element

Hanson Cement
Padeswood Works
SRF Noise Assessment

14 Feb 2023

Quality Management

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Contents

Figures

Tables

Appendices

1. Introduction

1.1 Background

A noise impact assessment has been conducted by Element, on behalf of Hanson Cement, to determine the noise impact from the operation of the proposed SRF plant for the application FUL/000562/22. BS4142:2014 – *Methods for rating and assessing industrial and commercial sound* is required to assess any impact for the proposed plant. As the plant is not in operation the impact has been modelled.

In BS4142:2014 section 7.3 Determination of specific sound levels paragraph 7.3.6 states "Determine the specific sound by calculation alone if measurement is not practicable, for example the source is not yet in operation. In such cases report the method of calculation and give the reasons for using it."

A site source noise survey targeting the dominant noise sources on the works has been completed during site visits on the Padeswood works in 2020 and 2021 to satisfy improvement condition IC) 7 of Permit No. EPR/BL1096IB which states. *"(IC7.) Given the difficulties of applying the BS 4142 assessment methodology to this specific situation as there are existing sources due to be removed which may be contributing to the background levels. A monitoring study should be carried out once Mill 5 is operational to validate the noise source assumptions and implementation of proposed mitigation measures. A report shall be submitted to Natural Resources Wales demonstrating the results of the monitoring exercise".*

All areas of the Padeswood works have been assessed with monitoring conducted during calm conditions. The source data collected has been used to build a CadnaA noise model of the Padeswood works which best represents the current operational conditions with cement mill 3 and 5 operational. The model utilised ISO 9613-2 - *Attenuation of sound during propagation outdoors* the influence of buildings and topography have also been included.

Due to the significant variability in measured noise levels at each off-site measurement locations due to environmental factors and general background noise variability. Using the model produced in 2021 as the baseline, and including the SRF plant noise sources in the model, is the best method to demonstrate any impact from the works at offsite receptor locations.

