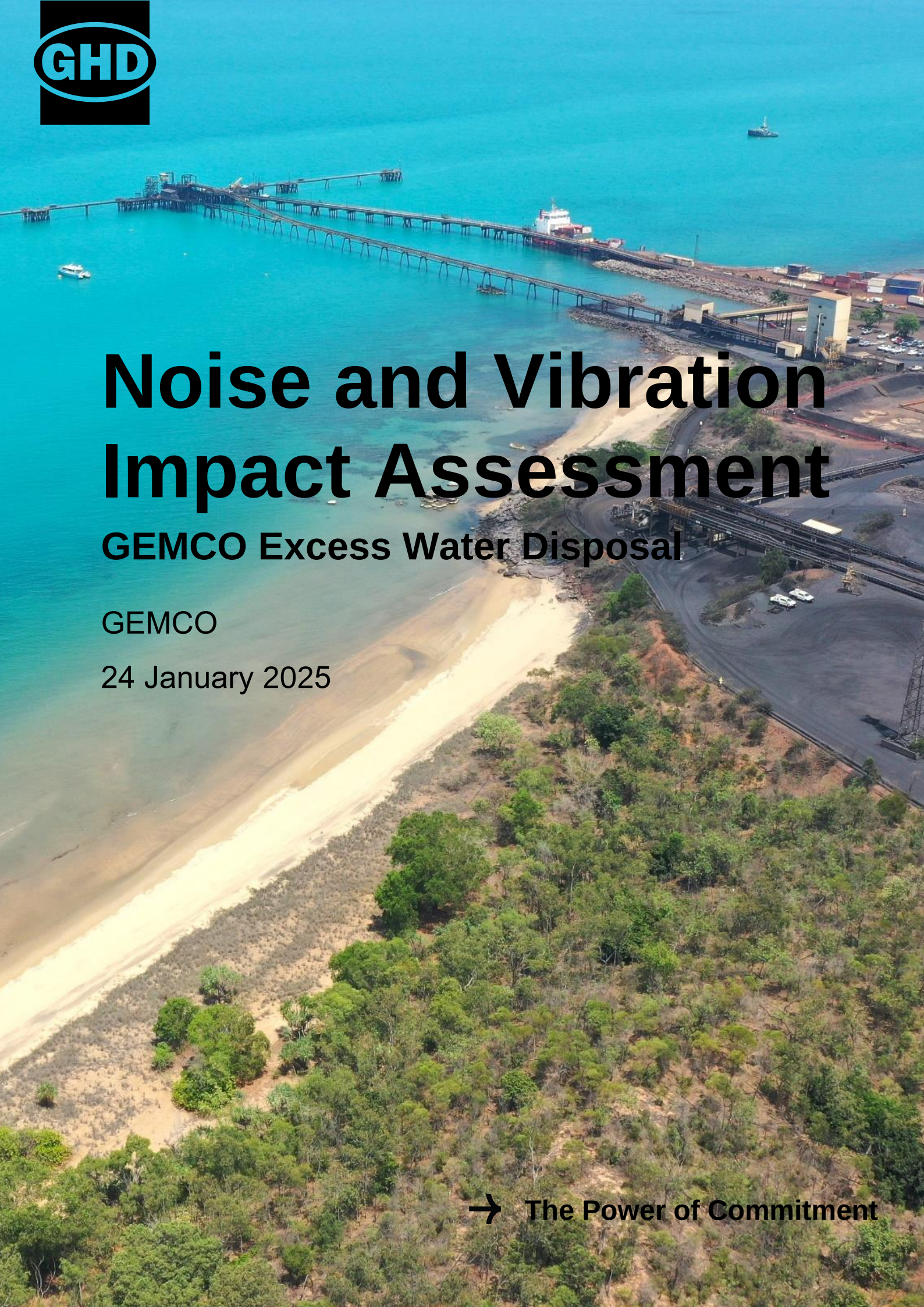

Noise and Vibration Impact Assessment

GEMCO Excess Water Disposal

GEMCO

24 January 2025

→ The Power of Commitment

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Key terms, acronyms and abbreviations

Term	Definition
ACNL	Assigned Construction Noise Level
ALC	Anindilyakwa Land Council
AS	Australian Standard
AVTG	Assessing Vibration: a technical guideline
BS	British Standard
CNVG	Construction Noise and Vibration Guideline
dBA	A-weighted decibel
DIN	German National Organization for Standardisation
EP Act	*Environment Protection Act 2019* (NT)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
Fisheries Act	*Fisheries Act 1988* (NT)
FS	Feasibility Study
GEMCO	Groote Eylandt Mining Company Pty Ltd
GHD	GHD Pty Ltd
GL	Gigalitre
HF	High Frequency
Hz	Hertz
ISO	International Organisation for Standardisation
m	Metre
ML	Mineral Lease
MMP	Mining Management Plan
MNES	Matters of National Environmental Significance
NMFG	Noise Management Framework Guideline
NT	Northern Territory
pa	Per annum
PSANL	Project Specific Assigned Noise Level
PTS	Permanent Threshold Shift
RBL	Rating Background Level
RMS	Root Mean Square
SA Guideline	Underwater Piling and Dredging Noise Guidelines
SEL	Sound Exposure Level
SI	Sirenians
SPL	Sound Pressure Level
SWL	Sound Power Level
the Port	Milner Bay Port Facility
the Project	Excess Water Disposal Project
TPWC Act	*Territory Parks and Wildlife Conservation Act 2000* (NT)

Term	Definition
TTS	Temporary Threshold Shift
VDV	Vibration Dose Value
Water Act	*Water Act 1992* (NT)
WMPC Act	*Waste Management and Pollution Control Act 1998* (NT)

Executive summary

The Project

The proponent is proposing to install and operate a marine outfall pipeline which will run from a quarry on the existing GEMCO mining lease (ML), along the Rowell Highway, through to an ocean outfall located adjacent to their existing port facility at Milner Bay.

This report

This report has been prepared by GHD to assess potential airborne and underwater noise and vibration impacts from the construction and operation of the Project. The Project has the potential to generate noise and vibration emissions during construction of the pipeline and the outfall structures, and during operation of pumps and generators.

Potential impacts of the Project have been assessed with respect to the following guidelines:

– Terrestrial noise – *Northern Territory Noise Management Framework Guideline* (NMFG) (NT EPA , 2018)
– Underwater noise – *Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects* (Southall, et al., 2019) and *Underwater Piling and Dredging Noise Guidelines* (SA Guideline) (South Australia, 2023)

Recommended mitigation and management measures were identified in response to the impact assessment findings.

Existing environment

The sensitive receptors within the study area have been defined and classified in categories based on their noise amenity area, being either ‘rural residential’, ‘suburban residential’, or ‘urban residential’.

In lieu of background noise monitoring, the minimum rating background levels provided in the NMFG have been assumed at the sensitive receptors.

Terrestrial impacts from the proposal during construction

An assessment of potential noise impacts during the construction phase has been undertaken against the NMFG assigned construction noise levels (ACNL) during and outside of the recommended standard hours for construction works.

Based on the predicted noise levels, the ANCLs during and outside of the recommended standard hours at residential receptors are predicted to be exceeded during all construction scenarios. The linear construction scenarios (CS01, CS02 and CS03) are considered to be worst-case, as the duration of exposure to receptors would be at worst 12 days per scenario, and noise levels would decrease as equipment progresses along the pipeline alignment.

Construction vibration levels are unlikely to generate levels above the vibration criteria due to the relatively large distance between the construction footprint and the nearest residential receptors. No adverse human comfort or structural damage impacts are predicted from the construction of the Project.

Underwater impacts from the proposal during construction

An assessment of the potential underwater noise impacts associated with piling and trenching construction works to the identified marine fauna has been undertaken against the noise exposure criteria developed by Southall et al. (2019).

No physiological impacts to the identified marine fauna are anticipated due to the vibratory piling and trenching construction activities. Marine fauna within 10 metres of the source are assumed to move at least 10 metres from the source to avoid relatively high sound exposure levels (SEL).

Impacts from the proposal during operation

A quantitative assessment of the operational noise from the proposed pumps and generators has been undertaken to predict noise levels at several distances from the pumps and generators. At the nearest residential receptors, situated approximately 4 kilometres from the operational noise sources, operational noise levels are predicted to be below 20 dBA and therefore no impacts are anticipated.

Recommended mitigation measures

The following measures are recommended to manage noise and vibration during construction:

– Development of a construction noise and vibration management plan.
– All feasible and reasonable work practices to minimise noise as listed in Table 23.

This report is subject to, and must be read in conjunction with, the limitations, assumptions and qualifications contained throughout the Report.

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1. Introduction

1.1 Project background

Groote Eylandt Mining Company Pty Ltd (GEMCO) operates an open cut, strip-mining operation, on Groote Eylandt, in the Gulf of Carpentaria in Northern Territory (NT). The existing operation mines manganese ore by open-cut methods before processing the ore at an on-site facility. Manganese is then transported by road train to GEMCO's Milner Bay Port Facility (the Port) (Figure 1).

To access the manganese ore, existing vegetation is cleared, topsoil and overburden is removed, forming mine pits (quarries). As mining intersects aquifers and due to rainfall and runoff in some areas, water naturally collects within the quarries. The water is extracted, and a portion is typically used during operations with surplus water transferred between quarries and released to bushland in accordance with the existing Mining Management Plan (MMP).

Deeper mining has resulted in greater groundwater intrusion within the quarries while progression of mining towards the coast has resulted in an increase in salinity within quarry water in some areas. Mine models indicate dewatering volumes could reach up to 100 gigalitres (GL) per annum (pa) in the near future. To address this increase in quantity and salinity, a marine outfall project (the Excess Water Disposal project (herein the Project)) is being evaluated to allow the discharge of up to 80GL pa of water from the quarries.

GEMCO is currently in the Feasibility Stage (FS) of the Project, which will include pipeline (approximately 12 km length of terrestrial pipeline and 600 m length of underwater pipeline, which includes 200-300 m buried through the surf zone) and pumping infrastructure from an existing northern quarry to a discharge point at the Port. The pipeline is planned to traverse adjacent to the Rowell Highway (road train haul route; Figure 1) and utilise areas of existing or historical disturbance as far as practical. A referral under the *Environment Protection Act 2019* (NT) (EP Act) has been prepared to assess the potential impacts of the Project.

1.2 Purpose of this report

This noise and vibration impact assessment report has been prepared to support the assessment of the Project impacts and forms part of the referral documentation. This report has been prepared by GHD to assess potential airborne and underwater noise impacts from the construction and operation of the Project. The Project has the potential to generate noise emissions during construction of the pipeline and the outfall structures, and during operation of pumps and generators.

1.3 Scope of works

The following scope of works were undertaken for this assessment:

Terrestrial noise

- Review recent aerial photography of the study area to identify potential noise and vibration sensitive receptors for assessment purposes
- Development of assigned construction noise levels and project specific assigned noise levels based on the minimum rating background noise levels in lieu of background noise monitoring
- Establishment of noise modelling scenarios based on the construction methodology, equipment use and location of construction activities
- Assessment of construction noise levels based on modelling undertaken in SoundPLAN
- Assessment of potential vibration impacts using safe working distances
- Identification of reasonable and feasible construction noise and vibration management levels where impacts are identified.

Underwater noise

- A qualitative description of the existing marine environment with respect to noise
- The identification of the marine fauna within the study area
- Assessment of the potential underwater noise impacts associated with piling and trenching construction works to the identified marine fauna
- Recommendation of measures to mitigate and manage any identified impacts.

1.4 Project spatial boundary

The Project spatial boundary is defined in Table 1.

Table 1 Project spatial boundary

Term	Definition
Project	All aspects of the GEMCO Excess Water Disposal Project (excluding internal movement of water between quarries as covered by the existing approved mine management plan) including construction and operation.
Construction footprint	Area directly impacted by the construction of the Project including both onshore and offshore areas and totalling 25.17 hectares (ha). This has been calculated as 1.84 ha in offshore area and 23.33 ha in the onshore area.

1.5 Limitations

This report: has been prepared by GHD for GEMCO and may only be used and relied on by GEMCO for the purpose agreed between GHD and GEMCO as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than GEMCO arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.6 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by GEMCO and others who provided information to GHD (including Government authorities) which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.6 Assumptions

The following assumptions have been used in preparation of this report:

- Sensitive receptors were identified using aerial photography, land use planning information and publicly available datasets with addresses. These may not include all existing or future receptors in the Construction footprint and pipeline alignment but are considered representative of receptors.
- Underwater sound levels from vibratory sheet piling and dredging have been sourced from *Underwater Piling and Dredging Noise Guidelines* (South Australia, 2023) and similar sound levels are anticipated for the Project.
- Marine fauna closer to the noise sources are assumed to move at least 10 metres from the source to avoid significant Sound Exposure Levels (SELs).

