



Crieff Draft Air Quality Action Plan



Draft AQAP July 2018



Local Authority Officer	Kirsty Steven
Department	Regulatory Services (Housing & Environment)
Address	Pullar House, 35 Kinnoull Street, Perth, PH1 5GD
Telephone	01738 476477
E-mail	KSteven@pkc.gov.uk
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Executive summary

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, Perth & Kinross Council (PKC) has undertaken a programme of air quality assessments. The strategy requires each unitary 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.

Where an authority identifies an exceedance at a location of relevant exposure, it is obligated 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 (AQAP), setting out the local actions that will be implemented to improve air quality and work towards meeting the objectives currently being exceeded.

Air pollution has been associated with a wide range of effects on 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.

A detailed assessment was conducted in 2012 which quantified the likely exceedance area within Crieff and PKC declared an AQMA in 2014.

Exceedances of Nitrogen Dioxide (NO₂) and Particulate Matter less than 10 micrometres in diameter (PM₁₀) have been measured within Crieff as a result of traffic congestion within Crieff Town Centre. High Street which runs through the centre of Crieff is a narrow street with tall buildings either side of the road. This has resulted in a canyon effect which prevents air pollutants from dispersing. The narrow road often becomes congested, particularly at peak times throughout the day.

What is the cause of the problem?

The source apportionment analysis undertaken for the Crieff AQMA concluded:

- The proportion of emissions from queuing traffic is higher at the western end of West High Street than at other locations. Traffic surveys indicate that traffic appears to queue regularly throughout the day at this location with longer queues occurring during peak periods.
- The source apportionment also indicated that the highest proportion of Oxides of Nitrogen (NO_x) emissions at all receptors is from HGV's and cars.
- NO_x and PM₁₀ emissions from buses are relatively low when compared to other vehicle types.

Creation of Draft Air Quality Action Plan

A steering group including key representatives from Perth and Kinross Council (PKC) was formed to develop the AQAP. The steering group considered a wide range of potential options for improving air quality within Crieff.

Subsequently the steering group undertook an assessment of each of these options. The options were assessed against the following criteria:

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

A package of measures has been taken forward by the steering group that target vehicle types as identified through the further assessment which contribute most to the concentrations of particulate and nitrogen dioxide, other wide ranging measures have also been considered; such as active travel and parking provisions within the AQMA.

The measures will be taken forward for public consultation and all responses will be reviewed and evaluated to determine the measures to be included in the final AQAP.

Contents

1.	Introduction.....	1
2.	Summary of Current Air Quality in Crieff	2
3.	Ambient Air Quality and Local Air Quality Management.....	2
3.1	Potential Impacts of Air Pollution on Human Health	2
3.2	Cleaner Air for Scotland - The Road to a Healthier Future	3
3.3	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland	3
3.4	The Local Air Quality Management Regime	4
3.5	Existing Strategies and Policies relevant to Air Quality in Crieff	4
4.	Development of Draft Air Quality Action Plan.....	9
5.	Action Plan Option and Assessment.....	11
5.1	Initial Assessment of Options	11
5.2	Development of Proposed Measures.....	14
	Appendix 1: AQMA Order	40
	Appendix 2: Existing Strategies and Policies Relevant to Air Quality in Crieff.....	42
	Appendix 3: Consultation on the Draft Air Quality Action Plan.....	43
	Appendix 4: Conclusions of LAQM Review and Assessments	44
	Appendix 5: Evaluation of Action Plan Measures.....	60
	Appendix 6 - Glossary of Air Quality Terms.....	65
	References	67

Table 1: Air Quality Objectives	4
Table 2: AQAP Options Eliminated from Further Consideration	12
Table 3: Measures Proposed to be included in the Crieff AQAP	13
Table 4: Proposed Action Plan Measures (to be read in conjunction with Section 5)	28
Table 5: Scenario 1- Increase Average Speed through AQMA-Predicted NO ₂ Annual Mean Concentrations	55
Table 6: Scenario 1- Increase Average Speed through AQMA-Predicted PM ₁₀ Annual Mean Concentrations	55
Table 7: Scenario 2- Reduce queuing times at junction of West High St/Comrie St - Predicted NO ₂ annual mean concentrations at relevant receptors	57
Table 8: Scenario 2- Reduce queuing times at junction of West High St/Comrie St - Predicted PM ₁₀ annual mean concentrations at relevant receptors	57
Table 9: Scenario 3 Decrease in %HGV in AQMA – Predicted NO ₂ annual mean concentrations at worst case receptors	58
Table 10: Scenario 3 Decrease in %HGV in AQMA – Predicted PM ₁₀ annual mean concentrations at worst case receptors	58
Table 11: Criteria for Feasibility Analysis	64

Figure 1: AQMA Boundary	1
Figure 2: The Complete AQAP Process.....	10
Figure 3: Annual mean Concentrations NO ₂ at 1.5 m.....	45
Figure 4: NO ₂ Annual Mean at 4 m.....	46
Figure 5: PM ₁₀ annual mean at 1.5 m	47
Figure 6: PM ₁₀ annual mean at 4 m	48
Figure 7: Worst case receptor locations used for source apportionment	50
Figure 8: NO _x expressed as %	51
Figure 9: NO _x expressed as µg.m-3	52
Figure 10: PM ₁₀ expressed as %	52
Figure 11: PM ₁₀ expressed as µg.m-3	53

1. Introduction

This draft report outlines the actions PKC proposes to deliver in order to reduce concentrations of air pollutants within the declared AQMA (see Figure 1) and exposure to air pollution; thereby positively impacting on the health and quality of life of residents and visitors to Crieff.

It has been developed in recognition of the legal requirements on the local authority to work towards Air Quality Strategy Objectives (see Table 1) under Part IV of the Environment Act 1995, to meet the requirements of the Local Air Quality Management (LAQM) statutory process.

A Final AQAP will be developed once this draft has undergone this consultation process and comments have been considered.

The Final Plan will be reviewed every five years and progress on measures set out within this Plan will be reported annually within PKCs Annual Progress Report to the Scottish Government.

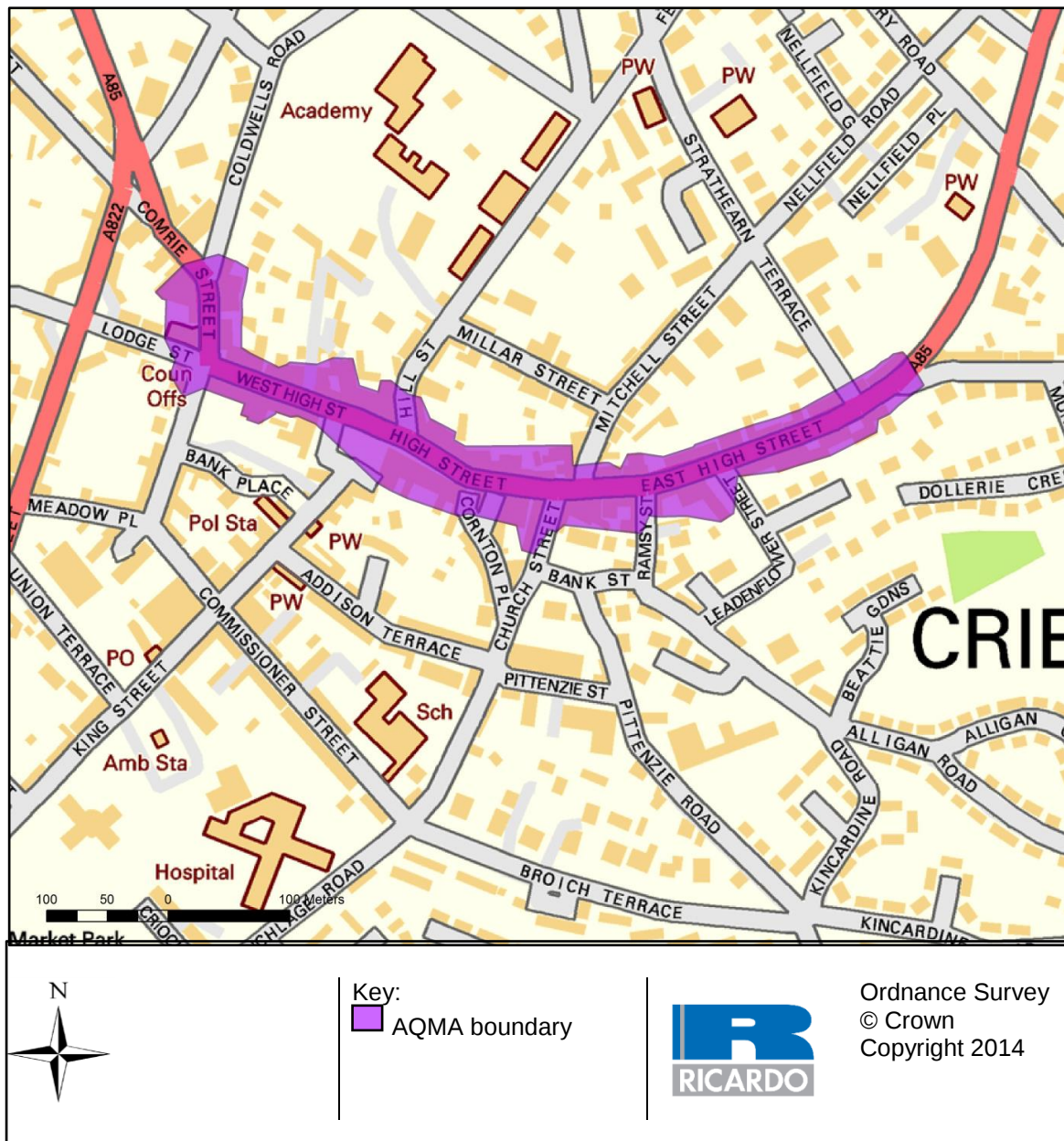


Figure 1: AQMA Boundary

This Action Plan adopts the following structure meeting the requirements of LAQM technical guidance TG (16) for an effective Action Plan:

- **Chapter 2** presents a summary of recent monitoring data and reviews of local air quality undertaken by Perth & Kinross Council.
- **Chapter 3** 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 at the study location.
- **Chapter 4** describes how the AQAP has been developed by Perth & Kinross Council.
- **Chapter 5** presents the range of potential options that were considered when aiming to improve local air quality within the designated AQMA and a summary of proposed measures to be adopted by Perth & Kinross Council.

2. Summary of Current Air Quality in Crieff

The AQAP focuses on the Crieff High Street corridor, where an AQMA (see Figure 1) has been declared as a result of elevated concentrations marginally exceeding the Air Quality Standards (AQS) Annual Mean objectives for NO₂ and PM₁₀.

Previous Review and Assessments, including the Detailed and Further Assessment, which included source apportionment, identified the area of exceedance. For more details on the aforementioned assessments see Appendix 4.

PKC have a statutory duty through the LAQM process to report annually to the Scottish Government on monitoring undertaken within Perth and Kinross. All reports and assessments, including the existing AQAP for Perth, are available at <http://www.pkc.gov.uk/article/15307/Air-quality-reports>.

Recent monitoring results indicate a general downward trend in levels of both NO₂ and PM₁₀ within the Crieff AQMA. This trend, which is being seen on a national basis, is most likely due to the reduction in emissions from newer vehicles. Although exceedances are marginal (5-10% above objective limits) further monitoring is required to establish if this is a continual trend that could eventually lead to compliance with the objectives. A period of 3-5 years of compliance is required before PKC would be in a position to consider amending/revoking the AQMA. As a result, the application of an action plan is still required.

3. Ambient Air Quality and Local Air Quality Management

3.1 Potential Impacts of Air Pollution on Human Health

Air pollution has been associated with a wide range of effects on 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.

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).

Large studies have shown a strong link with cardiovascular disease such as heart disease and strokes. There is also clear evidence that long term exposure to outdoor air pollution can suppress

lung function and is linked to the development of asthma and can aspirate symptoms for those that already have the condition.

3.2 Cleaner Air for Scotland - The Road to a Healthier Future

The Cleaner Air for Scotland (CAFS) was published in November 2015. This Strategy identifies the Scottish Government's policies focused on air quality and sets out a series of actions to improve air quality across Scotland. The document sets out six main objectives:

1. To reduce transport emissions by implementing low and zero emissions zones, promoting a modal shift away from the car, through active travel (walking and cycling), and reducing the need to travel;
2. To comply with the European and the Scottish legal requirements relating to air quality;
3. To inform, engage and empower the population to improve air quality;
4. To protect citizens from the harmful effects of air pollution and to reduce health inequalities;
5. To make sure that new or existing developments are not compromising air quality requirements and that places are designed to minimise air pollution and its effects;
6. To reduce greenhouse gas emissions and achieve Scotland's renewable energy targets whilst delivering co-benefits for air quality.

In addition to the six main objectives, CAFS outlines new initiatives to be implemented to compliment the objectives set, these initiatives include a National Modelling Framework and Low Emissions Framework. CAFS outlines further changes such as the adoption of the WHO guideline values for PM_{2.5}; this was transposed by the Air Quality Scotland Amendment Regulations 2016 when the annual mean objective for PM_{2.5} was set at 10µg.m⁻³.

CAFS considers the impact of air quality on health and looks at the estimated costs as well as the premature deaths associated with poor air quality. It has been estimated that 2,000 premature deaths and around 22,500 lost life-years across the Scottish population are linked to fine particulate air pollution¹.

The proposed actions outlined in CAFS not only work towards reducing pollutant concentrations but in turn aim to reduce congestion and improve traffic flow within urban areas.

The Scottish Government recognises that a multi-disciplinary approach is required to deliver the main objectives of CAFS.

3.3 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in July 2007. The objectives specified in the strategy incorporate the limit values outlined by the EU Framework.

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 the LAQM 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 (Air Quality Strategy 2007).

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf

However the Scottish Government have set more stringent national objectives for PM₁₀ in Scotland and have introduced the requirement for local authorities to monitor PM_{2.5} with an annual mean objective level of 10µg/m³ to be achieved by 2020.

3.4 The Local Air Quality Management Regime

Under the Environment Act 1995 local authorities are required to review and assess air quality annually against the air quality objectives. Where local authorities identify an exceedance of the objectives they are required to declare an Air Quality Management Area (AQMA).

The air quality objectives to be worked towards in Crieff are detailed below in Table 1.

Table 1: Air Quality Objectives

Pollutant	Air Quality Objective Concentration	Measured as
Nitrogen Dioxide	200 µg.m ⁻³ not to be exceeded more than 18 times a year	1 hour mean
	40 µg.m ⁻³	Annual Mean
Particles (PM ₁₀) (Gravimetric) Authorities in Scotland	50 µg.m ⁻³ not to be exceeded more than 7 times a year	24 hour mean
	18 µg.m ⁻³	Annual Mean
Particles (PM _{2.5}) (Gravimetric) Authorities in Scotland	10 µg.m ⁻³	Annual Mean

3.5 Existing Strategies and Policies relevant to Air Quality in Crieff

PKC already have a number of plans and policies in place which aim to improve air quality and the key ones are listed below with other relevant strategies and policies found in Appendix 2.

A. National Transport Strategy

The National Transport Strategy for Scotland was published in December 2006 and updated in 2015. The Strategy introduced three key strategic objectives. The strategy works towards an efficient and integrated transport system which promotes economic growth, health and environmental benefits. The three key objectives include:

- To improve journey times and connections by reducing congestion;
- To reduce emissions to tackle climate change;
- To improve the quality, accessibility and affordability of transport.

These key objectives have been set to support the vision of the Scottish Government. The strategy sets out a number of commitments in order to achieve the three objectives outlined above. In particular, areas of interest for PKC which are applicable to the Crieff AQMA include tackling congestion and improving connections. In addition to the three key strategic outcomes, the National Transport Strategy outlines five high level objectives:

- Promotes economic growth
- Promote social inclusion
- Protect our environment and improve health

- Improve safety of journeys
- Improve integration

The anticipated outcomes of the strategy rely on transport partnerships between local authorities and transport operators.

B. Tayside and Central Scotland Transport Partnership (TACTRAN)

Regional Transport Partnerships (RTPs) were established in 2005 to strengthen the planning and delivery of regional transport developments.

The TACTRAN RTP includes Angus, Dundee, Perth and Kinross and Stirling Councils. The partnership was developed to bring together local authorities and stakeholders to deliver a strategic approach to transport within the region.

The strategy outlines improvements to the transport infrastructure within the region over a 5-year period up until 2023.

