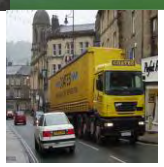
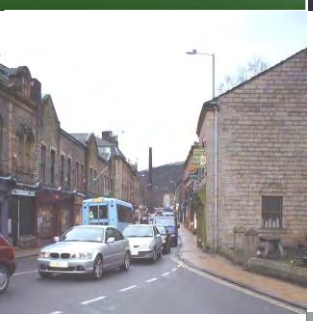




Calderdale Council

Calderdale Air Quality Action Plan

A requirement under Part IV of the Environment Act 1995

AQMA No.1: A629 Huddersfield Road (Salterhebble Hill), Halifax

AQMA No.2: Sowerby Bridge

AQMA No.3: Hebden Bridge

March 2009

EXECUTIVE SUMMARY

The aim of this Action Plan is to identify how Calderdale Council will use its existing powers and work together with other agencies, organisations and the local communities in pursuit of the achievement of air quality objectives in the declared Air Quality Management Areas (AQMA's) within the district.

To date six AQMA's have been declared where assessments showed that the annual mean air quality objective for nitrogen dioxide (NO_2) of 40 microgrammes per cubic metre ($\mu g/m^3$) would not be met by the target date of December 2005. Further Assessments have been completed for the following three areas, each indicating that excess concentrations of NO_2 are derived mainly from vehicular traffic:

AQMA No.1: A629 Huddersfield Road (Salterhebble Hill)

AQMA No.2: A58 Sowerby Bridge

AQMA No.3: A646 Hebden Bridge

The Assessments formed the basis of draft Air Quality Action Plans which went out to public consultation during 2007 and 2008. This final Action Plan takes into account the results of these consultations and sets out a programme of actions to address air quality issues across the District. It is intended to be a working document that will be continually reviewed and updated in order to maintain progress towards those objectives.

The Action Plan identifies a number of key issues that must be addressed if its aims are to be achieved:

- Achieve a better understanding of the causes of poor air quality;
- Raise awareness of air quality issues;
- Identify and engage with stakeholders;
- Develop a package of practical and achievable measures to address poor air quality;
- Indicate relative costs and benefits of these measures;
- Establish a monitoring regime to measure progress.

The programme of actions that the Plan develops may be categorised as follows:

- Specific measures to be pursued within each AQMA;
- General District-wide measures;
- Proposed measures currently deferred or discounted on the grounds of cost, feasibility or acceptability.

Estimates of cost and implementation time scale are shown for each action and a methodology is derived to indicate the potential impact upon air quality. A summary of anticipated improvements in air quality is shown for each AQMA.

The Action Plan identifies that the measures projected to have greatest impact upon poor air quality are those that may only be deliverable over the longer term and that require further, more detailed investigation and discussion before they can be implemented (if at all).

Contents

1 INTRODUCTION

The main reason for tackling poor air quality is to address its impact upon health and quality of life. Its effects are felt particularly by the most vulnerable members of society such as the very young, the elderly and those already suffering from other health conditions. It is also damaging to the local economy. Poor air quality can result in loss of working days, reduced productivity, increased absenteeism from school and a drain on national health resources.

2 LEGISLATIVE BACKGROUND

Part IV of the Environment Act 1995 places a statutory duty on a local authority to carry out a process of review and assessment of air quality in its area against objectives for eight pollutants, prescribed in the Air Quality (England) Regulations 2000 and subsequent amendment (2002). One such objective is that the annual mean level of nitrogen dioxide (NO_2) should not exceed or be likely to exceed 40 microgrammes per cubic metre ($\mu g/m^3$) as at December 2005. Where it is considered that an air quality objective will not be achieved by the target date, the local authority must declare an Air Quality Management Area (AQMA) relevant to that pollutant and area of its district.

Where an AQMA has been declared section 84(2)(a) of the Act requires the local authority to prepare a Further Assessment Report of the existing and likely future air quality and of the respects in which it appears that the objective will not be met. Sections 84(2)(b) and (3) further require the preparation of a written Air Quality Action Plan (AQAP) in pursuit of the achievement of the air quality objective within the AQMA and Schedule 11 of the Act requires the local authority to undertake public consultation on this Action Plan. The contents of the AQAP should reflect the statutory Local Air Quality Management Policy Guidance (LAQM.PG(03) and LAQM.PG(A)05) and the non-statutory guidance of the National Society for Clean Air ('Air Quality Action Plans: Interim Guidance for Local Authorities' and 'Air Quality: Planning for Action' (June 2001). Section 84(4) of the Environment Act permits the Council to revise the action plan from time to time.

3 CALDERDALE AIR QUALITY MANAGEMENT AREAS

A series of reports discussing and assessing air quality across Calderdale have been published and remain available for inspection on the Calderdale Council web-site and at the Council's offices at Northgate House, Halifax.

To date six AQMA's have been declared (Map 1) where assessments showed that the annual mean air quality objective for nitrogen dioxide (NO_2) of 40 microgrammes per cubic metre ($\mu g/m^3$) would not be met by the target date of December 2005. These are:

AQMA No.1: A629 Huddersfield Road (Salterhebble Hill)

AQMA No.2: A58 Sowerby Bridge

AQMA No.3: A646 Hebden Bridge

AQMA No.4: A646 Luddendenfoot

AQMA No.5: A58 / A6036 Stump Cross

AQMA No.6: Brighouse town centre

Further Assessments of air quality have been undertaken at Salterhebble, Sowerby Bridge and Hebden Bridge, each indicating that excess concentrations of NO_2 are derived mainly from vehicular traffic. The Assessments formed the basis of draft Air Quality Action Plans

for each of these areas, which went out to public consultation during 2007 and 2008. This Action Plan incorporates the previous draft documents, including the results from each consultation, and sets out a practical programme of actions that may contribute to achieving air quality objectives across the District.

4 EXISTING POLICIES AND STRATEGIES THAT ADDRESS AIR QUALITY

4.1 West Yorkshire Local Transport Plan (LTP2)

Road transport is a major source of local air pollution, particularly in urban areas, and road traffic accounts for a major part of the total emissions of NO_2. Guidance from DEFRA recommends that where road transport and traffic emissions are the largest single contributor to pollution in the AQMA, local authorities are advised to co-ordinate AQAPs with the Local Transport Plan (LTP).

The second West Yorkshire Local Transport Plan (LTP2) has been prepared by the five district authorities and Metro, the Integrated Transport Authority, and sets out a five-year strategy for the co-ordination and improvement of transport (2006-2011). It contains five 'shared priority' objectives: delivering accessibility; tackling congestion; safer roads; better air quality; and improving the quality of the street environment.

The air quality strategy comprises the following elements:

AQ1 Traffic demand management measures, focusing on commuter journeys;

AQ2 Encouraging more sustainable travel;

AQ3 Actions to reduce vehicle emissions; and

AQ4 Measures to adapt to the effects of climate change.

Implementation of these measures will have a significant bearing upon the achieval of air quality objectives. Measures identified to address other priorities may also impact upon air quality, some beneficial but others not so. A process of continual assessment will identify forecast changes in air quality, and schemes and initiatives will be amended accordingly to minimise any negative effects.

LTP Environmental Report

A Strategic Environmental Assessment (SEA) became a mandatory requirement for LTPs in July 2004. The aim of the SEA is 'to provide a high level of protection of the environment and to ensure the integration of environmental considerations, when developing regulations that apply to a number of plans and programmes' (including the LTP).

A set of sixteen SEA objectives has been developed to assess the impact of the developing LTP2 upon the environment. The environmental baseline describes the current and likely future environment and is structured around the SEA objectives, describing the relationship of these objectives to local transport. The baseline information is reviewed annually as part of the SEA monitoring framework to allow any changes in the environment to be identified.

The SEA for LTP2 is included in the LTP Appendices with an Environmental Report and a Non-Technical Summary produced as separate documents (June 2006).

4.2 Replacement Calderdale Unitary Development Plan (August 2006)

The effect of vehicle emissions is an area in need of improvement that cannot be controlled directly through planning legislation. The sustainable development objectives of

the Unitary Development Plan aim to ensure emissions are decreased through the appropriate location of development, a reduction in the need for vehicle journeys and the encouragement of public transport or other means to reduce the need to travel by car.

Where an AQMA is declared, development will be controlled to ensure the air quality is not made worse and the objectives of the associated Action Plan are upheld. Development of a commercial, industrial or traffic generating nature should not result in an unacceptable level of air pollution to the detriment of other land users and public health. Developers will therefore be expected to take proper account of air quality issues in drawing up development proposals in accordance with the following policies:

Policy EP1: Protection of Air Quality

Development which might cause air pollution (including that from modes of transport) will only be permitted if:

- It would not harm the health and safety of users of the site and surrounding area; and
- It would not harm the quality and enjoyment of the environment.

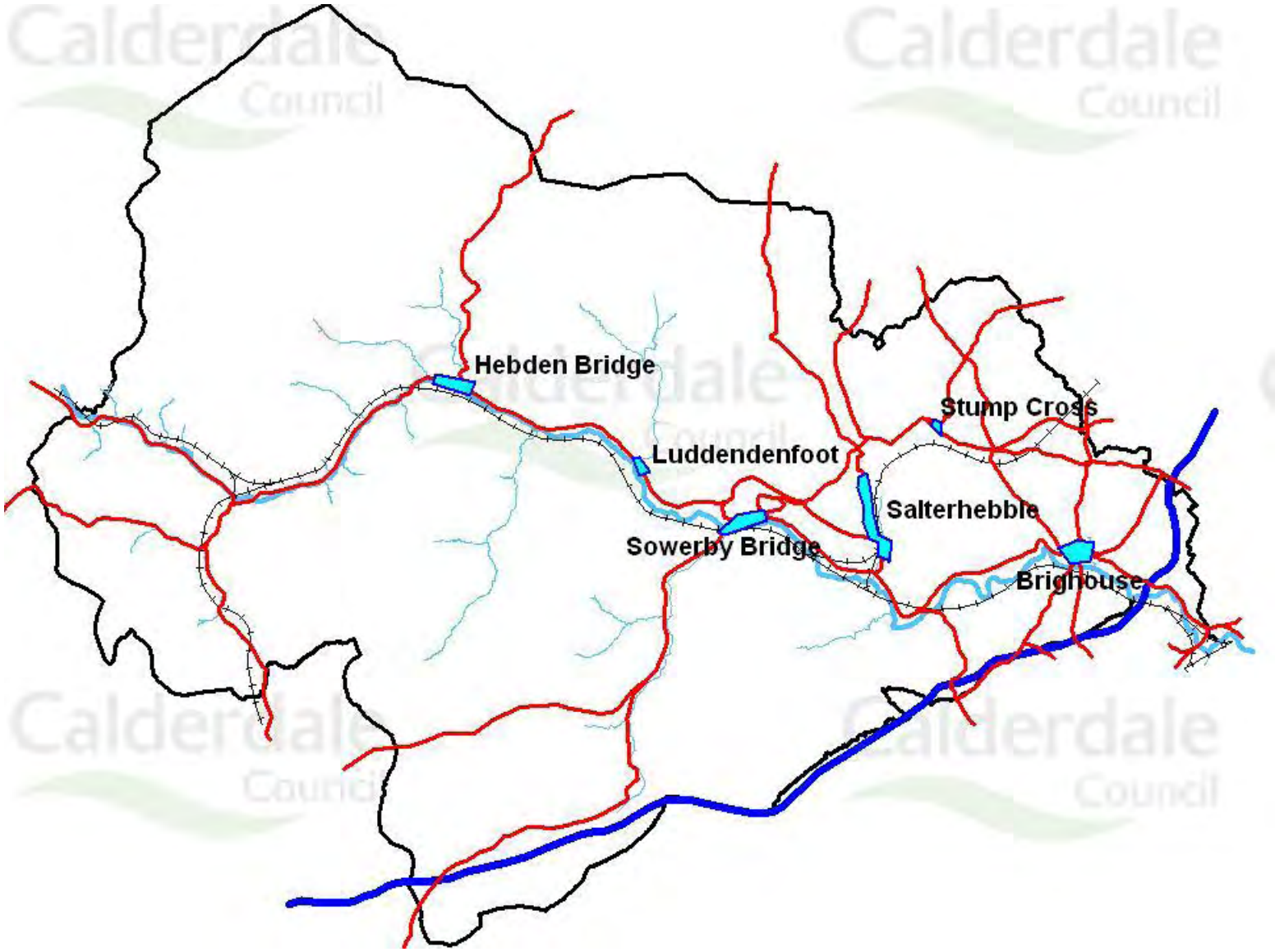
Where permission is granted, appropriate conditions and / or planning obligations will be attached to ensure that the air quality is maintained.

