Port 110 Mtpa Expansion Project

Environmental Noise Assessment

Prepared for Roy Hill Infrastructure

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Executive Summary

Roy Hill Infrastructure Pty Ltd (Roy Hill) is planning to increase the approved throughput capacity of their Port Hedland Port Facility from 70 Million tonnes per annum (Mtpa) to 110 Mtpa (the Project). The Project capacity uplift will be achieved by installing new infrastructure and upgrading existing infrastructure. This report summarises an environmental noise impact assessment undertaken for the Project.

The aim of this noise assessment is to quantify the environmental noise impacts of the Project on the Town of Port Hedland.

The "during growth" methodology adopted for this noise assessment is based on the Port Hedland Industries Council (PHIC) Cumulative Environmental Noise Study (CENS) recommendations described in section 2.2 of this report. Following this methodology requires that Roy Hill's 110 Mtpa noise levels in Port Hedland are less than or equal to the Base Case[1] noise levels.

Based on this approach, the following noise modelling scenarios were undertaken to determine if noise emissions from the 110 Mtpa facility will result in an increase in overall noise levels in the Town of Port Hedland:

- Base Case[1] – the current port facility noise emissions.
- 110 Mtpa Case – the Base Case[1] plus all new Project infrastructure.
- Determine if noise emissions from the 110 Mtpa facility will result in an increase in noise levels in Port Hedland.

The modelling and analysis undertaken has shown that the Project increases the facility noise levels received in the Town of Port Hedland by up to 1.6 dB when compared to the Base Case. This change is due to new infrastructure being added to the facility. As a result, noise control is required to reduce the increase in received noise levels to the Base Case.

The Project will implement a noise control package which includes a combination of the following:

- Ultra-Low Noise Idlers (ULNI[2]) applied to conveyors.
- Noise shielding of conveyor drives.

The noise control package will result in a no net increase in the received noise levels in the Town of Port Hedland. As the received noise levels are predicted to remain the same, the 110 Mtpa facility will not result in any increase in Port Hedland's existing background noise levels.

[1] Several key receivers in the Town of Port Hedland are used to evaluate the noise impacts of the Roy Hill facility. All the receivers, except for one (i.e. the Hospital), have the assigned levels as their maximum allowable level. The Hospital's maximum allowable level is the level specified in the Department of Water and Environmental Regulation (DWER) Licence Amendment decision report L8967-2016 [4]).

[2] SWL ≤85dB(A)/m (i.e. Sound Pressure Level (SPL) ≤74 dB(A) at 1 metre).

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1 Introduction

Roy Hill Infrastructure Pty Ltd (Roy Hill) is planning to increase the approved throughput capacity of their Port Hedland Port Facility from 70 Million tonnes per annum (Mtpa) to 110 Mtpa (the Project). The Project capacity uplift will be achieved by installing new infrastructure and upgrading existing infrastructure.

This report summarises an environmental noise impact assessment undertaken for the Project.

1.1 Aim

The aim of this noise assessment is to quantify the environmental noise impacts of the Project on the Town of Port Hedland.

1.2 Scope

The scope of the report includes an environmental noise assessment of Roy Hill's proposed 110 Mtpa facility. The Project noise emissions were compared against the assessment criteria given in section 2.

1.3 Applicable Documents

[1] Environmental Protection Act 1986.

[2] Environmental Protection (Noise) Regulations 1997.

[3] Draft Guidance Note 8 "Guideline on Environmental Noise for Prescribed Premises".

[4] Department of Water and Environmental Regulation (DWER) Licence Amendment Decision Report L8967/2016/1, 3 December 2018.

[5] Port Hedland Industries Council "Port Hedland Cumulative Environmental Noise Study", 2014.

[6] Port Hedland Industries Council "Port Hedland Cumulative Environmental Noise Study", 2020 Rpt01-1253921.5-Rev0-17 Jan 2020.

2 Assessment Criteria

2.1 Environmental Protection (Noise) Regulations

Noise management in Western Australia is implemented through the *Environmental Protection (Noise) Regulations 1997* [2], which operate under the *Environmental Protection Act 1986 (EP Act)*.

The Regulations define maximum allowable noise levels which apply to noise received at noise sensitive premises, such as residential areas. These are determined by a combination of a base noise level plus an Influencing Factor (IF). The result is termed the "assigned level".

The assigned noise levels include L_{A1}, L_{A10} and L_{AMAX} noise parameters, defined as:

- L_{ASMAX} means an assigned level which is not to be exceeded at any time;
- L_{AS1} means an assigned level which is not to be exceeded for more than 1% of time;
- L_{AS10} means an assigned level which is not to be exceeded for more than 10% of time.