1.2 Proposed SRF Plant Plan

Figure 1 SRF building plan

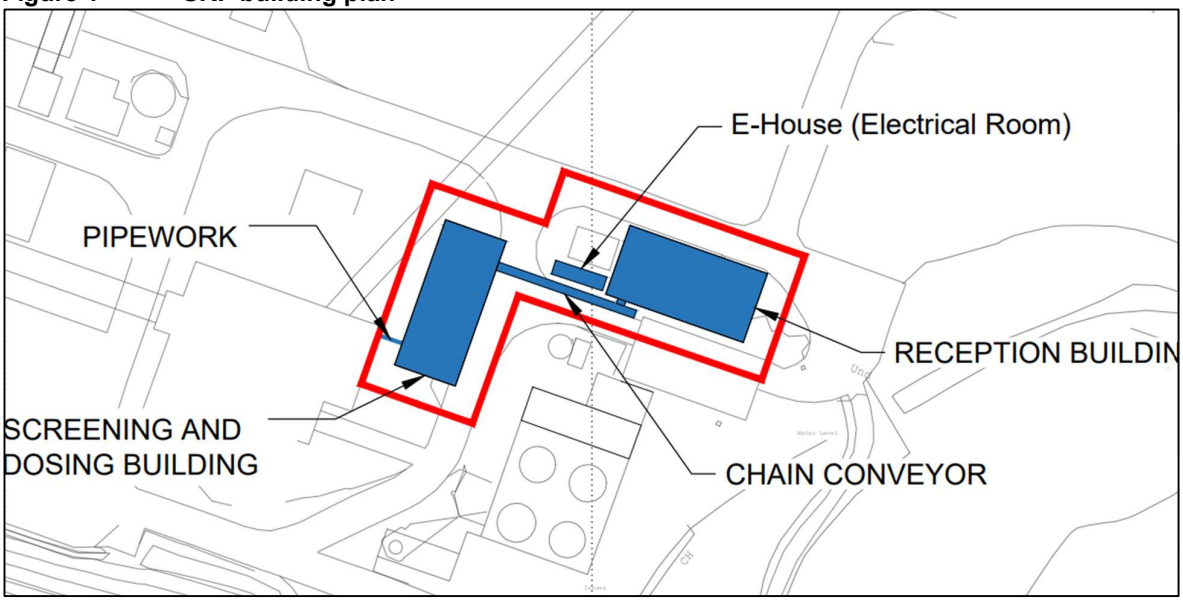
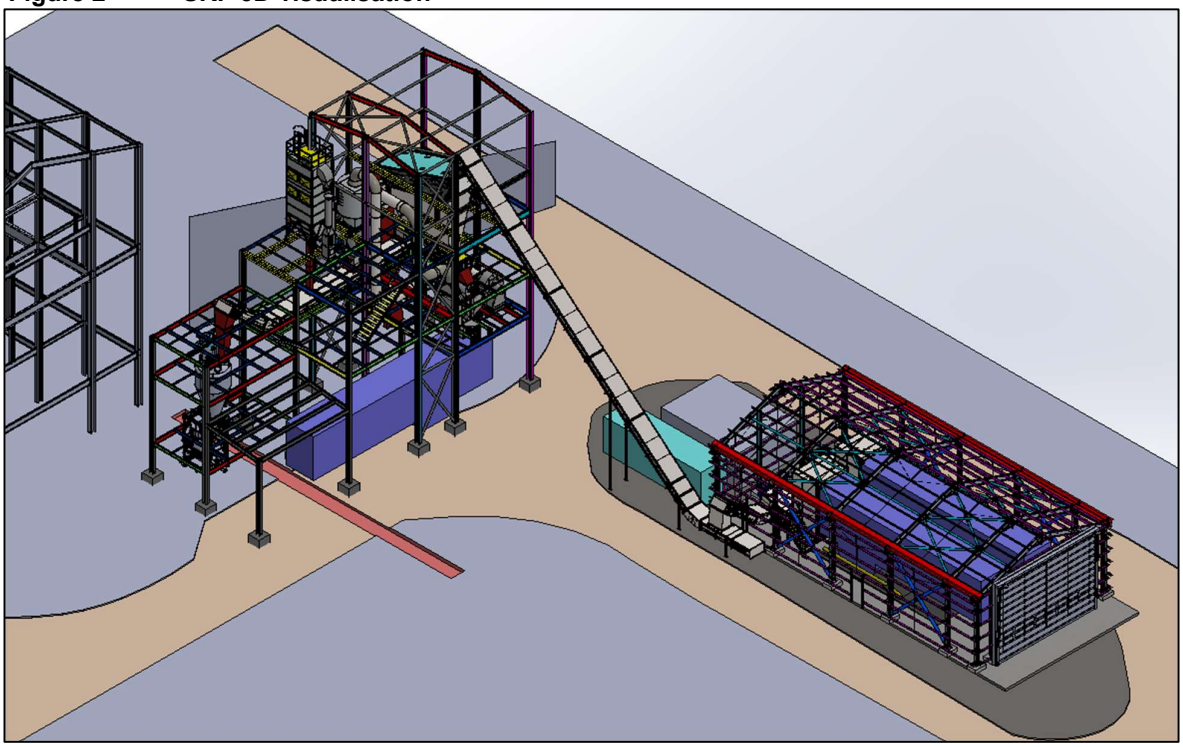
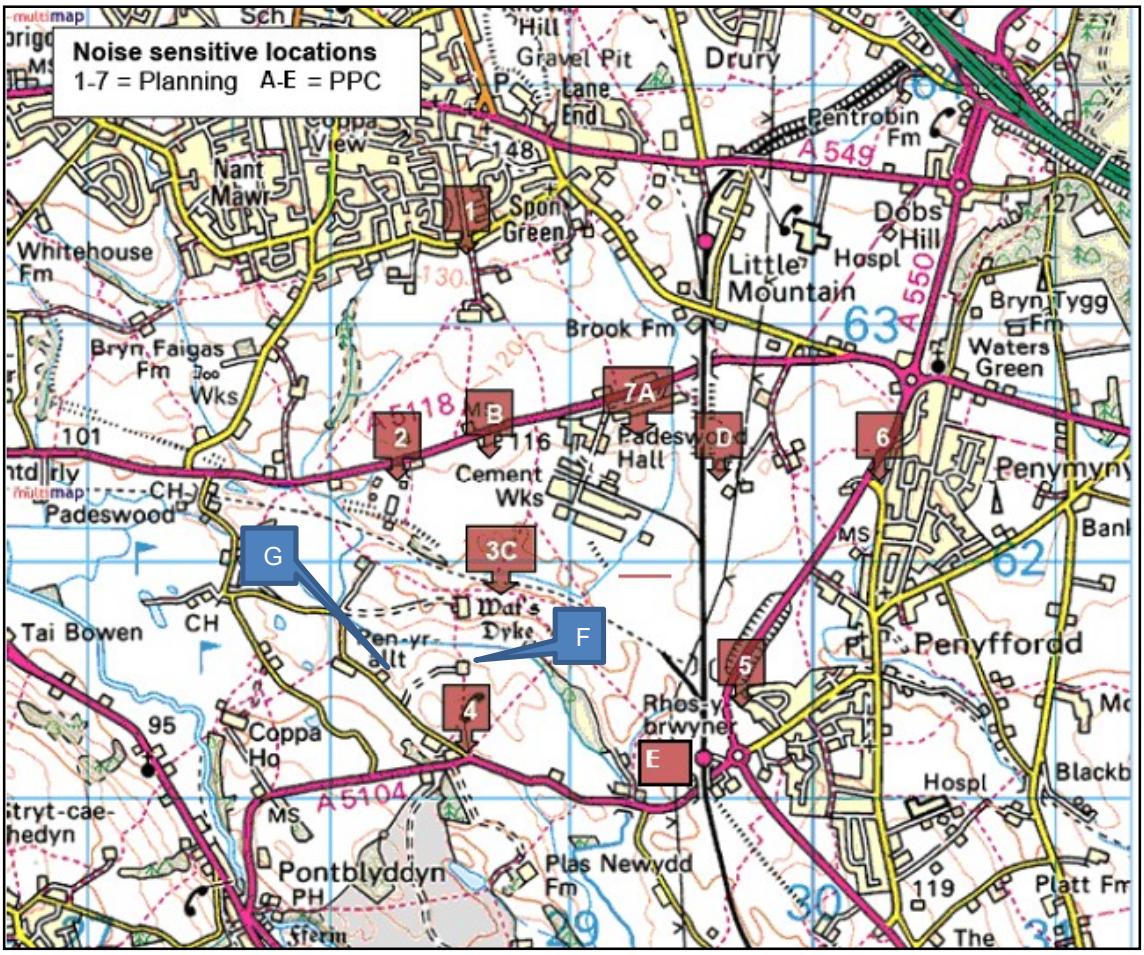


