USKMOUTH POWER STATION DEVELOPMENT

ENVIRONMENTAL STATEMENT

TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (WALES) REGULATIONS 2017

ON BEHALF OF SIMEC USKMOUTH POWER LTD.

Air Quality Appendices

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Prepared by:
RPS
Mark Barrett
Associate
20 Western Avenue
Milton Park
Abingdon
Oxon
OX14 4SH
T 01235 821888
E Barrettm@rpsgroup.com

Prepared for:
Simec Atlantis Energy Ltd.
Cara Donovan
Senior Environment and Consents Manager
4th floor, Edinburgh Quay 2,
139 Fountainbridge,
Edinburgh,
EH3 9QG
T 07469 854528
E cara.donovan@simecatlantis.com

GLOSSARY

Term	Definition
ACT	Advanced Conversion Technology power plant
ADMS	Atmospheric Dispersion Modelling System
AOD	Above Ordnance Datum
APC	Air Pollution Control
AQMA	Air Quality Management Areas
BAT	Best Available Technique
BGS	British Geological Survey
BS	British Standard
BSI	British Standard Institute
CCGT	Combined Cycle Gas Turbine
CERC	Cambridge Environmental Research Consultants
CIEEM	Chartered Institute of Ecology and Environmental Management
CRTN	Calculation of Road Traffic Noise
DCLG	Department for Communities and Local Government
DMRB	Design Manual for Roads and Bridges
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EfW	Energy from Waste
EMF	Electromagnetic Fields
EPUK	Environmental Protection UK
ES	Environmental Statement
FEED	Front End Engineering Design
FGT	Flue Gas Treatment
FRA	Flood Risk Assessment
GGAT	Glamorgan Gwent Archaeological Trust
GHG	Greenhouse Gasses
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
IEA	Institute of Environmental Assessment
IED	Industrial Emissions Directive
IEFs	Important Ecological Features
LAQM	Local Air Quality Management
LCP	Large Combustion Plant
LDP	Newport Local Development Plan
LHV	Lower Heating Value
LVIA	Landscape and Visual Impact Assessment
NCC	Newport City Council
NLCAs	National Landscape Character Areas
NOx	Oxides of Nitrogen
NRW	Natural Resources Wales
NSR	Noise Sensitive Receptors
PROW	Publics Rights of Way
SRF	Solid Recovered Fuel
SUP	Simec Uskmouth Power Limited
ZTV	Zone of Theoretical Visibility
ZVI	Zone of Visual Influence

Contents

Tables

Appendix 12.1
Air Quality Planning Policy Context

Regulatory and Policy Framework

There are three main aspects to the regulatory framework affecting potentially-polluting developments; the planning process determines whether and where the development can be located; building regulations control the design and construction of developments; and once built, regulation of pollution from the operation of certain prescribed processes is by the Environmental Permitting Regulations or by nuisance provisions for premises not operating prescribed processes. The relevant parts of the framework of pollution regulation, planning policy and relevant guidance are summarised below.

Planning Policy Context

Planning Policy Framework

Current land use policies for Wales are set out in Planning Policy Wales (Edition 10, December 2018). This document is intended to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales; and to provide a strategic policy framework to assist local authorities in the preparation of their development plans. Planning Policy Wales (PPW) is supported by Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters. Planning authorities may use planning conditions or obligations to meet planning aims to protect the environment. PPW, the TANs and Circulars may be material to decisions made on individual planning applications and will be taken into account by the Secretary of State and his Inspectors in the determination of called-in planning applications and appeals.

Chapter 6: Distinctive & Natural Places of the PPW concerns minimising and managing environmental risks and pollution. Section 6.7 focuses on Air Quality and Soundscape and states in paragraphs 6.7.6 to 6.7.10:

"*In proposing new development, planning authorities and developers must, therefore:*

A.1 address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;

A.2 not create areas of poor air quality or inappropriate soundscape; and

A.3 seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer.

Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

A.4 traffic management and road safety;

A.5 ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;

A.6 supporting low or zero emissions public transport;

A.7 providing active travel infrastructure; and

A.8 incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.

When proposing new strategies for development and when allocating sites in development plans it will be important to avoid instances where incremental development of infrastructure, housing, commercial and industrial development creates or exacerbate health and amenity inequalities by introducing more sensitive receptors into an area or by making existing occupiers more vulnerable to poor air quality or noise. This may particularly be the case when proposing high density developments adjacent to transport hubs or where development pressure to meet short-term needs may have detrimental long-term effects and care must be taken not to exacerbate health inequalities whilst recognising accessibility needs.

Taking a sustainable approach will mean balancing short-term needs against long-term objectives to reduce public exposure to airborne pollution and giving particular consideration to the presence of air quality management areas, noise action planning priority areas and areas with sensitive receptors when proposing new development and particularly when preparing development plans. It will be important to identify wider mitigation solutions to reduce air and noise pollution and to avoid exacerbating problems in existing air quality management areas or noise hotspots through the provision of green infrastructure identified as part of Green Infrastructure Assessments, by the provision of electric vehicle charging infrastructure or through promoting the need to consider effective design solutions. Planning authorities should work closely with bodies such as the Public Service Boards in the preparation of their well-being plans and seek input from their own Environmental Health departments".

PPW recognises that transport emissions contribute significantly to climate change and poor local air quality, which can in turn affect people's health. TAN 18 on Transport [1] elaborates further on traffic growth and its implications on the UK's ability to meet objectives for greenhouse gas emissions and for air quality. It advises that local planning authorities should therefore take into account statutory air quality objectives together with the outcomes of reviews and assessments any Air Quality Action Plans that may have been prepared.

The goal of the transport strategy One Wales: Connecting the Nation [2] is to promote sustainable transport networks that safeguard the environment while strengthening the country's economic and social life. The transport strategy identifies a series of high-level outcomes. Outcome 14 is to *"Reduce the contribution of transport to air pollution and other harmful emissions".* A measure of success for this outcome will be emissions of harmful pollutants attributable to the transport sector and the number of AQMAs designated due to vehicle emissions.

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1 Planning Policy Wales (March 2007) Technical Advice Note 18: Transport

2 Welsh Assembly Government, 2008, One Wales: Connecting the Nation

Newport City Council's Local Development Plan

The Newport Local Development Plan 2011 – 2026 was adopted in January 2015 and sets out policies up to 2026. There are four policies relevant to this proposed development.

GP2 General Development Principles – General Amenity

"Development will be permitted where, as applicable:

i) There will not be a significant adverse effect on local amenity, including in terms of noise, disturbance, privacy, overbearing, light, odour and air quality…"

GP4 General Development Principles – Highways and Accessibility

"Development proposals should:

…iii) be designed to avoid or reduce transport severance, noise and air pollution…"

GP7 General Development Principles – Environmental Protection and Public Health

"Development will not be permitted which would cause or result in unacceptable harm to health because of land contamination, dust, instability or subsidence, air, hear, noise or light pollution…"

W2 Waste Management Proposals

"Development proposals for sustainable waste management facilities will be permitted provided that:

…iv) there is no impact on amenity through noise, air pollution, odours, dust and emissions that cannot be appropriately controlled by mitigation measures…"

Appendix 12.2
Baseline Conditions

Nitrogen Dioxide

Local Monitoring Data

There is one local monitoring station where urban background concentrations are measured using a continuous automatic instrument. NCC monitors NO_2 at the St Julian's urban background location. The most recently measured annual-mean concentrations are presented in Table 12.2.1.

Table 12.2.1: Automatically Monitored Annual-Mean Background Concentration (μg.m^{-3})

Monitor	Approx. Distance from Application Site (km)	Pollutant	Concentration (μg.m^{-3})					
			2013	2014	2015	2016	2017	Average
St Julian's	5.9	NO_2	23.1	22.4	21.0	22.0	21.0	21.9

Defra Mapped Concentration Background Estimates

Defra's total annual-mean NO_2 concentration estimates have been collected for the 1 km grid squares of the monitoring site and the Application Site are summarised in Table 12.2.2.

Table 12.2.2: Defra Mapped Annual-Mean Background NO_2 Concentration Estimates (μg.m^{-3})

Site	Approx. Distance from Application Site (km)	Concentration (μg.m^{-3})	
		Range of Monitored	Estimated Defra Mapped (2017)
Application Site	-	-	9.9
St Julian's	5.9	21.0 - 23.1	22.7

For NO_2, the Defra mapped concentration estimate of 22.7 μg.m^{-3} at St Julian's is within the range of measured concentrations and above the average measured concentration of 21.9 μg.m^{-3}. This indicates that the Defra mapped concentration may be representative of the area. However, the Defra mapped concentration at the Application Site, 9.9 μg.m^{-3}, is well below the measured concentrations. To ensure the assessment is conservative, the background annual-mean NO_2 concentration has been derived from the highest concentration of 23.1 μg.m^{-3}, measured in 2013.

Heavy Metals

The Heavy Metals Network monitors the concentrations in air, and the deposition rates of a range of metallic elements at urban, industrial and rural sites.

The nearest monitoring site to the Application Site is the Port Talbot, Margam urban industrial site. Monitored concentrations up to 2018 are provided in Table 12.2.3.

