

## Fife Council: Air Quality Action Plan for Appin Crescent, Dunfermline



**Report for Fife Council**

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## Executive summary

This Air Quality Action Plan (AQAP) for Appin Crescent (Dunfermline), has been prepared by Fife Council in line with its statutory obligations under Section 84 [2] of the Environment Act 1995. The Council has a statutory duty to manage local air quality within its designated boundaries. Under the Strategic Policy Framework for Local Air Quality Management published by the Scottish Government, Fife Council has undertaken a programme of air quality assessments. The strategy requires each authority to undertake a series of air quality assessments to determine the current situation regarding local air quality, and to outline the progress of their local air quality management procedures to date.

The fourth round of the air quality review and assessment process commenced in 2009. Fife Council submitted their Progress Report in May 2010 where it was identified that it was likely that the Air Quality Strategy objective for nitrogen dioxide (NO<sub>2</sub>) would not be met at Appin Crescent, Dunfermline. A Detailed Assessment was prepared in 2011, which confirmed that the annual mean objective for NO<sub>2</sub> was exceeded at relevant locations within Appin Crescent. The air quality objectives have been set to protect human health, and consequently it is now Fife Council's duty to work toward the achievement of the objective in Appin Crescent where possible.

Where an authority identifies that a given air quality objective is likely to be exceeded at a relevant location, it is obliged to declare an Air Quality Management Area (AQMA) and undertake a further assessment of existing and likely future air quality. The Authority must then develop an Air Quality Action Plan, setting out the local actions that will be implemented to improve air quality and work towards meeting the objectives.

### *What is the cause of the problem?*

The findings of the further assessment indicate that road traffic is the principal source responsible for the local exceedances of NO<sub>2</sub>. The Further Assessment also indicates that the Scottish annual mean objective for PM<sub>10</sub> is also being exceeded within Appin Crescent, and as such it has been recommended that the AQMA declared for Appin Crescent is amended to include annual mean PM<sub>10</sub>. The source apportionment undertaken in the further assessment indicated that background sources constitute the principal sources of PM<sub>10</sub> within the Appin Crescent AQMA although road traffic makes a significant contribution to local PM<sub>10</sub> concentrations.

### *Air Quality Action Plan*

A steering group including key representatives from relevant services of Fife Council has been formed to develop the AQAP. The steering group considered the conclusions listed above and the wide range of potential options for improving air quality within the Appin Crescent AQMA. Subsequently the steering group undertook an assessment of each of these options. The options were assessed against the following criteria:

- How much support was there initially within the steering group for the option?
- Potential air quality impact;
- Potential costs;
- Overall cost-effectiveness;
- Potential co-environmental benefits, risk factors, social impacts and economic impacts;
- Feasibility and acceptability.

The assessments were then considered in total to place the options in a prioritised order. This then became the draft AQAP which was subject to review by the statutory consultees and a public consultation process. The Plan is summarised in tabular form below.

### **Summary of the Air Quality Action Plan for the Appin Crescent AQMA**

No	Measure	Timescale <sup>1</sup>
<b>Strategic Measures</b>		
1	Liaise with Scottish Government to encourage the consideration of national measures	
2	Feasibility study	
3	Improving links with Local Transport Strategy/ Area Transport Plan	
4	Improving Air Quality links with Local Planning and Development Framework	
5	Integrate AQ with other Council strategies	
<b>Direct measures</b>		
6	Traffic management optimisation (dependent upon feasibility study)	Short-term/ Acceptable
7	Travel Plans for Large Institutions and Businesses	Short-term/ Acceptable
8	Provision of Information and Promotion of Travel options	Short- Medium-term/ Acceptable
9	Provision of Information relating to Air Quality	Short-term/ Acceptable
10	Target reductions in emissions from the Council fleet and contract vehicles (including driver training)	Short-Medium term/ Acceptable
11	Investigate the potential for establishing voluntary bus agreements	Medium Term/ Acceptable
12	Consideration of development of Appin Crescent bypass (dependent upon feasibility study)	Unknown at present

*Note: AQMA = Air Quality Management Area. In this document the AQMA comprises of an area of Appin Crescent, Dunfermline that has been subject to a formal order defining it as an area where an air quality objective is not being achieved.*

The plan aims to work towards reducing transport emissions of NO<sub>x</sub> and PM<sub>10</sub> in the AQMA by approximately 18% and 40% respectively. It is anticipated that a reduction of this scale will lead to the achievement of the annual mean NO<sub>2</sub> air quality standard (40 µg m<sup>-3</sup>) and Scottish annual mean objective for PM<sub>10</sub> (18 µg m<sup>-3</sup>) within Appin Crescent in future years. Fife Council will continue to review and assess air quality to monitor the situation and success of the plan. Following adoption, reports on progress of the implementation of the action plan will be submitted to the Scottish Government and SEPA on an annual basis.

### **What happens next?**

Fife Council has consulted the public and other statutory consultees on its intention to implement this plan. Consultation responses have been taken into consideration in the finalisation of the Plan which will be adopted by the Council in 2013.

<sup>1</sup> Short term (1-2 years); Medium term (3-6 years); Long term (>6 years)

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# 1 Introduction

This Plan has been produced by Fife Council and constitutes the Air Quality Action Plan (AQAP) designed to address the air quality problems identified in Appin Crescent, Dunfermline, Fife. It is a statutory duty for Fife Council to develop an Air Quality Action Plan following the declaration of an air quality management area (AQMA) in response to identified exceedance(s) of one or more of the air quality strategy objectives. Before the plan can be adopted it must be subject to consultation with the general public, and must also be appraised and accepted by the Scottish Government and the Scottish Environment Protection Agency as being suitable for purpose. The purpose of the Air Quality Action Plan is, on the basis of the evidence available, to set out the local actions that will be implemented to improve air quality and work towards meeting the objectives. **Not all of the measures discussed in this report have been formally adopted by Fife Council, but are actively under consideration.**

This Action Plan has been developed from discussions within a steering group and on the basis of guidance from Fife Council's contracted consultants, Ricardo-AEA. Following approval by the steering group and the Council, the Plan has been subject to formal consultation having been submitted to the following organisations and groups for comment:

- Fife Council;
- The Scottish Government;
- The Scottish Environment Protection Agency (SEPA);
- Statutory consultation, where the document will be made available to the general public and other stakeholders for scrutiny and general comment.

Comments received during the consultation process were taken into consideration and where possible incorporated into the Plan. The final version of the Plan will be submitted to the Scottish Government and SEPA for appraisal, and if accepted will then be adopted as a formal authority plan and will be implemented via the efforts of Fife Council and other stakeholders.

## 1.1 Objectives

This Air Quality Action Plan summarises the air quality review and assessments that have been undertaken in Fife to date, focussing on exceedances of the Air Quality Strategy Objectives, and outlining the mechanisms and the targeted measures proposed by Fife Council that aim to improve local air quality. The plan focuses on air quality within Appin Crescent, where an Air Quality Management Area (AQMA) came into force in November 2011 as a result of elevated concentrations of nitrogen dioxide. 12 measures have been incorporated within the Action Plan, several of which have already been developed/implemented through existing plans and policies. In addition, new measures have been incorporated aimed at supplementing ongoing activities and focussing specifically on improving air quality within the vicinity of Appin Crescent.

## 1.2 Report Contents and Structure

Policy Guidance LAQM.PGS (09) was published by the Scottish Government in 2009 and provides statutory guidance on the development of air quality action plans. As a minimum, the AQAP is expected to include the following:

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

The Scottish Government recommends that a Further Assessment of air quality should be undertaken in parallel with the development of the Action Plan to provide the technical justification for the measures an authority later includes in its Action Plan. This further assessment has been undertaken and the findings have been summarised in this plan.

The remainder of this report is structured as follows:

- Chapter 2 provides a brief overview of the significance of local air quality management on human health, the statutory duties placed on local authorities, and a summary of existing plans and strategies which may influence air quality within Dunfermline;
- Chapter 3 presents a summary of recent reviews of local air quality undertaken by Fife Council, and the results of the source apportionment exercise undertaken for the Appin Crescent AQMA including the improvement required to meet the air quality objectives;
- Chapter 4 describes how the Appin Crescent AQAP has been developed by Fife Council;
- Chapter 5 presents the range of potential options that were considered to improve local air quality in the Appin Crescent AQMA and wider Dunfermline area generally, and a summary of proposed measures to be assessed against a variety of criteria;
- Chapter 6 provides an overview of the assessment process and the results of an assessment of each option;
- Chapter 7 summarises the AQAP, outlining measures proposed for implementation and makes reference to important factors that require to be considered and addressed prior to the adoption of the plan.
- Chapter 8 summarises the consultation exercise undertaken by Fife Council in relation to the Draft AQAP.



## **2 Ambient Air Quality and Local Air Quality Management**

This chapter outlines the significance of local air quality management in the context of human health, the legislation in place to protect human health, and the statutory duties placed on local authorities in relation to Local Air Quality Management. This information is included to provide readers with a general overview of air quality issues and the Local Air Quality Management process in Scotland.

### **2.1 Potential Impacts of Air Pollution on Human Health**

Air pollution has been associated with a wide range of effects on human health and the wider environment; however, it is the potential negative impacts of ambient air pollution on human health that is the primary focus of local air quality management. Air pollution has been associated with both long- and short-term effects on human health (COMEAP, 2009, 2010), with the nature of the effects influenced by factors such as the type and concentration of the pollutant and the duration of exposure. Short-term exposure to high concentrations of common outdoor pollutants has been linked with a temporal increase in hospital admissions (Anderson et al., 2001).

In the long-term, the available scientific evidence indicates that air pollution can have a significant effect on human health, although the effects will vary depending on where an individual lives (urban or rural) and the type of pollutant(s) to which they are exposed. Whilst the full extent of these impacts across the population is difficult to quantify, in the UK, poor air quality is considered to reduce the average life expectancy by several months (COMEAP, 2009). In general, air quality in the UK is considered to have improved significantly since the smogs of the 1950s, with improvement primarily resulting from the increased regulation of domestic and industrial emissions. However, in recent years, emissions from motor vehicles have been shown to be having an increasing impact on urban air quality. As a result, a large number of authorities across the UK have declared Air Quality Management Areas in response to identified exceedances of the air quality strategy objectives and are developing plans to improve air quality at the local level.

Furthermore, action is also being taken at national and international levels to reduce exposure to air pollution. National Government, through the Air Quality Strategy for England, Scotland, Wales and Northern Ireland and the Integrated Transport Policy, is setting the framework for local action to be taken to reduce levels of pollution (AQS, 2007).

### **2.2 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland**

The Environment Act 1995 placed a responsibility on UK Government to prepare an Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland. The most recent version of the strategy (2007) sets out the current UK framework for air quality management and includes a number of air quality objectives for specific pollutants.

The most recent version of the Air Quality Strategy sets out the UK vision for clean air for a good quality of life and the steps being taken to achieve this. The Strategy also outlines the



established framework of local air quality management and details a series of air quality objectives to be achieved with the aim of protecting human health and the environment. The objectives have been set throughout the UK at levels that aim to protect the vulnerable in society from the harmful effects of breathing pollution (AQS, 2007), although more stringent national objectives have been established in Scotland (annual mean objective for PM<sub>10</sub>). A list of health Objectives relevant to Scotland is presented in Table 2.1.

Part IV of the Act, also requires that local authorities “review and assess” air quality within their respective boundaries. The 1997 Air Quality Strategy introduced the Local Air Quality Management (LAQM) model and associated Review and Assessment process. The Review and Assessment process is intended to locate and spatially define areas where the AQS objectives are not being met. In such instances the Local Authority is required to declare an Air Quality Management Area (AQMA), carry out a Further Assessment of Air Quality, and develop an Air Quality Action Plan (AQAP) which should include measures to improve air quality so that the objectives may be achieved in the future. The timetables and methodologies for carrying out Review and Assessment studies are prescribed in the statutory Technical Guidance document LAQM.TG(09).

Table 2.1 lists the objectives that are included in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97) and the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297) for the purposes of Local Air Quality Management (LAQM).

Table 2.1 Air Quality Objectives			
Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	3.25 µg m <sup>-3</sup>	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg m <sup>-3</sup>	Running annual mean	31.12.2003
Carbon Monoxide <sup>2</sup> Authorities in Scotland only	10.0 mg m <sup>-3</sup>	Running 8-hour mean	31.12.2003
Lead	0.5 µg m <sup>-3</sup>	Annual mean	31.12.2004
	0.25 µg m <sup>-3</sup>	Annual mean	31.12.2008
Nitrogen dioxide	200 µg m <sup>-3</sup> not to be exceeded more than 18 times a year	1 hour mean	31.12.2005
	40 µg m <sup>-3</sup>	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric) <sup>2</sup>	50 µg m <sup>-3</sup> not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
	18 µg m <sup>-3</sup>	Annual mean	31.12.2010
Sulphur dioxide	350 µg m <sup>-3</sup> not to be exceeded more than 24 times a year	1 hour mean	31.12.2004
	125 µg m <sup>-3</sup> not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg m <sup>-3</sup> not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

The Objectives apply at locations where members of the public are likely to be exposed over the averaging period of the objective. Table 2.2 below summarises the locations where these objectives should and should not apply respectively.

<sup>2</sup> Objectives relevant to Local Authorities in Scotland only.

**Table 2.2 Typical locations where the objectives should and should not apply**

<b>Averaging Period</b>	<b>Pollutants</b>	<b>Objectives should apply at ...</b>	<b>Objectives should not generally apply at ...</b>
Annual mean	1,3 Butadiene Benzene Lead Nitrogen dioxide PM <sub>10</sub>	All background locations where members of the public might be regularly exposed.	Building facades of offices or other places of work where members of the public do not have regular access.
		Building facades of residential properties, schools, hospitals, libraries etc.	Gardens of residential properties.
			Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term
24 hour mean and 8-hour mean	Carbon monoxide PM <sub>10</sub> Sulphur dioxide	All locations where the annual mean objective would apply.  Gardens of residential properties.	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
1 hour mean	Nitrogen dioxide Sulphur dioxide	All locations where the annual mean and 24 and 8-hour mean objectives apply.	Kerbside sites where the public would not be expected to have regular access.
		Kerbside sites (e.g. pavements of busy shopping streets).	
		Those parts of car parks and railway stations etc. which are not fully enclosed.	
15 minute mean	Sulphur dioxide	Any outdoor locations to which the public might reasonably be expected to have access.  All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

Whilst it is anticipated that measures adopted at a national and international level will enable the objectives to be attained in the majority of relevant locations, measures adopted at a local level can make a significant contribution to improving air quality in specific locations. The UK government acknowledges the significant role that local authorities play in helping to achieve the air quality objectives.

## 2.3 The Local Air Quality Management Regime

Part IV of the Environment Act, 1995, places numerous statutory duties on local authorities in relation to local air quality management, a summary of which is outlined below:

1. Local authorities are required to undertake annual assessments of current and future air quality within their respective authority boundary and determine whether any of the air quality objectives are likely to be exceeded.
2. Where an authority identifies an area where one or more of the objectives are likely to be exceeded, the authority is required to designate the identified area, by official Order, as an Air Quality Management Area (AQMA). Such Orders may be amended or revoked as a result of the findings of later air quality assessments where these indicate a change in the extent of the exceedence, or that the relevant objective(s) are likely to be attained.
3. Following the declaration of an AQMA, the Local Authority is required to undertake a Further Assessment of current and likely future air quality within the AQMA, and to develop an Air Quality Action Plan (AQAP) outlining the measures that will be implemented at a local level in pursuit of the air quality objectives. The Further Assessment should be completed within 12 months of the AQMA designation Order and provide the technical justification to enable the authority to prepare an AQAP “in pursuit of the achievement of air quality standards and objectives in the designated area”. Note that authorities are not obliged to meet the objectives but must show that it is working towards them.

The Air Quality Strategy states that air quality issues should be dealt with in a holistic and multi-disciplinary way. In developing an Air Quality Action Plan it is therefore important that the Local Authority engages with officers across relevant Services, notably strategic-, development- and transport- planners, to ensure that any measures included in the plan are supported by the relevant parts of the authority. It is vital that organisations, groups and individuals that have an impact on local air quality work together to help attain the aims of an adopted plan. Furthermore, it is essential that the AQAP considers existing policies and programmes in operation within the region that may have important implications for the plan.

## **2.4 Existing Strategies and Policies relevant to Air Quality in Dunfermline**

Numerous existing policies and strategies adopted at a local, regional and national level can exert significant effects, both positive and negative, on air quality in Fife. It is important that these plans and strategies are considered at an early stage of the development of the plan, as these will likely establish the context in which any specific options for improving air quality can be implemented. This Chapter identifies the most important of these.

### **2.4.1 The National Transport Strategy**

The National Transport Strategy for Scotland was published in December 2006. The Strategy identified the need to provide an efficient, integrated and reliable transport network that successfully promotes economic growth, protection of the environment, health and social inclusion, and introduced three key strategic objectives:

1. To reduce journey times between Scotland’s towns/ cities and global markets, tackle congestion and provide access to key markets;
2. To reduce emissions to tackle climate change;
3. To improve the quality, accessibility and affordability of transport, to give people the choice of public transport as an alternative to the car.

These key objectives have been designed to support the role of Government and respond to the strategic objectives, namely a Wealthier, Fairer, Smarter, Healthier, Safer, Stronger and Greener Scotland. The plan includes a wide range of commitments aimed at tackling each of the key strategic objectives. Commitments identified as being of particular significance to Dunfermline and the AQMA are:

- In order to improve journey times and connections, tackle congestion and the lack of integration and connections in transport, the strategy outlines the following commitments:
- 'Investing to tackle congestion from the School Run;
- Promoting SMART<sup>3</sup> measures on all journeys, focusing especially on the commute to work through developing travel awareness and marketing campaigns;
- Exploring with key partners sustainable travel demonstration towns across Scotland to reduce car use and promote cycling and walking;
- Promoting and encouraging new vehicle technologies;
- Supporting sustainable distribution strategies through the Scottish Road Haulage Association;
- Publishing a Bus Action Plan to help achieve a step change in the quality of bus service provision;
- Support the introduction of integrated ticketing pilots to enhance the passenger journey.'

The Strategy clearly states that Regional Transport Partnerships, local authorities and transport operators will be key partners in delivering the strategic outcomes.

## 2.4.2 Regional Transport Strategy (2008-2023)

Fife Council is a member of the South East of Scotland Transport Partnership (SEStran). The SEStran Regional Transport Strategy was developed to complement the objectives of the National Transport Plan and includes 17 sub-objectives that stem from the four high level objectives of: Economy, Accessibility, Environment and Safety and Health. The Strategy Framework comprises three different types of projects and initiatives:

<b>Region-wide initiatives</b>	Region wide initiatives that affect the area measures affecting the whole SEStran area e.g. travel behaviour/ planning, integrated ticketing, regional freight initiatives, awareness campaigns and frameworks for parking (standards and management).
<b>Initiatives for specific areas and groups</b>	Initiatives targeting accessibility and providing minimum levels of service to specific localities and groups, and rural areas.
<b>Network-based initiatives</b>	Covering specific infrastructure schemes and public transport services on principal travel corridors. These include a wide range of measures proposed for movements of strategic importance to the SEStran area.

The regional Strategy makes specific reference to the increasing importance of local air quality, its effects on human health and the role that transport plays in air quality issues in urban areas.

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<sup>3</sup> SMART Measures: Specific, Measurable, Achievable, Realistic and Time.

### 2.4.3 Fife Council Local Transport Strategy (2006-2026)

This Local Transport Strategy 2006 (LTS) sets the 5-year (short term) programme, 10-year (medium term) plan and 20-year (longer term) vision and objectives for transport delivery in Fife. In order to achieve success at a local level, the strategy has adopted a decentralised approach to service delivery, with teams in West, Central and East areas of Fife having developed local area transport plans through consultation with local communities and stakeholders.

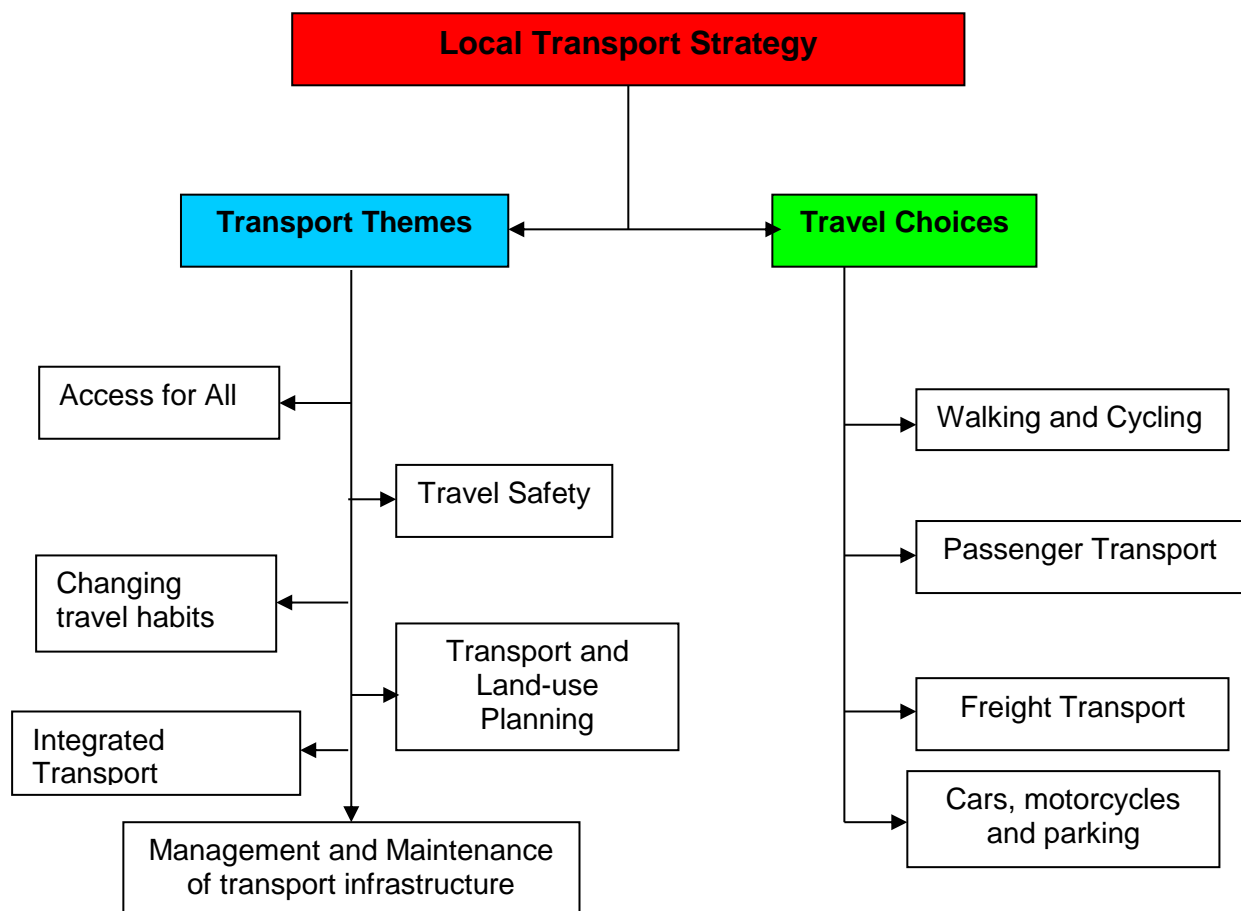
The Strategy has been designed to complement Fife Council's Community Plan, Development Plan and other supporting policies, particularly Fife's Environmental Strategy. The strategy provides an overview of the region's transportation services, pertinent transport issues, visions and objectives together with a list of priorities, policies and projects for future transport provision in Fife.

