines specified in the Air Quality Strategy. This detailed investigation was intended to determine whether or not the Council would need to declare Air Quality Management Areas in accordance with the Environment Act 1995 (as amended). The investigation utilised data obtained from computer modelling techniques, emission inventories, road traffic surveys and results obtained from a network of air pollution monitoring stations located throughout Walsall and the West Midlands.

A1.13 The combined Second and Third Stage Review & Assessment required the Council to provide further screening of pollutant concentrations with reference to AQOs and their associated compliance deadlines, together with accurate detailed assessment of current and future air quality. The combined Assessment concluded that in Walsall, the Government's air quality objectives would be met by the specified deadlines and that no air quality management areas would need to be declared. The report nonetheless recognised that further work would be required before the next review and assessment was due in 2003 to overcome anomalies identified in relation to measured and modelled concentrations of certain pollutants (notably NO_2).

A1.14 An addendum report was subsequently produced specifically in regard to NO_2 which led to the declaration of five AQMAs in 2002. As part of continuing work on air quality it had been established that the Council's original AQMAs did not sufficiently reflect all locations where air quality objectives are/were, or are likely to be exceeded, and it was necessary to re-define these areas.

A1.15 In August 2006 Walsall MBC revoked the five original AQMAs in order to consolidate the whole of its borough as an AQMA in relation to nitrogen dioxide. The Walsall Air Quality Management Area 2006 for NO_2 was declared on 31st August 2006.