Policy EP2: Development within an Air Quality Management Area

Within a declared Air Quality Management Area development will be permitted provided it can be demonstrated that the pollution levels, if any, would be consistent with the objectives and / or targets of an Action Plan and would not lead to unacceptable pollution levels.

Where a development is likely to have a significant effect on the environment through the creation of air pollution, the applicant will be expected to undertake an Environmental Assessment in accordance with the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

Map 1: Calderdale Air Quality Management Areas



5 ACTION PLAN OVERVIEW

5.1 Aims and Scope

This Action Plan aims to minimise relevant exposure to poor air quality within Calderdale and to pursue / achieve the air quality objective of 40$\mu g/m^3$ of NO_2. There are a number of key objectives to be addressed in order to achieve these aims:

- Achieve a better understanding of the causes behind the current poor air quality with particular reference to patterns of traffic flow and travel demand through and within the AQMA;
- Raise awareness of poor air quality and its causes and effects;
- Identify and engage with stakeholders, including the local community, and seek active participation in a joint search for solutions;
- Identify a package of practical and achievable measures consistent with the aims of the Plan. These may address a broad range of issues such as:
  - ~ Changes to the highway network
  - ~ Travel demand management
  - ~ Travel choice
  - ~ Vehicle technology
  - ~ Planning policy - both to restrict / prevent growth in air pollution and to restrict relevant exposure to poor air quality.
- Indicate levels of costs and benefits in order to enable prioritisation of schemes;
- Establish a monitoring regime to measure progress and indicate areas where corrective action is required.

Proposed actions aimed at reducing NO_2 levels may also lead to a reduction in other pollutants, including the greenhouse gas carbon dioxide, so delivering wider benefits and contributing to the core objectives of the Local Transport Plan and national transport and environmental objectives, in particular road safety and climate change targets.

5.2 Consultation

Following statutory guidance set out in LAQM.PG(03) the Council has consulted widely on this Air Quality Action Plan. Consultative draft plans for each AQMA for which a Further Assessment has been completed have been circulated as follows:

- Salterhebble: eight week period ending September 2007;
- Sowerby Bridge: eight week period ending April 2008;
- Hebden Bridge: eight week period ending April 2008.

The list of consultees includes residents and businesses within each AQMA, ward members, transport operators, DEFRA and other relevant organisations and authorities. The plans were also made available to the general public via the Council's web-based consultation facility 'Calderdale Engage'.

The consultative draft plans outlined a wide range of proposals, including existing measures already being adopted through the Local Transport Plan plus other initiatives for further investigation and development. In preparing this Action Plan responses to these consultations have been considered and judgements have been taken in terms of the practicability of each of the proposals, the existence of available funding, the level of dependency upon other stakeholders to deliver them and their political acceptability at the

present time. A number of proposals have been deferred or discounted, but it should be noted that the Action Plan is a living document and that these and other proposals may be considered for inclusion in future programmes of work.

5.3 Programme of Actions

Section 6 below sets out a programme of actions as follows:

- General District-wide measures to address air quality, including information and awareness initiatives and use of planning controls;
- A package of measures specific to each AQMA;
- Proposed measures currently deferred or discounted on the grounds of cost, feasibility or acceptability.

It also identifies a range of measures already ongoing through the LTP process or other work programmes and which may impact positively upon air quality throughout the District.

Appendix 1 provides a summary of the findings of the Further Assessments for each AQMA. These form the basis for the programme of actions and also develop a methodology for apportionment of traffic emissions.

For each action an estimate of cost, time scale for implementation and potential impact upon air quality is given. A summary of anticipated improvements in air quality is shown for each AQMA.

5.4 Funding

The ability to implement the Action Plan depends upon securing adequate and consistent levels of capital and revenue funding. Transport and highways measures identified within the Plan will be prioritised for funding through the Local Transport Plan process although supplementary funding bids may be required in view of the restricted level of capital available. Other measures such as air quality monitoring, promotional activities and planning controls will require funding through relevant Council budgets. Delivery of a number of actions, such as enhanced bus and rail services or school and workplace travel plans, is dependent upon funding from other partners.

5.5 Implementation and monitoring

Calderdale Council will work jointly on Action Plan measures with relevant partners including Metro, transport operators and local schools and businesses. In order to secure necessary improvements in air quality there must be involvement from all local stakeholders and the Council will actively work to encourage participation from the local community.

Implementation of specific projects will be carefully managed and the effectiveness of the Plan will be measured through ongoing monitoring of air quality, traffic flows and uptake of sustainable travel initiatives.

There will be regular review and assessment of Action Plan proposals to evaluate progress and identify any remedial actions to be taken and this will be reported on an annual basis.

6 CALDERDALE AIR QUALITY ACTION PLAN

6.1 Measures currently ongoing through LTP or other work programmes

Data Collection and Modelling

Traffic monitoring and modelling

There is a regular programme of traffic counts across the district. This includes continuous volumetric counts and an annual modal split survey on radial routes into Halifax town centre. Peak-hour traffic speeds are monitored across the District and particularly with reference to designated 'congestion monitoring' corridors along the A629 and A646. Traffic models have been developed for Halifax (including Sowerby Bridge) and Brighouse that will enable better understanding of traffic flows and allow testing of various scenarios that could address air quality issues

Air quality monitoring and modelling

Calderdale Council continues to monitor air quality within the AQMA's and across the district. The impact of Action Plan measures will be assessed and any additional locations identified where intervention may be required. Air quality modelling, including improved sourcing of emissions, will aim to provide more accurate information and understanding of air quality within the district.

Changing / managing the highway network

Congestion Target Delivery Plan

This plan sets out the actions being followed across West Yorkshire to tackle congestion as part of the Department for Transport's Public Service Agreement Target. It focuses on 13 specified corridors, which include the A629 Salterhebble to Halifax and A646 Mytholmroyd to King Cross in Calderdale. For each corridor there is a target in the form of 'average journey time per person per mile' and an associated Action Plan of measures to address congestion along the route. The aims of the Plan complement those of the Air Quality Action Plan in that traffic congestion results in increased emissions and poorer air quality.

Public transport development and promotion

West Yorkshire Bus Partnership

Metro's Bus Strategy aims to encourage mode switch to bus services by making them more attractive. The West Yorkshire Bus Partnership brings together Metro, the five West Yorkshire Districts and local bus operators to deliver a number of outputs and outcomes:

- Performance Improvement Partnerships seek to improved punctuality and reliability by using 'real time' bus running information to identify and address the causes of delays and cancellations;
- Simplified ticketing and fares, including 'Yorcard' swipe-card technology currently being developed jointly with South Yorkshire;
- Quality corridors – measures include bus priority, improved bus stop facilities and access and investment in modern vehicles.

Metro's Information Strategy complements these initiatives, aiming to promote and increase the use of public transport through the provision of public transport information,

including real time information at bus stops, that is easily accessed and easy to understand.

Metro's Rail Strategy

Metro aims to encourage mode switch to rail by working in partnership with the rail authorities and operators and the five West Yorkshire Districts to make rail services more attractive through measures such as additional peak capacity, improved access to stations, improved integration between bus and rail services and improved quality of facilities and trains.

Calderdale Council continues to press for improvements to rail services and facilities across the District. Peak hour trains on the Caldervale line were strengthened from December 2006 and funding has been secured for refurbishment of Halifax station during 2009. Funding bids have recently been submitted for improvements to Caldervale line stations, including 'park-and-ride' facilities, and for the development of a business case and feasibility studies for a new station in Elland.

Provision and promotion of sustainable travel options

Walking and Cycling Strategies

Walking and Cycling Strategies form part of the West Yorkshire Local Transport Plan. They seek to maintain, encourage and develop the role of walking and cycling as alternatives to the private car.

Calderdale Council is developing Action Plans setting out programmes of practical measures to implement these strategies. These include the development of a network of strategic routes, enhanced local highways infrastructure to remove barriers to walking and cycling and improve safety, and provision of information and training.

Sustainable Travel Plans

A Travel Plan is a package of measures tailored to the needs of an organisation with the aim of promoting sustainable travel choices and reducing car use.

Workplace Travel Plans have been adopted by a number of Calderdale's larger employers, including Calderdale Council, HBOS and the Huddersfield and Calderdale NHS Trust. West Yorkshire Travel for Work Partnership brings together Metro, the five West Yorkshire Districts and the Highways Agency, to support local employers in developing their own travel plans.

School Travel Plans identify the potential for developing safer walking and cycling routes to school or influencing public transport provision, so that parents will choose to let their children walk, cycle or use the bus. They are also about improving the health and fitness of children, improving our environment and developing social skills and independence. All schools are required to develop and adopt a travel plan by March 2010.

Car Share

Car sharing is when two or more people share a car and travel together. There are benefits both to the participants in terms of reduced fuel and parking costs and to the environment in terms of reduced congestion and emissions.

Calderdalecarshare.com has been set up by Calderdale Council and HBOS plc in partnership with liftshare.com, the national car share organisation. It provides a free car

sharing service for all those who live, work and travel in and around Calderdale. The site matches up journeys and also provides advice on public transport.

Additional incentives are available for car sharers travelling to Halifax with discounted parking rates at Cow Green and Eureka car parks.

Travel demand management

Car Parking Strategy

Management and enforcement of car parking forms a part of the Local Transport Plan strategy to tackle congestion, with the aim of encouraging more sustainable travel. Elements include restricting numbers of long stay spaces in urban centres, extending parking control zones, raising parking charges in real terms and controlling the amount of parking provided at new developments.

Calderdale Council adopted Civil Parking Enforcement in March 2008, taking on responsibility for enforcing on-street parking restrictions, and is currently conducting a district-wide parking review, due to report in June 2009. This is examining the link between parking provision and control and issues such as the economic wellbeing of an area, air quality, modal shift, individual independence, access to jobs and services, tourism, investment, congestion and land-use planning. The findings will inform development of a comprehensive parking strategy for the district.

6.2 General District-wide Actions

Stakeholder engagement

Action 1: Local Air Quality Partnership

Calderdale Council cannot address issues of poor air quality in isolation. It is proposed to investigate the formation of a Local Air Quality Partnership which would bring together parties that could influence air quality e.g. transport operators, those that could influence exposure e.g. planners and developers, and those affected by poor air quality e.g. residents and businesses within each AQMA, with the aim of working jointly to seek and implement solutions.

