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A specialist energy consultancy

Noise Impact Assessment

Rover Way, Celsa Site

EAME

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1 Introduction

TNEI have been commissioned to undertake an environmental Noise Impact Assessment (NIA) in order to support the Environmental Permit Variation application for an asphalt plant and associated slag crushing activities (the proposed processes), to be located within the Celsa owned site on Rover Way, Cardiff.

The NIA also considers the cumulative noise level impacts from operations already conducted within the Celsa site and a permitted (but yet to be operated) Metal Recycling Centre.

The Asphalt Plant is currently in the planning process (awaiting decision) though the associated slag crushing has not been included in the planning application; rather, this is considered solely through the Permit Variation.

The Asphalt Plant would be at approximate OS coordinates 321470,176260.

1.1 Background

A number of NIAs were undertaken and refined during 2019 as the designs and plans for a various developments within the Celsa site progressed. NIA reports were issued to support the planning applications for some of these development.

One NIA report (TNEI 13331-001) was issued to Harsco Ltd and EAME Ltd on 21st June 2019. The purpose of this report was to support the planning application for the Asphalt Plant only (the Proposed Development).

In light of new information regarding the Proposed Development, the NIA report was amended and re-issued on 4th July 2019 (13331-001-R2). Whereas the first issue of the report had considered associated slag crushing activities, at the request of Harsco Ltd. the second issue did not consider slag crushing, as these activities were not to form part of the planning application.

The second issue of the report included an additional assessment of noise impacts on ecological receptors.

The 4th July report replaced the 21st June report and no weight should be given to the first issue.

Neither version of the report was intended to be used for an Environmental Permit variation. Regardless, both versions of the report were submitted to Natural Resources Wales (NRW) to accompany an Environmental Permit Variation and NRW have since issued a Schedule 5 request for further information (February 2020).

1.2 Purpose of this NIA

The purpose of this NIA report is to support permit application EPR/TP3639BH/V009 (variation) only.

The aims of the NIA are to:

- Quantify the existing baseline sound levels at the nearest Noise Sensitive Receptor (NSR) locations;
- Identify the noise sources associated with the proposed processes;
- Calculate the likely levels of noise at the nearest receptors to determine the noise impacts associates with the proposed processes;
- Undertake a cumulative impact assessment to consider the proposed processes occurring in combination with existing, operational sound sources as well as sound levels arising from future activities associated with the Metal Recycling Centre;

- indicate any requirements for mitigation measures, if required, in order to provide sufficient levels of protection for nearby receptors; and;
- Provide information in order to address comments *1a* through to *1k* of the Schedule 5 Request.

Please note that this report replaces TNEI report 13331-001-R0 (June 2019 and July 2019).

1.3 Nomenclature and Format of the Report

Please note the following terms and definitions, which are used throughout this report:

- Emission refers to the sound level emitted from a sound source, expressed as either a sound power level or a sound pressure level;
- Immission refers to the sound pressure level received at a specific location from a sound source(s);
- SWL indicates the sound power level in decibels (dB);
- SPL indicates the sound pressure level in decibels (dB);
- NML refers to any location where baseline sound levels have been measured: Noise Monitoring Location.
- NSRs are all identified receptors which are sensitive to noise: Noise Sensitive Receptors; and
- NAL refers to any location where the noise immission levels are calculated and assessed: Noise Assessment Location.

Unless otherwise stated, all noise levels refer to free field levels i.e. noise levels without influence from any nearby reflective surfaces.

In the interests of clarity, a Glossary of Terms is provided as Appendix A.

With regards to geographical descriptions of the existing and proposed processes;

- All of the land containing both the existing and the proposed Permitted Processes is referred to within this report as the 'Celsa Site'. This includes land both north and south of Rover Way; and,
- The section of the Celsa Site that will house the proposed processes and the Metal Recycling Centre is referred to within this report as the 'Development Site'.

All Figures can be found in Appendix F.

All grid coordinates refer to the Ordnance Survey grid using Eastings and Northings.

1.3.1 Schedule 5 Request

An extract from the NRW's Schedule 5 request (comments *1a* through to *1k*) is included as Appendix E alongside details regarding how each comment/query has been addressed.

2 Process Description

2.1 Proposed Processes

Environmental, or community noise is a broad term that encompasses noise emitted from many sources, including road, rail, air traffic, industry, construction, public work and neighbourhood noise. All of these sources potentially contribute adversely to the overall noise environment. It is therefore reasonable to expect communities to be sensitive to any deterioration in their acoustic environment as a result of a proposed development.

The proposed processes will introduce new sound sources into the local area in the form of fixed and mobile plant that will typically operate during weekday daytime hours from 06:00 onwards and may also operate during weekend daytime periods. The proposed processes will be located within the Celsa site to the south of Rover Way. A site layout is included in Appendix B that shows the location of the proposed processes.

The Asphalt Plant will consist of a Parker StarMix 4000 asphalt production plant. The production plant will include externally located fixed plant and some mobile plant. Specifically, the primary sound sources associated with the Asphalt Plant that require consideration within the assessment are:

- Tracked Excavator (loading materials into cold feed system);
- Cold Feed Conveyor;
- Aggregate Dryer;
- Loading Car;
- Loading Car Winch; and,
- Loading of asphalt into lorries.

Slag Crushing plant will consist of a number of screens plus the crushing plant. All of the screening and crushing plant will be mobile though it is understood that once in operation the positions will be fixed.

Very limited noise source data is available for the above sound sources, however, a similar slag crushing and asphalt plant operation occurs on a Celsa site in Rotherham. Therefore, TNEI undertook sound level measurements of this plant in order to obtain representative sound level data for the assessment.

In addition to the above, a wheeled loader and a dumper truck will be employed on site to move materials and load the plant.

2.2 Permitted Processes

Information with regards to the permitted processes that already occur within the Celsa site can be found in the EPR/TP3639BH/V008 Permit document dated 07/02/2020.

Baseline monitoring has been undertaken that has quantified off-site sound levels, which include contributions from the existing processes, however, operations from the Metal Recycling Centre are not included within the survey data as this was not constructed at the time of the survey. Accordingly, sound levels have been calculated from the Metal Recycling Plant and these were provided in TNEI report 13331-008-R1 [1], which was issued to NRW as part of the most recent permit variation (Permitted on 7th February 2020).

[1] TNEI Services, *13331-008-R1 Cardiff Scrap Metal Sorting Facility – Noise Assessment*; 6 November 2019

2.3 Study Area

NSRs are properties, people or fauna that are sensitive to noise and, therefore, may require protection from nearby noise sources. Figure 1 details the closest identified NSRs.

The Study Area has been defined through the identification of the closest NSRs to the development. Specifically, the study area considers the closest NSRs only, on the assumption that if noise levels are within acceptable levels at the closest receptors then it is reasonable to assume they will also be acceptable at more distant locations.

Three groups of residential NSRs have been identified. Group 1 consists of a large number of properties located to the north of the Celsa site, with the closest NSRs just a few meters away from the northern Celsa site boundary, on Willows Avenue. These receptors are approximately 450 m north west of the development site and would benefit from substantial levels of barrier attenuation provided by the existing Celsa buildings (including the new and old melt shops), which are located directly between the development site and the receptors.

NSR Group 2 is a group of residential properties located to the north of the development site at a greater distance of approximately 750 m but with limited barrier attenuation.

NSR Group 3 is a traveller site located approximately 350 m to the north east on Rover Way. This is the location of the closest residential NSRs to the development site (as opposed to the wider Celsa site).

No residential NSRs have been identified in other directions.

The area around the coastline to the south and east of the development site is designated as SPA, Ramsar and SAC. As such it is also important to consider any noise effects that may occur to wildlife within these areas.

3 Assessment Methodology

3.1 Legislation and Policy Context

3.1.1 Noise and Soundscape Action Plan 2018–2023

The Welsh Government, in 2018, published the Noise and Soundscape Action Plan 2018–2023 (NSAP), which outlines the Welsh public sector's strategic policy direction in relation to noise and soundscape management.

With regards to industrial noise the NSAP explains how noise from major industrial sources is regulated by Natural Resources Wales (NRW) through the Environmental Permitting Regulations 2016 (EPR). Paragraph 8.2.5 states;

"Under EPR, noise is regulated through the use of standard noise conditions and each site's environmental management plan, rather than through the use of specific limits. This provides greater flexibility for adaptation to a changing soundscape."

3.1.2 Guidance for Permitting – Horizontal Guidance Note H3 Part 2

Overarching noise guidance for IPPC permit applications i.e. not sector specific; is contained in *Horizontal Guidance Notes H3 Part 2 Noise Assessment and Control*, which provides guidance for both the regulator and the operator. In particular, the Horizontal Guidance presents detailed information on noise monitoring, prediction and control as well as appropriate methods for the assessment of noise impacts. In particular the guidance notes refer to BS 4142, BS 8233 and guideline noise levels presented by the World Health Organisation (WHO), although in this regards the documents states;

"… one difficulty with the [WHO] guidelines is that they discuss general outdoor noise and do not focus on the specific issues of industrial noise. Hence it is possible that specific industrial sources levels lower than those identified by WHO may give rise to annoyance if ambient levels from other sources are lower still. This is addressed by implementing BS4142: 1997. For industrial noise, undoubtedly the excess of the noise over the background noise is a key issue and an indicator of likely noise impact."

It should be noted that whilst the Horizontal Guidance Note refers to BS 4142:1997, the standard was updated in 2014. Accordingly, this NIA refers to the updated BS 4142:2014 '*Methods for Rating and Assessing Industrial and Commercial Sound*' rather than the previous standard.

Note: Part 1 of the H3 Guidance Note has now been withdrawn.

3.2 Assessment Methods

A number of standards and guidelines are available for the assessment of environmental noise from industrial developments. Typically, assessments are based on a comparison of likely noise levels against either 'context' based limits or a set of fixed limits.

Context based limits are set relative to the existing noise environment and may also consider the characteristics of the noise source(s), whilst fixed limits are usually set regardless of the existing noise environment or type of noise source(s).

3.2.1 'Context' Based Assessments

BS 4142:2014 *'Methods for Rating and Assessing Industrial and Commercial Sound'* is commonly used to assess the potential impacts of new sound sources on nearby residential receptors. In June 2019

the standard was amended and reissued as BS 4142:2014 + A1:2019. No material changes have been made to the assessment process detailed within the Standard, rather the amendments are simply to provide clarifications to the existing text. Hereafter, the Standard is referred to simply as BS4142 and denotes the 2019 publication.

The BS 4142 form of assessment is based on the predicted or measured levels of an assessed sound source compared to the measured background sound levels without the specific sound source present and uses, *"outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident".*

Specifically, the assessment is made by subtracting the measured background sound level from a calculated or measured 'Rating Level'.

BS4142 uses the following definitions;

Ambient Sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far. Described using the metric, $L_{Aeq\ (t)}$.

Specific Sound Level: Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *Tr*. Described using the metric $L_{Aeq\ (t)}$. Also referred to in this report as the *Immission Level*.

Residual Sound Level: Equivalent continuous A-weighted sound pressure level of the residual sound without the specific sound source(s) present at the assessment location over a given time interval, *T*. Described using the metric $L_{Aeq\ (t)}$.

Background Sound Level: A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T*, measured using time weighting *F* and quoted to the nearest whole number of decibels. Described using the metric $L_{A90\ (t)}$.

Rating Level: The Specific Sound Level adjusted for the characteristics of the sound. The Rating Level is calculated by adding a penalty or penalties (if required) to the Specific Sound Level when the sound source contains audible characteristics such as tonal, impulsive or intermittent components. Described using the metric, $L_{Aeq\ (t)}$.

3.2.2 Fixed Guideline Levels (BS 8233:2014)

BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' presents guideline noise levels for daytime and night-time periods for a number of different building types; for residential developments these are based on guidelines issued by the WHO. Specifically, the Standard states; *"it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4."* Table 4 is reproduced here as Table 3-1.

Table 3-1: Indoor Ambient Noise Levels for Dwellings (*BS8233:2014 Table 4*)

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16\ hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\ hour}$	30 dB $L_{Aeq,8\ hour}$

The guideline levels in BS8233 are set against a 16 hour metric for daytime and an 8 hour metric at night. As such it is not possible to make a direct comparison between, for example, the one hour noise levels that may occur between 06:00 and 07:00 and the 8 hour guideline noise level for night-time.

BS 8223 suggests that an allowance of 15 dBA for the attenuation of a partially open window is reasonable in order to convert between internal and external sound levels and limits. Therefore, an assessment of external noise levels can assume an external noise level limit of 15 dB above those values detailed within Table 3-1 i.e. to achieve an internal night-time level of 30 dB $L_{Aeq(8hour)}$ with windows open, the external sound level must not exceed 45dB $L_{Aeq(8hour)}$.

3.3 Assessment Criteria

Considering all of the above, the assessment is made as follows:

- A quantitative assessment for daytime activities is made against the fixed daytime guideline levels defined in BS 8233:2014; and
- A qualitative assessment is undertaken in accordance with BS 4142:2014, taking into consideration the context of the development and the outcome of the quantitative assessment.

3.4 Calculation Methods

In order to predict the noise immission levels attributable to the proposed developments a noise propagation model is constructed using the propriety noise modelling software CadnaA. Within the software, complex models can be produced in order to simulate the propagation of noise according to a range of international calculation standards.

For this assessment, noise propagation is calculated in accordance with ISO9613 '*Acoustics – Attenuation of sound during propagation outdoors'* using the following input parameters:

- Temperature is assumed to be 10°C and relative humidity as 70%;
- A ground attenuation factor of 0 (hard ground) is used for the majority of the model and 1 (soft ground) is used for the larger grassy areas in between the Celsa Site and the nearest NSRs; and
- Receiver heights are set to 4 m for residential buildings (to represent a first-floor bedroom) and 1.5 m for the single-story dwellings within the traveller site.

The noise propagation model is intended to give a good approximation of the specific sound level and the contribution of each individual sound source; however, it is expected that measured levels are unlikely to be matched exactly with modelled values and the following limitations in the model should be considered:

- In accordance with ISO 9613, all assessment locations are modelled as downwind of all sound sources and propagation calculations are based on a moderate ground-based temperature inversion, such as commonly occurs at night. These conditions are favourable to the propagation of sound;
- Table 5 of ISO 9613 estimates overall accuracy for broadband noise predictions of ± 3dB, with average source to receiver heights <5m, at distances of up to 1000m;
- The predicted barrier attenuation provided by local topography, embankments, walls, buildings and other structures in the intervening ground between source and receiver can only be approximated and not all barrier attenuation may have been accounted for; and
- The model assumes all sound sources are operating continuously and simultaneously, estimating a worst-case source noise level.

4 Baseline Sound Level Monitoring

The local noise environment within the development site is dominated by noise from industrial activities and processes undertaken within the Celsa site and road traffic on Rover Way.

At all of the NSRs, the local noise environment is influenced considerably by local road traffic, particularly at the traveller site, where baseline sound levels are dominated by road traffic on Rover Way.

Attended baseline sound level monitoring was undertaken at three locations on the 12th and 13th May 2019, during daytime periods only. No night-time working is proposed, however as the Aspahlt Plant may operate from 06:00 onwards and include weekend working, baseline monitoring was conducted during early morning and Sunday daytime periods, as well as during regular weekday working hours.

Table 4-1 details the Noise Monitoring Locations (NMLs), which are also displayed on Figure 1 (in Appendix F).

Table 4-1: Baseline Noise Monitoring Locations

NML		Coordinates		Comments
ID	Descriptor	Easting	Northing	
NML01	Willow Avenue	321084	176583	Representative of closest NSRs to the North West on Willows Avenue.
NML02	Rover Way	321788	176715	Representative of NSRs within the traveller site on Rover Way.
NML03	Runway Road	321283	177044	Representative of closest NSRs to North in the area of Pengam Green and Tremorfa Park.

A handheld weather meter was used to check wind speeds during the survey. Throughout all of the monitoring periods wind speeds were low and no precipitation events were noted.

The noise monitoring equipment consisted of a Cirrus Optimus Green integrating sound level meter (SLM) fitted with a standard windshield. All noise monitoring equipment (calibrator, SLM and microphone) used for the study are categorised as Class 1, as specified in IEC 61672-1 ‘Electroacoustics. Sound level meters. Specifications’ (IEC, 2002). The equipment was calibrated on site at the beginning and end of each measurement period with no significant deviations noted. Appendix C contains the equipment and laboratory calibration details.

All measurements were made with the sound level meter (SLM) and microphone mounted on a tripod approximately 1.5 meters above the ground and away from nearby reflective surfaces i.e. building façades, fences etc. At all locations, measurements were logged in 5 minute periods.

Early morning measurements consisted of at least a 15-minute survey at each NML between 06:00 and 07:10 per day.

Measurements made after 07:00 for all NMLs were conducted during both morning and afternoon periods for a minimum of 75 mins total survey time per location per day.

A breakdown of the logged LAeq sound levels can be found in Appendix C. Table 4-2 details the arithmetic average $LAeq_{(5mins)}$, for a number of periods of interest including, early mornings, Sundays and weekdays.

Table 4-2: Average Residual Sound Levels, dB $L_{Aeq(5mins)}$

Measurement Location		Measurement period			
ID	Descriptor	Sunday: Early Morning 06:00 – 07:00	Sunday: Daytime	Weekday: Early Morning 06:00 – 07:00	Weekday: Daytime
NML01	Willow Avenue	61	61	62	64
NML02	Rover Way	70	74	76	75
NML03	Runway Road	44	46	51	48

Table 4-3 details the typical background sound levels $L_{A90\ (15mins)}$, which have been determined after considering the distribution of data for each measurement period. Detailed measurement data including statistical analysis charts can be found in Appendix C.

Table 4-3: Representative Background Sound level, dB L_{A90}, Derived Through Statistical Analysis

Measurement Location		Measurement period			
ID	Descriptor	Sunday: Early Morning 06:00 – 07:00	Sunday: Daytime	Weekday: Early Morning 06:00 – 07:00	Weekday: Daytime
NML01	Willow Avenue	43	46	50	50
NML02	Rover Way	48	62	59	66
NML03	Runway Road	37	42	45	39

4.1 NML01 Measured Sound Levels

At NML01 the measured sound levels remained fairly consistent throughout the survey periods. Noise levels were quietest in the weekend early morning time period and increased by a small amount during the weekend daytime. As expected, noise levels during the weekday time periods were higher than the weekend, however, it is noted that the background sound level in the early morning was no lower than during the rest of the daytime.