Table 12.2.3: Measured Metals Concentrations (ng.m^{-3})

Metal	2013	2014	2015	2016	2017	2018	Maximum
As	0.61	0.66	0.66	0.72	0.74	0.81	0.81
Co	0.16	0.20	0.28	0.20	0.22	0.22	0.28

Mn	45.93	45.94	38.07	29.58	34.14	33.36	45.94
Ni	1.70	1.78	4.99	3.63	1.34	1.59	4.99

The maximum concentration of each heavy metal from the monitoring period has been used in this assessment.

Polycyclic Aromatic Hydrocarbons

The polycyclic aromatic hydrocarbon (PAH) network monitors ambient concentrations of PAHs at 31 sites in the UK. At the most sites, only solid PAHs are monitored; both gaseous and solid PAHs are only monitored at two locations.

The nearest sites monitoring solid PAHs are Newport St Julian's and Cardiff Lakeside. The nearest sites monitoring both gaseous and solid PAHs are Auchencorth Moss and Harwell.

Measurements at all five monitoring sites are compared in Table 12.2.4.

Table 12.2.4: Annual-mean PAHs Concentrations (ng.m^{-3})

Site Name	2014	2015	2016	2017	2018	Average
Newport St Julian's	0.2	0.19	0.25	0.19	0.16	0.20
Cardiff Lakeside	0.2	0.18	0.2	0.2	0.2	0.20
Auchencorth Moss (solid and vapour)	0.03	-	-	-	-	0.03
Harwell (solid and vapour)	0.04	-	-	-	-	0.04

Although only PAHs in the solid phase are measured at the two closest sites (Newport St Julian's and Cardiff Lakeside), the measurements are typically higher than the measurements at Harwell and Auchencorth Moss which include the gaseous phase. The average monitored concentration of 0.20 ng.m^{-3} at Newport St Julian's and Cardiff Lakeside has therefore been used within the assessment.

Appendix 12.3
Construction Dust Methodology and Assessment

Methodology

Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter (British Standard Institute, 1983). Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.

The effects of dust are linked to particle size and two main categories are usually considered:

A.9 PM_{10} particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and

A.10 Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites.

The Institute of Air Quality Management (IAQM) *Guidance on the assessment of dust from demolition and construction* (IAQM, 2014) sets out 350 m as the distance from the site boundary and 50 m from the site traffic route(s) up to 500 m of 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.

Concentration-based limit values and objectives have been set for the PM_{10} suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or World Health Organisation (WHO) level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

The IAQM dust guidance aims to estimate the impacts of both PM_{10} and dust through a risk-based assessment procedure. The IAQM dust guidance document states: *"The impacts depend on the mitigation measures adopted. Therefore the emphasis in this document is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified."*

The IAQM dust guidance provides a methodological framework, but notes that professional judgement is required to assess effects: *"This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also a wide range of factors affect the amount of dust that may arise, and these are not readily quantified."*

Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the development, using the well-established source-pathway-receptor approach:

A.11 The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.

A.12 The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.

Source

The IAQM dust guidance (IAQM, 2014) gives examples of the dust emission magnitudes for demolition, earthworks and construction activities and trackout. These example dust emission magnitudes are based on the site area, building volume, number of Heavy Duty Vehicle (HDV) movements generated by the activities and the materials used. These example magnitudes have been combined with details of the period of construction activities to provide the ranking for the source magnitude that is set out in Table 12.3.1.

Table 12.3.1: Risk Allocation – Source (Dust Emission Magnitude)

Features of the Source of Dust Emissions	Dust Emission Magnitude
Demolition - building over 50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 20 m above ground level. **Earthworks** – total site area over 10,000 m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved > 100,000 tonnes. **Construction** - total building volume over 100,000 m^3, activities include piling, on-site concrete batching, sand blasting. Period of activities more than two years. **Trackout** – 50 HDV outwards movements in any one day, potentially dusty surface material (e.g. High clay content), unpaved road length > 100 m.	Large
Demolition - building between 20,000 to 50,000 m^3, potentially dusty construction material and demolition activities 10 - 20 m above ground level. **Earthworks** – total site area between 2,500 to 10,000 m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8 m in height, total material moved 20,000 to 100,000 tonnes. **Construction** - total building volume between 25,000 and 100,000 m^3, use of construction materials with high potential for dust release (e.g. concrete), activities include piling, on-site concrete batching. Period of construction activities between one and two years. **Trackout** – 10 - 50 HDV outwards movements in any one day, moderately dusty surface material (e.g. High clay content), unpaved road length 50 – 100 m.	Medium
Demolition - building less than 20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 10 m above ground, demolition during winter months. **Earthworks** – total site area less than 2,500 m^2. Soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 10,000 tonnes earthworks during winter months. **Construction** - total building volume below 25,000 m^3, use of construction materials with low potential for dust release (e.g. metal cladding or timber). Period of construction activities less than one year. **Trackout** – < 10 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.	Small

Pathway and Receptor - Sensitivity of the Area

Pathway means the route by which dust and particulate matter may be carried from the source to a receptor. The main factor affecting the pathway effectiveness is the distance from the receptor to the source. The orientation of the receptors to the source compared to the prevailing wind direction is a relevant risk factor for long-duration construction projects; however, short-term construction projects may be limited to a few months when the most frequent wind direction might be quite different, so adverse effects can potentially occur in any direction from the site.

As set out in the IAQM dust guidance, a number of attempts have been made to categorise receptors into high, medium and low sensitivity categories; however there is no unified sensitivity classification scheme that covers the quite different potential effects on property, human health and ecological receptors.

Table 12.3. 2 and Table 12.3.3 set out the IAQM basis for categorising the sensitivity of people and property to dust and PM_{10} respectively.

Table 12.3.2: Sensitivities of People and Property Receptors to Dust

Receptor	Sensitivity
Principles: Users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land. Indicative Examples: Dwellings. Museums and other culturally important collections. Medium and long-term car parks and car showrooms.	High
Principles: Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Indicative Examples: Parks. Places of work.	Medium
Principles: the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative Examples: Playing fields, farmland (unless commercially-sensitive horticultural). Footpaths and roads. Short-term car parks.	Low

Table 12.3.3: Sensitivities of People and Property Receptors to PM_{10}

Receptor	Sensitivity
Principles: Locations where members of the public are exposed over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative Examples: Residential properties. Schools, hospitals and residential care homes.	High
Principles: Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM_{10}, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative Examples: Office and shop workers (but generally excludes workers occupationally exposed to PM_{10} as protection is covered by Health and Safety at Work legislation).	Medium
Principles: Locations where human exposure is transient exposure. Indicative Examples: Public footpaths. Playing fields, parks. Shopping streets.	Low

The IAQM methodology combines consideration of the pathway and receptor to derive the 'sensitivity of the area'. Table 12.3.4, Table 12.3.5 and Table 12.3.6 show how the sensitivity of the area has been derived for this assessment.

Table 12.3.4: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors [a]	Distance from the Source (m) [b]			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

a The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

b For trackout, the distances have been measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and trackout impacts have only been considered up to 50 m from the edge of the road.

Table 12.3.5: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration [a]	Number of Receptors [b, c]	Distance from the Source (m) [d] <20	<50	<100	<200	<350
High	> 32 µg.m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg.m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 - 28 µg.m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	< 24 µg.m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	> 32 µg.m^{-3}	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32 µg.m^{-3}	> 10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	< 28 µg.m^{-3}	>1	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

a This refers to the background concentration derived from the assessment of baseline conditions later in this report. The concentration categories listed in this column apply to England, Wales and Northern Ireland but not to Scotland.

b The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

c For high sensitivity receptors with high occupancy (such as schools or hospitals), the approximate number of occupants has been used to derive an equivalent number of receptors.

d For trackout, the distances have been measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and trackout impacts have only been considered up to 50 m from the edge of the road.

Table 12.3.6: Sensitivities of Ecological Receptors to Dust

Receptor	Sensitivity
Principles: Locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. Indicative Examples: Special Area of Conservation (SAC) designated for acid heathlands adjacent to the demolition of a large site containing concrete (alkali) buildings or for the presence of lichen.	High
Principles: Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition. Indicative Examples: Site of Special Scientific Interest (SSSI) with dust sensitive features.	Medium
Principles: Locations with a local designation where the features may be affected by dust deposition. Indicative Examples: A Local Nature Reserve with dust sensitive features	Low

The IAQM dust guidance (IAQM, 2014) lists the following additional factors that can potentially affect the sensitivity of the area and, where necessary, professional judgement has been used to adjust the sensitivity allocated to a particular area:

A.13 any history of dust generating activities in the area;

A.14 the likelihood of concurrent dust generating activity on nearby sites;

A.15 any pre-existing screening between the source and the receptors;

A.16 any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which the works will take place;

A.17 any conclusions drawn from local topography;

A.18 duration of the potential impact, as a receptor may become more sensitive over time; and

A.19 any known specific receptor sensitivities which are considered go beyond the classifications given in the table above.

