Harborough District Council - Air Quality Report

Local Plan 2020 to 2041

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Quality information

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1. Executive Summary

1.1 Harborough District Council (HDC) has commissioned AECOM Limited (AECOM) to prepare an air quality assessment to inform the preparation and evidence base for their Local Plan 2020-2041.

1.2 As part of this work AECOM has prepared this report which includes the following:

- Review of air quality in HDC and in the vicinity of the Air Quality Management Areas (AQMAs);
- Review of relevant legislation and air quality planning policy;
- Review of emissions from 2019 baseline traffic data, 2041 traffic data with cumulative schemes (without the local plan in place) and 2041 traffic data with cumulative schemes and implementation of the local plan to visualise where emissions are highest within Harborough;
- Review of sensitive locations in the Lutterworth and Kibworth AQMAs, Market Harborough and close to selected sensitive ecological habitats within Harborough and the neighbouring Rutland Water Special Protection Area (SPA) and Ramsar site;
- Modelling assessment of nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) concentrations within and close to the AQMAs and modelling of nitrogen oxides (NO_x) and ammonia (NH_3) at relevant ecological habitats with comparison against UK Air Quality Strategy (AQS) objectives and critical loads to determine the magnitude of change in annual mean pollutant concentrations attributable to planned development within the Local Plan Review.

1.3 The results of the 2019 baseline assessment support that baseline air quality is good within the Lutterworth AQMA and pollutant concentrations are below AQS objectives. However, within the Kibworth AQMA, exceedances of the AQS objectives were observed for 2019.

1.4 By 2041, pollutant concentrations will decrease across the district, resulting from continued improvements in the vehicle fleet and reductions in background concentrations, and there are no predicted exceedances of the AQS objectives with or without the Local Plan in the modelled areas. The impacts due to the implementation of the Local Plan were found to be negligible at all modelled representative receptors relevant for human health in Lutterworth, Kibworth and Market Harborough. The assessment also considered impacts on several ecological sites, including Rutland Water Special Protection Area (SPA) and three Sites of Special Scientific Interest (SSSIs): Cave's Inn Pits, Misterton Marshes, and Great Bowden Borrowpit. Changes in traffic flows close to these sites were either insigificant to require an assessment or resulting changes in pollutant concentrations were minor and remained within acceptable limits with the Local Plan.

1.5 Overall, the the traffic changes resulting from the Local Plan in 2041 are predicted to have small impacts on air quality, with no significant adverse effects on human health or sensitive ecological receptors.

2. Introduction

2.1 Harborough District Council (HDC) has commissioned AECOM Limited (AECOM) to prepare an air quality assessment to inform the preparation and evidence base for their Local Plan 2020-2041. The Council is following a fast-track programme to prepare the Local plan in order to meet the Government's proposed deadline of June 2025 for the submission of Local Plans under the current system.

2.2 This report has been prepared to provide an overview of air quality in Harborough District, drawing on recent trends in monitoring data and an overview of current legislation and relevant policy. The report provides the methodology and results showing the spread of emissions across the district as well as the results of the modelled pollutant (NO_2, PM_{10}, $PM_{2.5}$) concentrations at selected sensitive human health receptors, including within and close to AQMAs and NO_x and NH_3 at selected ecological receptors.

2.3 Traffic data and emissions for the entire district with and without the Local Plan's proposed level of growth have also been assessed to consider the impacts of the Local Plan on air quality across the district.

Harborough District

2.4 Harborough District covers an area of 238 square miles of rural south Leicestershire. It is one of seven Leicestershire districts and lies within the East Midlands Region. The population of over 97,631 (Office for National Statistics, 2021) is split between the two market towns of Market Harborough and Lutterworth, large villages such as Broughton Astley, Great Glen, the Kibworths and Fleckney, a built-up area of Leicester's urban fringe (Thurnby/Bushby and Scraptoft) and numerous small rural settlements. Alongside Market Harborough, there are around 90 parishes and the district has approximately 40,400 households (Office for National Statistics, 2021). The district is predominantly rural and agriculture which continues to be the most widespread land use in the area. The M1 runs through part of the district to the west and the A14 runs through a small part of the district to the southwest. Other major roads include the A47 to the north, the A6 and A5199 through the middle of the district, the A4304 across the south, and the A5 to the west.

2.5 There are a large number of national designated ecological habitats, designated as Sites of Special Scientific Interest (SSSI) in the district. In addition, there is an internationally important Special Protection Area (SPA) and Ramsar site designated in Rutland Waters in neighbouring Rutland District.

Air Quality Management Areas

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

2.7 In July 2001, HDC declared the Lutterworth AQMA (an area encompassing dwellings adjacent to Rugby Road, High Street and Market Street) for exceedances of the UK AQS annual mean objective for NO_2. This AQMA was subsequently amended in April 2011 and April 2013 to include areas to the south which were identified as exceeding the annual mean objective in detailed modelling assessments and a source apportionment study. HDC revoked the Lutterworth AQMA in June 2024. In November 2017, the Kibworth AQMA (an area encompassing dwelling with close proximity to the kerb line along the A6 between the roundabout with Wistow Road south to the junction with Church Road) was declared for exceedances of the NO_2 annual mean objective.

2.8 The location of HDC's AQMAs and NO_2 monitoring sites are shown in Figure 4-1 to Figure 4-3.

3. Policy Context

Air Quality Standards Regulations (as amended) (2016)

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

3.2 The UK is no longer a member of the European Union, however, EU legislation as it applied to the UK on 31st December 2020 (UK Statutory Instruments, 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 consolidated and replaced (with the exception of the 4th Daughter Directive) preceding EU directives with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC ('EU Air Quality Framework Directive') (Council of European Union, 2008). This directive is transcribed into UK legislation by the Air Quality Standards Regulations 2010 which came into force on 11th June 2010 (HM Government, 2010). The 2010 Regulations were amended by the Air Quality Standards Regulations 2016, which came into force on 31st December 2016 (HM Government, 2016). The limit values defined therein are legally binding and are considered to apply everywhere (with the exception of the carriageway and central reservation of roads and any locations where the public do not have access).

Clean Air Strategy

3.3 In 2019, the UK government released its Clean Air Strategy 2019 (Defra, 2019) as part of its 25-year Environment Plan.

3.4 Local air quality management focus in recent years has primarily related to nitrogen dioxide (NO_2), and its principal source in the UK, road traffic. However, the 2019 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 (WHO) guideline level; lower than the current UK objective (World Health Organization, 2005).

3.5 The Environment Act 2021 (HM Government, 2021) amends the Environment Act 1995. On 9th November 2021, the Act received Royal Assent 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).

3.6 The Secretary of State must publish a report reviewing the AQS every five years (as a minimum and with yearly updates to Parliament).

UK Air Quality Strategy

3.7 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.

3.8 The Air Quality Objectives set out in the AQS (Defra, 2007) (Defra, 2023) have been outlined in legislation solely for the purposes of LAQM. The objectives for the pollutants of relevance to this assessment are displayed in Table 3-1 including the new national targets for $PM_{2.5}$ concentrations stated within the Environment Act 2021 (H.M. Government , 2021), the Environmental Improvement Plan 2023 (H.M. Government , 2023) and the Air Quality Strategy 2023 (Defra, 2023).

Table 3-1 UK AQS Objectives

Pollutant	Averaging Period	Value	Maximum Permitted Exceedances/Target
NO_2	Annual Mean	40 µg/m^3	None
	Hourly Mean	200 µg/m^3	18 times per year
NOx	Annual Mean	30 µg/m^3	None
PM_{10}	Annual Mean	40 µg/m^3	None
	24-Hour Mean	50 µg/m^3	35 times per year
$PM_{2.5}$	Annual Mean	20 µg/m^3	None
		10 µg/m^3	By 2040
		12 µg/m^3	Interim target, (by end of January 2028)
	Exposure reduction compared to 2018	35%	By 2040
		22%	Interim target, (by end of January 2028)

WHO guidelines

3.9 The WHO guidelines (World Health Organization , 2021) are shown in Table 3-2. These are not legally binding standards, but identify the levels of air quality necessary to protect public health worldwide. Interim targets are also provided by the WHO to guide reductions towards achieving levels.

Table 3-2 WHO Guidelines

Pollutant	Averaging Period	WHO Guideline (µg/m^3)	Not to be Exceeded More Than
NO_2	Annual	10	N/A
	1-hour	N/A	N/A
	Daily	25	3 days
PM_{10}	Annual	15	N/A
	Daily	45	3 days
$PM_{2.5}$	Annual	5	N/A
	Daily	15	3 days

Environmental Improvement Plan 2023

3.10 The 25 Year Environment Plan, originally published in January 2018, and updated in 2019, sets out the actions the UK Government will take to help the natural world regain and retain good health (H.M. Government, 2018).

3.11 The Environment Plan was revised in February 2023 (H.M. Government , 2023) with the publication of the Environmental Improvement Plan 2023. The plan outlines several actions that are being taken to improve air quality, most notably by supporting local authorities, facilitating the rollout of Clean Air Zones, supporting the transition away from petrol and diesel cars, regulating domestic burners, and regulating agricultural emissions.

3.12 Interim targets (deadline 2028) for $PM_{2.5}$ were also announced to demonstrate the trajectory against the long-term legal targets (deadline 2040) set out in The Environmental Targets (Fine Particulate Matter) Regulations 2023 (H.M. Government , 2023).

National Planning Policy Framework

3.13 The National Planning Policy Framework (NPPF) (DLUHC, 2023) sets out the Government's environmental, economic and social policies and principles for land use planning in England and how these are expected to be applied. The revised Framework replaces the previous NPPF published in March 2012, revised in July 2018, updated in February 2019, revised in July 2021 and updated in September 2023 and in December 2023. There is a draft NPPF that was submitted for consultation in July 2024, but this does not propose any changes relating to air quality (Ministry of Housing, Community and Local Government, 2024)

3.14 Paragraphs 109, 180, 191, 192, and 194 of the NPPF provide advice on when air quality should be a material consideration in development management decisions. The key NPPF paragraphs most relevant to an air quality assessment are provided in Table 3-3.

Table 3-3 Relevant NPPF requirements relevant to the air quality assessment

Relevant NPPF paragraph reference	Requirement of the NPPF
Paragraph 180	Planning policies and decisions should contribute to and enhance the natural and local environment by: 1. protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); 2. preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and 3. remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.
Paragraph 192	Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.

Source: NPPF (DLUHC, 2023)

Planning Guidance

3.15 The National Planning Practice Guidance (NPPG) for Air Quality was published on March 2014 and updated as of November 2019 to provide more in-depth guidance to the NPPF (DHDLUHC, 2019).

3.16 The NPPG notes that air quality assessments should include the following information (paragraph 5):

- The existing air quality in the study area (existing baseline);
- The future air quality without the Proposed Development in place (future baseline); and
- The future air quality with the Proposed Development in place (with mitigation).

3.17 Paragraph 7 states that assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this, assessments are likely to be location specific.

Local Planning Policy

Leicestershire County Council Strategic Plan 2024 – 2026

3.18 The Leicestershire County Council Strategic Plan 2024 – 2026 (Leicestershire County Council, 2024) covers the Leicester City area as well as its surrounding boroughs, Blaby, Charnwood, Harborough, Hinckley & Bosworth, Melton, Northwest Leicestershire and Oadby & Wigston. It is a revised version of the 2022 – 2026 Strategic Plan and sets out the goals and priorities to improve safety, wellbeing and the environment within the County.

3.19 Air pollution is considered under section 8.3 '*People enjoy long lives in good health*' where $PM_{2.5}$ in particular is considered a significant health hazard as the third leading cause of preventable deaths in Leicestershire. Levels of air pollution have also been noted as a measure of success for improving health throughout the county.

Leicestershire Local Transport Plan 3

3.20 The Local Transport Plan 2011 – 2026 (Leicestershire County Council, 2011) sets out the priorities for the Council up to 2026 in regard to transport and infrastructure. The main goals of the strategy to provide the following:

> *"A transport system that supports a prosperous economy and provides successfully for population growth.*
>
> *An efficient, resilient and sustainable transport system that is well managed and maintained.*
>
> *A transport system that helps to reduce the carbon footprint of Leicestershire.*
>
> *An accessible and integrated transport system that helps promote equality of opportunity for our residents.*
>
> *A transport system that improves the safety, health and security of our residents.*
>
> *A transport system that helps to improve the quality of life for our residents and makes Leicestershire a more attractive place to live, work and visit."*

3.21 Planned Infrastructure improvements are listed for all areas to improve traffic flow and the impact of traffic on air quality. Specific policy relating to air quality is mentioned in Chapter 10: Managing the impact of our transport system on quality of life, which states:

> *"Air quality hotspots will continue to be taken into account as part of our efforts to prioritise smaller works to reduce congestion. Continued attention to managing the road network, with a view to improving its operational efficiency and reliability, will also make a contribution to reducing congestion and improving air quality.*
>
> *Influencing people to make less use of the private car, supporting less polluting car travel and seeking to reduce the need to travel in the first place. In terms of reducing travel demand, this will be achieved through the inclusion of requirements within the planning process to ensure that development takes due consideration of the demand for travel and the opportunity to reduce the need for travel that development will create. The planning process will also need to take account of the potential contribution the location of developments could have on known Air Quality Management Areas. The modal shift initiatives outlined above and initiatives to encourage a shift to more carbon efficient vehicles as part of efforts to reduce carbon emissions, will also help us to tackle air quality problems."*

Harborough Local Plan 2011 – 2031

3.22 The Harborough Local Plan was adopted in 2019 (Harborough District Council, 2019) and sets out the overall vision for the district, including specific objectives and detailed policies to explain how this vision will be achieved. This plan is still considered up to date but to ensure policies remain as such in the future, the Council's new local plan is being developed up to 2041 (Harborough District Council, 2024).

3.23 The Local Plan also includes a spatial strategy for management of planned growth in a sustainable manner. The strategy also includes a settlement hierarchy to identify what areas are meeting the district's 2031 development needs in accordance with sustainability objectives.

3.24 The Plan contains multiple policies split by key topics of development such as green infrastructure and Climate Change. There aren't any policies specific to air quality but the impacts on air quality are mentioned as part of policy IN2: Sustainable Transport:

> *"The Council is anxious to ensure that both the occupiers and users of new development, and those elsewhere who may be affected by it indirectly, will not be subjected to below acceptable standards of air quality. Therefore, in controlling the potential impact of development upon air quality, the Council will require an effective air pollution mitigation strategy if a development proposal would be likely to either:*
>
> *• have a moderate adverse, or worse, impact upon air quality within an existing Air Quality Management Area (AQMA) whether the proposal is inside or outside of that AQMA; or*
>
> *• contribute directly or indirectly to the declaration of another AQMA be it in this district or an adjoining one."*

3.25 Air quality is also mentioned in regard to the AQMAs in the district under their specific locations, Lutterworth and Kibworth. This mentions the developments planned to help alleviate air pollution within the AQMAs including the introduction of new spine roads which bypass the AQMAs.

2013 Lutterworth AQMA Action Plan Framework

3.26 The Lutterworth AQAP (Harborough District Council, 2013) was adopted in 2013 and seeks to improve air quality within the AQMA through implementation of measures such as:

- Lower emissions from district and it's contractor vehicle fleets;
- Work with bus companies to reduce bus emissions;
- Network management for road works, incidents and planned events; and
- Better vehicle use of road space for less disruption to free flowing traffic.

3.27 The air quality within Lutterworth has improved in recent years and as such this AQMA was revoked in June 2024.

Kibworth AQMA Action Plan

3.28 The Kibworth AQAP (Harborough District Council, 2019) was adopted in 2019 and outlines the actions and priorities made to improve air quality within the AQMA. The key priorities of the AQAP include:

- tackle emissions due to congestion at peak times;
- educate and inform the public of air quality; and
- ensure air quality is a key consideration in the planning process.

3.29 HDC is working to achieve these through the following measures:

- Impact assessment of local traffic management options;
- Continue consultation between Regulatory Services and Development Management;
- Provide Guidance and Training to members;
- Ensure air quality policies in Local Plan documents and evidence base;

- Provide information about the AQMA to local residents; and
- Development of local air quality monitoring.

Other Relevant Policy, Standards and Guidance

3.30 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 followed in this air quality assessment.

3.31 Best practice and advice / guidance contained within documents from Natural England (Natural England, 2018), the Institute of Air Quality Management (IAQM) (IAQM, 2020), Chapter 6 “Local Plans” in the IQAM guidance document “A guide to the assessment of air quality impacts on designated nature conservation sites” (IAQM, 2019) and the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2021) have been used to determine the methodology applied, and in the accompanying ecological interpretation of the results.

3.32 HDC have also commissioned a Habitats Regulations Assessment (HRA) of the 2041 Local Plan, the scoping for which has been completed and the full HRA will be undertaken upon provision of key information as listed in the HRA Scoping Report (LUC, 2024). The Scoping Report identifies European ecological sites which may be affected by the Local Plan, listing the Rutland Water SPA and Ramsar site and the Ensoor’s Pool SAC, The Ensoor’s Pool SAC was scoped out of the assessment as it is over 8km from HDC’s boundary and 200m from any strategic roads. As such the following documents were listed as key evidence required to inform the delivery of the full HRA:

- Recreation studies and/or visitors surveys for Rutland Water SPA and Ramsar site to inform an appropriate zone of influence (ZOI) for considering recreational impacts as a result of the Local Plan; and.
- Road traffic annual average daily traffic (AADT) flow calculations to determine whether thresholds are exceeded in-combination with other plans and projects as a result of the Local Plan. If AADT thresholds are exceeded, air quality modelling will be required to understand whether the Local Plan will result in adverse effect on integrity and whether avoidance and mitigation measures can be applied which would prevent an adverse effect on integrity; and
- Updated Water Cycle Study for Harborough District.

Critical Levels

3.33 Annual mean critical levels of NO_x and NH_3 are summarised in Table 3-4. These are concentrations above which adverse effects on ecosystems may occur based on present knowledge. The critical level for NO_x is taken from the EU Ambient Air Quality Directive 2008/50/EU (EU Directives, 2008) which has also been set as the Air Quality Strategy objective for the protection of vegetation and ecosystems, and has been incorporated into English legislation.

3.34 The EU Directive (EU Directives, 2008) states that the sampling point to determine compliance should be sited more than 20 km away from agglomerations or more than 5 km away from other built-up areas, industrial installations or motorways or major roads with traffic counts of more than 50,000 vehicles per day, which means that a sampling point must be sited in such a way that is representative of an area of at least 1,000 km^2. Applying the critical level for NO_x to designated nature conservation sites that are located close to busy roads is therefore precautionary.

3.35 The critical levels for NH_3 have not been incorporated into legislation and are a recommendation made by the United Nations Economic Commission for Europe (UNECE) Executive Body for the Convention on Long-Range Transboundary Air Pollution (CLRTAP) (UNECE, 2013).

Table 3-4 Annual Mean Critical Levels (NO_x and NH_3)

Pollutant	Critical Level
Oxides of nitrogen (NO_x)	30 µg/m^3
Ammonia (NH_3)	3 µg/m^3 for higher plants 1 µg/m^3 for lichens and bryophytes

4. Methodology

Summary

4.1 This section presents the steps and methodology used to model the air quality in the study area for each of the following traffic scenarios:

- 2019 baseline traffic data;
- 2041 traffic data including cumulative developments; and
- 2041 traffic data including cumulative developments and the Harborough Local Plan, as well as other Local Plans from neighbouring areas.

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

- Defra's current 2018-based Air Quality Background Concentration Maps (Defra, 2020);
- Defra's Vehicle Emission Factors within the Emissions Factor Toolkit (EFT) (Defra, 2021b);
- Air quality monitoring data from 2018 to 2022 (Harborough District Council, 2023) and latest 2023 data[1];
- Traffic count and speed data provided by AECOM Limited for 2019;
- Emission rates as published in the Calculator for Road Emissions of Ammonia (CREAM) tool (Air Quality Consultants, 2020); and
- 1x1 km modelled nitrogen and acid deposition data and ammonia background concentrations from the Air Pollution Information System (APIS, 2022).

4.3 The modelling assessment was conducted following the methodology in Chapter 7 Section 4 "Dispersion Modelling of Emissions" within Defra's LAQM.TG(22) Technical Guidance (Defra, 2022) and guidance contained within documents from Natural England (Natural England, 2018), the Institute of Air Quality Management (IAQM) (IAQM, 2020) and the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2021).

4.4 A baseline year of 2019 was assessed in line with available traffic data. This provides a conservative assessment of air quality, as concentrations have declined since this time. Discussion on this is provided in the baseline and results sections.

Traffic Data

4.5 Traffic data for roads were provided by AECOM's Transport Consultants, as part of their work with South Leicestershire County, for a series of road links. Modelled links are shown in Figure 4-1 to Figure 4-6.

4.6 Traffic data was provided for each of these links in the form of 24-hour AADT flows split by basic vehicle types, i.e. cars, Light Goods Vehicles (LGVs), Heavy Duty Vehicles (HDVs) and average speeds for each given vehicle type.

4.7 The traffic data for 2041 with and without the Local Plan were screened in accordance with IAQM Guidance on land-use planning and development control: Planning for air quality (IAQM, 2017) in order to determine the sensitive receptors to be modelled. The IAQM screening criteria states that an air quality assessment is required if a development will *"cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors"* or if the development will generate *"a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors"*.

4.8 The indicative criteria to proceed with an assessment are, for LDVs:

[1] 2023 data provided by HDC for this assessment. Not yet publicly available.

"A change of LDV flows of:

more than 100 annual average daily traffic (AADT) within or adjacent to an Air Quality management Area (AQMA); or

more than 500 AADT elsewhere."

4.9 And for HDVs:

"A change in HDV flows of:

more than 25 AADT within or adjacent to an AQMA; or

more than 100 AADT elsewhere."

4.10 The difference in traffic flows along road links as a result of the implementation of the Local Plan is shown in Figure 6-1 and Figure 6-2 for all vehicles and in Figure 6-3 and Figure 6-4 for HDVs.

4.11 Traffic data was also used to review the NOx emissions for each traffic scenario to visualise where the highest emissions are in comparison to where people live. These figures are provided in Figure 6-5 and Figure 6-6.

Receptors (Human Health)

4.12 A desk-top review using aerial mapping cross-checked with address base OS mapping was conducted to select representative locations where people are likely to be present, such as residential properties or medical centres.

4.13 The locations of the chosen sensitive receptors relevant to human health are included in Figure 4-1 to Figure 4-3 and Table 4-1 to Table 4-3. Receptors were chosen within and close to the previous AQMA in Lutterworth, Kibworth AQMA and in Market Harborough.

4.14 Receptors were modelled at the lowest point where there is residential exposure, at ground floor level or first floor, at a height of 1.5 metres or 4.5m respectively above ground.

