ARUP

CiNER Glass Limited

Volume II Appendix

Dragon Glass Bottle Manufacturing Facility

DRAGON-ARUP-ENVZ-XX-RP-YE-000004
30th March 2022

Contents

Appendix A

General

A1 Welsh Ministers Screening Direction

Head of Planning Control
Blaenau Gwent County Borough Council
Municipal Offices
Civic Centre
Ebbw Vale
Gwent
NP23 6XB

By email : steve.smith@blaenau-gwent.gov.uk

Ein Cyf/Our Ref: qA1434487

Date: 19 November 2020

Dear Mr Smith

TOWN AND COUNTRY PLANNING ACT 1990
TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (WALES) REGULATIONS 2017
CINER GLASS MANUFACTURING FACILITY, RASSAU INDUSTRIAL ESTATE

1. The Welsh Ministers have been requested to make a screening direction under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 ("the 2017 Regulations") as to whether or not the proposed CiNER Glass manufacturing facility within the Rassau Industrial Estate is 'EIA development'.

2. I am authorised by the Minister for Housing and Local Government to consider your request and make the screening direction.

3. The works fall within the description of development at paragraph 5 (d) of Schedule 2 ("the Schedule") to the 2017 Regulations and meet the applicable criteria in column 2 of the table in the Schedule as the area of new floorspace would exceed 1,000 sqm. Therefore, I consider the development to comprise "Schedule 2" development within the meaning of the 2017 Regulations.

Ffôn • Tel 03000 255362
Alan.Groves@gov.wales
Gwefan • website: www.llyw.cymru
www.gov.wales

Parc Cathays • Cathays Park
Caerdydd • Cardiff
CF10 3NQ

4. The applicant, through its planning agent, has been provided with an opportunity to submit additional information to the Welsh Ministers to inform consideration of the project.

5. Natural Resources Wales (NRW) was consulted and was provided with a copy of the applicant's information. Its advice is included in the EIA checklist (attached), which identifies the key areas the Welsh Ministers considered when reaching their conclusions.

6. Based on the information provided NRW is unable to rule out likely significant effects, resulting from aerial emissions from the manufacturing facility, on sensitive sites surrounding the proposed development site. The sensitive sites are the Usk Bats Sites SAC, the Mynydd Llangatwg (Mynydd Llangattock) SSSI and Mynydd Llangynidr SSSI. NRW is also unable to advise on the significance of any effect on European protected species. I consider, based on the information provided, it is also difficult to determine the extent or significance of any operational noise generated by the manufacturing operation or the impact of aerial emissions on human health.

7. I note the content of the additional information, provided by the applicant to inform the Welsh Ministers' consideration of the project. However, no adequate information or evidence has been submitted, regarding aerial emissions, operational noise or impact on protected species, to indicate the potential resulting impacts that may be generated by the development. Whilst a detailed assessment of environmental impacts may not necessarily be expected at screening stage, the information available is insufficient to be able to assess the likely significant effects on the environment.

8. The precautionary principle is detailed in Article 191 of the Treaty of the Functioning of the European Union. It aims at ensuring a higher level of environmental protection through preventative decision-taking in the case of risk.

9. I have considered and accept the advice provided by NRW. I particularly note NRW considers the information provided by the applicant at this time is not sufficient to make any conclusions, regarding whether the development is likely to have significant environmental effects on protected species, or on sensitive sites resulting from aerial emissions. I have also taken into account the selection criteria in Schedule 3 to the 2017 Regulations and the guidance in Welsh Office Circular 11/99: Environmental Impact Assessment. In terms of the selection criteria in Schedule 3, I have taken account of the characteristics of the development and consider the proposed development could generate potential noise nuisance, potential risk to sensitive areas and human health from air pollution, and potential adverse impacts on protected species. In terms of the location of the development, the proposed site is not in a sensitive area as defined by the 2017 Regulations, however, it is located approximately 800m from the Usk Bats Sites SAC and the Mynydd Llangatwg (Mynydd Llangattock) SSSI, and approximately 1.5km from the Mynydd Llangynidr SSSI. Based on the information provided, it is difficult to assess the type and characteristics of the potential impacts identified above. However, any impact would persist for the duration of the glass manufacturing operation. Based on the information submitted and available, in accordance with the precautionary principle, I consider the project is likely to have significant effects on the environment due to the potential impact from operational noise and aerial emissions, and the potential adverse impact on protected species.

10. I note the applicant states that the scheme will require an Environmental Permit. However, the project must also comply with the requirements of the 2017 Regulations.

Accordingly, in exercise of the authority referred to in paragraph 2 above, I hereby direct that **the proposed development is “EIA development”** within the meaning of the 2017 Regulations. The content of this letter constitutes the statement required by regulation 5(9) of the 2017 Regulations.

11. Any application for planning permission for this development must be accompanied by an Environmental Statement. I recommend you refer to the Regulations before and during the preparation of the Environmental Statement.

12. You should note that my opinion on the likelihood of the development having significant environmental effects is reached only for the purposes of this direction.

13. A copy of this letter has been sent to Arup, agent for the applicant.

Yours sincerely

Alan Groves
Senior Planning Manager
Decisions Branch

Arwyddwyd o dan awdurdod Y Gweinidog Tai a Llywodraeth Lleol; un o Weinidogion Cymru.
Signed under authority of the Minister for Housing and Local Government; one of the Welsh Ministers

STAGE 1 – INITIAL SCREENING ASSESSMENT

1	Case Details
A	Appeal case reference **(PINS Only)**
B	LPA case reference
	Pre-app EIA screening
C	LPA
	Blaenau Gwent CBC
D	Appellant/Applicant
	Arup on behalf of Ciner Glass
E	Site address
	Land at Rassau Industrial Estate, Ebbw Vale
F	Brief description of development
	Glass bottle manufacturing facility
G	Site area of development/works/new floorspace (as appropriate), i.e. m2 or hectares (Ha)
	Site are = approx 21 hectares **Proposed development is described by the applicant as consisting of** • 2No furnaces and associated chimney stacks (up to 75m in height); • Warehouse facilities (**33,000m2**) for the storage of glass bottles; • Production lines for the manufacturing, inspection and packaging of glass bottles including pallet storage facilities and utilities (**35,000m2**); • 2No cullet buildings for the processing of rejected and recycled glass; and • External hardstanding for the storage of materials, parking and access roads.
H	Approval of reserved matters or conditions? If yes, state which one
	n/a

Parc Cathays ● Cathays Park
Caerdydd ● Cardiff
CF10 3NQ

Ffôn ● Tel 03000 255362
Alan.Groves@gov.wales
Gwefan ● website: www.llyw.cymru
www.gov.wales

I	If Yes, enter the description of development subject of the related planning permission		
J	Is the project located wholly or partly within a 'Sensitive Area' as defined by Regulation 2 of the EIA Regulations? If Yes, state which area below.	~~Yes~~	**No**

2	**EIA Screening Details**		
2A	**Schedule 1**		
(i)	Is the project Schedule 1 development as described in Schedule 1 of the EIA Regulations?	Yes	**No**
(ii)	*If Yes, under which description of development i.e. Nos. 1 -21? Go to Section 8 and tick Recommended Action 8A/B 'EIA Required'. If No, consider whether project is 'Schedule 2' development below in part 2(B).*		
2B	Schedule 2		
(i)	Is the project listed as a description of development under Column 1 of the table in Schedule 2 of the EIA Regulations?	**Yes**	No
	If Yes, note under which description of development i.e. paragraphs 1-12. If No, complete section 3 -5 and then proceed to Section 8 and tick Recommended Action 8L 'EIA Not Required' as the project does not fall within the EIA Regulations i.e. it is not Schedule 2 development and is not EIA development.		
	Schedule 2, paragraph 5(d) - installations for the manufacture of glass including glass fibre		
(ii)	Does the project change or extend development described in paragraphs 1 to 12 of Column 1 of schedule 2?	Yes	**No**
	If Yes, proceed straight to part 2C. If No, proceed to point (iii) below.		
(iii)	Is the project located wholly or partly within a 'Sensitive Area' as defined by Regulation 2 of the EIA Regulations?	Yes	**No**
	If Yes, state which area and proceed to Section 3 as project is 'Schedule 2 development'. There is no need to consider thresholds/criteria. If No, proceed to point (iv) below.		
(iv)	Are the applicable thresholds/criteria in Column 2 exceeded/met?	**Yes**	No
	If Yes, note which applicable threshold/criteria and proceed to Section 3 as project is 'Schedule 2 development'. If No, complete section 3-5 and then proceed to Section 8 and tick Recommended Action 8L 'EIA Not Required' as the project does not fall within the EIA Regulations i.e. it is not Schedule 2 development and is not EIA development.		
	Schedule 2 development as the area of new floorspace exceeds 1,000 square metres.		

C	**Changes or extensions to Schedule 1 or Schedule 2 development**		
(i)	Does the project involve any change to or extension of development of a description listed in Schedule 1 (other than a change of extension falling within paragraph 23 of that Schedule) where that development is already authorised, executed or in the process of being executed and the development as changed or extended may have significant adverse effects on the environment. **Or** Does the project involve a change or extension of development listed in paragraphs 1 to 12 of Column 1 of the table in Schedule 2, where that development is already authorised, executed or in the process of being executed, and the thresholds and criteria in the corresponding part of Column 2 of the table in Schedule 2 applied to the development as changed or extended are met or exceeded and in such a case the development as changed or extended may have significant adverse effects on the environment. Provide reasons for your answer in the space below.	Yes	**No**
	If Yes indicated above, proceed to Stage 2 as the project is Schedule 2 EIA development. *If No, check if the site is located in a "sensitive area". If not located in a "sensitive area" complete section 3-5 and then proceed to Section 8 and tick Recommended Action 8L 'EIA Not Required' as the project does not fall within the EIA Regulations i.e. is not Schedule 2 development and is not EIA development.* *If the project is located in a "sensitive area" and meets the description in either 13 (a) or 13 (b), proceed to Stage 2 as the project is Schedule 2 EIA development.*		
3	**LPA / Welsh Ministers Screening - All Applications Including Reserved Matters/Conditions**		
(i)	Has the LPA issued a Screening Opinion (SO)?	**Yes**	~~No~~
(ii)	Have the Welsh Ministers issued a Screening Direction (SD)?	~~Yes~~	**No**
(iii)	If Yes to either, is a copy of the SO/SD on the file? Note which one. **Screening Opinion**	**Yes**	~~No~~
(iv)	If Yes, is the SO/SD positive i.e. EIA is required?	Yes	**No**
4	Reserved Matters/Conditions Applications Only		
(i)	Was the original planning permission subject to EIA screening?	Yes	No
(ii)	Was a SO/SD issued for the original planning permission?	Yes	No

(iii)	If Yes, is a copy of the SO/SD for the original planning permission on file?	Yes	No
5	Environmental Statement (ES)		
(i)	Has the applicant/appellant supplied an ES for the current or previous application?	Yes	**No**

STAGE 2 – DETAILED SCREENING ASSESSMENT

6(A).	**Screening Questions**		
Part 1 - Questions to be considered	**Part 2 – Provide answers to questions in Part 1 (use Yes/No/Not Known) and briefly explain reasoning. If applicable, and/or known, include name of feature and approximate proximity to site**	**Part 3 – For all 'Yes' answers in Part 2, assess whether those interactions (i.e. effects) are likely to be significant by considering them against the 'Assessment of Significance' ('AoS') Criteria outlined in Section 6(B). Provide detailed reasons for your answers here. Include in your answers a summary of advice from consultees if received. [NB. If answer in Part 2 is 'No' use 'NA' and proceed to section 7.]**	**Part 4 – Outline the overall conclusion reached in Part 3 i.e. Unlikely to have a significant effect / Likely to have a significant effect?**
CRITERION 1. CHARACTERISTICS OF DEVELOPMENT			
Question 1(a) Size of the Development			
Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc.)?	**Yes. The applicant notes the proposed site is currently undeveloped and is located on the northeast extent of the industrial estate consisting of existing scrubland, a mixture of broadleaved and coniferous woodland.**	**The site is located in an industrial area, however, the boundary of the Brecon Beacons National Park is approx. 500m to the north of the development site.** **NRW's consultation response, dated 10 November 2020, states that views of the proposed development from the high ground within the National Park to the north/north west are likely, and potentially from the east/north east. However, views from the National Park are likely to be limited in number and the development would be seen in the context of the existing industrial estate buildings, electricity pylons and wind turbines.**	**Unlikely significant effect.**

		Given the site context and existing surrounding uses, and taking into account the advice from NRW, regarding landscape change, the impact of the proposed development in terms of physical change is considered unlikely to have a significant effect.	
Question 1(b) Cumulation with Other Development			
(i) Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?	**Yes. Possible cumulative effect in terms of visual impact with existing uses in the area.**	**Given the context of the site, and noting NRW's consultation response, dated 10 November 2020, any cumulative visual impact is unlikely to be significant.**	**Unlikely significant effect**.
(ii) Are there any plans for future land uses on or around the location which could be affected by the project?	**No.**	**N/A**	
(iii) Is the Project likely to lead to transfrontier effects?	**No.**	**N/A**	
Question 1(c) Use of Natural Resources			
Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?	**Yes**	**There will be a need for construction materials, sand and soda ash, water, gas and electricity.** **The LPA notes it is anticipated that existing capacity for the industrial estate will need to be increased and talks are underway with undertakers. The LPA also notes gas expansion plans have been procured. There is no known issues with providing a water supply to the proposed development.**	**Unlikely significant effect**

Question 1(d) Production of Waste			
Will the Project produce solid wastes during construction or operation or decommissioning?	**Yes**	**The removal of existing vegetation and trees on site would generate waste during the construction phase, however, the extent of site clearance works required and the nature of waste produced is unlikely to generate a significant effect in EIA terms.** **The LPA's screening opinion notes there would be limited waste from the production process, however, this is not considered substantial in the context of the scale of development. Also, the percentage of waste going to landfill is considered to be insignificant.** **Whilst the conclusions of the LPA's screening opinion are noted, there is limited information relating to waste in the applicants' screening request to the LPA or in the additional information submitted to the Welsh Ministers.** **However, considering the type and nature of the proposed glass bottle manufacturing facility and having regard to advice in Annex A of Circular 11/99, regarding indicative thresholds and criteria for identifying Schedule 2 development, the production of solid waste during operation or decommissioning is unlikely to be significant in EIA terms.**	**Unlikely significant effect.**

Question 1(e) Pollution and Nuisances			
(i) Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?	**No.**	**N/A**	
(ii) Will the Project release pollutants or any hazardous, toxic or noxious substances to air?	**Yes. The applicant notes the proposed development will generate aerial emissions.**	**The applicant notes (letter, dated 9 October) that detailed dispersion modelling of the primary pollutants of concern relating to glass manufacturing will be undertaken, to include nitrogen dioxide (NO2), particulate matter (PM10 and PM2.5), sulphur dioxide (SO2), hydrogen chloride (HCl) and metals as a result of emissions from the proposed facility.** **Further information, regarding air quality, was provided by the applicant on 20 October.** **NRW's consultation response, dated 25 August, notes the Usk Bat Sites SAC lies within 800m of the proposed development, of which Lesser Horseshoe Bats are a qualifying feature. In addition, the Mynydd Llangatwg SSSI (Mynydd Llangattock) and Mynydd Llangynidr SSSI are located 800m and 1.5km respectively. These are designated for their sensitive habitats, namely blanket bog, degraded raised bog capable of regeneration, heaths, calcareous rock with chasmophytic vegetation, and support Lesser Horseshoe Bats amongst other bat species.** **NRW notes the applicant indicates that Best Available Techniques (BAT) will be applied to**	**Based on the precautionary principle, the development is likely to have significant effects on the environment**.

		the furnaces to control the emissions however, no further details have been given in relation to any aerial emissions. NRW was, therefore, unable to advise on the likely significant effects of aerial emissions on protected sites. **NRW has considered the additional information, provided by the applicant on 20 October. In its consultation response, dated 10 November 2020, NRW states that "as no details have been given in relation to any aerial emissions and impacts on sensitive receptors, we are unable to advise on the likely significant effects of the proposals in relation to the protected sites on the environment".** **I note that, at this stage, there is a similar lack of detail, regarding aerial emissions and the potential impact on sensitive residential receptors and human health.**	
(iii) Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	**Yes, there will be noise during construction and operation.** **Noise sources during the operational phase include fixed plant and equipment, and vehicular movements.**	**The applicant states, letter dated 20 October, that a construction noise assessment, in accordance with BS5228 is being undertaken. Preliminary results of the assessment indicate that exceedances of the impact thresholds are unlikely, and any potential exceedances can be mitigated with the use of Best Practicable Means outlined in a Construction Code of Practice (CoCP) or a Construction Environmental Management Plan (CEMP).** **The construction traffic is expected to use the existing road network including the A465.**	**Based on the information provided, it is difficult to determine whether the proposed development is likely to have a significant effect on the environment, resulting from operational**

		The applicant states all HGV movements are anticipated to take place during the daytime and, therefore, it is unlikely that the increase in noise will result in a significant effect. **I am satisfied that a CEMP could be secured by planning condition, which would provide a means of controlling or mitigating any potential noise generated during the construction stage, including night-time activities. I note the findings of the applicant's initial construction noise assessment. In this context, there is unlikely to be a significant effect on the environment from construction noise.** **At operational stage, the applicant notes there will be an additional 100 HGV two-way movements accessing and egressing the site. Access to the site will be made from the A465 Heads of the Valleys Road, avoiding sensitive receptors within the village of Rassau where possible. A travel plan for employees will be implemented during operation to minimise potential impacts. The applicant's additional information, dated 20 October, notes preliminary calculations based upon the operational movements of the facility suggests that increases in noise within the nearby road network are likely to result in negligible or minor impacts. Based on the information above, I am satisfied there is unlikely to be a significant effect on the environment from operational traffic noise.**	**noise from the plant. Therefore, based on the precautionary principle, the development is likely to have significant effects on the environment.** **However, there is unlikely to be significant effect resulting from construction activities or from traffic movements during the operational stage.**

		Regarding operational noise from the plant itself, the applicant (letter, dated 20 October) notes a model is being used to calculate operational industrial noise emissions and an assessment of the potential impacts arising from the operational industrial noise sources is currently being undertaken. Potential mitigation measures will then be assessed. However, this information is not currently available. Whilst I note the presence of existing industrial facilities within the Industrial estate and the intervening Heads of the Valleys Road, given the lack of information it is difficult to determine how significant any potential operational noise would be for sensitive residential receptors or the adequacy/effectiveness of any potential mitigation measures.	
(iv) Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater, coastal wasters or the sea?	**No.**	**The applicant has submitted additional information to the Welsh Ministers (dated 20 October), regarding ground conditions and pollutants.** **The desk study found that no significant contamination is anticipated within the site area, however there is a potential for off-site contamination migration into the site via groundwater.** **In its consultation responses to the Welsh Ministers, NRW did not identify any likely significant effects, regarding watercourses or controlled waters.**	**Unlikely significant effect**

Question 1(f) Risk of accidents, having regard in particular to substances or technologies used			
Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?	**Yes.**	**Possibility of accidents during construction phase, but health and safety requirements and legislation would be the appropriate method for dealing with this issue.** **It is not considered that the risk of accidents during construction or operation is likely to be significant.**	**Unlikely significant effect.**
CRITERION 2. LOCATION OF DEVELOPMENT			
Question 2(a) Existing Land Use			
(i) Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?	**No.**	**Additional employment during construction and operational stages, however, not a significant effect in EIA terms.**	
(ii) Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the project?	**No.**		
(iii) Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected by the project?	**No.**	**N/A**	
(iv) Is the project located in a previously undeveloped area where there will be loss of greenfield land?	**Yes - partly**	**Extent of land not significant and site lies in an existing industrial area.**	**Unlikely significant effect.**
(v) Are there existing land uses on or around the location e.g. homes, gardens,	**Yes**	**The applicant notes that the nearest residential properties are located 150m from**	**Unlikely significant**

other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?		**the proposed site, on the southern side of the A465.** **Potential impacts from aerial emissions and noise are considered in question 1(e) (ii) and 1(e) (iii).**	**effect.**
(vi) Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project?	**No.**	**N/A**	
Question 2(b) Relative Abundance, Quality and Regenerative Capacity of Natural Resources in the Area			
Are there any areas on or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?	**No.**	**N/A**	

Question 2(c) Absorption Capacity of the Natural Environment			
(i) Are there any areas on or around the location which are protected under international or national or local legislation for their ecological, landscape, cultural or other value (i.e. historical), which could be affected by the project?	**Yes.**	**The Usk Bat Sites SAC lies within 800m of the proposed development site. The Mynydd Llangatwg (Mynydd Llangattock) SSSI and Mynydd Llangynidr SSSI are located approx. 800m and 1.5km respectively from the proposed development site.** **NRW's advice, dated 10 November 2020 concludes that, "as no details have been given in relation to any aerial emissions and impacts on sensitive receptors, we are unable to advise on the likely significant effects of the proposals in relation to the protected sites on the environment".** **See question 1 (e) (ii).** **The Brecon Beacons National Park is approx. 500m to the north of the site. Potential visual/landscape impacts, regarding the National Park, are considered under question 1(a).**	**Based on the precautionary principle, the development is likely to have significant effects on the environment resulting from the impact of aerial emissions on protected sites**.
(ii) Are there any other areas on or around the location which are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other waterbodies, the coastal zone, mountains, forests or woodlands, which could be affected by the project?	**No.**	**N/A**	
(iii) Are there any areas on or around the		**The Usk Bats Sites SAC is within 800m of the**	**Based on the**

location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project?	**Yes**	**development site, the presence of the lesser horseshoe bat is the primary reason for selection of the site as a SAC. The Mynydd Llangatwg (Mynydd Llangattock) SSSI and Mynydd Llangynidr SSSI are also present in the surrounding area and are designated for their sensitive habitats and support for bat species including Lesser Horseshoe Bats. They are located 800m and 1.5km from the proposed development site, respectively.** **The applicant has provided a draft ecological impact assessment, which NRW notes identifies evidence of a roost adjacent to the site which supports common pipistrelle, brown long eared, myotid bats and lesser horseshoe bats, a feature of the Usk Bat SAC. Both reports confirm that these species are noted to be foraging and commuting on site. However, the value of the habitats on site have not yet been assessed. In addition, there is no indication of the extent the site will be developed or of the likely impacts on the habitats present.**	**precautionary principle, the development is likely to have significant effects on the environment**.
(iv) Are there any inland, coastal, marine or underground waters on or around the location which could be affected by the project?	**No.**	**N/A**	
(v) Are there any areas or features of high	**Yes**	**The boundary of the Brecon Beacons National**	**Unlikely**

landscape or scenic value on or around the location which could be affected by the project, but which are not protected sites? (see 2(c)(i) if located in or near to a protected site)		**Park is approx. 500m to the north of the development site.** **Potential visual/landscape impacts, regarding the National Park, are considered under question 1(a).**	**significant effect.**
(vi) Is the project in a location where it is likely to be highly visible to many people?	**Yes**	**The industrial estate and proposed site will be visible from the A465. However, these views will be transitory for vehicular traffic.** **Due to the topography of the area, the intervening Heads of the Valleys Road, and the presence of existing structures on the industrial site, any visual impact on residential properties is unlikely to be significant.** **The potential visual/landscape impact from Brecon Beacons National Park is considered under question 1(a).**	**Unlikely significant effect.**
(vii) Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project, but which are not designated as historical assets? (see 2(c)(i) if located in or near to designated historical assets)	**No.**	**N/A**	
(viii) Are there any areas on or around the location which are densely populated or built-up, which could be affected by the project?	**Yes**	**The potential impacts from the proposed development on residential properties around the site have been considered in questions 1 (e) (ii) 1 (e) (iii), 2 (a) (v) and 2 (c) (vi)**	
(ix) Are there any areas on or around the	**No.**	**N/A**	

location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?			
(x) Is the project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	**No.**	**N/A**	

6(B).	**Assessment of Significance (AoS) Criteria** **[TO BE USED ONLY IF ANSWERS IN PART 2 (COLUMN 2) OF SECTION 6(A) ARE ‘YES’**
1.	Will there be a large change in environmental conditions?
2.	Will new features be out-of-scale with the existing environment?
3.	Will the effect be unusual in the area or particularly complex?
4.	Will the effect extend over a large area?
5.	Will there be any potential for transfrontier impact?
6.	Will many people be affected?
7.	Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
8.	Will valuable or scarce features or resources be affected?
9.	Is there a risk that environmental standards will be breached?
10.	Is there a risk that protected sites, areas, features will be affected?
11.	Is there a high probability of the effect occurring?
12.	Will the effect continue for a long time?
13.	Will the effect be permanent rather than temporary?
14.	Will the impact be continuous rather than intermittent?
15.	If it is intermittent will it be frequent rather than rare?
16.	Will the impact be irreversible?
17.	Will it be difficult to avoid, or reduce or repair or compensate for the effect?

7	Conclusion			
(i)	**Summary of features of project and of its location**			
	a	Characteristics of development		
		Glass bottle manufacturing facility		
	b	Location of development		
		Land at Rassau Industrial Estate, Ebbw Vale		
	c	Characteristics of the potential impact		
		The proposed project falls within the description of development in paragraph 5(d) to Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (the "EIA Regulations"). The proposed development would generate over 1,000 sqm of new floorspace and, therefore, the project comprises Schedule 2 development for the purposes of the EIA Regulations. **In considering this case I have had regard to the selection criteria in Schedule 3 of the 2017 Regulations and the general advice contained in Welsh Office Circular 11/99: Environmental Impact Assessment ("Circular 11/99").** **In reaching my recommendation I note the advice of NRW, which I accept. NRW, based on the information provided, is unable to rule out likely significant effects resulting from aerial emissions, to the Usk Bats Sites SAC, the Mynydd Llangatwg (Mynydd Llangattock) SSSI and Mynydd Llangynidr SSSI. NRW is also unable to advise on the significance of any effect on protected species. I consider, based on the information provided, it is also difficult to determine the extent or significance of any operational noise generated by the manufacturing operation or the impact of aerial emissions on human health.** **It is my overall opinion and recommendation that, based on the information submitted and the precautionary principle, the proposed development would be likely to have significant effects on the environment and EIA is, therefore, required.**		
(ii)	If a SO/SD has been provided do you agree with it?		Yes	**No**
(iii)	Is EIA required?		**Yes**	~~No~~

8	Options	
Assessment	**Recommended Action**	✓
Schedule 1 development	**8A.** Issue direction stating EIA Required	
Schedule 1 development – appeal is at an advanced stage (PINS ONLY)	**8B.** Issue direction stating EIA Required	
Schedule 2 development – threshold exceeded/ criterion met or Sensitive Area and likely to have significant effects	**8C.** Issue direction stating EIA Required	✓
Schedule 2 development – appeal is at an advanced stage - threshold exceeded/ criterion met or Sensitive Area and likely to have significant effects (PINS ONLY)	**8D.** Issue direction stating EIA Required	
Schedule 2 development – not likely to have significant effects on the environment	**8E.** Issue direction stating EIA Not Required	
Schedule 2 development – appeal is at an advanced stage - not likely to have significant effects on the environment (PINS ONLY)	**8F.** Issue direction stating EIA Not Required	
Schedule 2 development but effects not clear at this stage – file to be reviewed at a later stage	**8G.** No action – review when appropriate i.e. on receipt of new information/case progress	
Schedule 2 development – negative (i.e. EIA not required) LPA screening/Welsh Ministers screening direction issued – PINS agrees (PINS ONLY)	**8H.** EIA Not Required	
Schedule 2 development but not EIA development – negative screening opinion – Welsh Ministers agree	**8I.** EIA Not Required	
Schedule 2 development but not EIA development – positive screening opinion – Welsh Ministers disagree	**8J.** EIA Not Required	
Schedule 2 development – positive (i.e. EIA not required) LPA screening/Welsh Ministers screening direction issued – PINS disagrees (PINS ONLY)	**8K.** EIA Not Required	
Project does not fall within the EIA Regulations as either: (a) it is listed within the descriptions of development Column 1 of Schedule 2 of the EIA Regs but does not meet relevant threshold/criterion; or (b) it does not fall within the categories of development in Column 1 of Schedule 2 of the EIA Regs.	**8L.** EIA Not Required - Issue direction stating either: (A) project listed within descriptions of development in Column 1 of Schedule 2 of the EIA Regs but does not meet relevant threshold/criterion; or (B) project does not fall within the categories of development in Column 1 of Schedule 2 of the EIA Regs.	

Name and Job Title of Assessor	**Nick Iles, Decisions Officer, Planning Directorate, Welsh Government**
Date of Assessment	**18 November 2020**

9A	**Sign-off**
Name and Job Title of Countersigning Officer	**Alan Groves, Senior Planning Manager, Decisions Branch, Planning Directorate, Welsh Government**
Comments of Countersigning Officer[1]	**I agree the assessments made above and the conclusion that EIA is required for the proposed development.**
Signature	
Date	18/11/2020

[1] Comments should reflect whether conclusions/ recommended action of assessor are agreed with.

A2 BGCBC Scoping Response

Richard Crook BSc, DipTP, MBA, MRTPI
Corporate Director Environment and Regeneration / Cyfarwyddwr Corfforaethol yr Amgylchedd ac Adfywio

T: (01495) 355571 DDI: (01495) DX: 43956 Ebbw Vale
F: (01495) 355598 E: Steve.smith@blaenau-gwent.gov.uk

Cyngor Bwrdeisdref Sirol
Blaenau Gwent

Our Ref./Ein Cyf. C/2021/0128
Your Ref./Eich Cyf.
Contact:/Cysylltwch â: Steve Smith

24th June 2021

Mr. Tom Watson
Arup
63 St. Thomas Street
Bristol
BS1 6JZ

Dear Tom,

Re: Environmental Impact Assessment - Scoping Request
Ciner Glass Ltd, Dragon Glass Bottle Manufacturing Facility, Rassau Industrial Estate, Ebbw Vale.

I write in respect of your request that Blaenau Gwent County Borough Council (BGCBC) adopt a scoping opinion under Regulation 14(1) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. This is in respect of a proposed development by Ciner Glass Ltd, Dragon Glass Bottle Manufacturing Facility on land at Rassau Industrial Estate, Ebbw Vale. The scoping report has been considered in light of the amendments made which was submitted to the Council on 20th May 2021.

The proposed development is for a glass bottle manufacturing facility including administration buildings, car parking, landscaping, ecological areas, boundary fencing and other ancillary works. This proposal is to be the subject of a full planning application for the works you have detailed at paragraph 4.3 of the submitted EIA Scoping Report.

The development would consist of a three-part operation to produce glass bottles; the handling of raw materials, the manufacturing of the glass containers and the product-inspection, packaging, storage and despatch. The proposed development consists of a number of distinct components, specifically:

Continued….

- 2No furnaces and associated filters and chimney stacks at approximately 75m in height;
- 2No cullet buildings and stores, approximately 40m in height, for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials approximately 40m in height;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles (approx. 77,000m^2 Gross Internal Area[1]) including workshops and storage areas;
- Office space and welfare facilities including canteen, infirmaries and changing facilities (approx. 5,000m^2 Gross Internal Area);
- An automated warehouse for storage and distribution of glass bottles (approx. 17,300m^2 Gross Internal Area);
- Utilities building which includes plant space and workshops (approx. 10,000m^2 Gross Internal Area);
- Offices and Welfare facilities for plant operations and visitors;
- Waste material stores;
- Standalone plant buildings including substation facilities, liquefied petroleum gas (LPG), Regulating and Metering Station (RMS), and back up fuel storage buildings and facilities;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading

The site is located within the Rassau Industrial Estate to the north of Ebbw Vale. The site is approximately 21.5ha and comprises a vacant plot adjacent to the built facilities of the industrial estate.

Continued…..

[1] Gross Internal Area - the area of a building measured to the internal face of the perimeter walls at each floor level

The site is currently owned by Welsh Government and BGCBC; it is anticipated these will be acquired by the Applicant.

Rassau Industrial Estate was built in the late 1970s to early 1980s and comprises of purpose built business and general industrial units with ancillary office accommodation. It is situated on the slopes of Mynydd Llangynidr, approximately 450m south of the Brecon Beacons National Park (BBNP) boundary. See Figure 1.1.

Tall structures are a common feature including pylons and wind turbines in addition to the industrial units with associated chimney stacks.

The majority of the application site is a vacant plateau on the eastern extremity of the estate. created during the formation of the original industrial estate. Much of the site is now overgrown and consists of grass land, scrub, broadleaved and coniferous woodland. An unadopted asphalt access road extends from the western boundary of the site which transitions into an unbound gravel track providing access to the eastern site extents.

A tributary of the River Ebbw is located within the centre of the site which appears to have been diverted around the northern extent of Rassau Industrial Estate as part of the industrial estate development. The River Ebbw is part of the South East Valleys catchment which eventually flow into the Usk Estuary.

The topography of the site falls from north to south, with the terrain elevation ranging from 427.5m AOD in the north down to 390m AOD in the south eastern corner.

The main access is located at the north-west corner of the site from within the Rassau Industrial Estate. The existing roundabout would be revised to a priority T-junction and comprise a secure access point with a security gate and weighbridge.

Within the surrounding area, the site is located approx. 900m from the SAC, Usk Bat Sites / Safleoedd Ystlumod Wysg and Mynydd Llangatwg (Mynydd Llangattock) SSSI, which stretch to the north, and east of the proposed development.

Continued…..

Cyngor Bwrdeisdref Sirol
Blaenau Gwent
County Borough Council

Lesser horseshoe bats (LHB) are a qualifying feature of the
Usk Bat Site SAC and are the primary reason for the selection of the site. Mynydd Llangatwg (Mynydd Llangattock) SSSI is designated for its habitats, notably base-rich grassland, heath blanket mire and dry heath. The site is also located 1.6km south of Mynydd Llangynidr SSSI, designated for its geological interest; both this site and Mynydd Llangatwg SSSI are also designated as a Regionally Important Geodiversity Sites (RIGS).

Other protected sites are also in proximity, including Sites of Importance for Nature Conservation; the nearest is located adjacent to the east of the site: ENV 3.28 – Ebbw (fawr) River North and South which stretches for 12.4km and includes Carno Reservoir and the associated watercourse.

Section 5.3 Ecology provides further information on these designations. A location plan of the designated sites is presented on Figures 5.6 to 5.8.

There are a number of sensitive receptors within 1km of the site within the surrounding residential areas which include the Rhos Y Fed, wen Primary School, Mrs Puddleduck Day Nursery and Bank House Care Home. Other nearby sensitive receptors include residential properties, some of which are located within 500m of the site boundary.

The proposed scheme falls under Schedule 2 of the EIA Regulations (Wales). A Screening Opinion issued by Welsh Ministers (19/11/2020) concluded that the proposal requires an Environmental Impact Assessment to consider the potential significant environmental effects.

The Scoping Report provides details of the proposed works, consideration of the likely significant effects on the environment, the assessment methodologies to assess these effects, and confirmation of what the developer considers should be scoped in and out of the EIA.

The amended Scoping Report has been circulated to statutory consultees and BGCBC's internal advisors. A list of consultees is provided at Appendix A and copies of their responses provided in Appendix B.

Continued….

Consultees have responded positively and have confirmed the approach set out in your scoping opinion is generally acceptable.

However, NRW have noted that in their response (attached at Appendix B) that Great Crested Newts should not be scoped out of the ecology assessment and that contamination should be scoped in. The Council has had regard to the rationale provided by NRW and agrees with its approach: Great Crested Newts and contamination should therefore be scoped in.

Some additional comments have been made by consultees which you are advised to take into account when preparing the ES.

In summary I can confirm that in accordance with Regulation 15 (Part 4) of the Town and Country Planning (EIA) Regulations 2017, BGCBC as Local Planning Authority has adopted this Scoping Opinion in relation to the Environmental Impact of the proposed works for the future development at Rassau Industrial Estate. The LPA is satisfied that subject to Great Crested Newts and contamination being scoped in, the information provided in the Scoping Report provides an acceptable basis for preparing an ES to support an application for this development. In addition, the topics scoped out (with the exception of the above) appear appropriate for the reasons provided.

A copy of this letter has been placed on Part 1 of the Planning Register as part of the application record (ref C/2021/0128).

Yours sincerely,

S. S

Steve Smith
Service Manager Development & Estates

Appendix A: List of Consultees

Consultee	Resp. Received	General Comments
Internal		
Estates	✓	Provided comments only in relation to land ownership
Highways	✓	Agree with approach
Landscape	✓	Agree with approach
Ecology	✓	Agree with approach
Arboriculture	✓	Agree with approach
Geotech/Structures	✓	Agree with approach
Drainage	✓	No observations other than SAB required
Environmental Health	✓	Agree with approach. Note the following comments: 1. Noise – Need to ensure that developer quotes the correct BS4142 reference. The most up to date one is BS 4142:2014+A1:2019. Also during the construction phase of the project, I would like them to apply for a Section 61 Control of Pollution Act 1974 consent. 2. Air quality modelling. The applicant has proposed using Sennybridge weather data which is OK in principle. However, I am aware that EnviroWales has its own weather station and if that data is available and is robust then it may be more appropriate for this local meteorological data to be used. 3. Light impacts. There is a very brief mention of light nuisance on page 26, just want to ensure the applicant gives due consideration to any potential impacts from the operating of lighting systems both during development and operation of the plant in the EIA.
External		
Brecon Beacons N.P.	✓	Agree with approach, note the following comments: For clarity and accuracy: • Mynydd Llangynidr has extensive upland heath and bog

		S7 priority habitats. Reflected in Table 17, the S7 status1 of these habitats should be noted in Table 39 (page 113).
Natural Resources Wales	✓	Partially agree with approach. NRW are of the opinion that Great Crested Newts and contamination should be scoped in. Their rationale is included in the letter attached at Appendix B. They also note further general comments in relation to a number of other sections in relation to preparation of the EIA.
Public Health Wales	✓	Agree with approach, note the following comments: Regarding environmental considerations, PPW11 highlights the need to consider aspects of climate change, including; • Will the causes and impacts of climate change be fully taken into account through the location, design, build, operation, decommissioning and restoration; and • Does it support decarbonisation and transition to a low carbon economy? PHW suggest that coverage of population and human health are considered as a discrete section within the ES. It would be also useful to consider the following five key principles that should underpin the coverage of population and human health within EIA • Comprehensive approach to health • Proportionate • Consistency • Equity • Reasonableness The end point of EIA population and human health analysis should, where possible, describe the predicted

		health and well-being outcomes as outlined in Planning Policy for Wales Edition 11.
Welsh Gov Roads	✓	Agree with approach
GGAT	✓	Agree with approach
Welsh Water	✓	General drainage comments provided only
Utilities	*X*	
Health & Safety Exec	*X*	

Appendix B – Consultee Responses

Attached

ESTATES

FW: Planning Consultation - Screening Scoping Opinion C/2021/0128

Horner, Louise <Louise.Horner@blaenau-gwent.gov.uk>

Wed 12/05/2021 15:09

To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

Steph

No further comments from Estates other than part of the land within the application is within the ownership of the Council.

Louise

Louise Horner BSc. MRICS

Team Leader Estates & Valuation

Blaenau Gwent County Borough Council

Municipal Buildings

Civic Centre

Ebbw Vale

NP23 6XB

Phone (01495) 355029

louise.horner@blaenau-gwent.gov.uk

From: Miles, Paul <paul.miles@blaenau-gwent.gov.uk>
Sent: 12 May 2021 08:06
To: Horner, Louise <Louise.Horner@blaenau-gwent.gov.uk>
Subject: FW: Planning Consultation - Screening Scoping Opinion C/2021/0128

One for you!

From: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Sent: 11 May 2021 19:26
To: Miles, Paul <paul.miles@blaenau-gwent.gov.uk>
Subject: Planning Consultation - Screening Scoping Opinion C/2021/0128

Date: 11 May 2021

Our Ref: C/2021/0128

Dear Sir/Madam,

TOWN AND COUNTRY PLANNING ACT 1990

HIGHWAYS

RE: Planning Consultation - Scoping Opinion for C/2021/0128

Hopkins, Mark <Mark.Hopkins@blaenau-gwent.gov.uk>
Tue 01/06/2021 14:20
To: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Cc: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

1 attachments (21 KB)
CiNER BGBGC Scoping Response Comments log (002).docx;

Hi Planning

I can confirm that the scoping report parameters and proposed assessment methodology regarding traffic and transport are acceptable to the highway authority.

I trust this response will suffice.

Kind regards

Mark Hopkins BEng (Hons)
Team Manager – Built Environment

Infrastructure Services

REGENERATION & COMMUNITY SERVICES

Blaenau Gwent County Borough Council

Municipal Offices, Civic Centre, Ebbw Vale NP23 6XB

t: 01495 355411 e-mail: mark.hopkins@blaenau-gwent.gov.uk

From: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Sent: 28 May 2021 07:41
To: Hopkins, Mark <Mark.Hopkins@blaenau-gwent.gov.uk>; Eversfield, Kay <Kay.Eversfield@blaenau-gwent.gov.uk>; Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk>; Forouzan, Muhammad <Muhammad.Forouzan@blaenau-gwent.gov.uk>; Leyshon, Jonathan <jon.leyshon@blaenau-gwent.gov.uk>; Jervis, Wayne <Wayne.Jervis@blaenau-gwent.gov.uk>; Congreve, Mark <Mark.Congreve@blaenau-gwent.gov.uk>; Davies, Robert <Robert.Davies@blaenau-gwent.gov.uk>; Griffin, Tim <tim.griffin@blaenau-gwent.gov.uk>; Long, Andrew <andrew.long@blaenau-gwent.gov.uk>; Osborne, Steve <steve.osborne@blaenau-gwent.gov.uk>; Thompson, Dave <dave.thompson@blaenau-gwent.gov.uk>; West, Rhydian <Rhydian.West@blaenau-gwent.gov.uk>
Cc: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>
Subject: Planning Consultation - Scoping Opinion for C/2021/0128

Date: 28 May 2021

Our Ref: C/2021/0128

Dear Sir/Madam,

TOWN AND COUNTRY PLANNING ACT 1990

APPLICATION FOR PLANNING PERMISSION

PROPOSAL: Construction And Operation Of A Glass Bottle Manufacturing Facility.

Memorandum / Memorandwm
Green Infrastructure Team Planning Consultation Response

Planning Application – C/2021/0128
Case Officer: Steph Hopkins
Date: 10/05/2021 **Sent 03/06/02021**

Officer & Date	Comments	LDP Policies (delete as appropriate)	Conclusion	Further Consultation (delete as appropriate)
Landscape Chris Engel (Date) CE 03/06/21	The EIA scoping report provides details of the on-going iterative process associated with the proposal for the Dragon Glass Bottle Manufacturing facility. The report clearly identifies the areas of greatest sensitivity regarding Landscape and Visual Impact. The development site is located at the Eastern extent of Blaenau Gwents primary employment areas with some overspill into the adjacent land areas and as such the report logically concludes that direct landscape impacts are scoped out. The more significant landscape visual impacts on the locality (within 5Km) of the development area are to be subjected to a robust Landscape Visual Impact Assessment in accordance with the Landscape Institutes (GLVIA3) guidance for landscape visual Impact. This methodology is defined in the report and considered appropriate.	ENV1 Green Wedges ENV2 Special Landscape Areas DM1 New Development Criteria DM2 Design and Placemaking	No objection	
Ecology Nadine Morgan (Date)NM 21/05/21	The applicant, CiNER Glass Ltd, are requesting a scoping comment in relation to the proposed Dragon Glass Bottle Manufacturing Facility. The proposed development seeks to utilize a vacant plot within the Rassau Ind Est. Enclosed is an EIA scoping report (prepared by Arup, 30 April 2021) for the applicant in relation to the Dragon Glass Bottle Manufacturing Facility. The potential for significant effects on ecology is one of the topics considered to be scoped into the Environmental Statement (ES), which is to be prepared as part of the application. Pre consultation has taken place with ARUP's ecologist regarding the scope of ecology surveys and potential mitigation. As part of the pre-consultations, potential offsetting was discussed, and potential sites identified within Blaenau Gwent CBC ownership to be considered. The report adequately covers all the impacts on designated sites, key habitats	SP10 Protection and Enhancement of the Natural Environment DM14 Biodiversity Protection and Enhancement ENV3 Sites of Importance for Nature Conservation	No objection Holding Objection Object in current form Object	NRW/GWT

	and species arising as a result of the construction and operation of the proposed development. The potential effects were summarised in Table 39 of the report and adequately identifies the significant biodiversity impacts. In the absence of mitigation, construction and operational effects could occur through habitat degradation, disturbances to protected species, mortality and injury to priority and protected species and loss of ecological connectivity through habitat fragmentation. The proposed mitigation follows the hierarchy of avoid; mitigate; compensate; and enhance (including net gain to ensure protection/enhancement of ecosystem resilience). I agree with the Ecological Assessment Scope methodology detailed within the report, and the rationale for scoping it in the ES (for both construction and operation).			
Rights of Way Chris Engel (Date) **CE 03/06/21**	There are no PROW affected directly by the proposal but the wider network of public paths are considered to be sensitive receptors to the proposal and as such a number of PROW that have potential for greater significant impacts are identified for inclusion in the LVIA	SP9 Active and Healthy Communities	No objection	

Definitions	
No objection	When a feature will not be significantly affected, but enhancements could be made. Or In support of mitigation or conditions put forward by the developer that will prevent a feature from being significantly affected. The relevant plans or documents containing these recommendations will be cited.
Holding Objection	Used when there is insufficient information to determine whether a feature will be affected. Additional information (usually surveys/management plans) will be stated.
Object in current form	Used when the development will have a significant impact on a feature, unless it is modified or conditions attached. Changes, mitigation or compensation will be stated.
Object	Used when the development will have a significant impact on a feature and there is no feasible way to mitigate or compensate

GEO-TECH

RE: CiNER Glass EIA Scoping Opinion Request

Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk>
Mon 17/05/2021 14:05
To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

Hi Steph,

The Geo-technical and Geoenvironmental desk study report submitted with the application (Arup, 2020) highlights potential contamination risks and sets out the proposed intrusive site investigation works to take place before the development starts, including soil and ground water sampling and testing, and ground gas monitoring.

Coal mining (along with sandstone mining) is discussed in the report, but the risk of any subsidence or other damage due to past mining activity is considered low, and no further investigation is considered needed at this stage.

I'm happy with the recommendations made in the desk study report.

Jessica

From: Hopkins, Steph
Sent: 17 May 2021 09:02
To: Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk>
Subject: Re: CiNER Glass EIA Scoping Opinion Request

Its C/2021/0128

From: Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk>
Sent: 17 May 2021 08:42
To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>
Subject: RE: CiNER Glass EIA Scoping Opinion Request

Yes I'll take a look – what is the planning number please?

From: Hopkins, Steph
Sent: 17 May 2021 08:42
To: Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk>
Subject: Re: CiNER Glass EIA Scoping Opinion Request

Neither can I anymore lol, can you access is via the consultation you had from us on N Drive?

From: Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk

Sent: 16 May 2021 22:44
To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>
Subject: RE: CiNER Glass EIA Scoping Opinion Request

DRAINAGE

RE: Planning Consultation - Scoping Opinion for C/2021/0128

Jervis, Wayne <Wayne.Jervis@blaenau-gwent.gov.uk>
Wed 02/06/2021 11:11
To: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Cc: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

Hi Both.
I have no observations to make regarding this amendment.
Regards

W. Jervis,
Team Leader Natural Environment
Municipal Offices
Civic Centre
Ebbw Vale
NP23 6XB
Tel 01495 311556

From: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Sent: 28 May 2021 07:41
To: Hopkins, Mark <Mark.Hopkins@blaenau-gwent.gov.uk>; Eversfield, Kay <Kay.Eversfield@blaenau-gwent.gov.uk>; Norris, Jessica <Jessica.Norris@blaenau-gwent.gov.uk>; Forouzan, Muhammad <Muhammad.Forouzan@blaenau-gwent.gov.uk>; Leyshon, Jonathan <jon.leyshon@blaenau-gwent.gov.uk>; Jervis, Wayne <Wayne.Jervis@blaenau-gwent.gov.uk>; Congreve, Mark <Mark.Congreve@blaenau-gwent.gov.uk>; Davies, Robert <Robert.Davies@blaenau-gwent.gov.uk>; Griffin, Tim <tim.griffin@blaenau-gwent.gov.uk>; Long, Andrew <andrew.long@blaenau-gwent.gov.uk>; Osborne, Steve <steve.osborne@blaenau-gwent.gov.uk>; Thompson, Dave <dave.thompson@blaenau-gwent.gov.uk>; West, Rhydian <Rhydian.West@blaenau-gwent.gov.uk>
Cc: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>
Subject: Planning Consultation - Scoping Opinion for C/2021/0128

Date: 28 May 2021

Our Ref: C/2021/0128

Dear Sir/Madam,

TOWN AND COUNTRY PLANNING ACT 1990

APPLICATION FOR PLANNING PERMISSION

PROPOSAL: Construction And Operation Of A Glass Bottle Manufacturing Facility.

PROPOSED DEVELOPMENT AT: Rassau Ind Est, Main Spine Road North, Rassau, Blaenau Gwent

Further to the consultation we sent you regarding the above application **An inconsistency in the original Scoping Report issued to you has been identified by the agent. The summary tables at section 1.2 and section 5 identified that 'Major Accidents and Disasters' should be 'scoped in' to an Environmental Statement for the development. However, the Scoping Report actually concludes that this topic should be 'scoped out'. The summary tables of the Scoping Report have therefore been updated for consistency and a revised copy of the Scoping Opinion has been attached.**

Please forward your observations on the development within 21 days of the date of this letter. If you are unable to forward your observations within this period, please inform me when they will be available. In the event of no reply from you within that period it may be assumed that you have no observations to offer I will proceed to determine the application.

Yours faithfully

Steph Hopkins

ENV. HEALTH

Ciner

Davies, Robert <Robert.Davies@blaenau-gwent.gov.uk>
Thu 10/06/2021 09:31
To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

Morning Steph,

As discussed yesterday here are EH comments on the above EIA.

Overall comfortable with what has been proposed.

1. Noise – Need to ensure that they are quoting the correct BS4142 reference. The most up to date one is BS 4142:2014+A1:2019.
   Also during the construction phase of the project I would like them to apply for a Section 61 Control of Pollution Act 1974 consent.
2. Air quality modelling. The applicant has proposed using Sennybridge weather data which is OK in principle, but I am aware that Envirowales has its own weather station and if that data is available and is robust then it may be more appropriate for this local meteorological data to be used.
3. Light impacts. There is a very brief mention of light nuisance on page 26, just want to ensure the applicant gives due consideration to any potential impacts from the operating of lighting systems both during development and operation of the plant in the EIA.

Hope this is ok.

Rob

Robert James Davies MCIEH AMIOA
Swyddog Arbenigol Iechyd yr Amgylchedd (Tîm Diogelu'r Amgylchedd)
Specialist Environmental Health Officer (Environmental Protection)

Ffon/Phone: (01495) 355509
07837 093952
Ebost/Email: robert.davies@blaenau-gwent.gov.uk
Gwasanaeth Diogelu'r Cyhoedd, Gwasanaeth Diogelu'r Cyhoedd, Gyngor Bwrdeisdref Sirol Blaenau Gwent, Swyddfeydd Bwrdeistrefol, Canolfan Dinesig, Glyn Ebwy, NP23 6XB
Public Protection Service, Blaenau Gwent County Borough Council, Municipal Offices, Civic Centre, Ebbw Vale, NP23 6XB
Tudalen We/Website: http://www.blaenau-gwent.gov.uk
Tyrdar/Twitter: http://www.twitter.com/blaenaugwentcbc
Facebook: http://www.facebook.com/blaenaugwentcbc

BRECON BEACONS NATIONAL PARK

PARC CENEDLAETHOL BANNAU BRYCHEINIOG
BRECON BEACONS NATIONAL PARK

Sent by e-mail to:		**Date:**	03 June2021
Blaenau Gwent County Borough Council katherine.rees@blaenau-gwent.gov.uk FAO Steph Hopkins		**Officer:**	Chris O'Brien
		Your Ref:	C/2021/0128
		Our Ref:	21/19960/FRI

Proposal: *EIA Scoping for the construction and operation of a Glass Bottle Manufacturing Facility at Rassau Ind Est, Blaenau Gwent.*

Thank you for writing to seek the views of the Brecon Beacons National Park Authority on the Environmental Impact Assessment Scoping Report (Rev A 20 May 2021), received on 28 May 2021.

In line with Part 1 (10) of the Brecon Beacons National Park Authority Scheme of Delegation (*delegation to the chief executive and the planning and heritage manager*), my response has been authorised as that of the Authority by Stephanie Evans, Transition Director / Tracy Nettleton, Planning and Heritage Manager, Brecon Beacons National Park Authority.

Whilst the proposed development is entirely outside the National Park and is accessed from the A465; the scoping report recognises that the Environmental Statement will need to detail:

- The impact of emissions on ecological receptors in the National Park (Tables 17 & 39).
- The visual impact of the development from receptors in the National Park (Table 50).

I agree with these scoping conclusions and note the discharge of vapour from the chimneys has been scoped out of the visual appraisal because the specific weather conditions needed for the formation of a vapour plume will only occur for approximately 0.1% of the year (i.e. <10hrs per year).

For clarity and accuracy:

- Mynydd Llangynidr has extensive upland heath and bog S7 priority habitats. Reflected in Table 17, the S7 status[1] of these habitats should be noted in Table 39 (page 113).
- Section 5.5.2 and Table 45 and 46 refer to consultation with the Landscape Officer of the Brecon Beacons National Park Authority (BBNPA). My observations at pre-application stage were made in my then position of Senior Planning Officer (Policy).

Please do not hesitate to get in touch should you wish to discuss these observations.

Yours faithfully,

---

1 https://www.legislation.gov.uk/anaw/2016/3/section/7/enacted
https://www.biodiversitywales.org.uk/File/57/en-GB

pp. Chris O'Brien MRTPI, Senior Policy Officer

Yr ydym yn croesawu gohebiaeth yn y Gymraeg. Bydd unrhyw ohebiaeth yn y Gymraeg yn cael ei ateb yn y Gymraeg a ni fydd unrhyw gyswllt trwy gyfrwng y Gymraeg yn arwain at oedi yn y mater sy'n cael ei drin.

We welcome correspondence in Welsh. Any correspondence in Welsh will be answered in Welsh and corresponding in Welsh will not lead to a delay in the matter being dealt with.

Cyfoeth Naturiol Cymru
Natural Resources Wales

Ein cyf/Our ref: CAS-148971-H9S2
Eich cyf/Your ref: C/2021/0128

Rivers House,
St Mellons Business Park,
St Mellons,
Cardiff,
CF3 0EY

ebost/email:
southeastplanning@cyfoethnaturiolcymru.gov.uk

Blaenau Gwent County Borough
Council,
Planning Control,
Floor 1A,
Civic Centre,
Ebbw Vale,
NP23 6XB

09/06/2021

Annwyl Syr/Madam / Dear Sir/Madam,

BWRIAD / PROPOSAL: SCOPING DIRECTION FOR CONSTRUCTION AND OPERATION OF A GLASS BOTTLE MANUFACTURING FACILITY.

LLEOLIAD / LOCATION: RASSAU IND EST, RASSAU, EBBW VALE

Thank you for consulting us on the request for a Scoping Direction in relation to the above development which we received on 10/05/2021.

We have considered the information contained within the following documents:

- CiNER Glass Ltd – Environmental Impact Assessment Scoping Report (Ref: Dragon-ARUP-ENVZ-XX-RP-000001) Rev A dated 20/05/2021.
- CiNER Glass Ltd – Geotechnical and Geo-environmental Desk Study (Ref: DRAGON-ARUP-GINV-XX-RP-C-001008) Rev A dated 20/10/2020.

We advise the following matters / topics are 'scoped in' to the Environmental Statement (ES) due to likely significant effects from the scheme.

Ecology

Protected Species
We advise the site is subject to assessment to determine the likelihood of protected species being present in the area and likely to be affected by the proposals. Targeted species surveys should be undertaken for all species scoped in which should be undertaken by qualified, experienced and where necessary, licensed ecologist and comply with current best practice guidelines. In the event that the surveys deviate from published guidance, or there are good reasons for deviation, full justification for this should be included within the EIA.

With reference to Table 39 of the submitted report. We note that great crested newts, water voles and dormice are proposed to be scoped out of the EIA.

Regarding great crested newts, we would advise that this species is not scoping out on the basis of the results of e-DNA surveys alone. We advise that each waterbody is subject to assessment using the High Suitability Index (HIS) methodology and traditional surveys regardless of an e-DNA survey result.

Should protected species be found during the surveys, information must be provided identifying the species specific impacts in the short, medium and long term together with any mitigation and compensation measures proposed to offset the impacts identified. Where proposals implicate protected species which are also notified features of designated sites (e.g. SAC, SSSI), we advise that the EIA considers the impacts on those species from both perspectives.

We advise that the EIA sets out how the long term site security of any mitigation or compensation will be assured, including management and monitoring information and long term financial and management responsibility. Where the potential for significant impacts on protected species is identified, we advocate that a Conservation Plan is prepared for the relevant species and included as an Annex to the EA.

EPS Licence
Where a European Protected Species is identified and the development proposal will contravene the legal protection they are afforded, a licence should be sought from NRW. The EIA must include consideration of the requirements for a licence and set out how the works will satisfy the three requirements as set out in the Conservation of Habitats and Species Regulations 2017 (as amended). One of these requires that the development authorised will 'not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status (FCS) in their natural range'. These requirements are also translated into planning policy through Planning Policy Wales (PPW) February 2021, section 6.4.22 and 6.4.23 and Technical Advice Note (TAN) 5, Nature Conservation and Planning (September 2009). The local planning authority will take them into account when considering the EIA where a European Protected Species is present. We advise that the development incorporates robust green infrastructure that will remain unlit to allow protected species to continue to inhabit the site and move through it. It is vital that the design of the development avoids narrow green infrastructure corridors through it, and avoids breaks in those corridors.

Securing Biodiversity Enhancement
We also advise that, in accordance with the Environment (Wales) Act 2016 and Planning Policy Wales, the application demonstrates how it can deliver biodiversity enhancements and thus contribute to promoting ecological resilience. This is reaffirmed in the Welsh Government letter of 23/10/19 to all Chief Planning Officers.

Air Quality

We note from the submitted report that Air Quality is proposed to be scoped into the EIA. We note the scope of the air quality assessment and proposed methodology in relation to the potential impacts to ecological receptors and agree with the proposals outlined.

Designated Sites

We note that a series of designated sites have been outlined in Table 37 of the submitted report. We note that the majority of the sites that are scoped in are appropriate and I agree with the recommendations in Table 39 to determine what is scoped in or out.

However, given that Siambre Ddu is scoped in we advise that further reasoning is given to why Gilwern Hill and Cwm Llanwenarth Meadows SSSIs are not scoped in for clarity.

Pollution Prevention

We note the submitted report makes references producing a Construction Environmental Management Plan (CEMP). Should permission be granted, we would advise a condition for the inclusion of a CEMP be included.

Landscape

The proposal is likely to add to the industrial character of some views from the edges of the National Park and to have some adverse effects, including cumulatively, by adding to the clutter of vertical structures in the locality. However, views from the National Park are likely to be limited in number and the development would be seen in the context of the existing industrial estate buildings, electricity pylons and wind turbines. Some adverse effects on the National Park are likely, including cumulative effects.

We note that the submitted report identifies that the proposed development may affect the landscape character of the site and immediate surrounding area and that these effects are likely to be minor and not significant. Consultation with the National Park states that the proposals are unlikely to affect the wider Special Qualities of the National Park as effects would be localised, the development does not lie within the park, and the proposed development would not affect the National Park's Core Dark Skies Area. We consider that the development is unlikely to have a significant adverse effect on the landscape character of the National Park and agree that a Landscape Assessment can be scoped out. The assessment can be confined to a Visual Impact Assessment. We note that the assessment would be carried out in accordance with GLVIA 3 and NRW's recent LANDMAP Guidance Note GN46, which is acceptable.

Section 5.5.3 states that a ZTV will be used to analyse visibility and the selection of viewpoints. The discharge of vapour from chimneys has been scoped out as the weather conditions needed for the formation of a vapour plume will only occur for approx. 0.1% of the year. The mitigation will be described in the DAS & Landscape Plans, including design, cladding and appearance. We consider that the detailed design, including the choice of materials and colours, and potential mitigation may reduce the adverse effects to some extent and should be included in the assessment. Cumulative effects, including with the adjacent wind turbine will be appraised. We consider that cumulative effects with adjacent industrial buildings, wind turbine and pylons should be assessed.

Section 5.5.4 outlines the visual baseline for the National Park and five viewpoints within the park to be assessed (Viewpoints 16, 17, 18, 19, 20). We agree with the viewpoint selection and would add that the development has the potential to impact on the visual amenity of views towards the park from the south.

Section 5.5.8 notes that there is the potential for significant adverse visual effects from tall structures, intensification of the industrial estate and infrastructure, loss of woodland in the site, increased hard standing and vehicle movements, and intensification of lighting. We agree that these elements have the potential for significant adverse effects and note that, although the site does not fall within the park's Dark Sky Area, light pollution should nevertheless be kept to a minimum through the design of a sensitive lighting scheme.

Whilst we note the height of the tall structures cannot be mitigated, the colour and finish of the building can make it appear recessive and integrate in views. It notes that a metallic grey reflective building will reflect the landscape back to the viewer. We consider the use of metallic and highly reflective materials far more likely to draw the eye, stand out against the landscape and increase the visual impact, rather than to reduce it and appear recessive. We advise that an Environmental Colour Assessment should be used to inform the colours and materials to be used in the buildings.

Land Contamination

We have reviewed the information submitted in relation to Land Contamination however, at this stage do not recommend contamination be scoped out at this stage.

We note that the site is associated with Made Ground, albeit likely to consist of reworked natural ground. In addition, the site is underlain by the bedrock that forms part of the Lower Coal Measures; sandstones, siltstones and mudstones. The Lower Coal Measures Aquifer is defined as a Secondary 'A' Aquifer.

It would appear that significant ground reprofiling will be required at the proposed development site and that the site is under risk from artesian pressure. The area to the north of the Rassau Industrial Estate is characterised by the presence of numerous springs and marshy ground which would suggest a heightened potential for groundwater and surface water interaction; heightened hydrodynamics that can influence the movement of contaminants, the design of stormwater management systems, piling design and managing legacy water features such as the onsite culverted water course.

We note that the foundation design has not been defined and the nature of stormwater management at the site has not been defined. In addition, the construction of the Rassau Industrial Estate has altered the natural hydrology. One of the onsite surface water features has been culverted. A site-specific geo-environmental site investigation has not been performed to date and is required to assess the ground conditions at the site including the environmental quality of the various ground materials that underlie the site and are likely to be interacted with by the proposed excavation, construction and operational phases of the site.

Flood Risk

We agree with the information submitted in respect of flooding and note these are mainly associated with ordinary watercourses and pluvial/surface water issues. We advise further discussion with the Lead Local Flood Authority on the scope of this.

Further Advice

Description of the Project
Within the EIA, the proposed scheme should be described in detail in its entirety. This description should cover construction, operation and decommissioning phases as appropriate and include detailed, scaled maps and drawings as appropriate.

We would expect the description to include:

- The purpose and physical characteristics of the proposals;
- Location, development size and configuration of the development including flexibility of the site layout;
- Procedures for good working practices;
- Identification of appropriate pollution contingency and emergency measures for watercourses on site;
- Timing of all works and contingency plans should slippage in the programme occur;
- Maintenance requirements of structures;
- Maintenance of any habitats within the site;
- Artificial lighting requirements, including likely intensity and location of light spill on green infrastructure.

Illustrations within the Environmental Statement
Any maps, drawings and illustrations that are produced to describe the project should be designed in such a way that they can be overlaid with drawings and illustrations produced for other sections of the EIA such as biodiversity.

Description of Biodiversity
The EIA must include a description of all the existing natural resources and wildlife interests within and in the vicinity of the proposed development, together with a detailed assessment of the likely impacts and significance of those impacts.

Key Habitats
Any habitat surveys should accord with the NCC Phase 1 survey guidelines (NCC (1990) Handbook for Phase 1 habitat survey. NCC, Peterborough). We advise that Phase 1 surveys are undertaken and completed during the summer to ensure the best chance of identifying the habitats present.

Other Matters

Our comments above only relate specifically to matters included on our checklist, *Development Planning Advisory Service: Consultation Topics* (September 2018), which is published on our website. We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests.

We advise the applicant that, in addition to planning permission, it is their responsibility to ensure they secure all other permits/consents/licences relevant to their development. Please refer to our website for further details.

If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

Lindy Marshall

Cynghorydd - Cynllunio Datblygu / Advisor - Development Planning
Cyfoeth Naturiol Cymru / Natural Resources Wales

PUBLIC HEALTH

25/05/21

Your Ref: C/2021/0128
Our Ref: B5KM2611

SENT BY EMAIL

Steph Hopkins - steph.hopkins@blaenau-gwent.gov.uk
Kath Rees – katherine.rees@blaenau-gwent.gov.uk

Dear Steph

Town & Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017
Scoping opinion request by CiNER Glass Limited for the construction and operation of a glass bottle manufacturing facility at Rassau Industrial Estate, Rassau, Ebbw Vale, NP23 5SD

Thank you for the opportunity to comment on the above scoping opinion.

We understand that the proposed bottle manufacturing facility falls within the threshold of Schedule 2 of the Environmental Impact Assessment Regs (2017) and the consultant (ARUP) has provided a detailed report of what information is to be scoped within the Environmental Statement (ES). We are content with the rationale outlined in the report of identifying the potential environmental effects due to the proposed development, in particular the specific sections on air quality and health. We have a couple of points to consider prior to producing the ES.

Regarding environmental considerations, PPW11 highlights the need to consider aspects of climate change, including;

- Will the causes and impacts of climate change be fully taken into account through the location, design, build, operation, decommissioning and restoration; and
- Does it support decarbonisation and transition to a low carbon economy?

We would suggest that coverage of population and human health are considered as a discrete section within the ES. It would be also useful to consider the following five key principles that should underpin the coverage of population and human health within EIA

- Comprehensive approach to health
- Proportionate
- Consistency
- Equity
- Reasonableness

The end point of EIA population and human health analysis should, where possible, describe the predicted health and well-being outcomes as outlined in Planning Policy for Wales Edition 11.

We look forward to receiving the ES in due course.

Yours sincerely,

Ed Huckle
Principal Environmental Public Health Scientist, CRCE Wales

Andrew Kibble, Senior Manager, CRCE Wales

On Behalf of Environmental Public Health Service Wales

WG ROADS

Response | C/2021/0128 - Bottling Plant Rassau | Welsh Gov

BGCBC - Planning <Planning.bgcbc@blaenau-gwent.gov.uk>
Fri 21/05/2021 08:55
To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

Morning Steph,

Please see response below for your use/info. Saved to the N drive and Civica.

Thanks
Ann

From: Richard.Jones7@gov.wales <Richard.Jones7@gov.wales>
Sent: 21 May 2021 08:40
To: BGCBC - Planning <Planning.bgcbc@blaenau-gwent.gov.uk>
Cc: Kieran.Hayes@gov.wales; A.Webb@southwales-tra.gov.uk; LGC_Development_Control-South@gov.wales
Subject: Bottling Plant Rassau C/2021/0128

FAO Blaenau Gwent Planning,

Regarding the principle of the bottling plant above, the Welsh Government would have no objection. The EIA scoping covers drainage aspects and this will ultimately be signed off by the SAB Authority although there should be no impacts to the A465 in terms of the drainage for the road, ie. No connections or increased run-off to the A465 highway. We may have further comments regarding drainage although the proposals would appear to have this issue generally covered within a proposed EIA.

Yours faithfully,

Richard Jones
Peiriannydd Ffyrdd / Route Engineer

Is-adran Rheoli'r Rhwydwaith - Network Management Division
Trafnidiaeth / Transport
Llywodraeth Cymru / Welsh Government
Parc Cathays / Cathays Park
Caerdydd / Cardiff

Ffôn / Tel: 03000 256573

WG ROADS

FW: Planning Consultation - Scoping Opinion for C/2021/0128

Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Fri 11/06/2021 15:35
To: Hopkins, Steph <steph.hopkins@blaenau-gwent.gov.uk>

From: Richard.Jones7@gov.wales <Richard.Jones7@gov.wales>
Sent: 11 June 2021 14:15
To: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>; LGC_Development_Control-South@gov.wales
Cc: Kieran.Hayes@gov.wales
Subject: RE: Planning Consultation - Scoping Opinion for C/2021/0128

Afternoon Katherine,

As regards this site, there is a bund between the site and the A465 trunk road. The applicant should be mindful that their drainage strategy should not impact on the A465 drainage or runoff rates to the trunk road. This will probably all be picked up in the SAB application although it's worth making the comment.

Kind regards

Richard Jones
Peiriannydd Ffyrdd / Route Engineer

Is-adran Rheoli'r Rhwydwaith - Network Management Division
Trafnidiaeth / Transport
Llywodraeth Cymru / Welsh Government
Parc Cathays / Cathays Park
Caerdydd / Cardiff

Ffôn / Tel: 03000 256573

From: Rees, Katherine <katherine.rees@blaenau-gwent.gov.uk>
Sent: 28 May 2021 07:44
To: Jones, Richard (EST - Transport) <Richard.Jones7@gov.wales>; LGC Development Control (South) <LGC_Development_Control-South@gov.wales>
Subject: Planning Consultation - Scoping Opinion for C/2021/0128

Date: 28 May 2021

Our Ref: C/2021/0128

Dear Sir/Madam,

TOWN AND COUNTRY PLANNING ACT 1990

APPLICATION FOR PLANNING PERMISSION

Our ref: BLG0266/RD

ARCHAEOLOGICAL PLANNING

Blaenau Gwent County Borough Council
Floor 1A
Civic Centre
Ebbw Vale
NP23 6XB

12th May 2021

Dear Sir,

EIA Scoping Opinion – Construction and operation of a glass bottle manufacturing facility
Rassau Industrial Estate, Rassau, Ebbw Vale
App no. C/2021/0128

Thank you for your consulting us on this scoping opinion. We have read the accompanying document produced by the Arup (dated 30th April 2021) with interest.

