

Edinburgh Meadows to George Street

Air Quality Assessment

City of Edinburgh Council

August 2023

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
V0.1	22.09.2023	Draft			Technical Director

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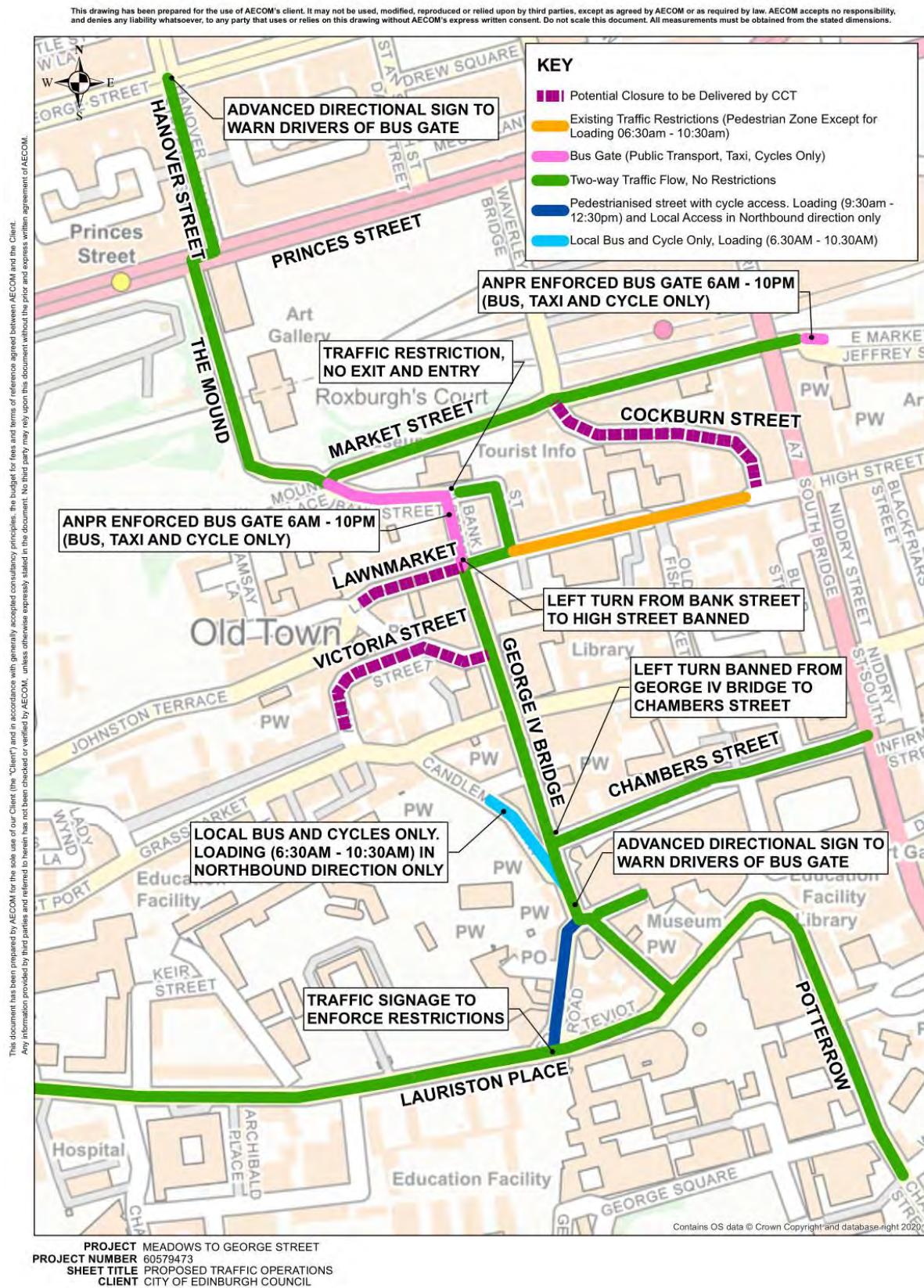
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1. Introduction

Project Background

- 1.1 The Meadows to George Street (MGS) development (herein referred to as the “Proposed Scheme”) aims to provide key walking and cycling improvements extending from Teviot Place to Hanover Street in Edinburgh city centre. The project forms a key part of the City of Edinburgh Council’s (CoEC) ambitions for the City in the next 10 years outlined in their Edinburgh City Centre Transformation Strategy (ECCTS) document (City of Edinburgh Council, 2019). As a result of the Proposed Scheme, walking, cycling and public transport will be prioritised over general through traffic in this area by the creation of additional cycleways, wider pavements and the closure of streets to certain traffic types.
- 1.2 The implementation of the Proposed Scheme will result in the following specific changes to roads in the city centre which will have a potential impact on traffic patterns (and hence emissions), also summarised in Figure 1:
 - Pedestrianisation of Forrest Road and pedestrian priority granted on Candlemaker Row;
 - Candlemaker Row, between Merchant Street and George IV Bridge, all traffic removed other than the number 2 bus service and access for residents of the street;
 - Limited loading allowed on Candlemaker Row and no loading permitted along Forrest Road, George IV bridge, Bristo Place and Bank Street;
 - Market Street bus gate: a new bus gate on Market Street at the junction with Jeffrey Street, permitting access only for buses, taxis and cycles during hours of operation, two new mini roundabouts, and new and improved pedestrian crossings;
 - Bus priority corridor, with no general through traffic on Bank Street, between Market Street and Lawnmarket;
 - Segregated cycleways on Forrest Road, George IV Bridge, The Mound, Bank Street and Hanover Street; and
 - Wider, decluttered pavements and continuous footways at key points, such as Victoria Street and Candlemaker Row.
- 1.3 CoEC’s objectives include creating a place for people and an improved pedestrian space; connecting and respecting the World Heritage Site with increased pedestrian access; provide sustainable and inclusive transport including a dedicated space for walking, cycling, accessibility, and retaining public transport access; and enable a thriving economy for businesses of all sizes (Meadows to George Street, 2023).

Figure 1: Traffic Changes due to the Proposed Scheme



Source: Meadows to George Street, 2023. Project Details. Available at: https://meadowstogeorgestreet.info/wp-content/uploads/2022/04/Transport-Operations-Plan_MGS-March-2022.jpg

Scope of Assessment

1.4 An initial baseline appreciation was undertaken by the AECOM team in 2020 in order to identify an appropriate air quality study area. This was based on liaison with the Project's Transport Consultants and a review of air quality monitoring in the vicinity of the Proposed Scheme area.

1.5 Following the baseline appreciation, the agreed air quality assessment scope of works is summarised below with detailed methodology provided in Section 3:

- Prediction of pollutant concentrations using the ADMS-Roads software, at sensitive receptors adjacent to all roads that traffic data was available for. Based on the extent of the traffic impacts, all road links were included in the assessment where data was available.
- Emissions calculated using Defra's most up to date version of the Emission Factor Toolkit (EFT) using the traffic data provided by the Project Transport Consultants, with some conservative assumptions of improvements in vehicle fleet.
- Data from St Leonards automatic monitoring station was utilised for background pollutant concentrations in combination with Air Quality Scotland (AQS) and Defra background concentrations, to include an appreciation of representative background concentrations over the whole study area.
- Air quality modelling is typically verified by comparison with monitoring data. Based on a review of CoEC monitoring, it was decided that there was sufficient data from the existing network to satisfactorily verify the air quality model. Considering that the traffic model data used in the model verification was undertaken prior to the new junction layout at Picardy Place, 2018 monitoring data was the most recent representative year to verify model outputs for, and to provide an appropriate baseline characterisation.
- The local air quality impacts of the Proposed Scheme were appraised for the opening year of 2025 and described in accordance with the Environmental Protection Scotland and the Royal Town Planning Institute Scotland assessment terminology (EPS/RTPI, 2017), with reference to air quality criteria.
- To ensure the air quality assessment considered the wide number of other City Schemes aimed at reducing traffic in the city centre, including ECCT and the Low Emission Zone, a future year assessment of 2026 was also presented, to incorporate consideration of modal shift.

1.6 The following four scenarios were included as part of the air quality assessment:

Scenario 1. Base year (2018)

Scenario 2. Opening year (2025) Do Minimum

Scenario 3. Opening year (2025) with MGS Scheme

Scenario 4. Future year (2026) with MGS Scheme and a 5% traffic flow reduction in strategic movements

2. Legislation, Policy Context and Guidance

European and National Legislation

- 2.1 The United Kingdom (UK) is no longer a member of the European Union (EU). Most EU legislation as it applied to the UK on 31st December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies as a form of domestic legislation known as 'retained EU legislation'. This is set out in Sections 2 and 3 of the European Union (Withdrawal) Act 2018. Section 4 of the European Union (Withdrawal) Act 2018 ensures that most remaining EU rights and obligations, including directly effective rights within EU treaties, continue to be recognised and available in domestic law after exit.
- 2.2 The Clean Air for Europe (café) programme consolidated and replaced (with the exception of the 4th Daughter Directive) preceding directives with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC ('EU Air Quality Framework Directive') (European Parliament, Council of the European Union, 2008). This directive is transcribed into Scottish legislation set out in the Air Quality (Scotland) Regulations 2000 (Scottish Government, 2000), the Air Quality (Scotland) Amendment Regulations 2002 (Scottish Government, 2002) and the Air Quality (Scotland) Amendment Regulations 2016 (Scottish Government, 2016). These Standards transpose the EU Directive 2008/50/EC into law. Air quality limit values (AQLVs) were published for 7 pollutants, as well as Target Values for an additional 5 pollutants.
- 2.3 Part IV of the Environment Act (2021) requires UK governments to produce a national Air Quality Strategy which contains standards, objectives and measures for improving ambient air quality. The most recent Air Quality Strategy for Scotland was produced by the Scottish Government and its partner organisations in July 2021, Clean Air for Scotland 2 (CAFS2) Strategy (Scottish Government, 2021). The CAFS2 sets out how the Scottish Government propose to reduce air pollution to protect human health and fulfil Scotland's legal responsibilities over the period 2021-2026. The Air Quality Strategy sets out Air Quality Objectives (AQO) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. Table 1 provides a summary table for current AQOs in Scotland concerning pollutants considered within this study.

Table 1: Current Air Quality Objectives in Scotland (Scottish Government, 2010) (Scottish Government, 2016)

Pollutant	Concentration ($\mu\text{g}/\text{m}^3$)	Measured as	Permitted exceedances of objective value
Nitrogen Dioxide, NO_2	200	1-hour mean	Not to be exceeded more than 18 times a year
	40	Annual mean	None
Particulates, PM_{10}	50	24-hour mean	Not to be exceeded more than 7 times per year
	18	Annual mean	None
Particulates, $\text{PM}_{2.5}$	10	Annual mean	None

National Planning Policy

National Planning Framework 4

- 2.4 The National Planning Framework (NPF4) was adopted on 13th February 2023 and sets out the Scottish Government's priorities and policies for the planning system up to 2045 and how the approach to planning and development will help achieve net zero, and a sustainable Scotland by 2045 (Scottish Government, 2023). NPF4 differs from previous NPFs as it incorporates the NPF and Scottish Planning Policy (SPP) into a single document forming part of the statutory development plan.
- 2.5 Within NPF4, Policy 23 within NPF4 states:

“Development proposals that are likely to have significant adverse impacts on air quality will not be supported. Development proposals will consider opportunities to improve air quality and reduce exposure to poor air quality. An air quality assessment may be required where the nature of the proposal or the air quality in the location suggest significant effects are likely.”

Scottish Planning Policy

2.6 The Scottish Planning Policy (SPP) document (Scottish Government, 2014) is a statement of the Scottish Government’s policy on nationally important land use matters.

2.7 SPP facilitates development while at the same time *“protecting and enhancing the natural and built environment”* and is considered to be central to the Scottish Government’s central purpose of achieving sustainable economic growth (Paragraph 4). The SPP refers to air quality numerous times.

2.8 Policies and decisions should be guided by:

“...avoiding over-development, protecting the amenity of new and existing development and considering the implications of development for water, air and soil quality.”

2.9 It is stipulated that plans for local development should:

“...set out the factors that specific proposals will need to address, including: disturbance, disruption and noise, blasting and vibration, and potential pollution of land, air and water.”

2.10 Town centre strategies should:

“...identify how green infrastructure can enhance air quality, open space, landscape/settings, reduce urban heat island effects, increase capacity of drainage systems, and attenuate noise.”

Cleaner Air for Scotland

2.11 Cleaner Air for Scotland (CAFS) is a strategy, set out in conjunction with Transport Scotland, Scottish Environment Protection Agency (SEPA), Health Protection Scotland and health boards as well as local authorities to provide a national framework to help improve air pollution and fulfil legal responsibilities (Scottish Government, 2015). The original CAFS document was published in 2015, with an updated CAFS (CAFS2) strategy published in July 2021 (Scottish Government, 2021).

2.12 CAFS2 strategy provides detail on air pollution in general and ways to reduce the impact of air quality.

2.13 The CAFS2 strategy document sets out a number of actions relevant to the Proposed Scheme, including the following:

- **Placemaking Actions**
 - *“We will ensure that NPF4 has regard to CAFS 2 in its preparation, in accordance with the Planning (Scotland) Act 2019.”*
 - *“We will work with local authorities to assess how effectively air quality is embedded in plans, policies, City Deals and other initiatives, and more generally in cross-department working, identifying and addressing evidence, skills, awareness and operational gaps.”*
- **Transport Actions**
 - *“We will work with local authorities to ensure that noise action plans are closely aligned with air quality action plans to deliver co-benefits. Guidance will be produced to facilitate this.”*
 - *“We will ensure that all actions taken by the Scottish Government to address air quality maximise the potential for co-benefits with climate change mitigation and adaptation. The 50 recommendations for maximising co-benefits set out in the CAFS Governance Group climate change report will be used to guide this process. We will work with local authorities to ensure that a similar approach is taken at local level.”*
 - *“We will ensure that actions in the Scottish Government’s Climate Change Plan maximise co-benefits for air quality.”*

- *“We must enable a modal shift from private cars to mass transit at a faster pace than occurred in the 2010s, whilst reversing the decrease in public transport use observed during the COVID-19 pandemic.”*
- *“We will explore how we can reallocate road space to cycling and pedestrians following learning from COVID-19 spaces for people scheme.”*

2.14 The document also highlights:

“The overarching objectives of the Scottish Government’s transport policy are: A Scotland that is connected by a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors. A sustainable travel hierarchy that promotes both a reduction in the need to travel, a modal shift to minimise transport emissions and effectively manage demand to reduce the number of road-based vehicle movements.”

National Guidance

Delivering Cleaner Air for Scotland

- 2.15 Delivering Cleaner Air for Scotland is a guidance document put together in 2017 by Environmental Planning Scotland (EPS) and the Royal Town Planning Institute (RTPI Scotland (EPS/RTPI, 2017), which refers to IAQM guidance from 2015. Whilst this document was released prior to the 2017 version of the IAQM and EPUK guidance (EPUK/IAQM, 2017), it relates more specifically to Scotland and its national policy and objectives. Both documents have been referenced in this assessment.
- 2.16 The document details guidance for local authorities and consultants on criteria to use when undertaking an air quality assessment and notes the following recommendations in relation to air quality assessment:
- Planning Process and Reducing Air Quality impacts: *“Major applications may be approved subject to conditions AQAs should be prepared and considered by the planners and committee as part of processing the application.”*
 - Approaches to Reducing Emissions and Impacts: *“Where new roads are proposed in close proximity to housing an adequate modelling exercise to predict exposure of local residents to air pollution should be undertaken using approved modelling methods and take account of vulnerable sectors of the population.”*

Local Planning Policy

Edinburgh Local Development Plan

- 2.17 The existing Local Development Plan (LDP) (City of Edinburgh Council, 2016) was adopted in November 2016 and sets out local strategy and policy to direct development within in the city during the next five-to-ten-year period. CoEC are currently working towards the publication of an update to this Plan entitled “City Plan 2030”, however, this document remains at the consultation stage.
- 2.18 There is a specific policy set in relation to air quality. Policy Env 22 ‘Pollution and Air, Water and Soil Quality’ states that planning permission will only be granted for new developments where *“...there will be no significant adverse effects on: air quality”* or to include *“appropriate mitigation to minimise any adverse effects can be provided.”*
- 2.19 The LDP also includes the following policies relevant to air quality and the Proposed Scheme:
- Policy Del 2 ‘City Centre’ states that developments will be required to include *“the creation of new civic spaces and traffic-free pedestrian routes where achievable.”*
 - Policy Des 7 ‘Layout Design’ dictates that planning permission will be granted where:

“...the layout will encourage walking and cycling, cater for the requirements of public transport if required and incorporate design features which will restrict traffic speeds to an appropriate level and minimise potential conflict between pedestrians, cyclists and motorised traffic...”

“...public open spaces and pedestrian and cycle routes are connected with the wider pedestrian and cycle network including any off-road pedestrian and cycle routes where the opportunity exists.”

Edinburgh City Centre Transformation Plan

- 2.20 The Edinburgh City Centre Transformation (ECCT) Plan (City of Edinburgh Council, 2019) adopted in September 2019, sets out the council's strategy for the next 10 years to *“rebalance the design, management, and operation of the city centre”*. CoEC aim to prioritise active and public transport and to *“adapt public spaces to better support urban life and a thriving economy”* with the Proposed Scheme being one of their key proposals.
- 2.21 The ECCT Plan claims the Proposed Scheme is; *“central to increasing the city's modal share for travel by bike”*, and; *“Full implementation of current Active Travel Action Plan programme, including... the Meadows to George Street scheme.”*
- 2.22 The ECCT includes a number of requirements to be met in response to an identified city-wide environmental problem in relation to air quality:
- *“Reduce harmful emissions to air*
 - *Encourage modal shift to lower emission modes of travel*
 - *Protect citizens from the harmful effects of air pollution*
 - *Air quality should not be compromised by new or existing development and where places are designed to minimise air pollution and its effects”*

Edinburgh Air Quality Action Plan

- 2.23 Air Quality Management Areas (AQMA) have been established as a result of poor air quality, largely due to traffic congestion within the city. Air Quality Action Plans (AQAP) have been put together to help reduce emissions in these areas by CoEC, with a draft AQAP published in December 2022 (City of Edinburgh Council, 2022).
- 2.24 The draft AQAP outlines a number of actions relevant to the Proposed Scheme, including:
- *Action 1.1 Implementation of the Low Emission Zone*
 - *Action 2: Support and Implement Strategic Transport Improvements*
 - *Action 2.1: In the context of a strategic approach to traffic management that seeks to reduce motorised traffic and encourage public transport and active travel, seek to ensure that traffic management projects achieve positive impacts on air quality especially in locations in breach of, or at risk of breaching, air quality objectives, and include mitigations for negative impact.*
 - *Action 2.3: In conjunction with Transport Scotland, seek to ensure that investigate the feasibility of any new traffic management schemes within the Glasgow Road AQMA to reduce the impacts of congestion achieve improvements in local air quality and reduce exposure to pollutants.*
 - *Action 3: Promote Active Travel to Reduce Private Vehicle Use*
 - *Action 4: Support and Implement Public Transport Improvements*
 - *Action 4.1: Ensure that air quality is considered in the new Public Transport Action Plan*
 - *Action 4.2: Support projects to decarbonise the Edinburgh bus fleet*
 - *Action 5: Support the Use of Low Emission Vehicles*

3. Assessment Methodology

- 3.1 The air quality assessment has been undertaken in accordance with Delivering Cleaner Air for Scotland (EPS/RTPI, 2017) and the Institute of Air Quality Management guidance (EPUK/IAQM, 2017), to assess the long term operational impact of the Proposed Scheme upon pollutant concentrations (nitrogen dioxide (NO₂), and particulate matter (PM₁₀ and PM_{2.5})).