The key vision of Fife's LTS is:

***“An integrated and sustainable transport system which is accessible to all and contributes towards a strong economy, strong community and healthy environment.”***

The objectives of the Strategy are broadly categorised into 2 groups and are summarised in Figure 2.1.

**Figure 2.1 Objectives of the Local Transport Strategy**



These objectives have been considered during the development of the air quality action plan for Appin Crescent, Dunfermline.

#### **2.4.4 The Fife Structure Plan**

The Fife Structure Plan (2006-2026) gained final Scottish Government approval on the 24<sup>th</sup> May 2009 and represents the strategic element of the development plan for Fife. The Plan sets out the development strategy and strategic land use policies and proposals. It establishes the context for local plans that translate these strategies and policies into site-specific guidance. Together, the Structure Plan and Local Plans form the Fife Development Plan. The principal aims of the plan are to support the growth of Fife's economy and population, whilst addressing the affordability and quality of housing, ensuring sustainable communities and safeguarding and improving Fife's environment.

The Structure Plan outlines that Dunfermline, Kirkcaldy and St Andrews town centres will constitute the key centres of focus for development, but recognises the need to support other towns and villages in order to achieve balanced and sustainable growth throughout Fife. In order to achieve this, the plan outlines that development will be focused primarily in existing urban areas and in locations that are best placed to support sustainable travel. In particular reference to Dunfermline, the structure plan outlines the intention to develop the civic, commercial and cultural hub of the city as a sub-regional centre with the focus on sustaining and enhancing its economic growth. In terms of strategic land allocations, the plan outlines the aim to expand Dunfermline, growing out by development to the south west, west and north around a revitalised city centre. The plan also outlines the transport infrastructure improvements that will be made to enable the population of Dunfermline to grow to 50,000 over the lifetime of the plan; and the designation of green corridors to protect the historic setting of the city.

Within the lifetime of the plan, 80 ha of land for business use, a minimum of 3,800 new houses, and the provision, by the private sector, of public transport rapid transit corridors and a distributor ring road will be developed and integrated with the existing city commencing from 2011. The potential to connect a light rapid transit network to Edinburgh City and West Edinburgh will be addressed in the context of the Forth Replacement Crossing (reference Structure Plan).

#### **2.4.5 Dunfermline and West Fife Local Plan**

At the time of the preparation of this plan, the Dunfermline and West Fife Local Plan is at the examination stage and it is not possible to provide further information on its content.

#### **2.4.6 Fife Council Carbon Emissions Reduction Plan**

Fife Council is committed to reduce its carbon emissions by 80% by 2050. The Carbon Emissions Reduction Plan (2009) was developed to provide managers within the Council with the tools to build carbon emission reductions into day-to-day service delivery and long term planning. In addition to helping the Council meet its own carbon emission reduction targets, the Plan has been designed to support the achievement of the Scottish Government's national climate change targets.

The vision of the plan is to enable Fife Council to thrive in a low carbon economy, facilitating the transition to a low carbon organisation whilst maintaining quality services. Through embedding carbon emissions reduction, environmental awareness and efficiency in the use of our assets and operations, Fife Council will be a leading Green Council. The plan includes the commitment to consider the carbon emissions, and environmental impact of all services and projects.



The plan aims to deliver through:

- Setting carbon emissions reduction targets to meet or exceed government legislation;
- Embedding carbon emissions reduction into the culture and governance of the Council; and,
- Developing management tools to embed carbon emissions reduction and carbon efficiency into the Council systems, processes and operations.

The Plan targets reductions in 'direct emissions' from Council buildings, infrastructure energy, transport fleet fuel and commercial waste. Some of these measures may link with this Air Quality Action Plan, particularly the targeted reduction in emissions from the Council transport fleet.

#### 2.4.7 Fife Community Plan 2011-2020

Fife Council's Community Plan is the culmination of an analysis of future risks and opportunities for Fife and provides an overarching strategic plan for Fife. It provides a framework and reference point for the other strategies and plans that the Council puts in place to deliver the outcomes of the Community Plan.

The vision of the plan is to:

***“Strengthen Fife’s future to make Fife a great place to live, work, visit and invest”.***

With the plan aiming to:

- Highlight the challenges facing Fife, both now and in the coming decade.
- Empower communities to respond to these challenges.
- Set out what the Fife Partnership's plans to do to improve the wellbeing of people in Fife and to strengthen Fife's future.

Community planning is a way of working that brings together key organisations within Fife with the communities they serve, ensuring that everyone is working together to deliver a shared vision for improving the quality of life. Fife's community planning partners, Fife Council, NHS Fife, Fife Constabulary, Fife's voluntary sector, Scottish Enterprise Fife, Skills Development Scotland, Scotland's Colleges Fife (Adam Smith College, Carnegie College and Elmwood College), St Andrew's University, the South East Scotland Transport Partnership (SEStran) and the Scottish Government have all signed up to the shared objectives set out in the plan. Each of the partner organisations will work with the communities of Fife to deliver the objectives of the plan, with each partner providing a unique and valued contribution.

The community plan also prioritises opportunities and risks where a partnership approach can make a real difference. Consequently, the Fife Partnership has therefore agreed the following high level outcomes:

- Reducing inequalities
- Increasing employment
- Tackling climate change

By tackling climate change and by sustaining and improving the environment, Fife Council's Community Plan contributes to the Council's aims of improving air quality across Fife and links strategically with this action plan.

## **2.4.8 Fife Council Plan 2007-2011**

Fife Council's Plan 2007-2011 is intrinsically linked to the Council's Community Plan and outlines the Council's commitment to make a difference to the people of Fife and provide top performing public services. In order to achieve this, the plan outlines the following key priorities for the Council and how these ambitions will be achieved and progress measured:

1. Improve educational achievement and education for all;
2. Make Fife the leading green Council;
3. Increased access to housing;
4. Improved local conditions for economic development;
5. Improved sport, leisure and cultural opportunities;
6. Targeted support for vulnerable people;
7. Improved community safety; and,
8. Become a top performing Council.

Many of the objectives introduced by Fife Council through the Council Plan offer the potential to improve local air quality across Fife, most notably the objective of making Fife the leading green Council. This priority objective includes initiatives aimed at:

- Promoting sustainable transportation options and encouraging better travel habits;
- Ensuring that environmental awareness is promoted as part of the education curriculum; and,
- Reducing Council energy use and promoting sustainable procurement.

At the time of the preparation of this document, the Council Plan was being updated.

## **2.4.9 State of Environment Report**

Fife Council's State of the Environment Report provides an overview and basic analysis of environmental baseline information to support the Strategic Environmental Assessment (SEA) of future plans. The report also provides a summary of progress towards achieving environmental targets set by the 'Take A Pride in Fife Environmental Network' (TAPIFEN) known as Theme Measures and Community Plan Milestones.

The Report includes a Chapter on the atmosphere which relates directly to air quality and climate change. A summary of relevant local air quality issues is presented, including concentrations of air quality pollutants (2006-2007) and objectives for improving air quality and reducing contributions and vulnerability to climate change.

## **2.4.10 Fife Council's Air Quality Action Plan for the Bonnygate, Cupar (2010).**

In September 2010, Fife Council adopted its first air quality action plan for the Bonnygate area of Cupar in response to measured exceedances of the annual mean objectives for NO<sub>2</sub> and PM<sub>10</sub>. The plan was developed with the consensus of an extensive steering group and sets out a series of local and strategic actions that will be implemented to improve air quality and work towards meeting the objectives. Fife Council adopts a holistic and strategic approach to improving air quality across Fife, and as such, the Council has attempted to coordinate the development of this plan, so that it aligns with the content and approach used in the development of the action plan for the Bonnygate.

#### 2.4.11 Community Planning Achievements State of Fife Report 2010/2011

The Community Planning Achievements State of Fife Report includes an environmental outcome relating to better water, air and land quality. The report outlines how Fife Council are assessing progress and achievements against these objectives.

In relation to air quality, the report states that:

"In 2008 Fife Council declared Bonnygate in Cupar an air quality management area due to high levels of road traffic pollutants - nitrogen dioxide (NO<sub>2</sub>) and fine particles (PM<sub>10</sub>) – being monitored at this location. In 2010 the Council produced an air quality action plan that set out a range of measures to improve air quality in the area. The implementation of improvement measures has coincided with a downward trend in NO<sub>2</sub> concentrations, and PM<sub>10</sub> concentrations now only marginally exceed annual targets. Traffic management measures and the demolition of a number of buildings in Bonnygate appear to have contributed to this downward trend in pollutant concentrations. Monitoring will continue in order to confirm this downward trend in pollutant concentrations. The TRY IT Cupar initiative, which encourages people to walk or cycle rather than using the car, is also receiving positive feedback. If successful this approach will be rolled out to other areas with air quality issues. Closer working relationships are being developed between Fife Council and NHS Fife in dealing with air quality issues using an investigation template that is being developed by NHS Fife and the University of St Andrews.

Fife Council has produced an easy to use booklet to help planning applicants deal with air quality related issues. This is available on the Fife Direct website. The Bonnygate Air Quality Action Plan has been cited as an example of good practice by the Scottish Government and the Department for Environment, Food and Rural Affairs (DEFRA). Following the Bonnygate template, Fife Council has enhanced air quality monitoring at Appin Crescent in Dunfermline, Admiralty Road in Rosyth and St Clair Street in Kirkcaldy. These initiatives are supported by Scottish Government grants (£142,625 in 2011/12.)"

#### 2.4.12 Annual Report of the Chief Medical Officer NHS Scotland 2010 and Christie Commission report on the Future Delivery of Public Services in Scotland (2011)

Asset based approaches value the capacity, skills and knowledge and connections in individuals and communities. A "health asset" is any factor or resource which enhances the ability of individuals, communities and populations to maintain and sustain health and well-being. Asset approaches recognise that individuals and communities are part of the solution, work with people rather than viewing them as passive recipients of services, and empower people to control their future. Asset based approaches and ways of thinking have been highlighted in the 2010 Annual Report of the Chief Medical Officer (Scottish Government) - in particular the need to involve people more in shaping and running public services in the future - a theme which has also been reinforced in the findings of the Christie Commission Report on the Future Delivery of Public Services report (2011).

Asset based approaches rely on **"embedded engagement"** with communities which is consistent with themes contained in official guidance to local authorities on how best to consult with communities on air quality issues - including production of air quality action plans (UWE 2006).

Fife Council has already undertaken a consultation exercise on the Bonnygate Air Cupar Quality Action Plan in 2010 which adopted methods consistent with an asset based approach

- including public surveys and workshops. This has also resulted in actions such as the "TRY IT" initiative which aims to encourage more sustainable modes of travel (walking and cycling) than the car in the Cupar community. Fife Council therefore intends to use such proven communication methods – considered consistent with asset based approaches - in the context of the production and implementation of the Appin Crescent Dunfermline Air Quality Action Plan.

## 2.5 Consultation on the Action Plan

Authorities in Scotland must consult the agencies and organisations listed below following the preparation or revision of their Air Quality Action Plan:

- Scottish Ministers;
- The Scottish Environment Protection Agency;
- Neighbouring local authorities;
- Other public authorities as appropriate;
- Bodies representing local business interests and other organisations as appropriate (potentially including representatives of the public e.g. community councils); and,
- Any National Park authority within or adjacent to the Local Authority area.

Authorities should also proactively make copies of the Action Plan available to the public, and undertake other efforts deemed necessary to adequately consult members of the public on the content and significance of the plan. It is recommended that the consultation period be no less than 6 weeks in duration to enable consultees the opportunity to contribute to the process.

Following consultation and the formal adoption of the Action Plan, the Council is also required to submit annual Action Plan progress reports to the Scottish Government and SEPA, and also revise the Action Plan appropriately when circumstances influence the content and progress of the plan.

## 3 Conclusions of previous rounds of LAQM review and assessments

Fife Council has completed its Local Air Quality Management duties in compliance with the guidance provided in Chapter 2 of this report. The bulk of work to date has been to review air quality in Fife and to assess whether any exceedances of the health based air quality objectives have been identified or have been predicted for future years. This chapter provides a summary of this work.

### 3.1 Summary of Relevant LAQM Review and Assessment in Fife Council 2006 to 2011

#### 3.1.1 Summary of Updating and Screening Assessment (2006)

The findings of the Updating and Screening Assessment concluded that the respective air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide were unlikely to be exceeded, and that there was no requirement to progress to a detailed assessment for these pollutants.

The results of PM<sub>10</sub> monitoring undertaken at Admiralty Road (Rosyth) and Bonnygate (Cupar) indicated that the 2004 air quality objectives for PM<sub>10</sub> were attained at these locations, but that projected concentrations of PM<sub>10</sub> in 2010 for both sites were likely to approach and potentially exceed the 2010 annual mean objective. The report recommended that a detailed assessment was not required but that further monitoring should be undertaken at both sites to gain a more complete perspective of local concentrations of PM<sub>10</sub>.

In addition, concentrations of NO<sub>2</sub> recorded at automatic monitoring sites and diffusion tubes deployed locations within Fife indicated that annual mean concentrations close to the 40 µg m<sup>-3</sup> objective were noted at Bonnygate, Cupar and Appin Crescent, Dunfermline respectively. No other relevant locations were shown to approach or exceed the NO<sub>2</sub> objective concentrations.

#### 3.1.2 Summary of Progress Report (2007)

The Progress Report concluded that the respective air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide were unlikely to be exceeded, and that therefore there was no requirement to progress to a detailed assessment for these pollutants.

The results of automatic and passive sampling of NO<sub>2</sub> and PM<sub>10</sub> undertaken at Bonnygate, Cupar indicated that the annual mean objectives for each pollutant were likely to be exceeded and that therefore a Detailed Assessment of air quality for NO<sub>2</sub> and PM<sub>10</sub> was required for the area.

In addition, one NO<sub>2</sub> diffusion tube deployed at Appin Crescent, Dunfermline recorded a slight exceedance of the annual mean objective, whilst the data of PM<sub>10</sub> monitoring undertaken at Rosyth indicated that the annual mean objective was at risk of being exceeded at this location. In light of these findings, the report identified that Fife Council intended to

continue monitoring of PM<sub>10</sub> at Rosyth, and deploy a chemiluminescent analyser at Appin Crescent to assess concentrations of NO<sub>2</sub> at this location in more detail.

### 3.1.3 Summary of Detailed Assessment for Bonnygate, Cupar (2008)

The Detailed Assessment reported that the results of air quality monitoring undertaken in the Bonnygate area of Cupar identified exceedances of the annual mean objectives for NO<sub>2</sub> and PM<sub>10</sub> in 2007. In addition, the results of air dispersion modelling of the Bonnygate (A91), Crossgate (A914) and St Catherine Street (A91) suggested that the AQS objectives for NO<sub>2</sub> and PM<sub>10</sub> were likely to be exceeded at several locations within the Bonnygate area in 2007 and were also likely to be exceeded in 2010.

As a result of these findings, and in accordance with the Local Air Quality Management Guidance, the Bonnygate Air Quality Management Area came into force in December 2008. The most recent listed LAQM Review and Assessment documents are available for viewing at Fife Council's website ([www.Fifedirect.org.uk](http://www.Fifedirect.org.uk)), whilst all other documents are available on request from Fife Council.

### 3.1.4 Updating and Screening Assessment Report (2009)

In 2009 Fife Council completed the Local Air Quality Management Updating and Screening Assessment using the guidance outlined in LAQM.TG(09). On the basis of this assessment, it was concluded that no further action was required in respect to pollutants:

- Carbon Monoxide;
- Benzene;
- 1,3-Butadiene;
- Lead; and,
- Sulphur Dioxide.

Following analysis of the 2008 data for NO<sub>2</sub> and PM<sub>10</sub> it was concluded that no further action is required with respect to both these pollutants above and beyond the work that was already in progress by Fife Council. Bias adjusted NO<sub>2</sub> diffusion tube concentrations measured at St Clair Street, Kirkcaldy during 2008 are considered borderline exceedances of the relevant air quality objectives. However, in preceding years, although NO<sub>2</sub> concentrations were relatively high, they have not previously exceeded the relevant air quality objective. Fife Council concluded that further monitoring should be undertaken to confirm the findings prior to undertaking a detailed assessment. The Updating and Screening Assessment concluded that no further action was required for the following sources within Fife:

- Busy Streets where people may spend 1-hour or More Close to Traffic;
- Roads with a high flow of buses and/or HGVs;
- Junctions;
- New roads constructed or proposed since the last round of review and assessment;
- Roads with significantly changed traffic flows and;
- Bus and coach stations;
- Airports;
- Railways (diesel and steam trains);
- Poultry Farms; and,
- Ports (shipping).

Under the screening criteria set out within Local Air Quality Management Technical Guidance LAQM.TG (09), Fife Council has identified the need for one detailed assessment to be carried out for pollutants nitrogen dioxide and particulate matter at the following location: Kinghorn Primary School Biomass Boiler, Baliol Street, Burntisland, Kinghorn. The detailed



assessment of the biomass boiler in relation to Kinghorn Primary School is available at Fife Council's website<sup>4</sup> and concluded that the Scottish air quality objectives were unlikely to be breached as a result of the proposal.

### 3.1.5 Summary of Progress Report (2010)

The Progress Report identified no exceedances of the objectives in relation to carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide and it was concluded that no further action was required in respect to these pollutants.

Analysis of the 2009 Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>) monitoring data also resulted in the conclusion that no further action was required, over and above that already in progress by Fife Council. Bias adjusted data from additional diffusion tubes installed in 2009 at Appin Crescent have exceeded the annual mean concentrations. However, at the time of the completion of the report, monitoring had only been undertaken for five months of the calendar year. Consequently it was concluded that the Council should continue to monitor NO<sub>2</sub> at this location for a period of 12 months. Should measured levels of NO<sub>2</sub> exceed the annual mean objective when 12 months diffusion tube data is available at this location then Fife Council should proceed immediately to a Detailed Assessment at Appin Crescent, Dunfermline.

### 3.1.6 Summary of Detailed Assessments for Appin Crescent, Dunfermline

Detailed Assessments for Appin Crescent have been undertaken on 2 occasions. In 2008, the first detailed assessment was undertaken in response to results from diffusion tubes which indicating an exceedance of the annual mean objective for NO<sub>2</sub>. The assessment concluded that "Diffusion tube data, bias corrected from a locally derived correction factor; indicated that one of the relevant exposure receptors located on Appin Crescent was breaching the AQS annual average objective, reporting a concentration of 40 µg m<sup>-3</sup>.

However, taking into consideration the guidance outlined in LAQM.TG (09) with regards the limitations of diffusion tube samplers, and the borderline nature of the exceedance, it was recommended that the Council delay declaring an AQMA in the vicinity of Appin Crescent until further monitoring and validation can be undertaken. It was therefore concluded that the Council expand the diffusion tube network in the vicinity of the relevant exposure receptor to enable ambient concentrations to be characterised in more detail. Furthermore, it is suggested that triplicate tubes are located at this site and all new monitoring locations in this vicinity for 12-18 months. It was considered that this approach would fulfil the guidance outlined in LAQM.TG (09) and enable the Council to fully justify any future decision to declare, or not declare, an AQMA in the vicinity of Appin Crescent.

Following the recommendations of the Council's LAQM Progress Report for 2009, Fife Council undertook a Detailed Assessment of air quality in the vicinity of Appin Crescent, Dunfermline using the guidance outlined in LAQM.TG(09). The modelling study utilised ADMS-Roads in conjunction with relevant published vehicle emissions factors, ambient measurements, traffic counts and meteorological data for the area.

The study concluded that there are current exceedances of the NO<sub>2</sub> annual mean objective in Appin Crescent, Dunfermline. The spatial extent of the exceedances is quite small, although it was recommended that the Council should consider declaring the area as an AQMA, with the size of the declared area being slightly larger than the minimum required in order to account for any unavoidable uncertainty within the dispersion modelling. It was recommended that the AQMA declaration at Appin Crescent should as a minimum

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<sup>4</sup> [http://admin.1fife.org.uk/uploadfiles/publications/c64\\_KinghornBiomassBoilerAirQualityAssessmentReport2009.pdf](http://admin.1fife.org.uk/uploadfiles/publications/c64_KinghornBiomassBoilerAirQualityAssessmentReport2009.pdf)

encompass all residential properties which lie within the  $40 \mu\text{g m}^{-3}$  contour in the dispersion plots.

### 3.1.7 Summary of Progress Report (2011)

The Air Quality Progress Report identified no exceedances of the objectives in relation to carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide; but identified exceedances of the annual mean objectives for Nitrogen Dioxide ( $\text{NO}_2$ ) and Particulate Matter ( $\text{PM}_{10}$ ) at several locations. Monitoring of  $\text{NO}_2$  at the three automatic sites in Fife showed that concentrations at Appin Crescent, Dunfermline, Bonnygate, Cupar and Admiralty Road, Rosyth, were below the annual mean objective. Bias-adjusted diffusion tube data at 3 locations within Fife were found to exceed the  $\text{NO}_2$  annual mean objective, these were: Appin Crescent, Dunfermline; Admiralty Road, Rosyth and the Bonnygate, Cupar. However, diffusion tube data for the Bonnygate indicated that  $\text{NO}_2$  diffusion tube concentrations have generally reduced since the introduction of traffic management measures in 2009. The apparent downward trend in  $\text{NO}_2$  concentrations will be confirmed through ongoing monitoring.

Data of  $\text{PM}_{10}$  concentrations collected for 2010 showed that both the Bonnygate and Admiralty Road sites also marginally exceeded the annual mean objective for  $\text{PM}_{10}$  with concentrations of  $19 \mu\text{g m}^{-3}$ .

On the basis of the monitoring results, the report concluded that Fife Council should declare an AQMA at Appin Crescent, Dunfermline (which was the subject of a second Detailed Assessment in 2011), encompassing as a minimum all residential properties which lie between Park Lane and Couston Street. It was further recommended that the Council also undertake further monitoring of  $\text{NO}_2$  and  $\text{PM}_{10}$  in the vicinity of Admiralty Road, Rosyth. It was proposed that this process includes the incorporation of more diffusion tube locations at locations relevant for exposure of the general public.

In response to these recommendations, two new  $\text{NO}_2$  monitoring locations were added to the monitoring network around Appin Crescent in spring 2011. These were located at 11 and 57 Halbeath Road respectively, to the east of Appin Crescent. These monitoring locations were implemented mainly to ensure that the previously identified  $\text{NO}_2$  exceedance area was confined to Appin Crescent. In addition, an automatic  $\text{PM}_{10}$  analyser was also installed alongside the existing  $\text{NO}_x$  analyser at Appin Crescent in the spring 2011.

Furthermore, in February 2011, Fife Council also installed an automatic monitoring station at St Clair Street, Kirkcaldy to further investigate  $\text{NO}_2$  and  $\text{PM}_{10}$  concentrations. This data will be analysed in the 2012 Updating and Screening Assessment (USA), and if found to be exceeding the objective, Fife Council should proceed with a Detailed Assessment.

The most recent listed LAQM Review and Assessment documents are available for viewing at Fife Council's website ([www.Fifedirect.org.uk](http://www.Fifedirect.org.uk)), whilst all other documents are available on request from Fife Council.

### 3.2 Consultant's observations from site visits to the Appin Crescent AQMA

Prior to the development of the Air Quality Action Plan for Appin Crescent, Dunfermline, representatives from Ricardo-AEA have visited the AQMA on several occasions in order to observe local conditions and considerations that could help to guide the development of the action plan. The visits firstly identified that the area where exceedances of the annual mean objectives for NO<sub>2</sub> have been reported are associated with the close proximity of residential properties to the road, with the facades of some properties located approximately 1 m from the edge of the road (Figures 3.1 and 3.2).

