1.0 EMR Snailwell – Noise Impact Assessment – Proposed Twitch Metals Polishing Plant – Northern corner of EMR site

1.1 Introduction and Background

1.2 EMR are proposing to introduce a new recycling metals finishing process that reduces later post processing of recycled metals. The process involves a slow rotating polishing drum which is fully enclosed resulting in cleaned metal fragments.

1.3 As the process is relatively new and furthermore EMR are enclosing the processing in an acoustic enclosure there is not any clear data on the noise emission levels to the external air. In order to ensure a robust assessment we have taken the internal plant noise levels at 1m and assumed these break out of openings in the building giving a series of point sources of noise.

1.4 Where breakout noise was found to be excessive then openings could be retrospectively fitted with absorbent lined ductwork to reduce the emissions. However, the levels of noise are considered so low this is not considered necessary.

1.5 The noise prediction modelling provided below is based on absolute worst case breakout noise.

1.6 The location of the EMR Snailwell site is well away from residential areas and the northern part of the site is particularly screened and mitigated by distance. The only risk of impact is upon commercial neighbours who adjoin the site.

1.7 The nearest building with operable windows to offices, thr modt sound sensitive use and facing the site's sources of noise are to the north at a distance from the sources of noise of not less than 76m. Disregarding screening and directional reduction effects, this gives a distance reduction alone of the order of 37dBA.

1.8 The northern corner of the site benefits from significant screening by industrial buildings and the absence of any nearby residential use. Assessment is based on commercial office use as the most sensitive form of use.

1.9 No guidance is available for the assessment of this noise upon commercial uses other than basic criteria set out in BS8233:2014 which is compared in this case. The new sources of noise is also compared with the existing sound emission levels at the EMR boundary and demonstrate a reduction in noise levels.

1.10 Sound Environment at the development location.

1.11 The current northern corner of the EMR site as shown in figure 1 below is used for materials storage by EMR in relation to adjacent processing operations and movement using bucket loaders. This is a loud operation with peaks of noise as an excavator drops its bucket to the ground and scoops up metal fragments. This does not change except the location of such handling is better screened by the new process buildings which are higher than the existing screening features. It is also moved further away as well as better screened by existing buildings. As a result this is not further assessed as it represents reduced noise. The current storage and bucket loading activity is indicated by the orange crosses. This will move southwards and eastwards.

1.12 Just to the south the open buildings contain a number of noise sources that do not change.

1.13 The EMR site is edged in red and the office buildings with potentially noise sensitive rooms with operable windows are edged in blue. Off site buildings which form large obstructions to the passage of sound are edged in purple. They do not contain windows to noise sensitive activities and serve as effective screens.

1.14 Currently plant noise at the EMR site is the main source of continuous noise which is therefore comparable with this continuous plant process. The levels of noise due to processing drop significantly.

1.15 In the prediction model constructed in the next section of this report the compound to the north of the EMR site edged in green and which provides additional screening has been excluded to provide an absolute worst case analysis.

1.16 Currently the average continuous plant level of noise at 3m high at the red X was measured as 68dB LAeq(15 minutes).

