

Crawley Borough Council Air Quality Action Plan

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

2018

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Executive Summary

This Air Quality Action Plan (AQAP) has been produced as part of our statutory duties required by the Local Air Quality Management framework. It outlines the action we will take to improve air quality in Crawley Borough Council over the period 2018-2023

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³. Crawley Borough Council is committed to reducing the exposure of people in Crawley to poor air quality in order to improve health.

We have developed actions that can be considered under 7 broad topics:

- Policy guidance and development control
- Promoting low emission plants;
- Promoting low emission transport
- Promoting travel alternatives
- Public information
- Transport planning and infrastructure
- Traffic management

Traffic emissions are the main source of air pollution in the Hazelwick AQMA and the primary focus of this air quality action plan is to put measures in place which will ensure levels of NO₂ within the AQMA and across the borough, are consistently below the objective annual mean of 40µg/m³.

Our priorities are therefore to improve public health by reducing the impact of long term exposure to air pollution from traffic sources and build sustainability into our

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

planning and policy guidance for the future development to minimise emissions from future housing developments and reduce dependency on private vehicle usage.

These priorities are grouped under three main headings: Public health, Transport and Sustainability (Planning and Policy Guidance), however, there is flexibility in these groupings as their benefits overlap.

1. **Public health** measures include public information and awareness events such as, Clean Air Day, Breathe Easy Week, and the annual Junior Citizen educational programme for all Year 6 (KS2) pupils in Crawley. Particular emphasis is placed on encouraging modal shift and active travel. These strategies provide mid to long term benefits to address behavioural change and educating future generations about air pollution issues, sustainable travel options, and the importance of making choices to improve air quality and public health.
2. **Transport** measures are important to improve sustainable transport within the town and help reduce congestion, which contributes to worsening air quality. To deliver this, the council has engaged with its partners in the Coast to Capital Local Enterprise Partnership to introduce a £60m package of investment known as the Crawley Growth Programme, which will deliver a programme of sustainable transport infrastructure and highway schemes to tackle these key concerns, enabling modal shift and helping to improve air quality.
3. **Sustainability (Planning and Policy Guidance)** focuses on measures to reduce emissions that are under the council's direct control such as strengthening local planning policy for air quality on future development and requiring damage costs from developers to fund emissions mitigation. In addition, we can use policy and regulation to encourage behavioural change and modal shift through financial incentives that encourage more sustainable forms of transport. Examples include council procurement policies that promote low emission plant and vehicles and taxi licensing policies to encourage our taxi fleet to be zero emission capable (ZEC) and meet Euro 6 standards for emissions.

In this AQAP we outline how we plan to effectively tackle air quality issues within our control. However, we recognise that there are a large number of air quality policy

areas that are outside of our influence (such as vehicle emissions standards agreed in Europe), but for which we may have useful evidence, and so we will continue to work with regional and central government on policies and issues beyond Crawley Borough Council's direct influence

Responsibilities and Commitment

This AQAP was prepared by the Environmental Health Department of Crawley Borough Council reporting to the Head of Community Services, with the support and agreement of a steering group of officers from across council services, input from partner organisations such as neighbouring local authorities, highways authorities and business groups with technical support provided by an external air quality specialist Ricardo Energy and Environment.

This AQAP will be subject to an annual review, appraisal of progress and reporting to the Head of Community Services and Environment Portfolio holder. Progress each year will be reported in the Annual Status Reports (ASRs) produced by Crawley Borough Council, as part of our statutory Local Air Quality Management duties.

If you have any comments on this AQAP please send them to:

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1 Introduction

Background

In 2015 an area around the Hazelwick roundabout on the A2011 was declared an AQMA as levels of Nitrogen Dioxide (NO₂) above the national annual mean objective of 40µg/m³ were measured in the area. Following this a source apportionment assessment was undertaken by Ricardo Energy & Environment in 2016, followed by a draft Air Quality Action Plan in 2017 and a period of consultation in 2018.

Source apportionment showed that emissions associated with road traffic are the main source of pollution in the AQMA. The majority of movements through the AQMA are by cars and light goods vehicles (LGVs), with a smaller proportion (between 1-5%) by heavy goods vehicles (HGVs). A large proportion of cars (nationally around 50%) and LGVs are fueled by diesel, furthermore, the amount of nitrogen dioxide (NO₂ or NO_x) emitted by diesel is significantly higher than that from petrol. Consequently, the most significant contributor of NO_x emissions is from diesel cars and diesel LGVs, and the most significant contributor of Particulates (PM₁₀) emissions is from the diesel cars, petrol cars and diesel LGVs. Emissions of NO_x from HGVs are significantly higher than from smaller road vehicles (cars/LGVs), so despite the lower percentage of HGVs movements through the AQMA, their contribution to NO_x and PM can be disproportionately large.

Detailed analysis of peak flow traffic in Crawley, identified the majority of commuters coming into Crawley travel along the A2011 (E) approach from the M23 through the Hazelwick roundabout within the AQMA. Since these roads are strategic for access to the town and Manor Royal Business district, the Action Plan includes actions specifically targeted within the AQMA boundary to manage traffic flows, as well as more generalised actions across the borough.

About This Report

This report outlines the actions that Crawley Borough Council will deliver between 2018-2023 in order to reduce concentrations of air pollutants and exposure to air pollution; thereby positively impacting on the health and quality of life of residents and visitors to Crawley.

It has been developed in recognition of the legal requirement on the local authority to work towards Air Quality Strategy (AQS) objectives under Part IV of the Environment

Act 1995 and relevant regulations made under that part and to meet the requirements of the Local Air Quality Management (LAQM) statutory process.

This Plan will be reviewed every five years at the latest and progress on measures set out within this Plan will be reported on annually within Crawley's air quality ASR.

2 Summary of Current Air Quality in Crawley

Air Quality in Crawley is mainly good, with national targets being met for all pollutants, with the exception of nitrogen dioxide (NO₂) at a small number of locations alongside busy roads and within the AQMA. Road traffic is the main source of nitrogen dioxide in Crawley, and our network of monitoring sites records levels along busy roads as well as at background locations and areas of specific interest such as Gatwick airport, in order to give a broad picture of pollution levels across the borough.

A small reduction in nitrogen dioxide levels was seen at all of Crawley’s monitoring site during 2017. This pattern was also seen regionally and is attributed to climatic influences, rather than local conditions. It is therefore more informative to look at the long term trends. The long term monitoring data for Crawley shows that concentrations of Particulates (PM₁₀) and nitrogen dioxide have fallen in real terms since 2008. However over the last five years the downward trend in nitrogen dioxide has started to slow.

Fig 2.1 Trend in Background PM₁₀ in Crawley

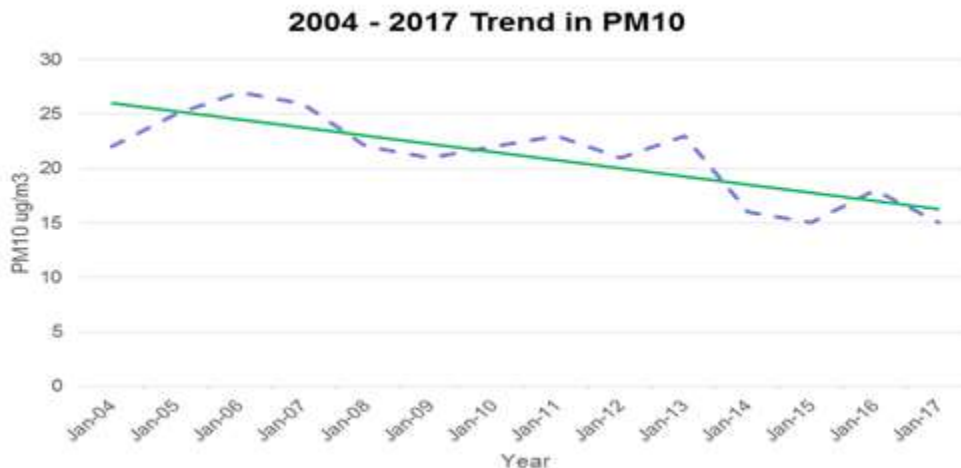


Fig 2.2 Trend in Background NO₂ in Crawley

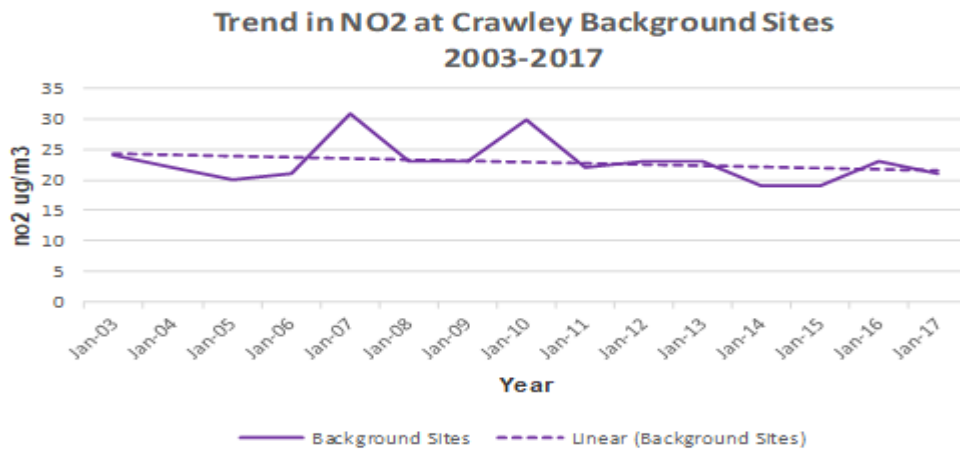


Fig 2.3 Trend in Roadside NO₂ in Crawley

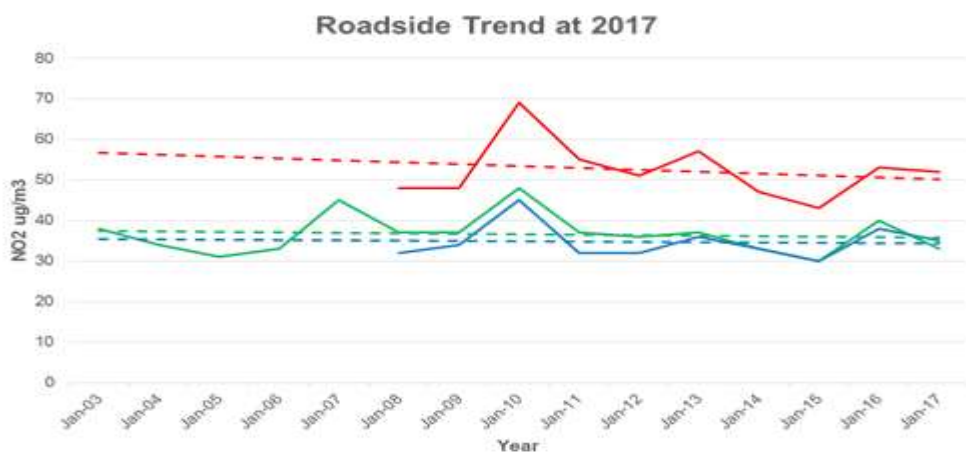
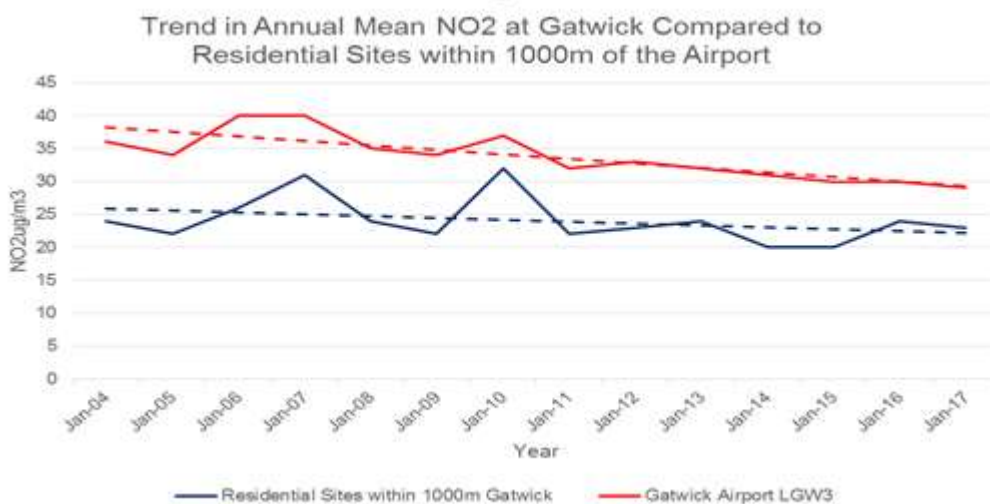


Fig 2.4 Trend in NO₂ at sites close to Gatwick Airport



Crawley Borough Council

In 2017 there were no exceedances of the hourly objective for nitrogen dioxide, but one location close to the busy A2011 dual carriageway in the AQMA exceeded the annual objective for nitrogen dioxide, and a further busy roadside site close to Three Bridges Station, also showed exceedances of the objective levels (based on short term data). The 2018 Annual Status Report (ASR) presents the latest measurements and current status of air quality within the Borough of Crawley. The current ASR can be found on Crawley Council [website](#)

Description of the AQMA

CBC declared an [Air Quality Management Area](#) (AQMA) in the area around the busy Hazelwick Roundabout in 2015 based on exceedances of the annual average national air quality objective for NO₂.

The designated boundary of the AQMA (Fig) includes the roads and properties bordering: Hazelwick Roundabout, A2011 (Crawley Avenue) and Hazelwick Avenue between the Hazelwick Roundabout and the roundabout at Bycroft Way. The wide designation of the boundary was designed to give focus to the traffic corridors that are contributing to the problem at the junction.

