# Proposed Mixed-Use Development, 52-66 Salamander Street, Edinburgh

## Air Quality Impact Assessment

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| Client: | Stephen G Dalton & Son |
| Project No: | 6716 |
| Version: | 1.2 |
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# Document Information

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| Document Title: | Air Quality Impact Assessment |
| Client Name: | Stephen G Dalton & Son |
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## Revision History

| Version | Date | Authored | Reviewed | Approved | Notes |
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| 1.0 | 2023 -10-25 | Jemima Hill | Annie Danskin | Annie Danskin | Final for issue |
| 1.1 | 2023-10-31 | Jemima Hill | Annie Danskin | Annie Danskin | Updated after client comments |
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# Contents

# 1. Introduction

This Air Quality Impact Assessment (AQIA) has been prepared on behalf of Stephen G Dalton & Son ('the Applicant') who is seeking detailed planning permission for the following description of development: "*Demolition of the existing building, and the erection of mixed use development including: residential development (build to rent) and purpose-built student accommodation development with commercial/retail floorspace (Class A1) at street level with associated amenity space, landscaping and cycle parking at 52-66 Salamander Street, Leith, Edinburgh EH6 7LA* ('the Application' or 'Proposed Development').

This AQIA is part of a suite of documents submitted with the Application, as outlined below. These supporting documents are in addition to the formal application documents comprising the accompanying plans, sections, and elevations.

- Planning Statement
- Pre-application Consultation Report
- Design and Access Statement (Inc. Waste Management Plan, Building Adaptability and Amenity Breakdown)
- Landscape Statement
- Noise Impact Assessment
- **Air Quality Impact Assessment**
- Transport Statement
- Flood Risk and Drainage Strategy
- Geo-environmental Report
- Sunlight and Daylight Assessment
- Ecological Assessment
- Statement of Energy
- Archaeological Assessment

The purpose of the "AQIA" is to assess the air quality impact of the construction and operational phases of the Proposed Development on selected proposed receptors in the vicinity of Salamander Street. The design of the Proposed Development, in conjunction with a consented development on the opposite side of the street (21/01163/PPP), will create a street canyon along Salamander Street, changing dispersion patterns and potentially impacting receptors within the canyon by increasing concentrations of traffic-emitted pollutants. The pollutants included in this assessment are nitrogen dioxide ($NO_2$) and fine particulate matter ($PM_{10}$ and $PM_{2.5}$). This AQIA also includes a construction phase dust risk assessment, which assesses the potential risk of impacts of dust emissions from construction activities on nearby existing sensitive receptors.

The Proposed Development will not include car parking spaces and is therefore predicted to have an insignificant effect on the traffic flow or the fleet composition on the local road network.

The energy demand for the site is to be met by all electric means and no combustion sources are proposed. Air source heat pumps are included within the development plans.

The Proposed Development site layout and red line boundary are shown in **Drawing 1.** The roads and sensitive receptors modelled in this assessment are shown in **Drawing 2.**

# 2. Legislation and Policy

The UK's legislation and regulatory regime, along with national, regional and local planning policy play a key role in the prevention, control and minimisation of atmospheric emissions that are potentially harmful to human health and the environment. Air Quality Standards (AQS)[1] are used as assessment criteria for determining the significance of any potential changes in local air quality resulting from development proposals.

## 2.1 European Legislation

The EU has published a Directive on Ambient Air Quality Assessment and Management which came into force in September 1996 (Council of the European Union, 1996). This Directive was intended as a strategic framework for tackling air quality consistently, through setting European wide air quality limit values in a series of daughter directives, superseding and extending existing European legislation. The first four daughter directives were placed into national legislation. A new EU air quality directive (European Parliament and the Council of the European Union, 2008) came into force in June 2008 and was transposed into The Air Quality Standards Regulations in England, Wales, Scotland and Northern Ireland in June 2010 (HM Government, 2010). The directive merged the four daughter directives and one Council decision into a single directive on air quality.

## 2.2 National Legislation and Strategy

The Environment Act 1995 (HM Government, 1995) required the preparation of a national air quality strategy setting Air quality Objectives (AQOs) for specified pollutants and outlining measures to be taken by local authorities through the system of Local Air Quality Management (LAQM) and by others to work in pursuit of the achievement of these objectives. A National Air Quality Strategy (NAQS) was published in 1997 and subsequently reviewed and revised in 2000, and an addendum to the Strategy published in 2002. The current Strategy was published in July 2007 (Welsh Assembly Government, Scottish Executive, Department of the Environment, Department for Environment Food and Rural Affairs, 2007).

The AQOs which are relevant to LAQM have been set into Regulations namely Air Quality (Scotland) Regulations 2000, Air Quality (Scotland) Amendment Regulations 2002 and Air Quality (Scotland) Amendment Regulations 2016 (Scottish Executive, 2016), the latter of which introduces an additional statutory obligation for Scottish Local Authorities to comply with an annual mean standard for $PM_{2.5}$ to align with the World Health Organisation (WHO) guideline value (WHO, 2005).

The AQSs are set for the purpose of protecting human health, vegetation and ecosystems from certain harmful atmospheric pollutants. The Scottish standards take account of the EU objective values and are either effectively identical, or more stringent.

The standards applicable to this study are shown in **Table 1**.

*Table 1 - AQS for Scotland Applicable to this Assessment*

| Pollutant | Concentration | Measured as |
|---|---|---|
| **Human Receptors** | | |
| Nitrogen dioxide ($NO_2$) | 200 µg/m$^3$ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 µg/m$^3$ | Annual mean |

[1] Air Quality Standards are concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to indicate whether air pollution is getting better or worse.

| Pollutant | Concentration | Measured as |
|---|---|---|
| Particulate material ($PM_{10}$) | 50 µg/m$^3$, not to be exceeded more than 7 times a year | 24-hour mean |
| | 18 µg/m$^3$ | Annual mean |
| Particulate material ($PM_{2.5}$) | 10 µg/m$^3$ | Annual mean |

The LAQM Technical Guidance, LAQM TG(22) (Department for Environment Food and Rural Affairs, 2022) provides advice on where the AQS for pollutants considered in this study apply. These are summarised in **Table 2**.

*Table 2 - Examples of Where the AQS Apply*

| Averaging Period | Standards Should Apply to | Standards Should Not Apply to |
|---|---|---|
| Annual Mean | All locations where members of the public might be reasonably exposed such as: Building façades of Residential properties, schools, hospitals, care homes etc. | Building façades of offices or other places of work where members of the public do not have regular access such as: Hotels, unless people live there as a permanent Residence; gardens of Residential properties; Kerbside sites (as opposed to locations at the building façade), or any other location where the public exposure is expected to be short-term. |
| 8-hour and 24-hour Means | All locations where the annual mean objective would apply, together with hotels. Gardens of Residential properties. | Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term. |
| 1-hour Mean | All locations where the annual mean, 24-hour mean and 8-hour mean apply plus: Kerbside sites of busy shopping streets; Parts of car parks, bus and railway stations, etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer. | Kerbside sites where the public would not be expected to have regular access. |

### 2.2.1 National Planning Framework 4

The National Planning Framework 4 (NPF4) was published in November 2022 (Scottish Government, 2022) and sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland.

The NPF4 sets out the Scottish Government's development priorities and identifies national developments which support the development strategy.

The key planning outcomes for Scotland set out in the NPF4 are the following:

- "**Net-Zero Emissions**
- **A Wellbeing Economy**
- **Resilient Communities**
- **Better Greener Places**"

Policy 23 (d) of the draft NPF4 states that:

*"Development proposals that are likely to have significant adverse effects 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."*

### 2.2.2 PAN 51 – Planning, Environmental Protection and Regulation

Planning Advice Note (PAN) 51: Planning, Environmental Protection and Regulation (Scottish Executive, 2006) supports existing policy on the role of the planning system in relation to the environmental protection regimes and summarises the responsibilities of the environmental protection bodies.

With regard to air quality, PAN51 recognises that where proposals are within an Air Quality Management Area (AQMA) or adjacent to them, air quality is likely to be:

*"a material consideration for large scale proposals or if they are to be occupied by sensitive groups such as the elderly or young children or are likely to have cumulative effects"*

For proposals that are likely to yield a significant effect on local air quality, a detailed assessment of air quality impacts will be warranted. PAN 51 also states that:

*"it may be necessary to consider the cumulative effect of developments on air quality leading to a gradual deterioration".*

### 2.2.3 The Scottish Government Cleaner Air for Scotland Strategy

The Scottish Government Cleaner Air for Scotland (CAFS) strategy – The Road to a Healthier Future (Scottish Government, 2015), is a national strategy that sets out how the Scottish Government will deliver its commitment to further improving air quality to protect human health.

The CAFS strategy aims to help the Scottish Government achieve the ambitious goal "to have the best air quality in Europe". A National Modelling Framework (NMF) and National Low Emission Framework (NLEF) will be developed to provide the tools and mechanism to put in place measures to improve air quality.

The majority of the 40 actions included in the CAFS strategy have now been completed or are ongoing and will be taken forward in parallel with new actions outlined in the updated CAFS2 published in July 2021 (Scottish Government, 2021).

## 2.3 Local Planning Policy

The Edinburgh Local Development Plan (LDP) (CEC, 2016) was adopted in November 2016 and replaces the Edinburgh City Local Plan and Rural West Edinburgh Local Plan (CEC, 2006). A review of the Edinburgh City Local Plan indicated the following policy in relation to air quality:

*"Policy Env 22 – Pollution and Air, Water and Soil Quality Planning permission will only be granted for development where:*

- *there will be no significant adverse effects for health, the environment and amenity and either;*
- *there will be no significant adverse effects on air and soil quality; the quality of the water environment; or on ground stability;*
- *appropriate mitigation to minimise any adverse effects can be provided*."

This policy has been considered throughout this report by assessing potential air quality impacts as a result of the construction activity and the street canyon created by the Proposed Development and considering mitigation where appropriate.

## 2.4 Guidance

There is currently no statutory guidance on the method by which an AQIA should be undertaken; the AQIA has however been informed by the following guidance documents:

- Institute of Air Quality Management (IAQM) Assessment of Dust from Demolition and Construction Guidance (IAQM, 2014);
- IAQM/Environmental Protection UK (EPUK) Guidance on Land-use Planning and Development Control: Planning for Air Quality (EPUK & IAQM, 2017);
- Environmental Protection Scotland (EPS)/Royal Town Planning Institute (RTPI) Delivering Cleaner Air for Scotland: Development Planning & Development Management (EPUK & IAQM, 2017); and
- Defra Local Air Quality Management Technical Guidance, LAQM TG.22 (Department for Environment Food and Rural Affairs, 2022).

# 3. Scope and Methodology

## 3.1 Scope of Work

The scope of work for the AQIA included the following:

- Consultation with a City of Edinburgh Council (CEC )Environmental Health Officer (EHO);
- Desktop review of baseline and background air quality in the local area;
- Geo-referencing of Proposed Development layout on high resolution base-map;
- Addition of existing residential receptors and proposed receptors;
- Specification of advanced street canyon dimensions;
- Development, calibration, and verification of the baseline road dispersion model using the latest version of ADMS-Roads (V6)and local CEC operated monitoring sites;
- Prediction of the future with-Proposed Development pollutant concentrations at the site, and comparison of predicted concentrations at proposed sensitive receptors with relevant Air Quality Standards (AQSs) to assess the site suitability for its proposed uses;
- Prediction of the future without Proposed Development pollutant concentrations at existing and consented receptors, and comparison of predicted concentrations with relevant AQSs to assess the impact and significance of effect of the Proposed Development;
- Completion of a qualitative construction phase dust risk assessment with identification of mitigation measures commensurate to the scale of the Proposed Development; and
- Production of an AQIA report.

## 3.2 Consultation

ITPEnergised consulted with CEC Environmental Health EHO directly to obtain agreement on the assessment scope.

A summary of the consultation responses received from CEC Environmental Health EHO is provided in **Table 3** below**.** Email correspondence is provided in **Appendix 1.**

*Table 3 - Summary of Consultations*

| Organisation | Contact/Date | Comment / Issues Raised |
|---|---|---|
| CEC | 26/09/2023 | CEC were contacted with a description of the site and its location and details of the planned assessment scope. CEC were asked to comment on the scope and provide any additional data that should be taken into consideration. |
| CEC | 2/10/2023 | CEC replied with agreement of the scope and their concern over the creation of street canyons. |
| CEC | 9/10/2023 | After pre-app comments had been received by the client advising that a particulate matter monitoring study and odour risk assessment should be undertaken, CEC were contacted for their agreement to scope out these additional assessments. |
| CEC | 18/10/2023 | CEC responded with an agreement to scope out the odour assessment. Difficulties of monitoring whilst the metals recycling site were still in operation were acknowledged and the methodology of a modelling study to assess $PM_{10}$ and $PM_{2.5}$ was requested. |
| CEC | 23/10/2023 | CEC were contacted with the methodology of the modelling exercise included in the air quality assessment. They were asked to provide any comment on the methodology. |
| CEC | 26/10/2023 | CEC responded asking for clarification on whether the contribution from the metals scrapyard had been removed from the data, if the impact from consented development (21/01163/PPP) had been included and the program used to model the assessment. ITP responded to clarify these elements of the assessment. |

## 3.3 Effects Scoped Out

### 3.3.1 Construction Phase Traffic

The construction phase of the application site is likely to lead to a temporary increase in the number of vehicles, including cars and Heavy Good Vehicles (HGVs), on the local highway network for the duration of the construction works only. The change in HGV flows during the construction period will not exceed 100 Annual Average Daily Traffic (AADT) equivalent, which is the IAQM and EPUK criteria triggering the need for a detailed air quality impact assessment outside of an AQMA. The construction traffic route to the Proposed Development is defined as shown in **Drawing 3**, avoiding high sensitivity receptors and will be strictly controlled by the Construction Environmental Management Plan (CEMP). The effect of construction road traffic emissions upon local air quality at sensitive receptors will be not significant and construction phase road traffic emissions are therefore not considered further in this assessment.

### 3.3.2 Operational Phase

#### 3.3.2.1 Road Traffic Emissions

The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and sulphur dioxide ($SO_2$), carbon monoxide (CO), $PM_{10}$ and $PM_{2.5}$ in exhaust emissions. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form $NO_x$, mainly in the form of nitric oxide (NO), which is then converted to $NO_2$ in the atmosphere. $NO_2$ is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

Although $SO_2$, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this Proposed Development. Road traffic emissions of these substances linked to the Proposed Development will not be capable of compromising the achievement of the relevant AQS for the protection of human health. Emissions of $SO_2$, CO, benzene and 1,3-butadiene from road traffic are therefore not considered further within this assessment.

## 3.4 Emission Sources

### 3.4.1 Construction Phase

#### 3.4.1.1 Fugitive Emissions of Particulate Matter

Fugitive emissions of airborne particulate matter are readily produced through the action of abrasive forces on materials and therefore a wide range of site preparation and construction activities have the potential to generate this type of emissions. These include:

- Demolition;
- Earthworks, including the handling, working and storage of materials;
- Construction activities; and
- The transfer of dust-making materials from the site onto the local road network (track-out).

The size fraction called "$PM_{10}$" is composed of material with an aerodynamic diameter of less than 10 µm in diameter and overlaps with the size fraction for dust. AQS for $PM_{10}$ have been set for the protection of human health and the term $PM_{10}$ is only used in this assessment when referring to the potential impact of emissions of particulate matter from demolition and construction activities on human health receptors. The short-term, 24-hour mean standard for airborne concentrations of $PM_{10}$ is the appropriate AQS for assessing the potential impact on health of short-term fugitive emissions from demolition and construction sites.

This AQIA therefore considers the risk of dust impacts and resulting significance of effects without mitigation in place and recommends any additional mitigation measures appropriate to the identified risk of dust impacts to receptors, to minimise the significance of any residual effects.

### 3.4.2 Operational Phase

#### 3.4.2.1 Road Traffic Emissions

Following completion of the construction phase, there is the potential for changes to long-term and short-term mean concentrations of fine particulates ($PM_{10}$, $PM_{2.5}$), $NO_2$ and $NO_x$ to occur because of the creation of a street canyon between the Proposed Development and the consented development opposite on Salamander Street (Land at Bath Road/Salamander Street (Planning Application: 21/01163/PPP)). This AQIA has therefore considered impacts and the resulting significance of effects associated with the Proposed Development-generated street canyon and the suitability of the site for its proposed use.

Pollutant concentrations for each scenario have been predicted by modelling emissions from road traffic using predicted road traffic flows for each different scenario. The traffic flows used were taken from the air

quality assessment submitted with the planning application for the consented development (21/01163/PPP) as agreed with CEC.

Details of general model conditions used in the dispersion model are provided in **Table 4**.

*Table 4 - General ADMS Model Conditions*

| Variables | ADMS Roads Model Input |
|---|---|
| Surface roughness at source/meteorological site | 1m /0.3m |
| Minimum Monin-Obukhov length for stable conditions at source/meteorological site | 10m / Model-calculated per hourly meteorological condition |
| Terrain types | Flat Terrain |
| Receptor location | x, y coordinates determined by Geographic Information System (GIS)<br>z = 1.5m for ground floor for human receptors with 3m increment for upper floors or modelled at elevations provided by the project team |
| Pollutants | $NO_x$, $PM_{10}$, $PM_{2.5}$ |
| Traffic Emissions Factors | DEFRA EFT 11.0 (2 VC) emission factor dataset for 2026 (completion year), 2018 for model verification with 2018 monitoring data |
| Meteorological data | One year (2018) hourly World Meteorological Organisation (WMO) synoptic data from Edinburgh Gogarbank) |
| Emission profiles traffic | No diurnal profiles applied. |
| Receptors | Selected proposed, consented and existing human receptors. |
| Model output | Long-term annual mean $NO_x$ concentrations<br>Long-term annual mean $PM_{10}$ concentrations<br>Long-term annual mean $PM_{2.5}$ concentrations |

## 3.5 Road Traffic Data

Road traffic data were taken from the application documents for consented development 21/01163/PPP for the following scenarios:

- Baseline surveyed in 2018;
- Future 2026 without Proposed Development canyon, including committed developments; and
- Future 2026 including committed developments and Proposed Development canyons.