651000 652000 653000 654000 655000 656000 657000 658000 659000 660000

8468000 8467000 8466000 8465000 8464000 8463000 8462000 8461000 8460000 8459000 8458000 8457000

Alyangula township

Milner Bay Port Facility

Malkala community

Proposed pipeline

Rowell Highway

Western leases

NH pumping station

NH2 Pit

GROOTE EYLANDT

Legend

- Road
- Stream
- Proposed pipeline
- Disturbance area
- Special purpose lease
- Lease boundaries

Paper Size ISO A3

0 230 460 690 920

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53

N

GHD

South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Noise and Vibration Impact Assessment Report

Project No. **12624084**
Revision No. **A**
Date **29/11/2024**

Locality plan

FIGURE 1

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Print date: 29 Nov 2024 - 08:10

Data source: GHD: predicted mixing zone (2024); South32: Aerial photos (2023), Pipeline route (2024), GEMCO tenements (2024), Pipeline disturbance footprint (2024); South32/GHD: Special purpose lease (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe

2. Project description

A detailed project description is included in the Environmental Referral Report, a summary of construction and operation activities is included in Section 2.1 and 2.2.

2.1 Construction

2.1.1 Construction methodology

The construction of the pipeline along the alignment is proposed to involve the following:

– Right of way preparation, during which vegetation will be cleared in the immediate vicinity of the proposed pipeline, and the terrain will be graded where necessary in order to provide a level surface for the pipeline installation.
– Pipeline stringing, during which the pipeline sections would be installed along the alignment.
– Pipeline welding, during which the pipeline sections would be welded together to create a continuous pipeline.
– Two pumps and generators at the NH2 quarry would be installed. The pumps would be powered by diesel generators and sit on pontoons.

The ocean interface construction works is proposed to involve the following:

– Preliminary site works, which would include the construction of an access road and pipe laydown area, setting up pipe support rollers, the pipe track, and welding equipment.
– Construction of the pre- break tank and outfall sumps, which would involve the installation of sheet pile walls surrounding the tank construction to minimise water seepage to a manageable level with dewatering pumps.
– The pipeline would be buried from the sump tank out past the surf zone (~200-300m length). An excavator mounted on a barge will be used to dig a trench for the pipeline placement. To minimise constant infilling of this trench due to natural sand movement, a temporary sheet pile walled corridor would be constructed from the sump tank to beyond the extent of the buried pipe using vibratory piling and onshore excavation works. Additionally, tubular steel pipes would be installed using vibratory piling on the outside of the steel sheet corridor for support. Both the sheet pile wall and the supporting steel pipes will be removed following completion of construction.
– Once the pipeline is at the shoreline, it will be launched incrementally with precast collars fitted before entry into the water. The pipeline would remain buoyant on the ocean surface due to the ends being capped and sealed. Once the pipe is fully launched, it will be brought into position and on the correct alignment by a tug. When the alignment is confirmed, the pipeline will be sunk to the seabed. The end of the pipeline would be kept in place by installing two permanent piles using vibratory piling.

2.1.2 Construction scenarios and equipment

Based on the construction methodology, the construction scenarios outlined in Table 2 have been defined for the purpose of assessing the terrestrial noise and vibration impacts during the construction of the Project. Additionally, Table 2 details the considered equipment during each scenario and the associated sound power level (SWL). The SWLs are sourced from the following documents:

– *AS 2436 – 2010 Guide to Noise and Vibration Control on Construction* (Australian Standard, 2010))
– *BS5228,2009 – A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise* (British Standard, 2009))
– *Construction Noise and Vibration Guideline* (TfNSW, 2023).

Table 2 Terrestrial noise construction scenarios and associated SWLs

Construction scenario	Description	Equipment	Number of items of equipment	SWL (dBA)	Source	Modelled SWL per scenario (dBA)[1]
CS01	Clearing and preparation	Grader	1	113	CNVG,2022	118
		Side tipper	2	107	AS2436	
		Dozer	1	116	CNVG,2022	
		Excavator	1	110	CNVG,2022	
		Water truck	1	107	AS2436	
CS02	Stringing of the pipeline	Manitou	2	107	BS5228	110
		Flat-bed trucks	4	107	AS2436	
CS03	Welding the pipeline	Excavator	1	110	CNVG,2022	111
		Welding machine	2	105	AS2436	
CS04	Ocean outfall sheet piling and trenching	Side tipper	4	107	AS2436	119
		Excavator	2	110	CNVG,2022	
		Manitou	1	107	BS5228	
		Vibratory piling rig	2	116	BS5228	
Note 1: The noise modelling has assumed the two loudest items of equipment are operational simultaneously at the closest location between the construction footprint and sensitive receptors.						

2.1.3 Construction hours and duration

The project's standard working hours are from 6 am to 6 pm, 7 days a week, in line with the operating hours of GEMCO Operations, which are permitted under their licence and accepted by the Groote Eylandt community.

While prestart meetings, equipment checks, and risk management activities begin at 6am, practical construction work typically commences after 7am. However, GEMCO retains the flexibility to carry out works from 6 am, using the following justification:

– The project follows GEMCO Operations' schedule, aligning with community expectations and regulatory norms.
– Any high noise generating activities, such as pile driving, would be scheduled to be conducted within the standard construction hours as defined by the *Northern Territory Noise Management Framework Guideline* (NMFG) (NT EPA , 2018).
– Any noise complaints would be investigated, and appropriate mitigation measures will be implemented to minimise impacts on sensitive receptors.

Considering works could be undertaking in the early morning period, all construction activities have been assessed against the criteria for works outside of the recommended standard hours as detailed in the NMFG (NT EPA , 2018).

Construction is anticipated to occur between March to December 2026, with the ocean outfall works scheduled to occur from June and December 2026. Pipeline construction would progress along the alignment at an anticipated rate of 1.5 km per 6 days. Table 3 details the indicative construction hours for each construction scenario.

Table 3 Construction hours per scenario

Construction scenario	Primary works	Construction hours		Stationary or linear construction works
		Standard	Outside of standard	
CS01	Clearing and preparation	Yes	Mon-Sat: 6 am to 7 am Sun: 6 am to 9 am	Linear
CS02	Stringing of the pipeline	Yes	Mon-Sat: 6 am to 7 am Sun: 6 am to 9 am	Linear
CS03	Welding the pipeline	Yes	Mon-Sat: 6 am to 7 am Sun: 6 am to 9 am	Linear
CS04	Ocean outfall sheet piling and trenching	Yes	Mon-Sat: 6 am to 7 am Sun: 6 am to 9 am	Stationary

2.2 Operation

Noise associated with the operation of the pipeline would be limited to the pumps and generators at the NH2 quarry. An overview of the equipment and estimated SWL is provided in Table 4. The SWL estimates are considered to be conservative and are based on similar equipment. The location of the equipment is shown in Figure 2.

Table 4 Operational equipment overview

Equipment	Number of items	Estimated SWL per item (dBA)
Generator	2	110
Pump	2	100

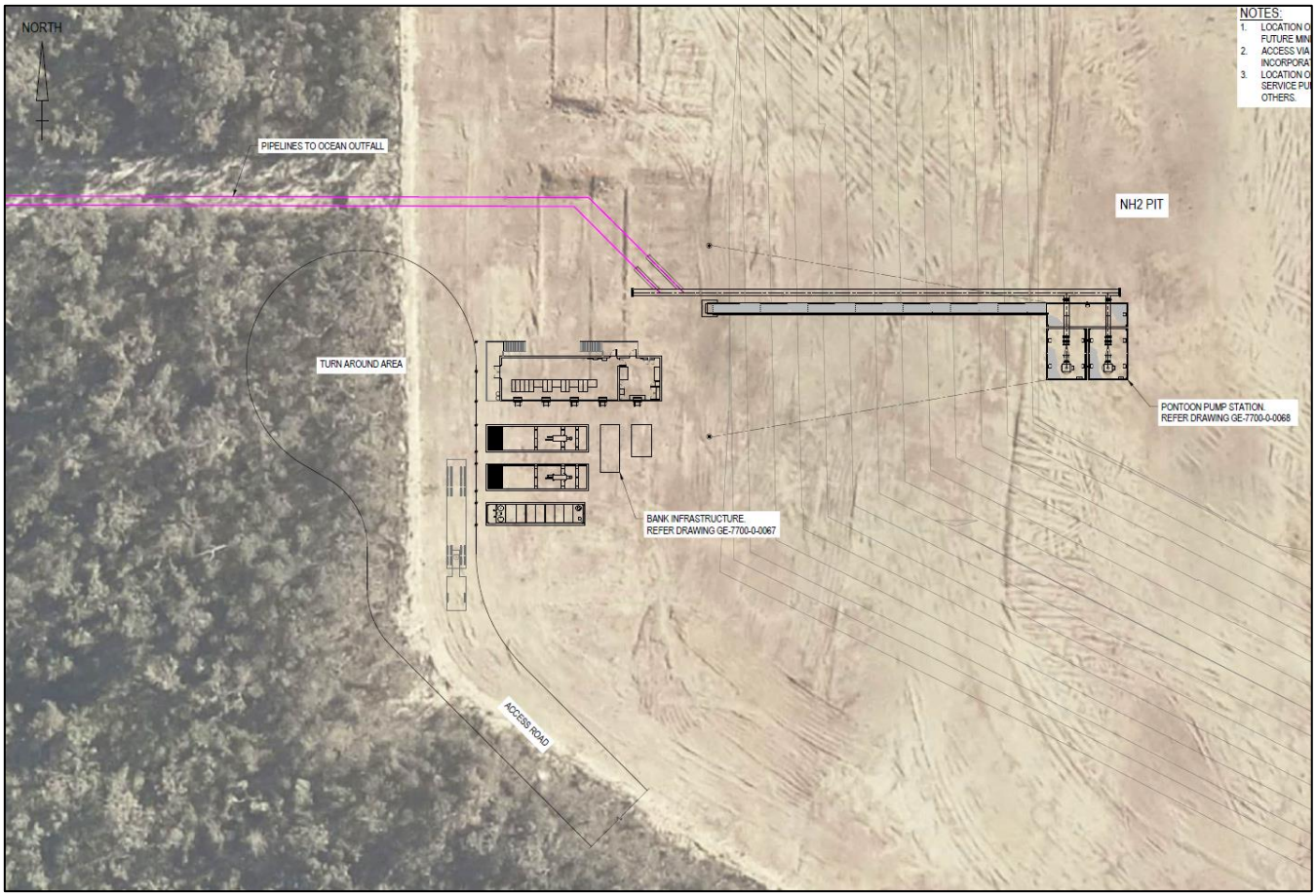

Figure 2 Pump station and generator location at NH2

3. Existing environment

3.1 Terrestrial sensitive receptors and land uses

Noise sensitive receptors are defined based on the type of occupancy and the activities performed within the land parcel in the NMFG. The receptors are classified within the following categories:

– Residential premises
– Hotels, motel, caretakers' quarters, holiday accommodation, permanent resident caravan parks
– School classrooms
– Hospitals wards
– Places of worship
– Passive and active recreation areas
– Commercial premises
– Industrial premises

Sensitive receptors within the study area have been identified and are shown in Figure 3, along with the corresponding receptor categories. The study area encompasses a 2.5-kilometre buffer area surrounding the construction footprint. Noise impacts at receptors beyond this distance are unlikely due to the distance to the construction works.

The NMFG requires residential receptors to be categorised based on their noise amenity area, being either 'rural residential', 'suburban residential', or 'urban residential'. The classification of residential receptors is described in Table 3.6 of the NMFG and considers the planning zone, the typical existing background noise levels and the composition of the acoustic environment.

The residential receptors within the study area have been identified as follows:

1. Residential receptors situated in Alyangula are zoned as 'urban residential' and have therefore been categorised as such.
2. The residential receptors situated along the Rowell Highway in Malkala are zoned as a 'remote community'. Considering no major noise sources are situated nearby, these receptors have been categorised as 'rural residential'.
3. Residential receptors in Angurugu - these receptors are situated more than 4 kilometres from the Construction footprint. These receptors have not been considered in the assessment due to the large distance, as noise and vibration impacts from the construction would be negligible. However, as these receptors are situated closest to the operational noise sources, a qualitative assessment was undertaken to estimate operational noise levels at these receptors.

Additionally, several commercial, active recreational and industrial receptors have been identified within the study area.

3.2 Noise environment

The existing noise environment is influenced by both mining operations and the nearby highway. Heavy machinery and truck traffic are likely to contribute to the existing noise environment, especially during peak times.

No background noise monitoring was undertaken as part of the Project. The minimum rating background noise levels (RBLs) have been assumed at the sensitive receptors and are provided in

Table 5. These minimum RBLS are outlined in Table 3.4 of the NMFG for the day, evening and night periods and are considered conservative as these result in the most stringent noise criteria for the Project.

