NOISE IMPACT ASSESSMENT

NEWPORT DOCKS - CEMMINERALS

Stephenson Halliday

2062040-RSKA-RP-001-(02)

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General notes

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.
This work has been undertaken in accordance with the quality management system of RSK Acoustics Ltd.

Contents

List of Tables & Figures

Appendix Tables & Figures

1 Introduction

1.1 Background

RSK Acoustics Limited has been instructed by Stephenson Halliday to undertake the assessment of noise and vibration as part of a planning application for Cemminerals cement factory ('the Proposed Development') at Alexander Dock in Newport, Wales.

The primary purpose of this noise and vibration assessment is to identify any likely adverse or significantly adverse airborne noise and / or vibration impacts caused by the construction and operation of the new facilities on nearby noise/vibration sensitive receptors. The noise and vibration assessment will also develop noise control recommendations to reduce or avoid any likely adverse or significant adverse impacts, where these are identified.

This noise and vibration assessment (and its associated figures and appendices) has been prepared by competent experts with relevant and appropriate experience. It is intended to be read alongside associated documentation for the planning permission application.

A glossary of acoustic terminology relevant to the assessment is included in Appendix A - Glossary

1.2 Site Description and Location

1.2.1 Site

The site is situated along E Way Road in the south area of Alexander Dock, Newport. The dockland area is operated by Associated British Ports and falls within the jurisdiction of Newport City Council. It is understood that the extant use falls under the B2 (general industry) / B8 (storage and distribution) planning use classes.

1.2.2 Proposed Development

The Proposed Development consists of three phases, which are:

- Phase One; site preparation, connection to services, security fencing and provision of foundations. This will include the removed of any redundant temporary buildings and scrub and the provisions of temporary welfare facilities
- Phase Two; importation, storage and onward distribution of estimated aprox.100,000 tonnes per annum of cement and or cement substitutes. The second phase requires the installation of silos. The cement coming from the import of vessels will be unloaded pneumatically and transported via pipes to 4 storage silos of approximately 45 m height with weighbridges beneath the silos. All operations within this phase would occur on a 24-hour basis. The silos will be above the height of the lighting columns but below the height of the wind turbines located to the east of the site.
- Phase Three; importation of estimated approx. 1,000,000 tonnes per annum of raw materials such as cement clinker and slag, construction and operation of mill for processing, manufacture of cement and cement substitutes and onward distribution. Substation and hydrogen storage will be investigated. This phase will also include permanent office/welfare and septic tank arrangement. A clean water supply will be taken from the mains system but a heat exchange coolant system will be in operation that may require an abstraction and discharge consent from Natural Resources Wales. Loading takes place automatically from the silo above and is controlled by a small workforce of two personnel per shift. Again, it is proposed that operations would take place on a 24-hour basis

Whilst Phase 2 is operational, Phase 3 will be constructed. The material that is unloaded in Phase 3 consists of raw materials such as cement clinker. These raw materials will be unloaded directly from vessels to a hopper/conveyor system that will carry the material over the rail sidings. Some raw materials such as slag can be stored in open air, others such as clinker need to be stored in a covered storage to the south of the railway line. From the storage area the raw material is fed into the mill and the final product is moved to the four retained silos used in Phase 2 which are augmented with a further 4/6 silos. Roadgoing vehicles would arrive at the site entrance and be directed to the space beneath a silo. A sealed connection will be formed and a 30-tonne load directed into the vehicle. Weighing is automatic and, upon decoupling, the vehicle is driven from the site to its delivery destination.

1.3 Scope of the Assessment

The objectives of this report are to:

- Detail appropriate assessment criteria based on the requirements of the local authority and industry standard guidance.
- Present the results of the environmental noise survey undertaken at the site.
- Determine the suitability of the site for the proposed uses.
- Suggest, if appropriate, measures to mitigate any noise impact associated with the Proposed Development.

1.3.1 Elements scoped out of the assessment

The elements shown in Table 1 are not considered to give rise to any impacts as a result of the Proposed Development and have therefore not been considered within this assessment.

Element Scoped Out	Justification
Vibration during the construction phase	The nearest residential receptor is over 1200 m away (New Dairy Farm) from the proposed site boundary meaning there will be very limited potential for adverse operational vibration impacts. The nearest ecological is over 150 m away (River Usk SSSI) from the proposed site boundary, which falls outside of the 100 m study stated in in the guidance from DMRB. For the reasons above, operational vibration is not considered any further in this assessment.
Vibration during operation phases	The Proposed Development has a very low potential to generate any operational vibration. The nearest residential receptor is over 1200 m away (New Dairy Farm) from the proposed site boundary meaning there will be very limited potential for adverse operational vibration impacts. The nearest ecological is over 150 m away (River Usk SSSI) from the proposed site boundary, meaning there will be very limited potential for adverse operational vibration impacts. For the reason above, operational vibration is not considered any further in this assessment.
Freight vehicle movements via the port	While the Proposed Development will be receiving deliveries through the port, this has been confirmed to not exceed the existing level of port activities.

Element Scoped Out	Justification
	For the reason above, freight via the port is not considered any further in this assessment.
Freight vehicle movements via railway	The Proposed Development is not expected to receive deliveries via the existing railway line. For the reason above, freight via the railway is not considered any further in this assessment
Noise and vibration from heavy vehicle movements associated with construction activities.	There are no noise sensitive receptors within 1 km of the Proposed Development that are within 50 m of any potentially affected route. For the reason above, noise and vibration from heavy vehicles associated with construction activities are not considered any further in this assessment.
Noise from road traffic vehicle movements associated with the operation of the Proposed Development.	There are no noise sensitive receptors within 1 km of the Proposed Development that are within 50 m of any potentially affected route. For the reason above, noise and vibration from heavy vehicles associated with operational activities are not considered any further in this assessment.

Table 1 Elements scoped out of the assessment

1.3.2 Elements scoped into the assessment

The elements shown in Table 2 are considered as having the potential to give rise to adverse impacts as a result of the Proposed Development and are therefore considered within this assessment.

Element Scoped In	Justification
Noise from construction activities.	Temporary noise and vibration impacts associated with construction activities could result in adverse impacts.
Noise from the operation of the Proposed Development.	Noise from the operation of the Proposed Development including new noise generating equipment associated with the operation of the Proposed Development could result in adverse impacts.

Table 2 Elements scoped into the assessment

1.4 Study Areas

The study area for the assessment varies depending on the impacts under assessment, and in accordance with the relevant standards and guidance. A summary of the study areas adopted for the assessment is provided below:

- Construction Noise: The Study Area considered for the construction phase is 300 m from the Red Line Boundary. BS 5228:2009+A1:2014 states that at distances over 300 m noise predictions have to be treated with caution.
- Operational Noise: Noise effects arising from the operation project, will be limited to the nearest residential receptor, circa 1250 m from the Red Line Boundary.

Figure C.1 provides an overview of the site location and a graphical overview of the study areas described above.

2 Consultation and Assessment Methodology

2.1 Consultation

Table 3 provides a summary of the consultation undertaken to inform the noise and vibration assessment to date.

Body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Newport City Council (NCC)	Email sent 04/04/2024	General approach to baseline monitoring and acoustic assessment of the Proposed Development
Newport City Council (NCC)	Email sent 07/05/2024	Follow up to previous email
Newport City Council (NCC)	Email received 07/05/2024	Confirmation that proposed methodology was acceptable

Table 3 Summary of the consultation in relation to noise and vibration

A pre-application enquiry was submitted to NCC, who provided a response dated 10th June 2024. NCC raised the potential impact of the scheme could include noise disturbance to otters. RammSanderson has undertaken an Ecological Impact Assessment (document ref "*RSE_7345_R2_V1_EclA*") for the proposed scheme and, with relation to otters, found no evidence of otters or their habitats within their study area. Therefore, no further noise assessment in relation to the potential noise impact on otters has been undertaken.

2.2 Noise Assessment Methodology and Criteria

2.2.1 Operational Criteria at Residential Receptors

The operational noise impact assessment has been undertaken in general accordance with BS 4142:2014+A1 2019, which is based on the comparison of rating levels during the site operation with respect to the background noise level prevailing at representative NSRs. According to this methodology, where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact on the receptors under investigation, depending on context. The assessment must also provide an understanding of the context in which the sound occurs / will occur to establish the significance of the impact. For the purpose of this assessment the criteria will be equal to the representative background sound level derived from the baseline survey.

The assessment of night-time noise considers the ProPG guidance for individual noise events (from all sources) to not exceed 45 dB L_{AFmax} more than 10 times a night, to achieve good acoustic design. This internal noise limit during the night-time is also reflected in the WHO Guidelines for Community Noise.

For the purposes of the operational noise impact assessment, Phase Three of the scheme has been used as a worst-case scenario, therefore noise arising from Phase Two of the scheme has been discounted.

2.2.2 Construction Criteria at Residential Receptors

The construction noise impact assessment has been carried out in general accordance with BS 5228-1:2009+A1:2014, which provides construction noise criteria based on existing ambient noise levels at the receptor. Further details can be found in Appendix B.

2.2.3 SSSI Assessment and Criteria

Based on the guidance within the IECS 2009 report (Cutts et al., 2009) and the review of thresholds provided in the Natural England 2018 document, it is considered that a noise threshold of 55 dB(A) is acceptable for the assessment of nesting and wintering birds within the SSSI. Such a noise level is an indication of low noise level effect in the Natural England, 'A Review of the Effects of Noise on Birds – Version 1' 2018 guidance.

Although not specifically stated, for the purpose of this assessment the 55 dB(A) level has been assumed to relate to both average and maximum noise events e.g. 55 dB $L_{Aeq, T}$ and L_{AFMax}. In a similar way to the BS 4142:2014+A1 2019 assessment, context and existing noise levels are important to be accounted for when assessing impacts on fauna. The 55 dB(A) level will be used for both the construction and operational assessments.

3 Baseline Noise Survey

3.1 Methodology

A baseline noise survey has been undertaken to define the pre-development noise levels at the closest noise sensitive receptors to the site. The resulting measurement data set has been used to inform the assessment.

The survey comprised unattended noise monitoring carried out between Thursday 11 July 2024 and Friday 19 July 2024 at two locations representative of the closest noise sensitive receptors to the site. Attended measurements were also undertaken at a single location across two dates, Thursday 11 July 2024 and Friday 19 July 2024. Weather conditions were recorded through the duration of the surveys.

All baseline noise survey monitoring was undertaken in general accordance with BS 4142:2014+A1:2019 Section 6 (Measurement procedure).