Traffic data were provided in 24-hour AADT format with percentage of Heavy-Duty Vehicles (HDVs) for each link.

Traffic data were further processed into hourly flows for use in the dispersion model.

Completion year (2026) traffic flows were modelled using 2026 emission factors, background concentrations from 2026 and meteorological data from 2018 as this was used in the model verification.

All 24-hour AADT and processed road traffic data, road speeds and geometry used in the dispersion model for this assessment are presented in **Appendix 2**.

## 3.6 Study Area and Air Quality Sensitive Receptors

### 3.6.1 Study Area

#### 3.6.1.1 Construction Phase

The study area for each construction phase of this AQIA has been defined in accordance with the IAQM guidance (IAQM, 2014) which stipulates that *"an assessment will normally be required where there is:*

- *A 'human receptor' within:*
    - *350 m of the boundary of the site; and/or*
    - *50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).*
- *A* [designated] *ecological receptor within:*
    - *50 m of the boundary of the site;*
    - *50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s)."*

There are no designated ecological receptors within 50 m of either construction phase site boundary.

The study area for the construction phase is shown in **Drawing 3**.

#### 3.6.1.2 Operational Phase

The road sources selected for the assessment of impacts associated with the operational phase of the Proposed Development have been defined by professional judgement and discussions with CEC to establish receptors likely to be impacted by the canyon created by the Proposed Development.

The study area and road links considered in this assessment are shown on **Drawing 2.**

### 3.6.2 Sensitive Receptors

#### 3.6.2.1 Construction Phase – Fugitive Emissions of Particulate Matter

The sensitive receptors considered as part of the assessment of impacts associated with the construction phase of the Proposed Development include all human receptors within the buffers defined in **Section 3.6.1.1.**

#### 3.6.2.2 Operational Phase – Traffic Emissions

The sensitive receptors selected for the assessment of impacts associated with the operational phase of the Proposed Development are human receptors, where people are likely to be present for a period of time consistent with the AQSs and are based on effects on human health. The AQSs have been set at concentrations that provide protection to all members of the public, including more vulnerable groups such as the very young, elderly or unwell. As such, the sensitivity of receptors was considered in the definition of the AQS values and therefore no additional subdivision of human health receptors on the basis of building or location type is necessary.

The human sensitive receptors used in this assessment are those which correspond to existing residential and commercial receptors where the short-term (hourly and daily means) and annual mean standards are relevant.

The receptors used in this assessment are summarised in **Appendix 3** and illustrated in **Drawing 2**.

Each of the receptors chosen represents the maximum level of exposure that could be experienced at other similar receptors in their vicinity (i.e., receptors closest to the modelled roads).

### 3.6.3 Advanced Street Canyon Model

The ADMS Roads dispersion model contains an option to add the input of an 'Advanced Street Canyon'. This allows for uneven building heights, carriageway widths and pavements widths on each side of a road centre line to put added into the model. The tool allows road links to be broken into smaller segments, allowing street geometry to be better represented.

Road widths included in the advanced canyon file, were measured using Emapsite and where this was not up to date, measured in Google Earth. For buildings that have not yet been built, design documents submitted for Application 21/01163/PPP and design information from the project team were used for the Proposed Development were used to estimate the canyon width.

Building heights were taken for the consented development, 21/01163/PPP and existing surrounding buildings were taken from the "Proposed Max Building Heights" document available on the CEC Planning Portal. Heights for the Proposed Development which were provided by the project team.

Two scenarios were included in the modelling study – with and without Proposed Development. The Without Proposed Development scenario included canyons created by existing buildings on Bath Road, Salamander Street and the one-sided canyon that would be created upon the completion of consented development, 21/01163/PPP. The With Proposed Development canyon includes the addition of the buildings created by the Proposed Development.

**Appendix 4** shows the data included within the Advanced Canyon inputs and **Drawings 4** and **5** show the Canyons modelled for the Without and With development options respectively.

## 3.7 Meteorological Data

The closest meteorological station to the Proposed Development is Edinburgh Gogarbank, located approximately 11.8 km southwest of the Proposed Development site. Meteorological conditions recorded at Edinburgh Gogarbank are considered to be representative of conditions within the study area.

Hourly meteorological data recorded from Edinburgh Gogarbank meteorological station for the year 2018 were used for model verification and the assessment of future 2026concentrations at receptors.

The wind rose for 2018 is presented in **Drawing 6.**

## 3.8 Background Air Quality Data

There are no CEC urban background monitoring sites within the study area. Background concentrations within the study area have therefore been sourced from the updated 2018-based Scottish Air Quality ($NO_x$, $NO_2$ and $PM_{10}$) (Scottish Air Quality, 2023) and DEFRA ($PM_{2.5}$) background maps (DEFRA, 2023) for the baseline year of 2018 and relevant completion year of 2026. Background concentrations used in this assessment are provided in **Appendix 5**

## 3.9 Methods of Analysis of Modelling Predictions

### 3.9.1 Model Verification

Model verification is used to check the performance of the model at a local level. The verification of the ADMS-Roads model is achieved by modelling concentrations at existing monitoring location(s) within the study area and comparing the modelled concentration(s) with the measured concentration(s).

It is recommended in Defra's LAQM TG.22 guidance (DEFRA, 2022), that model verification is undertaken for at least two monitoring sites at separate locations within the study area to account for varying conditions across the study area. The following monitoring sites have been included in the modelling study.

- 51C, a roadside Diffusion Tube Site measuring annual mean $NO_2$, located on Salamander Street, Edinburgh.
- ID8, a roadside automatic monitor, measuring annual mean $NO_2$, located on Salamander Street, Edinburgh.
- CL7, a roadside Diffusion Tube Site measuring annual mean $NO_2$, located on Salamander Street, Edinburgh.

Model verification used traffic, monitoring and meteorological data from 2018 to provide an indication of model performance elsewhere in the study area.

The model verification process resulted in a model adjustment factor of 1.28 to be applied to modelled road source $NO_x$, $PM_{10}$ and $PM_{2.5}$ concentrations.

The model verification process is provided in detail in **Appendix 6**.

### 3.9.2 $NO_x$ to $NO_2$ Conversion

To accompany the publication of the guidance document LAQM.TG (09) (Department for Environment Food and Rural Affairs, 2009); a $NO_x$ to $NO_2$ converter was made available as a tool to calculate the road source $NO_2$ contribution from modelled road source $NO_x$ contributions. The tool was last updated in August 2020 (Department for Environment Food and Rural Affairs, 2020). The tool comes in the form of an MS Excel spreadsheet and uses local authority area-specific data to calculate annual mean concentrations of $NO_2$ from dispersion model output values of annual mean concentrations of $NO_x$. This tool was used to calculate the total $NO_2$ concentrations at receptors from the modelled road $NO_x$ contribution and associated background concentration. Due to the location of the Proposed Development, the 'All other urban UK Traffic' setting was selected.

### 3.9.3 Predicting the Number of Times per Year the $NO_2$ Hourly Mean Standard is Exceeded

Research projects completed on behalf of DEFRA and the Devolved Administrations (Prof. Duncan Laxen and Dr Ben Marner, 2003) have concluded that the hourly mean $NO_2$ standard is unlikely to be exceeded if annual mean concentrations are predicted to be less the 60 µg/m$^3$.

In 2003, Laxen and Marner concluded:

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

The findings presented by Laxen and Marner are further supported by AEAT who revisited the investigation to complete an updated analysis including new monitoring results and additional monitoring sites. The recommendations of this report are:

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

Therefore, this assessment will evaluate the likelihood of exceeding the hourly mean $NO_2$ standard by comparing predicted annual mean $NO_2$ concentrations at all receptors to an annual mean equivalent threshold of 60 µg/m$^3$ $NO_2$. Where predicted concentrations are below this value, it can be concluded with confidence that the hourly mean $NO_2$ standard (200 µg/m$^3$ $NO_2$ not more than 18 times per year) will be achieved.

### 3.9.4 Predicting the Number of Times per Year the $PM_{10}$ 24 - Hour Mean Standard is Exceeded

Prediction of the number of times per year the 24-hour mean for $PM_{10}$ is exceeded can be difficult to determine directly using dispersion modelling. Therefore, in this assessment, the number of times this objective is exceeded per year has been predicted using the equation below, as suggested in Technical Guidance LAQM.TG(22) (Department for Environment Food and Rural Affairs, 2022).

$$No.\,24-hour\ mean\ exceedances = -18.5 + 0.00145 \times annual\ mean^3 + \left(\frac{206}{annual\ mean}\right)$$

It should be noted that this equation is only valid for predicted annual mean concentrations above 14 µg/m$^3$.

### 3.9.5 Construction Phase Emissions

#### 3.9.5.1 Fugitive Emissions of Particulate Matter

The IAQM guidance on the assessment of dust from demolition and construction (IAQM, 2014) was used in this assessment to determine the significance of effect due to dust arising from the construction phase of the Proposed Development upon human receptors.

The Proposed Development site was firstly allocated a risk category based on the following two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large; and
- The sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity.

These two factors were then combined to determine the risk of dust impacts with no mitigation applied.

Experience in the UK is that good site practice is capable of mitigating the impact of fugitive emissions of particulate matter effectively. In all but the most exceptional circumstances, effects at receptors can be controlled to ensure residual risk of impacts are negligible to low at worse and are therefore not significant.

### 3.9.6 Operational Emissions

The change in pollutant concentrations with respect to future baseline concentrations has been described at receptors that are representative of exposure to impacts on local air quality within the study area. The absolute magnitude of pollutant concentrations in the "future without-Proposed Development" and "future with-Proposed Development" scenarios is also described, and this is used to consider the risk of the AQSs being exceeded in each scenario.

For a change of a given magnitude, the IAQM (EPUK & IAQM, 2017) have published recommendations for describing the magnitude of impacts and determining the significance of such impacts at individual receptors. The impact descriptors are summarised in Error! Reference source not found.. A change of less than 0.5% of t he Air Quality Assessment Level (AQAL) is described as Negligible.

*Table 5- Impact Descriptors for Individual Receptors*

| Long Term Average Concentration at Receptor in Assessment Year | % Change in concentration relative to Air Quality Assessment Level (AQAL) | | | |
|---|---|---|---|---|
| | 1 | 2-5 | 6-10 | >10 |
| 75% or less of AQAL | Negligible | Negligible | Slight | Moderate |
| 76-94% of AQAL | Negligible | Slight | Moderate | Moderate |
| 95-102% of AQAL | Slight | Moderate | Moderate | Substantial |
| 103-109% of AQAL | Moderate | Moderate | Substantial | Substantial |
| 110% or more of AQAL | Moderate | Substantial | Substantial | Substantial |

### 3.9.7 Overall Assessment of Significance at Sensitive Receptors

The significance of individual impacts has also been considered for the Proposed Development in overall terms. The potential for the Proposed Development to contribute to or hinder the successful implementation of policies and strategies for the management of local air quality at larger scale than at individual receptors, was considered if relevant and overall impact/risk descriptors derived.

Table 6 summarises the descriptors used to characterise the overall significance of effects at sensitive receptors.

*Table 6- Descriptors used for the Overall Assessment of Significance at Sensitive Receptors*

| Overall Impact/Risk Descriptor | Significance |
|---|---|
| Substantial/High | A significant effect that is likely to be a material consideration in its own right. |
| Moderate/Medium | A significant effect that may be a material consideration in combination with other significant effects but is unlikely to be a material consideration in its own right. |
| Minor/Low | An effect that is not significant but that may be of local concern. |
| Negligible | An effect that is not significant change. |

# 4. Baseline

## 4.1 CEC's Review & Assessment of air quality

CEC have designated six AQMAs within their administrative boundary as a consequence of their review and assessment work. The site is located within the Salamander Street AQMA, designated in 2017 due to exceedances of the annual mean AQS for $PM_{10}$.

CEC published its Draft Air Quality Action plan (AQAP) (City of Edinburgh Council, 2022) in 2022 which outlines the actions proposed to improve air quality within the Local Authority area. The measures include traffic management plans which would reduce motorised traffic and encourage uptake of public transport and active travel modes.

## 4.2 Local Emission Sources

The Application site is located in an area where air quality is mainly influenced by emissions from road transport on Salamander Street and Salamander Place.

The following industrial processes have been identified near to the Proposed Development.

- NWH Group, a waste management service located approximately 330 m to the northeast of the Application Site
- Breedon, a building materials and cement supplier located approximately 380 m to the north of the site at the Leith Docks.

These processes will be required to adhere to the conditions and mitigation measures detailed within their permits and therefore it is not anticipated that they will have any impact on air quality in the vicinity of the Proposed Development.

## 4.3 Background Air Quality Data

**Table 7** Summarises the background pollutant concentrations of $NO_2$, $PM_{10}$ and $PM_{2..5}$ for the current year of 2023. All the annual mean background concentrations are well below the relevant objectives. $NO_2$ and $PM_{10}$ have been taken from the Scottish Air Quality background concentrations (Scottish Air Quality, 2023) whereas $PM_{2.5}$ has been taken from the Defra background concentrations (DEFRA, 2023).

*Table 7-Background Air Quality Concentration.*

| Grid Square (centre on the O.S Grid reference) | $NO_2$ (ug/m$^3$) | $PM_{10}$ (ug/m$^3$) | $PM_{2.5}$ (ug/m$^3$) |
|---|---|---|---|
| 327500, 676500 | 12.4 | 11.9 | 6.3 |

The reported background concentrations are observed to be below the respective annual mean objectives for all identified pollutants in the current year.

## 4.4 Local Air Quality Monitoring Data

CEC carry out automatic and passive monitoring in the vicinity of the Proposed Development. The nearest automatic monitor to the Application site is ID8 on Salamander Street, located approximately 30 m to the west of the Site. It measures concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$. ED012, located approximately 275m to the north west of the Site, measures concentrations of $PM_{10}$ and $PM_{2.5}$.

*Table 8 – CEC Automatic Monitoring Results*

| Monitor ID | Pollutant (ug/m$^3$) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| ID8 | $NO_2$ | 25.0 | 25.0 | 24.3 | 19.5 | 22.1 |
| ID8 | $PM_{10}$ | 19.0 | 20.0 | 18.1 | 14.8 | 15.4 |
| ED012 | | ND* | ND | 10.7 | 8.6 | 9.9 |
| ID8 | $PM_{2..5}$ | ND | ND | ND | 4.0 | 5.5 |
| ED012 | | ND | ND | 5.7 | 4.2 | 4.7 |

*No data

The data shown in **Table 8** indicate reductions in $NO_2$ concentrations since 2018 at monitor ID8 but show an increase in 2021. Concentrations of $PM_{10}$ and $PM_{2.5}$ have decreased since 2018, but have also experienced increases from 2020 to 2021. This could be representative of recovery in traffic flow due to the removal of

the travel restrictions brought in during the Covid-19 pandemic and additionally, improvements in vehicle emissions on the road network. All concentrations are below the relevant objectives in all years.

*Table 9 – CEC Passive Monitoring Results*

| ID | Distance from Site (m) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| 51C | 192 | 32.0 | 31.0 | 26.5 | 22.4 | 21.4 |
| CL7,CL8, CL9 (co-located with ID8?) | 29 | 32.0 | 27.0 | 27.8 | 20.7 | 20.7 |
| 51B | 13 | ND | ND | ND | 20.4 | 24.0 |

The diffusion tube data in **Table 9** show that annual mean concentrations of $NO_2$ were below the objective for all years 2017-2021. The most recent concentrations were below the objective by at least 16 ug/$m^3$. Concentrations have generally decreased since 2017, however a slight rise in 2021 at tubes 51B and 51C may be attributed to a recovery in traffic flow due to the removal of the travel restrictions brought in during the Covid-19 pandemic and additionally, improvements in vehicle emissions on the road network. The closest tube to the Proposed Development is 51B which is located on Salamander Street opposite the development site. Concentrations recorded by the diffusion tube are considered to be representative of conditions at the Site.

## 4.5 Summary

CEC operates an extensive network of automatic monitors and passive diffusion tubes within the Local Authority area, five of which are located within the vicinity of the Site. Data from **Table 8** and **Table 9** demonstrate that there have not been any exceedances recorded. Concentrations measured at diffusion tube site 51B are considered to be representative of the site due to the similar road conditions experienced by both the Application site and the monitoring location.

Background pollutant data from **Table 7** show that concentrations in the current year are predicted to remain below their respective annual mean objectives. Additionally, air quality at the Site is likely to be better than predicted in future years, particularly for particulate matter, due to the removal of the Daltons metals recycling centre which would reduce dust emitting activities in the area.

# 5. Results

## 5.1 Predicted Concentrations of $NO_2$

The predicted annual mean $NO_2$ concentrations at all selected sensitive receptors with and without the advanced street canyon model are displayed in **Appendix 7, Table 7A and 7B.**

With the updated model configuration and emissions factors *without* the Proposed Development, the highest predicted annual mean $NO_2$ concentration at all selected sensitive receptors included in the model is 19.2 µg/$m^3$ at Receptor 8G (an existing ground floor residential receptor at 70 Salamander Street).

With the Proposed Development, the highest predicted annual mean $NO_2$ concentration at all selected sensitive receptors within the Proposed Development is 19.0 µg/$m^3$ at (an existing ground floor residential receptor at 70 Salamander Street

Predicted future concentrations at all selected sensitive receptors are all predicted to be below the AQS of 40 µg/$m^3$ and the impact descriptor is negligible.

It can be seen that the predicted annual mean concentrations at each existing receptor are lower with the Proposed Development modelled with the advanced street canyon effects on each side of the road, than a single canyon opposite the development site. The modelled canyon has the effect of changing the distribution of air pollution in the study area due to areas of recirculating flow dispersion through gaps and out the top and ends of the canyon; and, channelling along the canyon; so that some areas experience higher concentrations when modelled with the canyon and others experience reductions

Predicted concentrations at all selected sensitive receptors are significantly below the annual mean equivalent (60 µg/m$^3$) for the hourly mean $NO_2$ standard (200 µg/m$^3$ not to be exceeded more than 18 times). Consequently, it is concluded that there are no predicted exceedances of the hourly standard at all selected sensitive receptors within the Proposed Development.