Traffic Data

- 3.2 The Project Transport Consultant provided modelled data extracted from the strategic VISUM model, including traffic counts for a peak AM 2-hour and a peak PM 2-hour period, as well as the proportion of traffic relating to heavy goods vehicles (HGVs) on each link. Data relating to buses within the network was also provided. These were combined with HGV counts to give a heavy duty vehicle (HDV) count.
- 3.3 The traffic model version is understood to represent a 2016 base year. Based on the information provided by the Project Transport Consultant, it is understood that work undertaken for both ECCT and the Proposed Scheme assume that there would be no background traffic growth included for future year modelling. Therefore, the traffic model was considered representative of current and future year traffic demands.
- 3.4 As the 2016 traffic model year used in the air quality model verification process was undertaken prior to the new junction layout implemented in 2019 at Picardy Place, 2018 monitoring data was considered the most recent representative year to verify model outputs for, and to provide an assessment baseline characterisation where CoEC air quality monitoring data was available at the time of writing (City of Edinburgh Council, 2019). An air quality assessment base year of 2018 was therefore considered appropriate.
- 3.5 It should be noted that the impacts of the Low Emission Zone (LEZ) being implemented have not been included in any of the traffic models used to generate data for use within the air quality assessment, with the exception of Morrison Street two-way and Tollcross right turn.
- 3.6 The scenarios of traffic data made available and appropriate to use in the air quality assessment are therefore as follows (scenario name in the air quality assessment in brackets):
1. Base year. The base traffic model layout is understood to be a 2016 model, considered representative of 2018, prior to the implementation of the Picardy Place development in 2019 (Base Year 2018)
 2. ECCT Scenario 2, without the Proposed Scheme (Opening year (2025) Do Minimum)
 3. ECCT Scenario 2, with the Proposed Scheme, to include Market Street bus gate and Tarvit Street closure (Opening year (2025) with MGS Scheme)
 4. ECCT Scenario 2 with the Proposed Scheme, to include Market Street bus gate and Tarvit Street closure with a 5% reduction in targeted trips through Edinburgh city centre. 5% has been used instead of a possible 10%, as a cautious estimate. Although the majority of City Centre schemes will be in place by 2025, a 10% reduction is a longer-term estimate once the full impact of the schemes have been realised and people's travel behaviours have changed. A 5% reduction is considered to be more realistic for 2026. (Future year (2026) with MGS Scheme and a 5% traffic flow reduction in strategic movements)
- 3.7 The following list of developments have been included in all traffic data for Opening Year 2025 and Future Year 2026 scenarios:
- New Picardy Place gyratory;
 - Waverley Bridge closed;
 - Design refinement of George Street / Hanover Street to support active travel;
 - Four additional network changes: bus stop rationalization on the Bridges corridor, Lothian Road to Western Approach lane rationalisation, George Street / Hanover Street active travel improvements, and Tollcross junction improvement;

- Tarvit Street one-way; and
 - Edinburgh's LEZ (Morrison Street two-way and Tollcross right turn)
- 3.8 AECOM's Transport Team scaled the peak hour data into annual average daily traffic (AADT) using automated traffic count (ATC) data from 14 sites across Edinburgh collected in a 2016 and 2019 study. Traffic counts for the AM and PM peak hours were compared to the AADT counts at these sites in order to calculate appropriate scaling factors for light vehicles (LVs), HGVs, and buses which were averaged across all sites to produce global scaling factors. These factors were then applied to the provided peak hour data for all scenarios to give the AADTs and HDV percentage for each link.
- 3.9 Based on the screen of the traffic impacts in the initial baseline appreciation, it was apparent that the Proposed Scheme had potential to affect air quality across the city due to the extent of traffic being redirected as a result of its implementation. All roads that traffic data was available for have therefore been included in the study as shown in Figure A-1 in Appendix A for all scenarios.
- 3.10 Data for a number of the road links provided by the Project Transport Consultant from the VISUM model had an assigned speed of zero kph. Following guidance from the Project Transport Consultant, appropriate speeds in the range 20-25 or 25-30 kph were applied to these links, based on the data at nearby local roads. Details of the assignments are provided in Table B-1 in Appendix B.
- 3.11 The traffic data provided does not allow for the accurate representation of conditions at junctions as links are not broken down into sufficient detail as to give lower speeds i.e. queuing in these locations. As discussed in the CoEC AQAP, traffic congestion is recognised as a key issue in the city, being a main cause of AQMA declarations.

Emissions Modelling

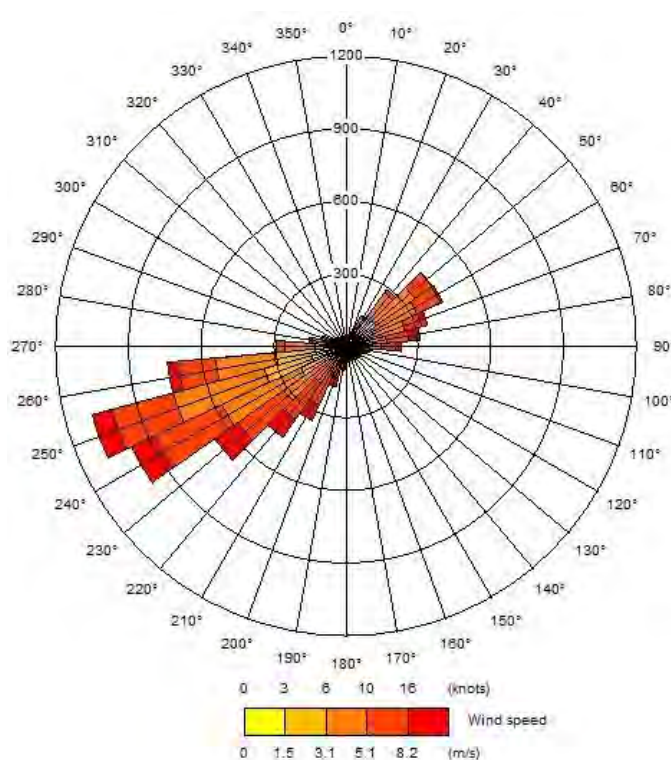
- 3.12 The assessment used the latest version of dispersion model software ADMS-Roads v5 (CERC, 2020) to quantify baseline and with-development pollution levels at selected receptors. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies.
- 3.13 Defra's Emission Factor Toolkit (EFT) (version 11) (Defra, 2021) was used to convert the traffic data into vehicle emissions (g/km/s), which were input into the dispersion modelling software.
- 3.14 The following four scenarios have been modelled:
1. Base year (2018)
 2. Opening year (2025) Do Minimum
 3. Opening year (2025) with MGS Scheme
 4. Future year (2026) with MGS Scheme and a 5% traffic flow reduction in strategic movements
- 3.15 To ensure a cautious prediction of emissions in the opening year of 2025, 2023 emission factors were used to calculate emissions from traffic data for the opening year models. This is despite the withdrawal notes of the IAQM Position Statement (Institute of Air Quality Management, 2018) on vehicle emissions uncertainty noting that the EFT may be used with greater confidence for future year modelling. No amendments were however made to the future year scenario's emission calculations, in line with the withdrawal notes of the Position Statement.
- 3.16 Due to the architecture of Edinburgh's city centre, the ADMS-Roads advanced street canyon option was used to better represent the conditions experienced on certain roads in the network. Figure A-2 in Appendix A shows which roads within the network were modelled as canyons. LAQM TG22 guidance (Defra, 2022) defines a street canyon as a location where *"the height of buildings on both sides of the road is greater than the road width"*. Such effects can also apply in broader roads where there is reduced opportunity for the air to disperse. This situation is common in Edinburgh where the façades of adjacent buildings are flush with one another. Streets were assigned as street canyons where the height of buildings on both sides of the road is greater than the road width and also along roads where there is reduced opportunity for the air to disperse. OS Mastermap© building heights data was utilised to input to the canyon tool for the selected roads.
- 3.17 Details of general model conditions are provided in Table 2.

Table 2: General Model Conditions

Variables	Model Input
Surface roughness at meteorological measurement site	0.2 m
Surface roughness at dispersion site	1.5 m
Minimum Monin-Obukhov length for stable conditions	30 m
Terrain types	Flat
Receptor location	x,y coordinates determined by OS Mastermap© with z height of 0 m for basement receptors, 1.5 m for 1 st floor and 4.5 m for 2 nd floor.
Emissions	NO _x , PM ₁₀ , PM _{2.5} , based on the traffic data supplied
Emission factors	Emission Factor Toolkit version 11
Meteorological data	1 year (2018) hourly sequential data from Edinburgh Airport meteorology station
Street Canyoning	OS Mastermap© for building geometry and heights for input to the Advanced Street Canyon tool
Receptors	Selected human receptors
Model output	Long-term annual mean NO _x concentrations (µg/m ³) Long-term annual mean PM ₁₀ concentrations (µg/m ³) Long-term annual mean PM _{2.5} concentrations (µg/m ³)

Meteorological Data

- 3.18 One year (2018) of hourly sequential observation data from Edinburgh Airport meteorological station has been used in this assessment. The station is located approximately 10 km west of the Proposed Scheme and experiences meteorological conditions that are considered to be representative of those experienced in the air quality assessment study area.
- 3.19 The year 2018 has been chosen as it is a typical year, it has been used in recent air quality assessments by CoEC and it represents a known dataset, with no missing data issues.
- 3.20 The wind rose presented in Figure 2 indicates that the predominant wind direction is from the south-west.

Figure 2: 2018 Wind Rose from Edinburgh Airport

Background Pollutant Concentration Data

- 3.21 A large number of sources of air pollutants exist which individually may not be significant, but collectively, over a large area, need to be considered. The concentrations calculated by the model due to vehicle emissions can then be added to these background concentrations to give the total concentration.
- 3.22 Modelled estimations of background air quality concentrations are provided by AQS (Air Quality in Scotland, 2020) for each 1 km square in Scotland for each year between 2018 and 2030. This assessment has used AQS background concentrations for NO₂ and PM₁₀, and in the absence of PM_{2.5} data from AQS, Defra background mapping (Defra, 2020) has been used for PM_{2.5}; a UK wide 1 km square pollutant mapping. This is in line with guidance from AQS. Further detail on the background mapping data used within the modelling can be found in Table 6.
- 3.23 The air quality background 1 km grid square data from AQS and Defra was adjusted in communication with CoEC using a factor determined from a comparison of the relevant grid square data with the St Leonard's automatic background monitoring station data in the base year of 2018 (City of Edinburgh Council, 2019). The factors for NO_x, NO₂, PM₁₀ and PM_{2.5} were then applied to the air quality background 1 km grid square data from AQS and Defra in the Base Year (2018), Opening Year (2025) and Future Year (2026) to get the final background data for use in the assessment. Calculation of the adjustment factors is shown in Table 3.

Table 3: Air Quality Background Adjustment for use in Dispersion Modelling

Pollutant	Edinburgh St. Leonards Monitored Concentration ¹ (µg/m ³)	Corresponding Mapped Pollutant Concentration for grid square (µg/m ³)	Adjustment Factor
NO _x	25.0	31.0 ²	0.81
NO ₂	17.9	20.2 ²	0.89
PM ₁₀	10.7	12.2 ³	0.88
PM _{2.5}	6.3	6.7 ²	0.94

Source: 1. City of Edinburgh Council 2019 Annual Progress Report, 2. Defra Background Map, 3. Air Quality Scotland Background Maps

- 3.24 The Defra NO₂ Adjustment for NO_x Sector Removal Tool (Defra, 2020) was used to remove the contribution of Primary and Trunk roads from the NO₂ backgrounds to avoid double counting, as these road types were modelled as part of this assessment.

Sensitive Receptors

- 3.25 Long-term human health receptors across the network were selected to represent the worst-case conditions along each road. With reference to LAQM TG22 guidance (Defra, 2022) sensitive receptors relevant for comparison with long term annual mean AQO and therefore chosen to be modelled, included residential properties, schools and hospitals. A total of 392 receptors were assessed as shown in Figure A-3 in Appendix A.
- 3.26 The ADMS Roads model predicted concentrations of key pollutants at these receptors to inform the impact of the Proposed Scheme across the city.

Conversion of NO_x to NO₂

- 3.27 The proportion of NO₂ in NO_x varies greatly with location and time according to a number of factors including the amount of oxidant available and the distance from the emission source. NO_x concentrations are expected to decline in future years due to falling emissions, therefore NO₂ concentration will not be limited as much by ozone and consequently it is likely that the NO₂/NO_x ratio will in the future increase. In addition, a trend has been noted in recent years whereby roadside NO₂ concentrations have been increasing at certain roadside monitoring sites, despite emissions of NO_x falling.
- 3.28 In accordance with LAQM guidance (Defra, 2022), modelled road NO_x concentrations have been converted to total NO₂ concentrations using Defra's 'NO_x to NO₂' calculator (V8.1 released in August 2020) (Defra, 2020). The year and region for which the modelling has been undertaken are specified,

along with the appropriate Defra background NO₂ concentrations at each receptor. For this assessment, the tool was run for the City of Edinburgh region in the year 2018 for the base (Scenario 1), 2025 for the Opening Year “Do Minimum” and “with MGS Scheme” (Scenarios 2 and 3) and 2026 for the Future Year (Scenario 4). The calculation then uses an appropriate factor of NO_x emitted as NO₂.

Model Verification

- 3.29 When using modelling techniques to predict air quality concentrations, it is necessary to make a comparison between the modelling results and the monitoring data, to ensure the model predicts pollution concentrations reasonably well across the study area. This is a process called model verification and has been undertaken in accordance with the principles outlined in Defra’s air quality technical guidance (Defra, 2022).
- 3.30 Modelling results are subject to systematic and random error; such errors arise due to many factors, such as uncertainty in the traffic data and the composition of the vehicle fleet, and uncertainty in the meteorological dataset. Where the modelling under/over predicts pollutant concentrations, an adjustment factor(s) is derived which is then applied to the future modelling predictions to correct for any systematic bias. This approach is intended to address any limitations in the ability of the model to predict the dispersion of pollutants away from the roads and limitations in the emission factors used. The accuracy of the opening year and future year modelling results are relative to the accuracy of the base year results, and so greater confidence can be placed in the opening year and future year concentrations if good agreement is found for the base year. The factoring therefore rectifies any differences or under-prediction in the model outputs. One overarching factor can be derived, or a zoned factor approach can be considered appropriate if contrasting conditions exist in different areas of the model.
- 3.31 The verification found that the model tends to under-predict concentrations of road NO_x, which is a common feature with models in urban environments due to the stop -start nature of traffic. The monitoring sites included in the verification process were separated into four distinct zones, shown in Figure A-4 in Appendix A, each with its own adjustment factor to adjust the modelled output. The model bias adjustment factors calculated were applied to modelled road NO_x contributions of each receptor considered in the assessment.
- 3.32 The detailed verification procedure used in the assessment is presented in Appendix C.

Significance Criteria

- 3.33 Air quality effects may be considered to be significant if AQO are predicted to be breached or if the Proposed Scheme leads to significant effects on air quality due to road traffic emissions at sensitive receptors. According to the Delivering Cleaner Air for Scotland guidance (EPS/RTPI, 2017) there is a two-stage process to be followed in the assessment:
- Magnitude: a qualitative or quantitative description of the impacts on local air quality arising from the drive-through restaurant; and
 - Significance: a judgement on the overall significance of the effects of any impacts.
- 3.34 The guidance states that a meaningful description to the degree of an impact is to express the magnitude of incremental change as a proportion of a relevant assessment level (for example an AQO), and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion.
- 3.35 An air quality effect can be described as ‘significant’ or ‘not significant’. The impact descriptors in Table 4, are intended for application at the modelled sensitive receptors and whilst there may be a ‘slight’, ‘moderate’ or ‘substantial’ impact at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances. Any judgement on the overall significance of the effects of the Proposed Scheme will need to consider such factors as:
- The existing and future air quality in the absence of the Proposed Scheme;
 - The extent of current and future population exposure to the impacts; and
 - The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

3.36 For the judgement of significance in this study, an opening year 2025 Do-Minimum (DM) model has been run using base traffic and impacts are judged relevant to these modelled outputs.

Table 4: Description of Operational Phase Impacts

Long term average concentration at receptor in assessment year	% change in concentration relative to AQO			
	<2	2 – 5	6 – 10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76% - 94% of AQO	Negligible	Slight	Moderate	Moderate
95% - 102% of AQO	Slight	Moderate	Moderate	Substantial
103% - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

Source: EPS/RTPI 2017, *Delivering Cleaner Air for Scotland*

Assumptions, Limitations, and Uncertainties

3.37 The following points have been discussed throughout the methodology section of this assessment and represent the main assumptions made and the reasons for potential limitations and uncertainty in the results produced:

- The traffic data provided by the Project Transport Consultant was extracted from a VISUM model run as 2016 to represent base and all other year scenarios, discussed in paragraph 3.3. Verification of model results was undertaken using monitoring data with trends that supported the assumption of traffic remaining consistent between 2016 and 2018.
- The VISUM traffic model outputs were suitable for the air quality assessment, however although unlikely, there is potential of some air quality impacts of the Proposed Scheme which have not been assessed across the Edinburgh City region. The air quality study area was confined to the area modelled and the traffic data available, as shown in Figure A-1 in Appendix A.
- Peak hour data was converted into AADT using ATC data from 14 sites across Edinburgh collected in a 2016 and 2019 study. These factors were then applied to the provided peak hour data for all scenarios to give the AADTs and HDV percentage for each link. The assumption is that the ATC data is considered representative for this purpose.
- Bus data were combined with HGV counts to give a HDV count relating to buses within the network based on the local public transport timetabling and assumed to remain the same across all scenarios.
- Opening year 2025 emissions were calculated from the traffic data using 2023 emission factors, to ensure a cautious prediction of emissions in the opening year of 2025, discussed in paragraph 3.15. Modelling the emissions as 2023 provides a reasonable conservative estimate of the opening year.
- Air quality backgrounds were adjusted to ensure spatial variation was considered. These were factored based on comparison with data from an automatic monitor at an urban background site at Edinburgh St Leonards, as described in paragraph 3.23.
- The impacts of the LEZ being implemented have not been included in any of the traffic models used to generate data for use within the air quality assessment, with the exception of Morrison Street two-way and Tollcross right turn as discussed in paragraph 3.5. A qualitative appreciation of the combined effects has been presented.
- The roads in the provided traffic data without modelled speeds were assigned either a 20 – 25 or 25 – 30 kph bracket by the Project Transport Consultant and then an exact value based on the speeds of nearby links, discussed in paragraph 3.10. This method provides a coarser approach than using exact speed outputs from the traffic model, but has allowed conservatism where possible.
- The traffic model is inherently strategic and not broken down into sufficient detail to accurately represent conditions (i.e. congestion) at junctions, discussed in paragraph 3.11.

- Terrain data has not been included in the model and the model does not allow for the representation of increased emissions of vehicles travelling on roads with a gradient.
- Meteorological data from the site at Edinburgh Airport is considered to be representative of regional meteorological conditions (and hence, those of the study area) and sufficient to satisfy the requirements of this assessment.
- Picardy Place was included in the ADMS-Roads model using the 2019 new junction layout. The latest update of the Edinburgh VISUM model that provided the traffic data was undertaken prior to the new junction layout. In order to limit the impacts of this on the modelling, no monitors used in model verification, or sensitive receptors within 200m of the junction were included.
- The 'Non-Canyons' zone which produced results with a RMSE of greater than the $4 \mu\text{g}/\text{m}^3$ recommended by LAQM TG22 guidance is not ideal for adjusting results, however, is considered acceptable. This uncertainty likely stems from limitations in the traffic model especially its inability to model congestion at junctions. This is discussed in Appendix C.
- Edinburgh city centre includes a number of roads that have been identified as street canyons. In order to maximise the effectiveness of the street canyoning tool, it was ensured that both receptors and monitoring locations were located within canyons where appropriate, as described in Appendix C.
- Cowgate passes below roads including South Bridge and the George IV Bridge. In the model, all of these roads are represented on the same level, as if they were flat. In order to reduce the uncertainty produced as a result of this inconsistency, Cowgate has been assigned its own verification factor to more accurately represent conditions along this stretch of road, as described in Appendix C.

