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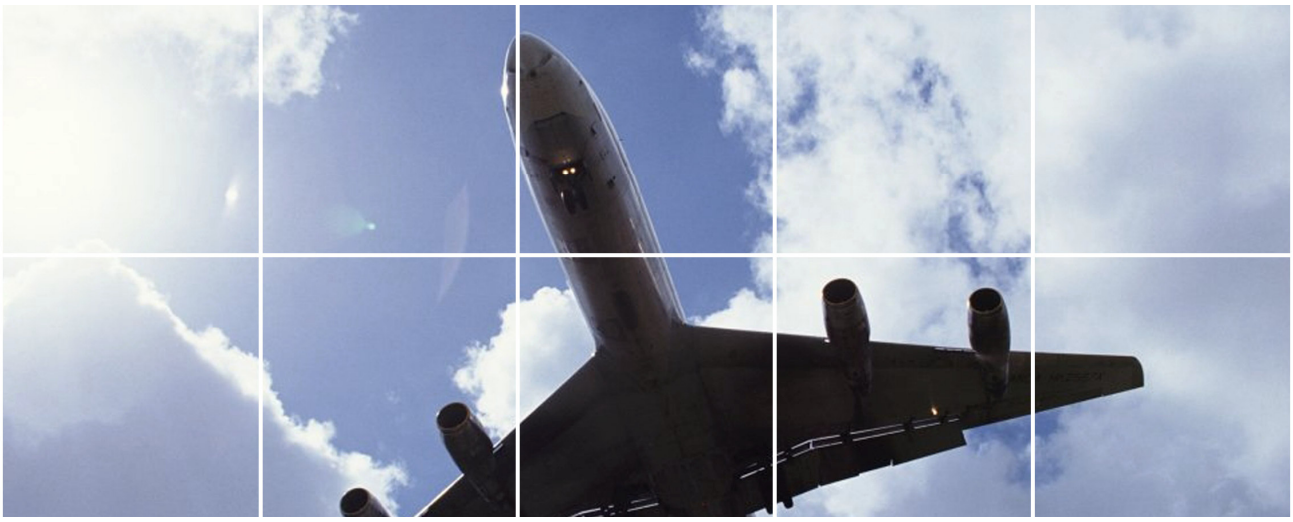

Watford Borough Council

Provisional Draft Air Quality Action Plan

Report to Watford Borough Council

Restricted Commercial
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Issue 1
March 2009 update

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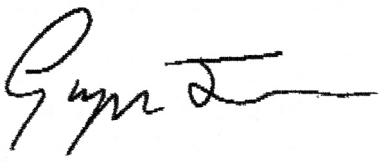
	Signature	
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Executive summary

Introduction

This document is Watford Borough Council's (WBC) draft air quality action plan (AP) which sets measures in place to attempt to address the air quality problems identified in Watford. It is a statutory duty for Watford to develop this AP and this draft will be subject to revision as it progresses through the appraisal and consultation process developing towards the final AP. It will be submitted to the Council, Defra and to public consultation and further changes will potentially be made before it is adopted and implemented by Watford.

Why is an air quality action plan necessary?

Watford Borough Council has a statutory duty to manage air quality locally. Analysis suggests that the annual mean concentration of nitrogen dioxide (NO_2) found at six locations in the borough including, Watford no 1: St Albans Road, Watford no 2: Vicarage Road, Watford no 3: Aldenham Road, Watford no 4: Chalk Hill, Watford no 5: A405/Horseshoe Lane and Watford no 6: M1 Meriden is at levels that exceed the national air quality standard for this pollutant (40µg/m^3). The standard is set at a level to protect human health and hence it is now WBC's statutory duty to make progress towards this standard where possible. Assessment of other key pollutants, Benzene, 1-3 Butadiene, CO, Lead, SO_2 and Particulates (PM_{10}), indicates that objectives for these pollutants will be met.

What is the cause of the problem?

Previous work by Watford identified six areas that are at risk of not achieving a UK air quality objective for nitrogen dioxide (annual mean concentration of 40 µg/m^3 in relevant locations). Transport on the roads within these areas is responsible. Heavy-duty vehicles (freight and buses) in particular contribute largely to emissions from traffic although the number of these types of vehicle passing through the areas is relatively small.

Watford has a statutory duty to designate these locations as Air Quality Management Areas (AQMAs) and to develop an action plan setting out the measures that it will adopt to make progress towards the achievement of the air quality objectives. The plan takes account of the contributory factors leading to the exceedence of the air quality objective and any limitations in the Council's ability to act on this issue.

Since the designation of Watfords six AQMAs, WBC undertook a Further Review and Assessment of air quality in January 2009. The Further Assessment recommended that AQMA 1 (St Albans Road) and AQMA 5 (A405/Horseshoe Lane) should be retained. AQMA 2 (Vicarage Road), AQMA 3 (Aldenham Road) and AQMA 4 (Chalk Hill) should be extended and AQMA 6 (M1 Meriden) should be revoked. The recommendations of the Further Assessment were accepted by Defra in April 2009. It is now the intention of WBC to amalgamate AQMA 3 (Aldenham Road) and AQMA 4 (Chalk Hill) to form a single AQMA (AQMA 3A, Aldenham Road and Chalk Hill, this report) due to their proximity and similarity in air quality issues affecting them.

This draft action plan considers the following revised AQMAs, Watford no 1: St Albans Road, Watford no 2: Vicarage Road, Watford no 3A: Aldenham Road and Chalk Hill and Watford no 5: A405/Horseshoe.

A source apportionment undertaken by WBC indicates that road traffic is the dominant local source of emissions in the borough accounting for between 40 to 79% of the total NOx concentrations in all four of the remaining AQMAs. Reductions in local road transport NOx emissions of between 5 to 34% are required to achieve NO_2 objectives in 2010. It is estimated that congestion contributes significantly to local NOx emissions in AQMAs 1, 2 and 3A (between 20-30%). HGVs although small in number contribute significantly to local NOx emissions in all 4 AQMAs (between 10 to 15%) whilst buses are estimated to make small contributions (<3%) to local NOx emissions in AQMAs 1 and 2 but have significant contributions around 10% in AQMAs 3A and 5. Cars contribute significantly to local NOx emissions in AQMAs 2, 3A and 5 (15 to 23%) but do not contribute significantly in AQMA 1. The background concentration of NOx is also significant across the borough and contributes between 21 to 58% of the total NOx in the 4 AQMAs, being by far the largest source of NOx in AQMA 5.

This analysis indicates that measures to reduce congestion generally and in some locations measures to reduce emissions from HGVs and buses specifically would be the most effective strategy for achieving the air quality objective in 2010.

How has the action plan been developed?

Under the guidance of an external consultant, a steering group comprising council officers from relevant departments (District Environmental Health, Development Control, and Planning Strategy officers, as well as County Transport Planners) has been formed. A core steering group consisting of Environmental Health Staff and County Transport Planners has made an initial assessment of a wide range of potential options for improving air quality in Watford.

WBC has carried out an initial assessment to identify options available for improving air quality in the AQMAs. A provisional scenario analysis was undertaken for three options, including

(1) Impacts of strategic measures to avoid worsening air quality: This was assessed on the assumption of zero growth in traffic in the AQMAs from 2006 to 2010.

(2) Impacts of efforts to reduce dependence on cars (e.g. the travel plan): This was assessed on the assumption of a reduction of 10% in car flow rates from 2006 to 2010, with all other vehicle flow rates remaining at 2006 levels; Watford assumed that congestion may be unaffected by this approach although in reality short term improvements in congestion may result.

(3) Impacts of efforts to reduce HGV flow through the AQMAs: This was assessed on the assumption of a reduction of 10% in HGV flow rates from 2006 to 2010, with all other vehicle flow rates remaining at 2006 levels.

The impact of these measures was assessed by comparison with the base case of 2010. The results of the provisional scenario analysis indicated that for each of the aforementioned options,

(1) Zero growth in traffic in the AQMAs from 2006 to 2010 was the least effective in reducing ambient concentrations of NO_2, resulting in a 0.2-0.8 $\mu g\ m^{-3}$ reduction in comparison with the 2010 baseline.

(2) A reduction of 10% in car flow rates and a reduction of 10% in HGV flow rates had broadly similar impacts within all four remaining AQMAs, although at the majority of relevant locations, the reduction of HGV flow rates was found to have the most significant impact.

It is WBC's intention to adopt a corporate air quality strategy that will work in parallel with development planning and transport planning in order to carry out a detailed assessment of options and define measures under categories 2-4 outlined below. The detailed assessment of options, is scheduled to be carried out between 2009 and 2010. It is WBC's intention that the action plan will be integrated with and delivered through Hereford County Council's Local Transport Plan (LTP).

At this stage the steering group has decided to take the following options forward for further consideration.

1. Strategic actions
    - Integrate AQAP with Local Transport Plan
    - Improving links with Local Planning and Development framework
    - Planning conditions policy
    - Commercial delivery strategy
    - Supplementary planning guidance
    - Carry out detailed assessment of options, feasibility and cost effectiveness and identify priority options

2. Encourage sources to use routes away from the AQMAs
    - Consider freight access
    - Control access for buses
    - Bypasses
    - Other traffic management schemes e.g. improving satellite navigation
    - Retain speed controls
    - Differentiate parking charges
    - Road use charging and workplace parking levy

3. Encourage the reduction of emissions from sources by technical means
    - Reduce the age of the Council vehicle fleet
    - Encouraging uptake of low emission vehicles
    - Traffic light phasing
    - Improving road signage
    - Explore introduction of low emissions zone
    - Bus quality partnerships
    - Freight quality partnerships
    - Green procurement for Council/local business

Vehicle idling regulations

    - Promote the uptake of greener vehicles by the community and businesses

4. Encourage better travel choices
    - Promote better personal and community travel choices
    - Promote better travel choices within businesses and institutions
    - Better access to alternative modes
    - Green Travel Plans for large businesses and institutions
    - Parking provision/Park and Ride

The plan aims to reduce transport emissions in the AQMAs. It proposes a number of possible options that will be subject to further detailed assessment over the next two years to define specific quantitative measures that will be implemented in order to bring about marked improvements in air quality in the designated areas. The table below summarises the draft plan.

What happens next?

WBC is consulting the public and other statutory consultees on this draft air quality action plan. The intention is to consider consultation responses and to then finalise and adopt the plan during 2009. The Council will report annually on progress with implementing the plan and will revise the plan from time to time if necessary.

Summary of options included within the draft Action Plan						
Measure	**Focus**	**Lead**	**Planning phase**	**Implementation phase**	**Indicator**	**Target emission reduction**
Develop Options into fully planned and costed measures.	Identify most appropriate options for improving air quality within each of the AQMAs – Consideration of Options listed below:	WBC	2009	2009	Provision of prioritised list of options.	N/A
Improving links with Local Transport Plan	Decide best options to reduce emissions in AQMAs	WBC and HCC	Ongoing	TBC	Adoption of LTP	AQ Target for each measure
Improving links with Local Planning and Development framework	Avoid deterioration of local AQ	WBC	Ongoing	TBC	Adoption of corporate strategy/Development and adoption of new planning policies	N/A
Bypasses	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced traffic flows through AQMAs through diversion of traffic to alternate routes	TBC (to be confirmed)
Control access for freight	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced HGV and LGV traffic flows through AQMAs	TBC
Control access for buses	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced bus traffic flows through AQMAs	TBC
Traffic light phasing	Assess potential to reduce traffic congestion	WBC and HCC	2009/10	Outcome following consultation and further assessment	Emissions reduction/Reduction in queuing	TBC
Retain Speed controls	Vehicle emissions	WBC	2009/10	Outcome following consultation and further assessment	Emissions reduction	TBC
Other traffic management schemes	Reduce congestion and vehicle km	WBC	2009/10	Outcome following consultation and further assessment	Emissions reduction/Reduction in queuing	TBC
Explore introduction of Low Emission Zone	Assess potential to reduce unit emissions in the AQMA	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in unit emissions	TBC
Freight quality partnerships	Target reduction in emissions from freight	WBC and HCC	2009/10	Outcome following consultation and further assessment	% uptake of scheme/emissions reduction	TBC

Summary of options included within the draft Action Plan						
Measure	**Focus**	**Lead**	**Planning phase**	**Implementation phase**	**Indicator**	**Target emission reduction**
				assessment		
Education/Awareness Raising – Low emission vehicles	Target reduction in emissions	WBC	2009/10	Outcome following consultation and further assessment	% uptake of LEVs	TBC
Green procurement – Council/ Buses/ Local Business	Target reduction in emissions from Council, bus and local commercial fleet.	WBC	2009/10	Outcome following consultation and further assessment	% change/uptake of LEVs	TBC
Differentiate parking charges	Encourage consideration of alternative/ cleaner forms of transport	WBC and HCC	2009/10	Outcome following consultation and further assessment	% change/uptake of cleaner transport	TBC
Provide information relating to travel options/ public transport	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Access to alternative modes (cycling + walking)	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Green Travel Plans for large businesses and institutions	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Parking provision, Park and Ride	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Adoption of scheme/Reduction in traffic flows through AQMAs	TBC
Commercial delivery strategy	Target reduction in emissions from local commercial fleet	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in HGV/LGV flows through AQMAs	TBC
Road use charging and workplace parking levy	Reduce reliance on car and reduce queuing time in AQMA	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in traffic flows in AQMAs	TBC
Vehicle idling regulations	Target reduction in emissions	WBC	2009/10	Outcome following consultation and	Emissions reductions	TBC

Summary of options included within the draft Action Plan						
Measure	**Focus**	**Lead**	**Planning phase**	**Implementation phase**	**Indicator**	**Target emission reduction**
	from idling vehicles			further assessment		

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Appendices

1 Introduction

This document is the consultation draft Air Quality Action Plan (AP) to address the air quality problems identified at locations in the borough including, Watford no 1: St Albans Road, Watford no 2: Vicarage Road, Watford no 3A: Aldenham Road and Chalk Hill and Watford no 5: A405/Horseshoe. It is a statutory duty for WBC to develop an AP and it must be appraised and accepted by Defra as being fit for purpose before it can be finally adopted.

The objective of the plan is, on the basis of the currently available best evidence, to draw up measures that will be introduced to make progress in improving air quality in the aforementioned problem areas of Watford Borough.

This document is not the final version of the AP. It has been developed from initial discussions within a steering group and on the basis of guidance from WBC's contracted consultants, AEA. However, this draft is ready to be consulted upon. At this stage the draft plan is being submitted to:

- Watford Borough Council
- Hertfordshire County Council
- Government Department for Environment, Food and Rural Affairs, Defra
- Statutory consultation where it will be made available for scrutiny by the public and other stakeholders

Comments received during this consultation will be addressed and potentially, changes will be made to the plan. The revised version will also be submitted to the Borough and County Councils and may be revised further as a result. This final version will be submitted to appraisal by Defra. If it is accepted then it will be adopted as a formal authority plan and will be implemented via the efforts of the Borough and County Councils.

The Draft Air Quality Action Plan is structured as follows:

- Section 2 outlines the regulatory context and role of the action plan in relation to the Air Quality Strategy for England, Scotland, Wales and Northern Ireland and UK guidance on local air quality management.

- Section 3 provides a summary of previous rounds of review and assessment of air quality undertaken by Watford Borough Council that led to the designation of AQMAs within the borough. A source apportionment analysis showing the contribution to total pollution concentrations from different vehicle types and congestion within the AQMAs is provided.

- Section 4 provides details on how the draft action plan has been developed and actions that have been taken to date in order to address air quality issues within the borough.

- Section 5 identifies the range of options that have been considered by Watford Borough Council in addressing the air quality issues within the AQMAs and how these have been assessed and developed within the draft action plan. Results of a provisional scenario analysis for three scenarios selected for preliminary assessment is summarised.

- Section 6 provides an overview of the draft action plan and how options and sub-options will be developed into specific actions or measures for implementation within the final action plan.

1.1 Summary of the Strategy and draft Action Plan

WBC intends to deal with air quality issues through development of a corporate air quality strategy that will work in parallel with development planning and transport planning. It is intended that Hertfordshire County Councils Local Transport Plan (LTP) will be the delivery plan for Watford's action plan measures. The action plan will therefore be integrated with the LTP in due course. Options identified in this draft action plan will be examined in more detail between 2009 and 2010 so that a better understanding of effectiveness and feasibility of implementing the different options in reality can be assessed in order to deliver a quantitative action plan that will ensure that marked improvements in air quality are achieved in the four remaining AQMAs.

The following table presents the draft action plan options in summary format. The remainder of this report describes how this draft plan was developed and important details considered during this process. Interested readers can therefore examine the background to the plan.

Summary of options included within the draft Action Plan

Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target emission reduction
Develop Options into fully planned and costed measures.	Identify most appropriate options for improving air quality within each of the AQMAs – Consideration of Options listed below:	WBC	2009	2009	Provision of prioritised list of options.	N/A
Improving links with Local Transport Plan	Decide best options to reduce emissions in AQMAs	WBC and HCC	Ongoing	TBC	Adoption of LTP	AQ Target for each measure
Improving links with Local Planning and Development framework	Avoid deterioration of local AQ	WBC	Ongoing	TBC	Adoption of corporate strategy/Development and adoption of new planning policies	N/A
Bypasses	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced traffic flows through AQMAs through diversion of traffic to alternate routes	TBC (to be confirmed)
Control access for freight	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced HGV and LGV traffic flows through AQMAs	TBC
Control access for buses	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced bus traffic flows through AQMAs	TBC
Traffic light phasing	Assess potential to reduce traffic congestion	WBC and HCC	2009/10	Outcome following consultation and further assessment	Emissions reduction/Reduction in queuing	TBC
Retain Speed controls	Vehicle emissions	WBC	2009/10	Outcome following consultation and further assessment	Emissions reduction	TBC
Other traffic	Reduce	WBC	2009/10	Outcome	Emissions	TBC

Summary of options included within the draft Action Plan						
Measure	**Focus**	**Lead**	**Planning phase**	**Implementation phase**	**Indicator**	**Target emission reduction**
management schemes	congestion and vehicle km			following consultation and further assessment	reduction/Reduction in queuing	
Explore introduction of Low Emission Zone	Assess potential to reduce unit emissions in the AQMA	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in unit emissions	TBC
Freight quality partnerships	Target reduction in emissions from freight	WBC and HCC	2009/10	Outcome following consultation and further assessment	% uptake of scheme/emissions reduction	TBC
Education/Awareness Raising – Low emission vehicles	Target reduction in emissions	WBC	2009/10	Outcome following consultation and further assessment	% uptake of LEVs	TBC
Green procurement – Council/ Buses/ Local Business	Target reduction in emissions from Council, bus and local commercial fleet.	WBC	2009/10	Outcome following consultation and further assessment	% change/uptake of LEVs	TBC
Differentiate parking charges	Encourage consideration of alternative/ cleaner forms of transport	WBC and HCC	2009/10	Outcome following consultation and further assessment	% change/uptake of cleaner transport	TBC
Provide information relating to travel options/ public transport	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Access to alternative modes (cycling + walking)	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Green Travel Plans for large businesses and institutions	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Parking provision, Park and Ride	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Adoption of scheme/Reduction in traffic flows through AQMAs	TBC
Commercial delivery strategy	Target reduction in emissions	WBC and HCC	2009/10	Outcome following consultation and	Reduction in HGV/LGV flows through AQMAs	TBC

Summary of options included within the draft Action Plan						
Measure	**Focus**	**Lead**	**Planning phase**	**Implementation phase**	**Indicator**	**Target emission reduction**
	from local commercial fleet			further assessment		
Road use charging and workplace parking levy	Reduce reliance on car and reduce queuing time in AQMA	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in traffic flows in AQMAs	TBC
Vehicle idling regulations	Target reduction in emissions from idling vehicles	WBC	2009/10	Outcome following consultation and further assessment	Emissions reductions	TBC

2 Regulatory context and role of the action plan

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

This strategy sets out the UK vision for clean air for a good quality of life and the steps being taken to achieve this. Improvements are sought in air quality due to the impacts pollution has on human health and the environment.

The strategy aims to achieve the air quality objectives that have been set for a range of pollutants commonly found in ambient air. The objectives are expressed as a maximum ambient concentration not to be exceeded, either without exception or with a permitted number of exceedences within a specified timescale (see annex 1). The objectives have been set throughout the UK and European Union at levels that aim to protect the vulnerable in society from the harmful effects of breathing pollution.