We do not have the legal expertise to determine whether or not an Environmental Impact Assessment is required; however, there are archaeological and cultural heritage issues which need to be addressed in order to determine the impact of the proposals on the historic environment.

We note that the Cultural Heritage section (Section 6.1) indicates that there are no known archaeological sites within the proposed development area. Sites are located in the vicinity, including several cairns to the west of the proposal. The site has been partially developed and it is likely that previous construction activities have had an adverse effect on any potential remains that may be present in such areas. Therefore it is proposed to scope cultural heritage out of the EIA, whilst maintaining an archaeological watching brief on groundworks in previously undisturbed areas.

In our opinion, such an approach is appropriate and the scope of the watching brief can be detailed in a Written Scheme of Investigation (WSI) and secured via condition. All archaeological work needs to be adhere to the Standards and Guidance of the Chartered Institute for Archaeologists (CIfA).

Furthermore it is our policy to recommend that all archaeological work is carried out by a Registered Organisation (RO) with the Chartered Institute for Archaeologists, or by a full Member (MCIfA) of the Chartered Institute for Archaeologists.

Thank you for consulting us on this scoping opinion. If you or the applicants have any questions or require further advice please do not hesitate to contact us.

Yours faithfully,

R. Dunning

Rob Dunning BSc MCIfA
Archaeological Planning Officer

Archaeologica
Planning

The Glamorgan-Gwe
Archaeological Trus
Limited

Heathfield House
Heathfield
Swansea
SA1 6EL

Tel: (01792)655208
Fax:(01792)474469
www.ggat.org.uk

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
Cardiff
CF30 0EH

Tel: +44 (0)800 917 2652
Fax: +44 (0)2920 740472
E.mail: developer.services@dwrcymru.com

Gwasanaethau Datblygu
Blwch Post 3146
Caerdydd
CF30 0EH

Ffôn: +44 (0)800 917 2652
Ffacs: +44 (0)2920 740472
E.bost: developer.services@dwrcymru.com

Blaenau Gwent County
Council Offices
High Street Blaina
Blaina
Gwent
NP13 3XD

Date: 28/05/2021
Our Ref: PLA0057135
Your Ref: C/2021/0128

Dear Sir/Madam,

Grid Ref: SO154128 315890 212817
Site: Rassau Industrial Estate Ebbw Vale
Development: Construction And Operation Of A Glass Bottle Manufacturing Facility

We refer to your planning consultation relating to the above site, and we can provide the following comments in respect to the proposed development.

SEWERAGE

We can confirm capacity exists within the public sewerage network in order to receive the domestic foul only flows from the proposed development site.

Asset Protection

This site is crossed by public foul and surface water sewers with their approximate positions being marked on the attached Statutory Public Sewer Record. In accordance with the Water Industry Act 1991, Dwr Cymru Welsh Water requires access to its apparatus at all times in order to carry out maintenance and repairs.

No part of any building will be permitted within the protection zone of the public 150mm foul water sewer measured 3 metres either side of the centreline. No part of any building will be permitted within the protection zone of the public 450mm surface water sewer measured 3 metres either side of the centreline. No part of any building will be permitted within the protection zone of the public 985 mm surface water sewer measured 5 metres either side of the centreline. No part of any building will be permitted within the protection zone of the public 1050mm surface water sewer measured 5.5 metres either side of the centreline

Our strong recommendation is that your site layout takes into account the location of the assets crossing the site and should be referred to in any master-planning exercises or site layout plans submitted as part of any subsequent planning application. Further information regarding Asset Protection is provided in the attached Advice & Guidance note.

Surface Water Drainage

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. It is therefore recommended that the developer engage in consultation with the Local Authority, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, Dwr Cymru Welsh Water is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation.

Conditions

No development shall commence until a drainage scheme for the site has been submitted to and approved in writing by the local planning authority. The scheme shall provide for the disposal of foul water. Thereafter the scheme shall be implemented in accordance with the approved details prior to the occupation of the development and no further foul water shall be allowed to connect directly or indirectly with the public sewerage system.

Reason: To prevent hydraulic overloading of the public sewerage system, to protect the health and safety of existing residents and ensure no pollution of or detriment to the environment.

No development shall take place until a potable water scheme to serve the site has been submitted to and approved in writing by the Local Planning Authority. The scheme shall demonstrate that the existing water supply network can suitably accommodate the proposed development site. If necessary a scheme to reinforce the existing public water supply network in order to accommodate the site shall be delivered prior to the occupation of any building. Thereafter, the agreed scheme shall be constructed in full and remain in perpetuity.

Reason: To ensure the site is served by a suitable potable water supply.

Advisory Notes

If the development will give rise to a new discharge (or alter an existing discharge) of trade effluent, directly or indirectly to the public sewerage system, then a Discharge Consent under Section 118 of the Water Industry Act 1991 is required from Welsh Water. Please note that the issuing of a Discharge Consent is independent of the planning process and a consent may be refused although planning permission is granted.

The applicant may need to apply to Dwr Cymru / Welsh Water for any connection to the public sewer under S106 of the Water industry Act 1991. If the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Gravity Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com

The applicant is also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist us in dealing with the proposal the applicant may contact Dwr Cymru Welsh Water. Under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

Our response is based on the information provided by your application. Should the proposal alter during the course of the application process we kindly request that we are re-consulted and reserve the right to make new representation.

If you have any queries please contact the undersigned on 0800 917 2652 or via email at **developer.services@dwrcymru.com**

Please quote our reference number in all communications and correspondence.

Yours faithfully,

Jake MacMillan
Development Control Officer
Welsh Water/Dwr Cymru

A3 Outline CEMP

CiNER Glass Ltd

Dragon Glass Bottle Manufacturing Facility

Outline Construction Environmental Management Plan

Issue | 20 September 2021

Job number 273927-00

Ove Arup & Partners Ltd
63 St Thomas Street
Bristol BS1 6JZ
United Kingdom
www.arup.com

ARUP

Contents

Appendices

1 Introduction

1.1 Project description

The Dragon Glass Bottle Manufacturing Facility development, proposed by CiNER Glass Ltd. seeks to develop a glass bottle manufacturing facility, modelled on their pre-existing facility in Turkey. It will be developed on the Rassau Industrial Estate which is located next to the village of Rassau on the north-eastern edge of Blaenau Gwent County Borough Council (BGCBC) in south east Wales. The site is currently vacant, but there are a number of pre-existing purpose-built light industrial units and ancillary office accommodation adjacent to the site.

The site has existed as development plateaus since the 1980s, when the surrounding industrial estate was also under construction. It is presently overlain with mostly grassland and an area of mixed conifer plantation and broadleaved woodland in the centre.

The proposed development would comprise the following elements:

- 2No furnaces and associated filter buildings and chimney stacks;
- 2No cullet buildings and stores for the storage and processing of rejected and recycled glass;
- Batch building and silos for the storage and mixing of raw materials;
- 2No production lines for hot & cold processing, inspection and packaging of glass bottles including workshops and storage areas;
- Office space and welfare facilities including canteen, infirmaries and changing facilities;
- An automated warehouse for storage and distribution of glass bottles;
- Utilities building which includes plant space and workshops;
- Waste material stores;
- Substation facilities;
- Liquefied petroleum gas (LPG) stores;
- Regulating and Metering Station (RMS);
- Back up fuel storage facilities;
- Main entrance security lodges and associated weighbridge; and
- External hardstanding for the storage of materials, parking and loading.

The proposed development would also include three attenuation ponds for the control of surface water, as well as landscape planting on site to help screen the development and to offset against the vegetation loss on site, amenity space and an ecological pond.

Full details of the project description can be found in ES Volume I: Chapter 3 - Proposed Development.

1.2 Purpose of the Outline CEMP and the CEMP

Outline CEMP

The purpose of the Outline CEMP is to provide a basis from which the detailed CEMP will be developed by the Contractor(s). The Outline CEMP identifies the control measures which will be implemented to avoid and reduce impacts during construction.

At the construction stage, the Outline CEMP will be revised and updated into the CEMP by the appointed Contractor(s) and will include updates following pre-construction surveys, detailed design and construction method statement. The CEMP will be updated should any of the following occur:

- modifications to the design of the proposed development;
- changes in external factors (for example, regulations or standards);
- requirements requested by environmental statutory bodies;
- unforeseen circumstances and changes during construction stage;
- failings in environmental performance identified by routine inspections;
- new findings such as protected species or habitats; and
- unknown archaeological finds.

CEMP

As part of the design process, an Environmental Impact Assessment (EIA) has been undertaken. As part of the EIA, environmental control measures have been incorporated into the design of the proposed development. The CEMP is used to communicate these measures to Contractors during construction.

The CEMP is a "live" document which is constantly developed and updated throughout the design and construction stages. The CEMP will be revised during the construction period to take account of any changes in design and changes in external factors such as regulations and standards.

Towards the end of the construction period, the CEMP will be refined by the appointed Contractor(s) into a Handover Environmental Management Plan (HEMP) which will contain essential environmental information needed by the body responsible for the future maintenance and operation of the proposed development.

In implementing the CEMP, Contractor(s) shall provide details of site personnel and specialist advice required to manage and implement environmental mitigation measures including but not limited to; ecologist, a landscape architect, an arboriculturalist, and archaeologist.

The key aims of the CEMP are to:

- Allow transparent monitoring of environmental commitments made through the detailed design stage. The CEMP will include a register of commitments detailing responsibilities and target dates of implementing and achieving commitments;
- Identify the key staff responsible for implementing environmental control, communicating the commitments set out in the CEMP and identifying training requirements as necessary;
- Incorporate the Contractor(s)'s Environmental Management System (EMS), which will include procedures for change control;
- Include procedures for dealing with emergencies and non-compliances;
- Ensuring that environmental design and mitigation made through the detailed design stage are achieved, or are in the process of being achieved by the Contractor(s), during the construction stage; and
- Provide a review, monitoring and audit mechanism to implement environmental control measures and how any necessary corrective action will take place.

The CEMP will include the following:

- Register of Commitments (RoC) including actions and target dates for completion/achievement, monitoring and reporting procedures;
- details on site management procedures such as hold points at which construction work shall cease until the Environmental Manager agrees that work can proceed;
- latest baseline information gathered as part of any pre-construction surveys and monitoring;
- any licences or consents required (if applicable);
- information and commitments made as part of any public consultation (if required) and consultation following the completion of the EIA;
- details of communication procedures with statutory authorities, non-statutory authorities, interest groups and the public, and for co-ordination of these activities; and
- review, monitoring and change control procedures during construction.

All relevant management plans and method statements will be produced to be include in the CEMP prior to construction, including (but not limited to):

- Invasive Species Management Plan;
- Construction Traffic Management Plan (CTMP);
- Dust Management Plan;
- Construction Noise and Vibration Management Plan;
- Surface Water Management Plan;

- Materials Management Plan;
- Site Waste Management Plan (SWMP);
- Wheel Wash Management Plan;
- Emergency and Pollution Response Plan; and
- Remediation Strategy.

1.3 Guidance

The CEMP is intended to satisfy the principles of the International Environmental Management System (EMS) Standard ISO 14001. The appointed Contractor(s) will ensure that the CEMP for the proposed development complies with the Contractor(s)'s own EMS.

The CEMP will be developed in accordance with relevant best construction practice guidance including:

- Guidance for Pollution Prevention (GPP) 1 – 28[1]. In particular:
    - GPP 2 Above Ground oil storage tanks;
    - GPP 5 Works and maintenance in or near water;
    - GPP 6 Working at construction and demolitions sites;
    - GPP 21 Pollution incident response planning;
- Pollution Prevention Guidance (PPG) 22 Incident response – dealing with spills (Note these are no longer formal best practice guidance although some PPGS have not yet been replaced by GPPs); and
- CIRIA Environmental handbook for building and civil engineering projects.

1.4 Assumptions of the Outline CEMP

This Outline CEMP is based on the information available at the time of writing. It is assumed that the Outline CEMP will be developed into the CEMP by the appointed Contractor(s).

Any planning conditions and commitments made following submission of the planning application (if required) will be incorporated into the CEMP by the appointed Contractor(s).

It is assumed that the CEMP will be updated regularly by the Contractor(s) during construction. Events that will likely trigger a need to update the CEMP are identified in Section 1.2.

It is assumed that a number of Contractors (including specialist Contractors and sub-contractors) may be appointed during construction. All site construction staff, including sub-contractors, will be required to comply with the CEMP throughout the entire construction stage of the proposed development.

[1] http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/ (Accessed 01/06/2021)

It is assumed that any failings in environmental management will be corrected through regular site monitoring and site audits, undertaken by the Contractor's Environmental Manager.

1.5 Documents and records

There shall be two electronic copies of the CEMP, one to be held on site by the Environmental Manager and the other off site by Blaenau Gwent County Borough Council. Both copies are to be kept up to date by the Contractor's Environmental Manager.

1.6 Incident response planning

The Contractor(s) will develop a Pollution Incident Response Plan which identifies the procedures for the event of a pollution incident during construction. The procedures will be in accordance with the guidance set out in PPG21 Incident Response Planning.

All environmental incidents and accidents will be recorded and reported to the Contractor(s)'s Site Foreman and the proposed development Manager. Following a review of the incident, the Contractor's Environmental Manager will instigate an appropriate change in procedures where necessary.

The appropriate equipment required to implement these procedures shall be made available by the Contractor(s) and stored within the Contractor(s)' compound.

2 Roles and Responsibilities

This section of the Outline CEMP identifies the roles and responsibilities of those involved in environmental management during construction.

2.1 Employer

CiNER Glass Ltd are the employer and will appoint a Project Manager to oversee the construction stage of the project.

2.2 Project Manager

The Project Manager will act on behalf of the Employer, with responsibility for managing construction of the proposed development within the agreed environmental constraints in conjunction with all other necessary management processes.

2.3 Contractor(s)

The central role of a Main Contractor is to coordinate and manage all aspects of construction within the site including the provision of the following anticipated roles and or functions:

- A Construction Manager;
- A Health and Safety Manager;
- An Environmental Manager;
- An Ecological Clerk of Works;
- A Community Liaison Officer; and
- A Traffic Safety and Control Officer.

The Main Contractor's role is managing subcontractors and coordinating effectively with other Principal Contractors working within the site. The delivery arrangements associated with the aggregates area (A2) will be developed directly by the operator.

CiNER Glass Ltd will also appoint:

- A Principal Designer; and
- A Technical Advisor/Quality Assurance role.

A summary of each role and function of those detailed above is described in the forthcoming sections. The listed roles should not be regarded as an exhaustive list of all construction roles. Those described reflect anticipated core management functions or where there is perceived exceptional need based on the proposed works or site geography.

2.4 Technical Advisor/Quality Assurance

The Technical Advisor will oversee design matters on behalf of CiNER Glass Ltd to maintain quality standards and the cohesiveness of the entire design and construction across the site.

The Technical Advisor will also support CiNER Glass Ltd in the delivery of periodic safety inspections and support the accurate and consistent reporting of project information produced by the Contractor.

2.5 Principal Designer

CiNER Glass Ltd is to appoint a Principal Designer for the full duration of the construction programme (all phases) to assume the following responsibilities under Construction (Design and Management) Regulations 2015.

The Principal Designer will liaise directly with HSE as necessary on behalf of CiNER Glass Ltd. They will be responsible for planning, managing and monitoring the pre-construction phase and coordinate matters relating to health and safety as well as ensuring all designers comply with their duties.

2.6 Construction Manager

Within their Management Team, the Main Contractor will employ a dedicated Construction Manager whose key roles amongst others will be to:

- Prepare and communicate a detailed Construction Management Plan describing arrangement for delivering the works;
- Discharge Principal Contractor duties under The Construction (Design and Management) Regulations 2015;
- Plan and coordinate the construction work from start to finish, including organising the schedule of work; and
- Manage the construction site on a day-to-day basis, including supervising workers, monitoring sub-contractors, checking materials, inspecting work and overseeing quality control.

2.7 Health and Safety Manager

A Health and Safety Manager will be employed by the Main Contractor to monitor health and safety risks and hazards in delivery of the construction works. This will include ensuring the Contractor and project is compliance with all health and safety legislation and managing emergency procedures as per an Emergency Plan and Evacuation. The Health and Safety Manager will also review and accept on the Contractor’s behalf, all method statements and risk assessments as provided by sub-contractors.

2.8 Environmental Manager

An Environmental Manager will oversee the implementation of the CEMP including environmental control measures, mitigation and procedures. The Environmental Manager will be appointed by the Contractor prior to the enabling works and will implement the control measures and main construction.

The Environmental Manager shall monitor, measure and review the environmental performance of the construction activities.

The Environmental Manager will host regular internal and external meetings and undertake audits to review the operation and effectiveness of the CEMP. The results shall be reported by the Environmental Manager at monthly construction progress meetings and used to update the CEMP.

2.9 Ecological Clerk of Works (ECoW)

An Ecological Clerk of Works will be employed by the Main Contractor to oversee and monitor the implementation of management and mitigation for the protection of habitats and species within and adjacent to the works.

2.10 Community Liaison Officer

A Community Liaison Officer (CLO) will be employed by the Main Contractor to communicate with the community and key stakeholders on progress with the project and construction matters.

The key roles include preparing a Construction Community Engagement Plan and managing the interface between construction and the general public/local community . The CLO will be responsible in fostering an environment that encourages and supports community involvement and engagement, hosting community meetings and leading community development activities such as apprenticeships, work experience schemes etc.

2.11 Traffic Safety and Control Officer

A Traffic Safety and Control Officer (TSCO) will be employed by the Main Contractor to identify, plan and manage traffic management arrangements in support of the works.

3 Control of construction processes

3.1 Contractor Code of Practice

It is recognised that development, whilst essential, is often disruptive to daily life and as such contractors must adhere to the following guidelines in relation to noise, smoke and dust.

Noise

With the exception of emergency works, the generally accepted working hours for noisy construction work are:

- Monday to Friday: 08:00 to 18:00
- Saturday: 08:00 to 13:00
- Sunday: none
- Bank holidays: none.

In addition, the Best Practicable Means (BPM) of controlling noise should be employed at all times.

Smoke

Construction sites should not be burning materials unless a person or building company has a D7 Exemption, which is regulated by Natural Resources Wales (NRW).

Dust

Construction sites should take adequate dust control measures, including:

- reducing dust at source
- damping down
- screening.

3.2 Training, awareness and competence

The Contractor(s) will set out a programme of training to enable all site personnel to be aware of the potential risk to the environment during the construction progress.

The Environmental Manager will set out a series of induction courses for all site personnel including sub-contractors. The induction courses shall ensure all site personnel (including any new personnel) are aware of the environmental risks which have the potential to happen during construction. The inductions will inform the construction team on how to identify relevant environmental risks on site, record actions taken to protect the environmental and implement best practice to minimise pollution.

Environmental Awareness Toolbox Talks will be delivered by the Environmental Manager on a regular basis. These will provide an update to the site team on any relevant environmental issues as the construction progresses.

Selected members of the site management team including the Construction Site Foreman and Environmental Manager will be given practical training in the use of the spill kits, appropriate PPE, clean-up procedures and the appropriate disposal and recycling plans.

3.3 Environmental inspection, monitoring and reporting

The Environmental Manager will prepare a monthly environmental report to be tabled at the monthly site progress meetings. This report will monitor the implementation of the CEMP and review the ongoing site monitoring and inspections.

The monthly reports will be circulated to the Employer and the Contractor(s) for consultation and review.

3.4 Internal communications

All staff and Contractor(s) will be informed of the content and location of the CEMP and associated management plans and method statements. Method Statements will be used to communicate specific environmental requirements as appropriate.

The Environmental Manager will have responsibility for communicating any changes and updates in policy, procedure, best practice guidance and legislation.

The Contractor(s) will have responsibility for maintaining internal communication, including changes to material on display.

3.5 Communications with the statutory bodies and the public

The Contractor(s) will organise and facilitate regular meetings with statutory environmental bodies to provide an update on risk mitigation, progress against targets and a review of site monitoring and inspections. This will provide a mechanism for updating and adapting the CEMP as the project progresses.

The Contractor(s) will maintain a record of all meetings held with statutory bodies during construction stage.

A designated notice board shall be identified on site where environmental information on the project shall be displayed.

In addition, it is envisaged that a section of the site hoardings may be utilised to display information to the public on progress and programme. This will be agreed with BGCBC during the detailed design stage.

4 Description of the construction activities

4.1 Construction programme

Construction will be undertaken over several phases anticipated to commence in Spring 2022.

A detailed construction methodology incorporating the requirements of the outline CEMP will be developed by the Contractor once appointed. For the purposes of this outline CEMP, several assumptions on construction activities and durations have been formulated and are outlined in this chapter.

4.1.1 Indicative construction phasing

The construction programme will be approximately three years, with key activities for each phase of construction outlined in Table 1.

Table 1: Estimated construction phasing periods

Phase	Target Year	Works Summary
1	April 2022 – August 2022	• Mobilisation • Earthworks commence
2	September/October 2022 – 2024	• Commence superstructure for Furnace 1/Line 1 with a view for Furnace 1 to be operational by Q4 2023
3	2025 – 2025	• Commence Furnace 2 works mid 202, with a view for Furnace 2 to be operational by Q4 2025

4.2 Working hours

The Contractor will seek to obtain Section 61 consents from the Environmental Health Officer at BGCBC under the Control of Pollution Act (COPA) 1974 for the proposed construction works including proposed working hours.

General activities will be undertaken 6 days per week from:

- 08:00 to 18:00 Monday to Friday, and
- 09:00 to 12:00 on Saturdays with no Sunday working.

The Contractor may require a period of up to one hour before and one hour after core working hours for start-up and close down activities such as:

1. arrival and departure of workforce and staff on site;
2. deliveries and unloading;

3. checks and examinations of plant and machinery (including test running) and the carrying out of essential repairs/maintenance to plant and machinery;
4. re-fuelling of plant and machinery engines;
5. site inspections and safety checks prior to commencing work;
6. site meetings; and
7. site clean-up.

Certain specific construction activities will require extended working hours for reasons of engineering practicability and safety such as major concrete pours and piling, surveys and lifting/fitting of infrastructure and abnormal deliveries. The nature and timing of these works and the associated extended working hours will be discussed with BGCBC and approval sought through the Section 61 consent process. The Contractor will be required to liaise and consult with BGCBC prior to applying for a Section 61 consent and will be required to maintain regular consultation with BGCBC throughout the duration of the construction works to help facilitate the Section 61 process with regards to additional working hours.

In the case of work required in an emergency, or which if not completed would be unsafe or harmful to workers, the public or local environment, BGCBC will be informed as soon as reasonably practicable of the reasons and likely duration. Examples may include: where the ground needs stabilising if unexpected ground conditions are encountered, concrete pouring taking longer than anticipated due to delayed deliveries or equipment failure.

4.3 Construction compounds

Construction compounds to serve the enabling works and the main construction phases will be located within the site boundary. Further details on location of compounds will be provided in the detailed CEMP once the Contractor(s) have been appointed.

The structures are likely to be comprised of portable cabins, which will act as a focal point for general site management including deliveries and visitor information. Welfare facilities for the construction workforce will also be provided along with meeting space. These facilities are also likely to be comprised of portable cabins.

Onsite parking will be required for construction workers within close proximity to the site offices. The Contractor for each phase will provide clear parking instructions and zoning within each plot boundary for staff and visitor cars; with reverse parking mandated.

Suitable drainage features will be included to minimise and manage sediment and potential contaminants.

4.4 Earthworks and piling

The proposed development will require piled foundations to support the high loads from the superstructure. A ground investigation has not yet been carried out, therefore the substructure strategy and design are based on the geotechnical desk study. The estimated rock level in some areas of the site are likely to be shallow. Where the rock is less than 2.5m from the underside of the proposed slab level it will not be practical to provide piled foundations. Instead, reinforced concrete pad foundations will be provided at column positions bearing directly onto the rock.

Earthworks and retaining walls will be subject to geotechnical and structural design, refer to geotechnical and structural reports. Fill should be placed and compacted in accordance with an earthworks speciation to control and reduce the potential for self-weight settlement.

In delivering all site earthworks, the Contractor will target to re-use, recycle or recover a significant proportion of all terrestrial excavation waste. Contaminated materials will be segregated from ‘clean’ excavated materials, water courses and water bodies to avoid cross-contamination before they are sent for appropriate and permitted treatment, recovery or disposal. An earthworks strategy will be developed prior to construction.

4.5 Plant and machinery

The plant and equipment that would likely be used during the construction may include scrapers, dozers, 360 degree excavators, backhoe loaders, dumpers, dump trucks, rollers and compressors. Other heavy equipment may also be required during the construction of buildings including lifting plant, cranes and fork lift trucks. Precise details of the nature and quantity of plant and machinery for each phase are unknown at this stage but would be defined by the Contractor.

4.6 Site lighting

Temporary lighting to support construction work would generally be limited to working hours with minimal intrusion onto adjacent properties and skyglow. Occasionally for health and safety reasons there may be the need for some intrusion into adjacent properties and to sky glow. It is anticipated that this intrusion would be in exceptional circumstances.

The Contractor will prepare a Construction Lighting Management Plan covering proposed arrangements for managing dimmed and directional lighting. A Construction Manager will be responsible for managing the lighting during the construction phase of the project. The Construction Manager will also be responsible for managing changes to the lighting plans if required.

4.7 Hoardings, fencing and screening

Fencing will be erected around the perimeter of any defined construction site. All plant construction plant will be stored within the confines of the sites, with keys removed and all doors locked. Small plants and tools will be secured within a locked container with suitable warning signs.

4.8 Traffic management

A Construction Traffic Management Plan (CTMP) will be developed by the Contractor. Deliveries by road will be organised to arrive within the construction site working hours and avoid 'peak road activity' times between 08.00-09.30 and 16.00-17.30.

A Construction Logistics Strategy will be implemented by the appointed Contractor to control the impact of construction traffic.

5 Environmental control measures

Control measures have been designed as part of the EIA and are integral to the proposed development.

This section of the Outline CEMP identifies the control (i.e. mitigation) measures as per each environmental topic assessed within the ES.

5.1 General measures

All excavation plant machinery will be fitted with fuel spill kits.

Lighting will be positioned and directed so as not to unnecessarily intrude on adjacent buildings and land uses (including foraging habitats) and prevent any unnecessary interference with local residents.

Vehicle/equipment washing facilities will be positioned away from watercourses and constructed with a drainage system which will capture run-off and effluent which will then be contained for proper treatment as per the Surface Water Management Plan.

To minimise noise, vibrational and air quality impacts from vehicles and plant/equipment, the Contractor(s) will instigate behavioural policies for all site staff. This will include:

- Minimising traffic to site by 'sharing' vehicles or by the use of a site bus (this will be detailed in the CTMP);
- Avoidance of part load deliveries (this will be detailed in the CTMP);
- Utilisation of a pre-booked delivery policy to minimise holding vehicles prior to loading or unloading (this will be outlined in the CTMP); and
- Ensuing that all construction plant, vehicles and equipment are turned off rather than left idling while awaiting usage (this will be detailed in the CTMP).

Where possible, bulk quantities of materials will not be stored on site for long periods. The site will as far as is reasonably practical adopt a ‘just in time’ delivery regime.

Timber and timber-based products will be sourced from Sustainable or Forest Law Enforcement Governance and Trade (FLEGT) licensed sources. The supply of other Construction Products with BES6001 certificates will be maximised to confirm product provenance.

Weather-tight and secure compounds will be established for the storage of materials. Storage areas will not be established in ecologically or environmentally sensitive areas. Materials will be stored within designated areas which may include the use of steel containers.

Areas will be clearly marked and managed to prevent them becoming overfilled and ensured that the areas are suitable for the materials stored.

Hazardous materials such as fuel will be stored within secure compound areas to prevent spillage, theft or malicious damage. A single Control of Substances Hazardous to Health (COSHH) area will be established to ensure the correct level of protection against fire spills and other chemical hazards. This will prevent sub-contractors and others creating individual stores, which are then not recorded or controlled.

5.1.1 Site management and maintenance activities

The contractor will be required to record matters of potential nuisance on site during construction including:

- The record all complaints, including dust / air quality / noise / vibration / odour, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked; and
- Record any exceptional incidents that have the potential to cause nuisance, either on- or offsite, and the action taken to resolve the situation in the log book.

5.1.2

5.2 Air quality

5.2.1 Air quality management – general provisions

CiNER Glass Ltd will require its Contractors to manage dust, air pollution, odour and exhaust emissions during the construction works in accordance with Best Practicable Means. This will include the following as appropriate:

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment Manager/engineer or the Site Manager;
- Display the head or regional office contact information; and
- Develop and implement a Dust Management Plan (DMP), which will include measures to control other emissions, approved by the local authority.

5.2.2 Site management

The site layout will be planned to locate machinery and dust-causing activities away from sensitive receptors, where reasonably practicable. Appropriate methods, such as the erection of hoardings or other barriers along the site boundary, will be used, where appropriate, to mitigate the spread of dust to any sensitive buildings or other environmental receptors.

5.2.3 Monitoring

Air quality monitoring will take place throughout construction, with activities including:

- Undertaking daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary;
- Carrying out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked; and
- Increasing the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

5.2.4 Measures specific to earthworks

Measures specific to earthworks include:

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once where possible.

5.2.5 Measures specific to construction

Measures specific to construction include:

- Avoid scabbling (roughening of concrete surfaces) if possible; and
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

5.2.6 Measures specific to trackout

Measures specific to trackout include:

- Use of water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; and

- Record all inspections of haul routes and any subsequent action in a site log book.

5.3 Cultural heritage

5.3.1 Cultural heritage management – general provisions

All works will be managed in accordance with relevant Standards and Guidance of the Chartered Institute for Archaeologists, taking account of the relevant sections of Written Scheme of Investigation, developed by CiNER Glass Ltd. and its contractors.

General cultural heritage management measures will include:

- provision to the contractors of locations and descriptions of all known cultural heritage assets within and adjacent to, construction works, including restrictions to construction methods to protect cultural heritage assets, where these have been identified in the ES;
- a programme detailing the implementation of cultural heritage survey works prior to and during construction, addressing the measures set out in the ES;
- CiNER Glass Ltd. will ensure that the cultural heritage mitigation works measures (as set out in the ES and below) are properly programmed by its contractors;
- CiNER Glass Ltd. will require its contractors to monitor compliance using appropriately qualified environmental management staff with specific responsibility for supervising works with the potential to affect cultural heritage interests;
- during all stages, CiNER Glass Ltd. will require its contractors to facilitate archaeological specialists undertaking the works as specified as an appropriate mitigation measure (including purposive investigation and/or watching brief works);
- all archaeological intervention, recording, analysis, dissemination and archiving will be undertaken by a suitably qualified and demonstrably experienced organisation; and
- BGCBC heritage officer will be consulted as appropriate through all stages of the implementation of the programme of cultural heritage works.

5.3.2 Written scheme of investigation

A Written Scheme of Investigation (WSI) will be prepared in advance of site preparation and construction, in consultation with BGCBC by a suitably qualified archaeological sub-contractor. A programme of works shall also be agreed with BGCBC. The archaeological works may include, but are not limited to:

- archaeological excavation – strip, map and record;
- archaeological excavation – targeted; and/or
- geoarchaeological sampling.

The WSI will detail the generic principles, standards, methods and techniques to be employed on the project for cultural heritage works. All cultural heritage works will be undertaken in accordance with the WSI.

The WSI must also make provisions for:

- the deposition and management of an archive; and
- present an achievable timescale for the publication of final reports and the deposition of these, and their data, with the HER and/or HCRO as appropriate.

5.3.3 Metal detectors

During site preparation and construction, the use of metal detectors will be prohibited within areas of identified/defined archaeological interest unless deployed by archaeological specialists or other appointed persons in the execution of their activities. Should during artefacts of archaeological interest or expected interest be located the course of construction these will immediately be reported to the contractors' project manager.

5.3.4 Human remains

Should human remains be located during construction either during archaeological works or as part of construction activity CiNER Glass Ltd. and its contractors will comply with all relevant legislative and project specific requirements.

5.3.5 Measures in the event of unexpected discoveries of significance

Should cultural heritage assets of potential national significance be unexpectedly revealed during construction the procedure, as previously agreed with BGCBC, and where appropriate Cadw, will be implemented in the event of any such discoveries being made. Mitigation may include the following, as appropriate:

- investigation and assessment of discoveries to determine their significance if this cannot be determined from the asset as found;
- assessment of potential project impacts to inform design of appropriate mitigation measures;
- preparation of a written scheme of investigation for any stage of archaeological work required;
- excavation, recording and reporting on any discoveries; and
- recording and implementing measures to preserve any discoveries in situ, if required or if appropriate.

Appropriate fencing and hoarding will be provided as necessary to protect sites of archaeological or cultural heritage interest within or adjacent to the construction site, including unknown sites discovered during construction.

5.3.6 Monitoring

Archaeological works will be monitored on a regular basis by BGCBC where appropriate.

Risk assessments will be undertaken at sites of archaeological interest adjacent to the construction site prior to, during and following construction works.

5.4 Ecology

5.4.1 Ecology management – general provisions

Appropriate measures will be adopted to protect the ecology of the site with special attention to specified ecological resources, as identified within the ES.

Contractors will need to manage impacts from construction on ecological resources, including the following measures relevant to ecological impacts:

- Protected and notable species (e.g. including bats, breeding birds and invertebrates);
- Statutory designated sites including Usk Bat Sites SAC, Cwm Clydach Woodlands SAC, Mynydd Llangatwg SSSI and Mynydd Llangynidr SSSI;
- Other habitats and features of ecological importance (e.g. retained scrub,trees and watercourse).

Where reasonably practicable, environmental mitigation will be provided via the design and implemented by the Contractors within the works. This will require preparatory work to be undertaken ahead of the start of construction to permit timely progress of the programme.

The following information will be prepared prior to construction including the following measures, as appropriate:

- summary of features of interest for all known areas of nature conservation interest (as identified within the ES) which may be affected due to construction;
- plans showing the locations of all known areas of nature conservation interest that may be affected due to construction including access routes;
- provision of guidance on ecological best practice methods to be followed in order to mitigate potential ecological effects during construction;
- plans showing the location for all fences/barriers to be erected for the purpose of controlling animal movements during and post construction, e.g. badger and reptile fencing;
- plans showing the location of ecological features which are to be created/installed prior to construction (e.g. reptile refugia and bord boxes);
- procedures to be adopted in the event of unanticipated discovery or disturbance of protected species;
- reference to the relevant procedures, including any special measures, to be implemented in the event of a pollution incident, where this occurs on or adjacent to an area where protected and/or notable species are known to be present;

- invasive individual habitat or species management plans to include the information above (where appropriate) for:
  - terrestrial habitats;
  - European Protected Species (e.g. bats, great crested newts, otter);
  - other protected and/or notable species, e.g. badgers, breeding birds, invertebrates; and
  - treatment of Schedule 9 species on site.
- The Contractor shall adhere to the Landscape Management Plan required to be produced;
- Protective fencing during construction will be used ensure no vehicle or people enter riparian buffer zone, tree root protection zones, and/or ecological retention areas, except for habitat creation and enhancement activities and then under supervision by a suitably qualified ecologist, as appropriate;
- All terrestrial habitat clearance will be conducted in a staged and sensitive manner to allow individuals (e.g reptiles, amphibians, hedgehogs) to move out the area in to existing habitats and monitored by a Ecological Clerk of Works (ECoW). Provisions will be made by the ECoWs for any animals found during construction which need to be moved;
- An ECoW will monitor any draw down of waterbodies, to ensure that any amphibians are removed safely;
- All active badger setts will be closed under a derogation licence from Natural Resources Wales (NRW) under supervision of a licensed ecologist;
- Any great crested newts or reptiles encountered will be carefully moved out of the construction areas to suitable receptor areas outside of the construction footprint. A destructive search will be undertaken, at the end of the trapping/relocation programme, therefore facilitating the relocation of any reptiles which have evaded capture (and in any areas where it has not been possible to fence). Further details are provided in the separate Great Crested Newt Conservation Strategy and will be fully detailed in a subsequent licence application and associated method statement;
- Materials or plant will not be left overnight in an area that may prohibit access for accessible to commuting otters and or badgers and excavations will not be left uncovered overnight. If any excavations are required to be left open overnight, a ramp will be provided created to allow any animals to escape;
- Trees assessed as being low suitability for roosting bats after the pre-construction survey will be soft felled under supervision of an ECoW, with any cutting avoiding potential roosting features and leaving tree limbs on the ground overnight to allow any bats to escape;
- The contractors will, where reasonably practicable, reduce any habitat loss within the land provided for the proposed development by keeping the working area to the minimum required for construction of the proposed development.

The following management measures for potential ecological impacts are addressed in other sections of this document and are not repeated here. These include measures relating to:

- Protection of retained habitat, including trees, in accordance with British Standard BS 5837:2012;
- Control of dust (discussed throughout);
- Control of water quality (see Section 5.8);
- Control of noise and vibration (see Section 5.5); and
- Lighting (discussed throughout).

5.4.2 Monitoring

CiNER Glass Ltd will require an ecologist to be retained to act as an Ecological Clerk of Works (ECoW) during the construction period. The ECoW will be available to monitor any potential aspects of the works as required and advise on potential constraints relating to qualifying features of the SAC that may arise.

5.4.3 Measures specific to construction

CiNER Glass Ltd will require its Contractors to undertake the following general provisions to prevent potential impacts on lesser Horseshoe bats:

- The provision of toolbox talks by a qualified ecologist to highlight the ecological features on site to all site staff. A list of all attendees will be signed and recorded with the site office as record of the talk;
- Measures to protect trees to be retained within and immediately adjacent to the Site and access route in line with the British Standard BS5837:2012 and the tree survey report submitted as part of planning;
- In order to ensure minimal lighting of adjacent habitats and disturbance to nocturnal species, any lighting required outside of daylight hours will be directional towards the ground to ensure no light spill over 0.5 Lux;
- Construction noise and vibration will be minimised as far as possible in line best practice;
- All vehicles and machinery will be switched off when not in use;
- All traffic on site will be restricted to low speeds during construction;
- A sensitive lighting plan will be produced to demonstrate how retained landscape habitats within and adjacent to the site will not be illuminated during operation. This will follow best practice guidance by the Bat Conservation Trust[2]; and

[2] https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/

- A traffic management plan for the site's operation will ensure traffic on site is restricted to low speeds.

Other measures required to be followed by the appointed Contractors include:

- Potential impacts on European designated sites and retained fungi habitats on site from changes in air quality during construction will be mitigated for through the implementation of best practice dust management and management of traffic during construction;
- Where possible, broadleaved trees of value to fungi will be retained on site during construction; and
- Amphibians and reptiles will be removed safely by a suitably qualified ecologist if any waterbodies drained down, and or any found during reptile trapping and relocation. Any amphibians will be relocated to adjacent marshy grassland.

5.5 Noise and vibration

5.5.1 Noise and vibration management – general provisions

The following measures relevant to noise impact will be implemented, where possible:

- Best Practicable Measures (BPM) (as outlined in Section 72 of COPA will be employed in order to minimise noise and vibration levels throughout the period of the works;
- Recommendations and good practice as shown BS 5228 'Code of practice for noise and vibration control on construction and open sites' (2009) would be adopted; and
- The general BPM measures set out in BS 5228.

The effects of noise and vibration from construction sites will be controlled by introducing management and monitoring processes to ensure that BPM are planned and employed to minimise noise and vibration during construction. As part of the Contractors' environmental management system, a noise and vibration management plan will be prepared and will set out these processes. The plan will include management and monitoring processes to ensure as a minimum;

- integration of noise control into the preparation of method statements;
- ensuring proactive links between noise management activities and community relations activities;
- preparing details of site hoardings, screens or bunds which will be put in place to provide acoustic screening during construction, together with an inspection and maintenance schedule for such features;
- undertaking and publishing all monitoring required to ensure compliance with all acoustic commitments and consents;

- implementing management processes to ensure on-going compliance, improvement and rapid corrective actions to avoid any potential non-compliance;
- provision of lined and sealed acoustic covers for equipment which would be in place while equipment is running;
- regular maintenance of all equipment;
- operation of equipment in the mode of operation that minimises noise;
- shutting down equipment when not in use;
- avoiding waiting or queuing on the public highway with engines running;
- selection of piling methods which minimise noise and vibration;
- handling all materials in a manner which minimises noise;
- the use, by preference, of non-audible warning systems and where audible warnings are necessary for reversing, vehicles operations would be planned to minimise reversing;
- fitting of silencers to all plant, machinery and vehicles;
- choice of routes and programming for the transport of construction materials, spoil and personnel;
- limiting the duration of noisy activities across working day to control overall daily noise exposure; and
- choosing optimum times of day to operate noisier equipment timed to cause least disruption to the largest number of neighbours.

5.5.2 Site management and maintenance

CiNER Glass Ltd will require its Contractors to limit noise and vibration whilst on site as follows:

- All vehicles and mechanical plant shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order and operated to minimise noise emissions;
- All compressors and generators shall be ‘sound reduced’ models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use, and all pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;
- All machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum. Lorry engines will be switched off, as soon as practicable, when vehicles are stationary;
- Noise emitting equipment which is required to run continuously shall be housed in a suitable acoustic enclosure;
- Temporary noise barriers will be used to reduce noise levels where appropriate and practicable. Such measures can be particularly appropriate for stationary or near-stationary plant such as pneumatic breakers, piling rigs and

compressors. Barriers should be located as close to the plant as possible and, in order to provide adequate attenuation and should have a mass per unit area of at least 7 kg/m2;

- Plant and equipment liable to create noise and/or vibration whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors and away from walls reflecting towards sensitive receptors;
- Materials for night-time working shall be delivered, where practicable, during normal hours of working and be placed as close as possible to the work area for which they are required;
- Where reasonably practicable, fixed items of construction plant shall be electrically powered in preference to combustion engine driven; and
- Doors on plant and equipment will be kept closed.

Additionally, it should be noted the local authority has powers under the Control of Pollution Act (1974) to control noise from construction sites.

5.5.3 Measures specific to construction

To minimise the level of noise to which sensitive receptors will be exposed, the construction work will be conducted in accordance with the below measures which will be based upon the BS5228 standard:

- Careful selection of plant and construction methods. Only plant conforming to relevant national, EU or international standards, directives and recommendations on noise and vibration emissions should be used;
- Design and use of site enclosures, housing and temporary stockpiles, where practicable and necessary, to provide acoustic screening at the earliest opportunity;
- Where practicable, doors and gates should not be located opposite occupied noise-sensitive buildings. The mechanisms and procedures for opening doors/gates will minimise noise, as far as reasonably practicable;
- Choice of routes and programming for the transport of construction materials, spoil and personnel; and
- Careful programming so that activities which may generate significant noise are planned with regard to local occupants and sensitive receptors.

5.5.4 Section 61

CiNER Glass Ltd will require its Contractors to obtain Section 61 consent from the BGCBC under the Control of Pollution Act 1974. Section 61 applications will be made to the BGCBC at least 28 days before the relevant work is due to start or earlier if reasonably practicable.

The Contractor will submit the application to the Applicant for review and approval, prior to submission to the BGCBC.

Details of construction activities, prediction methods and levels, location of sensitive receptors and noise and vibration levels will be discussed with the BGCBC, prior to and during construction work. Dialogue between the Applicant, the Contractor and the BGCBC will continue for the duration of the construction period.

Guidance and advice including a template document can be found from the Association of Noise Consultants website (https://www.association-of-noise-consultants.co.uk/construction-noise/). The Applicant and/or the Contractor will seek to agree a common format for the Section 61 application, consent conditions or any dispensations, variations and over-runs.

5.5.5 Dispensation/variation/overrun

In the event that works for which a Section 61 consent has been applied for have to be rescheduled or modified (e.g. method or working hours) for reasons not envisaged at the time of submitting the Section 61 consent application, the Contractor will apply for a dispensation or variation of the Section 61 consent application from the BGCBC. The Contractor will apply for and obtain the dispensation or variation before commencing those works, at the time specified within the Control of Pollution Act 1974.

In the event that planned works extend beyond the approved working hours and continue due to unforeseen circumstances that would affect safety or engineering practicability, the Contractor will notify the BGCBC as soon as reasonably practicable of the overrun using a pre-agreed approach with the BGCBC.

5.5.6 Monitoring

The Contractor will undertake regular noise and vibration monitoring including physical measurements and visual checks/audits at the Application Site in line with the Section 61 consent to highlight any potential noise impacts arising from the construction of the Project.

The relevant Section 61 application will include a detailed description of the monitoring and monitoring locations proposed for the particular works covered by the consent application.

5.6 Transport

5.6.1 Transport management – general provisions

CiNER Glass Ltd will require its Contractors to manage transport during the construction works in accordance with BPM. General provisions will include drawing up a CTMP, the scope of which will be agreed in discussion with BGCBC.

5.6.2 Site management and maintenance

The site will be managed to reduce the effects on traffic arising from construction. Measures to promote appropriate management and maintenance of the site will include:

- Speed limits shall be put into place on site for all vehicular movements;
- HGV movements will be restricted as far as reasonably possible to avoid traffic flow periods 08:00 to 09:00 and 16:30 to 18:00;
- Temporary and permanent site accesses, alongside an access management strategy to avoid potential traffic congestion in the peak hours;
- Speed limits shall be put into place on site for all vehicular movements;
- Sufficient parking and circulation will be provided within the site to avoid impacts on the neighbouring highways of nuisance car parking; and
- A wheel wash facility shall be used for vehicles egressing the site.

5.6.3 Monitoring

Monitoring of the traffic associated with the proposed development during the construction period will also be undertaken as part of the CTMP. It is anticipated that monitoring of traffic in the operational phase will be undertaken as part of the implementation of the full Travel Plans.

5.6.4 Measures specific to construction

Measures specific to construction include:

- Where necessary, use of road sweepers shall be incorporated to ensure highways remain clear of dust and mud;
- Road edges and pathways shall be swept by hand and damped down as necessary;
- Stockpiles to be dampened down, enclosed or covered as appropriate, be sealed or sprayed with chemical bonding agents as required, and located away from any sensitive receptors wherever possible;
- Neighbouring communities and businesses will be consulted and kept informed of the traffic management proposals;
- Where appropriate, all vehicles carrying loose material shall be covered;
- Designated construction traffic routes to avoid disruption on local roads;
- Introduction of temporary pedestrian and cyclist crossings, if considered necessary; and
- Temporary traffic control measures, where required, such as temporary traffic signals and banksperson.

5.7 Visual

5.7.1 Visual management – general provisions

The following measures relevant to landscape and visual impact will be implemented, where possible:

- Adherence to recommendations made by arboricultural impact assessment in accordance with BS 5837:2012, to retain and protect trees during the construction period in accordance with the recommendations made;
- Compounds and other construction facilities would be sited with temporary fencing and facilities would be rendered in appropriate tonal colours to reflect the landscape as well as screened in part by solid hoardings;
- Soil structures would be protected where land would be used temporarily, such as for compounds, haul roads, re-grading areas, so that when it is returned to the existing land use, it is in a suitable condition, with any soil remediation work strictly following soil management plan;
- Retention of woodland along the southern boundary to maintain part of the character and composition of the view; and
- Early or advanced planting, where practical, would be established prior to main construction works for softening and filtering views of the construction and subsequent operational phase, as well as part of the wider visual mitigation if land is not required for other construction activities.

5.7.2 Measures specific to earthworks

Soil structures would be protected where land would be used temporarily, such as for compounds, haul roads, re-grading areas, so that when it is returned to the existing land use, it is in a suitable condition, with any soil remediation work strictly following soil management plan.

5.7.3 Measures specific to construction

Early or advanced planting, where practical, would be established prior to main construction works for softening and filtering views of the construction and subsequent operational phase, as well as part of the wider visual mitigation if land is not required for other construction activities.

5.8 Water environment

5.8.1 Water environment management – general provisions

The measures in the following will be put in place to prevent pollution to the water environment:

- Any hazardous materials (such as fuels, oils and chemicals) will be stored in a secure area with suitable secondary containment (e.g. drip trays, bunds);

- Refuelling of plant and machinery onsite would be carried out in a designated area with suitable measures for the containment of any spillage; all refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses and away from drains as far as reasonably practicable. Vehicles will not be left unattended during refuelling;
- All construction staff will receive appropriate training of what to do in the event of a spillage and there will be provision of spill kits on site. Machinery will be regularly maintained and checked to minimise the risk of spillage;
- Restrictions will be placed on the use of machinery near adjacent water bodies;
- Where required, treatment of any runoff from construction areas with elevated suspended solids prior to discharge. Approval will be obtained from NRW for any discharges to controlled waters. Treatment measures could include perimeter cut-off ditches, settlement lagoons, overland flow and/or settlement tanks;
- Wheel wash facilities will be provided for vehicles moving to and from the application site at all entry and exit points. Silty water from wheel-washes will require appropriate disposal to prevent unacceptable levels of suspended solids entering any nearby surface water bodies. As noted above, where required, any disposal of surface water generated on site during construction to controlled waters will require consent from NRW. Wheel washing facilities will be located as far from surface waters as possible;
- If dewatering is required on any part of the application site, pumped groundwater will be disposed of appropriately and any relevant consents obtained;
- The reseeding of cleared land will be undertaken as soon as practicable, to minimise exposed land and the entrainment of sediment by overland flow. This can be managed by ensuring construction plant/materials are stored on hardstanding surfaces where possible. Where this is unavoidable, the Contractor will ensure any compacted soil is loosened as soon as possible following completion of the works; and
- Only construction equipment and vehicles free of oil/fuel leaks which could cause material contamination will be permitted on site.

CiNER Glass Ltd will require its Contractors to manage and dispose of foul water and sewage effluents from site facilities, complying with Pollution Prevention Guideline 4: Treatment and disposal of sewage where no foul sewer is available, the EA's guidance document GP3 - Groundwater Protection Policy and Practice, other relevant guidance and the following measures, as appropriate:

- Containment by temporary foul drainage facilities and disposal off-site by licensed contractors;
- By preference, connection to the local foul sewer system as agreed with the relevant authorities; or

- Where a foul sewer is not present, appropriate treatment and discharge to a watercourse or soakaway with approval from the EA, where required. Any foul drainage discharge to the public sewer will require approval from BGCBC. If not permitted, provisions need to be adopted to remove the liquid from site for disposal, such as via tanker.

5.8.2 Site management and maintenance

Measures to mitigate the potential impacts on the water environment and flood risk will include:

- An Action Plan for safely dealing with unexpected contamination;
- Management of construction-related waters; and
- Sustainable use of soils on a construction site.

5.8.3 Monitoring

A watching brief will be undertaken for the duration of site works in areas of potential contaminated land or groundwater (by a suitably qualified and experienced person).

Other environmental monitoring must also be undertaken, including surface water and ground water monitoring.

5.8.4 Measures specific to earthworks

Foundation Works Risk Assessments (FWRA) for piling, to identify appropriate piling techniques, will be undertaken. The detailed design of underground structures, such as piled foundations would also consider measures to reduce impacts on groundwater flow and quality. The selection of the piling methodology allowing to minimise the risks will be informed by foundation works risk assessment undertaken in accordance with published guidance.

The assessment in the ES will estimate the zone of influence of the proposed work based on site specific parameters obtained from intrusive ground investigations. Should impact on any of the identified features be confirmed the following mitigation would be considered:

- Construction sequencing and zoning to reduce the pumping rates and the surface area that must be dewatered;
- Using 'closed-circuit' dewatering systems that involve recharging the abstracted water to ground within or close to the site, rather than pumping off-site;
- Groundwater level monitoring on the boundary during basement construction; and
- Surveillance of the potentially impacted features including water level monitoring in the abstraction well.

The estimated zone of influence will also allow identification of off-site sources and potential contaminants associated with these sources that may potentially impact the site during the dewatering works. In addition, ground investigations will gather information on the aquifer to estimate travel times of these contaminants within the aquifer to inform the risk assessments, which in turn will form basis to water management practices during construction.

5.9 Climate change

5.9.1 Climate change – general provisions

5.9.2 Measures specific to construction

Measures proposed to mitigate the impact of GHG emissions from the construction of the proposed development may include:

- Implement the principles of ‘designing out waste’ to reduce the embodied emissions associated with the manufacture of materials that are subsequently wasted;
- Select alternative materials with lower emissions intensities e.g. recycled materials, cement substitutes; and
- Select local material suppliers to reduce the transport distances and associated emissions from freight.

5.10 Health

5.10.1 Health – general provisions

Measures to minimise impacts on health are largely embedded within Section 5.2: Air quality and Section 5.5: Noise and vibration, and has mostly been addressed by embedded mitigation. Additional measures include ensuring that local residences are kept informed over the duration of the construction programme, to warn them of any particularly noisy construction practices that are scheduled to take place. Local procurement strategies should be used to enhance potential for positive effects as a result of the proposed development.

5.11 Materials and waste

5.11.1 Measures specific to construction

Measures proposed to mitigate the impact on material sources and waste arisings as a result of the proposed development include:

- Employing Circular Economy principles in the design and construction, including sourcing sustainable materials and 'designing out waste’. Measure should be employed to minimise the wider environmental impacts of the materials used in construction and to reduce the volume of waste produced during construction;

- Appropriate segregation and storage of all excess and waste materials, to facilitate either reuse on site or reuse and recycling off site.
- Onsite reuse excess materials from earthworks for site preparation and landscaping.

Appendix A

Site Waste Management Plan

1 Introduction

1.1 Purpose

The purpose of the Outline Site Waste Management Plan (SWMP) is to set out proposals for the identification, segregation, handling and storage of different types of wastes identified as arising from the works. These wastes (by quantity/type/ /EWC code, etc.) and their disposal route will be recorded in the SWMP during construction.

The aim of using a SWMP is to minimise the amount of waste produced during the construction of the project, minimising environmental impacts and maximising cost savings. The Client, CiNER Glass Ltd, as well as the Contractor (to be appointed) shall take all reasonable steps to ensure all waste from this site is dealt with in accordance with the waste duty of care in section 34 of the Environmental Protection (Duty of Care Regulations 1991 (b), including that materials will be handled efficiently and waste managed appropriately.

1.2 Structure and Scope

This Outline SWMP has been prepared during the outline design period, in preparation for planning application submission. Detailed information on the waste arisings is not yet available. This will become available during the detailed design stage upon appointment of the contractor.

The Outline SWMP considers the type and volume of waste that are likely to be generated from the construction of the Dragon Glass Bottle Manufacturing Facility. In particular, it sets out:

the waste regulation framework;

the types of waste that will be generated;

how the waste will be managed;

the waste management facilities available; and

the methods used to measure and record the quantity of waste generated from the construction of the new road.

The SWMP is a ‘live’ document that will be reviewed and updated as the design is progresses and potential waste streams can be identified and the quantities estimated .

1.3 Responsibilities

The key roles and associated responsibilities with regard to this plan are outlined below.

CiNER Glass Ltd will be responsible for the following:

- appointing the Contractors for the purpose of the SWMP;
- ensuring that the SWMP is implemented effectively; and
- reviewing, revising and refining the SWMP (where necessary) in conjunction with the Contractor.

The Contractor has the overall responsibility for:

- updating and delivering this SWMP on behalf of the Client;
- ensuring all procedures in this SWMP are followed;
- ensuring all contractors are suitably qualified and experienced in implementing the measures within this SWMP. These measures will be contained within the terms of contract to ensure understanding and accountability;
- making and maintaining arrangements that enable those engaged in construction and demolition to co-operate effectively in promoting measures to manage waste in accordance with the terms of the SWMP;
- ensuring, so far as is reasonably practicable, that waste produced during construction is re-used, recycled or recovered;
- appropriate segregation and storage of waste materials;
- regularly reviewing (every three months as a minimum) the SWMP and updating where necessary;
- reporting on the performance of the SWMP within three months of the work being completed (see Section 6.3);
- establishing procedures for the regular review and recording of the quality of the works as part of the Quality Management System; and
- maintaining records relevant to this SWMP.

The individuals responsible for elements of the site waste management plan will be identified in the Site Waste Management Plan prior to construction starting.

2 Regulatory Framework

2.1 Definition of Waste

For the purpose of this document, the definition of "waste" is "any substance or object which the holder discards or intends or is required to discard"[3]. Once it has been discarded, the substance or object remains a waste until fully recovered.

"Discard" includes the recovery and recycling of a subject or object as well as its disposal. The decision on whether something is discarded must take account of all the circumstances (for example, the nature of the material, how it was produced and how it would be used) and must have regard to the aims of the European Waste Framework Directive (WFD): "the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste".

Guidance on the interpretation of the WFD definition of waste is taken from Department for Environment, Food and Rural Affairs' 'Guidance on the legal definition of waste and its application', which provides a practical guide to help organisations make decisions about whether a material is a waste or not[4].

The document also takes into account CL:AIRE's Definition of Waste: Development Industry Code of Practice (CoP) (CL:AIRE, 2011)[5]. The CoP is voluntary and applies to Wales and England only. The CoP sets out good practice for the development industry to use on a site-specific basis when assessing if excavated materials are classified as waste or not and, when treated, excavated waste can cease to be a waste for a particular use. If materials are dealt with in accordance with the CoP, the EA considers that those materials are unlikely to be waste if they are used for the purposes of "land development".

The scope of the CoP relates to "excavated materials", which include:

- soil, both topsoil and sub soil, parent material and underlying geology;
- soil and mineral based dredgings (following appropriate dewatering);
- ground based infrastructure that is capable of reuse within earthworks projects, for example road base, concrete floors any processing would have to be in-line with permitted controls before considered suitable for reuse);
- made ground;
- source segregated aggregate material arising from demolition activities, such as crushed brick and concrete, to be reused on the site of production within earthworks projects or as sub-base or drainage materials; and
- stockpiled excavated materials that include the above.

[3] from Article 3(1) of the revised European Waste Framework Directive (WFD) (2008/98/EC)
[4] Defra, 2012. Guidance on the legal definition of waste and its application
[5] CL:AIRE, 2011. Definition of Waste: Development Industry Code of Practice

2.2 Legislation and Guidance

Waste (Miscellaneous Amendments) (EU Exit) (No. 2) Regulations 2019

The Waste (Miscellaneous Amendments) (EU Exit) (No 2) Regulations 2019, SI 2019/188, introduce amendments to multiple pieces of EU-derived domestic legislation to address aspects arising from the UK's withdrawal from the EU, to ensure that the waste regime can continue to operate effectively after the UK leaves the EU. The European directives which these 12 domestic waste Regulations implemented include the Directive 2008/98/EC on waste (the Waste Framework Directive).

EU Waste Framework Directive 2008/98/EC

The revised EU Waste Framework Directive 2008/98/EC[6] (which has been transposed into UK law) provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and mandates the Waste Hierarchy which requires that where waste is unavoidable, products and materials should, subject to regulatory controls, be used again, for the same or a different purpose (re-use). Otherwise, resources should be recovered from waste through recycling. Value can also be recovered by generating energy from waste but only if none of the above offer an appropriate alternative solution.

[6] European Commission, 2016. Directive 2008/98/EC on Waste (EU Waste Framework Directive)

3 Waste arisings

3.1 Waste forecasting

In order to identify the types of waste generated by the proposed development, the construction programme is divided into key stages. The key programme stages that have the potential to generate waste include:

- site clearance;
- site remediation/preparation; and
- construction.

The excess materials that will be produced during the site preparation has been estimated to be 15,000m^3, based on the necessary cut and fill require.

The quantities of waste that will be produced during construction are not yet available but will be included in the updated SWMP prior to the start of construction.

3.2 Waste types

The key waste streams produced on site can be classified as:

- Inert – wastes that would not cause adverse effects to the environment when disposed of, or do not decompose and they have no potentially hazardous content when placed in a landfill. Examples of inert wastes are rocks, concrete, mortar, glass, uncontaminated soils and aggregates;
- Non-hazardous – wastes that would decompose when buried resulting in the production of methane and carbon dioxide. Examples of non-hazardous wastes include timber, paper and cardboard;
- Hazardous – wastes that are harmful to human health or the environment (for example, pollution of watercourses) if they are inappropriately contained, treated or disposed of. Hazardous wastes may have one or more of the following properties: explosive, corrosive, flammable, highly flammable, infectious, oxidising or sensitising.

The waste generated during construction will be assigned a European Waste Catalogue code[7]. A list of relevant codes is provided in Table 3.1[8]. These codes will be provided on each waste transfer note that will accompany every movement of waste from the site.

[7] UK Government guidance on European Waste Codes. https://www.gov.uk/how-to-classify-different-types-of-waste/construction-and-demolition-waste.
[8] The list is not exhaustive

Table 3.1. List of waste categories for construction wastes (adapted from the European Waste Codes)

17 Construction and demolition wastes (including excavated soil from contaminated sites)
17 01 Concrete, bricks, tiles and ceramics
17 01 01 Concrete
17 01 02 Bricks
17 01 03 Tiles and ceramics
17 01 06* Mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing dangerous substances
17 01 07 Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02 Wood, glass and plastic
17 02 01 Wood
17 02 02 Glass
17 02 03 Plastic
17 02 04* Glass, plastic and wood containing or contaminated with dangerous substances
17 03 Bituminous mixtures, coal tar and tarred products
17 03 01* Bituminous mixtures containing coal tar
17 03 02 Bituminous mixtures other than those mentioned in 17 03 01
17 03 03* Coal tar and tarred products
17 04 Metals (including their alloys)
17 04 01 Copper, bronze, brass
17 04 02 Aluminium
17 04 03 Lead
17 04 04 Zinc
17 04 05 Iron and steel
17 04 06 Tin
17 04 07 Mixed metals
17 04 09* Metal waste contaminated with dangerous substances
17 04 10* Cables containing oil, coal tar and other dangerous substances
17 04 11 Cables other than those mentioned in 17 04 10
17 05 Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03* Soil and stones containing dangerous substances
17 05 04 Soil and stones other than those mentioned in 17 05 03
17 05 05* Dredging spoil containing dangerous substances
17 05 06 Dredging spoil other than those mentioned in 17 05 05
17 05 07* Track ballast containing dangerous substances
17 05 08 Track ballast other than those mentioned in 17 05 07
17 06 Insulation materials and asbestos–containing construction materials

17 Construction and demolition wastes (including excavated soil from contaminated sites)
17 06 01* Insulation materials containing asbestos
17 06 03* Other insulation materials consisting of or containing dangerous substances
17 06 04 Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05* Construction materials containing asbestos
17 08 Gypsum – based construction material
17 08 01* Gypsum–based construction materials contaminated with dangerous substances
17 08 02 Gypsum–based construction materials other than those mentioned in 17 08 01
17 09 Other construction and demolition wastes
17 09 01* Construction and demolition wastes containing mercury
17 09 02* Construction and demolition wastes containing PCB (for example PCB–containing sealants, PCB–containing resin–based floorings, PCB– containing sealed glazing units, PCB–containing capacitors)
17 09 03* Other construction and demolition wastes (including mixed wastes) containing dangerous substances
Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

3.3 Estimated Waste Arisings

An excess of 15,000m^3 of excavated material will be generated through earthworks activity. Whilst opportunities will be sought for reuse, these are not known at this stage and as such this material is considered as waste.

The type and quantities of other waste that will arise at each stage of the project are not currently known at this stage. This information will become available, during design development and be added to the SWMP prior to start of construction.

Materials will be reused on site where possible, thereby reducing the amount of waste arisings.

Table 3.2. Estimated waste arisings

Project activity	Waste arisings from the project	Quantities of waste arisings	Additional information on waste arisings
Site remediation/ preparation/ earthworks	Excavated material	15,000m^3	Opportunities for reuse will be sought on site and off site.
Site construction	To be completed prior to construction	To be completed prior to construction	To be completed prior to construction

4 Management of waste

4.1 Waste hierarchy

Construction waste generated from the scheme will be managed according to the principles of the waste hierarchy which ranks waste management options according to environmental impact. The waste hierarchy indicates “waste prevention” as the best outcome for the environment and “disposal” as the least favoured.

The SWMP sets out how waste will be managed throughout each stage of the project. Prior to the commencement of the construction phase, the Contractor will identify suitable waste management contractors and investigate opportunities to recycle other materials.

Prevention

The Contractor will ensure that waste is prevented where possible by using less material in design and manufacture and only ordering quantities of material required.

The SWMP will record identified measures to be implemented to prevent and minimise the quantity of waste produced during the project. The following measures have been identified as ways of preventing and minimising the quantity of waste produced during this project:

- all waste arisings to be segregated on site;
- re-usable materials to be identified on site and removed for storage and re-sale;
- recyclable materials to be removed from site for processing in licenced facilities; and
- recoverable materials will be removed from site for processing in licenced facilities.

Re-use

The Contractor will ensure that any waste generated on site will be re-used where possible in accordance with the waste hierarchy. The materials currently identified that have the potential to be re-used on site include earthwork material. The SWMP will detail the estimated quantities of waste material and the opportunities for reuse, recycling, recovery or disposal.

A Materials Management Plan will be used during construction to ensure that the appropriate use of reused and recycled materials on the site, to maximise reuse of materials while avoiding potential contamination or pollution impacts.

Recycling

Recycling facilities in the vicinity of the proposed scheme location will be identified by the Contractor. Only appropriately qualified and licensed waste management facilities will be used as a requirement of this SWMP. There is potential for the available sites for recycling, reprocessing and disposal to change and it is the responsibility of the Contractor to evaluate the waste management market and identify suitable options.

Recovery

Opportunities for the recovery of waste generated by the scheme will be considered by the Contractor.

Disposal

Any waste that cannot be prevented, re-used, recycled or recovered, will be disposed of in a responsible manner.

Local waste management facilities will be identified and assessed to ensure the appropriate permit are in place and there is adequate capacity for the waste generated by the proposed scheme. It is not anticipated that there will be a large amount of waste associated with the proposed scheme.

4.2 Storage of waste

Waste management will be stored in line with best practice measures. Guidance is provided in PPG 6: Working at construction and demolition sites[9].

[9] The Pollution Prevention Guidelines (PPG) have now been withdrawn and a review plan for the PPGs is currently underway, replacing them with a replacement guidance series, Guidance for Pollution Prevention (GPPs). GPPs provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only. Individual PPGs are still considered best practice where they have not yet been superseded by a GPP

5 Implementation

5.1 Training

Training regime focused on the provisions of the SWMP will be implemented for all relevant members of the construction team to ensure their competence in carrying out their duties on the Scheme.

The site induction for site personnel will include introduction to the SWMP and important environmental controls associated with the construction of the Scheme (for example, waste storage arrangements and waste segregation at source).

Toolbox talks and method statement briefings will be given to the construction teams as work proceeds and will cover the types of wastes produced at each key build stage and any SWMP controls related to specific activities undertaken during the works.

All training records will be maintained and filed on site, including record of attendance and schedule of review.

6 Monitor, review and report

6.1 Monitoring

Monitoring of the SWMP will principally be achieved through the completion of the Waste Management Data sheets and regular inspections of the works areas by the Contractor to ensure that the provisions of this SWMP and control measures outlined in relevant method statements are being implemented.

Duty of Care paperwork documenting the movements of waste from the site (i.e. Waste Transfer Notes) and the registered carriers' details will be retained.

6.2 Review

During the construction process, the SWMP will be reviewed as often as necessary or at least once every three months to ensure that the plan accurately reflects the progress of the Scheme in terms of waste estimates and targets. As part of the review, the Contractor must record the following:

- Any waste minimisation initiatives and the estimated types and volumes of waste avoided.
- the types and volumes of waste produced; and
- the types and volumes of waste that have been:
    - re-used (and whether this was on or off site);
    - recycled (and whether this was on or off site);
    - sent for another form of recovery (and whether this was on or off site);
    - sent to landfill; or
    - otherwise disposed of.

6.3 Report

Within three months of the end of construction, the Contractor will report on the performance of the SWMP. This will include confirmation that the plan has been monitored on a regular basis to ensure compliance with the provisions of the SWMP, that the plan was updated accordingly and that any deviations from the plan will be explained. The Contractor will continue to report on the performance of the SWMP on an annual basis throughout the construction period.

In addition to the above, the report will include a comparison of the estimated quantities of each waste type against the actual quantities of each waste type, performance against the scheme standards and an estimate of the cost savings achieved by and costs incurred in completing and implementing the plan.

A4 Statements of competency

A4 Statements of competency

Part 5 of The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations, 2017 requires that an Environmental Statement (ES) much be prepared by persons who have '*sufficient expertise to ensure the completeness and quality of the statement*' and that a statement must be included describing the expertise of the person (or persons) who prepared the ES.

This appendix sets out statements of competency for all topic authors of the ES and for the EIA lead.

Phill Martin: EIA lead / Climate change
Phill is a Chartered Environmentalist (CEnv) and Full member of the Institute of Environmental Management and Assessment (MIEMA) working as a Senior Environmental Consultant at Arup. Phill has 8 years' experience of working on large scale infrastructure projects specialising in the management and delivery of Environmental Impact Assessments (EIAs), working with multidisciplinary teams on high profile projects in the UK including HS2 Phase 2a. Phill also has key experience in the engineering and construction sector working in utilities and advising on infrastructure and asset development. Phill has experience across both GHG emissions mitigation and climate change resilience and is climate topic lead on other EIA projects within Arup.
Alex Welch: Traffic and transport
Alex is a Senior Transport Planner with 19 years' experience within Consultancy, Local Authority Government and National Government throughout the UK, Bahrain and the United Arab Emirates. His expertise includes the preparation of studies (including Transport Assessments/Scheme Feasibility etc.) related to the planning of developments ranging from a single dwelling to major masterplans in excess of 2,500 homes. Alex has supported development sites through many forms of consultation both in the public forum and via representations made to local members and Ministers.
Agnieszka Lopez-Parodi: Water
Agnieszka Lopez-Parodi is a Chartered Engineer and Member of the Institution of Civil Engineers. She has a MEng (Hons) degree in Environmental Engineering from the Wrocław University of Technology, Poland, and BSc (Hons) degree in Applied Sciences from the University of Glamorgan, Wales. She has 17 years of experience in management of land contamination issues on a variety of projects including highway schemes and land development. She has worked on a number of Environmental Statements providing assessment of ground conditions including land/water contamination and geology.
Dr Paul Clack: Ecology
Paul is an experienced ecologist with 20 years' post-doctoral experience in ecological consultancy. Paul is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and a Charted Environmentalist (CEnv). Paul holds degrees in Geography (BSc) and hydrology (PhD). He has acted as ecology expert witness, project director and project manager for many commissions and been lead author for avian and non-avian chapters within Environmental Statements and Habitats Regulations Assessments for projects.