**Figure 3.1 Appin Crescent AQMA – Facing West**



**Figure 3.2 Appin Crescent AQMA – Facing East**



The close proximity of the residential properties to the road offers minimal opportunity for road traffic pollution to disperse and to be diluted to lower concentrations. It was also observed that Appin Crescent leads onto the busy roundabout which links with the A823, Holyrood Place, East Port and Carnegie Drive with traffic flow managed through a series of traffic lights. During busy periods queues of traffic often form within Appin Crescent contributing to emissions of air pollutants including NO<sub>2</sub> but also PM<sub>10</sub>. The visits supported the view that the volume and nature of the flow of traffic through Appin Crescent combined with the close proximity of the residential properties is primarily responsible for the air quality exceedances identified in the previous review and assessment reports.

### **3.3 Summary of Further Assessment for the Appin Crescent AQMA (2012)**

Following the declaration of the Appin Crescent AQMA, the LAQM process requires a Further Assessment of air quality to be undertaken for the area. The objective of this Further Assessment was to re-assess the conclusions of the detailed assessment and to include any new information since the completion of the detailed assessment. The further assessment includes a source apportionment exercise, the aim of which is to identify the sources of emissions that contribute to local concentrations of NO<sub>2</sub> and PM<sub>10</sub>. The source apportionment thus provides a significant technical input to the action plan by identifying the principal local sources that can be targeted and considered within the action plan. The report also includes a provisional assessment of the potential impact of traffic management scenarios (traffic queuing) and reduced traffic volume on concentrations of NO<sub>2</sub> and PM<sub>10</sub>.

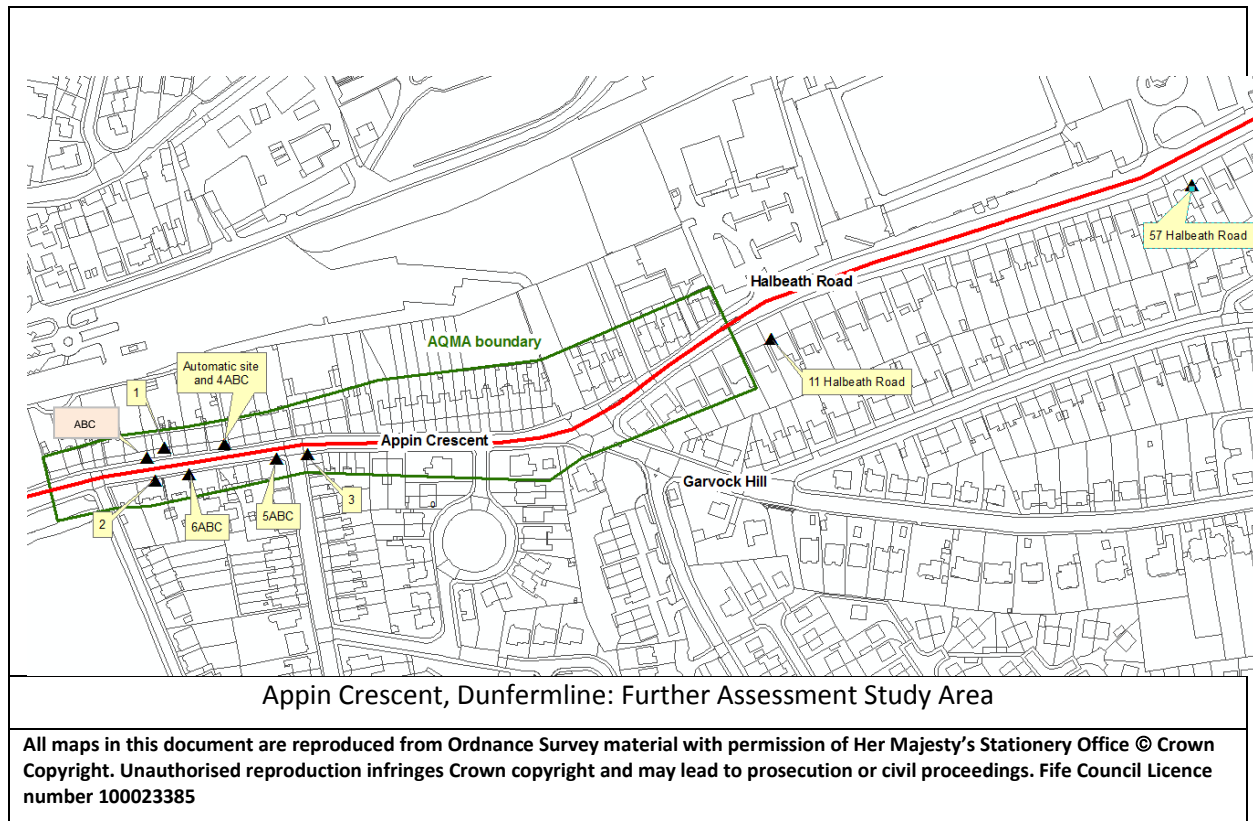
#### **3.3.1 Source Apportionment**

The report included an assessment of source apportionment whereby the contributions from different sources of each relevant pollutant are determined. In local air quality, the relevant sources typically include: road transport, local background concentrations, industrial, domestic and commercial sources. In AQMAs where road transport is identified as the principal source of emissions, the relative contributions from the different types of vehicles (e.g. cars, HGVs and buses) can also be determined to identify which vehicle types represent the most significant sources of pollution. Thus, the source apportionment allows the most important source or sources to be identified and options to reduce ambient concentrations of pollutants can then be considered and assessed.

The source apportionment exercise was undertaken using an air dispersion model which modelled the contribution of emissions of NO<sub>x</sub> and PM<sub>10</sub> from various sources at relevant exposure locations. The receptors of relevant exposure utilised within the study were correlated with the NO<sub>2</sub> diffusion tubes located within the study area. These receptor locations (1, 2, 3, ABC, 4ABC (and Automatic site), 5ABC, 6ABC, 11 Halbeath Road and 57 Halbeath Road) are presented in Figure 3.3. These receptors were chosen as locations where the public are likely to be regularly present and exposed over the averaging period of the objectives. Data for the source apportionment exercise is summarised below. Further details are presented in the Further Assessment.



**Figure 3.3 Receptor locations considered within the source apportionment**



The results of the source apportionment exercise have helped the Appin Crescent AQAP Steering Group to identify the most appropriate measures to include within the Action Plan. This exercise has enabled the prominent sources of emissions to be targeted, to help bring about the most effective reduction in emissions and subsequently ambient concentrations of both  $\text{NO}_x$  and  $\text{PM}_{10}$ .

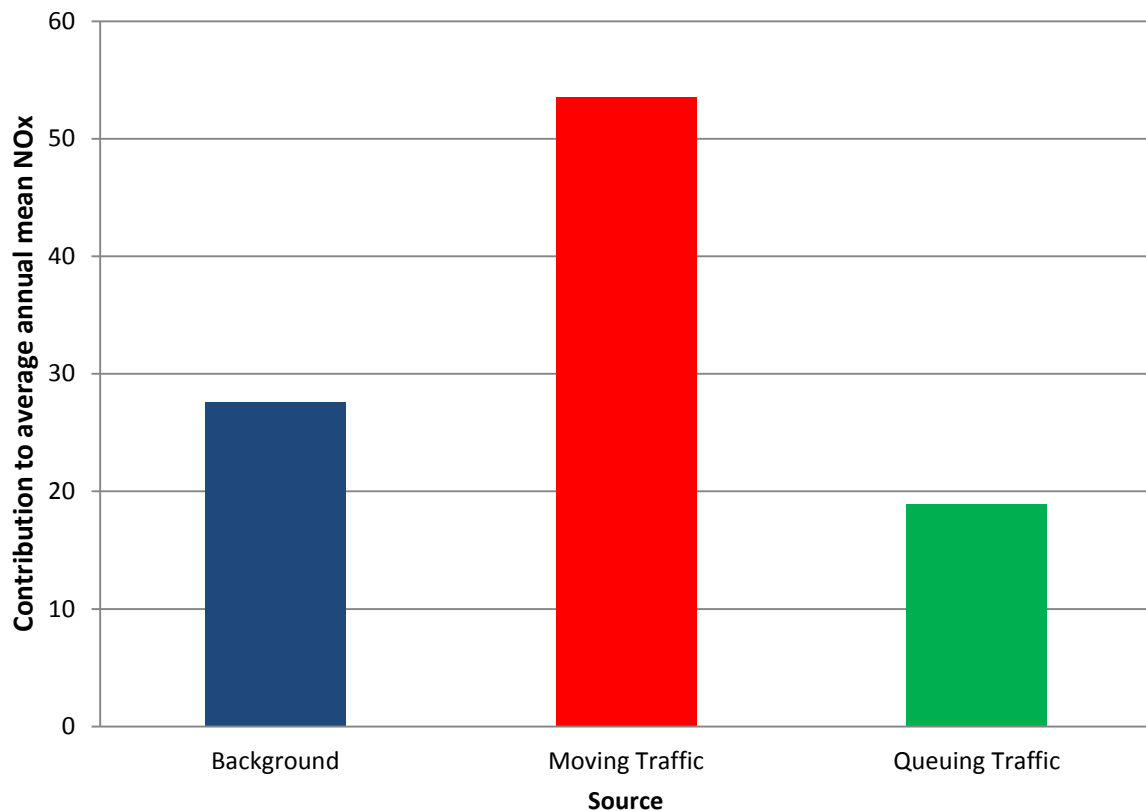
In the AQMA the exceedance of the annual mean  $\text{NO}_2$  objective has been identified as being mainly attributable to emissions generated from road transport sources. There are no other significant sources within the AQMA, and as such, road traffic is identified as being the main source and should be the focus of any work undertaken to remedy the problem in the AQMA. Tables 3.1-3.4 and Figures 3.4 and 3.5 summarise the key findings of the source apportionment study undertaken as part of the Further Assessment.

### 3.3.2 Sources of Nitrogen dioxide

The results of the source apportionment exercise relating to ambient concentrations of  $\text{NO}_2$  ( $\text{NO}_x$ ) are summarised in Figures 3.4 and 3.5. Modelling indicated that background concentrations of  $\text{NO}_x$  contributed between 22 to 42% of total  $\text{NO}_x$  concentrations at the receptor points within the AQMA, with the remaining 58 to 78% predicted to be attributable to emissions from local road traffic. At locations outwith the AQMA on Halbeath Road where concentrations of  $\text{NO}_2$  are lower, background sources make a more significant contribution to local concentrations. Analysis of the average contributions to  $\text{NO}_x$  concentrations from free-moving traffic and stationary vehicles indicated that moving traffic contributed approximately 43-62% of  $\text{NO}_x$  emissions, with queuing traffic estimated to contribute between 12 and 29% depending upon the location with the AQMA. Queuing traffic was predicted to make a more significant contribution to local  $\text{NO}_2$  concentrations around monitoring locations Appin

Crescent 2 and Appin Crescent 6ABC which are located towards the western periphery of the AQMA. Further details are presented in Appendix 5.

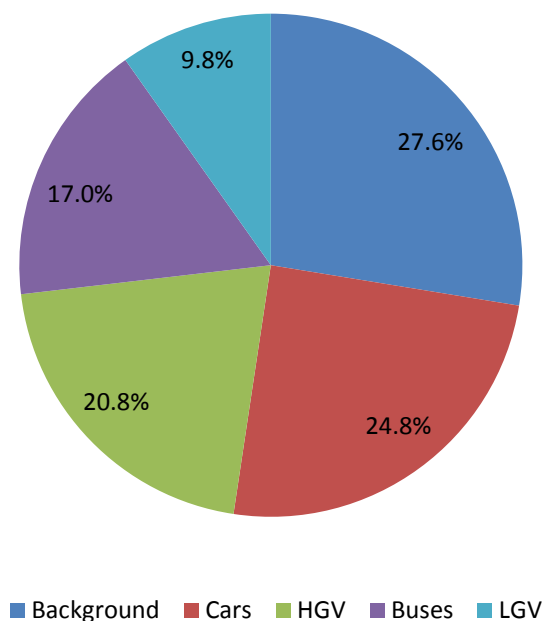
**Figure 3.4 Estimated average percentage contributions to ambient NO<sub>x</sub> concentrations within the Appin Crescent AQMA**



It is also useful to assess the emissions attributable to different classes of vehicles, to enable the action plan to target the vehicle classes that contribute most to local emissions. Hence analysis was undertaken to assess emissions contributions from various categories of the traffic fleet, namely Light Duty Vehicles (LDV) (cars, vans and motorcycles), Heavy Goods Vehicles (HGVs) and buses. A summary of the results of the analysis for NO<sub>x</sub> in the Appin Crescent AQMA is presented in Figure 3.5.



**Figure 3.5 Sources of ambient NO<sub>x</sub> concentrations within the Appin Crescent AQMA (%)**



The results indicated that all vehicle classes make a significant contribution to local NO<sub>x</sub> emissions, with cars being estimated to contribute approximately 25% on average. Heavy goods vehicles were found to make the second most significant contribution to local NO<sub>x</sub> concentrations, contributing approximately 21% on average and buses estimated to contribute approximately 17 %. Light goods vehicles were estimated to contribute less than 10% of emissions.

Taken collectively, these findings indicate that cars, HGVs and buses represent the principal source of NO<sub>x</sub> emissions within the Appin Crescent AQMA, and it is generally the volume of traffic that is contributing to the local air quality issue. However, it should also be noted that these figures relate to larger numbers of cars than other vehicle types, and that on an individual vehicle basis, HGVs and buses will generally produce more emissions of NO<sub>x</sub> than cars.

All of these vehicle sources represent potential targets for measures aimed at reducing emissions of NO<sub>x</sub>. In general, measures aimed at reducing the amount of traffic whether free-flowing or stationary will have a beneficial effect on local NO<sub>x</sub> concentrations.

### 3.3.3 Required Reduction in NO<sub>x</sub> Concentrations

LAQM.PGS(09) states that the further assessment must show that a Local Authority has calculated the reduction in emissions required to achieve the objectives of concern, as this will enable the authority to consider whether the measures proposed to achieve these reductions are proportionate and cost effective. From the modelling undertaken in the Further Assessment, it has been calculated that an 18% reduction in ambient concentrations of NO<sub>x</sub> from road transport is required to attain the annual mean NO<sub>2</sub> objective in the AQMA (Table 3.1).

**Table 3.1 Reductions required in NO<sub>x</sub> concentrations to achieve the NO<sub>2</sub> annual mean objective**

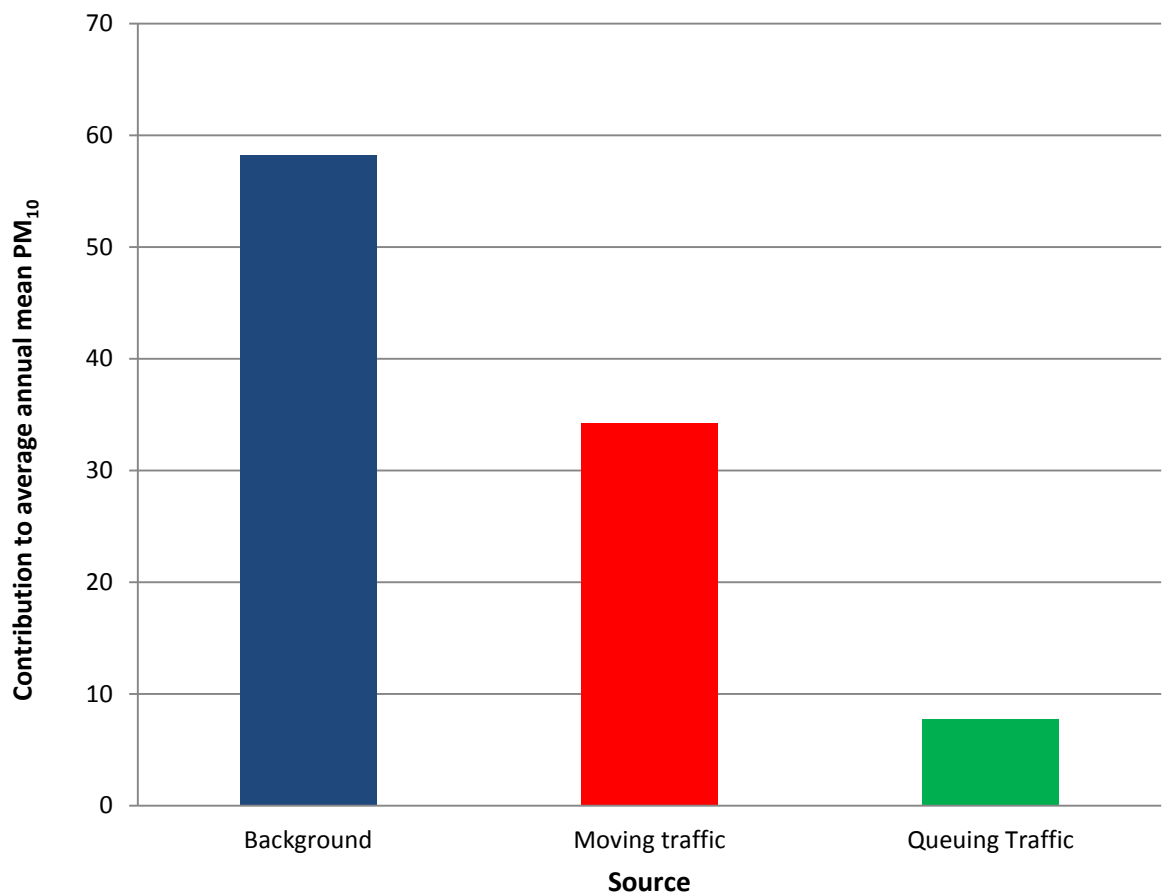
Location	Current Road- [NO <sub>x</sub> ] (µg m <sup>-3</sup> )	Required Road- [NO <sub>x</sub> ] (µg m <sup>-3</sup> )	Road-[NO <sub>x</sub> ] Reduction required (%)
Auto analyser + 4ABC	45.3	61.1	0.0
Appin Crescent ABC	48.4	61.1	0.0
Appin Cr 1	30.2	61.1	0.0
Appin Cr 2	65.7	61.1	7.5
Appin Cr 3	67.4	61.1	10.3
Appin Cr 5ABC	68.4	61.1	11.9
Appin Cr 6ABC	71.9	61.1	<b>17.7</b>
11 Halbeath Rd	15.4	61.1	0.0
57 Halbeath Rd	16.6	61.1	0.0

### 3.3.4 Sources of Particulate Matter (PM<sub>10</sub>)

The results of the source apportionment exercise regarding ambient concentrations of PM<sub>10</sub> are summarised in Figures 3.6 and 3.7. The results of modelling indicate that background concentrations constitute the most significant source of ambient concentrations of PM<sub>10</sub> within the Appin Crescent AQMA, being estimated to contribute between 53 and 71% of ambient concentrations at various points within the AQMA. Background sources make a larger contribution to ambient concentrations at the two sites on Halbeath Road which lie out-with the AQMA. Emissions from local road traffic are estimated to contribute the remaining 29-47%, with the majority of these local traffic emissions being attributed to moving traffic. However, queuing traffic makes a significant contribution to local PM<sub>10</sub> concentrations at the western periphery of the AQMA. Further details are presented in Appendix 5.

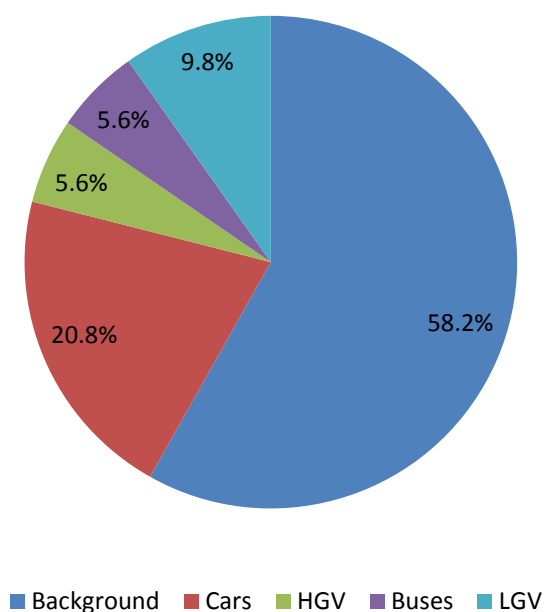
The high percentage contribution of PM<sub>10</sub> from background sources represents a problem for Fife Council, as it is difficult to implement measures at a local level that will result in a significant reduction in background concentrations. The background concentration of PM<sub>10</sub> represents the contribution from sources outside of the Appin Crescent AQMA. Common sources of background PM<sub>10</sub> include industrial, road transport, and domestic/ commercial combustion sources (heating), but natural sources and particulates produced through atmospheric reactions can also contribute significantly.

**Figure 3.6 Estimated percentage contributions to local concentrations of PM<sub>10</sub> within Appin Crescent**



The results of the estimated contribution from different vehicle types to ambient annual mean PM<sub>10</sub> concentrations are presented in Figure 3.7. These indicated that cars represent the most significant road transport source of PM<sub>10</sub> within the AQMA, being estimated to contribute 20.8% to ambient concentrations on average. LGVs were estimated to contribute a further 9.8% to local concentrations, with buses and HGV both estimated to contribute just over 5%. These findings indicate that whilst background concentrations represent the principal source of elevated PM<sub>10</sub> concentrations within Appin Crescent, road transport also makes a significant contribution to local concentrations. In particular, cars and light goods vehicles were found to make significant contributions to local concentrations and thus represent prime targets for measures aimed at reducing concentrations of PM<sub>10</sub> within the AQMA.

In general, measures aimed at reducing the amount of traffic whether free-flowing or stationary will have a beneficial effect on local PM<sub>10</sub> concentrations.

**Figure 3.7 Sources of ambient PM<sub>10</sub> concentrations within the Appin Crescent AQMA**

### 3.3.5 Required Reduction in PM<sub>10</sub> Concentrations

Taking into consideration the current concentrations of PM<sub>10</sub> reported in Appin Crescent and the Scottish annual mean objective (18 µg m<sup>-3</sup>), it is calculated that a 40% reduction in road-PM<sub>10</sub> concentrations is required in order for the objective to be attained at all locations within the AQMA (Table 3.2).

**Table 3.2 Reductions required in PM<sub>10</sub> concentrations to achieve the annual mean objective**

Location	Current Road- [PM <sub>10</sub> ] (µg m <sup>-3</sup> )	Required Road- [PM <sub>10</sub> ] (µg m <sup>-3</sup> )	Road-[PM <sub>10</sub> ] Reduction required (%)
Auto analyser + 4ABC	6.8	7.1	0.0
Appin Crescent ABC	7.3	7.1	2.8
Appin Cr 1	4.4	7.1	0.0
Appin Cr 2	8.9	7.1	25.4
Appin Cr 3	9.4	7.1	32.4
Appin Cr 5ABC	9.6	7.1	35.2
Appin Cr 6ABC	9.9	7.1	<b>39.4</b>
11 Halbeath Rd	2.4	7.1	0.0
57 Halbeath Rd	2.5	7.1	0.0

### 3.3.6 Conclusions of Source Apportionment

On the basis of the findings of the source apportionment exercise, Fife Council have considered measures that will target reductions in emissions from road traffic in general, but have included measures that target emissions from both moving and queuing traffic.