## 5.2 Predicted Concentrations of $PM_{10}$

The predicted annual mean $PM_{10}$ concentrations at all selected sensitive receptors with and without the advanced street canyon model are displayed in **Appendix 7, Tables 7C and 7D.**

With the updated model configuration and emissions factors *without* the Proposed Development, the highest predicted annual mean $PM_{10}$ concentration at all selected sensitive receptors is 14.3 µg/m$^3$ at 8G (an existing ground floor residential receptor at 70 Salamander Street).

With the Proposed Development, the highest predicted annual mean $PM_{10}$ concentration at all selected sensitive receptors is 14.2 µg/m$^3$ at 8G (an existing ground floor residential receptor at 70 Salamander Street

Predicted future concentrations at all selected sensitive receptors where the annual mean $PM_{10}$ AQS applies are all predicted to be below the AQS of 18 µg/m$^3$ and the impact descriptor is negligible

Three ground floor receptors (4G,5G and 6G) are predicted to experience a Slight Adverse Impact when the percentage of change is considered in relation to the annual mean objective of 18 ug/m$^3$, however as each of these receptors are commercial, the annual mean objective does not apply at these receptors. When the change in concentration is compared to the relevant objective for commercial receptors, the 24-hour mean of 50 µg/m$^3$, the impact is considered Negligible.

Using the LAQM.TG(22) formulae (Department for Environment Food and Rural Affairs, 2022); up to one of the seven allowable daily mean exceedances were predicted at two selected sensitive receptors without the development, and one in the  with development scenario. it is concluded that there are no predicted exceedances of the $PM_{10}$ daily mean AQS (>50 µg/m$^3$ more than 7 times a year).

## 5.3 Predicted Concentrations of $PM_{2.5}$

The predicted annual mean $PM_{2.5}$ concentrations at all selected sensitive receptors with and without the Proposed Development are displayed in **Appendix 7, Tables 7E and 7F.**

With the updated model configuration and emissions factors *without* the Proposed Development, the highest predicted annual mean $PM_{10}$ concentration at all selected sensitive receptors is 7.5 µg/m$^3$ at exsiting receptors G7 and G8 (ground floor commercial receptor at the consented Salamander Street/Bath Road development and ground floor residential receptor at 70 Salamander Street).

With the Proposed Development, the highest predicted annual mean $PM_{10}$ concentration at all selected sensitive receptors within the Proposed Development is 7.5 µg/m$^3$ at 8G (existing ground floor receptor at 70 Salamander Street).

Predicted future concentrations at all selected sensitive receptors within the Proposed Development where the annual mean $PM_{2.5}$ AQS applies are all predicted to be below the AQS of 10 µg/m$^3$.

## 5.4 Site Suitability

The predicted $NO_2$, $PM_{10}$ and $PM_{2.5}$ annual mean concentrations at all selected sensitive future receptors within the Proposed Development where the annual mean AQSs apply are below the relevant AQS. The results are displayed in **Appendix 7, Table 7G.**

Predicted concentrations at all selected sensitive future receptors within the Proposed Development are significantly below the annual mean equivalent (60 µg/m$^3$) for the hourly mean $NO_2$ standard (200 µg/m$^3$ not to be exceeded more than 18 times). Consequently, it can be concluded that there are no predicted exceedances of the hourly $NO_2$ standard at all selected sensitive future receptors within the Proposed Development.

There are no predicted exceedances of the $PM_{10}$ daily mean AQS (>50 µg/m$^3$ more than 7 times a year) at any receptor within the Proposed Development.

The predicted concentrations at future sensitive receptors decrease for all pollutants with each floor elevation above street level.

Overall, with respect to air quality, the Proposed Development site is assessed as suitable for its proposed use.

## 5.5 Construction Dust Emissions

As with the majority of construction projects of this type, the early phases of the works are likely to involve excavations and earthworks and temporary stockpiling of potentially dusty materials. During the middle phases, when the buildings are erected, the principal sources of dust are likely to be from the cutting and grinding of materials and the movement of construction related road vehicles. The latter phases, when the majority of the buildings and infrastructure are complete, will involve the landscaping and finishing works. During these phases, the principal sources of dust will include the storage, handling and movement of materials generated during the associated earthworks.

The proposal has the potential to increase levels of airborne dust and $PM_{10}$ during the construction phase. Specifically, there is potential for exposure to dust emissions at neighbouring residential, and public amenity properties.

## 5.6 Construction Phase Dust Risk Assessment

In accordance with the IAQM guidance (IAQM, 2014), the risk of dust arising in sufficient quantities to cause annoyance, health and/or ecological impacts should be determined using four *risk categories:*

- Negligible;
- Low;
- Medium; and
- High risk.

A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude as small, medium, or large; and
- the sensitivity of the area to dust impacts as low, medium or high, which is dependent on the number of individual receptors (1-10, 10-100 or >100) with each sensitivity classification within prescribed distances from the site (20 m, 50 m, 100 m and 350 m). For the sensitivity of the area to human health impacts, the baseline ambient particulate concentration is also accounted for.

These two factors are combined to determine the risk of dust impacts with no mitigation applied.

The study area and buffer zones as prescribed by the IAQM guidance (IAQM, 2014) used in the assessment are shown in **Drawing 3.**

The construction dust risk assessment detailed above concludes that without specific site mitigation measures there are:

- > 100 high sensitivity human receptors within 20 m of the Proposed Development site subject to:
  - High risk of dust soiling during earthworks and construction; and
  - Medium risk to human health impacts during earthworks and construction.

Table 10 below summaries the potential risk of dust impacts on nearby sensitive receptors, without specific mitigation measures in place.

*Table 10– Summary of Dust Risk to Define Site-Specific Mitigation*

| Potential Impact | Risk of Dust Impact | | | |
|---|---|---|---|---|
| | Demolition | Earthworks | Construction | Track-out |
| Dust Soiling | Medium | Medium | High | Medium |
| Human Health | Negligible | Low | Medium | Medium |

## 5.7 Assessment of Significance of Effects at Existing Residential Receptors

The results of the predicted concentrations of each pollutant at existing sensitive receptors without and with the advanced street canyon are shown in **Appendix 7.**

It can be seen that the predicted annual mean concentrations at each existing receptor are lower with the Proposed Development modelled with the advanced street canyon effects. The modelled canyon has the effect of changing the distribution of air pollution in the study area due to areas of recirculating flow; dispersion through gaps and out the top and ends of the canyon; and, channelling along the canyon; so that some areas experience higher concentrations when modelled with the canyon and others experience reductions.

There are no predicted exceedances of any of the annual mean AQSs at existing residential receptors and the effect at each receptor is either slight beneficial or moderate beneficial in accordance with the Institute of Air Quality Management (IAQM) assessment criteria (EPUK & IAQM, 2017).

The effects of the Proposed Development on existing residential receptors is therefore not significant.

# 6. Mitigation Measures

## 6.1 Proposed Mitigation for Construction Dust Management

The general mitigation measures that will be implemented during the construction phase to minimise risks of adverse air quality effects will include actions such as those listed in **Appendix 8**.

## 6.2 Proposed Mitigation for Operational Traffic Emissions Management

This AQIA has been undertaken following a conservative methodology and therefore no mitigation measures are deemed to be required with regard to operational traffic emissions.

# 7. Conclusion

This report is the AQIA for a proposed mixed-use development in Leith, Edinburgh, comprising student and buy to rent units, with commercial ground floor space.

The assessment has been undertaken to demonstrate compliance with AQOs as set out in the NAQS and adopted into AQSs for Scotland. It has been undertaken in accordance with IAQM, EPUK and DEFRA technical guidance and CEC planning policy.

Detailed dispersion modelling using the ADMS-Roads modelling software was undertaken to predict the concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ at existing and proposed future sensitive human receptors within the study area, due to the creation of a street canyon along Salamander Street.

No exceedances of the AQSs for $NO_2$, $PM_{10}$ and $PM_{2.5}$ are predicted at any of the sensitive human receptors within the study area.

The predicted change in $NO_2$, $PM_{10}$ and $PM_{2.5}$ annual mean concentrations between the future without Proposed Development and future with Proposed Development scenarios shows that the Proposed Development is predicted to have a **Negligible** impact at selected receptors when compared to relevant annual mean for residential occupancy.

The predicted short-term mean concentrations for $NO_2$ and $PM_{10}$ which are relevant for the short-term exposure of members of public, comply with the relevant AQSs for $NO_2$ and $PM_{10}$ at all human receptors.

In summary, the significance of effect associated with operational canyon phase effects upon local air quality of the Proposed Development is assessed as ***not significant***. Additionally, air quality at the Site is likely to be better than predicted in the baseline and model results, particularly for particulate matter, due to the removal of the Daltons metals recycling centre which would reduce dust emitting activities in the area.

With regards to the risks of dust impacts predicted in the included construction dust risk assessment, the good-practice mitigation measures and site-specific mitigation measures outlined in **Appendix 8** will be adopted to minimise the risks identified, such that the residual impact of dust is negligible and therefore ***not significant***.

The Proposed Development site is assessed as suitable for its intended future uses with regard to air quality.

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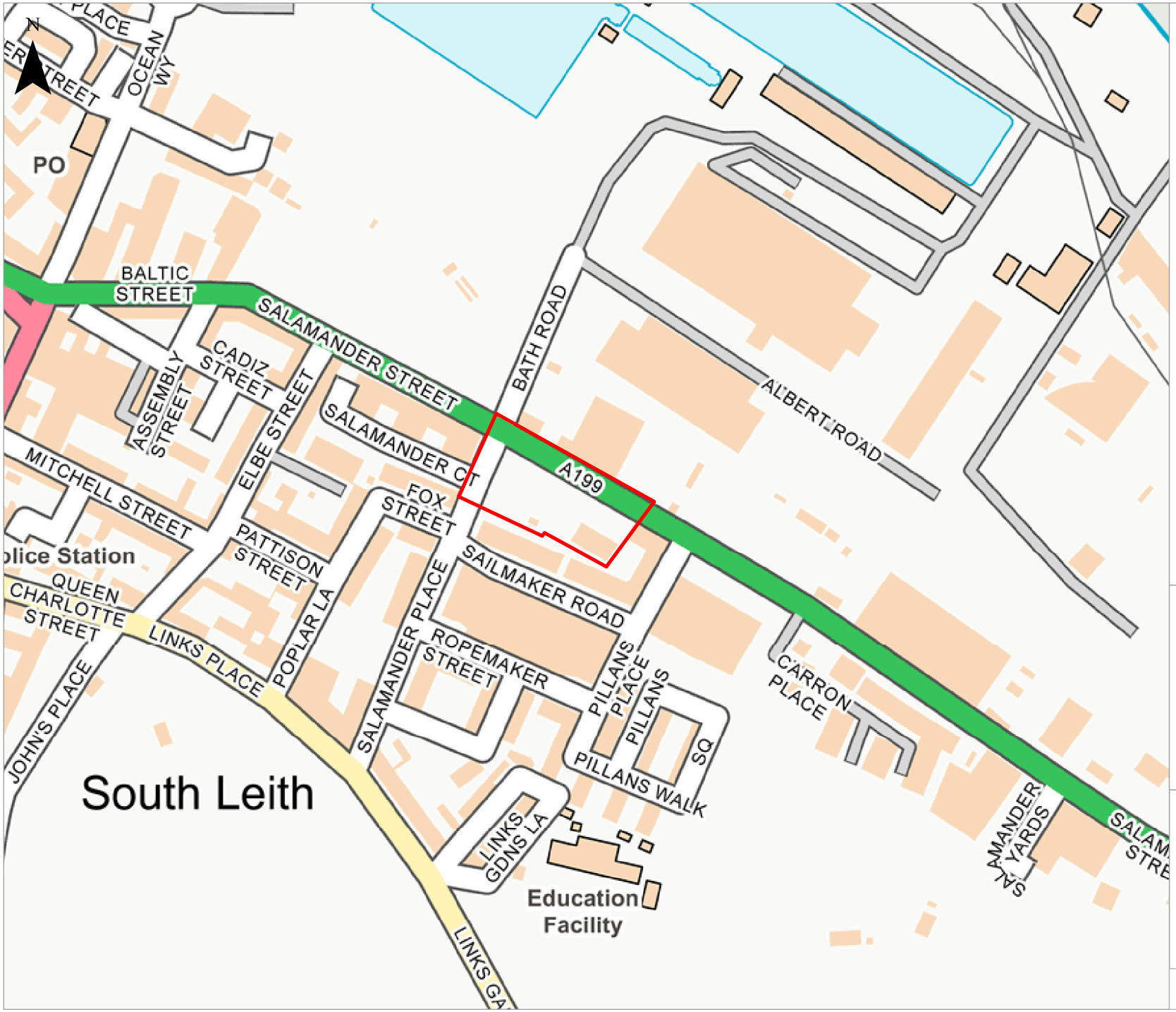
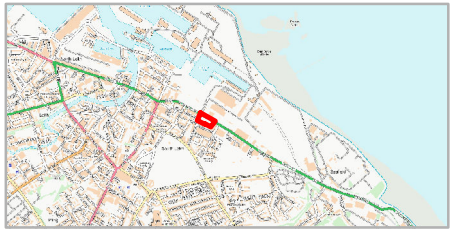
# Drawings




**KEY**

Red Line Boundary



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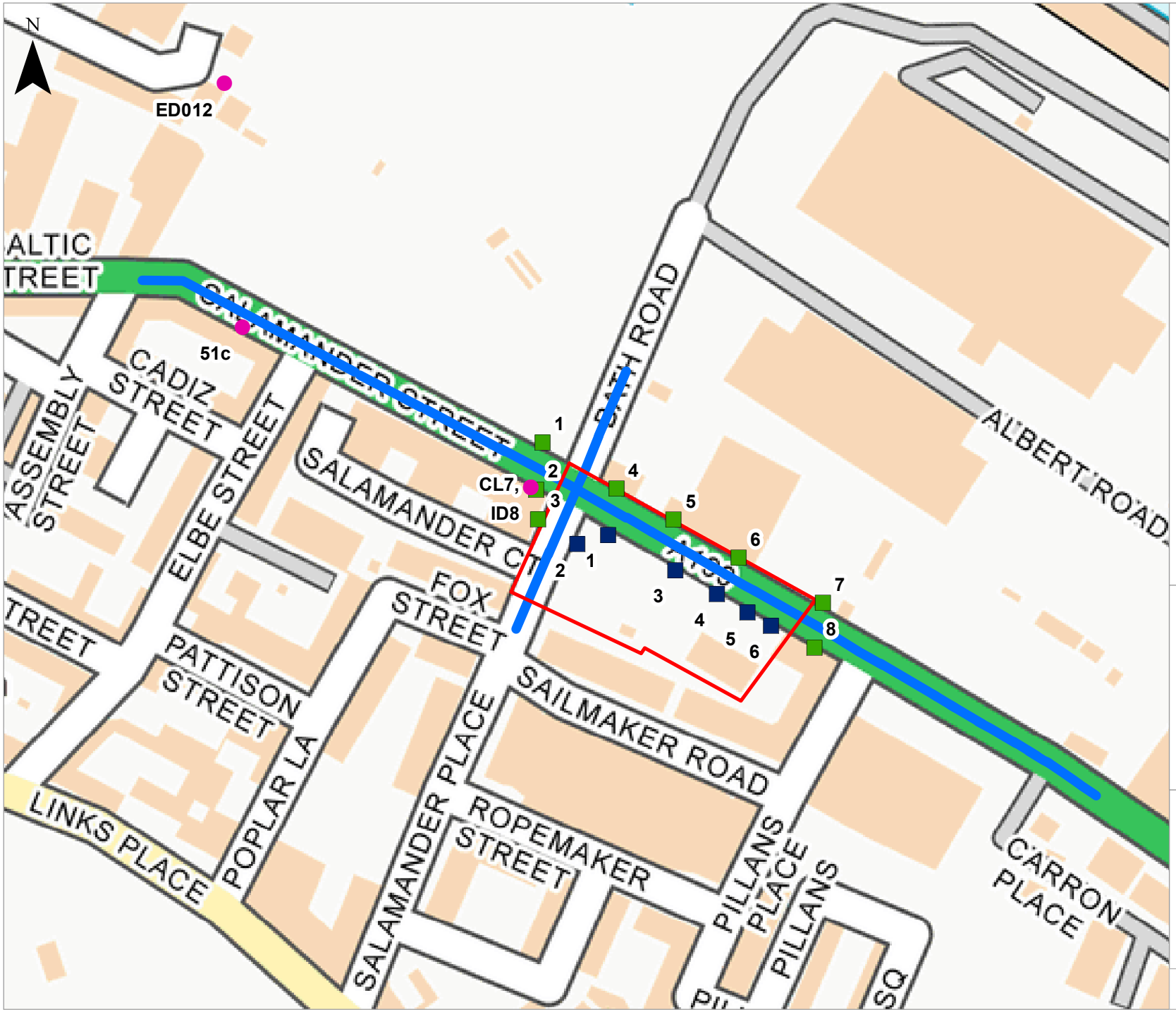
Daltons Metals Recycling Site, Salamander Street
Air Quality Impact Assessment

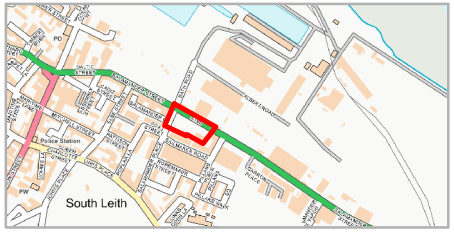
**Drawing 1**
**Site Location**

| Date: | Lead: | Review: | Version: |
|---|---|---|---|
| 25/10/2023 | J.Hill | A. Danskin | 1.0 |




**KEY**

- Red Line Boundary
- Modelled Road Sources
- Existing and Consented Receptors
- Proposed Receptors
- CEC Monitoring Locations

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Daltons Metals Recycling Site, Salamander Street
Air Quality Impact Assessment

