Saffron Walden AQMA – Air Quality Modelling Assessment

Uttlesford District Local Plan 2021-2041 – Regulation 18

Uttlesford District Council

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Quality information

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1. Introduction

1.1 The requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act 1995 (HM Government, 1995), as amended by the Environment Act 2021 (HM Government, 2021) places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether the Air Quality Strategy (AQS) objectives are likely to be achieved. Where an exceedance is considered likely through monitoring or modelling, the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

1.2 Uttlesford District Council (UDC) is working on their new Local Plan (2021-2041) to replace the current Local Plan which was adopted in 2005 (Uttlesford District Council, 2005). The draft Uttlesford Local Plan 2019 was withdrawn in response to the government-appointed Inspectors' Letter, dated 10 January 2020 and the independent Peer Review report from the East of England Local Government Association, dated 23 March 2020.

1.3 The Council has commissioned AECOM Limited to conduct an air quality modelling assessment to assess the impact of traffic resulting from planned development in UDC's emerging Local Plan on the Saffron Walden AQMA in the District, covering both Regulation 18 and Regulation 19 stages.

1.4 In August 2007, UDC declared three small AQMAs in the centre of Saffron Walden for exceedances of nitrogen dioxide (NO_2) hourly and annual mean objectives. The area is centred on Elm Grove in Saffron Walden town centre and extends to a radius of 1400m forming a circular AQMA. Further monitoring was subsequently undertaken which revealed a wider area of concern, and in 2012 a larger AQMA was declared by the Council covering the central area of the town.

1.5 No exceedances of the NO_2 annual mean objective have been recorded in Saffron Walden for several years, and it is UDC's intention to revoke the AQMA in 2023/24 and to develop the Saffron Walden Clean Air project.

1.6 UDC's current AQMA boundary and NO_2 monitoring sites are shown in Appendix A.

1.7 The main aims of this study are to:

- Identify potentially sensitive human receptor locations (such as houses and schools) within the Saffron Walden AQMA;
- Estimate annual mean NO_2 and particulate matter concentrations for three scenarios at selected receptors:
    - 2021 Baseline year: represents air quality in a past year to be used for model verification;
    - 2040 'Do Minimum' (DM): future assessment year which includes the influence of forecast growth and strategic planned development, but excludes the emerging Uttlesford Local Plan; and
    - 2040 'Do Something' (DS): future assessment year which includes the influence of forecast growth and strategic planned development, including the emerging Uttlesford Local Plan.
- Determine if there are any exceedances of the AQS objectives for NO_2 and particulate matter within the Saffron Walden AQMA in 2021 and 2040.
- Screen available traffic data for the wider area to indicate where further assessment would be beneficial.

2. Policy Context

National Air Quality Legislation

2.1 The principal air quality legislation within the United Kingdom is the Air Quality Standards Regulations (as amended 2016) ((HM Government, 2016), including amendments, such as 'The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020' (UK Statutory Instruments, 2020).

2.2 The UK is no longer a member of the European Union, however, 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. These types of legislation are published by the Publications Office of the European Union on the EUR-Lex website and are now published on legislation.gov.uk as 'legislation originating from the EU'.

2.3 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. Legislation as it applied to the UK on 31st December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies. The Clean Air for Europe (CAFE) programme (European Union, 2001) 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 (Council of European Union, 2008). This Directive repealed and replaced the EU Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management and its associated Daughter Directives 1999/30/EC (Council of European Communities, 1999), 2000/69/EC (Council of European Communities, 2000), 2002/3/EC (Council of European Communities, 2002) (relating to limit values for ambient air pollutants) and the Council Decision 97/101/EC (Council of European Union, 1997) which established a reciprocal exchange of information and data within Member States.

2.4 The UK National AQS (Defra, 2000) was initially published in 2000, under the requirements of the Environment Act 1995 (HM Government, 1995), as amended by the Environment Act 2021 (HM Government, 2021). The 2007 version of the AQS (Defra, 2007) set objectives for key pollutants as a tool to help local authorities manage local air quality improvements, with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

National Clean Air Strategy (2019)

2.5 In 2019, the UK government released its 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 it aims to achieve this (including the development of new enabling legislation).

2.6 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 2019 Strategy broadened the focus to other areas, including domestic emissions from wood burning stoves and from agriculture.

A Green Future: 25 Year Plan to Improve the Environment

2.7 The 25 Year Environment Plan, originally published in January 2018, sets out the actions the UK Government will take to help the natural world regain and retain good health (HM Government, 2018). The Environment Plan was updated in 2023 with the publication of the Environmental Improvement Plan 2023, which includes targets specifically for England (HM Government, 2023). The plan outlines several actions that are being taken to improve air quality, most notably the publication of the Clean Air Strategy (referenced earlier) and the introduction of several Clean Air Zones (CAZs) across England. Emphasis is also placed on $PM_{2.5}$ concentrations, with several new targets for $PM_{2.5}$ concentrations stated within the plan including:

- "A legal target to reduce population exposure to $PM_{2.5}$ by 35% in 2040 compared to 2018 levels, with a new interim target to reduce by 22% by the end of January 2028.
- A legal target to require a maximum annual mean concentration of 10 micrograms of $PM_{2.5}$ per cubic metre ($\mu g/m^3$) by 2040, with a new interim target of 12 $\mu g/m^3$ by the end of January 2028."

Environment Act (2021)

2.8 The Environment Act 2021 (HM Government, 2021) was approved on 9th November 2021, after being first introduced to Parliament in January 2020 to address environmental protection and the delivery of the Government's 25-year Environment Plan following Brexit. It includes provisions to establish a post-Brexit set of statutory environmental principles and ensure environmental governance through an environmental watchdog, the Office for Environmental Protection (OEP). Part IV of the Environment Act (2021) requires the Government to update the AQS which contains standards, objectives and measures for improving ambient air quality. Details regarding the AQS and recent updates are provided below.

2.9 The Environment Act (2021) proposes that the Secretary of State will publish a report reviewing the AQS every five years (as a minimum and with yearly updates to Parliament), in the form of the Environmental Improvement Plan (HM Government, 2018).

UK Air Quality Strategy

2.10 A new AQS was published in April 2023 (Defra, 2023). It sets out the actions the government expects local authorities to take in support of achieving the new national $PM_{2.5}$ targets, by reducing emissions from sources within their control.

2.11 The Air Quality Objectives set out in the AQS (Defra, 2007) (Defra, 2023) have been outlined in legislation solely for the purposes of local air quality management. The objectives for the pollutants of relevance to this assessment are displayed in Table 2-1, including the new national targets for $PM_{2.5}$ concentrations stated within the Environment Act 2021, the Environmental Improvement Plan 2023 and the Air Quality Strategy 2023.

Table 2-1: UK AQS Objectives

Pollutant	Averaging Period	Value	Maximum Permitted Exceedances / Target
Nitrogen Dioxide (NO_2)	Annual Mean	40 $\mu g/m^3$	None
	Hourly Mean	200 $\mu g/m^3$	18 times per year
Particulate Matter (PM_{10})	Annual Mean	40 $\mu g/m^3$	None
	24-Hour Mean	50 $\mu g/m^3$	35 times per year
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	[a] 20 $\mu g/m^3$	None
		[b] 10 $\mu g/m^3$	By 2040
		[c] 12 $\mu g/m^3$	Interim target, (by end of January 2028)
	Exposure reduction compared to 2018	[b] 35%	By 2040
		[c] 22%	Interim target, (by end of January 2028)

[a] Air Quality Strategy 2007; [b] The Environment Act 2021;
[c] Environmental Improvement Plan 2023, Air Quality Strategy 2023

Regional Planning Policy

Essex – Local Transport Plan 2011

2.12 The Local Transport Plan 2011 – 2026 (Essex County Council, 2011) sets out a countywide approach to delivering our vision and identify specific priorities to be addressed at a more local level through four area plans which cover the four planning areas of Essex (shown in the figure below). These are:

- The Heart of Essex (covering Brentwood, Chelmsford and Maldon)
- Haven Gateway (covering Colchester, Tendring and Braintree)
- Thames Gateway (covering Basildon, Castle Point and Rochford)
- West Essex (covering Epping Forest, Harlow and Uttlesford)

2.13 The report contains the priorities for each of the four Essex planning areas which have been determined through evidence compiled in support of this strategy. For West Essex, planning infrastructure improvements are listed for local centres, such as Saffron Walden. These are:

- Providing for and promoting access by sustainable modes of transport to development areas
- Improving passenger transport connections to and between the local centres, key services and Harlow
- Improving the attractiveness and usability of streets and public spaces
- Improving cycling and walking routes and promoting their greater use
- Improving connections to London, working with Transport for London to make best use of and manage access to Underground links
- Improving links with surrounding rural areas

2.14 The Local Transport Plan also includes fifteen Transport Policies. These include Public Transport, Connectivity, Freight Movement, the Promotion of Sustainable Travel Choices.

Uttlesford Local Plan 2021-2041

2.15 The Uttlesford Local Plan responds to a national requirement that Local Planning Authorities (LPAs) must set planning policies in a local authority area. Local plans must be positively prepared, justified, effective and consistent with national policy.

2.16 Once in place the new Uttlesford Local Plan will be known as the Uttlesford Local Plan 2021-2041, and will largely supersede the adopted local plan.

2.17 A series of plan objectives is in place to guide plan preparation, structured under the following three broad headings: Meeting the challenge of climate change and ensuring sustainable development; Maintaining and developing a sustainable local economy; Building healthy and sustainable communities. The Local Plan will set out where new homes are most sustainably and suitably located, support the success of our local businesses, ensure the right facilities and infrastructure are delivered by developers, and protect, and enhance our historic and natural environment.

