13 AIR QUALITY

Introduction

13.1.1 This chapter details the air quality assessment undertaken for the Project. The Local Authority, North Ayrshire Council (NAC), has not currently designated any Air Quality Management Areas (AQMAs) indicating that air quality in the area is generally good.

13.1.2 This air quality assessment covers the:

- Construction phase - an evaluation of the temporary effects from fugitive construction dust and construction-vehicle exhaust emissions; and
- Operational phase – an evaluation of the impacts of the development traffic on the local area

13.1.3 This chapter begins by setting out the policy and legislative context for the assessment. The methods and criteria used to assess potential air quality effects have then been described. The baseline air quality conditions have been established taking into account the Department for Environment, Food and Rural Affairs (Defra) estimates, Local Authority documents and the results of any local monitoring. The results of the assessment of air quality impacts have been presented. A conclusion has been drawn on the significance of the construction-phase effects and operational-phase effects.

Assessment Methodology

Legislative Context

Air Quality Standards Regulation

13.1.4 The Air Quality Standards (Scotland) Regulations 2010 (Scottish Government, 2010) and the Air Quality (Scotland) Amendment Regulations 2016 (Scottish Government, 2016) set limit values for ambient air concentrations for the main air pollutants: particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene, certain toxic heavy metals (arsenic, cadmium and nickel) and polycyclic aromatic hydrocarbons (PAHs). These limit values are legally binding on the Secretary of State. The Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the limit values.

UK Air Quality Strategy

13.1.5 The Environment Act 1995 established the requirement for the Government and the devolved administrations to produce a National Air Quality Strategy (AQS) for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2007 (Defra, 2007). The Strategy sets UK air quality standards[1] and objectives[2] for the pollutants in the Air Quality Standards Regulations plus 1,3-butadiene and recognises that action at national, regional and local level may be needed, depending on the scale and nature of

[1] Standards are concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. Standards, as the benchmarks for setting objectives, are set purely with regard to scientific evidence and medical evidence on the effects of the particular pollutant on health, or on the wider environment, as minimum or zero risk levels.

[2] Objectives are policy targets expressed as a concentration that should be achieved, all the time or for a percentage of time, by a certain date.

the air quality problem. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the Air Quality Standards Regulations.

13.1.6 The 1995 Environment Act also established the UK system of Local Air Quality Management (LAQM), that requires local authorities to go through a process of review and assessment of air quality in their areas, identifying places where objectives are not likely to be met, then declaring Air Quality Management Areas (AQMAs) and putting in place Air Quality Action Plans to improve air quality. These plans also contribute, at local level, to the achievement of the limit values in the Air Quality Standards (Scotland) Regulations.

13.1.7 The lower of the limit values and objectives for pollutants relevant to this assessment are summarised in Table 13.1.

Table 13.1 Summary of Relevant Air Quality Limit Values and Objectives

Pollutant	Averaging Period	Objectives/ Limit Values	Not to be Exceeded More Than
Nitrogen Dioxide (NO_2)	1 hour	200 µg.m^{-3}	18 times per calendar year
	Annual	40 µg.m^{-3}	-
Particulate Matter (PM_{10})	24 hour	50 µg.m^{-3}	7 times per calendar year
	Annual	18 µg.m^{-3}	-
Particulate Matter ($PM_{2.5}$)	Annual	10 µg.m^{-3}	-

13.1.8 In July 2021, the Scottish Government published the *Cleaner Air for Scotland 2 – Towards a Better Place for Everyone*. This new air quality strategy builds on the success of Scotland's original air quality strategy and sets out how the Scottish Government will continue to deliver further air quality improvements over the next five years.

13.1.9 The strategy considers the role of placemaking in improving air quality and states that:

"Placemaking means working collaboratively across professions and communities to identify the best place-based solutions for the issues that we face. Overall, to improve and maintain air quality, development approaches to place should have an emphasis on mixed use neighbourhoods with:

- *the population density to sustain local services, planned and in locations that reduces the need to travel unsustainably;*
- *makes best use of existing transport infrastructure; and*
- *builds in walking and wheeling as the most natural choice to get around."*

Planning Policy Context

National Planning Policy

13.1.10 The primary assessment of relevant Scottish Planning Policy (SPP) is provided in the Planning Statement accompanying the application. The following sub-section provides an overview by way of background, where this is relevant for the air quality assessment.

13.1.11 Scotland's Third National Planning Framework (NPF3) (Scottish Government, 2014b) is '*a long-term strategy for Scotland'*. There are four themes throughout the document which outline the Government's aims, namely: a successful, sustainable place; a low carbon place; a natural, resilient place; and a connected place. Under *Spatial Priorities for Change,* NPF3 states that:

"Reducing the impact of the car on city and town centres will make a significant contribution to realising their potential as sustainable places to live and invest by addressing congestion, air

pollution and noise and improving the public realm. Significant health benefits could be achieved by substantially increasing active travel within our most densely populated areas."

13.1.12 A presumption in favour of sustainable development lies at the heart of Scottish policy. For determining planning applications, this means approving development proposals if they accord with the local development plan, unless material considerations indicate otherwise. If the development plan is absent, silent or the policies are out of date, then planning permission should be granted unless any adverse impacts would significantly outweigh the benefits, or specific policies in Scottish planning policy indicate that development should be restricted.

13.1.13 Planning Advice Notes (PANs) provide advice on good practice. PAN 51 (Scottish Executive, 2006) is entitled Planning, Environmental Protection and Regulation and supports existing policy on the role of the planning system in relation to the environmental protection regimes.