The matrices in Table 12.3.7, Table 12.3.8, Table 12.3.9 and Table 12.3.10 have been used to assign the risk for each activity to determine the level of mitigation that should be applied. For those cases where the risk category is 'negligible', no mitigation measures are required beyond those mandated by legislation.

Table 12.3.7: Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk

Low	Medium Risk	Low Risk	Negligible

Table 12.3.8: Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 12.3.9: Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 12.3.10: Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Dust Risk Assessment

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.

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.

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 normally 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, 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

No demolition will occur on site so has not been considered further.

The site area is greater than 10,000 m^2, however earthworks will not occur on the majority of the site. The dust emission magnitude for the earthworks phase is classified as large.

The total volume of the buildings to be constructed would be greater than 100,000 m^3, the dust emission magnitude for the construction phase is classified as large.

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

Table 12.3.11: Dust Emission Magnitude for Earthworks, Construction and Trackout

Earthworks	Construction	Trackout
Large	Large	Large

Pathway and Receptor - Sensitivity of the Area

All earthworks and construction activities are assumed to occur within the 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. The sensitivity of the area has been classified and the results are provided in Table 12.3.12 below.

Table 12.3.12: Sensitivity of the Surrounding Area for Earthworks and Construction

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Low	RSPB Newport Wetlands footpaths (low sensitivity receptor) within 350 m of earthworks and construction areas. ()
Human Health	Low	RSPB Newport Wetlands footpaths (low sensitivity receptor) within 350 m of earthworks and construction areas ()
Ecological	-	There are no sites designated for their ecological importance within 50 m of earthworks and construction areas.

The Dust Emission Magnitude for trackout is classified as large and trackout may occur on roads up to 500 m from the site. The sensitivity of the area has been classified and the results are provided in Table 12.3.12.

Table 12.3.13: Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Low	RSPB Newport Wetlands footpaths (low sensitivity receptor) within 50 m of the roads (Table 12.3.4)
Human Health	Low	RSPB Newport Wetlands footpaths (low sensitivity receptor) within 50 m of the roads (Table 12.3.5)
Ecological	Medium	Newport Wetlands SSSI within 20 m of roads (Table 12.3.6)

Overall Dust Risk

The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area (Table 12.3.7 to Table 12.3.10) to give the Dust Impact Risk. Table 12.3.14 summarises the Dust Impact Risk for the three activities.

Table 12.3.14: Dust Impact Risk for Earthworks, Construction and Trackout

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

Taking the site as a whole, the overall risk is deemed to be low. The mitigation measures appropriate to a level of risk for the site as a whole and for each of the phases are set out in Table 12.13 of Chapter 12: Air Quality of this ES.

Provided this package of mitigation measures is implemented, the residual construction dust effects will not be significant. The IAQM dust guidance (IAQM, 2014) 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.

References

British Standard Institute (1983) BS 6069:Part 2:1983, ISO 4225-1980 Characterization of air quality. Glossary

IAQM (2014) Guidance on the assessment of dust from demolition and construction

Appendix 12.4
Stack Height Determination

Overview

A stack height determination has been undertaken to establish the height at which there is minimal additional environmental benefit associated with the cost of further increasing the height of the stack. The Environment Agency removed their detailed guidance, Horizontal Guidance Note EPR H1 [3], for undertaking risk assessments on 1 February 2016; however, the approach used here is consistent with that EA guidance which required the identification of "*an option that gives acceptable environmental performance but balances costs and benefits of implementing it*".

Methodology

Model simulations have been run using ADMS 5 to determine what stack height is required to provide adequate dispersion/dilution and to overcome local building wake effects.

The stack height determination considers ground level concentrations over the averaging periods relevant to the air quality assessment, together with the full range of all likely meteorological conditions through the use of five years (2014 to 2018) of hourly sequential meteorological data from Rhoose. A complex terrain file was also used within the model. The model was run for a range of stack heights between 110 m and 130 m, in 2 m increments.

Concentrations have also been modelled across a coarse 20 km by 20 km grid, with a spacing of 100 m. Results have been reported for the location where the highest concentration is predicted and for the worst-case meteorological conditions.

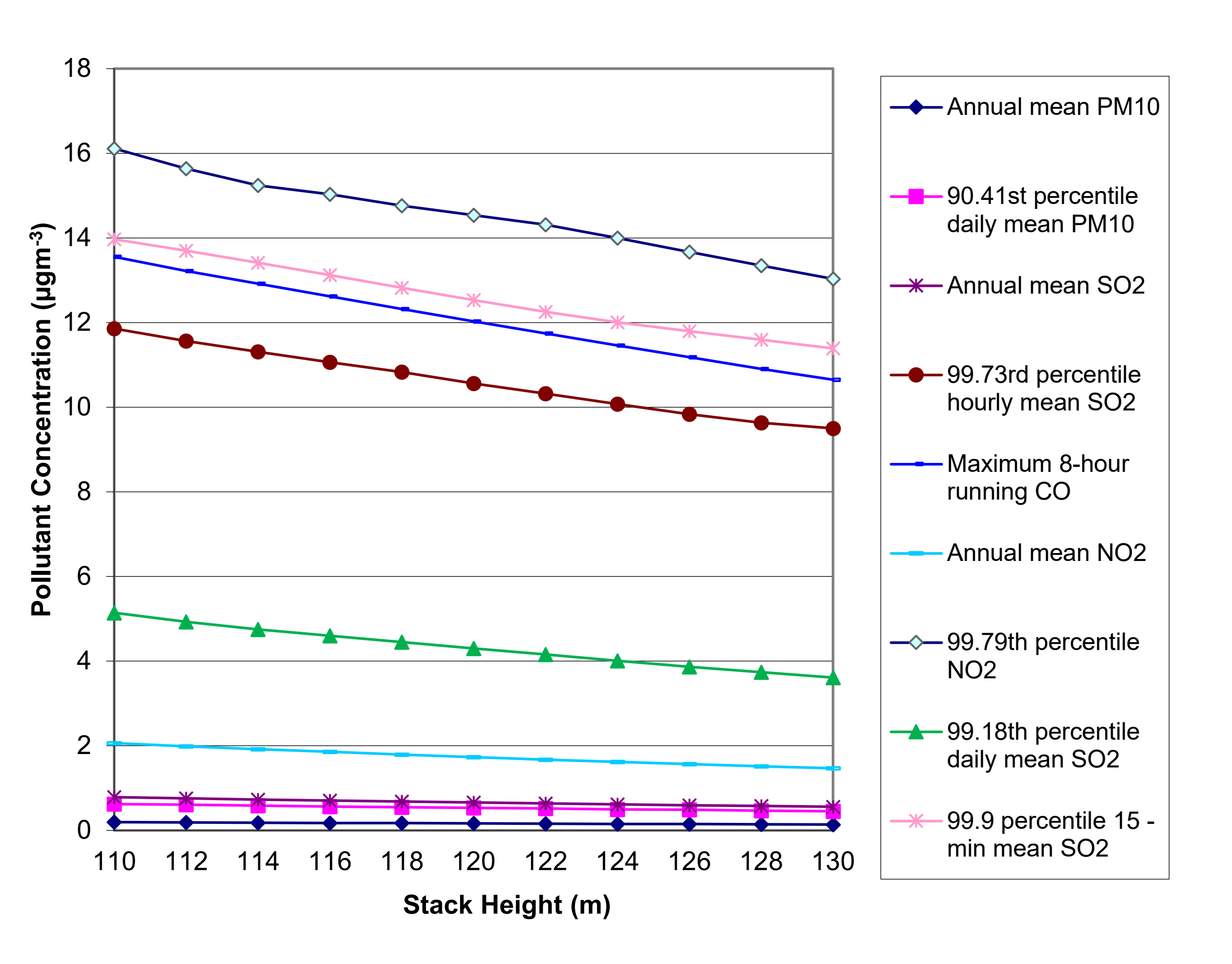
Stack Height Determination Results

The stack height modelling results have been analysed in two stages as discussed below.

Stage 1 - The maximum predicted Process Contributions (PCs) have been plotted against height to determine if there is a height at which no benefit is gained from increases in stack heights.

3 Environment Agency (2010) Environmental Permitting Regulations (EPR) – H1 Environmental Risk Assessment, Annex K

Graph 12.4.1: Maximum Predicted Process Contributions vs Stack Height



The graphs do not show the ground-level Process Contribution levelling off within the range of heights considered. The graphs indicate that the point at which there are no further potential benefits in increasing the stack height has not been reached by 130 m.

Stage 2 – The online EA guidance entitled '*Environmental management – guidance, Air emissions risk assessment for your environmental permit'* [4]] is for risk assessments and provides details for screening out substances for detailed assessment. In particular, it states that:

"*To screen out a PC for any substance so that you don't need to do any further assessment of it, the PC must meet both of the following criteria:*

A.20 the short-term PC is less than 10% of the short-term environmental standard

A.21 the long-term PC is less than 1% of the long-term environmental standard

If you meet both of these criteria you don't need to do any further assessment of the substance.

If you don't meet them you need to carry out a second stage of screening to determine the impact of the PEC."

The PEC refers to the Predicted Environmental Concentration calculated as the PC added to the Ambient Concentration (AC).