4.2 NML02 Measured Sound Levels

Sound levels at NML02 are relatively high for all time periods though the background sound level for Weekend Early Morning was lower than at other times.

4.3 NML03 Measured Sound Levels

The measured sound levels at NML03 where not as expected; in particular the following should be noted;

- Background sound levels were lower on the weekday than on the weekend; and,
- Background sound levels for early morning weekday were much higher than other time periods, which may be atypical and should be treated with caution.

With regards to point 1 we feel that an element of uncertainty needs to be recognised within the measurements and suspect that the background sound levels measured on the weekday may be lower than would typically occur.

5 Operational Noise Impacts

5.1 Noise Level Modelling

The noise model considers all of the individual sound sources detailed within Section 2.1.1 and the following sections detail the model input data used for each modelled item of plant. Appendix D provides further information on the data used within the noise model.

Sound levels for all fixed plant included in the model were measured at a similar development operated by Celsa at their site in Rotherham. The same SLM and equipment used for the baseline data survey was also used for the specific sound level monitoring, which was conducted on site during normal operations.

The choice of monitoring locations was limited due to access and health and safety restrictions, therefore, only one measurement position per sound source was possible. However, for all sound sources it was possible to undertake the measurement in a location that accounted for the highest possible noise output with regards to directivity.

With regards to mobile plant, each vehicle has been modelled as a single point source operating within its anticipated typical work area. The exact whereabouts of each point source has been chosen to represent the location most likely to contribute to the overall noise immission level at the NSRs within it's likely work area. Each item of mobile plant is modelled operating continuously at the fixed location, which offers a conservative approach to assessment; whereas, in reality mobile plant will move around the development site and noise levels will fluctuate.

5.1.1 Asphalt Plant Noise Source Data

Approximate measurement locations and measured SPL data for each sound source is provided in Appendix D. Table 5-1 details the calculated SWL used in the noise model for each source. The conversion from SPL to SWL is undertaken automatically within the CadnaA software and is based on the measurement distance and the proximity of the source to any reflective surfaces during the measurement period.

Table 5-1: SWL for Parker StarMix 4000 Modelled Sound Sources, dB

Name	31.5	63	125	250	500	1000	2000	4000	8000	A	lin
Aggregate Dryer	101	99	99	96	94	89	87	82	77	96	106
Cold Feed Conveyor	87	91	86	83	81	78	74	69	64	83	94
Loading Car	115	115	114	109	103	100	98	94	89	107	120
Material loading into lorries	101	103	96	94	92	92	93	94	89	100	107
Winch for Loading	101	96	91	90	89	90	88	89	84	95	103

Along with the fixed plant detailed above, a tracked excavator will be used to load materials into the asphalt plant. Based on subjective observation of the mobile plant main working areas at the Rotherham site, the excavator has been modelled working in the area of the asphalt bins. The sound level data provided in BS 5228 for a Tracked Excavator (BS 5228 reference C2.14) has been used within the model.

5.1.2 Slag Crushing Noise Source Data

Measurements were made of both the slag screening and slag crushing plant and this data is detailed in Appendix D along with images of the measurement locations. Table 5-2 details the calculated SWL used in the noise model.

Table 5-2: SWL for Slag Crushing Modelled Sound Sources, dB

Name	31.5	63	125	250	500	1000	2000	4000	8000	A	lin
Slag Crushing	109.3	119.4	118.6	111.0	117.3	111.7	111.0	102.8	94.3	118.0	124.2
Slag Screening	104.4	110.9	107.0	113.6	110.2	110.9	113.6	110.7	105.1	118.3	120.1

Along with the fixed plant detailed above, a dumper truck and a wheeled loader will be used to load materials into the slag crusher. The sound level data provided in BS 5228 for a *Dump Truck (tipping fill)* (BS 5228 reference C2.30) and *Wheeled loader (loading hopper)* (BS 5228 reference C6.32) has been used within the model.

5.2 Calculated Noise Immission Levels (Proposed Processes)

The broadband noise immission levels have been calculated assuming all plant is operating continuously and concurrently and at maximum capacity.

The predictions have been made for a total of four Noise Assessment Locations (NALs) representative of the nearest NSRs and these are detailed in Table 5-3. In addition, Figures 2 and 3 presents an isopleth noise contour plot for a height of 1.5 m overlaid on digital mapping data. Figure 2 details the noise propagation towards the residential receptors. Figure 3 is provided to illustrate the noise propagation in the areas of the ecological receptors.

Table 5-3: Noise Immission Levels, dB LAeq(t), from Asphalt Plant and Slag Crushing

Noise Assessment Location		Calculated Noise Immission Level, dB $L_{Aeq(t)}$		
NAL ID	NAL Descriptor	Slag Crushing	Asphalt Plant	Total
NAL01	Willows Avenue	40	37	42
NAL02	Traveller Site	47	33	47
NAL03	Greenbay Road	32	27	33
NAL04	Hind Close	45	34	45

6 Noise Impact Assessment

6.1 Noise Impacts on Residential Receptors

6.1.1 Quantitative Assessment

The assessment against fixed noise levels is made against the guideline levels for resting (bedroom and living room) presented in BS 8233:2014 (detailed in Table 3-1). 15 dB has been added to the BS 8233 internal levels to allow for the attenuation that is provided by a partially open window, as detailed in Table 6-1.

Table 6-1: Derived Fixed Level Limits, dB LAeq(t)

Assessment parameter	BS8233 internal guideline level	Allowance for open window attenuation	Equivalent external level
Daytime 07:00 – 23:00	35	15	50 dB $L_{Aeq(16\ hours)}$

Table 6-2 compares the predicted immission levels with the guideline noise levels.

Table 6-2: Quantitative Assessment

Noise Assessment Location		Immission Level, dBA			Margin, dB		
NAL ID	NAL Descriptor	Slag Crushing	Asphalt Plant	Total	Slag Crushing	Asphalt Plant	Total
NAL01	Willows Avenue	40	37	42	-10	-13	-8
NAL02	Traveller Site	47	33	47	-3	-17	-3
NAL03	Greenbay Road	32	27	33	-18	-23	-17
NAL04	Hind Close	45	34	45	-5	-16	-5

No exceedances of the fixed guideline levels are predicted during daytime hours.

Although the proposed processes could operate from 06:00 onwards it is not considered appropriate to assess the noise immission levels against the night-time guideline levels, which are based on an eight-hour noise metric. Rather, this is considered within the qualitative assessment.

6.1.2 Qualitative Assessment

In order to assess the sound immission levels in accordance with BS4142, the Specific Sound Levels must be converted into Rating Levels. The Rating Level allows for penalties to be added to the Specific Sound Level in order to account for particular characteristics of the sound which may be perceived as more annoying. In particular the Rating Level considers the tonality, impulsivity and intermittency of the sound, as well any other sound characteristics that are neither tonal nor impulsive, nor intermittent, but are otherwise readily distinctive against the residual acoustic environment.

With regards to tonality, BS4142:2014(+A1-2019) states:

"For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible."

None of the noise data indicates any tonal elements and no tonality is expected to be present within the noise immission levels.

With regards to impulsivity, BS4142:2014(+A1-2019) states:

"A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible."

The nature of the activities are not impulsive and no impulsive noise events are anticipated.

With regards to intermittency, BS4142:2014(+A1-2019) states:

"When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

The noise model assumes that all operations will occur simultaneously and continually. In reality, noise levels may vary throughout the day as activity rates vary, however, no specific on/off conditions are anticipated.

With regards to other sound characteristics, BS4142:2014(+A1-2019) states:

"Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

Considering the context of the existing noise environment, including the measured residual levels (as detailed in Table 4-2) and the other dominant sound sources in the area, we do not anticipate the specific sound levels being '*readily distinctive against the residual acoustic environment*'.

With due regard to the above, no character corrections are required, therefore, the Rating Level is equivalent to the Specific Sound Level.

BS4142, Section 11, requires that the assessment considers the context in which the sound occurs, and as such there is no definitive pass/fail element to the standard. However, as a starting point the standard states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following…

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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. Where the rating

level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

Table 6-3 and Table 6-4 presents a comparison of the Rating Level with the daytime and early morning background sound levels.

Table 6-3: BS4142 Assessment: Daytime

NAL	Activity	Rating Level, dB LAeq	Background Sound Level, dB LA90		Rating Level Minus Background Level, dB	
			Weekend	Weekday	Weekend	Weekday
NAL01	Slag Crushing	40	46	50	-6	-10
	Asphalt plant	37			-9	-13
	Combined	42			-4	-8
NAL02	Slag Crushing	47	62	66	-15	-19
	Asphalt plant	33			-29	-33
	Combined	47			-15	-19
NAL03	Slag Crushing	32	42	39	-10	-7
	Asphalt plant	27			-15	-12
	Combined	33			-9	-6
NAL04	Slag Crushing	45	42	39	+3	+6
	Asphalt plant	34			-8	-5
	Combined	45			+3	+6

The Rating Levels at all NALs are below the background sound levels except at NAL04, where the Rating level exceeds the background sound level for both weekday and weekend daytime periods.

- At NAL04 during weekend the Rating Level during slag crushing operations is 3dB above the background sound level but below the indicator '*of an adverse impact, depending on the context.'*
- At NAL04 during weekday the Rating Level during slag crushing operations is 6dB above the background sound level. This is "*an indication of an adverse impact, depending on the context."*
- At NAL04 on all days, during asphalt plant operations *"the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*
- At NAL01, 02 and 03 on all days, during all operations "*the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

Table 6-4: BS4142 Assessment: Early Morning

NAL	Activity	Rating Level, dB LAeq	Background Sound Level, dB LA90		Rating Level Minus Background Level, dB	
			Weekend	Weekday	Weekend	Weekday
NAL01	Slag Crushing	40	43	50	-3	-10
	Asphalt plant	37	43	50	-6	-13
	Combined	42	43	50	-1	-8
NAL02	Slag Crushing	47	48	59	-1	-12
	Asphalt plant	33	48	59	-15	-26
	Combined	47	48	59	-1	-12
NAL03	Slag Crushing	32	37	45	-5	-13
	Asphalt plant	27	37	45	-10	-18
	Combined	33	37	45	-4	-12
NAL04	Slag Crushing	45	37	45	+8	0
	Asphalt plant	34	37	45	-3	-11
	Combined	45	37	45	+8	0

The Rating Levels at all NALs are below the background sound levels except at NAL04, where the Rating Level exceeds the background sound level for the weekend daytime periods.

- At NAL04 during weekday early morning the Rating Level during slag crushing operations is 8dB above the background sound level. This is "*an indication of an adverse impact, depending on the context."*
- At NAL04 on all days the during asphalt plant operations *"the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*
- At NAL01, 02 and 03 on all days, during all operations "*the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

When undertaking a BS4142 assessment It is important to consider the context of the proposed processes and the existing environment before reaching a conclusion. In this case the context is as follows;

- The proposed processes will introduce new sound sources into an area that is already heavily influenced by industrial sound and road traffic;
- The new sound sources will have a similar character to existing sound sources in the area. Noise immission levels are not anticipated to be tonal or impulsive or readily distinctive against the residual sound levels;

- The residual sound level at the NSRs represented by NAL01 and NAL02 is higher than the predicted noise immission levels;
- Measured baseline levels at NML03 are uncertain and additional monitoring may be appropriate to verify existing sound levels. In particular, typical weekday background sound levels may actually be higher than those presented in this assessment;
- Nevertheless, it is anticipated that noise from slag crushing may be audible at the nearest NSRs to NAL04 may be significantly higher than the background sound level during early mornings; and,
- The quantitative assessment indicates no exceedance of the daytime guideline levels.

With due regards to the above, the BS4142 assessment concludes;

- during daytime hours noise levels attributable to the operation of the Asphalt Plant and Slag Crushing **will not have an adverse impact** on the nearest residential NSRs; and,
- for early morning activities, particularly at weekends, Slag Crushing activities **will have an adverse impact** on the nearest residential NSRs.

Accordingly, we would recommend that Slag Crushing is not undertaken during the early morning.

6.2 Noise Impacts on Ecological Receptors

Figure 3 illustrates how the sound levels propagate outwards from the Proposed Development across the designated SPA/Ramsar/SAC sites. It can be seen that along the shoreline to the south of the Proposed Development the predicted noise level varies between approximately 35 and 45 dB $L_{Aeq(t)}$ within the closest of the designated areas. No baseline sound level measurements have been undertaken in this area for comparison, however, given the amount of existing industrial activity in the area it is expected that ambient sound levels will be higher than the predicted levels.

It is noted that in a 2017 noise assessment report[2] for another nearby proposed development by Industrial Noise and Vibration Centre Ltd (INVC) the existing noise levels measured close to the Celsa site and approximately 250 m from the coast, were around 63 dB $L_{Aeq(85\ mins)}$.

With due regards to the above, it is assumed that noise levels across the designated areas will not be increased due to operations from the proposed processes. Accordingly, no adverse noise impacts are anticipated.

[2] *Report number 8804, Environmental Noise Assessment — Industrial development at Parc Calon Gwyrdd, Rover Way, Cardiff:* (August 2017) INVC Ltd

7 Cumulative Noise Impact Assessment

7.1 Cumulative Noise Impacts on Residential Receptors

The assessment of cumulative noise impacts considers weekday daytime hours only, as the activities from other operations will only occur during this time period.

7.1.1 Quantitative Assessment

Table 7-1 presents the predicted noise levels of the proposed processes plus the predicted noise levels of the Metal Recycling Centre.

Table 7-1: Proposed Processes plus Metal Recycling Plant, dB $L_{Aeq(t)}$

Noise Assessment Location		Immission Level		
NAL ID	NAL Descriptor	Proposed Processes	Metal Recycling Plant	Cumulative Level
NAL01	Willows Avenue	42	33	43
NAL02	Traveller Site	47	40	48
NAL03	Greenbay Road	33	40	41
NAL04	Hind Close	45	40	46

Table 7-2 presents the cumulative level detailed in Table 7-1 alongside the measured residual sound level at the NMLs.

Table 7-2: Predicted Change in Noise Levels

Noise Assessment Location		Cumulative Level	Residual Level	Predicted Ambient Sound Level	Increase in Existing Sound Levels
NAL ID	NAL Descriptor	dB $L_{Aeq(t)}$	dB $L_{Aeq(t)}$	dB $L_{Aeq(t)}$	dB
NAL01	Willows Avenue	43	64	64	0
NAL02	Traveller Site	48	75	75	0
NAL03	Greenbay Road	41	48	49	+1
NAL04	Hind Close	46	64	64	0

With the combined operation of the existing processes on the Celsa site, the permitted Metal Recycling Centre and the proposed processes the noise level ambient sound level is only anticipated to increase by 1 dB at NAL03.

Figures 4 and 5 presents a cumulative isopleth noise contour plot for a height of 1.5 m overlaid on digital mapping data. Figure 4 details the noise propagation towards the residential receptors. Figure 5 is provided to illustrate the noise propagation in the areas of the ecological receptors.

8 Summary

In order to assess the impact of noise emissions from the proposed asphalt plant development, TNEI has produced a noise propagation model in accordance with ISO9613-2, which predicts the noise immission levels at the nearest identified NSRs.

The assessment has been made against fixed guideline sound levels for daytime and in accordance with BS 4142:2014+A1 2019.

The predicted noise levels indicate that no exceedance of the fixed guideline levels are anticipated, however, the BS4142 assessment concluded that slag crushing operations were likely to cause an adverse noise impact should they occur during early morning.

It is proposed to undertake the proposed processes from 06:00 weekdays and some weekend working is also possible. The NIA recommends that no slag crushing is allowed between 06:00 and 07:00 any day of the week although the asphalt plant should be able to run from 06:00 with no adverse noise impacts.

Figure 3 and Figure 5 illustrates the predicted sound levels across the nearby SPA/Ramsar/SAC sites. The predicted noise levels in these areas closest to the Celsa site vary between 35 dB $L_{Aeq(t)\ and}$ 45 dB $L_{Aeq(t).}$ Across the majority of the designated areas it will be lower than this. Given that the existing noise levels are expected to be significantly higher than the predicted levels it is unlikely that operational noise from the proposed processes or the cumulative operation of all processes (permitted plus proposed) will result in an increase in overall noise levels.

Accordingly, it is considered that the proposed processes will not have an adverse noise impact on the local area.

Notwithstanding the above, it is recommended that additional baseline sound level monitoring is undertaken in order to verify baseline noise levels in the area and to ensure that operational noise immission are maintained within acceptable limits.

Appendix A – Glossary of Terms

Attenuation: the reduction in level of a sound between the source and a receiver due to any combination of effects including: distance, atmospheric absorption, acoustic screening, the presence of a building façade, etc.

Background Sound Level: the sound level rarely fallen below in any given location over any given time period, often classed according to daytime, evening or night-time periods. The LA90 indices (see below) are typically used to represent the background sound level.

Broadband Noise: noise with components over a wide range of frequencies.

Decibel (dB): the ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. A logarithmic scale is used in sound level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level.

dB(A): the ear has the ability to recognise a particular sound depending on its pitch or frequency. Microphones cannot differentiate sound in the same way as the ear, and to counter this weakness the sound measuring instrument applies a correction to correspond more closely to the frequency response of the human ear. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) weighting is internationally accepted and has been found to correspond well with people's subjective reaction to sound levels and noise. Some typical subjective changes in sound levels are:

- a change of 3dB(A) is just perceptible;
- a change of 5dB(A) is clearly perceptible;
- a change of 10dB(A) is twice (or half) as loud.

Directivity: the property of a sound source that causes more sound to be radiated in one direction than another.

Emission: the sound energy emitted by a sound source (e.g. a wind turbine).

Frequency: the pitch of a sound in Hz or kHz. See Hertz.

Ground Effects: the modification of sound at a receiver location due to the interaction of the sound waves with the ground along its propagation path from source to receiver. Described using the term 'G', and ranges between 0 (hard ground), 0.5 (mixed ground) and 1 (soft ground).

Hertz (Hz): sound frequency refers to how quickly the air vibrates, or how close the sound waves are to each other (in cycles per second, or Hertz (Hz)).

Immission: the sound pressure level detected at a given location (e.g. the nearest dwelling).

Isopleth: a line on a map connecting points of equal value, for example air pressure, noise level etc.