The L_{A10} noise limit is most representative of continuous noise emissions from the Project.

For noise sensitive premises, the time of day also affects the assigned levels. As the Project will operate 24 hours a day, 7 days a week, the noise emissions have been assessed against the most stringent night-time assigned levels (10pm-7am).

Based on the above, the night-time L_{A10} noise level will be used to assess the Project. A discussion of the Environmental Protection (Noise) Regulations [2] is presented in Appendix A.

2.2 Port Hedland Industries Council (PHIC) Cumulative Environmental Noise Study (CENS) Methodology

The PHIC cumulative environmental noise study (CENS) [5],[6] has identified that cumulative noise emissions from industry in Port Hedland currently exceed the Regulatory noise levels. At this stage, a Regulation 17 exemption process has not been initiated for Port Hedland. Until such an exemption has been approved, the PHIC strategic noise goals are being used to ensure that there is no net increase in noise levels within Port Hedland.

This study has therefore adopted the "during growth" methodology based on the PHIC CENS recommendations, which are as follows:

- When assessed in-isolation, i.e. excluding existing plant and infrastructure, any new plant equipment and infrastructure must comply with the *Environmental Protection (Noise) Regulations 1997*.
- The overall noise emissions, i.e. those of new plant and existing plant, remain the same or improve.
- As Low As Reasonably Practicable (ALARP) noise levels must be achieved and demonstrated.

The "during growth" methodology is applicable to the Project as it involves the installation of new infrastructure. This methodology requires Roy Hill to determine the change in impact of the 110110 Mtpa upgrades on the existing facility noise emissions and received noise levels in Port Hedland.

Given that the extent of the new Project infrastructure is significant, the 'in-isolation' scenario has not been considered and the cumulative overall emissions of the facility have been the focus of the noise assessment as they have the largest impact on the Town of Port Hedland. Therefore, it is important

that the noise impacts from the 110 Mtpa scenario improve or remain the same by ensuring no net increase in noise levels into the Town of Port Hedland.

The following noise modelling scenarios were undertaken to determine if noise emissions from the 110 Mtpa facility will result in an increase in overall noise levels in the Town of Port Hedland:

- **Base Case[3].** The existing noise emissions from existing 70 Mtpa facility. This is used to determine the impact of the Project equipment.
- **Impact of 110 Mtpa upgrades on Base Case.** This scenario consists of the existing facility (i.e. the Base Case) plus all new equipment required for the Project. This scenario is used to determine the increase in facility noise emissions for the 110 Mtpa facility (i.e. Base Case plus new Project equipment) when considering Roy Hill operations only (i.e. without any other industrial facilities noise).

- **Impact of 110 Mtpa upgrades on cumulative levels.** Determine if the upgraded 110 Mtpa facility will result in an increase in background noise levels in the Town of Port Hedland.

2.3 Applicable Noise Limits for the Project

Five key noise sensitive receivers have been used to quantify the noise impacts of the Project which are consistent with those used for the PHIC CENS noise study in Port Hedland [6] and previous Roy Hill expansions.

In order to quantify the noise impact of the Project on the overall facility noise emissions, the existing facility noise emissions are used as the Base Case[3] for the assessment. The applicable noise Base Case for the Project is presented in Table 2-1.

Table 2-1 Receiver Locations (as per PHIC CENS) and Applicable Noise Levels

Receiver Name	GPS Coordinates (UTM MGA94)		Night-time LA10 BASE CASE	PHIC Current Scenario Cumulative Noise Levels
	Easting	Northing		
Brearley Street	667699	7753338	32	50.5
Hospital	665799	7753424	37.7	58.2
Police Station	664652	7753117	47	62.9
Pretty Pool	671261	7752709	30	39.2
South Hedland	667852	7742771	30	34.7

[3] Several key receivers in the Town of Port Hedland are used to evaluate the noise impacts of the Roy Hill facility. All the receivers, except for one (i.e. the Hospital), have the assigned levels as their maximum allowable level. The Hospital's maximum allowable level is the level specified in the Department of Water and Environmental Regulation (DWER) Licence Amendment decision report L8967-2016 [4]).

