

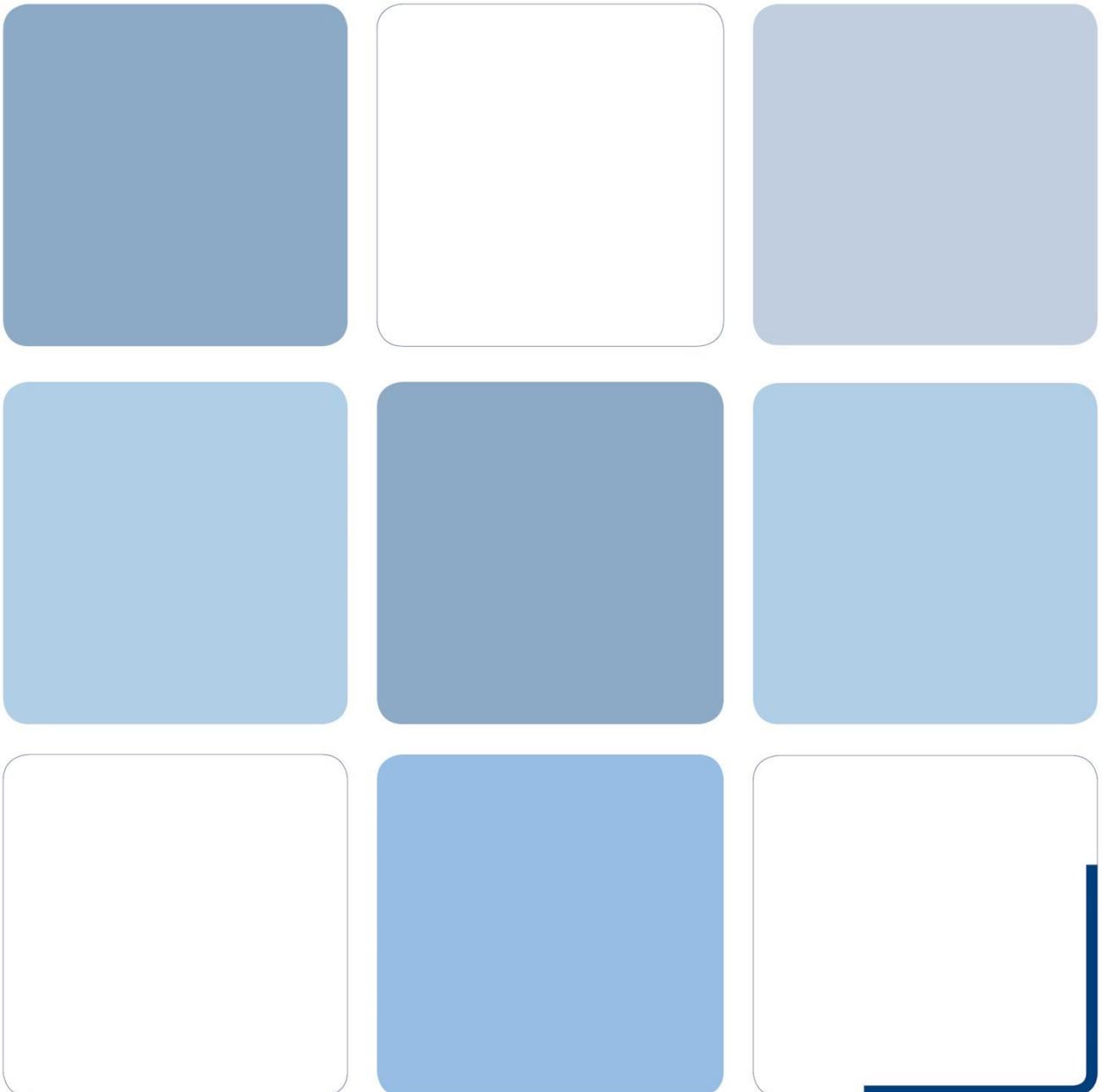


**Air Quality Damage Costs Assessment**

**Proposed aggregate importation and processing and the preparation and manufacture of value added products**

**Fisher's Wharf East Quay Newhaven Port**

**For Brett Aggregates Limited**



## Quality Management

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# 1 Introduction

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- 1.1 An Air Quality Chapter formed part of the Environmental Statement (ES) submitted with the planning application for the proposed aggregate importation and processing and the preparation and manufacture of value added products at Fisher's Wharf, East Quay, Newhaven Port. The Air Quality assessment in that chapter predicted the air quality impacts of the proposed development on sensitive receptors on the surrounding area. The conclusion of that assessment was that the residual impacts on the surrounding area are categorised as negligible (using published best-practice descriptors) and the resulting effects would be not significant.
- 1.2 No additional mitigation measures were considered necessary or proportionate, because the effects were not significant. Notwithstanding that, the planning authority has requested a monetary valuation of the air quality impacts. This report provides a damage costs calculation which provides a valuation of the air quality impacts of the development, based on the method described in *Air quality and emissions mitigation guidance for Sussex authorities (2013)*.
- 1.3 Air quality good-practice guidance advises that the organisation engaged in assessing the overall risks should hold relevant qualifications and/or extensive experience in undertaking air quality assessments. The RPS air quality team members involved at various stages of this assessment have professional affiliations that include Fellow of the Institute of Air Quality Management, Chartered Chemist, Chartered Scientist, Chartered Environmentalist and Member of the Royal Society of Chemistry and have the required academic qualifications for these professional bodies. In addition, the Director responsible for authorising all deliverables has over 25 years' experience.

## 2 Policy and Guidance Context

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### National Planning Policy & Guidance

#### National Planning Policy Framework

- 2.1 The National Planning Policy Framework (NPPF) [1] is a material consideration for local planning authorities and decision-takers in determining applications. The NPPF states national policy on the use of planning conditions and obligations, which should be considered when their use can make acceptable an otherwise unacceptable development. Paragraph 103 states that “*Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.*”