13.1.14 The Scottish Government is reviewing SPP and NPF3 with a view to bringing them together into a single policy document National Planning Framework 4 (NPF4). *Scotland's Fourth National Planning Framework Position Statement*, published in November 2020 includes the following potential policy change:

"Minimising and mitigating environmental hazards and pollution, and embedding an evidence-based approach to the avoidance and alleviation of health impacts from new development. We will also include new policies to improve air quality alongside reducing climate change emissions."

13.1.15 The NPF4 draft has been laid in the Scottish Parliament where it is open to Parliamentary scrutiny and public consultation until 31 March 2022. The final adoption date will depend on the approval of NPF4 by the Scottish Parliament, but the current aim is to lay a finalised version for approval by summer 2022.

Local Planning Policy

13.1.16 North Ayrshire Council adopted the North Ayrshire Local Development Plan 2 in November 2019, setting out policies for the next 20 years. The policies relevant to the context of this chapter includes:

Policy 27: Sustainable Transport and Active Travel

"We will support development that: …

… reduces the need to travel or appropriately mitigates adverse impacts of significant traffic generation, road safety and air quality, including taking into account the cumulative impact."

Relevant Guidance

13.1.17 This air quality assessment is consistent with the Environmental Protection Scotland (EPS) and the Royal Town Planning Institute (RTPIS) *Delivering Clear Air for Scotland Development Planning & Development Management document* (EPS & RTPIS, 2017), Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) *Land-Use Planning & Development Control: Planning For Air Quality* document (EPUK & IAQM, 2017), the IAQM *Guidance on the assessment of dust from demolition and construction* (IAQM, 2014) and, where relevant, Defra's Local Air Quality Management *Technical Guidance: LAQM.TG16* (Defra, 2018a).

Study Area

13.1.18 The assessment study area differs between the construction and operational phases. The study areas in each case are described in detail within the methodology that follows, referencing the relevant guidance documents. An overview is provided below.

Construction

13.1.19 With respect to dust during construction, the 2014 IAQM Guidance on the assessment of dust from demolition and construction sets out 350 metres as the distance from the Project site boundary or 50 metres from the centreline of the site traffic route(s) up to 200 metres from the entrance, within which there could potentially be nuisance dust and PM_{10} effects on human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases. These distances are set to be deliberately conservative.

Operation

13.1.20 The EPS & RTPIS Delivering Cleaner Air for Scotland document (EPS & RTPIS, 2017) provides the following threshold criteria for determining when an air quality assessment should be undertaken for sites outside an AQMA:

- an increase in annual average daily Light Duty Vehicle (LDV) flows by more than 500; or
- an increase in annual average daily HDV flows by more than 100.

13.1.21 The generated traffic is expected to be above these threshold criteria.

Baseline Methodology

13.1.22 The background concentration often represents a large proportion of the total pollution concentration, so it is important that the background concentration selected for the assessment is realistic. EPUK & IAQM guidance (EPUK & IAQM, 2017) highlight public information from Defra and local monitoring studies as potential sources of information on background air quality. LAQM.TG16 recommends that Defra mapped concentration estimates are used to inform background concentrations in air quality modelling and states that "*where appropriate these data can be supplemented by and compared with local measurements of background, although care should be exercised to ensure that the monitoring site is representative of background air quality".*

13.1.23 For this assessment, the background air quality has been characterised by drawing on information from the following public sources:

- Defra maps (Defra, 2018b) and the Scotland specific maps (Scotland's Environment, 2018), which show estimated pollutant concentrations across the UK in 1 km grid squares; and
- Published results of Local Authority Review and Assessment (R&A) studies of air quality, including local monitoring and modelling studies.

13.1.24 A detailed description of how the baseline air quality has been derived for this Project site is summarised under the heading 'Baseline Environment'.

Consultation

Table 13.2 Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How / Where Addressed?
Date	Consultee and Issues Raised	How / Where Addressed?
7th February 2022	**William Mcnish, Contaminated Land Officer** The council agreed with the proposed methodology and highlighted the following points: *"A sensitivity analysis should be carried out on the meteorological data*	A sensitivity test for on the meteorological data has been carried out and can be found in Appendix 13.4. When determining the baseline for the assessment, both Defra mapped and Scotland mapped background concentrations have been considered.

Date	Consultee and Issues Raised	How / Where Addressed?
	used to demonstrate that it is the most suitable information for the scenario being modelled." *"Scottish and DEFRA derived background maps should be used, where applicable, for the appropriate NO_X, NO_2, PM_{10} and $PM_{2.5}$ background concentrations."*	
16th December 2021	**SEPA** *"The local authority is the responsible authority for local air quality management under the Environment Act 1995, and therefore we recommend that Environmental Health within the local authority be consulted."*	The North Ayrshire Council were consulted (See above).
17th December 2021	**North Ayrshire Council** *"An air quality assessment will be required for the development.* *Any associated air quality risks will be identified through this assessment and mitigation measures implemented if required."*	This Chapter presents the Air Quality Assessment.
7th December 2021	**Health Officer (NAC)** *"An air quality assessment will be required for the development as part of the planning process. Any associated air quality risks will be identified through this assessment and mitigation measures implemented if required. Therefore any air quality impacts should be included in any EIA screening, if it is deemed necessary."*	This Chapter presents the Air Quality Assessment.
25th November 2021	**Private Individual, Mr Riddle** **"***Refers solely to combustion plant, but additional statements required as to gaseous and particulate emissions, including odours, from all aspects of the operational phase, including both on site and ship sources."* *"The scope of the assessment should not be limited to the risk of dust impacts during construction but must include emissions during the operational phase."* *"Air quality effects related to operational traffic and from the operational facility should not be scoped out. Noise effects related to operational traffic should not be scoped out."*	Odour, gaseous and particulate emissions not emitted during the operational phase. Emissions from traffic generated by the operational phase have been considered in this chapter (See 13.1.79).
13th December 2021	**NatureScot**	The Kames Bay SSSI and Ballochmartin SSSI are on an island