3.1.1 Identified Noise Sensitive Receptors

Receptor sensitivity has been categorised based on professional judgement for a range of receptor types as set out in Table 4 below.

Receptor Sensitivity	Type of Receptor
High	Residential properties (including gardens), educational establishments, hospitals, places of worship, hotels, children's nurseries, nursing homes, quiet areas (designated under noise and soundscape plan 2023-2028).
Medium	Commercial premises, halls, public municipal areas, bars and restaurants, SSSI.
Low	Industrial premises.
Very low	All other areas such as those used primarily for agricultural purposes.

Table 4 Receptor sensitivity

The nearest residential NSR to the development site is identified in Table 5 below.

NSR Ref.	Description	Type of Receptor	Easting	Northing
R1	New Dairy Farm	Residential	330634	183906

Table 5 Residential noise sensitive receptor

It should be noted that New Dairy Farm is 1.2 km away from the boundary of the Proposed Development, with the next nearest residential receptor (Fair Orchard Farm, Lighthouse Road) being over 1.7 km away. Given the significant distance between Fair Orchard Farm and the Proposed Development, it and all other residential noise sensitive receptors who are further away have been excluded from this assessment.

Other areas of interest to be considered within this assessment include the nearby Site of Special Scientific Interest (SSSI) as identified in Table 6 below.

NSR Ref.	Description	Type of Receptor	Easting	Northing
R2	River Usk	SSSI	278040	185241
R3	Newport Wetlands	SSSI	279744	184949

Table 6 Ecological noise sensitive receptors

3.2 Noise Survey

3.2.1 Monitoring Locations

The survey locations are described in Table 7. Figure C.1 in Appendix C presents the survey locations in context with the Proposed Development.

Location	Description	Measurement Purpose	Attended / Unattended
MP1	The microphone was located in a free-field position at a height of approximately 1.5 m above ground level, along Hoel Pont-y-Cwcw and adjacent to New Dairy Farm.	Representative of noise levels at New Dairy Farm.	Unattended
MP2	The microphone was located in a free-field position at a height of approximately 1.5 m above ground level.	Representative of noise levels for River Usk SSSI	Unattended
MP3	The microphone was located in a free-field position at a height of approximately 1.5 m above ground level.	Representative of noise levels for Newport Wetlands SSSI	Attended

Table 7 Baseline survey location descriptions

3.2.2 Monitoring Equipment

The instrumentation used in the survey is listed in Table 8. Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Sound level meters are calibrated every two years, with acoustics calibrators being calibrated on a yearly basis. Calibration certificates for the sound level meters and the calibrator are available upon request.

Equipment	Type	Serial Number
Class 1 sound level meters	01dB Fusion	15189
Class 1 sound level meters	01dB Fusion	15171
Class 1 sound level meters	Rion NL-52	00943371
Acoustic calibrator	Rion NC-75	35124522

Table 8 Instrumentation

All sound level meters used as part of the survey conform to BS EN 61672-1, Class 1, for free-field application. Any filters, where used, will conform to BS EN 61260, Class 1, and sound calibrators to BS EN 60942, Class 1.

3.2.3 Meteorological Conditions

Weather conditions have been obtained through an onsite weather station, (Vaisala WXT536) installed by RSKA. The weather information has been summarised in alongside

Date	Temperature / °C (Average)	Precipitation / mm	Wind Speed / ms^{-1} (Average)
Thursday 11/07/2024	18.1	0.0	1.2
Friday 12/07/2024	15.3	7.8	0.6
Saturday 13/07/2024	14.8	0.0	0.7
Sunday 14/07/2024	15.3	0.0	1.3
Monday 15/07/2024	14.2	10.0	0.9
Tuesday 16/07/2024	17.5	0.0	1.4
Wednesday 17/07/2024	17.3	0.0	1.3
Thursday 18/07/2024	19.8	0.0	1.5
Friday 19/07/2024	18.6	0.0	0.9

Table 9 Meteorological conditions

The collated weather data shows rainfall was recorded on Friday 12th July and Monday 20th July. Any periods with rainfall or wind speeds above 5 m/s were measured have been excluded from the results

3.2.4 Onsite Observations

During the installation of the monitoring equipment, the engineer noted the following observations

Location	Temperature / °C (Average)
MP1	Noise environment dominated by farmyard activity, along with livestock and poultry. Some noise from foliage moving in the breeze and birdsong also present.
MP2	Noise environment dominated by dockland activity. Noise from foliage moving in the breeze and birdsong also present.
MP3	Noise environment dominated by birdsong and foliage moving in the wind. Occasional noise from people walking and conversing.

Table 10 Monitoring location observations

3.3 Assumptions/Limitations

The engineer noticed nothing unusual in terms of the sound climate at the time of the survey. This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

3.4 Noise Monitoring Survey Results

3.4.1 Residential Receptor Baseline Survey Results

A summary of the noise survey results for New Dairy Farm (MP1) is presented below in Table 11.

Date	Time Period	Measured noise levels, dB[2]		
		$L_{Aeq, T}$	$L_{Afmax,T}$	$L_{A90, T}$
11/07/2024	13:00-23:00[1]	58	99	43
	23:00-07:00	52	88	42
12/07/2024	07:00-23:00	60	93	44
	23:00-07:00	51	87	40
13/07/2024	07:00-23:00	60	92	43
	23:00-07:00	53	92	42
14/07/2024	07:00-23:00	62	93	43
	23:00-07:00	52	91	42
15/07/2024	07:00-23:00	59	92	45
	23:00-07:00	54	88	42
16/07/2024	07:00-23:00	59	93	45
	23:00-07:00	53	88	42
17/07/2024	07:00-23:00	62	98	43
	23:00-07:00	52	89	40
18/07/2024	07:00-23:00	59	95	42
	23:00-07:00	51	89	39
19/07/2024	07:00-15:00[1]	60	91	50

[1] Measurements not taken throughout full 16hr period.
[2] $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, $L_{A90,T}$ is the arithmetic average of the $L_{A90,15min}$ samples, and the $L_{Afmax,T}$ is the maximum singular noise level in any measured period.

Table 11 Unattended baseline noise survey summary (MP1)

3.4.2 Ecological Receptor Baseline Survey Results

A summary of the unattended noise survey at River Usk (SSSI) and attended noise survey at Newport Wetlands (SSSI) are presented in Table 12 and Table 13

Date	Time Period	Measured noise levels, dB[2]		
		$L_{Aeq,\ T}$	$L_{Afmax,T}$	$L_{A90,\ T}$
11/07/2024	12:00-23:00[1]	47	81	42
	23:00-07:00	45	64	40
12/07/2024	07:00-23:00	47	74	40
	23:00-07:00	42	71	37
13/07/2024	07:00-23:00	46	75	35
	23:00-07:00	45	72	37
14/07/2024	07:00-23:00	50	77	38
	23:00-07:00	44	85	37
15/07/2024	07:00-23:00	47	80	40
	23:00-07:00	46	75	40
16/07/2024	07:00-23:00	46	73	40
	23:00-07:00	45	83	38
17/07/2024	07:00-23:00	45	73	37
	23:00-07:00	44	74	39
18/07/2024	07:00-23:00	43	75	37
	23:00-07:00	43	74	38
19/07/2024	07:00-14:00[1]	45	67	39

[1] Measurements not taken throughout full 16hr period.
[2] $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, the $L_{A90,T}$ are the arithmetic average of the $L_{A90,15min}$ samples, and the $L_{Afmax,T}$ is the maximum singular noise level in any measured period.

Table 12 Unattended baseline noise survey summary (MP2)

Date	Time Period	Measured noise levels, dB		
		$L_{Aeq,\ T}$	$L_{Afmax,T}$	$L_{A90,\ T}$
11/07/2024	14:15-13:15	47	72	40
19/07/2024	10:15-12:15	40	63	35

Table 13 Attended baseline noise survey summary (MP3)

During the survey, L_{AFmax} events were measured. An analysis of the typical number of events has been undertaken and is summarised below. The analysis included an assumption that only a single L_{AFmax} event could occur in any 5 second period.

Over the course of the survey at MP1 (River Usk SSSI) the average number of L_{AFmax} events above 55 dB L_{AFmax} in any given 24 hour period was in the order of 1250 events (circa 7% of total events). The magnitude of these events ranged between 55 dB and 90 dB.

At MP3 (Newport Wetlands SSSI) the average number of L_{AFmax} events above 55 dB L_{AFmax} during both monitoring periods was 2%. The magnitude of these events ranged between 55 dB and 72 dB.

4 Assessment Criteria

4.1 Operational Noise Assessment and Criteria

4.1.1 Residential Criteria

The project criteria shown in Table 14 below were derived using a combination of background measurement data, ambient measurement data and legislative/guidance documents.

The methodology detailed in BS 4142: 2014+A1: 2019 provides an example of statistical analysis to determine the representative background noise level ($L_{A90,T}$). The following analysis adopts the methodologies applied within the aforementioned standard.

Based on the statistical analysis of the data collected, for MP1 the noise levels of 42 dB $L_{A90,\ 1\ hour}$ and 39 dB $L_{A90,\ 15\ minutes}$ are considered representative of the background noise levels for daytime and night-time respectively.

Results of the statistical analysis are shown in Appendix D – Statistical Analysis

Receptor	Background Noise Level Criteria, dB $L_{A90,\ T}$		L_{AFmax} Criteria[1]
	Daytime	Night-time	Night-time
R1	42	39	57
Note: 1 External criteria based on internal criteria of 45 dB L_{AFmax} where an openable window results in 12 dB attenuation of the external L_{AFmax} level.			

Table 14 Operational criteria

For the purposes of the operational noise impact assessment, Phase Three of the scheme has been used as a worst-case scenario, therefore noise arising from Phase Two of the scheme has been discounted.

4.1.2 Operational Noise Source Data

The noise source data used to inform the propagation model and assessment of the operational phase is provided in Table 15 below.

Plant	Quantity.	Operational on-time	Ref. L_{wA} (dB)
Building (breakout)	1	24hrs / 100%	98 dB L_{wA}
Fresh air supply mill	2	24hrs / 100%	105 dB L_{wA}
Cement coller	1	24hrs / 100%	95 dB L_{wA}
Dedusting clinker hall	1	07:00 – 18:00 / 60%	112 dB L_{wA}
Discharging vessel	1	07:00 – 18:00 / 50%	111 dB L_{wA}
Loading truck	1	24hrs / 10%	99 dB L_{wA}

Table 15 Operational plant list

Operational noise data (sound power levels and frequency data) has been provided by Cemmerinals, which was measured at their processing plant in Gent, Belgium by acoustic specialist Bureau De Fonseca. The proposed site layout and spectral data for the measurements can be found in Appendix B

It is considered that operational activities and estimated operational on-times represent the typical worst-case scenario for the proposal.

