Ellesmere Port and Neston Borough Council

Air Quality Action Plan, 2007

Final Report

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First draft report endorsed by:	Environment Committee (12/07/2007) Ellesmere Port and Neston Borough Council Air Quality Policy, Defra (15/10/2007)

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1. Executive Summary

This document outlines Ellesmere Port and Neston Borough Council's Air Quality Action Plan (AQAP) for Air Quality Management Area No.1 (Whitby Road / Station Road). Forming part of the Local Air Quality Management process, the AQAP details the measures that are proposed in order to improve air quality in the Air Quality Management Area (AQMA). Ellesmere Port AQMA was designated because the annual average objective for nitrogen dioxide (NO_2) was unlikely to be met at residential premises by the end of 2005.

The Further Assessment, completed earlier this year, showed that local road traffic is the predominant source of NO_2 in the AQMA. Annual mean NO_2 in 2006 was in the range 32-49$\mu g/m^3$ (micrograms per cubic metre). The national objective for NO_2 at the facade of residential properties is 40$\mu g/m^3$. Without intervention, parts of the area are unlikely to be compliant until 2012.

A broad range of options that may have the potential to reduce NO_2 in the AQMA, thereby bringing forward the date of compliance, are considered in the report. As it is unlikely that any single measure will prove effective in achieving the objectives, options have been selected from a variety of categories such as traffic management and development control through to lifestyle improvements. Estimates of the effectiveness (in terms of cost, environmental benefit and timescales for implementation) of each measure are presented along with a framework for refinement, consultation and delivery. It is envisaged that the Air Quality Action Plan will eventually be incorporated into the Local Transport Plan.

2. Statutory Background

Local Authorities are obliged under the Air Quality Regulations (2002) to regularly review and assess current (and future) local air quality from industrial, commercial, transportation and domestic sources.

The Government's Expert Panel on Air Quality Standards (EPAQS) has prescribed health-based standards and objectives for seven key pollutants. Where, as an outcome of the Local Air Quality Management (LAQM) process, it is anticipated that objectives may not be achieved at a particular location the Local Authority must declare an Air Quality Management Area (AQMA).

Section 84(1) of the Environment Act 1995 requires local authorities to carry out a further assessment of existing and likely future air quality in an AQMA. Based on the findings of the further assessment the authority must produce an Air Quality Action Plan (AQAP) detailing how the authority plans to work towards achieving the objectives. The AQAP should consider a range of measures to reduce air pollution in and around the AQMA.

This report details the measures proposed to be taken by this authority and other relevant bodies in pursuit of the annual mean air quality objective for nitrogen dioxide (NO_2) within the designated area.

3. Local Air Quality Management – Review and Assessment Summary

During the first round of review and assessment (completed in 2000) the combined 'Stage 2/3 Review' – which involved detailed air monitoring and dispersion modelling – concluded that it was not necessary to declare any AQMAs in the borough of Ellesmere Port and Neston (Ref. 12.1).

The second round of review and assessment commenced with the Updating and Screening Assessment (USA), 2003 (Ref. 12.2). USAs are intended to identify those matters that have changed since the last assessment, which might lead to the risk of an air quality objective being exceeded. The approach prescribed follows a checklist of source, data and location categories that have to be assessed. Work conducted by Ellesmere Port and Neston Borough Council's (EPNBC) Environmental Protection Unit showed that a Detailed Assessment would be necessary for the following: nitrogen dioxide (NO_2) on a section of the A5032 (Whitby Road / Station Road) and industrial sources emitting benzene, 1,3-butadiene, lead, NO_2, particulates (PM_{10}) and sulphur dioxide (SO_2).

The Detailed Assessment, 2004 (Ref. 12.3) recommended the designation of an AQMA in respect of road traffic on the A5032 because of a likely exceedence of

the annual average objective for NO2. An AQMA was subsequently designated in May 2005 (see Section 4 below).

4. Air Quality Management Area

Ellesmere Port's AQMA was designated on the basis of the likely exceedence of the annual NO_2 objective because of road traffic using the one of the main routes between the town centre and the M53 motorway. The AQMA is officially known as: 'Air Quality Management Area N^o.1 (Whitby Road / Station Road)' and is described as: 'An area incorporating residential properties on Whitby Road (between Enfield Road and Cromwell Road); Princes Road (between Whitby Road and Ashfield Road); and Station Road, in Ellesmere Port' (see Figure 1).

Air quality objectives apply at all locations where members of the public might be regularly exposed over the relevant averaging period. For the annual mean for NO_2 this would include the building facades of residential properties, schools, hospitals etc. It does not apply at, for example, places of work, residential gardens, kerbside sites, or any other location where public exposure is expected to be short term.

Locally, relevant receptors for NO_2 are a mixture of terraced houses and first storey flats above commercial premises, totalling 81 residential properties. The AQMA has been demarcated to include properties fronting the road and is therefore linear in nature and about 800 metres long. A number of properties are as close as 2.5 metres from the kerb, although the angular distance to the facade of the first floor flats is greater than this. It is estimated that about 200 members of the public live at relevant receptors in the AQMA. This represents about a quarter of one percent of the population of the borough.

The southern end of the AQMA is a narrow street canyon (i.e. at the closest point buildings on opposite sides of the road are 13 metres apart), which is also affected by queuing traffic at certain hours of the day. It is here that the highest levels of NO_2 are encountered.

A permanent count site on Westminster Bridge indicates that the Annual Average Daily Flow (AADF) of vehicles in the central section of the AQMA is over 19,000.

The decision to create an AQMA was endorsed by council members and an official Order, made under Section 83(1), Part IV of the Environment Act (1995), brought it into effect on 16 May 2005. This was publicised in advance in the local press and invitations for a public meeting were sent to all residential and commercial properties in the AQMA. Members of the local Air Quality Forum were appraised of the need to designate, and presentations were also given at various committees and liaison panels. It is important to recognise that EPNBC is not unique in having to create an AQMA: to date, at least 214 local authorities have AQMAs in force.

