Community Board
South West
Chilterns

Action Group: Environment and Climate Change

Meeting date: 27 January 2022

ACTION NOTES

(high level notes for the purpose of tracking/monitoring activity)

Present: David Johncock, Makyla Devlin, Carl Griffin, Verity, Neil Marshall, Zahir Mohammed, Stuart Wilson, Kathryn Acres, Alex Collingwood, David Watson, Sam Kershaw, Nick Rowcliffe, John Laker, Liz Lorente, Sian Herschel, Jocelyn Towns, Richard Parker

Apologies: Sophie Kayani, Mark Turner

No	Topic	Lead
1	**Agree notes of the last meeting** The notes from last meeting agreed by the group.	Neil Marshall
2	**Actions arising (not on agenda)** Solar Bins – Makyla has contacted British Bins and they are happy for us to have a bin on trial for at least 3 weeks. She has to sort the necessary permissions for the siting of the bin and is still waiting for a response from the Waste Team. 20 is plenty – No response received at yet. Solar Schools – It has gone through the Children's Education team and they've submitted their report and it's now going through the Property Team. It has been signed off by the head and has now gone up to Director level. Chiltern Rangers – Makyla is collating more information, so this is work in progress. Holy Trinity School – Waiting for feedback from Education.	Neil Marshall

	Trinity Road – Consultation has come to and end and is all being collated now. **Action: Once results released Makyla will share with the board**	
3	**Marlow AQMA** The year long project, Marlow low emission zone feasibility study, which came from the Wycombe District air quality action plan, was going to look at ways of tackling issues in areas of concern. Previously Carl had gone through the reasons why air quality is poor in parts of Marlow. In the report a long list of options to look at the model was created. Carl spoke about the results of some of the actions which are detailed in the report, appended to these notes, along with some further recommendations: The next stage is delivery and trying to find funding through various grants and also talking to transport colleagues. Carl informed the group that he will no longer be an Air Quality Office due to the establishment of the Unitary Council so is in the process of handing the project over to a colleague. David commented on the parking issues on Spittal Street and whether barring parking would make a difference. Neil asked if Carl could feed David's comment back to the team to consider this as an option. **ACTION: Carl Griffin** Liz Lorente, Transition Town Marlow commented, what a really disappointing report! Surely we can get somewhere with education e.g. every time I go to Sainsbury's back entrance I tell someone to turn their engines off, 90% of the time they comply. Deliveries in Spittal Street continue to be a problem - can we not RED ROUTE Spittal Street?	Carl Griffin
4	**Little Marlow Country Park application** The project is to enable the development of Little Marlow Country Park. Little Marlow Parish Council are applying for funding of £7,000 from the Community Board. Sam shared a presentation with the group (attached to the end of the notes). Little Marlow Parish Council, in order to enable the Country Park, has put together a working group made up of some parish	Sam Kershaw Little Marlow Parish Council

	councillors, local councillors, residents associations and the community partnership. They have been putting together a vision of what they think the country park should look like and the facilities that can be offered to the community. Stuart suggested that Marlow Rugby Club and Longbridge be invited to be part of the working group, as they are leisure facilities that sit alongside this facility. He also recommended that Wooburn Green and Bourne End Parish Council be approached for funding and participation. Jocelyn mentioned funds should be available from Thames Water. David confirmed that this money was available but a MOU would need to be set up so the money could be transferred. He also acknowledged that there were still funds available from Section 106 which needs to be spent wisely. Makyla confirmed that the application had been received and has been presented to the Funding Panel and further internal comments were required from officers about the proposal. It has been asked that it be forwarded to Charles Brocklehurst so he can have an overview. **Action: Makyla to relay feedback to Sam and the Community Board once received.** Neil spoke about the difficulties of getting across the Westhorpe roundabout for pedestrians and cyclists. He commented that he would like to see the route opened up down to the tunnel under the Marlow bypass to try and get a direct cycling/walking route through the country park area. He has been trying to enable this through the Marlow Studio development as a possible support. Liz Lorente, Transition Town Marlow commented, that she agreed with the cycle route however disagreed that we need the studio to deliver it.	
6	**Any other business, topics for future discussion** An across board proposal has come through regarding a Refresh project, which is trying to capture recycling on commercial stuff that is not used. Members to discuss. Thermal Imaging Project: John confirmed that the camera has been bought and they are going to do some surveys next Monday.	All

	Neil asked if they could look at some of the institutional buildings such as Court Gardens, the library and community hall. Cycle Racks: William Borlaise have not come back to John on the cycle racks and coverings.	
7	**Date of next meeting** 24 February - 1830	

Marlow Low Emission Zone Study - Air Quality Baseline

Buckinghamshire Council

Project reference: 60648202

July 2021

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	July 2021	Draft Report - Baseline	TS	Tom Stenhouse	Technical Director

Distribution List

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1. Introduction

1.1 AECOM were appointed by Buckinghamshire Council to undertake a Low Emission Zone (LEZ) feasibility study for Marlow town centre. It should be noted that the term Clean Air Zone (CAZ) is a comparable term to LEZ as it can be used to describe an area where charging is used to encourage the use of cleaner vehicles. A CAZ can also be a non-charging or voluntary scheme.

1.2 An air quality management area (AQMA) was declared in Marlow town centre in December 2017 due to exceedances of the annual mean objective for nitrogen dioxide (NO_2).

1.3 The main objectives for this study are:

- To determine the current air quality baseline and key emission sources within the town centre and identify areas of exceedances of the objective value.
- To identify a range of measures, including charging options, which could be adopted to reduce air pollution in Marlow.
- To qualitatively assess these measures based on likely effectiveness, cost, practicality, risk, etc., including consideration of enforcement of the measures, where appropriate.
- To quantify the effectiveness of preferred options, chosen in agreement with the Council, using dispersion modelling. A possible set of scenarios may include:
    - Non-charging option model runs;
    - Charging option; and
    - A package of the charging option with one or more non-charging measures.
- To form a conclusion about the feasibility of introducing a LEZ and/or other measures in Marlow, how it would need to be done, how effective it would be, and how much it would cost.

2. Legislation and Policy

2.1 There are national, regional and local policies for the control of air pollution, and local action plans for the management of local air quality in Buckinghamshire Council. The achievement of such policies and plans are matters that may be a material consideration for planning authorities when making decisions for individual planning applications.

National Legislation

2.2 The UK is no longer a member of the European Union. EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies.

2.3 Some types of EU legislation such as Regulations and Decisions, are directly applicable as law in an EU Member State. This meant that, as a Member State, these types of legislation applied automatically in the UK, under section 2(1) of the European Communities Act 1972 (c.68), without any further action required by the UK (H.M. Government, 1972). These types of legislation are published by the Publications Office of the European Union on the EUR-Lex website. This legislation is now published on legislation.gov.uk as 'legislation originating from the EU'.

2.4 Other types of EU legislation, such as Directives, are indirectly applicable, which means they require a Member State to make domestic implementing legislation before becoming law in that State. In the UK this was often achieved by making Statutory Instruments rather than passing primary legislation. This implementing legislation is also been published on legislation.gov.uk.

2.5 EU legislation which applied directly or indirectly to the UK before 11.00 p.m. on 31 December 2020 has been retained in UK law as a form of domestic legislation known as 'retained EU legislation'. This is set out in sections 2 and 3 of the European Union (Withdrawal) Act 2018 (c.16) (H.M. Government, 2018). Section 4 of the 2018 Act ensures that any remaining EU rights and obligations, including directly effective rights within EU treaties, continue to be recognised and available in domestic law after exit.

Air Quality Standards Regulations (Amended)

2.6 The Clean Air for Europe (CAFE) (European Commission, 2001) programme revisited the management of Air Quality within the EU and replaced much of the existing air quality legislation with a single legal act, Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (European Parliament, 2008). This Directive repealed and replaced the EU Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management (European Council, 1996) and its associated Daughter Directives 1999/30/EC (European Council, 1999), 2000/69/EC (Eupopean Parliament, 2000), 2002/3/EC (European Parliament, 2002), (relating to limit values for ambient air pollutants) and the Council Decision 97/101/EC (European Council, 1997) which established a reciprocal exchange of information and data within Member States.

2.7 Directive 2008/50/EC is transcribed into UK legislation by the Air Quality Standards Regulations 2010 (H.M. Government, 2010) and subsequent amendments (H.M. Government, 2016).

UK Air Quality Strategy

2.8 The UK National Air Quality Strategy (AQS) was initially published in 2000, under the requirements of the Environment Act 1995 (H.M. Government, 1995). The most recent revision of the strategy (2007) (Defra, 2007) sets objective values for key pollutants as a tool to help local authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objective values have subsequently been laid out within the Air Quality (England) Regulations 2000 (H.M. Government, 2000) and later amendments (2015) (H.M. Government, 2002), (H.M. Government, 2015).

2.9 The AQS objective values referred to below have been outlined in legislation solely for the purposes of local air quality management. Under the local air quality management (LAQM) regime, local authorities have a duty to carry out regular assessments of air quality against the objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an AQMA and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. Consequently, it is not unusual for the boundary of an AQMA to include relevant locations where air quality is not at risk of exceeding an Air Quality Objective.

2.10 The UK's national objective values for the pollutants of relevance to this assessment are displayed in Table 1.

Table 1 Key Air Quality Strategy objectives

Pollutant	Objective	Averaging Period	Maximum Permitted Exceedances
Nitrogen Dioxide (NO_2)	200 µg/m^3	1 hour	18 times per year (i.e. 99.79th percentile)
	40 µg/m^3	Annual	-
Particulate Matter (PM_{10})	40 µg/m^3	Annual	-
	50 µg/m^3	24-hour	35 times per year (i.e. 90.4th percentile)
Particulate Matter ($PM_{2.5}$)	25 µg/m^3	Annual	-

National Clean Air Strategy

2.11 In 2019, the UK government released its much-anticipated Clean Air Strategy 2019 (Defra, 2019), part of its 25 Year Environment Plan. The Strategy places greater emphasis on improving air quality in the UK than has been seen before and outlines how this is to be achieved (including the development of new enabling legislation).

2.12 Air quality management focus in recent years has primarily related to one pollutant, NO_2, and its principal source in the UK, road traffic. However, the Strategy broadens the focus to other areas, including domestic emissions from wood burning stoves and from agriculture. This shift in emphasis is part of a goal to reduce the levels of fine particulate matter ($PM_{2.5}$) in the air to below the World Health Organisation guideline level; far lower than the current EU limit value.

Local Policy

2.13 Marlow lies within the jurisdiction of Wycombe District Council. However, in April 2020, the Council joined the unitary local authority, Buckinghamshire Council. Buckinghamshire Council are yet to develop their own local planning policy, as such the local planning policy for Wycombe District Council remains.

Wycombe District Council Air Quality Action Plan

2.14 Under the requirements of Part IV of the Environment Act (1995) (H.M. Government, 1995), WDC has carried out a review and assessment of local air quality within the District (Wycombe District Council, 2019).

2.15 There are three AQMAs within WDC's jurisdiction:

- M40 AQMA, declared in August 2001 but amended in December 2017 for exceedances of the annual mean objective for NO_2;
- Wycombe AQMA, declared in December 2017 for exceedances of the annual mean objective for NO_2; and
- Marlow AQMA, declared in December 2017 for exceedances of the annual mean objective for NO_2.

2.16 The Council published an AQAP in 2018 to manage their AQMAs (Wycombe District Council, 2018). With respect to the Marlow AQMA, the AQAP outlines a number of measures to achieve the reductions in road traffic emissions required to meet the NO_2 annual mean objective at the Council's monitoring sites.

2.17 The majority of measures are designed to target all three AQMAs within the Council's jurisdiction. However, Action 23 makes specific reference to Marlow AQMA stating:

- *"No lane closures resulting from unstaffed roadworks will be permitted within the High Wycombe and Marlow Air Quality Management Areas during peak traffic hours (0700- 1900hrs). Any works during the pre-stated core hours must either have workers on site or manually operated stop/ go signs."*

3. Assessment Methodology

3.1 This section presents the methodology used to establish the current baseline and to assess the potential effects on air quality as a result of the proposed measures.

3.2 The following sources of information and data have been used to form the basis of the air quality assessment:

- Review of Defra's Air Quality Background Concentration Maps (Defra, 2020b) and published Emission Factors;
- Examination of air quality monitoring from the Council's Air Quality ASR (Wycombe District Council, 2019).
- Fleet data and origin-destination data from a two-day automatic number plate (ANPR) survey in April 2021; and
- Traffic count data from Buckinghamshire Council and Department for Transport (DfT) count points.

Stage 1: Establishing the Baseline

Overview

3.3 Initially, a desk-based review of existing air quality monitoring data and traffic count data was undertaken to define the study area (see Figure 1 and Figure 2 in Appendix A).

3.4 Following this, an air quality modelling assessment was conducted for the baseline year of 2019 following the methodology within the Department of Environment Food and Rural Affairs (Defra)'s LAQM.TG (16) technical guidance (Defra, 2016).

Emissions Modelling

Road Traffic Emissions

3.5 The latest version of Defra's Emission Factor Toolkit (EFT) (version 10.1) (Defra, 2020a) was used to calculate NO_x, PM_{10} and $PM_{2.5}$ emissions by vehicle type for each road link for the baseline year of 2019. The vehicle fleet was taken from the 2021 ANPR camera survey (backcast to the 2019 base year) instead of the default fleet breakdown assumptions within the EFT spreadsheet.

Other Emission Sources

3.6 The assessment has only explicitly modelled emissions from road traffic sources in the study area. Emissions from other sources such as rail and industry directly within the study area, other roads and other sources from further afield were taken into account as part of the background contribution.

Prediction of Air Quality Impacts

3.7 The dispersion model software 'ADMS-Roads' (5.0.0.1) was used to quantify concentrations of NO_2, PM_{10} and $PM_{2.5}$ at selected receptors due to road traffic emissions. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies.

3.8 The model outputs have been presented at individual receptor locations rather than across a regular grid to provide a contour plot (see Figure 3 in Appendix A). This chosen approach provides a better representation of the impact of the scheme as it avoids the need to interpolate results between gridded points.

Dispersion Model Input Data and Model Conditions

3.9 Details of general model conditions set up in ADMS-Roads are provided in Table 2.

Table 2 General ADMS-Roads model conditions

Variables	ADMS-Roads Model Input: Road Traffic Model
Surface roughness at source	1m

Variables	ADMS-Roads Model Input: Road Traffic Model
Minimum Monin-Obukhov length for stable conditions	10 m
Terrain types	Flat
Street canyons	Street canyons on Chapel Street and West Street
Receptor location	x, y coordinates determined by GIS, z = various.
Emissions	NO_x, PM_{10}, $PM_{2.5}$
Emission factors	EFT Version 10.1 emission factor dataset.
Meteorological data	1 year (2019) hourly sequential data from Heathrow Airport meteorological station.
Receptors	Facades of selected receptors only.
Model output	Long-term (annual) mean NO_x concentrations.
	Long-term (annual) mean PM_{10} concentrations.
	Long-term (annual) mean $PM_{2.5}$ concentrations.

Meteorological Data

3.10 One year (2019) of hourly sequential observation data from Heathrow Airport meteorological station has been used in this assessment to correspond with the baseline year. The station is located approximately 35 km south east of the proposed development and experiences meteorological conditions that are representative of those experienced within the air quality study area., within wind speeds up to 8.2 m/s. A wind rose for the site is presented in Figure 4.

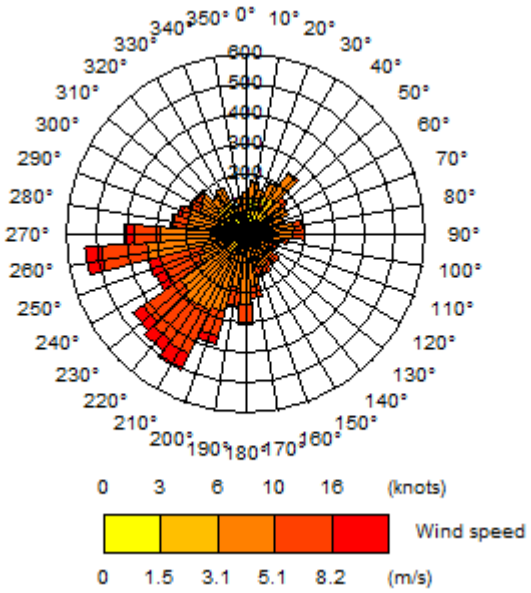


Figure 4 Wind rose, Heathrow airport, 2019

3.11 It is recommended in LAQM.TG(16) that the meteorological data log file be checked, to confirm the number of missing and calm hours that cannot therefore be modelled (Defra, 2018). The meteorological data should only be used if the percentage of usable hours is greater than 75%, and preferably 90%. 2019 meteorological data from Heathrow Airport includes 8427 lines of usable hourly data out of the total 8,760 for the year, i.e. 96% usable data. These data are therefore suitable for application to the assessment.

Background Pollutant Concentrations

3.12 Background pollution concentrations used in this assessment were sourced from Defra's 2018-based background maps (Defra, 2020b) for the 2019 baseline. The data used in this assessment are presented and discussed in Section 4.

