



**REPORT IN SUPPORT OF THE REVOCATION OF
CROY Air Quality Management Area (AQMA)
NORTH LANARKSHIRE**

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Background

North Lanarkshire Council has been working to improve air quality within its jurisdiction for a number of years in accordance with the National Air Quality Strategy (NAQS). In 2006, an Updating and Screening Assessment (US&A) report produced by the Council was submitted to the Scottish Government. The US&A identified potential for exceedance of air quality objectives for PM₁₀ in Croy, and specifically the annual mean objective.

A further review of air quality in Croy was undertaken in 2007 as part of the LAQM Progress Report. This report concluded that Detailed Assessment of air quality in Croy was required. A LAQM Detailed Assessment was then undertaken in 2008. The report concluded that there was a risk of exceeding the (then) 2010 annual mean objective for PM₁₀ and consequently it was recommended that an Air Quality Management Area (AQMA) be declared. An AQMA was subsequently declared in 2011. The AQMA boundary is annotated on Figure 1.

In response to the AQMA declaration an Action Plan was developed in 2012/13 that considered air quality in Croy and proposed measures to improve air quality. Analysis of baseline conditions identified that measured ambient concentrations were closely correlated with activity levels at the adjacent quarry in Croy. Additionally, analysis of emissions data for the area identified that approximately 90% of local emissions were attributable to industrial sources, and specifically the quarry.

It was noted in the Action Plan that operations at the Croy Quarry had reduced since 2011, with a corresponding reduction in measured PM₁₀ concentrations noted.

The Action Plan included specific action measures in relation to Croy, as follows:-

- **Action Plan measure 37** – the Council will continue to monitor air quality within the Croy AQMA
- **Action Plan measure 38** – should the quarry become operational once more the Council will enter into dialogue with SEPA in relation to attaching appropriate licence conditions such that PM₁₀ levels in the area do not rise above NAQS objectives.