James Bellinger: Air quality
James Bellinger (Air quality lead) (MSc, CEnv, CSci, MIEnvSc, MIAQM, PIEMA) is a senior consultant with over 10 years' experience carrying our air quality assessment. He is an experienced leader (Project Manager) of technical projects including high profile projects and has provided expertise internationally.
Sonia Duarte: Noise and vibration
Sonia Duarte is a member of the Institute of Acoustics and has 15 years' experience of working in consultancy, assessing the environmental impacts from noise and vibration of new developments across the UK. Her experience has included large transport and infrastructure schemes such as A303 Amesbury to Berwick Down and Lake Lothing third crossing, as well as mixed used and residential developments such as Eastern Quarry, Brent Cross redevelopment and East Village.
David Brown: Socio-economics
David is an Associate in the Planning team at Ove Arup and Partners Ltd (Arup) with over 15 years' experience in planning consultancy. He has a BSc (Hons) Geography (Human) and Planning, and an MSc Regeneration Studies. David is a Chartered Member of the Royal Town Planning Institute (MRTPI) and a Member, Institute of Economic Development (MIED). David has experience working on a range of commissions with a focus on the socio-economic assessment and consenting of major infrastructure and energy projects. He has worked under a number of consenting regimes including the DCO process, Schedule 7 of the Crossrail Act and more widely the Town and Country Planning and Highways Acts. Major infrastructure projects that David has worked on include: Richborough Connection Project (National Grid), Hinkley Point C Connection Project (National Grid), A40 Improvements (Welsh Government), Whitechapel Station (Crossrail) and large scale on-shore wind and solar developments.
Rowena Ekermawi: Health and Cumulative effects
Rowena Ekermawi is a Chartered Environmentalist with more than 18 years' experience as an environmental consultant. Her qualifications include a BSc in Environmental Biology and an MSc in Environmental Assessment and Management and is currently completing a Master of Public Health. Rowena is a health assessment practitioner and has led or contributed to many health assessments for development projects within varying sectors. Rowena is also skilled at equality impact assessment
Alan Kerr: Visual
Alan Kerr is a Senior Landscape Architect at Arup, with 11 years professional experience working in the UK landscape industry. He has been a chartered member of the Landscape Institute for seven years. Alan has a Bachelor of Science in Landscape Design and Ecology and has a Master of Landscape Architecture both from University of Sheffield. Alan has extensive experience working in landscape planning, particularly landscape and visual impact assessments and landscape character studies, working on a diverse range of projects, including large scale infrastructure and commercial projects. Alan is required by the Landscape Institute to conduct himself in accordance with their Code of Conduct, undertaking work within his professional competence and follow best practice guidance such as, in this instance, follow the Guidelines for Landscape and Visual Impact Assessment, 3rd edition.
Max Rooksby: Materials
Max Rooksby is a Chartered Water and Environment Manager, with full member of the Chartered Institute of Water and Environmental Management (CIWEM)

Max has an MSc in Environmental Engineering and Project Management from Leeds University and BSc (Hons) degree in Environmental Sciences from the University of Southampton. He has 22 years of experience working in the environmental sector, with the last 12 specialising on resource and waste management. Max has worked on a number of Environmental Statements providing assessment of material and waste on large scale infrastructure projects.

Appendix B

Air Quality

B1 Consultation

B1.1 Methodology note

A copy of the methodology note provided to Blaenau Gwent County Borough Council Environmental Department has been provided here. This note was provided in order to set out the methodology and proposed emission limits prior to the final design and assessment of the proposed site.

CiNER Technical Note: Air Quality Assessment Methodology

1 Introduction

1.1 Overview

Ove Arup & Partners Ltd (Arup) has been appointed by CiNER Glass Ltd. (CiNER) to provide an air quality assessment for a proposed glass production facility (the site) in Rassau, Wales.

This note has been prepared to begin technical discussions with Blaenau Gwent County Borough Council (BGCBC) who will be responsible for planning and permitting requirements for air quality.

The CiNER site is located on the Rassau industrial estate to the north of Rassau. The site is bound by the Brecon Beacon national park to the north and the A465 road to the south. The site is currently brownfield land being an extension to the adjacent to existing industrial sites.

The main operational phase sources of emissions will be from furnaces and printing lines. There are two proposed natural gas fuelled furnaces for the production of glass with a design capacity of 700 and 500 tonnes per day. Each furnace will have a separate flue gas stack. In addition to the main furnaces five printing lines will be included in the design each will have a gas fired boiler and associated flue. A small furnace will also be proposed to support for workshop. There are backup generators included in the design, however these are not expected to be required other than for emergencies and have therefore been scoped out of detailed assessment. Justification for scoping out generators are provided in section 4.4.5.

Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, and are regulated through the Pollution Prevention and Control (PPC) system[1,2]. The site will be permitted under the part A2 regulations.

This technical note outlines the proposed methodology for delivery of, and approach to gaining, the necessary permits relating to air quality for the development and operation of the CiNER installation and associated activities.

1.2 Assessment

An air quality assessment will be undertaken to support the environmental planning and permit application to be submitted to the local authority. It will be written to address the requirements of the planning and permit and include assessment of construction and operational impacts.

The air quality assessment will consider the likely change in air quality that would arise as a result of the construction and operation of the new site. It will examine the changes in air

[1] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

[2] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

pollutant concentrations in the area including the potential effect on designated wildlife sites and on human health.

The assessment of air quality impacts during construction will comprise an assessment of earthworks, construction and trackout and their potential impact on human health and nuisance following the IAQM Guidance on the assessment of dust from demolition and construction[3].

The assessment of air quality impacts during operation will comprise an assessment of the impacts of emissions from the stacks and emissions from changes to vehicle flows on local roads on local air quality, and will consider:

- Impacts of the operational emissions on sensitive human receptors during operation; and
- Impacts of the operational emissions on sensitive habitat sites in relation to ammonia, oxides of nitrogen (NOx) and sulphur dioxide (SO_2) emissions during operation.

2 Baseline

Existing or baseline ambient air quality refers to the concentrations of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, road traffic and natural sources.

The assessment will consider baseline air pollutant concentrations from various data sources, including:

- Local authority review and assessment reports and local air quality monitoring data[4];
- Defra UK Air Information Resource website[5] for details of air quality monitoring and AQMAs; and
- Ammonia, Acid Gases and Aerosols, and Heavy Metals Monitoring Networks for the UK[6].

2.1 Sources of Air Pollution

The main sources of air pollution near the proposed development are road traffic emissions from vehicles using the A465 and existing industrial sites.

2.1.1 Industrial processes

Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, regulated through the Pollution Prevention Control (PPC) system[1,2]. The larger more polluting processes are regulated by the Natural Resource Wales (NRW) and the smaller, less polluting ones by the relevant Local Authority.

---

[3] IAQM Guidance on the assessment of dust from demolition and construction (v1.1)
[4] Blaenau Gwent County Borough Council, 2019 Air Quality Progress Report (September 2019)
[5] Defra (2020) https://uk-air.defra.gov.uk/data/
[6] Defra (2020) https://uk-air.defra.gov.uk/networks/network-info?view=metals

Arup requested the NRW regulated sites which are within 1km away from the site, they are presented in Table 1.

Table 1: NRW regulated sites within 1km

Site	Permit number	Approximate distance from Site (km)	Releases to air[7]
Rassau Recycling Facility. Enviro Wales Ltd	EP3230BE	0.2	Sulphur acid mist, total particulate, cadmium and compounds, copper, lead, nickel, zinc and their compounds, antimony, tin, tellurium and their compounds, cadmium, arsenic, thallium, selenium and their compounds , sulphur dioxide (SO_2), hydrogen chloride (HCl) dioxins and furans, oxides of nitrogen (NOx), volatile organic compounds. carbon monoxide (CO), mercury and lead
GD Yuasa Battery Manufacturing UK Ltd	BV5361Z	0.6	Lead

2.1.1.1 Short-term operating reserve (STOR) site

A short-term operating reserve (STOR) is located on the west side of the Rassau Industrial Estate (X 314250, Y 211780). The STOR site comprises 14 gas-fired generators with 14 individual flues. The permitted STOR plant data[8] were provided by BGCBC and predicted impacts from the STOR site will be included in the cumulative assessment using an advanced dispersion model. The emission data for the generators (taken from the permitting report[8]) are presented in Table 2, and they will be used in the assessment.

Table 2: STOR – emission data for each gas-fired generator

Parameter	Unit	Emission data for each generator
Location of the centre of the compound	NRG	314250, 211780
Stack height above ground	M	5.3
Stack diameter	m	0.4
Efflux velocity	m/s	36.1
Efflux temperature	(℃)	388
NOx emission rate	g/s	0.78
Operational time	hour/annum	1,000

2.1.1.2 Other sources of industrial emissions

There are other sources of industrial emissions in the local area, the STOR assessment included a cumulative impact assessment from the following industrial sites:

- U26/ Beaufort and Techboard/ Brecon;

[7] Releases to air data are taken from the permits provided by NRW
[8] Amec Foster Wheeler (2015) Air Quality Assessment of Peak Supply Generator for Eider Reserve Power Limited at Rear of Unit 26A site on Rassau Industrial Estate, Ebbw Vale

- Circuit of Wales development;
- Biomass Plant at Unit 21 and;
- Ogmore Power Rassau.

The air quality assessments from these sites will be requested from the local authority and will be included in the cumulative assessment by taking the maximum predicted impacts at nearby receptors and adding to the total concentrations predicted in this assessment. They will not be explicitly modelled.

2.2 Local air quality

The proposed CiNER site is located in the jurisdiction of BGCBC and is close to the borders with Caerphilly County Borough Council, Merthyr Tydfil County Borough Council, Monmouthshire County Council, and Powys County Council. Data from these local authorities will be included in the assessment, where relevant.

Air Quality Management Areas (AQMAs) are declared when air quality is close to or exceeding the relevant air quality objectives, as included in The Air Quality Standards (Wales) Regulations 2010[9].

There are no declared AQMAs in BGCBC or in the vicinity of the proposed CiNER site.

2.3 Local air quality monitoring

A review of local air quality monitoring in the vicinity of the CiNER site has been carried out and shows that BGCBC carries out passive diffusion tube monitoring in the vicinity of the site. Details of the nearest monitoring locations are outlined in Table 3. The site location and closest monitoring sites are shown in Figure 1.

Annual mean NO_2 concentrations for 2015 to 2019 are shown in Table 4. Results show that concentrations were well below the 40µg/m^3 objective at all monitoring locations in all years.

Table 3: Local air quality monitoring sites in Blaenau Gwent

Site ID	Site name	Site type	OS grid reference	
			x	y
BGBC-04	22 Parkhill, Beaufort, Ebbw Vale	Urban Background	317298	211287
BGBC-18	Welfare Hall, Beaufort Hill, Ebbw Vale	Roadside	317543	211688
BGBC-19	42 Beaufort Rise, Ebbw Vale	Roadside	316670	211597
BGBC-20	122 Beaufort Road, Tredegar	Roadside	314858	210240
BGBC-21	14 Bryn Rhosyn, Merthyr Road, Tredegar	Other	312846	210586
BGBC-24	4 Glen View, Nantybwch, Tredegar	Roadside	313145	210769

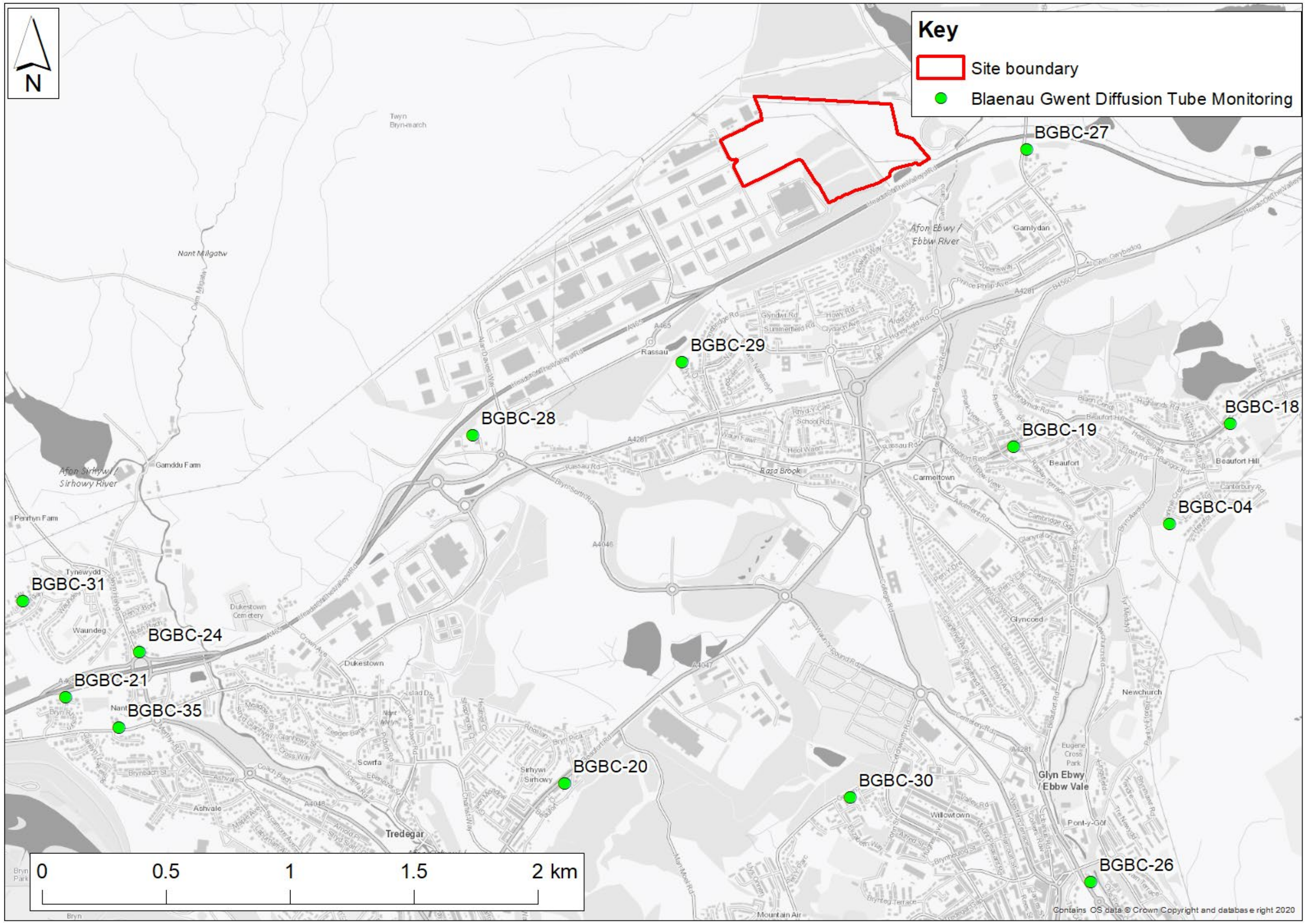
[9] The Air Quality Standards (Wales) Regulations 2010 transpose into law the requirements of Directives 2008/50/EC and 2004/107/EC on ambient air quality.

Site ID	Site name	Site type	OS grid reference	
			x	y
BGBC-26	2 The Dingle, Ebbw Vale	Other	316980	209842
BGBC-27	Tyn y Rhyn, Llangynidr Road, Ebbw Vale	Roadside	316720	212796
BGBC-28	1 Coates Row, Rassau, Ebbw Vale	Roadside	314488	211642
BGBC-29	10 Ivy Close, Rassau, Ebbw Vale	Roadside	315331	211938
BGBC-30	8 Annes Court, Ebbw Vale.	Other	316010	210183
BGBC-31	18 Maes Morgan, Tredegar	Other	312674	210974
BGBC-35	Brynbach Primary School, Merthyr Road, Tredegar	Roadside*	313061	210466
Note: Updated classification following Defra's LAQM.TG(16) guidance				

Table 4: Local air quality monitoring data

Site ID	Site name	Annual mean NO_2 concentration (µg/m^3)				
		2015	2016	2017	2018	2019
BGBC-04	22 Parkhill, Beaufort, Ebbw Vale	6.9	7.7	7.3	7.7	TBC
BGBC-18	Welfare Hall, Beaufort Hill, Ebbw Vale	17.3	20.6	17.4	20.2	TBC
BGBC-19	42 Beaufort Rise, Ebbw Vale	19.8	23.0	20.1	21.4	TBC
BGBC-20	122 Beaufort Road, Tredegar	18.9	22.1	19.6	22.3	TBC
BGBC-21	14 Bryn Rhosyn, Merthyr Road, Tredegar	12.4	13.8	12.4	11.7	TBC
BGBC-24	4 Glen View, Nantybwch, Tredegar	13.6	12.9	12.0	12.6	TBC
BGBC-26	2 The Dingle, Ebbw Vale	13.1	14.9	13.1	14.0	TBC
BGBC-27	Tyn y Rhyn, Llangynidr Road, Ebbw Vale	9.4	8.4	8.3	8.7	TBC
BGBC-28	1 Coates Row, Rassau, Ebbw Vale	6.8	8.7	7.5	8.7	TBC
BGBC-29	10 Ivy Close, Rassau, Ebbw Vale	N/A	N/A	N/A	7.4	TBC
BGBC-30	8 Annes Court, Ebbw Vale.	N/A	N/A	N/A	8.5	TBC
BGBC-31	18 Maes Morgan, Tredegar	N/A	N/A	N/A	6.4	TBC
BGBC-35	Brynbach Primary School, Merthyr Road, Tredegar	N/A	N/A	N/A	10.8	TBC
Note: 'N/A' indicates that the monitoring site was either removed, had no data for that year or that the data capture rate was below 70%. 'TBC' indicates data to be provided.						

Figure 1: Local authority monitoring locations


N
Key
Site boundary
Blaenau Gwent Diffusion Tube Monitoring
BGBC-27
BGBC-29
BGBC-28
BGBC-18
BGBC-19
BGBC-04
BGBC-31
BGBC-24
BGBC-21
BGBC-35
BGBC-20
BGBC-30
BGBC-26
0
0.5
1
1.5
2 km
Contains OS data © Crown Copyright and database right 2020

2.4 Defra estimated background concentrations

Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of stationary and non-stationary sources, such as roads and industrial processes. The Defra website includes estimated background pollutant concentrations for NOx, NO_2, PM_{10} and $PM_{2.5}$ for each 1km by 1km OS grid square in the UK.

Background pollutant concentrations for the existing baseline year of 2020 have been obtained for the two grid squares in which the site red line boundary lies and are shown in Table 5. It can be observed that the annual mean background concentrations are below the relevant air quality standards for all pollutants (NO_2, PM_{10} and $PM_{2.5}$).

Table 5: Defra background pollutant concentrations in 2020 around the site

OS Grid Square		Annual mean concentrations (µg/m³)				
X	Y	NOx	NO_2	PM_{10}	$PM_{2.5}$	SO_2
315500	212500	12.9	9.8	11.7	7.5	2.3
316500	212500	9.1	7.2	11.4	7.4	2.7
Average		11.0	8.5	11.6	7.5	2.5

A comparison against monitored background concentrations has also been undertaken, using urban background monitoring site BGBC-04 with the latest year of available monitoring data, 2018. Table 6 presents the comparison of the monitored NO_2 concentrations against the Defra backgrounds for 2018. It can be observed that there is good agreement between Defra modelling and observed concentrations.

Table 6: Comparison of background NO_2 concentrations in 2018

Site	Defra OS grid square	Monitored NO_2 (µg/m³)	Defra background NO_2 (µg/m³)
BGBC-04	317500, 211500	7.7	7.2

2.5 Proposed background concentrations

Data from the following monitoring stations and sources has been reviewed, to determine representative of concentrations at the site: Local monitoring data (NO_2); Cwmbran (NO_2 and SO_2); Swansea Coedgwilym and Cymystwyth (heavy metals); Narbeth (HCl); and Defra background maps (NO_2 SO_2, PM_{10} and $PM_{2.5}$). The proposed baseline concentrations and justification behind the choice for each pollutant are shown in Table 7. Appropriate locations have been selected based on data availability and proximity to the site. Baseline concentrations for short-term limits will calculated as twice the annual mean background concentration, in accordance with NRW guidance.

Table 7: Summary of proposed baseline air quality concentrations

Pollutant	Long Term Conc. [a]	Units	Year(s)	Reasoning behind the selection of the Long-Term Concentration
Nitrogen oxides (NOx)	9.8	µg/m^3	2018	Based on annual mean NO_2 concentration measured at the nearest urban background monitoring site, BGBC-04. Data for 2018 as the last year of measured concentrations. The ratio from the Defra mapped concentrations for NO_2 to NO_x has been applied.
Nitrogen dioxide (NO_2)	7.7	µg/m^3	2018	Annual mean NO_2 concentration measured at the nearest urban background monitoring site, BGBC-04. Data for 2018 as the last year of measured concentrations. As shown in Table 6 this provides a slightly conservative assessment if compared to the Defra mapped backgrounds. 1-hour mean concentration will be calculated as twice the long-term concentration.
Sulphur dioxide (SO_2)	3.5	µg/m^3	2006	Annual mean concentration measured at the Cwmbran automatic monitoring site in 2006. Cwmbran is the closest urban background monitoring site which measured for SO_2. 2006 is the latest year with monitoring results with a data capture rate >70%. Monitored results are higher than estimated Defra maps, therefore will be applied as a conservative (pessimistic) assumption. 15-min mean, 1-hour mean and 24-hour mean concentrations will be calculated as twice the long-term concentration.
Fine particulate matter (PM_{10})	Location dependent	µg/m^3	2020	In the absence of local monitoring data, it is proposed to use the Defra background map data for PM_{10}, for the location where the discrete or gridded receptor is located. 24-hour mean concentration will be calculated as twice the long-term concentration.
Fine particulate matter ($PM_{2.5}$)	Location dependent	µg/m^3	2020	In the absence of local monitoring data, it is proposed to use the Defra background map data for $PM_{2.5}$, for the location where the discrete or gridded receptor is located.

Pollutant	Long Term Conc. [a]	Units	Year(s)	Reasoning behind the selection of the Long-Term Concentration
Hydrogen chloride (HCl)	0.28	µg/m³	2013	Annual mean concentration measured at the Narbeth rural background monitoring site (nearest monitoring site which monitors for HCl). Review of results from 2006 to 2014 showed 2013 with the highest concentration and 100% data capture, therefore this has been applied as a conservative (pessimistic) assumption.
Hydrogen fluoride (HF)	0.04	µg/m³	1984-1986	No background monitoring is carried out in the UK so historical data close to a brickworks in Bedfordshire have been used to give an indication. Actual values are likely to be lower than this as there are no local sources of HF.
Ammonia (NH_3)	2.88	ug/m³	2019	Concentration measured at Narbeth rural background monitoring site (nearest monitoring site which monitors for NH_3). Review of results in 2017, 2018 and 2019 showed that 2019 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.
Cadmium (Cd)	0.33	ng/m³	2019	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Cd). Review of results in 2017, 2018 and 2019 showed that 2019 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.
Copper (Cu)	3.98	ng/m³	2017	Concentration measured at Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Cu). Review of results in 2017, 2018 and 2019 showed that 2017 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption. The 1-hour mean concentration will be calculated as twice the long-term concentration.
Arsenic (As)	0.71	ng/m³	2019	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for As). Review of results in 2017, 2018 and 2019 showed that 2019 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.

Pollutant	Long Term Conc. [(a)]	Units	Year(s)	Reasoning behind the selection of the Long-Term Concentration
Lead (Pb)	6.47	$\mu g/m^3$	2019	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Pb). Review of results in 2017, 2018 and 2019 showed that 2019 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.
Nickel (Ni)	13.26	ng/m^3	2019	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Ni). Review of results in 2017, 2018 and 2019 showed that 2019 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.
Cobalt (Co)	0.52	ng/m^3	2019	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Co). Review of results in 2017, 2018 and 2019 showed that 2019 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.
Chromium (Cr)	2.79	ng/m^3	2018	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Cr). Review of results in 2017, 2018 and 2019 showed that 2018 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption. For Cr the 1-hour mean concentration will be calculated as twice the long-term concentration. Hexavalent chromium (CrVI) will be calculated as 20% of the total Cr annual mean concentration.
Manganese (Mn)	3.69	ng/m^3	2018	Concentration measured at the Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Mn). Review of results in 2017, 2018 and 2019 showed that 2018 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption. The 1-hour mean concentration will be calculated as twice the long-term concentration.

Pollutant	Long Term Conc. [(a)]	Units	Year(s)	Reasoning behind the selection of the Long-Term Concentration
Vanadium (V)	0.76	ng/m^3	2017	Concentration measured at Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for V). Review of results in 2017, 2018 and 2019 showed that 2017 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption. The 1-hour mean concentration will be calculated as twice the long-term concentration.
Selenium (Se)	0.60	ng/m^3		Concentration measured at Swansea Coedgwilym urban background monitoring site (nearest monitoring site which monitors for Se). Review of results in 2017, 2018 and 2019 showed that 2017 had the highest concentrations, therefore this has been applied as a conservative (pessimistic) assumption.
Tin (Sn)	0.22	ng/m^3	2013	Concentration measured at Cymystwyth rural background site (nearest monitoring site that measures Sn). Review of results from 2009 to 2013 showed 2013 with the highest concentration and 100% data capture, therefore this has been applied as a conservative (pessimistic) assumption.
Antimony (Sb)	0.26	ng/m^3	2013	Concentration measured at Cymystwyth rural background site (nearest monitoring site that measures Sb). Review of results from 2009 to 2013 showed 2013 with the highest concentration and 100% data capture, therefore this has been applied as a conservative (pessimistic) assumption.

(a) The Long Term Concentration is the value that is used to generate the concentration that will be added to the predicted concentration from the plant. This might be the value given for the long term assessment or some multiple of it for the short term assessment.

3 Construction phase

The construction phase dust impacts will be assessed following IAQM guidance for the Assessment of dust from demolition and construction 2014 v1.1.

Construction phases vehicle emissions will be screened following EPUK/IAQM guidance[10]. Should vehicle numbers exceed the screening thresholds a detailed modelling assessment will be carried out.

4 Operational phase

4.1 Receptors and spatial scope

Modelling will be undertaken to predict impacts at discrete and gridded receptors. The discrete receptors relevant to the assessment include residential properties, schools, hospitals as well as other sensitive locations and facilities in the area, such as designated ecological sites and protected wildlife sites. Discrete human receptors have been selected based on relevant sensitive receptors in the vicinity of the site, these are shown in and Figure 3.

Ecological receptors have been reviewed within 15km of the site. This review has identified a number of designated sites for ecological assessment. The nearest ecological sites to the site have been identified as Safleodd Ystlumod Wysg Special Area of Conservation (SAC), Mynydd Llangatwg Site of Special Scientific Interest (SSSI), and Beaufort Hills Pond, Woodland Local Nature Reserve (LNR) and several parcels of ancient woodland within 5km from the site. Receptor points have been placed at the closest point of the ecological site to the proposed stack.

There are six SSSIs which have been designated for geological reasons within 15km of the site (these are: Abercriban Quarries, Baltic & Tyle'r-bont Quarries, Llanover Quarry, Cwar yr Ystrad a Cwar Blaen Dyffryn, Nant Glais Caves and Mynydd Llangynidr) and therefore these have been excluded from further assessment.

None of the discrete receptors have been identified as tall buildings (such as flats, where exposure may be several tens of metres above ground level), therefore all human receptors will be modelled at a height of 1.5m, representative of the breathing zone of a human receptor standing on the ground, and ecological receptors will be modelled at a height of 0m, representative of ground level.

The assessment of emissions from the stacks of the new furnaces and boilers will also be predicted at locations over a cartesian grid of 5km by 5km, for contour plotting of the results and identification of the point of maximum impact on the modelled grid. The grid area will use the proposed stack locations as the central point. The grid will be plotted at a height of 1.5m and with a resolution of 20m. The modelled grid extent will be: National Grid

[10] Moorcroft and Barrowcliffe et al. (2017), Land-Use Planning & Development Control: Planning for Air Quality. v1.2. London: Institute of Air Quality Management

Reference (NGR) (313081, 210255) to (318081, 215255). The proposed model grid area is shown in Figure 4.

The spatial scope of the assessment may be refined following initial modelling if a more detailed assessment is required where significant air quality impacts are found.

Table 8: Proposed discrete receptors

ID	Name	NGR (m)		Height (m)	Distance to site (m) and (direction)
		x	y		
Human					
1	Rhos Y Fedwen Primary School	315748.6	211960.1	1.5	644 (NE)
2	Buds to Blossoms Day Nursery	316538.2	211674.9	1.5	1070 (N)
3	Mrs Puddleduck Day Nursery	315961.3	211748.5	1.5	833 (N)
4	Glyn Coed Primary School	316572.4	211149.0	1.5	1,572 (N)
5	Beaufort Hill Primary School	317515.9	211578.9	1.5	1,675 (NW)
6	Ysbyty'r Tri Chwm Hospital	316189.7	211096.5	1.5	1,509 (N)
7	Bank House Care Home	316869.0	212498.5	1.5	601 (NW)
8	Sonael Care Home	316494.1	211526.2	1.5	1,193 (N)
9	Residential dwelling: Chestnut Close	316201.5	212511.7	1.5	170 (N)
10	Residential dwelling: Maple Way	316002.8	212373.1	1.5	223 (N)
11	Residential dwelling: Pen-Y-Crug	315834.5	212303.0	1.5	291 (N)
12	Residential dwelling: Llangynidr Road	316720.3	212811.5	1.5	397 (E)
13	Residential dwelling: Stonebridge Road	315481.0	212137.3	1.5	516 (N)
14	Residential dwelling: Nant-T-Croft	314856.8	211566.6	1.5	1,296 (NE)
15	Residential dwelling: Honeyfield Road	316275.3	212077.7	1.5	600 (N)
16	Pen-y-Cwm Special School	316658.2	212482.8	1.5	431 (SE)
17	Wells Farm	314435	211623	1.5	1,550 (SW)
18	Coates Row 1	314489	211646	1.5	1,467 (SW)
19	Coates Row 2	314543	211727	1.5	1,382 (SW)
20	Residential Dwelling: Beaufort Wells	314568	211583	1.5	1,467 (SW)
21	Residential Dwelling: A4046	314619	211526	1.5	1,472 (SW)
22	Residential Dwelling: Unnamed Road	314318	211324	1.5	1,816 (SW)
Ecological					
E1	Beaufort Hills Pond and Woodland LNR	317642	22188	0	760 (SE)
E2	Trevor Rowson LNR	319318	10204	0	3,861 (SE)
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	315230	209897	0	1,802 (S)
E4	Parc Nant-y-Waun LNR	318032	211609	0	1,757 (SE)
E5	Parc Bryn Bach LNR	312985	210211	0	3,553 (SW)
E6	Brynmawr Sections SSSI	319681	212106	0	3,413 (E)
E7	Cwm Clydach SSSI	320555	212318	0	4,251 (E)
E8	Mynydd Llangatwg SSSI	316821	213599	0	900 (NE)
E9	Mynydd Llangynidr	315824	214438	0	1,461 (NE)

ID	Name	NGR (m)		Height (m)	Distance to site (m) and (direction)
		x	y		
E10	Cwm Clydach NNR	320555	212318	0	4,251 (E)
E11	Craig y Cilau NNR	318639	215713	0	3,685 (NE)
E12	Usk Bat Sites / Safleodd Ystlumod Wysg SAC	316821	213599	0	900 (NE)
E13	Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	320555	212318	0	4,251 (E)
E13	Ancient Woodland 1 (B4560)	314355	216357	0	3,578 (N)
E15	Ancient Woodland 2 (The Brecon Beacons)	317392	217028	0	4,234 (NE)
E16	Ancient Woodland 3 (Main Road)	320223	212309	0	3,921 (E)
E17	Ancient Woodland 4 (A4281/ A4046)	314704	211364	0	1,550 (SW)
E18	Ancient Woodland 5 (B4256 Morgan Street)	314333	208650	0	4,184 (SW)
E19	Ancient Woodland 6 (Tredegar)	315429	207963	0	4,652 (S)
E20	Ancient Woodland 7 (Belle Vue)	316697	211419	0	1,370 (S)
E21	Ancient Woodland 8 (A467)	319194	208859	0	4,845 (SE)

Figure 2: Proposed human receptor locations

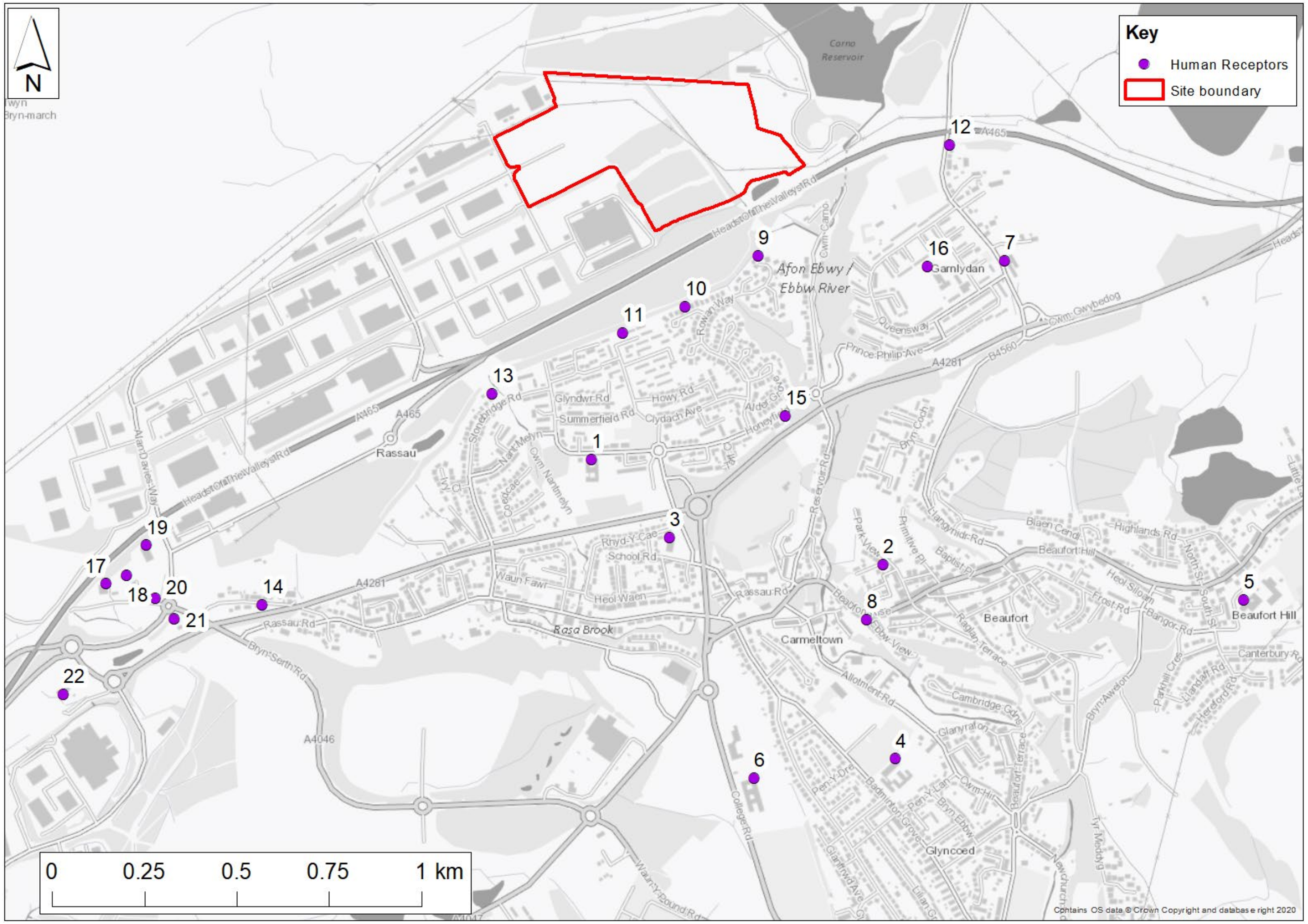


Figure 3: Proposed ecological receptors within 5km

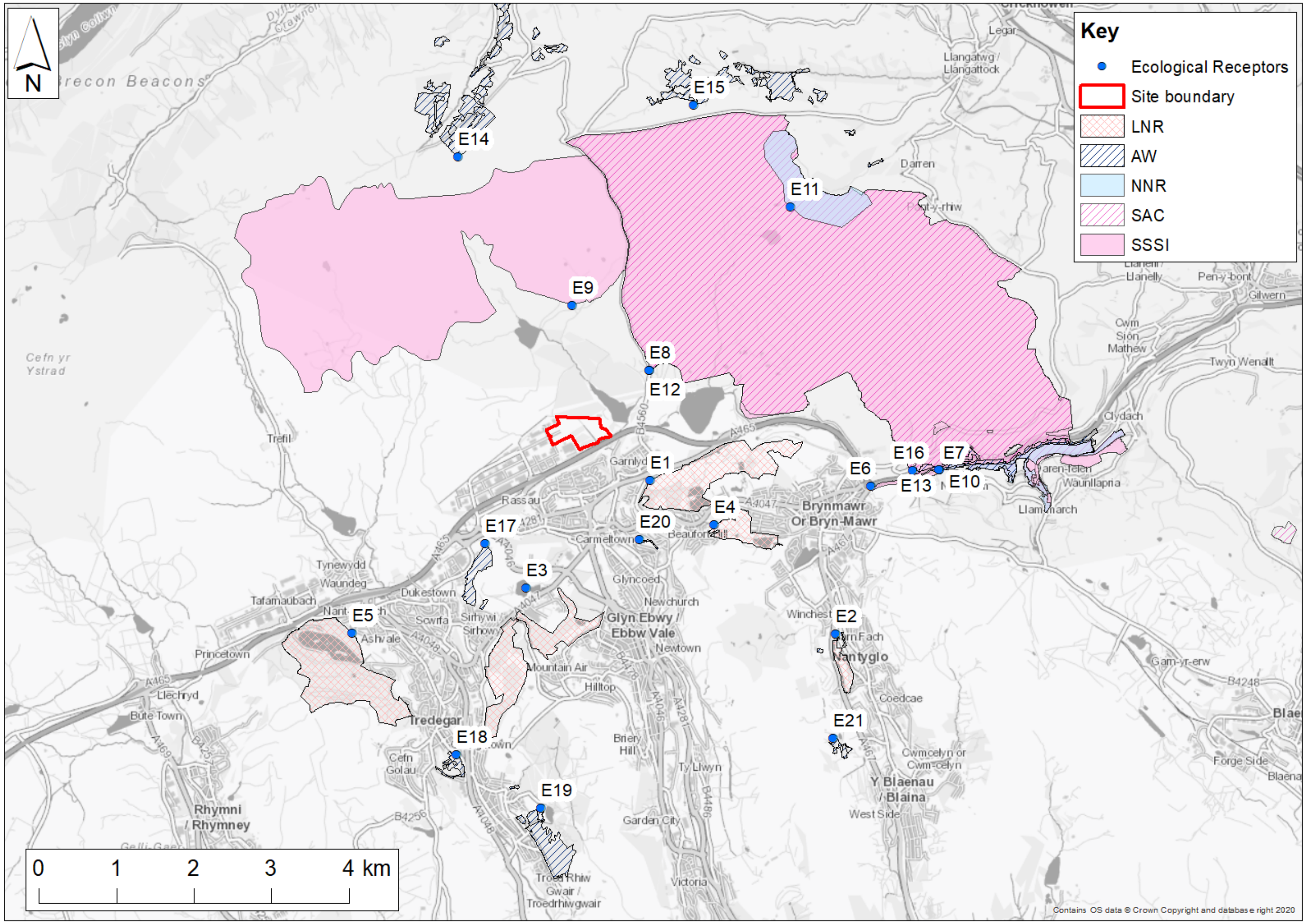
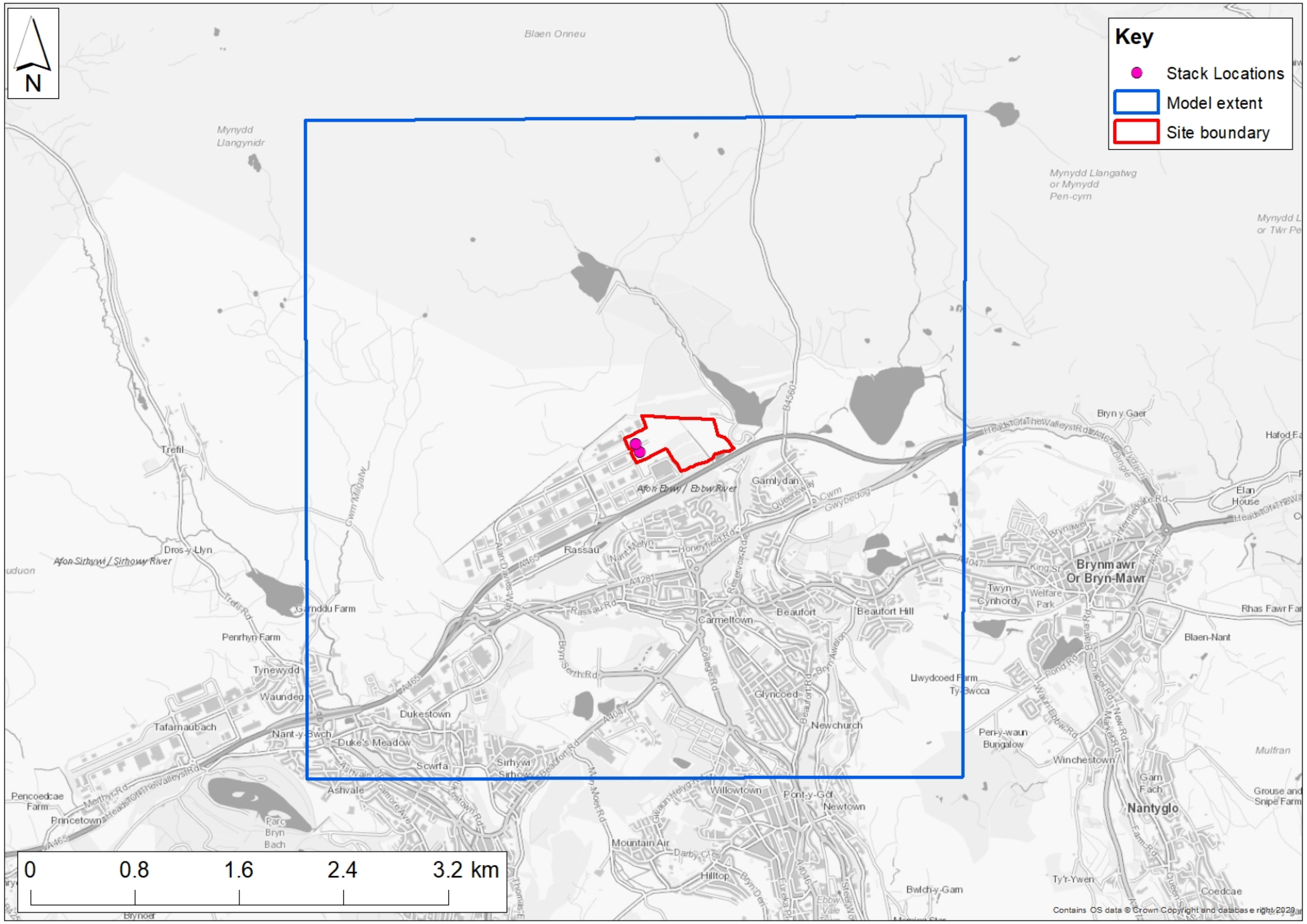


Figure 4: Model extent



4.2 Operational assessment parameters

The operational assessment will primarily concentrate on those pollutants included in the best available techniques (BAT) conclusion under Directive 2010/75/EU on industrial emissions for the manufacture of glass [11]and those included within EU and UK air quality standards, namely:

- Nitrogen oxides (NOx) and nitrogen dioxide (NO_2);
- Sulphur dioxide (SO_2);
- Fine particulate matter (PM_{10} and $PM_{2.5}$);
- Hydrogen fluoride (HF) and hydrogen chloride (HCl);
- Ammonia (NH_3);
- Trace metals: lead (Pb), arsenic (As), cadmium (Cd), nickel (Ni), antimony (Sb), chromium (CrIII and CrVI), cobalt (Co), copper (Cu), manganese (Mn), selenium (Se), tin (Sn) and vanadium (V).

For the assessment of impacts on sensitive habitats, the potential impacts of NH_3, HF, HCl, NOx and SO_2 will be assessed, both through the impacts directly to air and through deposition of acidic compounds and nutrient nitrogen.

4.3 Stack and fugitive emissions

The assessment of emissions from the stack during operation will use the ADMS 5 dispersion model (version 5.2.2.0). This is a well-established model originally developed on behalf of a number of UK bodies. The model can take into account the relevant information on the plant design and operations, local meteorological data, terrain and local building dimension information to predict pollutant concentrations at selected receptors around the site. The BAT[11] emission limit values (ELVs) will be used for modelling of the installation emissions.

As previously described, a grid of receptors will be used so that contour plots can be prepared. In addition, selected discrete receptors will be included in the model where there are important sensitive receptors. The model will be set up to predict the required parameters to compare predicted pollutant concentrations with the relevant air quality objectives and guidelines.

The principal air quality objectives and guidelines used will be the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), the Air Quality Standards Regulations 2010 and air quality standards outlined in the Environment Agency (EA) environmental permitting guidance[12]. The most stringent standards will be used in the

[11] The best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament of the Council on industrial emissions for the manufacture of glass
[12] Environment Agency (2017) Air emissions risk assessment for your environmental permit, updated August 2016 [Accessed July 2020 - https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit]

assessment, as appropriate. The changes in pollutant concentrations and significance will be assessed using the EA permitting guidance (also adopted by NRW).

4.4 Model inputs

4.4.1 Meteorological data and terrain

Meteorological data will be taken from the Sennybridge monitoring station, which lies approximately 27km to the north-west of the site and is considered to be the most appropriate site for this assessment. The Sennybridge monitoring site has been used for detailed dispersion modelling of emissions at other locations on the Rassau Industrial Estate. The latest five years of data (2015-2019) will be obtained from this site to allow sensitivity testing and examine the variation in predicted concentrations for each year.

Terrain effects will play a role in the dispersion of pollutants in this geographic area. The site is located in a wide valley which limits the risk of inversions trapping pollutants (which can be an issue in deep steep sided valleys). Terrain will be included in the model as a sensitivity test to determine the worst-case modelling set up. By including terrain in the model, the localised meteorological conditions will be taken into account.

4.4.2 Model parameters

The extent of mechanical turbulence (and hence, mixing) in the atmosphere is affected by the surface/ground over which the air is passing. Typical surface roughness values range from 1.5m (for cities, forests and industrial areas) to 0.0001m (for water or sandy deserts). In this assessment, the general land use in the local study area can be described as open moorland with some small towns and industrial areas, therefore surface roughness of 0.3m has been applied.

Another model parameter is the minimum Monin-Obukhov length, which describes the minimum stability of the atmosphere. For this assessment it is proposed that a length of 10m is used representing “small towns”.

4.4.3 Buildings

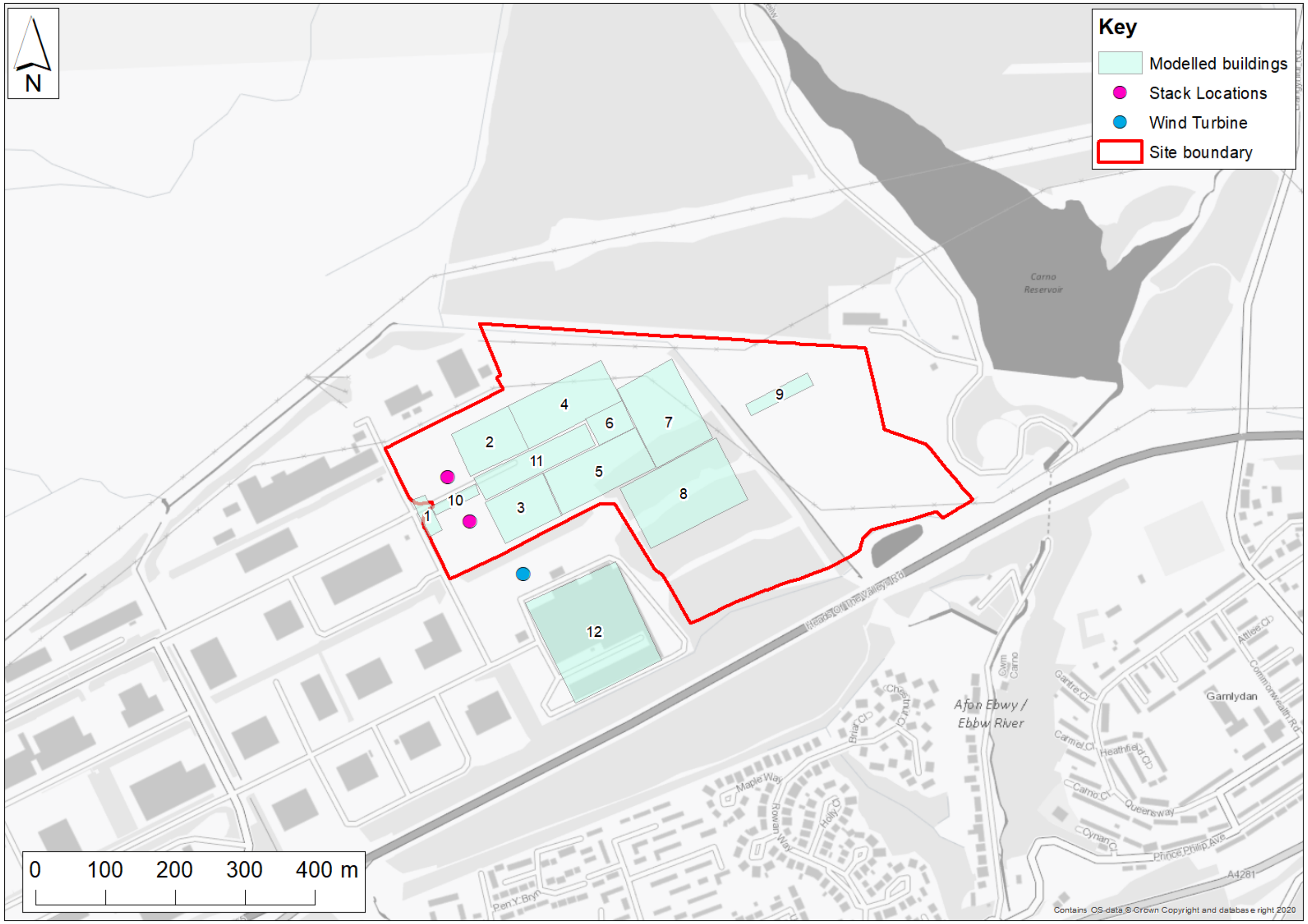
Buildings can have a significant effect on the dispersion of pollutants and will be included within the model. Building input geometries are shown in

Table 9 and Figure 5, including onsite buildings and a significant building located to the south of the site. Buildings to be included in the assessment will be determined by a sensitivity test, and the worst case scenario will be used. The complex building geometry has been simplified so as to be included within the model which only accepts rectangular or circular building shapes.

Table 9: Building geometries

Building Name	NGR (m)		Height (m)	Length (m)	Width (m)	Angle (˚)
	x	y				
1 (onsite)	315543	212736	38.5	19.6	53.7	64.7
2 (onsite)	315635	212840	34	86.7	63.8	63.2
3 (onsite)	315685	212745	34	92.6	65.0	62.4
4 (onsite)	315741	212894	28	150.9	62.9	63.6
5 (onsite)	315791	212799	28	148.4	60.9	64.7
6 (onsite)	315809	212867	28	53.7	42.4	60.3
7 (onsite)	315886	212882	28	53.7	42.4	60.3
8 (onsite)	315910	212767	20	155.0	95.0	63.6
9 (onsite)	316049	212909	7.5	96.3	18.8	64.2
10 (onsite)	315586	212755	38.5	69.9	15.2	63.7
11 (onsite)	315701	212813	18	177.4	35.8	64.5
12 (offsite)	315780	212570	8.9	141.3	151.7	66.5

Figure 5: Buildings, stack and wind turbine locations based on draft design



4.4.4 Wind turbine

The nearby wind turbine will be included in the modelling (location shown in Figure 5), to ensure their effects on pollutant dispersion are captured. There is one turbine located adjacent to the proposed site on the Techboard land (south of the proposed site). The turbine parameters included within the model will include the hub height, the wind speed at hub height and the thrust coefficient of the turbine. These are given in Table 10.

Table 10: Wind turbine model input parameters

Rated power output	500kW
Make/model	EWT DW54
Number of units	1
Location (NGR, m)	315683, 212651
Turbine rotor diameter	54m
Hub height	46m
Wind speed at hub height (m/s)	**Thrust Coefficient (Ct)**
1	0.00
2	0.00
3	0.94
4	0.86
5	0.80
6	0.80
7	0.80
8	0.77
9	0.73
10	0.57
11	0.40
12	0.30
13	0.23
14	0.18
15	0.15
16	0.12
17	0.10
18	0.09
19	0.08
20	0.07
21	0.06
22	0.05
23	0.05
24	0.04
25	0.04

4.4.5 Proposed plant

There are two proposed furnaces with a design capacity of 500 and 700 tonnes per day. Each furnace will run on natural gas and will be operational 24 hours per day all year. Emissions from each furnace will be emitted via a separate stack having been passed through the abatement equipment and filters following best practice technology design. At the time of writing the stack height assessment is still being completed to determine a suitable stack height for input to planning and permitting.

A printing line is proposed for the site which will require five natural gas fired boilers each with an individual flue. A small furnace is also proposed to support the on-site workshop. At the time of writing the emission parameters and flue locations are not available. However, they will be included in the air quality assessment once confirmed. They are not expected to be a significant source of emissions in comparison to the furnaces.

The 5 backup generators will be diesel fuelled and they are at 2.8MW each. The installation of those generators is to provide resilience purposes for the electrical requirement for the site and. Due to their limited hours of operation, it is proposed to scope out the impacts from the 5 back-up generators of the detailed assessment with the following reasons:

- They will only be tested for 5 minutes every week (operating time to be less than 5 hours each year for each generator);
- The electricity will be supplied by Western Power and the network reliability for local electricity grids remained high at around 99.99% from information supplied by the project electrical engineer; and
- The downtime from Western Power is usually less than 1 hour at a maximum.

4.4.6 Stack parameters

The parameters for the furnace stacks are presented in Table 11 and location is shown in Figure 5). Details for the proposed plant emissions and design have been provided by Tecoglas (project furnace designer).

Emissions will be modelled at emission limits. If these impacts are unacceptable a more realistic worst case will be modelled. This would be detailed in the report.

Table 11: Furnace stack parameters

Parameter	Unit	Furnace 1 (700 tonnes)	Furnace 1 (500 tonnes)
Stack location*	NGR (m)	315607, 212727	315575, 212791
Stack flue diameter	m	2.25	2.25
Stack height (from ground)	m	TBC	
Flue gas efflux velocity	m/s	5.51	4.59
Efflux temperature	˚C	160	160
Moisture content	%	12	12
Oxygen content (wet gas)	%	8	8

Parameter	Unit	Furnace 1 (700 tonnes)	Furnace 1 (500 tonnes)
Note: *Indicative location as the design is currently being finalised.			

4.4.7 Stack emissions

The legislation[1] contains the ELVs applicable to the new glass furnaces as set out in Table 12.

The modelling of the new furnaces will use ELVs, the maximum emission permitted, to ensure that a worst-case modelling scenario is considered.

The assessment will also consider abnormal operating scenarios for the new furnaces, which could lead to higher pollutant emissions over short periods. Abnormal event scenarios are only expected to include periods when the filters are being maintained or replaced. The maintenance and replacement time for the selective catalytic reduction (SCR) and dust reduction systems will only take 5 days at a maximum during a year. There are not expected to be any other periods where abnormal emissions would occur. Proposed abnormal emissions are outlined in Table 13.

Table 12: Emission Limit Values (ELV)

Substance	Daily mean (mg/Nm^3)
Particles	20
NO_x	500
SO_x	500
HF	5
HCl	20
NH_3	30
Total metals – As, Co, Ni, Cd, Se, CrVI	1
Total metals – As, Co, Ni, Cd, Se, Cr VI, Sb, Pb, CrIII, Cu, Mn V, Sn	5
Note: Units are in Nm^3 (273K, dry and 8% O_2)	

Table 13: Proposed abnormal emissions

Substance	Abnormal emissions	
	Short-term averaging period	Short-term emissions (mg/Nm^3)
Particles*	24 hour	100
NOx as NO_2*	1 hour	1200

Substance	Abnormal emissions	
	Short-term averaging period	Short-term emissions (mg/Nm^3)
Total metals – As, Co, Ni, Cd, Se, CrVI#	1 hour	5
Total metals – As, Co, Ni, Cd, Se, Cr VI, Sb, Pb, CrIII, Cu, Mn V, Sn#	1 hour	25
Note: * Data provided by Tecoglas # Abnormal emissions for total metals are not available. A factor of 5 has been used on the total metals normal emissions to calculate the abnormal emissions. This is determined by the ratio between normal and abnormal emission for particulates.		

4.4.8 Trace metals

The applicant operates a glass container factory in Turkey, and stack measurements from the glass melting furnaces were undertaken in 2018. The measurements include results for the concentrations of Cd, Pb and Sn in the flue gas. None of the other trace metals included in the BAT note were measured. In the absence of emissions monitoring for those other pollutants and taking into account that emissions of metals is highly dependent on the characteristics of the raw materials the following approach is proposed. The measured concentrations of Cd, Pb and Sn as a percentage of total particulate matter will be applied to the dispersion modelling results. For the other trace metals without measurements, it is proposed to split the percentage impact across the remaining metals after removing the measured components.

4.4.9 NOx to NO_2 conversion

The air quality model predicts concentrations of NO_x which is a mixture of NO_2 and nitric oxide (NO). Both gases react in the atmosphere, particularly with ozone. In general, the NO_x are mainly emitted as NO and this converts to NO_2 in the atmosphere. The air quality standard has been set for NO_2 and therefore it is important that an appropriate conversion rate is used to calculate ambient NO_2 concentrations at the receptors that result from the modelled NO_X emissions. It is proposed that the EA advice on conversion rates is used, which suggests a ratio of 35% for short-term (i.e. hourly average) and 70% for long-term (i.e. annual mean) concentrations. In practice, these ratios represent conditions some distance away from a release source. Close to an industrial source, the proportion of NO_2 in NOx is typically much lower than this. Applying these ratios will therefore provide a conservative assessment.

4.4.10 Ecology

All sensitive designated ecological sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA), and SSSIs) and locally designated sites (local nature reserves, ancient woodland and local wildlife sites) within 2km of the development will be considered within the assessment, as outlined in Section 2.2.

EA guidance[12] recommends that if the predicted long-term contribution of the installation under investigation (Process Contribution) exceeds 1% of the Critical Level[13], then the contribution of the installation in conjunction with the prevailing background airborne concentration (Predicted Environmental Concentration) must be assessed against the Critical Level. If the total Predicted Environmental Concentration is less than 70% of the Critical Level, the installation is not likely to have a significant effect on the sensitive ecosystem.

Site and habitat specific critical loads[14] and existing deposition rates will be taken from the Air Pollution Information System (APIS) website, and predicted deposition at receptors will be compared against the lowest critical loads as a worst case assessment.

The assessment will also look at the Critical Load Functions (CLFs) for acidity for designated ecological sites using the graphs on the APIS website. The CLF graphs for the most sensitive species in each designated area will be used in the assessment to estimate the worst case impact.

4.5 Traffic emissions

The air quality assessment will include an assessment of potential impacts of vehicle emissions during operation.

Traffic flows during operation and construction will be assessed against the screening criteria in the guidance[10] produced by the Environmental Protection UK (EPUK) and the IAQM.

The EPUK/ IAQM guidance includes two stages for assessing the need for an air quality assessment. Stage 1 includes the set of criteria presented in Table 14, relating to the size and use of the development, and the provision of car parking. Stage 2 includes more specific criteria in relation to the anticipated traffic flows generated by the development and the nature of the local area, as presented in Table 15.

If these thresholds are not triggered, then a detailed air quality assessment can be scoped out. Should screening of the traffic data indicate that any of the criteria are met, then potential impacts at sensitive receptor locations will be assessed by calculating the predicted change in pollutant concentrations as a result of the development. This assessment will use the ADMS Roads atmospheric dispersion model[15] (version 5, March 2020).

Table 14: EPUK/ IAQM Guidance Stage 1 Criteria

If any of the following apply	Coupled with any of the following
≥ 10 residential units or ≥ 0.5ha site area; ≥ 1,000m^2 for other uses or ≥ 1ha site area	> 10 car parking spaces

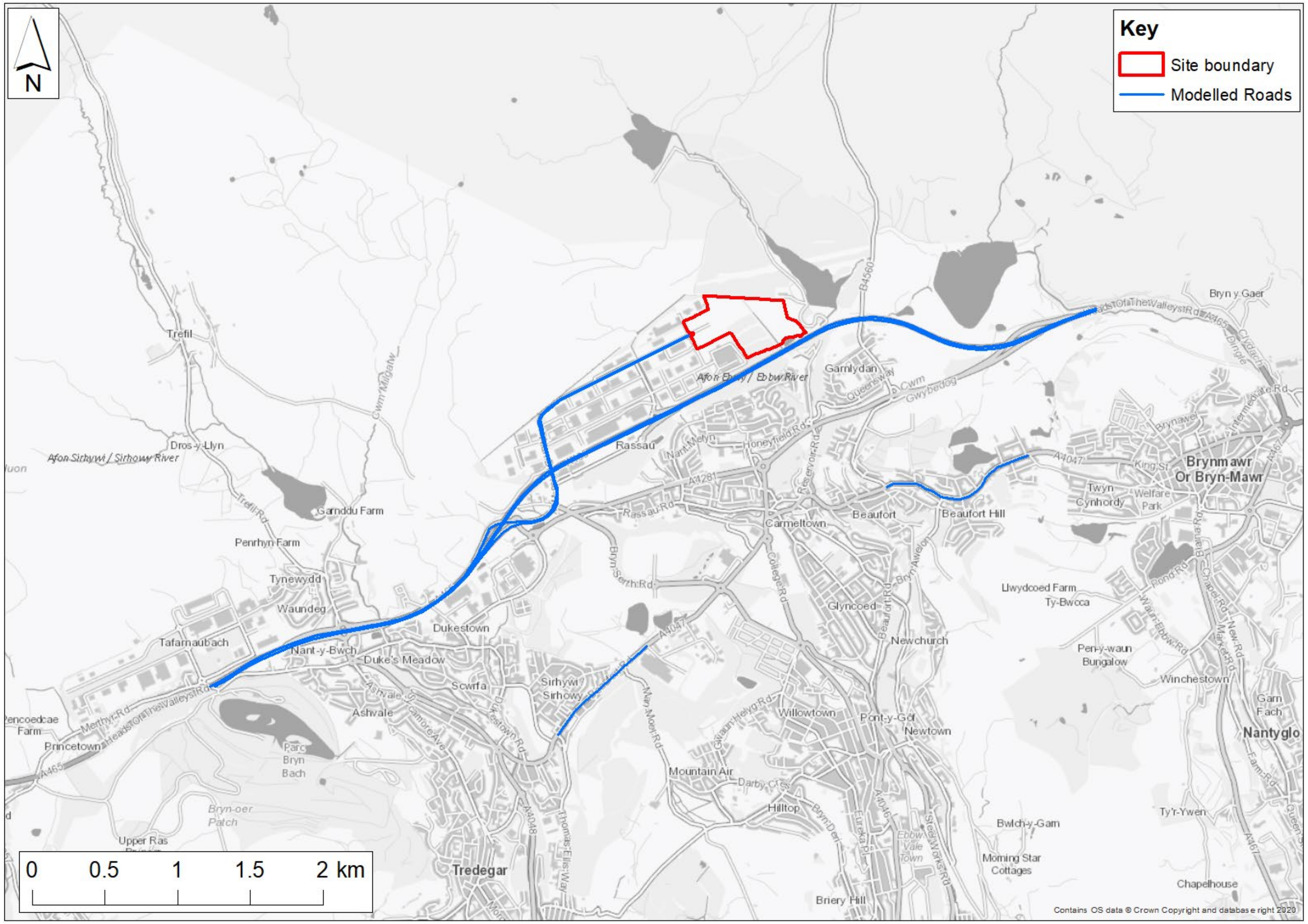
[13] Critical Levels are defined by APIS as "concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge". The critical level is the gaseous concentration of a pollutant in the air.
[14] Critical Loads are defined by APIS as: "a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge". The critical load relates to the quantity of pollutant deposited from the air to the ground.
[15] CERC, ADMS-Roads, http://cerc.co.uk/environmental-software/ADMS-Roads-model.html

Table 15: EPUK/ IAQM Guidance Stage 2 Criteria

Change in…	In or adjacent to an AQMA	Elsewhere
Light Duty Vehicle (LDV) flows	≥ 100 AADT	≥ 500 AADT
Heavy Duty Vehicle (HDV) flows	≥ 25 AADT	≥ 100 AADT
Road alignment	≥ 5m	n/a

Based on the above criteria and data provided by the transport consultant it is expected that the thresholds will be exceeded, the indicative affected road network is presented in Figure 6. The network includes additional roads added for model verification purposes. The final road network will be included in the assessment reports.

Figure 6: Indicative model network



4.6 Odour

There are not expected to be sources of odour from the proposed plant which could result in a statutory nuisance. As such, an odour impact assessment will not be carried out.

DOCUMENT CHECKING (not mandatory for File Note)

	Prepared by	Checked by	Approved by
Name	Angie Chan	James Bellinger	Michael Bull
Signature			

B1.2 Consultation with environmental department

Following submission of the methodology note additional consultation was carried out via email. A summary of the discussions and responses is provided in Table B1.1.

Table B1.1 Summary of consultation

Local authority comment	Response
Can you please add carbon monoxide to the list of pollutants included as part of the assessment as there is likely to be an emission limit in any future permit for this pollutant.	The IED on industrial emissions for the manufacture of glass provides CO emissions for melting furnaces as 100mg/Nm3, and this value will be used.
For the receptor locations can you please add in the risk posed to workers on the industrial estate as well.	On-site locations have been included in the modelling.
Visual stack emissions- can you put something in the proposal to cover this as I expect this to be raised as an issue by local councillors in the future.	A plume assessment has been carried out.
Odour- given the historical odour problems we have had from this industrial estate I advise that you expand on this and provide some technical reasoning to justify why an odour nuisance won't be caused.	A source pathway receptor odour assessment has been carried out.
The diesel generators/ STOR plant- This was something that hasn't been discussed previously. Do they have to be diesel? Is there any chance they can be replaced with gas generators instead? If they are to remain as diesel generators I would like the impacts of the generators to be included in the assessment. I appreciate the likely operating hours proposed are based on grid reliability however there will be no restrictions to the hours of their operation so I would like a couple of scenarios modelled to represent this including a worst case one.	Generators have been included in the dispersion modelling.
Following submission of the ES air quality chapter additional consultation was held with the council, to address questions from both the Council officers and third party organisations. A summary of the discussion is provided here: There are two Part A1 industrial facilities (Rassau Recycling Facility, Enviro Wales Limited and GD Yuasa Battery Manufacturing UK Limited) on the Rassau industrial estate which could not be included in the cumulative air quality assessment as the requested data was not provided prior to the ES. A review of risk carried out at the time of the ES indicated the risk of cumulative impacts was low.	The results of the screening following EPUK/IAQM guidance is provided in section 0. The cumulative effects assessment using the EA H1 tool is provided in section B8.1.

Local authority comment	Response
The risk of missing potential effects from the proposed development due to a combined effect with the existing emissions from the Part A1 industrial facilities was discussed with BGCBC and Ricardo. It was agreed that while a cumulative assessment could not be carried out, due to the lack of data, for the Part A1 facilities, that Arup would provide an assessment of the potential for cumulative impacts associated with the emissions from the Part A1 industrial facilities and the proposed development, resulting in a significant effect. The agreed two-step approach used the Environment Agency (EA) H1 screening tool methodology to identify the change required and an estimate of emissions to result in a significant effect following the EPUK/IAQM significance criteria.	
The council requested additional receptors were added to the wider Rassau industrial estate to assess short-term impacts.	Modelling has been carried out to provide the predicted concentrations at the Rassau industrial estate, these are shown in section B5.

B2 Assessment methodology

This appendix details the method used for the assessment of air quality effects for the proposed Dragon Glass Bottle Manufacturing Facility. The assessment has examined the changes in air pollutant concentrations in the surrounding area that will result from the construction and operation of the site facility (for 2026, the first full year of operation when both furnaces will be working, as a worst case, worst case traffic impacts have been added to the assessment) and in combination with existing facilities. The effects on human health and sites which are designated for biodiversity have been assessed.

B2.1 Construction dust assessment methodology

The proposed development will require earthworks, construction of new buildings and may create associated trackout activities as a result of construction vehicles. There will be no demolition of buildings as no existing buildings are present on site. Some demolition of the existing road on site is required and has been considered as part of the assessment of earthworks. The impacts of construction and associated air quality effects upon locally sensitive receptors from earthworks, construction and trackout activities have been assessed using the qualitative approach guidance prescribed by the Institute of Air Quality Management (IAQM)[1].

An 'impact' is described as a change in pollutant concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during demolition and construction of the proposed development are:

dust deposition, resulting in the soiling of surfaces;
visible dust plumes;
elevated PM_{10} concentrations as a result of dust generating activities at the proposed development; and
an increase in NO_2 and PM_{10} concentrations due to exhaust emissions from non-road mobile machinery and vehicles accessing the proposed development.

The IAQM guidance[1] considers the potential for dust emissions from activities such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the proposed development onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dust materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

[1] IAQM (2016), Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)

There are five steps in the assessment process described in the IAQM guidance[1]. These are summarised in Diagram 1 and are further outlined in the paragraphs below.

Step 1: Need for assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the proposed development boundary (or 50m where there are ecological receptors) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the proposed development entrance(s).