4. Baseline Conditions

Air Quality Management Areas

- 4.1 The Proposed Scheme is located within the boundary of CoEC. The most recent information available at the time of writing (2022 Air Quality Annual Progress Report (City of Edinburgh Council, 2022)) states that CoEC currently have six AQMAs declared across their local authority area; five for exceedances of the annual mean NO₂ AQO for Scotland, and one for exceedances of the annual mean PM₁₀ AQO. The Central AQMA is considered relevant to this study, as the other five AQMAs are further than 500m away from the air quality assessment study area.
- 4.2 The CoEC declared AQMAs are summarised in Table 5 (City of Edinburgh Council, 2022). A full display of all currently declared CoEC AQMA extents are included in Figure A-5 in Appendix A.

Table 5: City of Edinburgh Council Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutant Declared For	Continuing Exceedance?	Within 500m of Modelled Network
Central AQMA	31/12/2000	Annual Mean NO ₂	Yes	Yes
St John's Road AQMA	31/12/2006	Annual Mean NO ₂	No	No
Great Junction Street AQMA	09/03/2009	Annual Mean NO ₂	No	No
Glasgow Road AQMA	26/04/2013	Annual Mean NO ₂	No	No
Inverleith Row AQMA	26/04/2013	Annual Mean NO ₂	No	No
Salamander Street AQMA	20/01/2017	Annual Mean PM ₁₀	No	No

Local Air Quality Monitoring

- 4.3 CoEC monitoring data from 2015 to 2019 are presented and discussed in this section. Although data for 2020 and 2021 are available, it is likely that air pollution levels in these years will have deviated from normal levels, due to changes in travel behaviour brought about by local and national lockdowns to combat the Covid-19 pandemic and are therefore excluded. At the time of writing, 2022 data was not available.
- 4.4 CoEC undertook automatic monitoring of NO₂ at nine sites in 2019 (City of Edinburgh Council, 2020). Two of these sites are located within the study area (St Leonard's and Nicolson Street). The monitored concentrations for 2015 to 2019 are shown in Table D-1 in Appendix D. This data shows that annual mean NO₂ concentrations steadily declined between 2015 and 2019 at automatic monitoring sites within the study area, in line with the national trend, noted by the 2020 Annual Progress Report (City of Edinburgh Council, 2020).
- 4.5 CoEC undertook non-automatic monitoring of NO₂ at 158 monitoring locations in 2019 (City of Edinburgh Council, 2020). 63 of these are located within the study area. The monitored concentrations for 2015 to 2019 are shown in Table D-2 in Appendix D. CoEC conducted trend analyses for this diffusion tube data within their 2020 Annual Progress Report highlighting a trend of decreasing annual mean NO₂ concentrations across all AQMAs, in line with the national trend (City of Edinburgh Council, 2020).
- 4.6 CoEC undertook automatic monitoring of PM₁₀ at eight sites in 2019 (City of Edinburgh Council, 2020). Two of these are located within the study area (St Leonard's and Nicolson Street). However, monitoring of PM₁₀ at Nicolson Street did not begin until December 2019. The monitored concentrations for 2015 to 2019 at the St Leonard's site are shown in Table D-3 in Appendix D, with relatively stable concentrations observed across the five-year period.
- 4.7 CoEC undertook automatic monitoring of PM_{2.5} at four sites in 2019 (City of Edinburgh Council, 2020). Two of these are located within the study area (St Leonard's and Nicolson Street). However, monitoring of PM_{2.5} at Nicolson Street did not begin until December 2019. The monitored concentrations for 2015 to

2019 at the St Leonard's site are shown in Table D-4 in Appendix D. As observed in the PM₁₀ data at the same automatic monitoring site, PM_{2.5} concentrations have remained relatively stable between 2015 and 2019.

Air Quality Background

- 4.8 As described in the methodology (paragraphs 3.22 and 3.23), this study used 1 km square background pollutant maps sourced from AQS and Defra, before adjustment using comparison with the St. Leonard's automatic monitor, shown in Table 3. Table 6 provides a summary of the adjusted background concentrations utilised in the air quality assessment.

Table 6: Annual Mean Background Pollutant Concentrations used in Assessment

	Pollutant Concentration (µg/m ³)								
	NO ₂			PM ₁₀			PM _{2.5}		
	Base Year 2018	Opening Year 2025	Future Year 2026	Base Year 2018	Opening Year 2025	Future Year 2026	Base Year 2018	Opening Year 2025	Future Year 2026
Minimum	13.9	10.8	10.6	10.4	7.8	7.7	6.2	4.8	4.8
Average	17.7	14.1	13.9	11.1	9.7	9.7	6.6	5.4	5.4
Maximum	21.6	17.5	17.3	12.0	11.5	11.5	12.0	11.5	11.5

Sources: Background Mapping Data for Local Authorities, Defra and Data for Local Authority Review and Assessment purposes, AQS

Modelled Pollutant Concentrations: Base year (2018) Scenario

- 4.9 Annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at 392 sensitive receptors in the Base year (2018) model scenario.
- 4.10 The predicted annual mean NO₂ concentrations in the Base year (2018) scenario are shown in Figure A-6 in Appendix A and in Table E-1 in Appendix E.
- 4.11 Results show that exceedances of the annual mean AQO for NO₂ were predicted at 36 of the assessed receptors. Many of these exceedances were predicted at receptors within the Central AQMA, including several receptors on North and South Bridge, A700 at Haymarket, St Mary's Street, York Place, Grassmarket and Leith Walk. The highest predicted annual mean NO₂ concentration was 53.2 µg/m³ at R319 at South Bridge, between the junctions of High Street and Cowgate.
- 4.12 No exceedances of the AQOs for PM₁₀ or PM_{2.5} were predicted at any of the assessed receptors in the Base year (2018) scenario.

5. Results

Opening Year (2025) Do Minimum

- 5.1 This scenario includes all proposed CCT developments, but does not include the Proposed Scheme, as per the description provided in paragraph 3.6.
- 5.2 Figure A-7 in Appendix A shows the predicted annual mean NO₂ concentrations in the Opening Year (2025) Do Minimum scenario using 2023 vehicle emission predictions. These are also provided in Table E-2 in Appendix E.
- 5.3 There were no exceedances of the annual mean AQO for NO₂ predicted in this scenario. The maximum NO₂ concentration predicted was just below the AQO at 39.2 µg/m³, at receptor R319. This receptor is located on South Bridge, between the junctions with Cowgate and High Street.
- 5.4 There were no exceedances of the annual mean AQOs for PM₁₀ or PM_{2.5} predicted in this scenario. The maximum PM₁₀ and PM_{2.5} concentrations predicted were 15.3 µg/m³ and 8.9 µg/m³, respectively. These concentrations were both predicted at receptor R321, located on South Bridge, between the junctions with Cowgate and Chambers Street.

Opening Year (2025) with MGS Scheme

- 5.5 For this scenario, the Proposed Scheme and all other proposed CCT developments are included, as per the description provided in paragraph 3.6. This section describes the impact of the Proposed Scheme with comparison to the Do Minimum.
- 5.6 Figure A-8 in Appendix A shows the predicted annual mean NO₂ concentrations in the Opening Year (2025) with MGS Scheme scenario using 2023 vehicle emission predictions. These are also provided in Table E-2 in Appendix E.
- 5.7 The maximum predicted annual mean NO₂ concentration was 41.0 µg/m³, at receptor R319 on South Bridge, between the junctions with Cowgate and High Street. This therefore exceeds the annual mean AQO for NO₂.
- 5.8 Figure A-9 in Appendix A shows the predicted impact of the Proposed Scheme on annual mean NO₂ concentrations at the 392 human health receptors, using 2023 vehicle emission predictions. The maximum increase in predicted annual mean NO₂ concentration was +2.9 µg/m³, at receptor R148, located on New Street, near the junction with Canongate. Although this is outside the Central AQMA, there are also receptors located on streets within the AQMA which were also predicted to experience increases in annual mean NO₂ concentration on the implementation of the Proposed Scheme, including North Bridge, South Bridge and Queen Street. Other areas outside of the AQMA predicted to experience an increase due to the Proposed Scheme include Howe Street, Cumberland Street and London Street.
- 5.9 The maximum decrease in predicted annual mean NO₂ concentration was -5.3 µg/m³, at receptor R272, located outside of the Central AQMA, on Candlemaker Row. There were also predicted decreases in annual mean NO₂ concentration at receptors on streets within the AQMA, such as at Hanover Street, between the junctions with George Street and Thistle Street.
- 5.10 Table E-2 in Appendix E also shows the predicted annual mean PM₁₀ and PM_{2.5} concentrations in the Opening Year (2025) with MGS Scheme scenario, with maximum predicted concentrations of 15.6 µg/m³ and 9.1 µg/m³, respectively. These were predicted at receptor R319; the same receptor experiencing the maximum NO₂ concentration (paragraph 5.7). A PM₁₀ concentration of 15.6 µg/m³ was also predicted at receptor R321 on South Bridge, between the junction with Cowgate and Chambers Street. There were no exceedances of the annual mean AQOs for PM₁₀ or PM_{2.5} predicted.
- 5.11 The maximum increases in predicted annual mean PM₁₀ and PM_{2.5} concentrations were 0.5 µg/m³ and 0.3 µg/m³, respectively. These were predicted at receptor R55, which is located outside of the Central AQMA, on Cumberland Street. The maximum decrease in predicted annual mean PM₁₀ and PM_{2.5} concentrations were -1.5 µg/m³ and -0.9 µg/m³ respectively. These were predicted at receptor R272; the same receptor experiencing the maximum decrease in annual mean NO₂ concentration (paragraph 5.9).

- 5.12 The 392 human health receptors assessed have been assigned a significance according to the EPUK/IAQM criteria and comparison with the modelled results from the Opening Year (2025) Do Minimum scenario.
- 5.13 Table 7 shows the predicted annual mean NO₂, PM₁₀ and PM_{2.5} impact in terms of these significance criteria. The predicted impact on annual mean NO₂ is also shown in Figure A-10 in Appendix A.

Table 7: Summary of Proposed Scheme Air Quality Impacts

Significance Criteria	Number of Receptors		
	Annual mean NO ₂	Annual mean PM ₁₀	Annual mean PM _{2.5}
Substantial Beneficial	0	0	0
Moderate Beneficial	8	0	1
Slight Beneficial	10	9	7
Negligible	361	377	384
Slight Adverse	12	6	0
Moderate Adverse	1	0	0
Substantial Adverse	0	0	0

- 5.14 For the Opening Year (2025) scenarios, where a conservative approach has been applied (with 2023 emission factors used to calculate emissions), there is a wide variety of impacts associated with the Proposed Scheme.
- 5.15 For annual mean NO₂, the predicted impacts range from 'moderate beneficial' to 'moderate adverse'.
- 5.16 One 'moderate adverse' annual mean NO₂ impact was predicted at receptor R319 on South Bridge, between the junctions with Cowgate and High Street, which also experienced the highest predicted annual mean NO₂ concentration, and the only exceedance of the AQO for NO₂ (as discussed in paragraph 5.7). The majority of 'slight adverse' impacts on NO₂ were predicted on North Bridge, at receptors R165, R316, R317, and R318, and on South Bridge, at receptors R266, R320 and R321. The adverse impacts and exceedance recorded in this scenario relate to predicted increases in traffic flows on North Bridge and South Bridge, caused by the Proposed Scheme. Other locations with 'slight adverse' impacts predicted include two receptors on Canongate, two receptors on Broughton Street and one receptor on A700 Lothian Road.
- 5.17 'Moderate beneficial' impacts were predicted on Hanover Street (at receptors R136 and R137), George IV Bridge (at receptors R272 and R301), Bristo Place (at receptors R277 and R325), Forrest Road (at receptor R273) and Canongate (at receptor R162); with decreases in predicted traffic flows in these areas on implementation of the Proposed Scheme. 'Slight beneficial' annual mean NO₂ impacts were predicted on streets including as West Bow (at receptors R367 and R368), Victoria Street (at receptor R201) and North Bank Street (at receptor R167).
- 5.18 Paragraphs 5.8 and 5.9 discussed the areas that are predicted to experience the most significant impacts in terms of changes in annual mean NO₂ concentrations, with both increases and decreases predicted at receptors within the Central AQMA (see Figure A-9 in Appendix A). Figure A-10 in Appendix A also shows this, with both beneficial and adverse impacts predicted within the Central AQMA, such as those predicted at receptors R136 (located on Hanover Street, between the junction with Princes Street and the junction with Thistle Street) and R321 (located on South Bridge, between the junction with Cowgate and the junction with Chambers Street), respectively.
- 5.19 For PM₁₀, the predicted impacts range from 'slight beneficial' to 'slight adverse'.
- 5.20 A 'slight adverse' impact to annual mean PM₁₀ was predicted at R319 on South Bridge, between the junctions with Cowgate and High Street; where the only 'moderate adverse' impact on NO₂ was also predicted. 'Slight adverse' impacts on PM₁₀ were also predicted on Queen Street (at receptor R120), Nicolson Street (at receptors R286, R372 and R373), and South Bridge (at receptor R321; where a 'slight

adverse' impact on NO₂ was also predicted). These adverse impacts relate to predicted increases in traffic flows in these areas, caused by implementation of the Proposed Scheme.

- 5.21 'Slight beneficial' impacts to annual mean PM₁₀ were predicted were predicted in several areas in which beneficial impacts were also predicted for NO₂, namely Hanover Street (at receptors R136 and R137), George IV Bridge (at receptors R272 and R301), Canongate (at receptor R162), Bristo Place (at receptors R277 and R325) and Forrest Road (at receptor R273). A 'slight beneficial' impact on PM₁₀ was also predicted on Candlemaker Row (at receptor R271). These beneficial impacts relate to predicted decreases in traffic flows in these areas, caused by the Proposed Scheme
- 5.22 For PM_{2.5}, the predicted impacts range from 'moderate beneficial' to 'negligible'.
- 5.23 'Moderate beneficial' impacts on PM_{2.5} were predicted on Bristo Place (at receptor R325); where beneficial impacts on NO₂ and PM₁₀ were also predicted. These beneficial impacts relate to predicted decreases in traffic flows in these areas, caused by the Proposed Scheme. 'Slight beneficial' impacts to annual mean PM_{2.5} were predicted in several areas in which beneficial impacts were also predicted for NO₂ and PM₁₀, namely Hanover Street (at receptor R137), George IV Bridge (at receptors R272 and R301), Canongate (at receptor R162), Bristo Place (at receptor R277) and Forrest Road (at receptor R273). A 'slight beneficial' impact on PM_{2.5} was also predicted on Brougham Street, at receptor R245.

Future Year (2026) with MGS scheme and 5% traffic flow reduction in strategic movements

- 5.24 For this scenario, the MGS scheme and all other proposed CCT developments are included, and as per the description provided in paragraph 3.6, this scenario has the additional impact of a 5% modal shift in traffic patterns. Comparison of the Future Year 2026 scenario predicted concentrations with the Do Minimum or to the EPUK/IAQM significance criteria is not a part of the scope of this assessment.
- 5.25 Figure A-11 in Appendix A shows the predicted annual mean NO₂ concentrations in the Future Year (2026) with MGS scheme and 5% traffic flow reduction in strategic movements scenario. The predicted concentrations are also provided in Table E-2Table E-2 in Appendix E.
- 5.26 Results from the Future Year (2026) with MGS scheme and 5% traffic flow reduction in strategic movements scenario show that, with modal shift, there are no predicted exceedances of the annual mean AQO for NO₂, with a maximum predicted annual mean concentration of 33.9 µg/m³ at receptor R319 on South Bridge.

Comparison of Modelled Results with “Cleaner Air for Scotland” Low Emission Zone Evidence Report

- 5.27 The Scottish Environment Protection Agency (SEPA) published a report in 2021 (Scottish Environment Protection Agency, 2021), which presented the results of the air quality modelling work done to examine potential changes in emissions and air quality concentrations for several LEZ options in Edinburgh. Modelled LEZ scenarios (“Small LEZ” and “Large LEZ”) were based on the 2019 fleet, and in order to represent a “future” scenario, the predicted 2023 fleet.
- 5.28 This section of the report qualitatively compares the modelled results from the 2023 “future” scenarios in the SEPA report with those derived in this report. It should be noted that methodology undertaken by the SEPA report differs to that applied in the assessment of the Proposed Scheme, with the former modelling at kerbside locations and the latter modelling at sensitive receptor façades.
- 5.29 Results predicted in this modelling have highlighted one ‘moderate adverse’ impact, at receptor R319 on South Bridge (between the junction with Cowgate and High Street); the section of the SEPA report which discusses the North Bridge/South Bridge/Clerk Street corridor (page 31) states that emissions in this area of Edinburgh will continue to fall in the future.
- 5.30 Referencing the SEPA report, it is understood that annual mean NO₂ concentrations across the “Small LEZ” and “Large LEZ” options are predicted to decrease by as much as -34.79 µg/m³ within the city centre. Following a review of Figure 60 in the report, it is understood that South Bridge might experience concentration reductions of as much as -11.96 µg/m³ at kerbside locations.

- 5.31 Although the LEZ reduces concentrations significantly in several areas, results from the SEPA report modelling study (page 58) find that there are still exceedances on Lothian Road, Torphichen Street, Morrison Street and Cowgate in 2023 at kerbside locations. This air quality assessment did not observe these exceedances.
- 5.32 It is noted that the LEZ is predicted to have a large impact at Palmerston Place and Chester Street, with the SEPA report stating that their model predicts reduced concentrations of approximately 5 $\mu\text{g}/\text{m}^3$ and 3 $\mu\text{g}/\text{m}^3$, respectively. This area is on the edge of this air quality assessment study area.
- 5.33 As discussed in paragraph 5.26, in the Future Year (2026) scenario, where no conservatism relating to emissions has been applied, there were no predicted exceedances of the annual mean AQO for NO_2 , with the highest modelled concentration predicted to be 33.9 $\mu\text{g}/\text{m}^3$ at receptor R319 on South Bridge. According to the SEPA report, there will also be benefits associated with the LEZ implementation in this area of Edinburgh, which the model applied in this assessment does not incorporate (aside from Morrison Street two-way and Tollcross right turn, as outlined in paragraph 3.5).

6. Summary and Conclusion

- 6.1 An air quality assessment has been undertaken to determine the potential local air quality effects of the Proposed Scheme, which aims to improve walking and cycling infrastructure from Teviot Place to Hannover Street, in Edinburgh city centre.
- 6.2 The operational impact on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations was assessed at 392 sensitive receptor locations. The assessment used ADMS-Roads modelling software, the most recently published DEFRA tools and referred to appropriate national guidance documents, such as LAQM TG(22) and Environmental Planning Scotland (EPS) and the Royal Town Planning Institute (RTPI Scotland (EPS/RTPI, 2017) development planning guidance.
- 6.3 The following scenarios were assessed:
 - Opening year (2025) Do Minimum
 - Opening year (2025) with MGS Scheme
 - Future year (2026) with MGS Scheme and 5% traffic flow reduction in strategic movements
- 6.4 For the opening year of the Proposed Scheme (2025), conservative assumptions were made in relation to vehicle emissions predictions, with the use of 2023 representing the opening year of 2025 and assuming no improvement in emissions, despite the withdrawal notes of the IAQM Position Statement on vehicle emissions uncertainty (Institute of Air Quality Management, 2018).
- 6.5 Results from the air quality assessment show that in the Opening Year (2025) scenario, there are wide ranging impacts associated with the Proposed Scheme, ranging from 'moderate adverse' to 'moderate beneficial' for annual mean NO₂; from 'slight adverse' to 'slight beneficial' for annual mean PM₁₀; and from 'negligible' to 'moderate beneficial' for annual mean PM_{2.5}. One 'moderate adverse' impact (and the only exceedance of the annual mean AQO for NO₂) was predicted on South Bridge (within the Central AQMA), at receptor R319, with a modelled concentration of 41.0 µg/m³. Both beneficial and adverse impacts on annual mean NO₂ were predicted within the Central AQMA. There were no predicted exceedances of annual mean PM₁₀ and PM_{2.5} concentrations
- 6.6 When no conservatism is taken into consideration in the Future Year (2026) scenario, no exceedances are predicted for any pollutant, with a maximum annual mean NO₂ concentration of 33.9 µg/m³ at receptor R319 on South Bridge.
- 6.7 Alongside the consideration of the predicted beneficial impact of the LEZ implementation, with reference to relevant guidance, the overall impact of the Proposed Scheme on local air quality at sensitive receptors is considered to be 'not significant'.
- 6.8 National Planning 4 (NP4) guidance states that *"Development proposals that are likely to have significant adverse impacts on air quality will not be supported. Development proposals will consider opportunities to improve air quality and reduce exposure to local air quality."* With the determined 'not significant' local air quality impacts, this assessment is considered to have shown that the Proposed Scheme is in-line with NP4 guidance.
- 6.9 As the Cleaner Air for Scotland 2 (CAFS2) strategy and the draft Air Quality Action Plan (AQAP) highlight the focus of transport schemes to have clear sustainable travel options, the Proposed Scheme is also considered to be in-line with these strategic plans, with the creation of additional cycleways, wider pavements and the closure of streets to limit specific vehicle types and aiming to prioritise sustainable travel options over general through traffic.