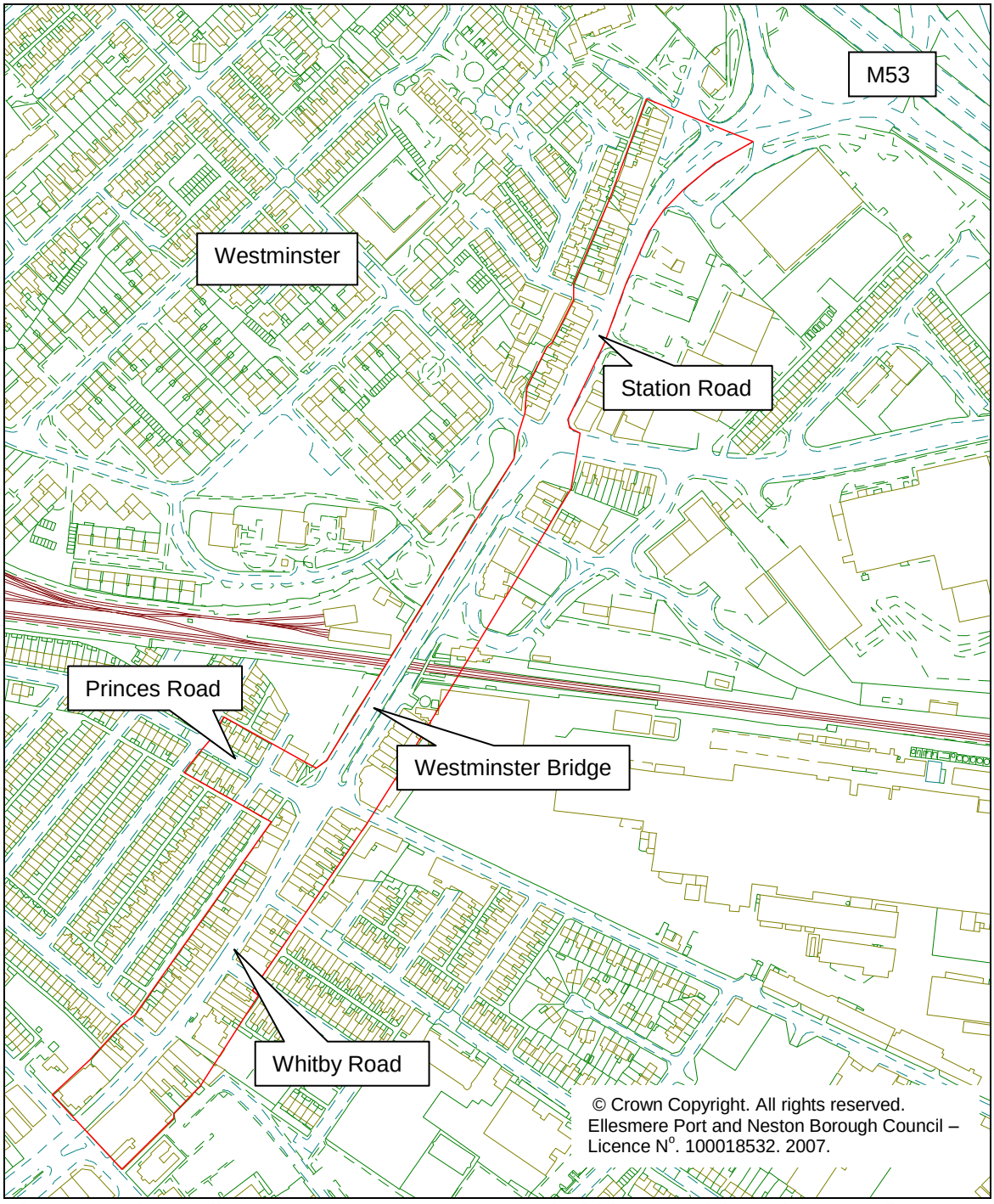

Figure 1. Air Quality Management Area No.1 (Whitby Road / Station Road)

5. Findings of the Further Assessment, 2007

Following designation of an AQMA local authorities are required to conduct a Further Assessment of air quality within the AQMA. The Further Assessment is an integral part of the LAQM process as it provides the technical justification for the measures an authority includes in its Action Plan. This Action Plan should be read in conjunction with the council's Further Assessment 2007 (Ref.12.4).

Further Assessments allow the authority to:

- *confirm the original assessment of air quality against the prescribed objectives, and thus to ensure that the designation of the AQMA was correct;*
- *calculate more accurately how much of an improvement in air quality would be needed to deliver the national air quality objectives within the AQMA;*
- *refine the knowledge of the sources of pollution so that air quality action plans can be properly targeted;*
- *take account as far as possible of any local developments such as new major housing or commercial developments which are likely to affect / be affected by air quality by the relevant date (2005 for NO_2);*
- *carry out real-time monitoring where this was not done as part of the earlier reviews and assessments;*
- *carry out further monitoring in the AQMA to check earlier findings;*
- *corroborate other assumptions on which the designation of the AQMA has been based, and to check that the original designation is still valid, and does not need amending in any way.*

The findings of Ellesmere Port and Neston Borough Council's Further Assessment were accepted by DEFRA in March 2007 and subsequently endorsed by Environment Committee. The main conclusions of the Further Assessment were:

- Monitoring data in the range of 32 – 49$\mu g/m^3$ during 2006 confirmed that the original decision to declare an AQMA was correct.
- All but one monitoring station is expected to meet the annual objective by 2010 and the worst case site (at the junction of Cambridge Road and Whitby Road) should do so by 2012.
- Source apportionment work showed that the dominant source of NOx in the AQMA is traffic on the adjacent roads, contributing an estimated 68% at the worst case location.
- Queuing traffic at the junction of Cambridge Road and Whitby Road is responsible for about 11% of NO_x in the street canyon.
- Early indications are that ambient NO_2 at the facade of first floor flats is likely to be slightly less than at street level.

A real-time chemiluminescent NO_x analyser and collocated triplicate diffusion tubes were installed in the AQMA in early 2006 to improve monitoring coverage. Data polled during this period was utilised in the Further Assessment (Ref. 12.4).

In the source apportionment work conducted as part of the Further Assessment, relative contributions of different sources of pollution were assessed at the worst-

case receptor. Figure 2 shows how this was broken down. Emissions from different classes of vehicles are grouped into light duty vehicles (LDV) and heavy-duty vehicles (HDV). Background includes minor roads, cold starts, domestic sources, railways, regional background etc.

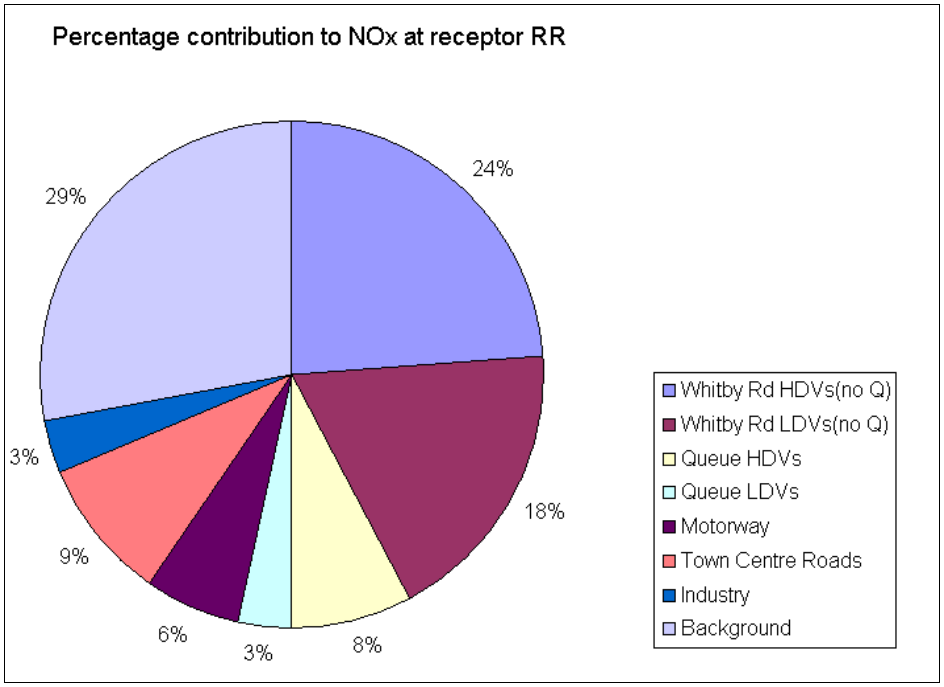

Figure 2. Source apportionment pie chart for NO_x

6. Improvements Required

In order to make an informed judgement of which proposed options are taken forward to tackle air quality it is necessary to calculate the overall improvement in air quality required to deliver the national air quality objectives within the AQMA. This work was conducted as part of the Further Assessment, summarised in Section 5 above. (Ref. 12.4). Using the 'NO_x from NO_2 calculator' on the LAQM tools website (Ref. 12.6), it was calculated that a 36% decrease in 2006 NO_x levels would be necessary at the point of maximum concentration; RR on Whitby Road in order to meet the air quality objective. Local road traffic is the principal source of annual average NO_2 concentrations in the AQMA (background sources contribute almost 30%).

Recent studies have shown that the ratio of NO_2:NO_x in tailpipe emissions is likely to increase in coming years as a greater proportion is released as primary NO_2 from diesels vehicles. This may have implications for achievement of the objective in AQMAs. Unfortunately the revised methodology for incorporating this into modelling was not published in time for the Further Assessment, but the authority will endeavour to use them for future calculations.

Pollutant	Concentration at RR ($\mu g/m^3$)	Annual mean objective ($\mu g/m^3$)	Improvement required ($\mu g/m^3$)	Percentage improvement required
NO_2	49.0	40.0	9.0	18.4%
NO_x	179.1	115.2 (equivalent)	63.9	35.7%

Table 1. Estimated NO_x improvement required to achieve the annual objective.

