

4 Action Plan Options

Appropriate actions have been considered to improve Air Quality for all AQMAs. These include generic Countywide or National initiatives as well as focused local actions in specific AQMAs. The types of actions considered are broad and have been determined following a review of available sources including:

- Example Best Practice AQAPs (available from Defra website) produced by other councils in UK; Fife Council, Dudley MBC, Belfast City Council, West Oxfordshire DC, West Sussex County Council.
- Defra guidance documents (see references)
- Existing Local Action Plans
- Local Transport Plan 3 and associated policy documents

Additionally some actions have been formulated from a requirement to mitigate a specific circumstance in an AQMA.

4.1.1 Type of Options

The Action Plan Options are in two sections relating to the effect the actions would have on air quality:

- **Generic Actions:** These are those Actions that are not AQMA specific and could be used in more than one scenario or could have a positive impact on more than one AQMA.
- **AQMA Specific Actions:** Where an action relates to a specific circumstance or characteristic that would be likely to only affect one AQMA.

For both types of action, the anticipated feasibility, impact on NO₂ levels, rationale and the AQMA issues (identified in Section 5) mitigated by each action are identified for each AQMA. A summary of actions against these specific AQMA issues is provided at the end of the section. The generic actions have been grouped into types under the following headings:

- Traffic Management
- Lowering Emissions
- Promotion of Alternatives
- Education & Information
- Planning Initiatives
- Policy & Guidance

Anticipated Costs, Timescale and air quality benefit i.e. pollution reduction details are referenced using the following category codes:

Cost of implementation

VH	= Very High	= greater than £100k
H	= High	= £25 to 100k
M	= Medium	= £5 to 25k
L	= Low	= up to £5k
NQ	= Not quantifiable	at this time

Timescale to implement

VL	= Very Long term	= greater than 10 years (after 2023)
L	= Long term	= 6 to 10 years (2019 to 2023)
M	= Medium term	= 3 to 5 years (2016 to 2018)
S	= Short term	= 1 to 2 years (2014 to 2015)
NQ	= Not quantifiable at this time	

Pollution Reduction Impact

5	=High
4	=Medium to High
3	=Medium
2	=Low to Medium
1	=Low
0	=Negligible impact
-1	=Detrimental Impact
NQ	=Not quantifiable at this time

It should be noted that costs, timescales and air quality benefit i.e. pollution reduction will be specific to the local circumstances and final scheme design to be implemented thus it is very difficult to accurately predict figures without specific detail. The anticipated values applied are estimates based on available information and experience.

4.1.2 Prioritisation of Options

To aid future prioritisation of actions, it is proposed that timescales are classified between short to very long term, costs could be scaled from 1 to 7, very high to very low, and impact classified as -1 to 5 where -1 indicates a potential detrimental impact on air quality to 5 a high reduction in existing pollutant levels. A simple cost-benefit analysis can then be implied by multiplying values applied to impact and cost. At the time of producing this AQAP we are awaiting details of indicative costs from partners to better quantify a range of potential actions. – not provided. Cost benefit analysis and prioritisation will be undertaken at a later stage.

It is unlikely that adopting a single particular action will result in desired reductions in pollution levels in any AQMA and a range of options will be required to effect measurable improvements

Actions identified as a priority for implementation by the AQAP Steering Group will be identified in a future version of this AQAP. An Implementation Plan will be included in future updates with details on progress, stakeholders involved and measurement tools.

Clearly some options will not be viable and this may be identified through consultation on the Action Plan, prioritisation of the options, the work of the Air Quality Action Plan Steering Group or previous work undertaken. When such a conclusion is reached it shall be documented within the final Action Plan with a summary of the details surrounding that action and when reconsideration of that Option may be appropriate.

Potentially many of the preferred actions may be grouped into a coordinated countywide, or a specified regional, Low Emissions Strategy (see 4.1.3) which will be included as an addendum to the AQAP.

4.1.3 Low Emissions Strategy (LES)

As defined by the Low Emissions Strategy Partnership (LESP), 'a planning-based Low Emission Strategy (LES) provides a package of measures to help mitigate the transport impacts of development. The primary aim is to reduce transport emissions by accelerating the uptake of low emission fuels and technologies in and around a development site.

Strategies may be secured through a combination of planning conditions and legal obligations (section 106 agreements), and potentially in future through the Community Infrastructure Levy. They may incorporate policy measures and/or require financial contributions to the delivery of low emission transport projects and plans, e.g. emission based parking policies, investment in low emission infrastructure, fleet emission improvement, low emission procurement and supply chain initiatives and contributions to local transport projects and strategic monitoring.

In reducing transport emissions, low emission strategies improve local air quality and reduce greenhouse gas emissions associated with climate change. They also contribute to local government performance targets, provide local economic benefits, help to streamline planning decisions and contribute to wider sustainable development goals.

Early LESP work focussed on establishing Low Emission Strategies adopted through the planning system. The partnership has developed a Procurement Guidance Document for Local Authorities. They are now working on a range of other applications, including incorporation of low emissions strategies into Local Transport Plans and Low Emission Air Quality Action Planning. (www.lowemissionstrategies.org/ accessed 26/07/2013)

Many local authorities in England have secured capital funding through Defra's Air Quality Grant programme to establish a LES in their area and many LA strategies are much broader in concept and objective than purely planning based LES. The process starts with a feasibility study to identify and assess options which will suit the local circumstances of the Local Authority. The range of measures identified for the LES are then put forward for consultation to be adopted by the Local Authority.

For example the neighbouring West Midlands Low Emission Towns & Cities Programme (LETCP) draft LES 2013 includes a Low Emission Zone feasibility study, best practice Procurement Guidance, best practice Planning Guidance, Low Emission Vehicle and Infrastructure plan and Health Awareness Campaign.

The stated aims of the draft LES are:

'The LETCP seeks to promote joint working to reduce regulated road transport emissions, primarily Oxides of Nitrogen (NOx) and particulates (as coarse, PM10 and fine, PM2.5, fractions), while simultaneously seeking reductions in greenhouse gases and noise emissions where practicable. Building on policies and measures to discourage vehicle use and encourage a shift to sustainable transport modes, the LETCP seeks to target emission improvements of the vehicle fleet through the accelerated take-up of cleaner fuels and technologies and by discouraging the use of high emission vehicles.

Walsall Metropolitan Borough Council is the lead authority for this aspect of the work stream, and the strategy is the first step towards the development of an overarching Low Emission Strategy for the West Midlands, aimed at helping regional authorities to achieve the UK Air Quality Objectives and EU Air Quality Limit Values. The development of the LES is an Implementation Plan requirement of the West Midlands 3rd Local Transport Plan.

The purpose of the LES is to outline policies and measures that can influence a reduction in road transport emissions, highlighting current good practice within the West Midlands.’ (LETCP, 2013)

Fundamentally, a LES for Worcestershire would incorporate many of the potential solutions identified within this AQAP that could have an impact on improving air quality throughout all areas of the county. Specifically, but not exclusively, these include most of the actions identified within the Lowering Emissions, Promotion of Alternatives, Education & Information and Planning Initiatives sections in the following chapter. However an LES could also include some specific actions from the other sections such as:

- Variable Messaging Signing (Traffic Management);
- Alterations to parking provision and pricing (Traffic Management);
- Influence Climate Change Strategy actions (Policy & Guidance);
- Forge closer links with local health agencies (Policy & Guidance).

Development of an overarching Low Emission Strategy for Worcestershire would be work undertaken by the Steering Group and any subsequent LES document would be included in this AQAP as an addendum.

5 Worcestershire Air Quality Action Plan – Generic Actions

5.1 Traffic Management Actions

These actions have a direct effect on traffic movements within AQMAs or surrounding areas. They are intended to reduce pollutant levels via changes in road infrastructure, restrictions on vehicle movements, reduction in traffic congestion and improving traffic flow.

Actions discussed in this section are as follows:

- Alteration to phasing of traffic light system (5.1.1)
- Change carriageway from two way to one way only (5.1.2)
- HGV or weight restriction on affected roads (5.1.3)
- Variable Messaging Signing (5.1.4)
- Loading and unloading restrictions during peak traffic periods (5.1.5)
- Priority bus and High Occupancy Vehicle (HOV) lanes (5.1.6)
- Improvement of signage for traffic to avoid AQMA (5.1.7)
- Introduction of traffic signals at roundabouts (5.1.8)
- Introduce or improve feeder/merger lanes to improve flow (5.1.9)
- Pedestrianisation of streets within area (5.1.10)
- Remove build out in streets to allow cars to pass simultaneously (5.1.11)
- Removal of parking bays in problem streets (5.1.12)
- Alterations to parking provision and pricing (5.1.13)
- Traffic calming measures (5.1.14)

5.1.1 Action: Alteration to phasing of traffic lights system – Intelligent Traffic Signals.

Altering the phasing of existing traffic light systems at key junctions could improve flow of traffic, reduce peak hour congestion and queuing. There are two types of intelligent traffic signal control systems used in Worcestershire; SCOOT and MOVA. Additionally there are a number of different pedestrian crossings such as Pelican and Puffin crossings.

LTP3: Intelligent Transport Systems Policy (WCC, 2011h) outlines the functions and benefits of the different systems as follows:

‘Junction Control - SCOOT

The SCOOT (Split Cycle Offset Optimisation Technique) Urban Traffic Signal Control System is designed for use in urban networks with large numbers of traffic signals (such as Town and City Centres). SCOOT is an adaptive system that responds automatically to fluctuations in traffic flow through the use of on-street detectors embedded in the road. A SCOOT system can deliver the following benefits:

- Reduced Delays and Congestion – SCOOT typically reduces traffic delay by an average of 20% in urban areas.
- Bus and Emergency Service Vehicle Priority
- Traffic Gating –Traffic flow can be limited to ensure that traffic flow is maintained through congested sections of the network.
- Incident Detection – Identification of the location of accidents. This information can be fed into the UTMC system to manage the flow of traffic.
- Vehicle Emissions Estimates (Local Air Quality) – This is particularly useful when traffic is flowing through known Air Quality Management Areas (AQMAs). The SCOOT system can feed information to the UTMC system to divert traffic away from

AQMAs when prevailing weather conditions will not enable dissipation of harmful emissions.

- On-line Saturation Occupancy Measurement – This can identify to the UTMC system when the network is reaching saturation point (full capacity), enabling investment focus and developing additional capacity

There is currently only one SCOOT Urban Traffic Control System in the County covering the city centre of Worcester.

Junction Control – MOVA

The MOVA (Microprocessor Optimised Vehicle Actuation) Traffic Signal Control System is suited to situations where junctions are some distance (greater than 1 kilometre) apart. Like SCOOT, MOVA is an adaptive system that responds automatically to fluctuations in traffic flow through the use of on-street detectors embedded in the road. A MOVA system can deliver... Reduced Delays and Congestion – MOVA significantly reduces vehicle delays when compared with vehicle activated control. MOVA is suited to the following location types:

- Sites with high traffic flow, particularly where these are seasonal or intermittent (for instance, motorway diversion routes and holiday routes).
- Sites experiencing capacity difficulties under vehicle activated control, with congestion on one or more of the approaches.
- Sites with high speed approaches and/or red light compliance problems.
- Where additional capacity is required to allow pedestrian facilities or a safety enhancements to be introduced.
- Where more than one junction is situated too close to be considered as an isolated junction, there are ways in which two or more junctions can be linked by the use of MOVA control. Partially or even fully signalised roundabouts are a good example of a MOVA linking opportunity.
- Puffin crossings where the call-cancel demands from kerbside detectors can be dealt with correctly and the identification of gaps in traffic can be considerably more effective than vehicle activated systems.
- Traffic Gating
- Incident Detection'

This action will require some feasibility study to determine most appropriate signalling system for any particular junction, likely costs and timelines have not been identified at this stage. Some actions are already identified within LTP3 for implementation such as installation of MOVA signals at Port Street/Waterside junction due to be implemented as part of Abbey Bridge development in 2013 (LTP3 reference SW6).

Pros	Cons	Key Stakeholders	Cost	Time
Reduce congestion and queuing	Requires feasibility studies initially	WCC	NQ	NQ
	Costs and timelines unknown	Linked Policy		
	Disruption during works could cause temporary congestion and rising emissions	LTP3: AQ1-3, AQ5, AQ7, ITS3,ITS5		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR5	Required	NQ	Improvements to A491 Stourbridge Rd/A456 Kidderminster Rd/Hagley Hill junction essential to reducing pollutant levels in AQMA. Traffic light phasing should be considered as part of wider study. Impact depends on final junction solution
Lickey End	None	No	0	No problem junctions with traffic signals identified. Traffic signals on gyratory only improved in 2000s
Redditch Road	None	Limited	NQ	Improvements to Hagley Turn junction could be explored
Worcester Road	None	No	0	No problem junctions with traffic signals identified
Dolday	DD3	Required	NQ	Unknown if any improvements can be made to current phasing. Update from WCC required to assess if any benefit can be obtained from undertaking a review
Lowesmoor	LRH7	Yes	2 - 3	Improvements to lights exiting Lowesmoor onto Lowesmoor Terrace could benefit congestion within AQMA – this is currently being delivered as part of a major renovation scheme in Lowesmoor and will be completed by Autumn 2013
Port Street	PS4, PS5	Yes	2 - 3	Already planned works as part of LTP3
Horsefair	None	Yes	0 - 1	Unlikely to have a significant effect on existing system
Welch Gate	WG6	Yes	3	Improvement to pedestrian lights at crossings at the Horn & Trumpet PH in Dog Lane and in Load Street would reduce hinder to flow of traffic at the junction of Welch Gate in conjunction with improvement to road markings

5.1.2 Action: Change carriageway from two way to one way only

This action would only apply to AQMAs consisting of narrow single carriageways which potentially could benefit from this action rather than areas of key connecting routes. It will limit traffic using a route and subsequently emissions. A number of options are possible;

- Two one way lanes
- One lane dedicated for public transport or HOV (see below)
- One lane dedicated for parking
- Part pedestrianisation of one lane to improve pedestrian safety and ambience of street area, and encourage shopping
- Introduction of cycle lane
- A combination of the above

Pros	Cons	Key Stakeholders	Cost	Time
Limits traffic using route and reduces emissions	Displaces traffic onto adjoining roads	WCC, LA	NQ	NQ

Allows for greater use of carriageway – dedicated bus lanes or stops, part pedestrianisation, cycle lanes, create additional parking. Improvements in ambience of street area could benefit local trade	Could shift pollution issues onto other routes			
	Impact on local residences	Linked Policy		
		LTP3: AQ1-3, AQ5, AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	N/A	N/A	Not applicable on this route
Lickey End	None	N/A	N/A	Not applicable on this route
Redditch Road	None	N/A	N/A	Not applicable on this route
Worcester Road	None	Required	1	May not be possible due to lack of alternative routes or have limited impact due to destinations within or through AQMA
Dolday	None	N/A	N/A	Already one way
Lowesmoor	LRH5, LRH6, LRH7	Further study required for Rainbow Hill. Yes for Lowesmoor	RH 1-2 Lwm 5	May have limited impact due to destinations or routes accessible via AQMA and effect of displacing traffic onto other routes at Astwood Road/Rainbow Hill end of AQMA. However far more merit in applying this action to Lowesmoor area. Changing to a single lane in the direction of City Walls Road would eliminate congestion due parked vehicles/delivery vans blocking two way movement, traffic light congestion and allows for part pedestrianisation, bus and delivery pull ins, additional parking facilities and improve general ambience of retail area for shoppers. However, WCC advise (June 2013) 'this option not applicable as Lowesmoor is an essential bus route and two way traffic flow must be maintained for buses due to a lack of suitable alternative routes. There is potential to reduce general traffic flows by making this an access-only route, however a one way route would increase traffic speeds, making the street less attractive for pedestrians and cyclists and causing deterioration in the public realm.'
Port Street	PS6, PS7, PS8	Yes	3 - 5	Tackles several identified issues. Changing to single direction towards river/town would eliminate emissions from traffic travelling up gradient and congestion due to bus stops at Shor St. Reducing to single lane allows for part pedestrianisation, bus and delivery pull ins, additional parking facilities serving

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
				commercial and residential properties. More effective combined with other actions such as restrictions on HGV and improvement to bus emissions.
Horsefair	HR5	Yes	3 - 5	One way directional traffic flows are included in the Churchfields Masterplan and Rewyre prospectus for part of the area and are high in planning consideration. Impact will depend on final scheme.
Welch Gate	WG8	Yes	NQ	One way directional traffic flows have recently been trialled in one location of Welch Gate with traffic light controlled queues lengths and signage at the bypass. The results of this trial form part of the wider Wyre Forest Transport Package. WCC advise June 2013 These trials had no positive effects.

5.1.3 Action: HGV or weight restriction on affected roads.

Reviews of the AQMAs determined that HGVs are a disproportionately significant source of pollutant levels within most of them. Absolute restrictions to any such vehicles traversing AQMA could be achieved through conventional signage or VMS (see below) with agreement of LA and WCC. Signage may have to be quite extensive on some routes to ensure vehicles have enough spatial warning and do not cause road obstructions attempting U-turns at AQMA boundaries.

However an absolute ban will not be a viable option for AQMAs on major road arteries and will be difficult even on local roads, particularly where deliveries are made to commercial properties, unless alternative routes are available.

Similar results may be more achievable through Freight Quality Partnerships and updates to WCC Lorry Road Map.

Pros	Cons	Key Stakeholders	Cost	Time
Removes highest polluting vehicles from AQMA	Requires alternative routes for HGVs Potential displacement of vehicles shifts pollutant issues onto alternative route Access still required for deliveries within AQMA	WCC, LA	L - M	S - M
		Linked Policy		
		LTP3: AQ1-3, AQ5, AQ7, F7, TMP2		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR7	No	1 - 2	Restrictions possible on vehicles heading to Kidderminster or M5 but unlikely an absolute restriction is achievable because of accessibility required to A491

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
				Stourbridge Road from several directions.
Lickey End	None	Limited	NQ	Unlikely achievable without adding pressure onto the other AQMAs in Bromsgrove. Possible via J2 and A448 Redditch to Sideslow gyratory. Probably have adverse effect on Redditch Rd AQMA and other local roads. Detailed dispersion modelling required to ascertain up to date source apportionment data to determine impact
Redditch Road	RR11	Limited	1	Unlikely achievable without adding pressure onto the other AQMAs in Bromsgrove. Possibly redirect some traffic from Hanbury Industrial Areas to exit onto M5 via Stoke Prior and could shift pollutant to another local area.
Worcester Road	None	Limited	1	Unlikely achievable without adding pressure onto the other AQMAs in Bromsgrove. Could redirect traffic going through Worcs Rd to town centre from south onto bypass but may have adverse effect on levels in Charford Rd. HGVs not identified as dominant source of pollutants.
Dolday	DD11	No	0 - 1	Unavoidable major route through city for traffic crossing bridge. Source apportionment indicates HDVs issue in Dolday but individually action unlikely to have significant effect. BQP and FQP likely more effective.
Lowesmoor	LRH8	Yes	RH 0-1 Lwm 1-2	Low proportion of HGV vehicles traverse Astwood Road route currently. Source apportionment indicates HDVs issue in Lowesmoor. Not many HGVs observed in Lowesmoor except for local deliveries.
Port Street	None	Yes – in future	NQ	No source apportionment data to ascertain effect. Currently restriction on >7.5 tonne vehicles traversing Abbey Bridge will be lifted when works complete. A Vale of Evesham HGV Control Zone restricting and managing HGVs in sensitive areas is part of SWDP. Nor clear if the area includes Port St.
Horsefair	None	Yes	0 - 1	Low proportion of HGV vehicles traverse this route currently
Welch Gate	WG7	Yes	1	An extension of weight limit on bridge to the AQMA may be appropriate in conjunction with improvement of signage for alternative routes

5.1.4 Action: Variable Message Signing (VMS)

These are electronic messaging systems that disseminate Real Time Information (RTI) to the general public. VMS provide real time traffic conditions and travel information to enable users to make informed travel and route decisions and reduce the impact of events/incidents

on the network (WCC, 2011h). Examples include matrix signs on motorways, train arrival and departure boards at stations, car park availability signage and bus information at stops.

VMS can be used to 'Enhance Network Efficiency' (WCC, 2011h) with warnings to road users of network congestion, traffic incidents, bus and rail connection information, presence of AQMA and potentially real time air pollution updates encouraging use of alternative transport methods (such as Park and Ride, Passenger Transport, Walking and Cycling).

VMS could be implemented as part of other initiatives such as Park & Ride schemes, priority bus corridors, train station enhancements or improve signage for car parking. A potential solution, which requires further research and potential development, is to link car park ticket machines to real time air quality information and VMS placed outside of the city which could direct traffic to park and ride alternatives during poor air quality events – see Introducing Differential Parking Rates 5.2.9.