Figure 2 SRF 3D visualisation



2. Receptor locations

Figure 3 Sensitive Receptor Locations



The historic planning and PPC receptor positions have been used to assess any impact . An additional two receptors have been added at Well Farm location F and a property on Padeswood Lake Road location G.

Table 1 Sensitive Receptor Locations

ID	Location	X Coordinates (m)	Y Coordinates (m)
1	Spon Green	328545	363299
2	Ty Gwyn	328319	362372
3C	Dyke Farm*	328524	361816
4	Toll Bar Cottage	328563	361172
5	Penyffordd Play area	329734	361442
6	Hawarden Road	330305	362434
7A	Sports Ground	329216	362582
B	Oak Tree Farm West*	328634	362500
D	Oak tree Farm East*	329711	362293
E	Penyffordd Station	329555	361097
F	Well Farm*	328545	361522
G	Padeswood Lake Rd *	328198	361491

*receptor position located at house façade

3. Noise Impact Assessment

3.1 Noise model

Site source noise measurements were collected during calm weather conditions over multiple site visits across 2020 and 2021. The assessments assessed the existing operational dominant noise levels across the works with Mill 3 and Mill 5 in operation. Using the noise source measurements collected, noise modelling was undertaken using Datakustik's CadnaA noise propagation software. The CadnaA software implements most common national and international acoustic calculation methods as described in International Standard (ISO) 9613. The output of this modelling assessment allows the impact of the site noise to be assessed without the influence of any external noise influences.

A 3D noise model was constructed of the works and using the noise source measurements taken during the site assessment, the noise propagation and impact on the noise levels at offsite locations could be assessed. All major buildings on the works and receptor locations have been included. Any other relevant obstructions that could affect the propagation from the works have also been included. Estimation of building heights has been used where no data was available. Topographic data with 5m grid spacing was used in the model with obstructions including foliage included in the model where required.

The model produced in 2021 has been used as a baseline operational noise level. The SRF plant noise sources and buildings have been added the model to assess any impact at the receptor locations around the Padeswood works with the whole site operational and the SRF plant in isolation to assess relative impact.

Table 2 Model noise source data used for SRF plant

Location	Data used in model
Cladding on buildings	Rw 23
Roller shutter Doors	Rw 20
Reception Building internal level @ offloading area	75dB
Reception building internal level @ Lorry standing area	70dB
Screening building internal level	75dB
Screening building internal level	85dB (34m^2 of façade area around main plant in building)
Filter fan/motor and exhaust on top of screening building	75dB @1m
Process stack on top of screening building	75dB @1m
Stack exit	80dB