Table 4-1 Human Receptor Locations in and close to Lutterworth AQMA[2]

Receptor ID	Receptor Type	Within AQMA	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R1	Residential	N	454511	284128	1.5
R2	Residential	Y	454450	284371	4.5
R3	Residential	Y	454454	284474	4.5
R4	Residential	N	454321	284287	1.5
R5	Residential	N	454239	284258	1.5
R6	Residential	N	454496	284439	4.5
R7	Residential	N	454390	284637	1.5
R8	Residential	N	454365	284510	1.5
R9	Residential	N	454334	284600	1.5
R10	Residential	N	454645	284791	1.5
R11	Residential	N	454548	284813	1.5
R12	Medical	N	454521	284722	1.5
R47	Residential	N	453638	283936	1.5
R48	Residential	N	453491	283971	1.5
R49	Residential	N	453223	284061	1.5

[2] Note Additional receptors added for the Local Plan assessment (R47-50)

Receptor ID	Receptor Type	Within AQMA	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R50	Residential	N	453112	284117	1.5

Table 4-2 Human Receptor Locations in and close to Kibworth AQMA

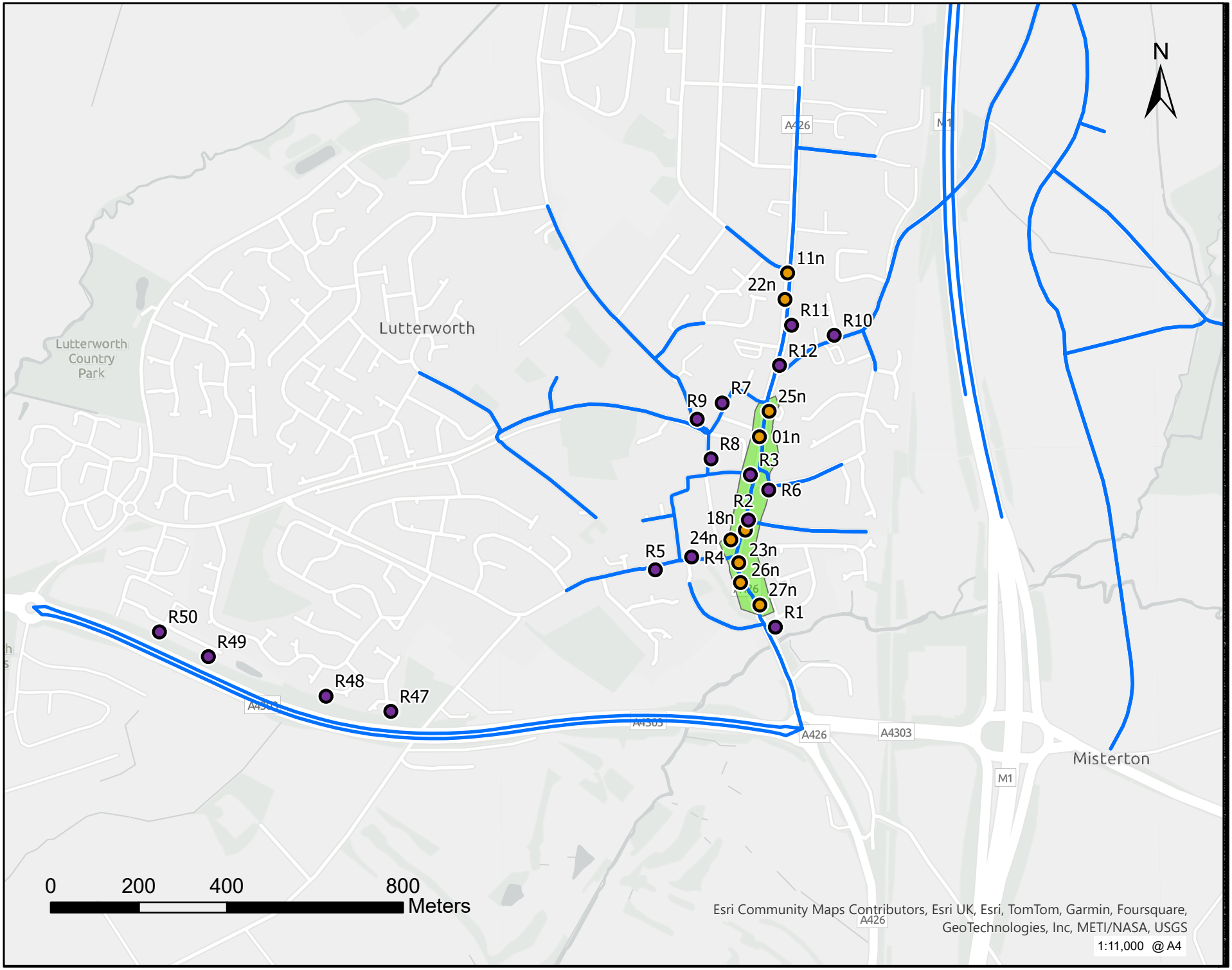
Receptor ID	Receptor Type	Within AQMA	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R13	Residential	N	468374	294125	1.5
R14	Residential	N	468222	294359	1.5
R15	Residential	N	467847	294688	1.5
R16	Residential	N	468490	294502	1.5
R17	Residential	Y	468212	294563	1.5
R18	Residential	Y	467738	294607	1.5
R19	Residential	Y	467796	294795	1.5
R20	Residential	N	467965	294603	1.5
R21	Residential	N	468061	294362	1.5
R22	Residential	N	468368	294345	1.5
R23	Residential	N	468476	294286	1.5
R24	Residential	Y	468340	294333	1.5
R25	Residential	Y	468161	294350	1.5
R26	Residential	Y	467987	294536	1.5
R27	Residential	Y	467976	294621	1.5
R28	Residential	N	468026	294428	1.5
R29	Residential	N	468400	294593	1.5

Table 4-3 Human Receptor Locations in Market Harborough[3]

Receptor ID	Receptor Type	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R30	Residential	472977	287768	1.5
R31	Residential	473178	287531	1.5
R33	Residential	473113	287635	1.5

[3] Note. Baseline modelling was not conducted for receptors in Market Harborough. This was added following the traffic screening of the Local Plan.

Receptor ID	Receptor Type	X co-ordinate (m)	Y co-ordinate (m)	Height (m)
R34	Residential	473216	287441	4.5
R35	Residential	473268	287363	1.5
R36	Residential	473490	287087	4.5
R37	Residential	473558	286888	1.5
R38	Residential	473550	286985	1.5
R39	Nursery	473643	286690	1.5
R40	Medical	473540	287238	1.5
R41	Residential	473567	287222	1.5
R42	Residential	473650	287212	1.5
R43	Residential	473749	287247	1.5
R44	Residential	473651	286744	1.5
R45	Residential	473055	287661	1.5
R46	Residential	473155	287561	1.5
R51	Medical	472609	288191	1.5
R52	Residential	472686	288074	1.5



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LEGEND

- Receptors
- HDC Diffusion Tube
- Digitised Road Network
- AQMAs

NOTES

ISSUE PURPOSE
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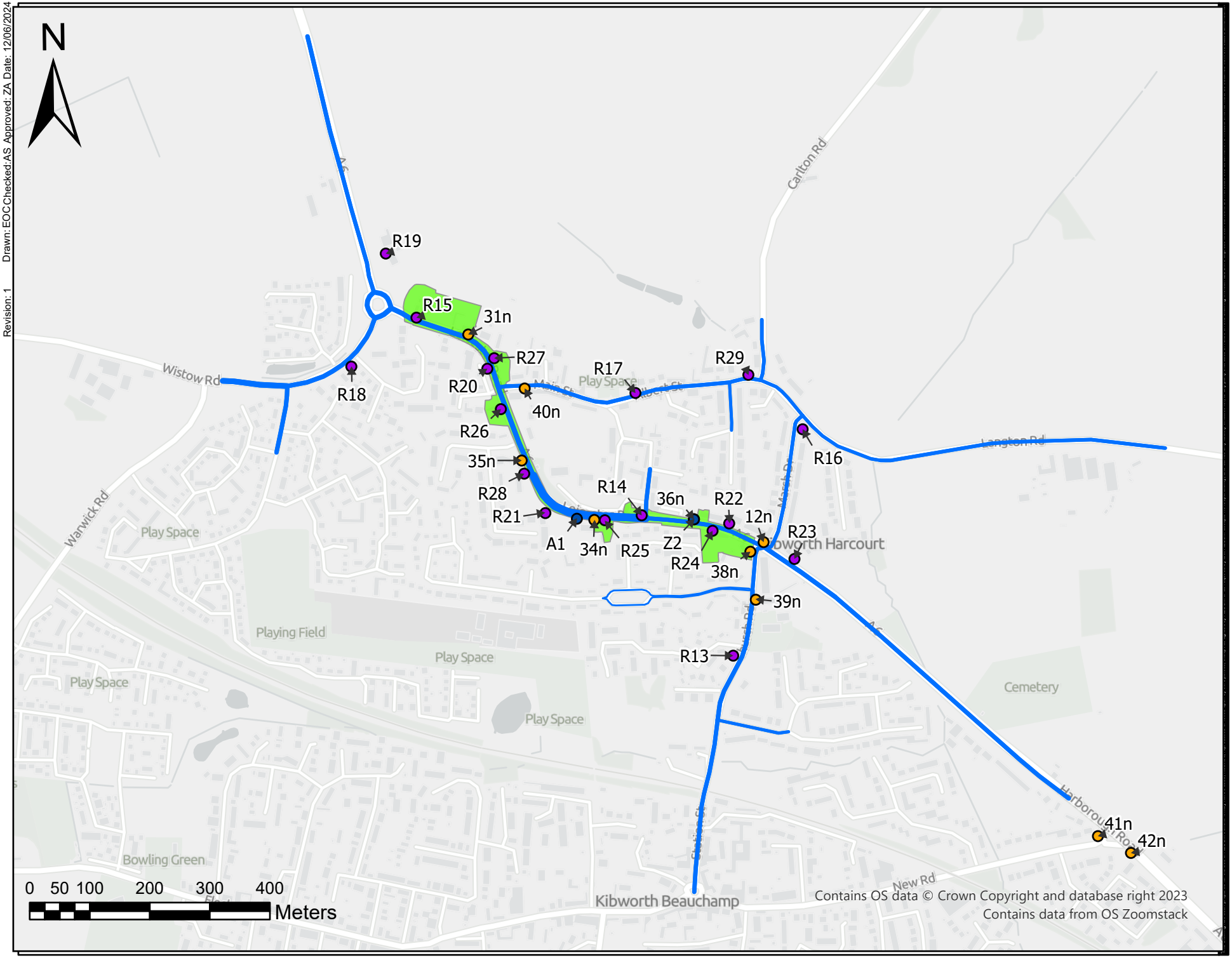
PROJECT NUMBER
60730753

SHEET TITLE
Air Quality Study Area
Lutterworth AQMA

SHEET NUMBER
Figure 4-1



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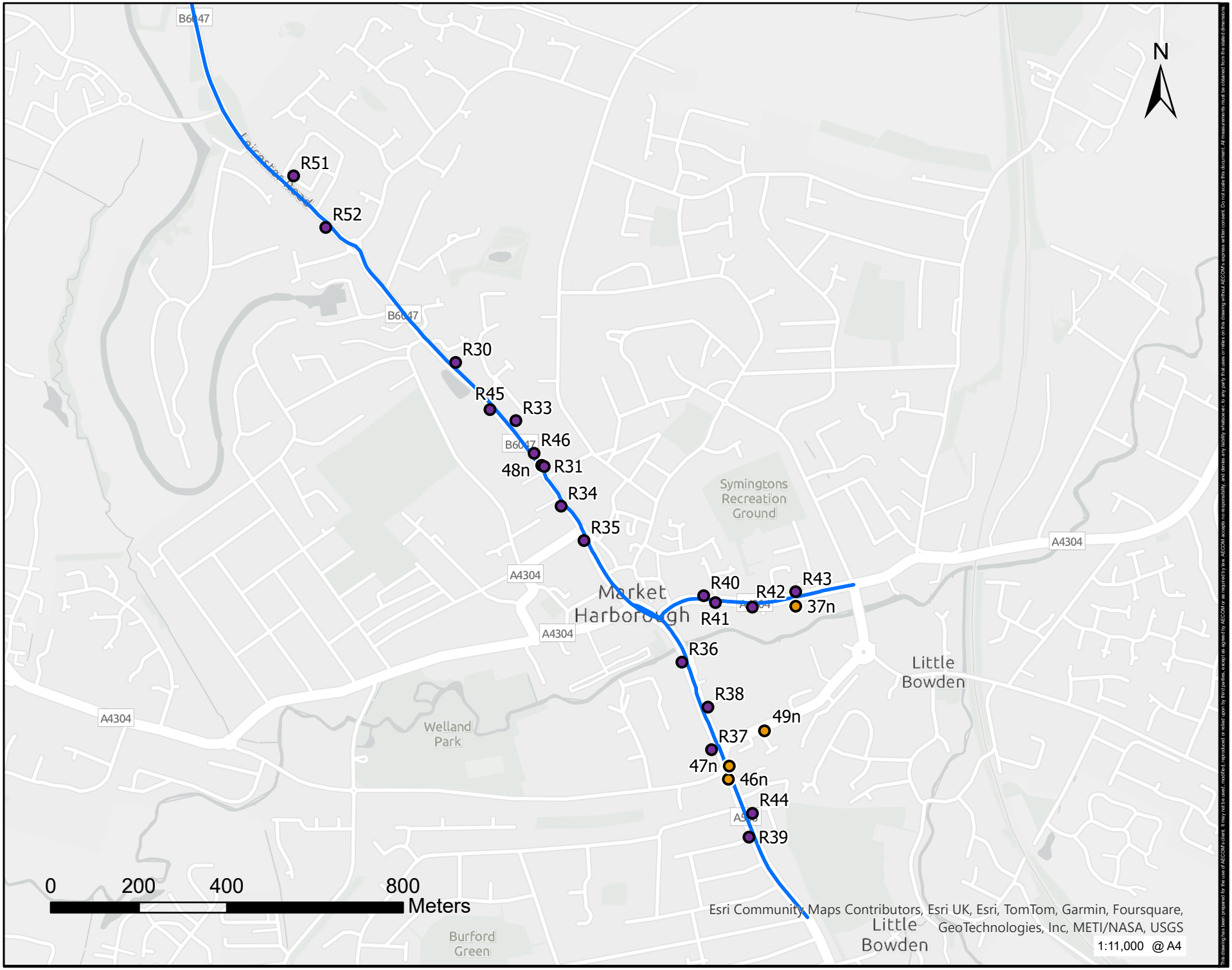
SHEET TITLE
Air Quality Study Area
Kibworth AQMA

SHEET NUMBER
Figure 4.2



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SHEET TITLE
Air Quality Study Area
Market Harborough

SHEET NUMBER
Figure 4-3

Receptors (Ecological)

4.15 The pollutants of interest with regard to sensitive ecosystems for which critical levels and critical loads exist, and which are included in the air quality modelling and assessment of impacts on the selected SPA and SSSI are NO_x, NH_3, and nitrogen and acid deposition. Modelling of these pollutants is undertaken to assess the air quality impacts of planned development in the Local Plan on the SPA/SSSIs including existing plans within surrounding authorities.

4.16 Whilst emissions of NO_x from road vehicles are regulated according to Euro standards, emissions of NH_3 are not. This means that emissions of NH_3 from individual vehicle types are highly uncertain, particularly as measurements are rarely made (as this is not required for regulatory purposes). The uncertainty associated with the predicted nitrogen deposition rates from NH_3 is also greater than for NO_2, with the NH_3 derived nitrogen deposition rates representing an upper estimate.

4.17 There is currently no tool publicly available for the assessment of road traffic emissions of NH_3 from National Highways, Defra, Natural England, or other nature conservation bodies. However, there is evidence that exclusion of NH_3 from assessments leads to an underestimate of deposited nitrogen (Air Quality Consultants, 2020).

4.18 The methodology used to model NH_3 concentrations from road traffic, using ADMS Roads, and the subsequent contribution to nitrogen deposition within the SPAs and SSSIs is considered the most appropriate that is available at this time. The methodology has been applied by AECOM in several Appropriate Assessments to inform HRA including that for Tunbridge Wells Borough Council, Epping Forest, Wealden and Mid Sussex District Councils.

4.19 Pollutant concentrations and deposition rates have been predicted along defined transects within the SPA and SSSIs within 200m of affected roads, in accordance with National Highways guidance for ecological assessments (LA105) (DMRB, 2019) and Natural England guidance (Natural England, 2018). The greatest impacts from changes in road traffic emissions will be observed and modelled closest to the roadside. Consideration of the road network within 200m of the SPA/SSSI is therefore considered robust as background concentrations utilised in the assessment will account for all other sources that are not defined explicitly in the model.

4.20 From review of the traffic data and resultant NO_x emissions, Cave's Inn Pit, Great Bowden Borrowpit and Misterton Marshes have been identified as sensitive SSSIs which may be affected by implementation of the Harborough Local Plan. The remaining SSSIs in the district are unlikely to be affected by the Local Plan as they are not located near any roads with changes above IAQM screening criteria or are not sensitive to nitrogen deposition. The Rutland water SPA in the neighbouring authority is also unlikely to be affected as the roads close to it are not expected to see any large changes in AADT.

4.21 The transects were chosen at key locations where the greatest impacts upon each of the selected SPAs and SSSI assessed are likely to occur. Receptors were situated at the closest point to the road within the SSSI, and spaced every 10m along the transects, up to 200m from the roadside.

4.22 The locations of receptors along transects to each SSSI are shown in Table 4-4 to Table 4-6 as well as Figure 4-4 to Figure 4-6.

4.23 All transect points were modelled at ground level (0m) to represent worst case nitrogen deposition points.

Table 4-4 Transect Points within Cave's Inn SSSI

Receptor ID	Distance from Road (m)	X co-ordinate (m)	Y co-ordinate (m)
CT01	110	453655	279419

Receptor ID	Distance from Road (m)	X co-ordinate (m)	Y co-ordinate (m)
CT01	120	453664	279423
CT01	130	453673	279427
CT01	140	453682	279432
CT01	150	453691	279436
CT01	160	453700	279440
CT01	170	453709	279445
CT01	180	453718	279449
CT01	190	453727	279453
CT01	200	453736	279457

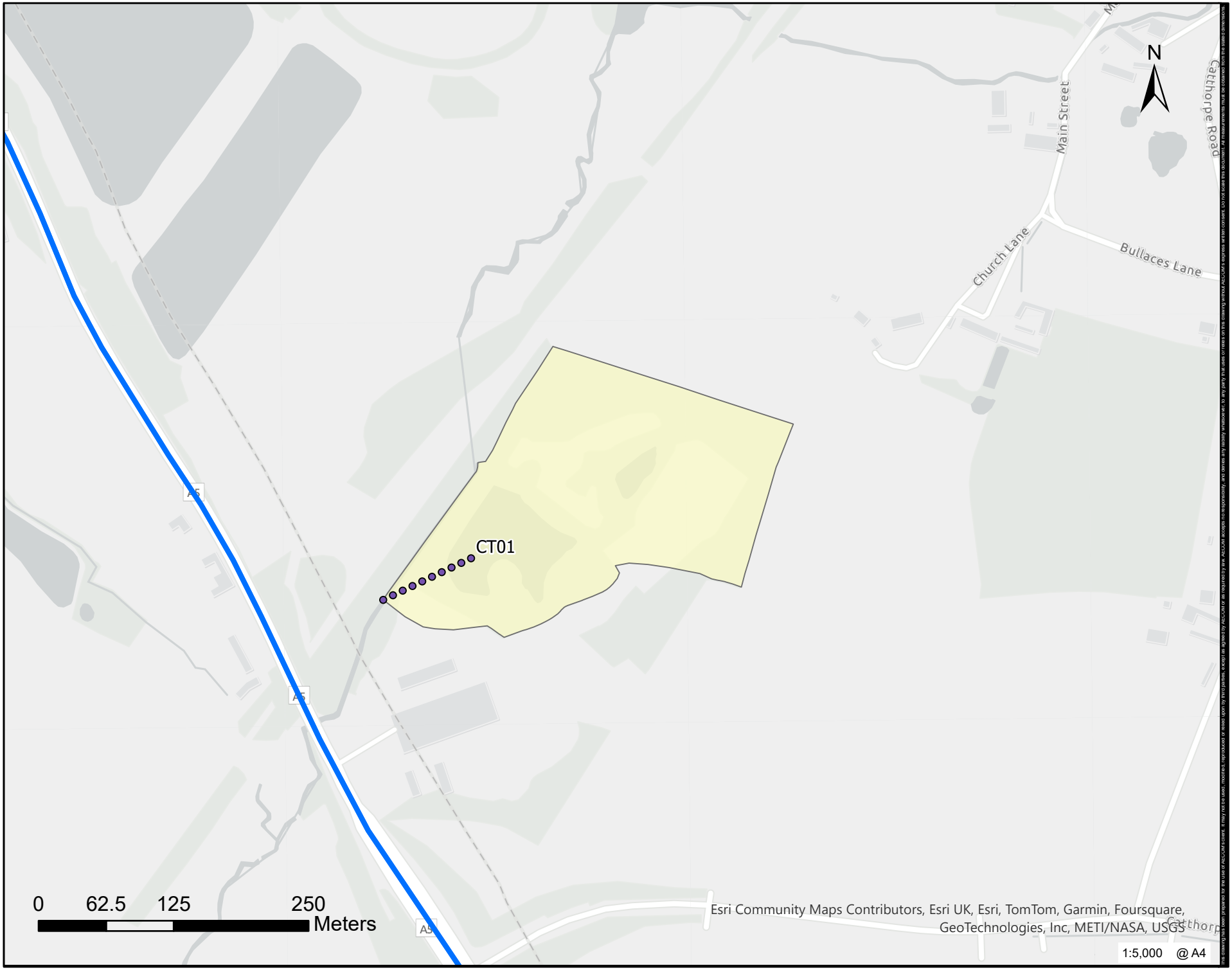
Table 4-5 Transect Points within Misterton Marshes SSSI

Receptor ID	Distance from Road (m)	X co-ordinate (m)	Y co-ordinate (m)
CT02	0	455575	284813
CT02	10	455577	284823
CT02	20	455578	284833
CT02	30	455580	284842
CT02	40	455581	284852
CT02	50	455583	284862
CT02	60	455584	284872
CT02	70	455586	284882
CT02	80	455587	284892
CT02	90	455589	284902
CT02	100	455591	284912
CT02	110	455592	284922
CT02	120	455594	284931
CT02	130	455595	284941
CT02	140	455597	284951

Receptor ID	Distance from Road (m)	X co-ordinate (m)	Y co-ordinate (m)
CT02	150	455598	284961
CT02	160	455600	284971
CT02	170	455601	284981
CT02	180	455603	284991
CT02	190	455604	285001
CT02	200	455606	285010

Table 4-6 Transect Points within Great Bowden Borrowpit SSSI

Receptor ID	Distance from Road (m)	X co-ordinate (m)	Y co-ordinate (m)
CT03	20	474375	289961
CT03	30	474371	289952
CT03	40	474367	289943
CT03	50	474362	289934
CT03	60	474358	289925
CT03	70	474354	289916
CT03	80	474349	289907
CT03	90	474345	289898
CT03	100	474341	289889
CT03	110	474337	289880
CT03	120	474332	289871
CT03	130	474328	289862
CT03	140	474324	289853
CT03	150	474319	289844
CT03	160	474315	289835
CT03	170	474311	289826
CT03	180	474306	289817
CT03	190	474302	289808
CT03	200	474298	289799