7. Consultation

A key component in the development of an Action Plan is consultation with statutory bodies, members of the public, local businesses and other stakeholders. Following endorsement of the draft action plan by members of the council's Environment Committee the report was submitted to Defra in July 2007 for approval. Consultants contracted to review action plans on behalf of Defra submitted their assessment of the action plan in October 2007.

The need for engagement on air quality related matters has been recognised locally for some time resulting in the establishment of the Air Quality Forum in 2000. Membership includes representatives of tenants and residents associations, local pressure groups, utilities, industry, commerce, agriculture, health services, parish councils and local politicians as well as relevant staff from both EPNBC and neighbouring authorities. The Forum has been appraised of, and involved in developments throughout the course of LAQM.

Members of the Forum participated in a LAQM workshop exercise in Spring 2006. The intention was to gather opinion on what measures might prove effective in reducing NO_2 pollution in the AQMA. Participants were asked to come up with a broad range of actions, discuss their effectiveness and then rank the solutions according to perceived costs and benefits. These included:

- Introduce a park and ride scheme
- Provide a free bus service using LPG-fuelled vehicles
- Create a one way system
- Reduce the number of traffic light signals
- Improve railway station surroundings
- Link air monitoring information to traffic using existing electronic display signs
- Reroute heavy-duty vehicles
- Pedestrianize Whitby Road
- Traffic / pedestrian surveys
- Improved links to Cheshire Oaks

Residents living in the immediate vicinity of the AQMA have also been given the opportunity to have their say on how the Action Plan should proceed from an early stage. A questionnaire / information leaflet was delivered to 3300 homes and businesses in September 2006. This was supplemented with a town centre event where members of the public could consult council staff, access the internet and submit completed questionnaires. Respondents were asked to rate 13 key actions and also to suggest their own ideas for tackling the pollution issue. The most popular options were:

- Pedestrianize Whitby Road
- Test emissions of heavy duty vehicles
- Restrict heavy duty vehicles in the AQMA
- Introduce a park and ride scheme

- Install secure cycle storage in the town centre
- Increase parking enforcement in AQMA
- Actively consult cyclists
- Tackle idling vehicles
- Monitor emissions from industry
- Walk to school schemes
- Restrict parking outside banks
- Improve bus service
- Target ‘boy-racers’

A breakdown of the responses to the questionnaire is shown in Figure 3. The overall response rate for return of completed questionnaires was about 5%.

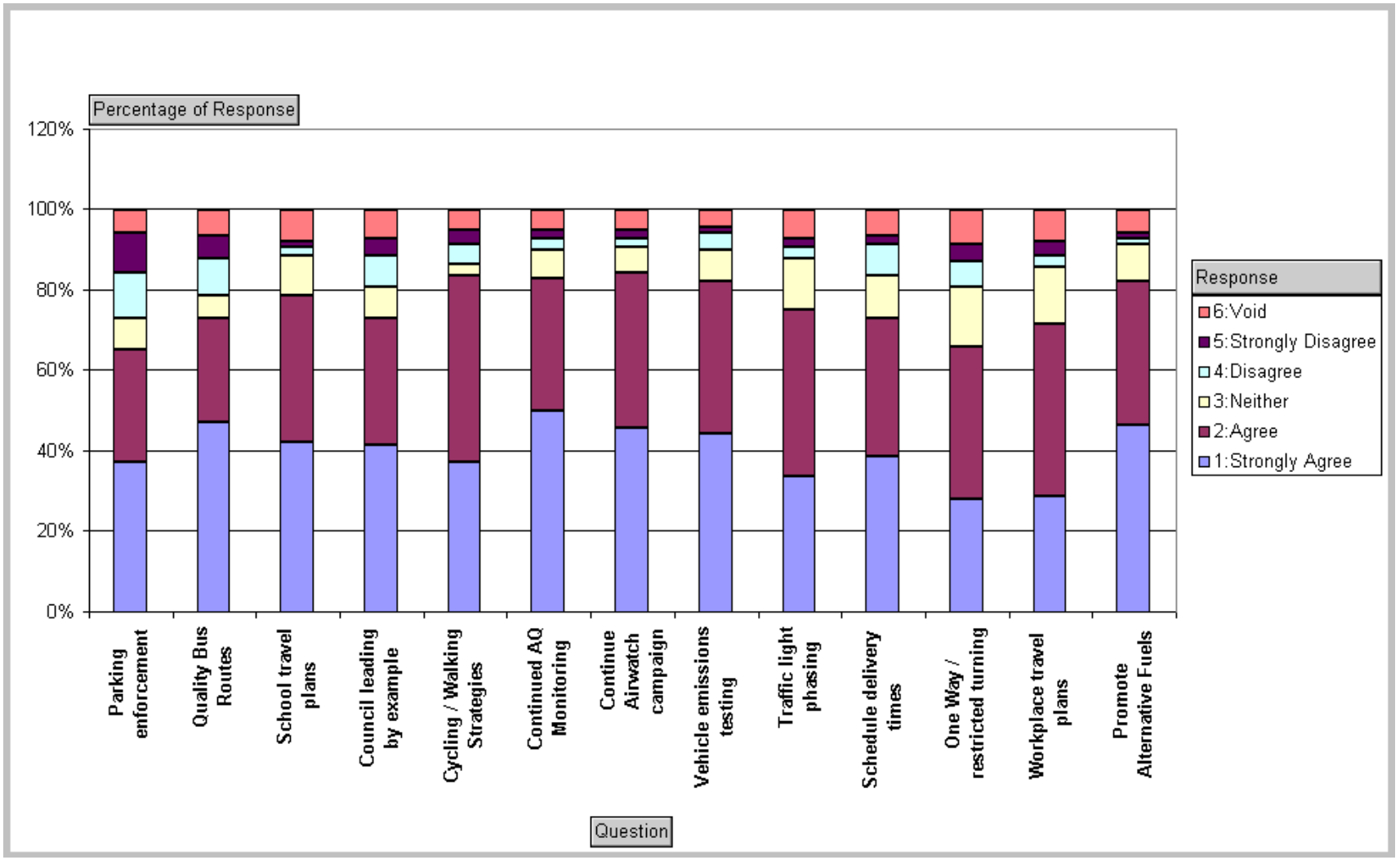

Figure 3. Breakdown of responses to the Action Plan questionnaire, 2006.

An Action Plan Working Group was convened in early 2006 to facilitate the development of the draft Action Plan and to review the options available for delivery of cleaner air. The core working group, which comprises members of the Environmental Protection Unit, joint Highways and Environmental Planning has met on six occasions over the last 12 months. Other relevant bodies continue to be consulted as necessary.

In early October 2007 a further public consultation exercise sought views on the draft version of the Action Plan. Leaflets were distributed to the same geographical area used in 2006, covering 3,300 homes and businesses. Members of the local air quality forum were also invited to contribute. A copy of the draft Action Plan was placed on the council's website for this purpose and hard copies posted out on request. Consultees were asked to provide feedback on the Action Plan itself and to submit suggestions for the improvement of air quality in the AQMA. A breakdown of responses is presented in Table 2 below.