2.18 Air quality is addressed in the emerging Local Plan in Core Policy 42. It refers to UDC's Air Quality Technical Guidance (Uttlesford District Council, 2018), and states that 'Development will not be permitted where it might lead to significant adverse effects on health, the environment or amenity from emissions to air'.

Uttlesford District Council Air Quality Action Plan 2017

2.19 UDC's Air Quality Action Plan (AQAP) 2017 (Uttlesford District Council, 2017) outlines the actions to improve air quality in the district. The exceedances in these areas are largely related to road traffic emissions and the AQMA boundaries represent the worst affected areas.

2.20 UDC will prioritise the following air quality measures (Uttlesford District Council, 2023) and will:

- Revoke the Saffron Walden AQMA;

- Implement the Saffron Walden Clean Air Project;
- Investigate the increasing particulate matter concentrations at the UTT3 London Road monitoring site.

Other Relevant Policy, Standards and Guidance

2.21 There is currently no statutory guidance on the method by which an air quality assessment should be undertaken. Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) (Environmental Protection UK (EPUK) & IAQM, 2017) and the Department for Environment, Food and Rural Affairs (Defra) (Defra, 2022) have published their own guidance for carrying out air quality assessments for development control. These guidance documents have been used in this air quality assessment to present best practice for mitigation measures and for the significance of effects of the District Plan Review.

3. Methodology

3.1 This section presents the methodology used to model local air quality in the study area.

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

- Department for Environment, Food and Rural Affairs (Defra)'s 2018-based Air Quality Background Concentration Maps (Defra, 2020);
- Defra's Vehicle Emission Factors within the Emission Factor Toolkit (EFT) v11 (Defra, 2021b);
- Air quality monitoring data (Uttlesford District Council, 2023); and
- Traffic data – in the format of 24-hour Annual Average Daily Traffic, percentage of heavy goods vehicles (HGV) and average speed –provided for 2021 and 2040.

3.3 The modelling assessment was conducted following methodology within Defra's LAQM.TG(22) Technical Guidance (Defra, 2022).

Traffic Data

3.4 Traffic data for roads within 500m of the AQMA were provided by UDC through the ITP Transport team for a series of road links. The traffic links included in the model are shown in Appendix A.

3.5 Traffic data were provided for each of these links in the form of 24-hour Annual Average Daily Traffic (AADT) flows, with percentage heavy duty vehicle (HDV) flows and average speed for three scenarios – 2021 baseline, future year 'Do Minimum' (DM), and future year 'Do Something' (DS). A summary of the traffic data used in the air quality assessment is given in Appendix B.

Receptors

3.6 A desk-top review using aerial mapping with reference to the OS AddressBase was conducted to select representative locations where people are likely to be present, such as residential properties or medical centres.

3.7 The locations of the chosen sensitive receptors within and in the vicinity of the AQMA are included in Appendix A and Table 3-1 ..Receptors were modelled at the lowest point where there is residential exposure, either at ground floor level, at a height of 1.5 metres above ground, or at first floor level at 4.5 metres.

Table 3-1: Selected Receptor Locations in Saffron Walden AQMA

Receptor ID	Road Name	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R1	London Road	553741	238075	1.5
R2	High Street / B1052	553776	238106	1.5
R3	Audley Road	554078	238261	1.5
R4	East Street	554264	238425	1.5
R5	East Street	554326	238449	1.5
R6	Hill Street	553940	238460	1.5
R7	East Street	554187	238445	1.5
R8	Bridge Street	553586	238618	1.5
R9	Hill Street	553840	238417	1.5
R10	Radwinter road	554435	238485	1.5
R11	East Street	554018	238463	1.5

Receptor ID	Road Name	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R12	High Street / B184	553652	238535	1.5
R13	East Street	553980	238464	1.5
R14	Audley Road	554159	238343	1.5
R15	Audley Road	553838	238165	1.5
R16	George Street	553732	238391	4.5
R17	High Street / B184	553722	238417	4.5
R18	Chaters Hill	554288	238647	1.5
R19	Thaxted Road	554416	238338	1.5
R20	Borough Lane	553646	237868	1.5
R21	Borough Lane	553851	237759	1.5
R22	Ashdon Road	554242	238681	1.5
R23	Church Street	553941	238659	1.5
R24	High Street / B184	553689	238504	1.5
R25	Church Street	553699	238518	1.5
R26	Castle Street	553936	238779	1.5
R27	Thaxted Road	554513	238186	1.5
R28	Peaslands Road	554245	237763	1.5
R29	Thaxted Road	554565.5118	238050	1.5

Model Setup

3.8 Road traffic emissions of NOx, PM_{10} and $PM_{2.5}$ were derived using Defra's latest version of the EFT (v11.0) at the time of assessment and associated guidance and tools[1]. The modelled road network is presented in **Figure 9-1** in Appendix A.

3.9 Detailed dispersion modelling was undertaken using the current version of ADMS-Roads (v5.0) to model concentrations of NOx, PM_{10} and $PM_{2.5}$ using the parameters in Table 3-2 for the following scenarios:

- 2021 Baseline – 2021 AADT, 2021 emission factors and 2021 background concentrations;
- 2040 'Do Minimum' – 2040 AADT (without the Local Plan), uses 2030 emission factors and 2030 background concentrations;
- 2040 'Do Something' – 2040 AADT (with the Local Plan), uses 2030 emission factors and 2030 background concentrations.

3.10 The difference between the 'Do Something' and the 'Do Minimum' scenarios provides the impact of the planned development within the new Local Plan.

3.11 Version 11.0 of the EFT and Defra's associated tools provide data from 2018 to 2050. For this assessment, 2021 emission rates and background concentrations were used for the baseline year scenario, and 2030 emission rates and background concentrations were used for the future year scenarios. Whilst fleet data beyond 2030 are provided within the EFT, 2030 is the latest year for which the accompanying tools are available e.g. background concentrations and the NOx-to-NO_2 calculator.

[1] https://laqm.defra.gov.uk/

Table 3-2: General ADMS-Roads Model Conditions

Variables	ADMS-Roads Model Input
Surface roughness at source	0.5m
Surface roughness at Meteorological Site	0.5m
Minimum Monin-Obukhov length for stable conditions	10m
Terrain types	Flat
Receptor location	x, y coordinates determined by GIS, z = 1.5m for human receptors or 4.5m for first floor.
Emissions	NOx, PM_{10} and $PM_{2.5}$ – Defra's EFT v11.0
Meteorological data	1 year (2021) hourly sequential data from Stansted meteorological station.
Receptors	Selected receptors
Model output	Long-term (annual) mean NO_x, PM_{10} and $PM_{2.5}$ concentrations.

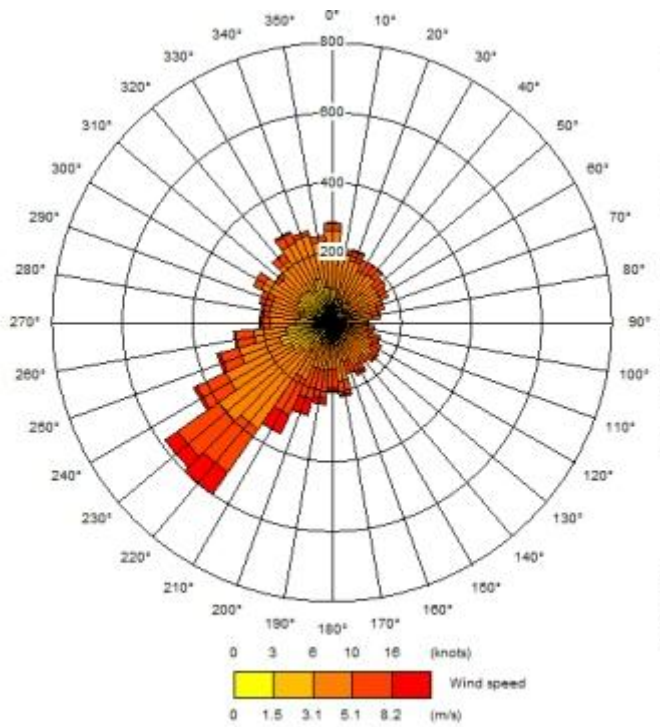
Meteorological Data

3.12 One year (2021) of hourly sequential observation data from Stansted meteorological station was used in this assessment to correspond with the baseline traffic data and monitoring data used for model verification. The station is located approximately 15km south of Saffron Walden.

3.13 Stansted experiences meteorological conditions that are representative of those experienced within the air quality study area.

3.14 Figure 3-1 shows that the dominant direction of wind was from the south-west, as is typical for the UK.

Figure 3-1: Wind Rose, Stansted Airport Meteorological Data, 2021



Background Data

3.15 Background concentrations of NO_2, NOx, PM_{10} and $PM_{2.5}$ for 2021 and 2030 were sourced from Defra's 2018-based 1x1km background maps (Defra, 2020).

3.16 The background data presented in Table 3-3 and Table 3-4 show that the mapped background concentrations are predicted to decrease between 2021 and 2030. There were no 'in-grid' contributions from motorways, trunk A roads nor primary A roads, therefore the background concentrations were not sector-removed so as to be conservative.

3.17 A background NO_2 concentration of 9.7 µg/m³ was used in the base year modelling, including verification. This value is the average from background monitoring locations in Saffron Walden (UT003, 8.5 µg/m³; UT012, 10.8 µg/m³) and is consistent with Defra's 1km based background maps for the same year (Table 3-3).

3.18 Background concentrations from Defra's 2018-based 1x1km background maps, as presented in Table 3-3 and Table 3-4, were used to calculate total pollutant concentrations of particulate matter in the base year, and all pollutants in the future year scenarios.

