OXFORDSHIRE
STRATEGIC RAIL FREIGHT INTERCHANGE

DCO Submission

Environmental Statement

Chapter 4: Air Quality and Odour
Appendix 4.7: Air Quality Damage Cost Calculation

Document 6.4G

On behalf of
Oxfordshire Railfreight Limited

Prepared by Phlorum
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Appendix 4.7: Air Quality Damage Cost Calculation

Consultation

In June 2021, an Environmental Statement Scoping Report was prepared on behalf of Oxfordshire Railfreight Interchange Limited and submitted to the local planning authority, Cherwell District Council (CDC). The Scoping Report outlined the proposed focus of, and methodology for, the Air Quality and Odour Environmental Statement Chapter.

Following review of the Scoping Report, CDC provided their Scoping Opinion on 5th July 2021. With respect to air quality, this Scoping Opinion provided a number of comments, with one stating: "*The assessment should also include a Damage Cost Calculation*". This request is in keeping with the requirement listed within CDC's Air Quality Action Plan[1].

Accordingly, an air quality damage cost calculation has been undertaken for the Proposed Development, as presented within this Appendix to **ES Chapter 4: Air Quality and Odour**.

Methodology

In the absence of any specific guidance published by CDC on undertaking air quality damage cost calculations for developments within the district, this calculation has been undertaken in line with DEFRA's Damage Cost Guidance[2] and following the methodologies established by air quality supplementary planning documents (SPDs) and air quality / emissions mitigation guidance documents from across the UK, including the following:

- The Sussex Air Quality Partnership's *Air Quality and Emissions Mitigation Guidance for Sussex*[3];
- Medway Council's *Air Quality Planning Guidance*[4];
- The Black Country Air Quality SPD[5], developed in combination by Dudley Metropolitan Borough Council, Sandwell Metropolitan Borough Council, Walsall Council and City of Wolverhampton Council; and

1 Cherwell District Council (2024). *Cherwell District Council Air Quality Action Plan*.
2 DEFRA (2025). *Air quality appraisal: damage cost guidance.*
3 Sussex Air Quality Partnership (2021). *Air quality and emissions mitigation guidance for Sussex (2021)*.
4 Medway Council (2016). *Air Quality Planning Guidance*.
5 Dudley Metropolitan Borough Council, Sandwell Metropolitan Borough Council, Walsall Council and City of Wolverhampton Council (2016). *Black Country Air Quality Supplementary Planning Document (SPD)*.

- The *Air Quality & Planning Guidance*[6] developed in combination by Stratford District Council, Warwick District Council, Coventry City Council, Coventry and Warwickshire Public Health, Nuneaton and Bedworth Borough Council and Rugby Borough Council.

Air quality damage cost calculations are typically used to determine an appropriate level of mitigation required for a development based on its potential to generate additional emissions.

The aforementioned air quality SPDs and air quality emissions mitigation guidance documents outline a general methodology to assess additional emissions expected to be generated by development and provides an approach to mitigating such emissions for all development, even those that have no overall significant impact on local air quality.

Damage Cost Calculation

An air quality damage cost calculation has been undertaken following Defra's latest Damage Cost Guidance and the methodologies established by UK Local Planning Authorities for quantifying the Proposed Development's 'damage cost'.

In accordance with established methodologies, DEFRA's latest Emissions Factor Toolkit (version 13.1)[7] was used to estimate emissions of NO_x and $PM_{2.5}$ from traffic generated by the Proposed Development in its first five operational years post-completion (i.e. 2034 to 2038, inclusive).

These emissions were combined with DEFRA's 'damage costs', which are a set of monetised impact values, defined per tonne of pollutant for use within this calculation. Damage costs estimate the total societal costs associated with changes in pollutant emissions, which, when combined with the calculated emission changes, provide an approximation for the cost to society caused by changes in emissions from new development.

Defra's damage cost appraisal toolkit[8], which incorporates the latest damage cost values, was used to determine the cost associated with the change in emissions forecast as a result of the Proposed Development's operation. The principle of the calculation is summarised as follows:

Forecast Change in Emissions × Damage Costs × 5 Years = 5 Year Exposure Cost Value (in £)

6 Stratford District Council, in conjunction with Warwick District Council, Coventry City Council, Coventry and Warwickshire Public Health, Nuneaton and Bedworth Borough Council and Rugby Borough Council (2018). *Air Quality & Planning Guidance*.
7 DEFRA (2025). Emissions Factor Toolkit (version 13.1). Available from: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/
8 DEFRA (2025). Damage Costs Appraisal Toolkit (Updated December 2025).

