

Tritax Symmetry (Hinckley) Limited

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

The Hinckley National Rail Freight Interchange Development Consent Order

Project reference TR050007

Sapcote Technical Note [Appendix F - Sapcote Enhanced Option Air Quality Technical Note]

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Planning Act 2008

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(q)**

**Appendix F:
Sapcote Enhanced Option Air Quality
Technical Note**

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE (HNRFI)

AIR QUALITY TECHNICAL NOTE – SAPCOTE ENHANCED SCHEME

Project	Hinckley National Rail Freight Interchange		
Document Number	HNRFI-BWB-VUT-ZZ-RP-G-0003_TN	BWB Ref	NTT2814
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Approved	K. Sinclair MSc BSc (Hons)	Date	25/10/2024

Introduction

This air quality technical note was prepared to assess the impact of the Sapcote Enhanced Scheme with regards to air quality.

Methodology

The methodology used in this technical note is consistent with that utilised for the air quality assessment, as detailed in ES Chapter 9 – Air Quality (document reference: APP-118) and the air quality addendum, as detailed in Addendum 6.4.1 Air Quality PM Sensitivity Assessment (document reference: AS-023).

For the purposes of this technical note, the following scenarios were modelled:

- Scenario 1: 2026 Opening Year, without HNRFI;
- Scenario 2: 2026 Opening Year, with HNRFI;
- Scenario 3: 2036 Completion Year, without HNRFI; and
- Scenario 4: 2036 Completion Year, with HNRFI.

In accordance with ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), the 2026 Opening Year was utilised in the assessment as this is the earliest year in which certain elements of the Main HNRFI Site may become operational. Whilst this is the earliest year that some operations may commence on the Main HNRFI Site, the whole Main HNRFI Site will not be fully operational until 2036. The 2026 Opening Year assessments considered development traffic flows associated with the whole Main HNRFI Site being operational and not just the elements which will actually be operational in 2026. It is therefore considered to represent a robust scenario assuming the entire HNRFI, and its associated vehicle trips, is operational in the earliest possible year (2026) as this will not be the reality. In addition, vehicle emission factors and background concentrations are expected to decrease year on year as vehicle technologies improve, therefore 2026 vehicle emissions and background concentrations are expected to be higher than later years, for example 2036 when the whole Main HNRFI Site is expected to be fully operational. The 2026 Opening Year assessments have therefore considered higher traffic flows, higher vehicle emissions and higher background pollutant concentrations than will be the reality. The operational phase Opening Year therefore represents a robust and conservative scenario.

Whilst Scenario 2: Opening Year, with HNRFI considers a robust approach to development traffic flows, vehicle emissions and background concentrations as detailed above, it does not

account for the higher background traffic which will be on the road network in 2036. Scenario 4: Opening Year, with HNRFI therefore takes into consideration the higher background traffic which will be present when the HNRFI is fully operational in 2036, along with the consideration of the full operation of the Main HNRFI Site.

Study Area

The study area used for the purposes of this technical note covers the B4669 Hinckley Road and B4669 Leicester Road which run through Sapcote. The modelled road network is shown in **Appendix A**.

Sapcote Enhanced Scheme

The Sapcote Enhanced Scheme has been modelled in Scenario 2: 2026 Opening Year, with HNRFI and Scenario 4: 2036 Completion Year, with HNRFI. The potential impact of queueing as a result of carriageway narrowings, carriageway markings and warning signage to move HGVs to the middle of the carriageway, ensuring that they are away from footway and will give way to each other have been considered. Light vehicles remain able to pass each other and will be unaffected by the proposals. As such a queue has been modelled along the length of the B4669 between Stanton Lane and Coventry Road. To provide a robust approach, it has been assumed in Scenario 2 and Scenario 4 that a constant queue, of 10mph, is present 24 hours a day, 365 days a year, for all vehicles, and not just HGVs. It is considered that this is a robust approach as a queue of this length will not be present constantly for all vehicles and the average speed throughout the day is not likely to be as low as 10mph. In addition, the assessment also considered area where the carriageway is being widened to allow large vehicles to pass each other and to introduce a new bus stop layby.