Table 3-3: Defra Mapped Background Pollutant Concentrations (µg/m³), 2021

Grid Square (X, Y)	Annual Mean Concentrations (µg/m³)			
	2021 NO_2	2021 NOx	2021 PM_{10}	2021 $PM_{2.5}$
553500, 238500	9.2	12.0	14.6	9.2
554500, 238500	10.5	13.9	14.5	9.4
553500, 237500	9.3	12.1	14.8	9.3
554500, 237500	8.8	11.5	15.0	9.4

Table 3-4: Defra Mapped Background Pollutant Concentrations (µg/m³), 2030

Grid Square (X, Y)	Annual Mean Concentrations (µg/m³)			
	2030 NO_2	2030 NOx	2030 PM_{10}	2030 PM_2
553500, 238500	7.2	9.3	13.9	8.6
554500, 238500	8.5	11.1	13.8	8.8
553500, 237500	7.4	9.5	14.1	8.7
554500, 237500	7.0	9.0	14.3	8.8

Verification

3.19 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.

3.20 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 2021 monitoring data in order to correspond with the baseline year of assessment, traffic data and meteorological data.

3.21 It was found that the model both under- and over-estimated concentrations recorded at the monitoring sites. So as to be precautionary, only those sites where the under-estimated were considered for model verification. Table 3-5 shows the 14 monitoring sites used for verification.

3.22 The locations of the monitoring sites are presented in Appendix A.

Table 3-5: Monitoring sites used in model verification

Site ID	Automatic / Passive	Site Location
UTT2	Automatic	Thaxted Road & Radwinter Road Junction
UT001	Passive	Walden PO High Street
UT004	Passive	Walden YHA
UT005	Passive	Walden Thaxted Road
UT011	Passive	Walden 33 High Street
UT015	Passive	Walden 57 High Street
UT016	Passive	Walden Radwinter Road
UT021	Passive	Walden 41 East Street
UT028	Passive	Walden London Road
UT030	Passive	Walden Friends School
UT031	Passive	Walden Mount Pleasant Rd
UT037	Passive	Walden Castle Street
UT044/UT045/UT046	Passive	Thaxted Road Co-located 3
UT051	Passive	Walden Church Street 2

3.23 Following Defra's Technical Guidance LAQM.TG(22), model performance was analysed at these monitoring sites. Without adjustment the root mean square error (RMSE) was 8.2 µg/m³.

3.24 The RMSE should ideally be less than 10% of the relevant air quality objective (for NO_2, 4.0 µg/m^3) but less than 10.0 µg/m^3 is acceptable.

3.25 An adjustment factor was therefore calculated to bring modelled concentrations into line with the monitored data. The adjustment factor calculated was a factor of 2.36. A factor of this magnitude is typical of roads assessments and may in particular reflect the behaviour of typical urban stop-start traffic. Applying this factor reduced the RMSE to 2.7 µg/m^3, as presented in Table 3-6.

3.26 Details of the verification process by site are presented in Table 3-7.

Table 3-6: Verification details

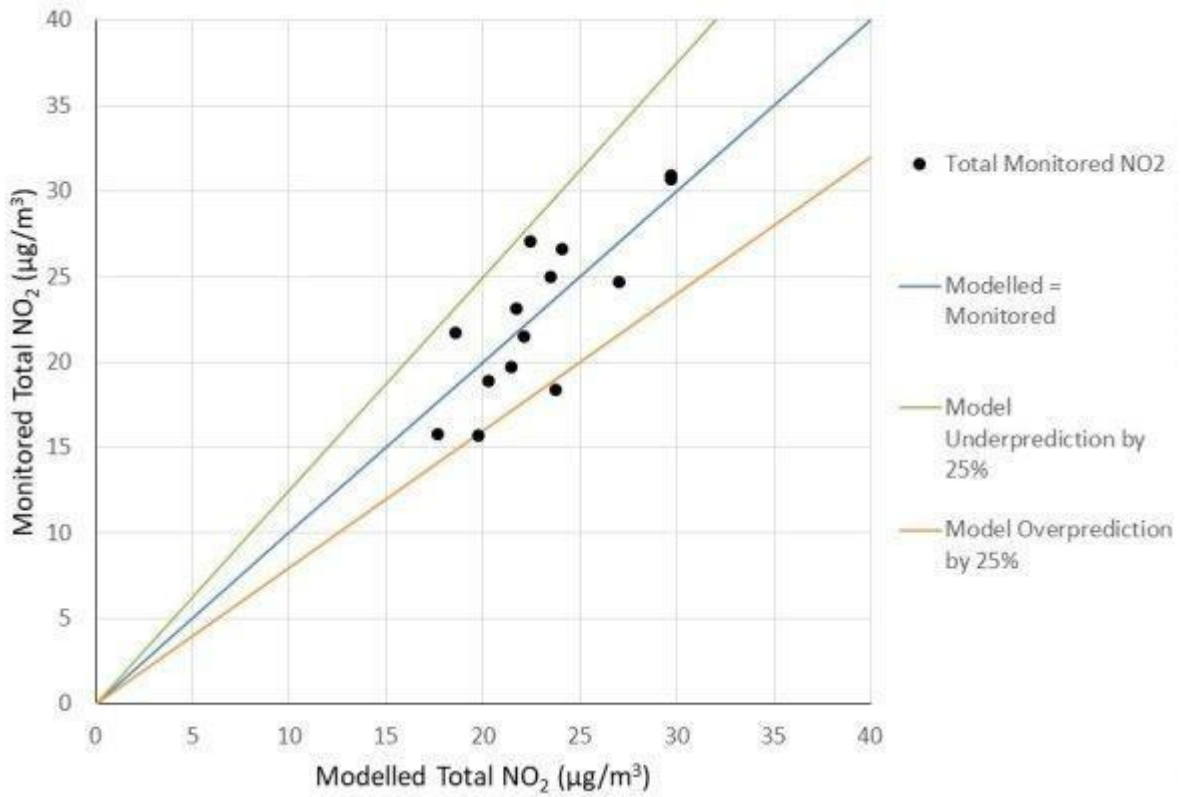
Number of Sites	Number of Monitoring Sites within ±10% of Monitored NO_2 Concentration Pre-Adjustment	RMSE pre-adjustment (µg/m^3)	Model Adjustment Factor Applied	Number of Sites within ±10% of Monitored NO_2 Concentration Post Adjustment	RMSE post adjustment (µg/m^3)	Fractional Bias post adjustment)
14	0	8.2	2.36	9	2.7	0.0

Table 3-7: Verification details by monitoring site

Site ID	Monitored total NO_2 (µg/m^3)	Monitored Road NOx (µg/m^3)	Modelled Adjusted Road NOx (µg/m^3)	Modelled Total NO_2 After Adjustment (µg/m^3)	% Difference
UTT2	30.9	41.6	39.1	29.7	-3.8
UT001	23.1	25.5	22.7	21.7	-6.0
UT004	27.1	33.6	24.1	22.4	-17.2

Site ID	Monitored total NO_2 ($\mu g/m^3$)	Monitored Road NOx ($\mu g/m^3$)	Modelled Adjusted Road NOx ($\mu g/m^3$)	Modelled Total NO_2 After Adjustment ($\mu g/m^3$)	% Difference
UT005	26.6	32.6	27.4	24.1	-9.5
UT011	21.7	22.7	16.5	18.6	-14.5
UT015	18.9	17.2	19.9	20.3	7.4
UT016	24.7	28.7	33.4	27.0	9.3
UT021	18.4	16.2	26.7	23.7	29.0
UT028	25.0	29.3	26.2	23.5	-6.0
UT030	19.7	18.8	22.1	21.4	8.7
UT031	15.8	11.3	14.8	17.7	11.8
UT037	15.7	11.1	18.9	19.8	26.0
UT044/UT045/UT046	30.7	41.2	39.1	29.7	-3.2
UT051	21.5	22.3	23.4	22.1	2.7

Figure 3-2: Modelled vs Monitored Total NO_2 (After Adjustment)



Assessment of Significance

3.27 With regard to road traffic emissions, the change in pollutant concentrations with respect to future baseline concentrations has been described at receptors that are representative of exposure to impacts on local air quality within the study area.

3.28 For consideration of a change in annual mean concentration of a given magnitude, the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) have published recommendations for describing the effects of such impacts at individual receptors as

set out in (Environmental Protection UK (EPUK) & IAQM, 2017). The descriptors for NO_2 and PM_{10} are presented in Table 3-8 whilst the descriptors for $PM_{2.5}$ are presented in Table 3-9.

Table 3-8: Impact Descriptors for NO_2 and PM_{10}

Long Term Average Concentration at Receptor in Assessment Year (µg/m³)	Change in Concentration Relative to Air Quality Assessment Level (AQAL) – NO_2 and PM_{10} (µg/m³)				
	<0.2	0.2 - <0.6	0.6 - <2.2	2.2 -<=4.0	>4.0
	(Imperceptible)	(Very Small)	(Small)	(Medium)	(Large)
<30.2	Negligible	Negligible	Negligible	Slight	Moderate
30.2 - <37.8	Negligible	Negligible	Slight	Moderate	Moderate
37.8 - <41.0	Negligible	Slight	Moderate	Moderate	Substantial
41.0 - <43.8	Negligible	Moderate	Moderate	Substantial	Substantial
≥43.8	Negligible	Moderate	Substantial	Substantial	Substantial

Table 3-9: Impact Descriptors for $PM_{2.5}$

Long Term Average Concentration At Receptor In Assessment Year (µg/m³)	Change in concentration relative to Air Quality Assessment Level (AQAL) – $PM_{2.5}$ (µg/m³)				
	<0.1	0.1 - <0.4	0.4 - <1.4	1.4 -<=2.5	>2.5
	(Imperceptible)	(Very Small)	(Small)	(Medium)	(Large)
<18.9	Negligible	Negligible	Negligible	Slight	Moderate
18.9 - <23.6	Negligible	Negligible	Slight	Moderate	Moderate
23.6 - <25.6	Negligible	Slight	Moderate	Moderate	Substantial
25.6 - <27.4	Negligible	Moderate	Moderate	Substantial	Substantial
≥27.4	Negligible	Moderate	Substantial	Substantial	Substantial

3.29 The IAQM/ EPUK guidance states that the descriptors are for individual receptors only and that overall significance is determined using professional judgement. It also states that it is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the objective. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the objective, rather than being exactly equal to it.