- 2.2 Regarding planning conditions, Paragraph 206 states they “*..should only be imposed where they are necessary, relevant to planning and the development to be permitted, enforceable, precise and reasonable in all other respects.*”
- 2.3 Regarding planning obligations, Paragraph 204 states they “*... should only be sought where they meet all the following tests:*
- *necessary to make the development acceptable in planning terms;*
  - *directly related to the development; and*
  - *fairly and reasonably related in scale and kind to the development.*”

#### National Planning Practice Guidance

- 2.4 The National Planning Practice Guidance (NPPG) was issued on-line in March 2014 and is updated periodically by government as a live document. The Air Quality section of the NPPG describes the circumstances when air quality, odour and dust can be a planning concern, requiring assessment.
- 2.5 The NPPG advises that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).
- 2.6 The NPPG provides advice on how air quality impacts can be mitigated and notes “*Mitigation options where necessary will be locationally specific, will depend on the proposed development and should be proportionate to the likely impact. It is important therefore that local planning authorities work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.*”

## Guidance on Monetary Valuation of Air Quality Impacts

2.7 Government national guidance on valuing air quality impacts in monetary terms is provided jointly by HM Treasury and Defra in the 2013 Supplementary Green Book Guidance *Valuing Impacts on Air Quality* [2]. It provides guidance on how government can report the value of impacts of its proposed policies, programmes and projects that lead to changes in UK air pollution. The guidance describes three alternative methods that can be used to carry out the valuation:

- i. An approximate estimation method, known as the Damage Cost Calculation, which needs information only on the emissions of pollutants, and involves the application of published average damage cost factors (£ per tonne emitted) that are generalised estimates derived from dispersion and exposure modelling across the UK.
- ii. The more detailed Impact Pathway (I-PA) approach is stated as being the central methodology for appraisal and is mandatory when air quality impacts exceed a certain value threshold. It states, “*By using bespoke modelling to calculate local changes in concentrations, the impact pathway approach offers a more detailed assessment than damage costs can provide. Valuation is then based on local levels of pollution, height of emission sources, population density and meteorology.*”
- iii. Where the proposed policy, programme or project is predicted to lead to a breach of legally binding obligations, a third approach, the Marginal Abatement Cost method, is used to calculate the cost to subsequently restore compliance.