Figure 4 3D model Padeswood works

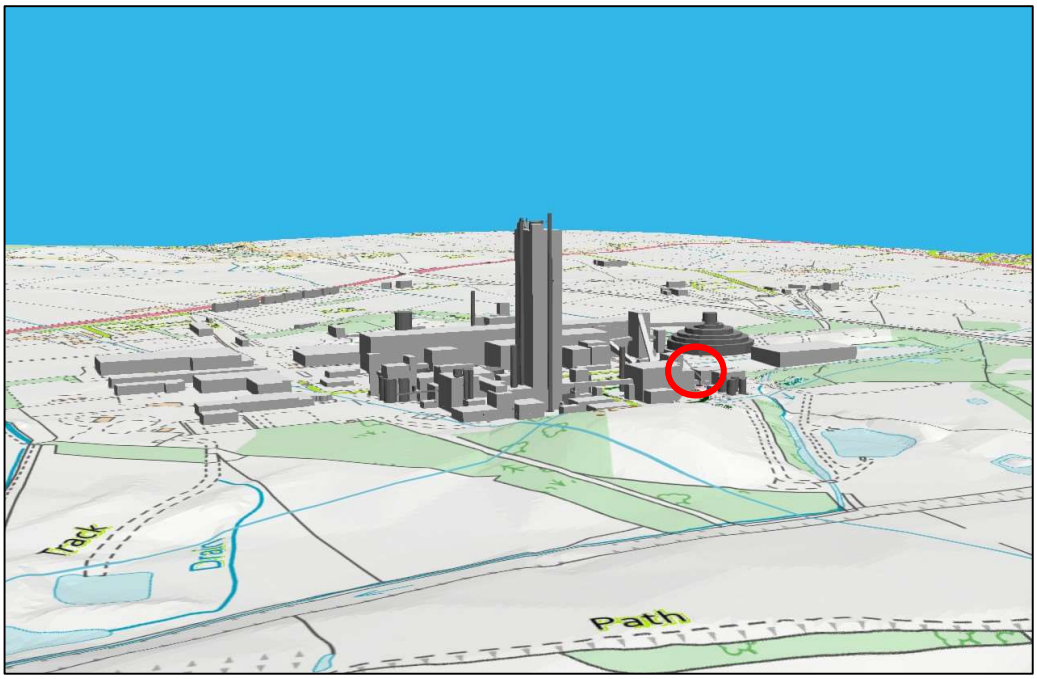


Figure 5 3D model with proposed SRF buildings