Action 2: Information, education and travel awareness initiatives

Calderdale Council web site already carries information on air quality assessment throughout the District, but the generally low response rate to the Air Quality Action Plan consultations suggests that public awareness of the issues around poor air quality is limited.

The Council proposes to develop a package of information and education presenting the causes and effects of poor air quality in a clear and accessible way that would promote understanding and raise awareness. This could include:

- Ongoing updates of air quality in declared AQMA's;
- General advice on the causes and effects of poor air quality;
- Advice for motorists on cutting pollution;
- Promotion of alternative fuels;
- Voluntary vehicle emissions testing.

A complementary programme of travel awareness initiatives is proposed, with the broad aim of encouraging behavioural changes that may lead to reduced or more efficient car use, greater uptake of sustainable travel alternatives and wider acceptance of air quality management measures:

- Travel awareness initiatives e.g. 'Bike Week', 'Walk to Work Week';
- 'Active lifestyle' / promotions including elements of the Healthy Halifax programme;
- Personalised journey planning – assistance and encouragement for individuals / families to seek alternatives to the private car for their daily journeys, targeted at travel corridors containing AQMA's.

Vehicle emissions

Action 3: Cleaner fuel technology

It is anticipated that Government and European legislation will continue to promote tighter emissions standards for new vehicles and development of cleaner fuels, which should contribute to a general reduction in emissions over time.

The Council will investigate opportunities to support and encourage this process through a number of initiatives such as:

- Adoption / demonstration of best practise in the Council's own fleet management;
- Partnership working on demonstration projects e.g. provision of electric car docking infrastructure, Metro Low Carbon Bus Demonstration Project;
- Incentives for vehicles using alternative fuels e.g. discounted / free parking;
- Setting emissions standards in local bus service contracts.

Freight

Action 4: Freight Quality Partnership

The AQMA Further Assessments identify that although 'heavy vehicles (HGV and PCV) only account for between 6% and 7% of traffic moving through Calderdale's AQMA's they may contribute up to 37% of total NO_2 emissions. This suggests that tackling these emissions should have a significant effect upon air quality in the AQMA's.

The Government's Sustainable Distribution Strategy (1999) provides a framework to deliver a modern, efficient freight transport system. Its objectives include making better use of the transport infrastructure and minimising the impact of freight movements on congestion and pollution. The development of Freight Quality Partnerships, bringing together business and local government representatives, is a key element within this strategy.

It is proposed to investigate the establishment of a Freight Quality Partnership for Calderdale with the aim of developing a more efficient, safer and cleaner means of local goods distribution. Areas of work could include promotion of cleaner fuel technology, emissions standards and agreements on routeing, load sharing and town centre access.

Planning policy

Action 5: Planning controls

Policies EP1 and EP2 of the Replacement Calderdale Unitary Development Plan require developers to take proper account of air quality issues and stipulate that development proposals within an AQMA will only be permitted provided it can be demonstrated that the

pollution levels would be consistent with the objectives and / or targets of an Air Quality Action Plan.

The AQMA Further Assessments identify a need for additional planning guidance with regard to any potential development outside an AQMA but which may influence the movement of traffic through the AQMA. They also identify a lack of guidance on developments within an AQMA that may result in increased exposure to existing air pollution (e.g. change of use to a café or provision of living quarters above a shop).

With regard to planning applications both within an AQMA or influencing the movement of traffic through an AQMA it is proposed that Calderdale Council will:

- Ensure that air quality is fully considered in all Environmental Impact Assessments and Traffic Impact Assessments;
- Fully consider the potential impact on air quality where traffic volumes are anticipated to increase on roads within or adjacent to an AQMA;
- Ensure that new developments are located, designed and managed so that the number of additional vehicle journeys they are likely to generate are minimised;
- Ensure that new development shall, where appropriate, contribute to the provision of transport infrastructure for walking, cycling, public transport and highway improvements e.g. through Section 106 agreements or Community Infrastructure Levy;
- Fully consider potential increased exposure to existing air pollution within an AQMA;
- Ensure that new developments do not lead to the declaration of further AQMA’s.

It is also proposed that the Council will produce guidance aimed at advising developers wishing to submit planning applications for developments in or adjacent to AQMA’s that could adversely affect air quality.

6.3 Salterhebble Hill AQMA / A629 Huddersfield Road corridor

6.3.1 Proposed Actions within the AQMA

Changing / managing the highway network

Action S1: Provision of bus stop lay-by facilities within the AQMA

Bus stops within the AQMA are situated on the highway and thus when a bus needs to stop for boarding and alighting there may be a resulting queue of standing traffic. This is a particular problem for traffic climbing the A629 at Salterhebble Hill where the main inbound stop adjacent to Calderdale Royal Hospital is located immediately through the signalised junction with Dudwell Lane. The resulting stop / start movements, particularly on the inbound climb, exacerbate air quality issues in the area.

It is proposed to investigate provision of full or half lay-by's at bus stops, where practicable, with the aim of removing stationary vehicles from the main carriageway and reducing these effects.

Action S2: Halifax – Huddersfield corridor bus / high occupancy vehicle priorities

Halifax to Huddersfield via Elland is a nominated 'priority corridor' under the Performance Improvement Partnership recently formed between Calderdale Council, Metro and bus operator First. The A629 between Calder and Hebble Junction and Halifax is also a specified 'congestion corridor' within the West Yorkshire Congestion Target Delivery Plan.

Calderdale Council and its partners will investigate a package of measures aimed at improving bus service reliability and punctuality, with the aim of attracting modal shift from car to bus, and also improving the general flow of traffic through the congestion corridor. These include:

- Bus lanes / high occupancy vehicle lanes;
- Junction remodelling and adjustments to signals;
- Traffic light priorities (Automatic Vehicle Location) for buses at signals and crossings.

Potential air quality improvements would result from reduced numbers of cars passing through the AQMA and reduced stop / start movements of buses as they are given priority through traffic signals.

Action S3: Traffic queue relocation and 'pulse' flows through the AQMA

Traffic signals control the Dudwell Lane and Dryclough Lane junctions within the AQMA. There are also pelican crossings at Jubilee Road, Stafford Road and Coronation Road. The signals result in constant stop / start movements along the A629 corridor. Research shows that accelerating vehicles produce higher levels of emissions and the problem is made worse by the high numbers of heavy vehicles (HGV and PCV) accelerating up the steep gradient through Salterhebble Hill AQMA.

It is proposed to investigate the potential to co-ordinate traffic signals such that traffic is held at Calder and Hebble junction, to the south of the AQMA, and then 'pulsed' through the following signals thus reducing stop / start movements on the inbound climb.

Provision and promotion of sustainable travel options

Action S4: Development and promotion of walking and cycling routes

Local traffic originating within Salterhebble Hill AQMA and surrounding areas may be reduced by development and promotion of walking and cycling routes, with a particular focus on access to Calderdale Royal Hospital, Halifax town centre and local public transport facilities.

Calderdale Council has developed the 'Walk It' initiative which was trialled in Halifax in 2007. This provides isochrone maps and pavement signs showing walking times into the town centre and promotes the health and economic benefits of walking.

It is proposed to work with the local community to improve local walking and cycling routes and to promote these through 'Walk It' and other initiatives to encourage more people to walk and cycle short distances rather than using the private car.

6.3.2 Potential outcomes within Salterhebble AQMA

The summary below indicates the potential impact of ongoing and proposed measures and actions within Salterhebble AQMA in terms of potential reduction in NO_x.

Timescale	Low impact	Medium impact	High impact	**Total NO_x ($\mu g/m^3$)**
	NO_x ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	
Ongoing (2009/10)	0.8			**0.8**
Short term (2010/11 – 2011/12)	1.6			**1.6**
Medium term (2011/12 – 14/15)		1.4	4.0	**5.4**
Long term (2015/16 onwards)			13.5	**13.5**
TOTAL				**21.3**
			TARGET REDUCTION	**53.0**

This suggests that even were all the initiatives to be implemented the concentrations of NO_2 throughout the AQMA would remain significantly higher than the annual mean air quality objective for NO_2 of 40$\mu g/m^3$. Although a number of simple, low-cost measures are identified, they may potentially only deliver small-scale benefits albeit in a relatively short space of time. It is the measures categorised as 'long term' that are projected to yield the greatest impact in improving air quality.

The summary should be treated with a degree of caution. The extent of the Salterhebble Hill AQMA is still under review following installation of traffic speed cameras – the results of further monitoring are still awaited. No account is taken of potential reductions in background concentrations of NO_2. It is assumed that general district-wide measures will

have a similar impact upon air quality within all AQMA's, which may not be the case. There is also a degree of uncertainty over the methodology by which projected improvements have been calculated, requiring further research into sourcing of emissions. However it does suggest a need for much higher prioritisation of the measures currently categorised as 'long term' and also the earliest possible consideration of measures currently deferred (see Section 6.6 below).

6.4 Sowerby Bridge AQMA / A58 Rochdale Road corridor

6.4.1 Proposed Actions within the AQMA

Changing / managing the highway network

Action SB1: A58 Sowerby Bridge corridor bus priorities

The Performance Improvement Partnership recently formed between Calderdale Council, Metro and bus operator First ranks the A58 Sowerby Bridge corridor as the number 1 priority bus corridor in Calderdale with the greatest potential for patronage growth.

Calderdale Council and its partners will investigate a package of measures aimed at improving bus service reliability and punctuality, with the aim of attracting modal shift from car to bus. These may include:

- Bus lanes / high occupancy vehicle lanes;
- Junction remodelling and adjustments to signals;
- Traffic light priorities (Automatic Vehicle Location) for buses at signals and crossings.

Potential air quality improvements would result from reduced numbers of cars passing through the AQMA and reduced stop / start movements of buses as they are given priority through traffic signals.

Action SB2: Traffic queue relocation and 'pulse' flows through the AQMA

Traffic signals control the Tuel Lane and Wakefield Road junctions within the AQMA. There are also pelican crossings at Station Road, Town Hall Street, Stanley Street and Bolton Brow. The signals result in constant stop / start movements along the A58 corridor and research shows that this constant pattern of vehicles accelerating from a stand produces higher levels of emissions.

It is proposed to investigate the potential to co-ordinate traffic signals such that traffic is held at points outside the AQMA and then 'pulsed' through the following signals thus reducing stop / start movements within Sowerby Bridge town centre.

Provision and promotion of sustainable travel options

Action SB3: Development and promotion of walking and cycling routes

Local traffic originating within Sowerby Bridge AQMA and surrounding areas may be reduced by development and promotion of walking and cycling routes, with a focus on access to shops and facilities within Sowerby Bridge town centre and to local public transport facilities.

It is proposed to work with the local community to improve local walking and cycling routes and to promote these through 'Walk It' and other initiatives to encourage more people to walk and cycle short distances rather than using the private car.

Sowerby Bridge station is subject of proposals for development as a 'Sustainable Community Eco Station', with major enhancements to passenger facilities. Existing links between the station and the town centre are poor and improvements are a priority.

Calderdale Council is seeking to enhance the strategic cycle network through the Sowerby Bridge area. Improvements to the surfacing of the existing Calder Valley Cycle route along the Rochdale canal corridor are under way and extension to the Calder and Hebble Junction, linking with the Hebble Trail to Halifax town centre, and Brighouse and the

Kirklees boundary is programmed to start during 2009/10. The Council also proposes to investigate provision of an off-road route to Ripponden and Rishworth.

6.4.2 Potential outcomes within Sowerby Bridge AQMA

The summary below indicates the potential impact of ongoing and proposed measures and actions within Sowerby Bridge AQMA in terms of potential reduction in NO_x.