3.30 An impact that is 'Negligible', given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant. A 'slight' impact is also likely to be very difficult to distinguish from the inter-annual effects of varying meteorological conditions and are therefore not considered likely to be capable of having a direct effect on local air quality that could be considered to be significant. 'Moderate' impacts do not necessarily constitute a significant effect, where they do not contribute to an exceedance or risk of an exceedance of an air quality objective, particularly where such impacts relate to a small minority

of receptors with the majority experiencing lesser impacts. A 'Substantial' impact will almost certainly constitute a significant effect that will require additional mitigation to address.

4. Baseline Air Quality

Local Air Quality Management

4.1 Under the requirements of Part IV of the Environment Act 1995 (HM Government, 1995), as amended by the Environment Act 2021 (HM Government, 2021), UDC has carried out a review and assessment of local air quality.

4.2 UDC undertake non-automatic monitoring of NO_2 at 39 diffusion tube sites across the district. UDC's diffusion tube monitoring locations around the AQMA are shown in Table 4-1 and in Appendix A. Measured concentrations ranged between 8.7 µg/m^3 and 31.1 µg/m^3 in 2022. No exceedances of the annual mean air quality objective were recorded in 2022. The site that recorded the highest concentration of 31.1 µg/m^3 in 2022, UT044/045/046, is a roadside triplicate diffusion tube site located on Thaxted Road within Saffron Walden AQMA.

4.3 NO_2 concentrations have generally declined since 2018. In 2020, there was a larger decrease compared to concentrations measured in 2019. This is largely as a result of impacts from COVID-19 and the associated restrictions on activity during lockdown which led to lower traffic flows across the country. A small increase was observed at some sites in 2021 and 2022 compared to 2020.

Table 4-1: UDC NO_2 Diffusion Tube Monitoring Data within Saffron Walden AQMA's boundaries.

Site ID	Site Type	Annual Mean NO_2 Concentration (µg/m^3)				
		2018	2019	2020	2021	2022
UT001	Urban Centre	29.8	30.0	23.9	23.1	23.9
UT003	Urban Background	12.0	11.1	9.1	8.5	8.7
UT004	Kerbside	35.5	35.1	26.9	27.1	27.5
UT005	Kerbside	36.4	33.9	26	26.6	27.1
UT011	Urban Centre	29.0	26.3	19.9	21.7	22.0
UT012	Urban Background	15.4	15.5	11.0	10.8	11.6
UT015	Roadside	25.8	24.9	20.7	18.9	21.8
UT016	Roadside	32.1	30.7	23.1	24.7	26.2
UT021	Roadside	27.0	24.0	17.6	18.4	19.1
UT028	Roadside	33.4	31.2	24.8	25.0	25.5
UT029	Roadside	20.5	20.1	15.9	15.1	16.3
UT030	Kerbside	27.2	25.0	19.6	19.7	19.4
UT031	Roadside	19.8	20.7	15.2	15.8	16.2
UT032	Roadside	15.2	15.0	11.5	11.1	11.2
UT036	Urban Centre	19.2	18.4	14.3	13.6	14.1
UT037	Kerbside	22.0	22.4	16.8	15.7	16.5
UT044, UT045, UT046	Roadside	N/A	37.0	31.6	30.7	31.1

UT047, UT048, UT049	Roadside	N/A	N/A	N/A	13.4	14.5
UT050	Roadside	N/A	N/A	N/A	11.2	11.3
UT051	Roadside	N/A	N/A	N/A	21.5	22.8

Note: N/A denotes where monitoring did not take place

Baseline Air Quality Modelling

4.4 Annual mean NO_2 concentrations were modelled at selected sensitive receptors close to and within the Saffron Walden AQMA study area. 29 receptors were modelled, as shown in figures presented in Appendix A.

4.5 Modelled results at all receptors are presented in Table 4-2. The key results are summarised in the paragraphs below.

Table 4-2: Predicted Annual Mean Concentrations at Selected Receptors in 2021

Receptors	NO_2 (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
R1	22.0	16.9	10.5
R2	35.6	19.5	12.0
R3	20.0	16.5	10.5
R4	25.4	17.3	11.0
R5	23.3	16.9	10.8
R6	25.8	17.2	10.7
R7	25.2	17.1	10.9
R8	31.7	18.6	11.5
R9	23.8	17.0	10.6
R10	25.2	17.3	11.0
R11	25.9	17.2	11.0
R12	22.0	16.9	10.5
R13	25.0	17.2	10.7
R14	19.0	16.2	10.4
R15	20.6	16.4	10.3
R16	16.0	15.6	9.8
R17	15.3	15.5	9.7
R18	17.5	15.9	10.2
R19	24.5	17.0	10.9
R20	16.4	16.1	10.0
R21	17.7	16.3	10.1
R22	16.5	15.7	10.1
R23	21.0	16.5	10.3
R24	25.0	17.4	10.8
R25	23.6	16.7	10.4
R26	20.9	16.3	10.2
R27	19.2	16.4	10.5
R28	16.0	16.3	10.1
R29	16.4	15.9	10.2

4.6 There were no sites that exceeded the AQS annual mean objective of 40 µg/m^3 in the Saffron Walden AQMA in the 2021 Baseline. There are therefore unlikely to be any exceedances of the hourly mean objective in 2040.

4.7 The receptors located on High Street/B1052 and East Street have the highest modelled NO_2 annual mean concentrations, with the maximum concentrations estimated at R2 and R8 on High Street/B1052 and Bridge Street respectively. These concentrations remain well below the annual mean objective.

4.8 This is consistent with the most recent Annual Status Report (Uttlesford District Council, 2023) which states that:

"*For the sixth year running, no exceedances have been measured… It is Uttlesford District Council's intention to revoke the AQMA in 2023/24 and to develop the Saffron Walden Clean Air project.*"

4.9 Predicted PM_{10} and $PM_{2.5}$ concentrations meet the annual mean objectives of 40 µg/m^3 and 20 µg/m^3 respectively in 2021. The highest modelled annual mean PM_{10} and $PM_{2.5}$ concentrations are at receptors R2 on High Street/B1052 and R8 on Bridge Street.

4.10 The traffic flow on High Street/B1052 adjacent to R2 is the highest in the air quality model domain, of over 17,000 AADT. The traffic flow adjacent to R8 on Bridge Street is almost 14,000 AADT in 2021.

5. Future Modelled Pollutant Concentrations

5.1 Modelled results at all receptors are presented in Table 5-1. The key results are summarised in the paragraphs below.

Table 5-1: Predicted Annual Mean Concentrations at Selected Receptors in 2040

Receptors	NO_2 (µg/m^3)			PM_{10} (µg/m^3)			$PM_{2.5}$ (µg/m^3)		
	DM	DS	Change	DM	DS	Change	DM	DS	Change
R1	12.9	13.2	0.3	16.4	16.5	0.1	10.0	10.1	<0.1
R2	19.6	20.0	0.4	19.2	19.3	0.2	11.6	11.7	0.1
R3	13.5	14.0	0.5	16.1	16.3	0.2	10.1	10.2	0.1
R4	16.0	17.1	1.1	17.0	17.4	0.4	10.6	10.9	0.2
R5	14.8	15.7	0.9	16.5	16.9	0.3	10.4	10.5	0.2
R6	14.8	15.7	1.0	16.7	17.0	0.3	10.2	10.4	0.2
R7	15.4	16.6	1.2	16.5	16.9	0.4	10.4	10.6	0.2
R8	17.9	18.7	0.9	18.4	18.7	0.3	11.1	11.3	0.2
R9	13.9	14.6	0.6	16.5	16.7	0.2	10.1	10.2	0.1
R10	14.8	15.5	0.8	16.6	16.9	0.3	10.4	10.5	0.2
R11	15.7	16.8	1.1	16.7	17.0	0.4	10.4	10.6	0.2
R12	13.0	13.5	0.5	16.4	16.6	0.2	10.1	10.2	0.1
R13	14.2	15.1	0.9	16.7	17.0	0.3	10.2	10.4	0.2
R14	13.0	13.5	0.5	15.8	16.0	0.2	9.9	10.0	0.1
R15	13.0	13.7	0.7	16.0	16.1	0.1	9.8	9.9	0.1
R16	10.2	10.3	0.2	15.0	15.1	0.1	9.3	9.3	<0.1
R17	9.8	10.0	0.2	14.9	14.9	0.1	9.2	9.2	<0.1
R18	12.0	12.4	0.4	15.4	15.5	0.1	9.7	9.8	0.1
R19	13.2	13.6	0.4	15.8	16.0	0.2	10.0	10.1	0.1
R20	10.6	10.8	0.2	15.6	15.7	0.1	9.5	9.6	<0.1
R21	11.3	11.6	0.3	15.9	16.0	0.1	9.7	9.7	0.1
R22	11.4	11.6	0.2	15.1	15.1	0.1	9.5	9.6	<0.1
R23	12.0	12.0	<0.1	15.8	15.8	<0.1	9.7	9.7	<0.1
R24	14.6	15.1	0.6	17.0	17.1	0.1	10.3	10.4	0.1
R25	14.0	14.8	0.7	16.1	16.2	<0.1	9.9	9.9	<0.1
R26	12.6	12.8	0.2	15.8	15.9	0.1	9.7	9.8	<0.1
R27	11.5	11.8	0.3	15.2	15.4	0.1	9.6	9.7	0.1
R28	10.0	10.3	0.3	15.8	15.9	0.1	9.6	9.7	0.1
R29	10.7	10.8	0.2	14.9	15.0	0.1	9.4	9.5	0.1

5.2 All of the 29 selected receptors were estimated to have annual mean NO_2 concentrations below the annual mean air quality objective in both future scenarios. There are therefore unlikely to be any exceedances of the hourly mean objective in 2040.