'Real Time Passenger Information (RTPI) refers to the application of RTI for passenger transport. RTPI can be installed at key bus stops, interchanges and rail stations, and has the potential to deliver significant benefits' such as 'Modal Shift' and 'Enhanced Attractiveness of the Passenger Transport'. (WCC,2011h)

'The City of Worcester has six strategic VMS; five of which are located on radial routes into the city and the other is located on approach to the Perdiswell Park and Ride site. To complete the ring of VMS for the City of Worcester, three further signs are required on radial routes coming into Worcester from the north. There is significant scope to increase the provision of VMS across the county to enhance the capability of the Worcestershire UTMC to influence travel behaviour.' (WCC,2011h)

As part of the Worcester Transport Strategy, WCC have installed VMS at the entrances and exits of the main 6 car parks in the city centre in 2013. This will enable visitors and locals to know which car park has spaces available and will prevent recirculation of traffic around the city attempting to find a space thereby reducing emissions.

VMS offers many applications and opportunities for better traffic management, improvements to public transport and traveller information which could ease congestion in town centres and subsequently reduce pollution, however the costs of even a simple system could be very expensive. This solution is most effective for town centres with a number of AQMAs where economies of scale can be made.

Pros	Cons	Key Stakeholders	Cost	Time
Real time public transport information improvements encourages greater uptake	Integrated system likely prohibitively expensive.	WCC, LAs, HA	H - VH	S - VL
Real time car park availability, traffic incidents, diversions from AQMA reduces congestion and emissions.	Availability of appropriate real time AQ monitoring network to link to	Linked Policy		
Real time multi-located roadside air quality information in public view		LTP3: AQ1-3, AQ5, AQ7, ITP8, ITS3-4, ITS7-8		

AQMA	Specific Issues	Feasibility Check	Impact Score	Rationale
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	Addressed			
Hagley	KR7	More research required	3 - 4	Explore possibility of utilising existing matrix signs on M5 to divert all traffic around AQMA during high pollution episodes. Explore possibility of directing HGVs around to J4 of M5 instead of J3 Matrix signs at all times.
Lickey End	LE2	Yes	3 - 4	Additional matrix signs on M42 to provide relevant traffic info on M5 and A38. Divert via Redditch and other areas if possible during incidents or high pollution episodes
Redditch Road	RR2	Yes	1 - 2	Few public transport hubs in Redditch Rd and no public car parks as on outskirts of town, although erected signage could provide information on issues elsewhere. Congestion relief during incidents on motorways relies on diversion of traffic from A38 at much earlier intervention e.g. prior to vehicles exiting M42/M5, influencing level of impact.
Worcester Road	None	Yes	1 - 3	Signage in town centre at bus station in connection with new train station development could increase public transport take up, and provide info to public on air quality issues. Car park at top of Hanover Street. Divert via other routes during incidents of high pollution. Impact depends on how wide and integrated a scheme is emplaced.
Dolday	DD4, DD8	Yes	2 - 3	WCC to emplace car park availability VMS. Bus station adjacent to AQMA provides possibility of signs and warnings on air quality but only viewed by existing public transport users. Signage would be more effective in approaches to city along A38 both sides of river for example.
Lowesmoor	LRH8	Limited	1 - 3	Limited car parking or public transport hubs for signage in actual AQMA. WCC advise June 2013 'Significant parking availability immediately adjacent to AQMA. There is potential to reduce or remove on-street parking in this area and make better use of VMS and RTIS (Real Time Information System) to encourage increased bus use and more efficient use of local car parking infrastructure as part of a city-wide approach. VMS have now been installed on a number of major approaches into the city as part of the Worcester transport Strategy (Phase 1).'
Port Street	PS9	Limited	1	Most car parks and transport hubs other side of river. More conventional signage could be used to divert traffic on bypass. Could be used to display congestion and air quality info.
Horsefair	None	Limited	0 - 2	Limited opportunity to move traffic to alternative routes without impacting
Welch Gate	WG7	No	0	This has been trialed but was unsuccessful

5.1.5 Action: Loading and unloading restrictions during peak traffic periods.

This action requires enforcement of restrictions within AQMA and working with local businesses to ensure better timing of town centre deliveries. Restrictions can be displayed with conventional signage at relatively low cost. Will specifically apply to AQMAs with a high proportion of commercial activities.

Pros	Cons	Key Stakeholders	Cost	Time
Reduces congestion caused by blockages from delivery vehicles Reduction in LGVs and HGVs during congestion time	Potential effect on local businesses Extra traffic enforcement required	WCC, LA, Traffic Enforcers Linked Policy LTP3: AQ1-3, AQ5, AQ7, ITS6	L	S - M

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	Yes	0	Few commercial properties not observed to be a particular issue. Subject could be discussed with those business directly to avoid any such issues
Lickey End	None	Yes	0	Few commercial properties not observed to be a particular issue. Subject could be discussed with those business directly to avoid any such issues
Redditch Road	None	Yes	0	Few commercial properties not observed to be a particular issue. Subject could be discussed with those business directly to avoid any such issues
Worcester Road	WR6, WR8	Yes	1	Yes a few instances of deliveries to residential properties in street canyon area were observed during peak traffic times.
Dolday	None	N/A	0	No waiting at any time on this busy one way system
Lowesmoor	LRH5	Limited	0 - 1	Loading and unloading vehicles is a significant issue within the Lowesmoor area where there are already restrictions in place. Due to the number of commercial outlets these are already failing to have the desired effect. WCC June 2013 advise 'The maintenance and enhancement scheme will significantly improve traffic regulation in Lowesmoor.'
Port Street	PS7	Yes	1	A few instances of deliveries to residential properties in street canyon area were observed during peak traffic times.
Horsefair	None	Limited	0	Already in place but could have additional impact if in conjunction with other actions
Welch Gate	None	Limited	0	Already in place but could have additional impact if in conjunction with other actions

5.1.6 Action: Priority Bus and High Occupancy Vehicle (HOV) lanes and corridors.

Priority bus lanes have been successfully implemented in parts of Worcester City in association with introduction of Park and Ride scheme. They involve restricting parts of existing carriageway to Public Service Vehicles (PSVs) only (and potentially cyclists and goods vehicles making deliveries depending on local circumstance) and/or introducing PSV priority at traffic lights.

A bus priority measure improves speed and reliability of public service but require bus lane enforcement cameras. They reduce the amount of carriageway for other road users and encouraging uptake of sustainable transport. Other improvements possible with addition of real time passenger information (VMS – see below). Could be used in conjunction with other actions such as BQPs (see Lowering Emissions below) and Park and Ride schemes.

WCC, 2011g states: ‘There is a range of potential measures that can be employed to deliver enhanced reliability and operating speeds on the bus network. These vary according to their cost and effectiveness, and thus their appropriateness. For example, a segregated busway (which is the highest form of bus priority, and more expensive to deliver) can usually only be justified where the levels of demand and/or the scale of the benefits to users, operators and the wider economy and environment, result in a strong business case. This is only likely to be the case in congested urban areas and along key inter-urban corridors.

In terms of existing bus priority measures, there is a major busway in Redditch which was incorporated into the design of the new town and enables the operation of the most efficient, heavily used and commercially viable part of Worcestershire's bus network. Elsewhere in the county there are a very limited amount of bus priority measures, including bus gates and bus lanes. These are principally in Worcester City.

Additional priority measures have been developed and are being installed during the LTP2 period:

- Newtown Road Corridor – linking Warndon Villages and Worcestershire Royal Hospital with Worcester City Centre via Worcester Shrub Hill station and Lowesmoor.
- Bromyard Road Corridor – linking Dines Green with Worcester City Centre via St John's’

High Occupancy Vehicle lanes are specially designated lanes on major routes that can only be used by vehicles carrying two or more people. They give priority to those travelling together; those who would normally travel alone can take advantage of them by sharing their journey with one or more others, reducing the number of cars on the road and so reducing congestion and harmful emissions. HOV lanes may use spare capacity in existing bus lanes, or may be introduced as part of a policy to encourage car sharing. It allows cost of journeys to be shared by both drivers and passengers which is desirable for many employees at a time when fuel costs continue to rise. Travelling with others can reduce transport costs by up to £1000 a year (LACORS)

However, in June 2013 WCC advised WRS as part of the consultation of this AQAP: ‘Worcestershire County Council does not support HOV or Bus lanes. Bus priority in Worcestershire is now provided using intelligent traffic signals instead.’

Pros	Cons	Key Stakeholders	Cost	Time
Encourage uptake of public transport Reduction in number of	Reduces carriageway for other users including cyclists and pedestrians	WCC, LA	NQ	NQ

cars and emissions Lower travel costs for drivers and passengers Reduces need for private car ownership Can be effective tool in Businesses Travel Plans	Reducing carriageway could create congestion if switch to buses is not high enough Potentially displaces traffic onto other routes Potentially shifts pollution issues onto other routes			
		Linked Policy		
		LTP3: AQ1-3, AQ5, AQ7, ITP1, ITP5-7, ITS6, SMT5, TMP2		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR3	Yes	-1 to 3	Being dual carriageway there is possibly enough space to amend lanes. However not many buses have been observed in within AQMA so introducing a bus only lane could have detrimental effect. However a lot of vehicles with a single occupant were observed so a HOV only lane at peak times may have significant impact.
Lickey End	None	No	-1	Carriageway not wide enough
Redditch Road	None	No	-1	Carriageway not wide enough
Worcester Road	None	No	-1	Carriageway not wide enough
Dolday	None	No	-1	Carriageway not wide enough
Lowesmoor	None	No	-1	Carriageway not wide enough (without other changes such as one way system). Not supported, although there is potential to remodel Lowesmoor as a bus-only street given the availability of alternative routes for general traffic (WCC, 2013)
Port Street	None	No	-1	Carriageway not wide enough (without other changes such as one way system)
Horsefair	None	No	-1	Carriageway not wide enough (without other changes such as one way system)
Welch Gate	None	No	-1	Carriageway not wide enough

5.1.7 Action: Improvement of signage for traffic to avoid AQMA

Improving signage on approaches to AQMA or bypasses and ring roads can be a relatively low cost and effective way of encouraging vehicles to avoid AQMA and use alternative routes if available. They could be aimed at a specific group i.e. HGVs in conjunction with FQP action (see Lowering Emissions) or HGV restrictions, or a broader message such as 'Please continue on bypass to avoid AQMA'.

More advanced electronic signage can go further in giving real time information to travellers on potential traffic congestion and air quality problems. This is explored further below in Variable Messaging Signage (VMS).

It should be noted this action is not the same as identifying an AQMA in order to effect behavioural change amongst drivers within the AQMA – this is discussed below under Lowering Emission actions.

Pros	Cons	Key Stakeholders	Cost	Time
Diverts traffic from using AQMA route Reduces congestion Low cost and short timescale possible	Displaces traffic onto other routes May shift pollution problem onto other routes Relies on voluntary behaviour of drivers Loss of trade to local businesses	WCC, LA	L	S - M
		Linked Policy		
		LTP3: AQ1-3, AQ5, AQ7, F7, ITS3,ITS4		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR7	Yes	0 - 1	Unlikely to alter behaviour significantly due to lack of obvious alternatives close to AQMA. Diverting HGVs could be achieved more effectively from further afield via other methods e.g. VMS and Freight Quality Partnership
Lickey End	None	Limited	0 - 1	Few routes into or out of Bromsgrove without affecting an AQMA. Not appropriate to emplace on M42 approaching AQMA. Unlikely to alter behaviour significantly for traffic exiting Bromsgrove as most direct exit to northerly destinations.
Redditch Road	RR6, RR11	Limited	0 - 1	Few routes into or out of Bromsgrove without affecting an AQMA . Possibly redirect some traffic from Hanbury Industrial Areas to exit onto M5 via Stoke Prior but could shift pollutant onto other local roads.
Worcester Road	WR14	Limited	0 - 1	Few routes into or out of Bromsgrove without affecting an AQMA. Could redirect traffic going through Worcs Rd to town centre from south onto bypass but may have adverse effect on levels in Charford Rd. HGVs not identified as dominant source of emissions.
Dolday	None	N/A	2	WCC advise (June 2013): Southern Link Road enhancements currently programmed. A comprehensive programme of re-signage (both static and VMS) in the City Centre and along the Southern, Northern and Eastern Worcester Link Roads could do much to discourage through traffic. Current signage encourages through traffic to route via the City Centre.

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Lowesmoor	LRH1 LRH8	Yes	0 - 1	Blackpole - Astwood Road – Rainbow Hill used by drivers to avoid congestion in A38. Unlikely to alter behaviour significantly without other deterrents in place. Specific signage aimed at HGVs could discourage vehicles coming from Blackpole area but low proportion.
Port Street	PS3	Limited	0 - 1	Believe signs already in place to direct traffic along A44 bypass to town centre. Review current signage with WCC to determine if any additional improvements can be made.
Horsefair	None	Limited	0 - 1	Problem of alternative routes in to town centre.
Welch Gate	WG7, WG9	Yes	0 - 1	Signage at appropriate points to promote use of bypass for HGV's and school traffic in conjunction with weight restriction in AQMA and Freight Quality Partnership would have significant impact

5.1.8 Action: Introduction of traffic signals at roundabouts

Introducing signals to a gyratory may seem counter intuitive but this solution can actually improve traffic flow within connecting roads. As traffic is paused at an earlier point it reduces the volume of stationary traffic within the AQMA at any one time and thus reduces emissions from idling vehicles. Introducing intelligent signalling systems controls queuing times and avoids build-up of traffic exiting AQMA. Additionally it can provide for more pedestrian crossings for other road users improving pedestrian safety and encouraging uptake of alternative forms of travel. Such schemes are already in place in some AQMAs and planned for others. Clearly it will not be a shortlisted option for AQMAs where no gyratory exists. Specific junction modelling will be required to ascertain if there is any benefit from such schemes for AQMAs where this has not previously been considered. This can be achieved via the planning regime where substantial new developments are involved.

Pros	Cons	Key Stakeholders	Cost	Time
<p>Reduces congestion within AQMA</p> <p>Increases pedestrian and cycle safety crossings</p> <p>Encourages uptake of alternatives</p>	Requires junction modelling to ascertain benefit.	WCC, LPA	NQ	NQ
	Costs of implementation likely to be high.			
	Time for implementation could be very long if not part of current LTP3 i.e. beyond 2026	Linked Policy		
	Disruption during construction could cause increase in emissions	LTP3: AQ1-3, AQ5, AQ7, ITS3, ITS5		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR5	Yes	3 - 4	Planned as part of Hagley ADR development but not due completion until 2022. Will reduce traffic congestion entering Kidderminster Rd from south, but not impact congestion on Hagley Hill.
Lickey End	None	No	0	Already in place
Redditch Road	None	Yes	0	Possible at eastern end Morrison's roundabout at bottom of Buntsford Hill but this is not proximal to street canyons.
Worcester Road	WR13, WR14	Yes	NQ	Possible on A448 Kidderminster Road/Hanover Street/St Johns Street junction could help to reduce congestion entering north end of AQMA. Would require junction modelling to ascertain impact.
Dolday	None	No	0	Already in place
Lowesmoor	None	Yes	2	Lowesmoor Terrace/Place mini roundabout will be signalised as part of Worcester Transport Strategy (Phase 1) to improve and regulate traffic flow (WCC, 2013)
Port Street	None	No	0	No gyratory impact
Horsefair	HF3	Review required	NQ	Already tied in with one way action as part of LTP3
Welch Gate	None	No	0	No gyratory impact

5.1.9 Action: Introduce or improve feeder/merger lanes to improve flow.

Feeder/merger lanes allow traffic to enter/exit left onto destination carriageways without pausing at junction. It reduces congestion at junctions and therefore emissions.

It requires the width of the road to be sufficient to allow for an additional lane at approach to junction. Clearly this will not be an option in AQMAs with restricted narrow streets. Several AQMAs already have feeder lanes and improvements are likely limited. Some junction modelling will be required in order to ascertain if any benefits can be gained from improvements.

Pros	Cons	Key Stakeholders	Cost	Time
Feeder/Merger lanes improve flow and reduce congestion	Junction modelling required to ascertain benefits Sufficient road width required	WCC	NQ	NQ
		Linked Policy LTP3: AQ1-3, AQ5, AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	Limited	0 - 1	Lanes already in place
Lickey End	None	No	0	Not applicable to gyratory and limited opportunity within A38
Redditch Road	None	Limited	0 - 1	Lanes already in place at Hanbury Turn. Requires feasibility study of junction to

				determine any possible improvements.
Worcester Road	None	Required	NQ	Possibility of feeder lane exiting Hanover Street onto A448 Kidderminster Road could be explored in a feasibility study combined with examining introduction of traffic lights.
Dolday	None	No	0	Not applicable on this one way system
Lowesmoor	None	No	2	Worcester Transport Strategy Phase 1 includes capacity, which will include redesign of street layout to improve traffic flow (WCC, 2013)
Port Street	None	No	0	Not applicable on this narrow street
Horsefair	None	No	0	Not applicable on this narrow street
Welch Gate	None	No	0	Not applicable on this narrow street

5.1.10 Action: Pedestrianisation of streets within area.

Similarly to one way street option this action would only be appropriate for AQMAs consisting of narrow single carriageways and additionally where alternative routes for travellers exist.

The benefits are clearly enormous as would lead to a total reduction in roadside emissions which would effectively guarantee revocation of AQMA, but the potential drawbacks are equally huge. Clearly this option will not be appropriate to AQMAs on major carriageways.

Pros	Cons	Key Stakeholders	Cost	Time
Total reduction in emissions (maybe with exception of allowable delivery vehicles)	Displacement of all traffic onto alternative routes Could shift pollutant issues to another route Deliveries unable to get to businesses Residents unable to access properties.	WCC, LA	NQ	NQ
Increased pedestrian safety		Linked Policy		
Potential benefit to businesses and retail outlets		LTP3: AQ1-3, AQ5, AQ7, TMP2		
Allows for potential redevelopment such as cafes with outdoor seating				
Create secure cycle stores				

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	No	N/A	Not applicable
Lickey End	None	No	N/A	Not applicable
Redditch Road	None	No	N/A	Not applicable
Worcester Road	None	No	N/A	Not applicable. Not sufficient alternative routes
Dolday	None	No	N/A	Not applicable
Lowesmoor	LRH4	Possibly at	RH n/a	Not applicable at Astwood

	LRH6 LRH7 LRH8 LRH9	Lowesmoor	Lwm 5	Road/Rainbow Hill end of AQMA. Possible to apply this action to Lowesmoor. Would completely eliminate emissions and improve general ambience of retail area for shoppers extending the St Martins Gate area. WCC (June, 2013) advise: Lowesmoor could be made an 'access only' route for deliveries, residents and buses only, significantly reducing emissions and improving general ambience...'
Port Street	None	Unlikely (WCC)	5	Reduction in emissions would provide conditions to revoke AQMA. Create a pedestrian and shopper friendly environment. However business and residential areas would require some permitted access. WCC (June, 2013) advise '...scheme is unlikely to be feasible on accessibility grounds.'
Horsefair	None	No	N/A	N/A
Welch Gate	None	No	N/A	Only possible if another bridge built offering an alternative route

5.1.11 Action: Remove build-out in streets to allow cars to pass simultaneously.

Removing traffic calming measures or excessive pavement areas would increase road width and ease two way traffic flow where problematic areas exist.

Pros	Cons	Key Stakeholders	Cost	Time
Improves traffic flow. Reduces congestion.	May reduce pedestrian safety areas	WCC, LA	NQ	S - M
		Linked Policy LTP3: AQ1-3, AQ5, AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	N/A	0	Not applicable in this AQMA
Lickey End	None	N/A	0	Not applicable in this AQMA
Redditch Road	None	N/A	0	Not applicable in this AQMA
Worcester Road	WR7	Required	2 - 3	May help to reduce pinch point near Turks Head and busy Shrubbery Road junction. May not be possible to reduce pavement areas near Turks Head, reduction to other side of road could be explored in a feasibility study. Similar requirement as part of a wider review of potential improvements to Shrubbery Road junction.
Dolday	None	N/A	0	Not applicable in this AQMA
Lowesmoor	None	N/A	0	Complete streetscape redesign currently underway as part of Worcester Transport Strategy (Phase 1) Scheme due to complete in Autumn 2013
Port Street	None	N/A	0	Not applicable in this AQMA

Horsefair	None	N/A	0	Not applicable in this AQMA
Welch Gate	None	N/A	0	Not applicable in this AQMA

5.1.12 Action: Removal of parking bays in problem streets.

Removing parking availability would increase road width and ease two way traffic flow where problematic areas exist. This needs to be considered in conjunction with availability of car parking elsewhere and potentially other actions such as car parking pricing and policy.

