Prepared for
Stolthaven Australia Pty Ltd
ABN: 26 075 030 992

Stolthaven Bulk Liquids Fuel Storage Facility, Mayfield

Operational Noise Compliance Assessment (2022)

20-Dec-2022
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Client: Stolthaven Australia Pty Ltd

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Prepared by

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A	19-Dec-2022	Draft for client's comments	Patrick Martinez Technical Director - Acoustics	
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Table of Contents

List of Tables

List of Figures

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was engaged by Stolthaven Australia Pty Ltd (Stolthaven) in November 2022 to carry out noise compliance measurements for operations at the Stolthaven Bulk Liquids Fuel Storage Facility (the Facility) operated by Stolthaven at the Port of Newcastle, Mayfield, NSW.

Mayfield No. 7 Berth was commissioned in 2018 and now services the Facility for the import and export of petroleum products.

The Facility has three approval/license documents that currently control its operations, these documents are:

- The NSW Environment Protection Authority (EPA) issued Environment Protection Licence No. 20193 (EPL 20193), License version date 31 January 2020;
- State Significant Development (SSD) Development Consent 7065 – 15 December 2016; and
- Mayfield Concept Approval (MCP) (Application 09_0096) dated 16 July 2012 (latest modification 12 December 2014).

The 2022 acoustic assessment was conducted to determine compliance with the requirements of EPL 20193 and SSD 7065.

As the Facility lies within the MCP approval area, it requires noise emissions from the site to be consistent with the environmental assessment requirements of the MCP Approval. Consistency with the MCP Approval requirements has also been addressed in this report.

Conditions L5.6, L5.7 and M9 of EPL 20193 outline the methods to determine compliance with the noise limits within EPL 20193. Attended noise measurements for the 2022 licenced reporting period were undertaken at the closest nearby residential receiver locations in accordance with EPL 20193, Condition L5.6. During the attended measurements, it was not possible to directly measure the noise arising from operations at the Facility due to the influence from extraneous noise sources (i.e. existing industrial noise from other industrial areas unrelated to the Facility and traffic noise on Industrial Drive). In accordance with the EPA NSW Industrial Noise Policy (INP), an alternative method was employed to demonstrate the compliance noise levels. This compliance assessment was carried out using SoundPLAN noise modelling software.

This method of noise compliance assessment is in accordance with Chapter 11 of the INP. In order to determine compliance of the facility's operational noise emissions with the required noise limits, 'reasonable' worst case operational scenarios were projected based on truck movement historical data (provided by Stolthaven) and noise levels based upon on-site attended noise measurements undertaken over the period of 28 to 29 November 2022 and previous site visits. Stolthaven has confirmed that that previous assumed worst case truck movement scenarios are still valid for the 2022 noise compliance assessment.

AECOM has been advised by Stolthaven that no noise complaints have been received to date in relation to noise.

1.1 Mayfield No. 7 Berth Operations

Mayfield No. 7 Berth operated by Stolthaven was commissioned in 2018 and now services the Facility for the import and export of petroleum products. Mayfield No. 7 Berth is classified as Complying Development under State Environmental Planning Policy (Three Ports) 2014 and a Complying Development Certificate (CDC 2016-00067), dated 5 March 2016, was issued by Newcastle City Council for this project. A noise assessment was not required for the Complying Development therefore no noise levels or operational criteria have been developed specifically for Mayfield No. 7 Berth.

Discussions between Stolthaven and the NSW Environment Protection Authority (email dated 20 December 2018) confirmed that shipping activities associated with Mayfield No. 7 Berth are not required to be included as part of the Facility's operational noise compliance assessments.

1.2 Mayfield Concept Plan Approval Requirements

Under Condition 1.6 of the MCP approval, noise emissions associated with the berths, berthing or harbour operations (i.e. shipping activities) are excluded from contributing to the overall MCP noise emissions.

In addition, under Condition 1.14 of the MCP approval, Mayfield No. 7 Berth is excluded from the MCP area as it operates under an existing Complying Development Certificate (CDC 2016-00067), dated 5 March 2016. Note that the Complying Development Certificate does not specify any noise limits associated with operation of Mayfield No. 7 Berth.

Therefore, for the purpose of determining compliance with the MCP approval, operational noise associated with bulk fuel vessels berthed at Mayfield No. 7 Berth have not been included in this assessment.

1.3 State Significant Development (SSD) 7065 Requirements

Similarly to the MCP approval requirements, noise emissions associated with vessels at Mayfield No. 7 Berth are excluded from SSD 7065 and therefore have not been included in this assessment.

In summary, as part of this noise compliance assessment, ship noise emissions associated with Mayfield No. 7 Berth operations have not been considered in this report.

1.4 Noise Generated from Steel Works Road (Shared Access Road)

Stolthaven requested and received confirmation from the following agencies:

- NSW Environment Protection Authority (email dated 1 October 2019)
- Port of Newcastle (email dated 28 October 2019)
- Department of Planning, Industry and Environment (email dated 20 November 2019).

that noise generated from Steel Works Road (shared access road) operational activities (i.e. fuel truck movements) do not form part of the Facility's operational activities. Therefore, fuel truck movements on Steel Works Road are excluded from operational noise compliance assessments.

1.5 EPA Noise Policy for Industry

The *NSW Industrial Noise Policy* (EPA 2000) was withdrawn in November 2017 and replaced by the *Noise Policy for Industry* (EPA 2017) except as described in the EPA document *Implementation and transitional arrangements for the Noise Policy for Industry (2017),* point 8, as presented below:

> *8. The NSW Industrial Noise Policy (2000) will continue to apply where it is referenced in existing statutory instruments (such as consents and licences), except for the NSW Industrial Noise Policy Section 4 modifying factors, which will be transitioned to the Noise Policy for Industry (2017) Fact Sheet C through a NSW Industrial Noise Policy application note. This approach has been taken because the Noise Policy for Industry (2017) modification factor approach reflects more recent understanding of the impact of tonal and low-frequency noise on the community.*

Therefore, the NSW Industrial Noise Policy (2000) continues to apply to the Facility for the purpose of assessing compliance.