Date	Consultee and Issues Raised	How / Where Addressed?
	"We advise that the impact of air emissions and deposition on designated sites within the screening area should be undertake according to our guidance" *"Kames Bay SSSI and Ballochmartin Bay SSSI: Atmospheric and water based pollution impacts may arise from the enabling work and the construction and operation of this development. We advise that these impacts are assessed and mitigation proposed if necessary."*	more than 2 km from the site and are therefore not within the study area. The nearest SSSI is Southannan Sands. The impact of dust during the construction phase on this SSSI has been considered in the Construction Dust Assessment. For assessing the impacts of traffic emissions on ecological receptors, the Design Manual for Roads and Bridges (DMRB) provides a series of traffic screening criteria. These include the change in AADT flows on a given road of 1000 vehicles or 200 heavy duty vehicles (HDVs). These thresholds have been widely used to screen out the need for quantitative assessment of projects. The proposed development generates fewer than 1000 vehicles and fewer than 200 HDVs so an assessment on ecological receptors was scoped out.

Assessment Criteria and Assignment of Significance

13.1.25 For the construction phase of the Project, the key pollutant is dust, covering both the PM_{10} fraction that is suspended in the air that can be breathed, and the deposited dust that has fallen out of the air onto surfaces and which can potentially cause temporary annoyance effects. The methodology for the assessment of construction dust is outlined in Appendix 13.1.

13.1.26 The UK AQS identifies the pollutants associated with road traffic emissions and local air quality impacts as nitrogen oxides (NO_x) and particulate matter. Emissions of total NO_x comprise nitric oxide (NO) and NO_2. NO oxidises in the atmosphere to form NO_2.The assessment of construction and operational impacts therefore focuses on changes in NO_2 and PM_{10} concentrations. The impact form fine particulate matter, known as $PM_{2.5}$ (a subset of PM_{10}) concentrations has also been considered.

13.1.27 In urban areas, pollutant concentrations are primarily determined by the balance between pollutant emissions that increase concentrations, and the ability of the atmosphere to reduce and remove pollutants by dispersion, advection, reaction and deposition. An atmospheric dispersion model is used as a practical way to simulate these complex processes; such a mode requires a range of input data, which can include emissions rates, meteorological data and local topographical information.

13.1.28 The air quality impacts associated with traffic generated by the operation of the Project have been modelled using the atmospheric dispersion modelling system (AMDS) Roads model.

13.1.29 Regarding exhaust emissions from construction-related vehicles (contractors' vehicles and Heavy Goods Vehicles (HGVs), diggers, and other diesel-powered vehicles), these are unlikely to have a significant effect on local air quality (IAQM, 2014) except for large, long-term construction sites: the EPS and RTPIS Delivering Cleaner Air for Scotland document (EPS & RTPIS, 2017) indicates that air quality assessments should include developments increasing annual average daily HDV traffic flows by more than 100. The results of the Highways and Access assessment indicates that the aforementioned EPS and RTPIS thresholds are not expected to be exceeded for any individual

road during the construction phase of this Project; therefore, construction-vehicle exhaust emissions have not been assessed specifically.

13.1.30 For the operational phase, modelling has been undertaking for the following scenarios:

- Without Development – without the Project in the first year that the Project is expected to be fully operational, 2024; and
- With Development – with the Project in the first year that the Project is expected to be fully operational, 2024.

13.1.31 The model used and the input data relevant to this assessment are described in Appendix 13.2.

Receptor for Assessment of Operational Phase

13.1.32 The principles for selecting sensitive receptors are described in Appendix 13.2. Sensitive receptors for this assessment have been selected at representative properties where pollutant concentrations and/or changes in pollutant concentrations are anticipated to be greatest. These are set out in Table 13.3 and their locations are shown on Figure 13.1.

Table 13.3 Modelled Sensitive Receptors

ID	Description	Type	x	y	z
1	The Rowan Tree Restaurant	Non-residential	222010	644452	1.5
2	The Catch at Fins Restaurant		220466	653057	
3	The Gatehouse	Residential	220785	654055	
4	Irvine Road 1		219877	649907	
5	Irvine Road 2		219812	648849	
6	32 Snowdon Terrace		219967	648015	
7	118 Ardrossan Road		220522	646570	

13.1.33 The annual, daily and hourly-mean AQS objectives apply at the front and rear façades of all residential receptors. The daily and hourly-mean AQS objectives apply at the front and rear façades of the non-residential receptors.

13.1.34 For the purposes of this assessment, all modelled residential receptors are considered to be highly sensitive and non-residential receptors are considered to be of medium sensitivity.

Significance of Effects

13.1.35 The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) advises that:

"The significance of the effects arising from the impacts on air quality will depend on a number of factors and will need to be considered alongside the benefits of the development in question. Development under current planning policy is required to be sustainable and the definition of this includes social and economic dimensions, as well as environmental. Development brings opportunities for reducing emissions at a wider level through the use of more efficient technologies and better designed buildings, which could well displace emissions elsewhere, even if they increase at the development site. Conversely, development can also have adverse consequences for air quality at a wider level through its effects on trip generation."

