

## RESPONSE TO NATURAL RESOURCE WALES PRE-APPLICATION CONSULTATION COMMENTS

### MÔR HAFREN ENERGY RECOVERY FACILITY

#### 1. Introduction

Natural Resources Wales (NRW) has provided a response to the statutory pre-application consultation for a Development of National Significance (Wales), relating to the proposed construction and operation of an energy recovery facility, including the formation of a new access on to Newlands Road and ancillary infrastructure.

This short report is provided to address the comments raised by NRW in their letter dated 13/08/2020 in relation to air quality issues both from the proposed installation itself, and from the traffic associated with the development.

#### 2. Response to Comments Regarding the Detailed Air Quality Assessment

In summary, the comments made with regard to the detailed air quality assessment were:

- 1) The Severn Estuary Special Area of Conservation (SAC) does not appear to have been assessed in the Air Quality Assessment documents.
- 2) The upper level of the nutrient Nitrogen Critical Load ( $20 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ ) has been applied to the assessment rather than the lower level ( $10 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ ) which is considered by NRW to be more appropriate.
- 3) NRW require an addendum to the Air Quality Assessment which identifies the ecological receptors that have been considered in the cumulative assessment and considers all Process Contributions.
- 4) NRW notes that it does *“not agree that if the PC is above 1% and the PEC is below 100% then the emissions are not significant.”*

##### 2.1 Severn Estuary SAC

The mapping extract over page locates the two discrete receptor points included within the model to represent the Severn Estuary, marked by yellow circles. Although these are referred to as Severn Estuary Ramsar Site 1 and 2, the locations are equally relevant to the SAC as, at these locations at least, the boundaries of the two designations are the same, as can be seen by the overlapping green and lavender coloured lines, representing the Ramsar site and SAC respectively. The site location is marked by the red star.

As noted by NRW in their response to the consultation, the Severn Estuary SAC includes pioneer, low-mid, and mid-upper saltmarshes, which should be assessed against a Critical Load range for nutrient Nitrogen of  $20 - 30 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ . As the lower end of this range has already been applied to the Severn Estuary discrete receptor locations in Table 29, and screens as insignificant, there is no further data to provide and no further investigation is required.

*See statement now included in Section 2.7.4 (page 10) of Issue 6 of the Detailed Air Quality Assessment.*

**Figure 1 Location of the Severn Estuary Ramsar and SAC Discrete Receptor Locations**



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## 2.2 Gwent Levels

Natural Resources Wales notes that the upper end of the nutrient Nitrogen Critical Load range has been applied whereas, to provide a worst-case assessment, the lower end of the range ( $10 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ ) should have been applied.

Bradley Murphy Design (BMD, ecology consultant) advised that air quality modelling for the Gwent Levels – Rumney and Peterstone SSSI should use the lower end of the Critical Load for nutrient Nitrogen deposition given for coastal floodplain and grazing for initial assessment ( $20 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ ). Their advice is set out in the Proposed Application Documents, in Technical Appendix 10, Appendix 1.2.

The Critical Load has been taken directly from the Air Pollution Information System (APIS) on the basis that is described in the SSSI citation as an "extensive area of reclaimed wet pasture". Furthermore, The Newport Local Biodiversity Action Plan highlights that most of the coastal and floodplain grazing marsh that occurs in Newport is on the Gwent Levels. APIS does not provide any specific unit data, hence the decision to use the broad habitat type from the citation.

It is noted that the reens are the key element of this SSSI. APIS only list standing open water and canals as a habitat for the SSSI, but APIS gives no critical load for nitrogen for this habitat type, hence the decision to use the broad habitat type coastal and floodplain grazing marsh which better suits the citation description reclaimed wet pasture. In terms of current condition of the SSSI, there is no suitable information on the condition of the SSSI on the NRW website or wider sources.

