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GO PLANT LTD

PROPOSED DEWATERING FACILITY FOR ROAD SWEEPER WASTE

BARNESLEY DEPOT

ASSESSMENT OF ENVIRONMENTAL NOISE

Prepared for:
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A handwritten signature in black ink, appearing to read 'I F Bennett'.

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1 INTRODUCTION

ACIA was commissioned by Go Plant Ltd to provide acoustic consultancy services in connection with the proposed new road sweepings dewatering plant at the company's depot at Shawfield Road, Carlton Industrial Estate, Barnsley. The site currently operates as a depot for a fleet of road sweepers and similar equipment.

This report presents an assessment of the effects of the proposed development on ambient noise levels in the locality as a result of the operation of the plant. Noise mitigation measures are recommended where necessary.

The nearest noise-sensitive properties are located on Rainford Drive and Fylde Close, directly to the east of the industrial estate. All other development in the immediate vicinity consists of commercial and industrial uses.

2 NOISE CRITERIA

2.1 Definitions

It is appropriate at this stage to define some of the terms used in the measurement and specification of noise levels in the environment.

A-weighting

The A-weighted sound pressure level results from filtering a signal by an 'A' filter (BS.4197) whereby both low-frequency and high-frequency components have been attenuated without affecting the components near 1000Hz.

Equivalent continuous noise level (L_{Aeq})

This is the A-weighted noise level which if present for the entire measurement period would produce the same sound energy to be received as was actually received as a result of a signal which varied with time. It is normally abbreviated to ' L_{eq} ' or ' L_{Aeq} ', and is often followed by a specification of the time period (such as one hour, or five minutes) indicating the period of time to which the measured value has been normalised; for example, ' $L_{Aeq,1hr}$ '.

L_n index

The L_n resulting from an environmental noise measurement is the level which was exceeded for n percent of the measurement period. Thus, an L_{A90} of 35dB represents the A-weighted sound pressure level which was exceeded at the microphone for 90% of the measurement period. Any value of n between 0 and 100 is meaningful, but the indices in general use in the UK are L_{A90} and L_{A10} . The

L_{A90} index is generally taken to be representative of the steady background sound level. The L_{A50} is the arithmetic average of all the instantaneous values during the measurement period. The principal use of L_{A10} is in the assessment of road traffic noise. It is a widely accepted convention that hourly measurement periods are adopted during the day, and fifteen-minute periods at night.

2.2 Acceptable noise emissions from operations

2.2.1 BS.4142:2014

The acceptability of environmental noise is usually assessed with reference to this well-established standard. It recommends that a 'new' industrial noise be compared with the pre-existing background level. Corrections can be made for the additional effects of tonal or impulsive noise, and (in the 1997 and earlier versions) the likelihood of complaints from the local community could be predicted. The standard was subject to extensive revision leading to the publication of the latest version, BS.4142:2014 *Methods for rating and assessing industrial and commercial sound* in November 2014.

The use of the 1997 methods when considering noise emissions from industrial type processes in rural areas had some shortcomings. A major problem arose from the fact that the minimum background noise levels could reasonably be expected to fall well below 30dB(A) at night, which is considerably lower than was anticipated by the original authors of the standard. The basic principle of the standard was to compare the rating level of the 'new' noise with the pre-existing background noise level in or new noise source which noticeably increases the levels of ambient noise at a noise-sensitive location such as a private dwelling is likely to provoke justifiable complaints.

The 2014 standard has addressed these problems and now calls for a comparison of the 'new' noise with the pre-existing background sound, with adjustments to be made for particular noise characteristics such as intermittency and tonality. The concepts of NOAEL, LOAEL and SOAEL¹ are included in the latest version of the standard.

2.2.2 Integrated Pollution Prevention and Control (IPPC)

Section 2.5.1 of IPPC advises that noise levels should be calculated according to the principles of ISO 9613-2:1996. This is a method of calculating noise levels at a receptor a known distance from a noise source, taking into account atmospheric absorption, soft ground attenuation and geometrical diffusion.