1.6 Stolthaven Bulk Liquid Storage Terminal Description

1.6.1 Location

The Facility is located on the former BHP steelworks site in Mayfield North, adjacent to the Hunter River, approximately 5 km north-west of Newcastle CBD. The site location falls within the MCP area, which is currently being redeveloped as an industrial precinct.

During operations, haulage ships will dock at the Mayfield No. 7 Berth and pump fuel into storage tanks to be held on site. Haulage trucks receive the fuels and transport it through an access road leading to the intersection of Industrial Drive and Ingall Street.

The nearest residential areas to the site are located to the south-west of the Facility at Mayfield, with the closest receivers in Crebert Street, approximately 900 m away. To the south there are residential receivers located in Carrington, approximately 2 km away. To the south east there are the residential receivers located in Stockton, approximately 3 km away.

The Facility location and key sensitive receivers are shown in **Figure 1**.

1.6.2 Operational Activities and Facilities

Stolthaven has approval to operate the Facility to receive, store and dispatch diesel and biodiesel fuel. The Facility has been approved for an annual throughput of 1,300 ML of combustible fuels under SSD 7065. Additionally, SSD 7065 authorises the annual storage and handling of 3,500ML of flammable and combustible fuels. Flammable fuels are not yet stored on site but this may occur in future as part of the staged progression of the project.

Note, the Facility surrendered its development consent SSD 6664 in April 2020, and now operates in accordance with consent SSD 7065 (see Appendix B).

The Facility makes use of the newly commissioned Mayfield No. 7 Berth facility to receive diesel fuel, which are transferred to site using an above-ground, dedicated pipeline. Transportation of the fuel to customers is undertaken by road tankers. Transportation occurs 24 hours per day, seven days per week.

1.6.3 Operational Noise Sources

Operations at the site consist of the following activities:

Internal private access roads	• Moving trucks, idling trucks.
Industrial noise sources	• Fuel pumps • Haulage tanker trucks filling

Sound power levels of the different operations at the Facility were determined through on-site measurements conducted on 29 November 2022 and other site visits conducted during previous compliance inspections. Additionally, as previously mentioned, activities from Mayfield No. 7 Berth are not required to be included as part of the Facility's operational noise compliance assessments.

1.6.4 Hours of Operation

The operational hours for the Facility are Monday to Sunday, 24 hours per day.

1.6.5 Nearby Sensitive Receiver Locations

The locations of the Facility and nearby assessment receivers are shown in **Figure 1**. Provided in **Table 1** are the assessment receiver locations including the land use classification in accordance with the INP.

Table 1 Assessment Receiver Locations

EPL Receiver Number / Mayfield Concept Plan Receiver Location[1]	Address	Land use Classification	Associated Receiver Area
Stolthaven EPL Receiver Number			
R1/A	1 Arthur Street, Mayfield	Residence - Urban	Mayfield
R2	52 Arthur Street, Mayfield	Residence - Urban	Mayfield
R3/B	2 Crebert Street, Mayfield	Residence - Urban	Mayfield
R4	21 Crebert Street, Mayfield	Residence - Urban	Mayfield
R5	24 Crebert Street, Mayfield	Residence - Urban	Mayfield
R6	30 Crebert Street, Mayfield	Residence - Urban	Mayfield
R7	50 Crebert Street, Mayfield	Residence - Urban	Mayfield
R8	2 McNeil Close, Mayfield	Residence - Urban	Mayfield
Mayfield Concept Plan Receiver Location			
C	32 Elizabeth Street, Carrington	Residence - Suburban	Carrington
D	186 Fullerton Road, Stockton	Residence - Suburban	Stockton

Notes:

1. Letters designate the Mayfield Concept Plan assessment receiver locations.

Figure 1 Site Location, Assessment Receiver Locations and Measurement Locations

1.7 Compliance Assessment Criteria

This section presents a summary of the noise monitoring requirements applicable to the operation of the Facility.

1.7.1 Environment Protection Licence 20193

Condition L5 *Noise limits* of the EPL 20193, License version date 31 January 2020, presents the noise limits that apply to the operation of the Facility.

Condition L5.1 specifies:

> *Noise generated by the premises must not exceed the noise limits specified in the table below:*

Table 2 Summary of Operational Noise Limits

Receiver	Operational noise limits, dB(A)			
	Day	Evening	Night	
	$L_{Aeq, 15min}$	$L_{Aeq, 15min}$	$L_{Aeq, 15min}$	$L_{A1, 1min}$
R1 - 1 Arthur Street, Mayfield	35	35	35	45
R2 - 52 Arthur Street, Mayfield	35	35	35	48
R3 - 2 Crebert Street, Mayfield	41	41	41	49
R4 - 21 Crebert Street, Mayfield	40	40	40	47
R5 - 24 Crebert Street, Mayfield	42	42	42	51
R6 - 30 Crebert Street, Mayfield	41	41	41	50
R7 - 50 Crebert Street, Mayfield	35	35	35	50
R8 - 2 McNeil Close, Mayfield	35	35	35	48

Condition L5.2 specifies:

> *Fire pumps at the premises must be designed and operated so that noise from routine testing or maintenance is not more than LAeq (15min) 53 dB(A) at the most affected residential or sensitive receiver. Routine testing or maintenance must only occur during the daytime.*

Condition L5.5 specifies:

> *The noise limits specified in conditions L5.1, L5.2 and L5.4 apply under all meteorological conditions except for any of the following:*
>
> *a. Wind speeds greater than 3 metres/second at 10 metres above ground level; or*
>
> *b. Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or*
>
> *c. Stability category G temperature inversion conditions.*

1.7.1.1 Sleep Disturbance Requirements

Condition L5.1 of the EPL 20193 presented sleep disturbance noise limits which are provided in **Table 2**.