Air pollution is currently estimated to reduce the life expectancy of every person in the UK by an average of 7-8 months. In response a number of measures have been introduced at an international level (including the UK) to reduce this impact. They include

- Incremental reductions in emissions from vehicles and industry
- Climate change programme policies
- Local air quality management (see following section)

The UK government recognises the important role that local authorities have and continue to play in helping deliver the air quality objectives. “Action taken at the local level can be an effective way of tackling localised air quality problems leading to an overall improvement of air quality.”

2.2 Guidance relating to local air quality management

Guidance to local authorities on how to develop an Air Quality Action Plan is contained in:

- Part IV of the Environment Act 1995 Local Air Quality Management Policy Guidance: LAQM.PG(09).

Due regard has been given to these documents. They indicate that Watford is required to complete the following process.

Environment Act 1995 Part IV

The provisions in Part IV of the Act provide the framework for Local Air Quality Management (LAQM). The duties within the LAQM framework are now listed.

Results of Review and Assessment

Watford along with all local authorities is statutorily obliged to assess current and future air quality within the authority’s area from time to time. Assessments consider whether the UK air quality standards and objectives are likely to be achieved (see annex 1) and identify those areas where the standards and objectives are not likely to be achieved.

Designation of Air Quality Management Areas

Watford would then designate by order any such areas identified above as air quality management areas (AQMA). Such orders could be varied or revoked as a result of a subsequent air quality assessment if it appears likely that the air quality standards and objectives would be achieved.

Further Assessment of air quality within AQMAs

Watford would then make a further assessment of the air quality and the respects in which it appears that the air quality standards and objectives are unlikely to be achieved in the AQMA. The purpose of this assessment is to supplement information already gathered in earlier assessment work and to provide the technical justification for further measures to be implemented. Watford would complete this further assessment within 12 months of the AQMA designation order.

Preparation of an Action Plan (AP)

The further assessment would provide information to allow Watford to prepare an action plan "for the exercise by the authority, in pursuit of the achievement of air quality standards and objectives in the designated area, of any powers exercisable by the authority". **Note that the Council is not obliged to meet the objectives but must show that it is working towards them**. The AP must include:

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

Once the AP is adopted, the Council would also have to submit to Defra an AP progress report annually and revise the AP from time to time depending on circumstances.

Consultation on the AP

Following on the preparation or revision of their Action Plan, Watford, would be obliged to undertake consultation for a period recommended to be not less than 8 weeks in duration, with the following individuals and bodies:

- The Secretary of State
- The Environment Agency
- The highways authority
- All neighbouring local authorities
- The county council (if applicable)
- Other public authorities as appropriate
- Bodies representing local business interests and other organisations as appropriate (potentially including representatives of the public)

Watford should also proactively make copies of the Action Plan available to the public.

Partnership with the highways authority/Hertfordshire county council

Watford Borough Council and Hertfordshire County would be required to work in partnership to develop the AP. This process is already underway in Watford. The County obliged to exchange information with the District Council and to take into account the outcome of air quality assessments before they publish structure or transport plans. The County council must also put forward proposed actions, which they themselves can implement in pursuit of the air quality objectives.

Integration with Local Transport Plan (LTP)

Watford should look to integrate the AP into the LTP where local road transport is the primary source of predicted exceedences of the air quality objectives[1]. Consultation on the integrated LTP/AP should be completed as described above. Measures proposed by the County council should be included in the air quality section of the LTP. This process is already underway in Watford and following a series of meetings with the County a number of air quality targets now feature in the County LTP dated 2006.

The aim of integration is to take a common approach to air quality management (and the other shared priorities of the LTP). The LTP should show a balance between schemes being implemented to tackle other priority areas (which can also have a beneficial impacts on air quality) and those schemes being implemented specifically to tackle air pollution.

The LTP should set out the same information as described above for the preparation of an AP. In addition it should set out:

- Intermediate road transport indicators which relate to pollutant emissions from road transport
- Targets for these intermediate indicators (i.e. the outcome that each measure in the LTP is attempting to achieve). The County is encouraged to set ambitious yet realistic targets for outcomes
- Baseline pollutant concentrations in 2006, and 2010 (in the AQMAs).
- A target relating to pollutant concentrations in 2010 (in the AQMAs) based on the achievement of or progress related to the intermediate indicator targets.

Holistic approach

The Air Quality strategy reiterates that the government strongly believes that Air Quality issues should be dealt with in a holistic and multi-disciplinary way. In developing an AP the local authority should engage officers across different departments, particularly, land-use and transport planners to ensure the actions are supported by all parts of the authority. It is vital that organisations, groups and individuals that have an impact on local air quality work towards the objectives of an adopted plan.

[1]Authorities with AQMAs relating to trunk roads or motorways should report within the LTP on any joint work with the Highways Agency. Authorities with other significant sources contributing to pollutant concentrations should report on any other key non-transport measures by attaching an annex to the LTP.

3 Conclusions of previous review and assessment of air quality in Watford

This section provides a summary of previous work in Watford to characterize air quality problems.

3.1 Summary of round 1 review and assessment

The results of the first round of review and assessment were as follows:

3.1.1 Stage First Round of Review & Assessment 1 (*December 2000*)

- The combined effect of the stage one and stage two reports of the first round review and assessment suggested that a stage 3 review and assessment need only be carried out for two pollutants: Nitrogen dioxide; and PM_{10} Particles. This revealed that exceedances of the Air Quality Regulation objectives were predicted close to some major roads.

- A public exposure assessment was carried out, which concluded that there were no domestic properties within the areas of exceedence. Accordingly no Air Quality Management Areas were declared.

3.2 Summary of round 2 review and assessment

The results of the second round of review and assessment were as follows:

3.2.1 Summary of Updating and Screening Assessment (June 2003)

This study concluded that:

- There was no need to progress to a detailed assessment for carbon monoxide, lead, benzene, 1,3-butadiene, or sulphur dioxide.

- It was considered necessary to proceed to a detailed assessment for nitrogen dioxide and PM_{10} particles as there were 23 locations that require further assessment before a decision is to made as to whether it will be necessary to declare one or more air quality management areas.

3.2.2 Summary of Detailed Assessment (April 2004)

This study concluded that for nitrogen dioxide, there were likely to be six areas where the annual mean objective for nitrogen dioxide was unlikely to be met.

1. Parts of St.Albans Road between Beechen Grove and North Western Avenue;
2. Parts of Rickmansworth Road between the High Street and Cassio Road;
3. Parts of Farraline Road close to its junction with Vicarage Road;
4. Parts of Pinner Road close to its junction with Chalk Hill;
5. Close to the junction of Horseshoe Lane, the A405 and St.Albans Road;
6. Parts of the Gossamers, Ravenscroft, Eastlea Avenue and Westlea Avenue.

Officers from the Council determined whether there was any relevant public exposure in these areas, and in February 2006 declared six Air Quality Management Areas at the following residential properties:

Watford no 1 (St Albans Road)

- 1B & 1C Wellington Road
- 155 – 157 St. Albans Road

- 211-215 St. Albans Road
- 164 – 454 St. Albans Road

Watford no 2 (Vicarage Road)

- 28A – 30A Vicarage Road (Flats above shops)
- 85A-87A Vicarage Road (Flats above shops)

Watford no 3 (Aldenham Road)

- Residential Accommodation above The Railway Arms, Aldenham Road

Watford no 4 (Chalk Hill)

- 12 Chalk Hill

Watford no 5 (A405/Horseshoe Lane)

- 3A – 5A Horseshoe Lane
- 887 St Albans Road
- 1026 St Albans Road

Watford no 6 (M1/Meriden)

- 16, 17 & 18 Ravenscroft
- 1 – 5 The Gossamers
- 31 The Gossamers
- 63 – 65 The Gossamers
- 95 – 97 The Gossamers
- 62, 64, 69 Eastlea Avenue

Maps of the six areas can be found in Appendix 2. The modeling results from the Further assessment for the sites can be found in Appendix 3.

3.3 Summary of Further Assessment- Air Quality Management Areas 1-6 (2009)

Following on from the Detailed Assessment, a Further Assessment of air quality in the six AQMAs was carried out in January 2009. The further assessment report has identified that:

- AQMA 1 and 5 should remain unchanged;
- The boundary of AQMA 2 may be extended;
- The boundaries of AQMA 3 & 4 may be extended and may overlap to form a single AQMA (AQMA 3A); and
- AQMA 6 will be revoked.

The conclusions of the Further Assessment were accepted by Defra in April 2009. The results of the Further Assessment indicated that concentrations of nitrogen dioxide in AQMA 6 are no longer likely to exceed the national air quality strategy objectives, however although the AQMA is to be revoked Defra recommend that the Council undertake further monitoring in the surrounding area of AQMA 6, at a worst case location, where properties are very close to the M1 to assess future concentrations of nitrogen dioxide in the area. AQMA 6 is therefore subject to no further consideration in the Action Plan.

The results of air dispersion modeling undertaken in relation to AQMA 2 (Vicarage Road) for 2006 predicted widespread exceedences of the annual mean objective for nitrogen dioxide around the Hornets Gyratory and extending along Cassio Road north to Whippendell Road, along Vicarage Road northeast as far as Exchange Road, along Vicarage Road southwest as far as Occupation Road and 150 m southeast along Wiggenhall Road. The further assessment therefore recommended that Watford Borough Council consider increasing the size of the AQMA to cover the whole of the Hornets

Gyratory and extending along Cassio Road north to Whippendell Road, along Vicarage Road northeast as far as Exchange Road, along Vicarage Road southwest as far as Occupation Road and 150 m southeast along Wiggenhall Road.

Furthermore, the findings of Further Assessment recommended that the boundaries of AQMA 3 and AQMA 4 overlap and should potentially be merged to form a single AQMA. For the purposes of the Action Plan, AQMA 3 and AQMA 4 have been considered as a single entity (AQMA 3A*). In the following section, four remaining AQMAs are discussed, these are:

- Watford no 1 (St Albans Road)
- Watford no 2 (Vicarage Road)
- Watford no 3A[2] (Combined AQMA: Aldenham Road and Chalk Hill)
- Watford no 5 (A405/Horseshoe Lane)

In all four remaining AQMAs, the exceedences are identified as being dominated by emissions from local road traffic. There are no other significant sources within the locality of the four sites and as such, road traffic is identified as being the main source and should be the focus of any work done to remediate the problems at the sites.

Dispersion modeling undertaken in the further assessment was used to estimate concentrations of NO_2 at relevant sensitive receptors within each of the air quality management areas. A summary of the modelled NO_2 concentration at each of these locations for the 2006 base year, and the projected concentrations for 2010 are presented in Table 3.1. Further details including modelling contour plots and concentrations for other locations are presented in the further assessment and in appendix 3.

Table 3.1 Modeled annual mean concentrations of NO_2 at relevant locations within the four remaining AQMAs

RECEPTOR	OS GRID COORDINATES		ANNUAL MEAN [NITROGEN DIOXIDE] μg m^{-3}	
	X, m	Y, m	2006 Baseline	Predicted 2010 'No Change' Scenario
AQMA 1 St Albans Road				
1	510970	198970	42.0	39.5
2	511010	198330	44.4	41.9
3	510900	197750	44.6	42.0
4	510760	197220	42.0	39.5
AQMA 2 Vicarage Road				
1	510775	196002	48.7	45.6
2	510764	196010	46.1	43.2
3	510774	196024	44.2	41.4
4	510789	196016	45.8	42.9
AQMA 3A Aldenham Road and Chalk Hill				
1	511870	195510	53.4	49.9
2	511969	195431	66.4	60.5
3	512030	195436	56.5	52.6
4	511943	195307	54.8	51.1
AQMA 5 Horseshoe Lane				
1	511860	200700	40.7	38.1
2	511690	200620	39.0	36.3

Predicted reductions in NO_2 concentrations from 2006 to 2010 are based on the assumption that as the vehicle fleet gradually adopts engines with better European emission standards, there will be a decrease in density of NO_x emissions and therefore, NO_2 concentrations may reduce through time. It is of course important to utilize ambient air quality monitoring to support this assertion and it is

[2] AQMA 3A is a non-formal designation used to identify the combination of AQMAs 3 and 4 for the purposes of this draft action plan. The Draft plan will be amended as appropriate in future drafts of the Plan.

possible that concentrations may not drop at all if roads become more congested. The term NOx represents the sum of NO_2 and NO which are both emitted from road vehicles. Therefore, NOx is emitted in greater quantities than NO_2 so the reduction in NOx emissions required to reduce ambient NO_2 can appear quite large.

AQMA 1: St Albans Road

The results of air dispersion modeling in the vicinity of St Albans Road indicated that exceedences of the annual mean objective are predicted to occur at numerous locations within the AQMA. The contour plots indicated that exceedences were likely to occur at residential properties on both sides of St Albans Road, including near the junctions of St Albans Road with Bushey Mill Lane, Balmoral Road and Leavesden Road. At the relevant receptors selected within the further assessment, modelled concentrations of NO_2 for the baseline year (2006) were estimated to range from 42.0 to 44.6 $\mu g\ m^{-3}$. Predicted concentrations for 2010 at each of the relevant locations were predicted to decline, although were anticipated to exceed the annual objective in some locations ranging from 39.5 to 42.0 $\mu g\ m^{-3}$ (Table 3.1).

Based on 2010 figures and the data presented in the Further Assessment, it is estimated that a 5% reduction in road traffic emissions of NO_x (or nitrogen oxides, a pre-cursor of NO_2) beyond the 'do nothing' case in 2010 would be required to achieve the AQ objective.

AQMA 2: Vicarage Road

The results of air dispersion modeling in the vicinity of Vicarage Road indicated that exceedences of the annual mean objective are predicted to occur at numerous locations within and outwith the existing AQMA. Predicted nitrogen dioxide concentrations for 2006 for the modelled roads around the Hornets Gyratory indicated concentrations in exceedences of the objective over a wide area covering the whole of the Hornets Gyratory and extending along Cassio Road north to Whippendell Road, along Vicarage Road northeast as far as Exchange Road, along Vicarage Road southwest as far as Occupation Road and 150 m southeast along Wiggenhall Road.

A summary of predicted concentrations of NO_2 are presented in Table 3.1 with concentrations estimated to range from 44.2 to 48.7 $\mu g\ m^{-3}$ for 2006 and 41.4 to 45.6 $\mu g\ m^{-3}$ for 2010. A more detailed analysis including contour plots along the route is presented in the Further Assessment.

Based on 2010 figures and the data presented in the Further Assessment, it is estimated that a 12.5% reduction in road traffic emissions of NO_x (or nitrogen oxides, a pre-cursor of NO_2) beyond the 'do nothing' case would be required to achieve the AQ objective in 2010.

AQMA 3A: Aldenham Road and Chalk Hill

The results of modeling undertaken in the vicinity of AQMA 3A (AQMA 3 and 4 combined) in the further assessment indicated all properties on the gyratory system with facades on Chalk Hill, Pinner Road and Aldenham Road are predicted to have concentrations greater than the 40 μg m-3 annual mean objective. The area of exceedence extends with the queuing traffic along Eastbury Road as far as Deacon Hill, Pinner Road as far as Oxhey Avenue, Chalk Hill as far as Haydon Road, Aldenham Road as far as The Larches and Lower High Street as far as Dalton Way. Modeled annual mean concentrations at relevant locations for base year (2006) were predicted to range from 53.4 to 66.4 $\mu g\ m^{-3}$ and 49.9 to 60.5 $\mu g\ m^{-3}$ for base year 2010 (Table 3.1). The further assessment recommended that Watford Borough Council consider extending the existing AQMAs to cover these areas.

Based on 2010 figures and the data presented in the Further Assessment, it is estimated that a 35% reduction in road traffic emissions of NO_x (or nitrogen oxides, a pre-cursor of NO_2) beyond the 'do nothing' case would be required to achieve the AQ objective.

AQMA 5: A405/Horseshoe Lane

The results of air dispersion modeling in the vicinity of Horseshoe Lane indicated slight exceedence of the annual mean objective for NO_2, with a concentration of 40.7 $\mu g\ m^{-3}$ predicted at one relevant location (Table 3.1). From the modeling contours, one property (1026 St Albans Road) that is currently included in the AQMA is indicated to be outside the predicted area of exceedence. However, the predicted concentration is only marginally less than the objective and within the range of uncertainty in the model.

Based on these figures and the data presented in the Further Assessment, it is estimated that the air quality objective for nitrogen dioxide will be met throughout the AQMA and no reduction in road traffic emissions of NO_x (or nitrogen oxides, a pre-cursor of NO_2) beyond the 'do nothing' case would therefore be required to achieve the AQ objective.

3.4 Source Apportionment

The Watford Further Assessment 2009 completed a source apportionment analysis for the four AQMAs. This analysis is designed to show the contribution to total pollution concentrations that can be attributed to different vehicle types and to their producing emissions while being stationary at junctions rather than moving along road links.

The following table 3.2. summarizes the results of the source apportionment analysis.

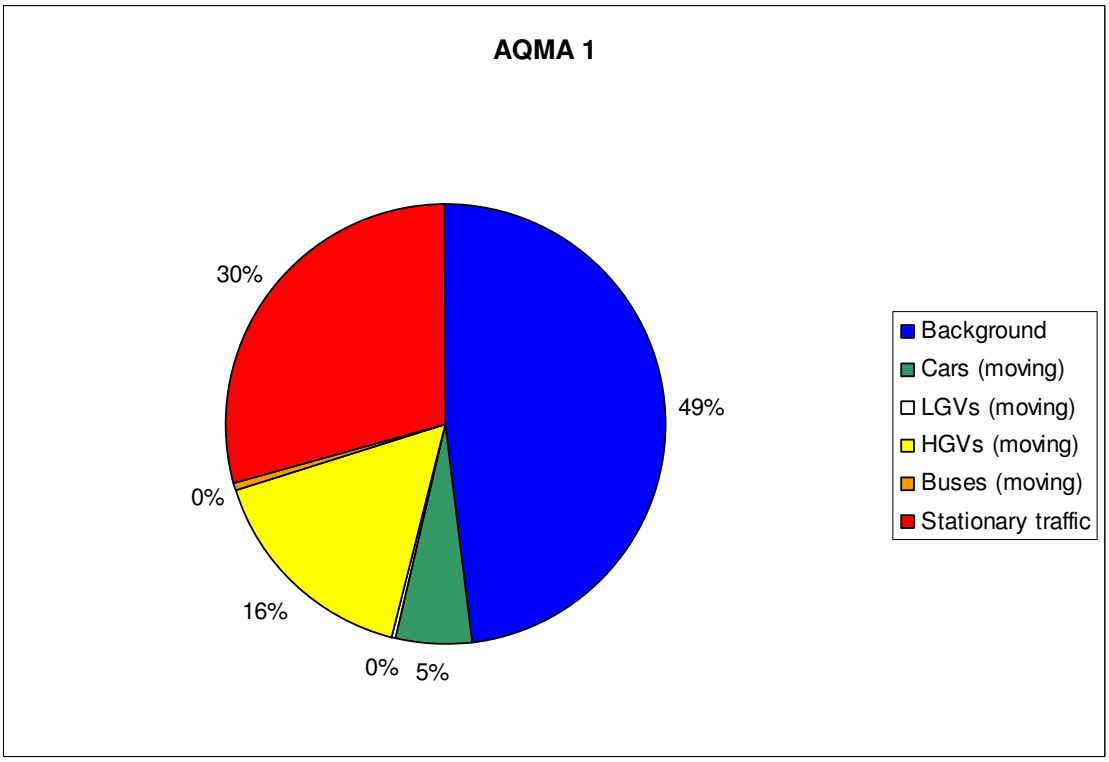
Table 3.2. Average contribution of vehicle type and stationary traffic to total annual mean NO_x concentrations at the four AQMAs

	AQMA 1	**AQMA 2**	**AQMA 3A**	**AQMA 5**
	St Albans	Vicarage	Chalk Hill	Horseshoe
Background	48.14%	43.89%	20.90%	58.67%
Cars (moving)	5.41%	19.79%	22.91%	13.85%
LGVs (moving)	0.43%	6.22%	3.97%	4.37%
HGVs (moving)	16.16%	8.97%	12.48%	13.53%
Buses (moving)	0.34%	2.52%	10.91%	9.59%
Stationary traffic	29.53%	18.61%	28.83%	*0.00%

*No major congestion problems are associated with AQMA 5 however some peak time queuing does occur along St.Albans Road and Horseshoe Lane.