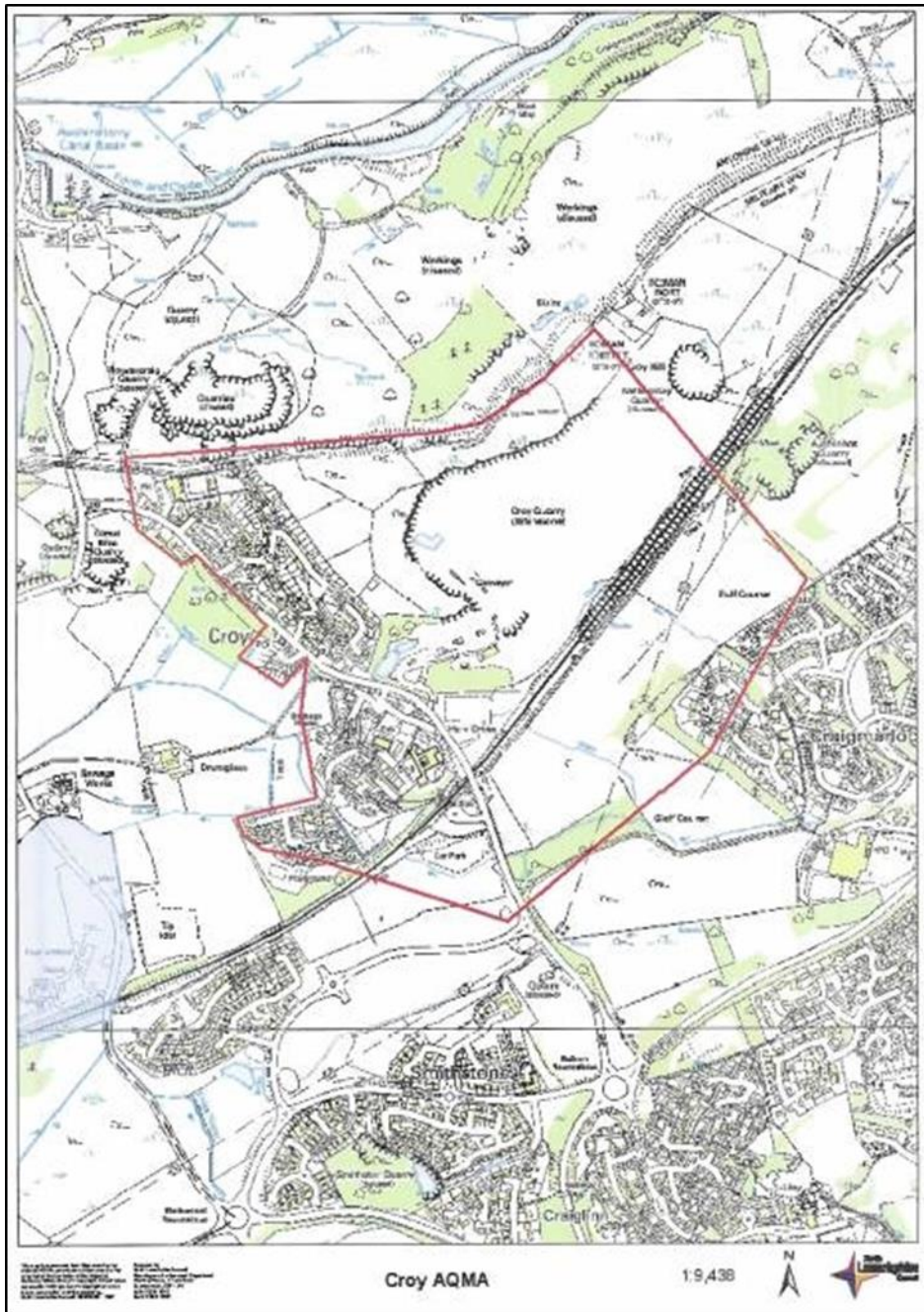


Figure 1 – Air Quality Management Area Boundary

Scope of the Study

The study considers local PM₁₀ air quality monitoring data within Croy from the last eight years to determine trends in measured concentrations. Measured concentrations are analysed against NAQS objectives with current and likely future compliance with the annual mean PM₁₀ objective determined.

Based on the analysis the report provides a recommendation on the relevance of the Croy AQMA and whether the AQMA should be revoked.

LEGISLATION AND POLICY

In order to prevent, control and minimise atmospheric emissions that are potentially harmful to human health and the environment, legislation and policies at European, national and regional levels have been put in place.

European Legislation

The EU has published a Directive on Ambient Air Quality Assessment and Management which came into force in September 1996 (Union Council of the European Union, 1996). This Directive was intended as a strategic framework for tackling air quality consistently, through setting European wide air quality limit values in a series of daughter directives, superseding and extending European legislation. The first four daughter directives were placed into national legislation. A new EU air quality directive (European Parliament and the Council of the European Union, 2008) came into force in June 2008 and was transposed into The Air Quality Standards Regulations in England, Wales, Scotland and Northern Ireland in June 2010). The directive merged the four daughter directives and one Council decision into a single directive on air quality.

National Legislation

The Environment Act 1995 (HM Government, 1995) required the preparation of a national air quality strategy setting Air Quality Objectives (AQOs) for specified pollutants and outlining measures to be taken by local authorities through the system of Local Air Quality Management (LAQM) and by others to work in pursuit of the achievement of these objectives. A National Air Quality Strategy (NAQS) was published in 1997 and subsequently reviewed and revised in 2000, and an addendum to the Strategy published in 2002. The current Strategy was published in July 2007 (Welsh Assembly Government, Scottish Executive, Department of the Environment, Department for Environment food and Rural Affairs, 2007).

The AQOs, which are relevant to LAQM have been set into regulations namely Air Quality (Scotland) Regulations 2000, Air Quality (Scotland) Amendment Regulations 2002 and Air Quality (Scotland) Amendment Regulations 2016 (Scottish Government, 2016), the latter of which introduces an additional statutory obligation for Scottish local authorities to comply with an annual mean standard for PM_{2.5} to align with the World Health Organisation (WHO) guideline value (WHO, 2005).

The Air Quality Standards (AQSs) are set for the purpose of protecting human health, vegetation and ecosystems from certain harmful atmospheric pollutants. The Scottish standards take account of the EU objective values and are either effectively identical, or more stringent.

The standards applicable to the study are shown in Table 1.

Table 1 – AQS for Scotland

Pollutant	Concentration	Measured as
Particulate Material (PM ₁₀)	50 µg/m ³ not to be exceeded more than 7 times per year	24-hour mean
	18 µg/m ³	Annual mean
Particulate Material (PM _{2.5})	10 µg/m ³	Annual mean

The LAQM technical Guidance, LAQM.TG(16) (Department for Environment, Food and Rural Affairs, 2018) provides advice on where the AQS for pollutants considered in this study apply. These are summarised in Table 2.