Fig 2.5: Crawley Borough Council AQMA boundary map

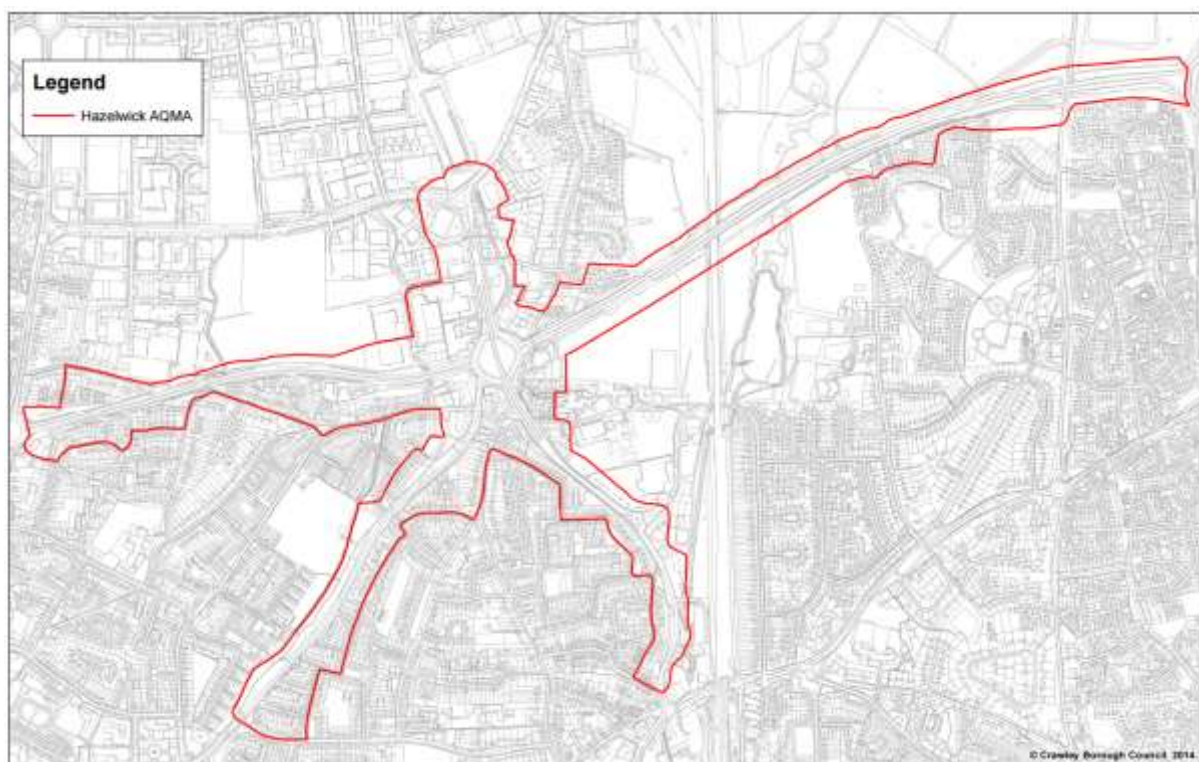


Table 2.1: Monitoring data for sites within AQMA, 2016 and 2017 (Diffusion Tube)

Site reference	Type	2016 Annual Mean NO ₂ (adjusted to façade)	2017 Annual Mean NO ₂ (adjusted to façade)
CR62	Background	40	40
CR63	Roadside	36	38
CR64	Roadside	36	36
CR69	Facade	43	42
CR71	Facade	31	-
CR76	Roadside	39	36
CR77	Roadside	36	35
CR79	Facade	30	27
CR85	Background	31	27
CR89	Facade	-	19*
CR91	Roadside	39	39

*Short term data adjusted

3 Crawley Borough Council's Air Quality Priorities

3.1 Public Health Context

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007) sets out a framework to achieve cleaner air to protect human health and the environment. The strategy sets a series of standards and objectives for a range of air pollutants based on associated health effects, based on recommendations made by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). The 'standards' are pollutant concentrations below which adverse health effects are unlikely, even in sensitive groups within the population. The 'objectives' are the target dates by which the 'standards' must not be exceeded. The air quality objectives are only applicable where members of the public are likely to be present and different standards are set depending on the length of public exposure. For long term exposure to sensitive receptors, such as residential properties, hospitals, schools etc., the objective for NO₂ is based on an annual mean. For short term exposure where the public are likely to be present for an hour or more, the objective is based on hourly averaging periods.

Those most at risk from air pollution are the young and elderly and those with predisposed medical conditions, which may be exacerbated by elevated levels of air pollution. Although air quality is not a direct cause of death, it is considered to be a significant contributory factor. There is a growing body of evidence for the impact of air pollution on our health, with Public Health England (PHE) suggesting that particulate matter is a contributory factor in 29,000 deaths nationally in 2010 (Estimating Local Mortality Burdens Associated with Particulate Air Pollution, Public Health England, April 2014). A further [report](#) by the Royal College of Physicians in 2016 reported air pollution contributed to the equivalent of 40,000 deaths in 2015. When equated to the Crawley area, this meant ambient air pollution was a contributory factor in an estimated 41 deaths or a total 497 years reduction in life expectancy.

In addition to attributable deaths, the health burden costs that air pollution incurs through healthcare and loss of productivity to UK Gross Domestic Product is substantial. Public Health England recently developed a [tool](#) to estimate of the

healthcare costs of living in conditions of poor air quality. The calculations found costs of approximately £95,000 per 100,000 head of population were identifiable over the lifetime of the plan (five years). These included the value attributed to GP's, community health, hospitals, specialists and medication as well as loss of productivity through illness and time off work.

Long term exposure to air pollution is a real health burden and it affects everyone, it is therefore important for public health to continue to improve air quality. The council anticipates some of the measures implemented within this action plan for the achievement of reductions in NO₂, will have additional benefits in reducing other pollutants such as particulate matter.

3.2 Planning and Policy Context

There is a range of national, regional and local planning and policy to contribute toward improvements in air quality and prevent development from having an adverse effect in Crawley and the surrounding area. A summary of the relevant planning framework and policy documents that support improvement to air quality are outlined below.

The National Framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied and provides a framework within which locally-prepared plans for housing and other development can be produced. The NPPF states that the purpose of the planning system is to help achieve sustainable development, including environmental improvements that can be secured through the development control process. The most relevant policies include:

Conserving and Enhancing the Natural Environment: planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at an unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality.

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, and should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas.

Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications.

Promoting Sustainable Transport: issues should be considered from the earliest stages of plan-making and development proposals, so that opportunities to promote walking, cycling and public transport use are identified and pursued, the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account - including appropriate opportunities for avoiding and mitigating any adverse effects.

Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health.

Promoting Healthy and Safe Communities: planning policies and decisions should aim to achieve healthy, inclusive and safe places where the street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, enable and support healthy lifestyles. Increasing Active Travel has been identified as a measure with a significant public health impact.

Local Development Plan

The Crawley Local Plan 2015-2030 outlines planning and development within the area and sets out the strategic priorities and policies for Crawley to deliver:

- Homes and jobs
- Provision of retail, leisure and other commercial development

- Provision of infrastructure for transport, telecommunications, water supply, wastewater, flood risk management, and energy
- Provision of health, security, community and cultural infrastructure and other local facilities
- Climate change mitigation and adaptation
- Conservation and enhancement of the natural and historic environment, including landscape
- Control of Gatwick Airport

Effective cooperation with neighbouring authorities is critical for Crawley because of its primary economic role in the sub-region and the wider economic and environmental implications relating to Gatwick Airport.

It is Crawley's aim by 2030 to have a strong road network that will be complemented by a good public transport system, giving people choice about how they travel. Crawley has excellent communications, lying adjacent to the M23, close to the M25 and is on the main railway line linking London to the south coast. The town itself is served by a rapid guided bus service: Fastway, and a network of green corridors, pedestrian and cycle routes through the neighbourhoods and into the town centre and out into the countryside. The National Cycle Route 21, from Greenwich to Eastbourne and forming part of the "Avenue Verte" Greenway, linking London to Paris, also runs through the borough. The Plan states that all new development will be planned to maximise links in the transport network and opportunities for sustainable transport.

The plan recognises Crawley's natural environment is of great importance to the health and wellbeing of the people who live, work and visit Crawley. The Local Development Plan has a designated section on Air Quality (Policy ENV12), outlining air quality focuses within the borough. It recognises the main sources of air pollution across the area are local and major road traffic, airport related activities, and industry.

The Local Development Plan outlines the need for sustainable travel within Crawley. Development and Requirements for Sustainable Transport Development should be concentrated in locations where sustainable travel patterns can be achieved through the use of the existing transport network, including public transport routes and the cycling and walking network. Developments should meet the access needs they generate and not cause an unacceptable impact in terms of increased traffic congestion.

Developments will not be permitted if the cumulative impact on the transport network is too severe and cannot be satisfactorily mitigated. In order to consider such impacts, developments that generate significant amount of movements should be supported by a) A transport Statement, which assesses the impact of a development with relatively small transport implications; or a b) Transport Assessment, which assesses the impact of a development when there are significant transport implications, and a Travel Plan, which identifies how the development will maximise the usage of sustainable modes of transport as opposed to the private motor vehicle.

Local Transport Plans

West Sussex Transport Plan 2011-2026

The West Sussex Transport Plan 2011-2026 provides strategic direction for transport within West Sussex, it aligns itself closely with other major strategies, such as the County Strategy and the Local Community Strategies.

Four objectives are presented in the plan as a result of consultation in order to make the plan integrate with the community. The four objectives are:

- promoting economic growth
- tackling climate change
- providing access to services, employment and housing
- improving safety, security and health

All of the objectives contribute to the overall objective to improve the quality of life for all those who live, work and visit West Sussex.

Under the safety, security and health objective areas, poor health quality is listed as a concern within areas of West Sussex. This links the West Sussex Transport Plan with air quality and recognises the importance that transport planning has to play in improving local air quality in Crawley.

Plan is divided into two parts: Part 1, the Long-Term Strategy and Part 2, the Implementation Plan. Part 1 sets out the vision for transport in West Sussex. Part 2 of the Plan sets out how the Plan will be implemented, identifying what infrastructure is required and any available options to achieve the Council's main objective in both the short and long-term for each borough.

The plan recognises that the transport network can impact on public health by contributing to poor air quality. In order to reduce the negative impacts of transport on public health the plan aims to work with district and borough councils when AQMAs are declared to develop Air Quality Action Plans, this joint approach includes engineering, monitoring and promotional activities implementing actions in the AQAPs for new, and existing, AQMAs.

In Part 2 -The Implementation Plan, each Borough is presented separately. Crawley is reported in Section 2.4 outlining the strategy aims to address localised transport issues. The aims include improving network efficiency in order to improve journey times and air quality. The key transport focuses related to air quality which are suitable for inclusion and consideration within the AQAP include:

- Localised congestion occurs around the Borough at the start and end of the school day.
- In order to avoid congestion and maintain journey times HGVs are diverting onto unsuitable residential roads, causing concerns over safety.
- The current provision of pedestrian and cycling facilities across the town are not sufficient. Much of the network is disjointed and suffers from inadequate signing, safe crossing points and poor surfacing.
- Lack of secure public cycle parking throughout Crawley.
- Peak time rail services suffer from overcrowding. Current track and platform capacity at Gatwick Airport causes a bottleneck on the Brighton Main Line which limits the ability to provide additional services.

- The railway stations located throughout the town suffer from poor integration with other transport modes as well as outdated passenger facilities.
- Ensuring that maximum transport benefits from new developments are realised so as to mitigate their impacts and integrate them into existing communities through, for example, extensions to Fastway.
- Making the best use of the existing road network and improving the way in which the network is managed to reduce current levels of congestion by achieving a shift to sustainable modes of transport. For example, through introducing intelligent transport systems, making public transport more convenient, comfortable and safe.
- Encouraging HGVs to use the advisory lorry route network while maintaining access to areas which businesses need to access.
- Involving local employers in travel behaviour change projects to encourage cycling, walking and using public transport to travel to work.
- Promoting sustainable transport choices through projects such as Safer Routes to School.
- Working with our rail partners, CBC and developers to explore opportunities for the redevelopment of Three Bridges and Crawley railway stations

As well existing transport focuses the plan outlines the future pressures on the existing network due to planned developments. The development of 2,500 dwellings to the land west of Bewbush (Kiln Wood Vale), along with 1,900 dwellings on land in the North East Sector (Forge Wood), will have a major impact upon the current highway network and public transport services. Issues that will need resolution include overloading of the highway network and public transport, air quality, parking and ensuring good interconnectivity from development to/from local and town centre facilities, especially by walking and cycling.

A proposed retail-led redevelopment in the town centre could increase congestion levels, demand for parking, and have a detrimental effect on air quality. Road congestion during peak periods affects many parts of the highway network, causing unreliable journey times and poor air quality.

Crawley Borough Council Local Plan Transport Strategy

Stage 1 of the Local Plan Transport Strategy was to examine the implications of three land use development options in Crawley Borough and compared them with a baseline situation. The stage-1 model assignments were made using a future year 'do-minimum' highway and public transport network, which excluded any impact mitigation schemes.

The stage 2 report identified the Hazelwick junction as requiring mitigation through carriageway widening over and above the Forge Wood development signalisation/capacity changes.

Sussex Air Quality Partnership

Sussex Air Quality Partnership (SAQP or Sussex-air) is a regional partnership of Sussex local and county authorities, the Health Protection Agency, the Environment Agency and Sussex Universities. The partnership delivers cost effective resources and expertise in the field of air quality, health protection and is strongly linked to climate change/sustainability. Crawley borough council is a partner in [Sussex-air](#)

Air Quality & Emissions Mitigation for Sussex Authorities

Sussex-air, in partnership with the local authority planning departments and air quality officers, developed a guidance on the assessment of air quality and the mitigation of potential impacts from proposed developments across Sussex. This [guidance](#) sets out the required assessments and reporting requirements for developers regarding air quality impacts and emissions mitigation for developments.

The guidance has three aims:

- Enable early engagement, highlighting the points that need to be considered and addressed prior to making a planning application and therefore minimise any potential delays during the decision making process.
- Offer clear and consistent guidance to developers on the level of information that will be required to be submitted with planning applications for developments that are likely to have an impact on local air quality.

- Ensure better regulation by setting out the approach to undertaking air quality assessments and determining mitigation, and applying these consistently in planning decisions.

Climate Change Declaration

Crawley is committed to supporting the legally binding national carbon reduction targets and being carbon neutral by 2050; this is to be achieved by aligning with the national zero carbon agenda in planning policies and by engaging with local businesses and communities.

3.3 Source Apportionment

The AQAP measures presented in this report are intended to be targeted towards the predominant sources of emissions within Crawley Borough Council's area.

Determining the local sources of pollution within the AQMA and modelling the proportion of emissions from these sources is known as 'source apportionment'. This process provides information on what emissions are coming from which sources and can assist in targeting actions within the Action Plan.