Timescale	Low impact	Medium impact	High impact	**Total NO_x ($\mu g/m^3$)**
	NO_x ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	
Ongoing (2009/10)	0.8			**0.8**
Short term (2010/11 – 2011/12)	1.2			**1.2**
Medium term (2011/12 – 14/15)		2.7		**2.7**
Long term (2015/16 onwards)			13.5	**13.5**
TOTAL				**18.2**
			TARGET REDUCTION	**72.0**

This suggests that even were all the initiatives to be implemented the concentrations of NO_2 throughout the AQMA would remain significantly higher than the annual mean air quality objective for NO_2 of 40$\mu g/m^3$. Although a number of simple, low-cost measures are identified, they may potentially only deliver small-scale benefits albeit in a relatively short space of time. It is the measures categorised as 'long term' that are projected to yield the greatest impact in improving air quality.

The summary should be treated with a degree of caution. No account is taken of potential reductions in background concentrations of NO_2. It is assumed that general district-wide measures will have a similar impact upon air quality within all AQMA's, which may not be the case. There is also a degree of uncertainty over the methodology by which projected improvements have been calculated, requiring further research into sourcing of emissions. However it does suggest a need for much higher prioritisation of the measures currently categorised as 'long term' and also the earliest possible consideration of measures currently deferred (see Section 6.6 below).

6.5 Hebden Bridge AQMA / A646 Burnley Road corridor

6.5.1 Proposed Actions within the AQMA

Changing / managing the highway network

Action HB1: A646 Burnley Road corridor bus priorities

A646 Burnley Road is a nominated 'priority corridor' under the Performance Improvement Partnership recently formed between Calderdale Council, Metro and bus operator First.

Calderdale Council and its partners will investigate a package of measures aimed at improving bus service reliability and punctuality, with the aim of attracting modal shift from car to bus, and also improving the general flow of traffic through the congestion corridor. These include:

- Bus lanes / high occupancy vehicle lanes;
- Junction remodelling and adjustments to signals;
- Traffic light priorities (Automatic Vehicle Location) for buses at signals and crossings.

Potential air quality improvements would result from reduced numbers of cars passing through the AQMA and reduced stop / start movements of buses as they are given priority through traffic signals.

Action HB2: Traffic queue relocation and 'pulse' flows through the AQMA

Traffic signals control the Heptonstall Road, Bridge Gate and Albert Street junctions within the AQMA. There are also pelican crossings on New Road and at Station Road. The signals result in constant stop / start movements along the A646 corridor and research shows that this constant pattern of vehicles accelerating from a stand produces higher levels of emissions.

It is proposed to investigate the potential to co-ordinate traffic signals such that traffic is held at points outside the AQMA and then 'pulsed' through the following signals thus reducing stop / start movements within Hebden Bridge town centre.

Provision and promotion of sustainable travel options

Action HB3: Development and promotion of walking and cycling routes

Local traffic originating within Hebden Bridge AQMA and surrounding areas may be reduced by development and promotion of walking and cycling routes, with a particular focus on access to shops and facilities within Hebden Bridge town centre and to local public transport facilities.

Calderdale Council has developed the 'Walk It' initiative which was trialled in Halifax in 2007. This provides isochrone maps and pavement signs showing walking times into the town centre and promotes the health and economic benefits of walking.

It is proposed to work with the local community to improve local walking and cycling routes and to promote these through 'Walk It' and other initiatives to encourage more people to walk and cycle short distances rather than using the private car.

6.5.2 Potential outcomes within Hebden Bridge AQMA

The summary below indicates the potential impact of ongoing and proposed measures and actions within Hebden Bridge AQMA in terms of potential reduction in NO_x.

Timescale	Low impact	Medium impact	High impact	**Total NO_x ($\mu g/m^3$)**
	NO_x ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	
Ongoing (2009/10)	0.8			**0.8**
Short term (2010/11 – 2011/12)	1.1			**1.1**
Medium term (2011/12 – 14/15)	0.4	2.3		**2.7**
Long term (2015/16 onwards)			13.5	**13.5**
TOTAL				**18.1**
			TARGET REDUCTION	**36.4**

This suggests that even were all the initiatives to be implemented the concentrations of NO_2 throughout the AQMA would remain significantly higher than the annual mean air quality objective for NO_2 of 40$\mu g/m^3$. Although a number of simple, low-cost measures are identified, they may potentially only deliver small-scale benefits albeit in a relatively short space of time. It is the measures categorised as 'long term' that are projected to yield the greatest impact in improving air quality.

The summary should be treated with a degree of caution. The extent of the Hebden Bridge AQMA is still under review following implementation of measures under the District Centre Traffic Review, including implementation of a 20mph zone throughout the town centre. It is assumed that general district-wide measures will have a similar impact upon air quality within all AQMA's, which may not be the case. There is also a degree of uncertainty over the methodology by which projected improvements have been calculated, requiring further research into sourcing of emissions. However it does suggest a need for much higher prioritisation of the measures currently categorised as 'long term' and also the earliest possible consideration of measures currently deferred (see Section 6.6 below).

6.6 Proposals deferred on the grounds of cost, feasibility or acceptability

A number of proposed measures are potentially controversial, requiring more detailed analysis and assessment, significant resource commitments and a degree of political will before they can be successfully progressed.

Public transport development and promotion

Bus 'Park-and-Ride'

Evidence suggests that pre-conditions for a successful Park-and-Ride scheme are congested travel corridors, high levels of travel demand to the town centre and pressure on town centre parking. Implementation costs are high and there are significant operating costs such that even the most successful schemes require ongoing subsidy.

Travel demand management

Road user charging

The Transport Act 2000 gives Local Authorities powers to introduce road user ('congestion') charging and use the revenue generated to improve local transport. Experience from London and Manchester suggests high implementation costs and a lack of public support for such schemes.

Vehicle emissions

Road Traffic (Vehicle Emissions) (Fixed Penalty) Regulations 2002

Under these regulations Local Authorities are able to undertake roadside emissions testing of vehicles and to issue fixed penalties for those that fail. Experience from other authorities indicates that income from fines is inadequate to cover the significant costs of a testing programme which include equipment, police support, training, officer time and publicity. There is also little evidence to show any detectable improvement in air quality through use of these powers.

Low Emission Zone

A Low Emission Zone (LEZ) is a defined area where vehicles only of an acceptable emissions standard can enter and move around. The significant practical and financial implications in establishing and enforcing an LEZ are such that it is more appropriate to a large urban area.

SCHEDULE OF ACTIONS AND INITIATIVES

Key To Schedule

Lead roles / responsibility

LTP SG	West Yorkshire Local Transport Plan - Steering Group
ES	Calderdale Council – Engineering Services
PS	Calderdale Council – Planning Services
EH	Calderdale Council – Environmental Health
Metro	West Yorkshire Passenger Transport Executive
PT Ops	Public Transport Operators
WYTfW	West Yorkshire Travel for Work Partnership
PCT	Calderdale Primary Care Trust
DfT	Department for Transport
RHA / FTA	Freight Operators

Potential Air Quality Impact on AQMA

Low	Will only have an impact if other complimentary measures are implemented
	Assumed saving up to 0.5 $\mu g/m^3$ NO_x
Medium	Likely to have some impact on air quality with or without other complimentary measures
	Assumed saving over 0.5 and up to 2 $\mu g/m^3$ NO_x
High	Expected to have a significant impact without other complimentary measures
	Assumed saving over 2 $\mu g/m^3$ NO_x

Timescale / status

Ongoing	Already underway, or programmed in the current financial year
Short	Planned within the next two years
Medium	Planned between the next two to five years
Long	Between five and ten years but not in a current plan or programme

Cost

Low	Implement as part of a scheme or initiative in the LTP programme, or as a separate scheme or initiative less than £25,000
Medium	Implement as a single or a number of separate schemes or initiatives between £25,000 - £99,000
High	Implement as a separate scheme or initiative between £100,000 - £500,000
Very high	Implement as a separate scheme or initiative over £500,000

Table 1: Measures already ongoing through LTP and other work programmes

Measure	Lead roles	Potential air quality impact	Estimated average reduction in NO_x ($\mu g/m^3$) (All AQMA's)	Timescale	Cost
Data collection and monitoring					
Traffic monitoring and modelling	ES	n/a	n/a	Ongoing	High
Air quality monitoring and modelling	EH	n/a	n/a	Ongoing	Low
Changing / managing the highway network					
Congestion Target Delivery Plan	ES Metro	See measures specific to each AQMA			
Public transport development and promotion					
West Yorkshire Bus Partnership	ES Metro PT Ops	Low	0.3	Ongoing	Medium
Metro's Rail Strategy	Metro PT Ops	High	2.0	Long	High
Provision and promotion of sustainable travel options					
Walking and Cycling Strategies	ES	Low	0.1	Ongoing	Low
Sustainable Travel Plans	PS WYTfW	Low	0.3	Ongoing	Low
Car Share	PS	Low	0.1	Ongoing	Low
Travel demand management					
Car Parking Strategy	ES	Medium	0.7	Medium	Medium

Table 2: General district-wide actions

Action / initiative		Lead roles	Potential air quality impact	Estimated average reduction in NO_x ($\mu g/m^3$) (All AQMA's)	Timescale	Cost
Stakeholder engagement						
1.	Local Air Quality Partnership	ES EH	n/a	n/a	Short	Low
2.	Information, education and travel awareness initiatives	ES WYTfW PCT	Low	0.5	Short	Medium
Vehicle emissions						
3.	Cleaner fuel technology	DfT ES	High	7.0	Long	Very High
Freight						
4.	Freight Quality Partnership	ES RHA / FTA	High	4.5	Medium / Long	Very High
Planning policy						
5.	Planning controls	PS	Low	0.4	Short	Low

Table 3.1: Salterhebble Hill AQMA / A629 Huddersfield Road corridor

	Action / initiative	Lead roles	Potential air quality impact	Estimated potential reduction in NO_x ($\mu g/m^3$)	Timescale	Cost
Changing / managing the highway network						
S1.	Provision of bus stop lay-by facilities within the AQMA	ES	Medium	0.5	Short	Medium
S2.	Halifax – Huddersfield corridor bus / high occupancy vehicle priorities	ES	Medium	0.7	Medium	Very High
S3.	Traffic queue relocation and 'pulse' flows through the AQMA	ES	High	4.0	Medium	Very High
Provision and promotion of sustainable travel options						
S4.	Development and promotion of walking and cycling routes	ES	Low	0.2	Short	Medium

Table 3.2: Sowerby Bridge AQMA / A58 Rochdale Road corridor

Action / initiative		Lead roles	Potential air quality impact	Estimated potential reduction in NO_x ($\mu g/m^3$)	Timescale	Cost
Changing / managing the highway network						
SB1.	A58 Sowerby Bridge corridor bus priorities	ES	Medium	0.6	Medium	High
SB2.	Traffic queue relocation and 'pulse' flows through the AQMA	ES	Medium	1.4	Medium	Very High
Provision and promotion of sustainable travel options						
SB3.	Development and promotion of walking and cycling routes	ES	Low	0.3	Short	Medium