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LEGEND
- Eco Transect
- Digitised Road Network
- Cave's Inn Pits SSSI

NOTES

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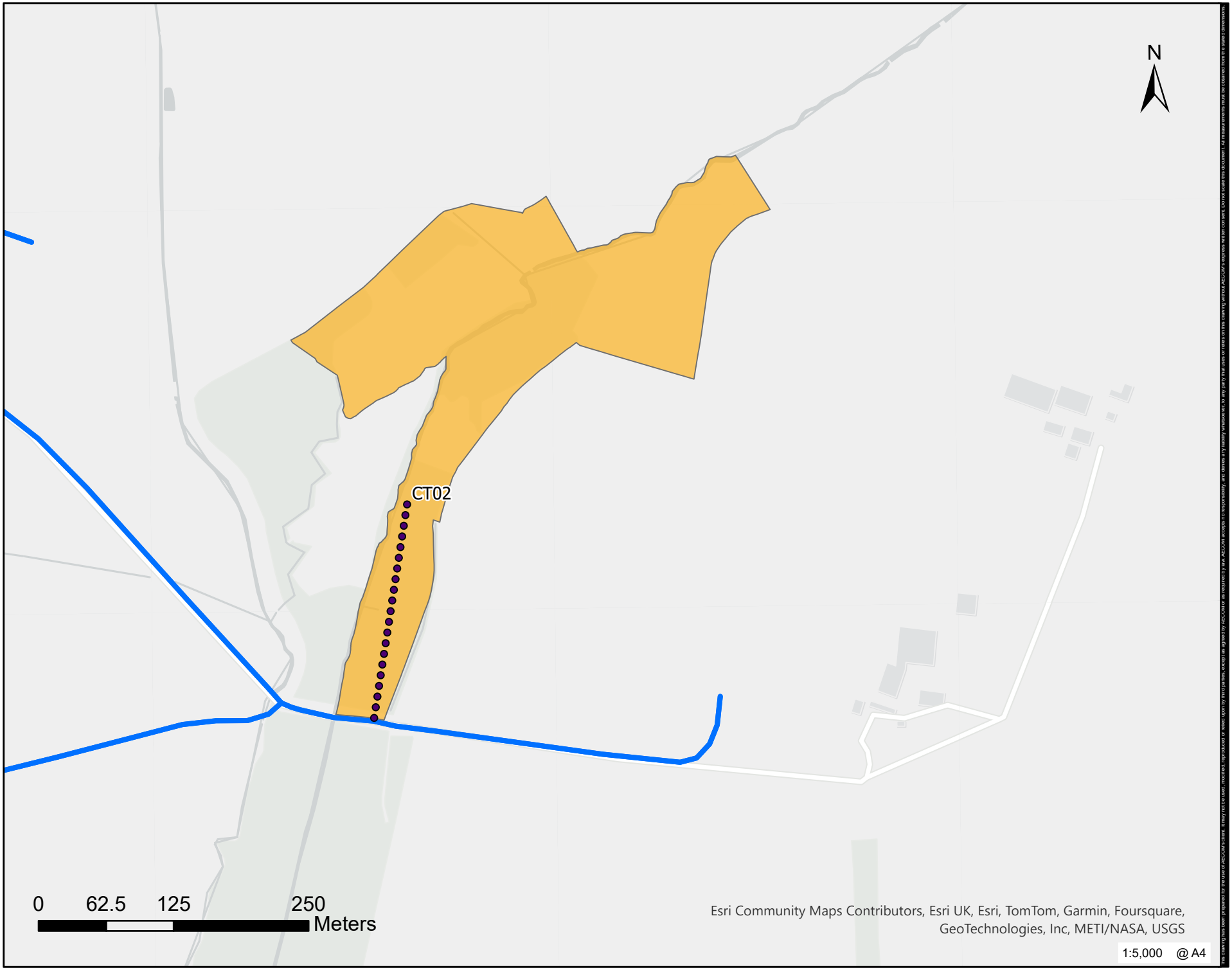
PROJECT NUMBER
60730753

SHEET TITLE
Modelled Road Network and Ecological Receptor Transects

SHEET NUMBER
Figure 4-4



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LEGEND

- Eco Transect
- Digitised Road Network
- Misterton Marshes SSSI

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PROJECT NUMBER
60730753

SHEET TITLE
Modelled Road Network and Ecological Receptor Transects

SHEET NUMBER
Figure 4-5

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LEGEND

- Eco Transect
- Digitised Road Network
- Great Bowden Borrowpit SSSI

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60730753

SHEET TITLE
Modelled Road Network and Ecological Receptor Transects

SHEET NUMBER
Figure 4-6

Model Setup

4.24 Road traffic emissions of nitrogen oxides (NOx) were derived using the latest version of Defra's EFT (v12.0) at the time of assessment and associated guidance and tools[4].

4.25 The EFT provides fleet projections and emission rates for 2018 through to 2050 for England (not London), London, Northern Ireland, Scotland and Wales. Specifically, the EFT can be used to provide the following information:

- Emission rates as g/km/s, g/km, or kg (or tonnes)/year from the total traffic for NO_X, PM_{10}, $PM_{2.5}$ and CO_2.
- Calculation of PM_{10} and $PM_{2.5}$ from tyre and brake wear, and road abrasion emission sources.
- Source apportionment for LDVs and HDVs, or individual vehicle classes. This includes a breakdown of emissions for conventional (i.e. internal combustion engine), hybrid, electric and other alternative technology vehicles for the UK (depending on user information).
- Calculation of annual emissions in kg/yr for each vehicle type and Euro Emission Standard for NO_X, PM_{10} and $PM_{2.5}$, and annual emissions in tonnes/yr for exhaust CO_2.
- Calculation of non-exhaust CO_2 equivalent (CO_2e) emissions associated with the charging of batteries from plug-in electric vehicles. This accounts for charging emissions from battery electric cars, battery electric light goods vehicles (LGVs), plug-in hybrid cars and plug-in hybrid LGVs.
- Calculation of the fraction of primary NO_2 emissions (f-NO_2) for the provided input data.

4.26 The CREAM tool currently uses vehicle fleet information from Defra's EFT v9 which has now been superseded. AECOM has therefore applied the ammonia emission factors, as derived by Air Quality Consultants and in the current version of CREAM, with the vehicle fleet on rural roads from EFT v12.0.1, following the same vehicle fleet methodology as listed above, to estimate NH_3 emissions.

4.27 Detailed dispersion modelling was undertaken using the current version of ADMS-Roads (v5.0) to model concentrations of NOx, particulates and NH_3 using the parameters in Table 4-7. For the 2019 Baseline scenario, 2019 traffic data, 2019 emission factors and 2019 background concentrations were used for consistency. For the 2041 scenarios, 2041 traffic data was used, however due to limitations of the tools, 2030 emission factors and background concentrations were applied as this is the furthest projection year.

4.28 Some roads have been modelled as street canyons due to being surrounded by buildings and flora, this has been applied to the sections of the A6 within the Kibworth AQMA.

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

Table 4-7 General ADMS-Roads Model Conditions

Variables	ADMS-Roads Model Input
Surface roughness at source	0.3m
Surface roughness at Meteorological Site	0.2m
Minimum Monin-Obukhov length for stable conditions	10m
Terrain types, Canyon	Flat, with street canyon for part of Leicester Road, Kibworth
Receptor location	x, y coordinates determined by GIS, z = 1.5m or 4.5m for human receptors.
Emissions	NO_x, PM_{10} and $PM_{2.5}$ – Defra's EFT v12.0 NH_3 – CREAM V1A
Meteorological data	1 year (2019) hourly sequential data from Church Lawford meteorological station.
Receptors	Selected receptors
Model output	Long-term (annual) mean NO_x, PM_{10} and $PM_{2.5}$ concentrations.

Meteorological Data

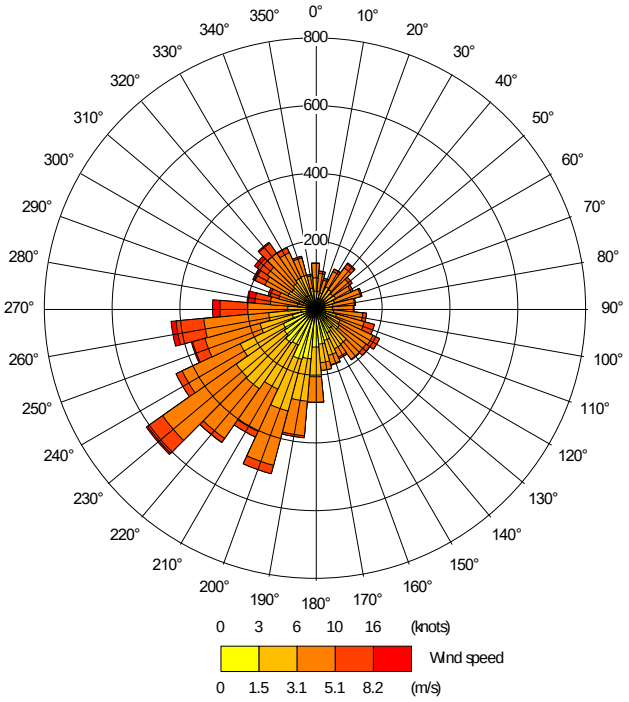
4.29 One year (2019) of hourly sequential observation data from Church Lawford meteorological station was used in this assessment to correspond with the baseline traffic data and monitoring data used for model verification. The station is the nearest to the study areas and is located approximately;

- 9.5km South-West of Cave Inn's Pit SSSI
- 13.3km South-West of the Lutterworth AQMA;
- 14.3km South-West of Misterton Marshes SSSI;
- 30.1km South-West of the Kibworth AQMA;
- 30.4km South-West of Market Harborough; and
- 32.4km South-West of Great Bowden Borrowpit SSSI

4.30 Church Lawford experiences meteorological conditions that are representative of those experienced within the air quality study area.

4.31 Figure 4-7 shows that the dominant direction of wind was from the south-west, as is typical for the UK.

Figure 4-7 Wind Rose, Church Lawford Meteorological Data, 2019



Background Data (Human Health)

4.32 Background concentrations of nitrogen oxides (NO_x), PM_{10} and $PM_{2.5}$ for 2019 and 2030 were sourced from Defra's 2018-based 1x1km background maps (Defra, 2020).

4.33 Contributions from explicitly modelled source sectors were removed from the background concentrations reported in Table 4-8 to Table 4-10, in accordance with Defra guidance (Defra, 2022). This is to avoid the double counting of modelled process contributions as outlined in point 7.538 of LAQM.TG22.

4.34 The 2030 Mapped Background NO_2 concentrations for the entirety of Harborough can be viewed in Figure 4-8, which shows that predicted NO_2 concentrations for 2030 are quite low within the district, being well below the NO_2 air quality objective (40 µg/m³). It is noted that NO_2 concentrations are higher towards Leicester and along the M1.

Table 4-8 Defra Mapped Background Pollutant Concentrations, Lutterworth AQMA

Receptor ID	Grid Square (X, Y)	2019 Annual Mean Concentrations (µg/m³)			2030 Annual Mean Concentrations (µg/m³)		
		NO_x	PM_{10}	$PM_{2.5}$	NO_x	PM_{10}	$PM_{2.5}$
R1-R12	454500_284500	17.5	15.6	9.8	11.8	14.5	8.9
R47-R50	453500_284500	13.8	14.2	9.0	9.4	13.1	8.2

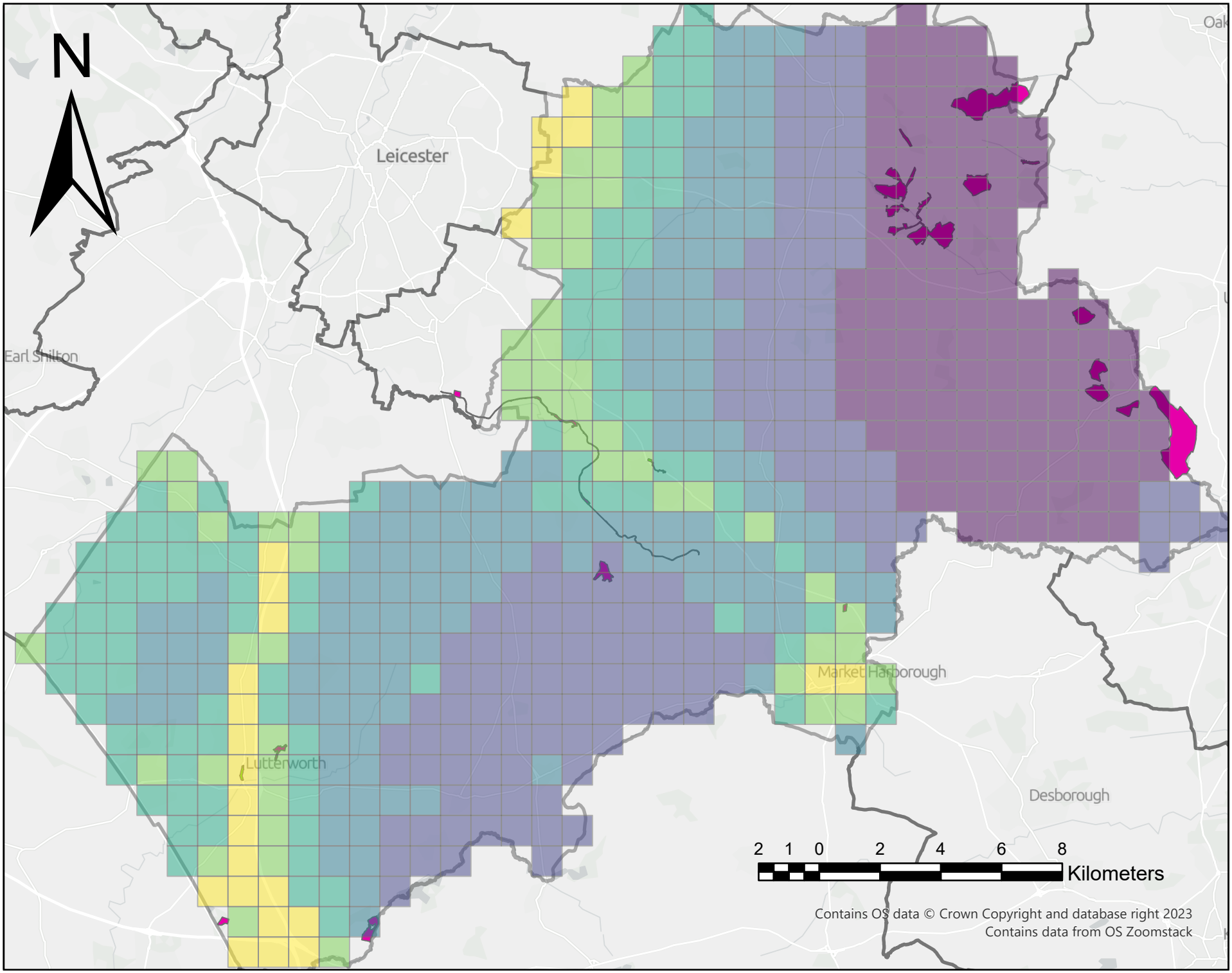
Table 4-9 Defra Mapped Background Pollutant Concentrations, Kibworth AQMA

Receptor ID	Grid Square (X, Y)	2019 Annual Mean Concentrations (µg/m³)			2030 Annual Mean Concentrations (µg/m³)		
		NO_x	PM_{10}	$PM_{2.5}$	NO_x	PM_{10}	$PM_{2.5}$
R15, R18-R20, R26-R27	467500_294500	11.9	14.5	8.9	9.7	13.5	8.0

R13-R14, R16-R17, R21-R25, R28-R29	468500_294500	10.9	13.3	8.5	8.7	12.2	7.7

Table 4-10 Defra Mapped Background Pollutant Concentrations, Market Harborough

Receptor ID	Grid Square (X, Y)	2019 Annual Mean Concentrations (µg/m³)			2030 Annual Mean Concentrations (µg/m³)		
		NO_x	PM_{10}	$PM_{2.5}$	NO_x	PM_{10}	$PM_{2.5}$
R37-R39, R44	473500_286500	12.6	13.4	8.9	9.4	12.3	8.0
R30-R36, R40-R43, R45-R46	473500_287500	14.3	13.5	8.9	10.7	12.4	8.0
R51-R52	472500_288500	11.4	13.7	8.6	8.6	12.7	7.8



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LEGEND

- Harborough SSSIs
- Harborough AQMAs
- District Boundaries

Background NO_2 $\mu g/m^3$

- 4.8 - 5.4
- 5.5 - 5.9
- 6.0 - 6.5
- 6.6 - 7.1
- 7.2 - 8.1
- 8.2 - 10.9

NOTES

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60730753

SHEET TITLE
2030 Background NO_2 Concentrations

SHEET NUMBER
Figure 4-8

Background Data (Ecology)

4.35 Background concentrations of nitrogen dioxide (NO_2) and nitrogen oxides (NO_x) for 2030 were sourced from Defra's background maps for the grid squares relevant to the study area, as shown in Table 4-11. These concentrations are considered to be a worst-case representation of conditions in 2041, given that NO_2 and NO_x levels are expected to continue decreasing beyond 2030. Background concentrations of ammonia were sourced from 5x5 km modelled maps available from APIS.

Table 4-11 Defra Mapped Background Pollutant Concentrations

Transect	Road Name	Grid Square (X, Y)	Annual Mean Concentrations (µg/m³)	
			2030 NO_2	2030 NO_x
CT01	A5 (EB) (20781_76752)	453500, 279500	10.42	8.07
CT02	99215_99219 (EB)	455500, 284500	10.21	7.93
CT03	A6 (WB) (20784_20825)	474500, 289500	9.36	7.28

4.36 Data from APIS for the appropriate habitat, forest, have been applied for each receptor along the transect. This includes critical loads of nitrogen and the average nitrogen and acid deposition rates to the habitat, as presented in Table 4-12.

4.37 In order to create a robust and scientifically agreed projection for background nitrogen deposition trends in the UK, even allowing for growth, the Joint Nature Conservation Committee (JNCC) commissioned the Nitrogen Futures project (JNCC, 2020). The JNCC Nitrogen Futures project investigated whether a net improvement in nitrogen deposition (including expected development over the same period) was expected to occur to 2030 under a range of scenarios ranging from the most cautious scenario (Business As Usual, BAU, reflecting simply existing emission reduction commitments and measures already in place) to much more ambitious scenarios that would require varying amounts of additional, currently uncommitted, measures from the UK government and devolved administrations.

4.38 The report concluded that *'The scenario modelling predicts a substantial decrease in risk of impacts on sensitive vegetation by 2030, under the most likely future baseline [a scenario called '2030 NAPCP+DA (NECR NOx)'].* This is estimated to achieve the UK Government's Clean Air Strategy (CAS) target for England, defined as a 17% decrease in total reactive N deposition onto protected priority sensitive habitats, with a predicted 18.9% decrease [for England] from a 2016 base year'. The report predicted a fall in nitrogen deposition by 2030 under every modelled scenario, including the most cautious (2030 BAU). For the BAU scenario nitrogen deposition was forecast to decrease between 2017 and 2030 from 277.1 kt N to 239.5 kt N (i.e. a reduction of 37.6 kt N).

4.39 Background nitrogen deposition at Ashdown Forest was specifically discussed in Annex 5 of the report as a case study. The report predicted a 1-2 kgN/ha/yr reduction in background nitrogen deposition to low growing vegetation (i.e. the heathland interest feature) at the SAC between 2016 and 2030, depending on scenario, and noted that 'The emission reductions predicted between the 2017 and 2030 baseline scenarios cover a range of sectors, including road transport, and so improvements are predicted to occur over the whole site, including the worst-affected roadside locations'. This was the case under all modelled scenarios.

4.40 In summary, the Nitrogen Futures study forecast a minimum rate of improvement in background nitrogen of 0.07 kgN/ha/yr at Ashdown Forest, with other forecasts indicating a greater rate of reduction. In line with the forecast for Ashdown Forest, and therefore taking a precautionary approach, this study applies a projected decrease in background nitrogen of 0.07 kgN/ha/yr. The corresponding decrease is also reflected in the total average acid deposition rate for nitrogen in the future scenarios (reduction of 0.065 keq/ha/yr N.).

4.41 Over the 22-year period, this equates to a reduction in the APIS background nitrogen deposition rate presented in Table 4-12 (3-year average, 2020-22) of 1.54 kg N/ha/yr for the 2041 model scenarios. This decrease is also reflected in the total average acid deposition rate for nitrogen in the 2041 scenarios (reduction of 0.110 keq/ha/yr N).

4.42 No other changes to the APIS data have been made from those presented (3-year average, 2020-22) for any modelled scenario.

Table 4-12 APIS Data for Ecological Transects for 2020-2022

Transect	Average N Dep kgN/ha/yr[$]	Critical Load N Dep kgN/ha/yr	Total Av. Acid Dep keq/ha/yr N[$]	Critical Load N Acid Dep keq/ha/yr MinCLMaxN	Background NH_3 ($\mu g/m^3$)
CT01	8.32	10 - 20	0.63	5.071	1.56
CT02	8.74	10 - 20	0.66	5.071	1.87
CT03	10.19	5 - 15	0.76	0.513	1.53

Note: [$] Average nitrogen deposition rate (kgN/ha/yr) projected to decrease by 1.54 kgN/ha/yr from base year to future year (i.e. 0.07 x 22 years = 1.54 kgN/ha/yr). This results in a corresponding decrease in acid deposition of 0.110 keq/ha/yr N.

4.43 Deposition of nitrogen from road traffic derived NH_3 and NO_2 were estimated using the Air Quality Technical Advisory Group (AQTAG) deposition velocities that are cited in the 2020 IAQM guidance (IAQM, 2020), as shown in Table 4-13.

4.44 The modelling methodology includes the effect of dry deposition for NOx, NO_2, and NH_3, which accounts for some depletion of these pollutants as they deposit onto surfaces. This provides a more realistic representation of the impacts of the Local Plan relative to the critical levels and loads, although it remains a precautionary assessment.

Table 4-13 Nitrogen Deposition Velocities and Conversion Rates

Pollutant	Habitat	Nitrogen deposition conversion rates	Deposition velocity
NO_2	Grassland	1 $\mu g/m^3$ NO_2 = 0.14 kgN/ha/yr	0.0015 m/s
NO_2	Forest	1 $\mu g/m^3$ NO_2 = 0.29 kgN/ha/yr	0.003 m/s
NH_3	Grassland	1 $\mu g/m^3$ NH_3 = 5.2 kgN/ha/yr	0.020 m/s
NH_3	Forest	1 $\mu g/m^3$ NH_3 = 7.8 kgN/ha/yr	0.030 m/s

Verification

4.45 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. It is necessary to perform a comparison of the modelled results versus monitoring results at relevant locations as model validation studies undertaken by developers are unlikely to have been undertaken in the study area being considered.