13.1.36 When describing the air quality impact at a sensitive receptor, the change in magnitude of the concentration should be considered in the context of the absolute concentration at the sensitive receptor. Table 13.4 provides the EPS & RTPIS and EPUK & IAQM approach for describing the long-term air quality impacts at sensitive human-health receptors in the surrounding area.

Table 13.4 Impact Descriptors for Individual Sensitive Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level			
	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 than AQAL	Moderate	Substantial	Substantial	Substantial

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as negligible.
3. The table is only designed to be used with annual mean concentrations.
4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

13.1.37 The human-health impact descriptors above apply at individual receptors. The EPUK & IAQM guidance states that the impact descriptors *"are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it maybe that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances."*

13.1.38 Professional judgement by a competent, suitably qualified professional is required to establish the significance of effect associated with the consequence of the impacts. This judgement is likely to take into account the extent of the current and future population exposure to the impacts and the influence and/or validity of any assumptions adopted during the assessment process.

13.1.39 In assigning significance levels to the likely effects, the following terms have been used:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance

that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.

- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the Project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

13.1.40 Effects assessed as moderate or above are considered within this assessment to be significant in terms of the EIA Regulations.

Limitations of the Assessment

13.1.41 All air quality assessment tools, whether models or monitoring measurements, have a degree of uncertainty associated with the results. The choices that the practitioner makes in setting-up the model, choosing the input data, and selecting the baseline monitoring data will decide whether the final predicted impact should be considered a central estimate, or an estimate tending towards the upper bounds of the uncertainty range (i.e., tending towards worst-case).

13.1.42 The atmospheric dispersion model itself contributes some of this uncertainty, due to it being a simplified version of the real situation: it uses a sophisticated set of mathematical equations to approximate the complex physical and chemical atmospheric processes taking place as a pollutant is released and as it travels to a receptor. The predictive ability of even the best model is limited by how well the turbulent nature of the atmosphere can be represented.

13.1.43 Each of the data inputs for the model, listed earlier, will also have some uncertainty associated with them. Where it has been necessary to make assumptions, these have mainly been made towards the upper end of the uncertainty range informed by an analysis of relevant, available data.

13.1.44 The atmospheric dispersion model used for this assessment, ADMS Roads, has been validated by its supplier and is widely used by professionals in the UK and overseas. A site-specific verification (calibration) provides additional certainty and is particularly important when air quality levels are close to exceeding the objectives/limit values.

13.1.45 LAQM.TG16 requires that local authorities verify the results of any detailed modelling undertaken for the purposes of fulfilling their R&A duties. Model verification refers to the checks that are carried out on model performance at a local level. Modelled concentrations are compared with the results of monitoring. Where there is a disparity between modelled and monitored concentrations, the first step is to review the appropriateness of the data inputs to determine whether the performance of the model can be improved. Once reasonable efforts have been made to reduce the uncertainties in the data inputs, an adjustment may be established and applied to reduce any remaining disparity between modelled and monitored concentrations. No adjustment factor is deemed necessary where the modelled concentrations are within 25% of the monitored concentrations.

13.1.46 For the verification and adjustment of NOx/NO_2 concentrations for R&A purposes, it is recommended that the comparison involves a combination of automatic and diffusion monitoring, rather than a single automatic monitor. This is to ensure any adjustment factor derived is representative of all locations modelled and not unduly weighted towards the characteristics at a

single site. Where only diffusion tubes are used for the model verification, the study should consider a broad spread of monitoring locations across the study area to provide sufficient information relating to the spatial variation in pollutant concentrations.

13.1.47 Local Authorities generally implement a broad spread of monitoring, particularly in areas that are known to be sensitive to changes in air quality. Consequently, Local Authorities are usually able to verify the models they use for R&A purposes; however, for individual developments, there is less likely to be a broad range of monitoring locations within the relevant study area.

13.1.48 In this case, a broad spread of monitoring data is not currently available to allow the model to be verified for the study area. Instead, a sensitivity test has been undertaking using an adjustment factor of 2. The results of the sensitivity test are shown in Appendix 13.3.

13.1.49 The main components of uncertainty in the total predicted concentrations, made up of the background concentration and the modelled fraction, include those summarised in Table 13.5.

Table 13.5 Approaches to Dealing with Uncertainty used Within the Assessment

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
Background Concentration	Characterisation of current baseline air quality conditions	The background concentration used within the assessment is the most conservative value from a comparison of measured, Defra mapped and Scotland mapped concentration estimate.	The background concentration is the major proportion of the total predicted concentration. The conservative assumptions adopted ensure that the background concentration used within the model contributes to the result being towards the top of the uncertainty range, rather than a central estimate.
	Characterisation of future baseline air quality (i.e. the air quality conditions in the future assuming that the development does not proceed)	The future background concentration used in the assessment is the same as the current background concentration and no reduction has been assumed. This is a conservative assumption as, in reality, background concentrations are likely to reduce over time as cleaner vehicle technologies form an increasing proportion of the fleet.	
Fraction from Modelled Sources	Traffic flow estimates	High growth assumptions have been used to develop the traffic dataset used within the model.	The modelled fraction is a minor proportion of the total predicted concentration.
	Traffic speed estimates	The average speed has been reduced in congested areas to take account of slow-moving and queuing traffic.	
	Road-related emission factors – projection to future years	The most recently published emission factors have been used within the modelling and these are based on the current and best understanding of the variation in emission factors in future years.	
	Meteorological Data	Uncertainties arise from any differences between the conditions at the met station and the development site, and between the historical met years and the future years. These have been minimised by using meteorological data collated at a representative measuring site. The model has been run for a full	

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
		year of meteorological conditions. This means that the conditions in 8,760 hours have been considered in the assessment. At the request of the council, a sensitivity test for the meteorological data is shown in Appendix 13.4.	
	Receptors	Receptor locations have been identified where concentrations are highest or where the greatest changes are expected.	
	Dispersion Modelling	It has not been possible to verify the model as no monitoring is undertaken in the study area. A sensitivity test using an adjustment factor of 2 is shown in Appendix 13.3.	