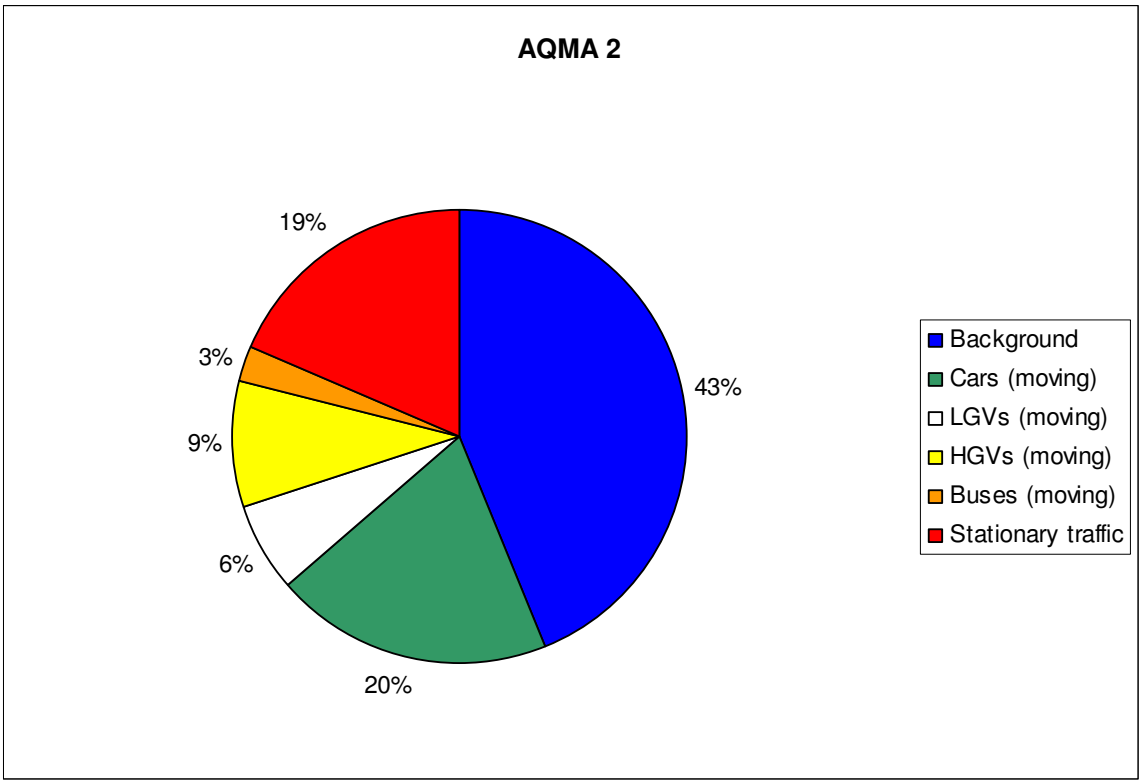
The following pie charts and discussion illustrates these results.

Figure 1. Average contribution of vehicle type and stationary traffic to total annual mean NO_x concentrations at AQMA 1



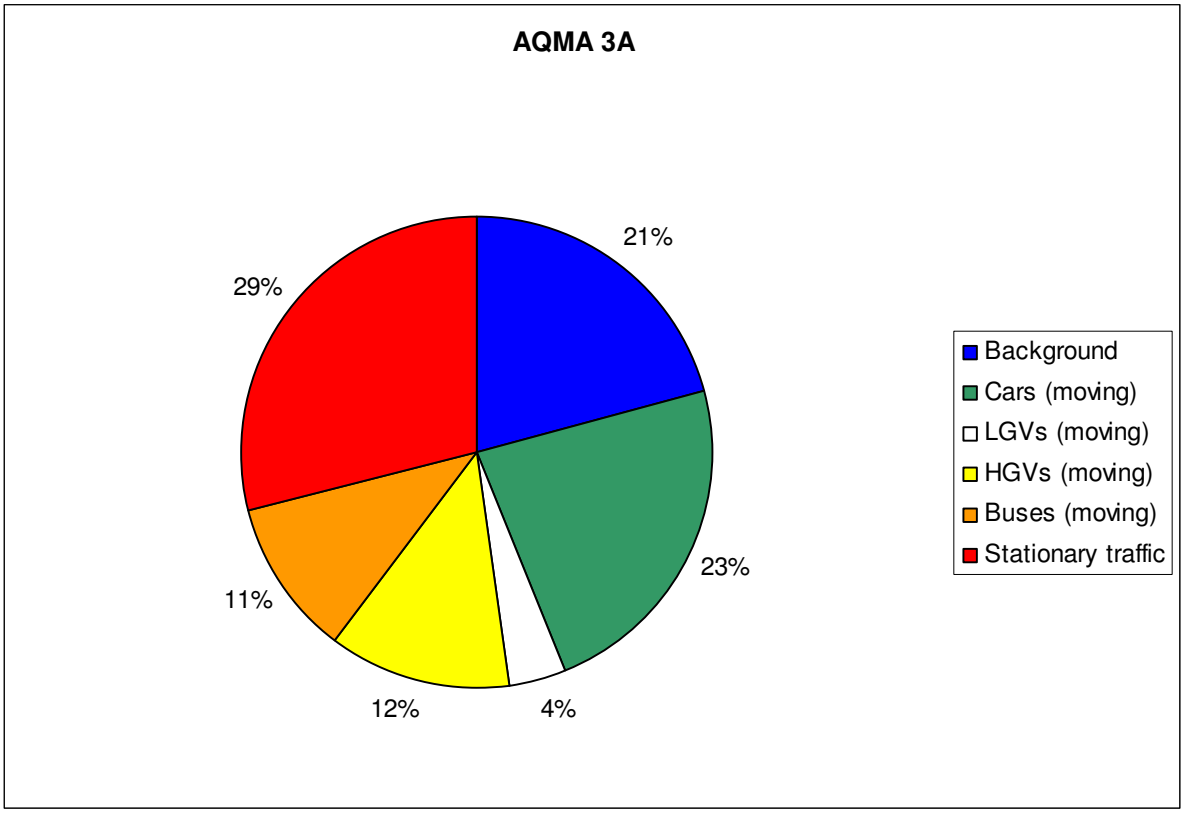
In AQMA 1, St Albans Road, a significant source of NOx is from background emissions, with stationary traffic, moving HGVs contributing significantly to NOx emissions in the AQMA. Emissions from background sources and local road emissions make approximately equal contributions in this area. Measures to reduce the amount of road emissions from stationary traffic would be a natural focus for the AP and that complimentary measures to improve freight quality or alter their activity could also be beneficial.

Figure 2. Average contribution of vehicle type and stationary traffic to total annual mean NOx concentrations at AQMA 2



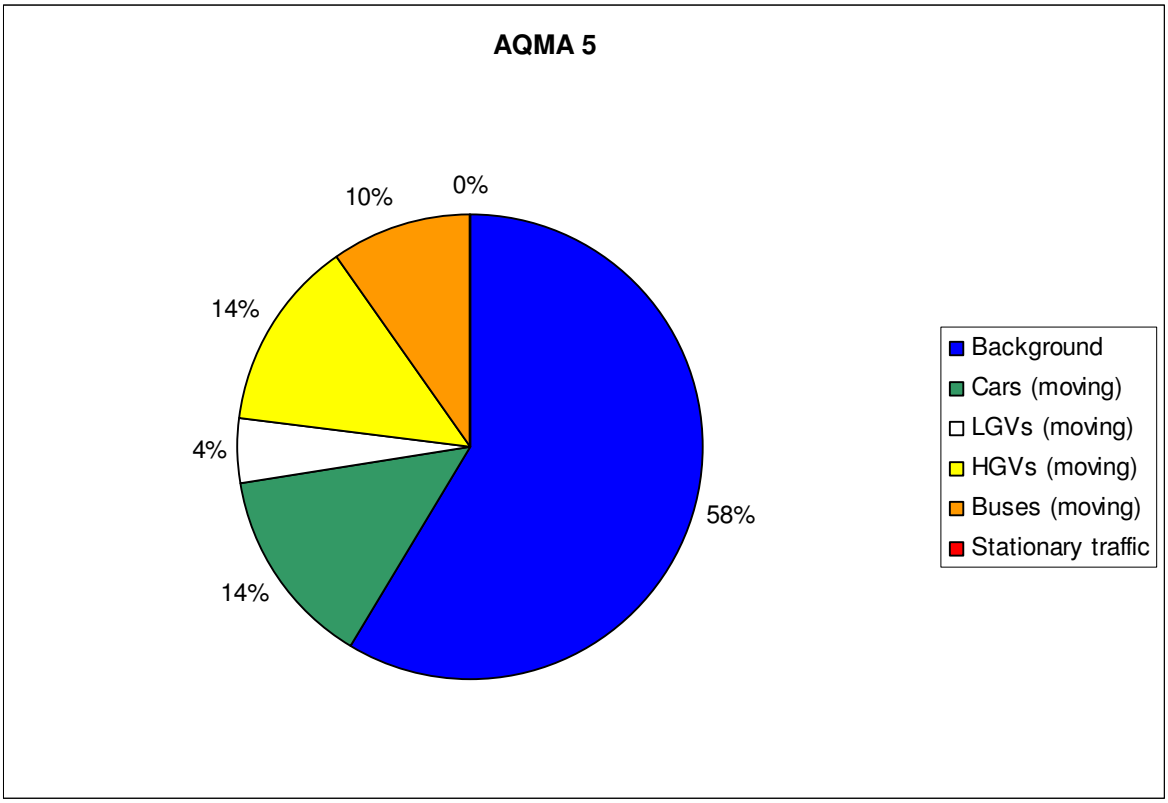
In AQMA 2, Vicarage Road, local road emissions contribute significantly to NOx emissions with moving cars, stationary vehicles and moving HGVs being the most important local sources, LGVs contribute in this area to a greater extent than in any of the other AQMAs. Background sources also contribute significantly in the AQMA. This would indicate that the plan for AQMA 2 should focus on reducing the number of private cars transitting the area, taking steps to improve the flow of traffic, and improving the quality of freight vehicles.

Figure 3. Average contribution of vehicle type and stationary traffic to total annual mean NO_x concentrations at AQMA 3A



In AQMA 3A, Aldenham Road and Chalk Hill, the background contribution is again important, but is not dominant as in AQMAs 1 and 2. In this case local sources such as stationary traffic, moving cars, buses and HGVs contribute significantly to emissions of NOx. This would indicate a need to tackle congestion generally, but also to reduce the emissions of all types of vehicles by either technical means, by reducing their numbers or by (in the case of freight/buses) influencing at which times they transit the AQMA.

Figure 4. Average contribution of vehicle type and stationary traffic to total annual mean NO_x concentrations at AQMA 5



In AQMA 5, A405/Horseshoe Lane, the background contribution is by far the largest source of NOx. Of the local sources, moving cars, HGVs and buses contribute significantly to overall NOx. This would indicate a natural focus for the plan being an overall reduction in car numbers (perhaps by green travel planning or other behavioural measures), and steps to improve the quality of the buses and freight vehicles that transit the AQMA. As with AQMA 3A there is potential to look at the timing of bus services and freight deliveries in the area.For all of the AQMAs, the contribution from background is important although not always dominant (it is particularly important in the case of AQMA 5). There are differences in the types of vehicles that are most important as sources in the AQMAs meaning that actions targeting a certain type may have beneficial impacts in one AQMA but not in others.

In general terms, there is a need to address congestion in Watford as this has been identified as a significant source in AQMAs 1, 2 and 3A so action plan measures for these would be best targeted at reducing overall vehicle numbers. Private cars are important in all AQMAs so a reduction in these could also provide a benefit across the borough. Moving HGVs contribute significantly to NOx emissions in AQMAs 1, 3A and 5 though this is not the case for AQMA 2 where LGVs are more important pointing towards action on freight quality and activity being important in this plan. Buses are also important sources in AQMA 3A and 5 though are not thought to be so important in AQMA 1 or 2. This would indicate that measures to improve bus quality will have benefits specific to AQMA 3A and 5 with little impact on the others. Table 3.3 provides a summary of sources of emissions affecting the designated AQMAs.

Table 3.3. Significant sources of NOx emissions in each AQMA		
Emission Source	AQMA	Potential Focus of Measures
Background	**1, 2, 3A & 5**	Coordinated action on a regional/national scale
Stationary traffic	**1, 2 & 3A**	Measures to reduce the amount of road emissions from stationary traffic and improve traffic flow
HGVs	**1, 2, 3A & 5**	Measures to improve freight quality and activity
LGVs	**2**	Measures to improve freight quality and activity
Buses	**3A & 5**	Measures to improve the quality of the buses and bus time-tabling
Cars	**2, 3A & 5**	Measures to reduce car numbers (perhaps by green travel planning or other behavioural measures)
Summary of Potential Focus of Measures for each AQMA		
AQMA		
1. St. Albans	(i) Coordinated action on a regional/national scale (ii) Measures to reduce the amount of road emissions from stationary traffic and improve traffic flow (iii) Measures to improve freight quality and activity* *Since only a 5% reduction in NOx emissions is required it is likely that (ii) above would achieve the necessary reduction	
2. Vicarage Road	(i) Coordinated action on a regional/national scale (ii) Measures to reduce the amount of road emissions from stationary traffic and improve traffic flow (iii) Measures to reduce car numbers (perhaps by green travel planning or other behavioural measures)* (iv) Measures to improve freight quality and activity* *As with St Albans it is likely that (ii) above would achieve the necessary reduction in NOx emissions	
3A. Aldenham Road & Chalk Hill	(i) Coordinated action on a regional/national scale (ii) Measures to reduce the amount of road emissions from stationary traffic and improve traffic flow (iii) Measures to reduce car numbers (perhaps by green travel planning or other behavioural measures) (iv) Measures to improve freight quality and activity (v) Measures to improve the quality of the buses and bus time-tabling	
5. Horseshoe Lane	(i) Coordinated action on a regional/national scale (ii) Measures to improve freight quality and activity No additional measures are needed in Horseshoe Lane but (I) and (ii) above could also be beneficial in reducing emissions	

3.5 Conclusions

Consideration of the results of previous assessments and the guidance on developing an Action Plan the following conclusions have been reached. The evidence of the source apportionment analysis suggests that road traffic is the dominant local source of emissions (40-79% of the total NOx concentration) and a reduction of between 5 and 34% in local road transport NOx emissions is required to achieve the objectives in 2010. Congestion contributes significantly to NOx emissions in the AQMAs (20-30% in AQMAs 1,2 & 3A) therefore measures to reduce congestion would be a focused and proportionate response in making progress towards the air quality objective in all of the AQMAs.

HGVs contribute significantly in all AQMAs accounting for 10-15% of local NOx emissions. Buses are less significant (<3% of local NOx emissions in AQMAs 1 & 2) and are only a significant contributor at the Aldenham and Chalk Hill and Horseshoe AQMAs accounting for 10% of local NOx emissions. Cars however are a significant contributor in all but the St Albans AQMA accounting for 15-23% of local NOx emissions. A focused and proportionate action plan will attempt to reduce emissions from these vehicles at these locations. However, in order to achieve this successfully, action may be required over a wider area.

Road transport is the dominant local source of pollutant emissions. Therefore it is suggested that the Hertfordshire County Council's LTP be the delivery plan for the action plan measures. The Watford

Borough Council AP will be integrated into the LTP. In this case the LTP team should consider adopting a set of indicators and targets related to the measures to be adopted in the AP (ie focused on reducing emissions from HGVs, cars and buses in the AQMAs). There is a risk that without meaningful integration with current development plans and transport plans then the air quality problems in the AQMAs may worsen due to additional traffic flow through them.

Since the AP has not yet been integrated into the LTP it will continue to be developed as a stand-alone plan but with the understanding that even if it is not integrated the LTP will be the mechanism by which measures are implemented.

4 Development of the draft action plan

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

4.1 Formation of steering group

The development of the Action Plan began with a formal kick-off meeting, which was attended by a number of local authority officers. These officers will be informed and consulted throughout the development of the Action Plan. In this way the Action Plan should be influenced by their local knowledge and area of responsibility.

This steering group comprises:

- *Chair: Richard Brown, Environmental Health Manager (Commercial), Watford Borough Council*
- *Simone Smith, Assistant Environmental Health Officer, Watford Borough Council*
- *Matt Thomson, Planning Policy Manager, Watford Borough Council*
- *David Noble, Development Manager, Watford Borough Council*
- *Tina Gigg / Danielle Keogh, Transport Planning Officers, Hertfordshire County Council*

It was quickly evident that as the majority of issues were transport related, smaller subgroup could explore the options, as follows:

- *Chair: Richard Brown, Environmental Health Manager (Commercial), Watford Borough Council*
- *Simone Smith, Assistant Environmental Health Officer, Watford Borough Council*
- *Tina Gigg / Danielle Keogh, Transport Planning Officers, Hertfordshire County Council*

As a statutory duty, Watford Borough Council will consult widely outside of this group at an appropriate stage in the Action Plan process. Therefore other stakeholders will have the opportunity to influence the plan before it is adopted.

4.2 Actions to date

The steering group in developing the draft Action Plan has considered a full range of relevant options to reduce emissions from traffic within each of the 4 remaining AQMAs. The process has followed the available guidance and considered a wide range of measures before undertaking an initial assessment to eliminate measures that are not deemed feasible and thus will not be considered further at the present time.

Essentially the steering group adopted the following procedure:

- Consideration was given to the full range of potential options; and,
- Initial decisions were made on those options to eliminate from consideration at that stage.

The following section outlines the processes undertaken to during the initial assessment of options.

5 Initial consideration of AP options

This section reports on the work undertaken by WBC to consider the full range of AP options available. It provides an overview of how options have been assessed in relation to their feasibility and applicability and how these options have either been eliminated from the process or taken forward for further consideration and inclusion in the draft action plan.

5.1 Range of possible options

There is a very wide range of options available to reduce the emissions from road transport. Watford Borough Council does not necessarily have the power to implement them all directly but potentially it does have a role in attempting to influence those bodies or individuals who could implement them. Therefore, it is appropriate for Watford Borough Council to initially consider all options.

Watford Borough Council's consultants have structured the options into a typology, which is presented in the table below.

Table 5.1 Typology of potential options to reduce emissions in AQMAs

Type	Description	Notes
1	Strategic actions	The underlying reason why AQMAs have been declared is the massive increase in road transport activity over decades and the fact that this activity is very largely unregulated. The freedom to travel has created local environmental stress in urban areas and global stress due to its contribution to climate change. A local long-term strategy is required for an overall reduction in pollutant and greenhouse gas emissions. Such a strategy might include: • Building the capacity to better assess and manage the environmental impacts from road transport • Specific commitments or targets within local development and transport planning policy to significantly reduce the impacts of new development
2	Move receptors away from the AQMA	Receptors are the people exposed to adverse pollutant levels in the AQMAs. If they were no longer resident in the AQMAs then there would be less pressure to do anything further to reduce pollution in the AQMAs. Note that this option therefore makes no effort to reduce emissions in any way. In this situation there is a danger that traffic activity will continue to increase and new locations will need to be declared as AQMAs.
3	Move sources away from the AQMA	The source is road transport. Construction of new roads could divert traffic away from the roads in the AQMAs. Less traffic on these roads results in lower pollution levels in the AQMAs. However, the opportunity to build such roads is frequently absent. In cases where such roads can be built, care needs to be exercised that the locations where the new roads are built do not become AQMAs in turn. Note that this option moves emissions from one location to another with no requirement to reduce them. Overall emissions may be increased by such actions.
4	Optimise how sources move through the AQMA	Changes in how the roads in the AQMAs are signed or otherwise managed could reduce emissions from road transport a) by diverting some traffic onto better routes for them or b) by reducing the amount of time that traffic is stationary with engines idling. Note that the

Table 5.1 Typology of potential options to reduce emissions in AQMAs		
Type	Description	Notes
		opportunity to take such action is frequently limited.
5	Reduce emissions from sources by technical means	The majority of vehicles using roads in the AQMAs are conventional petrol or diesel powered vehicles with a range of ages. There are many technical options to convert such vehicles into ones using cleaner engine and fuel technology. By accelerating the uptake of these technologies the emissions in the AQMAs would be reduced. Note that technology does not always work in a positive sense for all emissions. They sometimes trade benefits for one pollutant against disbenefits for another one.
6	Reduce emissions from sources by reducing the demand for travel or achieving better travel choices	An important way to reduce emissions from transport is to reduce the number of journeys made through the AQMAs. This could be achieved either through avoiding making some journeys or by ensuring that these journeys are made via a less polluting form of transport. The success of such measures depends on policies that influence how people make travel choices. Note that there is increasing emphasis placed on such policies and that they work holistically by reducing emissions of all pollutants and greenhouse gases.
7	Other options	It may be that Watford Borough Council feels that it cannot implement measures or influence others to implement measures alone. In this case it may appeal to central government or its agencies (such as the Highways Agency) to take further steps to bring about the necessary improvements in air quality. Note that national measures take many years to be negotiated, implemented and finally to have a significant effect. They are also frequently a less cost-effective way to solve problems in an AQMA than local measures.