The Regional Transport Strategy (RTS) objectives are classified into six key areas, these include:

- Economy
- Accessibility
- Equity and Social Inclusion
- Health and Well-being
- Safety and security
- Integration

The objectives are delivered via nine detailed strategies/frameworks; these include Health and Transport which includes for example HT3 – Transport and Public Health, policy HT3.1 Review Traffic Management at air quality hot spots within AQMAs.

The strategy aims to build on the existing transport network established within the region. Measures have been developed to work towards the vision outlined by TACTRAN; there are three key themes in the Strategy to work towards this:

- Delivering economic prosperity
- Connecting communities and social inclusion
- Environmental sustainability and promoting health and wellbeing

TACTRAN are a key partner in delivering measures that could benefit air quality within Crieff and the wider Perth and Kinross area. The delivery of the outlined measures in the AQAP will require close partnership working with TACTRAN.

The RTS identifies congestion and pressure on the road network as a result of increased traffic over the past 10 years. The strategy outlines commuting patterns and statistics within the region detailing the % of journeys made by car, bus etc. This is important for PKC when considering the development of AQAP taking into account residents' transport needs, target communication and engagement strategies.

The RTS outlines local air quality issues within the TACTRAN area such as road traffic emissions. The key air pollutants from this source are nitrogen dioxide (NO₂) and particulate matter (PM₁₀).

The RTS shows the national cycling network which incorporates Crieff for a proposed national route running between Stirling and Perth.

C. Local Development Plan

Perth & Kinross Council's Local Development Plan (LDP) sets out policies and proposals that the Council will use to guide development in the area up to 2024. The LDP was adopted in 2014 and will be reviewed before a replacement Plan is adopted in 2019.

At the time of writing, the Local Development Plan review is at the stage at which the Council has reached its settled view as to the policies and proposals it wishes to see in the replacement Plan. Public consultation took place in 2017/8 and an independent examination of the issues raised in consultation is scheduled to start in 2018. Depending on the outcome of the examination, the Council will make modifications to the Proposed Plan before adopting it to replace the 2014 LDP.

The LDP outlines Perth & Kinross Council's vision for future development to promote sustainable growth. The Local Development Plan is supported by statutory Supplementary Guidance, which expands on the policies and proposals in the Plan. The LDP key objectives are set out below.

Local Development Plan Key Objectives

Our area - highly valued for the beauty of its natural and built environment - is a great place to live, work and visit, and should be developed in a way that does not detract from its attractiveness nor places an unsustainable burden on future generations.

We want to improve the distinctiveness of our towns, villages and neighbourhoods. We want growth to be undertaken sensitively and in keeping with our environment whilst providing enough dynamism to keep communities viable and prosperous.

A well cared-for rural environment is a social and economic asset vital to the wellbeing of the area's citizens and to its future prosperity.

Place	Housing	Climate	Infrastructure	Economy	Biodiversity
Livable with new and regenerated neighbourhoods	Well designed and built with a quality built and natural environment	Resilient and adapted with communities resilient to a changing climate	Well served with public and private investment appropriate to the areas needs	Thriving with a flourishing and diverse local economy	Connecting with green networks providing sustainable long term management
Produce a more efficient settlement pattern by ensuring that the location of new development contributes to reducing the need to travel. Protect and enhance the cultural and historic environment. Ensure that new development enhances the environment and embraces the principles of sustainable design and construction. Protect and enhance the character, diversity and special qualities of the area's landscapes to ensure that new development does not exceed the capacity of the landscape in which it lies.	Accommodate population and household growth and direct that growth to appropriate locations. Ensure a continuous seven year supply of developable housing land. Seek to ensure that the housing land supply accommodates the needs of the various sectors of the market.	Improve the longterm resilience and robustness of the natural and built environment to climate change. Ensure that development and land uses make a positive contribution to helping to minimise the causes of climate change and adapting to its impacts.	Identify and provide for new and improved social and physical infrastructure to support an expanding and changing population. Establish clear priorities to ensure stakeholders and agencies work in partnership so that investment is co-ordinated and best use is made of limited resources to enable the delivery of the strategy. Ensure investment in the renewal and enhancement of existing infrastructure is consistent with the strategy of the Plan in order to make best use of the investment embedded in our existing settlements.	Provide the framework to increase the economic sustainability of Perth and Kinross by maintaining and providing locally accessible employment opportunities. Ensure a continuous seven year supply of developable economic development land. Provide a flexible policy framework to respond to changing economic circumstances and developing technology. Promote the vitality and viability of shopping centres and reduce the potential loss of shoppers to retail centres outwith Perth and Kinross.	Conserve and enhance habitats and species of international, national and local importance. Identify and promote green networks where these will add value to the provision, protection, enhancement and connectivity of habitats, recreational land and landscape in and around settlements.

The LDP contains a policy that deals specifically with transport. The policy outlines transport assessment requirements for new developments; and addresses the potential impacts of increased traffic, as a result of developments, on the designated AQMA. Developments which propose to adversely affect air quality may not be permitted as outlined by the policy dealing with air quality management areas. Both the transport and air quality policies are under review to ensure they continue to address impacts on the AQMA. It is proposed to expand the scope of the Air Quality policy to apply to all but the smallest developments in or adjacent to AQMAs.

The LDP also contains several site-specific proposals for development. Crieff is identified as an area of growth for both housing and commercial development. The Plan allocates land for the following housing proposals in Crieff:

- Broich Road (300+ units);
- Wester Tomaknock (100-120 units);

The LDP outlines that in relation to the housing proposals, developers will be required to demonstrate that the A85 trunk road through Crieff can accommodate the level of development proposed. Further information can be obtained from page 250, Crieff 8.3, within the 2014 adopted LDP. All of the site specific proposals are under review. It is proposed to increase the density of the Broich Road allocation to make better use of this green field site, and to introduce a smaller mixed use site allocation to the north of Broich Road for retail and other uses. These proposals are subject to the outcome of the LDP examination.

The Local Development Plan is reviewed every five years. More detailed information on the policies and proposals in the Plan is available on the Council's website. The first LDP was adopted in February 2014 and the replacement LDP is scheduled to be adopted in 2019. This section of the report may be updated as the review of the LDP progresses.

i. Local Development Plan-Action Programme

The Action Programme has been prepared to support the delivery of the Perth and Kinross LDP. The Action Programme is reviewed every 6 months to identify any relevant updates for specific sites. The plan outlines the outcome of proposed developments within Crieff, detailing if an Environmental Impact Assessment has been a requirement of the planning proposal. In Crieff, the proposal for a large mixed use site at Broich Road will be the subject of a masterplan, with an Environmental Impact Assessment.

D. Climate Change Declaration

Scotland's Climate Change declaration acknowledges the importance of climate change and is a means of demonstrating PKC's commitment to action: all of Scotland's 32 local authorities are signatories. The declaration includes commitments both to mitigate our impact on climate change through reducing greenhouse gas emissions and to adapt to future predicted climate change impacts.

PKC is a signatory to the Declaration and this has been included within the AQAP. Where measures seek to reduce road transport, this will have a direct impact on not only air quality within the AQMA but also a reduction in carbon dioxide (CO₂) emissions.

4. Development of Draft Air Quality Action Plan

A steering group was formed and held regular meetings to develop the Draft Action Plan. The members of the steering group are:

- PKC officers from the following departments:
 - Environmental Health
 - Sustainable Development
 - Roads
 - Transport Planning
 - Public Transport
 - Planning
 - Parking

Ricardo Energy & Environment- Consultants engaged by PKC to assist the steering group and action plan process

Transport Scotland - Head of Environment & Sustainability Branch

TACTRAN – Sustainable Transport Strategy.

The meetings followed prescribed agendas which included:

- The requirements of the action planning process
- Review of possible air quality management options to determine potential measures
- Review of draft full list of measures and assessment of measures.
- Review of short list of measures to be taken forward
- Draft Action Plan report

LAQM TG (16) outlines the key requirements for the development of an effective Action Plan and these have been followed throughout the action planning process:

- Undertake appropriate local monitoring and assessment (source apportionment)
- Decide what levels of actions are required
- Establish links with other key policy areas/strategies
- Undertake measures selection and impact assessment
- Agree monitoring and evaluation of success
- Undertake Consultation

The complete AQAP Process undertaken is detailed below in **Figure 2**.

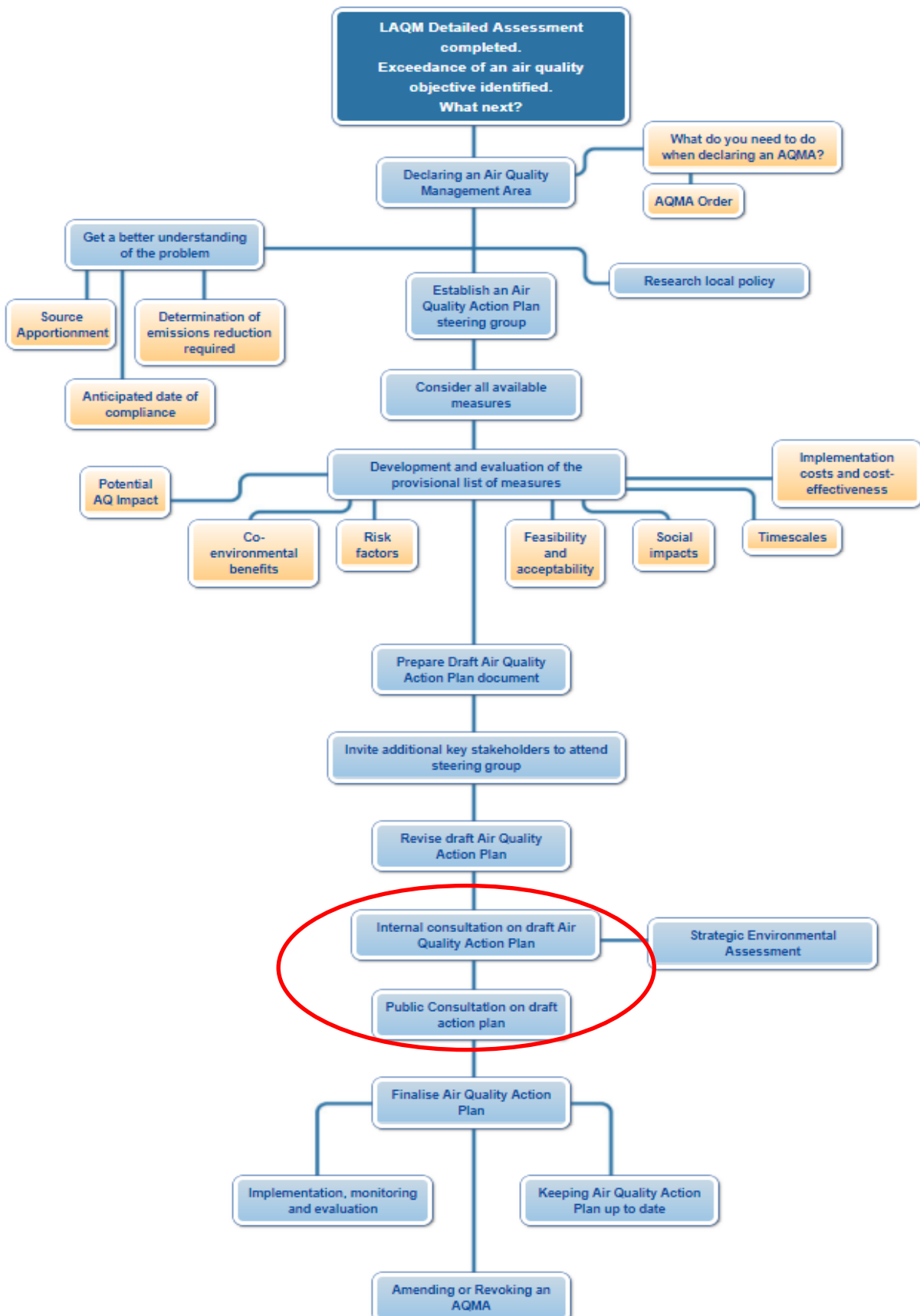


Figure 2: The Complete AQAP Process

5. Action Plan Option and Assessment

During the Action Plan process the steering group has considered a full range of relevant options aimed at reducing ambient pollutant concentrations within the designated AQMA. The process consisted 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 problem (road traffic emissions), are feasible and cost-effective compared to others.

This section describes how this was achieved and outlines some of the considerations of the steering group, as a result of continuing discussions and considerations.

The steering group have amalgamated some options with other options, some options have been rejected at this stage and going forward, further changes may also result from the forthcoming wider consultation process.

This chapter provides more information on the options and their assessment. The measures in the Draft Action Plan are presented in Chapter 5.

5.1 Initial Assessment of Options

This section outlines the work undertaken by the steering group to consider the full range of action plan options as outlined in LAQM Policy Guidance for Scotland 2016 (LAQM. PG (S) (16)). From the initial full list of options, measures were selected based on their feasibility and effectiveness to take forward into the Air Quality Action Plan.

A. Range of Possible Options

The Policy Guidance LAQM.PG (S) (16) 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 range of potential options may be available to PKC and other stakeholders to improve local air quality within the Crieff AQMA, and the surrounding area.

Therefore, it is important at the early stages of the action planning process 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.PG (S) (16) as well as recommendations of members of the steering group.

Whilst PKC may not have the necessary powers to implement all such options, they may engage with other organisations and agencies that have the capacity to take such options forward.

A list of six 'Option Categories' was 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.

B. Initial Responses to the Options

From the provisional list of options considered by the steering group, a decision has been made on which measures to take forward into the action plan and those measures to be discounted from further action. This decision is the result of:

- Comments received from the steering group members
- The conclusions from the source apportionment exercise and LAQM assessments presented in Chapter 3

- Additional comments from Perth & Kinross Council's consultant based on experience in prior assessments.
- Feasibility and acceptability of measures

The measures discounted from further development are presented in Table 2.

Table 2: AQAP Options Eliminated from Further Consideration

Options eliminated from further consideration in the Crieff AQMA	Reason for Elimination
Move receptors away from AQMA	Not feasible to do so
Provision of new bypass to take traffic away from High St	Not feasible to do so
Re-routing of HGV traffic	This would move issue elsewhere in Crieff as no suitable alternative route - not feasible
Consider "de-trunking" the road	No benefits of doing this
Consider relocation of bus stops in the AQMA	Unlikely be accepted locally
Use of A85 for trunk traffic only	Not feasible or practical to do so
Consider one-way traffic on West/East High street to reduce congestion	Not clear how this could be done practically
Innovative technologies	Intend to take new innovative technologies into consideration as and when they become available

The measures listed above have been excluded from further consideration at this time, after consultation with the steering group 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. Notwithstanding, should further consultation result in justifiable reasons to revisit any of these options then, the benefits may be reconsidered

PKC intends to consult on all of the measures for potential inclusion within the Final Air Quality Action Plan.

A summary of the measures proposed by the Steering Group for inclusion in the Action Plan are presented in Table 3 below. Further details of the measures and their assessment are also presented in the following sections.

Table 3: Measures Proposed to be included in the Crieff AQAP

Measures selected for inclusion in the Crieff AQAP by Steering Group
A. Strategic Measures Proposed
A.1 Liaise with the Scottish Government regarding the consideration of national measures to reduce background concentrations of PM.
A.2 Improving Links with Local Transport Policies
A.3 Improve Links with Regional Transport Strategy
A.4 Encourage Integration of Air Quality with other Council strategies
A.5 Air Quality Planning Policy and Guidance
A.6 Procurement Guidance to ensure air quality is a formal consideration of the procurement process within PKC
A.7 Local Development Plan- Assess merit of further development in Crieff
B. Move Traffic away from AQMA
B.1 Local road traffic movements onto the A85
B.2 Incentive parking out with AQMA
C. Traffic Management – Optimisation of Traffic Movement Through the AQMA
C.1 Possible provision of smart parking in Crieff
C.2 Urban Traffic Control Systems congestion management
C.3 Anti-idling Enforcement
C.4 Relocation of pedestrian crossing on High Street
C.5 Consider gating/holding traffic out with street canyon
C.6 Limit or prioritise traffic turning right on to High Street
D. Reduce the Emissions from Source
D.1 Encourage private and public operators to pursue cleaner vehicles
D.2 Development of a Local/ Voluntary Bus Quality Partnership
D.3 School Travel Plans
D.4 Public transport improvements
D.5 Introduce LEZ/restrict access for polluting vehicles.
D.6 Implement eco stars scheme for HGV and bus operators
D.7 PKC eco driver training for fleet drivers and council staff
E. Reduce emissions by reducing demand for traffic, change in traffic choice
E.1 Promotion of lift sharing and development of car clubs
E.2 Travel Plans for large institutions and businesses
E.3 Create and Implement PKC Corporate Travel Plan
E. 4 Promotion of active travel
E.5 Provide additional buses/increase bus routes
E.6 Undertake further social marketing re active travel/modal shift
E.7 Awareness raising and education, presentations at local school's/ community meetings
E.8 Cycling and walking routes to be routed to link in with the campus for sport.
E.9 Provision of PKC "Champions" for transportation methods
F. Reduction from non-transport sources
F.1 Biomass Installations- minimise developments which causes pollution
G. Other
G.1 Increase AQ Monitoring Network
G.2 Regional AQ Modelling study.
G.3 Cycling and walking routes to be incorporated into transport model
G.4 Transport assessments for developments to be required as part of the planning process

5.2 Development of Proposed Measures

Each of the measures short-listed for further consideration in the draft 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. The responsible authority for each measure is identified and indicated within each measure description.