The main pollutant of concern in the Hazelwick AQMA is nitrogen dioxide, and the primary emission source for NO₂ is oxides of nitrogen (NO_x) from vehicle exhausts. A source apportionment exercise was carried out on behalf of the council, by Ricardo Energy and Environment in 2016. This source apportionment study confirmed that vehicle emissions were the main source of nitrogen dioxide pollution, and determined which class of vehicle releases the most pollutants to air. The percentage contribution to emissions and overall concentrations from sources are summarised below:

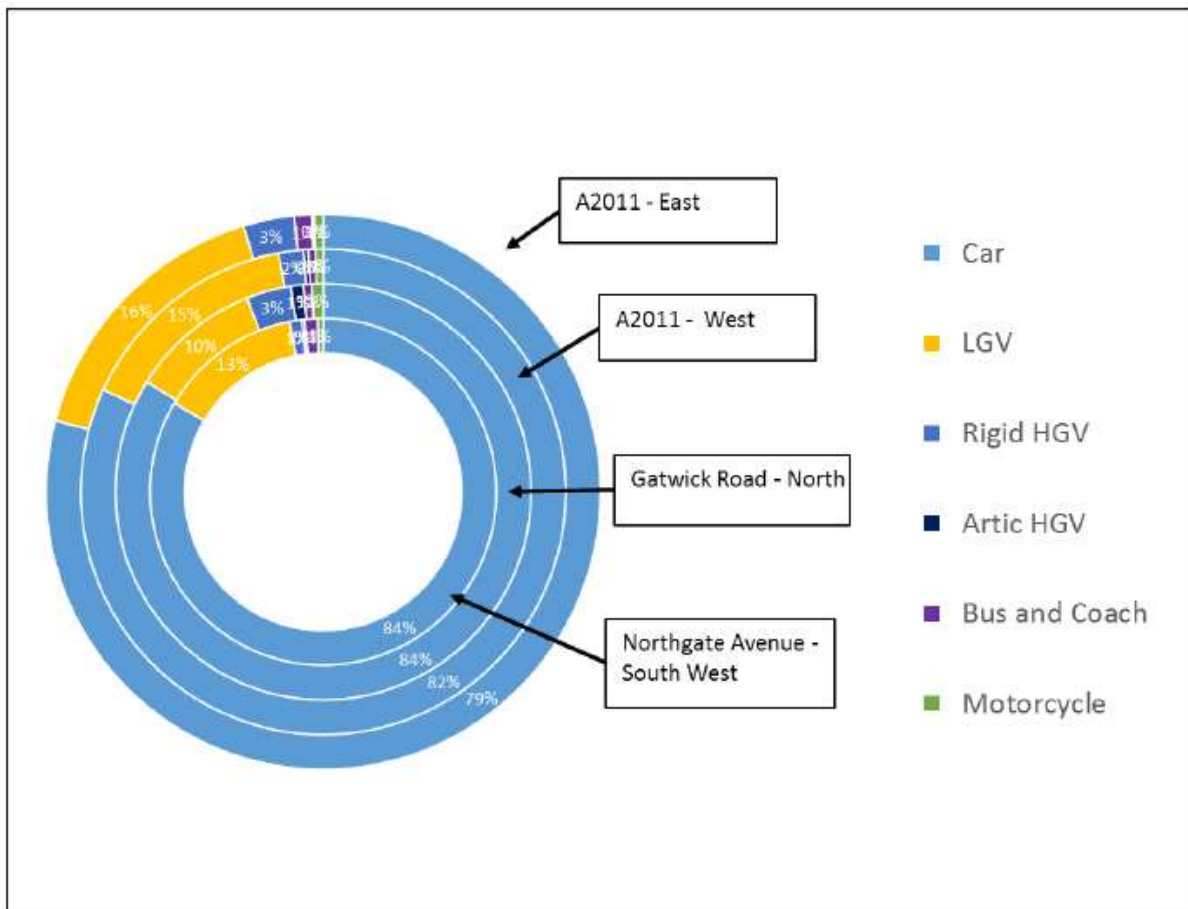
Traffic Flow through Hazelwick AQMA

The proportion of each vehicle category as an average percentage of total traffic flows for all vehicle movements along the main east-west corridor route of the A2011, and the A2004 were determined as good representation of the traffic at the roundabout. Table 3.1 and Figure 3.1 shows the annual average daily traffic (AADT) flow (2015), broken down by vehicle class passing through the Hazelwick roundabout.

Table 3.1 Annual Average Daily Traffic (AADT) flow at the Hazelwick roundabout (2015)

Direction	Road	Site ID	AADT Joining roundabout	AADT leaving roundabout	Join- leave
East	Crawley Av (A2011)	5719 (WSCC)	20974	19816	
East ¹	Crawley Av (A2011)	7548 (DfT)	22857	20588	2269
West	Crawley Av (A2011)	57977 (DfT)	8707	9201	-494
North ²	Gatwick Rd	902 (WSCC)	6893	8299	-1406
South-west	Northgate Av (A2004)	7888 (DfT)	4872	5842	-970
South ³	Hazelwick Av.		Net (601)		(601)
Flyover ⁴	Hazelwick Av. - Gatwick Rd		No data	No data	

Fig 3.1: Annual Average Daily Traffic (AADT) flow by percentage at the Hazelwick roundabout (2015)



The AADT traffic flows are dominated by cars with 83% (average) followed by LGVs with a range 10-15% of the AADT. Total HGVs (Rigid + Artic) equated to approximately 1- 5% of the traffic flow, with Buses and Coaches making up only 1% (average).

Additionally, a further detailed analysis of AM and PM peak flow traffic was commissioned (by the Homes and Communities Agency) on the approach roads to the Hazelwick roundabout. This data analysis of the traffic flow through the roundabout identified that there was significantly higher AM peak flow on the A2011 (E) approach (from the M23), than other approaches, and therefore managing or prioritising this AM peak flow could help to improve emissions.

Emissions within the Hazelwick AQMA

Source apportionment of vehicular emissions, broken down by vehicle class, was undertaken for the main pollutant of concern within the AQMA, namely total oxides of nitrogen (NO_x), but calculations for particulates (PM₁₀ and PM_{2.5}) were also provided in the study.

Using a modelling tool, the Emissions Factor Toolkit (EFT), emissions were calculated from the traffic data. The EFT provides an estimation of road vehicle pollutant emission rates within the AQMA based on road type, vehicle speed and vehicle fleet composition for a specified year. Table 3.2 and Figure 3.2 shows the source apportionment of NO_x emissions on Hazelwick roundabout (2015), broken down by vehicle class passing through the Hazelwick roundabout.

Table 3.2 Source apportionment NOx emissions Hazelwick roundabout (2015)

Vehicle category	A2011 E	A2011-W	Gatwick Rd	Northgate Ave.
Petrol Cars	8%	8%	8%	8%
Diesel Cars	42%	47%	44%	47%
Petrol LGV	0%	0%	0%	0%
Diesel LGV	17%	27%	17%	24%
Rigid HGV	22%	10%	20%	7%
Artic HGV	8%	2%	6%	2%
Buses/Coaches	2%	5%	6%	12%
Motorcycles	0%	0%	0%	0%
Full Hybrid Petrol Cars	0%	0%	0%	0%
Plug-In Hybrid Petrol Cars	0%	0%	0%	0%
Full Hybrid Diesel Cars	0%	0%	0%	0%
CNG Bus	0%	0%	0%	0%
f Hybrid Bus	0%	0%	0%	0%

Fig 3.2 Source apportionment NOx emissions on Hazelwick roundabout (2015)

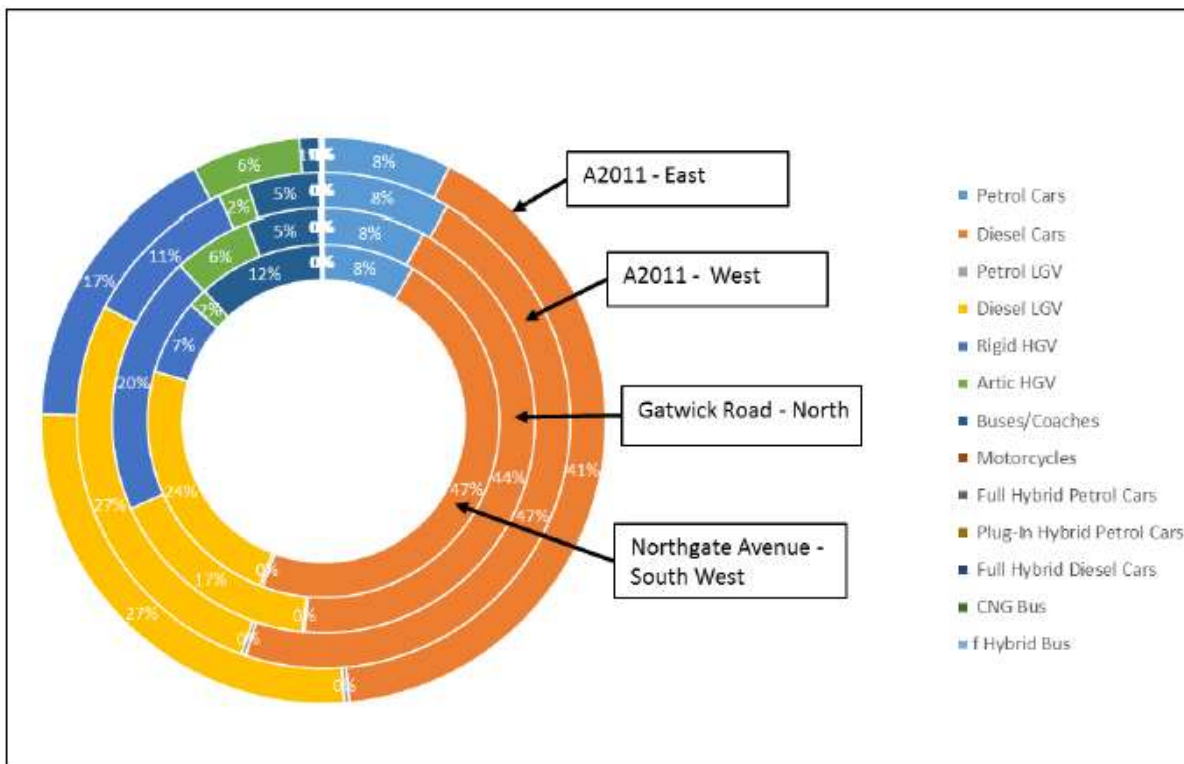


Fig3.3 NOx annual emissions Hazelwick roundabout (2015) by vehicle category

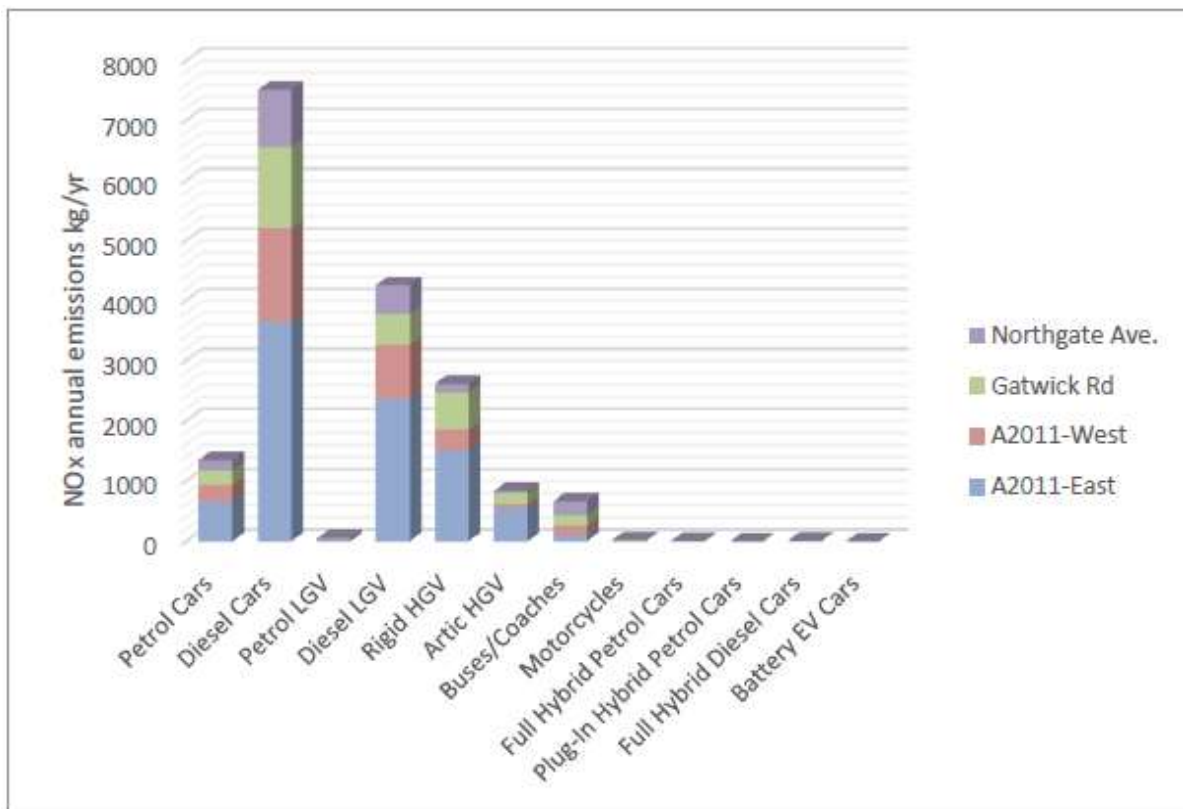
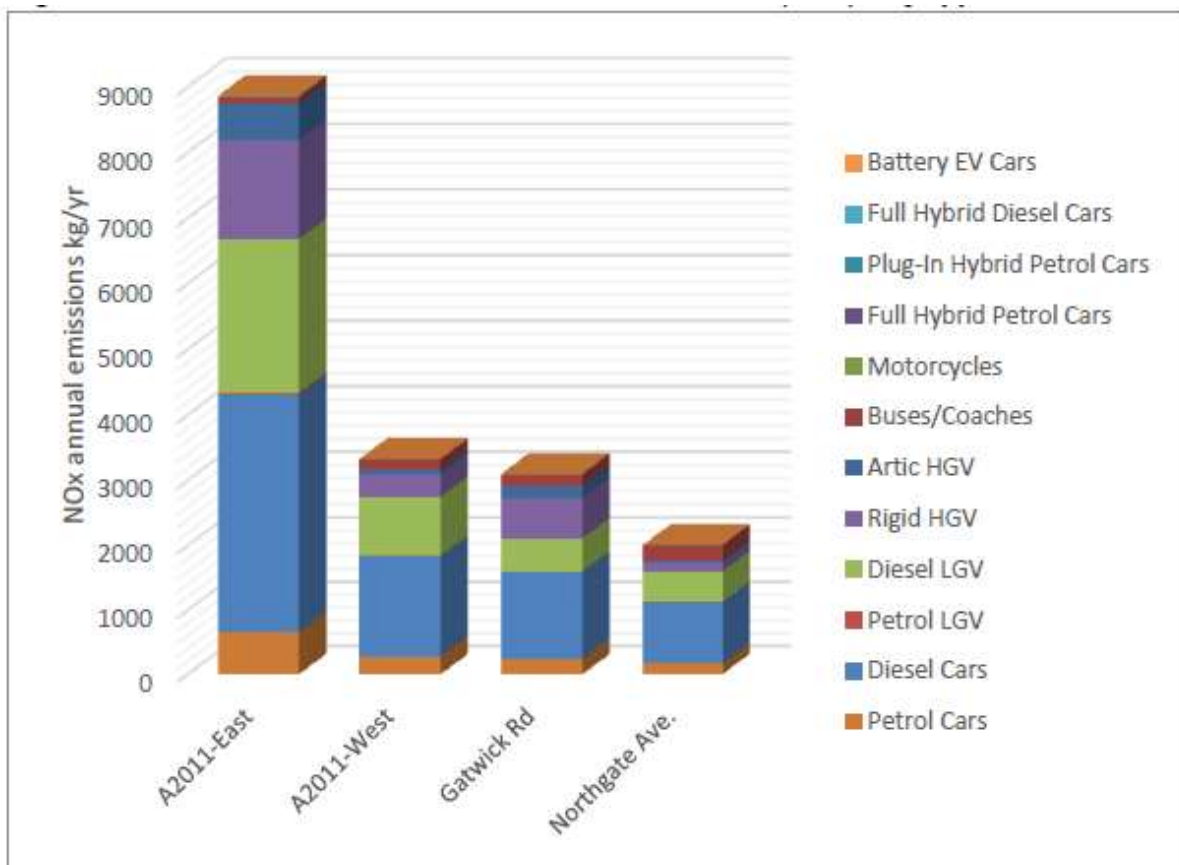


Fig 3.4 NOx annual emissions Hazelwick roundabout (2015) by approach road.