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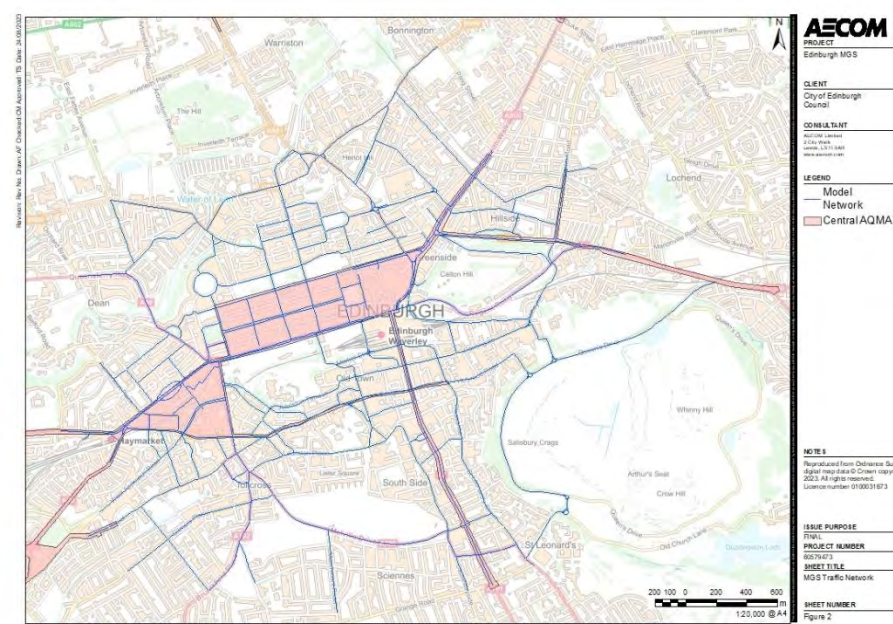
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Appendix A Figures

This Appendix presents the figures to support the report text.

Figure A-1: Modelled Air Quality Study Area



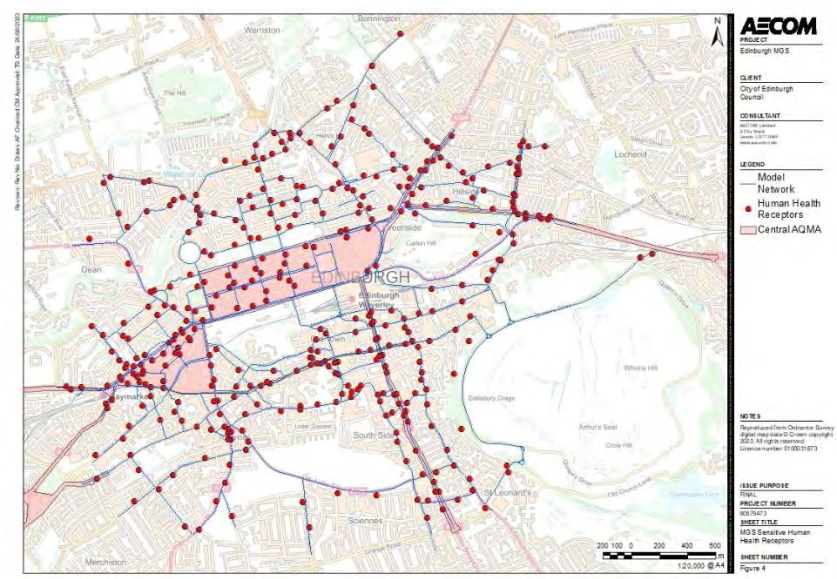
PLACEHOLDER FOR LANDSCAPE PDF OF FIGURE

Figure A-2: Modelled Network with Canyons Identified



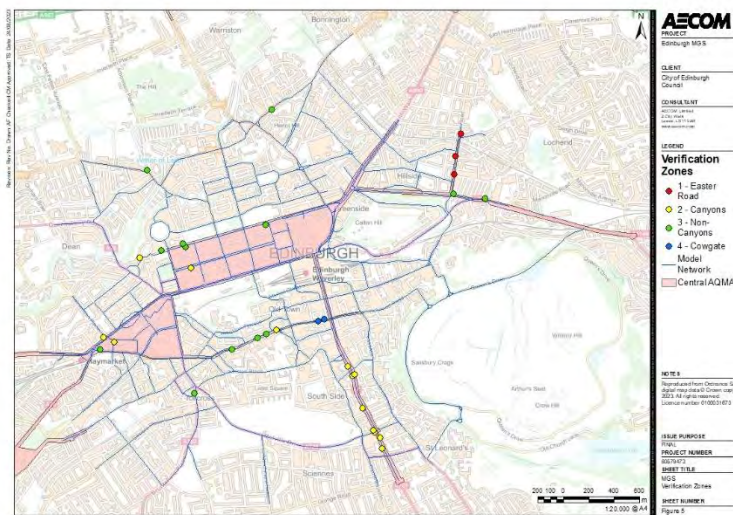
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Figure A-3: Sensitive Human Health Receptors



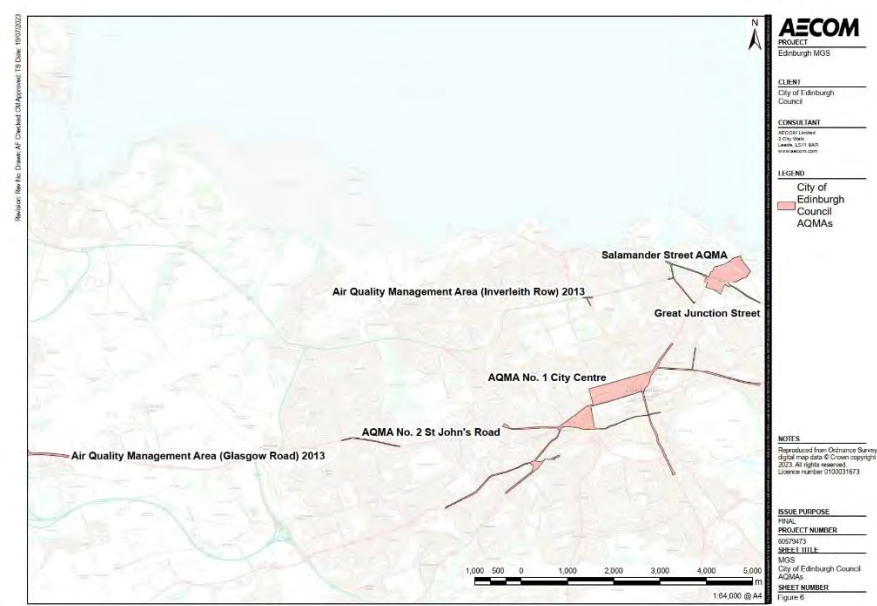
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Figure A-4: Verification Zones

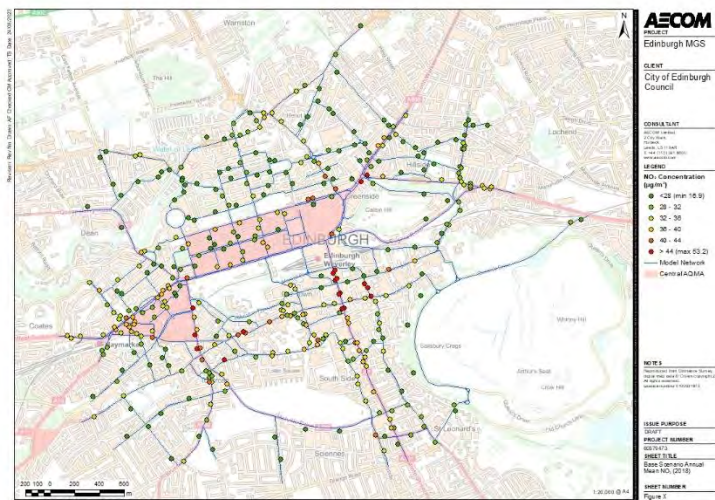


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Figure A-5: City of Edinburgh Council Air Quality Management Areas

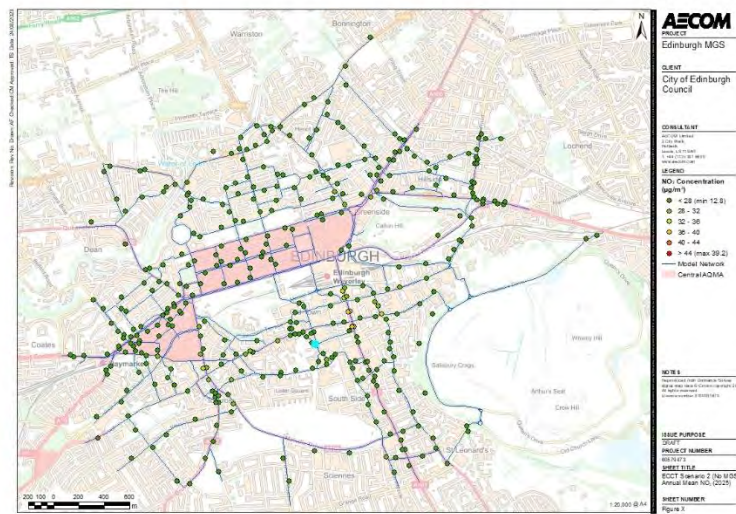


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Figure A-6: Predicted Annual Mean NO₂ Concentrations – Base (2018)

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Figure A-7: Predicted Annual Mean NO₂ Concentrations – Opening Year (2025) Do Minimum Scenario



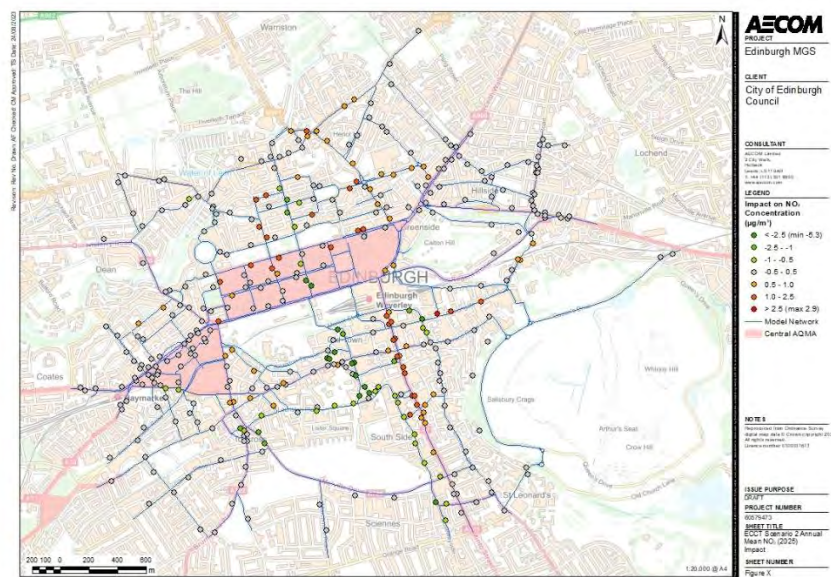
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Figure A-8: Predicted Annual Mean NO₂ Concentrations - Opening Year (2025) with MGS Scheme Scenario



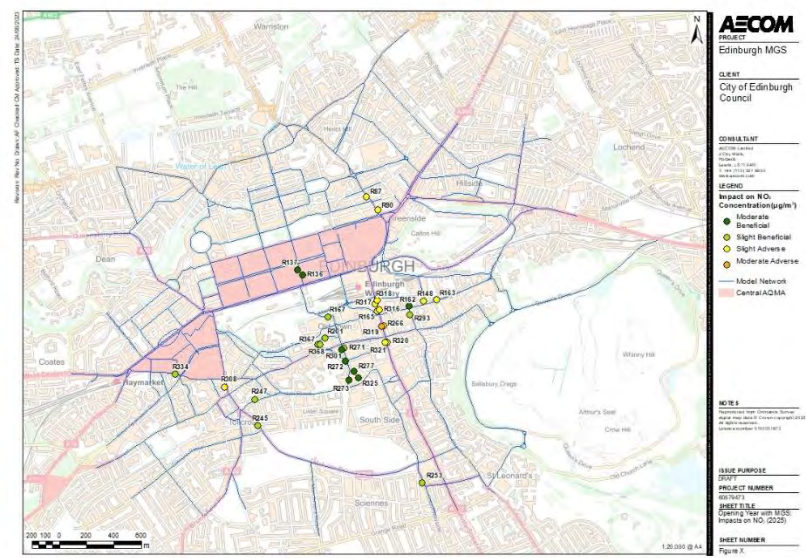
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Figure A-9: Predicted Impact of the Proposed Scheme on Annual Mean NO₂ Concentrations



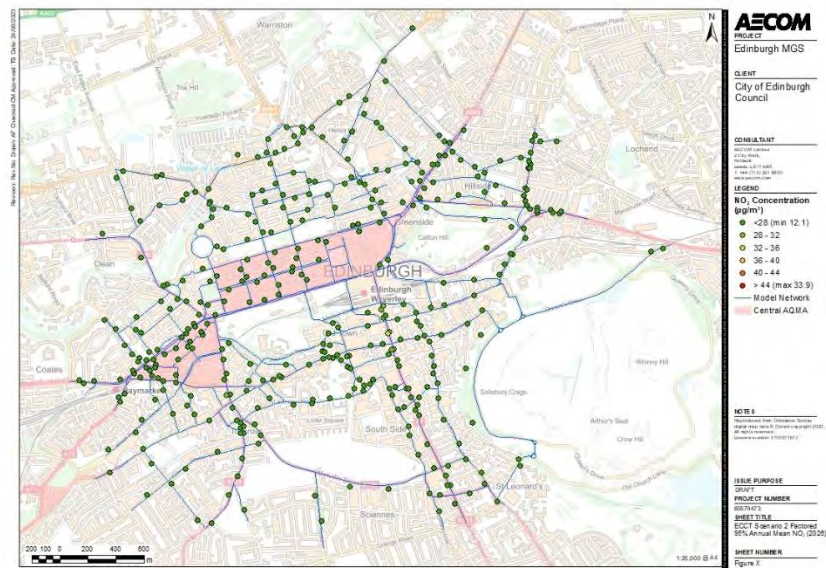
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Figure A-10: Predicted Impact of the Proposed Scheme on Annual Mean NO₂ Concentrations (EPUK/IAQM Significance Criteria)



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Figure A-11: Predicted Annual Mean NO₂ Concentrations – Future Year (2026) with MGS scheme and 5% traffic flow reduction in strategic movements Scenario



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Appendix B Road Links – VISUM Model-Assigned vs Applied Speeds

This Appendix presents the road links with zero speeds from the VISUM traffic data and the resulting speeds applied to the air quality assessment.

Table B-1: VISUM Model-Assigned vs Applied Speeds

Road Name	VISUM Model Assigned Speed (kph)	Speed Applied in Air Quality Assessment (kph)
St Andrew Street	0.0	30.0
Shandwick Place	0.0	30.0
St Andrew Street	0.0	30.0
Shandwick Place	0.0	30.0
Queensferry Street	0.0	30.0
High Street	0.0	20.0
Princes Street	0.0	30.0
Frederick Street	0.0	30.0
Haymarket Yards	0.0	30.0
Hope Street	0.0	30.0
Marshall Street/Nicolson Square	0.0	30.0
Shandwick Place	0.0	30.0

Appendix C Model Verification

This appendix presents further detail on the model verification procedure used in the assessment.

When using modelling techniques to predict concentrations, it is necessary to make a comparison between the modelling results and the monitoring data, to ensure that the model is reproducing actual observations. The accuracy of the future year modelling results are relative to the accuracy of the base year results, therefore greater confidence can be placed in the future year concentrations if good agreement is found for the base year.

Modelling results are subject to systematic and random error; such errors arise due to many factors, such as uncertainty in the traffic data and the composition of the vehicle fleet, and uncertainty in the meteorological dataset. This can be considered by factoring the modelled results against monitoring data.

This is referred to as model verification. The first step of which is to consider the performance of the model, prior to any adjustment, by comparing modelled and measured total NO₂ concentrations predicted and gathered at the same locations. Monitors located on roads within the study area were considered for inclusion in the model verification exercise, sourced from CoEC's 2019 Annual Progress Report (City of Edinburgh Council, 2019).

It was ensured that monitoring locations in areas that had been identified as canyons were within the canyon in the model in order to accurately reflect the conditions of the monitor in ADMS-Roads.

It is important to ensure that monitoring is appropriate for verifying model results. With reference to LAQM TG 22 guidance (Defra, 2022), some of the CoEC monitoring was not appropriate to verify the dispersion model results. The full list of excluded monitoring locations and the justification for their removal are detailed in Table C-1 below. In summary, exclusion was for the following reasons:

- Where the site was classified as an urban background site.
- Where data capture was below the 75% minimum required by LAQM TG 22 (Defra, 2022).
- Where the monitor was located on the edge of- or outside of the study area.
- Where uncertainty was around the location (i.e. X,Y coordinates) of the monitoring site provided in the APR (City of Edinburgh Council, 2019).
- Where the air quality concentration trend at the monitoring location was not consistent between the years 2016 and 2018. The traffic model data input to the air quality assessment assumes no anticipated city centre traffic growth in the near future, with the base model representing current and all future year traffic demands. It was assumed that 2016 traffic data is appropriate for the air quality base model year of 2018.
- Where the monitor was within the vicinity of the Picardy Place junction, which underwent a major development that was completed in 2019. This junction was included in the ADMS-Roads model however the latest update of the traffic model was undertaken prior to the new junction layout, and so monitoring in this area cannot be used to verify the model.