A. Strategic Measures

It is important that Air Quality Action Plans support and consider existing or forthcoming plans and strategies. Therefore, some integration of the AQAP with the local transport strategy, the development plan and other relevant Council strategies is considered essential and represents a strategic and integrated approach to local air quality management. The adoption of these measures will help to improve air quality across Perth and Kinross. These strategic actions are outlined in the proposed measures 1 to 6, below.

i. Liaise with the Scottish Government

The source apportionment study undertaken as part of the further assessment identified that background sources make a significant contribution to local concentrations of PM₁₀. 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. In light of the new PM_{2.5} annual mean objective of 10 µg.m⁻³, PKC intend to extend their monitoring network to include PM_{2.5}. The measures outlined within this AQAP which work towards reducing PM₁₀ concentrations are anticipated to have the same impact on PM_{2.5} concentrations within Crieff.

PKC proposes to liaise with the Scottish Government regarding the consideration and adoption of new measures that will contribute to reducing background concentrations of Particulate Matter (PM) and other pollutants.

Measure	Title
A.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
Local Authorities/Scottish Government	Voluntary

ii. Improve Links with Local Transport Policies

Air quality measures will be included in the forthcoming Active Travel Strategy and any Local Transport Strategy should one be written. The forthcoming Corporate Travel Plan will also link to the AQAP, as this will encourage more sustainable methods of traveling to work. The 'Crieff on the Go' social marketing campaign also promotes sustainable and active travel, which links to the AQAP.

Measure	Title
A.2	Improve Links with Local Transport Policies
Definition	Key Intervention
Ensure AQ is incorporated into local transport policies to raise awareness of air quality.	Measures to ensure that air quality is improved in the AQMA through local transport measures
	Powers to be used
Perth & Kinross Council/Tactran/Transport Travel Associations	Voluntary

iii. Improve Links with Regional Transport Strategy

The Regional Transport Strategy contains a section on air quality, and the AQAP will link to this by working with both TACTRAN and other partners such as Transport Scotland to tackle transport issues that contribute to poor air quality. As the major hotspot is the A85 Trunk Road, any AQAP will have a regional and national dimension to it as the A85 is a major strategic route on the national transport network.

Measure	Title
A.3	Improving Links with Regional Transport Strategy
Definition	Key Intervention
PKC when considering improvement to the transport network within Crieff, will ensure that ongoing improvements, identified from PKCs Capital programme or when addressing new development application, will work within the wider objectives set out within the National Transport Strategy and the Regional Transport Strategy. Ensure that the economic and environmental objectives, which include AQ and Climate Change, are set out within PKC Local Development Plan	Measures to ensure that AQ and Climate change are considered with regards to Transport Planning for Crieff at a regional strategy level
Responsible authority and other partners	Powers to be used
Perth & Kinross Council /Tactran	Voluntary

iv. Encourage Integration of AQ with other council strategies

Measure	Title
A.4	Encourage Integration of AQ with other council strategies
Definition	Key Intervention
a. Encourage and enhance joint-working between Council Services to consider air quality implications of existing and future Council strategies. b. Maintain communication between members of the air quality action plan steering group and Corporate Air Quality Working Group (in accordance with CAF'S principles of integrated working).	Encourage opportunities for improving local air quality and minimising negative impacts from existing and future PKC strategies.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

v. Air Quality Planning Policy and Guidance

When determining planning or other applications for development, the determination is to be made in accordance with the development plan unless material considerations indicate otherwise. Both the Strategic and the Local Development Plan contain policies on Air Quality. The Local Development Plan policy in particular can influence planning requirements for proposed developments in the Plan area that might have an adverse impact on air quality. The policy will be reviewed to make sure that any impacts and appropriate mitigation measures are considered at the design stage for all proposed developments. Supplementary Guidance will provide more detail as to when an air quality assessment is likely to be required, what should be included in an air quality assessment, and some examples of best practice design measures.

Measure	Title
A.5	Air Quality Planning Policy and Guidance
Definition	Key Intervention
a. Review of Local Development Plan policy on Air Quality (Policy EP11)	Ensure that air quality impacts and mitigation measures are considered at the design stage for all proposed developments across the Local Development Plan area
b. Adoption of Supplementary Guidance on Air Quality and Planning alongside the reviewed policy	
c. Regional modelling for planning and scenario testing	
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Statutory: Town & Country Planning (Scotland) Act 1997 as amended by the Planning etc. (Scotland) Act 2006

vi. TG (16) Procurement Guidance to ensure Air Quality is a formal consideration

PKC will consider AQ within our procurement process to influence the uptake of more fuel efficient and lower emission vehicles and report the number of vehicles replaced, purchased or contracted and report their Euro standards, along with an estimation of emissions saved.

Measure	Title
A.6	Procurement Guidance to ensure Air Quality is a formal consideration of the procurement process within PKC
Definition	Key Intervention
Ensure air quality is formally considered in future tender process for new PKC vehicles and public transport decisions (i.e. for school subsidised public services, school buses and taxis)	Ensure localised AQ improvements by procuring vehicles with lower emissions. Could also include localised improvements in air quality around schools.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

vii. Local Development Plan-Assessment of further development in Crieff

The Development Plan currently focuses the majority of new development in the principal settlements, where most people live, and where most jobs, services and facilities are already located. Crieff is one of the principal settlements. Principal settlements usually have significant land and infrastructure capacity to accommodate new development. However, in Crieff's case, there are additional considerations between accommodating significant new development and the aims of the Air Quality Action Plan.

Measure	Title
A.7	Local Development Plan- Assess merit of further development in Crieff
Definition	Key Intervention
a. Integration of the AQAP with future versions of the LDP b. Ensure that development proposals with the potential to exert an impact on the Crieff AQMA are assessed for air quality impacts and where necessary, appropriate mitigation measures considered. c. Continue to promote sustainable developments by using the planning process to maximise commitment from developers to minimise air quality impacts. d. Review Crieff's ability to accommodate significant development proposals. e. Ensure new developments incorporate green infrastructure to promote active travel and make connections where possible to blue and green networks.	Maintain and update air quality considerations with planning and development control. Ensure the AQ impacts from significant development proposals avoid Crieff's AQMA.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

B. Measures to move road traffic away from AQMA

i. Local road traffic movements onto the A85

Perth & Kinross Council, in partnership with Transport Scotland (and working with relevant stakeholders) will aim to examine transport flow movements off and onto the trunk road in relation to local roads around the AQMA and to assess the impact and possibility of altering the flows onto and off of the A85 in relation to local roads. Ultimately, if the A85 through Crieff can be used predominantly for strategic road journeys, and alternative local roads can be used for road journeys within Crieff, then, the theoretical lower levels of traffic on the A85 could lead to tangible lowering of emissions. Rerouting some of the traffic that currently accesses onto the A85 from local roads to otherwise use only local roads, where practicable would be one key area of consideration.

Measure	Title
B.1	Local road traffic movements onto the A85
Definition	Key Intervention
Examining transport flow movements off and onto the trunk road in relation to local roads around the AQMA, to understand: a. how movements of vehicles, particularly from local roads onto the trunk road contribute to air pollution and b. to understand the impact of altering the flows of local traffic away from the A85 and how this might impact on local road capacity and practicality.	Undertake a feasibility study to examine alteration of traffic flows and movements off and onto the trunk road in relation to local roads around the AQMA.
Responsible authority and other partners	Powers to be used
Perth and Kinross Council working in partnership with Transport Scotland	Traffic Regulation Order

ii. Incentive parking out with AQMA

Perth & Kinross Council, in consultation with relevant stakeholders will continue to consult and review the existing parking options in Crieff to reduce parking pressures and alleviate the impact on congestion in order to improve air quality.

Measure	Title
B.2	Incentive parking out with AQMA
Definition	Key Intervention
Examining parking policies and seek to potentially discourage parking within, or in close proximity to the AQMA.	Encourage parking of polluting vehicles away from the AQMA through e.g. parking charges parking restrictions, signage and length of stay and incentivise parking by electric vehicles, car clubs etc.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Traffic Regulation Order

C. Traffic Management

i. Possible provision of smart parking in Crieff

Perth & Kinross Council will seek to assess the potential options for SMART parking in Crieff to facilitate effective location of available parking spaces and in doing so reduce adverse impacts on congestion. SMART parking technology gives real time information to enable users to find spaces quickly and easily.

Measure	Title
C.1	Possible provision of smart parking in Crieff
Definition	Key Intervention
Ensure that parking behaviour does not negatively impact on local air quality by ensuring people travelling by car are able to find a parking space quickly and easily thereby reducing parking pressures and congestion.	Review existing parking behaviour and consider feasibility studies on the benefits of introducing SMART parking based on advanced sensor technology to enable real time parking availability via a smart phone app.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

ii. Urban Traffic Control Systems/Congestion Management.

In conjunction with Transport Scotland and their operating company BEAR Scotland, PKC will consider investigating the efficiency and optimisation of traffic management controls.

Measure	Title
C.2	TG.16 Urban Traffic Control Systems congestion management
Definition	Key Intervention
Improve efficiency of transit through the AQMA to reduce local emissions and concentrations	Assess and implement a variety of traffic interventions to optimise the existing traffic management system
Responsible authority and other partners	Powers to be used
Perth & Kinross Council in conjunction with Transport Scotland and BEAR	Voluntary

iii. Anti-Idling enforcement

PKC will consider the adoption of powers to undertake enforcement through Traffic Regulation Orders to compel drivers to switch off idling engines. Fixed penalty notices could be issued to drivers who refuse to co-operate.

Measure	Title
C.3	Anti-Idling enforcement
Definition	Key Intervention
Investigate the potential for undertaking enforcement action with respect to idling vehicles.	The enforcement against idling vehicles can contribute to reducing emissions of air quality pollutants but also help to raise awareness of local air quality issues.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary The Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003

iv. Review of pedestrian crossing within High Street Corridor

In conjunction with Transport Scotland and their operating company BEAR Scotland, PKC may review the location and timings of the existing pedestrian crossings to determine if traffic flow within the AQMA can be improved.

Measure	Title
C.4	Relocation of pedestrian crossing on High Street
Definition	Key Intervention
Review pedestrian crossing locations/timings	Implement relevant changes
Responsible authority and other partners	Powers to be used
Perth & Kinross Council in conjunction with Transport Scotland and BEAR	Voluntary

v. Consider holding/gating traffic out with canyon

Gating of traffic out with the AQMA may be considered as part of a wider traffic management strategy, to improve traffic within the street canyon.

Measure	Title
C.5	Consider holding/gating traffic out with street canyon
Definition	Key Intervention
a. Review measures to minimise congestion within the existing AQMA	Consider traffic control measures appropriate to the local issues in order to optimise traffic flows, such as gating.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council and Transport Scotland	Voluntary

vi. Limit or prioritise traffic turning right on the High Street

PKC will carry out relevant traffic management assessments/counts and modelling thereafter to determine alternative junction arrangements to enhance traffic flow within/affecting the AQMA.

Measure	Title
C.6	Limit or prioritise traffic turning right on the High Street
Definition	Key Intervention
Review of existing junction arrangements and impact of possible changes to seek improved traffic flow.	Amendment to junction priorities to further reduce congestion
Responsible authority and other partners	Powers to be used
Perth & Kinross Council and Transport Scotland	Voluntary

D. Reduce the emissions from source

i. Encourage private and public operators to pursue cleaner vehicles

Crieff already has a rapid charger for electric vehicles in the King Street public car park, and this is advertised not only on the Council's website, but also on various websites that promote electric car use. Local bus and coach operators in the area do have a relatively modern fleet, but when upgrading could be encouraged to buy vehicles meeting the latest Euro engines standards. Operators could also be encouraged to use bio-fuels, electric vehicles and/or retro fitting existing vehicles.

Measure	Title
D.1	Encourage private and public operators to pursue cleaner vehicles
Definition	Key Intervention
a. Liaise with Local operators to promote the use of lower emission vehicles within Crieff b. The Council to look to include lower emission standards in their future Conditions of Contract for subsidised bus services c. Electric charging infrastructure	Encourage a reduction in emissions of NO ₂ and PM ₁₀ from companies operating vehicles in Crieff.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary and contractual

ii. Development of local/voluntary bus quality partnership

The development and continuation of a voluntary bus partnership to promote and share 'best practice'. The Council's Public Transport Unit will work with local bus operators to promote best practice operational standards, including vehicle 'euro standards'.

Measure	Title
D.2	Development of local/voluntary bus quality partnership
Definition	Key Intervention
a. Liaise with local bus operators, as well as the voluntary sector, to promote 'best practice' operational standards, including the promotion of the Scottish Government's Bus Emissions Abatement Retrofit (BEAR) Programme. b. Look to improve the minimum 'euro standard' of vehicles operating in the AQMA, in part through contractual requirements.	Encourage good operational practices, including driving standards, which support the environmental agenda; whilst still providing high quality bus provision.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

iii. School Travel Plans

All schools in Perth and Kinross have a School Travel Plan which is aimed at reducing the incidence of car usage, especially around the school gates. These are aimed at both pupils and staff. Several schools, including both Crieff Primary School and St Dominic's participate in the Travel Tracker initiative run by Living Streets Scotland and as part of the Crieff on the Go campaign; both primaries have received AQ and Travel Planning workshops. This should facilitate a modal shift from car to active travel, reducing transport emissions. It will also help inform, engage and empower locals to improve air quality in Crieff. There would be a co-benefit to greenhouse gas reduction

Measure	Title
D.3	School Travel Plans
Definition	Key Intervention
Encourage uptake of School Travel Plans to promote sustainable travel	Education of local pupils and staff on alternative/sustainable travel
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

iv. Public Transport Improvements

After active travel, the next most desirable form of transport is the use of public transport; in the case of Crieff, this means bus travel. Work to improve local bus quality should further encourage the modal shift away from cars again reducing transport emissions.

Measure	Title
D.4	Public Transport Improvements
Definition	Key Intervention
Engage with key local stakeholders to consider enhanced public transport provision both within and serving Crieff	Look at opportunities to provide additional public transport options, directly linking residential areas with key traffic generators. Identification of funding sources will be key both for revenue and capital developments.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

v. Introduce Low Emission Zone (LEZ)/restrict access for polluting vehicles

The SGs CAFs Strategy 2015 has commitment to a National Low Emission Framework (NLEF) and a National Modelling Framework (NMF) for Scotland and has stated in the Governments programme for Scotland 2017-18 that SG will work with LAs to introduce LEZs to all AQMAs by 2023.

An access regulation scheme may be applicable at Crieff's AQMA; this depends on the outcomes from the proposed NLEF assessment.

Measure	Title
D.5	Introduce LEZ/restrict access for polluting vehicles
Definition	Key Intervention
Appraise the Crieff AQMA in line with the future NLEF and put in place a scheme as recommended	This may involve Low Emission or Clean Air Zones or other Access Regulation Schemes. It may also involve Traffic Management Vehicle Licensing Regulations or other measures.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council and Transport Scotland	LAQM statutory duties & Traffic Regulation Orders

vi. Introduce eco schemes for HGV and bus operators

The introduction of an eco-scheme would raise awareness among commercial vehicle operators to improve air quality through improved fleet environmental performance. It would provide recognition, guidance and advice to operators of goods vehicles, buses and coaches on operational and environmental performances. It would be attractive to operators on the potential for environmental benefits and for the reduction in operational costs. This should help to reduce both transport emissions effecting air quality and greenhouse gases.