4.1.3 Operational Assumptions

Based on the operational data as provided by the project team, the following assumptions have been made:

- Operation of the site will be 24 hour per day, seven days a week;
- Sound power levels and spectrum data has been provided by Cemminerals, however L_{AFmax} data was not provided. Previously measured data by RSKA for similar activities has been used for L_{AFmax} values
- All operational assumptions have been derived following review of available information or project meetings with Stephenson Halliday. All assumptions have been reviewed and agreed as appropriate by Stephenson Halliday.

4.2 Construction Noise Assessment and Criteria

4.2.1 Construction Criteria

The construction noise criteria are shown in Table 16 below. For the residential receptor (R1) the criteria have been established in accordance with Table E.1 of BS5228 and is based on the measured baseline noise level at the each of the noise monitoring locations. Based on the survey results, Category A has been used for R1. For the two ecological receptors (R2 and R3) the criteria stated in Section 2.2.3 has been adopted.

Noise Sensitive Receptors/ Nearest Monitoring Location	Threshold values		
	Daytime	Evenings and weekends	Night-time
R1	65 ($L_{Aeq,T}$)	55 ($L_{Aeq,T}$)	45 ($L_{Aeq,T}$)
R2	55 ($L_{Aeq,T}$) / (L_{AFmax})		
R3	55 ($L_{Aeq,T}$) / (L_{AFmax})		

Table 16 Noise Assessment Criteria (Construction Noise)

4.2.2 Construction Assumptions

A detailed construction programme and methodology is current unavailable for the Proposed Development, therefore quantitative predictions of construction noise have not been undertaken at this stage. As an alternative and worst-case potential scenario, an initial piling assessment has been undertaken using source data taken from previous RSKA measurements. For this assessment, it has been assumed that there will be a single hydraulic impact piling rig operating for 50 % of the time.

Predictions are considered worst case, as they assume all plant within a given construction task are undertaken at the shortest separation distance from the receptor. In reality, this is unlikely to be the case, therefore noise levels and associated impacts are likely to be lower than those predicted.

4.3 Computer Noise Modelling

To determine the predicted impact at the nearest noise sensitive receptors, a computer noise propagation model has been prepared. This uses a combination of noise source assumptions, including consideration of:

- Hours of operation.

- Mode of operation (e.g. continuous).
- Operational load (e.g. 100% load, number of movements).
- Location of noise sources.
- Specific source emission levels.

All noise propagation predictions have been carried out using SoundPLAN v 9.1. An overview of the noise propagation modelling parameters is provided in Table 17.

Item	Setting
Algorithms	ISO 9613-2:1996 Acoustics — Attenuation of noise during propagation outdoors — Part 2: General method of calculation.
Ground Absorption	The ground absorption across the site has been set with an absorption coefficient of 0.2, representing hard, reflective surfaces. Beyond the site boundary, ground absorption settings have either been determined as hard (0.2) or soft (0.8) following a desktop review of the ground conditions.
Meteorological Conditions (ISO 9613-2)	10 degrees Celsius; 70 % humidity; and Wind from source to receiver.
Receptor Height	Ground Floor 1.5 m above ground, representative of living rooms. Used for daytime calculations. First Floor 4 m above ground, representative of bedrooms. Used for night-time calculations.
Terrain	LiDAR DTM with a 1-metre resolution has been imported into the model.
Source Modelling	Dedusting clinker hall, discharging vessel, fresh air supply vents and the cement cooler have been modelled as point sources. The loading of HGV vehicles has been modelled as an area source The mill building has been modelled as an industrial building, with vertical and horizontal area sources to represent emissions from its surface area.
Buildings and barriers	All the existing structures and buildings in the immediate surroundings of the site have been incorporated into the model.

Table 17 Modelling Parameters

5 Noise Assessment

5.1 Construction Noise Assessment

A prediction of the likely construction noise levels for each activity is presented in Table 18 below. These noise levels are given in terms of the construction noise in isolation, without any contribution from ambient noise levels, in accordance with methodology in BS 5228+A1:2014.

Receptor	Location	Predicted Noise Level	
		$L_{Aeq,T}$	L_{AFmax}
R1	New Dairy Farm	48	-
R2	River Usk	59	68
R3	Newport Wetlands	48	57

Table 18 Calculated construction noise levels in dB $L_{Aeq,T}$

The specific noise level results are also provided in graphical form as a contour noise map in Figures C.3 and C.4.

Calculations show that the worst case predicted noise levels for New Dairy Farm are likely to be below the proposed daytime criterion of 65 dB $L_{Aeq,T}$.

The calculated L_{Aeq} levels for Newport Wetlands is below the criteria of 55 dB and therefore are predicted to have low impact potential on the acoustic environment. For River Usk, the calculated L_{Aeq} level is slightly above the criteria, indicating the potential for a moderate impact based on the criteria set in Table 16.

When looking at the L_{AFmax} values, the calculated noise levels for the two ecological receptors indicate the potential for a moderate impact based of the criteria stated in Table 16. However, it should be noted that the predicted L_{AFmax} levels for both SSSI areas are below the measured L_{AFmax} values obtained during the noise survey and are therefore unlikely to have a significant impact on the ecological environment.

Once a detailed construction plan is in place, it is recommended that a Construction Noise and Vibration Management Plan is put in place and that all noise control measures and Best Practicable Means are implemented across the project to ensure minimal impact.

5.2 Operational Noise Assessment

5.2.1 Assessment at residential receptor

5.2.1.1. Acoustic Feature Corrections

Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific noise levels and the background noise level. The calculated specific noise level should therefore be modified in accordance with the following guidance as outlined in BS 4142:2014+A1 2019. Due to the type of assessment, the subjective method has been used to determine the type and level of acoustic feature corrections applied to each source.

BS 4142 offers the following guidance on the subjective assessment of acoustic feature corrections.

"Tonality

For sound ranging from not tonal to predominantly 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.

Impulsivity

A correction of up to + 9 dB 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 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time… If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other Sound Characteristics

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."

It is considered that the Proposed Development would emit noise with characteristics readily distinctive against the residual acoustic environment. As such, no character corrections have been applied within this assessment

5.2.1.2. Assessment Results

Table 19 below provides the predicted results for operational phase of the Proposed Development.

The specific noise level results are also provided in graphical form as a contour noise map in Figures C.5, C.6 and C.7.

NSR	Time Period	Prediction Results		Background Noise Level Criteria (dB $L_{A90,T}$)	Excess of Rating over Background Level (dB)
		Specific Noise Level dB $L_{Aeq,Tr}$	Rating Level dB $L_{Ar,Tr}$		
R1	Daytime	34	34	42	-8
	Night-time	33	33	39	-6

Table 19 Operational Predicted Results (Residential Receptor)

The results provided in Table 19 indicate that the predicted rating levels from the operational activities of the Proposed Development are below the background noise level (dB $L_{A90,T}$) during the daytime and night-time at R1. This is an indication of the specific source having a low impact at the receptor, depending on the context.

5.2.1.3. Context Discussion

The above assessment details the results of the preliminary numerical assessment of noise levels at the nearest noise sensitive receptors. It is important to note that the numerical assessment of impact is influenced by the context of the proposals including the surrounding environment and the operating characteristics.

Following the initial estimate of impact, the following contextual considerations have been identified:

- The existing site is used for storing aggregate and operates using similar mobile plant items and activities during both the day and night-time (albeit at a lesser frequency).
- Specific levels are lower than the representative background noise levels across daytime and night-time.
- Both historically and up until the present day, the site and surrounding area has been subject to industrial activities at Newport Docks.
- The highest calculated specific noise level (34 dB $L_{Aeq,T}$) at the worst affected façade of the identified NSRs falls below the relevant criteria in World Health Organisation and BS8233 guidelines with respect to noise levels in external amenity areas.
- Assuming a 12 dB attenuation from an open window, the internal noise levels would also meet the relevant criteria in BS8233 guidelines with respect to internal noise levels (dB $L_{Aeq, T}$) during both the daytime and the night-time (dB $L_{Aeq, T}$ and L_{AFmax}).
- When the specific noise levels are compared with the prevailing average ambient noise levels, the specific noise levels are shown to be in the order of 10 dB below measured ambient noise level. This indicates that operational activity would be unlikely to contribute to the ambient noise levels at the residential NSRs.

5.2.1.4. Uncertainty

Uncertainty has been limited where possible through the monitoring methodology and conservative assessment approach. It is considered unlikely that uncertainty would adversely impact the assessment outcomes.

The following measures have been taken to reduce uncertainty:

- Use of monitoring equipment in accordance with section 5 of BS 4142:2014+A1:2019, using Class 1 instrumentation.
- Measurement procedures followed in general accordance with section 6 of BS 4142: 2014+A1: 2019 with all precautions taken to minimize interference whilst maintaining the security of both personnel and monitoring equipment.
- Use of computer noise modelling techniques to calculate noise propagation levels using accurate design layouts and plant noise emission assumptions derived with input from the project team and the client.

Specific noise level propagation has been calculated in accordance with the requirements of ISO 9613-2:1996 which is the widely accepted procedure for the calculation of noise propagation, including favorable wind conditions from source to receiver.

5.2.1.5. Assessment Summary

The results of the assessment, when looked at in context, indicate that the Proposed Development is unlikely to result in significant adverse impacts at the residential receptors.

5.2.2 SSSI Assessment

Table 20 below provides the predicted results for both Phase One and Phase Two of the Project at nearby SSSI receptors.

NSR	Prediction Results (dB)	
	$L_{Aeq, T}$	L_{AFmax}
R2	47	66
R3	31	47

Table 20 Operational Predicted Results (Ecological Receptors)

Average predicted noise levels during the operational scenario at the ecological receptors range between 33 dB $L_{Aeq, T}$ and 48 dB $L_{Aeq, T}$. Although the applicable criteria for ecological receptors are concerned with the impact of construction related noise, predicted noise levels are considerably below the adopted 55 dB(A) threshold and consequently considered not significant.

Maximum predicted noise levels during the operational scenario at the ecological receptors range between 47 dB and 66 dB L_{AFmax}. The predicted L_{AFmax} for Newport Wetlands is below the adopted 55 dB(A) threshold and consequently considered not significant. Based on an analysis of the measured L_{AFmax} events during the baseline survey, presented in section 3.4.2, the River Usk SSSI area is currently subject to levels (>75 dB L_{AFmax}), well in excess of the predicted L_{AFmax} levels.

