Appendix 9.6 – Damage Cost Calculations

The Transportation Chapter (Chapter 12) has predicted that the Proposed Development when fully operational, in 2031, will result in a reduction in 92million HGV miles annually. This is equivalent to a 16 train per day maximum capacity and 1938 two-way HGV trips.

In 2021, the Proposed Development will be able to accommodate at least 4 trains a day and as such, for the purposes of this assessment, we have assumed a 23 million reduction in HGV miles in the opening year (2021), i.e. 484.5 two-way HGV trips.

In the interim years, it has been assumed that the Proposed Development will increase in capacity at a steady rate; this equates to an annual reduction in HGV miles of 6.9 million 145.35 additional two-way trips)

From the above information, an average trip length of 209.3km was calculated.

An emissions cost calculation was carried out using an approach adapted from Defra Guidance. The inputs used for the Defra EFT (v.8.0.1), which have been used to estimate the mass of pollutants emitted each year between 2021 and 2035, are provided in the table below.

Table 9.6.1 Emission cost calculation inputs

EFT Input Factors		Notes
Trip Rate	484.5 – 1938 HGV AADT	Increasing by 145.35 AADT annually between 2021 and 2031.
Average Speed	50kph	In line with Defra and EPUK/IAQM guidance
Link Length	209.3km	Calculated from daily trip rate and annual reduction in HGV miles.
Road Type	Motorway (Not London)	Although some of the reductions in HGV flows will be on the M25 (Motorway –London); this will only form a small fraction of reduction in HGV miles.
Years	2021 – 2035	In the absence of predictions of emissions factors for 2031-2035, 2030 emission factors were used.

The following equations can be used to calculate the annual value of the changes in emissions of NO_x and PM_{10}.

$$\text{NOx emission 'damage'(cost, £)} = \text{Damage Cost NOx (£)} \times \text{NOx emissions reductions (tonnes)}$$

$$P\text{M10 emission 'damage'(cost, £)} = \text{Damage Cost PM10(£)} \times \text{PM10 emissions reductions (tonnes)}$$

The Damage Cost values used were "Transport average'; they are detailed for NO_x and $PM_{10,}$ below.

Table 9.6.2 Damage costs for NO_2 and PM_{10}

Transport average damage cost	Cost per tonne of NO_x (£)	Cost per tonne of PM_{10} (£)
Low central estimate	£8,417	£45,510
Central estimate	£21,044	£58,125
High central estimate	£33,670	£66,052

Note: these costs have not accounted for a 2% annual increase in healthcare spending.