#### 3.3.7 Scenario Analysis

In addition to modelling baseline concentrations of NO<sub>2</sub> and PM<sub>10</sub> for the Appin Crescent AQMA for the base year, the further assessment modelled the potential impact of five potential scenarios (measures) to ascertain their potential impact on local concentrations of NO<sub>x</sub>/ NO<sub>2</sub> and PM<sub>10</sub> and in terms of compliance with the relevant objectives. The scenarios assessed were:

1. 5% reduction in traffic volume
2. 10% reduction in traffic volume
3. 20% reduction in traffic volume
4. 25% reduction in queuing traffic
5. 50% reduction in queuing traffic

These scenarios were modelled to inform future management decisions, but do not speculate on how the necessary reductions may be achieved. The scenarios were selected to obtain an indication of what impact various changes in traffic volume and queuing could have on concentrations of NO<sub>2</sub> and PM<sub>10</sub> within Appin Crescent. For both scenario classes (1) traffic volume and (2) queuing traffic, a range of reductions were assessed to inform the action plan. The lower reductions were included to assess the impact of what were considered to be more realistic changes in both parameters, 5% reduction in traffic volume and 25% reduction in queuing. It was considered that these reductions could feasibly be implemented with the appropriate consideration and therefore could be used to give an indication of what could feasibly be achieved by measures that could bring about such changes. Scenarios requiring larger reductions in traffic volume and queuing were also modelled to reinforce the impact of both these parameters on air quality within Appin Crescent, and the impact such large yet unlikely changes could have on local air quality.

A summary of these scenario analyses is presented below together with anticipated impacts on concentrations of NO<sub>x</sub> and PM<sub>10</sub> at relevant receptors.

##### 3.3.7.1 Scenarios 1-3: 5, 10 and 20% reductions in traffic flow

This scenario involves reducing the flow of vehicles on the Appin Crescent as well as Halbeath Road. To model this, a new set of emissions factors were derived for all modelled roads using the Emissions Factor Toolkit<sup>5</sup> (Eft) with the reduced flow of traffic. Tables 3.3 and 3.4 show the results of the analysis.

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<sup>5</sup> Emissions Factor Toolkit for Vehicle Emissions: <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#eft>

**Table 3.3 NO<sub>2</sub> concentrations at receptors for the ‘do-nothing’ and Scenarios 1-3**

Location	Modelled NO <sub>2</sub> <i>do-nothing</i> (µg m <sup>-3</sup> )	Modelled NO <sub>2</sub> <i>5% reduction</i> (µg m <sup>-3</sup> )	Modelled NO <sub>2</sub> <i>10% reduction</i> (µg m <sup>-3</sup> )	Modelled NO <sub>2</sub> <i>20% reduction</i> (µg m <sup>-3</sup> )
Auto analyser and 4ABC	33.9	32.9	32.0	29.9
Appin Crescent ABC	35.1	34.0	33.2	31.1
Appin Crescent 1	27.4	26.7	26.1	24.6
Appin Crescent 2	<b>41.8</b>	<b>40.5</b>	39.4	36.8
Appin Crescent 3	<b>42.4</b>	<b>41.2</b>	39.9	35.9
Appin Crescent 5ABC	<b>42.7</b>	<b>41.5</b>	<b>40.3</b>	36.0
Appin Crescent 6ABC	<b>44.0</b>	<b>42.7</b>	<b>41.5</b>	38.8
11 Halbeath Rd	20.6	20.2	19.8	19.1
57 Halbeath Rd	21.1	20.7	20.3	19.6

Values presented in bold indicate modelled exceedances of the annual mean objective.

**Table 3.4 PM<sub>10</sub> concentrations at receptors for the ‘do-nothing’ and Scenarios 1-3**

Location	Modelled PM <sub>10</sub> <i>do-nothing</i> (µg.m <sup>-3</sup> )	Modelled PM <sub>10</sub> <i>5% reduction</i> (µg.m <sup>-3</sup> )	Modelled PM <sub>10</sub> <i>10% reduction</i> (µg.m <sup>-3</sup> )	Modelled PM <sub>10</sub> <i>20% reduction</i> (µg.m <sup>-3</sup> )
Auto analyser and 4ABC	17.7	17.4	17.1	16.3
Appin Crescent ABC	<b>18.2</b>	17.9	17.5	16.4
Appin Crescent 1	15.3	15.1	14.9	14.3
Appin Crescent 2	<b>19.8</b>	<b>19.6</b>	<b>18.8</b>	<b>18.0</b>
Appin Crescent 3	<b>20.3</b>	<b>19.9</b>	<b>19.5</b>	<b>18.5</b>
Appin Crescent 5ABC	<b>20.5</b>	<b>20.0</b>	<b>19.6</b>	<b>18.6</b>
Appin Crescent 6ABC	<b>20.8</b>	<b>20.3</b>	<b>19.9</b>	<b>18.7</b>
11 Halbeath Rd	13.3	13.2	13.1	12.8
57 Halbeath Rd	13.4	13.2	13.2	12.9

Values presented in bold indicate modelled exceedances of the annual mean objective.

### 3.3.7.2 Scenarios 4 and 5: reduction in traffic queuing emissions: 25 and 50%

This scenario involves reducing the assumed queuing emissions in the baseline model by 25% and 50%. The same methodology as used for scenarios 1-3 was used, but this time reducing the number of queuing vehicles in the Eft to generate new emissions factors for input to the model. Tables 3.5 and 3.6 show the results of the analysis.



**Table 3.5 NO<sub>2</sub> concentrations at receptors for the ‘do-nothing’ and Scenarios 4 and 5**

Location	Modelled NO <sub>2</sub> <i>do-nothing</i> (µg.m <sup>-3</sup> )	Modelled NO <sub>2</sub> <i>25% reduction Qs</i> (µg.m <sup>-3</sup> )	Modelled NO <sub>2</sub> <i>50% reduction Qs</i> (µg.m <sup>-3</sup> )
Auto analyser and 4ABC	33.9	33.0	32.2
Appin Crescent ABC	35.1	33.9	32.7
Appin Crescent 1	27.4	26.5	25.5
Appin Crescent 2	<b>41.8</b>	39.5	37.2
Appin Crescent 3	<b>42.4</b>	<b>41.1</b>	39.9
Appin Crescent 5ABC	<b>42.7</b>	<b>41.5</b>	<b>40.3</b>
Appin Crescent 6ABC	<b>44.0</b>	<b>41.9</b>	39.8
11 Halbeath Rd	20.6	20.2	19.9
57 Halbeath Rd	21.1	20.8	20.4

Values presented in bold indicate modelled exceedances of the annual mean objective.

**Table 3.6 PM<sub>10</sub> concentrations at receptors for the ‘do-nothing’ and Scenarios 4 and 5**

Location	Modelled PM <sub>10</sub> <i>do-nothing</i> (µg m <sup>-3</sup> )	Modelled PM <sub>10</sub> <i>25% reduction Qs</i> (µg m <sup>-3</sup> )	Modelled PM <sub>10</sub> <i>50% reduction Qs</i> (µg m <sup>-3</sup> )
Auto analyser and 4ABC	17.7	17.5	17.4
Appin Crescent ABC	<b>18.2</b>	17.9	17.6
Appin Crescent 1	15.3	15.1	14.9
Appin Crescent 2	<b>19.8</b>	<b>19.2</b>	<b>18.6</b>
Appin Crescent 3	<b>20.3</b>	<b>20.0</b>	<b>19.6</b>
Appin Crescent 5ABC	<b>20.5</b>	<b>20.2</b>	<b>19.9</b>
Appin Crescent 6ABC	<b>20.8</b>	<b>20.2</b>	<b>19.7</b>
11 Halbeath Rd	13.3	13.3	13.2
57 Halbeath Rd	13.4	13.4	13.3

Values presented in bold indicate modelled exceedances of the annual mean objective.

As anticipated, the queue reduction scenarios above improve the likelihood of compliance with the NO<sub>2</sub> and PM<sub>10</sub> annual mean objectives in Appin Crescent. Both queue reduction scenarios reduce NO<sub>2</sub> and PM<sub>10</sub> concentrations, but even for the more realistic scenario exceedances of the objective are still predicted.

The built up urban topography that prevails at the worst case locations in Appin Crescent mean that, notwithstanding significant traffic flows along quite narrow road links, exceedances of the NO<sub>2</sub> and PM<sub>10</sub> objectives could exist until improvements in fleet emissions are observed (for instance by gradually improving Euro standards). That said, action planning interventions that reduce flows and/or queuing could reduce the magnitude of the exceedances predicted in this study.

### 3.3.8 Conclusions and recommendations from the further assessment

The findings of the further assessment confirmed that there are continued current exceedances of the NO<sub>2</sub> annual mean objective in Appin Crescent, Dunfermline. The spatial extent of the exceedances remains quite small and the current AQMA boundary is adequate for NO<sub>2</sub>. The assessment also indicated that there are exceedances of the Scottish annual mean PM<sub>10</sub> objective within the Appin Crescent AQMA and as this pollutant is not currently included in the AQMA order for the location, it was recommended that the order is amended accordingly. Fife Council submitted a report on the proposed amendment of the Order to the City of Dunfermline Area Committee for approval in August 2012.

The results of the source apportionment indicate that for PM<sub>10</sub> existing background concentrations are thought to be predominant in the overall concentrations at all locations in Appin Crescent. For NO<sub>x</sub>/NO<sub>2</sub> the contribution from road traffic is dominant overall.

The contribution from moving and queuing vehicles was tested. The contribution from moving traffic is thought to predominate between the two, although emissions from queuing vehicles are also important, though perhaps more so for NO<sub>x</sub> than PM<sub>10</sub>. Of the vehicle classes tested, cars and HGVs are the most significant sources of vehicular NO<sub>x</sub>, whilst cars and LGVs have been identified as the most significant sources of vehicular PM<sub>10</sub>. Buses are also an important source of both pollutants.

The study investigated the potential impact of several mitigation scenarios tested to provide insight into what influence they would likely have on ambient air quality and the likelihood of compliance with the NO<sub>2</sub> and PM<sub>10</sub> annual mean objectives in Appin Crescent. The scenarios modelled assessed percentage reductions in traffic volumes passing through Appin Crescent and also reductions in traffic queuing. All scenarios tested were, as expected, found to reduce NO<sub>2</sub> and PM<sub>10</sub> concentrations. However, each of the more realistic scenarios when considered in isolation was still found to have exceedances of the respective objectives.

From consideration of the source apportionment and scenario analyses, it is recommended that the action plan should include measures aimed at:

- Encouraging a reduction of the volume of traffic passing through Appin Crescent;
- Minimising the impacts of traffic queuing within the AQMA;
- Reducing the background concentration of PM<sub>10</sub> through encouragement of efforts at the national level.

## 4 Development of the Action Plan

This section reports on how the Action Plan has been developed to date.

### 4.1 Formation of Action Planning Steering Group

The development of the Action Plan began with an inception meeting, which was attended by a number of Local Authority officers. These officers have guided and been consulted on the development of the Action Plan. In this way the Action Plan has been influenced by their local knowledge and area of responsibility.

This steering group comprises:

- Douglas Mayne, Environmental Strategy, Fife Council (Chair)
- Nick Barron, Transportation and Environmental Services, Fife Council
- Kenny Bisset, Environmental Strategy, Fife Council
- Mary Siskou – Locality Support Team Leader, Fife Council
- Sally-Ann Kinsell – Community Team (Dunfermline), Fife Constabulary
- Tom Henderson – Fleet Services, Fife Council
- Tara Cowley, Development Management, Fife Council
- Blair Falconer, Environmental Strategy, Fife Council
- Dr Jackie Hyland, NHS Fife
- John Lamb, Scottish Environment Protection Agency
- Dr Jenny Wares, NHS Fife
- Mike Harvey, University of St Andrews
- Jim Robb, Environmental Strategy, Fife Council
- Eloise Griffin, Environmental Strategy, Fife Council
- Donald Payne, Environmental Strategy, Fife Council

The steering group was formed to provide an appropriate forum for developing the draft Air Quality Action Plan. The composition of the group was carefully considered to include representatives from relevant Local Authority Services with an interest in air quality and who may have an influence on the measures being considered within the draft plan. The composition of the steering group will be extended during the development of the action plan to include representatives from relevant organisations. Following the development of the initial draft it is proposed that representatives of Central Dunfermline Community Council and Dunfermline Delivers are invited to join the steering group and help progress the development of the plan. These organisations have already been provided with a presentation by the Chair of the Appin Crescent Air Quality Steering Group outlining the proposed action plan consultation method. Furthermore, an Appin Crescent Air Quality Management Board has also been formed, with the main remit of administering the action planning process. This Board consists of local elected members, in whose ward the Appin Crescent AQMA is located, and also representatives from Fife Council Enterprise, Planning and Protective Services and Transportation and Environmental Services.

## 4.2 Action Plan Development Process

The steering group have met and provided input to the development of the action plan several times during early 2012. The content of these meetings and discussions have included the following issues:

- Overview of the requirements of the action planning process;
- Review of air quality management options for the steering group to consider as potential measures within the AQAP;
- Detailed consideration and assessment of short-listed options aimed at reducing emissions and determination of how proposals outlined in the draft plan will be prioritised and implemented.
- Consideration of consultation feedback on the draft Action Plan.

The Scottish Local Air Quality Management Policy Guidance LAQM.PG(S)(09) provides statutory guidance on the content and development of air quality action plans. This document outlines that the AQAP should include the following as a minimum:

1. Quantification of the source contributions to the predicted exceedances of the objectives (to enable measures to be effectively targeted);
2. Evidence that all available options have been considered on the grounds of cost-effectiveness and feasibility;
3. Indicate how the Council will use its powers and also work in conjunction with other organisations and agencies in pursuit of the air quality objectives;
4. Clear timescales in which the Council, other organisations and agencies aim to implement measures identified within the plan;
5. Quantification of the expected impacts of the proposed measures and, where appropriate, an indication as to whether the measures will be sufficient to meet the air quality objectives; and
6. Indicate how the Council intends to monitor and evaluate the effectiveness of the action plan.

The Steering Group has taken the content of this guidance into consideration during the development of the plan.

## 4.3 Actions to date

To date the steering group has completed five main actions:

1. Initial consideration of all possible options for reducing ambient concentrations of NO<sub>2</sub> and PM<sub>10</sub> within the Appin Crescent AQMA. This provisional assessment enabled the identification of measures that are not feasible, sufficiently focussed, or which are considered disproportionate to the prevailing situation.
2. More detailed consideration and assessment of short-listed options aimed at reducing emissions. The role of the group is to provide comments, evaluate the options and to make decisions so that a list of prioritised options could be developed.
3. Determination of how proposals outlined in the draft plan will be prioritised and implemented.
4. Submission of the draft Action Plan for the consideration of the wider Council and other stakeholders to review the proposed content of the draft Action Plan and offer the opportunity to influence the development of the plan.
5. Finalisation of the plan incorporating feedback from public consultation.

The following sections of this report present the outcomes of these actions.

## 5 Action Plan Options and their Assessment

During the development of the Action Plan, the steering group has considered a full range of relevant options aimed at reducing ambient concentrations of NO<sub>2</sub> and PM<sub>10</sub> within the Appin Crescent AQMA. To date, the action plan drafting process has comprised of a gradual refinement of the range of potential options under consideration, to enable the focus to be centred on measures that directly address the principal problems but are also feasible and cost-effective compared to other potential options. As a result of continuing discussions and considerations of the steering group, some options have been amalgamated with other options, and going forward, further changes may also result from the forthcoming wider consultation process. This section describes how this was achieved and outlines some of the considerations of the steering group.

This chapter provides more information on the options and their assessment. The measures in the Action Plan are presented in the next chapter.

### 5.1 Initial Assessment of Options

This section reports on the work undertaken to consider the full range of Air Quality Action Plan options available in line with the requirements outlined in LAQM.PGS(09), to enable the identification of feasible and effective measures that can be developed in the Action Plan.

#### 5.1.1 Range of Possible Options

The Policy Guidance LAQM.PGS(09) states that Air Quality Action Plans must focus on 'effective, feasible, proportionate and quantifiable measures' and provide 'evidence that all available options have been considered on the grounds of cost effectiveness and feasibility'.

A wide range of potential options may be available to Fife Council and other stakeholders to improve local air quality within the Appin Crescent AQMA, and Dunfermline more generally. Therefore, at the onset of the action planning process it is appropriate to consider all potential options. The identification of potential measures for the consideration of the Steering Group was undertaken through a review of existing local and regional plans, consideration of measures referenced in LAQM.PGS(09) and relevant Environmental Protection UK guidance documents as well as recommendations of members of the Steering Group. Whilst Fife Council may not have the necessary powers to implement all such options, they may work with, or encourage other organisations and agencies that have the capacity to take such options forward.

Table 5.1 presents a list of six 'Option Categories' presented to the Steering Group. The Group was invited to provide an initial assessment of their feasibility and applicability. Each Option category includes several specific options that were considered by the Steering Group. A full list of the provisional options, together with a summary of comments from the steering group and the Council's consultant regarding their feasibility and applicability are presented in Appendix 3.

**Table 5.1 Potential Options to Improve Air Quality within the Appin Crescent AQMA**

Type	Description	Notes
1	Strategic measures	<p>Road transport emissions constitute a significant source of air pollution across the UK, and have contributed to the declaration of numerous Air Quality Management Areas. Due to the prevalence of road transport, a local long-term strategy is required to bring about a progressive reduction in emissions from the road transport sector in future years and encourage improvements in local air quality as a result.</p> <p>Furthermore, in Scotland, a more stringent annual mean objective for PM<sub>10</sub> is in place. Consequently, background concentrations of particulate matter make a significant contribution to local PM<sub>10</sub> concentrations.</p> <p>A long-term strategy aimed at reducing concentrations from these sources might include:</p> <ul style="list-style-type: none"> <li>• Building the capacity to better assess and manage the environmental impacts from road transport.</li> <li>• Specific commitments or targets within local development and transport planning policy to significantly reduce the impacts of new development.</li> <li>• Liaising with the Scottish Government to encourage the consideration/ implementation of national actions to reduce background concentrations of PM<sub>10</sub>.</li> <li>• Undertaking more detailed 'feasibility assessments' of complex actions or measures that would otherwise be eliminated from consideration.</li> </ul>
2	Move sources away from the AQMA	<p>Road transport emissions have been shown to represent the principal source of NO<sub>x</sub> within the AQMA and make a significant contribution to local PM<sub>10</sub> concentrations. The construction of new roads could divert traffic away from the roads in the AQMAs. Less traffic on these roads results in lower pollution levels in the AQMAs. However, the opportunity to build such roads is frequently absent. In cases where such roads can be built, care needs to be exercised that the locations where the new roads are built do not become AQMAs in turn. <b>Note that this option moves emissions from one location to another with no requirement to reduce them. Overall emissions may be increased by such actions.</b></p>
3	Traffic Management – optimisation of traffic movement through AQMA	<p>Changes in how the roads in the AQMA are signed or otherwise managed may reduce emissions from road transport a) by diverting some traffic onto better routes for them, or b) by reducing congestion/ stationary traffic. <b>Note that the opportunity to take such action is frequently limited.</b></p>
4	Reduce emissions from sources by technical means	<p>The majority of vehicles using roads in the AQMA are conventional petrol or diesel powered vehicles with a range of ages. There are many technical options to convert such vehicles into ones using cleaner engine and fuel technology. By accelerating the uptake of these technologies the emissions in the AQMAs would be reduced. <b>Note that technology does not always work in a positive sense for all emissions. They sometimes trade benefits for one pollutant against negative aspects for another one.</b></p>
5	Reduce emissions from sources by reducing the demand for travel or achieving better travel choices	<p>An important way to reduce emissions from transport is to reduce the number of journeys made through the AQMA. This could be achieved either through reducing the need to make some journeys, or by ensuring that these journeys are made via a less polluting form of transport. The success of such measures depends on policies that influence how people make travel choices. Note that there is</p>



**Table 5.1 Potential Options to Improve Air Quality within the Appin Crescent AQMA**

Type	Description	Notes
		increasing emphasis placed on such policies and that they work holistically by reducing emissions of all pollutants and greenhouse gases.
6	Other	May include a variety of measures e.g. targeting reduced emissions from domestic sources, industry or statutory nuisance.

### 5.1.2 Initial responses to the options

For each of the provisional options considered by the Steering Group, a decision has been made to eliminate several options from further consideration, or to consider the option further. This decision has been made with reference to:

- 1) Comments received from the steering group;
- 2) The conclusions from the source apportionment exercise presented in Chapter 3; and,
- 3) Additional comments from Fife Council's consultant based on experience in prior assessments.

Taking into consideration the situation in Appin Crescent the findings of the source apportionment exercise (Section 3) and existing Council Policy, several of the measures included within the provisional list of measures were eliminated from further consideration at this time. These measures are presented in Table 5.2.

**Table 5.2 Options eliminated from further consideration in the Appin Crescent AQMA**

<b>Move receptors away from AQMA</b>
Relocating residents from the AQMA
<b>Move sources away from AQMA</b>
Local ban on freight, car or bus traffic
Pedestrianisation of Appin Crescent
<b>Traffic Management – optimisation of traffic movement through AQMA</b>
Improved signage – AQMA signs
Speed controls
Commercial deliveries - loading/ unloading restrictions
Urban Clearway
<b>Reduce the emissions from sources by technical means</b>
Taxi Quality Partnership – e.g. investigate preferential licensing for taxis with low emissions
Vehicle emissions testing
Idling vehicle enforcement
Parking Management and Control
<b>Reduce the emissions from sources by means of encouraging better travel choices/ behavioural change</b>
Road use charging and workplace parking levy
Bus lanes

**Table 5.2 Options eliminated from further consideration in the Appin Crescent AQMA**

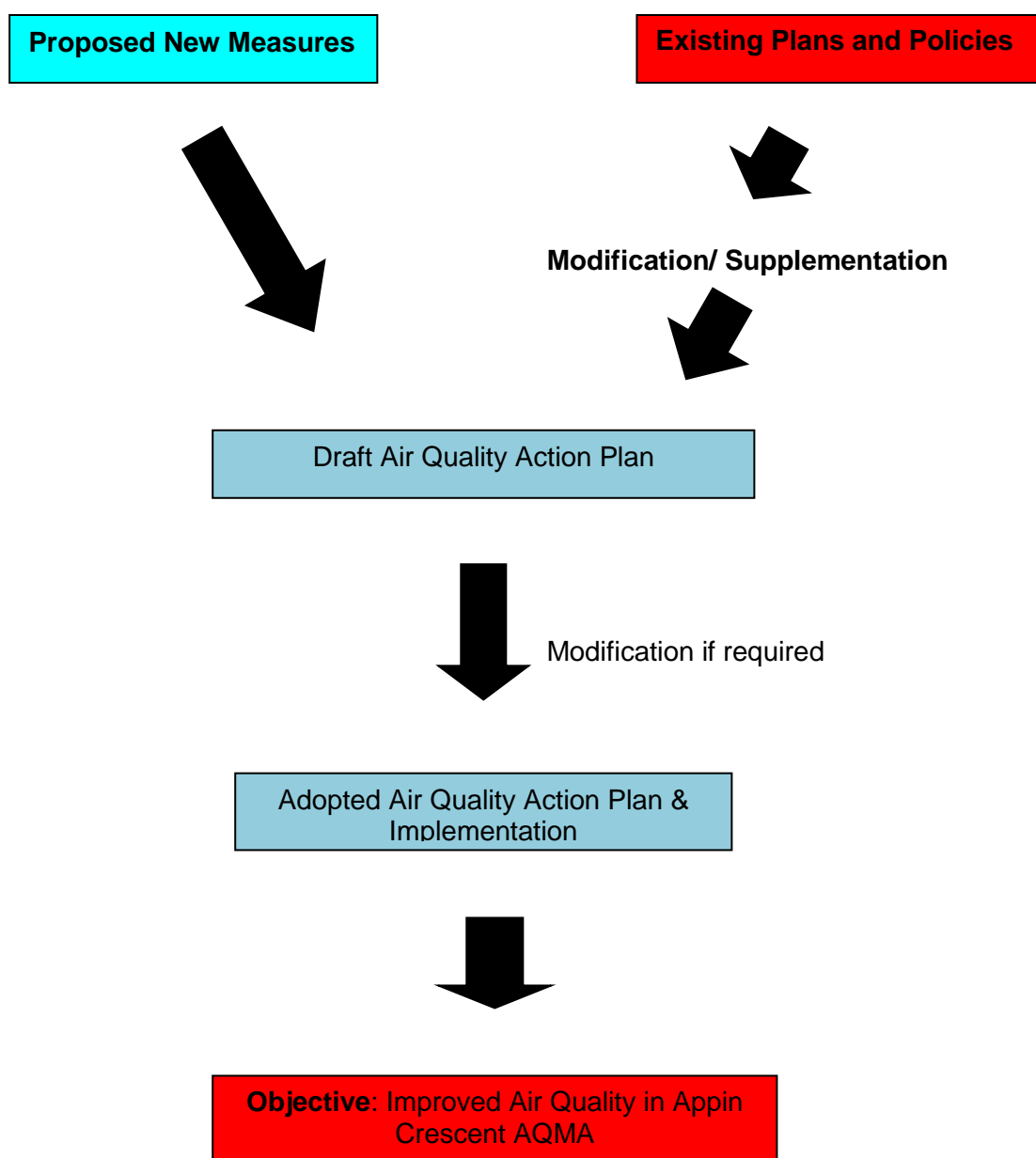
Relocating bus stops
<b>Other</b>
Home Energy Efficiency
Environmental Nuisance (including bonfires)

The measures listed in Table 5.2 have been excluded from further consideration at this time, as they were either not considered feasible, or were not believed to have an appropriately targeted impact on the predominant sources of emissions identified in the further assessment.