13.1.50 The analysis of the component uncertainties indicates that, overall, the predicted total concentration is likely to be towards the top of the uncertainty range rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.

Baseline Environment

Review and Assessment Process

13.1.51 There are no designated AQMAs close to the Project site and air quality in the area is generally good.

Local Urban Background Monitoring

13.1.52 Monitoring at urban background locations measure concentrations away from the local influence of emission sources and are therefore broadly representative of residential areas within large conurbations. Monitoring at local urban background locations is considered an appropriate source of data for the purposes of describing baseline air quality for the Project site. Only measurements up to and including 2019 have been used in the assessment to avoid the potentially low measurements during pandemic lockdowns when traffic was unusually low.

13.1.53 There are currently no continuous automatic monitors in urban background locations in the Project site area. The nearest urban background monitors are approximately 10 km or more away from the site; however, there is one local monitoring station that has been operating for several years where rural concentrations are measured using passive diffusion tubes. The most recently measured annual-mean concentrations are presented in Table 13.6.

Table 13.6 Passively Monitored Annual-Mean NO_2 Concentrations

Monitor Code	Monitor Location	Approximate Distance from the Project Site (km)	Concentration ($\mu g.m^{-3}$)			
			2016	2017	2018	2019
DT21	Hunterston Road	3.3	17	15	16	15

All concentrations have been adjusted for the bias.

Mapped Concentration Estimates

13.1.54 The Scotland specific and Defra's total annual-mean NO_2 concentration estimates have been collected for the 1 km grid square of the monitoring site and the Project and are summarised in Table 13.7.

Table 13.7 Mapped Annual-Mean Background NO_2 Concentration Estimates

Monitor Code	Monitor Location	Approximate Distance from the Project Site (km)	Concentration ($\mu g.m^{-3}$)		
			Range of Monitored	Estimated Defra Mapped	Scotland Specific Mapped
DT21	Hunterston Road	3.3	15 - 17	3.5	3.5
-	Project Site	-	-	4.5	4.5

Appropriate Background Concentrations for the Development Site

13.1.55 For NO_2, the Defra mapped background concentration estimate is significantly lower than the result from monitoring and the use of this data would not be conservative. To ensure the assessment is conservative, the background annual-mean NO_2 concentration has been derived from the 17 $\mu g.m^{-3}$, monitored at DT21 in 2016.

13.1.56 In the absence of PM_{10} and $PM_{2.5}$ at this site, the background annual-mean concentrations at the Project site have been derived from the higher of the Scotland Specific (where available) and the Defra mapped background concentration estimates.

13.1.57 Table 13.8 summarises the annual-mean background concentration for NO_2, PM_{10} and $PM_{2.5}$ used in this assessment.

Table 13.8 Summary of Background Annual-Mean (Long-Term) Concentrations used in the Assessment

Pollutant	Data Source	Concentration ($\mu g.m^{-3}$)
NO_2	DT21 (2016)	17
PM_{10}	Scotland (2018)	7.4
$PM_{2.5}$	Defra (2018)	4.8

Future Baseline Conditions

13.1.58 Historically the view has been that background traffic-related NO_2 concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. After a prolonged period through the last decade where background annual-mean NO_2 concentrations did not generally decrease in line with expectations, the most recent monitoring studies indicate ambient traffic-related NO_2 concentrations are now falling. Inspection of the results of local monitoring presented here do not provide enough information to determine if there is a trend over time for concentrations of NO_2 in the vicinity of the Project site.

13.1.59 To ensure that the assessment presents conservative results, no reduction in the background has been applied for future years.

13.1.60 The future baseline conditions are therefore predicted to be as in Table 13.8.

Mitigation Measures Adopted as Part of the Project

Construction Mitigation

13.1.61 As part of the Project design process, a number of designed-in measures have been committed to by the applicant to reduce the potential for air quality impacts. The measures are considered standard industry practice for this type of development.

13.1.62 The following mitigation measures and controls will be implemented during the construction and demolition works.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name an contact details of person(s) accountable for air quality and dust issues on the Project site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact number.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

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.
- 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 log book.

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 the 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.
- 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 on site or, if a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is 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 the Project site or specific operations where there is a high potential for dust production and the site is active for an extended period.
- Avoid site runnoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove matierals that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary – no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extractions, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on 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.
- 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.

Waste Management

- Avoid bonfires and burning of waste materials.

Low Risk Measures Specific to Demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, that are manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechnical alternatives.
- Bag and remove any biological debris or damp down such materials before demolition.

Medium Risk Measures Specific to Construction

- 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 additional control measures are in place.

Medium Risk Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material trackout out of the site. This may require the 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.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul rotes and any subsequent action in a site log book.
- Install hard surfaced hall routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaces roads between the wheel washing facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Assessment of Construction Effects

13.1.63 Whilst no detailed construction phase information is currently available, the type of activities that could cause fugitive dust emissions are: demolition; earthworks; handling and disposal of spoil; wind-blown particulate material from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site.