Based on the existing habituation of one-off noise events in excess of both the predicted L_{AFmax} levels and the 55 dB L_{AFmax} threshold, it is considered unlikely that the predicted L_{AFmax} levels from the Proposed Development would result in significant effects on the ecological receptors.

6 Mitigation Measures

6.1.1 Construction Phase (Noise)

Despite the low impact predicted during the construction phase, mitigation measures in the form of Best Practicable Means (BPM) should be implemented.

Examples of such measures are presented below:

- During the construction phase, the contractor will apply BPM as defined under Section 72 of the CoPA to minimise noise and vibration impacts.
- Provision of a Construction Environmental Management Plan (CEMP), Construction Noise and Vibration Management Plan (CNVMP) or relevant equivalent.
- Prior consent agreement for any works outside weekday and Saturday core hours, where there is potential for significant adverse effects.
- Contact details for nominated site contact for local residents to deal with complaints and engaging with local residents.
- Selection of quiet and low noise equipment and methodologies.
- Optimal location of acoustic screening, where required to minimise noise adverse effects.
- Optimal location of equipment, where required to minimise noise disturbance at nearby NSRs.
- The provision of acoustic enclosures around static plant, where required to minimise noise adverse effects.
- Use of less intrusive alarms, such as broadband vehicle reversing warnings.

6.1.2 Operational Phases

Due to the low predicted noise from the operational activities at the assessed noise sensitive receptors, no mitigation measures have been proposed.

7 Conclusion

RSK Acoustics Limited (RSKA) has undertaken a noise and vibration assessment for Cemminerals related to a planning permission application for a cement processing facility (Proposed Development) at Newport Docks in Newport, South Wales.

Consultation with the Newport County Council (NCC) included general agreement to the proposed approach to baseline monitoring and the noise and vibration assessment of the Proposed Development.

Due to the large distances between the nearest receptors and the site, a vibration assessment was scoped out.

The noise assessment includes consideration of activities associated with the Proposed Development that have the potential to give rise to adverse impacts. The noise limits or thresholds referred to within the assessment have been derived following review of relevant legislation, policy and technical guidance.

A baseline noise survey, consisting of unattended and attended monitoring, was undertaken at the nearest residential and ecological receptors. The data was used to gain an understanding of the existing acoustic environment and inform the construction and operational noise criteria and assessments.

A noise propagation computer model has been developed to predict noise emissions from the Proposed Development at nearby noise sensitive receptors. Noise source and operational assumptions that inform both the prediction and assessment of noise have been derived following review of available information provided by Cemminerals or following project meetings with Stephenson Halliday.

The construction noise impact assessment is summarised below:

- Due to the unavailability of a detailed construction programme and methodology, a worst-case scenario using hydraulic impact piling has been modelled.
- Construction noise levels are likely to be below the thresholds for significant impacts at all receptors.

A summary of the operational results and contextual considerations that contribute to the overall assessment conclusion is provided below:

- Predicted rating levels from the Proposed Development are below the background noise level (dB $L_{A90, T}$) during both the daytime and the night-time. This is an indication of the specific source having a low impact, depending on the context.
- When compared with the measured ambient noise levels at the residential noise sensitive receptor, predicted noise levels are shown to be around 10 dB below existing ambient noise levels. Therefore, when context is taken into account there impacts are considered to be non-significant.
- Predicted external L_{AFmax} levels are in the order of 55 dB L_{AFmax} (the loudest predicted is 56 dB L_{AFmax}). Based on the measured baseline data, all NSRs are currently subject to levels (>75 dB L_{AFmax}) well in excess of the predicted L_{AFmax} levels.
- Predicted average and maximum levels from the Proposed Development are in line with low impact thresholds for ecological receptors and it is considered unlikely that the Proposed Development would result in significant effects on the ecological receptors.

The Proposed Development is likely to be acceptable in relation to the potential noise impacts identified herein.

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Appendix A - Glossary

Terms	Definitions
Ambient Noise Level $L_{Aeq,\,T}$:dB	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Note: The ambient sound comprises the residual sound and the specific sound when present.
dB (decibel)	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value and the scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Background Sound Level $L_{A90,\,T}$: dB	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.
Rating Level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound.
Residual Sound:	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual Sound Level $L_r = L_{Aeq,T}$: dB	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.
Sound pressure level L_p dB	Sound pressure level is given by the formula $$L\rho = 10\log\left(\frac{\rho}{\rho_0}\right)^2$$ where ρ is the root mean square sound pressure, in pascals (Pa); ρ_0 is the reference sound pressure (20 µPa)
Specific sound source	sound source being assessed.
Specific sound level $L_s = L_{Aeq,Tr}$ dB	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.

Table A 1 Appendix Glossary

Appendix B - Legislation, Policy and Guidance

Legislation

UK Government (1974). The Control of Pollution Act 1974.

Part III of Control of Pollution Act (CoPA) 1974 gives local authorities powers to control construction site noise and vibration. Best Practicable Means (BPM) is defined in Section 72 of CoPA.

UK Government (1990). Environmental Protection Act 1990.

This Act introduced integrated pollution control to prevent pollution arising as a result of emissions to air, land or water. The Act empowers local authorities to address noise pollution, classifying excessive noise as a statutory nuisance.

The Environment (Air Quality and Soundscapes) (Wales) Act 2024

The Act makes provision for improving air quality in Wales; for a national strategy for assessing and managing soundscapes in Wales.

Policy

Planning Policy Wales: Ed. 12, February 2024

The Planning Policy Wales states:

'Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales'.

Technical Advice Note (TAN) 11 Noise: October 1997. CL-01-15 Updates to TAN 11 Noise, Noise Action Plan (2013-18) Commitments

Technical Advice Note (TAN) 11 should be taken into account by local planning authorities in Wales in the preparation of development plans. This document provides guidance on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.

'CL-01-15 Updates to TAN 11 Noise - Noise Action Plan (2013-18) Commitments' includes clarifications on how the amendments/ revision of the supporting legislation and British Standards affect the content of TAN11. This update includes references to the publication of the revised BS 4142:2014 *'Methods for rating and assessing industrial and commercial sound'.*

Annex B *'The Assessment of Noise from Different Sources'* of CL-01-15 includes a section related to industrial and commercial noise sources:

'In light of the introduction of the environmental permitting regime and the updating of British Standards, the existing paragraph B17 should be deleted and replaced with the following: B17. The likelihood of adverse impacts arising from noise of an industrial and/or commercial nature can be assessed, where the application of BS 4142:2014 is appropriate, using the guidance set out in that standard (…)'.

'(…) BS 4142:2014 states that as an initial estimate: "A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context." However, this initial estimate of the impact may need to be modified due to the context, and determining whether this is the case should include consideration of absolute sound levels, the character and level of the residual sound compared to the specific sound, the sensitivity of the receptor, and good building design. Since background sound levels vary throughout a 24-hour period it will usually be necessary to assess the acceptability of sound levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable sound levels within buildings can be found in BS 8233:2014 (…)'.

'Future Wales: the national plan 2040': 2019; updated in 2021

Future Wales is the national development framework for Wales. Policy 31 *'South West Metro' states that '(…) the Welsh Government wishes to see development built in sustainable locations supported by active travel and public transport infrastructure and services to enable people to live active and healthy lives. This includes ensuring levels of air and noise pollution are reduced or at least minimised'.* This would mainly apply to transportation infrastructures.

Noise and Soundscape Action Plan, 2023-2028, Welsh Government

Noise and soundscape action plan is the Welsh Government's central noise policy document. It outlines the Welsh public sector's strategic policy direction in relation to noise and soundscape management for the next 5 years.

Newport Council Replacement Local Development Plan (2021-2036) (Adopted September 2023)

Newport City Council (NCC) has prepared a replacement plan to cover the period 2021 to 2036, which replaced the Local Development Plan (2011-2026). This document "*(…) will provide a vision for Newport for how land uses will be distributed, to achieve sustainable development within Newport over the period 20212036. The RLDP will sit, as the adopted LDP does, within a wider framework of Development Plan documents*"

Preferred Strategy 3 Sustainable Placemaking states "*All new development proposals will be required to make a positive contribution to sustainable places to support the high-quality design, health and well-being of communities"* and with regards to noise says "*Avoiding unacceptable harm to health as a result of land contamination, air quality, noise, light or flooding*" includes considerations to noise:

Guidance

BS 5228-1: 2009+A1:2014 'Code of Practice for noise and vibration control on construction and open sites. Noise'

The two parts of BS 5228 provide guidance on the control of noise and vibration on construction and open sites. BS 5228-1 contains a methodology for predicting construction noise levels taking both stationary and mobile noise sources into consideration within designated construction areas.

Annexe E of BS 5228 provides broad guidance on the significance of construction noise on residential and commercial sensitive receptors. This includes significance based on absolute limit levels and those according to magnitude of change in ambient levels. In terms of absolute limits, Section E.2 recommends that daytime construction noise should not exceed 70 dB(A) in rural & suburban environments and 75 dB(A) in urban environments close to main roads or heavy industry to limit overall impact on receptors. This absolute criterion can be applied to both residential and commercial receptors.

Section E.3 of BS5228 presents two methods of deriving construction noise criteria, based on existing ambient noise levels. The first method looks at the existing ambient noise in combination with threshold values for day, evening and night-time periods, and then prescribes the appropriate value, as shown in Table B.1.

Assessment category and threshold value period	Threshold value in decibels (dB) (LAeq, T)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23.00 – 07.00)	45	50	55
Evening and weekends [D]	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 – 13.00)	65	70	75
NOTE 1 A potential significant effect is indicated if the LAeq,T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total LAeq,T noise level for the period increases by more than 3 dB due to site noise. NOTE 3 Applied to residential receptors only.			
A Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB(A)) are less than these values. B Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as the category A values. C Category C: Threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. D 19.00 – 23.00 weekdays, 13.00-23.00 Saturdays and 07.00 – 23.00 Sundays.			

Table B 1 Example threshold of potential significant effect at dwellings (BS5228 Table E.1)

The second method identifies significance where a 5 dB(A) increase in the ambient noise levels occur, subject to lower cut off values of 65, 55 and 45 dB(A) for each assessment period respectively. For the purpose of this assessment a conservative assumption has been applied and the lower criteria of the two methods have been applied.

In addition to the general construction assessment criteria, Section E.4 of BS 5228 provides thresholds at which consideration to noise insulation should be given. Given the distances and activities involved the likelihood of any of these applying is considered negligible.

