

Noise Assessment Information

As part of the permit variation request Dairy Partners Limited have completed a noise assessment of normal operations at the Newcastle Emlyn Creamery (Grid Ref SN 315 401).

The assessment was completed on the 20th May 2018, weather conditions were sunny, and air movements should be considered calm.

Short duration noise checks (in line with BS 4142:2014), at various locations around the plant were completed, including boundary reviews near the closest residential receptors (SN 316 401).

British Standard 4142 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". The main points of the standard are [in brief] as follows:

- Make measurements of all noise at the assessment location, including the "problem" noise, in terms of LAeq - termed the "ambient" noise level
- A measurement is then made of all the noise excluding the "problem" noise in terms of both LAeq and LA90; these measurements are termed the "residual" and "background" noise levels respectively.
- the "residual" LAeq measurement is then subtracted (logarithmically) from the "ambient" LAeq measurement to produce the noise level produced by the "problem" noise alone - termed the "specific" noise level [are you following this?]
- If the "problem" noise is tonal [containing a noticeable hiss, whine or hum] or if it is impulsive [contains bangs clatters, clicks or thumps] or if it is irregular enough to attract attention [?] a correction of 5 dBA is added to the "specific" level to produce the "rating level" (still with it?).
- The "background" LA90 measurement is then compared against the "rating" level.
- If the "rating" level exceeds the "background" by around 10 dBA or more this "indicates that complaints are likely". A difference of around 5 dBA is of marginal significance; at a difference below 5 dBA, the lower the value, the less likely that complaints will occur; a difference of -10 dBA or more is "a positive indication that complaints are unlikely".

During the daytime, measurements of the "problem" noise are averaged over an hour, whereas at night the average is performed over five minutes. The standard should not be used where BOTH the background noise and rating level are low i.e. the background should not be below 30 LA90 AND the rating level should not be below 35 dB.

The standard requires that the weather conditions are recorded and are such that the weather does not cause spurious measurements, e.g. the wind speed at the microphone can sometimes cause a "fluting" effect across the microphone grid; given that the sound level meter cannot differentiate (not yet) between noises, it will measure the fluting effect. Windmuffs/windshields are used to reduce this effect, but depending on the loudness of the "real" noise, fluting can be important when the wind speed at the microphone is as low as 5 m/s.

Process followed

There was no background data available at the time of the noise assessment, key items such as the LNG terminal (Grid Ref. SN 31589 40112) were not in operation, the noise assessment could only capture the noise levels related to normal business activities at the Creamery.

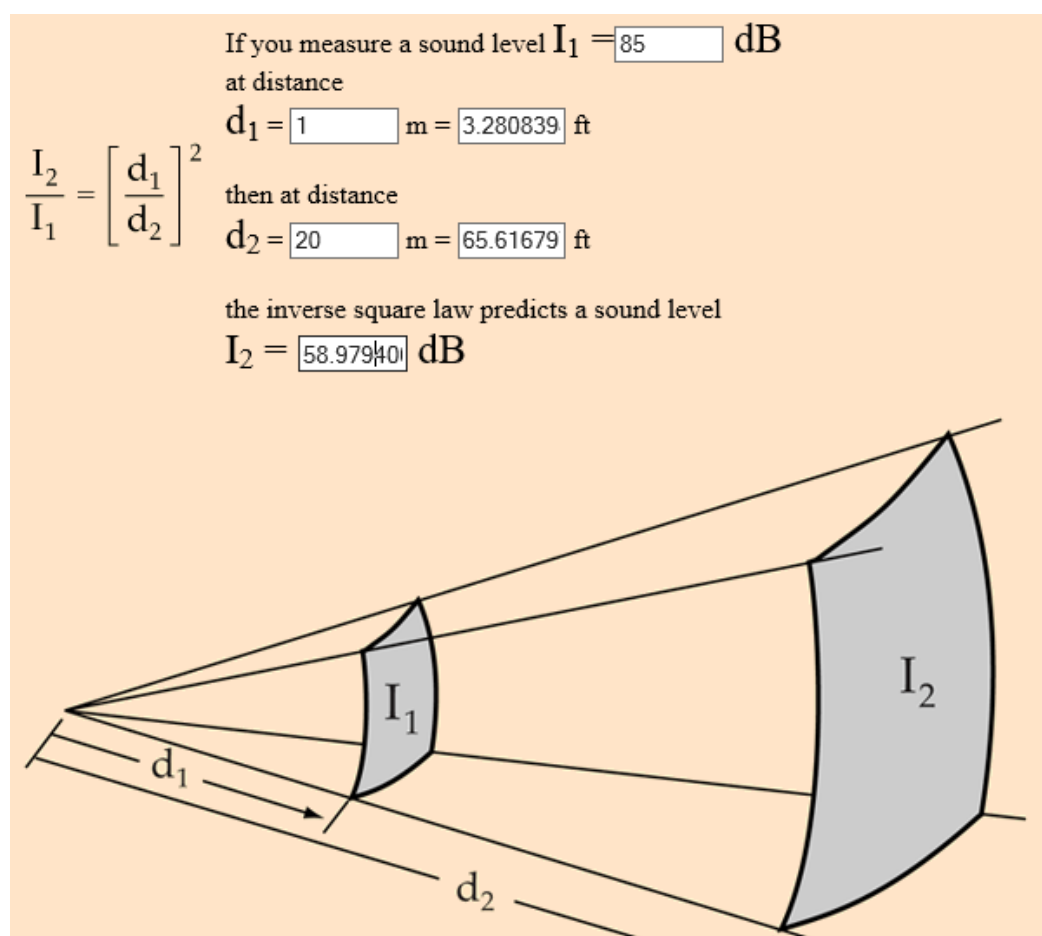
A desktop study based on information supplied by the vendor of the LNG storage terminal via the specification document revealed that the only equipment with a potential for noise generation was a small air compressor located in the control room, this had a noise pressure level when in full loading of 65dB.