3.13 It is noted that the projections in the 2018 LAQM background maps are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these maps do not reflect short- or longer-term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

Traffic Flow and Speed Data

3.14 Traffic flows across the study area have been determined using a combination of temporary automatic traffic count (ATC) surveys conducted by Buckinghamshire Council and DfT traffic count data. For selected roads where no count data were available, total vehicles observed in the video from the 24 hour ANPR survey were used. The traffic count and ANPR camera locations are given in Figure 2.

3.15 Projection factors for each year of available data to 2019 were calculated using TEMPro, the Department for Transport's (DfT) Trip End Model Presentation Program (DfT, 2021). These factors were applied to calculate estimated traffic flows across the study area for 2019.

3.16 Where speed data were not available, the speed limit was used. The average speeds across 24 hours were reduced on the approach to junctions or on roads prone to queuing to 20 mph. This reflected the queuing traffic in peak times, but more free-flow conditions in the interpeak and overnight periods.

3.17 The full set of traffic data are provided in Appendix B.

Fleet Data

3.18 An ANPR camera survey was undertaken from midnight to midnight for a 24 hour period on 22nd and 24th April 2021 across 12 locations (see Figure 2). The data were analysed to inform the composition of the local vehicle fleet and to create an accurate emissions profile based on vehicle classifications and ages.

3.19 The local adjusted vehicle type breakdown and fleet profile from the ANPR camera survey was used in conjunction with the EFT v10.1 to calculate the total emissions on road links in the study area. These data were used to inform both the baseline and scenario testing.

Vehicle Trips

3.20 The data from the 12 ANPR camera survey were also used as part of survey to identify the most common trips made within the town centre, and identify if most journeys are made by drivers travelling straight through or by local trips (i.e. people visiting, shopping and working). These data will be used to assist in the development of options as part of the scenario testing phase.

Model Verification

3.21 Model verification is the process by which the performance of the model is assessed to identify any discrepancies between modelled and measured concentrations at air quality monitoring sites within the study area.

3.22 Model verification has been undertaken following the methodology described in Defra's technical guidance (LAQM.TG16) (Defra, 2018). This verification process is supported by The Department for Environment, Food and Rural Affairs (Defra's) oxides of nitrogen to nitrogen dioxide (NO_X - NO_2) conversion tool to convert modelled NO_X from the road to NO_2 by taking into account the background concentrations. A full description of model verification is given in Appendix C with a summary below.

3.23 Modelled predictions were made for annual mean NO_2 concentrations at local authority monitoring sites in order to compare monitored and modelled NO_2 concentrations. The comparison of model outputs was made to 2019 monitoring data in order to correspond with the baseline year of assessment. A number of sites were discounted from the process as they were not well placed for verification (for example if they were too far from the roadside or influenced by specific local traffic conditions not represented in the model). Based on the nine chosen monitoring sites, an adjustment factor of 2.12 was calculated and then applied to the modelled road NO_X, PM_{10} and $PM_{2.5}$ concentrations at receptor locations.

3.24 Where a number of monitoring sites are used to provide an adjustment factor, the accuracy of the adjusted model can be determined using the Route Mean Square Error (RMSE) calculation. An RMSE value within ±25% of the national air quality objective of 40 µg/m^3 is considered acceptable i.e. 10 µg/m^3. The RMSE value for the adjusted model using the 2.12 adjustment factor was 3.8 µg/m^3. As such the model is considered robust and suitable for use.

Predicting Short Term NO_2 Objective

3.25 Research projects completed on behalf of Defra and the Devolved Administrations have concluded that the hourly mean NO_2 objective is unlikely to be exceeded if annual mean concentrations are predicted to be less the 60 µg/m^3.

3.26 In 2003, Laxen and Marner (Laxen & Marner, 2003) concluded:

> *"…local authorities could reliably base decisions on likely exceedances of the 1-hour objective for nitrogen dioxide alongside busy streets using an annual mean of 60 µg/m^3 and above."*

3.27 The findings presented by Laxen and Marner (Laxen & Marner, 2003) are further supported by AEA (2008) (AEA Energy & Environment, 2008) who revisited the investigation to complete an updated analysis including new monitoring results and additional monitoring sites. The recommendations of this report are:

> *"Local authorities should continue to use the threshold of 60 µg/m^3 NO_2 as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective."*

3.28 This means that where predicted concentrations are below 60 µg/m^3, it can be concluded that the hourly mean NO_2 objective (200 µg/m^3 NO_2 not more than 18 times per year) will be achieved. In addition to this, the assessment has evaluated the likelihood of exceeding the hourly mean NO_2 objective by predicting the 99.79th percentile of NO_2 concentrations as this is equivalent to the hourly objective value.

Predicting Short Term PM_{10} Objective

3.29 The guidance document LAQM.TG(16) (Defra, 2018) sets out the methodology by which the number of days in which the PM_{10} 24-hour objective is exceeded can be obtained based on the relationship with the predicted PM_{10} annual mean concentration (C). As such, the formula used within this assessment is:

$$\text{No. of } Exceedances = 0.0014 * C^3 + \frac{206}{C} - 18.5$$

Receptors

3.30 The concentration of road traffic emitted pollutants at the roadside or at sensitive receptors is influenced by a number of factors. These include background pollution levels and the amount of traffic emissions, which is dictated by traffic flow rates, composition and speed.

3.31 The national air quality objective values for pollutants have been set at concentrations that provide protection to all members of society, including more vulnerable groups such as the very young, elderly or unwell. As such the sensitivity of receptors was accounted for in the definition of the air quality objective values and therefore all receptors that represent exposure of the public are of equal sensitivity as any member of the public could be present at those locations.

3.32 Receptors to be considered against the annual mean objective include public present in areas affected by regular exposure. This includes building facades of residential properties, schools, hospitals, care homes, etc. Receptors to be considered against the short-term objective include members of the public present in areas where the annual mean objective applies, but also areas with less regular exposure, such as any outdoor locations where the public might reasonably be expected to spend one hour or longer.

3.33 Commercial properties are not considered sensitive to changes in ambient pollutant concentrations and are legislated separately as part of health and safety regulations. These are therefore not included in the assessment and the focus is on proposed and existing residential buildings and sensitive receptors such as schools and hospitals as these are most sensitive to the annual mean objective values.

3.34 The air quality predictions have been completed at 139 receptors across the study area. These are all located close to the roadside on sensitive buildings and haven selected from the current AddressBase ordnance survey data in conjunction with a review of aerial photography and publicly available mapping. Each of the receptors chosen represents the maximum level of exposure that could be experienced at other receptors in their vicinity.

3.35 The selected receptors are presented in Figure 3 (Appendix A) and The results of baseline concentrations provided below in Table 26, based on adjustment factor of 2.12 and RMSE value indicating model uncertainty of 3.8µg/m^3.

3.36 in Appendix D. Receptors have been modelled at heights representing the lowest floor with the greatest sensitivity, and as such not all receptors are modelled at the same height.

Stage 2: Identification of Air Quality Interventions

tbc

Stage 3: Action Appraisal

tbc

4. Baseline Conditions

Local Monitoring Data

4.1 Marlow is located within the administrative boundary of Buckinghamshire Council. Buckinghamshire Council is a unitary local authority established in April 2020, which is the unification of the districts South Bucks, Chiltern, Wycombe and Aylesbury Vale. As the unitary authority is relatively new, no new ASR has been published under their name. As such monitoring data from Wycombe District Council were used.

4.2 Under the requirements of Part IV of the Environment Act (1995), Buckinghamshire Council has carried out a review and assessment of local air quality. Currently the Council monitor for NO_2 and PM_{10}. In 2019 the Council conducted diffusion tube monitoring at 51 locations, of which 15 are within Marlow town centre. Details of these monitoring sites are presented in Table 3.

Table 3 Local authority annual mean NO_2 monitoring data, Marlow 2015-2019

Site	Coordinates (X, Y)	Type	Annual Mean NO_2 Concentration ($\mu g/m^3$)				
			2015	2016	2017	2018	2019
S1	485012, 186444	Urban Centre	19.8	24.8	28.5	28.5	23.8
S2	484966, 186773	Roadside	**49.4**	39.2	**40.7**	**44.3**	37.4
S3	484753, 186888	Roadside	18.8	28.6	30.8	31.4	32.1
S21	485070, 186871	Roadside	**55.8**	**48.0**	**46.1**	**41.1**	**43.7**
S29	485217, 187010	Roadside	22.7	21.7	22.1	19.3	17.9
S30	484868, 186656	Roadside	36.7	37.0	36.8	36.9	29.8
S31	484888, 186571	Urban Centre	31.1	33.2	28.4	29.2	27.6
S35	484749, 186496	Roadside	34.8	32.0	30.7	32.2	30.8
S36	484643, 186436	Roadside	36.0	37.3	35.4	34.4	31.4
S41	485024, 186825	Roadside	**43.4**	**40.6**	36.6	38.7	37.1
S42	485028, 186327	Urban Centre	32.6	35.9	33.9	26.9	27.6
S43	485182, 186974	Roadside	27.0	34.6	34.6	26.3	24.8
S49	484958, 186748	Roadside	-	-	**43.9**	**45.7**	**43.8**
S52	484830, 186550	Roadside	-	-	32.1	30.8	30.4
S53	484893, 186677	Roadside	-	-	**48.6**	**47.0**	32.7

Note: Exceedances of the annual mean objective for NO_2 are depicted in **bold**.

4.3 The locations of all monitoring sites across the study are presented in Figure 1.

Background Pollutant Concentrations

4.4 Background data for the relevant 1 km x 1 km grid squares across the entire study area have been sourced from Defra Background Maps (Defra, 2020b) for the 2019 baseline. As trunk roads and Primary A roads are included in the ADMS-Roads model, these have been taken out of the background to avoid double counting. Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ in the grid squares across the study area are presented in Table 4 for 2019 and are well below the relevant AQS objective values for all pollutants.

Table 4 2019 Background pollutant concentrations in study area

1km x 1km Grid Square	Background concentrations ($\mu g/m^3$)		
	NO_2	PM_{10}	$PM_{2.5}$
484500_188500	10.8	14.6	10.0
483500_186500	10.4	13.7	9.5
484500_189500	10.8	14.3	9.7
487500_188500	12.0	15.5	10.1
484500_186500	12.1	14.6	10.2

1km x 1km Grid Square	Background concentrations (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
485500_188500	11.7	15.6	10.3
485500_187500	12.3	15.1	10.6
484500_187500	11.1	14.3	10.0
486500_187500	12.5	15.6	10.6
485500_186500	14.2	15.1	10.6
483500_185500	10.7	13.8	9.5
486500_188500	11.6	15.9	10.3
483500_187500	10.4	14.0	9.5
484500_185500	12.0	14.5	9.8
485500_185500	12.4	15.5	10.3

Vehicle Fleet

4.5 The ANPR camera survey was conducted on a neutral weekday and weekend during school term-time in April 2021. The survey was delayed to after the Covid-19 lockdown period from January to March 2021 and after planned roadworks in the town, to allow traffic flows to return to more “normal” levels. It is likely that traffic flows were lower than pre-Covid levels, but the vehicle fleet makeup may be similar.

4.6 The results of the two-day ANPR camera survey are shown in full in Appendix B.2, with the key findings summarised below.

4.7 The data collected showed that the majority of the vehicle fleet observed was made up of petrol cars (47%) and diesel cars (32%) which is similar to the national average outside London. There was a lower proportion of diesel light goods vehicles (LGVs) and very few heavy goods vehicles (HGV) and buses identified travelling in the town centre over the two days. With regards to electric vehicles, there was a higher number (5.5%) identified in Marlow than the national average of 4.6%.

4.8 Half of the petrol cars observed had an engine size of less than 1,400cc, with only 8% of vehicles with an engine greater than 2,000cc, similar to national assumptions. Diesel cars typically had larger size engines with 67% with engines between 1,400-2,000cc in size and 32% with engines greater than 2,000cc, compared to the default national assumptions of 61% and 29% respectively.

4.9 The survey results showed that there were notable differences in the fleet within Marlow to national assumptions. There were a higher proportion of older cars and vans (Euro 3 and Euro 4 representing new vehicles registered from January 2001 and 2006 respectively) and a lower proportion of the latest Euro 6c vehicles (from September 2018) compared to national assumptions. For the rigid HGVs, there were more Euro IV and V vehicles (registered from October 2005 and 2008 respectively) and fewer Euro VI vehicles (from December 2012). There were very few buses and coaches identified, but of those that were observed, very few of the newest Euro VI vehicles were captured.

Vehicle Movements

4.10 In addition to vehicle count and fleet information, the ANPR camera survey provided information on vehicle movements and on routes taken by vehicles. Summary tables of these data are provided in Appendix B3.

4.11 The survey results were split into trips completed in less than 15 minutes and trips completed in more than 15 minutes. The majority of trips taking less than 15 minutes were assumed to represent internal movements to a specific destination within Marlow. Trips taking more than 15 minutes were assumed to represent through-traffic although some of these may also be local traffic.

4.12 Approximately 90% of vehicle movements across the survey area were completed in less than 15 minutes and 10% took longer than 15 minutes, indicating that most trips are likely to be internal or local.

4.13 The most common trip was from ANPR camera 3 to ANPR 2 outside of the town centre, followed by the reverse (from ANPR 2 to ANPR 3). ANPR 3 is located on A4155 Little Marlow Road, just west of the junction with the A404, and ANPR 2 is located on Wycombe Road, near to the junction with Marlow Bottom. These trips may reflect residents in the Marlow Bottom area exiting Marlow to access the A404. A proportion of the trips between ANPR 3 and ANPR 2 may also be due to motorists using Wycombe Road as an alternative route to avoid the A404 and join the M40 at Junction 4. The majority of these trips are unlikely to enter the town centre.

4.14 Other common trips are from ANPR 3 to ANPR 6 and ANPR 3 to ANPR 9. Vehicle movements between ANPR 3 and ANPR 6 (located on the A4155 Henley Road south-west of Marlow) are most likely through-traffic trips, whereas movements between ANPR 3 and ANPR 9 are likely to be internal trips to destinations within Marlow.

4.15 Trips between the following camera locations are likely to represent through-traffic movements and result in vehicles passing through the AQMA:

- ANPR 1 and ANPR 3;
- ANPR 1 and ANPR 4;
- ANPR 1 and ANPR 5;
- ANPR 1 and ANPR 6;
- ANPR 2 and ANPR 4;
- ANPR 2 and ANPR 5;
- ANPR 2 and ANPR 6;
- ANPR 3 and ANPR 6;
- ANPR 4 and ANPR 6; and
- ANPR 5 and ANPR 6.

4.16 Collectively, the trips between these camera locations account for slightly more than 23% of all trips captured in the ANPR survey.

4.17 The survey results revealed more than 1,800 unique routes taken by captured vehicles. However, almost 1,000 of the routes were associated with a single vehicle, and approximately 1,600 involved fewer than 10 vehicle movements. Filtering of the trip chain survey results for routes associated with more than 200 vehicle movements identified 35 routes. Collectively these 35 routes accounted for 54% of the total number of vehicles captured.

4.18 The most common route was between ANPR 2 and ANPR 3, indicative of motorists in the Marlow Bottom area exiting Marlow to access the A404. The next most frequent trip chain was between ANPR 3 and ANPR 9, which are likely to be internal trips to destinations within Marlow.

4.19 Commonly occurring routes are:

- ANPR 3 to ANPR 9 to ANPR 6 (and the reverse); and
- ANPR 1 to ANPR 8 to ANPR 9 to ANPR 3 (and the reverse).

4.20 These are most likely through-traffic movements and would result in vehicle movements through the AQMA. Collectively, these chains are associated with approximately 8% of all captured vehicle movements.

Modelled Baseline NO_2 Concentrations

4.21 A full set of pollutant concentrations for the 2019 baseline year at all 139 selected sensitive receptors are presented in Appendix D and Figure 3 in Appendix A.

4.22 Modelled annual mean NO_2 concentrations at all receptors except at several residential properties within the existing AQMA are well below the air quality objective value (see Table 5). PM_{10} and $PM_{2.5}$ concentrations are below objectives across the study area.

Table 5 Number of receptors by NO_2 concentration

Number of receptors in banded annual mean NO_2 concentrations ($\mu g/m^3$)

Below 20	21-30	30-40	Above 40
93	40	3	2

Note: Adjustment factor of 2.12 and RMSE of 3.8 $\mu g/m^3$.