Step 2: Assess the risk of dust impacts

This step is split into three sections as follows:

2A – define the potential dust emission magnitude;
2B – define the sensitivity of the area; and
2C – define the risk of impacts.

Each of the dust-generating activities is prescribed a dust emission magnitude depending on the scale and nature of the works (Step 2A) based on the criteria shown in Table B2.2.

The sensitivity of the surrounding area is then determined (Step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Table B2.2 to Table B2.5 shows the criteria for defining the sensitivity of the area to different dust effects.

The overall risk of the impacts for each activity is then determined (Step 2C) prior to the application of any mitigation measures (Table B2.6) and an overall risk for the proposed development derived.

Step 3: Determine the site-specific mitigation

Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

Step 4: Determine any significant residual effects

Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance[1] notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a dust assessment report

The last step of the assessment is the preparation of a Dust Assessment Report which forms part of the EIA.

Diagram 1 IAQM dust assessment methodology

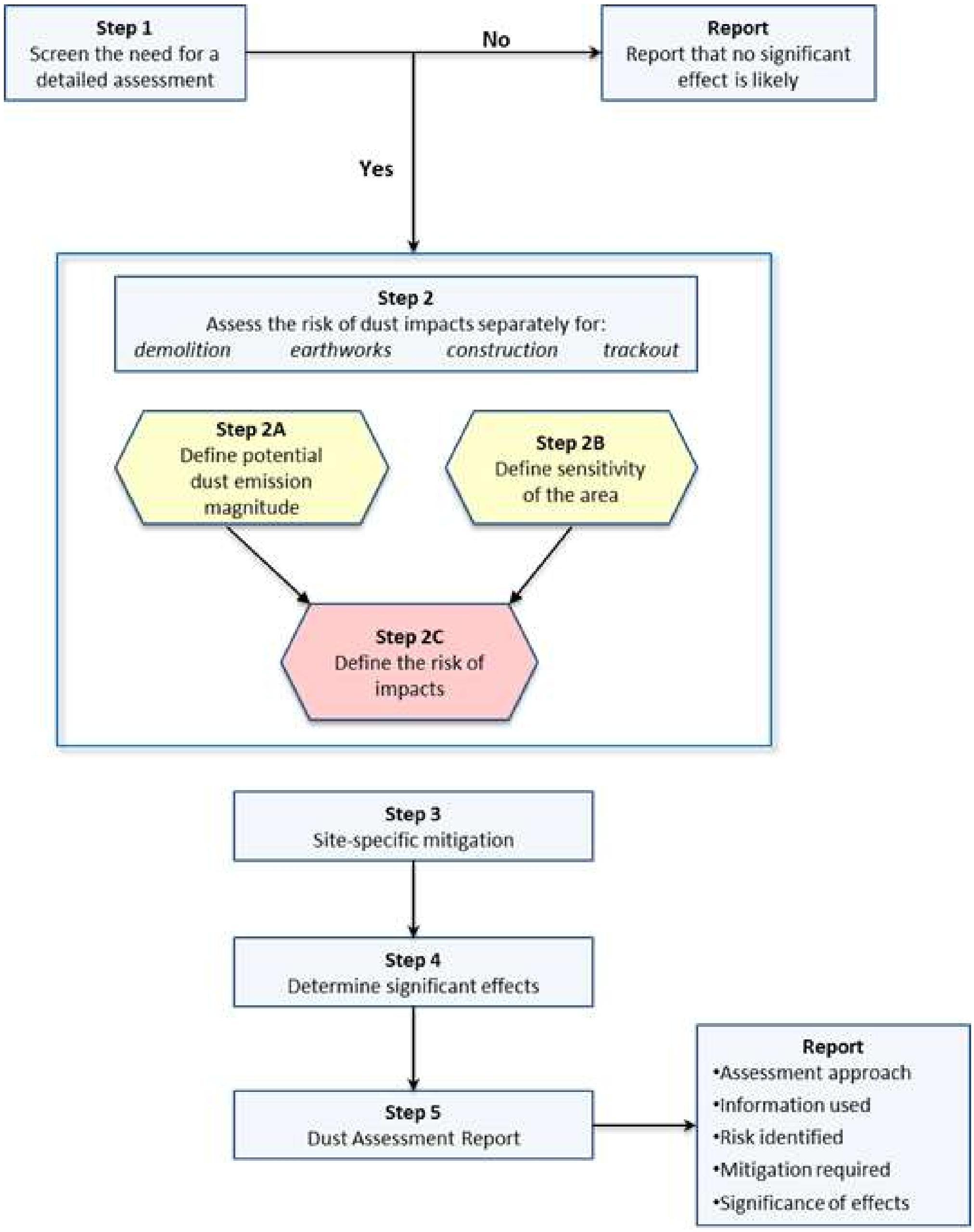


Table B2.2 Dust emission magnitude

Dust emission magnitude		
Small	**Medium**	**Large**
Demolition		
• total building volume <20,000m³; • construction material with low potential for dust release (e.g. metal cladding or timber); • demolition activities <10m above ground; and • demolition during wetter months.	• total building volume 20,000 – 50,000m³; • potentially dusty construction material; and • demolition activities 10 – 20m above ground level.	• total building volume >50,000m³; • potentially dusty construction material (e.g. concrete); • on-site crushing and screening; and • demolition activities >20m above ground level.
Earthworks		
• total site area <2,500m² • soil type with large grain size (e.g. sand); • <5 heavy earth moving vehicles active at any one time; • formation of bunds <4m in height; • total material moved <10,000 tonnes; and • earthworks during wetter months.	• total site area 2,500m² – 10,000m² • moderately dusty soil type (e.g. silt); • 5 – 10 heavy earth moving vehicles active at any one time; • formation of bunds 4 – 8m in height; and • total material moved 20,000 – 100,000 tonnes.	• total site area >10,000m²; • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size); • >10 heavy earth moving vehicles active at any one time; • formation of bunds >8m in height; and • total material moved >100,000 tonnes.
Construction		
• total building volume <25,000m³; and • construction material with low potential for dust release (e.g. metal cladding or timber).	• total building volume 25,000 – 100,000m³; • potentially dusty construction material (e.g. concrete); and • on-site concrete batching.	• total building volume >100,000m³; • on-site concrete batching; and • sandblasting.
Trackout		
• <10 Heavy duty vehicle (HDV) (>3.5t) outward movements in any one day; • surface material with low potential for dust release; and • unpaved road length <50m.	• 10 – 50 HDV (>3.5t) outward movements in any one day; • moderately dusty surface material (e.g. high clay content); and • unpaved road length 50 – 100m.	• >50 HDV (>3.5t) outward movements in any one day; • potentially dusty surface material (e.g. high clay content); and • unpaved road length >100m.

Table B2.3 Sensitivity of the area to dust soiling effects

Receptor sensitivity	**Number of receptors**	**Distance from the source (m)**			
		< 20	**< 50**	**< 100**	**< 350**
High	> 100	High	High	Medium	Low

	10 – 100	High	Medium	Low	Low
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table B2.4 Sensitivity of the area to human health impacts

<table>
<tr><th rowspan="2">Background PM_{10} concentrations (annual mean)</th><th rowspan="2">Number of receptors</th><th colspan="5">Distance from the source (m)</th></tr>
<tr><th>< 20</th><th>< 50</th><th>< 100</th><th>< 200</th><th>< 350</th></tr>
<tr><td colspan="7">High receptor sensitivity</td></tr>
<tr><td rowspan="3">> 32µg/m³</td><td>> 100</td><td rowspan="3">High</td><td rowspan="2">High</td><td>High</td><td>Medium</td><td rowspan="3">Low</td></tr>
<tr><td>10 – 100</td><td>Medium</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td><td>Medium</td><td>Low</td></tr>
<tr><td rowspan="3">28 – 32µg/m³</td><td>> 100</td><td rowspan="3">High</td><td>High</td><td>Medium</td><td rowspan="3">Low</td><td rowspan="3">Low</td></tr>
<tr><td>10 – 100</td><td rowspan="2">Medium</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td></tr>
<tr><td rowspan="3">24 – 28µg/m³</td><td>> 100</td><td rowspan="2">High</td><td rowspan="2">Medium</td><td rowspan="3">Low</td><td rowspan="3">Low</td><td rowspan="3">Low</td></tr>
<tr><td>10 – 100</td></tr>
<tr><td>< 10</td><td>Medium</td><td>Low</td></tr>
<tr><td rowspan="3">< 24µg/m³</td><td>> 100</td><td>Medium</td><td rowspan="3">Low</td><td rowspan="3">Low</td><td rowspan="3">Low</td><td rowspan="3">Low</td></tr>
<tr><td>10 – 100</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td></tr>
<tr><td colspan="7">Medium receptor sensitivity</td></tr>
<tr><td rowspan="2">> 32µg/m³</td><td>> 10</td><td>High</td><td>Medium</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td><td>Medium</td><td>Low</td></tr>
<tr><td rowspan="2">28 – 32µg/m³</td><td>> 10</td><td>Medium</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td><td>Low</td></tr>
<tr><td rowspan="2">24 – 28µg/m³</td><td>> 10</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td></tr>
<tr><td rowspan="2">< 24µg/m³</td><td>> 10</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td><td rowspan="2">Low</td></tr>
<tr><td>< 10</td></tr>
<tr><td colspan="7">Low receptor sensitivity</td></tr>
<tr><td>–</td><td>> 1</td><td>Low</td><td>Low</td><td>Low</td><td>Low</td><td>Low</td></tr>
</table>

Table B2.5 Sensitivity of the area to ecological impacts

<table>
<tr><th rowspan="2">Receptor sensitivity</th><th colspan="2">Distance from the source (m)</th></tr>
<tr><th>< 20</th><th>< 50</th></tr>
<tr><td>High</td><td>High</td><td>Medium</td></tr>
<tr><td>Medium</td><td>Medium</td><td>Low</td></tr>
</table>

Low	Low	Low

Table B2.6 Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	**Medium**	**Small**
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible

B2.2 Operational assessment methodology

B2.3 Sensitive receptors

Modelling has been undertaken to predict impacts at discrete and gridded receptors. The discrete receptors relevant to the assessment include residential properties, schools, hospitals as well as other sensitive locations and facilities in the area, such as designated ecological sites.

Discrete human receptors have been selected based on relevant sensitive receptors in the vicinity of the site, these are shown Figure 5.1 in Volume III Figures and detailed in Table B2.7. None of the discrete human receptors have been identified as tall buildings (such as flats, where exposure may be several tens of metres above ground level), therefore all human receptors will be modelled at a height of 1.5m, representative of the breathing zone of a human receptor standing on the ground.

Receptors have also been selected on-site and at locations across the Rassau industrial estate, presented in Table B2.7. They represent locations and heights (ranged from ground to second floor) where the workers will be during operational phase.

The assessment of emissions from the stacks of the new furnaces and generators has also been predicted at locations over a cartesian grid of 5km by 5km, for contour plotting of the results and identification of the point of maximum impact on the modelled grid. The grid area has used the proposed stack locations as the central point. The grid has been plotted at a height of 1.5m and with a resolution of 20m. The modelled grid extent will be: National Grid Reference (NGR) (313081, 210255) to (318081, 215255). The proposed model grid area is shown in Figure 5.2 in Volume III Figures.

Table B2.7 Discrete human receptors

ID	Name	NGR (m)		Height (m)	Distance to site (m) and direction
		X	Y		
1	Rhos Y Fedwen Primary School	315748.6	211960.1	1.5	644 NE
2	Buds to Blossoms Day Nursery	316538.2	211674.9	1.5	1070 N
3	Mrs Puddleduck Day Nursery	315961.3	211748.5	1.5	833 N
4	Glyn Coed Primary School	316572.4	211149.0	1.5	1,572 N
5	Beaufort Hill Primary School	317515.9	211578.9	1.5	1,675 NW
6	Ysbyty'r Tri Chwm Hospital	316189.7	211096.5	1.5	1,509 N
7	Bank House Care Home	316869.0	212498.5	1.5	601 NW
8	Sonael Care Home	316494.1	211526.2	1.5	1,193 N
9	Residential dwelling: Chestnut Close	316201.5	212511.7	1.5	170 N
10	Residential dwelling: Maple Way	316002.8	212373.1	1.5	223 N
11	Residential dwelling: Pen-Y-Crug	315834.5	212303.0	1.5	291 N
12	Residential dwelling: Llangynidr Road	316720.3	212811.5	1.5	397 E
13	Residential dwelling: Stonebridge Road	315481.0	212137.3	1.5	516 N
14	Residential dwelling: Nant-T-Croft	314856.8	211566.6	1.5	1,296 NE
15	Residential dwelling: Honeyfield Road	316275.3	212077.7	1.5	600 N
16	Wells Farm	314435.0	211623.0	1.5	1,550 SW
17	Coates Row 1	314489.3	211646.5	1.5	1,467 SW

ID	Name	NGR (m)		Height (m)	Distance to site (m) and direction
		X	Y		
18	Coates Row 2	314543.5	211727.2	1.5	1,382 SW
19	Residential Dwelling: Beaufort Wells	314568.3	211583.5	1.5	1,467 SW
20	Residential Dwelling: A4046	314619.1	211526.9	1.5	1,472 SW
21	Residential Dwelling: Unnamed Road	314318.5	211324.2	1.5	1,816 SW
22	EnviroWales Ltd, Rassau Ind Park	315474.0	212815.6	1.5	22 W
23	EnviroWales Ltd, Rassau Ind Park	315402.8	212824.0	1.5	90 NW
24	EnviroWales Ltd, Rassau Ind Park	315296.4	212794.6	1.5	210 NW
25	EnviroWales Ltd, Rassau Ind Park	315398.0	212728.0	1.5	130 W
26	Sears Seating Europe, Rassau	315502.8	212680.3	1.5	80 SW
27	Box Litho, Rassau Ind Park	315579.0	212581.1	1.5	185 SW
28	GTS Flexible Materials, Rassau Ind Park	315655.2	212481.9	1.5	290 SW
29	Velox Power, Rassau Ind Park	315724.3	212631.9	1.5	190 SE
30	Yuasa Battery Ltd, Rassau Ind Park	315207.0	212258.4	1.5	590 SW
N1	New on-site receptor	315867.5	212943.6	1.5 to 10.5	-
N2	New on-site receptor	315784.6	212859.4	1.5 to 7.0	-
N3	New on-site receptor	315720.2	212851.6	1.5 to 10.5	-
N4	New on-site receptor	315649.6	212813.4	1.5 to 19.0	-
N5	New on-site receptor	315594.1	212818.2	1.5 to 10.5	-
N6	New on-site receptor	315620.6	212870.8	1.5 to 19.0	-
N7	New on-site receptor	315698.3	212910.7	1.5 to 10.5	-
N8	New on-site receptor	315795.5	212960.8	1.5 to 7.0	-

ID	Name	NGR (m)		Height (m)	Distance to site (m) and direction
		X	Y		
N9	New on-site receptor	315680.7	212821.5	1.5 to 10.5	-
N10	New on-site receptor	315699.3	212798.8	1.5 to 7.0	-
N11	New on-site receptor	315668.6	212773.2	1.5 to 19.0	-
N12	New on-site receptor	315751.8	212815.8	1.5 to 10.5	-
N13	New on-site receptor	315639.3	212727.2	1.5 to 10.5	-
N14	New on-site receptor	315698.3	212717.0	1.5 to 10.5	-
N15	New on-site receptor	315778.5	212757.5	1.5 to 10.5	-
N16	New on-site receptor	315875.0	212732.8	1.5 to 14.0	-
N17	New on-site receptor	315953.2	212725.6	1.5 to 14.0	-
N18	New on-site receptor	316003.7	212805.0	1.5 to 14.0	-
N19	New on-site receptor	315889.8	212901.2	1.5 to 10.5	-
N20	New on-site receptor	315592.9	212760.6	1.5 to 28.7	-

Ecological receptors have been reviewed within 15km of the site. This review has identified a number of designated sites for ecological assessment. The nearest ecological sites to the site have been identified as Usk Bat Sites / Safleodd Ystlumod Wysg (SAC), Mynydd Llangatwg Site of Special Scientific Interest (SSSI), Mynydd Llangynidr SSSI, and Beaufort Hills Pond, Woodland Local Nature Reserve (LNR), several parcels of ancient woodland and Sites of Importance for Nature Conservation (SINCs) within 5km from the site. Receptor points have been placed at the closest point of the ecological site to the proposed stack. The locationd of the ecological receptors are shown in Figure 5.3 in Volume III Figures and details are presented in Table B2.8.

There are five SSSIs which have been designated for geological reasons within 15km of the site (these are: Abercriban Quarries, Baltic & Tyle'r-bont Quarries, Llanover Quarry, Cwar yr Ystrad a Cwar Blaen Dyffryn and Nant Glais Caves) and therefore these have been excluded from further assessment.

Ecological receptors have been modelled at a height of 0m, representative of ground level.

Table B2.8 Ecological receptors

ID	Name	NGR (m)		Height (m)	Distance to site (km) and direction
		X	Y		
E1	Beaufort Hills Pond and Woodland LNR	316829.4	212188.2	0	1.1 SE
E2	Trevor Rowson LNR	319222.1	210203.9	0	4.2 SE
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	315660.6	210797.8	0	2.0 SW
E4	Parc Nant-y-Waun LNR	317655.7	211609.3	0	2.1 SE
E5	Parc Bryn Bach LNR	312984.9	210212.0	0	3.9 SW
E6	Brynmawr Sections SSSI	319681.5	212105.6	0	3.9 SE
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	320555.3	212317.5	0	4.7 SE
E8	Mynydd Llangynidr SSSI	315824.2	214438.2	0	1.6 NE
E9	Mynydd Llangynidr SSSI	314110.7	213747.6	0	2.0 NW
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	318639.0	215713.3	0	4.0 NE
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	316821.3	213599.2	0	1.2 NE
E12	Ancient Woodland 1 (B4560)	314354.5	216357.0	0	3.9 NW
E13	Ancient Woodland 2 (The Brecon Beacons)	317392.0	217027.6	0	4.5 NE
E14	Ancient Woodland 3 (Main Road)	320222.9	212309.1	0	4.4 SE
E15	Ancient Woodland 4 (A4281/ A4046)	314703.6	211363.8	0	1.9 SW
E16	Ancient Woodland 5 (B4256 Morgan Street)	314332.8	208649.6	0	4.5 SW
E17	Ancient Woodland 6 (Tredegar)	315428.8	207962.7	0	4.9 SW
E18	Ancient Woodland 7 (Belle Vue)	316697.1	211419.3	0	1.6 S
E19	Ancient Woodland 8 (A467)	319194.3	208858.6	0	5.2 SE
E20	Garnlydan (SINCs)	316800.4	213347.1	0	1.0 NE
E21	Garnlydan (SINCs)	316916.1	212867.5	0	1.0 SE
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	314968.1	211472.4	0	1.6 SW

ID	Name	NGR (m)		Height (m)	Distance to site (km) and direction
		X	Y		
E23	Hirgan Fields Grassland (SINCs)	314571.2	211576.9	0	1.8 SW
E24	Land at Park View, Beaufort (SINCs)	316456.0	211785.4	0	1.2 S
E25	Land off Parkhill Crescent (SINCs)	317243.2	211279.6	0	2.1 SE
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	315181.0	211796.8	0	1.2 SW
E27	Nant-y-Croft, Rassau (SINCs)	314734.0	211657.4	0	1.6 SW
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	318294.8	212844.4	0	2.4 SE
E29	Rassau Pond SO1512/198 (SINCs)	315918.9	212404.5	0	0.4 S
E30	Rhyd y blew (SINCs)	315334.9	211477.0	0	1.5 SW
E31	Waun y Pound (SINCs)	315409.0	210844.6	0	2.0 SW

All modelled receptors were included in the dispersion modelling for the stack and roads assessment. Where receptors were within 200m of a road the effect of road emissions was added to stack emissions in order to calculate a total impact.

B2.4 Dispersion model set-up

For the assessment of emissions from the two stacks of the proposed development, the latest ADMS atmospheric dispersion model (version 5.2.2.0) has been used. This is a well-established model originally developed on behalf of a number of UK bodies. The model can take into account the relevant information on the plant design and operations, local meteorological data, terrain and local building dimension information. ADMS has been used to predict long-term and short-term concentrations, at discrete receptors and across a gridded domain, and results have been compared with the relevant objectives.

The following sections detail the inputs and processes used in this assessment.

B2.4.1 Meteorological data

Meteorological data has been taken from the Sennybridge monitoring station, which lies approximately 27km to the north-west of the site and is considered to be the most appropriate site for this assessment. The Sennybridge monitoring site has been used for detailed dispersion modelling of emissions at other locations on the Rassau Industrial Estate. The latest five years of data (2015-2019) have been obtained from this site to allow sensitivity testing and examine the variation in predicted concentrations for each year, these can be found in Figure 5.4 in Volume III Figures.

In order for the modelling exercise to be representative of local conditions and to predict long-term averages, the dispersion model requires representative meteorological data. Most dispersion models cannot make predictions during calm wind conditions, as dispersion of air pollutants is more difficult to calculate in these circumstances. The default option within ADMS for treating calm conditions has been implemented, by setting the minimum wind speed to 0.75m/s. LAQM.TG16 guidance recommends that the meteorological data file is tested within a dispersion model and the relevant output log file checked to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedances. The guidance recommends that meteorological data should only be used if the percentage of usable hours is greater than 75% and preferably 90%.

The datasets for 2015-2019 all had usable hours greater than 90% (2015: 91%; 2016: 89%; 2017: 90%; 2018: 90%; and 2019: 89%), and therefore the data meets the requirements of the Defra guidance and is adequate for use in dispersion modelling.

It is known that a meteorological site is located at the industrial park near to the proposed development, that data was requested for use in this assessment however it was not available as data was not able to be provided. The use of Sennybridge meteorological data has been agreed with the planning authority.

B2.4.2 Surface roughness and minimum Monin-Obukhov length

The extent of mechanical turbulence (and hence, mixing) in the atmosphere is affected by the surface/ground over which the air is passing. Typical surface roughness values range from 1.5m (for cities, forests and industrial areas) to 0.0001m (for water or sandy deserts). In this assessment, the general land use in the local study area can be described as open moorland with some small towns and industrial areas, therefore surface roughness of 0.3m has been applied.

Another model parameter is the minimum Monin-Obukhov length, which describes the minimum stability of the atmosphere. For this assessment it is proposed that a length of 10m is used representing “small towns”, which is considered representative of the area.

B2.4.3 Terrain effects

Terrain effects will play a role in the dispersion of pollutants in this geographic area. The site is located in a wide valley which limits the risk of inversions trapping pollutants (which can be an issue in deep steep sided valleys). To determine whether terrain has an effect, sensitivity analysis has been carried out using terrain data as an input into the ADMS model. Terrain data has been obtained from the Ordnance Survey (OS).

Terrain has been included in the modelling as shown in Figure 5.5 in Volume III Figures.

Following all the modelling sensitivity tests, results were compared, and those inputs generating realistic worse case outcomes have been taken forward. The results from these sensitivity tests are presented in section B2.5.2 of this appendix.

B2.4.4 Buildings

Buildings can have a significant effect on the dispersion of pollutants and have been included within the model. Building input geometries are shown in Table B2.9 and Figure 5.6 in Volume III Figures, including onsite buildings and a significant building located to the south of the site. Buildings included in the assessment have been determined by a sensitivity test, and the worst-case scenario used. The main building for each point source is selected according to the nearest location. The complex building geometry has been simplified so as to be included within the model which only accepts rectangular or circular building shapes.

Table B2.9 Building Geometries

Building name	NGR (m)		Main building	Height (m)	Length (m)	Width (m)	Angle (°)
	x	y					
1 (onsite)	315707.2	212756.7	Furnace 2	35.3	93.7	65.1	62.6
2 (onsite)	212756.7	212756.7	-	39.4	62.7	11.9	64.4
3 (onsite)	315658.1	212853.8	Furnace 1	35.3	92.3	65.8	62.9
4 (onsite)	315740.7	212896.7	-	28.2	93.1	65.8	62.2
5 (onsite)	315715.2	212823.2	Back-up generators	9	155.1	28.8	82.7
6 (onsite)	315788.8	212799.1	-	28.2	90.2	65.1	62.6
7 (onsite)	315839.6	212898.3	-	28.2	90.2	151.7	65.5
8 (onsite)	315930.9	212784.7	-	28.05	129.0	146.0	333.4
9 (offsite)	315782.7	212569.7	-	8.9	140.0	158.8	64.5

B2.4.5 Wind turbines

The nearby wind turbine has been modelled (location shown in Figure 5.6 in Volume III Figures) to account for their effects on pollutant dispersion. There is one turbine located adjacent to the site on the Techboard land (south of the proposed site). The turbine parameters included within the model will include the hub height, the wind speed at hub height and the thrust coefficient of the turbine. These are given in Table B2.10.

Table B2.10 Wind turbine model input parameters

Rated power output	500kW
Make/model	EWT DW54
Number of units	1
Location (NGR, m)	315683, 212651
Turbine rotor diameter	54m
Hub height	46m

Wind speed at hub height (m/s)	Thrust coefficient (Ct)
1	0.00
2	0.00
3	0.94
4	0.86
5	0.80
6	0.80
7	0.80
8	0.77
9	0.73
10	0.57
11	0.40
12	0.30
13	0.23
14	0.18
15	0.15
16	0.12
17	0.10
18	0.09
19	0.08
20	0.07
21	0.06
22	0.05
23	0.05
24	0.04
25	0.04

B2.4.6 Furnace parameters and emissions

The emission parameters for the proposed development have been based on achieving compliance with the LA-IPPC Part A2 legislation. The legislation contains the ELVs applicable to the proposed development as set out in the main report chapter.

The modelling of the site has used ELVs, the maximum emissions permitted, to ensure that a worse-case modelling scenario is considered. There are two proposed furnaces with a design capacity of 500 tonnes per day, each running on natural gas and will be in operation 24 hours per day all year.

The parameters for the furnace stacks are presented in Table B2.11 and location is shown in Figure 5.7 in Volume III Figures). Details for the proposed plant emissions and design have been provided by Tecoglas. For the site, the plant selection was based on the scenario which would result in the highest emissions in order to present a reasonable worst-case assumption.

Table B2.11 Furnace stack parameters

Parameter	Unit	Furnace
Number of unit	-	2
Production capacity	-	500 tonnes per day
Stack location	NGR (m)	315592.2, 212823.5 315644.4, 212725.3
Stack flue diameter	m	2.25
Stack height (from ground)	m	75
Flue gas efflux velocity	m/s	4.6
Efflux temperature	˚C	160
Moisture content	%	12
Oxygen content (wet gas)	%	8
Emission rates		
Oxides of nitrogen (NOx) as NO2	g/s	0.8
Sulphur dioxide (SO2)	g/s	0.5
Fine particulates (PM10)	g/s	0.2
Very fine particulates (PM2.5)*	g/s	0.2
Carbon monoxide (CO)	g/s	1.0
Hydrogen chloride (HCl)	g/s	0.2
Hydrogen fluoride (HF)	g/s	0.05
Total metals – As, Co, Ni, Cd, Se, CrVI	g/s	0.01
Total metals – As, Co, Ni, Cd, Se, Cr VI, Sb, Pb, CrIII, Cu, Mn V, Sn	g/s	0.01
CrVI#	g/s	0.000005
Ammonia (NH3)	g/s	0.02
Note: *Assumed emission rates to be the same as PM_{10} #Emission measured at the applicant's glass factory in Turkey		

B2.4.7 Abnormal emissions

The assessment has considered abnormal operating scenarios for the new furnaces, which could lead to higher pollutant emissions over short periods. Abnormal event scenarios are only expected to include periods when the filters are being maintained or replaced. The maintenance and replacement time for the selective catalytic reduction (SCR) and dust reduction systems will only take five days at a maximum during a year. There are not expected to be any other periods where abnormal emissions would occur. Abnormal emissions are outlined in Table B2.12.

Table B2.12 Proposed abnormal emissions

Substance	Abnormal emissions			
	Short-term averaging period	Short-term emissions		
		mg/Nm3	Furnace 1 (g/s)	Furnace 2 (g/s)
Particles*	24 hour	100	1	
NOx as NO2*	1 hour	1200	12.1	
Total metals (Group 1) – As, Co, Ni, Cd, Se, CrVI#	1 hour	5	0.05	
Total metals (Group 2) – As, Co, Ni, Cd, Se, Cr VI, Sb, Pb, CrIII, Cu, Mn V, Sn#	1 hour	5	0.05	
Note: * Data provided by Tecoglas # Abnormal emissions for total metals are not available. A factor of 5 has been used on the total metals normal emissions to calculate the abnormal emissions. This is determined by the ratio between normal and abnormal emission for particulates.				

B2.4.8 Generator parameters and emissions

There are five backup diesel generators proposed to be installed, they are 2.8MW each. The installation of those generators is to provide resilience purposes for the electrical requirement for the site and. Due to their limited hours of operation, they do not fall under the medium combustion plant directive or specified generators directive.

- They will only be tested for approximately 5 minutes every week (typical operating time to be less than 5 hours each year for each generator);
- The electricity will be supplied by Western Power and the network reliability for local electricity grids remained high at around 99.99% from information supplied by the project electrical engineer;
- The downtime from Western Power is usually less than 1 hour at a maximum; and
- Predicted long-terms and short-term results associated with the backup generators are under a pro-rota basis.

The generators have been included in the model, to allow for a cumulative assessment of short-term impacts. The modelled parameters are detailed in Table B2.13.

Table B2.13 Generator stack parameters

Parameter	Unit	Generators
Stack location+	NGR (m)	315709.1, 212810.5 315717.7, 212814.8 315724.3, 212817.4 315731.8, 212820.6

Parameter	Unit	Generators
		315739.7, 212824.2
Hours of operation	hr/year	<5
Stack flue diameter	m	0.6
Stack height	m	10
Flue gas efflux velocity	m/s	31.3
Efflux temperature	˚C	400
Emission rates		
Oxides of nitrogen (NOx) as NO2	g/s	8.3
Sulphur dioxide (SO2)	g/s	0.1
Fine particulates (PM10)	g/s	0.01
CO	g/s	0.4
Note: The testing will turn on one generator at a time. Should the backup generators be in use, only 4 out of 5 will be in operation.		

B2.4.9 STOR parameters and emissions

There are two short-term operating reserves (STOR) located on the Rassau Industrial Estate. The STOR sites comprises gas-fired generators with individual flues. The emissions data from these sites has been taken from their respective planning applications[2],[3] and the emissions have been modelled as part of the assessment of cumulative effects. These emission sources are included in the modelling as the local effects are not likely to be sufficiently included in background data, this will result in a pessimistic set of results as there would be some double counting of emissions. Details are provided in Table B2.14 and Table B2.15.

Table B2.14 STOR – emission data for each gas-fired generator – rear of Unit 26A site

Parameter	Unit	Emission data for each generator
Location of the centre of the compound	NRG	314250, 211780
Stack height above ground	M	5.3
Stack diameter	m	0.4
Efflux velocity	m/s	36.1
Efflux temperature	(°C)	388
NOx emission rate	g/s	0.78
Operational time	hour/annum	1,000

[2]Amec Foster Wheeler (2015) Air Quality Assessment of Peak Supply Generator for Eider Reserve Power Limited at Rear of Unit 26A site on Rassau Industrial Estate, Ebbw Vale
[3] Amec Foster Wheeler (2015) Air Quality Assessment of Peak Supply Generator for Eider Reserve Power Limited at Brecon/ Techboarf site on Rassau Industrial Estate, Ebbw Vale

Parameter	Unit	Emission data for each generator
There are 14 generators included in the model.		

Table B2.15 STOR – emission data for each gas-fired generator – Brecon/Techboard site

Parameter	Unit	Emission data for each generator
Location of the centre of the compound	NRG	315625, 212600
Stack height above ground	M	5.3
Stack diameter	m	0.4
Efflux velocity	m/s	36.1
Efflux temperature	(°C)	388
NOx emission rate	g/s	0.78
Operational time	hour/annum	1,000
There are 14 generators included in the model.		

B2.4.10 Trace metals

The applicant operates a glass container factory in Turkey, and stack measurements from the glass melting furnaces were undertaken in 2020. It is understood these process does not include a particulate filtration system. The measurements include results for the concentrations of Group 1 (As, Co, Ni, Cd, Se and CrVI) and Group 2 metals (As, Co, Ni, Cd, Se, CrVI, Sb, Pb, CrIII, Cu, Mn, though there are no measurements for V and Sn) in the flue gas. Breakdown percentages (shown in Table B2.16 and Table B2.17) have been calculated and applied onto the predicted concentrations for total metal Group 1 and Group 2. For the trace metals without measurements, predicted concentrations have been assumed to be 100% of the total metals as a pessimistic approach.

Table B2.16 Percentage breakdowns for Group 1 metals

Metal	Measured concentrations - Group 1 metals (mg/Nm3)	% breakdown
As	0.00044	7
Co	0.00044	7
Ni	0.00444	69
Cd	0.00044	7
Se	0.00044	7
CrVI	0.0002	3
Total	0.0064	100

Table B2.17 Percentage breakdowns for Group 2 metals

Metal	Measured concentrations - Group 1 metals (mg/Nm3)	% breakdown
As	0.00044	3

Metal	Measured concentrations - Group 1 metals (mg/Nm3)	% breakdown
Co	0.00044	3
Ni	0.00444	26
Cd	0.00044	3
Se	0.00044	3
CrVI	0.00020	1
Sb	0.00044	3
Pb	0.00044	3
CrIII	0.00851	50
Cu	0.00089	5
Mn	0.00044	3
Total	0.01712	100
V	No measurement	100 has been used as a pessimistic approach
Sn	No measurement	

In addition, as CrVI concentrations are generally in excess of the objective across the UK, therefore, the measured CrVI emission has also been modelled (emission rates presented in Table B2.11) in order to represent a realistic approach. Further, it is understood the proposed filtration system will be able to remove 95% of the particles in the flue gas as per the furnace designer's (Tecoglas) advice. As such, the final predicted concentrations for CrVI have been reduced by 95%.

B2.4.11 Short-term background concentrations

For many pollutants there are short-term air quality limits and EALs, such as the 15-minute mean limit for SO_2 and the 24-hour mean limit for PM_{10}. The limits are given as a permitted annual number of exceedances of a threshold concentration which can be expressed as an equivalent percentile. For instance the SO_2 15-minute mean limit can be expressed as the 99.9th percentile of the predicted environmental concentration, that is, the sum of the contribution from the process and the background concentration.

99.9th percentile 15-minute mean SO_2 concentrations due to the process (existing or proposed development) were obtained as a direct output from the ADMS model. The modelled concentrations of substances emitted from the facility are combined with background concentrations of the substances present in the environment for comparison with air quality standards. In the case of long-term mean concentrations, the long-term mean concentration contributions from the proposed development could be added directly to long-term mean background concentrations. It is not possible to add short-term peak background concentrations and process concentrations in the same way. This is because the conditions which give rise to peak ground-level concentrations of substances emitted from an elevated source at a particular location and time are likely to be different from the conditions which give rise to peak concentrations due to emissions from other sources.

This point is addressed in EA's guidance[4] which advises that an estimate of the maximum combined pollutant concentration can be obtained by adding the maximum short-term concentration due to emissions from the source to twice the annual mean background concentration.

The same method has been applied for short-term PM_{10} concentrations and for all other pollutants with short-term limits/EALs.

B2.4.12 NOx to NO_2 conversion for point sources

The air quality model predicts concentrations of NOx which is a mixture of NO_2 and nitric oxide (NO). Both gases react in the atmosphere, particularly with ozone. In general, the NOx is mainly emitted as NO and this converts to NO_2 in the atmosphere. The air quality standard has been set for NO_2 and therefore it is important that an appropriate conversion rate is used to calculate ambient NO_2 concentrations at the receptors that result from the modelled NOX emissions. It is proposed that the EA advice on conversion rates is used, which suggests a ratio of 35% for short-term (i.e. hourly average) and 70% for long-term (i.e. annual mean) concentrations[5]. In practice, these ratios represent conditions some distance away from a release source. Close to an industrial source, the proportion of NO_2 in NOx is typically much lower than this. Applying these ratios will therefore provide a conservative assessment.

B2.4.13 Plume visibility

Water in the emitted gases can condense in the air and form a visible plume if conditions are suitable. There are no formal or informal standards for visible plume lengths although visible plumes that are long enough to reach ground level should be avoided. Reducing the frequency and length of visible plumes can increase energy use, and therefore a balance must be made between visible plume length/frequency and energy use.

Plume visibility from the stack depends on ambient meteorological conditions, flue gas humidity and the efflux temperature of the stack. Condensation of water droplets occurs when the temperature of the ambient air mixed with the flue gas, is lower than the saturation temperature of that mixture. If enough condensation occurs then a plume may become visible. The plume has been modelled and quantified using the ADMS 5 dispersion model.

As noted, there are no standards for visible plume lengths; for this study, the frequency of visible plume lengths has been examined.

The values used in the modelling were:

- Proposed furnace plume: 0.07 kg/kg.

[4] EA (2016) Air emissions risk assessment for your environmental permit
Available at: [https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit]

[5] These proportions differ slightly from the EA guidance which suggests 100% of long-term NO_x as NO_2 and 50% of short-term NO_x as NO_2, however the proposed method is considered to be more realistic.

B2.5 Sensitivity analysis of modelling methods

In order to define the method used to undertake the assessment a number of sensitivity analyses were undertaken to determine which modelling options should or should not be included in the main assessment. Emissions from the proposed development were used and the effect of changing elements of the modelling methodology were examined. Each is discussed in detail and the results are presented in the following sections;

selection of met year from Sennybridge met station (5 years examined);

- consideration of terrain;
- consideration of buildings; and
- consideration of wind turbines.

The impact on ground level concentrations for a range of pollutants and averaging periods was examined using the maximum predicted on the grid of receptors.

B2.5.1 Sensitivity analysis: selection of met year

The effect of using each of the five years (2015-2019) of meteorological data from Sennybridge met station on the ground level concentrations was examined for each of the following pollutants/averaging period/statistic combinations:

- maximum 15-minute mean SO_2 for each year;
- maximum 1-hour mean and annual mean NOx for each year; and
- maximum 24 hour mean PM_{10} for each year.

It is not necessary to carry out a sensitivity test for each pollutant as the sensitivity to meteorological year will be the same for each averaging time/statistic combination. The maximum concentration from the modelled grid are presented in Table B2.18 (bold indicates the maximum value in the series). The terrain model option was included. The values were calculated modelling emissions at 1g/s.

Table B2.18 Sensitivity of ambient concentrations to choice of met year

Maximum concentration (µg/m3)	2015	2016	2017	2018	2019
99.9th p-tile 15 min SO_2	12.44	14.35	12.15	12.73	12.81
99.79th p-tile 1 hour NOx	10.33	10.52	10.40	10.70	10.18
90.41th p-tile 24 hour PM_{10}	1.94	1.86	1.76	1.65	1.73
Annual Mean NOx	0.74	0.62	0.63	0.53	0.57

The results show that for 24-hour and annual mean results 2015 gives the highest concentrations so for pollutants with 24-hour and annual average targets 2015 has been used. For short term impacts 2018 has been used.

B2.5.2 Sensitivity analysis: terrain

The effect on pollutant concentrations of including terrain in the ADMS model using 2015 and 2018 Sennybridge meteorological data was investigated and results are shown in Table B2.19. The results indicate without the use of terrain data gives the highest concentrations, with changes of up to 0.5µg/m^3. However, in order to account for the surrounding valley impact, it is deemed to be appropriate and robust to include the terrain data in the assessment.

Table B2.19 Sensitivity of ambient concentrations to inclusion of terrain

Maximum concentration (µg/m3)	Met year	With terrain	Without terrain
99.9th p-tile 15 min SO_2	2018	12.7	13.1
99.79th p-tile 1 hour NOx	2018	10.3	10.8
90.41th p-tile 24 hour PM_{10}	2015	1.9	2.2
Annual Mean NOx	2015	0.5	0.6

B2.5.3 Sensitivity analysis: buildings

ADMS has the ability to include the effect of buildings on dispersion. The effect on pollutant concentrations of including buildings on and off-site using ADMS model, 2015 and 2018 meteorological data was investigated including the effect of terrain and onsite and offsite buildings, shown in Table B2.20. The results indicate with the inclusion of onsite and offsite buildings gives the highest concentrations across all the pollutants, and therefore buildings have been included in the assessment.

Table B2.20: Sensitivity of ambient concentrations to inclusion of buildings

Maximum concentration (µg/m3)	Met year	With buildings	Without buildings
99.9th p-tile 15 min SO_2	2018	12.4	11.0
99.79th p-tile 1 hour NOx	2018	9.4	8.1
90.41th p-tile 24 hour PM_{10}	2015	1.9	1.3
Annual Mean NOx	2015	0.7	0.5

B2.5.4 Sensitivity analysis: wind turbine

ADMS has the ability to include the effect of wind turbines and buildings on dispersion. The effect on pollutant concentrations of including the nearby wind turbine using ADMS model, 2015 and 2018 meteorological data was investigated including the effect of terrain, shown in Table B2.21 The results show that inclusion of the nearby wind turbine gives higher results and so wind turbine has been included in the main assessment.

Table B2.21: Sensitivity of ambient concentrations to the inclusion of the wind turbine effects on dispersion

Maximum concentration (µg/m3)	Met year	With wind turbine	Without wind turbine
99.9th p-tile 15 min SO_2	2018	12.73	12.72
99.79th p-tile 1 hour NOx	2018	10.15	10.14
90.41th p-tile 24 hour PM_{10}	2015	1.94	1.84

Maximum concentration (µg/m3)	Met year	With wind turbine	Without wind turbine
Annual Mean NOx	2015	0.74	0.70

B2.6 Road modelling

B2.6.1 Operational traffic

Operational phase traffic has the potential to impact local concentrations of pollutants. The traffic volumes have been screened using the EPUK/IAQM criteria to determine an appropriate level of assessment.

A screening assessment has been undertaken using the indicative criteria contained in the EPUK/IAQM land-use guidance[6]. As the proposed development is not within an AQMA and is not likely to affect traffic in an AQMA the following criteria has been used to determine whether a detailed air quality assessment is likely to be considered necessary for construction traffic:

- A change of Light Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT) movements; or
- A change of Heavy Duty Vehicle (HDV) flows of more than 100 AADT movements.

Meeting any of the criteria would indicate that detailed dispersion modelling of the road traffic emissions would be necessary.

The traffic data provided by Arup transport consultants showed that traffic flows would exceed the thresholds listed above. Therefore, a detailed assessment of traffic impacts has been carried out. The transport consultants provided annual average daily traffic (AADT), percentage HDV and speeds for the roads screened into the assessment. For road links recognised as junctions and roundabouts, modelled speeds were assumed to be 20kph following Defra's LAQM.TG16[7] guidance.

Traffic data used for the air quality modelling has been provided in Table B2.22.

Table B2.22 Operational traffic data

ID	Road name	2018 baseline		2026 Do-minimum		2026 Do-something		Speed (kph)
		AADT	HDV%	AADT	HDV%	AADT	HDV%	
1	Alan Davies Way (SB)	3391	2.6	3679	2.6	4092	5.1	48.3
3	Alan Davies Way (SB)	3391	2.6	3679	2.6	4092	5.1	48.3

[6] EPUK/IAQM, (2017) Land-Use Planning & Development Control: Planning for Air Quality
[7] Defra (2016) Local Air Quality Management Technical Guidance TG(16)

ID	Road name	2018 baseline		2026 Do-minimum		2026 Do-something		Speed (kph)
		AADT	HDV%	AADT	HDV%	AADT	HDV%	
4	Alan Davies Way (SB)	3391	2.6	3679	2.6	4092	5.1	48.3
5	Alan Davies Way (SB)	3391	2.6	3679	2.6	4092	5.1	48.3
6	Alan Davies Way (NB)	2388	2.7	2592	2.7	3004	6.0	48.3
7	Alan Davies Way (NB)	2388	2.7	2592	2.7	3004	6.0	48.3
9	Alan Davies Way (NB)	2388	2.7	2592	2.7	3004	6.0	48.3
10	A4046 (SB)	4531	2.5	5007	2.6	5300	4.4	48.3
12	Alan Davies Way (SB)	4531	2.5	5007	2.6	5300	4.4	48.3
13	A4046 (NB)	4258	2.7	4714.4	2.7	5006.9	4.8	48.3
15	A4046 (NB)	4258	2.7	4714.4	2.7	5006.9	4.8	48.3
16	A465 (WB)	7054	8.2	4714.4	2.7	5006.9	4.8	96.6
17	A465 (WB)	7054	8.2	7654.3	8.2	7940.6	8.9	96.6
18	A465 (EB)	5868	9.4	7654.3	8.2	7940.6	8.9	96.6
19	A465 (EB)	5868	9.4	6367.4	9.4	6653.7	10.2	96.6
20	A465 (WB)	10309	6.4	6367.4	9.4	6653.7	10.2	96.6
21	A465 (EB)	10124	6.6	11772.8	6.4	12065.4	7.1	96.6
22	A465 (WB)	12167	5.6	11566.2	6.6	11858.7	7.4	96.6
23	A465 (EB)	11363	6.7	13293.4	5.6	13585.9	6.3	96.6
11_j	A4046 (SB)	4531	2.5	5007.3	2.6	5299.9	4.4	20.0
14_j	A4046 (NB)	4258	2.7	4714.4	2.7	5006.9	4.8	20.0
2_j	Alan Davies Way (SB)	3391	2.6	3679.4	2.6	4092.2	5.1	20.0
8_j	Alan Davies Way (NB)	2388	2.7	2591.6	2.7	3004.3	6.0	20.0

ID	Road name	2018 baseline		2026 Do-minimum		2026 Do-something		Speed (kph)
		AADT	HDV%	AADT	HDV%	AADT	HDV%	
Note: The following assumptions have been made in order to provide a comprehensive detailed traffic impact assessment: Traffic flows at links 1 and 6 have been assumed to be the same as links 5 and 9 respectively. Traffic flows at links 17 and 19 have been assumed to be the same as links 16 and 18 respectively. Traffic flows at 11j and 13 have been assumed to be the same as links 10 and 15 respectively.								

B2.6.2 Assessment scenarios

The assessment scenarios can be summarised as follows:

- Baseline scenario (using 2018 traffic flows and 2018 emission factors), carried out for model verification purposes;
- Do-Minimum (DM) scenario, which is the opening year without the proposed development (using opening year traffic flows and 2026 emission factors); and
- Do-Something (DS) scenario, which is the opening year including the impact from the proposed development (using opening year traffic flows and 2026 emission factors).

Emission rates have been calculated using the Defra Emissions Factor Toolkit (EFT) v10.1[8].

The modelled road network is shown in Figure 5.8 in Volume III Figures.

B2.6.3 Model set-up

The dispersion model, receptors and meteorological data used for the operation traffic assessment are the same as used for the assessment of point source emissions. Meteorological data for 2018 was used for model verification purposes.

B2.6.4 NOx to NO_2 conversion

The dispersion model predicts NOx concentrations which comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NOx is emitted from combustion processes, primarily as NO with a small percentage of NO_2. The emitted NO reacts with oxidants in the air (mainly ozone) to form NO_2. NO_2 is associated with effects on human health. The air quality standards for the protection of human health are based on NO2 rather than total NOx or NO. A suitable NOx: NO_2 conversion has been applied to the modelled NOx concentrations in order to determine the impact of the NOx emissions on ambient concentrations of NO_2.

LAQM.TG16 details an approach for calculating the roadside conversion of NOx to NO2. This approach takes into account the difference between ambient NOx

[8] Defra (2020), Emissions Factors Toolkit (EFT) v10.1, https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Accessed June 2021]

concentrations with and without the proposed development, the concentration of ozone and the different proportions of primary NO_2 emissions in different years. This approach is available as a spreadsheet calculator, with the most up-to-date version being version 8.1, released in August 2020[9].

B2.7 Odour assessment

B2.7.1 IAQM guidance

The Institute of Air Quality Management (IAQM) produced guidance in 2014[10] with the specific intention to provide advice for "assessing odour impacts for planning purposes". It recommends various assessment techniques including the use of a Source, Pathway, Receptor (SPR) model. The risk of an adverse odour impact is determined by examining the source characteristics, how effectively the odours can travel from the Source to a receptor (i.e. the Pathway) and examining the sensitivity of the Receptor. Example risk factors are shown in Table B2.23.

The SPR model has been used in this assessment as there is no available data regarding the potential odour impacts from the materials or process outputs.

Table B2.23 IAQM source pathway receptor approach

Source odour potential	**Pathway effectiveness**	**Receptor**
Factors affecting the source odour potential include: The magnitude of the odour release How inherently odorous the compounds are The unpleasantness of the odour	Factors affecting the odour flux to the receptor are: Distance from source to receptor The frequency of winds from source to receptor The effectiveness of any mitigation in reducing flux to the receptor The effectiveness of dispersion/dilution in reducing the odour flux to the receptor Topography and terrain	Use professional judgement based on the expectation of the users at the receptor location.

B2.8 Nutrient nitrogen deposition and acid deposition

With regard to nitrogen and acid deposition, site and habitat specific critical loads and existing deposition rates have been taken from the APIS website[11]. Predicted deposition at ecological receptors have been compared against the lowest critical loads to provide a worst-case assessment.

The assessment has looked at the Critical Load Functions (CLFs) for acidity using the graphs on the APIS website. The CLF graphs for the most sensitive species in

[9] Defra NOx to NO_2 calculator (version 8.1), https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc; [Accessed: June 2021]
[10] Bull M, IAQM, Guidance on the assessment of odour for planning v.1, July 2018.
[11] http://www.apis.ac.uk/srcl

each designated area have been used to estimate the worst case impact where the impacts have not been screened out as less than 1%.

The information on the critical loads and the most sensitive habitat for each designated for vegetation of nutrient nitrogen and acidity (nitrogen and sulphur) are given in section B7.

Acid deposition is assessed in terms of the CLFs for acidity, which are a function of nitrogen (N) and sulphur (S) deposition. The critical load functions are site and feature/habitat-specific. Total nitrogen (N) deposition has been derived from the addition of ammonia and nitrogen dioxide deposition results. While HCl and HF give rise to acid deposition, they are not assessed as part of the CLFs as the emissions from the stack are not significant in comparison to N and S.

The CLFs comprise two lines on a graph, which represent two envelopes of safety (reflecting the present uncertainty in the scientific knowledge and evidence-base on the effects of acidic air pollution on sensitive species). If the total acid deposition rate falls above the higher ‘maximum CL’ line, it is likely that there are harmful effects on the relevant habitat/features arising from the current level of acid (due to both nitrogen and sulphur) deposition. If the total acid deposition level is below the lower ‘minimum CL’ line, it is unlikely that the feature/habitat is being harmed. If the current total acid (due to both nitrogen and sulphur) deposition level lies between the lower and upper CLFs, it is not possible to be certain that harm is occurring.

The dry deposition flux for each receptor location has been calculated based on recommended deposition velocities as shown in Table B2.24.

Table B2.24: Recommended dry deposition velocities

Chemical species	Recommended deposition velocity, m/s	
NO2	Grassland	0.0015
	Forest	0.003
SO2	Grassland	0.012
	Forest	0.024
NH3	Grassland	0.020
	Forest	0.030
HCl	Grassland	0.025
	Forest	0.060

Conversion factors are used to convert dry deposition flux from units of µg/m2/s to kg/ha/yr are shown in Table B2.25.

Table B2.25: Conversion factors to change units from µg/m2/s of chemical species X to kg of X/ha/yr

Chemical species	Conversion factor µg m2/s of species X to kg/ha/year	
NO2	of N:	96
SO2	of S:	157.7

Chemical species	Conversion factor µg m2/s of species X to kg/ha/year	
NH3	of N:	259.7
HCl	of HCl:	306.7

The unit of 'equivalents' is also used for acidification purposes, rather than a unit of mass. Essentially it means 'moles of charge' i.e. it is a measure of how acidifying the chemical species can be. It is denoted by 'keq'.

To convert kg/ha/yr to keq/ha/yr, the conversion factors shown in Table B2.26 have been used.

Table B2.26: Conversion factors to alter units from kg of N or S ha/yr to keq of N or S ha/ya

Species	Conversion factor kg/ha/year to keq/ha/year
N	0.071428
S	0.0625

For hydrogen chloride (HCl) both wet and dry deposition has been considered, and results are a sum of both deposition methods. A constant value of 0.00007 has been used for the wet deposition coefficient.

B2.9 Cumulative impacts sensitivity testing

As noted in Section 5.4.1 of the ES Volume I, the information for the two Part A processes on the Rassau Industrial Estate (Rassau Recycling Facility. Enviro Wales Ltd and GD Yuasa Battery Manufacturing UK Ltd.) was requested in 2020 from Blaenau Gwent County Borough Council (BGCBC) and Natural Resource Wales (NRW). No information was provided at that time or from follow up requests in 2021.

Additional requests made by Arup to NRW in 2022 resulted in NRW providing some information for the Enviro Wales Ltd. site in the form of a carbon monoxide (CO) modelling study[12] from 2013. No detailed dispersion modelling of other pollutants or comprehensive information for all stack parameters has been made available.

The annual permitting reports for the two Part A processes were provided which contain some information which has been used in the sensitivity testing. However, there was not sufficient data to model the emissions for a cumulative assessment of the Part A processes together with the proposed development.

This section sets out the method used to assess cumulative risk, due to the lack of comprehensive data for the two sites. To assess the risk, two assessments have been carried out. The first screens the risk based on the EPUK/IAQM criteria[6] and the second uses the Environment Agency H1 screening tool as agreed with BGCBC.

[12] Environmental Compliance Limited (2013) Atmospheric dispersion modelling study of carbon monoxide releases to air, prepared for Envirowales, Rassau Industrial Estate

B2.9.1 Cumulative effects screening

An assessment has been carried out to determine the risk of a potential significant effect occurring. The assessment has followed the method for assessment of significance as set out in the Section 5.3.4 of the ES Volume I which shows how significance has been determined for long-term and short-term impacts following the EPUK/IAQM guidance[6].

The EPUK/IAQM criteria for long-term impacts derives significance based on the percentage change in concentrations relative to the air quality standard and takes into account the existing baseline conditions. Table B2.27 provides the EPUK/IAQM matrix for determining the impact descriptors.

This assessment has focused on the pollutants which have long-term annual mean targets (other than the 24-hr PM_{10} objective which is assessed as recommended in the guidance section 6.34[6]). The pollutants with short-term impacts have been screened out of requiring further assessment as the EPUK/IAQM guidance states that short-term impacts should be assessed based on the process contribution impact and they do acknowledge *'That is not to say that background concentrations are unimportant, but they will, on an annual average basis, be a much smaller quantity than the peak concentration caused by a substantial plume and it is the contribution that is used as a measure of the impact, not the overall concentration at a receptor. This approach is intended to be a streamlined and pragmatic assessment procedure that avoids undue complexity.'*.

The results for short-term impacts and their impacts following the EPUK/IAQM guidance are shown in the section B5 of this appendix, all changes were shown to be not significant.

Table B2.27: Impact descriptors for air quality assessment (applicable for annual mean concentrations)

Total predicted annual mean concentrations	**% Change in concentrations relative to air quality standard**			
	1%	**2 – 5%**	**6 – 10%**	**> 10%**
< 75% of standard	Negligible	Negligible	Slight	Moderate
76 – 94% of standard	Negligible	Slight	Moderate	Moderate
95 – 102% of standard	Slight	Moderate	Moderate	Substantial
103 – 109% of standard	Moderate	Moderate	Substantial	Substantial
> 110% of standard	Moderate	Substantial	Substantial	Substantial

In order to calculate risk of a significant impact occurring, the increase required in baseline concentrations (i.e. the amount that the Part A processes would have to add to the existing concentrations) which could result in a moderate adverse impact has been calculated. This has been presented as a percentage increase and as a concentration. In addition, to provide context on the scale of increase that would be required at individual receptor locations, the contribution from the Part A processes in comparison to the proposed development is provided. An example for Nickel with description is provided in Table B2.28.

The pollutants which are emitted by both the proposed development and the two Part A processes have been considered in this assessment.

Table B2.28: Example of information provided for each pollutant

Pollutant	**Percentage increase required to result in a moderate adverse impact**	**Increase in baseline required to result in moderate adverse impact (ng/m^3)**	**Contribution required in comparison to the proposed development emissions**
Nickel (receptor 1)	30	5.7	18
Description	A 30% increase is required in the baseline to result in the baseline being 95% of the objective.	As the impact descriptor is based on the change and the existing concentration is it important to work out what change in the baseline is required to result in an impact of moderate adverse. In the example for of Nickel the largest changes are predicted to be between 2-5% of the objective so a background which is 95% of the standard could result in a moderate adverse impact. The change of 5.7ng/m^3 is the concentration required to reach 95% of the objective.	Based on the required increase in the baseline being 5.7ng/m^3 the two existing part A processes would have to add 18 times the amount the proposed development adds. 0.3 (PC) /5.7 (change required) = 18

B2.9.2 Cumulative effects H1 assessment

Stack information

At the time of writing, full stack information from the Enviro Wales Ltd facility is not available, as noted. The only stack related information provided was a carbon monoxide (CO) modelling study[12] from 2013, through the data request process with Natural Resource Wales (NRW). The 2013 modelling study only provides stack information for three point sources (eight point sources are detailed in Enviro Wales Ltd's 2019 permit[13]), as the CO assessment information is the only available data it has been used along with professional judgement and assumptions. The stack information from the 2013 modelling study is presented in Table B2.29.

[13] Envirowale Ltd, Rassau Recycling Facility (2019) Permit number: EPR/EP3230BW

Table B2.29: Stack information

Stack	A2	A3	A5
Stack height (m)	30	30	15
Stack exit diameter (m)	1.8	1	0.7
Discharge temperature (ºC)	96	41	342
Reference flowrate (m^3/s)	23.7	14.6	0.4
Actual flowrate (m3/s)	32.0	16.8	0.9
Velocity (m/s)	12.6	21.4	2.3
Note: actual flowrate has been corrected using temperatures only as the 2013 modelling does not provide oxygen and water contents. Reference flowrates represent a temperature of 273K.			

The point sources information associated with the Enviro Wales Ltd facility is provided in its 2019 permit, it was obtained through the data request process with NRW. There are eight point sources on site, and only point sources associated with NOx and Nickel are relevant and they are presented in Table B2.30.

Table B2.30: NOx and Nickel emissions associated with the Enviro Wales Ltd

Stack	Source	Relevant pollutants	Stack parameters used in H1 tool (from Error! Reference source not found.)
A1	Wet scrubber abatement serving battery breaking	Nickel	A2 (assumed as it is for abatement, A2 has a lower velocity and therefore it represents a conservative case)
A2	Bag filter abatement plant serving rotary furnace F1 and F2	Nickel	A2
A3	Bag filter abatement plant serving refining kettles K2-K6 and scrap melting kettle	NOx, Nickel	A3
A4	Bag filter abatement plant serving slag treatment and storage area	Nickel	A2 (assumed as it is also a bag filter, A2 has a lower velocity and therefore it represents a conservative case)
A5	Oxy burners for scrap melting kettle K1 and refining kettles K2, K3, K4, K5 and K6	NOx	A5
A6	Lead melting operations	NOx	A5 (assumed, as it is melting related activity)

Emission information

The emission information is taken from the National Atmospheric Emissions Inventory[14] (NAEI)'s UK Emissions Interactive Map. NOx emission is 31.9 tonnes per annum and 0.0008 tonnes per annum for Nickel in the 1km x 1km grid square in which the industrial estate is located. It should be noted that the annual emission for each pollutant for each stack have been allocated based on a percentage of the total flow, presented in Table B2.31 and Table B2.32. It has

[14] National Atmospheric Emissions Inventory – UK Emissions Interactive Map. Available at: https://naei.beis.gov.uk/emissionsapp/. [Access: March 2022)

been assumed the total tonnage of emissions in that grid square is from the Enviro Wales Ltd facility as a pessimistic assumption.

Table B2.31: Percentage of total flow for NOx

Stack	Flowrate (m^3/s)	% of total flow
A3	16.8	90
A5	0.9	5
A6	0.9	5
Total	18.5	-

Table B2.32: Percentage of total flow for Nickel

Stack	Flowrate (m^3/s)	% of total flow
A1	32	28
A2	32	28
A3	16.8	15
A4	32	28
Total	112.9	-

B3 Air quality baseline

This section contains full details of the background monitoring data and assumptions made to determine the likely background concentrations at the application site for the following pollutants:

- Nitrogen Dioxide (NO_2);
- Carbon monoxide (CO);
- Total organic carbon (TOC) as benzene;
- Sulphur dioxide (SO_2);
- Fine particulate matter (PM_{10} and $PM_{2.5}$);
- Hydrogen fluoride (HF)
- Hydrogen chloride (HCl);
- Ammonia (NH_3);
- Trace metals: arsenic (As), cadmium (Cd), lead (Pb), nickel (Ni), antimony (Sb), chromium, cobalt (Co), copper (Cu), manganese (Mn) and vanadium (V), selenium (Se) and tin (Sn).
- Tin (Sn) and
- Titanium (Ti).

Background data has been obtained from a variety of sources, and these are outlined in the following sections. Two times of the annual mean background concentrations have been used for short term background concentrations in the assessment following EA guidance[4].

B3.1 Nitrogen Dioxide (NO_2)

Blaenau Gwent County Borough Council (BGCBC) only carries out passive diffusion tube monitoring in the vicinity of the site. Details of the nearest monitoring locations are provided in Table B3. and Table B3. The site locations are also presented in Figure 5.9 in Volume III Figures.

Annual mean NO_2 concentrations for 2015 to 2019 are shown in Table B3. Results show that concentrations were well below the 40µg/m^3 objective at all monitoring locations in all years.

Table B3.1 BGCBC NO_2 monitoring sites

Site ID	**Site name**	**Site type**	**OS grid reference**	
			X	**Y**
BGCBC-04	22 Parkhill, Beaufort, Ebbw Vale	Urban Background	317298	211287

Site ID	Site name	Site type	OS grid reference	
			X	Y
BGCBC-18	Welfare Hall, Beaufort Hill, Ebbw Vale	Roadside	317543	211688
BGCBC-19	42 Beaufort Rise, Ebbw Vale	Roadside	316670	211597
BGCBC-20	122 Beaufort Road, Tredegar	Roadside	314858	210240
BGCBC-21	14 Bryn Rhosyn, Merthyr Road, Tredegar	Other	312846	210586
BGCBC-24	4 Glen View, Nantybwch, Tredegar	Roadside	313145	210769
BGCBC-26	2 The Dingle, Ebbw Vale	Other	316980	209842
BGCBC-27	Tyn y Rhyn, Llangynidr Road, Ebbw Vale	Roadside	316720	212796
BGCBC-28	1 Coates Row, Rassau, Ebbw Vale	Roadside	314488	211642
BGCBC-29	10 Ivy Close, Rassau, Ebbw Vale	Roadside	315331	211938
BGCBC-30	8 Annes Court, Ebbw Vale.	Other	316010	210183
BGCBC-31	18 Maes Morgan, Tredegar	Other	312674	210974
BGCBC-35	Brynbach Primary School, Merthyr Road, Tredegar	School	313061	210466

Table B3.2 BGCBC NO_2 monitoring data

Site ID	Site name	Annual mean NO2 concentration (µg/m3)				
		2015	2016	2017	2018	2019
BGCBC-04	22 Parkhill, Beaufort, Ebbw Vale	6.9	7.7	7.3	7.7	7.3
BGCBC-18	Welfare Hall, Beaufort Hill, Ebbw Vale	17.3	20.6	17.4	20.2	15.3
BGCBC-19	42 Beaufort Rise, Ebbw Vale	19.8	23.0	20.1	21.4	21.4
BGCBC-20	122 Beaufort Road, Tredegar	18.9	22.1	19.6	22.3	21.2
BGCBC-21	14 Bryn Rhosyn, Merthyr Road, Tredegar	12.4	13.8	12.4	11.7	12.4
BGCBC-24	4 Glen View, Nantybwch, Tredegar	13.6	12.9	12.0	12.6	12.0
BGCBC-26	2 The Dingle, Ebbw Vale	13.1	14.9	13.1	14.0	13.9
BGCBC-27	Tyn y Rhyn, Llangynidr Road, Ebbw Vale	9.4	8.4	8.3	8.7	8.3
BGCBC-28	1 Coates Row, Rassau, Ebbw Vale	6.8	8.7	7.5	8.7	8.1
BGCBC-29	10 Ivy Close, Rassau, Ebbw Vale	n/a	n/a	n/a	7.4	7.2
BGCBC-30	8 Annes Court, Ebbw Vale.	n/a	n/a	n/a	8.5	7.7
BGCBC-31	18 Maes Morgan, Tredegar	n/a	n/a	n/a	6.4	6.0
BGCBC-35	Brynbach Primary School, Merthyr Road, Tredegar	n/a	n/a	n/a	10.8	11.2

Site ID	Site name	Annual mean NO2 concentration (µg/m3)				
		2015	2016	2017	2018	2019
'n/a'indicates that the monitoring site was either removed, had no data for that year or that the data capture rate was below 70%.						

B3.2 Carbon Monoxide (CO)

CO is not monitored within the BGCBC administrative area, therefore CO concentrations are taken from the relevant Defra's 1km by 1km OS grid squares. Estimated CO background concentrations for the existing baseline year of 2020 have been obtained from five grid squares in which cover the site boundary and the existing receptors and they are shown in Table B3 The pollutant concentrations have been scaled up to 2020 using Defra's adjustment factor. All concentration are below relevant objectives.

Table B3.3: Defra's 2020 CO concentrations

Grid square		2020 CO concentration (mg/m3)	
X	Y	Annual mean	1-hour/ 8-hour mean
314500	211500	0.099	0.20
315500	211500	0.099	0.20
315500	212500	0.094	0.19
316500	211500	0.100	0.20
316500	212500	0.095	0.19
317500	211500	0.100	0.20

B3.3 Sulphur Dioxide (SO_2)

SO_2 is not monitored within the BGCBC administrative area, as such estimated and monitored concentrations from Defra and the nearest automatic monitor station have been reviewed respectively and they are presented in Table B3. All concentrations were well below the relevant objectives.

Table B3.4: Defra and Cwmbran SO_2 data

Source	Grid square		Year	SO2 concentration (µg/m3)	
	X	Y		Annual mean	15 min/ 1=hour/ 24 hour mean
Defra*	314500	211500	2001	2.3	4.6
	315500	211500	2001	2.7	5.4
Cwmbran urban background automatic monitor	330436	195481	2006	3.5	7.0
Note: * Year Adjustment factors for SO_2 are no longer provided by Defra as SO_2 background levels near industrial sources would change very little, i.e. the factor would be close to 1.					

Monitored SO_2 concentration at Cwmbran urban background automatic monitor is higher than estimated concentrations from Defra, therefore it will be applied in the assessment as it is considered to be a conservative approach.

B3.4 Fine Particulate Matter (PM_{10} and $PM_{2.5}$)

PM_{10} and $PM_{2.5}$ are not monitored within the BGCBC administrative area, therefore PM_{10} and $PM_{2.5}$ concentrations are taken from the relevant Defra's 1km by 1km OS grid squares. Estimated background concentrations for the existing baseline year of 2020 have been obtained from five grid squares in which cover the site boundary and the existing receptors and they are shown in Table B3. Both PM_{10} and $PM_{2.5}$ are below the relevant air quality objectives.

Table B3.5: Defra's 2020 PM_{10} annual mean concentrations

Grid square		**PM10 concentration (µg/m3)**		**PM2.5 concentration (µg/m3)**
X	**Y**	**Annual mean**	**24-hour mean**	**PM2.5**
314500	211500	11.1	22.2	7.2
315500	211500	11.5	23.0	7.5
315500	212500	11.7	23.4	7.5
316500	211500	11.5	23.0	7.7
316500	212500	11.4	228	7.4
317500	211500	10.9	21.8	7.3

B3.5 Hydrogen Fluoride (HF)

No background monitoring is carried out in the UK so historical data close to a brickworks in Bedfordshire have been used to give an indication. Annual mean concentration of 0.04µg/m3 has been used in the assessment measured from 1984 to 1986. Actual values are likely to be lower than this as there are no local sources of HF.

B3.6 Hydrogen Chloride (HCl)

HCl is not monitored within the BGCBC administrative area. The closest monitoring site to the site which carries out automatic monitoring for HCl is Narbeth rural background monitoring sites. Review of monitored concentrations has been undertaken from 2006 to 2015, and the results indicated that 2013 results provided the highest concentration with 100% data capture. As such, the 2013 average concentration for HCl has been used in the assessment, and this is considered to be a conservative approach. The HCl monitored concentrations at Narbeth are presented in Table B3.

Table B3.6: Narbeth 2013 HCl monitoring data

Average period	**2013 HCl monitored concentrations (µg/m3)**
Annual mean	0.28

Average period	**2013 HCl monitored concentrations (µg/m3)**
Hourly mean	0.56
Note: Site location for Narbeth monitoring site is 214440, 212663.	

B3.7 Ammonia (NH_3)

NH_3 is not monitored within the BGCBC administrative area. The closest monitoring site to the site which carries out automatic monitoring for NH_3 is Narbeth rural background monitoring sites. Review of monitored concentrations has been undertaken from 2016 to 2019, and the results indicated that 2016 results provided the highest concentration with 83% data capture. As such, the 2016 average concentration for NH_3 has been used in the assessment, and this is considered to be a conservative approach. The NH_3 monitored concentrations at Narbeth are presented in Table B3.

Table B3.7: Narbeth 2016 NH_3 monitoring data

Monitoring period	**2016 NH3 monitored concentrations (µg/m3)**
Annual mean	2.34
Hourly mean	4.68

B3.8 Trace metals

Trace metals included in this assessment are: arsenic (As), cadmium (Cd), lead (Pb), nickel (Ni), antimony (Sb), chromium, cobalt (Co), copper (Cu), manganese (Mn) and vanadium (V), selenium (Se) and tin (Sn).

Trace metals are not monitored within the BGCBC administrative area. The closest monitoring sites for trace metals are Swansea Coedgwilym (urban background) and Cwmystwyth (rural background). Review of monitored concentrations has been undertaken from 2010 to 2013 and 2017 to 2019 for the abovementioned stations, and highest monitored concentrations among those years have been used in the assessment to provide a conservative approach. The monitored concentrations are presented in Table B3 and Table B3Table B3.

