# ROYAL MINT CHP ENGINE
# AIR QUALITY ASSESSMENT

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| Project name | Royal Mint CHP Engine |
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| Description | Royal Mint CHP Engine - EPR/ PAN-014743/Additional information Request |

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## Introduction

This report provides additional information to respond to Natural Resources Wales' (NRWs) notice requesting further information on the Environmental Permit application PAN-014743 dated 17th November 2021.

This report should be read in conjunction with the original dispersion modelling report (hereafter referred to as 'original report') submitted with the application (Ramboll, Royal Mint CHP Engine Air Quality Modelling Report, No. 1620009679, dated 03/07/2021). The responses have been prepared without repeating information from the original report.

## Question 1 H1 Screening Tool

### Question

*Please provide a copy H1 screening tool to demonstrate the CO screens out at the initial stage and requires no further assessment.*

### Response

An air emissions risk assessment was undertaken in order to screen out the impact of CO emissions.

The process contribution (PC) was calculated as summarised in Table 1.1 in accordance with the H1 screening tool calculations outlined in the web based guidance 'Air emissions risk assessment for your environmental permit'[1].

Table 1.1: Summary of Air Emissions Risk Assessment – Process Contribution

| Parameter | Value |
|---|---|
| CO Emission Concentration (mg/Nm$^3$) at 15% $O_2$ | 111.3 |
| CO Emission Rate (g/s) | 0.48 |
| Effective height of release (m) | 0 |

[1] https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

| Parameter | Value |
|---|---|
| Hourly dispersion factor (µg/m$^3$/g/s) | 3,900 |
| PC - hourly average (µg/m$^3$) | 1,872 |
| PC – 8-hour average (µg/m$^3$) | 1,310 |
| PC – 8-hour average (mg/m$^3$) | 1.31 |
| PC% of the CO short-term environmental standard | 13.1% |

The short-term PC is above 10% of the short-term environmental standard. The predicted environmental concentration (PEC) has therefore been calculated, as summarised in Table 1.2.

Table 1.2: Summary of Air Emissions Risk Assessment – PEC

| Parameter | Value |
|---|---|
| CO Background Concentration (mg/m$^3$) | 0.25 |
| PEC (mg/m$^3$) | 1.56 |
| Headroom (Standard – 2 x background) | 9.50 |
| 20% of the headroom | 1.90 |

The short term PC is less than 20% of the headroom and therefore in accordance with the air quality risk assessment guidance modelling of CO emissions is not required.

## Question 2 Site Plan

### Question

*Please provide us with more information to question Form B2 part 5a. We need the site plan to contain the installation*

- *the CHP plant boundary outlined in one colour*
- *the proposed Royal Mint installation boundary outlined in another colour*
- *labelled emission point for the CHP*

### Response

Please see Drawing 1620009679 1b provided as a separate pdf file.

The NGR for the CHP Plant is ST 03502 84973 – this is a marginal change from the NGR provided in the original application.

## Question 3 Non-Statutory Habitat Sites

### Question

*Please provide us with more information to question Form B3 question 3 part b. Carry out an air emissions risk assessment of emissions on all non-statutory habitat sites within 2 km of the CHP (ancient woodland, national nature reserves, local nature reserves, local wildlife sites) in line with the following guidance: Air emissions risk assessment for your environmental permit - GOV.UK (www.gov.uk). As per Air emissions risk assessment for your environmental permit - GOV.UK*

*(www.gov.uk) for local wildlife sites, local nature reserves, national nature reserves and ancient woodlands you can screen out your emissions as insignificant if your emissions are less than 100 % of the short term and long term environmental standards.*

Response

Identified non-statutory habitat sites within 2 km of the site comprise various areas of Ancient Woodland and Sites of Importance for Nature Conservation (SINC), as shown in Figure 3.1. Specific receptor locations were chosen within these sites to represent worst case locations, at the closest points to the site. All concentrations were predicted at ground level. The receptor locations are specified in Table 3.1 and are also shown in Figure 3.1.