Pros	Cons	Key Stakeholders	Cost	Time
Improves traffic flow. Reduces congestion.	Can create issues if appropriate parking levels not available in close vicinity. Detrimental effect on local business from reduction in delivery's	WCC, LA	NQ	S - M
		Linked Policy LTP3: AQ1-3, AQ5, AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	N/A	0	Not applicable in this AQMA
Lickey End	None	N/A	0	Not applicable in this AQMA
Redditch Road	None	N/A	0	Not applicable in this AQMA
Worcester Road	WR6	Yes	2 - 3	Reducing ability to park outside residential properties near Turks Head (strictly speaking not parking bays) would increase road width and reduce congestion. Additional parking must be made available to local residents nearby. Explore opportunities with other actions.
Dolday	None	N/A	0	Not applicable in this AQMA
Lowesmoor	LRH5	Yes	0 - 1	Parking outside some businesses in Lowesmoor causes congestion. But removal of legitimate parking bays could affect businesses and current restrictions are ignored.
Port Street	None	Yes	0 - 1	Potential problematic parking areas noted from vehicles parking or reversing out of area just adjacent to the AQMA opposite Shor St and outside Pizza bar near Waterside junction lights – technically not a parking area. Latter requires some additional restrictions. Not significant impact enough to warrant priority.
Horsefair	None	No	0	Not applicable in this AQMA
Welch Gate	None	No	0	Not applicable in this AQMA

5.1.13 Action: Alterations to Parking Provision and Pricing

Parking policies have an important role to play in reducing reliance on the car. It has been found that parking policy measures are likely to be relatively more important than many other traffic management measures in influencing mode choice. More specifically, the decision to use a car for the journey to work is greatly influenced by the availability and cost of parking.

Hence parking policy has a major role to play in encouraging changes in travel behaviour in combination with strategies of increasing opportunities for travel by other modes. (Fife)

'Traffic and Parking Management measures, when applied strategically, can act to significantly increase the efficiency of constrained transport networks by encouraging the use of more resource-efficient modes such as walking, cycling and passenger transport. The increasing use of more sustainable modes of transport can lead to a number of environmental benefits, including enhanced public health, reduced emissions, reduced congestion and increased accessibility to key services and facilities.' (WCC, 2011m)

This action would feature as part of other strategic measures such as introduction of a Park and Ride scheme or Priority Bus/HOV Lanes and public transport improvements. Also linked to Introducing Differential Parking Pricing solutions 5.2.8 and 5.2.9.

Pros	Cons	Key Stakeholders	Cost	Time
Reduce car use and subsequently emissions	Alternatives to using car need to be provided to ensure traffic reduction e.g. Park & Ride, BQP, Bus Lanes	LA, WCC	L	S - M
Increase uptake in sustainable travel		Linked Policy LTP3: AQ1-3, AQ5, AQ7, TMP1, TMP3-5		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	No	0	No car parking in vicinity. Large proportion of traffic in AQMA is not bound for local destinations.
Lickey End	None	No	0	No car parking in vicinity. Large proportion of traffic in AQMA is not bound for local destinations.
Redditch Road	None	No	0 - 1	No car parking in vicinity. Through route onto other destinations
Worcester Road	None	Yes	1 - 3	Close to town centre and several car parks in mile radius. Level of impact depends on final strategy.
Dolday	None	Yes	1 - 3	Close to town centre and several car parks in mile radius. Level of impact depends on final strategy.
Lowesmoor	None	Yes	1 - 2	Close to town centre and several car parks within 400 metres of the street. Through route onto other destinations and access to local residences. Impact depends on take up of alternatives
Port Street	PS9	Yes	1	Is a local car park but already underutilised. Through route onto other destinations and access to local residences. Impact depends on take up of alternatives
Horsefair	None	Yes	1	Better signposting for St Marys on approach to Kidderminster
Welch Gate	None	Possible	NQ	Due to Medical Centre development assessment

5.1.14 Action: Traffic calming measures

The rationale of introducing traffic calming measures (20 mph zones, speed bumps etc.) on local roads is the deterrent to drivers to use the route leads to a reduction in traffic, congestion and an improvement in air quality. Additionally it could encourage uptake of walking and cycling around AQMA.

LAQM PG(O9) states: 'LAs can set speed limits by making orders under the Road Traffic Regulation Act 1984. Reducing maximum speeds is likely to do more to improve flow and capacity on congested roads outside towns and cities, particularly on motorways, than in urban areas, but it may still have some benefit. Some authorities have piloted experimental variable mandatory 20 mph speed limits in urban areas on road safety grounds, but without complimentary enforcement or engineering measures there has been limited effect. Much greater safety benefit is achieved with permanent 20 mph zones and speed limits, which rely on engineering measures or constraints of an existing road layout to ensure compliance with the lower limit. The resulting lower traffic speeds are unlikely to reduce emissions significantly, and may actually increase emissions of some pollutants. Speed limits below 30 mph generally have to be self-enforcing to be effective.'

Therefore in reality whilst these may provide significant safety improvements, it is unlikely that such measures will have the desired impact on reducing pollutant levels and more likely have a detrimental effect without provision of alternative routes for traffic.

Pros	Cons	Key Stakeholders	Cost	Time
Discourage traffic from using AQMA if alternative routes available Increased all road user safety	Reduces vehicle speed, increase emissions Displacing traffic onto other routes may shift pollutant issues elsewhere	WCC, Road safety partnership Linked Policy LTP3: AQ1-3, AQ5, AQ7, ITS6	NQ	NQ

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	No	-1	Would severely increase congestion and emissions on a major carriageway
Lickey End	None	No	-1	Would severely increase congestion and emissions on a major carriageway
Redditch Road	None	No	-1	Would severely increase congestion and emissions on a major carriageway
Worcester Road	None	No	-1	No alternative routes for local destinations. Likely detrimental effect within street canyon
Dolday	None	No	-1	Would severely increase congestion and emissions on a major town centre carriageway
Lowesmoor	None	Possible	-1 to 1	Potential detrimental effect due to street canyon and possibly shifting higher pollutant levels to alternative routes due to displaced traffic.
Port Street	None	Possible	-1 to 1	An alternative route is available, but potential detrimental effect due to street canyon and possibly shifting high pollutant levels to alternative Cheltenham

				Road due to displaced traffic.
Horsefair	None	No	- 1	Queuing traffic no change
Welch Gate	None	No	- 1	Already slow speeds

5.2 Lowering Emissions Actions

These are a broad range of actions generally incorporating technical changes to vehicles or effecting a reduction in volumes of most polluting vehicles or other strategies aimed at achieving a reduction in emissions within AQMAs.

Actions discussed in this section are as follows:

- Bus Quality Partnerships (5.2.1)
- Freight Quality Partnerships (5.2.2)
- Park and ride schemes (5.2.3)
- Railway enhancements (5.2.4)
- Greening Council and Business Fleets (5.2.5)
- Low Emission Zones (5.2.6)
- Introduce Fixed Penalty Notices for Stationary Idling (5.2.7)
- Introducing Differential Parking Rates - Engines (5.2.8)
- Introducing Differential Parking Rates – Car Parking (5.2.9)
- Installing Electric Vehicle Charging Points (5.2.10)
- Roadside Emission Testing (5.2.11)
- Signage identifying AQMA (5.2.12)
- Tree Planting (5.2.13)

Refer to sections 4.1.3 and 5.6.9 for information regarding development of an overarching Lower Emissions Strategy.

5.2.1 Action: Bus Quality Partnerships (BQP)

Buses and coaches constitute an essential component of public transport, representing an important alternative to cars. However, buses can make a significant contribution to emissions of NO_x and other emissions, and consequently it is important to assess what can be done to minimise emissions from fleet vehicles.

'Bus services form the backbone of the passenger transport network in Worcestershire, carrying approximately 17.5 million passenger journeys annually. At the time of writing (LTP3), there were approximately 160 registered bus services, although levels of service are highly variable around the county, with the most frequent services provided on key urban and interurban routes.

In Worcestershire, the bus fleet is highly variable in terms of age, capacity, quality and levels of comfort provided. All buses in Worcestershire at the time of writing (LTP3) are fuelled with either diesel or petrol. The majority of buses are single-deck vehicles, with the newest vehicles operating in the main, but not exclusively, on the high frequency (most profitable) routes. On more marginal routes, the rolling stock is generally either older bus or coach stock which has 'retired' from more intensive use on urban or interurban routes... Double Decker vehicles are operated in Redditch and on a number of selected school routes in Worcestershire; although Worcestershire's generally constrained, historic urban street patterns are not suited to Double Decker or articulated vehicle operation.

The Worcester City Park and Ride routes (operated by WCC) use vehicles which meet the Euro V standard emissions. WCC continues to encourage operators to renew older vehicles

with modern fleet with cleaner, more efficient engines using a variety of incentives.’ (WCC, 2011g)

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

Strategy:

- Liaise with local bus operators to establish the potential for developing a local bus quality partnership.
- Target reduced emissions from buses operating within AQMAs.
- Encourage bus companies to improve emission performance of fleet through rolling vehicle replacement programmes (Eurocode VI comes into force in 2014) and/or retrofitting abatement equipment to existing vehicles.
- Integrate bus services with rail networks and new developments.
- Encourage transport providers to promote greater uptake of public transport
- Review and amend position of bus stops where appropriate

Could be undertaken in conjunction with other options e.g. priority bus lanes, LEZs.

Pros	Cons	Key Stakeholders	Cost	Time
Replacing older bus stock on AQMA routes reduces emissions Improve local public transport for passengers encouraging greater uptake	Take time to set up and companies to replace stock	WCC, bus companies, WRS	L	M - VL
	High cost to bus companies Many private bus companies with older stock operate within AQMA e.g. school runs	Linked Policy LTP3: AQ1-3, AQ5, AQ7, ITP1-11, ITP13, ITP16, ITP18, SMT5, TCC1, TMP2		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR4	Yes	0 - 1	Not many public services observed within AQMA at peak times and not identified as a significant source within FA. Greater impact if BQP formed with private school bus companies.
Lickey End	LE5, LE10	Yes	1 - 2	Some public services observed within AQMA at peak times. Possibly greater impact if BQP formed with private school bus companies or in conjunction with other options such as Park and Ride scheme
Redditch Road	None	Yes	1 - 3	Few public services observed within AQMA at peak times. Greater impact if BQP formed with private school bus companies, several observed
Worcester	WR11	Yes	3 - 5	Regular public services observed within

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Road				AQMA at peak times in street canyon. Lowest emission vehicles integrated with new developments including Bromsgrove train station essential to improving AQ on this route. 'Greater Bromsgrove Accessibility Enhancements Study identified that local accessibility in Bromsgrove is currently poor, particularly outside of peak times and over weekends. As a result, the study suggested the development of a Bromsgrove Town Bus Service, which would replace existing local services and provide significant accessibility enhancements to all trip attractors in Bromsgrove, in particular, the new bus/rail interchange. This was shown to deliver significant accessibility benefits, with wider social and economic benefits also apparent (WCC, 2011b).
Dolday	DD5, DD8	Yes	4 - 5	Bus station adjacent to AQMA so makes high proportion of traffic. Introducing lowest emission vehicles essential to improving AQ on this route. WCC advise (June, 2013): 'A bus quality partnership is being introduced for Worcs City in September 2013.'
Lowesmoor	LRH6	Yes	3 - 4	Regular public services observed within AQMA at peak times in street canyons. Introducing lowest emission vehicles on this route could have large impact at both end of AQMA. Greater impact at Lowesmoor west end of AQMA achievable if used in conjunction with other options such as amendment to one way street for general traffic. WCC advise (June, 2013): 'Lowesmoor is a critical east-west bus corridor in the city for which no suitable alternatives exist. A bus quality partnership is being introduced for Worcs City in September 2013.'
Port Street	PS6	Yes	1 - 2	Some public services observed within AQMA at peak times. Possibly greater impact achievable if BQP formed with private school bus companies and/or used in conjunction with other options such as amendment to one way street.
Horsefair	None	Yes	1 - 2	Move bus stop further away from AQMA to reduce congestion
Welch Gate	WG4	Yes		The longer length variety of buses regularly used in the area block the road due to narrow bends of Welch Gate. Encouraging bus companies to operate shorter length busses would be more advantageous. WCC have indicated that as bus contracts come up for renewal this

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
				will be considered along with lower emission buses.

5.2.2 Action: Freight Quality Partnerships (FQPs)

The delivery and collection of goods is essential to the economy, is important to the quality of people's lives and also has an impact on the environment. The movement of freight is currently dominated by road haulage. The results of the source apportionment exercise for several AQMAs indicated that HGVs make a significant contribution of emissions of NO_x, but comprise a relatively small proportion of traffic. It is recognised that reducing emissions from HGVs may represent a targeted and effective approach to improving air quality within some AQMAs.

Freight Quality Partnerships (FQPs) are partnerships between local authorities, the freight industry and other interested stakeholders. FQPs encourage sustainable distribution by working together to develop environmentally sensitive, economic and efficient ways of delivering goods and establishing best practice. (LACORS, 2008)

The Freight Strategy was developed by WCC in 2001 in partnership with the Road Haulage Association and Rail Operators. A countywide Freight Quality Partnership was established in 2002 and an advisory Lorry Route Map was published in 2003. The Worcestershire FQP Working Group is made up of the following members:

Worcestershire County Council, (WCC) 6 District Councils, Police, Freight Operators and Generators, Road Haulage Association (RHA), Freight Transport Association (FTA), National Farmers Union (NFU), County Association of Local Councils (CALC).

WRS will work with the above group to ensure air quality issues are recognised and addressed such as:

- Reviewing lorry route maps and ensuring AQMAs are recognised and avoided on routes as much as possible.
- Encourage a wider uptake of freight by rail – see below.
- Improving air quality by promoting the use of cleaner and more fuel efficient vehicles
- Encourage retrofitting abatement equipment to existing vehicles

Rail Freight

WCC,2011f states ‘...there are limited opportunities for rail freight within Worcestershire at present. The nearest major rail freight facilities exist in Coventry, Daventry and Swindon, with freight transported by road to these locations from Worcestershire... Rail is particularly well suited to bulk freight movements. New rail freight locations will in general require planning permission and suitable locations will need to be identified with the Worcestershire Borough, City and District Councils through the LDF process.’

Pros	Cons	Key Stakeholders	Cost	Time
Reduces emissions from major contributing source	Depends on availability of alternative routes (or availability of rail alternatives)	WCC, WFQP, LA, WRS	L	S - VL
Lorry maps amendments could be short timescale	Greening of entire fleet	Linked Policy LTP3: AQ5, F1		

	or switching to rail freight could be very long timescale	- F10, TMP2		
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AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR7	Yes	4	HGVs identified as significant emissions source. Alternative routes for some journeys available via J4 M5.
Lickey End	LE2	Yes	3	Alternative routes for some journeys via J2 M42 Redditch but could displace traffic onto other AQMAs or shift pollutant issues onto other local routes.
Redditch Road	RR6, RR10	Yes	3	Alternative routes for some journeys via J5 M5 or J2 Redditch but could displace traffic onto other AQMAs or shift pollutant issues onto other local routes.
Worcester Road	None	Yes	3	Alternative routes for some journeys J2 Redditch but could displace traffic onto other AQMAs or shift pollutant issues onto other local routes
Dolday	DD11	Yes	1 - 2	HGVs only identified as significant emissions source in combination with buses. Alternative routes for some journeys available via ring roads. Updates to lorry maps may be beneficial
Lowesmoor	LRH8	Yes	2 - 3	HGVs identified as significant emissions source in combination with buses. Alternative routes for some journeys available via ring roads. Updates to lorry maps in conjunction with weight restriction or improved signage could have a reasonable impact on emissions
Port Street	None	Yes	1 - 2	Alternative routes into Evesham via A46 bypass believe signed already (review possible). HGVs not most significant source identified. Reopening of Abbey Bridge and lifting of weight restriction in 2014 will ease HGV flow in Port St, particularly in conjunction with action for review of requirements for additional signage on bypass.
Horsefair	None	Yes	1 - 2	Updates to lorry maps in conjunction with weight restriction and improved signage could have a significant impact on emissions
Welch Gate	WG7	Yes	1 - 2	Updates to lorry maps In conjunction with weight restriction and improved signage could have a significant impact on emissions

5.2.3 Action: Park & Ride Schemes

A Park and Ride scheme allows you to park your vehicle in a car park outside town, and then use a special, frequent bus service to get into the town centre or other destination. These schemes provide a cheaper and faster way for visitors to get into areas such as town centres, which are often congested and where parking may be both scarce and expensive.

Park and ride facilities will provide higher reduction in car volumes, congestion and emissions if introduced in conjunction with other options as part of an integrated alternatives mode of transport strategy e.g. review of parking pricing in town centres, priority bus lanes, VMS, train station enhancements and BQPs to ensure most emission efficient buses are used,

May increase traffic volumes in the vicinity of park and ride site however these are generally on periphery of town centres where air quality is not an issue. Providing a Park and Ride facility can also increase the number of tourists and other visitors to your area by making access to town centres and attractions faster, cheaper and hassle-free.

WCC is supportive of Park and Ride proposals; however, a number of criteria must be met in order to deliver effective operation of these facilities:

- Reallocation of Long Stay Parking in Urban Centres to Short Stay 3 hrs max - This 'creates the market' for Park and Ride, by moving long-stay demand into Park and Ride sites. Additionally, this ensures that urban centre parking is not used by commuters, instead freeing up this capacity for use by residents and visitors. (This also enables the provision of enhanced disabled parking.)
- Consolidation of Urban Centre Off Street Car Parking - Small, surface level car parks represent an inefficient use of space, particularly in urban centres.
- Effective Management of On Street Car Parking in Urban Centre - Where parking capacity is constrained, it is common for parking demand to reallocate to nearby residential areas. Where this occurs, Worcestershire County Council will pursue the delivery of Controlled Parking Zones (CPZ) to protect residents' parking whilst limiting the use of capacity in residential areas for non-permit holders.
- On-going Removal of Private Non-Residential Parking in Urban Areas. This parking capacity is generally offered free-of-charge, and so can undermine parking policies unless properly managed.
- Effective Planning Policy Application - This will deliver urban environments which are supportive of parking policies.

Pros	Cons	Key Stakeholders	Cost	Time
Reduced cars travelling into town centres Reduces cars recirculating looking for parking spaces Reduced congestion in AQMA Update in Eurocode standards of PSV fleet will reduce emissions Quicker into town centres via priority bus lanes and traffic lights Parking normally cheaper than Town Centres	Requires large out of town site for car parking and Bus Station Change of PSV fleet required or could lead to increased emissions from PSVs; cost to bus companies Expensive set up costs	WCC, LA, LPA, Bus Co, Politicians Linked Policy LTP3: A3, AQ3, AQ5-7, ITP1, ITP5-7, SMT5, TCC1, TMP4	H - VH	L - VL

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR3,	No	0	Too low a demand for Hagley Town Centre as a destination and too small to accommodate large amounts of buses
Lickey End	None	Yes	5	Lickey End is ideal situation for Park & Ride consideration. Location adjacent to M42 could have a great impact on reducing levels in Lickey End AQMA
Redditch Road	RR10, RR11,	Review required	-1 to 1	A southern Bromsgrove park and ride facility likely to have a minimal impact as Redditch Road acts largely as through route between east and west bypassing town centre. Possibly even cause detrimental effect by increasing volumes if Park & Ride was placed adjacent to AQMA
Worcester Road	WR13, WR14,	Yes	3 - 4	A southern Bromsgrove park and ride facility could have a beneficial impact on Worcester Road AQMA depending on location. Impact likely to be less than Lickey End as much traffic destined for local destinations e.g. schools.
Dolday	DD4, DD8, DD12,	Yes	2 - 4	Two facilities already in place on east of City. Additional benefit and reduction in vehicles possible if facility emplaced serving west side of City. Could also benefit air quality in St Johns area. To be delivered as part of LTP3 actions. WCC, 2011h states: 'The City of Worcester will be the initial focus for an Urban Car Parking Strategy...to implement a comprehensive network of Park and Ride sites to replace existing long stay parking within the city centre, encouraging a transfer of trips on the edge of the City Centre where their impact can be minimised. Car Parking VMS and web based RTI can provide the public with advance information to influence responsible travel choices...'
Lowesmoor	LRH1, LRH9,	No	0	Two facilities already in place on east of City
Port Street	None	Yes	1 - 3	Evesham could potentially benefit from park and ride facilities. Impact on AQMA would depend on proximity of location around the town.
Horsefair	HF3,	Limited	1	Been attempted in the past by WFDC and not successful due to financial viability. Put in place for special events
Welch Gate	WG2	Limited	1	Been attempted in the past by WFDC and not successful due to financial viability. Put in place for special events

5.2.4 Action: Railway enhancements.

Improved rail service frequency and pattern will increase rail patronage and help to ease congestion and reduce emissions. Additionally improvements to railway stations such as

secure cycle stores, improved footpath lighting, Variable Message Signing and integrated bus services can encourage passengers to use alternative modes of transport to cars to and from local train stations.

A number of railway enhancements and a major redevelopment in Bromsgrove Station are planned as part of LTP3. WCC are also currently bidding for funds for a completely new station just southeast of Worcester known as Worcestershire Parkway.

WRS support major public transport developments such as Bromsgrove Station or Worcestershire Parkway but recognise such schemes are unlikely to aid a reduction in existing pollutant levels because of the long timescales involved. However such schemes are important for maintaining air quality improvements in the future.

'WCC recognises that, whilst rail is a sustainable means of travel, the provision of parking at stations is not sustainable, as this encourages rail users to drive to access rail services (particularly for short trips). WCC will work with Network Rail and Train Operating Companies to identify optimum levels of car parking at rail stations, supported with Station Travel Plans (as identified in the LTP3 Smarter Choices Policy (WCC, 2011i)) to encourage greater use of sustainable modes of travel to access rail services.' (WCC, 2011m)

WRS will promote and support provision of integrated public transport systems between new developments and town centres and enhancements which encourage public to use alternatives to cars.