4 Environment Agency 2019, Environmental management – guidance. Air emissions risk assessment for your environmental permit. .gov.uk website: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#environmental-standards-for-air-emissions.

The on-line EA guidance continues by stating that:

"You must do detailed modelling for any PECs not screened out as insignificant."

It then states that further action may be required where:

"*your PCs could cause a PEC to exceed an environmental standard (unless the PC is very small compared to other contributors – if you think this is the case contact the Environment Agency)*

the PEC is already exceeding an environmental standard"

On that basis, the stack height has been determined as the height at which the effects are not considered significant, i.e. the height at which:

A.22 the short-term PC is less than 10 % of the short-term Environmental Assessment Level (EAL) or the PEC is below the EAL; and

A.23 the long-term PC is less than 1 % of the long-term EAL or the PEC is below the EAL.

Table 12.4.1 provides the maximum predicted PC and Table 12.4.2 provides the maximum predicted PC as a percentage of the EAL.

Table 12.4.1: Maximum Predicted Process Contributions (µg.m^{-3}) at each Stack Height Modelled

Height (m)	Concentration (µg.m^{-3})									
	Annual-mean PM_{10}	90.41st percentile daily mean PM_{10}	Maximum hourly HCl	Annual mean SO_2	99.73rd percentile hourly mean SO_2	Maximum 8-hour running CO	Annual-mean NO_2	99.79th percentile NO_2	99.18th percentile daily mean SO_2	99.9th percentile 15-minute mean SO_2
110	0.10	0.31	3.21	0.79	11.86	13.55	2.06	16.11	5.14	13.97
112	0.09	0.30	3.14	0.76	11.57	13.22	1.99	15.64	4.93	13.70
114	0.09	0.29	3.08	0.73	11.31	12.92	1.92	15.24	4.75	13.42
116	0.09	0.28	3.03	0.71	11.06	12.62	1.86	15.03	4.60	13.12
118	0.09	0.27	2.96	0.68	10.83	12.32	1.79	14.76	4.45	12.83
120	0.08	0.27	2.92	0.66	10.56	12.03	1.73	14.54	4.30	12.53
122	0.08	0.26	2.88	0.64	10.32	11.74	1.68	14.31	4.15	12.25
124	0.08	0.25	2.83	0.62	10.08	11.46	1.62	14.00	4.01	12.01
126	0.07	0.24	2.79	0.60	9.84	11.18	1.57	13.67	3.87	11.80
128	0.07	0.24	2.75	0.58	9.63	10.90	1.52	13.35	3.74	11.59
130	0.07	0.23	2.72	0.56	9.50	10.65	1.47	13.03	3.61	11.39

Table 12.4.2: Maximum Predicted Process Contributions as a Percentage of the Relevant EAL at each Stack Height Modelled

Environmental Assessment Level ($\mu g.m^{-3}$)	Percentage of Environmental Assessment Level (%)									
	40	50	750	50	350	10000	40	200	125	266
Height (m)	Annual-mean PM_{10}	90.41st percentile daily mean PM_{10}	Maximum hourly HCl	Annual mean SO_2	99.73rd percentile hourly mean SO_2	Maximum 8-hour running CO	Annual mean NO_2	99.79th percentile NO_2	99.18th percentile daily mean SO_2	99.9th percentile 15-minute mean SO_2
110	0	1	0	2	3	0	5	8	4	5
112	0	1	0	2	3	0	5	8	4	5
114	0	1	0	1	3	0	5	8	4	5
116	0	1	0	1	3	0	5	8	4	5
118	0	1	0	1	3	0	4	7	4	5
120	0	1	0	1	3	0	4	7	3	5
122	0	1	0	1	3	0	4	7	3	5
124	0	0	0	1	3	0	4	7	3	5
126	0	0	0	1	3	0	4	7	3	4
128	0	0	0	1	3	0	4	7	3	4
130	0	0	0	1	3	0	4	7	3	4

Cells are shaded grey where the predicted process contribution is above 1% (for long-term concentrations) or 10% (for short-term concentrations) of the EAL.

Discussion

The results in indicate that there are no heights below 130 m at which the impacts can be screened-out as insignificant based on the PC alone for all pollutants.

In particular, the maximum predicted PC for annual-mean NO_2 is above 1% at all heights. If the maximum predicted PC for NO_2 are ignored, the maximum PCs do not exceed 1% and 10% for long- and short-term impacts respectively at heights of 110 m and above.

The proposal is to use the existing 122 m stack at Uskmouth Power Station. The results in Section 4 are based on this stack height of 122 m. For annual-mean NO_2, the PEC for a 122 m stack is 24.8 $\mu g.m^{-3}$ (see Chapter 12: Air Quality, Table 12.14) which is well below the EAL. On that basis, the existing stack height of 122 m is considered to be acceptable.

Appendix 12.5
Air Quality Impacts on Designated Habitat Sites

The air quality impacts at thirty habitat sites within 15 km of the stack have been assessed and the results presented in this appendix.

Air quality impacts were assessed at:

A.24 Coed-Y-Darren SSSI (Site of Special Scientific Interest)
A.25 Dan Y Graig SSSI
A.26 Gwent Levels – Magor and Undy SSSI
A.27 Gwent Levels – Nash and Goldcliff SSSI
A.28 Gwent Levels – Redwick and Llandevenny SSSI
A.29 Gwent Levels – Rumney and Peterstone SSSI
A.30 Gwent levels - St Brides SSSI
A.31 Gwent levels – Whitson SSSI
A.32 Gwlyptiroedd casnewdd/ Newport Wetlands SSSI
A.33 Henllys Bog SSSI
A.34 Langstone-Llanmartin Meadows SSSI
A.35 Llandegfedd Reservoir SSSI
A.36 Magor Marsh SSSI
A.37 Parc Seymour Woods SSSI
A.38 Penhow Woodlands SSSI
A.39 Plas Machan Wood SSSI
A.40 Rectory Meadow – Rogiet SSSI
A.41 River Usk SSSI
A.42 River Usk Special Area of Conservation (SAC)
A.43 Ruperra Castle and Woodlands SSSI
A.44 Severn Estuary (England) SAC
A.45 Severn Estuary (Wales) SAC
A.46 Severn Estuary SSSI
A.47 Severn Estuary Special Protection Area (SPA)

The following sites within 15 km of the stack are not sensitive to air quality and have not been considered further.

A.48 Brook Cottage, Llangybi Site of Special Scientific Interest (SSSI)
A.49 Cilwrgi Quarry SSSI
A.50 Lisvane Reservoir SSSI
A.51 Penylan Quarry SSSI
A.52 Rhymney River Section SSSI
A.53 Rumney Quarry SSSI

Modelling was undertaken across a grid of points with a spacing of 100 m within each habitat site and the maximum modelled concentration within each habitat site are presented in this appendix.

Critical Levels

Critical levels are maximum atmospheric concentrations of pollutants for the protection of vegetation and ecosystems and are specified within relevant European air quality directives and corresponding UK air quality regulations. Process Contributions (PCs) and Predicted Environmental Concentrations (PECs) of NOx, SO_2 and NH_3 have been calculated for comparison with the relevant annual-mean critical level.

Background concentrations of NO_x, SO_2 and NH_3 at each designated site have been derived from the UK Air Pollution Information System (APIS) database [5].

Critical Loads

Critical loads refer to the quantity of pollutant deposited, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

Critical Loads – Nutrient Nitrogen Deposition

Percentage contributions to nutrient nitrogen deposition have been derived from the results of the Atmospheric Dispersion Modelling System (ADMS) dispersion modelling. Deposition rates have been calculated using empirical methods recommended by the EA, as follows:

The deposition flux ($\mu g.m^{-2}.s^{-1}$) has been calculated by multiplying the ground level NO_2 and *NH_3* concentrations ($\mu g.m^{-3}$) by the deposition velocity. The EA guidance provides deposition velocities of 0.0015 $m.s^{-1}$ for short habitats and 0.003 $m.s^{-1}$ for forests for NO_2 and 0.02 $m.s^{-1}$ for short habitats and 0.03 $m.s^{-1}$ for forests for *NH_3.*

Units of $\mu g.m^{-2}.s^{-1}$ have been converted to units of $kg.ha^{-1}.year^{-1}$ by multiplying the dry deposition flux by the standard conversion factor of 96 for NOx and the wet deposition flux by 259.7 for *NH_3.*

Predicted contributions to nitrogen deposition have been calculated and compared with the relevant critical load range for the habitat types associated with the designated site. These have been derived from the APIS database. Where no 'site relevant critical loads' are available in the APIS database, site specific data has been sourced from the APIS database for the location instead. Data sourced from the location are shown with an asterisk in the tables in this appendix.

Critical Loads – Acidification

The acid deposition rate, in equivalents $keq.ha^{-1}.year^{-1}$, has been calculated by multiplying the dry deposition flux ($kg.ha^{-1}.year^{-1}$) by a conversion factor of 0.071428 for N and adding the deposition rate for S. The acid deposition rate for S has been calculated by multiplying the ground level SO_2 concentration by the deposition velocity to derive the deposition flux $\mu g.m^{-2}.s$. For short habitats this is 0.012 $m.s^{-1}$ and for forests it is 0.024 $m.s^{-1}$. This has then been multiplied by a conversion factor of 157.7 and 0.0625 (i.e. 9.86) to determine the acid deposition arising from S ($keq.ha^{-1}.year^{-1}$). This takes into account the degree to which a chemical species is acidifying, calculated as the proportion of N within the molecule.