1.7.2 Stolthaven Stage 3 (SSD 7065) - Specific MCP Requirements

SSD 7065 Condition C30 (Table 3) and Condition C31, provide applicable operational noise limits. The noise limits under Condition C30 and C31 are the same as the noise limits in Condition L5 of EPL 20193, refer to **Table 2**.

PON is using a Cumulative Environmental Noise Management Tool (CENMT) that has been developed for the MCP to manage individual site noise requirements for projects within the MCP. It is noted that site specific noise quotas were not issued as part of the Stolthaven SSD 6664 MOD 1 submission. However, as part of Stolthaven Stage 3 (SSD 7065) Environmental Impact Statement, noise quotas were allocated to the Stolthaven Stage 3 development. In the absence of other noise quotas for the existing Facility, the noise quotas from the development consent for SSD 7065 have been referenced in this compliance assessment.

As part of SSD 7065, two key conditions are relevant to this noise compliance assessment, conditions C32 and C35, which specify:

Mayfield Concept Plan Noise Quota

C32. The Applicant shall:

a) ensure noise from the Site does not exceed the noise quotas provided by the PON in accordance with the Site Noise Mode; and

b) comply with the directions of the PON in relation to the management of noise from the Site.

Noise Monitoring

C35. The Applicant shall monitor noise from the Site. The monitoring shall:

a) be undertaken annually, or to address genuine noise complaints related to the Site as determined by the Secretary, EPA or the PON; and

b) be undertaken in accordance with the NSW Industrial Noise Policy and the Noise Verification Monitoring Plan, October 215 or its latest version;

c) demonstrate compliance with the noise limits in this consent and the noise quotas provided by PON in accordance with the Mayfield Concept Plan; and

d) be reported annually to the Secretary, EPA and the PON.

Note: The monitoring requirements could be satisfied by the monitoring network required for the Mayfield Concept Plan once established

Stolthaven Stage 3 (SSD_7065) specific cumulative amenity noise quotas derived using the MCP CENMT are presented in **Table 3**. The quotas are based upon the project area presented in **Figure 2**.

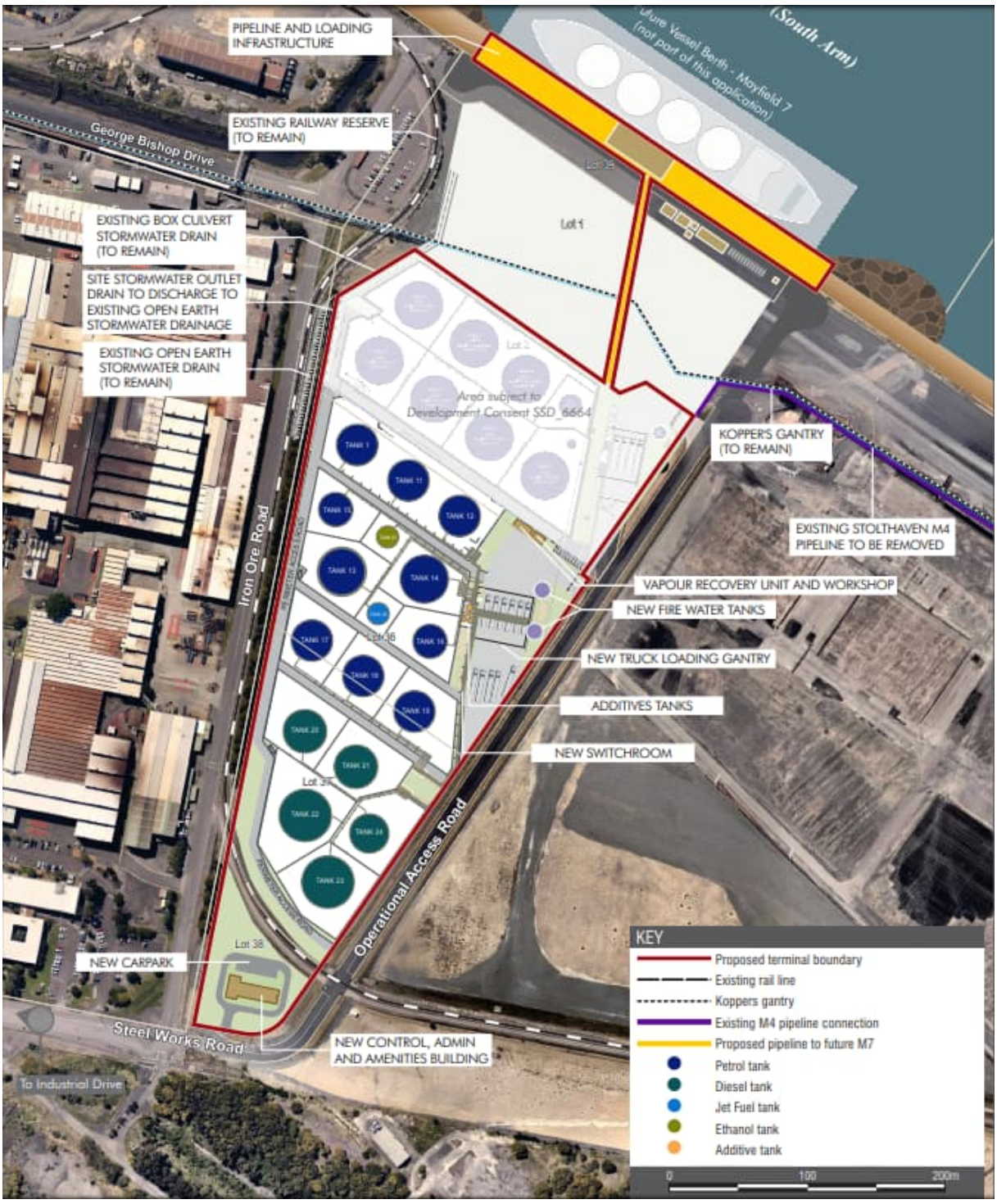

Figure 2 Site Operational Area for Derivation of MCP Noise Quota – Stolthaven Stage 3 (Not yet Constructed, Mayfield No. 7 Berth now operational)