5.2 Initial responses to the options

Within each type described above there are several possible sub-options. These have been introduced to the steering group who were then invited to provide an initial assessment of their feasibility and applicability. The responses received are presented in Annex 4 along with comments from Watford Borough Council 's consultants.

For each option a decision has been made to eliminate the option from further consideration or to consider the option further. This decision has been made with reference to **a)** the conclusions of Chapter 3 (defining the air quality problem and its chief sources) **b)** comments received from the steering group and **c)** additional comments from Watford Borough Council consultant based on experience in prior assessments. The results of this initial assessment are listed below.

Table 5.2 Options eliminated from further consideration in the Watford Borough Council AP
Move receptors away from AQMA
Remove homes and businesses
Move sources away from AQMA
Lobby for regional policies
Reduce the emissions from sources by technical means
Public Carriage Office policy
Vehicle scrappage incentives
Lobby for additional national policy
Infrastructure for cleaner fuels
Roadside emissions testing

From review of the prominent sources of pollution, comments received from the Action Plan Steering group and the professional experience of the consultant, several of the measures included within the full list of measures have been eliminated from further consideration at present. These measures were excluded from further consideration at this time, as they were not considered feasible or were not anticipated to have an appropriate impact on the predominant sources of emission identified in the further assessment.

Conversely the steering group decided to accept a number of other options that would therefore be examined further. A summary of these is presented in Table 5.3. Within each category listed in the table there are several sub-options, which are included in further detail in Annex 4.

Table 5.3 Options selected for further consideration in the Watford Borough Council AP
Strategic Actions
Improving links with Local Transport Plan
Improving links with Local Planning and Development framework
Move sources away from AQMA
Bypasses
Control access for freight
Control access for buses
Optimise how sources transit the AQMA
Traffic light phasing
Improved road signage
Retain Speed controls
Other traffic management schemes – working with Ordnance Survey to Improve Satellite Navigation
Reduce the emissions from sources by technical means
Explore introduction of Low Emission Zone
Bus quality partnerships
Freight quality partnerships
Other: Education and Awareness Raising – Low emission vehicles
Green procurement – Council/ Buses/ Local Business
Differentiate parking charges
Reduce the emissions from sources by means of better travel choices
Provide information relating to travel options/ public transport
Access to alternative modes (cycling + walking)
Green Travel Plans for large businesses and institutions
Parking provision, Park and Ride
Commercial delivery strategy
Road use charging and workplace parking levy
Vehicle idling regulations
Others
Integrate AQAP into the Local Transport Plan
Supplementary planning guidance

These options were considered worth further examination since they do address the relevant emission sources and it was felt that the approaches to implementing such options had some feasibility and it lay within the powers of local government to implement them.

5.3 Development and assessment of AP options

Prior to examining options in detail it was appropriate at this stage of the action planning process to carry out a preliminary assessment to determine what action would be required to bring about improvements in air quality in each of the designated AQMAs.

As part of this process, Watford Borough Council has undertaken an initial assessment to identify some of the best options available for improving air quality in the AQMAs and the potential impact of the Local Transport Plan. The key measures could potentially include:

- Strategic measures to avoid worsening air quality;
- Efforts to reduce dependence on cars (e.g. the travel plan); and,
- Efforts to reduce HGV flow through the AQMAs.

These measures have been represented for modelling purposes within the Further Assessment as:

1. **Impacts of strategic measures to avoid worsening Air Quality**: To assess this Watford assumed Zero growth in traffic in the AQMAs from 2006 to 2010;

2. **Impacts of efforts to reduce dependence on cars (i.e. the travel plan, etc. measures):** To assess this Watford assumed a reduction of 10% in car flow rates from 2006 to 2010, with all other vehicle flow rates remaining at 2006 levels; Watford assumed that congestion may be unaffected by this approach although in reality short term improvements in congestion may result. Long term reductions in congestion may require parallel policies to 'lock in' benefits. Such policies may include access restrictions or a change in road-use priorities to promote more sustainable travel modes.

3. **Impacts of efforts to reduce HGV flow through the AQMAs**: To assess this Watford assumed A reduction of 10% in HGV flow rates from 2006 to 2010, with all other vehicle flow rates remaining at 2006 levels.

These scenarios were modelled, and detailed findings are outlined in the Further Assessment report. A summary of the modeled impact of each scenario is presented in Section 5.4. below

5.4 Provisional scenario analysis

The impact of the three scenarios selected for preliminary assessment are summarized in Table 5.4 with each measure assessed by comparison of predicted nitrogen dioxide concentrations at relevant location against the base case for 2010.

The baseline concentrations of nitrogen dioxide are predicted to decrease between 2006 and 2010 due anticipated reductions in emissions from the fleet. In addition, results from the modeling of the three provisional Action Plan Scenarios indicate further small reductions in concentrations of NO_2 at each receptor location.

The modelled reductions in annual mean concentrations of NO_2 as a result of each of the scenarios were found to range from 0.2 to 1.8 $\mu g\ m^{-3}$. In general, of the three scenarios assessed,

Suggest highlighting these results as bullet points

- Option 1: Zero growth in traffic in the AQMAs from 2006 to 2010 was the least effective in reducing ambient concentrations of NO_2, resulting in a 0.2-0.8 $\mu g\ m^{-3}$ reduction in comparison with the 2010 baseline.

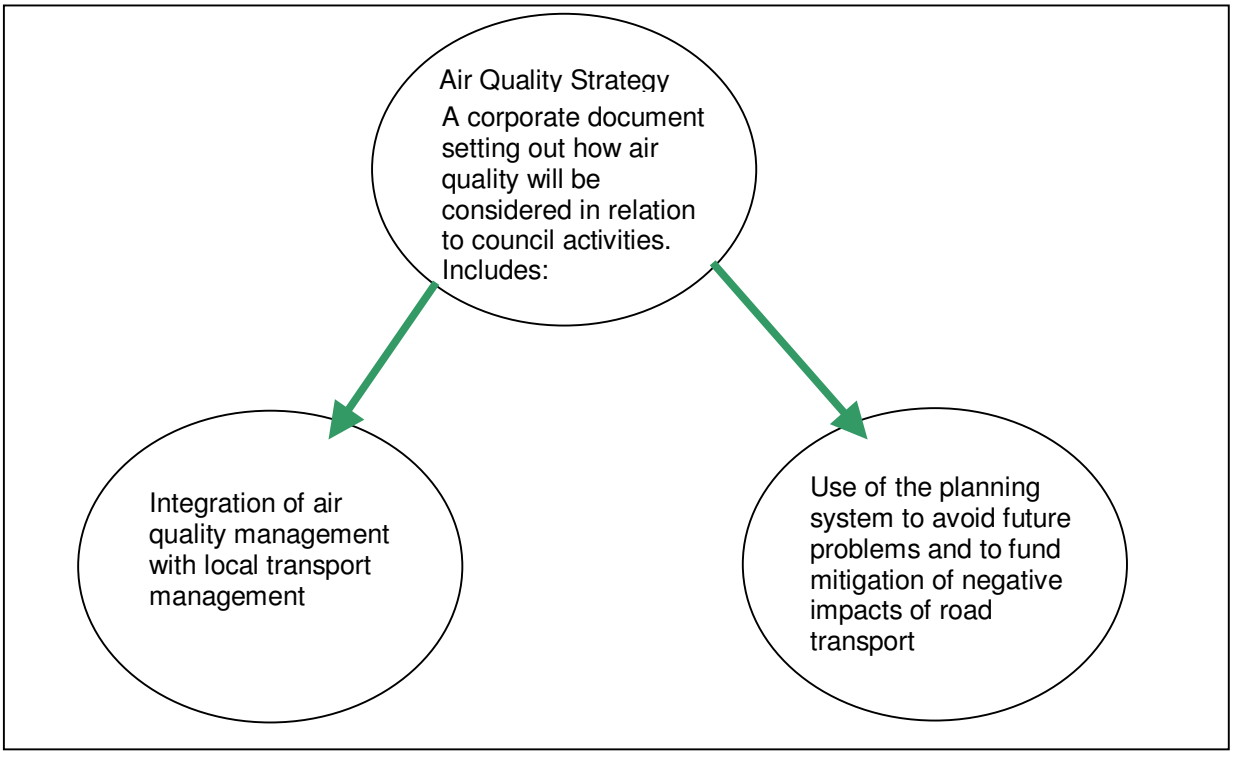
- Scenarios 2 (10% in car flow rates) and 3 (10% in HGV flow rates) had broadly similar impacts within all four remaining AQMAs, although at the majority of relevant locations, the reduction of HGV flow was found to have the most significant impact.

At some of the receptors in the areas of St Albans Road, the Hornets Gyratory and Horseshoe Lane, the predicted reduction in ambient concentrations for the 2010 baseline are sufficient that the annual mean objective is expected to be met without the need for further action. The Action Plan Scenarios result in further small reductions in nitrogen dioxide concentrations; however, the reductions were found to be insufficient to achieve the annual mean objective at any of the selected receptors.

This implies that even more significant interventions in local business as usual transport activity, than the modest interventions examined in this assessment, would be required to achieve the air quality objectives by 2010 in all relevant locations in the district. Although it was not examined in detail in this assessment it is believed that a long-term solution to local congestion problems would be an effective means to make progress towards the air quality objective in the AQMAs.

5.5 Development of Watford's air quality strategy

There are a complexity of issues affecting air quality in Watford, with background sources and local road transport being major contributors to NOx emissions. Although emissions are predicted to decrease between 2006 and 2010 in the AQMAs, as a result of improvements in vehicle technology, it is still likely that exceedences of the NO_2 objective will occur at a number of locations within the borough. The level of local intervention required to address air quality issues is therefore potentially very significant. WBC intends to deal with the air quality issues through development of a corporate air quality strategy that will work in parallel with development planning and transport planning. The diagram below illustrates simple but key concepts associated with such a strategy. It is intended that Hertfordshire County Councils Local Transport Plan (LTP) will be the delivery plan for Watford's action plan measures. The action plan will therefore be integrated with the LTP in due course. Options identified in this draft action plan will be examined in more detail between 2009 and 2010 so that a better understanding of effectiveness and feasibility of implementing the different options in reality can be assessed in order to deliver a quantitative action plan that will ensure that marked improvements in air quality are achieved in the four remaining AQMAs.



Following the initial elimination of wider measures not considered feasible, Watford Borough Council are currently in the process of developing and refining the full range of existing measures to enable these to be assessed appropriately. The intention of the Council is to identify the most appropriate and cost-effective options for addressing the air quality issues identified in the four remaining AQMAs. It is considered that the most appropriate way to do this is to undertake further study and consultation over the next two year in order to develop fully planned and costed measures.

Watford Borough Council has commissioned a technical consultant to help develop the Action Plan. They have collated the initial responses to the available options and made additional comments (Annex 4).

Following the initial review of available options, the future work of the Steering group is now focussed on the following 2 requirements:

1. **Defining the remaining options and undertaking a detailed assessment of their cost-effectiveness and feasibility.**

The criteria against which options will be assessed will include:

- Can the option be defined with a clear view on how it aims to improve air quality;
- Identifying the appropriate authority for implementing the options;
- Assess whether it is feasible;
- Assess whether stakeholders would find it acceptable;
- Potential air quality benefits;
- Potential costs;
- Overall cost-effectiveness; and,
- Potential other environmental benefits, risk factors, social impacts and economic impacts.

2. **Utilise the results of the assessment to identify options to prioritise and to adopt as measures within the Action Plan.**

The steering group will thus meet again to further consider those options that appear most positive (in terms of feasibility, effectiveness in reducing emissions, costs and other factors). The role of the group will be to provide comments, evaluate the options and to make decisions so that a list of prioritised options is developed as far as possible.

These options will become the proposed measures within the draft Action Plan. Watford Borough Council will potentially develop targets for these measures and consult more widely on the plan before it is finalised.

Table 5.4 Predicted nitrogen dioxide concentrations for the Action Plan Scenarios							
RECEPTOR	**OS GRID COORDINATES**		**ANNUAL MEAN [NITROGEN DIOXIDE] μg m^{-3}**	**2010 SCENARIOS ANNUAL MEAN [NITROGEN DIOXIDE] μg m^{-3}**			
	X, m	Y, m	2006 Baseline	Baseline	1	2	3
AQMA 1 St Albans Road							
1	510970	198970	42.0	39.5	39.2	38.9	38.8
2	511010	198330	44.4	41.9	41.5	41.3	40.9
3	510900	197750	44.6	42.0	41.6	41.4	41.0
4	510760	197220	42.0	39.5	39.2	38.9	38.8
AQMA 2 Vicarage Road							
1	510775	196002	48.7	45.6	45.2	45.0	44.9
2	510764	196010	46.1	43.2	42.9	42.6	42.6
3	510774	196024	44.2	41.4	41.1	40.8	40.9
4	510789	196016	45.8	42.9	42.6	42.3	42.3
AQMA 3A Oxhey							
1	511870	195510	53.4	49.9	49.4	49.2	49.0
2	511969	195431	66.4	60.5	59.7	59.4	58.7
3	512030	195436	56.5	52.6	52.0	51.7	51.4
4	511943	195307	54.8	51.1	50.6	50.3	50.0
AQMA 5 Horseshoe Lane							
1	511860	200700	40.7	38.1	37.8	37.6	37.5
2	511690	200620	39.0	36.3	36.1	35.9	35.9

6 Draft Action Plan

Although emissions are predicted to decrease between 2006 and 2010 in the four remaining AQMAs, the development of suitable measures, indicators and targets within an AP aimed at reducing NOx emissions from HGVs, cars and buses will be necessary to ensure that objective levels are met. It is the intention of WBC to develop a corporate air quality strategy that will work in parallel with development planning and transport planning to ensure that emission reductions are achieved.

At present, Watford Borough Council's draft air quality action plan incorporates a broad range of measures that the Action Plan Steering Group proposes to subject to further research and development as the first defining actions of the draft plan. Currently the outlined measures have not been developed to the extent necessary to enable measures to be prioritised, but it is considered that the appropriate investment of time and effort will enable the most robust and appropriate measures to be developed and implemented.

Table 6.7 presents an overall summary of options that have been retained within the draft action plan for further consideration. It is not possible at this time to present a fully developed and prioritised list of measures, together with anticipated costs, air quality impact and indicators for charting the progress of the draft plan. It is therefore proposed that future progress reports for the Air Quality Action Plan and Local Transport Plan demonstrate the progress being made in terms of developing and refining the listed measures into refined and costed measures.

6.1 Draft Action Plan options

The options remaining within Watford Borough Council's draft air quality action plan can be understood as comprising four distinct categories:

1. Strategic actions aimed at:
    a. Integrating air quality into all relevant areas of decision making within Watford District and Hertfordshire County Councils;
    b. Examining options in more detail to define the measures (grouped under 2-4 below) that could be implemented to make progress towards the AQ objective in the AQMAs.
2. Encourage sources to use routes away from the AQMAs;
3. Encourage the reduction emissions from sources by technical means; and,
4. Encourage better travel choices.

The Council now intend to develop each of the listed options and sub-options into specific proposals for actions or measures for implementation within the final plan. This process will enable the following to be clearly identified for each option and sub-option:

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

An example table illustrating this information is shown below Table 6.1.

Table 6.1. Example table **Measure**	**Title**
Number ID	Short descriptive title
Definition	Key Intervention
A brief description of the intent of the measure	Simple description of how the measure intends to reduce emissions
Responsible authority and other potential partners	Powers to be used
1. The authority and department who will be responsible for implementing the measure and its actions 2. Other organisations to be involved	Regulatory powers the authority will use to implement the measure

Actions	Implementation timetable							Progress indicator	Target
	09	10	11	12	13	14	15		
Simple description of tasks	When the tasks will be completed							What will be monitored	What the intervention aims to achieve
1									
2									
3									

Notes
1. Additional notes

Tables 6.2 to 6.5 below address options remaining within Watford Borough Council's draft air quality action plan that will be assessed detail in order to further define measures that will be taken forward.

Table 6.2. Strategic Actions **Measure**	**Title**
1	An Air Quality Strategy
Definition	Key Intervention
This measure comprises option 1, Strategic Actions A corporate strategy document including: • Guidance from heads of service on the importance attached to the strategy • Policies of how WBC manages air quality (i.e. monitoring, assessment and planning) • Policies of how WBC will work with, development planning, transport planning and other relevant stakeholders • Policies of how WBC's air quality action plan will be integrated with the Local Transport Plan • Policies of how the development planning system in WBC will be used to support the air quality action plan • Detailed examination of options including cost effectiveness, to define priority measures that could be implemented in order to achieve AQ objectives	Adoption of corporate air quality strategy to address current and future air quality issues.
Responsible authority and other partners	Powers to be used
1. WBC 2. HCC and Strategic partners 3. Steering Group	Voluntary (although government guidance recommends this measure)

Actions	Implementation timetable							Progress indicator	Target
	09	10	11	12	13	14	15		
1 Development of the strategy									Not applicable
2 Define detailed measures									
3 Adoption of the strategy								Final document	
4 Periodic review and revision								Revised document	

Notes
1. The implementation timetable is defined in financial year terms. i.e. '09 = end of March 09

Table 6.3. Encourage sources to use routes away from AQMAs	
Measure	**Title**
1	Move emissions sources away from AQMAs

Definition	Key Intervention
This measure comprises option 2, Encourage sources to use routes away from AQMAs Detailed examination of options including cost effectiveness and feasibility in order to define measures that could be implemented in order to move emissions sources away from AQMAs: • Consideration of freight access • Control of bus access and timetabling • Consideration of bypasses • Consideration of traffic management schemes e.g. Ordnance Survey and improvements in satellite navigation. • Retain speed controls • Differentiate parking charges • Road use charging and workplace parking levy	Introduction of prioritised quantitative measures with clear indicators and targets that aim to move sources of emissions away from AQMAs
Responsible authority and other partners	**Powers to be used**
1. WBC 2. HCC and Strategic partners 3. Steering Group	Voluntary (although government guidance recommends this measure)

Actions	Implementation timetable							Progress indicator	Target
	09	10	11	12	13	14	15		
1 Detailed examination of measures									Not applicable
2 Prioritisation of measures									
3 Implementation of measures								Final document	
4 Review effectiveness of measures								Revised document	

Notes
1. The implementation timetable is defined in financial year terms. i.e. '09 = end of March 09

Table 6.4. Encourage reduction of emissions from sources by technical means	
Measure	**Title**
1	Reduce emissions by technical means

Definition	Key Intervention
This measure comprises option 3, Encourage reduction of emissions from sources by technical means Detailed examination of options including cost effectiveness and feasibility in order to define measures that could be implemented in order to reduce emissions by technical means: • Reduce age of Council vehicle fleet • Traffic light phasing • Improved road signage • Bus quality partnerships • Freight quality partnerships • Green procurement for Council/local business • Vehicle idling regulations • Introduction of LEZs • Encourage uptake of LEVs	Introduction of prioritised quantitative measures with clear indicators and targets that aim to reduce emissions by technical means
Responsible authority and other partners	**Powers to be used**
1. WBC 2. HCC and Strategic partners 3. Steering Group	Voluntary (although government guidance recommends this measure)

Actions	Implementation timetable							Progress indicator	Target
	09	10	11	12	13	14	15		
1 Detailed examination of measures									Not applicable
2 Prioritisation of measures									
3 Implementation of measures								Final document	
4 Review effectiveness of measures								Revised document	

Notes
1. The implementation timetable is defined in financial year terms. i.e. '09 = end of March 09

Table 6.5. Encourage reduction of emissions through better travel choices	
Measure	**Title**
1	Encourage better travel choices

Definition	Key Intervention
This measure comprises option 4, Encourage better travel choices Detailed examination of options including cost effectiveness and feasibility in order to define measures that could be implemented in order to encourage better travel choices: • Promote better personal and community travel choices • Promote better travel choices within businesses and institutions • Better access to alternative modes of travel • Green Travel Plans for large businesses and institutions • Parking provision/Park and Ride	Introduction of prioritised quantitative measures with clear indicators and targets that aim to reduce emissions through better travel choices
Responsible authority and other partners	**Powers to be used**
1. WBC 2. HCC and Strategic partners 3. Steering Group	Voluntary (although government guidance recommends this measure)

Actions	Implementation timetable							Progress indicator	Target
	09	10	11	12	13	14	15		
1 Detailed examination of measures									Not applicable
2 Prioritisation of measures									
3 Implementation of measures								Final document	
4 Review effectiveness of measures								Revised document	

Notes
1. The implementation timetable is defined in financial year terms. i.e. '09 = end of March 09

The following table 6.6. is an example of what WBC will aim to achieve with measures that will be taken forward following a more detailed assessment of options over the period 2009 and 2010.

