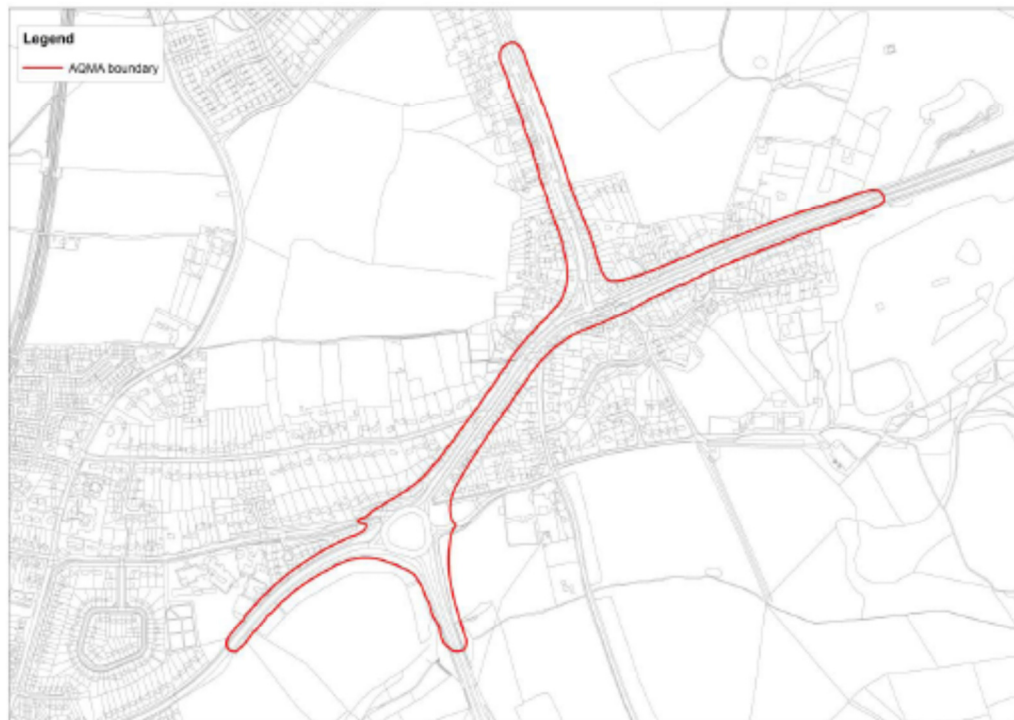


3.1 Kidderminster Road, Hagley AQMA - Bromsgrove District Council

Date of Detailed Assessment: July 2009
Date of Declaration: 17th February 2010
Date of Further Assessment: March 2012

Figure 3-1 Current plan of AQMA



The current area of the Kidderminster Road, Hagley AQMA comprises the conjunction of two major A roads between a busy gyratory at the southern end of the AQMA and a busy traffic light junction at the northern end of the AQMA and extends part way along the various arms from those two junctions.

At the traffic lights the A491 Stourbridge Road (north) meets the A456 Birmingham Road at the bottom of Hagley Hill emanating from a north easterly direction. From the traffic lights the conjunction of these two A roads continues southwest on the main stretch of the AQMA for ½ km culminating in the gyratory at the southern boundary. There are 5 arms leading off the gyratory including the Kidderminster Road AQMA section. The A456 Kidderminster Road continues off in a south-westerly direction and the A491 Stourbridge Road continues in a southerly direction away from the gyratory. The remaining arms are local roads; Park Road (east) which is not within the AQMA and the B4187 Park Road (west). There is a small access T road to residential properties also known as Park Road immediately before the exit from the B4187 onto the gyratory. Some properties within the latter are included in the AQMA as there is no distinctive boundary between that road and the A456 Kidderminster Road.

The current boundary of the AQMA follows the contours of predicted pollution levels produced in the Further Assessment (March, 2012). However these straight contour

lines cut through residential gardens and buildings which is not compliant with Defra guidance (TG09 and PG09) thus the AQMA boundary requires amendment.