Receptors

Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at the receptor locations within Sapcote that were modelled in the ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), receptors R12 - R18. Details and locations are shown in **Table 1** below and **Appendix A**. In addition, pollutant concentrations were predicted across the study area. A Cartesian grid from minimum X 448273, Y 293175 to maximum X 449813, Y 293729 was modelled at a height of 1.5m to represent average breathing height conditions.

Table 1: Modelled Receptor Locations

ES Chapter Receptor ID	X	Y	Address	Height (m)
R12	448578	293537	Residential dwelling on Frewen Drive	1.5
R13	448466	293532	Residential dwelling on Hinckley Road	1.5
R14	448878	293424	Residential dwelling on Church Street	1.5
R15	448992	293409	Residential dwelling on Leicester Road	1.5
R16	449071	293433	Residential dwelling on Grace Road	1.5
R17	449097	293424	Residential dwelling on Grace Road	1.5
R18	449059	293391	Residential dwelling on Sharnford Road	1.5

Impact Assessment

2026 Opening Year

Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted in the 2026 Opening Year at identified existing receptor locations to consider the impact of the Sapcote Enhanced Scheme. Predicted pollutant concentrations are detailed in **Table 2** for NO₂, PM₁₀ and PM_{2.5} respectively together with the 'without HNRFI' concentrations for comparison purposes. The predicted change in pollutant concentrations resulting from development-generated traffic, and the associated impacts are also provided.

Table 2: Predicted Annual Mean NO₂, PM₁₀ and PM_{2.5} Concentrations and Sapcote Enhanced Scheme Impact at Receptor Locations for 2026 Opening Year

Receptor	2026 Opening Year Without HNRFI (µg.m ⁻³)	2026 Opening Year With HNRFI (µg.m ⁻³)	Concentration Change* (µg.m ⁻³)	Change in Concentration Relative to Air Quality Assessment Level (%)	Impact
NO₂					
R12	9.2	10.4	+1.3	3	Negligible
R13	8.8	9.4	+0.7	2	Negligible
R14	8.9	9.7	+0.8	2	Negligible
R15	9.2	10.3	+1.1	3	Negligible
R16	8.3	8.8	+0.5	1	Negligible
R17	8.4	9.0	+0.6	2	Negligible
R18	8.3	8.8	+0.5	1	Negligible
PM₁₀					
R12	12.7	13.0	+0.3	1	Negligible
R13	12.6	12.7	+0.1	0	Negligible
R14	12.6	12.8	+0.2	0	Negligible
R15	12.7	12.9	+0.2	1	Negligible
R16	12.8	12.9	+0.1	0	Negligible
R17	12.8	12.9	+0.1	0	Negligible
R18	12.8	12.9	+0.1	0	Negligible
PM_{2.5}					
R12	8.2	8.3	+0.1	1	Negligible
R13	8.1	8.1	+0.1	0	Negligible
R14	8.1	8.2	+0.1	0	Negligible
R15	8.2	8.3	+0.1	1	Negligible
R16	8.0	8.1	<0.1	0	Negligible
R17	8.0	8.1	+0.1	0	Negligible
R18	8.0	8.1	<0.1	0	Negligible

*discrepanices due to rounding effects

Predicted concentrations of NO₂ and PM₁₀ are below the current annual mean air quality objectives of 40µg.m⁻³ at all modelled receptor locations. PM_{2.5} concentrations are below the current annual mean air quality objective of 20µg.m⁻³. In addition, PM_{2.5} concentrations are predicted to be below the 2028 interim target of 12µg.m⁻³ and the 2040 future objective of 10µg.m⁻³.

In accordance with Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) guidance¹, and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023, the predicted impact is predicted to be ‘negligible’ at all receptor locations.

In accordance with guidance¹ and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), ‘negligible’ impacts are predicted to be ‘not significant’.

Pollutant concentration contour maps were also produced across the study area as shown in **Appendix B**. Pollutant concentrations were predicted to be below the relevant objectives for all pollutants across the Study Area.

2036 Completion Year

Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted in the 2036 Completion Year at identified existing receptor locations to consider the impact of the Sapcote Enhanced Scheme. Predicted pollutant concentrations are detailed in **Table 3** for NO₂, PM₁₀ and PM_{2.5} together with the ‘without HNRFI’ concentrations for comparison purposes. The predicted change in pollutant concentrations resulting from development-generated traffic, and the associated impacts are also provided.