2.8 More detailed technical guidance is provided on these alternative approaches. Defra has published guidance, *Air Quality Appraisal – Damage Cost Methodology* [3], from the Interdepartmental Group on Costs and Benefits (IGCB). It notes that there are a number of potential applications for the use of damage costs values across central government. It also notes that damage costs are one way of approximating the impacts of changes in air pollution, but the use of the simpler damage methodology is not considered a replacement for detailed modelling and analysis of concentrations. Damage cost factors are provided for:

- PM<sub>10</sub> impact, which encompasses health (both mortality and morbidity) and soiling of buildings, but does not include the impacts of secondary PM;
- NO<sub>x</sub> impact, which encompasses the health impacts of secondary PM as nitrates, but not the health impacts of ozone formed;
- SO<sub>2</sub> impact, which encompasses health impacts (from both direct impacts of gaseous SO<sub>2</sub> and from secondary PM as sulphates) and impacts on materials (corrosion of stone and metals); and
- NH<sub>3</sub> impact, which encompasses health impacts from secondary PM as ammonium nitrate.

2.9 Defra published an update to the guidance in 2015 [4] which details the 2015 damage cost prices. The guidance states how the damage cost factors should be adjusted to the baseline year of the policy/project appraisal by 2.5% per annum to take into account inflation and then uplifted

by a further 2% pa to reflect the assumption that willingness to pay for health will rise in line with economic growth. Once the annual damage costs of the project are calculated over the period of years concerned, the guidance states that a discount rate of 3.5% should be applied to future years to calculate the total present value.

- 2.10 The *Air quality and emissions mitigation guidance for Sussex authorities (2013)* provides a simplified methodology for deriving a monetary valuation of air quality impacts. This assessment uses the methodology outlined in the Sussex guidance but uses the 2015 damage cost prices.

## 3 Assessment Methodology

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### Approach

- 3.1 As requested by Lewes District Council, RPS has carried out a valuation assessment of the air quality impact of the proposed Newhaven Port development, using the estimation method described in *Air quality and emissions mitigation guidance for Sussex authorities (2013)*.
- 3.2 The Damage Cost Calculation method gives an approximation based solely on the emissions of pollutants from the scheme and involves the application of published average damage cost factors (£ per tonne emitted) that are generalised estimates derived from dispersion and exposure modelling across the UK.
- 3.3 The Government national guidance notes that there are a number of potential applications for the use of damage costs values across central government. It also notes that damage costs are one way of approximating the impacts of changes in air pollution, but the use of the simpler damage methodology is not considered a replacement for detailed modelling and analysis of concentrations.

### Methodology – Damage Cost Calculation

- 3.4 RPS has used the *Air quality and emissions mitigation guidance for Sussex authorities (2013)* guidance, to carry out this valuation exercise. In summary, the method involved the following:
  - a. first, the relevant emissions of pollutants from the scheme (tonnes per year) were quantified, in this case NO<sub>x</sub> and PM<sub>10</sub> emissions associated with traffic generated by the development;
  - b. to reflect the assumption that willingness to pay for health will rise in line with economic growth; a further uplift of 2% pa was applied from the current year, 2018, through to 2024, to encompass five years of operation from the first fully occupational year of 2020;
  - c. these adjusted damage cost factors were applied to the scheme emissions to give the annual damage cost of the scheme for the five year period from the first fully occupational year, 2020 through to 2024 (inclusive); and

## 4 Results of Damage Cost Calculation

4.1 Vehicle trip rates generated by the Proposed Development were provided by the project's transport consultants, Cannon Consulting Engineers. Following the submission of the Air Quality ES Chapter in September 2016, the traffic data has been updated. The new traffic dataset does not include Stage 4 (concrete block-making plant) which is no longer being included in the development scheme. The traffic data used in the damage costs calculation are summarised in Table 4.1.