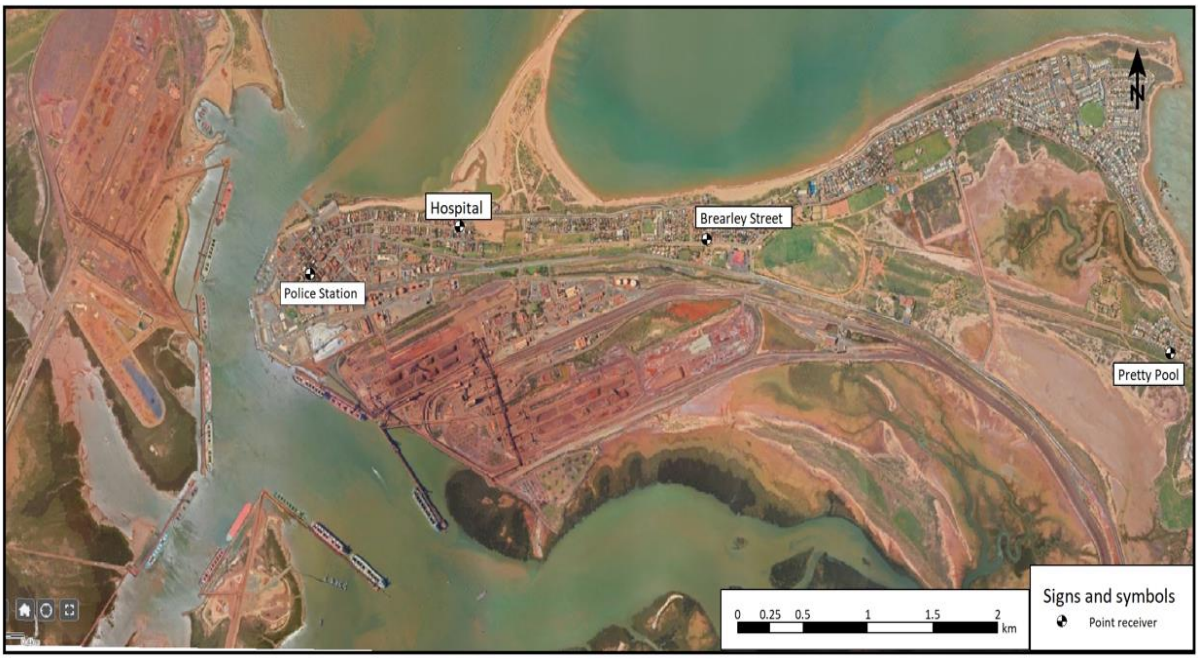

Figure 2-1 Noise Sensitive Receivers in Port Hedland (as per PHIC CENS)

3 Facility and Project Overview

3.1 Facility Overview

The Port Facility currently exports 70 Mtpa of iron ore. The facility includes a rail loop, train unloading infrastructure, conveyors, drives, transfer stations, stockyard machines (i.e. reclaimers and stackers, overland conveyor and outload infrastructure including wharf and ship loader).

The Port Facility operates 24 hours a day, 7 days a week.

3.2 Project Overview

The Project is proposing to increase the maximum throughput capacity of the Port Facility from 70 to 110 Mtpa. The Project will require new infrastructure, as well as some modification to existing infrastructure (e.g. drive motor replacements). The noise model includes all infrastructure changes required by the Project.

Figure 3-1 shows the new Project infrastructure which is proposed to be added to Roy Hill's existing Port Facility to facilitate the capacity uplift.

A detailed list of the new and existing equipment noise source levels are given in Appendix B.

Table 3-1 New Infrastructure

Description	Belt Speed	Drive Size & Quantity
Machines		
Car Dumper CDU201		
Stacker SKR211		
Reclaimer REC215		
Shiploader 2 SLD264		
Stockyard		
Conveyor CVR204	5.00 m/s	1800 kW x1
Conveyor CVR205	5.50 m/s	1800 kW x1
Conveyor CVR211	5.50 m/s	1250 kW x3
Conveyor CVR216	6.00 m/s	1250 kW x3
Process and Overland Conveyors		
Conveyor CVR222	5.50 m/s	1000 kW x 2
Conveyor CVR261	5.50 m/s	2000 kW x 2
Wharf		
Conveyor CVR264	5.15 m/s	2000 kW x 1

Figure 3-1 Project Layout – Port Landside

Figure 3-2 Project Layout - Port Marine

4 Noise Modelling Overview

4.1 Approach and Base Case Model

The Base Case model configuration used for this study is the 70 Mtpa model [4]. All new equipment for the Project will be modelled and compared with the Base Case to determine the increase in noise emissions caused by the Project.

4.2 Noise Model Software

A desktop environmental noise model was created to simulate the Roy Hill facility (and the Project) using the SoundPlan v8 software program. This software package calculates sound pressure levels at nominated receiver locations and produces noise contours over a defined area of interest. SoundPlan can be used to model different types of noise, such as industrial noise, traffic noise and aircraft noise.