The air compressor identified in the specification (Atlas Copco (Model reference LFX 2.0-10TM 50 230/1/50), is a back-up unit, all air will be supplied from the factory air supply, reducing the requirement to operate this pump unless the factory air supply is lost. The air compressor is housed within an acoustic cabin, which also doubles as the control room for the gas terminal.

The most significant noise emitter in the LNG process would be the delivery tanker, the refuelling is a low frequency task likely to be weekly when the plant is in full operation using LNG as the primary fuel.

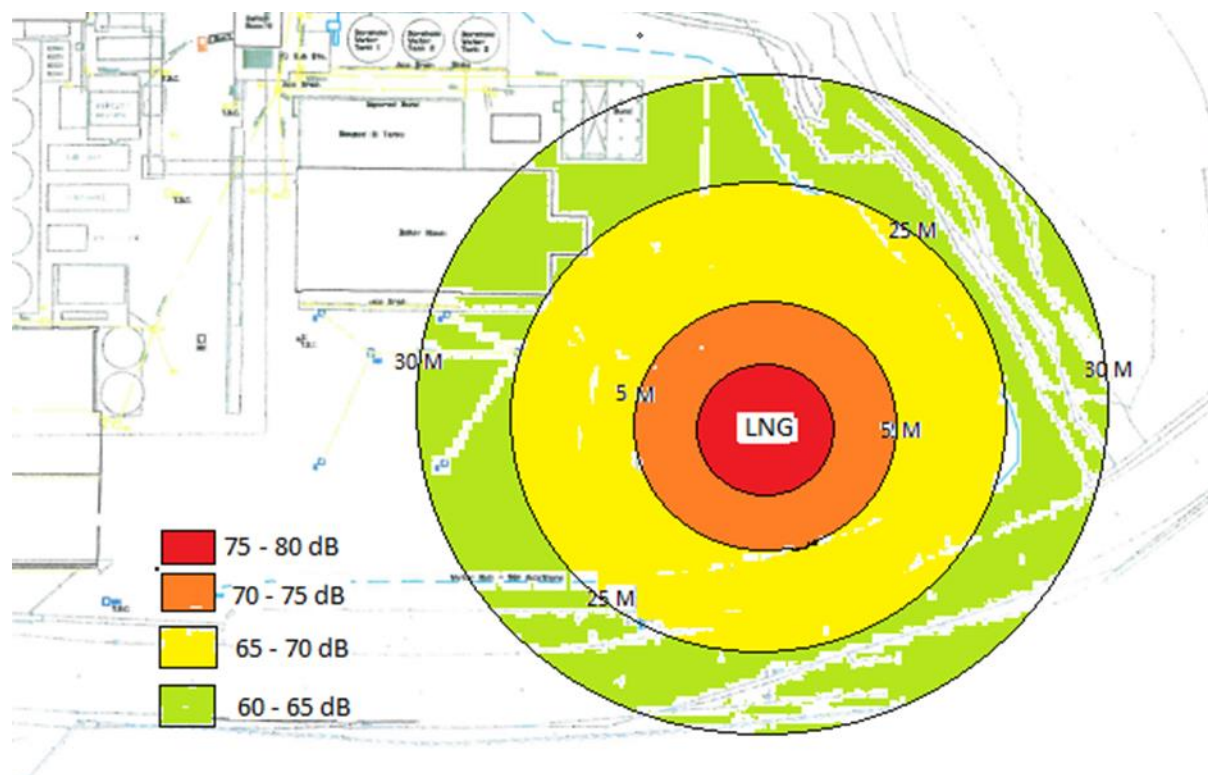
The refuelling process takes around 3 hours from start to finish and includes a period of tank and pipe cooling (noise generator). The tanker pump is a Cryostar CSH 185/4-7.1, the specification suggests this pump has an 85dB rating.