44 reply slips returned
39 reply slips received with comments
17 requests for copies of the action plan

Issue raised through consultation	Response rate
Concern about withdrawal of local bus services	12
Concern about level of industrial pollution	7
Increase monitoring (out of hours; Cromwell Rd; Bus Station; Princes Rd)	6
Traffic should be diverted from Whitby Rd (pedestrianize)	4
Restrict HGVs using Whitby Rd	4
Improve cycle routes	3
Introduce traffic calming	2
Link McGarva Way to the M53	1
Introduce cycle facilities	1
Encourage people to use their cars less	1
Carry out exhaust emissions tests	1
Subsidise bus services	1
Introduce park and ride scheme	1
Schedule commercial delivery times	1
Assist small businesses with renewable energy initiatives	1
Tackle HGV emissions	1
Introduce through-train to / from Chester	1
Construct link from M53 solely for HGV use	1
Improve public transport on continental model	1
Stop through traffic. Take traffic off at junction 8 or 10 of M53	1
Traffic calming should be removed from Princes Rd	1
Disagrees with promotion of cycling because of industrial	1

pollution	
Does not think that re-routing would be beneficial as M53 runs around north and east of town.	1
Concern about pollution from fireworks and bonfires	1

Table 2. Responses to the action planning consultation exercise, 2007

8. Options

The Action Plan Working Group has, in consultation with relevant stakeholders, and with consideration to Section 7 above, identified a broad range of options that may assist with the reduction of NO_2 in the AQMA. Initially evaluation of costs, benefits and timescales are by necessity broad as detailed costings are, in the majority of cases, difficult to calculate. Similarly, the environmental benefits for many of the options are not readily measurable. Table 3 below shows the indicative costs, benefits and timescales applied to the proposed actions. Development of the Action Plan framework should allow for the refinement of options over time. A number of initiatives are already being implemented, but have nevertheless been included for completeness. Funding for many of these proposals will, therefore, already be committed. It is unlikely in this case that any one specific measure would prove effective in solving the problem in the AQMA, but rather that a variety of actions may need to be employed.

Estimated Cost		Estimated Environmental Benefit		Estimated Timescale	
Low	<£1000	Low	<0.2μg/m^3	Short	<6 months
Medium	<£10,000	Medium	0.2-1.0μg/m^3	Medium	<2 years
High	>£10,000	High	>1.0μg/m^3	Long	>2 years

Table 3. Cost, Environmental and Timescale criteria used in option appraisal

Traffic Management
Road traffic is the major contributor to exceedence of the air quality objective in the AQMA (see Figure 2 above). It is appropriate, therefore, for traffic management options to play a leading role in remediation (See Table 4 below). A firm of environmental consultants has investigated the feasibility of traffic management schemes to improve the flow of traffic through the AQMA (See Section 10 below).

Vehicle Emissions
VOSA (the Vehicle and Operator Services Agency), in conjunction with the borough council, county council and police, conducted a vehicle emissions testing exercise in Spring 2006. Nearly 200 vehicles were tested, allowing officers to identify poorly maintained vehicles and to require the owners to take action. It was also successful in terms of publicising the existence of the AQMA The Action Plan will be seeking to undertake similar exercises covering both light duty vehicles and public service vehicles in 2008. Vehicle emissions options have also been included for operations within the remit of the borough council itself i.e. taxi licensing and the council fleet. (See Table 5 below)

Planning and Development
The authority's Local Plan – which is in the process of being superseded by the Local Development Framework, provides a policy framework for development control across the borough. Planning obligations (section 106 agreements) can be negotiated by the planning authority to mitigate the impacts of new developments, for example, through increased public transport provision.
As a consultee, the Environmental Protection Unit maintains close liaison with Planning Services so that environmental impacts are fully considered from the outset. (See Table 6 below)

Promotion and Publicity
Fundamental to the success of the AQAP is effective dissemination of information. The borough council's Airwatch campaign was launched in 2003 with the aim of providing relevant and up to date information to the public using a variety of media. A number of options in the AQAP are intended to encourage the uptake of alternatives to use of the car. The authority's website, electronic display boards and internet kiosk will be used for these purposes. (See Table 7 below)

Air Quality Monitoring
The Environmental Protection Unit maintains a network of over 25 air quality monitoring stations including both automated 'real-time' analysers and passive diffusion tubes. For the purposes of LAQM and the provision of information to the local populace it is essential to site monitors in relevant locations. Therefore, a strategic review of monitoring provision will be conducted each December to ensure continuity at existing hotspots (i.e. within the AQMA) and to investigate other areas over the following calendar year.
(See Table 8 below)

Public Transport
A common theme of feedback from the consultation exercise in September 2007 was concern about the frequency of local bus services, particularly in Westminster ward (see Table 2). It is understood that some services have been withdrawn recently because the operator deemed them no longer commercially viable. Westminster Bridge, forming part of the AQMA, offers the only practical route into town from this area so any consequential migration of passengers from public transport to private cars will have a negative impact on air quality. These issues were given detailed consideration during development of the action plan and a number of potential remedies were explored.

The action plan working group, in conjunction with the county transport service looked at whether it might be possible to increase the frequency of bus services in the Westminster area through sponsorship or alteration of existing routes. Initially it was thought that there might be scope to incorporate an additional loop within the schedule for the '111' service. However, from a staffing perspective, this didn't prove to be feasible. An alternative approach is for the council to use existing funds to sponsor an additional bus route (regardless of whether it is commercially

viable). Unfortunately, monies currently allocated for air quality purposes in the Local Transport Plan are not sufficient to fund such a venture. However, it may be possible to pursue this further through s106 agreements (see Planning and Development above).

The enhanced Cheshire scheme providing free bus travel for pensioners is a positive step in air quality terms and this has now been supplemented by the national government's initiative, operated along similar lines.
Patronage of public transport may be encouraged through improvements in infrastructure and the provision of information. Raised kerbs have been installed at most bus stops in the AQMA to make buses more accessible. (See Table 9 below)

Quality of Life
A number of general options have been identified that have an emphasis on improving the quality of life of residents of the borough, rather than being aimed specifically at improving air quality in the AQMA. These are shown in Table 10 below. Cycling and walking strategy initiatives are included.

Options

The options listed below are categorised as Traffic Management, Vehicle Emissions, Planning and Development Control, Air Quality Monitoring, Promotion and Publicity, Quality of Life and Public Transport. The table details proposed actions, the reason for their inclusion in the Action Plan, progress to date, the organisation responsible for implementation as well as indicative costs, environmental benefits and timescales.

Traffic Management Options					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
TM1	Feasibility of repositioning road sensor away from Cambridge road lights	To increase 'green time' for northbound traffic on Whitby Road.	Modelling study undertaken July – September 2007. Final report advises that option should be discounted (See section 10).	Highways authority	Medium / Medium / Short
TM2	Feasibility of rerouting traffic in AQMA.	To reduce the impact of queuing vehicles on Whitby Road.	Modelling study July – September 2007. Final report received. See section 10	Highways authority	Medium / Medium-High / Short
TM3	Investigate feasibility of optimising traffic signals / installing MOVA system.	Responsive traffic light signals allow smoother flow of vehicles on main routes	Modelling study July – September 2007. Final report received. See section 10. Signals to be optimised by Summer 2008.	Highways authority	Medium-High / Low-Medium / Medium
TM4	Investigate potential for scheduling of commercial delivery times in AQMA	To decrease obstructions from delivery vehicles	To be explored in July 2008 alongside TM5.	Highways authority	Medium / Low / Medium
TM5	Focus on parking contraventions in the town centre area.	To reduce congestion in the AQMA.	Parking enforcement is to be decriminalised, with responsibility passing to the local authority in July 2008.	Highways authority	High / Low-Medium / Medium
TM6	Investigate benefit of replacing Whitby Rd / Cromwell Rd signals with a mini-roundabout	Temporary roundabout used for bridge repairs. Possible improvement in traffic flow	Modelling study January 2008. Trial installation Jan / Feb 2008.	Highways authority	Medium / Low / Short

Table 4. Traffic management options for the AQMA

Vehicle Emissions Options					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
VE1	Arrange for statutory roadside vehicle emissions testing in AQMA	Raise profile of AQMA issues and target highly polluting vehicles.	Initial testing exercise completed April 2006. Further tests (extended to include public transport) due to be done in Spring 2008	VOSA / Highways Authority / Environmental Protection Unit	Low / Low / Short
VE2	Annual MOT-type tests on licensed taxis and private hire vehicles performed by the EPNBC depot.	To ensure that vehicles are maintained to a recognised high standard.	Ongoing. Tests conducted upon application for / renewal of a licence. Failure results in refusal of licence.	Licensing Enforcement Unit	Low / Low / Ongoing
VE3	Visual emissions assessments of idling taxis at town centre rank.	To minimise excess emissions throughout the year.	Spot checks are conducted at the rank as well as cross county checks annually. Borderline cases referred to depot for further tests.	Licensing Enforcement Unit	Low / Low / Ongoing
VE4	Consideration to be given to incentivising the use of less polluting vehicles through licensing.	To minimise excess emissions throughout the year.	Policy to be reviewed by May 2010.	Licensing Enforcement Unit	Low / Low / Long
VE5	Corporate procurement policies to give consideration to more sustainable fleet vehicles wherever possible.	Council leading by example. To reduce the environmental impact from the authority's own operations.	Procurement Strategy Action 48: Develop and implement an agreed corporate environmental purchasing policy that addresses the protection of the environment, ensuring that sustainability is considered as part of the evaluation.	EPNBC	High / Low / Long