The inputs required by the SoundPlan modelling software are noise sources, ground topographical and absorption data, meteorological data, and sensitive receiver point locations. SoundPlan has been setup for the study to utilise ISO9613 for calculating the attenuation of sound during outside propagation and the CONCAWE[4,5] prediction algorithm.

4.3 Noise Model Inputs

4.3.1 Noise Sensitive Receivers

Five key noise sensitive receivers listed in Table 2-1 and shown in Figure 2-1 have been used for this noise assessment. These receivers are the same as used in the PHIC CENS [6].

4.3.2 Topography and Ground Absorption

The topographical data, digital ground map and ground absorption factors entered in the noise model was consistent with the PHIC CENS [6]. This includes topography as well as stockpile berms within the existing facility. The ground absorption for the sea surface was set to zero (perfectly reflecting) representing a realistic worst-case condition, and a ground factor of 0.6 was used for land.

4.3.3 Meteorological Conditions

SoundPlan calculates noise levels for defined meteorological conditions. Temperature, relative humidity, wind speed and direction data are required as inputs to the model. Table 4-1 presents the worst-case meteorological conditions applied to the model, which are defined in DWER's environmental noise guidelines [3]

[4] CONCAWE (Conservation of Clean Air and Water in Europe) was established in 1963 by a group of oil companies to carry out research on environmental issues relevant to the oil industry.

[5] The propagation of noise from petroleum and petrochemical complexes to neighbouring communities, CONCAWE Report 4/81, 1981.

Table 4-1 : Worst-Case Meteorological Conditions applied to the model

Time of day	Temperature	Relative Humidity	Wind Speed	Wind Direction	Pasquil Stability Category (PSC)
Night (19:00 - 07:00)	15° Celsius	50%	3 m/s	worst case	F

4.3.4 Noise Sources

Existing Facility - The existing Roy Hill facility equipment noise source Sound Power Levels (SWLs) used in the model are a combination of existing modelled data and site-based measurement data.

New Project Equipment - The new Project equipment SWLs added to the facility have been calculated based on existing equipment or representative similar equipment from other facilities and/or engineering data and information provided by Roy Hill.

The new infrastructure required for the Project has been added to the existing Roy Hill Port Operations noise model. New noise sources have been positioned using layout drawings (see Figure 4-1 and Figure 4-2) and engineering information provided by Roy Hill.

4.4 Noise Model Scenarios

In accordance with PHIC CENS "during growth" recommendations, the following scenarios have been modelled:

- **Base Case (70 Mtpa).** The existing 70 Mtpa facility, as per [4].
- **110 Mtpa Scenario**. The 110 Mtpa scenario consists of all the new infrastructure plus all existing Port Facility equipment.

