ROYAL MINT CHP ENGINE
AIR QUALITY ASSESSMENT

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CONTENTS

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, as shown in Figure 3.1. Specific receptor locations were chosen within the Ancient Woodland 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 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

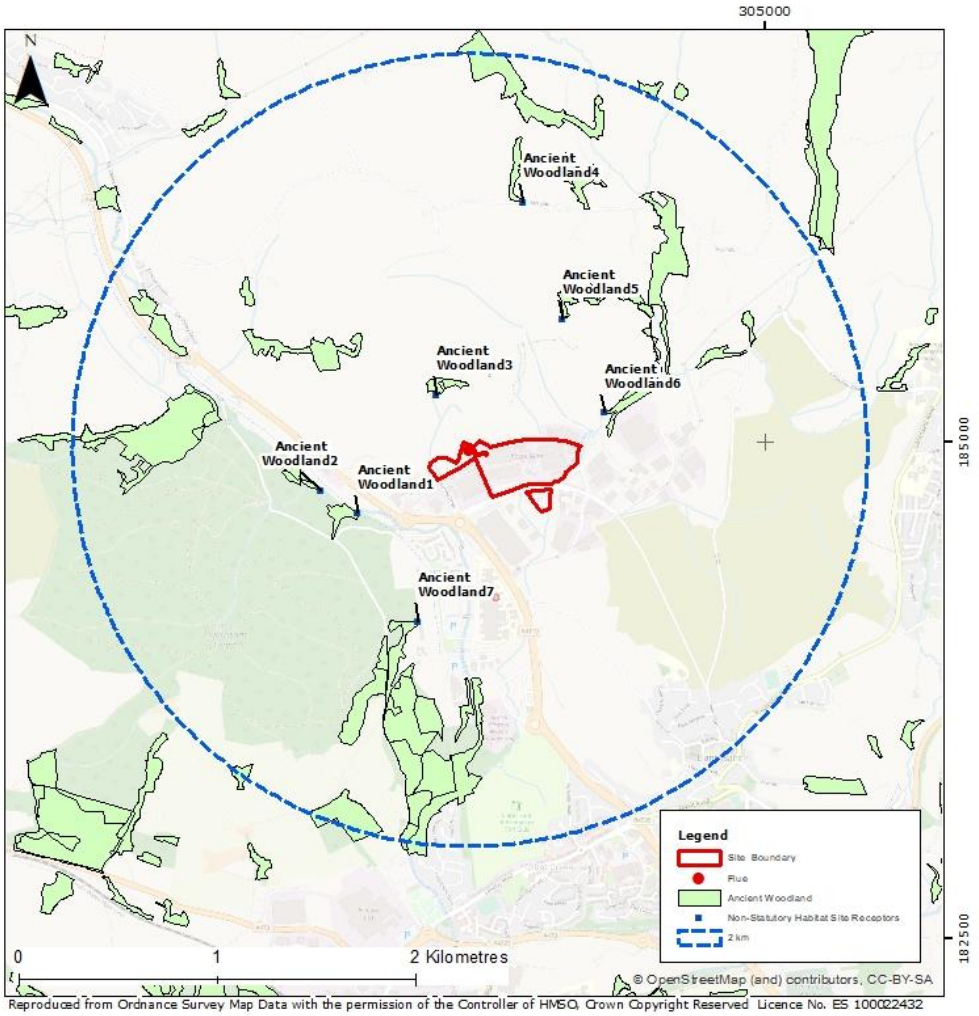

Figure 3.1: Non-Statutory Habitat Site Receptor Locations

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

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

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.