Table 5 Minimum RBLs

Time of day	Minimum assumed RBL, dBA
Day (7 am to 6 pm on Monday to Saturday or 8 am to 6 pm on Sundays)	35
Evening (6 pm to 10 pm)	30
Night (remaining periods)	30

3.3 Marine sensitive receptors

Southall et al. (2019) developed noise exposure criteria for a variety of marine mammals hearing-groups for impulsive and continuous noise sources. The Marine Ecology Assessment (GHD, 2024) has established the following functional hearing groups in the study area:

– High-frequency cetaceans (various species of dolphins)
– Sirenians (dugong)
– Fishes (various species of pipefish, seahorses, sawfish, sharks and manta rays) and marine turtles (various species)

Alyangula township

Milner Bay Port Facility

Proposed ocean outfall

Malkala community

NH pumping station

NH2 Pit

Angurugu Creek

Angurugu township

Legend

Receptor categories

- Urban residential
- Active recreation
- Commercial
- Industrial
- Rural residential
- Stream
- Road
- Proposed pipeline
- Study area

Paper Size ISO A3

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53

N

GHD

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Noise and Vibration Impact Assessment Report

Identified sensitive receptors within the study area

Project No. **12624084**
Revision No. **A**
Date **13/09/2024**

FIGURE 3

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Print date: 13 Sep 2024 - 08:21

Data source: GHD: sensitive receptors, study area (2024); South32: Pipeline route (2024), GEMCO tenements (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe

4. Legislation and policy context

4.1 Terrestrial noise

4.1.1 Government plans, policies and guidelines

The terrestrial noise and vibration impact assessment was prepared with reference to the following: :

– *Waste Management and Pollution Control Act 1998* (NT) (WMPC Act) (NT, 1998)
– *Northern Territory Noise Management Framework Guideline* (NMFG) (NT EPA , 2018)

4.1.1.1 Waste Management and Pollution Control Act

The WMPC Act provides the main legal framework and basis for managing unacceptable, offensive noise in the NT. The WMPC Act contains obligations on all persons to prevent noise pollution and includes general offences and regulatory tools that may be utilised to effect compliance.

4.1.1.2 Northern Territory Noise Management Framework Guideline

As the WMPC Act does not provide guidance on specific noise criteria, the NMFG is used to determine the project-specific noise criteria. The NMFG recommends assigned noise levels for various types of noise in the NT.

4.1.2 Construction noise criteria

4.1.2.1 Construction hours

Construction noise management levels for the Project are based on the NMFG. Recommended standard hours of work are as follows:

– Monday to Saturday: 7 am to 7 pm
– Sundays or public holidays: 9 am to 6 pm

Construction activities undertaken outside the recommended standard hours of work would incur a regulatory response in accordance with section 2.2.4 of the NMFG. However, the guideline does acknowledge five categories of work that may be undertaken outside the recommended standard hours:

1. The delivery of oversized plant or structures
2. Emergency work to avoid the loss of life, damage to property or to prevent environmental harm
3. Maintenance and repair of public infrastructure
4. Public infrastructure works that shorten the length of the Project and are supported by the affected community
5. Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours

Categories 1, 2 and 5 are applicable to the project. Works outside of the recommended standard hours could be undertaken where no noise impacts are identified and would be undertaking within the approved and accepted operational working hours.

4.1.2.2 Assigned construction noise levels

Assigned construction noise levels (ACNL) for residential premises and other sensitive land uses are provided in Table 3.8 and Table 3.9 of the NMFG. The method to determine the ACNL for residential receptors is outlined in Table 6.

Table 6 Assigned construction noise levels for residential receptors

Time of day	Assigned construction noise level ($L_{Aeq,15min}$)	Application notes
Recommended standard hours	Noise affected: RBL + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. – Where the predicted or measured $L_{Aeq,15\ min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level – The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
Outside recommended standard hours	Noise affected: RBL + 5 dBA	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable measures have been applied and noise is more than 5 dBA above the noise affected level, the proponent should consult with the community.

ACNLs for non-residential receptors are fixed target levels as prescribed in the NMFG. The ACNLs for non-residential receptors apply when the land use is occupied and in use.

The adopted ACNLs for the Project are provided in Table 7.

Table 7 ACNLs for sensitive receptors

Receptor category	Standard construction hours ($L_{Aeq,15min}$, dBA)	Outside standard construction hours ($L_{Aeq,15min}$, dBA)		
		Day	Evening	Night
Residential	45	40	35	35
Active recreation	65 (when in use)			
Commercial	70 (when in use)			
Industrial	75 (when in use)			

4.1.3 Construction vibration criteria

4.1.3.1 Human comfort

The NMFG provides recommended assigned levels for continuous, impulsive and intermittent vibration based on *Assessing Vibration: A Technical Guideline* (DEC, 2006). The acceptable values for continuous and impulsive vibration (1-80 Hz) are provided in Table 8 for sensitive receptors. Typically, vibration intensive activities generate ground vibration of an intermittent nature. Intermittent vibration is assessed using the vibration dose value (VDV). Acceptable values of vibration dose are presented in Table 9 for sensitive receptors.

Table 8 Preferred and max weighted rms values for continuous and impulsive acceleration 1-80 Hz

Location	Assessment period[1]	Preferred values (m/s^2)		Maximum values (m/s^2)	
		z- axis	x- and y-axes	z- axis	x- and y-axes
Continuous vibration					
Critical areas[2]	Day or nighttime	0.0050	0.0036	0.010	0.0072
Residences	Day time	0.010	0.0071	0.020	0.0014
	Nighttime	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or nighttime	0.020	0.014	0.040	0.028
Workshops	Day or nighttime	0.04	0.029	0.080	0.058

Location	Assessment period[1]	Preferred values (m/s^2)		Maximum values (m/s^2)	
		z- axis	x- and y-axes	z- axis	x- and y-axes
Impulsive vibration					
Critical areas[2]	Day or nighttime	0.0050	0.0036	0.010	0.0072
Residences	Day time	0.30	0.21	0.60	0.42
	Nighttime	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day or nighttime	0.64	0.46	1.28	0.92
Workshops	Day or nighttime	0.64	0.46	1.28	0.92
Note 1: Day is 7.00 am to 10.00 pm and night is 10.00 pm to 7.00 am. Note 2: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.					

Table 9 Human comfort intermittent vibration limits (VDV)

Location	Day[1] (m/s$^{1.75}$)		Night[1] (m/s$^{1.75}$)	
	Preferred value	Maximum value	Preferred value	Maximum value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60
Note 1: Day is 7.00 am to 10.00 pm and night is 10.00 pm to 7.00 am. Note 2: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.				

4.1.3.2 Structural damage

The NMFG references the use of *BS 7385-1:1990 – Evaluation and measurement of vibration in buildings* (British Standards, 1993) to assess vibration induced damage to standard structures or building contents and *DIN 4150-3: Structural vibration – Part 3 Effects of vibration on structures* (German Standards, 1999) to assess vibration-induced damage to heritage structures.

Based on BS 7385, the transient vibration guide values for standard structures are presented in Table 10. The guidance values for short-term vibration on structures (including items of heritage) are presented in Table 11 based on DIN 4150. Measured values exceeding those listed Table 11:

"*… does not necessarily lead to damage; should they be significantly exceeded; however further investigations are necessary."*

Table 10 Transient vibration guide values–minimal risk of cosmetic damage

Line	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 – 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Table 11 Guidance values for short-term vibration on structures

Line	Type of structure	Guideline values for velocity v(t)[1] (mm/s)		
		1 – 10 Hz	10 – 50 Hz	50 – 100 Hz[2]
At grade structures (DIN 4150.3:1999)				
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design.	20	20 to 40	40 to 50
2	Dwellings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g. listed buildings under preservation order)	3	3 to 8	8 to 10
Notes: The term v refers to vibration levels in any direction (x, y or z axis). Where frequencies are above 100 Hz the 50 – 100 Hz values may be used as minimum values.				

4.1.4 Operational noise criteria

4.1.4.1 Intrusiveness and amenity noise levels

The NMFG uses the project specific assigned noise level (PSANL) when assessing noise from commercial or industrial premises. If the PSANL is exceeded, noise management or mitigation actions are required to be implemented by the proponent.

Two groups of noise criteria are used to develop the PSANL:

Intrusiveness noise level (Component A): Established based on background noise measurements (rating background level + 5 dB). The minimum intrusiveness noise levels are 40 dBA for the day period and 35 dBA for the evening and night periods, when the RBL is lower than the minimum RBLs. The intrusiveness noise level is only applicable to residential receptors and considers noise emission from a single industrial development.

Amenity noise level (Component B): The NMFG states that the ambient noise level within an area from all industrial noise sources combined should remain below the recommended maximum assigned amenity noise levels specified in Table 3.5 of the Guideline, where feasible and reasonable. The amenity noise level is applicable to both residential and non-residential receptors and is reproduced in Table 12.

The recommended maximum assigned amenity noise level for residential receptors is based on the noise amenity area, being either ‘rural residential’, ‘suburban residential’ or ‘urban residential’.

Table 12 Recommended maximum assigned amenity noise level, $L_{Aeq(period)}$

Receptor type	Noise amenity area	Time of day	Recommended maximum assigned amenity noise level $L_{Aeq,period}$, dBA
Residential	Rural	Day	50 (external)
		Evening	45 (external)
		Night	40 (external)
	Suburban	Day	55 (external)
		Evening	45 (external)
		Night	40 (external)
	Urban	Day	60 (external)
		Evening	50 (external)
		Night	45 (external)
Industrial premises (including airports)	All	When in use	70 (external)

Receptor type	Noise amenity area	Time of day	Recommended maximum assigned amenity noise level $L_{Aeq,period}$, dBA
Commercial premises	All	When in use	65 (external)
Active recreation	All	When in use	55 (external)
Passive recreation	All	When in use	50 (external)
Educational institute	All	Noisiest 1 hour	35 (internal)
Place of worship	All	When in use	40 (internal)

4.1.4.2 Project specific assigned noise level

The determined PSANLs for each receptor type identified within the study area are presented in Table 13.

Table 13 PSANLs recommended in accordance with the NMFG

Receptor type	Time period	Rating Background Level[1] L_{A90}, dBA	Intrusiveness noise level $L_{Aeq,15min}$, dBA	Project amenity noise level[2] $L_{Aeq,15min}$, dBA	PSANL[3] $L_{Aeq,15min}$, dBA
Rural Residential	Day	35	40	48	**40**
	Evening	30	35	43	**35**
	Night	30	35	38	**35**
Urban Residential	Day	35	40	58	**40**
	Evening	30	35	48	**35**
	Night	30	35	43	**35**
Industrial premises	When in use	-	-	70	**70**
Commercial premises	When in use	-	-	65	**65**
Active recreation area	When in use	-	-	55	**55**

Note 1: The minimum RBLs have been adopted in lieu of noise monitoring

Note 2: The project amenity noise levels are determined by subtracting 5 dB from the recommended maximum assigned amenity noise level, and adding a +3 dB correction to convert the $L_{Aeq,period}$ noise levels to $L_{Aeq,15min}$ noise levels

Note 3: Based on the lower of the intrusiveness (where applicable) and the project specific amenity noise levels

4.2 Underwater noise

4.2.1 Legislative context

4.2.1.1 Key legislation

The construction of the sheet pile walled corridor from the sump tank to beyond the extent of the surf zone is anticipated to result in elevated underwater noise levels during the construction of the Project, specifically during the vibratory piling and dredging works associated with the construction of the corridor and installation of the piles. Legislation relevant to underwater noise impacts to marine fauna includes:

***Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)**: The EPBC Act serves as the primary legislation for the Commonwealth Government's oversight of environmental and heritage protection, particularly focusing on matters of national environmental significance (MNES). It aims to conserve MNES by safeguarding threatened species, ecological communities, migratory, marine and other protected species listed under the Act.

***Fisheries Act 1988* (NT)(Fisheries Act)**: The Fisheries Act is purposed primarily to manage the aquatic resources of the NT including an acknowledgement of the rights and interest of Aboriginal people and resources.

A permit will be required for activities that cause shock, sound, or other vibration underwater, which includes construction activities associated with the Project.

Territory Parks and Wildlife Conservation Act 1976 **(NT) (TPWC Act)**: The TPWC Act serves as the principal legislation for nature conservation in the NT, it focuses on the protection of native wildlife, their habitats, and management of protected areas. The Project should aim to avoid significant disturbance or direct/indirect impacts on native marine fauna under the TPWC Act.

Water Act 1992 **(NT) (Water Act)**: Provides for the investigation, allocation, use, control, protection, management, and administration of water resources, including extraction of groundwater, marine discharge management and water pollution. This Act also provides for water allocation plans, drilling licences, bore construction permits, water extraction licenses, waste discharge licenses, fees and charges, and penalties for offences against the Act.

4.2.1.2 Relevant guidelines

Currently, there are no quantitative Commonwealth or Territory guidelines on acceptable exposure levels for fauna to underwater noise generated during construction works in a waterbody. However, the South Australian Department for Infrastructure and Transport has produced the *Underwater Piling and Dredging Noise Guidelines* (South Australia, 2023) (SA Guideline) which provide relevant behavioural and physiological noise criteria for some species of megafauna.

This assessment incorporates findings and guidance from the SA Guideline and the latest research and recommendations in the field i.e.:

– *Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects* (Southall, et al., 2019)
– *Underwater Piling and Dredging Noise Guidelines* (South Australia, 2023).

4.2.1.3 Regulation of shipping noise

Currently, there are no quantitative noise exposure thresholds for the assessment or regulation of marine fauna exposure specific to shipping noise in Australian waters.

4.2.2 Noise exposure criteria

The criteria for continuous sources for the identified functional hearing groups are reproduced in Table 14, where Permanent Threshold Shift (PTS) criteria represent the likelihood of permanent threshold shifts and Temporary Threshold Shift (TTS) criteria represent the likelihood of temporary threshold shifts, if noise exposure exceeds these values over a 24-hour period. It should also be noted that these criteria are frequency weighted to the functional hearing group, analogous to the A-weighting developed for the human ear. Details of these weighting functions are provided in Southall et al. (2019).