Table 3.3: Hebden Bridge AQMA / A646 Burnley Road corridor

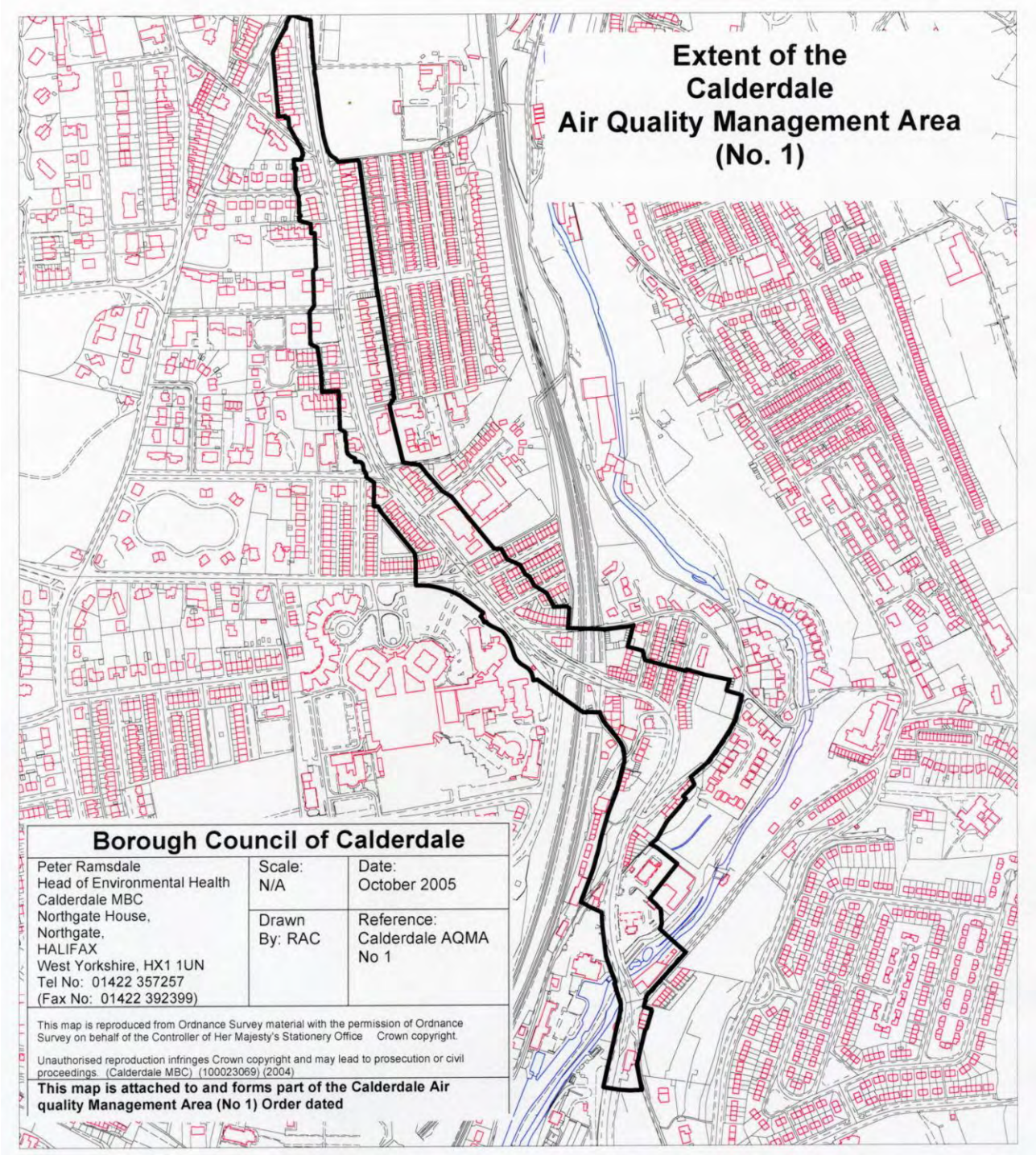
Action / initiative		Lead roles	Potential air quality impact	Estimated potential reduction in NO_x ($\mu g/m^3$)	Timescale	Cost
Changing / managing the highway network						
HB1.	A646 Burnley Road corridor bus priorities	ES	Low	0.4	Medium	Medium
HB2.	Traffic queue relocation and 'pulse' flows through the AQMA	ES	Medium	1.6	Medium	Very High
Provision and promotion of sustainable travel options						
HB3.	Development and promotion of walking and cycling routes	ES	Low	0.2	Short	Medium

Table 4: Proposals deferred on the grounds of cost, feasibility or acceptability

Action / initiative	Lead roles	Potential air quality impact	Estimated average reduction in NO_x ($\mu g/m^3$) (All AQMA's)	Timescale	Cost
Public transport development and promotion					
Bus 'Park-and-Ride'	ES Metro	Medium	0.8	Long	High
Travel demand management					
Road user charging	LTP SG ES	High	2.5	Long	High
Vehicle emissions					
Road Traffic (Vehicle Emissions) (Fixed Penalty) Regulations 2002	EH	Medium	0.7	Medium	Medium
Low Emissions Zone	ES EH	High	2.5	Long	Very High

CALDERDALE AIR QUALITY MANAGEMENT AREA No.1: A629 HUDDERSFIELD ROAD (SALTERHEBBLE HILL), HALIFAX

Map 2: Salterhebble AQMA



Principal findings of the Further Assessment Report, November 2006

Calderdale AQMA No.1 Salterhebble Hill took effect from 1st November 2005. The Further Assessment Report analyses more detailed air quality monitoring data collected throughout 2006. Although this data strongly supports shrinking the extent of the AQMA, albeit with a possible extension along Dryclough Lane, the report proposes that the boundaries should not change pending further monitoring following installation of traffic speed cameras on this stretch of the A629 (Spring 2008).
The Report goes on to calculate the extent of improvement in air quality needed to achieve the objective of 40μg/m^3 of NO_2. It determines a representative background NO_2 concentration for the AQMA based upon local measurement, which is assumed to include emissions from local major boiler plant and small industrial units. Using statutory guidance in LAQM.TG(03), measured NO_x levels from the 'Romon 1' and 'Romon 2' electronic monitors sited along the corridor and a ratio of background NO_x to NO_2 derived from recorded data at 'Romon 1' during 2006, a calculation of the proportion of NO_x and NO_2 attributable to road traffic is made (see below). The reduction in NO_2 emissions needed to achieve the air quality objective at Salterhebble Hill is then expressed in equivalent reductions in NO_x.

Apportionment of NO_2 and NO_X emissions, Salterhebble AQMA ('Romon 1')

The 2006 annual mean NO_2 is 53μg/m^3 and annual mean NO_x is 145μg/m^3. The background NO_2 level is 20μg/m^3 equating to 34μg/m^3 NO_x. The background component is 23% of measured total NO_x (34/145*100%). By inference the road component is 77%, equating to 111μg/m^3 NO_x.

The annual mean NO_2 concentration needs to be reduced from 53μg/m^3 to 40μg/m^3 to comply with the air quality objective. 40μg/m^3 NO_2 is equivalent to 92μg/m^3 NO_x.

To reduce the NO_2 the reduction needed in <u>total</u> NO_x is 145-92=53μg/m^3. This is equivalent to 36.5% (i.e. 53/145*100%) of the total NO_x emissions.

If the necessary NO_2 reduction is to be <u>solely from changes to road traffic</u> then road NO_x emissions would need to be **reduced by 47%** (i.e. 53/111*100%).

The calculation suggests a reduction of 47% in road NO_x emissions may be required to achieve the air quality objective. A similar calculation based upon the 'Romon 2' site readings suggests an even greater reduction of 53% road NO_x emissions may be required.

By re-running the model the effects of various scenarios upon levels of NO_2 at monitoring locations throughout the AQMA are tested e.g. removing heavy vehicles; changes in traffic speed; no congestion; reducing traffic volume. Drastic reductions in traffic volumes inevitably offer the greatest reductions in emissions. Calculations suggest that the 6% of traffic comprising 'heavy' vehicles (HGV and PCV) accounts for between 29% and 37% of NO_x traffic emissions within the AQMA. Tackling this source offers potentially significant improvements in air quality. Traffic management measures to smooth traffic flow and to reduce congestion could also bring more limited savings. The report refers in particular to the much slower speeds of heavy vehicles along certain sections of the route and standing traffic due to the light controlled junctions at Dudwell Lane and Dryclough Lane. A comparison of traffic flow by vehicle type, travel mode make-up and vehicle emission levels is depicted in Figures 1 to 3 below.

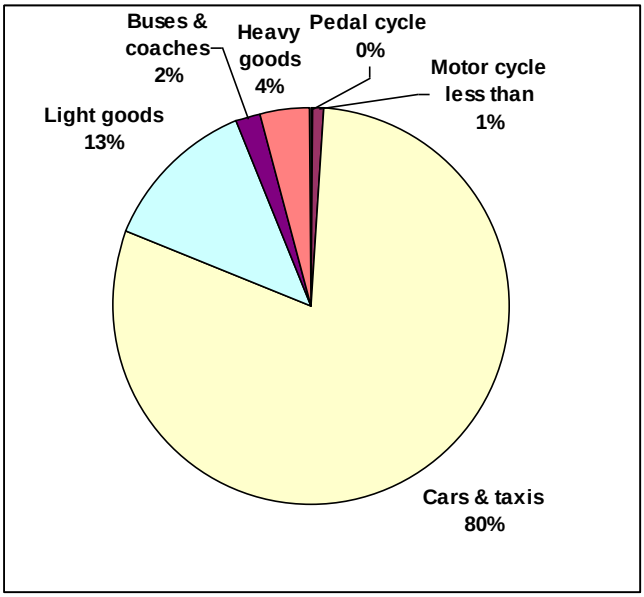


Fig.1: Traffic flow by vehicle type, A629 Huddersfield Road

The majority of road vehicle movements in AQMA No.1 are cars, taxis and light goods, comprising 93% of all traffic. Buses, coaches and HGV's accounting for only 6% over a typical 24 hour weekday period.

The base classified traffic survey was carried out in September 2005.

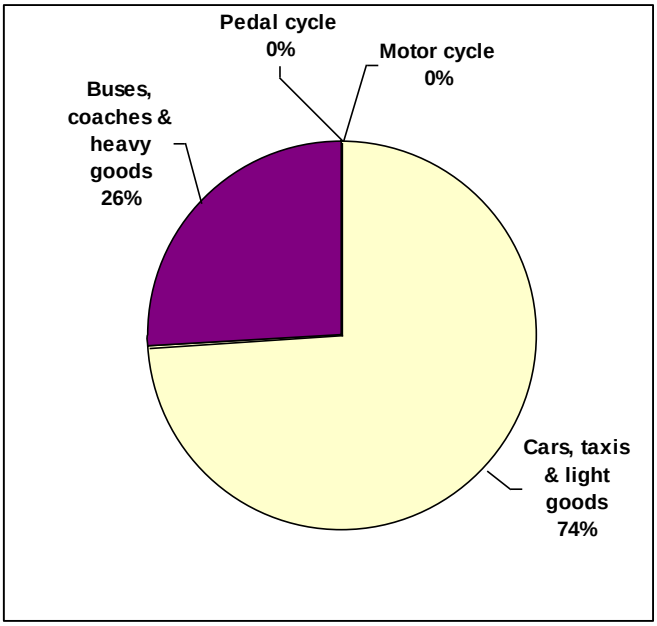


Fig.2: Proportion of people by vehicle type

The diagram is based on average car occupancy of 1.35 persons and average bus occupancy of 20 as recorded from the base modal split survey carried out in May 2005.

Indications are that 74% of people passing through the AQMA are in a car, taxi or light goods vehicle with 26% of people passing through the AQMA in a bus, coach or heavy goods vehicle.