4.46 As noted in LAQM.TG(22), “the predicted results from a dispersion model may differ from measured concentrations for a large number of reasons:

- Estimates of background concentrations;
- Meteorological data uncertainties;
- Uncertainties in source activity data such as traffic flows and emissions factors;
- Model input parameters such as roughness length, minimum Monin-Obukhov; and overall model limitations; and
- Uncertainties associated with monitoring data, including locations.”

4.47 Model verification is the process by which these and other uncertainties are investigated and, where possible, minimised.

4.48 Modelled predictions were made for annual mean NO_2 concentrations at local authority monitoring sites for each AQMA 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, traffic data and meteorological data.

4.49 From these sites, only those representative of modelled sensitive receptor locations and with sufficient data capture for 2019 were considered suitable for the purposes of model verification.

4.50 Some diffusion tubes sites were excluded from model verification. Of the sites used, 23n, 24n and 27n in the Lutterworth AQMA were not used. 23n was excluded as the monitoring location was found to be surrounded by vegetation, 24n was excluded as the monitoring location was on a road that wasn't included in the traffic data and 27n due to its monitoring location being on a bus stop. Similarly, 35n in the Kibworth AQMA was not used due its monitoring location also being surrounded by dense vegetation.

Table 4-14 Local Authority Monitoring Sites used in Model Verification Lutterworth AQMA

Site ID	Site Type	Site Name	Grid reference (X, Y)
26n	Roadside	24 Rugby Road Lutterworth	454432, 284229
25n	Roadside	26 Market Street Lutterworth	454497, 284618
01n	Roadside	Lutterworth Service Shop	454475, 284560
27n	Roadside	17 Rugby Road Lutterworth	454476, 284178
23n	Roadside	6 The Terrace Rugby Road	454428, 284274
24n	Roadside	Regent Court	454410, 284326
18n	Roadside	Jazz Hair	454443, 284348

Table 4-15 Local Authority Monitoring Sites used in Model Verification Kibworth AQMA

Site ID	Site Type	Site Name	Grid reference (X, Y)
36n	Roadside	Signpost Just north of 11 Leicester Road Kibworth	468309, 294352
A1	Roadside	Kibworth	468114, 294353
40n	Roadside	106 main street Kibworth	468027, 294570
31n	Roadside	69 Leicester Road Kibworth	467933, 294660
38n	Roadside	Coach and horse Kibworth	468403, 294298
35n	Roadside	Lamppost outside 78 Leicester Road Kibworth	468022, 294450
39n	Roadside	Lamppost 29 Church Road Kibworth	468412, 294218

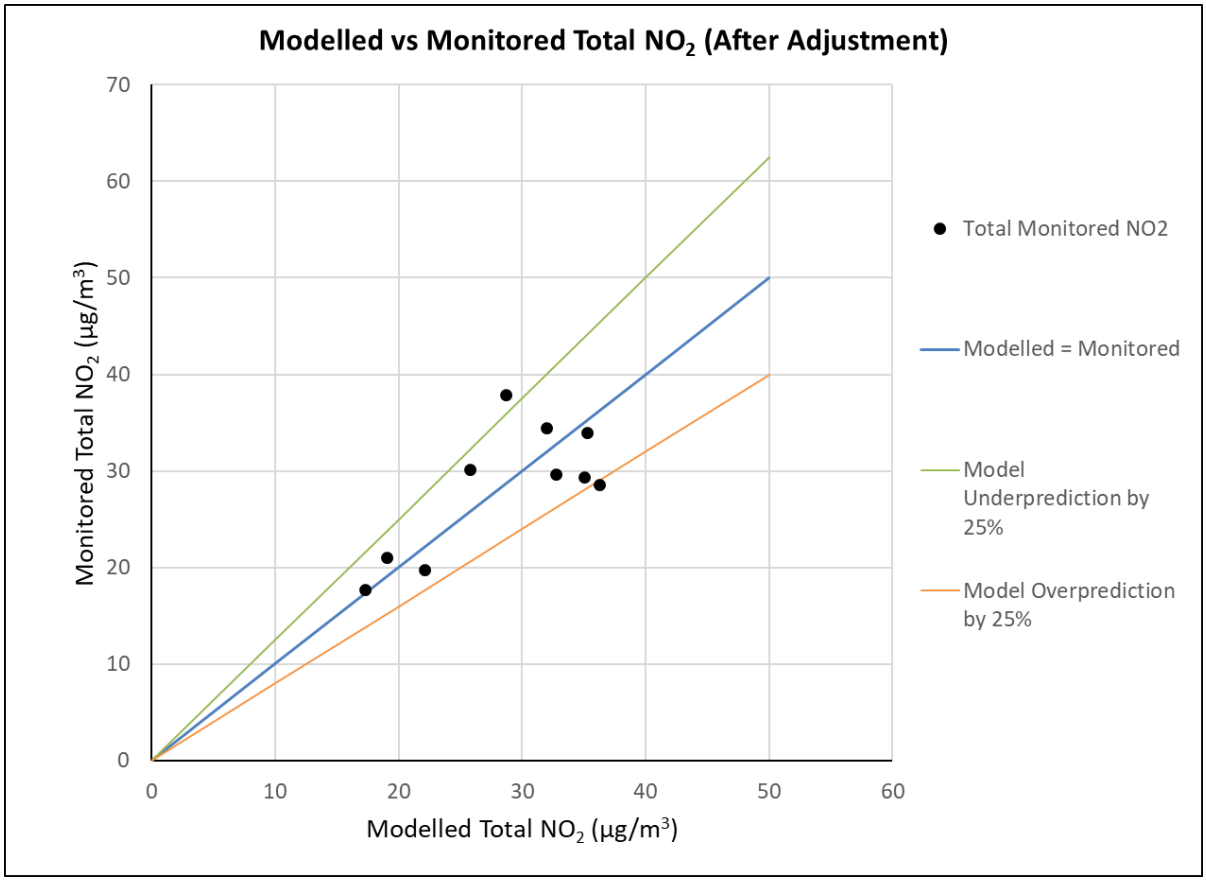
4.51 Following Defra's Technical Guidance LAQM.TG(22), model performance was analysed at these monitoring sites. An adjustment factor of 1.09 was applied in the Lutterworth AQMA (Table 4-16). With adjustment the root mean square error (RMSE) was 5.1 $\mu g/m^3$. Although this is more than 10% of the objective which is not ideal, a value of less than 10.0 $\mu g/m^3$ is acceptable according to the guidance. For Kibworth, a number of reviews were made to verify the model, and it was determined not to adjust the model outputs, as the verification factors were close or less than 1.0. For Market Harborough, an overall adjustment factor was calculated using monitoring sites at both Kibworth and Lutterworth, however as the resultant factor were close to / less than 1.0, the model outputs have not been adjusted.

4.52 The application of adjustment factors to model outputs minimises the inherent uncertainties associated with dispersion modelling as discussed in paragraph 4.46.

Table 4-16 Verification details Lutterworth AQMA

Number of Sites	Number of Monitoring Sites within ±10% of the Monitored Concentration Pre-Adjustment	RMSE pre-adjustment (µg/m^3)	Model Adjustment Factor Applied	Number of Sites within ±10% of the Monitored Concentration Post Adjustment	RMSE post adjustment (µg/m^3)	Fractional Bias post adjustment)
4	1	5.3	1.09	1	5.1	0.0

Figure 4-9 Modelled vs Monitored Total NO_2 (after adjustment)



4.53 There are no appropriately located local air quality monitoring stations within the model domain to allow for a direct comparison between modelled and measured NH_3 concentrations. Therefore, a verification factor of 1.0 for NH_3 has been applied to the modelled concentrations. This factor is based on professional judgement and experience from similar projects, ensuring the accuracy and reliability of the EFT and CREAM tools for the study area.

5. Baseline

5.1 Under the requirements of Part IV of the Environment Act (HM Government, 1995), HDC has carried out a review and assessment of local air quality.

5.2 HDC undertakes automatic monitoring at two locations using a static reference monitor, A1, and a low-cost sensor, Z2, both of which measure NO_2 but only Z2 measures PM_{10} and $PM_{2.5}$. Non-automatic monitoring of NO_2 occurs at 34 diffusion tube sites across the district, with site 36n being co-located with automatic monitoring site Z2. HDC's monitoring locations around the Lutterworth and Kibworth AQMAs and in Market Harborough are shown in tables below, and in Figure 4-1 and Figure 4-2 for the AQMAs. Measured concentrations ranged between 13.2 µg/m^3 and 37.0 µg/m^3 in 2023 with no exceedances of the AQS objective of 40 µg/m^3.

5.3 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 compared to 2020. Conversely, a small decrease was observed at most sites in 2023 compared to 2022.

5.4 It should be noted that there has been a considerable decrease in NO_2 concentrations from the 2019 (baseline year) to 2023 (latest year of monitoring data available). In this period, NO_2 concentrations have declined by 22.6% and 23.9% on average across monitoring sites within the Lutterworth AQMA and Kibworth AQMA respectively.

Table 5-1: HDC Monitoring Data for Lutterworth AQMA.

				Annual Mean NO_2 Concentration (µg/m^3)					
Site ID	Monitoring Type	In AQMA?	Site Type	2018	2019	2020	2021	2022	2023
01n	Diffusion Tube	Y	Roadside	38.1	37.9	29.2	31.7	31.9	30.7
11n	Diffusion Tube	N	Roadside	30.1	**41.8**	21.6	22.9	17.9	17.2
18n	Diffusion Tube	Y	Roadside	36.2	34.0	26.1	28.4	29.8	28.2
22n	Diffusion Tube	N	Roadside	17.6	18.3	14.3	14.6	13.8	13.2
23n	Diffusion Tube	Y	Roadside	27.6	25.3	19.9	23.3	22.8	21.7
24n	Diffusion Tube	Y	Roadside	36.1	32.8	26.7	28.8	27.5	26.7
25n	Diffusion Tube	Y	Roadside	31.4	29.7	23.6	24.3	24.5	23.0
26n	Diffusion Tube	Y	Roadside	31.4	30.2	25.2	26.2	24.4	24.3
27n	Diffusion Tube	Y	Roadside	27.3	24.4	21.0	23.8	22.9	23.0

Note: Values that exceed the annual AQS Objective for NO_2 (40 µg/m^3) are shown in **bold.**

Table 5-2: HDC Monitoring Data for Kibworth AQMA.

				Annual Mean NO_2 Concentration (µg/m^3)					
Site ID	Monitoring Type	In AQMA?	Site Type	2018	2019	2020	2021	2022	2023
A1	Automatic	Y	Roadside	-	**44.0**	30.6	32.2	31.0	29.0

	Site ID	Monitoring Type	In AQMA ?	Site Type	Annual Mean NO_2 Concentration (µg/m^3) 2018	2019	2020	2021	2022	2023
Z2	NO_2	Automatic	Y	Roadside	-	-	34.5	35.0	17.5	-
	PM_{10}	Automatic	Y	Roadside	-	-	16.2	9.2	12.4	-
	$PM_{2.5}$	Automatic	Y	Roadside	-	-	9.2	6.8	11.5	-
	12n	Diffusion Tube	N	Roadside	28.4	29.4	20.7	22.7	22.7	21.2
	31n	Diffusion Tube	Y	Roadside	31.0	28.6	23.6	25.2	23.1	23.9
	34n	Diffusion Tube	Y	Roadside	**49.3**	**52.0**	37.6	38.0	39.6	37.0
	35n	Diffusion Tube	Y	Roadside	32.0	38.5	26.2	30.7	29.6	28.3
	36n	Diffusion Tube	Y	Roadside	34.4	34.5	24.8	26.8	27.9	27.7
	38n	Diffusion Tube	Y	Roadside	19.4	19.8	15.0	15.3	16.7	14.3
	39n	Diffusion Tube	N	Roadside	18.1	17.7	13.9	14.9	14.3	13.9
	40n	Diffusion Tube	N	Roadside	21.0	21.1	16.1	16.3	15.8	16.4

Note: Values that exceed the annual AQS Objective for NO_2 (40 µg/m^3) are shown in **bold.**

Table 5-3: HDC Monitoring Data for Market Harborough.

Site ID	Monitoring Type	In AQMA?	Site Type	Annual Mean NO_2 Concentration (µg/m^3) 2018	2019	2020	2021	2022	2023
37n	Diffusion Tube	N	Roadside	25.9	27.7	20.3	20.7	20.9	19.1
46n	Diffusion Tube	N	Roadside	0	31.4	22.0	24.1	26.5	25.1
47n	Diffusion Tube	N	Roadside	0	27.0	21.9	25.9	24.6	23.0
48n	Diffusion Tube	N	Roadside	0	26.1	18.5	22.4	21.3	20.9
49n	Diffusion Tube	N	Roadside	0	26.0	17.9	22.8	20.9	18.8

5.5 In the neighbouring Rutland County, the Council monitor NO_2 at 13 diffusion tube sites. Concentrations at all sites are well within the objective and the Council has not declared an AQMAs. Levels close to Rutland Water SPA/Ramsar site are very low, for example, measured concentrations at the nearest site (DT9), which is a rural location were 8.9 µg/m^3 in 2019, dropping to 4.7 µg/m^3 in 2022 ((Rutland County Council, 2023).

6. Results

Traffic Flows

6.1 The 2041 traffic data were processed to provide two-way traffic flows for each road link within Harborough for all vehicles. The changes due to the Local Plan are shown in Figure 6-1 to Figure 6-2, and for HDVs shown in Figure 6-3 to Figure 6-4.

6.2 Figure 6-1 to Figure 6-2 shows that the largest increase in traffic flow occur at the following locations:

- South of Lutterworth: large increases of 2,000-3,000 AADT were observed along the A4304 with a large change of 7500 observed along Beaufort Boulevard, this is believed to be a result of Policy L2 in the Harborough 2011-2031 plan which includes development of the area for approximately 10,000 m^2 of industrial and office space.
- North of Market Harborough: increases of 1,600-2,300 AADT were observed along the B6407 and Gallow Field Road which is likely due to planned developments at the Airfield Business Park (Policy MH5) which will result in an increase of approximately 23,000 m^2 of employment floorspace.
- Great Glen: Increases of 1,500-2,000 AADT were observed along the access roads leading into Great Glen. There are no specific developments mentioned within the Harborough 2011-2031 plan for this area, however it has been identified as a focus area for Rural / Local developments and will be a significant growth area within the emerging 2041 Local Plan, as such it is expected that traffic flows will increase as new developments are introduced to the area.

6.3 There were also road links with change in traffic flows above the IAQM screening criteria towards the north of Harborough leading into Blaby District, Oadby and Wigston District and the City of Leicester. However these roads, and roads around Great Glen, are in areas with low projected background concentrations, as seen in Figure 4-8, and are expected to have low emission rates in 2041 with the Local Plan in place as shown in Figure 6-9 and Figure 6-10. As such, it is unlikely that implementation of the Local Plan will result in any significant effects on local receptors in these areas. These areas have therefore not been assessed further.

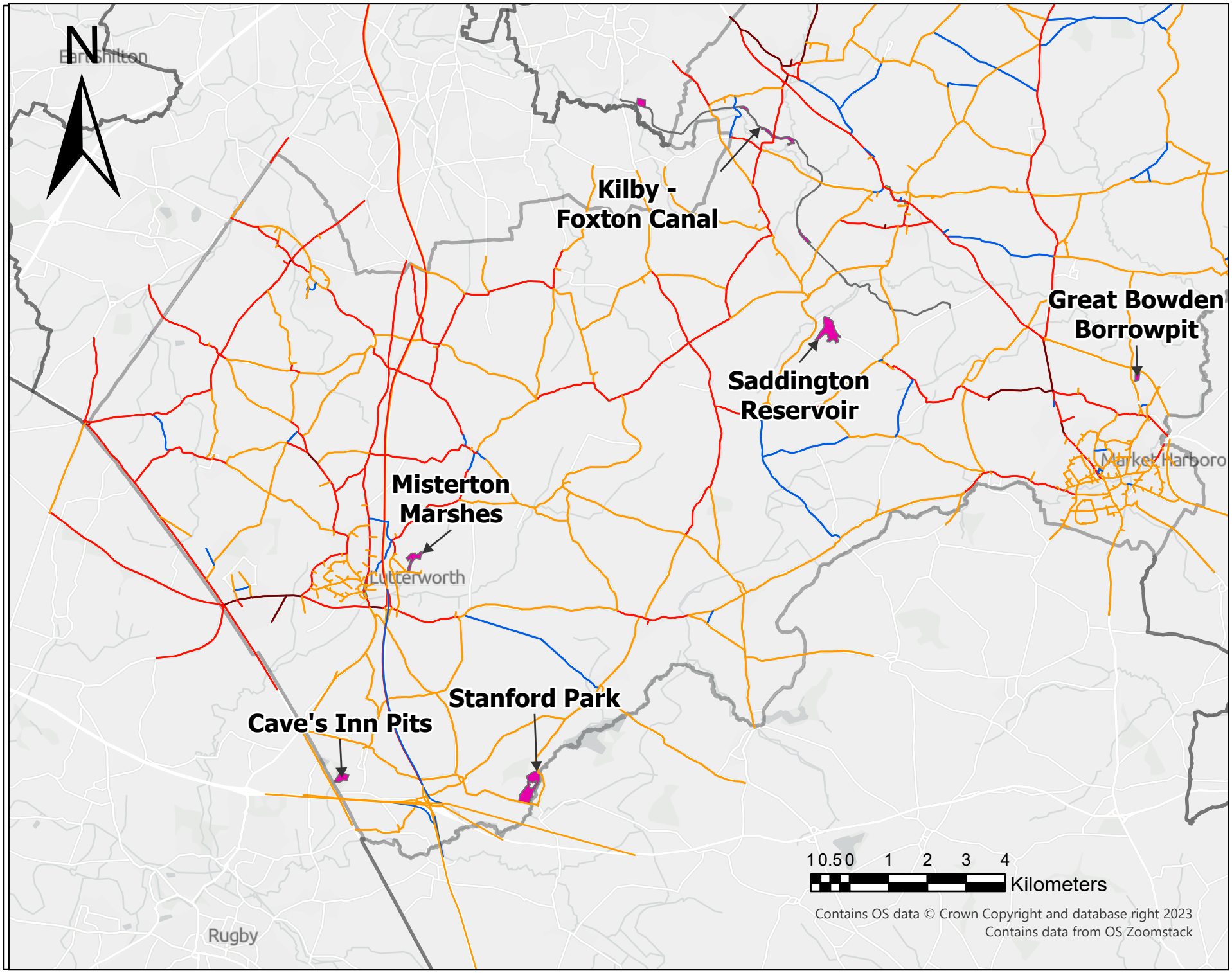
6.4 The A Roads and B Roads leading into or going through Lutterworth, Kibworth and Market Harborough also have roads with flows that exceed the IAQM screening criteria.

6.5 Large changes in traffic flows were also observed going through the Foxton Canal SSSI, however as this is a lowland freshwater system it has no critical loads for nitrogen and is not considered a sensitive receptor in terms of air quality.

6.6 Figure 6-3 to Figure 6-4 shows large changes in HDV Flows towards the west of Harborough which includes parts of the A5 which bypass the Cave's Inn SSSI.

6.7 Traffic data for three links (A6003 north of Stamford Road, A606 and A6003 south of Stamford Road) were also provided for the neighbouring authority, Rutland, to assess the impacts of the local plan on the Rutland Water SPA. Screening of this traffic data showed that the changes introduced by the Local Plan would not exceed IAQM criteria, the largest changes in traffic amongst these roads did not exceed 60 AADT, less than 20 of which were HDVs. As such, any impacts due to plan are unlikely to have any significant effect on this habitat.