Noise: unwanted sound

Lw: is the sound power level. It is a measure of the total sound energy radiated by a sound source and is used to calculate sound levels at a distant location. The *LWA* is the A-weighted sound power level.

Leq: is the equivalent continuous sound level, and is the sound level of a steady sound with the same energy as a fluctuating sound over the same period. It is possible to consider this level as the

ambient noise encompassing all noise at a given time. The LAeq,T is the A-weighted equivalent continuous sound level over a given time period (T).

L90: index represents the sound level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background sound level. The LA90,10min is the A-weighted background sound level over a ten minute measurement sample.

Sound Level Meter: an instrument for measuring sound pressure level.

Sound Pressure Level: a measure of the sound pressure at a point, in decibels.

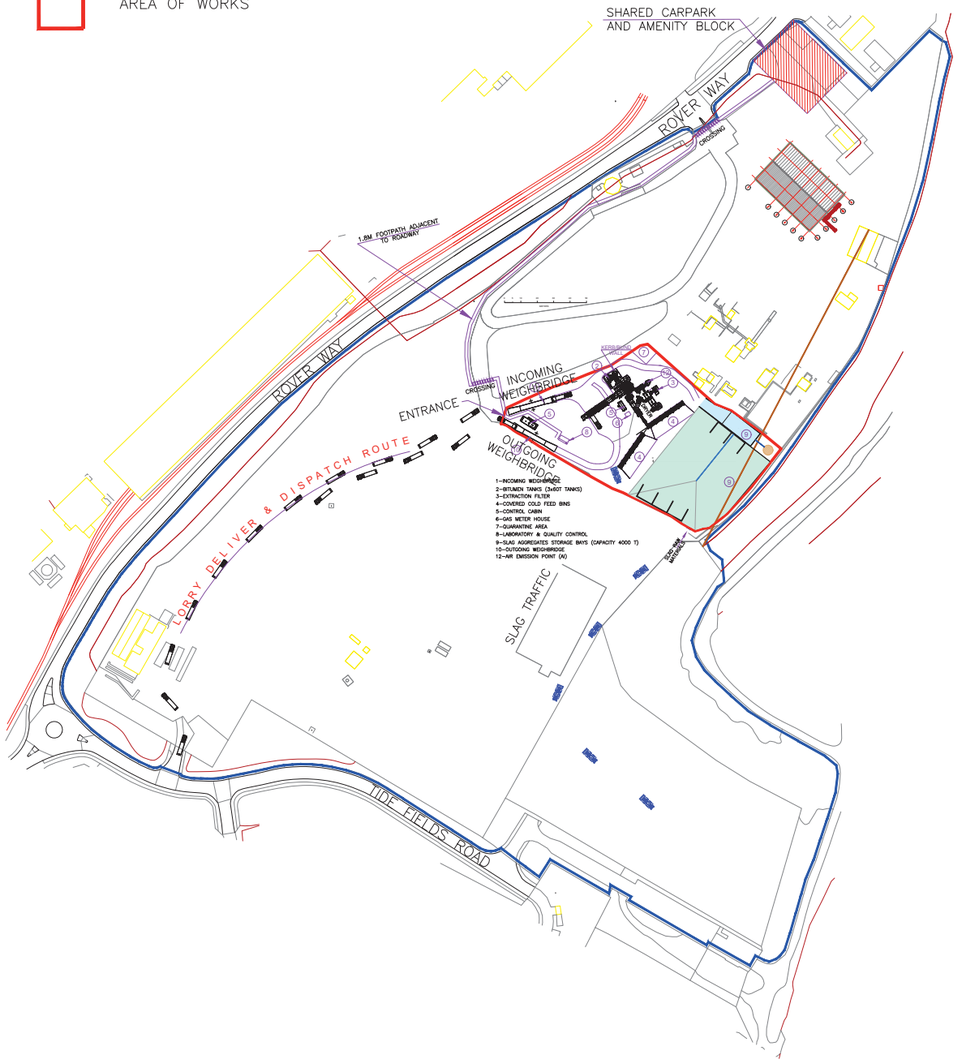
Tonal Noise: noise which covers a very restricted range of frequencies (e.g. a range of ≤20 Hz). This noise is subjectively more annoying than broadband noise.

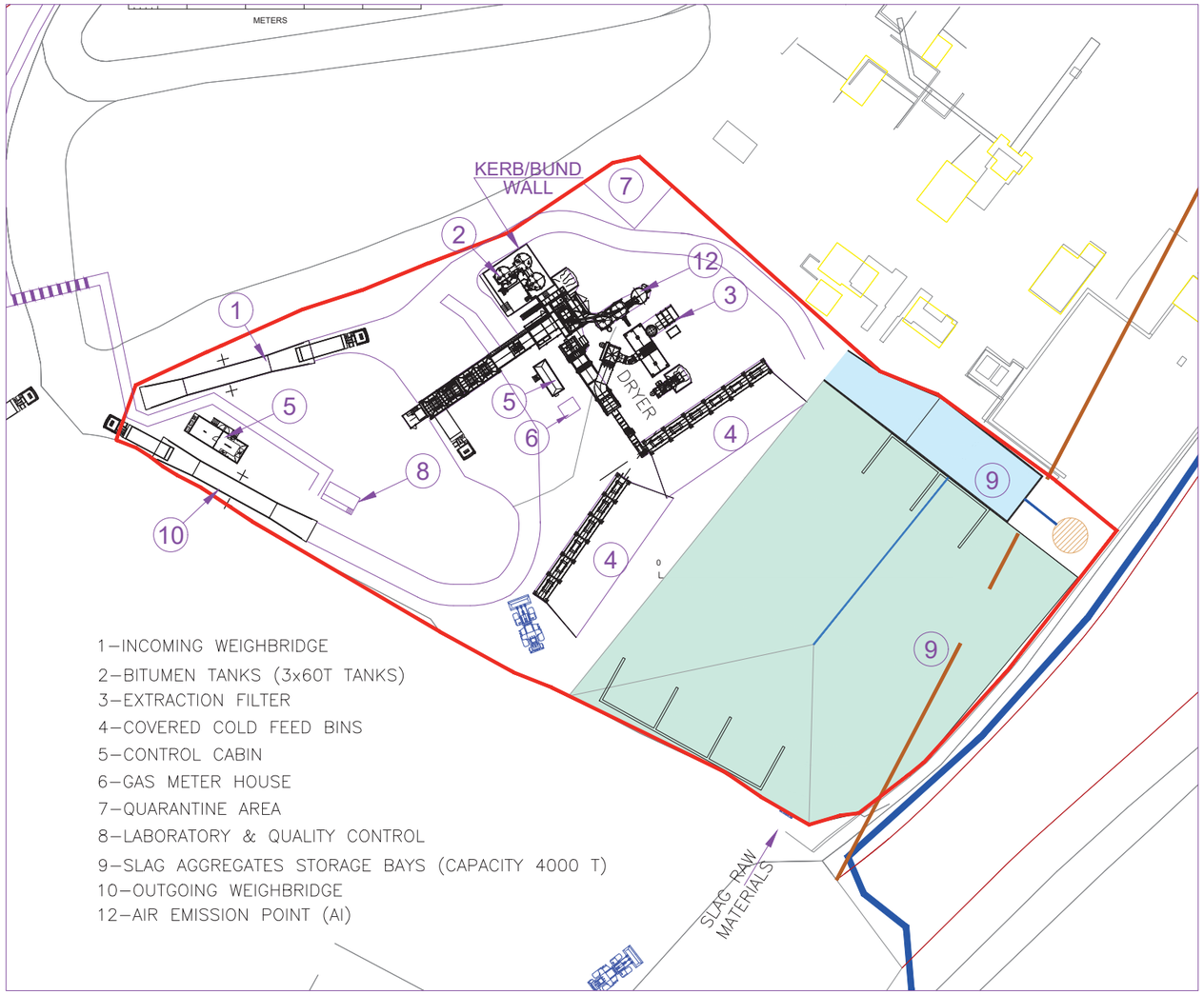
Appendix B – Site Information

LEGEND

DENOTES CELSA SITE OWNERSHIP
AREA = 150,669m² (15.07ha)

AREA OF WORKS





ASPHALT PLANT AREA
(CIRCA 10,022 M²)
SCALE 1:500 ON A0

NOTES

1. Do not scale from this drawing
2. Dimensions are for reference only
3. Plants' components and their locations are preliminary and may change during design stage
4. This drawing is prepared, in part, based on information provided by others. While this information is believed to be reliable, Harsco Metals assume no responsibility for inaccuracies, errors or omissions that might have been incorporated into this drawing as a result of incorrect information provided to us
5. This drawing is for planning purposes only. Not to be used for construction

RevNo	Revision note	Date	Signature	Checked
1	STREET NAMES ADDED	01.10.2018	AI	
0	RELEASED FOR DISCUSSION	26.09.2018	AI	

OWNER: HARSCO METALS&MINERALS

ENGINEERING DEPT.
HARSCO HOUSE, Bradmarsh Business Park, The Point, Bradmarsh Way
Rotherham, S60 1BW, UK. TELEPHONE +44(0)1709 536850, FAX +44(0)1709 536805

VENDOR/CONSULTANT:

PROJECT: ASPHALT PRODUCTION AT CELSA CARDIFF

PROJECT No. : O1994

	NAME	SIGN	DATE
ENGR	AI		25.09.18
DRAWN	AI		26.09.18
CHKD			
APPD			

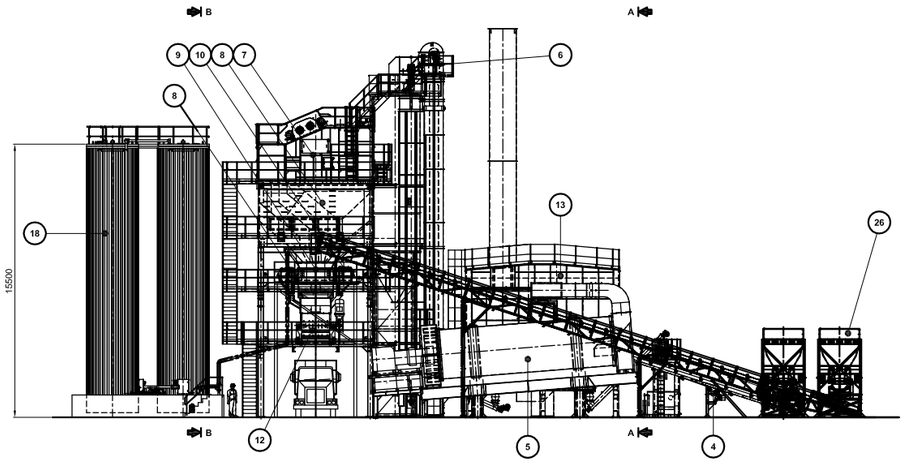
TITLE:- NEW ASPHALT PLANT AT CELSA CARDIFF. LOCATION PLAN OPTION 7.5

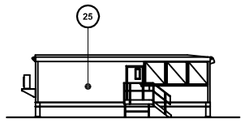
SCALE 1:1250

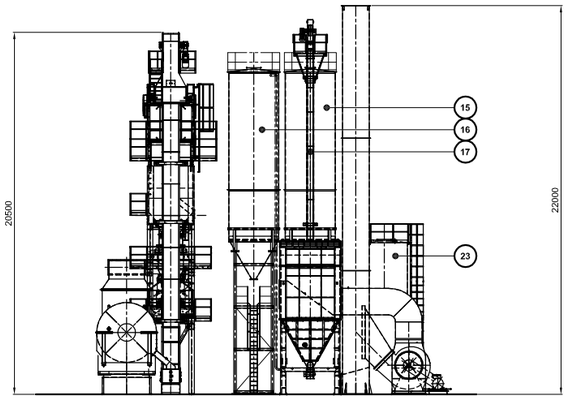
DRG. NO. O1994-00-01-07.05

SIZE A0 | REV. 0

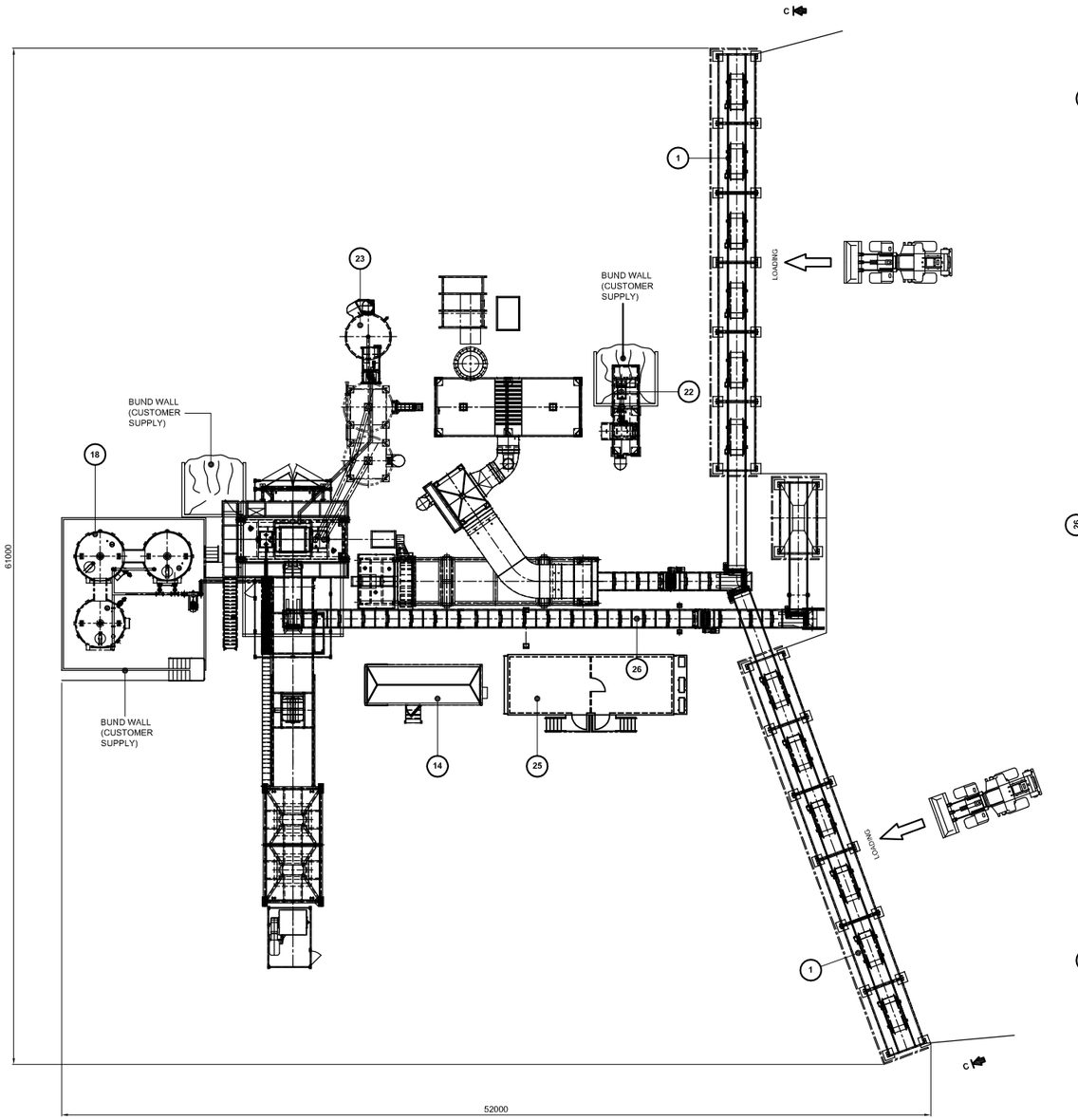
RELEASED FOR
☑ PRELIMINARY ☐ INFORMATION ☐ APPROVAL ☐ FABRICATION ☐ CONSTRUCTION

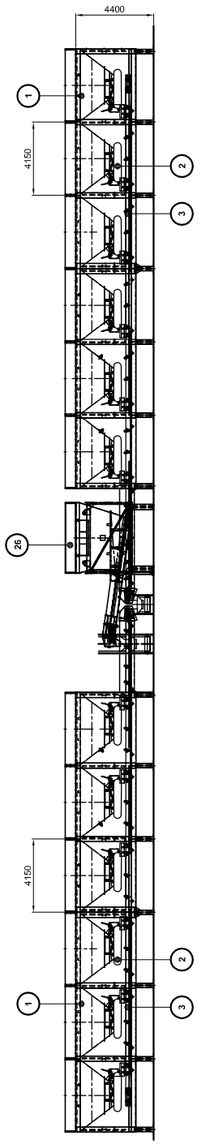




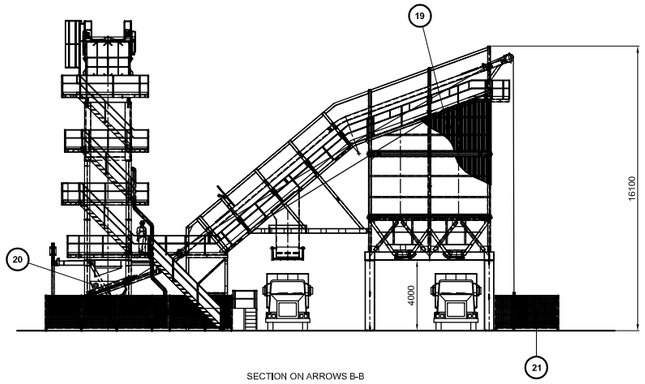


SECTION ON ARROWS A-A





SECTION ON ARROWS C-C
SIDE ELEVATION OF FEED UNITS



SECTION ON ARROWS B-B

REF	DESCRIPTION
1	2 x 6-OFF COLD FEED HOPPERS c/w CANOPY
2	750 WIDE x 1800 CRS BELT FEEDERS - VARIABLE SPEED 3 KW
3	800 WIDE COLLECTING CONVEYOR 7.5 KW
4	800 WIDE DRYER FEED CONVEYOR 11 KW
5	2.8 DIA.x10.0 LG.ROTARY DRYER - 4 x 30 KW
6	700 WIDE BUCKET ELEVATOR - 30 KW
7	2.2 x 4.0 x 5 DECK SCREEN - 2 x18.5 KW
8	5 COMPARTMENT STORAGE HOPPER - 60 TONNE CAPACITY
9	AGGREGATE WEIGH HOPPER - 4250 KGS CAPACITY
10	FILLER WEIGH HOPPER - 900 KGS CAPACITY
11	BITUMEN WEIGH HOPPER - 650 KGS CAPACITY
12	4250 KGS. CAPACITY PADDLE MIXER - 2 x 45 KW GEARMOTORS
13	DUST COLLECTION - SKIMMER & BAG FILTER - 118,825 CUM/HR
14	CONTROL CABIN
15	RECLAIM FILLER STORAGE SILO 60 cu.m
16	IMPORTED FILLER STORAGE SILO 60 cu.m
17	RECLAIMED DUST ELEVATOR
18	3-OFF BITUMEN TANKS 60 TONNE CAPACITY (ONE WITH STIRRER)
19	200 TONNE MIXED MATERIAL STORAGE
20	4250KG MIXED MATERIAL SKIP
21	MIXED MATERIAL WINCH 90 KW
22	DUST CONDITIONER
23	SMA FIBRE PELLET ADDITIVE SYSTEM
24	WETMIX ADDITIVE SYSTEM (NOT SHOWN)
25	CONTROL HOUSE & OFFICE
26	RECYCLED ASPHALT (RAP) SYSTEM