Wet deposition in the near field is not significant compared with dry deposition for N [6] and therefore for the purposes of this assessment, wet deposition has not been considered.

Predicted contributions to acid deposition have been calculated and compared with the minimum critical load function for the habitat types associated with each designated site as derived from the APIS database.

Significance Criteria

The PCs and PECs have been compared against the relevant critical level/load for the relevant habitat type/interest feature. Based on current Environment Agency guidelines [7] and the Institute of Air Quality

5 Air Pollution Information Systems, www.apis.ac.uk. Accessed October 2019.

6 Approaches to modelling local nitrogen deposition and concentrations in the context of Natura 2000 - Topic 4

7 https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#screening-for-protected-conservation-areas

Management *A guide to the assessment of air quality impacts on designated nature conservation sites* [8] the following criteria have been used to determine if the impacts are significant:

A.54 If the PC does not exceed 1% of relevant critical level/load the emission is considered not significant; and

A.55 If the PC exceeds 1% but the resulting PEC is below 100% of the relevant critical level/load, the emission is not considered significant.

Results

The predicted annual-mean concentrations for NOx, SO_2 and NH_3 are compared with the relevant critical levels in Table 12.5.1, Table 12.5.2 and Table 12.5.3. The predicted nutrient N deposition rate is compared with the critical load in Table 12.5.4 and the predicted acid deposition rate is compared with the critical load in Table 12.5.5.

The predicted daily-mean concentrations for NOx are compared with the relevant critical levels in Table 12.5.6.

8 IAQM (2019) A guide to the assessment of air quality impacts on designated nature conservation sites

Table 12.5.1: Predicted Annual-Mean NOx Concentrations at Designated Habitat Sites

Habitat Site	Critical Level ($\mu g.m^{-3}$)	PC ($\mu g.m^{-3}$)	PC/Critical Level (%)	Ambient Concentration ($\mu g.m^{-3}$)	PEC ($\mu g.m^{-3}$)	PEC/ Critical Level (%)
Coed-Y-Darren SSSI	30	0.18	1	-	-	-
Dan Y Graig SSSI		0.11	0	-	-	-
Gwent Levels – Magor and Undy SSSI		0.47	2	11.34*	11.81	39
Gwent Levels – Nash and Goldcliff SSSI		2.39	8	15.28*	17.67	59
Gwent Levels – Redwick and Llandevenny SSSI		0.68	2	12.09*	12.77	43
Gwent Levels – Rumney and Peterstone SSSI		0.40	1	-	-	-
Gwent levels - St Brides SSSI		0.94	3	15.63*	16.57	55
Gwent levels – Whitson SSSI		1.05	3	12.15*	13.20	44
Gwlyptiroedd casnewdd/ Newport Wetlands SSSI		1.56	5	13.72*	15.28	51
Henllys Bog SSSI		0.08	0	-	-	-
Langstone-Llanmartin Meadows SSSI		0.23	1	-	-	-
Llandegfedd Reservoir SSSI		0.09	0	-	-	-
Magor Marsh SSSI		0.44	1	-	-	-
Parc Seymour Woods SSSI		0.16	1	-	-	-
Penhow Woodlands SSSI		0.23	1	-	-	-
Plas Machan Wood SSSI		0.18	1	-	-	-
Rectory Meadow – Rogiet SSSI		0.28	1	-	-	-
River Usk SSSI		0.70	2	19.22*	19.92	66
River Usk SAC		0.70	2	12.39	13.09	44
Ruperra Castle and Woodlands SSSI		0.16	1	-	-	-
Severn Estuary (England) SAC		0.31	1	-	-	-
Severn Estuary (Wales) SAC		1.02	3	12.83*	13.85	46
Severn Estuary SSSI		1.02	3	12.83	13.85	46
Severn Estuary SPA		0.31	1	-	-	-

*Data derived from 'search by location' tab on APIS.

Table 12.5.2: Predicted Annual-Mean SO_2 Concentrations at Designated Habitat Sites

Habitat Site	Critical Level ($\mu g.m^{-3}$)	PC ($\mu g.m^{-3}$)	PC/Critical Level (%)	Ambient Concentration ($\mu g.m^{-3}$)	PEC ($\mu g.m^{-3}$)	PEC/ Critical Level (%)
Coed-Y-Darren SSSI	20	0.05	0	-	-	-
Dan Y Graig SSSI		0.03	0	-	-	-
Gwent Levels – Magor and Undy SSSI		0.12	1	-	-	-
Gwent Levels – Nash and Goldcliff SSSI		0.64	3	1.87*	2.51	13
Gwent Levels – Redwick and Llandevenny SSSI		0.18	1	-	-	-
Gwent Levels – Rumney and Peterstone SSSI		0.11	1	-	-	-
Gwent levels - St Brides SSSI		0.25	1	-	-	-
Gwent levels – Whitson SSSI		0.28	1	-	-	-
Gwlyptiroedd casnewdd/ Newport Wetlands SSSI		0.42	2	1.87*	2.29	11
Henllys Bog SSSI		0.02	0	-	-	-
Langstone-Llanmartin Meadows SSSI		0.06	0	-	-	-
Llandegfedd Reservoir SSSI		0.02	0	-	-	-
Magor Marsh SSSI		0.12	1	-	-	-
Parc Seymour Woods SSSI		0.04	0	-	-	-
Penhow Woodlands SSSI		0.06	0	-	-	-
Plas Machan Wood SSSI		0.05	0	-	-	-
Rectory Meadow – Rogiet SSSI		0.08	0	-	-	-
River Usk SSSI		0.19	1	-	-	-
River Usk SAC		0.19	1	-	-	-
Ruperra Castle and Woodlands SSSI		0.04	0	-	-	-
Severn Estuary (England) SAC		0.08	0	-	-	-
Severn Estuary (Wales) SAC		0.27	1	-	-	-
Severn Estuary SSSI		0.27	1	-	-	-
Severn Estuary SPA		0.08	0	-	-	-

*Data derived from ‘search by location’ tab on APIS.

Table 12.5.3: Predicted Annual-Mean NH_3 Concentrations at Designated Habitat Sites

Habitat Site	Critical Level (µg.m⁻³)	PC (µg.m⁻³)	PC/Critical Level (%)	Ambient Concentration (µg.m⁻³)	PEC (µg.m⁻³)	PEC/ Critical Level (%)
Coed-Y-Darren SSSI	3	0.04	1	-	-	-
Dan Y Graig SSSI		0.03	1	-	-	-
Gwent Levels – Magor and Undy SSSI		0.11	4	0.88*	0.99	33
Gwent Levels – Nash and Goldcliff SSSI		0.55	18	1.15*	1.70	57
Gwent Levels – Redwick and Llandevenny SSSI		0.16	5	1.72*	1.88	63
Gwent Levels – Rumney and Peterstone SSSI		0.09	3	1.61*	1.70	57
Gwent levels – St Brides SSSI		0.22	7	1.15*	1.37	46
Gwent levels – Whitson SSSI		0.24	8	1.11*	1.35	45
Gwlyptiroedd casnewdd/ Newport Wetlands SSSI		0.36	12	1.15*	1.51	50
Henllys Bog SSSI		0.02	1	-	-	-
Langstone-Llanmartin Meadows SSSI		0.05	2	1.72*	1.77	59
Llandegfedd Reservoir SSSI		0.02	1	-	-	-
Magor Marsh SSSI		0.10	3	1.68*	1.78	59
Parc Seymour Woods SSSI		0.04	1	-	-	-
Penhow Woodlands SSSI		0.05	2	1.68*	1.73	58
Plas Machan Wood SSSI		0.04	1	-	-	-
Rectory Meadow – Rogiet SSSI		0.06	2	1.2*	1.26	42
River Usk SSSI		0.16	5	1.15*	1.31	44
River Usk SAC		0.16	5	1.42	1.58	53
Ruperra Castle and Woodlands SSSI		0.04	1	-	-	-
Severn Estuary (England) SAC		0.07	2	1.29	1.36	45
Severn Estuary (Wales) SAC		0.24	8	1.15*	1.39	46
Severn Estuary SSSI		0.24	8	1.35	1.59	53
Severn Estuary SPA		0.07	2	1.35	1.42	47

*Data derived from 'search by location' tab on APIS.