Using the inverse square law to estimate the sound level pressures based on the information within the pump specification, we can estimate that the 85dB rating at 1m from the source, using the data based on a distance of 20 meters to the nearest residential receptor the noise level would be 58dB during delivery.



During a refill of the LNG tank, for use during the commissioning process a number of real time noise readings were taken, the samples were taken over a three minute period with the time weighted average recorded at each point, focus was paid to the residential receptors located closest to the terminal position:

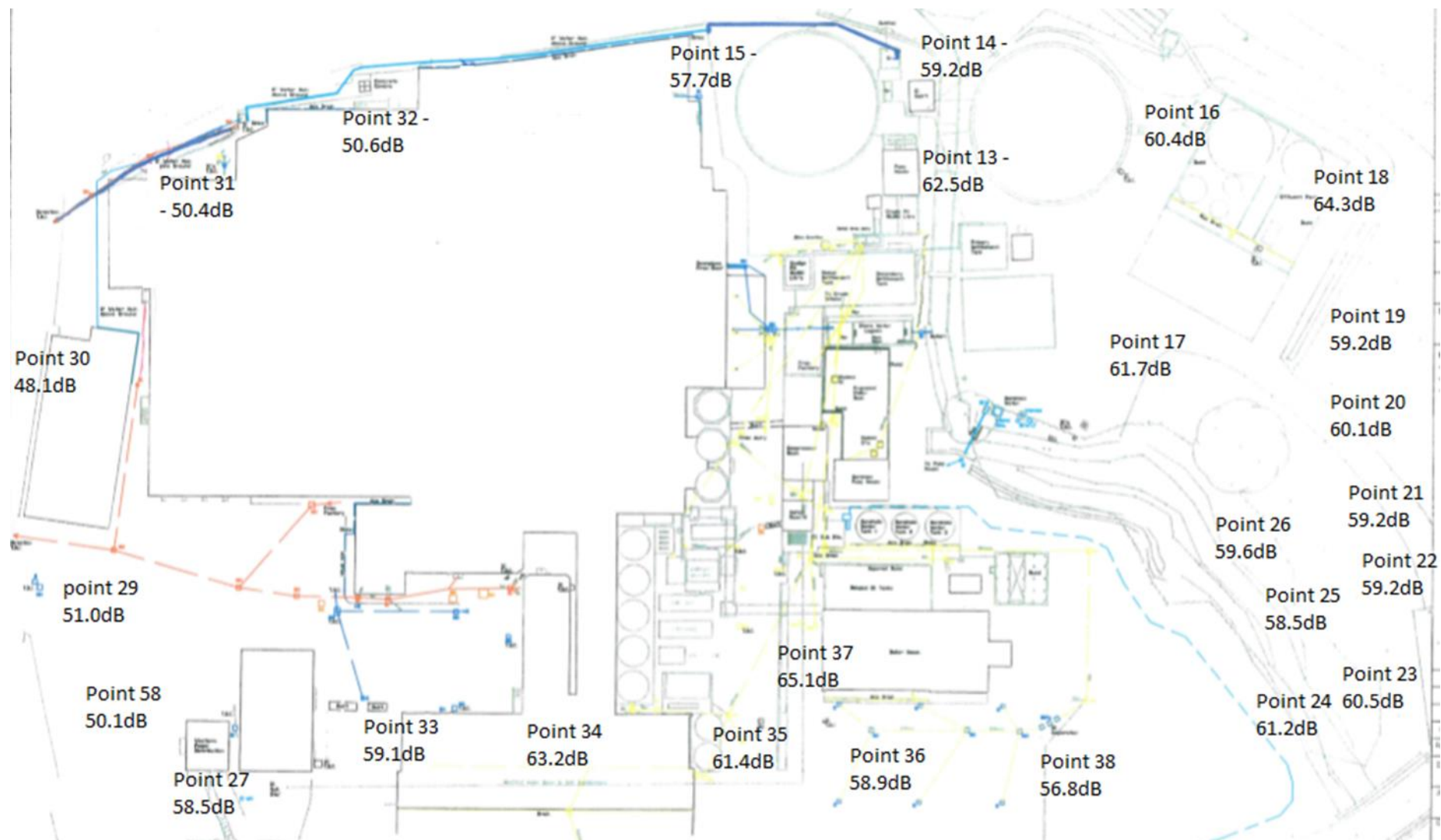
Ref No	Location	Noise levels
1	Bungalow fence line	66.2
2	ETP access gate	65.2
3	20m west of delivery point	69.0
4	25m west of delivery point	67.6
5	40m west of delivery point	66.4
6	20m North of delivery (bungalow across road)	64.1
7	30m North as above	67.2
8	30m North East (end of drive above)	67.4
9	2m from delivery pump	78.5
10	4m from pump	71.1