*See statement now included in Section 6.2 (page 31) of Issue 6 of the Detailed Air Quality Assessment.*

## 2.3 Cumulative Assessment at Ecological Receptors

When considering the assessment of cumulative effects, the data included within the pre-application Air Quality Assessment reported the maximum gridded Process Contributions only, although where relevant these were assessed against the most stringent Environmental Quality Standards, being the Environmental Assessment Levels for ecological sites. By way of an addendum to the original report, the following tables provide a summary of the differences in Process Contributions to air quality impacts at the maximum gridded point, and the Process Contributions of nutrient Nitrogen and acid deposition at each of the ecological receptors considered.

*See revised and additional tables and discussion (as below) now included in Section 7 (pages 36, 39 and 40) of Issue 6 of the Detailed Air Quality Assessment.*

**Table 1 Maximum Process Contributions from Emissions from the Môr Hafren ERF and the Cumulative Assessment Including Emissions from Trident Park (Replacement Table 34 in Detailed Air Quality Assessment)**

Pollutant	Statistic	Exceedance Threshold	Môr Hafren ERF		Cumulative Impact	
			Concentration ( $\mu\text{g m}^{-3}$ )	Percentage of the AQS	Concentration ( $\mu\text{g m}^{-3}$ )	Percentage of the AQS
NO <sub>x</sub> for ecosystems	Annual	30	2	6.7%	2.1	7.0%
Nitrogen Dioxide	Annual	40	2	5.0%	2.1	5.3%
	99.79 % Hourly	200	9.9	5.0%	9.9	5.0%
Sulphur Dioxide	Annual	20	0.5	2.5%	0.523	2.6%
	99.9 % 15 Minute	266	5.49	2.1%	5.49	2.1%
	99.73 % Hourly	350	4.87	1.4%	4.87	1.4%
	99.18 % 24-Hour	125	2.99	2.4%	2.99	2.4%
Carbon Monoxide	8-Hour Max. Rolling	10000	6.74	0.1%	6.74	0.1%
Particulate Matter	Annual	40	0.0834	0.2%	0.0881	0.2%
	90.41 % 24-Hour	50	0.389	0.8%	0.395	0.8%
VOC	Annual	5	0.166	3.3%	0.171	3.4%
Lead	Annual	0.25	0.005	2.0%	0.00523	2.1%
Dioxins	Annual	No Assessment Level	6.64E-10	-	7.11E-10	-

As confirmed in the detailed Air Quality Assessment, there is no significant difference between the model predictions for the combined emissions scenario at the location of the maximum Process Contribution across the 4km x 4km modelled grid.

**Table 2 Cumulative Contributions to Nutrient Nitrogen Deposition at Sensitive Ecological Receptors  
(New Table 36 in Detailed Air Quality Assessment)**

Receptor Name	No.	Lower Critical Load (kgN/ha/r)	Process Deposition PC (kgN/ha/yr)	Process Deposition PC (% of Critical Load)	Total Deposition as N (kgN/ha/yr)	Total Deposition as N (% of Lower Critical Load)
Newport Wetlands SSSI	E1	10	0.02	0.2%	12.3	<b>123%</b>
Gwent Levels St Brides SSSI	E2	20	0.02	0.1%	12.3	62%
Gwent Levels Rumney & Peterstone SSSI 1	E3	20	0.04	0.2%	15.8	<b>79%</b>
Gwent Levels Rumney & Peterstone SSSI 2	E4	20	0.53	<b>2.6%</b>	14.2	<b>71%</b>
Gwent Levels Rumney & Peterstone SSSI 3	E5	20	0.17	0.9%	13.9	69%
Severn Estuary Ramsar Site 1	E6	20	0.15	0.7%	10.2	51%
Severn Estuary Ramsar Site 2	E7	20	0.02	0.1%	13.7	69%
River Usk/Afon Wysg SAC	E8	20	0.01	0.1%	17.7	<b>88%</b>
Cardiff Beech Woods SAC	E9	10	0.01	0.1%	26.6	<b>266%</b>
Cwm Cydfin Leckwith SSSI	E13	21	0.02	0.1%	21.3	<b>100%</b>
Lisvane Reervoir SSSI	E14	17	0.02	0.1%	16.9	<b>100%</b>
Fforestganol A Cwm Nofydd SSSI	E15	10	0.01	0.1%	16.9	<b>169%</b>
Glamorgan Canal / Long Wood SSSI	E16	10	0.01	0.1%	26.6	<b>266%</b>
Cefn Onn SSSI	E17	10	0.01	0.1%	17.8	<b>178%</b>
Plas Machen Wood SSSI	E20	10	0.01	0.1%	25.1	<b>251%</b>
Hendre Lake West SINC	E22	20	0.13	0.7%	17.8	<b>89%</b>
Hendre Road SINC	E23	20	0.09	0.5%	13.8	69%
Wentloog Industrial Park SINC	E24	20	0.26	<b>1.3%</b>	14.0	<b>70%</b>
Rhymney Great Wharf SINC	E25	20	0.06	0.3%	13.8	69%