Table 6.6. Example of what WBC aims to achieve through further assessment of feasibility of options listed in Tables 6.2 - 6.5 above	
Measure	**Title Example of reduction of emissions through smarter travel choices**
(i)	Travel planning (businesses and schools, etc.)

Definition	Key Intervention
This measure comprises option **(x)** from the assessment. WBC/HCC enhance travel planning programmes promoting the sustainable travel choices for: • WBC activity • Other community facilities such as schools • Other large employers WBC includes promotion of efficient driving skills. The programme will target travel through the AQMA as a priority but will not be limited strictly to the AQMA itself.	Reduce reliance on car usage within key organisations
Responsible authority and other partners	**Powers to be used**
1. WBC 2. HCC 3. Public sector: Schools, colleges, hospitals, etc. 4. Large employers in the region	Voluntary (although national policy is promoting this approach)

Actions	Implementation timetable							Progress indicator	Target
	09	10	11	12	13	14	15		
1 Complete baseline travel survey									N/A
2 Strategy defined and capacity developed								Survey results and baseline inventory	N/A
3 Local authority targeted								Document	N/A
4 Schools targeted								In AQMA **(x)**: 1. Reduced use of car overall 2. Reduced use of car at peak times 3. Reduced use of car for journeys <2km	e.g. 1) 5% 2) 10% 3) 10%
5 Large businesses targeted									

Notes
1. The implementation timetable is defined in financial year terms. i.e. '09 = end of March 09
2. A baseline inventory is an effective tool for assessing the current impacts of community transport activity and for assessing the potential benefits of promoting travel planning
3. Developing the strategy will require study to prioritise community groups and those travel modes to be promoted.

Table 6.7 Summary of options included within the draft Action Plan Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target emission reduction
Develop Options into fully planned and costed measures.	Identify most appropriate options for improving air quality within each of the AQMAs – Consideration of Options listed below:	WBC	2009	2009	Provision of prioritised list of options.	N/A
Improving links with Local Transport Plan	Decide best options to reduce emissions in AQMAs	WBC and HCC	Ongoing	TBC	Adoption of LTP	AQ Target for each measure
Improving links with Local Planning and Development framework	Avoid deterioration of local AQ	WBC	Ongoing	TBC	Adoption of corporate strategy/Development and adoption of new planning policies	N/A
Bypasses	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced traffic flows through AQMAs through diversion of traffic to alternate routes	TBC
Control access for freight	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced HGV and LGV traffic flows through AQMAs	TBC
Control access for buses	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduced bus traffic flows through AQMAs	TBC
Traffic light phasing	Assess potential to reduce traffic congestion	WBC and HCC	2009/10	Outcome following consultation and further assessment	Emissions reduction/Reduction in queuing	TBC
Retain Speed controls	Vehicle emissions	WBC	2009/10	Outcome following consultation and further assessment	Emissions reduction	TBC
Other traffic management schemes	Reduce congestion and vehicle km	WBC	2009/10	Outcome following consultation and further	Emissions reduction/Reduction in queuing	TBC

Table 6.7 Summary of options included within the draft Action Plan Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target emission reduction
				assessment		
Explore introduction of Low Emission Zone	Assess potential to reduce unit emissions in the AQMA	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in unit emissions	TBC
Freight quality partnerships	Target reduction in emissions from freight	WBC and HCC	2009/10	Outcome following consultation and further assessment	% uptake of scheme/emissions reduction	TBC
Education/Awareness Raising – Low emission vehicles	Target reduction in emissions	WBC	2009/10	Outcome following consultation and further assessment	% uptake of LEVs	TBC
Green procurement – Council/ Buses/ Local Business	Target reduction in emissions from Council, bus and local commercial fleet.	WBC	2009/10	Outcome following consultation and further assessment	% change/uptake of LEVs	TBC
Differentiate parking charges	Encourage consideration of alternative/ cleaner forms of transport	WBC and HCC	2009/10	Outcome following consultation and further assessment	% change/uptake of cleaner transport	TBC
Provide information relating to travel options/ public transport	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Access to alternative modes (cycling + walking)	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and further assessment	Reduction in peak time flows and reduced queuing	TBC
Green Travel Plans for large businesses and institutions	Reduce reliance on car and reduce queuing time in AQMA	WBC	2009/10	Outcome following consultation and	Reduction in peak time flows and reduced queuing	TBC

Table 6.7 Summary of options included within the draft Action Plan Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target emission reduction
				further assessment		
Parking provision, Park and Ride	Assess potential to reduce traffic entering AQMAs	WBC and HCC	2009/10	Outcome following consultation and further assessment	Adoption of scheme/Reduction in traffic flows through AQMAs	TBC
Commercial delivery strategy	Target reduction in emissions from local commercial fleet	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in HGV/LGV flows through AQMAs	TBC
Road use charging and workplace parking levy	Reduce reliance on car and reduce queuing time in AQMA	WBC and HCC	2009/10	Outcome following consultation and further assessment	Reduction in traffic flows in AQMAs	TBC
Vehicle idling regulations	Target reduction in emissions from idling vehicles	WBC	2009/10	Outcome following consultation and further assessment	Emissions reductions	TBC

6.2 What happens next?

The draft plan must be presented for consultation to statutory consultees including the Department for Environment Food and Rural Affairs (Defra), but also the community of Watford Borough. Therefore, WBC is now submitting this report for consultation. The Council will make the report available to the statutory consultees and to the public by appropriate means.

At the end of the consultation period the Steering Group will collate and consider the comments received on the draft action plan. Potentially these comments will either influence the form and measures of the plan or would be addressed in a response attached to the plan in an appendix. Once consultation comments have been addressed, the Steering Group will submit the plan for final approval to Defra and the Council, at which point it will become an adopted policy of the Council.

Watford Borough Council will then proceed to develop the measures included in the plan and to report annually on progress being made. Depending on progress and trends in monitored air quality it may be appropriate to periodically review and potentially revise the air quality action plan to ensure it is still fit for purpose.

References

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Appendices

Appendix 1: UK air quality standards and objectives
Appendix 2: Maps of declared AQMAs in Watford Borough Council
Appendix 3: Maps of detailed assessment of air quality in the AQMAs
Appendix 4: Initial assessment of potential Action Plan options

Appendix 1

UK air quality standards and objectives

Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene All authorities	16.25 μg/m^3	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 μg/m^3	annual mean	31.12.2010
Authorities in open areas and coastal areas should be cleaner as air changes more frequently and Northern Ireland only	3.25 μg/m^3	running annual mean	31.12.2010
1,3-Butadiene	2.25 μg/m^3	running annual mean	31.12.2003
Carbon monoxide Authorities in England, Wales and Northern Ireland only	10.0 mg/m^3	maximum daily running 8-hour mean	31.12.2003
Authorities in Scotland only	10.0 mg/m^3	running 8-hour mean	31.12.2003
Lead	0.5 μg/m^3 0.25 μg/m^3	annual mean annual mean	31.12.2004 31.12.2008
Nitrogen dioxide[b]	200 μg/m^3 not to be exceeded more than 18 times a year 40 μg/m^3	1 hour mean annual mean	31.12.2005 31.12.2005
Particles (PM_{10}) (gravimetric)[c] All authorities	50 μg/m^3 not to be exceeded more than 35 times a year 40 μg/m^3	24 hour mean annual mean	31.12.2004 31.12.2004
Authorities in Scotland only[d]	50 μg/m^3 not to be exceeded more than 7 times a year 18 μg/m^3	24 hour mean annual mean	31.12.2010 31.12.2010
Sulphur dioxide	350 μg/m^3 not to be exceeded more than 24 times a year 125 μg/m^3 not to be exceeded more than 3 times a year 266 μg/m^3 not to be exceeded more than 35 times a year	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

b. The objectives for nitrogen dioxide are provisional.
c. Measured using the European gravimetric transfer standard sampler or equivalent.
d. These 2010 Air Quality Objectives for PM10 apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002.

Additional national particles objectives for England, Wales and Greater London (see table below) are not currently included in Regulations for the purpose of LAQM. The Government and the Welsh Assembly Government however intends that the new particles objectives will be included in Regulations as soon as practicable after the review of the EU's first air quality daughter directive. Whilst authorities have no obligation to review and assess against them, they may find it helpful to do so, in order to assist with longer-term planning, and the assessment of development proposals in their local areas.

Proposed new particles objectives for England, Wales and Greater London (not included in Regulations)

Region	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
London	50 μg/m^3 not to be exceeded more than 10 times a year	24 hour mean	31.12.2010
London	23 μg/m^3	annual mean	31.12.2010
London	20 μg/m^3	annual mean	31.12.2015
Rest of England and Wales	50 μg/m^3 not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
Rest of England and Wales	20 μg/m^3	annual mean	31.12.2010

Efforts to achieve these objectives should be focussed on locations where members of the public are likely to be exposed over the averaging period of the objective. The table below summarises the locations where these objectives should and should not apply.

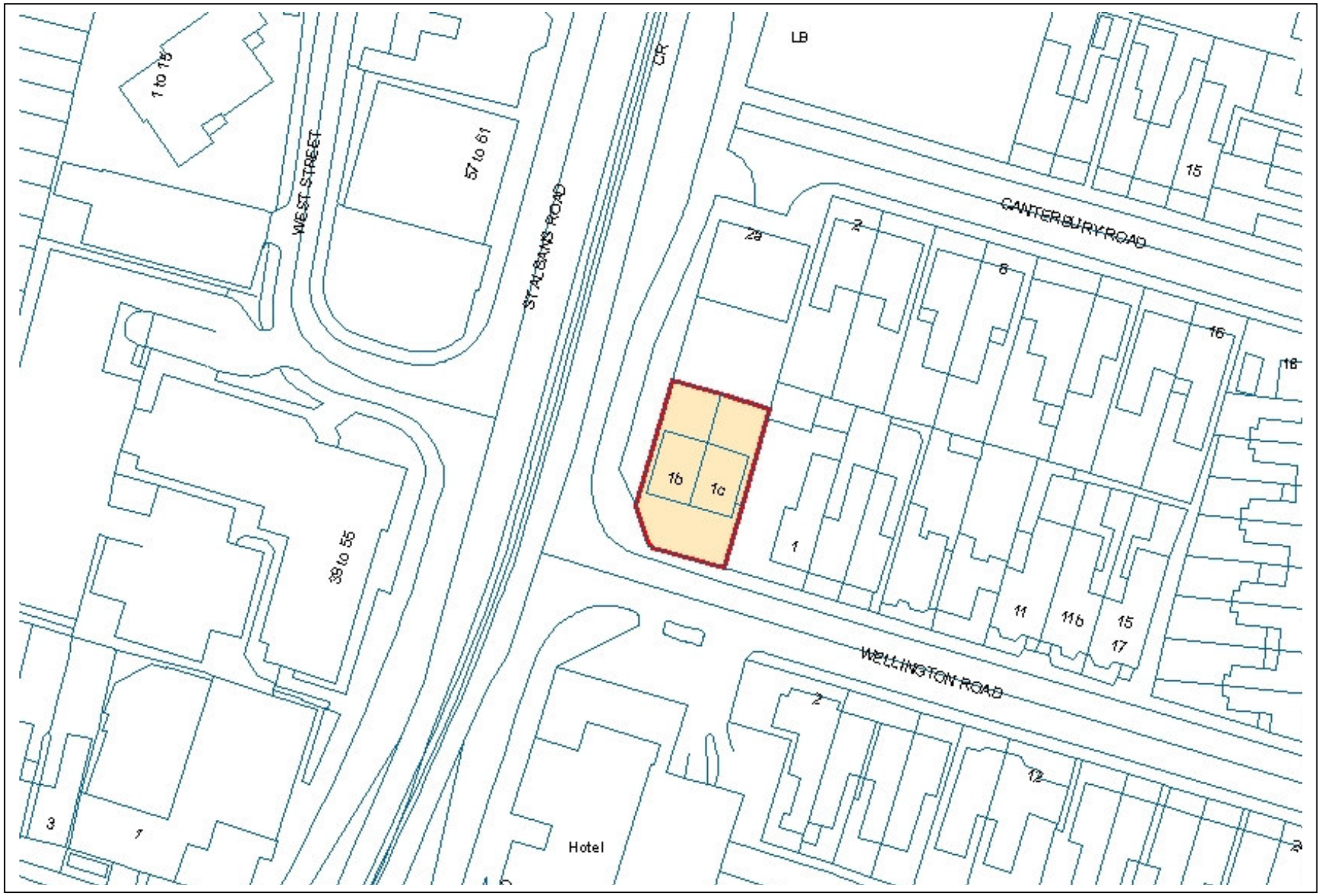
Typical locations where the objectives should and should not apply			
Averaging Period	**Pollutants**	**Objectives *should* apply at …**	**Objectives should *not* generally apply at …**
Annual mean	1,3 Butadiene Benzene Lead Nitrogen dioxide PM_{10}	All background locations where members of the public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

Appendix 2

Maps of declared AQMAs in Watford Borough Council

Reproduced from Watford Borough Council's Further Assessment report

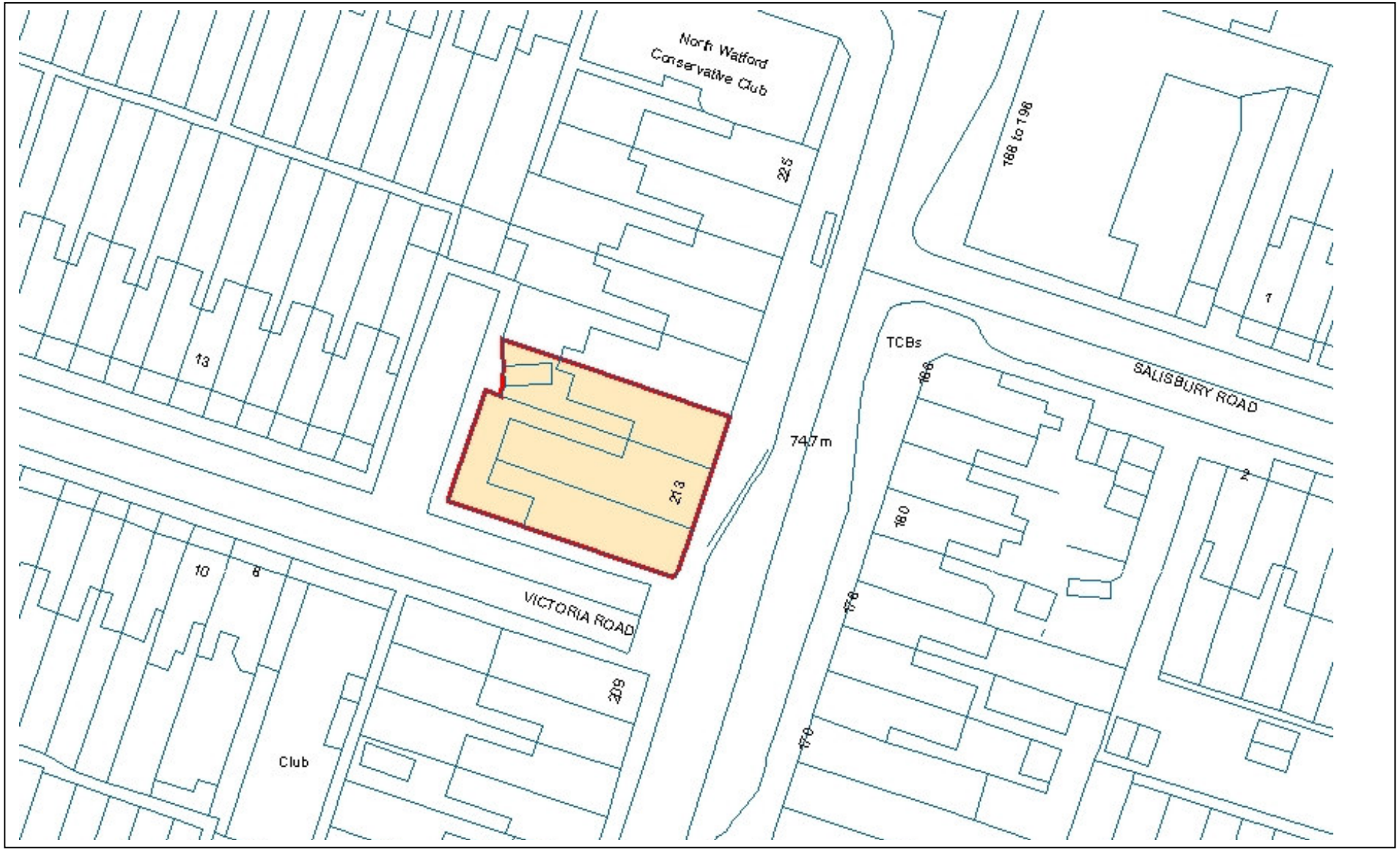
Air Quality Management Area – Watford No.1 (St.Albans Road) Map A



AEA

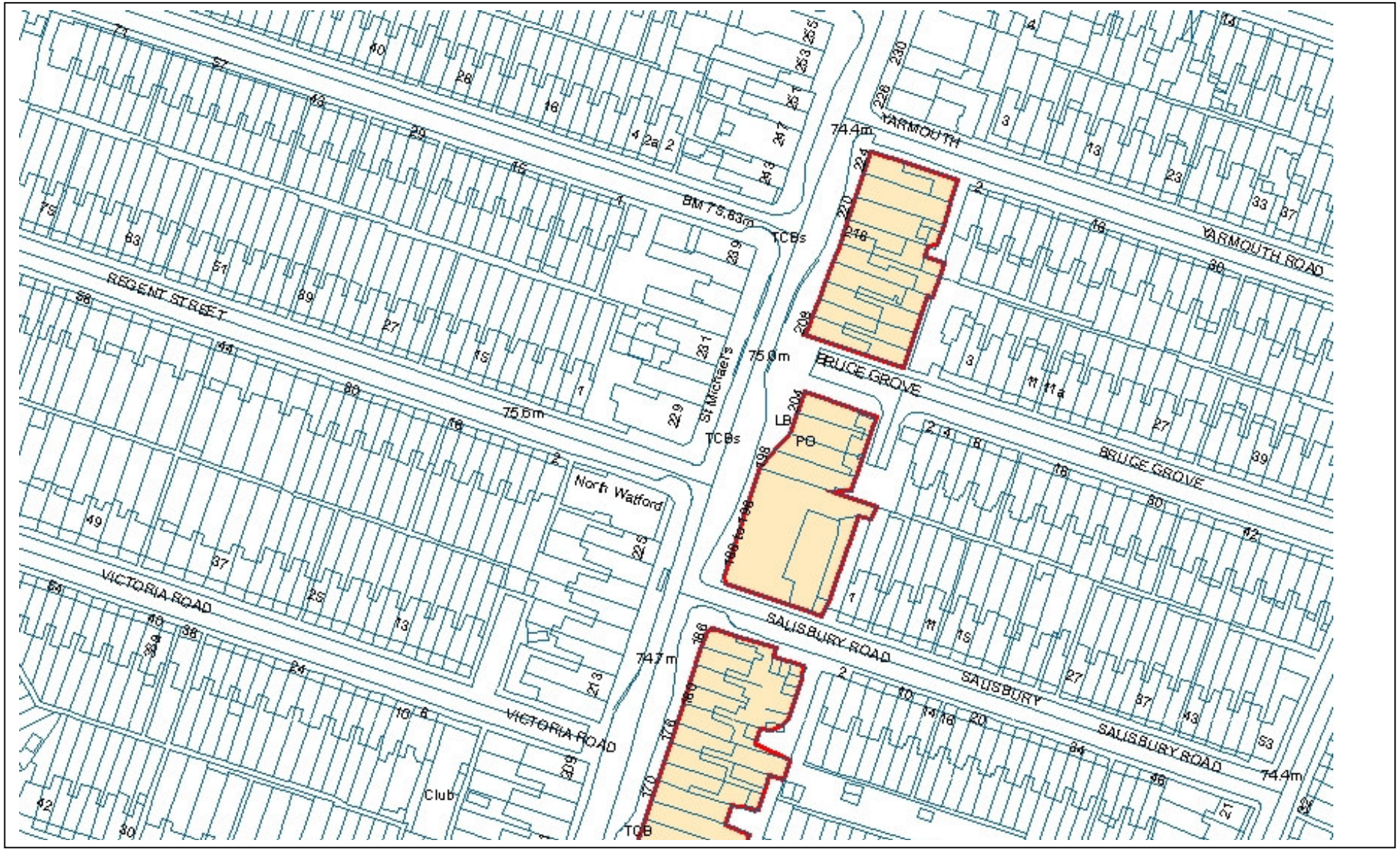
Air Quality Management Area – Watford No.1 (St.Albans Road) Map B