Measure	Title
D.6	Introduce Eco Star scheme for HGV and bus operators
Definition	Key Intervention
Promote awareness among commercial vehicle operators of improved fleet environmental performance	To reduce emissions from commercial vehicles by improving environmental efficiency of operations
Responsible authority and other partners	Powers to be used
Perth & Kinross Council & Eco Stars	Voluntary

vii. PKC Eco driver training for fleet drivers and council staff

PKC will continue the eco driving training programme for all PKC employees that drive fleet vehicles. Eco training for PKC drivers means significant fuel savings and therefore reduced emissions. PKC will report the number of drivers trained per year and the anticipated fuels savings which will provide an estimate of emissions avoided.

Measure	Title
D.7	PKC Eco driver training for fleet drivers and council staff
Definition	Key Intervention
Undertake eco training for PKC fleet drivers on fuel efficiency and eco driving.	To reduce emissions from PKC drivers by improving efficiency of driving and fuel consumption.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

E. Reduce Emissions by reducing demand for traffic

i. Promotion of car sharing and development of car clubs

PKC participates in the TACTRAN Liftshare scheme and this is promoted on the Council's and Tactran website. There will also be further promotion as part of the Smarter Choices, Smarter Places (SCSP) projects. This should reduce transport emissions and greenhouse gas emissions.

Measure	Title
E.1	Promotion of car sharing and development of car clubs
Definition	Key Intervention
Continued and further promotion of this scheme	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
Perth & Kinross Council/TACTRAN	Voluntary

ii. Travel Plans for large institutions and businesses

All large businesses in Perth and Kinross are encouraged to produce a Travel Plan, sometimes in compliance with the conditions of a planning consent. Transport Planning works with large employers to encourage implementation of Travel Plans and has actively participated with employers such as Crieff Hydro in staff awareness sessions. This encourages a modal shift from away from car travel improving pollution levels and greenhouse gas emissions.

Measure	Title
E.2	Travel Plans for large institutions and businesses
Definition	Key Intervention
a. To encourage and assist large organisations to develop and implement travel plans b. Work with local businesses to encourage the development/ implementation of travel plans	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
Perth & Kinross Council	Voluntary

iii. PKC Corporate Travel Plan

A Corporate Travel Plan is currently being progressed and this will encourage active and sustainable travel modes to be used by all staff. The aim will be to achieve a modal shift away from single occupancy car use. This will have a direct bearing on air quality by reducing the amount of traffic on the roads.

Measure	Title
E.3	Create and implement PKC Corporate Travel Plan
Definition	Key Intervention
PKC Corporate Travel Plan encompasses staff travelling to and from PKC workplaces and fleet operators for PKC	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
Perth & Kinross Council Sustrans Tactran Cycling Scotland Paths for All (SCSP) Revolution Strathearn	Voluntary

iv. Promotion of Active Travel

PKC receives SCSP funding and this is used to promote our 'On the Go' range of brands that are aimed at providing local solutions to encouraging active travel. As part of the campaign, all households in Crieff received a copy of this travel guide. It is recommended that as part of the AQAP, the Travel Guide is updated and reissued as required. The Crieff on the Go campaign will continue to promote walking and cycling in the area, as well as the use of public transport as most journeys are very local in nature. Active travel is promoted within PKC Active Travel Strategy².

Measure	Title
E.4	Promotion of active travel
Definition	Key Intervention
To encourage members of the community to adopt cycling and walking as alternatives to using private vehicles. a. Improve pedestrian facilities such as new footpaths and crossings. b. Continue to promote cycling and walking and raise awareness of cycling and walking networks available. c. Undertake modal shift monitoring where feasible	To encourage a shift away from the use of private motor vehicles for travelling to more sustainable forms of transport, or reducing the need for travel.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

² Active Transport Strategy for Perth and Kinross, available at: <https://perth-and-kinross.cmis.uk.com/Perth-and-Kinross/Document.ashx?czJKcaeAi5tUFL1DTL2UE4zNRBcoShgo=mZcCnujHqiTukOtiNVyedggYITs7XU2kYZGUKY9TX0HwyoLS84Z%2b1g%3d%3d&rUzwRP%2bZ3zd4E7lkn8Lw%3d%3d=pwRE6AGJFLDNih225F5OMaOWCtPHwdhUfcZ%2fLUOzgA2uL5jNRG4jdO%3d%3d&mCTIbCubSFFxsDGW9lXnlq%3d%3d=hFflUdN3100%3d&kCx1AnS9%2fWZQ40DXFvEw%3d%3d=hFflUdN3100%3d&uJovDxwdiMPoYy%2bA3vYtvA%3d%3d=ctNjF55vVA%3d&FqPIIEJYlotS%2bYGoBi5oIA%3d%3d=NHdURQburHA%3d&d9Qij0ag1Pd993jsyOJgFvmyB7X0CSOK=ctNjF55vVA%3d&WGwmoAfeNR9xqBux0r1Q8Za60lavYmz=ctNjF55vVA%3d&WGwmoAfeNQ16B2MHuCPMRKZMwaG1PaO=ctNjF55vVA%3d>

v. Provide additional buses – Increase bus routes

Providing extra buses should encourage the shift from car journeys, thus improving both air quality and greenhouse gas emissions. This will be particularly effective if combined with low emission buses and perhaps a scheme as outlined in D4.

Measure	Title
E.5	Provide additional buses/Increase bus routes
Definition	Key Intervention
a. To encourage the use of public transport as an alternative to using private vehicles. b. Work with partners to improve public transport infrastructure provision; c. Continue to encourage, promote and increase awareness of public transport options through working with partner organisations. d. Look to identify additional funding sources to facilitate network enhancements.	To encourage a shift away from the use of private motor vehicles for travelling
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

vi. Undertake further social marketing

PKC will continue to develop social marketing campaigns, such as “Crieff on the Go”, to promote active travel, primarily through funding streams such as SCSP. The campaigns will promote active and sustainable travel to encourage individual behaviour changes that will benefit health and wellbeing.

Measure	Title
E.6	Undertake further social marketing re active travel/modal shift
Definition	Key Intervention
a. Continue to develop and promote active and sustainable travel through social marketing campaigns b. Continue to actively investigate available funding sources	To work in partnership with the Community Council and other local partners to promote Crieff as a more attractive and sustainable place to live and work, through active travel
Responsible authority and other partners	Powers to be used
Perth & Kinross Council Community Council Business Sectors	Voluntary

vii. Awareness raising and education at local schools and community meetings

PKC have a ‘Schools on the Go’ package of workshops for both primary and secondary pupils, which is regarded as an example of best practice by Transport Scotland. These workshops encourage pupils to consider why active and sustainable travel is beneficial to the environment and health. The workshops will equip the community with the skills and knowledge to make informed choices that will influence future travel choices.

Measure	Title
E.7	Awareness raising and education at local schools and community meetings
Definition	Key Intervention
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 Crieff AQMA; c. Include reference to air quality in promotion of active travel to school campaigns.	Continue to encourage and promote and increase awareness of active and sustainable transport options through working with partner organisations and the community
Responsible authority and other partners	Powers to be used
Perth & Kinross Council Community Council	Voluntary

viii. Cycling and walking routes to be linked in with the Campus for Sport

Accessibility audits are currently being conducted in Crieff, which will provide information on the current infrastructure and also suggest where travel routes could be improved or upgraded.

Action Plan for future improvement works to be carried out and allow for more robust funding bids to be made to funding partners such as Sustrans.

Measure	Title
E.8	Cycling and walking routes to be linked in with the Campus for Sport
Definition	Key Intervention
a. Undertake an audit on walking & cycling infrastructure for Crieff b. Create a walking and cycling infrastructure Action Plan	Improve and develop walking and cycling routes, to encourage active transport
Responsible authority and other partners	Powers to be used
Perth & Kinross Council Live Active Sustran Crieff Community Groups/Council	Voluntary

ix. Provision of PKC “Champions” for transportation methods

The Transport Planning team within PKC works in partnership with community groups to encourage them to take ownership of projects and to promote local initiatives regarding active and sustainable travel. Our ‘On the Go’ campaigns are very much seen as a partnership and PKC actively encourages local walking or cycling groups to get involved and to champion their modes of travel.

Measure	Title
E.9	Provision of PKC “Champions” for transportation methods
Definition	Key Intervention
Engage with local walking and cycling groups to promote active travel within Crieff	To encourage community involvement and ownership of promoting active and sustainable modes of travel within and around Crieff
Responsible authority and other partners	Powers to be used
Perth & Kinross Council Local Community Groups Community Council	Voluntary

F. Reduction from non-transport sources

i. Biomass Installations- review developments which may cause pollution

Environmental Health Team as internal consultees for development management will continue to request and assess all planning applications for Crieff that are specifically for biomass installations. The screening process will ensure that all new biomass installations will not have an adverse effect on air quality especially within the AQMA.

Measure	Title
F.1	Biomass Installations- minimise developments which causes pollution
Definition	Key Intervention
Consider air quality in planning decisions for new biomass installations by carrying out initial screening process to determine if an air quality assessment is required	Continue to assess new biomass installations to ensure air quality is considered at the planning development stage.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

G. Other Measures

i. Increase AQ monitoring network

PKC will continue to monitor air quality within Crieff and to ensure that monitoring is in line with LAQM statutory duties, thus ensuring that monitoring data is robust for annual reports and the decisions on air quality measures are well informed.

Measure	Title
G.1	Increase AQ Monitoring network
Definition	Key Intervention
Continue to evaluate and review monitoring network: a. Establish PM _{2.5} monitoring within AQMA b. Review Real Time Monitors location	Continue to access and review monitoring to collate accurate data to ensure more accurate and informed decisions on air quality measures, modelling and reporting.
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary / Statutory

ii. Regional modelling study

PKC with Consultants Ricardo Energy & Environment have developed a regional model for Perth and Kinross which encompasses Crieff. The model will allow more continuity with regards to planning applications that require an Air Quality Assessment. The model will predict any future exceedances of the Air Quality Objectives within the Crieff area which may also have a detrimental effect on the AQMA, with regards to future developments.

Measure	Title
G.2	Regional AQ modelling study
Definition	Key Intervention
To establish a Crieff regional dispersion model for NO ₂ & PM ₁₀ & PM _{2.5}	To ensure a more consistent air quality evidence based proactive model that can anticipate issues of air quality rather than react to them and will also aid and support the evaluation of planning applications
Responsible authority and other partners	Powers to be used
Perth & Kinross Council AQ Consultants	Voluntary

iii. Cycling and walking routes to be incorporated into transport model

The Crieff transport model allows for different transport scenarios to be modelled, including walking and cycling routes, therefore allowing an assessment of the feasibility of these routes to be made. PKC will work with other partners, including our term consultants to investigate this option.

Measure	Title
G.3	Cycling and walking routes to be incorporated into transport model and their feasibility assessed
Definition	Key Intervention
a. Incorporate walking and cycling routes into the transport model b. Assess feasibility of routes and consult with the community c. Progress a modal shift towards walking and cycling	To identify and develop walking and cycling routes within Crieff to encourage the uptake of active travel within the Crieff Community
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Voluntary

iv. Transport assessment for developments to be required as part of the planning process

The Local Development Plan contains a policy on Transport Standards and Accessibility Requirements, which applies to all development proposals that involve significant travel generation. Its aims include reducing travel demand by car and incorporating appropriate mitigation measures on and off-site to enhance active travel and public travel provision. It sets out that transport assessments should be prepared and implemented for significant travel generating developments; and that supplementary guidance is provided that explains when a travel plan and transport assessment is required. Mitigation measures could include a requirement that development proposals support the provision of infrastructure necessary to support positive changes in transport technologies, such as charging points for electric vehicles.

Measure	Title
G.4	Transport assessment for developments to be required as part of the planning process
Definition	Key Intervention
a. Review of Local Development Plan policy on Transport Standards and Accessibility Requirements (TA1) b. Adoption of non-statutory guidance for transport alongside the reviewed policy c. Developers to be required to provide financial contribution(s) towards local bus services if there are identified accessibility issues.	The consideration of additional criteria requiring new development proposals to support the provision of infrastructure such as charging points for electric vehicles
Responsible authority and other partners	Powers to be used
Perth & Kinross Council	Statutory: Town & Country Planning (Scotland) Act 1997 as amended by the Planning etc. (Scotland) Act 2006

The Stakeholders having undertaken evaluation criteria for all proposed measures and have compiled a summary of the results of the assessment which is presented in Table 4 below.

Each of the measures have been evaluated following a specific criteria, the evaluation process is detailed in Appendix 5.

Table 4: Proposed Action Plan Measures (to be read in conjunction with Section 5)

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
A. Strategic measures											
A.1	Liaise with the Scottish Government regarding the consideration of national measures to reduce background concentrations of PM.				Y	Unknown	Y	Y	Scottish Govt & Local Authorities	Unknown	Medium/ Long
A.2	Improving Links with Local Transport Policies				Y	N	Y	Y	PKC & TACTRAN & Transport Travel Associations	Y	Medium
A.3	Improving Links with Regional transport strategy				Y	N	Y	Y	PKC & TACTRAN	Y	Medium
A.4	Encourage Integration of AQ with other Council strategies				Y	N	Y	Y	PKC	Y	Medium
A.5	TG.16 Air Quality planning policy and Guidance				Y	Y	Y	Y	PKC	Y	Medium

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co- environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
A.6	TG.16 Procurement Guidance to ensure air quality is a formal consideration of the procurement process within PKC.				Y	Y	Y	Y	PKC	Y	Medium

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
A 7	Local Development Plan - Assessment of areas currently earmarked for development. - Integration of the AQAP with future versions of the LDP - Ensure that development proposals with the potential to exert an impact on the Crieff AQMA are assessed for air quality impacts and where necessary, mitigation measures considered. - Assess Crieff's ability to accommodate significant development proposals.				Y	Y	Y	Y	PKC	Y	Medium
					30						

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
B. Move traffic away from the AQMA											
B.1	Examine local road traffic movements onto the A85	Medium	Medium/ High	6	Y	Y	Y	Y	PKC & Transport Scotland	Y	Medium/ Long
B.2	Incentivise parking out with AQMA: • Signage for parking • Lengthen stay of car parks • Different signage for tourist parking – Macrosty Park • Cost of parking • Remove or relocate parking, parking enforcements • Double yellow lines to restrict stopping on High Street.	Medium	Medium/ High	6	Y	Y	Y	Y	PKC	Y	Medium/ Short

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
C. Traffic Management											
C.1	Possible provision of smart parking in Crieff – possibly applied for through grant funding.	Medium	High	4	Y	Y	Y	Y	PKC	Y	Medium
C.2	- Urban Traffic Control Systems congestion management - traffic reduction - traffic signal phasing and junction intervention - amend traffic light signalling - Intelligent traffic management system	Large	High	6	Y	Y	Y	Y	Transport Scotland & PKC	Y	Medium
C.3	Anti –idling enforcement	Small	Low	4	Y	Y	Y	Y	Police Scotland & PKC	Y	Short

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
C.4	Relocation of pedestrian crossing on High Street	Small	Low	4	Y	Y	Y	Y	Transport Scotland & PKC	Y	Short
C.5	Consider gating/holding traffic out with canyon.	Medium	Medium	6	Y	Y	Y	Y	Transport Scotland & PKC	Y	Medium
C.6	Limiting traffic turning right on the high street to reduce traffic stopping and backing up.	Medium	Low	8	Y	Y	Y	Y	Transport Scotland & PKC	Y	Short
D. Reduce the emissions from source											
D.1	Encourage Private and public operators to pursue cleaner vehicles and abatement measures • Bus operators • Local business • PKC fleet	Medium	Medium	6	Y	Y	Y	Y	PKC	Y	Medium

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
D.2	Development of a Local/ Voluntary Bus Quality Partnership	Small	Low	4	Y	Y	Y	Y	PKC	Y	Short
D.3	School Travel Plans	Small	Low	4	Y	N	Y	Y	PKC	Y	Short
D.4	Public Transport Improvements	Small	Medium	3	Y	Y	Y	Y	PKC	Y	Medium
D.5	Incorporation of N-LEF – National Low Emissions Framework and consideration of Low emission zone for Crieff High Street Corridor.	Medium	High	4	Y	Y	Y	Y	Transport Scotland & PKC	Y	Long
D.6	Introduce Eco Stars scheme for HGV and bus operators	Small	Medium	3	Y	Y	Y	Y	PKC & Eco Stars	Y	Short
D.7	PKC eco driver training for fleet drivers and council staff, tracking fitted to vehicles	Small	Low	4	Y	N	Y	Y	PKC	Y	Short