Table B3.8: Trace metals monitoring data at Swansea Coedgwilym

Pollutant	**Averaging period**	**Standard (ng/m3)**	**Average concentration (ng/m3)**		
			2017	**2018**	**2019**
Data capture			100%		
Arsenic (As)	Annual mean	6	0.56	0.63	0.71
Cadmium (Cd)	Annual mean	5	0.28	0.32	0.33
Lead (Pb)	Annual mean	250	5.34	5.38	6.47
Nickel (Ni)	Annual mean	20	8.58	12.38	13.26
Chromium (Cr)	Hourly mean	150,000	3.0	5.58	4.28
	Annual mean	5,000	1.5	2.79	2.14

Pollutant	**Averaging period**	**Standard (ng/m3)**	**Average concentration (ng/m3)**		
			2017	**2018**	**2019**
Cobalt (Co)	Annual mean	1,000	0.32	0.47	0.52
Copper (Cu)	Hourly mean	200,000	7.96	6.72	7.36
	Annual mean	10,000	3.98	3.36	3.68
Manganese (Mn)	Hourly mean	1,500,000	6.02	7.38	7.16
	Annual mean	150	3.01	3.69	3.58
Vanadium (V)	Hourly mean	1,000	1.52	1.42	1.46
	Annual mean	5,000	0.76	0.71	0.73
Selenium (Se)	Hourly mean	30	1.2	1.08	1.04
	Annual mean	1	0.6	0.54	0.52
Note: Site location for Swansea Coedgwilym monitoring site is 270593, 201989 Bold denotes for pollutant concentrations used in the assessment.					

Table B3.9: Trace metals monitoring data at Cwmstwyth

Pollutant	**Averaging period**	**Standard (ng/m3)**	**Average concentration (ng/m3)**			
			2010	**2011**	**2012**	**2013**
Data capture			72.3%	89.6%	53.2%	90.1%
Antimony (Sb)	Hourly mean	150,000	7.62	0.64	1.84	0.48
	Annual mean	5000	3.81	0.32	0.92	0.24
Tin (Sn)	15 min mean	4000	6.96	0.52	1.14	0.38
	Annual mean	2000	3.48	0.26	0.57	0.19
Note: Site location for Cwmystwyth monitoring site is 277138, 274242. Bold denotes for pollutant concentrations used in the assessment.						

B4 Air quality sites used for verification

Model verification refers to the comparison of modelled pollutant concentrations with measured concentrations at the same points to assess the performance of the model and determine an adjustment factor, if one is required Defra's LAQM.TG(16)[7] guidance provides advice on model verification, which is used for the modelling of roads for highways assessments, local air quality management and other local modelling of roads. Should the model results for NO_2 be largely within ±25% of the measured values and here is no systematic over or under-prediction of concentrations, then Defra's LAQM.TG(16) guidance advises that no adjustment is necessary. If this is the case, then the modelled values are adjusted based on the observed relationship between modelled results and measured NOx concentrations to provide better agreement.

Modelled results may not compare as well at some locations for various reasons, including:

- Errors/uncertainties in model input data (e.g. traffic flows and speed data estimates);
- Model set-up (including street canyons where applicable, road widths, location of monitoring sites);
- Neglect of local effects (including queues, bus stops and street canyons);
- Model limitations (treatment of surface roughness and meteorological data);
- Uncertainty in monitoring data, notably diffusion tubes (e.g. bias adjustment factors and annualisation of short-term data); and
- Uncertainty in emissions and emission factors.

The above factors were investigated as part of the model verification process to minimise the uncertainties as far as practicable. The model verification is based on the 2018 baseline model and carried out using two NO diffusion tubes. These are all roadside monitoring locations across the affected road network. The location of these verification sites is shown in Figure 5.9 in Volume III Figures.

Monitoring data for 2018 at these sites was obtained from BGCBC's 2018 air quality ASR and compared with the modelled concentrations at the same location. The model verification was undertaken following methodology described in Defra's LAQM.TG(16) guidance.

A comparison of monitored and modelled annual mean NO_2 for 2018 before and after adjustment are presented in Table B4 with the graphical representation shown in Figure 5.11 in Volume III Figures. Table B4 provides the model verification details.

Table B4.1 Comparison of modelled and monitored annual mean NO_2 concentrations

Site ID	Background NO2 concentration (µg/m3)	Monitored NO2 concentration (µg/m3)	Modelled NO2 concentration (µg/m3)	% Difference (modelled – monitored)/monitored
Before adjustment				
BGCBC-24	7.7	12.6	11.1	-11.6%
BGCBC-27	7.7	8.7	10.9	24.9%
After adjustment				
BGCBC-18	7.7	12.6	10.9	-13.7
BGCBC-20	7.7	8.7	10.6	22.1%

Table B4.2 Model performance

Adjustment factor –	**0.92**
Within +10%	0
Within -10%	0
Within ±10%	0
Within +10 to 25%	1
Within -10 to 25%	1
Within +-10 to 25%	2
Over +25%	0
Under -25%	0
Greater ±-25%	0
Within +-25%	2
Correlation	1
RMSE (µg/m3)	0.276
Fractional bias	-0.009

The factor calculated is less than 1, therefore a conservative approach has been taken and the results were not adjusted.

In the absence of relevant local monitoring of PM_{10} and $PM_{2.5}$, the modelled concentrations of these pollutants treated similarly to road NOx, as such the results were not adjusted. This is in line with Defra's LAQM.TG(16) guidance.

B5 Human receptor results – normal operation

This appendix presents the model results at all the 30 receptors (receptors 1 to 21 for long term results and receptors 22 to 30 for short term results) and 8 new onsite receptors for comparison with each of the pollutant-averaging time-statistic combination for the standards and guidelines given in Appendix B3.

B5.1 Nitrogen oxides (NOx) and nitrogen dioxide (NO_2)

Receptor	NO_2 annual mean			NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 40µg/m^3		Significance	Air quality standard: 200µg/m^3 not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	21.8	21.9	Negligible	43.6	45.7	Negligible
2	21.1	21.1	Negligible	42.1	43.3	Negligible
3	21.1	21.1	Negligible	42.2	43.8	Negligible
4	21.0	21.0	Negligible	42.0	42.9	Negligible
5	21.0	21.0	Negligible	42.0	42.7	Negligible
6	21.0	21.0	Negligible	42.0	43.3	Negligible
7	21.1	21.1	Negligible	42.2	43.6	Negligible
8	21.1	21.1	Negligible	42.1	43.1	Negligible
9	22.1	22.2	Negligible	44.2	46.8	Negligible
10	22.1	22.2	Negligible	44.1	47.4	Negligible
11	22.3	22.4	Negligible	44.7	47.8	Negligible
12	23.0	23.1	Negligible	46.0	48.0	Negligible
13	22.8	23.0	Negligible	45.7	49.4	Negligible
14	21.2	21.3	Negligible	42.5	44.3	Negligible
15	21.2	21.2	Negligible	42.3	44.0	Negligible
16	21.7	21.7	Negligible	43.3	44.8	Negligible
17	23.3	23.5	Negligible	46.7	48.5	Negligible
18	24.1	24.3	Negligible	48.2	50.1	Negligible
19	23.2	23.4	Negligible	46.4	48.4	Negligible
20	23.0	23.2	Negligible	46.1	48.1	Negligible
21	22.5	22.6	Negligible	45.0	46.5	Negligible
22	-	-	-	43.8	50.2	Negligible
23	-	-	-	43.3	48.4	Negligible

Receptor	NO_2 annual mean			NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 40µg/m³		Significance	Air quality standard: 200µg/m³ not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
24	-	-	-	43.0	47.6	Negligible
25	-	-	-	43.3	48.7	Negligible
26	-	-	-	44.5	51.4	Negligible
27	-	-	-	52.0	59.4	Negligible
28	-	-	-	46.3	53.0	Negligible
29	-	-	-	55.8	79.7	Slight Adverse
30	-	-	-	44.6	47.8	Negligible
N1_0	-	23.9	-	-	59.6	-
N1_1	-	23.8	-	-	59.5	-
N1_2	-	23.8	-	-	58.2	-
N2_0	-	25.7	-	-	70.8	-
N2_1	-	25.6	-	-	71.2	-
N3_0	-	25.6	-	-	80.6	-
N3_1	-	25.6	-	-	80.6	-
N3_2	-	25.7	-	-	145.1	-
N4_0	-	24.9	-	-	63.8	-
N4_1	-	24.9	-	-	63.9	-
N4_2	-	24.9	-	-	80.9	-
N4_3	-	24.8	-	-	96.7	-
N4_4	-	24.8	-	-	116.2	-
N5_0	-	23.3	-	-	59.3	-
N5_1	-	23.3	-	-	59.2	-
N5_2	-	23.2	-	-	60.3	-
N6_0	-	23.2	-	-	60.4	-
N6_1	-	23.2	-	-	60.4	-
N6_2	-	23.2	-	-	62.2	-

Receptor	NO_2 annual mean			NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 40µg/m³		Significance	Air quality standard: 200µg/m³ not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N6_3	-	23.2	-	-	65.4	-
N6_4	-	23.2	-	-	70.0	-
N7_0	-	23.7	-	-	71.2	-
N7_1	-	23.7	-	-	71.1	-
N7_2	-	23.7	-	-	67.5	-
N8_0	-	23.8	-	-	68.2	-
N8_1	-	23.8	-	-	68.2	-
N8_2	-	23.8	-	-	58.4	-
N9_0	-	25.9	-	-	66.3	-
N9_1	-	25.9	-	-	66.2	-
N10_0	-	27.9	-	-	85.6	-
N10_1	-	27.8	-	-	85.4	-
N11_0	-	27.8	-	-	68.2	-
N11_1	-	27.8	-	-	70.0	-
N11_2	-	27.7	-	-	96.7	-
N11_3	-	27.6	-	-	132.5	-
N11_4	-	27.5	-	-	174.0	-
N12_0	-	27.2	-	-	73.7	-
N12_1	-	27.1	-	-	73.5	-
N12_2	-	26.9	-	-	100.7	-
N13_0	-	28.0	-	-	67.1	-
N13_1	-	28.4	-	-	68.2	-
N13_2	-	28.7	-	-	74.3	-
N14_0	-	35.6	-	-	100.5	-
N14_1	-	35.6	-	-	100.7	-
N14_2	-	35.6	-	-	83.1	-

Receptor	NO_2 annual mean			NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 40µg/m³		Significance	Air quality standard: 200µg/m³ not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N14_3	-	35.3	-	-	89.1	-
N14_4	-	34.7	-	-	103.3	-
N15_0	-	28.3	-	-	71.3	-
N15_1	-	28.2	-	-	71.0	-
N15_2	-	28.0	-	-	71.5	-
N16_0	-	24.2	-	-	62.1	-
N16_1	-	24.2	-	-	62.0	-
N16_2	-	24.1	-	-	56.0	-
N17_0	-	23.1	-	-	57.6	-
N17_1	-	23.1	-	-	57.4	-
N17_2	-	22.9	-	-	51.8	-
N18_0	-	22.6	-	-	51.8	-
N18_1	-	22.6	-	-	51.8	-
N18_2	-	22.6	-	-	51.3	-
N19_0	-	23.9	-	-	60.4	-
N19_1	-	23.9	-	-	60.3	-
N19_2	-	23.9	-	-	60.3	-
N20_0	-	24.1	-	-	62.5	-
N20_1	-	24.0	-	-	62.9	-
N20_2	-	24.0	-	-	63.9	-
N20_3	-	24.1	-	-	65.9	-
N20_4	-	24.3	-	-	72.2	-
N20_5	-	25.1	-	-	86.8	-

B5.2 Sulphur dioxide (SO_2)

Receptor	99.18th percentile - 24-hour mean			99.73th percentile - 1 hour mean		
	Air quality standard: 125µg/m³ not to be exceeded more than 3 times per year (99.18th percentile)		Significance	Air quality standard: 350µg/m³ not to be exceeded more than 24 times per year (99.73th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	7.0	7.7	Negligible	7.0	9.0	Negligible
2	7.0	7.3	Negligible	7.0	8.1	Negligible
3	7.0	7.5	Negligible	7.0	8.5	Negligible
4	7.0	7.3	Negligible	7.0	7.8	Negligible
5	7.0	7.2	Negligible	7.0	7.6	Negligible
6	7.0	7.3	Negligible	7.0	7.9	Negligible
7	7.0	7.2	Negligible	7.0	8.3	Negligible
8	7.0	7.3	Negligible	7.0	8.1	Negligible
9	7.0	7.5	Negligible	7.0	9.3	Negligible
10	7.0	7.8	Negligible	7.0	9.7	Negligible
11	7.0	8.0	Negligible	7.0	10.2	Negligible
12	7.0	7.4	Negligible	7.0	8.6	Negligible
13	7.0	8.0	Negligible	7.0	9.9	Negligible
14	7.0	7.5	Negligible	7.0	8.5	Negligible
15	7.0	7.4	Negligible	7.0	8.6	Negligible
16	7.0	7.5	Negligible	7.0	8.2	Negligible
17	7.0	7.5	Negligible	7.0	8.2	Negligible
18	7.0	7.5	Negligible	7.0	8.3	Negligible
19	7.0	7.6	Negligible	7.0	8.3	Negligible
20	7.0	7.6	Negligible	7.0	8.3	Negligible
21	7.0	7.5	Negligible	7.0	8.1	Negligible
22	7.0	7.3	Negligible	7.0	8.9	Negligible
23	7.0	7.4	Negligible	7.0	8.9	Negligible

Receptor	99.18th percentile - 24-hour mean			99.73th percentile - 1 hour mean		
	Air quality standard: 125µg/m^3 not to be exceeded more than 3 times per year (99.18th percentile)		Significance	Air quality standard: 350µg/m^3 not to be exceeded more than 24 times per year (99.73th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
24	7.0	8.0	Negligible	7.0	10.6	Negligible
25	7.0	7.7	Negligible	7.0	9.5	Negligible
26	7.0	7.7	Negligible	7.0	9.2	Negligible
27	7.0	8.2	Negligible	7.0	10.7	Negligible
28	7.0	8.2	Negligible	7.0	11.4	Negligible
29	7.0	7.6	Negligible	7.0	12.2	Negligible
30	7.0	8.3	Negligible	7.0	10.0	Negligible
N1_0	-	8.4	-	-	12.3	-
N1_1	-	8.4	-	-	12.3	-
N1_2	-	8.4	-	-	12.2	-
N2_0	-	8.3	-	-	13.2	-
N2_1	-	8.3	-	-	13.3	-
N3_0	-	8.2	-	-	13.8	-
N3_1	-	8.2	-	-	13.9	-
N3_2	-	8.5	-	-	23.7	-
N4_0	-	8.1	-	-	11.5	-
N4_1	-	8.1	-	-	11.5	-
N4_2	-	8.1	-	-	13.9	-
N4_3	-	8.2	-	-	16.5	-
N4_4	-	8.2	-	-	19.4	-
N5_0	-	7.4	-	-	9.8	-
N5_1	-	7.4	-	-	9.9	-
N5_2	-	7.4	-	-	10.1	-
N6_0	-	7.8	-	-	11.2	-
N6_1	-	7.8	-	-	11.2	-
N6_2	-	7.8	-	-	11.4	-

Receptor	99.18th percentile - 24-hour mean			99.73th percentile - 1 hour mean		
	Air quality standard: 125µg/m³ not to be exceeded more than 3 times per year (99.18th percentile)		Significance	Air quality standard: 350µg/m³ not to be exceeded more than 24 times per year (99.73th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N6_3	-	7.8	-	-	11.9	-
N6_4	-	7.8	-	-	12.6	-
N7_0	-	8.0	-	-	12.7	-
N7_1	-	8.0	-	-	12.7	-
N7_2	-	8.0	-	-	12.2	-
N8_0	-	8.0	-	-	12.9	-
N8_1	-	8.0	-	-	12.9	-
N8_2	-	8.1	-	-	11.5	-
N9_0	-	8.1	-	-	11.8	-
N9_1	-	8.1	-	-	11.8	-
N10_0	-	8.5	-	-	15.1	-
N10_1	-	8.5	-	-	15.1	-
N11_0	-	8.2	-	-	11.4	-
N11_1	-	8.2	-	-	11.7	-
N11_2	-	8.3	-	-	15.7	-
N11_3	-	8.4	-	-	21.2	-
N11_4	-	8.5	-	-	27.3	-
N12_0	-	8.1	-	-	12.3	-
N12_1	-	8.1	-	-	12.4	-
N12_2	-	8.2	-	-	16.3	-
N13_0	-	7.5	-	-	9.8	-
N13_1	-	7.5	-	-	9.9	-
N13_2	-	7.5	-	-	10.7	-
N14_0	-	8.1	-	-	13.6	-
N14_1	-	8.1	-	-	13.6	-
N14_2	-	8.1	-	-	11.2	-

Receptor	99.18th percentile - 24-hour mean			99.73th percentile - 1 hour mean		
	Air quality standard: 125µg/m³ not to be exceeded more than 3 times per year (99.18th percentile)		Significance	Air quality standard: 350µg/m³ not to be exceeded more than 24 times per year (99.73th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N14_3	-	8.1	-	-	12.1	-
N14_4	-	8.1	-	-	14.5	-
N15_0	-	8.1	-	-	11.8	-
N15_1	-	8.1	-	-	11.8	-
N15_2	-	8.1	-	-	11.8	-
N16_0	-	8.0	-	-	12.2	-
N16_1	-	8.0	-	-	12.2	-
N16_2	-	8.0	-	-	11.3	-
N17_0	-	8.0	-	-	11.7	-
N17_1	-	8.0	-	-	11.8	-
N17_2	-	8.0	-	-	11.2	-
N18_0	-	8.1	-	-	11.4	-
N18_1	-	8.1	-	-	11.4	-
N18_2	-	8.1	-	-	11.3	-
N19_0	-	8.4	-	-	12.6	-
N19_1	-	8.4	-	-	12.6	-
N19_2	-	8.5	-	-	12.6	-
N20_0	-	7.4	-	-	10.2	-
N20_1	-	7.4	-	-	10.3	-
N20_2	-	7.4	-	-	10.4	-
N20_3	-	7.4	-	-	10.7	-
N20_4	-	7.4	-	-	11.6	-
N20_5	-	7.4	-	-	13.5	-

Receptor	99.90th percentile - 15 minute mean		
	Air quality standard: 266µg/m^3 not to be exceeded more than 35 times per year (99.90th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m+)	
1	7.0	10.3	Negligible
2	7.0	8.9	Negligible
3	7.0	9.4	Negligible
4	7.0	8.8	Negligible
5	7.0	8.4	Negligible
6	7.0	9.0	Negligible
7	7.0	9.5	Negligible
8	7.0	8.9	Negligible
9	7.0	10.8	Negligible
10	7.0	11.5	Negligible
11	7.0	11.4	Negligible
12	7.0	9.7	Negligible
13	7.0	12.0	Negligible
14	7.0	9.9	Negligible
15	7.0	9.6	Negligible
16	7.0	9.4	Negligible
17	7.0	9.5	Negligible
18	7.0	9.5	Negligible
19	7.0	9.7	Negligible
20	7.0	9.8	Negligible
21	7.0	9.3	Negligible
22	7.0	8.9	Negligible
23	7.0	8.9	Negligible
24	7.0	10.6	Negligible
25	7.0	9.5	Negligible
26	7.0	9.2	Negligible
27	7.0	10.7	Negligible
28	7.0	11.4	Negligible
29	7.0	12.2	Negligible

Receptor	99.90th percentile - 15 minute mean		
	Air quality standard: 266µg/m³ not to be exceeded more than 35 times per year (99.90th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m+)	
30	7.0	10.0	Negligible
N1_0	-	18.5	-
N1_1	-	18.5	-
N1_2	-	17.6	-
N2_0	-	23.0	-
N2_1	-	23.5	-
N3_0	-	32.2	-
N3_1	-	32.2	-
N3_2	-	72.5	-
N4_0	-	18.7	-
N4_1	-	19.0	-
N4_2	-	31.0	-
N4_3	-	43.1	-
N4_4	-	55.3	-
N5_0	-	17.3	-
N5_1	-	17.3	-
N5_2	-	18.3	-
N6_0	-	18.5	-
N6_1	-	18.5	-
N6_2	-	20.2	-
N6_3	-	22.0	-
N6_4	-	25.8	-
N7_0	-	27.2	-
N7_1	-	27.2	-
N7_2	-	22.9	-
N8_0	-	26.7	-
N8_1	-	26.7	-
N8_2	-	17.8	-
N9_0	-	20.0	-

Receptor	99.90th percentile - 15 minute mean		
	Air quality standard: 266µg/m³ not to be exceeded more than 35 times per year (99.90th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m+)	
N9_1	-	20.0	-
N10_0	-	33.0	-
N10_1	-	33.0	-
N11_0	-	19.1	-
N11_1	-	19.9	-
N11_2	-	39.1	-
N11_3	-	63.3	-
N11_4	-	94.5	-
N12_0	-	23.4	-
N12_1	-	23.5	-
N12_2	-	47.6	-
N13_0	-	16.1	-
N13_1	-	16.3	-
N13_2	-	20.4	-
N14_0	-	31.2	-
N14_1	-	31.2	-
N14_2	-	18.3	-
N14_3	-	23.6	-
N14_4	-	37.4	-
N15_0	-	20.1	-
N15_1	-	20.2	-
N15_2	-	23.8	-
N16_0	-	19.6	-
N16_1	-	19.6	-
N16_2	-	16.7	-
N17_0	-	18.4	-
N17_1	-	18.4	-
N17_2	-	14.7	-
N18_0	-	15.0	-

Receptor	99.90th percentile - 15 minute mean		
	Air quality standard: 266µg/m^3 not to be exceeded more than 35 times per year (99.90th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m+)	
N18_1	-	15.0	-
N18_2	-	14.6	-
N19_0	-	18.8	-
N19_1	-	18.8	-
N19_2	-	18.9	-
N20_0	-	17.9	-
N20_1	-	18.3	-
N20_2	-	19.0	-
N20_3	-	20.9	-
N20_4	-	24.9	-
N20_5	-	37.3	-

B5.3 Fine particulate matter (PM_{10} and $PM_{2.5}$)

Receptor	PM10 annual mean			PM10 90.41th percentile - 24-hour mean		
	Air quality standard: 40µg/m^3		Significance	Air quality standard: 50µg/m^3 not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	8.9	8.9	Negligible	17.8	17.8	Negligible
2	9.1	9.1	Negligible	18.2	18.3	Negligible
3	8.9	8.9	Negligible	17.8	17.8	Negligible
4	9.1	9.1	Negligible	18.2	18.3	Negligible
5	9.0	9.0	Negligible	18.0	18.0	Negligible
6	9.1	9.1	Negligible	18.2	18.2	Negligible
7	9.1	9.1	Negligible	18.2	18.3	Negligible

Receptor	PM10 annual mean			PM10 90.41th percentile - 24-hour mean		
	Air quality standard: 40µg/m^3		Significance	Air quality standard: 50µg/m^3 not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
8	9.1	9.1	Negligible	18.2	18.3	Negligible
9	9.4	9.5	Negligible	18.9	18.9	Negligible
10	9.4	9.4	Negligible	18.8	18.9	Negligible
11	9.2	9.2	Negligible	18.4	18.5	Negligible
12	9.8	9.9	Negligible	19.7	19.8	Negligible
13	9.2	9.3	Negligible	18.5	18.6	Negligible
14	8.9	8.9	Negligible	17.8	17.9	Negligible
15	9.1	9.1	Negligible	18.2	18.3	Negligible
16	8.9	8.9	Negligible	17.8	17.9	Negligible
17	9.6	9.7	Negligible	19.2	19.4	Negligible
18	9.9	10.0	Negligible	19.8	20.1	Negligible
19	9.6	9.6	Negligible	19.1	19.3	Negligible
20	9.5	9.6	Negligible	19.0	19.3	Negligible
21	9.4	9.5	Negligible	18.8	19.0	Negligible
22	-	-	-	23.5	23.5	Negligible
23	-	-	-	23.5	23.5	Negligible
24	-	-	-	23.5	23.5	Negligible
25	-	-	-	23.5	23.5	Negligible
26	-	-	-	23.5	23.5	Negligible
27	-	-	-	23.5	23.5	Negligible
28	-	-	-	24.0	24.0	Negligible
29	-	-	-	23.5	23.5	Negligible
30	-	-	-	24.0	24.3	Negligible
N1_0	-	9.0	-	-	18.0	-
N1_1	-	9.0	-	-	18.0	-
N1_2	-	9.0	-	-	18.0	-

Receptor	PM10 annual mean			PM10 90.41th percentile - 24-hour mean		
	Air quality standard: 40µg/m³		Significance	Air quality standard: 50µg/m³ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N2_0	-	9.0	-	-	18.0	-
N2_1	-	9.0	-	-	18.0	-
N3_0	-	9.0	-	-	18.0	-
N3_1	-	9.0	-	-	18.0	-
N3_2	-	9.0	-	-	18.0	-
N4_0	-	9.1	-	-	18.2	-
N4_1	-	9.1	-	-	18.1	-
N4_2	-	9.1	-	-	18.1	-
N4_3	-	9.0	-	-	18.1	-
N4_4	-	9.0	-	-	18.0	-
N5_0	-	9.0	-	-	18.1	-
N5_1	-	9.0	-	-	18.0	-
N5_2	-	9.0	-	-	18.0	-
N6_0	-	9.0	-	-	18.1	-
N6_1	-	9.0	-	-	18.1	-
N6_2	-	9.0	-	-	18.1	-
N6_3	-	9.0	-	-	18.0	-
N6_4	-	9.0	-	-	18.0	-
N7_0	-	8.9	-	-	17.9	-
N7_1	-	8.9	-	-	17.9	-
N7_2	-	8.9	-	-	17.9	-
N8_0	-	8.9	-	-	17.9	-
N8_1	-	8.9	-	-	17.9	-
N8_2	-	8.9	-	-	17.9	-
N9_0	-	9.1	-	-	18.2	-
N9_1	-	9.1	-	-	18.2	-

Receptor	PM10 annual mean			PM10 90.41th percentile - 24-hour mean		
	Air quality standard: 40µg/m³		Significance	Air quality standard: 50µg/m³ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N10_0	-	9.1	-	-	18.3	-
N10_1	-	9.1	-	-	18.2	-
N11_0	-	9.1	-	-	18.3	-
N11_1	-	9.1	-	-	18.2	-
N11_2	-	9.1	-	-	18.2	-
N11_3	-	9.1	-	-	18.2	-
N11_4	-	9.1	-	-	18.1	-
N12_0	-	9.0	-	-	18.0	-
N12_1	-	9.0	-	-	18.0	-
N12_2	-	9.0	-	-	18.0	-
N13_0	-	9.0	-	-	18.1	-
N13_1	-	9.0	-	-	18.0	-
N13_2	-	9.0	-	-	18.0	-
N14_0	-	9.1	-	-	18.3	-
N14_1	-	9.1	-	-	18.2	-
N14_2	-	9.1	-	-	18.2	-
N14_3	-	9.1	-	-	18.1	-
N14_4	-	9.0	-	-	18.1	-
N15_0	-	8.9	-	-	17.9	-
N15_1	-	8.9	-	-	17.9	-
N15_2	-	8.9	-	-	17.9	-
N16_0	-	8.9	-	-	17.8	-
N16_1	-	8.9	-	-	17.8	-
N16_2	-	8.9	-	-	17.8	-
N17_0	-	9.1	-	-	18.1	-
N17_1	-	9.0	-	-	18.1	-

Receptor	PM10 annual mean			PM10 90.41th percentile - 24-hour mean		
	Air quality standard: $40 \mu g/m^3$		Significance	Air quality standard: $50 \mu g/m^3$ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations ($\mu g/m^3$)	Proposed concentrations ($\mu g/m^3$)		Existing concentrations ($\mu g/m^3$)	Proposed concentrations ($\mu g/m^3$)	
N17_2	-	9.0	-	-	18.0	-
N18_0	-	9.1	-	-	18.3	-
N18_1	-	9.1	-	-	18.3	-
N18_2	-	9.1	-	-	18.3	-
N19_0	-	8.9	-	-	18.0	-
N19_1	-	8.9	-	-	18.0	-
N19_2	-	8.9	-	-	18.0	-
N20_0	-	9.1	-	-	18.1	-
N20_1	-	9.0	-	-	18.0	-
N20_2	-	9.0	-	-	18.0	-
N20_3	-	9.0	-	-	17.9	-
N20_4	-	8.9	-	-	17.9	-
N20_5	-	8.9	-	-	17.8	-

Receptor	$PM_{2.5}$ annual mean		
	Air quality standard: 25µg/m3		Significance
	Existing concentrations (µg/m3)	Proposed concentrations (µg/m3)	
1	5.8	5.8	Negligible
2	5.9	5.9	Negligible
3	5.8	5.8	Negligible
4	5.9	5.9	Negligible
5	5.9	5.9	Negligible
6	5.9	5.9	Negligible
7	5.9	5.9	Negligible

Receptor	$PM_{2.5}$ annual mean		
	Air quality standard: 25µg/m3		Significance
	Existing concentrations (µg/m3)	Proposed concentrations (µg/m3)	
8	5.9	5.9	Negligible
9	6.0	6.1	Negligible
10	6.0	6.0	Negligible
11	6.0	6.0	Negligible
12	6.3	6.3	Negligible
13	6.0	6.0	Negligible
14	5.8	5.8	Negligible
15	5.9	5.9	Negligible
16	5.8	5.8	Negligible
17	6.2	6.2	Negligible
18	6.4	6.4	Negligible
19	6.2	6.2	Negligible
20	6.1	6.2	Negligible
21	6.1	6.1	Negligible
N1_0	-	5.9	-
N1_1	-	5.9	-
N1_2	-	5.9	-
N2_0	-	5.9	-
N2_1	-	5.9	-
N3_0	-	5.9	-
N3_1	-	5.9	-
N3_2	-	5.9	-
N4_0	-	5.9	-
N4_1	-	5.9	-
N4_2	-	5.9	-
N4_3	-	5.9	-
N4_4	-	5.9	-
N5_0	-	5.9	-
N5_1	-	5.9	-
N5_2	-	5.8	-

Receptor	$PM_{2.5}$ annual mean		
	Air quality standard: 25µg/m3		Significance
	Existing concentrations (µg/m3)	Proposed concentrations (µg/m3)	
N6_0	-	5.9	-
N6_1	-	5.9	-
N6_2	-	5.9	-
N6_3	-	5.9	-
N6_4	-	5.9	-
N7_0	-	5.8	-
N7_1	-	5.8	-
N7_2	-	5.8	-
N8_0	-	5.9	-
N8_1	-	5.9	-
N8_2	-	5.9	-
N9_0	-	6.0	-
N9_1	-	6.0	-
N10_0	-	6.0	-
N10_1	-	6.0	-
N11_0	-	6.0	-
N11_1	-	6.0	-
N11_2	-	6.0	-
N11_3	-	5.9	-
N11_4	-	5.9	-
N12_0	-	5.9	-
N12_1	-	5.9	-
N12_2	-	5.9	-
N13_0	-	5.9	-
N13_1	-	5.9	-
N13_2	-	5.8	-
N14_0	-	6.0	-
N14_1	-	5.9	-
N14_2	-	5.9	-
N14_3	-	5.9	-

Receptor	$PM_{2.5}$ annual mean		
	Air quality standard: 25µg/m3		Significance
	Existing concentrations (µg/m3)	Proposed concentrations (µg/m3)	
N14_4	-	5.9	-
N15_0	-	5.8	-
N15_1	-	5.8	-
N15_2	-	5.8	-
N16_0	-	5.8	-
N16_1	-	5.8	-
N16_2	-	5.8	-
N17_0	-	5.9	-
N17_1	-	5.9	-
N17_2	-	5.9	-
N18_0	-	5.9	-
N18_1	-	5.9	-
N18_2	-	5.9	-
N19_0	-	5.9	-
N19_1	-	5.9	-
N19_2	-	5.9	-
N20_0	-	5.9	-
N20_1	-	5.9	-
N20_2	-	5.9	-
N20_3	-	5.8	-
N20_4	-	5.8	-
N20_5	-	5.8	-

B5.4 Carbon monoxide (CO)

Receptor	Maximum annual 8-hour running mean			100th percentile - 1 hour mean		
	Air quality standard: 10,000 µg/m^3		Significance	EAL: 30,000µg/m^3		Significance
	Existing concentrations (mg/m^3)	Proposed concentrations (mg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	274.5	277.8	Negligible	407.5	412.2	Negligible
2	225.8	227.8	Negligible	272.7	276.6	Negligible
3	294.5	297.0	Negligible	363.3	366.8	Negligible
4	201.3	202.9	Negligible	275.1	279.0	Negligible
5	198.6	199.7	Negligible	239.3	243.3	Negligible
6	252.0	253.4	Negligible	306.9	310.5	Negligible
7	233.9	235.8	Negligible	325.1	331.8	Negligible
8	211.4	213.2	Negligible	269.9	273.7	Negligible
9	313.5	318.0	Negligible	397.8	403.7	Negligible
10	372.5	378.1	Negligible	468.8	475.5	Negligible
11	463.6	469.9	Negligible	609.4	616.4	Negligible
12	325.8	328.0	Negligible	359.3	366.6	Negligible
13	418.2	423.2	Negligible	518.7	524.6	Negligible
14	306.5	309.2	Negligible	377.3	380.4	Negligible
15	268.2	271.1	Negligible	372.1	376.1	Negligible
16	605.6	607.3	Negligible	859.6	862.0	Negligible
17	478.3	480.1	Negligible	738.1	740.6	Negligible
18	633.4	635.3	Negligible	811.6	814.3	Negligible
19	422.9	425.1	Negligible	596.7	599.4	Negligible
20	384.0	386.3	Negligible	518.7	521.5	Negligible
21	301.2	302.9	Negligible	397.0	399.9	Negligible
22	681.6	684.0	Negligible	292.5	300.3	Negligible
23	547.5	550.9	Negligible	884.9	896.5	Negligible
24	427.8	434.1	Negligible	638.7	648.2	Negligible
25	571.4	575.5	Negligible	690.8	701.2	Negligible

Receptor	Maximum annual 8-hour running mean			100th percentile - 1 hour mean		
	Air quality standard: 10,000 µg/m^3		Significance	EAL: 30,000µg/m^3		Significance
	Existing concentrations (mg/m^3)	Proposed concentrations (mg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
26	1094.1	1100.4	Negligible	802.8	816.9	Negligible
27	2151.8	2160.2	Negligible	1335.0	1348.0	Negligible
28	1278.5	1286.0	Negligible	2732.2	2743.1	Negligible
29	1214.1	1224.0	Negligible	1481.4	1493.3	Negligible
30	412.5	417.8	Negligible	1568.9	1574.8	Negligible
N1_0	-	434.2	-	-	680.4	-
N1_1	-	436.3	-	-	685.6	-
N1_2	-	438.9	-	-	691.6	-
N2_0	-	560.2	-	-	948.6	-
N2_1	-	552.3	-	-	958.1	-
N3_0	-	660.1	-	-	844.2	-
N3_1	-	646.9	-	-	883.8	-
N3_2	-	632.5	-	-	933.6	-
N4_0	-	854.9	-	-	1079.8	-
N4_1	-	835.5	-	-	1117.6	-
N4_2	-	815.9	-	-	1162.5	-
N4_3	-	805.3	-	-	1215.8	-
N4_4	-	905.6	-	-	1737.0	-
N5_0	-	902.7	-	-	1181.7	-
N5_1	-	900.0	-	-	1206.3	-
N5_2	-	894.1	-	-	1236.0	-
N6_0	-	688.2	-	-	856.2	-
N6_1	-	680.8	-	-	864.5	-
N6_2	-	670.4	-	-	874.4	-
N6_3	-	654.9	-	-	1106.7	-
N6_4	-	913.8	-	-	1664.7	-
N7_0	-	547.7	-	-	767.7	-
N7_1	-	537.7	-	-	805.3	-

Receptor	Maximum annual 8-hour running mean			100th percentile - 1 hour mean		
	Air quality standard: 10,000 µg/m^3		Significance	EAL: 30,000µg/m^3		Significance
	Existing concentrations (mg/m^3)	Proposed concentrations (mg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N7_2	-	524.8	-	-	853.6	-
N8_0	-	454.7	-	-	805.7	-
N8_1	-	454.0	-	-	809.9	-
N8_2	-	453.4	-	-	813.8	-
N9_0	-	786.1	-	-	974.5	-
N9_1	-	771.2	-	-	979.9	-
N10_0	-	875.2	-	-	946.7	-
N10_1	-	860.2	-	-	1014.5	-
N11_0	-	1020.2	-	-	1253.1	-
N11_1	-	1014.5	-	-	1296.0	-
N11_2	-	1000.1	-	-	1347.4	-
N11_3	-	970.2	-	-	1408.8	-
N11_4	-	983.4	-	-	1737.6	-
N12_0	-	702.7	-	-	1019.7	-
N12_1	-	690.7	-	-	1048.8	-
N12_2	-	674.9	-	-	1088.1	-
N13_0	-	1466.9	-	-	1648.0	-
N13_1	-	1528.9	-	-	1713.9	-
N13_2	-	1622.3	-	-	2041.1	-
N14_0	-	1336.1	-	-	1579.9	-
N14_1	-	1338.6	-	-	1622.5	-
N14_2	-	1377.2	-	-	1736.6	-
N14_3	-	1444.8	-	-	2154.2	-
N14_4	-	1718.0	-	-	3010.7	-
N15_0	-	832.3	-	-	1265.4	-
N15_1	-	816.1	-	-	1309.1	-
N15_2	-	794.9	-	-	1368.1	-
N16_0	-	596.4	-	-	897.5	-

Receptor	Maximum annual 8-hour running mean			100th percentile - 1 hour mean		
	Air quality standard: 10,000 µg/m^3		Significance	EAL: 30,000µg/m^3		Significance
	Existing concentrations (mg/m^3)	Proposed concentrations (mg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N16_1	-	594.3	-	-	936.6	-
N16_2	-	628.0	-	-	1150.9	-
N17_0	-	487.6	-	-	690.0	-
N17_1	-	499.2	-	-	713.6	-
N17_2	-	562.4	-	-	856.1	-
N18_0	-	452.5	-	-	857.5	-
N18_1	-	455.4	-	-	876.2	-
N18_2	-	463.6	-	-	928.4	-
N19_0	-	463.8	-	-	856.4	-
N19_1	-	466.7	-	-	865.1	-
N19_2	-	470.4	-	-	873.4	-
N20_0	-	1242.2	-	-	1465.8	-
N20_1	-	1269.0	-	-	1479.7	-
N20_2	-	1297.9	-	-	1500.6	-
N20_3	-	1311.2	-	-	1752.4	-
N20_4	-	1322.2	-	-	2495.5	-
N20_5	-	2230.2	-	-	5010.6	-

B5.5 Hydrogen chloride (HCl)

Receptor	100th percentile - 1-hour mean		
	Air quality standard: 750µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	0.6	1.5	Negligible
2	0.6	1.3	Negligible
3	0.6	1.2	Negligible
4	0.6	1.3	Negligible

Receptor	100th percentile - 1-hour mean		
	Air quality standard: 750µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
5	0.6	1.3	Negligible
6	0.6	1.3	Negligible
7	0.6	1.9	Negligible
8	0.6	1.3	Negligible
9	0.6	1.7	Negligible
10	0.6	1.9	Negligible
11	0.6	2.0	Negligible
12	0.6	2.0	Negligible
13	0.6	1.7	Negligible
14	0.6	1.2	Negligible
15	0.6	1.3	Negligible
16	0.6	1.0	Negligible
17	0.6	1.1	Negligible
18	0.6	1.1	Negligible
19	0.6	1.1	Negligible
20	0.6	1.1	Negligible
21	0.6	1.1	Negligible
22	0.6	2.1	Negligible
23	0.6	2.8	Negligible
24	0.6	2.4	Negligible
25	0.6	2.6	Negligible
26	0.6	3.3	Negligible
27	0.6	3.1	Negligible
28	0.6	2.7	Negligible
29	0.6	2.8	Negligible
30	0.6	1.7	Negligible
N1_0	-	2.7	-
N1_1	-	2.7	-
N1_2	-	2.7	-
N2_0	-	2.8	-

Receptor	100th percentile - 1-hour mean		
	Air quality standard: 750µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N2_1	-	2.8	-
N3_0	-	2.6	-
N3_1	-	2.6	-
N3_2	-	2.6	-
N4_0	-	2.6	-
N4_1	-	2.6	-
N4_2	-	2.6	-
N4_3	-	2.6	-
N4_4	-	2.6	-
N5_0	-	1.8	-
N5_1	-	1.8	-
N5_2	-	1.8	-
N6_0	-	2.5	-
N6_1	-	2.5	-
N6_2	-	2.5	-
N6_3	-	2.5	-
N6_4	-	2.5	-
N7_0	-	2.1	-
N7_1	-	2.1	-
N7_2	-	2.1	-
N8_0	-	2.6	-
N8_1	-	2.6	-
N8_2	-	2.6	-
N9_0	-	2.6	-
N9_1	-	2.6	-
N10_0	-	2.7	-
N10_1	-	2.7	-
N11_0	-	2.7	-
N11_1	-	2.7	-
N11_2	-	2.7	-

Receptor	100th percentile - 1-hour mean		
	Air quality standard: 750µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N11_3	-	2.7	-
N11_4	-	2.7	-
N12_0	-	2.2	-
N12_1	-	2.2	-
N12_2	-	2.2	-
N13_0	-	1.9	-
N13_1	-	1.9	-
N13_2	-	1.9	-
N14_0	-	2.3	-
N14_1	-	2.3	-
N14_2	-	2.4	-
N14_3	-	2.4	-
N14_4	-	2.4	-
N15_0	-	2.7	-
N15_1	-	2.7	-
N15_2	-	2.7	-
N16_0	-	2.9	-
N16_1	-	2.9	-
N16_2	-	2.9	-
N17_0	-	2.5	-
N17_1	-	2.5	-
N17_2	-	2.5	-
N18_0	-	2.5	-
N18_1	-	2.5	-
N18_2	-	2.5	-
N19_0	-	2.8	-
N19_1	-	2.8	-
N19_2	-	2.8	-
N20_0	-	1.9	-
N20_1	-	1.9	-

Receptor	100th percentile - 1-hour mean		
	Air quality standard: 750µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N20_2	-	1.9	-
N20_3	-	1.9	-
N20_4	-	1.9	-
N20_5	-	1.9	-

B5.6 Hydrogen fluoride (HF)

Receptor	100th percentile - 1 hour mean		
	EAL: 160µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	0.1	0.3	Negligible
2	0.1	0.3	Negligible
3	0.1	0.3	Negligible
4	0.1	0.3	Negligible
5	0.1	0.3	Negligible
6	0.1	0.3	Negligible
7	0.1	0.4	Negligible
8	0.1	0.3	Negligible
9	0.1	0.4	Negligible
10	0.1	0.4	Negligible
11	0.1	0.4	Negligible
12	0.1	0.4	Negligible
13	0.1	0.4	Negligible
14	0.1	0.2	Negligible
15	0.1	0.3	Negligible
16	0.1	0.2	Negligible
17	0.1	0.2	Negligible
18	0.1	0.2	Negligible
19	0.1	0.2	Negligible

Receptor	**100th percentile - 1 hour mean**		
	EAL: 160µg/m^3		**Significance**
	Existing concentrations (µg/m^3)	**Proposed concentrations (µg/m^3)**	
20	0.1	0.2	Negligible
21	0.1	0.2	Negligible
22	0.1	0.5	Negligible
23	0.1	0.6	Negligible
24	0.1	0.6	Negligible
25	0.1	0.6	Negligible
26	0.1	0.8	Negligible
27	0.1	0.7	Negligible
28	0.1	0.6	Negligible
29	0.1	0.6	Negligible
30	0.1	0.4	Negligible
N1_0	-	0.6	-
N1_1	-	0.6	-
N1_2	-	0.6	-
N2_0	-	0.6	-
N2_1	-	0.6	-
N3_0	-	0.6	-
N3_1	-	0.6	-
N3_2	-	0.6	-
N4_0	-	0.6	-
N4_1	-	0.6	-
N4_2	-	0.6	-
N4_3	-	0.6	-
N4_4	-	0.6	-
N5_0	-	0.4	-
N5_1	-	0.4	-
N5_2	-	0.4	-
N6_0	-	0.6	-
N6_1	-	0.6	-
N6_2	-	0.6	-

Receptor	100th percentile - 1 hour mean		
	EAL: 160µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N6_3	-	0.6	-
N6_4	-	0.6	-
N7_0	-	0.5	-
N7_1	-	0.5	-
N7_2	-	0.5	-
N8_0	-	0.6	-
N8_1	-	0.6	-
N8_2	-	0.6	-
N9_0	-	0.6	-
N9_1	-	0.6	-
N10_0	-	0.6	-
N10_1	-	0.6	-
N11_0	-	0.6	-
N11_1	-	0.6	-
N11_2	-	0.6	-
N11_3	-	0.6	-
N11_4	-	0.6	-
N12_0	-	0.5	-
N12_1	-	0.5	-
N12_2	-	0.5	-
N13_0	-	0.4	-
N13_1	-	0.4	-
N13_2	-	0.4	-
N14_0	-	0.5	-
N14_1	-	0.5	-
N14_2	-	0.5	-
N14_3	-	0.5	-
N14_4	-	0.6	-
N15_0	-	0.6	-
N15_1	-	0.6	-

Receptor	100th percentile - 1 hour mean		
	EAL: 160µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N15_2	-	0.6	-
N16_0	-	0.7	-
N16_1	-	0.7	-
N16_2	-	0.7	-
N17_0	-	0.6	-
N17_1	-	0.6	-
N17_2	-	0.6	-
N18_0	-	0.6	-
N18_1	-	0.6	-
N18_2	-	0.6	-
N19_0	-	0.6	-
N19_1	-	0.6	-
N19_2	-	0.6	-
N20_0	-	0.4	-
N20_1	-	0.4	-
N20_2	-	0.4	-
N20_3	-	0.4	-
N20_4	-	0.4	-
N20_5	-	0.4	-

B5.7 Ammonia (NH_3)

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 180µg/m³		Significance	EAL: 2,500µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	2.34	2.34	Negligible	4.7	4.8	Negligible
2	2.34	2.34	Negligible	4.7	4.8	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 180µg/m^3		Significance	EAL: 2,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
3	2.34	2.34	Negligible	4.7	4.7	Negligible
4	2.34	2.34	Negligible	4.7	4.8	Negligible
5	2.34	2.34	Negligible	4.7	4.8	Negligible
6	2.34	2.34	Negligible	4.7	4.8	Negligible
7	2.34	2.34	Negligible	4.7	4.8	Negligible
8	2.34	2.34	Negligible	4.7	4.8	Negligible
9	2.34	2.35	Negligible	4.7	4.8	Negligible
10	2.34	2.35	Negligible	4.7	4.8	Negligible
11	2.34	2.35	Negligible	4.7	4.8	Negligible
12	2.34	2.35	Negligible	4.7	4.8	Negligible
13	2.34	2.35	Negligible	4.7	4.8	Negligible
14	2.34	2.34	Negligible	4.7	4.7	Negligible
15	2.34	2.34	Negligible	4.7	4.8	Negligible
16	2.34	2.34	Negligible	4.7	4.7	Negligible
17	2.34	2.34	Negligible	4.7	4.7	Negligible
18	2.34	2.34	Negligible	4.7	4.7	Negligible
19	2.34	2.34	Negligible	4.7	4.7	Negligible
20	2.34	2.34	Negligible	4.7	4.7	Negligible
21	2.34	2.34	Negligible	4.7	4.7	Negligible
22	-	-	-	4.7	4.8	Negligible
23	-	-	-	4.7	4.9	Negligible
24	-	-	-	4.7	4.9	Negligible
25	-	-	-	4.7	4.9	Negligible
26	-	-	-	4.7	5.0	Negligible
27	-	-	-	4.7	4.9	Negligible
28	-	-	-	4.7	4.9	Negligible
29	-	-	-	4.7	4.9	Negligible
30	-	-	-	4.7	4.8	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 180µg/m³		Significance	EAL: 2,500µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N1_0	-	2.35	-	-	4.9	-
N1_1	-	2.35	-	-	4.9	-
N1_2	-	2.35	-	-	4.9	-
N2_0	-	2.35	-	-	4.9	-
N2_1	-	2.35	-	-	4.9	-
N3_0	-	2.35	-	-	4.9	-
N3_1	-	2.35	-	-	4.9	-
N3_2	-	2.35	-	-	4.9	-
N4_0	-	2.35	-	-	4.9	-
N4_1	-	2.35	-	-	4.9	-
N4_2	-	2.35	-	-	4.9	-
N4_3	-	2.35	-	-	4.9	-
N4_4	-	2.35	-	-	4.9	-
N5_0	-	2.35	-	-	4.8	-
N5_1	-	2.35	-	-	4.8	-
N5_2	-	2.35	-	-	4.8	-
N6_0	-	2.35	-	-	4.9	-
N6_1	-	2.35	-	-	4.9	-
N6_2	-	2.35	-	-	4.9	-
N6_3	-	2.35	-	-	4.9	-
N6_4	-	2.35	-	-	4.9	-
N7_0	-	2.34	-	-	4.8	-
N7_1	-	2.34	-	-	4.8	-
N7_2	-	2.34	-	-	4.8	-
N8_0	-	2.35	-	-	4.9	-
N8_1	-	2.35	-	-	4.9	-
N8_2	-	2.35	-	-	4.9	-
N9_0	-	2.35	-	-	4.9	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 180µg/m^3		Significance	EAL: 2,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N9_1	-	2.35	-	-	4.9	-
N10_0	-	2.35	-	-	4.9	-
N10_1	-	2.35	-	-	4.9	-
N11_0	-	2.35	-	-	4.9	-
N11_1	-	2.35	-	-	4.9	-
N11_2	-	2.35	-	-	4.9	-
N11_3	-	2.35	-	-	4.9	-
N11_4	-	2.36	-	-	4.9	-
N12_0	-	2.35	-	-	4.8	-
N12_1	-	2.35	-	-	4.8	-
N12_2	-	2.35	-	-	4.8	-
N13_0	-	2.35	-	-	4.8	-
N13_1	-	2.35	-	-	4.8	-
N13_2	-	2.35	-	-	4.8	-
N14_0	-	2.35	-	-	4.9	-
N14_1	-	2.35	-	-	4.9	-
N14_2	-	2.35	-	-	4.9	-
N14_4	-	2.35	-	-	4.9	-
N14_3	-	2.35	-	-	4.9	-
N15_0	-	2.34	-	-	4.9	-
N15_1	-	2.34	-	-	4.9	-
N15_2	-	2.34	-	-	4.9	-
N16_0	-	2.34	-	-	4.9	-
N16_1	-	2.34	-	-	4.9	-
N16_2	-	2.34	-	-	4.9	-
N17_0	-	2.35	-	-	4.9	-
N17_1	-	2.35	-	-	4.9	-
N17_2	-	2.35	-	-	4.9	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 180µg/m^3		Significance	EAL: 2,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N18_0	-	2.34	-	-	4.9	-
N18_1	-	2.34	-	-	4.9	-
N18_2	-	2.34	-	-	4.9	-
N19_0	-	2.35	-	-	4.9	-
N19_1	-	2.35	-	-	4.9	-
N19_2	-	2.35	-	-	4.9	-
N20_0	-	2.35	-	-	4.8	-
N20_1	-	2.35	-	-	4.8	-
N20_2	-	2.35	-	-	4.8	-
N20_3	-	2.35	-	-	4.8	-
N20_4	-	2.35	-	-	4.8	-
N20_5	-	2.35	-	-	4.8	-

B5.8 Trace metals

B5.8.1 Group I metals

B5.8.1.1 Cobalt (Co)

Receptor	Annual mean		
	EAL: 100µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	5.20E-04	3.20E-02	Negligible
2	5.20E-04	4.11E-02	Negligible
3	5.20E-04	2.69E-02	Negligible
4	5.20E-04	2.32E-02	Negligible

Receptor	Annual mean		
	EAL: 100µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
5	5.20E-04	2.79E-02	Negligible
6	5.20E-04	1.80E-02	Negligible
7	5.20E-04	3.70E-02	Negligible
8	5.20E-04	3.40E-02	Negligible
9	5.20E-04	6.84E-02	Negligible
10	5.20E-04	8.39E-02	Negligible
11	5.20E-04	5.44E-02	Negligible
12	5.20E-04	4.70E-02	Negligible
13	5.20E-04	8.58E-02	Negligible
14	5.20E-04	3.83E-02	Negligible
15	5.20E-04	5.86E-02	Negligible
16	5.20E-04	2.47E-02	Negligible
17	5.20E-04	2.59E-02	Negligible
18	5.20E-04	2.76E-02	Negligible
19	5.20E-04	2.71E-02	Negligible
20	5.20E-04	2.83E-02	Negligible
21	5.20E-04	2.17E-02	Negligible
N1_0	-	2.50E-01	-
N1_1	-	2.51E-01	-
N1_2	-	2.53E-01	-
N2_0	-	3.07E-01	-
N2_1	-	3.07E-01	-
N3_0	-	3.28E-01	-
N3_1	-	3.29E-01	-
N3_2	-	3.29E-01	-
N4_0	-	2.82E-01	-
N4_1	-	2.82E-01	-
N4_2	-	2.82E-01	-
N4_3	-	2.82E-01	-
N4_4	-	2.82E-01	-

Receptor	Annual mean		
	EAL: 100µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N5_0	-	1.39E-02	-
N5_1	-	1.39E-02	-
N5_2	-	1.40E-02	-
N6_0	-	1.10E-01	-
N6_1	-	1.10E-01	-
N6_2	-	1.10E-01	-
N6_3	-	1.10E-01	-
N6_4	-	1.11E-01	-
N7_0	-	1.45E-01	-
N7_1	-	1.45E-01	-
N7_2	-	1.46E-01	-
N8_0	-	2.12E-01	-
N8_1	-	2.14E-01	-
N8_2	-	2.16E-01	-
N9_0	-	3.63E-01	-
N9_1	-	3.63E-01	-
N10_0	-	4.29E-01	-
N10_1	-	4.29E-01	-
N11_0	-	3.98E-01	-
N11_1	-	3.98E-01	-
N11_2	-	3.98E-01	-
N11_3	-	3.99E-01	-
N11_4	-	3.99E-01	-
N12_0	-	3.12E-01	-
N12_1	-	3.13E-01	-
N12_2	-	3.13E-01	-
N13_0	-	1.99E-02	-
N13_1	-	2.02E-02	-
N13_2	-	2.07E-02	-
N14_0	-	3.33E-01	-

Receptor	Annual mean		
	EAL: 100µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N14_1	-	3.34E-01	-
N14_2	-	3.35E-01	-
N14_3	-	3.36E-01	-
N14_4	-	3.38E-01	-
N15_0	-	1.52E-01	-
N15_1	-	1.53E-01	-
N15_2	-	1.53E-01	-
N16_0	-	8.26E-02	-
N16_1	-	8.35E-02	-
N16_2	-	8.64E-02	-
N17_0	-	8.15E-02	-
N17_1	-	8.22E-02	-
N17_2	-	8.43E-02	-
N18_0	-	9.24E-02	-
N18_1	-	9.30E-02	-
N18_2	-	9.50E-02	-
N19_0	-	2.14E-01	-
N19_1	-	2.15E-01	-
N19_2	-	2.17E-01	-
N20_0	-	1.74E-02	-
N20_1	-	1.74E-02	-
N20_2	-	1.74E-02	-
N20_3	-	1.74E-02	-
N20_4	-	1.74E-02	-
N20_5	-	1.77E-02	-

B5.8.1.2 Cadmium (Cd)

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
1	0.3	0.4	Negligible
2	0.3	0.4	Negligible
3	0.3	0.4	Negligible
4	0.3	0.4	Negligible
5	0.3	0.4	Negligible
6	0.3	0.3	Negligible
7	0.3	0.4	Negligible
8	0.3	0.4	Negligible
9	0.3	0.4	Negligible
10	0.3	0.4	Negligible
11	0.3	0.4	Negligible
12	0.3	0.4	Negligible
13	0.3	0.4	Negligible
14	0.3	0.4	Negligible
15	0.3	0.4	Negligible
16	0.3	0.4	Negligible
17	0.3	0.4	Negligible
18	0.3	0.4	Negligible
19	0.3	0.4	Negligible
20	0.3	0.4	Negligible
21	0.3	0.4	Negligible
N1_0	0.3	0.6	-
N1_1	-	0.6	-
N1_2	-	0.6	-
N2_0	-	0.6	-
N2_1	-	0.6	-
N3_0	-	0.7	-
N3_1	-	0.7	-

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N3_2	-	0.7	-
N4_0	-	0.6	-
N4_1	-	0.6	-
N4_2	-	0.6	-
N4_3	-	0.6	-
N4_4	-	0.6	-
N5_0	-	0.3	-
N5_1	-	0.3	-
N5_2	-	0.3	-
N6_0	-	0.4	-
N6_1	-	0.4	-
N6_2	-	0.4	-
N6_3	-	0.4	-
N6_4	-	0.4	-
N7_0	-	0.5	-
N7_1	-	0.5	-
N7_2	-	0.5	-
N8_0	-	0.5	-
N8_1	-	0.5	-
N8_2	-	0.5	-
N9_0	-	0.7	-
N9_1	-	0.7	-
N10_0	-	0.8	-
N10_1	-	0.8	-
N11_0	-	0.7	-
N11_1	-	0.7	-
N11_2	-	0.7	-
N11_3	-	0.7	-
N11_4	-	0.7	-
N12_0	-	0.6	-

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N12_1	-	0.6	-
N12_2	-	0.6	-
N13_0	-	0.3	-
N13_1	-	0.3	-
N13_2	-	0.4	-
N14_0	-	0.7	-
N14_1	-	0.7	-
N14_2	-	0.7	-
N14_3	-	0.7	-
N14_4	-	0.7	-
N15_0	-	0.5	-
N15_1	-	0.5	-
N15_2	-	0.5	-
N16_0	-	0.4	-
N16_1	-	0.4	-
N16_2	-	0.4	-
N17_0	-	0.4	-
N17_1	-	0.4	-
N17_2	-	0.4	-
N18_0	-	0.4	-
N18_1	-	0.4	-
N18_2	-	0.4	-
N19_0	-	0.5	-
N19_1	-	0.5	-
N19_2	-	0.5	-
N20_0	-	0.3	-
N20_1	-	0.3	-
N20_2	-	0.3	-
N20_3	-	0.3	-
N20_4	-	0.3	-

Receptor	Annual mean EAL: $5ng/m^3$ Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	Significance
N20_5	-	0.3	-

B5.8.1.3 Arsenic (As)

Receptor	Annual mean		
	EAL: $6ng/m^3$		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
1	0.7	0.7	Negligible
2	0.7	0.8	Negligible
3	0.7	0.7	Negligible
4	0.7	0.7	Negligible
5	0.7	0.7	Negligible
6	0.7	0.7	Negligible
7	0.7	0.7	Negligible
8	0.7	0.7	Negligible
9	0.7	0.8	Negligible
10	0.7	0.8	Negligible
11	0.7	0.8	Negligible
12	0.7	0.8	Negligible
13	0.7	0.8	Negligible
14	0.7	0.7	Negligible
15	0.7	0.8	Negligible
16	0.7	0.7	Negligible
17	0.7	0.7	Negligible
18	0.7	0.7	Negligible
19	0.7	0.7	Negligible
20	0.7	0.7	Negligible
21	0.7	0.7	Negligible
N1_0	-	1.0	-

Receptor	Annual mean		
	EAL: 6ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N1_1	-	1.0	-
N1_2	-	1.0	-
N2_0	-	1.0	-
N2_1	-	1.0	-
N3_0	-	1.0	-
N3_1	-	1.0	-
N3_2	-	1.0	-
N4_0	-	1.0	-
N4_1	-	1.0	-
N4_2	-	1.0	-
N4_3	-	1.0	-
N4_4	-	1.0	-
N5_0	-	0.7	-
N5_1	-	0.7	-
N5_2	-	0.7	-
N6_0	-	0.8	-
N6_1	-	0.8	-
N6_2	-	0.8	-
N6_3	-	0.8	-
N6_4	-	0.8	-
N7_0	-	0.9	-
N7_1	-	0.9	-
N7_2	-	0.9	-
N8_0	-	0.9	-
N8_1	-	0.9	-
N8_2	-	0.9	-
N9_0	-	1.1	-
N9_1	-	1.1	-
N10_0	-	1.1	-
N10_1	-	1.1	-

Receptor	Annual mean		
	EAL: 6ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N11_0	-	1.1	-
N11_1	-	1.1	-
N11_2	-	1.1	-
N11_3	-	1.1	-
N11_4	-	1.1	-
N12_0	-	1.0	-
N12_1	-	1.0	-
N12_2	-	1.0	-
N13_0	-	0.7	-
N13_1	-	0.7	-
N13_2	-	0.7	-
N14_0	-	1.0	-
N14_1	-	1.0	-
N14_2	-	1.0	-
N14_3	-	1.0	-
N14_34	-	1.0	-
N15_0	-	0.9	-
N15_1	-	0.9	-
N15_2	-	0.9	-
N16_0	-	0.8	-
N16_1	-	0.8	-
N16_2	-	0.8	-
N17_0	-	0.8	-
N17_1	-	0.8	-
N17_2	-	0.8	-
N18_0	-	0.8	-
N18_1	-	0.8	-
N18_2	-	0.8	-
N19_0	-	0.9	-
N19_1	-	0.9	-

Receptor	Annual mean		
	EAL: 6ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N19_2	-	0.9	-
N20_0	-	0.7	-
N20_1	-	0.7	-
N20_2	-	0.7	-
N20_3	-	0.7	-
N20_4	-	0.7	-
N20_5	-	0.7	-

B5.8.1.4 Nickel (Ni)

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
1	13.3	13.6	Negligible
2	13.3	13.7	Negligible
3	13.3	13.5	Negligible
4	13.3	13.5	Negligible
5	13.3	13.5	Negligible
6	13.3	13.4	Negligible
7	13.3	13.6	Negligible
8	13.3	13.6	Negligible
9	13.3	13.9	Negligible
10	13.3	14.1	Negligible
11	13.3	13.8	Negligible
12	13.3	13.7	Negligible
13	13.3	14.1	Negligible
14	13.3	13.6	Negligible
15	13.3	13.8	Negligible
16	13.3	13.5	Negligible

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
17	13.3	13.5	Negligible
18	13.3	13.5	Negligible
19	13.3	13.5	Negligible
20	13.3	13.5	Negligible
21	13.3	13.5	Negligible
N1_0	-	15.8	-
N1_1	-	15.8	-
N1_2	-	15.8	-
N2_0	-	16.3	-
N2_1	-	16.4	-
N3_0	-	16.6	-
N3_1	-	16.6	-
N3_2	-	16.6	-
N4_0	-	16.1	-
N4_1	-	16.1	-
N4_2	-	16.1	-
N4_3	-	16.1	-
N4_4	-	16.1	-
N5_0	-	13.4	-
N5_1	-	13.4	-
N5_2	-	13.4	-
N6_0	-	14.4	-
N6_1	-	14.4	-
N6_2	-	14.4	-
N6_3	-	14.4	-
N6_4	-	14.4	-
N7_0	-	14.7	-
N7_1	-	14.7	-
N7_2	-	14.7	-
N8_0	-	15.4	-

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N8_1	-	15.4	-
N8_2	-	15.4	-
N9_0	-	16.9	-
N9_1	-	16.9	-
N10_0	-	17.6	-
N10_1	-	17.6	-
N11_0	-	17.3	-
N11_1	-	17.3	-
N11_2	-	17.3	-
N11_3	-	17.3	-
N11_4	-	17.3	-
N12_0	-	16.4	-
N12_1	-	16.4	-
N12_2	-	16.4	-
N13_0	-	13.5	-
N13_1	-	13.5	-
N13_2	-	13.5	-
N14_0	-	16.6	-
N14_1	-	16.6	-
N14_2	-	16.6	-
N14_3	-	16.6	-
N14_4	-	16.7	-
N15_0	-	14.8	-
N15_1	-	14.8	-
N15_2	-	14.8	-
N16_0	-	14.1	-
N16_1	-	14.1	-
N16_2	-	14.1	-
N17_0	-	14.1	-
N17_1	-	14.1	-

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N17_2	-	14.1	-
N18_0	-	14.2	-
N18_1	-	14.2	-
N18_2	-	14.2	-
N19_0	-	15.4	-
N19_1	-	15.4	-
N19_2	-	15.4	-
N20_0	-	13.4	-
N20_1	-	13.4	-
N20_2	-	13.4	-
N20_3	-	13.4	-
N20_4	-	13.4	-
N20_5	-	13.4	-

B5.8.1.5 Selenium (Se)

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m^3		Significance	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	6.00E-04	6.32E-04	Negligible	1.20E-03	4.34E-03	Negligible
2	6.00E-04	6.41E-04	Negligible	1.20E-03	3.90E-03	Negligible
3	6.00E-04	6.26E-04	Negligible	1.20E-03	3.54E-03	Negligible
4	6.00E-04	6.23E-04	Negligible	1.20E-03	3.85E-03	Negligible
5	6.00E-04	6.27E-04	Negligible	1.20E-03	3.89E-03	Negligible
6	6.00E-04	6.18E-04	Negligible	1.20E-03	3.64E-03	Negligible
7	6.00E-04	6.36E-04	Negligible	1.20E-03	5.76E-03	Negligible
8	6.00E-04	6.33E-04	Negligible	1.20E-03	3.80E-03	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m^3		Significance	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
9	6.00E-04	6.68E-04	Negligible	1.20E-03	5.25E-03	Negligible
10	6.00E-04	6.83E-04	Negligible	1.20E-03	5.72E-03	Negligible
11	6.00E-04	6.54E-04	Negligible	1.20E-03	6.01E-03	Negligible
12	6.00E-04	6.46E-04	Negligible	1.20E-03	6.17E-03	Negligible
13	6.00E-04	6.85E-04	Negligible	1.20E-03	5.16E-03	Negligible
14	6.00E-04	6.38E-04	Negligible	1.20E-03	3.27E-03	Negligible
15	6.00E-04	6.58E-04	Negligible	1.20E-03	3.91E-03	Negligible
16	6.00E-04	6.24E-04	Negligible	1.20E-03	2.83E-03	Negligible
17	6.00E-04	6.25E-04	Negligible	1.20E-03	2.89E-03	Negligible
18	6.00E-04	6.27E-04	Negligible	1.20E-03	2.98E-03	Negligible
19	6.00E-04	6.27E-04	Negligible	1.20E-03	3.00E-03	Negligible
20	6.00E-04	6.28E-04	Negligible	1.20E-03	3.12E-03	Negligible
21	6.00E-04	6.21E-04	Negligible	1.20E-03	3.18E-03	Negligible
22	-	-	-	1.20E-03	6.53E-03	Negligible
23	-	-	-	1.20E-03	9.02E-03	Negligible
24	-	-	-	1.20E-03	7.67E-03	Negligible
25	-	-	-	1.20E-03	8.25E-03	Negligible
26	-	-	-	1.20E-03	1.06E-02	Negligible
27	-	-	-	1.20E-03	9.94E-03	Negligible
28	-	-	-	1.20E-03	8.43E-03	Negligible
29	-	-	-	1.20E-03	8.73E-03	Negligible
30	-	-	-	1.20E-03	5.18E-03	Negligible
N1_0	-	8.49E-04	-	-	8.66E-03	-
N1_1	-	8.51E-04	-	-	8.66E-03	-
N1_2	-	8.53E-04	-	-	8.66E-03	-
N2_0	-	9.06E-04	-	-	8.98E-03	-
N2_1	-	9.07E-04	-	-	9.01E-03	-
N3_0	-	9.28E-04	-	-	8.20E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m^3		Significance	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N3_1	-	9.28E-04	-	-	8.20E-03	-
N3_2	-	9.28E-04	-	-	8.20E-03	-
N4_0	-	8.82E-04	-	-	8.20E-03	-
N4_1	-	8.82E-04	-	-	8.20E-03	-
N4_2	-	8.82E-04	-	-	8.20E-03	-
N4_3	-	8.82E-04	-	-	8.20E-03	-
N4_4	-	8.82E-04	-	-	8.20E-03	-
N5_0	-	6.13E-04	-	-	5.58E-03	-
N5_1	-	6.13E-04	-	-	5.58E-03	-
N5_2	-	6.13E-04	-	-	5.58E-03	-
N6_0	-	7.09E-04	-	-	8.00E-03	-
N6_1	-	7.09E-04	-	-	8.00E-03	-
N6_2	-	7.09E-04	-	-	8.00E-03	-
N6_3	-	7.10E-04	-	-	8.00E-03	-
N6_4	-	7.10E-04	-	-	8.00E-03	-
N7_0	-	7.44E-04	-	-	6.61E-03	-
N7_1	-	7.45E-04	-	-	6.61E-03	-
N7_2	-	7.45E-04	-	-	6.61E-03	-
N8_0	-	8.12E-04	-	-	8.20E-03	-
N8_1	-	8.13E-04	-	-	8.20E-03	-
N8_2	-	8.15E-04	-	-	8.20E-03	-
N9_0	-	9.62E-04	-	-	8.20E-03	-
N9_1	-	9.62E-04	-	-	8.20E-03	-
N10_0	-	1.03E-03	-	-	8.50E-03	-
N10_1	-	1.03E-03	-	-	8.50E-03	-
N11_0	-	9.98E-04	-	-	8.44E-03	-
N11_1	-	9.98E-04	-	-	8.44E-03	-
N11_2	-	9.98E-04	-	-	8.44E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m^3		Significance	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N11_3	-	9.98E-04	-	-	8.44E-03	-
N11_4	-	9.98E-04	-	-	8.44E-03	-
N12_0	-	9.12E-04	-	-	6.73E-03	-
N12_1	-	9.12E-04	-	-	6.79E-03	-
N12_2	-	9.13E-04	-	-	6.86E-03	-
N13_0	-	6.19E-04	-	-	5.76E-03	-
N13_1	-	6.20E-04	-	-	5.76E-03	-
N13_2	-	6.20E-04	-	-	5.76E-03	-
N14_0	-	9.33E-04	-	-	7.24E-03	-
N14_1	-	9.33E-04	-	-	7.29E-03	-
N14_2	-	9.34E-04	-	-	7.37E-03	-
N14_4	-	9.37E-04	-	-	7.47E-03	-
N14_3	-	9.35E-04	-	-	7.67E-03	-
N15_0	-	7.52E-04	-	-	8.68E-03	-
N15_1	-	7.52E-04	-	-	8.69E-03	-
N15_2	-	7.53E-04	-	-	8.70E-03	-
N16_0	-	6.82E-04	-	-	9.38E-03	-
N16_1	-	6.83E-04	-	-	9.38E-03	-
N16_2	-	6.86E-04	-	-	9.40E-03	-
N17_0	-	6.81E-04	-	-	7.90E-03	-
N17_1	-	6.82E-04	-	-	7.90E-03	-
N17_2	-	6.84E-04	-	-	7.89E-03	-
N18_0	-	6.92E-04	-	-	8.02E-03	-
N18_1	-	6.92E-04	-	-	8.02E-03	-
N18_2	-	6.95E-04	-	-	8.02E-03	-
N19_0	-	8.14E-04	-	-	8.79E-03	-
N19_1	-	8.15E-04	-	-	8.79E-03	-
N19_2	-	8.16E-04	-	-	8.79E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: $1\mu g/m^3$		Significance	EAL: $30\mu g/m^3$		Significance
	Existing concentrations ($\mu g/m^3$)	Proposed concentrations ($\mu g/m^3$)		Existing concentrations ($\mu g/m^3$)	Proposed concentrations ($\mu g/m^3$)	
N20_0	-	6.17E-04	-	-	5.68E-03	-
N20_1	-	6.17E-04	-	-	5.68E-03	-
N20_2	-	6.17E-04	-	-	5.68E-03	-
N20_3	-	6.17E-04	-	-	5.68E-03	-
N20_4	-	6.17E-04	-	-	5.68E-03	-
N20_5	-	6.17E-04	-	-	5.68E-03	-