Currently there are no receptor locations beyond the eastern part of Park Road (west). It would therefore also be appropriate to reduce the southern end of the AQMA boundary to exclude the gyratory and the A491 Stourbridge Road (south) entirely and reduce the extent along the A456 Kidderminster Road (south-west).

3.1.1 Prevailing conditions

AM and PM peak traffic time site observations of the Kidderminster Road AQMA were undertaken in 2012 to characterise existing conditions and identify issues in order to inform the focus of potential measures within the action plan. Photos from the site walkover are included at the end of this section.

The A456 is a busy highway connecting the M5 motorway junction 3 at Halesowen to Kidderminster and beyond. The A491 emanates from Junction 4 of the M5 and continues from Hagley northwards to the populace areas of Stourbridge and Brierley Hill. When compared to other AQMAs in Worcestershire, Kidderminster Road is a relatively wide road consisting of dual carriageway in both northerly and southerly directions separated by a central reservation.

From the gyratory going north the majority of buildings along the stretch of road are detached residential dwellings. The residential setting continues until a number of commercial properties positioned on the eastern side of the carriageway either side of the Bromsgrove Road turning. This includes a car showroom, a newsagents and a public house with a substantial car park. Beyond this on the eastern side the residential properties resume on Market Way, adjacent to the A491 Stourbridge Road/A456 Birmingham Road traffic light junction, and continue half way up Hagley Hill.

No drop offs of equipment to the commercial properties were observed to cause any traffic issues during site walkovers.

Opposite the Bromsgrove Road turning on the western side of the A456 is a small access road to a newer residential development consisting of 3 storey blocks of flats. These are slightly set back from the main road behind a pull-in bus stop. Detached residential dwellings continue beyond the flats along Stourbridge Road and across the traffic light junction on the western side of the carriageway half way up Hagley Hill.

The pull-in bus stop on the western side of the carriageway allows traffic to continue moving freely on the Kidderminster Road heading north. The stop on opposite side of the A456 located just south of the car showroom is a painted stop on the nearside lane of the carriageway and has the potential to cause traffic to queue. The routes identified at the bus stops were for the 192, 197 and 318. However no buses were observed stopping at either of the bus stop during site walkovers in 2012.

There are single yellow lines both sides and length of AQMA along (A456) but no restrictions on A491. No vehicles were observed ignoring parking restrictions during site walkovers.

There are pedestrian crossing traffic lights adjacent to the car showroom and at the exit/entrance on the A456 to the gyratory. However relatively few pedestrians were

observed in the AQMA in general during peak time site walkovers and even fewer were observed utilising the pedestrian crossings so activation of these light may be appropriately described as infrequent.

The length of the AQMA can be traversed comfortably in 5 to 10 minutes' walk by an average person. Therefore the area does not meet the description of a location requiring assessment against any short term (i.e. 1 hour for NO₂) air quality standards, as outlined in TG09.

Site observations during the AM and PM peak traffic hours noted the majority of traffic consisted of cars/commuters with some LDVs and few HGVs with almost 100% commuter/cars observed travelling north from the gyratory at AM peak time. The majority of vehicles were noted to have only one occupant. Private Buses were quite numerous at AM peak times heading to schools located on or at least accessible via Park Road (west). School destination traffic was estimated to make up 10 to 20% of vehicles traversing the gyratory and 50% of vehicles turning onto Park Road (west) at AM peak time.

Queuing traffic was observed in the filter lane at the traffic lights heading west onto A491 Stourbridge Road from both northerly and southerly directions on the A456 at peak PM time. From the southerly direction it was observed that traffic gradually built up all the way back to the exit from the gyratory in the nearside lane. Some queuing traffic was observed in the offside lane approaching the exit from Kidderminster Road onto the gyratory. On rare occasions this was observed to be caused by pedestrians utilising the crossings. Generally it was noted traffic only paused here momentarily.