1 No Observable Adverse Effect Level, Lowest Observable Adverse Effect Level, and Significant Observable Adverse Effect Level

2.2.3 NPPF

The National Planning Policy Framework (NPPF) was published in 2012 and revised in July 2018: it replaced previous Planning Policy Guidance (PPG) 24: Planning and Noise. The NPPF provides the following guidance on noise and planning. The NPPF states at paragraph 123 that planning policies and decisions should avoid noise giving rise to *'significant adverse impacts ... on ... quality of life'*, and mitigate the adverse impacts through the use of conditions, but should recognise that development will often create some noise.

The NPPF also states at paragraph 144, that when determining applications local planning authorities should;

'ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source'.

The Technical Guidance to the NPPF relating to noise emissions deals only with mineral workings (at paragraphs 28 and 29). It is therefore necessary to refer to the provisions of the Noise Policy Statement for England (NPSE) dating from March 2010, which is also referenced by the current PPG (see below).

The aim that adverse impacts on health and quality of life should be mitigated and minimised is the most relevant here: it refers to the situation where the impact of a 'new' noise lies somewhere between LOAEL and SOAEL. This in turn implies that assessment criteria such as those in BS.4142:1997 may be appropriate for a fixed installation. However, the British Standard is itself under review, with the latest issue expected in late 2014.

2.2.4 March 2014 Planning Practice Guidance

The online Planning Practice Guidance appeared in March 2014 and states that noise needs to be considered when a new development may create additional noise, or in the reverse situation when a new development would be sensitive to the prevailing acoustic environment. It refers to the three stated aims of the Noise Policy Statement for England (NPSE): to avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; to mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; and where possible, to contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development. The concepts of 'no observed effect level', 'lowest observed adverse effect level', and 'significant observed adverse effect level' (NOEL, LOAEL and SOAEL) as applied by the World Health Organisation were introduced by the NPSE and are referred to by the PPG, although no specific guidance is provided.

2.3 Noise limits

No noise limits have been suggested as planning conditions, but provided that the sound levels at nearby noise-sensitive locations do not increase as a result of the operation of the facility, the second aim of the NPSE, which is to mitigate and minimise the impact on local residents, will be fulfilled.

3 BACKGROUND NOISE

3.1 Noise survey details

A survey of ambient sound levels was undertaken on site during the early morning period, in order to allow for the normal opening time at the depot, 07:00h on weekdays. It is understood that there may be some activity on site before that time, so the survey began about half an hour beforehand. A microphone location was selected at the western end of Fylde Close, at OS grid reference 436697E, 408810N marked 'X' in Figure 1. The location was selected to be representative of the sound levels affecting the nearest residential properties without requiring access to private property.

The survey took place between 06:30h and 09:30h on Monday 20 August 2018.

3.2 Instrumentation

A Rion type NL-52 sound analyser, serial number 921231, was set up at location 'A'. It was fitted with a preamplifier type UC-59, serial number 04266, and half-inch condenser microphone type NH-25, serial number 21273. The unit was mounted on a tripod with the microphone 1.5m above ground level and protected by a foam windshield.

It was set to monitor 15-minute sample periods, with the parameters L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} being logged. Fifteen-minute averaging periods are recommended in BS.4142:2014 for night-time background sound measurements as they give an indication of how a noise climate changes with time, without being unduly influenced by single events. Hourly measurements are often used during the normal daytime, but the $L_{Aeq,1h}$ can in any case be calculated from any four successive values of $L_{Aeq,15min}$ for any hour.

The instrument was subject to calibration checks before and after the surveys by means of a Rion type NC-74 electronic calibrator: no drift was observed. The meter and calibrator are subject to regular laboratory calibration. The type NL-52 was last calibrated traceably in a laboratory on 21 October 2017, and the calibrator on 8 June 2018.

3.3 Weather and other observations

The weather on the morning of 20 August 2018 was dry but cloudy (8/8 cloud cover, with an air temperature of 16°C and no measurable wind. There was no rainfall during the survey.

All noise measurements were made by Ian F Bennett BSc CEng MIOA, consulting acoustical engineer.