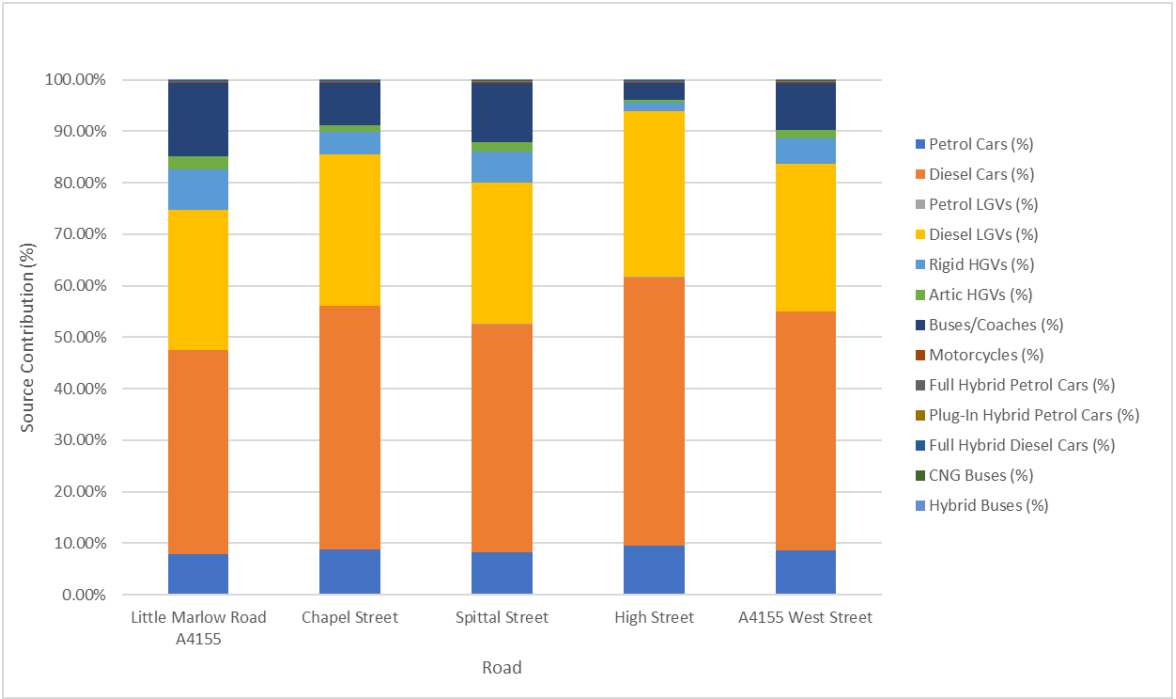
4.23 The highest concentrations are found along Chapel Street on approach to Dean Street (receptors R137 and R138). This section of the road has been modelled as a street canyon, 24-hourly traffic flows are more than 18,000, and the average speed was assumed to be 20 mph due to periods of queuing. The majority of buildings close to both West Street and High Street within the AQMA are commercial (i.e. shops and restaurants) and concentrations at sensitive first floor residential properties are predicted to be below 30 $\mu g/m^3$. Residential properties at ground floor on West Street have modelled concentrations of 30 $\mu g/m^3$ (R37).

Source Apportionment

4.24 A source apportionment assessment was conducted to determine the contribution of vehicle type to NO_x emissions with the results showing that light duty vehicles (LDVs), i.e. cars and vans make up more than 95% of the fleet and between 75% to 95% of NO_x emissions. Of these, it is the diesel cars that make the largest contribution of up to 50%, with diesel vans contributing around 1/3 of emissions. Of the heavy-duty vehicles (HDVs); buses contribute up to 14% of NO_x emissions and rigid heavy goods vehicles (HGVs) contribute up to 6%.

4.25 Figure 5 provides the full set of results for selected roads in the AQMA to illustrate the contribution of each vehicle type to NO_x emissions on each road.

Figure 5 Source apportionment results, selected roads in the AQMA



5. Air Quality Interventions

Tbc

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Appendix A Maps

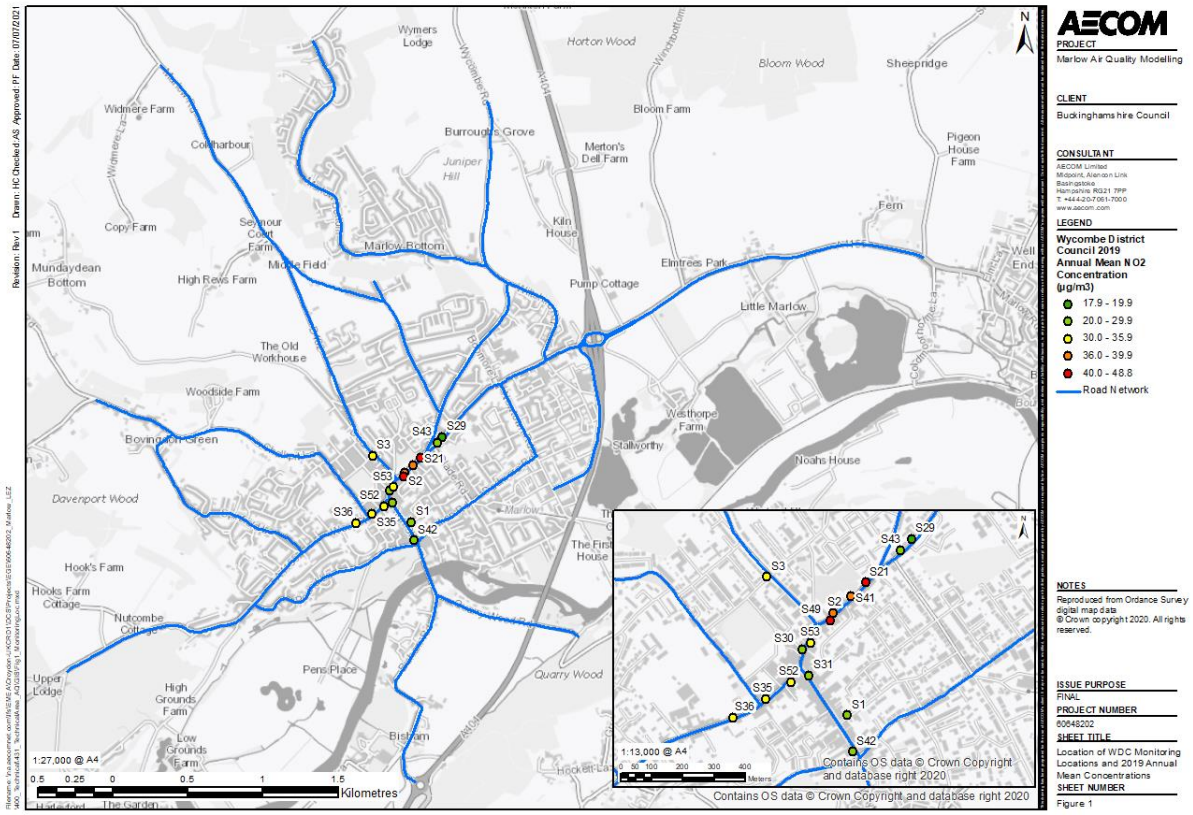


Figure 1 Air quality monitoring locations in Marlow

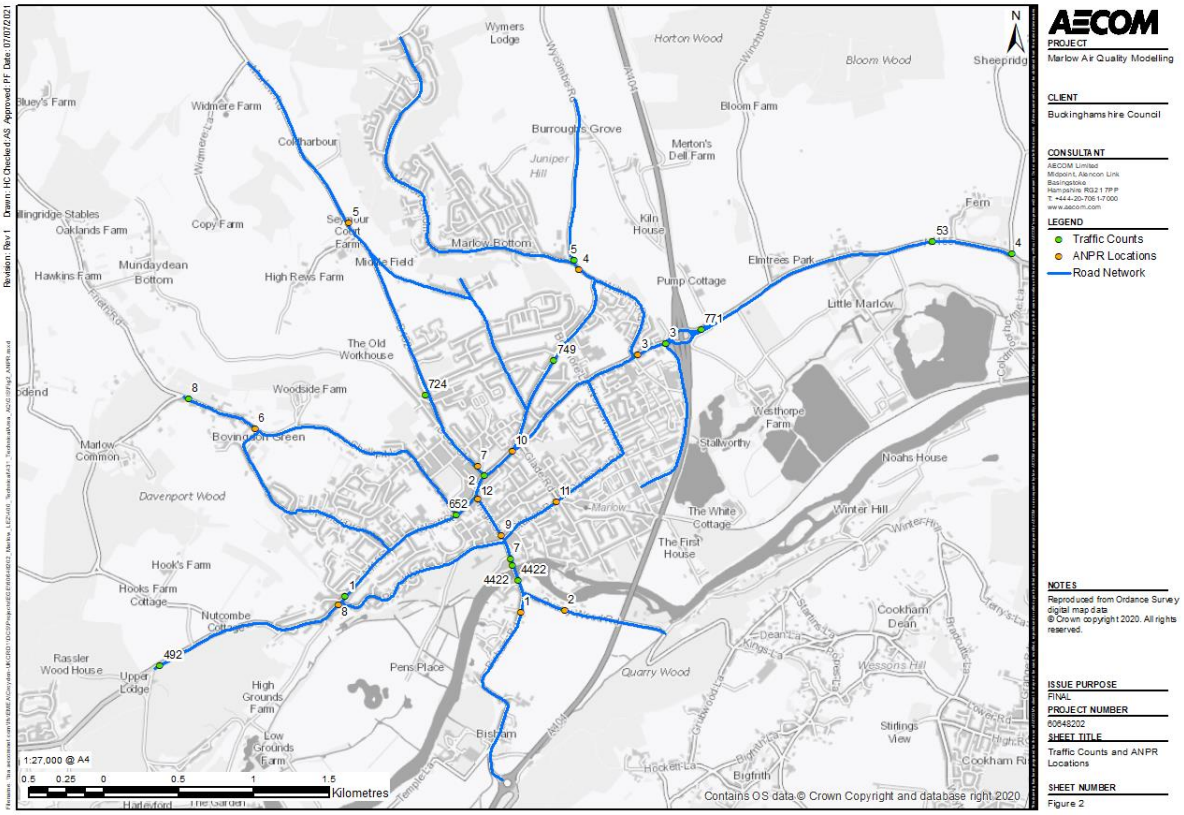


Figure 2 Traffic count and ANPR locations in Marlow

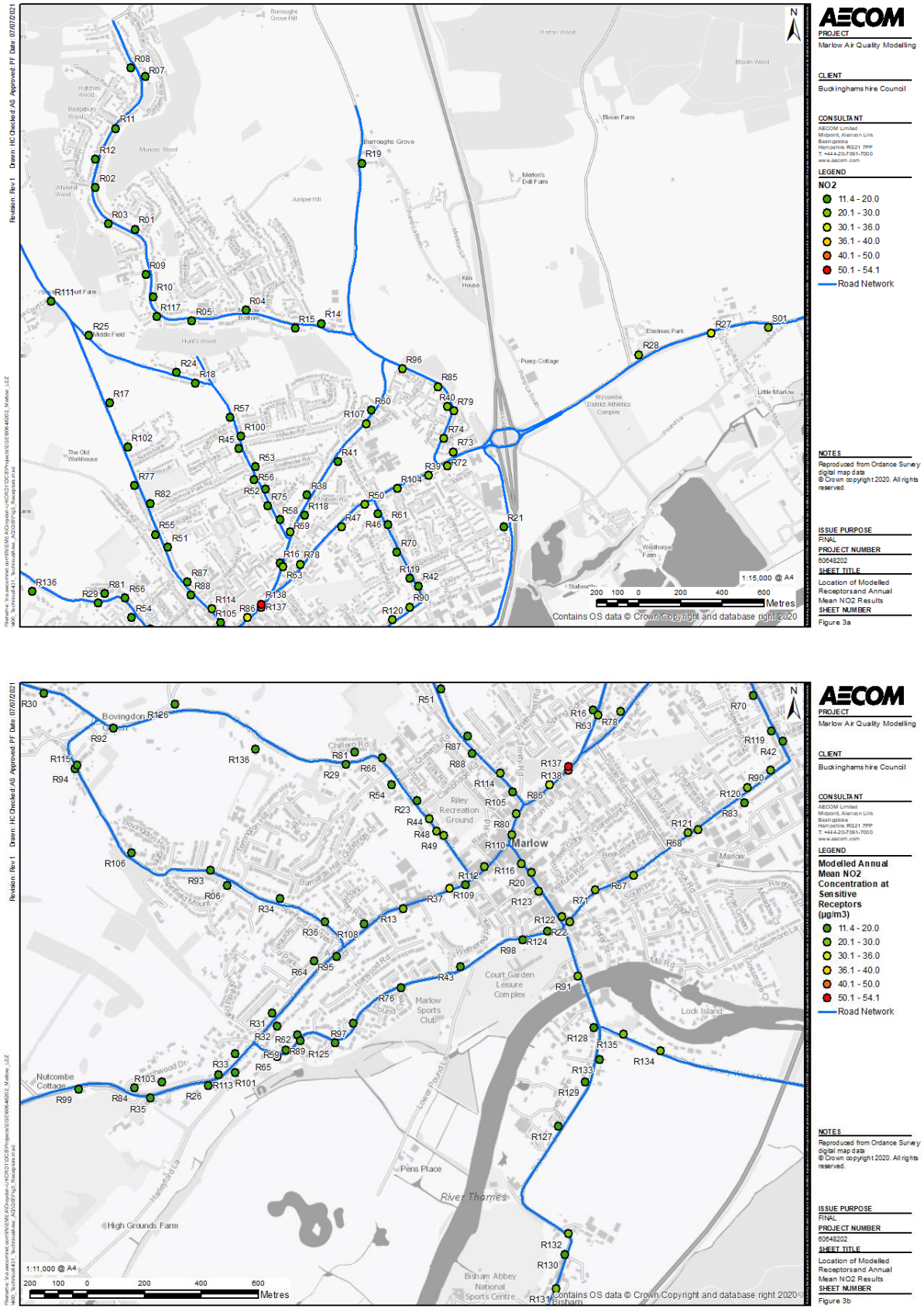


Figure 3a and 3b 2019 Annual mean NO_2 concentrations at modelled receptors

Appendix B Traffic Data

B.1 Traffic Flows

Table 6 provides a summary of the 2019 traffic data assumed on the modelled road links.

Table 6 Traffic flows and percentage HDVs on modelled roads, 2019

Road Name	AADT 24h Flow	% HDV	Speed (km/h)
Little Marlow Road A4155	19,078	4.3	48
Chapel Street	18,277	1.8	32
Spittal Street	13,126	2.6	32
High Street	8730	0.6	32
A4155 Henley Road	8470	2.1	48
B482 Seymour Court Road S	10,781	2.1	48
Marlow Bridge	8,555	0.6	32
Station Road	3255	0.9	32
Quarry Wood Road	3,011	1.2	64
Bisham Road S	8,910	0.2	64
Chalkpit Lane	4,056	3.3	48
B482 Seymour Court Road N	10,121	1.7	80
Wiltshire Road	14,159	2.5	48
Dedmere Road	3,255	0.9	32
Pound Lane	2,130	0.7	48
A4155 West Street	9,880	2.0	32
High Street	8,555	0.6	32
Bisham Road N	8,910	0.2	32
Oxford Road	5,867	2.1	48
Frieth Road	2,054	4.9	48
Dean Street	9,577	1.8	48
Barnards Hill	2,127	1.7	32
Marlow Bottom Road	7,462	2.6	48
Wycombe Road	10,891	2.8	64

Road Name	AADT 24h Flow	% HDV	Speed (km/h)
Parkway	8,480	3.2	48
A4155 Marlow Road	24,847	4.3	97
Wycombe Road 2	7,712	2.1	48
Newton Road S	2,607	1.1	32
Newton Road N	3,667	0.9	32
Oak Tree Road	2,302	1.5	40
Seymour Plain	118	10.3	24
Little Marlow Road/A404 rdbt	9,539	4.3	32
Bisham Road S	6,341	0.8	64
B482 Marlow Road	10,121	1.7	80
A4155 Marlow Road	12,424	4.3	24

B.2 Fleet

A total of 199,526 data entries were obtained from the two day ANPR camera survey, 20,522 entries did not contain sufficient information to categorise accurately and were discarded.

Table 7 provides a summary of the breakdown by the observed fleet by vehicle type, based on numbers of trips as information on individual unique vehicles were not provided.