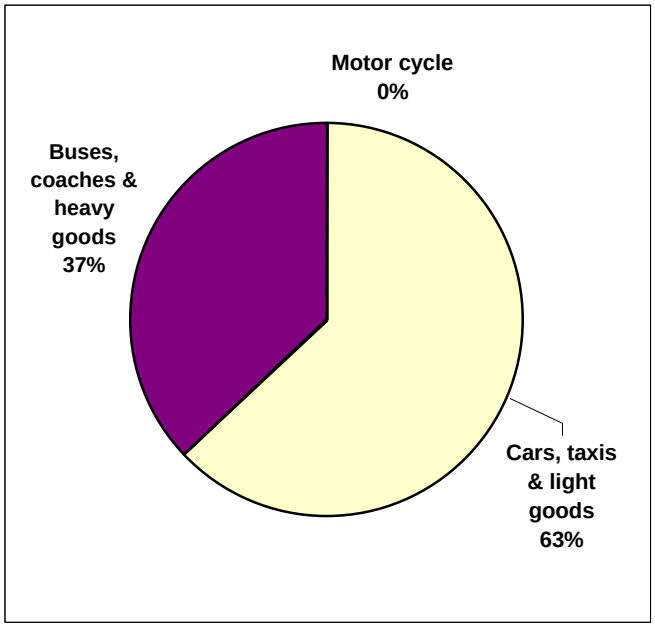


Fig.3: Emissions by vehicle type

Road traffic data provided a breakdown by road vehicle groups suggesting that cars, taxis or light goods vehicles are responsible for 63% of NO_X emissions with buses, coaches and heavy goods vehicles accounting for 37% of the total NO_X emissions in a typical 24 hour weekday period in the AQMA.

It is anticipated that government legislation will continue to promote tighter emission standards for new vehicles, cleaner fuels, sustainable distribution of freight and to provide incentives regarding low emission vehicles, all of which should contribute to a general reductions in emissions. However the Further Assessment Report still indicates an exceedence of the air quality objective for NO_2 at 2010 and beyond for this section of Huddersfield Road unless there is a significant reduction in traffic levels and a greater fluidity in traffic movement along the corridor.

The Report notes the significant rise in commuter traffic in recent years. Census data shows that between 1991 and 2001 commuting from Calderdale to Kirklees increased by 14.7% and in the opposite direction by 7.5%. The A629 forms the main road link between the two districts and is also a significant route for traffic passing through Calderdale. The Report identifies a need for a much greater understanding of the numbers and patterns of journeys within the AQMA and the relative proportions of local and through traffic.

Declaration of the AQMA also has implications regarding planning policy. The Report identifies that a review and update of planning guidance is required with regard to potential developments in the vicinity or influencing the movement of traffic through the AQMA.

The findings of the Further Assessment provide the basis for the Action Plan, which outlines a package of measures and initiatives considered appropriate for improving air quality along the A629 Huddersfield Road / Salterhebble Hill corridor.

Apportionment of emissions by vehicle type

In order to assess the potential impact of proposed measures some indicative figures for the contribution of types of vehicles and the effects of queuing traffic upon overall emissions have been derived based upon the different scenarios modelled in the Further Assessment Report. For example the removal of all ‘heavy’ vehicles from the A629 Huddersfield Road corridor gave a predicted emission level of 62$\mu g/m^3$ NO_2, a reduction of 37% over the ‘all traffic’ (modelled) levels of 98$\mu g/m^3$.

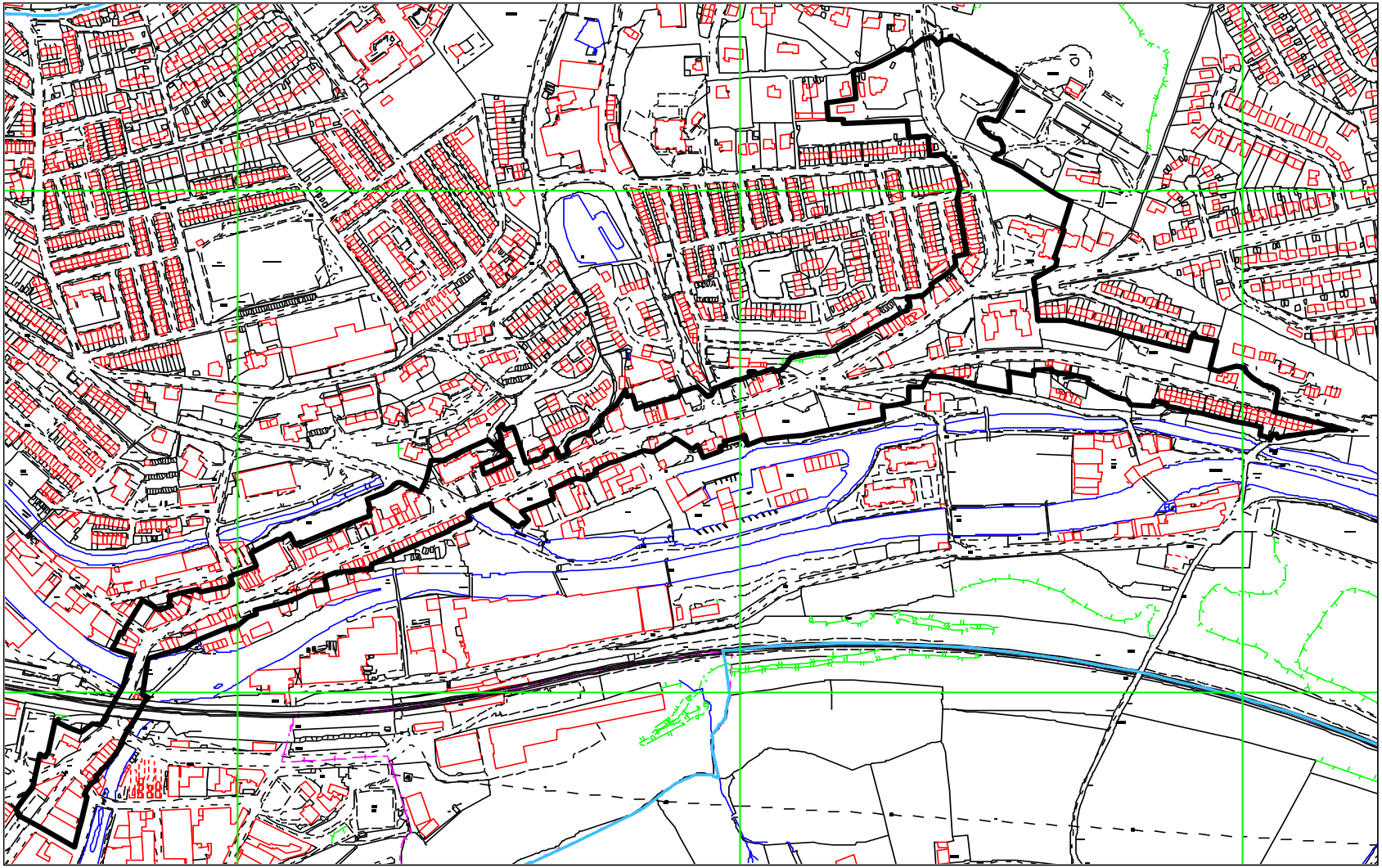
Examination of diurnal profiles of NO_2 concentration and other data suggest that it is morning peak period commuter traffic travelling towards Halifax town centre that makes the most significant contribution to poor air quality. Using the proportions derived within the Further Assessment Report and morning peak traffic counts (0730 to 0930) from September 2005 an indicative ‘emissions per vehicle’ figure may be derived.

With 3400 private cars, taxis and LGV’s travelling inbound towards Halifax during the morning peak contributing towards approximately 64$\mu g/m^3$ of NO_x it is assumed an average of 0.01$\mu g/m^3$ NO_x is developed by each vehicle passing through the AQMA. Using a similar assessment for the 170 HGV’s and PCV’s passing inbound through the AQMA during the period, this group produces 42$\mu g/m^3$ of NO_x at an estimated average of 0.1$\mu g/m^3$ NO_x for each vehicle.

It is not suggested that this methodology accurately reflects the relative contributions of individual vehicles to overall levels of emissions but in the absence of any further guidance these would seem to be reasonable assumptions upon which to base the assessment of each intervention.

CALDERDALE AIR QUALITY MANAGEMENT AREA No.2: SOWERBY BRIDGE

Map 3: Sowerby Bridge AQMA



Principal findings of the Further Assessment Report, August 2007

Calderdale AQMA No.2 Sowerby Bridge took effect from 1st September 2006. The Further Assessment Report analyses more detailed air quality monitoring data collected throughout 2006 and 2007 and confirms that the extent of the AQMA is defined correctly. A small number of locations are identified where NO_2 levels appear lower than expected but it proposes that the AQMA boundary should not be changed pending further monitoring.

The Report goes on to calculate the extent of improvement in air quality needed to achieve the objective of 40$\mu g/m^3$ of NO_2. It determines a representative background NO_2 concentration for the AQMA based upon local measurement, which is assumed to include emissions from local major boiler plant and small industrial units. Using statutory guidance in LAQM.TG(03) and measured NO_x levels from the 'Romon 4' electronic monitor sited on Wharf Street a calculation of the proportion of NO_x and NO_2 attributable to road traffic is made (see below). The reduction in NO_2 emissions needed to achieve the air quality objective in Sowerby Bridge is then expressed in equivalent reductions in NO_x.

Apportionment of NO_2 and NO_X emissions, Sowerby Bridge

The 2006 annual mean NO_2 at Romon 4 on Wharf Street is 50$\mu g/m^3$ and annual mean NO_x is 164μgm^{-3}. The background NO_2 level is 18.3$\mu g/m^3$ equating to 31$\mu g/m^3$ NO_x. The background component is 19% of measured total NO_x (31/164*100%). By inference the road component is 81%, equating to 133$\mu g/m^3$ NO_x.

At Romon 4 the annual mean NO_2 concentration needs to be reduced from 50$\mu g/m^3$ to 40$\mu g/m^3$ to comply with the air quality objective. 40$\mu g/m^3$ NO_2 is equivalent to 92$\mu g/m^3$ NO_x.

To reduce the NO_2 the reduction needed in <u>total</u> NO_x is 164 - 92 = 72$\mu g/m^3$. This is equivalent to 44% (i.e. 72/164*100%) of the total NO_x.

If the necessary NO_2 reduction were to come <u>solely from changes to road traffic</u> then road NO_x emissions would need to be **reduced by 54%** (i.e. 72/133*100%).

The background NO_2 concentration is projected to fall to 15$\mu g/m^3$ in 2010 but to bring about the necessary reduction in total NO_2 it is calculated that NO_x emissions from road traffic must be reduced by 54%.

The model is re-run to represent various scenarios e.g. no heavy vehicles; changes in traffic speeds; no congestion; reduced traffic volume. Calculations suggest that the 7% of traffic comprising 'heavy vehicles' (HGV and PCV) accounts for between 17% and 36% of NO_x traffic emissions within the AQMA. Tackling this source offers potentially significant improvements in air quality. Road speed and congestion are other factors that can be tackled to achieve significant overall improvements. Eliminating congestion alone appears to reduce emissions by around 15% and in conjunction with increasing traffic speeds by 10km/hr would results in savings of 18%. The Report notes that congestion in Sowerby Bridge can be severe throughout the day, but is particularly bad when traffic is diverted from the M62 due to accidents or inclement weather conditions. A comparison of traffic flow by vehicle type, travel mode make-up and vehicle emission levels is depicted in Figures 4 to 6 below.