Table C-1: Monitors excluded from model verification

Monitor ID	X	Y	Reason for removal during verification
143a	324699	674651	6 µg/m ³ difference between 2016 and 2018
79d	323926	672550	Located on the edge of the study area – model does not include all roads within 200m
79a	324731	672984	Data Capture <75%
79	324682	672939	8 µg/m ³ difference between 2016 and 2018
25d	326974	674780	6 µg/m ³ difference between 2016 and 2018
25	326934	674503	9 µg/m ³ difference between 2016 and 2018
45d	326503	674436	Coordinates do not appear to be a roadside location – monitor cannot be found in desk based study
20	326361	674882	Data Capture <75%

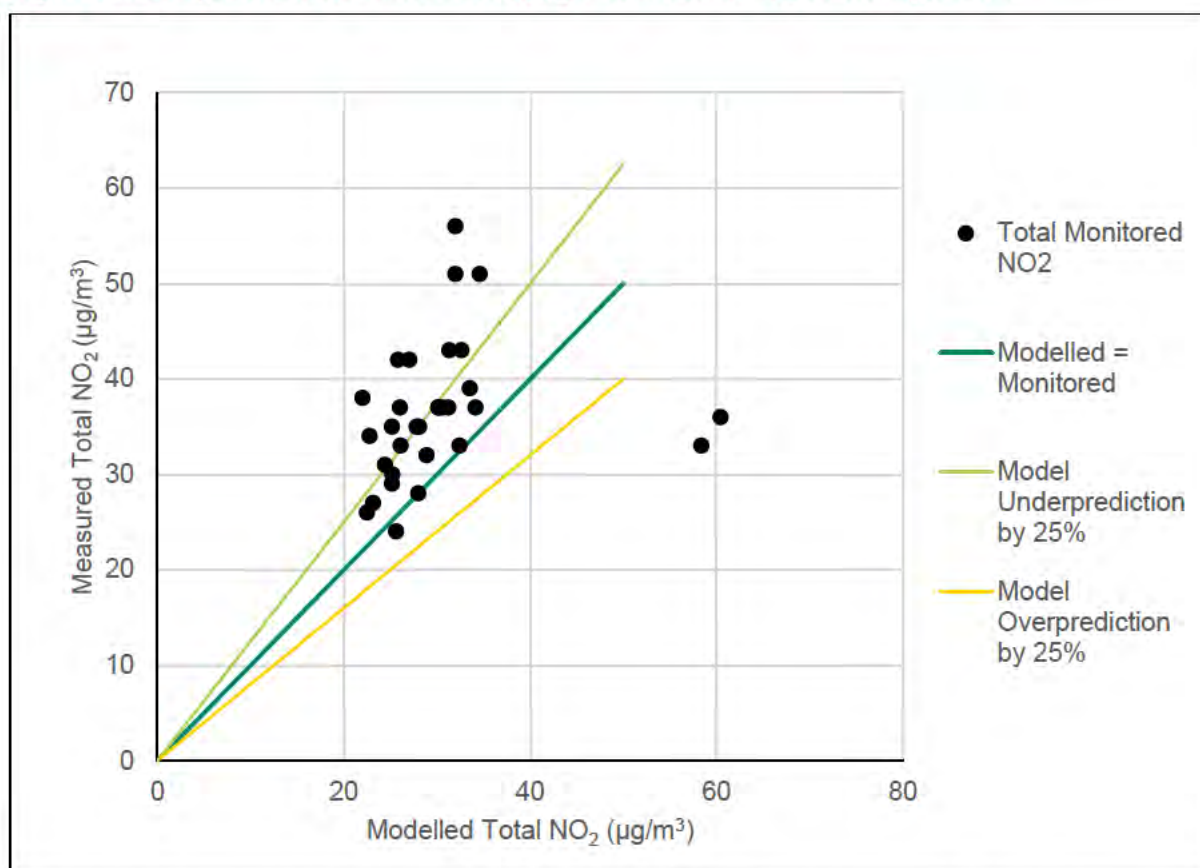
Monitor ID	X	Y	Reason for removal during verification
81	326980	674446	14 µg/m ³ difference between 2016 and 2018
44	325918	674430	Within 200m of Picardy place - not modelled with 2018 layout
48f	326198	673587	Data Capture <75%
48c	326047	673519	6 µg/m ³ difference between 2016 and 2018
HT1	323985	673219	11 µg/m ³ difference between 2016 and 2018
HT2	323787	673212	Data Capture <75%
38	325141	672733	Monitoring site located under trees
27	325944	673670	13 µg/m ³ difference between 2016 and 2018
47	325049	673791	8 µg/m ³ difference between 2016 and 2018
24	325397	673869	Data Capture <75%
SH1	324513	673556	Data Capture <75%
144	326020	673370	Data Capture <75%
3	324258	673295	7 µg/m ³ difference between 2016 and 2018
28b	325166	673242	Data Capture <75%
28c	325184	673261	6 µg/m ³ difference between 2016 and 2018
36	325828	674362	Data Capture <75%

A comparison for the monitors used for verification is shown in Table C-2 and in Figure C-1 as points with associated trendline. This shows that the unadjusted model tends to underpredict total NO₂ concentrations. The monitoring sites included in the verification process were separated into four zones, this is also shown in Table C-2 and Figure A-4 in Appendix A .

Table C-2: Verification Zones and Monitoring Data Used for Model Verification

Zone	Monitoring site ID	Modelled Road NO _x	Modelled Road NO ₂	Measured Road NO _x	Measured Total NO ₂	Modelled Total NO ₂
1 – Easter Road	25c	31.5	16.0	16.6	33.0	32.4
	25e	22.4	11.6	11.6	28.0	28.0
	25b	24.2	12.5	15.6	32.0	28.9
2 - Canyons	ID11	33.9	17.0	33.4	51.0	34.6
	74f	10.3	5.4	10.2	30.0	25.2
	75e	11.1	5.8	4.2	24.0	25.6
	140	20.9	11.0	14.8	29.0	25.2
	136	24.5	12.6	19.4	37.0	30.1
	142	26.8	13.9	20.8	35.0	28.1
	2	27.1	13.7	19.2	39.0	33.5
	138	31.1	15.9	22.8	37.0	30.1
	48e	24.9	12.6	15.4	37.0	34.1
	17a	19.4	10.2	16.8	31.0	24.4
3 – Non-Canyons	141	33.3	17.0	22.8	37.0	31.2
	135	29.7	15.1	25.4	43.0	32.6
	3b	22.5	11.5	23.2	43.0	31.3
	13a	12.6	6.7	10.2	26.0	22.5
	43	16.2	8.6	19.8	34.0	22.7

Zone	Monitoring site ID	Modelled Road NO _x	Modelled Road NO ₂	Measured Road NO _x	Measured Total NO ₂	Modelled Total NO ₂
	67	24.6	12.8	27.7	42.0	27.0
	46	18.5	9.6	20.6	37.0	26.0
	37a	20.4	10.4	34.4	56.0	32.0
	37b	17.6	9.0	15.4	37.0	30.6
	10	13.4	7.1	23.1	38.0	22.0
	75d	13.9	7.3	11.2	27.0	23.1
	28d	20.4	10.4	29.4	51.0	32.0
	49	15.5	8.0	15.2	35.0	27.8
	33b	17.9	9.4	19.2	35.0	25.2
	33a	19.7	10.3	17.2	33.0	26.1
	33	14.0	7.3	23.5	42.0	25.8
	48a	87.3	38.8	14.4	36.0	60.4
4 - Cowgate	48	81.8	36.8	11.4	33.0	58.3

Figure C-1: Comparison of total modelled NO₂ against measured NO₂ before adjustment

In line with Defra guidance (Defra, 2022), further analysis was undertaken to account for this model bias. This involved the comparison of the modelled and measured road NO_x contribution at each of the monitoring locations. Modelled road NO_x contributions were obtained from the dispersion model output and measured road NO_x contributions were taken from Defra's NO_x to NO₂ conversion spreadsheet.

This process identified that the model performed better at some locations than others, and the adjustment of model bias took this into account. The comparison of road NO_x contributions provided the following collective bias-adjustment factors across the study area, which were then applied to the modelled road contributions at the air quality sensitive receptors most represented by them, before being converted into total NO₂ concentrations.

The model adjustment factors applied to modelled road NO_x contributions is summarised below in Table 18 for each zone

To quantify the accuracy of the dispersion model, the Root Mean Square Error (RMSE) is calculated of the modelled vs the measured concentrations. According to current Defra guidance (Defra, 2022), an RMSE that is within 25% of the relevant AQO (i.e. $\leq 10 \mu\text{g}/\text{m}^3$) is considered acceptable, and within 10% of the relevant AQO (i.e. $\leq 4 \mu\text{g}/\text{m}^3$) is considered ideal.

The biggest disparity in model performance was observed for monitoring located in a canyon as opposed to that outside a canyon, therefore it was considered appropriate to verify the two modelled street characteristic conditions separately. Additionally, two roads within the City of Edinburgh were highlighted as requiring their own model zone.

Table C-3: Model Verification Statistics

Zone	Number of sites	Number of Sites Within $\pm 10\%$ of the Measured Concentration Pre-Adjustment	RMSE Pre-Adjustment ($\mu\text{g}/\text{m}^3$)	Model Adjustment Factor	Number of Sites Within $\pm 10\%$ of Measured Concentration Post-Adjustment	RMSE Post-Adjustment ($\mu\text{g}/\text{m}^3$)	Fractional Bias Post-Adjustment
1	3	5	11.7	1.10	3	1.4	0.0
2	13			1.62	9	3.5	0.0
3	13			2.45	4	5.4	0.0
4	3			0.31	2	1.1	0.0

Note: RMSE = Root Mean Square Error

Following the application of the model bias adjustment factors listed above, the modelled and measured values at these locations included in the verification exercise were compared again. These comparisons are shown in Figure C-2 to C-5.

Figure C-2: Comparison of total modelled NO₂ against measured NO₂ after adjustment for Zone 1 – Easter Road

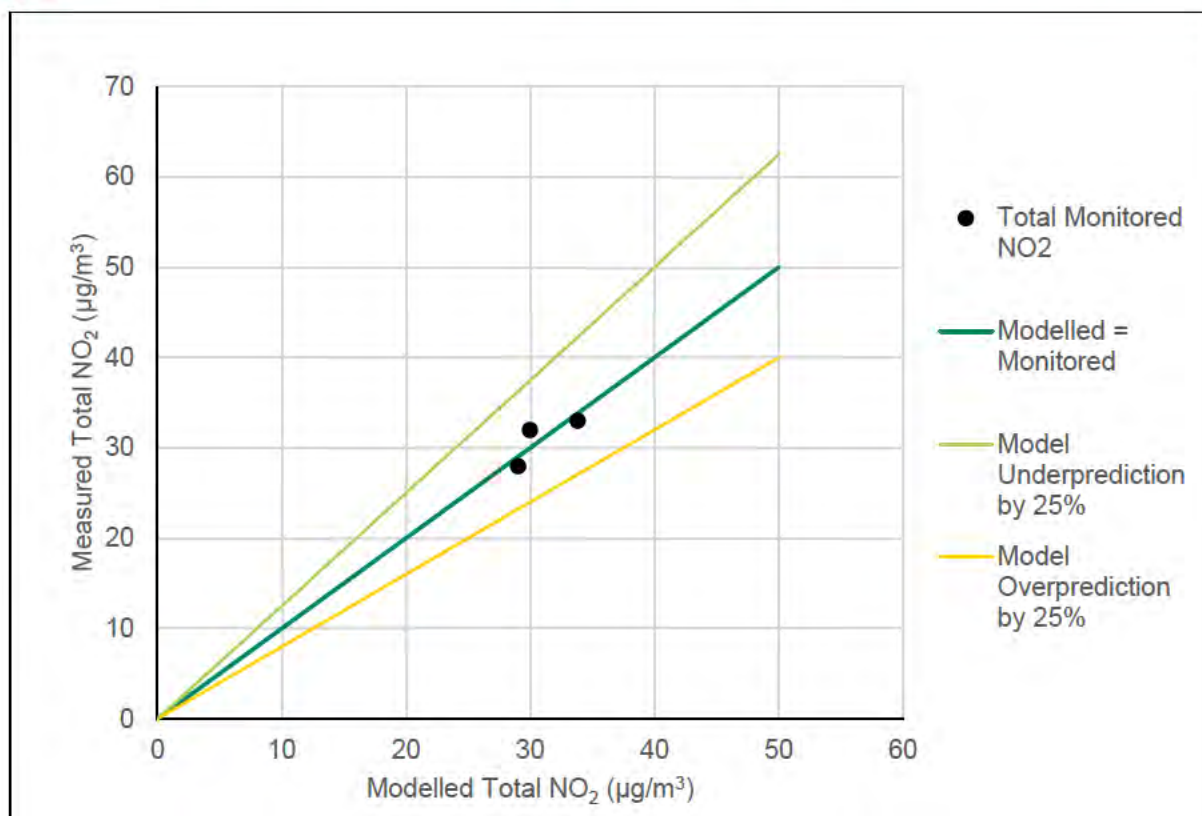


Figure C-3: Comparison of total modelled NO₂ against measured NO₂ after adjustment for Zone 2 – Canyons

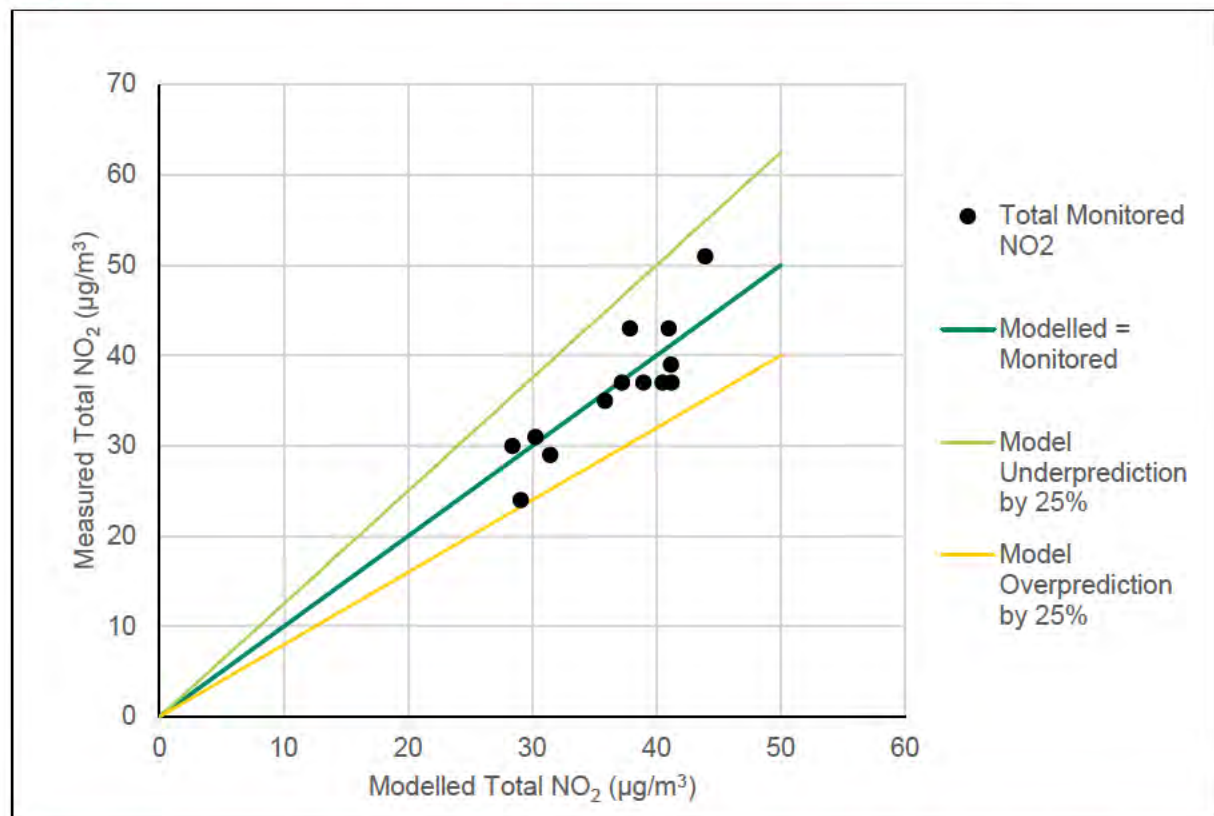


Figure C-4: Comparison of total modelled NO₂ against measured NO₂ after adjustment for Zone 3 – Non-Canyons

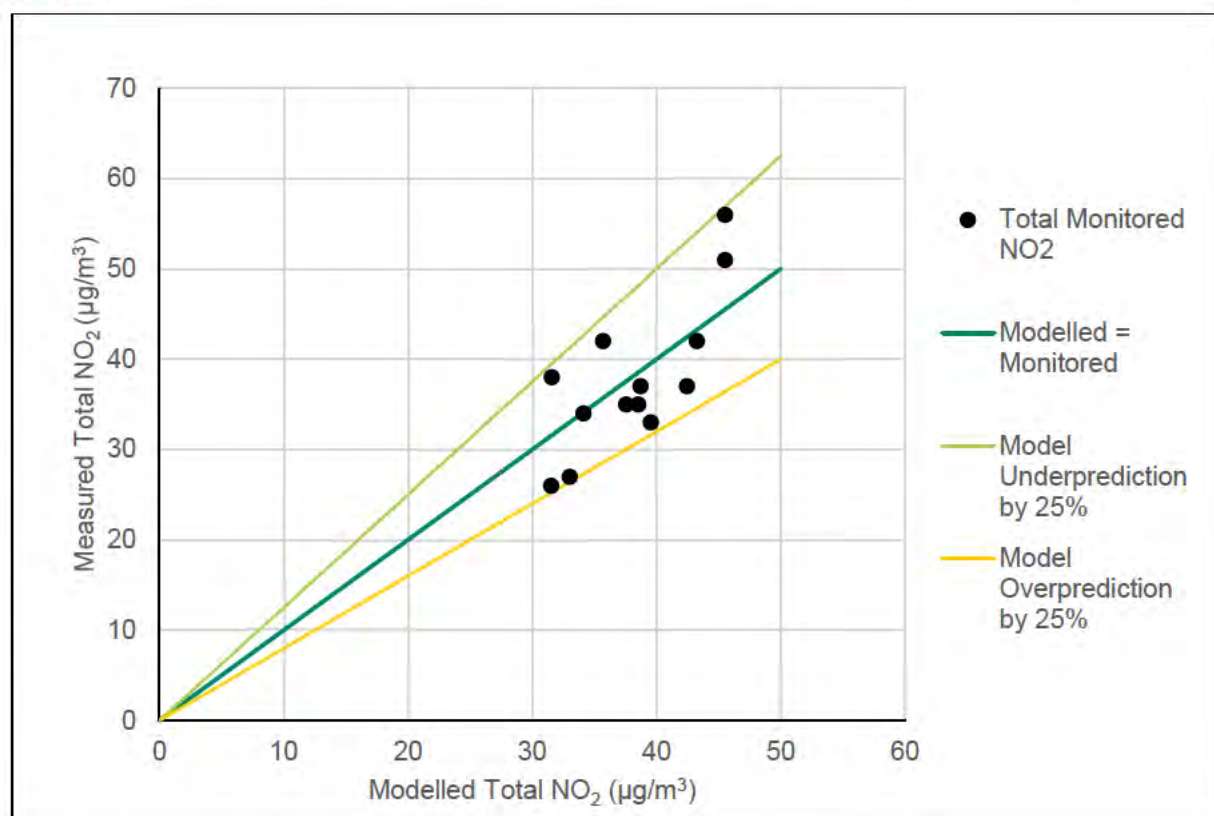
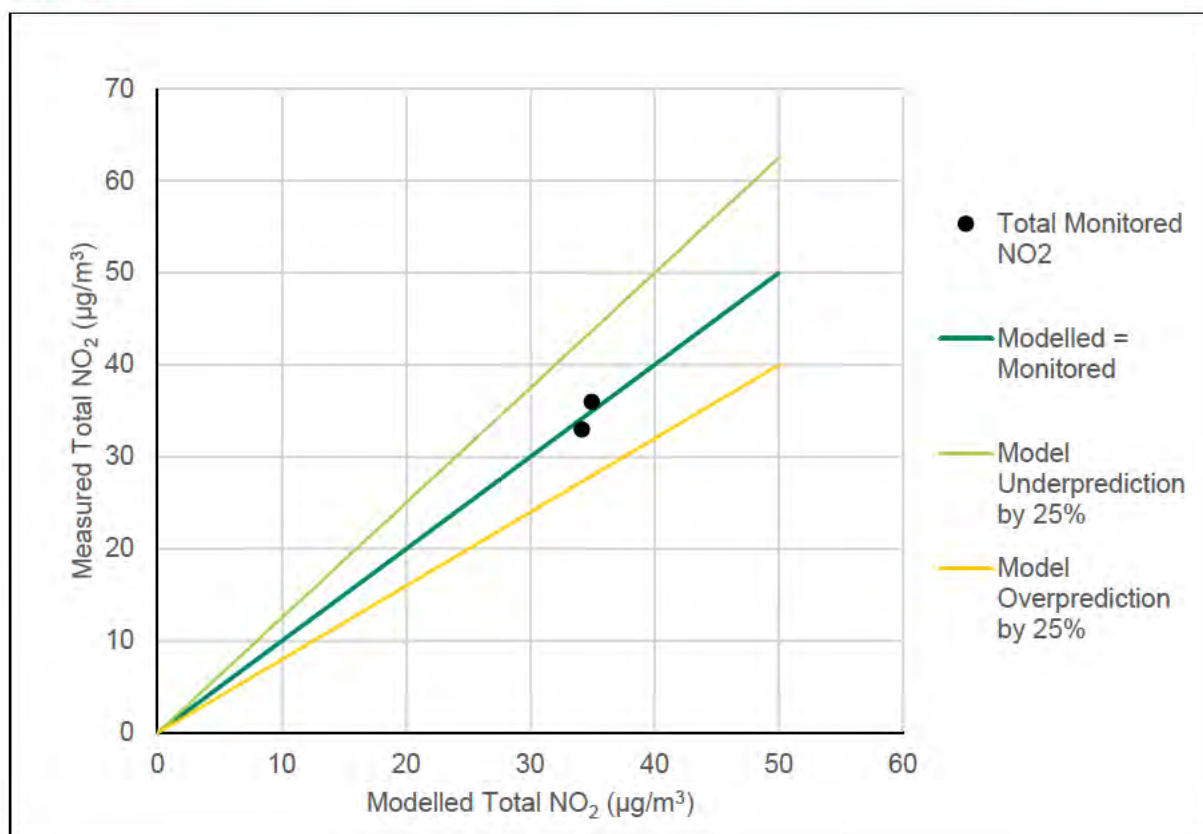


Figure C-5: Comparison of total modelled NO₂ against measured NO₂ after adjustment for Zone 4 – Cowgate



Following adjustment, the RMSE for the dispersion model ranges from 1.1 to 5.4 µg/m³, this is considered ideal in all zones except zone 3 'Non-Canyons', where it is considered acceptable.