6.8 The Table in Appendix A summarises the approximate flow rates through main roads within each region.



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- Harborough SSSIs
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- District Boundaries

Changes in 2041 Traffic Flows (AADT)

- -243 - 0
- 1 - 500
- 501 - 1500
- 1501 - 7421

NOTES

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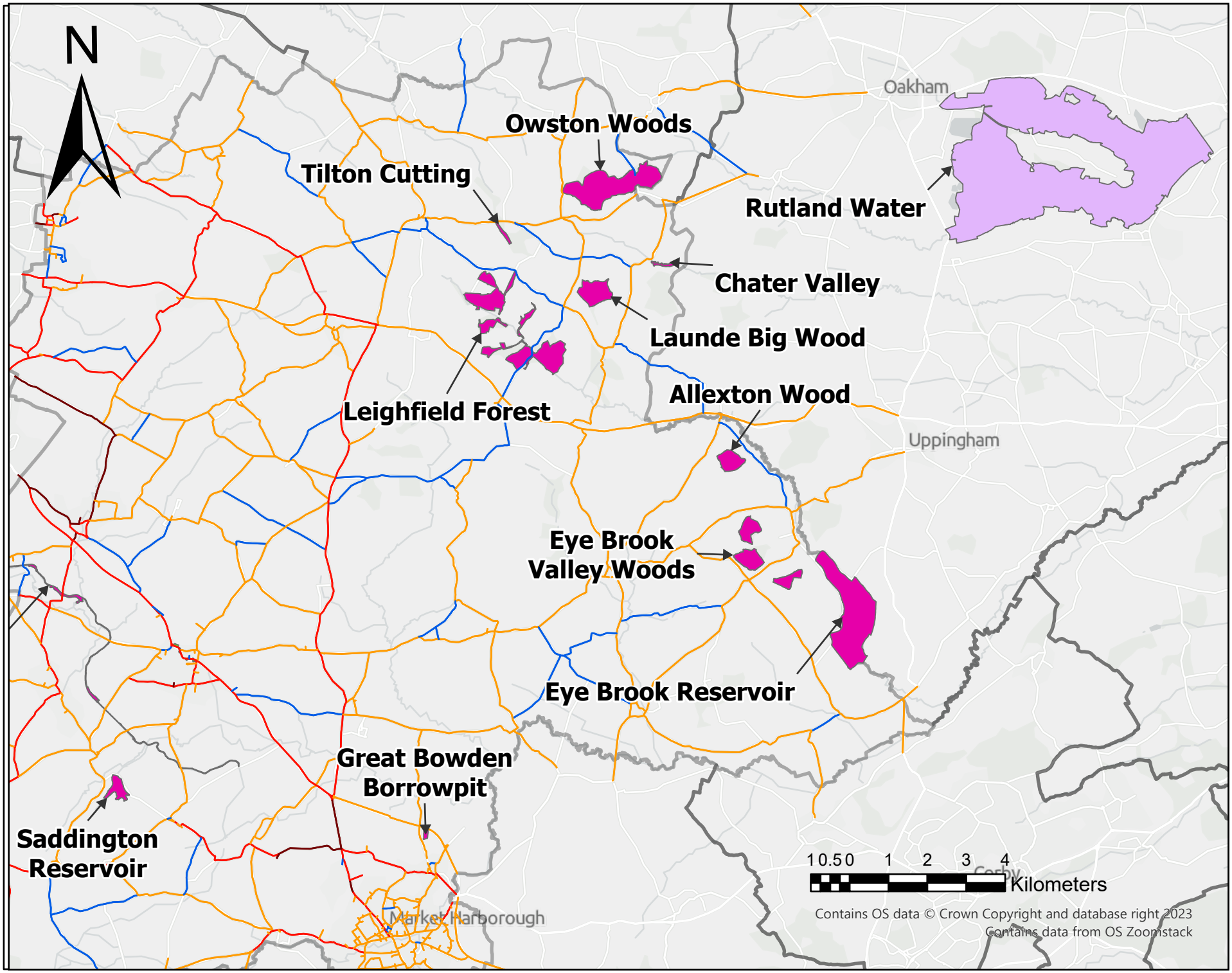
FINAL

PROJECT NUMBER
60730753

SHEET TITLE
Changes in Traffic Flows with Local Plan 2041

SHEET NUMBER
Figure 6-1



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Changes in 2041 Traffic Flows (AADT)

- -243 - 0
- 1 - 500
- 501 - 1500
- 1501 - 7421

NOTES

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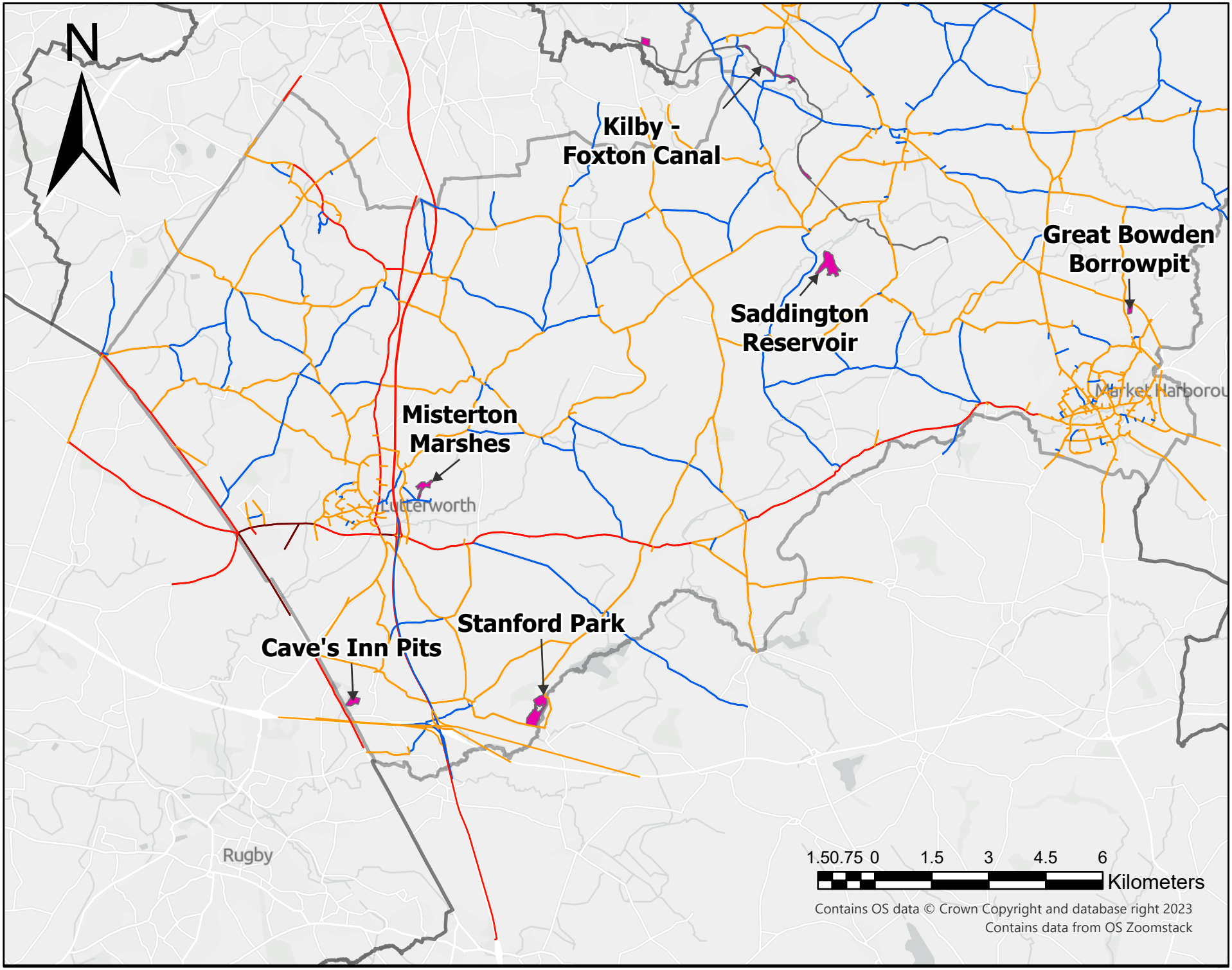
PROJECT NUMBER
60730753

SHEET TITLE
Changes in Traffic Flows with Local Plan 2041

SHEET NUMBER
Figure 6-2



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Changes in 2041 HDV Flows (AADT)

- -108 - 0
- 1 - 100
- 101 - 500
- 501 - 1726

NOTES

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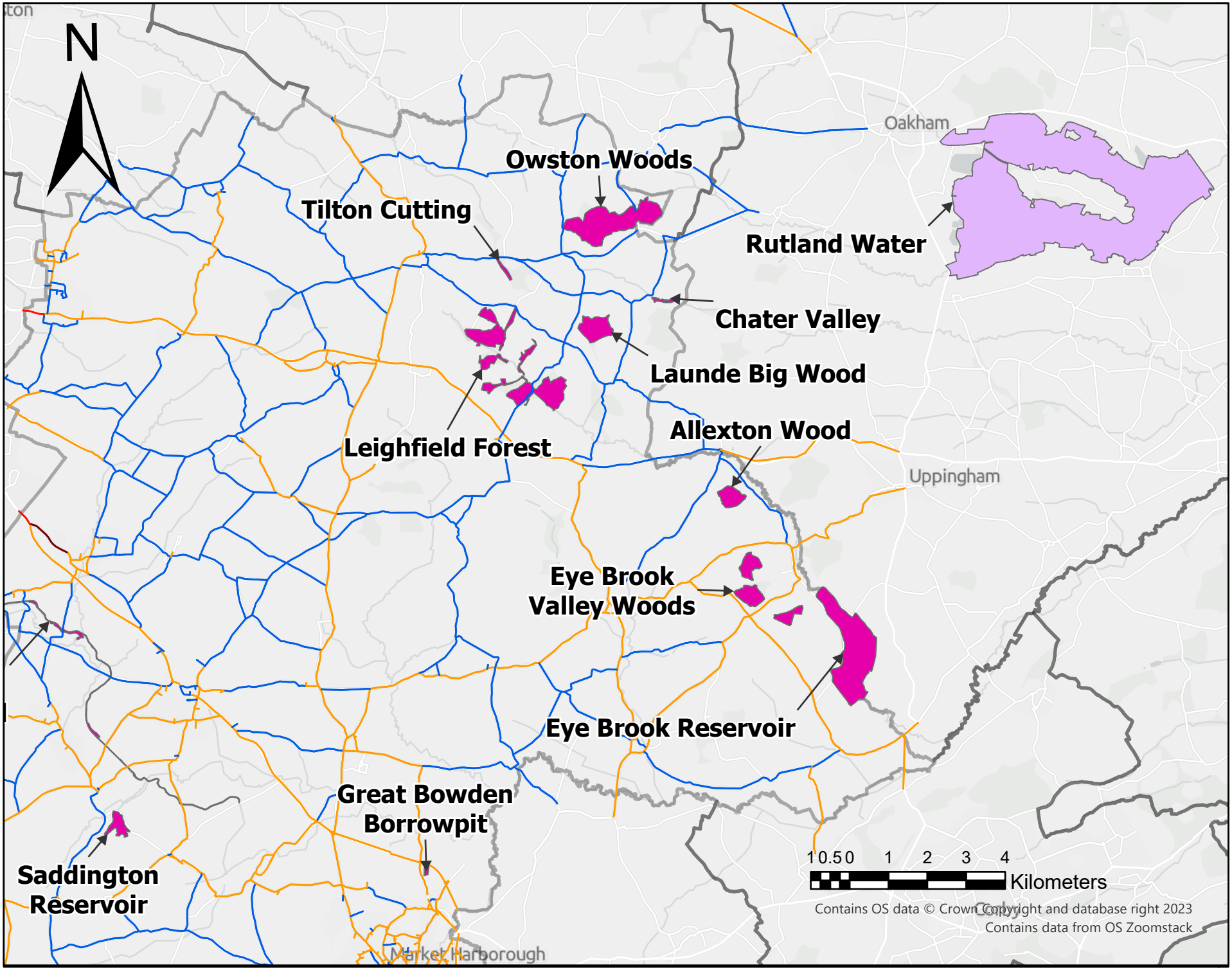
FINAL

PROJECT NUMBER
60730753

SHEET TITLE
Changes in HDV Flows with Local Plan 2041

SHEET NUMBER
Figure 6-3



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Changes in 2041 HDV Flows (AADT)

- -108 - 0
- 1 - 100
- 101 - 500
- 501 - 1726

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SHEET TITLE
Changes in HDV Flows with Local Plan 2041

SHEET NUMBER
Figure 6-4

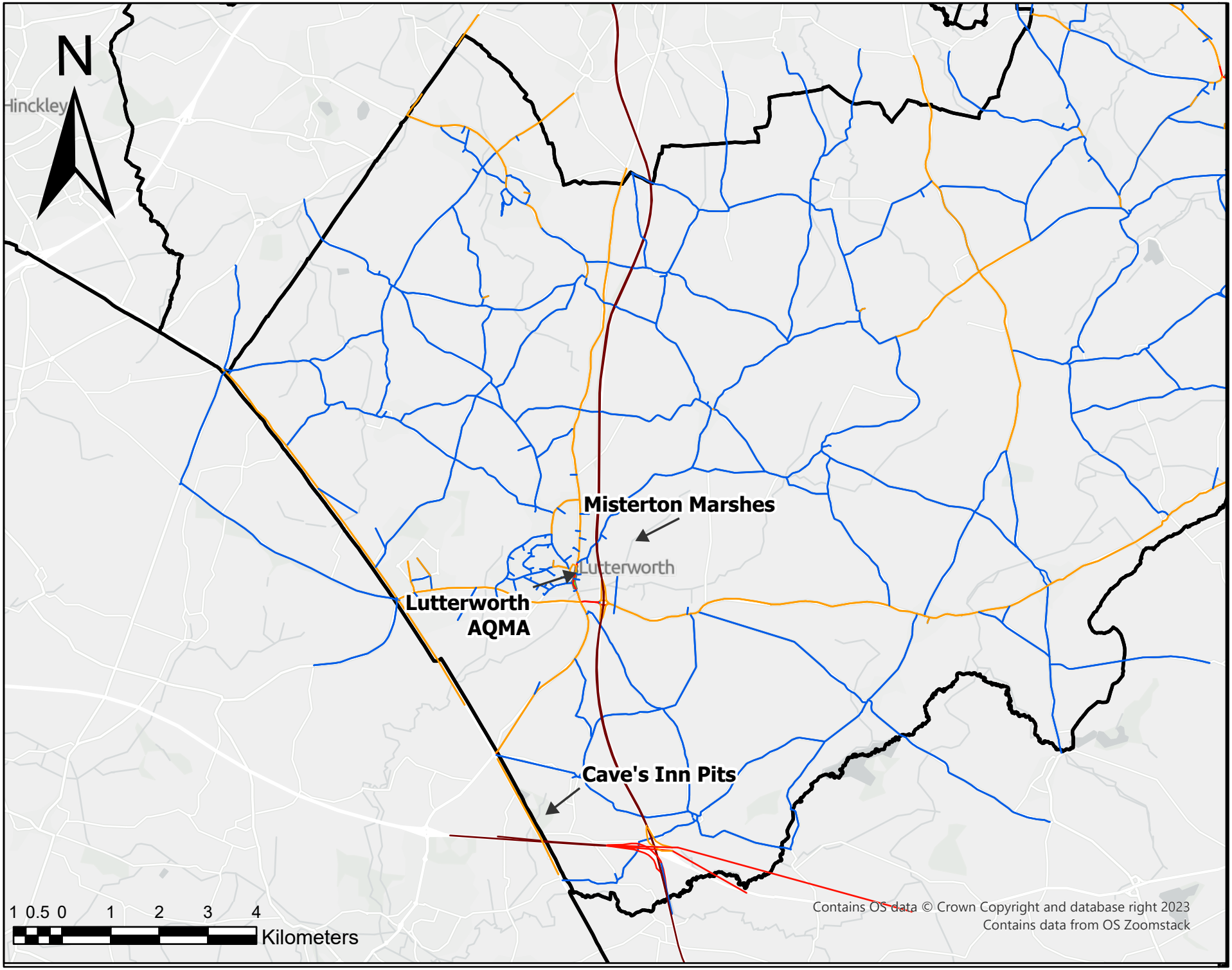
NO_x Emissions

2019 Emission Levels

6.9 Using the 2019 Baseline traffic data and EFT v12, a review of the NO_x emissions from roads within the wider Harborough District has been undertaken, the results of which can be shown in Figure 6-5 and Figure 6-6.

6.10 A comparison has been made for the NO_X emission rates across all of the modelled road links where traffic data is available in Harborough to illustrate where the main sources of NO_X emissions lie in the district.

6.11 Figure 6-5 and Figure 6-6 show that the main road sources of NO_x emissions within the borough are from the M1, M6 and A6. As such in addition to the AQMAs, SSSIs within the vicinity of these roads, such as Cave's Inn Pits, Misterton Marshes and Great Bowden Borrow Pit, have also be considered as sensitive receptors. Furthermore, it should be noted that there are high traffic flows and NO_X emissions in Market Harborough which is in close proximity to the A6.



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AQMAs
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SSSIs
- Harborough SSSIs

- District Boundaries

NO_x Emissions (g/km/s)
- 0.000 - 0.013
- 0.014 - 0.050
- 0.051 - 0.120
- 0.121 - 0.255

NOTES

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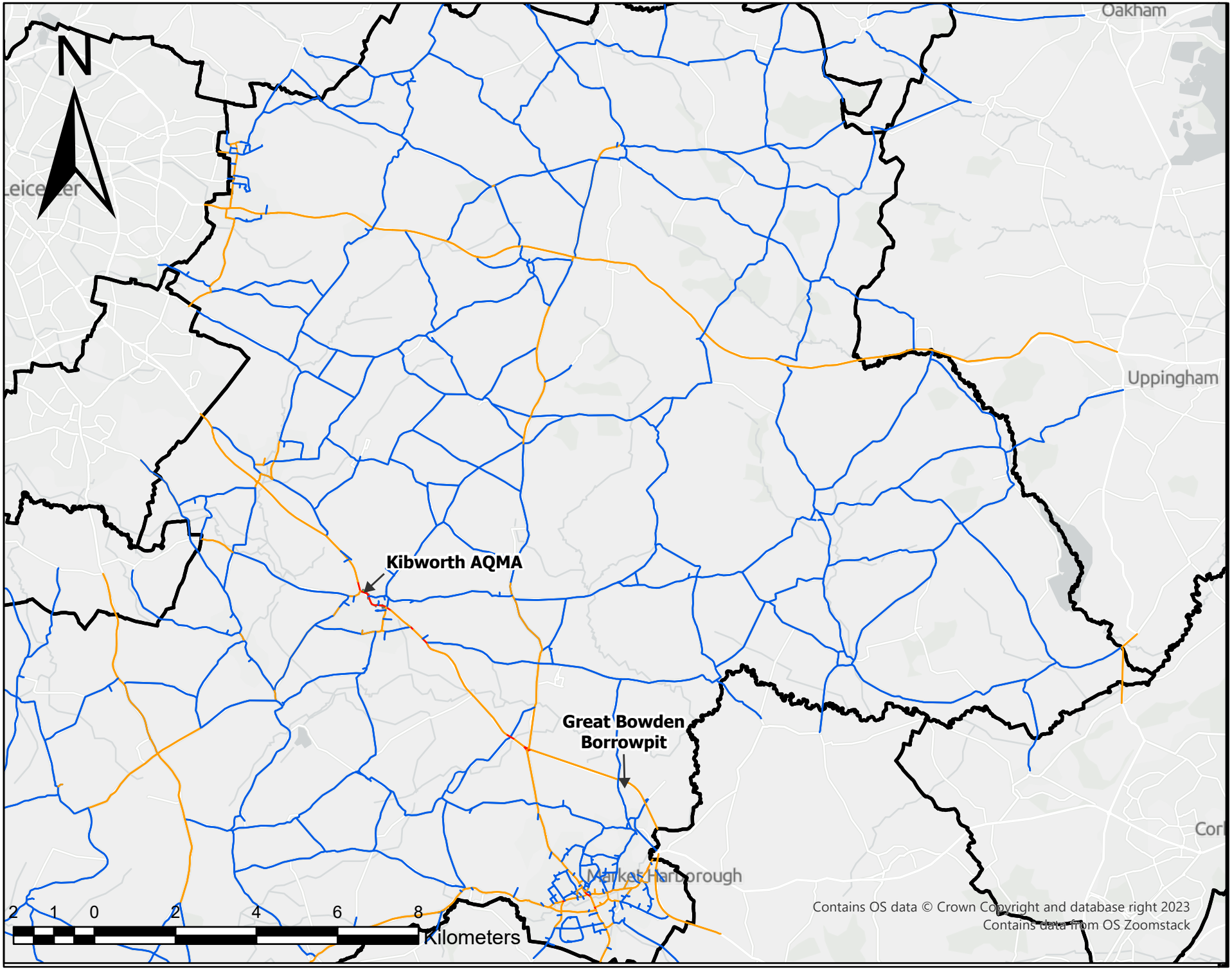
SHEET TITLE
Review of NO_x Road Emission Sources West Harborough

SHEET NUMBER
Figure 6-5



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SSSIs
- Harborough SSSIs

- District Boundaries

NO_x Emissions (g/km/s)
- 0.000 - 0.013
- 0.014 - 0.050
- 0.051 - 0.120
- 0.121 - 0.255

NOTES

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60730753

SHEET TITLE
Review of NO_x Road Emission Sources East Harborough

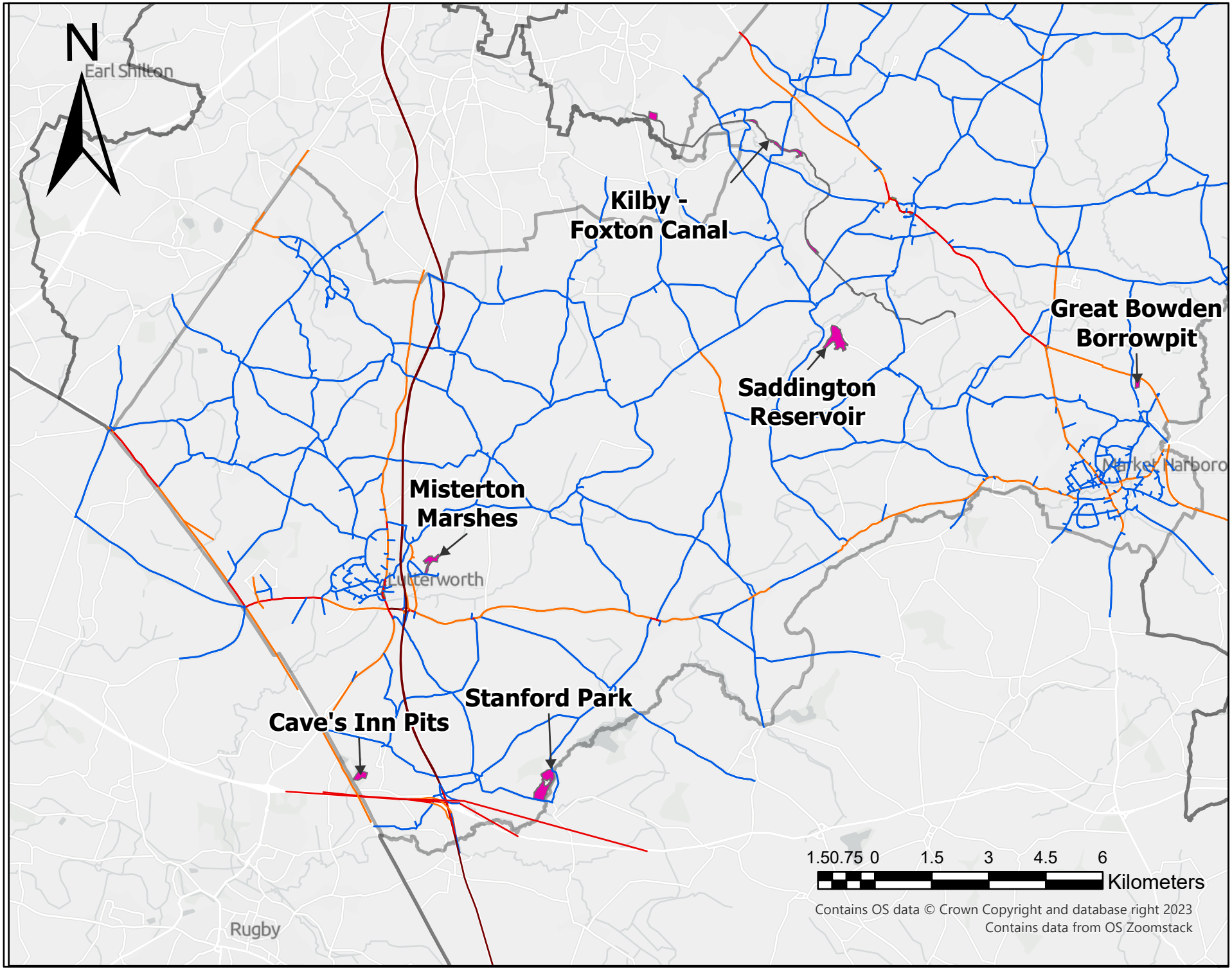
SHEET NUMBER
Figure 6-6

2041 Emission Levels

6.12 The 2041 traffic data both with and without the local plan in place were processed through EFT v12 to review of the NO_x emissions from roads within the wider Harborough District, the results of which can be shown in Figure 6-7 to Figure 6-10 .

6.13 A comparison has been made for the NO_X emission rates across all of the modelled road links where traffic data is available in Harborough to illustrate where the main sources of NO_X emissions lie in the district and how NO_x emissions change with implementation of the local plan.

6.14 In both 2041 scenarios, with and without the Local Plan, the main sources of NOx emissions are concentrated along the major roadways in Harborough District, such as the A6 and other primary routes leading into key areas like Lutterworth, Kibworth, and Market Harborough. The NOx emissions are higher along these major roads, particularly where traffic flows are more substantial. However, the introduction of the Local Plan has a small impact on the distribution and scale of NOx emissions. While there are some slight increases in emissions along certain road links with implementation of the local plan, particularly near the AQMAs, these changes are relatively small or in areas with low predicted background concentrations, as shown in Figure 4-8. The largest road emissions in 2041 are observed in the vicinity of the AQMAs and areas of higher traffic density, however these emissions are relatively small compared to emissions observed in 2019. As such, 2041 road emissions are likely to have a lesser impact on local receptors.