ISSUE	CHANGE DESCRIPTION	BY	DATE

DO NOT SCALE IF IN DOUBT ASK
UNLESS OTHERWISE STATED: DIMENSIONS IN MM
1ST ANGLE
DRN: PS
CHK:
APP:
SCALE: 1:175
DATE: 16/10/18

CUSTOMER - LOCATION

CONTRACT NUMBER

PARKER PLANT LTD
LEICESTER - ENGLAND

TYPE
STARMIX 4000
DESCRIPTION
320 TPH STATIC ASPHALT PLANT

DRG SIZE	DRAWING NO	ISSUE NO
A1	PP1924 (SHEET 1)	7

Parker PLANT LIMITED

Appendix C – Baseline Data

Certificate of Calibration

Cirrus Research plc
dedicated to noise measurement

Certificate Number: **114121**

Date of Issue: **26 September 2017**

Microphone Capsule

Manufacturer: **Cirrus Research plc** Serial Number: **206546A**

Model Number: **MK:224**

Calibration Procedure

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to the National Physical Laboratory, Middlesex, UK.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Date of Calibration: **25 September 2017**

Open Circuit Sensitivity at 1 kHz: **54.7 mV/Pa**

-25.2 dB rel 1 V/Pa

Environmental Conditions

Pressure: **101.50 kPa**

Temperature: **24.0 °C**

Humidity: **54.0 %**

Calibration Laboratory

Laboratory: Cirrus Research plc
Acoustic House, Bridlington Road, Hunmanby
North Yorkshire, YO14 0PH, United Kingdom

Test Engineer: Ray Hutchison

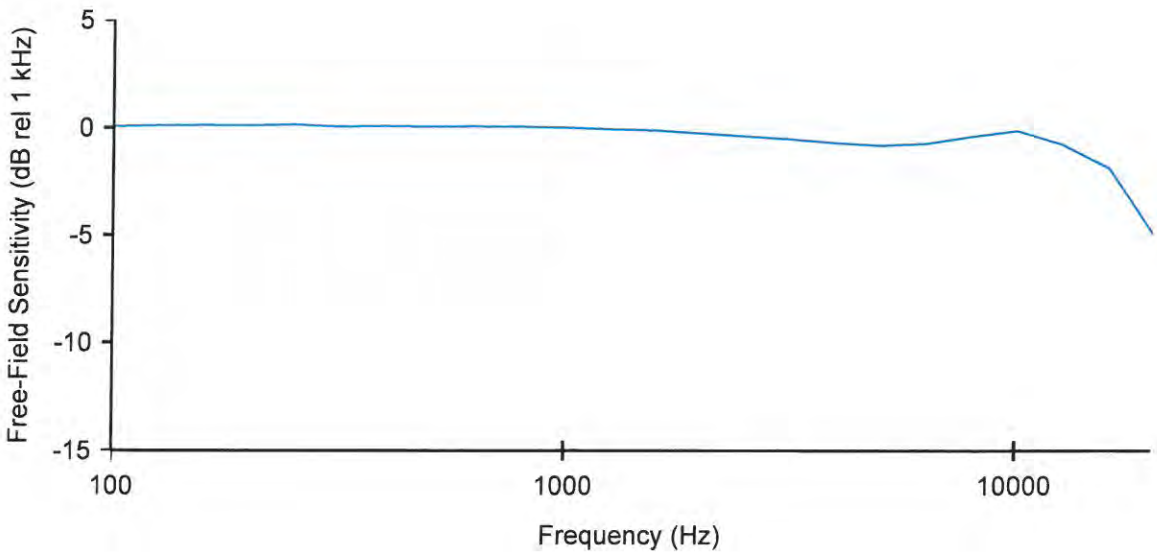
R Q Hutchison

Cirrus Research plc, Acoustic House, Bridlington Road
Hunmanby, North Yorkshire, YO14 0PH, United Kingdom
Telephone: 0845 230 2434 **Int**: +44 1723 891655
Email: sales@cirrusresearch.co.uk
Web: www.cirrusresearch.co.uk
UK Registration No. 987160

bsi. ISO 9001 Quality Management ISO 14001 Environmental Management
FM 531001 EMS 552104

Free-Field Frequency Response

Frequency (Hz)	Free-Field Sensitivity (dB rel 1 kHz)	Actuator Response (dB)
100	0.07	0.19
125	0.11	0.21
160	0.11	0.22
200	0.11	0.23
250	0.15	0.25
315	0.05	0.15
400	0.07	0.16
500	0.05	0.14
630	0.06	0.12
800	0.05	0.08
1 000	0.00	0.02
1 250	-0.07	-0.09
1 600	-0.14	-0.22
2 000	-0.27	-0.45
2 500	-0.40	-0.74
3 150	-0.53	-1.15
4 000	-0.71	-1.70
5 000	-0.82	-2.32
6 300	-0.74	-3.00
8 000	-0.40	-3.72
10 000	-0.15	-5.00
12 500	-0.76	-6.93
16 000	-1.88	-9.72
20 000	-4.90	-13.98



Certificate of Calibration

Cirrus Research plc
dedicated to noise measurement

Certificate Number: **114119**
Date of Issue: **26 September 2017**

Instrument

Manufacturer: **Cirrus Research plc** Serial Number: **78219**
Model Number: **CR:515**

Calibration Procedure

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC 60942:2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer s data.

Date of Calibration: **26 September 2017**

Calibration Results

Measurement	Level (dB)	Frequency (Hz)	Distortion (% THD + Noise)
1	94.01	1000.3	0.31
2	94.00	1000.3	0.31
3	94.02	1000.3	0.31

Average	**94.01**	**1000.3**	**0.31**
Uncertainty	± 0.13	± 0.1	± 0.10

The reported uncertainties of measurement are expanded by a coverage factor of k=2, providing a 95% confidence level.

Cirrus Research plc, Acoustic House, Bridlington Road
Hunmanby, North Yorkshire, YO14 0PH, United Kingdom
Telephone: 0845 230 2434 **Int**: +44 1723 891655
Email: sales@cirrusresearch.co.uk
Web: www.cirrusresearch.co.uk
UK Registration No. 987160

bsi. ISO 9001 Quality Management FM 531001
ISO 14001 Environmental Management EMS 552104

Environmental Conditions

Pressure:	**101.60 kPa**
Temperature:	**23.9 °C**
Humidity:	**52.2 %**

Evidence of Pattern Approval

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC 60942:2003 Annex A to Class 1. This has been confirmed with the PhysikalischTechnische Bundesanstalt (PTB).

Statement of Calibration

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

Calibration Laboratory

Laboratory:	Cirrus Research plc Acoustic House, Bridlington Road, Hunmanby North Yorkshire, YO14 0PH, United Kingdom
Test Engineer:	Terry Goodrich

T. A. Goodrich.

Certificate of Calibration

Cirrus Research plc
dedicated to noise measurement

Equipment Details

Instrument Manufacturer	Cirrus Research plc
Instrument Type	CR:171B
Description	Sound Level Meter
Serial Number	G078532

Calibration Procedure

The instrument detailed above has been calibrated to the publish test and calibration data as detailed in the instrument hand book, using the techniques recommended in the latest revisions of the International Standards IEC 61672-1:2013, IEC 61672-1:2002, IEC 60651:1979, IEC 60804:2001, IEC 61260:1995, IEC 60942:2003, IEC 60942:1997, IEC 61252:1993, ANSI S1.4-1983, ANSI S1.11-1986 and ANSI S1.43-1997 where applicable.
Sound Level Meters: All Calibration procedures were carried out by substituting the microphone capsule with a suitable electrical signal, apart from the final acoustic calibration.

Calibration Traceability

The equipment detailed above was calibrated against the calibration laboratory standards held by Cirrus Research plc. These are traceable to International Standards {A.0.6}. The standards are:

Microphone Type	B&K 4192	Serial Number	1920791	Calibration Ref.	S6450
Pistonphone Type	B&K 4220	Serial Number	613843	Calibration Ref.	S6388

Calibrated by T. A. Goodhill

Calibration Date	26 September 2017
Calibration Certificate Number	252819

This Calibration Certificate is valid for 12 months from the date above.

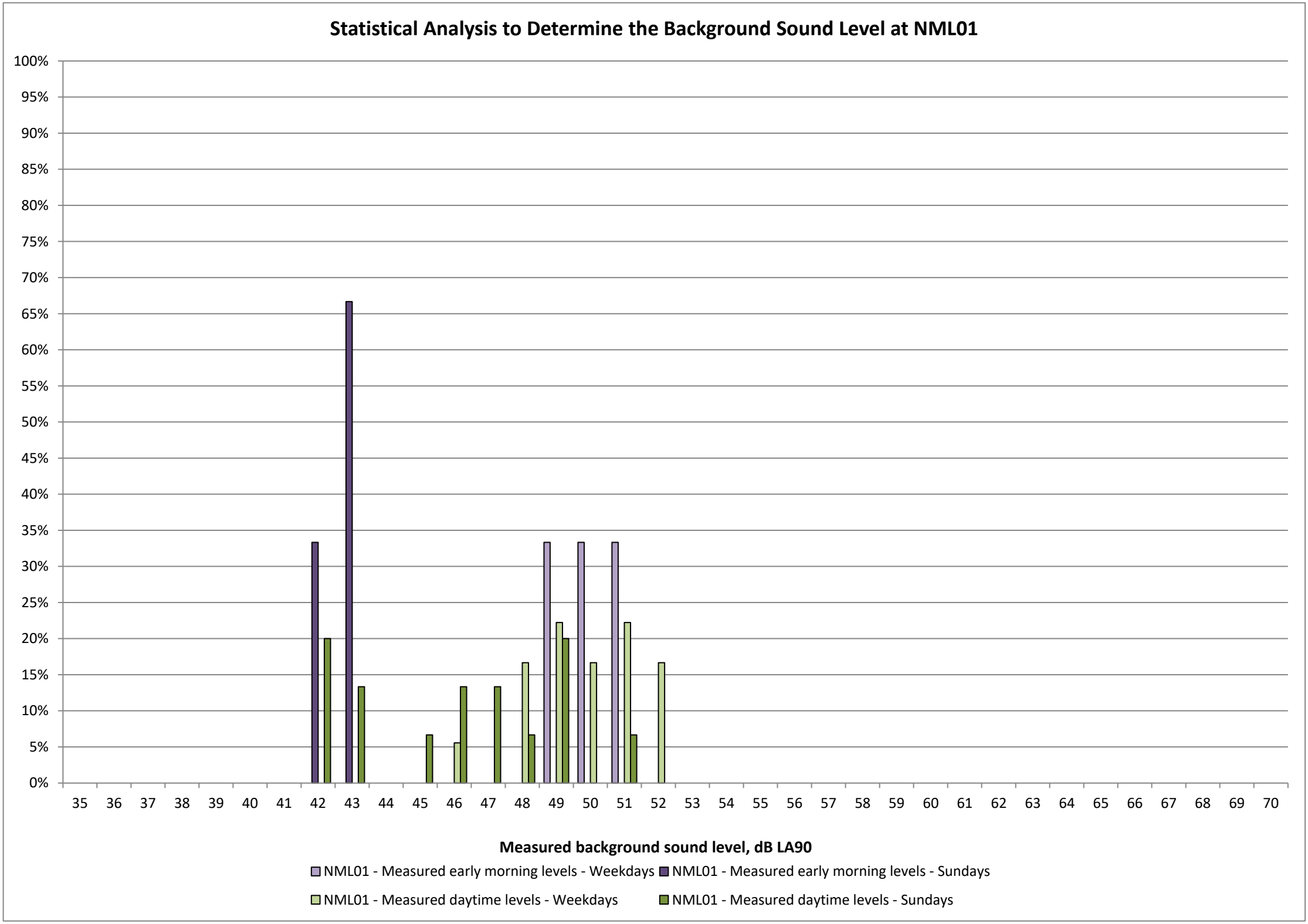
Cirrus Research plc, Acoustic House, Bridlington Road, Hunmanby, North Yorkshire, YO14 0PH
Telephone: +44 (0) 1723 891655 Fax: +44 (0) 1723 891742
Email: sales@cirrusresearch.co.uk

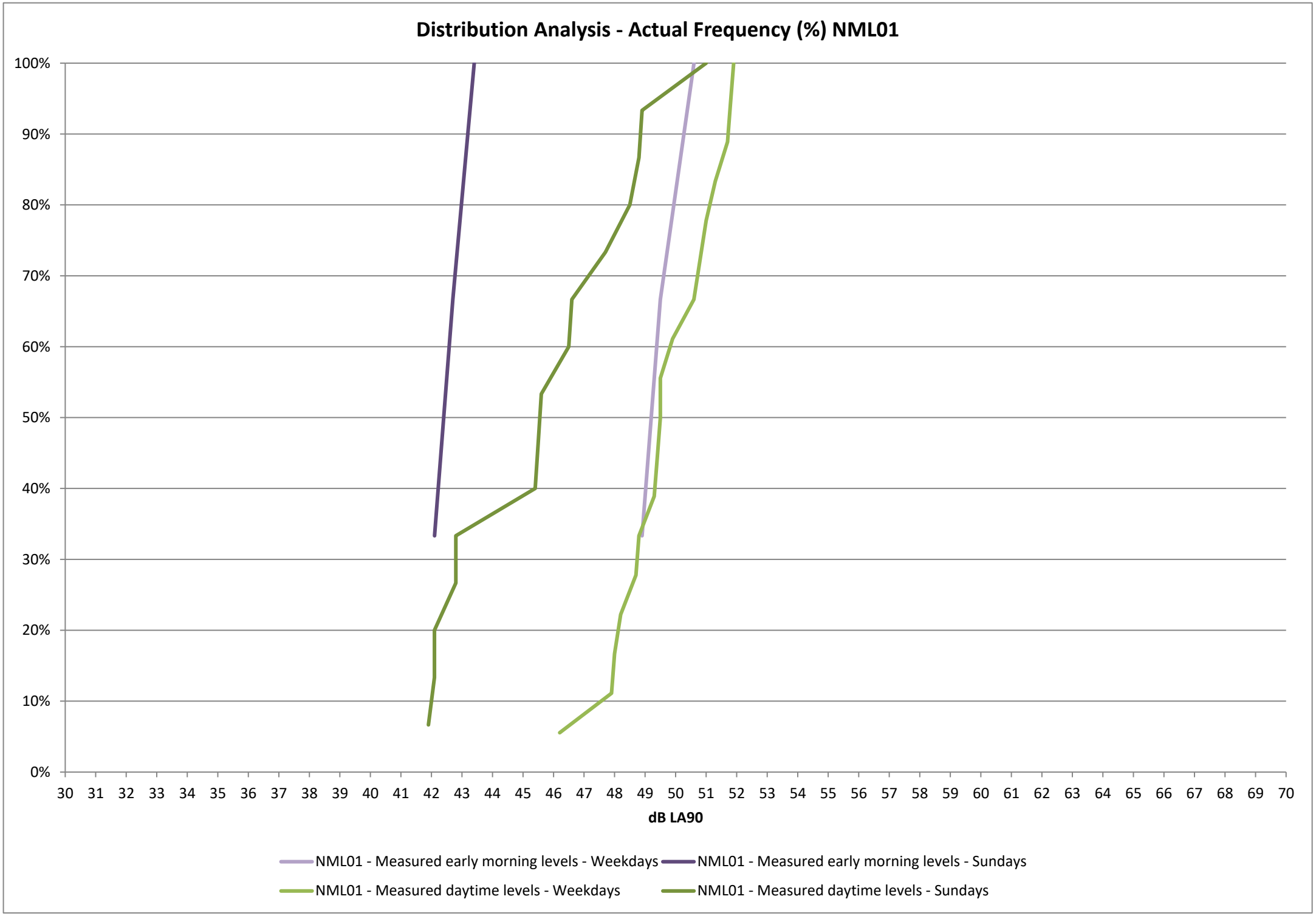
Measurement Time	Duration	Measurement ID	LAeq	Location
12/05/2019 06:30	00:05:00	5	62	NML01
12/05/2019 06:35	00:05:00	6	59.2	NML01
12/05/2019 06:40	00:05:00	7	62.5	NML01

Measurement Time	Duration	Measurement ID	LAeq	Location
12/05/2019 07:45	00:05:00	18	57.7	NML01
12/05/2019 07:50	00:05:00	19	51.6	NML01
12/05/2019 08:50	00:05:00	30	63.8	NML01
12/05/2019 08:55	00:05:00	31	67.3	NML01
12/05/2019 09:00	00:05:00	32	55.9	NML01
12/05/2019 11:00	00:05:00	38	62.1	NML01
12/05/2019 11:05	00:05:00	39	61	NML01
12/05/2019 11:10	00:05:00	40	58.9	NML01
12/05/2019 11:15	00:05:00	41	59.7	NML01
12/05/2019 11:20	00:05:00	42	61.2	NML01
12/05/2019 11:25	00:05:00	43	62.8	NML01
12/05/2019 11:30	00:05:00	44	62.1	NML01
12/05/2019 11:35	00:05:00	45	60.8	NML01
12/05/2019 11:40	00:05:00	46	61.4	NML01
12/05/2019 13:20	00:05:00	67	62.5	NML01

Measurement Time	Duration	Measurement ID	LAeq	Location
13/05/2019 06:25	00:05:00	88	62.7	NML01
13/05/2019 06:30	00:05:00	89	61.6	NML01
13/05/2019 06:35	00:02:03	90	62.3	NML01