Table 3 Summary of MCP Noise Quotas for Noise Assessment for Stolthaven Stage 3 (SSD 7065)

Receiver	Applicable Amenity Noise Quota, $L_{Aeq, period}$ dB(A)		
	Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
A – 1 Arthur Street, Mayfield	47	36	30
B – 2 Crebert Street, Mayfield	51	40	34
C – 32 Elizabeth Street, Carrington	42	30	25
D – 186 Fullerton Road, Stockton	39	28	22

Notes:

1. These cumulative amenity noise quota levels are subject to approval by PON and DP&E and have been included for assessment purposes.

These noise quotas apply under winds of up to 3 m/s (measured at 10 metres above the ground level) and Pasquill stability class from A to F.

Predicted amenity noise emission levels for assessment against the MCP requirements are provided in **Section 2.5.2.**

2.0 Measurement Methodology and Results

2.1 Instrumentation

Attended noise measurements were conducted using the equipment presented in **Table 4.**

Table 4 Measurement Instruments

Equipment	Serial Number
Attended Noise Measurements	
Brüel and Kjaer Type 2250	3009330

All instruments presented in **Table 4** are designated as Class 1 instruments. Each sound level meter was calibrated before and after the measurements using a calibrator (Rion NC-74 Serial Number 34667836) with a drift in calibration not exceeding ±0.5 dB.

All the acoustic instrumentation employed during the noise measurements comply with the requirements of Australian/New Zealand Standard AS/NZS IEC 61672.1-2019 *Electroacoustics - Sound level meters – Part 1: Specifications*.

All equipment used for this report has valid calibration certificates.

2.2 Attended Measurement Results and Discussion

Attended noise measurements of typical operations were undertaken at the Facility in order to develop the noise model used for this noise compliance assessment.

The results of the attended measurements and site observations are presented in **Table 5**.

The attended measurement receiver locations were selected as they are EPL 20193, SSD 7065 and MCP receiver locations or all other receiver locations are further away. As such, by achieving compliance at these locations, compliance will be achieved at all other receiver locations.

At all the measurement locations the measured noise levels exceeded the noise limits. However, it should be noted that noise from the Stolthaven Facility was not clearly distinguishable or quantifiable at any of the attended measurement receiver locations.

Stolthaven confirmed that during the night-time attended measurements at nearby residential receivers the Facility was operating under normal conditions (i.e. including truck movements).

During the attended measurements it was not possible to measurably distinguish the noise contribution from the Facility from other industrial sources in the surrounding area at all receiver locations. Thus, it was not possible to determine the noise contribution through direct measurement. The INP provides guidance in Chapter 11 as to how to review the noise emissions of a site where the existing noise levels are already high.

Table 5 Attended Measurements at Assessment Receiver Locations on 28 and 29 November 2022

Location		Time of Measurement	Monitored Noise Levels			Comments
			L_{Aeq} dB(A)	L_{A1} dB(A)	L_{A90} dB(A)	
R1/A	1 Arthur Street, Mayfield	29/11/2022 0:53	35	43	32	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum audible. No distinguishable noise sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: distant road traffic on Industrial Drive was the main noise source. Local car pass by 43 dB(A). OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.
R2	52 Arthur Street, Mayfield	29/11/2022 1:11	37	44	31	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum audible. No distinguishable noise sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: distant road traffic on Industrial Drive was the main noise source. Local car pass by 43 dB(A). OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.
R3/B	2 Crebert Street, Mayfield	28/11/2022 23:16	53	65	39	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum audible. No distinguishable noise sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: Road traffic on Industrial Drive was the main noise source. Truck pass by 63 dB(A) and car pass by 56 dB(A) on Industrial Drive. OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.
R4	21 Crebert Street, Mayfield	28/11/2022 22:56	58	72	42	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum audible. No distinguishable noise sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: Road traffic on Industrial Drive was the main noise source. Truck pass by 80 dB(A) and car pass by 65 dB(A) on Industrial Drive. OTHER: insects audible throughout measurement.

Location		Time of Measurement	Monitored Noise Levels			Comments
			L_{Aeq} dB(A)	L_{A1} dB(A)	L_{A90} dB(A)	
						Weather – Minimal breeze, Some cloud cover.
R5	24 Crebert Street, Mayfield	28/11/2022 23:36	40	50	36	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum audible. No distinguishable noise sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: Road traffic noise from Industrial Drive audible. Car pass by 40 dB(A). OTHER: insects audible throughout measurement 35 dB(A). Weather – Minimal breeze, Some cloud cover.
R6	30 Crebert Street, Mayfield	28/11/2022 23:56	51	56	49	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum audible. No distinguishable noise sources in the direction of the Stolthaven Facility. Air conditioning unit or similar noise audible from function centre 50 dB(A). TRAFFIC CONTRIBUTION: Road traffic noise from east and north east audible, most likely from Industrial Drive. Car pass by 52 dB(A). OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.
R7	50 Crebert Street, Mayfield	29/11/2022 0:15	37	44	33	INDUSTRIAL CONTRIBUTION: Constant broadband industrial hum audible. No distinguishable sources in the direction of the Stolthaven Facility. 33 dB(A) background. TRAFFIC CONTRIBUTION: distant road traffic noise audible. Car pass by 40 dB(A). OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.
R8	2 McNeil Close, Mayfield	29/11/2022 0:34	35	43	29	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum could be faintly heard from the north / north-north west, but unable to determine where it is coming from nor attribute it to a particular site. No distinguishable noise sources in the direction of the Stolthaven Facility.