5.3 The modelled NO_2 concentrations range from 9.8 µg/m^3 to 19.6 µg/m^3 at selected receptors in the 2040 DM scenario. The receptors located on High Street/B1052 and East Street have the highest NO_2 annual mean concentrations, with the maximum concentration estimated at Receptor R2 on High Street/B1052.

5.4 In the 2040 DS Scenario with the Local Plan, concentrations increase slightly at all receptors compared to 2040 DM. A maximum concentration of 20.0 µg/m^3 is estimated at Receptor R2 (High Street/B1052) where the highest AADT flows (>20,000 AADT) were predicted.

5.5 Receptors R4, R7 and R11, located on East Street, experience the greatest increase in annual mean NO_2 due to the Local Plan of up to 1.2 µg/m^3. The main reason for this is that the AADT flows are expected to increase by over 1,000 AADT.

5.6 In both the DM and DS scenarios, the lowest modelled NO_2 concentrations are estimated at Receptor R17 on High Street/B184, with 9.8 and 10.0 µg/m^3 respectively.

5.7 With reference to the IAQM/EPUK guidance (Environmental Protection UK (EPUK) & IAQM, 2017), the predicted changes in NO_2 concentrations due to the Local Plan are considered to be negligible at all receptors.

5.8 Predicted PM_{10} and $PM_{2.5}$ concentrations meet the annual mean objectives of 40 µg/m^3 and 20 µg/m^3 respectively in both future scenarios. The annual mean $PM_{2.5}$ target of 12 µg/m^3 (interim target) is achieved at all receptors in 2040, however modelled concentrations are very close to or above the 2040 annual mean target of 10 µg/m^3.

5.9 With the Local Plan in place (DS), the highest annual mean PM_{10} concentrations of 19.3 µg/m^3 and 18.7 µg/m^3 are modelled at receptors R2 and R8 on High Street/B1052 and Bridge Street, respectively. The highest annual mean $PM_{2.5}$ concentrations of 11.7 µg/m^3 and 11.3 µg/m^3 are also modelled at receptors R2 and R8.

5.10 The greatest changes in PM_{10} concentration due to the Local Plan are modelled at receptors R4, R7 and R11 on East Street (0.4 µg/m^3) where the greatest increase in traffic is predicted (>1,000 AADT).

5.11 Relative to the base year of 2021, a decrease in $PM_{2.5}$ concentrations is projected, ranging between -1% and -8%.

5.12 With reference to the IAQM/EPUK guidance (Environmental Protection UK (EPUK) & IAQM, 2017), the predicted changes in PM_{10} and $PM_{2.5}$ concentrations due to the Local Plan are considered to be negligible at all receptors.

6. Screening of road traffic changes outside the AQMA

6.1 AECOM has been provided with traffic data for the wider Saffron Walden area. The data were screened according to the criteria in the Design Manual for Roads and Bridges (DMRB) (National Highways, 2019) to assess for likely impacts upon air quality. Those links where a change of 1,000 AADT or more were identified, and those within the AQMA were included in the air quality model, as presented in Table B.1, Appendix B.

6.2 There are 18 links with a predicted change in 24h AADT of more than 1000 AADT that are situated outside the AQMA. A schematic diagram of these links (i.e. the identified links are not aligned to mapped roads) are presented in **Figure 9-4** in Appendix A.

6.3 The greatest change in traffic flow within the AQMA model is an increase of 1,668 AADT on Radwinter Road, where a change in concentration of 0.8 µg/m^3, 0.3 µg/m^3 and 0.2 µg/m^3 for NO_2, PM_{10} and $PM_{2.5}$ respectively at R10 are modelled due to the Local Plan.

6.4 The greatest change in traffic flow outside the modelled study area, are increases of 3,050 to 3,989 vehicles a day, along Radwinter Road (links 6841_6962, 6864_6962, 2928_6999, 6999_7000), to the east. This is greater than the change in traffic flow modelled within the AQMA, and so the impact on air quality would be expected to be greater at a receptor situated a similar distance from the road.

6.5 Due to the change in flow, it is recommended that this area is reviewed and considered for further assessment where sensitive receptors are identified within 200m of the road. There is the potential for the resulting increase in NO_2 concentration to be 2 to 3 µg/m^3 at sensitive receptors close to the road due to the Local Plan. As background concentrations in the area are expected to be low in 2040, with reference to the IAQM/EPUK guidance (Environmental Protection UK (EPUK) & IAQM, 2017), the predicted changes in concentrations would be expected to be negligible or slight at receptors in this area. These changes would not be considered significant.

7. Summary and Recommendations

7.1 This report presents the results of the air quality assessment for the Regulation 18 Uttlesford Local Plan 2021-2041 for the AQMA in Saffron Walden. A baseline year of 2021 was modelled, as well as a future 'Do Minimum' scenario and a 'Do Something' scenario in 2040.

7.2 Based on the modelling presented herein, concentrations of NO_2 (for which the AQMA is designated), PM_{10} and $PM_{2.5}$ at selected receptors are below the annual mean objectives in the 2021 baseline year. No exceedances of the annual mean objectives for NO_2 or PM_{10} are predicted at any selected receptors in Saffron Walden AQMA in 2040 either with or without the Local Plan in place.

7.3 The annual mean $PM_{2.5}$ target of 12 µg/m^3 (interim target) is achieved at all receptors in 2040, however modelled concentrations are very close to or above the 2040 annual mean target of 10 µg/m^3.

7.4 No mitigation measures for the Local Plan Review are therefore required or recommended with regard to the AQMA at this stage. Further assessment will be undertaken at Regulation 19, if required.

7.5 Changes in traffic flow due to the Local Plan of more than 3,000 vehicles per day are predicted to the east of the AQMA, on Radwinter Road. Due to this change in flow, it is recommended that this area is considered for further assessment, although it is expected that increases in concentration at receptors would not exceed the air quality objectives and would not be considered significant.

8. References

Council of European Communities. (1999). *First Daughter Directive on Limit Values for Sulphur Dioxide, Nitrogen Dioxide and Oxides of Nitrogen, Particulate Matter and Lead in Ambient Air, 1999/30/EC.*

Council of European Communities. (2000). *Second Daughter Directive on Limit Values for Benzene and Carbon Monoxide in Ambient Air, 2000/69/EC.*

Council of European Communities. (2002). *Third Daughter Directive on Ozone in Ambient Air, 2002/3/EC.*

Council of European Union. (1997). *Directive 97/101/EC: Council Decision of 27 January 1997 establishing a reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States.*

Council of European Union. (2008). *Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe.*

Defra. (2000). *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.* Available at: http://www.gov.scot/resource/doc/1052/0051687.pdf.

Defra. (2007). *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1).* Department for Environment, Food and Rural Affairs.

Defra. (2019). *Clean Air Strategy.* London: Defra.

Defra. (2020). *Background Mapping data for local authorities - 2018-based.* Retrieved from UK AIR: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

Defra. (2021b). *Emissions Factors Toolkit (version 11.0).* Retrieved March 23, 2021, from https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

Defra. (2022, August). *Local Air Quality Management Technical Guidance (TG22)*. Retrieved March 23, 2021, from https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

Defra. (2023). *Air Quality Strategy for England.* Available at: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery .

Environmental Protection UK (EPUK) & IAQM. (2017). *Land-Use Planning and Development Control: Planning for Air Quality.*

Essex County Council. (2011). *Essex- Local Transport Plan 2015 - 2031.*

European Union. (2001). *Clean Air For Europe (CAFE) Programme: Towards a Thematic Strategy for Air Quality.*

HM Government. (1995). Environment Act 1995, Part IV Air Quality. Her Majesty's Stationery Office.

HM Government. (2016). *The Air Quality Standards (Amendment) Regulations. SI 2016 No. 1184. Her Majesty's Stationery Office.*

HM Government. (2018). *A Green Future: Our 25 Year Plan to Improve the Environment.*

HM Government. (2021). *Environment Act 2021, Part IV Air Quality. Her Majesty's Stationery Office.*

HM Government. (2023). *Environmental Improvement Plan 2023.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1133967/environmental-improvement-plan-2023.pdf.

National Highways. (2019). *Design Manual for Roads and Bridges (DMRB): LA105 Air Quality .* Available at: https://www.standardsforhighways.co.uk/search/10191621-07df-44a3-892e-c1d5c7a28d90.

UK Statutory Instruments. (2020). *The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 .* Available at: https://www.legislation.gov.uk/uksi/2020/1313/regulation/2/made .

Uttlesford District Council. (2005). *Adopted Local Plan 2005.* Available at: https://www.uttlesford.gov.uk/local-plan-2005.