**Table 4.1 Traffic Data used for Damage Costs Calculation**

Link Number	Daily Two Way Vehicle Flow Associated with Development (2020)		Link Length (km)*	Speed (km.hr <sup>-1</sup> )**
	Total Vehicles	HDV %		
1	141	77	11	48

Notes: (km.hr<sup>-1</sup>) = kilometres per hour

HDV = Heavy Duty Vehicle - vehicles greater than 3.5 t gross vehicle weight including buses

\*Based on the National Traffic Survey 2014/15 average trip length

\*\* Assumes UK average driving speed

4.2 The emissions (tonnes per year) of NO<sub>x</sub> and PM<sub>10</sub> from these vehicle movements were quantified using the Defra Emissions Factor Toolkit (EFT) version 8.

4.3 The (IGCB) damage costs factors (£ per tonne emitted) of those air pollutants relevant to this assessment are shown in Table 4.2 below.

**Table 4.2 IGCB Air Quality Damage Cost Factors (per Tonne), 2015 prices**

Pollutant	Central Estimate <sup>(1)</sup>	Sensitivities	
		Low Central Range <sup>(2)</sup>	High Central Range <sup>(2)</sup>
NO <sub>x</sub> (Transport Urban Small)	£18,182	£7,273	£29,091
PM (Transport Urban Small)	£41,850	£32,768	£47,557

<sup>(1)</sup>This estimate is intended for use only where a single point estimate is necessary and should always be accompanied by the central range.

<sup>(2)</sup>Variation between the central values reflects uncertainty about the lag between exposure and the associated health impact.

4.4 Table 4.3 shows how the additional willingness-to-pay uplift of 2% pa was applied in accordance with the guidance through to 2024 to encompass five years of operation from the first fully occupational year of 2020 (i.e. when Stage 3 is operational).

4.5 Table 4.4 shows, in tonnes per year, the emissions from the development traffic.

4.6 Table 4.5 summarises how these adjusted damage cost factors were applied to the scheme emissions to give an approximation of the annual damage cost of the scheme for the five year period from the first fully occupational year, 2020.

**Table 4.3 Willingness-to-pay Uplift of Air Quality Damage Cost Factors (£ per Tonne) from 2020 to 2024**

	Uplift Factor	NO <sub>x</sub>			PM <sub>10</sub>		
		Low Central Range (£)	Central Estimate (£)	High Central Range (£)	Low Central Range (£)	Central Estimate (£)	High Central Range (£)
<b>2020</b>	<b>1</b>	7,418	18,546	29,673	33,423	42,687	48,508
<b>2021</b>	<b>1.02<sup>1</sup></b>	7,567	18,917	30,266	34,092	43,541	49,478
<b>2022</b>	<b>1.02<sup>2</sup></b>	7,718	19,295	30,872	34,774	44,412	50,468
<b>2023</b>	<b>1.02<sup>3</sup></b>	7,873	19,681	31,489	35,469	45,300	51,477
<b>2024</b>	<b>1.02<sup>4</sup></b>	8,030	20,074	32,119	36,179	46,206	52,507