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
E. Reduce emissions by reducing demand for traffic, change in travel choice											
E.1	Promotion of liftsharing and development of car clubs	Small	Low	4	Y	N	Y	N	PKC & TACTRAN	Y	Short
E.2	Travel Plans for large institutions and businesses	Small	Low	4	Y	Y	Y	N	PKC & TACTRAN	Y	Short
E.3	PKC corporate travel plan : Promotion of liftsharing Workplace travel plans eco driving for staff and council fleet operators	Small	Low	4	Y	N	Y	Y	PKC	Y	Medium
E.4	Promotion of active travel, walking and cycling.	Small	Low	4	Y	Y	Y	Y	PKC Sustran Tactran Cycle Scotland Paths for All (SCSP) Revolution Strathearn	Y	Short
E.5	Provide additional buses- increase bus routes	Small	Medium	3	Y	Y	Y	Y	PKC	Y	Medium

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
E.6	Undertake further social marketing	Small	Medium	3	Y	N	Y	N	PKC	Y	Short
E.7	Awareness raising and education, presentations at local schools/ community meetings	Small	Medium	3	N	N	N	N	PKC & Community Council	Y	Short
E.8	Cycling and walking routes to be routed to link in with the campus for sport to encourage use by students/staff.	Small	Medium	3	Y	Y	Y	Y	PKC Community Council Live Active & Sustran	Y	Medium
E.9	Provision of PKC "Champions" for transportation methods such as bus, cycling to encourage others to engaged in these modes of travel.	Small	Low	4	Y	N	Y	N	PKC Local Community Groups & Community Council	Y	Short

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
F. Reduction from non-transport sources											
F.1	Biomass installations- Review developments which may cause pollution	Small	Low	4	Y	N	Y	Y	PKC	Y	Short
G. Other											
G.1	Increase AQ Monitoring Network: - Establish PM_{2.5} monitoring within AQMA, possibly relocate site - Additional diffusion tube monitoring - Background monitoring to validate background concentration s.	Zero	Medium	0	N	N	N	Y	PKC	Y	Medium/ Long
G.2	Regional Modelling study-concentrations across Crieff.	Zero	Low	0	N	N	N	Y	PKC & AQ Consultant	Y	Short

Action Plan measures											
No.	Measure Title (CE Score)	Potential Air Quality Impact Zero 0% Small 1% Medium 2-5% Large > 5%	Estimated Costs Low ≤£20k Medium £20k≤£60k High £60k≤£200k Very High ≥£200k	Cost Effectiveness Low ≤ 4 Med 5-9 High ≥10	Potential Co-environmental Impacts	Risk Factors	Potential Social Impacts	Potential Economic Impacts	Lead Authority	Feasibility/ Acceptability	Short Term 1-2 yrs Medium Term 3-6 yrs Long Term > 6yrs
G.3	Cycling and walking routes to be incorporated into transport model-link in with “Smarter Choices”.	Small	Low	4	Y	N	Y	Y	PKC	Y	Short
G.4	Transport assessments for developments to be required as part of the planning process. To ensure more sustainable modes of transport for the proposed development.	Small	Low	4	Y	Y	Y	Y	PKC	Y	Short

Appendices

Appendix 1: AQMA Order

Environment Act 1995 Part IV, Section 83(1)

Perth and Kinross Council

AQMA Order

Perth and Kinross 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 "Perth and Kinross Council Air Quality Management Area (No2) Order" and shall come into effect on the Fourteenth day of April 2014.

The area shown in red on the attached maps to be designated as an air quality management area (the "designated area").

The designated area incorporates an area within this boundary line:- from the point at the Y-Junction at Perth Road and Dollerie Terrace, follow the A85 east to East High Street, the Cross, High Street, James Square then on to West High Street stopping at the junction of Galvelmore Street and Lodge Street and north up Comrie Street to the Y-Junction at Coldwells Road and mid point of Comrie Street. The AQMA area will take in the whole of the buildings along East High Street /High Street /West High Street /and Comrie Street.

This Order and map may be viewed at all public Council offices, all libraries (including mobile ones) and on the Council Website.

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

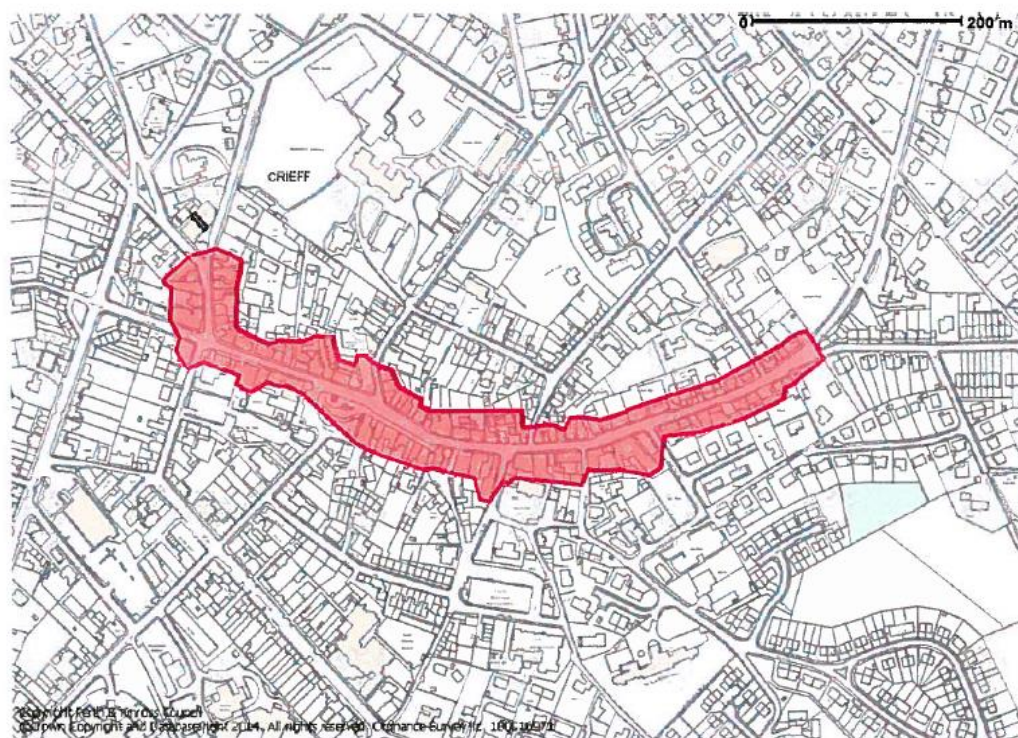
This Order shall remain in force until it is varied or revoked by a subsequent order.

This Order together with the attached map are sealed with the Common Seal of Perth and Kinross Council and subscribed for them and on their behalf by Ian Taylor Innes their Head of Legal Services and Proper Officer for the purposes hereof at Perth on the Tenth day of April Two thousand and fourteen.

..... 



This is the map referred to in the foregoing Order entitled the “Perth and Kinross Council Air Quality Management Area (No2) Order”



Appendix 2: Existing Strategies and Policies Relevant to Air Quality in Crieff

A. Local Transport Policies

i. Shaping Perth's Transport Future

In order to shape transport at a local level in Perth, PKC have adopted a transport strategy for Perth to address congestion locally. The strategy focuses mainly on the city of Perth however the key transport issues it highlights are applicable to Crieff, these are:

- Walking and Cycling - Unattractive due to road traffic, better routes required.
- Bus Network - congestion caused by bus traffic, reliability of existing bus serves.
- Local Road Network - constraints on local road network, resulting in congestion

The strategy adopts the visions and objectives set out by the regional and national transport strategy.

ii. Perth Traffic and Transport Issues Transport Appraisal

The Perth Traffic and Transport Issues Transport Appraisal were carried out in 2010. The transport appraisal was commissioned by PKC to assess the transport issues in and around Perth. The study was conducted in accordance with the Scottish Transport Appraisal Guidance (STAG).

The Appraisal recognises that air pollutants can cause local problems if they occur at high concentrations. The traffic modelling indicated that the existing road network in Perth could not support the anticipated future development.

Although the appraisal was specifically for Perth the aforementioned principle is also relevant to Crieff in that high concentrations of ambient air pollutants can cause local issues.

B. Community Plan

PKC Community Plan (Local Outcomes Improvement Plan) 2017-2027 is a plan for improving the lives and experiences of everyone who lives, works and visits Perth & Kinross.

The purpose of the Community Plan is to provide strategic direction for Perth and Kinross for the area, local communities and individuals. One of the underpinning values within the plan is sustainability, to shape the economic, social and environmental impacts of decision making and activities within local communities.

One objective is to create safe and sustainable places within P&K for future generations which include specific actions that relate to AQ: By

- 2018/19 there will be ' AQAPs for Perth City and High Street area in Crieff '
- 2020/21 there will be ' Improved health and wellbeing of the local community as a result of reducing air pollution in Perth and Crieff '

PKC recognise that the challenges cannot be addressed by one organisation; they require multiple organisations working together to understand the changing environment and to improve and sustain the wellbeing of local communities.

The Crieff Community Trust & Crieff Community Council in conjunction with Crieff & Upper Strathearn Partnership has developed a Community Action Plan for Crieff 2013 -2018.

Appendix 3: Consultation on the Draft Air Quality 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;
- SEPA;
- 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.
- NHS Tayside

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 updates as part of the Annual Progress Report submission to the Scottish Government and SEPA.

Appendix 4: Conclusions of LAQM Review and Assessments

Summary of LAQM Review and Assessment in Perth and Kinross

A. Updating and Screening Assessment 2009

The 2009 Updating and Screening Assessment (USA) identified annual mean concentrations above the Air Quality Strategy (AQS) objective of $40\mu\text{g.m}^{-3}$ at two sites in Crieff (out with Perth Centre AQMA) during 2008. As a result, two additional monitoring sites at the façade of buildings were introduced in Crieff.

B. Updating and Screening Assessment 2012

The 2012 USA started the fifth round of review and assessment for PKC. During 2011 the diffusion tubes in Crieff continued to show NO_2 levels above the objective, therefore PKC commissioned Ricardo AEA to conduct a Detailed Assessment.

C. Detailed Assessment Crieff (2012)

A Detailed Assessment was conducted to investigate the magnitude and spatial extent of exceedances of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) annual mean along the A85 in Crieff.

The study concluded that exceedances of the NO_2 annual mean objective of $40\mu\text{g.m}^{-3}$ occurred at locations with relevant exposure in 2011. The exceedances are in areas along East High Street and West High Street. The study also concludes that exceedances of the Scottish PM_{10} annual mean objective of $18\mu\text{g.m}^{-3}$ occurred at locations with relevant exposure in 2011. The exceedance areas for PM_{10} are slightly larger than for NO_2 , but are still confined to short stretches of East High Street and West High Street.

NO_2 and PM_{10} concentrations were modelled at two heights, 1.5 m and 4 m to represent relevant exposure at ground floor height and 1st floor height. Figure 3 and Figure 4 show contour plots with annual mean NO_2 concentrations along the A85 in Crieff at the two specified heights during 2011. [Figure 5](#) and [Figure 6](#) show contour plots for PM_{10} . Black dots in the plots denote residential properties. It can clearly be seen that several residential properties lie within the exceedance areas for both NO_2 and PM_{10} at 1.5m and 4m height. The exceedance area for PM_{10} is larger than that for NO_2 .

The Detailed Assessment recommended that PKC should consider declaring an AQMA for the NO_2 and PM_{10} annual mean objectives in the areas of the East High Street and West High Street in Crieff. As a result of the assessment PKC declared an AQMA in Crieff in April 2014.