Pros	Cons	Key Stakeholders	Cost	Time
Improved public transport provision encourages switch to alternative modes of transport and reduces emissions Station enhancements encourage walking or cycling to station	Major developments prohibitively expensive and long timescale to deliver	WCC, LAs, LPAs	M - VH	M - VL
		Linked Policy LTP3: A3, AQ5, AQ7, F3, ITP1, ITP6-8, ITP10-11, ITP16, ITP18		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Depends on WCC	NQ	Depends on planned and implemented WCC schemes

5.2.5 Action: Greening Council and Business fleets

Fleet management is the effective operation of an organisation's vehicles. A council's fleet might include council owned or leased company cars, buses, refuse collection vehicles, plant items etc.

Effective fleet management may include:

- Fleet inventory's which includes information such as individual vehicle details, mileage, maintenance costs etc.
- Rolling vehicle replacement programme requiring purchase of Lower Emission Vehicles complying with prevailing 'Euro-standard' for exhaust emissions
- Fuel Monitoring Management

- Commitment to using alternative fuelled vehicles e.g. electric vehicles, Liquefied Petroleum Gas (LPG), combined fuel (hybrid) vehicles
- Safe and Fuel Efficient Driving Training – more info in Education and Information section
- Undertaking a Green Fleet Review through the Energy Savings Trust to identify the environmental impact of fleet (>50 vehicles) and ascertain improvements to be made.
- Test fleet vehicle emissions whenever routine servicing is carried out.
- Retro fit pollution abatement equipment to Council HGVs e.g. fitting of particulate traps to refuse collection vehicles

Performance indicators (NI 194 & NI 185), brought into practice in 2008, required councils to reduce carbon dioxide, particulates and nitrogen dioxide emissions from their own estate and vehicles.

The above fleet considerations should already been actioned by the LAs in Worcestershire already or are included in their Council Transport Strategy's for on-going action following the introduction of the performance indicators. Significant reductions in local emissions are therefore unlikely to be achieved by focussing attention on improving Council fleets further.

However such experience does provide an opportunity for LAs to become leaders in emissions reduction in their communities, disseminating information and best practice and encouraging local businesses to follow suit. There are also financial benefits to be achieved by implementing green fleet policies, through fuel efficiency and tax savings.

WRS could undertake a review of fleet management strategies adopted by LAs in Worcestershire and promote appropriate examples of best practice to encourage local businesses for inclusion in their own Fleet Management Strategy.

Pros	Cons	Key Stakeholders	Cost	Time
LAs leading by example Potentially replace some higher polluting vehicles on road with lower emission vehicles Potential reduction in fuel costs	Council fleets are relatively small proportion of vehicles contributing to local emissions Many authorities will have enacted previously Time dependent on expiry of vehicle leases Increased capital costs and specialist maintenance for alternative fuel vehicles Converting vehicles can be high cost	WRS, LA Procurement officers	NQ	NQ
		Linked Policy LA Climate Change Strategy, LA Procurement Strategy, LTP3: ITP11, ITP16, SCP15, TCC1		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	RR6	Review required	NQ	Impact from greening council and business fleets depends on take up

5.2.6 Action: Low Emission Zones (LEZ)

The following information is a summary of LAQM Practice Guidance 2 (Defra, 2009d).

A Low Emission Zone (LEZ) is a geographically defined area where the most polluting of vehicles are restricted, deterred or discouraged from access and use by setting particular emission standards or criteria.

LEZs tend to be focussed on city and town centres, where land-use is dense, traffic is heavy and population exposure is high. There is the highest value in such areas from restricting, discouraging or deterring the use of more polluting vehicles. LEZs have been successfully implemented and run for a number of years in Sweden and the Greater Tokyo Area, and more recently in London and cities in Germany and the Netherlands. The impact can be similar to an acceleration of fleet turnover or the fitting of abatement devices, thereby reducing emissions sooner than would otherwise have happened.

It should be noted that reducing the number of more polluting vehicles might be achieved by a range of other methods. For example, incentivisation mechanisms, partnerships or regulations that focus on specific sectors of road transport might be used to encourage lower emission vehicles or take-up of emission abatement technologies.

The economic rationale for LEZs is linked to the external costs of operating polluting vehicles. Previous studies have demonstrated that the most common vehicles to target in a scheme with enforceable restrictions are diesel powered Heavy Duty Vehicles due to their cost-effectiveness relative to schemes that would restrict other vehicle types.

There are a number of considerations and options for any LEZ which will need to be determined once the objectives of the scheme have been established i.e. targeting pollutants emitted by specific vehicle type(s). These are briefly described in Table 5-1 below:

Table 5-1 Summary of considerations for Low Emission Zones

Scheme Aspects	Options
Legal basis	Two main routes to setting up an area (or zone) with traffic or parking controls based on vehicle emission criteria: <ul style="list-style-type: none"> • Traffic Regulation Orders for enforceable restrictions on the public highway; • Section 106 agreements as planning obligations for development sites and private land.
Enforcement powers and penalties	<u>Vehicle Restrictions</u> - Outside London the relevant moving vehicle offences are currently enforceable by Police. Powers under Traffic Management Act 2004 (TMA 2004) may provide civil enforcement powers to local authorities. These are necessary to effectively enforce a scheme. <u>Parking restrictions</u> - TMA 2004 provides for the civil enforcement of most types of parking contraventions. LA appointed Civil Enforcement Officers can issue Penalty Charge Notices (PCN) for parking contraventions. <u>Planning system</u> - Following a breach of planning control the Planning Authority (Local Authority or Council) has the option to take enforcement action via notice or court injunctions.
Vehicle emissions standards and vehicle type	Defining vehicle standards and vehicle type on which to base enforceable restrictions could be determined in one or a combination of the following criteria: <ul style="list-style-type: none"> • Euro standards (the term for European type approval standards on the emission performance of new vehicles over a defined test cycle); • Age of vehicle/ Year of first registration (because older vehicles tend to be more polluting, largely because Euro standards have progressively raised performance in this area); • Particular fuel/technology combination (if they are considered to have particular benefits, such as hybrid, gaseous or renewable fuels); • Retrofit technology (which can be used on older vehicles to clean up exhaust emissions); • Vehicle type (cars, vans, heavy goods vehicles (HGVs), emergency vehicles etc.) that is to be included or excluded.
Management of permitted vehicles	The scheme operator maintains the definition of what is a permitted vehicle. Management of the permission to enter the zone requires information and identification of individual vehicles with administration systems to cross-check permissions e.g. London LEZ has database with links to the DVLA. If a scheme is small-scale, affecting relatively few vehicles or one focussed on local fleets, then a basic permit management and verification system might be sufficient. Access control schemes in Cambridge and Bath are examples of where transponders are provided to a relatively small number of exempted vehicles (taxis and buses).
Vehicle detection	Detection of a vehicle for subsequent identification of emission status could be carried out by a variety of methods, sometimes in combination: <ul style="list-style-type: none"> • Manual methods, whereby enforcement personnel visually check vehicles travelling within or parked within the scheme

	<p>area for identification marks (Vehicle Registration Mark and/or a permit/sticker). Some post checking against a database of compliant vehicles would then be necessary.</p> <ul style="list-style-type: none">• Digital cameras and Automatic Number Plate Recognition (ANPR) – all passing number plates are recorded and using Optical Character Recognition (OCR) for matching against a database of vehicle data. A network of cameras would be installed on the key routes into/out of the boundary of the scheme and possibly at key junctions within the zone if it is very large. Mobile ANPR cameras could be used to monitor key junctions and/or 'hot-spots' of possible non-compliance. ANPR is used in London LEZ• Dedicated Short Range Communication (DSRC) – tags and beacons, more suitable for schemes with relatively few and pre-determined users which comply with the scheme criteria. Tags or proximity smartcards are commonly issued to vehicle owners for accessing private car parks, or can be scanned through a wind-screen, and can also be used to trigger bollards which control access on the public highway.
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While the choice between these options in relation to LEZs is a choice for local authorities, Defra and DfT are currently considering how to approach vehicle classification to ensure that there is a level of consistency between schemes. This work will also be relevant for those Authorities considering LEZ schemes as to increase efficiency across scheme types through added consistency.

Existing LEZ that target toxic pollutants most commonly use Euro standards as the basis for setting emission. In a great number of cases there exist supplementary criteria to allow some exemption (or time-extensions) for retrofitting emission abatement technology. Age as a proxy for Euro standard is also a common accompanying basis.

The benefits of manual detection methods are lower capital costs, and some flexibility over future operating costs if enforcement levels can be reduced. Manual enforcement is suitable for parking schemes, whether on-street parking on development sites. A drawback of manual enforcement is the limit on the number and speed of vehicles that can be checked by a person.

The benefits automated enforcement systems are that high speed and volume flows of vehicles can be detected and recorded, and that every vehicle can be checked. Drawbacks can include the relative inflexibility of fixed camera systems once they are installed, and the up-front capital costs.

For any scheme, in order to demonstrate value for money local authorities will need to analyse both set up costs and operational costs. Table 5-2 below considers the various cost elements that need to be considered.

Table 5-2 Various cost considerations for LEZs

Capital costs	Operating costs
<ul style="list-style-type: none"> • Scheme design and planning • Legal support • TRO review and update • Consultation process • Marketing and information campaign • Traffic management / safety • Roadside equipment (signing, detection, enforcement) • Central administration and IT systems (back-office functions: vehicle record, certification, enquiry handling) <ul style="list-style-type: none"> - project management - systems design and configuration control - systems integration and implementation - systems testing and acceptance 	<ul style="list-style-type: none"> • Accommodation • Staff costs • Training • Registration and validation of vehicles • Any new vehicle identification method (for example windscreen stickers) and the issuing process for this • Equipment / software replacement and maintenance costs • Vehicle immobilisation and removals • PCN processing • Adjudication and appeal costs • Supplies, services and transport <ul style="list-style-type: none"> - contingency plans for business continuity and disaster recovery; - data retention and archiving; • Monitoring and evaluating the scheme impacts • Certification of retrofit devices, suppliers and vehicles fitted with retrofit devices

LEZs are potentially an effective method of achieving the air quality objectives within Worcestershire. However it is complex subject because of the various options and considerations, significant costs involved and resources required. Initial screening assessments to identify potential followed by more detailed feasibility studies, where

appropriate, will be required to be undertaken by Steering Group to ascertain if LEZs are a viable option.

Clearly LEZs are likely to provide a higher cost-benefit in large urban areas where a number of AQMAs exist (e.g. Worcester City and Bromsgrove) and economies of scale can be achieved through implementation. However at this stage this option is not ruled in or out for any of the AQMAs.

Possible UK network of LEZs may be proposed as part of future changes of LAQM currently under review by Defra (Defra, 2012).

Pros	Cons	Key Stakeholders	Cost	Time
Significant reductions in emissions can be achieved through implementation	Several stages of assessment and significant cost-benefit analysis required to determine feasibility	WCC, LA, LPA, Politicians, WRS	VH	L - VL
	Agreement required of many stakeholders			
	Significant costs in set up and operation	Linked Policy		
	Long timescale before assessments and agreement and resources achieved	LTP3: AQ5-7, TCC1, TMP2		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Required	NQ	Further assessment required

5.2.7 Action: Introduce Fixed Penalty Notices for Stationary Idling

The Roadside Vehicle Emissions (Fixed Penalty) Regulations 2002 permit Local Authorities to take action against drivers who leave their vehicle engines running unnecessarily when parked (it does not apply to vehicles in traffic, or having engines examined, or is required to run machinery e.g. a refrigeration unit.)

Councils can request drivers to turn off their engines and issue a Fixed Penalty Notice to those who refuse to cooperate, which will result in fine of £20. This increases to £40 if not paid within 28 days. (LACORS, 2008)

Buses and taxis may be a significant source of emissions from idling vehicles. Issues may be avoided by working with local companies prior to enforcement action being undertaken and introducing appropriate signage in AQMAs such as 'Switch engines off – AQMA'.

Pros	Cons	Key Stakeholders	Cost	Time
Reduction in idling vehicles causing unnecessary pollution, create noise and waste fuel.	May only have significant effect where taxi ranks and bus stations impact on AQMA. Situation may be avoided through other collaborative means.	LA, Traffic enforcers	L	S - M
		Linked Policy		
		LTP3: TMP3		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	n/a	0	No taxi ranks or outdoor bus depot in AQMA

5.2.8 Action: Introducing Differential Parking Rates - Engines

These distinguish between vehicles of different engine sizes, or levels of pollutants emitted, with the costs of parking permits issued by Local Authority reflecting these. Smaller engines and environmentally friendly vehicles such as those that run on electricity are given preferential rates with largest engines paying more. Some schemes differentiate between vehicles by engine size, other by carbon dioxide emissions. Vehicles with lower CO₂ emissions tend to be those with smaller engines and therefore less fuel use and subsequently less air pollutant emissions but this may not always be the case. Some diesel vehicles may have lower CO₂ emissions but higher air pollutant emissions (LACORS, 2008).

Introducing differential parking rates at car park ticket machines linked to real time air quality information database directing traffic to outside park and ride services as an alternative to increased car parking costs during poor air quality events.

Pros	Cons	Key Stakeholders	Cost	Time
Can help to improve air quality by encouraging use of more efficient and less polluting vehicles or alternative transportation.	May only have significant effect where LA provides parking permits for areas in vicinity of AQMA. Some diesel vehicles may have lower CO ₂ emissions but higher air pollutant emissions	LA, Traffic enforcers, LPA	L	S - M
		Linked Policy		
		LTP3: ITS4, ITS8, TMP1, TMP4		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	n/a	0	No chargeable residential parking facilities identified in vicinity of AQMA

5.2.9 Action: Introducing Differential Parking Rates – Air Quality Events

A potential solution is to link car park pricing at ticket machines to real time air quality information used in conjunction with out of town park and ride facilities. During anticipated

poor air quality days or events the car parking prices centred in town and city destinations could be increased remotely at start of chosen period e.g. day or week. Messages would then be relayed to drivers of increased costs via VMS e.g. matrix signs placed outside of the city prior to Park and Ride services and encouraging drivers to take advantage of reduced parking costs at those facilities.

This solution will clearly only be appropriate and have a benefit for town centre and city AQMAs where there are a number of car parks and either existing or potential for out of town Park and Ride facilities. Furthermore this solution requires further research into available technologies.

Pros	Cons	Key Stakeholders	Cost	Time
<p>Encourage modal shift to sustainable Park and Ride services</p> <p>Avoids potential detrimental impact on local economy from permanent increased car parking pricing</p> <p>Reduces emissions in towns and cities during worst conditions leading to improvement in measured levels in AQMAs.</p> <p>Reduction in emissions during worse conditions protects health of most vulnerable to AQ events and reduces hospital admissions.</p>	<p>Research and potential development of technology required.</p> <p>Will require significant investment in infrastructure.</p>	WCC, LA	NQ	M - L
		Linked Policy		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley		No	0	Limited amount of car parks or requirement for Park & Ride facility
Lickey End		Yes	3 - 4	Park and Ride is considered appropriate solution for Lickey End and there are a number of attractive low cost car parks within Bromsgrove Town Centre
Redditch Road		Review required	0 to 1	A southern Bromsgrove park and ride facility not considered major impact on Redditch Road
Worcester Road		Yes	2 - 3	A southern Bromsgrove park and ride facility considered to have a beneficial impact on Worcester Road AQMA and there are a number of attractive low cost car parks within Bromsgrove Town Centre. However reduced impact as much traffic is local destined for schools
Dolday		Yes	3 - 4	Two Park & Ride facilities already in place on east of City with more planned for west side of city. Several City centre

				car parks are destinations for drivers. Car park prices have been concern for local businesses.
Lowesmoor		Yes	2 - 3	Two Park & Ride facilities already in place on east of City and Lowesmoor is major bus route. Several City centre car parks are destinations for drivers. Impact may be lessened by highway alterations currently underway in Lowesmoor area.
Port Street		Limited	1	Evesham could potentially benefit from park and ride facilities. Impact on AQMA would depend on proximity of location around the town. Low cost car park nearby currently under utilised
Horsefair		Limited	1 - 2	Park and Ride attempts in the past have not proved financial viability or successful but are put in place for special events. A number of public car parks are easily available from Kidderminster Ring Road.
Welch Gate		Limited	1	Park and Ride attempts in the past have not proved financial viability or successful but are put in place for special events. A few car parks are currently available

5.2.10 Action: Installing Electric Vehicle Charging Points

Electric powered only and hybrid cars (cars that combine a battery with a conventional engine) have been around for a number of years now but only make up a small proportion of traffic on our roads. There are a number of factors why this is the case:

- Purchase and operating costs of vehicles
- Range of vehicles
- Availability of public electric charging points

Increase initial cost of these vehicles even after government available Plug in Car Grant of £5000 and some require extra for battery lease. There are currently 32 hybrid and electric cars on sale in the UK and cost up to £10k more than conventional family car (Which, 2012).

Electric powered only vehicles have a range of less than 100 miles before requiring a recharge making them unsuitable for long distance travel but are low cost to refuel. Hybrid cars offer a greater range utilising the battery at lower speeds making them more suitable for use as a main car.

To be of benefit to both drivers and in encouraging greater uptake vehicles a local network of charging points is required, particularly given the limited range of battery powered only vehicles. At the time of printing it has been difficult to establish the exact number of publicly available charging points in Worcestershire as there are a number of different providers competing to present charging point location maps. However each district has at least between one and four charging points. There are a further number of sites accessible within the Birmingham area with potentially more in the future planned as part of the West Midlands Low Emissions Towns and Cities Programme. Across the UK there are approximately 1500 charging points with a further 8500 planned with support of the UK government's 'Plugged in Places' initiatives.

At present WRS have not been able to establish any costs or timescales for implementation of charging points to determine how viable an option this will be. But it could be considered in conjunction with other options or forming part of a wider Lower Emissions Strategy.

Pros	Cons	Key Stakeholders	Cost	Time
Reduces emissions Reduce purchase cost grants available Reduced running costs for car owners for fuel, vehicle duties and through other incentives	Requires a network of charging points Additional initial costs to owners for vehicles	WCC, LA	NQ	S - VL
		Linked Policy		
		LA Climate Change, LTP3: A1, AQ3, AQ5-7, DC1		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	RR10, RR11, WR13, WR14, DD12, LRH9	Review required	NQ	Depend on outcomes of cost benefit analysis and uptake of ultra-low emission vehicles

5.2.11 Action: Roadside Emission Testing

Under the Roadside Vehicle Emissions (Fixed Penalty) Regulations 2002, Local Authorities are able to undertake roadside testing vehicles. The aim is to identify those vehicles that make a disproportionate contribution to emissions though poor maintenance with on the spot fines for those that fail. Wide scale emission testing will ensure more highly polluting vehicles can be identified. Clearly such an action requires a large amount of resources, personnel and equipment, to police a sufficiently large vehicle testing programme. Success also relies on an element of enforcement officers being in the right place at the right time to catch offending vehicles in the act. The number of offending vehicles is likely to be low proportion of traffic. Also can cause further congestion and emissions when closing lanes to provide area for testing.

Pros	Cons	Key Stakeholders	Cost	Time
Targets worse polluting vehicles Creates revenue to put back into other air quality mitigating programs Advertisement of practice could act as deterrent to owners to use polluting vehicles	Large amount of resource required to make worthwhile High costs Requires being in right place at right time May result in further congestion and subsequently emissions at time of testing As emissions testing is part of MOT Number of vehicles identified likely	WCC, HA, LA, Traffic enforcers	NQ	NQ
		Linked Policy		
		LTP3: TMP3		

	to be relatively low			
AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	RR10, RR11, WR13, WR14, DD12, LRH9	Yes	0	For all the reasons stated above

5.2.12 Action: Signage identifying AQMA

This action would involve the design and erection of signs at various locations within or adjacent to an AQMA to alert drivers to the presence of the AQMA and encourage behavioural change e.g. reduce vehicle idling. This is an action which has been considered or promoted by some local authorities in the UK.

However there are a number of potential issues with this approach. Firstly no evidence or guidance has been found that this approach will have a significant reducing effect on pollutant levels. It relies on voluntary action by drivers concerning themselves with air quality issues to amend behaviour or altering journey at the point of entering AQMA.

Additionally local residents may perceive that highlighting the presence of the AQMA results in 'blighting' the value of their properties. This action not only risks alienating that community but also potentially encourages legal challenges against the LA.

Thus before taking such action the residents of an AQMA should be consulted for their views and permission to undertake this option. And, as previously stated, WRS at this time would be unable to provide any specific evidence to those residents that this action will have desired effect in reducing emission levels.

Pros	Cons	Key Stakeholders	Cost	Time
Encourage behavioural change to reduce emissions	No evidence has desirable impact	WCC, LA, Local residents	L	S
	Relies on voluntary action of drivers	Linked Policy		
	Perception of blighting properties	LTP3: AQ1, AQ3, AQ5		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	0	Unlikely to have a measurable impact on reducing levels

5.2.13 Action: Tree Planting

There is a general perception that planting trees can only benefit air quality. WRS have sought and reviewed available guidance from Defra on the effectiveness of tree planting schemes in reducing air quality pollutants in AQMAs. The beneficial impacts of reducing some pollutants such as carbon dioxide, ozone and particulate matter and other social

community benefits are relatively well documented. However, WRS have been unable to obtain definitive evidence that tree planting within AQMAs has a significant impact in reducing levels of NO₂, the key pollutant of concern within this AQAP.