**Table 4.4 Development Traffic Emissions – Tonnes per Year**

Pollutant	Tonnes per year
NO <sub>x</sub>	0.574
PM <sub>10</sub>	0.061

**Table 4.5 Air Quality Damage Costs from 2020 to 2024 inclusive**

	NO <sub>x</sub>			PM <sub>10</sub>		
	Low Central Range (£)	Central Estimate (£)	High Central Range (£)	Low Central Range (£)	Central Estimate (£)	High Central Range (£)
<b>2020</b>	4,260	10,650	17,039	2046	2613	2969
<b>2021</b>	4,345	10,863	17,380	2087	2665	3028
<b>2022</b>	4,432	11,080	17,728	2128	2718	3089
<b>2023</b>	4,521	11,302	18,082	2171	2773	3151
<b>2024</b>	4,611	11,528	18,444	2214	2828	3214

4.7 The present values for NO<sub>x</sub> and PM<sub>10</sub> for the low central range, central estimate and high central range for the five year period from 2020 to 2024 inclusive have been summed to give the totals shown in Table 4.6.

**Table 4.6 Total Present Values for Air Pollution Damage from 2020 to 2024 inclusive**

	Total Present Value (£) (Low Central Range)	Total Present Value (£) (Central Estimate)	Total Present Value (£) (High Central Range)
NO <sub>x</sub>	22,169	55,422	88,674
PM <sub>10</sub>	10,646	13,597	15,451
Total	32,815	69,018	104,125

4.8 For the five year period from 2020 to 2024 (inclusive), the estimates of the total present value of the air quality impacts range from £32,815 to £104,125, with a central estimate of £69,018.

## **Assumptions and Limitations**

- 4.9 The Damage Cost calculation approach uses a simplified method to give an approximation. The method uses official damage factor estimates that assume national/regional average pathway (i.e. meteorological dispersion conditions, distance to receptors and population density). If the study area is markedly different from the average, the estimate will be inaccurate.
- 4.10 The other factor involved in the calculation is the scheme emissions. The reliability of the estimate is directly influenced by the accuracy of the predicted traffic flow data for the development, and the emissions factors provided by Defra.
- 4.11 It should be further noted that the Defra Damage Cost calculation method is currently undergoing revision in light of recent advances in knowledge and practice. This is likely to include lower damage cost factors for NO<sub>x</sub> than those still in the current method. Depending on the factors that are finally adopted, this imminent revision could significantly lower the magnitude of the damage cost calculated here.

## 5 Mitigation

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5.1 The *Air quality and emissions mitigation guidance for Sussex authorities (2013)* guidance also includes a list of mitigation options to be considered by the developer. This list is reproduced below.

- EV recharging infrastructure within the development (wall mounted or free standing in garage or off-street points).
- Car club provision or support to local car club/eV car club.
- Designation of parking spaces for low emission vehicles.
- Differential parking charges depending on vehicle emissions
- All commercial vehicles should comply with either current or previous European Emission Standard.
- Fleet operations should provide a strategy for considering reduced emissions, low emission fuels and technologies.
- Use of ultra-low emission service vehicles.
- Support local walking and cycling initiatives
- On-street EV recharging
- Contribution to low emission vehicle refuelling infrastructure
- Low emission bus service provision or wastecollection services
- Bike/e-bike hire schemes
- Contribution to renewable fuel and energy generation projects
- Incentives for the take-up of low emission technologies and fuels

5.2 The guidance continues by stating that the above list is not exhaustive and further options may be suggested where authorities feel it is appropriate, depending on the scale of development and air quality issues within an area. It states that the mitigation options selected for a development should be relevant and appropriate to:

- Any local policies including Air Quality Action Plans, which may determine the mitigation priorities for a scheme that the local authority may wish to see be incorporated within a particular scheme.
- Any local air quality concerns; to assist in the remediation of potential cumulative air pollution impacts of the development on the local community.
- The type, size and activity of the development.