BS 4142:2014+A1:2019 'Method for rating and assessing industrial and commercial sound'

BS 4142:2014+A1:2019 provides a method for rating industrial and commercial sound and assessing the resulting impacts upon surrounding receptors. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities. The rating method considers specific acoustic characteristics of the noise source, such as tonality, impulsivity and intermittency.

The impact assessment procedure described in BS 4142:2014+A1:2019 is based on a comparison of rating level from the noise source with the background sound level prevailing at the receptor locations. The assessment of impact and likelihood of complaints is made based on the following differences:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context.
- 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.

Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:

- The absolute level of sound.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
    - Façade insulation treatment.

- Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation.
- Acoustic screening.

BS 8233: 2014 'Guidance on sound insulation and noise reduction for buildings'

Internal Noise Criteria

BS 8233 establishes internal ambient noise levels for dwellings based upon occupancy patterns and derived from World Health Organisation (WHO) '*Guidelines for community noise*'. These are summarised in Table B.2.

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

Table B 2 Summary of internal noise levels criteria

It should be noted that the internal target levels as shown in Table B.2 can be relaxed by 5 dB where the proposed development is considered 'necessary or desirable' and reasonable internal conditions would still be achieved, as per Paragraph 7.7.2 of BS 8233.

External Noise Criteria

BS8233 also provides design criteria for external noise and Paragraph 7.7.3.2 states:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.'

Professional Planning Guidance on Planning and Noise (ProPG)

The ProPG: Planning and Noise guidance document was published by the Association of Noise Consultants (ANC), the Institute of Acoustics (IoA) and the Chartered Institute of Environmental Health (CIEH), together with practitioners from a planning and local authority background, in May 2017.

ProPG encourages the use of good acoustic design as a means to inform the site masterplans and is key to avoiding or reducing to a minimum any adverse effects on any sensitive internal or external spaces. In considering acoustic design, consideration should be given by the developer to the management of noise through a hierarchy of potential mitigation measures which may include:

- Maximising the separation distance between source and receiver.
- Incorporate noise barriers (where applicable) to screen the development site (or individual plots) from significant sources of noise.
- Use existing features to reduce noise propagation across the site.
- Orientate the buildings in a manner which reduces the noise levels within noise sensitive rooms.
- Building envelope design to mitigate the noise to acceptable levels, whilst providing adequate ventilation.

BS 7445-1,-2,-3 'Description and measurement of environmental noise. Guide to quantities and procedures'

The three-part standard (BS) 7445 provides the framework within which environmental noise should be quantified.

BS 7445 does not prescribe the meteorological conditions under which noise measurements should or should not be taken, although it recommends that, to facilitate the comparison of results, measurements should be undertaken under certain weather conditions (wind speed not exceeding 5 ms^{-1}, no strong temperature inversions and no heavy precipitation).

International Standard ISO 9613-2:2024 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'

International Standard: ISO 9613-2: 2024: '*Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation*' enables the prediction of noise levels in the community from sources of known sound emission.

The noise prediction method described in this part of the standard is general and is suitable for a wide range of engineering applications where the noise level outdoors is of interest. The noise source(s) may be moving or stationary and the method considers the following major mechanisms of noise attenuation:

- Geometrical divergence (also known as distance loss or geometric damping);
- Atmospheric absorption.
- Ground effect.
- Reflection from surfaces.
- Screening by obstacles.

The method predicts noise levels under meteorological conditions favourable to noise propagation from the sound source to the receiver, such as downwind propagation, or equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.

The propagation algorithms described in ISO 9613-2 are implemented into the three-dimensional noise modelling software package SoundPLAN v9.1, which has been used to undertake the propagation calculations for this assessment.

Institute of Estuarine and Coastal Studies 'Construction and Waterflow: Defining Sensitivity, Response, Impacts and Guidance' 2009

The IECS 2009 report (Cutts et al., 2009) defines disturbance in the general context as discrete events that disrupt ecosystem, community or population structures or in some way alter resource levels i.e. food and space. It may also influence the survival of individual birds and reduce the function of the site either for roosting or feeding. The report states that disturbance varies in its magnitude, frequency, predictability, spatial distribution and duration, and species vary greatly in their susceptibility to disturbance and this susceptibility is likely to vary with age, season, weather and the degree of previous exposure. The links between visual and audible stimuli are evident throughout the report and it is clear that noise by itself is not necessarily a cause for disturbance if not accompanied by a perceived visual threat.

In its literature review the IECS report cites a Dutch study (Smit and Visser, 1993) that found that reactions to noise from shooting ranges are stronger if sounds are combined with visual disturbance.

The IECS report reviews a 1999 study (Cutts and Allen 1999) into the disturbance of birds in response to flood defence works at Saltend on the Humber estuary.

In a separate series of reports by IECS to the Saltend Cogeneration Company into the effects of piling noise on estuarine birds, the monitoring of noise related disturbance was carried out. Noise levels were predicted across the site and ranged between 55 – 84 dB(A) (no indication is given initially in the report of the noise index used but, in subsequent paragraphs, use is made of the L_{Amax} parameter, with the time response factor not identified – but it is presumed that the Fast time response is inferred).

Effects on the bird population were observed via observations of flight responses and or behavioural changes. With respect to specific noise levels the following response descriptors are given:

- Noise below 50 dB(A) – low;
- Regular noise 50 – 70 dB – low to moderate;
- Irregular noise 50 – 70 dB – moderate;
- Regular piling noise below 70 dB – moderate; and
- Irregular piling noise above 70 dB – moderate to high.

Cutts et al. 2013 using a combination of literature review and field observations linked the likely behavioural responses of waterbirds to typical noise levels that may arise during construction works. They categorised disturbance effects into high, moderate or low and linked these to a range of noise levels, as follows:

High Noise Level Effects

Noise disturbance is typified by regular responses to stimuli with birds moving away from the works to areas which are less disturbed (within noise tolerances). Most birds will show a degree of response to noise stimuli. Birds that remain in the affect area may not forage efficiently and if there are additional pressures on the birds (cold weather, extreme heat etc.) then this may impact upon the survival of individual birds or their ability to breed. For auditory disturbances to qualify as a high level, it must constitute a sudden noise event of over 60 dB (at the bird, not at source) or a more prolonged noise of over 72 dB.

Moderate Noise Level Effects

Moderate noise disturbance is typified as high level noise which has occurred over long periods so that birds become habituated to it or lower level noise which causes some disturbance to birds. This encompasses occasional noise events above 55 dB, regular noise 60 - 72dB and long-term regular noise above 72 dB, where birds have become habituated. There is cross-over in moderate and high level noise thresholds although the lower band can be assumed unless the species is particularly sensitive. Those species that are particularly sensitive are Brent Goose, Curlew and Redshank. Birds that may be more sensitive than average include Shelduck and Bar-tailed Godwit (Smit & Visser, 1993)

Low Noise Level Effects

Low level noise is classed as that which is unlikely to cause response in birds using a fronting intertidal area. As such noises of less than 55 dB at the bird are included in this category. These effects are likely to be masked by background inputs in all but the least disturbed areas and thus would not disturb the birds close by. Noise between 55 – 72 dB in some highly disturbed areas e.g., industrial or urban areas and adjacent to roads, may feature a low level of disturbance provided the noise level was regular as birds will to often habituate to a constant noise level.

A summary of the impact thresholds for bird populations is provided below:

Level	Impact	Effect Level	Noise Level / dB(A)	Type of Noise
1	No impact	Low	Below 50	Regular construction noise

Level	Impact	Effect Level	Noise Level / dB(A)	Type of Noise
2	Behavioral changes (alarm calls, heads up, change in feeding/roosting activity)	Moderate	Equal to or below 70	Piling noise
3	Movement within zone	Moderate to high	Above 70	Piling noise
4	Movement out of zone but remaining on site	High	Above 85	Piling noise
5	Movement off site	High	Not defined	N/A

Table B 3 IECS noise impact criteria

The noise unit in Table B.3 is not defined in the 2009 IECS Report but is likely to refer to the L_{AFmax} which is referenced throughout. The A-weighting network has therefore been adopted to inform the impact thresholds for those ecological receptors.

Natural England, 'A Review of the Effects of Noise on Birds – Version 1' 2018

This guidance note describes the nature of the effects of noise on birds and provides a literature review of present studies and broad measures of mitigation. This includes the application of generic thresholds for potentially harmful noise levels (or increases in noise levels), and measures to help mitigate noise effects on birds.

The document does not prescribe specific noise limits, rather a list of published thresholds for a range of activities, including construction piling, general construction, sporadic events such as shooting ranges and transportation sources. The document references the previously discussed Cutts et al, 2009 document, plus a number of others, all of which present noise thresholds for construction activity of between 55 dB(A) and 84 dB(A) as an indication of behavioural changes from anxiety displays to moderate responses (birds moving away).