Uttlesford District Council. (2017). *Uttlesford District Council Air Quality Action Plan 2017.*

Uttlesford District Council. (2018). *Air Quality Technical Planning Guidance.* Available at: https://www.uttlesford.gov.uk/media/8250/Air-Quality-Technical-Planning-Guidance-2018/pdf/Air_Quality_Technical_Guidance_.pdf?m=636652790533370000

Uttlesford District Council. (2023). *Local Air Quality Management Annual Status Report 2023.*

Appendix A – Figures

Figure 9-1: Modelled Network, Receptors and Monitoring Sites in Saffron Walden AQMA – overview

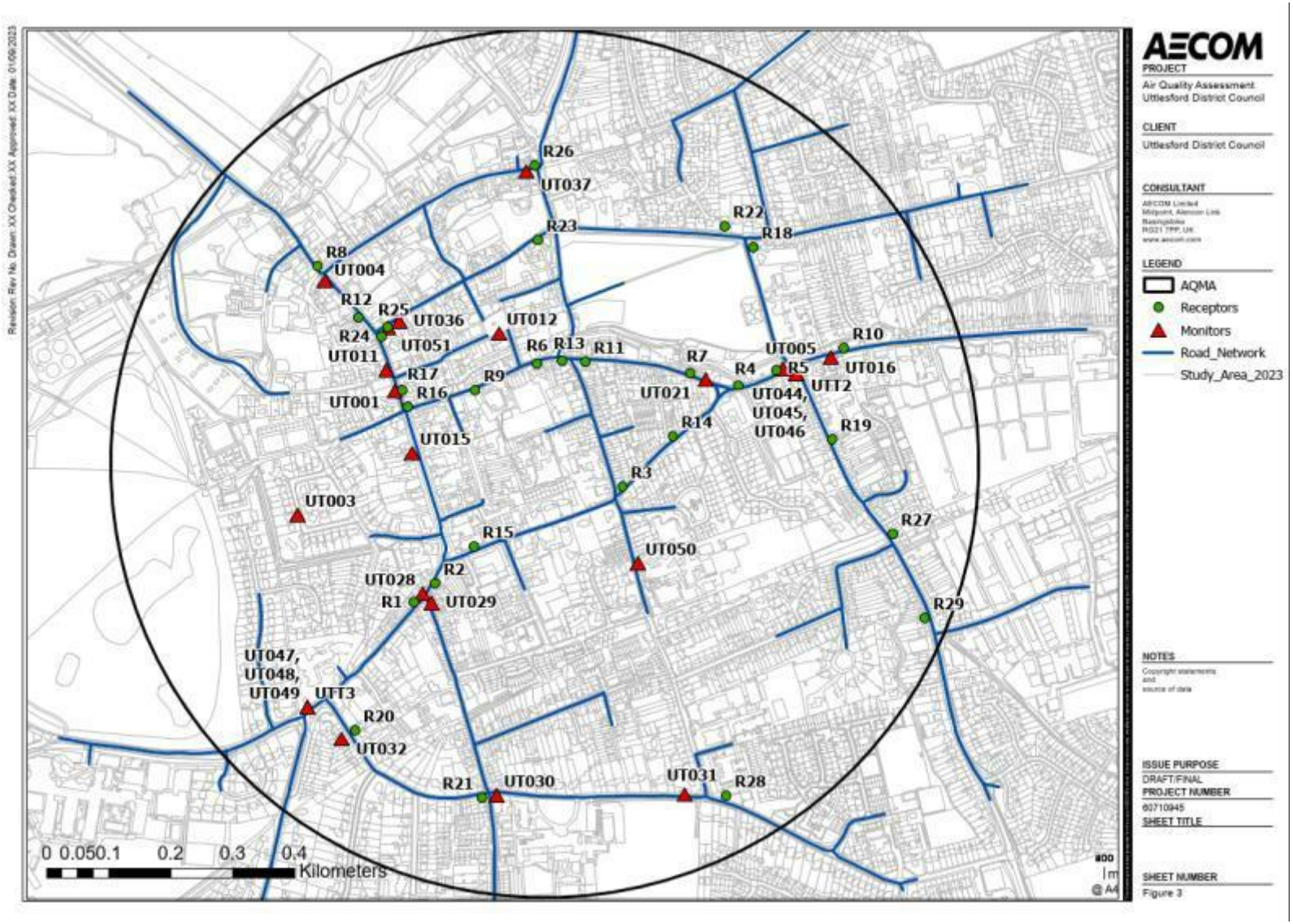


Figure 9-2: Modelled Network, Receptors and Monitoring Sites in Saffron Walden AQMA – High St / Church St

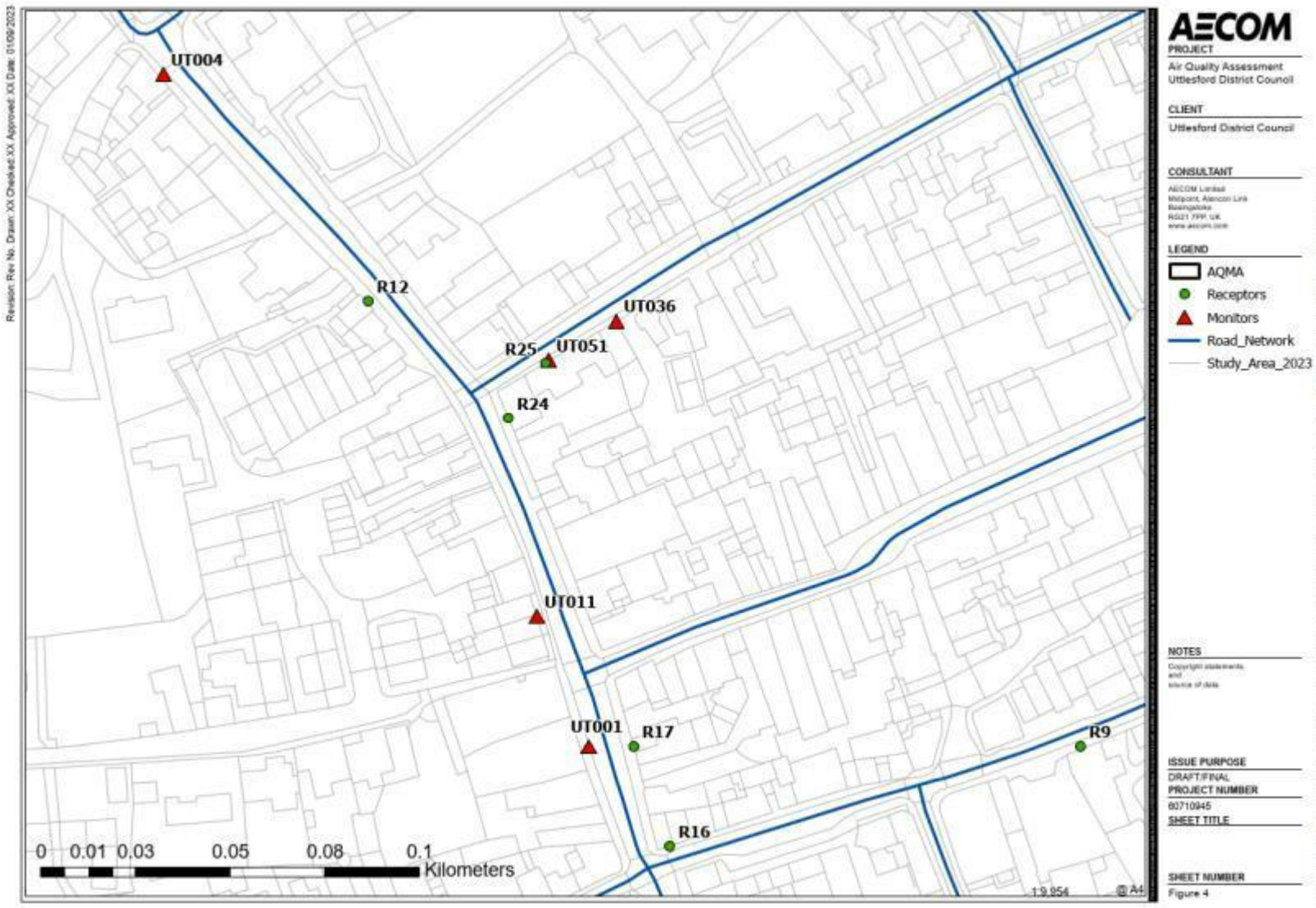


Figure 9-3: Modelled Network, Receptors and Monitoring Sites in Saffron Walden AQMA – B184 / Radwinter Road