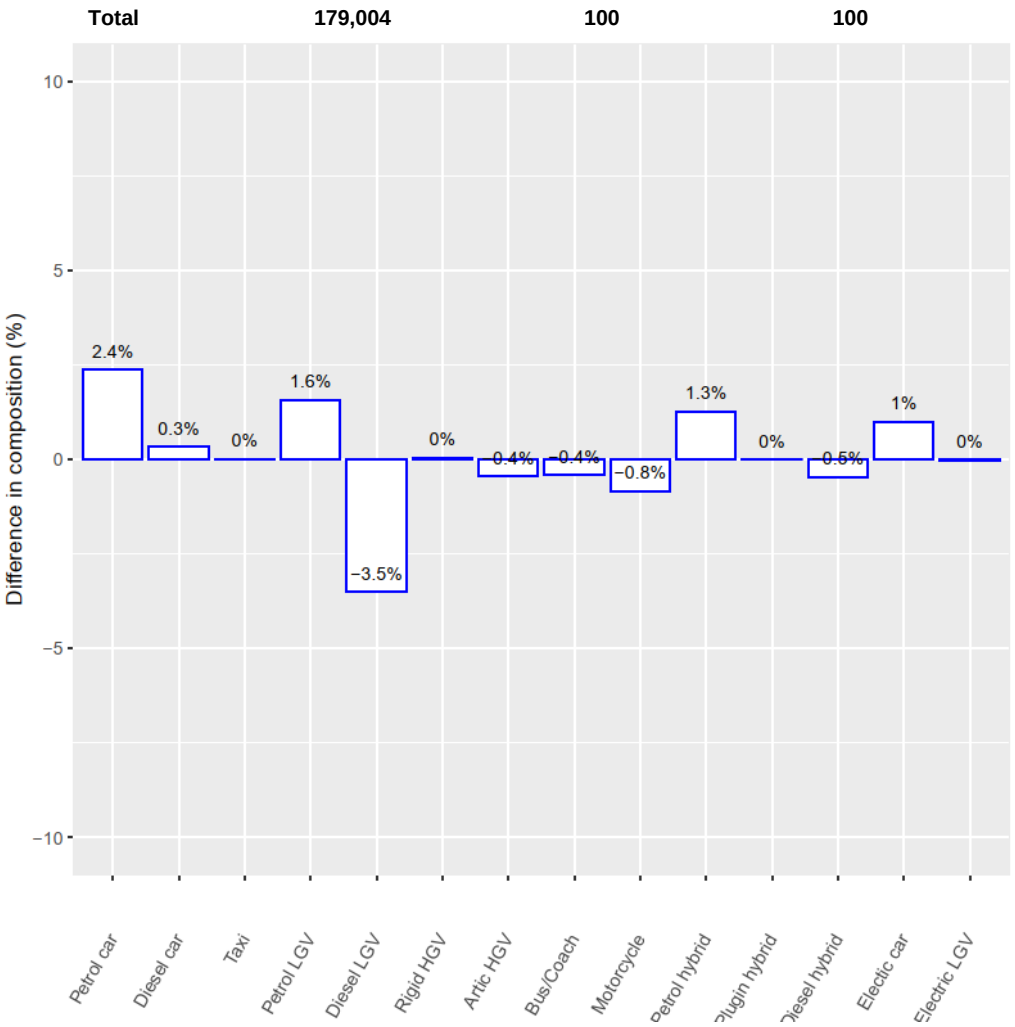
Vehicle Type Summary

Table 7 Vehicle type summary results table

Vehicle Type	Data Entries (trips)	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Petrol car	83,702	46.76	44.38	2.38
Diesel car	58,069	32.44	32.10	0.34
Taxi (hackney carriages)*	36	0.02	0.00	0.02
Petrol LGV	3,186	1.78	0.20	1.58
Diesel LGV	21,498	12.01	15.50	-3.50
Rigid HGV	1,736	0.97	0.93	0.04
Artic HGV	0	0.00	0.45	-0.44
Bus/Coach	698	0.39	0.80	-0.41
Motorcycle	322	0.18	1.01	-0.82
Petrol hybrid	6,641	3.71	2.43	1.28
Plugin hybrid	0	0.00	1.01	0.00
Diesel hybrid	90	0.05	0.51	-0.46
Electric car	2,954	1.65	0.64	1.00
Electric LGV	54	0.03	0.04	-0.01

Vehicle Type	Data Entries (trips)	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Total	**179,004**	**100**	**100**	

Note: It was not possible at this stage to disaggregate the private hire taxis from cars.



Engine Size Distribution

A comparison of engine sizes of petrol and diesel cars observed in Marlow compared to the national averages are provided in Figure 6 and 7.

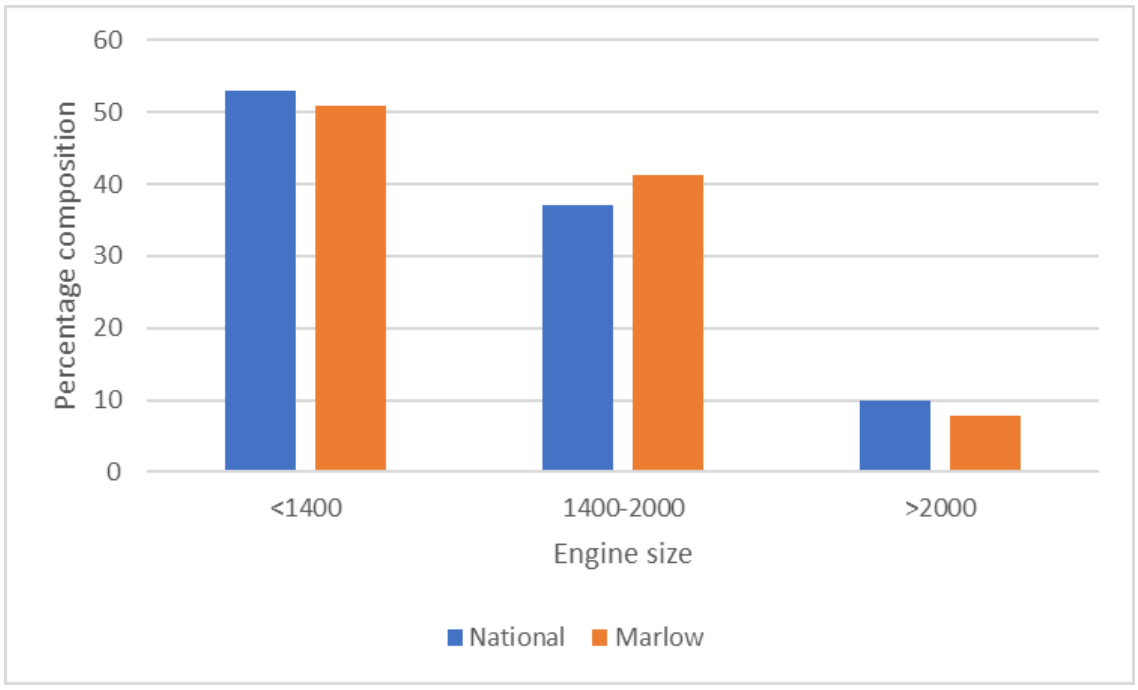


Figure 6 Comparison of engine size distribution for petrol cars

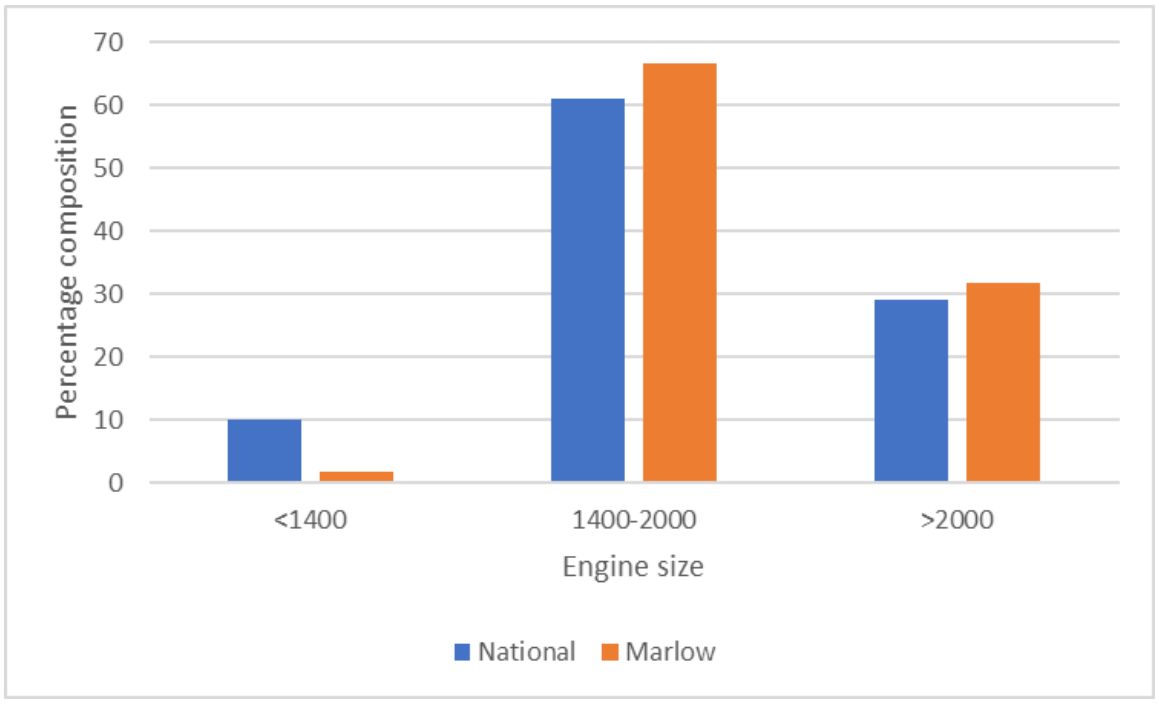
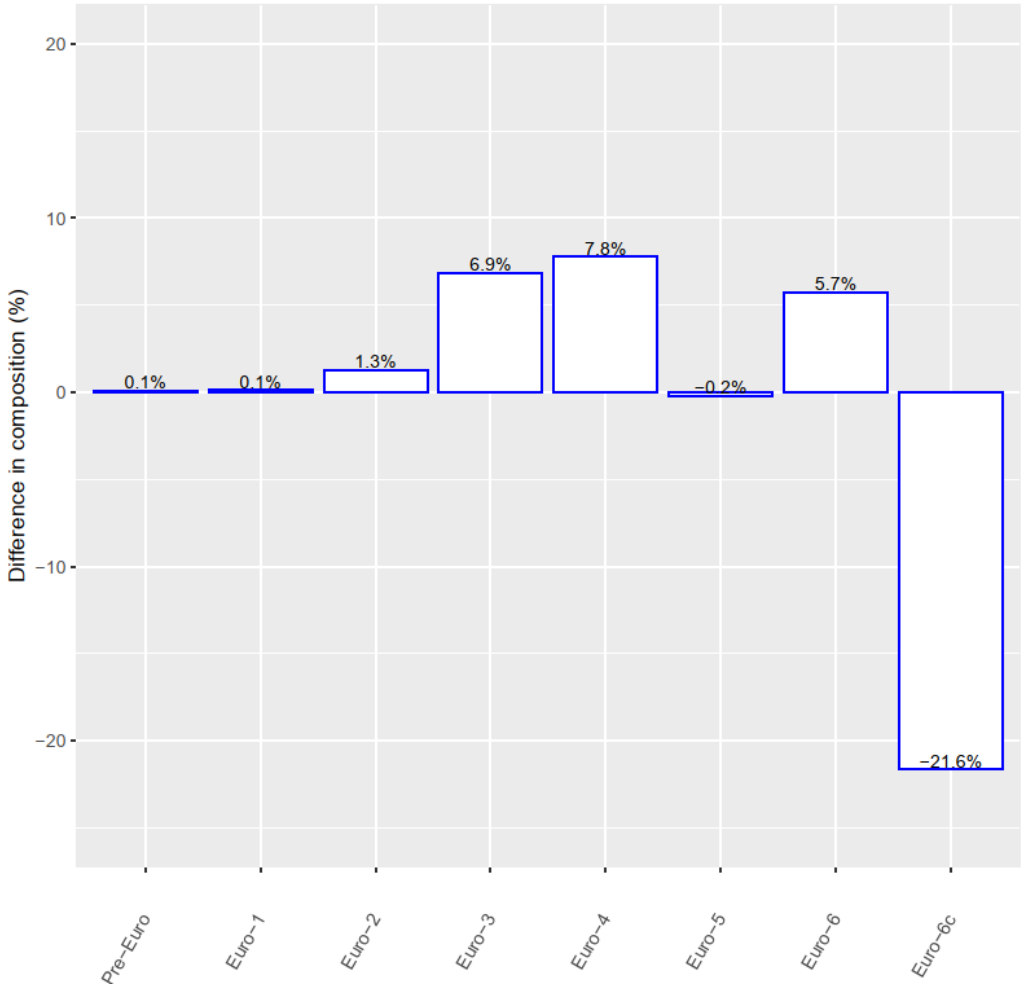


Figure 7 Comparison of engine size distribution for diesel cars

Petrol Car Engine Type Summary

Table 8 Petrol car engine type summary

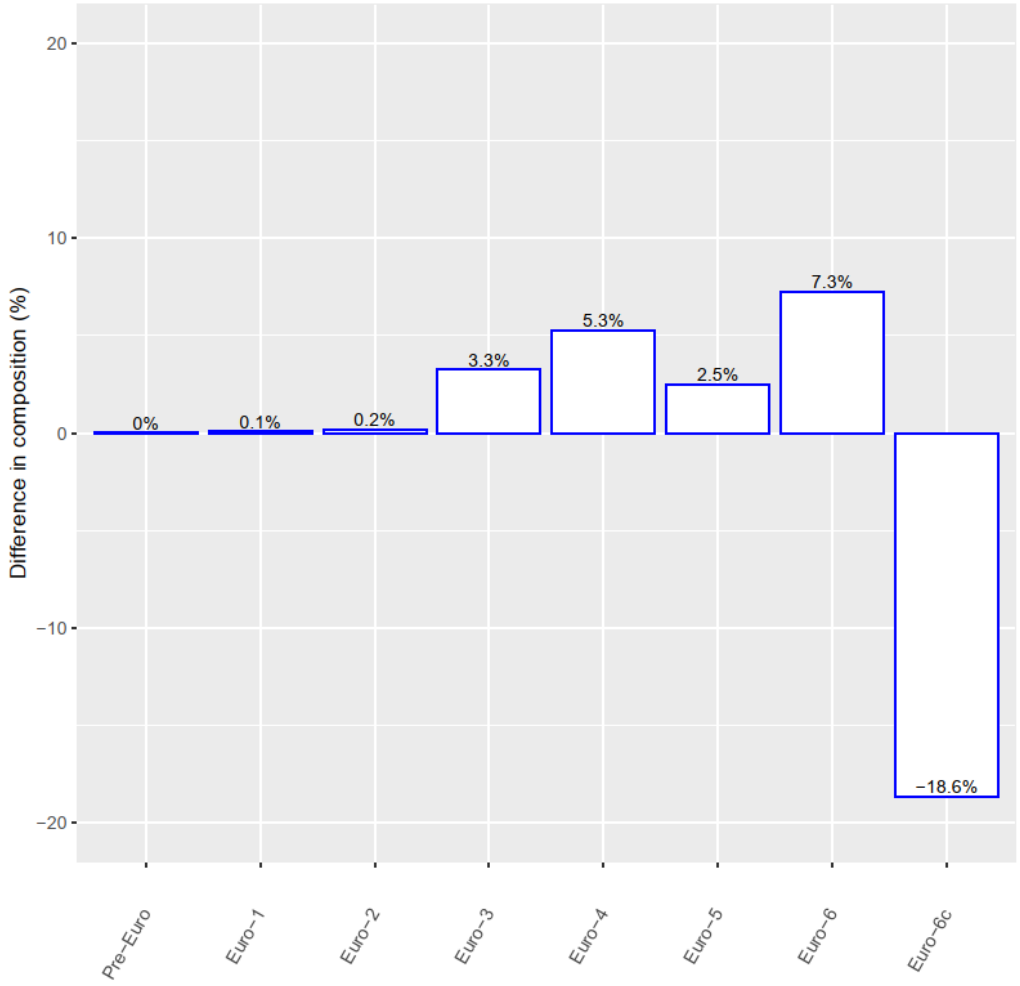
Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Pre-Euro	0.11	0.00	0.11
Euro-1	0.13	0.00	0.13
Euro-2	1.27	0.00	1.27
Euro-3	8.51	1.65	6.86
Euro-4	15.88	8.10	7.77
Euro-5	22.02	22.24	-0.22
Euro-6	19.38	13.66	5.72
Euro-6c	32.70	54.34	-21.64