Appendix C – Figures

Figure C 1 Noise monitoring positions and proposed site boundary

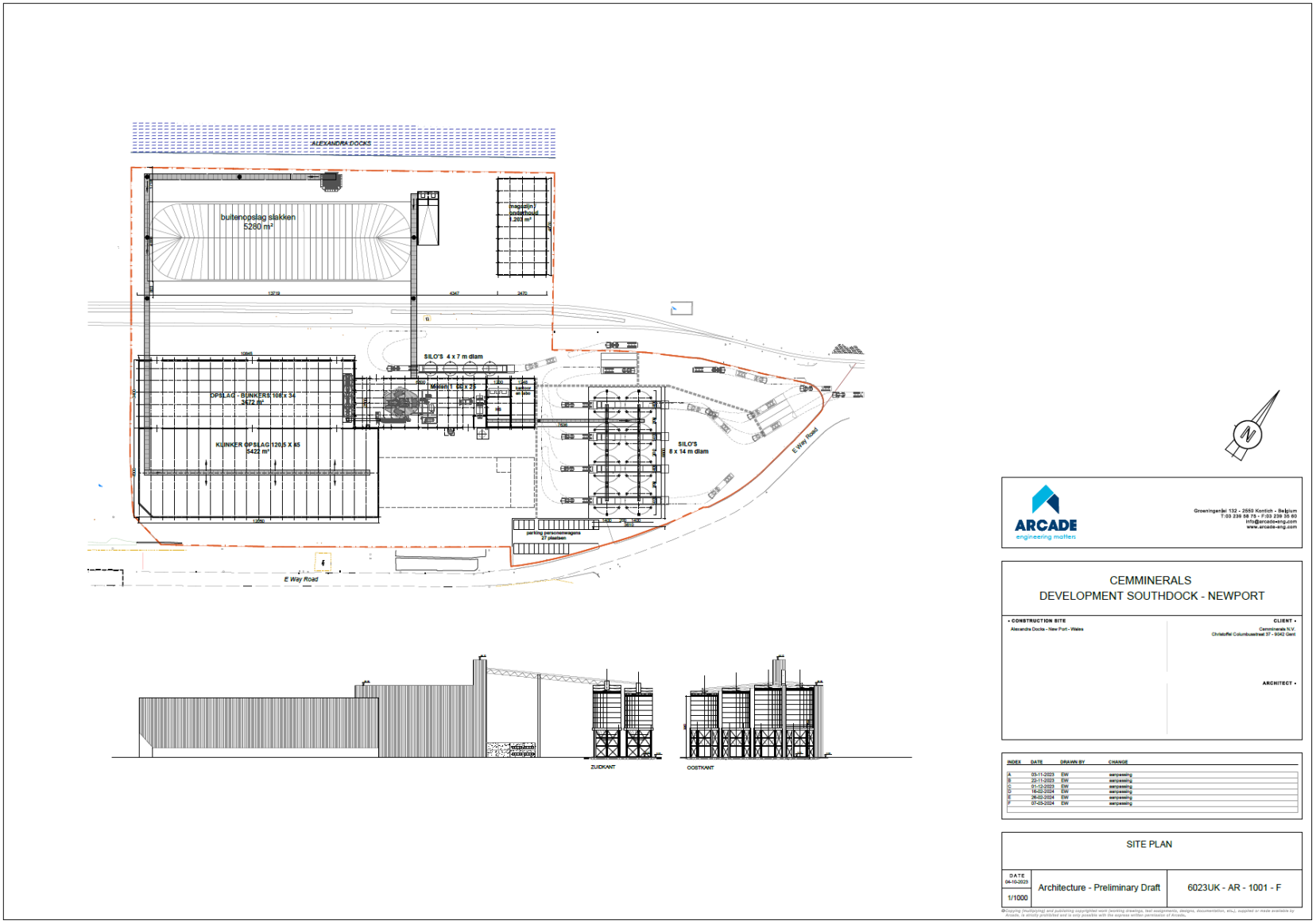

Figure C 2 Proposed site layout

Frequency	Activity Sound Power Level, dB L_{Zw}					
	Mill	Fresh Air Mill Supply	Cement cooler	Dedusting clinker hall	Discharging vessel	Loading truck
12.5 Hz	105.7	104.7	94.2	94.1	-	95.4
16 Hz	113.8	107.6	96.9	95.9	-	103.7
20 Hz	111.9	104.6	97.1	97.5	104.8	97
25 Hz	113	103.6	91.3	98.3	108	93.8
31.5 Hz	109.4	101.5	91.3	105.3	110.1	90.6
40 Hz	100.8	97.7	91.9	103.9	106.7	91.4
50 Hz	99.8	96.7	91.3	102.9	109.5	92.5
63 Hz	95	93.1	89.9	100.8	106.6	88.8
80 Hz	95.1	91.3	87.6	100.4	108.8	89.1
100 Hz	94.1	95.9	85.5	102.9	109.5	91.3
125 Hz	92.4	101	86.3	100.3	104.7	94
160 Hz	92.2	110	94.2	100	104.8	93.6
200 Hz	91.4	101	84.6	102.5	108.8	88.5
250 Hz	89	102.1	83.8	104.6	103.7	95.4
315 Hz	89.3	105	86.9	108.6	101.4	100.6
400 Hz	90.3	99.7	86.9	106.3	99.7	90.2
500 Hz	85.9	95.9	90.6	106.4	102.2	89
630 Hz	83.6	94.8	92.8	105.3	101.7	90.2
800 Hz	81.1	95.7	83.3	100.3	100.3	87.2
1000 Hz	79.2	91.5	84.4	101.3	100.5	87.4
1250 Hz	77.9	89.5	85	97.4	99.6	88.3
1600 Hz	80.9	85.6	80.8	94.2	99.3	87
2000 Hz	79.1	81.8	80.3	93	99.4	83.4
2500 Hz	77.1	77.9	78.2	91.8	99.4	84.4
3150 Hz	74.5	74	72.5	89.4	98	82.6
4000 Hz	72.5	71	70.7	88.2	98.7	78.9
5000 Hz	72.9	67.9	66.6	89.5	95.6	78.8
6350 Hz	63.9	63.4	65.3	87.4	91.4	76.6
8000 Hz	56.8	60.5	63.6	82.7	87.5	74.3
10000 Hz	51.6	57.4	62.7	78.3	81.6	72.5