Measurement Time	Duration	Measurement ID	LAeq	Location
13/05/2019 07:40	00:05:00	100	64.1	NML01
13/05/2019 07:45	00:05:00	101	63.6	NML01
13/05/2019 07:50	00:05:00	102	67.1	NML01
13/05/2019 08:45	00:05:00	112	60.9	NML01
13/05/2019 08:50	00:05:00	113	64.3	NML01
13/05/2019 08:55	00:05:00	114	64.9	NML01
13/05/2019 12:10	00:05:00	136	63.9	NML01
13/05/2019 12:15	00:05:00	137	63	NML01
13/05/2019 12:20	00:05:00	138	64.6	NML01
13/05/2019 12:25	00:05:00	139	64.4	NML01
13/05/2019 12:30	00:05:00	140	64.2	NML01
13/05/2019 12:35	00:05:00	141	63.6	NML01
13/05/2019 12:40	00:05:00	142	63.7	NML01
13/05/2019 12:45	00:05:00	143	63.7	NML01
13/05/2019 12:50	00:05:00	144	63.5	NML01
13/05/2019 12:55	00:05:00	145	65.7	NML01
13/05/2019 13:00	00:05:00	146	64.4	NML01
13/05/2019 13:05	00:05:00	147	63.5	NML01


Statistical Analysis to Determine the Background Sound Level at NML01
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Measured background sound level, dB LA90
NML01 - Measured early morning levels - Weekdays
NML01 - Measured early morning levels - Sundays
NML01 - Measured daytime levels - Weekdays
NML01 - Measured daytime levels - Sundays


Distribution Analysis - Actual Frequency (%) NML01
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
dB LA90
NML01 - Measured early morning levels - Weekdays
NML01 - Measured early morning levels - Sundays
NML01 - Measured daytime levels - Weekdays
NML01 - Measured daytime levels - Sundays

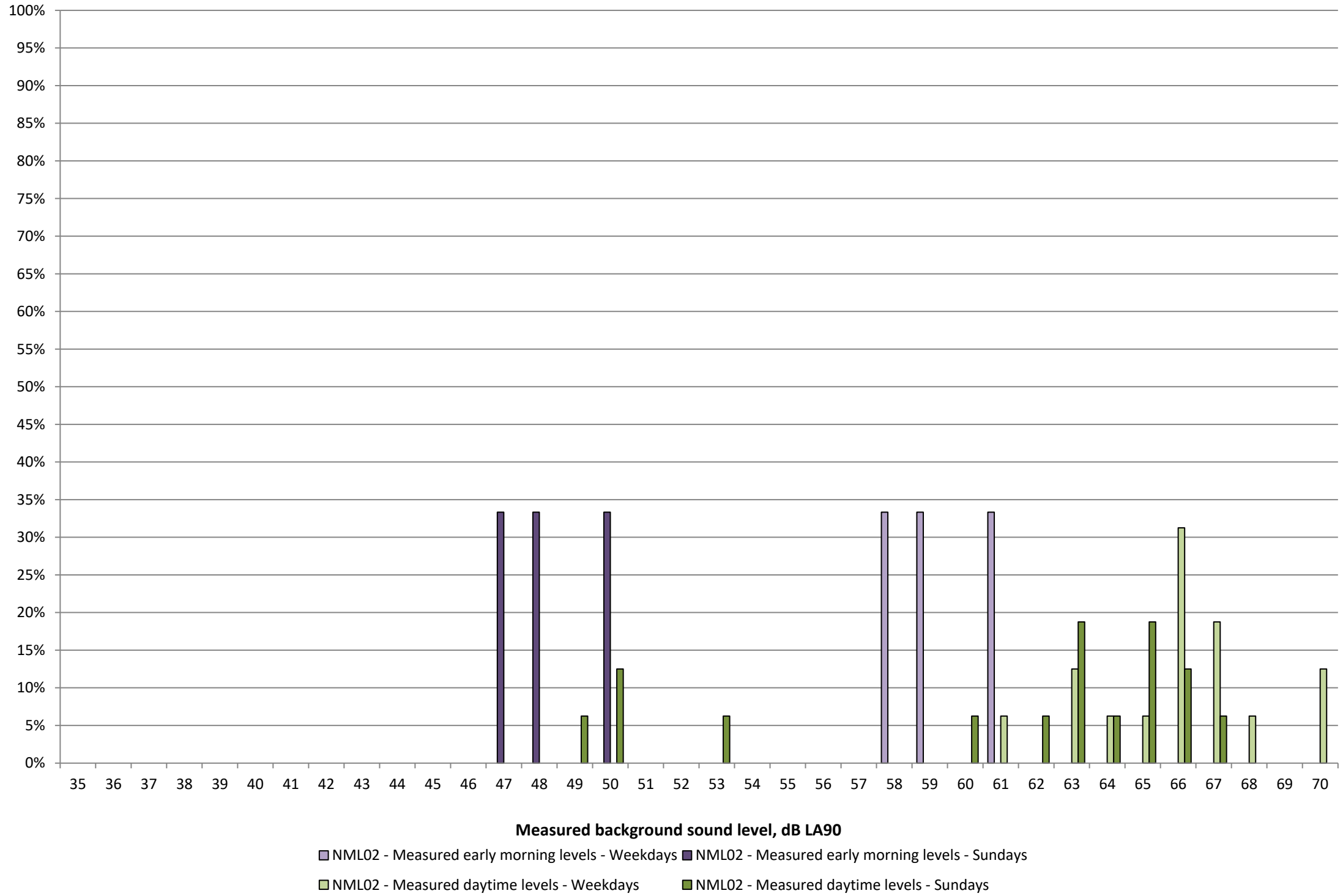
Measurement Time	Duration	Measurement ID	LAeq	Location
12/05/2019 06:00	00:05:00	1	68.5	NML02
12/05/2019 06:05	00:05:00	2	70.2	NML02
12/05/2019 06:10	00:05:00	3	69.8	NML02

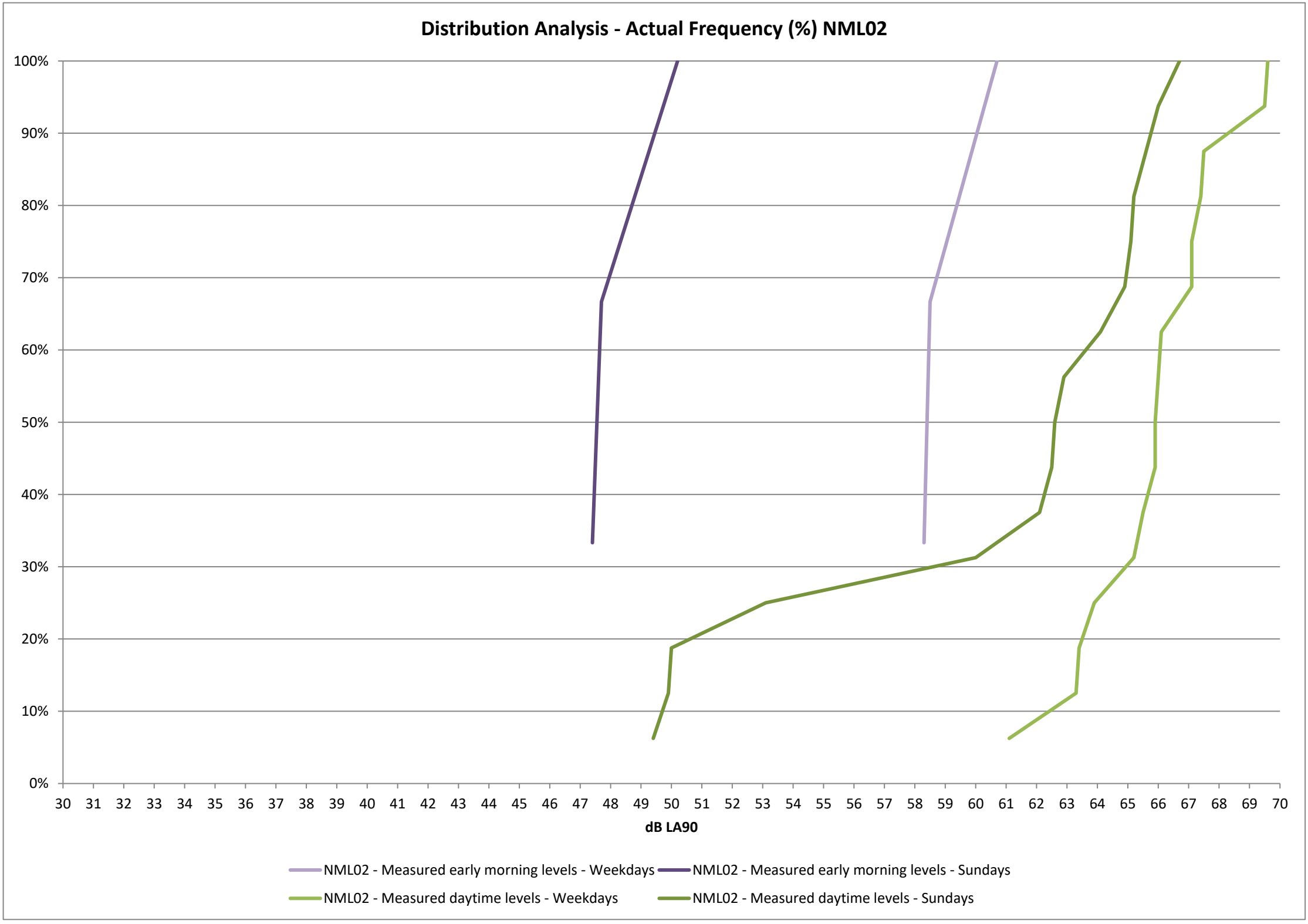
Measurement Time	Duration	Measurement ID	LAeq	Location
13/05/2019 06:00	00:04:37	83	76.8	NML02
13/05/2019 06:05	00:05:00	84	75.1	NML02
13/05/2019 06:10	00:05:00	85	76	NML02

Measurement Time	Duration	Measurement ID	LAeq	Location
12/05/2019 07:25	00:05:00	14	71.6	NML02
12/05/2019 07:30	00:05:00	15	70.9	NML02
12/05/2019 08:30	00:05:00	26	71.9	NML02
12/05/2019 08:35	00:05:00	27	72.8	NML02
12/05/2019 14:00	00:05:00	70	70.5	NML02
12/05/2019 14:05	00:05:00	71	73.6	NML02
12/05/2019 14:10	00:05:00	72	74.4	NML02
12/05/2019 14:15	00:05:00	73	74.8	NML02
12/05/2019 14:20	00:05:00	74	74.9	NML02
12/05/2019 14:25	00:05:00	75	74.8	NML02
12/05/2019 14:30	00:05:00	76	75.7	NML02
12/05/2019 14:35	00:05:00	77	75.4	NML02
12/05/2019 14:40	00:05:00	78	75.2	NML02
12/05/2019 14:45	00:05:00	79	72.9	NML02
12/05/2019 14:50	00:05:00	80	74.5	NML02
12/05/2019 14:55	00:05:00	81	74.7	NML02

Measurement Time	Duration	Measurement ID	LAeq	Location
13/05/2019 07:10	00:05:00	96	75.8	NML02
13/05/2019 07:15	00:05:00	97	75.6	NML02
13/05/2019 08:25	00:05:00	109	72.8	NML02
13/05/2019 08:30	00:05:00	110	73.6	NML02
13/05/2019 11:00	00:05:00	122	75	NML02
13/05/2019 11:05	00:05:00	123	75.2	NML02
13/05/2019 11:10	00:05:00	124	74.9	NML02
13/05/2019 11:15	00:05:00	125	74.5	NML02
13/05/2019 11:20	00:05:00	126	76	NML02
13/05/2019 11:25	00:05:00	127	74.7	NML02
13/05/2019 11:30	00:05:00	128	74.9	NML02
13/05/2019 11:35	00:05:00	129	74.1	NML02
13/05/2019 11:40	00:05:00	130	72.8	NML02
13/05/2019 11:45	00:05:00	131	74.8	NML02
13/05/2019 11:50	00:05:00	132	75.1	NML02
13/05/2019 11:55	00:05:00	133	74.8	NML02

Statistical Analysis to Determine the Background Sound Level at NML02



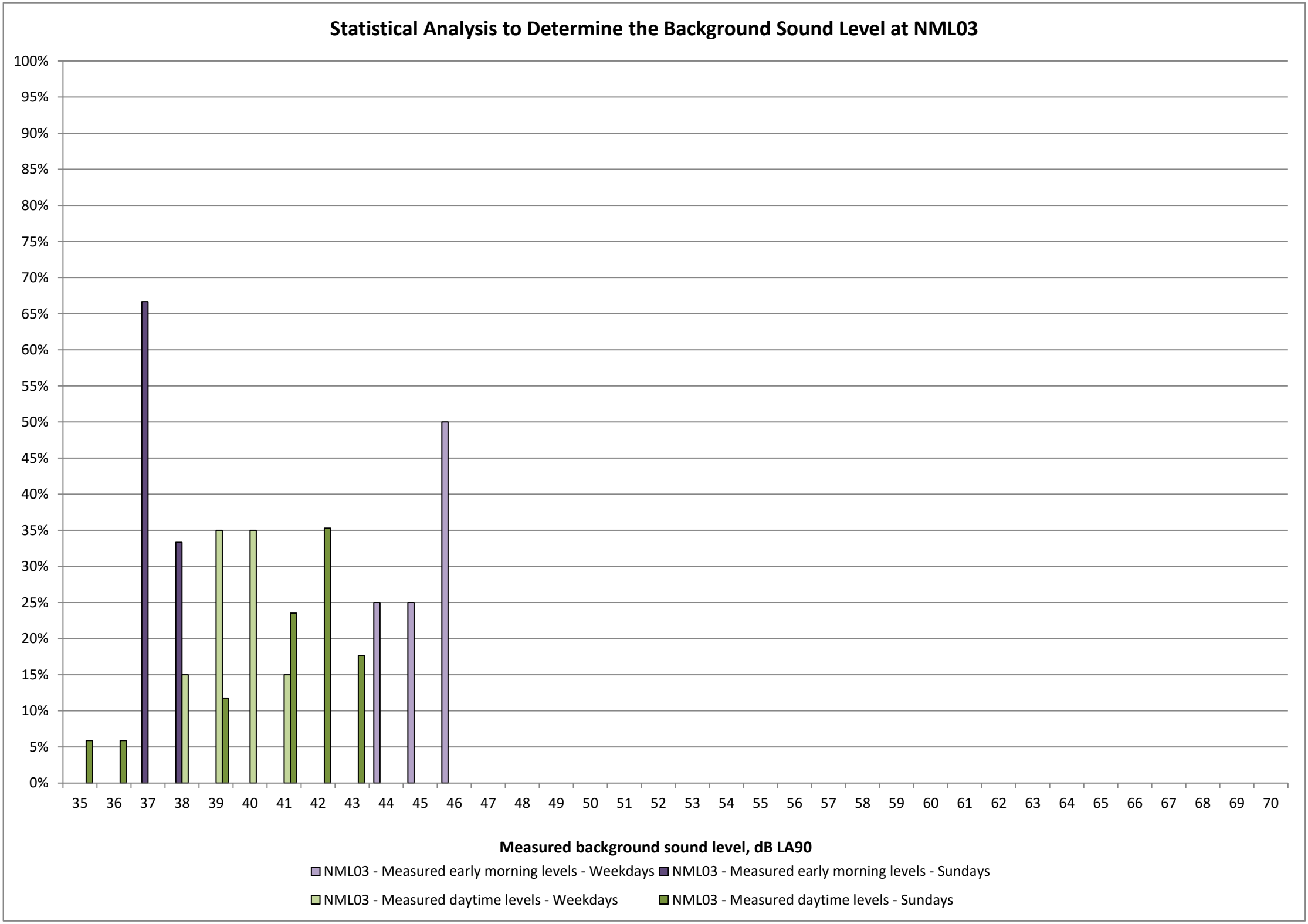

Distribution Analysis - Actual Frequency (%) NML02
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
dB LA90
NML02 - Measured early morning levels - Weekdays
NML02 - Measured early morning levels - Sundays
NML02 - Measured daytime levels - Weekdays
NML02 - Measured daytime levels - Sundays

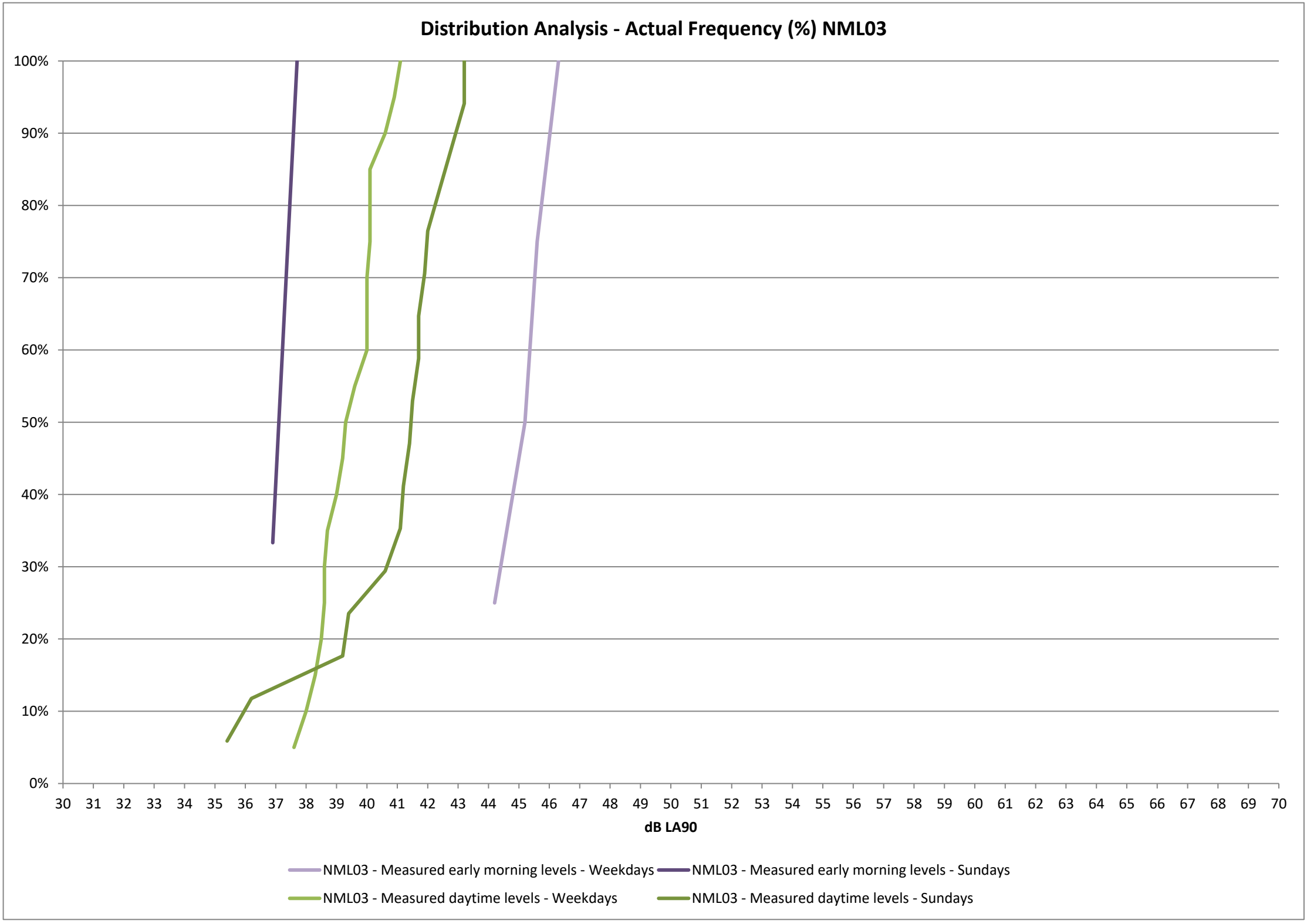
Measurement Time	Duration	Measurement ID	LAeq	Location
12/05/2019 06:55	00:05:00	9	43.5	NML03
12/05/2019 07:00	00:05:00	10	43.8	NML03
12/05/2019 07:05	00:05:00	11	45.5	NML03