Air Quality Management Area – Watford No.1 (St.Albans Road) Map C



AEA

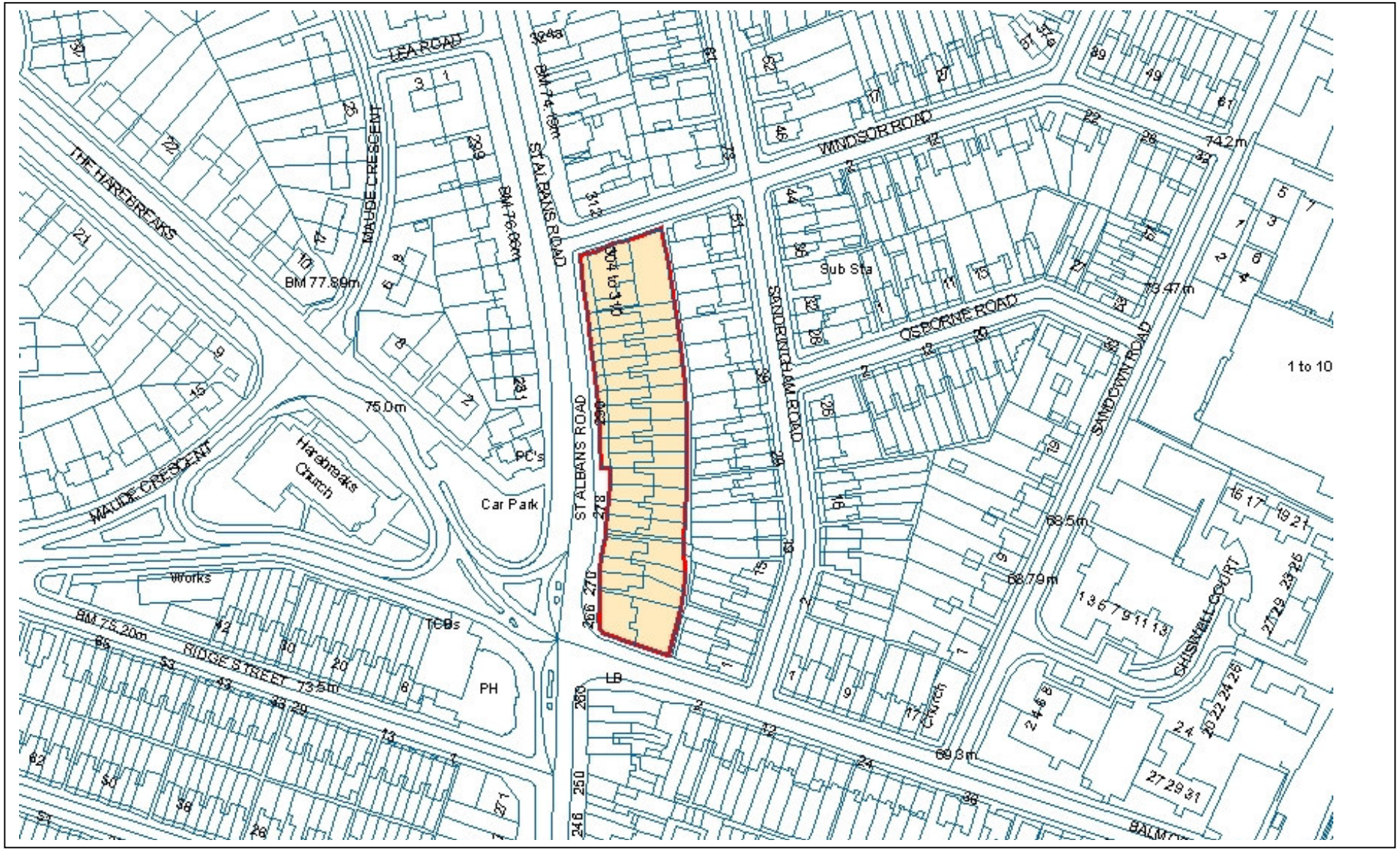
Air Quality Management Area – Watford No.1 (St.Albans Road) Map D



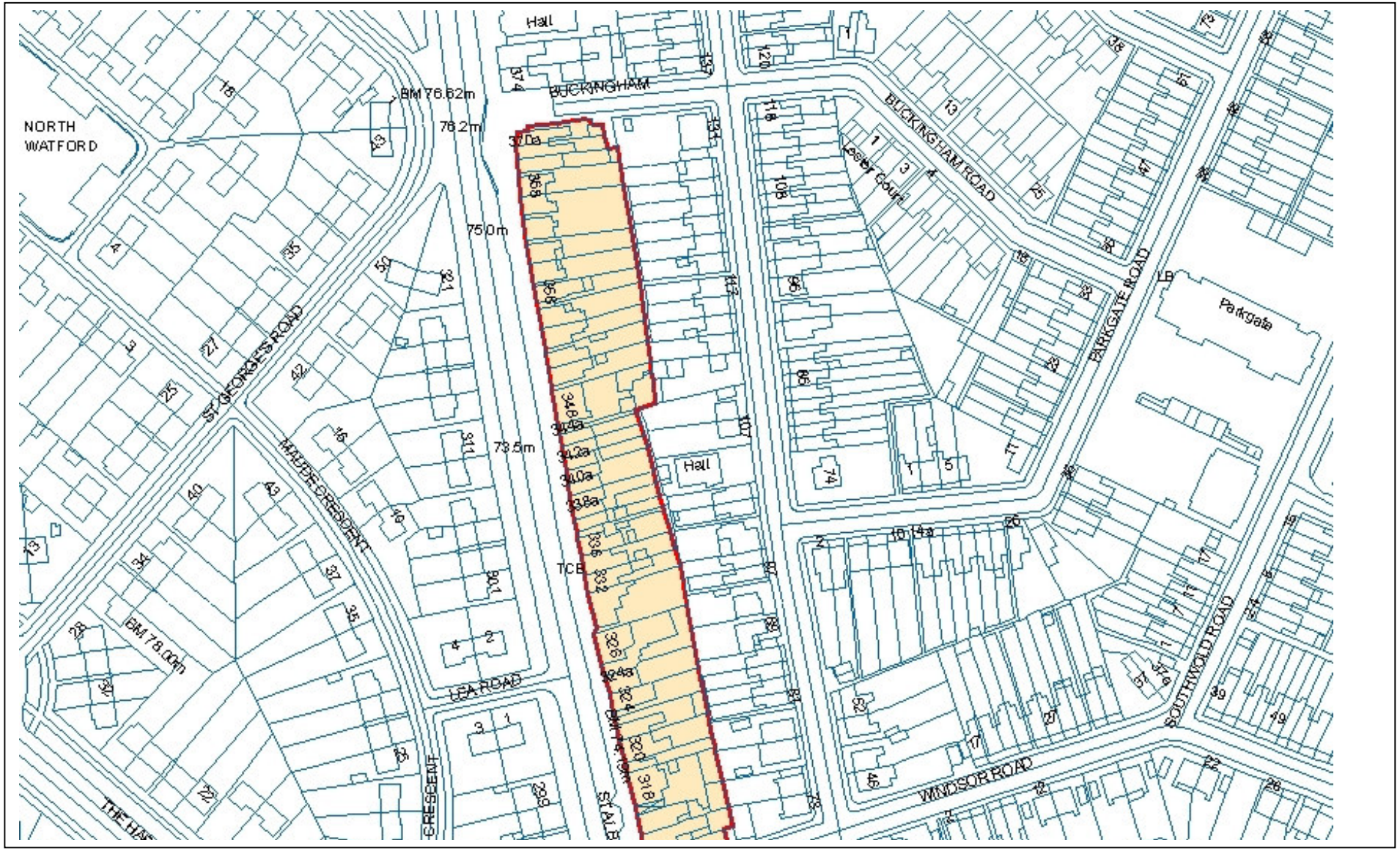
Air Quality Management Area – Watford No.1 (St.Albans Road) Map E

AEA

Air Quality Management Area – Watford No.1 (St.Albans Road) Map F



Air Quality Management Area – Watford No.1 (St.Albans Road) Map G



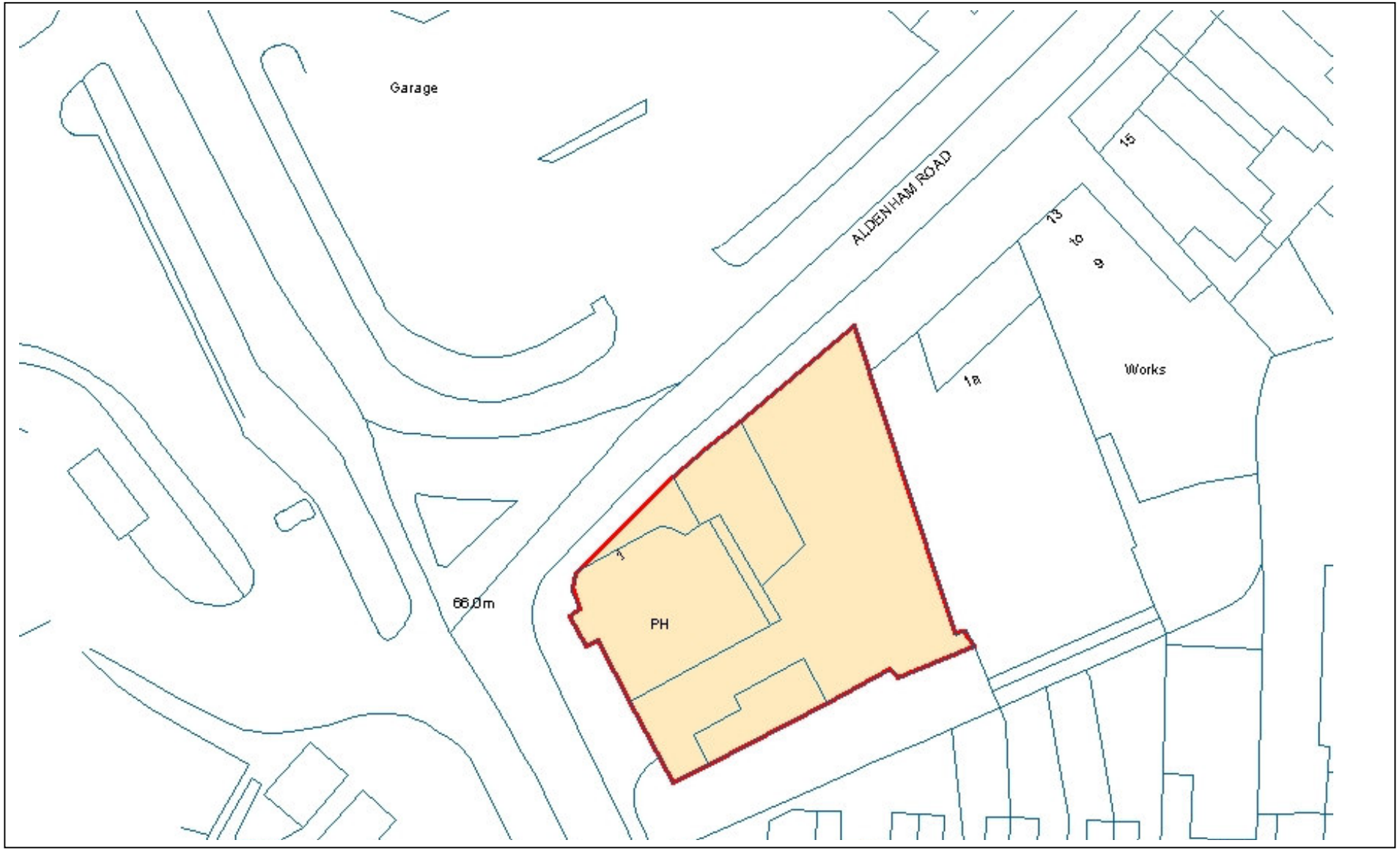
AEA

Air Quality Management Area – Watford No.1 (St.Albans Road) Map H

Air Quality Management Area – Watford No.2 (Vicarage Road) Map A

AEA

Air Quality Management Area – Watford No.3 (Pinner Road) Map A



Air Quality Management Area – Watford No.4 (Chalk Hill) Map A

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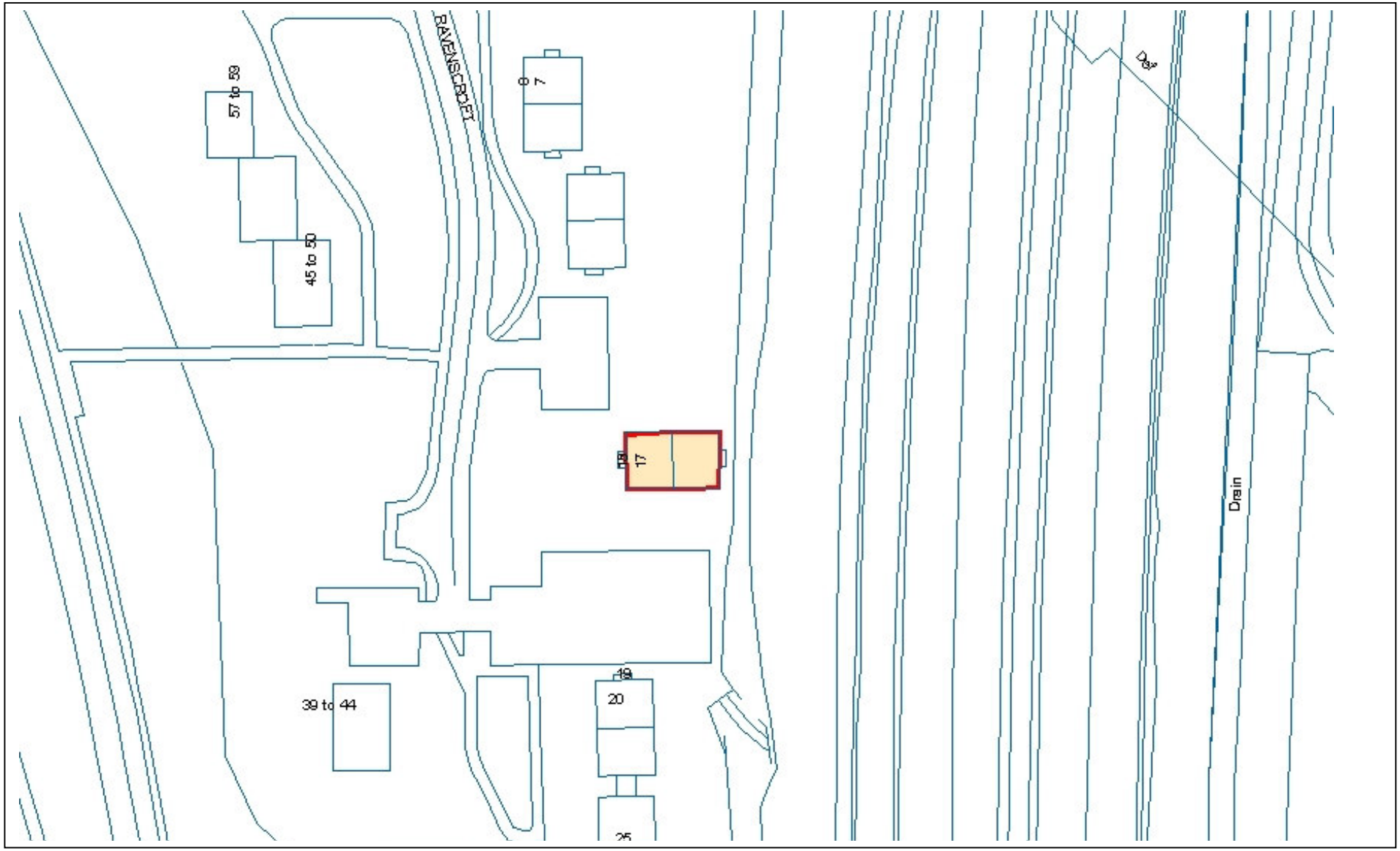
Air Quality Management Area – Watford No.5 (A405/Horseshoe Lane) Map A

Air Quality Management Area – Watford No.6 (M1/Meriden) Map A



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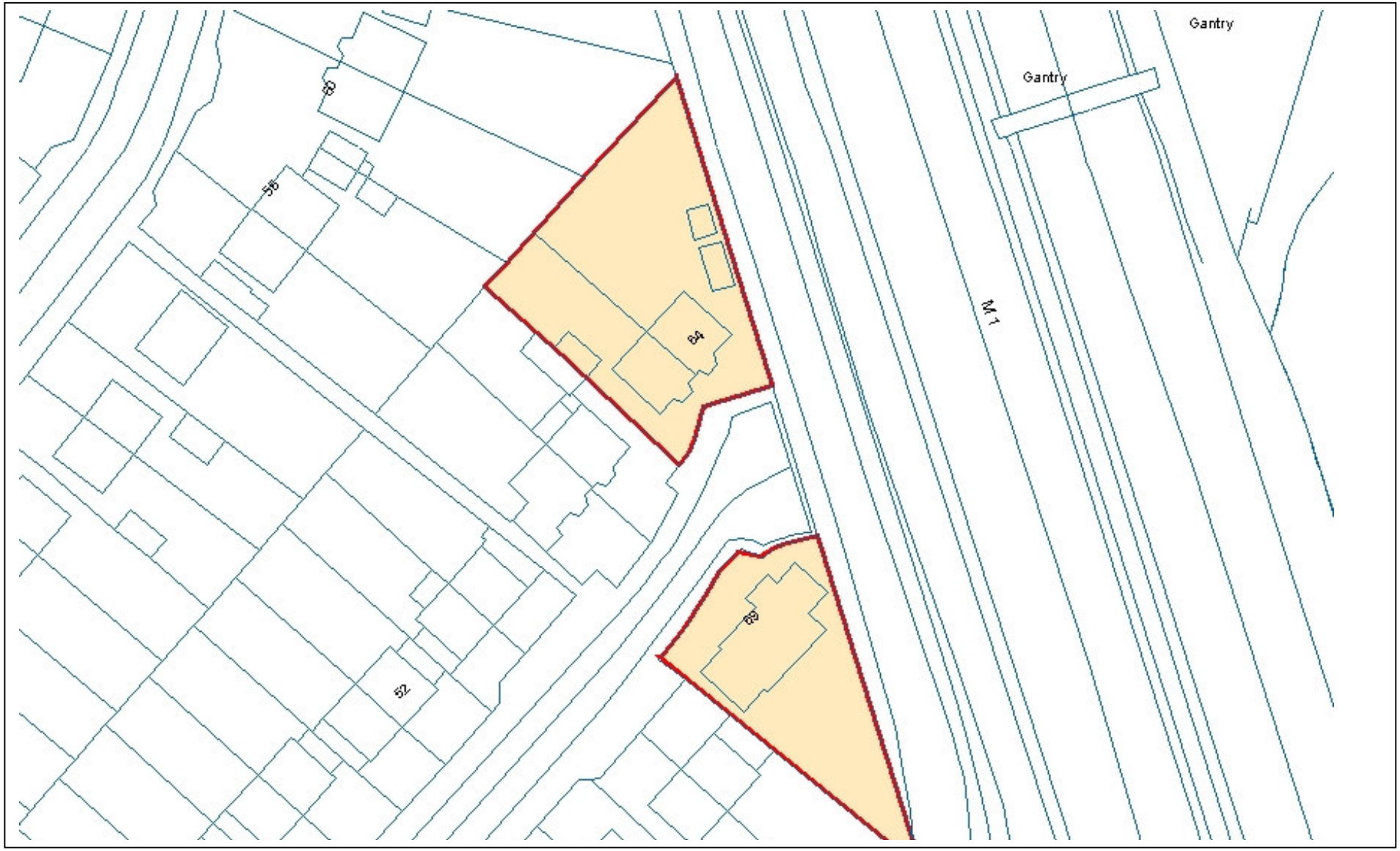
Air Quality Management Area – Watford No.6 (M1/Meriden) Map B