Fife Council intends to develop all of the remaining measures for inclusion within the Air Quality Action Plan. These measures include several new measures that require to be developed further and assessed prior to implementation. Also included are numerous measures that are in the process of being implemented by Fife Council but which may require some modification or supplementation in order to make a more significant contribution to improving local air quality in the Appin Crescent AQMA and also meet future reporting requirements. Some of these measures are already being implemented for the Bonnygate AQAP and thus will help Fife Council in developing a strategic and consistent approach to improving air quality within Fife.

Consequently, the approach adopted in this action plan to enable the assessment of new measures differs from that utilised to assess measures that have already been implemented. Most significantly, for measures that have already been implemented through existing plans and programmes, it is clear that these measures have previously been determined to be acceptable. As such, the assessment of existing measures undertaken within this plan is restricted to the assessment of their potential impact on air quality within the AQMA, plus any additional costs/ benefits associated with any modification/ supplementation of these measures.

**Figure 5.1. Overview of measures included within the Action Plan**



A summary of the remaining **new** and **existing** measures proposed for inclusion in the Action Plan are presented in Tables 5.3 and 5.4 respectively. Further details of the measures and their assessment are presented in the following sections.

**Table 5.3 New measures selected for further assessment and potential inclusion in the Appin Crescent AQAP**

<b>1 Strategic Measures</b>
a) Liaise with the Scottish Government to encourage the consideration and adoption of new measures that aim to reduce background concentrations of PM <sub>10</sub> and PM <sub>2.5</sub> .
b) Undertake a feasibility study to assess: <ul style="list-style-type: none"> <li>i. The potential for encouraging a proportion of existing traffic to use an alternative route (e.g. bypass);</li> <li>ii. The potential impacts and constraints of optimising the traffic phasing in and around the Appin Crescent AQMA;</li> <li>iii. The potential impact of proposed Halbeath Park and Ride on traffic within the AQMA and;</li> <li>iv. The Northern Link Road.</li> </ul>
<b>2 Traffic Management – optimisation of traffic movement through the AQMA</b>
a) Consideration of development of Appin Crescent bypass (dependent upon feasibility study)
b) Optimisation of traffic light phasing in and around Appin Crescent AQMA (dependent upon feasibility study)

**Table 5.4 Existing measures selected for further assessment and potential inclusion in the Appin Crescent AQAP**

<b>1 Strategic Measures</b>
c) Improving links with Local Transport Strategy
d) Improving links with Local Planning and Development framework
e) Encourage the integration of Air Quality within other Council plans and strategies
f) Maintain an Air Quality guidance note for developers
<b>3 Reduce the emissions from sources by technical means</b>
a) Investigate the potential for developing local bus quality agreements
b) Encourage Private and Public Operators to pursue cleaner vehicles and abatement.
c) Green Procurement (Council) and fleet management – Council fleets and contract vehicles
d) Eco-driving training policy (Fife Council)
e) Fleet/ fuel monitoring
<b>4 Reduce the emissions from sources by means of encouraging better travel choices/ behavioural change</b>
a) Provision of information regarding air quality and travel options – includes awareness raising
b) Promotion of alternative modes (cycling + walking)
c) Travel Plans for large institutions and businesses
d) Encourage use of public transport by working with local bus operators to improving/ upgrading bus stops – make public transport more attractive

## 5.2 Development of proposed measures

Each of the measures short-listed for further consideration in the plan are discussed in more detail below, together with a summary of potential sub-measures, the relevant authorities responsible for implementation, and the powers available to implement the given measures. Options were identified as being within the responsibility of the following authorities:

1. Fife Council further subdivided into:
  - a. Transportation and Environmental Services;
  - b. Development Management;
  - c. Environmental Strategy;
  - d. Procurement and Supplies;
  - e. Fleet Operations.
2. The Regional Transport Partnership (SEStran)

The assessment of the measures including their perceived cost-effectiveness and wider impacts together with the methodology utilised to undertake the assessment are discussed in Section 6. The proposed measures have been broken into relevant categories as presented in Table 5.1, and discussed in further detail below.

### 5.2.1 Strategic Measures

It is important that Air Quality Action Plans support and consider existing and or forthcoming transport and development plans, and vice versa. Therefore some integration of the AQAP with the local transport strategy/ area transport plan and the development plan is considered essential and represents a strategic and integrated approach to local air quality management. This strategic approach is outlined in proposed measures 1A to 1F.

#### ***5.2.1.1 Liaise with the Scottish Government to encourage the consideration and adoption of new measures that aim to reduce background concentrations of PM<sub>10</sub> and PM<sub>2.5</sub>***

The source apportionment study undertaken as part of the further assessment identified that background sources make a significant contribution to local concentrations of PM<sub>10</sub>. Background sources of particulate matter include a wide range of natural and man-made processes including industry, residential and commercial combustion and transport sources. However, local authorities have very limited opportunities to address background concentrations of pollutants and instead must rely on regional and national measures to address these and contribute to improving local concentrations.

Fife Council has been proactive in reviewing local concentrations of particulate matter (PM) including PM<sub>2.5</sub> and proposes to liaise with the Scottish Government regarding the consideration and adoption of new measures that will contribute to reducing background concentrations of PM and other pollutants.

Measure	Title
1	Liaise with the Scottish Government regarding the consideration of national measures to reduce background concentrations of PM
Definition	Key Intervention
a. Maintain contact with the Scottish Government regarding the adoption of national air quality measures.	Increase focus on background concentrations of PM and encourage national action.
Responsible authority and other partners	Powers to be used
Fife Council – Environmental Strategy	Voluntary

### ***5.2.1.2 Undertake a feasibility study to assess the potential impact of local infrastructure developments and traffic management optimisation on air quality in Appin Crescent***

In reviewing the situation with respect to air quality at Appin Crescent, Fife Council has recognised that there are a number of potential measures that should be considered in much greater detail to assess their feasibility for inclusion within the AQAP. These include complex and potentially expensive infrastructure and technical proposals that would typically be considered unfeasible for inclusion by stakeholders without further detailed investigation and thus excluded from the plan. However, Fife Council recognises that air pollution is a complex yet important issue that merits the consideration of 'difficult' measures to address the problem rather than focussing on soft measures that may have less of an impact at the identified area of exceedance. Consequently, Fife Council proposes to take a more strategic approach and assess the wider feasibility (including air quality impact, and wider social, environmental and economic impacts) of the following proposals:

#### **Appin Crescent bypass**

The Appin Crescent bypass is included in the Dunfermline and West Fife Local Plan and has been promoted by a number of local organisations and individuals as a potential solution to the air quality issues identified. However, the proposal of a bypass at Appin Crescent is realistically a concept at present with considerable uncertainty regarding its route and the wider infrastructure considerations.

#### **Optimisation of the traffic management system at Appin Crescent and the surrounding network**

The further assessment of air quality study indicated that traffic queuing on Appin Crescent makes a potentially significant contribution to road traffic emissions and local concentrations of air pollutants. Fife Council recognises that there is potentially scope for reducing traffic queuing in the Crescent and consequently local concentrations of NO<sub>2</sub> and PM<sub>10</sub>. However, the Council also note complex and extensive nature of the traffic management network associated with Appin Crescent and that consequently any work that was undertaken to optimise the traffic light phasing around Appin Crescent would require the consideration of potential implications across the wider area. The conclusions of the feasibility study will help to determine whether the required changes are viable and could realistically be progressed.

#### **Halbeath Park and Ride Development**

In addition, the Council also recognise that the approved development of the Halbeath Park and Ride could have an impact on road traffic and consequently emissions of air pollutants within Appin Crescent. The Park and Ride has been approved for development by 2013 as part of the replacement Forth Crossing project. The park and ride will provide 1000 parking spaces and aims to reducing traffic congestion travelling into Edinburgh from Fife. As part of



the Council's strategic approach to air quality, it is proposed that the potential impact of the park and ride development on road traffic and air quality in Appin Crescent is assessed.

Measure	Title
2	Feasibility study
Definition	Key Intervention
Undertake a feasibility study to assess the potential impact of local infrastructure developments and traffic management optimisation on air quality in Appin Crescent. a) Appin Crescent bypass b) Traffic management optimisations c) Halbeath Park and Ride d) The Northern Link Road	To adopt a strategic approach to air quality in Appin Crescent and undertake a detailed assessment of the feasibility and impacts of proposed infrastructure and traffic management measures.
Responsible authority and other partners	Powers to be used
Fife Council – Transportation and Environmental Services and Environmental Strategy	Voluntary

### 5.2.1.3 Improving links with the Local Transport Strategy

Road transport has been identified as the principal source of NO<sub>x</sub> and a significant source of PM<sub>10</sub> in the Appin Crescent AQMA. Consequently, Fife Council's Local Transport Strategy and the developing Dunfermline and West Fife Local Plan constitute key mechanisms for delivering initiatives aimed at improving local air quality.

Measure	Title
3	Improving links with Local Transport Strategy
Definition	Key Intervention
Future versions of LTS to be revised to include: <ul style="list-style-type: none"> <li>Reference to Appin Crescent AQMA and measures included in Air Quality Action Plan. Integration of plan with LTS.</li> <li>Develop action plan options that will be implemented via the local transport strategy.</li> </ul>	Measures to ensure the current poor air quality in the AQMA is improved where possible and to avoid future problems are implemented via the Local Transport Strategy.
Responsible authority and other partners	Powers to be used
Fife Council – Enterprise, Planning and Protective Services	Voluntary

### 5.2.1.4 Improving links with Local Planning and Development Framework

Development Planning and Control play an important role in minimising the potential detrimental impacts that new developments may have on local air quality. This Strategic measure is intended to minimise the potential impact of future developments on local air quality across Fife. As a strategic measure it has a broader remit that is not specific to Dunfermline but Fife generally. Whilst, Air Quality is already considered by Fife Council during the development planning process, the declaration of the new AQMA in Dunfermline presents the opportunity to refocus on the potential impacts of developments on local air quality during construction and operational phases. Whilst it is important that all large-scale developments are considered in terms of their potential impact on local air quality, it is particularly important that proposed developments that may exert an impact on the Appin

Crescent AQMA should be subject to particular consideration in terms of their potential impact on local air quality, and that all practicable mitigation measures are implemented.

This measure also includes the maintenance and continued provision of Fife Council's Air Quality guidance note for developers that was originally prepared to support the Bonnygate Air Quality Action Plan for Cupar<sup>6</sup>. This document outlines the potential requirement to undertake an Air Quality Impact Assessment for certain developments and the required content of such assessments. The guidance note should enable a consistent approach to air quality impact assessment to be adopted in the Council and minimise the potential effects of future development on air quality across Fife.

Measure	Title
4	Improving Air Quality links with Local Planning and Development Framework
Definition	Key Intervention
<ul style="list-style-type: none"> <li>a. Integration of Appin Crescent AQAP with future versions of Local Plan.</li> <li>b. Ensure that development proposals with the potential to exert an impact on the Appin Crescent AQMA are assessed for air quality impacts and where necessary, appropriate mitigation measures adopted.</li> <li>c. Continue to promote sustainable developments by using the planning process to maximise commitment from developers to minimise air quality impacts.</li> <li>d. Maintain and make available - air quality guidance note for developers.</li> </ul>	Local planning considerations aim to mitigate the cumulative negative air quality impacts of new development
Responsible authority and other partners	Powers to be used
Fife Council: Planning and Building Standards and Environmental Strategy	Voluntary

#### 5.2.1.5 Encourage Integration of Air Quality with other Council Strategies

Fife Council recognised the benefit of increasing the general awareness of air quality issues throughout the Council and the need to integrate air quality considerations within existing and future Council plans and strategies. Fife Council's Single Outcome Agreement (SOA) with the Scottish Government outlines the aim of providing better water, air and land quality under the banner of Sustaining and Improving Our Environment. In the future, the Appin Crescent AQAP should represent a key tool for helping to deliver on the SOA targets and indicators.

<sup>6</sup> Fife Council (2009). Bonnygate Air Quality Action Plan.

Measure	Title
5	Encourage Integration of AQ with other Council strategies
Definition	Key Intervention
a. Continue and enhance joint working between Council Services to encourage potential air quality implications of existing and future Council strategies.	Encourage opportunity for contributions towards improving local air quality and minimising negative impacts from existing and future Council strategies.
b. Maintain regular and ongoing communication between members of the Appin Crescent AQAP steering group.	Increase awareness of local air quality.
Responsible authority and other partners	Powers to be used
Fife Council and community planning partners	Statutory and Voluntary

## 5.2.2 Traffic Management – optimisation of traffic movement through AQMA

### 5.2.2.1 Consideration of development of Appin Crescent bypass (dependent upon feasibility study)

The proposal of a bypass for Appin Crescent is included in the Dunfermline and West Fife Local Plan and has been promoted by a number of local organisations and individuals as a potential solution to the air quality issues identified. Strategic measure 2 (above) outlines that Fife Council proposes to undertake a more detailed feasibility study regarding the proposal, as whilst the proposal is already included in the Local Plan a considerable amount of work still requires to be undertaken regarding the funding of such an expensive infrastructure project, the route itself and other social and environmental considerations. Consequently this measure has tentatively been included in the plan, as its acceptability and feasibility still requires to be determined.

Measure	Title
6	Consideration of development of Appin Crescent bypass (dependent upon feasibility study)
Definition	Key Intervention
This measure is dependent upon the conclusions of the feasibility study outlined in Strategic Measure 2. a. Development of an Appin Crescent bypass	If determined to be feasible, the development of a bypass at Appin Crescent may be a potential option to facilitate a reduction in the traffic volume passing through the AQMA and consequently contribute to lower emissions.
Responsible authority and other partners	Powers to be used
Fife Council	Voluntary

### 5.2.2.2 Optimisation of the traffic management system at Appin Crescent and the surrounding network

It has been identified that traffic queuing on Appin Crescent makes a potentially significant contribution to road traffic emissions and local concentrations of both NO<sub>2</sub> and PM<sub>10</sub>. Fife Council recognises that there may be potential scope for reducing traffic queuing in the

western part of the AQMA and consequently local concentrations of NO<sub>2</sub> and PM<sub>10</sub>. However, the Council also note the complex and extensive nature of the traffic management network associated with Appin Crescent and that consequently any work that was undertaken to optimise the traffic light phasing around Appin Crescent would require the consideration of potential implications across the wider area and the associated costs.

Fife Council proposes to undertake a study to assess the feasibility of this proposed measure and to help determine how, if possible, this measure can be progressed. Consequently measure 7 is included in the plan to help inform the internal decision making process, as the scenario analysis undertaken during the further assessment has identified the potential benefit to local air quality of reducing traffic queues within the AQMA.

Measure	Title
7	Optimisation of the traffic management system
Definition	Key Intervention
<p>This measure is dependent upon the conclusions of the feasibility study outlined in Strategic Measure 2.</p> <p>a. Optimisation of the traffic management system at Appin Crescent and the surrounding network.</p>	Reduce traffic queuing within the AQMA through the optimisation of the traffic management system.
Responsible authority and other partners	Powers to be used
Fife Council	Voluntary

### 5.2.3 Reduce the Emissions from Sources by Technical Means

#### 5.2.3.1 Investigate the potential for developing local bus quality agreements and the use of lower emission vehicles

Buses and coaches constitute an essential component of public transport in Fife, representing an important alternative to cars. Consequently the encouragement of the development of public transport options forms an important part of many of Fife Councils policies. Bus services represent a valuable and viable alternative to the use of private cars and the contribution of local services across Fife are considered an essential component of the Council's promotion of sustainable alternatives to private transport. However, in some circumstances buses can also make a significant contribution to emissions of NO<sub>x</sub> and PM<sub>10</sub>, and consequently it is important to assess what can be done to reduce emissions from fleet vehicles where possible.

Voluntary Bus Quality Partnerships are informal agreements between relevant bus operators and local authorities that are not enshrined in legislation. Such partnerships are usually formed between one or more Local Authority and bus operator(s) but may also include large organisations or institutions (e.g. businesses). In these partnerships each party makes a commitment to improvements that will result in enhancements to bus services in a given area through measures such as improved infrastructure or better vehicles. Numerous authorities in Scotland have already developed voluntary agreements with bus operators.

Since 2000, Fife Council has operated a voluntary agreement with Stagecoach in Fife at the Ferrytoll Park & Ride. Through the agreement, the Council provides a 1000 plus vehicle car park, CCTV system, and associated facilities. In return, Stagecoach provides a frequent service to Edinburgh and supervisory staff. Fife Council recognizes the potential benefits of developing voluntary bus agreements across Fife, including Dunfermline and Cupar and proposes to liaise with bus operators to investigate the future potential for reducing emissions from the bus fleet where this is feasible. The Council also proposes to liaise with

local operators regarding improvements to bus facilities to encourage members of the public to use public transport as an alternative to private vehicles.

Measure	Title
8	Investigate the potential for establishing voluntary bus agreements
Definition	Key Intervention
a. Liaise with local bus operators to establish the potential for developing local bus quality agreements. b. Liaise with bus operators regarding emissions from the bus fleet and improvements to bus service infrastructure.	Target reduced emissions from buses operating within the Appin Crescent AQMA.
Responsible authority and other partners	Powers to be used
Fife Council (Transportation and Environmental Services)	Voluntary

### 5.2.3.2 Reduce Emissions from the Council Fleet and Contract Vehicles

Fife Council considers that it should lead by example and target reductions in emissions from their transport fleet activities as much as practicable. Fife Council currently operates in the region of 2309 vehicles, comprising of:

- 147 Cars;
- 1104 Light Commercial Vehicles;
- 294 Heavy Goods Vehicles;
- 142 Passenger Vehicles;
- 45 Items of Heavy Plant.
- 577 Other small plant and miscellaneous items

The Council has implemented numerous policies and programmes aimed at improving the energy efficiency of the Council fleet. These are divided into four categories:

#### Procurement of Lower Emission Vehicles

Fife Council undertakes an evaluation process, taking into consideration fuel consumption figures and CO<sub>2</sub> emissions when procuring new vehicles for the Council fleet. Wherever practicable, Fife Council's Fleet Services aim to procure vehicles meeting the new emission limits established in the EU Directives. As a result of this replacement policy, the vast majority of the heavy goods vehicles operating within Fife Council's fleet comply with Euro IV or V emission standards.

#### Fuel Monitoring Management

Fife Council's Fleet Services provide data relating to fuel consumption to all Services within Fife Council, enabling each service to monitor targeted reductions in fuel usage and emissions. In order to refine this process, the Council has also implemented a vehicle telemetry system on some of its fleet vehicles. The system collects data on speed, odometer readings and fuel consumption from each vehicle and sends the data to a central server for collation. The introduction of this system should enable the Council to identify efficiencies in fuel and fleet management that will contribute to reduced emissions from the fleet across Fife.

## Alternative Fuelled Vehicles

There are a number of alternative fuels and technologies available that offer the potential to lower emissions of air pollutants and CO<sub>2</sub> from road transport sources. Fife Council operates a policy of assessing and where appropriate, incorporating new alternative fuelled vehicles within its fleet.

In line with the requirements of the Renewable Transport Fuel Obligation<sup>7</sup>, as of October 2008, all diesel utilised by Fife Council contains up to 7% bio diesel. Whilst bio-diesel is currently seen as the best alternative fuel approach, Fleet Operations will continue to evaluate the use of other alternative fuels such as hybrid vehicles and electric vehicles. In addition, Fleet Services are undertaking trials of numerous electric powered cars and vans to test the effectiveness and reliability of these vehicles during operation. The Council are to improve electric vehicle charging infrastructure via the Plugged in Places project.

## Safe and Fuel Efficient Driving Training

Fife Council trains and re-trains drivers to ensure that they drive in a more efficient way in a process linked to the introduction of the Driver CPC's (Certificate of Professional Competence). Fife Council's Fleet Services have received accreditation through the Joint Approvals Unit for Periodic Training (JAUP), to undertake in-house training for the new Driver CPC.

The Vehicle Drivers (Certificates of Professional Competence) Regulations 2007 requires the continuous training of vocational bus, coach and lorry drivers with part of the syllabus covering Safe and Fuel Efficient Driving (SAFED). The Council have approximately 400 members of staff who require to undertake and complete the training. However, Fleet Services are in discussions with other services within the Council regarding the advantages of fuel-efficient driver training and exploring the potential for extending training to other services.

Measure	Title	
9	Continue to target reductions in emissions from the Council fleet and contract vehicles.	
Definition		Key Intervention
Continue to target reductions in emissions from the Council fleet and contract vehicles through: <ul style="list-style-type: none"> <li>a. Continue periodic procurement of low emission vehicles;</li> <li>b. Monitor and assess viable options for alternative fuels, technologies and fuel additives;</li> <li>c. Undertake periodic training for vocational fleet drivers including Safe and Fuel Efficient Driving (SAFED);</li> <li>d. Assess potential for emissions standards for fleet contracts.</li> </ul>		Target reduced emissions from Council fleet vehicles and Council contract fleet vehicles.
Responsible authority and other partners		Powers to be used
Fife Council (Fleet Services/ Procurement and Supplies)		Voluntary and Certificate of Professional Competence

<sup>7</sup> Renewable Transport Fuel Obligation. The UK has since set a target of 5% of road fuel sold to come from biofuels by 2010



## **5.2.4 Reduce emissions from sources by means of encouraging better travel choices/ behavioural change**

The choices that people and organisations make in terms of travel and general behaviour can have a significant impact on local air quality. The Local Transport Strategy lists 'changing travel habits' as one of its key objectives.

By raising awareness of air quality and the Appin Crescent AQMA, and by promoting options and alternatives by which people can contribute to improving local air quality, it is hoped that long-term behavioural change can be encouraged. It is important that members of the public and organisations are informed about local air quality issues, as their support is important to the success of the AQAP. It is also important that local air quality is linked with other programmes being progressed within the Council, such as the Council's Climate Change Strategy. In order to achieve this, Fife Council is aiming to progress numerous actions outlined below.