Photo 1: Maximum queue at A491/A456 traffic lights observed AM peak time. Traffic heading north. Looking NW from corner of Bromsgrove Road.



Photo 2: Pedestrian crossing on A456, 3 storey flats beyond pull-in bus stop. Looking SW from Bromsgrove Road.



Photo 3: PM traffic queue at pedestrian traffic lights heading south on A456 to gyratory exit.



Photo 4: PM traffic movement on gyratory. Looking SE from war memorial.



Photo 5: PM traffic queue in filter lane for Stourbridge Road, traffic lights and A456 Hagley Hill in background. Looking N from Kidderminster Road.



Photo 6: PM traffic queue at A491/A456 traffic lights. Looking E from Stourbridge Road



Photo 7: PM Maximum traffic queue observed in filter lane turning W onto A491 Stourbridge Road. Looking SW from Hagley Hill.



3.1.2 Summary of Further Assessment findings (AQC March 2012)

A Further Assessment to confirm the requirement for an AQMA in Kidderminster Road Hagley and undertake modelling to inform potential solutions was completed by independent consultants AQC (Air Quality Consultants) on behalf of BDC and WRS in March 2012. A summary of the findings of the Further Assessment is outlined below.

- The model results are consistent with the monitoring data and modelling carried out for the Detailed Assessment.
- The results indicate that the annual mean nitrogen dioxide objective is only being exceeded at a small number of properties near to the Kidderminster Road gyratory and at the Stourbridge Road/Kidderminster Road/Hagley Hill junction. At the majority of relevant locations the annual mean objective is being achieved.
- The highest predicted concentration in 2010 is $42.7 \mu\text{g}/\text{m}^3$, at 62 Kidderminster Road (R15). Concentrations are also predicted to exceed the annual mean objective at 1 Hall Close (R5).
- There are no predicted annual mean concentrations greater than $60 \mu\text{g}/\text{m}^3$ and therefore it is unlikely that the 1-hour nitrogen dioxide objective is being exceeded at these locations.
- The results demonstrate there are predicted exceedences of the annual mean objective within the existing AQMA and therefore the AQMA should be retained.
- AQC recommend that the AQMA boundary, as a minimum, be based on those residential properties where concentrations of $36 \mu\text{g}/\text{m}^3$ or greater are predicted to allow for the uncertainty in the measured and predicted concentrations.
- The results demonstrated that the locations where concentrations are $36 \mu\text{g}/\text{m}^3$ or greater are all within the existing AQMA and therefore the boundary does not need to be extended.

3.1.3 Source Apportionment

Sources contributing to the objective exceedences within the AQMA have been identified within the Further Assessment. The data presented below have been calculated in line with guidance provided in LAQM.TG (09) (Defra, 2009).