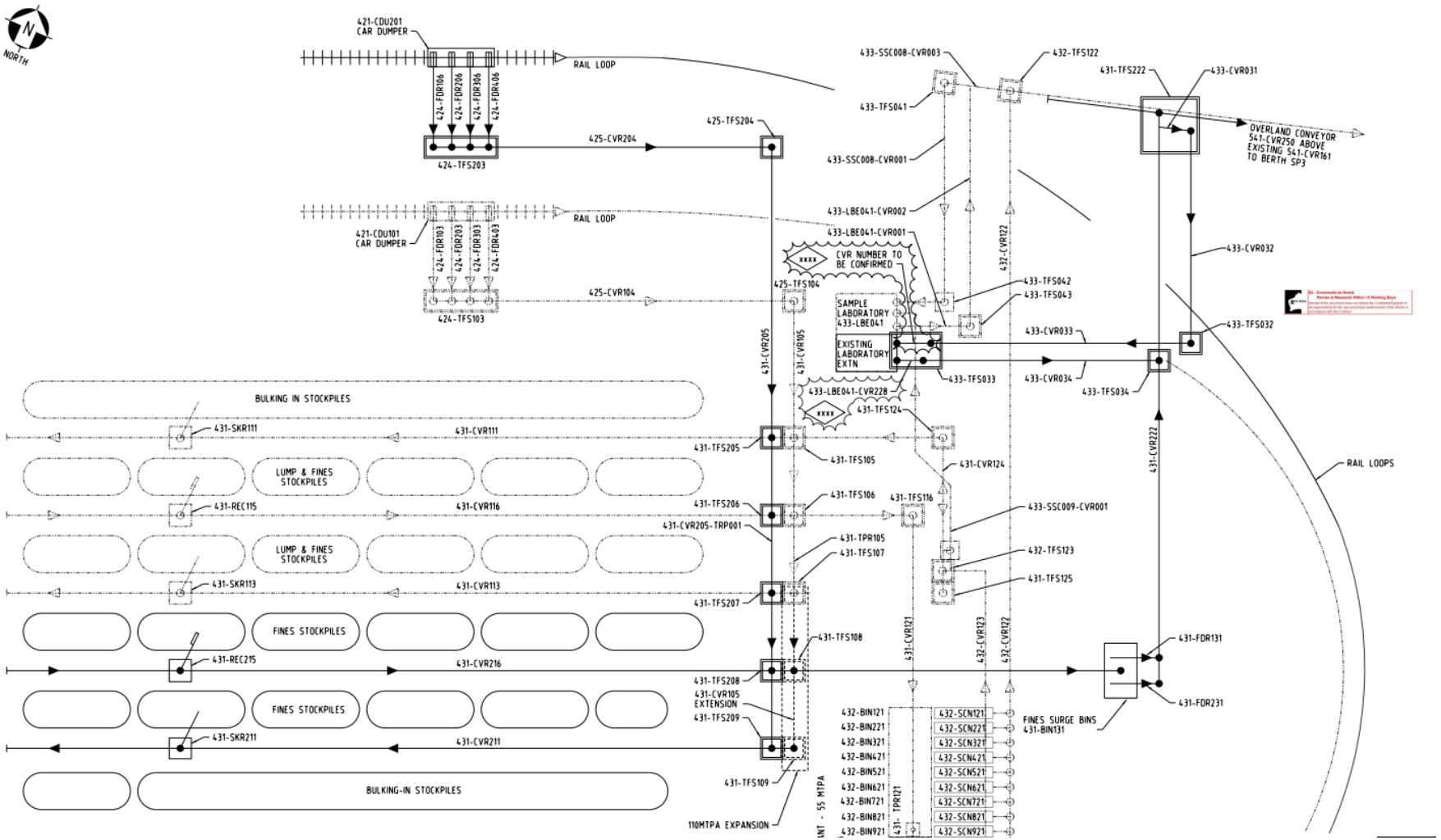

Figure 4-1 Stockyard Layout (refer to Roy Hill Drawing (4000-ME-DRG-3309)