13.1.64 The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression methods.

13.1.65 The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars, and laundry. However, it is possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects, although short-term events may occur (for example, due to technical failure or exceptional weather conditions). The following assessment, using the IAQM methodology (IAQM, 2014), predicts the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is “not significant”.

Risk of Dust Impacts

Source

13.1.66 There are no buildings on site that would be demolished, however, there would be 680 m^3 of concrete to break up and use on site. As this is below 20,000 m^3, the dust emission magnitude for the demolition phase is classified, using the IAQM dust guidance, as small.

13.1.67 The Project site area is significantly greater than 10,000 m^2 and the dust emission magnitude for the earthworks phase is classified, using the IAQM dust guidance, as large.

13.1.68 The total volume of buildings to be constructed would be over 100,000 m^2 and there will be a concrete batching plant on site. The dust emission magnitude for the construction phase is classified as large.

13.1.69 The maximum number of outwards movements in any one day is over 50 HDVs, the dust emission magnitude for trackout would be classified as large.

Table 13.9 Dust Emission Magnitude for Demolition, Earthworks, Construction and Trackout

Demolition	Earthworks	Construction	Trackout
Small	Large	Large	Large

Pathway and Receptor – Sensitivity of the Area

13.1.70 All earthworks and construction activities are assumed to occur within the Project site boundary. As such, receptors at distances within 20 m, 50 m, 100 m, 200 m and 350 m of the site boundary have been identified and are illustrated in Figure 13.2. The sensitivity of the area has been classified and the results are provided in Table 13.10 below.

Table 13.10 Sensitivity of the Surrounding Area for Demolition, Earthworks and Construction

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Low	Residential receptors on Southannan Estate within 350 m, towards the northeast of the site boundary. 1 – 10 high sensitivity receptors located within 350 m of the site boundary (Appendix 13.1, Table 2).
Human Health	Low	Residential receptors on Southannan Estate within 350 m, towards the northeast of the site boundary. Background PM_{10} concentrations for the assessment = 7.4 $\mu g.m^{-3}$. 1 – 10 high sensitivity receptors located within 350 m of the site boundary and PM_{10} concentrations below 14 $\mu g.m^{-3}$ (Appendix 13.1, Table 3).
Ecological	Medium	Southannan Sands (SSSI) within 20 m of the site boundary. Medium sensitivity receptor located within 20 m of the site boundary (Appendix 13.1, Table 4).

13.1.71 The Dust Emission Magnitude for trackout is classified as large and trackout may occur on roads up to 500 m from the site. The major route within 500 m of the Project site is Irvine Road (A78). The sensitivity of the area has been classified and the results are provided in Table 13.11.

Table 13.11 Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Medium	Residential receptors on Irvine Road are located within 20 m of the road. 1 – 10 high sensitivity receptors located within 20 m of the roads (Appendix 13.1, Table 2).
Human Health	Low	Residential receptors on Irvine Road are located within 20 m of the road. Background PM_{10} concentrations for the assessment = 7.4 $\mu g.m^{-3}$. 1 – 10 high sensitivity receptors located within 350 m of the road and PM_{10} concentrations below 14 $\mu g.m^{-3}$ (Appendix 13.1, Table 3).

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Ecological	Medium	Southannan Sands (SSSI) within 20 m of the road. Medium sensitivity receptor located within 20 m of the road (Appendix 13.1, Table 4).

Overall Dust Risk

13.1.72 The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area (See Appendix 13.1, Tables 5, 6 and 7) to give the Dust Impact Risk. Table 13.12 summarises the Dust Impact Risk for the four activities.

Table 13.12 Dust Impact Risk for Demolition, Earthworks, Construction and Trackout

Source	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Low	Low	Medium
Human Health	Negligible	Low	Low	Low
Ecology	Low	Medium	Medium	Medium
Risk	Low	Medium	Medium	Medium

13.1.73 Taking the site as a whole, the overall risk is deemed to be medium.

13.1.74 The IAQM dust guidance lists mitigation measures for low, medium and high risks. The 'highly recommended' mitigation measures appropriate to the level of risk for the site as a whole and for each of the phases are set out in 'Mitigation Measures Adopted as Part of the Project'. The 'highly recommended' measures for low-risk demolition and medium-risk construction and trackout are also listed. The IAQM guidance does not highly recommend any measures for medium-risk earthworks.

13.1.75 Provided this package of mitigation measures is implemented, the residual construction dust effect will not be significant. The IAQM dust guidance states that *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."* The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

Further Mitigation

13.1.76 With the IAQM recommended dust controls in place, the effects are not considered significant and further mitigation is not required. However, the effectiveness of the controls will be checked through an inspection/monitoring programme detailed below.

Future Monitoring

13.1.77 The main influences on air quality arising from the construction of the development are likely to be dust generating activities, and recommended inspection/monitoring methods include:

- Carry out regular site inspections to record inspection results, and make an inspection log available to the Local Authority when asked.
- Increase the 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.

Accidents and/or Disasters

13.1.78 In accordance with the 2017 EIA regulations, consideration has been given to the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters. With the recommended mitigation measures in place, there are no potential construction accidents/disasters (that could realistically occur) that are relevant to air quality. No significant adverse air quality effects to the environment during the construction phase due to accidents or disasters are anticipated.

Assessment of Operational Effects

Assessment of Air Quality Impacts on Surrounding Area

13.1.79 This section of the chapter summarises the future operational phase air quality impacts of the key pollutants associated with the development traffic of the proposed scheme.