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2041 NO_x Emissions Without Local Plan (g/km/s)

- 0.00000 - 0.00625
- 0.00626 - 0.01250
- 0.01251 - 0.02500
- 0.02501 - 0.05977

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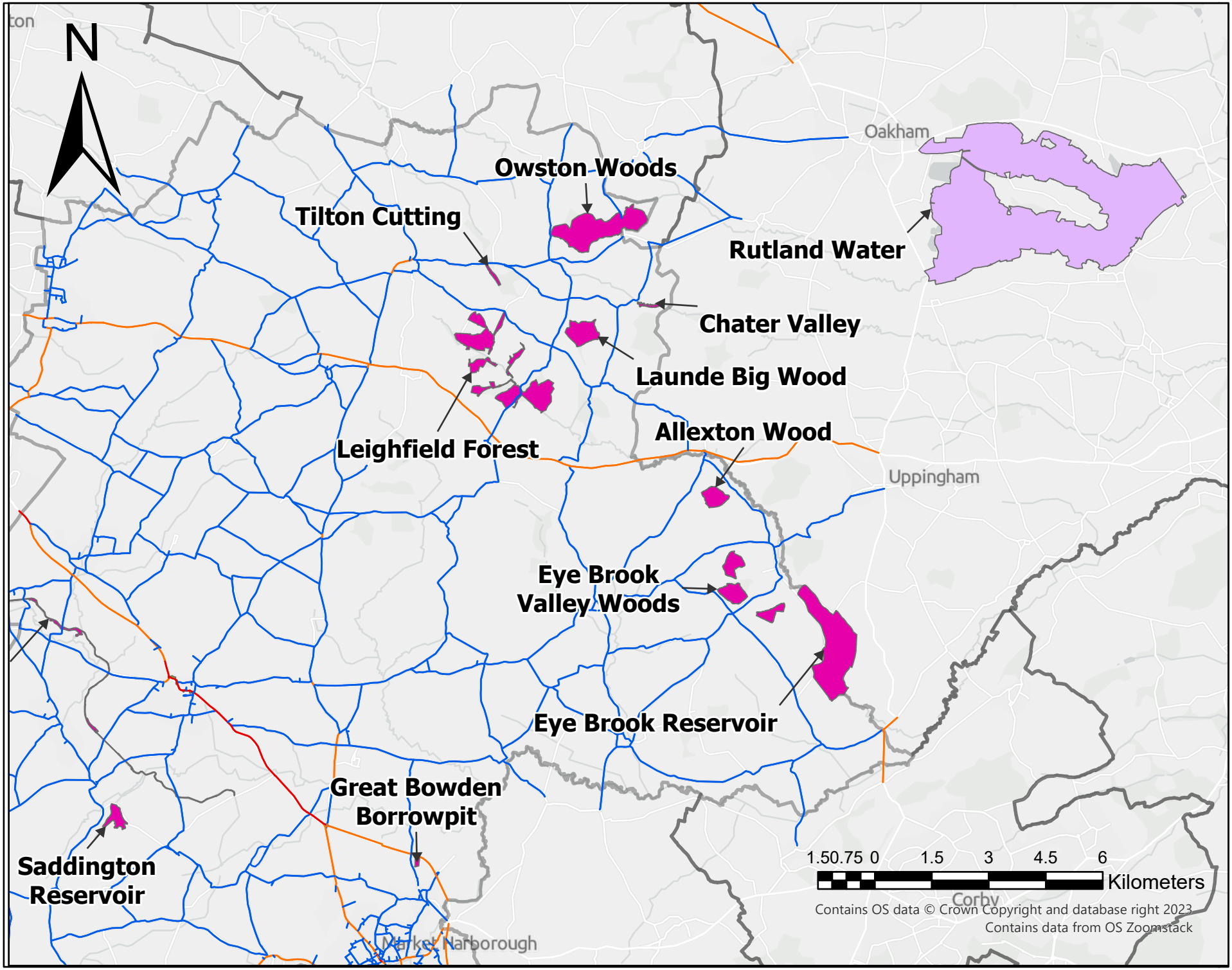
SHEET TITLE
2041 NO_x Emissions Without Local Plan

SHEET NUMBER
Figure 6-7



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2041 NO_x Emissions Without Local Plan (g/km/s)

- 0.00000 - 0.00625
- 0.00626 - 0.01250
- 0.01251 - 0.02500
- 0.02501 - 0.05977

NOTES

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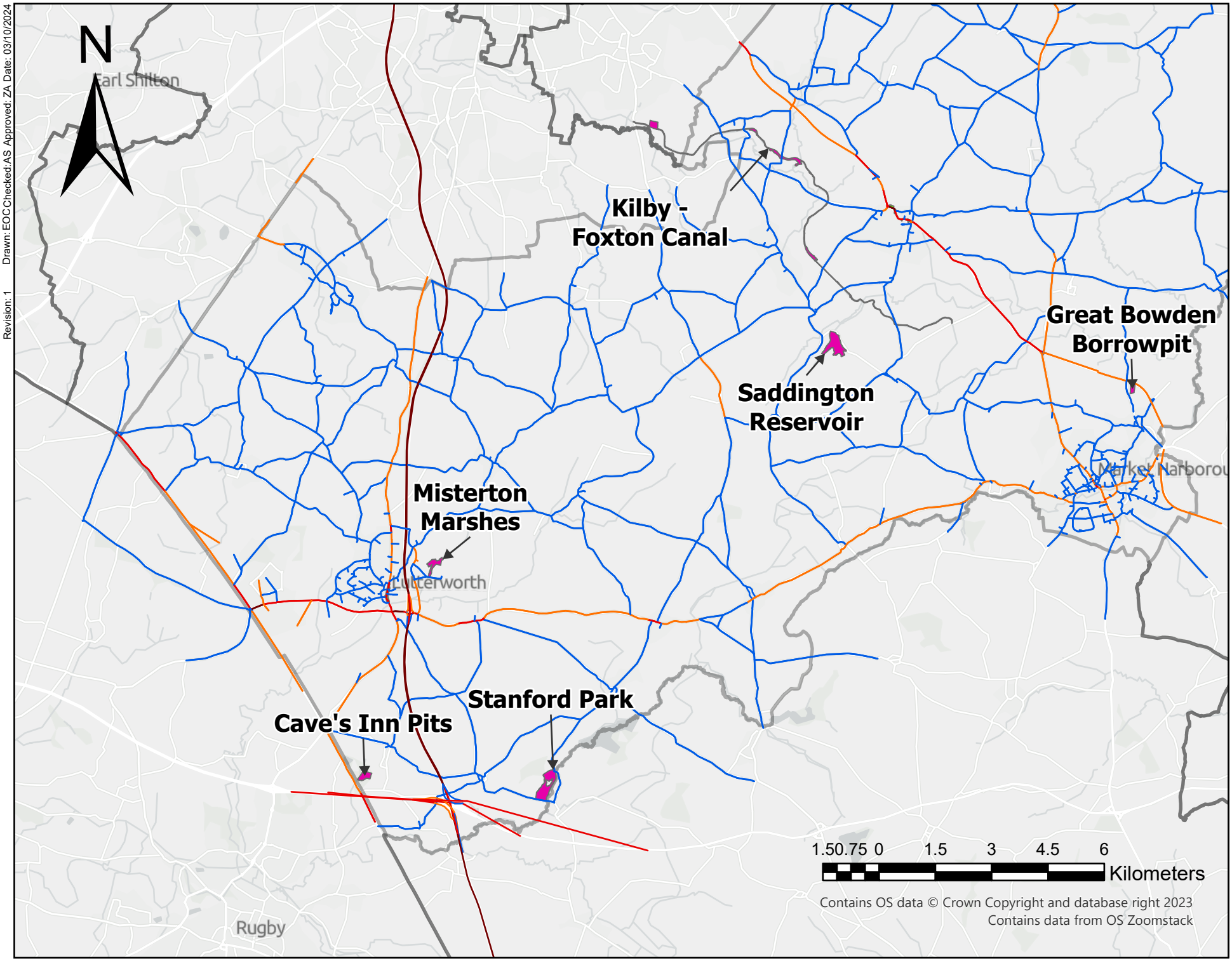
SHEET TITLE
2041 NO_x Emissions Without Local Plan

SHEET NUMBER
Figure 6-8



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2041 NO_x Emissions With Local Plan (g/km/s)

- 0.00000 - 0.00625
- 0.00626 - 0.01250
- 0.01251 - 0.02500
- 0.02501 - 0.07044

NOTES

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PROJECT NUMBER
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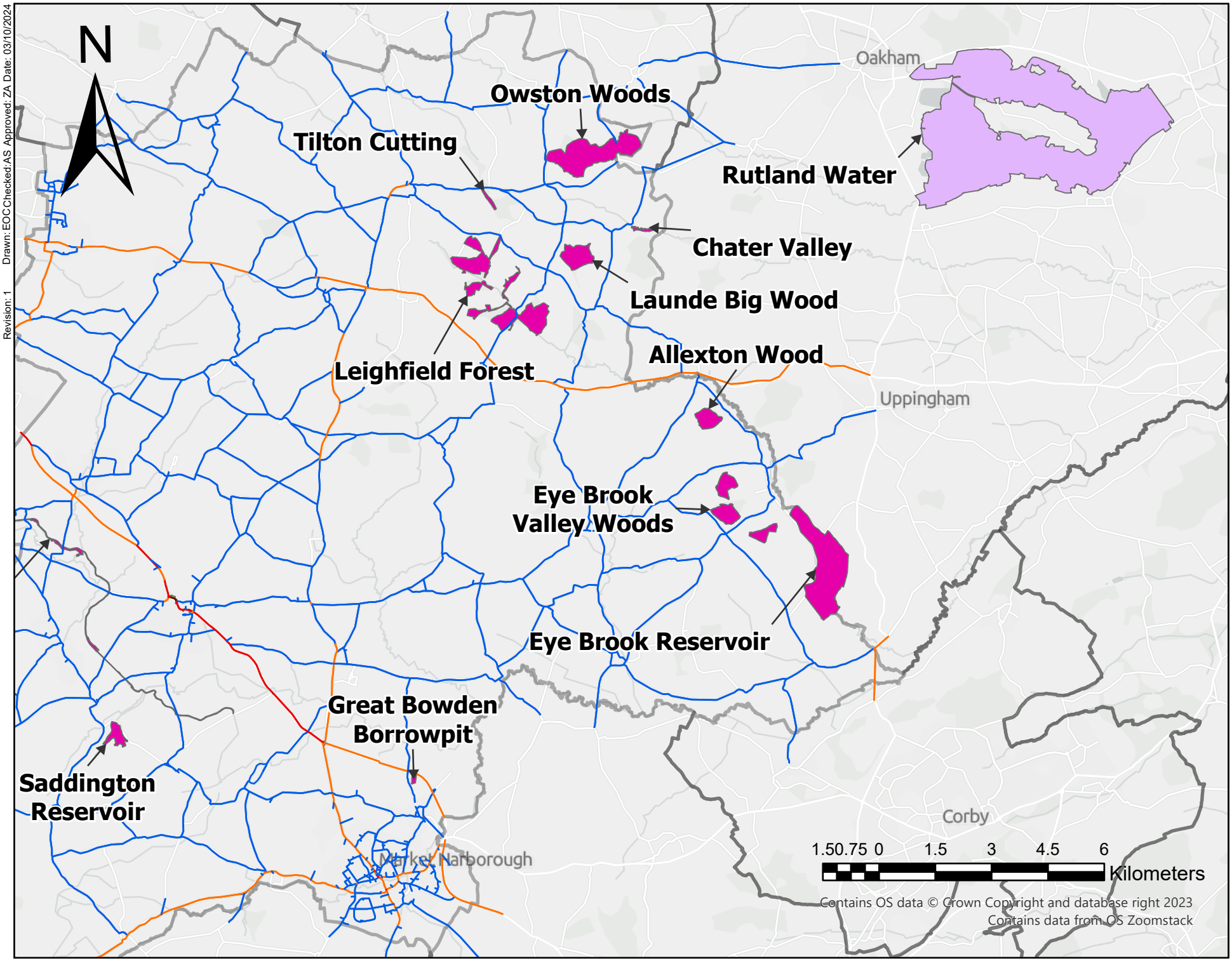
SHEET TITLE
2041 NO_x Emissions With Local Plan

SHEET NUMBER
Figure 6-9



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- District Boundaries

2041 NO_x Emissions With Local Plan (g/km/s)

- 0.00000 - 0.00625
- 0.00626 - 0.01250
- 0.01251 - 0.02500
- 0.02501 - 0.07044

NOTES

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SHEET TITLE
2041 NO_x Emissions With Local Plan

SHEET NUMBER
Figure 6-10

Modelled Concentrations

2019 Baseline (Human Health)

6.15 Modelled results at locations within Lutterworth Kibworth are presented in Table 6-1 and Table 6-2 and the resultant NO_2 concentrations can be visualised in Figure 6-11 and Figure 6-12.

6.16 These receptors have been chosen as they are representative of selected locations within each AQMA and provide the worst case annual mean concentration at relevant exposure.

Table 6-1 Predicted Annual Mean Concentrations at Selected Receptors for 2019, Lutterworth AQMA

Receptor ID	X co-ordinate	Y co-ordinate	Height (m)	Annual Mean (µg/m^3)		
				NO_2	PM_{10}	$PM_{2.5}$
R1	454511	284128	1.5	25.8	17.9	11.1
R2	454432	284229	2.0	20.7	16.9	10.6
R3	454497	284618	2.0	19.8	16.7	10.5
R4	454450	284371	4.5	18.9	16.6	10.4
R5	454454	284474	4.5	15.0	16.0	10.1
R6	454475	284560	2.0	19.5	16.7	10.4
R7	454321	284287	1.5	21.7	16.9	10.6
R8	454239	284258	1.5	21.2	17.0	10.6
R9	454496	284439	4.5	23.7	17.2	10.7
R10	454390	284637	1.5	19.4	16.8	10.5
R11	454365	284510	1.5	26.3	18.1	11.2
R12	454334	284600	1.5	36.6	19.8	12.2

Table 6-2 Predicted Annual Mean Concentrations at Selected Receptors for 2019, Kibworth AQMA

Receptor ID	X co-ordinate	Y co-ordinate	Height (m)	Annual Mean (µg/m^3)		
				NO_2	PM_{10}	$PM_{2.5}$
R13	468374	294125	1.5	13.6	14.3	9.1
R14	468222	294359	1.5	**46.5**	20.3	12.5
R15	467847	294688	1.5	**41.9**	20.7	12.4
R16	468490	294502	1.5	12.7	14.0	9.0
R17	468212	294563	1.5	15.0	14.5	9.2
R18	467738	294607	1.5	15.5	15.7	9.5
R19	467796	294795	1.5	20.0	16.5	10.0
R20	467965	294603	1.5	27.9	17.8	10.7
R21	468061	294362	1.5	17.7	14.8	9.4
R22	468368	294345	1.5	28.6	17.1	10.7
R23	468476	294286	1.5	26.1	16.7	10.5
R24	468340	294333	1.5	23.6	16.1	10.1
R25	468161	294350	1.5	**44.2**	19.7	12.2
R26	467987	294536	1.5	27.0	17.5	10.6

Receptor ID	X co-ordinate	Y co-ordinate	Height (m)	Annual Mean (µg/m^3)		
				NO_2	PM_{10}	$PM_{2.5}$
R27	467976	294621	1.5	34.8	19.2	11.5
R28	468026	294428	1.5	22.1	15.5	9.8
R29	468400	294593	1.5	13.7	14.3	9.1

Note: Values that exceed the annual AQS Objective (40 µg/m^3) are shown in **bold.**

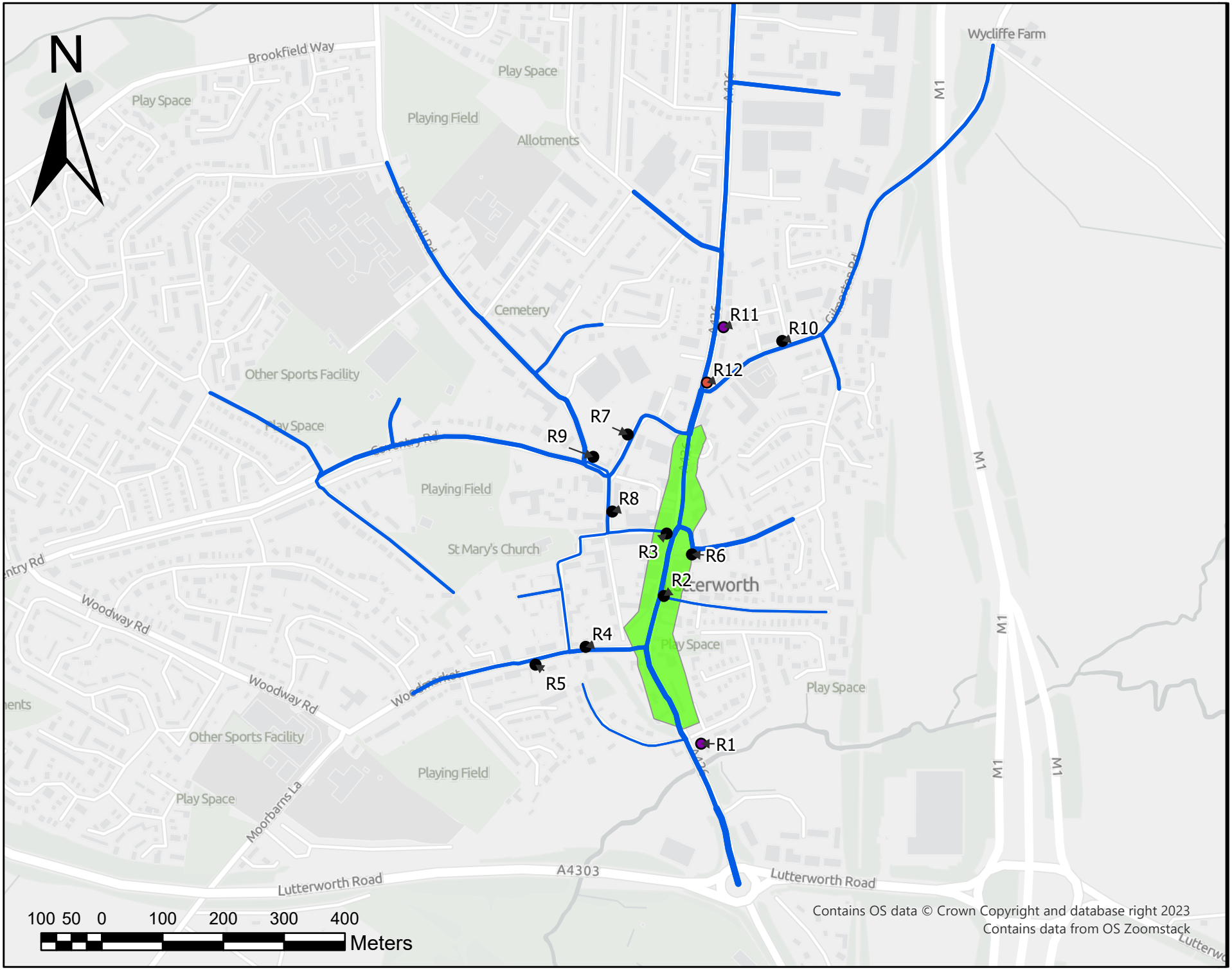
6.17 Annual mean NO_2 concentrations were modelled at selected sensitive receptors close to and within the AQMA study areas.

6.18 There were no exceedances of the annual mean NO_2 AQS objective of 40 µg/m^3 in the Lutterworth AQMA in the 2019 baseline, however R12 experienced a concentration within 10% of the AQS objective of 36.6 µg/m^3. This receptor is located just outside the AQMA at a junction with Gilmorton Road. The modelled concentrations were found to be highest towards the North of the AQMA between Crescent Road and Station Road.

6.19 There were three sites that exceeded the annual mean NO_2 AQS objective in the Kibworth AQMA in the 2019 Baseline, Receptors R14, R15 and R25 which reported concentrations of 46.5 µg/m^3, 41.9 µg/m^3 and 44.2 µg/m^3 respectively. R14 is located at the intersection between the A6 and Main Street, with R25 being slightly to the west of R14. R15 is located along the A6 on the approach to a roundabout with Wistow Road. These properties are located within the street canyon section of the road, where measured concentrations of NO_2 at site A1 and tube 34n were above the objective in 2019.

6.20 Since 2019, measured concentrations have declined as evident from HDC's monitoring data. Measured concentrations have declined by 22.6% and 23.9% for the Lutterworth and Kibworth AQMAs respectively so it is likely that there would be no exceedances of the AQS objective in 2023 at any of the modelled receptors.

6.21 Modelled PM_{10} and $PM_{2.5}$ concentrations are both well below their respective AQS objectives in 2019, however the $PM_{2.5}$ concentrations at some locations are just above the AQS 2028 interim target of 12 µg/m^3, with a maximum of 12.5 µg/m^3 at R14 in Kibworth. It is likely that $PM_{2.5}$ concentrations will be similar in 2023 as levels over the last few years have been constant.



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LEGEND

NO_2 Concentrations $\mu g/m^3$

- 12 - 24
- 24 - 30
- 30 - 36
- 36 - 40
- 40 - 44
- 44 - 48
- Digitised Road Network
- AQMAs

NOTES

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PROJECT NUMBER
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SHEET TITLE
2019 Baseline NO_2 Concentrations Lutterworth AQMA

SHEET NUMBER
Figure 6-11

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LEGEND

NO_2 Concentrations $\mu g/m^3$

- 12 - 24
- 24 - 30
- 30 - 36
- 36 - 40
- 40 - 44
- 44 - 48
- Digitised Road Network
- AQMAs

NOTES

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PROJECT NUMBER
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SHEET TITLE
2019 Baseline NO_2 Concentrations Kibworth AQMA

SHEET NUMBER
Figure 6-12

2041 Local Plan Impacts

Human Health

6.22 Modelled results at all locations of relevance to Human Health are presented in Table 6-3 to Table 6-5, the significance of the impacts from the local plan are summarised in Table 6-6 to Table 6-8 and the resultant NO_2 concentrations can be visualised in Figure 6-13 to Figure 6-18. These receptors have been chosen as they provide the worst case annual mean concentration at relevant exposure.