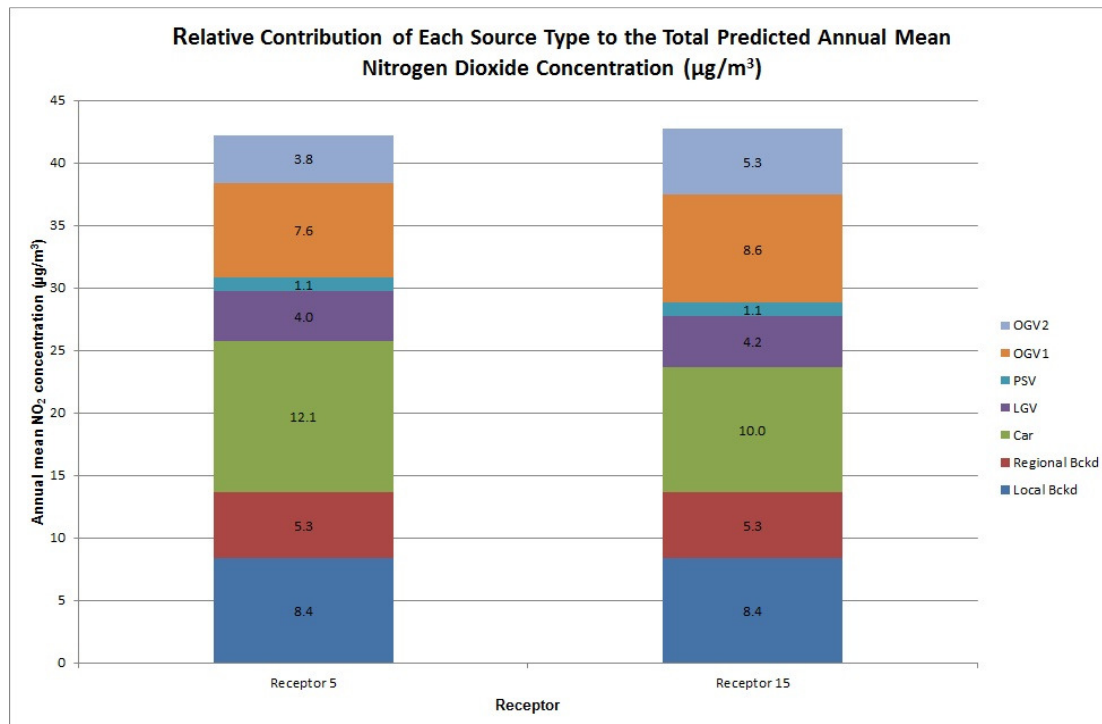
Table 3-3 and Figure 3-2 (AQC, 2012) set out the relative contributions of traffic emissions to the total predicted nitrogen dioxide concentration at two receptor locations.

Table 3-3 Predicted Annual Mean (2010) Nitrogen Dioxide Concentrations and the Contribution of Each Source Type to the Total

Receptor	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)						
	Local Bkgd	Regional Bkgd	Car	LGV	PSV	HGV	Total
R5	8.4	5.3	12.1	4.0	1.1	11.4	42.2
R15	8.4	5.3	10.0	4.2	1.1	13.9	42.7
	% Contribution to Total						
	Local Bkgd	Regional Bkgd	Car	LGV	PSV	HGV	Total
R5	19.8	12.5	28.6	9.5	2.6	27.0	100.0
R15	19.6	12.3	23.3	9.7	2.5	32.5	100.0

Two receptor locations (R5 and R15) identified within the Further Assessment have been used to provide an overview of source contributions. Table 3-3 shows the most significant component for both Receptors 5 and 15 is from Cars, HGVs and background concentrations. HGVs, despite making up a relatively small proportion of the total traffic volume (5% on Kidderminster Road) have the largest impact on concentrations (32.5 % at Receptor 15). In most cases, the ambient background concentration and emissions from cars also contribute a significant proportion to the overall concentration.

Figure 3-2 Relative Contribution of Each Source Type to the Total Annual Mean Nitrogen Dioxide Concentration ($\mu\text{g}/\text{m}^3$) at Receptor Locations where exceedences of the Annual Mean Objective are predicted.



3.1.4 Air Quality Improvements Required

The degree of improvement, identified in the Further Assessment, required in order for the mean objective for nitrogen dioxide to be achieved is defined by the difference between the highest measured or predicted concentration and the objective level (40 $\mu\text{g}/\text{m}^3$). The highest NO_2 concentration at a relevant location is that modelled at R15 (a property in Kidderminster Road) requiring a reduction of 2.7 $\mu\text{g}/\text{m}^3$ in order for the objective to be achieved.

However the Further Assessment explains that in terms of describing reductions in emissions required it is more useful to consider nitrogen oxides (NO_x) which has been calculated in line with guidance presented in LAQM.TG(09) (Defra, 2009). Table 3-4 below sets out the required reduction in local emissions of NO_x in Hagley AQMA to achieve the annual mean objective at two properties where an exceedence was predicted in 2010. At R15 local emissions would need to have been 12.3 % lower in order to meet the objective.