Air Quality Management Area – Watford No.6 (M1/Meriden) Map C



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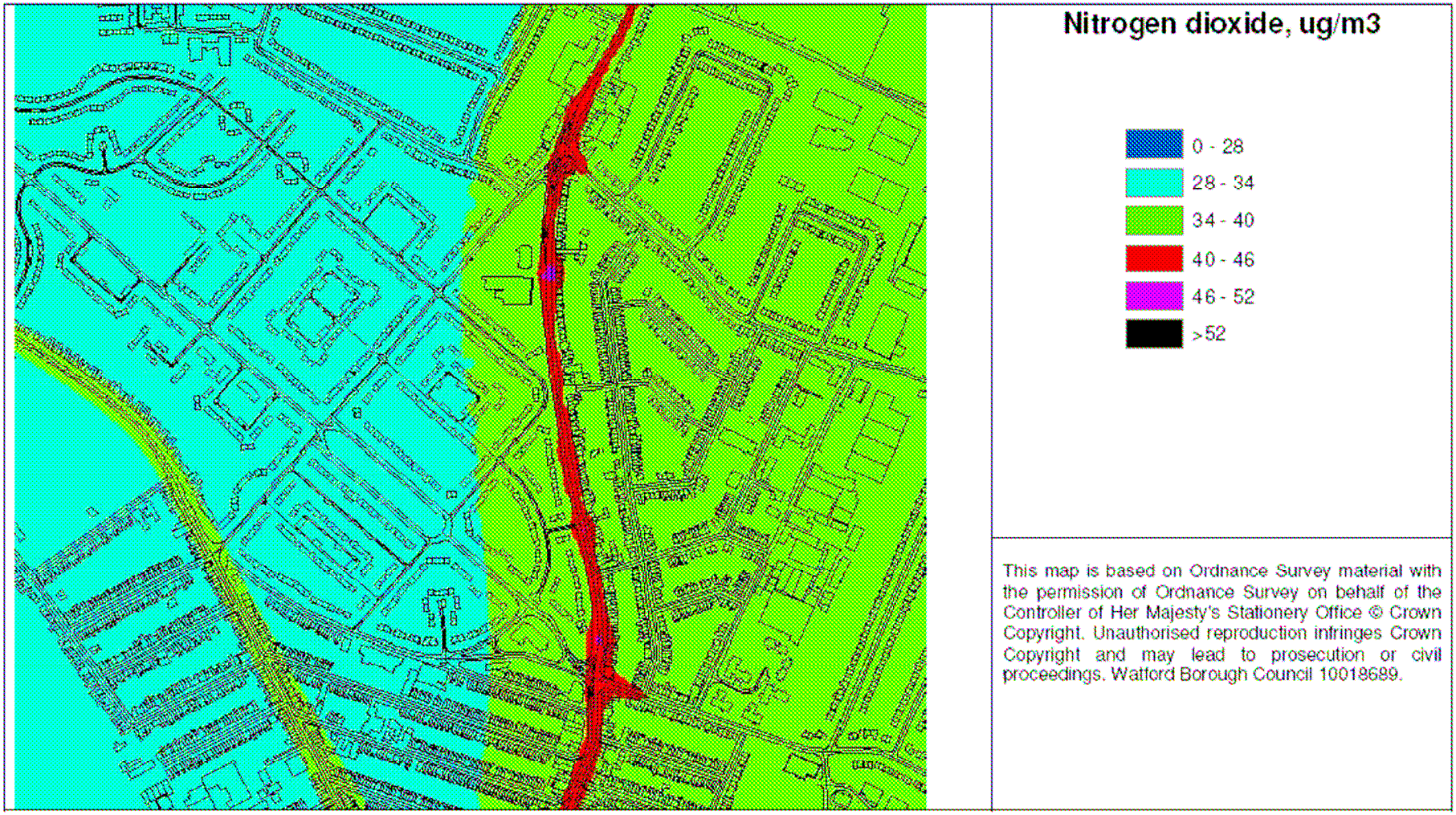
Appendix 3

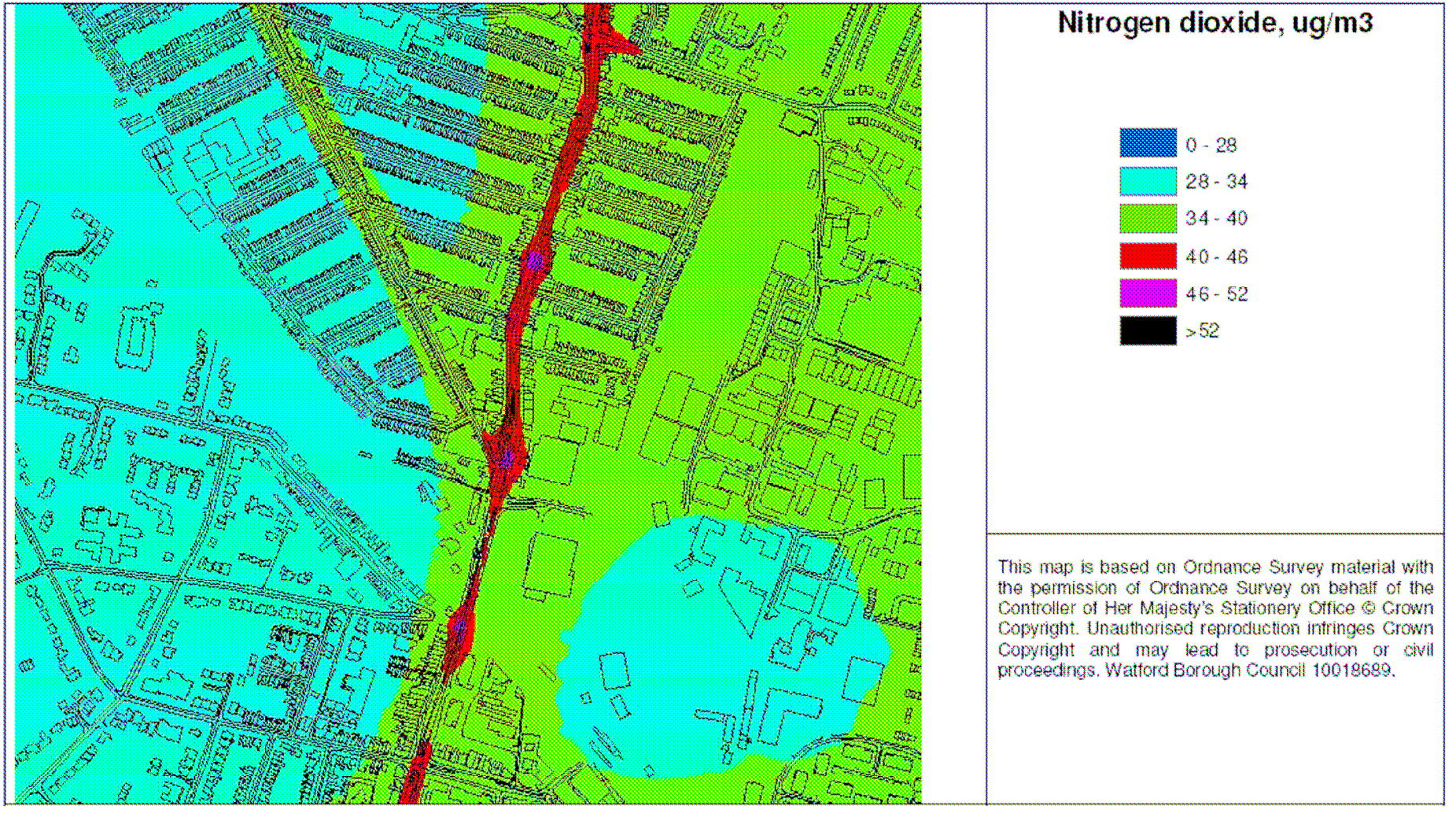
Maps of detailed assessment of air quality in the AQMAs

Reproduced from Watford Borough Councils Further Assessment report

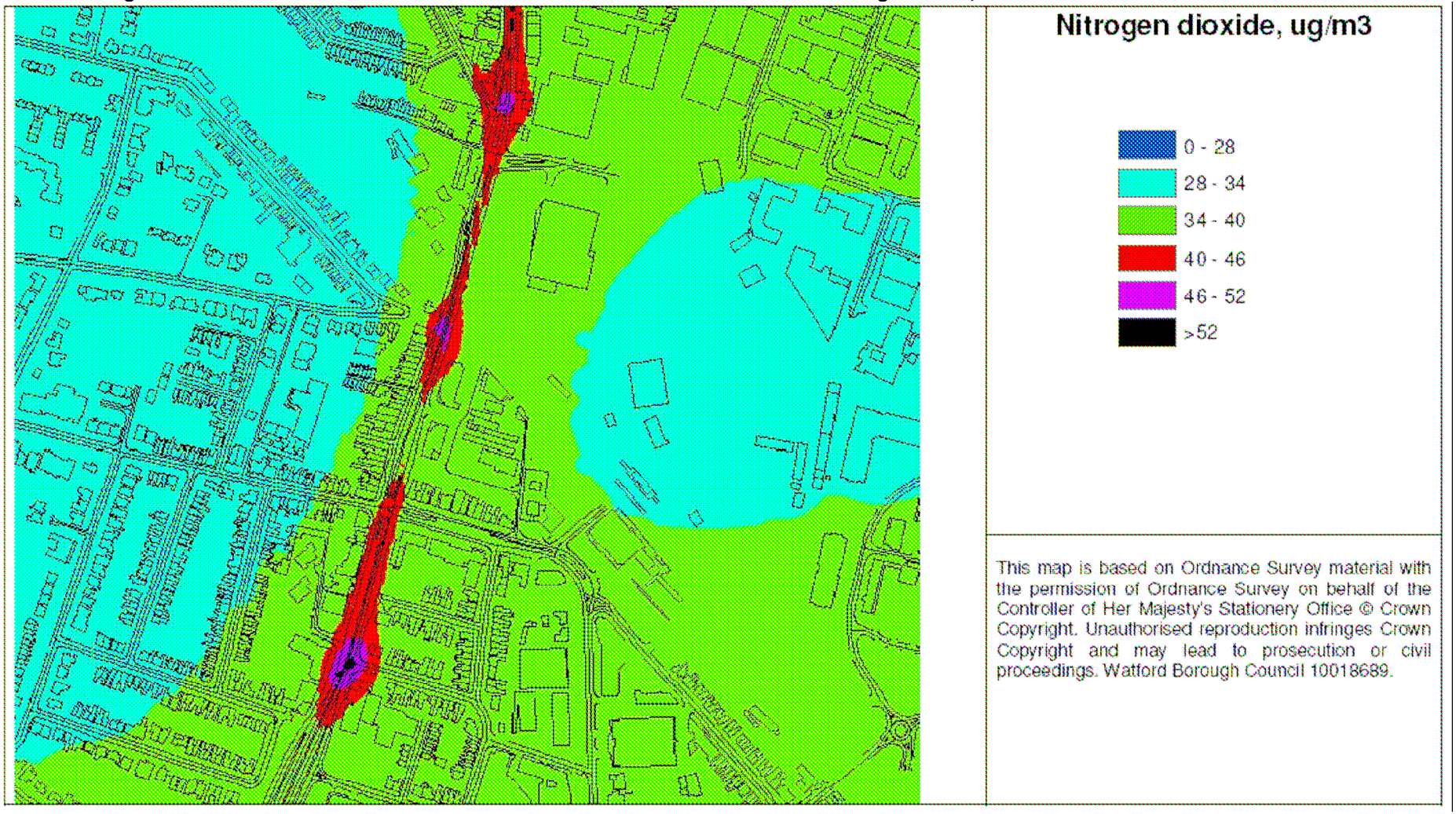
Predicted nitrogen dioxide concentrations on St Albans Road between Bushey Mill Lane and Balmoral Road, 2006



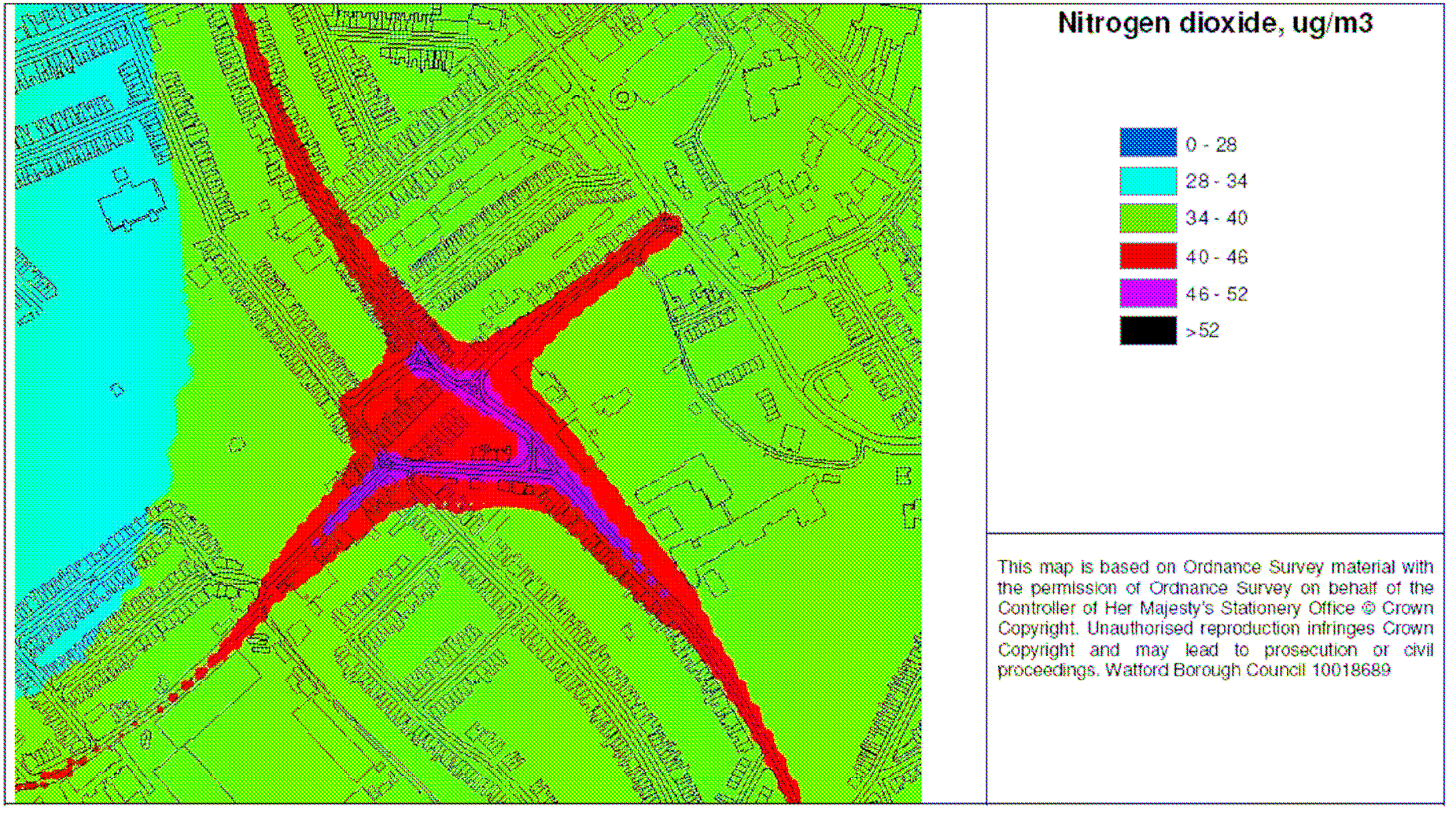
Predicted nitrogen dioxide concentrations on St Albans Road between Balmoral Road and Leavesden Road, 2006



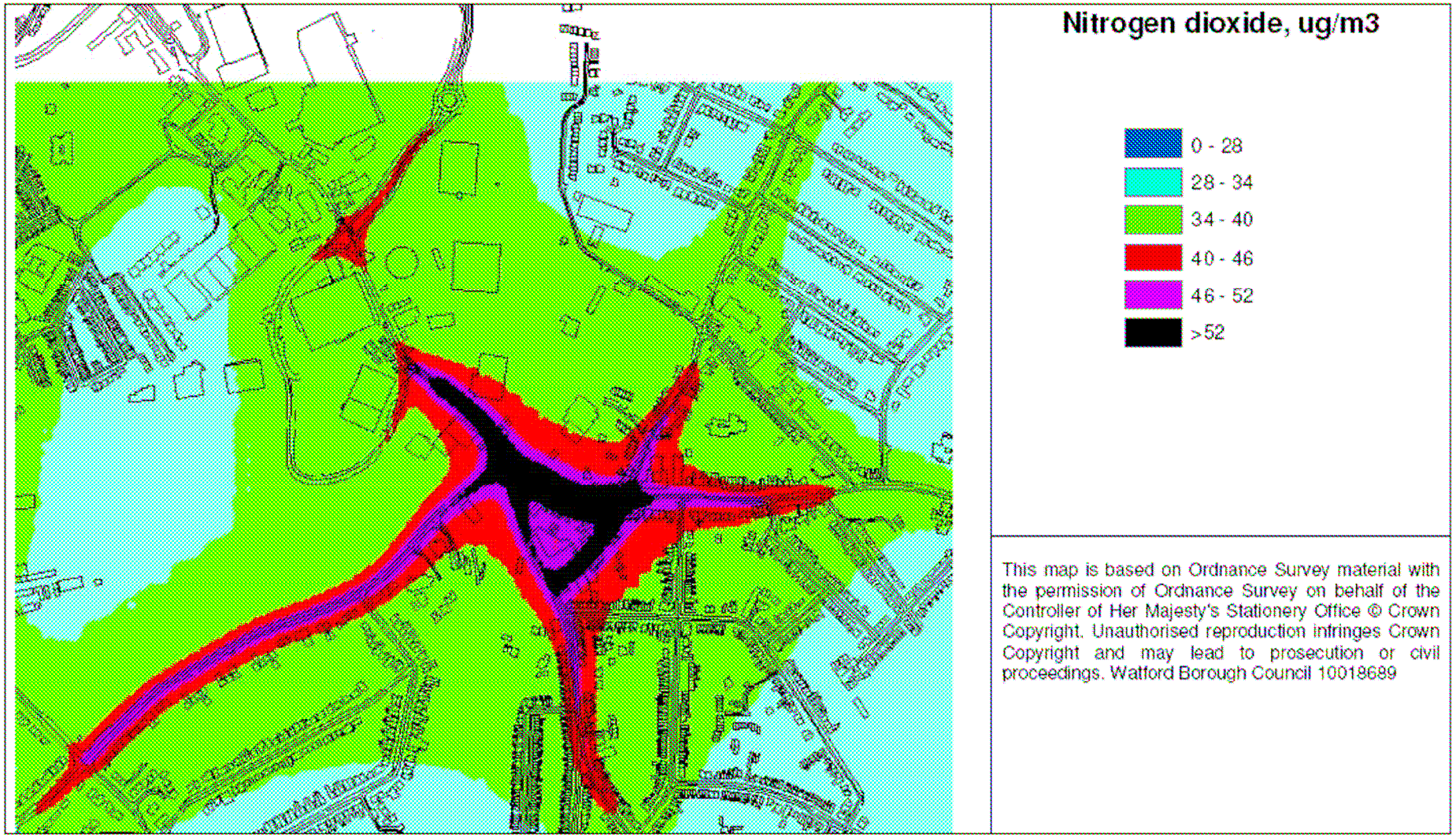
Predicted nitrogen dioxide concentrations on St Albans Road between Leavesden Road and Wellington Road, 2006