The review of available information determined a number of additional issues with this potential solution:

- Trees can emit gases known as volatile organic compounds VOCs which, in combination with NO_x, can contribute to the production of other pollutants, especially ozone and particles.
- The removal of pollutants by trees is a local effect, whereas the formation of pollutants from compounds emitted by trees happens downwind of the trees themselves.
- Trees can have an adverse effect by suppressing the mixing of air between a street canyon and the wider atmosphere through a process called “fumigation”.
- Where street level emissions are high, i.e. AQMAs, tree planting should be used with utmost caution. Specific combinations of tree species, canopy volume, geometry, wind speed and direction must be modeled on a case by case basis. As this is beyond typical models used in air quality this is likely to require a highly specialist consultant to undertake such modeling.
- No available Defra document covered this subject or provides any guidance.
- Most Local Authority AQAPs provided by Defra as examples of best practice did not shortlist this solution for further action.

Costs would depend on number of trees to be planted.

Pros	Cons	Key Stakeholders	Cost	Time
<p>Green infrastructure improves visual perspective of urban environment</p> <p>Creates shade and cooling effect</p> <p>Benefit in reducing some other pollutants and CO₂</p>	<p>No evidence provides reduction in NO₂ levels</p> <p>Has an adverse effect on other pollutant levels</p> <p>Not appropriate in street canyons</p> <p>Unique modelling required to ascertain if any benefit</p> <p>Long time to wait till trees reach potentially most effective mature stage (approx. 20 years)</p> <p>On-going maintenance costs and potential ownership issues</p> <p>Introduction of fatal</p>	WCC, LA,	L – M	L - VL
		<p>Linked Policy</p> <p>LA Climate Change; LTP3: W14</p>		

	<p>accident hazard along roadside</p> <p>Requires large space to plant large areas of trees required to remove significant levels of ambient pollution</p> <p>Risk of subsidence to local properties</p>			
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AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	Limited	-1 to 0	Not desirable along AQMA as could create street canyon effect by reducing air flow and creating fumigation. Space available on gyratory at bottom of AQMA but would reduce driver vision and introduce hazard. Also upwind of majority of road source thus anticipated limited effect, possibly worsen air quality for receptors downwind.
Lickey End	None	Limited	-1 to 1	Space available on gyratory but would reduce vision of drivers and introduce driver hazard. At centre of receptors thus upwind may benefit in long term but worsen air quality downwind.
Redditch Road	None	Possible	-1 to 0	Possible to plant in open areas south of Redditch Road but receptors downwind, possibly worsen air quality
Worcester Road	None	No	-1	Street canyon
Dolday	None	No	-1	Street canyon
Lowesmoor	None	No	-1	Street canyon
Port Street	None	No	-1	Street canyon
Horsefair	None	No	-1	Street canyon
Welch Gate	None	No	-1	Street canyon

5.3 Promotion of Alternatives (Smarter Choices)

Also known as Smarter Choices or 'soft' measures, these are actions which stimulate and encourage modal shift to sustainable transport options, through intensive marketing and information dissemination.

Actions discussed in this section are as follows:

- Travel Planning (5.3.1)
- Encourage car sharing (5.3.2)
- Promote Teleconferencing facilities and encourage uptake (5.3.3)
- Promote flexible working arrangements (5.3.4)
- Workplace charging schemes (5.3.5)
- Improve cycling and walking routes in local areas (5.3.6)
- Install secure cycle parking shelters (5.3.7)
- Promote and support walking and cycling initiatives (5.3.8)
- Smarter choices – 'Choose How You Move - Worcestershire' (5.3.9)

5.3.1 Action: Travel Planning

A Travel Plan is a package of measures, initiatives and targets tailored to enable an organisation to reduce its impact from travel and transport on the environment. Travel plans encourage changes in travel behaviour and reductions in single occupancy car journeys, leading to reduced congestion and emissions.

Travel plans have been widely adopted across the UK and have been shown to be cost-effective at reducing car usage in numerous situations. As a result, the adoption of Travel Plans is now widely promoted by the UK Government. There are a number of types of travel plans that differ based on the type of organisation: Councils, Schools, Workplace and Residential Travel Plans.

Most local authorities have been proactive in the development of Travel Plans for their own employees, and by providing guidance and support to schools, businesses and organisations in relation to the design and implementation of successful Travel Plans.

Council and Workplace Travel Plans are a package of measures produced by employers to encourage staff to use alternatives to single occupancy car-use. Such plans typically recognise that one solution is unlikely to be suitable for everyone and may include:

- A reduction in the number of single occupancy car journeys to work aim
- An increase in the use of more sustainable forms of travel to work
- A reduction in the amount of travel undertaken at work (e.g. Tele and video conferencing)
- Car-share to work schemes with designated parking;
- The development and implementation of Car Park Management Guidelines e.g. revising allocation of parking spaces or restricting their use;
- Enhancing facilities for passenger transport users (such as negotiated season ticket prices or free fare schemes, new or improved bus stop infrastructure, new or improved bus services and improved access to rail stations and services, for example)
- The support and promotion and enhancing facilities for cycling and walking e.g. provision of secure cycle store, discounts for purchasing bicycle schemes, lockers, showers and pedestrian/cycle paths;
- A dedicated bus service

- Reducing the need of staff to travel (e.g. flexible working arrangements such as remote access)

Employer/workplace travel plans can offer real benefits not only to the organisation and its employees, but also the community that surrounds it. It may help to relieve local parking or congestion problems or improve public transport connections across the area. It may also relieve stress on employees through reducing delays or providing the opportunity to cut their travel commitments by working from home on occasion. They can also be applied to new commercial/industrial developments that meet certain criteria i.e. greater than 2500m² office area or number of employees or car parking spaces.

'There are 35 active Workplace Travel Plans in the County, including some of the major employers such as the NHS Worcestershire Royal Hospital and QinetiQ. Bosch Thermotechnology Ltd is currently updating their Workplace Travel Plan with the assistance of Worcestershire County Council.' (WCC, 2011i)

School Travel Plans represent a commitment from schools to develop a package of measures aimed at encouraging healthier, safer and more environmentally friendly methods of travelling to and from school by parents, pupils and staff. They can be particularly effective in reducing emissions in AQMAs with lots of schools nearby.

Some UK councils have employed School Travel Plan Coordinators to assist teachers, pupils and parents in the development and implementation of Travel Plans, together with promoting health and environmental benefits of alternative travel choices. The Travel Coordinators provide guidance, and where appropriate, help establish a link between schools and other stakeholders. The Plans incorporate established programmes such as 'Safer Routes to School' and 'Active School Travel' but also aim to initiate a change in transport culture through education and encouraging change through initiatives like walking buses.

WCC are already proactive in encouraging uptake of School Travel Plans having developed documents and guidance for schools to develop their own plans available to download from dedicated webpages.

A number of local planning authorities require and support residential travel planning which involves the production of a travel plan for new (or existing) residential developments. 'Essentially, a Residential Travel Plan is a package of measures designed to reduce car use originating from new housing by supporting sustainable alternative modes of transport, and reducing the need to travel in the first place. As a result, Residential Travel Plans are focused on journeys made from one base location to a number of destinations and may include provisions for measures such as:

- Car Clubs;
- Car sharing schemes;
- Cycle stands, cycle lanes and cycle training;
- Bicycle user groups;
- Public transport information and marketing;
- High quality bus services;

WCC's Development Control team require all new developments of greater than 70 dwellings to produce a Residential Travel Plan. It is the developer's responsibility to set up the Residential Travel Plan and provide or procure a travel plan coordinator throughout the intended period of its operation.' (WCC, 2011i)

'Station Travel Plans are aimed at encouraging rail users to access their local station using sustainable modes, whilst also seeking to encourage greater use of rail travel. A Station Travel Plan is developed in partnership with the Train Operating Company that owns the station and key stakeholders to deliver against the objectives mentioned above. Station Travel Plans can bring about enhancements to the station to improve facilities, such as secure cycle parking, car sharing initiatives and improved bus and taxi facilities and information at stations.

Online Travel Plan Builder - Worcestershire County Council has developed a web-based Workplace Travel Plan Builder to allow organisations to create and maintain travel plans online, replacing paper based documents and reducing associated administration costs. It is intended that. It is proposed that this online tool will be extended to Station Travel Plans, Residential Travel Plans and School Travel Plans. ' (WCC, 2011i)

A comprehensive list of benefits of Travel Plans are outlined in LTP3: Smarter Choices Policy (WCC, 2011i) accessible at:

http://www.worcestershire.gov.uk/cms/pdf/LTP3_SCP_PUBLIC_FINAL.pdf

WRS will seek to promote greater take up of Travel Plans in Worcestershire via:

- Review existing Council Travel Plans to ascertain best practice and work with WCC to promote Travel Plans and encourage take-up of voluntary travel plans among Worcestershire employers
- Work with WCC and local schools near AQMAs to implement School Travel Plans
- Support and promote to LPAs to require Residential and Employment Travel Plans for large developments, for developments that will generate a large amount of travel, or for development that may cause local traffic problems such as unacceptable congestion or off-site parking problems. (All new developments of greater than 70 dwellings are expected to produce a Residential Travel Plan by WCC's Development Control Team (WCC, 2011i)).

Pros	Cons	Key Stakeholders	Cost	Time
Reduce traffic congestion and pollution, including greenhouse gas emissions, as part of an integrated transport strategy	Impact depends on voluntary uptake by external organisations	WCC, LPAs, WRS	L	S - L
LAs and WRS leading by example For businesses: recruit and retain staff more effectively, save money on car parking spaces and business travel, promote a more environmentally friendly corporate image		Linked Policy LA Climate Change; LTP3: A1, AQ1, AQ3, AQ5-7, C10, C14, DC1, DC10-11, SCP11-17, SMT2, SMT6, TCC4		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, KR4, LE2, LE5, RR8, RR10, RR11,	Yes	1 - 5	Impact depends on uptake but could have significant impact on all AQMAs

	WR5, WR9, WR13, WR14, DD4, DD9, DD12, LRH1, LRH3, LRH9, HF3, HF6, WG2, WG9			
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5.3.2 Action: Encourage car-sharing

Car sharing is when two or more people share a car and travel together. One of the people travelling is usually the owner of the vehicle and the other(s) usually make a contribution towards fuel costs. It allows people to benefit from the convenience of the car, whilst alleviating the associated problems of congestion and pollution, car parking requirements and costs of travel for individuals who participate. It also retains the usefulness of car travel for those for whom walking, cycling or passenger transport may not be an appropriate or viable option.

There are many socio-economic advantages for public including lower travel costs for drivers and passengers: 'travelling with others can reduce transport costs by up to £1000 a year' (LACORS, 2008). It gives employees and employers more transport options which can be included as part of Business Travel Plans.

WCC already operate a Car Share Database at www.worcesthirecarshare.org.uk which currently has 1450 members and 23 businesses. The database could be promoted via the WRS website and in conjunction with other options e.g. raising awareness of air quality campaigns and other strategies such as Business Travel Plans for new developments.

Pros	Cons	Key Stakeholders	Cost	Time
Fewer cars on road reducing congestion, parking issues and emissions	Requires significant behavioural change – people are very 'attached' to their cars	WCC, LA, LPA, WRS	L	S
Reduces need for car ownership		Linked Policy		
Lowers travel costs for drivers and passengers		LTP3: A3, AQ7, TCC2		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, LE2, RR10, RR11, WR13, WR14, DD12, LRH1, LRH9, HF3, WG2	Yes	1 - 4	Impact depends on amount of take up

5.3.3 Action: Promote Teleconferencing facilities and encourage uptake

A teleconference or teleseminar is the live exchange of information among several persons and machines remote from one another but linked by a telecommunications system. Audio teleconferencing involves no more complicated machinery than office or home telephone but

videoconferencing and web-conferencing are also widely available via the internet. In addition to tailored tools for business to facilitate teleconferencing there are many free services and software available also.

Teleconferencing offers huge savings to business through saved hours travelling to meetings, fuel, vehicle hire or company car purchase and maintenance and accommodation removing the need to travel at all. There are additional benefits for employees through improved moral, health and wellbeing, due to reduced travelling sitting in fixed position for long periods, overnight stays away from home and avoiding frustration or stress due to congestion.

This option can be included as part of employer travel plans, as discussed above, or as a standalone action. Details of best practice from review of Councils Travel Plans and links to free services could be promoted on WRS air quality webpages.

Pros	Cons	Key Stakeholders	Cost	Time
Reduces car journeys	Do not have one to one contact with clients	WRS, WCC, LPAs	L	S
Cost savings to employers on fuel, car hire, company cars & maintenance, car mileage allowances, overnight accommodation	Networking opportunities lost			
Health benefits to employees through removal of travel stress and improved work life balance	Some messages require demonstrating to live audience	Linked Policy		
	Message can be misunderstood due to lack of visual communication	LA Climate Change; LTP3: SCP11-17, TCC4		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, RR10, RR11, WR13, WR14, DD12, LRH1, LRH9, HF3, WG2	Yes	1 - 4	Impact depends on take up

5.3.4 Action: Promote flexible working arrangements

These are types of working arrangement which give some degree of flexibility regarding how long, where and when employees work. The flexibility can be in terms of time, location and the pattern of working.

Types of flexible working that could provide air quality benefit through reduced travel to workplaces are:

- Working from home – some or all working days per week
- Part time - Working less than full-time hours (usually by working fewer days).
- Compressed hours - Working full-time hours but over fewer days.

All of the above flexible arrangements reduce the number of journeys taken during the working week. They provide cost saving benefits for employees through saved fuel, car

maintenance or ownership and parking. Due to work-life balance employees moral, health and wellbeing improves from reduced travel stress and increased time at home.

Working from home arrangements also provides cost savings and benefits to employers through:

- additional hours gained from employees reduced journey time
- additional hours gained from employees potentially working from home when ill
- elimination of lost working days due to poor weather preventing employees travelling to workplace
- reduction in desk furniture required
- reduction in office floor space required
- reduction in car parking spaces required
- reduction in company cars and maintenance
- increased staff moral

Working from home arrangements may not be suitable for all industry and commercial practices and roles. There can be initial costs for some equipment for employee at home e.g. computer, phone, desk, chair depending on requirements and clearly IT network needs to be able to support remote working.

Many large employers including LAs already have flexible working arrangements in place although not all will include working from home practices. Local businesses could be encouraged to consider these measures within employer travel plans, as discussed above, or as a standalone action. Details of best practice from review of Council's Travel Plans and policies and links to external companies that can assist could be promoted on WRS air quality webpages.

Pros	Cons	Key Stakeholders	Cost	Time
LAs leading the way Travel cost savings to employees and improved work-life balance Cost savings to employers in terms of employees hours gained and infrastructure savings	Requires cultural change in many businesses as element of trust required for WFH Network connections, appropriate space & equipment required for working from home Additional fuel costs to employee through heating etc.	WRS, WCC, LPA	L	S - VL
		Linked Policy LA Climate Change; LTP3: TCC4		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, RR10, RR11, WR13, WR14, DD4, DD12, LRH1, LRH9, HF3, WG2	Yes	1 - 5	Impact depends on take up

5.3.5 Action: Workplace charging schemes

These are schemes where employees are charged to use their workplace car park provision and are intended to discourage reliance on single occupant car journeys to work and encourage uptake of more sustainable modes of transport e.g. walking, cycling, public transport and car sharing.

The employer will need to set up and operate a system for enforcing the scheme e.g. through issue of permits to those wishing to pay for provision and verifying offenders who have not made contributions.

Workplace charging schemes are voluntary actions by employers but could be promoted as part of Employer Travel Plans and other air quality promotional campaigns and material. But there are advantages to be gained for the employer by a reduction in land for car parking spaces required or freeing up spaces making more attractive for visitors to the business. Clearly the success relies on the availability and efficiency of more sustainable forms of travel and could be promoted in conjunction with a number of other options: for example, Council car parking pricing and provision, Park & Ride schemes, HOV and priority bus lanes, working from home initiatives and as part of Employer Travel Plans.

Such schemes are unlikely to be popular in times of economic austerity, but in locations where parking is already at a premium may be more acceptable.

Pros	Cons	Key Stakeholders	Cost	Time
Disincentive to use vehicle to travel to work reduces vehicle trips Reduces congestion and emissions Increase uptake in journeys via more sustainable transport	Unpopular increased costs to employees Penalise staff that live further afield from workplace Effect on businesses from lower staff morale, compromise service provision and staff retention Requires investment in provision of alternatives e.g. Park & Ride facilities, electric charging points Set up and operational costs of enforcing scheme, verifying offenders and permitted vehicles	LA, LPA, Businesses	L	M - VL
		Linked Policy		
		LTP3: AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, RR10, RR11, WR13, WR14, DD4, DD12,	Yes	1 - 3	Impact depends on voluntary take up and unlikely to be as popular as other initiatives

	LRH1, LRH9, HF3, WG2			
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5.3.6 Action: Improve cycling and walking routes in local areas.

Establish comprehensive walking and cycling networks complementing existing routes focused on main urban centres and main transport corridors and integrate with local public transport hubs. Includes new footpaths, cycle paths and crossings. Some initiatives are outlined in LTP3. Available routes could be promoted through production of walking and cycling maps of local areas. Also should be applied to any new substantial developments and business travel plans within the planning regime.

Makes changing travel behaviour and mode of transport more attractive. In addition to reducing number of car journeys and therefore emissions this initiative also provides health benefits to individuals who participate in a permanent change and meets requirements of LA Health policies. Also supports local economy through purchases of bikes and accessories. Maximum benefit would be achievable through combining with associated actions such as introducing more secure cycle stores in local destinations and promotion of cycling and walking initiatives.

Pros	Cons	Key Stakeholders	Cost	Time
<p>Successful implementation encourages uptake of sustainable travel</p> <p>Reduce congestion</p> <p>Health benefits and fuel cost savings for individuals</p>	<p>Potentially benefits wider area but limited effect within AQMAs</p> <p>Limited capacity to input in narrow streets</p> <p>Could be expensive and long term before completed</p> <p>Potential lack of facilities at workplaces for employees</p> <p>Also requires provision of secure parking for bikes</p>	<p>WCC, LPA, Health promoters</p> <hr/> <p>Linked Policy</p> <p>LTP3: A1, A3, A4, AQ3, AQ5-7, C1-6, C8, DC1, DC9, DC11, SMT6, TCC4, W1-2, W5, W10</p>	NQ	S - VL

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR3,	Possible routes within AQMA	0 - 1	Majority of traffic through AQMA is trans boundary improving local routes may have limited effect on AQMA. New ADR development will include cycling and walking enhancements to gyratory but not due completion until 2022.
Lickey End	None	Yes	1 - 3	Forecast benefits are dependent on amount of take-up and implementation as part of combined strategy with other associated actions. Increasing beneficial effect where there is a
Redditch Road	RR10, RR11,	Yes		
Worcester Road	WR13, WR14,	No – street canyon		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
				number of AQMAs in close proximity and economies of scales can be achieved through implementation e.g. Bromsgrove
Dolday	DD4, DD12,	Need WCC study	1 - 3	Forecast benefits are dependent on amount of take-up and implementation as part of combined strategy with other associated actions. Increasing beneficial effect where there is a number of AQMAs in close proximity and economies of scales can be achieved through implementation e.g. Worcester City
Lowesmoor	LRH1, LRH9,	No – street canyon		
Port Street	None	No – street canyon	0 - 2	Narrow carriageway excludes significant improvements to cycling and walking route through AQMA unless a one way system or pedestrianisation action is adopted in combination. Potential benefit if adopted in wider Evesham area
Horsefair	HF3,	No – street canyon	0 - 1	Narrow carriageway excludes significant improvements to cycling and walking route through AQMA unless a one way system or pedestrianisation action is adopted in combination.
Welch Gate	WG2	No – street canyon	0 - 1	Narrow carriageway excludes significant improvements to cycling and walking route through AQMA unless a one way system or pedestrianisation action is adopted in combination. Potential benefit if adopted in wider Bewdley area

5.3.7 Action: Install secure cycle parking shelters

Providing secure cycle parking stores in local destinations makes changing travel behaviour and mode of transport more attractive. In addition to reducing number of car journeys and therefore emissions this initiative also provides health benefits to individuals who participate in permanent change. Some initiatives are outlined in LTP3 such as installing secure cycling stores at railway stations but more benefit could be achieved by expanding to other destinations such as car parks around town centres, local employment, education and leisure facilities, and new large residential developments. Maximum benefit would be achievable through combining with associated actions such as improving cycle network into those locations and promotion of cycling initiatives.