Table 3-4 Required reduction of NO_x in Hagley AQMA

Receptor Number	Receptor	Required Reduction in Annual Mean NO_2 Concentration ($\mu\text{g}/\text{m}^3$)	Required reduction in Emissions of NO_x from Local Roads (%)
R5	Hall Close	2.2	10.3
R15	Kidderminster Road	2.7	12.3

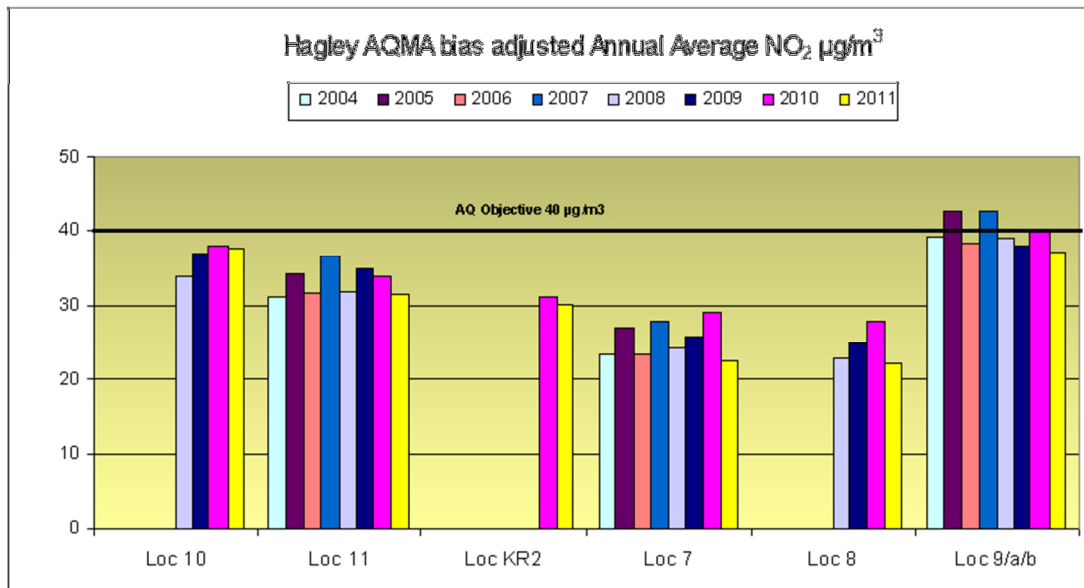
The results highlight that targeting individual types of vehicle on these local roads in isolation would not lead to the annual mean objective being achieved unless the reductions are very large (i.e. greater than 25% reduction in cars or HGVs). This is primarily because the background concentration, which is not influenced significantly by very local emissions, contributes a large proportion of total nitrogen dioxide concentrations. Reducing total vehicle emissions by between 10 to 25% would be a potentially effective measure for achieving the objectives at all receptor locations.

Measures within the Action Plan need to be proportionate to the scale of the exceedence of the objective and the number of people affected. In this case, only a small number of people (approximately three properties) are subject to exceedences of the annual mean objective and the extent of the exceedence is relatively small (2 to 3 $\mu\text{g}/\text{m}^3$ above the objective) (AQC, 2012).

3.1.5 Long term local trends in NO_2

As part of the AQAP process data has been collated from previous BDC yearly progress reports and screening assessments to produce meaningful picture of long term trends in monitoring results of nitrogen dioxide in Hagley.

The graph below depicts these long term trends from bias adjusted annual average results of NO_2 at relevant exposure receptor locations.

Figure 3-3 Bias adjusted annual average NO₂ monitoring results in Hagley 2004 - 2011

Loc 10 - 77a Park Road; Loc 11 - 74 Worcester Lane; Loc KR2 - 10 Kidderminster Road; Loc 7 - 5 Stourbridge Road; Loc 8 - 9 Market Way; Loc 9/a/b - 78 Kidderminster Road

3.1.6 Summary of progress of actions identified or implemented to date

No previous action plans have been produced for the Kidderminster Road, Hagley AQMA.