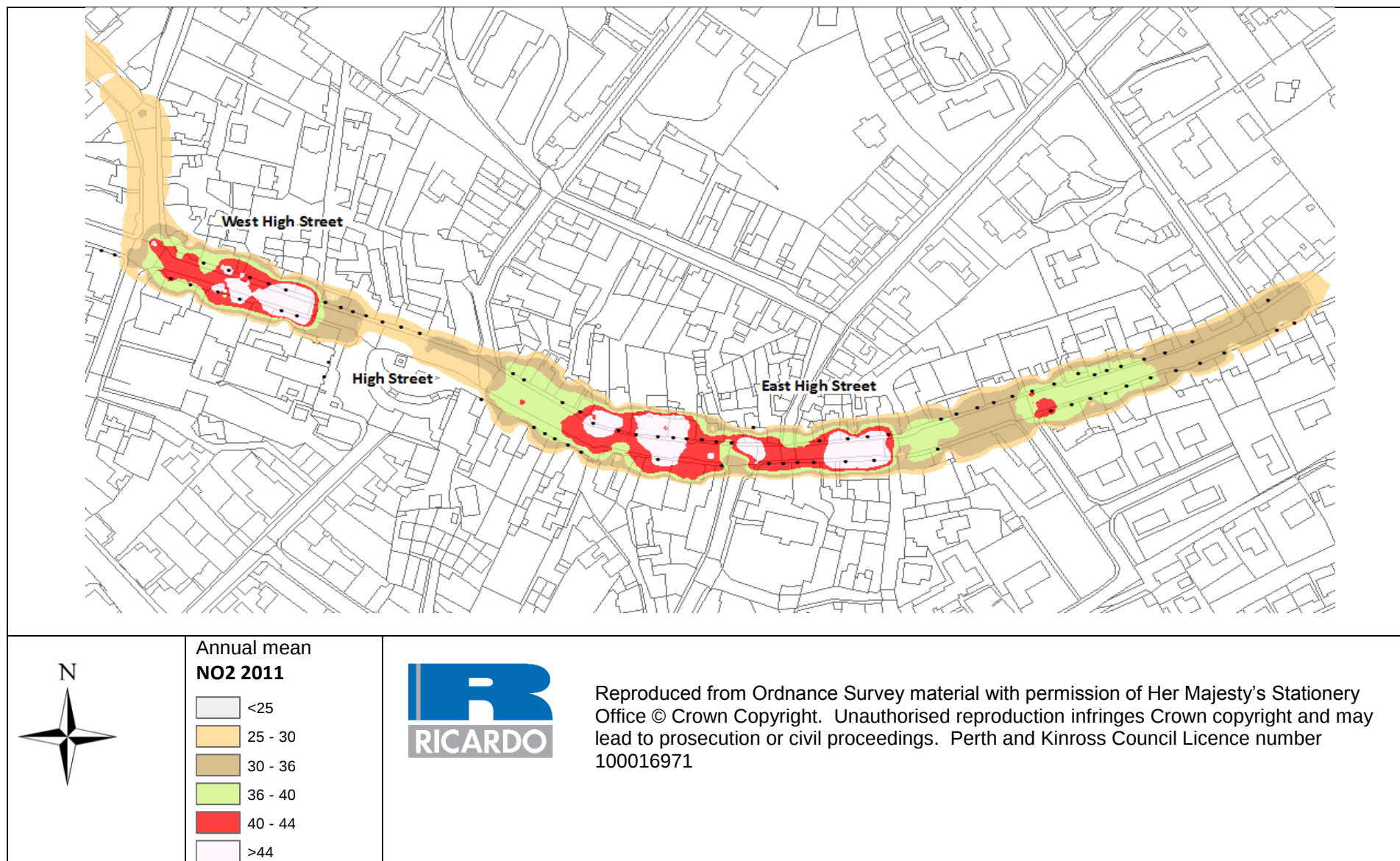


Figure 3: Annual mean Concentrations NO2 at 1.5 m

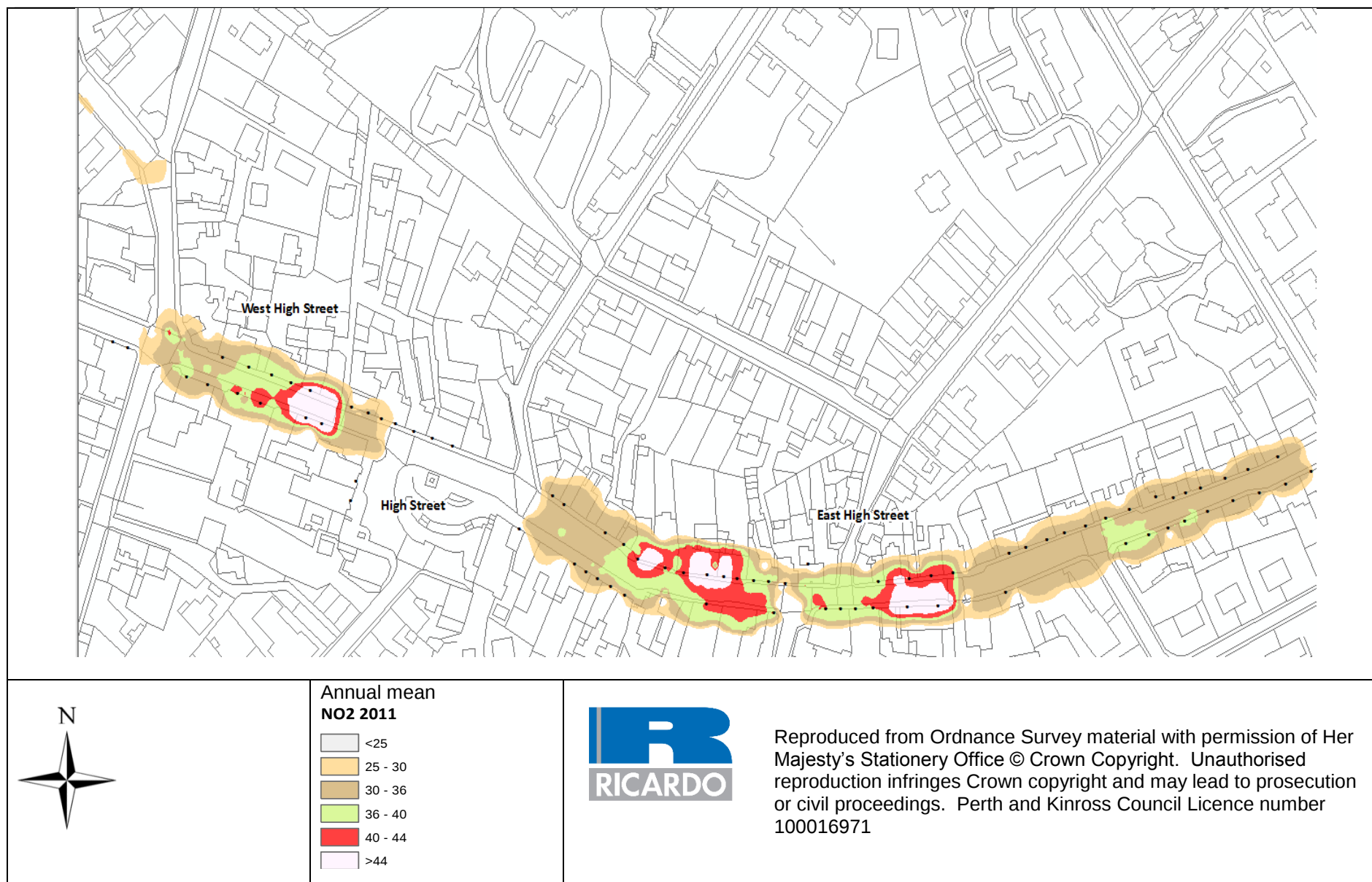


Figure 4: NO2 Annual Mean at 4 m

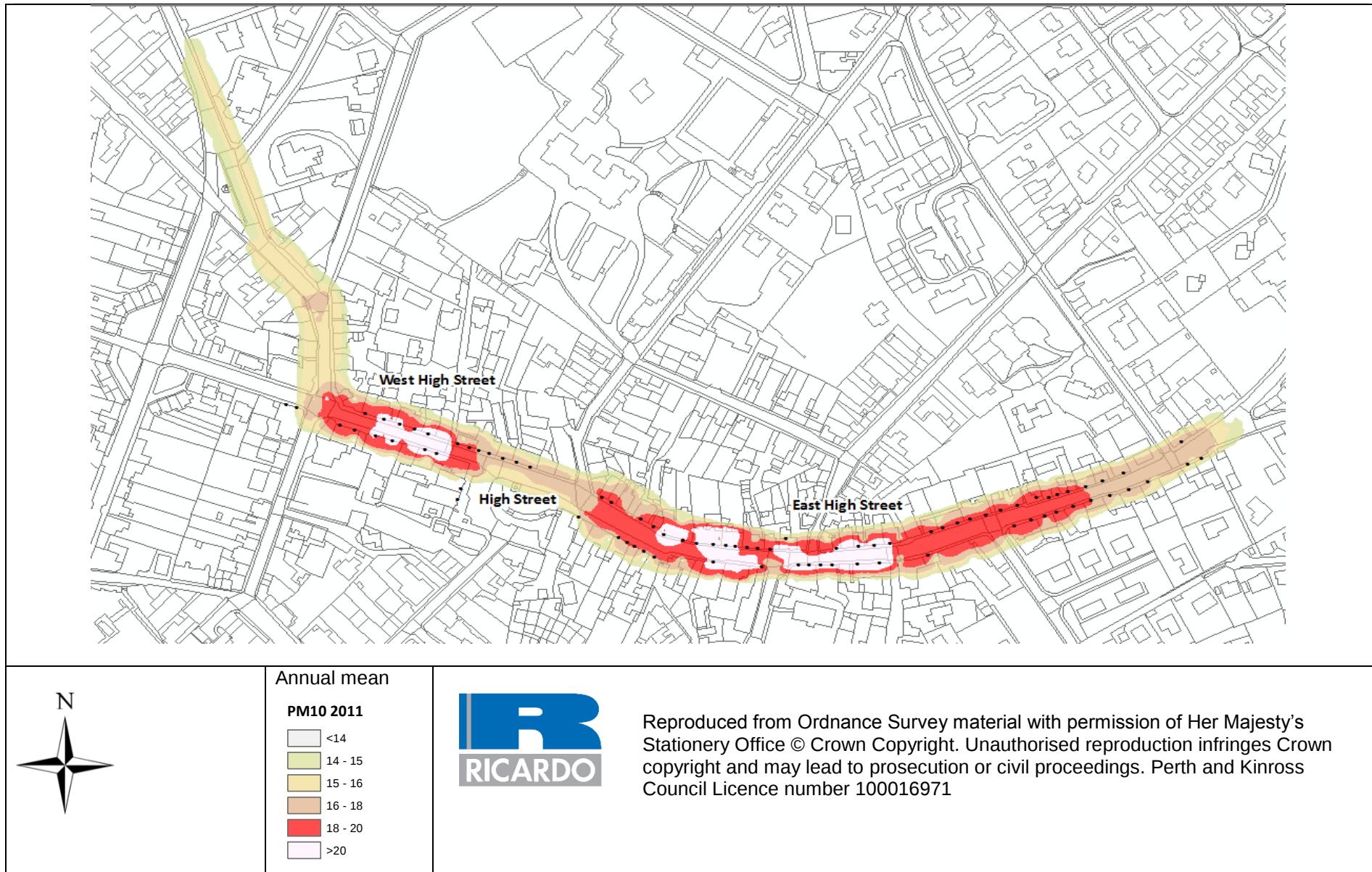


Figure 5: PM10 annual mean at 1.5 m

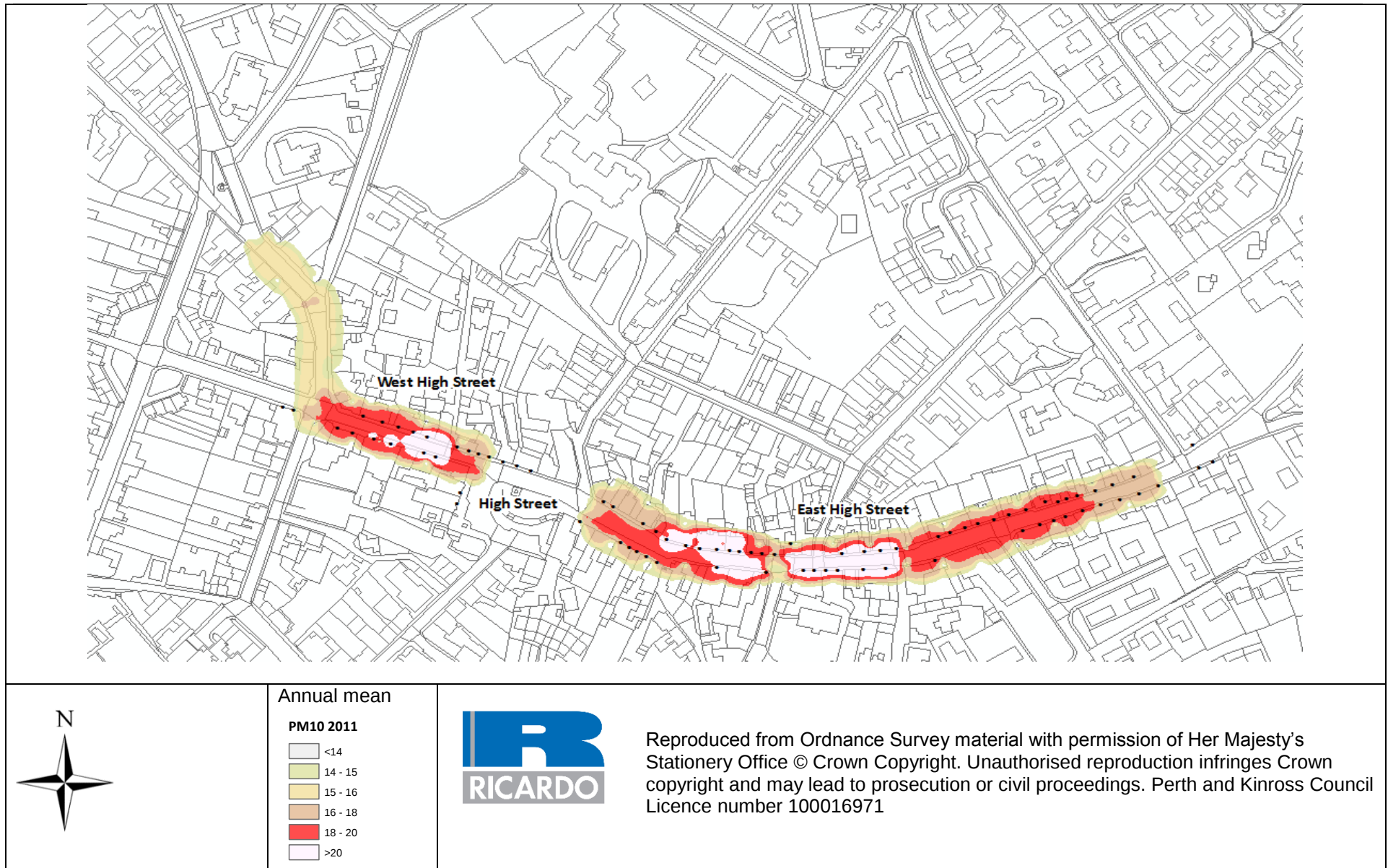


Figure 6: PM10 annual mean at 4 m

D. Further Assessment Crieff (2015)

The Further Assessment was conducted in May 2015 to assess the magnitude and spatial extent of any exceedances of the annual mean air quality objectives for NO₂ and PM₁₀ within the Air Quality Management Area (AQMA) that was declared at Crieff's High Street corridor in April 2014. The AQMA boundary within Crieff is presented in Figure 1.

The study confirmed the findings of the previous Detailed Assessment, namely that there were exceedances of the annual mean NO₂ objective and annual mean PM₁₀ objective where relevant exposure exists. The monitoring and dispersion modelling carried out to support the Further Assessment indicated that exceedances of the NO₂ and PM₁₀ annual mean objectives were still occurring within the Crieff AQMA. The boundaries of the AQMA were therefore still appropriate and did not require to be revoked or amended at the time of the Further Assessment.

Within the Crieff AQMA, the dispersion modelling results indicated that up to 70 residential properties within the AQMA were exposed to exceedances of the annual mean NO₂ and PM₁₀ objectives during 2012, equating to an exposed population of approximately 153 people.

The further assessment estimated that emission reductions of road NOx (first noted) in the Crieff AQMA of up to 22% were required in order to achieve compliance with the annual mean NO₂ objective at all locations of relevant exposure. For compliance with the annual mean PM₁₀ objective, it was estimated that a reduction in the road contribution of PM₁₀ of up to 46% was required.

Source Apportionment Analysis

Source apportionment is the process whereby the contributions of different pollutant sources to ambient concentrations are quantified. This aims to allow the Local Authority's Action Plan to target specific sources when attempting to reduce pollutant concentrations in the AQMA. Tailpipe emissions are predominantly NOx which is converted to NO₂ through chemical reactions, therefore emissions of NOx are analysed.

The source apportionment for the Crieff AQMA assessment:

- Confirmed that exceedances of the NO₂ and PM₁₀ objective are due to road traffic.
- Determined the extent to which different vehicle types are responsible for the emission contributions to NOx/NO₂ and PM₁₀.
- Quantified what proportion of total NOx and PM₁₀ are due to background emissions, or local emissions from busy roads in the local area. Quantifying emissions aided PKC to focus actions on local traffic movements.

The 'Baseline' is the modelling of annual mean NOx and PM₁₀ concentrations without any measures to reduce these concentrations by Perth & Kinross Council. In this case, the baseline is the modelling of emissions in 2012. To calculate the proportion of total NOx and PM₁₀ concentrations attributable to various types of vehicles, the Emissions Factors Toolkit (Eft) was used within which emission sources were effectively switched on or off accordingly e.g. for calculating the contribution from HGVs all other sources were set to zero. This allowed derivation of new emission factors for the road segments which were then modelled in ADMS-Roads to obtain the contribution of each source to ambient NOx and PM₁₀ concentrations at the worst-case specified receptor locations i.e. the locations where the highest concentrations were predicted.

The contributions from each of the following sources were quantified:

- Background
- Moving vehicles
- Queuing vehicles

- Cars
- Light Goods Vehicles
- Heavy Goods Vehicles
- Buses

Examination of the source apportionment results indicates that:

- The proportion of emissions from queuing traffic is higher at the western end of West High Street than at other locations. Traffic surveys indicated that traffic appears to queue regularly throughout the day at this location with longer queues occurring during peak periods; this may be when vehicles are waiting to turn right onto Comrie Street.
- The source apportionment also indicated that the highest proportion of NO_x emissions at all receptors is from HGV's and cars.
- NO_x and PM₁₀ emissions from buses are relatively low when compared to other vehicle types.

The NO_x source apportionment was conducted at four locations in Crieff. As presented in Figure 7.