Location		Time of Measurement	Monitored Noise Levels			Comments
			L_{Aeq} dB(A)	L_{A1} dB(A)	L_{A90} dB(A)	
						TRAFFIC CONTRIBUTION: Traffic noise can be heard at times from Industrial Drive with trucks clearly audible. No local pass-by OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.
C	32 Elizabeth Street, Carrington	28/11/2022 22:34	47	57	32	INDUSTRIAL CONTRIBUTION: Constant broadband industrial hum from the east audible. Sound of a motor running audible intermittently. No distinguishable sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: distant road traffic noise audible. Truck pass by 48 dB(A) on Darling Street. Local car pass by 72 dB(A). OTHER: insects audible throughout measurement. 34 dB(A) at times. Weather – Minimal breeze, Some cloud cover.
D	186 Fullerton Road, Stockton	28/11/2022 22:00	59	73	37	INDUSTRIAL CONTRIBUTION: Strong constant broadband industrial hum from Kooragang Island dominates. No distinguishable sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: Local traffic on Fullerton Road controls ambient noise levels with car pass-by ~ 72-79 dB(A). OTHER: insects audible throughout measurement. Weather – Minimal breeze, Some cloud cover.

Section 11.1.2 Notes on Noise Monitoring of the INP states:

Where existing noise levels are high

"When compliance is being measured it may be found that, in many cases, existing noise levels are higher than noise level from the source, making it difficult to separate out the source noise level. When this happens, it may not be feasible to measure compliance at the specified location, and other methods will be needed. In these cases, measurements may be taken closer to the source and then calculated back to the specified location."

Accordingly, on-site measurements of individual plant items and typical operations were undertaken on 29 November 2022 at the Facility and during previous compliance inspections.

It was noted during all measurements that the specific noise source being measured was the dominant noise source throughout the measurement period. Observations were made of the onsite operations, which have then been reviewed in conjunction with the Facility operational data to model 'reasonable' worst case operational scenarios over the assessment periods. These scenarios are described in **Section 2.3**.

Key on-site attended measurement results are summarised in **Table 6**.

Table 6 On-site Attended Measurements at the Facility on 29 November 2022

Operation	Time of Measurement	Monitored Noise Levels				Comments
		$L_{Aeq(t)}$, dB(A)	$L_{A1(t)}$, dB(A)	$L_{A10(t)}$, dB(A)	$L_{A90(t)}$, dB(A)	
Truck idling	9:57 AM	75	85	76	70	Truck idling within gantry at 3 metres.
Front gate buzzer	9:58 AM	74	79	77	70	Gate buzzer at 2 metres.
Operating pump	10:01 AM	80	81	81	79	Fuel pump measured at 1 metre
Exit gate buzzer	10:09 AM	81	85	84	77	Gate buzzer at 2 metres.
Truck leaving site	10:13 AM	73	78	74	71	Truck pass-by (accelerating from exit gate and departing site) at 3 metres from closest point of truck pass-by.
Truck leaving with buzzer	10:13 AM	74	78	77	69	Truck leaving with gate siren audible at 3 metres.
Compressor 1m	10:17 AM	82	83	82	82	Compressor measured at 1 metre
Air release valve	10:19 AM	80	83	83	64	Air release valve measured at 2 metres.

2.3 Modelled Operational Scenarios

2.3.1 Observed Operations for Modelling

Based upon the attended measurements presented in **Table 6,** the movement logs for the Facility over the measurement period, and discussions with Stolthaven personnel, a 'reasonable' worst case operational scenario was established and modelled for the operations during the day, evening and night assessment periods, as required to satisfy the assessment periods under the following documents:

1. EPL 20193; and
2. State Significant Development (SSD) Development Consent 7065 – 15 December 2016

2.3.2 Truck Operations

The following data on truck operations was obtained from a combination of site observations during the attended noise measurements, and from data provided by Stolthaven for the movements.

- Truck operations were typically B-Double trucks, and that a typical 'in-and-out' cycle time in the Facility was on median 30 minutes, with each tank filling cycle taking approximately 5-8 minutes;
- The average idling time for a truck from when it arrived to when it entered the Facility was approximately 1.5 minutes;
- There was typically a 5 to 6 minute gap between the pumping operations when switching between tanks;
- A maximum of four trucks used the fuelling loading bays simultaneously;
- The pump source levels were based upon attended noise measurements. These have been included in the sound power levels presented in **Table 7**;
- Air-brake releases would occur when the trucks came to a complete stop at the truck gates and within the bays;
- Reversing beepers were not used on site. It is noted that truck can enter and exist in a forward movement and do not need to reverse;
- When the truck entered or exited the fuel shed a warning alarm at the gate would sound as the gate opened or closed;
- One pump services one load bay. A maximum of four pumps can be run at one time (4 load bays).

2.3.3 Compressor Shed and Office Area Operations

- The main compressor would run for durations of around 5 minutes;
- An air-release valve that protruded from the southern façade of the compressor shed would operate rarely which is consistent with the previous year; and
- The sound power level of some of the ventilation units used in the office was noted on the side of the units, and that unit types were also noted. As such, these were included in the modelling to take into account for periods where these are required for use.

2.3.4 Fire Pump Testing

- The fire pump is conservatively assumed to run for an entire 15 minute period;
- The testing occurs only during the daytime as per Condition L5.2 of EPL 20193;
- It is assumed only one pump will be tested at a time; and
- The fire pump has a measured sound power level of 108 dB(A) (Based on 2021 measurements).

2.3.5 Assessment Noise Source Levels

The sound power level inputs presented in **Table 7** were used in the noise compliance modelling, and adjusted for duration and frequency of operations in accordance with the operations described in **Section 2.3.6**. The plant item sound power levels were determined from the attended noise measurements of typical operations made on site (**Table 6**). In order to determine compliance with the recommended noise limits, the predicted noise levels for each operational scenario were determined at each of the assessment locations. The results are presented in **Section 2.4**.