3.4 Results of noise measurements

The ambient sound levels $L_{Aeq,15min}$, $L_{A90,15min}$ and L_{Amax} at location A are presented in the Appendix.

It can be seen that the typical equivalent continuous sound level was around 47dB $L_{Aeq,15min}$ and the underlying background sound level was 40dB. The equivalent continuous sound levels were affected from about 07:50h onwards by some construction activity on a site near the Go Plant depot, but this was not continuous and the underlying $L_{A90,15min}$ values were judged not to be affected.

4 PREDICTED NOISE LEVELS

4.1 Basis of predictions

The predicted noise levels from the site were calculated for two representative noise-sensitive locations: (A) the rear or western elevation of 29 Fylde Close (a two-storey house), and (B) the side or south-western elevation of 16 Rainford Drive (a single-storey bungalow). These two locations are 82m and 90m respectively from the proposed dewatering and screening plant.

Assuming that the operation of the proposed plant is the only significant contributor to the overall noise level apart from current movements of road sweepers and the permitted maintenance operations in the workshop, the decay of sound levels with distance (geometric effects) was taken into account according to basic acoustical principles. Calm weather is assumed, but the separation distances are too low for significant diffraction to occur.

The direct lines of sight between the proposed development and the two nearest potentially noise-sensitive locations are partially obscured by a band of trees and by the local topography, meaning that there may be additional beneficial screening effects, but no allowance was made for this.

4.2 Calculated noise levels

4.2.1 Source data

Noise levels (L_{Aeq}) at the two receptor locations were calculated using the octave band sound power levels in Table 1. The source levels for the wheeled loading shovel (telescopic handler) equate to 87dB(A) overall and represent the average sound power levels propagating from the machine whilst it is use within the facility. The levels for a typical road sweeper (Johnston VT650 or VT 561) are the energy average during a low-speed manoeuvre involving reversing and tipping, and were derived from actual measurements on Go Plant Ltd's fleet. The dewatering and separation plant consists of several stages and the sound power level emitted in the direction of the nearest residential properties was derived from measurements on a similar plant at another depot.

TABLE 1: Typical sound power levels emitted by plant, L_{eq} dB

source	63	125	250	500	1k	2k	4k	8k	'A'
telescopic handler	98	97	91	88	88	88	84	79	87
dewatering/screening plant	99	93	84	84	83	82	81	77	89
road sweeper (tipping)	98	93	87	89	89	88	84	76	94

The equivalent continuous sound level emitted by normal operation of the plant will result from the continuously-running dewatering and screening plant, the use of a JCB 535 telehandler, typically for 50% of every hour, and the emptying and washing down of road sweepers. Sweepers will visit the facility intermittently but at the busiest times of day, a road sweeper may be unloading for 20% of any given hour. The typical equivalent continuous sound power level emitted by the plant operations as a whole (the composite noise source) can then be calculated by decibel addition as 96dB.

The resulting sound pressure levels L_p in octaves were estimated from the following expression:

$$L_p = L_w - 20 \log r - 11 + DI + \Sigma A \text{ [dB]}$$

where r is the separation distance in metres between the composite noise source and the receptor; DI is the directivity index, assumed to be +3dB for sound propagation over a reflecting plane surface; and ΣA is the aggregate excess attenuation resulting from the ground effects attenuation A_G and the atmospheric absorption A_A . The two terms A_G and A_A are frequency dependent, but geometrical attenuation is not. The soft ground attenuation factor G which determines the overall ground effect attenuation A_G is taken as zero for concrete or tarmac areas.

4.2.2 Predicted noise levels

Table 2 shows the predicted overall noise levels, L_{Aeq} , and the octave equivalent continuous levels, produced by the plant (in the absence of background noise) at the two potential receptors, including a 5dB net screening effect from the eastern site wall and the local topography. No allowance is made for the band of mature trees and undergrowth between the industrial estate and the nearest houses, although experience suggests the additional attenuation it provides may be significant.