Note: Process Contributions to deposition which exceed 1 % of the Critical Load are highlighted in bold, as are total deposition levels (Process Contribution plus background) which exceed 70 %.

The results in the table above confirm that the cumulative levels of nutrient Nitrogen deposition are less than 1 % at each of the discrete receptors with the exception of E4 (a location within the Gwent Levels) and E24, representing the Wentloog Industrial Park SINC. The impact at most receptors is therefore screened as insignificant. At location E4 within the Gwent levels, the resultant total deposition, considering both the cumulative effects of the Môr Hafren and Trident Park facilities and the existing background nutrient Nitrogen levels, equates to 71 % of the lower Critical Load for nutrient Nitrogen deposition.

As stated earlier, exceedance of a Critical Load is not a quantitative estimate of damage to a particular habitat, but is instead "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". As such, and with the total calculated levels of nutrient Nitrogen at both sites where the process contributions cannot immediately be screened as insignificant remaining within the Critical Loads, it is considered that the potential for the development of the Môr Hafren facility to have a significant negative impact on either site is limited.

**Table 3 Cumulative Contributions to Acid Deposition at Sensitive Ecological Receptors  
(New Table 37 in Detailed Air Quality Assessment)**

Sites Affected by Acid Deposition	Newport Wetlands SSSI	Cardiff Beech Woods SAC	Cwm Cydfin Leckwith SSSI	Fforestganol A Cwm Nofydd SSSI	Glamorgan Canal / Long Wood SSSI	Cefn Onn SSSI	Plas Machen Wood SSSI	Hendre Lake West SINC	Hendre Road SINC
Acidity Critical Load (keqN/ha/yr)	4.538	11.4	11.161	1.103	2.967	4.383	2.05	2.048	4.856
Acidity Critical Load (keqS/ha/yr)	4.1	11.4	10.947	0.88	2.825	4.16	1.908	1.906	4
Deposition PC (keqN/ha/yr)	0.00121	0.000824	0.00147	0.000985	0.000858	0.000483	0.00112	0.00102	0.00930
Deposition as N (% Critical Load)	0.027%	0.007%	0.013%	0.089%	0.029%	0.011%	0.055%	0.050%	0.192%
Current Background (keqN/ha/yr)	0.88	1.9	1.52	1.21	1.9	1.27	1.79	1.79	1.26
Total Deposition as N (keqN/ha/yr)	0.881	1.901	1.521	1.211	1.901	1.270	1.791	1.791	1.269
Total Deposition as N (% of Lower Critical Load)	19%	17%	14%	<b>110%</b>	64%	29%	<b>87%</b>	<b>87%</b>	26%
Deposition PC (keqS/ha/yr)	0.000866	0.000726	0.00130	0.000869	0.000756	0.000346	0.000991	0.000896	0.006661
Deposition PC (keqCl/ha/yr)	0.000317	0.000319	0.000569	0.000382	0.000332	0.000127	0.000435	0.000394	0.00244
Deposition PC (keqF/ha/yr)	7.81E-06	3.28E-06	5.84E-06	3.92E-06	3.41E-06	3.12E-06	4.47E-06	4.04E-06	6.01E-05
Total Deposition PC (keq/ha/yr) (S, Cl & F)	0.00119	0.00105	0.00187	0.00125	0.00109	0.000476	0.00143	0.00129	0.00916
Deposition PC (% of Critical Load S, Cl & F)	0.029%	0.009%	0.017%	0.143%	0.039%	0.011%	0.075%	0.068%	0.229%
Current Background (keqS/ha/yr)	0.34	0.5	0.43	0.42	0.47	0.49	0.49	0.49	0.44
Total Deposition as S, Cl & F (keq/ha/yr)	0.3412	0.5010	0.4319	0.4213	0.4711	0.4905	0.4914	0.4913	0.4492
Total Deposition as S, Cl & F (% of Critical Load)	8%	4%	4%	48%	17%	12%	26%	26%	11%