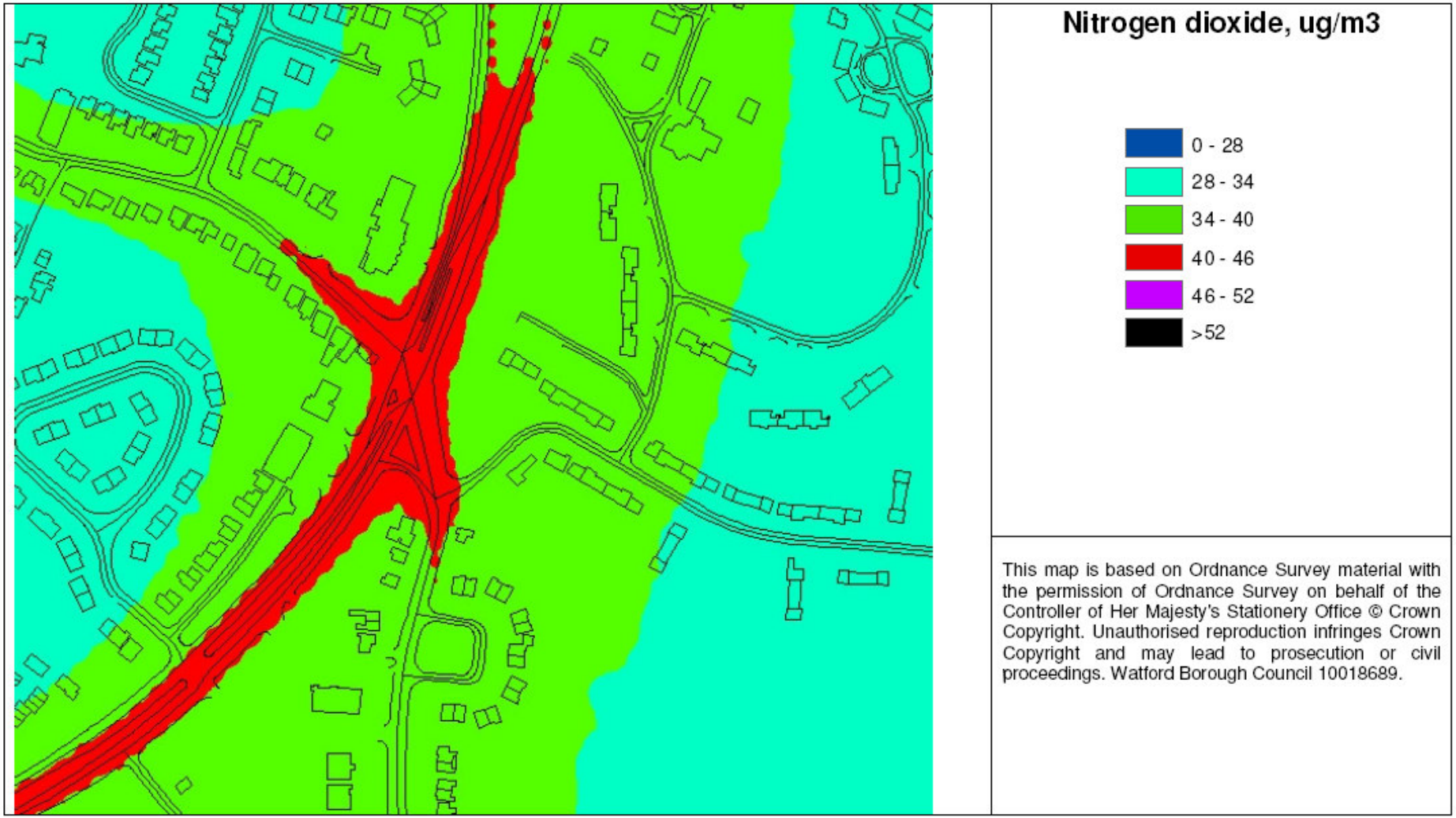
Predicted nitrogen dioxide concentrations on the Hornets gyratory, 2006



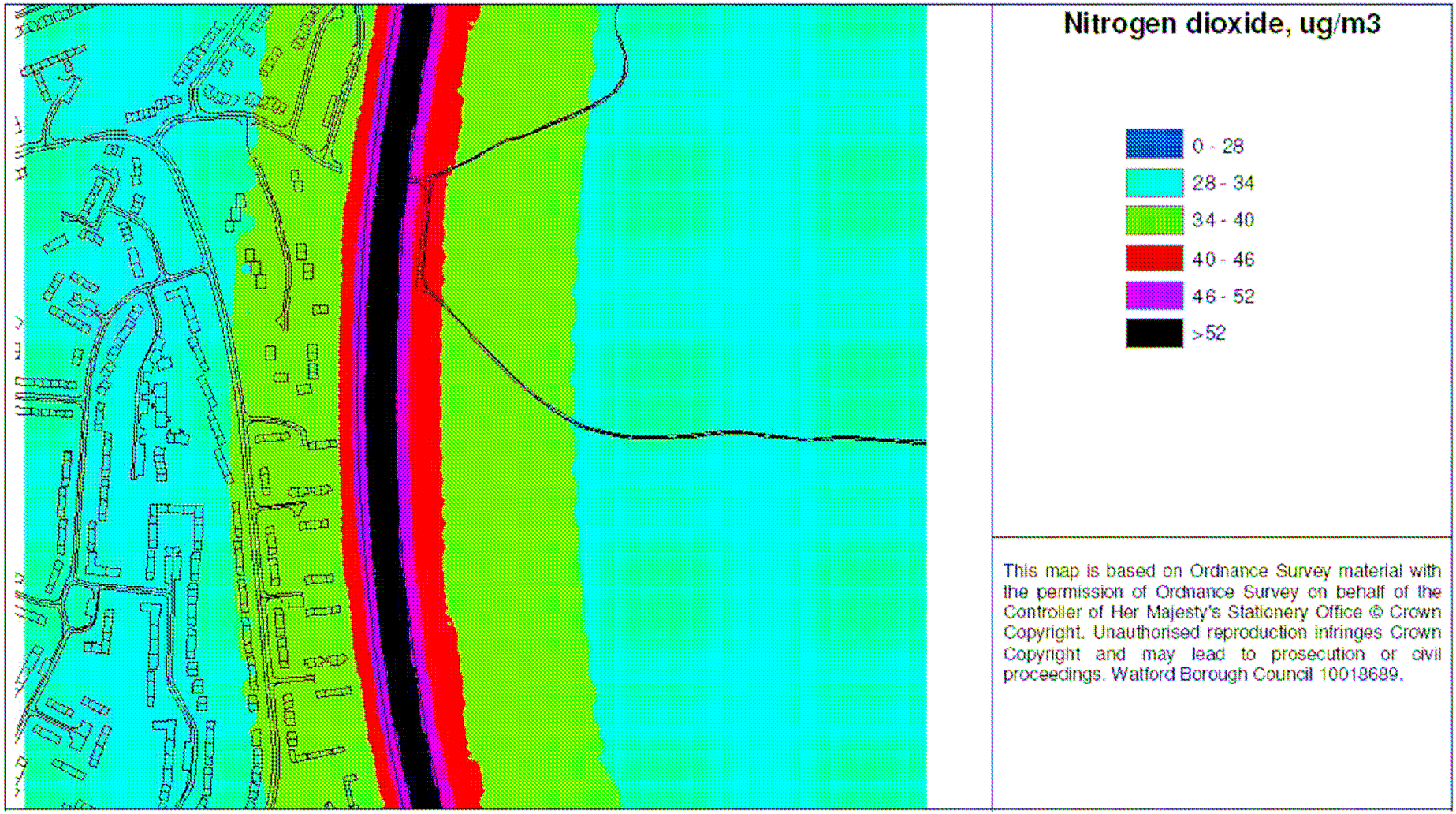
Predicted nitrogen dioxide concentrations on Chalk Hill and Pinner Road, 2006



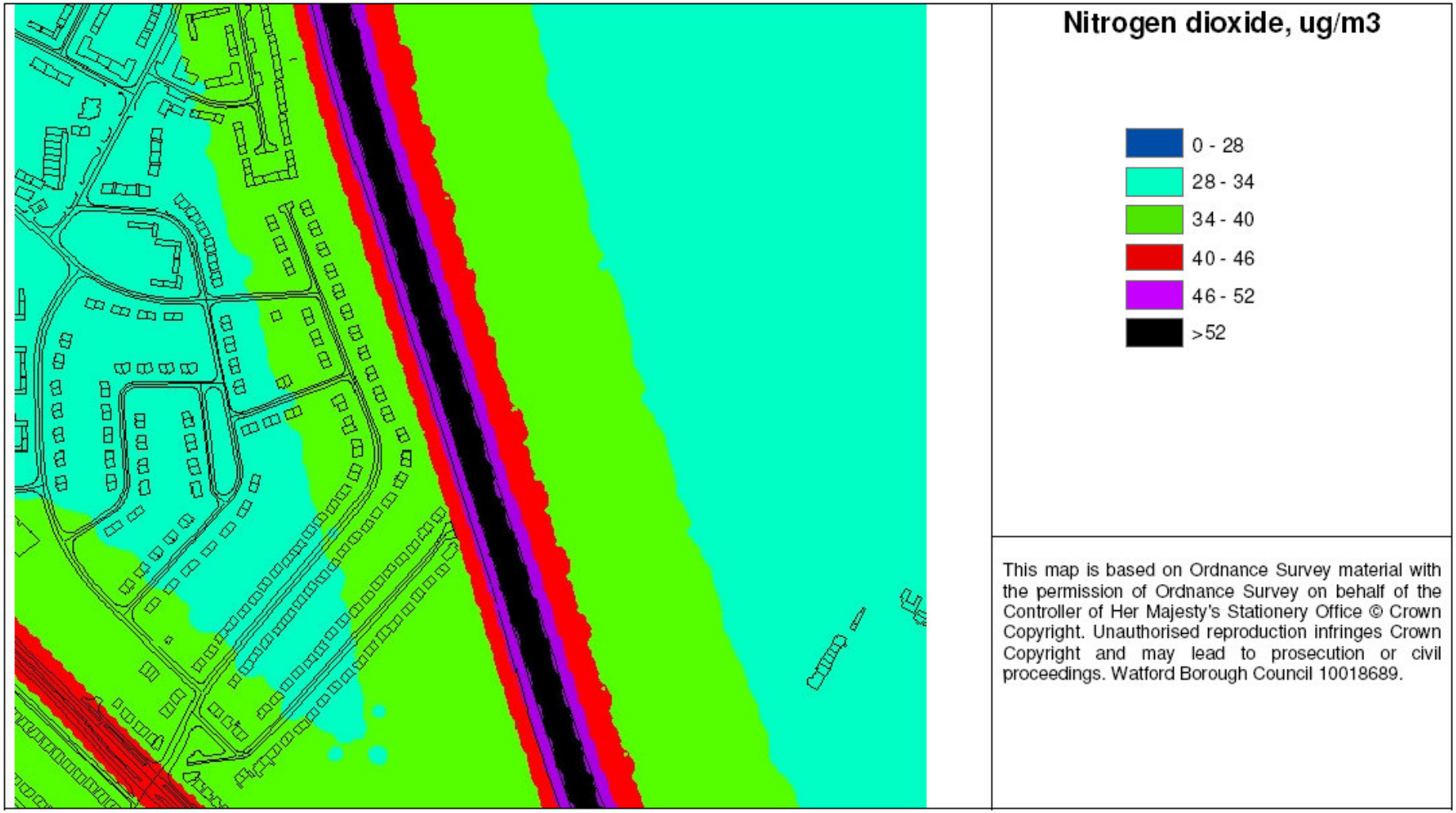
Predicted nitrogen dioxide concentrations at the junction of St Albans Road and Horseshoe Lane, 2006



Predicted nitrogen dioxide concentrations near the M1 past Ravenscroft and the Gossamers, 2006



Predicted nitrogen dioxide concentrations near the M1 past Eastfield Avenue, 2006



Appendix 4

Initial assessment of potential AP options

Initial assessment of AP options			
Options	Steering group's comments	Consultant's comments	Conclusion
1 Strategic Actions			
Improving links with Local Transport Plan			Include in WBC AQAP.
Improving links with Local Planning and Development framework			Include in WBC AQAP.
2.Move receptors away from AQMA			
Remove homes and businesses		Option is not sustainable in the long term anyway since does nothing to reduce emissions.	Removed from AQAP
3.Move sources away from AQMA			
Bypasses	– Bushey Arches = Health campus bypass. Transport plan for Oxhey/Bushey transport routes. Bushey Arches study plan to widen High Street is on hold. – Hornets Gyratory = Health campus bypass – St Albans Road = Colonial Way link. Review junction designs	Do I understand this means bypasses are planned that may significantly re-route traffic? It is hard to tell from the detail given here. Be careful that new and relieved roads always induce new traffic such that with no other measures to "lock-in" benefits then the situation will return in a few years. Also need to be confident that the location of the new bypass does not lead to new exposure there. Bypasses will not be built due to AQ considerations alone so I imagine there are other drivers for this potential policy.	Include in WBC & District AQAP.
Control access for freight	– Bushey Arches = Introduce low emission zone. Incorporate Link Road. LEZ, Freight quality partnerships, preferred routes. SW Herts transportation being reviewed – Hornets Gyratory = Introduce low emission zone. Incorporate Link Road. LEZ Freight quality partnerships, preferred routes.	– Freight and buses combined are apparently contributing 20-40% of total Nox concentration so these are potentially useful measures. The source apportionment results do not allow us to say whether buses or freight are dominant. – These measures have a role to play and you should liaise with the County and businesses to understand further what	Include in WBC & District AQAP..

Initial assessment of AP options			
Options	Steering group's comments	Consultant's comments	Conclusion
	SW Herts transportation being reviewed – StA = Improved signage for Industrial Estates near Balmoral Road is being considered	potential there is to implement these measures. Understanding the business practices is a first step to finding a solution.	
Control access for buses	– Bushey Arches = Not feasible. Introduction of LEZ in London will have an impact. Assess implications of bus service for Bushey train station. – Hornets Gyratory = Introduce more buses and bus stops. Proposed heath campus will have improved bus Links. Speak to Arriva. – St Albans Road = Bus lanes already in place	– Access to urban centres via buses is a usually a key council policy so restricting access is not logical. Bus priority could have a positive impact in making bus journeys more reliable and encourage increased patronage. – If more buses are envisaged then care should be taken to ensure that they are newer models to avoid increased emissions from diesel fuelled vehicles.	Include in WBC & District AQAP.
Lobby for regional policies	Not feasible		Remove from action Plan
4.Optimise how sources transit the AQMA			
Traffic light phasing	– Bushey Arches = Can be reviewed – Hornets Gyratory = Check phasing. Pedestrian crossing optimises pollution/ congestion/ safety – St Albans Road = 'Scoot' in place, check this	– Highly likely that changes to phasing is currently optimised. What chance is there of influencing phasing such that traffic queues outside of the AQMAs where no one is exposed?	Include in WBC & District AQAP.

Initial assessment of AP options			
Options	Steering group's comments	Consultant's comments	Conclusion
Improve signage	– Bushey Arches = Greener Herts/WBC/HCC. S106 for pedestrians. Show preferred routes for HGV – work with OS Improve signage for car park Provide 'car park full' indicator. – HG = Check sufficient signage for Hospital and football Ground	If it is felt that some traffic is re-circulating to find its destination then preferred routes and car parking signage may help.	Include in WBC & District AQAP.
Speed controls	are already low	No further comments	Include in WBC & District AQAP.
Other traffic management schemes.	Work with Ordinance Survey re satellite navigation	Any progress to report? Is this a significant issue?	Include in WBC & District AQAP.
5.Reduce the emissions from sources by technical means			
Low Emission Zone	Explore introduction of LEZ	Commercial bus and coach fleets, the public and business freight and other fleets need a LEZ-type approach. However, a London type scheme would be very expensive to Watford and potentially require a lot of analytical work. Other options exist for regulating bus emissions. If they are a significant contributor to NOx then it is worth thinking about this some more.	Include in WBC & District AQAP.
Bus quality partnerships	Passenger transport unit Liaise with Pauline Pownceby SW Herts Transportation Strategy	– This is linked to LEZ in that regulating bus emissions via BQP is to be preferred to expensive LEZ schemes.	Include in WBC & District AQAP.

Initial assessment of AP options			
Options	Steering group's comments	Consultant's comments	Conclusion
		– Is a minimum emissions standard part of BQP discussions? If not why not?	
Freight quality partnerships	– Bushey Arches & Hornets Gyratory = to consider with local businesses – StA = To consider for Balmoral Rd, Greycaine Rd, Car parking at Harebreaks to become pay and display	See previous discussion on freight. The basis of the partnership would be that in return for effort to improve reliability of freight routes, cleaner vehicles might be introduced.	Include in WBC & District AQAP.
Other	– Bushey Arches = Driver information sign – Gateway? Pollution concentrations Website, Leaflets, Area news Letters – St Albans Road = Right hand turn into Balmoral Road	– There are now several websites containing comprehensive information on how people can choose a lower emitting vehicle and drive in fuel efficient manner. The Watford website could provide links and publicity to these sites.	Include in WBC & District AQAP.
Green procurement	– Explore fleet management of buses and local Businesses	– What about the Watford Council fleet? Leadership could be shown. Minimum emission standards could be introduced for all contracted services. – Eco Driving – could be cost effective	Include in WBC Action Plan
Differentiate parking charges	Extend and more actively manage.	How much urban centre parking is controlled by Watford? If low then this approach is likely to have little impact.	WBC need to speak to Parking Shop when template completed
Planning conditions policy	Define current policy	Any progress to report? Are planners willing to consider planning conditions that force fleet renewal?	– need to speak to planning when template completed – Include in

Initial assessment of AP options			
Options	Steering group's comments	Consultant's comments	Conclusion
			WBC & District AQAP.
Lobby for additional national policy	Not feasible	Additional national policies highly unlikely to have an impact before 2010.	Removed from AQAP
Public Carriage Office policy	Taxis	Not relevant to AQMA therefore remove	Removed from AQAP
Infrastructure for cleaner fuels	Not feasible	No further comments	Removed from AQAP
Roadside emissions testing	Not feasible	No further comments	Removed from AQAP
Vehicle scrappage incentives	Not feasible	No further comments	Removed from AQAP
6.Reduce the emissions from sources by means of better travel choices			
Provide information	See above. Travel Smart . Customized journey planning Sustainable travel plan	– There are now several websites containing comprehensive information on other travel choices and public transport. The Watford website could provide links and publicity to these sites. – The authority could operate a service to help organisations develop travel plans. A key consideration should be setting targets for the impacts of such plans.	– Include in WBC & District AQAP.
Access to alternative modes (cycling + walking)	– Bushey Arches & Hornets Gyratory = cycling is not attractive – can it be made easier? Green enhanced Herts pedal environment – St Albans Road = put more emphasis on the bus, provide information for passengers	– A large percentage of car journeys are 5km or less so shift towards cycling and walking may have a large impact and could therefore be important to the Watford action plan. – Feeling safe is an important factor preventing people cycling and walking so that the provision of high quality routes will remove barriers to change.	Include in WBC & District AQAP.
Green Travel Plans for large businesses and	School travel plan	Setting targets and monitoring progress	Include in WBC &

Initial assessment of AP options			
Options	Steering group's comments	Consultant's comments	Conclusion
institutions		should be considered.	District AQAP.
Parking provision, Park and Ride	– Bushey Arches = in SW Herts Transportation strategy – Hornets Gyratory = Parking enforcement in rush hour. Prevent cars parking outside shops – higher curbs	– Any new park and ride should be attractive enough to reduce the number of daily commuters through the AQMAs. – The comments on parking are relevant to the freight quality partnership comments made previously.	Include in WBC & District AQAP.
Commercial delivery strategy	– Bushey Arches = FOP link to planning condition – St Albans Road = Loading bays Balmoral Rd – Leavesden Rd Already in place	Relevant to the freight quality partnership comments made previously	Include in WBC & District AQAP.
Road use charging and workplace parking levy	BA = leave in	What is the intent here?	Include in WBC & District AQAP.
Vehicle idling regulations	Bushey Arches & Hornets Gyratory = speak to Alan Gough re taxis HG = speak to Alan Gough re taxis StA = more of an issue here re buses and loading	Could be significant at those locations where buses, taxis, etc idle within the AQMAs. Do the bus operators already have a policy? How good is compliance?	Include in WBC action plan
7.Others			
Integrate AQAP into the LTP	Ongoing	What is happening? How closely will the county engage with the development of the action plan and are they willing to set targets and implement them?	Is happening
Supplementary planning guidance	Ongoing	What is happening? How closely are planners engaging with the development of the action plan and are they willing to set targets and implement them?	Is happening

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