

Introduction

Background

The Environment Act 1995 places a statutory duty on Local Authorities to carry out a programme of Local Air Quality Management (LAQM), including the periodic review and assessment of air quality in their area. This identifies areas of concern regarding poor air quality. One such area is around the castle and in particular Castle Meadow.

The Norwich Air Quality Action Plan sets out one way of dealing with the air quality problem, particularly Nitrogen Oxides (NO_x) and Particulates (PM₁₀) in this area as the possible implementation of a Low Emission Zone (LEZ).



Benefits of reducing NO_x and PM

The primary benefits of reduced NO_x and PM levels fall into 3 categories:

- Primary health benefits (reductions in new respiratory problems and so hospital admissions).
- Secondary health benefits (improving existing respiratory problems).
- Non-health benefits (a reduction in damage to buildings as well as providing a better environmental appearance).



Background to CIVITAS

What is CIVITAS?

CIVITAS stands for City-VITALity-Sustainability.

The CIVITAS objectives are:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport



A number of European cities have previously participated in CIVITAS initiatives or are involved in the current projects

The lessons learned from the projects can then be used to help other cities considering similar projects.

What is a Low Emission Zone?

A Low Emission Zone can be described as a geographically defined area that can only be entered by specified vehicles meeting certain emissions criteria or standards, e.g. certain Euro standards. An LEZ prohibits older vehicles from operating in an area, and so accelerates the turnover of the vehicle fleet. Although traffic volumes do not necessarily change, a higher number of the vehicles travelling in an area are cleaner vehicles with lower emissions, and this leads directly to air quality improvements.

Low Emission Zones have been operating in the Swedish cities of Gothenburg, Lund and Malmö for a number of years and more recently London. These cities ban diesel-engined HGV's and buses from entering their boundaries if they are over 8 years old and have not been fitted with appropriate abatement equipment. The zone is enforced using a permit system for older vehicles (windscreen stickers) with visual inspections. Vehicles driving illegally in the zone are subject to a fine, enforced by the police authorities.



Norwich Low Emission Zone

The introduction of the Low Emission Zone (LEZ) is a joint initiative between Norfolk County Council and Norwich City Council and is one of the measures introduced as part of the CIVITAS initiative, co-financed by the European Union, for cleaner and better transport in cities.

The LEZ is being introduced using an innovative approach through obtaining a Traffic Regulation Condition (TRC) via the area Traffic Commissioner to regulate vehicle emissions from buses. Other softer measures associated with the LEZ include an engine switch off Traffic Regulation Order and the offer of free 'Eco-driving' training sessions to bus operators, these are explained in more detail below.



Norfolk County Council has worked in close partnership with operators in developing the TRC and have aided operators meet the requirements by providing grants of up to 65% towards the cost of emissions reducing equipment or engine replacement for older vehicles.

To monitor Euro standards of each bus a list/database of compliant vehicles will be held by Norfolk County Council, which will also include buses which have not been retrofitted but meet the set criteria by their date of manufacture. Norfolk County Council will be happy to share this information with the Traffic Commissioner if requested.