Table 14 Physiological noise criteria for continuous sources (Southall, et al., 2019)

Functional hearing group	Noise criteria	Continuous sources (vibratory piling)
High-frequency cetaceans (Majority of toothed whales)	Physiological (TTS)	SEL_{24hr} 178 dB re 1µPa^2·S (HF)
	Physiological (PTS)	SEL_{24hr} 198 dB re 1µPa^2·S (HF)
Sirenians (dugong)	Physiological (TTS)	SEL_{24hr} 186 dB re 1µPa^2·S (SI)
	Physiological (PTS)	SEL_{24hr} 206 dB re 1µPa^2·S (SI)
Notes: Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS)		

In an applied construction noise management context, the TTS criteria are used in preference to PTS criteria as these are more stringent and therefore minimise the risk of irreversible auditory damage to marine mammals.

The SA Guideline also provides guidance on noise levels for fishes and marine turtles, based on the *Sound Exposure Guidelines for Fishes and Sea Turtles* (Popper, et al., 2014). The SA Guideline adopts a subjective approach for continuous sources criteria where insufficient data exists. This approach determines the risk of an effect in order of rank at three distances from the source:

– Near-field = tens of metres from the source
– Intermediate = hundreds of metres from the source
– Far-field = thousands of metres from the source

In the near field, the risk of TTS impacts from continuous sources is estimated to be moderate for fishes (swim bladder is not involved in hearing) and marine turtles, whereas in the intermediate and far-field the risk of TTS impacts from continuous sources is estimated to be low.

5. Impact assessment

5.1 Construction noise impacts

5.1.1 Noise modelling methodology

Construction noise impacts associated with the construction of the Project were determined using SoundPLAN version 8.2 noise modelling software using the ISO 9613 algorithm. The key modelling parameters and assumptions are presented in Table 15.

Table 15 Construction noise contour model inputs

Input / assumption	Description
Prediction algorithm	*ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'*
Weather conditions	Based on an average temperature of 10°C and an average humidity of 70 per cent
Meteorological conditions	A moderate temperature inversion or downwind meteorological conditions is considered in the ISO 9613-2 prediction algorithm.
Model inputs	
Topography	5-metre interval contours derived from the 1 Second Digital Elevation Model of Australia, Version 1.0
Ground absorption	0.75, assumed a mostly soft ground for all other areas.
Source height	2 m
Calculation settings	
Contour grid spacing	10 m
Contour grid height	1.5 m above ground
Note 1: the weather conditions are considered favourable for noise propagation and therefore conservative for the purpose of the assessment	

The noise modelling assumes that the two loudest items of equipment in the scenario (refer to Section 2.1.2) are operating at maximum capacity simultaneously at the closest distance between the construction works and the receptor as illustrated in Figure 4. As the construction activities progress along the alignment, the predicted noise levels are often highly conservative and actual construction noise impacts would vary greatly depending on the following factors:

– Location of the work within the construction footprint and the distance to the nearest receptor
– Overall duration of the construction works
– Intensity of the noise levels
– Time at which the construction works would occur
– Character of the noise source
– At-source and in-transmission mitigation measures implemented to reduce impacts

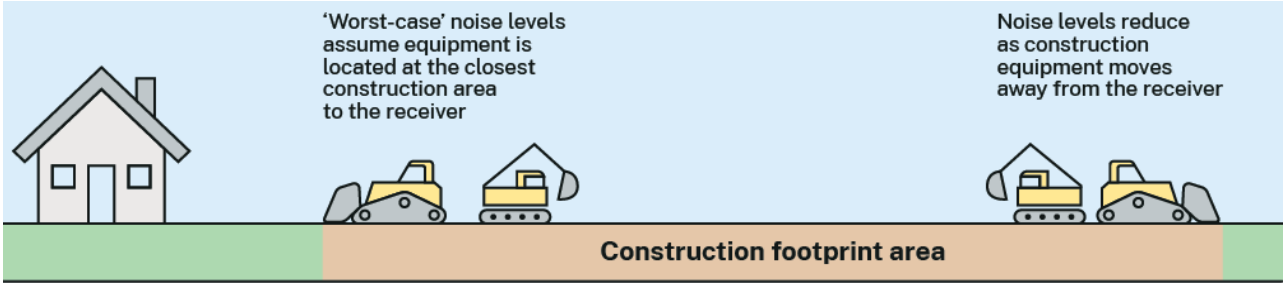


Figure 4 Worst-case noise levels for the construction work area

5.1.2 Predicted noise levels

A summary of the unmitigated predicted noise levels and exceedances of the ACNLs at sensitive receptors is presented in Table 16. It should be noted that the predicted noise levels and exceedances are based on the shortest distance between source and receiver. Contours for each construction scenario and an overview of the predicted noise levels at all receptors are included in Appendix A.

At residential receptors in Alyangula and Malkala, the ACNLs during standard and outside of standard hours are predicted to be exceeded for all construction scenarios.

The linear construction scenarios (CS01, CS02 and CS03) are predicted to exceed the ACNLs by up to 19 dBA during standard hours and 29 dBA outside of standard construction hours at the residences along the Rowell Highway. Residences located in Alyangula are also predicted to experience exceedances of the ACNLs, with the predicted noise levels to exceed the ANCLs by up to 11 dBA during standard hours and 21 dBA outside of standard hours.

Exceedances due to the linear construction scenarios (CS01, CS02 and CS03) are considered to be worst-case, as these scenarios progress along the alignment at approximately 1.5 km per 6 days. Once construction activities move beyond a distance of 1.5 km from the receivers, noise impacts are expected to be minimal. As such, it is anticipated that sensitive receivers would experience noise impacts for a maximum of 12 days per construction scenario, of which the majority of the time the noise levels would be lower than the predicted levels as noise levels would decrease as equipment progress along the pipeline alignment.

The stationary construction scenario (CS04) is predicted to exceed the ACNLs by up to 2 dBA during standard hours and 12 dBA outside of standard hours at residences in Alyangula.

No exceedances of the ACNLs are predicted at commercial, industrial and active recreation receptors.

Table 16 Summary of predicted construction noise levels and exceedances

Receptor category	Description	Period	Predicted $L_{Aeq,15min}$ noise level for each construction scenario (dBA)			
			CS01	CS02	CS03	CS04
Residential (urban and rural)	Highest predicted noise level	All	64	56	57	47
	Highest exceedance of ACNL	Standard hours	19	11	12	2
		Outside standard hours	29	21	22	12
	Number of receivers exceeding ACNL	Standard hours	32	23	31	24
		Outside standard hours	243	63	80	204
Non-residential (commercial, industrial and active recreation)	Highest predicted noise level	All	71	63	64	52
	Highest exceedance of ACNL	Standard hours	0	0	0	0
		Outside standard hours	0	0	0	0
	Number of receivers exceeding ACNL	Standard hours	0	0	0	0
		Outside standard hours	0	0	0	0

5.2 Construction vibration impacts

5.2.1 Construction vibration prediction methodology

Vibration is assessed based on the criteria outlined in Section 4.1.3.1 and Table 9. Safe working distances for human comfort and damage to structures due to vibration intensive equipment are provided in *Construction Noise and Vibration Guideline* (TfNSW, 2023) and reproduced in Table 17.

No heritage buildings or heritage structures have been identified within 200 metres of the construction footprint. As such the BS7385 vibration screening criteria for reinforced and unreinforced structures should apply for buildings.

Table 17 Vibration safe working distances, metres

Equipment	Human comfort (AVTG guideline)	Damage to standard structures (BS 7385)
Vibratory roller (1-2 tonnes)	15 m to 20 m	5 m
Vibratory roller (2-4 tonnes)	20 m	6 m
Vibratory roller (4-6 tonnes)	40 m	12 m
Vibratory roller (7-13 tonnes)	100 m	15 m
Vibratory roller (13-18 tonnes)	100 m	20 m
Vibratory roller (>18 tonnes)	100 m	25 m
Small hydraulic hammer 300 kg (5-12t excavator)	7 m	2 m
Medium hydraulic hammer 900 kg (12-18t excavator)	23 m	7 m
Large hydraulic hammer 1600 kg (18-34t excavator)	73 m	22 m
Pile driver – Vibratory (sheet piles)	20 m	2 m to 20 m
Piling rig – Bored (< 800 mm)	N/A	2 m (nominal)
Piling rig – Hammer (12t down force)	50 m	15 m
Jackhammer	Avoid contact with structure	1 m (nominal)

5.2.2 Human comfort

The most vibration intensive activities associated with the construction works of the Project are the vibratory sheet piling rig at the ocean outfall. Vibrations from the vibratory sheet piling have the potential to exceed the human comfort vibration criteria should these works occur within 20 metres of residences. No residences have been identified within 20 metres of the construction footprint and as such, no adverse human comfort vibration impacts are anticipated as a result of the ocean outfall construction.

Human comfort vibration impacts are not anticipated at residences along the pipeline alignment, as the nearest receptor is located 105 metres from the construction footprint, and the proposed construction equipment is not vibration intensive.

5.2.3 Structural damage

Vibratory sheet piling has the potential to exceed the structural damage vibration criteria should these works occur within 20 metres of residences. As no residences are situated within 20 metres of the ocean outfall construction footprint, no adverse structural damage vibration impacts are anticipated as a result of the ocean outfall construction.

Structural damage vibration impacts at structures along the pipeline alignment are also not anticipated due to the nearest structure (Rowell Highway Power Station) being located 33 metres from the construction footprint, and no vibration intensive equipment is proposed to be used.

5.3 Operational noise impacts

5.3.1 Noise modelling methodology

Operational noise impacts associated with the construction of the Project were determined using CadnaA version 2023 noise modelling software using the ISO 9613 algorithm. The key modelling parameters and assumptions are presented in Table 18.

Table 18 Construction noise contour model inputs

Input / assumption	Description
Prediction algorithm	*ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors'*
Weather conditions	Based on an average temperature of 10°C and an average humidity of 70 per cent
Meteorological conditions	A moderate temperature inversion or downwind meteorological conditions is considered in the ISO 9613-2 prediction algorithm.
Topography	The topography was considered to be flat for the purpose of the operational noise assessment.
Ground absorption	0.75, assumed a mostly soft ground for all other areas.
Source height	2 m above ground level
Sound power level	A total sound power level of 113 dBA (2 generators with 110 dBA and 2 pumps with 103 dBA)

5.3.2 Predicted noise levels

The noise level of the proposed pumps and generators at the NH2 quarry at several distances are shown in Table 19.

Table 19 Noise level at nominal distances from proposed operational equipment

Distance (m)	Predicted operational noise level (dBA)
1,000	36
1,100	35
2,000	28
3,000	23
4,000	19

Based on the predicted noise levels, compliance with the operational noise criteria is achieved at 1,100 metres distance from the source. The sensitive receptors in Angurugu are situated approximately 4 kilometres to the southeast from the operational noise sources at NH2 quarry. At this distance the predicted noise levels are less than 20 dBA, and as such no operational noise impacts are anticipated.

5.4 Underwater noise impacts

5.4.1 Vibratory piling

Vibratory piling data has been sourced from *Underwater Piling and Dredging Noise Guidelines* (South Australia, 2023). The levels at 10 metres from the pile are reproduced in Table 20, which shows that the source levels of vibratory sheet piling are 4 dBA above the source levels for vibratory piling of a steel pipe. As vibratory sheet piling produces the most noise, calculations of the SEL were limited to vibratory sheet piling. This is considered an environmentally conservative approach.

Table 20 Source level for vibratory sheet piling

Approximate Pile Size	Pile type	Hammer Type	SPL at 10m dB re 1 µPa^2	SEL at 10m dB re 1 µPa^2 s
0.61 m	Steel Sheet	Vibratory	163	163
0.61 m	Steel Pipe	Vibratory	-	159

To calculate the SEL_{24hr} noise level to estimate an animal's cumulative exposure to noise over a 24-hour period, the following formula is used:

$$\mathrm{SEL}_{24hr} = SEL + 10\log_{10}(total\ number\ of\ noise\ generating\ minutes\ of\ 24\ hours)$$

The duration of the vibratory piling would range between 0 hours to a maximum of 12 hours. As such, the accumulated SEL values, weighted for the identified functional hearing groups, have been calculated at 10 metres for a range of construction hours and are shown in Table 21.

It is assumed that marine fauna within 10 metres of the noise source would swim away from the noise source and, as such, SEL closer to the source have not been calculated.

Table 21 Calculated vibratory sheet piling SEL accumulated at 10m from the source for 1 to 12 hours of construction

Construction duration (hours)	SEL_{hr} at 10m corrected for the construction duration (dB re 1 µPa^2 s)	
	High frequency cetaceans (dolphins)	Sirenians (dugongs)
TTS Criteria	**178**	**186**
1	163	168
2	166	171
4	169	174
6	171	176
8	172	177
10	173	178
12	174	179

At a distance of 10 m or further from the source, up to 12 hours of vibratory piling will not expose dugongs or dolphins to SEL that exceed TTS or PTS criteria. As such, specific mitigation measures are not required to be implemented during vibratory piling activities.