Table 5. Vehicle emissions options for the AQMA

Planning and Development Control Options					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
PD1	Maintain close liaison between Environmental Protection and Development Control for planning applications.	To assess potential air quality impacts at application stage	Procedures in place. Target to screen 100% of planning applications that may have an impact on / be impacted by the local environment.	Environmental Protection / Planning	Low / Low-Medium / Ongoing
PD2	Central Ellesmere Port Area Action Plan (CEPA) to include specific air quality measures	AQMA lies within CEPA	Due to go out to consultation in March 2008.	Planning	tbc / Low / Short
PD3	Supplementary Planning Document (SPD) on S106 agreements for new developments. Focus on e.g. transport infrastructure including cycling, walking and highway improvements.	To highlight possible air quality impacts prior to development. To mitigate the impacts of developments	Internal consultation for the SPD due to commence in January 2008. Final document due to be agreed by April 2008.	Planning	tbc / Low-Medium / Short

Table 6. Planning and development control options for the AQMA

Promotion and Publicity					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
PP1	Provision of health bandings and general information via electronic display boards (PDUs)	Enables public – vulnerable groups in particular – to make informed decisions about local air quality.	Ongoing – installation of first unit Aug 2003. Information is updated every four hours throughout the day.	Environmental Protection Unit	Low / Low / Short
PP2	Provision of public information via council website	Provide an accessible source of air quality information including current data and health bandings.	Ongoing – annual review and development of site content conducted July each year.	Environmental Protection Unit	Low / Low / Short
PP3	Promote benefits of public transport (including links to bus / train timetables) on Airwatch website and public display units	Increases accessibility of public transport information	To be implemented by August 2007 Website review completed July 2007	Environmental Protection Unit	Low / Low / Short
PP4	Publicise VOSA's Smoky Vehicle hotline on website and public display units	Targets vehicles having disproportionate impact on local air quality	To be implemented by August 2007Website review due July 2007	Environmental Protection Unit	Low / Low / Short
PP5	Promote Energy Saving Trust (formerly Powershift) scheme	Encourages use of cleaner fuels by individuals and businesses in local area	To be implemented by September 2007. Existing link on website and info on PDUs.	Environmental Protection Unit	Low / Low / Short
PP6	Promote initiatives such as 'Bike Week and 'Walk to Work Day'	Encourages community involvement in sustainable modes of transport.	Ongoing – annual review and development of site content conducted July each year	Environmental Protection Unit	Low / Low / Short

Table 7. Promotion and publicity options for the AQMA

Air Quality Monitoring Options					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
AQ1	Additional NO2 diffusion tubes to be sited within AQMA	Enhanced spatial coverage of AQMA corridor to characterise ambient NO2.	First full year's worth of monitoring in 2005.	Environmental Protection Unit	Low / Low / Ongoing
AQ2	Strategic review of AQ monitoring provision and locations	To ensure that all areas of relevant exposure have been considered in line with LAQM	To be reviewed December 2007 and annually thereafter. Reviewed on a continual basis.	Environmental Protection Unit	Low / Medium / Ongoing

Table 8. Air quality monitoring options for the AQMA

Public Transport Options					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
PT1	Quality bus partnership	Improved bus stop facilities including raised kerbs and kneeling buses for improved accessibility	Most bus stops in the AQMA already upgraded	Transportation CCC	Medium / Low / Completed
PT2	Install signage at railway station to indicate the nearest bus stop(s)	Information may encourage patronage of public transport	To be installed by March 2008 Scheme to be explored by Highways	Highways CCC	Low / Low / Short

Table 9. Public transport options for the AQMA

Quality of Life Options					
Item	Action	Reason	Progress	Responsibility	Cost / Benefit / Timescale
QL1	Whitby Park education trail	Raise awareness of AQ issues in line with KS2 targets.	Project approved by Air Quality Forum. Due to be installed by February 2008 and launched by March 2008	Air Quality Forum / Environmental Protection	High / Low / Short - Ongoing
QL2	Support and help to promote the cycling strategy	Encourages alternative modes of transport	New link on McGarva Way due to be implemented by March 2008. Community Sports Network has bank of adapted cycles for group use. To be supplemented with ordinary bikes by March 2008.	CCC EPNBC Community	Low / Low / Ongoing Low / Low / Short
QL3	Investigate the potential for provision of secure cycle storage in town centre	Encourages alternative modes of transport	Additional cycle parking facilities installed at four sites in Ellesmere Port, 2007	EPNBC Property Services / CCC Highways	Low / Low / Completed
QL4	Support and help to promote the 'Feet First' walking strategy for Cheshire	Promotes fitness on foot. Challenges reliance on cars.	Target Wellbeing funding secured to promote healthy walks in Westminster, Wolverham and Overpool wards. Target: sustained participation by 200 people over 4 years.	CCC / EPNBC Community / PCT	Low / Low / Short
QL5	Corporate Travel Plans, voluntary and statutory (section 106 agreements)	Encourages alternative modes of transport	LTP target: 66% of businesses with 500+ staff to implement by 2011	CCC Highways EPNBC Planning	Low / Low / Ongoing
QL6	Journeys to Schools (LTP)	Reduces home to school car journeys	LTP target: 100% of schools to have Travel Plans by 2011	CCC	Low / Low / Ongoing

Table 10. Lifestyle options for the AQMA

9. Framework for delivery of Action Plan

This Section sets out the procedural framework that will be used to assess the cost and benefits (environmental and socio-economic) of the proposed measures identified in the previous section and determine whether they will be included in the final Action Plan.

Phase 1 - Consultation
A broad encompassing consultation will be held for each of the possible measures identified. Consultation will involve all interested parties, both within the council and external, invited to inform the process to ensure a properly balanced and integrated approach. It will ensure that the relevant contributions from different sources are cost effective, proportionate and appraise the wider environmental, economic and social consequences of each option. Original timescale: completion by the end of September 2007.

Phase 2 – Confirm measures/actions to be undertaken
Any action measure identified to be employed to reduce NO_2 levels within the AQMA will be proportionate to the scale of the problem. Specifically the council will have regard to the fact that the Further Assessment predicted that the objective will be achieved by 2012 with no intervention. On this basis high cost action measures that do not demonstrate that the objective will be achieved significantly sooner than this date are unlikely to be considered further.

Performance will ultimately be judged by compliance with the objective and comparison of scenarios both with and without intervention. However this can be difficult to evaluate in the short term because air quality tends to vary from year to year due to fluctuations in meteorology. It will be necessary therefore to maintain air quality monitoring provision throughout the lifetime of the AQMA. Also, some individual actions undertaken may not have a measurable effect on NO_2 levels. In effect there will be two types of action measures, those aimed directly at reducing NO_2 levels within the AQMA and those designed to improve the quality of life and health of residents within the borough irrespective of whether they live within the AQMA or not. Original timescale: completion by the end of October 2007.

Phase 3 - Implementation
Once viable action measures have been identified and confirmed, manageable timeframes for their implementation will be agreed.

Phase 4 – Monitoring and review
Ultimately the success of any proposed action will be the achievement of the objective within the AQMA. Any action measure implemented will be reviewed periodically to ensure that it continues to meet the requirements of its inclusion. Timeframes for review will be determined after the action measures have been agreed. Air quality monitoring coverage within the AQMA will be maintained in order to gauge progress in working towards achieving the objectives. Action Plan Progress Reports will be used to communicate progress with implementation.