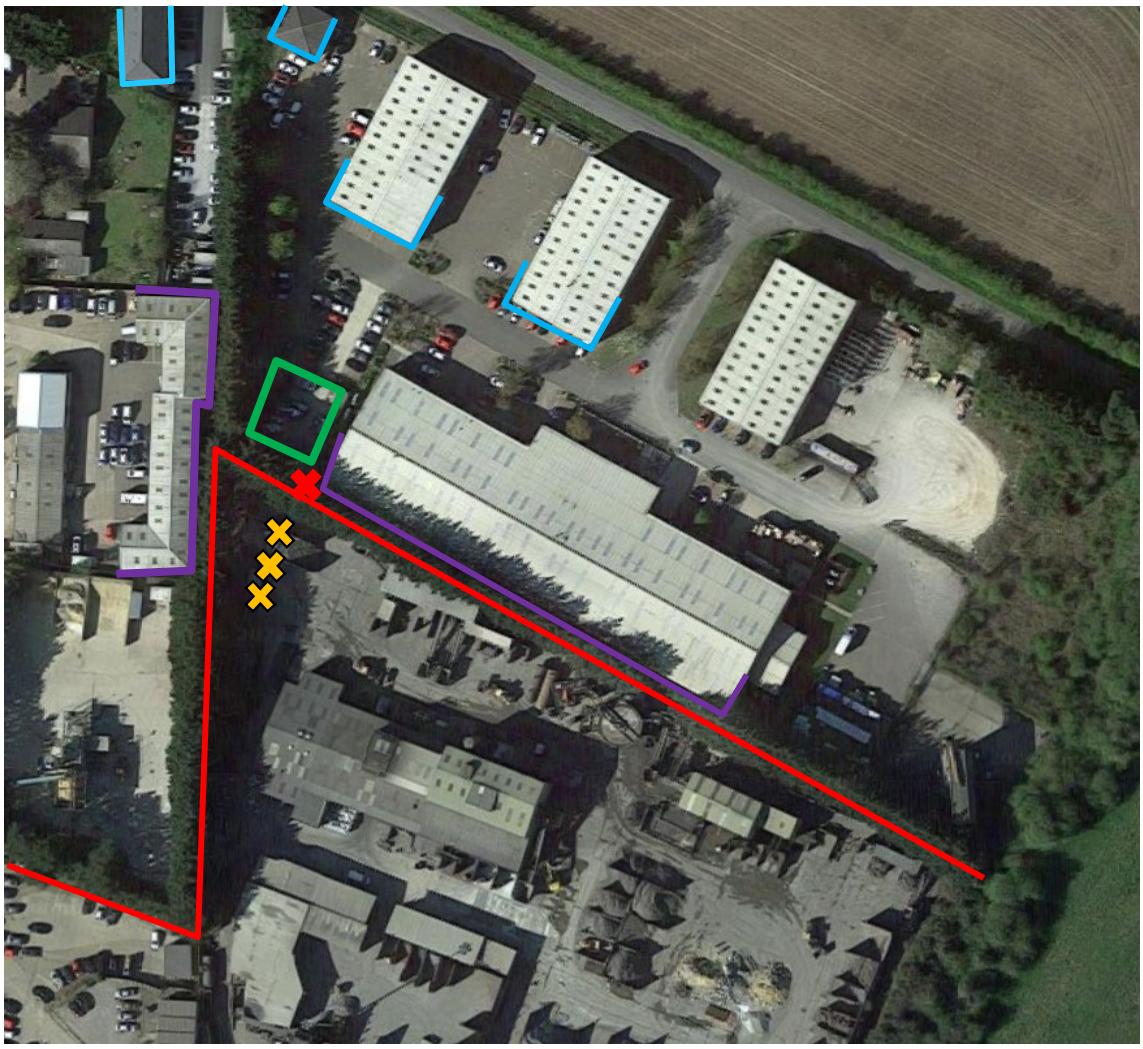


Figure 1 shows northern corner of EMR Snailwell and location of the commercial neighbours.

1.17 Guidance within BS8233:2014.

1.18 There is an absence of UK guidance which considers impact upon commercial use based on the nature and character of the area. This area is a heavy industrial area and thus higher than average levels of noise might be expected. This cannot be assessed further absent clear guidance other than by direct comparison with the absolute guideline levels given with BS8233:2014.[1]

1.19 BS8233:2014 provides the following guideline levels:

a) Open Plan Office (Table 2) = 45-50dB LAeqT (inside)

b) Study and concentration (Table 6) = 35-40dB LAeqT (inside)

[1] Guidance on sound insulation and noise reduction for buildings

c) Staff meeting room, training room = 35-45dB LAeqT

1.20 As can be seen the lowest average level of noise internally is 35dB LAeqT. T is the averaging time period. Noise reduction from outside to inside, ignoring any façade reflections through an open window is in the range of 10-15dBA and commonly 12-13dBA. Using 10dBA as a conservative value means the lowest external value as a criteria of acceptability would be not less than 45dB LAeqT.

1.21 In other words external noise levels outside office buildings and ignoring reflected noise below 45dB LAeqT should be regarded as acceptable. The noise prediction modelling provided in the next section includes façade reflections.

2.0 Predicted noise levels from new process.

2.1 The new process has been presented in a couple of noise maps below. Noise Map 1 shows the decibel resulting values only at 4.5m above ground level. This is chosen to represent first floor level which is the least screened height.