The source apportionment modelling determined that the most significant contributor of NO_x emissions was from diesel cars and diesel LGVs, combined these accounted for between 50-55% of the local emissions. NO_x emissions from HGVs (ridged and articulated) accounted for between 9-30% of emissions, which is significant considering the lower percentage of HGVs (between 1-5%) travelling through the AQMA. Buses and coaches also contributed between 2-12% of the NO_x emissions with the highest 12% on Northgate Ave

Although NO_x is the main local source of nitrogen dioxide (NO₂), particulates, namely PM₁₀ and PM_{2.5}, are also a major health concern, and action plan measures to reduce NO₂ and improve air quality will also help to reduce local sources of PM.

The most significant contributor of PM₁₀ and PM_{2.5} emissions were from the diesel cars, petrol cars and diesel LGVs. HGVs (ridged and articulated) also accounted for between 5-20% of PM emissions. The highest HGV emission sources occur on the A2011 (E) to Gatwick Rd (N) route, to and from the Manor Royal Industrial Estate and Gatwick airport.

3.4 Required Reduction in Emissions

Technical Guidance LAQM.TG (16) states that local authorities should identify the reduction in pollutant emissions required to attain the objectives within their AQMAs to determine the scale of effort likely to be required.

Exhaust emissions are made up of a number of substances including nitrous oxides often referred to as NO_x. NO_x is a mix of nitrogen dioxide (NO₂) and nitric oxide (NO). NO reacts with oxygen in the atmosphere to produce more NO₂, therefore it's important to know how much NO_x emissions are coming from the roads because it will contribute to NO₂ in the atmosphere. The National Air Quality Objective that the Council is required to work towards is 40 micrograms NO₂ per cubic metre (40ug/m³). The required reduction in emissions has been calculated in line with Technical Guidance LAQM.TG16 Chapter 7 (Box 7.6). It is based on the required reduction in the road NO_x concentration at the worst-case relevant exposure location. Details are provided in Appendix D.

The NO₂ concentration at the worst case relevant exposure location within the AQMA in 2017 was 42µg/m³. This was measured at a site (CR69), adjacent to A2011 Crawley Avenue. The legally required reduction in the level of nitrogen dioxide is therefore 2 microgram per cubic metre annual mean, from 42ug/m³ to 40ug/m³. From the calculation shown in Appendix D, the recorded level of nitrogen dioxide at site CR69 equates to a roads NO_x concentration of 49.3µg/m³ and a reduction in road NO_x emissions to 44.5µg/m³ is required to bring the nitrogen dioxide level to 40ug/m³ or less. An emissions reduction of 4.8µg/m³ or 9.7% is therefore required.

In order to achieve NO₂ concentration to a more ambitious level of 10% below the limit value (ie 36µg/m³) a reduction in road NO_x emissions to approximately 35µg/m³ would be required, which equates to a 29% emissions reduction.

3.5 Key Priorities

The priorities for Crawley Borough Council are to protect *public health* by reducing emissions so that concentrations of nitrogen dioxide are below the National Air Quality Objective, the second is to target the source of emissions from *transport* and the third is to ensure nitrogen dioxide levels remain below the objectives by building *sustainability* into our planning and policy guidance.

- **Priority 1 - Public Health**

Improving public health by reducing the impact of long term exposure to air pollution is one of the key priorities for the council. The council anticipates some of the measures implemented within this action plan for reducing nitrogen dioxide levels to below the national air quality objectives, will have additional benefits in reducing exposure to other pollutants such as particulate matter.

Keeping emissions low, and reducing them further in the future will require ongoing involvement and behavioural change by all of us. As a council we have a key role to play in facilitating this change through education, information and awareness raising. We also have a responsibility to lead by example, such as lowering emissions from our own fleet and buildings, and encouraging sustainable travel options in our staff such as active travel and avoiding unnecessary travel. To support this process there are a range of measures outlined in the action plan aimed at encouraging behaviour change, modal shift and health promotion. Despite these measures scoring a low

impact for targeted pollution reductions within the AQMA, they have very important wider benefits considered a priority for changing attitudes and behaviours needed for sustaining long term improvements in air quality and public health.

- **Priority 2 - Transport**

The source apportionment shows that traffic emissions are the main source of air pollution in the Hazelwick AQMA, with major contributions from diesel cars and LGVs. A reduction in emissions of 9.7% is required to meet the air quality objectives at the worst case location within the AQMA. Reducing transport emissions through the measures within the action plan is therefore a key priority for the council.

The traffic corridors contributing to the air quality problem at the Hazelwick roundabout include the primary commuter routes between the Crawley town centre, Manor Royal business district and the M23, and additional capacity from the Forge Wood development and proposed Gatwick expansion are expected to increase congestion to the local road network.

Due to spatial boundaries and density of the developed area, physical improvements to the highway network, which require space outside the existing road boundary, are difficult to deliver. The action plan therefore focuses on measures to influence transport emissions that are under the council's direct control such as the issuing of taxi licences, EV charging and working closely with WSCC on transport infrastructure and highways improvements within the AQMA, such as signalisation of the Hazelwick roundabout and potential extra lane on the SW quadrant of the roundabout to handle the additional capacity for Forge Wood. Engaging with key stakeholders is also important in understanding infrastructure upgrades and transport links, for example Manor Royal BID (as the main destination for traffic), and GAL and Metrobus (given the relevance of buses providing surface access to Manor Royal and the Airport).

The evolving work of the council's "Crawley Growth Programme" (CGP), which together with its partners in the Coast to Capital Local Enterprise Partnership, will implement a £60m package of sustainable transport infrastructure and highway upgrades, will be key to the immediate, medium and long term success of the Air Quality Action Plan. These measures will enhance sustainable transport within the town and tackle congestion enabling modal shift, and are expected to reduce the level of emissions from traffic in general, resulting in improvements to air quality in Crawley.

- **Priority 3 – Sustainability (Planning and Policy Guidance)**

Crawley borough has some unique characteristics which arise from the density of the urban area and the proximity to Gatwick Airport. These characteristics go hand in hand with high levels of commercial and commuter traffic associated the Airport, Manor Royal business district, and more recently the town centre redevelopment and major residential development. However, the compact nature of the urban area also provides opportunities to mitigate against some of these pollution impacts from traffic and other sources, since the town itself is served by a rapid guided bus service (Fastway), and a network of green corridors, providing attractive pedestrian and cycle routes through the neighbourhoods and into the town centre and out into the countryside.

As the local planning authority we aim to develop sustainable communities by requiring all new development to maximise links to the transport network and opportunities for sustainable transport. The action plan therefore includes a number of planning and policy measures aimed at strengthening local planning policy which minimises emissions from future housing developments and reduces dependency on private vehicle usage by facilitating and encouraging active travel and sustainable transport modes. These actions also compliment the measures on sustainable transport that will be delivered by the Crawley Growth programme, to reduce emissions from traffic in Crawley.

As members of the Sussex Air Quality Partnership (SAQP) we are also working with neighbouring authorities to update emissions mitigation guidance for planners and developers. The action plan includes measures to embed this air quality and emissions guidance into planning policy, requiring damage costs from developers to fund emissions mitigation.

4 Development and Implementation of Crawley Borough Council AQAP

4.1 Consultation and Stakeholder Engagement

In developing this AQAP, we have worked with other local authorities, agencies, businesses and the local community to improve local air quality. Schedule 11 of the Environment Act 1995 requires local authorities to consult the bodies listed in Table 4.1. A draft version of this Action Plan was subject to a consultation in December 2017, through publication on the Council's website and circulation to:

- West Sussex County Council
- Sussex-air and all partnership Authorities (East and West Sussex County Councils, Sussex city, district and borough councils, Environment Agency, Sussex and Surrey Health Protection Agency).
- Defra
- MetroBus
- Manor Royal Business district CEO

The response to our consultation stakeholder engagement is given in Appendix A.

Table 4.1 – Consultation Undertaken

Yes/No	Consultee
Yes	the Secretary of State
Yes	the Environment Agency
Yes	the highways authority
Yes	all neighbouring local authorities
Yes	other public authorities as appropriate, such as Public Health officials
Yes	bodies representing local business interests and other organisations as appropriate

4.2 Steering Group

Crawley Borough Council set up a steering group in January 2018, to take forward the development and implementation of the Action Plan for the Hazelwick AQMA. The group was chaired by the Head of Environmental Health. The steering group consisted of representatives from internal departments of the Council including Environmental Health, Planning, Sustainability (energy and transport), Economic Development and Regeneration, as well as West Sussex County Council Highways, Transport Planners and representatives from Manor Royal Business District and MetroBus.

The Steering Group reviewed the draft action plan to determine which measures to take forward in the final AQAP for consultation and submission to Defra. The terms of reference for the group are set out in Appendix E.

5 AQAP Measures

Following the Steering Group consultation and refinement of the draft AQAP, the viability of the key measures, including key support and delivery partners responsible for implementing and monitoring the progress of the AQAP, was discussed with the stakeholders. Through this process, the Council will work with its partners to set out the delivery programme and key milestones with the objective of working towards improved air quality within the AQMA and Crawley as a whole. However, the council recognises that more work is needed on modelling future emission reduction scenarios to assess the impact of proposed measures and to inform decision making for prioritisation of future measures.

The full set of AQAP measures listed in Table 5.1 are those where both delivery partners and committed funding has been identified and can therefore demonstrate certainty in deliverability. These measures will contribute towards reducing air pollution in the AQMA in the short, medium and long term. Many of these are ongoing actions, such as awareness raising and education. Whilst these may not provide direct emissions reduction within the AQMA, they have broader and longer term benefits. Other measures are more targeted and measurable, such as transport infrastructure upgrades and traffic management schemes within the AQMA road network. And finally there are measures that build sustainability into the action plan include strengthening planning and policy guidance to build air quality controls into future development, council services and regulation.

The following priority measures described in more detail below, are those considered important in engaging public support, targeting key emission sources, or contributing towards long term sustainability. The actions are grouped under the three priority headings: Public health, Transport and Sustainability (Planning and Policy Guidance), although there is flexibility in these groupings as their benefits overlap.

Priority 1 - Public Health

Measure No. 38	Junior Citizen Event
Details of Measure	<p>Junior Citizen is an annual 2 week educational programme for all Year 6 (KS2) pupils in Crawley, providing an interactive teaching platform on environmental issues, safety and citizenship.</p> <p>“Air Quality in our Local Area” is delivered through eco-action games and small discussion groups. As part of this programme the airAlert service is promoted and an information pack provided to each pupil. Over 1200 children participate each year.</p> <p>Particular emphasis is placed on encouraging modal shift to active travel which has health benefits as well as reducing the impact of traffic on air quality.</p>
Lead Authority	<p>Organised by Crawley Borough Council – with input from WSCC, and other public service providers.</p> <p>The air quality activity is delivered by Crawley’s Environmental Health team.</p>
AQ Benefits	<p>Long term benefits of educating future generations about air pollution issues, sustainable travel options, and the importance of making changes to improve air quality and public health.</p>
Pollution Reduction in AQMA	<p>Not quantifiable</p>
Timescale for Delivery	<p>Annual event – ongoing</p>
Monitoring Progress	<p>Feedback from Schools</p>
Costs	<p>Low - £8K annual event costs + officer time</p>

Measure No. 21	Defra Grant Funded Project Work
Details of Measure	<p>Defra’s air quality grant scheme provides funding to local authorities to help support measures that improve air quality in areas with AQMAs.</p> <p>Sussex Air Quality Partnership (SAQP) have submitted bids for grant funding for the last 3 years on behalf of the Sussex joint authorities.</p> <p>The specific nature of these projects will vary from year to year dependent on the ideas put forward by the members of the</p>

	<p>regional partnership to meet the needs of their communities. However, proposals submitted for grant funding are designed to provide direct air quality benefits in the short/medium term and/or develop solutions over the longer term by increasing awareness and encouraging behavior change.</p> <p>The 2018 bid is an air quality project targeting schools and businesses. The project is divided into three main elements:</p> <p>The schools project - includes an anti-idling, cycling and walking programme delivered on behalf of the council by Sustrans and Living Streets.</p> <p>The business project – provides personalised eco-audit to SMEs focusing on improving energy efficiency of plant/machinery, eco driver training, staff travel and identifying grants to implement suggested AQ improvements. Delivery of the business element of the project has been awarded to an environmental consultancy who will project manage the scheme on behalf of the council.</p> <p>LEVs Event - As part of the business element of this scheme, a LEV event is planned to showcase low/zero emission vehicle options for businesses, as well as charge point suppliers/service providers, and also hope to promote our business travel plan toolkit. It is intended to carry this event forward as an ongoing event with the support of Manor Royal and Gatwick Airport Ltd.</p> <p>The practical measures within these projects will support air quality improvements and public health in our area and will be reported on annually in the ASR.</p>
<p>Lead Authority</p>	<p>SAQP joint application for grant funded projects - supported by Crawley Borough Council (Environmental Health) and other local authorities for local delivery</p>
<p>AQ Benefits</p>	<p>Short term benefits from direct action such as reducing emissions</p> <p>Long term benefits of improving understanding of pollution impacts, and the importance of making changes to improve public health and air quality.</p>
<p>Pollution Reduction</p>	<p>Some projects may be quantifiable – such as reduction in measured energy efficiency/plant or vehicle emissions. These will</p>

in AQMA	be assessed on an individual project basis Educational programmes mostly unquantifiable
Timescale for Delivery	Annual – ongoing
Monitoring Progress	Monitoring progress will be reported annually in the ASR
Costs	Grant funded projects + officer time Costs for the 2018 project work: £105,900 grant money covering all SAQP authorities over the 3 project elements