Nitrogen Dioxide (NO_2)

13.1.80 Table 13.13 presents the annual-mean NO_2 concentrations predicted at the façades of existing receptors.

Table 13.13 Predicted Annual-Mean NO_2 Impacts at Existing Receptors

Receptor ID	Concentration (µg.m^{-3})		With – Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
The Gatehouse	17.5	17.5	0	Negligible
The Catch at Fins Restaurant	18.4	18.5	0	Negligible
Irvine Road 1	19.0	19.1	0	Negligible
Irvine Road 2	18.6	18.8	0	Negligible
32 Snowdon Terrace	18.6	18.7	0	Negligible
The Rowan Tree Restaurant	18.0	18.0	0	Negligible
118 Ardrossan Road	18.0	18.0	0	Negligible
Maximum	**19.0**	**19.1**	**-**	**-**
Minimum	**17.5**	**17.5**	**-**	**-**

AQS objective = 40 µg.m^{-3}

13.1.81 Predicted annual-mean NO_2 concentrations in the opening year at the façades of the existing receptors are well below the AQS objective for NO_2. When the magnitude of change is considered in the context of absolute concentrations, the impact is 'negligible' for all modelled receptors.

13.1.82 As all predicted annual-mean NO_2 concentrations are below 60 µg.m^{-3}, the hourly-mean objective for NO_2 is likely to be met at all receptors. The short-term NO_2 impact can be considered 'negligible' and is not considered further within this assessment.

13.1.83 Overall, the impact on the surrounding area from NO_2 is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Particulate Matter (PM_{10})

13.1.84 Table 13.14 presents the annual-mean PM_{10} concentrations predicted at the façades of existing receptors.

Table 13.14 Predicted Annual-Mean PM_{10} Impacts at Existing Receptors.

Receptor ID	Concentration (µg.m^{-3})		With – Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
The Gatehouse	7.5	7.5	0	Negligible
The Catch at Fins Restaurant	7.5	7.5	0	Negligible
Irvine Road 1	7.6	7.6	0	Negligible
Irvine Road 2	7.6	7.6	0	Negligible
32 Snowdon Terrace	7.6	7.6	0	Negligible
The Rowan Tree Restaurant	7.5	7.5	0	Negligible
118 Ardrossan Road	7.5	7.5	0	Negligible
Maximum	**7.6**	**7.6**	-	-
Minimum	**7.5**	**7.5**	-	-

AQS objective = 18 µg.m^{-3}

13.1.85 Predicted annual-mean PM_{10} concentrations in the opening year at the façades of the existing receptors are well below the AQS objective for PM_{10}. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is 'negligible' for all modelled receptors.

13.1.86 As all predicted annual-mean PM_{10} concentrations are below 22.4 µg.m^{-3}, the daily-mean PM_{10} objective is expected to be met at all receptors and the short-term PM_{10} impact is not considered further within this assessment.

13.1.87 Overall, the impact on the surrounding area from PM_{10} is considered to be 'negligible', using the criteria adopted for this assessment and based on professional judgement.

Fine Particular Matter ($PM_{2.5}$)

13.1.88 Table 13.15 presents the annual-mean $PM_{2.5}$ concentrations predicted at the façades of existing receptors.

Table 13.15 Predicted Annual-Mean $PM_{2.5}$ Impacts at Existing Receptors

Receptor ID	Concentration (µg.m^{-3})		With – Without Dev as % of the AQS Objective	Impact Descriptor
	Without Development	With Development		
The Gatehouse	4.9	4.9	0	Negligible
The Catch at Fins Restaurant	5.0	5.0	0	Negligible
Irvine Road 1	5.1	5.1	0	Negligible
Irvine Road 2	5.1	5.1	0	Negligible
32 Snowdon Terrace	5.1	5.2	0	Negligible
The Rowan Tree Restaurant	5.0	5.0	0	Negligible
118 Ardrossan Road	5.0	5.0	0	Negligible

Receptor ID	Concentration (µg.m^{-3}) Without Development	With Development	With – Without Dev as % of the AQS Objective	Impact Descriptor
Maximum	**5.1**	**5.2**	**-**	**-**
Minimum	**4.9**	**4.9**	**-**	**-**

AQS objective = 10 µg.m^{-3}

13.1.89 Predicted annual-mean $PM_{2.5}$ concentrations in the opening year at the façades of the existing receptors are below the AQS objective for $PM_{2.5}$ at all receptors. When the magnitude of change is considered in the context of the absolute concentrations, the impact descriptor is categorised as 'negligible' for all modelled receptors.

13.1.90 Overall, the impact on the surrounding area from $PM_{2.5}$ is considered to be 'negligible', using the criteria adopted for this assessment are based on professional judgement.

Significance of Effects

13.1.91 It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively. Professional judgement by a competent, suitably qualified professional is required to establish the significance associated with the consequence of the impacts.

13.1.92 The results of the modelling presented in this chapter and the results of the sensitivity test, presented in Appendix 13.3 of this EIA Report, indicate that with the Project, the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at modelled receptors are below the relevant long and short term AQS objectives. When the magnitude of change in annual-mean NO_2, PM_{10} and $PM_{2.5}$ concentrations is considered in the context of the absolute predictions, the air quality impacts of the development on receptors are categorised as 'negligible'. Taking into account the geographical extent of the impacts predicted in this study, the overall impact of the development on the surrounding area as a whole is considered to be 'negligible', using the descriptors adopted for this assessment.