'Recent surveys have shown that demand to cycle in Worcestershire is constrained by a lack of secure cycle parking. Worcestershire County Council has set out its policy for cycle parking in the LTP3 Cycle Policy.' (WCC,2011m)

Pros	Cons	Key Stakeholders	Cost	Time
Successful implementation results in uptake of sustainable travel	Potentially benefits wider area but limited effect within AQMAs	WCC, LPA	NQ	S - VL

Reduce congestion Health benefits and fuel cost savings for individuals	Could be expensive depending on number required in final design			
	Space required for installation Concern for safety of cyclists without additional network improvements	Linked Policy LTP3: A1, AQ3, AQ5-7, C7, DC1, DC5, SMT6, TCC4		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR3,	No - Not a specific destination	0 - 1	Majority of traffic through AQMA is trans boundary installing in town centre likely will have limited effect on AQMA.
Lickey End	None	No - Not a specific destination	1 - 3	Forecast benefits are dependent on amount of take-up and implementation as part of combined strategy with other associated actions. Increasing beneficial effect where there is a number of AQMAs in close proximity and economies of scales can be achieved through implementation e.g. Bromsgrove
Redditch Road	RR10, RR11,	No - Not a specific destination		
Worcester Road	WR13, WR14,	Yes – Market St car park		
Dolday	DD4, DD12,	Yes within Newport St car park	1 - 3	Forecast benefits are dependent on amount of installations and implementation as part of combined strategy with other associated actions. Increasing beneficial effect where there is a number of AQMAs in close proximity and economies of scales can be achieved through implementation e.g. Worcester City
Lowesmoor	LRH1, LRH9,	Within St Martins Gate		
Port Street	None	No – street canyon	0 - 2	Narrow carriageway excludes installation in AQMA unless a one way system or pedestrianisation action is adopted in combination. Potential benefit if installed in Evesham town centre depending on number of installations
Horsefair	HF3,	No – street canyon	0 - 1	Narrow carriageway excludes installation in AQMA unless a one way system or pedestrianisation action is adopted in combination. Potential benefit if installed in Kidderminster town centre depending on number of installations
Welch Gate	WG2	No – street canyon	1 - 2	Narrow carriageway excludes installation in AQMA unless a one way system or pedestrianisation action is adopted in combination. Potential benefit if installed in Bewdley town centre depending on number of installations

5.3.8 Action: Promote and support walking and cycling initiatives in Worcestershire

There are many national and local initiatives encouraging the health benefits of cycling and walking and clearly also have a potential benefit for local air quality such as:

National Bike Week, Choose How You Move Halfords cycle race, Walk to school week, employee loan schemes for bike purchases, company cycle usage mileage schemes.

Such initiatives should be supported and encouraged through local advertising, production of cycle and walking maps, providing details or links on WRS air quality webpages, Worcestershire Works Well organisation, Choose How You Move initiatives and working with local businesses to include as part of employer travel plans.

'Worcestershire Cycle Loan Scheme - was established in 2008, which enables any resident in Worcestershire (over the age of 18 years) to borrow a bike for a period of 6 months. A fleet of bicycles and tandems were purchased and fitted with cycle computers to monitor mileage. All bicycles have been security coded by the Police. The key aim of this scheme was to encourage residents to try cycling for key journeys, such as to work. To date nearly 400 loans to new customers have taken place and there are currently 171 bikes on loan (89 to men, and 82 to women).' (WCC, 2011i)

Additionally, new businesses moving into area could be encouraged to take up initiatives as part of Employer Travel Plans via planning process.

More benefit gained by integrating option with others as part strategy to develop cycling into a realistic choice as a method of transport and Worcestershire as a cycle friendly destination.

Pros	Cons	Key Stakeholders	Cost	Time
Encourages uptake of sustainable travel Reduce congestion Health benefits and fuel cost savings for individuals	Potentially benefits wider area but limited effect within AQMAs Concern for safety of cyclists and walkers without additional network improvements Resource implications in supporting and promoting a range of initiatives.	WCC, LPA. Health promoters Linked Policy LTP3: A4, AQ3, AQ5-7, C1-14, DC1, DC5, SMT3, SMT6, TCC2, W1, W4-5	L	S - VL

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, RR10, RR11, WR13, WR14, DD4, DD12, LRH1, LRH9, HF3, WG2	Yes	0 - 2	Forecast benefits are dependent on amount of take-up and implementation as part of combined strategy with other associated actions. Increasing beneficial effect where there is a number of AQMAs in close proximity

5.3.9 Action: Smarter Choices – ‘Choose how you move - Worcestershire’

‘The term "Smarter Choices", put simply, refers to the use of marketing and information measures which seek to encourage and enable the use of sustainable travel modes, and typically include workplace, school, residential, community and personal travel planning, car sharing initiatives, car clubs, improved information provision, and innovative marketing, media and awareness-raising campaigns.’ (WCC, 2011i)

The aim is to encourage ‘modal shift’ from car based trips to more sustainable travel such as walking, cycling and public transport through a combination of tailored travel advice, information and incentives. The process and delivery of travel planning is central to the delivery of Smarter Choices (WCC, 2011i).

WCC identify this action within LTP3 and currently support ‘Choose how you move - Redditch’, a three-year programme which encourages people in the borough to travel more sustainably. With the help of funding by the Department for Transport, the Choose team produce a range of events, information material and personal travel plans as a means of engaging as many people as possible, increasing their knowledge and appreciation of the benefits of sustainable travel.

The programme includes an Individual Travel Marketing campaign, periodic reprinting of walking/cycling and passenger transport maps and a programme of Travel Plan development for Employers and Organisations. ITM is a technique using personal telephone contact with households to identify those willing to make changes, before providing them with tailor made information on alternatives and incentives.

It follows on from success of the previous Worcester Choose How You Move Project which is recognised nationally as representing smarter choices best practice.

WRS will support and promote Smarter Choices particularly in districts with AQMAs.

Pros	Cons	Key Stakeholders	Cost	Time
<p>Reduces emissions via reducing amount of car journeys.</p> <p>Promotes healthier alternatives</p> <p>Supports charities work such as Sustrans</p>	<p>Use of telemarketing may deter people from participating.</p> <p>Relies on individuals making behavioural change.</p> <p>Needs to be used in conjunction with other action e.g. improvements to cycle and pedestrian facilities</p>	WCC, WRS	NQ	M - VL
		<p>Linked Policy</p> <p>LA Climate Change;</p> <p>LTP3: A1, A3-5,C1, C11, DC1, DC5, ITP2-13, ITP15, ITS8, SCP1-6, SCP10-11, SCP20-21, SMT5, SMT7, TCC2, TCC4</p>		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	More info required	0	Currently concentrating on Redditch where no AQMAs, Worcester City programme complete. Increased impact depends on funding availability

5.3.10 Car Clubs

Car clubs offer an alternative to private car ownership. A car club provides its members with quick and easy access to a car for short term hire. Members can make use of car club vehicles as and when they need them, for as little as half-an-hour at a time. A car can usually be booked by telephone or internet, up to an hour before it's needed. Unlike conventional car hire companies, car club cars are not parked at one central location but are usually located singly in designated bays in urban and suburban streets – near to where the users need them. Car clubs can also be a workplace or a residential development club. Car clubs can achieve a significant reduction in the number of car miles driven, through changes in travel behaviour and in the number of cars on the road. In the UK, former car owners increase their use of non-car transport modes by 40% after joining a car club (LaCors, 2008).

While car clubs are designed to be self-financing, they may need start up funding in the initial period. Local Authorities (including WCC) may be required to provide funding which can give a project credibility and release funding from other sources.

Currently the only car club WRS have identified in Worcestershire is in Malvern and there is another club in nearby Colwall, Herefordshire. WRS will work with LAs and WCC to promote and establish car clubs in conjunction with local communities and groups in areas where opportunities or a desire to form a club is identified. This action could form part of a wider Low Emissions Strategy and or be promoted via WRS and WCC websites.

Advice on setting up car clubs can be found at Carplus, a Non Government Organisation (NGO) supporting the development of affordable accessible and low-carbon shared mobility. Carplus have produced a number Best Practice Guidance documents which can be found and downloaded from www.carplus.org.uk.

Pros	Cons	Key Stakeholders	Cost	Time
<p>Reduces emissions via reduced congestion.</p> <p>Encourages modal shift to other sustainable transport and less reliance on car ownership.</p> <p>Substantial savings for members on reduction in Vehicle Licence, MOT and services</p> <p>Can reduce parking requirements in cities due to reduction in cars</p>	<p>Relies on private enterprise to organise and continually run</p>	<p>LA, WCC, WRS</p>	<p>L</p>	<p>S - M</p>
		<p>Linked Policy</p> <p>LA Climate Change; LTP3: A5, AQ3, AQ5-6, DC1, DC10, SCP6, SCP11-12, SCP16, SCP21, TCC1-2, TCC4</p>		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	0 - 2	Impact depends on take up.

5.4 Education & Information Actions

These are a broad range of actions designed to inform the general public on local air quality issues and/or encourage individuals to effect behavioural changes that could benefit local air quality.

Actions discussed in this section are as follows:

- Smarter driving tips (5.4.1)
- Provide link to real time air quality information (5.4.2)
- Establish an Air Quality Alert System (5.4.3)
- Make air quality information more available and accessible (5.4.4)
- Raise the profile and increase awareness of air quality within the region (5.4.5)

5.4.1 Action: Smarter Driving Tips

Smarter driving (or eco-driving) is the adoption of environmentally conscious driving techniques and optimal vehicle operation. Factors to consider include driving behaviour, tyre type and pressure, and speed management. (LACORS 2008)

Many motorists waste money because of the way they drive or the way they use and maintain their car. Simply offering advice to motorists could help them change the way they behave and reduce their motoring costs whilst also reducing emissions of air pollutants. Smarter Driving Tips and information on local providers could be added to WRS Air Quality webpages.

Local Authorities can take the lead by providing eco-driving courses for employees. Employers can be encouraged to include courses as part of their Travel Plans via planning regime and targeting car fleet managers, professional drivers from local businesses.

Pros	Cons	Key Stakeholders	Cost	Time
Lower emissions of air pollutants and greenhouse gases. Lower motoring costs for drivers.	Relies on individuals making behavioural change.	WCC, LAs, WRS Linked Policy LTP3: AQ7, C12, F8, TCC1	L	S

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	1	Does not actually reduce car journeys made

5.4.2 Action: Provide link to real time air quality information

There are some websites that have information on air quality updated on a daily basis. This provides free information about air pollution and related health advice to those with medical conditions that are proved or believed to be exacerbated by poor air quality such as asthma, emphysema, bronchitis, heart disease or angina.

Following some research into most appropriate website(s) available a link could be provided on Air Quality pages of WRS website, and potentially also accessible via social networking

sites. This would be a relatively quick and simple solution to action. However, accessibility would depend on persons having access to computers and internet.

The possibility of displaying via other public displays, such as in street VMS or at Doctors surgeries, could be explored but will involve additional partnership working and be considerably more expensive and a longer timeframe before delivered.

Pros	Cons	Key Stakeholders	Cost	Time
Empowers people most affected by poor air quality to change their behaviour and reduce impact of pollution on their health. Raises profile of air quality issues and encourages change in travel choices.	Has no impact on reducing pollutant levels Relies on individuals making behavioural change. Requires internet access	WRS, Public Health bodies, WCC, LA	L	S
		Linked Policy LTP3: ITS4, ITS8		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	0	Has no effect on pollution levels

5.4.3 Action: Establish an Air Quality Alert System

Air quality alerts provide free information about air pollution and related health advice to those individuals with medical conditions that are proved or believed to be exacerbated by poor air quality such as asthma, emphysema, bronchitis, heart disease or angina. These alert systems are not intended to help mitigate existing air quality effects but helps raise profile of air quality and reduce hospital admissions and NHS costs.

Subscribers receive a text message to their mobile phone, a recorded voice message to their home phone or an email the evening before or the morning of an expected air pollution episode.

Costs of establishing system depend on a number of variables including:

- Availability and format of an emissions inventory
- Size of area to be covered
- Number of local authorities involved
- Whether low or high resolution forecasts are required
- Whether the SMS, voicemail and email alert system is required

Costs are indicated as £5 – 20k to set up and operate 1st yr. and £3 to £10k per year thereafter from other experiences in UK (LACORS 2008).

Pros	Cons	Key Stakeholders	Cost	Time
Empowers people most affected by poor air quality to change their behaviour and reduce impact of pollution on their health.	Has no impact on reducing pollutant levels Relies on individuals making behavioural change.	WRS, WCC, LAs, Politicians	M - VH	NQ
		Linked Policy LTP3: AQ2, AQ5, AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Review required	0	Has no impact on reducing pollutant levels. Feasibility may depend on available funding

5.4.4 Action: Make air quality information more available and accessible

WRS are committed to ensuring all relevant air quality documents are accessible to the general public as they become available. WRS website went live in September 2012. Currently the air quality pages on the website provide general information on the pollutants of concern, air quality objectives and access to the last three annual reports provided to Defra for each local authority. During or following the completion of the AQAP consultation period this Action Plan and future final versions will be made available to download. Additionally the 2013 Progress Reports will be uploaded upon completion later this year. Reports can be provided for review in paper format, upon request by members of public if they have no access to the internet.

Documents pertaining to individual proposed developments that may be the subject of air quality concerns are available from the relevant LPA.

Pros	Cons	Key Stakeholders	Cost	Time
Provides information for people on air quality in their local area.	Has no impact on reducing pollutant levels	WRS	L	S
		Linked Policy		
		None		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	0	Has no effect on pollution levels

5.4.5 Action: Raise the profile and increase awareness of air quality within the region

The choices that people and organisations make in terms of travel and general behaviour can have a significant impact on local air quality. It is important that members of the public and organisations are informed about local air quality issues, as their support is important to the success of the AQAP. It is also important that local air quality is linked with other programmes being progressed within the Local Authorities such as Climate Change Strategies, Local Development and Transport Plans. Raising the profile and awareness of local air quality issues will be achieved by the range of activities outlined in this document:

- The AQAP consultation process
- Formation of Steering Group and engagement with partners
- Publication of material and promotion of alternatives on website and potentially other operational centres
- Implementation of shortlisted actions
- Working with local communities to produce travel plans and other relevant actions

Pros	Cons	Key Stakeholders	Cost	Time
Raising awareness of issues encourages people to switch to alternative	Relies on individuals changing behaviour	All	NQ	NQ
		Linked Policy		
		LTP3: AQ3,		

modes of transport		AQ7		
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AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	0 - 5	Impact depends on success of all of the above

5.5 Planning Initiative Actions

Planning and development control play an important role in minimising the potential detrimental impacts that new developments may have on local air quality. Air Quality is already considered during the development planning process and WRS are consulted on all relevant applications.

It is important that all small or large-scale major developments are considered in terms of their potential impact on local air quality and particularly relevant where proposed developments may exert an impact on an existing AQMA, and that all practicable mitigation measures are implemented. Development proposals should aim to be 'air quality neutral' and not lead to further deterioration of existing poor air quality and increased exposure to existing poor air quality should be minimised.

The Herefordshire and Worcestershire Air Quality Planning Protocol was adopted by all Worcestershire district councils and Herefordshire Unitary Authority in 2009. The protocol sets out the general requirements for Air Quality Assessments for new developments. A new ITC system being introduced during the consultation period will highlight areas where air quality is a concern and enhance the current screening process for LPAs.

However there are a number of additional actions identified below that could be applied to a range of situations within the planning regime to improve local air quality.

Actions discussed in this section are as follows:

- Produce Supplementary Planning Document in respect of Air Quality (5.5.1)
- Formula for s106 (or CIL) contributions towards air quality mitigation measures and programmes (5.5.2)
- Encourage the uptake of Employer and Residential Travel Plans for major employers and new developments to the area (5.5.3)
- Encourage developers to provide sustainable transport facilities and links serving new developments (5.5.4)
- Compulsory Purchase Schemes (5.5.5)

5.5.1 Action: Produce Air Quality Supplementary Planning Document

Supplementary Planning Documents (SPDs) represent guidance formally adopted by local authorities in England. They provide additional information in relation to specific policy areas within the Local Development Framework. Many local authorities have now published SPDs on air quality. They generally set out when an air quality assessment is required and what it should include. Some also include criteria for assessing the significance of the impact of a proposed development. These documents are a very useful tool for providing transparent and consistent advice to both development control departments and to developers. They can also provide a benchmark to assess the adequacy of an air quality assessment (EPUK, 2010)

WRS will produce an up to date SPD to serve as technical guidance on Air Quality for all partner local planning authorities, including County Council, and developers to replace the existing Herefordshire and Worcestershire Planning Protocol (2008).

The SPD will clarify and specify requirements for air quality assessments for developments in line with current national guidance from DEFRA and in line with the NPPF and EPUK Planning Guidance 2010 (due to be updated in 2013) e.g.

- Identify when Air Quality Assessments for developments are required i.e. size and type of development;
- What should be considered and provided within an assessment e.g. cumulative impact of committed developments locally, input data;
- Which air quality models are acceptable use within for assessments;
- Outline acceptable monitoring data to be used within models and presentation;
- Provide guidance on types of sustainable measures developers should consider incorporating within development plans to provide air quality neutral and beneficial developments in line with this AQAP and LA Sustainable Development Policies;
- Provide matrices for developers to calculate proportion of sustainable measures required for developments e.g. number of EV points per car parking spaces or financial contributions towards Low Emission Strategies via CIL;
- Outline when mitigation measures will be required of developers based on principle of 'air quality neutral' developments;
- May outline requirements for financial contributions (e.g. CIL's) from developers of small scale and large scale developments towards air quality targets; (*include if highlighted above not preferred*)

Production of the SPD will be future work undertaken by the Steering Group. The guidance will be inserted into the Air Quality Action Plan as an appendix and provided on the air quality pages of the WRS website.

Pros	Cons	Key Stakeholders	Cost	Time
Specifies requirements for air quality assessments for developers and LPAs. Provides up to date guidance in line with recent national and local policy changes and frameworks.	Up dated EPUK guidance not yet available	WRS, LPAs, WCC planning authority	L	S
		Linked Policy		
		NPPF; LTP3:DC6		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	NQ	Depends on proximity, size and impact of new developments to AQMAs and schemes to be implemented

5.5.2 Action: Formula for s106 (or CIL) contributions towards air quality mitigation measures and programmes.

Planning obligations also known as Section 106 (of the Town and Country Planning Act 1990) agreements are legally binding agreements negotiated, usually in context of a planning application between local planning authorities and developers. They provide a means of ensuring that developers contribute towards any infrastructure and services that the Council believes are necessary to facilitate proposed developments. Contributions may be either in cash or in kind; for example, by providing funds for traffic calming measures, cycle paths, air quality monitoring, changes to junctions, traffic signals etc. (LACORS, 2008).

The Community Infrastructure Levy (CIL) is a new levy designed to replace s106 agreements that local authorities can choose to charge on new developments in their area. In authorities where a CIL is in force, land owners and developers must pay the levy set by the local council based on the size and type of the new development.

The community infrastructure levy:

- gives local authorities the freedom to set their own priorities for what the money should be spent on
- gives local authorities a predictable funding stream that allows them to plan ahead more effectively
- gives developers much more certainty from the start about how much money they will be expected to contribute
- makes the system more transparent for local people, as local authorities have to report what they have spent the levy on each year

Some LAs in Worcestershire are already considering or in process of switching from section 106 agreements to the new CIL type of levy. WRS will work with LPAs to ensure that a proportion of CILs is utilised for air quality projects or section 106 agreements are obtained where appropriate.

Pros	Cons	Key Stakeholders	Cost	Time
Developer Funding can be used for a range of air quality issues specific to AQMA.	Competing with other LPA requirements in Local development plans.	WRS, LPA, LA, Politicians	L	S - M
Air quality impacts can be mitigated.	May deter developments and associated infrastructure improvements which could benefit LAQM	Linked Policy		
Places restrictions on developments		LTP3: AQ4, AQ6-7, C4, DC8		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	NQ	Impact depends proportion of CIL funding obtained and individual scheme s106

5.5.3 Action: Encourage the uptake of Employer and Residential Travel Plans for major employers and new developments to the area.

WRS will work with Local Planning Authorities to ensure these are given appropriate levels of consideration within the planning regime for new developments and form part of Local Development Strategies.

More details on Travel Plans are outlined in Lowering Emissions actions above.

Pros	Cons	Key Stakeholders	Cost	Time
Encourages uptake of sustainable modes of transport	Relies on individuals to change travel behaviour	LPAs, WCC, WRS	L	On-going
Reduces congestion and emissions		Linked Policy		
		NPPF; LTP3:AQ4, AQ6-7, DC10, ITP6, ITP9, SCP11-17		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	KR3, RR10, RR11, WR13, WR14, DD4, DD12, LRH1, LRH9, HF3, WG2	Yes	NQ	Depends on proximity, size and impact of new developments and schemes to be implemented

5.5.4 Action: Encourage developers to provide sustainable transport facilities and links serving new developments

WRS will work with Local Planning Authorities and developers to ensure sustainable development initiatives (for example secure cycle storage, bus stops, electric charging points) are given appropriate levels of consideration within the planning regime for new developments and form part of Local Development Strategies now and in the future.

More details on sustainable travel initiatives are outlined in Promotion of Alternatives section above.