Diesel Car Engine Type Summary

Table 9 Diesel car engine type summary

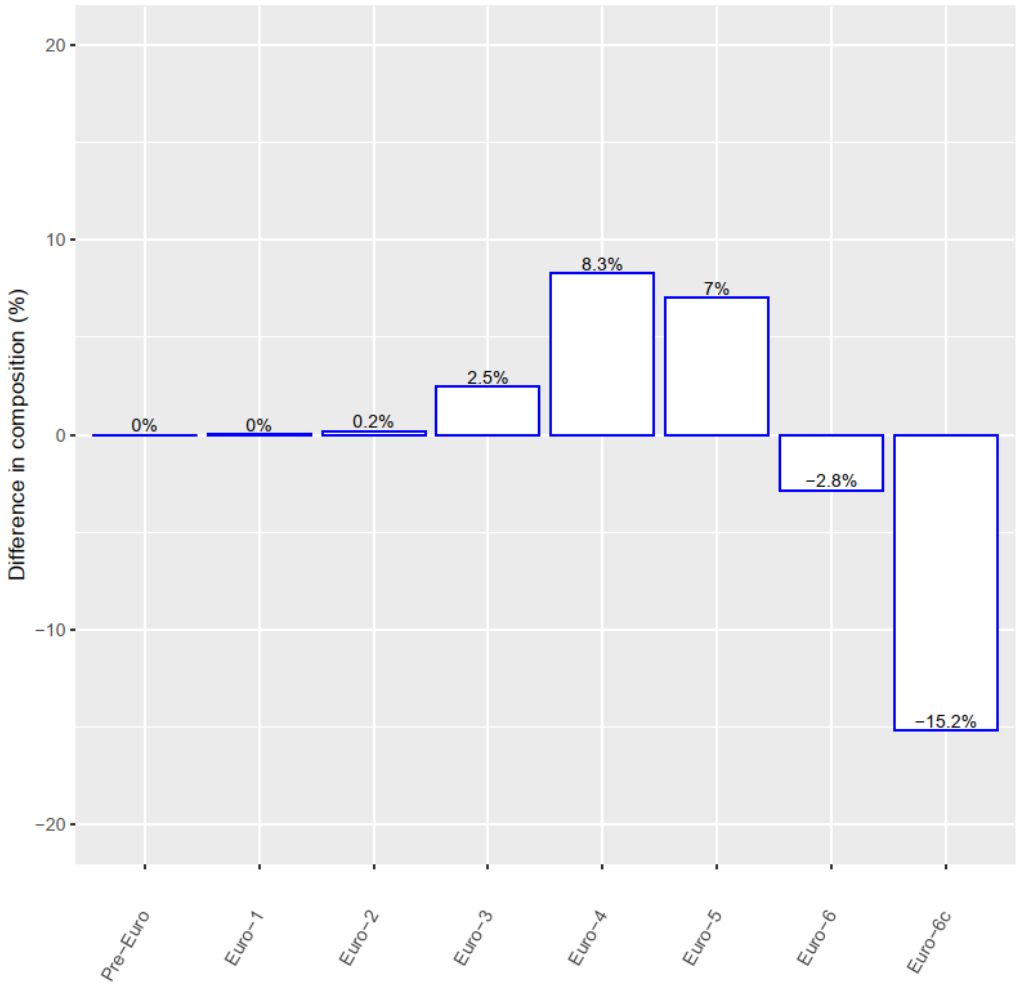
Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Pre-Euro	0.01	0.00	0.01
Euro-1	0.09	0.00	0.09
Euro-2	0.20	0.00	0.20
Euro-3	4.30	1.05	3.26
Euro-4	13.33	8.05	5.28
Euro-5	33.35	30.83	2.51
Euro-6	25.37	18.09	7.27
Euro-6c	23.35	41.98	-18.63



Diesel LGV Engine Type Summary

Table 10 Diesel LGV engine type summary

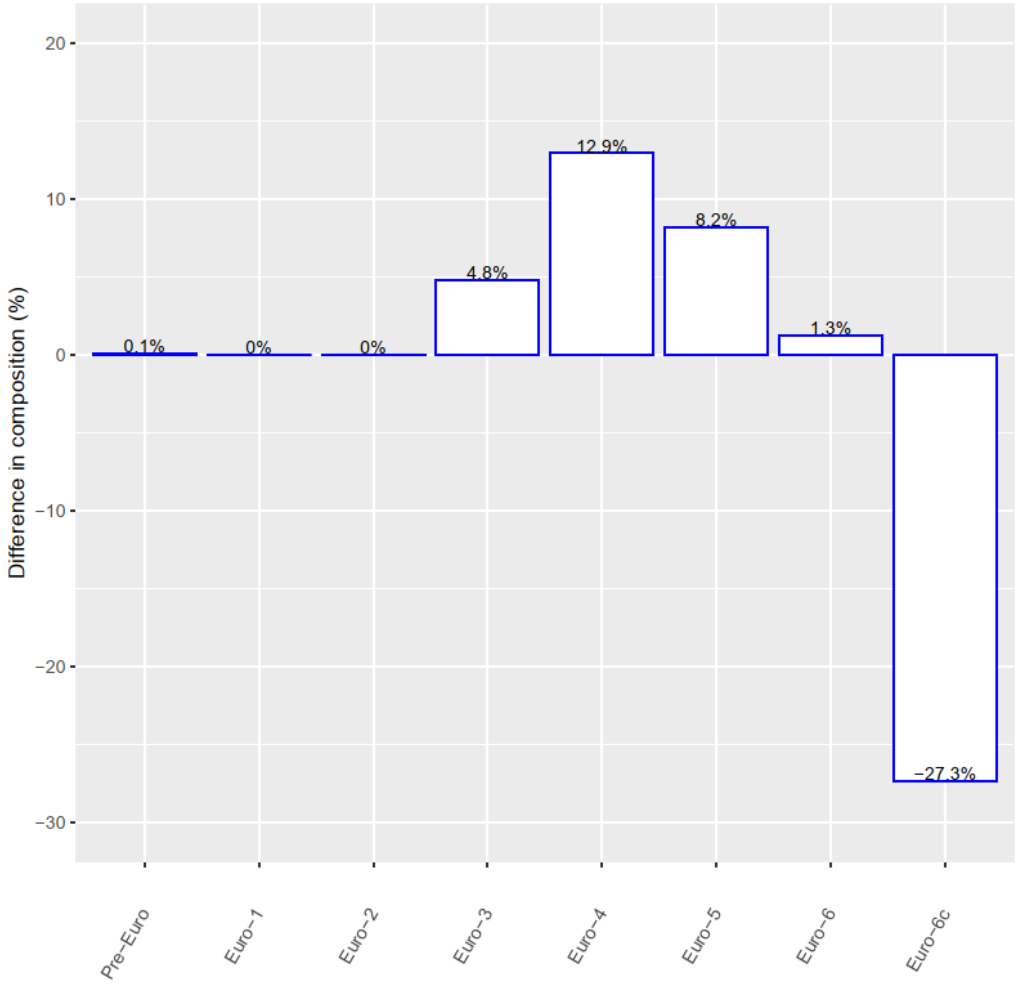
Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Pre-Euro	0.00	0.00	0.00
Euro-1	0.01	0.00	0.01
Euro-2	0.30	0.10	0.20
Euro-3	3.59	1.12	2.47
Euro-4	15.62	7.35	8.27
Euro-5	29.65	22.61	7.04
Euro-6	12.12	14.96	-2.84
Euro-6c	38.70	53.86	-15.16



Petrol LGV Engine Type Summary

Table 11 Petrol LGV engine type summary

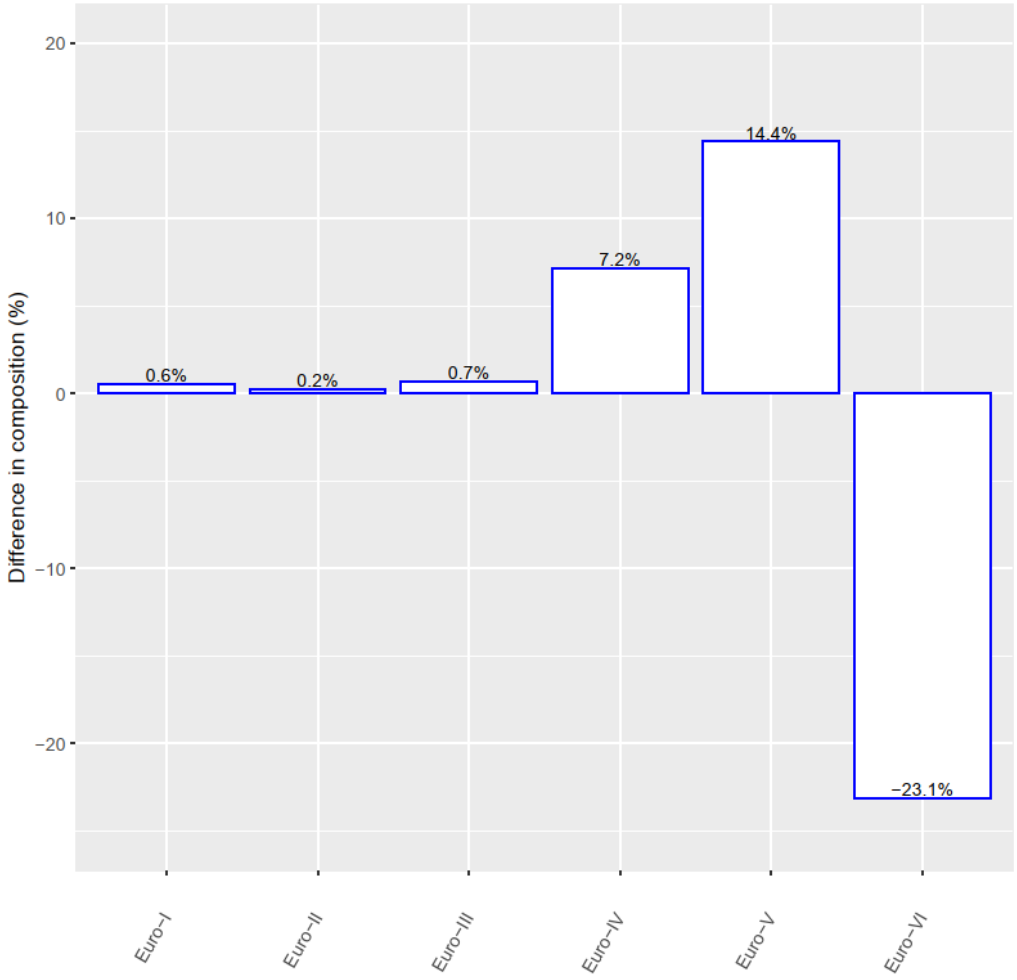
Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Pre-Euro	0.09	0.00	0.09
Euro-1	0.00	0.00	0.00
Euro-2	0.28	0.30	-0.02
Euro-3	7.75	2.92	4.83
Euro-4	21.89	8.96	12.94
Euro-5	31.27	23.08	8.19
Euro-6	19.07	17.79	1.29
Euro-6c	19.64	46.95	-27.32



Rigid HGV Engine Type Summary

Table 12 Rigid HGV engine type summary

Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Euro-I	0.57	0.00	0.57
Euro-II	0.34	0.11	0.24
Euro-III	2.81	2.09	0.72
Euro-IV	9.42	2.25	7.17
Euro-V	26.31	11.89	14.41
Euro-VI	60.54	83.66	-23.12

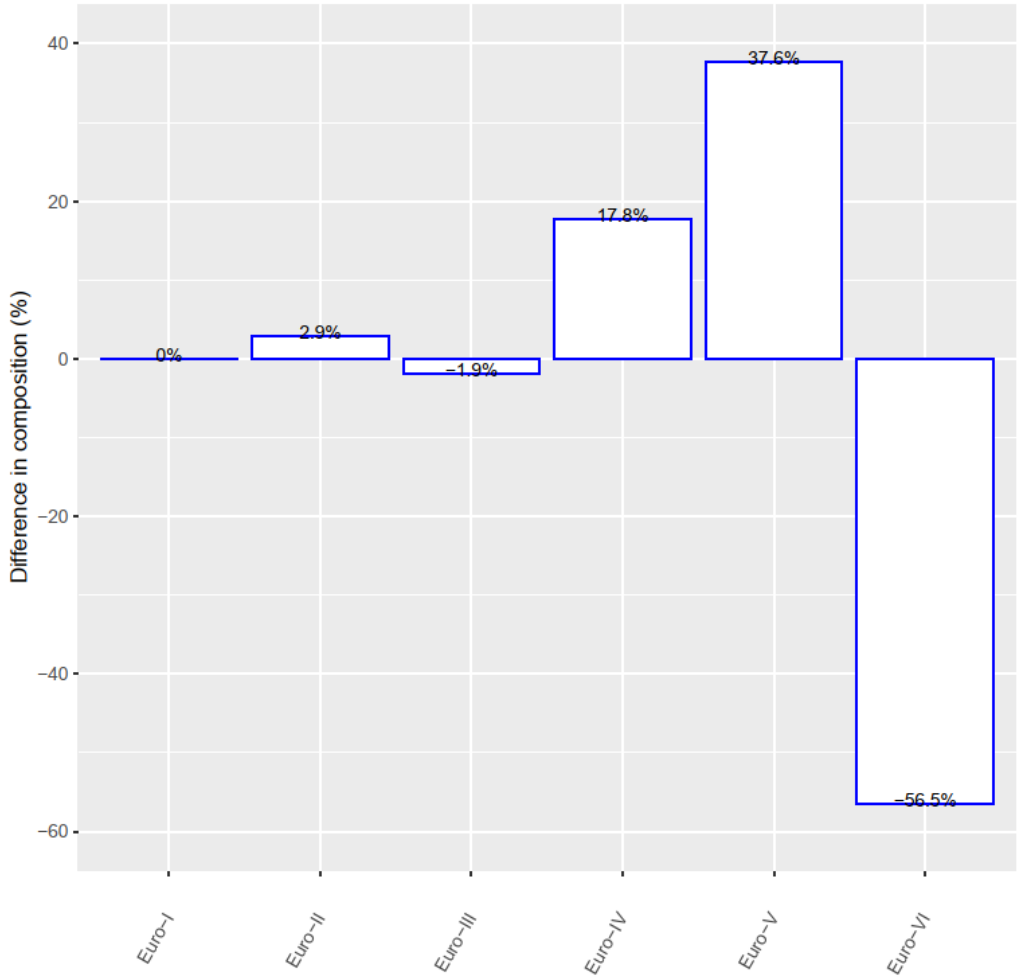


Bus and Coach Engine Type Summary

Table 13 Bus and coach engine type summary

Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Euro-I	0.14	0.00	0.14
Euro-II	3.30	0.35	2.95
Euro-III	3.30	5.25	-1.95
Euro-IV	21.81	4.06	17.75

Engine Standard	ANPR Composition (%)	Default EFT Composition (%)	Difference (%)
Euro-V	56.81	19.20	37.62
Euro-VI	14.63	71.15	-56.51



B.3 Route Data

Table 14 Summary of results, 22nd April 2021: Movements completed in less than 15 minutes

Movement From	Movement To												
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total**
01	229	298	657	118	309	421	66	358	411	89	202	50	**3208**
02	171	352	1178	47	37	396	55	40	298	53	98	39	**2764**
03	661	1526	587	57	74	950	131	447	1136	161	340	115	**6185**
04	106	54	43	91	501	91	13	40	51	128	36	93	**1247**
05	276	52	60	453	181	261	66	108	66	455	148	186	**2312**
06	385	502	717	84	271	113	12	57	232	42	55	155	**2625**
07	91	87	145	18	61	16	40	6	50	7	17	16	**554**
08	354	104	382	39	119	73	14	68	214	33	65	23	**1488**
09	263	455	873	44	36	224	32	163	126	42	54	37	**2349**
10	138	112	128	95	357	75	8	35	90	35	78	64	**1215**
11	192	163	275	79	241	68	21	60	97	150	26	39	**1411**
12	38	45	102	100	219	175	7	21	29	119	26	88	**969**
Total	**2904**	**3750**	**5147**	**1225**	**2406**	**2863**	**465**	**1403**	**2800**	**1314**	**1145**	**905**	**26327**

Table 15 Summary of results, 22nd April 2021: Movements completed in more than 15 minutes

Movement From	Movement To												
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total**
01	148	34	61	6	15	26	5	22	26	15	13	16	**387**
02	35	179	35	4	12	18	5	22	32	14	16	16	**388**
03	58	101	302	22	44	48	9	33	65	31	40	27	**780**
04	10	2	13	43	12	6	2	2	9	7	5	1	**112**
05	14	15	31	18	106	13	2	11	21	15	13	6	**265**
06	23	31	35	4	12	93	2	7	24	13	13	14	**271**
07	4	11	9	1	2	3	23	3	6	7	1	1	**71**
08	12	11	15	3	1	6	0	28	11	9	9	6	**111**
09	24	20	20	2	5	10	2	10	70	8	12	14	**197**
10	8	6	6	5	7	7	1	8	11	20	12	10	**101**
11	8	10	18	4	14	5	2	6	9	7	20	3	**106**
12	13	11	27	2	8	6	1	5	20	13	11	43	**160**
Total	**357**	**431**	**572**	**114**	**238**	**241**	**54**	**157**	**304**	**159**	**165**	**157**	**2949**

Table 16 Summary of results, 22nd April 2021: All movements

Movement From	Movement To												
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total**
01	377	332	718	124	324	447	71	380	437	104	215	66	**3595**
02	206	531	1213	51	49	414	60	62	330	67	114	55	**3152**
03	719	1627	889	79	118	998	140	480	1201	192	380	142	**6965**
04	116	56	56	134	513	97	15	42	60	135	41	94	**1359**
05	290	67	91	471	287	274	68	119	87	470	161	192	**2577**
06	408	533	752	88	283	206	14	64	256	55	68	169	**2896**
07	95	98	154	19	63	19	63	9	56	14	18	17	**625**
08	366	115	397	42	120	79	14	96	225	42	74	29	**1599**
09	287	475	893	46	41	234	34	173	196	50	66	51	**2546**
10	146	118	134	100	364	82	9	43	101	55	90	74	**1316**
11	200	173	293	83	255	73	23	66	106	157	46	42	**1517**
12	51	56	129	102	227	181	8	26	49	132	37	131	**1129**
Total	**3261**	**4181**	**5719**	**1339**	**2644**	**3104**	**519**	**1560**	**3104**	**1473**	**1310**	**1062**	**29276**