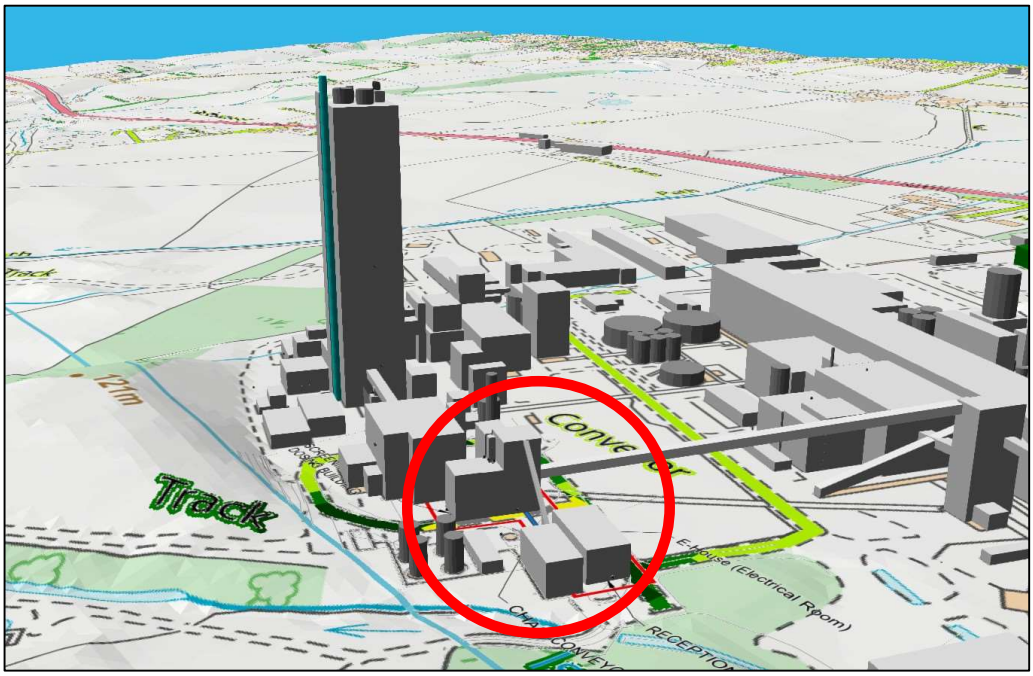
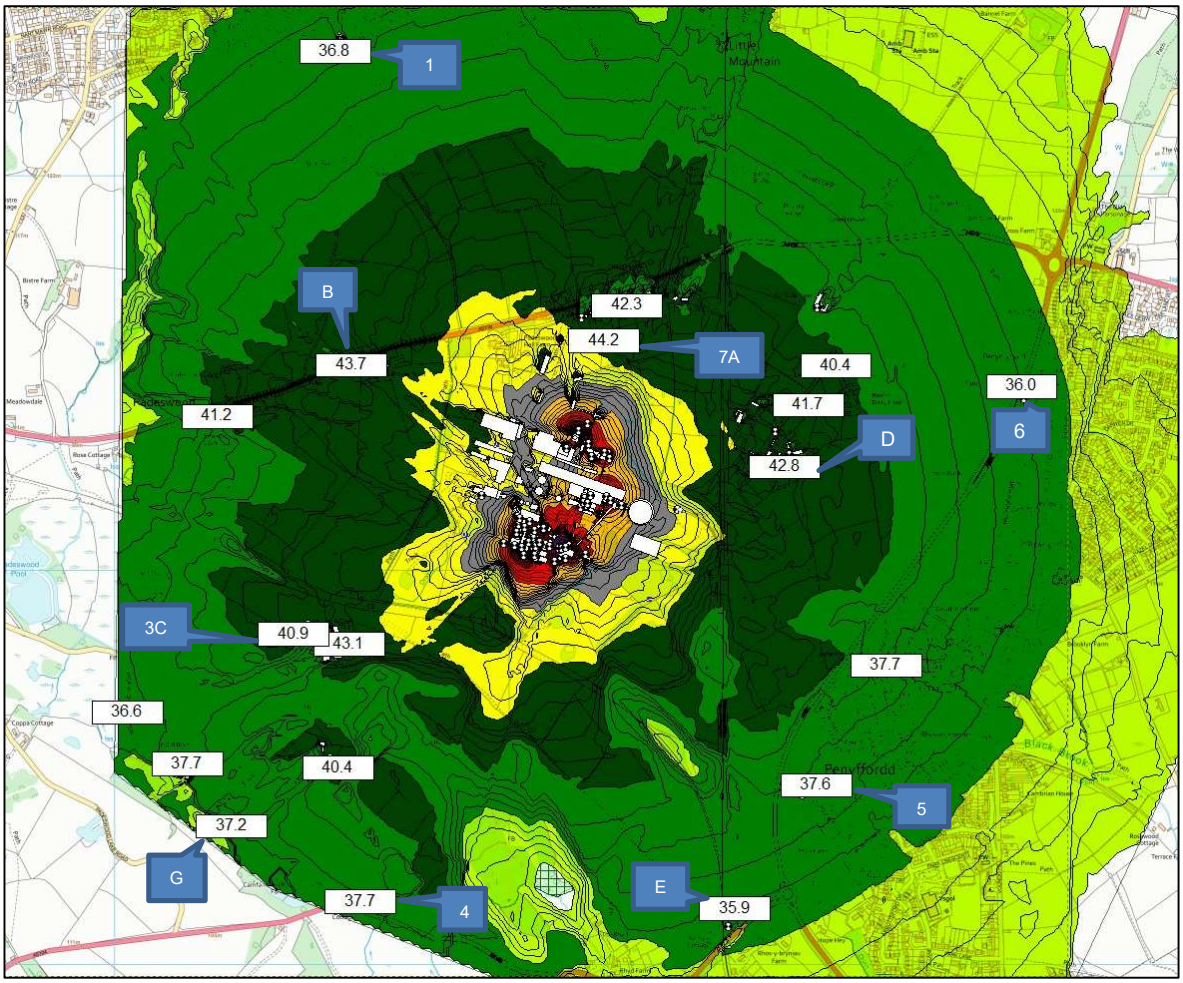
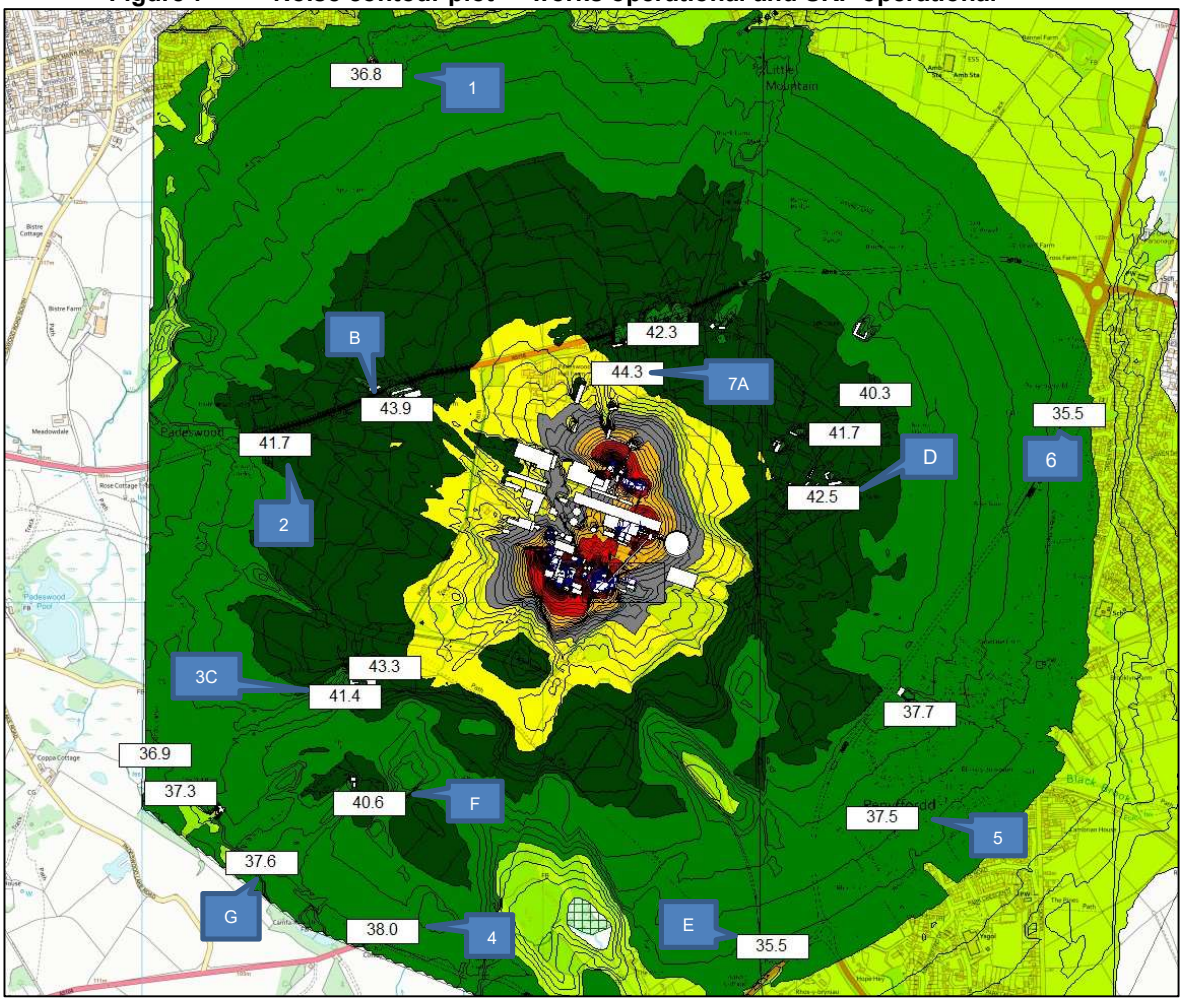