Measurement Time	Duration	Measurement ID	LAeq	Location
13/05/2019 06:42	00:02:21	91	48.8	NML03
13/05/2019 06:45	00:05:00	92	51.5	NML03
13/05/2019 06:50	00:05:00	93	48.8	NML03
13/05/2019 06:55	00:03:02	94	53.6	NML03

Measurement Time	Duration	Measurement ID	LAeq	Location
12/05/2019 08:05	00:05:00	22	40.7	NML03
12/05/2019 08:10	00:05:00	23	40	NML03
12/05/2019 09:10	00:05:00	34	47.8	NML03
12/05/2019 09:15	00:05:00	35	43.3	NML03
12/05/2019 09:20	00:05:00	36	43.6	NML03
12/05/2019 12:10	00:05:00	53	49.7	NML03
12/05/2019 12:15	00:05:00	54	50.7	NML03
12/05/2019 12:20	00:05:00	55	47.5	NML03
12/05/2019 12:25	00:05:00	56	46.7	NML03
12/05/2019 12:30	00:05:00	57	47.5	NML03
12/05/2019 12:35	00:05:00	58	45.9	NML03
12/05/2019 12:40	00:05:00	59	49.4	NML03
12/05/2019 12:45	00:05:00	60	45	NML03
12/05/2019 12:50	00:05:00	61	47.2	NML03
12/05/2019 12:55	00:05:00	62	46.1	NML03
12/05/2019 13:00	00:05:00	63	47.8	NML03
12/05/2019 13:05	00:05:00	64	50	NML03

Measurement Time	Duration	Measurement ID	LAeq	Location
13/05/2019 08:00	00:05:00	105	48.6	NML03
13/05/2019 08:05	00:05:00	106	47.2	NML03
13/05/2019 09:05	00:05:00	116	41.7	NML03
13/05/2019 09:10	00:05:00	117	46.9	NML03
13/05/2019 09:15	00:05:00	118	49.3	NML03
13/05/2019 09:20	00:05:00	119	45	NML03
13/05/2019 13:15	00:05:00	150	46.5	NML03
13/05/2019 13:20	00:05:00	151	47.1	NML03
13/05/2019 13:25	00:05:00	152	46.8	NML03
13/05/2019 13:30	00:05:00	153	46.5	NML03
13/05/2019 13:35	00:05:00	154	62.1	NML03
13/05/2019 13:40	00:05:00	155	54.8	NML03
13/05/2019 13:45	00:05:00	156	43.6	NML03
13/05/2019 13:50	00:05:00	157	49.7	NML03
13/05/2019 13:55	00:05:00	158	51.8	NML03
13/05/2019 14:00	00:05:00	159	52.4	NML03
13/05/2019 14:05	00:05:00	160	53.8	NML03
13/05/2019 14:10	00:05:00	161	43.4	NML03
13/05/2019 14:15	00:05:00	162	41.1	NML03
13/05/2019 14:20	00:05:00	163	48.3	NML03


Statistical Analysis to Determine the Background Sound Level at NML03
100%
95%
90%
85%
80%
75%
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Measured background sound level, dB LA90
NML03 - Measured early morning levels - Weekdays
NML03 - Measured early morning levels - Sundays
NML03 - Measured daytime levels - Weekdays
NML03 - Measured daytime levels - Sundays


Distribution Analysis - Actual Frequency (%) NML03
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
dB LA90
NML03 - Measured early morning levels - Weekdays
NML03 - Measured early morning levels - Sundays
NML03 - Measured daytime levels - Weekdays
NML03 - Measured daytime levels - Sundays

Appendix D – Noise Modelling Data

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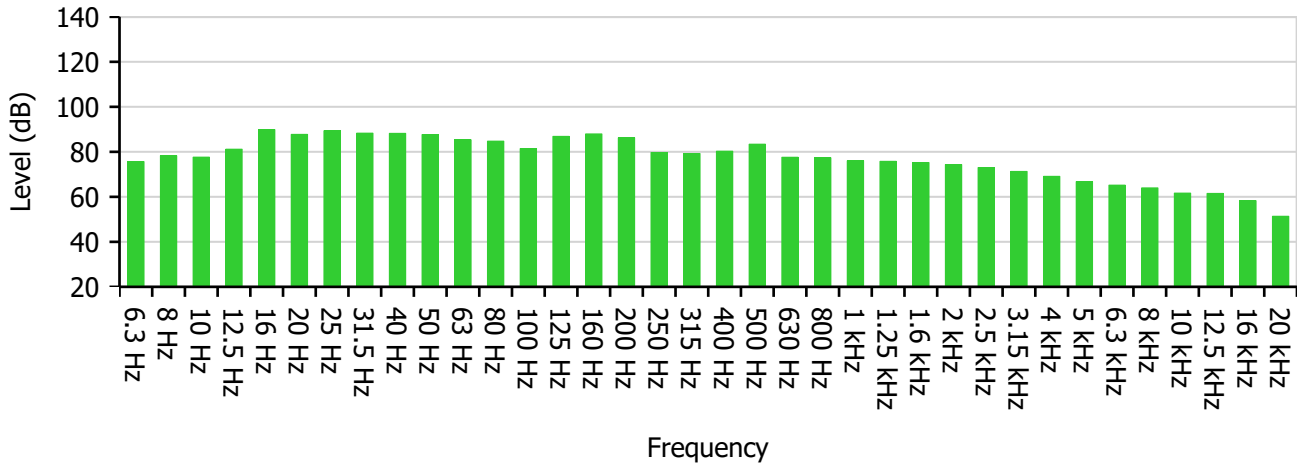
Measurement 1:3-Octave Report

Name	Aggregate Dryer at 1 m			
Time	30/05/2019 11:18:20	**Person**	**Place**	**Project**
Duration	00:01:00	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	**6.3**	**8**	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**
Level (dB)	75.7	78.3	77.7	81.2	89.9	87.8	89.4	88.3	88.2
-	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
-	87.7	85.3	84.8	81.5	86.9	88.0	86.2	79.7	79.3
-	**400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**	**2 500**
-	80.3	83.4	77.6	77.4	76.0	75.8	75.3	74.4	73.0
-	**3 150**	**4 000**	**5 000**	**6 300**	**8 000**	**10 000**	**12 500**	**16 000**	**20 000**
-	71.3	69.1	66.8	65.2	64.0	61.7	61.5	58.3	51.4

Highest Band	16 Hz	89.9 dB

ReportId

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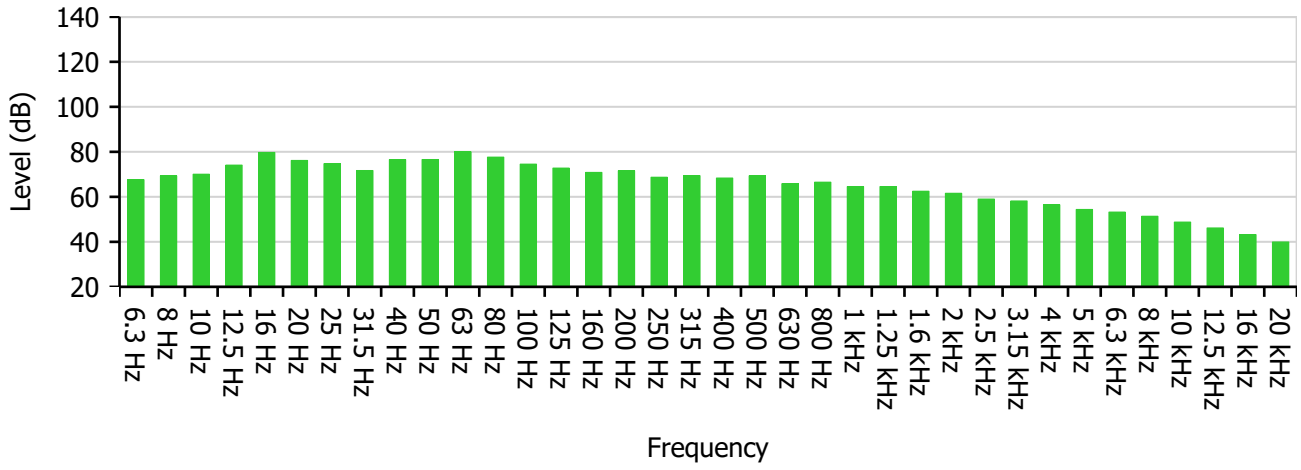
Measurement 1:3-Octave Report

Name	Cold Feed Conveyor at 1 m			
Time	30/05/2019 11:21:03	**Person**	**Place**	**Project**
Duration	00:01:00	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	6.3	8	10	12.5	16	20	25	31.5	40
Level (dB)	67.6	69.3	70.1	74.1	79.7	76.2	74.7	71.7	76.6
-	50	63	80	100	125	160	200	250	315
-	76.6	80.0	77.7	74.6	72.8	70.9	71.6	68.7	69.4
-	400	500	630	800	1 000	1 250	1 600	2 000	2 500
-	68.4	69.4	65.8	66.5	64.6	64.6	62.5	61.6	59.0
-	3 150	4 000	5 000	6 300	8 000	10 000	12 500	16 000	20 000
-	58.2	56.5	54.4	53.2	51.4	48.8	46.2	43.2	40.0

Highest Band	63 Hz	80.0 dB

ReportId

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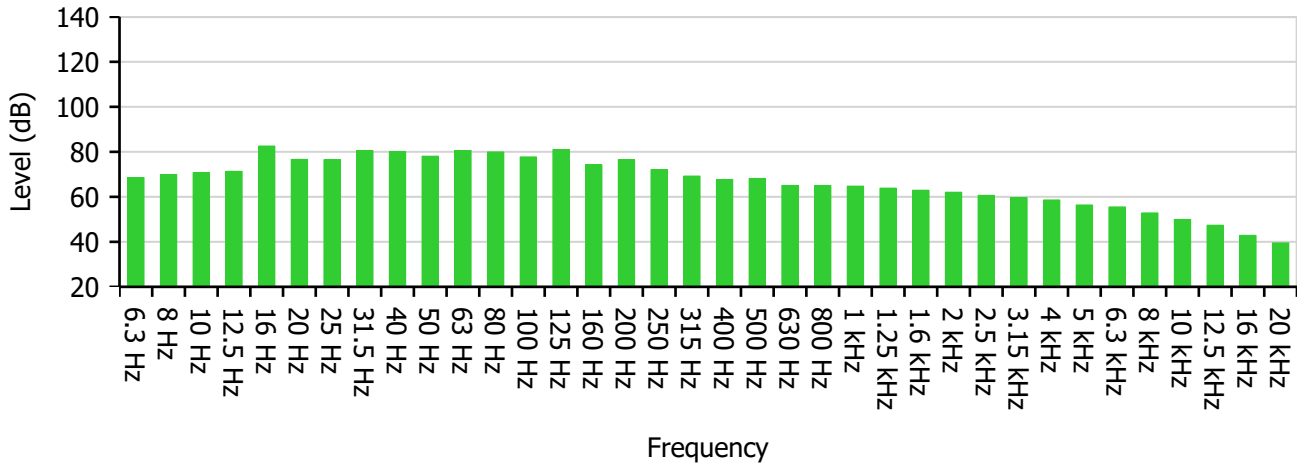
tnei

Measurement 1:3-Octave Report

Name	Loading Car at 10 m			
Time	30/05/2019 11:24:14	**Person**	**Place**	**Project**
Duration	00:01:00	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	**6.3**	**8**	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**
Level (dB)	68.6	69.9	70.7	71.3	82.6	76.7	76.5	80.6	80.0
-	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
-	78.1	80.6	79.9	77.8	80.9	74.2	76.5	72.1	69.2
-	**400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**	**2 500**
-	67.7	68.2	65.1	65.1	64.8	63.9	63.0	62.1	60.7
-	**3 150**	**4 000**	**5 000**	**6 300**	**8 000**	**10 000**	**12 500**	**16 000**	**20 000**
-	59.6	58.6	56.4	55.5	52.9	50.0	47.4	42.9	39.5

Highest Band	16 Hz	82.6 dB

ReportId

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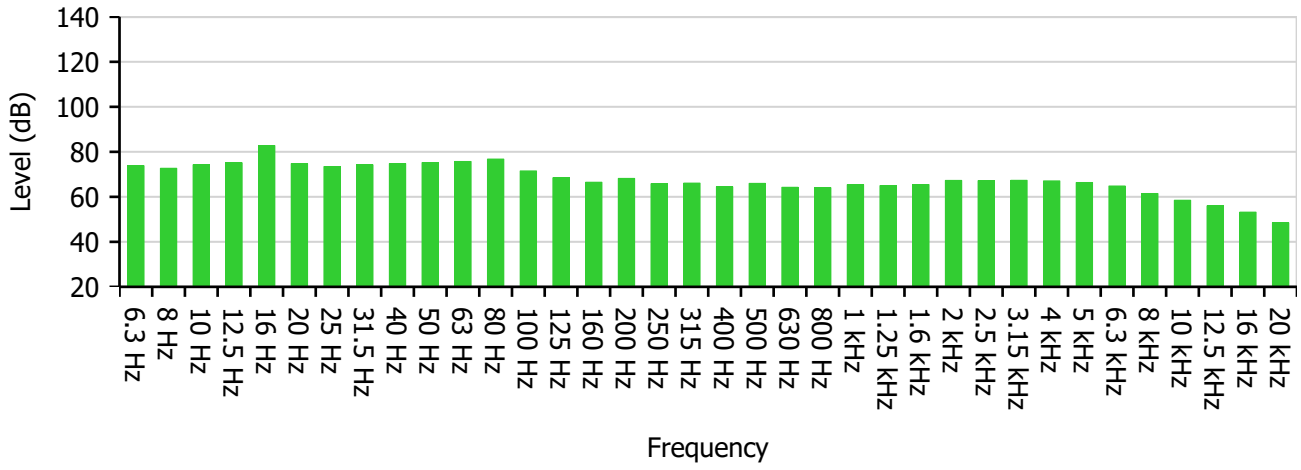
Measurement 1:3-Octave Report

Name	Loading material into lorries at 10 m			
Time	30/05/2019 11:27:32	**Person**	**Place**	**Project**
Duration	00:01:34	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	6.3	8	10	12.5	16	20	25	31.5	40
Level (dB)	73.8	72.7	74.3	75.1	82.8	74.8	73.5	74.2	74.8
-	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
-	75.2	75.7	76.8	71.5	68.5	66.5	68.2	65.8	66.1
-	**400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**	**2 500**
-	64.5	66.0	64.3	64.1	65.4	65.0	65.5	67.3	67.2
-	**3 150**	**4 000**	**5 000**	**6 300**	**8 000**	**10 000**	**12 500**	**16 000**	**20 000**
-	67.3	67.1	66.4	64.8	61.5	58.5	56.0	53.2	48.5

Highest Band	16 Hz	82.8 dB

ReportId

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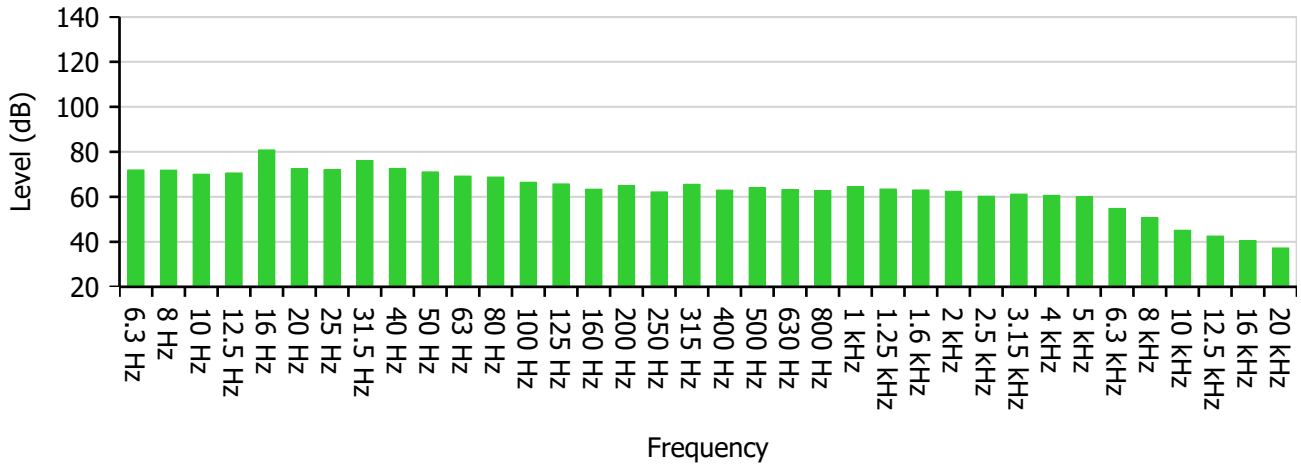
tnei