Table 3.1: Non-Statutory Habitat Site Receptor Locations

| Receptor | x | y | Height (m) |
|---|---|---|---|
| Ancient Woodland | | | |
| Ancient Woodland1 | 302953 | 184643 | 0 |
| Ancient Woodland2 | 302764 | 184760 | 0 |
| Ancient Woodland3 | 303350 | 185242 | 0 |
| Ancient Woodland4 | 303784 | 186213 | 0 |
| Ancient Woodland5 | 303980 | 185626 | 0 |
| Ancient Woodland6 | 304192 | 185151 | 0 |
| Ancient Woodland7 | 303257 | 184099 | 0 |
| SINC | | | |
| Coedcae-mawr | 304078 | 186168 | 0 |
| Crofft-yr-haidd Marshy Grassland | 304416 | 186319 | 0 |
| Garth Grabben Slopes | 303030 | 185794 | 0 |
| Llantrisant Common1 | 305377 | 185061 | 0 |
| Llantrisant Common2 | 305344 | 184773 | 0 |
| Llantrisant Common3 | 305357 | 184366 | 0 |
| Llantrisant Forest and Craig Melyn Woodland1 | 303131 | 184539 | 0 |
| Llantrisant Forest and Craig Melyn Woodland2 | 302767 | 184734 | 0 |
| Nant Muchudd1 | 303769 | 184745 | 0 |
| Nant Muchudd2 | 303994 | 184847 | 0 |
| Nant Muchudd3 | 304111 | 185029 | 0 |
| Nant Muchudd4 | 303990 | 185603 | 0 |
| Pant-y-ddraenen | 303319 | 186210 | 0 |
| Rhiwfelin Fawr | 302985 | 185307 | 0 |
| River Ely1 | 303402 | 184581 | 0 |
| River Ely2 | 303116 | 184638 | 0 |
| River Ely3 | 302616 | 184991 | 0 |

| Receptor | x | y | Height (m) |
|---|---|---|---|
| Y Graig | 303897 | 183902 | 0 |