Modelling was undertaken using SoundPLAN noise modelling software. In total an intrusive (reasonable 'worst' 15-minute period) operational scenario was modelled, in addition to day, evening and night-time amenity (whole of period) scenarios. The assessment of the intrusive scenario considers a 'reasonable' worst case operational period. The assumptions made for modelling purposes with regards to the equipment operating and the duration and frequency of operation are described in **Section 2.3.6**.

The predicted noise levels for both worst case wind or from worst case temperature inversion scenarios as required by the project approval conditions, in addition to the neutral scenarios are presented **Section 2.4**.

Table 7 Facility Plant Items Sound Power Levels

Plant Item/Operation	Sound Power Level, L_{Aeq}, dB(A)
Trucks approaching/leaving site - Accelerating	91
Trucks approaching/leaving site – Using main access road	91
Trucks idling at site	82
Truck airbrake event	104[1]
Fuel Pump/Motor (Bay 1/2)	89
Fuel Pump/Motor (Bay 3/4)	89
Entrance gate alarm	88
Exit gate alarm	95
Office plant (individual item) – 5 items	68[2]
Office plant (individual item) – 2 items	75[2]
Compressor	89
Compressor shed air release valve	94

Notes:

1. Based on previous year.
2. Based on manufacturer data.

Table 8 Facility Plant Items Sound Power Levels for Peak Events

Plant Item/Operation	Sound Power Level, $L_{A1\ 1\ min}$, dB(A)
Trucks approaching/leaving site - Accelerating	100
Truck airbrake event	116[1]
Entrance gate alarm	92
Exit gate alarm	105
Compressor shed air release valve	94

Notes:

1. Based upon previous years' measurements.

2.3.6 Reasonable Worst Case Intrusiveness Scenarios (15 minute period)

The following is the modelled reasonable worst case intrusiveness scenario (15 minute period). The make-up of this scenario has been determined from an analysis of the truck movement data over the measurement period, discussions with Stolthaven and historical truck movement data.

The worst case scenario occurs during the night-time measurement period, and so this has been used to assess against the day, evening and night periods. Noting the only difference will be the office noise contribution from the office based mechanical services, which generate negligible contribution to the overall noise impacts from the site operations.

Table 9 Worst Case 15 Minute Intrusive Assessment Scenario

Activity	Worst case 15 minute assessment period
Leaving	Three trucks move down the approach road at approximately 40 km/h departing site. (Bays 1 & 4)
Arriving	Three trucks move down the approach road at approximately 40 km/h and arrive at the site, stop with airbrake release, and idle for 0.5 minutes at the entrance gate of the fuel shed (Bays 1 & 4).
Pumping	Four B-Double trucks pumping in the facility. a. Bay 1 – Pumps operating for 9.5 minutes during 15 minute period. b. Bay 2 – Pumps operating for 6.5 minutes during 15 minute period c. Bay 3 – Pumps operating for 6.5 minutes during 15 minute period. d. Bay 4 – Pumps operating for 9.5 minutes during 15 minute period.
	Consideration for the onsite speed and the usage of airbrakes at the Facility has been included in the modelling.
	The operation of the entrance gate is associated with each truck movement through the Facility.
Other	Compressor shed operating with gas discharge during period.
Office Plant	Office plant is not operating as the office building is not operating during the night period.

2.3.7 Reasonable Worst Case Amenity Scenario

The following are the modelled whole of period scenarios based upon on-site observations. All noise sources in the model were assumed to operate as per the points below.

1. Each truck using the Facility is a B-Double;
2. Each truck idles for a total of 0.5 minutes on site at gate;
3. Air-break releases occur when the trucks arrived on-site and stopped prior to swiping in at the gate, and also when they stopped after moving into the bays;
4. Trucks move down the approach road at approximately 40 km/h and arrive at the site;
5. The operation of the entrance and exit gate is associated with each truck movement through the fuel shed;
6. Consideration for the onsite speed and the usage of airbrakes at the Facility has been included in the modelling;
7. Usage of the pump/motors is distributed throughout available pumps as per the operational usage;
8. Compressor shed operating with gas discharge operating throughout period;

9. Office plant are operating throughout the day and evening periods, 5 condenser units were noted on the south-western façade of the office building and are assumed the operation during the day and evening periods when the office could be occupied; and
10. In consultation with Stolthaven, reasonable worst-case truck movements were determined for 2022 based on historical (2015 to 2019) truck movement data provided by Stolthaven. The approach was based upon the top 10% of movements through the facility during each of the day, evening or night assessment periods. The source noise levels were based upon the on-site measured noise levels.

Presented in **Table 10** are the truck numbers modelled to represent the reasonable worst case truck throughput during 2022.

Table 10 Reasonable Worst Case Trucks through the Facility – 2022

Reasonable Worst Case Trucks through the Facility	Day (7am - 6pm)	Evening (6pm - 10pm)	Night (10pm - 7am)
Truck movements (either to or from the facility)	80	18	46
Trucks in each period	40	9	23

2.4 Modelling Methodology

2.4.1 General Modelling Assumptions

Noise levels due to the operational activities shown in **Section 2.3** have been predicted to nearby noise sensitive receivers using SoundPLAN (Version 8.2) noise modelling software. The base model has been based upon the current version of the *MCP Master SoundPLAN model*.

The CONCAWE method was originally developed for predicting the long-distance propagation of noise from petrochemical complexes. It is especially suited to predicting noise propagation over large distances because it accounts for a range of atmospheric conditions that can significantly influence the propagation of noise over large distances.

Noting that the closest receptors in the vicinity of the proposed Facility are at least 500 m from the site, the CONCAWE environmental noise prediction method is an appropriate method for predicting the noise propagation. Whilst the General Prediction Method algorithm more accurately predicts at closer receiver locations and was used for modelled receiver locations less than 100 m, as part of the model validation.