Table 12.5.4: Predicted Nutrient N Deposition at Designated Habitat Sites

Habitat Site	Critical Load ($kgN.ha^{-1}.yr^{-1}$)	PC ($kgN.ha^{-1}.yr^{-1}$)	PC/Critical Load (%)	Ambient Concentration ($kgN.ha^{-1}.yr^{-1}$)	PEC ($kgN.ha^{-1}.yr^{-1}$)	PEC/ Critical Level (%)
Coed-Y-Darren SSSI	no data	0.18	-	no data	-	-
Dan Y Graig SSSI	20*	0.11	1	-	-	-
Gwent Levels – Magor and Undy SSSI	30*	0.47	2	9.8*	10.27	34
Gwent Levels – Nash and Goldcliff SSSI	30*	2.38	8	12.32*	14.70	49
Gwent Levels – Redwick and Llandevenny SSSI	30*	0.68	2	15.54*	16.22	54
Gwent Levels – Rumney and Peterstone SSSI	30*	0.40	1			
Gwent levels – St Brides SSSI	30*	0.94	3	12.32*	13.26	44
Gwent levels – Whitson SSSI	30*	1.05	3	11.2*	12.25	41
Gwlyptiroedd casnewdd/ Newport Wetlands SSSI	20*	1.55	8	12.32*	13.87	69
Henllys Bog SSSI	no data	0.08	-	-	-	-
Langstone-Llanmartin Meadows SSSI	30*	0.23	1	-	-	-
Llandegfedd Reservoir SSSI	no data	0.09	-	-	-	-
Magor Marsh SSSI	30*	0.44	1	-	-	-
Parc Seymour Woods SSSI	20*	0.16	1	-	-	-
Penhow Woodlands SSSI	20*	0.23	1	-	-	-
Plas Machan Wood SSSI	20*	0.18	1	-	-	-
Rectory Meadow – Rogiet SSSI	25*	0.28	1	-	-	-
River Usk SSSI	not sensitive					
River Usk SAC	not sensitive					
Ruperra Castle and Woodlands SSSI	20*	0.16	1	-	-	-
Severn Estuary (England) SAC	30*	0.31	1	-	-	-
Severn Estuary (Wales) SAC	30*	1.02	3	12.32*	13.34	44
Severn Estuary SSSI	30*	1.02	3	12.6	13.62	45
Severn Estuary SPA	30*	0.31	1	-	-	-

*Data derived from 'search by location' tab on APIS.

Table 12.5.5: Predicted Acid Deposition at Designated Habitat Sites

Habitat Site	Critical Loads (keq.ha^{-1}.yr^{-1})			PC (keq.ha^{-1}.yr^{-1})		Ambient Concentration (keq.ha^{-1}.yr^{-1})		PEC (keq.ha^{-1}.yr^{-1})		PC/CLF (%)
	Min N	Max S	Max N	N	S	N	S	N	S	
Coed-Y-Darren SSSI	no data	no data	no data	0.01	0.01	no data	no data	-	-	-
Dan Y Graig SSSI	0.142	11.47	11.612	0.01	0.01	1.31	0.52	1.32	0.53	0
Gwent Levels – Magor and Undy SSSI	no data	no data	no data	0.03	0.03	no data	no data	-	-	-
Gwent Levels – Nash and Goldcliff SSSI	no data	no data	no data	0.17	0.15	0.88	0.34	1.05	0.49	-
Gwent Levels – Redwick and Llandevenny SSSI	no data	no data	no data	0.05	0.04	1.37	0.34	1.42	0.38	-
Gwent Levels – Rumney and Peterstone SSSI	no data	no data	no data	0.03	0.03	1.13	0.38	1.16	0.41	-
Gwent levels – St Brides SSSI	no data	no data	no data	0.07	0.06	0.88	0.33	0.95	0.39	-
Gwent levels – Whitson SSSI	no data	no data	no data	0.07	0.07	0.8	0.28	0.87	0.35	-
Gwlyptiroedd casnewdd/ Newport Wetlands SSSI	no data	no data	no data	0.11	0.10	0.88	0.34	0.99	0.44	-
Henllys Bog SSSI	no data	no data	no data	0.01	0.01	no data	no data	-	-	-
Langstone-Llanmartin Meadows SSSI	no data	no data	no data	0.02	0.01	1.11	0.34	1.13	0.35	-
Llandegfedd Reservoir SSSI	0.856	4	4.856	0.01	0.01	1.33	0.46	1.34	0.47	0
Magor Marsh SSSI	No data	No data	No data	0.03	0.03	1.07	0.3	1.10	0.33	-
Parc Seymour Woods SSSI	0.142	1.691	1.833	0.01	0.01	1.73	0.36	1.74	0.37	1
Penhow Woodlands SSSI	0.142	5.93	6.072	0.02	0.01	1.81	0.33	1.83	0.34	1
Plas Machan Wood SSSI	0.142	1.906	2.048	0.01	0.01	1.79	0.49	1.80	0.50	1
Rectory Meadow – Rogiet SSSI	1.071	4	5.071	0.02	0.02	0.98	0.45	1.00	0.47	0
River Usk SSSI	Not sensitive									
River Usk SAC	Not sensitive									
Ruperra Castle and Woodlands SSSI	0.142	1.908	2.05	0.01	0.01	1.79	0.49	1.80	0.50	1
Severn Estuary (England) SAC	No data	No data	No data	0.02	0.02	0.8	0.3	0.82	0.32	-
Severn Estuary (Wales) SAC	No data	No data	No data	0.07	0.06	0.88	0.34	0.95	0.40	-

Severn Estuary SSSI	No data	No data	No data	0.07	0.06	0.9	0.3	0.97	0.36	-
Severn Estuary SPA	No data	No data	No data	0.02	0.02	0.8	0.3	0.82	0.32	--

*Data derived from 'search by location' tab on APIS.

Table 12.5.6: Predicted Daily-Mean NOx Concentrations at Designated Habitat Sites

Habitat Site	Critical Level ($\mu g.m^{-3}$)	PC ($\mu g.m^{-3}$)	PC/Critical Level (%)	Ambient Concentration ($\mu g.m^{-3}$)	PEC ($\mu g.m^{-3}$)	PEC/ Critical Level (%)
Coed-Y-Darren SSSI	75	2.87	4	-	-	-
Dan Y Graig SSSI		1.67	2	-	-	-
Gwent Levels – Magor and Undy SSSI		3.47	5	-	-	-
Gwent Levels – Nash and Goldcliff SSSI		19.07	25	30.56*	49.63	66
Gwent Levels – Redwick and Llandevenny SSSI		5.03	7	-	-	-
Gwent Levels – Rumney and Peterstone SSSI		6.08	8	-	-	-
Gwent levels – St Brides SSSI		15.29	20	31.26*	46.55	62
Gwent levels – Whitson SSSI		8.16	11	24.3*	32.46	43
Gwlyptiroedd casnewdd/ Newport Wetlands SSSI		14.44	19	27.44*	41.88	56
Henllys Bog SSSI		2.13	3	-	-	-
Langstone-Llanmartin Meadows SSSI		3.30	4	-	-	-
Llandegfedd Reservoir SSSI		4.82	6	-	-	-
Magor Marsh SSSI		3.23	4	-	-	-
Parc Seymour Woods SSSI		2.00	3	-	-	-
Penhow Woodlands SSSI		2.43	3	-	-	-
Plas Machan Wood SSSI		2.87	4	-	-	-
Rectory Meadow – Rogiet SSSI		2.19	3	-	-	-
River Usk SSSI		14.32	19	38.44*	52.76	70
River Usk SAC		14.32	19	24.78	39.10	52
Ruperra Castle and Woodlands SSSI		2.28	3	-	-	-

Severn Estuary (England) SAC	2.37	3	-	-	-
Severn Estuary (Wales) SAC	17.74	24	25.66*	43.40	58
Severn Estuary SSSI	17.74	24	25.66	43.40	58
Severn Estuary SPA	3.30	4	-	-	-

*Data derived from ‘search by location’ tab on APIS.

Interpretation of Results

Annual-mean NOx

The maximum annual-mean NO_X PCs do not exceed 1% of the critical level or the PEC is below the critical level for all habitat sites. On that basis, the impacts can be screened out as insignificant.

Annual-mean SO_2

The maximum annual-mean SO_2 PCs do not exceed 1% of the critical level or the PEC is below the critical level for all habitat sites. On that basis, the impacts can be screened out as insignificant.

Annual-mean NH_3

The maximum annual-mean NH_3 PCs do not exceed 1% of the critical level or the PEC is below the critical level for all habitat sites. On that basis, the impacts can be screened out as insignificant.

Nutrient N Deposition

The maximum nitrogen deposition PCs do not exceed 1% of the critical load or the PEC is below the critical load for all habitat sites. On that basis, the impacts can be screened out as insignificant.

Acid Deposition

The maximum acid deposition PCs do not exceed 1% of the critical load or the PEC is below the critical load for all habitat sites. On that basis, the impacts can be screened out as insignificant.

Daily-mean NOx

The maximum daily-mean NO_X PCs do not exceed 10% of the critical level or the PEC is below the critical level for all habitat sites. On that basis, the impacts can be screened out as insignificant.

Appendix 12.6
Results at Discrete Receptors

Table 12.6.1 and Table 12.6.2 show the PCs and the PCs as a percentage of the EAL at the modelled sensitive receptors.