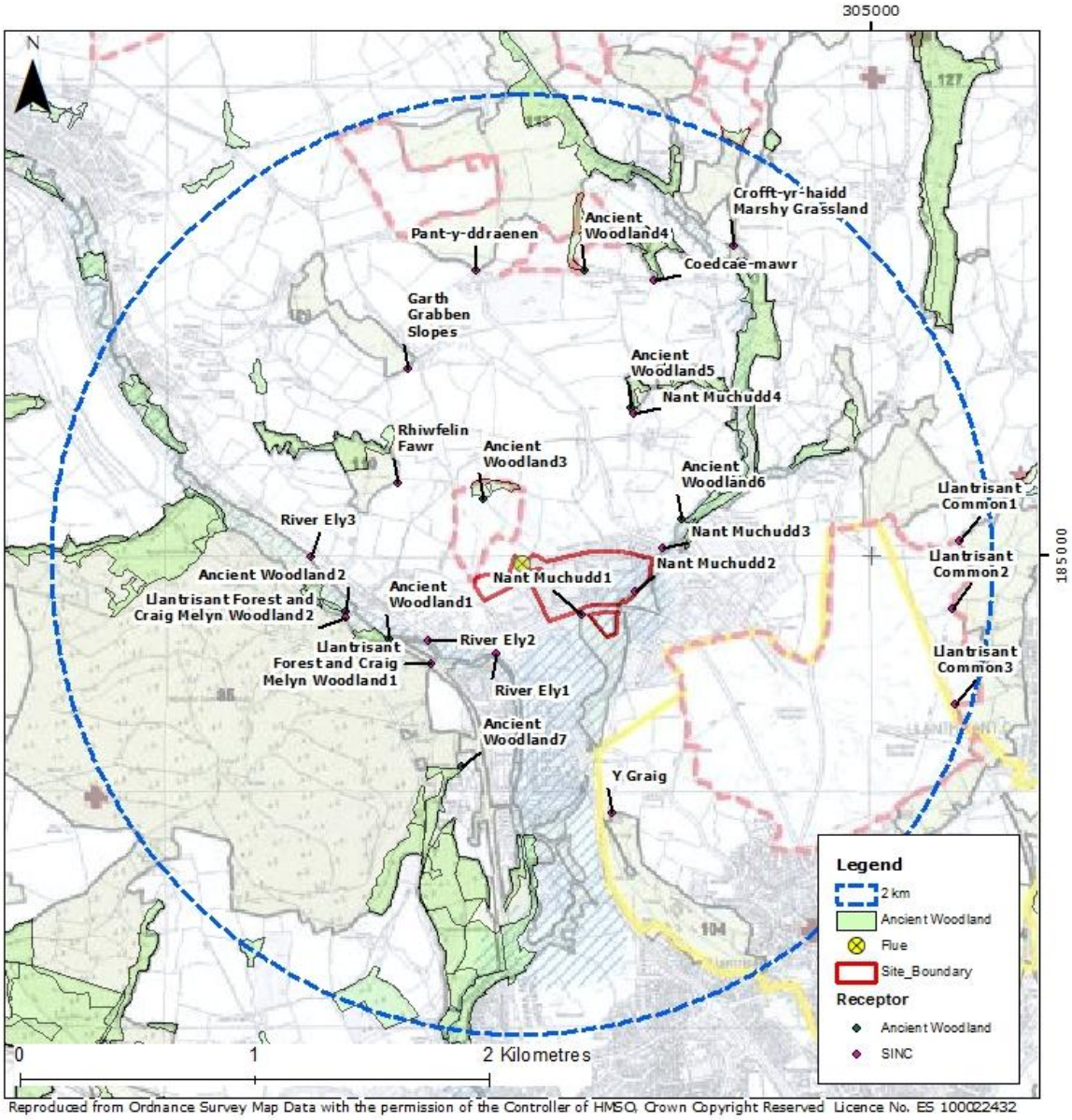


Figure 3.1: Non-Statutory Habitat Site Receptor Locations

ADMS dispersion modelling of the operational plant emissions undertaken within the original report has been updated to include impacts at non-statutory habitat sites for comparison against relevant ambient assessment levels. The model was re-run with a new receptor file (Non-Statutory Habitat Site Receptors.asp) to predict annual mean and hourly mean $NO_x$ concentrations within the non-statutory habitat sites that have been identified.

For non-designated sites, consideration is only given to the PC. If concentrations meet both of the following criteria, then the impacts are considered insignificant and no further assessment is necessary:

- the short-term PC is less than 100% of the short-term environmental standard.

- the long-term PC is less than 100% of the long-term environmental standard.

The modelling results presented are the highest predicted concentrations from any of the five years' worth of meteorological data modelled. They represent the CHP engine operating at its ELV all year round and are therefore conservative. The maximum predicted annual mean and daily mean $NO_x$ concentrations within the Ancient Woodlands are shown in Tables 3.2 and 3.3.

Table 3.2: Maximum Annual Mean $NO_x$ concentrations

| Site | Critical Level ($\mu g / m^3$) | PC ($\mu g / m^3$) | % PC of Critical Level |
|---|---|---|---|
| Ancient Woodland1 | 30 | 0.30 | 1.0 |
| Ancient Woodland2 | 30 | 0.35 | 1.2 |
| Ancient Woodland3 | 30 | 0.37 | 1.2 |
| Ancient Woodland4 | 30 | 0.11 | 0.4 |
| Ancient Woodland5 | 30 | 0.13 | 0.4 |
| Ancient Woodland6 | 30 | 0.40 | 1.3 |
| Ancient Woodland7 | 30 | 0.04 | 0.1 |
| Coedcae-mawr | 30 | 0.07 | 0.2 |
| Crofft-yr-haidd Marshy Grassland | 30 | 0.05 | 0.2 |
| Garth Grabben Slopes | 30 | 0.06 | 0.2 |
| Llantrisant Common1 | 30 | 0.10 | 0.3 |
| Llantrisant Common2 | 30 | 0.12 | 0.4 |
| Llantrisant Common3 | 30 | 0.13 | 0.4 |
| Llantrisant Forest and Craig Melyn Woodland1 | 30 | 0.17 | 0.6 |
| Llantrisant Forest and Craig Melyn Woodland2 | 30 | 0.32 | 1.1 |
| Nant Muchudd1 | 30 | 0.86 | 2.9 |
| Nant Muchudd2 | 30 | 0.83 | 2.8 |
| Nant Muchudd3 | 30 | 0.60 | 2.0 |
| Nant Muchudd4 | 30 | 0.14 | 0.5 |
| Pant-y-ddraenen | 30 | 0.06 | 0.2 |
| Rhiwfelin Fawr | 30 | 0.21 | 0.7 |
| River Ely1 | 30 | 0.17 | 0.6 |
| River Ely2 | 30 | 0.32 | 1.1 |
| River Ely3 | 30 | 0.21 | 0.7 |
| Y Graig | 30 | 0.04 | 0.1 |