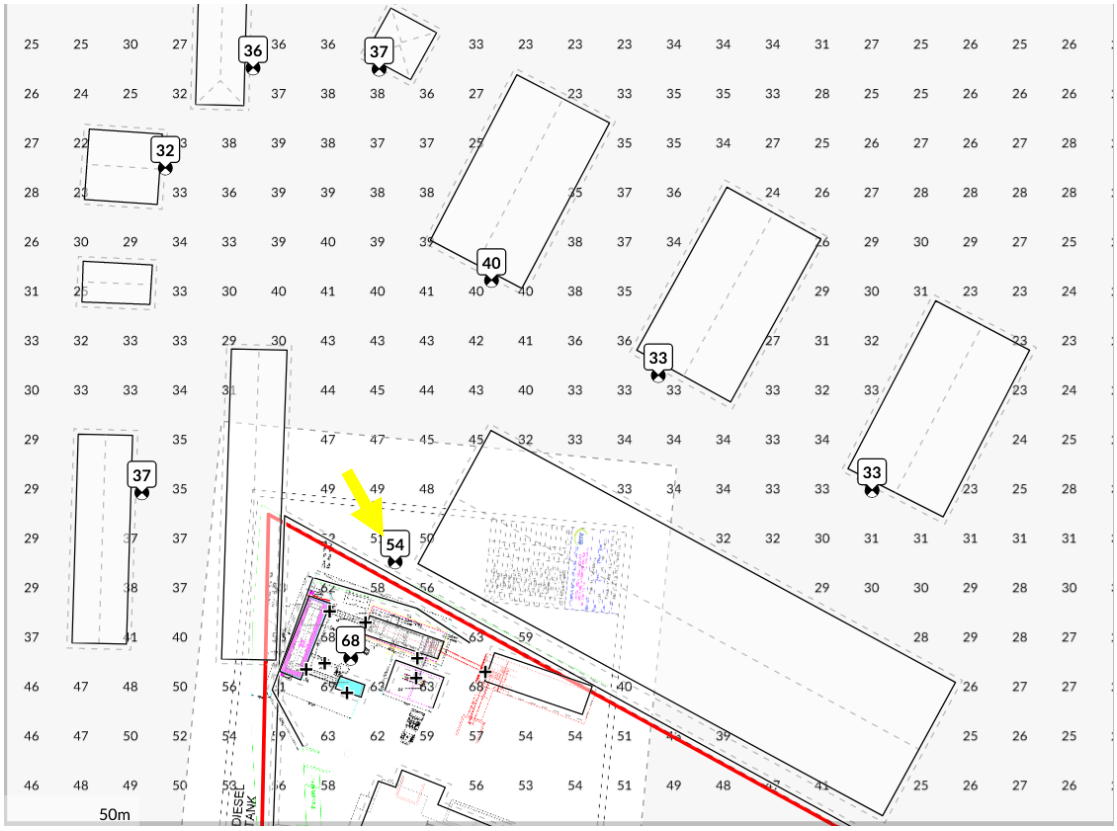
2.2 It can be seen the highest level obtained is 40dBA at the façade facing and closest to the EMR boundary. This includes reflected noise and the level incident on the façade is 1-3dBA lower. Notwithstanding this the level is well below the point where noise would be unacceptable.

2.3 The yellow arrow in Noise Map 1 shows the boundary position where noise was measured before this plant is introduced with an average level of 68dB LAeq(15 minute) recorded due to continuous running plant at the EMR site. This places the new site emissions 14dBA below existing boundary levels and likely inaudible[2]. As the new plant will improve screening at this location existing site noise is also likely to reduce but the outcome is less noise and potentially substantially less as well as below any conservative consideration of the maximum likely acceptable noise.

2.4 On the basis the new emissions are at least 14dBA lower than the existing levels then an increase over that predicted level of noise of about 7dBA would only push up the resulting level to 69dBA. This assumes no reduction is caused by the screening offered by the new plant in terms of the existing emissions.[3] 1dBA increase would not be discernible.

2.5 The analysis indicates noise emissions at this boundary location will reduce and a substantial margin is available for any uncertainty.

[2] The measured level was at 3m above ground level and the predicted level is at 4.5m indicating the differential is likely greater than 14dBA as with elevation the boundary level is less screened.
[3] The existing boundary level was 68.2dBA and 68.2 + 61dB gives 69dBA.