### **5.2.4.1 Provision of Information and Promotion of Travel options**

Fife Council will continue to provide information and undertake marketing initiatives targeting increasing the Public's awareness of air pollution issues in Fife and to encourage members of the public to participate in improving the situation. This measure is intrinsically linked to the promotion of cycling and walking and the development of travel plans but focuses on the provision of information relating to air quality within Fife and public transport.

#### **Public Transport Information**

Public Transport is a key priority for Fife Council and our Transportation and Environmental Services work closely with the commercial operators of taxis, buses and trains. In order to encourage members of the public to utilise public transport instead of private vehicles, Fife Council provides information on public transport services operating within Fife through the Council website, and links to external organisations such as Traveline Scotland. The Council in partnership with Traveline also operates a mobile phone texting service for information on bus times for any bus stop (charged service).

#### **Promoting Cycling and Walking**

Promoting cycling and walking represents a key objective of Fife Council's Local Transport Strategy and also constitutes important aspects of the Fife Access Strategy. Fife Council aims to encourage members of the public to consider walking or cycling instead of using their car, and as a consequence, promote healthy lifestyle choices and environmental improvement by reducing the number of cars on the road.

Fife's vision is to develop cycling into a realistic choice as a method of transport and Fife as a cycle friendly leisure location. As part of this, the Local Transport Strategy (LTS) includes numerous short term objectives aimed at achieving this goal. In addition, the Council has developed a Cycling Strategy (2008-2013) to supporting the objectives of the Access Strategy and Local Transport Strategy (2006-2026). Fife attracted Millennium Funding to put in place over 300 miles of off and on road cycle network. In order to promote cycling, Fife Council has produced a series of maps to help cyclists navigate the 24 circular routes and five town networks. Each map shows colour-coded routes and gives route advice and recommends things to look out for and attractions to visit along the way.

Measure	Title
10	Provision of Information and Promotion of Travel options
Definition	Key Intervention
<p>To increase awareness of travel choice options and promote cycling/ walking, Fife Council propose to:</p> <ol style="list-style-type: none"> <li>Produce Travel Choices facility for Dunfermline.</li> <li>Undertaking Travel Marketing in Dunfermline.</li> <li>Undertake a publicity exercise to raise awareness of the Appin Crescent AQMA and encourage people to use sustainable forms of transport wherever possible.</li> <li>Maintain and promote the use of Tripshare Fife, car-sharing initiative.</li> <li>Continue to provide information about public transport services through the Council website.</li> <li>Ensure cycle networks and facilities are provided, as a matter of course, within existing and new networks and developments.</li> <li>To improve integration between cycling, walking and public transport.</li> <li>Increase cycling trips to employment, education and leisure facilities.</li> <li>Improve pedestrian facilities such as new footpaths and crossings.</li> </ol>	<p>To increase awareness of travel choices and encourage changes in behaviour that will contribute to improving local air quality.</p>
Responsible authority and other partners	Powers to be used
Fife Council (Environmental Strategy and Transportation and Environmental Services) and SEStran	Voluntary

#### 5.2.4.2 Provision of Information relating to Air Quality

Fife Council operates an extensive air quality monitoring network, with data from these sites made available to the public through the Scottish Air Quality Database and website. In addition, the most recent air quality management reports prepared by the Council are available through the Council website.

In order to raise the awareness of air quality issues and the presence of the AQMA in Dunfermline, Fife Council proposes to undertake a series of actions. In order to help raise awareness of air quality issues generally. In addition, in order to continue to raise the profile of Air Quality Management across Fife, and in particular the Appin Crescent AQMA, Fife Council propose to undertake a public awareness exercise aimed at improving awareness of local air quality issues and encouraging members of the public to participate in improving local air quality.

Measure	Title
11	Provision of Information and raising awareness of Air Quality issues
Definition	Key Intervention
To increase awareness of local air quality issues and public transport information. a. Continue to make information relating to local air quality management available through the Council website. b. Undertake a publicity campaign to raise awareness of the Appin Crescent AQMA.	To increase awareness of local air quality issues and encourage changes in behaviour that will contribute to improving local air quality.
Responsible authority and other partners	Powers to be used
Fife Council (Environmental Strategy and Transportation and Environmental Services)	Environment Act 1990 and Voluntary

### 5.2.4.3 Travel Plans for Large Institutions and Businesses

Travel plans aim to address the negative impacts of car travel, notably single occupancy vehicles, by encouraging car sharing, or a shift to more sustainable forms of transport, such as walking, cycling and public transport; or reducing the need for travel. Such plans typically recognise that one solution is unlikely to be suitable for everyone and thus focus on encouraging the consideration of alternative forms of travel through the provision of incentives such as improved cycle facilities, flexible working arrangements and discounted public transport.

Travel plans have been widely adopted across the UK and have been shown to be cost-effective at reducing car usage in numerous situations. As a result, the adoption of Travel Plans is now widely promoted by the UK Government<sup>8</sup>. Fife Council have been proactive in the development of Travel Plans, through the development of the 'Way Ahead to Work' Council Travel Plan, and by providing guidance and support to schools, businesses and organisations in relation to the design and implementation of successful Travel Plans. A summary of some of the activities undertaken by Fife Council in relation to travel plans is presented below.

#### School Travel Plans

School Travel Plans represent a commitment from schools to develop a package of measures aimed at encouraging healthier, safer and more environmentally friendly methods of travelling to and from school by parents, pupils and staff.

Fife Council already employs School Travel Plan Co-ordinators to assist teachers, pupils and parents in the development and implementation of Travel Plans, together with promoting health and environmental benefits of alternative travel choices. The Travel Co-ordinators provide guidance, and where appropriate, help establish a link between schools and other stakeholders. The Plans incorporate established programmes such as 'Safer Routes to School' and 'Active School Travel' but also aim to initiate a change in transport culture through education and encouraging change through initiatives like walking buses. Fife Council produced Primary and Secondary School Travel Plan resource packs which were distributed to all schools in Fife. Also a wide variety of publications aimed at encouraging the establishment of School Travel Plans have been made available through the Council website at [www.fifedirect.org.uk/schooltravelplans](http://www.fifedirect.org.uk/schooltravelplans).

<sup>8</sup> Good Practice Guidelines. Delivering Travel Plans through the planning Process. DfT (2009)

### Fife Council Travel Plan

In order to encourage a reduction in car dependency for commuting to and from work and whilst at work, Fife Council has developed a Council Travel Plan 'Way Ahead to Work' (2000). The Plan was based on a Council Travel Survey undertaken in 1999 and identified the following Objectives:

- A reduction in the number of single occupancy car journeys to work;
- An increase in the use of more sustainable forms of travel to work, and,
- A reduction in the amount of travel undertaken at work.

In order to achieve this, the plan outlined numerous actions covering walking and cycling, public transport, car use and reducing the need to travel. This overall plan has been supplemented by the development of framework travel plans for several town in Fife including Dunfermline. The travel plan includes a number of measures which are of interest to the development of this action plan, including:

- Fife Council Private Car Share Group;
- The development and implementation of Car Park Management Guidelines;
- The support and promotion of cycling and walking;
- Promotion of public transport;
- Reducing the need of staff to travel (e.g. flexible working).

Fife Council's travel plan is widening staff travel options.

### Encouraging External Organisations to Develop Travel Plans

Fife Council provides guidance and support to local businesses and organisations in the design of successful Travel Plans.

Measure	Title
12	Travel Plans for Large Institutions and Businesses
Definition	Key Intervention
To encourage and assist large organisations to develop and implement travel plans, including: <ul style="list-style-type: none"><li>a. Continue the implementation of Fife Council's travel plan;</li><li>b. Continue to support the implementation of School travel plans;</li><li>c. Work with local businesses/ organisations to encourage the development and implementation of travel plans.</li></ul>	To encourage a shift to more sustainable forms of travel, or reducing the need for travel.
Responsible authority and other partners	Powers to be used
Fife Council	Voluntary

## 6 Methodology Utilised to Assess Shortlisted Measures

In accordance with the government guidance, the measures short-listed for inclusion within the action plan have been assessed against a wide range of criteria in order to assess their suitability for inclusion within the plan and enable suitable measures to be prioritised. At this stage a number of measures are still in development, and it is likely that as these measures are further defined their contribution to the plan will require to be assessed in further detail. The criteria against which options were assessed were:

- Potential air quality impact;
- Implementation costs;
- Cost-effectiveness;
- Potential co-environmental benefits, risk factors, social impacts and economic impacts;
- Feasibility and Acceptability.

The following paragraphs outline how the assessment has been undertaken.

### 6.1 Potential Air Quality Impact

This is a key assessment in that the AQAP must focus on prioritising options that improve air quality most effectively. The assessment is complex in that the detailed assessment of any given option could normally be subject to a study of its own requiring significant resources. A semi-quantitative assessment relying on a level of judgement has been adopted. The method used is outlined below:

1. The description of the option and the proposed change to be brought about by the option is used alongside the source apportionment analysis (Chapter 3) to define what proportion of road transport emissions would potentially be affected by the option.
2. A view is then expressed on how much of the traffic would actually be changed by the option.
3. The proportion of emissions potentially affected by the option and the view on how far they could be changed by the option are combined to express a view on how much transport emissions may be reduced in the AQMA due to the option.
4. A view is then expressed on how significant this change in emissions would be in terms of making progress towards the air quality standard in the AQMA.

For the purpose of the AQ assessment the result of the realistic intervention has been assessed as having a potentially:

- Zero local AQ benefit if the realistic intervention is 0% or worse;
- Small local AQ benefit if the realistic intervention is 1%;
- Medium local AQ benefit if the realistic intervention is 2-5%;
- Large local AQ benefit if the realistic intervention is >5%.

## 6.2 Implementation Costs

The potential implementation costs of each option are assessed as follows:

- Cost neutral (measure already implemented through existing plans/ programmes)
- Low costs (up to £20k annually e.g. for small surveys or campaigns or other options using current resources)
- Medium costs (up to £60k annually e.g. for a full time officer and resources)
- High costs (up to £200k annually e.g. for small traffic management schemes)
- Very high costs (above £200k annually e.g. for new infrastructure)

The assessed costs attempt to include the costs to vehicle operators as well as to Fife Council. These cost bandings may be subject to revision depending on comments received from those consulted.

## 6.3 Cost-Effectiveness

The effectiveness of each measure in improving air quality is compared to the implementation costs in the following matrix:

AQ benefit \ Cost		Score	Zero	Small	Medium	Large
Score			0	1	2	3
Neutral		5	0	5	10	15
Low		4	0	4	8	12
Medium		3	0	3	6	9
High		2	0	2	4	6
Very High		1	0	1	2	3

In this table the assessed implementation costs and potential air quality impacts have been given a weighted score. The product of the weighted scores for each option is calculated. The results can be interpreted as follows:

- If the product is high (10 or more) then the measure is more cost-effective (significant impacts for the cost involved) and perhaps favourably cost-effective;
- If the product is medium (between 5-9) then the measure is in the medium range of cost-effectiveness;
- If the product is low (4 or less) then the measure is less cost-effective (small impacts for the cost involved) and perhaps unacceptably poor in cost-effectiveness terms.

This method only estimates the *relative* cost-effectiveness of options rather than their *absolute* values. The method is useful during discussions of the relative priority of different options. The final cost-effectiveness value is sensitive to changes in the assumptions of how effective a measure might be in reducing emissions and how costly it is.

## 6.4 Potential Co-environmental Benefits

In this assessment other environmental benefits are highlighted.

- Greenhouse gases: The likely effect on greenhouse gas emissions is assessed as being an overall reduction or a local reduction perhaps with emissions being relocated elsewhere.
- Noise.

Without detailed information on the true impacts of the options these assessments rely on judgement.

## 6.5 Potential Risk Factors

In this assessment risk factors are highlighted. These may be looked at more closely within a Strategic Environmental Assessment of any measure implemented. At this stage it is simply highlighted whether or not it is likely that the measure would:

- Relocate emissions and hence lead to worsening air quality elsewhere;
- Require a change in land use;
- Place limits on pace of development, or increase costs of development significantly.

Without detailed information on the true impacts of the measures, these assessments rely on judgement.

## 6.6 Potential Social Impacts

Potential social impacts are highlighted. These may need to be examined more closely when developing the options further. At this stage it is simply highlighted whether or not it is likely that the option would potentially:

- Provide health benefits in terms of lower exposure to pollutants or increased mobility;
- Increase road safety;
- Improve accessibility.

Without detailed information on the true impacts of the options these assessments rely on judgement.

## 6.7 Potential Economic Impacts

Potential economic impacts are highlighted. These may need to be examined more closely when developing the options further. At this stage it is simply highlighted whether or not it is likely that the option would potentially:

- Influence sustainable development or accessibility in Dunfermline;
- Reduce or increase overall travel time;
- Place additional requirements on operators.



## 6.8 Feasibility and Acceptability

Each option has been assessed for its feasibility against three simple criteria. These are whether the authority has:

- The executive powers under existing legislation to implement and enforce a measure. Alternatively, whether the authority has an existing mechanism to influence other agencies to implement a measure;
- Secured funding for the measure or a straightforward route for securing funding;
- Characterised the potential positive and negative impacts of the measure with sufficient evidence or confidence to make a decision to implement the measure.

The table below sets out the criteria adopted for defining the option as being feasible over the short, medium or long term, or as being unfeasible. Each option is assessed against each criterion. The final feasibility timeframe is defined according to which of the three assessments results in the longest of the four possible terms (short, medium, long or unfeasible). For example, an option for which powers are clear and for which impacts are well characterised but for which funding will be difficult to obtain would be assessed as feasible over the long term.

Feasible in the:	Authority has the powers	Funding secured	Potential positive and negative impacts are well characterised
Short term (1-2 years)	Yes, clearly defined and already exercised	Yes potentially straightforward	Yes
Medium term (3-6 years)	Yes but novel or with an element of uncertainty	Yes with forward planning	Not without further study
Long term (>6 years)	Highly uncertain	No or extremely difficult	Not without further study
Unfeasible	No	Will never attract funding	Hard to characterise and with high risks

In relation to the acceptability, a preliminary judgement is expressed on how acceptable each option might be to stakeholders according to the following criteria:

- The option is considered potentially acceptable if: the option is unlikely to compel people to change behaviour or increase their costs significantly or at least some level of behaviour change or personal costs are required but the scheme is overall consistent with community policies;
- The option is considered potentially unacceptable if: unacceptably intrusive changes in behaviour or large personal costs would be incurred.

Final judgements on acceptability will necessarily rest with the elected Council members.

A summary of the results of the assessment is presented in Table 6.1 below, with further details presented in Appendix 4.

Table 6.1 Summary Assessment of Proposed Measures									
Measure Title (CE Score)	Potential Air Quality Impact	Estimated Costs	Cost Effectiveness	Potential Co- environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability
<b>Strategic measures</b>									
Liaise with Scottish Government to encourage the consideration of national measures				GHG – positive Other AQ pollutants - positive			Potential costs to operators of prominent sources	Fife Council	Short-term/ Acceptable
Feasibility study				NA	NA	NA	NA	Fife Council	Short-term/ Acceptable
Improving links with Local Transport Strategy/ Area Transport Plan				GHG - positive Other AQ pollutants – positive	Care to avoid relocating pollution	None Identified	May influence development and associated aims.	Fife Council Enterprise, Planning and Protective Services	Short-term/ Acceptable
Improving Air Quality links with Local Planning and Development Framework				GHG - positive Other AQ - positive	Care to avoid relocating pollution	None Identified	May influence development and associated aims.	Fife Council Planning and Building Control and Environmental Strategy	Medium-term/ Acceptable
Integrate AQ with other Council strategies				GHG - positive. Other AQ-positive		None Identified		Fife Council Environmental Strategy	Medium-term/ Acceptable
<b>Measures aimed at optimising how road traffic sources transit AQMA</b>									
Consideration of development of Appin Crescent bypass (dependent upon feasibility study)	L	VH	Low	Other AQ in Appin Crescent	Relocate a proportion of emissions.	Impact on resident close to proposed development route. Wider impact in area during development.		Fife Council	Unknown at present
Traffic management optimisation (dependent upon feasibility study)	M-L	H	Medium-High	Other AQ – positive Noise – positive GHG – positive	None identified	Improved road safety.	None identified	Fife Council Transportation and Environmental Services	Short-term/ Acceptable
<b>Reduce the emissions from sources by technical means</b>									
Investigate the potential for establishing voluntary bus agreements	S	M-H	Low	GHG- positive Other AQ – positive			Potential impact on Operators	Fife Council Transportation and Environmental Services	Medium Term/ Acceptable

Table 6.1 Summary Assessment of Proposed Measures									
Measure Title (CE Score)	Potential Air Quality Impact	Estimated Costs	Cost Effectiveness	Potential Co- environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability
Target reductions in emissions from the Council fleet and contract vehicles (including driver training).	S	H*	Low	GHG- positive Other AQ – positive Noise - positive	None identified	Neutral Positive impact of training	Neutral	Fife Council Procurement and Supplies	Short- Medium term/ Acceptable
<b>Reduce emissions from sources by means of encouraging better travel choices/ behavioural change</b>									
Travel Plans for Large Institutions and Businesses	M	M*	Medium	GHG - positive Other AQ – positive Noise - positive	None identified	Health benefits	Potential financial benefits to employees	Fife Council Transportation and Environmental Services	Short-term/ Acceptable
Provision of Information and Promotion of Travel options	M	M*	Medium	GHG - positive Other AQ – positive Noise - positive	Potential road safety issues (cycling and walking)	None Identified	Potential benefits	Fife Council Environmental Strategy and Transportation and Environmental Services	Short- Medium-term/ Acceptable
Provision of Information relating to Air Quality	S	L*	Medium	GHG - positive Other AQ – positive Noise - positive		Access to information		Fife Council Environmental Strategy and Transportation and Environmental Services	Short-term/ Acceptable

*\*Partly or wholly implemented through existing finance stream*

## 7 Action Plan

Fife Council has already introduced several measures that will contribute to improving air quality within the Appin Crescent AQMA in future years. They are now seeking to implement further measures to bring about a greater improvement in local air quality and make progress towards meeting all of the respective air quality strategy objectives. This Chapter presents the measures that have been identified as being the most appropriate in addressing the local air quality problem identified within the Appin Crescent AQMA and therefore the priority measures for inclusion within the Action Plan.

The measures identified via assessment as priorities and therefore included within the Action Plan can be understood as comprising two lists:

1. Strategic options aimed at integrating air quality into all relevant areas of decision making within Fife Council.
2. Specific options aimed at reducing congestion within the Appin Crescent AQMA, reducing emissions from principal sources, promoting greater awareness of local air quality and encouraging more sustainable travel choices within Fife in general.

### 7.1 Prioritisation of Measures

Based on the assessment undertaken for each measure, a prioritised list of options has been produced. It is potentially complex to decide on priorities from such a wide range of criteria. However, for the purpose of the AQAP we have put particular weight on those options, which are supported by members of the Steering Group, and which provide good potential AQ benefits (with appropriate consideration of cost-effectiveness and the wider environmental benefits or risks). Due to their overarching nature, it is anticipated that the strategic measures will provide some of the frameworks by which the other measures will be successfully implemented. Therefore they are not assessed in the same way and are regarded as overall priorities for implementation.

To enable the prioritisation of measures, the score (1-3) assigned to the air quality impact has been multiplied by the score assigned to the anticipated cost implications (1-5). This approach provides a basic cost-effectiveness analysis which together with consideration of other factors and timescales has enabled the prioritisation of the measure included within the plan. This has identified the following ranking of options:

Table 7.1 Prioritisation of Measures		
No	Measure	Timescale <sup>9</sup>
<b>Strategic Measures</b>		
1	Liaise with Scottish Government to encourage the consideration of national measures	
2	Feasibility study	
3	Improving links with Local Transport Strategy/ Area Transport Plan	
4	Improving Air Quality links with Local Planning and Development Framework	
5	Integrate AQ with other Council strategies	
<b>Direct measures</b>		
6	Traffic management optimisation (dependent upon feasibility study)	Short-term/ Acceptable
7	Travel Plans for Large Institutions and Businesses	Short-term/ Acceptable
8	Provision of Information and Promotion of Travel options	Short- Medium-term/ Acceptable
9	Provision of Information relating to Air Quality	Short-term/ Acceptable
10	Target reductions in emissions from the Council fleet and contract vehicles (including driver training)	Short-Medium term/ Acceptable
11	Investigate the potential for establishing voluntary bus agreements	Medium Term/ Acceptable
12	Consideration of development of Appin Crescent bypass (dependent upon feasibility study)	Unknown at present

## 7.2 Funding Implementation of the Action Plan

The capacity to successfully implement an Air Quality Action Plan is heavily dependent upon obtaining adequate funding and resources to deliver the proposed measures. Many of the measures included within the plan are already supported through existing strategies (e.g. local transport strategy) but may require some additional funding to facilitate modification in line with the requirements of this action plan. For other measures, other sources of funding will require to be secured before the proposals are progressed. Other potential sources of funding include:

- Scottish Government Air Quality Funding;
- Developer contributions;

The availability of such funding is likely to determine the progress of the Action Plan.

The final action plan will have to be approved by Fife Council and by the Scottish Government before it can become a fully adopted plan. Once it has been adopted, Fife Council will collaborate with relevant stakeholders regarding the implementation of identified measures and monitor the progress of their implementation. This information will be reported annually to the Scottish Government and SEPA in the statutory progress report.

Throughout the period that the plan is implemented Fife Council will:

- Continue to monitor and review air quality to assess whether the AQMA should be revised or revoked;

<sup>9</sup> Short term (1-2 years); Medium term (3-6 years); Long term (>6 years)

- Produce an annual progress report that sets out new information on air quality in Fife, which will also report on progress made with implementing the action plan;
- Continue to work closely with other stakeholders and partner organisations in implementing the action plan measures and in assessing whether the plan needs to be revised in the light of the findings from air quality review and assessments.

## 8 Consultation on the Draft Air Quality Action Plan

During the period of 1<sup>st</sup> October to the 23<sup>rd</sup> November 2012, Fife Council undertook an extensive consultation process where complete and summarised copies of the draft Air Quality Action Plan were distributed to statutory consultees, external organisations and the general public. In addition, consultation leaflets (Figure 8.1) with an associated questionnaire were made available at [www.fifedirect.org.uk](http://www.fifedirect.org.uk) and at various locations throughout Dunfermline, including public buildings.

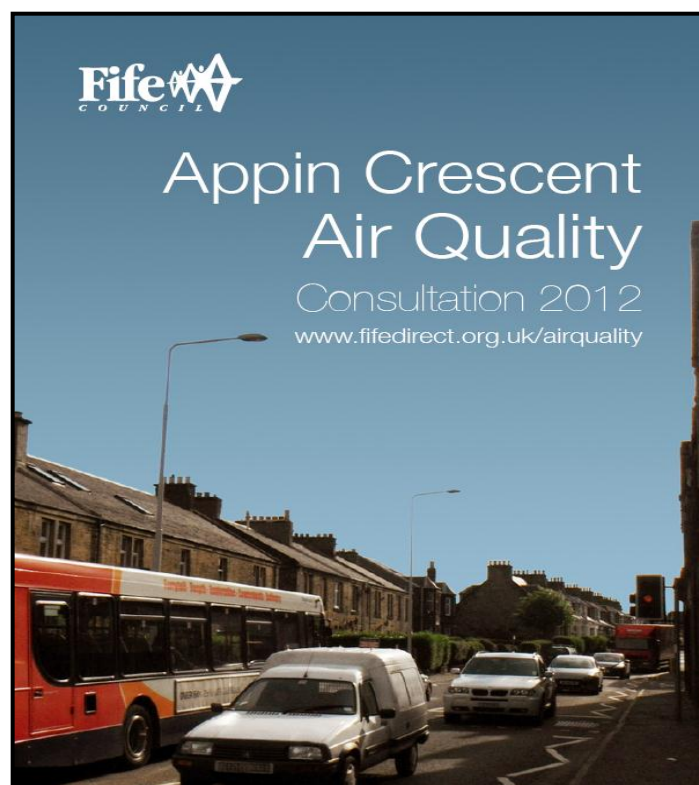
In addition, public workshop events for the draft Appin Crescent Air Quality Action Plan were held on Tuesday 16th and Thursday 18th October 2012 in the Library/Lecture Room facilities at Carnegie Hall, Dunfermline. Despite low attendance figures a wide range of air quality related issues were discussed at these events.