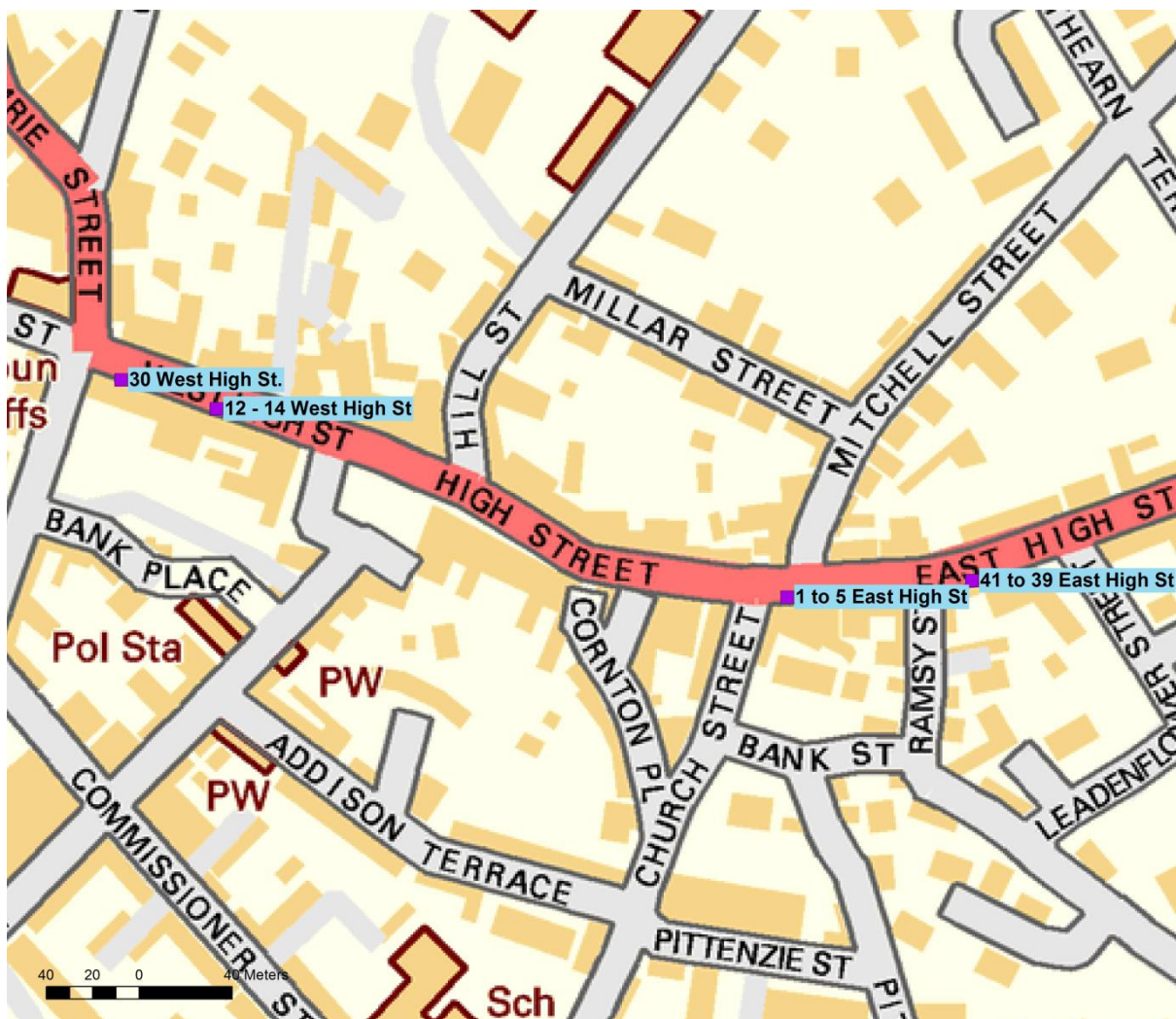


Figure 7: Worst case receptor locations used for source apportionment

For each site the % contributions from each category are presented in Figure 8 and the concentration breakdown by source is presented in Figure 9. The source apportionment results presented confirms the findings outlined above. The PM₁₀ source apportionment is displayed in Figure 10 as a % for each of the four locations along High Street. The breakdown in concentration is presented in Figure 11. It is evident that the background PM₁₀ concentrations are responsible for a large proportion of PM₁₀ concentrations with in Crieff. In order to reduce background concentrations national policies and measures are required to address background PM₁₀ concentrations across Scotland. PKC will work with Scottish Government in support of any national PM reduction measures.

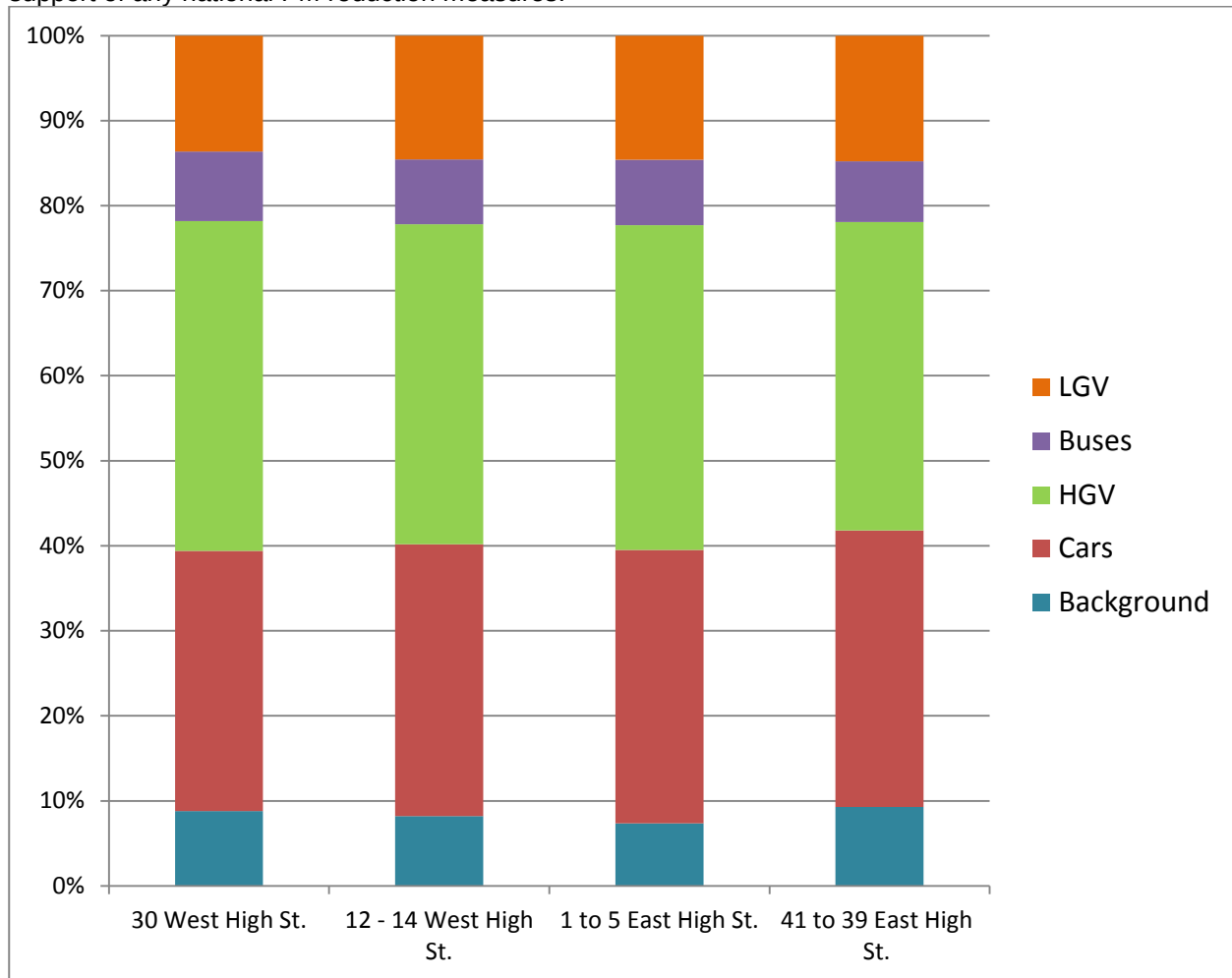


Figure 8: NOx expressed as %

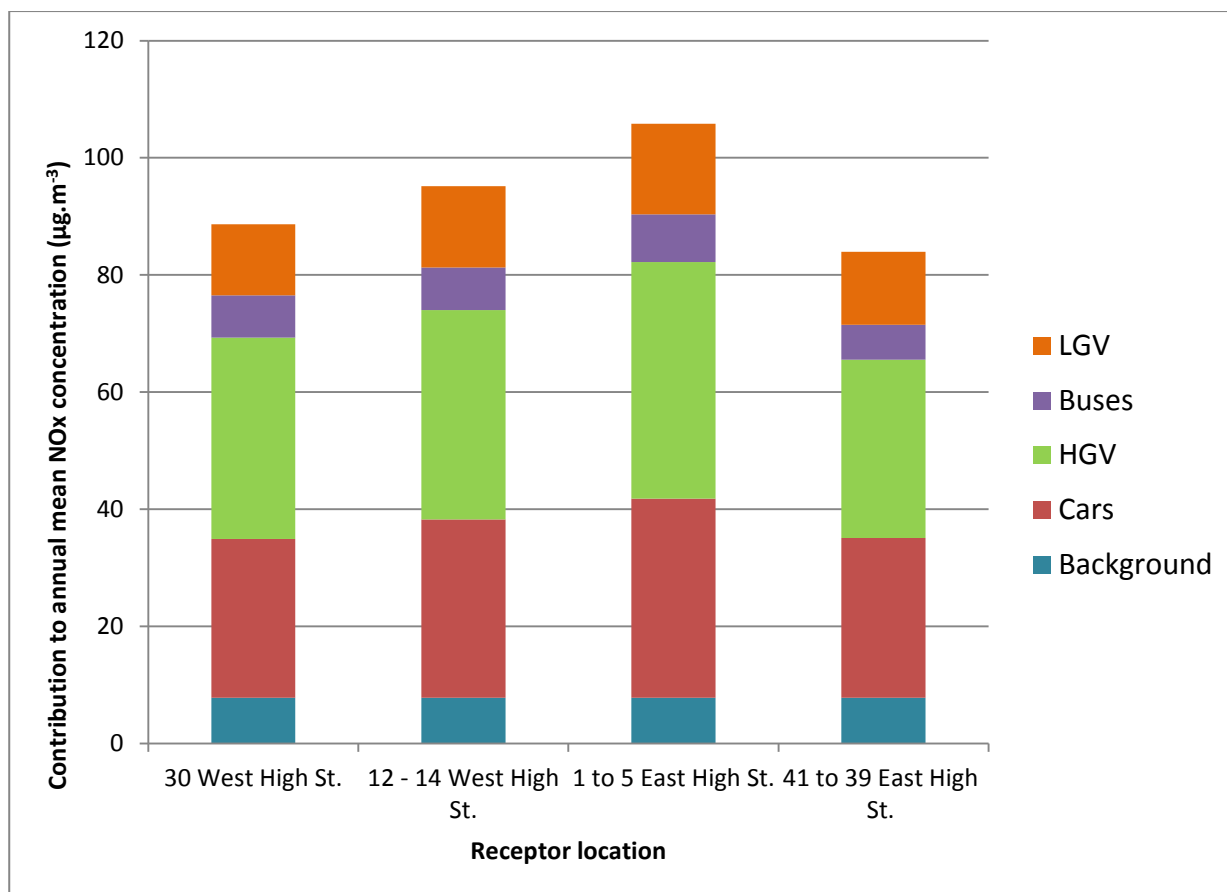


Figure 9: NOx expressed as $\mu\text{g.m}^{-3}$

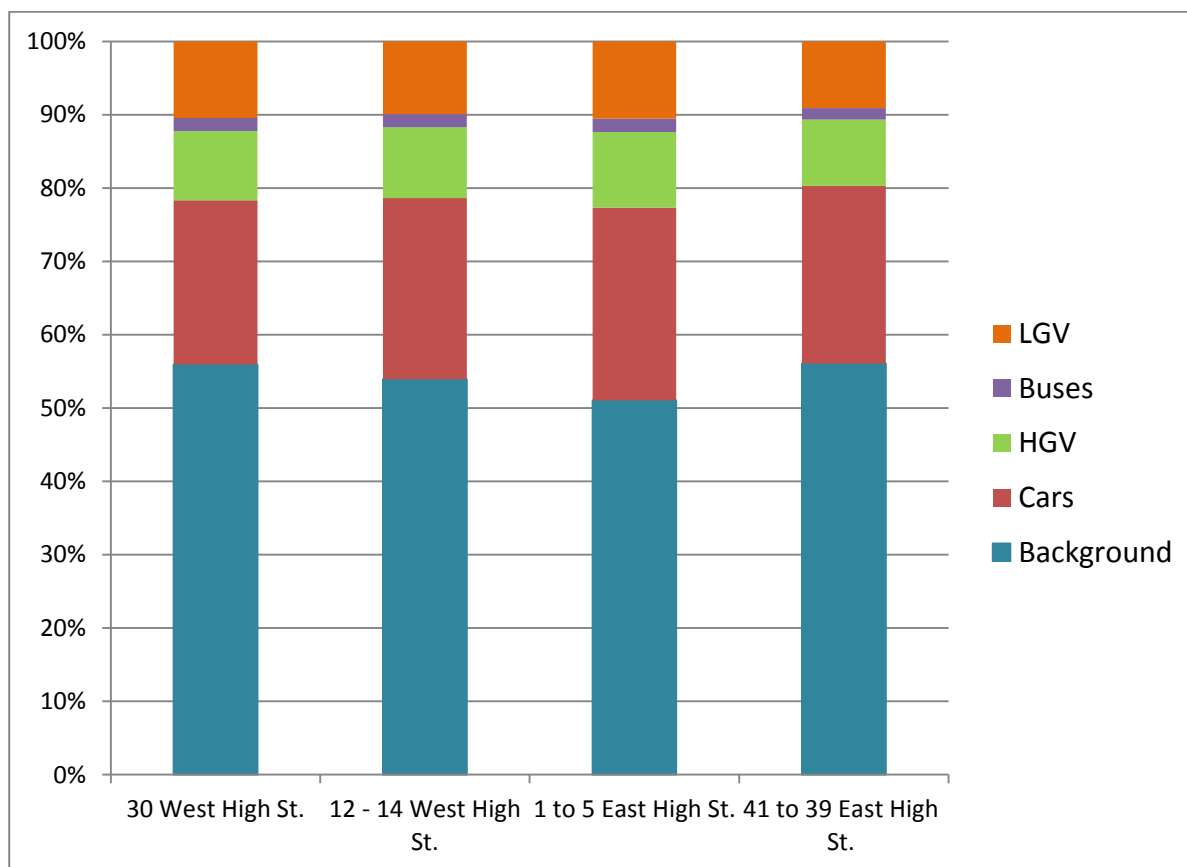


Figure 10: PM10 expressed as %

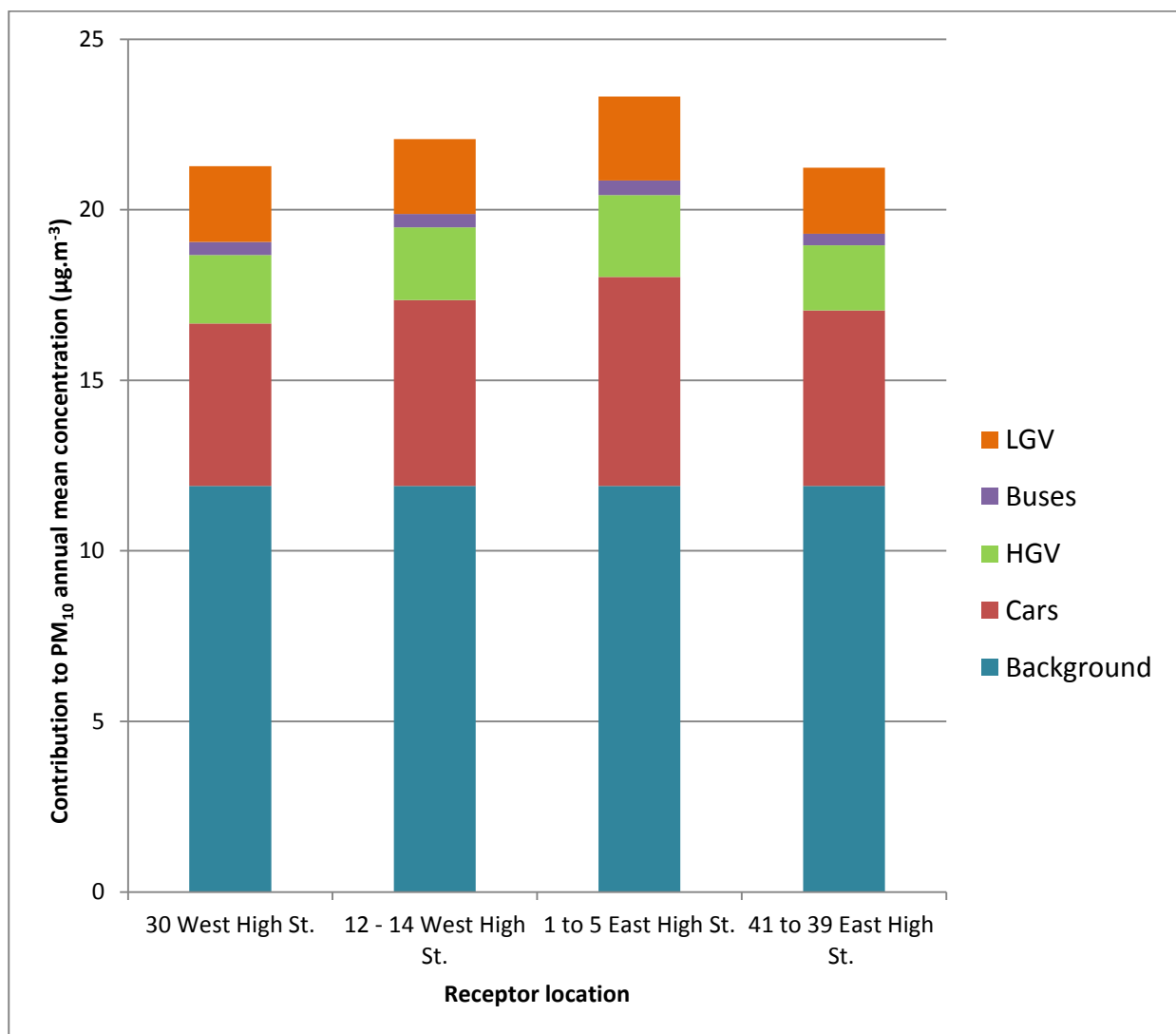


Figure 11: PM₁₀ expressed as µg.m⁻³

Scenario Analysis

As part of the 2015 Further Assessment three mitigation scenarios were modelled following the conclusions of the source apportionment analysis, these scenarios are detailed below. The modelling results indicate that compliance with the NO₂ annual mean objective may be achievable by implementing the measures modelled in this assessment. It is likely that a combination of measures will be required to reduce annual mean PM₁₀ concentrations sufficiently to be compliant with the Scottish objective.