The noise modelling includes:

- Ground topography;
- Buildings and structures;
- All sources behave as point, or moving point sources;
- Ground Absorption; and
- Representative operational noise sources as required.

It can be expected that there may be differences between predicted and measured noise levels due to variations in instantaneous operating conditions, plant in operation during the measurement and also the location of the plant equipment.

2.5 Noise Compliance Assessment

Provided in **Table 11** and **Table 12** are the predicted noise levels at each of the assessment locations during the reasonable worst case operational scenarios. The predicted noise levels identify that the operational scenarios are compliant with the applicable noise criteria.

As required by the EPL 20193 and the MCP noise verification requirements, adverse meteorological conditions should be assessed for each period. Previous assessments have identified that the 3 m/s

source to receiver wind meteorological condition predictions to be consistently between 0 dB(A) to 1 dB(A) higher than temperature inversion predictions. As such this report has limited the assessment of adverse conditions to the more conservative 3 m/s source to receiver wind meteorological condition.

2.5.1 Environment Protection Licence 20193 and SSD 7065

2.5.1.1 Intrusiveness Noise Assessment (15 minute period)

Table 11 and **Table 12** present predicted noise level results for the reasonable worst case intrusiveness scenario (15 minute period) for neutral and adverse weather conditions respectively. The modelling scenario are presented in **Section 2.3.**

Table 11 Predicted Intrusive Noise Levels – Neutral Weather

Receiver	EPL 20193 and SSD 7065 Noise Limits, $L_{Aeq,15min}$ dB(A)[1]	Predicted Noise Level, $L_{Aeq,15min}$ dB(A)	Compliance	
			Exceedance	Yes/No
R1	35	14	-	Yes
R2	35	14	-	Yes
R3	41	24	-	Yes
R4	40	24	-	Yes
R5	42	23	-	Yes
R6	41	21	-	Yes
R7	35	17	-	Yes
R8	35	15	-	Yes

Notes:

1. Operational noise limits are based on the most stringent operational noise limits (i.e. night-time period).

Table 12 Predicted Intrusive Noise Levels – Adverse Weather

Receiver	EPL 20193 and SSD 7065 Noise Limits, $L_{Aeq,15min}$ dB(A)[1]	Predicted Noise Level, $L_{Aeq,15min}$ dB(A)	Compliance	
			Exceedance	Yes/No
R1	35	19	-	Yes
R2	35	19	-	Yes
R3	41	29	-	Yes
R4	40	29	-	Yes
R5	42	28	-	Yes
R6	41	26	-	Yes
R7	35	22	-	Yes
R8	35	20	-	Yes

Notes:

1. Operational noise limits are based on the most stringent operational noise limits (i.e. night-time period).
2. Adverse weather considers the worst case of 3 m/s source to receiver wind and temperature inversions.

The Facility's predicted operational noise levels, **Table 11** and **Table 12** results, indicate that under neutral and adverse weather conditions, the Facility comply with EPL 20193 and SSD 7065 noise limits at all assessment locations.

2.5.1.2 Sleep Disturbance Noise Assessment

The following are the predicted modelled results to determine noise compliance against the EPL 20193 and SSD 7065 sleep disturbance noise limits. The sound power levels for the maximum noise events at the Facility are included in **Table 8.**

Table 13 Predicted Sleep Disturbance Noise Levels, Night-time Period

Receiver	EPL 20193 and SSD 7065 Noise Limits, $L_{A1,\ 1\ min}$ dB(A)	Predicted Noise Level, $L_{A1,\ 1\ min}$ dB(A)		Compliance
		Neutral Weather	Adverse Weather[1]	
R1	45	26	31	Yes
R2	48	25	30	Yes
R3	49	33	36	Yes
R4	47	37	42	Yes
R5	51	34	37	Yes
R6	50	33	36	Yes
R7	50	27	31	Yes
R8	48	26	31	Yes

Notes:

1. Adverse weather considers the worst case of 3 m/s source to receiver wind and temperature inversions.

The $L_{A1,\ 1min}$ night-time site operation assessment indicates that the predicted noise levels at all receiver locations comply with the EPL 20193 and SSD 7065 sleep disturbance noise limits during both neutral and adverse weather conditions.

2.5.1.3 Fire Pump Testing Noise Assessment

Table 14 presents the modelled results for the fire pump testing operational scenario.

Table 14 Predicted Fire Pump Testing Noise Levels, Day-time Period

Receiver	EPL 20193 and SSD 7065 Noise Limits, $L_{Aeq,15min}$, dB(A)	Predicted Noise Level $L_{Aeq,15min}$, dB(A)		Compliance
		Neutral Weather	Adverse Weather[1]	
R1	53	17	23	Yes
R2	53	18	23	Yes
R3	53	33	38	Yes
R4	53	40	45	Yes
R5	53	28	33	Yes
R6	53	24	29	Yes
R7	53	20	25	Yes
R8	53	19	24	Yes

Notes:

1. Adverse weather considers the worst case of 3 m/s source to receiver wind and temperature inversions.

The fire pump testing operational noise assessment indicates that the predicted noise levels at all receiver locations comply with the EPL 20193 and SSD 7065 noise limits during both neutral and adverse weather conditions.

2.5.2 Mayfield Concept Plan Noise Quotas

2.5.2.1 Amenity Noise Assessment

Table 15 presents the modelled results for whole of period amenity operating scenarios.

Table 15 Predicted Amenity Noise Levels

Receiver	MCP Noise Quota $L_{Aeq, period}$ dB(A)[1]	Predicted Noise Level $L_{Aeq, period}$ dB(A)		Compliance
		Neutral Weather	Adverse Weather[2]	
Daytime				
A	47	14	19	Yes
B	51	23	28	Yes
C	42	5	10	Yes
D	39	4	10	Yes
Evening				
A	36	13	18	Yes
B	40	21	26	Yes
C	30	3	9	Yes
D	28	2	8	Yes
Night-time				
A	30	13	18	Yes
B	34	21	26	Yes
C	25	3	9	Yes
D	22	2	8	Yes

Notes:

1. Operational noise limits are based on the most stringent operational noise limits (i.e. night-time period).
2. Adverse weather considers the worst case of 3 m/s source to receiver wind and temperature inversions.