TABLE 2: Predicted noise levels dB resulting from plant operation

location	63	125	250	500	1k	2k	4k	8k	'A'
L_{Aeq} at 29 Fylde Close	49	46	39	37	37	36	34	29	43
L_{Aeq} at 16 Rainford Drive	48	45	38	37	36	36	33	28	42

4.3 Assessment

4.3.1 29 Fylde Close

An assessment to BS.4142:2014 is set out at Appendix 2. The equivalent continuous sound level at the façade of this property facing the Go Plant site will be 43dB $L_{Aeq,1h}$ under the worst-case conditions.

BS.4142:2014 recommends comparison of the rating level with the pre-existing background sound level, which was 40dB $L_{A90,15min}$ (not the result of activities on the Go Plant site).

It is therefore reasonable to compare the rating level for the dewatering plant, 43dB, with the background level of 40dB. There is no intermittency because the plant itself will operate continuously, and the noise from the plant will not be tonal. No further corrections to the rating level are therefore appropriate.

Paragraph 11(d) of BS.4142:2014 states that the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Here, the rating level exceeds the background sound level by 3dB, and this is an indication that the specific sound may have an adverse impact, depending on the context, although the difference is less than the 5dB exceedance above which an adverse impact is likely (paragraph 11(c)).

The context here is that the noise emissions from the proposed plant will not exceed the pre-existing ambient sound level in terms of $L_{Aeq,1h}$ or $L_{Aeq,15min}$ and will therefore for practical purposes be inaudible, especially with the additional attenuation through the band of trees referred to above. The acoustical impact of the development is therefore below the LOAEL and no special consideration is required.

4.3.2 16 Rainford Drive

The equivalent continuous sound level at the nearest house on Rainford Drive will be 42dB $L_{Aeq,1h}$ compared with a background sound level of 40dB $L_{A90,15min}$. There is no intermittency because the plant itself will operate continuously, and the noise from the plant will not be tonal. No further corrections to the rating level are therefore appropriate.

The rating level is 2dB above the background sound level, and this is again an indication that the specific sound source will have a low impact, depending on the context.

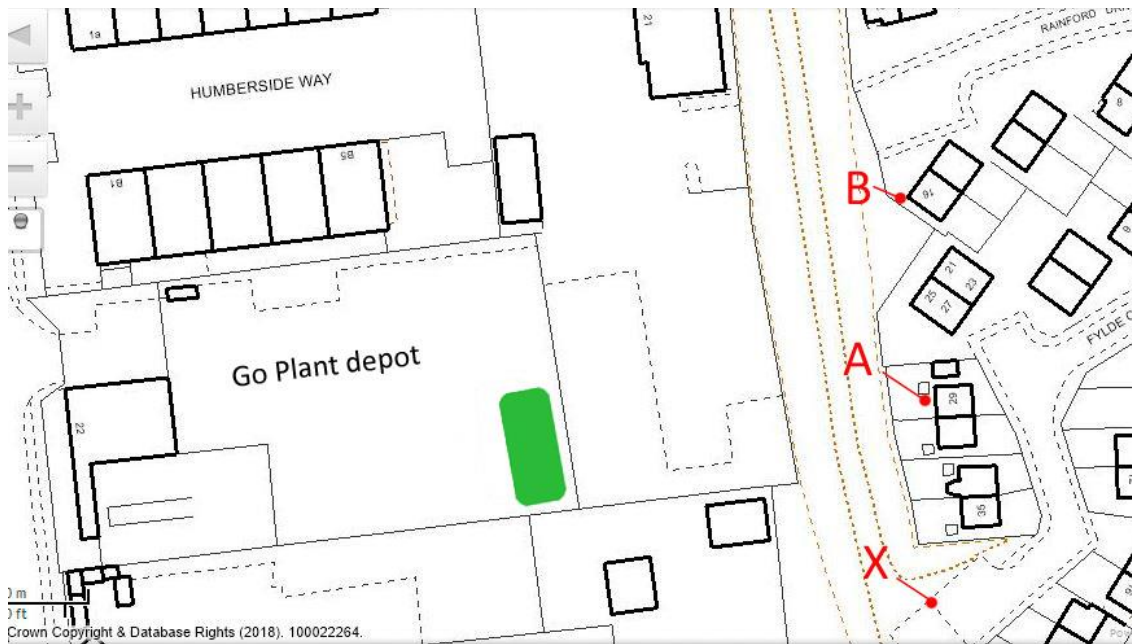
The context here is that the noise emissions from the proposed plant will not exceed the pre-existing ambient sound level in terms of $L_{Aeq,1h}$ or $L_{Aeq,15min}$ and will therefore for practical purposes be inaudible, especially with the additional attenuation through the band of trees referred to above. The acoustical impact of the development is therefore below the LOAEL and no special consideration is required.