Local Transport Plan

As the predominant source of nitrogen oxides in the AQMA is traffic, Cheshire County Council's Local Transport Plan (LTP) will play a key role in delivery of this Action Plan. Recognising that traffic growth targets have a direct link with traffic emissions, the LTP set a target to restrain traffic growth. Objective five of the LTP seeks to protect and enhance the environment, and lists reducing the adverse effects of traffic on air quality as one of the ways of achieving this. The LTP has funded (£50K over two years with a further amount committed for officer time) and supported preliminary actions including data gathering and investigation of transport strategies to lead the action plan. The ultimate aim is to incorporate the Action Plan into the Local Transport Plan.

10. Traffic Management Feasibility Study

Since the draft action plan was completed, traffic management options TM1, 2 and 3 outlined in Section 8 above have been investigated in a traffic / air quality modelling study (Ref. 12.7). The TRANSYT package was used for traffic modelling in combination with the ADMS-Roads air dispersion model. Road links used for the modelling study are shown in
Figure 4 below.

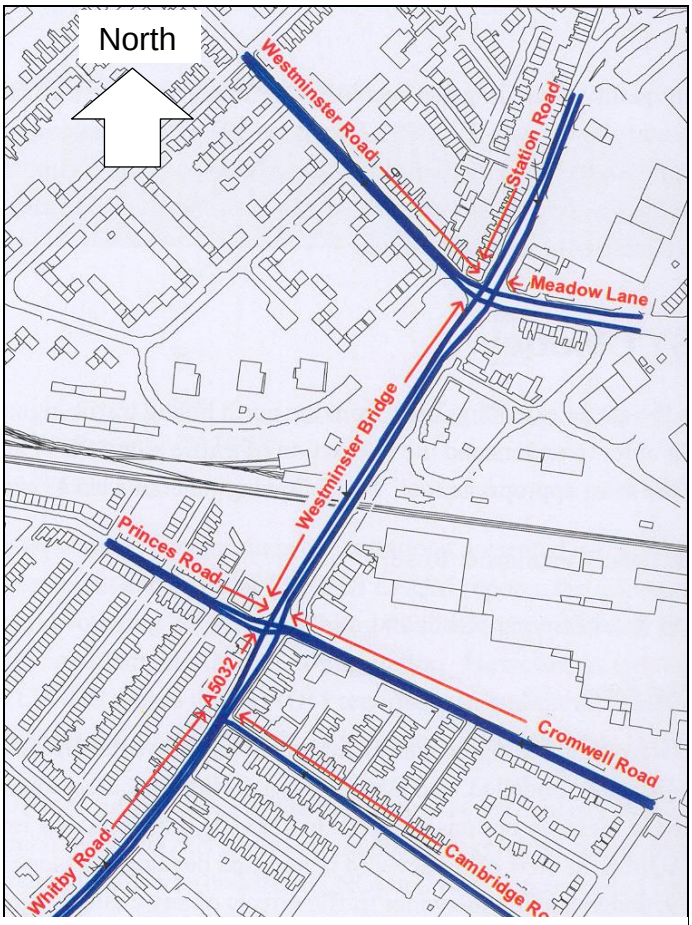

Figure 4. Road links modelled in the feasibility study

The authority's Further Assessment (Ref. 12.4) showed that congested and queuing road traffic, especially within the narrow street canyon of Whitby Road, is the main contributor to NO_2 pollution in the AQMA. For the feasibility study four scenarios, which are designed to optimise traffic flow through the AQMA, were tested to gauge the relative benefits for the AQMA itself as well as wider impacts in the immediate area up to 2015 (2006 base year). New and committed developments (primarily residential) due to come on line in the next eight years were factored into each scenario.

Scenario 1: Closure of Cambridge Road. For this scenario the set of traffic lights at Whitby Road / Cambridge Road would no longer be required offering

the advantage that queues on Whitby Road would be significantly reduced. Traffic exiting the junction would be displaced elsewhere on the network.

Scenario 2: Cambridge Road One Way Left Out Only. With a restricted exit from Cambridge Road, northbound queues on Whitby Road would be reduced and dispersed elsewhere. Southbound signals would be retained and traffic turning left out of Cambridge Road would be unaffected.

Scenario 3: Optimisation of Signals to Reduce Queuing Over the AQMA. With existing signals retained with optimised timing to replicate a 'hurry-call' on Whitby Road northbound, queue characteristics would be improved.

Do Nothing Scenario
Anticipated changes in vehicle emissions along with committed developments modelled without intervention.

A further option, for repositioning the Cambridge Rd sensor, that is included as TM1 in Table 4 of this report was also considered. It was felt, however that this would be of minimal benefit in air quality terms and was not modelled further.

The assessment showed that, in comparison to the prevailing situation (i.e. without intervention), all scenarios would bring about improvements in traffic flow and thus, improvements in annual mean NO_2 within the AQMA. Modelled outputs were verified against a combination of real-time and passive monitoring using the method detailed on page A3-39 of the Technical Guidance TG03 (Ref. 12.8). Ratios of monitored to modelled NO_2 concentrations were in the range –17% to +23% with an average of –2%. Subsequent adjustment of modelled outputs has been applied to base year data to allow for estimation of predicted environmental benefits for future years.

Traffic modelling showed that scenarios 1and2 perform better at optimising the flow of traffic through the AQMA than scenario 3. On the whole, the air quality benefits are greatest with scenarios 1and2 (see Figure 5 below). At monitoring station WH (close to the junction of Cambridge Road and Whitby Road) scenarios 1 and 2 are predicted to give improvements of 1.80$\mu g/m^3$ and 1.63$\mu g/m^3$ NO_2 respectively by 2008, whereas the figure for scenario 3 is 0.3$\mu g/m^3$. Closure of / restricted turning out of Cambridge Road, therefore, would bring forward the date of compliance at WH from 2009 to 2008. However, comparisons between the scenarios at different sites are not consistent and, depending on the year under consideration, in some cases the do nothing scenario outperforms scenario 3. At monitoring site WS, which represents relevant exposure, adoption of scenario 3 would appear to delay compliance by a year when compared to all other scenarios (see Figure 6). There is, however, just over 1$\mu g/m^3$ difference between the best and worst cases and this would be outweighed by the uncertainties associated with both modelling and monitoring. Predictions for monitoring site WC are that the objective will be met comfortably by 2008 regardless of intervention (see Figure 7).

It was shown that each of the three scenarios would generate additional congestion on other routes in the modelled area, with Cromwell Road the worst

affected. Optimisation of the traffic signals (scenario 3) results in less congestion than the other scenarios and consequently the lowest predicted concentrations of NO_2 on Cromwell Road.