Measure No. 26-28	Travel Plans
Details of Measure	<p>Travel Plans for CBC staff, schools and the Manor Royal BID are part of the measures that aim to enable sustainable travel choices to be made, benefitting both the environment (less congestion, fewer emissions to air) and the health and fitness of the workforce/pupils.</p> <p>Travel plan measures include:</p> <p>Assistance with travel planning as well as incentives to increase number of staff/pupils not driving to/from work/school, and to increase the number cycling, walking or choosing healthy commuting options.</p> <p>Incentives include public transport discounts (15% discount on rail and bus with an easitCARD), provision of pool bikes, provision of pool car/car club membership for occasional travel for work, bicycle purchase loan scheme and secure, covered cycle parking.</p> <p>In addition developments of certain size required to implement Travel Plan through Planning process (Measure 10) - each application has its own target plan.</p>
Lead Authority	Crawley Borough Council and WSCC
AQ Benefits	<p>Long term benefits of behavioural change and modal shift supported by other policy measures such as home working policy.</p> <p>Benefits include public health/wellbeing associated with active travel options as well as reduction in traffic emissions.</p>
Pollution Reduction	Not quantifiable at this stage

in AQMA	
Timescale for Delivery	Ongoing
Monitoring Progress	% Modal shift. Progress will be reported annually in the ASR
Costs	Low/Medium - officer time

Priority 2 - Transport

Measure No. 1-3	Crawley Growth Programme
Details of Measure	<p>A strategic priority for Crawley Borough council is to reduce congestion (which contributes to worsening air quality), and enhance sustainable transport within the town. To deliver this, the council has engaged with its partners in the Coast to Capital Local Enterprise Partnership (Crawley Town Centre Partnership, West Sussex County Council, Gatwick Diamond Initiative, Manor Royal BID, Metrobus, Gatwick Airport Limited, Arora Group) to introduce a £60m package of investment known as the Crawley Growth Programme, which will deliver a programme of sustainable transport infrastructure and highway schemes to tackle these key concerns, enabling modal shift and helping to improve air quality. The measures that will be delivered over the next 4/5 years include:</p> <p>Major interchange improvements: Major interchange improvements at Crawley, Three Bridges and Gatwick railways stations for both buses and cyclists, and to extend the bus priority lanes through Manor Royal Business district and Gatwick airport through selective road space re-prioritising.</p> <p>Bus shelter “super hub” upgrades: Real Time Passenger Information (RTPI) upgrade at bus shelters - £900,000 from the Crawley Growth Programme has been identified to provide new RTPI displays and replace older displays which had no audio provision. And an additional 66 RTPI displays to be installed at bus stops in Crawley, bringing the total in the town with audio capability to 134. RTPI works by tracking buses using GPS (Global Positioning Systems) and using this information to accurately</p>

	<p>calculate the predicted time of arrival at the bus stop. The upgrades provide a better travel experience for customers, including visually-impaired passengers who can access the information via specialised key fobs that activate an audio message announcing the information shown on the displays. Improved passenger convenience and accessibility is known to encourage modal shift.</p> <p>Cycle Network: Worth Park Avenue Cycle Scheme. A 1km-long, shared use cycleway, connecting Three Bridges Station from Station Hill in the west along Worth Park Avenue to Ridley's Corner in the east and along sections of Worth Road. The scheme connects with local schools, and provides improved connectivity to National Cycle Network route 21 at St Mary's Drive and Three Bridges Railway station to benefit the local community and encourage residents and visitors to choose sustainable transport options including walking and cycling rather than using a car.</p> <p>Traffic signals upgrades: Haslett Avenue and Worth Park Avenue traffic signal upgrades as part of the cycle scheme to improve traffic flow using the MOVA system and all cycle crossing points are fully Toucan controlled, shared between cyclists and pedestrians.</p>
<p>Lead Authority</p>	<p>Crawley Borough Council /Coast to Capital Local Enterprise Partnership</p>
<p>AQ Benefits</p>	<p>Where transport infrastructure is in place, there are a range of behaviour change activities and initiatives which have been shown to encourage its use and increase% Modal shift. From private vehicle use – resulting in reduced traffic emissions.</p>
<p>Pollution Reduction in AQMA</p>	<p>Individual scheme assessment through planning process</p>
<p>Timescale for Delivery</p>	<p>Ongoing -2022/23</p>
<p>Monitoring Progress</p>	<p>Progress will be reported annually in the ASR</p>
<p>Costs</p>	<p>High £60 million (breakdown of individual scheme cost will be reported as projects come forward)</p>

Measure No. 5-6	Traffic Management at Hazelwick Roundabout
Details of Measure	<p>Future traffic growth from Forge Wood development (1,900 dwellings adjacent AQMA) is expected to result in further congestion within the AQMA. Where physical improvements to the highway network aren't possible, controlling flow to optimise movement around the roundabout is proposed to manage congestion. The proposed signalisation of the roundabout must comply with WSCC signals standards which specify MOVA control for all junctions. MOVA is system designed to maximise the operational efficiency of a junction. There is also planned extra lane capacity on the SW quadrant of Hazelwick roundabout to handle traffic associated with the Forge Wood development.</p>
Lead Authority	WSCC.
AQ Benefits	<p>Long term - increased emissions from traffic growth offset by reduction in emissions as result of improved engine technology - Euro6/ZEC vehicles</p>
Pollution Reduction in AQMA	<p>Not quantifiable at this stage. Scheme still in development. Scenario testing carried out as part of source apportionment work in 2016 needs updating as part of ongoing development of action plan. Since the 2016 exercise, there have been changes to the Crawley Transport Model* used in the modelling assumptions, and CBC will work with WSCC to understand the implications in traffic terms on this junction and ensure more accurate reporting of emissions impact from the junction signalisation at the roundabout</p> <ul style="list-style-type: none"> • Ongoing work modelling signalisation to test impact of the scheme on NO₂ emissions. • Modelling test potential of reduced average speeds on roundabout and increased NO₂ concentrations • Modelling test dual effect of signalisation/ extra lane capacity
Timescale for Delivery	Tbc – still in development
Monitoring Progress	Progress will be reported annually in the ASR
Costs	High – individual scheme costs WSCC reported once available

*Crawley Transport Model developed for WSCC by Peter Brett Associates (February 2017).

Priority 3 – Sustainability (Planning and Policy Guidance)

Measure No. 8	Emerging Crawley Local Plan 2020-2035
Details of Measure	<p>Crawley’s next Local Plan is due for review 2019. Whilst air quality and other planning policies in the current Local Plan will continue to ensure that developments coming forwards are assessed for air quality impact and that mitigation is in place, the future Local Plan will establish the planning policy framework for good design in future development in Crawley to maximise energy efficiency and minimise the need for private car travel.</p> <p>Since the last review, new energy efficient design principles for minimising emissions from development have emerged and should be incorporated into planning policy. There is also the opportunity to strengthen air quality policy within the Plan to build upon the public health principles already required in the design stage of a development including connectivity, public transport, walking, cycling and electric vehicle infrastructure and where appropriate car-free development. In addition, the requirement for damage costs calculations for emissions mitigation from developments is key to helping reduce emissions and improve air quality.</p> <p>The shaping of planning policy in improving air quality/public health within the emerging Local Plan, will be subject to consultation and collaboration between Environmental Health and Planning during the development stages of the draft Local Plan.</p>
Lead Authority	CBC – Environmental Health and Planning
AQ Benefits	<p>Strengthen local planning policy for air quality on future development.</p> <p>Design and construction to minimise emissions from new housing developments</p> <p>Requirements for sustainable travel and active travel options and infrastructure</p> <p>Emissions mitigation/reduction</p>
Pollution Reduction in AQMA	Not quantifiable at this stage – individual scheme assessment provided as part of major development application process

Timescale for Delivery	Draft Crawley Local Plan (2020-2035) due 2019. Consultation and adoption 2020 Timescales for individual planning/development schemes
Monitoring Progress	Progress will be reported annually in the ASR
Costs	Low/Medium for development of Local Plan - officer time. Individual schemes will be costed for CBC funded development.

Measure No. 13	Hackney Carriage and Private Hire Vehicle Emissions Policy
Details of Measure	<p>The Council is responsible for licensing approximately 780 Hackney Carriage and Private Hire vehicles annually which undertake a large number of local journeys within the Town, Gatwick Airport and further afield. An opportunity exists to directly take steps to reduce air pollution by changes to licence conditions with regards to taxi vehicle emissions</p> <p>The Council currently charges a reduced fee of £144.30 per year to licence a 100% electric vehicle compared to £323.60 for a 100% petrol/diesel vehicle. However, uptake of this offer has been low (only 5 vehicles to date). An amendment to the existing policy is therefore considered the best means of taking effective action to incentivise uptake and help improve local air quality.</p> <p>This is currently at the development stage, however the aim is to require all new applications for taxi licences to have vehicles that are zero emission capable (ZEC) and meet (as a minimum) the Euro 6 standards for emissions. And for existing licensed vehicles to be retrofitted to meet Euro 6 standard within a set timescale, with diesel-fuelled vehicles phased out of the Council's taxi and hackney carriage fleet by 2025.</p>
Lead Authority	CBC
AQ Benefits	Reduction in NOx emissions to be calculated
Pollution Reduction in AQMA	Not quantifiable at this stage – Modelling/scenario testing required
Timescale for Delivery	2019/20 for delivery of policy

Monitoring Progress	Progress will be reported annually in the ASR
Costs	Low for development of policy (officer time) The taxi trade may be subject to additional costs due to higher costs of cleaner engines but offset by OLEV grants available to for taxis via 'plug in taxi grant' and DfT reductions in annual vehicle road tax. Detailed cost benefit assessments required.

Table 5.1 shows the Crawley Borough Council's AQAP measures. It contains:

- a list of the actions that form part of the plan
- the responsible individual and departments/organisations who will deliver this action
- estimated cost of implementing each action (overall cost and cost to the local authority)
- expected benefit in terms of pollutant emission and/or concentration reduction
- the timescale for implementation
- how progress will be monitored

The Air Quality Action Plan measures to address the three priority areas have been grouped under seven main category headings, detailed below:

	Transport Planning and Infrastructure
	Traffic Management
	Policy Guidance and Development Control
	Promoting Low Emission Transport
	Promoting Low Emission Plant
	Promoting Travel Alternatives
	Public Information

NB: Please see future ASRs for regular annual updates on implementation of these measures

Table 5.1 – Air Quality Action Plan Measures

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	*Target Pollution Reduction in AQMA	Progress to Date	Estimated Completion Date	Comments/ **Costs
1	Crawley Growth Programme Three Bridges and Gatwick railways stations Interchange improvement schemes	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	Coast to Capital Local Enterprise Partnership WSCC/ CBC	2015	2016-2022 Ongoing	Modal Shift/ Improved traffic flow	Medium	Road space re-prioritising for bus routes to Gatwick via Manor Royal delivered. Further upgrades programmed.	Phased delivery, to be completed in stages. Final completion estimated 2022/23	Working with LEP and partners to deliver major interchange improvements at Crawley, Three Bridges and Gatwick railways stations for both buses and cyclists Costs: High
2	Crawley Growth Programme Upgrade to RTPI and Super-Hub bus shelters	Transport Planning and Infrastructure	Bus route improvements	Coast to Capital Local Enterprise Partnership WSCC/ CBC	2017	2018/19	Increased bus patronage and Modal shift	Medium	Still in design	2019	Super hub Costs: High (£900,000)
3	Crawley Growth Programme Cycle Network	Transport Planning and Infrastructure	Cycle Network	Coast to Capital Local Enterprise Partnership WSCC/ CBC	2016/17	2018- 2022	Modal shift	Medium	New cycle schemes and improvements to existing schemes including: Town Centre – County mall, Manor Royal Road, Fleming Way	Phased delivery, to be completed in stages. Final completion estimated 2019 2022	Connectivity between new Forge wood neighbour development (1900 dwellings) Town centre, Three Bridges station and Manor Royal Business district Costs: High
4	New Manor Royal bus Route	Transport Planning and Infrastructure	Bus route improvements	MetroBus	2017	2018/19	Improved journey times and timetable accuracy / Modal shift	Low/Medium	Still in design	2018/19	Costs: Medium
5	Extra lane capacity on the SW quadrant of Hazelwick	Traffic Management	UTC, Congestion management, traffic reduction	WSCC Highways/ Transport Planning	2017	tbc	Improved flow, reduced emissions	tbc	Still in planning	tbc	WSCC Capital Programme - potential extra lane capacity on Hazelwick roundabout to handle increased

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	roundabout to handle increased traffic from Forge Wood										traffic from Forge Wood – further work required on beneficial effect Cost: High
6	Signalisation of Hazelwick roundabout	Traffic Management	UTC, Congestion management, traffic reduction	WSCC/ CBC	2017	tbc	Improved flow reduced emissions	tbc	Still in design	tbc	Increases AADT expected due to new Forgewood development. Possibility that signalisation could lead to reduced average speeds on roundabout and increased NO ₂ concentrations Long term offset by reduction in emissions as % Euro6/ZEC vehicles increases Costs: High
7	Anti-idling signage – Digital signage/ peak time signage to Cut Engine/ Pollution/ Save Fuel	Traffic Management	Anti-idling enforcement	CBC/WSCC	2017	2018/2019	Reduced exhaust pollution from queuing traffic	Medium in locality	Review of existing signage	2019	Costs: Low
8	Emerging Crawley Local Plan 2020 - 2035	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CBC	Due 2019	2020-2035	Reduction of at least 19% against the Target Emission Rate (TER) set by the 2013 Edition of the 2010 Building Regulations (Part L)	Medium	Draft due 2019 Consultation due 2020	2020-2035	Strengthen local planning policy for air quality on future development. Design and construction to minimise emissions from new housing developments- Sustainable travel and transport emissions reduction/ mitigation. Costs: Low
9	Air Quality and Emissions Mitigation	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes	CBC with Sussex-air	completed	ongoing	Conditions on planning applications to require	Low	Air Quality and Mitigation Guidance incorporated in Crawley Local Plan	ongoing	Document under review - completion due 2019

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	Guidance for Sussex embed in Planning Policy		to develop Area wide Strategies to reduce emissions and improve air quality				damage cost to fund emissions mitigation from developers		referenced to developers in local list		Costs: Low
10	Residential travel plans for major development	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CBC	completed	ongoing	Reduced private vehicle usage – increased uptake of active travel and sustainable transport modes	Individual target set for application	Developments of certain size required to implement Travel Plan	Ongoing	Implemented through Planning process - each application has its own target plan Costs: Low
11	Gatwick Airport Surface Access Strategy 2018 (ASAS)	Policy Guidance and Development Control	Low Emissions Strategy	GAL/WSCC	Completed	2018-2023 (5 year plan)	Key targets: 48% public transport for airport passengers by 2022, 40% rail mode share by 2022 (with aim of 45% by 2030), 42% employees using sustainable modes of transport by 2030 5% year on year increase in bus use by staff and passengers.	Low/Medium	5 GAL published new ASAS in May 2018 year plan setting targets for 2030	ongoing	WSCC working with Gatwick Airport Limited (GAL) on improving surface access to Gatwick Airport through the Gatwick Transport Forum Steering Group in line with commitments set out in the legal agreement between GAL, CBC and WSCC. The New strategy sets out a vision, targets and actions for sustainable access to and from Gatwick. Cost: Medium
12	West Sussex Air Quality Action Plan, "Breathing Better,	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce	WSCC/CBC and joint authorities	completed	ongoing	Regional reduction in emissions and long term pollution concentrations	Medium	Published 2018	ongoing	West Sussex Air Quality Action Plan, "Breathing Better" A joint action plan for the County Council and the District and Borough Councils across West Sussex.