- 5.3 It is reiterated that the October 2017 air quality assessment concluded that the residual impacts on the surrounding area would be categorised as negligible (using published best-practice descriptors) and the resulting effects would be not significant. No additional mitigation measures (over and above those incorporated into the scheme design) were therefore considered necessary or proportionate.
- 5.4 The development has already committed to
- ensuring that all Brett HGVs would have the latest Euro 6 low emissions engines; and
  - preparing and implementing a travel plan with monitoring.
- 5.5 These commitments have costs associated with them, which should be borne in mind when considering the Damage Costs estimates provided in section 4.
- 5.6 The development also already includes 35% of the output being transported by rail to reduce the number of traffic flows. The development would also reduce the distance travelled by HGVs by displacing aggregates transported from outside the Plan area and replace the bus depot recently on the site.

## 6 Conclusions

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- 6.1 The results of the Air Quality chapter submitted as part of the planning application for this development predicted that the residual air quality impacts associated with the operational phase of the development on the surrounding area are categorised as negligible and the resulting effects would be “*not significant*”. On that basis, no additional mitigation was recommended or considered necessary or proportionate.
- 6.2 As requested by Lewes District Council, RPS has carried out a monetary valuation of air quality impacts of the Newhaven Port development using the *Air quality and emissions mitigation guidance for Sussex authorities (2013)*.
- 6.3 The Damage Cost calculation gives an approximate monetary valuation based solely on the emissions of pollutants from the scheme, and involves the application of published average damage cost factors (£ per tonne emitted) that are generalised estimates derived from dispersion and exposure modelling across the UK. For the five year period from 2020 to 2024 (inclusive), the central estimate of the total value of the air quality impacts is £69,018. This estimate does not take into account the costs of mitigation already committed to, and resulting from the reduction in lorry miles driven when meeting the aggregate needs of the construction industry in the Plan Area, so care needs to be taken in the interpretation to avoid double counting.
- 6.4 Furthermore, it should be noted this estimation is subject to wide uncertainty; furthermore, Defra is currently revising the method to reflect recent advances in knowledge and is likely to include lower damage cost factors for NO<sub>x</sub>. Depending on the factors finally adopted, this imminent revision could significantly lower the magnitude of the damage cost calculated here.

## Glossary

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COMEAP	Committee on the Medical Effects of Air Pollution
Concentration-Response factor	Also known as the risk coefficient, it describes the change in health outcome (e.g. number of life years lost) in the pollution, per unit change in ambient pollutant concentration.
Damage Cost Calculation method	This gives an approximation based solely on the emissions of pollutants from the scheme and involves the application of published average damage cost factors (£ per tonne emitted) that are generalised estimates derived from dispersion and exposure modelling across the UK.
Effect	The consequences of an impact, experienced by a receptor
EfT	Defra's Emissions Factor Toolkit
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
IGCB	Interdepartmental Group on Costs and Benefits
Impact	The change in atmospheric pollutant concentration and/or dust deposition. A scheme can have an 'impact' on atmospheric pollutant concentration but no effect, for instance if there are no receptors to experience the impact.
Impact Pathway (I-PA) approach	This takes local factors (location of emissions, meteorology and population patterns) into account, and applies concentration-response factors to the results of air pollution modelling of population exposure, to estimate the change in health outcome (e.g. number of life-years lost to the population), which is then valued using IGCB prices.
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PHE	Public Health England
Receptor	A person, their land or property and ecologically sensitive sites that may be affected by air quality.
WHO	World Health Organisation

## References

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- 1 Communities and Local Government, March 2012, National Planning Policy Framework
- 2 HM Treasury and Defra, *Valuing Impacts on Air Quality: Supplementary Green Book Guidance*, May 2013.
- 3 Defra, *Air Quality Appraisal – Damage Cost Methodology*, Interdepartmental Group on Costs and Benefits Air Quality Subject Group, February 2011.
- 4 Defra, *Valuing Impacts on Air Quality: Updates in valuing changes in emissions of Oxides of Nitrogen (NO<sub>x</sub>) and concentrations of Nitrogen Dioxide (NO<sub>2</sub>)*, September 2015.



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