**Drawing 2**
**Modelled Roads and Receptors**

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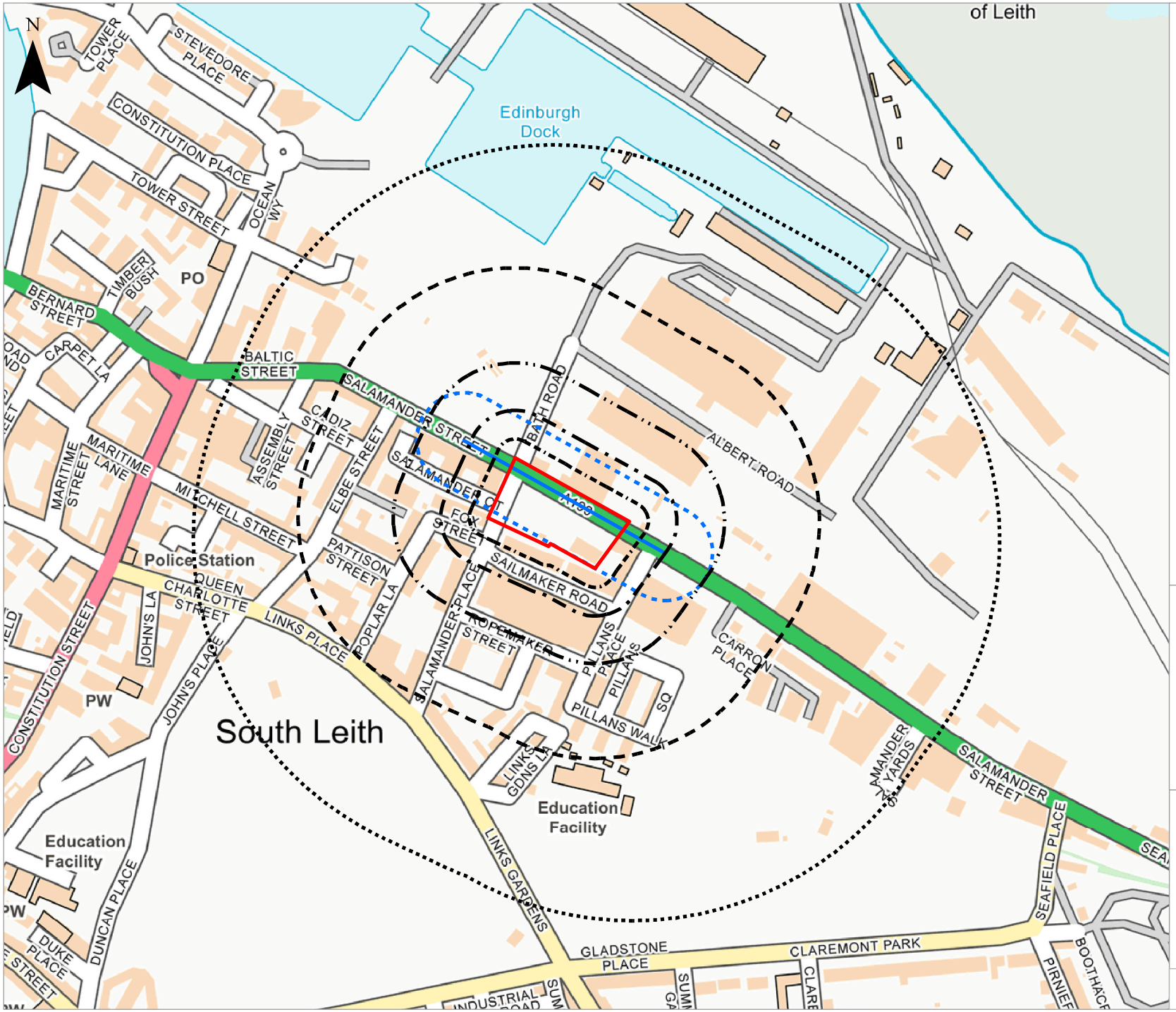
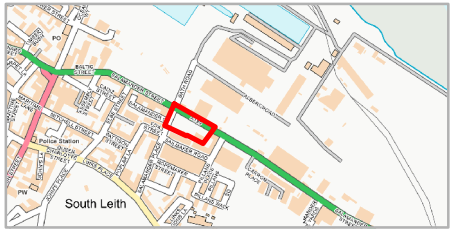
| 25/10/2023 | J.Hill | A. Danskin | 1.0 |




**KEY**

- Red Line Boundary
- 350 Study Area
- 200m Study Area
- 100m Study Area
- 50m Study Area
- 20m Study Area
- Trackout Route
- Trackout 50m Study Area

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Daltons Metals Recycling Site, Salamander Street
Air Quality Impact Assessment

**Drawing 3**
**Construction Phase Dust Impact Study Area**

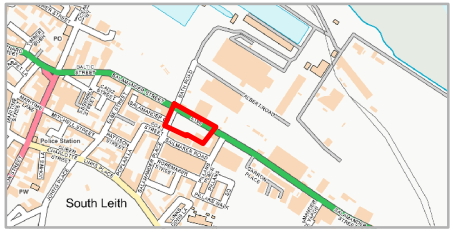
| Date: | Lead: | Review: | Version: |
|---|---|---|---|
| 25/10/2023 | J.Hill | A. Danskin | 1.0 |


## KEY

- Red Line Boundary
- Existing/Consented Receptors
- Modelled Road Network

**Canyon Width**

- Meters

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Daltons Metals Recycling Site, Salamander Street
Air Quality Impact Assessment

**Drawing 4**
**Modelled Advanced Canyon Without Development**

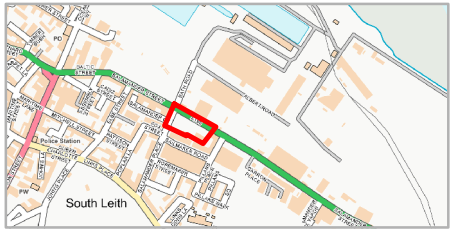
| Date: | Lead: | Review: | Version: |
|---|---|---|---|
| 27/10/2023 | J.Hill | A. Danskin | 1.0 |


## KEY

- Red Line Boundary
- Existing/Consented Receptors
- Proposed Receptors
- Modelled Road Network

**Canyon Width**

- Meters

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Projection: Transverse Mercator



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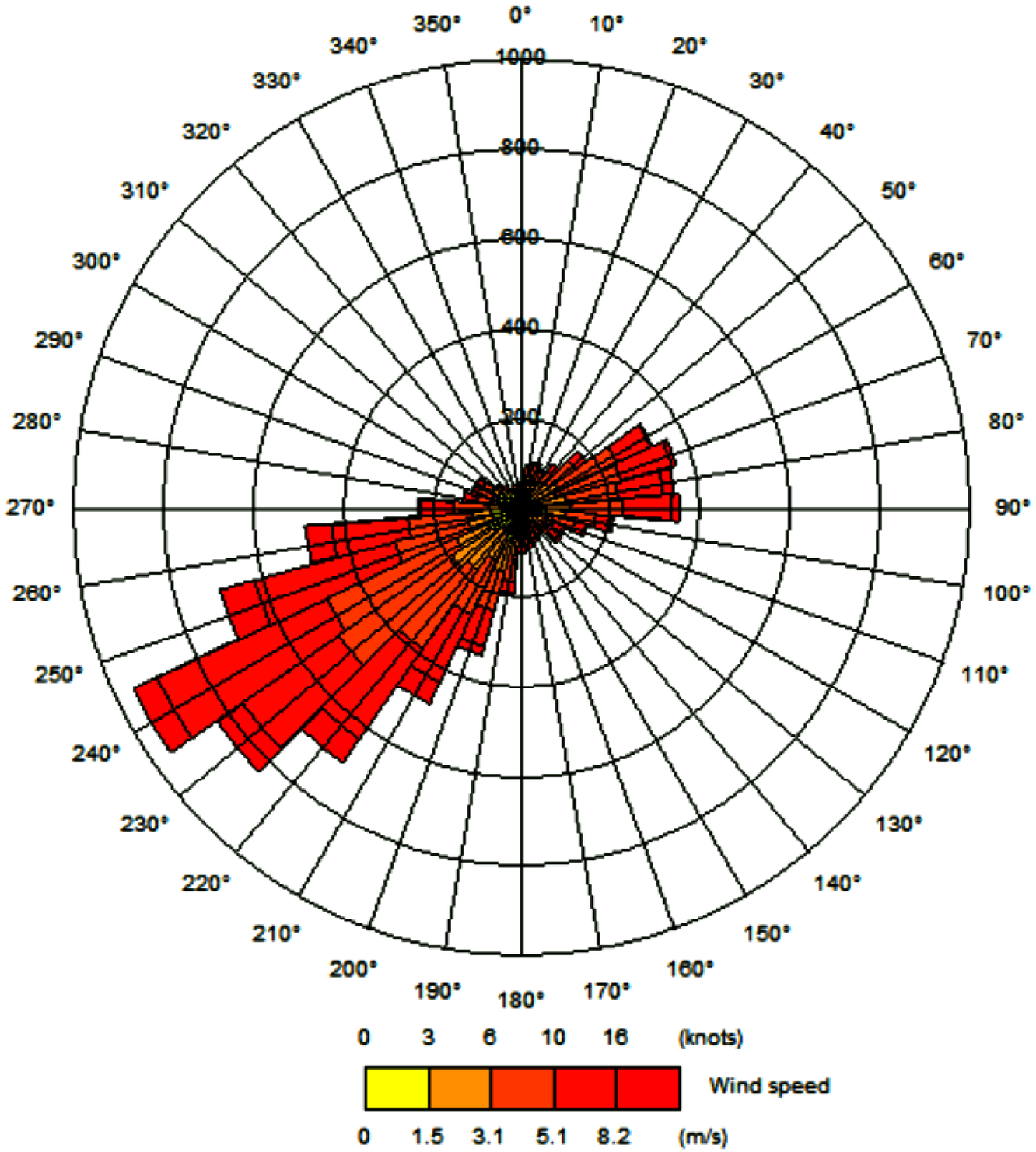
Daltons Metals Recycling Site, Salamander Street
Air Quality Impact Assessment

**Drawing 5**
**Modelled Advanced Canyon With Development**

| Date: | Lead: | Review: | Version: |
|---|---|---|---|
| 27/10/2023 | J.Hill | A. Danskin | 1.0 |

N

# Edinburgh Gogarburn (2018)

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Daltons Metals Recycling Site, Salamander Street
Air Quality Impact Assessment

**Drawing 5**
**Edinburgh Gogarburn**
**Hourly Met Data 2018**

| Date: | Drawn by: | Checked by: | Version: |
|---|---|---|---|
| 27/10/2023 | J.Hill | A. Danskin | V1.0 |

Project Number: 6716

# Appendix 1: Summary of Consultation

[redacted]

**From:** Jemima Hill [redacted]
**Sent:** 26 October 2023 16:15
**To:** Claire Devlin
**Cc:** Annie Danskin
**Subject:** Re: Air Quality Assessment Consultation - 52/66 Salamander Street

Hi Claire

Thank you for your response.

We have carried out a modelling study using ADMS Roads 5.1.03.

We have not removed any contribution from the metals site from any data.

The traffic flows for the 'with development' scenario, are the same flows used for the 'with scenario' in the air quality assessment for the agreed development opposite on Salamander Street (21/01163/PPP) so includes the impact of their generated traffic.

Kind Regards

Jemima

---

**From:** Claire Devlin [redacted]
**Sent:** Thursday, October 26, 2023 15:34
**To:** Jemima Hill [redacted]
**Cc:** Annie Danskin [redacted]
**Subject:** RE: Air Quality Assessment Consultation - 52/66 Salamander Street

Good afternoon Jemima,

Many thanks for the below. Could you confirm what software / model you will be using (e.g. ADMS Roads Extra) .

Can I also get a bit more clarification on the assessment for the canyon effect? Are you including the scrapyard contribution for the proposed pend layout? If you are removing it's contribution, how will you achieve that? Are you mapping or modelling? And are you including the impact of the agreed development opposite on Salamander Street (21/01163/PPP)?

Many thanks

Claire

Claire Devlin | Environmental Health Officer | Environmental Protection | Regulatory Services | Directorate of Place | The City of Edinburgh Council | G1, Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG | [redacted]

---

**From:** Jemima Hill [redacted]
**Sent:** Monday, October 23, 2023 9:54 AM
**To:** Claire Devlin [redacted]
**Cc:** Annie Danskin [redacted]
**Subject:** Re: Air Quality Assessment Consultation - 52/66 Salamander Street

Hi Claire,

Thank you for your response.

The Proposed Development will not generate any traffic or contain any parking so we have scoped out a detailed modelling study of generated vehicle movements. Instead we have carried out a modelling study of the impact of introducing the street canyons, using the design option that contains the pend, linking the two buildings.

Our traffic data has been taken from a previous planning application Land at Bath Road/Salamander Street (21/01163/PPP) and we are modelling a baseline year of 2018 and a development year of 2026 (with and without the proposed development). The pollutants that have been included in the modelling study are $NO_2$, $PM_{10}$ and $PM_{2.5}$.

Our assessment uses background concentrations from the Scottish Air Quality Website and Defra. These backgrounds will have the particulate matter contribution from the metals recycling site, as will the monitored concentrations from the CEC ASR, which should make our assessment somewhat conservative.

Would you be able to let me know if you have any comments on our methodology?

Kind Regards

Jemima

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**From:** Claire Devlin [redacted]
**Sent:** Wednesday, October 18, 2023 15:54
**To:** Jemima Hill [redacted]
**Cc:** Annie Danskin [redacted]
**Subject:** RE: Air Quality Assessment Consultation - 52/66 Salamander Street

Good afternoon Jemima,

Thank you for your email below.

In the first instance I would clarify it is an air quality monitoring exercise focusing on particulates (Pm10 and 2.5) we were looking for.

The past few years have shown a mixed picture in relation to PM10 levels at Salamander Street. 2020 was the first year that the Air Quality Statutory Objective was met at that location and we are of the view that the measured levels may have been affected by the Covid pandemic.

We do acknowledge the difficulties of monitoring whilst the scrap metal site is still in operation.

Could you therefore provide details of the methodology / emissions etc you would use to desktop assess / model the PM10 and PM2.5 level with and without the development?

The information you have provided in your email below is satisfactory in relation to concerns about odour from Seafield Waste Water Treatment works.

Many thanks

Claire

Claire Devlin | Environmental Health Officer | Environmental Protection | Regulatory Services | Directorate of Place | The City of Edinburgh Council | G1, Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG | [redacted]

**From:** Jemima Hill [redacted]
**Sent:** Monday, October 9, 2023 1:01 PM
**To:** Claire Devlin <[redacted]
**Cc:** Annie Danskin[redacted]
**Subject:** Re: Air Quality Assessment Consultation - 52/66 Salamander Street

Good afternoon,

Thank you for your response to our consultation and for your agreement of our scope. Our client has received pre-app comments from one of your colleagues and I would like to clarify what is required for our assessment. The comments indicated that a six month baseline dust monitoring assessment would be required. I would like to query the purpose and necessity of this.

There are no exceedances shown in the council monitoring for the area surrounding the development site. The most recent monitoring air quality status report showed particulate matter concentrations measured at automatic monitor ID8 (approximately 30 m from the Proposed Development) were 15.4 ug/$m^3$ for $PM_{10}$ and 5.5 ug/$m^3$ for $PM_{2.5}$, 2.5 ug/$m^3$ and 4.5 ug/$m^3$ below their respective objectives. As the Proposed development is car-free it will not contribute to particulate matter concentrations in the surrounding area. Additionally, it replaces an operational metals recycling site.

The replacement of the metals recycling site with residential units is expected to improve the air quality with regards to particulate matter in the Salamander Street area. We are unsure what six months of baseline monitoring whilst the metals recycling site is still operating would achieve in the case of this specific development? Would you agree with our proposition to scope this out?

The pre-app comments also mentioned odour from the Seafield Wastewater Treatment Works (WwTW) as a concern for future residents and suggested that this be included within our assessment. There has been a significant amount of residential developments in the Leith area which have not required an odour assessment as part of their application. We are confused as to why this is a concern specific to this development and would like some clarification on this.

Seafield Wastewater Treatment Works is regulated by the Scottish Environment Protection Agency (SEPA) and is required to incorporate mitigation measures that will minimise the risk of odour affecting nearby residents as part of their permit to operate. In the event that odour is emitted from the WwTW, this is not something that can be controlled by the developer of the Proposed Development.

Furthermore, ITP recently undertook a wind analysis for a development in the vicinity of Salamander Street. This analysis shows the prevailing wind is from the south west as shown in the Table below. The frequency of the wind from the north east was 6.7-9.8% of the year between 2020 and 2022, with wind speeds between 0.9-1.8m/s. These infrequent and calm conditions mean that the odour pathway to the development is also considered ineffective during periods where the Proposed Development would be downwind of the WwTW.

*Table 2 - Edinburgh 2020 to 2022 Dry Days Wind Data Analysis*

| Year | | Wind Direction | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | N | NE | E | SE | S | SW | W | NW |
| 2020 | Wind Frequency % of the Year | 5.1 | 9.8 | 11.4 | 2.9 | 7.9 | **36.3** | 23.3 | 3.2 |
| | Average wind speed m/s | 1.8 | 3.7 | 3.4 | 2.2 | 3.0 | 5.1 | 5.0 | 2.5 |
| 2021 | Wind Frequency of the Year | 10.9 | 9.4 | 12.4 | 2.6 | 6.8 | **31.1** | 21.9 | 4.5 |
| | Average wind speed m/s | 1.1 | 3.0 | 3.2 | 2.7 | 2.7 | 4.3 | 4.6 | 3.0 |
| 2022 | Wind Frequency % of the Year | 11.0 | 6.7 | 9.7 | 2.7 | 9.2 | **35.5** | 21.6 | 2.6 |
| | Average wind speed m/s | 0.9 | 3.4 | 3.5 | 3.2 | 3.2 | 4.8 | 5.3 | 2.8 |
| **Frequency Category** | | **Infrequent** | **Infrequent** | **Infrequent** | **Infrequent** | **Infrequent** | **Very Frequent** | **Very Frequent** | **Infrequent** |

The Proposed Development is approximately 900 m away from the WwTW (well over the 400 m the IAQM odour guidance states is the effective pathway range) and this combined with the upwind position of the development site makes the pathway for odour ineffective. Additionally, the south westerly wind speeds shown between 2020-2022 (shown in the Table below) correlate with the Beaufort scales 'gentle breeze' which would help disperse any odour towards the north east in the event that a release would occur, minimising any impacts on future residents.

We seek your agreement in scoping out these assessments. I would be grateful if you could respond at your earliest convenience in order that we can progress with the planning application submission with our Client.