Table 3: Predicted Annual Mean NO₂, PM₁₀ and PM_{2.5} Concentrations and Sapcote Enhanced Scheme Impact at Receptor Locations for 2036 Completion Year

Receptor	2036 Completion Year Without HNRFI (µg.m ⁻³)	2036 Completion Year With HNRFI (µg.m ⁻³)	Concentration Change* (µg.m ⁻³)	Change in Concentration Relative to Air Quality Assessment Level (%)	Impact
NO₂					
R12	8.2	9.0	+0.8	2	Negligible
R13	7.9	8.4	+0.4	1	Negligible
R14	8.0	8.5	+0.5	1	Negligible
R15	8.2	8.9	+0.7	2	Negligible
R16	7.6	7.9	+0.3	1	Negligible
R17	7.6	8.0	+0.4	1	Negligible
R18	7.6	7.9	+0.3	1	Negligible
PM₁₀					
R12	12.7	12.9	+0.3	1	Negligible
R13	12.5	12.6	+0.1	0	Negligible
R14	12.6	12.7	+0.2	0	Negligible
R15	12.7	12.9	+0.2	1	Negligible
R16	12.7	12.8	+0.1	0	Negligible
R17	12.7	12.9	+0.1	0	Negligible
R18	12.7	12.8	+0.1	0	Negligible
PM_{2.5}					
R12	8.1	8.2	+0.1	1	Negligible

¹ Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality

Receptor	2036 Completion Year Without HNRFI ($\mu\text{g.m}^{-3}$)	2036 Completion Year With HNRFI ($\mu\text{g.m}^{-3}$)	Concentration Change* ($\mu\text{g.m}^{-3}$)	Change in Concentration Relative to Air Quality Assessment Level (%)	Impact
R13	8.0	8.1	+0.1	0	Negligible
R14	8.1	8.1	+0.1	0	Negligible
R15	8.1	8.2	+0.1	1	Negligible
R16	8.0	8.0	+0.1	0	Negligible
R17	8.0	8.1	+0.1	0	Negligible
R18	8.0	8.2	+0.1	0	Negligible

*discrepancies due to rounding effects

Predicted concentrations of NO_2 and PM_{10} are below the current annual mean air quality objectives of $40\mu\text{g.m}^{-3}$ at all modelled receptor locations. $\text{PM}_{2.5}$ concentrations are below the current annual mean air quality objective of $20\mu\text{g.m}^{-3}$. In addition, $\text{PM}_{2.5}$ concentrations are predicted to be below the 2028 interim target of $12\mu\text{g.m}^{-3}$ and the 2040 future objective of $10\mu\text{g.m}^{-3}$.

In accordance with IAQM and EPUK guidance¹ and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), the predicted impact is predicted to be ‘negligible’ at all receptor locations.

In accordance with guidance¹ and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), ‘negligible’ impacts are predicted to be ‘not significant’.

Pollutant concentration contour maps were also produced across the Study Area as shown in **Appendix B**. Pollutant concentrations were predicted to be below the relevant objectives for all pollutants across the Study Area.

Comparison of Impacts to Original Sapcote Scheme

2026 Opening Year

As detailed above, the Sapcote Enhanced Scheme is predicted to result in negligible and not significant impacts when compared to the without HNRFI scenarios for the Opening Year of 2026. **Table 4** below details the results of the Sapcote Enhanced Scheme in comparison with the Original Sapcote Scheme assessed in the ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023).

Table 4: Difference in Concentration Changes and Impacts between the Original Scheme and the Enhanced Scheme for the 2026 Opening Year.