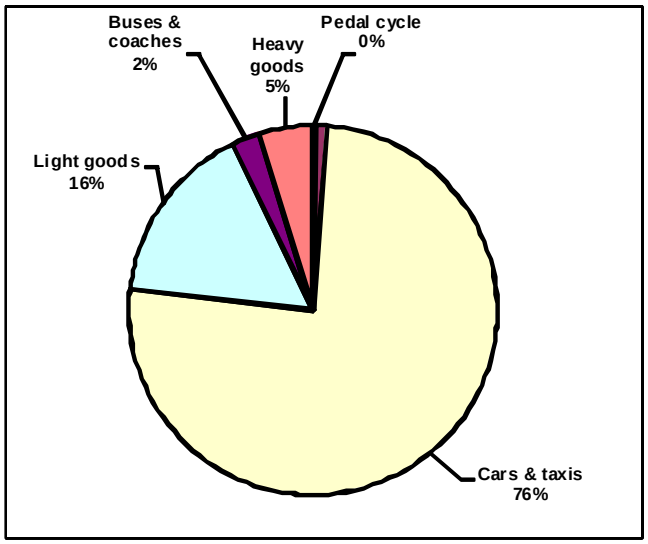


Fig.4: Traffic flow by vehicle type, A58 Sowerby Bridge

The majority of road vehicle movements through AQMA No.2 are cars, taxis and light goods, comprising 92% of all traffic, with buses, coaches and HGV's accounting for only 7% over a typical 24hour weekday period.

The base classified traffic survey was carried out in June 2005.

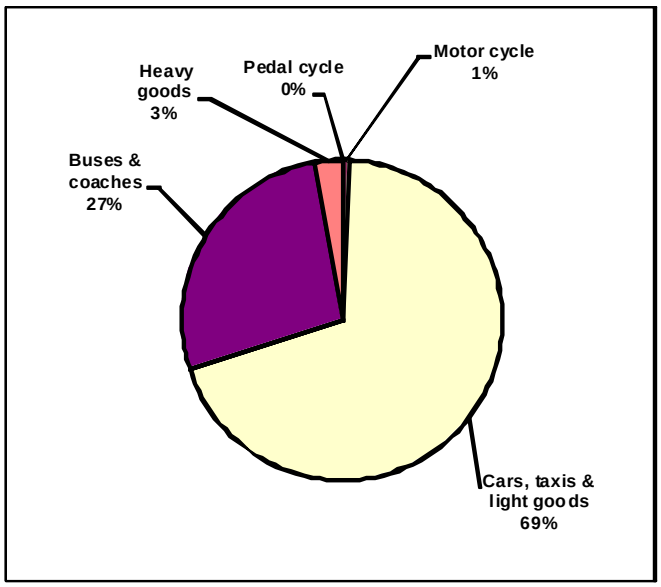


Fig.5: Proportion of people by vehicle type

The diagram is based on average car occupancy of 1.37 persons and average bus occupancy of 19 as recorded from the base modal split survey carried out in May 2005.

Indications are that 70% of people passing through the AQMA are by motor-cycle or in a car, taxi or light goods vehicle with 30% of people passing through the AQMA in a bus, coach or heavy goods vehicle.

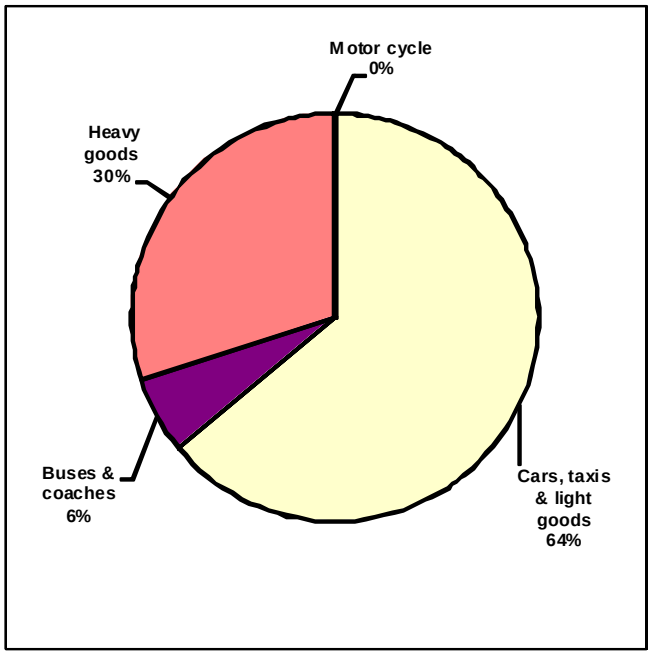


Fig.6: Emissions by vehicle type

Road traffic data provided a breakdown by road vehicle groups suggesting that cars, taxis or light goods vehicles are responsible for 64% of the NO_X emissions with buses, coaches and heavy goods vehicles accounting for 36% of the total NO_X emissions in a typical 24hour weekday period in the AQMA.

It is anticipated that government legislation will continue to promote tighter vehicle emission standards for new vehicles, cleaner fuels, sustainable distribution of freight and to provide incentives regarding low emission vehicles, all of which should contribute to a general reductions in emissions. However the Further Assessment Report still indicates an exceedence of the air quality objective for nitrogen dioxide at 2010 and beyond for this section of the A58 unless there is a significant reduction in traffic levels and a greater fluidity in traffic movement along the corridor.

Currently the amount of commuter traffic travelling through Sowerby Bridge, particularly to and from Halifax during peak periods, is unknown. The Report identifies a need for a greater understanding of the number, type and the need for journeys within the AQMA if poor air quality is to be addressed and improved.

The Report also identifies that a review and update of planning guidance is needed. With peak period trip generation in mind, applications for planning permission in the vicinity or influencing the movement of traffic passing through the AQMA, require careful consideration.

The findings of the Further Assessment provide the basis for the Action Plan which outlines a package of measures and initiatives considered appropriate for improving air quality along the A58 corridor in Sowerby Bridge.

Apportionment of emissions by vehicle type

In order to assess the potential impact of measures being proposed some indicative figures for the contribution of types of vehicles and the effects of queueing traffic to overall emissions have been derived based upon the different scenarios modelled in the Further Assessment Report. For example, based on the 2005/06 'all traffic' (modelled) levels providing an emission level of 49$\mu g/m^3$, the removal of all heavy goods vehicles from the A58 through Sowerby Bridge gave a predicted emission level of 34$\mu g/m^3$, a reduction of 34%.

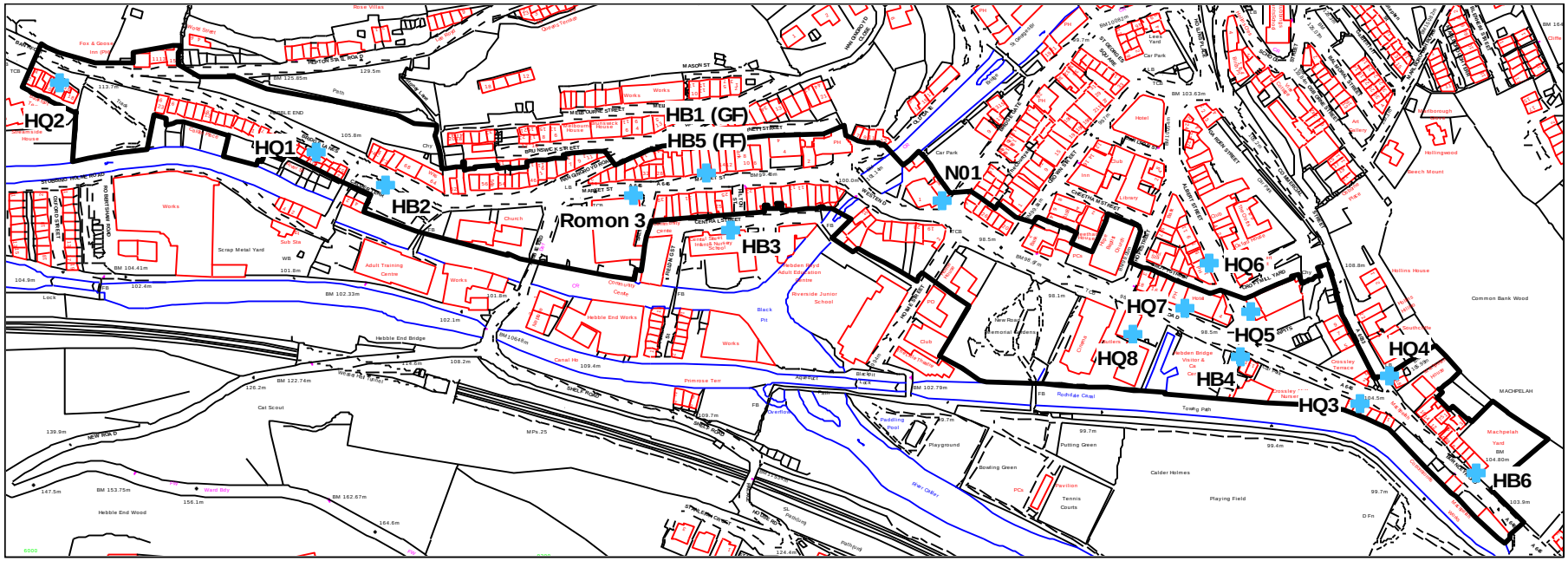
Examination of diurnal profiles of NO_2 concentration and other data based evidence suggest that it is morning peak period commuter traffic that makes the most significant contribution to poor air quality. Using the proportions derived above and morning peak traffic counts (0730 to 0930) an indicative 'emissions per vehicle' figure may be derived.

With 3208 private cars, taxis and LGV's on the A58 in Sowerby Bridge town centre during the morning peak contributing towards approximately 73$\mu g/m^3$ of NO_x it is assumed an average of 0.02$\mu g/m^3$ NO_x is developed by each vehicle passing through the AQMA during this period. Using a similar assessment for the 171 HGV's and 85 PCV's passing through the AQMA during the period, this group produces 40$\mu g/m^3$ of NO_x at an estimated average of 0.16$\mu g/m^3$ NO_x for each HGV and 0.15$\mu g/m^3$ NO_x for each PCV.

It is not suggested that this methodology accurately reflects the relative contributions of individual vehicles to overall levels of emissions but in the absence of any further guidance these would seem to be reasonable assumptions upon which to base the assessment of each intervention.

CALDERDALE AIR QUALITY MANAGEMENT AREA No.3: HEBDEN BRIDGE

Map 4: Hebden Bridge AQMA (showing monitoring points)



Principal findings of the Further Assessment Report, September 2007

Calderdale AQMA No.3 Hebden Bridge took effect from 1st September 2006. The Further Assessment Report analyses more detailed air quality monitoring data collected throughout 2006 and 2007 and confirms that the extent of the AQMA is defined correctly. A small number of locations are identified where NO_2 levels appear lower than expected but it proposes that the AQMA boundary should not be changed as the local highway network is currently undergoing a process of revision through the Hebden Bridge District Centre Traffic Review.

The Report goes on to determine a representative background NO_2 concentration for the AQMA based upon local measurement, which is assumed to include emissions from local major boiler plant and small industrial units. Using statutory guidance in LAQM.TG(03), measured NO_x levels from the 'Romon 3' electronic monitor on Market Street and a ratio of background NO_x to NO_2 (source: Barnsley MBC) a calculation of the proportion of NO_x and NO_2 attributable to road traffic is made (below).

Apportionment of NO_x and NO_2 emissions 2006, Hebden Bridge

Measured data gives the following:

- local annual mean background NO_2 for 2006 is 23.6μg/m^3
- **Measured NO_x** at Romon 3 at Market Street, Hebden Bridge for 2006 is **164μg/m^3**
- ratio of background NO_x to NO_2 is assumed as 28μg/m^3 NO_x to 19μg/m^3 NO_2 (source: Barnsley MBC).