Table 2 – Examples of Where the AQS Apply

Averaging Period	Standards Should Apply to	Standards Should Not Apply to
Annual Mean	All locations where members of the public might be reasonably exposed such as : Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other paces of work where members of the public do not have regular access such as: hotels, unless people live there are as a permanent residence; gardens of residential properties; kerbside sites (as opposed to locations at the building façade), or any other location where the public exposure is expected to be short-term.
8-hour and 24-hour Means	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites 9as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
1-hour Mean	All locations where the annual mean, 24-hor mean and 8-hour mean apply plus: kerbside sites of busy shopping streets; parts of car parks, bus and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

The Scottish Government Cleaner Air for Scotland Strategy

The Scottish Government Cleaner Air for Scotland (CAFS) Strategy – The Road to a Healthier future (Scottish Government, 2015) is a national strategy that sets out how the Scottish Government will deliver its commitment to further improving air quality to protect human health.

The CAFS strategy aims to help the Scottish Government achieve the ambitious goal “to have the best air quality in Europe”. A National Modelling Framework (NMF) and National Low Emission Framework (NLEF) will be developed to provide the tools and mechanism to put in place measures to improve air quality.

Local Air Quality Management

The aforementioned AQOs have been set down in regulation solely for the purposes of LAQM. The Environment Act 1995 requires that Local Authorities undertake a tiered appraisal of air quality within their area to establish compliance or non-compliance with the targets established in the UK National Air Quality Strategy, and, if it is unlikely that the objective values will be met in the given timescale, they must designate an AQMA and prepare an Air Quality Action Plan (see earlier) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent AQAP. Consequently, it is not unusual for the boundary of an AQMA to include within it, relevant locations where air quality is not at risk of exceeding an air quality objective.

In North Lanarkshire there are four AQMAs which have been declared, namely, Croy, Chapelhall, Coatbridge and Motherwell (Air Quality in Scotland, 2019).

Technical guidance requires that a decision to amend or revoke an AQMA should only be taken following detailed study, providing sufficient information to justify a decision. Supporting information for revocation should be equivalent to detail required in declaring an AQMA. An AQMA can be revoked on the basis of robust monitoring evidence.

LOCAL MONITORING DATA

A single air quality monitoring site is located within Croy, an automatic roadside site. The site is located in a public car park immediately south of Constarry Road (national grid square coordinates NS 272775 675738). The site is located within the AQMA, approximately 200m north-west of the site entry to the Croy Quarry and approximately 100m from the closest point of quarry operations.

The monitoring station is located at a similar orientation (west/north-westerly) and distance from quarry operations as the closest residential receptors to the main quarry activities. The monitoring station is therefore representative of relevant public exposure and accordingly present likely worst case ambient concentrations at locations of relevant public exposure within the AQMA.

The monitoring site and the quality assurance measures adopted for the monitoring data are reported in the 2019 Annual Progress Report.

Monitoring Data pre-AQMA Declaration

Measured annual average concentrations at the quarry from 2007-2011 (at the point of LAQM Further Assessment and decision to declare the AQMA) are presented in Table 3.

Table 3 – Croy PM₁₀ Annual Mean Concentrations 2007-2011

Year	2007	2008	2009	2010
Annual Mean PM ₁₀ Concentration (µg/m ³)	22	19	19	21

The results clearly demonstrate that measured concentrations were above NAQS annual mean objective levels at the time of the AQMA declaration.

Monitoring Data post-AQMA Declaration

Data for the Croy automatic monitoring site has been analysed for the years 2011-2018. All air quality data was sourced from the Air Quality in Scotland Website (Air Quality in Scotland, 2019). Measured PM₁₀ annual mean concentrations for the Croy automatic monitoring site for the years 2011-2018 are presented in figure 2 below, along with the Scottish Air Quality Standard (AQS) limit for PM₁₀.