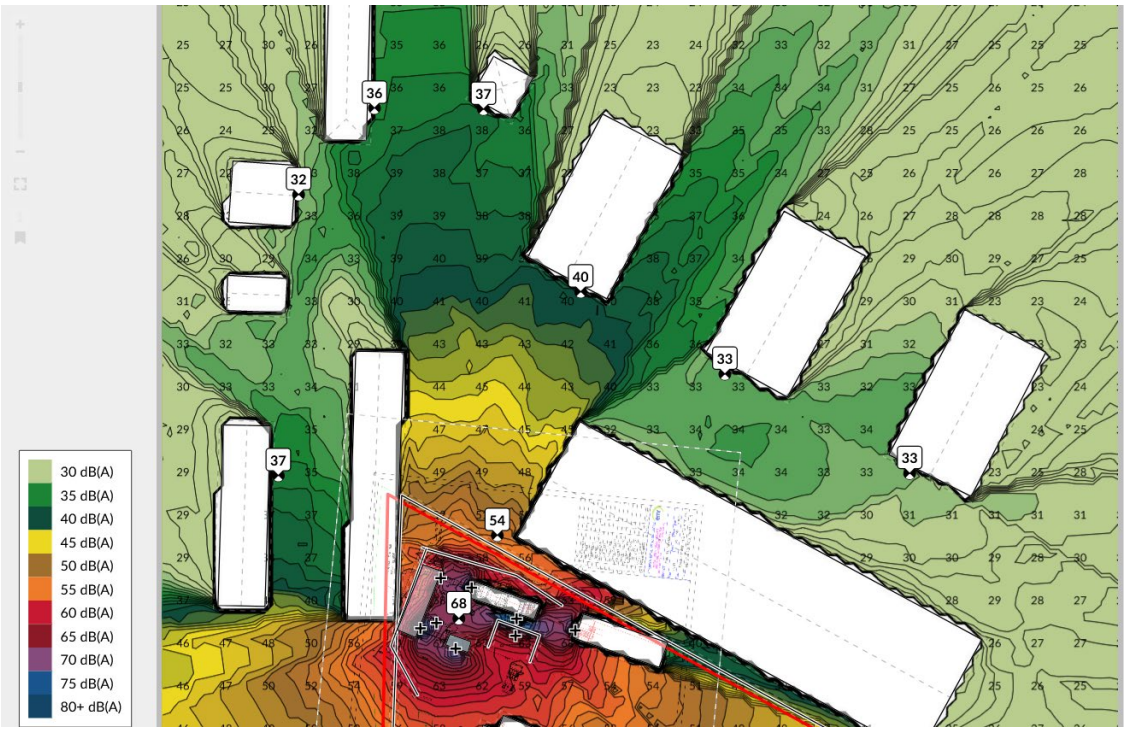
Noise Map 1 – grid of noise levels and buildings only. This shows the highest façade level including façade reflection is 40dBA.

2.6 Noise Map 2 below shows the decibel level contours also at 4.5m above ground level. It shows how noise is reflected off buildings and refracted around them. The sources of emission are plotted as point sources at small openings in the enclosure of the plant where noise can escape. Most are facing south meaning any emissions are greatest towards the EMR site.

2.7 The sources are based on the actual plant levels provided by the manufacturer as points at the height of the openings in the enclosure.

2.8 In the unexpected circumstances that the plant generates more noise than predicted from the openings, any particular opening can be further mitigated by providing a ductwork section over the opening to further attenuate emissions and narrow the point of escape. Typically an extension of 0.5-1m would be provided using absorbent lined material. Internal baffles could also be added within the enclosure of the plant but neither is recommended by MAS as the resulting levels are well below any level of concern.

2.9 As reductions through the acoustic enclosure are much greater than 20dBA this has not been considered further.



Noise Map 2 – Showing 1 decibel contours at 4.5m above ground level to match first floor offices.

2.10 All the inputs into he model can be provided if required along with access to it to interrogate the inputs. It can be seen that most noise emanates to the south into the EMR site by design. In effect openings are, where feasible, made on the southern side of the enclosures so that escaping noise is emitted to the south. The following points are made in summary form:

a) Modelling uses ISO9613-2.

b) All ground is treated as hard ground and therefore reflective.

c) Noise contours are 1 decibel apart.

d) Modelling is on medium resolution which means it is accurate to 1 metre. This produces a zig zag effect around buildings closer than 1m.

e) All off site buildings are input at 8m high even though some are higher. Screens and barriers are input at their actual height and as flat radiating surfaces. Some are profiled which will scatter and reduce sound levels a little.

f) All predicted noise levels are at 4.5m above the ground level.

g) Points of emission of noise from openings are assumed as point sources outside of the plant enclosure. In reality noise emitted is directional and not omnidirectional meaning less noise would be emitted to the north than modelled.

3.0 Findings and Conclusions.

3.1 The modelling assumes there is continuous escape of noise from all openings simultaneously and thus provides an absolute worst case.

3.2 Using worst case assumptions for the new polishing plant and in particular that its identified noise levels are taken as point sources escaping the enclosure, resulting levels are substantially below existing boundary emissions levels. This indicates a significant improvement in noise levels off site. Whilst not all site sources will be further mitigated, some will by the enclosure over the polishing plant.

3.3 Predicted level are of the order of 14dBA below existing boundary level and on that basis alone are insignificant. Furthermore they result in levels at least 5dBA and after excluding reflected contributions, likely 7dBA below any point expected to adversely impact even a staff room, study area or executive officer within any office building. This is based on the guidance within BS8233:2014 and assuming a reduction of only 10dBA through an open window.

3.4 In the unlikely event greater noise escaped from openings in the acoustic enclosure around the polishing drum these would remain well below any level of concern. However, additional mitigation can readily be retro fitted by providing a acoustic duct section at any opening.

3.5 Noise is not a reason to control or regulate this plant and can be expected to lead to an improved situation with reduced emissions from this part of the site as a result.

3.6 The height and dimensions of the new enclosure also serves to increase screening of existing site sources of noise further reducing noise escape from the site.

3.7 Significant improvement also arises as shovelling of metals is pushed further into the EMR site and better screened by the new plant.

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