Receptor	Original Scheme Concentration Change* ($\mu\text{g.m}^{-3}$)	Enhanced Scheme Concentration Change* ($\mu\text{g.m}^{-3}$)	Difference in Change between Enhanced Scheme and Original Scheme ($\mu\text{g.m}^{-3}$)	Original Scheme Impact	Enhanced Scheme Impact	Difference in Impact between Enhanced Scheme and Original Scheme
NO_2						
R12	+0.5	+1.3	+0.8	Negligible	Negligible	No Change
R13	+0.3	+0.7	+0.4	Negligible	Negligible	No Change
R14	+0.3	+0.8	+0.5	Negligible	Negligible	No Change

Receptor	Original Scheme Concentration Change* ($\mu\text{g.m}^{-3}$)	Enhanced Scheme Concentration Change* ($\mu\text{g.m}^{-3}$)	Difference in Change between Enhanced Scheme and Original Scheme ($\mu\text{g.m}^{-3}$)	Original Scheme Impact	Enhanced Scheme Impact	Difference in Impact between Enhanced Scheme and Original Scheme
R15	+0.4	+1.1	+0.7	Negligible	Negligible	No Change
R16	+0.1	+0.5	+0.4	Negligible	Negligible	No Change
R17	+0.1	+0.6	+0.5	Negligible	Negligible	No Change
R18	+0.2	+0.5	+0.3	Negligible	Negligible	No Change
PM₁₀						
R12	+0.2	+0.3	+0.1	Negligible	Negligible	No Change
R13	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R14	+0.1	+0.2	+0.1	Negligible	Negligible	No Change
R15	+0.1	+0.2	+0.1	Negligible	Negligible	No Change
R16	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R17	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R18	+0.1	+0.1	0.0	Negligible	Negligible	No Change
PM_{2.5}						
R12	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R13	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R14	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R15	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R16	0.0	<0.1	0.0	Negligible	Negligible	No Change
R17	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R18	0.0	<0.1	0.0	Negligible	Negligible	No Change

*discrepancies due to rounding effects

Table 4 shows that the Enhanced Scheme results in larger concentration changes than the Original Scheme in the 2026 Opening Year at all receptor locations considered for NO₂, at all receptors apart from R13 and R18 for PM₁₀, and at no receptors apart from R16 for PM_{2.5}. Whilst there are increases in the pollutant concentrations changes, the overall impact of the Enhanced Scheme, in accordance with IAQM and EPUK guidance¹, and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), is Negligible for all receptors for NO₂, PM₁₀ and PM_{2.5}, for the 2026 Opening Year, which is no change from the overall impact of the Original Sapcote Scheme.

2036 Completion Year

As detailed above, the Sapcote Enhanced Scheme is predicted to result in negligible and not significant impacts when compared to the without HNRFI scenarios for the Completion Year 2036. **Table 5** below details the results of the Sapcote Enhanced Scheme in comparison with the Original Sapcote Scheme assessed in the ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023).

Table 5: Difference in Concentration Changes and Impacts between the Original Scheme and the Enhanced Scheme for the 2036 Completion Year.

Receptor	Original Scheme Concentration Change* ($\mu\text{g.m}^{-3}$)	Enhanced Scheme Concentration Change* ($\mu\text{g.m}^{-3}$)	Difference in Change between Enhanced Scheme and Original Scheme ($\mu\text{g.m}^{-3}$)	Original Scheme Impact	Enhanced Scheme Impact	Difference in Impact between Enhanced Scheme and Original Scheme
NO₂						
R12	+0.4	+0.8	+0.4	Negligible	Negligible	No Change
R13	+0.2	+0.4	+0.2	Negligible	Negligible	No Change
R14	+0.2	+0.5	+0.3	Negligible	Negligible	No Change
R15	+0.3	+0.7	+0.4	Negligible	Negligible	No Change
R16	+0.1	+0.3	+0.2	Negligible	Negligible	No Change
R17	+0.1	+0.4	+0.3	Negligible	Negligible	No Change
R18	+0.1	+0.3	+0.2	Negligible	Negligible	No Change
PM₁₀						
R12	+0.2	+0.3	+0.1	Negligible	Negligible	No Change
R13	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R14	+0.1	+0.2	+0.1	Negligible	Negligible	No Change
R15	+0.2	+0.2	0.0	Negligible	Negligible	No Change
R16	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R17	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R18	+0.1	+0.1	0.0	Negligible	Negligible	No Change
PM_{2.5}						
R12	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R13	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R14	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R15	+0.1	+0.1	0.0	Negligible	Negligible	No Change
R16	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R17	0.0	+0.1	+0.1	Negligible	Negligible	No Change
R18	0.0	+0.1	+0.1	Negligible	Negligible	No Change