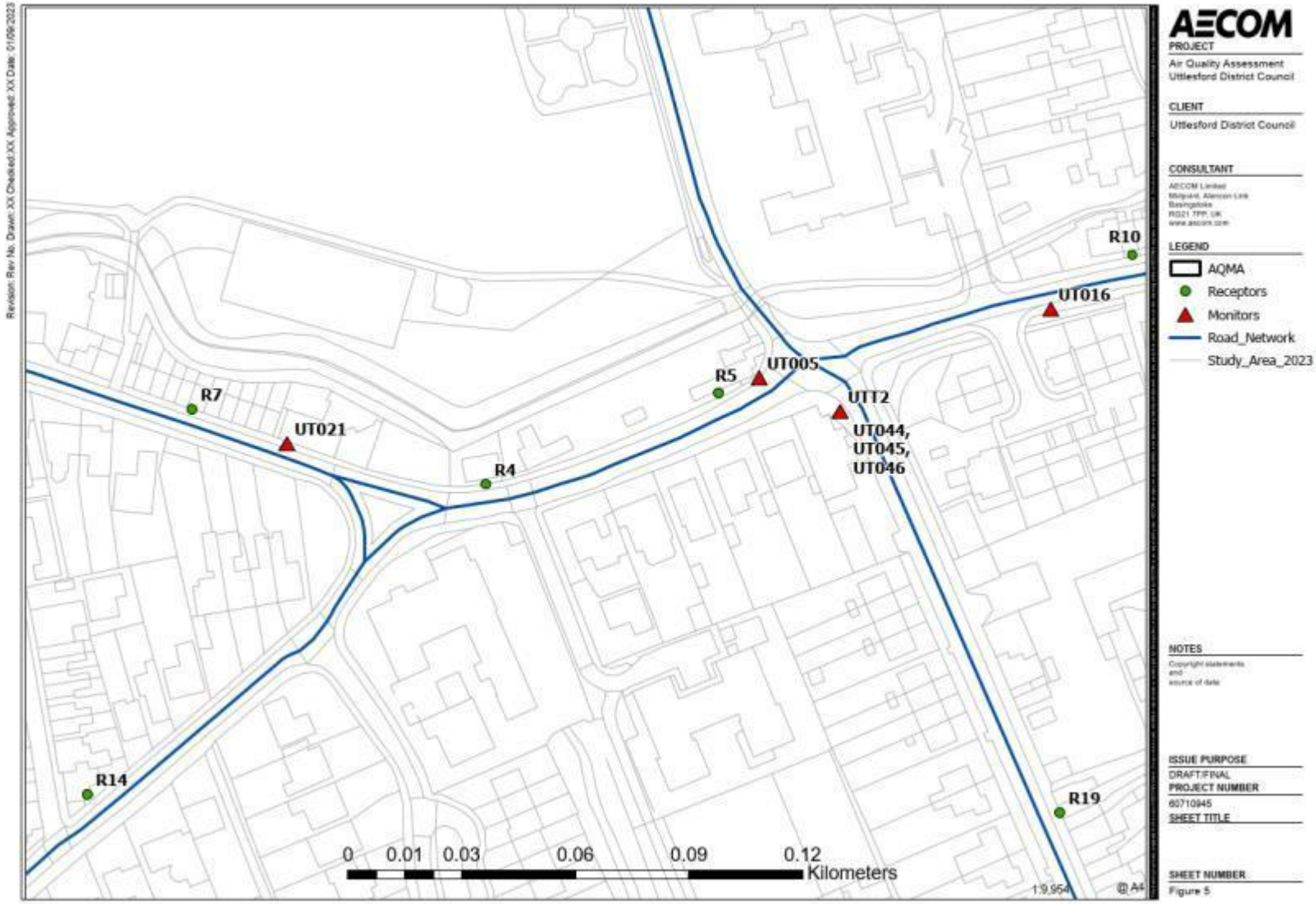
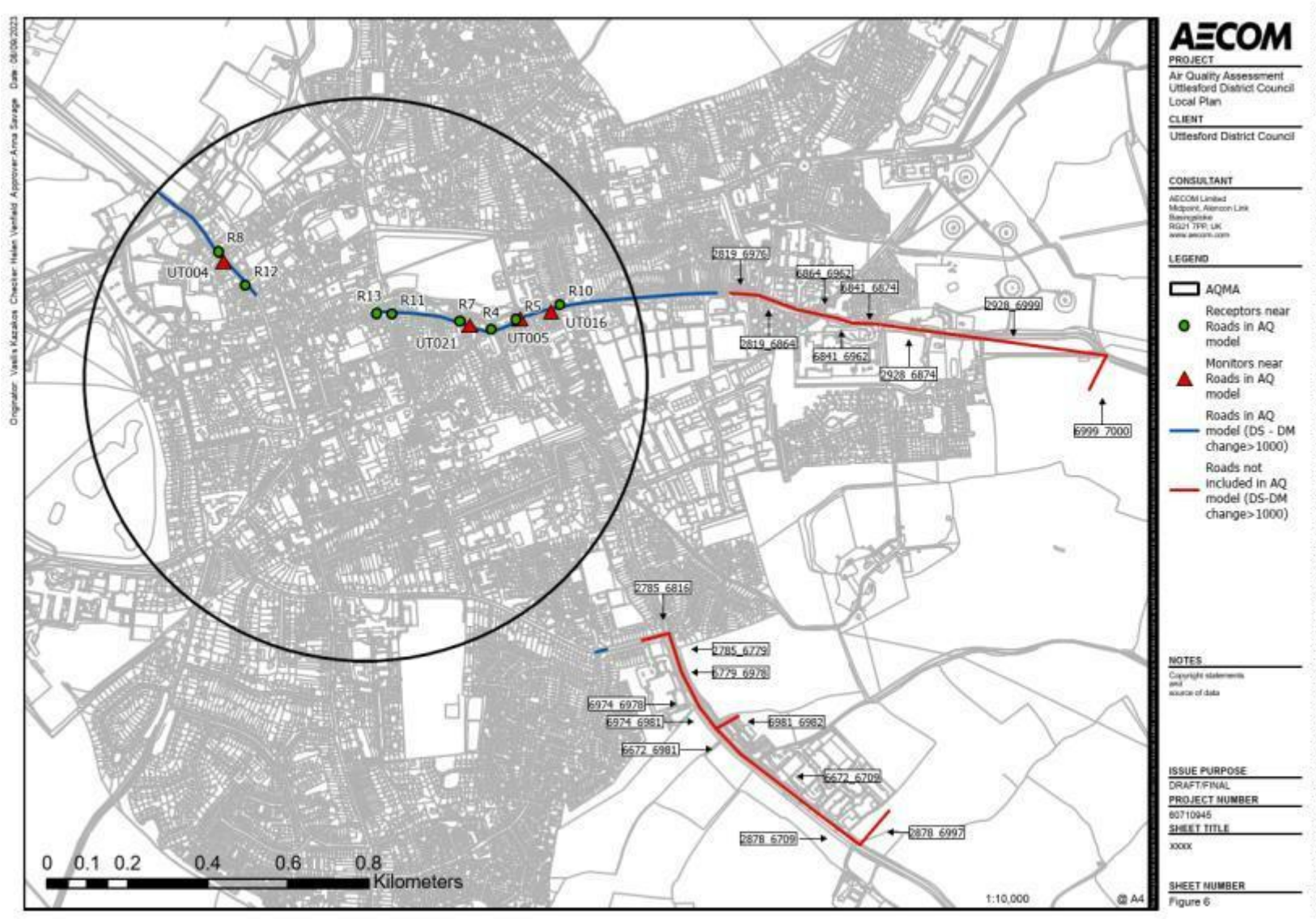


Figure 9-4: Roads where traffic flow change >1000 AADT



Appendix B – Traffic Data

Table B.1: Traffic data for Road links with AADT change >1000 vehicles.

Link	Within Air Quality Model	AADT change (DS-DM)	Receptors on the Road
2700_2710	Yes	1543	R7
2671_2700	Yes	1543	R11
2665_2671	Yes	1521	R13
2710_2714	Yes	1217	N/A
2714_2727	Yes	1794	R4, R5
2594_6742	Yes	1178	R12
2594_6884	Yes	1154	R8
6770_6884	Yes	1142	N/A
2727_6904	Yes	1668	R10
6904_6976	Yes	1668	N/A
2878_6709	No	1488	N/A
6672_6709	No	1957	N/A

Link	Within Air Quality Model	AADT change (DS-DM)	Receptors on the Road
2785_6779	No	1435	N/A
2785_6816	No	1442	N/A
6781_6816	Yes	1422	N/A
2819_6864	No	2943	N/A
6841_6874	No	3040	N/A
2928_6874	No	2922	N/A
6841_6962	No	3050	N/A
6864_6962	No	3050	N/A
2819_6976	No	1840	N/A
6974_6978	No	1435	N/A
6779_6978	No	1435	N/A
6974_6981	No	2742	N/A
6672_6981	No	1957	N/A
6981_6982	No	1599	N/A
2878_6997	No	1288	N/A
2928_6999	No	3860	N/A

Table B.2 - Traffic Data used in the Air Quality Assessment in Saffron Walden AQMA

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
2564_6770	11331.6	2	40	13967.4	1	37	14889.3	1	36
2594_6742	11986.2	2	26	14086.7	1	24	15265.0	1	23
2594_6821	3798.4	1	23	4117.2	1	22	4338.3	1	21
2594_6884	14234.7	2	18	16963.1	1	17	18116.7	1	16
2595_6611	15670.1	2	13	18449.6	2	11	18970.5	2	10
2595_6803	3695.5	2	32	4746.5	1	31	5193.4	1	30
2595_6958	12350.3	2	21	14110.2	2	19	14504.2	2	18
2610_6736	13353.4	2	13	15523.9	2	11	15868.0	2	10
2610_6793	277.4	2	32	295.3	2	32	307.9	2	32
2610_6855	7687.4	3	24	9123.9	2	22	10044.9	2	20
2610_6936	10048.6	2	14	12100.9	2	14	12747.4	1	13
2614_2623	17860.1	2	20	20322.3	2	18	20921.2	2	18
2614_6847	5948.3	2	24	6702.5	1	22	6908.6	1	20
2614_6958	12107.2	2	26	13825.7	2	24	14217.6	2	23
2623_6846	14141.1	2	28	16494.7	2	25	16914.4	2	24
2642_6808	6089.6	2	23	6901.2	1	22	7104.1	1	23
2642_6886	3695.5	2	23	4746.5	1	21	5193.4	1	21
2642_6888	4053.0	1	23	4815.2	1	23	5334.1	1	22
2642_6994	7645.1	2	28	9428.4	1	21	9993.2	1	20
2654_6740	7623.7	2	17	9513.9	2	16	9788.9	2	16
2654_6772	6527.0	2	40	8155.8	1	38	8437.7	1	38
2665_2671	8975.2	2	22	9914.3	2	21	11434.9	2	19