Pros	Cons	Key Stakeholders	Cost	Time
Encourages uptake of sustainable modes of transport Reduces congestion and emissions	Relies on individuals to change travel behaviour	LPA, WCC, WRS Linked Policy NPPF; LTP3: A3-4, AQ4, AQ6-7, C2, C4, DC1-2, DC5, DC7-8, ITS10, SMT6, TCC4	L	On-going

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	NQ	Depends on proximity and impact of new developments and schemes to be implemented

5.5.5 Action: Compulsory Purchase Schemes

A compulsory purchase order (CPO) is a legal function in the United Kingdom and Ireland that allows certain bodies which need to obtain land or property to do so without the consent of the owner. In the United Kingdom, most Orders are made as subordinate legislation under powers given to Local Authorities in existing legislation (e.g. an Order for road works is made under the Highways Act 1980). Whilst the powers exist the Authority must demonstrate that the taking of the land is necessary and there is a compelling case in the public interest. Owners or occupiers can challenge this, and their objection will be heard by an independent Inspector.

In some areas of the UK where an AQMA has been declared based on a single or small number of receptors it has sometimes been possible to effectively remove the residential exposure via compulsory purchase of the property(s) (DMBC, 2011).

Costs involved will be very high due to compensation rights for the owners which usually include the value of the property, costs of acquiring and moving to a new property, and sometimes additional payments. Then there are the costs involved in demolishing the properties to remove street canyon and construction of replacement open space.

Clearly this would be an unpopular and very expensive option to action and therefore only desirable as a last resort. However potentially it will be the most effective approach to removal of the reduced dispersion of emissions factor where short street canyons exist.

Pros	Cons	Key Stakeholders	Cost	Time
Removing street canyon increases airflow and dispersion of emissions	Requires acquirement of residential properties or business premises	LAs LPAs	VH	M - VL
	Very expensive for purchase of properties, compensation, demolishing and rebuild	Linked Policy		
		None		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	None	No	0	No street canyon
Lickey End	None	No	0	No street canyon
Redditch Road	RR5	Review required	4 - 5	There are a couple of short street canyons comprising 3 to 4 houses. Removing properties would potentially allow for complete revocation of AQMA.
Worcester Road	WR12	Review Required	4 - 5	There are a couple of street canyons comprising a number of residential dwellings and businesses. Removing business premises on western side of Hanover Street/Worcester Road bend would effectively remove canyon and potentially allow for complete revocation of AQMA. Black Cross PH may be listed reducing impact
Dolday	DD6	No	0	All Saints Road and Bridge Street are street canyons. Not feasible to action due to number of properties involved.
Lowesmoor	LRH4	No	0	Great lengths of the AQMA are street canyons and therefore not feasible due to the number of properties required
Port Street	PS2	No	0	The whole length of the AQMA is a street canyon and therefore not feasible due to the number of properties required
Horsefair	HR4	No	0	Not feasible because of listed buildings
Welch Gate	WG3	No	0	Not feasible because of listed buildings

5.6 Policy & Guidance Actions

These are a mixture of actions involving partnership working to ensure other local authority strategies are in harmony with air quality issues. Several are broad actions WRS are unable to influence or participate in directly as they go beyond local issues and achievement will rely on direction at central government level.

Actions discussed in this section are as follows:

- Air Quality policies in Local Development Frameworks (5.6.1)
- Influence Climate Change Strategy actions (5.6.2)
- Air Quality networks (5.6.3)
- Lobby and support government to subsidise public transport (5.6.4)
- Lobby and support government to ensure the manufacture and use of cleaner vehicles and fuels (5.6.5)
- Lobby and support government to adopt policies to carry out nationally targeted green transport initiatives (5.6.6)
- Removal of receptors from Air Quality Management Areas (5.6.7)
- Forge closer links with local health agencies (5.6.8)
- Development of a Low Emission Strategy for Worcestershire (5.6.9)

5.6.1 Action: Air Quality policies in Local Development Plans.

Local development plans and frameworks outline the policy for sustainable development within LAs areas. Many LAs are redrawing their LDPs at this time to reflect recent central government changes through the introduction of the NPPF. WRS will work with LAs and LPAs to ensure air quality considerations have appropriate profile and strategy within local policies.

Pros	Cons	Key Stakeholders	Cost	Time
Increase general awareness of air quality issues in LA Encourage strategies for improving local air quality and minimising negative impacts from development	Some Local Plans may already have been completed and adopted	LPA's, WRS Linked Policy NPPF, LDP, LDF	L	S

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	3 - 5	Appropriate policy provides checks and restrictions on new developments

5.6.2 Action: Influence Climate Change Strategy actions

Climate change strategies are primarily concerned with reducing carbon dioxide (CO₂) but it is clear from review of local policy (see section 4) that many of the strategies adopted to improve carbon emissions are similar to actions proposed in this document. However it is recognised that some climate change improvements can have a negative effect on local air quality, for example:

- Biomass boilers – boilers that use biomass fuels (wood, straw, poultry litter) are increasingly used as renewable energy sources. However they emit LAQM pollutants including nitrogen oxides and particulate matter. NO_x emissions due to biomass boilers will rise from 8.7 kilotonnes in 2015 to 20.86kt in 2020 in UK (Air Quality News, February 2013)
- Vehicles with lower CO₂ emissions - some diesel vehicles may have lower CO₂ emissions but higher air pollutant emissions.
- Tree planting within AQMA could have a detrimental effect. Refer to Lowering Emissions section above.

A close working partnership with climate change groups is required to ensure activities are in harmony with each other strategies and do not cause detrimental effects.

Pros	Cons	Key Stakeholders	Cost	Time
Increase general awareness of air quality issues in LA Encourage strategies for improving both local air quality and climate change and minimising negative impacts on either	Some actions may already have been completed	Climate Change groups, WRS Linked Policy LA Climate Change; LTP3: TCC1, TCC5, TCC12	L	On-going

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Yes	NQ	Impact depends on future planned schemes

5.6.3 Action: Air quality networks

An air quality network is a group of councils working in partnership to address air quality issues in their area. Networks enable councils to pool data together and gain an overall perspective of air quality in their area. (LACORS, 2008)

There are a number of advantages:

- Sharing information provides a more comprehensive and detailed picture of air quality across a region.
- Sharing experiences to avoid duplication of effort.
- Networks make it easier for councils to work together on developing joint actions across the area.
- Pooling financial resources can allow the purchase of expensive monitoring equipment, which could be prohibitively costly for one council alone.
- Joint funding of a network co-ordinator can provide dedicated expertise to all councils involved. (LACORS, 2008)

In many respects these are exactly the ideals that led to the formation of WRS and the advantages the amalgamation of environmental health departments can provide.

An air quality network exists between the neighbouring local authorities north of the Worcestershire border. The West Midlands authorities of Birmingham, Solihull, Coventry, Walsall, Dudley, Sandwell and Wolverhampton have formed a partnership to tackle air quality in the region via the West Midlands Low Emission Towns and Cities Programme (LETCP).

WRS already have some links with the West Midlands authorities through association with the Midland Joint Advisory Committee (MJAC). However closer links could be forged with the coordinators of the programme to learn from their experience of implementing a Low Emission Strategy, LEZ feasibility study and best practises and potentially undertake joint exercises or actions where applicable.

Pros	Cons	Key Stakeholders	Cost	Time
Share information and experience and supplier contacts	Other authorities local circumstances and mitigation strategy may not be relevant to Worcs	WRS, MJAC, LETCP	L	S - L
Joint beneficial exercises or actions		Linked Policy		
Economies of scale through joint implementation of actions		None		

5.6.4 Action: Lobby and support government to subsidise public transport

Above inflation railway ticket price increases are often reported in the news. Buses in AQMAs were observed to often be barely half full even at peak time traffic. In a recent survey of Redditch borough inhabitants by the 'Choose how you move team', 77% of those surveyed stated 'nothing' would persuade them to switch to bus travel for their work journeys. These demonstrate the enormity of the challenge of successfully encouraging the public to switch to alternative modes of transport. An integrated, reliable, cleaner public transport service is unlikely to provide sufficient impact on reducing emissions without an accompanying attractive and affordable pricing structure.

Pros	Cons	Key Stakeholders	Cost	Time
Successful lobbying could result in reduced ticket prices on public transport providing economical alternative to car	Requires additional government funding in austere economic climate	Politicians	L	M - VL
		Linked Policy		
		LTP3: AQ7, ITP2, ITP10		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Unknown	NQ	Beyond WRS remit

5.6.5 Action: Lobby and support government to ensure the manufacture and use of cleaner vehicles and fuels

Technological advancements in engines and emissions can have an enormous impact on local air quality as older more polluting vehicles are replaced. Engine advancements in conjunction with other policies such as the recent car scrappage scheme, initiatives to

encourage take up of low emission vehicles and disincentivising use of most polluting diesel vehicles can dramatically speed up the process of reducing emissions on our roads

Pros	Cons	Key Stakeholders	Cost	Time
Successful lobbying should result in increase in lower emission efficient engines and fuels	Requires government pressure effecting changes in international companies and influencing public choice of vehicle	Politicians	NQ	L - VL
		Linked Policy		
		LTP3: AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Unknown	NQ	Beyond WRS remit

5.6.6 Action: Lobby and support government to adopt policies to carry out nationally targeted green transport initiatives

These could be leave your car at home day, green transport week, car sharing initiatives, incentives to employers to provide travel plans, increase cycling initiatives, free bus travel for a day. If coordinated with the worst air quality months annually i.e. December and January could have significant impact on local levels.

Pros	Cons	Key Stakeholders	Cost	Time
Successful lobbying results in uptake of sustainable travel Increase profile of air quality issues, alternative transport	Requires government pressure and new incentives effecting changes in public behaviour	Politicians	NQ	L - VL
		Linked Policy		
		LTP3: AQ7		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Unknown	NQ	WRS are unable to influence action

5.6.7 Action: Removal of Receptors from Air Quality Management Areas

Similar to compulsory purchase of properties discussed in the previous section, where an AQMA has been declared based on a single or small number of receptors it may be possible to effectively remove exposure to the effect of air quality pollutants via permanent removal of all receptors at risk.

However, as this action is likely involve the Local Authority using available powers to forcibly remove residents from their homes and incur associated compensation costs of doing so, in reality it is unlikely to be a desirable option for the Local Authority.

Clearly this would be an unpopular and very expensive option to action and therefore only desirable as a last resort. However, potentially it could be a very effective approach to removing effect of poor air quality.

Pros	Cons	Key Stakeholders	Cost	Time
Removes receptors at risk	Does not improve air quality emissions	LAs	VH	M - VL
	Very expensive for repatriation of residents, compensation.			
	Leaves buildings empty and unused unless demolished which incurs additional cost	Linked Policy		
	Potentially further receptors at risk if buildings reoccupied	None		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
Hagley	KR6	Yes	3 - 4	Only 3 receptor properties identified in FA. Removing receptors would potentially allow for complete revocation of AQMA.
Lickey End	None	Review required	NQ	Number of receptors at risk not quantified at this time
Redditch Road	RR5	Yes	3 - 4	There are a couple of short street canyons comprising 3 to 4 houses. Removing receptors would potentially allow for complete revocation of AQMA.
Worcester Road	None	No	0	Too many receptors
Dolday	None	No	0	Too many receptors
Lowesmoor	None	No	0	Too many receptors
Port Street	PS10	Yes	3 - 4	Only 1 receptor property identified in FA. Removing receptors would potentially allow for complete revocation of AQMA.
Horsefair	None	Review required	NQ	Number of receptors at risk not quantified at this time
Welch Gate	None	Review required	NQ	Number of receptors at risk not quantified at this time

5.6.8 Action: Forge closer links with Local Health Agencies

Whilst most solutions and potential actions within air quality action plans aim to reduce or remove emissions of air pollutants from sources such as traffic, the requirement for these actions is fundamentally driven by the concern for public health for the reasons outlined in Chapter 1 of this document. The lead for Local Air Quality Management comes from the national strategies, standards and objectives set by the UK government, adopted from EU policies, and are informed by international health studies. As the targets to protect health are well established there is no specific requirement, currently, within the LAQM regime for coordination between local authorities and the local health service agencies.

However it may be beneficial to forge a partnership with local health agencies such as Public Health England and local Primary Care Trusts in conjunction with other partners to improve knowledge and understanding of local air quality and associated health issues.

A similar partnership is proposed within the neighbouring West Midlands authorities as part of the Lower Emissions Towns and Cities Programme. 'The LETCP has identified organisations in the West Midlands that are recognised nationally for their work on air pollution and health, including Birmingham University, Sandwell Primary Care Trust (PCT) and Birmingham NHS Health Impact Assessment Unit, with the purpose of developing a West Midlands steering group on health and air quality. In line with the new Public Health Framework, the steering group will review existing and emerging evidence regarding the local health impacts of air quality, including the Low Emission Zone Feasibility Study: Health Impact Assessment with a view to informing local policy development and implementation.' (WMLETCP, 2013)

WRS propose to undertake an initial review of relevant local health agencies in Worcestershire prior to invitations to representatives of those organisations to form a similar working partnership to that described above.

Pros	Cons	Key Stakeholders	Cost	Time
Improve knowledge and understanding of health issues Raises profile and increases awareness of air quality issues within the region Help to inform local policy development	Does not reduce or improve air quality emissions	WRS, Local Health Agencies e.g. PHE, PCT	L	S
		Linked Policy		
		None		

AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Review required	0	Has no effect on pollution levels

5.6.9 Action: Development of a Low Emission Strategy for Worcestershire

Refer to section 4.1.3 for detailed explanation and review of low emission strategies.

Pros	Cons	Key Stakeholders	Cost	Time
Combines preferred solutions into a coordinated strategy across the entire county. Focusses limited resources and have benefits for all areas. Supports sustainable	Reaching agreement amongst all seven partner authorities on strategy measures to be included may be difficult.	WRS, LA's LPA,s, WCC	L - M	S - M
		Linked Policy		
		NPPF, LA Climate Change; LTP3: A3, A8, AQ2, AQ4, C1-C14, DC2, F1, F3-5, F7-		

development policies in Local and National Policies. Supports local climate change plans and policies. Support and integrate Local Transport Plan & Highways initiatives		F10, ITP1-13, ITP15-16, ITP18, SCP1-6, SCP10-17, SCP20-21, SMT1-3, SMT5-7, TCC1-2, TCC4, TMP1-4, W1, W5-7, W10,		
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AQMA	Specific Issues Addressed	Feasibility Check	Impact Score	Rationale
All	None	Review required	4 - 5	Impact depends on range of actions incorporated into strategy but anticipated to include preferred efficient emission reducing solutions identified in AQAP

6 Worcestershire Air Quality Action Plan – AQMA Specific Actions

AQMA specific actions are listed in the order and identified by key code as follows:

AQMA	District	Key Issue ID
Kidderminster Road, Hagley	Bromsgrove DC	KR
Lickey End	Bromsgrove DC	LE
Redditch Road	Bromsgrove DC	RR
Worcester Road	Bromsgrove DC	WS
Dolday/Bridge Street	Worcester City Council	DD
Lowesmoor/Rainbow Hill	Worcester City Council	LRH
Port Street, Evesham	Wychavon DC	PS
Horsefair/Coventry Street	Wyre Forest DC	HF
Welch Gate, Bewdley	Wyre Forest DC	WG

Table 6-1 Worcestershire AQMA specific issues and actions as appropriate

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
KR1	Conjunction of busy A456 and A491 roads	Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
KR2	Current boundary of AQMA requires amendment to conform with best practice guidance	Amend boundary following future dispersion modelling if revocation not appropriate	Focus resources on reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place until future monitoring implies AQMA revocation is possible and modelling is undertaken	WRS, LA	0	L	M - L
KR3	Large proportion of single occupancy vehicles	Generic actions e.g. Travel Plans, HOV lanes, Car sharing, Smarter Choices Measures Package	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
KR4	Older private bus fleet destined for local schools	Generic actions e.g. School Travel Plans, Bus Quality Partners. WCC advise June 2013): 'The Public Service Vehicle Accessibility Regulations (PSVAR) 2000 will result in widespread renewal of bus fleets to more accessible models. In all cases, this will also result in more efficient, lower emissions vehicles.'	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
KR5	Significant queuing traffic observed in both directions on A456	Propose WCC undertake junction review to ascertain	Appropriate expertise addressing problem junction. Impact	Not included within current LTP3 runs until 2026 so timescales	WCC	NQ	NQ	M - L

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
	heading for A491 Stourbridge Road	improvements to current and future predicted flows	depends on resulting scheme	could be long.				
KR6	AQO only exceeded at a few properties	Mitigation measures should be proportionate. Generic actions e.g. all	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
KR7	HGVs largest source	Generic actions e.g. FQPs, utilising existing VMS	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
KR8	Long Term Local Trend data indicates only three exceedences have been recorded in last 7 years	Targeted monitoring of existing and new locations and analysis to continue	Increased data improves quality of long term trend analysis and indication of effect local and national actions	Resources required to analyses data	WRS	n/a	L	On - going
LE1	Current boundary of AQMA requires amendment to conform with best practice guidance	Amend boundary following future dispersion modelling if revocation not appropriate	Focus resources on reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place until future monitoring implies AQMA revocation is possible and modelling is undertaken	WRS, LA	0	L	M - L
LE2	A38 south from gyratory is very busy route, comes under extra pressure during motorway incidents	Reduction in traffic and congestion through shortlisted Generic actions. Request WCC & HA review alternative routes for traffic during incidents	Refer to Generic Actions. Appropriate expertise addressing incident congestion. Impact depends on alternative routes available	Refer to Generic Actions. Review not included within current LTP3 runs until 2026 so timescales could be long.	Refer to Generic Actions	Refer to Generic Actions		
						NQ	NQ	M - L
LE3	A38 south pedestrian crossing causes pause in flow	Replace with footbridge if feasible	Improves flow and increases pedestrian safety for nursery	Requires sufficient space for bridge footwall and pavement either side of carriageway	WCC	2	NQ	NQ
LE4	Narrowing of two lanes into one causes bottleneck at top of A38	Propose WCC undertake junction (including gyratory)	WCC advised June 2013: 'Included in the LTP3 as Scheme BR2 –	No details of scheme or timeline available at this time.	WCC	NQ	NQ	M - L

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
	south	review to ascertain improvements to current and future predicted flows	Bromsgrove Transport Package – Bromsgrove Eastern Bypass Junction Improvements.'					
LE5	School Lane is busy junction just south of AQMA	Review Lickey End First School Travel Plan. Encourage alternative modes of transport and routes	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
LE6	Traffic exiting Bamsley Hall Rd right	No turning right restriction except for emergency vehicles	Reduce congestion and improve flow	Vehicles will have to journey round gyratory to come back to chosen direction of travel but few vehicles affected. Effect on nursery business	WCC	1 - 2	NQ	S - M
LE7	Turning right into Harvester PH from A38 south	No turning right restriction	Reduce congestion and improve flow and encourage vehicles to access from Alcester Road	Vehicles will have to journey round gyratory to come back to chosen direction of travel but few vehicles affected. Effect on business	WCC	2	NQ	S - M
LE8	Exiting right from Esso garage towards gyratory	No turning right restriction	Reduce congestion and improve flow	Vehicles will have to reach gyratory via turning left onto School Lane and Alcester Road but few vehicles affected.	WCC	1 - 2	NQ	S - M
LE9	Lane markings on gyratory approach to B4096 north and M42 appear to confuse drivers	Request WCC review junction to ascertain any improvements can be made	Avoids potential incidents which could cause congestion. WCC advised June 2013: 'programmed for delivery as part of LTP3 BR2 –Bromsgrove	No details of scheme or timeline available at this time.	WCC	0 - 1	NQ	M - L

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
			Eastern Bypass Enhancements Scheme.'					
LE 10	In carriageway bus stop A38 south	Move bus stop further south or create pull-in stop where space available	Reduces amount of traffic arriving all in AQMA at one time and queuing at gyratory traffic lights	Not many spatial opportunities to create pull in stop. Also limited use of bus stop	WCC, Bus company	1	NQ	S – M
LE 11	No visible restrictions on gyratory with exception of box markings which are sometimes ignored	Increase restrictions and repaint double yellows on the gyratory and on approaches where appropriate. Emplace cameras and penalties for vehicles ignoring markings	Reduce vehicles blocking flow. WCC advised June 2013: 'Included in the LTP3 as Scheme BR2 – Bromsgrove Transport Package – Bromsgrove Eastern Bypass Junction Improvements.'	No details of scheme or timeline available at this time.	WCC	1	NQ	M – L
LE 12	Long term trend data analysis indicates higher pollution levels associated with A38 instead of M42	Targeted monitoring of existing and new locations and analysis to continue	Increased data improves quality of long term trend analysis and indication of effect of local and national actions	Resources required to collect and analyse data	WRS	0	L	S – M
LE 13	Further assessment out of date	Undertake up to date detailed dispersion modelling using latest tools, data	Provide more accurate source apportionment scenario and pollutant dispersion model to inform AQAP actions	Full calendar years' worth of data required for any new location to inform modelling in 2015. Cost of modelling and reporting	WRS	0	L	S – M
LE 14	Additional monitoring points required to capture data from different points	Locate and emplace new monitoring points depending on access	Increased data improves quality of analysis	Resources required to collect and analyse data	WRS	0	L	S – M
LE 15	Options identified in previous AQAP focus	Undertake up to date detailed dispersion	Provide more accurate source apportionment	Full calendar years' worth of data required	WRS	0	L	S – M