*discrepancies due to rounding effects

Table 5 shows that the Enhanced Scheme results in larger concentration changes than the Original Scheme in the 2036 Completion Year at all receptor locations considered for NO₂, at all receptors apart from R13, R15 and R18 for PM₁₀ and at no receptors apart from R16, R17 and R18 for PM_{2.5}. Whilst there are increases in the pollutant concentrations changes, the overall impact of the Enhanced Scheme, in accordance with IAQM and EPUK guidance¹, and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023), is Negligible for all receptors for NO₂, PM₁₀ and PM_{2.5}, for the 2036 Completion Year, which is no change from the overall impact of the Original Sapcote Scheme.

Whilst the Enhanced Scheme is predicted to result in some larger concentration increases at receptor locations in both the 2026 Opening Year and 2036 Completion Year when compared to the Original Scheme, the overall impacts have not changed and still remain negligible and not significant in accordance with IAQM and EPUK guidance¹, and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air

Quality Addendum (document reference: AS-023). In addition, as previously discussed, it is considered that the Enhanced Scheme has utilised a robust approach as a constant queue has been modelled for 24 hours a day, 365 days a year, with an average speed of 10mph for all vehicles, which will not be the reality. It is therefore considered that the Enhanced Scheme will not result in any additional adverse impacts with regard to air quality.

Summary

A highly conservative and robust air dispersion modelling assessment was undertaken to consider any impacts on local air quality associated with the Sapcote Enhanced Scheme.

Predicted pollutant concentrations, considering the Enhanced Scheme, including carriageway narrowing's and associated potential queueing, and carriageways widenings to allow large vehicles to pass each other and to introduce a new bus stop layby, are predicted to be below the current relevant air quality objectives and the 2028 interim and 2040 future air quality objectives for PM_{2.5}. In accordance with IAQM and EPUK guidance¹, and in line with the methodology used in ES Chapter 9 – Air Quality (document reference: APP-118) and the Air Quality Addendum (document reference: AS-023) impacts are predicted to be 'negligible' at all receptors. In accordance with guidance, 'negligible' impacts are considered to be 'not significant'.

A conservative and robust assessment was undertaken as follows:

- The queue period was applied to all vehicles for 24 hours a day, 365 days a year, along the length of the B4669 where in reality, queueing will not be constantly present.
- An assessment year of 2026 was utilised, assuming all operational phase HNRFI traffic is on the road network, where in reality, a smaller proportion of this traffic will be utilising the road network in 2026. In addition, vehicle emission factors and background concentrations are expected to decrease in future years as vehicle technologies improve, therefore the 2026 assessment has considered higher traffic flows, higher vehicle emission factors and higher backgrounds than will be the reality once the whole Main HNRFI Site is operational

It is therefore considered modelled pollutant concentrations are likely to be lower than those presented in this technical note, and the impact of the Sapcote Enhanced Scheme is 'not significant' with regards to local air quality.

A comparison was undertaken of the pollutant concentration changes predicted between the Original Scheme and the Enhanced Scheme. Whilst the Enhanced Scheme is predicted to result in some higher concentration changes when compared to the Original Scheme, the overall impacts remain negligible and not significant. In addition, a robust Enhanced Scheme was modelled where the queue period was applied to all vehicles for 24 hours a day, 365 days a year, along the length of the B4669 where in reality, queueing will not be constantly present.

It is therefore considered that the Enhanced Scheme will not result in any additional adverse impacts with regard to air quality.