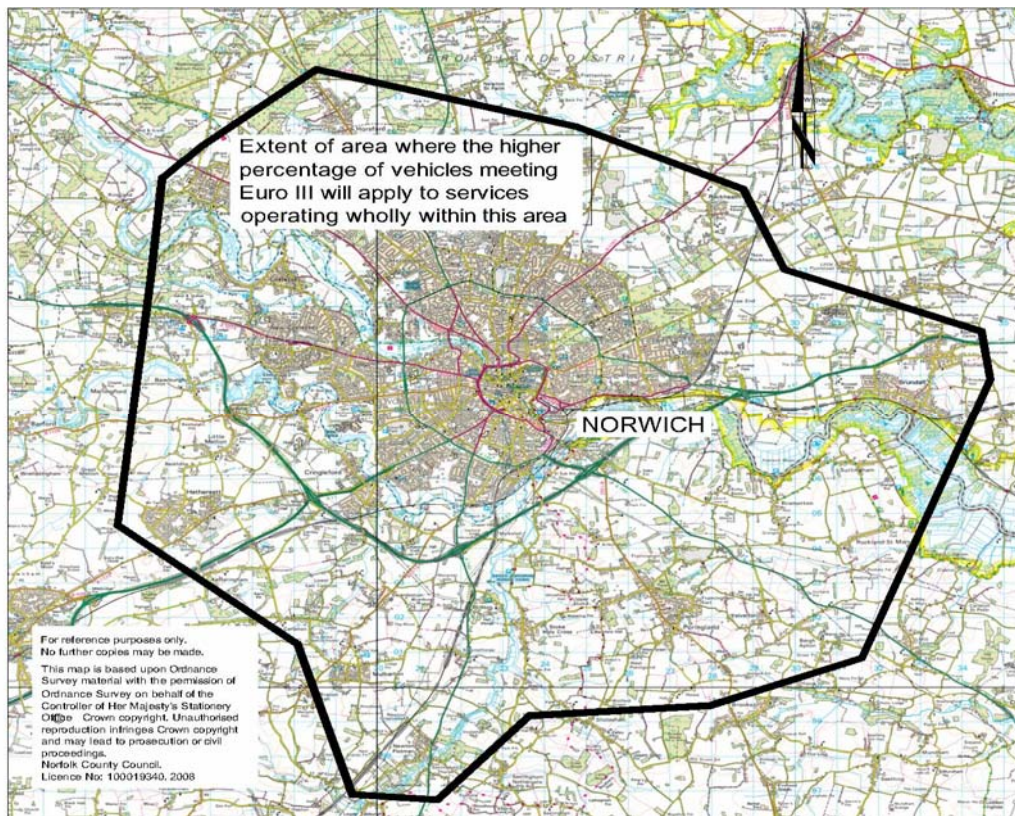
Traffic Regulation Condition

The main aspect of the LEZ is the introduction of a Traffic Regulation Condition which is attached to the PSV operator licences of all operators currently operating or wishing to operate local bus services where the registered route of the service includes Castle Meadow, Norwich, except for services meeting one of the following criteria.

- A. Local bus services with less than five departures per week from Castle Meadow and are exempt from this.

Operators who have services with both terminal points within the area defined in Figure 1		Operators who have services with a terminal point outside the area defined in Figure 1	
Year	Percentage of vehicles needed to comply with TRC	Year	Percentage of vehicles needed to comply with TRC
1 April 2008	40%	1 April 2008	20%
1 April 2009	70%	1 April 2009	35%
1 April 2010	100%	1 April 2010	50%

Table 1. Indicates the criteria required to meet the TRC



Retro-fitting of buses

It is recognised that the proposed TRC condition would have some cost implications for bus operators. These costs include purchasing emissions abatement equipment, to meet the proposed Euro Standard, however Norfolk County Council has provided grants to cover 65% of the costs of fitting this equipment.

There are many abatement measures available on the market at present for controlling emissions from road vehicles. Operators were able to choose the equipment most appropriate for their vehicles. As NO_x and PM₁₀ are the main focus of pollution reduction in Castle Meadow this section will discuss systems aimed at reducing these.

Selective Catalytic Reduction (SCR)

Selective Catalytic Reduction (SCR) uses ammonia or urea, which is injected into the exhaust gas to reduce NO_x. SCR has been used for many years in large industrial processes, but only recently in vehicles.

Technology Overview:

CRT – Oxidation catalyst converts CO and HC to CO₂ and H₂O. The NO₂ is then used to combust the soot in the PM collected in the wall flow filter.

Urea – SCR – Urea is injected into the exhaust which then forms ammonia. Ammonia then reacts with the NO_x over a dedicated SCR catalyst to form nitrogen and water.

An SCR system has the potential to reduce NO_x emissions by between 30 and 70% and soot particle emissions by 40%.

Exhaust Gas Recirculation (EGR)

Exhaust Gas Recirculation (EGR) has to date primarily been developed as a retro-fit NO_x reduction technology for buses although many equipment manufacturers have also used EGR on light and heavy duty trucks. It consists of a valve that uses the exhausts back pressure to recirculate exhaust gases back through the engine.

Fitting an exhaust gas recirculation system can reduce emissions of NO_x by around 40 to 50%. For maximum benefit, EGR should always be fitted with exhaust after treatment, which would further reduce emissions of particulate matter, CO and HC.



Eco- Driving

Part of the LEZ is to also include softer measures, one of which is to promote and encourage Eco-driving. Eco-driving is a way of driving that reduces fuel consumption and vehicle emissions. In order to aid operators who operate in Castle Meadow, Norfolk County Council has offered free places on the training sessions which are run by Norfolk County Council qualified eco-driving instructors.

The benefits from eco-driving are:

Benefits to Norfolk County Council

- Reductions in vehicle emissions, helping to achieve the emission standards that have been set for Norwich.

Benefits to operators

- Improved fuel consumption (cost savings),
- Possible reduction in accidents.

Engine Switch Off in Castle Meadow

Local authorities an additional tool for managing air quality in their areas. Under new powers local authorities will also be able to instruct motorists to switch off their engines while their vehicles are parked and to issue Fixed Penalty Notices those drivers who refuse to co-operate.



Norfolk County Council have now introduced a 'Engine Switch Off' Traffic Regulation Order in Castle Meadow forcing drivers of vehicles parked or waiting at the kerbside in must ensure that the vehicle's engine is switched off, other when actively loading or unloading passengers.