When considering the levels of acid deposition which, it is noted, is only relevant at the sites included within the Table as the other previously considered ecological receptors are deemed to not be sensitive to acid, the cumulative process deposition of Nitrogen, Sulphur and Hydrogen-based species (HCl and HF) remain within 1 % of the Critical Loads and are therefore immediately screened as insignificant. No further assessment is therefore required.

## 2.4 Consideration of Insignificant Process Contributions

Within their pre-application consultation response, Natural Resources Wales notes that *“We do not agree that if the PC is above 1% and the PEC is below 100% then the emissions are not significant.”*

It is unclear what this comment refers to, as the air quality assessments for both process and traffic emissions have considered the screening criteria suggested by NRW, as follows:

*“For Ramsar, European and national designated sites, the guidance advises that to screen out the need for further assessment, a PC for any substance emitted from an industrial source must meet both of the following criteria:*

- *the short-term PC is less than 10% of the short-term environmental standard; and*
- *the long-term PC is less than 1% of the long-term environmental standard.”*

*“The Environment Agency risk assessment guidance states that if the PEC is less than 70% of the long-term criterion it can be deemed to be insignificant, regardless of the PC.”*

Additionally, reference is made to the EPUK / IAQM impact descriptor matrix.

## 3. Traffic Emissions

Natural Resources Wales provided the following comment on the report titled ‘Assessment of the Impact of Traffic Emissions from the Proposed Môr Hafren Bio Power Limited Energy Recovery Facility’:  
*“we consider that the increase in traffic NO<sub>x</sub> in the Gwent Levels, with a PC of above 1% and a PEC of 72% needs to be further assessed, in terms of the impact on designated sites.”*

The impacts referred to relate to two modelled locations within the Gwent Levels, which are located immediately adjacent the proposed traffic route as follows:

Receptor Location 10    Grid Reference: 323720 179061  
Receptor Location 11    Grid Reference: 323128 178660

The inputs and background data for these two locations have been reviewed and it is noted that the existing background at Receptor Location 11 has reduced from that originally reported, and is now specified as 18.57 µg NO<sub>x</sub> (as NO<sub>2</sub>) m<sup>-3</sup> on the current APIS website.

The updated table below demonstrates that this reduced background results in a Predicted Environmental Concentration (PEC) of 63 % at Receptor Location 11 and therefore, the impact of the proposed development can be screened as insignificant at this point.

Receptor Location 10 is still reported as potentially receiving a Process Contribution of 1.44 % resulting in a PEC of 73 % of the Critical Level, largely due to the background concentration already equating to approximately 72 % of the Critical Level.

**Table 4 Updated Consideration of NO<sub>x</sub> Contributions at Receptors 10 and 11 (New Table 8 in Traffic Emissions Assessment Report)**

Assessment Parameter	Receptor Location 10	Receptor Location 11
Process Contribution from Traffic Emissions ( $\mu\text{g m}^{-3}$ )	0.432	0.398
Critical Level ( $\mu\text{g m}^{-3}$ )	30	30
PC as a Percentage of the Critical Level	<b>1.44 %</b>	<b>1.33 %</b>
Background at Receptor ( $\mu\text{g m}^{-3}$ )	21.51	18.57
Predicted Environmental Concentration ( $\mu\text{g m}^{-3}$ )	21.94	18.97
PEC as a Percentage of the Critical Level	<b>73 %</b>	63 %

Although the PC is not immediately screened as insignificant at Receptor Location 11, the PEC remains within 70 % of the Critical Level and is therefore screened at the second assessment stage.