Kind Regards

Jemima

Office: [redacted]
4th Floor | Centrum House | 108-114 Dundas Street | Edinburgh | EH3 5DQ
www.itpenergised.com






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**From:** Claire Devlin [redacted]
**Sent:** Monday, October 2, 2023 15:43
**To:** Jemima Hill [redacted]
**Subject:** RE: Air Quality Assessment Consultation - 52/66 Salamander Street

Good afternoon Jemima,

Many thanks for your email below. Your outline proposal looks fine to us.

I would advise that I am aware of a meeting between the developers and my planning colleagues occurred last week. Concern was raised about the potential street canyons being introduced, as the design has now apparently changed from pre-app stage (where there were gaps in the frontage). I believe it has been agreed to look at the air quality impact of both options.

The proposed site currently sits within an AQMA for particulate matter and very close to an AQMA for $NO_2$. I'm pleased to note that there will be no parking onsite and no use of fossil fuels. The main industrial source is the Forth Ports site, which includes movement of scrap metals and aggregates. They also have permission for a cement works at the site, but this activity may have moved away from this part of the port in recent years.

Many thanks

Claire

Claire Devlin | Environmental Health Officer | Environmental Protection | Regulatory Services | Directorate of Place | The City of Edinburgh Council | G1, Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG | [redacted]

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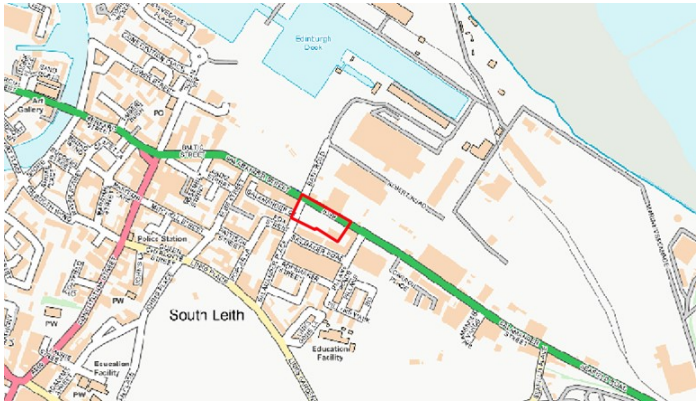
**From:** Jemima Hill [redacted]
**Sent:** Tuesday, September 26, 2023 12:56 PM
**To:** Environmental Health [redacted]
**Cc:** Annie Danskin [redacted]
**Subject:** Air Quality Assessment Consultation - 52/66 Salamander Street

Dear Sir/Madam

ITP Energised has been appointed to undertake an air quality impact assessment to accompany the planning application for a site located at 52/66 Salamander Street. The development proposals comprise a café on the ground floor with a mixture of student and build to rent accommodation on the floors above. The site is currently in use as the Daltons Metals Recycling Site. The location of the Proposed Development is shown in the figure below.




The Proposed Development is located within the Salamander Street AQMA, however the plans do not include any parking provision and the development is not anticipated to generate any additional movements on the road network. The Proposed Development includes air source heat pumps and does not include any boilers or CHP.

The AQIA will be undertaken in accordance with relevant statutory and non-statutory guidance on air quality assessment and will give reference to local policy and Local Air Quality Management (LAQM) reports, including:

1. Defra and Devolved Administrations, LAQM Technical Guidance (TG22) – 2022;
2. Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) Land-Use Planning & Development Control: Planning for Air Quality – 2017;
3. IAQM, Guidance on the assessment of dust from demolition and construction – 2023;
4. CEC latest Air Quality Annual Progress Report (APR);
5. CEC Local development plan (2016); and
6. CEC emerging City Plan 2030

*Construction*

We will carry out a Construction Dust Assessment with reference to the methodology detailed in the IAQM Guidance on the assessment of dust from demolition and construction and mitigation measures will be recommended commensurate with the scale and risk of the development.

The construction phase of the Proposed Development will be phased over a period of a few years and it is not anticipated that the peak construction traffic flow will exceed the criteria of 100 LDVs and 25 HDVs AADT within an AQMA, detailed in the IAQM and EPUK Planning for Air Quality Guidance. Therefore, a detailed assessment of construction phase traffic has been scoped out of the assessment.

*Operational*

The introduction of the Proposed Development will introduce new sections of street canyons along Salamander Street and Salamander Place, potentially influencing the dispersion environment and impacting air quality for existing and future residential receptors. Although we have scoped out a detailed traffic modelling assessment of

generated vehicle movements, we propose to carry out a modelling study using ADMS Roads, of the impact of introducing the street canyons. We will use background data from the Scottish Air Quality website and local monitoring data to verify the model.

Our client has directed us to a previous planning application, Land at Bath Road/Salamander Street (21/01163/PPP) and we propose to use the traffic flow data within the AQIA undertaken for that development for a baseline year of 2018 and a development year of 2026.

Please confirm if you have any comments on our proposed methodology and if there are any additional up-to-date data or guidance documents that we should be aware of for consideration. Additionally, if there are any permitted activities in the vicinity of the Proposed Development that may influence air quality surrounding the Site, please could you provide us with the details of these businesses.

Kind Regards

Jemima

**Jemima Hill | Air Quality Consultant |** ITPEnergised
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4th Floor | Centrum House | 108-114 Dundas Street | Edinburgh | EH3 5DQ
www.itpenergised.com



# Appendix 2: Modelled Road Source Data

*Table 2A – Modelled Road Sources and Traffic Data (Baseline)*

| Name | Width (m) | Light Duty Vehicle Speed (kph) | Light Duty Vehicle Count/hr | Heavy Duty Vehicle Speed (kph) | Heavy Duty Vehicle Count/hr | $NO_x$ (g/km/s) | $PM_{10}$ (g/km/s) | $PM_{2.5}$ (g/km/s) | $NO_2$ (g/km/s) |
|---|---|---|---|---|---|---|---|---|---|
| Salamander Place 1RSA | 12.7 | 20 | 70 | 20 | 7 | 0.016642163 | 0.000996447 | 0.000616577 | 0.003502367 |
| Bath Road RSA 1 | 12.6 | 20 | 46 | 20 | 21 | 0.029126451 | 0.001382471 | 0.000876301 | 0.003969621 |
| Salamander Street W RSA | 27.5 | 20 | 651 | 20 | 37 | 0.123604806 | 0.008020172 | 0.004926939 | 0.029713928 |
| Bath Road RSA 2 | 12.1 | 32 | 46 | 32 | 21 | 0.020467615 | 0.0012989 | 0.00079273 | 0.003001976 |
| Salamander Street E 1 RSA | 16.3 | 20 | 651 | 20 | 37 | 0.123604806 | 0.008020172 | 0.004926939 | 0.029713928 |
| Salamander Street E 2 RSA | 16.3 | 20 | 651 | 20 | 37 | 0.123604806 | 0.008020172 | 0.004926939 | 0.029713928 |
| Salamander Street E 3 | 16.5 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 4 | 16.5 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 5 | 17.1 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 6 | 17.1 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 7 | 17.4 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 8 | 17.4 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 9 | 17.4 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 10 | 17.5 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 11 | 17.8 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 12 | 17.1 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 13 | 17.1 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 14 | 16.8 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 15 | 16.8 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street E 16 | 16.8 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Place 2 | 10.5 | 32 | 70 | 32 | 7 | 0.012725567 | 0.000953392 | 0.000573522 | 0.002847629 |
| Salamander Street West | 26 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street West 2 | 20.5 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |
| Salamander Street West 3 | 26 | 32 | 651 | 32 | 37 | 0.097606715 | 0.007714471 | 0.004621238 | 0.024545628 |

*Table 2B – Modelled Road Sources and Traffic Data (Without Development)*

| Name | Width (m) | Light Duty Vehicle Speed (kph) | Light Duty Vehicle Count/hr | Heavy Duty Vehicle Speed (kph) | Heavy Duty Vehicle Count/hr | $NO_x$ (g/km/s) | $PM_{10}$ (g/km/s) | $PM_{2.5}$ (g/km/s) | $NO_2$ (g/km/s) |
|---|---|---|---|---|---|---|---|---|---|
| Salamander Place 1RSA | 23.9 | 20 | 73 | 20 | 7 | 0.006457948 | 0.000896087 | 0.000503939 | 0.001331252 |
| Bath Road RSA 1 | 24.2 | 20 | 52 | 20 | 21 | 0.00932817 | 0.001198099 | 0.00066816 | 0.001248702 |
| Salamander Street W RSA | 27.5 | 20 | 673 | 20 | 38 | 0.051702828 | 0.007333623 | 0.004133582 | 0.011775274 |
| Bath Road RSA 2 | 21.9 | 32 | 52 | 32 | 21 | 0.006556997 | 0.001174032 | 0.000644093 | 0.000976052 |
| Salamander Street E 1 RSA | 21.8 | 20 | 673 | 20 | 38 | 0.051702828 | 0.007333623 | 0.004133582 | 0.011775274 |
| Salamander Street E 2 RSA | 21.3 | 20 | 673 | 20 | 38 | 0.051702828 | 0.007333623 | 0.004133582 | 0.011775274 |
| Salamander Street E 3 | 21.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 4 | 21.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 5 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 6 | 22.1 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 7 | 26.2 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 8 | 26.2 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 9 | 17.4 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 10 | 22.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 11 | 22.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 12 | 22.1 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 13 | 22.1 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 14 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 15 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 16 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Place 2 | 22.15 | 32 | 73 | 32 | 7 | 0.005044091 | 0.000881314 | 0.000489166 | 0.001102325 |
| Salamander Street West | 26 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street West 2 | 20.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street West 3 | 17.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |

*Table 2C – Modelled Road Sources and Traffic Data (With Development)*

| Name | Width (m) | Light Duty Vehicle Speed (kph) | Light Duty Vehicle Count/hr | Heavy Duty Vehicle Speed (kph) | Heavy Duty Vehicle Count/hr | $NO_x$ (g/km/s) | $PM_{10}$ (g/km/s) | $PM_{2.5}$ (g/km/s) | $NO_2$ (g/km/s) |
|---|---|---|---|---|---|---|---|---|---|
| Salamander Place 1RSA | 23.9 | 20 | 73 | 20 | 7 | 0.006457948 | 0.000896087 | 0.000503939 | 0.001331252 |
| Bath Road RSA 1 | 24.2 | 20 | 52 | 20 | 21 | 0.00932817 | 0.001198099 | 0.00066816 | 0.001248702 |
| Salamander Street W RSA | 27.5 | 20 | 673 | 20 | 38 | 0.051702828 | 0.007333623 | 0.004133582 | 0.011775274 |
| Bath Road RSA 2 | 21.9 | 32 | 52 | 32 | 21 | 0.006556997 | 0.001174032 | 0.000644093 | 0.000976052 |
| Salamander Street E 1 RSA | 27.6 | 20 | 673 | 20 | 38 | 0.051702828 | 0.007333623 | 0.004133582 | 0.011775274 |
| Salamander Street E 2 RSA | 21.3 | 20 | 673 | 20 | 38 | 0.051702828 | 0.007333623 | 0.004133582 | 0.011775274 |
| Salamander Street E 3 | 21.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 4 | 21.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 5 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 6 | 22.1 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 7 | 26.2 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 8 | 26.2 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 9 | 17.4 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 10 | 22.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 11 | 22.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 12 | 22.1 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 13 | 22.1 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 14 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 15 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street E 16 | 21.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Place 2 | 22.15 | 32 | 73 | 32 | 7 | 0.005044091 | 0.000881314 | 0.000489166 | 0.001102325 |
| Salamander Street West | 26 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street West 2 | 20.5 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |
| Salamander Street West 3 | 17.8 | 32 | 673 | 32 | 38 | 0.041591195 | 0.00721987 | 0.004019829 | 0.009846328 |

# Appendix 3: Modelled Receptors

*Table 3-A – Sensitive Receptor Locations*

| ID | Description | Coordinates | | |
|---|---|---|---|---|
| | | X | Y | Z |
| **Existing Human Receptors** | | | | |
| 1G | 42 Salamander Street Ground Floor (commercial) | 327623 | 676362 | 6.7 |
| 1.1 | 42 Salamander Street First floor (Residential) | 327623 | 676362 | 9.7 |
| 1.2 | 42 Salamander Street Second floor (Residential) | 327623 | 676362 | 12.7 |
| 1.3 | 42 Salamander Street Third floor (Residential) | 327619 | 676339 | 1.5 |
| 2G | Gillespie Accountancy Ground Floor | 327619 | 676339 | 6.7 |
| 2.1 | 1st Floor (Residential) | 327619 | 676339 | 9.7 |
| 2.2 | 2nd Floor (Residential) | 327619 | 676339 | 12.7 |
| 2.3 | 3rd Floor (Residential) | 327619 | 676339 | 15.7 |
| 2.4 | 4th Floor (Residential) | 327619 | 676339 | 18.7 |
| 2.5 | 5th Floor (Residential) | 327620 | 676324 | 1.5 |
| 3G | Gillespie Accountancy Ground Floor | 327620 | 676324 | 6.7 |
| 3.1 | 1st Floor (Residential) | 327620 | 676324 | 9.7 |
| 3.2 | 2nd Floor (Residential) | 327620 | 676324 | 12.7 |
| 3.3 | 3rd Floor (Residential) | 327620 | 676324 | 15.7 |
| 3.4 | 4th Floor (Residential) | 327620 | 676324 | 18.7 |
| 3.5 | 5th Floor (Residential) | 327623 | 676362 | 6.7 |
| 4G | The Pond Ground Floor | 327687 | 676324 | 1.5 |
| 4.1 | 1st Floor (Residential) | 327687 | 676324 | 6.7 |
| 4.2 | 2nd Floor (Residential) | 327687 | 676324 | 9.7 |
| 4.3 | 3rd Floor (Residential) | 327687 | 676324 | 12.7 |
| 4.4 | 4th Floor (Residential) | 327687 | 676324 | 15.7 |
| 8G | 70 Salamander Street Ground Floor (Residential) | 327755 | 676262 | 1.5 |
| 8.1 | 70 Salamander Street Ground Floor (Residential) | 327755 | 676262 | 6.7 |
| 8.2 | 70 Salamander Street First Floor (Residential) | 327755 | 676262 | 9.7 |
| 8.3 | 70 Salamander Street Second Floor (Residential) | 327755 | 676262 | 12.7 |
| 8.4 | 70 Salamander Street Third Floor (Residential) | 327755 | 676262 | 15.7 |
| 8.5 | 70 Salamander Street Fourth Floor (Residential) | 327755 | 676262 | 18.7 |

| ID | Description | Coordinates | | |
|---|---|---|---|---|
| | | X | Y | Z |
| Consented Human Receptors | | | | |
| 5G | Salamander Street/Bath Road (21/01163/PPP) Area 1 Ground Floor (Commercial) | 327659 | 676339 | 1.5 |
| 5.1 | Salamander Street/Bath Road (21/01163/PPP) Area 1 First Floor (Residential) | 327659 | 676339 | 6.7 |
| 5.2 | Salamander Street/Bath Road (21/01163/PPP) Area 1 Second Floor (Residential) | 327659 | 676339 | 9.7 |
| 5.3 | Salamander Street/Bath Road (21/01163/PPP) Area 1 Third Floor (Residential) | 327659 | 676339 | 12.7 |
| 5.4 | Salamander Street/Bath Road (21/01163/PPP) Area 1 Fourth Floor (Residential) | 327659 | 676339 | 15.7 |
| 6G | Salamander Street/Bath Road (21/01163/PPP) Area 1 Ground Floor (Commercial) | 327718 | 676305 | 1.5 |
| 6.1 | Salamander Street/Bath Road (21/01163/PPP) Area 1 First Floor (Residential) | 327718 | 676305 | 6.7 |
| 6.2 | Salamander Street/Bath Road (21/01163/PPP) Area 1 Second Floor (Residential) | 327718 | 676305 | 9.7 |
| 6.3 | Salamander Street/Bath Road (21/01163/PPP) Area 1 Third Floor (Residential) | 327718 | 676305 | 12.7 |
| 6.4 | Salamander Street/Bath Road (21/01163/PPP) Area 1 Fourth Floor (Residential) | 327718 | 676305 | 15.7 |
| 7G | Salamander Street/Bath Road (21/01163/PPP) Area 2 Ground Floor (Commercial) | 327760 | 676284 | 1.5 |
| 7.1 | Salamander Street/Bath Road (21/01163/PPP) Area 2 First Floor (Residential) | 327760 | 676284 | 6.7 |
| 7.2 | Salamander Street/Bath Road (21/01163/PPP) Area 2 Second Floor (Residential) | 327760 | 676284 | 9.7 |
| 7.3 | Salamander Street/Bath Road (21/01163/PPP) Area 2 Third Floor (Residential) | 327760 | 676284 | 12.7 |
| 7.4 | Salamander Street/Bath Road (21/01163/PPP) Area 2 Fourth Floor (Residential) | 327760 | 676284 | 15.7 |
| **Proposed Receptors** | | | | |
| 1P GF | Proposed Receptor Block A Ground Floor (Commercial) | 327654 | 676317 | 1.5 |
| 1P 1F | Proposed Receptor Block A First Floor (Residential) | 327654 | 676317 | 6.7 |
| 1P 2F | Proposed Receptor Block A Second Floor (Residential) | 327654 | 676317 | 9.7 |
| 1P 3F | Proposed Receptor Block A Third Floor (Residential) | 327654 | 676317 | 12.7 |
| 1P 4F | Proposed Receptor Block A Fourth Floor (Residential) | 327654 | 676317 | 15.7 |
| 1P5F | Proposed Receptor Block A Fifth Floor (Residential) | 327654 | 676317 | 18.7 |