5.4.2 Trenching

Trenching is proposed to be undertaken using a backhoe dredge. The *Underwater Piling and Dredging Noise Guidelines* indicates a source level of 175 dBA re: 1µPa^2 s at 1 metre. The source level has been converted to a SEL at 10 metres based on an attenuation rate of 6.6 dB per doubling of distance, as the works would be undertaken in shallow waters (<10 metres of depth) as described in ICF Jones and Stokes et al. (2009). This attenuation rate has been assumed appropriate as choppy wave conditions, a decreasing bathymetry and/or a silty acoustically absorptive bottom material would increase the attenuation rate within the waterbody.

The duration of the trenching would be up to 12 hours. As such, the accumulated SEL values, weighted for the identified functional hearing groups, have been calculated at 10 metres for a range of construction hours and are shown in Table 22.

Table 22 Calculated trenching SEL accumulated at 10m from the source for 1 to 12 hours of construction

Construction duration (hours)	SEL_{hr} at 10m corrected for the construction duration (dB re 1 µPa^2 s)	
	High frequency cetaceans (dolphins)	Sirenians (dugongs)
TTS Criteria	**178**	**186**
1	164	170
2	167	173
4	170	176
6	172	177
8	173	179
10	174	180
12	175	180

At a distance of 10 m or further from the source, up to 12 hours of trenching will not expose dugongs or dolphins to SEL that exceed TTS or PTS criteria. As such, specific mitigation measures are not required to be implemented during trenching activities.

5.4.3 Shipping

Given the ocean outfall construction works occur near the existing GEMCO jetty and the marine traffic in close proximity to this jetty is relatively high density, sound pressure level noise descriptors (i.e., RMS SPL and Pk SPL) are not expected to increase significantly.

However, the cumulative sound exposure level noise descriptor (typically assessed/measured over a 24-hour period) could increase depending on the following factors:

1. The composition, speed and frequency of vessel movements associated with the Project in the Port
2. The composition, speed and frequency of existing vessel movements in the Port
3. The propeller design, hull design and selection of onboard machinery for vessels described in 1) and 2), and
4. The proximity of a given receptor location to the vessel routes described in 1) and 2)

Any effort to reduce underwater radiated noise from commercial shipping in the Gulf of Carpentaria would require consultation and collaboration across the key stakeholders contributing to the underwater shipping noise soundscape.

Gradual exposure to continuous noise sources, such as additional shipping vessels during construction of the Project, is generally regarded as being less harmful and less likely to startle or stress marine fauna than rapid-onset impulsive noise sources like piling (Hamernik, R. et al, 1993) (Hamernik, R. et al, 2003). In view of the above, the potential increase in sound exposure levels due to additional vessel movements has not been assessed any further in this report.

6. Mitigation and management measures

6.1 Construction airborne noise

The noise levels at the residential receptors are predicted to be above the recommended ACNLs, and as such GEMCO should apply all feasible and reasonable work practices to meet the recommended ACNLs. The mitigation measures provided in Table 23 shall be implemented where feasible and reasonable by the construction contractor to reduce potential noise impacts at receptors.

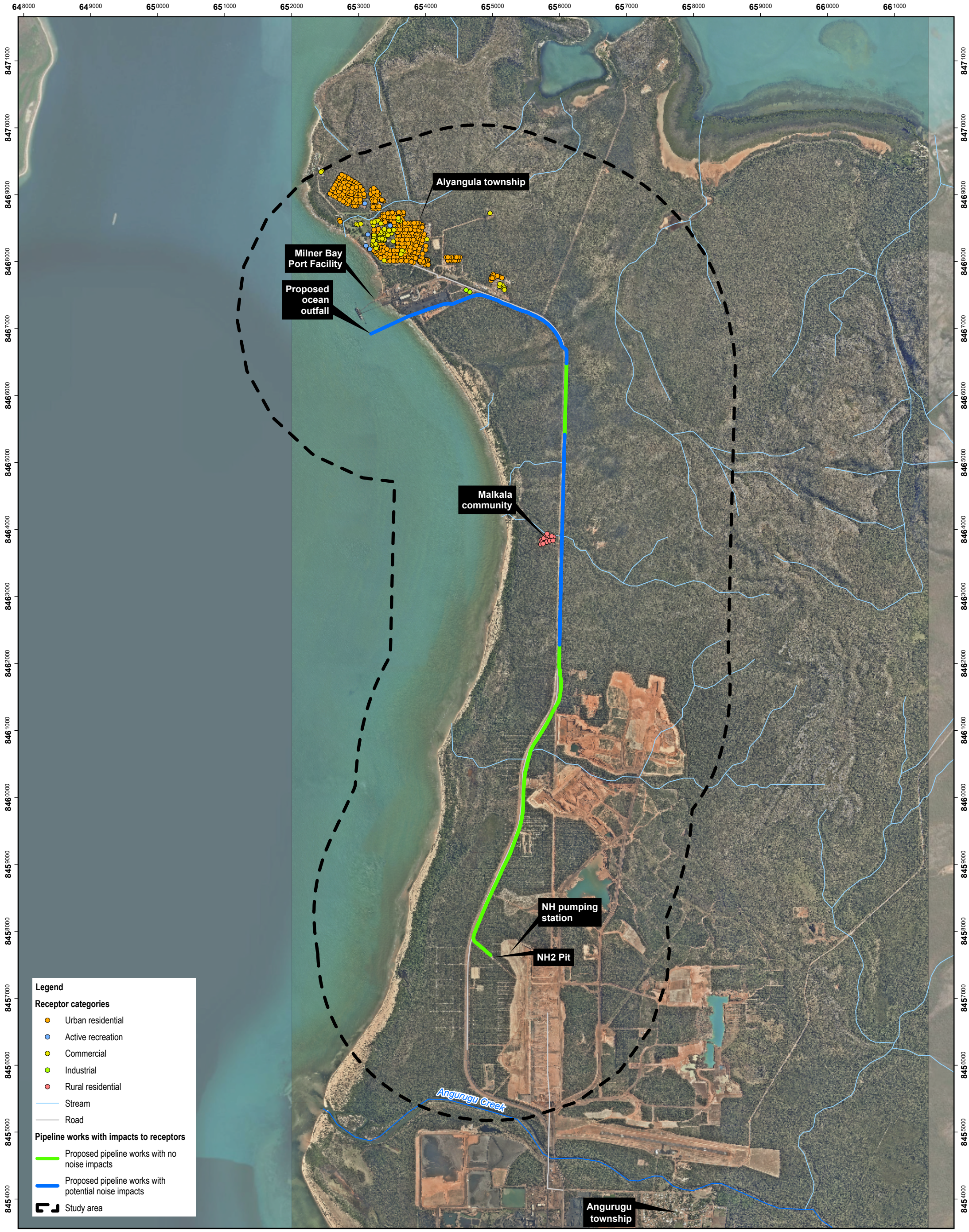
Subsequent to the incorporation of the noise mitigation measures, the recommended ACNLs may still be exceeded during standard and non-standard construction hours at the most-affected sensitive receptors. Receptors which are impacted by the construction works of the pipeline alignment would experience noise levels above the ACNLs for a relatively short-term period, as the construction works progress along the alignment. These receptors are anticipated to not be impacted for more than 12 days in a worst-case scenario.

Table 23 Construction noise and vibration mitigation measures

Control type	Mitigation measures
Management measures	
Work scheduling	Noise generating activities with the potential to impact receptors are to be scheduled during recommended standard construction hours (7 am to 7 pm on Monday to Saturday and 9 am to 6 pm on Sunday). Where no receptors are predicted to be impacted, works could occur outside. of the recommended standard construction hours. Figure 5 provides an indicative overview of the sections expected to impact sensitive receivers during the worst-case construction activities
	Include an outside standard hours works procedure to minimise the impact of any significant noise and vibration works during construction works outside of the recommended standard hours. This procedure could include, but is not limited to, the following: – Limiting works to low noise generating activities, such as work crews arriving on site, equipment refuelling, safety checks and toolbox talks – Minimise the use of heavy machinery
Site inductions	Inductions for the work crew will include the specific noise issues and mitigation measures required for the site. The induction would include: – All relevant project specific and standard noise mitigation measures – Relevant licence and approval conditions – Permissible hours of work – Location of sensitive receptors where the recommended assigned construction noise levels may be exceeded – Designated construction employee parking areas – Designated loading/unloading areas and procedures – Site opening/closing times (including deliveries) – Behavioural practices that minimise noise – Avoiding dropping materials from height and avoiding metal to metal contact – Complaints handling process
Construction Noise and Vibration Management Plan	The Project's Construction Environmental Management Plan will include a Noise and Vibration Management Plan, which will be prepared prior to the commencement of the Project.

Control type	Mitigation measures
Community Notification	
Notification	Notification regarding specific construction activities should be provided to residents and property owners likely to be affected by noise and vibration from the activity. Such notification should be provided prior to the activity commencing (typically one week notice) and should provide the following details: – The reason for the activity – Types of equipment required – The expected hours of operation, including any permitted site preparation works which will occur outside the recommended standard hours – The likely duration and impact of operation at the site and any requirement for subsequent additional works – Contact details for further information and complaints Have check-ins with adjacent residents and property owners regarding construction noise and vibration impacts when construction is occurring in close proximity, where possible.
Consultation	Prior to commencing the construction activities, noise affected residences will be asked about potential concerns they have, and possible solutions will be discussed. During the construction activities the noise affected residences shall be informed of the progress of the works, where possible.
Handling of complaints	The Project should establish an effective documented complaints handling process which provides a fair and quick response to valid complaints. A complaint handling process should consider the following: – A dedicated phone line should be provided to enable the community to contact a central project representative. – A central point of contact should have the authority to alter mitigation, management and construction activities onsite. – A register of complaints should be maintained – Notification of construction project manager within 24 hours of any complaints received or within 24 hours of becoming aware of any noise nuisance caused by construction activities. – Internal and external reporting procedures. – Complaints will trigger an investigation in which the construction activities at the time of the reported nuisance would be investigated. A noise monitoring program would be undertaken if the investigation determines it is warranted. For example, if multiple complaints are received from multiple receptors, suggesting a pattern of nuisance.
Source mitigation measures	
Plant and equipment	Selecting plant and equipment based on noise and vibration emission levels.
	Ensuring equipment is operated in the correct manner and correctly maintained including replacement of engine covers, repair of defective silencing equipment, tightening of rattling components, repair of leakages in compressed air lines and shutting down of equipment not in use.
	Turning off plant and equipment or throttling them down to a minimum when not in use.

Control type	Mitigation measures
Acoustic screening	Where fixed plant (such as generators) contributes to the received noise levels, acoustic shielding should be considered such as enclosures or barriers.
Reversing alarms	Broadband reversing alarms should be used where reasonable and feasible instead of traditional beeper reversing alarms.
Plant and equipment maintenance	Vehicles, plant and equipment will be regularly maintained and kept in good operational condition.
Number of operational plant and equipment	The number of items of equipment could be reduced to minimise noise impacts during construction works during construction works outside of the recommended hours.



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Grid: GDA2020 MGA Zone 53

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South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Noise and Vibration Impact Assessment Report

Sections of pipeline works with impacts to receptors

Project No. 12624084
Revision No. A
Date 13/09/2024

FIGURE 5

\\ghdnet\ghd\AU\Brisbane\Projects\44\12624084\GIS\Maps\Working\12624084_GEMCO\12624084_GEMCOv2.aprx - 12624084_NVIA_607_PipelineWorksReceptorImpacts
Print date: 13 Sep 2024 - 14:56

Data source: GHD: sensitive receptors, study area, pipeline works with impacts to receptors (2024); South32: GEMCO tenements (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe

6.2 Underwater noise during construction

Significant underwater noise impacts are not predicted due to vibratory piling or trenching at a distance of 10 metres and assuming 12 hours of exposure (the maximum predicted). As such, specific mitigation measures are not required to be implemented.

At the current stage, it is estimated that vibratory piling is sufficient to install the required piles for the Project. Should detailed information become available which suggests that impact piling may be necessary, a detailed underwater noise impact assessment would be undertaken to determine safety zones and potential effect zones and identify mitigation measures to minimise impacts to marine fauna.

6.3 Operational noise

Operational noise impacts from the proposed generators and pump stations are not anticipated, and as such specific mitigation measures are not required to be implemented.

7. Conclusion

A noise and vibration assessment has been undertaken for the construction and operation of proposed GEMCO Excess Water Discharge pipeline including intake and outfall infrastructure.

A quantitative assessment was undertaken to establish potential terrestrial construction noise impacts at sensitive receptors, in accordance with the NMFG. The construction noise levels are predicted to be above the recommended ACNLs at the receptors situated along the Rowell Highway at the middle of the pipeline alignment (Malkala community), and at receptors close to the construction footprint in Alyangula. As such, feasible and reasonable mitigation measures have been recommended to be implemented to reduce the noise impacts at receptors in Section 6.1, noting that receptors impacted by the linear construction works are only expected to experience noise levels above the ACNL for 12 days per construction scenario.

Construction vibration levels are unlikely to generate levels above the vibration criteria due to the relatively large distance between the construction footprint and the nearest residential receptors. No adverse human comfort or structural damage impacts are predicted from the construction of the Project.