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			emissions and improve air quality								It is a partnership approach to improving air quality in West Sussex, with input from all the joint authorities.
13	Hackney Carriage and Private Hire Vehicle Emissions Policy – Requirement for Low Emissions Taxis	Policy Guidance and Development Control And Promoting Low Emissions Transport	Other policy Taxi Licensing conditions	CBC	2018/19	2019/20	New vehicles and existing vehicles (retrofitted) to be ZEC by 2023. Diesel taxis to be phased out by 2025	Medium CBC license >780 vehicles annually. These will be either 100% electric or a hybrid model. Ultra-Low Emission Vehicles (ULEV). Emits < 75 g/km of CO ₂	Discussions with the Trade	ongoing	Amend current policy to require all new applications vehicles to be < 4 yrs old, Zero emissions capable and meet Euro 6 Emissions The Office for Low Emission Vehicles (OLEV) grants available to specifically for taxis via a 'plug in taxi grant' DfT reductions in the annual vehicle road tax Costs: Low for delivery of policy Cost to trade: medium – offset by OLEV grant/road tax and licence reduction
14	Taxi License Fee Discount Scheme for LEVs	Promoting Low Emissions Transport	Taxi emission incentives	CBC	Completed	ongoing	% uptake	Low (depending on uptake)	Gatwick Cars currently using 5 Tesla Electric vehicle taxis will be adding 2 more in 2019 and planning on 100% hybrid/electric vehicle fleet by 2020	ongoing	Costs: Low
15	Council LEV Vehicle procurement Policy for fleet replacement	Promoting Low Emissions Transport	Vehicle Procurement - Prioritising uptake of low emission vehicles	CBC	Completed	ongoing	Minimum CO ₂ level of < 150 g/kg.	Medium Review 2019/20 to bring to Euro 6 (75 g/km of CO ₂) as minimum. EV where possible	100% uptake for vehicle procurement Parking Services New Nissan Leaf and Nissan e-NV200 (zero emissions) to replace diesel van 2018	Ongoing Review 2019/20 to bring to Euro 6	2019/20 vehicle replacement programme expect to replace both Community warden cars and Port Health Van with EV Costs: High
16	Council staff car loan policy	Promoting Low Emissions	Vehicle Procurement - Prioritising	CBC	completed	ongoing	Modal shift to LEV and EV (zero	Low	100% uptake for staff car loan applications	ongoing	Possible future cut financial support for essential car user

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	Emissions limit for eligibility	Transport	uptake of low emission vehicles				emissions)				allowances to encourage public transport or LEV pool cars Costs: Low
17	Provide/ rent on street space/ land for docking stations for commercial EV Car Club	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	CBC/WSCC/ GAL	2018	2019	Reduction in private vehicle ownership	Low	Still in discussion	Still in discussion	Blue City electric cars between Gatwick and Crawley/Manor Royal/Gatwick Diamond Costs: Low- Medium
18	Town Hall Rapid Charging Point (50 kWh) for electric vehicles	Promoting Low Emissions Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging	CBC	2015	2017/18	kWh of electricity supplied indicating EV usage.	Low/Medium depending on long term uptake of EV	Installation 4 new rapid chargers 2017/18 Town Hall car park – high usage measured since installed. Rapid charger planned 2019 Orchard Street car park.	Ongoing	Rapid Charging Points for Three Bridges Station, Crawley Station and Town Centre to be delivered through Crawley Growth Programme 2019-2022 Costs: Medium
19	CBC Staff Bicycle Loan Scheme	Promoting Low Emissions Transport	Prioritising uptake of low emission vehicles	CBC	2015	ongoing	Modal shift from private vehicle to bicycle	Low (due to low uptake)	1 new loan awarded 2017/18	ongoing	CBC staff loan to buy Bike Costs: Low
20	CBC Staff Bike to Work Scheme	Promoting Low Emissions Transport	Prioritising uptake of low emission vehicles	CBC	2016	ongoing	Modal shift from private vehicle to bicycle	Low (due to low uptake)	8 new applicants 2017/18	ongoing	Bike Hire Scheme CBC/Partnership with Evans Cycle Costs: Low
21	Defra Grant funded Project work to support measures to improve air quality in areas with AQMAs	Promoting Low Emissions Transport	Other	CBC/SAQP	Ongoing	Ongoing	Individually assessed	Individually assessed	Annual grant bid application	ongoing	The specific nature of these projects will vary from year to year dependent on the ideas put forward by the members of the regional partnership to meet the needs of their communities Cost: grant funded contribution

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22	Defra funded AQ project Electric vehicle and Sustainable Transport Event on Manor Royal 2019	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	CBC/SAQP	2018	2019	commitment to procure LEVs	Low (depending on uptake)	CBC/Manor Royal sourcing venue and exhibitors for summer 2019 event	2019/Ongoing to be carried forward as an annual event	Costs: £105,900 grant money covering all SAQP authorities over the 3 project elements
23	Defra funded AQ project in schools	Promoting Low Emissions Transport	Other-educational programme delivered to schools	CBC	2018	2018/19	Modal shift/ Fuel economy/ reduction in vehicle emission from school run	Low/Medium (if results in large behavioural change)	Sustrans consultants engaged to deliver programme	2018/19	Primary schools in Crawley (adjacent to AQMA) AQ/sustainable transport project/anti-idling campaign – run by Sustrans Costs: £105,900 grant money covering all SAQP authorities over the 3 project elements
24	Defra funded AQ project Eco-Audit Scheme/ energy grants for businesses	Promoting Low Emission Transport And Promoting Low Emission Plant	Company Vehicle Procurement - Prioritising uptake of low emission vehicles And Shift to installations using low emission fuels for stationary and mobile sources	CBC/SAQP	2018	2018/19	commitment to procure LEVs And Uptake of energy audit and energy grants	Low (depending on uptake)	Environmental consultants engaged to deliver programme	2019	Business project Eco-Audit offered to SME's Manor Royal - to focus on staff travel, improving plant/machinery, eco driver training and identifying grants to implement suggested AQ/energy improvements. Costs: £105,900 grant money covering all SAQP authorities over the 3 project elements
25	Solar Panel Installation Program	Promoting Low Emission Plant	Shift to installations using low emission fuels	CBC	completed	ongoing	20% Reduction in CO2 Emissions by 2020 100% Reduction in	CO2 Savings from 4 new installations 2018: 14,000 Kg pa 25% reduction in last 5 years	Solar panels installed at CBC properties in 2018: Ifield Drive CC Furnace Green CC Southgate CC Bewbush Pavilion	Ongoing retro fit and new build	2019/20 aim to install at Tilgate Nature Centre, K2 leisure centre, The Hawth Theatre, Waterlea and Millpond Play Centres

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							CO2 Emissions by 2050				Costs: Medium
26	Manor Royal Business Park Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	Crawley Borough Council (CBC)	Due 2018/19	2019	Modal shift/ staff travelling by sustainable means Record number new businesses with travel plans	Low	Guidance Travel pack completed 2018. Planning requirement for Travel plans to be integrated into new development on MR Business District	ongoing	Sustainability officer working with Businesses on Manor Royal and promoting Travel pack Costs: Low
27	School Travel plans	Promoting Travel Alternatives	School Travel Plans	West Sussex County Council (WSCC)	complete	ongoing	Modal Shift %children travelling to school by sustainable means	Low	Increase % Uptake	Ongoing	Helps reduce emissions during morning rush hour Costs: Low
28	CBC Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	CBC	complete	2019/20	% staff travelling by sustainable means	Low	Draft Travel plan produced	ongoing	Costs: Low
29	Easit discount(15 %) on staff commuting on rail and bus - available to CBC and business across Crawley.	Promoting Travel Alternatives	Promote use of rail and bus	Easit/CBC	Completed	ongoing	% staff travelling by sustainable means	Low	Currently, 111 Easit member organisations, 4,848 registered individuals and 3,674. individuals with valid Easit Card across Crawley	Ongoing	Council originally involved in funding the setting up of the scheme Costs: Low
30	Crawley car club scheme with private sector partner	Promoting Travel Alternatives	Personalised Travel Planning	CBC	2016/17	2019/20	Reduction in private vehicle ownership	Low	Procurement due 2018 but delayed launch now due 2019/20	ongoing	Costs: Low
31	Council home-working Policy	Promoting Travel Alternatives	Encourage / Facilitate home-working	CBC	Completed	ongoing	% annual working from home	Low(due to low uptake)	Positive staff uptake (numbers variable)	ongoing	Council home-working Policy Costs: Low

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32	Cycle Crawley campaign	Promoting Travel Alternatives And Public Information	Promotion of Cycling And Via other Mechanisms	CBC	Completed	ongoing	Modal shift	Low	Events, activities and materials that support uptake and promotion of cycling in Crawley.	Ongoing	Undertaken in partnership with the Crawley Cycle Forum Costs: Low
33	Living Streets campaign	Promoting Travel Alternatives And Public Information	Promotion of Walking And Via other mechanisms	CBC	completed	Annual	Modal shift	Low	Annual campaign event for CBC staff (approximately 100 pledges from staff for modal shift)	Ongoing	Information, events, and activities to promote walking amongst council staff and local businesses Costs: Low
34	SAQP airAlert Pollution Warning Service for vulnerable groups	Public Information	Via other mechanisms SMS/ Mobile phone App/ Email	CBC with Sussex Air Quality Partnership SAQP /CBC	completed	ongoing	Uptake: Number of people receiving forecasting alert	Low Awareness raising/Health benefit	Over 800 registered subscribers	ongoing	Costs: Low
35	Sussex Air Website upgrade/ improvement	Public Information	Via the Internet	SAQP	2017	ongoing	Number of views/visits accessed by partners/public to keep up to date with air quality locally.	Low Public Information on Air quality issue	Draft technical specification/service level agreement	2019	Update to the website planned for 2019, subject to resources Costs: Low
36	Clean Air Day, Awareness Raising Event for air Pollution issues	Public Information	Via other mechanisms	CBC/ Crawley Wellbeing/ WSCC	completed	Annual	Engagement and Feedback Behavioural change Modal shift	Low Commitment to reducing air pollution Sign up to Clean Van Commitment/ Living Streets/ Air Alert service	Annual event - content, exhibitors and promotional material planned with sustainability team	ongoing	Awareness Raising Event for air quality issues. Advice and Information on reducing emissions/ air quality impact also provided through WSCC quarterly newspaper, online, radio and digital advertising boards Costs: Low

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37	Breathe Easy Week Awareness Raising Event for air quality issues	Public Information	Via other mechanisms	CBC/ Crawley Wellbeing/ WSCC	completed	Annual	Engagement and Feedback Behavioural Change	Low Commitment to reducing air pollution for better lung health/ Sign up Air Alert service	Annual event organised	ongoing	Awareness Raising Event for Lung health and pollution issues affecting health. Advice and Information on reducing emissions/ air quality impact also provided through WSCC quarterly newspaper, online, radio and digital advertising boards Costs: Low
38	Junior Citizen Educational Programme/ Event	Public Information	Via other mechanisms	CBC	completed	Annual Educational Event	Engagement and Feedback Behavioural change Modal shift	Low Educating future generations for long term impact	Event venue and exhibitors /Trainers signed up	ongoing	Costs: Low

*Target Pollution Reduction in AQMA: estimates of likely pollution reduction in AQMA for measures that have a low impact over a wider area, or benefit other areas such as behavioral change, modal shift or promoting more active lifestyles are often not quantifiable. In cases where specific air quality assessments/modelling is provided, more reliable estimates will be available on a case by case basis.

**Costs - estimates of likely costs:

- Low: <£50k
- Medium: £50k - £200k
- High: >£200k

Emissions Reduction Calculations

The key measures outlined in the plan above are those where both delivery partners and committed funding has been identified and can therefore demonstrate certainty in the delivering of these measures. However, many of these measures are difficult to quantify in terms of emissions reduction and others have not yet received a comprehensive assessment of emissions reductions.

The council recognises that quantification is necessary and therefore more work is needed modelling future emission reduction scenarios to assess if the impact of proposed measures is on target to achieve the 9.7% reduction in NO_x emissions within the AQMA.

To address this, modelling of the potential emissions reduction associated with individual measures needs to be undertaken on a scheme by scheme basis as information becomes available. The key transport measures (Priority 2) proposed within the Crawley Growth programme plan are expected to deliver more targeted reduction in NO_x emissions within the AQMA and more information on emissions reductions assessments will be provided as project clarity is developed. Likewise, Priority 3 measures, which are aimed at building sustainable air quality improvements into future planning and policy, can provide estimates of emissions reductions through modelling or air quality assessments for planning applications. However many of the key measures under Priority 1 (Public Health) which are currently being delivered at both local and County level, such as awareness raising and encouraging behavioural change and modal shift, may not be possible to assess accurately.

Ongoing Assessment of Progress

LAQM.TG(16) recommends that the success of the AQAP is dependent upon the on-going assessment and reporting of progress in the implementation of measures through the annual LAQM report (ASR).