As a number of the inputs are based on assumptions, the resulting figure should be treated with caution. Nonetheless, it can offer an approximation of a development's magnitude in terms of total transport emissions. Consequently, the resulting figure can serve as a basis for informing decisions and judgements about an appropriate level of mitigation.

It is usual for monetised costs established in this way to be apportioned to low emission measures to be incorporated into, or provided alongside, new development. In doing this, it is possible for a development to offset its associated 'damage cost'.

Damage Cost Calculation

To evaluate the scale of the Proposed Development's transport-related emissions, the calculation outlined above has been utilised.

The Proposed Development's projected increase in traffic flows has been defined by using total development-generated traffic flows in the Proposed Development's projected completion year of 2034 (i.e. when fully operational). The inputs for this calculation are provided in Table 4.7.1.

The calculation accounts for an 'uplift factor' of 2% cumulatively per annum and a 'discount rate' in line with DEFRA's latest guidance. Central estimate damage costs for *Road Transport Urban Small* have been based on DEFRA 2025 prices.

Table 4.7.1: Damage Cost Calculation Inputs

Item	Value	Unit	Source / Guidance
Trip Length	10	km	Established air quality SPDs and guidance documents
Traffic Flow	15,730 LDVs & 4,920 HDVs	AADT	Framework Travel Plan[9] (Page 22)
EFT Road Type	Urban (not London)	-	DEFRA EFT (v13.1)
Emission Years	2034 – 2038	-	Completion Year + 4 Years
Average Speed	50	km/hr	Established air quality SPDs and guidance documents
Appraisal Period	5	Years	Established air quality SPDs and guidance documents

The total air quality 'damage cost' has been calculated using DEFRA's latest air quality appraisal toolkit and is presented in Table 4.7.2.

9 ADC Infrastructure Limited (2025). *Framework Travel Plan: Oxfordshire SRFI*.

Table 4.7.2: Damage Cost Calculation Outputs

	2034	2035	2036	2037	2038
NO_x					
NO_x Increase (Tonnes)	10.40	9.94	9.58	9.29	9.11
Central Damage Cost	£10,012	£10,012	£10,012	£10,012	£10,012
Adjusted Damage Cost	£104,164	£98,045	£93,073	£88,967	£85,895
Total Damage Cost	£470,145				
$PM_{2.5}$					
$PM_{2.5}$ Increase (Tonnes)	2.04	2.03	2.02	2.02	2.02
Central Damage Cost	£84,998	£84,998	£84,998	£84,998	£84,998
Adjusted Damage Cost	£173,074	£169,906	£166,945	£164,102	£161,404
Total Damage Cost	£835,431				

The Proposed Development's air quality damage costs are, therefore, summarised as follows:

NO_x emissions 'damage cost' = £470,145

$PM_{2.5}$ emissions 'damage cost' = £835,431

Total emission 'damage cost' = £1,305,567

Mitigation

The resulting value of the air quality 'damage cost', calculated above, is typically used to provide an indication as to the value of an appropriate package of mitigation to offset potential air quality impacts from new development.

Details of mitigation proposed as part of the Proposed Development to minimise potential air quality impacts include the following:

- Contribution to fund new and enhanced bus services, to the value of circa £3,200,000 and a bus infrastructure contribution to the value of £130,984;
- Providing future employees with a 6-month bus pass to encourage sustainable transport usage; and
- Use of solar photovoltaic panels covering 15% of the gross internal area of the Main Site buildings to assist in meeting the Proposed Development's energy demand through renewable means.
- Provision of electric vehicle (EV) charging infrastructure at 25% of proposed parking spaces;

- Implementation of a Framework Travel Plan[9], promoting and facilitating the use of sustainable travel modes, and reducing trips associated with single occupancy vehicle usage - once the Travel Plan targets are achieved (projected in year 5), it is anticipated that these measures would reduce light-duty vehicle (LDV) flows by approximately 26% (or 4,103 vehicle movements daily);
- Provision of secure, covered cycle parking;
- Provision of links with new and improved pedestrian and cycle routes to Heyford Park, Ardley, Middleton Stoney and Bicester;
- Provision of a new, dedicated bus stop within the development and a new off-site bus stop adjacent to the Ardley Energy Recovery site;
- Designated priority car share bays for each proposed warehouse unit and the proposed rail terminal to encourage car sharing;

Although detailed costs for the majority of the measures forming the Proposed Development's mitigation package are not yet available, based on those that are available, it is clear that the total cost of this mitigation package would exceed the calculated damage cost of £1,305,567, with this figure being exceeded by the investment in public transport services and infrastructure alone. These mitigation measures, in particular those relating to bus services will positively contribute towards the aims of the Council's Air Quality Action Plan[1]. The Proposed Development's mitigation package is therefore considered appropriate to offset the identified impacts.

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