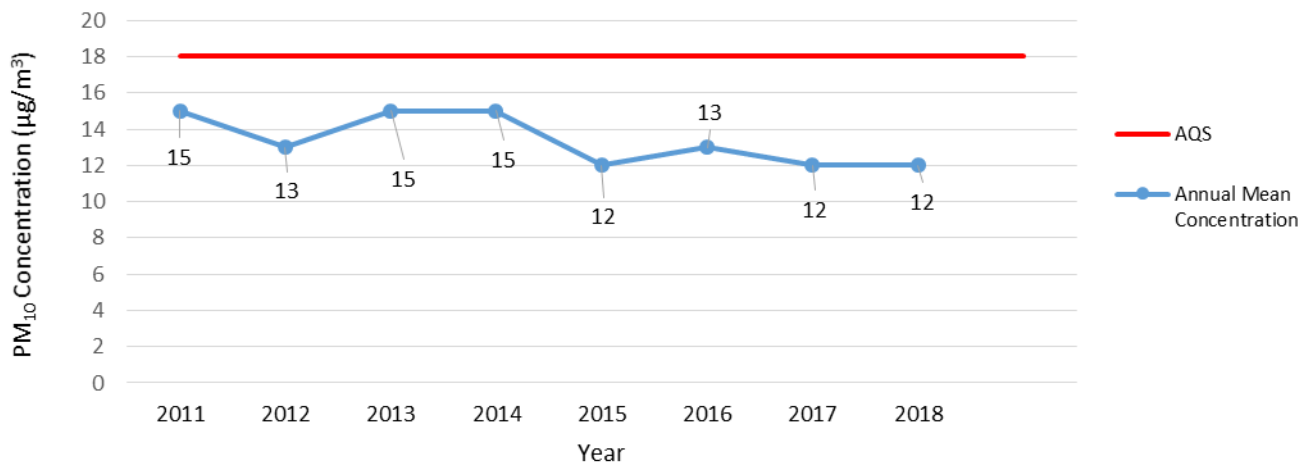


Figure 2 – Annual Mean PM₁₀ Concentrations : Croy Automatic Monitoring Site (2011-2018)

The presented results demonstrate that the annual mean PM₁₀ concentrations for the past eight years have all been recorded below NAQS objective level. The general trend in measured concentrations can be seen to be decreasing with a 3µg/m³ reduction in measured concentrations between 2011 and 2018.

A temporary increase in measured concentrations during 2015 and 2016 was noted to coincide with a resumption and increase in crushing activities at the quarry during these years.

Variation in Daily Mean PM₁₀ Concentrations

The Scottish AQS for the 24-hour mean concentration for PM₁₀ is for a concentration of 50µg/m³ not to be exceeded more than 7 times a year. Analysis of measured daily mean PM₁₀ concentrations can be used to determine whether ambient concentrations are typically consistent, or whether the annual average is influenced by a number of short-term pollution episodes.

Table 4 below presents the number of days where the PM₁₀ concentration in Croy has exceeded 50µg/m³. For further analysis, the number of days with concentrations >30µg/m³ is also presented.

Table 4 – Number of Days 24-hour Mean PM₁₀ Concentration Above 30

Year	Number of Days >30µg/m ³	Number of Days >50µg/m ³
2011	20	1
2012	18	1
2013	23	3
2014	24	3
2015	11	1
2016	24	2
2017	9	1
2018	13	2

The results in Table 4 above show that the 24-hour mean AQS for PM₁₀ has been met every year for the previous eight years. The number of days >50µg/m³ are significantly below the AQS threshold of seven days for the last eight years.

The results also demonstrate a trend of a reduction in pollution episodes i.e. days where daily PM₁₀ concentrations are elevated above 30µg/m³.

Short-term (1-hour) mean PM₁₀ Concentrations

Hourly mean concentrations of PM₁₀ were sourced from the Air Quality in Scotland Website (Air Quality in Scotland, 2019). There is no national AQS for the 1-hour mean PM₁₀ concentration. However, for the purposes of this study, the 1-hour mean concentrations for the years 2011-2018 were analysed and compared with historical meteorological data, to further highlight the relationship between elevated PM₁₀ levels and emissions from Croy Quarry.

The meteorological data used in this study is hourly data from Glasgow Airport, located approximately 25km south-west of Croy. The weather recorded at Glasgow Airport met station is deemed representative of the weather which would be experienced at the study area.

Considering the location of the automatic monitoring site relative to the quarry, wind coming from the angles 0-90° (from the quarry to the monitoring site) is expected to be associated with high monitoring PM₁₀ concentrations.

The 1-hour mean PM₁₀ concentrations were compared to the hourly mean wind direction for each year. The total number of occurrences linked to a wind direction between 0-90° was also calculated. A percentage correlation of high PM₁₀ concentrations and wind coming from the direction of the quarry was derived and is presented in Table 5 below.

Table 5 – Correlation Between High PM₁₀ Concentrations and Wind Direction

Year	2011	2012	2013	2014	2015	2016	2017	2018
Number 1-hour PM ₁₀ Means >50µg/m ³	89	NA	133	142	87	167	65	156
Number 1-hour PM ₁₀ Means >50µg/m ³ With Wind Direction 0-90°	45	NA	101	86	55	125	51	114
Percentage Correlation Between High PM ₁₀ Levels and Wind Direction from Quarry	51%	NA	76%	61%	63%	75%	78%	73%

NB. No wind data is available for 2012, therefore no analysis has been undertaken for 2012

The results in Table 5 show there to be a significant correlation between high monitored levels of PM₁₀ and wind direction, as expected due to the orientation of the monitoring station relative to quarrying activities. This supports the assumption that emissions from the quarry are the principal source of elevated concentrations at the monitoring station.