Table 12.6.1: Predicted Maximum Process Contributions (µg.m^{-3}) – Results at Sensitive Receptors

Pollutant	Averaging Period	EAL (µg.m^{-3})	Receptor ID 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PM_{10}	24 hour (90.41st percentile)	50	0.01	0.03	0.13	0.20	0.22	0.21	0.16	0.08	0.04	0.04	0.04	0.05	0.06	0.04	0.12	0.00	0.09	0.07	0.08	0.00	0.00	0.00	0.00
	24 hour (annual mean)	40	0.00	0.01	0.04	0.06	0.06	0.07	0.06	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
$PM_{2.5}$	24 hour (annual mean)	25	0.00	0.01	0.04	0.06	0.06	0.07	0.06	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00
HCl	1 hour (maximum)	750	1.77	0.20	0.46	0.60	0.66	0.63	0.67	0.34	0.17	0.22	0.19	0.23	0.25	0.24	0.69	0.15	0.48	0.34	0.25	0.01	0.00	0.03	0.07
HF	1 hour (maximum)	160	0.22	0.02	0.06	0.07	0.08	0.08	0.08	0.04	0.02	0.03	0.02	0.03	0.03	0.03	0.09	0.02	0.06	0.04	0.03	0.00	0.00	0.00	0.01
SO_2	15 minute (99.90th percentile)	266	6.26	7.46	9.93	9.76	8.74	7.82	7.04	6.97	5.51	5.48	6.81	6.42	6.06	5.24	6.78	7.63	10.81	7.92	7.48	0.19	0.03	1.22	2.13
	1 hour (99.73th percentile)	350	3.54	4.96	8.20	8.33	7.73	6.86	6.03	5.94	4.11	4.25	4.27	3.99	4.44	4.39	5.81	3.35	9.20	6.89	5.64	0.10	0.00	0.47	1.05
	24 hour (99.18th percentile)	125	0.74	1.00	2.32	2.99	3.29	3.13	3.33	1.68	0.86	1.08	0.97	1.16	1.26	1.22	3.44	0.75	2.38	1.71	1.27	0.03	0.00	0.15	0.35
	1 hour (annual mean)	50	0.03	0.06	0.34	0.46	0.52	0.54	0.45	0.17	0.08	0.09	0.09	0.11	0.12	0.09	0.25	0.03	0.16	0.14	0.19	0.00	0.00	0.01	0.01
NO_2	1 hour (99.79th percentile)	200	5.63	7.19	11.33	11.03	10.23	9.08	8.10	7.85	5.53	5.70	5.96	5.58	6.08	5.82	7.78	5.53	12.35	9.15	7.70	0.15	0.00	0.84	1.78
	1 hour (annual mean)	40	0.08	0.16	0.90	1.21	1.37	1.41	1.17	0.44	0.22	0.23	0.22	0.29	0.31	0.23	0.64	0.07	0.41	0.37	0.50	0.00	0.00	0.01	0.03
CO	8 hour (maximum daily running)	10,000	3.98	3.88	7.89	8.15	7.62	7.04	7.71	6.40	4.22	4.94	5.21	4.79	7.79	5.07	6.32	7.56	10.37	7.84	5.19	0.24	0.16	1.37	2.11
Cd	1 hour (annual mean)	5.00E-03	1.6E-05	3.1E-05	1.7E-04	2.3E-04	2.6E-04	2.7E-04	2.2E-04	8.5E-05	4.2E-05	4.3E-05	4.3E-05	5.5E-05	6.0E-05	4.3E-05	1.2E-04	1.3E-05	7.8E-05	7.1E-05	9.5E-05	4.3E-07	1.2E-07	2.5E-06	6.2E-06
Tl	1 hour (maximum)	3.00E+01	4.4E-03	4.7E-03	5.1E-03	5.8E-03	6.0E-03	5.7E-03	4.8E-03	5.3E-03	4.1E-03	3.8E-03	4.4E-03	4.4E-03	5.2E-03	3.9E-03	3.9E-03	5.1E-03	5.6E-03	4.5E-03	5.8E-03	4.7E-04	5.2E-04	3.9E-03	4.9E-03
	1 hour (annual mean)	1.00E+00	1.6E-05	3.1E-05	1.7E-04	2.3E-04	2.6E-04	2.7E-04	2.2E-04	8.5E-05	4.2E-05	4.3E-05	4.3E-05	5.5E-05	6.0E-05	4.3E-05	1.2E-04	1.3E-05	7.8E-05	7.1E-05	9.5E-05	4.3E-07	1.2E-07	2.5E-06	6.2E-06
Hg	1 hour (maximum)	7.50E+00	4.4E-03	4.7E-03	5.1E-03	5.8E-03	6.0E-03	5.7E-03	4.8E-03	5.3E-03	4.1E-03	3.8E-03	4.4E-03	4.4E-03	5.2E-03	3.9E-03	3.9E-03	5.1E-03	5.6E-03	4.5E-03	5.8E-03	4.7E-04	5.2E-04	3.9E-03	4.9E-03
	1 hour (annual mean)	2.50E-01	1.6E-05	3.1E-05	1.7E-04	2.3E-04	2.6E-04	2.7E-04	2.2E-04	8.5E-05	4.2E-05	4.3E-05	4.3E-05	5.5E-05	6.0E-05	4.3E-05	1.2E-04	1.3E-05	7.8E-05	7.1E-05	9.5E-05	4.3E-07	1.2E-07	2.5E-06	6.2E-06
Sb	1 hour (maximum)	1.50E+02	4.4E-02	4.7E-02	5.1E-02	5.8E-02	6.0E-02	5.7E-02	4.8E-02	5.3E-02	4.1E-02	3.8E-02	4.4E-02	4.4E-02	5.2E-02	3.9E-02	3.9E-02	5.1E-02	5.6E-02	4.5E-02	5.8E-02	4.7E-03	5.2E-03	3.9E-02	4.9E-02
	1 hour (annual mean)	5.00E+00	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05

As	1 hour (annual mean)	3.00E-03	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Cr	1 hour (maximum)	1.50E+02	4.4E-02	4.7E-02	5.1E-02	5.8E-02	6.0E-02	5.7E-02	4.8E-02	5.3E-02	4.1E-02	3.8E-02	4.4E-02	4.4E-02	5.2E-02	3.9E-02	3.9E-02	5.1E-02	5.6E-02	4.5E-02	5.8E-02	4.7E-03	5.2E-03	3.9E-02	4.9E-02
	1 hour (annual mean)	5.00E+00	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Co	1 hour (maximum)	6.00E+00	4.4E-02	4.7E-02	5.1E-02	5.8E-02	6.0E-02	5.7E-02	4.8E-02	5.3E-02	4.1E-02	3.8E-02	4.4E-02	4.4E-02	5.2E-02	3.9E-02	3.9E-02	5.1E-02	5.6E-02	4.5E-02	5.8E-02	4.7E-03	5.2E-03	3.9E-02	4.9E-02
	1 hour (annual mean)	2.00E-01	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Cu	1 hour (maximum)	2.00E+02	4.4E-02	4.7E-02	5.1E-02	5.8E-02	6.0E-02	5.7E-02	4.8E-02	5.3E-02	4.1E-02	3.8E-02	4.4E-02	4.4E-02	5.2E-02	3.9E-02	3.9E-02	5.1E-02	5.6E-02	4.5E-02	5.8E-02	4.7E-03	5.2E-03	3.9E-02	4.9E-02
	1 hour (annual mean)	1.00E+01	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Pb	1 hour (annual mean)	2.50E-01	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Mn	1 hour (maximum)	1.50E+03	4.4E-02	4.7E-02	5.1E-02	5.8E-02	6.0E-02	5.7E-02	4.8E-02	5.3E-02	4.1E-02	3.8E-02	4.4E-02	4.4E-02	5.2E-02	3.9E-02	3.9E-02	5.1E-02	5.6E-02	4.5E-02	5.8E-02	4.7E-03	5.2E-03	3.9E-02	4.9E-02
	1 hour (annual mean)	1.50E-01	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Ni	1 hour (annual mean)	2.00E-02	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
V	1 hour (maximum)	5.00E+00	4.4E-02	4.7E-02	5.1E-02	5.8E-02	6.0E-02	5.7E-02	4.8E-02	5.3E-02	4.1E-02	3.8E-02	4.4E-02	4.4E-02	5.2E-02	3.9E-02	3.9E-02	5.1E-02	5.6E-02	4.5E-02	5.8E-02	4.7E-03	5.2E-03	3.9E-02	4.9E-02
	1 hour (annual mean)	1.00E+00	1.6E-04	3.1E-04	1.7E-03	2.3E-03	2.6E-03	2.7E-03	2.2E-03	8.5E-04	4.2E-04	4.3E-04	4.3E-04	5.5E-04	6.0E-04	4.3E-04	1.2E-03	1.3E-04	7.8E-04	7.1E-04	9.5E-04	4.3E-06	1.2E-06	2.5E-05	6.2E-05
Dioxins & Furans	1 hour (annual mean)	-	4.7E-08	9.3E-08	5.1E-07	6.9E-07	7.8E-07	8.0E-07	6.7E-07	2.5E-07	1.3E-07	1.3E-07	1.3E-07	1.7E-07	1.8E-07	1.3E-07	3.7E-07	3.8E-08	2.3E-07	2.1E-07	2.9E-07	1.3E-09	3.5E-10	7.5E-09	1.9E-08
PAHs	1 hour (annual mean)	2.50E-04	2.3E-06	4.7E-06	2.6E-05	3.5E-05	3.9E-05	4.0E-05	3.4E-05	1.3E-05	6.3E-06	6.5E-06	6.4E-06	8.3E-06	9.0E-06	6.5E-06	1.8E-05	1.9E-06	1.2E-05	1.1E-05	1.4E-05	6.5E-08	1.8E-08	3.8E-07	9.3E-07