APPENDICES

APPENDIX A: MODELLED ROADS AND RECEPTORS

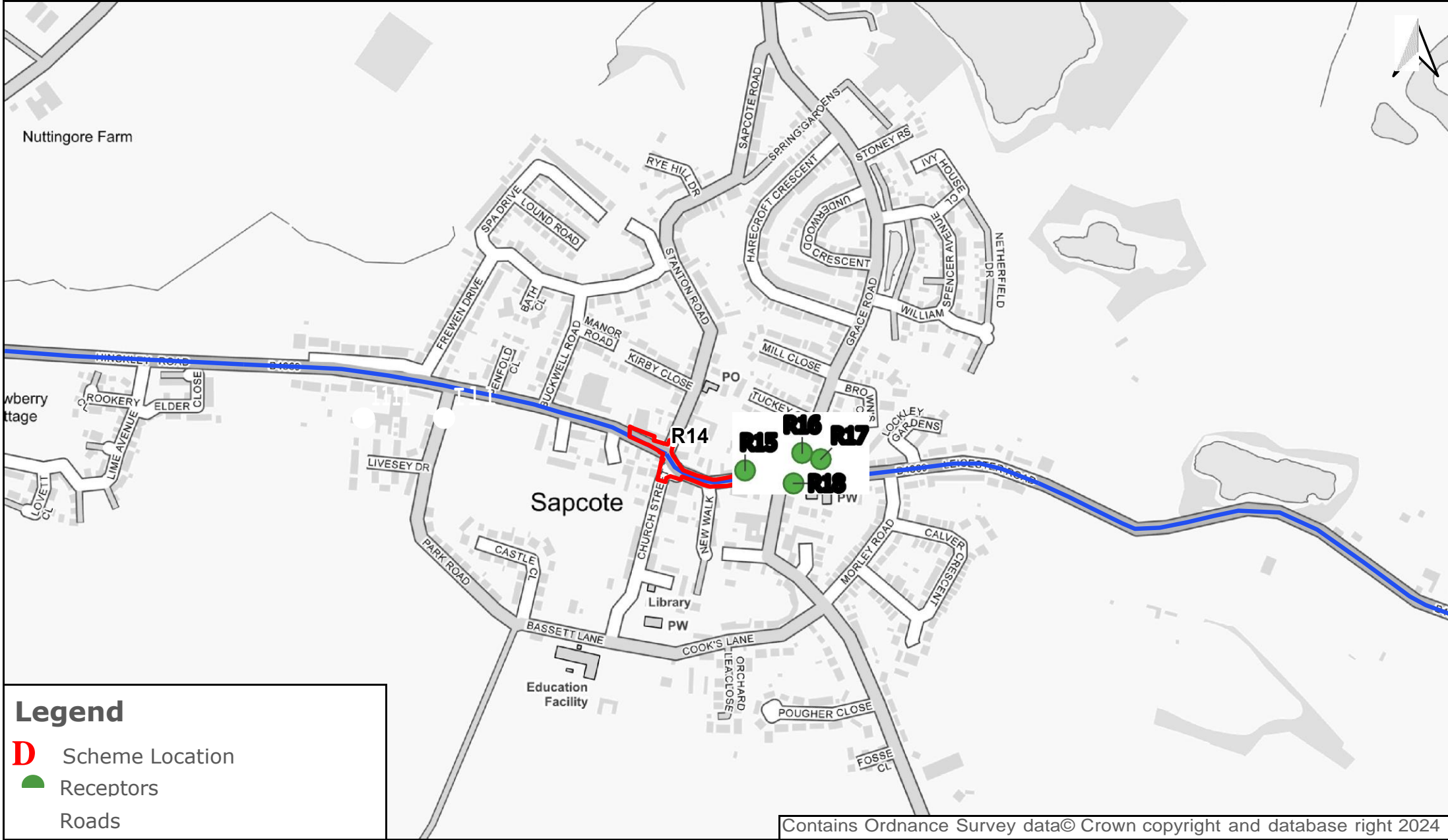


Figure 1: Modelled Roads and Receptors

Drawn by: AVS
Date: 22/10/2024



APPENDIX B: POLLUTANT CONCENTRATION CONTOURS AND IMPACTS



Figure 2: Annual Mean NO_2 Concentrations - 2026
Opening Year With Development

Drawn by: AVS
 Date: 23/10/2024