Table 17 Summary of results, 24th April 2021: Movements completed in less than 15 minutes

Movement From	Movement To												
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total**
01	190	276	516	75	211	277	44	323	332	95	221	47	**2607**
02	170	319	1075	31	34	372	69	61	261	55	123	48	**2618**
03	596	1878	603	84	107	997	116	394	1067	165	422	170	**6599**
04	76	64	49	59	498	92	15	22	38	83	47	56	**1099**
05	186	66	91	472	152	234	38	100	61	368	145	128	**2041**
06	273	457	794	78	204	92	12	44	168	37	53	114	**2326**
07	56	95	104	15	41	14	26	13	41	10	15	7	**437**
08	327	106	357	23	87	60	8	49	148	41	48	14	**1268**
09	213	456	868	33	46	169	26	125	78	43	68	23	**2148**
10	112	83	164	72	266	59	8	37	60	20	59	42	**982**
11	243	263	384	65	230	81	18	58	103	117	24	31	**1617**
12	44	79	130	63	160	155	11	27	42	77	20	57	**865**
Total	**2486**	**4142**	**5135**	**1070**	**2036**	**2602**	**391**	**1253**	**2399**	**1111**	**1245**	**737**	**24607**

Table 18 Summary of Results, 24th April 2021: Movements completed in more than 15 minutes

Movement From	Movement To												
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total**
01	111	38	52	4	13	13	2	14	30	11	14	15	**317**
02	22	161	48	13	14	37	6	18	37	13	18	11	**398**
03	63	102	261	20	44	71	13	25	67	23	37	29	**755**
04	9	10	10	30	5	5	2	2	9	2	8	5	**97**
05	20	13	46	10	62	12	5	8	13	18	21	9	**237**
06	14	25	31	9	8	64	5	6	21	8	8	14	**213**
07	1	9	7	2	4	3	29	2	3	3	6	3	**72**
08	7	8	14	2	4	6	2	21	7	4	4	9	**88**
09	10	14	20	2	5	10	4	10	56	3	14	11	**159**
10	4	11	12	4	7	4	5	4	7	8	7	2	**75**
11	9	15	18	8	10	8	2	4	8	12	18	5	**117**
12	14	14	18	1	5	6	3	9	16	11	6	28	**131**
Total	**284**	**420**	**537**	**105**	**181**	**239**	**78**	**123**	**274**	**116**	**161**	**141**	**2659**

Table 19 Summary of Results, 24th April 2021: All Movements

Movement From	Movement To												
	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total**
01	301	314	568	79	224	290	46	337	362	106	235	62	**2924**
02	192	480	1123	44	48	409	75	79	298	68	141	59	**3016**
03	659	1980	864	104	151	1068	129	419	1134	188	459	199	**7354**
04	85	74	59	89	503	97	17	24	47	85	55	61	**1196**
05	206	79	137	482	214	246	43	108	74	386	166	137	**2278**
06	287	482	825	87	212	156	17	50	189	45	61	128	**2539**
07	57	104	111	17	45	17	55	15	44	13	21	10	**509**
08	334	114	371	25	91	66	10	70	155	45	52	23	**1356**
09	223	470	888	35	51	179	30	135	134	46	82	34	**2307**
10	116	94	176	76	273	63	13	41	67	28	66	44	**1057**
11	252	278	402	73	240	89	20	62	111	129	42	36	**1734**
12	58	93	148	64	165	161	14	36	58	88	26	85	**996**
Total	**2770**	**4562**	**5672**	**1175**	**2217**	**2841**	**469**	**1376**	**2673**	**1227**	**1406**	**878**	**27266**

Table 20 Summary of results for routes with greater than 200 AADT, 22nd April 2021

Trip Chain	Vehicle Type						
	Car	LGV	OGV1	OGV2	Bus	Other	Total
03_IN>02_OUT	1261	211	29	13	10	0	1524
02_IN>03_OUT	1002	146	13	4	5	1	1171
03_IN>09_S	972	105	23	4	2	1	1107
09_N>03_OUT	730	97	18	2	2	1	850
03_IN>09_S>06_OUT	611	184	26	19	6	4	850
06_IN>09_N>03_OUT	492	125	20	14	2	1	654
03_IN>03_OUT	447	116	16	0	5	2	586
04_IN>05_OUT	388	90	10	1	9	1	499
01_IN>08_S>09_N>03_OUT	379	77	12	2	8	0	478
03_IN>09_S>08_N>01_OUT	350	72	16	3	8	1	450
05_IN>04_OUT	351	74	13	1	9	1	449
09_N>02_OUT	391	49	5	2	0	0	447
03_IN>09_S>08_N	344	58	11	2	0	0	415
06_IN>09_N>02_OUT	327	63	8	0	8	0	406
01_IN>08_S>09_N	333	50	2	1	1	0	387
02_IN>02_OUT	328	33	3	0	0	0	364
05_IN>11_N>10_N	314	36	0	0	0	0	350
08_S>09_N>03_OUT	289	59	0	0	1	0	349
01_IN>08_S	312	31	2	0	0	0	345
08_N>01_OUT	310	24	4	2	2	0	342
01_IN>08_S>06_OUT	291	37	6	4	3	0	341
02_IN>09_S>06_OUT	229	45	4	0	41	0	319
06_IN>08_N>01_OUT	237	31	9	3	8	1	289
10_S>11_S>05_OUT	268	19	0	0	0	0	287
02_IN>09_S	241	34	2	0	4	0	281
09_S>08_N>01_OUT	210	34	3	0	1	0	248
11_N>10_N>09_N>03_OUT	209	21	4	0	0	1	235
01_IN>02_OUT	210	16	6	0	0	0	232
11_S>05_OUT	196	30	0	0	0	0	226
06_IN>09_N	179	35	5	3	1	2	225
03_IN>09_S>10_S>11_S	200	17	2	0	0	0	219
01_IN>01_OUT	197	12	2	0	0	0	211
12_W>05_OUT	191	18	2	0	0	0	211
01_IN>08_S>10_S>11_S>05_OUT	180	29	0	0	0	0	209
09_S>06_OUT	173	23	3	0	3	1	203

Numerical value represents ANPR camera location. IN = Inbound, OUT = Outbound, N = Northbound, S = Southbound

Table 21 Summary of results for routes with greater than 200 AADT, 24th April 2021

Trip Chain	Vehicle Type						
	Car	LGV	OGV1	OGV2	Bus	Other	Total
03_IN>02_OUT	1675	170	9	1	1	1	1857
02_IN>03_OUT	979	89	5	1	1	1	1076
03_IN>09_S	966	44	10	1	0	0	1021
03_IN>09_S>06_OUT	794	76	9	7	1	1	888
09_N>03_OUT	788	48	10	1	0	0	847
06_IN>09_N>03_OUT	654	54	5	8	0	2	723
03_IN>03_OUT	452	64	7	2	0	1	526
04_IN>05_OUT	426	53	5	0	3	0	487
05_IN>04_OUT	424	37	5	0	3	0	469
09_N>02_OUT	415	29	5	0	1	0	450
03_IN>09_S>08_N>01_OUT	383	26	6	4	2	0	421
01_IN>08_S>09_N>03_OUT	366	22	1	0	1	0	390
06_IN>09_N>02_OUT	347	32	0	0	1	1	381
03_IN>09_S>08_N	320	25	3	1	0	0	349
08_S>09_N>03_OUT	296	32	1	2	0	0	331
08_N>01_OUT	299	17	1	0	0	0	317
11_N>10_N>09_N>03_OUT	298	19	0	0	0	0	317
01_IN>08_S	297	15	1	0	1	0	314
01_IN>08_S>09_N	292	18	1	0	0	0	311
02_IN>02_OUT	281	16	4	1	0	3	305
05_IN>11_N>10_N	291	11	0	0	0	0	302
03_IN>09_S>10_S>11_S	280	10	1	0	0	0	291
02_IN>09_S>06_OUT	217	29	1	0	19	0	266
02_IN>09_S	224	17	0	0	2	0	243
11_N>10_N>08_N>01_OUT	212	11	1	0	0	0	224
11_N>10_N>09_N>02_OUT	219	4	0	0	0	0	223
01_IN>02_OUT	204	6	0	0	0	0	210
11_S>05_OUT	201	7	0	0	0	0	208
10_S>11_S>05_OUT	203	4	0	0	0	0	207
09_S>08_N>01_OUT	186	16	2	0	0	0	204
01_IN>08_S>06_OUT	178	20	3	0	0	0	201

Numerical value represents ANPR camera location. IN = Inbound, OUT = Outbound, N = Northbound, S = Southbound

Appendix C Model Verification

Model verification was undertaken using monitoring sites within the study area.

From these sites, only those representative of modelled sensitive receptor locations and with sufficient data capture (2019) were considered suitable for the purposes of model verification. Following detailed analysis of each monitoring location in the study area, a total of nine monitoring sites were taken forward in the model verification process. Table 22 details the sites removed from the verification process, whilst Table 23 details the sites used in verification.

Table 22 Monitoring sites excluded from model verification

Site ID	Grid reference (X, Y)	Reason for exclusion from Verification
S1	485013,186445	Not on a modelled road
S3	484754,186890	Roads surrounding (within 200m) not modelled
S21	485069,186870	Close to traffic lights
S29	485217,187011	Model unable to represent dispersion in open location
S31	484890,186571	Close to a bus stop
S49	484966,186760	Close to a bus stop

Table 23 Monitoring sites used in model verification

Site ID	Site Type	Site Name	Grid reference (X, Y)
S2	Roadside	Solicitors, Chapel Street	484965, 186772
S30	Roadside	Spitall Street	484869, 186657
S31	Urban Centre	Marlow High Street	484890, 186571
S36	Roadside	West Street	484643 ,186436
S41	Roadside	55 Chapel Street	485024, 186825
S42	Urban Centre	Training centre, Marlow High Street	485029, 186327
S43	Roadside	Glade View	485182, 186975
S52	Roadside	West Street	484813, 186535
S53	Roadside	Chapel Street	484888, 186680

Following Defra's Technical Guidance LAQM.TG(16), model performance was analysed at these nine monitoring sites. It was found that three sites had modelled NO_2 concentrations within +/- 25% of the monitored road, and the root mean square error (RMSE), an assessment of the uncertainty in modelled estimates, was close to or higher than the ideal limit (10% of the relevant air quality criterion). Therefore, an adjustment factor of 2.12 was calculated to bring modelled concentrations into line with the monitored (see Table 24).

Four of the nine sites had modelled NO_2 concentrations within 10% of the corresponding monitored concentrations post-adjustment and the rest were within 25%. LAQM.TG(16) indicates that an RMSE within 10% of the AQO (4µg/m^3) is ideal; the model performance is therefore considered to be robust.

Table 24 Verification details

Number of Sites	Number of Monitoring Sites within ±10% of the Monitored Concentration Pre-Adjustment	RMSE pre-adjustment (µg/m^3)	Model Adjustment Factor	Number of Sites within ±10% of the Monitored Concentration Post Adjustment	RMSE post adjustment (µg/m^3)	Fractional Bias post adjustment)
9	0	10.1	2.12	4	3.8	0.0

Details of modelled NO_2 before and after adjustment at each monitoring site are provided in Table 25 and the relationship between modelled and monitored NO_2 before after adjustment is shown in Figure 8 and 9.

Table 25 Monitoring data used in model verification

Site	Monitored total NO_2 (µg/m^3)	Monitored Road NO_X (µg/m^3)	Modelled Road NO_X (µg/m^3)	Modelled Total NO_2 Before Adjustment (µg/m^3)	Modelled Total NO_2 After Adjustment (µg/m^3)
S2	37.4	51.1	17.3	21.3	30.9
S30	29.8	34.4	15.3	20.3	28.8
S31	27.6	29.9	16.9	21.1	30.5
S36	31.4	37.8	16.9	21.1	30.5
S41	37.1	46.2	27.1	28.2	42.0
S42	27.6	25.9	11.4	20.2	26.7
S43	24.8	20.3	14.0	21.6	29.5
S52	30.4	35.6	11.7	18.4	25.1
S53	32.7	40.7	16.9	21.1	30.4

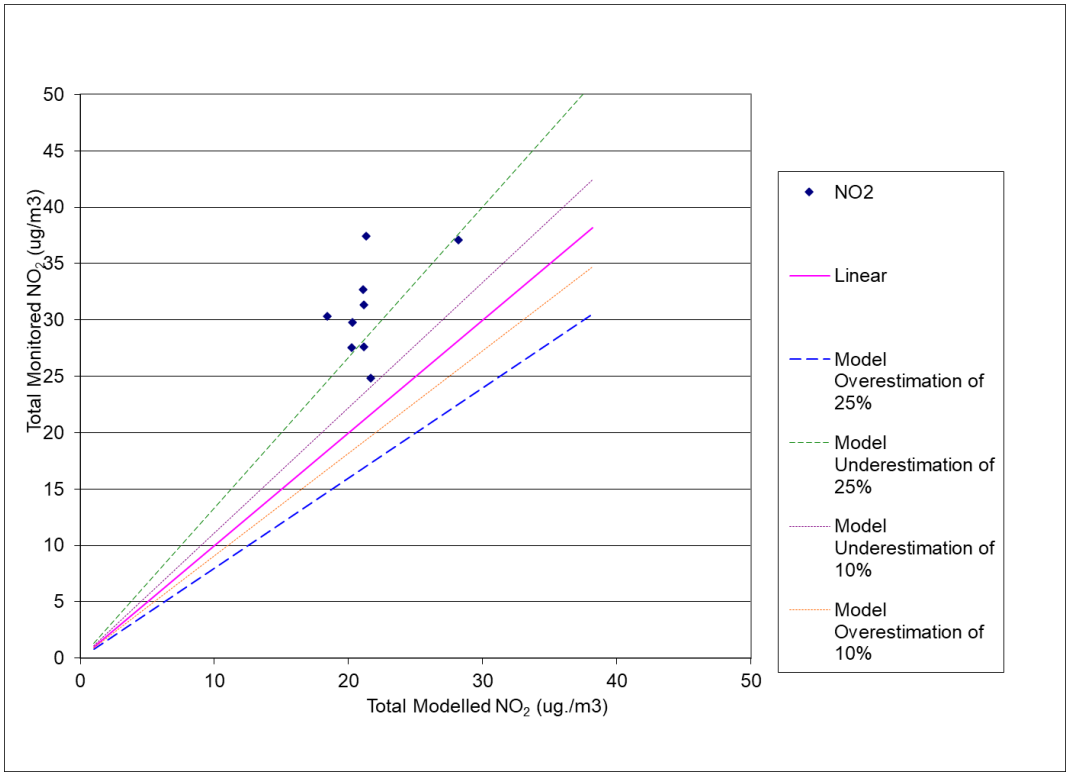


Figure 8 Total monitored and modelled NO_2 concentrations pre-adjustment

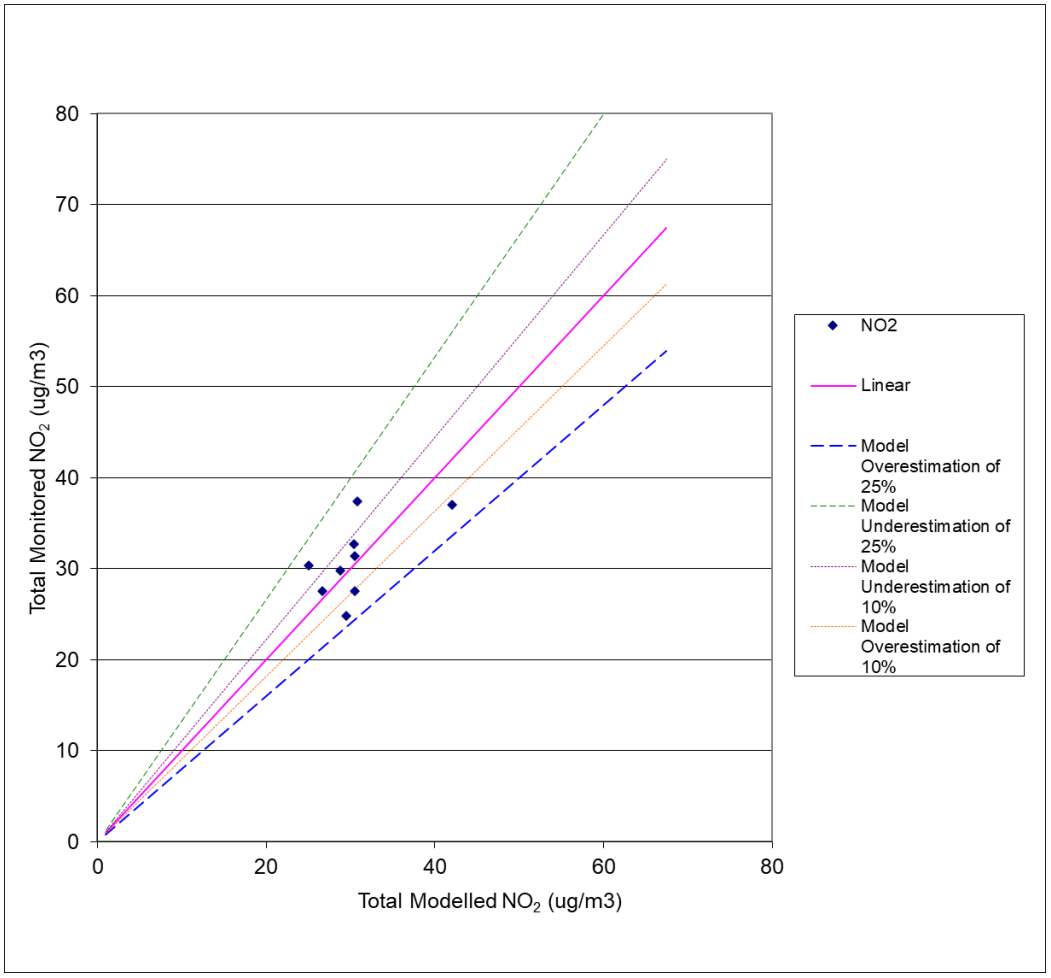


Figure 9 Total monitored and modelled NO_2 concentrations post-adjustment

Appendix D Baseline Results

The results of baseline concentrations provided below in Table 26, based on adjustment factor of 2.12 and RMSE value indicating model uncertainty of 3.8µg/m^3.