Figure 6 Noise contour plot – works operational with no SRF plant



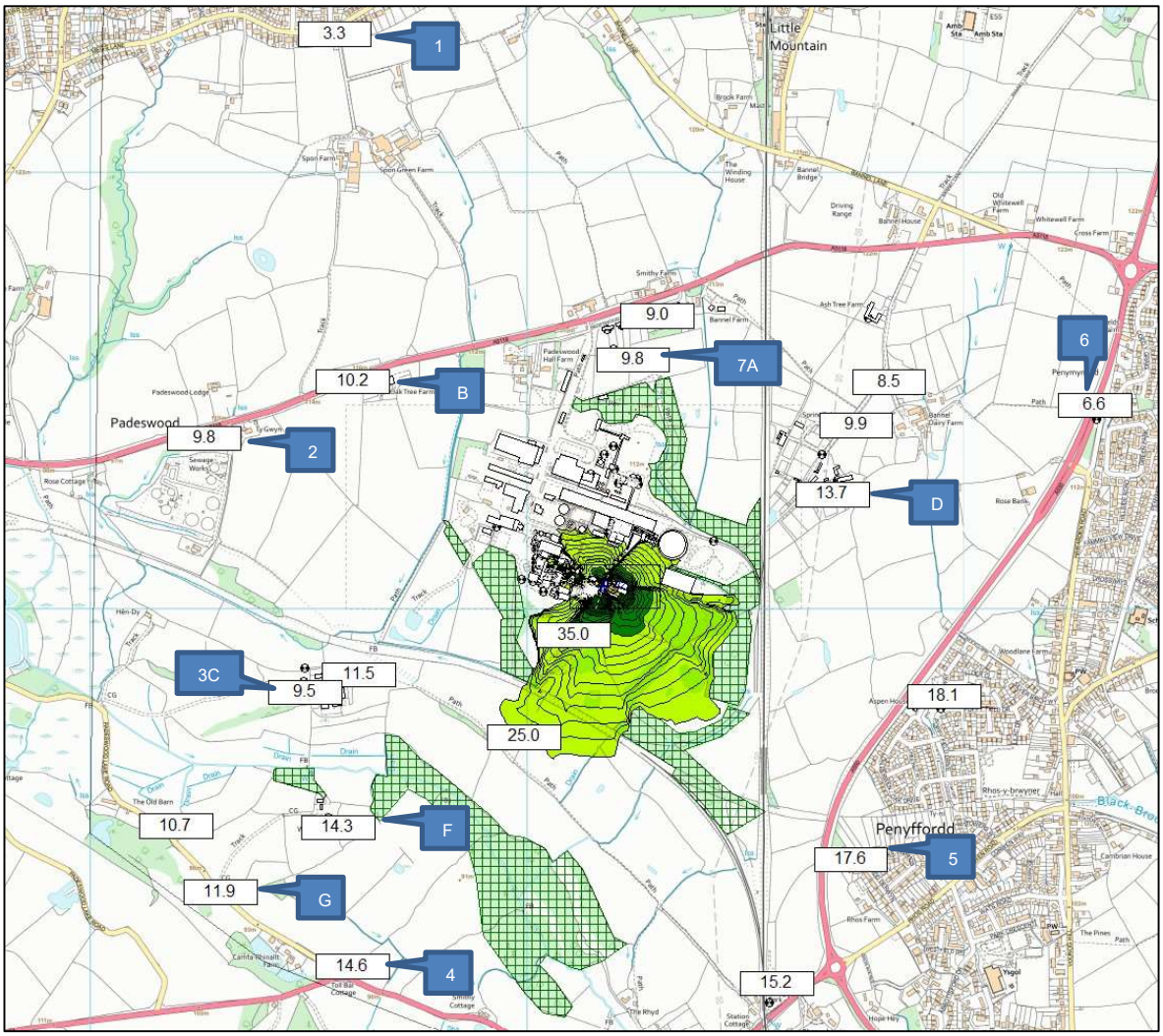
Model output highlighting the predicted noise levels in dB at the offsite locations