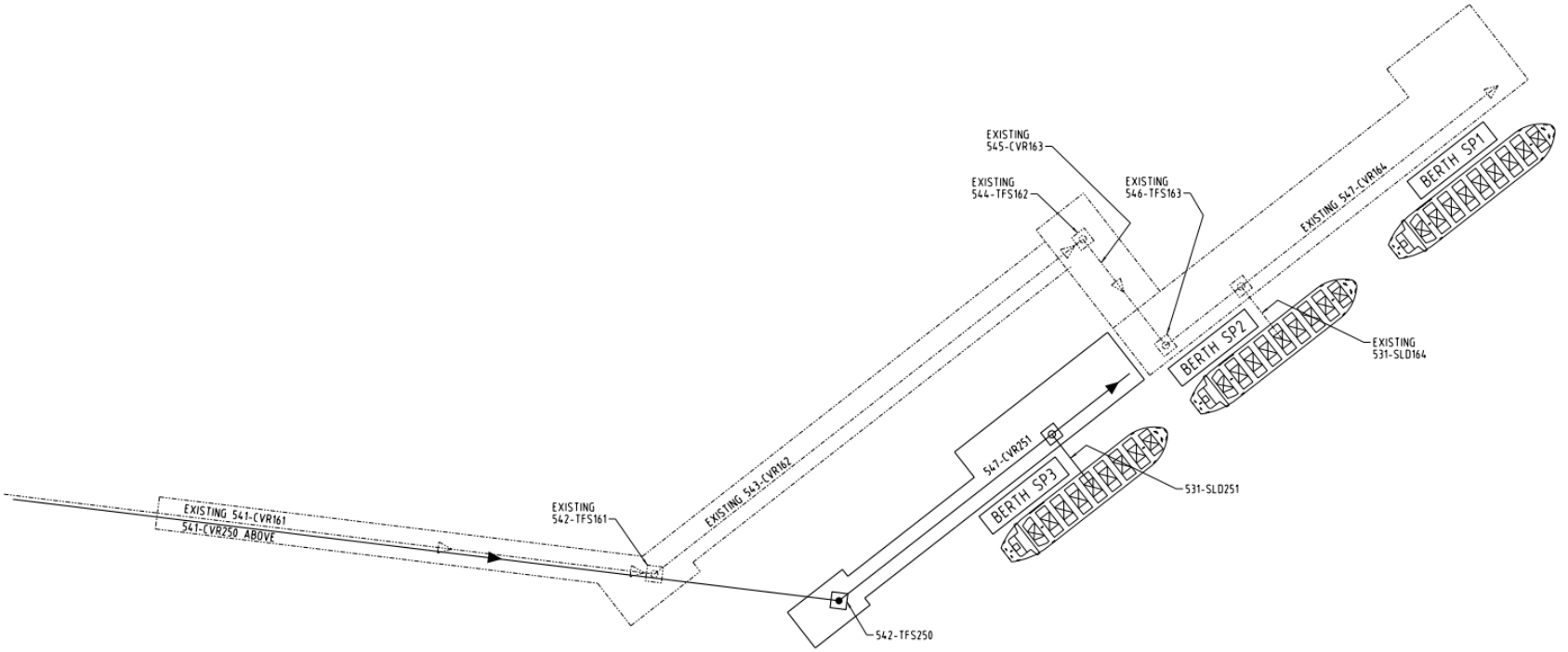

Figure 4-2 Wharf Layout (refer to Roy Hill Drawing 4000-ME-DRG-0010)

Figure 4-3 Model Layout – New Project Infrastructure

5 Noise Model Results

The following sections present the modelling results, contour maps and a results discussion.

5.1 Model Results

Table 5-1 shows the predicted received noise levels for the 110 Mtpa facility (Project plus existing facility), and a comparison against the Base Case. All model scenarios were run under worst case night-time weather conditions [3].

Table 5-1 LA10 Noise Modelling Results and compliance assessment

Sensitive Receiver	Base Case[1]	110 Mtpa Model Result	Increase in overall facility noise emissions (Δ in dB) / exceedance of Base Case
Brearley Street	32	32.2	0.2
Hospital	37.7	39.3	1.6
Police Station	47	45.6	Nil
Pretty Pool	30	23.7	Nil
South Hedland	30	21.1	Nil

5.2 Results Discussion

From the modelling and analysis for the Project, the following has been concluded:

- The received noise levels from the 110 Mtpa facility exceeds the Base Case at two receivers, with the largest increase occurring at the Hospital of 1.6 dB.
- Noise control will be required to reduce the 110 Mtpa facility noise levels to the Base Case (see section 6).

5.3 Noise Contour Maps

Figure 5-1 is a noise contour map showing the 110 Mtpa noise levels in the Town of Port Hedland.

Figure 5-1 110 Mtpa Noise Contour Map (no noise control)

6 Noise Control

Noise control is required to reduce the received noise levels to the Base Case. From the modelling and analysis undertaken, the Project will implement a noise control package (see Table 6-1) which includes a combination of the following:

- Ultra-Low Noise Idlers (ULNI) applied to conveyors.
- Noise shielding of conveyor drives.

Table 6-1 Noise Control Package

Equipment item	Noise Control
Conveyor CVR264	ULNI
Conveyor CVR261	ULNI
Conveyor CVR164	ULNI
Shiploader SLD264 Conveyor	ULNI
Conveyor CVR205	ULNI
Conveyor CVR211	ULNI
Conveyor CVR216	ULNI
Conveyor CVR222	ULNI
Drive CVR164-DRV001	Drive Shielding
Drive CVR164-DVR002	Drive Shielding
Drive CVR264	Drive Shielding

The noise control package will result in a no net increase in the received noise levels in the Town of Port Hedland.

Figure 6-1 presents a noise contour map for the facility after the noise control package has been applied.