PCB	1 hour (annual mean)	2.00E-01	6.2E-08	1.2E-07	6.8E-07	9.2E-07	1.0E-06	1.1E-06	8.9E-07	3.4E-07	1.7E-07	1.7E-07	1.7E-07	2.2E-07	2.4E-07	1.7E-07	4.9E-07	5.1E-08	3.1E-07	2.8E-07	3.8E-07	1.7E-09	4.7E-10	1.0E-08	2.5E-08

Table 12.6.2: Maximum Process Contributions as a Percentage of the EAL – Results at Sensitive Receptors

Pollutant	Averaging Period	EAL ($\mu g.m^{-3}$)	Criteria	Receptor ID 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PM_{10}	24 hour (90.41st percentile)	50	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	24 hour (annual mean)	40	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$PM_{2.5}$	24 hour (annual mean)	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HCl	1 hour (maximum)	750	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HF	1 hour (maximum)	160	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SO_2	15 minute (99.90th percentile)	266	10	2	3	4	4	3	3	3	3	2	2	3	2	2	2	3	3	4	3	3	0	0	0	1
	1 hour (99.73th percentile)	350	10	1	1	2	2	2	2	2	2	1	1	1	1	1	1	2	1	3	2	2	0	0	0	0
	24 hour (99.18th percentile)	125	10	1	1	2	2	3	3	3	1	1	1	1	1	1	1	3	1	2	1	1	0	0	0	0
	1 hour (annual mean)	50	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO_2	1 hour (99.79th percentile)	200	10	3	4	6	6	5	5	4	4	3	3	3	3	3	3	4	3	6	5	4	0	0	0	1
	1 hour (annual mean)	40	1	0	0	2	3	3	4	3	1	1	1	1	1	1	1	2	0	1	1	1	0	0	0	0
CO	8 hour (maximum daily running)	10,000	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cd	1 hour (annual mean)	0.005	10	0	1	3	5	5	5	4	2	1	1	1	1	1	1	2	0	2	1	2	0	0	0	0
Tl	1 hour (maximum)	30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1 hour (annual mean)	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	1 hour (maximum)	7.5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1 hour (annual mean)	0.25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sb	1 hour (maximum)	150	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1 hour (annual mean)	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	1 hour (annual mean)	0.003	1	5	10	57	77	87	89	74	28	14	14	14	18	20	14	41	4	26	24	32	0	0	1	2
Cr	1 hour (maximum)	150	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	1 hour (annual mean)	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Co	1 hour (maximum)	6	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
	1 hour (annual mean)	0.2	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Cu	1 hour (maximum)	200	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1 hour (annual mean)	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pb	1 hour (annual mean)	0.25	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mn	1 hour (maximum)	1500	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1 hour (annual mean)	0.15	1	0	0	1	2	2	2	1	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0
Ni	1 hour (annual mean)	0.02	1	1	2	9	11	13	13	11	4	2	2	2	3	3	2	6	1	4	4	5	0	0	0	0
V	1 hour (maximum)	5	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
	1 hour (annual mean)	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dioxins & Furans	1 hour (annual mean)	-	1											-												
PAHs	1 hour (annual mean)	0.00025	1	1	2	10	14	16	16	13	5	3	3	3	3	4	3	7	1	5	4	6	0	0	0	0
PCB	1 hour (annual mean)	0.2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Highlighted cells indicate where the PC as a % of the EAL exceeds 1% for long-term and 10% for short term averaging periods and the impacts cannot be screened out as insignificant based on the PC alone.

For receptors where the PC as a percentage of the EAL is less than 1% for long-term and 10% for short-term averaging periods, the impacts can be screened out as insignificant. For the pollutants where the impacts can't be screened out as insignificant based on the PC alone, the PEC is considered in Table 12.6.3.

Table 12.6.3: Predicted Environmental Concentrations at Long-Term Emission Limit Values – Results at Sensitive Receptors

Pollutant	Averaging Period	EAL ($\mu g.m^{-3}$)	AC ($\mu g.m^{-3}$)	Receptor ID											
				1	2	3	4	5	6	7	8	9	10	11	12
NO_2	1 hour (annual mean)	40	23.1	23.2	23.3	24	24.3	24.5	24.5	24.3	23.5	23.3	23.3	23.3	23.4
As	1 hour (annual mean)	3.00E-03	8.10E-04	9.70E-04	1.10E-03	2.50E-03	3.10E-03	3.40E-03	3.50E-03	3.00E-03	1.70E-03	1.20E-03	1.20E-03	1.20E-03	1.40E-03
Mn	1 hour (annual mean)	1.50E-01	4.60E-02	4.60E-02	4.60E-02	4.80E-02	4.80E-02	4.90E-02	4.90E-02	4.80E-02	4.70E-02	4.60E-02	4.60E-02	4.60E-02	4.60E-02
Ni	1 hour (annual mean)	2.00E-02	5.00E-03	5.10E-03	5.30E-03	6.70E-03	7.30E-03	7.60E-03	7.70E-03	7.20E-03	5.80E-03	5.40E-03	5.40E-03	5.40E-03	5.50E-03

PAHs	1 hour (annual mean)	2.50E-04	2.00E-04	2.00E-04	2.00E-04	2.30E-04	2.30E-04	2.40E-04	2.40E-04	2.30E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04	2.10E-04

Pollutant	Averaging Period	EAL ($\mu g.m^{-3}$)	AC ($\mu g.m^{-3}$)	Receptor ID										
				13	14	15	16	17	18	19	20	21	22	23
NO_2	1 hour (annual mean)	40	23.1	23.4	23.3	23.7	23.2	23.5	23.5	23.6	23.1	23.1	23.1	23.1
As	1 hour (annual mean)	3.00E-03	8.10E-04	1.40E-03	1.20E-03	2.00E-03	9.40E-04	1.60E-03	1.50E-03	1.80E-03	8.10E-04	8.10E-04	8.40E-04	8.70E-04
Mn	1 hour (annual mean)	1.50E-01	4.60E-02	4.70E-02	4.60E-02	4.70E-02	4.60E-02	4.70E-02	4.70E-02	4.70E-02	4.60E-02	4.60E-02	4.60E-02	4.60E-02
Ni	1 hour (annual mean)	2.00E-02	5.00E-03	5.60E-03	5.40E-03	6.20E-03	5.10E-03	5.80E-03	5.70E-03	5.90E-03	5.00E-03	5.00E-03	5.00E-03	5.10E-03
PAHs	1 hour (annual mean)	2.50E-04	2.00E-04	2.10E-04	2.10E-04	2.20E-04	2.00E-04	2.10E-04	2.10E-04	2.10E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04

Highlighted cells indicate where the PEC exceeds the EAL and the impacts cannot be screened out as insignificant based on the PEC.

For all pollutants except arsenic, the PECs are below the EAL and the impacts can be screened out as not significant.

For As, the predicted PC is more than 1% of the EAL and the PEC is above the EAL. These predictions are based on the assumption that arsenic comprises the total of the group 3 metals emissions. The concentration used in the assessment applies to all nine of the group 3 metals in total. The Environment Agency's '*Releases from waste incinerators – Guidance on assessing group 3 metal stack emissions from incinerators'* version 4 (undated), provides a summary of 34 measured values for each metal recorded at 18 municipal waste and waste wood co-incinerators between 2007 and 2015. For As, the measured concentration varies from 0.04% to 5% of the IED emission concentration limit.

Table 12.6.4 shows the predicted PC if the total emission concentration used in the assessment is assumed to apply equally to each of the nine group 3 metals. i.e. the PC for As has been divided by 9. In this case the PECs at all receptors are below the EAL and the impacts are therefore not considered significant.

Table 12.6.4: Maximum Predicted Environmental Concentrations ($\mu g.m^{-3}$) – Arsenic

Pollutant	Averaging Period	EAL ($\mu g.m^{-3}$)	AC ($\mu g.m^{-3}$)	Receptor ID											
				1	2	3	4	5	6	7	8	9	10	11	12
As	1 hour (annual mean)	0.003	8.10E-04	8.27E-04	8.44E-04	9.98E-04	1.06E-03	1.10E-03	1.10E-03	1.06E-03	9.03E-04	8.56E-04	8.58E-04	8.57E-04	8.71E-04

Pollutant	Averaging Period	EAL ($\mu g.m^{-3}$)	AC ($\mu g.m^{-3}$)	Receptor ID										
				13	14	15	16	17	18	19	20	21	22	23
As	1 hour (annual mean)	0.003	8.10E-04	8.76E-04	8.57E-04	9.45E-04	8.24E-04	8.95E-04	8.88E-04	9.15E-04	8.10E-04	8.10E-04	8.13E-04	8.17E-04