Table 6-3 Annual Mean Air Quality Results for 2041 traffic flows in µg/m^3 – Lutterworth

Receptor	Without Local Plan			With Local Plan			Change		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	13.9	16.8	10.2	14.1	17.0	10.3	0.2	0.2	0.1
R2	13.1	15.7	9.6	13.2	15.8	9.7	0.1	0.1	0.1
R3	13.0	15.6	9.5	13.1	15.7	9.6	0.1	0.1	<0.1
R4	12.9	15.7	9.6	13.0	15.8	9.7	0.1	0.1	<0.1
R5	12.5	15.2	9.3	12.6	15.3	9.4	0.1	0.1	<0.1
R6	12.9	15.6	9.5	13.0	15.6	9.6	0.1	0.1	<0.1
R7	13.3	15.7	9.6	13.4	15.8	9.6	0.1	0.1	<0.1
R8	13.2	15.9	9.7	13.3	16.0	9.7	0.1	0.1	0.1
R9	13.7	15.9	9.7	13.8	16.0	9.8	0.2	0.1	0.1
R10	12.7	15.4	9.5	12.8	15.5	9.5	0.1	0.1	<0.1
R11	13.8	16.8	10.2	14.0	16.9	10.2	0.2	0.2	0.1
R12	14.9	17.8	10.7	15.2	18.1	10.8	0.3	0.2	0.1
R47	10.2	15.8	9.2	10.4	16.1	9.4	0.2	0.3	0.2
R48	10.1	15.6	9.1	10.3	15.9	9.3	0.2	0.3	0.1
R49	11.1	15.0	9.2	11.3	15.3	9.4	0.2	0.3	0.2
R50	11.0	14.9	9.2	11.2	15.2	9.3	0.2	0.3	0.2

Table 6-4 Annual Mean Air Quality Results for 2041 traffic flows in µg/m^3 – Kibworth

Receptor	Without Local Plan			With Local Plan			Change		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R13	9.4	13.1	8.2	9.5	13.2	8.2	0.1	0.1	<0.1
R14	13.1	17.4	10.4	13.3	17.6	10.5	0.2	0.2	0.1
R15	15.2	19.3	11.1	15.4	19.5	11.2	0.3	0.2	0.1
R16	9.4	13.0	8.1	9.4	13.0	8.1	<0.1	<0.1	<0.1
R17	9.6	13.5	8.4	9.7	13.5	8.4	<0.1	<0.1	<0.1
R18	10.7	14.7	8.7	10.8	14.7	8.7	<0.1	<0.1	<0.1
R19	11.3	15.2	8.9	11.4	15.3	9.0	0.1	0.1	<0.1
R20	12.5	16.5	9.6	12.7	16.6	9.7	0.1	0.1	0.1
R21	9.8	13.5	8.4	9.9	13.6	8.4	<0.1	<0.1	<0.1
R22	11.6	15.6	9.5	11.8	15.8	9.6	0.2	0.2	0.1
R23	11.3	15.4	9.4	11.4	15.5	9.4	0.1	0.1	0.1
R24	10.9	14.7	9.0	11.0	14.9	9.1	0.1	0.1	0.1
R25	11.4	15.4	9.4	11.5	15.5	9.4	0.1	0.1	0.1
R26	11.9	16.0	9.4	12.0	16.1	9.4	0.1	0.1	<0.1

R27	13.7	17.8	10.3	13.9	17.9	10.3	0.2	0.2	0.1
R28	10.3	14.1	8.7	10.4	14.2	8.7	0.1	0.1	<0.1
R29	9.5	13.3	8.2	9.5	13.3	8.3	<0.1	<0.1	<0.1

Table 6-5 Annual Mean Air Quality Results for 2041 traffic flows in µg/m^3 – Market Harborough

Receptor	Without Local Plan			With Local Plan			Change		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R30	10.3	14.4	8.9	10.4	14.5	8.9	0.1	0.1	0.1
R31	12.5	14.5	9.1	12.6	14.6	9.2	0.1	0.1	0.1
R33	11.6	13.7	8.7	11.7	13.7	8.7	0.1	0.1	<0.1
R34	11.1	12.8	8.3	11.1	12.8	8.3	<0.1	<0.1	<0.1
R35	12.1	13.8	8.8	12.2	13.9	8.8	0.1	0.1	<0.1
R36	11.1	12.8	8.3	11.1	12.8	8.3	<0.1	<0.1	<0.1
R37	10.2	13.1	8.4	10.2	13.1	8.4	<0.1	<0.1	<0.1
R38	10.5	13.7	8.7	10.5	13.7	8.7	<0.1	<0.1	<0.1
R39	10.1	13.2	8.5	10.1	13.3	8.5	<0.1	<0.1	<0.1
R40	12.2	14.0	8.9	12.2	14.0	8.9	0.1	0.1	<0.1
R41	11.7	13.5	8.6	11.8	13.5	8.6	<0.1	<0.1	<0.1
R42	11.4	13.1	8.4	11.4	13.2	8.4	<0.1	<0.1	<0.1
R43	11.5	13.4	8.6	11.6	13.4	8.6	<0.1	<0.1	<0.1
R44	10.4	13.6	8.7	10.4	13.7	8.7	<0.1	<0.1	<0.1
R45	11.5	13.5	8.6	11.5	13.5	8.6	<0.1	0.1	<0.1
R46	12.3	14.6	9.2	12.4	14.7	9.3	0.1	0.1	0.1
R51	9.3	13.7	8.3	9.4	13.8	8.4	0.1	0.1	0.1
R52	9.5	13.8	8.4	9.6	13.9	8.4	0.1	0.1	0.1

Table 6-6 Air Quality Significance – Lutterworth

Receptor	IAQM Significance		
	NO_2	PM_{10}	$PM_{2.5}$
R1	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible
R7	Negligible	Negligible	Negligible
R8	Negligible	Negligible	Negligible
R9	Negligible	Negligible	Negligible
R10	Negligible	Negligible	Negligible
R11	Negligible	Negligible	Negligible
R12	Negligible	Negligible	Negligible
R47	Negligible	Negligible	Negligible
R48	Negligible	Negligible	Negligible
R49	Negligible	Negligible	Negligible

R50	Negligible	Negligible	Negligible

Table 6-7 Air Quality Significance – Kibworth

Receptor	IAQM Significance		
	NO_2	PM_{10}	$PM_{2.5}$
R13	Negligible	Negligible	Negligible
R14	Negligible	Negligible	Negligible
R15	Negligible	Negligible	Negligible
R16	Negligible	Negligible	Negligible
R17	Negligible	Negligible	Negligible
R18	Negligible	Negligible	Negligible
R19	Negligible	Negligible	Negligible
R20	Negligible	Negligible	Negligible
R21	Negligible	Negligible	Negligible
R22	Negligible	Negligible	Negligible
R23	Negligible	Negligible	Negligible
R24	Negligible	Negligible	Negligible
R25	Negligible	Negligible	Negligible
R26	Negligible	Negligible	Negligible
R27	Negligible	Negligible	Negligible
R28	Negligible	Negligible	Negligible
R29	Negligible	Negligible	Negligible

Table 6-8 Air Quality Significance – Market Harborough

Receptor	IAQM Significance		
	NO_2	PM_{10}	$PM_{2.5}$
R30	Negligible	Negligible	Negligible
R31	Negligible	Negligible	Negligible
R33	Negligible	Negligible	Negligible
R34	Negligible	Negligible	Negligible
R35	Negligible	Negligible	Negligible
R36	Negligible	Negligible	Negligible
R37	Negligible	Negligible	Negligible
R38	Negligible	Negligible	Negligible
R39	Negligible	Negligible	Negligible
R40	Negligible	Negligible	Negligible
R41	Negligible	Negligible	Negligible
R42	Negligible	Negligible	Negligible
R43	Negligible	Negligible	Negligible
R44	Negligible	Negligible	Negligible
R45	Negligible	Negligible	Negligible
R46	Negligible	Negligible	Negligible
R51	Negligible	Negligible	Negligible
R52	Negligible	Negligible	Negligible

6.23 All 52 selected human health receptors in the study areas were estimated to have annual mean NO_2 concentrations well below the air quality objective of 40 µg/m³ in both future scenarios (with and without the Local Plan). There are therefore unlikely to be any exceedances of the hourly mean objective in 2041.

6.24 In the 2041 scenario, none of the receptors in Lutterworth are expected to exceed the annual mean NO_2 air quality objective of 40 µg/m³, both with and without the Local Plan. Receptor R12, located near a busy junction, shows the highest concentrations in both scenarios, with 14.9 µg/m³ without the Local Plan and 15.2 µg/m³ with the Local Plan, reflecting a minimal increase of 0.3 µg/m³. The smallest increase is observed at R48, with 10.1 µg/m³ without the Local Plan and 10.3 µg/m³ with the Local Plan.

6.25 The receptor with the greatest increase in NO_2 concentrations is R12, with changes of 0.3 µg/m³ as traffic flows increase due to the Local Plan. The overall changes are small and do not suggest any significant air quality impacts in Lutterworth.

6.26 Similar trends are observed for PM_{10} and $PM_{2.5}$. The concentrations of both pollutants remain below their respective objectives in both scenarios. For example, at R12, PM_{10} rises slightly from 17.8 µg/m³ without the Local Plan to 18.1 µg/m³ with the Local Plan, while $PM_{2.5}$ highest increase is 0.2 µg/m³ (i.e., R47, R49 and R50).

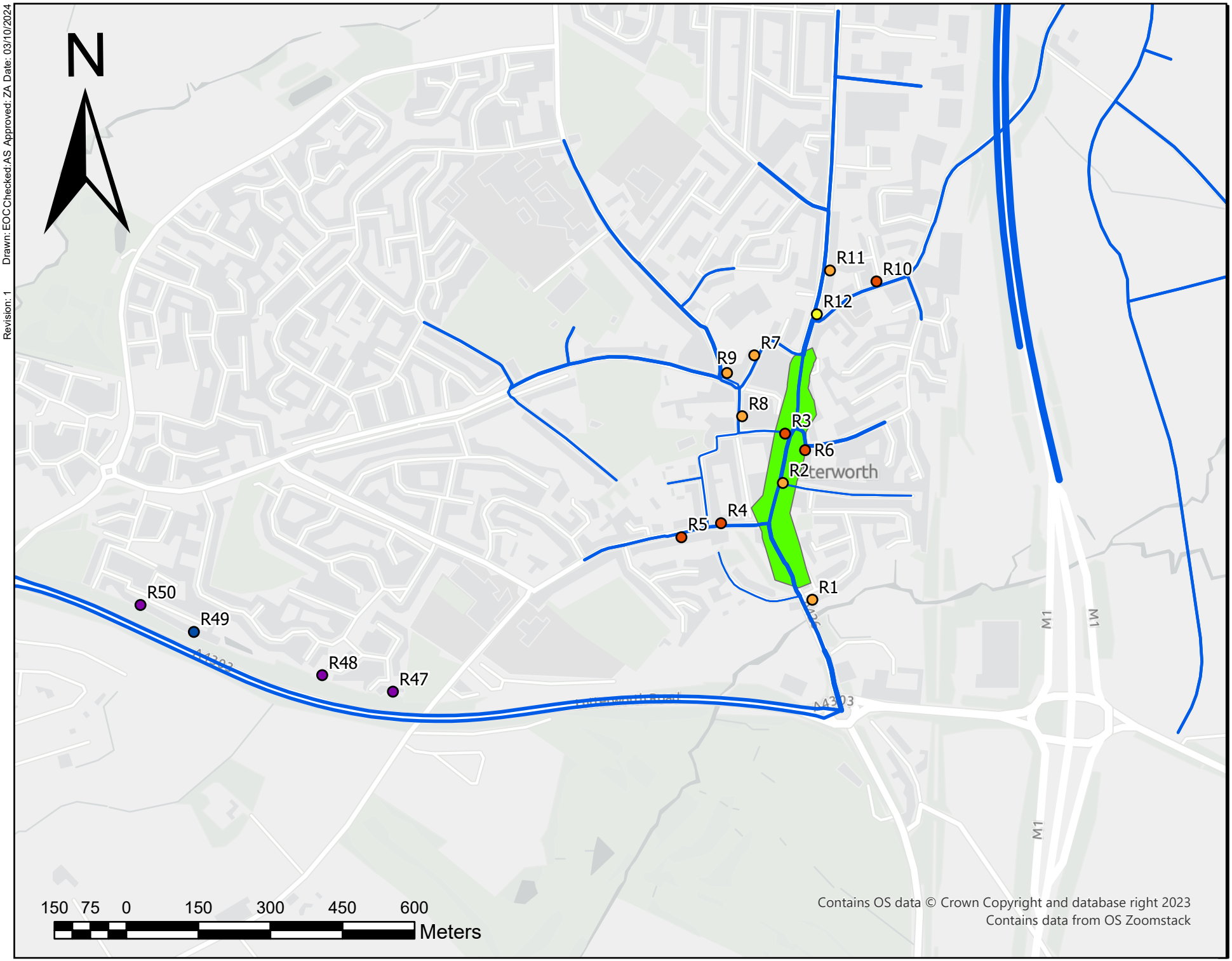
6.27 In Kibworth, the results show that no receptors will exceed the annual mean NO_2 air quality objective of 40 µg/m³ in 2041. Receptor R15, which is situated near areas of increased traffic due to the Local Plan, shows the highest concentration, with 19.3 µg/m³ without the Local Plan and 19.5 µg/m³ with the Local Plan, an increase of 0.2 µg/m³.

6.28 In terms of particulate matter, the concentrations of PM_{10} and $PM_{2.5}$ remain below their respective objectives across all receptors. The maximum PM_{10} concentration of 19.5 µg/m³ is observed at R15 with the Local Plan in place, while $PM_{2.5}$ reaches 11.2 µg/m³ at the same location. These results suggest no significant concerns for particulate pollution in Kibworth, as changes between the scenarios are minor.

6.29 For Market Harborough, the concentrations of NO_2 remain well below the air quality objective of 40 µg/m³ in both scenarios. The highest NO_2 concentration is observed at R31, with 12.5 µg/m³ without the Local Plan and 12.6 µg/m³ with the Local Plan, an increase of 0.1 µg/m³.

6.30 Similarly, PM_{10} and $PM_{2.5}$ concentrations remain below their respective objectives. The maximum PM_{10} concentration of 14.7 µg/m³ is observed at R46 in the scenario with the Local Plan, while $PM_{2.5}$ concentrations show small changes, with no receptor exceeding 10 µg/m³ in either scenario.

6.31 With reference to the IAQM/EPUK guidance (Environmental Protection UK (EPUK) & IAQM, 2017), the predicted changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations due to the Local Plan are considered to be negligible at all receptors.



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LEGEND

2041 NO_2 Concentrations Without Local Plan ($\mu g/m^3$)

- 9.3 - 10.0
- 10.0 - 11.0
- 11.0 - 12.0
- 12.0 - 13.0
- 13.0 - 14.0
- 14.0 - 15.2
- Digitised Road Network
- Harborough AQMAs

NOTES

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2041 NO_2 $\mu g/m^3$ Concentrations Without Local Plan

SHEET NUMBER

Figure 6-13

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LEGEND

2041 NO_2 Concentrations Without Local Plan (µg/m^3)

- 9.3 - 10.0
- 10.0 - 11.0
- 11.0 - 12.0
- 12.0 - 13.0
- 13.0 - 14.0
- 14.0 - 15.2
- Digitised Road Network
- Harborough AQMAs

NOTES

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PROJECT NUMBER
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SHEET TITLE
2041 NO_2 µg/m^3 Concentrations Without Local Plan

SHEET NUMBER
Figure 6-14

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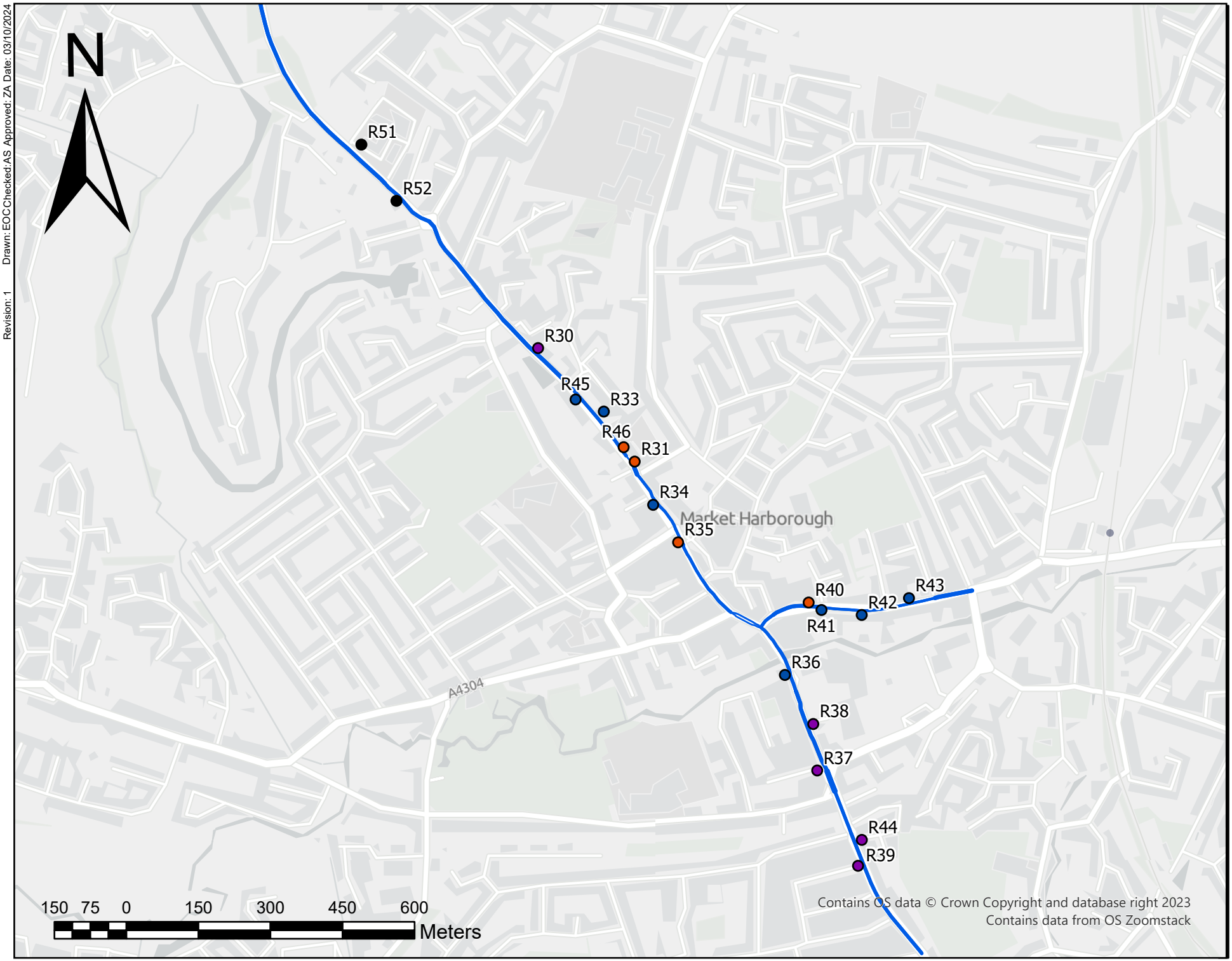

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LEGEND

2041 NO_2 Concentrations Without Local Plan ($\mu g/m^3$)

- 9.3 - 10.0
- 10.0 - 11.0
- 11.0 - 12.0
- 12.0 - 13.0
- 13.0 - 14.0
- 14.0 - 15.2
- Digitised Road Network

NOTES

ISSUE PURPOSE

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PROJECT NUMBER

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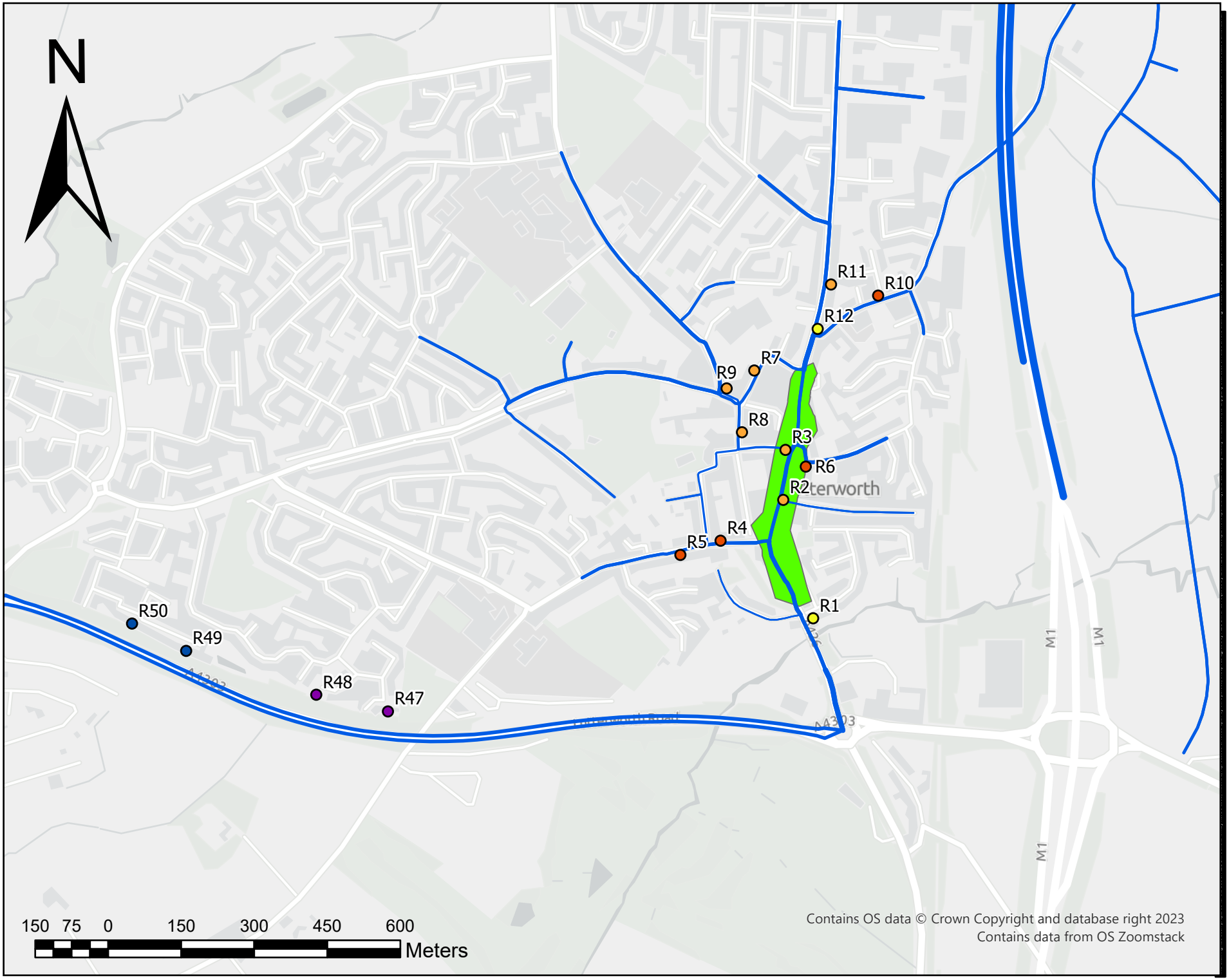
SHEET TITLE

2041 NO_2 $\mu g/m^3$ Concentrations Without Local Plan

SHEET NUMBER

Figure 6-15



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LEGEND

2041 NO_2 Concentrations With Local Plan ($\mu g/m^3$)

- 9.4 - 10.0
- 10.0 - 11.0
- 11.0 - 12.0
- 12.0 - 13.0
- 13.0 - 14.0
- 14.0 - 15.4
- Digitised Road Network
- Harborough AQMAs