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
	on M42 improvements mostly not implementable	modelling using latest tools, data	scenario and pollutant dispersion model to inform AQAP actions	for any new location to inform modelling in 2015. Cost of modelling and reporting				
RR1	A38 Redditch Road is major through route between two junctions	Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
RR2	Redditch Road is occasionally impacted by large volumes of congested traffic during motorway incidents	Request WCC & HA review alternative routes for traffic during incidents	Appropriate expertise addressing incident congestion. Impact depends on alternative routes available. WCC advised June 2013: 'Included in LTP3 as Scheme BR2 – Bromsgrove Eastern Bypass Junction Improvements.'	No details of scheme or timeline available at this time.	WCC, HA	NQ	NQ	M - L
RR3	Current boundary of AQMA requires amendment to conform with best practice guidance	Amend boundary following future dispersion modelling if revocation not appropriate	Focus resources on reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place until future monitoring implies AQMA revocation is possible and modelling is undertaken	WRS, LA	0	L	M - L
RR4	Topography at either end is a contributing factor to emissions	Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
RR5	Properties close to roadside create street canyon	Not feasible to change without CPO and removal of properties – refer to generic actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
RR6	High proportion of HGVs and LGVs noted due to several proximal	Generic actions e.g. Greening Fleets, FQP	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
	Industrial Estates							
RR7	Two in road bus stops on carriageway either side of central street canyon	Move to further along road with more desirable pull in stops	Improves traffic flow and reduces idling vehicles at top of Buntsford Hill, reducing emissions	Review of siting locations for stops may be required	WCC, bus companies	2	NQ	S - M
RR8	Access to the Bromsgrove Prep school potentially impacts Hanbury Turn junction	Generic action e.g. School Travel Plans	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
RR9	Difficult access to Engineering co potentially cause issues at Hanbury Turn junction	Work with business re loading and unloading in non-peak traffic times, assess if access can be improved	Ensure no obstructions causing congestion	Alternative access may not be available	WCC, LPA	1	NQ	S - M
RR 10	Cars and HGVs are biggest source of roadside emissions	Generic actions e.g. FQPs, greening fleets, Travel Plans, promotion of alternative transport	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
RR 11	Max. exceedence is 6.2 $\mu\text{g}/\text{m}^3$ and total vehicle emissions need to reduce by 25%	Generic actions e.g. FQPs, greening fleets, Travel Plans, promotion of alternative transport	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
WR1	Close to Town Centre and busy junction	Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
WR2	Current boundary of AQMA requires amendment and extension	Amend boundary following setting up of steering group	Focus resources on implementing reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place for time being	WRS, LA	0	L	S
WR3	Zebra crossing at Hanover St/ Worcester Rd causes congestion	Replace with footbridge if feasible	Improves flow and increases pedestrian safety for schools	Requires sufficient space for bridge foot well and pavement either side of	WCC	3	NQ	NQ

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
				carriageway				
WR4	Two street canyons	Canyons may effectively be removed through CPO – see generic action.	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WR5	Eight school and nursery campuses within or adjacent to AQMA	Generic action e.g. School Travel Plans	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
WR6	Reduced two way traffic flow due to residential parking near Turks Head PH	Introduce parking restrictions and provide space for residential parking with permits elsewhere in Worcester Road. Potentially as part of future redevelopment of Sanders Road Industrial Estate or parking area created by demolishing of street canyon following CPO	Reduces congestion caused by parked vehicles restricting two way flow	Lack of available alternative parking space identified presently without additional substantial action e.g. development or demolishing properties to open up canyon	LPA, WCC	2	NQ	NQ
WR7	Bulbous traffic calming measure at Shrubbery Road junction	Generic action e.g. Remove all build out	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
WR8	Not enough parking spaces for One stop convenience store	Promote use of PH car park through arrangement between businesses	Avoids parking in Shrubbery Road on double yellow lines causing congestion in turning	Requires agreement between businesses	LPA	1	L	S
WR9	Local and school traffic causes congestion exiting Shrubbery Road junction	Generic action e.g. School Travel plan. Propose WCC undertake junction review to ascertain	WCC advised June 2013: 'Included in LTP3 as BR2 –Bromsgrove Eastern Bypass Enhancements	No details of scheme or timeline available at this time.	WCC	2	NQ	NQ

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
		improvements to current and future predicted flows	Scheme.' Impact depends on resulting scheme					
WR 10	Sanders Road Industrial Estate and Market Site car park are redevelopment targets	Work closely with LPA and LA to ensure air quality in AQMA is not further compromised. Generic actions e.g. S106, CIL funding for improvements	Could provide benefits for local air quality	Timeline likely to long	LPA, LA	NQ	NQ	M - VL
WR 11	Old bus fleet	Generic actions e.g. BQP, and PSVAR (2000) will also assist in this area (WCC June 2013)	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WR 12	Modelling indicates exceedences only at properties within street canyons	Generic actions e.g. CPO, parking restrictions, BQP, FQP	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WR 13	Cars are biggest source of roadside pollutants	Generic actions e.g. Travel plans, promotion of alternatives, electric charging points, parking restrictions	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WR 14	25 to 50% Total vehicle emissions required	Generic actions e.g. Travel plans, Smarter Choices Measures, electric charging points, parking restrictions, Park & Ride	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD1	The A44 Dolday one way system is the only route for all traffic crossing the River Severn	Not feasible to change without addition of another river crossing for vehicles in City. However WCC advise	Dualling of the Southern Link Road will significantly increase the capacity of this alternative route. Could	Unable to quantify likely reduction in City Centre traffic volumes and therefore impact at present.	WCC, LA	NQ	VH	TBC

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
		(June 2013): 'Dualling of the Southern Link Road will draw through traffic away from City Centre'.	ease traffic congestion travelling into and out of city.					
DD2	Current boundary of AQMA requires amendment to additional residential buildings on east boundary and exclude open areas	Amend boundary following setting up of steering group	Focus resources on implementing reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place for time being	WRS, LA	0	L	S
DD3	Three sets of traffic lights within AQMA cause pause in traffic	Refer to Generic e.g. Alteration to traffic lights	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD4	Some congestion in AQMA linked to congestion further afield in city	Propose WCC undertake modelling of how flows can be improved along key routes across city.	WCC advise June 2013: 'Included as part of The Worcester Transport Strategy bid, a comprehensive package of measures to improve the efficiency of Worcester's transportation networks.'	No details of specific scheme or timeline available at this time.	WCC, LA	NQ	NQ	NQ
DD5	High proportion of buses due to proximity of bus station	Generic actions e.g. BQP, PSVAR 2000, potential to relocate bus station to east of City Centre.	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD6	Two street canyons within the AQMA	Generic actions e.g. CPOs	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD7	Box markings are sometimes ignored during periods of	Emplace cameras and penalties for vehicles ignoring markings	Reduce vehicles blocking flow	Not WCC policy unless safety issue is identified (June 2013).	WCC	1 - 2	NQ	NQ

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
	congestion							
DD8	Number of proximal car parks	To rationalise car parking provision in City Centre and improve signage (including VMS), implement park and ride.	Part of Worcester Transport Strategy	Details of specific scheme and timeline unknown at this time.	WCC, LA	1 - 2	NQ	NQ
DD9	Nearby college of technology	Generic action e.g. School Travel Plan	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD 10	Existing monitoring positions are placed outside street canyons	Redesigned monitoring positions have been emplaced in early 2013	Will improve data quality and definition of AQMA boundary.	Will have to wait full calendar year for results	WRS	0	L	S
DD 11	Source apportionment indicates HDVs are biggest source of road emissions	Generic actions e.g. BQPs, FQPs	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD 12	Further assessment indicates reducing vehicle emissions by 50% will be an effective measure	Generic actions e.g. all	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
DD 13	Recorded data needs working back to facades of properties	Use available background maps and calculator tool to recalculate data	Provides accurate analysis for use in final AQAP and future progress reports	Resource required.	WRS	0	L	S
DD 14	Traffic queues back along the street canyon in Bridge Street from the exit onto North Parade due to a lack of traffic signals. Congestion is exacerbated by queues caused by pedestrian crossing in North	Recommend as part of Worcester Transport Strategy WCC place traffic lights at exit from bridge onto North Parade and move pedestrian crossing closer to Newport Street turning.	Pauses traffic on wide open space of bridge where emissions not an issue and allows easier exit from Bridge Street canyon. Increases length of road for cars in open North Parade being paused at	May have a knock on effect to traffic congestion other side of bridge so requires alignment of traffic light phasing further afield	WCC	3	NQ	S - M

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
	Parade.		crossing and allows for traffic to exit Newport Street more easily					
LRH 1	The B4550 is used by commuters to avoid other congested routes to get into city	Generic actions e.g. Travel plans, car sharing.	Refer to generic actions.	Refer to generic actions	Refer to generic actions	Refer to generic actions		
		WCC advise June 2013: 'Key corridor programme within the Worcester Transport Strategy.'	Key corridor programme will see enhancements to bus stops (including VMS signs) and pedestrian crossings.	Unlikely to lead to significant reductions in volumes of traffic	WCC	0 - 1	NQ	M - L
LRH 2	Current boundary of AQMA requires amendment to conform with best practice guidance and extension to include properties recommended in FA	Amend boundary following setting up of steering group	Focus resources on implementing reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place for time being	WRS	0	L	S
LRH 3	Number of schools in area	Generic actions e.g. School Travel Plans	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
LRH 4	Street canyon effects in most parts	Not feasible to change due to number of properties involved	n/a	n/a	n/a	n/a	n/a	n/a
LRH 5	Delivery vehicles often observed obstructing traffic flow	Generic actions e.g. Make one way, pedestrianisation, limited loading and parking	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
LRH 6	Number of bus routes and non pull-in stops in AQMA	Generic actions e.g. Make one way, BQPs including rationalisation of bus stops	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
LRH	Traffic lights onto	Generic actions e.g.	WCC advise June 2013:	No WRS consultation	WCC	2-3	NQ	S

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
7	Lowesmoor Terrace cause congestion	Phasing of traffic lights, one way system	Currently being delivered as part of Worcester Transport Strategy (Phase 1)	on programme content as predates WRS				
LRH 8	Source apportionment indicates emissions for HDVs are greatest contributors in Lowesmoor and LDVs in Rainbow Hill	Generic actions e.g. FQPs and BQPs in Lowesmoor, car sharing, car parking provision, VMS, cycling initiatives in Rainbow Hill	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
LRH 9	Further assessment indicates reducing vehicle emissions by 50% will be an effective measure	Generic actions e.g. all	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
LRH 10	Recorded data needs working back to facades of properties	Use available background maps and calculator tool to recalculate data	Provides accurate analysis for use in final AQAP and future progress reports	Resource required.	WRS	0	L	S
PS1	Current boundary of AQMA requires amendment to conform with best practice guidance	Amend boundary following future dispersion modelling if revocation not appropriate	Focus resources on reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place until future monitoring implies AQMA revocation is possible and modelling is undertaken	WRS, LA	0	L	S - M
PS2	Street canyon on incline	Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
PS3	HGV >7.5t currently unable to utilise alternative bridge	Will be lifted in 2014 following bridge replacement. Generic action e.g. signage improvement	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions		
PS4	Traffic queuing at Waterside junction	Generic action e.g. alteration to traffic	Refer to Generic actions	Refer to Generic actions	Refer to Generic	Refer to Generic actions		

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
		phasing lights already planned as part of bridge replacement			actions			
PS5	Two sets of pedestrian lights cause temp traffic queues	Generic action e.g. alteration to traffic phasing lights already identified within LTP3	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions		
PS6	Single in carriageway bus stop causes congestion in AQMA	Move bus stop further along Port Street towards Lidl	Reduces congestion	May effect businesses and passengers by moving further away	WCC, bus companies	2 - 3	L	S - M
PS7	Incidents of cars and vans unloading causing congestion	Generic action e.g. convert to one way system, loading and unloading restrictions	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions		
PS8	Busy side roads with poor visibility for drivers exiting can cause congestion	Could be improved by convert to one way system - refer to generic action	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions		
PS9	Poorly utilised car park in Burford Road	Generic action e.g. Review of parking provision and pricing. Improve signposting	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions	Refer to Generic actions		
PS 10	AQO only exceeded at a few properties	Mitigation measures should be proportionate. Generic actions e.g. all	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions	Refer to Generic Actions		
PS 11	Initial review of data indicates less exceedences than previously indicated	More detailed review and cleansing of data required for final version of report	Improved qualification of data will enable identification of level of mitigation required	Resource required to undertake detailed quality review	WRS	0	L	S
PS 12	No automatic monitoring has previously been undertaken	Undertake 6 month AM as part of potential revocation and detailed assessment in future	Provides improved quality data	Expensive. Timeline will depend on observed downward trend in monitoring results following implementation of	WRS	0	M	M - L

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
				planned and generic actions				
HF1	Additional monitoring locations and detailed modelling required as part of Further Assessment	Undertake detailed modelling and further assessment following min. of 1 calendar year monitoring at additional locations to be identified	Meet recommendations of Detailed Assessment to determine extent of AQMA	Will not be able to undertake Further Assessment because of monitoring requirements until 2015	WRS, LA	0	L - M	S - M
HF2	Current boundary of AQMA requires amendment to conform with best practice guidance	Amend boundary following additional monitoring, dispersion modelling and Further Assessment if revocation not appropriate	Focus resources on reducing emission actions instead of performing administrative requirements	Current boundary outline remains in place until HF1 is completed	WRS, LA	0	L	S - M
HF3	Main issue is volume of traffic entering and exiting ring road	Generic actions e.g. Travel plans, car sharing, Park & Ride, promotion of alternatives, electric charging points etc.	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
		WCC advise June 2013: 'LTP3 Kidderminster Transport Package Major Scheme including Hoobrook Link Road (between the A449 Worcester Road and A451 Stourport Road).'	WCC advise June 2013: 'A proposed Hoobrook Link Road is planned which will act to reduce traffic queuing on the Kidderminster Ring Road.' This would provide an alternative diversion from the ring road for traffic between Stourport and Hagley/ Stourbridge destinations via A449 Chester Road'	Link road is 2 km south of the AQMA. Reductions in traffic likely limited to Stourport-Hagley/Stourport bound traffic. Traffic will have to travel through additional traffic signals thus faster Ring Road may be preferred route. Given levels in Horsefair limited impact anticipated.	WCC	1	£5m	S-M

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
HF4	Blackwell street canyon	Some of the buildings are part of the conservation area and cannot be altered. Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
HF5	Two way traffic flow results in congestion due to narrow carriageway	Generic actions e.g. convert to one way only	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
HF6	There are two local schools in vicinity	Generic actions e.g. School Travel Plans	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WG1	More than 8 years since detailed modelling and Automatic monitoring undertaken	Undertake detailed modelling	Would provide up to date source apportionment, required emission reduction and confirm if existing boundary requires amendment	Automatic monitoring would better inform modelling but is costly.	WRS, LA	0	L - M	S - M
WG2	Main issue is volume of traffic proceeding to two bridges	Generic actions e.g. Travel plans, car sharing, Park & Ride, promotion of alternatives, electric charging points etc.	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WG3	Street canyon	Some of the buildings are part of the conservation area and cannot be altered. Not feasible to change	n/a	n/a	n/a	n/a	n/a	n/a
WG4	Normal length buses block road in narrow bends	Generic action e.g. Bus Quality Partnership	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WG5	No waiting box markings are ignored	Yellow box needs repainting and signing.	Reduce vehicles blocking flow	Not included within current LTP3 runs until	WCC	1	NQ	M - L

Key Issue ID	Description	Proposed action	Pros	Cons	Stakeholders/ Associated Policy	Impact Score	Cost	Time scale
		Emplace cameras and penalties for vehicles ignoring markings		2026 so timescales could be long.				
WG6	Pedestrian traffic light at PH in Dog Lane causes congestion at junction of Welch Gate	Generic action e.g. Alteration to phasing of traffic lights	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WG7	HGVs traverse Welch Gate even though bridge has weight limit	Generic actions e.g. Weight restriction, FQP, Improve signage away from AQMA	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WG8	Two way traffic flow results in congestion due to narrow carriageway	Generic actions e.g. convert to one way only	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		
WG9	There are three local schools in vicinity	Generic actions e.g. School Travel Plans, Improve signage away from AQMA	Refer to generic actions	Refer to generic actions	Refer to generic actions	Refer to generic actions		

7 Next steps

Stage	Timeline	Description	Detail
Stage 1	April to June 2013	Public Consultation on Action Plan document	<p>Document will be made available to view/download from website and in local government buildings including libraries in paper format.</p> <p>Local residents within AQMA will be informed of consultation via hand delivered letter.</p> <p>Consultees will be invited to express comments on plans and suggestions via electronic or paper format.</p> <p>List of proposed consultees:</p> <ul style="list-style-type: none"> Air Quality Task Group BDC Better Environment Theme Group BDC Defra Hagley Residents Association Health Protection Agency Highways Agency Local Councillors and Portfolio Holders Local Planning Authorities Neighbouring authorities e.g. Dudley MBC Parish Councils PCT Residents of AQMA's Worcestershire County Council – Highways & Planning departments
Stage 2	July to September 2013	Review of Public Consultation outcomes	<p>All responses received by end of June will be reviewed and considered for inclusion within AQAP.</p> <p>Action Plan will be updated with appropriate amendments and additional solutions identified from the consultation.</p> <p>A summary of consultee comments not included for further consideration within AQAP and reasoning will be posted on website and included as appendix within updated AQAP.</p>
Stage 3	October to December 2013	Formation of Worcestershire Air Quality Steering Group	<p>Invitations to partake in Steering Group will be forwarded by early October to organisations and individuals identified from the consultation process whom can help deliver actions within plan.</p> <p>The Steering Group will be set up and initial meetings arranged.</p>

Stage	Timeline	Description	Detail
			<p>The Steering Group will assign initial actions, prioritise options, determine timeframe for delivery and devise measurements of impact of actions.</p> <p>AQAP will be updated with details of Steering Group, prioritisation of actions, timeframe and measurements and funding options.</p>
	November 2013 to early 2014	Modelling of shortlist options	<p>If the situation arises that the benefit of shortlisted options is unclear, or the preferred scenario is difficult to determine, detailed modelling will be undertaken where possible, and where costs, time and resources permit, to determine potential reduction in pollution and ascertain best options.</p> <p>AQAP will be updated with results of any such modelling.</p>
Stage 4	2014 onwards	Worcestershire Air Quality Steering Group	The Steering Group will meet on regular basis to ensure preferred options are progressed actions.
	2014 and onwards	Annual Air Quality Action Plan Update	<p>Updates on the action plan will be included as part of the annual progress report for each district required by Defra. These will be posted onto WRS Air Quality webpages and available to download.</p> <p>Yearly updates can be included as appendices in AQAP.</p>

8 Glossary and Abbreviations

AADT	Annual Average Daily Traffic (Vehicles per day)
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
ADMS Roads	Atmospheric Dispersion Modelling System for Roads.
Air Quality Neutral	Air Quality Neutral concept requires new developments to have lower or equivalent emissions of air pollution than those emitted from a site prior to its redevelopment.
ATC	Automatic Traffic Counter
AURN	Automatic Urban and Rural (air quality monitoring) Network
COMEAP	Committee on the Medical Effects of Air Pollutants
DCLG	Department for Communities & Local Government
Defra	Department for Environment Food and Rural Affairs
DMBC	Dudley Metropolitan Borough Council
DMRB	Design Manual for Roads and Bridges Screening Model
Euro Standards	Euro standards describe the emissions criteria that vehicle manufacturers must type approve their vehicles to in order to supply for general sale in the EU. Euro I vehicles began to be produced for an EC-specific type approval standard that came into force in 1993, with pre-Euro vehicles generally being those registered before this date.
Exceedence	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
Kerbside	A site sampling within 1 m of the kerb of a busy road
LAQM	Local Air Quality Management
LDF	Local Development Framework
LGV	Light Goods Vehicle
LTP3	Worcestershire County Council's Local Transport Plan 3
MHDC	Malvern Hills District Council

NO_x	Nitrogen oxides
NO₂	Nitrogen dioxide
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
PCT	Primary Care Trust
PM₁₀	Particulate Matter with a (equivalent aerodynamic) diameter of ten microns (10 µm) or less
PPS	Planning Policy Statement
PSV	Public Service Vehicles (buses)
RBC	Redditch Borough Council
Roadside	A site sampling between 1 m of the kerbside of a busy road and the back of the pavement. Typically this will be within 5 m of the road, but could be up to 15 m (Defra, 2009).
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.
Street Canyon	A relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road.
Trans-boundary traffic	Traffic emanating from beyond local area and travelling to destinations outside the local area
µg/m³	Micrograms per cubic metre.
USA	Updated Screening Assessment
WCC	Worcester City Council or Worcestershire County Council
WDC	Wychavon District Council
WFDC	Wyre Forest District Council

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