5 CONCLUSIONS

A study of environmental noise levels in the vicinity of the proposed dewatering and screening facility shows that the sound levels will be acceptably low. The plant will emit sound levels below the lowest observable adverse effect level at noise-sensitive locations.

The movements of sweeper vehicles into and out of the site, which have been a feature of the site's use under its existing planning permission, will not give rise to any additional noise impact and these movements were not audible at the background sound measurement location at any time.

It is concluded that the proposed addition of a road sweepings recovery plant will give rise to no noise nuisance or loss of amenity at neighbouring residential or potential residential properties. No further noise mitigation will be necessary.

Figure 1: Noise measurement and prediction locations

Location X is the main sound level measurement location. Locations A and B are those used as representative locations for noise predictions. The location of the proposed dewatering plant is shown shaded green.

APPENDIX 1

TABLE A1: Results of ambient sound level measurements

start h	end h	L _{Aeq,15min} dB	L _{A90,15min} dB	L _{A10,15min} dB	L _{Amax} dB
06:15	06:30	49	38	46	63
06:30	06:45	52	40	48	64
06:45	07:00	47	40	44	58
07:00	07:15	48	39	45	62
07:15	07:30	45	38	42	57
07:30	07:45	54	40	51	64
07:45	08:00	57	44	51	65
08:00	08:15	55	45	54	65
08:15	08:30	56	43	54	66
08:30	08:45	56	44	54	68
08:45	09:00	47	41	50	55
09:00	09:15	52	43	53	66

APPENDIX 2

TABLE A2: Assessment to BS.4142:2014 of proposed operations

Results		Clause	Commentary
<i>Location: 29 Fylde Close</i>			
Residual sound level	$L_{Aeq,15min} = 47dB$	7.3.3	No noisy operations on Go Plant site
Background sound level	$L_{A90,15min} = 40dB$	8.3	Normal operations
Daytime assessment, so reference time interval is 1 hour		7.2	
Specific sound level	$L_{Aeq,1h} = 43dB$	7.3.4	Current ambient sound level adjusted for changes in operations
Acoustic feature correction	0dB	9.2	No acoustic features present
Rating level	$(43 + 0)dB = 43dB$	9.2	
Background sound level	$L_{A90,1h} = 40dB$	8	
excess of rating over background	$(43 - 40)dB = 3dB$	11	
Indicates low likelihood of adverse impact		11	The rating level is 3dB above background and is not significant in the context
Uncertainty		10	Assumptions are considered to be conservative and will tend to overstate the likely impact. No allowance made for attenuation through trees and vegetation

TABLE A2 continued

Results		Clause	Commentary
<i>Location: 16 Rainford Drive</i>			
Residual sound level	$L_{Aeq,15min} = 47dB$	7.3.3	No noisy operations on Go Plant site
Background sound level	$L_{A90,15min} = 40dB$	8.3	Normal operations
Daytime assessment, so reference time interval is 1 hour		7.2	
Specific sound level	$L_{Aeq,1h} = 42dB$	7.3.4	Current ambient sound level adjusted for changes in operations
Acoustic feature correction	0dB	9.2	No acoustic features present
Rating level	$(42 + 0)dB = 42dB$	9.2	
Background sound level	$L_{A90,1h} = 40dB$	8	
excess of rating over background	$(42 - 40)dB = 2dB$	11	
Indicates low likelihood of adverse impact		11	The rating level is 2dB above background and is not significant in the context
Uncertainty		10	Assumptions are considered to be conservative and will tend to overstate the likely impact. No allowance made for attenuation through trees and vegetation