The model bias adjustment factors calculated were applied to modelled road NO_x contributions of each receptor considered in the assessment with consideration to the location of the receptor, whether located on Easter Road or Cowgate; or whether situated on a road classified as a street canyon, or a road not classified as a street canyon, with reference to Figure A2.

Appendix D City of Edinburgh Council Monitoring Data

This appendix presents City of Edinburgh Council monitoring data used in the assessment.

Table D-1: City of Edinburgh Council Automatic NO₂ Monitoring Data (City of Edinburgh Council, 2020)

Site ID	X	Y	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)				
				2015	2016	2017	2018	2019
St Leonard's	326265	673129	Urban background	-	23	20	18	21
Nicolson Street	326151	673041	Roadside	-	-	-	51	50

Values in bold indicate an exceedance of the annual mean AQO of 40 µg/m³; Values underlined indicate a concentration higher than 60µg/m³. Where concentrations are higher than 60µg/m³ there is a risk that the 1-hour NO₂ AQO may be exceeded.

Table D-2: City of Edinburgh Council Non-Automatic NO₂ Monitoring Data (City of Edinburgh Council, 2020)

Site ID	X	Y	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)				
				2015	2016	2017	2018	2019
13a	324533	674655	Roadside	-	26	23	26	22
143a	324699	674651	Roadside	29	33	28	27	25
79d	323926	672550	Roadside	42	39	38	40	35
79a	324731	672984	Roadside	31	36	31	29	27
79	324682	672939	Roadside	30	36	25	28	29
11a	326151	673041	Roadside	-	-	-	33	28
43	325513	675134	Roadside	32	34	32	34	29
25c	326958	674770	Roadside	31	33	31	33	33
25e	326999	674940	Roadside	24	27	24	28	26
25d	326974	674780	Roadside	30	32	29	38	26
25	326934	674503	Roadside	40	46	38	37	33
25b	326950	674624	Roadside	31	35	30	32	30
45d	326503	674436	Roadside	37	33	33	32	31
21	326413	674899	Roadside	33	40	38	-	31
20	326361	674882	Roadside	33	40	-	39	38
66	327468	674362	Roadside	32	32	31	28	30
67	327190	674433	Roadside	42	41	42	42	37
81	326980	674446	Roadside	50	57	41	43	50
46	326944	674472	Roadside	37	39	40	37	35
68	328042	674179	Roadside	31	31	30	33	28
44	325918	674430	Roadside	30	33	36	30	27
138	326229	672789	Roadside	37	39	41	37	33

Site ID	X	Y	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)				
				2015	2016	2017	2018	2019
48f	326198	673587	Roadside	37	38	34	39	35
48c	326047	673519	Roadside	41	40	41	34	36
48a	325929	673490	Roadside	34	37	27	36	38
48	325881	673471	Roadside	33	38	33	33	32
48e	325537	673405	Roadside	44	41	43	37	30
74f	324880	673891	Roadside	26	31	30	30	26
37a	325401	673340	Roadside	43	53	50	56	53
37b	325471	673369	Roadside	36	37	34	37	39
37c	325397	673377	Background	27	28	26	26	25
75e	324476	673967	Roadside	24	24	22	24	20
HT1	323985	673219	Roadside	37	42	41	31	37
HT2	323787	673212	Kerbside	39	39	39	35	41
10	324904	672906	Roadside	30	37	38	38	31
140	326323	672596	Roadside	32	31	30	29	27
17a	326312	672614	Roadside	36	34	32	31	29
34	324790	674341	Background	20	21	20	19	18
74g	325897	674051	Roadside	49	59	-	-	44
38	325141	672733	Roadside	24	23	23	23	23
49	324167	673249	Roadside	35	39	36	35	37
135	326112	673115	Roadside	46	46	44	43	-
136	326164	673054	Roadside	35	38	32	37	32
27	325944	673670	Roadside	-	53	37	40	41
47	325049	673791	Roadside	42	48	43	40	36
24	325397	673869	Kerbside	42	41	54	40	53
33b	324837	674053	Roadside	-	-	-	35	29
33a	324817	674077	Roadside	-	-	29	33	29
33	325467	674229	Roadside	-	39	40	42	36
SH1	324513	673556	Roadside	39	36	-	40	37
144	326020	673370	Roadside	44	50	43	41	38
142	326367	672554	Roadside	34	37	33	35	30
141	326383	672472	Roadside	40	36	38	37	33
75d	324646	674025	Roadside	26	29	25	27	23
153	326374	673474	Roadside	-	-	17	17	17
3b	324277	673309	Roadside	42	44	41	43	40
3	324258	673295	Roadside	45	50	42	43	41
154	326418	673511	Roadside	-	-	19	20	20

Site ID	X	Y	Site Type	Annual Mean NO ₂ Concentration (µg/m ³)				
				2015	2016	2017	2018	2019
2	324193	673346	Kerbside	42	42	39	39	46
28d	325203	673250	Roadside	52	51	47	51	44
28b	325166	673242	Roadside	58	59	-	<u>65</u>	54
28c	325184	673261	Roadside	46	44	36	38	35
36	325828	674362	Roadside	35	32	35	31	30

Values in bold indicate an exceedance of the annual mean AQO of 40 µg/m³; Values underlined indicate a concentration higher than 60µg/m³. Where concentrations are higher than 60µg/m³ there is a risk that the 1-hour NO₂ AQO may be exceeded.

Table D-3: City of Edinburgh Council Automatic PM₁₀ Monitoring Data (City of Edinburgh Council, 2020)

Site ID	X	Y	Site Type	Annual Mean PM ₁₀ Concentration (µg/m ³)				
				2015	2016	2017	2018	2019
St Leonard's	326265	673129	Urban background	10	11	10	11	11

Table D-4: City of Edinburgh Council Automatic PM_{2.5} Monitoring Data (City of Edinburgh Council, 2020)

Site ID	X	Y	Site Type	Annual Mean PM _{2.5} Concentration (µg/m ³)				
				2015	2016	2017	2018	2019
St Leonard's	326265	673129	Urban background	6	6	7	6	6.4

Appendix E Modelled Concentrations

This Appendix presents the predicted pollutant concentrations at assessed receptors for all four scenarios.

Table E-1: Predicted Annual Mean Pollutant Concentrations - Base year (2018) Scenario

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R01	26.3	12.6	7.5
R02	35.6	14.2	8.5
R03	32.4	13.6	8.1
R04	20.6	11.7	7.0
R05	20.0	11.5	6.9
R06	21.3	11.8	7.1
R07	22.3	11.9	7.1
R08	34.6	14.1	8.4
R09	38.7	15.0	8.9
R10	27.9	13.0	7.7
R11	31.6	13.5	8.0
R12	34.0	13.7	8.2
R13	25.2	12.3	7.3
R14	23.1	12.0	7.2
R15	25.5	12.4	7.4
R16	26.4	12.5	7.5
R17	31.6	13.3	7.9
S1	19.5	11.5	6.8
R18	30.5	12.9	7.7
R19	27.2	12.8	7.7
R20	28.9	12.6	7.5
R21	27.4	12.5	7.5
R22	29.2	12.5	7.5
H1	29.8	12.7	7.6
R23	36.0	13.6	8.1
R24	28.3	12.5	7.5
R25	39.9	14.1	8.4
R26	34.4	14.1	8.4
R27	32.7	13.8	8.3
R28	34.8	14.3	8.5
S2	29.8	13.3	7.9
S3	21.3	11.8	7.0
R29	29.1	13.2	7.9
R30	23.9	13.0	7.6
R31	23.6	12.1	7.2
R32	24.1	11.8	7.1
R33	35.4	13.9	8.3

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R34	35.7	13.8	8.2
R35	32.8	13.2	7.9
R36	32.6	13.1	7.8
R37	26.9	12.3	7.3
R38	24.3	11.8	7.1
R39	22.5	11.6	6.9
R40	27.8	12.4	7.4
R41	26.7	12.2	7.3
R42	31.2	13.0	7.8
R43	35.0	13.7	8.1
R44	26.7	12.3	7.3
R45	41.4	14.3	8.5
R46	31.6	12.9	7.7
R47	26.9	12.2	7.3
R48	30.3	12.9	7.7
R49	22.8	11.6	6.9
R50	22.2	11.6	6.9
R51	31.2	13.1	7.8
R52	28.3	12.6	7.5
R53	25.9	12.1	7.2
R54	23.7	11.8	7.0
R55	23.5	12.1	7.2
R56	25.8	12.1	7.2
R57	29.0	12.7	7.6
R58	29.4	12.7	7.6
R59	26.4	12.6	7.5
R60	26.2	12.5	7.5
R61	26.9	12.6	7.5
R62	25.9	12.5	7.4
H2	21.7	11.8	7.0
R63	22.4	11.9	7.1
R64	20.0	11.5	6.9
S4	19.3	11.4	6.8
R65	38.7	14.8	8.8
R66	28.8	13.1	7.8
R67	26.4	12.7	7.5
R68	28.1	12.9	7.7
R69	27.2	12.8	7.6
R70	20.5	11.6	6.9
R71	20.1	11.5	6.9
R72	27.0	12.3	7.4
R73	23.7	12.1	7.2

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R74	19.2	11.5	6.8
R75	18.0	11.3	6.7
R76	23.6	11.7	7.0
R77	17.9	11.3	6.7
R78	21.4	11.8	7.0
R79	26.3	12.6	7.4
R80	34.4	14.6	8.6
R81	32.2	13.5	8.0
R82	26.4	12.6	7.4
R83	28.3	12.5	7.5
S5	27.4	12.4	7.4
R84	30.0	12.8	7.6
R85	38.7	14.5	8.6
R86	22.1	11.5	6.9
R87	41.6	14.6	8.7
R88	24.5	11.8	7.1
R89	24.2	11.8	7.0
R90	43.4	14.9	8.9
R91	26.0	12.5	7.4
R92	27.9	12.8	7.5
R93	35.6	14.1	8.3
R94	25.1	12.3	7.3
R95	28.2	12.8	7.6
R96	30.0	13.2	7.7
R97	45.3	15.7	9.3
R98	47.5	15.7	9.3
R99	27.0	12.6	7.4
R100	27.5	12.7	7.5
R101	24.1	12.2	7.2
R102	24.1	12.2	7.2
S6	23.7	12.2	7.2
R103	32.2	13.5	8.0
R104	22.7	12.0	7.1
R105	25.1	12.4	7.3
R106	27.5	12.8	7.5
R107	31.4	13.6	8.0
R108	26.0	12.7	7.5
R109	26.7	12.6	7.4
R110	23.3	12.1	7.1
R111	23.2	12.2	7.2
R112	31.5	13.6	8.0
R113	30.9	13.6	8.0

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R114	23.3	12.1	7.1
R115	28.1	13.0	7.7
R116	23.0	12.1	7.1
R117	27.0	12.7	7.5
R118	37.1	14.4	8.5
R119	34.6	14.0	8.3
R120	36.1	14.3	8.5
R121	36.5	14.0	8.4
R122	35.5	13.6	8.1
R123	24.5	12.4	7.4
R124	30.1	12.7	7.6
R125	26.2	12.1	7.2
R126	26.2	12.5	7.4
R127	27.9	12.9	7.7
R128	30.0	12.8	7.6
R129	27.4	12.3	7.3
R130	32.6	13.2	7.8
R131	32.2	13.1	7.8
R132	34.3	13.3	7.9
R133	32.1	13.3	7.9
R134	33.2	12.5	7.4
R135	29.1	12.1	7.1
R136	38.4	13.6	8.1
R137	39.1	13.7	8.1
R138	28.7	12.9	7.6
R139	21.8	11.9	7.0
R140	32.6	13.6	8.0
R141	36.6	14.4	8.5
R142	42.9	15.0	8.9
R143	37.4	13.1	7.8
R144	41.2	14.4	8.6
R145	34.1	13.3	7.9
R146	24.3	11.7	6.9
R147	25.8	12.0	7.1
R148	26.8	12.1	7.2
R149	21.7	11.9	7.0
R150	22.8	12.1	7.1
R151	32.3	13.7	8.0
R152	30.6	13.6	8.0
R153	30.3	13.4	7.9
R154	28.8	12.5	7.4
R155	31.0	13.7	8.1

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R156	23.4	12.3	7.2
R157	27.2	12.3	7.3
R158	33.0	13.0	7.7
R159	32.7	12.9	7.7
R160	47.0	15.2	9.0
R161	25.7	11.9	7.1
R162	26.3	12.1	7.1
S7	39.2	13.8	8.2
R163	41.4	14.1	8.4
R164	27.0	12.1	7.2
R165	51.5	15.5	9.2
R166	26.8	11.9	7.0
R167	37.8	13.6	8.0
R168	27.0	11.9	7.0
R169	29.3	12.4	7.3
R170	29.1	12.4	7.3
R171	22.0	11.4	6.7
R172	22.6	11.5	6.8
R173	18.5	11.6	6.7
R174	28.0	13.2	7.7
R175	26.7	13.0	7.6
R176	28.1	13.2	7.7
S8	29.5	13.4	7.8
R177	34.0	13.8	8.2
R178	34.6	13.9	8.3
R179	36.9	14.7	8.7
R180	33.8	13.6	8.3
R181	28.2	13.1	7.8
R182	32.0	13.8	8.2
R183	26.7	12.9	7.6
R184	25.8	12.7	7.5
R185	30.0	13.4	7.9
R186	25.4	12.6	7.5
R187	38.0	13.9	8.3
R188	29.7	12.9	7.7
R189	27.4	12.7	7.5
R190	31.4	13.4	7.9
R191	29.4	13.1	7.8
R192	34.7	14.1	8.3
R193	27.2	12.8	7.6
R194	27.4	12.8	7.6
R195	45.9	16.0	9.5

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R196	34.9	14.2	8.4
R197	28.6	13.2	7.8
R198	27.7	13.0	7.7
R199	32.3	12.8	7.6
R200	30.5	12.5	7.4
R201	32.1	12.6	7.5
R202	36.7	13.3	7.9
R203	40.8	14.3	8.4
R204	40.1	14.2	8.4
R205	39.6	14.9	8.9
R206	34.3	13.5	8.2
R207	28.4	13.1	7.8
R208	36.2	14.5	8.6
R209	34.0	14.0	8.3
R210	38.2	14.8	8.8
R211	33.3	14.0	8.3
R212	35.3	14.4	8.5
R213	27.5	13.1	7.7
R214	29.5	14.0	8.0
R215	27.1	13.5	7.8
R216	25.4	13.8	7.8
R217	27.3	13.0	7.7
R218	26.0	12.7	7.5
R219	21.8	12.3	7.1
R220	30.6	13.5	8.0
R221	23.8	12.6	7.3
R222	34.0	15.1	8.6
R223	30.4	13.5	8.0
R224	33.1	14.0	8.3
R225	46.8	15.7	9.3
R226	40.6	14.8	8.8
S9	23.8	12.5	7.2
R227	33.1	14.2	8.2
R228	28.0	13.3	7.7
S10	23.8	12.5	7.2
R229	42.0	15.3	9.1
R230	33.8	13.9	8.1
R231	29.5	13.6	7.9
R232	28.2	13.3	7.7
R233	22.8	12.5	7.2
R234	20.4	12.1	7.0
R235	23.7	12.6	7.3

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R236	23.1	12.5	7.2
R237	25.2	12.9	7.4
R238	35.6	14.8	8.5
R239	33.6	14.3	8.3
R240	29.3	13.5	7.8
R241	26.4	13.0	7.5
R242	21.8	12.3	7.1
R243	34.4	14.4	8.3
R244	28.2	12.8	7.5
R245	37.1	14.5	8.5
R246	36.5	14.7	8.7
R247	47.4	15.5	9.2
R248	31.4	12.6	7.5
H3	32.0	12.8	7.6
R249	23.4	11.9	7.0
R250	20.9	11.6	6.8
R251	20.0	11.6	6.7
R252	18.9	11.4	6.6
R253	43.7	15.9	9.4
R254	32.3	14.0	8.2
R255	27.5	13.2	7.7
R256	28.4	13.3	7.8
R257	16.9	11.3	6.6
R258	31.5	13.6	8.0
R259	30.8	13.6	8.0
R260	28.3	13.2	7.7
R261	30.0	13.5	7.9
R262	31.8	13.8	8.1
R263	36.8	13.6	8.1
R264	31.1	12.4	7.4
R265	33.1	12.7	7.5
R266	46.6	14.8	8.8
R267	38.5	13.7	8.2
R268	35.3	13.3	7.9
R269	28.1	12.2	7.2
R270	30.3	12.5	7.4
R271	35.1	13.4	7.9
R272	39.8	14.3	8.4
R273	35.7	13.5	8.0
R274	37.0	13.8	8.1
R275	30.6	12.5	7.4
R276	34.1	13.2	7.8

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R277	38.0	13.9	8.2
R278	35.6	13.4	7.9
R279	33.0	14.0	8.2
R280	34.1	14.2	8.3
R281	32.3	13.9	8.1
R282	24.6	11.8	7.0
R283	28.4	12.3	7.3
R284	28.8	12.4	7.3
R285	37.7	14.0	8.3
R286	40.1	14.4	8.5
R287	34.1	14.1	8.2
R288	36.5	14.5	8.5
R289	27.3	12.2	7.2
R290	29.9	12.7	7.5
H4	32.2	13.2	7.8
R291	23.3	12.4	7.2
R292	22.5	11.5	6.8
R293	47.6	15.0	9.0
R294	26.8	13.0	7.6
R295	41.7	14.3	8.6
R296	28.5	13.1	7.8
R297	29.6	12.4	7.3
R298	30.5	12.8	7.6
R299	27.2	12.0	7.1
R300	33.6	12.9	7.6
R301	38.7	14.0	8.3
R302	35.4	13.1	7.7
R303	34.3	13.4	8.0
R304	34.8	13.6	8.1
R305	28.2	12.4	7.4
R306	39.5	14.7	8.8
R307	39.9	14.6	8.7
R308	48.5	16.2	9.6
R309	38.7	14.3	8.5
R310	40.7	14.7	8.8
R311	39.7	15.0	8.9
R312	36.5	14.3	8.5
R313	38.6	15.0	8.9
R314	34.2	14.3	8.4
R315	35.7	14.5	8.6
R316	44.9	14.5	8.6
R317	51.4	15.5	9.2