A. Option 1- Increase average speed via parking restrictions

This scenario investigated the potential reductions in NO₂ and PM₁₀ annual mean concentrations that could be achieved by amending roadside parking restrictions along the main road in Crieff. The average journey time measurements conducted during the traffic survey indicated that average vehicle speeds through Crieff are fairly low. This may mean that, if possible, increasing speed and hence improving flow, is a potential option for reducing NO_x and PM₁₀ emissions within the AQMA. Slow moving traffic may be attributable to vehicles waiting to take parking spaces and the resulting delays while traffic behind waits as vehicles enter and leave roadside parking spaces.

To test what is potentially achievable by increasing average speed, five sub-scenarios were tested to represent varying average speed changes up to the speed limit of 30 mph at locations where traffic can be free flowing. For the baseline model, average speeds for three different sections of the A85 were calculated from the traffic survey data - [Tables 5 & 6](#)

To calculate the resulting change in vehicle emissions for potential increases in average speed up to the speed limit, the minimum headroom in speed was calculated for each section i.e. 30mph minus the speed in the fastest road link within each section. E.g. a section with average link speeds ranging from 10 mph to 23 mph has headroom of 30 mph minus 23 mph = 7 mph. As test options, link speeds were then increased using five incremental percentages of the headroom for each section.

The modelling results indicated that both annual mean NO₂ and PM₁₀ concentrations would decrease as average speeds increased towards the speed limit at different locations within the AQMA.

The predicted NO₂ annual mean is less than the 40 µg.m⁻³ objective after a 20% of headroom increase in speed at all the worst-case receptor locations modelled; except for 1 to 5 East High Street where an 80% of headroom increase in speed is required before the predicted annual mean is within the 40 µg.m⁻³ objective. At this location an 80% of headroom increase would represent achieving an average speed of approximately 28 mph.

Examination of the predicted annual mean PM₁₀ concentrations at all of the receptors modelled indicated that smaller reductions would be achieved for PM₁₀ and would not be sufficient to achieve compliance with the 18 µg.m⁻³ Scottish annual mean objective at any of the worst case receptor locations.

Table 5: Scenario 1- Increase Average Speed through AQMA-Predicted NO₂ Annual Mean Concentrations

Receptor	Minimum headroom to speed limit (30mph)	2012 baseline NO ₂ Annual mean	NO ₂ annual mean with percentage increase of minimum headroom to 30 mph speed limit				
			20% (µg.m ⁻³)	40% (µg.m ⁻³)	60% (µg.m ⁻³)	80% (µg.m ⁻³)	100% (µg.m ⁻³)
30 West High St (1 st floor)	17.5 mph	40.5	37.4	34.9	33.0	31.5	30.2
12 - 14 West High St (1 st floor)	17.5 mph	42.3	39.0	36.3	34.2	32.4	31.1
1 to 5 East High St (1 st floor)	8.1 mph	45.8	44.0	42.4	41.0	39.7	38.5
41 to 39 East High St (ground floor)	8.1 mph	38.7	37.3	36.0	34.9	33.9	32.9

Note: Sections of the table highlighted in pink indicate an exceedance of the objective

Table 6: Scenario 1- Increase Average Speed through AQMA-Predicted PM₁₀ Annual Mean Concentration

Receptor	Minimum headroom to speed limit (30mph)	2012 baseline PM ₁₀ Annual mean	PM ₁₀ annual mean with percentage increase of minimum headroom to 30 mph speed limit				
			20% (µg.m ⁻³)	40% (µg.m ⁻³)	60% (µg.m ⁻³)	80% (µg.m ⁻³)	100% (µg.m ⁻³)
30 West High St (1 st floor)	17.5 mph	20.8	20.3	20.0	19.9	19.8	19.7
12 - 14 West High St (1 st floor)	17.5 mph	21.5	21.1	20.8	20.7	20.6	20.5
1 to 5 East High St (1 st floor)	8.1 mph	22.7	22.5	22.3	22.1	22.0	21.9
41 to 39 East High St (ground floor)	8.1 mph	20.8	20.7	20.6	20.5	20.4	20.3

Note: Sections of the table highlighted in pink indicate an exceedance of the objective

Option 2- Reduce traffic queue lengths during peak periods at the junction of West High Street and Comrie Street

Traffic can become slow moving and congested at certain locations in Crieff during peak times. Observations made during a traffic survey conducted in May 2013 indicated that westbound traffic appears to queue regularly throughout the day at the western end of West High Street (A85), with longer queues occurring during peak periods; this may be a result of vehicles waiting to turn right onto Comrie Street, while waiting for eastbound traffic to pass. Analysis of the queue survey at this location indicated that there were westbound queues occurring as follows:

- 10m queues occurring approximately 3 - 5 times per hour during normal hours
- 20 - 30m during peak periods (8am - 9am; 12pm - 1pm; 4pm - 5pm)

Eastbound traffic on Comrie Street heading east along the A85 also appears to experience queues at this junction. Analysis of the queue survey data indicated:

- 10m queues regularly throughout day at lights
- Up to 40m from 8am - 9am
- 20 - 30m between 12pm - 1pm
- 20m from 1pm - 2pm
- Up to 40m queues from 4pm to 5pm

If the priority is changed here so that traffic had right of way along this route, it may cut down on vehicle queuing within the section of West High St Street where canyon effects are limiting pollutant dispersion. This scenario assumed that changing the traffic flow priority at this junction could decrease both eastbound and westbound vehicle queuing time by up to 75%.

The results indicated that a reduction of up to $3.5 \mu\text{g.m}^{-3}$ in annual mean NO_2 concentrations at West High Street may be achievable if queue times can be reduced at this location; this could help achieve compliance with the $40 \mu\text{g.m}^{-3}$ objective at this location. A reduction of $1.4 \mu\text{g.m}^{-3}$ in annual mean PM_{10} concentrations was predicted; this was not sufficient to achieve compliance with the $18 \mu\text{g.m}^{-3}$ Scottish objective at this location using this measure alone.

Table 7: Scenario 2- Reduce queuing times at junction of West High St/Comrie St - Predicted NO_2 annual mean concentrations at relevant receptors

Receptor	2012 baseline NO_2 annual mean	NO_2 annual mean with 75% reduction in queuing times
30 West High St (1st floor)	40.5	37
9 Comrie Street diffusion tube	23.1	17

Note: Sections of the table highlighted in pink indicate an exceedance of the objective

Table 8: Scenario 2- Reduce queuing times at junction of West High St/Comrie St - Predicted PM_{10} annual mean concentrations at relevant receptors

Receptor	2012 baseline PM_{10} annual mean	PM_{10} annual mean with 75% reduction in queuing times
30 West High St (1st floor)	20.8	19.4
9 Comrie Street diffusion tube	17	14.9

Note: Sections of the table highlighted in pink indicate an exceedance of the objective

B. Option 3- Decrease in the number of HGV traffic passing through the AQMA

The traffic data used within the further assessment indicated that HGVs account for approximately 5% of the average daily traffic flow through the town. This scenario modelled the effect of reducing the number of HGVs passing through Crieff in increments from 5% down to 2%.

A reduction in HGV to 2% of the fleet resulted in predicted annual mean NO₂ concentrations below the 40 µg.m⁻³ objective at all of the worst case receptor locations. For PM₁₀, reducing HGV numbers provided a benefit by reducing annual mean concentration at all receptors by up to 0.9 µg.m⁻³; it was not however sufficient to achieve the 18 µg.m⁻³ annual mean objective at any of the worst case receptor locations.

Euro 5 or Euro 6 HGVs

There may also be some potential for freight operators to use more modern/lower emitting vehicles on this route; therefore a lower emission scenario whereby HGVs passing through the AQMA are restricted to Euro 5 or Euro 6 classification was included. Emissions of NO_x and PM₁₀ from vehicles are regulated under various European Directives which specify emission standards for different vehicle types. The emission standards become increasingly stringent for newer vehicles over time.

Restricting HGV traffic to Euro 5 and 6 vehicles achieved compliance with the NO₂ annual mean objective at all of the worst case receptors except for at 1- 5 East High Street. Restricting HGV traffic to Euro 5 and 6 classifications only had no benefit at all in terms of reducing annual mean PM₁₀ concentrations.

Table 9: Scenario 3 Decrease in %HGV in AQMA – Predicted NO₂ annual mean concentrations at worst case receptors

Receptor	2012 baseline (5% HGV)	4% HGV	3% HGV	2% HGV	5% HGV - Euro 5 & 6 only
30 West High St (1 st floor)	40.5	38.2	36.0	33.7	37.5
12 - 14 West High St (1 st floor)	42.3	40.1	37.9	35.6	39.0
1 to 5 East High St (1 st floor)	45.8	43.3	40.9	38.4	42.1
41 to 39 East High St (ground floor)	38.7	36.6	34.6	32.6	35.3

Table 10: Scenario 3 Decrease in %HGV in AQMA – Predicted PM₁₀ annual mean concentrations at worst case receptors

Receptor	2012 baseline (5% HGV)	4% HGV	3% HGV	2% HGV	5% HGV - Euro 5 & 6 only
30 West High St (1 st floor)	20.8	20.5	20.2	20.0	20.8
12 - 14 West High St (1 st floor)	21.5	21.2	20.9	20.6	21.6
1 to 5 East High St (1 st floor)	22.7	22.4	22.1	21.8	22.8
41 to 39 East High St	20.8	20.6	20.3	20.1	20.9

(ground floor)					
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The Further Assessment concluded that the three mitigation scenarios modelled indicated that each option will provide reduction in both NO_x and PM₁₀ emissions. The predicted reduction in NO₂ concentrations were much greater than the predicted reduction in PM₁₀ concentrations for all scenarios tested.

The modelling results indicate that compliance with NO₂ annual mean objectives may be achievable by implementing the measures modelled in the further assessment. However it is likely that a combination of the measures will be required to reduce annual mean PM₁₀ concentrations sufficiently to be compliant with the Scottish objective.

Appendix 5: Evaluation of Action Plan Measures

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:

- 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.
- A view is then expressed on how much of the traffic would actually be changed by the option.
- 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.
- 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%.

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)

These cost bandings may be subject to revision depending on comments received from those consulted.

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

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.

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.

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.

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.

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 Crieff
- Reduce or increase overall travel time
- Place additional requirements on operators.

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.

Table 11 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.

Table 11: Criteria for Feasibility Analysis

Criteria for feasibility analysis			
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

Appendix 6 - Glossary of Air Quality Terms

Air Quality Action Plan (AQAP)

When a Local Authority has set up an Air Quality Management Area, AQMA, it must produce an action plan setting out the measures it intends to take in pursuit of the Air Quality Objectives in the designated area

Air Quality Management Area (AQMA)

If a Local Authority identifies any locations within its boundaries where the Air Quality Objectives are not likely to be achieved, it must declare the area as an Air Quality Management Area (AQMA). The area may encompass just one or two streets, or it could be much bigger. The Local Authority is subsequently required to put together a plan to improve air quality in that area - a Local Air Quality Action Plan.

Air Quality Objectives

The Air Quality Objectives are policy targets generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances, within a specified timescale. The Objectives are set out in the UK Government's Air Quality Strategy for the key air pollutants.

Air Quality Standards

Air Quality Standards are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The Standards are based on assessment of the effects of each pollutant on human health, including the effects on sensitive sub-groups.

Air Quality Strategy

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland describes the plans drawn up by the Government and the Devolved Administrations to improve and protect ambient air quality in the UK in the medium-term. The Strategy sets Objectives for the main air pollutants to protect health. Performance against these Objectives is monitored where people regularly spend time and might be exposed to air pollution.

Annual mean

The annual mean is the average concentration of a pollutant measured over one year. This is normally for a calendar year, but some species are reported for the period April to March, which is known as a pollution year. This period avoids splitting a winter season between two years, which is useful for pollutants that have higher concentrations during the winter months.

Automatic Monitoring

Monitoring is usually termed "automatic" or "continuous" if it produces real-time measurements of pollutant concentrations. Automatic fixed point monitoring methods exist for a number of pollutants, providing high resolution data averaged over very short time periods. BAM, TEOM and FDMS instruments are all automatic monitors.

COMEAP

Committee on the Medical Effects of Air Pollutants, COMEAP is an Advisory Committee of independent experts that provides advice to Government Departments and Agencies on all matters concerning the potential toxicity and effects upon health of air pollutants.

Diffusion Tube Samplers

Passive diffusion tube samplers collect nitrogen dioxide and other pollutants by molecular diffusion along an inert tube to an efficient chemical absorbent. After exposure for a known time, the absorbent material is chemically analysed and the concentration calculated.

Dispersion Model

A dispersion model is a means of calculating air pollution concentrations using information about the pollutant emissions and the nature of the atmosphere. In the action of operating a factory, driving a car, or heating a house, a number of pollutants are released into the atmosphere. The amount of pollutant emitted can be determined from knowledge of the process or actual measurements. Air Quality Objectives are set in terms of concentration values, not emission rates. In order to assess whether an emission is likely to result in an exceedance of a prescribed objective it is necessary to know the ground level concentrations which may arise at distances from the source. This is the purpose of a dispersion model.

Emission Factor

An emission factor gives the relationship between the amount of a pollutant produced and the amount of raw material processed or burnt. For example, for mobile sources, the emission factor is given in terms of the relationship between the amount of a pollutant that is produced and the number of vehicle miles travelled. By using the emission factor of a pollutant and specific data regarding quantities of materials used by a given source, it is possible to compute emissions for the source. This approach is used in preparing an emissions inventory.

Exceedance

An exceedance defines a period of time during which the concentration of a pollutant is greater than, or equal to, the appropriate air quality criteria. For Air Quality Standards, an exceedance is a concentration greater than the Standard value. For Air Pollution Bandings, an exceedance is a concentration greater than, or equal to, the upper band threshold.

Local Air Quality Management (LAQM)

The Local Air Quality Management (LAQM) process requires Local Authorities to periodically review and assess the current and future quality of air in their areas. A Local Authority must designate an Air Quality Management Area (AQMA) if any of the Air Quality Objectives set out in the regulations are not likely to be met over a relevant time period.

Micrograms per cubic metre ($\mu\text{g}/\text{m}^3$)

A measure of concentration in terms of mass per unit volume. A concentration of $1 \mu\text{g}/\text{m}^3$ means that one cubic metre of air, contains one microgram (10^{-6} grams) of pollutant.

Oxides of Nitrogen (NO_x)

Combustion processes emit a mixture of nitrogen oxides (NO_x), primarily nitric oxide (NO) which is quickly oxidised in the atmosphere to nitrogen dioxide (NO_2). Nitrogen dioxide has a variety of environmental and health impacts. It is a respiratory irritant which may exacerbate asthma and possibly increase susceptibility to infections. In the presence of sunlight, it reacts with hydrocarbons to produce photochemical pollutants such as ozone. NO_2 can be further oxidised in air to acidic gases, which contribute towards the generation of acid rain.

Particulate matter (PM)

Airborne PM includes a wide range of particle sizes and different chemical constituents. It consists of both primary components, which are emitted directly into the atmosphere, and secondary components, which are formed within the atmosphere as a result of chemical reactions. Of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Air Quality Objectives are in place for the protection of human health for PM_{10} and $\text{PM}_{2.5}$ – particles of less than 10 and 2.5 micrometres in diameter, respectively.

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