| ID | Description | Coordinates | | |
|---|---|---|---|---|
| | | X | Y | Z |
| 1P 6F | Proposed Receptor Block A Sixth Floor (Residential) | 327654 | 676317 | 21.7 |
| 1P 7F | Proposed Receptor Block A Seventh Floor (Residential) | 327654 | 676317 | 24.7 |
| 2P GF | Proposed Receptor Block A Ground Floor (Commercial) | 327639 | 676312 | 1.5 |
| 2P 1F | Proposed Receptor Block A First Floor (Residential) | 327639 | 676312 | 6.7 |
| 2P 2F | Proposed Receptor Block A Second Floor (Residential) | 327639 | 676312 | 9.7 |
| 2P 3F | Proposed Receptor Block A Third Floor (Residential) | 327639 | 676312 | 12.7 |
| 2P 4F | Proposed Receptor Block A Fourth Floor (Residential) | 327639 | 676312 | 15.7 |
| 2P5F | Proposed Receptor Block A Fifth Floor (Residential) | 327639 | 676312 | 18.7 |
| 2P 6F | Proposed Receptor Block A Sixth Floor (Residential) | 327639 | 676312 | 21.7 |
| 2P 7F | Proposed Receptor Block A Seventh Floor (Residential) | 327639 | 676312 | 24.7 |
| 3P GF | Proposed Receptor Block B Ground Floor (Commercial) | 327687 | 676299 | 1.5 |
| 3P 1F | Proposed Receptor Block B First Floor (Residential) | 327687 | 676299 | 6.7 |
| 3P 2F | Proposed Receptor Block B Second Floor (Residential) | 327687 | 676299 | 9.7 |
| 3P 3F | Proposed Receptor Block B Third Floor (Residential) | 327687 | 676299 | 12.7 |
| 3P 4F | Proposed Receptor Block B Fourth Floor (Residential) | 327687 | 676299 | 15.7 |
| 3P5F | Proposed Receptor Block B Fifth Floor (Residential) | 327687 | 676299 | 18.7 |
| 4P GF | Proposed Receptor Block B Ground Floor (Commercial) | 327708 | 676288 | 1.5 |
| 4P 1F | Proposed Receptor Block B First Floor (Residential) | 327708 | 676288 | 6.7 |
| 4P 2F | Proposed Receptor Block B Second Floor (Residential) | 327708 | 676288 | 9.7 |
| 4P 3F | Proposed Receptor Block B Third Floor (Residential) | 327708 | 676288 | 12.7 |
| 4P 4F | Proposed Receptor Block B Fourth Floor (Residential) | 327708 | 676288 | 15.7 |
| 4P5F | Proposed Receptor Block B Fifth Floor (Residential) | 327708 | 676288 | 18.7 |
| 5P GF | Proposed Receptor Block B Ground Floor (Commercial) | 327723 | 676279 | 1.5 |
| 5P 1F | Proposed Receptor Block B First Floor (Residential) | 327723 | 676279 | 6.7 |
| 5P 2F | Proposed Receptor Block B Second Floor (Residential) | 327723 | 676279 | 9.7 |
| 5P 3F | Proposed Receptor Block B Third Floor (Residential) | 327723 | 676279 | 12.7 |
| 5P 4F | Proposed Receptor Block B Fourth Floor (Residential) | 327723 | 676279 | 15.7 |
| 5P5F | Proposed Receptor Block B Fifth Floor (Residential) | 327723 | 676279 | 18.7 |
| 6P GF | Proposed Receptor Block B Ground Floor (Commercial) | 327734 | 676272 | 1.5 |
| 6P 1F | Proposed Receptor Block B First Floor (Residential) | 327734 | 676272 | 6.7 |

| ID | Description | Coordinates | | |
|---|---|---|---|---|
| | | X | Y | Z |
| 6P 2F | Proposed Receptor Block B Second Floor (Residential) | 327734 | 676272 | 9.7 |
| 6P 3F | Proposed Receptor Block B Third Floor (Residential) | 327734 | 676272 | 12.7 |
| 6P 4F | Proposed Receptor Block B Fourth Floor (Residential) | 327734 | 676272 | 15.7 |
| 6P 5F | Proposed Receptor Block B Fifth Floor (Residential) | 327734 | 676272 | 18.7 |
| **Diffusion Tube Site for Verification (2018 data)** | | | | |
| 51C | Roadside Diffusion tube, Salamander Street | 327474 | 676415 | 2 |
| ID8 | Roadside Automatic Monitor, Salamander Street | 327614 | 676341 | 2.86 |
| CL7 | Roadside Diffusion tube, Salamander Street | 327614 | 676341 | 2.4 |

# Appendix 4: Advanced Canyon Modelled Parameters

*Table 4A – Road and Canyon Geometry (Without Development)*

| Link Name | Canyon Width North Side (m) | Canyon Height (m) | Building Length in Canyon | Canyon Width South Side (m) | Canyon Height (m) | Building Length in Canyon |
|---|---|---|---|---|---|---|
| Salamander Place 1RSA | 11.8 | 24.0 | 10.5 | 12.2 | 26.9 | 10.6 |
| Bath Road RSA 1 | 12.0 | 12.0 | 24.5 | 12.2 | 21.7 | 11.2 |
| Salamander Street W RSA | 14.8 | 24.0 | 16.4 | 12.7 | 12.0 | 16.4 |
| Bath Road RSA 2 | 11.9 | 12.0 | 33.8 | 10.1 | 21.3 | 13.4 |
| Salamander Street E 1 RSA | 8.2 | 0.0 | 0.0 | 13.7 | 21.7 | 18.0 |
| Salamander Street E 2 RSA | 8.2 | 0.0 | 0.0 | 13.2 | 18.3 | 11.1 |
| Salamander Street E 3 | 8.3 | 0.0 | 0.0 | 13.3 | 21.3 | 15.3 |
| Salamander Street E 4 | 8.3 | 0.0 | 0.0 | 13.3 | 15.3 | 14.4 |
| Salamander Street E 5 | 8.6 | 0.0 | 0.0 | 13.3 | 15.3 | 25.8 |
| Salamander Street E 6 | 8.6 | 0.0 | 0.0 | 13.6 | 21.3 | 13.6 |
| Salamander Street E 7 | 12.5 | 24.8 | 19.0 | 13.7 | 12.3 | 19.0 |
| Salamander Street E 8 | 12.5 | 24.8 | 10.4 | 13.7 | 21.3 | 105.0 |
| Salamander Street E 9 | 8.7 | 0.0 | 0.0 | 8.7 | 0.0 | 0.0 |
| Salamander Street E 10 | 8.8 | 0.0 | 0.0 | 13.8 | 15.3 | 31.6 |
| Salamander Street E 11 | 8.9 | 0.0 | 0.0 | 13.9 | 0.0 | 0.0 |
| Salamander Street E 12 | 8.6 | 0.0 | 0.0 | 13.6 | 21.3 | 15.0 |
| Salamander Street E 13 | 8.6 | 0.0 | 0.0 | 13.6 | 12.3 | 20.0 |
| Salamander Street E 14 | 8.4 | 0.0 | 0.0 | 13.4 | 21.3 | 8.4 |
| Salamander Street E 15 | 8.4 | 0.0 | 0.0 | 13.4 | 0.0 | 0.0 |
| Salamander Street E 16 | 8.4 | 0.0 | 0.0 | 13.4 | 7.2 | 21.3 |
| Salamander place 2 | 10.7 | 0.0 | 0.0 | 11.5 | 26.9 | 30.1 |
| Salamander Street West | 13.1 | 24.0 | 36.0 | 12.9 | 12.0 | 14.0 |
| Salamander Street West 2 | 12.3 | 24.0 | 30.0 | 8.2 | 0.0 | 0.0 |
| Salamander Street West 3 | 8.9 | 0.0 | 0.0 | 8.9 | 0.0 | 0.0 |

*Where there is no canyon, the width is the carriageway width from the modelled road centreline.

*Table 4B – Road and Canyon Geometry (With Development)*

| Link Name | Canyon Width North Side (m) | Canyon Height (m) | Building Length in Canyon | Canyon Width South Side (m) | Canyon Height (m) | Building Length in Canyon |
|---|---|---|---|---|---|---|
| Salamander Place 1RSA | 11.8 | 24.0 | 10.5 | 12.2 | 26.9 | 10.6 |
| Bath Road RSA 1 | 12.0 | 12.0 | 24.5 | 12.2 | 21.7 | 11.2 |
| Salamander Street W RSA | 14.8 | 24.0 | 16.4 | 12.7 | 12.0 | 16.4 |
| Bath Road RSA 2 | 11.9 | 12.0 | 33.8 | 10.1 | 21.3 | 13.4 |
| Salamander Street E 1 RSA | 14.0 | 26.9 | 15.7 | 13.7 | 21.7 | 18.0 |
| Salamander Street E 2 RSA | 14.0 | 20.2 | 17.2 | 13.2 | 18.3 | 11.1 |
| Salamander Street E 3 | 13.1 | 20.9 | 19.0 | 13.3 | 21.3 | 15.3 |
| Salamander Street E 4 | 13.1 | 20.9 | 14.4 | 13.3 | 15.3 | 14.4 |
| Salamander Street E 5 | 13.4 | 20.9 | 25.8 | 13.3 | 15.3 | 25.8 |
| Salamander Street E 6 | 13.4 | 20.9 | 20.5 | 13.6 | 21.3 | 13.6 |
| Salamander Street E 7 | 12.5 | 24.8 | 19.0 | 13.7 | 12.3 | 19.0 |
| Salamander Street E 8 | 12.5 | 24.8 | 10.4 | 11.7 | 21.3 | 105.0 |
| Salamander Street E 9 | 8.7 | 0.0 | 0.0 | 8.7 | 0.0 | 0.0 |
| Salamander Street E 10 | 8.8 | 0.0 | 0.0 | 13.8 | 15.3 | 31.6 |
| Salamander Street E 11 | 8.9 | 0.0 | 0.0 | 13.9 | 0.0 | 0.0 |
| Salamander Street E 12 | 8.6 | 0.0 | 0.0 | 13.6 | 21.3 | 15.0 |
| Salamander Street E 13 | 8.6 | 0.0 | 0.0 | 13.6 | 12.3 | 20.0 |
| Salamander Street E 14 | 8.4 | 0.0 | 0.0 | 13.4 | 21.3 | 8.4 |
| Salamander Street E 15 | 8.4 | 0.0 | 0.0 | 13.4 | 0.0 | 0.0 |
| Salamander Street E 16 | 8.4 | 0.0 | 0.0 | 13.4 | 7.2 | 21.3 |
| Salamander place 2 | 10.7 | 0.0 | 0.0 | 11.5 | 26.9 | 30.1 |
| Salamander Street West | 13.1 | 24.0 | 36.0 | 12.9 | 12.0 | 14.0 |
| Salamander Street West 2 | 12.3 | 24.0 | 30.0 | 8.2 | 0.0 | 0.0 |
| Salamander Street West 3 | 8.9 | 0.0 | 0.0 | 8.9 | 0.0 | 0.0 |

*Where there is no canyon, the width is the carriageway width from the modelled road centre

# Appendix 5: Modelled Background Concentrations

*Table 5A – Annual Mean Background Concentrations for 2018 and 2026*

| 1km x 1km Grid Square | Sector Removed Annual Mean Background Concentrations – (µg/m³) | | | | | |
|---|---|---|---|---|---|---|
| | $NO_2$ | | $PM_{10}$ | | $PM_{2.5}$ | |
| | 2018 | 2026 | 2018 | 2026 | 2018 | 2026 |
| 327500, 676500 | 15.1 | 11.3 | 12.7 | 11.7 | 6.7 | 6.1 |

# Appendix 6: Modelled Verification

*Table 6A - Comparison of Monitored vs Modelled Road $NO_x$*

| Monitoring Site ID | Monitored $NO_2$ (µg/m³) | Background $NO_x$ Concentration (µg/m³) (after sector removal) | Monitored Road $NO_x$ (µg/m³) | Modelled Road $NO_x$ (µg/m³) | % Difference $NO_x$ (Modelled-Monitored)/Monitored x100 |
|---|---|---|---|---|---|
| 51C | 31.0 | 22.4 | 31.1 | 14.66 | -53% |
| ID8 | 25.0 | 22.4 | 18.8 | 19.20 | 2% |
| CL7 | 27.0 | 22.4 | 22.8 | 20.30 | -11% |

*Chart 6A - Comparison of Monitored vs Modelled Road $NO_x$*

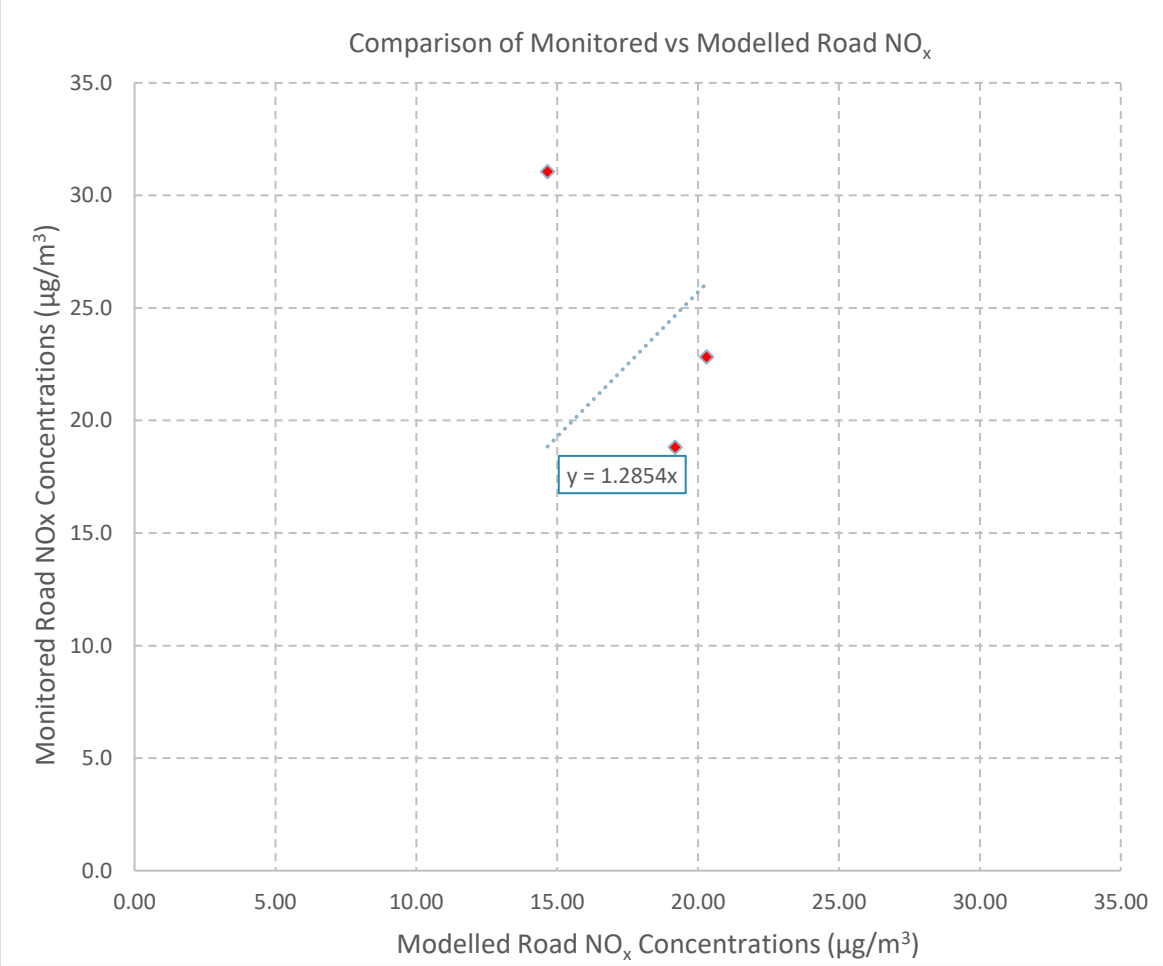


*Table 6B - Comparison of Monitored vs Adjusted Road $NO_x$*

| Monitoring Site ID | Monitored Road $NO_x$ ($\mu g/m^3$) | Modelled Road $NO_x$ ($\mu g/m^3$) | Ratio of Monitored / Modelled Road $NO_x$ | Adjustment factor for modelled road contribution | Adjusted Modelled Road $NO_x$ ($\mu g/m^3$) | Adjusted Modelled Total $NO_x$ ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| 51C | 31.1 | 14.7 | 2.12 | 1.29 | 18.8 | 41.3 |
| ID8 | 18.8 | 19.2 | 0.98 | 1.29 | 24.7 | 47.1 |
| CL7 | 22.8 | 20.3 | 1.12 | 1.29 | 26.1 | 48.5 |