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
2665_6950	7167.9	1	20	7870.3	1	20	8283.2	1	18
2666_6740	6664.8	2	22	7519.9	1	20	7860.9	1	21
2666_6946	1858.7	3	17	2001.9	3	17	2052.0	2	17
2666_6950	7045.6	2	30	7812.7	1	30	8168.9	1	29
2671_2700	9291.6	2	16	10268.0	2	15	11811.5	2	13
2687_6868	5634.7	1	34	7565.5	1	30	8295.5	1	29
2687_6882	2031.3	3	29	2115.0	3	29	2240.2	3	28
2687_6916	890.5	4	47	931.9	4	47	980.8	4	47
2700_2710	9291.6	2	16	10268.0	2	15	11811.5	2	13
2710_2711	3585.2	2	4	3581.1	2	3	3907.7	2	2
2710_2714	5706.4	2	20	6687.0	2	19	7903.8	1	17
2711_6856	8556.5	2	28	10612.5	1	24	11516.4	1	23
2714_2711	4971.3	2	35	7031.4	1	31	7608.7	1	30
2714_2727	10677.7	2	20	13718.4	1	21	15512.5	1	19
2727_6741	1729.4	3	26	3232.2	2	23	3688.7	2	19
2727_6776	9154.9	2	18	7123.4	2	21	7764.1	2	21
2727_6904	13765.9	2	21	14155.6	1	21	15823.1	1	20
2736_6780	7882.2	2	34	9810.1	1	31	10618.3	1	30
2736_6781	8011.3	2	32	10014.4	1	31	10802.7	1	30
2736_6813	1121.3	2	18	1197.4	2	18	1212.0	2	18
2751_6710	9029.3	2	43	6673.9	2	45	7333.3	2	45
2751_6776	9092.6	2	29	6831.6	2	31	7470.8	2	31
2751_6917	1032.5	2	27	1098.7	2	28	1143.1	2	28

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
2785_6778	10182.4	2	30	8575.9	2	25	9172.5	2	24
6607_6876	7047.9	1	43	8619.2	1	42	8868.2	1	42
6609_6610	9020.6	1	39	10673.9	1	37	10993.2	1	36
6609_6800	437.5	2	15	460.2	2	14	468.5	2	14
6609_6876	8714.1	1	43	10354.3	1	41	10665.3	1	40
6610_6611	9603.9	1	22	11282.3	1	20	11617.2	1	19
6610_6805	832.3	2	28	875.5	2	28	891.2	2	28
6611_6804	10945.7	2	34	12720.9	2	31	12919.4	2	30
6710_6778	9505.8	2	41	8345.1	2	40	8847.6	2	40
6710_6810	4401.8	2	19	4556.9	2	21	4678.6	2	20
6736_6771	13353.4	2	23	15523.9	2	21	15868.0	2	20
6740_6741	9240.5	1	23	9904.5	1	23	10408.6	1	23
6740_6820	5175.0	2	19	5270.4	2	19	5135.0	2	19
6741_6835	8679.8	1	27	7824.2	1	27	8462.0	1	26
6742_6936	9994.8	2	28	12049.0	2	26	12680.4	1	26
6770_6817	4384.8	1	18	4655.5	1	23	4875.9	1	22
6770_6884	14047.4	2	31	16773.2	1	28	17915.5	1	27
6771_6846	13467.5	2	26	15637.5	2	24	15976.0	2	22
6772_6892	5187.0	2	36	6759.6	1	35	7023.2	1	35
6772_6908	1493.9	1	25	1569.5	1	25	1587.2	1	25
6773_6892	4964.9	2	34	6528.2	1	32	6788.9	1	32
6776_6840	788.4	2	27	839.1	2	27	874.4	2	27
6778_6811	2064.8	2	28	2205.0	2	28	2231.8	2	28

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
6780_6809	7882.2	2	32	9810.1	1	29	10618.3	1	28
6781_6816	12295.5	2	35	15356.3	2	30	16778.1	1	28
6781_6859	6093.2	2	22	6882.2	2	21	7423.5	2	22
6791_6792	389.9	2	29	413.8	1	32	434.4	1	32
6792_6888	4053.0	1	45	4815.2	1	44	5334.1	1	43
6792_6910	3821.5	1	46	4670.7	1	44	5138.1	1	44
6792_6995	389.9	2	29	510.0	1	26	549.3	1	26
6801_6804	10856.3	2	41	12628.2	2	39	12820.9	2	38
6803_6886	3695.5	2	39	4746.5	1	38	5193.4	1	37
6804_6941	309.4	2	25	325.5	2	24	331.2	2	24
6808_6847	5948.3	2	36	6702.5	1	36	6908.6	1	35
6808_6926	1093.7	2	29	1160.9	1	29	1218.5	1	29
6809_6924	1522.7	2	20	1624.1	2	20	1722.8	2	19
6809_6993	7645.1	2	28	9481.6	1	32	10110.4	1	31
6817_6937	929.0	1	32	977.4	1	32	1010.2	1	32
6820_6742	3778.9	2	7	3782.5	2	6	3585.4	2	5
6820_6949	68.7	2	32	77.2	2	32	83.5	2	32
6820_6963	1327.4	2	19	1410.6	2	19	1466.0	2	19
6821_6870	3867.1	1	23	4194.4	1	22	4421.8	1	21
6823_6932	1016.9	1	32	1068.3	1	32	1080.3	1	32
6824_6907	579.0	1	32	608.3	1	32	615.2	1	32
6824_6920	495.2	1	32	520.3	1	32	526.2	1	32
6824_6931	1074.2	1	32	1128.6	1	32	1141.4	1	32

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
6834_6901	6320.3	1	22	5957.5	1	22	6699.5	1	21
6835_6905	7763.9	1	28	6893.7	1	28	7580.9	1	27
6835_6931	1569.4	1	25	1648.9	1	25	1667.6	1	25
6836_6837	338.5	1	18	355.5	1	18	359.5	1	18
6837_6872	7565.7	1	21	6729.3	1	21	7421.4	1	21
6837_6905	7763.9	1	28	6893.7	1	28	7580.9	1	27
6842_6917	610.9	2	32	650.0	2	32	676.1	2	32
6845_6846	3526.4	1	23	3739.2	1	21	3793.1	1	21
6848_6854	3052.2	2	17	3220.3	2	17	3358.3	2	17
6850_6771	683.5	1	17	721.8	1	16	735.9	1	15
6853_2665	7664.2	3	14	9093.1	2	13	10015.9	2	11
6853_6955	501.2	3	15	539.0	3	15	552.0	3	15
6854_2671	1241.3	1	16	1311.0	1	15	1390.4	1	13
6855_6849	141.9	2	32	150.7	2	32	156.3	2	32
6855_6853	7545.5	3	18	8973.2	2	16	9888.6	2	15
6856_6914	8556.5	2	28	10612.5	1	24	11516.4	1	23
6867_6868	919.5	1	25	970.8	1	24	985.1	1	23
6868_2623	5770.2	1	11	7701.9	1	7	8434.4	1	6
6869_6870	535.3	1	13	565.4	1	13	573.4	1	13
6870_2654	4080.2	1	5	4417.3	1	4	4644.3	1	3
6871_6872	1564.2	2	15	1657.6	1	15	1690.0	1	15
6872_6901	6708.9	1	21	6215.6	1	21	6953.9	1	20
6875_6876	2505.8	2	14	2638.3	2	14	2700.3	2	14

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
6881_6882	211.8	3	18	223.6	3	18	232.0	3	18
6882_6854	1982.7	3	29	2066.6	3	29	2186.9	3	29
6883_6884	326.2	1	14	343.1	1	13	354.4	1	12
6890_6912	3821.5	1	46	4670.7	1	45	5138.1	1	44
6891_6892	247.5	1	19	260.0	1	19	262.9	1	19
6900_6901	670.0	1	17	703.8	1	17	711.8	1	17
6904_6976	13765.9	2	33	14155.6	1	37	15823.1	1	35
6908_6932	1493.9	1	32	1569.5	1	32	1587.2	1	31
6910_6912	3821.5	1	46	4670.7	1	45	5138.1	1	44
6914_6921	8556.5	2	28	10612.5	1	24	11516.4	1	23
6916_6915	237.8	4	20	248.2	4	20	259.9	4	20
6916_6938	652.7	4	48	683.7	4	48	720.8	4	47
6917_6918	421.7	2	32	448.7	2	32	467.0	2	32
6919_6920	495.2	1	32	520.3	1	32	526.2	1	32
6921_2687	8556.5	2	28	10612.5	1	24	11516.4	1	23
6923_6924	1522.7	2	17	1624.1	2	17	1722.8	2	17
6925_6926	1093.7	2	20	1160.9	1	20	1218.5	1	20
6930_6931	495.2	1	29	520.3	1	29	526.2	1	29
6932_6933	477.1	1	32	501.2	1	32	506.8	1	32
6936_6964	332.1	2	20	353.3	2	20	367.8	2	20
6949_6821	68.7	2	20	77.2	2	20	83.5	2	20
6950_6951	608.5	3	18	659.1	3	18	673.2	3	18
6958_6959	1351.2	2	12	1424.9	2	12	1465.2	2	12

Link	2021 Base AADT	2021 Base HDV %	2021 Base Speed (kph)	2040 DM AADT	2040 DM HDV %	2040 DM Speed (kph)	2040 DS AADT	2040 DS HDV %	2040 DS Speed (kph)
6993_6994	7645.1	2	28	9311.5	1	32	9907.9	1	31
9_2564	11331.6	2	73	13967.4	1	69	14889.3	1	68