**Figure 3: Annual Mean PM₁₀ Concentrations - 2026
Opening Year With Development**

Drawn by: AVS
Date: 23/10/2024



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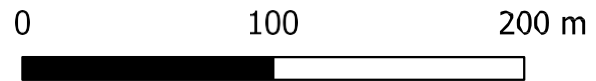
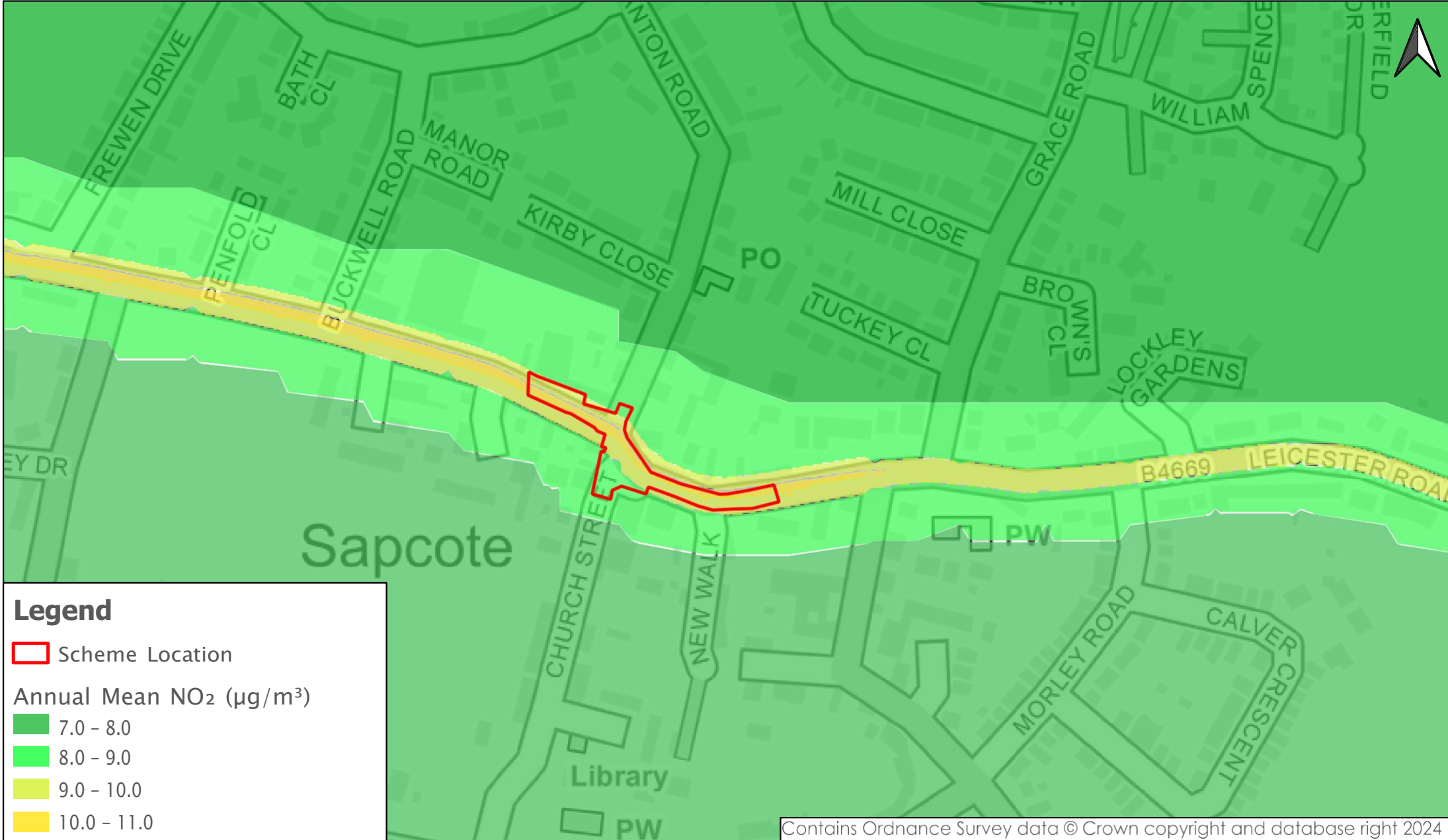


Figure 4: Annual Mean PM_{2.5} Concentrations - 2026
Opening Year With Development