At Receptor Location 10, the Process Contribution of  $0.43 \mu\text{g m}^{-3}$  equates to 1.44 % of the Critical Level and is not immediately screened as insignificant. An associated PEC of 73 % results in the overall potential impact also not being screened at the second assessment stage. However, in their May 2020 guidance<sup>i</sup>, the Institute of Air Quality Management (IAQM) state that:

*“In the IAQM’s opinion, the 1% and 10% screening criteria should not be used rigidly and, not to a numerical precision greater than the expression of the criteria themselves. Whilst it is straightforward to generate model results for the PC to any level of precision required, the accuracy of the result is much less certain and it is unwise to place too much emphasis on whether the PC is 0.9% or 1.1%, for example. In practice, because the magnitude of impacts attributable to new sources is often around 1% of the criterion, a regulator may require the results to be presented at greater resolution, i.e. having one (or more) decimal places. The distinction here is between the presentation of the model results and the weight given to fine differences around the criterion itself in making a judgement.”*

Environmental Visage Limited supports the suggestion that, when considering the likely impact on sensitive receptors of any kind, limited weight should be given to the portion of the contributions equating to less than 1 %. In themselves, these would be considered inconsequential, are unlikely to be a precise reflection of the impact at any sensitive receptor and would probably not be measurable to any reasonable degree of accuracy. The IAQM goes on to remind the reader that:

*“It is important to remember that a change of more than 1% does not necessarily indicate that a significant effect (or adverse effect on integrity) will occur; it simply means that the change in concentration or deposition rate cannot in itself be described as numerically inconsequential or imperceptible and therefore requires further consideration.”*

Taking account of the fact that the Process Contribution from the traffic impacts is less than 2 %, and considering the IAQM’s impact descriptor table, reproduced below for ease, further consideration of the increase in traffic NO<sub>x</sub> at the Gwent Levels would determine the potential impact to be negligible, and therefore should not require additional detailed assessment.

See new Table 8 and discussion (as above) now included in Section 6 (page 13) of Issue 2 of the Traffic Emissions Assessment report.

### Impact Descriptors for Changes in Air Quality

LT Average Concentration	Percent Increase on Air Quality Assessment Level (AQAL)			
	1	2 - 5	6 - 10	> 10
75 % or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94 % of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102 % of AQAL	Slight	Moderate	Moderate	Significant
103 – 109 % of AQAL	Moderate	Moderate	Significant	Significant
110 % or more of AQAL	Moderate	Significant	Significant	Significant



#### 4. Further Advice to Applicant: Environmental Permit

Natural Resources Wales note that they have not yet received an application for an Environmental Permit for the site and have provided some comments which are directly relevant when making such an application. These matters are noted as being provided in addition (but separate to) NRW's advice on the planning consultation, and indeed the Môr Hafren energy recovery facility will take full account of these comments at the time they make their Permit application.

However, in the interim, it is noted that the atmospheric dispersion modelling undertaken in support of the planning application has applied five years' worth of meteorological conditions and as such has considered a wide range of wind and weather conditions, and their subsequent effects on the discharge from the stack. The proposed efflux velocity of  $17.7 \text{ m s}^{-1}$  exceeds the minimum discharge velocity required to prevent aerodynamic downwash ( $15 \text{ m s}^{-1}$ ) and an initial chimney height calculation and subsequent iterative modelling, optimised the stack height. The results of the dispersion modelling confirmed that, under normal operating conditions, the impact of Process Contributions or their resultant Predicted Environmental Concentrations from the proposed plant are considered to be insignificant.

Further considerations, including the assessment of atypical and abnormal operating conditions and the potential for a visible plume to occur will be made and provided to NRW through the due process of Environmental Permitting where full technical details of the plant and processes to be installed will be provided, along with a demonstration of how the chosen plant meets the Best Available Techniques.

#### 5. References

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<sup>i</sup> <http://www.apis.ac.uk/critical-loads-and-critical-levels-guide-data-provided-apis>

<sup>ii</sup> A guide to the assessment of air quality impacts on designated nature conservation sites  
Version 1.1. May 2020. [www.iaqm.co.uk](http://www.iaqm.co.uk)