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R318	45.5	14.6	8.7
R319	53.2	15.9	9.4
R320	44.2	14.9	8.8
R321	49.3	15.9	9.4
R322	31.7	13.0	7.7
R323	33.8	13.1	7.7
R324	31.9	12.8	7.6
R325	41.8	14.7	8.7
R326	35.0	13.3	7.9
R327	36.6	13.6	8.0
R328	33.2	14.0	8.2
R329	30.1	13.4	7.9
R330	27.0	12.8	7.5
R331	30.7	13.5	8.0
R332	30.5	13.3	7.9
R333	35.7	14.5	8.6
R334	43.0	15.9	9.4
R335	32.4	13.9	8.2
R336	37.8	14.0	8.3
R337	32.7	13.3	7.9
R338	26.5	12.7	7.5
R339	31.8	13.7	8.0
R340	35.6	14.4	8.5
R341	39.4	14.4	8.7
R342	33.5	13.3	8.1
R343	28.3	13.1	7.8
R344	29.4	13.3	7.9
R345	39.2	14.7	8.7
R346	27.4	12.7	7.5
R347	37.2	14.4	8.5
R348	27.0	12.7	7.5
R349	33.8	14.0	8.3
R350	29.9	13.3	7.8
R351	29.2	13.2	7.8
R352	28.6	13.1	7.7
R353	33.9	14.0	8.2
R354	31.6	13.6	8.0
R355	29.7	13.2	7.8
R356	36.1	14.2	8.4
R357	33.1	13.7	8.1
R358	37.2	13.8	8.2
R359	37.3	13.8	8.2

Receptor ID	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R360	36.3	14.5	8.6
R361	30.8	13.8	8.0
R362	30.3	13.7	7.9
R363	41.8	16.0	9.3
R364	44.4	15.0	8.9
R365	41.0	14.3	8.5
R366	40.0	14.1	8.3
R367	32.9	12.8	7.6
R368	32.8	12.8	7.6
R369	31.9	12.7	7.5
R370	44.7	14.5	8.7
R371	37.7	14.0	8.3
R372	39.0	14.2	8.4
R373	38.8	14.2	8.4
R374	38.4	14.1	8.4
R375	35.1	13.6	8.0
R376	37.5	14.7	8.6
R377	32.3	13.8	8.1
S11	35.6	13.4	7.9

Table E-2: Predicted Annual Mean Pollutant Concentrations for Opening Year (2025) and Future Year (2026) Assessed Scenarios

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R01	18.6	18.3	16.4	12.3	12.3	12.2	5.8	5.8	5.8
R02	24.4	23.9	20.4	13.9	13.8	13.7	6.7	6.7	6.6
R03	22.3	21.9	19.0	13.3	13.2	13.2	6.4	6.3	6.3
R04	15.2	15.3	14.2	11.5	11.5	11.4	5.4	5.4	5.3
R05	14.4	14.3	13.1	9.5	9.5	9.5	5.9	5.9	5.8
R06	15.6	15.7	14.4	11.6	11.6	11.6	5.4	5.4	5.4
R07	16.2	16.1	14.7	11.6	11.6	11.6	5.5	5.4	5.4
R08	24.4	24.2	21.3	10.8	10.8	10.7	6.0	6.0	5.9
R09	27.1	26.8	23.3	11.7	11.6	11.5	6.5	6.4	6.4
R10	20.4	20.7	18.8	9.8	9.8	9.8	5.4	5.5	5.4
R11	22.7	22.7	20.2	10.3	10.3	10.2	5.7	5.7	5.6
R12	23.4	23.6	19.7	13.3	13.4	13.2	6.4	6.4	6.3
R13	18.7	18.3	16.5	12.2	12.1	12.1	5.8	5.7	5.7
R14	16.9	16.8	15.3	11.8	11.8	11.8	5.6	5.5	5.5
R15	18.2	18.0	16.2	12.1	12.1	12.1	5.7	5.7	5.7
R16	19.5	19.0	17.1	12.4	12.3	12.3	5.9	5.8	5.8
R17	22.4	22.2	19.1	13.1	13.0	12.9	6.3	6.2	6.2

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R18	21.4	21.2	18.8	12.5	12.4	12.3	7.0	7.0	6.9
R19	18.8	19.4	16.5	13.5	13.6	13.5	7.3	7.4	7.3
R20	20.5	20.3	18.2	12.3	12.2	12.1	6.9	6.8	6.8
R21	20.5	20.4	18.5	12.3	12.3	12.2	6.9	6.9	6.9
R22	21.0	21.0	18.8	12.2	12.2	12.1	6.9	6.8	6.8
R23	25.3	25.6	22.1	13.2	13.2	13.1	7.4	7.4	7.4
R24	20.6	20.4	18.7	12.2	12.1	12.1	6.8	6.8	6.8
R25	27.7	28.5	24.0	13.7	13.9	13.7	7.7	7.8	7.7
R26	23.6	24.7	20.3	14.7	14.9	14.7	8.0	8.1	8.0
R27	22.3	23.0	19.1	14.4	14.6	14.4	7.8	7.9	7.8
R28	23.3	24.1	19.8	14.7	15.0	14.7	8.0	8.1	8.0
R29	19.7	20.0	17.0	13.8	13.8	13.7	7.4	7.5	7.4
R30	16.6	16.8	14.8	9.7	9.7	9.6	5.7	5.7	5.6
R31	16.6	16.6	14.7	12.8	12.8	12.8	6.9	6.9	6.9
R32	18.1	18.1	16.8	11.6	11.6	11.5	6.5	6.5	6.5
R33	25.2	26.0	22.4	13.5	13.7	13.6	7.6	7.7	7.6
R34	25.3	25.8	22.4	13.4	13.6	13.5	7.6	7.6	7.5
R35	24.0	25.0	21.9	12.9	13.1	13.0	7.2	7.4	7.3
R36	23.9	25.0	21.9	12.8	13.1	13.0	7.2	7.3	7.3
R37	20.1	20.2	18.6	12.0	12.0	12.1	6.8	6.8	6.8
R38	18.1	18.6	17.1	11.6	11.7	11.6	6.5	6.6	6.5
R39	16.9	17.0	16.0	11.3	11.3	11.3	6.3	6.3	6.3
R40	20.6	21.9	19.0	12.1	12.4	12.2	6.8	7.0	6.8
R41	20.0	19.6	18.4	12.0	11.9	12.0	6.7	6.7	6.7
R42	20.9	19.3	17.9	12.4	12.0	12.0	7.0	6.7	6.7
R43	23.3	22.4	19.7	13.0	12.8	12.7	7.3	7.2	7.1
R44	19.3	19.4	17.7	11.9	11.9	11.9	6.7	6.7	6.6
R45	27.5	29.0	24.2	13.8	14.1	14.0	7.8	7.9	7.8
R46	21.7	22.2	19.6	12.5	12.6	12.6	7.0	7.1	7.0
R47	19.2	19.3	17.6	11.9	11.9	11.8	6.7	6.7	6.6
R48	21.0	20.8	18.3	12.4	12.4	12.2	7.0	6.9	6.8
R49	17.3	17.9	16.5	11.4	11.5	11.4	6.4	6.5	6.4
R50	17.1	17.5	16.3	11.3	11.4	11.4	6.4	6.4	6.4
R51	21.3	20.6	18.4	12.5	12.3	12.2	7.0	6.9	6.8
R52	19.6	18.4	17.2	12.0	11.7	11.8	6.8	6.6	6.6
R53	19.5	19.0	18.0	11.9	11.8	11.9	6.7	6.6	6.7
R54	18.4	20.0	17.3	11.6	12.0	11.7	6.5	6.8	6.6
R55	17.6	19.7	16.2	12.0	12.4	12.0	5.6	5.9	5.7
R56	19.6	19.1	18.1	11.9	11.8	11.9	6.7	6.6	6.7
R57	21.0	22.1	18.9	12.4	12.7	12.3	7.0	7.1	6.9

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R58	21.3	22.5	19.1	12.5	12.8	12.4	7.0	7.2	6.9
R59	18.7	18.7	16.6	12.3	12.3	12.2	5.8	5.8	5.8
R60	18.6	18.4	16.4	12.3	12.3	12.2	5.8	5.8	5.8
R61	19.0	18.8	16.7	12.4	12.3	12.3	5.9	5.8	5.8
R62	18.4	18.2	16.3	12.2	12.2	12.2	5.8	5.8	5.7
R63	16.6	16.4	15.1	11.7	11.7	11.6	5.5	5.5	5.5
R64	14.7	14.7	13.7	11.3	11.3	11.2	5.3	5.2	5.2
R65	27.5	29.3	24.7	11.6	12.0	11.8	6.5	6.7	6.5
R66	21.5	21.9	19.7	10.0	10.1	10.0	5.6	5.6	5.6
R67	19.5	19.7	18.1	9.5	9.6	9.5	5.3	5.3	5.3
R68	19.7	20.0	18.4	9.6	9.6	9.6	5.3	5.4	5.3
R69	19.4	19.8	18.2	9.5	9.6	9.5	5.3	5.3	5.3
R70	15.1	15.2	14.0	11.4	11.4	11.3	5.3	5.3	5.3
R71	14.8	15.0	13.9	11.3	11.3	11.3	5.3	5.3	5.2
R72	19.6	19.8	17.8	12.0	12.0	11.9	6.7	6.8	6.7
R73	17.0	17.3	15.4	11.8	11.9	11.8	5.6	5.6	5.5
R74	14.0	14.0	12.9	12.2	12.2	12.1	6.6	6.6	6.5
R75	13.3	13.4	12.4	12.0	12.0	12.0	6.5	6.5	6.4
R76	17.7	17.7	16.6	11.5	11.5	11.5	6.4	6.4	6.4
R77	13.2	13.3	12.4	12.0	12.0	12.0	6.5	6.5	6.4
R78	16.0	16.2	15.0	10.4	10.4	10.4	5.6	5.7	5.6
R79	18.8	19.1	16.9	11.0	11.1	11.0	6.0	6.1	6.0
R80	22.1	22.0	18.1	11.0	11.0	10.8	6.5	6.4	6.3
R81	22.0	22.0	18.8	11.9	11.9	11.8	6.5	6.5	6.4
R82	19.1	19.9	17.3	11.1	11.3	11.1	6.1	6.2	6.0
R83	20.7	21.4	19.0	12.2	12.4	12.2	6.9	6.9	6.8
R84	21.8	22.3	19.9	12.5	12.6	12.5	7.0	7.1	7.0
R85	27.7	28.4	24.7	14.1	14.3	14.4	7.9	8.1	8.0
R86	16.7	16.8	15.9	11.2	11.3	11.2	6.3	6.3	6.3
R87	29.4	30.4	26.2	14.2	14.4	14.4	8.0	8.1	8.1
R88	18.1	18.1	16.8	11.5	11.6	11.5	6.5	6.5	6.5
R89	17.8	17.9	16.6	11.5	11.5	11.5	6.4	6.5	6.4
R90	30.5	31.4	26.9	14.5	14.7	14.7	8.1	8.3	8.2
R91	18.8	19.5	17.0	11.0	11.1	11.0	6.0	6.1	6.0
R92	19.9	20.6	17.7	11.3	11.4	11.2	6.2	6.2	6.1
R93	23.6	23.3	19.7	12.4	12.4	12.2	6.8	6.8	6.6
R94	17.9	18.0	16.2	10.8	10.8	10.8	5.9	5.9	5.9
R95	19.5	19.3	17.1	11.3	11.2	11.2	6.2	6.1	6.1
R96	20.2	19.8	17.5	11.5	11.4	11.4	6.3	6.2	6.2
R97	30.2	30.2	24.9	14.1	14.1	13.9	7.7	7.7	7.6

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R98	31.5	31.2	25.7	14.1	14.0	13.9	7.7	7.7	7.6
R99	18.8	18.8	16.8	11.0	11.0	11.0	6.0	6.0	6.0
R100	19.5	19.5	17.3	11.2	11.2	11.1	6.1	6.1	6.1
R101	17.5	17.6	16.0	10.7	10.7	10.7	5.8	5.9	5.8
R102	17.5	17.6	16.0	10.7	10.8	10.7	5.9	5.9	5.8
R103	22.3	22.7	19.6	11.8	11.9	11.8	6.5	6.5	6.4
R104	16.8	16.9	15.5	10.6	10.6	10.5	5.7	5.8	5.7
R105	18.3	18.2	16.4	10.9	10.9	10.8	5.9	5.9	5.9
R106	19.9	19.7	17.4	11.3	11.2	11.1	6.2	6.1	6.1
R107	22.1	22.5	19.5	12.1	12.2	12.1	6.6	6.7	6.6
R108	18.3	18.6	16.2	10.8	10.8	10.8	6.0	6.0	6.0
R109	18.9	19.0	16.4	10.7	10.7	10.6	6.0	6.0	5.9
R110	16.7	16.8	14.9	10.2	10.2	10.1	5.7	5.7	5.6
R111	17.1	17.2	15.7	10.7	10.7	10.7	5.8	5.8	5.8
R112	22.1	22.5	19.4	12.1	12.2	12.1	6.6	6.7	6.6
R113	21.9	22.2	19.3	12.1	12.1	12.1	6.6	6.6	6.6
R114	17.0	17.1	15.6	10.6	10.7	10.6	5.8	5.8	5.8
R115	20.1	20.4	18.0	11.6	11.6	11.6	6.3	6.3	6.3
R116	16.8	17.1	15.6	10.6	10.6	10.6	5.8	5.8	5.8
R117	19.2	19.3	17.2	11.2	11.2	11.2	6.1	6.1	6.1
R118	25.4	25.7	21.7	12.9	13.0	12.9	7.1	7.1	7.0
R119	23.8	24.3	20.7	12.5	12.6	12.5	6.8	6.9	6.8
R120	24.7	26.4	21.3	14.0	14.4	14.0	6.8	7.0	6.8
R121	25.6	26.7	22.5	13.7	14.0	13.8	7.7	7.9	7.7
R122	24.3	24.8	21.3	13.2	13.4	13.2	7.4	7.5	7.4
R123	18.2	18.4	17.3	9.2	9.3	9.2	5.1	5.1	5.1
R124	20.2	19.8	17.7	12.1	12.0	11.9	6.8	6.8	6.7
R125	17.8	17.9	16.6	11.5	11.5	11.5	6.5	6.5	6.4
R126	18.8	18.3	16.9	12.2	12.1	12.2	5.8	5.7	5.8
R127	20.5	20.1	19.0	9.7	9.7	9.7	5.4	5.4	5.4
R128	20.9	22.2	18.6	12.3	12.7	12.2	6.9	7.1	6.9
R129	19.4	20.3	17.6	11.9	12.2	11.9	6.7	6.8	6.6
R130	21.6	20.8	18.9	12.5	12.3	12.3	7.0	6.9	6.9
R131	21.7	21.3	19.1	12.5	12.4	12.4	7.0	7.0	6.9
R132	23.1	24.3	21.0	12.9	13.2	13.1	7.2	7.4	7.3
R133	21.5	21.7	19.4	10.0	10.0	9.9	5.5	5.6	5.5
R134	22.8	22.8	20.7	11.3	11.3	11.2	6.6	6.6	6.6
R135	21.0	21.0	19.6	10.9	10.9	10.9	6.4	6.4	6.4
R136	27.1	22.5	20.7	12.4	11.4	11.3	7.3	6.7	6.6
R137	27.7	22.5	20.7	12.6	11.4	11.3	7.3	6.7	6.6

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R138	20.2	20.5	18.0	11.4	11.5	11.4	6.2	6.3	6.2
R139	16.2	16.4	15.2	10.4	10.5	10.4	5.7	5.7	5.7
R140	21.5	21.6	18.3	11.5	11.5	11.4	6.4	6.4	6.3
R141	23.8	23.8	19.9	12.2	12.2	12.0	6.8	6.8	6.7
R142	27.4	28.7	24.2	11.4	11.7	11.5	6.4	6.5	6.4
R143	24.8	24.9	22.2	11.8	11.8	11.7	6.9	6.9	6.8
R144	26.3	27.3	23.2	13.7	13.9	13.8	7.7	7.8	7.7
R145	23.0	23.7	20.7	12.8	12.9	12.8	7.2	7.2	7.2
R146	17.9	17.9	16.5	11.0	11.0	10.9	5.8	5.8	5.7
R147	18.8	18.8	17.2	11.2	11.2	11.1	5.9	5.9	5.9
R148	20.9	23.7	20.4	11.6	11.9	11.8	6.2	6.3	6.2
R149	15.8	15.8	14.7	10.4	10.3	10.3	5.6	5.6	5.6
R150	16.6	16.7	15.4	10.6	10.6	10.6	5.8	5.8	5.7
R151	22.4	22.8	19.6	12.1	12.2	12.1	6.6	6.7	6.6
R152	20.0	19.7	17.0	11.3	11.2	11.1	6.3	6.2	6.2
R153	21.4	21.9	19.1	11.9	12.0	11.9	6.5	6.6	6.5
R154	21.0	21.5	19.1	11.8	11.9	11.8	6.3	6.3	6.3
R155	22.2	22.1	19.0	11.7	11.7	11.6	6.5	6.5	6.4
R156	17.1	17.0	15.2	10.4	10.4	10.3	5.8	5.8	5.7
R157	20.0	20.1	18.2	11.6	11.6	11.5	6.1	6.1	6.1
R158	23.2	23.3	20.5	12.2	12.2	12.1	6.5	6.5	6.4
R159	23.1	23.2	20.4	12.1	12.1	12.1	6.4	6.5	6.4
R160	32.2	32.4	27.2	14.2	14.2	14.1	7.6	7.6	7.5
R161	19.5	17.3	16.1	11.4	10.8	10.8	6.0	5.7	5.7
R162	20.7	16.5	15.6	11.7	10.7	10.6	6.2	5.6	5.6
R163	28.8	30.7	25.4	13.1	13.2	13.1	7.0	7.1	7.0
R164	16.8	16.7	15.7	10.7	10.7	10.7	5.7	5.6	5.6
R165	35.6	37.1	31.1	14.4	14.6	14.5	8.4	8.5	8.4
R166	19.8	19.5	18.7	10.7	10.6	10.6	6.3	6.2	6.2
R167	24.6	21.1	19.8	11.9	11.0	10.9	7.0	6.5	6.4
R168	20.2	20.0	19.0	10.7	10.6	10.6	6.3	6.3	6.2
R169	19.7	19.4	18.6	10.6	10.6	10.5	6.3	6.2	6.2
R170	19.7	19.6	18.8	10.7	10.6	10.6	6.3	6.3	6.2
R171	16.7	16.6	15.7	10.7	10.7	10.7	5.7	5.7	5.6
R172	17.1	17.1	16.0	10.8	10.8	10.8	5.7	5.7	5.7
R173	13.8	13.7	12.8	8.4	8.4	8.3	5.2	5.2	5.2
R174	20.3	20.0	17.2	10.0	10.0	9.8	6.1	6.1	6.0
R175	19.4	19.1	16.6	9.8	9.7	9.6	6.0	6.0	5.9
R176	19.6	19.3	16.7	9.9	9.9	9.8	6.1	6.0	6.0
R177	24.5	25.1	22.1	10.6	10.7	10.6	5.9	6.0	5.9