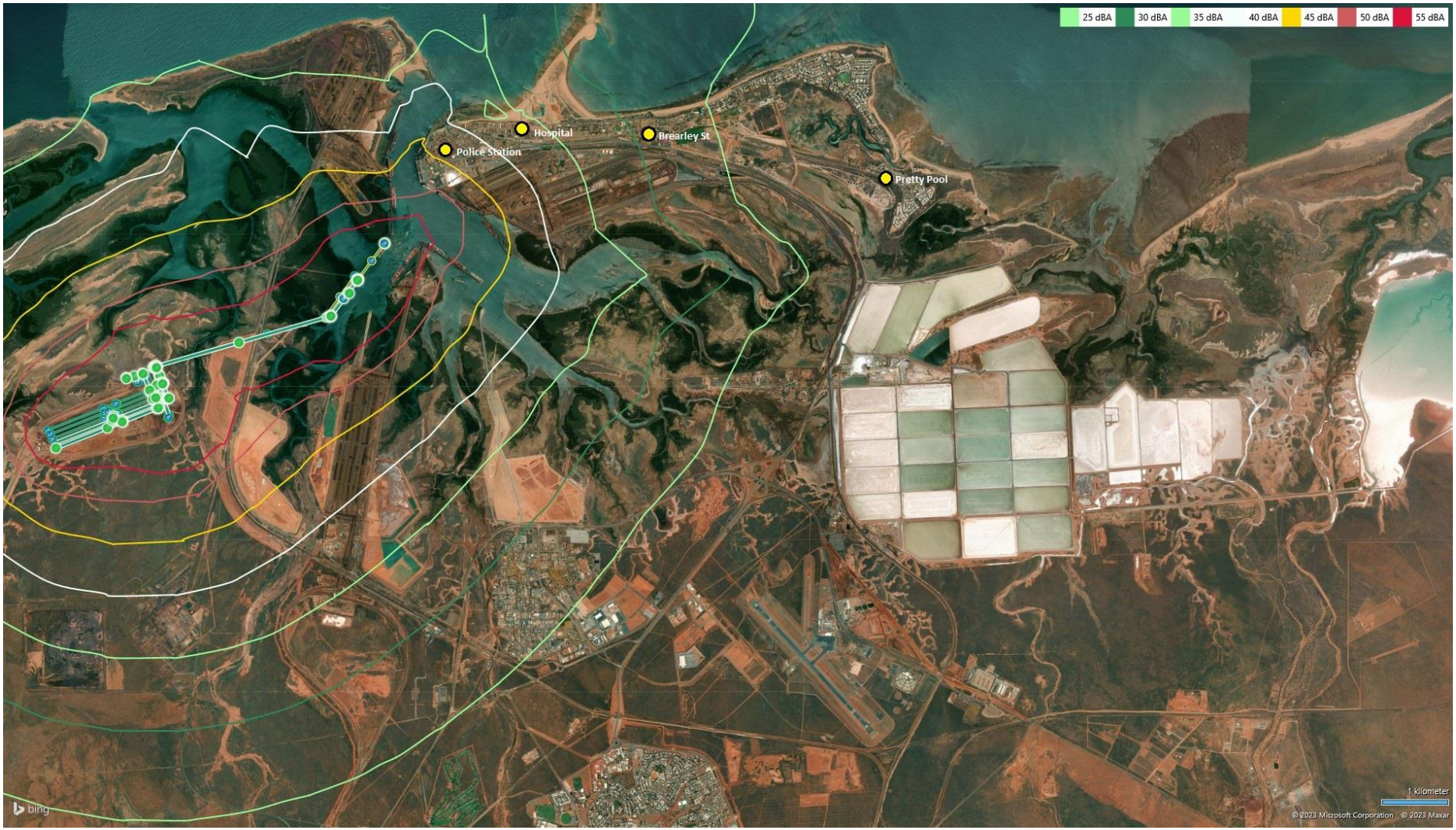

Figure 6-1 110 Mtpa Noise Contour Map (post noise control)

7 Cumulative Noise Levels in Port Hedland

As the received noise from the Project (with noise controls) is predicted to remain the same, the Project will not result in any increase in Port Hedland's existing background noise levels.

Table 7-1 shows that the Project results in no increase in background noise levels (i.e. PHIC Current Scenario) in Port Hedland.

Table 7-1 Roy Hill Contribution to the Cumulative Noise Levels in Port Hedland

Receiver	Cumulative Levels [dB(A)]		
	PHIC Current Scenario	Roy Hill 110 Mtpa facility (with Noise Control)	Increase in Background Noise
Brearley Street	50.5	32.0	NIL
Hospital	58.2	37.7	NIL
Police Station	62.9	45.6	NIL
Pretty Pool	39.2	23.7	NIL
South Hedland	34.7	21.1	NIL

APPENDIX A Noise Legislation

Noise management in Western Australia is implemented through *the Environmental Protection (Noise) Regulations 1997* (the Regulations), which operate under the EP Act . The Regulations specify maximum noise levels (assigned noise levels) which are the highest noise levels that can be received at noise-sensitive (residential), commercial and industrial premises.

Assigned noise levels are defined differently for noise sensitive premises, commercial premises, and industrial premises. For noise sensitive premises, an Influencing Factor (IF) is included in the assigned noise levels. The IF depends on the presence of major/minor roads and commercial/industrial land use zonings within circles of 100 metres and 450 metres radius from the noise receiver.

For noise sensitive residences, the time of day also affects the assigned levels. The regulations define three types of assigned noise level:

- L_{ASMAX} means an assigned level that is not to be exceeded at any time;
- L_{AS1} means an assigned level that is not to be exceeded for more than 1% of time;
- L_{AS10} means an assigned level that is not to be exceeded for more than 10% of time.

Table A1: Assigned Noise Levels for Noise Sensitive Receivers

Type of premises receiving noise	Time of day	Assigned Levels (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	70	75	80
Commercial premises	All hours	70	75	80
Industrial and utility premises other than those in the Kwinana Industrial Area	All hours	65	80	90

Industrial and utility premises in the Kwinana Industrial Area	All hours	75	85	90

Environmental Protection (Noise) Regulations 1997

Appendix A1 Non Significant Contributor

The Regulations require that *"noise emitted from any premises when received at other premises must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind".*

A noise emission is taken to significantly contribute to a level of noise if the noise emission exceeds a value which is **5 dB below the assigned level** at the point of reception.