Table C 1 1/3 octave frequency spectrum of operational activities, dB LZw

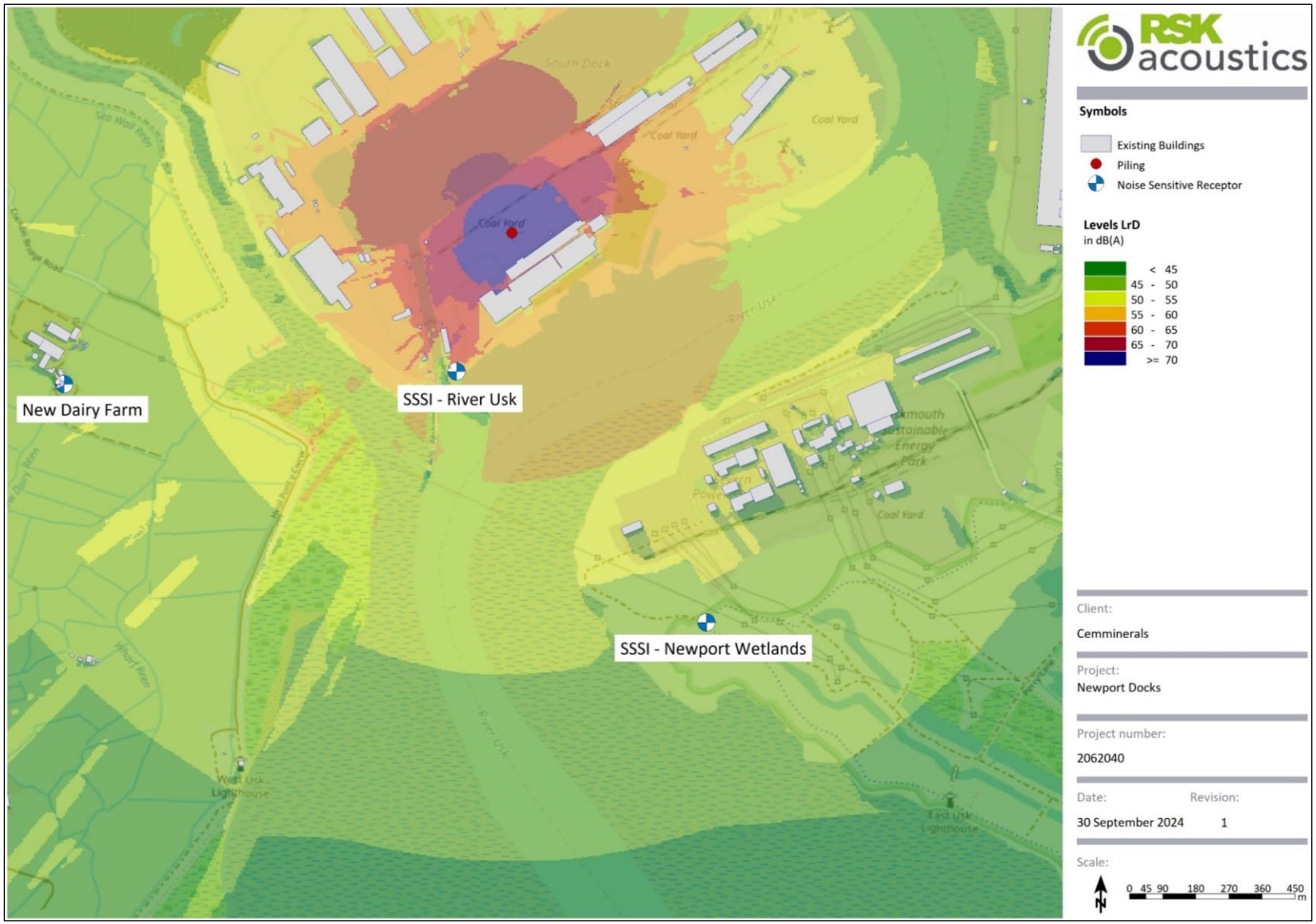

Figure C 3 Noise contour map for construction (piling) works, dB LAeq

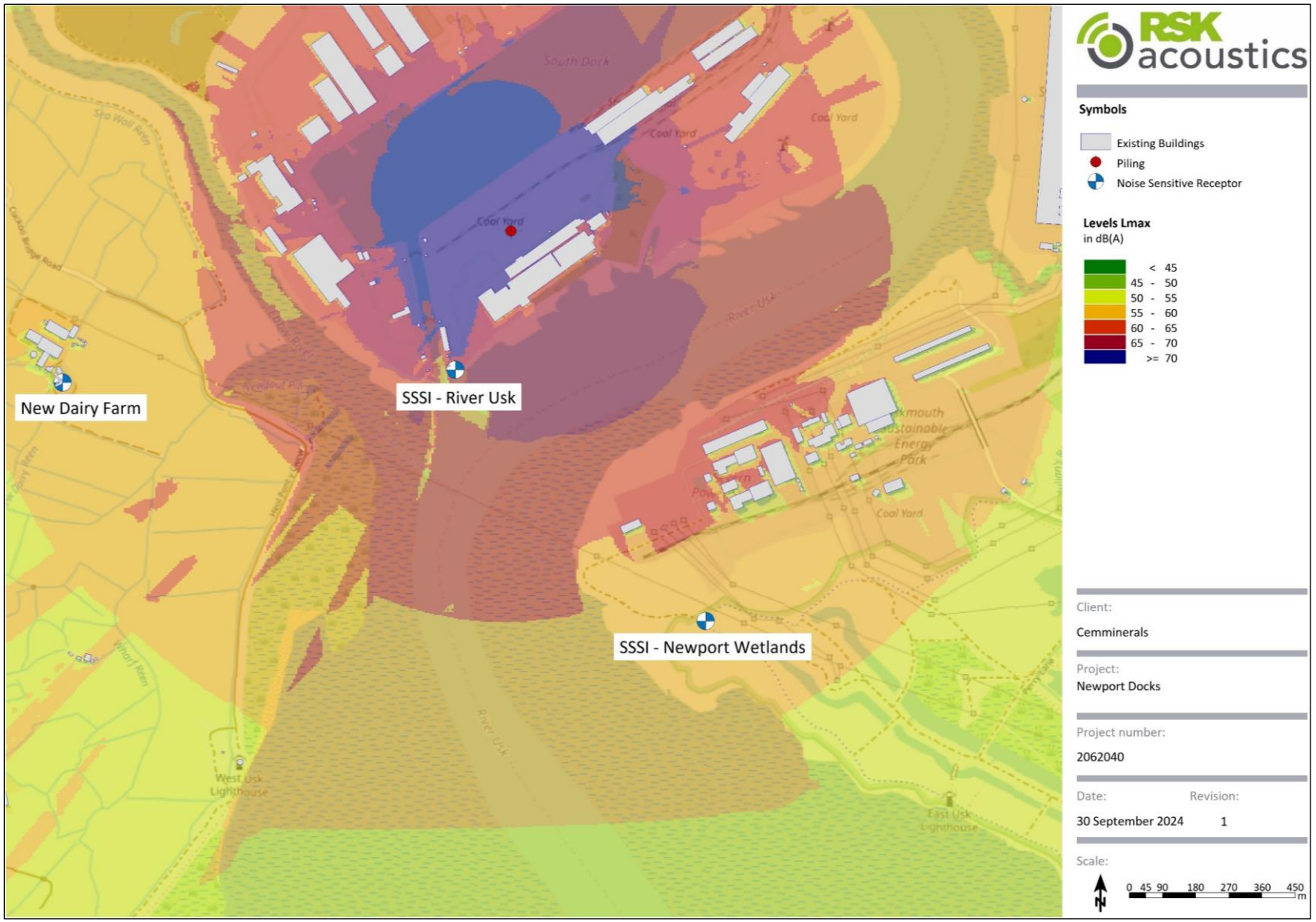

Figure C 4 Noise contour map for construction (piling) works, dB LAFmax

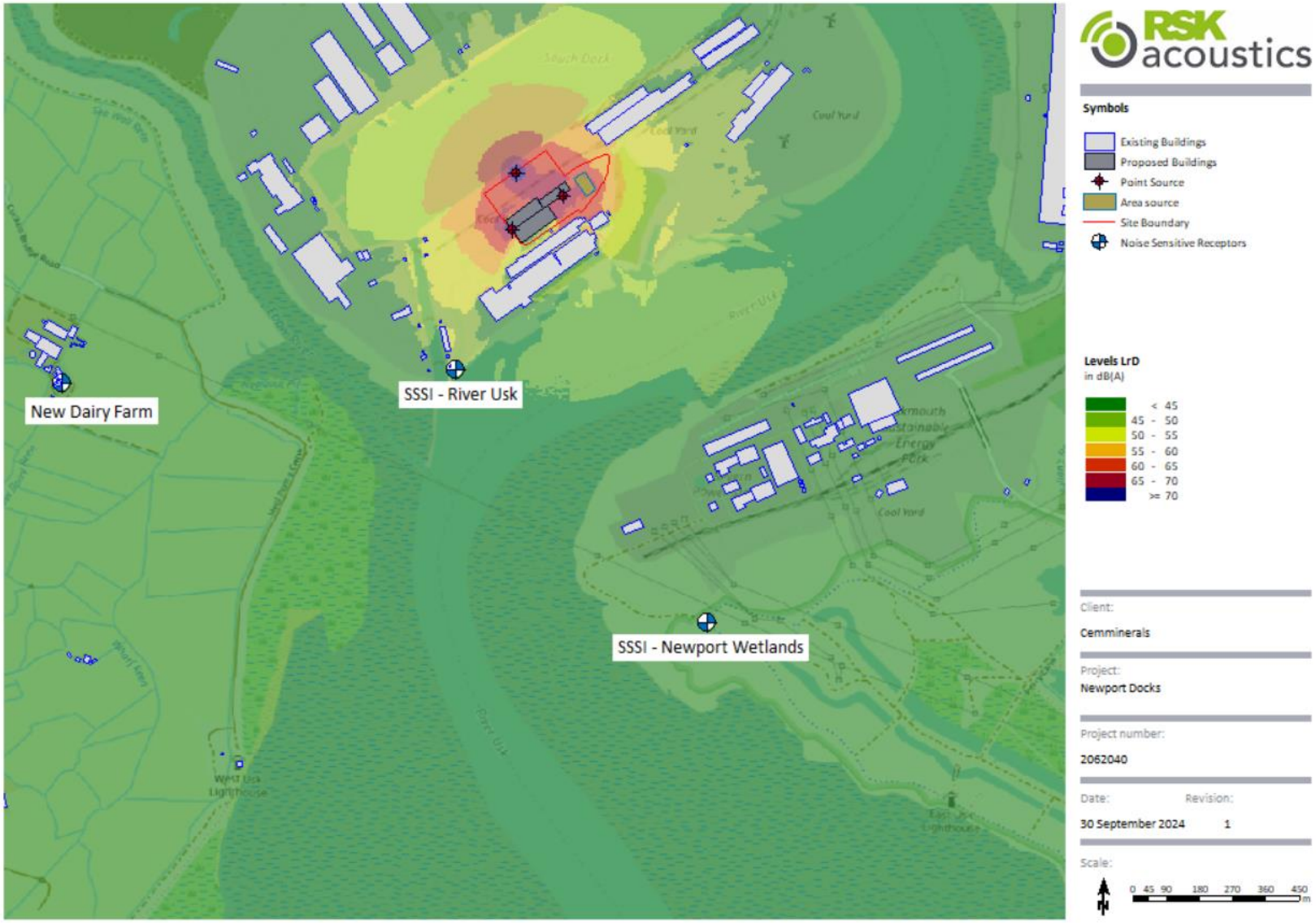

Figure C 5 Noise contour map for operational activities (daytime), dB LAeq

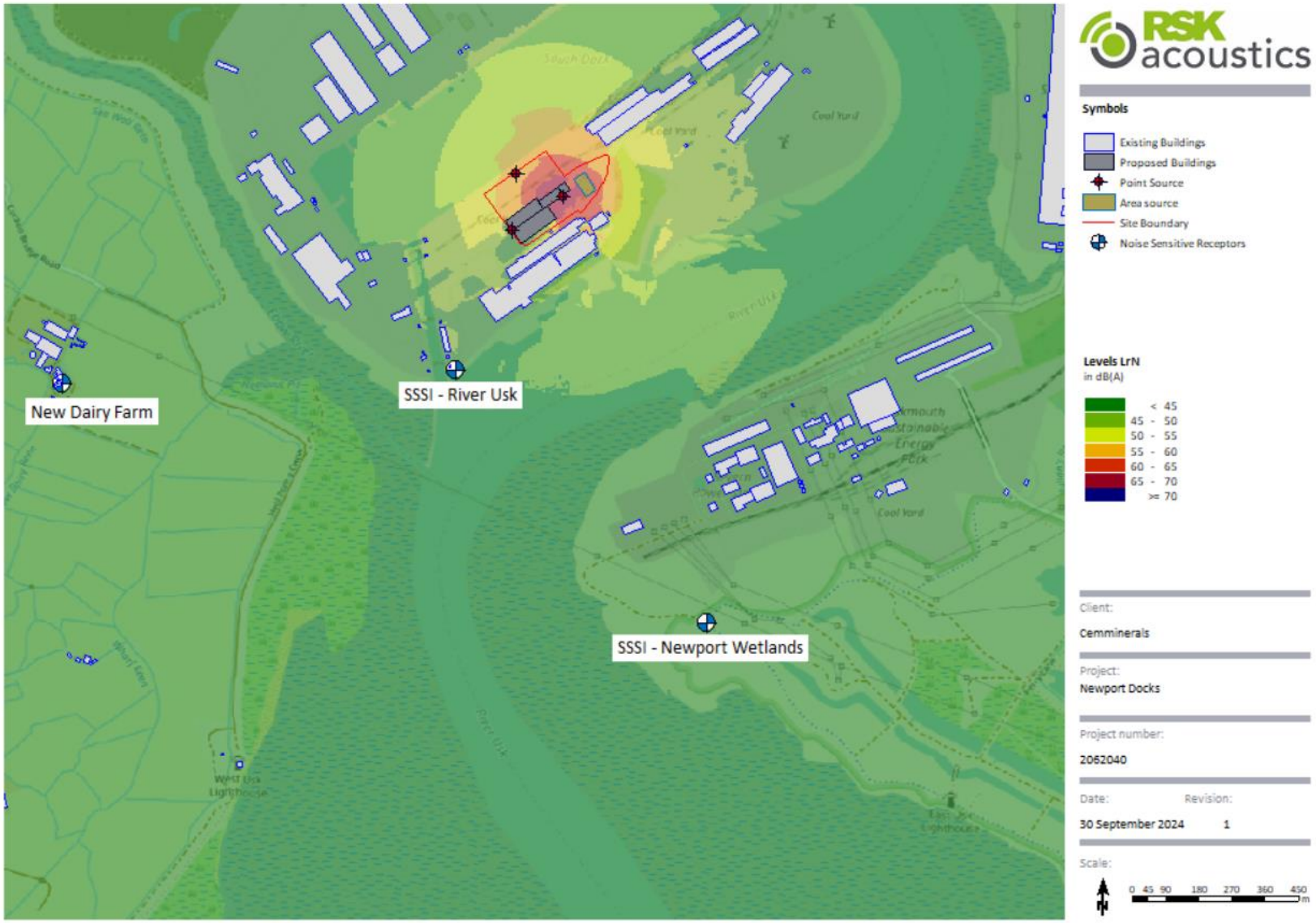

Figure C 6 Noise contour map for operational activities (night-time), dB LAeq

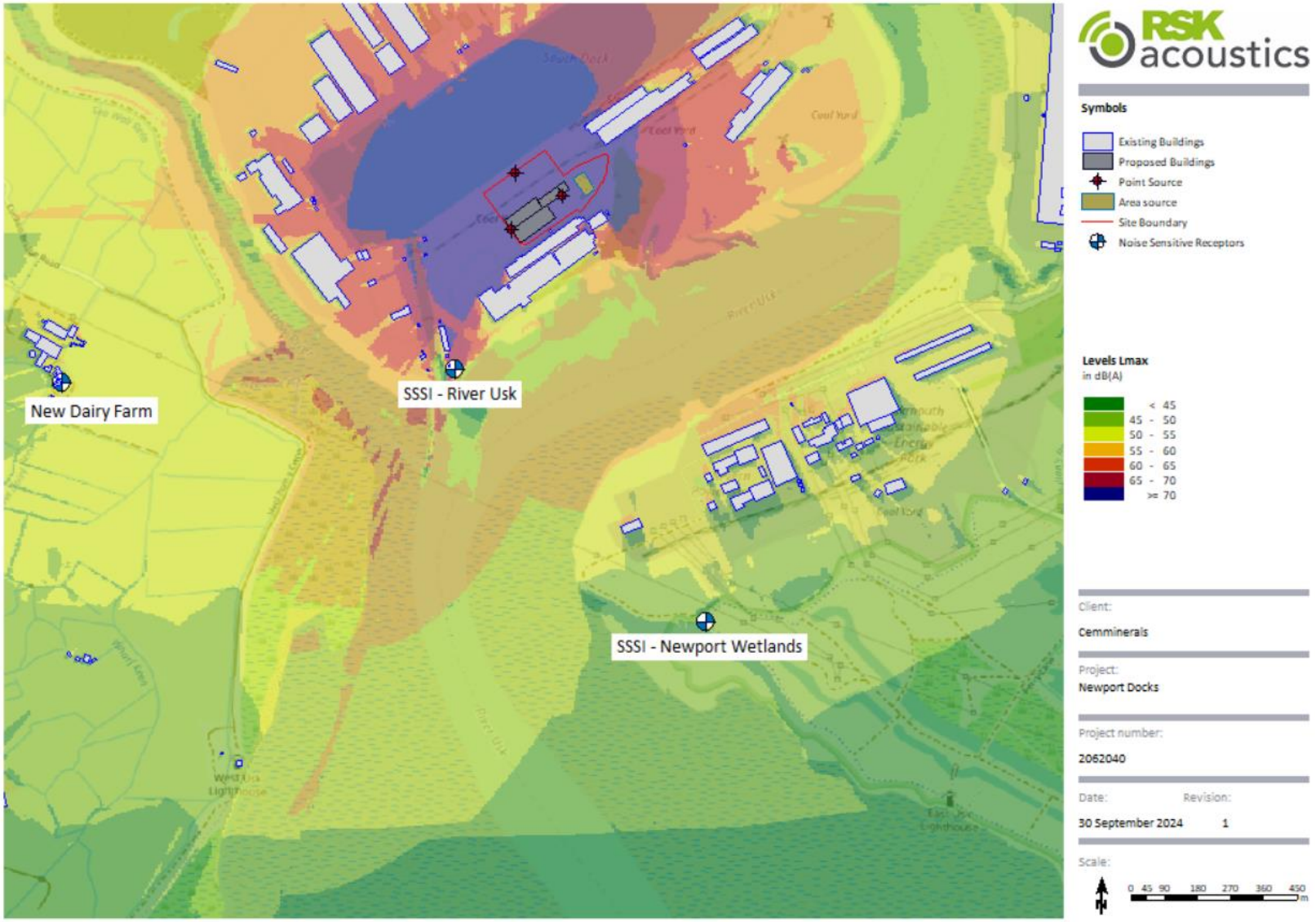