No physiological impacts to the identified marine fauna are anticipated due to the vibratory piling and trenching construction activities within the Construction footprint when vibratory piling and trenching does not last longer than 12 hours. Marine fauna closer to the noise sources are assumed to move at least 10 metres from the source to avoid significant SEL.

Operational noise impacts from the proposed generators and pump stations are not anticipated due to the distance between the noise sources and the nearest residential receptors.

The Project is considered to be acceptable from an acoustics perspective assuming the recommended noise mitigation and management measures are implemented.

8. References

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Appendices

Appendix A

Predicted construction noise levels

650000 651000 652000 653000 654000 655000 656000 657000 658000 659000 660000

847000 846900 846800 846700 846600 846500 846400 846300 846200 846100 846000 845900 845800 845700 845600

Angurugu Creek

Legend

Receiver categories

- Active recreation
- Commercial
- Industrial
- Rural residential
- Urban residential
- Stream
- Road
- Proposed pipeline
- Study area

Noise contours (dBA)

- 30
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70

Paper Size ISO A3

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53

N

GHD

South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Noise and Vibration Impact Assessment Report

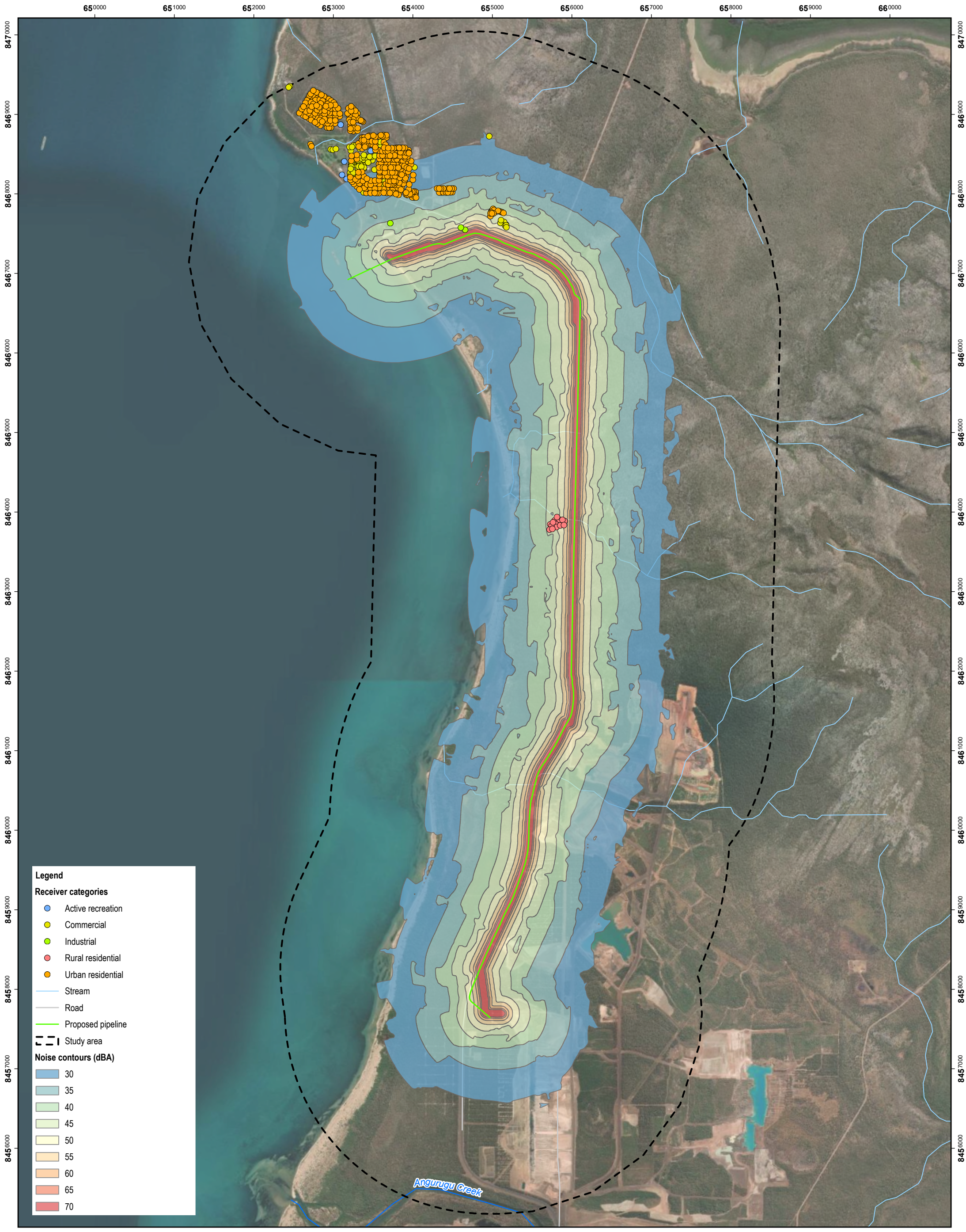
Predicted LAeq,15min contours
Construction scenario CS01

Project No. **12624084**
Revision No. **A**
Date **30/08/2024**

FIGURE A.1

N:\AU\Brisbane\Projects\44\12624084\GIS\Maps\Working\12624084_GEMCO\12624084_GEMCO.aprx - 12624084_NVIA_603_CS01
Print date: 30 Aug 2024 - 10:30

Data source: GHD: predicted LAeq contours, sensitive receivers, study area (2024); South32: Pipeline route (2024), GEMCO tenements (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe



Paper Size ISO A3

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53

N

South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Noise and Vibration Impact Assessment Report

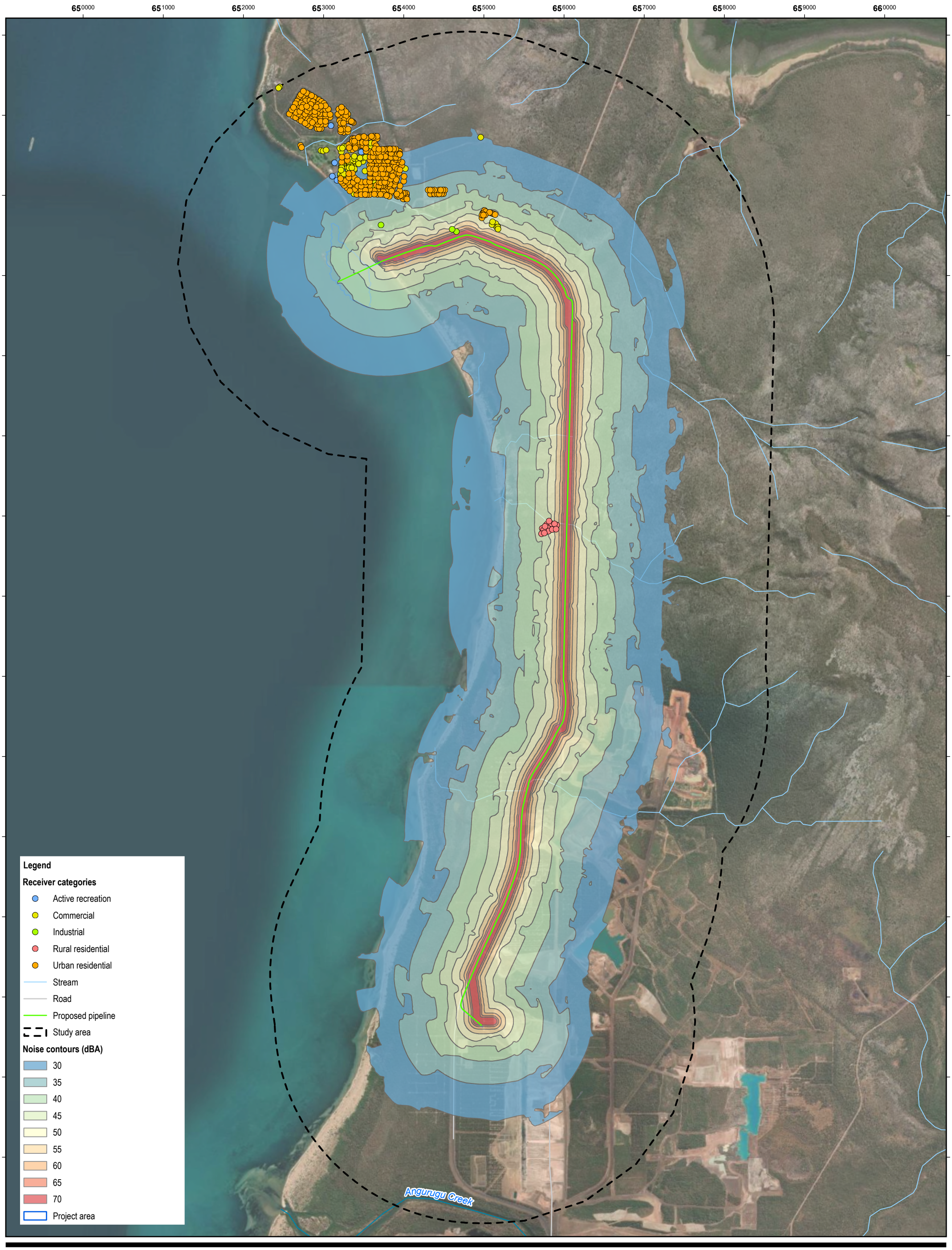
Predicted LAeq,15min contours Construction scenario CS02

Project No. **12624084**
Revision No. **A**
Date **30/08/2024**

FIGURE A.2

N:\AU\Brisbane\Projects\44\12624084\GIS\Maps\Working\12624084_GEMCO\12624084_GEMCO.aprx - 12624084_NVIA_604_CS02
Print date: 30 Aug 2024 - 10:28

Data source: GHD: predicted LAeq contours, sensitive receivers, study area (2024); South32: Pipeline route (2024), GEMCO tenements (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe



Paper Size ISO A3

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53

N

GHD

South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Noise and Vibration Impact Assessment Report

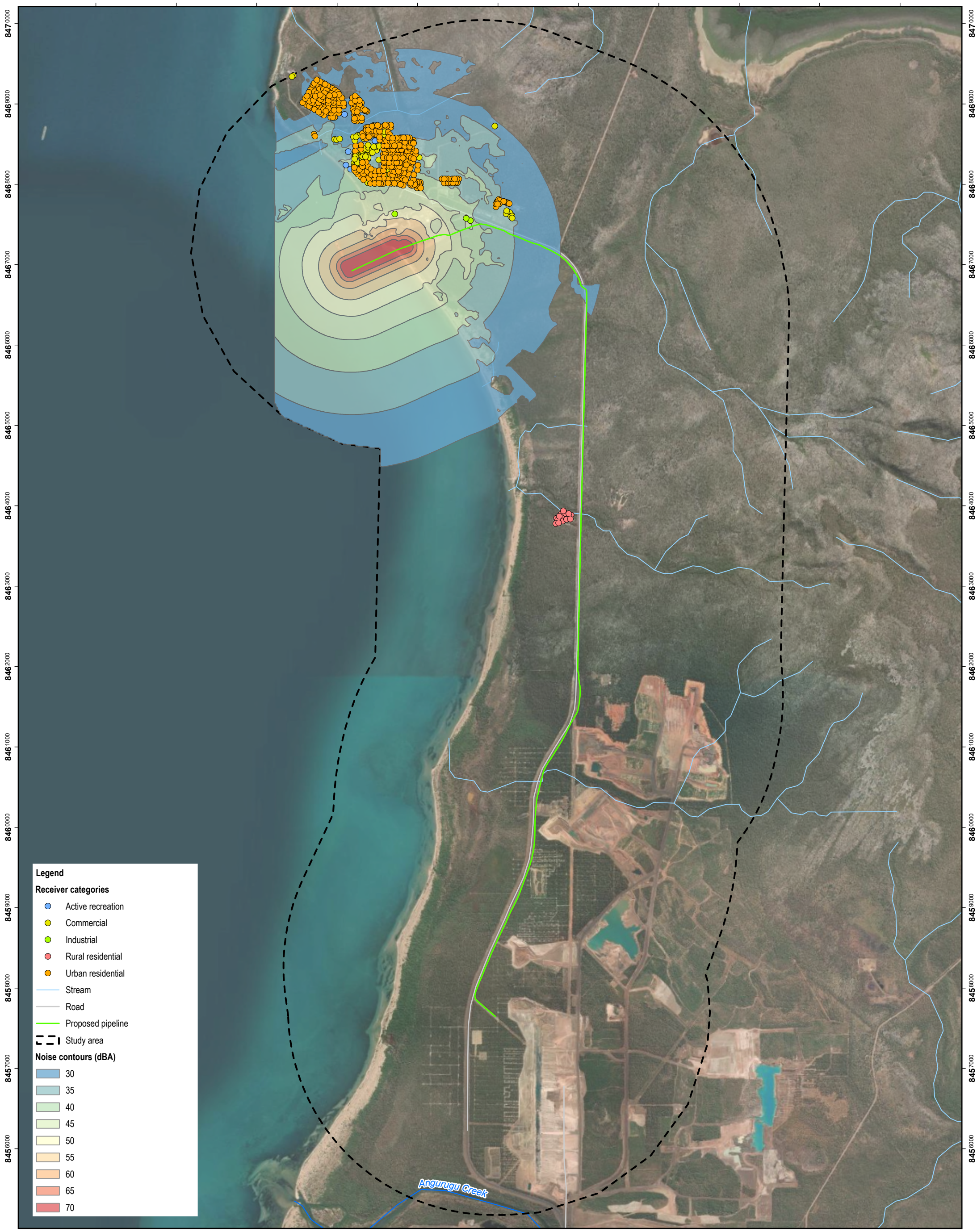
Predicted LAeq,15min contours Construction scenario CS03