From these we can derive the following:

- mean background NO_x level is estimated at 34.8μg/m^3
  [i.e. 23.6 x 28/19$_{\text{(Barnsley NOx/NO2 ratio)}}$]
- **road traffic NO_x contribution at Romon 3 is 129.2μg/m^3**
  [i.e. 164 $NO_{x\ \text{(total, Romon 3)}}$ -34.8 background NO_x]

LAQM.TG(03) guidance gives: $NO_{2(road)}=((-0.068 \times Ln(NO_{x\ (total)}))+0.53) \times NO_{x\ (road)}$]. Thus, where $NO_{x\ (total)}$ = 164μg/m^3 and $NO_{x\ (road)}$ = 129.2μg/m^3:

- NO_2 road traffic contribution at Romon 3 is 23.7μg/m^3
- the calculated total NO_2 at Romon 3 is 47.3 μg/m^3

In 2006 the calculated A646 road traffic contribution at Romon 3 of 23.7μg/m^3 represents **50.1% of the recorded total NO_2 and 78.8% of the total NO_x**

By projecting background levels to 2010 (below) the same methodology is used to see what reductions in levels are necessary to achieve the air quality objective of 40μg/m^3. The model suggests that if the necessary NO_2 reduction is to be solely from changes to road traffic then road NO_x emissions must reduce by 28.2%, from 129.2μg/m^3 to 92.8μg/m^3 by 2010.

Projection of NO_x and NO2 emissions to 2010, Hebden Bridge

- forecast local annual mean background NO_2 for 2010 is 21.1μg/m^3
- forecast ratio of background NO_x to NO_2 is 23.5μg/m^3 NO_x to 17μg/m^3 NO_2

From this we can derive:

- the forecast **mean background NO_x level** in 2010 is **29.2μg/m^3**
  [ie 21.1 x 23.5/17$_{(Barnsley\ NOx/NO_2\ ratio)}$]

The air quality objective for NO_2 is 40μg/m^3 and therefore:

- 23.7μg/m^3 NO_2 **road traffic contribution** at Romon 3 in 2006 **must reduce to 18.9μg/m^3** by 2010 to achieve the AQO of 40μg/m^3
  [ie 40 $NO_{2(total)}$ - 21.1 $NO_{2(background)}$]
- Using LAQM.TG(03) guidance the value of **total NO_x due to road traffic** equating to 18.9μg/m^3 NO_2 is **92.8μg/m^3**
- **Total NO_x** at Romon 3 in 2010 is **122μg/m^3**
  [i.e. 92.8+29.2]

In 2010 a road traffic NO_2 contribution of 18.9 μg/m^3 would represent **47.2% of the air quality objective of 40μg/m^3 NO_2 and 76.1% of the total NO_x**

In order to comply with the air quality objective by 2010 **total NO_x** at Romon 3 must fall 42μg/m^3 from 164μg/m^3 to 122μg/m^3, a reduction of **25.6%**

If the necessary NO_2 reduction is to be solely from changes to road traffic then **road NO_x emissions must reduce by 28.2%,** from 129.2μg/m^3 to 92.8μg/m^3 **by 2010**

By re-running the model the effects of various scenarios upon levels of NO_2 at monitoring locations throughout the AQMA are tested e.g. removing heavy vehicles; changes in traffic speed; no congestion; reducing traffic volume. The model suggests that the 6% of traffic comprising 'heavy' vehicles (HGV and PCV) accounts for between 12% and 24% of NO_2 emissions. Improvements in traffic flow to remove congestion could reduce NO_2 by between 7% and 21%. The report notes the presence of queueing traffic throughout the day with particularly severe congestion occurring when traffic diverts from the M62 motorway. The greater savings would appear to be possible where the A646 narrows and the buildings form a 'street canyon'. Other factors appear to have markedly less effect. Tackling both heavy vehicles and congestion together would appear to offer the most significant reductions in NO_2 of between 12% and 36% over 2006 levels.

There is no suggestion that the set of scenarios tested is comprehensive. More complex models could be set up to vary several parameters together, but it is clear that heavy vehicles and traffic congestion appear to have the greatest impact upon levels of NO_2. A comparison of traffic flow by vehicle type, travel mode make-up and vehicle emission levels is depicted below (Figs.7 to 9).

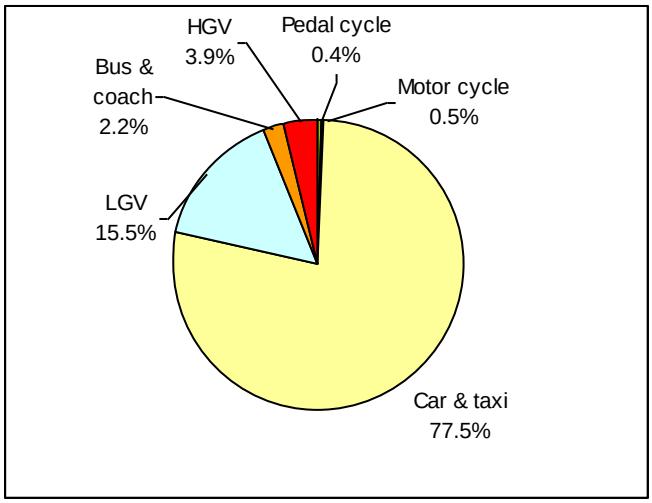


Fig.7: Traffic flow by vehicle type, A646 corridor, Hebden Bridge

The majority of road vehicle movements through AQMA No.3 are cars, taxis and light goods, comprising 93% of all traffic. Bus, coach and heavy goods vehicle account for only 6.1% over a typical 24 hour weekday period.

Figures are based on classified traffic counts on the A646 between Hebden Bridge and Mytholmroyd in June 2004.

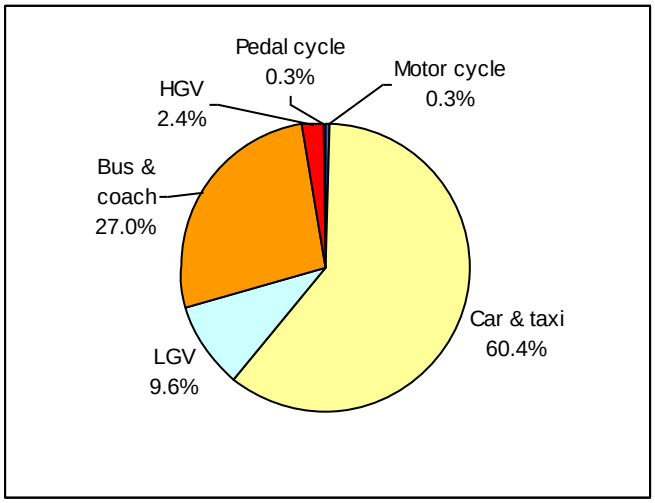


Fig.8: Proportion of people by vehicle type

Figures are based on average car occupancy of 1.26 persons and average bus occupancy of 20 as recorded from the base modal split survey carried out in May 2004.

Indications are that 70% of people passing through the AQMA travel by car, taxi or light goods vehicle and almost 30% travel by bus, coach or heavy goods vehicle.

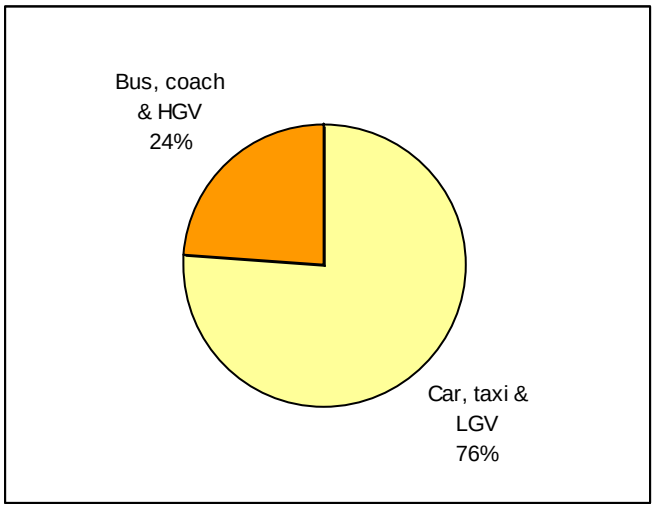


Fig.9: Emissions by vehicle type

Air quality modelling suggests that the 6.1% of road traffic classed as 'heavy vehicles' contributes up to 24% of NO_2 emissions in those parts of the AQMA that suffer from the poorest air quality.

It is anticipated that legislation will continue to promote tighter emission standards for new vehicles, cleaner fuels, sustainable distribution of freight and to provide incentives regarding low emission vehicles, all of which should contribute to a general reduction in emissions.

However the government's revised Air Quality Strategy (July 2007) does not expect levels of NO_2 to fall as quickly as previously thought due to both an overall increase in road traffic and an increase in road traffic NO_x being directly emitted as NO_2. As a result the Report suggests that the reduction in emissions projected by the model may be optimistic and that more significant intervention may be necessary to achieve the air quality objective.

The Report notes the significant rise in commuter traffic over recent years. Census data shows that between 1991 and 2001 commuting to work from Hebden Bridge to other parts of Calderdale increased by 65% and commuting to Hebden Bridge from other parts of Calderdale increased by 72%. Similarly travel to work journeys between Calderdale and Greater Manchester and the North West increased by 60% outbound and 54% inbound. These statistics give a broad indication of traffic growth but the Report identifies a need for a greater understanding of the numbers and patterns of journeys being made from, to, through and within Hebden Bridge in order for any effective interventions to be planned.

Declaration of an AQMA also has implications regarding planning policy but the Report identifies a potential weakness in that although development in the area could be restricted on the grounds of potential generation of increased air pollution (including from traffic generation) there is a lack of guidance on development that results in increased exposure to existing air pollution (e.g. change of use to a café, provision of living quarters above a shop etc.).

The findings of the Further Assessment provide the basis for the Action Plan, which outlines a package of measures and initiatives considered appropriate for improving air quality along the A646 corridor in Hebden Bridge.

Apportionment of emissions by vehicle type

In order to assess the potential impact of measures being proposed some indicative figures for the contribution of types of vehicles and the effects of queueing traffic to overall emissions have been derived based upon the different scenarios modelled in the Further Assessment Report. For example the removal of all 'heavy' vehicles from the A646 Hebden Bridge corridor gave a predicted emission level of 36.7$\mu g/m^3$ NO_2, a reduction of 24% over the 'all traffic' (modelled) levels of 48.7$\mu g/m^3$.

Examination of diurnal profiles of NO_2 concentration and other data based evidence suggest that it is morning peak period commuter traffic that makes the most significant contribution to poor air quality. Using the proportions derived above and morning peak traffic counts (0730 to 0930) from Traffic Census Point 17360 east of Hebden Bridge an indicative 'emissions per vehicle' figure may be derived.

With 2840 private cars, taxis and LGV's on the A646 in Hebden Bridge town centre during the morning peak contributing towards approximately 71$\mu g/m^3$ of NO_x it is assumed an average of 0.03$\mu g/m^3$ NO_x is developed by each vehicle passing through the AQMA. Using a similar assessment for the 158 HGV's and 84 PCV's passing through the AQMA during the period, this group produces 31$\mu g/m^3$ of NO_x at an estimated average of 0.13$\mu g/m^3$ NO_x for each HGV or PCV.

It is not suggested that this methodology accurately reflects the relative contributions of individual vehicles to overall levels of emissions but in the absence of any further guidance these would seem to be reasonable assumptions upon which to base the assessment of each intervention.

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