3.1.7 Actions identified from Local Transport Programme 3 (LTP3):

One action, NE5 - Hagley Station Enhancement, has been identified within the County Councils transport strategy as having a potential impact on the Hagley AQMA. This LTP3 action involves improvements to passenger facilities at the train station. This general improvement to public transport potentially has an indirect benefit for local air quality and the impact depends on general public willingness to change behaviour and switch to public transport for long journeys. Worcestershire County Council Highways confirmed in February 2013 that there were no proposals for this action at that time.

3.1.8 Neighbouring authority actions

Consideration has been given to neighbouring authorities outside Worcestershire with AQMAs impacting on boundary of the area.

As the Hagley area is on the north western boundary of the Bromsgrove District Council it borders a local authority outside of Worcestershire, Dudley Metropolitan Borough Council (DMBC). DMBC declared a borough wide AQMA in December 2007 and produced an AQAP in March 2011. Consideration should therefore be given to ensuring that identified/preferred actions/solutions will not conflict with any actions being undertaken in the DMBC area and DMBC will be invited to consult on the contents of this AQAP.

Similarly a review of the DMBC action plan was undertaken to identify any planned actions by DMBC that could significantly impact on the Hagley AQMA. The action plan identifies 15 areas within DMBC with exceedences of the NO₂ objectives due to roadside emissions. Two of those were identified to be on routes connected directly to Hagley: no7. Hagley Road, Halesowen and no 9. Lye. No actions anticipated to have a direct effect on the Hagley AQMA were identified. However a number of indirect actions in the following sections could have a wider positive impact on surrounding areas in harmony with solutions identified in this AQAP: Improving Public Transport & Rail Freight Facilities, Reducing Vehicle Emissions, Information and Awareness Raising and Encouraging Changes in Travel.

3.1.9 Summary of key issues identified from review for consideration within actions

Issue KR1 - Kidderminster Road, Hagley AQMA comprises the conjunction of two major A roads between a busy gyratory and a busy traffic light junction utilised by high volumes of trans-boundary traffic.

Issue KR2 - The current boundary of the AQMA requires amendment to comply with Defra guidance e.g. along defined buildings and exclusion of residential garden areas and sections of road not bounded by relevant exposure within identified 36 µg/m³ contour i.e. the gyratory, the A491 Stourbridge Road (south) and the A456 Kidderminster Road (south-west)

Issue KR3 – Majority of vehicles were noted to be single occupancy commuter cars.

Issue KR4 – A number of private buses heading for schools in Park Road.

Issue KR5 – Queuing traffic observed in both directions on A456 heading for A491 Stourbridge at both AM and PM peak times. In southerly direction queues observed spilling out of filter lane up Hagley Hill at times. In northerly direction observed queuing right back to gyratory at times.

Issue KR6 - The results of modelling in the Further Assessment indicate that the annual mean nitrogen dioxide objective is only being exceeded at a small number of properties (approximately three) within the AQMA and the extent of the exceedence is relatively small (2 to 3 µg/m³ above the objective). Measures within the Action Plan need to be proportionate to the scale of the exceedence of the objective and the number of people affected.

Issue KR7 – Source apportionment in FA demonstrated HGVs have the largest impact on concentrations (32.5 % at Receptor 15) despite making up only 5% of total traffic volume. In most cases, the ambient background concentration and emissions from cars also contribute a significant proportion to the overall concentration.

Issue KR8 – Long Term Local Trend data indicates only three exceedences have been recorded in last 7 years all at one receptor and a general downward trend is noted in the last four years. Additional monitoring positions have been erected in 2012 at appropriate receptor locations identified within the Further Assessment by AQC to improve coverage of relevant exposure.