13.1.93 Using professional judgement, the resulting air quality effect is considered to be 'negligible', which would not be significant in terms of the EIA Regulations.

Further Mitigation

13.1.94 The effects during operation are not considered to be significant, therefore no further mitigation is required during the operational phase.

Future Monitoring

13.1.95 The residual air quality effects during the operational phase are not considered significant and no future monitoring is required.

Accidents/Disasters

13.1.96 In accordance with the 2017 EIA regulations, consideration has been given to the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters. Once operational, there are no potential construction accidents/disasters (that could realistically occur) that are relevant to air quality. No significant adverse air quality effects to the environment during the operational phase due to accidents or disasters are anticipated.

Potential Changes to the Assessment as a Result of Climate Change

13.1.97 Based on current knowledge, the results of the assessment are not expected to be affected by climate change.

Assessment of Cumulative Effects

13.1.98 During the construction phase, cumulative dust effects may occur if there are other proposed and potential developments within 700 metres of the Project site and construction activities occur at the same time as the Project. Assuming that mitigation and control measures that are proportionate to risk of a dust impact are identified and implemented at those sites, the cumulative effect should not be significant.

13.1.99 During the operational phase, any cumulative effects have been taken into account to the extent that the traffic from other developments has been included in the traffic data provided for this assessment. The other developments, if any, included within the traffic data provided are given in Chapter 10 (Traffic and Transport) of this EIA Report. No further cumulative effects are considered likely.

Inter-relationships

13.1.100 The data inputs for this assessment have been informed by the outputs of the assessment of traffic and transport (see Chapter 10 (Traffic and Transport) of the EIA Report).

Summary of Effects

13.1.101 This assessment has considered dust effects during the construction phase and the air quality impacts during the operational phase of the Project.

13.1.102 Impacts during the construction, such as dust generation and plant vehicle emissions, are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the IAQM dust guidance, indicates that before the implementation of mitigation and controls, the risk of dust impacts will be medium. Implementation of the highly-recommended mitigation measures described in the IAQM construction dust guidance should reduce the residual dust effects to a level categorised as “not significant”.

13.1.103 For the operational phase, arrivals at and departures from the Project site may change the number, type and speed of vehicles using the local road network. Changes in road vehicle emissions are an important consideration during this phase of the Project. Detailed atmospheric dispersion modelling has been undertaken for the first year in which the Project is expected to be fully operational, in 2024. Pollutant concentrations are predicted to be well within the relevant health-based air quality objectives. Using the criteria adopted for this assessment together with professional judgement, the operational air quality effects are considered to be ‘not significant’ overall and no mitigation is considered necessary.

13.1.104 Using professional judgement, the resulting air quality effects of the Project is considered to be ‘not significant’ overall.

13.1.105 The Project does not, in air quality terms, conflict with national or local policies. There are, therefore, no constraints to the Project in the context of air quality.

Table 13.1: Summary of Likely Environmental Effects on Air Quality

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
All receptors within 350 m of site boundary	Receptors considered from low to high sensitivity	Increase in suspended particulate matter concentrations and deposited dust	Medium Term	Negligible	Negligible	Not Significant	Mitigation measures recommended as detailed in the IAQM dust guidance to reduce the effects of dust soiling during demolition, earthworks, construction and trackout.
Sensitive receptors within 200 m of affected road links	High (residential properties) and medium (non-residential properties, ecological)	Increases in NO_2, PM_{10} and $PM_{2.5}$ emissions from road traffic	Medium Term	Negligible	Negligible	Not Significant	Detailed dispersion modelling scoped out in para. 13.18.
Operational phase							
Sensitive receptors within 200 m of affected road links	High (residential properties) and medium (non-residential properties, ecological)	Increases in NO_2, PM_{10} and $PM_{2.5}$ emissions from road traffic	Long Term	Negligible	Negligible	Not Significant	

References

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

Department for Environment, Food and Rural Affairs (Defra) (2018a) Local Air Quality Management Technical Guidance, 2016 (LAQM.TG16).

Department for Environment, Food and Rural Affairs (Defra) (2018b) https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

Department for Environment, Food and Rural Affairs (Defra) (2017) UK plan for tackling roadside nitrogen dioxide concentrations.

Department for Environment, Food and Rural Affairs (Defra) (2019a) Clean Air Strategy 2019.

Department for Environment, Food and Rural Affairs (Defra) (2019b) Scotland's Third National Planning Framework.

Department for Environment, Food and Rural Affairs (Defra) (2020) http://laqm.defra.gov.uk/review-and-assessment/tools/tools.html

Environmental Protection Scotland & Royal Town Planning Institute Scotland (EPS & RTPIS) (2017) Delivering Cleaner Air for Scotland Development Planning & Development Management

Environmental Protection UK & Institute of Air Quality Management (EPUK & IAQM) (2017) Land-Use Planning & Development Control: Planning For Air Quality.

Institute of Air Quality Management (IAQM) (2014) Guidance on the assessment of dust from demolition and construction

North Ayrshire Council (2019) Adopted Local Development Plan: Your Plan Your Future.

Scotland's Environment (2018) http://www.scottishairquality.scot/data/mapping?view=data

Scottish Executive (2006) Pan 51 Planning, Environmental Protection and Regulation.

Scottish Government (2014a) Ambition Opportunity Place: Scotland's Third National Planning Framework.

Scottish Government (2014b) Scottish Planning Policy.

Scottish Government (2010) The Air Quality Standards (Scotland) Regulations.

Scottish Government (2016) The Air Quality (Scotland) Amendment Regulations.