Project No. **12624084**
Revision No. **A**
Date **30/08/2024**

FIGURE A.3

N:\AU\Brisbane\Projects\44\12624084\GIS\Maps\Working\12624084_GEMCO\12624084_GEMCO.aprx - 12624084_NVIA_605_CS03
Print date: 30 Aug 2024 - 10:27

Data source: GHD: predicted LAeq contours, sensitive receivers, study area (2024); South32: Pipeline route (2024), GEMCO tenements (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe



Paper Size ISO A3

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53

N

GHD

South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Noise and Vibration Impact Assessment Report

Predicted LAeq,15min contours
Construction scenario CS04

Project No. **12624084**
Revision No. **A**
Date **30/08/2024**

FIGURE A.4

N:\AU\Brisbane\Projects\44\12624084\GIS\Maps\Working\12624084_GEMCO\12624084_GEMCO.aprx - 12624084_NVIA_606_CS04
Print date: 30 Aug 2024 - 10:23

Data source: GHD: predicted LAeq contours, sensitive receivers, study area (2024); South32: Pipeline route (2024), GEMCO tenements (2024); GA: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
AR001	Active recreation	38	30	31	40	65	65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR002	Active recreation	38	30	31	41	65	65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR003	Active recreation	37	29	30	39	65	65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR004	Active recreation	32	24	26	32	65	65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR005	Active recreation	35	28	29	35	65	65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM001	Commercial	28	20	21	26	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM003	Commercial	28	20	21	27	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM005	Commercial	58	50	52	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM006	Commercial	58	50	51	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM007	Commercial	57	49	50	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM008	Commercial	58	50	52	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM009	Commercial	59	51	52	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM010	Commercial	58	50	51	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM011	Commercial	59	51	53	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM012	Commercial	43	35	36	45	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM013	Commercial	40	32	34	42	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM014	Commercial	40	33	34	44	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM015	Commercial	40	32	33	40	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM016	Commercial	40	33	34	43	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM017	Commercial	57	49	50	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM018	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM019	Commercial	36	28	30	39	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM020	Commercial	36	28	30	39	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM021	Commercial	36	28	29	39	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM022	Commercial	36	29	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM023	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM024	Commercial	36	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM025	Commercial	36	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM026	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM027	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM028	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM029	Commercial	36	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM030	Commercial	36	28	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM031	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM032	Commercial	37	29	30	38	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM033	Commercial	37	29	31	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM034	Commercial	36	29	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM035	Commercial	36	29	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM036	Commercial	36	29	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM037	Commercial	36	28	30	38	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM038	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM039	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM040	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM041	Commercial	37	29	31	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM042	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM043	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM044	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM045	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM046	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM047	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM048	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM049	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM050	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM051	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM052	Commercial	36	28	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM053	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
COM054	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM055	Commercial	37	29	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM056	Commercial	37	29	30	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM057	Commercial	37	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM058	Commercial	38	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM059	Commercial	38	30	32	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM060	Commercial	38	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM061	Commercial	38	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM062	Commercial	38	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM063	Commercial	38	30	31	40	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM064	Commercial	38	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM065	Commercial	38	30	31	41	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM066	Commercial	36	29	30	40	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM067	Commercial	37	29	30	40	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM068	Commercial	39	31	32	38	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM069	Commercial	35	27	28	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM070	Commercial	35	27	28	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM071	Commercial	34	27	28	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM072	Commercial	34	27	28	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM073	Commercial	37	29	30	31	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM074	Commercial	35	27	28	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM075	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM076	Commercial	35	27	28	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM077	Commercial	34	26	27	33	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM078	Commercial	35	27	28	35	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM079	Commercial	34	26	27	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM080	Commercial	34	26	27	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM081	Commercial	36	29	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM082	Commercial	36	28	30	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM083	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM084	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM085	Commercial	37	29	30	37	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM086	Commercial	34	27	28	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM087	Commercial	36	28	29	36	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COM088	Commercial	34	27	28	34	70	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IND001	Industrial	71	63	64	45	75	75	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IND002	Industrial	63	55	56	45	75	75	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RR001	Rural residential	57	49	50	22	45	35	Exceeds by 12 dB	Exceeds by 4 dB	Exceeds by 5 dB	Yes	Exceeds by 22 dB	Exceeds by 14 dB	Exceeds by 15 dB	Yes
RR002	Rural residential	55	47	48	22	45	35	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Yes	Exceeds by 20 dB	Exceeds by 12 dB	Exceeds by 13 dB	Yes
RR003	Rural residential	57	49	51	22	45	35	Exceeds by 12 dB	Exceeds by 4 dB	Exceeds by 6 dB	Yes	Exceeds by 22 dB	Exceeds by 14 dB	Exceeds by 16 dB	Yes
RR004	Rural residential	58	50	51	22	45	35	Exceeds by 13 dB	Exceeds by 5 dB	Exceeds by 6 dB	Yes	Exceeds by 23 dB	Exceeds by 15 dB	Exceeds by 16 dB	Yes
RR005	Rural residential	60	52	53	22	45	35	Exceeds by 15 dB	Exceeds by 7 dB	Exceeds by 8 dB	Yes	Exceeds by 25 dB	Exceeds by 17 dB	Exceeds by 18 dB	Yes
RR006	Rural residential	55	47	49	19	45	35	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 4 dB	Yes	Exceeds by 20 dB	Exceeds by 12 dB	Exceeds by 14 dB	Yes
RR007	Rural residential	55	47	48	22	45	35	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Yes	Exceeds by 20 dB	Exceeds by 12 dB	Exceeds by 13 dB	Yes
RR008	Rural residential	56	48	49	22	45	35	Exceeds by 11 dB	Exceeds by 3 dB	Exceeds by 4 dB	Yes	Exceeds by 21 dB	Exceeds by 13 dB	Exceeds by 14 dB	Yes
RR009	Rural residential	54	46	48	22	45	35	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 3 dB	Yes	Exceeds by 19 dB	Exceeds by 11 dB	Exceeds by 13 dB	Yes
RR010	Rural residential	55	48	49	22	45	35	Exceeds by 10 dB	Exceeds by 3 dB	Exceeds by 4 dB	Yes	Exceeds by 20 dB	Exceeds by 13 dB	Exceeds by 14 dB	Yes
RR011	Rural residential	64	56	57	22	45	35	Exceeds by 19 dB	Exceeds by 11 dB	Exceeds by 12 dB	Yes	Exceeds by 29 dB	Exceeds by 21 dB	Exceeds by 22 dB	Yes
RR012	Rural residential	62	54	55	22	45	35	Exceeds by 17 dB	Exceeds by 9 dB	Exceeds by 10 dB	Yes	Exceeds by 27 dB	Exceeds by 19 dB	Exceeds by 20 dB	Yes
RR013	Rural residential	60	52	53	22	45	35	Exceeds by 15 dB	Exceeds by 7 dB	Exceeds by 8 dB	Yes	Exceeds by 25 dB	Exceeds by 17 dB	Exceeds by 18 dB	Yes
RR014	Rural residential	63	55	56	22	45	35	Exceeds by 18 dB	Exceeds by 10 dB	Exceeds by 11 dB	Yes	Exceeds by 28 dB	Exceeds by 20 dB	Exceeds by 21 dB	Yes
UR001	Urban residential	31	23	24	28	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR002	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR003	Urban residential	30	22	23	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR004	Urban residential	29	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR005	Urban residential	29	21	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR006	Urban residential	29	21	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR007	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR008	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR009	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR010	Urban residential	30	22	23	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR011	Urban residential	30	22	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR012	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR013	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR014	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR015	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR016	Urban residential	31	23	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR017	Urban residential	29	21	23	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR018	Urban residential	29	21	23	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR019	Urban residential	29	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR020	Urban residential	29	21	22	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR021	Urban residential	29	21	22	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR022	Urban residential	31	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR023	Urban residential	31	23	24	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR024	Urban residential	31	23	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR025	Urban residential	31	23	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR026	Urban residential	30	22	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR027	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR028	Urban residential	31	23	24	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR029	Urban residential	31	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR030	Urban residential	33	25	26	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR031	Urban residential	31	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR032	Urban residential	32	24	26	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR033	Urban residential	33	25	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR034	Urban residential	32	24	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR035	Urban residential	32	25	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR036	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR037	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR038	Urban residential	31	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR039	Urban residential	31	23	24	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR040	Urban residential	32	25	26	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR041	Urban residential	31	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR042	Urban residential	31	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR043	Urban residential	31	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR044	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR045	Urban residential	32	24	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR046	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR047	Urban residential	31	23	25	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR048	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR049	Urban residential	32	24	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR050	Urban residential	32	24	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR051	Urban residential	30	22	23	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR052	Urban residential	32	25	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR053	Urban residential	31	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR054	Urban residential	30	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR055	Urban residential	31	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR056	Urban residential	31	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR057	Urban residential	32	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR058	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR059	Urban residential	30	22	23	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR060	Urban residential	31	23	25	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR061	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR062	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR063	Urban residential	31	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR064	Urban residential	32	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR065	Urban residential	31	23	25	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR066	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR067	Urban residential	32	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR068	Urban residential	32	24	25	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR069	Urban residential	31	23	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR070	Urban residential	30	22	23	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR071	Urban residential	30	22	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR072	Urban residential	32	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR073	Urban residential	30	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR074	Urban residential	31	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR075	Urban residential	31	24	25	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR076	Urban residential	30	22	23	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR077	Urban residential	30	22	23	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR078	Urban residential	32	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR079	Urban residential	31	24	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR080	Urban residential	30	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR081	Urban residential	30	23	24	29	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR082	Urban residential	30	22	24	30	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR083	Urban residential	30	23	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR084	Urban residential	31	23	24	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR085	Urban residential	30	22	24	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR086	Urban residential	44	37	38	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 5 dB
UR087	Urban residential	45	37	39	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 4 dB	Exceeds by 4 dB
UR088	Urban residential	44	36	38	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 3 dB	Exceeds by 5 dB
UR089	Urban residential	44	37	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR090	Urban residential	45	37	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR091	Urban residential	44	37	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR092	Urban residential	45	37	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR093	Urban residential	45	37	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR094	Urban residential	54	46	47	36	45	35	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Yes	Exceeds by 19 dB	Exceeds by 11 dB	Exceeds by 12 dB	Exceeds by 1 dB
UR095	Urban residential	53	46	47	36	45	35	Exceeds by 8 dB	Exceeds by 1 dB	Exceeds by 2 dB	Yes	Exceeds by 18 dB	Exceeds by 11 dB	Exceeds by 12 dB	Exceeds by 1 dB
UR096	Urban residential	54	47	48	36	45	35	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Yes	Exceeds by 19 dB	Exceeds by 12 dB	Exceeds by 13 dB	Exceeds by 1 dB
UR097	Urban residential	53	45	46	36	45	35	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 18 dB	Exceeds by 10 dB	Exceeds by 11 dB	Exceeds by 1 dB
UR098	Urban residential	53	45	46	36	45	35	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 18 dB	Exceeds by 10 dB	Exceeds by 11 dB	Exceeds by 1 dB
UR099	Urban residential	52	44	45	36	45	35	Exceeds by 7 dB	Yes	Yes	Yes	Exceeds by 17 dB	Exceeds by 9 dB	Exceeds by 10 dB	Exceeds by 1 dB
UR100	Urban residential	53	45	46	35	45	35	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 18 dB	Exceeds by 10 dB	Exceeds by 11 dB	Yes
UR101	Urban residential	52	45	46	36	45	35	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 17 dB	Exceeds by 10 dB	Exceeds by 11 dB	Exceeds by 1 dB
UR102	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR103	Urban residential	44	37	38	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 11 dB
UR104	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR105	Urban residential	45	37	38	47	45	35	Yes	Yes	Yes	Exceeds by 2 dB	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 12 dB
UR106	Urban residential	43	35	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 8 dB	Yes	Exceeds by 2 dB	Exceeds by 11 dB
UR107	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR108	Urban residential	44	37	38	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Exceeds by 11 dB
UR109	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR110	Urban residential	44	36	37	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 4 dB
UR111	Urban residential	44	36	37	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 4 dB
UR112	Urban residential	44	36	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR113	Urban residential	44	36	38	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 3 dB	Exceeds by 4 dB
UR114	Urban residential	43	35	37	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 8 dB	Yes	Exceeds by 2 dB	Exceeds by 4 dB
UR115	Urban residential	44	36	38	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 3 dB	Exceeds by 10 dB
UR116	Urban residential	44	36	37	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 4 dB
UR117	Urban residential	43	36	37	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 8 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 4 dB