Figure C 7 Noise contour map for operational activities, dB LAFmax

Appendix D – Statistical Analysis

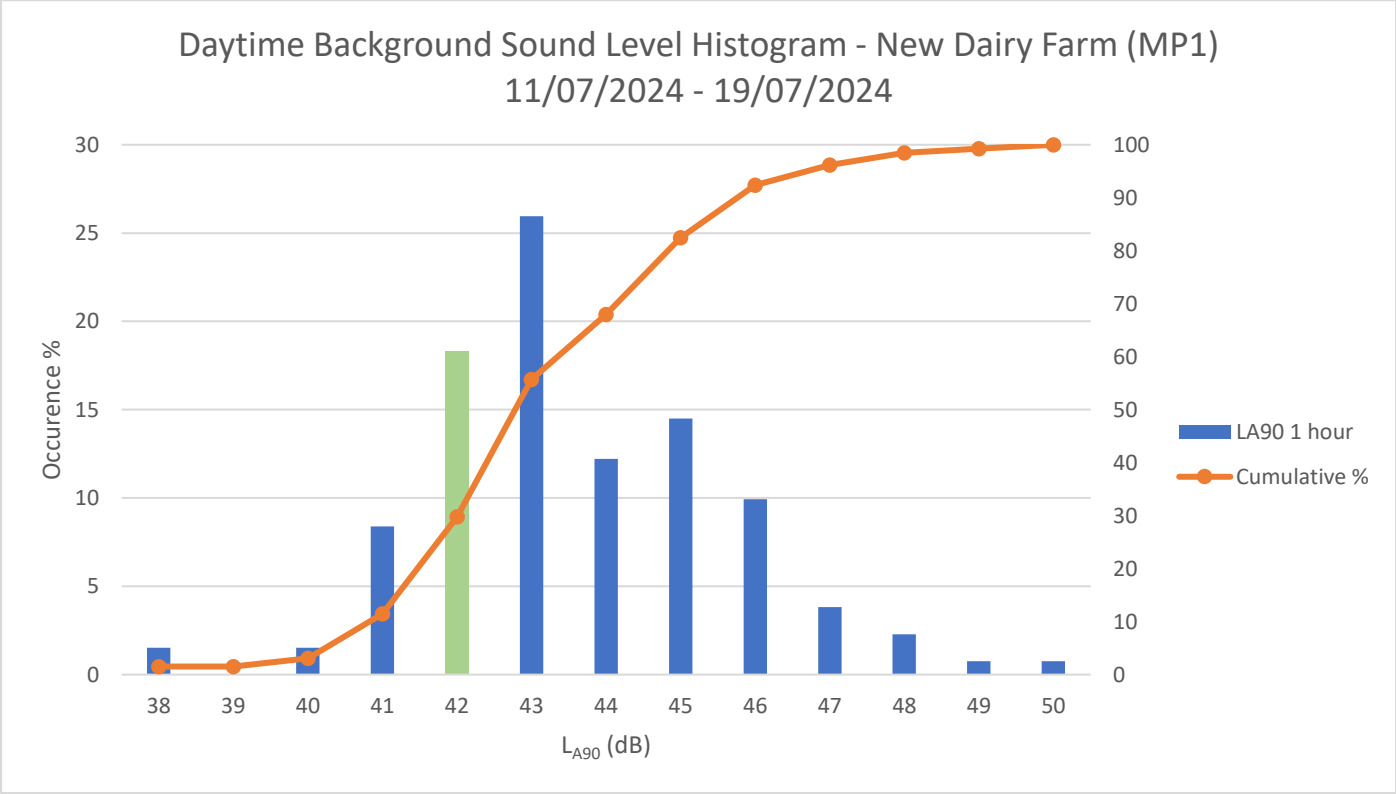

Figure D 1 Representative daytime background noise level at MP1

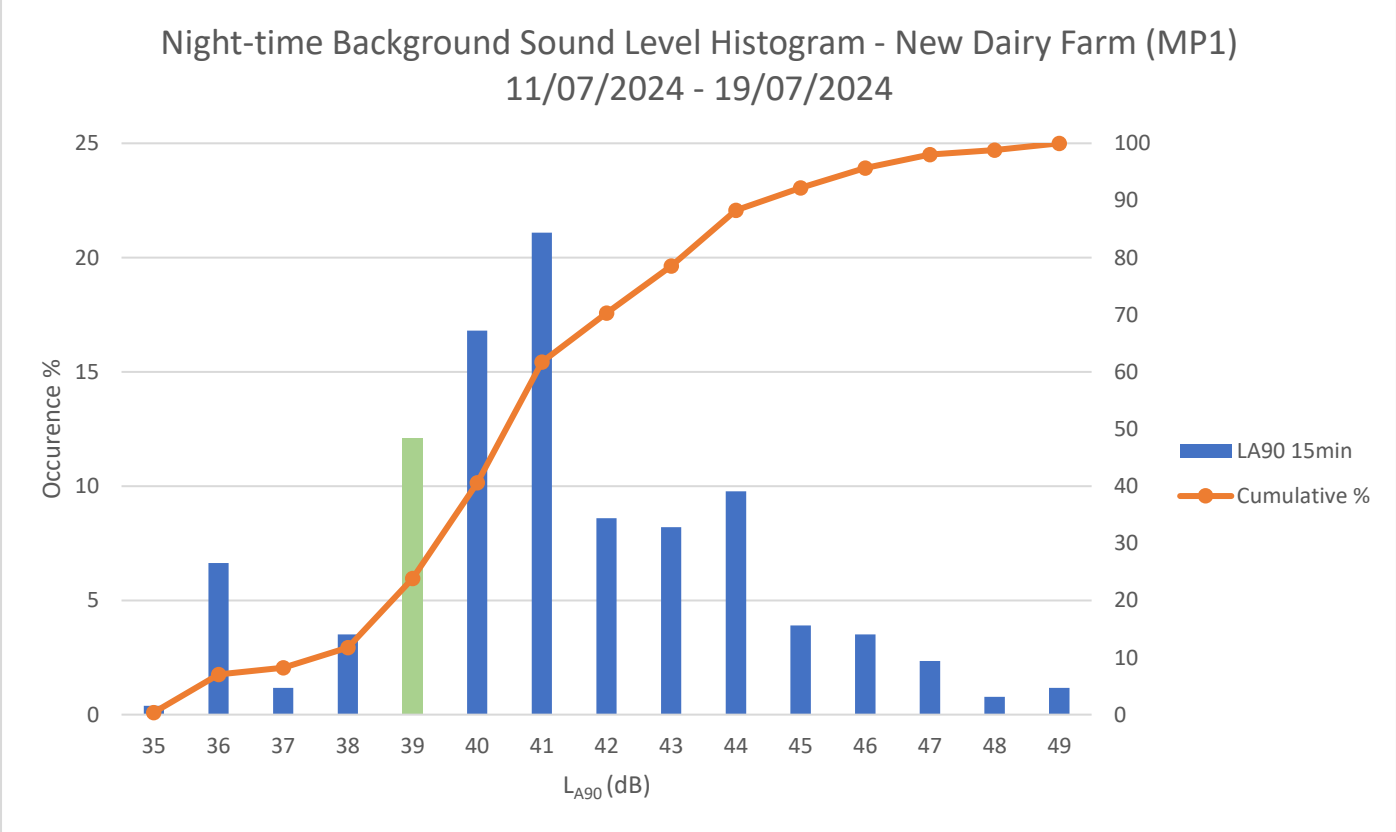

Figure D 2 Representative night-time background noise level at MP1

Appendix E – Monitoring Equipment Installation Photos

Figure E 1 MP1, New Dairy Farm

Figure E 2 MP1, New Dary Farm

Figure E 3 MP2, River Usk SSSI

Figure E 4 MP2, River Usk SSSI

Figure E 5 MP3, Newport Wetlands SSSI

Figure E 6 MP3, Newport Wetlands SSSI

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