This included views on:

- The proposed Appin Crescent bypass;
- Freight numbers in the Appin Crescent;
- Clarification on proposals for Northern Link Road;
- New traffic lights at Sinclair Gardens Roundabout;
- Need for more pictorial aids (such as graphs) in the action plan document and;
- Further clarification on timescales for action plan measures.

These views have been considered in finalising the Appin Crescent Air Quality Action Plan.

**Figure 8.1 Consultation Leaflet**





## 8.1 Draft Air Quality Action Plan: Public Consultation Summary

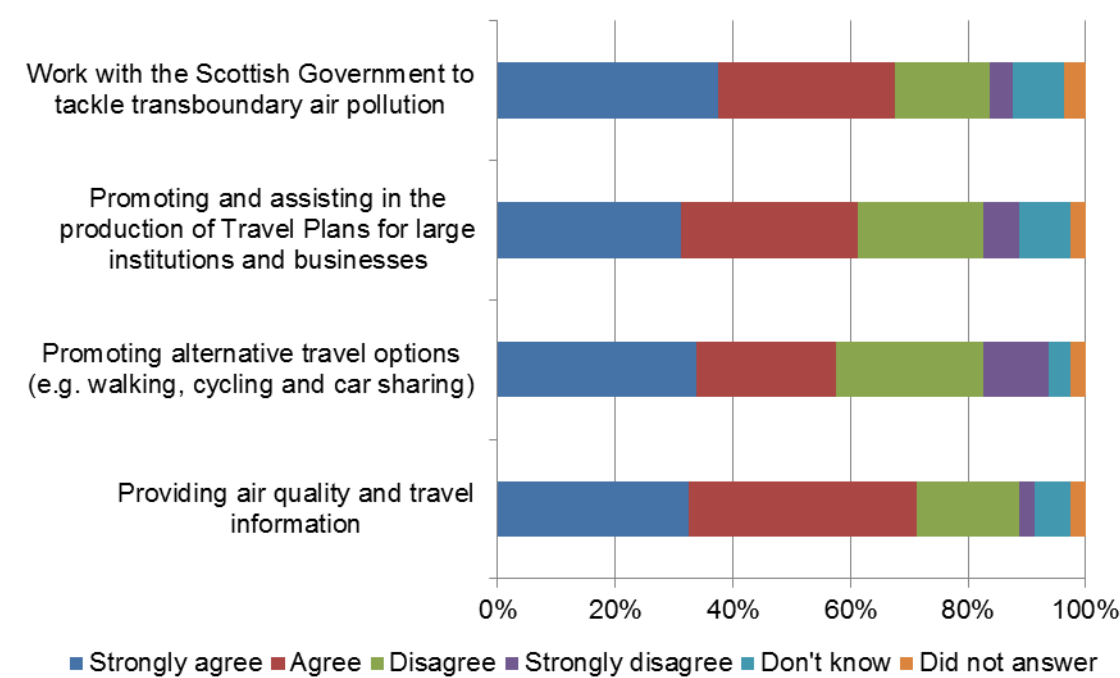
The following sections summarise the public consultation process undertaken by Fife Council in relation to the draft Air Quality Action Plan and the responses received from the general public and representatives from various organisations during the official consultation period.

### 8.1.1 Consultation Questionnaire

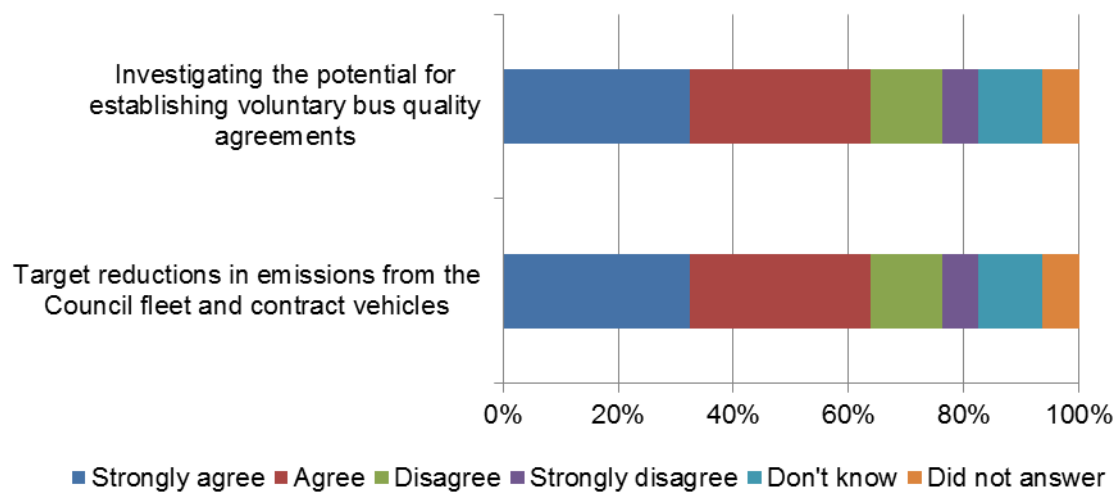
The leaflet distributed during the consultation period outlined the main air quality problems in and around Appin Crescent, Dunfermline and the measures proposed by Fife Council in the AQAP aimed at addressing these. The associated questionnaire sought opinions on the measures proposed within the Action Plan and the opportunity to make further comments. Formal responses from relevant organisations/ agencies (i.e. the Scottish Government, SEPA, Scottish Natural Heritage, Historic Scotland and Transport Scotland on the draft Action Plan have all been positive and these will be accounted for in progressing the action plan measures.

A summary of the responses to the AQAP questionnaire are presented in Figures 8.2 to 8.5.

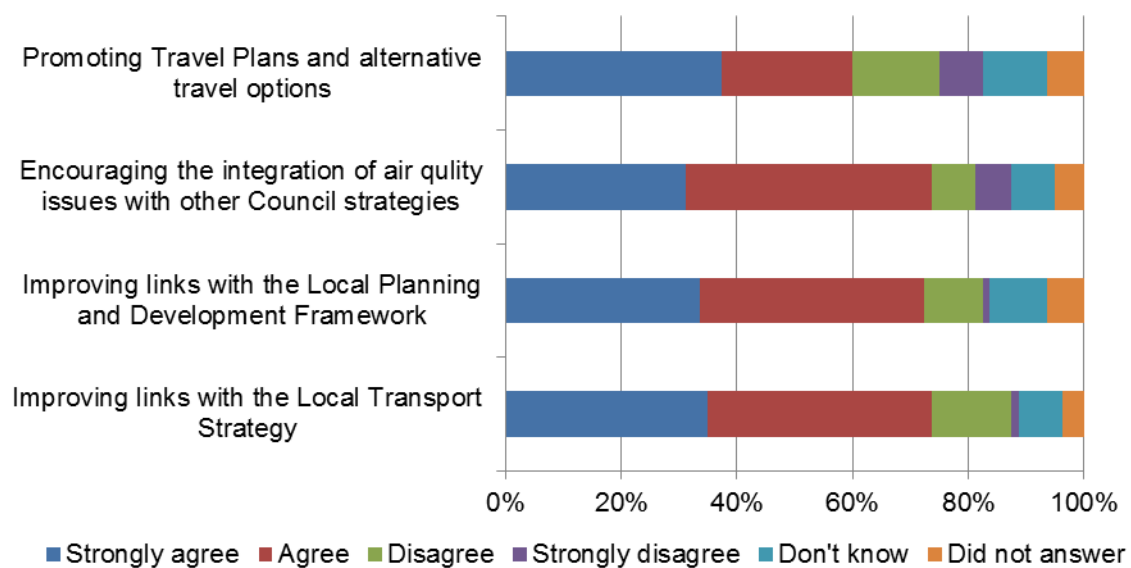
**Figure 8.2 Responses to draft Air Quality Action Plan measures relating to increasing awareness and importance of local air quality issues through:**



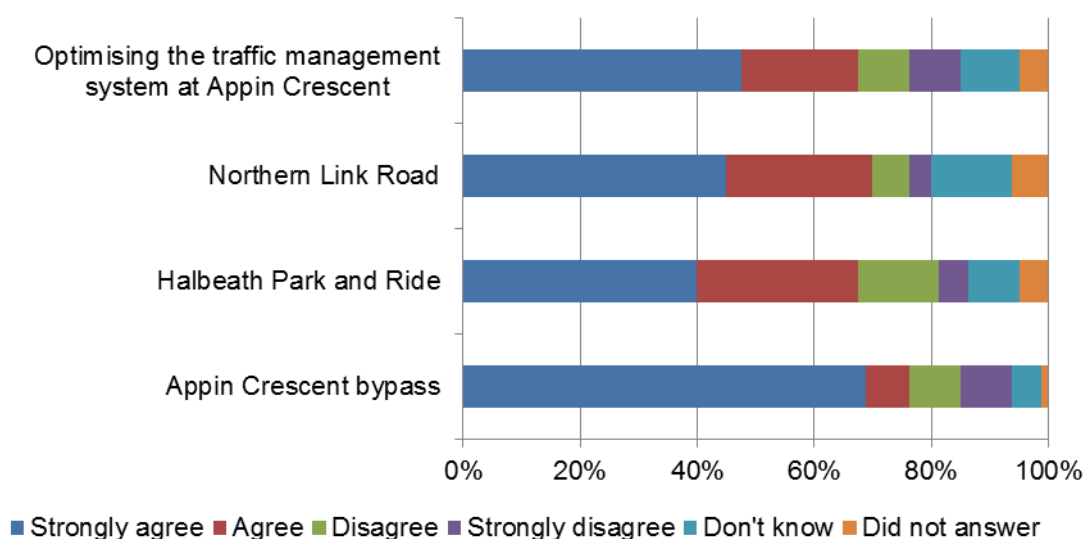
**Figure 8.3 Responses to draft Air Quality Action Plan measures relating to working in partnership with local operators to reduce emissions through:**



**Figure 8.4 Responses to draft Air Quality Action Plan measures relating to linking the Action Plan to other Council policies/strategies which seek to reduce emissions by:**



**Figure 8.5 Responses to draft Air Quality Action Plan measures relating to the undertaking of a study of possible infrastructure options to improve traffic flow in the Appin Crescent area, including consideration of:**



Overall, the results of the consultation process indicate general support for the majority of proposed action plan measures, with the highest percentage of agreement being for feasibility studies in relation to an Appin Crescent bypass and optimising the traffic management system in the vicinity of Appin Crescent. Obviously, continuing dialogue with the public and businesses will be a key component in considering such measures in greater detail in the future.

### 8.1.2 Comments and Suggestions

In addition to the measures proposed by Fife Council, the Air Quality Action Plan Questionnaire asked for additional comments and suggestions. Due to the diversity of comments made it is not possible to discuss all of these within the report. However, several comments were submitted on related topics. These including statements in support of the development of the northern link road and to reduce the use of the route by heavy good vehicles. Statements were also submitted in support of measures to promote the use of public transport and the relocation of bus stops to reduce congestion. All comments and suggestions received were considered during finalisation of the Action Plan.

In addition to the comments received by the Council during the AQAP consultation process, Fife Council also received various requests from the community council, elected members and some members of the public regarding the directional arrows on approach to the Appin Crescent/Sinclair Garden traffic signals, asking for these to be re-designated to increase the usage of the middle lane. This issue has been raised following the recognition of queues that form in the approach the roundabout from Appin Crescent during peak times when the middle lane was often under-utilised. Fife Council plan to carry out this work to encourage better use of all three lanes and consequently to contribute to reducing congestion on Appin Crescent at peak times.

Once the work is carried out, we will continue to monitor and review the traffic flow and report back on the effectiveness of the changes to traffic congestion on Appin Crescent.

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**University of the West of England (2006).** Steps to Better Practice – Guidance for Local Authorities on LAQM consultation.

## **Appendices**

**Appendix 1: Appin Crescent Air Quality Management Order**

**Appendix 2: Scenario analyses summary plots**

**Appendix 3: Initial Considerations of Options by Steering Group**

**Appendix 4: Details of the Action Plan measures**

**Appendix 5: Tabulated data of source apportionment study findings**

## **Appendix 1 Fife Council (Appin Crescent) Air Quality Management Area Order, 2011**



ENVIRONMENT ACT 1995 PART IV  
SECTION 83(1)

THE FIFE COUNCIL (APPIN  
CRESCENT, DUNFERMLINE) AIR  
QUALITY MANAGEMENT AREA  
ORDER 2012

The Fife Council  
Planning & Environment Team  
Legal Services  
Fife House  
North Street  
Glenrothes KY7 5LT

*Glenrothes 27 August 2012  
certified a true copy  
Jean S. McClure  
Solicitor, Glenrothes*

ENVIRONMENT ACT 1995 PART IV SECTION 83(1)

THE FIFE COUNCIL (APPIN CRESCENT, DUNFERMLINE) AIR QUALITY  
MANAGEMENT AREA ORDER 2012

The Fife Council, in exercise of the powers conferred upon it by Section 83(1) of the Environment Act 1995, hereby makes the following order.

This Order may be referred to as the The Fife Council (Appin Crescent, Dunfermline) Air Quality Management Area Order 2012 and shall come into effect on 27 September 2012.

The area within the red outline shown on the attached map is to be designated as an air quality management area ("the designated area").

The designated area incorporates Appin Crescent (A907) from its junction with Park Place to the mini-roundabout connecting Halbeath Road and Garvock Hill and includes (in whole or in part) the following properties:- 60 – 172 (even numbers only) Appin Crescent; 2-8 (even numbers only), 12 and 14 Halbeath Road; 1-7 (odd numbers only) Halbeath Road; 1 Garvock Hill; 1 and 4 Tansy Grove; 1 Couston Street; and, 71-119 (odd numbers only) Appin Crescent, Dunfermline.

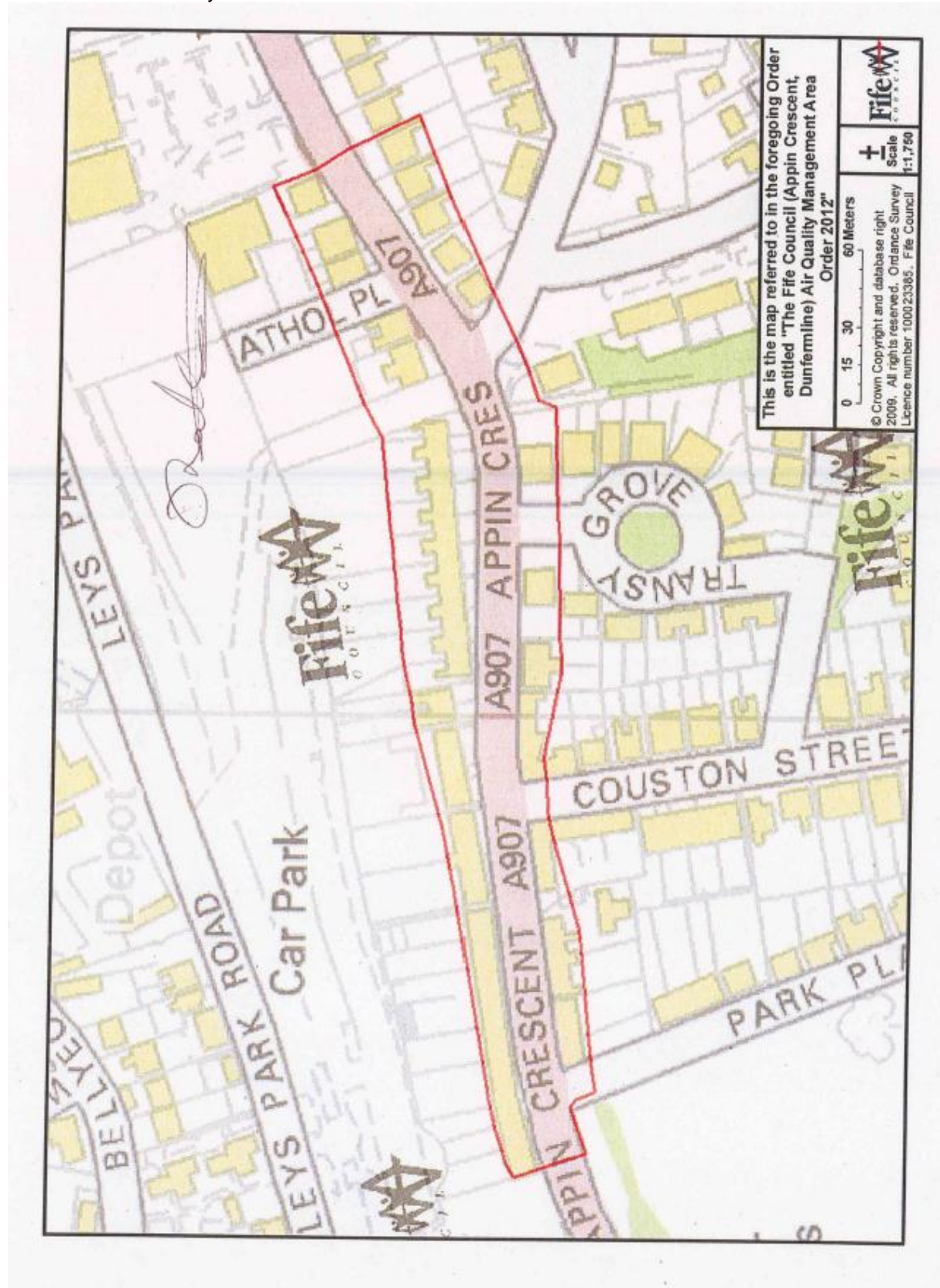
The Order and map may be viewed at the Fife Council Local Services offices at Walmer Drive, Dunfermline, at Forth House, Abbotshall Road, Kirkcaldy and at County Buildings, St Catherine Street, Cupar, in the Carnegie Library, 1 Abbot Street, Dunfermline and on the Fife Council web-site.

This area is designated in relation to a likely breach of the nitrogen dioxide and particulate matter (PM10) annual mean objectives as specified in the Air Quality (Scotland) Regulations 2000, as amended.

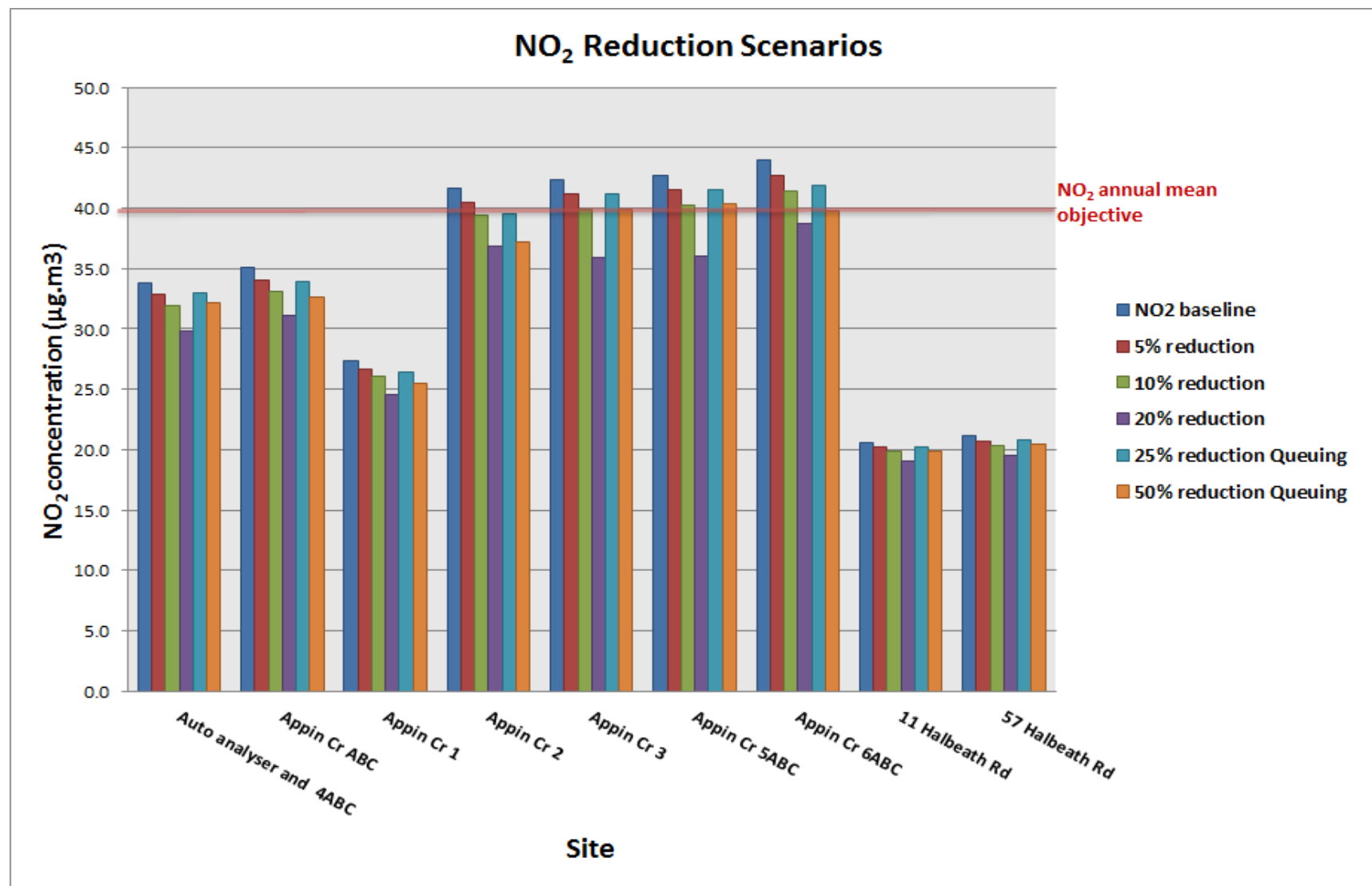
This Order shall remain in force until it is varied or revoked by a subsequent order. This Order revokes The Fife Council (Appin Crescent, Dunfermline) Air Quality Management Area Order 2011.

This Order together with the attached map are sealed with the Common Seal of The Fife Council and subscribed for them and on their behalf by David Stuart Crosbie, Managing Solicitor Planning & Environment, and Proper Officer at Glenrothes on the 23<sup>rd</sup> day of August 2012.