3.0 Conclusion

AECOM Australia Pty Ltd (AECOM) was commissioned by Stolthaven Australia Pty Ltd (Stolthaven) to undertake a compliance noise assessment of operations at the Stolthaven Bulk Liquids Fuel Storage Facility (the Facility) operated by Stolthaven at the Port of Newcastle, Mayfield, NSW.

This acoustic assessment was conducted to determine compliance with the following site operational approvals and requirements:

- The NSW Environment Protection Authority (EPA) issued Environment Protection Licence No. 20193 (EPL 20193), License version date 31 January 2020;
- State Significant Development (SSD) 7065 – 15 December 2016; and
- Mayfield Concept Approval (MCP) (Application 09_0096) dated 16 July 2012 (latest modification 12 December 2014).

As the Facility lies within the Mayfield Concept Plan approval area, it requires noise emissions from the site to be consistent with the environmental assessment requirements of the Mayfield Concept Plan Approval, as stated in SSD 7065, which have been demonstrated in this report.

Attended noise measurements were undertaken on 28 and 29 November 2022, at the closest nearby residential receiver locations. During the attended measurements, it was not possible to directly quantify the impacts of noise arising from operations at the Facility due to the influence from extraneous noise sources (i.e. existing industrial noise from other industrial areas unrelated to the Facility and traffic noise on Industrial Drive, or the noise impacts are significantly below the measured existing noise levels). As such, an alternative method was required in order to demonstrate compliance with the project approval requirements.

The compliance assessment was carried out using SoundPLAN noise modelling software, calibrated based upon attended noise measurements.

This method of noise compliance assessment is in accordance with Chapter 11 of the EPA NSW Industrial Noise Policy (INP). In order to determine compliance of the Facility operational noise emissions with the required noise limits, ‘reasonable’ worst case operational scenarios were determined from 2015 to 2019 truck movement historical data provided by Stolthaven, and noise levels based upon on-site attended noise measurements undertaken over the period of 28 to 29 November 2022 and during previous site visits.

Daytime, evening and night-time noise emissions were predicted to each of the required assessment locations and compared against the site noise limits for all scenarios. The Project approval requires that the noise emissions be assessed under worst case prevailing wind and temperature inversion conditions.

Results of the noise compliance modelling showed that the operation of the facility complies with the noise limits stated in EPL 20193 and SSD 7065 in addition to the project specific noise goals in the MCP for all outlined receivers.

Appendix A

Acoustic Terminology

Appendix A Acoustic Terminology

The following is a brief description of acoustic terminology that may have been used in this report.

Sound power level	The total sound emitted by a source
Sound pressure level	The amount of sound at a specified point
Decibel [dB]	The measurement unit of sound
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:

0dB(A)	Threshold of human hearing
30dB(A)	A quiet country park
40dB(A)	Whisper in a library
50dB(A)	Open office space
70dB(A)	Inside a car on a freeway
80dB(A)	Outboard motor
90dB(A)	Heavy truck pass-by
100dB(A)	Jackhammer/Subway train
110 dB(A)	Rock Concert
115dB(A)	Limit of sound permitted in industry
120dB(A)	747 take off at 250 metres

Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
L_{max}	The maximum sound pressure level measured over the measurement period
L_{min}	The minimum sound pressure level measured over the measurement period
L_{10}	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the L_{10}.

L_{90}	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the L_{90}.
Ambient noise	The all-encompassing noise at a point composed of sound from all sources near and far.
Background noise	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The L_{90} sound pressure level is used to quantify background noise.
Traffic noise	The total noise resulting from road traffic. The L_{eq} sound pressure level is used to quantify traffic noise.
Day	The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.
Evening	The period from 1800 to 2200 h Monday to Sunday and Public Holidays.
Night	The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.
Assessment background level [ABL]	The overall background level for each day, evening and night period for **each day** of the noise monitoring.
Rating background level [RBL]	The overall background level for each day, evening and night period for the **entire length** of noise monitoring.
Weighted sound reduction index [R_w]	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 *"Acoustics – Glossary of terms and related symbols"*, the EPA's NSW Industrial Noise Policy, Noise Policy for Industry and the EPA's NSW Road Noise Policy.

Appendix B

Surrender of Consent
SSD 6664

Appendix B Surrender of Consent SSD 6664

Planning, Industry & Environment

Mr Gaetan Amodeo
Compliance & Risk Manager
Stolthaven Australia Pty Ltd
Level 6, 60 Albert Road
South Melbourne, Victoria 3205

Dear Mr Amodeo

Stolthaven Fuel Terminal – Stage 3 (SSD 7065)
Surrender of Development Consent

I refer to your letter dated 23 April 2020 providing formal notice of Stolthaven Australia Pty Ltd's surrender of State significant development (SSD) consent 6664 (as modified), as required by Condition B11 of Schedule B of SSD 7065.

The Department has reviewed the notice of surrender of development consent and is satisfied the information provided addresses the relevant requirements pursuant to clause 97(1) of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation).

Pursuant to clause 97(2) of the EP&A Regulation, the notice of surrender of development consent takes effect on the date it is received by the consent authority, as such, development consent SSD 6664 is surrendered effective 23 April 2020.

The requirement of Condition B11 of Schedule B of SSD 7065 has now been satisfied.

Should you have any queries, please do not hesitate to contact Olivia Hirst, Environmental Assessment Officer, on (02) 9274 6583 or via Olivia.hirst@planning.nsw.gov.au.

Yours sincerely

8 May 2020

Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Department of Planning, Industry and Environment
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