Summary of Monitoring Data

Measured annual average PM₁₀ concentrations at Croy have been determined to have decreased since the declaration of the AQMA in 2011. Measured concentrations have been consistently below the NAQS annual mean objective for the last seven years.

Analysis of monitored concentrations support the conclusion that emission from the quarry are linked to elevated short-term pollution episodes. Analysis of monitoring data indicates a reduction in the number of short-term pollution episodes since 2011.

CROY QUARRY

As identified in the air quality 2013 Action Plan, air quality in Croy has been identified as closely linked to operations at the adjacent Croy Quarry. At the time of the Action Plan, operations at Croy Quarry were noted to have been significantly reduced and the site effectively mothballed, due to economic conditions. No information on the change in operations at the quarry after 2011 is available, however it was noted in the 2016 Annual Progress Report that an increase in annual average concentrations in 2015 and 2016 was attributable to an increase in crushing operations at the quarry site.

Planning Status

Application was made to North Lanarkshire Council in 2016 for an extension to the quarry's operation lifetime until 31st December 2017. It was noted that during the extension there would be a 23% reduction in annual mineral production levels and a corresponding reduction in heavy good vehicle (HGV) movements to and from the site.

Consent was granted to the extension of the quarry in April 2016. The planning permission included a planning condition requiring the implementation of new quarry access, with associated scheme of measures, as well as the implementation of effective dust suppression measures during:-

- Ground preparation works, soil stripping and the removal of overburden in advance of mineral extraction;
- Ground preparation works and the replacement of overburden and soils as part of the site restoration works;
- Dust arising in connection with blasting operations; and
- The transportation of stone within the site and following processing the exportation of stone from the site.

Further application was made in 2018 for an extension of the period of mineral extraction, as outlined in the 2016 extension, until 31st December 2020. Planning permission for the extension was granted in 2019.

Permitting Status

Operations at the Croy Quarry are covered by a number of environmental permits issued by SEPA. SEPA were consulted in October 2019 as follows:-

- CAR/R/1011858, controlled activity regulation for the abstraction of groundwater;
- WPC/W/09484, consent for the discharge of treated effluent from the quarry;
- WML/XC/1145322, waste management licence with respect to the restoration of the quarry by soil and stone for the purposes of ecological improvement.

The waste management licence requires management of waste ensuring no risk to air quality, otherwise there is no provision in consent for the protection of air quality from ongoing operations.

Aggregate Industries has a separate permit (PPC/B/1021177) for the operation of mobile crushing plant, which includes operation on the Croy Quarry site. The permit covers operation of crushing plant only and not the wider operation of the quarry. Review of SEPA compliance reports indicate Excellent level compliance with permit requirements in 2016 and 2017 (the most recent years for which compliance is reported).

CONCLUSIONS AND RECOMMENDATIONS

Study Conclusions

An assessment of measured ambient PM₁₀ concentrations since the declaration of the Croy AQMA in 2011 found a reducing trend in measured annual average concentrations since 2011, such that the annual average concentrations has been below NAQS objective levels for a number of years.

Analysis of measured concentrations demonstrates a linkage between short term pollution events and easterly wind directions. The results demonstrate a reduction in the number of short term pollution events since 2011, reflecting the overall reduction in annual average concentrations.

The monitoring results, reflecting historical assessment studies, demonstrate a link between quarry operations and measured air quality levels. No data is available on annual production levels and operations at the quarry since 2011, however operations are known to be ongoing but generally declining in operation up to cessation of operations in December 2020.

It can be concluded that ambient air quality in Croy is compliant with NAQS objectives, with compliance demonstrated over a period of seven years. No increase in quarry operations is predicted, such that future air quality will be compromised. Accordingly it can be presumed that air quality will continue to meet NAQS objectives in future years.

Recommendations

Based on the continued compliance with NAQS objectives for PM₁₀, and predicted future compliance, it can be concluded that there is no continued requirement for an AQMA in Croy. It is therefore recommended that the Council seek agreement of the Scottish Government and SEPA to revoke the AQMA. The recommendation is supported by robust monitoring data.