Significantly the noise emitted from the delivery pump was considerably lower than the 85dB listed within the specification document, the noise levels recorded were more like 85dB at 2m from the delivery point.

Noise levels near the closest residential receptors also included that of the vehicle and traffic movements, and normal operational noise from the plant. It is recommended that a full noise study is completed with focus on individual noises emitted from the plant.

In addition, following the same process of 3 minute reviews (in line with BS 4142:2014), at various locations around the plant, including boundary reviews near the closest receptors, a general noise assessment of normal operations has been conducted, the results can be found over the page:



38 sample points, were chosen across the site to cover all aspects of normal operations, each point was monitored for three mins to obtain a time weighted average, at this point no further in depth investigation of the data has taken place, this was a spot check of the operational noise generated during a normal production day.

Data obtained showed levels between 56 - 64dB, with samples closer to the site boundary effected by traffic on the busy external road.

Additional focus was placed on the Glycol cooling system (Grid Ref. SN 31586 40149), due to the acoustic barriers already constructed by Dairy Partners this was not an obvious nuisance noise at the boundary.

However, there was a distinct tonal noise identifiable at the boundary fence near the closest receptor (Bungalow), on further investigation this was found to be generated by the high frequency pumps attached to the cooling water system on the back end of the cooling towers. After discussion with Dairy Partners measures to mitigate /control the effects of this noise are being proposed.

Recommendations

Finding	Action	Time scale
Dairy Partners to evaluate the current tonal noise being emitted from the cooling water pumps	<p>If engineering activities cannot lower the tonal issue i.e. lower the load on the unit then additional measures should be taken.</p> <p>Cooling water pumps are high frequency type, erection of an acoustic barrier should be investigated.</p> <p>Dairy Partners to discuss with an expert and design a suitable enclosure to reduce the effect of the tonal noise.</p>	1 – 2 months
Cooling towers are currently running at a higher rating, due to the warmer weather the towers are under greater demand, as such the noise levels are noticeable	<p>Discuss with the vendor the options available to the site, can the rating be dropped, is there additional measures that can be taken using the Glycol system.</p> <p>Discuss the possibility of upgrading the system to a newer model, which performs better under the loadings expected</p>	<p>4 weeks to discuss options</p> <p>New action to be produced once options are known.</p>
Additional monitoring of site to take place	<p>Additional monitoring required of the LNG terminal.</p> <p>Site to have regular noise reviews (day & Night)</p>	Schedule to be developed based on 3 monthly frequency.