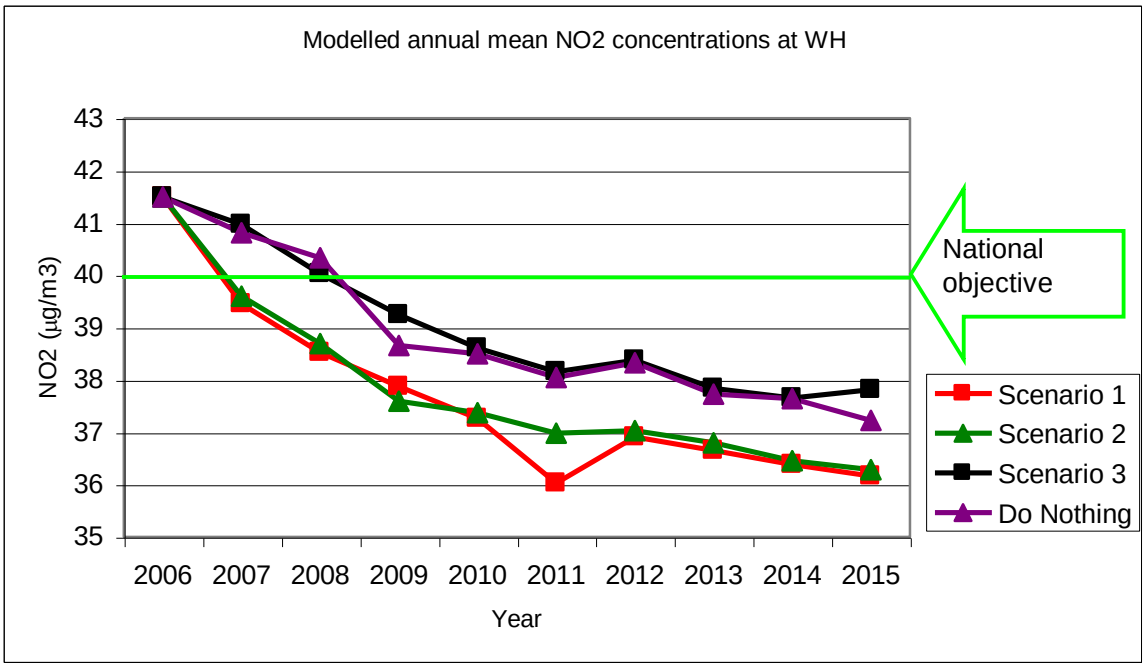

Figure 5. Modelled annual mean NO_2 on Whitby Road (WH)

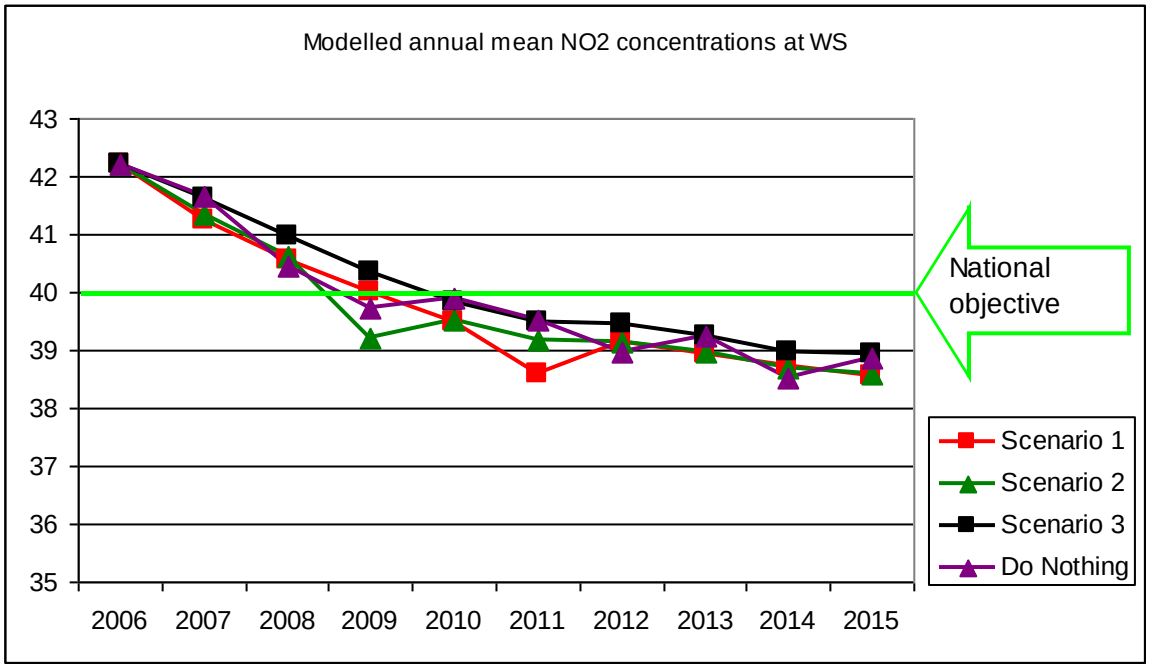

Figure 6 Modelled annual mean NO_2 on Whitby Road (WS)

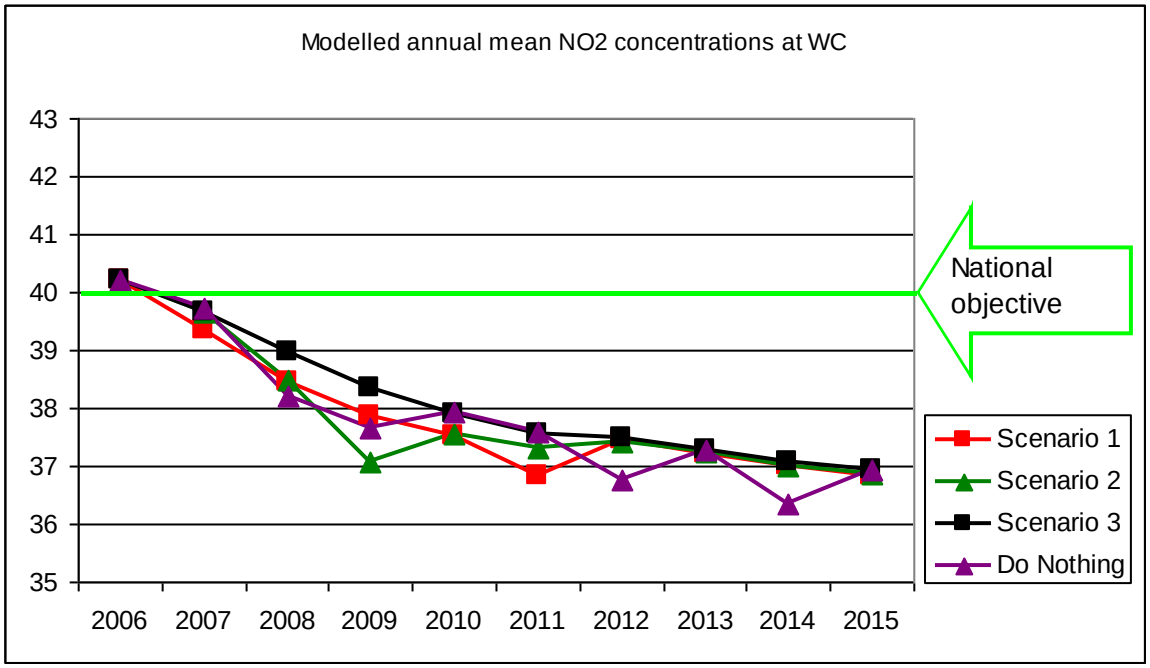

Figure 7 Modelled annual mean NO_2 on Whitby Road (WC)

In summary, the study showed that by adopting scenarios 1 and 2 it would be possible to reap a significant improvement in air quality on the main corridor of the AQMA. All scenarios, when committed developments are taken into account, would result in additional congestion on other routes in the vicinity. Scenario 3 (optimisation of signals) leads to less knock-on congestion than other scenarios. On balance therefore, scenario 3 would be the preferred option.

10.1. Characteristics of NO_2 concentration by height

It is important to understand how pollution varies with height as the majority of potential domestic exposure in the AQMA is at first floor level (ground floor premises are predominantly commercial). Monitoring results summarized in the Progress Report, 2007 (Ref. 12.5) indicated that NO_2 is likely to decrease with height: a difference of 7$\mu g/m^3$ was reported between sites RR (3m above street level)) and WS (5.5m high). The latter, however, only relied on 3 months' worth of data for 2006 so firm conclusions could not be drawn. All monitoring sites (along with an additional one at first floor level) in the AQMA have been maintained through 2007, so it should be possible to gain a better understanding of the situation on completion of the next Progress Report in Spring 2008.

The traffic management feasibility study also investigated the change in concentrations of NO_2 with height. It was shown that a drop off of 5μg/m^3 between ground floor and first floor could be expected at monitoring site RR (see Figure 8). This compares favourably with the interim monitoring results above. Interestingly, the relationship between receptor height and modelled concentrations of NO_2 appears to be non-linear.

All monitoring sites (along with an additional one at first floor level) in the AQMA have been maintained through 2007, so it should be possible to gain a better understanding of the situation on completion of the next Progress Report.