In order to achieve more ambitious targets of NO₂ emissions reduction, some measures rejected from the original list of action plan options, may be brought forward subject to feasibility study. Adoption of Euro VI emission standards for all LGVs and HGV's through implementation of a Clean Air Zone on the Manor Royal Business district has the potential to reduce emissions directly within the AQMA. Assessment of these reductions should be updated and reviewed as part of a feasibility study, subject to funding.

Appendix A: Response to Consultation

Table A.1 – Summary of Responses to Consultation and Stakeholder Engagement on the AQAP

Consultee/Category	Response	comment
Crawley Forward Planning	Crawley Borough Council's Air Quality Priorities: This section should identify priorities for whole borough & links with other strategies, particularly relating to sustainable transport; then show how action borough-wide (or further afield) will positively impact on the AQMA. This could then identify which of those actions have the most beneficial impact on the worst problem areas of the AQMA.	The key priorities section will be amended to reflect these comments
Crawley Forward Planning	Source Apportionment Study: Re managing/prioritising AM peak flow. Can the signalisation of this junction help to address this?	This was one of the measures –WSCC Transport planning input
Crawley Forward Planning	Quite a few of the actions are already taking place, or are identified and funded within Crawley Growth Programme to take place within the next few years. There are also projects underway or committed which GAL is funding through the Passenger Levy, which will help the AQMA. So it might be	Crawley Growth Programme key part of the Action plan with short to medium term actions to improve infrastructure / influence model shift. Progress will be updated and reported annually in ASR

	<p>possible to restructure the table to have a section on what's already happening/committed (with the key action being to monitor the effect of it all on the AQMA) + then identify the other additional actions which can support these projects (particularly encouraging modal shift, encouraging people to use the new infrastructure & services already being provided – all the actions/training/travel plans/corporate 'sticks' with the projects.</p>	
<p>Crawley Forward Planning</p>	<p>There is requirement to handle the additional capacity for Forge Wood, so should really be assessed in all scenarios. There is potential extra lane on the SW quadrant of the roundabout which WSCC has in its Capital Programme, so action plan could identify whether this would be beneficial or not.</p> <p>The roundabout will be signalised to cope with extra capacity and therefore the increase in emissions has to be added to the existing. Signalisation may have a detrimental effect but is necessary. Action to reduce traffic flow impact area...'</p>	<p>May need more detailed modelling. Discussions with WSCC</p>
<p>WSCC Transport Planning</p>	<p>Could more commentary be included to explain why such large area designated for the AQMA when hot spots are very</p>	<p>Explanation for wide designation AQMA boundary to give a focus to the traffic</p>

	<p>close to Hazlewick junction itself. May give the impression that the problem is worse (in a statutory sense) than it is. Other AQMA designations – e.g. Chichester appear to be more closely focused on the specific locations where the hotspots are.</p>	<p>corridors that are contributing to the problem at the junction</p>
<p>WSCC Transport Planning</p>	<p>The Amey LTPS identified the Hazelwick junction as requiring mitigation through carriageway widening over and above the Forge Wood development signalisation/capacity changes. Any measures being considered need to understand the implications in traffic terms on this junction in relation to delivering the Crawley 2030 Local Plan. Use of the Crawley Transport Model in the modelling assumptions should take the traffic growth into account.</p>	<p>Noted</p>
<p>Manor Royal Business District Executive Director MRBD</p>	<p>It would be beneficial to look to see how the action plan links to other plans e.g. Manor Royal BID Business Plan (2018-23), Crawley Growth Programme etc to help create credibility and a route to delivery.</p>	<p>To be investigated with relevant departments/steering group</p>
<p>Manor Royal Business</p>	<p>I have suggested adding an additional column to the AQMA</p>	<p>Noted</p>

<p>District Executive Director MRBD</p>	<p>to capture “Economic Benefit”. The reason is this is what the Coast-to-Capital LEP are interested in and what businesses (arguably) are most interested in. That way with a simple measure of Economic Benefit (ie the benefits to the economy of realising the action either in terms of saved cost/time, more jobs, more businesses etc)</p>	
<p>Manor Royal Business District</p>	<p>What are the implications for businesses of being subject to an AQMA and for us / the Council of not achieving the targets set out in the Action Plan?</p>	<p>Local authority will use its powers and also work in partnership with other organisations in pursuit of the air quality objectives</p>
<p>Manor Royal Business District</p>	<p>Re Low Emission Strategy for Manor Royal: I'm uncertain of the benefit of this. I understand the eco-driver training may be of some interest but not sure how popular it will be. Not sure either of the Low Emission Strategy sign up benefit unless it is backed up by something else e.g. some form of recognition scheme.</p>	<p>Need to determine more evidence of interest from business community/ Feasibility study</p>
<p>Manor Royal Business District</p>	<p>Is there any funding available to help us achieve the plan?</p>	<p>Funding streams to be investigated such as Defra AQ Grant</p>
<p>Metro Bus</p>	<p>Happy to assist with development of AQAP. Can provided</p>	<p>Invited to attend steering group</p>

Business Development Manager	update on progress on reducing emissions of current fleet, also work to move to hydrogen fuel cell zero emission technology which believe is key to improving air quality in the community	
Coast to Capital Head of Strategy and Policy	Don't have capacity to join Steering Group but keen to hear more about the work as it progresses. Currently developing new Strategic Economic Plan for the region and see this as key opportunity for protecting it and investing sustainably in the region's environment. Will discuss with head of EH to see how might represent action plan measures in our economic strategy.	Tony Baldock to update
General	<i>The dominant source of pollution affecting Crawley is road traffic...</i> Gatwick airport is probably the biggest generator of air pollution in Crawley Borough (i.e. it's located in Crawley, but the pollution goes elsewhere).	Gatwick airport contribution is recognised as an area source in the borough. Road traffic emissions impact at hot spots to exceed NAQS at locations with relevant public exposure
General	'Target Pollution Reduction in the AQMA' is an 'additional' requirement, when would assume this should actually be the key priority for the study. Table 3 does prioritise this, but it almost appears to be an additional consideration rather than	This will be corrected and clarified as a key target in final report

	a key one as worded.	
General	There is quite a lot of detail on historic reports. Could these be summarised more succinctly to provide the background detail to the AQMA?	This will be summarised for final report
General	Source Apportionment Study, third para: Is it possible to clarify why there is such a broad range for HGVs (9-30%) also 5-20% in the next.	Clarified with consultants modelling traffic flows by category – the range accounts for flows HGVs on different approach roads to roundabout

Appendix B: Reasons for Not Pursuing Action Plan Measures

Table B.1 – Action Plan Measures Not Pursued and the Reasons for that Decision

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
Policy Guidance and Development Control	Low Emission Strategy for Manor Royal	<p>Developing low emission transport strategy, planning requirements, eco-driving training etc would be voluntary for businesses. However, not enough evidence of commitment to Low Emission Strategy for Manor Royal from operators.</p> <p>Resource issue if to be done effectively and have any real impact. Would need dedicated Travel Adviser / Coordinator role with some money behind it.</p> <p>May be opportunity to look at this as part of the review of Manor Royal Transport study. Possible link with easit, Living Streets Walking Audits, Sustrans. Feasibility study to assess benefits for future inclusion in AQAP</p>
Policy Guidance and Development Control	Manor Royal Clean Air Zone	<p>Number of vehicles converted or replaced to CAZ compliance: Not considered commercially or financially feasible due to enforcement/ costs to business and lack of interest from the business district operators.</p>

		<p>Modelling evidence does not suggest there is likely to be a business case for a CAZ given that it is unlikely to be possible for early implement and annual mean concentration at worse receptor expected to be 10% below 40ugm³ limit level in next 5 years.</p> <p>Feasibility study to assess benefits - may be future opportunity if convincing Cost-benefit appraisal and incentives- as well as large promotional effort would be required. Resource issue, as above, if to be done effectively</p>
<p>Alternatives to private vehicle use</p>	<p>Bus/Rail based Park and Ride</p>	<p>WSCC have no live proposals for new park and ride facilities and question the feasibility and business case for this based on what market it would serve and where it would be located/land allocation.</p> <p>The compact urban nature of the town and good bus services make the benefit of this this to the AQMA and more generally unconvincing at this stage.</p>
<p>Freight and Delivery Management</p>	<p>Designated routes for Industrial estate delivery vehicles</p>	<p>Manor Royal BID not sure this is practical. Main routes from Manor Royal business district to M23 and Crawley town centre pass through the AQMA/ Hazelwick roundabout.</p> <p>There are no other practical routes for direct access to</p>

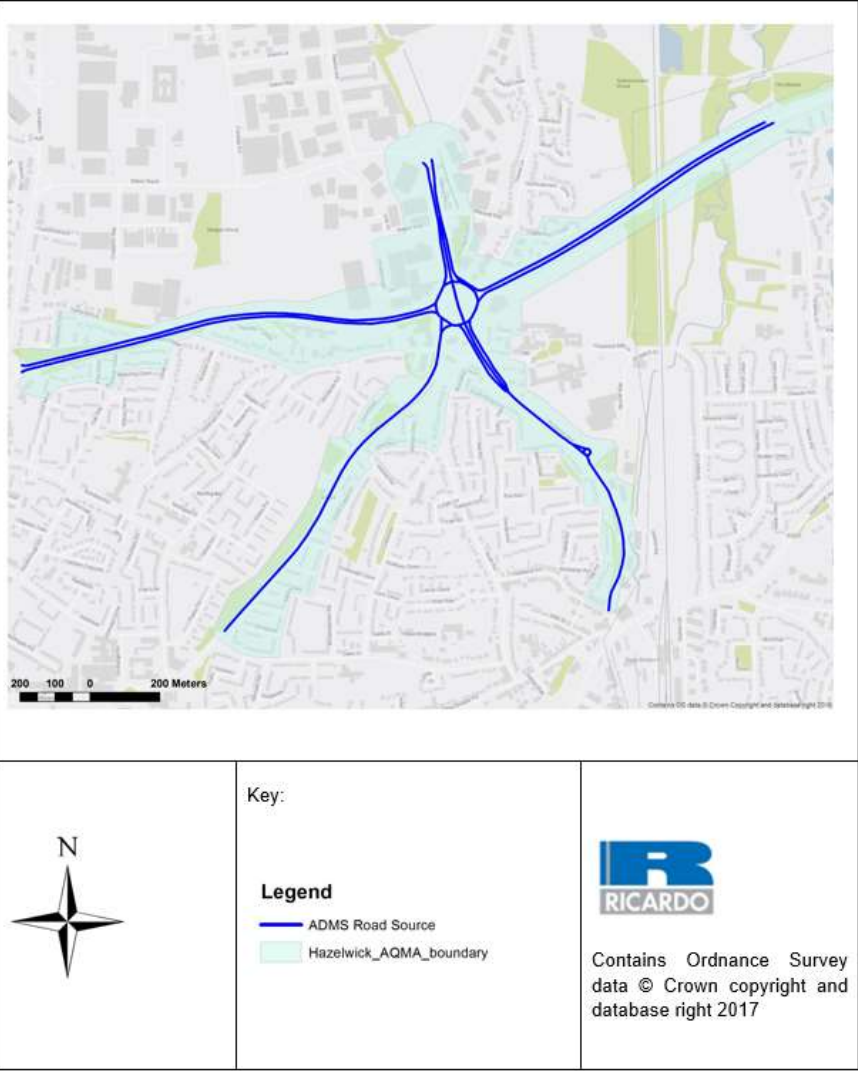
		M23/town centre without going via residential streets not suitable for HGVs.
Promoting Low Emission Transport	Priority parking for LEV's	Currently no commitment to this proposed measure in the West Sussex Parking Standards review.
Traffic Management	Reduction of speed limits	<p>This would need evidence that speed is contributing directly to an air quality hotspot problem. Although sections of the AQMA A2011 Crawley Avenue are national speed limit/70 mph, there are no direct receptor exceedances adjacent to these sections, so there is unlikely to be justification for speed limit changes on air quality grounds.</p> <p>In addition, WSCC speed limit policy makes no allowance for speed limits to change where air quality is poor. Any such change would require case by case approval by the cabinet member for highways, and police consultation.</p> <p>Advisory speed limits may be more acceptable and could be considered if there is evidence that speed is the problem, but non-standard signs may be needed (requiring DfT approval).</p>
Vehicle Fleet Efficiency	Vehicle retrofitting programmes	No progress in securing funding for implementing vehicle retrofitting programme

Appendix C: Air Quality Modelling of AQAP Scenario Measures

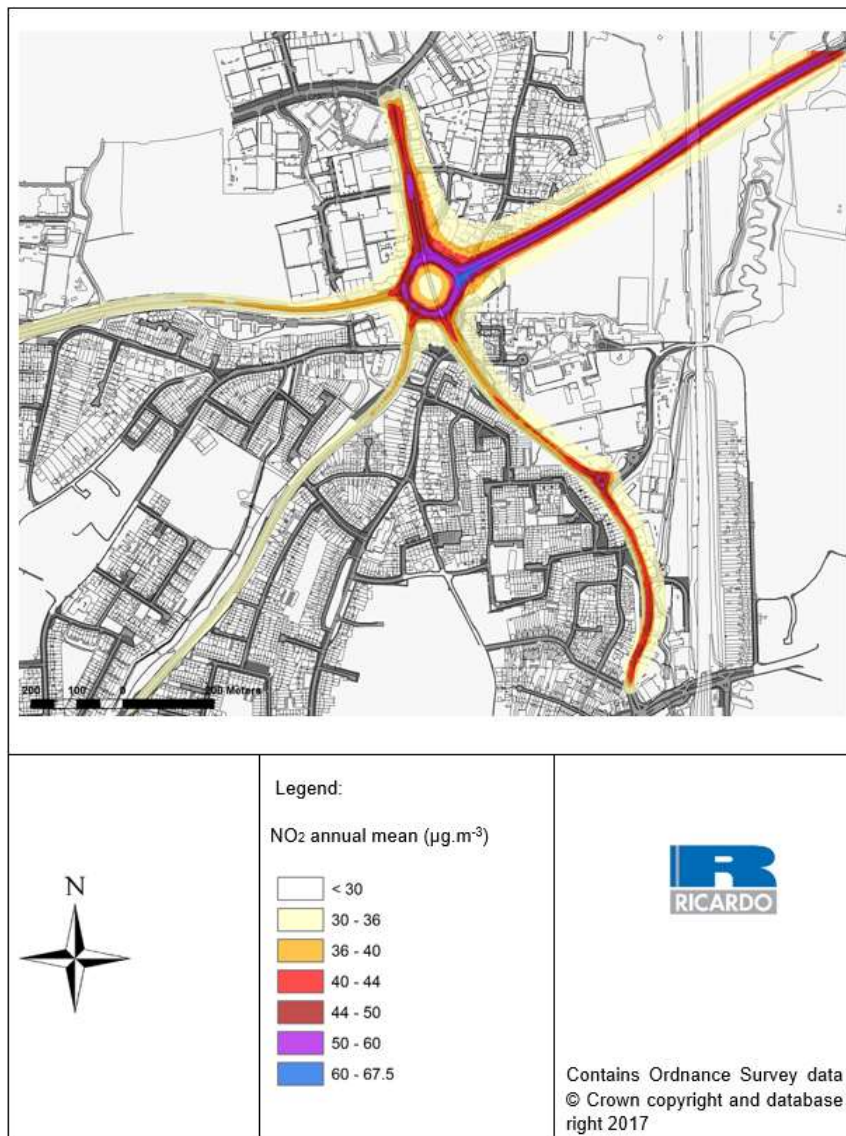
Air quality modelling was undertaken by Ricardo Energy and Environment in 2017 to determine current and future concentrations of NO₂ within the Hazelwick AQMA. The air quality modelling determined baseline concentrations of NO₂ within the AQMA for years 2015, 2018, 2020 and 2022. Baseline modelling infers a business as usual scenario, whereby natural traffic volume growth, vehicle (emission) type changes and any proposed schemes that are scheduled to occur are included in the modelling. These years were then compared to potential AQAP scenario measures that could be introduced to determine the change in concentration exposure at key receptor locations around the AQMA. The aim of the study was to provide the Council with an indication of the potential benefits of pursuing emission reductions through various traffic management strategies in the Hazelwick AQMA.