Measurement 1:3-Octave Report

Name	Winch for skip car at 1 m (measurement #01)			
Time	30/05/2019 11:29:52	**Person**	**Place**	**Project**
Duration	00:00:20	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	6.3	8	10	12.5	16	20	25	31.5	40
Level (dB)	72.0	71.9	70.1	70.6	80.8	72.4	72.1	76.2	72.7
-	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
-	71.1	69.2	68.8	66.5	65.8	63.4	65.0	62.2	65.6
-	**400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**	**2 500**
-	63.0	64.1	63.2	62.8	64.6	63.5	63.1	62.5	60.3
-	**3 150**	**4 000**	**5 000**	**6 300**	**8 000**	**10 000**	**12 500**	**16 000**	**20 000**
-	61.2	60.7	60.1	54.9	50.7	45.2	42.6	40.6	37.3

Highest Band	16 Hz	80.8 dB

ReportId

Cirrus Research plc

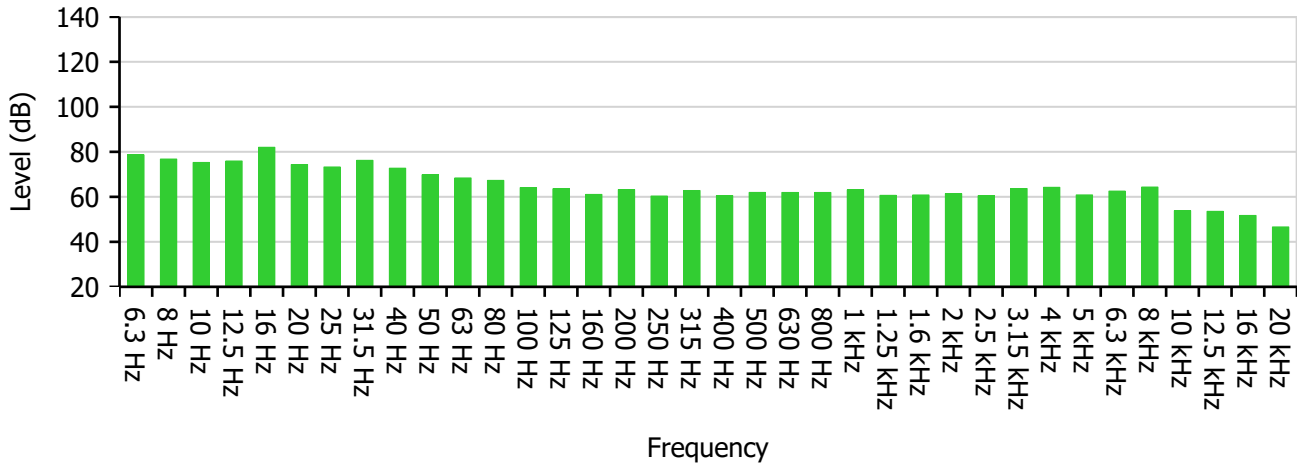
tnei

Measurement 1:3-Octave Report

Name	**Winch for skip car at 1 m (measurement #2)**			
Time	30/05/2019 11:30:23	**Person**	**Place**	**Project**
Duration	00:01:01	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	**6.3**	**8**	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**
Level (dB)	78.7	76.8	75.3	75.9	82.0	74.4	73.3	76.2	72.7
-	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
-	69.8	68.4	67.3	64.1	63.6	61.1	63.2	60.4	62.8
-	**400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**	**2 500**
-	60.5	62.0	62.0	62.0	63.1	60.7	60.8	61.4	60.5
-	**3 150**	**4 000**	**5 000**	**6 300**	**8 000**	**10 000**	**12 500**	**16 000**	**20 000**
-	63.7	64.2	60.9	62.6	64.4	53.8	53.6	51.7	46.6

Highest Band	16 Hz	82.0 dB

ReportId

Cirrus Research plc

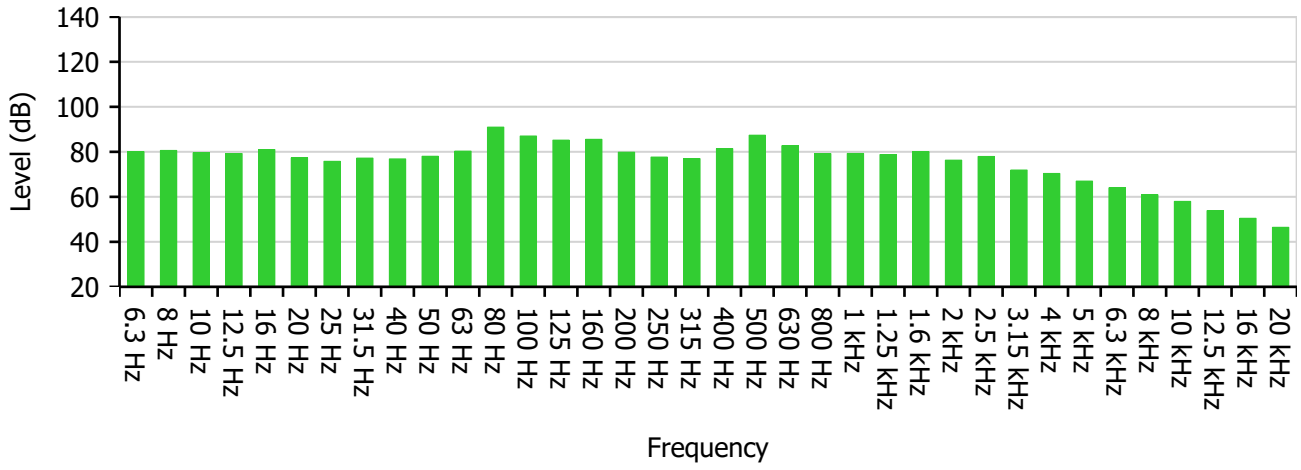
tnei

Measurement 1:3-Octave Report

Name	Slag Crushing Activities at 10 m			
Time	30/05/2019 11:03:09	**Person**	**Place**	**Project**
Duration	00:01:01	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



Frequency (Hz)	**6.3**	**8**	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**
Level (dB)	80.1	80.6	79.6	79.3	81.0	77.3	75.8	77.2	76.9
-	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**315**
-	78.0	80.3	91.0	87.0	85.2	85.6	79.8	77.7	77.0
-	**400**	**500**	**630**	**800**	**1 000**	**1 250**	**1 600**	**2 000**	**2 500**
-	81.4	87.4	82.7	79.2	79.3	78.8	80.1	76.3	77.9
-	**3 150**	**4 000**	**5 000**	**6 300**	**8 000**	**10 000**	**12 500**	**16 000**	**20 000**
-	71.9	70.4	67.0	64.0	60.9	58.0	53.9	50.5	46.5

Highest Band	80 Hz	91.0 dB

ReportId

Cirrus Research plc

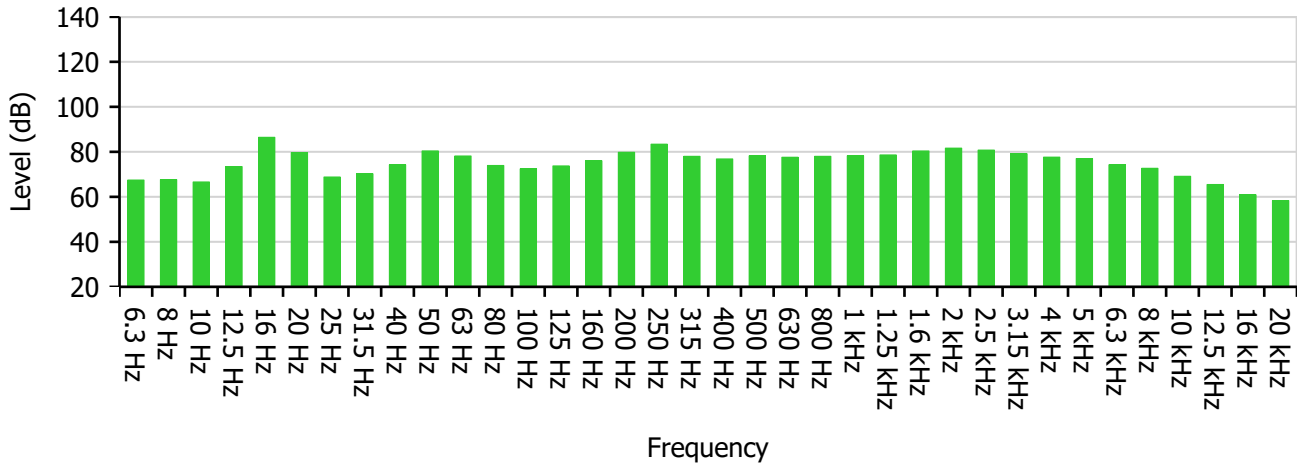
tnei

Measurement 1:3-Octave Report

Name	Slag Screening at 10 m			
Time	30/05/2019 11:09:16	**Person**	**Place**	**Project**
Duration	00:02:14	Ewan Watson	Harsco Rotherham	Cardiff Asphalt
Instrument	G056468, CR:171B			

Calibration

Before 30/05/2019 10:06 Offset -0.28 dB **After** Offset



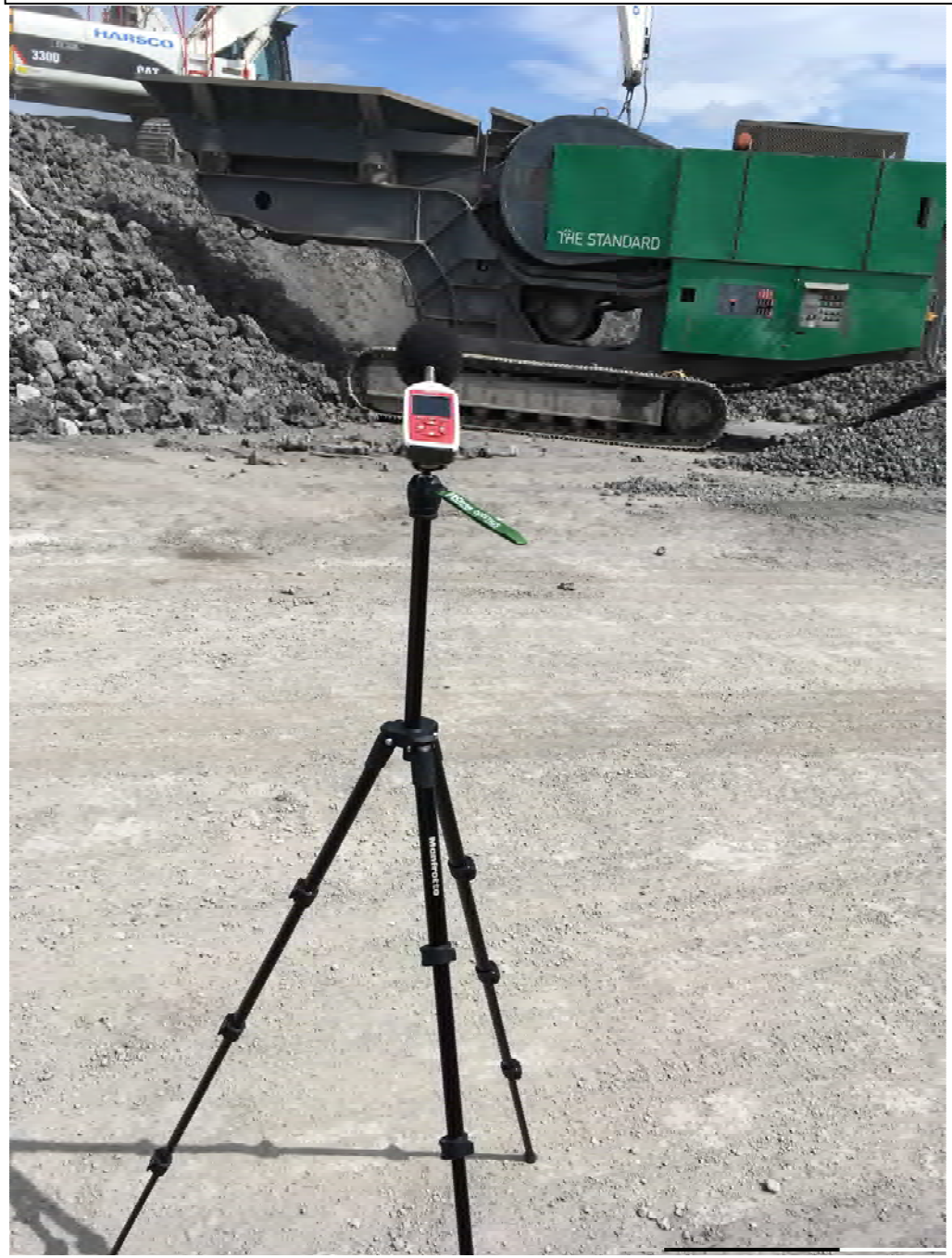
Frequency (Hz)	6.3	8	10	12.5	16	20	25	31.5	40
Level (dB)	67.5	67.6	66.6	73.5	86.5	79.6	68.8	70.3	74.2
-	50	63	80	100	125	160	200	250	315
-	80.4	78.2	73.9	72.4	73.8	76.0	79.8	83.4	78.0
-	400	500	630	800	1 000	1 250	1 600	2 000	2 500
-	76.9	78.3	77.6	78.0	78.3	78.6	80.4	81.7	80.8
-	3 150	4 000	5 000	6 300	8 000	10 000	12 500	16 000	20 000
-	79.1	77.7	77.0	74.3	72.7	69.2	65.5	60.9	58.4

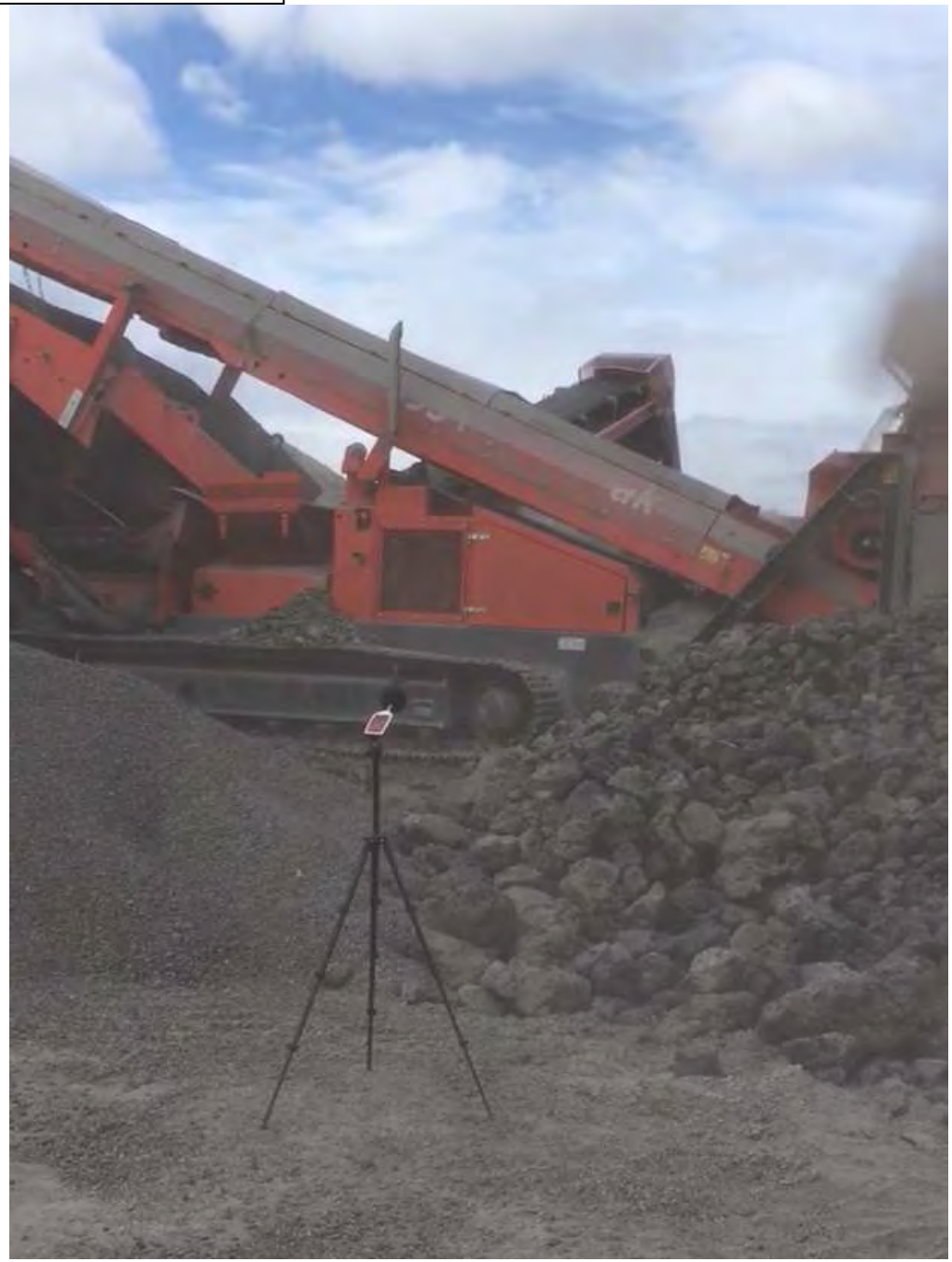
Highest Band	16 Hz	86.5 dB

ReportId


Measurement Locations for Asphalt Plant, Harsco Site, Rotherham
Cold Feed Conveyor
Aggregate Dryer
Loading Car
Loading Material into Lorries
Winch for Loading Car

Measurement Positions for Slag Crushing and Slag Screening, Harsco Site, Rotherham





Appendix E – Response to Schedule 5 Request

Schedule 5 Request. Noise Queries 1a to 1k

Please provide a cumulative noise impact assessment, as identified as necessary in the Noise Impact Assessment (dated 21st June 2019) submitted with your application. It should satisfy the requirements of our guidance, available at https://www.gov.uk/government/publications/environmental-permitting-h3-part-2-noise-assessment-and-control, BS4142:2019, and include all sources to assess the impact from all activities within the permit boundary. You should ensure that it also addresses the following other issues noted with the above report:

1a

The report above included slag crushing and screening as well as asphalt plant sources. A later report (believed to be for planning purposes) dated 4th July 2019 did not contain crushing and screening. The revised report needs to include all sources relevant to the proposed permit and variation.