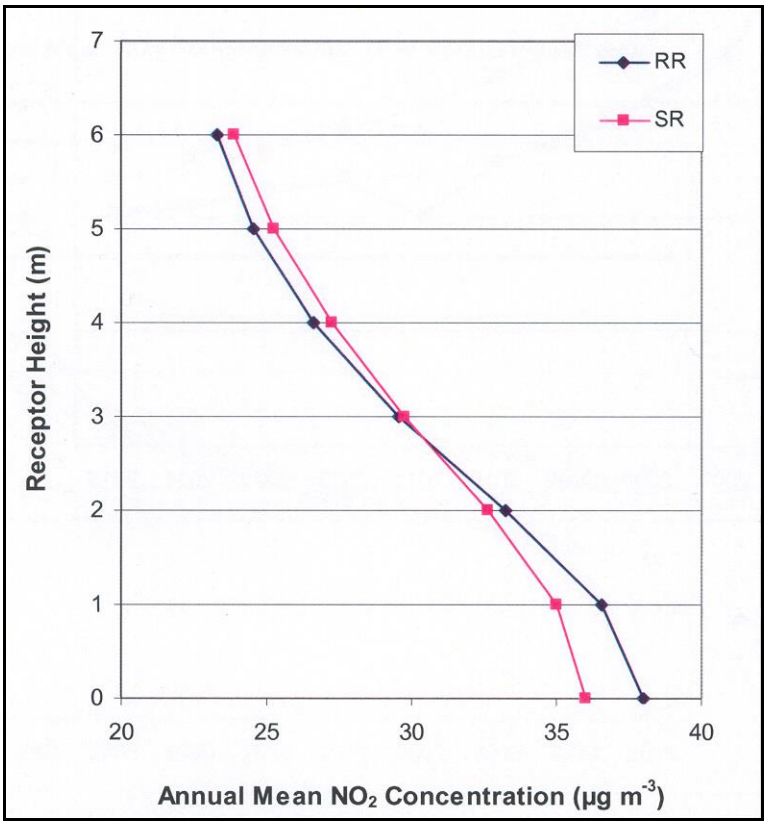

Figure 8. Modelled decrease of NO_2 with height (A5032)

11. Prioritisation

Of the full list of 30 options in Table 4 - Table 10 above, many can be defined as 'soft measures' i.e. they will not result in a significant improvement in air quality in isolation. Rather, they are intended to foster good practice and in many cases consist of measures already in progress. While these options are important components of the action plan, it is recognised that there is a need to prioritise those options / measures that are more likely to assist in achievement of the air quality objectives, are cost effective and achievable. On this basis, the action plan working group has prioritised nine options, listed below:

TM3 Signal Optimisation
The traffic management feasibility study showed that signal optimisation – although not as effective at tackling NO_2 within the AQMA as the other two scenarios – would have the least consequential impact outside of the area (i.e. queuing traffic on Cromwell Road). The Highways authority have recently upgraded the traffic light controls at the linked junction south of Westminster Bridge and it is intended to reprogram the signals in favour of traffic passing along the A5032 itself. Giving priority to the main route should reduce stop-start driving, encourage smooth traffic flow and minimise associated NO_x emissions. Committed developments, likely to come on line over the course of the next eight years, could lead to more complex traffic movements in the AQMA. If this is the case it may be necessary to upgrade existing signal controls to, for example, a MOVA system. MOVA uses advanced detector layout and microprocessor controls to improve signal timings which vary continuously according to traffic conditions.

TM5 *Decriminalised Parking*
Although parking is restricted along the length of the AQMA there is a tendency for drivers to park short-term while visiting shops and takeaways. This can create bottlenecks disrupting the flow of traffic. Parking restrictions, currently enforced by the police are due to pass to local authority control in July 2008 and, once this is the case, the intention will be prioritise enforcement within the AQMA.

TM6 *Construction of mini roundabout*
During recent structural repair works to Westminster Bridge a mini roundabout was temporarily installed at the junction with Princes Rd / Cromwell Rd. It has been suggested that traffic flows may have been improved during the course of the works (although it must be stated that traffic movements were additionally controlled by a set of traffic lights on the bridge). The Highways authority intends to reinstall the roundabout for a trial period early in 2008. A further traffic / air quality modelling study will be commissioned in order to properly assess the potential benefits of this.

VE1 *Vehicle Emissions Testing*
A repeat / extension of the multi-agency testing exercise conducted in 2006 is earmarked for Spring 2008.

PD3 *Supplementary Planning Document (SPD) on S106 agreements*
A Supplementary Planning Document on Section 106 agreements, which supplements policies in the Local Plan, is currently being drawn up by the Planning Policy Unit. The document provides the framework for negotiations between the local authority and developers to secure s106 agreements towards new facilities and services to mitigate the impacts of development. A developer contribution will be required, for example, from any development that leads to a material increase in traffic on the network. Specifically, for the AQMA, developments will be required to make a contribution towards sustainable methods of travel and highway improvements. Consultation on the SPD is due to commence in January 2008.

AQ2 *Strategic review of monitoring data*
Without appropriate and sufficient air quality monitoring provision it is not possible to gauge progress towards compliance with the air quality objective. For this reason it is imperative that the network is kept under regular review and revised where necessary. So, although monitoring will not in itself lead to improvements in air quality in the AQMA, it has been prioritised because it is an integral part of the AQAP. Coverage will be reviewed each December in readiness for the subsequent calendar year's worth of monitoring.

QL2 *McGarva Way cycle lane*
Cheshire County Council Highways plan to introduce a cycle lane along McGarva Way, which runs parallel to the southern portion of the AQMA. This will extend the current network and provide a key link between Stanney Lane and Cambridge Road. Construction is due to commence March 2008.

PT3 *Install public transport signage at railway station*
The bus stop closest to the railway station is a short walk away at the foot of Westminster Bridge. At present there are no signs indicating the direction of the bus stop. To address this, county Highways plan to install signage for pedestrians by April 2008.

PP1-6 *Provision of public information*
One of the primary objectives of the Air Quality Forum is to keep people informed about local air quality issues. A number of options have already been addressed via the council's Airwatch web pages, electronic display boards and internet kiosk. It is imperative to maintain and develop the provision of information to the public in future years. The issue was highlighted at November's forum meeting when members stressed that local air quality should be reflected within the Local Area Agreement negotiations to ensure that existing work is continued and wider authority support invested in delivering local air quality solutions.

12. References

12.1. Air Quality Review and Assessment. Stage 2/3 Report (2000). Ellesmere Port and Neston Borough Council.

12.2. Air Quality Review and Assessment. Updating and Screening Assessment Report (2003). Ellesmere Port and Neston Borough Council.

12.3. Air Quality Review and Assessment. Detailed Assessment Report (2004). Ellesmere Port and Neston Borough Council.

12.4. Air Quality Review and Assessment. Further Assessment Report (2007). Ellesmere Port and Neston Borough Council.

12.5. Air Quality Review and Assessment. Progress Report (2007). Ellesmere Port and Neston Borough Council.

12.6. LAQM tools website. Defra.

12.7. Whitby Road Traffic and Air Quality Modelling Report, Final Report. (Oct. 2007). ENTEC UK Ltd.

12.8. LAQM.TG (03) Part IV of the Environment Act 1995: Local Air Quality Management: Technical Guidance. (2003). Defra.

Appendix 1 List of statutory and non-statutory consultees

Secretary of State for the Environment

EPNBC: Planning Policy Unit
Development Control
Highways Authority
Community Unit
Property Services
Licensing Unit

CCC: Joint Highways Unit
Transportation and Regeneration Service
Environmental Planning

Western Cheshire Primary Care Trust
Cheshire and Merseyside Health Protection Unit
Ellesmere Port and Neston Local Air Quality Forum
Local Strategic Partnership
Ellesmere Port Town Centre Partnership
Chamber of Commerce
Trades Council

Environment Agency
Chester City Council
Flintshire County Council
Manchester Port Health Authority
Vale Royal Borough Council
Wirral Council