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR118	Urban residential	42	35	36	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 11 dB
UR119	Urban residential	43	35	36	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Exceeds by 11 dB
UR120	Urban residential	43	36	37	47	45	35	Yes	Yes	Yes	Exceeds by 2 dB	Exceeds by 8 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 12 dB
UR121	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR122	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR123	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR124	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR125	Urban residential	43	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 8 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR126	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR127	Urban residential	56	49	50	36	45	35	Exceeds by 11 dB	Exceeds by 4 dB	Exceeds by 5 dB	Yes	Exceeds by 21 dB	Exceeds by 14 dB	Exceeds by 15 dB	Exceeds by 1 dB
UR128	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR129	Urban residential	32	24	25	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR130	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR131	Urban residential	32	24	25	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR132	Urban residential	52	45	46	35	45	35	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 17 dB	Exceeds by 10 dB	Exceeds by 11 dB	Yes
UR133	Urban residential	53	45	46	35	45	35	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 18 dB	Exceeds by 10 dB	Exceeds by 11 dB	Yes
UR134	Urban residential	53	45	47	35	45	35	Exceeds by 8 dB	Yes	Exceeds by 2 dB	Yes	Exceeds by 18 dB	Exceeds by 10 dB	Exceeds by 12 dB	Yes
UR135	Urban residential	52	44	46	35	45	35	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Yes	Exceeds by 17 dB	Exceeds by 9 dB	Exceeds by 11 dB	Yes
UR136	Urban residential	54	47	48	36	45	35	Exceeds by 9 dB	Exceeds by 2 dB	Exceeds by 3 dB	Yes	Exceeds by 19 dB	Exceeds by 12 dB	Exceeds by 13 dB	Exceeds by 1 dB
UR137	Urban residential	55	47	48	36	45	35	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Yes	Exceeds by 20 dB	Exceeds by 12 dB	Exceeds by 13 dB	Exceeds by 1 dB
UR138	Urban residential	55	47	49	36	45	35	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 4 dB	Yes	Exceeds by 20 dB	Exceeds by 12 dB	Exceeds by 14 dB	Exceeds by 1 dB
UR139	Urban residential	55	47	48	36	45	35	Exceeds by 10 dB	Exceeds by 2 dB	Exceeds by 3 dB	Yes	Exceeds by 20 dB	Exceeds by 12 dB	Exceeds by 13 dB	Exceeds by 1 dB
UR140	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR141	Urban residential	34	26	28	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR142	Urban residential	34	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR143	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR144	Urban residential	34	26	27	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR145	Urban residential	53	46	47	35	45	35	Exceeds by 8 dB	Exceeds by 1 dB	Exceeds by 2 dB	Yes	Exceeds by 18 dB	Exceeds by 11 dB	Exceeds by 12 dB	Yes
UR146	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR147	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR148	Urban residential	42	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR149	Urban residential	42	34	35	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Yes	Exceeds by 10 dB
UR150	Urban residential	40	33	34	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 7 dB
UR151	Urban residential	41	33	34	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 7 dB
UR152	Urban residential	42	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR153	Urban residential	43	35	37	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 8 dB	Yes	Exceeds by 2 dB	Exceeds by 10 dB
UR154	Urban residential	41	34	35	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 10 dB
UR155	Urban residential	41	33	34	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 9 dB
UR156	Urban residential	42	34	35	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 7 dB	Yes	Yes	Exceeds by 11 dB
UR157	Urban residential	41	33	35	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 8 dB
UR158	Urban residential	41	33	35	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 8 dB
UR159	Urban residential	41	33	34	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 7 dB
UR160	Urban residential	43	35	37	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 8 dB	Yes	Exceeds by 2 dB	Exceeds by 10 dB
UR161	Urban residential	41	33	34	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 7 dB
UR162	Urban residential	40	32	33	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 6 dB
UR163	Urban residential	39	32	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 5 dB
UR164	Urban residential	42	34	35	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Yes	Exceeds by 10 dB
UR165	Urban residential	43	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR166	Urban residential	41	33	35	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 8 dB
UR167	Urban residential	42	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR168	Urban residential	42	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR169	Urban residential	39	31	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 5 dB
UR170	Urban residential	40	32	33	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 6 dB
UR171	Urban residential	40	32	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 5 dB
UR172	Urban residential	42	34	35	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 7 dB	Yes	Yes	Exceeds by 11 dB
UR173	Urban residential	40	32	34	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 6 dB

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR174	Urban residential	40	32	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 5 dB
UR175	Urban residential	40	33	34	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 7 dB
UR176	Urban residential	40	33	34	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 6 dB
UR177	Urban residential	41	33	34	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 8 dB
UR178	Urban residential	39	31	32	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 7 dB
UR179	Urban residential	41	33	34	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 7 dB
UR180	Urban residential	40	32	33	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 6 dB
UR181	Urban residential	39	32	33	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 6 dB
UR182	Urban residential	41	33	34	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 6 dB
UR183	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR184	Urban residential	39	31	32	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 5 dB
UR185	Urban residential	38	30	32	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 7 dB
UR186	Urban residential	42	34	36	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 9 dB
UR187	Urban residential	42	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR188	Urban residential	39	32	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 5 dB
UR189	Urban residential	40	32	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 5 dB
UR190	Urban residential	41	33	34	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 9 dB
UR191	Urban residential	40	33	34	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 9 dB
UR192	Urban residential	42	35	36	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 10 dB
UR193	Urban residential	41	33	34	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 9 dB
UR194	Urban residential	40	33	34	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 9 dB
UR195	Urban residential	41	33	34	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 5 dB
UR196	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR197	Urban residential	39	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR198	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR199	Urban residential	39	31	33	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 6 dB
UR200	Urban residential	39	31	32	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 6 dB
UR201	Urban residential	39	31	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 5 dB
UR202	Urban residential	41	33	34	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 9 dB
UR203	Urban residential	42	34	35	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Yes	Exceeds by 9 dB
UR204	Urban residential	42	34	35	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Yes	Exceeds by 9 dB
UR205	Urban residential	41	34	35	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 9 dB
UR206	Urban residential	44	36	37	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 9 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 11 dB
UR207	Urban residential	41	33	35	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 8 dB
UR208	Urban residential	42	34	35	45	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Yes	Exceeds by 10 dB
UR209	Urban residential	43	35	36	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Exceeds by 11 dB
UR210	Urban residential	41	33	34	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 6 dB	Yes	Yes	Exceeds by 8 dB
UR211	Urban residential	42	34	36	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 7 dB	Yes	Exceeds by 1 dB	Exceeds by 11 dB
UR212	Urban residential	42	34	35	44	45	35	Yes	Yes	Yes	Yes	Exceeds by 7 dB	Yes	Yes	Exceeds by 9 dB
UR213	Urban residential	43	36	37	47	45	35	Yes	Yes	Yes	Exceeds by 2 dB	Exceeds by 8 dB	Exceeds by 1 dB	Exceeds by 2 dB	Exceeds by 12 dB
UR214	Urban residential	43	35	36	46	45	35	Yes	Yes	Yes	Exceeds by 1 dB	Exceeds by 8 dB	Yes	Exceeds by 1 dB	Exceeds by 11 dB
UR215	Urban residential	37	29	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR216	Urban residential	37	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 3 dB
UR217	Urban residential	37	29	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 3 dB
UR218	Urban residential	37	29	30	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 3 dB
UR219	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR220	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR221	Urban residential	38	31	32	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR222	Urban residential	37	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 3 dB
UR223	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR224	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR225	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR226	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR227	Urban residential	37	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR228	Urban residential	38	30	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR229	Urban residential	37	30	31	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR230	Urban residential	37	30	31	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR231	Urban residential	36	28	29	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 1 dB
UR232	Urban residential	37	29	30	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR233	Urban residential	37	29	30	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR234	Urban residential	37	29	30	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR235	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR236	Urban residential	36	28	29	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 4 dB
UR237	Urban residential	37	29	30	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 4 dB
UR238	Urban residential	37	29	31	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR239	Urban residential	37	29	30	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 2 dB
UR240	Urban residential	40	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 4 dB
UR241	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR242	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR243	Urban residential	39	32	33	43	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 8 dB
UR244	Urban residential	38	30	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR245	Urban residential	40	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 4 dB
UR246	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR247	Urban residential	39	31	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR248	Urban residential	40	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 4 dB
UR249	Urban residential	38	30	31	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 7 dB
UR250	Urban residential	38	30	32	42	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 7 dB
UR251	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR252	Urban residential	39	31	33	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 5 dB
UR253	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR254	Urban residential	38	30	31	41	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 6 dB
UR255	Urban residential	38	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 4 dB
UR256	Urban residential	39	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR257	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR258	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR259	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR260	Urban residential	40	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 4 dB
UR261	Urban residential	39	31	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR262	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR263	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR264	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR265	Urban residential	40	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 5 dB	Yes	Yes	Exceeds by 4 dB
UR266	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR267	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR268	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR269	Urban residential	38	31	32	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 4 dB
UR270	Urban residential	38	30	31	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 4 dB
UR271	Urban residential	39	32	33	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 4 dB
UR272	Urban residential	37	30	31	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 5 dB
UR273	Urban residential	39	31	33	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR274	Urban residential	37	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 3 dB
UR275	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR276	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR277	Urban residential	38	30	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR278	Urban residential	38	30	31	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR279	Urban residential	38	31	32	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 2 dB
UR280	Urban residential	38	30	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR281	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR282	Urban residential	39	31	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 4 dB	Yes	Yes	Exceeds by 3 dB
UR283	Urban residential	38	30	31	39	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 4 dB
UR284	Urban residential	38	30	32	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 3 dB
UR285	Urban residential	38	30	31	40	45	35	Yes	Yes	Yes	Yes	Exceeds by 3 dB	Yes	Yes	Exceeds by 5 dB

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR286	Urban residential	35	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR287	Urban residential	35	28	29	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR288	Urban residential	35	27	28	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR289	Urban residential	34	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR290	Urban residential	34	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR291	Urban residential	35	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR292	Urban residential	35	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR293	Urban residential	35	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR294	Urban residential	35	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR295	Urban residential	35	27	28	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR296	Urban residential	35	27	29	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR297	Urban residential	32	25	26	36	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Exceeds by 1 dB
UR298	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR299	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR300	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR301	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR302	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR303	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR304	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR305	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR306	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR307	Urban residential	34	26	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR308	Urban residential	34	26	27	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR309	Urban residential	34	26	27	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR310	Urban residential	34	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR311	Urban residential	34	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR312	Urban residential	32	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR313	Urban residential	32	24	25	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR314	Urban residential	32	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR315	Urban residential	31	24	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR316	Urban residential	32	24	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR317	Urban residential	32	24	25	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR318	Urban residential	32	24	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR319	Urban residential	33	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR320	Urban residential	33	25	26	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR321	Urban residential	34	26	27	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR322	Urban residential	34	26	27	33	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR323	Urban residential	33	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR324	Urban residential	33	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR325	Urban residential	33	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR326	Urban residential	33	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR327	Urban residential	31	24	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR328	Urban residential	33	25	26	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR329	Urban residential	32	24	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR330	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR331	Urban residential	31	23	25	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR332	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR333	Urban residential	33	25	26	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR334	Urban residential	32	24	25	31	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR335	Urban residential	32	24	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR336	Urban residential	31	23	25	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR337	Urban residential	33	25	26	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR338	Urban residential	32	24	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR339	Urban residential	32	24	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR340	Urban residential	32	25	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR341	Urban residential	32	24	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

RID	Category	Predicted construction noise level				Construction noise criteria		Achieves Noise affected level?							
								Standard hours				Outside standard hours			
		CS01	CS02	CS03	CS04	Standard hours (day)	Outside standard hours	CS01	CS02	CS03	CS04	CS01	CS02	CS03	CS04
UR342	Urban residential	32	24	26	32	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR343	Urban residential	36	28	29	38	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 3 dB
UR344	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR345	Urban residential	36	28	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 1 dB
UR346	Urban residential	36	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 1 dB
UR347	Urban residential	35	28	29	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR348	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR349	Urban residential	36	28	30	37	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 2 dB
UR350	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR351	Urban residential	37	29	31	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR352	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR353	Urban residential	36	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 1 dB
UR354	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR355	Urban residential	37	29	31	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR356	Urban residential	36	29	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR357	Urban residential	36	28	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR358	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR359	Urban residential	36	28	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR360	Urban residential	36	29	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR361	Urban residential	36	29	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR362	Urban residential	36	29	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR363	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR364	Urban residential	36	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 1 dB
UR365	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR366	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR367	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR368	Urban residential	36	28	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR369	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR370	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR371	Urban residential	35	28	29	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR372	Urban residential	36	28	30	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR373	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR374	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR375	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR376	Urban residential	35	27	28	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR377	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR378	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR379	Urban residential	35	28	29	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR380	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR381	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR382	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR383	Urban residential	35	27	28	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR384	Urban residential	35	27	28	34	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR385	Urban residential	35	27	28	35	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UR386	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes
UR387	Urban residential	37	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 2 dB	Yes	Yes	Exceeds by 1 dB
UR388	Urban residential	36	29	30	36	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Exceeds by 1 dB
UR389	Urban residential	33	25	26	36	45	35	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Exceeds by 1 dB
UR390	Urban residential	36	28	29	35	45	35	Yes	Yes	Yes	Yes	Exceeds by 1 dB	Yes	Yes	Yes

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