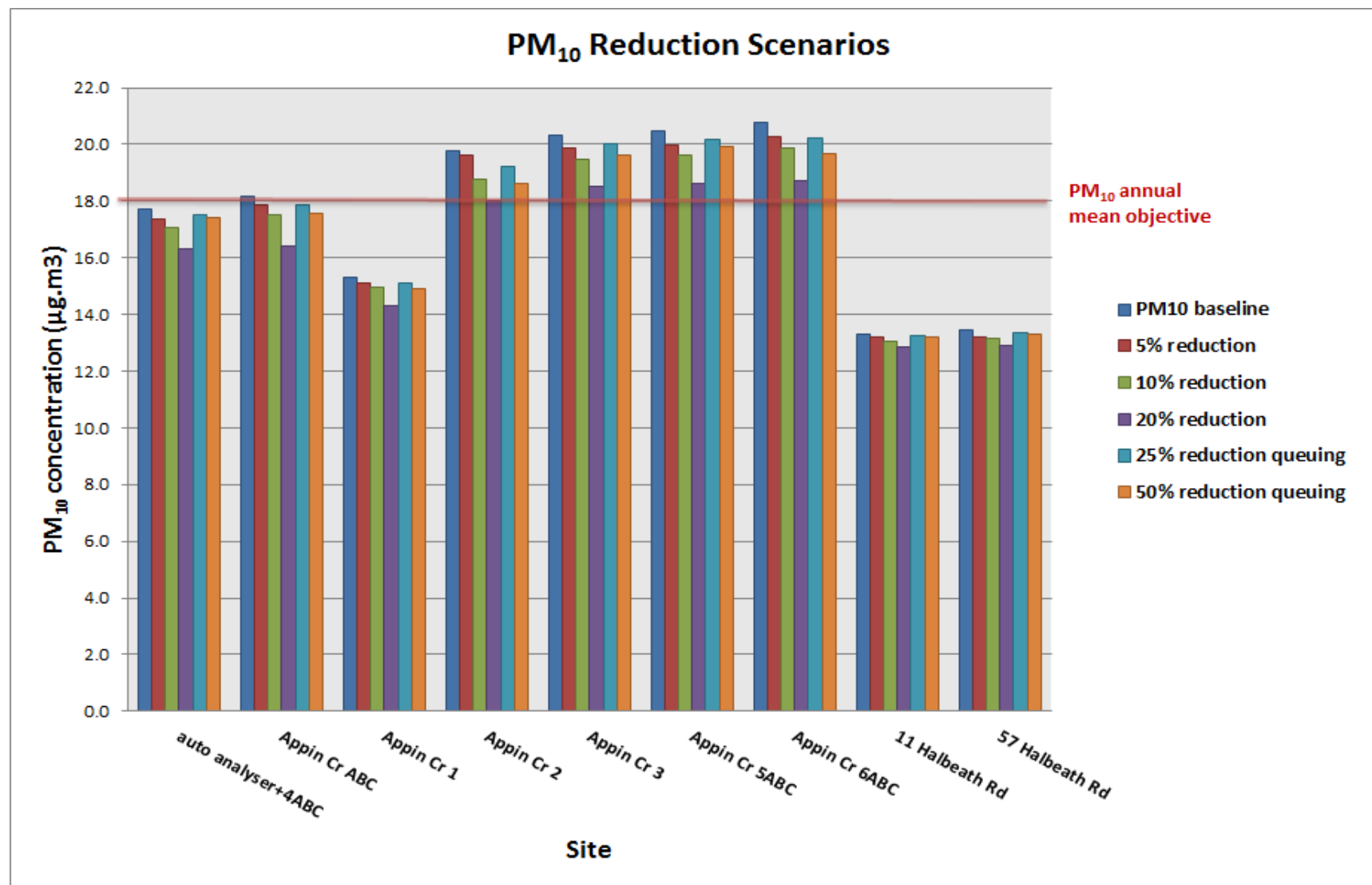




## **Appendix 2: Scenario analyses summary plots**

Comparison of all reduction scenarios – NO<sub>2</sub>



Comparison of all reduction scenarios – PM<sub>10</sub>

## **Appendix 3: Initial Considerations of Options by Steering Group**



Initial assessment of Action Plan options			
Options	Steering group's comments	Consultant's comments	Recommendation
Strategic Actions			
Improving links with Local Transport Strategy		Strategic measures that would benefit plan	To be included in draft Plan.
Improving links with Local Planning and Development framework		Strategic measures that would benefit plan.	To be included in draft Plan.
Integrate Air Quality with other Council Policies including Bonnygate AQAP		It is important that the AQAP considers existing Council policies and is also recognised in other Council policy decisions.	
Air Quality Guidance note/ Supplementary Planning Document		Note has already been developed and considering it's adoption as SPD would represent a strategic measure that would benefit plan.	
Lobby for additional national policy		Background concentrations of PM10 are relatively high in relation to the objective. It therefore makes sense to liaise with the Government and encourage regional and national activities that will reduce background PM concentrations.	To be included in the draft plan
Feasibility study – to assess: potential for encouraging a proportion of existing traffic to use an alternative route (e.g. Proposed bypass), potential impact of traffic rephasing and impact of proposed Halbeath Park and Ride	.	This option is likely to be raised and it may be worthwhile including a feasibility study in plan - to look at wider impacts, including financial, environmental and social.	

Options	Steering group's comments	Consultant's comments	Recommendation
Move sources away from AQMA			
Relief Road/ bypass	Measure is included in local plan and therefore should be put forward for further consideration and assessment. Recommended that additional work is undertaken regarding the potential impacts of a bypass. Proposed to be included in feasibility study (Strategic actions).	New and relieved roads often induce new traffic, and without the implementation of other measures to establish improvements, then the situation will return in a few years. Also need to be confident that the location of the new bypass does not lead to new exposure.	To be included in the draft plan and linked to feasibility study
Park and Ride	Park and Ride is proposed to be developed at Halbeath. This may have some implications for the Appin Crescent. Proposed that potential implications are assessed in further detail during a feasibility study.		To be included in the draft plan and linked to feasibility study
Optimise how sources transit the AQMA			
Traffic signal phasing - possibly linking to E-Mote (AQ monitoring/ traffic control)	Enhancing traffic light phasing in the vicinity of Appin Crescent could be looked at but very complex system. Recommended to be included in a feasibility study (Strategic Actions)	There are numerous traffic controls in or in close proximity to the AQMA. It is therefore worthwhile considering any potential impact that traffic phasing may have on traffic movements through the AQMA.	To be included in the draft plan and linked to feasibility study
Changes to pedestrian crossings	Linked to traffic phasing	May be tied to any changes to traffic phasing.	
Changes to junction layouts	Would have to consider this within any proposal for a bypass.		

Options	Steering group's comments	Consultant's comments	Recommendation
Reduce the emissions from sources by technical means			
Development of a Local Bus Quality Agreements		May wish to retain this measure due to any works regarding the Park and Ride?	Change reference from Partnership to agreements. To be included in draft plan
Encourage Private and Public Operators to pursue cleaner vehicles and abatement.		Work is already being undertaken in Fife regarding this, and it allows some degree of continuity to be retained with Bonnygate AQAP. Fife wide measure. Demonstrates joined up approach to reducing emissions.	
Green Procurement (Council) – Council fleets, contract vehicles	Council leading by example	Council leading by example is important.	To be included in draft Plan.
Eco-driving training policy	Council leading by example	Activity being undertaken by the Council and demonstrates the intention to encourage sustainability and reduce emissions of AQ pollutants and GHG.	To be included in draft Plan.
Fleet/ fuel monitoring	Council leading by example		
Monitoring new technology/ fuel additives		Recommend included under heading of Green procurement and fleet management.	To be included in draft Plan as part of overall Council activities
Retrofitting Council Fleet		Requires significant investment and can have negative impacts in terms of other emissions.	
Development of infrastructure for cleaner vehicle fuels			To be included in Council activities - plugged in places

Options	Steering group's comments	Consultant's comments	Recommendation
Reduce the emissions from sources by means of encouraging better travel choices/ behavioural change			
Provision of information regarding air quality and travel options		Display screens, website, link to Scottish Government Know and Respond Alert System.	To be included in plan
Promotion of alternative modes (cycling + walking)		A shift towards cycling and walking may have a large impact and could therefore contribute to improving air quality.	To be included in draft plan
Include the improvement of cycling and walking infrastructure.		Feeling safe is an important factor preventing people cycling and walking so that the provision of high quality routes will remove barriers to change.	
Travel Plans for large institutions and businesses.		Setting targets and monitoring progress should be considered.	To be included in draft plan
Encourage use of public transport by support local bus operators in improving/ upgrading bus stops – make public transport more attractive.			To be included in plan

Options	Steering group's comments	Consultant's comments	Recommendation
Move receptors away from AQMA			
Remove homes from existing AQMA		Option is not sustainable in the long term, as does nothing to reduce emissions.	Removed from further consideration.
Move sources away from AQMA			
Local ban on freight, car or bus traffic		Not feasible	
Pedestrianisation of route		Not appropriate to the given situation.	
Optimise how sources transit the AQMA			
Improved signage – AQMA signs		Unlikely to benefit the situation within the AQMA but may be relevant to days when Dunfermline Athletic are playing at home.	
Road user charging and workplace levy		Not feasible	To be removed from further consideration
Speed controls	Already in force - adds nothing new to plan	Are already in force	
Commercial deliveries - loading/unloading restrictions	Not particularly relevant to given situation. Bus parking/ bus station can be issue further along Appin Crescent.	Need to consider findings of further assessment	
Urban Clearway		Main route - not practical (and would simply move problem)	

Options	Steering group's comments	Consultant's comments	Recommendation
Reduce the emissions from sources by technical means			
Freight quality partnerships		Traffic is passing through AQMA and it would be difficult to identify relevant freight operators.	Work is ongoing with freight operators but it may be more appropriate to focus actions on activities that are more likely to bring benefits during current climate.
Taxi Quality Partnership – e.g. investigate preferential licensing for taxis with low emissions		Likely to make a very small contribution to emissions – limited impact.	Not to be included in the draft AQAP
Vehicle emissions testing		Most effective in raising public awareness rather than actually reducing emissions significantly.	
Idling vehicle enforcement	.	Expensive to implement with very small impact.	
Parking Management and Control	Not really a major issue in Appin Crescent.		
Reduce the emissions from sources by means of encouraging better travel choices/ behavioural change			
Road use charging and workplace parking levy		Unlikely to be acceptable.	
Bus lane	Unlikely to be acceptable or appropriate		
Relocating bus stops			
Other			
Home Energy Efficiency		Small impact at local level	
Environmental Nuisance (including dust and smoke)		Small impact at local level	

## **Appendix 4: Details of the Action Plan Measures**



In line with the requirements outlined in LAQM.PGS(09), the priority options have been developed into specific proposals, with associated timetables for implementation, responsible organisations, and where possible, progress indicators.

The following tables include:

- A simple title and definition of what the measure is aiming to achieve;
- The authority responsible for implementing and making progress with the measures;
- A description of those powers that this authority may use to implement the measures;
- A list of specific tasks and completion dates for tasks within each measure;
- An indicator (or indicators) that will be used to monitor progress with implementation;
- A target for the extent to which the indicator(s) will be changed in pursuit of the air quality objectives within the Appin Crescent AQMA;

Measure	Title
1	Liaise with the Scottish Government regarding the consideration of national measures to reduce background concentrations of PM
Definition	Key Intervention
Maintain contact with the Scottish Government regarding the adoption of national air quality measures.	Increase focus on background concentrations of PM and encourage national action.
Responsible authority and other partners	Powers to be used
Fife Council – Environmental Strategy	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Contact the Scottish Government lead regarding the consideration of national measures to reduce PM		•				Meeting/ consultation with Scottish Government	

Measure	Title
2	Feasibility Study
Definition	Key Intervention
Undertake a feasibility study to assess the potential impact of local infrastructure developments and traffic management optimisation on air quality in Appin Crescent. a) Appin Crescent bypass b) Traffic management optimisations c) Halbeath Park and Ride d) Northern Link Road	To adopt a strategic approach to air quality in Appin Crescent and undertake a detailed assessment of the feasibility and impacts of proposed infrastructure and traffic management measures.
Responsible authority and other partners	Powers to be used
Fife Council – Transportation and Environmental Services and Environmental Strategy	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Undertake feasibility studies		•				Feasibility study reports	
Publish findings of study and undertake consultation with relevant organisations regarding future progress		•	•	•		Evidence of consultation with relevant stakeholders regarding the findings of the feasibility studies.	

Measure	Title
3	Improving links with Local Transport Strategy
Definition	Key Intervention
<p>Future versions of LTS to be revised to include:</p> <ul style="list-style-type: none"> <li>a. Reference to Appin Crescent AQMA and measures included in Air Quality Action Plan. Integration of plan with LTS.</li> <li>b. Develop action plan options that will be implemented via the local transport strategy.</li> </ul>	<p>Measures to ensure the current poor air quality in the AQMA is improved where possible and to avoid future problems are implemented via the Local Transport Strategy.</p>
Responsible authority and other partners	Powers to be used
Fife Council – Enterprise, Planning and Protective Services	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Reference to Appin Crescent AQMA and measures included in Air Quality Action Plan. Integration of plan with LTS.		•	•			Inclusion of reference to Appin Crescent AQMA within LTS	
Develop action plan options that will be implemented via the local transport strategy.		•	•	•	•	Actions to be detailed in LTS & ATP.	

Measure	Title
4	Improving Air Quality links with Local Planning and Development Framework
Definition	Key Intervention
<ul style="list-style-type: none"> <li>a. Integration of Appin Crescent AQAP with future versions of Local Plan.</li> <li>b. Ensure that development proposals with the potential to exert an impact on the Appin Crescent AQMA are assessed for air quality impacts and where necessary, appropriate mitigation measures adopted.</li> <li>c. Continue to promote sustainable developments by using the planning process to maximise commitment from developers to minimise air quality impacts.</li> <li>d. Maintain and make available - air quality guidance note for developers.</li> </ul>	Local planning considerations aim to mitigate the cumulative negative air quality impacts of new development
Responsible authority and other partners	Powers to be used
Fife Council: Planning and Building Standards and Environmental Strategy	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Integration of Appin Crescent AQAP with future versions of Local Plan		•	•	•	•	No quantitative indicator	
Ensure that development proposals with the potential to exert an impact on the Appin Crescent AQMA are assessed for air quality	•	•	•	•	•		
Continue to promote sustainable development	•	•	•	•	•	Publication of promotion material	
Maintain and make available - air quality guidance note for developers.	•	•	•	•	•	Publication of guidance	Increased developer awareness.

Measure	Title
5	Encourage Integration of AQ with other Council strategies
Definition	Key Intervention
a. Continue and enhance joint working between Council Services to encourage consideration of potential air quality implications of existing and future Council strategies.  b. Maintain regular and ongoing communication between members of the Appin Crescent AQAP steering group.	Encourage opportunity for contributions towards improving local air quality and minimising negative impacts from existing and future Council strategies.  Increase awareness of local air quality.
Responsible authority and other partners	Powers to be used
Fife Council and community planning partners	Statutory and Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Enhance joint working between Council Services to encourage consideration of potential air quality implications		•	•	•	•	Evidence of Joint Working	Achieve AQ Objectives
Maintain regular and ongoing communication between members of the Appin Crescent AQAP steering group		•	•	•	•	Regular Steering Group Meetings and Minutes	

Measure	Title	
6	Consideration of development of Appin Crescent bypass (dependent upon feasibility study)	
Definition		Key Intervention
This measure is dependent upon the conclusions of the feasibility study outlined in Strategic Measure 2.  a. Development of an Appin Crescent bypass		If determined to be feasible, the development of a bypass at Appin Crescent could feasibly be seen to reduce the traffic volume passing through the AQMA and consequently contribute to lower emissions.
Responsible authority and other partners		Powers to be used
Fife Council		Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Development of an Appin Crescent bypass						Progress of this action is dependent on the conclusions of the feasibility study and related factors.	Long term consider STAG appraisal in technical and financial aspects

Measure	Title	
7	Optimisation of the traffic management system	
Definition		Key Intervention
This measure is dependent upon the conclusions of the feasibility study outlined in Strategic Measure 2. a. Optimisation of the traffic management system at Appin Crescent and the surrounding network;		Reduce traffic queuing within the AQMA through the optimisation of the traffic management system.
Responsible authority and other partners		Powers to be used
Fife Council		Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Optimisation of the traffic management system at Appin Crescent and the surrounding network						Progress of this action is dependent on the conclusions of the feasibility study and related factors.	

Measure	Title
8	Investigate the potential for establishing voluntary bus agreements
Definition	Key Intervention
a. Liaise with local bus operators to establish the potential for developing local bus quality agreements. b. Liaise with bus operators regarding emissions from the bus fleet and improvements to bus service infrastructure.	Target reduced emissions from buses operating within the Appin Crescent AQMA.
Responsible authority and other partners	Powers to be used
Fife Council (Transportation and Environment Services)	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Liaise with local bus operators to establish the potential for developing local bus quality agreements.			•	•	•	Bus quality agreement. Similar to P & R at Ferrytoll 2016/17 link to Forth Replacement Crossing	Increased operator awareness
Liaise with bus operators regarding emissions from the bus fleet and improvements to bus service infrastructure.		•	•	•	•	Existing liaison arrangements with Operators	

Measure	Title
9	Continue to target reductions in emissions from the Council fleet and contract vehicles.
Definition	Key Intervention
Continue to target reductions in emissions from the Council fleet and contract vehicles through: <ul style="list-style-type: none"> <li>a. Continue periodic procurement of low emission vehicles;</li> <li>b. Monitor and assess viable options for alternative fuels, technologies and fuel additives;</li> <li>c. Undertake periodic training for vocational fleet drivers including Safe and Fuel Efficient Driving (SAFED);</li> <li>d. Assess potential for emissions standards for fleet contracts.</li> </ul>	Target reduced emissions from Council fleet vehicles and Council contract fleet vehicles.
Responsible authority and other partners	Powers to be used
Fife Council (Fleet Services/ Procurement and Supplies)	Voluntary and Certificate of Professional Competence

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Continue periodic procurement of low emission vehicles;		•	•	•	•	Number of low emission vehicles in fleet	3% carbon e/yr
Monitor and assess viable options for alternative fuels, technologies and fuel additives		•	•	•	•	Increase in fleet using alternative fuels	All vehicles capable of using bio fuel or electric/hybrid vehicles
Undertake periodic training for vocational fleet drivers including Safe and Fuel Efficient Driving (SAFED)		•	•	•	•	Driver certification	All HGV drivers
Assess potential for emissions standards for fleet contracts		•	•	•	•	Number of vehicles	Reduce age profile



Measure	Title
10	Provision of Information and Promotion of Travel options
Definition	Key Intervention
<p>To increase awareness of travel choice options and promote more sustainable forms of travel, Fife Council propose to:</p> <ol style="list-style-type: none"> <li>Produce Travel Choices facility for Dunfermline.</li> <li>Undertaking Travel Marketing in Dunfermline.</li> <li>Undertake a publicity exercise to raise awareness of the Appin Crescent AQMA and encourage people to use sustainable forms of transport wherever possible.</li> <li>Maintain and promote the use of Tripshare Fife, car-sharing initiative.</li> <li>Continue to provide information about public transport services through the Council website.</li> <li>Ensure cycle networks and facilities are provided, as a matter of course, within existing and new networks and developments.</li> <li>To improve integration between cycling, walking and public transport.</li> <li>Increase cycling trips to employment, education and leisure facilities.</li> <li>Improve pedestrian facilities such as new footpaths and crossings.</li> </ol>	<p>To increase awareness of travel choices and encourage changes in behaviour that will contribute to improving local air quality.</p>
Responsible authority and other partners	Powers to be used
Fife Council (Environmental Strategy and Transportation and Environmental Services)	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Produce Travel Choices facility for Dunfermline			•	•	•	Create & publish map	
Undertaking Travel Marketing in Dunfermline.			•	•	•	Marketing	
Undertake a publicity exercise to raise awareness of the Appin Crescent AQMA and encourage people to use sustainable forms of transport wherever possible			•	•	•	Marketing	Volume of material and outlet numbers

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Maintain and promote the use of Tripshare Fife, car-sharing initiative.			•	•	•	Increased take up of car sharing journeys	
Continue to provide information about public transport services through the Council website.			•	•	•	Update on Council website	
Ensure cycle networks and facilities are provided, as a matter of course, within existing and new networks and developments		•	•	•	•	Signage. Number and lengths of cycling and walking routes established	
To improve integration between cycling, walking and public transport		•	•	•	•	Signage	
Increase cycling trips to employment, education and leisure facilities.		•	•	•	•		
Improve pedestrian facilities such as new footpaths and crossings.			•	•	•		

Measure	Title
11	Provision of Information and raising awareness of Air Quality issues
Definition	Key Intervention
<p>To increase awareness of local air quality issues and public transport information.</p> <p>a. Continue to make information relating to local air quality management available through the Council website.</p> <p>b. Undertake a publicity campaign to raise awareness of the Appin Crescent AQMA.</p>	To increase awareness of local air quality issues and encourage changes in behaviour that will contribute to improving local air quality.
Responsible authority and other partners	Powers to be used
Fife Council (Environmental Strategy and Transportation and Environmental Services)	Environment Act 1990 and Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Continue to make information relating to local air quality management available through the Council website.	•	•	•	•	•	Publication of LAQM Reports	
Undertake a publicity campaign to raise awareness of the Appin Crescent AQMA		•	•			Publication of materials, events held and website statistics	Target to follow on penetration of publicity/increased awareness

Measure	Title
12	Travel Plans for Large Institutions and Businesses
Definition	Key Intervention
<p>To encourage and assist large organisations to develop and implement travel plans, including:</p> <ul style="list-style-type: none"> <li>a. Continue the implementation of Fife Council's travel plan;</li> <li>b. Continue to support the implementation of School travel plans;</li> <li>c. Work with local businesses/ organisations to encourage the development and implementation of travel plans.</li> </ul>	To encourage a shift to more sustainable forms of travel, or reducing the need for travel.
Responsible authority and other partners	Powers to be used
Fife Council	Voluntary

Actions	Implementation timetable					Progress indicator	Target
	11	12	13	14	15		
Continue the implementation of Fife Council's travel plan		•	•	•	•	Council travel surveys	Reduction in private car use by council employees for commuting to/from work
Continue to support the implementation of School travel plans		•	•	•	•	Implemented and promoted in schools	Number of travel plans produced.
Work with local businesses/ organisations to encourage the development and implementation of travel plans		•	•	•	•	Number of large businesses approached to develop travel plans	

## **Appendix 5 Tabulated data of source apportionment study findings**

**Table A5.1 Estimated contributions to ambient NO<sub>x</sub> concentrations within the Appin Crescent AQMA**

Site	Contribution to annual mean NO <sub>x</sub> (% contribution)				
	Total NO <sub>x</sub>	Background	Road NO <sub>x</sub>	Moving traffic	Queuing Traffic
Auto analyser+4ABC	100	31.0	69.0	56.8	12.1
Appin Cr ABC	100	29.7	70.3	52.9	17.5
Appin Cr 1	100	40.3	59.7	42.9	16.7
Appin Cr 2	100	23.7	76.3	47.2	29.1
Appin Cr 3	100	23.2	76.8	61.0	15.8
Appin Cr 5ABC	100	23.0	77.0	62.0	15.1
Appin Cr 6ABC	100	22.1	77.9	51.9	26.0
11 Halbeath Rd	100	56.9	43.1	35.3	7.8
57 Halbeath Road	100	55.1	44.9	36.8	8.1

**Table A5.2 Estimated contributions to ambient PM<sub>10</sub> concentrations within the Appin Crescent AQMA**

Site	Contribution to annual mean PM <sub>10</sub> (% contribution)				
	Total PM <sub>10</sub>	Background	Road PM <sub>10</sub>	Moving traffic	Queuing Traffic
Auto analyser+4ABC	100	61.6	38.4	34.0	4.5
Appin Cr ABC	100	60.0	40.0	33.4	6.6
Appin Cr 1	100	71.1	28.9	23.4	5.5
Appin Cr 2	100	55.1	44.9	32.4	12.6
Appin Cr 3	100	53.6	46.4	39.6	6.8
Appin Cr 5ABC	100	53.2	46.8	40.3	6.5
Appin Cr 6ABC	100	52.5	47.5	36.0	11.5
11 Halbeath Road	100	81.8	18.2	16.1	2.1
57 Halbeath Road	100	81.1	18.9	16.6	2.2



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