B5.8.1.6 Chromium VI (CrVI)

Receptor	Annual mean		
	EAL: $0.0002\mu g/m^3$		Significance
	Existing concentrations ($\mu g/m^3$)	Proposed concentrations ($\mu g/m^3$)	
1	5.58E-04	5.59E-04	Negligible
2	5.58E-04	5.59E-04	Negligible
3	5.58E-04	5.58E-04	Negligible
4	5.58E-04	5.58E-04	Negligible
5	5.58E-04	5.58E-04	Negligible
6	5.58E-04	5.58E-04	Negligible
7	5.58E-04	5.59E-04	Negligible
8	5.58E-04	5.59E-04	Negligible
9	5.58E-04	5.59E-04	Moderate adverse
10	5.58E-04	5.59E-04	Moderate adverse
11	5.58E-04	5.59E-04	Negligible
12	5.58E-04	5.59E-04	Negligible
13	5.58E-04	5.59E-04	Moderate adverse
14	5.58E-04	5.59E-04	Negligible
15	5.58E-04	5.59E-04	Negligible

Receptor	Annual mean		
	EAL: 0.0002µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
16	5.58E-04	5.58E-04	Negligible
17	5.58E-04	5.58E-04	Negligible
18	5.58E-04	5.58E-04	Negligible
19	5.58E-04	5.58E-04	Negligible
20	5.58E-04	5.58E-04	Negligible
21	5.58E-04	5.58E-04	Negligible
N1_0	-	6.38E-04	-
N1_1	-	6.38E-04	-
N1_2	-	6.39E-04	-
N2_0	-	6.56E-04	-
N2_1	-	6.56E-04	-
N3_0	-	6.63E-04	-
N3_1	-	6.63E-04	-
N3_2	-	6.63E-04	-
N4_0	-	6.48E-04	-
N4_1	-	6.48E-04	-
N4_2	-	6.48E-04	-
N4_3	-	6.48E-04	-
N4_4	-	6.48E-04	-
N5_0	-	5.62E-04	-
N5_1	-	5.62E-04	-
N5_2	-	5.62E-04	-
N6_0	-	5.93E-04	-
N6_1	-	5.93E-04	-
N6_2	-	5.93E-04	-
N6_3	-	5.93E-04	-
N6_4	-	5.93E-04	-
N7_0	-	6.04E-04	-
N7_1	-	6.04E-04	-
N7_2	-	6.05E-04	-

Receptor	Annual mean		
	EAL: 0.0002µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N8_0	-	6.26E-04	-
N8_1	-	6.26E-04	-
N8_2	-	6.27E-04	-
N9_0	-	6.74E-04	-
N9_1	-	6.74E-04	-
N10_0	-	6.95E-04	-
N10_1	-	6.95E-04	-
N11_0	-	6.86E-04	-
N11_1	-	6.86E-04	-
N11_2	-	6.86E-04	-
N11_3	-	6.86E-04	-
N11_4	-	6.86E-04	-
N12_0	-	6.58E-04	-
N12_1	-	6.58E-04	-
N12_2	-	6.58E-04	-
N13_0	-	5.64E-04	-
N13_1	-	5.64E-04	-
N13_2	-	5.64E-04	-
N14_0	-	6.65E-04	-
N14_1	-	6.65E-04	-
N14_2	-	6.65E-04	-
N14_3	-	6.65E-04	-
N14_4	-	6.66E-04	-
N15_0	-	6.07E-04	-
N15_1	-	6.07E-04	-
N15_2	-	6.07E-04	-
N16_0	-	5.84E-04	-
N16_1	-	5.85E-04	-
N16_2	-	5.86E-04	-
N17_0	-	5.84E-04	-

Receptor	Annual mean		
	EAL: 0.0002µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N17_1	-	5.84E-04	-
N17_2	-	5.85E-04	-
N18_0	-	5.87E-04	-
N18_1	-	5.88E-04	-
N18_2	-	5.88E-04	-
N19_0	-	6.27E-04	-
N19_1	-	6.27E-04	-
N19_2	-	6.27E-04	-
N20_0	-	5.63E-04	-
N20_1	-	5.63E-04	-
N20_2	-	5.63E-04	-
N20_3	-	5.63E-04	-
N20_4	-	5.63E-04	-
N20_5	-	5.64E-04	-

B5.8.2 Group II metals

B5.8.2.1 Cobalt (Co)

Receptor	Annual mean		
	EAL: 100µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	5.20E-04	5.32E-04	Negligible
2	5.20E-04	5.35E-04	Negligible
3	5.20E-04	5.30E-04	Negligible
4	5.20E-04	5.28E-04	Negligible
5	5.20E-04	5.30E-04	Negligible
6	5.20E-04	5.27E-04	Negligible
7	5.20E-04	5.34E-04	Negligible

Receptor	Annual mean		
	EAL: 100µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
8	5.20E-04	5.33E-04	Negligible
9	5.20E-04	5.45E-04	Negligible
10	5.20E-04	5.51E-04	Negligible
11	5.20E-04	5.40E-04	Negligible
12	5.20E-04	5.37E-04	Negligible
13	5.20E-04	5.52E-04	Negligible
14	5.20E-04	5.34E-04	Negligible
15	5.20E-04	5.42E-04	Negligible
16	5.20E-04	5.29E-04	Negligible
17	5.20E-04	5.29E-04	Negligible
18	5.20E-04	5.30E-04	Negligible
19	5.20E-04	5.30E-04	Negligible
20	5.20E-04	5.30E-04	Negligible
21	5.20E-04	5.28E-04	Negligible
N1_0	-	6.13E-04	-
N1_1	-	6.14E-04	-
N1_2	-	6.15E-04	-
N2_0	-	6.34E-04	-
N2_1	-	6.35E-04	-
N3_0	-	6.43E-04	-
N3_1	-	6.43E-04	-
N3_2	-	6.43E-04	-
N4_0	-	6.25E-04	-
N4_1	-	6.25E-04	-
N4_2	-	6.25E-04	-
N4_3	-	6.25E-04	-
N4_4	-	6.25E-04	-
N5_0	-	5.25E-04	-
N5_1	-	5.25E-04	-
N5_2	-	5.25E-04	-

Receptor	Annual mean		
	EAL: 100µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N6_0	-	5.61E-04	-
N6_1	-	5.61E-04	-
N6_2	-	5.61E-04	-
N6_3	-	5.61E-04	-
N6_4	-	5.61E-04	-
N7_0	-	5.74E-04	-
N7_1	-	5.74E-04	-
N7_2	-	5.74E-04	-
N8_0	-	5.99E-04	-
N8_1	-	6.00E-04	-
N8_2	-	6.00E-04	-
N9_0	-	6.55E-04	-
N9_1	-	6.55E-04	-
N10_0	-	6.80E-04	-
N10_1	-	6.80E-04	-
N11_0	-	6.69E-04	-
N11_1	-	6.69E-04	-
N11_2	-	6.69E-04	-
N11_3	-	6.69E-04	-
N11_4	-	6.69E-04	-
N12_0	-	6.37E-04	-
N12_1	-	6.37E-04	-
N12_2	-	6.37E-04	-
N13_0	-	5.27E-04	-
N13_1	-	5.27E-04	-
N13_2	-	5.28E-04	-
N14_0	-	6.44E-04	-
N14_1	-	6.45E-04	-
N14_2	-	6.45E-04	-
N14_3	-	6.45E-04	-

Receptor	Annual mean		
	EAL: 100µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N14_4	-	6.46E-04	-
N15_0	-	5.77E-04	-
N15_1	-	5.77E-04	-
N15_2	-	5.77E-04	-
N16_0	-	5.51E-04	-
N16_1	-	5.51E-04	-
N16_2	-	5.52E-04	-
N17_0	-	5.50E-04	-
N17_1	-	5.51E-04	-
N17_2	-	5.51E-04	-
N18_0	-	5.54E-04	-
N18_1	-	5.55E-04	-
N18_2	-	5.55E-04	-
N19_0	-	6.00E-04	-
N19_1	-	6.00E-04	-
N19_2	-	6.01E-04	-
N20_0	-	5.26E-04	-
N20_1	-	5.26E-04	-
N20_2	-	5.26E-04	-
N20_3	-	5.26E-04	-
N20_4	-	5.26E-04	-
N20_5	-	5.26E-04	-

B5.8.2.2 Cadmium (Cd)

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
1	3.30E-01	3.42E-01	Negligible

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
2	3.30E-01	3.45E-01	Negligible
3	3.30E-01	3.40E-01	Negligible
4	3.30E-01	3.38E-01	Negligible
5	3.30E-01	3.40E-01	Negligible
6	3.30E-01	3.37E-01	Negligible
7	3.30E-01	3.44E-01	Negligible
8	3.30E-01	3.43E-01	Negligible
9	3.30E-01	3.55E-01	Negligible
10	3.30E-01	3.61E-01	Negligible
11	3.30E-01	3.50E-01	Negligible
12	3.30E-01	3.47E-01	Negligible
13	3.30E-01	3.62E-01	Negligible
14	3.30E-01	3.44E-01	Negligible
15	3.30E-01	3.52E-01	Negligible
16	3.30E-01	3.39E-01	Negligible
17	3.30E-01	3.39E-01	Negligible
18	3.30E-01	3.40E-01	Negligible
19	3.30E-01	3.40E-01	Negligible
20	3.30E-01	3.40E-01	Negligible
21	3.30E-01	3.38E-01	Negligible
N1_0	-	4.23E-01	-
N1_1	-	4.24E-01	-
N1_2	-	4.25E-01	-
N2_0	-	4.44E-01	-
N2_1	-	4.45E-01	-
N3_0	-	4.53E-01	-
N3_1	-	4.53E-01	-
N3_2	-	4.53E-01	-
N4_0	-	4.35E-01	-
N4_1	-	4.35E-01	-

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N4_2	-	4.35E-01	-
N4_3	-	4.35E-01	-
N4_4	-	4.35E-01	-
N5_0	-	3.35E-01	-
N5_1	-	3.35E-01	-
N5_2	-	3.35E-01	-
N6_0	-	3.71E-01	-
N6_1	-	3.71E-01	-
N6_2	-	3.71E-01	-
N6_3	-	3.71E-01	-
N6_4	-	3.71E-01	-
N7_0	-	3.84E-01	-
N7_1	-	3.84E-01	-
N7_2	-	3.84E-01	-
N8_0	-	4.09E-01	-
N8_1	-	4.10E-01	-
N8_2	-	4.10E-01	-
N9_0	-	4.65E-01	-
N9_1	-	4.65E-01	-
N10_0	-	4.90E-01	-
N10_1	-	4.90E-01	-
N11_0	-	4.79E-01	-
N11_1	-	4.79E-01	-
N11_2	-	4.79E-01	-
N11_3	-	4.79E-01	-
N11_4	-	4.79E-01	-
N12_0	-	4.47E-01	-
N12_1	-	4.47E-01	-
N12_2	-	4.47E-01	-
N13_0	-	3.37E-01	-

Receptor	Annual mean		
	EAL: 5ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N13_1	-	3.37E-01	-
N13_2	-	3.38E-01	-
N14_0	-	4.54E-01	-
N14_1	-	4.55E-01	-
N14_2	-	4.55E-01	-
N14_3	-	4.55E-01	-
N14_3	-	4.56E-01	-
N15_0	-	3.87E-01	-
N15_1	-	3.87E-01	-
N15_2	-	3.87E-01	-
N16_0	-	3.61E-01	-
N16_1	-	3.61E-01	-
N16_2	-	3.62E-01	-
N17_0	-	3.60E-01	-
N17_1	-	3.61E-01	-
N17_2	-	3.61E-01	-
N18_0	-	3.64E-01	-
N18_1	-	3.65E-01	-
N18_2	-	3.65E-01	-
N19_0	-	4.10E-01	-
N19_1	-	4.10E-01	-
N19_2	-	4.11E-01	-
N20_0	-	3.36E-01	-
N20_1	-	3.36E-01	-
N20_2	-	3.36E-01	-
N20_3	-	3.36E-01	-
N20_4	-	3.36E-01	-
N20_5	-	3.36E-01	-

B5.8.2.3 Arsenic (As)

Receptor	Annual mean		Significance
	EAL: 6ng/m^3		
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
1	7.10E-01	7.22E-01	Negligible
2	7.10E-01	7.25E-01	Negligible
3	7.10E-01	7.20E-01	Negligible
4	7.10E-01	7.18E-01	Negligible
5	7.10E-01	7.20E-01	Negligible
6	7.10E-01	7.17E-01	Negligible
7	7.10E-01	7.24E-01	Negligible
8	7.10E-01	7.23E-01	Negligible
9	7.10E-01	7.35E-01	Negligible
10	7.10E-01	7.41E-01	Negligible
11	7.10E-01	7.30E-01	Negligible
12	7.10E-01	7.27E-01	Negligible
13	7.10E-01	7.42E-01	Negligible
14	7.10E-01	7.24E-01	Negligible
15	7.10E-01	7.32E-01	Negligible
16	7.10E-01	7.19E-01	Negligible
17	7.10E-01	7.19E-01	Negligible
18	7.10E-01	7.20E-01	Negligible
19	7.10E-01	7.20E-01	Negligible
20	7.10E-01	7.20E-01	Negligible
21	7.10E-01	7.18E-01	Negligible
N1_0	-	8.03E-01	-
N1_1	-	8.04E-01	-
N1_2	-	8.05E-01	-
N2_0	-	8.24E-01	-
N2_1	-	8.25E-01	-
N3_0	-	8.33E-01	-
N3_1	-	8.33E-01	-

Receptor	Annual mean		
	EAL: 6ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N3_2	-	8.33E-01	-
N4_0	-	8.15E-01	-
N4_1	-	8.15E-01	-
N4_2	-	8.15E-01	-
N4_3	-	8.15E-01	-
N4_4	-	8.15E-01	-
N5_0	-	7.15E-01	-
N5_1	-	7.15E-01	-
N5_2	-	7.15E-01	-
N6_0	-	7.51E-01	-
N6_1	-	7.51E-01	-
N6_2	-	7.51E-01	-
N6_3	-	7.51E-01	-
N6_4	-	7.51E-01	-
N7_0	-	7.64E-01	-
N7_1	-	7.64E-01	-
N7_2	-	7.64E-01	-
N8_0	-	7.89E-01	-
N8_1	-	7.90E-01	-
N8_2	-	7.90E-01	-
N9_0	-	8.45E-01	-
N9_1	-	8.45E-01	-
N10_0	-	8.70E-01	-
N10_1	-	8.70E-01	-
N11_0	-	8.59E-01	-
N11_1	-	8.59E-01	-
N11_2	-	8.59E-01	-
N11_3	-	8.59E-01	-
N11_4	-	8.59E-01	-
N12_0	-	8.27E-01	-

Receptor	Annual mean		
	EAL: 6ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N12_1	-	8.27E-01	-
N12_2	-	8.27E-01	-
N13_0	-	7.17E-01	-
N13_1	-	7.17E-01	-
N13_2	-	7.18E-01	-
N14_0	-	8.34E-01	-
N14_1	-	8.35E-01	-
N14_2	-	8.35E-01	-
N14_3	-	8.35E-01	-
N14_4	-	8.36E-01	-
N15_0	-	7.67E-01	-
N15_1	-	7.67E-01	-
N15_2	-	7.67E-01	-
N16_0	-	7.41E-01	-
N16_1	-	7.41E-01	-
N16_2	-	7.42E-01	-
N17_0	-	7.40E-01	-
N17_1	-	7.41E-01	-
N17_2	-	7.41E-01	-
N18_0	-	7.44E-01	-
N18_1	-	7.45E-01	-
N18_2	-	7.45E-01	-
N19_0	-	7.90E-01	-
N19_1	-	7.90E-01	-
N19_2	-	7.91E-01	-
N20_0	-	7.16E-01	-
N20_1	-	7.16E-01	-
N20_2	-	7.16E-01	-
N20_3	-	7.16E-01	-
N20_4	-	7.16E-01	-

Receptor	Annual mean		
	EAL: 6ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N20_5	-	7.16E-01	-

B5.8.2.4 Nickel (Ni)

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
1	13.3	13.4	Negligible
2	13.3	13.4	Negligible
3	13.3	13.4	Negligible
4	13.3	13.3	Negligible
5	13.3	13.4	Negligible
6	13.3	13.3	Negligible
7	13.3	13.4	Negligible
8	13.3	13.4	Negligible
9	13.3	13.5	Negligible
10	13.3	13.6	Negligible
11	13.3	13.5	Negligible
12	13.3	13.4	Negligible
13	13.3	13.6	Negligible
14	13.3	13.4	Negligible
15	13.3	13.5	Negligible
16	13.3	13.4	Negligible
17	13.3	13.4	Negligible
18	13.3	13.4	Negligible
19	13.3	13.4	Negligible
20	13.3	13.4	Negligible
21	13.3	13.3	Negligible
N1_0	-	14.2	-

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N1_1	-	14.2	-
N1_2	-	14.2	-
N2_0	-	14.4	-
N2_1	-	14.4	-
N3_0	-	14.5	-
N3_1	-	14.5	-
N3_2	-	14.5	-
N4_0	-	14.3	-
N4_1	-	14.3	-
N4_2	-	14.3	-
N4_3	-	14.3	-
N4_4	-	14.3	-
N5_0	-	13.3	-
N5_1	-	13.3	-
N5_2	-	13.3	-
N6_0	-	13.7	-
N6_1	-	13.7	-
N6_2	-	13.7	-
N6_3	-	13.7	-
N6_4	-	13.7	-
N7_0	-	13.8	-
N7_1	-	13.8	-
N7_2	-	13.8	-
N8_0	-	14.1	-
N8_1	-	14.1	-
N8_2	-	14.1	-
N9_0	-	14.6	-
N9_1	-	14.6	-
N10_0	-	14.9	-
N10_1	-	14.9	-

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N11_0	-	14.8	-
N11_1	-	14.8	-
N11_2	-	14.8	-
N11_3	-	14.8	-
N11_4	-	14.8	-
N12_0	-	14.4	-
N12_1	-	14.4	-
N12_2	-	14.4	-
N13_0	-	13.3	-
N13_1	-	13.3	-
N13_2	-	13.3	-
N14_0	-	14.5	-
N14_1	-	14.5	-
N14_2	-	14.5	-
N14_3	-	14.5	-
N14_4	-	14.5	-
N15_0	-	13.8	-
N15_1	-	13.8	-
N15_2	-	13.8	-
N16_0	-	13.6	-
N16_1	-	13.6	-
N16_2	-	13.6	-
N17_0	-	13.6	-
N17_1	-	13.6	-
N17_2	-	13.6	-
N18_0	-	13.6	-
N18_1	-	13.6	-
N18_2	-	13.6	-
N19_0	-	14.1	-
N19_1	-	14.1	-

Receptor	Annual mean		
	EAL: 20ng/m^3		Significance
	Existing concentrations (ng/m^3)	Proposed concentrations (ng/m^3)	
N19_2	-	14.1	-
N20_0	-	13.3	-
N20_1	-	13.3	-
N20_2	-	13.3	-
N20_3	-	13.3	-
N20_4	-	13.3	-
N20_5	-	13.3	-

B5.8.2.5 Selenium (Se)

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m^3		Significance	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	6.00E-04	6.12E-04	Negligible	1.20E-03	2.37E-03	Negligible
2	6.00E-04	6.15E-04	Negligible	1.20E-03	2.21E-03	Negligible
3	6.00E-04	6.10E-04	Negligible	1.20E-03	2.07E-03	Negligible
4	6.00E-04	6.08E-04	Negligible	1.20E-03	2.19E-03	Negligible
5	6.00E-04	6.10E-04	Negligible	1.20E-03	2.21E-03	Negligible
6	6.00E-04	6.07E-04	Negligible	1.20E-03	2.11E-03	Negligible
7	6.00E-04	6.14E-04	Negligible	1.20E-03	2.90E-03	Negligible
8	6.00E-04	6.13E-04	Negligible	1.20E-03	2.17E-03	Negligible
9	6.00E-04	6.25E-04	Negligible	1.20E-03	2.71E-03	Negligible
10	6.00E-04	6.31E-04	Negligible	1.20E-03	2.89E-03	Negligible
11	6.00E-04	6.20E-04	Negligible	1.20E-03	3.00E-03	Negligible
12	6.00E-04	6.17E-04	Negligible	1.20E-03	3.06E-03	Negligible
13	6.00E-04	6.32E-04	Negligible	1.20E-03	2.68E-03	Negligible
14	6.00E-04	6.14E-04	Negligible	1.20E-03	1.97E-03	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m³		Significance	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
15	6.00E-04	6.22E-04	Negligible	1.20E-03	2.21E-03	Negligible
16	6.00E-04	6.09E-04	Negligible	1.20E-03	1.81E-03	Negligible
17	6.00E-04	6.09E-04	Negligible	1.20E-03	1.83E-03	Negligible
18	6.00E-04	6.10E-04	Negligible	1.20E-03	1.87E-03	Negligible
19	6.00E-04	6.10E-04	Negligible	1.20E-03	1.87E-03	Negligible
20	6.00E-04	6.10E-04	Negligible	1.20E-03	1.92E-03	Negligible
21	6.00E-04	6.08E-04	Negligible	1.20E-03	1.94E-03	Negligible
22				1.20E-03	3.19E-03	Negligible
23				1.20E-03	4.12E-03	Negligible
24				1.20E-03	3.62E-03	Negligible
25				1.20E-03	3.84E-03	Negligible
26				1.20E-03	4.73E-03	Negligible
27				1.20E-03	4.47E-03	Negligible
28				1.20E-03	3.90E-03	Negligible
29				1.20E-03	4.02E-03	Negligible
30				1.20E-03	2.69E-03	Negligible
N1_0	-	6.93E-04	-	-	3.99E-03	-
N1_1	-	6.94E-04	-	-	3.99E-03	-
N1_2	-	6.95E-04	-	-	3.99E-03	-
N2_0	-	7.14E-04	-	-	4.11E-03	-
N2_1	-	7.15E-04	-	-	4.12E-03	-
N3_0	-	7.23E-04	-	-	3.82E-03	-
N3_1	-	7.23E-04	-	-	3.82E-03	-
N3_2	-	7.23E-04	-	-	3.82E-03	-
N4_0	-	7.05E-04	-	-	3.82E-03	-
N4_1	-	7.05E-04	-	-	3.82E-03	-
N4_2	-	7.05E-04	-	-	3.82E-03	-
N4_3	-	7.05E-04	-	-	3.82E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m^3		Significance	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N4_4	-	7.05E-04	-	-	3.82E-03	-
N5_0	-	6.05E-04	-	-	2.84E-03	-
N5_1	-	6.05E-04	-	-	2.84E-03	-
N5_2	-	6.05E-04	-	-	2.84E-03	-
N6_0	-	6.41E-04	-	-	3.74E-03	-
N6_1	-	6.41E-04	-	-	3.74E-03	-
N6_2	-	6.41E-04	-	-	3.74E-03	-
N6_3	-	6.41E-04	-	-	3.74E-03	-
N6_4	-	6.41E-04	-	-	3.74E-03	-
N7_0	-	6.54E-04	-	-	3.22E-03	-
N7_1	-	6.54E-04	-	-	3.22E-03	-
N7_2	-	6.54E-04	-	-	3.22E-03	-
N8_0	-	6.79E-04	-	-	3.82E-03	-
N8_1	-	6.80E-04	-	-	3.82E-03	-
N8_2	-	6.80E-04	-	-	3.82E-03	-
N9_0	-	7.35E-04	-	-	3.82E-03	-
N9_1	-	7.35E-04	-	-	3.82E-03	-
N10_0	-	7.60E-04	-	-	3.93E-03	-
N10_1	-	7.60E-04	-	-	3.93E-03	-
N11_0	-	7.49E-04	-	-	3.91E-03	-
N11_1	-	7.49E-04	-	-	3.91E-03	-
N11_2	-	7.49E-04	-	-	3.91E-03	-
N11_3	-	7.49E-04	-	-	3.91E-03	-
N11_4	-	7.49E-04	-	-	3.91E-03	-
N12_0	-	7.17E-04	-	-	3.27E-03	-
N12_1	-	7.17E-04	-	-	3.29E-03	-
N12_2	-	7.17E-04	-	-	3.32E-03	-
N13_0	-	6.07E-04	-	-	2.90E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	Air quality standard: 1µg/m3		Significance	EAL: 30µg/m3		Significance
	Existing concentrations (µg/m3)	Proposed concentrations (µg/m3)		Existing concentrations (µg/m3)	Proposed concentrations (µg/m3)	
N13_1	-	6.07E-04	-	-	2.90E-03	-
N13_2	-	6.08E-04	-	-	2.90E-03	-
N14_0	-	7.24E-04	-	-	3.46E-03	-
N14_1	-	7.25E-04	-	-	3.48E-03	-
N14_2	-	7.25E-04	-	-	3.51E-03	-
N14_3	-	7.25E-04	-	-	3.55E-03	-
N14_4	-	7.26E-04	-	-	3.62E-03	-
N15_0	-	6.57E-04	-	-	4.00E-03	-
N15_1	-	6.57E-04	-	-	4.00E-03	-
N15_2	-	6.57E-04	-	-	4.00E-03	-
N16_0	-	6.31E-04	-	-	4.26E-03	-
N16_1	-	6.31E-04	-	-	4.26E-03	-
N16_2	-	6.32E-04	-	-	4.26E-03	-
N17_0	-	6.30E-04	-	-	3.70E-03	-
N17_1	-	6.31E-04	-	-	3.70E-03	-
N17_2	-	6.31E-04	-	-	3.70E-03	-
N18_0	-	6.34E-04	-	-	3.75E-03	-
N18_1	-	6.35E-04	-	-	3.75E-03	-
N18_2	-	6.35E-04	-	-	3.75E-03	-
N19_0	-	6.80E-04	-	-	4.04E-03	-
N19_1	-	6.80E-04	-	-	4.04E-03	-
N19_2	-	6.81E-04	-	-	4.04E-03	-
N20_0	-	6.06E-04	-	-	2.87E-03	-
N20_1	-	6.06E-04	-	-	2.87E-03	-
N20_2	-	6.06E-04	-	-	2.87E-03	-
N20_3	-	6.06E-04	-	-	2.87E-03	-
N20_4	-	6.06E-04	-	-	2.87E-03	-
N20_5	-	6.06E-04	-	-	2.87E-03	-

B5.8.2.6 Chromium VI (CrVI)

Predicted concentrations for CrVI within Group 2 total metals are consistent with Group 1 total metals (presented in B5.8.1.6), as emission from the Turkish glass factory has been used.

B5.8.2.7 Antimony (Sb)

Receptor	**Annual mean**			**100th percentile - 1 hour mean**		
	EAL: 5µg/m³		**Significance**	**EAL: 150µg/m³**		**Significance**
	Existing concentrations (µg/m³)	**Proposed concentrations (µg/m³)**		**Existing concentrations (µg/m³)**	**Proposed concentrations (µg/m³)**	
1	3.20E-04	3.32E-04	Negligible	6.40E-04	1.81E-03	Negligible
2	3.20E-04	3.35E-04	Negligible	6.40E-04	1.65E-03	Negligible
3	3.20E-04	3.30E-04	Negligible	6.40E-04	1.51E-03	Negligible
4	3.20E-04	3.28E-04	Negligible	6.40E-04	1.63E-03	Negligible
5	3.20E-04	3.30E-04	Negligible	6.40E-04	1.65E-03	Negligible
6	3.20E-04	3.27E-04	Negligible	6.40E-04	1.55E-03	Negligible
7	3.20E-04	3.34E-04	Negligible	6.40E-04	2.34E-03	Negligible
8	3.20E-04	3.33E-04	Negligible	6.40E-04	1.61E-03	Negligible
9	3.20E-04	3.45E-04	Negligible	6.40E-04	2.15E-03	Negligible
10	3.20E-04	3.51E-04	Negligible	6.40E-04	2.33E-03	Negligible
11	3.20E-04	3.40E-04	Negligible	6.40E-04	2.44E-03	Negligible
12	3.20E-04	3.37E-04	Negligible	6.40E-04	2.50E-03	Negligible
13	3.20E-04	3.52E-04	Negligible	6.40E-04	2.12E-03	Negligible
14	3.20E-04	3.34E-04	Negligible	6.40E-04	1.41E-03	Negligible
15	3.20E-04	3.42E-04	Negligible	6.40E-04	1.65E-03	Negligible
16	3.20E-04	3.29E-04	Negligible	6.40E-04	1.25E-03	Negligible
17	3.20E-04	3.29E-04	Negligible	6.40E-04	1.27E-03	Negligible
18	3.20E-04	3.30E-04	Negligible	6.40E-04	1.31E-03	Negligible
19	3.20E-04	3.30E-04	Negligible	6.40E-04	1.31E-03	Negligible
20	3.20E-04	3.30E-04	Negligible	6.40E-04	1.36E-03	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
21	3.20E-04	3.28E-04	Negligible	6.40E-04	1.38E-03	Negligible
22	-	-	-	6.40E-04	2.63E-03	Negligible
23	-	-	-	6.40E-04	3.56E-03	Negligible
24	-	-	-	6.40E-04	3.06E-03	Negligible
25	-	-	-	6.40E-04	3.28E-03	Negligible
26	-	-	-	6.40E-04	4.17E-03	Negligible
27	-	-	-	6.40E-04	3.91E-03	Negligible
28	-	-	-	6.40E-04	3.34E-03	Negligible
29	-	-	-	6.40E-04	3.46E-03	Negligible
30	-	-	-	6.40E-04	2.13E-03	Negligible
N1_0	-	4.13E-04	-	-	3.43E-03	-
N1_1	-	4.14E-04	-	-	3.43E-03	-
N1_2	-	4.15E-04	-	-	3.43E-03	-
N2_0	-	4.34E-04	-	-	3.55E-03	-
N2_1	-	4.35E-04	-	-	3.56E-03	-
N3_0	-	4.43E-04	-	-	3.26E-03	-
N3_1	-	4.43E-04	-	-	3.26E-03	-
N3_2	-	4.43E-04	-	-	3.26E-03	-
N4_0	-	4.25E-04	-	-	3.26E-03	-
N4_1	-	4.25E-04	-	-	3.26E-03	-
N4_2	-	4.25E-04	-	-	3.26E-03	-
N4_3	-	4.25E-04	-	-	3.26E-03	-
N4_4	-	4.25E-04	-	-	3.26E-03	-
N5_0	-	3.25E-04	-	-	2.28E-03	-
N5_1	-	3.25E-04	-	-	2.28E-03	-
N5_2	-	3.25E-04	-	-	2.28E-03	-
N6_0	-	3.61E-04	-	-	3.18E-03	-
N6_1	-	3.61E-04	-	-	3.18E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m³		Significance	EAL: 150µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N6_2	-	3.61E-04	-	-	3.18E-03	-
N6_3	-	3.61E-04	-	-	3.18E-03	-
N6_4	-	3.61E-04	-	-	3.18E-03	-
N7_0	-	3.74E-04	-	-	2.66E-03	-
N7_1	-	3.74E-04	-	-	2.66E-03	-
N7_2	-	3.74E-04	-	-	2.66E-03	-
N8_0	-	3.99E-04	-	-	3.26E-03	-
N8_1	-	4.00E-04	-	-	3.26E-03	-
N8_2	-	4.00E-04	-	-	3.26E-03	-
N9_0	-	4.55E-04	-	-	3.26E-03	-
N9_1	-	4.55E-04	-	-	3.26E-03	-
N10_0	-	4.80E-04	-	-	3.37E-03	-
N10_1	-	4.80E-04	-	-	3.37E-03	-
N11_0	-	4.69E-04	-	-	3.35E-03	-
N11_1	-	4.69E-04	-	-	3.35E-03	-
N11_2	-	4.69E-04	-	-	3.35E-03	-
N11_3	-	4.69E-04	-	-	3.35E-03	-
N11_4	-	4.69E-04	-	-	3.35E-03	-
N12_0	-	4.37E-04	-	-	2.71E-03	-
N12_1	-	4.37E-04	-	-	2.73E-03	-
N12_2	-	4.37E-04	-	-	2.76E-03	-
N13_0	-	3.27E-04	-	-	2.34E-03	-
N13_1	-	3.27E-04	-	-	2.34E-03	-
N13_2	-	3.28E-04	-	-	2.34E-03	-
N14_0	-	4.44E-04	-	-	2.90E-03	-
N14_1	-	4.45E-04	-	-	2.92E-03	-
N14_2	-	4.45E-04	-	-	2.95E-03	-
N14_3	-	4.45E-04	-	-	2.99E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N14_4	-	4.46E-04	-	-	3.06E-03	-
N15_0	-	3.77E-04	-	-	3.44E-03	-
N15_1	-	3.77E-04	-	-	3.44E-03	-
N15_2	-	3.77E-04	-	-	3.44E-03	-
N16_0	-	3.51E-04	-	-	3.70E-03	-
N16_1	-	3.51E-04	-	-	3.70E-03	-
N16_2	-	3.52E-04	-	-	3.70E-03	-
N17_0	-	3.50E-04	-	-	3.14E-03	-
N17_1	-	3.51E-04	-	-	3.14E-03	-
N17_2	-	3.51E-04	-	-	3.14E-03	-
N18_0	-	3.54E-04	-	-	3.19E-03	-
N18_1	-	3.55E-04	-	-	3.19E-03	-
N18_2	-	3.55E-04	-	-	3.19E-03	-
N19_0	-	4.00E-04	-	-	3.48E-03	-
N19_1	-	4.00E-04	-	-	3.48E-03	-
N19_2	-	4.01E-04	-	-	3.48E-03	-
N20_0	-	3.26E-04	-	-	2.31E-03	-
N20_1	-	3.26E-04	-	-	2.31E-03	-
N20_2	-	3.26E-04	-	-	2.31E-03	-
N20_3	-	3.26E-04	-	-	2.31E-03	-
N20_4	-	3.26E-04	-	-	2.31E-03	-
N20_5	-	3.26E-04	-	-	2.31E-03	-

B5.8.2.8 Lead (Pb)

Receptor	Annual mean		
	EAL: 0.25µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	6.47E-03	6.48E-03	Negligible
2	6.47E-03	6.49E-03	Negligible
3	6.47E-03	6.48E-03	Negligible
4	6.47E-03	6.48E-03	Negligible
5	6.47E-03	6.48E-03	Negligible
6	6.47E-03	6.48E-03	Negligible
7	6.47E-03	6.48E-03	Negligible
8	6.47E-03	6.48E-03	Negligible
9	6.47E-03	6.50E-03	Negligible
10	6.47E-03	6.50E-03	Negligible
11	6.47E-03	6.49E-03	Negligible
12	6.47E-03	6.49E-03	Negligible
13	6.47E-03	6.50E-03	Negligible
14	6.47E-03	6.48E-03	Negligible
15	6.47E-03	6.49E-03	Negligible
16	6.47E-03	6.48E-03	Negligible
17	6.47E-03	6.48E-03	Negligible
18	6.47E-03	6.48E-03	Negligible
19	6.47E-03	6.48E-03	Negligible
20	6.47E-03	6.48E-03	Negligible
21	6.47E-03	6.48E-03	Negligible
N1_0	-	6.56E-03	-
N1_1	-	6.56E-03	-
N1_2	-	6.56E-03	-
N2_0	-	6.58E-03	-
N2_1	-	6.58E-03	-
N3_0	-	6.59E-03	-
N3_1	-	6.59E-03	-

Receptor	Annual mean		
	EAL: 0.25µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N3_2	-	6.59E-03	-
N4_0	-	6.58E-03	-
N4_1	-	6.58E-03	-
N4_2	-	6.58E-03	-
N4_3	-	6.58E-03	-
N4_4	-	6.58E-03	-
N5_0	-	6.47E-03	-
N5_1	-	6.48E-03	-
N5_2	-	6.48E-03	-
N6_0	-	6.51E-03	-
N6_1	-	6.51E-03	-
N6_2	-	6.51E-03	-
N6_3	-	6.51E-03	-
N6_4	-	6.51E-03	-
N7_0	-	6.52E-03	-
N7_1	-	6.52E-03	-
N7_2	-	6.52E-03	-
N8_0	-	6.55E-03	-
N8_1	-	6.55E-03	-
N8_2	-	6.55E-03	-
N9_0	-	6.61E-03	-
N9_1	-	6.61E-03	-
N10_0	-	6.63E-03	-
N10_1	-	6.63E-03	-
N11_0	-	6.62E-03	-
N11_1	-	6.62E-03	-
N11_2	-	6.62E-03	-
N11_3	-	6.62E-03	-
N11_4	-	6.62E-03	-
N12_0	-	6.59E-03	-

Receptor	Annual mean		
	EAL: 0.25µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N12_1	-	6.59E-03	-
N12_2	-	6.59E-03	-
N13_0	-	6.48E-03	-
N13_1	-	6.48E-03	-
N13_2	-	6.48E-03	-
N14_0	-	6.59E-03	-
N14_1	-	6.59E-03	-
N14_2	-	6.59E-03	-
N14_3	-	6.60E-03	-
N14_4	-	6.60E-03	-
N15_0	-	6.53E-03	-
N15_1	-	6.53E-03	-
N15_2	-	6.53E-03	-
N16_0	-	6.50E-03	-
N16_1	-	6.50E-03	-
N16_2	-	6.50E-03	-
N17_0	-	6.50E-03	-
N17_1	-	6.50E-03	-
N17_2	-	6.50E-03	-
N18_0	-	6.50E-03	-
N18_1	-	6.50E-03	-
N18_2	-	6.51E-03	-
N19_0	-	6.55E-03	-
N19_1	-	6.55E-03	-
N19_2	-	6.55E-03	-
N20_0	-	6.48E-03	-
N20_1	-	6.48E-03	-
N20_2	-	6.48E-03	-
N20_3	-	6.48E-03	-
N20_4	-	6.48E-03	-

Receptor	Annual mean		
	EAL: 0.25µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N20_5	-	6.48E-03	-

B5.8.2.9 Chromium III (CrIII)

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m³		Significance	EAL: 150µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	2.79E-03	3.02E-03	Negligible	5.58E-03	2.83E-02	Negligible
2	2.79E-03	3.08E-03	Negligible	5.58E-03	2.51E-02	Negligible
3	2.79E-03	2.98E-03	Negligible	5.58E-03	2.25E-02	Negligible
4	2.79E-03	2.95E-03	Negligible	5.58E-03	2.47E-02	Negligible
5	2.79E-03	2.99E-03	Negligible	5.58E-03	2.50E-02	Negligible
6	2.79E-03	2.92E-03	Negligible	5.58E-03	2.32E-02	Negligible
7	2.79E-03	3.05E-03	Negligible	5.58E-03	3.85E-02	Negligible
8	2.79E-03	3.03E-03	Negligible	5.58E-03	2.44E-02	Negligible
9	2.79E-03	3.28E-03	Negligible	5.58E-03	3.48E-02	Negligible
10	2.79E-03	3.39E-03	Negligible	5.58E-03	3.83E-02	Negligible
11	2.79E-03	3.18E-03	Negligible	5.58E-03	4.03E-02	Negligible
12	2.79E-03	3.13E-03	Negligible	5.58E-03	4.15E-02	Negligible
13	2.79E-03	3.41E-03	Negligible	5.58E-03	3.42E-02	Negligible
14	2.79E-03	3.06E-03	Negligible	5.58E-03	2.06E-02	Negligible
15	2.79E-03	3.21E-03	Negligible	5.58E-03	2.52E-02	Negligible
16	2.79E-03	2.96E-03	Negligible	5.58E-03	1.74E-02	Negligible
17	2.79E-03	2.97E-03	Negligible	5.58E-03	1.78E-02	Negligible
18	2.79E-03	2.99E-03	Negligible	5.58E-03	1.85E-02	Negligible
19	2.79E-03	2.98E-03	Negligible	5.58E-03	1.86E-02	Negligible
20	2.79E-03	2.99E-03	Negligible	5.58E-03	1.94E-02	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
21	2.79E-03	2.94E-03	Negligible	5.58E-03	1.99E-02	Negligible
22	-	-	-	5.58E-03	4.41E-02	Negligible
23	-	-	-	5.58E-03	6.21E-02	Negligible
24	-	-	-	5.58E-03	5.24E-02	Negligible
25	-	-	-	5.58E-03	5.66E-02	Negligible
26	-	-	-	5.58E-03	7.39E-02	Negligible
27	-	-	-	5.58E-03	6.88E-02	Negligible
28	-	-	-	5.58E-03	5.79E-02	Negligible
29	-	-	-	5.58E-03	6.00E-02	Negligible
30	-	-	-	5.58E-03	3.44E-02	Negligible
N1_0	-	4.59E-03	-	-	5.95E-02	-
N1_1	-	4.60E-03	-	-	5.95E-02	-
N1_2	-	4.62E-03	-	-	5.95E-02	-
N2_0	-	5.00E-03	-	-	6.18E-02	-
N2_1	-	5.01E-03	-	-	6.20E-02	-
N3_0	-	5.16E-03	-	-	5.62E-02	-
N3_1	-	5.16E-03	-	-	5.62E-02	-
N3_2	-	5.16E-03	-	-	5.62E-02	-
N4_0	-	4.83E-03	-	-	5.62E-02	-
N4_1	-	4.83E-03	-	-	5.62E-02	-
N4_2	-	4.83E-03	-	-	5.62E-02	-
N4_3	-	4.83E-03	-	-	5.62E-02	-
N4_4	-	4.83E-03	-	-	5.62E-02	-
N5_0	-	2.89E-03	-	-	3.72E-02	-
N5_1	-	2.89E-03	-	-	3.72E-02	-
N5_2	-	2.89E-03	-	-	3.72E-02	-
N6_0	-	3.58E-03	-	-	5.48E-02	-
N6_1	-	3.58E-03	-	-	5.48E-02	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N6_2	-	3.58E-03	-	-	5.48E-02	-
N6_3	-	3.58E-03	-	-	5.48E-02	-
N6_4	-	3.59E-03	-	-	5.48E-02	-
N7_0	-	3.83E-03	-	-	4.47E-02	-
N7_1	-	3.84E-03	-	-	4.47E-02	-
N7_2	-	3.84E-03	-	-	4.47E-02	-
N8_0	-	4.32E-03	-	-	5.62E-02	-
N8_1	-	4.33E-03	-	-	5.62E-02	-
N8_2	-	4.35E-03	-	-	5.62E-02	-
N9_0	-	5.41E-03	-	-	5.62E-02	-
N9_1	-	5.41E-03	-	-	5.62E-02	-
N10_0	-	5.89E-03	-	-	5.84E-02	-
N10_1	-	5.89E-03	-	-	5.84E-02	-
N11_0	-	5.67E-03	-	-	5.79E-02	-
N11_1	-	5.67E-03	-	-	5.79E-02	-
N11_2	-	5.67E-03	-	-	5.79E-02	-
N11_3	-	5.67E-03	-	-	5.79E-02	-
N11_4	-	5.67E-03	-	-	5.79E-02	-
N12_0	-	5.04E-03	-	-	4.56E-02	-
N12_1	-	5.05E-03	-	-	4.60E-02	-
N12_2	-	5.05E-03	-	-	4.65E-02	-
N13_0	-	2.93E-03	-	-	3.85E-02	-
N13_1	-	2.93E-03	-	-	3.85E-02	-
N13_2	-	2.94E-03	-	-	3.85E-02	-
N14_0	-	5.20E-03	-	-	4.92E-02	-
N14_1	-	5.20E-03	-	-	4.96E-02	-
N14_2	-	5.21E-03	-	-	5.02E-02	-
N14_3	-	5.21E-03	-	-	5.09E-02	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N14_4	-	5.23E-03	-	-	5.24E-02	-
N15_0	-	3.89E-03	-	-	5.97E-02	-
N15_1	-	3.89E-03	-	-	5.97E-02	-
N15_2	-	3.89E-03	-	-	5.98E-02	-
N16_0	-	3.38E-03	-	-	6.47E-02	-
N16_1	-	3.39E-03	-	-	6.47E-02	-
N16_2	-	3.41E-03	-	-	6.48E-02	-
N17_0	-	3.38E-03	-	-	5.40E-02	-
N17_1	-	3.38E-03	-	-	5.40E-02	-
N17_2	-	3.40E-03	-	-	5.40E-02	-
N18_0	-	3.45E-03	-	-	5.49E-02	-
N18_1	-	3.46E-03	-	-	5.49E-02	-
N18_2	-	3.47E-03	-	-	5.49E-02	-
N19_0	-	4.34E-03	-	-	6.05E-02	-
N19_1	-	4.34E-03	-	-	6.05E-02	-
N19_2	-	4.35E-03	-	-	6.05E-02	-
N20_0	-	2.91E-03	-	-	3.80E-02	-
N20_1	-	2.91E-03	-	-	3.80E-02	-
N20_2	-	2.91E-03	-	-	3.80E-02	-
N20_3	-	2.91E-03	-	-	3.80E-02	-
N20_4	-	2.91E-03	-	-	3.80E-02	-
N20_5	-	2.91E-03	-	-	3.80E-02	-

B5.8.2.10 Copper (Cu)

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 10µg/m³		Significance	EAL: 200µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	3.98E-03	4.00E-03	Negligible	7.96E-03	1.03E-02	Negligible
2	3.98E-03	4.01E-03	Negligible	7.96E-03	1.00E-02	Negligible
3	3.98E-03	4.00E-03	Negligible	7.96E-03	9.73E-03	Negligible
4	3.98E-03	4.00E-03	Negligible	7.96E-03	9.96E-03	Negligible
5	3.98E-03	4.00E-03	Negligible	7.96E-03	9.99E-03	Negligible
6	3.98E-03	3.99E-03	Negligible	7.96E-03	9.81E-03	Negligible
7	3.98E-03	4.01E-03	Negligible	7.96E-03	1.14E-02	Negligible
8	3.98E-03	4.01E-03	Negligible	7.96E-03	9.92E-03	Negligible
9	3.98E-03	4.03E-03	Negligible	7.96E-03	1.10E-02	Negligible
10	3.98E-03	4.04E-03	Negligible	7.96E-03	1.14E-02	Negligible
11	3.98E-03	4.02E-03	Negligible	7.96E-03	1.16E-02	Negligible
12	3.98E-03	4.02E-03	Negligible	7.96E-03	1.17E-02	Negligible
13	3.98E-03	4.04E-03	Negligible	7.96E-03	1.10E-02	Negligible
14	3.98E-03	4.01E-03	Negligible	7.96E-03	9.53E-03	Negligible
15	3.98E-03	4.02E-03	Negligible	7.96E-03	1.00E-02	Negligible
16	3.98E-03	4.00E-03	Negligible	7.96E-03	9.20E-03	Negligible
17	3.98E-03	4.00E-03	Negligible	7.96E-03	9.24E-03	Negligible
18	3.98E-03	4.00E-03	Negligible	7.96E-03	9.31E-03	Negligible
19	3.98E-03	4.00E-03	Negligible	7.96E-03	9.32E-03	Negligible
20	3.98E-03	4.00E-03	Negligible	7.96E-03	9.41E-03	Negligible
21	3.98E-03	4.00E-03	Negligible	7.96E-03	9.45E-03	Negligible
22				7.96E-03	1.20E-02	Negligible
23				7.96E-03	1.39E-02	Negligible
24				7.96E-03	1.29E-02	Negligible
25				7.96E-03	1.33E-02	Negligible
26				7.96E-03	1.51E-02	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 10µg/m^3		Significance	EAL: 200µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
27				7.96E-03	1.46E-02	Negligible
28				7.96E-03	1.34E-02	Negligible
29				7.96E-03	1.37E-02	Negligible
30				7.96E-03	1.10E-02	Negligible
N1_0	-	4.17E-03	-	-	1.36E-02	-
N1_1	-	4.17E-03	-	-	1.36E-02	-
N1_2	-	4.17E-03	-	-	1.36E-02	-
N2_0	-	4.21E-03	-	-	1.38E-02	-
N2_1	-	4.21E-03	-	-	1.39E-02	-
N3_0	-	4.23E-03	-	-	1.32E-02	-
N3_1	-	4.23E-03	-	-	1.32E-02	-
N3_2	-	4.23E-03	-	-	1.32E-02	-
N4_0	-	4.19E-03	-	-	1.32E-02	-
N4_1	-	4.19E-03	-	-	1.32E-02	-
N4_2	-	4.19E-03	-	-	1.32E-02	-
N4_3	-	4.19E-03	-	-	1.32E-02	-
N4_4	-	4.19E-03	-	-	1.32E-02	-
N5_0	-	3.99E-03	-	-	1.13E-02	-
N5_1	-	3.99E-03	-	-	1.13E-02	-
N5_2	-	3.99E-03	-	-	1.13E-02	-
N6_0	-	4.06E-03	-	-	1.31E-02	-
N6_1	-	4.06E-03	-	-	1.31E-02	-
N6_2	-	4.06E-03	-	-	1.31E-02	-
N6_3	-	4.06E-03	-	-	1.31E-02	-
N6_4	-	4.06E-03	-	-	1.31E-02	-
N7_0	-	4.09E-03	-	-	1.21E-02	-
N7_1	-	4.09E-03	-	-	1.21E-02	-
N7_2	-	4.09E-03	-	-	1.21E-02	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 10µg/m^3		Significance	EAL: 200µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N8_0	-	4.14E-03	-	-	1.32E-02	-
N8_1	-	4.14E-03	-	-	1.32E-02	-
N8_2	-	4.14E-03	-	-	1.32E-02	-
N9_0	-	4.25E-03	-	-	1.32E-02	-
N9_1	-	4.25E-03	-	-	1.32E-02	-
N10_0	-	4.30E-03	-	-	1.35E-02	-
N10_1	-	4.30E-03	-	-	1.35E-02	-
N11_0	-	4.28E-03	-	-	1.34E-02	-
N11_1	-	4.28E-03	-	-	1.34E-02	-
N11_2	-	4.28E-03	-	-	1.34E-02	-
N11_3	-	4.28E-03	-	-	1.34E-02	-
N11_4	-	4.28E-03	-	-	1.34E-02	-
N12_0	-	4.22E-03	-	-	1.21E-02	-
N12_1	-	4.22E-03	-	-	1.22E-02	-
N12_2	-	4.22E-03	-	-	1.22E-02	-
N13_0	-	3.99E-03	-	-	1.14E-02	-
N13_1	-	3.99E-03	-	-	1.14E-02	-
N13_2	-	4.00E-03	-	-	1.14E-02	-
N14_0	-	4.23E-03	-	-	1.25E-02	-
N14_1	-	4.23E-03	-	-	1.26E-02	-
N14_2	-	4.23E-03	-	-	1.26E-02	-
N14_3	-	4.23E-03	-	-	1.27E-02	-
N14_4	-	4.23E-03	-	-	1.29E-02	-
N15_0	-	4.09E-03	-	-	1.36E-02	-
N15_1	-	4.09E-03	-	-	1.36E-02	-
N15_2	-	4.10E-03	-	-	1.36E-02	-
N16_0	-	4.04E-03	-	-	1.41E-02	-
N16_1	-	4.04E-03	-	-	1.41E-02	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 10µg/m^3		Significance	EAL: 200µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N16_2	-	4.04E-03	-	-	1.42E-02	-
N17_0	-	4.04E-03	-	-	1.30E-02	-
N17_1	-	4.04E-03	-	-	1.30E-02	-
N17_2	-	4.04E-03	-	-	1.30E-02	-
N18_0	-	4.05E-03	-	-	1.31E-02	-
N18_1	-	4.05E-03	-	-	1.31E-02	-
N18_2	-	4.05E-03	-	-	1.31E-02	-
N19_0	-	4.14E-03	-	-	1.37E-02	-
N19_1	-	4.14E-03	-	-	1.37E-02	-
N19_2	-	4.14E-03	-	-	1.37E-02	-
N20_0	-	3.99E-03	-	-	1.13E-02	-
N20_1	-	3.99E-03	-	-	1.13E-02	-
N20_2	-	3.99E-03	-	-	1.13E-02	-
N20_3	-	3.99E-03	-	-	1.13E-02	-
N20_4	-	3.99E-03	-	-	1.13E-02	-
N20_5	-	3.99E-03	-	-	1.13E-02	-

B5.8.2.11 Manganese (Mn)

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 0.15µg/m^3		Significance	EAL: 1,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	3.69E-03	3.70E-03	Negligible	7.38E-03	8.55E-03	Negligible
2	3.69E-03	3.71E-03	Negligible	7.38E-03	8.39E-03	Negligible
3	3.69E-03	3.70E-03	Negligible	7.38E-03	8.25E-03	Negligible

Receptor	**Annual mean**			**100th percentile - 1 hour mean**		
	EAL: 0.15µg/m^3		**Significance**	**EAL: 1,500µg/m^3**		**Significance**
	Existing concentrations (µg/m^3)	**Proposed concentrations (µg/m^3)**		**Existing concentrations (µg/m^3)**	**Proposed concentrations (µg/m^3)**	
4	3.69E-03	3.70E-03	Negligible	7.38E-03	8.37E-03	Negligible
5	3.69E-03	3.70E-03	Negligible	7.38E-03	8.39E-03	Negligible
6	3.69E-03	3.70E-03	Negligible	7.38E-03	8.29E-03	Negligible
7	3.69E-03	3.70E-03	Negligible	7.38E-03	9.08E-03	Negligible
8	3.69E-03	3.70E-03	Negligible	7.38E-03	8.35E-03	Negligible
9	3.69E-03	3.72E-03	Negligible	7.38E-03	8.89E-03	Negligible
10	3.69E-03	3.72E-03	Negligible	7.38E-03	9.07E-03	Negligible
11	3.69E-03	3.71E-03	Negligible	7.38E-03	9.18E-03	Negligible
12	3.69E-03	3.71E-03	Negligible	7.38E-03	9.24E-03	Negligible
13	3.69E-03	3.72E-03	Negligible	7.38E-03	8.86E-03	Negligible
14	3.69E-03	3.70E-03	Negligible	7.38E-03	8.15E-03	Negligible
15	3.69E-03	3.71E-03	Negligible	7.38E-03	8.39E-03	Negligible
16	3.69E-03	3.70E-03	Negligible	7.38E-03	7.99E-03	Negligible
17	3.69E-03	3.70E-03	Negligible	7.38E-03	8.01E-03	Negligible
18	3.69E-03	3.70E-03	Negligible	7.38E-03	8.05E-03	Negligible
19	3.69E-03	3.70E-03	Negligible	7.38E-03	8.05E-03	Negligible
20	3.69E-03	3.70E-03	Negligible	7.38E-03	8.10E-03	Negligible
21	3.69E-03	3.70E-03	Negligible	7.38E-03	8.12E-03	Negligible
22	-	-	-	7.38E-03	9.37E-03	Negligible
23	-	-	-	7.38E-03	1.03E-02	Negligible
24	-	-	-	7.38E-03	9.80E-03	Negligible
25	-	-	-	7.38E-03	1.00E-02	Negligible
26	-	-	-	7.38E-03	1.09E-02	Negligible
27	-	-	-	7.38E-03	1.06E-02	Negligible
28	-	-	-	7.38E-03	1.01E-02	Negligible
29	-	-	-	7.38E-03	1.02E-02	Negligible
30	-	-	-	7.38E-03	8.87E-03	Negligible
N1_0	-	3.78E-03	-	-	1.02E-02	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 0.15µg/m^3		Significance	EAL: 1,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N1_1	-	3.78E-03	-	-	1.02E-02	-
N1_2	-	3.78E-03	-	-	1.02E-02	-
N2_0	-	3.80E-03	-	-	1.03E-02	-
N2_1	-	3.80E-03	-	-	1.03E-02	-
N3_0	-	3.81E-03	-	-	1.00E-02	-
N3_1	-	3.81E-03	-	-	1.00E-02	-
N3_2	-	3.81E-03	-	-	1.00E-02	-
N4_0	-	3.80E-03	-	-	1.00E-02	-
N4_1	-	3.80E-03	-	-	1.00E-02	-
N4_2	-	3.80E-03	-	-	1.00E-02	-
N4_3	-	3.80E-03	-	-	1.00E-02	-
N4_4	-	3.80E-03	-	-	1.00E-02	-
N5_0	-	3.69E-03	-	-	9.02E-03	-
N5_1	-	3.70E-03	-	-	9.02E-03	-
N5_2	-	3.70E-03	-	-	9.02E-03	-
N6_0	-	3.73E-03	-	-	9.92E-03	-
N6_1	-	3.73E-03	-	-	9.92E-03	-
N6_2	-	3.73E-03	-	-	9.92E-03	-
N6_3	-	3.73E-03	-	-	9.92E-03	-
N6_4	-	3.73E-03	-	-	9.92E-03	-
N7_0	-	3.74E-03	-	-	9.40E-03	-
N7_1	-	3.74E-03	-	-	9.40E-03	-
N7_2	-	3.74E-03	-	-	9.40E-03	-
N8_0	-	3.77E-03	-	-	1.00E-02	-
N8_1	-	3.77E-03	-	-	1.00E-02	-
N8_2	-	3.77E-03	-	-	1.00E-02	-
N9_0	-	3.83E-03	-	-	1.00E-02	-
N9_1	-	3.83E-03	-	-	1.00E-02	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 0.15µg/m³		Significance	EAL: 1,500µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N10_0	-	3.85E-03	-	-	1.01E-02	-
N10_1	-	3.85E-03	-	-	1.01E-02	-
N11_0	-	3.84E-03	-	-	1.01E-02	-
N11_1	-	3.84E-03	-	-	1.01E-02	-
N11_2	-	3.84E-03	-	-	1.01E-02	-
N11_3	-	3.84E-03	-	-	1.01E-02	-
N11_4	-	3.84E-03	-	-	1.01E-02	-
N12_0	-	3.81E-03	-	-	9.45E-03	-
N12_1	-	3.81E-03	-	-	9.47E-03	-
N12_2	-	3.81E-03	-	-	9.50E-03	-
N13_0	-	3.70E-03	-	-	9.08E-03	-
N13_1	-	3.70E-03	-	-	9.08E-03	-
N13_2	-	3.70E-03	-	-	9.08E-03	-
N14_0	-	3.81E-03	-	-	9.64E-03	-
N14_1	-	3.81E-03	-	-	9.66E-03	-
N14_2	-	3.81E-03	-	-	9.69E-03	-
N14_3	-	3.82E-03	-	-	9.73E-03	-
N14_4	-	3.82E-03	-	-	9.80E-03	-
N15_0	-	3.75E-03	-	-	1.02E-02	-
N15_1	-	3.75E-03	-	-	1.02E-02	-
N15_2	-	3.75E-03	-	-	1.02E-02	-
N16_0	-	3.72E-03	-	-	1.04E-02	-
N16_1	-	3.72E-03	-	-	1.04E-02	-
N16_2	-	3.72E-03	-	-	1.04E-02	-
N17_0	-	3.72E-03	-	-	9.88E-03	-
N17_1	-	3.72E-03	-	-	9.88E-03	-
N17_2	-	3.72E-03	-	-	9.88E-03	-
N18_0	-	3.72E-03	-	-	9.93E-03	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 0.15µg/m³		Significance	EAL: 1,500µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N18_1	-	3.72E-03	-	-	9.93E-03	-
N18_2	-	3.73E-03	-	-	9.93E-03	-
N19_0	-	3.77E-03	-	-	1.02E-02	-
N19_1	-	3.77E-03	-	-	1.02E-02	-
N19_2	-	3.77E-03	-	-	1.02E-02	-
N20_0	-	3.70E-03	-	-	9.05E-03	-
N20_1	-	3.70E-03	-	-	9.05E-03	-
N20_2	-	3.70E-03	-	-	9.05E-03	-
N20_3	-	3.70E-03	-	-	9.05E-03	-
N20_4	-	3.70E-03	-	-	9.05E-03	-
N20_5	-	3.70E-03	-	-	9.05E-03	-

B5.8.2.12 Vanadium (V)

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m³		Significance	EAL: 1µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	7.60E-04	1.22E-03	Negligible	1.52E-03	4.71E-02	Negligible
2	7.60E-04	1.35E-03	Negligible	1.52E-03	4.08E-02	Negligible
3	7.60E-04	1.14E-03	Negligible	1.52E-03	3.55E-02	Negligible
4	7.60E-04	1.09E-03	Negligible	1.52E-03	4.00E-02	Negligible
5	7.60E-04	1.16E-03	Negligible	1.52E-03	4.06E-02	Negligible
6	7.60E-04	1.01E-03	Negligible	1.52E-03	3.70E-02	Negligible
7	7.60E-04	1.29E-03	Negligible	1.52E-03	6.78E-02	Negligible
8	7.60E-04	1.25E-03	Negligible	1.52E-03	3.93E-02	Negligible

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 1µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
9	7.60E-04	1.75E-03	Negligible	1.52E-03	6.04E-02	Negligible
10	7.60E-04	1.97E-03	Negligible	1.52E-03	6.73E-02	Negligible
11	7.60E-04	1.54E-03	Negligible	1.52E-03	7.14E-02	Negligible
12	7.60E-04	1.44E-03	Negligible	1.52E-03	7.39E-02	Negligible
13	7.60E-04	2.00E-03	Negligible	1.52E-03	5.92E-02	Negligible
14	7.60E-04	1.31E-03	Negligible	1.52E-03	3.17E-02	Negligible
15	7.60E-04	1.60E-03	Negligible	1.52E-03	4.09E-02	Negligible
16	7.60E-04	1.11E-03	Negligible	1.52E-03	2.53E-02	Negligible
17	7.60E-04	1.13E-03	Negligible	1.52E-03	2.60E-02	Negligible
18	7.60E-04	1.15E-03	Negligible	1.52E-03	2.74E-02	Negligible
19	7.60E-04	1.15E-03	Negligible	1.52E-03	2.77E-02	Negligible
20	7.60E-04	1.16E-03	Negligible	1.52E-03	2.94E-02	Negligible
21	7.60E-04	1.07E-03	Negligible	1.52E-03	3.02E-02	Negligible
22	-	-	-	1.52E-03	7.91E-02	Negligible
23	-	-	-	1.52E-03	1.15E-01	Negligible
24	-	-	-	1.52E-03	9.57E-02	Negligible
25	-	-	-	1.52E-03	1.04E-01	Negligible
26	-	-	-	1.52E-03	1.39E-01	Negligible
27	-	-	-	1.52E-03	1.29E-01	Negligible
28	-	-	-	1.52E-03	1.07E-01	Negligible
29	-	-	-	1.52E-03	1.11E-01	Negligible
30	-	-	-	1.52E-03	5.95E-02	Negligible
N1_0	-	4.38E-03	-	-	1.10E-01	-
N1_1	-	4.41E-03	-	-	1.10E-01	-
N1_2	-	4.44E-03	-	-	1.10E-01	-
N2_0	-	5.21E-03	-	-	1.15E-01	-
N2_1	-	5.22E-03	-	-	1.15E-01	-
N3_0	-	5.53E-03	-	-	1.03E-01	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 1µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N3_1	-	5.53E-03	-	-	1.03E-01	-
N3_2	-	5.54E-03	-	-	1.03E-01	-
N4_0	-	4.86E-03	-	-	1.03E-01	-
N4_1	-	4.86E-03	-	-	1.03E-01	-
N4_2	-	4.86E-03	-	-	1.03E-01	-
N4_3	-	4.86E-03	-	-	1.03E-01	-
N4_4	-	4.86E-03	-	-	1.03E-01	-
N5_0	-	9.54E-04	-	-	6.52E-02	-
N5_1	-	9.55E-04	-	-	6.52E-02	-
N5_2	-	9.56E-04	-	-	6.52E-02	-
N6_0	-	2.35E-03	-	-	1.01E-01	-
N6_1	-	2.35E-03	-	-	1.01E-01	-
N6_2	-	2.35E-03	-	-	1.01E-01	-
N6_3	-	2.35E-03	-	-	1.01E-01	-
N6_4	-	2.36E-03	-	-	1.01E-01	-
N7_0	-	2.86E-03	-	-	8.02E-02	-
N7_1	-	2.86E-03	-	-	8.02E-02	-
N7_2	-	2.87E-03	-	-	8.02E-02	-
N8_0	-	3.84E-03	-	-	1.03E-01	-
N8_1	-	3.86E-03	-	-	1.03E-01	-
N8_2	-	3.89E-03	-	-	1.03E-01	-
N9_0	-	6.03E-03	-	-	1.03E-01	-
N9_1	-	6.03E-03	-	-	1.03E-01	-
N10_0	-	6.99E-03	-	-	1.08E-01	-
N10_1	-	6.99E-03	-	-	1.08E-01	-
N11_0	-	6.54E-03	-	-	1.07E-01	-
N11_1	-	6.55E-03	-	-	1.07E-01	-
N11_2	-	6.55E-03	-	-	1.07E-01	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m³		Significance	EAL: 1µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N11_3	-	6.55E-03	-	-	1.07E-01	-
N11_4	-	6.55E-03	-	-	1.07E-01	-
N12_0	-	5.30E-03	-	-	8.20E-02	-
N12_1	-	5.30E-03	-	-	8.28E-02	-
N12_2	-	5.31E-03	-	-	8.39E-02	-
N13_0	-	1.04E-03	-	-	6.78E-02	-
N13_1	-	1.05E-03	-	-	6.78E-02	-
N13_2	-	1.05E-03	-	-	6.78E-02	-
N14_0	-	5.60E-03	-	-	8.93E-02	-
N14_1	-	5.61E-03	-	-	9.02E-02	-
N14_2	-	5.62E-03	-	-	9.13E-02	-
N14_3	-	5.63E-03	-	-	9.28E-02	-
N14_4	-	5.66E-03	-	-	9.57E-02	-
N15_0	-	2.97E-03	-	-	1.10E-01	-
N15_1	-	2.97E-03	-	-	1.10E-01	-
N15_2	-	2.98E-03	-	-	1.11E-01	-
N16_0	-	1.95E-03	-	-	1.20E-01	-
N16_1	-	1.97E-03	-	-	1.21E-01	-
N16_2	-	2.01E-03	-	-	1.21E-01	-
N17_0	-	1.94E-03	-	-	9.89E-02	-
N17_1	-	1.95E-03	-	-	9.89E-02	-
N17_2	-	1.98E-03	-	-	9.88E-02	-
N18_0	-	2.10E-03	-	-	1.01E-01	-
N18_1	-	2.11E-03	-	-	1.01E-01	-
N18_2	-	2.13E-03	-	-	1.01E-01	-
N19_0	-	3.87E-03	-	-	1.12E-01	-
N19_1	-	3.88E-03	-	-	1.12E-01	-
N19_2	-	3.91E-03	-	-	1.12E-01	-

Receptor	Annual mean			100th percentile - 1 hour mean		
	EAL: 5µg/m^3		Significance	EAL: 1µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N20_0	-	1.00E-03	-	-	6.67E-02	-
N20_1	-	1.01E-03	-	-	6.67E-02	-
N20_2	-	1.01E-03	-	-	6.67E-02	-
N20_3	-	1.01E-03	-	-	6.67E-02	-
N20_4	-	1.01E-03	-	-	6.67E-02	-
N20_5	-	1.01E-03	-	-	6.67E-02	-

B5.8.2.13 Tin (Sn)