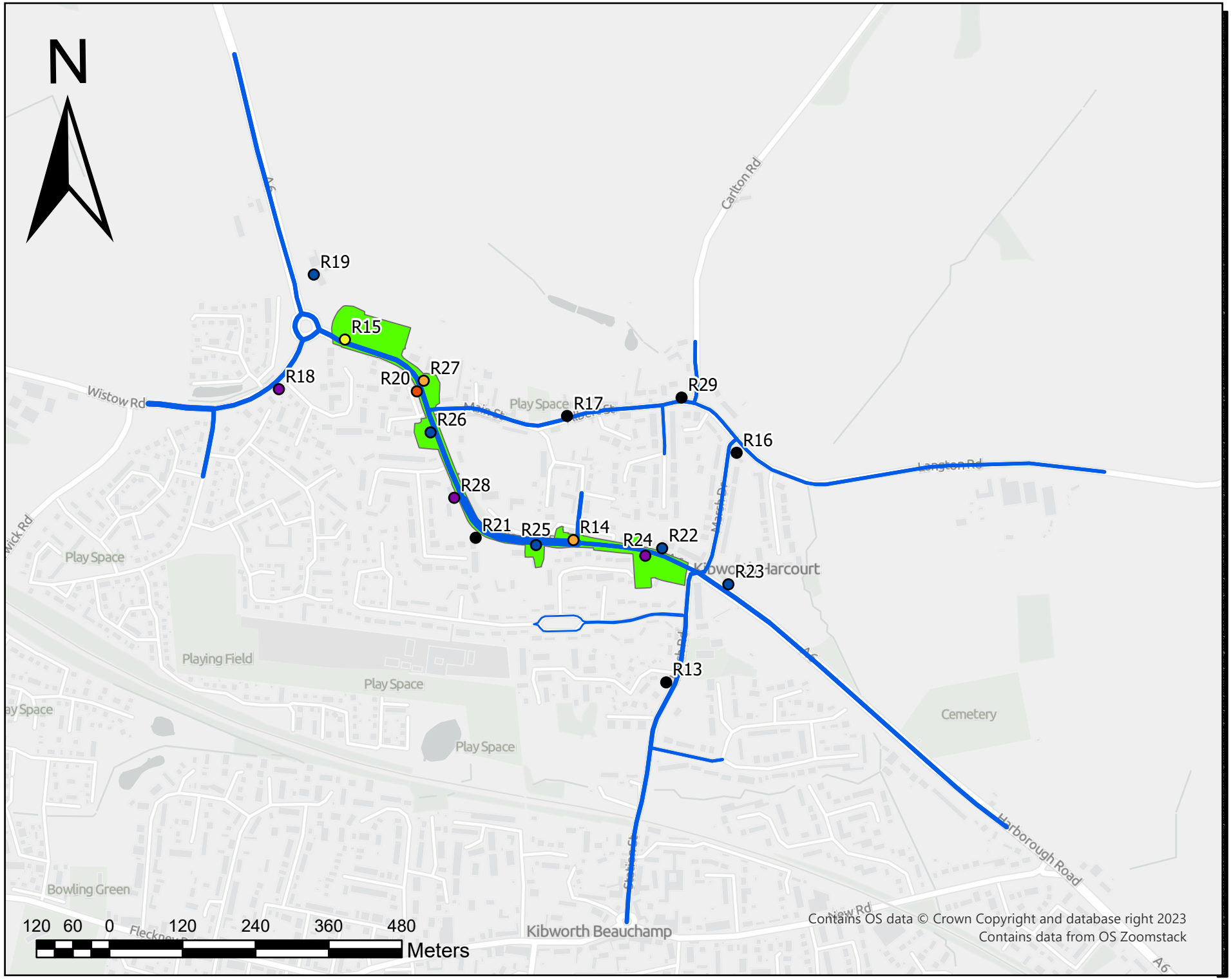
NOTES

ISSUE PURPOSE
FINAL

PROJECT NUMBER
60730753

SHEET TITLE
2041 NO_2 $\mu g/m^3$ Concentrations With Local Plan

SHEET NUMBER
Figure 6-16



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LEGEND

2041 NO_2 Concentrations With Local Plan ($\mu g/m^3$)

- 9.4 - 10.0
- 10.0 - 11.0
- 11.0 - 12.0
- 12.0 - 13.0
- 13.0 - 14.0
- 14.0 - 15.4
- Digitised Road Network
- Harborough AQMAs

NOTES

ISSUE PURPOSE
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PROJECT NUMBER
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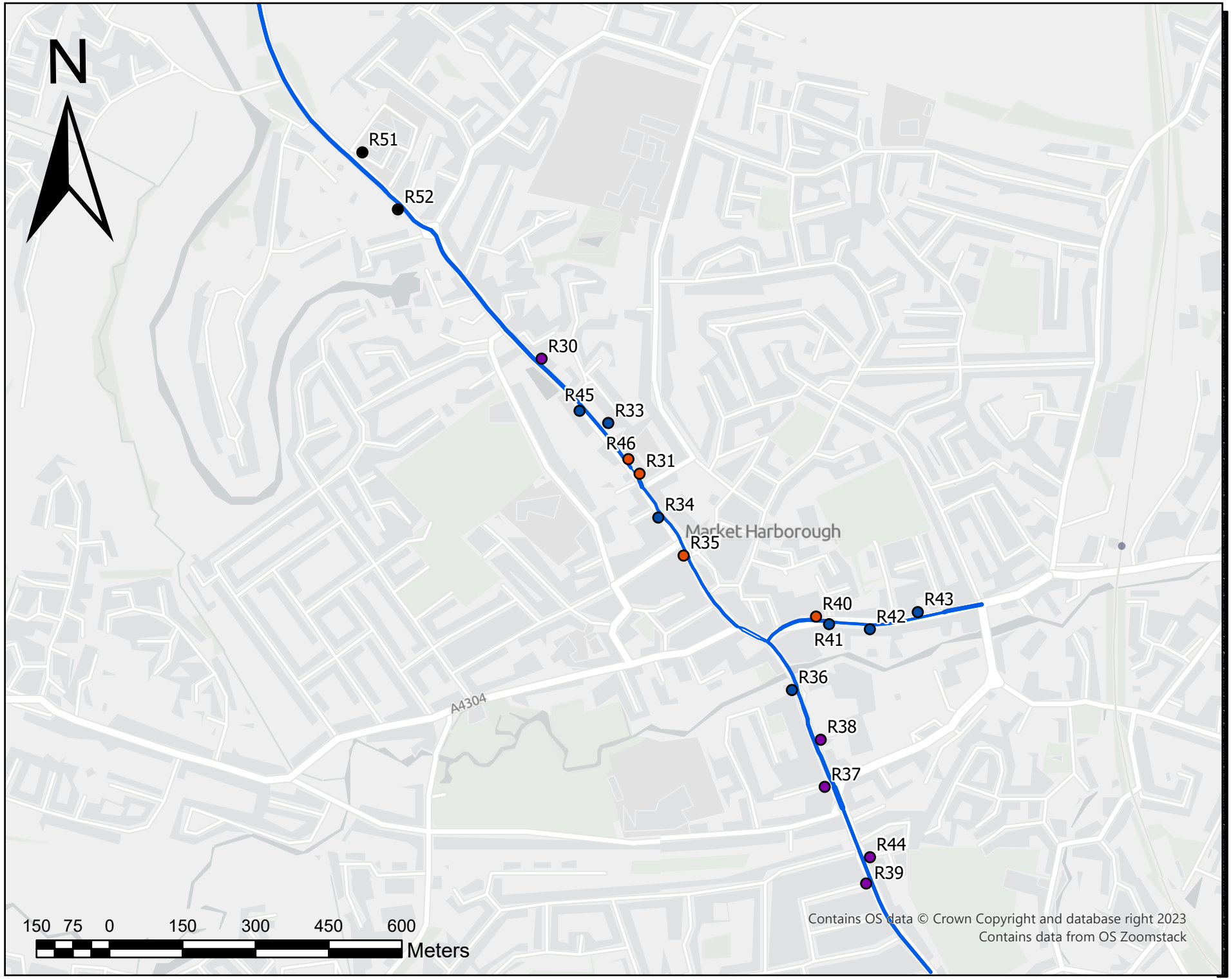
SHEET TITLE
2041 NO_2 $\mu g/m^3$ Concentrations With Local Plan

SHEET NUMBER
Figure 6-17



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AECOM

PROJECT

Harborough LP

CLIENT

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LEGEND

2041 NO_2 Concentrations With Local Plan ($\mu g/m^3$)

- 9.4 - 10.0
- 10.0 - 11.0
- 11.0 - 12.0
- 12.0 - 13.0
- 13.0 - 14.0
- 14.0 - 15.4
- Digitised Road Network
- Harborough AQMAs

NOTES

ISSUE PURPOSE

FINAL

PROJECT NUMBER

60730753

SHEET TITLE

2041 NO_2 $\mu g/m^3$ Concentrations With Local Plan

SHEET NUMBER

Figure 6-18

Ecological Sites

6.32 Modelled results at all transect locations for the three SSSIs are presented in Table 6-9 to Table 6-11.

Table 6-9: Annual Mean Concentrations (µg/m^3) at Cave's Inn Pit SSSI's Transect points.

		Without the Local Plan		With the Local Plan	
Site ID	Distance to Road (m)	NOx	NH_3	NOx	NH_3
CT01_110m	110	11.0	1.7	11.0	1.7
CT01_120m	120	10.9	1.7	10.9	1.7
CT01_130m	130	10.9	1.7	10.9	1.7
CT01_140m	140	10.9	1.7	10.9	1.7
CT01_150m	150	10.8	1.7	10.8	1.7
CT01_160m	160	10.8	1.6	10.8	1.6
CT01_170m	170	10.8	1.6	10.8	1.6
CT01_180m	180	10.7	1.6	10.8	1.6
CT01_190m	190	10.7	1.6	10.7	1.6
CT01_200m	200	10.7	1.6	10.7	1.6

Table 6-10: Annual Mean Concentrations (µg/m^3) at Misterton Marshes SSSI's Transect points.

		Without the Local Plan		With the Local Plan	
Site ID	Distance to Road (m)	NOx	NH_3	NOx	NH_3
CT02_0m	0	13.9	3.0	13.9	3.0
CT02_10m	10	12.1	2.4	12.2	2.4
CT02_20m	20	11.6	2.2	11.6	2.2
CT02_30m	30	11.3	2.1	11.4	2.1
CT02_40m	40	11.2	2.1	11.2	2.1
CT02_50m	50	11.1	2.0	11.1	2.0
CT02_60m	60	11.0	2.0	11.0	2.0
CT02_70m	70	11.0	2.0	11.0	2.0
CT02_80m	80	10.9	2.0	10.9	2.0
CT02_90m	90	10.9	2.0	10.9	2.0

Site ID	Distance to Road (m)	Without the Local Plan		With the Local Plan	
		NOx	NH_3	NOx	NH_3
CT02_100m	100	10.8	2.0	10.9	2.0
CT02_110m	110	10.8	2.0	10.8	2.0
CT02_120m	120	10.8	2.0	10.8	2.0
CT02_130m	130	10.8	2.0	10.8	2.0
CT02_140m	140	10.8	2.0	10.8	2.0
CT02_150m	150	10.8	2.0	10.8	2.0
CT02_160m	160	10.7	2.0	10.8	2.0
CT02_170m	170	10.7	2.0	10.7	2.0
CT02_180m	180	10.7	2.0	10.7	2.0
CT02_190m	190	10.7	2.0	10.7	2.0
CT02_200m	200	10.7	1.9	10.7	2.0

Table 6-11: Annual Mean Concentrations (µg/m^3) at Great Bowden Borrowpit SSSI's Transect points.

Site ID	Distance to Road (m)	Without the Local Plan		With the Local Plan	
		NOx	NH_3	NOx	NH_3
CT03_20m	20	10.6	2.0	10.6	2.0
CT03_30m	30	10.2	1.8	10.3	1.8
CT03_40m	40	10.0	1.7	10.1	1.7
CT03_50m	50	9.9	1.7	9.9	1.7
CT03_60m	60	9.8	1.6	9.9	1.7
CT03_70m	70	9.8	1.6	9.8	1.6
CT03_80m	80	9.7	1.6	9.7	1.6
CT03_90m	90	9.7	1.6	9.7	1.6
CT03_100m	100	9.7	1.6	9.7	1.6
CT03_110m	110	9.6	1.6	9.7	1.6
CT03_120m	120	9.6	1.6	9.6	1.6

Site ID	Distance to Road (m)	Without the Local Plan		With the Local Plan	
		NOx	NH_3	NOx	NH_3
CT03_130m	130	9.6	1.6	9.6	1.6
CT03_140m	140	9.6	1.6	9.6	1.6
CT03_150m	150	9.6	1.6	9.6	1.6
CT03_160m	160	9.6	1.6	9.6	1.6
CT03_170m	170	9.6	1.6	9.6	1.6
CT03_180m	180	9.5	1.6	9.6	1.6
CT03_190m	190	9.5	1.6	9.5	1.6
CT03_200m	200	9.5	1.6	9.5	1.6

6.33 For all three SSSIs, the NO_x and NH_3 concentrations remain largely consistent between the two scenarios, with all observed changes being less than 0.1µg/m³. This suggests that the implementation of the Local Plan would have a negligible impact on air quality in these areas. At Cave's Inn Pit, NO_x concentrations range between 10.7µg/m³ and 11.0µg/m³ across various distances from the road, while NH_3 concentrations hold at between 1.6µg/m³ and 1.7µg/m³. Similar trends are seen in Misterton Marshes, where NO_x concentrations range from 10.7µg/m³ to 13.9µg/m³ to depending on proximity to the road, with almost no variation between the scenarios. Finally, Great Bowden Borrowpit shows similar stability in pollutant levels, with NO_x and NH_3 concentrations ranging between 9.5µg/m³ and 10.6µg/m³ at different receptor points.

7. Conclusions

2019 Baseline

7.1 This report presents the baseline results of the air quality assessment for HDC's AQMAs for a baseline year of 2019, as well as the impacts of implementation of the Harborough Local Plan in 2041 at key residential and sensitive ecological receptors.

7.2 Based on the modelling presented herein, concentrations of NO_2 (for which the AQMAs are designated) at selected receptors in the Lutterworth AQMA are below the annual mean objective of 40 µg/m^3 in the 2019 baseline year. This is in line with HDC's recent monitoring data, and their revocation of the AQMA in June 2024.

7.3 Exceedances of the annual mean objective are predicted at receptors in the Kibworth AQMA for the 2019 baseline year. Particulate concentrations at selected receptors in both AQMAs are below the AQS objectives of 40 µg/m^3 for PM_{10} and 20 µg/m^3 for $PM_{2.5}$ However, $PM_{2.5}$ concentrations at a few receptors are slightly above the AQS interim target of 12 µg/m^3 by 2028.

2041 Local Plan

7.4 The air quality assessment for 2041 indicates that NO_2 concentrations across all 52 receptors in Lutterworth, Kibworth, and Market Harborough remain well below the annual mean air quality objective of 40 µg/m³, both with and without the Local Plan in place. The highest concentrations are observed at Receptor R12 in Lutterworth, R15 in Kibworth, and R31 in Market Harborough, but all remain significantly under the objective, even with minor increases due to the Local Plan. It is noted that the future modelling undertaken is indicative only as Defra backgrounds have only been projected to 2030 and the predicted fleet composition is based on current understanding of projections.

7.5 The impact of the Local Plan on NO_2 concentrations is generally minimal, with increases of 0.1 to 0.3 µg/m³ at most receptors.

7.6 Particulate matter (PM_{10} and $PM_{2.5}$) concentrations also remain below their respective air quality objectives across all locations. In Lutterworth, PM_{10} at Receptor R12 increases slightly from 17.8 µg/m³ to 18.1 µg/m³ with the Local Plan, while $PM_{2.5}$ concentrations increase marginally across the three study areas, with the highest $PM_{2.5}$ concentration of 11.2 µg/m³ observed at Receptor R15 in Kibworth. These increases, however, are still within acceptable limits and do not pose significant air quality concerns.

7.7 With reference to the IAQM/EPUK guidance, the predicted changes in NO_2, PM_{10}, and $PM_{2.5}$ concentrations due to the Local Plan are considered negligible at all receptors. Three receptors in Lutterworth (R1, R11 and R12) and three receptors in Kibworth (R14, R15, and R27) show $PM_{2.5}$ concentrations slightly above the 10 µg/m³ interim target for 2041. In Market Harborough, all receptors remain below the 10 µg/m³ target. The overall impact on air quality is expected to be small, with no significant adverse effects on human health or sensitive ecological receptors.

7.8 In summary, the implementation of the Local Plan does not result in exceedances of air quality objectives for NO_2, PM_{10}, or $PM_{2.5}$ at any of the selected receptors in Lutterworth, Kibworth, or Market Harborough. While there are slight increases in pollutant concentrations, these changes are minor and are not predicted to significantly affect air quality in the region in 2041. This is because background pollutant concentrations and vehicle fleet emissions are expected to improve as a result of fleet turnover (including due to tighter emission standards for new vehicles and an increasing uptake in electric vehicles).

7.9 The ecological assessment for 2041, based on the selected transect points within the Cave's Inn Pit, Misterton Marshes, and Great Bowden Borrowpit SSSIs, indicates that the concentrations of NO_x and NH_3 remain well below critical levels for nitrogen deposition impacts. The changes in concentrations between the with and without the Local Plan scenarios were small, with differences less than 0.1 µg/m³ at all points. These results suggest that the implementation of the Local Plan is unlikely to have a significant impact on the sensitive

ecological receptors within the SSSIs, as the changes in NO_x and NH_3 concentrations are very small. Given that the pollutant levels are below the thresholds for adverse ecological impact, the overall impact on these sites is considered negligible. Though the Rutland Water SPA was not modelled the projected change in traffic flows near this SPA were expected to be much smaller than the projected traffic changes observed near the selected SSSIs, such that IAQM screening criteria was not met. As such it is expected that NO_x and NH_3 concentrations will be below the thresholds for adverse ecological impact at this SPA, such that the overall impact is considered negligible.

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Appendix A – Traffic Data

Study Area	Road Name	Without Local Plan			With Local Plan			Change		
		AADT	HDV %	Speed (kpH)	AADT	HDV %	Speed (kpH)	AADT	HDV %	Speed (kpH)
Lutterworth	A426 between A4303 and Central Avenue	17278 - 12847	10.06 - 8.49	50.5 - 14.6	17817 - 13350	11.5 - 9.84	49.8 - 14.3	612 - 485	1.44 - 1.16	-0.1 - -0.8
	Gilmorton Road between A426 and Boundary Road	856	0	36.2	939	0	35.9	83	0	-0.3
	George Street between A426 and Coventry Road	3291	7.09	15.9	3445	7.25	15.8	154	0.16	-0.1
	Church Street between A426 and Bank Street	2796	6.5	21.8	2989	6.71	21.8	193	0.2	0
	Misterton Way	3775	3.15	33.8	3969	3.33	33.7	195	0.18	-0.1
	A4303 between A426 and Coventry Road	21527	12.55	78.6	23535	15.20	77.3	2008	2.63	-1.4
	M1 between A4303 and Boneham's Lane	52280 - 49889	14.52 - 12.32	92.3 - 90.7	53233 - 50279	14.78 - 12.44	92.2 - 90.3	953 - 390	0.26 - 0.12	-0.1 - -0.5
Kibworth	A6 between Paddock's Farm and New Road	29124 - 21626	7.65 - 5.89	49.3 - 25	30256 - 22729	7.63 - 5.88	48.9 - 24.5	1201 - 584	0.02 - -0.3	-0.3 - -1.2

Study Area	Road Name	Without Local Plan			With Local Plan			Change		
		AADT	HDV %	Speed (kpH)	AADT	HDV %	Speed (kpH)	AADT	HDV %	Speed (kpH)
	Wistow Road between A6 and Warwick Road	11392 - 9333	3.81 - 3.42	32.5 - 30.4	11300 - 9229	3.82 - 3.45	32.5 - 29.5	-92 - -104	0.02 - 0.01	0 - -0.9
	Main Street / Albert Street between A6 and Langton Road	4033 - 3653	0.2 - 0.17	37.5 - 35.5	4057 - 3657	0.2 - 0.17	37 - 35.5	24 - 4	0 - 0	0 - -0.5
	Marsh Drive between A6 and Langton Road	2168	3.79	30.2	2333	3.75	29.1	165	-0.04	-1.1
	Church Road between A6 and New Road	7792 - 5963	4.18 - 3.99	41.9 - 25	8601 - 6798	4.16 - 3.97	40.8 - 24.4	835 - 810	-0.02 - -0.02	-0.2 - -1.1
Market Harborough	B6047 between Welling Way and A4304	15027 - 12537	4.41 - 2.78	53.8 - 20	15732 - 14067	4.54 - 2.82	52.7 - 20	1530 - 608	0.14 - -0.31	0 - -1.1
	A4304 between B6047 and A508	15677 - 7251	5.79 - 3.63	29.2 - 6	16210 - 7390	6.09 - 3.74	29.2 - 5.9	567 - 96	0.29 - 0.1	0 - -0.2
	Northampton Road between A4304 and A508	11308 - 11308	3.12 - 3.12	40 - 18.8	11539 - 11539	3.17 - 3.17	40 - 18.6	231 - 231	0.05 - 0.05	0.1 - -0.2
	A508 between Northampton Road and Bath Street	16486 - 12148	3.83 - 3.36	38.7 - 10.2	16802 - 12444	3.88 - 3.41	38.7 - 10.1	354 - 296	0.08 - 0.05	0 - -0.2
Cave's Inn	A5 between M6 and A426	21046	8.08	82.1	21196	8.63	82	149	0.54	-0.1
Misterton Marsh	Road to Misterton Fields Farm	10369 - 5084	1.85 - 0.48	31.4 - 27.3	10388 - 5092	1.84 - 0.49	31.4 - 26.6	19 - 8	0 - -0.01	0 - -0.8

Study Area	Road Name	Without Local Plan			With Local Plan			Change		
		AADT	HDV %	Speed (kpH)	AADT	HDV %	Speed (kpH)	AADT	HDV %	Speed (kpH)
Great Bowden	A6 between B6047 and Welham Road	20341	6.27	82 - 80	20755	6.29	81.8 - 79.8	413	0.02	-0.2
	Langton Road between Langton Brook Farm and Welham Road	280	5.35	71.5 - 64	410	5.72	71.5 - 64	130	0.37	0
Rutland Water SPA	Stamford Road (A606)	13606	6.9	67-75	13621	6.9	67-74	15	0	1
	Burley Park Way (A6003 south of Stamford Road)	15682	8.6	62	15718	8.6	62	36	0	0
	Burley Park Way (A6003 north of Stamford Road)	26277	7.9	45-48	26333	8.0	44-48	57	0	1

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