Figure 7 Noise contour plot - works operational and SRF operational



Model output highlighting the predicted noise levels in dB at the offsite locations

Figure 8 Noise contour plot - SRF operational only



Model output with only the noise sources from SRF operational

Table 3 Predicted Receptor Noise Levels

ID	Location	2021 Baseline Model (General site works noise +mill 3 and mill 5) (dB)	2023 Model (2021 model + proposed SRF) (dB)	Level difference between 2021 baseline and 2023 model (dB)	2023 Model (Proposed SRF only) (dB)	X Coordinates (m)	Y Coordinates (m)
1	Spon Green	36.8	36.8	0	3.3	328545	363299
2	Ty Gwyn	41.2	41.7	+0.5	9.8	328319	362372
3 C	Dyke Farm*	40.9	41.4	-0.5	9.5	328524	361816
4	Toll Bar Cottage	37.7	38.0	+0.3	14.6	328563	361172
5	Penyffordd Play area	37.6	37.5	-0.1	17.6	329734	361442
6	Hawarden Road	36.0	35.5	-0.5	6.6	330305	362434
7 A	Sports Ground	44.2	44.3	+0.1	9.8	329216	362582
B	Oak Tree Farm West*	43.7	43.9	+0.2	10.2	328634	362500
D	Oak tree Farm East*	42.8	42.6	-0.2	13.7	329711	362293
E	Penyffordd Station	35.6	35.5	-0.1	15.2	329555	361097
F	Well Farm*	40.4	40.6	+0.2	14.3	328545	361522
G	Padeswood Lake Rd *	37.7	38.0	+0.3	10.7	328198	361491

*receptor position taken at house façade

The noise levels from the SRF plant in isolation are predicted to be well below the existing works noise level. The predicted noise levels form the SRF plant at receptor positions are > 10 dB lower at all locations and therefore will have minimal impact on the noise levels. The level difference between the existing operations and the inclusion of the SRF plant results in a <1dB change in overall noise level at the receptor locations. A change in < 1dB is unlikely to be perceptible at the sensitive receptor locations.

4. Summary

This assessment considered the potential impact from the proposed SRF development on noise levels at receptor locations around the Padeswood Cement Works boundary.

Assessing the noise levels at receptor locations and comparing measured data with predicted data will be difficult due to the variability of environmental noise measurement due to wind direction, distance from the works, and background noise variability. In order to reduce uncertainty of assessing against receptor measurements a source noise assessment was completed and a CadnaA noise model was produced in 2021. The model incorporates all the dominant noise sources on the Padeswood works with cement mill 3 and 5 operational and represents the current noise propagation from the works . This model has been used as a baseline where the proposed SRF plant can be included and any impact assessed at receptors without the external influence from wind traffic noise etc. As the noise level from the SRF plant is expected to be low and below the general works noise and background levels, modelling allows the levels at receptors to be assessed in isolation.