Receptor	Annual mean			100th percentile – 15-minute mean		
	EAL: 2000µg/m³		Significance	EAL: 4000µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)		Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	2.60E-04	7.18E-04	Negligible	5.2E-04	5.1E-02	Negligible
2	2.60E-04	8.50E-04	Negligible	5.2E-04	4.8E-02	Negligible
3	2.60E-04	6.44E-04	Negligible	5.2E-04	5.1E-02	Negligible
4	2.60E-04	5.91E-04	Negligible	5.2E-04	5.1E-02	Negligible
5	2.60E-04	6.58E-04	Negligible	5.2E-04	6.4E-02	Negligible
6	2.60E-04	5.15E-04	Negligible	5.2E-04	5.8E-02	Negligible
7	2.60E-04	7.90E-04	Negligible	5.2E-04	9.2E-02	Negligible
8	2.60E-04	7.47E-04	Negligible	5.2E-04	4.5E-02	Negligible
9	2.60E-04	1.25E-03	Negligible	5.2E-04	6.4E-02	Negligible
10	2.60E-04	1.47E-03	Negligible	5.2E-04	7.2E-02	Negligible
11	2.60E-04	1.04E-03	Negligible	5.2E-04	7.5E-02	Negligible
12	2.60E-04	9.36E-04	Negligible	5.2E-04	9.8E-02	Negligible
13	2.60E-04	1.50E-03	Negligible	5.2E-04	6.4E-02	Negligible
14	2.60E-04	8.10E-04	Negligible	5.2E-04	3.8E-02	Negligible
15	2.60E-04	1.10E-03	Negligible	5.2E-04	4.4E-02	Negligible
16	2.60E-04	6.11E-04	Negligible	5.2E-04	3.9E-02	Negligible
17	2.60E-04	6.28E-04	Negligible	5.2E-04	3.7E-02	Negligible
18	2.60E-04	6.54E-04	Negligible	5.2E-04	3.5E-02	Negligible
19	2.60E-04	6.47E-04	Negligible	5.2E-04	3.6E-02	Negligible
20	2.60E-04	6.64E-04	Negligible	5.2E-04	3.6E-02	Negligible
21	2.60E-04	5.69E-04	Negligible	5.2E-04	4.5E-02	Negligible
22	-	-	-	5.20E-04	7.99E-02	Negligible
23	-	-	-	5.20E-04	1.18E-01	Negligible
24	-	-	-	5.20E-04	9.81E-02	Negligible
25	-	-	-	5.20E-04	1.05E-01	Negligible

Receptor	Annual mean			100th percentile – 15-minute mean		
	EAL: 2000µg/m^3		Significance	EAL: 4000µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
26	-	-	-	5.20E-04	1.41E-01	Negligible
27	-	-	-	5.20E-04	1.31E-01	Negligible
28	-	-	-	5.20E-04	1.10E-01	Negligible
29	-	-	-	5.20E-04	1.12E-01	Negligible
30	-	-	-	5.20E-04	6.58E-02	Negligible
N1_0		3.88E-03	-	-	1.1E-01	-
N1_1		3.91E-03	-	-	1.1E-01	-
N1_2		3.94E-03	-	-	1.1E-01	-
N2_0		4.71E-03	-	-	1.2E-01	-
N2_1		4.72E-03	-	-	1.2E-01	-
N3_0		5.03E-03	-	-	1.1E-01	-
N3_1		5.03E-03	-	-	1.1E-01	-
N3_2		5.04E-03	-	-	1.1E-01	-
N4_0		4.36E-03	-	-	1.1E-01	-
N4_1		4.36E-03	-	-	1.1E-01	-
N4_2		4.36E-03	-	-	1.1E-01	-
N4_3		4.36E-03	-	-	1.1E-01	-
N4_4		4.36E-03	-	-	1.1E-01	-
N5_0		4.54E-04	-	-	6.5E-02	-
N5_1		4.55E-04	-	-	6.5E-02	-
N5_2		4.56E-04	-	-	6.5E-02	-
N6_0		1.85E-03	-	-	1.0E-01	-
N6_1		1.85E-03	-	-	1.0E-01	-
N6_2		1.85E-03	-	-	1.0E-01	-
N6_3		1.85E-03	-	-	1.0E-01	-
N6_4		1.86E-03	-	-	1.0E-01	-
N7_0		2.36E-03	-	-	8.2E-02	-
N7_1		2.36E-03	-	-	8.2E-02	-

Receptor	Annual mean			100th percentile – 15-minute mean		
	EAL: 2000µg/m^3		Significance	EAL: 4000µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N7_2		2.37E-03	-	-	8.2E-02	-
N8_0		3.34E-03	-	-	1.1E-01	-
N8_1		3.36E-03	-	-	1.1E-01	-
N8_2		3.39E-03	-	-	1.1E-01	-
N9_0		5.53E-03	-	-	1.1E-01	-
N9_1		5.53E-03	-	-	1.1E-01	-
N10_0		6.49E-03	-	-	1.1E-01	-
N10_1		6.49E-03	-	-	1.1E-01	-
N11_0		6.04E-03	-	-	1.1E-01	-
N11_1		6.05E-03	-	-	1.1E-01	-
N11_2		6.05E-03	-	-	1.1E-01	-
N11_3		6.05E-03	-	-	1.1E-01	-
N11_4		6.05E-03	-	-	1.1E-01	-
N12_0		4.80E-03	-	-	8.3E-02	-
N12_1		4.80E-03	-	-	8.4E-02	-
N12_2		4.81E-03	-	-	8.5E-02	-
N13_0		5.42E-04	-	-	6.8E-02	-
N13_1		5.47E-04	-	-	6.8E-02	-
N13_2		5.53E-04	-	-	6.8E-02	-
N14_0		5.10E-03	-	-	9.8E-02	-
N14_1		5.11E-03	-	-	9.8E-02	-
N14_2		5.12E-03	-	-	9.8E-02	-
N14_3		5.13E-03	-	-	9.8E-02	-
N14_4		5.16E-03	-	-	9.8E-02	-
N15_0		2.47E-03	-	-	1.1E-01	-
N15_1		2.47E-03	-	-	1.1E-01	-
N15_2		2.48E-03	-	-	1.1E-01	-
N16_0		1.45E-03	-	-	1.2E-01	-

Receptor	Annual mean			100th percentile – 15-minute mean		
	EAL: 2000µg/m^3		Significance	EAL: 4000µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)		Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N16_1		1.47E-03	-	-	1.2E-01	-
N16_2		1.51E-03	-	-	1.2E-01	-
N17_0		1.44E-03	-	-	1.0E-01	-
N17_1		1.45E-03	-	-	1.0E-01	-
N17_2		1.48E-03	-	-	1.0E-01	-
N18_0		1.60E-03	-	-	1.0E-01	-
N18_1		1.61E-03	-	-	1.0E-01	-
N18_2		1.63E-03	-	-	1.0E-01	-
N19_0		3.37E-03	-	-	1.2E-01	-
N19_1		3.38E-03	-	-	1.2E-01	-
N19_2		3.41E-03	-	-	1.2E-01	-
N20_0		5.05E-04	-	-	6.8E-02	-
N20_1		5.05E-04	-	-	6.8E-02	-
N20_2		5.05E-04	-	-	6.8E-02	-
N20_3		5.05E-04	-	-	6.8E-02	-
N20_4		5.06E-04	-	-	6.8E-02	-
N20_5		5.10E-04	-	-	6.8E-02	-

B6 Human receptor results – abnormal operation

B6.1 Nitrogen oxides (NOx) as nitrogen dioxide (NO_2)

Receptor	NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 200µg/m^3 not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	43.6	60.6	Negligible
2	42.1	51.8	Negligible
3	42.2	54.9	Negligible
4	42.0	49.4	Negligible
5	42.0	47.5	Negligible
6	42.0	50.1	Negligible
7	42.2	53.2	Negligible
8	42.1	51.3	Negligible
9	44.2	64.9	Slight Adverse
10	44.1	67.1	Slight Adverse
11	44.7	72.2	Slight Adverse
12	46.0	59.9	Negligible
13	45.7	69.8	Slight Adverse
14	42.5	54.7	Negligible
15	42.3	56.1	Negligible
16	43.3	53.2	Negligible
17	46.7	57.0	Negligible
18	48.2	59.0	Negligible
19	46.4	57.3	Negligible
20	46.1	57.2	Negligible
21	45.0	53.9	Negligible
22	43.8	53.9	Negligible
23	43.3	52.8	Negligible
24	43.0	63.1	Negligible
25	43.3	74.9	Slight Adverse
26	44.5	65.1	Slight Adverse

Receptor	**NO2 99.79th percentile - 1 hour mean**		
	Air quality standard: 200µg/m^3 not to be exceeded more than 18 times per year (99.79th percentile)		**Significance**
	Existing concentrations (µg/m^3)	**Proposed concentrations (µg/m^3)**	
27	52.0	70.9	Negligible
28	46.3	79.8	Slight Adverse
29	55.8	95.2	Slight Adverse
30	44.6	68.6	Slight Adverse
N1_0		90.1	-
N1_1		90.1	-
N1_2		88.8	-
N2_0		100.8	-
N2_1		101.2	-
N3_0		101.7	-
N3_1		101.9	-
N3_2		166.8	-
N4_0		84.3	-
N4_1		84.5	-
N4_2		101.4	-
N4_3		117.3	-
N4_4		136.8	-
N5_0		68.5	-
N5_1		68.5	-
N5_2		69.6	-
N6_0		78.7	-
N6_1		78.7	-
N6_2		80.5	-
N6_3		83.7	-
N6_4		88.3	-
N7_0		91.0	-
N7_1		91.0	-
N7_2		87.4	-
N8_0		92.8	-

Receptor	NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 200µg/m^3 not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N8_1		93.0	-
N8_2		83.5	-
N9_0		88.5	-
N9_1		88.5	-
N10_0		117.8	-
N10_1		117.6	-
N11_0		89.8	-
N11_1		91.6	-
N11_2		118.3	-
N11_3		154.1	-
N11_4		195.8	-
N12_0		93.9	-
N12_1		93.7	-
N12_2		121.2	-
N13_0		77.7	-
N13_1		79.2	-
N13_2		86.0	-
N14_0		120.5	-
N14_1		120.8	-
N14_2		103.3	-
N14_3		109.5	-
N14_4		123.9	-
N15_0		95.2	-
N15_1		95.2	-
N15_2		95.9	-
N16_0		91.1	-
N16_1		91.1	-
N16_2		85.8	-
N17_0		87.7	-

Receptor	NO2 99.79th percentile - 1 hour mean		
	Air quality standard: 200µg/m³ not to be exceeded more than 18 times per year (99.79th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N17_1		87.6	-
N17_2		82.0	-
N18_0		82.5	-
N18_1		82.5	-
N18_2		82.1	-
N19_0		91.8	-
N19_1		91.7	-
N19_2		91.8	-
N20_0		74.5	-
N20_1		74.9	-
N20_2		75.9	-
N20_3		77.9	-
N20_4		84.2	-
N20_5		98.9	-

B6.2 Fine particulate matter (PM_{10})

Receptor	PM_{10} 90.41th percentile - 24-hour mean		
	Air quality standard: 50µg/m³ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	17.8	18.0	Negligible
2	18.2	18.4	Negligible
3	17.8	18.0	Negligible
4	18.2	18.4	Negligible
5	18.0	18.0	Negligible
6	18.2	18.3	Negligible
7	18.2	18.4	Negligible

Receptor	PM_{10} 90.41th percentile - 24-hour mean		
	Air quality standard: 50µg/m³ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
8	18.2	18.4	Negligible
9	18.9	19.0	Negligible
10	18.8	19.0	Negligible
11	18.4	18.7	Negligible
12	19.7	19.9	Negligible
13	18.5	19.0	Negligible
14	17.8	18.3	Negligible
15	18.2	18.4	Negligible
16	17.8	18.2	Negligible
17	19.2	19.5	Negligible
18	19.8	20.2	Negligible
19	19.1	19.5	Negligible
20	19.0	19.5	Negligible
21	18.8	19.2	Negligible
22	23.5	23.7	Negligible
23	23.5	23.5	Negligible
24	23.5	23.5	Negligible
25	23.5	23.7	Slight Adverse
26	23.5	23.6	Slight Adverse
27	23.5	23.5	Negligible
28	24.0	24.1	Slight Adverse
29	23.5	23.7	Slight Adverse
30	24.0	24.1	Slight Adverse
N1_0		18.7	-
N1_1		18.8	-
N1_2		18.8	-
N2_0		18.9	-
N2_1		18.9	-
N3_0		18.7	-

Receptor	PM_{10} 90.41th percentile - 24-hour mean		
	Air quality standard: 50µg/m^3 not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N3_1		18.7	-
N3_2		18.7	-
N4_0		18.8	-
N4_1		18.8	-
N4_2		18.8	-
N4_3		18.8	-
N4_4		18.7	-
N5_0		18.1	-
N5_1		18.0	-
N5_2		18.0	-
N6_0		18.6	-
N6_1		18.6	-
N6_2		18.5	-
N6_3		18.5	-
N6_4		18.5	-
N7_0		18.3	-
N7_1		18.3	-
N7_2		18.3	-
N8_0		18.4	-
N8_1		18.4	-
N8_2		18.4	-
N9_0		19.0	-
N9_1		19.0	-
N10_0		19.4	-
N10_1		19.3	-
N11_0		19.2	-
N11_1		19.2	-
N11_2		19.1	-
N11_3		19.1	-

Receptor	PM_{10} 90.41th percentile - 24-hour mean		
	Air quality standard: 50μg/m³ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (μg/m³)	Proposed concentrations (μg/m³)	
N11_4		19.1	-
N12_0		18.8	-
N12_1		18.8	-
N12_2		18.9	-
N13_0		18.1	-
N13_1		18.1	-
N13_2		18.0	-
N14_0		19.2	-
N14_1		19.1	-
N14_2		19.1	-
N14_3		19.1	-
N14_4		19.0	-
N15_0		18.7	-
N15_1		18.7	-
N15_2		18.7	-
N16_0		18.0	-
N16_1		18.0	-
N16_2		18.0	-
N17_0		18.3	-
N17_1		18.3	-
N17_2		18.2	-
N18_0		18.7	-
N18_1		18.7	-
N18_2		18.7	-
N19_0		18.8	-
N19_1		18.8	-
N19_2		18.8	-
N20_0		18.1	-
N20_1		18.1	-

Receptor	PM_{10} 90.41th percentile - 24-hour mean		
	Air quality standard: 50µg/m³ not to be exceeded more than 7 times per year (98.08th percentile)		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N20_2		18.0	-
N20_3		18.0	-
N20_4		17.9	-
N20_5		17.9	-

B6.3 Trace metals

B6.3.1 Group I metals

B6.3.1.1 Selenium (Se)

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	1.20E-03	1.69E-02	Negligible
2	1.20E-03	1.47E-02	Negligible
3	1.20E-03	1.29E-02	Negligible
4	1.20E-03	1.45E-02	Negligible
5	1.20E-03	1.47E-02	Negligible
6	1.20E-03	1.34E-02	Negligible
7	1.20E-03	2.40E-02	Negligible
8	1.20E-03	1.42E-02	Negligible
9	1.20E-03	2.15E-02	Negligible
10	1.20E-03	2.39E-02	Negligible
11	1.20E-03	2.53E-02	Negligible

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
12	1.20E-03	2.61E-02	Negligible
13	1.20E-03	2.11E-02	Negligible
14	1.20E-03	1.16E-02	Negligible
15	1.20E-03	1.48E-02	Negligible
16	1.20E-03	9.39E-03	Negligible
17	1.20E-03	9.65E-03	Negligible
18	1.20E-03	1.01E-02	Negligible
19	1.20E-03	1.02E-02	Negligible
20	1.20E-03	1.08E-02	Negligible
21	1.20E-03	1.11E-02	Negligible
22	1.20E-03	2.79E-02	Negligible
23	1.20E-03	4.04E-02	Negligible
24	1.20E-03	3.36E-02	Negligible
25	1.20E-03	3.65E-02	Slight Adverse
26	1.20E-03	4.85E-02	Slight Adverse
27	1.20E-03	4.50E-02	Negligible
28	1.20E-03	3.74E-02	Slight Adverse
29	1.20E-03	3.89E-02	Slight Adverse
30	1.20E-03	2.12E-02	Slight Adverse
N1_0		3.86E-02	-
N1_1		3.86E-02	-
N1_2		3.86E-02	-
N2_0		4.02E-02	-
N2_1		4.03E-02	-
N3_0		3.62E-02	-
N3_1		3.62E-02	-
N3_2		3.62E-02	-
N4_0		3.62E-02	-
N4_1		3.62E-02	-
N4_2		3.62E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N4_3		3.62E-02	-
N4_4		3.62E-02	-
N5_0		2.31E-02	-
N5_1		2.31E-02	-
N5_2		2.31E-02	-
N6_0		3.53E-02	-
N6_1		3.53E-02	-
N6_2		3.53E-02	-
N6_3		3.53E-02	-
N6_4		3.53E-02	-
N7_0		2.83E-02	-
N7_1		2.83E-02	-
N7_2		2.83E-02	-
N8_0		3.62E-02	-
N8_1		3.62E-02	-
N8_2		3.62E-02	-
N9_0		3.62E-02	-
N9_1		3.62E-02	-
N10_0		3.78E-02	-
N10_1		3.78E-02	-
N11_0		3.75E-02	-
N11_1		3.75E-02	-
N11_2		3.75E-02	-
N11_3		3.75E-02	-
N11_4		3.75E-02	-
N12_0		2.89E-02	-
N12_1		2.92E-02	-
N12_2		2.96E-02	-
N13_0		2.40E-02	-
N13_1		2.40E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N13_2		2.40E-02	-
N14_0		3.14E-02	-
N14_1		3.17E-02	-
N14_2		3.21E-02	-
N14_3		3.26E-02	-
N14_4		3.36E-02	-
N15_0		3.87E-02	-
N15_1		3.87E-02	-
N15_2		3.88E-02	-
N16_0		4.22E-02	-
N16_1		4.22E-02	-
N16_2		4.23E-02	-
N17_0		3.48E-02	-
N17_1		3.47E-02	-
N17_2		3.47E-02	-
N18_0		3.54E-02	-
N18_1		3.54E-02	-
N18_2		3.54E-02	-
N19_0		3.92E-02	-
N19_1		3.92E-02	-
N19_2		3.92E-02	-
N20_0		2.36E-02	-
N20_1		2.36E-02	-
N20_2		2.36E-02	-
N20_3		2.36E-02	-
N20_4		2.36E-02	-
N20_5		2.36E-02	-

B6.3.2 Group II metals

B6.3.2.1 Selenium (Se)

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	1.20E-03	7.07E-03	Negligible
2	1.20E-03	6.26E-03	Negligible
3	1.20E-03	5.58E-03	Negligible
4	1.20E-03	6.16E-03	Negligible
5	1.20E-03	6.24E-03	Negligible
6	1.20E-03	5.77E-03	Negligible
7	1.20E-03	9.73E-03	Negligible
8	1.20E-03	6.06E-03	Negligible
9	1.20E-03	8.78E-03	Negligible
10	1.20E-03	9.67E-03	Negligible
11	1.20E-03	1.02E-02	Negligible
12	1.20E-03	1.05E-02	Negligible
13	1.20E-03	8.62E-03	Negligible
14	1.20E-03	5.08E-03	Negligible
15	1.20E-03	6.27E-03	Negligible
16	1.20E-03	4.26E-03	Negligible
17	1.20E-03	4.36E-03	Negligible
18	1.20E-03	4.54E-03	Negligible
19	1.20E-03	4.57E-03	Negligible
20	1.20E-03	4.79E-03	Negligible
21	1.20E-03	4.90E-03	Negligible
22	1.20E-03	1.12E-02	Negligible
23	1.20E-03	1.58E-02	Negligible
24	1.20E-03	1.33E-02	Negligible
25	1.20E-03	1.44E-02	Slight Adverse

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
26	1.20E-03	1.89E-02	Slight Adverse
27	1.20E-03	1.76E-02	Negligible
28	1.20E-03	1.47E-02	Slight Adverse
29	1.20E-03	1.53E-02	Slight Adverse
30	1.20E-03	8.66E-03	Slight Adverse
N1_0		1.52E-02	-
N1_1		1.52E-02	-
N1_2		1.52E-02	-
N2_0		1.58E-02	-
N2_1		1.58E-02	-
N3_0		1.43E-02	-
N3_1		1.43E-02	-
N3_2		1.43E-02	-
N4_0		1.43E-02	-
N4_1		1.43E-02	-
N4_2		1.43E-02	-
N4_3		1.43E-02	-
N4_4		1.43E-02	-
N5_0		9.40E-03	-
N5_1		9.40E-03	-
N5_2		9.40E-03	-
N6_0		1.39E-02	-
N6_1		1.39E-02	-
N6_2		1.39E-02	-
N6_3		1.39E-02	-
N6_4		1.39E-02	-
N7_0		1.13E-02	-
N7_1		1.13E-02	-
N7_2		1.13E-02	-
N8_0		1.43E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N8_1		1.43E-02	-
N8_2		1.43E-02	-
N9_0		1.43E-02	-
N9_1		1.43E-02	-
N10_0		1.49E-02	-
N10_1		1.49E-02	-
N11_0		1.48E-02	-
N11_1		1.48E-02	-
N11_2		1.48E-02	-
N11_3		1.48E-02	-
N11_4		1.48E-02	-
N12_0		1.16E-02	-
N12_1		1.17E-02	-
N12_2		1.18E-02	-
N13_0		9.74E-03	-
N13_1		9.74E-03	-
N13_2		9.74E-03	-
N14_0		1.25E-02	-
N14_1		1.26E-02	-
N14_2		1.28E-02	-
N14_3		1.30E-02	-
N14_4		1.33E-02	-
N15_0		1.52E-02	-
N15_1		1.52E-02	-
N15_2		1.52E-02	-
N16_0		1.65E-02	-
N16_1		1.65E-02	-
N16_2		1.65E-02	-
N17_0		1.37E-02	-
N17_1		1.37E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 30µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N17_2		1.37E-02	-
N18_0		1.40E-02	-
N18_1		1.40E-02	-
N18_2		1.40E-02	-
N19_0		1.54E-02	-
N19_1		1.54E-02	-
N19_2		1.54E-02	-
N20_0		9.59E-03	-
N20_1		9.59E-03	-
N20_2		9.59E-03	-
N20_3		9.59E-03	-
N20_4		9.59E-03	-
N20_5		9.59E-03	-

B6.3.2.2 Antimony (Sb)

Receptor	100th percentile - 1 hour mean		
	EAL: 150µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	6.40E-04	6.51E-03	Negligible
2	6.40E-04	5.70E-03	Negligible
3	6.40E-04	5.02E-03	Negligible
4	6.40E-04	5.60E-03	Negligible
5	6.40E-04	5.68E-03	Negligible
6	6.40E-04	5.21E-03	Negligible
7	6.40E-04	9.17E-03	Negligible
8	6.40E-04	5.50E-03	Negligible
9	6.40E-04	8.22E-03	Negligible
10	6.40E-04	9.11E-03	Negligible

Receptor	100th percentile - 1 hour mean		
	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
11	6.40E-04	9.64E-03	Negligible
12	6.40E-04	9.95E-03	Negligible
13	6.40E-04	8.06E-03	Negligible
14	6.40E-04	4.52E-03	Negligible
15	6.40E-04	5.71E-03	Negligible
16	6.40E-04	3.70E-03	Negligible
17	6.40E-04	3.80E-03	Negligible
18	6.40E-04	3.98E-03	Negligible
19	6.40E-04	4.01E-03	Negligible
20	6.40E-04	4.23E-03	Negligible
21	6.40E-04	4.34E-03	Negligible
22	6.40E-04	1.06E-02	Negligible
23	6.40E-04	1.53E-02	Negligible
24	6.40E-04	1.28E-02	Negligible
25	6.40E-04	1.38E-02	Slight Adverse
26	6.40E-04	1.83E-02	Slight Adverse
27	6.40E-04	1.70E-02	Negligible
28	6.40E-04	1.42E-02	Slight Adverse
29	6.40E-04	1.47E-02	Slight Adverse
30	6.40E-04	8.10E-03	Slight Adverse
N1_0	-	1.46E-02	-
N1_1	-	1.46E-02	-
N1_2	-	1.46E-02	-
N2_0	-	1.52E-02	-
N2_1	-	1.53E-02	-
N3_0	-	1.37E-02	-
N3_1	-	1.37E-02	-
N3_2	-	1.37E-02	-
N4_0	-	1.37E-02	-
N4_1	-	1.37E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 150µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N4_2	-	1.37E-02	-
N4_3	-	1.37E-02	-
N4_4	-	1.37E-02	-
N5_0	-	8.84E-03	-
N5_1	-	8.84E-03	-
N5_2	-	8.84E-03	-
N6_0	-	1.34E-02	-
N6_1	-	1.34E-02	-
N6_2	-	1.34E-02	-
N6_3	-	1.34E-02	-
N6_4	-	1.34E-02	-
N7_0	-	1.08E-02	-
N7_1	-	1.08E-02	-
N7_2	-	1.08E-02	-
N8_0	-	1.37E-02	-
N8_1	-	1.37E-02	-
N8_2	-	1.37E-02	-
N9_0	-	1.37E-02	-
N9_1	-	1.37E-02	-
N10_0	-	1.43E-02	-
N10_1	-	1.43E-02	-
N11_0	-	1.42E-02	-
N11_1	-	1.42E-02	-
N11_2	-	1.42E-02	-
N11_3	-	1.42E-02	-
N11_4	-	1.42E-02	-
N12_0	-	1.10E-02	-
N12_1	-	1.11E-02	-
N12_2	-	1.12E-02	-
N13_0	-	9.18E-03	-

Receptor	**100th percentile - 1 hour mean**		
	EAL: 150µg/m³		**Significance**
	Existing concentrations (µg/m³)	**Proposed concentrations (µg/m³)**	
N13_1	-	9.18E-03	-
N13_2	-	9.18E-03	-
N14_0	-	1.19E-02	-
N14_1	-	1.21E-02	-
N14_2	-	1.22E-02	-
N14_3	-	1.24E-02	-
N14_4	-	1.28E-02	-
N15_0	-	1.47E-02	-
N15_1	-	1.47E-02	-
N15_2	-	1.47E-02	-
N16_0	-	1.60E-02	-
N16_1	-	1.60E-02	-
N16_2	-	1.60E-02	-
N17_0	-	1.32E-02	-
N17_1	-	1.32E-02	-
N17_2	-	1.32E-02	-
N18_0	-	1.34E-02	-
N18_1	-	1.34E-02	-
N18_2	-	1.34E-02	-
N19_0	-	1.49E-02	-
N19_1	-	1.49E-02	-
N19_2	-	1.49E-02	-
N20_0	-	9.03E-03	-
N20_1	-	9.03E-03	-
N20_2	-	9.03E-03	-
N20_3	-	9.03E-03	-
N20_4	-	9.03E-03	-
N20_5	-	9.03E-03	-

B6.3.2.3 Chromium III (CrIII)

Receptor	**100th percentile - 1 hour mean**		
	EAL: 150µg/m³		**Significance**
	Existing concentrations (µg/m³)	**Proposed concentrations (µg/m³)**	
1	5.58E-03	1.19E-01	Negligible
2	5.58E-03	1.03E-01	Negligible
3	5.58E-03	9.02E-02	Negligible
4	5.58E-03	1.02E-01	Negligible
5	5.58E-03	1.03E-01	Negligible
6	5.58E-03	9.40E-02	Negligible
7	5.58E-03	1.71E-01	Negligible
8	5.58E-03	9.96E-02	Negligible
9	5.58E-03	1.52E-01	Negligible
10	5.58E-03	1.69E-01	Negligible
11	5.58E-03	1.80E-01	Negligible
12	5.58E-03	1.86E-01	Negligible
13	5.58E-03	1.49E-01	Negligible
14	5.58E-03	8.06E-02	Negligible
15	5.58E-03	1.04E-01	Negligible
16	5.58E-03	6.48E-02	Negligible
17	5.58E-03	6.67E-02	Negligible
18	5.58E-03	7.01E-02	Negligible
19	5.58E-03	7.08E-02	Negligible
20	5.58E-03	7.51E-02	Negligible
21	5.58E-03	7.71E-02	Negligible
22	5.58E-03	2.89E-01	Negligible
23	5.58E-03	2.40E-01	Negligible
24	5.58E-03	2.61E-01	Negligible
25	5.58E-03	3.48E-01	Slight Adverse
26	5.58E-03	3.22E-01	Slight Adverse
27	5.58E-03	2.67E-01	Negligible
28	5.58E-03	2.78E-01	Slight Adverse

Receptor	100th percentile - 1 hour mean		
	EAL: 150µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
29	5.58E-03	1.50E-01	Slight Adverse
30			Slight Adverse
N1_0		2.76E-01	-
N1_1		2.76E-01	-
N1_2		2.76E-01	-
N2_0		2.87E-01	-
N2_1		2.88E-01	-
N3_0		2.59E-01	-
N3_1		2.59E-01	-
N3_2		2.59E-01	-
N4_0		2.59E-01	-
N4_1		2.59E-01	-
N4_2		2.59E-01	-
N4_3		2.59E-01	-
N4_4		2.59E-01	-
N5_0		1.64E-01	-
N5_1		1.64E-01	-
N5_2		1.64E-01	-
N6_0		2.52E-01	-
N6_1		2.52E-01	-
N6_2		2.52E-01	-
N6_3		2.52E-01	-
N6_4		2.52E-01	-
N7_0		2.02E-01	-
N7_1		2.02E-01	-
N7_2		2.02E-01	-
N8_0		2.59E-01	-
N8_1		2.59E-01	-
N8_2		2.59E-01	-
N9_0		2.59E-01	-

Receptor	**100th percentile - 1 hour mean**		
	EAL: 150µg/m^3		**Significance**
	Existing concentrations (µg/m^3)	**Proposed concentrations (µg/m^3)**	
N9_1		2.59E-01	-
N10_0		2.70E-01	-
N10_1		2.70E-01	-
N11_0		2.68E-01	-
N11_1		2.68E-01	-
N11_2		2.68E-01	-
N11_3		2.68E-01	-
N11_4		2.68E-01	-
N12_0		2.06E-01	-
N12_1		2.08E-01	-
N12_2		2.11E-01	-
N13_0		1.71E-01	-
N13_1		1.71E-01	-
N13_2		1.71E-01	-
N14_0		2.24E-01	-
N14_1		2.26E-01	-
N14_2		2.29E-01	-
N14_3		2.33E-01	-
N14_4		2.40E-01	-
N15_0		2.77E-01	-
N15_1		2.77E-01	-
N15_2		2.77E-01	-
N16_0		3.02E-01	-
N16_1		3.02E-01	-
N16_2		3.02E-01	-
N17_0		2.48E-01	-
N17_1		2.48E-01	-
N17_2		2.48E-01	-
N18_0		2.53E-01	-
N18_1		2.53E-01	-

Receptor	100th percentile - 1 hour mean		
	EAL: 150µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N18_2		2.53E-01	-
N19_0		2.81E-01	-
N19_1		2.81E-01	-
N19_2		2.81E-01	-
N20_0		1.68E-01	-
N20_1		1.68E-01	-
N20_2		1.68E-01	-
N20_3		1.68E-01	-
N20_4		1.68E-01	-
N20_5		1.68E-01	-

B6.3.2.4 Copper (Cu)

Receptor	100th percentile - 1 hour mean		
	EAL: 200µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
1	7.96E-03	1.98E-02	Negligible
2	7.96E-03	1.82E-02	Negligible
3	7.96E-03	1.68E-02	Negligible
4	7.96E-03	1.80E-02	Negligible
5	7.96E-03	1.81E-02	Negligible
6	7.96E-03	1.72E-02	Negligible
7	7.96E-03	2.52E-02	Negligible
8	7.96E-03	1.78E-02	Negligible
9	7.96E-03	2.33E-02	Negligible
10	7.96E-03	2.51E-02	Negligible
11	7.96E-03	2.62E-02	Negligible
12	7.96E-03	2.68E-02	Negligible
13	7.96E-03	2.30E-02	Negligible

Receptor	100th percentile - 1 hour mean		
	EAL: 200µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
14	7.96E-03	1.58E-02	Negligible
15	7.96E-03	1.82E-02	Negligible
16	7.96E-03	1.42E-02	Negligible
17	7.96E-03	1.43E-02	Negligible
18	7.96E-03	1.47E-02	Negligible
19	7.96E-03	1.48E-02	Negligible
20	7.96E-03	1.52E-02	Negligible
21	7.96E-03	1.54E-02	Negligible
22	7.96E-03	2.82E-02	Negligible
23	7.96E-03	3.76E-02	Negligible
24	7.96E-03	3.25E-02	Negligible
25	7.96E-03	3.47E-02	Slight Adverse
26	7.96E-03	4.37E-02	Slight Adverse
27	7.96E-03	4.11E-02	Negligible
28	7.96E-03	3.53E-02	Slight Adverse
29	7.96E-03	3.65E-02	Slight Adverse
30	7.96E-03	2.31E-02	Slight Adverse
N1_0		3.62E-02	-
N1_1		3.62E-02	-
N1_2		3.62E-02	-
N2_0		3.74E-02	-
N2_1		3.75E-02	-
N3_0		3.45E-02	-
N3_1		3.45E-02	-
N3_2		3.45E-02	-
N4_0		3.45E-02	-
N4_1		3.45E-02	-
N4_2		3.45E-02	-
N4_3		3.45E-02	-
N4_4		3.45E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 200µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N5_0		2.45E-02	-
N5_1		2.45E-02	-
N5_2		2.45E-02	-
N6_0		3.37E-02	-
N6_1		3.37E-02	-
N6_2		3.37E-02	-
N6_3		3.37E-02	-
N6_4		3.37E-02	-
N7_0		2.85E-02	-
N7_1		2.85E-02	-
N7_2		2.85E-02	-
N8_0		3.45E-02	-
N8_1		3.45E-02	-
N8_2		3.45E-02	-
N9_0		3.45E-02	-
N9_1		3.45E-02	-
N10_0		3.56E-02	-
N10_1		3.56E-02	-
N11_0		3.54E-02	-
N11_1		3.54E-02	-
N11_2		3.54E-02	-
N11_3		3.54E-02	-
N11_4		3.54E-02	-
N12_0		2.89E-02	-
N12_1		2.91E-02	-
N12_2		2.94E-02	-
N13_0		2.52E-02	-
N13_1		2.52E-02	-
N13_2		2.52E-02	-
N14_0		3.08E-02	-

Receptor	**100th percentile - 1 hour mean**		
	EAL: 200µg/m^3		**Significance**
	Existing concentrations (µg/m^3)	**Proposed concentrations (µg/m^3)**	
N14_1		3.10E-02	-
N14_2		3.13E-02	-
N14_3		3.17E-02	-
N14_4		3.25E-02	-
N15_0		3.63E-02	-
N15_1		3.63E-02	-
N15_2		3.64E-02	-
N16_0		3.89E-02	-
N16_1		3.90E-02	-
N16_2		3.90E-02	-
N17_0		3.33E-02	-
N17_1		3.33E-02	-
N17_2		3.33E-02	-
N18_0		3.38E-02	-
N18_1		3.38E-02	-
N18_2		3.38E-02	-
N19_0		3.67E-02	-
N19_1		3.67E-02	-
N19_2		3.67E-02	-
N20_0		2.49E-02	-
N20_1		2.49E-02	-
N20_2		2.49E-02	-
N20_3		2.49E-02	-
N20_4		2.49E-02	-
N20_5		2.49E-02	-

B6.3.2.5 Manganese (Mn)

Receptor	100th percentile - 1 hour mean		
	EAL: 1,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	7.38E-03	1.33E-02	Negligible
2	7.38E-03	1.24E-02	Negligible
3	7.38E-03	1.18E-02	Negligible
4	7.38E-03	1.23E-02	Negligible
5	7.38E-03	1.24E-02	Negligible
6	7.38E-03	1.20E-02	Negligible
7	7.38E-03	1.59E-02	Negligible
8	7.38E-03	1.22E-02	Negligible
9	7.38E-03	1.50E-02	Negligible
10	7.38E-03	1.59E-02	Negligible
11	7.38E-03	1.64E-02	Negligible
12	7.38E-03	1.67E-02	Negligible
13	7.38E-03	1.48E-02	Negligible
14	7.38E-03	1.13E-02	Negligible
15	7.38E-03	1.25E-02	Negligible
16	7.38E-03	1.04E-02	Negligible
17	7.38E-03	1.05E-02	Negligible
18	7.38E-03	1.07E-02	Negligible
19	7.38E-03	1.08E-02	Negligible
20	7.38E-03	1.10E-02	Negligible
21	7.38E-03	1.11E-02	Negligible
22	7.38E-03	1.74E-02	Negligible
23	7.38E-03	2.20E-02	Negligible
24	7.38E-03	1.95E-02	Negligible
25	7.38E-03	2.06E-02	Slight Adverse
26	7.38E-03	2.51E-02	Slight Adverse
27	7.38E-03	2.37E-02	Negligible
28	7.38E-03	2.09E-02	Slight Adverse

Receptor	100th percentile - 1 hour mean		
	EAL: 1,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
29	7.38E-03	2.15E-02	Slight Adverse
30	7.38E-03	1.48E-02	Slight Adverse
N1_0		2.13E-02	-
N1_1		2.14E-02	-
N1_2		2.14E-02	-
N2_0		2.19E-02	-
N2_1		2.20E-02	-
N3_0		2.05E-02	-
N3_1		2.05E-02	-
N3_2		2.05E-02	-
N4_0		2.05E-02	-
N4_1		2.05E-02	-
N4_2		2.05E-02	-
N4_3		2.05E-02	-
N4_4		2.05E-02	-
N5_0		1.56E-02	-
N5_1		1.56E-02	-
N5_2		1.56E-02	-
N6_0		2.01E-02	-
N6_1		2.01E-02	-
N6_2		2.01E-02	-
N6_3		2.01E-02	-
N6_4		2.01E-02	-
N7_0		1.75E-02	-
N7_1		1.75E-02	-
N7_2		1.75E-02	-
N8_0		2.05E-02	-
N8_1		2.05E-02	-
N8_2		2.05E-02	-
N9_0		2.05E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 1,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N9_1		2.05E-02	-
N10_0		2.11E-02	-
N10_1		2.11E-02	-
N11_0		2.09E-02	-
N11_1		2.09E-02	-
N11_2		2.09E-02	-
N11_3		2.09E-02	-
N11_4		2.09E-02	-
N12_0		1.77E-02	-
N12_1		1.78E-02	-
N12_2		1.80E-02	-
N13_0		1.59E-02	-
N13_1		1.59E-02	-
N13_2		1.59E-02	-
N14_0		1.87E-02	-
N14_1		1.88E-02	-
N14_2		1.89E-02	-
N14_3		1.91E-02	-
N14_4		1.95E-02	-
N15_0		2.14E-02	-
N15_1		2.14E-02	-
N15_2		2.14E-02	-
N16_0		2.27E-02	-
N16_1		2.27E-02	-
N16_2		2.27E-02	-
N17_0		1.99E-02	-
N17_1		1.99E-02	-
N17_2		1.99E-02	-
N18_0		2.02E-02	-
N18_1		2.02E-02	-

Receptor	100th percentile - 1 hour mean		
	EAL: 1,500µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N18_2		2.02E-02	-
N19_0		2.16E-02	-
N19_1		2.16E-02	-
N19_2		2.16E-02	-
N20_0		1.58E-02	-
N20_1		1.58E-02	-
N20_2		1.58E-02	-
N20_3		1.58E-02	-
N20_4		1.58E-02	-
N20_5		1.58E-02	-

B6.3.2.6 Vanadium (V)

Receptor	100th percentile - 1 hour mean		
	EAL: 1µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	1.52E-03	2.30E-01	Negligible
2	1.52E-03	1.98E-01	Negligible
3	1.52E-03	1.72E-01	Negligible
4	1.52E-03	1.95E-01	Negligible
5	1.52E-03	1.97E-01	Negligible
6	1.52E-03	1.79E-01	Negligible
7	1.52E-03	3.34E-01	Negligible
8	1.52E-03	1.91E-01	Negligible
9	1.52E-03	2.96E-01	Negligible
10	1.52E-03	3.31E-01	Negligible
11	1.52E-03	3.52E-01	Negligible
12	1.52E-03	3.64E-01	Negligible
13	1.52E-03	2.90E-01	Negligible

Receptor	100th percentile - 1 hour mean		
	EAL: 1µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
14	1.52E-03	1.53E-01	Negligible
15	1.52E-03	1.99E-01	Negligible
16	1.52E-03	1.21E-01	Negligible
17	1.52E-03	1.24E-01	Negligible
18	1.52E-03	1.31E-01	Negligible
19	1.52E-03	1.33E-01	Negligible
20	1.52E-03	1.41E-01	Negligible
21	1.52E-03	1.45E-01	Negligible
22	1.52E-03	3.90E-01	Negligible
23	1.52E-03	5.71E-01	Substantial Adverse
24	1.52E-03	4.73E-01	Negligible
25	1.52E-03	5.15E-01	Substantial Adverse
26	1.52E-03	6.90E-01	Substantial Adverse
27	1.52E-03	6.38E-01	Substantial Adverse
28	1.52E-03	5.28E-01	Substantial Adverse
29	1.52E-03	5.50E-01	Substantial Adverse
30	1.52E-03	2.92E-01	Slight Adverse
N1_0	-	5.45E-01	-
N1_1	-	5.45E-01	-
N1_2	-	5.45E-01	-
N2_0	-	5.68E-01	-
N2_1	-	5.70E-01	-
N3_0	-	5.11E-01	-
N3_1	-	5.11E-01	-
N3_2	-	5.11E-01	-
N4_0	-	5.11E-01	-
N4_1	-	5.11E-01	-
N4_2	-	5.11E-01	-
N4_3	-	5.11E-01	-
N4_4	-	5.11E-01	-

Receptor	100th percentile - 1 hour mean		
	EAL: 1µg/m³		Significance
	Existing concentrations (µg/m³)	Proposed concentrations (µg/m³)	
N5_0	-	3.20E-01	-
N5_1	-	3.20E-01	-
N5_2	-	3.20E-01	-
N6_0	-	4.97E-01	-
N6_1	-	4.97E-01	-
N6_2	-	4.97E-01	-
N6_3	-	4.97E-01	-
N6_4	-	4.97E-01	-
N7_0	-	3.96E-01	-
N7_1	-	3.96E-01	-
N7_2	-	3.96E-01	-
N8_0	-	5.11E-01	-
N8_1	-	5.11E-01	-
N8_2	-	5.11E-01	-
N9_0	-	5.11E-01	-
N9_1	-	5.11E-01	-
N10_0	-	5.34E-01	-
N10_1	-	5.34E-01	-
N11_0	-	5.29E-01	-
N11_1	-	5.29E-01	-
N11_2	-	5.29E-01	-
N11_3	-	5.29E-01	-
N11_4	-	5.29E-01	-
N12_0	-	4.05E-01	-
N12_1	-	4.09E-01	-
N12_2	-	4.14E-01	-
N13_0	-	3.34E-01	-
N13_1	-	3.34E-01	-
N13_2	-	3.34E-01	-
N14_0	-	4.41E-01	-

Receptor	100th percentile - 1 hour mean		
	EAL: 1µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N14_1	-	4.46E-01	-
N14_2	-	4.51E-01	-
N14_3	-	4.59E-01	-
N14_4	-	4.73E-01	-
N15_0	-	5.47E-01	-
N15_1	-	5.47E-01	-
N15_2	-	5.48E-01	-
N16_0	-	5.97E-01	-
N16_1	-	5.98E-01	-
N16_2	-	5.99E-01	-
N17_0	-	4.90E-01	-
N17_1	-	4.89E-01	-
N17_2	-	4.89E-01	-
N18_0	-	4.98E-01	-
N18_1	-	4.98E-01	-
N18_2	-	4.98E-01	-
N19_0	-	5.55E-01	-
N19_1	-	5.55E-01	-
N19_2	-	5.55E-01	-
N20_0	-	3.28E-01	-
N20_1	-	3.28E-01	-
N20_2	-	3.28E-01	-
N20_3	-	3.28E-01	-
N20_4	-	3.28E-01	-
N20_5	-	3.28E-01	-

B6.3.2.7 Tin (Sn)

Receptor	100th percentile – 15-minute mean		
	EAL: 4000µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
1	5.2E-04	2.54E-01	Negligible
2	5.2E-04	2.37E-01	Negligible
3	5.2E-04	2.53E-01	Negligible
4	5.2E-04	2.53E-01	Negligible
5	5.2E-04	3.19E-01	Negligible
6	5.2E-04	2.89E-01	Negligible
7	5.2E-04	4.60E-01	Negligible
8	5.2E-04	2.25E-01	Negligible
9	5.2E-04	3.18E-01	Negligible
10	5.2E-04	3.56E-01	Negligible
11	5.2E-04	3.73E-01	Negligible
12	5.2E-04	4.89E-01	Negligible
13	5.2E-04	3.18E-01	Negligible
14	5.2E-04	1.89E-01	Negligible
15	5.2E-04	2.17E-01	Negligible
16	5.2E-04	1.94E-01	Negligible
17	5.2E-04	1.82E-01	Negligible
18	5.2E-04	1.73E-01	Negligible
19	5.2E-04	1.79E-01	Negligible
20	5.2E-04	1.81E-01	Negligible
21	5.2E-04	2.21E-01	Negligible
22	5.20E-04	3.98E-01	Negligible
23	5.20E-04	5.91E-01	Negligible
24	5.20E-04	4.89E-01	Negligible
25	5.20E-04	5.22E-01	Slight Adverse
26	5.20E-04	7.03E-01	Slight Adverse
27	5.20E-04	6.57E-01	Negligible
28	5.20E-04	5.48E-01	Slight Adverse

Receptor	100th percentile – 15-minute mean		
	EAL: 4000µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
29	5.20E-04	5.61E-01	Slight Adverse
30	5.20E-04	3.28E-01	Slight Adverse
N1_0	-	5.66E-01	-
N1_1	-	5.66E-01	-
N1_2	-	5.66E-01	-
N2_0	-	5.86E-01	-
N2_1	-	5.88E-01	-
N3_0	-	5.29E-01	-
N3_1	-	5.29E-01	-
N3_2	-	5.29E-01	-
N4_0	-	5.29E-01	-
N4_1	-	5.29E-01	-
N4_2	-	5.29E-01	-
N4_3	-	5.29E-01	-
N4_4	-	5.29E-01	-
N5_0	-	3.25E-01	-
N5_1	-	3.25E-01	-
N5_2	-	3.25E-01	-
N6_0	-	5.13E-01	-
N6_1	-	5.13E-01	-
N6_2	-	5.13E-01	-
N6_3	-	5.13E-01	-
N6_4	-	5.13E-01	-
N7_0	-	4.11E-01	-
N7_1	-	4.11E-01	-
N7_2	-	4.11E-01	-
N8_0	-	5.29E-01	-
N8_1	-	5.29E-01	-
N8_2	-	5.29E-01	-
N9_0	-	5.29E-01	-

Receptor	100th percentile – 15-minute mean		
	EAL: 4000μg/m^3		Significance
	Existing concentrations (μg/m^3)	Proposed concentrations (μg/m^3)	
N9_1	-	5.29E-01	-
N10_0	-	5.60E-01	-
N10_1	-	5.60E-01	-
N11_0	-	5.42E-01	-
N11_1	-	5.42E-01	-
N11_2	-	5.42E-01	-
N11_3	-	5.42E-01	-
N11_4	-	5.42E-01	-
N12_0	-	4.15E-01	-
N12_1	-	4.19E-01	-
N12_2	-	4.24E-01	-
N13_0	-	3.40E-01	-
N13_1	-	3.40E-01	-
N13_2	-	3.40E-01	-
N14_0	-	4.90E-01	-
N14_1	-	4.90E-01	-
N14_2	-	4.90E-01	-
N14_3	-	4.90E-01	-
N14_4	-	4.90E-01	-
N15_0	-	5.59E-01	-
N15_1	-	5.59E-01	-
N15_2	-	5.60E-01	-
N16_0	-	6.14E-01	-
N16_1	-	6.14E-01	-
N16_2	-	6.15E-01	-
N17_0	-	5.04E-01	-
N17_1	-	5.04E-01	-
N17_2	-	5.04E-01	-
N18_0	-	5.23E-01	-
N18_1	-	5.23E-01	-

Receptor	100th percentile – 15-minute mean		
	EAL: 4000µg/m^3		Significance
	Existing concentrations (µg/m^3)	Proposed concentrations (µg/m^3)	
N18_2	-	5.23E-01	-
N19_0	-	5.75E-01	-
N19_1	-	5.75E-01	-
N19_2	-	5.75E-01	-
N20_0	-	3.36E-01	-
N20_1	-	3.36E-01	-
N20_2	-	3.36E-01	-
N20_3	-	3.36E-01	-
N20_4	-	3.36E-01	-
N20_5	-	3.36E-01	-

B7 Ecological receptor results

B7.1 Annual mean NOx concentrations

Table B7.1 Predicted annual mean NOx concentrations at sensitive ecological sites, and comparison with critical level (30µg/m3)

Ecological receptor ID	Receptor location	Proposed modelled NOX (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled NOX (PEC) (µg/m3)	SSSI/ SAC PC screening (stage 2)
			If PC is >100% of 30µg/m3 (30 µg/m3)	If PC is >1% of 30µg/m3 (0.3 µg/m3)		If PEC is >1% of 30µg/m3 (21 µg/m3)
E1	Beaufort Hills Pond and Woodland LNR	0.05	No, screen out	-	9.85	No, screen out
E2	Trevor Rowson LNR	0.02	No, screen out	-	9.82	No, screen out
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	0.03	No, screen out	-	9.83	No, screen out
E4	Parc Nant-y-Waun LNR	0.03	No, screen out	-	9.83	No, screen out
E5	Parc Bryn Bach LNR	0.01	No, screen out	-	9.81	No, screen out
E6	Brynmawr Sections SSSI	0.01	-	No, screen out	9.81	No, screen out
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	0.01	-	No, screen out	9.81	No, screen out
E8	Mynydd Llangynidr SSSI	0.07	-	No, screen out	9.87	No, screen out
E9	Mynydd Llangynidr SSSI	0.02	-	No, screen out	9.82	No, screen out
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	0.08	-	No, screen out	9.88	No, screen out
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	0.23	-	No, screen out	10.03	No, screen out

Ecological receptor ID	Receptor location	Proposed modelled NOX (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled NOX (PEC) (µg/m3)	SSSI/ SAC PC screening (stage 2)
			If PC is >100% of 30µg/m3 (30 µg/m3)	If PC is >1% of 30µg/m3 (0.3 µg/m3)		If PEC is >1% of 30µg/m3 (21 µg/m3)
E12	Ancient Woodland 1 (B4560)	0.04	No, screen out	-	9.84	No, screen out
E13	Ancient Woodland 2 (The Brecon Beacons)	0.05	No, screen out	-	9.85	No, screen out
E14	Ancient Woodland 3 (Main Road)	0.01	No, screen out	-	9.81	No, screen out
E15	Ancient Woodland 4 (A4281/ A4046)	0.93	No, screen out	-	10.73	No, screen out
E16	Ancient Woodland 5 (B4256 Morgan Street)	0.02	No, screen out	-	9.82	No, screen out
E17	Ancient Woodland 6 (Tredegar)	0.02	No, screen out	-	9.82	No, screen out
E18	Ancient Woodland 7 (Belle Vue)	0.04	No, screen out	-	9.84	No, screen out
E19	Ancient Woodland 8 (A467)	0.01	No, screen out	-	9.81	No, screen out
E20	Garnlydan (SINCs)	0.16	No, screen out	-	9.96	No, screen out
E21	Garnlydan (SINCs)	3.84	No, screen out	-	13.64	No, screen out
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	0.05	No, screen out	-	9.85	No, screen out
E23	Hirgan Fields Grassland (SINCs)	3.84	No, screen out	-	13.64	No, screen out
E24	Land at Park View, Beaufort (SINCs)	0.05	No, screen out	-	9.85	No, screen out
E25	Land off Parkhill Crescent (SINCs)	0.04	No, screen out	-	9.84	No, screen out
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	0.08	No, screen out	-	9.88	No, screen out
E27	Nant-y-Croft, Rassau (SINCs)	1.58	No, screen out	-	11.38	No, screen out
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	1.63	No, screen out	-	11.43	No, screen out

Ecological receptor ID	Receptor location	Proposed modelled NOX (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled NOX (PEC) (µg/m3)	SSSI/ SAC PC screening (stage 2)
			If PC is >100% of 30µg/m3 (30 µg/m3)	If PC is >1% of 30µg/m3 (0.3 µg/m3)		If PEC is >1% of 30µg/m3 (21 µg/m3)
E29	Rassau Pond SO1512/198 (SINCs)	2.36	No, screen out	-	12.16	No, screen out
E30	Rhyd y blew (SINCs)	0.06	No, screen out	-	9.86	No, screen out
E31	Waun y Pound (SINCs)	0.03	No, screen out	-	9.83	No, screen out

B7.2 Daily mean NOx concentrations

Table B7.2 Predicted daily mean NOx concentrations at sensitive ecological sites, and comparison with critical level (70µg/m3)

Ecological receptor ID	Receptor location	Proposed modelled NOX (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled NOX (PEC) (µg/m3)
			If PC is >100% of 75µg/m3 (75 µg/m3)	If PC is >1% of 75µg/m3 (7.5 µg/m3)	
E1	Beaufort Hills Pond and Woodland LNR	0.5	No, screen out	-	20.1
E2	Trevor Rowson LNR	0.2	No, screen out	-	19.8
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	0.5	No, screen out	-	20.1
E4	Parc Nant-y-Waun LNR	0.3	No, screen out	-	19.9
E5	Parc Bryn Bach LNR	0.4	No, screen out	-	20.0
E6	Brynmawr Sections SSSI	0.3	-	No, screen out	19.9
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	0.3	-	No, screen out	19.9
E8	Mynydd Llangynidr SSSI	0.6	-	No, screen out	20.2
E9	Mynydd Llangynidr SSSI	0.5	-	No, screen out	20.1

Ecological receptor ID	Receptor location	Proposed modelled NOX (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled NOX (PEC) (µg/m3)
			If PC is >100% of 75µg/m3 (75 µg/m3)	If PC is >1% of 75µg/m3 (7.5 µg/m3)	
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	0.4	-	No, screen out	20.0
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	1.4	-	No, screen out	21.0
E12	Ancient Woodland 1 (B4560)	0.3	No, screen out	-	19.9
E13	Ancient Woodland 2 (The Brecon Beacons)	0.3	No, screen out	-	19.9
E14	Ancient Woodland 3 (Main Road)	0.3	No, screen out	-	19.9
E15	Ancient Woodland 4 (A4281/ A4046)	1.1	No, screen out	-	20.7
E16	Ancient Woodland 5 (B4256 Morgan Street)	0.3	No, screen out	-	19.9
E17	Ancient Woodland 6 (Tredegar)	0.2	No, screen out	-	19.8
E18	Ancient Woodland 7 (Belle Vue)	0.6	No, screen out	-	20.2
E19	Ancient Woodland 8 (A467)	0.2	No, screen out	-	19.8
E20	Garnlydan (SINCs)	1.4	No, screen out	-	21.0
E21	Garnlydan (SINCs)	0.9	No, screen out	-	20.5
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	1.1	No, screen out	-	20.7
E23	Hirgan Fields Grassland (SINCs)	1.1	No, screen out	-	20.7
E24	Land at Park View, Beaufort (SINCs)	0.8	No, screen out	-	20.4
E25	Land off Parkhill Crescent (SINCs)	0.5	No, screen out	-	20.1
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	1.3	No, screen out	-	20.9
E27	Nant-y-Croft, Rassau (SINCs)	1.4	No, screen out	-	21.0
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	0.5	No, screen out	-	20.1
E29	Rassau Pond SO1512/198 (SINCs)	2.2	No, screen out	-	21.8
E30	Rhyd y blew (SINCs)	0.9	No, screen out	-	20.5

Ecological receptor ID	Receptor location	Proposed modelled NOX (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled NOX (PEC) (µg/m3)
			If PC is >100% of 75µg/m3 (75 µg/m3)	If PC is >1% of 75µg/m3 (7.5 µg/m3)	
E31	Waun y Pound (SINCs)	0.6	No, screen out	-	20.2

B7.3 Annual mean SO_2 concentrations

Table B7.3 Predicted annual mean SO2 concentrations at sensitive ecological sites, and comparisons with the critical level (10µg/m3)

Ecological receptor ID	Receptor location	Proposed modelled SO2 (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed total SO2 (PEC) (µg/m3)	SSSI/ SAC PEC screening (stage 2)
			If PC is >100% of 10µg/m3 (10 µg/m3)	If PC is >1% of 10µg/m3 (0.1 µg/m3)		If PEC is >70% of 10µg/m3 (7 µg/m3)
E1	Beaufort Hills Pond and Woodland LNR	0.03	No, screen out	-	3.53	-
E2	Trevor Rowson LNR	0.01	No, screen out	-	3.51	-
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	0.02	No, screen out	-	3.52	-
E4	Parc Nant-y-Waun LNR	0.02	No, screen out	-	3.52	-
E5	Parc Bryn Bach LNR	0.01	No, screen out	-	3.51	-
E6	Brynmawr Sections SSSI	0.01	-	No, screen out	3.51	-
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	0.01	-	No, screen out	3.51	-
E8	Mynydd Llangynidr SSSI	0.04	-	No, screen out	3.54	-
E9	Mynydd Llangynidr SSSI	0.01	-	No, screen out	3.51	-

Ecological receptor ID	Receptor location	Proposed modelled SO2 (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed total SO2 (PEC) (µg/m3)	SSSI/ SAC PEC screening (stage 2)
			If PC is >100% of 10µg/m3 (10 µg/m3)	If PC is >1% of 10µg/m3 (0.1 µg/m3)		If PEC is >70% of 10µg/m3 (7 µg/m3)
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	0.05	-	No, screen out	3.55	-
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	0.14	-	Stage 2 screening required	3.64	No, screen out
E12	Ancient Woodland 1 (B4560)	0.02	No, screen out	-	3.52	-
E13	Ancient Woodland 2 (The Brecon Beacons)	0.03	No, screen out	-	3.53	-
E14	Ancient Woodland 3 (Main Road)	0.01	No, screen out	-	3.51	-
E15	Ancient Woodland 4 (A4281/ A4046)	0.02	No, screen out	-	3.52	-
E16	Ancient Woodland 5 (B4256 Morgan Street)	0.01	No, screen out	-	3.51	-
E17	Ancient Woodland 6 (Tredegar)	0.01	No, screen out	-	3.51	-
E18	Ancient Woodland 7 (Belle Vue)	0.02	No, screen out	-	3.52	-
E19	Ancient Woodland 8 (A467)	0.01	No, screen out	-	3.51	-
E20	Garnlydan (SINCs)	0.10	No, screen out	-	3.60	-
E21	Garnlydan (SINCs)	0.03	No, screen out	-	3.53	-
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	0.03	No, screen out	-	3.53	-
E23	Hirgan Fields Grassland (SINCs)	0.02	No, screen out	-	3.52	-
E24	Land at Park View, Beaufort (SINCs)	0.03	No, screen out	-	3.53	-
E25	Land off Parkhill Crescent (SINCs)	0.02	No, screen out	-	3.52	-

Ecological receptor ID	Receptor location	Proposed modelled SO2 (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed total SO2 (PEC) (µg/m3)	SSSI/ SAC PEC screening (stage 2)
			If PC is >100% of 10µg/m3 (10 µg/m3)	If PC is >1% of 10µg/m3 (0.1 µg/m3)		If PEC is >70% of 10µg/m3 (7 µg/m3)
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	0.05	No, screen out	-	3.55	-
E27	Nant-y-Croft, Rassau (SINCs)	0.02	No, screen out	-	3.52	-
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	0.01	No, screen out	-	3.51	-
E29	Rassau Pond SO1512/198 (SINCs)	0.06	No, screen out	-	3.56	-
E30	Rhyd y blew (SINCs)	0.04	No, screen out	-	3.54	-
E31	Waun y Pound (SINCs)	0.02	No, screen out	-	3.52	-

B7.4 Annual mean NH_3 concentrations

Table B7.4 Predicted annual mean NH3 concentrations at sensitive ecological sites, and comparison with the critical level (1µg/m3)

Ecological receptor ID	Receptor location	Proposed modelled NH3 (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed total NH3 (PEC) (µg/m3)
			If PC is >100% of 1µg/m3 (1 µg/m3)	If PC is >1% of 1µg/m3 (0.01 µg/m3)	
E1	Beaufort Hills Pond and Woodland LNR	0.0011	No, screen out	-	2.3411
E2	Trevor Rowson LNR	0.0004	No, screen out	-	2.3404
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	0.0006	No, screen out	-	2.3406
E4	Parc Nant-y-Waun LNR	0.0007	No, screen out	-	2.3407
E5	Parc Bryn Bach LNR	0.0003	No, screen out	-	2.3403
E6	Brynmawr Sections SSSI	0.0004	-	No, screen out	2.3404

Ecological receptor ID	Receptor location	Proposed modelled NH3 (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed total NH3 (PEC) (µg/m3)
			If PC is >100% of 1µg/m3 (1 µg/m3)	If PC is >1% of 1µg/m3 (0.01 µg/m3)	
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	0.0003	-	No, screen out	2.3403
E8	Mynydd Llangynidr SSSI	0.0016	-	No, screen out	2.3416
E9	Mynydd Llangynidr SSSI	0.0004	-	No, screen out	2.3404
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	0.0020	-	No, screen out	2.3420
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	0.0057	-	No, screen out	2.3457
E12	Ancient Woodland 1 (B4560)	0.0009	No, screen out	-	2.3409
E13	Ancient Woodland 2 (The Brecon Beacons)	0.0011	No, screen out	-	2.3411
E14	Ancient Woodland 3 (Main Road)	0.0003	No, screen out	-	2.3403
E15	Ancient Woodland 4 (A4281/ A4046)	0.0009	No, screen out	-	2.3409
E16	Ancient Woodland 5 (B4256 Morgan Street)	0.0005	No, screen out	-	2.3405
E17	Ancient Woodland 6 (Tredegar)	0.0004	No, screen out	-	2.3404
E18	Ancient Woodland 7 (Belle Vue)	0.0009	No, screen out	-	2.3409
E19	Ancient Woodland 8 (A467)	0.0003	No, screen out	-	2.3403
E20	Garnlydan (SINCs)	0.0040	No, screen out	-	2.3440
E21	Garnlydan (SINCs)	0.0012	No, screen out	-	2.3412
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	0.0013	No, screen out	-	2.3413
E23	Hirgan Fields Grassland (SINCs)	0.0008	No, screen out	-	2.3408
E24	Land at Park View, Beaufort (SINCs)	0.0013	No, screen out	-	2.3413
E25	Land off Parkhill Crescent (SINCs)	0.0009	No, screen out	-	2.3409
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	0.0019	No, screen out	-	2.3419

Ecological receptor ID	Receptor location	Proposed modelled NH3 (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed total NH3 (PEC) (µg/m3)
			If PC is >100% of 1µg/m3 (1 µg/m3)	If PC is >1% of 1µg/m3 (0.01 µg/m3)	
E27	Nant-y-Croft, Rassau (SINCs)	0.0009	No, screen out	-	2.3409
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	0.0006	No, screen out	-	2.3406
E29	Rassau Pond SO1512/198 (SINCs)	0.0024	No, screen out	-	2.3424
E30	Rhyd y blew (SINCs)	0.0014	No, screen out	-	2.3414
E31	Waun y Pound (SINCs)	0.0008	No, screen out	-	2.3408

B7.5 Daily HF concentrations

Table B7.5 Predicted daily mean HF concentrations at sensitive ecological sites, and comparison with the critical level (5µg/m^3)

Ecological receptor ID	Receptor location	Proposed modelled HF (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled HF (PEC) (µg/m3)
			If PC is >100% of 5µg/m3 (5 µg/m3)	If PC is >1% of 5µg/m3 (0.05 µg/m3)	
E1	Beaufort Hills Pond and Woodland LNR	0.03	No, screen out	-	0.11
E2	Trevor Rowson LNR	0.01	No, screen out	-	0.09
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	0.03	No, screen out	-	0.11
E4	Parc Nant-y-Waun LNR	0.02	No, screen out	-	0.10
E5	Parc Bryn Bach LNR	0.02	No, screen out	-	0.10
E6	Brynmawr Sections SSSI	0.02	-	No, screen out	0.10
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	0.02	-	No, screen out	0.10
E8	Mynydd Llangynidr SSSI	0.04	-	No, screen out	0.12
E9	Mynydd Llangynidr SSSI	0.03	-	No, screen out	0.11

Ecological receptor ID	Receptor location	Proposed modelled HF (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled HF (PEC) (µg/m3)
			If PC is >100% of 5µg/m3 (5 µg/m3)	If PC is >1% of 5µg/m3 (0.05 µg/m3)	
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	0.02	-	No, screen out	0.10
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	0.09	-	No, screen out	0.17
E12	Ancient Woodland 1 (B4560)	0.02	No, screen out	-	0.10
E13	Ancient Woodland 2 (The Brecon Beacons)	0.02	No, screen out	-	0.10
E14	Ancient Woodland 3 (Main Road)	0.02	No, screen out	-	0.10
E15	Ancient Woodland 4 (A4281/ A4046)	0.07	No, screen out	-	0.15
E16	Ancient Woodland 5 (B4256 Morgan Street)	0.02	No, screen out	-	0.10
E17	Ancient Woodland 6 (Tredegar)	0.01	No, screen out	-	0.09
E18	Ancient Woodland 7 (Belle Vue)	0.04	No, screen out	-	0.12
E19	Ancient Woodland 8 (A467)	0.01	No, screen out	-	0.09
E20	Garnlydan (SINCs)	0.08	No, screen out	-	0.16
E21	Garnlydan (SINCs)	0.05	No, screen out	-	0.13
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	0.07	No, screen out	-	0.15
E23	Hirgan Fields Grassland (SINCs)	0.07	No, screen out	-	0.15
E24	Land at Park View, Beaufort (SINCs)	0.05	No, screen out	-	0.13
E25	Land off Parkhill Crescent (SINCs)	0.03	No, screen out	-	0.11
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	0.08	No, screen out	-	0.16
E27	Nant-y-Croft, Rassau (SINCs)	0.08	No, screen out	-	0.16
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	0.03	No, screen out	-	0.11
E29	Rassau Pond SO1512/198 (SINCs)	0.13	No, screen out	-	0.21
E30	Rhyd y blew (SINCs)	0.05	No, screen out	-	0.13

Ecological receptor ID	Receptor location	Proposed modelled HF (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled HF (PEC) (µg/m3)
			If PC is >100% of 5µg/m3 (5 µg/m3)	If PC is >1% of 5µg/m3 (0.05 µg/m3)	
E31	Waun y Pound (SINCs)	0.03	No, screen out	-	0.11

B7.6 Weekly HF concentrations

Table B7.6 Predicted daily mean HF concentrations at sensitive ecological sites, and comparison with the critical level (0.5µg/m^3)

Ecological receptor ID	Receptor location	Proposed modelled HF (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled HF (PEC) (µg/m3)
			If PC is >100% of 0.5µg/m3 (0.5 µg/m3)	If PC is >10% of 0.5µg/m3 (0.05 µg/m3)	
E1	Beaufort Hills Pond and Woodland LNR	0.005	No, screen out	-	0.08
E2	Trevor Rowson LNR	0.002	No, screen out	-	0.08
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	0.008	No, screen out	-	0.09
E4	Parc Nant-y-Waun LNR	0.003	No, screen out	-	0.08
E5	Parc Bryn Bach LNR	0.010	No, screen out	-	0.09
E6	Brynmawr Sections SSSI	0.004	-	No, screen out	0.08
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	0.004	-	No, screen out	0.08
E8	Mynydd Llangynidr SSSI	0.020	-	No, screen out	0.10
E9	Mynydd Llangynidr SSSI	0.005	-	No, screen out	0.09
E10	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI/ Craig y Cilau NNR	0.012	-	No, screen out	0.09

Ecological receptor ID	Receptor location	Proposed modelled HF (PC) (µg/m3)	Local nature site PC screening	SSSI/ SAC PC screening (stage 1)	Proposed modelled HF (PEC) (µg/m3)
			If PC is >100% of 0.5µg/m3 (0.5 µg/m3)	If PC is >10% of 0.5µg/m3 (0.05 µg/m3)	
E11	Usk Bat Sites / Safleodd Ystlumod Wysg SAC/ Mynydd Llangatwg (Mynydd Llangattock) SSSI	0.051	-	Yes, detailed modelling undertaken	0.13
E12	Ancient Woodland 1 (B4560)	0.006	No, screen out	-	0.09
E13	Ancient Woodland 2 (The Brecon Beacons)	0.006	No, screen out	-	0.09
E14	Ancient Woodland 3 (Main Road)	0.004	No, screen out	-	0.08
E15	Ancient Woodland 4 (A4281/ A4046)	0.025	No, screen out	-	0.11
E16	Ancient Woodland 5 (B4256 Morgan Street)	0.005	No, screen out	-	0.09
E17	Ancient Woodland 6 (Tredegar)	0.004	No, screen out	-	0.08
E18	Ancient Woodland 7 (Belle Vue)	0.005	No, screen out	-	0.08
E19	Ancient Woodland 8 (A467)	0.002	No, screen out	-	0.08
E20	Garnlydan (SINCs)	0.051	No, screen out	-	0.13
E21	Garnlydan (SINCs)	0.012	No, screen out	-	0.09
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	0.027	No, screen out	-	0.11
E23	Hirgan Fields Grassland (SINCs)	0.026	No, screen out	-	0.11
E24	Land at Park View, Beaufort (SINCs)	0.007	No, screen out	-	0.09
E25	Land off Parkhill Crescent (SINCs)	0.004	No, screen out	-	0.08
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	0.036	No, screen out	-	0.12
E27	Nant-y-Croft, Rassau (SINCs)	0.030	No, screen out	-	0.11
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	0.007	No, screen out	-	0.09
E29	Rassau Pond SO1512/198 (SINCs)	0.018	No, screen out	-	0.10
E30	Rhyd y blew (SINCs)	0.016	No, screen out	-	0.10
E31	Waun y Pound (SINCs)	0.010	No, screen out	-	0.09

B7.7 HCl concentrations

Table B7.7 Predicted HCl concentrations and total deposition at sensitive ecological sites

Ecological receptor ID	Proposed modelled HCl (PC) (µg/3)	HCl dry deposition (PC) (kg/ha/yr)	HCl wet deposition (PC) (kg/ha/yr)	HCl annual mean total deposition (PC) (kg/ha/yr)
E1	0.29	2.23	0.0063	2.24
E2	0.28	5.23	0.0061	5.23
E3	0.29	5.26	0.0061	5.27
E4	0.29	2.20	0.0062	2.21
E5	0.28	2.17	0.0061	2.18
E6	0.28	2.17	0.0061	2.18
E7	0.28	2.17	0.0061	2.17
E8	0.30	2.27	0.0064	2.28
E9	0.28	2.18	0.0061	2.19
E10	0.30	2.30	0.0064	2.30
E11	0.34	2.59	0.0072	2.59
E12	0.29	5.32	0.0062	5.33

Ecological receptor ID	Proposed modelled HCl (PC) (µg/3)	HCl dry deposition (PC) (kg/ha/yr)	HCl wet deposition (PC) (kg/ha/yr)	HCl annual mean total deposition (PC) (kg/ha/yr)
E13	0.29	5.36	0.0063	5.37
E14	0.28	5.21	0.0061	5.22
E15	0.29	5.32	0.0062	5.33
E16	0.29	5.25	0.0061	5.26
E17	0.28	5.22	0.0061	5.23
E18	0.29	5.33	0.0062	5.33
E19	0.28	5.21	0.0061	5.22
E20	0.32	2.45	0.0069	2.46
E21	0.29	2.24	0.0063	2.25
E22	0.29	2.25	0.0063	2.25
E23	0.29	2.21	0.0062	2.21
E24	0.29	2.25	0.0063	2.25
E25	0.29	2.21	0.0062	2.22

Ecological receptor ID	Proposed modelled HCl (PC) (µg/3)	HCl dry deposition (PC) (kg/ha/yr)	HCl wet deposition (PC) (kg/ha/yr)	HCl annual mean total deposition (PC) (kg/ha/yr)
E26	0.30	2.29	0.0064	2.30
E27	0.29	2.22	0.0062	2.22
E28	0.29	2.19	0.0061	2.20
E29	0.30	5.60	0.0065	5.60
E30	0.29	5.42	0.0063	5.42
E31	0.29	2.21	0.0062	2.21

B7.8 Nutrient nitrogen deposition

Table B7.8 Nutrient nitrogen deposition critical loads and background deposition levels

Ecological receptor ID	Designated area	Most sensitive habitat	Minimum CLNN (kg N/ha/yr)	Background N dep (kg N/ha/yr)
E1	Beaufort Hills Pond and Woodland LNR	Neutral grassland	10	19.74
E2	Trevor Rowson LNR	Woodlands	10	30.8
E3	Sirhowy Hill Woodlands and Cardiff Pond LNR	Woodlands	10	30.8
E4	Parc Nant-y-Waun LNR	Grassland	10	30.8
E5	Parc Bryn Bach LNR	Neutral grassland	10	20.72

Ecological receptor ID	Designated area	Most sensitive habitat	Minimum CLNN (kg N/ha/yr)	Background N dep (kg N/ha/yr)
E6	No habitat interest features listed - not sensitive to acid or nitrogen deposition	NA	NA	NA
E7	Cwm Clydach SSSI/ Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	Non-Mediterranean dry acid and neutral open grassland, including inland dune grassland	8	19.2
E8	Mynydd Llangynidr SSSI	Non-Mediterranean dry acid and neutral open grassland, including inland dune grassland	8	18.8
E9	Mynydd Llangynidr SSSI	Non-Mediterranean dry acid and neutral open grassland, including inland dune grassland	8	18.8
E10	Safleodd Ystlumod Wysg SAC	Degraded raised bogs still capable of natural regeneration	5	19.3
E11	Safleodd Ystlumod Wysg SAC	Degraded raised bogs still capable of natural regeneration	5	19.3
E12	Ancient Woodland 1 (B4560)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	28.28
E13	Ancient Woodland 2 (The Brecon Beacons)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	28.7
E14	Ancient Woodland 3 (Main Road)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	29.68

Ecological receptor ID	Designated area	Most sensitive habitat	Minimum CLNN (kg N/ha/yr)	Background N dep (kg N/ha/yr)
E15	Ancient Woodland 4 (A4281/ A4046)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	29.26
E16	Ancient Woodland 5 (B4256 Morgan Street)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	31.22
E17	Ancient Woodland 6 (Tredegar)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	31.08
E18	Ancient Woodland 7 (Belle Vue)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	30.8
E19	Ancient Woodland 8 (A467)	Ancient semi natural woodland so consider it as broadleaved, mixed and yew woodland for APIS purposes	10	31.08
E20	Garnlydan (SINCs)	Neutral grassland	10	19.74
E21	Garnlydan (SINCs)	Neutral grassland	10	19.74
E22	Highway verge – Section 1 – Bryn Serth Road (SINCs)	Neutral grassland	10	18.34
E23	Hirgan Fields Grassland (SINCs)	Neutral grassland	10	18.34
E24	Land at Park View, Beaufort (SINCs)	Neutral grassland	10	19.74
E25	Land off Parkhill Crescent (SINCs)	Neutral grassland	10	19.74

Ecological receptor ID	Designated area	Most sensitive habitat	Minimum CLNN (kg N/ha/yr)	Background N dep (kg N/ha/yr)
E26	Land to the rear of Glyndwr road, Rassau (SINCs)	Neutral grassland	10	19.74
E27	Nant-y-Croft, Rassau (SINCs)	Neutral grassland	10	18.34
E28	Pond Group 2, Brynmawr/Beaufort Hill (SINCs)	NA as E28 is standing water	NA	NA
E29	Rassau Pond SO1512/198 (SINCs)	NA as E29 is standing water	NA	NA
E30	Rhyd y blew (SINCs)	NA as E30 is standing water	NA	NA
E31	Waun y Pound (SINCs)	Neutral grassland	10	30.8

Table B7.9 Effects as a percentage of minimum critical load

Ecological receptor ID	Process contribution Total N (kg N/ha/yr)	PC/CL (%)
E1	0.01	0.11
E2	0.01	0.07
E3	0.01	0.10
E4	0.01	0.07
E5	0.00	0.03
E6	0.00	NA
E7	0.00	0.03
E8	0.01	0.19
E9	0.00	0.05
E10	0.02	0.36
E11	0.05	1.07
E12	0.01	0.15
E13	0.02	0.18
E14	0.00	0.05

Ecological receptor ID	Process contribution Total N (kg N/ha/yr)	PC/CL (%)
E15	0.04	0.43
E16	0.01	0.09
E17	0.01	0.06
E18	0.02	0.15
E19	0.01	0.05
E20	0.04	0.37
E21	0.05	0.52
E22	0.01	0.12
E23	0.05	0.49
E24	0.01	0.12
E25	0.01	0.08
E26	0.02	0.17
E27	0.02	0.19
E28	0.00	NA
E29	0.00	NA
E30	0.00	NA
E31	0.01	0.08

B7.9 Acid deposition

Table B7.10 Maximum nitrogen and sulphur deposition at the designated areas

Ecological receptor ID	PC N dep (keq N/ha/yr)	PC S dep (keq N/ha/yr)
E1	0.00076	0.00339
E2	0.00046	0.00120
E3	0.00071	0.00181

Ecological receptor ID	PC N dep (keq N/ha/yr)	PC S dep (keq N/ha/yr)
E4	0.00049	0.00217
E5	0.00020	0.00088
E6	NA	NA
E7	0.00019	0.00084
E8	0.00106	0.00471
E9	0.00029	0.00131
E10	0.00130	0.00581
E11	0.00381	0.01700
E12	0.00104	0.00269
E13	0.00128	0.00332
E14	0.00035	0.00092
E15	0.00306	0.00272
E16	0.00062	0.00160
E17	0.00043	0.00111
E18	0.00108	0.00281
E19	0.00036	0.00093
E20	0.00264	0.01176
E21	0.00369	0.00362
E22	0.00088	0.00391
E23	0.00349	0.00230
E24	0.00085	0.00379

Ecological receptor ID	PC N dep (keq N/ha/yr)	PC S dep (keq N/ha/yr)
E25	0.00058	0.00259
E26	0.00125	0.00552
E27	0.00134	0.00273
E28	NA	NA
E29	NA	NA
E30	NA	NA
E31	0.00054	0.00238

B8 Cumulative impacts sensitivity testing results

Cumulative effects screening results

Table B8.1 provides the results of the assessment. It can be seen that for the majority of pollutants, the cumulative percentage increase which would be required to generate a result of a moderate adverse impact at worst case receptor locations is over 50%. There are three pollutants which have an increase required of less than 50% (NO_2, PM_{10} 24-hr and Nickel). The cumulative risk of impacts for NO_2 and PM_{10} are considered to be low risk as a 40% and 42% increase for PM_{10} and NO_2 respectively still represents a large increase in concentrations. The impact from the Part A processes would have to be 50 to 84 times that being added by the proposed development for PM_{10} and NO_2 respectively in order to result in a moderate adverse impact.