Table 26 2019 Baseline annual mean NO_2 concentrations at receptors

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
					NO_2	PM_{10}	$PM_{2.5}$
R01	138 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PP	484463	188659	1.5	15.3	15.5	10.5
R02	174 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PP	484274	188859	1.5	15.4	15.5	10.5
R03	179 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PL	484335	188684	1.5	14.8	15.4	10.4
R04	36 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3LY	484993	188273	1.5	15.3	15.5	10.5
R05	Leobra 81 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3NA	484735	188221	1.5	16.2	15.6	10.6
R06	Kenilworth, Spinfield Lane, Marlow, Buckinghamshire, SL7 2JT	483871	186450	1.5	11.4	13.9	9.6
R07	276 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PT	484512	189390	1.5	11.6	14.4	9.8
R08	295 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3QF	484443	189430	1.5	11.6	14.4	9.8
R09	129 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PJ	484515	188443	1.5	14.2	15.2	10.3
R10	94 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PH	484550	188337	1.5	16.5	15.7	10.6
R11	216 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PR	484372	189140	1.5	12.2	14.5	9.8

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
R12	223 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3PZ	484274	188994	1.5	12.0	14.8	10.1
R13	Little Westerns, West Street, Marlow, Buckinghamshire, SL7 2BS	484488	186370	1.5	22.8	16.7	11.5
R14	4 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3LT	485353	188208	1.5	17.3	16.7	10.9
R15	23 Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3LZ	485230	188185	1.5	16.1	16.5	10.7
R16	Spring House 1A Green Verges, Marlow, Buckinghamshire, SL7 3HT	485155	187064	1.5	19.3	16.4	11.4
R17	Stowe Farm Seymour Court Road, Marlow, Buckinghamshire, SL7 3BX	484343	187830	1.5	16.3	15.4	10.6
R18	Woodlands, Seymour Plain, Marlow, Buckinghamshire, SL7 3BZ	484752	187923	1.5	12.6	14.6	10.1
R19	Highcroft, Wycombe Road, Marlow, Buckinghamshire, SL7 3RA	485547	188974	1.5	19.3	17.2	11.2
R20	29B High Street, Marlow, Buckinghamshire, SL7 1AU	484939	186497	4.0	23.4	16.6	11.4
R21	20 The Chase, Marlow, Buckinghamshire, SL7 1UU	486227	187238	1.5	17.1	16.5	11.1
R22	5 Station Road, Marlow, Buckinghamshire, SL7 1NG	485072	186323	4.0	23.9	16.8	11.6
R23	Tilecotes Oxford Road, Marlow, Buckinghamshire, SL7 2NT	484536	186748	1.5	18.9	15.8	10.9
R24	Hatherleigh, Seymour Plain, Marlow, Buckinghamshire, SL7 3BZ	484663	187975	1.5	12.5	14.6	10.1
R25	Middle Field, Seymour Plain, Marlow, Buckinghamshire, SL7 3BY	484243	188151	1.5	14.0	15.2	10.3
R26	Upper Redpits, Henley Road, Marlow, Buckinghamshire, SL7 2DQ	483806	185749	1.5	16.0	14.8	10.1

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
R27	Bethwin Cottage, Marlow Road, Little Marlow, Buckinghamshire, SL7 3RS	487218	188162	1.5	31.2	19.3	12.3
R28	Durlston, Marlow Road, Little Marlow, Buckinghamshire, SL7 3RW	486872	188060	1.5	21.5	17.8	11.4
R29	White Ridings, Chalkpit Lane, Marlow, Buckinghamshire, SL7 2PN	484287	186874	1.5	17.0	15.5	10.8
R30	Ballaghy, Frieth Road, Marlow, Buckinghamshire, SL7 2JQ	483228	187123	1.5	12.3	14.3	9.7
R31	26 Henley Road, Marlow, Buckinghamshire, SL7 2DA	484028	186004	1.5	15.6	15.3	10.6
R32	Beechcroft House, Henley Road, Marlow, Buckinghamshire, SL7 2BZ	484047	185957	1.5	16.3	15.3	10.3
R33	Beechwood House, Henley Road, Marlow, Buckinghamshire, SL7 2DF	483899	185860	1.5	14.5	14.5	9.9
R34	Bluebells, Spinfield Lane, Marlow, Buckinghamshire, SL7 2LB	484058	186405	1.5	13.4	14.9	10.4
R35	Hill Cottage, Henley Road, Marlow, Buckinghamshire, SL7 2DQ	483603	185705	1.5	17.4	15.1	10.2
R36	Spinfield Cottage, Spinfield Lane, Marlow, Buckinghamshire, SL7 2LB	484214	186324	1.5	14.5	15.1	10.5
R37	82 West Street, Marlow, Buckinghamshire, SL7 2BP	484651	186440	1.5	30.8	18.4	12.5
R38	85 Wycombe Road, Marlow, Buckinghamshire, SL7 3HZ	485286	187389	1.5	17.5	16.1	11.2
R39	1 Stanley Close, Marlow, Buckinghamshire, SL7 1XL	485866	187484	1.5	29.7	18.4	12.6
R40	12 Wallace Close, Marlow, Buckinghamshire, SL7 1TY	485958	187812	1.5	20.6	16.7	11.6
R41	108 Wycombe Road, Marlow, Buckinghamshire, SL7 3JE	485434	187549	1.5	17.9	16.1	11.2
R42	73 Newtown Road, Marlow,	485819	186955	1.5	19.4	16.0	11.2

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
	Buckinghamshire, SL7 1LG						
R43	6 Pound Lane, Marlow, Buckinghamshire, SL7 2AQ	484690	186167	1.5	15.0	15.2	10.6
R44	94 Oxford Road, Marlow, Buckinghamshire, SL7 2NL	484581	186683	1.5	20.8	16.3	11.2
R45	63 Oak Tree Road, Marlow, Buckinghamshire, SL7 3ET	484960	187611	1.5	13.4	14.8	10.2
R46	4 Newtown Road, Marlow, Buckinghamshire, SL7 1JU	485623	187301	1.5	19.7	16.4	11.4
R47	106 Little Marlow Road, Marlow, Buckinghamshire, SL7 1HG	485450	187237	1.5	25.0	17.5	12.0
R48	57 Oxford Road, Marlow, Buckinghamshire, SL7 2NN	484605	186642	1.5	21.3	16.4	11.3
R49	66 Oxford Road, Marlow, Buckinghamshire, SL7 2NL	484630	186625	1.5	21.3	16.4	11.3
R50	142 Little Marlow Road, Marlow, Buckinghamshire, SL7 1HG	485561	187344	1.5	29.4	18.4	12.6
R51	32 Seymour Court Road, Marlow, Buckinghamshire, SL7 3AY	484621	187139	1.5	17.8	15.6	10.7
R52	40 Oak Tree Road, Marlow, Buckinghamshire, SL7 3EE	485089	187418	1.5	15.3	15.6	10.9
R53	54A Oak Tree Road, Marlow, Buckinghamshire, SL7 3EG	485038	187524	1.5	14.9	15.5	10.9
R54	87 Oxford Road, Marlow, Buckinghamshire, SL7 2NP	484448	186804	1.5	15.3	15.2	10.6
R55	23 Seymour Court Road, Marlow, Buckinghamshire, SL7 3AX	484560	187201	1.5	16.5	15.4	10.6
R56	45 Oak Tree Road, Marlow, Buckinghamshire, SL7 3ED	485033	187461	1.5	14.9	15.5	10.9
R57	87 Oak Tree Road, Marlow, Buckinghamshire, SL7 3EU	484916	187760	1.5	13.5	14.8	10.2
R58	8 Oak Tree Road, Marlow, Buckinghamshire, SL7 3EE	485157	187272	1.5	16.7	15.9	11.1

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
R59	54 Pound Lane, Marlow, Buckinghamshire, SL7 2AY	484077	185875	1.5	15.0	15.1	10.1
R60	23 Redshots Close, Marlow, Buckinghamshire, SL7 3LW	485593	187794	1.5	18.6	16.3	11.3
R61	9 Newtown Road, Marlow, Buckinghamshire, SL7 1JX	485672	187249	1.5	19.3	16.3	11.4
R62	48 Pound Lane, Marlow, Buckinghamshire, SL7 2AY	484117	185926	1.5	14.6	15.0	10.1
R63	14 Wycombe Road, Marlow, Buckinghamshire, SL7 3HU	485171	187048	1.5	26.7	17.9	12.3
R64	10 Henley Road, Marlow, Buckinghamshire, SL7 2DA	484176	186185	1.5	15.0	15.2	10.6
R65	57 Pound Lane, Marlow, Buckinghamshire, SL7 2AZ	484048	185852	1.5	15.0	15.1	10.1
R66	188 Oxford Road, Marlow, Buckinghamshire, SL7 2PR	484416	186898	1.5	17.9	15.7	10.9
R67	49 Station Road, Marlow, Buckinghamshire, SL7 1NW	485296	186486	1.5	25.1	17.1	11.8
R68	76 Station Road, Marlow, Buckinghamshire, SL7 1NX	485488	186636	1.5	25.3	17.1	11.8
R69	55 Wycombe Road, Marlow, Buckinghamshire, SL7 3HZ	485205	187215	1.5	20.3	16.6	11.5
R70	56 Newtown Road, Marlow, Buckinghamshire, SL7 1LA	485716	187116	1.5	16.4	15.8	11.1
R71	16 Station Road, Marlow, Buckinghamshire, SL7 1ND	485161	186436	1.5	23.1	16.7	11.6
R72	196C Little Marlow Road, Marlow, Buckinghamshire, SL7 1HX	485957	187528	1.5	25.1	17.5	12.0
R73	49 Stapleton Close, Marlow, Buckinghamshire, SL7 1TZ	485986	187595	1.5	23.3	17.1	11.8
R74	62 Stapleton Close, Marlow, Buckinghamshire, SL7 1TZ	485941	187659	1.5	26.5	17.8	12.2
R75	23 Oak Tree Road, Marlow, Buckinghamshire, SL7 3ED	485097	187337	1.5	15.3	15.6	10.9

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
R76	9 Pound Lane, Marlow, Buckinghamshire, SL7 2AH	484481	186092	1.5	15.6	15.3	10.6
R77	85 Seymour Court Road, Marlow, Buckinghamshire, SL7 3BQ	484461	187435	1.5	16.2	15.3	10.5
R78	33 Little Marlow Road, Marlow, Buckinghamshire, SL7 1HA	485252	187059	1.5	25.4	17.6	12.1
R79	11 Stapleton Close, Marlow, Buckinghamshire, SL7 1TZ	485988	187790	1.5	24.9	17.5	12.1
R80	31A Spittal Street, Marlow, Buckinghamshire, SL7 3HJ	484885	186702	4.0	21.9	16.3	11.3
R81	5A Chiltern Road, Marlow, Buckinghamshire, SL7 2PW	484319	186918	1.5	14.4	15.0	10.5
R82	72 Seymour Court Road, Marlow, Buckinghamshire, SL7 3BH	484538	187350	1.5	17.3	15.5	10.7
R83	15 Dedmere Road, Marlow, Buckinghamshire, SL7 1PE	485685	186740	1.5	19.3	16.0	11.2
R84	2 Beechwood Drive, Marlow, Buckinghamshire, SL7 2DJ	483546	185741	1.5	14.9	14.6	9.9
R85	12 George Close, Marlow, Buckinghamshire, SL7 1TR	485911	187907	1.5	21.7	16.9	11.7
R86	37 Chapel Street, Marlow, Buckinghamshire, SL7 3HN	485001	186803	1.5	34.0	18.9	12.9
R87	44 Dean Street, Marlow, Buckinghamshire, SL7 3AE	484714	186974	1.5	18.4	15.8	10.9
R88	59 Dean Street, Marlow, Buckinghamshire, SL7 3AD	484729	186912	1.5	18.7	15.9	11.0
R89	1 Grayling Close, Marlow, Buckinghamshire, SL7 2BA	484128	185906	1.5	15.5	15.2	10.2
R90	56 Dedmere Road, Marlow, Buckinghamshire, SL7 1PG	485776	186854	1.5	20.6	16.2	11.3
R91	15 Tierney Court, Riverside, Marlow, Buckinghamshire, SL7 2BL	485100	186132	1.5	21.9	16.5	11.4
R92	2 Rose Tree Cottages, Frieth Road, Marlow,	483473	187001	1.5	15.3	14.8	10.0

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
	Buckinghamshire, SL7 2JG						
R93	1 Capetown Cottages, The Close, Marlow, Buckinghamshire, SL7 2JZ	483812	186504	1.5	12.0	14.0	9.7
R94	1 Meadow View, Spinfield Lane, Marlow, Buckinghamshire, SL7 2JJ	483337	186860	1.5	13.0	14.1	9.8
R95	Arden House, Henley Road, Marlow, Buckinghamshire, SL7 2BZ	484255	186202	1.5	19.3	16.0	11.1
R96	12 James Close, Marlow, Buckinghamshire, SL7 1TS	485741	187992	1.5	23.4	17.2	11.9
R97	6 Pike Close, Marlow, Buckinghamshire, SL7 2AX	484314	185969	1.5	15.0	15.1	10.1
R98	5 Pound Lane, Marlow, Buckinghamshire, SL7 2AE	484908	186259	1.5	16.1	15.4	10.7
R99	Oakengrove Barn, Henley Road, Marlow, Buckinghamshire, SL7 2DL	483351	185737	1.5	16.9	14.9	10.1
R100	70A Oak Tree Road, Marlow, Buckinghamshire, SL7 3EX	484970	187670	1.5	14.1	14.9	10.3
R101	Hunters House, Henley Road, Marlow, Buckinghamshire, SL7 2DT	483899	185796	1.5	15.4	14.7	10.0
R102	Hollin Cottage, Seymour Court Road, Marlow, Buckinghamshire, SL7 3BX	484429	187618	1.5	16.6	15.4	10.6
R103	6B Beechwood Drive, Marlow, Buckinghamshire, SL7 2DJ	483643	185763	1.5	13.4	14.3	9.8
R104	26 Grainger House, Findlay Mews, Marlow, Buckinghamshire, SL7 1AP	485719	187421	1.5	29.4	18.4	12.6
R105	9A Dean Street, Marlow, Buckinghamshire, SL7 3AA	484872	186779	4.0	19.0	15.9	11.0
R106	Huckleberry House, Spinfield Lane, Marlow, Buckinghamshire, SL7 2JN	483537	186565	1.5	11.4	13.9	9.6
R107	10 Campbell Road, Marlow, Buckinghamshire, SL7 3GZ	485570	187730	1.5	20.8	16.7	11.6

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
R108	Moyleen Rise, Marlow, Buckinghamshire, SL7 2DP	484352	186316	1.5	17.8	15.7	10.9
R109	57A West Street, Marlow, Buckinghamshire, SL7 2LS	484707	186452	4.0	19.3	16.0	11.0
R110	3 Morris Place, Marlow, Buckinghamshire, SL7 1DF	484870	186629	4.0	23.6	16.6	11.4
R111	Seymour Court, Seymour Court Road, Marlow, Buckinghamshire, SL7 3DB	484061	188315	1.5	16.2	15.7	10.6
R112	40 West Street, Marlow, Buckinghamshire, SL7 2NB	484774	186516	4.0	20.2	16.0	11.1
R113	Hare And Hounds, Henley Road, Marlow, Buckinghamshire, SL7 2DF	483840	185787	1.5	17.7	15.1	10.2
R114	17 Peel Lodge, Dean Street, Marlow, Buckinghamshire, SL7 3FH	484830	186845	1.5	21.3	16.4	11.3
R115	Edgewood, Bovingdon Green, Marlow, Buckinghamshire, SL7 2JL	483345	186873	1.5	13.6	14.2	9.8
R116	26A High Street, Marlow, Buckinghamshire, SL7 1AW	484902	186526	4.0	22.0	16.3	11.2
R117	101A Marlow Bottom Road, Marlow Bottom, Buckinghamshire, SL7 3NA	484567	188242	1.5	15.2	15.4	10.5
R118	64 Wycombe Road, Marlow, Buckinghamshire, SL7 3JH	485274	187293	1.5	18.7	16.3	11.3
R119	82 Newtown Road, Marlow, Buckinghamshire, SL7 1LQ	485778	186992	1.5	17.9	15.8	11.0
R120	36A Dedmere Road, Marlow, Buckinghamshire, SL7 1PG	485695	186794	1.5	20.9	16.3	11.3
R121	109 Station Road, Marlow, Buckinghamshire, SL7 1NS	485523	186647	1.5	24.5	17.0	11.7
R122	87 High Street, Marlow, Buckinghamshire, SL7 1AB	485045	186340	4.0	24.7	16.9	11.7
R123	Flat 1 64 High Street, Marlow, Buckinghamshire, SL7 1AH	484963	186431	4.0	21.2	16.2	11.2

