



Appendix 13.4 Damage Cost Assessment

August 2021

APPENDIX 13.4 DAMAGE COST ASSESSMENT

The Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance¹ and the South Ribble Borough Council (SRBC) Planning Advisory Note (PAN)² states that Local Authorities may wish to incorporate additional measures in order to offset emissions at an early stage.

It is also critical that obligations to include offsetting measures must be proportional to the nature and scale of the proposed development and may be based on quantification of the emissions associated with a development.

The DEFRA guidance³ outlines the damage cost analysis methodology as the below:

- Identify the additional trip rates (as trips/annum) generated by the proposed development (this information will normally be provided in the Transport Assessment);
- Assume an average distance travelled of 10km/trip;
- Calculate the additional emissions of Oxides of Nitrogen (NO_x) and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) (kg/annum), based on emissions factors in the Emissions Factor Toolkit (Version 10.1)⁴, and an assumption of an average speed of 50km/h.
- Calculate emissions using the Emissions Factor Toolkit over a 5-year time frame;
- Use the latest 2021 DEFRA Damage Cost approach³ to provide a valuation of the excess emissions, using the currently applicable values for each pollutant (adjusting the PM₁₀ damage costs to PM_{2.5} utilising the conversion factors outlined within the DEFRA guidance³); and
- Sum the NO_x and PM_{2.5} costs.

The sum calculated via the above methodology provides a possible basis for defining the financial commitment required for the offsetting of emissions associated with an individual site.

Road Traffic Emissions

Based on the DEFRA guidance³ the Emissions Factor Toolkit (version 10.1) was used in order to calculate the additional emissions of NO_x and PM₁₀ (tonnes/annum) as a result of road vehicle exhaust emission associated with the Proposed Development.

For the calculation, the additional trip generation for the Proposed Development was obtained from Vectos, the appointed Transport Consultants for the project. This indicated a total anticipated 24-hour Annual Average Daily Traffic (AADT) trip generation of **4,760** vehicles with **no associated Heavy-Duty Vehicle (HDV)** movements during operational phase. This figure was utilised whilst undertaking the Damage Cost calculation.

Details of the utilised traffic data and parameters including, average speeds and link length are summarised in Table 13.4.1.

Table 13.4.1: Road Traffic Emission Factor Toolkit Inputs

AADT	%HDV	Speed (kph)	Link Length (km)
4,760	0.00	50	10

Total Development Emissions

Measures aimed to improve the efficiency of vehicles, including electric and hybrid fleets, are to be introduced throughout the UK and as such, NO_x and particulate matter (PM) emissions are predicted to reduce over time. The calculated NO_x and PM₁₀ emissions (tonnes/annum) as a result of the operational phase of the Proposed Development are summarised in Table 13.4.2. It should be noted that only 2030 emissions were used to represent the 2031 opening year and the five-year projection, as 2030 is

¹ Land-Use Planning and Development Control: Planning for Air Quality, EPUK and IAQM, January 2017.

² South Ribble Borough Council Planning Advisory Note Low Emissions and Air Quality V4, September 2020.

³ <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance#annex-a-updated-2020-damage-costs>

⁴ <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality>

the maximum output year in which emissions data was available from the Emissions Factor Toolkit.

Table 13.4.2: Development Emissions per Year

Year	NO _x Emissions (tonnes/annum)	PM ₁₀ Emissions (tonnes/annum)
2030	1.733	0.540

The DEFRA guidance³ provides a variety of damage cost values dependant on the pollutants emitted from a development, as well as considerations to geographical contexts. For the purpose of the assessment " **NO_x Road Transport Urban Medium**" central damage costings were agreed with SRBC on 5th August 2021, and are considered representative of the development and surrounding area. The following DEFRA damage costs were utilised within the calculation and summarised in Table 13.4.3.

Table 13.4.3: 2020 Damage Costs

Pollutant	Road Transport Medium (£/tonne)
NO _x	£7,614.00
PM _{2.5}	£66,797.00

In accordance with the DEFRA guidance³ 2017 costings were rebased to 2021, and an assumption is made that willingness to pay for health outcomes will rise each year in line with GDP and as such, an uplift factor of 2% has been utilised to reflect this. This is applied from 2021 to the development opening year of 2031 and over the five-year period until 2035.

The DEFRA damage cost approach and the central present values for "**Road Transport Urban Medium**" source were used. It should be noted that damage costs are provided for PM_{2.5} and as such, a conversion factor of 0.644 was applied to convert the PM₁₀ to PM_{2.5} emissions to allow for direct comparison with the PM_{2.5} damage costs. The Air Quality Damage Costs per Year are summarised in Table 13.4.4.

Table 13.4.4: Development Air Quality Damage Costs per Year

Year	Road NO _x (£/tonne)	Road PM _{2.5} (£/tonne)
2031	£18,805	£33,087
2032	£18,532	£32,607
2033	£18,264	£32,135
2034	£17,999	£31,669
2035	£17,738	£31,210
TOTAL	£91,338	£160,708

The final damage costs are summarised in Table 13.4.5.

Table 13.4.5: Development Air Quality Damage Costs - 5-Year Time Frame

Pollutant	Development Damage Costs
NO _x	£91,338
PM _{2.5}	£160,708
Total	£252,046

As outlined in Table 13.4.5, the total damage cost for the Proposed Development was calculated at **£252,046**.

Mitigation Measures

The cost provided above should be used as an indicator to the level of emissions offsetting measures required as part of the Proposed Development scheme. These may include on site and/or off-site measures.

The following measures will be implemented at an early stage:

- One electric vehicle (EV) dedicated charging point per house with a garage or driveway;
- Sustainable Travel Plan including;
 - Support for and promotion of car clubs (including financial incentives);
 - Support local walking and cycle initiatives;
 - Promotion of walking/cycling initiatives (including financial incentives);
 - Resident's Travel Pack;
 - Promotion of travel by public transport (including financial incentives); and
 - Sustainable travel methods (walking/cycling/public transport) to the school and other on-site commercial uses (including financial incentives)
- Improved pedestrian links to public transport stops;
- Provision of bus infrastructure including stands, shelters, bus gates, information displays;
- Site layout to include improved pedestrian pathways to encourage walking;
- Improved convenient and segregated cycle paths to link to local cycle networks; and
- Provision of storage and support for cycle purchase or hire (Bike/e-bike hire schemes).

Additional measures may be implemented and will be fully discussed and agreed with SRBC before completion of the development.