All sources have been included within this Noise Impact Assessment – TNEI 1331-010-R0

1b

The report dated 4th July 2019 predicted a greater impact than the 21st June 2019 report, which is unexplained given the later report excluded some sources. This needs to be clarified/corrected. It is noted that differences in Tables 4-2 of the reports (reference period and values) may contribute to the difference.

Please see Section 1.1 of this report

1c

In both reports the impact of the proposed operations is assessed against the ambient sound level (LAeq). This is incorrect. The sound levels from the proposed operations should be assessed against the background sound level (LA90) as required by BS4142, otherwise impact at the receptors may be underestimated. Please amend and resubmit the Noise Impact Assessment.

We note the comment in the report that "It was agreed [with an Environmental Health Officer at Cardiff Council] that where noise level modelling showed that noise immission levels from the proposed developments were at least 10 dB below the existing ambient levels then no further assessment would be necessary". However, we do not agree with this approach for permitting, and require the approach outlined above.

Where noise levels from a new noise source are more than 10dB below the existing noise levels then no increase in total noise will occur.

A BS4142 assessment has been included in this cumulative assessment and we would agree that in this instance this is the most appropriate method of assessment.

1d

Where ambient sound level (LAeq) is referred to in the report, it is actually residual level, as the measurements exclude the proposed plant which is not yet operational. Please amend terminology accordingly.

The use of the term *ambient sound level* is correct in the context of the previous report. The definition of ambient sound level that is referred to in the Schedule 5 Request is only in relation to a BS4142 assessment, however, the previous report was not based on a BS4142 assessment. *Ambient Sound Level* is not exclusive to BS4142 and is used differently outside of this standard.

1e

Meteorological parameters, as required by BS4141 are not reported for the duration of the background measurements and are required, please review and update the report as necessary.

Please see section 4 of this report. Met conditions were monitored during the survey but no data was logged. A check of historical weather data www.wunderground.com can be used to confirm that weather conditions were appropriate for monitoring.

1f

The 4th July 2019 report models receiver heights of 4m and 1.5m (first floor window and single story) at the traveller site. The 21st June 2019 report has only 1.5m, Explain and justify whether 4m is also required.

The 21st June report is not valid. It was replaced by the 4th July report. Please disregard.

We have opted to use 4m high receptors to replicate the position of a first floor bedroom window. We thought that this was appropriate given that operations may occur from 06:00 when many people may be sleeping.

This provides a worst-case assessment as predicted levels will be higher at 4 m than at 1.5 m (due to ground absorption effects).

1g

Location 2 baseline sound monitoring may overestimate the background sound levels at the traveller site as the monitoring location is directly on the road. In addition, the traveller site is screened by a concrete structure located between the site and the receptor, so background measurements may not be representative. Provide further information/justification, or baseline monitoring from a more appropriate location.

Our risk assessment process determined that NML02 was the most appropriate location for a lone worker to undertake the survey from a health and safety perspective. We are confident that sound levels within the traveller site will be similar to those measured and it is noted that there is very little screening between the road traffic and receptors within the traveller site. The concrete structure is unlikely to offer any significant reduction in road traffic noise.

Furthermore, we have not included the concrete structure within our noise modelling.

1h

Table 5-1 and Appendix D provide sound pressure levels of various pieces of fixed equipment. Appendix D states that the measurements were taken at 1m and 10m from the equipment. It is not clear if the equipment is anisotropic and whether the measurements were only taken at 1 location. This could lead to an underestimation of sound levels from the equipment. Provide further information or revised data.

Please see Section 5.1 of this report. No additional monitoring or data is required.

1i

For the moving plant on-site (tracked excavator), the operator has modelled this as a point source in one location and provided some justification for doing so. However, this should be modelled as a moving source (line). Please amend and update the report.

The method we have adopted provides a more conservative approach and we disagree that mobile plant should be modelled as a line source in this instance.

1j

The 4th July 2019 report refers to the noise impact at the nearby ecological receptor. The 21st June 2019 report does not. Impact of noise at ecological receptors should be assessed.

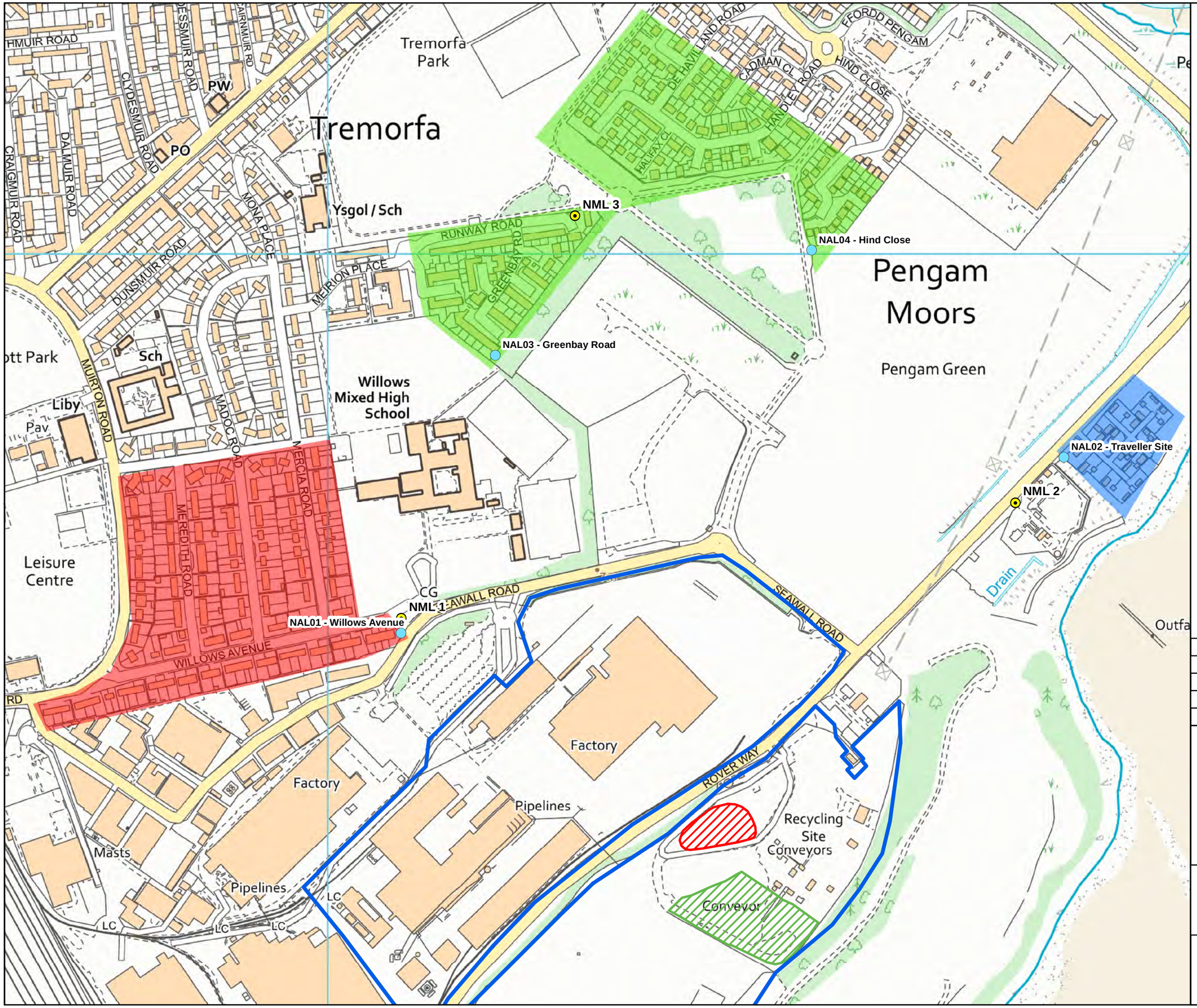
The 21st June report is not valid. It was replaced by the 4th July report. Please disregard.

1k

No modelling files have been submitted, please submit.

We would be happy to provide our modelling files and these will be submitted in due course. Modelling has been undertaken in CadnaA and the CadnaA model file is approximately 500 MB. Please advise on an appropriate method of delivery.

Appendix F – Figures



Legend

- Noise Monitoring Locations (NMLs)
- Noise Assessment Location (NAL)
- Slag Crushing Indicative Area
- Asphalt Plant Indicative Area
- IPPC Permitting Area

Nearest Noise Sensitive Receptors (NSRs)

- NSRs represented by NML 1
- NSRs represented by NML 2
- NSRs represented by NML 3

0 50 100 Metres

N

REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R0	FIRST ISSUE	EW	JS	JS	12/03/2020

Project	Cardiff Celsa Site Environmental Permit EPR/TP/3639BH/V009 (variation)
Client	EAME
Title	Noise Study Area
Figure No.	1
Scale	1:4,000 @A3
Doc. Ref.	13331-011

EAME Earth & Marine Environmental Consultants

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Tremorfa

Ysgol / Sch

RUNWAY ROAD

GREEN RD

NAL03 - Greenbay Road

NAL04 - Hind Close

Pengam Moors

Pengam Green

Willows Mixed High School

NAL02 - Traveller Site

NAL01 - Willows Avenue

SEAWALL ROAD

Outfall

Pipelines

Recycling

Conveyor

Inset Scale 1:1,500

Legend

- Noise Assessment Locations
- Modelled Buildings
- Site Layout
- Predicted Noise Contours (5 dB Increments)
- Predicted Noise Contours (1dB Increments)

Modelled Noise Sources

- Asphalt Plant (Fixed Plant)
- Asphalt Plant (Mobile Plant)
- Slag Crushing (Fixed Plant)
- Slag Crushing (Mobile Plant)

Predicted Noise Levels (dBA)

- 30-35
- 35-40
- 40-45
- 45-50
- 50-55
- 55-60
- 60-65
- 65-70
- 70-75
- 75-80
- 80>

Noise contours modelled in accordance with ISO9613-2:1996 at a height of 1.5 m and displayed on a 5 m by 5 m grid.

All noise sources assumed to be operating concurrently and continually at maximum output.

All levels shown as dB $L_{Aeq(t)}$.

0 50 100 Metres

N

REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R0	FIRST ISSUE	EW	MT	JS	12/03/2020

Project	Cardiff Celsa Site Environmental Permit EPR/TP/3639BH/V009 (variation)
Client	EAME
Title	Noise Contour Plot
Figure No.	2
Scale	1:4,000 @A3
Doc. Ref.	13331-012

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Legend

- Special Area of Conservation
- Site Layout
- Modelled Buildings
- INVC Monitoring Location (August 2017)
- Predicted Noise Contours (5 dB Increments)
- Predicted Noise Contours (1dB Increments)
- Asphalt Plant (Fixed Plant)
- Asphalt Plant (Mobile Plant)
- Slag Crushing (Fixed Plant)
- Slag Crushing (Mobile Plant)

Predicted Noise Levels (dBA)

- 30-35
- 35-40
- 40-45
- 45-50
- 50-55
- 55-60
- 60-65
- 65-70
- 70-75
- 75-80
- 80>

Noise contours modelled in accordance with ISO9613-2:1996 at a height of 1.5m and displayed on a 5m by 5m grid.

All noise sources assumed to be operating concurrently and continually at maximum output.

All levels shown as dB LAeq(t).

0 75 150 Metres

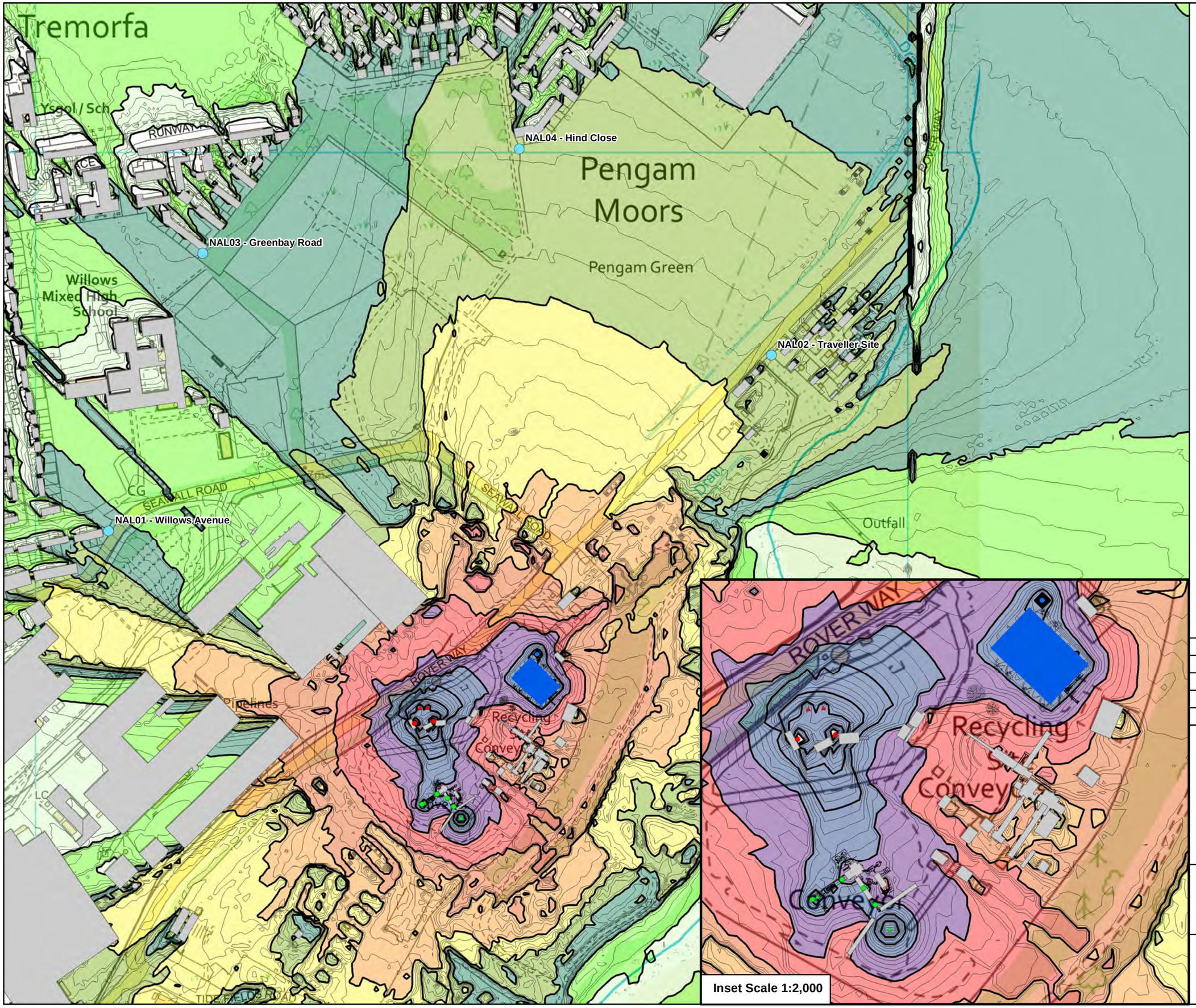
N

REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R0	FIRST ISSUE	EW	JS	JS	12/03/2020

Project	Cardiff Celsa Site Environmental Permit EPR/TP/3639BH/V009 (variation)
Client	EAME
Title	Ecological Receptor Noise Contour Plot
Figure No.	3
Scale	1:5,000 @A3
Doc. Ref.	13331-003

EAME Earth & Marine Environmental Consultants

tnei



Legend

- Noise Assessment Locations
- Modelled Buildings
- Site Layout
- Predicted Noise Contours (5 dB
- Predicted Noise Contours (1 dB

Modelled Noise Sources

- Asphalt Plant (Fixed Plant)
- Asphalt Plant (Mobile Plant)
- Slag Crushing (Fixed Plant)
- Slag Crushing (Mobile Plant)
- Metal Recycling (Mobile Plant)
- Metal Recycling Building

Predicted Noise Levels (dBA)

- 30-35
- 35-40
- 40-45
- 45-50
- 50-55
- 55-60
- 60-65
- 65-70
- 70-75
- 75-80
- 80>

Noise contours modelled in accordance with ISO9613-2:1996 at a height of 1.5 m and displayed on a 5 m by 5 m grid.

All noise sources assumed to be operating concurrently and continually at maximum output.

All levels shown as dB $L_{Aeq(t)}$.

0 50 100 Metres

N

REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R0	FIRST ISSUE	EW	MT	JS	12/03/2020

Project	Cardiff Celsa Site Environmental Permit EPR/TP/3639BH/V009 (variation)
Client	EAME
Title	Noise Contour Plot (Cumulative)
Figure No.	4
Scale	1:4,000 @A3
Doc. Ref.	13331-014

EAME Earth & Marine Environmental Consultants

tnei

Legend

- Special Area of Conservation
- Site Layout
- Modelled Buildings
- INVC Monitoring Location (August
- Predicted Noise Contours (5 dB
- Predicted Noise Contours (1 dB
- Asphalt Plant (Fixed Plant)
- Asphalt Plant (Mobile Plant)
- Slag Crushing (Fixed Plant)
- Slag Crushing (Mobile Plant)
- Metal Recycling (Mobile Plant)
- Metal Recycling Building

Predicted Noise Levels (dBA)

- 30-35
- 35-40
- 40-45
- 45-50
- 50-55
- 55-60
- 60-65
- 65-70
- 70-75
- 75-80
- 80>

Noise contours modelled in accordance with ISO9613-2:1996 at a height of 1.5m and displayed on a 5m by 5m grid.

All noise sources assumed to be operating concurrently and continually at maximum output.

All levels shown as dB LAeq(t).

0 75 150 Metres

N

R0	FIRST ISSUE	EW	JS	JS	12/03/2020
REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE

Project	Cardiff Celsa Site Environmental Permit EPR/TP/3639BH/V009 (variation)
Client	EAME
Title	Ecological Receptor Noise Contour Plot (Cumulative)
Figure No.	5
Scale	1:5,000 @A3
Doc. Ref.	13331-005

EAME Earth & Marine Environmental Consultants

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