*Chart 6B - Comparison of Monitored vs Adjusted Road $NO_x$*

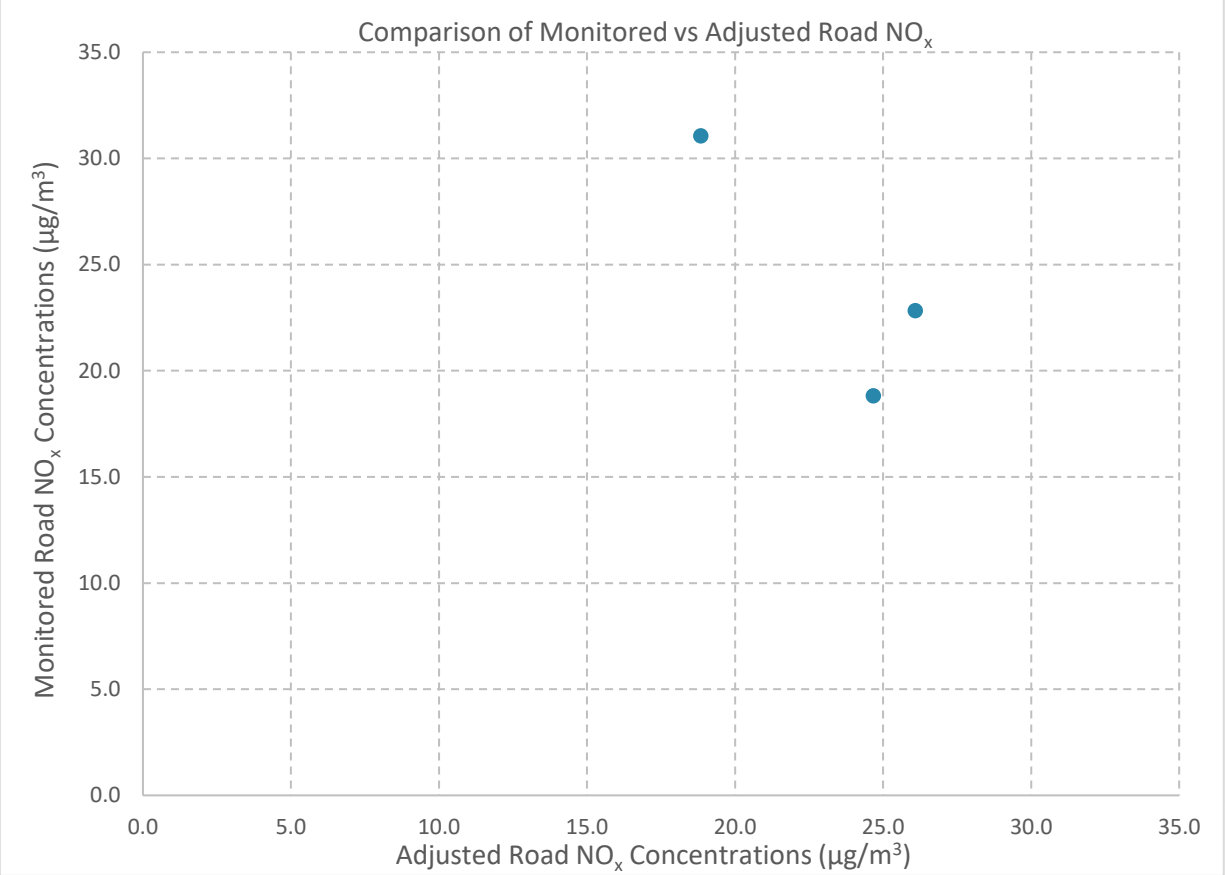
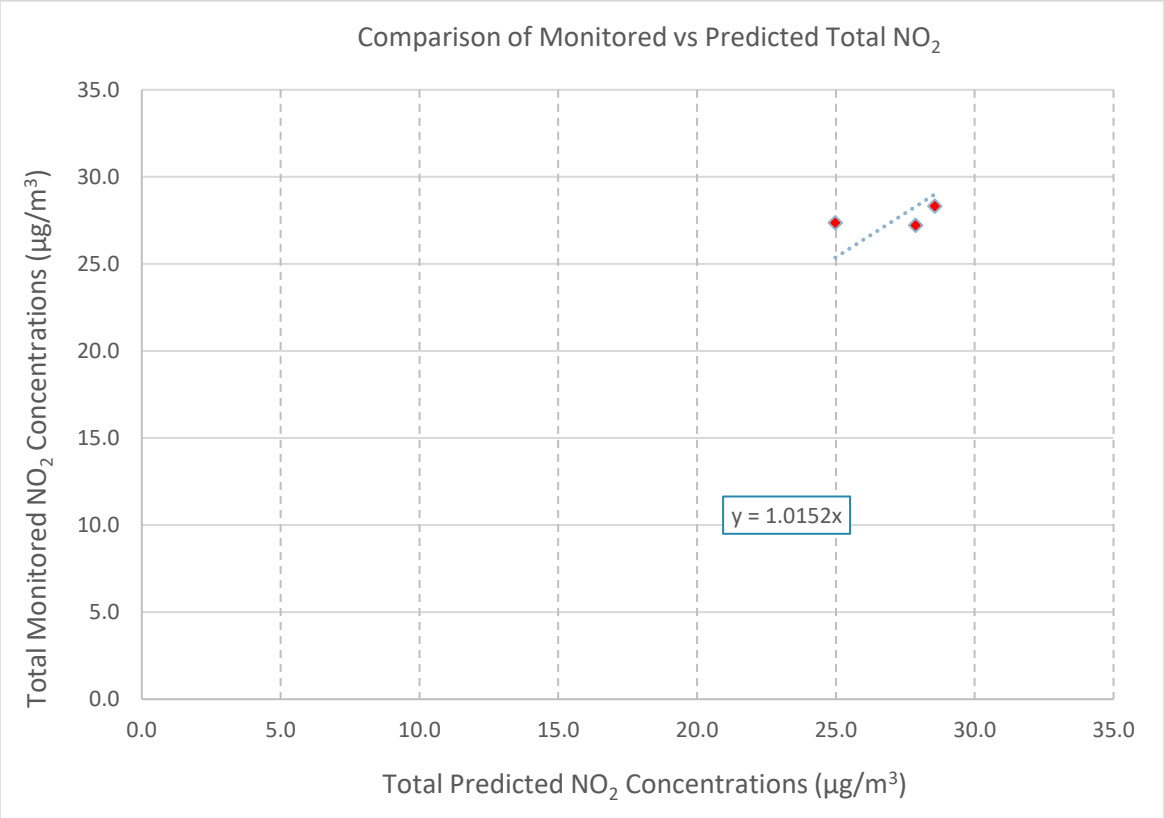


*Table 6C - Comparison of Monitored vs Modelled Total $NO_2$*

| Monitoring Site ID | Modelled total $NO_2$ (µg/m³) | Monitored $NO_2$ (µg/m³) | % Difference |
|---|---|---|---|
| 51C | 25.0 | 27.4 | -9% |
| ID8 | 27.9 | 27.2 | 2% |
| CL7 | 28.6 | 28.3 | 1% |

*Chart 6C - Comparison of Monitored vs Modelled Total $NO_2$*




## Model Uncertainty

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(Obs_i - Pred_i)^2} = 1.4 \qquad FB = \frac{(Avg.Obs - Avg.Pred)}{0.5(Avg.Obs + Avg.Pred)} = 0.0$$

As per the DEFRA LAQM Technical Guidance TG22 (DEFRA, 2022), if the following statement apply then the model is deemed robust:

- The majority of the predicted concentrations should be within 25% of the monitored concentrations as a minimum, preferably within 10%, after adjustment;
- RMSE is less than 10% of the AQS (i.e., <4ug/m³ for annual mean $NO_2$); and
- Model Fractional Bias is close to 0.

All of the above apply to the $NO_2$ model verification and therefore the model is found to be robust and suitable to be used for future scenario prediction

# Appendix 7: Modelled Results

## Consented and Existing Receptors

*Table 7A – Predicted 2026 $NO_2$ Concentrations at Selected Consented and Existing Residential Receptors for the With and Without Proposed Development Scenarios*

| Receptor ID | Receptor Name | Without Proposed Development Concentration (µg/m³) | With Proposed Development Concentration (µg/m³) | Numerical Magnitude of change (µg/m³) | % of change relative to AQS | Concentration as % of AQS | Impact Descriptor | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Negligible/ Slight/ Moderate/ Substantial | Adverse/ Beneficial |
| 2 | 1.1 | 13.9 | 13.7 | -0.1 | 0.3% | 34.6% | Negligible | - |
| 3 | 1.2 | 13.3 | 13.3 | -0.1 | 0.2% | 33.3% | Negligible | - |
| 4 | 1.3 | 12.9 | 12.9 | 0.0 | 0.1% | 32.4% | Negligible | - |
| 6 | 2.1 | 14.8 | 14.6 | -0.2 | 0.6% | 37.0% | Negligible | - |
| 7 | 2.2 | 14.0 | 13.9 | -0.1 | 0.3% | 34.9% | Negligible | - |
| 8 | 2.3 | 13.2 | 13.1 | -0.1 | 0.1% | 33.0% | Negligible | - |
| 9 | 2.4 | 12.7 | 12.7 | 0.0 | 0.0% | 31.7% | Negligible | - |
| 10 | 2.5 | 12.5 | 12.5 | 0.0 | 0.1% | 31.2% | Negligible | - |
| 12 | 3.1 | 12.4 | 12.2 | -0.3 | 0.7% | 31.1% | Negligible | - |
| 13 | 3.2 | 12.1 | 11.9 | -0.2 | 0.4% | 30.2% | Negligible | - |
| 14 | 3.3 | 11.9 | 11.8 | -0.1 | 0.2% | 29.8% | Negligible | - |
| 15 | 3.4 | 11.8 | 11.8 | 0.0 | 0.0% | 29.5% | Negligible | - |
| 16 | 3.5 | 11.7 | 11.8 | 0.0 | 0.1% | 29.5% | Negligible | - |
| 18 | 4.1 | 13.8 | 15.4 | 1.6 | 4.0% | 38.4% | Negligible | - |
| 19 | 4.2 | 13.1 | 14.7 | 1.6 | 4.0% | 36.8% | Negligible | - |
| 20 | 4.3 | 12.8 | 14.4 | 1.6 | 4.0% | 36.0% | Negligible | - |
| 21 | 4.4 | 12.6 | 14.2 | 1.6 | 4.0% | 35.5% | Negligible | - |
| 23 | 5.1 | 13.4 | 15.4 | 2.0 | 5.0% | 38.5% | Negligible | - |
| 24 | 5.2 | 13.0 | 14.9 | 2.0 | 4.9% | 37.3% | Negligible | - |
| 25 | 5.3 | 12.7 | 14.6 | 1.9 | 4.7% | 36.6% | Negligible | - |
| 26 | 5.4 | 12.6 | 14.5 | 1.9 | 4.7% | 36.3% | Negligible | - |
| 28 | 6.1 | 13.4 | 15.0 | 1.6 | 4.1% | 37.4% | Negligible | - |
| 29 | 6.2 | 12.9 | 14.5 | 1.6 | 4.0% | 36.2% | Negligible | - |
| 30 | 6.3 | 12.7 | 14.3 | 1.6 | 4.0% | 35.7% | Negligible | - |
| 31 | 6.4 | 11.8 | 13.5 | 1.7 | 4.3% | 33.8% | Negligible | - |
| 33 | 7.1 | 15.2 | 14.9 | -0.3 | 0.6% | 38.0% | Negligible | - |
| 34 | 7.2 | 14.5 | 14.3 | -0.1 | 0.3% | 36.2% | Negligible | - |
| 35 | 7.3 | 13.8 | 13.7 | 0.0 | 0.1% | 34.4% | Negligible | - |
| 36 | 7.4 | 13.2 | 13.2 | 0.0 | 0.0% | 33.0% | Negligible | - |
| 37 | 8G | 19.2 | 19.0 | -0.2 | 0.5% | 48.0% | Negligible | - |
| 38 | 8.1 | 15.7 | 15.5 | -0.1 | 0.3% | 39.1% | Negligible | - |
| 39 | 8.2 | 14.9 | 14.9 | -0.1 | 0.2% | 37.3% | Negligible | - |
| 40 | 8.3 | 14.1 | 14.0 | 0.0 | 0.1% | 35.1% | Negligible | - |
| 41 | 8.4 | 13.4 | 13.4 | 0.0 | 0.0% | 33.6% | Negligible | - |
| 42 | 8.5 | 13.2 | 13.2 | 0.1 | 0.1% | 33.1% | Negligible | - |

*Table 7B – Predicted 2026 $NO_2$ Concentrations at Selected Consented and Existing Commercial Receptors for the With and Without Proposed Development Scenarios*

| Receptor ID | Receptor Name | Without Proposed Development Concentration (µg/m³) | With Proposed Development Concentration (µg/m³) | Numerical Magnitude of change (µg/m³) | % of change relative to AQS | Concentration as % of AQS |
|---|---|---|---|---|---|---|
| 1 | 1G | 17.5 | 17.3 | -0.2 | 0.4% | 43.7% |
| 5 | 2G | 19.1 | 18.8 | -0.4 | 0.9% | 47.9% |
| 11 | 3G | 13.5 | 13.0 | -0.5 | 1.2% | 33.8% |
| 17 | 4G | 18.0 | 19.6 | 1.7 | 4.2% | 49.1% |
| 22 | 5G | 15.8 | 17.7 | 1.9 | 4.9% | 44.3% |
| 27 | 6G | 16.0 | 18.0 | 2.0 | 5.1% | 45.0% |
| 32 | 7G | 18.9 | 18.4 | -0.5 | 1.4% | 47.3% |

*Table 7C – Predicted 2026 $PM_{10}$ Concentrations at Selected Consented and Existing Residential Receptors for the With and Without Proposed Development Scenarios*

| Receptor ID | Receptor Name | Without Proposed Development Concentration (µg/m³) | With Proposed Development Concentration (µg/m³) | Numerical Magnitude of change (µg/m³) | % of change relative to AQS | Concentration as % of AQS | Impact Descriptor | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Negligible/ Slight/ Moderate/ Substantial | Adverse/ Beneficial |
| 2 | 1.1 | 12.4 | 12.4 | 0.0 | 0.2% | 68.8% | Negligible | - |
| 3 | 1.2 | 12.2 | 12.2 | 0.0 | 0.1% | 68.0% | Negligible | - |
| 4 | 1.3 | 12.1 | 12.1 | 0.0 | 0.1% | 67.5% | Negligible | - |
| 6 | 2.1 | 12.6 | 12.6 | -0.1 | 0.3% | 70.2% | Negligible | - |
| 7 | 2.2 | 12.4 | 12.4 | 0.0 | 0.2% | 69.0% | Negligible | - |
| 8 | 2.3 | 12.2 | 12.2 | 0.0 | 0.1% | 67.8% | Negligible | - |
| 9 | 2.4 | 12.1 | 12.1 | 0.0 | 0.0% | 67.0% | Negligible | - |
| 10 | 2.5 | 12.0 | 12.0 | 0.0 | 0.0% | 66.8% | Negligible | - |
| 12 | 3.1 | 12.0 | 11.9 | -0.1 | 0.4% | 66.7% | Negligible | - |
| 13 | 3.2 | 11.9 | 11.9 | 0.0 | 0.2% | 66.2% | Negligible | - |
| 14 | 3.3 | 11.9 | 11.8 | 0.0 | 0.1% | 65.9% | Negligible | - |
| 15 | 3.4 | 11.8 | 11.8 | 0.0 | 0.0% | 65.7% | Negligible | - |
| 16 | 3.5 | 11.8 | 11.8 | 0.0 | 0.1% | 65.7% | Negligible | - |
| 18 | 4.1 | 12.4 | 12.8 | 0.4 | 2.3% | 71.0% | Negligible | - |
| 19 | 4.2 | 12.2 | 12.6 | 0.4 | 2.4% | 70.1% | Negligible | - |
| 20 | 4.3 | 12.1 | 12.5 | 0.4 | 2.3% | 69.6% | Negligible | - |
| 21 | 4.4 | 12.0 | 12.5 | 0.4 | 2.3% | 69.2% | Negligible | - |
| 23 | 5.1 | 12.4 | 13.0 | 0.7 | 3.7% | 72.3% | Negligible | - |
| 24 | 5.2 | 12.2 | 12.9 | 0.6 | 3.5% | 71.4% | Negligible | - |
| 25 | 5.3 | 12.1 | 12.8 | 0.6 | 3.4% | 70.9% | Negligible | - |
| 26 | 5.4 | 12.1 | 12.7 | 0.6 | 3.3% | 70.6% | Negligible | - |
| 28 | 6.1 | 12.3 | 12.9 | 0.5 | 2.9% | 71.5% | Negligible | - |
| 29 | 6.2 | 12.2 | 12.7 | 0.5 | 2.8% | 70.7% | Negligible | - |
| 30 | 6.3 | 12.1 | 12.7 | 0.5 | 2.9% | 70.3% | Negligible | - |
| 31 | 6.4 | 11.9 | 12.4 | 0.5 | 3.0% | 68.9% | Negligible | - |
| 33 | 7.1 | 12.9 | 12.9 | -0.1 | 0.4% | 71.9% | Negligible | - |
| 34 | 7.2 | 12.7 | 12.7 | 0.0 | 0.2% | 70.6% | Negligible | - |
| 35 | 7.3 | 12.5 | 12.5 | 0.0 | 0.1% | 69.4% | Negligible | - |
| 36 | 7.4 | 12.3 | 12.3 | 0.0 | 0.0% | 68.3% | Negligible | - |
| 37 | 8G | 14.3 | 14.2 | -0.1 | 0.4% | 79.3% | Negligible | - |
| 38 | 8.1 | 13.1 | 13.1 | 0.0 | 0.2% | 72.8% | Negligible | - |
| 39 | 8.2 | 12.9 | 12.8 | 0.0 | 0.1% | 71.5% | Negligible | - |
| 40 | 8.3 | 12.6 | 12.6 | 0.0 | 0.0% | 69.9% | Negligible | - |
| 41 | 8.4 | 12.4 | 12.4 | 0.0 | 0.0% | 68.8% | Negligible | - |
| 42 | 8.5 | 12.3 | 12.3 | 0.0 | 0.1% | 68.4% | Negligible | - |

*Table 7D – Predicted 2026 $PM_{10}$ Concentrations at Selected Consented and Existing Commercial Receptors for the With and Without Proposed Development Scenarios*

| Receptor ID | Receptor Name | Without Proposed Development Concentration (µg/m³) | With Proposed Development Concentration (µg/m³) | Numerical Magnitude of change (µg/m³) | % of change relative to AQS | Concentration as % of AQS |
|---|---|---|---|---|---|---|
| 1 | 1G | 13.4 | 13.3 | 0.0 | 0.3% | 74.2% |
| 5 | 2G | 13.8 | 13.7 | -0.1 | 0.6% | 76.7% |
| 11 | 3G | 12.3 | 12.2 | -0.1 | 0.7% | 68.3% |
| 17 | 4G | 13.5 | 13.9 | 0.4 | 2.5% | 77.5% |
| 22 | 5G | 13.1 | 13.8 | 0.7 | 3.8% | 76.5% |
| 27 | 6G | 13.2 | 13.9 | 0.7 | 3.7% | 77.1% |
| 32 | 7G | 14.2 | 14.0 | -0.2 | 1.0% | 78.8% |