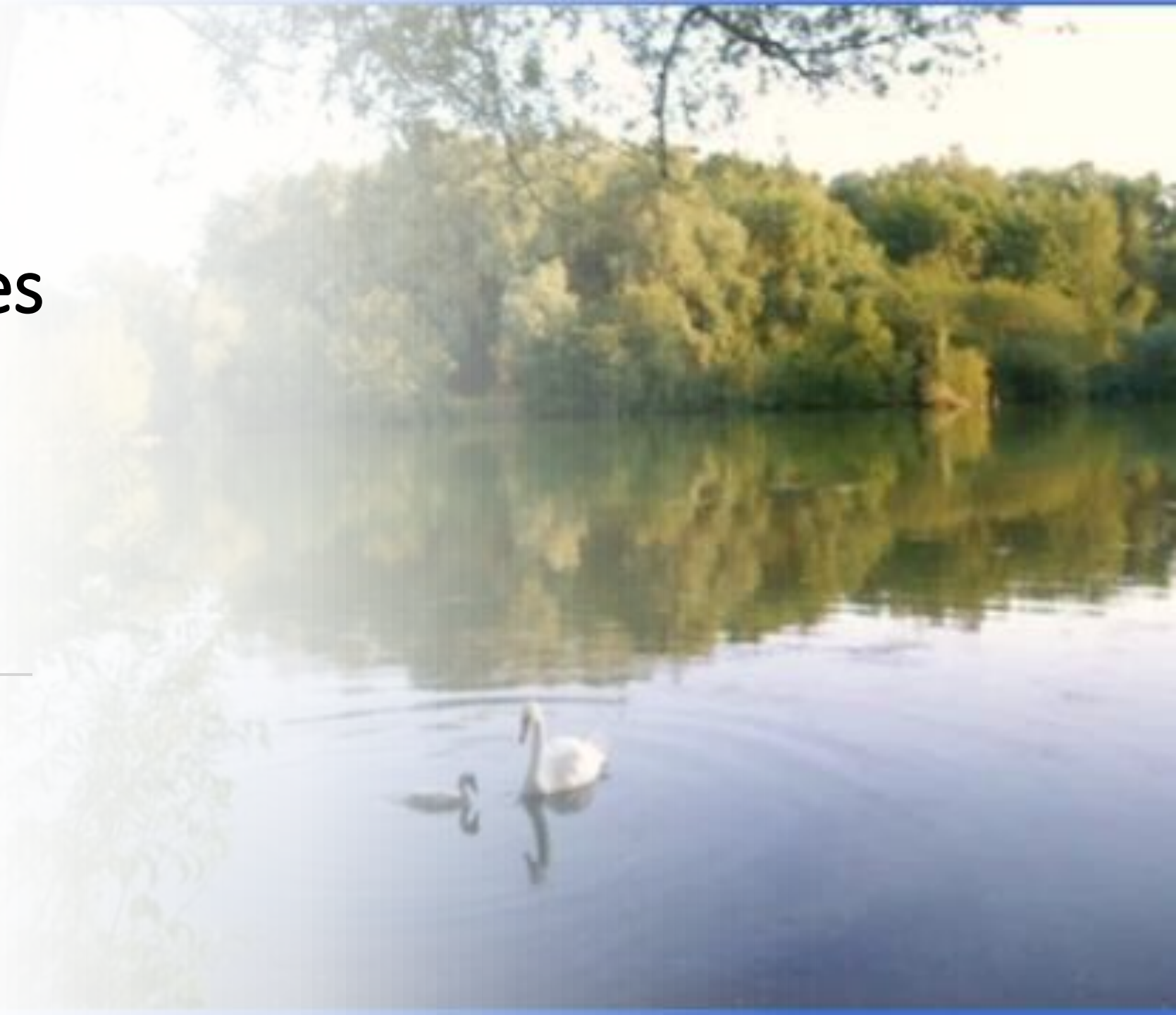
Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
R124	The Coach House, Pound Lane, Marlow, Buckinghamshire, SL7 2AQ	484994	186291	1.5	18.6	15.8	10.9
R125	39 Pound Lane, Marlow, Buckinghamshire, SL7 2AZ	484251	185898	1.5	14.5	15.0	10.1
R126	Blounts Lodge, Chalkpit Lane, Marlow, Buckinghamshire, SL7 2JE	483688	187086	1.5	12.4	14.3	9.7
R127	Weathervane Cottage, Stoney Ware, Bisham Road, Bisham, Maidenhead, SL7 1RN	485033	185608	1.5	17.1	16.4	10.9
R128	Magnolia Cottage, Bisham Road, Bisham, Maidenhead, SL7 1RL	485158	185953	1.5	18.6	16.7	11.0
R129	South Riding, Bisham Road, Bisham, Maidenhead, SL7 1RL	485127	185763	1.5	17.2	16.4	10.9
R130	3 Bisham Village, Marlow Road, Bisham, Maidenhead, SL7 1RR	485055	185158	1.5	19.8	17.0	11.3
R131	36 Bisham Village, Marlow Road, Bisham, Maidenhead, SL7 1RR	485025	185038	1.5	23.9	18.0	11.8
R132	43 Bisham Village, Marlow Road, Bisham, Maidenhead, SL7 1RR	485068	185230	1.5	22.1	17.6	11.6
R133	The River House, Bisham Road, Bisham, Maidenhead, SL7 1RP	485176	185842	1.5	19.1	16.9	11.2
R134	Al Hana, Quarry Wood Road, Marlow, SL7 1RE	485391	185871	1.5	23.1	17.7	11.6
R135	Booths Cottage, Quarry Wood Road, Marlow, SL7 1RE	485262	185929	1.5	23.5	17.8	11.7
R136	Hillside, Chalkpit Lane, Marlow, Buckinghamshire, SL7 2JE	483971	186929	1.5	12.0	14.0	9.7
R137	60 Chapel Street, Marlow, Buckinghamshire, SL7 1DE	485068	186853	1.5	**40.2**	20.3	13.7
R138	The Rookery, Rookery Gardens, Marlow, Buckinghamshire, SL7 1BD	485068	186868	1.5	**54.1**	23.7	15.7

Receptor ID	Site Description	X Co-ordinates	Y Co-ordinates	Height	2019 annual mean concentrations (µg/m^3)		
S011	Little Marlow Church Of England School, School Lane, Little Marlow, Buckinghamshire, SL7 3SA	487490	188190	1.5	22.3	17.4	11.2

Note. Values in bold exceed the annual mean air quality objective value

aecom.com

Little Marlow Lakes Country Park



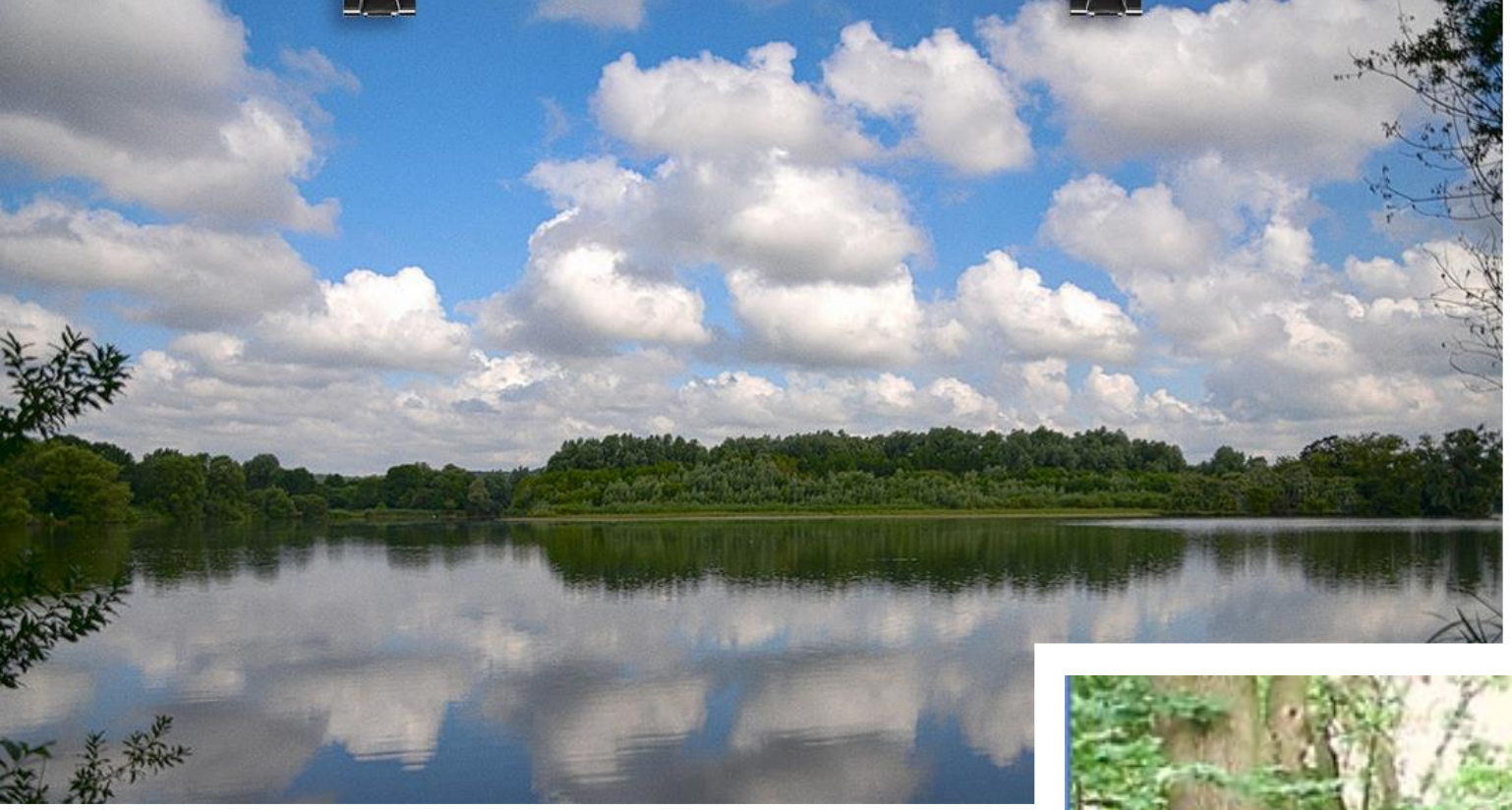
Grant Application by Little Marlow Parish Council

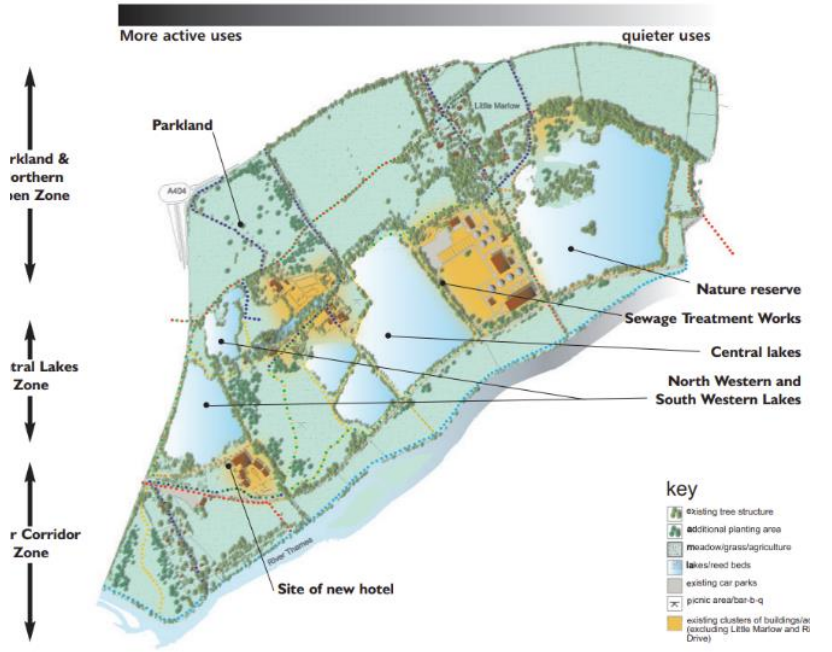
Southwest Chilterns Community Board

27th January 2022

Little Marlow Lakes Country Park

- Highly Attractive
- Ecologically Diverse
- Conveniently Located




More active uses
quieter uses
rkland &
orthern
en Zone
tral Lakes
Zone
r Corridor
Zone
Parkland
Nature reserve
Sewage Treatment Works
Central lakes
North Western and
South Western Lakes
Site of new hotel
key


ADVENTURE ZONE


DANGER


OAK MEADOW
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1
27

Developing The Country Park

"to provide or improve opportunities for the enjoyment of the countryside by the public, having regard to the location of the relevant area in relation to an urban or built-up area, and to availability and adequacy of existing facilities for the enjoyment of the countryside by the public".

- Environmental (habitat & biodiversity expansion, plantings, landscaping etc.)
- Access (footpaths, roadways, car parks etc.)
- Amenities (visitor centres, bird watching hides, toilets etc.)
- Leisure (benches, picnic areas, play areas etc.)
- Recreation (public sports areas, watersports facilities, footpaths, cycleways etc.)
- Enablement (tourism opportunities, concessions, events facilities etc.)

LMPC Country Park Vision Working Group

Purpose

The purpose of the WG is to enable the Parish Council to influence the evolution of Little Marlow Lakes Country Park (LMLCP) based on a consideration of local interests, public benefits and the protection of nature with the aim of creating a popular and valued Country Park.

Principles

- Public utilisation and enjoyment of the Country Park should be increased by leveraging its assets to create a special visitor experience which is accessible to all
- The nature, wildlife and biodiversity within LMLCP should be protected and enhanced
- The openness and rural nature of LMLCP should be protected
- Developments should protect and enhance the character of the area and cause no increases in traffic congestion, air pollution, disturbance by noise, disturbance by artificial light, litter or antisocial behaviour
- Developments should be in accordance with the Local Plan, the NPPF and the 2002 SPG

Members

- Little Marlow Parish Councillors x 3
- Buckinghamshire Councillors (Flackwell Heath & Little Marlow ward) x 2
- Residents' Associations x 2
- "Wild Marlow" x 1
- "Little Marlow Lakes Community Partnership" x 1

The Thameside Preservation Trust, The Marlow Society, The Chiltern Society, Marlow Angling Club, Bucks Bird Club and The Chiltern Rangers

The Importance of Vision

The vision is intended to represent the community's considerations about how the Country Park should be developed to improve the environment, serve the community and fulfil its potential

The Vision will

- Guide the development of infrastructure
- Focus on increasing biodiversity and improving the environment
- Be guided on the means through which visitors can engage with the Park's natural assets
- Be built around a theme and a style to give the park a particular character that is consistent with the area and its rural setting

The Vision Will be used to

- Used as a basis for engaging with Bucks Council
- Generate enthusiasm for defining and executing a plan to develop the Country Park
- Set the scope for a development plan

Without a vision, the opportunity may never be fulfilled, the development of facilities will be haphazard and result in an anonymous, disorganised and confusing place which lacks harmony, purpose or distinction.

Creating the Vision

Activities

- Site visit
- Workshops with stakeholders and interested parties
- Agreeing principles and objectives
- Identifying themes, styles, opportunities and constraints
- Producing options for discussion and consideration
- Visioning

Deliverables

- Background and introduction
- Vision statement
- Vision graphics
- Theme, Style and Character
- Suggested interventions

Landscape Architects

LDA Design

https://www.lda-design.co.uk/

BDP Ltd

https://www.bdp.com/

Grant Application

Body	**Amount**	**Status**
Southwest Chilterns Community Board	£7,000	**Requested**
Little Marlow Parish Council	£1,600	Approved
Little Marlow Lakes Community Partnership	£200	Requested. Decision on (TBD)
Little Marlow Residents' Association	£500	Requested. Decision on 3rd Feb
Coldmoorholme Residents' Association	£500	Requested. Decision on 10th Feb
"Save Marlow's Greenbelt"	£200	Approved