Drawn by: AVS
 Date: 23/10/2024





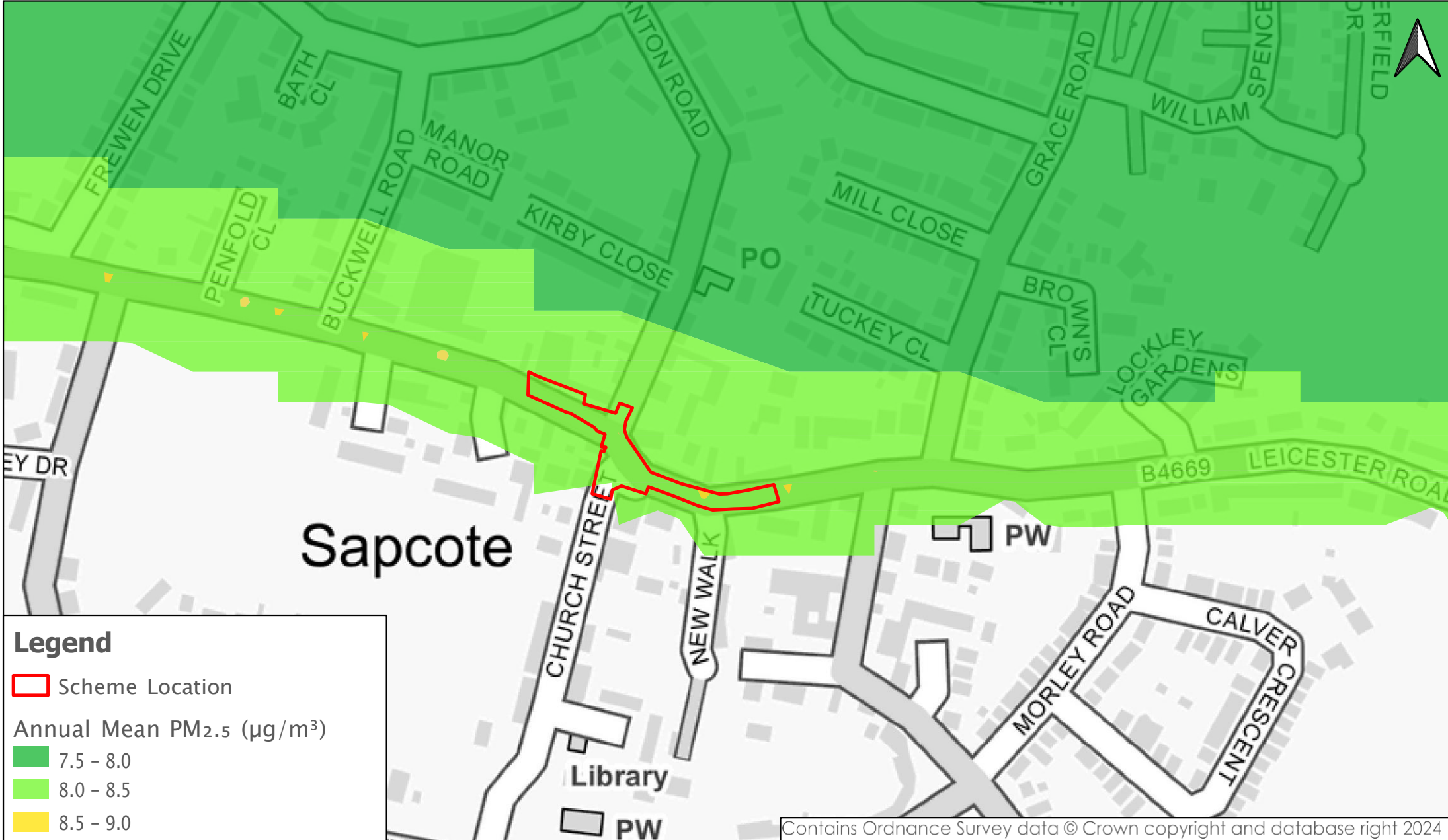
**Figure 5: Annual Mean NO₂ Concentrations - 2036
Completion Year With Development**

Drawn by: AVS
Date: 22/10/2024



**Figure 6: Annual Mean PM₁₀ Concentrations - 2036
Completion Year With Development**

Drawn by: AVS
Date: 22/10/2024



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**Figure 7: Annual Mean PM_{2.5} Concentrations - 2036
Completion Year With Development**

Drawn by: AVS
Date: 22/10/2024