The contribution of SRF operation to the noise level has little impact on the overall noise levels experienced at the closest receptor locations. The predicted noise levels from the addition of the SRF plant are significantly below the general influence of the works noise overall and will have little influence on the noise levels at receptor locations. The noise levels at some receptor locations have shown a small decrease and is due to the SRF buildings screening some of the existing noise sources on the works.

The noise levels from the SRF plant will have little perceptible impact on the noise levels from the works at receptors with noise levels changing by <1dB and the relative impact of the SRF plant is >10dB below the existing noise levels. The addition of the SRF plant would have no impact on the rating levels and outcome of a BS4142 assessment when assessed against current noise levels from the works.

Appendix A - Uncertainty and Acoustic Terminology

Uncertainty

Environmental conditions were favourable for the outdoor measurement of sound and were taken during calm conditions. Sound levels were measured to the nearest 0.1 dB, time periods were measured and recorded to the nearest second. No rounding was done in any calculations, the only rounding being done on final results, in compliance with BS 4142:2014. The sound level meter was calibrated before and after each survey period and no drift was apparent.

The 2021 model is based on site source measurements and is considered a representative of the current baseline noise levels from the works. No significant changes have been made to the works since the source measurements were taken. Modelling the addition if the SRF plant using the 2021 model is considered the best way to assess any impact on receptors from additional noise sources on the works. The model output is based on the calculations in ISO9613 and local topography and any relevant buildings have been included on the model.

Source Sound Power and pressure levels were taken from manufacturer data sheets and where no data was available practical estimations were used. The 85dB upper workplace noise level was used for internal noise levels within sections of the screening building. This is higher the expected noise levels with the aim to avoid under estimation of any impact at receptors.

Term	Definition
Noise sensitive receptors	People, property or designated sites for nature conservation that may be at risk from exposure to noise and vibration that could potentially arise as a result of the proposed development/project
Noise and Vibration study area	The area assessed for noise and vibration impacts during this assessment
Baseline scenario	Scenarios with the proposed development/project not in operation
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3 dB(A) is the smallest perceptible change.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
$L_{Aeq, T}$	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq, T is used to describe many types of noise and can be measured directly with an integrating sound level meter.
$L_{A10, T}$	The A weighted noise level exceeded for 10% of the specified measurement period (T). LA10 is the index generally adopted to assess traffic noise

Term	Definition
$L_{A90, T}$	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 2014 it is used to define the 'background' noise level.
L_{Amax}	The maximum A-weighted sound pressure level recorded during a measurement.
R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies.
Sound Reduction Index (SRI)	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Appendix B - Source Data

tmm BLOWER
1969 yılından günümüze...

Date : 11/12/2022

NOISE MEASUREMENT REPORT

(NOISE MEASUREMENT REPORT

Noise measurement table for HLB2230 Helical Lobe Blower with serial number 2022-12-192;

No.	Noise level (dB) / With cabinet	Working Hours
one	78	0
2	76	2
3	76	4
4	76	6
5	76	8
6	76	10
7	76	12

It is suitable to use according to the decibel measurement results of the blower serial number 2022-12-192.

controlling
Quality Engineer
Mert Saykal

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OPERATOR'S MANUAL

FLSmidth PFISTER

Rotor Weighfeeders TRW-S 4.14 / 4.18 / 4.20

TRF / 16.03.2010 **550.097.61.04-BA-a-GB**

1 Operating modes

The rotor weighfeeder TRW-S has three different operating modes:

Locked automatic mode:

Locked automatic mode is the normal operating mode in which the rotor weighfeeder is controlled by the overriding control system. In this mode the release, setpoint, etc. are transmitted externally to the control system (CSC) of the rotor weighfeeder.

Non-locked mode:

In non-locked mode, both controlled (non-locked automatic) operation and non-controlled (manual) operation using an internal setpoint are possible. This operating mode is usually selected during commissioning and other work of this nature.

Local operating mode:

In local operating mode, the appliance is controlled at the local operating unit. This operating mode is usually selected for maintenance and repair work.

For further information on the individual operating modes: → Electrical documentation.

2 Operation

When the rotor weighfeeder is in normal operation (locked automatic) it is not necessary for an operator to work at the control system of the rotor weighfeeder or locally at the rotor weighfeeder, as long as no faults occur.

However, even if the device is in perfect working condition, daily inspections must be made and maintenance work carried out at regular intervals, → Maintenance instructions.

Starting from the rotor weighfeeder, the A-weighted highest equivalent continuous sound pressure level at a distance of 1m and at a height of 1.6m amounts to 75dB(A).

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