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R178	24.9	25.6	22.4	10.7	10.8	10.7	5.9	6.0	5.9
R179	26.1	26.3	23.0	11.3	11.4	11.3	6.3	6.3	6.3
R180	23.1	23.3	19.7	12.5	12.6	12.5	7.5	7.5	7.4
R181	20.9	21.1	19.2	9.9	10.0	9.9	5.5	5.5	5.5
R182	23.3	23.6	21.0	10.6	10.6	10.6	5.9	5.9	5.9
R183	20.1	20.3	18.6	9.8	9.8	9.8	5.4	5.5	5.4
R184	19.4	19.6	18.1	9.6	9.6	9.6	5.3	5.4	5.3
R185	21.6	21.8	19.6	10.2	10.3	10.2	5.7	5.7	5.6
R186	18.7	18.8	17.6	9.3	9.4	9.3	5.2	5.2	5.2
R187	23.8	23.9	20.8	10.4	10.5	10.4	5.8	5.8	5.7
R188	20.2	20.3	18.5	9.6	9.7	9.6	5.4	5.4	5.3
R189	19.4	19.5	17.9	9.5	9.5	9.4	5.3	5.3	5.2
R190	21.8	21.9	19.6	10.1	10.1	10.0	5.6	5.6	5.6
R191	21.2	21.4	19.3	9.9	10.0	9.9	5.5	5.6	5.5
R192	24.2	24.4	21.5	10.8	10.8	10.7	6.0	6.0	5.9
R193	19.6	19.8	18.3	9.6	9.6	9.6	5.3	5.3	5.3
R194	19.5	19.8	18.2	9.5	9.6	9.5	5.3	5.3	5.3
R195	30.0	30.6	25.8	12.3	12.4	12.2	6.8	6.9	6.8
R196	23.7	24.7	21.7	10.6	10.9	10.8	5.9	6.0	6.0
R197	20.3	21.0	19.1	9.8	9.9	9.9	5.4	5.5	5.5
R198	19.7	20.0	18.4	9.7	9.7	9.7	5.4	5.4	5.4
R199	23.9	24.3	22.1	11.7	11.8	11.7	6.9	6.9	6.9
R200	22.3	22.4	20.8	11.3	11.3	11.3	6.6	6.7	6.6
R201	23.1	19.8	18.9	11.4	10.7	10.6	6.7	6.3	6.3
R202	26.6	27.2	24.2	12.1	12.2	12.1	7.1	7.2	7.1
R203	28.3	28.7	25.2	12.8	12.9	12.8	7.5	7.5	7.5
R204	28.0	28.4	25.0	12.8	12.9	12.8	7.5	7.5	7.4
R205	26.4	26.5	22.7	11.5	11.5	11.4	6.4	6.4	6.3
R206	21.9	21.6	18.2	12.3	12.2	12.1	7.4	7.3	7.2
R207	20.3	20.3	18.5	9.9	9.9	9.8	5.5	5.5	5.4
R208	25.3	25.5	22.3	11.2	11.2	11.1	6.2	6.2	6.2
R209	23.5	23.4	20.7	10.7	10.7	10.6	6.0	5.9	5.9
R210	27.2	27.4	23.6	11.6	11.7	11.5	6.5	6.5	6.4
R211	22.8	22.9	20.5	10.5	10.5	10.4	5.8	5.8	5.8
R212	25.6	24.9	21.8	11.1	11.0	10.8	6.2	6.1	6.0
R213	20.3	20.3	18.6	9.9	9.9	9.8	5.5	5.5	5.4
R214	20.5	20.5	17.6	13.1	13.1	13.0	7.1	7.1	7.0
R215	19.0	19.0	16.5	12.7	12.7	12.6	6.8	6.8	6.7
R216	17.8	17.8	15.7	10.4	10.4	10.3	6.2	6.2	6.1
R217	19.9	20.1	18.5	9.7	9.7	9.7	5.4	5.4	5.4

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R218	19.1	19.2	17.9	9.5	9.5	9.5	5.3	5.3	5.2
R219	15.6	15.8	14.3	11.6	11.7	11.6	6.2	6.3	6.2
R220	21.5	21.9	19.8	10.0	10.1	10.1	5.6	5.6	5.6
R221	16.4	16.8	15.0	11.8	11.9	11.8	6.3	6.4	6.3
R222	21.9	21.6	18.4	11.5	11.4	11.3	6.8	6.8	6.7
R223	20.8	20.3	18.6	10.0	9.9	9.8	5.5	5.5	5.4
R224	22.7	22.9	20.5	10.4	10.5	10.4	5.8	5.8	5.8
R225	28.3	28.7	24.6	11.7	11.8	11.7	6.5	6.6	6.5
R226	28.0	28.6	24.5	11.5	11.6	11.5	6.4	6.5	6.4
R227	21.8	21.7	18.5	13.4	13.3	13.2	7.2	7.2	7.1
R228	19.4	19.1	16.6	12.7	12.6	12.5	6.8	6.8	6.7
R229	29.0	29.3	25.0	12.1	12.2	12.0	6.7	6.8	6.7
R230	25.5	23.5	19.5	12.3	11.8	11.7	7.3	7.1	7.0
R231	19.2	19.1	16.6	12.6	12.6	12.5	6.8	6.8	6.7
R232	22.0	20.3	17.5	13.2	12.8	12.8	7.1	6.9	6.8
R233	16.1	16.3	14.8	11.7	11.7	11.7	6.3	6.3	6.3
R234	14.6	14.5	13.4	11.4	11.4	11.3	6.1	6.1	6.1
R235	16.9	17.3	15.7	11.8	11.9	12.0	6.4	6.4	6.4
R236	15.8	15.8	14.2	11.7	11.7	11.6	6.3	6.3	6.2
R237	16.8	16.8	14.9	12.0	12.0	11.9	6.4	6.4	6.4
R238	23.3	23.0	19.3	13.8	13.8	13.6	7.5	7.4	7.3
R239	22.1	22.3	18.7	13.4	13.4	13.3	7.2	7.2	7.1
R240	19.8	19.9	17.0	12.7	12.7	12.6	6.8	6.9	6.8
R241	18.1	17.9	15.8	12.2	12.2	12.1	6.6	6.6	6.5
R242	15.8	16.1	14.5	11.6	11.7	11.6	6.2	6.3	6.2
R243	22.7	22.2	18.9	13.5	13.4	13.3	7.3	7.2	7.1
R244	13.2	13.1	12.2	9.1	9.1	9.0	5.6	5.5	5.5
R245	28.2	25.7	21.1	13.0	12.4	12.3	7.8	7.4	7.3
R246	26.1	26.7	23.2	11.6	11.7	11.6	6.4	6.5	6.4
R247	30.8	30.0	26.0	13.8	13.6	13.4	8.0	7.9	7.8
R248	21.0	21.9	20.3	11.0	11.2	11.1	6.5	6.6	6.5
R249	16.3	15.9	14.2	9.7	9.6	9.6	5.9	5.9	5.8
R250	14.8	14.6	13.2	9.4	9.3	9.3	5.7	5.7	5.7
R251	14.5	14.1	12.9	9.4	9.3	9.3	5.8	5.7	5.7
R252	13.8	13.5	12.4	9.3	9.2	9.1	5.6	5.6	5.6
R253	28.7	26.1	21.4	12.4	11.7	11.5	7.4	7.1	6.9
R254	22.2	21.5	18.1	10.7	10.5	10.3	6.5	6.4	6.3
R255	18.9	18.3	15.9	9.8	9.7	9.5	6.0	5.9	5.8
R256	19.7	19.6	16.7	10.0	10.0	9.8	6.1	6.1	6.0
R257	12.8	12.8	12.1	8.1	8.1	8.1	5.1	5.1	5.0

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R258	21.2	21.2	17.9	10.5	10.5	10.4	6.4	6.4	6.3
R259	21.4	20.6	17.5	10.4	10.2	10.1	6.3	6.2	6.1
R260	19.7	19.9	17.1	10.0	10.1	10.0	6.1	6.2	6.1
R261	20.3	20.2	17.2	10.2	10.1	10.0	6.2	6.2	6.1
R262	21.2	20.9	17.7	10.4	10.3	10.1	6.3	6.3	6.2
R263	26.2	25.5	22.8	12.4	12.2	12.1	7.3	7.2	7.1
R264	23.3	23.7	21.7	11.3	11.4	11.3	6.6	6.7	6.6
R265	24.5	25.0	22.7	11.6	11.6	11.6	6.8	6.8	6.8
R266	34.4	35.8	30.2	14.0	14.3	14.1	8.2	8.3	8.2
R267	27.3	27.9	23.8	13.0	13.0	12.9	6.9	7.0	6.9
R268	25.1	25.5	22.1	12.5	12.6	12.5	6.7	6.7	6.6
R269	21.6	21.9	20.2	11.2	11.3	11.2	6.6	6.6	6.6
R270	22.7	23.0	21.0	11.4	11.5	11.4	6.7	6.8	6.7
R271	24.1	20.6	19.4	11.9	10.9	10.9	7.0	6.4	6.4
R272	26.9	21.6	20.1	12.7	11.2	11.1	7.4	6.6	6.5
R273	24.9	20.4	19.3	12.2	10.9	10.8	7.1	6.4	6.4
R274	26.2	26.5	23.6	12.5	12.6	12.5	7.3	7.3	7.3
R275	24.3	22.7	21.0	11.7	11.3	11.3	6.9	6.7	6.6
R276	23.9	23.1	21.2	11.8	11.6	11.5	6.9	6.8	6.7
R277	26.9	22.8	20.9	12.8	11.6	11.5	7.4	6.8	6.7
R278	24.4	23.4	21.4	12.0	11.7	11.6	7.0	6.9	6.8
R279	20.8	20.0	17.0	10.3	10.1	9.9	6.3	6.2	6.0
R280	21.3	20.5	17.3	10.5	10.2	10.1	6.4	6.2	6.1
R281	20.4	19.7	16.8	10.2	10.0	9.9	6.2	6.1	6.0
R282	17.8	17.6	16.4	11.1	11.0	11.0	5.8	5.8	5.8
R283	20.3	21.4	19.0	11.6	11.8	11.7	6.1	6.3	6.2
R284	20.5	21.4	19.1	11.6	11.8	11.8	6.1	6.3	6.2
R285	26.4	27.6	23.3	13.5	13.8	13.7	7.2	7.3	7.2
R286	27.7	29.1	24.4	13.9	14.2	14.1	7.4	7.6	7.5
R287	22.6	23.2	19.3	10.9	11.0	10.9	6.6	6.7	6.6
R288	24.1	24.7	20.4	11.3	11.5	11.4	6.8	6.9	6.8
R289	19.5	20.1	18.2	11.4	11.5	11.5	6.0	6.1	6.1
R290	20.8	20.7	18.4	11.8	11.8	11.7	6.3	6.2	6.2
R291	16.4	16.2	14.5	9.1	9.0	9.0	5.6	5.6	5.5
R292	16.8	16.9	15.9	10.8	10.8	10.7	5.7	5.7	5.6
R293	31.0	30.3	25.1	13.8	13.7	13.5	7.4	7.3	7.2
R294	18.4	18.1	15.8	9.7	9.6	9.5	5.9	5.9	5.8
R295	27.7	29.2	24.3	13.9	14.2	14.0	7.8	8.0	7.8
R296	19.9	20.7	18.8	9.6	9.8	9.7	5.4	5.4	5.4
R297	21.8	21.5	20.6	11.2	11.1	11.3	6.6	6.5	6.6

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R298	20.0	19.5	17.6	12.1	11.9	11.8	6.8	6.7	6.6
R299	20.8	20.5	19.7	10.9	10.9	10.9	6.4	6.4	6.4
R300	22.9	20.7	19.5	11.4	10.9	10.8	6.7	6.4	6.4
R301	25.8	21.1	19.7	12.5	11.0	11.0	7.3	6.5	6.4
R302	26.0	26.6	23.9	11.9	12.0	11.9	7.0	7.0	7.0
R303	23.4	23.3	20.3	12.5	12.4	12.3	6.6	6.6	6.5
R304	23.4	23.2	20.2	12.6	12.5	12.4	6.7	6.6	6.5
R305	19.8	19.8	17.8	11.6	11.6	11.5	6.1	6.1	6.1
R306	26.0	26.4	23.0	11.1	11.1	11.0	6.2	6.2	6.1
R307	25.0	25.4	22.2	10.9	11.0	10.9	6.1	6.1	6.0
R308	33.1	33.9	28.3	12.8	13.0	12.8	7.1	7.2	7.1
R309	26.6	26.9	22.9	11.2	11.3	11.1	6.3	6.3	6.2
R310	27.7	28.1	23.8	11.4	11.5	11.4	6.4	6.4	6.3
R311	26.4	26.5	22.8	11.6	11.6	11.5	6.4	6.4	6.3
R312	25.5	25.6	22.3	11.0	11.0	10.9	6.1	6.1	6.1
R313	26.8	27.1	23.4	11.6	11.7	11.6	6.5	6.5	6.4
R314	24.9	25.3	22.3	11.0	11.1	11.0	6.1	6.2	6.1
R315	25.8	26.1	22.8	11.2	11.3	11.2	6.3	6.3	6.2
R316	31.4	32.5	27.8	13.3	13.5	13.4	7.8	7.9	7.8
R317	35.7	37.1	31.1	14.4	14.6	14.5	8.4	8.5	8.4
R318	32.0	32.8	28.1	13.5	13.6	13.5	7.9	7.9	7.8
R319	39.2	41.0	33.9	15.2	15.6	15.4	8.9	9.1	8.9
R320	32.6	33.6	28.6	14.2	14.4	14.3	8.2	8.4	8.3
R321	36.3	37.5	31.4	15.3	15.6	15.4	8.9	9.0	8.9
R322	21.0	20.0	18.0	11.9	11.7	11.6	6.3	6.2	6.1
R323	23.6	23.0	21.1	11.7	11.6	11.5	6.9	6.8	6.7
R324	22.9	22.3	20.6	11.5	11.4	11.3	6.8	6.7	6.6
R325	29.2	24.0	21.8	13.4	12.0	11.9	7.8	7.0	6.9
R326	25.1	24.6	22.3	12.1	12.0	11.9	7.1	7.0	7.0
R327	26.1	25.6	22.9	12.4	12.2	12.2	7.2	7.2	7.1
R328	23.7	24.4	20.9	12.5	12.7	12.6	6.8	6.9	6.9
R329	21.6	22.2	19.3	11.9	12.0	12.0	6.5	6.6	6.5
R330	19.6	20.0	17.7	11.3	11.4	11.3	6.2	6.2	6.2
R331	22.0	22.5	19.6	12.0	12.2	12.1	6.6	6.6	6.6
R332	21.7	21.8	19.6	10.1	10.1	10.0	5.6	5.6	5.6
R333	25.2	25.0	21.9	10.9	10.9	10.8	6.1	6.1	6.0
R334	30.3	29.4	25.1	12.4	12.2	12.0	6.9	6.8	6.7
R335	22.2	22.3	20.1	10.3	10.4	10.3	5.7	5.8	5.7
R336	24.4	24.6	21.3	10.7	10.7	10.6	5.9	5.9	5.9
R337	21.5	21.7	19.3	9.9	10.0	9.9	5.5	5.5	5.5

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
R338	19.2	19.4	17.9	9.5	9.5	9.4	5.3	5.3	5.2
R339	22.2	22.6	19.5	12.2	12.3	12.2	6.6	6.7	6.6
R340	24.1	24.0	21.1	11.0	11.0	10.9	6.1	6.1	6.0
R341	24.8	24.4	20.2	13.1	13.0	12.9	7.8	7.8	7.7
R342	21.5	21.2	17.9	12.2	12.1	12.0	7.3	7.3	7.2
R343	20.2	20.3	18.5	9.9	9.9	9.8	5.5	5.5	5.4
R344	20.9	20.9	18.9	10.0	10.1	10.0	5.6	5.6	5.5
R345	25.3	24.8	20.7	12.9	12.8	12.6	7.1	7.0	6.9
R346	19.4	19.7	17.3	11.2	11.2	11.1	6.1	6.1	6.1
R347	24.2	23.8	20.1	12.6	12.5	12.3	6.9	6.8	6.7
R348	18.4	18.2	16.3	11.0	11.0	10.9	6.0	6.0	5.9
R349	23.5	23.9	20.5	12.5	12.6	12.5	6.8	6.9	6.8
R350	21.1	21.4	18.7	11.8	11.9	11.8	6.5	6.5	6.4
R351	20.8	21.1	18.5	11.8	11.9	11.8	6.4	6.5	6.4
R352	20.5	20.7	18.3	11.7	11.7	11.7	6.4	6.4	6.3
R353	23.5	23.9	20.4	12.4	12.5	12.4	6.8	6.8	6.8
R354	21.4	21.7	18.4	11.6	11.6	11.6	6.4	6.5	6.4
R355	20.2	20.5	17.5	11.3	11.3	11.2	6.3	6.3	6.2
R356	23.6	23.7	19.8	12.0	12.1	12.0	6.7	6.7	6.6
R357	21.8	21.9	18.5	11.6	11.6	11.5	6.5	6.5	6.4
R358	23.5	23.6	20.6	10.4	10.4	10.3	5.8	5.8	5.7
R359	23.5	23.6	20.6	10.4	10.4	10.3	5.8	5.8	5.7
R360	26.0	26.0	22.6	11.3	11.3	11.2	6.3	6.3	6.2
R361	20.4	19.9	17.1	13.0	12.8	12.7	7.0	6.9	6.8
R362	20.6	19.9	17.1	13.0	12.8	12.7	7.0	6.9	6.8
R363	27.0	26.6	21.9	14.9	14.8	14.7	8.1	8.0	7.9
R364	30.5	31.0	26.9	13.5	13.6	13.5	7.9	7.9	7.8
R365	28.5	29.0	25.5	13.0	13.0	12.9	7.6	7.6	7.5
R366	27.9	28.3	24.9	12.7	12.7	12.6	7.4	7.5	7.4
R367	23.6	20.5	19.4	11.5	10.8	10.8	6.8	6.4	6.3
R368	23.6	20.8	19.6	11.5	10.9	10.9	6.8	6.4	6.4
R369	23.4	23.6	21.6	11.5	11.5	11.4	6.7	6.8	6.7
R370	29.3	28.8	24.1	13.4	13.3	13.1	7.2	7.1	7.0
R371	26.4	27.6	23.4	13.5	13.8	13.7	7.2	7.3	7.2
R372	27.1	28.5	24.0	13.7	14.0	13.9	7.3	7.5	7.4
R373	27.0	28.3	23.8	13.6	13.9	13.8	7.3	7.4	7.3
R374	26.0	26.7	22.6	13.5	13.6	13.5	7.2	7.3	7.2
R375	24.1	24.6	21.2	12.9	13.0	12.9	6.8	6.9	6.8
R376	24.8	24.9	20.5	11.5	11.5	11.4	6.9	6.9	6.8
R377	21.7	21.6	18.3	10.6	10.6	10.5	6.4	6.4	6.3

Receptor ID	Annual Mean NO ₂ Concentration (µg/m ³)			Annual Mean PM ₁₀ Concentration (µg/m ³)			Annual Mean PM _{2.5} Concentration (µg/m ³)		
	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026	DM 2025	DS 2025	Future Year 2026
H1	21.4	21.5	19.1	12.3	12.3	12.2	6.9	6.9	6.8
H2	15.8	15.7	14.5	11.6	11.5	11.5	5.4	5.4	5.4
H3	23.4	23.0	21.1	11.6	11.5	11.5	6.8	6.8	6.7
H4	22.3	22.0	19.5	12.3	12.2	12.1	6.5	6.5	6.4
S1	14.5	14.5	13.6	11.2	11.2	11.2	5.2	5.2	5.2
S2	20.2	20.8	17.5	13.9	14.0	13.9	7.5	7.6	7.5
S3	15.2	15.4	13.8	12.5	12.5	12.5	6.7	6.7	6.7
S4	14.3	14.3	13.4	11.2	11.2	11.1	5.2	5.2	5.2
S5	20.1	20.8	18.5	12.0	12.2	12.0	6.8	6.9	6.8
S6	17.2	17.3	15.8	10.7	10.7	10.6	5.8	5.8	5.8
S7	27.4	29.1	24.2	12.8	12.9	12.8	6.8	6.9	6.8
S8	20.1	19.9	17.0	10.1	10.0	9.9	6.2	6.1	6.0
S9	16.2	16.5	14.8	11.7	11.7	11.7	6.3	6.3	6.3
S10	16.2	16.5	14.8	11.7	11.7	11.7	6.3	6.3	6.3
S11	25.5	24.9	22.5	12.2	12.1	12.0	7.1	7.1	7.0