Nickel is the pollutant with the smallest percentage required to result in a moderate adverse impact with a 30% cumulative increase required at the worst-case receptor. The impact from the Enviro Wales site (as Yuasa does not emit Nickel) would have to be seven times the amount as being added by the proposed development respectively in order to result in a moderate adverse impact.

In order to review if that increase is at risk of occurring, the Enviro Wales 2020 permit reporting forms[15] have been reviewed. The emission limit value (ELV) for the metals including Nickel is 2mg/m^3 for each of the four point sources which emit metals. Assuming the total Nickel percentage emitted is in line with the EA guidance[16] (3% for Nickel) the total Nickel being emitted would be 0.35% of the total ELV. Comparing that with the amount emitted by the proposed development is difficult as the volumetric flows from the Enviro Wales site are not known, however, to give some context, the Nickel percentage from the proposed development is 69% of the ELV, which is much larger than the 0.35% of the ELV from the Enviro Wales site. Therefore, there is a low risk that the Enviro Wales site would increase concentrations by enough to result in a moderate adverse impact.

Table B8.1 Results of the assessment (worst case receptor locations)

Pollutants from cumulative sites	**Percentage increase required to result in a moderate adverse impact**	**Increase in baseline required to result in moderate adverse impact**	**Contribution required in comparison to the proposed development emissions**
PM_{10} (µg/m^3)	76%	31.3	323
PM_{10} 24-hr (µg/m^3)	40%	13.1	50

[15] Rassau Recycling Facility, Enviro Wales, Permit number: EP3230BW Form Number: Air1/02/11/17 Reporting emissions to air for the year 2020

[16] Environment Agency, Releases from waste incinerators, Guidance on assessing group 3 metal stack emissions from incinerators

Pollutants from cumulative sites	Percentage increase required to result in a moderate adverse impact	Increase in baseline required to result in moderate adverse impact	Contribution required in comparison to the proposed development emissions
NO_2 (µg/m^3)	42%	17.1	84
Cadmium (ng/m^3)	93%	4.4	52
Copper (µg/m^3)	100%	10.3	159703
Lead (µg/m^3)	97%	0.3	7876
Nickel (ng/m^3)	30%	5.7	7
Antimony (µg/m^3)	100%	5.1	161570
Tin (µg/m^3)	100%	2060.0	1661103
Arsenic (ng/m^3)	88%	5.5	174
Selenium (µg/m^3)	100%	1.0	12074
Chromium (µg/m^3)	-171%	-0.0004	-1253

B8.1 Cumulative effects H1 assessment results

The stage one screening results are presented in Table B8.2. The results indicate the process contribution (PC) from Nickel can be screened out. The results for stage one show that NO_2 needs to progress to stage two screening which takes into account background concentration. The result for stage two screening is presented in Table B8.3.

Table B8.2: H1 screening results – air impact screening stage one

Pollutant	Long term EAL (µg/m^3)	Short term EAL (µg/m^3)	Long term		
			PC (µg/m^3)	%PC of EAL	>1% of EAL
NO_2	40	200	3.35	8.37	Yes
Nickel	0.0201	-	0.000035	0.178	No

Table B8.3: H1 screening results – air impact screening stage two

Pollutant	BG conc (µg/m^3)	PC (µg/m^3)	Long term			%PEC of EAL >=70?
			% PC of headroom	PEC	>PEC of EAL	
NO_2	7.7	3.35	10.4	8.3711.0	27.7	No

The results of the stage two screening show that no further assessment would be required for the facility. It is useful to reflect on the information from the cumulative assessment which confirms that the predicted maximum concentration of 3.4µg/m^3 from the Enviro Wales Ltd site is helpful. This is clearly well below the 17.1µg/m^3 increase required at off-site receptors over 500m to the south. In addition, the Ni maximum process contribution of 0.35ng/m^3 is well below the 5.7ng/m^3 increase required to result in a moderate adverse impact.

B8.2 Cumulative effects conclusion

The assessment following the EPUK guidance and additional assessment using the EA H1 tool has demonstrated the low risk of a cumulative effect from the two existing Part A processes resulting in a conclusion of no significant impact from the proposed development.

Appendix C

Climate Change

C1 Greenhouse Gas assessment

Table C1.1 GHG assessment assumptions

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Construction stage (A1-A3)													
Substructure	Standard foundations												
Substructure	Strip footing to LPG Tank 600x900dp	m3	35.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	84,000.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Isolated pad foundations to Security Building 900mm thick	m²	18.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	38,880.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Isolated pad foundations RMS-C & LPG Building 1300mm thick	m²	81.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	252,720.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3

[1] Material units are represented by the carbon factor variable units. For example, the material unit is 'kg' where the carbon factor unit is '$kgCO_2e/kg$' or is 'm^2' where the carbon factor unit is '$kgCO_2e/m^2$'.

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	Isolated pad foundations to North Stack (Flue)	m³	338.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	811,200.00	ICE V3.0	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Foundation to lifts	nr	20.00	Gleeds BoQ	Steel frame foundation	10.4	kgCO2e/m2	30.80	Carbon Insights Platform (Arup Concept Design Guide 2017, BCO Guide 2019, RICS Whole Life Carbon Assessment for the Built Environment 2017, ICE Database v3.0b 2019, Arup PECC 2020)	Proxy A1-A5	Carbon Insights Platform card name: Frame Foundation - Steel Superstructure Lift floor area of 1100mm x 1400mm	1.54	m2

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	Lowest floor construction												
Substructure	Basement Slabs												
Substructure	Batch Charge Elevator Basement Slab 800mm thick	m2	215.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	412,800.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Diesel Tanks Slab 600mm thick	m2	326.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	469,440.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Furnace Slabs 500mm thick	m2	1,066.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,279,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Fusion Pool Slabs 600mm thick	m2	991.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,427,040.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additi onal units
Substructure	Service Tunnel Slabs 400mm thick	m2	726.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/ kg	696,960. 00	ICE V2.0 (Reinforc ement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Silo 1 Basement Slab 300mm thick	m2	200.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/ kg	144,000. 00	ICE V2.0 (Reinforc ement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Silo 2 Basement Slab 300mm thick	m2	199.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/ kg	143,280. 00	ICE V2.0 (Reinforc ement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Utilities Basement slab 400mm thick	m2	3,323.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/ kg	3,190,08 0.00	ICE V2.0 (Reinforc ement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Cullet Basements slab	m2	919.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/ kg	1,764,48 0.00	ICE V2.0 (Reinforc ement factor) & 3.0	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	800mm thick								(Material factor)				
Substructure	RC32/40 Concrete	m3	3,970.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	9,528,000.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Edge of Slab 250-500mm (estimated)	m2	960.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	1,152,000.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Reinforcement-115kg/m3	T	457.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	457,000.00	ICE V3.0	Direct from ICE			
Substructure	GF Slabs												
Substructure	GF Slab 300mm thick	m2	13,524.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	9,737,280.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab 400mm thick	m2	10,843.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	10,409,280.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab 1000mm thick	m2	1,067.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	2,560,800.00	ICE V2.0 (Reinforcement factor) & 3.0	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
									(Material factor)				
Substructure	GF Slab to Batch Charge; assumed 400mm thick	m²	585.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	561,600.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to Batch Charge Elevator; assumed 600mm thick	m²	215.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	309,600.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to Substation 300mm	m²	39.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	28,080.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Warehouse Slab 450mm thick	m²	17,410.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	18,802,800.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to Silo 1	m²	200.00	Gleeds BoQ	Concrete 32/40 MPa	0.202	kgCO2e/kg	144,000.00	ICE V2.0 (Reinforc	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	300mm thick				30-35% Fly Ash				ement factor) & 3.0 (Material factor)				
Substructure	GF Slab to Silo 2 300mm thick	m²	199.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	143,280.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to Cullets 500mm thick	m²	919.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,102,800.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to Security Building 200mm thick	m²	74.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	35,520.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to RMS-C and LPG Building/Tank 275mm suspended slab	m²	500.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	330,000.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	GF Slab to Filter 1 350mm thick	m²	1,315.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,104,600.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slab to Filter 2 400mm thick	m²	1,314.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,261,440.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Utilities GF slab 300mm thick	m2	4,666.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	3,359,520.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Utilities Water Tank suspended slab 1000mm thick	m2	588.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,411,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	GF Slabs to Core Areas assumed	m2	485.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	349,200.00	ICE V2.0 (Reinforcement factor) & 3.0	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	300mm thick								(Material factor)				
Substructure	Cullet Storage Slab 500mm thick	m2	2,483.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	2,979,600.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Screed to Cullet storage slab; 75mm thick	m2	2,483.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	446,940.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	RC32/40 Concrete	m3	19,205.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	46,092,000.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Soffit Formwork; Height 3-4.5m (Plain Finish)	m2	55,336.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	2766800	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Substructure	Soffit Formwork; Height 4.5-6m (Plain Finish)	m2	1,088.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	54400	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Substructure	Edge of Slab 250-	m2	3,026.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	3,631,200.00	ICE V3.0	Direct from ICE		2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	500mm (estimated)												
Substructure	Reinforcement-115kg/m3	T	2,209.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	2,209,000.00	ICE V3.0	Direct from ICE			
Substructure	Concrete Lids/Roof												
Substructure	Concrete lids to service tunnels located outside building 400mm thick area assumed to be between furnace and utilities	m²	117.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	112,320.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete lid to Diesel Tanks 400mm thick	m²	326.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	312,960.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	RC32/40 Concrete	m3	178.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	427,200.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Soffit Formwork; Height 4.5-	m2	443.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	22150	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	6m (Plain Finish)												
Substructure	Edge of Slab 250-500mm (estimated)	m2	116.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	139,200.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Reinforcement-115kg/m3	T	21.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	21,000.00	ICE V3.0	Direct from ICE			
Substructure	Concrete Walls												
Substructure	Concrete walls to Diesel Tanks 500mm thick	m²	376.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	451,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete walls to Fusion Pools; 500mm thick; assumed 4m high	m²	1,148.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,377,600.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete walls to Service Tunnels; 300mm thick;	m²	2,258.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,625,760.00	ICE V2.0 (Reinforcement factor) & 3.0	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	assumed 4m high								(Material factor)				
Substructure	Concrete walls to Furnace Basement; 400mm thick; assumed 4m high	m²	996.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	956,160.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete walls to Cullets; 700mm thick; 13.5m high	m²	2,892.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	4,858,560.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete walls to Utilities building basement; 300mm thick; 4m high	m²	1,254.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	902,880.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete walls to Utilities water tank; 350mm thick; 9m high	m²	2,020.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	1,696,800.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	Concrete Walls to Silo 1; 500mm thick; assumed 4m high	m²	236.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	283,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Concrete Walls to Silo 2; 500mm thick; assumed 4m high	m²	236.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	283,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Allowance for tanking to basement walls	m²	11,416.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	13,699,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	500mm thick, 100 kg steel rebar / m3	2400	kg/m3
Substructure	RC40/50 Concrete	m3	5,134.00	Gleeds BoQ	Concrete 40/50 Mpa	0.159	kgCO2e/kg	12,321,600.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Edge of slab 250-500mm (estimated)	m2	22,832.00	Gleeds BoQ	Concrete 40/50 Mpa	0.159	kgCO2e/kg	27,398,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Reinforcement-assumed 150kg/m3	T	770.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	770,000.00	ICE V3.0	Direct from ICE			

Category	**Item**	**Item unit**	**Item Quantity**	**Data source**	**Material name**	**Carbon factor**	**Carbon factor unit**	**Material Quantity** [1]	**Carbon Factor Source**	**Methodology**	**Assumptions**	**Additional figures**	**Additional units**
Substructure	Kicker walls	m	1,999.00	Gleeds BoQ	Concrete 40/50 Mpa	0.159	kgCO2e/kg	359,820.00	ICE V3.0	Direct from ICE	150mm high, 500mm thick	2400	kg/m3
Substructure	Ground Beams												
Substructure	600x600 Ground Beams to areas with no slab	m3	588.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	1,411,200.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	600x600 RC Beam to Furnace Platform	m3	595.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	1,428,000.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	600x700dp Ground Beam to Silos	m3	12.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	28,800.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	600x700dp Ground Beams to Batch Charge	m3	136.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	326,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	600x1100 Ground Beams to 400mm thick slab	m3	4,716.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	11,318,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	RC32/40 Concrete for Ground Beams	m3	6,100.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	14,640,000.00	ICE V3.0	Direct from ICE		2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	500-1000mm Formwork (edge of beam)	m	7,530.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	37650	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Substructure	Exc 1000mm Forwork (edge of beam)	m2	7,860.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	393,000.00	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Substructure	Reinforcement 245kg/m3	T	1,495.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	1,495,000.00	ICE V3.0	Direct from ICE			
Substructure	Column Thickenings												
Substructure	3.5x3.5x1.5 dp	m3	1,029.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	2,469,600.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	3.8x3.8x1.5 dp	m3	1,516.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	3,638,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Utilities Building; 4x4x1.5m dp	m3	2,112.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	5,068,800.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	RC32/40 Concrete	m3	65.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	156,000.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Reinforcement 245kg/m3	T	16.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	16,000.00	ICE V3.0	Direct from ICE			
Substructure	Weighbridge												

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	RC Walls below weighbridge; 300mm thick; assumed 0.5m dp; 15x3m	m3	5.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	12,000.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	RC32/40 Concrete; 300mm thick slab under weighbridge	m3	14.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	33,600.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Soffit Formwork; Height 3-4.5m (Plain Finish)	m2	45.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	2250	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Substructure	Edge of Slab 250-500mm (estimated)	m2	27.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	32,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Substructure	Reinforcement-115kg/m3	T	2.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	2,000.00	ICE V3.0	Direct from ICE			
Substructure	Specialist foundations												
Substructure	Piled foundations:												

Category	**Item**	**Item unit**	**Item Quantity**	**Data source**	**Material name**	**Carbon factor**	**Carbon factor unit**	**Material Quantity** [1]	**Carbon Factor Source**	**Methodology**	**Assumptions**	**Additional figures**	**Additional units**
Substructure	Piling mats/platforms: details, including thickness of mat/platform (mm), to be stated.	m²	48,311.00	Gleeds BoQ	Aggregate	0.00747	kgCO2e/kg	37,875,824.00	ICE V3.0	Direct from ICE	350mm thick	2240	kg/m3
Substructure	Main Building Piles												
Substructure	Piles: 600mm Dia average length 14m (1598 nr)	m	21,653.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	15,181,281.54	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Piles: 750mm Dia average length 13m (653 nr)	m	8,489.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	9,000,780.76	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Piles: 750mm Dia average length 14m (172 nr)	m	2,408.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	2,553,172.35	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	Piles: 750mm Dia average length 7m (570 nr)	m	3,990.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	4,230,547.21	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Utilities Building Piles												
Substructure	Piles: 750mm Dia assumed 7m (192 nr)	m	1,344.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	1,425,026.43	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Warehouse Piles												
Substructure	Piles: 600mm Dia average length 12m (766 nr)	m	9,192.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	6,237,544.25	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Piles: 750mm Dia average length 12m (276 nr)	m	3,312.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	3,511,672.27	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Batch Building Piles												

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	Piles: 600mm Dia average length 8m (97 nr)	m	776.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	526,581.19	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Silos Piles												
Substructure	Piles: 600mm Dia average length 8m (36 nr)	m	288.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	195,432.20	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Filter Piles												
Substructure	Piles: 600mm Dia average length 9m (36 nr)	m	324.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	219,861.22	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3
Substructure	Chimney stack piles												
Substructure	Piles: 600mm Dia average length 9m (20 nr)	m	180.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	122,145.12	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3

Category	**Item**	**Item unit**	**Item Quantity**	**Data source**	**Material name**	**Carbon factor**	**Carbon factor unit**	**Material Quantity [1]**	**Carbon Factor Source**	**Methodology**	**Assumptions**	**Additional figures**	**Additional units**
Substructure	Pile Caps to Main Building												
Substructure	Total pile cap volume as per ARUP schedule	m³	10,904.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	26169600	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Piled raft foundation to South Stack (Flue)												
Substructure	Pile cap 13x13x2dp	m³	338.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	811200	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Piles 0.6x9m long	m	180.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	122,145.12	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	20 Nr, 200 kg rebar per m3	2400	kg/m3
Substructure	600mm dia Piles at 8m length (inc. 3m rock socket) to Silos	m	288.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	195,432.20	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	36 Nr, 200 kg rebar per m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	600mm dia Piles at 8m length (inc. 3m rock socket) to Batch Charge	m	720.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	488,580.49	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	90 Nr, 200 kg rebar per m3	2400	kg/m3
Substructure	Silos												
Substructure	Pile Cap 1 - 2700x2400x1500	m³	39.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	93600	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Pile Cap 2 - 2700x900x1500	m³	44.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	105600	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Batch Charge												
Substructure	Pile Cap 1 - 4500x2700x1500	m³	146.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	350400	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Substructure	Pile Cap 2 - 13500x900 x1500	m³	73.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	175200	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Pile Cap 4 - 4500x4400 x1500	m³	30.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	72000	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Substructure	Pile Cap 5 - 7200x3700 x1500	m³	40.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	96000	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Superstructure	Frame												
Superstructure	Walls: concrete core walls, 250mm thick	m²	21,139.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	12,683,400.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Superstructure	Concrete internal walls to	m2	499.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	119,760.00	ICE V3.0	Direct from ICE	100mm thick	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	hazardous waste building												
Superstructure	extra for fair face	m²	21,139.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	5,073,360.00	ICE V3.0	Direct from ICE	100mm thick	2400	kg/m3
Superstructure	Beams - costs calculated below (lines 25-27)												
Superstructure	RC Beam Type 1500 x 500dp	m	493.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	110,925.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 2 500 x 800dp	m	1,123.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	134,760.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 3 500 x 700dp	m	3,410.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	358,050.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 4 700 x 700dp	m	21,899.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	3,219,153.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 5 1250 x 700dp	m	256.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	67,200.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 7 1400 x 700dp	m	1,028.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	302,232.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 8 400 x 600dp	m	635.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	45,720.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	RC Beam Type 9 700 x 1000dp	m	3,847.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	807,870.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 10 1000 x 1000dp	m	665.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	199,500.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 11 1250 x 1000dp	m	1,244.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	466,500.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam Type 13 700 x 1200dp	m	296.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	74,592.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	600x600 RC Beams to Water Tanks	m	224.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	24,192.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam 350x700dp	m	104.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	7,644.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam 600x900dp	m	146.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	23,652.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC Beam 600x600mm	m	204.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	22,032.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC32/40 Concrete for Beams	m3	21,381.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	51,314,400.00	ICE V3.0	Direct from ICE		2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	Beam formwork (soffit and edge) 500N/mm2	m2	63,856.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	3192800	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Superstructure	Reinforcement 245kg/m3	T	5,239.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	5,239,000.00	ICE V3.0	Direct from ICE			
Superstructure	Steel Beams - to be confirmed costs												
Superstructure	457x152x52 UB to Cullet Building	tonne	82.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	82,000.00	ICE V3.0	Direct from ICE			
Superstructure	914x305x201 UB to Cullet Building	tonne	66.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	66,000.00	ICE V3.0	Direct from ICE			
Superstructure	Bracing 150x75x18 PFC to Cullet Building	tonne	38.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	38,000.00	ICE V3.0	Direct from ICE			
Superstructure	163x6.3 CHS (Bracing) to Silos Roof	tonne	33.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	33,000.00	ICE V3.0	Direct from ICE			
Superstructure	533x210x101 UB to Silos	tonne	115.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	115,000.00	ICE V3.0	Direct from ICE			

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	610x229x140 UB to Silos Roof	tonne	16.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	16,000.00	ICE V3.0	Direct from ICE			
Superstructure	762x267x173 UB to Silos	tonne	30.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	30,000.00	ICE V3.0	Direct from ICE			
Superstructure	762x267x173 UB to Silos Roof	tonne	22.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	22,000.00	ICE V3.0	Direct from ICE			
Superstructure	914x305x224 UB to Silos	tonne	20.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	20,000.00	ICE V3.0	Direct from ICE			
Superstructure	356x171x42 UB (Steel) to Security Building	tonne	2.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	2,000.00	ICE V3.0	Direct from ICE			
Superstructure	533x210x92 UB (Steel) to RMS-C and LPG	tonne	10.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	10,000.00	ICE V3.0	Direct from ICE			
Superstructure	CHS 114x5	tonne	0.47	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	470.00	ICE V3.0	Direct from ICE			
Superstructure	10% allowance for Steel fittings and connections	tonne	43.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	43,000.00	ICE V3.0	Direct from ICE			

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	Fire protection	tonne	476.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	476,000.00	ICE V3.0	Direct from ICE			
Superstructure	Columns - costs calculated lines 60-62												
Superstructure	Column Type CC1 800x1200mm	m	1,308.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	376,704.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	Column Type CC2 700 x 1200mm	m	3,846.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	969,192.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	Column Type CC3 800 x 800mm	m	2,883.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	553,536.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	Column Type CC4 700 x 700mm	m	10,153.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	1,492,491.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	Column Type CC5 600 x 600mm	m	13,032.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	1,407,456.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	Column Type CC6 950 x 950mm	m	455.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	123,191.25	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	500x800 RC Column	m	76.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	9,120.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	to Cullet Buildings												
Superstructure	400x400 RC Columns to Diesel Tanks	m	10.40	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	499.20	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	1500x700 piers to Water Tanks	m3	565.00	Gleeds BoQ	Concrete 32/40 Mpa	0.215	kgCO2e/kg	177,975.00	ICE V3.0	Direct from ICE	8m spacing, 100 kg steel rebar / m3	2400	kg/m3
Superstructure	RC32/40 Concrete for Columns	m3	17,006.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	40,814,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	Formwork 500N/mm2	m2	93,089.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	4,654,450.00	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Superstructure	Reinforcement 245kg/m3	T	4,167.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	4,167,000.00	ICE V3.0	Direct from ICE			
Superstructure	Steel Columns												
Superstructure	C1 - 356x406x393 UC to Silos	tonne	57.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	57,000.00	ICE V3.0	Direct from ICE			
Superstructure	C2 - 356x406x287 UC to Silos (small)	tonne	34.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	34,000.00	ICE V3.0	Direct from ICE			

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	C2 - 356x406x287 UC to Silos	tonne	207.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	207,000.00	ICE V3.0	Direct from ICE			
Superstructure	C3 - 356x406x235 UC to Silos	tonne	118.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	118,000.00	ICE V3.0	Direct from ICE			
Superstructure	152x152x23 UC (Steel) to Security Building	tonne	1.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	1,000.00	ICE V3.0	Direct from ICE			
Superstructure	254x254x73 UC (Steel) to RMS-C & LPG	tonne	4.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	4,000.00	ICE V3.0	Direct from ICE			
Superstructure	356x406x393 UC to Cullet Buildings	tonne	213.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	213,000.00	ICE V3.0	Direct from ICE			
Superstructure	10% allowance for Steel fittings and connections	tonne	63.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	63,000.00	ICE V3.0	Direct from ICE			
Superstructure	RC Wind Shields												
Superstructure	RC32/40 Concrete	m3	439.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	1,053,600.00	ICE V3.0	Direct from ICE		2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additi onal units
Superstructure	Formwork 500N/mm2	m2	1,532.00	Gleeds BoQ	Timber	0.492826	kgCO2e/ kg	76,600.0 0	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Superstructure	Reinforcem ent- 245kg/m3	T	108.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/ kg	108,000. 00	ICE V3.0	Direct from ICE			
Superstructure	RC Bund to LPG Tanks												
Superstructure	RC32/40 Concrete for Beams	m3	3.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/ kg	7,200.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	Beam formwork (soffit and edge) 500N/mm2	m2	13.00	Gleeds BoQ	Timber	0.492826	kgCO2e/ kg	650	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Superstructure	Reinforcem ent 75kg/m3	T	1.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/ kg	1,000.00	ICE V3.0	Direct from ICE			
Superstructure	Conveyor Bridge between Batch Charge Elevator and Furnace 1												
Superstructure	Allowance for conveyor bridge between Batch Charge Elevator and Furnace 1; 125kg/m2 Steel Beams	T	44.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/ kg	44,000.0 0	ICE V3.0	Direct from ICE			

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	Allowance for open mesh flooring; over 300mm wide; 8mm thick	m2	355.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	11,076.00	ICE V3.0	Direct from ICE	Mesh = 50% mass of clean surface	7800	kg/m3
Superstructure	Allowance for guard rails; 1100mm high; assumed around edges of conveyor belt	m	129.00	Gleeds BoQ	Steel parapet	144.144	kgCO2e/m	129.00	Carbon Insights Platform (Tata Steel Design Drawings and Specification for N2 Parapet January 2011, IStructE: How to calculate embodied carbon, ICE Database v3.0b 2019)	A1-A5, Steel parapet x 52% (steel portion) to remove concrete aspect	Carbon Insights Platform card name: Steel Parapet (N2)		
Superstructure	Allowance for metal roof over	m2	355.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	27,690.00	ICE V3.0	Direct from ICE	10mm thick	7800	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	conveyor bridge												
Superstructure	Pedestrian Bridge												
Superstructure	Precast Concrete Slab 250mm thick	m2	109.00	Gleeds BoQ	Precast Concrete - Ordinary Portland Cement (OPC) concrete - CEM I based - with total cementitious content of 300 kg per m3 of concrete	0.148233	kgCO2e/kg	52,865.00	ICE V3.0	Direct from ICE		1940	kg/m3
Superstructure	RC Concrete Plinth Support 600x800dp	m3	5.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	12,000.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Superstructure	Strip Footing 1200x1500 dp	m3	18.00	Gleeds BoQ	Concrete 32/40 MPa 70% GGBS	0.217	kgCO2e/kg	43,200.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	200 kg rebar per m3	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	Reinforced Concrete Support Wall 400mm thick	m3	12.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	28,800.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Superstructure	Steel balustrades; 3 nr. stainless steel infills; 1.1m high	m	44.00	Gleeds BoQ	Steel parapet	144.144	kgCO2e/m	44.00	Carbon Insights Platform (Tata Steel Design Drawings and Specification for N2 Parapet January 2011, IStructE: How to calculate embodied carbon, ICE Database v3.0b 2019)	A1-A5, Steel parapet x 52% (steel portion) to remove concrete aspect	Carbon Insights Platform card name: Steel Parapet (N2)		
Superstructure	Upper floors												
Superstructure	Floors (costed in lines 11-17)												

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	Upper floors to Batch Charge building; RC slab 250mm thick	m2	1,754.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	1,052,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	Upper Floors to Batch Elevator	m2	1,069.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	641,400.00	ICE V3.0	Direct from ICE	250mm thick	2400	kg/m3
Superstructure	FF Slab 250mm thick	m2	27,437.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	16,462,200.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	SF 300mm thick slab	m2	32,564.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	23,446,080.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	SF Process slab 300mm thick	m2	15,235.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	10,969,200.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	Level 03 Slab to Utilities 300mm thick	m2	4,654.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	3,350,880.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	Slabs to 9mx9m	m2	367.00	Gleeds BoQ	Concrete 32/40 MPa	0.125	kgCO2e/kg	264,240.00	ICE V3.0	Direct from ICE	300mm thick	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	small building in furnaces				30-35% Fly Ash								
Superstructure	Level 2a Batch Charge 400mm thick	m2	244.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	234,240.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	RC32/40 Concrete	m3	23,596.00	Gleeds BoQ	Concrete 32/40 Mpa	0.138	kgCO2e/kg	56,630,400.00	ICE V3.0	Direct from ICE		2400	kg/m3
Superstructure	Soffit Formwork; Height 3-4.5m (plain finish)	m2	52,453.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	2622650	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Superstructure	Soffit Formwork; Height 4.5-6m (Plain Finish)	m2	30,783.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	1539150	ICE V3.0	Direct from ICE	100mm wide	500	kg/m3
Superstructure	Reinforcement; 115kg/m3	T	494.00	Gleeds BoQ	Steel, rebar (85% recycled)	1.2	kgCO2e/kg	494,000.00	ICE V3.0	Direct from ICE			
Superstructure	Cullet buildings												
Superstructure	Allowance for lightweight metal flooring to cullet buildings;	m2	2,580.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	80,496.00	ICE V3.0	Direct from ICE	Mesh = 50% mass of clean surface	7800	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	open mesh flooring; over 300mm wide; 8mm thick												
Superstructure	Allowance for guard rail to metal flooring; 1100mm high	m	1,416.00	Gleeds BoQ	Steel parapet	144.144	kgCO2e/m	1,416.00	Carbon Insights Platform (Tata Steel Design Drawings and Specification for N2 Parapet January 2011, IStructE: How to calculate embodied carbon, ICE Database v3.0b 2019)	A1-A5, Steel parapet x 52% (steel portion) to remove concrete aspect	Carbon Insights Platform card name: Steel Parapet (N2)		
Superstructure	Roof												
Superstructure	Roof structure												
Superstructure	Flat roofs: Bituminous	m²	10,553.00	Gleeds BoQ	Straight-run bitumen	0.19086	kgCO2e/kg	506,544.00	ICE V3.0	Direct from ICE	20mm thick	2400	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	concrete roof												
Superstructure	Process metal deck roof assumed Kalzip or similar	m²	38,149.00	Gleeds BoQ	Aluminium sheet, European Mix, Inc Imports	6.581176	kgCO2e/kg	1,030,023.00	ICE V3.0	Direct from ICE	10mm thick	2700	kg/m3
Superstructure	Flat roof to substation	m²	39.00	Gleeds BoQ	Straight-run bitumen	0.19086	kgCO2e/kg	1,872.00	ICE V3.0	Direct from ICE	20mm thick	2400	kg/m3
Superstructure	Roof Structure												
Superstructure	Roof structure tonnage	tonne	2,454.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	2,454,000.00	ICE V3.0	Direct from ICE			
Superstructure	10% allowance for fittings and connections	tonne	245.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	245,000.00	ICE V3.0	Direct from ICE			
Superstructure	Roof features												
Superstructure	Handrail to roof	m³	348.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	2,714,400.00	ICE V3.0	Direct from ICE		7800	kg/m3
Superstructure	Stairs and ramps												
Superstructure	Stair/ramp structures												
Superstructure	Connection bridges												

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Superstructure	Tonnage - Assumed 30kg/m2	tonne	12.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	12,000.00	ICE V3.0	Direct from ICE			
Superstructure	20% for fittings and connections	tonne	2.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	2,000.00	ICE V3.0	Direct from ICE			
Superstructure	Bridge floor construction assumed precast concrete units	m2	385.00	Gleeds BoQ	Precast Concrete - Ordinary Portland Cement (OPC) concrete - CEM I based - with total cementitious content of 300 kg per m3 of concrete	0.148233	kgCO2e/kg	560,175.00	ICE V3.0	Direct from ICE	750mm thick	1940	kg/m3
Superstructure	Metal roof to bridges	m2	385.00	Gleeds BoQ	Aluminium sheet, European Mix, Inc Imports	6.581176	kgCO2e/kg	10,395.00	ICE V3.0	Direct from ICE	10mm thick	2700	kg/m3
Superstructure	Glazed walls to bridges	m2	381.00	Gleeds BoQ	Unitised Curtain Wall	235	kgCO2e/m2	381.00	Carbon Insights Platform (CWCT Standard for Systemised	Proxy, A1-A5	Carbon Insights Platform card name: Unitised Curtain Wall - Double glazed, shadow box, 60% vision area		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
									Building Envelopers (2006), LETI design guidance for Thermal / Solar performance, BCO Specifications (2019))				
Superstructure	Stair/ramp balustrades and handrails												
Superstructure	Balustrade to terrace	m	90.00	Gleeds BoQ	Steel parapet	144.144	kgCO2e/m	90.00	Carbon Insights Platform (Tata Steel Design Drawings and Specification for N2 Parapet January 2011, IStructE: How to calculate embodied carbon,	A1-A5, Steel parapet x 52% (steel portion) to remove concrete aspect	Carbon Insights Platform card name: Steel Parapet (N2)		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
									ICE Database v3.0b 2019)				
Superstructure	External enclosing walls above ground level												
Superstructure	Concrete Facade	m2	2,668.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	320,160.00	ICE V3.0	Direct from ICE	50mm thick	2400	kg/m3
Superstructure	Grey Coloured Concrete	m2	9,495.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.125	kgCO2e/kg	1,139,400.00	ICE V3.0	Direct from ICE	50mm thick	2400	kg/m3
Superstructure	Grey Metal Fins 4.6m x 0.1m	m2	2,582.00	Gleeds BoQ	Aluminium sheet, European Mix, Inc Imports	6.581176	kgCO2e/kg	69,714.00	ICE V3.0	Direct from ICE	10mm thick	2700	kg/m3
Superstructure	Grey Metal Louvres	m2	1,824.00	Gleeds BoQ	Aluminium sheet, European Mix, Inc Imports	6.581176	kgCO2e/kg	49,248.00	ICE V3.0	Direct from ICE	10mm thick	2700	kg/m3
Superstructure	Grey Metal Panel	m2	21,118.00	Gleeds BoQ	Aluminium sheet, European Mix, Inc Imports	6.581176	kgCO2e/kg	570,186.00	ICE V3.0	Direct from ICE	10mm thick	2700	kg/m3
Superstructure	Polycarbonate cladding:	m2	16,627.00	Gleeds BoQ	Polycarbonate	7.62	kgCO2e/kg	1,014,247.00	ICE V2.0	Direct from ICE		1220	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	Based on 50mm thick panel; inc. panel and aluminium frame; requires metsec system												
Superstructure	Mesh to front of hazardous waste building	m2	160.00	Gleeds BoQ	Steel, Section (85% recycled)	1.12	kgCO2e/kg	936.00	ICE V3.0	Direct from ICE	5mm thick, Mesh = 15% mass of clean surface	7800	kg/m3
Superstructure	Render to Substation: Cavity wall; rendered block outer skin; insulation; with plaster on standard weight block inner skin; emulsion block outer skin; insulation; lightweight block inner skin outer	m2	95.00	Gleeds BoQ	Brick facade option	138.4	kgCO2e/m2	95.00	Carbon Insights Platform (CWCT Standard for Systemised Building Envelopers (2006), LETI design guidance for Thermal / Solar performance, BCO Specifica	Proxy, A1-A5	Carbon Insights Platform card name: Brick facade option - Double glazed, punch window		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
	block rendered								tions (2019))				
Superstructure	Walls to Cullet Storage 280mm thick	m2	1,837.00	Gleeds BoQ	Brick facade option	138.4	kgCO2e/m2	1,837.00	Carbon Insights Platform (CWCT Standard for Systemised Building Enveloperrs (2006), LETI design guidance for Thermal / Solar performance, BCO Specifications (2019))	Proxy, A1-A5	Carbon Insights Platform card name: Brick facade option - Double glazed, punch window		
Superstructure	Windows and external doors												
Superstructure	External doors												
Superstructure	Glazing Facade (assumed punched windows)	m2	2,450.00	Gleeds BoQ	Unitised Curtain Wall	235	kgCO2e/m2	2,450.00	Carbon Insights Platform (CWCT Standard for Systemis	Proxy, A1-A5	Carbon Insights Platform card name: Unitised Curtain Wall - Double glazed, shadow box, 60% vision area		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
									ed Building Envelopers (2006), LETI design guidance for Thermal / Solar performance, BCO Specifications (2019))				
Superstructure	Internal walls and partitions												
Superstructure	Walls to small concrete building 350mm thick in Furnaces	m3	267.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.202	kgCO2e/kg	640,800.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	100 kg steel rebar / m3	2400	kg/m3
Externals & drainage	Roads, paths and pavings												
Externals & drainage	Sub Base	m2	65,850.00	Gleeds BoQ	General aggregate	0.00747	kgCO2e/kg	147,504,000.00	HE Carbon Tool	Directly from ICE	1000mm thick	2240	kg/m3
Externals & drainage	Kerbing												

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Externals & drainage	Kerbs	m	7,418.00	Gleeds BoQ	Pre-cast concrete 125x150mm	0.132	kgCO2e/kg	319.72	HE Carbon Tool	Directly from ICE		0.0431	HE conversion factor
Externals & drainage	Concrete Haunch	m	7,418.00	Gleeds BoQ	Pre-cast concrete 125x150mm	0.132	kgCO2e/kg	319.72	HE Carbon Tool	Directly from ICE		0.0431	HE conversion factor
Externals & drainage	Paving												
Externals & drainage	PT1- In-situ exposed aggregate	m2	1,966.00	Gleeds BoQ	General aggregate	0.00747	kgCO2e/kg	2,201,920.00	HE Carbon Tool	Direct from ICE	500mm thick	2240	kg/m3
Externals & drainage	PT2-Reinforced Concrete	m2	18,373.00	Gleeds BoQ	Concrete 32/40 MPa 30-35% Fly Ash	0.2405	kgCO2e/kg	17,638,080.00	ICE V2.0 (Reinforcement factor) & 3.0 (Material factor)	Direct from ICE	400mm thick, 150 kg steel rebar / m3	2400	kg/m3
Externals & drainage	PT3- Resin bound gravel	m2	219.00	Gleeds BoQ	General aggregate	0.00747	kgCO2e/kg	245,280.00	HE Carbon Tool	Direct from ICE	500mm thick	2240	kg/m3
Externals & drainage	PT4-Gravel reinforced with Geogrids	m2	4,338.00	Gleeds BoQ	General aggregate	0.00747	kgCO2e/kg	4,858,560.00	HE Carbon Tool	Direct from ICE	500mm thick	2240	kg/m3

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Externals & drainage	PT5- Gravel (undercroft)	m2	16,696.00	Gleeds BoQ	General aggregate	0.00747	kgCO2e/kg	18,699,520.00	HE Carbon Tool	Direct from ICE	500mm thick	2240	kg/m3
Externals & drainage	PT6- Pervious asphalt	m2	4,232.00	Gleeds BoQ	RAP (recycled asphalt pavement)	0	kgCO2e/kg	0.00	HE Carbon Tool	Directly from ICE	No new asphalt procured (recycled)		
Externals & drainage	PT7- Asphalt (carriageway)	m2	12,931.00	Gleeds BoQ	General Asphalt	0.0553	kgCO2e/kg	6,594,810.00	HE Carbon Tool	Directly from ICE	600mm thick	1700	kg/m3
Externals & drainage	PT8- Asphalt (footway)	m2	2,141.00	Gleeds BoQ	General Asphalt	0.0553	kgCO2e/kg	1,091,910.00	HE Carbon Tool	Directly from ICE	300mm thick	1700	kg/m3
Externals & drainage	PT9- Timber decking	m2	4,954.00	Gleeds BoQ	Timber	0.492826	kgCO2e/kg	297,240.00	ICE V3.0	Direct from ICE	120mm wide	500	kg/m3
Externals & drainage	External drainage												
Externals & drainage	Box Culvert Option 2; precast concrete pipes; 1.8m dia	m	68.00	Gleeds BoQ	1800mm diameter precast concrete circular pipework	0.18	kgCO2e/kg	194.48	HE Carbon Tool	Directly from ICE		2.86	HE conversion factor
Externals & drainage	Typical bridge Box culvert section 1	m	18.00	Gleeds BoQ	1800mm diameter precast concrete	0.18	kgCO2e/kg	51.48	HE Carbon Tool	Directly from ICE		2.86	HE conversion factor

Category	**Item**	**Item unit**	**Item Quantity**	**Data source**	**Material name**	**Carbon factor**	**Carbon factor unit**	**Material Quantity** [1]	**Carbon Factor Source**	**Methodology**	**Assumptions**	**Additional figures**	**Additional units**
					circular pipework								
Externals & drainage	Typical bridge Box culvert section 2	m	40.00	Gleeds BoQ	1800mm diameter precast concrete circular pipework	0.18	kgCO2e/kg	114.40	HE Carbon Tool	Directly from ICE		2.86	HE conversion factor
Externals & drainage	Fencing and railings												
Externals & drainage	Site Boundary Fencing assumed 1.8m galvanised mild steel angle posts	m	2,296.00	Gleeds BoQ	Steel/wire/chain fence (includes posts)	2.76	kgCO2e/kg	8.77	HE Carbon Tool	Direct from ICE		0.00382	HE conversion factor
Externals & drainage	Utilities line (Water)	km	1.50	Matthew Evans e-mail May 24 2021	50mm dia plastic cable ducting	2.52	tCO2e/t	0.60	HE Carbon Tool	Direct from ICE		0.0004	HE conversion factor
Externals & drainage	Utilities line (Gas)	km	1.50	Matthew Evans e-mail May 24 2021	50mm dia plastic cable ducting	2.52	tCO2e/t	0.60	HE Carbon Tool	Direct from ICE		0.0004	HE conversion factor
Externals & drainage	Utilities line (Electricity)	km	1.50	Matthew Evans e-mail May 24 2021	Misc cable	1.86	tCO2e/t	0.64	HE Carbon Tool	Direct from ICE		0.000425	HE conversion factor
Construction stage (A4)													

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Transport	Construction workers									Direct from BEIS 2020	450 construction workers on site at any given time (a 'worst case scenario' as assumed in Transport Chapter); 35% of workforce travel 10 km two-way to and from site each day, 45% travel 20 km and 20% travel 50 km. Each drive in an 'Average Van < 3.5t' with 2 persons per vehicle		
Transport	Materials	t	866,726	Gleeds BoQ (Arup calculations)						Direct from BEIS 2020	Materials are locally sourced (assumed 50 km) and delivered in an 'Average laden rigid HGV 7.5-17t'		
Construction stage (A5)													

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Construction/installation activities	Construction/installation activities			Construction Noise Assumptions, BS5228, Matthew Evans RFI response						Utilised Construction Noise Assumptions	Activities A-F (preliminaries, earthworks, demolition, piling, drainage works and hardstanding) are assumed to be completed in 76 working days per activity. Note that some of these activities are assumed to overlap. Activity G (erection of structures) is assumed to take place over 912 working days. The average working day is assumed to be 9 hrs. Nominal fuel consumption: 0.24 kg per kWh; CO2e per kg of diesel: 3.2299 kg; 0.7752 kgCO2e per kWh		
Operational stage (B1)													
Baseline (do-minimum)													
Land-use (by habitat)	Conifer plantation (local)	ha	3.42	Chapter 7 Ecology Table 7.13		-14.5	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Mixed native broadleaved woodland (30 years)		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Land-use (by habitat)	Mixed plantation woodland (Local)	ha	1.46	Chapter 7 Ecology Table 7.14		-14.5	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Mixed native broadleaved woodland (30 years)		
Land-use (by habitat)	Dense/continuous scrub (local)	ha	1.3	Chapter 7 Ecology Table 7.15		-1.99	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Hedgerow		
Land-use (by habitat)	Semi-improved acid grassland (county)	ha	2.99	Chapter 7 Ecology Table 7.16		-0.36	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Improved grasslands		
Land-use (by habitat)	Marshy grassland - species rich (county)	ha	2.73	Chapter 7 Ecology Table 7.17		0.054	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Marshy grassland - species poor (local)	ha	5.45	Chapter 7 Ecology Table 7.18		0.054	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Ephemeral/short perennial vegetation (county)	ha	0.16	Chapter 7 Ecology Table 7.19		0.054	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Line of mixed scattered trees (local)	ha	1.37	Chapter 7 Ecology Table 7.20		-14.5	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Mixed native broadleaved woodland (30 years)		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Land-use (by habitat)	Scattered scrub (local)	ha	1.17	Chapter 7 Ecology Table 7.21		-1.99	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Hedgerow		
Land-use (by habitat)	Line of scattered scrub (local) and earth bank	ha	0.0427	Chapter 7 Ecology Table 7.22		-1.99	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Hedgerow		
Land-use (by habitat)	Standing water – ditches and ephemeral waterbodies (local)	ha	0.16	Chapter 7 Ecology Table 7.24		-0.02	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Near Natural Bog (undrained)		
Land-use (by habitat)	Acid/neutral flush (local)	ha	0.0088	Chapter 7 Ecology Table 7.25		0.054	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Amenity planting – none currently on site	ha	0	Chapter 7 Ecology Table 7.26		-0.36	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Improved grasslands		
Do-something													
Land-use (by habitat)	Conifer plantation (local)	ha	0	Chapter 7 Ecology Table 7.13		-14.5	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Mixed native broadleaved woodland (30 years)		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Land-use (by habitat)	Mixed plantation woodland (Local)	ha	1.78	Chapter 7 Ecology Table 7.14		-14.5	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Mixed native broadleaved woodland (30 years)		
Land-use (by habitat)	Dense/continuous scrub (local)	ha	0	Chapter 7 Ecology Table 7.15		-1.99	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Hedgerow		
Land-use (by habitat)	Semi-improved acid grassland (county)	ha	3.22	Chapter 7 Ecology Table 7.16		-0.36	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Improved grasslands		
Land-use (by habitat)	Marshy grassland - species rich (county)	ha	0	Chapter 7 Ecology Table 7.17		0.054	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Marshy grassland - species poor (local)	ha	3.45	Chapter 7 Ecology Table 7.18		0.054	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Ephemeral/ short perennial vegetation (county)	ha	0	Chapter 7 Ecology Table 7.19		0.054	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Line of mixed scattered trees (local)	ha	1.37	Chapter 7 Ecology Table 7.20		-14.5	tCO2e/ha /yr		Natural England NERR094	Direct from NERR094	Mixed native broadleaved woodland (30 years)		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Land-use (by habitat)	Scattered scrub (local)	ha	0	Chapter 7 Ecology Table 7.21		-1.99	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Hedgerow		
Land-use (by habitat)	Line of scattered scrub (local) and earth bank	ha	0	Chapter 7 Ecology Table 7.22		-1.99	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Hedgerow		
Land-use (by habitat)	Standing water – ditches and ephemeral waterbodies (local)	ha	0.3	Chapter 7 Ecology Table 7.24		-0.02	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Near Natural Bog (undrained)		
Land-use (by habitat)	Acid/neutral flush (local)	ha	0	Chapter 7 Ecology Table 7.25		0.054	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Lowland heathland & Upland heathlands		
Land-use (by habitat)	Amenity planting – none currently on site	ha	0.09	Chapter 7 Ecology Table 7.26		-0.36	tCO2e/ha/yr		Natural England NERR094	Direct from NERR094	Improved grasslands		
Operational stage (Transport)													
Transport	Employee travel	Nr	641	CiNER Glass - Personel distribution						Direct from BEIS (2020)	35% of workforce travel 10 km two-way to and from site each day, 45% travel 20 km and 20% travel 50 km. Each drive		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
											in an 'Medium petrol car' with 1 person per vehicle		
Transport	Delivery of raw materials for glass production			Raw Material Useage spreadsheet (CiNER June 2021)						Direct from BEIS (2020)	Land freight by '100% laden articulated HGV >33t'. Sea freight by 'Cargo ship > Bulk carrier'. Distance from Belgium is 1,015 km by sea. Distance from Turkey is 5,120 km by sea (https://sea-distances.org/)		
Transport	Delivery of glass bottle products to distribution centres			Operational Traffic - Air Quality outputs						Direct from BEIS (2020)	Transport mode: HGV > Articulated (3.5-33t) Distribution to 5 different centres, one 55 km from site, one 60 km, one 80 km and two 120 km from site.		
Operational stage (B6)													
Energy consumption	Furnaces (Natural gas)			Park Cam Glass Packing Production Facility Project:						Direct from BEIS (2020)	60-year design life; Furnace 1 operational 2024-2083, Furance 2 operational 2026-2083; Fuel consumption per furnace is the same as that reported in the Park		

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
				EIA Report (2011)							Cam EIA; Fuel used: Natural gas.		
Energy consumption	Electrical supply (Factory operations)	MW	30	Arup Stage 2 Report Table 1 Preliminary Load Assessment						Direct from Green Book data tables (2019)	Assumed 30MW as worst case (20-30 MW in Stage 2 report)		
Energy consumption	Heating load	MW	7.6	Arup Stage 2 Report Table 1 Preliminary Load Assessment						Direct from Green Book data tables (2019)			
Energy consumption	Cooling load	MW	1.7	Arup Stage 2 Report Table 1 Preliminary Load Assessment						Direct from Green Book data tables (2019)			

Category	Item	Item unit	Item Quantity	Data source	Material name	Carbon factor	Carbon factor unit	Material Quantity [1]	Carbon Factor Source	Methodology	Assumptions	Additional figures	Additional units
Energy recovery	Heat recovery from furnace exhaust gases	MW	7	Darrol Hargreaves e-mail on June 9 2021						Direct from Green Book data tables (2019)			
Energy generation	Solar panels	kWh /year	50,625	Arup Stage 2 Report						Direct from Green Book data tables (2019)			

C2 Climate Change Resilience Assessment

Table C2.2 CCR Assessment

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Constructio n /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likeliho od	Hazard impact consequ ence	Risk rating
1	High temperatures	Mean daily winter temperatures are expected to decrease by 0.6°C in the 2020s and by 2.9°C in the 2080s compared to the observed baseline Mean daily summer temperatures are expected to increase by 0.9°C in the 2020s and by 4.8°C in the 2080s compared to the observed baseline	Rising temperature s impact building performanc e	Increased temperatures leads to increased HVAC system power demand and increased energy consumption to cool buildings.	Operation	Buildings	Expected temperature increase is within operational range of systems designed to current standards for 20-year design life of HVAC system. Energy efficient systems to be selected.	A level of resilience reached through maintenance of system and regular replacement	Unlikely	Slight	Very Low
2	High temperatures	Mean daily winter temperatures are expected to decrease by 0.6°C in the 2020s and by 2.9°C in the 2080s compared to the observed baseline Mean daily summer temperatures are expected to increase by 0.9°C in the 2020s and by 4.8°C in the 2080s	Rising temperature s impact building performanc e	Increased temperatures and extreme heat events lead to reduced thermal performance of buildings and reduce thermal comfort of occupants	Operation	Buildings	Expected temperature increase is within operational range of systems designed to current standards for 20-year design life of HVAC system.	A level of resilience reached through maintenance of system and regular replacement	As likely as not	Slight	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
		compared to the observed baseline									
3	High temperatures	Mean daily winter temperatures are expected to decrease by 0.6°C in the 2020s and by 2.9°C in the 2080s compared to the observed baseline Mean daily summer temperatures are expected to increase by 0.9°C in the 2020s and by 4.8°C in the 2080s compared to the observed baseline	Rising temperatures impact materials performance	Increased temperatures lead to accelerated degradation of building facade materials	Operation	Buildings	Design of external building materials to current standards, monitored and maintained as per standard maintenance procedures.	A level of resilience reached through maintenance of asset	Unlikely	Slight	Very Low
4	High temperatures	Mean daily winter temperatures are expected to decrease by 0.6°C in the 2020s and by 2.9°C in the 2080s compared to the observed baseline Mean daily summer	Rising temperatures impact equipment performance	Extreme heat events lead to failure of sensitive equipment at high temperatures	Construction and Operation	Buildings	Sensitive equipment to be located in temperature-controlled areas of buildings. Building design to meet guidance in	Resilience achieved through design decisions.	Unlikely	Moderate	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
		temperatures are expected to increase by 0.9°C in the 2020s and by 4.8°C in the 2080s compared to the observed baseline					Health Technical Memoranda.				
5	High temperatures	Mean daily winter temperatures are expected to decrease by 0.6°C in the 2020s and by 2.9°C in the 2080s compared to the observed baseline Mean daily summer temperatures are expected to increase by 0.9°C in the 2020s and by 4.8°C in the 2080s compared to the observed baseline	Increased number of hot days may lead to shrinkage of soil and drying out of vegetation	Extended periods of hot days may lead to a risk of spontaneous grassland fires, causing building damage	Operation	Buildings	The site only includes managed amenity grassland which is very unlikely to combust. There is a fire strategy for the site in place, including a network of hydrants for use in the event of a fire.	Resilience achieved through design decisions	Very unlikely	Major	Low
6	High temperatures	Number of frost days (daily minimum temperature equal or lower than 0°C) is projected to decrease from 60 in the observed baseline to 25.8 days in the 2080s	Rising temperatures impact building performance	Fewer frost days leads to decreased energy consumption to heat buildings	Operation	Buildings	No mitigation required	N/A	Very unlikely	Negligible	N/A

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Constructio n /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likeliho od	Hazard impact consequ ence	Risk rating
7	High temperatures	Number of frost days (daily minimum temperature equal or lower than 0°C) is projected to decrease from 60 in the observed baseline to 25.8 days in the 2080s	Rising temperature s impact building performanc e	Fewer frost days leads to improved thermal comfort of building occupants	Operation	Buildings	No mitigation required	N/A	Very unlikely	Negligib le	N/A
8	High precipitation	Mean precipitation rates expected to increase in winter from 5.8% in the 2020's to 21.3% in the 2080s Number of days with extreme precipitation (>25mm) ti increase from 0.8 days in 2020s to 2.2 days in the 2080s	Increase in number of wet days may cause building damage	Extreme rainfall events lead to localised flooding, causing damage to building structure, internal fit-out, and equipment	Constructio n and Operation	Buildings	Masterplan design is based on detailed flood risk assessment which incorporates projected climate change.	Resilience achieved through design decisions	Unlikely	Moderat e	Low
9	High precipitation	Mean precipitation rates expected to increase in winter from 5.8% in the 2020's to 21.3% in the 2080s Number of days with extreme precipitation (>25mm) ti increase from 0.8 days in 2020s to 2.2 days in the 2080s	Increased rainfall provides a water supply to building	Extreme rainfall events lead to opportunity for rainwater harvesting	Operation	Buildings	No mitigation required	N/A	Very unlikely	Negligib le	N/A

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
10	High precipitation	Mean precipitation rates expected to increase in winter from 5.8% in the 2020's to 21.3% in the 2080s Number of days with extreme precipitation (>25mm) ti increase from 0.8 days in 2020s to 2.2 days in the 2080s	Increased rainfall can cause flooding	Increased rainfall and flooding effects can damage internal building contents.	Operation	Buildings	Masterplan design is based on detailed flood risk assessment which incorporates projected climate change. The drainage strategy is to implement SuDS components that manage surface runoff close to the source and treat surface water run off on the surface. The selected SuDS components are sized for a 1:1-year return period. The piped network will be sized to ensure no flooding occurs on-site up to a	Resilience achieved through design decisions.	Unlikely	Moderate	Low

Risk ID	**Climate hazard**	**Trend or likelihood of climate hazard**	**Potential climate change impact**	**Potential climate change risk to scheme**	**Constructio n /operation stage**	**Asset type**	**Existing or embedded mitigation measure**	**Result of mitigation measure on resilience**	**Hazard impact likeliho od**	**Hazard impact consequ ence**	**Risk rating**
							100-year rainfall event.				
11	High precipitation	Mean precipitation rates expected to increase in winter from 5.8% in the 2020's to 21.3% in the 2080s Number of days with extreme precipitation (>25mm) ti increase from 0.8 days in 2020s to 2.2 days in the 2080s	Increased rainfall may cause flooding risk from river and groundwate r sources	Extreme rainfall events lead to localised flooding of infrastructure, causing disruption to services	Constructio n and Operation	Utilities	Masterplan design is based on detailed flood risk assessment which incorporates projected climate change. The drainage strategy is to implement SuDS components that manage surface runoff close to the source and treat surface water run off on the surface. The selected SuDS components are sized for a 1:1-year return	Resilience achieved through design decisions.	Unlikely	Moderat e	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Constructio n /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likeliho od	Hazard impact consequ ence	Risk rating
							period. The piped network will be sized to ensure no flooding occurs on-site up to a 100-year rainfall event.				
12	High precipitation	Mean precipitation rates expected to increase in winter from 5.8% in the 2020's to 21.3% in the 2080s Number of days with extreme precipitation (>25mm) ti increase from 0.8 days in 2020s to 2.2 days in the 2080s	Increased rainfall may cause flooding risk from river and groundwate r sources	Extreme rainfall events lead to sewer flooding and resulting effects	Constructio n and Operation	Utilities	Masterplan design is based on detailed flood risk assessment which incorporates projected climate change. The drainage strategy is to implement SuDS components that manage surface runoff close to the source and treat surface water run off on the surface. The selected SuDS components are sized for a 1:1-	Resilience achieved through design decisions.	Very unlikely	Moderat e	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
							year return period. The piped network will be sized to ensure no flooding occurs on-site up to a 100-year rainfall event.				
13	High precipitation	Mean precipitation rates expected to increase in winter from 5.8% in the 2020's to 21.3% in the 2080s Number of days with extreme precipitation (>25mm) ti increase from 0.8 days in 2020s to 2.2 days in the 2080s	Increased rainfall may cause debris and sediment run-off	Extreme rainfall events leading to debris and sediment runoff, causing blockage to drainage systems. Blockage may result in flooding and resulting effects.	Construction and Operation	Utilities	Masterplan design is based on detailed flood risk assessment which incorporates projected climate change. The drainage strategy is to implement SuDS components that manage surface runoff close to the source and treat surface water run off on the surface. The selected SuDS components are	Resilience achieved through design decisions	Unlikely	Moderate	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
							sized for a 1:1-year return period. The piped network will be sized to ensure no flooding occurs on-site up to a 100-year rainfall event.				
14	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no precipitation) are expected to increase from 0.3 days in the 2020s to 1.1 days in the 2080s	Decreased rainfall may increase soil shrinkage	Decreased average rainfall leads to drier soil conditions and soil shrinkage, causing damage to building foundation and possible ground movement.	Operation	Buildings	Shrinkage considered in foundation design	Resilience achieved through design decisions	Very unlikely	Moderate	Low
15	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no	Extended dry weather can lead to increased desiccation of soil	Dry spells lead to desiccation of soils, causing reduced slope stability and potential earthworks	Construction and Operation	Buildings	Shrinkage considered in foundation design	Resilience achieved through design decisions	Very unlikely	Moderate	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
		precipitation) are expected to increase from 0.3 days in the 2020s to 1.1 days in the 2080s		failure following subsequent rainfall events							
16	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no precipitation) are expected to increase from 0.3 days in the 2020s to 1.1 days in the 2080s	Decreased rainfall can reduce water supply to building	Decreased average rainfall and dry spells lead to disruption to water supply to building	Operation	Buildings	Buildings connected to mains water supply. Capacity checks have been undertaken with utilities to confirm capacity within network.	Resilience already accounted for	Very unlikely	Slight	Very Low
17	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no precipitation) are expected to increase from 0.3 days in the	Decreased rainfall can reduce water supply to building	Decreased average rainfall leads to increased reliance on mains water for landscape irrigation during summer	Operation	Public realm	Landscape Management Plan includes procedures for irrigation during establishment and ongoing maintenance. Resilience of plants chosen	A level of resilience achieved through maintenance of asset	Very likely	Slight	Medium

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
		2020s to 1.1 days in the 2080s					for the design is considered				
18	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no precipitation) are expected to increase from 0.3 days in the 2020s to 1.1 days in the 2080s	Decreased rainfall can reduce water supply to building	Decreased average rainfall leads to loss of vegetation during summer	Operation	Public realm	Landscape Management Plan includes procedures for irrigation during establishment and ongoing maintenance. Resilience of plants chosen for the design is considered	A level of resilience achieved through maintenance of asset	Likely	Moderate	Medium
19	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no precipitation) are expected to increase from 0.3 days in the	Decreased rainfall may increase soil shrinkage	Decreased average rainfall leads to drier soil conditions and soil shrinkage, causing damage to underground service infrastructure	Operation	Utilities	Underground service infrastructure all within the hardstanding areas and therefore have a resilience against drier soils.	Resilience achieved through design decisions	Very unlikely	Major	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
		2020s to 1.1 days in the 2080s									
20	Low precipitation	Mean precipitation rates expected to decrease in summer from -9.9% in the 2020's to -40.0% in the 2080s Dry spells (10 days or more with no precipitation) are expected to increase from 0.3 days in the 2020s to 1.1 days in the 2080s	Increased number of dry days may lead to shrinkage of soil and drying out of vegetation	Extended periods of dry days may lead to a risk of spontaneous grassland fires, causing building damage	Operation	Buildings	The site only includes managed amenity grassland which is very unlikely to combust. There is a fire strategy for the site in place, including a network of hydrants for use in the event of a fire.	Resilience achieved through design decisions	Very unlikely	Major	Low
21	Extreme winds	NA	Increased stress due to extreme wind	High winds lead to increased stress and damage to buildings, especially material fixtures,	Operation	Buildings	Current standards include sufficient allowance for changes in wind patterns	Resilience already accounted for in design standards	Very unlikely	Major	Low

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Constructio n /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likeliho od	Hazard impact consequ ence	Risk rating
				claddings and fasteners							
22	Extreme winds	NA	High winds can cause damage to vegetation	High winds lead to damage to vegetation and trees	Operation	Public realm	Site is exposed and strong winds currently occur, layout of buildings considers mitigation of wind impacts through creation of microclimates.	Resilience achieved through design decisions.	Very unlikely	Slight	Very Low
23	Extreme winds	NA	Increased stress due to extreme wind	High winds lead to increased stress and damage to above ground utility infrastructure	Operation	Utilities	Current standards include sufficient allowance for changes in wind patterns.	Resilience already accounted for in design standards	Likely	Slight	Mediu m

Risk ID	Climate hazard	Trend or likelihood of climate hazard	Potential climate change impact	Potential climate change risk to scheme	Construction /operation stage	Asset type	Existing or embedded mitigation measure	Result of mitigation measure on resilience	Hazard impact likelihood	Hazard impact consequence	Risk rating
24	Extreme winds	NA	High winds can cause greater movement of dust in the air	High winds leads to movement of dust from construction, which can harm the health of construction workers and the public.	Construction	Public realm	Current standards include sufficient allowance for changes in wind patterns.	Resilience achieved through design decisions.	Likely	Moderate	Medium
25	Lightning	NA	Lightening effects can cause building damage	Increased lighting strikes lead to more damage, especially roofs, guttering and windows.	Operation	Buildings	A lightning protection system has been provided to furnace buildings	Resilience achieved through design decisions.	Unlikely	Slight	Very Low
26	Humidity	NA	Higher temperatures means air can carry more water vapour, causing more humidity.	Increased humidity through warmer air causes mould, condensation and decreased thermal performance of buildings.	Operation	Buildings	Current standards include sufficient allowance for changes in humidity	Resilience already accounted for in design standards	Unlikely	Slight	Very Low