*Table 7E – Predicted 2026 $PM_{2.5}$ Concentrations at Selected Consented and Existing Residential Receptors for the With and Without Proposed Development Scenarios*

| Receptor ID | Receptor Name | Without Proposed Development Concentration (µg/m³) | With Proposed Development Concentration (µg/m³) | Numerical Magnitude of change (µg/m³) | % of change relative to AQS | Concentration as % of AQS | Impact Descriptor | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Negligible/ Slight/ Moderate/ Substantial | Adverse/ Beneficial |
| 2 | 1.1 | 6.5 | 6.5 | 0.0 | 0.2% | 64.8% | Negligible | - |
| 3 | 1.2 | 6.4 | 6.4 | 0.0 | 0.1% | 64.1% | Negligible | - |
| 4 | 1.3 | 6.3 | 6.3 | 0.0 | 0.1% | 63.5% | Negligible | - |
| 6 | 2.1 | 6.6 | 6.6 | 0.0 | 0.3% | 66.2% | Negligible | - |
| 7 | 2.2 | 6.5 | 6.5 | 0.0 | 0.2% | 65.0% | Negligible | - |
| 8 | 2.3 | 6.4 | 6.4 | 0.0 | 0.1% | 63.8% | Negligible | - |
| 9 | 2.4 | 6.3 | 6.3 | 0.0 | 0.0% | 63.1% | Negligible | - |
| 10 | 2.5 | 6.3 | 6.3 | 0.0 | 0.0% | 62.8% | Negligible | - |
| 12 | 3.1 | 6.3 | 6.2 | 0.0 | 0.4% | 62.7% | Negligible | - |
| 13 | 3.2 | 6.2 | 6.2 | 0.0 | 0.2% | 62.2% | Negligible | - |
| 14 | 3.3 | 6.2 | 6.2 | 0.0 | 0.1% | 61.9% | Negligible | - |
| 15 | 3.4 | 6.2 | 6.2 | 0.0 | 0.0% | 61.8% | Negligible | - |
| 16 | 3.5 | 6.2 | 6.2 | 0.0 | 0.1% | 61.7% | Negligible | - |
| 18 | 4.1 | 6.5 | 6.7 | 0.2 | 2.4% | 67.1% | Negligible | - |
| 19 | 4.2 | 6.4 | 6.6 | 0.2 | 2.4% | 66.1% | Negligible | - |
| 20 | 4.3 | 6.3 | 6.6 | 0.2 | 2.4% | 65.6% | Negligible | - |
| 21 | 4.4 | 6.3 | 6.5 | 0.2 | 2.3% | 65.3% | Negligible | - |
| 23 | 5.1 | 6.5 | 6.8 | 0.4 | 3.7% | 68.3% | Negligible | - |
| 24 | 5.2 | 6.4 | 6.7 | 0.4 | 3.6% | 67.4% | Negligible | - |
| 25 | 5.3 | 6.3 | 6.7 | 0.3 | 3.4% | 66.9% | Negligible | - |
| 26 | 5.4 | 6.3 | 6.7 | 0.3 | 3.3% | 66.7% | Negligible | - |
| 28 | 6.1 | 6.5 | 6.8 | 0.3 | 3.0% | 67.6% | Negligible | - |
| 29 | 6.2 | 6.4 | 6.7 | 0.3 | 2.9% | 66.7% | Negligible | - |
| 30 | 6.3 | 6.3 | 6.6 | 0.3 | 2.9% | 66.3% | Negligible | - |
| 31 | 6.4 | 6.2 | 6.5 | 0.3 | 3.0% | 64.9% | Negligible | - |
| 33 | 7.1 | 6.8 | 6.8 | 0.0 | 0.4% | 68.0% | Negligible | - |
| 34 | 7.2 | 6.7 | 6.6 | 0.0 | 0.2% | 66.6% | Negligible | - |
| 35 | 7.3 | 6.5 | 6.5 | 0.0 | 0.1% | 65.4% | Negligible | - |
| 36 | 7.4 | 6.4 | 6.4 | 0.0 | 0.0% | 64.4% | Negligible | - |
| 37 | 8G | 7.5 | 7.5 | 0.0 | 0.4% | 75.4% | Negligible | - |
| 38 | 8.1 | 6.9 | 6.9 | 0.0 | 0.2% | 68.8% | Negligible | - |
| 39 | 8.2 | 6.7 | 6.7 | 0.0 | 0.1% | 67.5% | Negligible | - |
| 40 | 8.3 | 6.6 | 6.6 | 0.0 | 0.0% | 65.9% | Negligible | - |
| 41 | 8.4 | 6.5 | 6.5 | 0.0 | 0.0% | 64.8% | Negligible | - |
| 42 | 8.5 | 6.4 | 6.4 | 0.0 | 0.1% | 64.4% | Negligible | - |

*Table 7F – Predicted 2026 $PM_{2.5}$ Concentrations at Selected Consented and Existing Commercial Receptors for the With and Without Proposed Development Scenarios*

| Receptor ID | Receptor Name | Without Proposed Development Concentration (µg/m³) | With Proposed Development Concentration (µg/m³) | Numerical Magnitude of change (µg/m³) | % of change relative to AQS | Concentration as % of AQS |
|---|---|---|---|---|---|---|
| 1 | 1G | 7.0 | 7.0 | 0.0 | 0.3% | 70.4% |
| 5 | 2G | 7.3 | 7.2 | -0.1 | 0.6% | 72.9% |
| 11 | 3G | 6.4 | 6.4 | -0.1 | 0.7% | 64.3% |
| 17 | 4G | 7.1 | 7.4 | 0.3 | 2.5% | 73.6% |
| 22 | 5G | 6.9 | 7.3 | 0.4 | 3.8% | 72.6% |
| 27 | 6G | 6.9 | 7.3 | 0.4 | 3.8% | 73.1% |
| 32 | 7G | 7.5 | 7.4 | -0.1 | 1.0% | 74.8% |

## Proposed Receptors

*Table 7G -Predicted 2026 Concentrations at Selected Proposed Receptors for the With Proposed Development Scenario*

| Receptor ID | Receptor Name | NO2 (µg/m$^3$) | PM10 (µg/m$^3$) | PM2.5 (µg/m$^3$) |
|---|---|---|---|---|
| 44 | 1P 1F | 20.9 | 13.1 | 6.9 |
| 45 | 1P 2F | 16.7 | 12.9 | 6.8 |
| 46 | 1P 3F | 15.9 | 12.8 | 6.7 |
| 47 | 1P 4F | 15.5 | 12.7 | 6.7 |
| 48 | 1P5F | 15.2 | 12.7 | 6.7 |
| 49 | 1P 6F | 15.0 | 12.4 | 6.5 |
| 50 | 1P 7F | 14.1 | 12.1 | 6.3 |
| 51 | 2P GF | 12.8 | 12.1 | 6.3 |
| 52 | 2P 1F | 12.8 | 11.9 | 6.2 |
| 53 | 2P 2F | 12.0 | 11.9 | 6.2 |
| 54 | 2P 3F | 11.9 | 11.8 | 6.2 |
| 55 | 2P 4F | 11.8 | 11.8 | 6.2 |
| 56 | 2P5F | 11.8 | 11.8 | 6.2 |
| 57 | 2P 6F | 11.8 | 11.9 | 6.2 |
| 58 | 2P 7F | 11.9 | 11.8 | 6.2 |
| 59 | 3P GF | 11.7 | 14.6 | 7.7 |
| 60 | 3P 1F | 20.2 | 13.4 | 7.0 |
| 61 | 3P 2F | 16.5 | 13.1 | 6.9 |
| 62 | 3P 3F | 15.8 | 13.0 | 6.8 |
| 63 | 3P 4F | 15.3 | 12.6 | 6.6 |
| 64 | 3P5F | 14.1 | 12.4 | 6.5 |
| 65 | 4P GF | 13.5 | 14.2 | 7.5 |
| 66 | 4P 1F | 19.0 | 13.2 | 6.9 |
| 67 | 4P 2F | 15.9 | 13.0 | 6.8 |
| 68 | 4P 3F | 15.3 | 12.9 | 6.7 |
| 69 | 4P 4F | 14.9 | 12.5 | 6.6 |
| 70 | 4P5F | 13.9 | 12.4 | 6.5 |
| 71 | 5P GF | 13.4 | 14.2 | 7.5 |
| 72 | 5P 1F | 19.0 | 13.2 | 6.9 |
| 73 | 5P 2F | 15.9 | 13.0 | 6.8 |
| 74 | 5P 3F | 15.3 | 12.9 | 6.7 |
| 75 | 5P 4F | 14.9 | 12.8 | 6.7 |
| 76 | 5P5F | 14.7 | 12.6 | 6.6 |
| 77 | 6P GF | 14.1 | 14.2 | 7.5 |
| 78 | 6P 1F | 19.1 | 13.2 | 6.9 |
| 79 | 6P 2F | 16.0 | 13.0 | 6.8 |
| 80 | 6P 3F | 15.3 | 12.9 | 6.8 |

| Receptor ID | Receptor Name | NO2 (µg/m$^3$) | PM10 (µg/m$^3$) | PM2.5 (µg/m$^3$) |
|---|---|---|---|---|
| 81 | 6P 4F | 15.0 | 12.8 | 6.7 |
| 82 | 6P 5F | 14.6 | 12.6 | 6.6 |

# Appendix 8: Construction Dust Risk Assessment

## Dust Risk Assessment

The study area for the construction phase dust impact assessment has been defined in accordance with the IAQM guidance (IAQM, 2014) which stipulates that *"an assessment will normally be required where there is:*

- A 'human receptor' within:
    - 350 m of the boundary of the site; and/or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- A [designated] ecological receptor within:
    - 50 m of the boundary of the site;
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s)."

The study area is based on these buffer zones around the entire site boundary. The study area considered as part of the construction phase assessment is shown in **Drawing 3**.

The dust risk assessment below has been carried out using the criteria in the IAQM Guidance on the assessment of dust from demolition and construction (IAQM, 2014) to determine the impact magnitude and sensitivity of the area around the construction activities associated with the Proposed Development.

The assessment covers the following activities of the construction phase:

- Demolition;
- Construction;
- Earthworks; and
- Trackout.

There are human receptors within 350 m of the site boundary. The are no ecological receptors within 50m of the site boundary or roads used by construction traffic and these have been scoped out of further assessment. Impacts upon human receptors have been considered as part of this assessment.

### Demolition

The demolition of buildings and structures can release dust and other particulates into the air, as can other demolition activities such as on-site crushing. The volume of buildings to be demolished is below 12,000m$^3$ and consist of materials with low potential for dust release such as metal cladding.

*Dust Emission Magnitude*

- The total volume of buildings to be demolished is below 12,000 m$^3$. In accordance with the IAQM guidance, the potential dust emission magnitude for demolition is assessed as **Small**.

*Sensitivity and Risk of Impacts*

- There are between over 100 high sensitivity receptors within 20 m of the proposed demolition area. Sensitivity of the area to dust soiling due to demolition is therefore assessed as **High**.

The Small magnitude with High sensitivity results in the risk of dust soiling impacts due to demolition being assessed as **Medium.**

- The average 2022 annual mean $PM_{10}$ background concentrations (Scottish Air Quality, 2023) at receptors within 350 m of the site boundary is approximately 9.61 µg/m$^3$, which is below the IAQM criterion of 14 µg/m$^3$. There are between 10-100 high sensitivity receptors within 20 m of the proposed earthworks area. Sensitivity of Residents to human health impacts due to earthworks is therefore assessed as **Low**.

  The Small magnitude with low sensitivity results in the risk of dust impacts on human health due to earthworks as being **Negligible**.

### Earthworks

Site clearance works, the digging of trenches for foundations and utilities and temporary stockpiling of material represents the principal activities that may generate emissions of particulate material. The potential for stockpiles of materials to generate dust depends on the nature of the material. The current grounds of the site are soft, friable earth compared to hard-core concrete.

*Dust Emission Magnitude*

- The total area of earthworks is under 18,000m$^2$ (approximately 7350m$^2$). In accordance with the IAQM guidance, the potential dust emission magnitude for earthworks is assessed as **Small**.

*Sensitivity and Risk of Impacts*

- There are between over 100 high sensitivity receptors within 20 m of the proposed earthworks area. Sensitivity of the area to dust soiling due to earthworks is therefore assessed as **High**.

  The Small magnitude with High sensitivity results in the risk of dust soiling impacts due to earthworks being assessed as **Medium.**

- The average 2023 annual mean $PM_{10}$ background concentrations (Scottish Air Quality, 2023) at receptors within 350 m of the site boundary is approximately 11.9 µg/m$^3$, which is below the IAQM criterion of 14 µg/m$^3$. There are over 100 high sensitivity receptors within 20 m of the proposed earthworks area. Sensitivity of Residents to human health impacts due to earthworks is therefore assessed as **Medium**.

  The Small magnitude with Medium sensitivity results in the risk of dust impacts on human health due to earthworks as being **Low**.

### Construction Phase

Dust emissions during construction can give rise to elevated dust deposition and $PM_{10}$ concentrations. These are generally short-lived changes over a few hours or days, which occur over a limited time period of several weeks or months and are usually in defined phases.

*Dust Emission Magnitude*

- The total building volume is estimated to be between 12,000m$^3$ – 75,000m$^3$. In accordance with the IAQM guidance, the potential dust emission magnitude for construction is therefore assessed as **Medium.**

*Sensitivity and Risk of Impacts*

- There are over 100 high sensitivity within 20 m of the proposed construction area. Sensitivity of the area to dust soiling due to construction is therefore assessed as **High**.

  The Medium magnitude with high sensitivity results in the risk of dust soiling impacts due to construction being assessed as **High**.

- The average 2022 annual mean $PM_{10}$ background concentrations (Scottish Air Quality, 2023) at receptors within 350 m of the site boundary is approximately 11.9 µg/m$^3$, which is below the IAQM criterion of 14 µg/m$^3$. There are over 100 high sensitivity receptors within 20 m of the proposed earthworks area. Sensitivity of Residents to human health impacts due to construction is therefore assessed as **Medium**.

  The Medium magnitude with the Medium sensitivity results in the risk of dust impacts on human health due to construction being assessed as **Medium**.

**Track-out Material –** Without site-specific mitigation, the IAQM guidance states that track-out can occur from roads up to 500 m from the site exit of a large construction site. The impact declines with distance from the roads and therefore, it is only necessary to consider track-out up to 50 m from the edge of the road.

*Dust Emission Magnitude*

- Although the specific number of Heavy-Duty Vehicle (HDV) movements per day during peak construction is not known at this stage, due to the size of the Site, an estimation of <20 HDV movements per day has been made. The potential dust emission magnitude for track-out is assessed as **Small.**

*Sensitivity and Risk of Impacts*

- There are estimated to be >100 high sensitivity human receptors within 50 m of the proposed track-out route. Sensitivity of the area to dust soiling due to track-out is therefore assessed as **High**.

  The Small magnitude with High sensitivity results in the risk of dust soiling impacts due to track-out being assessed as **Medium**.

- The average 2023 annual mean $PM_{10}$ background concentrations (Scottish Air Quality, 2023) at receptors within 350 m of the site boundary is approximately 11.9 µg/m$^3$, which is below the IAQM criterion of 14 µg/m$^3$. There are >100 high sensitivity receptors within 50 m of the proposed track-out route. Sensitivity of residents to human health impacts due to track-out activities is therefore assessed as **Medium**.

  The Small magnitude with the High sensitivity results in the risk of dust impacts on human health due to track-out being assessed as **Medium**.

### Overall Dust Emission Magnitude

The overall dust emission magnitude is summarised in **Table 7-A**

*Table 8A – Overall Dust Emission Magnitude*

| Activities | Dust Emission Magnitude |
|---|---|
| Demolition | Small |
| Earthworks | Small |
| Construction | Medium |
| Track-out | Small |

### Overall Sensitivity of the Surrounding Area

**Table 7-B** below summarises the sensitivity of the surrounding area.

*Table 8B – Overall Sensitivity of the Surrounding Area*

| Potential Impact | Sensitivity of the Surrounding Area | | | |
|---|---|---|---|---|
| | Demolition | Earthworks | Construction | Track-out |
| Dust Soiling | High | High | High | High |
| Human Health | Low | Medium | Medium | Medium |

### Overall Risk of Dust Impacts

**Table 7-C** below summarises the dust risk to define site-specific mitigation.

*Table 8C – Summary of Dust Risk to Define Site-Specific Mitigation*

| Potential Impact | Risk of Dust Impact | | | |
|---|---|---|---|---|
| | Demolition | Earthworks | Construction | Track-out |
| Dust Soiling | Medium | Medium | High | Medium |
| Human Health | Negligible | Low | Medium | Medium |

## Conclusions

The construction dust risk assessment detailed above concludes that without specific site mitigation measured there are:

- Over 100 high sensitivity human receptors within 20 m of the Proposed Development site subject to:
  - High risk of dust soiling during construction without mitigation; and
  - Medium risk to human health impacts during construction without mitigation.
- Over 100 high sensitivity human receptors within 50 m of the proposed track-out route subject to:
  - Medium risk of dust soiling as a result of track-out activities without mitigation; and
  - Medium risk to human health as a result of track-out activities without mitigation.

Experience in the UK is that good construction management is capable of mitigating the impact of fugitive emissions of particulate matter effectively. In all but the most exceptional circumstances, risk of dust impacts at receptors can be controlled to ensure that they are negligible or low at worst.

The good practice and site-specific mitigation measures to be implemented during construction are detailed below.

Risk of dust impacts associated with the construction of the Proposed Development will therefore be negligible to low and associated effects will be **not significant** once good practice and site-specific mitigation measures are implemented.

## Good Practice and Site-Specific Mitigation Measures

Outlined below are recommendations for mitigation measures, based on the overall risk of dust impacts as assessed above. These are measures that are listed as Desirable or Highly Recommended in the IAQM guidance (IAQM, 2014).

***Proposed mitigation for communications:***

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary; and
- Display the head or regional office contact information.

***Proposed mitigation for dust management:***

- Develop and implement a Dust Management Plan (DMP). This may include measures to control other emissions, approved by the Local Authority.

***Proposed mitigation for site management:***

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked; and
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook.

***Proposed mitigation for monitoring:***

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Authority when asked;
- Increase frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and
- Agree dust deposition, dust flux, or real-time $PM_{10}$ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences.

***Proposed mitigation for preparing and maintaining the site:***

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site; and
- Cover, seed or fence stockpiles to prevent wind whipping.

***Proposed mitigation for site operations:***

- Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event, using wet cleaning methods.

***Proposed mitigation for waste management:***

- Avoid bonfires and burning of waste materials.

***Operating vehicle/machinery and sustainable travel:***

- Ensure all vehicles switch off engines when stationary;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum speed limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas; and
- Issue all suppliers and contractors with delivery routes and access times/restrictions.

***Proposed mitigation specific to earthworks:***

- Re-vegetate earthworks and exposed areas/soils stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

***Proposed mitigation specific to construction:***

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

***Proposed mitigation specific to track-out:***

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. this may require a sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; and
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site logbook; and
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

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