The study area (Hazelwick AQMA) modelled to determine baseline and scenario pollutant concentrations is presented below.

ADMS modelling domain



Modelled (baseline) NO₂ annual mean concentrations Hazelwick AQMA 2018



Comparison of the modelling results to the 2018 measured concentration data showed inaccuracies in the modelled results with under predicting NO₂ concentrations at the worst case location within the AQMA. WSCC also queried some of the assumptions used in the baseline modelling, specifically whether the impact from the large Forge Wood development had been counterbalanced by continual vehicle fleet improvements, and if traffic volume growth was based on the Crawley Transport Model which would have included planned development identified in the Crawley Local Plan. However, a summary of the results are included here for reference, and to indicate potential reductions in emissions that may be achieved.

Scenario 1- Vehicle Volume Reductions (2018)

Scenario 1 assessed a hypothetical reduction in total vehicle volumes of 10% and 20% in 2018. The results indicated that at the worst case receptor a maximum reduction in annual mean NO₂ of 1.5ug/m³ could be achieved with a 10% reduction in traffic; and a maximum reduction of 3ug/m³ with a 20% reduction in traffic. The results indicate that although there is a significant reduction in concentrations, NO₂ concentrations are still likely to be within +/- 10% of the NAQS objective level.

Feedback from Steering Group on Scenario 1

A 20% reduction in vehicle volumes is very ambitious. DfT report: Sustainable Travel Towns, saw a 9% reduction in car driver trips between 2004 and 2008 across Darlington, Peterborough and Worcester which was the 'gold standard' at the time, so 5% and 10% may be a more appropriate target. More discussion of how achievable these scenarios are likely to be would be helpful. A 10% reduction is likely to be very challenging, a 20% is likely to be unrealistically ambitious.

Scenario 2 - Manor Royal Clean Air Zone

Scenario 2 assessed the potential impact of implementing a policy to incentivise the uptake of Euro VI vehicles for LGV and HGV drivers at the Manor Royal business district in the future years 2020 and 2022. These years were selected due to likely time such a programme would be in place to influence the fleet changes estimated for this scenario. The emissions calculations for this scenario assumed that 50% of the projected LGV and HGV fleet split that would be pre-Euro VI traffic in each future year become Euro VI compliant.

The maximum decrease in predicted annual mean NO₂ concentrations in 2020 is 0.6 µg.m⁻³ and in 2022 is 0.4 µg.m⁻³, both at the worst case receptor. The changes in NO₂ concentrations in 2020 and 2022 are likely to be significant enough to reduce the concentrations to be below the AQS objective.

Feedback from Steering Group on Scenario 2

A feasibility study would be needed to explore this – how it would work, benefits, unintended consequences, enforcement, cost, acceptability etc.

The modelling evidence does not suggest there is likely to be a business case for a CAZ given that it is unlikely to be possible to implement this before 2020 and by this point an annual mean concentration of 36 µg/m³ is predicted at the worst receptor location which is within 10% of the 40µg/m³ limit level.

Feasibility study to assess benefits - may be future opportunity if convincing Cost-benefit appraisal and incentives- as well as large promotional effort would be required. Resource issue, as above, if to be done effectively

Scenario 3 - Manor Royal Clean Air Zone

Scenario 3 provided a very simple indicative representation of how signalisation of the roundabout leading to reduced average speeds when driving around the roundabout may affect NO₂ concentrations at nearby receptors. Traffic travelling around the roundabout currently have average speeds of approximately 40kph (25 mph). The scenario modelled vehicle emissions based on a 10 kph reduction in average speeds on the roundabout road links.

The modelled results indicated that in 2018 a reduction in average speeds could lead to NO₂ annual mean concentrations exceeding of the 40 µg.m⁻³ objective at the worst case location.

The report cautioned that these results should be considered as purely indicative in demonstrating that a reduction in average speeds will increase vehicle emissions and hence annual mean NO₂ concentrations at nearby receptors. Road links approaching the roundabout may also be affected by this type of traffic management measure, but have not been simulated in the model. More detailed analysis of the impact of signalisation of the roundabout could be conducted by combining traffic microsimulation model outputs with detailed dispersion modelling.

Feedback from Steering Group on Scenario 3

The modelling of scenario 3 for the impact of Signalisation at the Hazelwick roundabout was questioned by WSCC who considered the representation of signalisation by modelling speed reductions of 10kph on the roundabout was an over-simplistic and made no attempt at identifying the more precise cause of the high concentrations at the worst case location on the east bound carriage way of the A2011.

It was recommended that the scenario should look in more detail at the traffic conditions at the worst case location adjacent to the east bound carriageway where there are high volumes of traffic accelerating up the east bound carriageway to the M23. In addition

there is queuing traffic on the west bound carriage-way. The contribution from these two sources should be more closely examined, both in terms of their contribution to background levels, and if there is assumed there is fall off with distance for emission exposure, then it is more likely that east bound traffic is causing the problem. Therefore then effect on emissions by changing vehicle speeds associated with signalisation of the roundabout, would be less significant.

Appendix D: Calculated Reduction in Road NOx Emissions

The required reduction in emissions has been calculated in line with Technical Guidance LAQM.TG16 Chapter 7 (Box 7.6). It is based on the required reduction in the road NOx concentration at the worst-case relevant exposure location required to meet the 40µg/m³ annual mean objective for NO₂.

The measured NO₂ at the worst-case relevant exposure location in 2017 was 42µg/m³

Step 1: Obtain the local background concentrations of NO₂ for 2017. This is 19.3µg/m³ from the background maps (see para 7.68).

Step 2: Use the NOx to NO₂ calculator (see para 7.86) to obtain the road NOx concentration that equates to the 42µg/m³ NO₂, which in this example is 49.3µg/m³.

Step 3: Calculate the road NOx concentration required to give a total NO₂ concentration of 40µg/m³, i.e. the annual mean objective (road NOx-required). This can be done using the NO₂ from NOx calculator by entering a total NO₂ concentration of 40µg/m³ along with the local background NO₂ concentrations. The calculator gives the road NOx-required concentration which in this case as 44.5µg/m³.

Step 4: Calculate the road NOx reduction to go from the road NOx-current to the road NOx-required. In this case the road NOx reduction is 4.8µg/m³ (49.3 minus 44.5µg/m³), which represents a 9.7% reduction in road NOx (4.8/49.3 as a percentage).

Appendix E: Terms of Reference for AQAP Steering Group (2018)

Title	Air Quality Steering Group
Contact officers	Tony Baldock – Environmental Health Group Manager Gill Narramore – Senior Environmental Health Officer
Overall objective of the group	To work together with the common goal of seeking to improve the air quality in Crawley through behavioural, strategic and infrastructure change to ensure that the level of pollutants (nitrogen dioxide and particulates (PM10) are in line with national air quality objectives and that this work supports the principles of sustainable development.
Purpose of the group	To oversee the development and implementation of an effective local Air Quality Action Plan for Crawley.

<p>Objectives</p>	<p>The Steering Group will collaborate to identify:</p> <ul style="list-style-type: none"> • If there are existing programmes in other areas that will contribute to emissions reductions (or increases) that should be accounted for within the Air Quality Action Plan (AQAP). • What may influence the local pollution situation in the near future (i.e. 5 to10 years); • The future trends that are likely to contribute (regional emissions trends as well as local factors); • If there is sufficient information to clearly define effective measures; • If emissions will reduce sufficiently to achieve air quality objectives in the next 5 years, as a result of measures already in place; • Whether it is appropriate to develop a generic set of measures, or whether locally derived measures targeting local hotspots is a preferred emissions management option – or a combination of both; • If traffic management interventions are required.
<p>Terms of reference</p>	<ul style="list-style-type: none"> • The Air Quality Steering Group (the Group) will work together to ensure the review and implementation of the Air Quality Action Plan (AQAP). • Membership will comprise of officers of Crawley Borough Council and elected Councillors (see Membership below). The group will co-opt other members onto the group as and when considered necessary and appropriate. • Governance arrangements for the Group will sit with The Corporate Management Team (CMT) –

	<p>the Group itself will have no voting rights. The Group will make recommendations to the Executive as and when decisions are required (including commissioning decisions) and will report the progress of its work by means of updates at future CMT meetings as appropriate.</p> <ul style="list-style-type: none"> • The Group will use the air quality data from the current monitoring regime to provide an objective framework for monitoring and for guiding its actions and recommendations, focusing on those areas with greatest exceedance with regard to air quality objectives. • The Group will endeavour to work within and complement existing national and local policy frameworks such as the Local Plan, Transport and Carbon Plan, etc. • The Officer members of The Group will explore any funding opportunities and recommend any commissioning decisions to CMT. • In order to review and implement the AQAP, The Group will assess the work already completed or in progress across the Borough with regard to air quality. • The Officer members of the group will link with Sussex Air Partnership and other groups across the County with a view to sharing good practice with respect to air quality management. <p>Engaging the community</p> <ul style="list-style-type: none"> • As part of the delivery of the AQAP, Officer members of the Group will establish a dialogue with community groups to understand existing
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	<p>concerns or perceptions regarding air quality and to explore a means of dealing with those concerns.</p> <ul style="list-style-type: none"> • Opportunities will be taken to develop community engagement initiatives and publicity related material.
<p>Membership</p>	<p>Core membership:</p> <ul style="list-style-type: none"> • Two elected members of Crawley Borough Council and The Portfolio Holder for Environment and Sustainability and Portfolio Holder for Planning and Regeneration. • Two elected members of West Sussex County Council (WSSCC). • Representatives from the following Crawley BC Services <ul style="list-style-type: none"> ○ Environmental Health ○ Planning & Development Control ○ Sustainability • Representatives from the following West Sussex County Council Services <ul style="list-style-type: none"> ○ Transport Planning ○ Highways ○ Public Health <p>Potential Co-optees</p> <ul style="list-style-type: none"> ○ Representatives from the Environment Agency ○ Representatives from Public Health

	<p>England</p> <ul style="list-style-type: none"> ○ Representatives of Town and Parish Councils as appropriate. ○ Local community groups, businesses, schools as appropriate.
Subgroups	<p>The Air Quality Steering Group may from time to time establish Sub Groups to focus on specific issues or identified geographical areas of concern which will then report back to it. Membership of these Sub Groups will be drawn from those listed above.</p>
Operation	<p>The Air Quality Steering Group will report its findings to the Corporate Management Team (CMT) by update reports/submitting minutes and Cabinet if required. CMT will be asked to endorse any recommendations from the Air Quality Steering Group.</p>
Meeting format	<p>Meeting frequency: The Group to meet quarterly (or more often as issues demand). The meetings are not public meetings to which the public are invited or permitted to attend. Separate public meetings may be held to engage with communities on specific issues or projects and / or representatives of the Steering Group may attend other public meetings to do so.</p>

Glossary of Terms

Abbreviation	Description
AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQS	Air Quality Strategy
ASR	Air quality Annual Status Report
CBC	Crawley Borough Council
CGP	Crawley Growth Programme
CAZ	Clean Air Zones
Defra	Department for Environment, Food and Rural Affairs
DFT	Department for Transport
EA	Environment Agency
EFT	Emissions Factor Toolkit
EPAQS	Expert Panel on Air Quality Standards
EU	European Union
GAL	Gatwick Airport Ltd
GP	General Practitioner
GPS	Global Positioning Systems
HGV	HGV Heavy Goods Vehicle
KS2	Key Stage 2
LAQM	Local Air Quality Management

LEP	Local Enterprise Partnership
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
LPTS	Local Plan Transport Strategy
MR BID	Manor Royal Business/Industrial District
MOVA	Microprocessor Optimised Vehicle Actuation (traffic light control system)
NAQS	National Air Quality Strategy
NPPF	National Planning Policy Framework
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles
PHE	Public Health England
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
RTPI	Real Time Passenger Information
SAQP	Sussex Air Quality Partnership
TBC	To be Confirmed
WHO	World Health Organisation
WSCC	West Sussex County Council
ZEC	Zero Emission Capable

References

1. Crawley Local Plan 2015-2030
2. Crawley Borough Council –Source Apportionment at Hazelwick AQMA 2016 (Ricardo Energy & Environment)
3. Crawley Borough Council Draft Air Quality Action Plan Report 2017 (Ricardo Energy & Environment)
4. Crawley Borough Council Annual Status Report (2018)
5. Crawley Borough Council Local Plan Transport Strategy 2014
6. Gatwick Airport Surface Access Strategy (2018)
7. LAQM – Policy Guidance (PG09)
8. LAQM – Technical Guidance (TG16)
9. National Planning Policy Framework
10. PHE Estimating Local Mortality Burdens Associated with Particulate Air Pollution (2014)
11. PHE Guidance: Estimation of costs to the NHS and social care due to the health impacts of air pollution (2018)
12. Royal College of Surgeons Every breath we take: the lifelong impact of air pollution (2016)
13. Sussex Air Quality Partnership: Air Quality and Emissions Mitigation Guidance
14. West Sussex Transport Plan 2011-2026