This means that received noise from the new infrastructure must not exceed a received noise level which is 5dB below the assigned noise level. This is because there are many other industrial premises located in Port Hedland which cumulatively contribute to the received noise levels, and as such, the proposed infrastructure must not significantly contribute to an exceedance of the assigned level. The results and compliance assessment have assumed that this -5dB adjustment is applicable.

APPENDIX B Equipment Noise Source Levels (SWLs)

Table B 1 - Modelled Equipment, Sound Power Levels (SWLs)

Equipment Item	Overall SWL per item in dB(A) [6]	Equipment Item	Overall SWL per item in dB(A)
New Infrastructure			
425- CVR204	87	CVR222 Drive 2	110
432-TFS206	99	CVR222 Drive 1	110
433-SSC008-CVR003 Extension	87	CVR261 Drive 1	112
Bucket Drive Reclaimer REC216	106	CVR261 Drive 2	112
Car Dumper CDU201	111	CVR264 Drive	112
Chute Reclaimer REC216	106	REC216 Drive CVR215	106
Chute Stacker SKR211	106	SKR211 Drive CVR212	106
Conveyor CVR 122_shortened	92	REC216	105
Conveyor CVR205	92	SLD264 Drive CVR265-DRV001	110
Conveyor CVR211	92	SLD264 Drive CVR265-DRV002	110
Conveyor CVR216	93	Ship Loader SLD264	110
Conveyor CVR222	93	Transfer Station BIN123	99
Conveyor CVR261	92	Transfer Station SHT208	99
Conveyor CVR264	91	Transfer Station SST207	99
Conveyor FDR131	86	Transfer station TFS261	99
Conveyor CVR204 Drive	112	Transfer Station TFS-201	99
Conveyor CVR205 Drive	112	Transfer Station TFS108	99
Conveyor CVR211 Drive	112	Transfer Station TFS122B	99
Conveyor FDR231	86	Transfer Station TFS200	99
SKR211 Conveyor CVR212	86	Transfer Station TFS202	99
Conveyor CVR222	91	Transfer Station TFS204	99
CVR164 Extension Drive	110	Transfer Station TFS205	99
CVR216 - Drive 2	110	Transfer Station TFS261	99
CVR205 Drive	112	CVR211 - Drive1	110

[6] Conveyors are quoted as SWL/metre (in dBA)

Equipment Item	Overall SWL per item in dB(A) [6]	Equipment Item	Overall SWL per item in dB(A)
CVR216 - Drive 1	110	CVR211 - Drive2	110
		CVR211 - Drive3	110
Existing Infrastructure			
Bucket Drive Reclaimer REC 116	112	Drive CVR 121	107
Car Dumper CDU 101	111	Drive CVR 122	107
Chute Reclaimer REC 116	106	Drive CVR 123	107
Chute Stacker SKR 111	106	Drive CVR 124	107
Chute Stacker SKR 113	108	CVR161 Drive 1	112
Conveyor CVR 104	87	CVR161 Drive 2	112
Conveyor CVR 105	87	Drive CVR 162	107
Conveyor CVR 111	89	Drive CVR 163	103
Conveyor CVR 113	89	Drive CVR 164 A	110
Conveyor CVR 116	89	Drive CVR 164 B	110
Conveyor CVR 121	91	Drive Reclaimer REC 116	106
Conveyor CVR 122	92	Drive Shiploader SP1	107
Conveyor CVR 123	88	Drive Stacker SKR 111	106
Conveyor CVR 124	88	Drive Stacker SKR 113	106
Conveyor CVR 161	88	LRP	123
Conveyor CVR 162	88	Ship loader SP 1	108
Conveyor CVR 163	93	Transfer Station 116	108
Conveyor CVR 164	92	Transfer Station TS 104	108
Conveyor Reclaimer REC 116	90	Transfer Station TS 105	108
Conveyor SKR 111	93	Transfer Station TS 111	108
Conveyor SKR 113	93	Transfer Station TS 113	108
CVR164 Drive	112	Transfer Station TS 121	108
Drive CVR 104	108	Transfer Station TS 122	108
Drive CVR 111	107	Transfer Station TS 123	108
Drive CVR 113	107	Transfer Station TS 162	108
Drive CVR 116	107	Transfer Station TS 163	108
CVR105 Drive	112	Drive CVR 121	107

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