The maximum predicted annual mean $NO_x$ concentrations are below 100% of the long-term critical level and therefore the impacts are not significant.

Table 3.3: Maximum Daily Mean $NO_x$ concentrations

| Site | Critical Level ($\mu g / m^3$) | PC ($\mu g / m^3$) | % PC of Critical Level |
|---|---|---|---|
| Ancient Woodland1 | 75 | 2.75 | 3.7 |
| Ancient Woodland2 | 75 | 3.18 | 4.2 |
| Ancient Woodland3 | 75 | 7.26 | 9.7 |
| Ancient Woodland4 | 75 | 2.04 | 2.7 |
| Ancient Woodland5 | 75 | 1.79 | 2.4 |
| Ancient Woodland6 | 75 | 2.52 | 3.4 |
| Ancient Woodland7 | 75 | 1.03 | 1.4 |
| Coedcae-mawr | 75 | 0.94 | 1.3 |
| Crofft-yr-haidd Marshy Grassland | 75 | 0.66 | 0.9 |
| Garth Grabben Slopes | 75 | 1.25 | 1.7 |
| Llantrisant Common1 | 75 | 0.79 | 1.1 |
| Llantrisant Common2 | 75 | 0.85 | 1.1 |
| Llantrisant Common3 | 75 | 0.79 | 1.1 |
| Llantrisant Forest and Craig Melyn Woodland1 | 75 | 3.00 | 4.0 |
| Llantrisant Forest and Craig Melyn Woodland2 | 75 | 2.89 | 3.9 |
| Nant Muchudd1 | 75 | 6.28 | 8.4 |
| Nant Muchudd2 | 75 | 4.17 | 5.6 |
| Nant Muchudd3 | 75 | 3.25 | 4.3 |
| Nant Muchudd4 | 75 | 1.81 | 2.4 |
| Pant-y-ddraenen | 75 | 1.00 | 1.3 |
| Rhiwfelin Fawr | 75 | 2.95 | 3.9 |
| River Ely1 | 75 | 3.98 | 5.3 |
| River Ely2 | 75 | 3.36 | 4.5 |
| River Ely3 | 75 | 2.72 | 3.6 |
| Y Graig | 75 | 0.79 | 1.1 |

The maximum predicted daily mean $NO_x$ concentrations are below 100% of the short-term critical level and therefore the impacts are not significant.

## Question 4 MWth Input

### Question

*Confirm the MWth input of the CHP, there is a contradiction in the application between 4.28 MWth and 4.3 MWth.*

### Response

Please apply the 4.28MWth. The use of 4.3MWth is simply a rounding-up of the 4.28MWth.

Note that this is the maximum for normal duty operation, the mode in which the plant will operate. The maximum thermal input at 100% load is 4.535MWth.

## Question 5 MCPD Identifier

### Question

*Provide a suitable MCPD identifier as per Appendix 8 of Form B3. The MCPD identifier must be traceable via a serial number or other unique identifier, name plate, manufacturer and/or model.*

### Response

The proposed CHP unit is an EcoMax-20, so the proposed identifier is EcoMax-20-A1. A serial number is not currently available.