Technical Memorandum

April 27, 2022

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From	Justin Cheah	**Ref. No.**	12559567
Subject	EES referral for the Geelong Hydrogen Hub – Noise assessment		

1. Introduction

GHD Pty Ltd (GHD) is engaged by GeelongPort Pty Ltd (GeelongPort) to support the preparation of environmental referral documents in relation to the proposed development of the Geelong Hydrogen Hub at the Port of Geelong. GeelongPort is seeking to undertake the following referrals to the relevant agencies:

– Environmental Effects Statement (EES) referral to the Victorian Minister for Planning and the Department of Environment, Land, Water and Planning (DELWP) under the *Environment Effects Act 1978*
– *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) self-assessment, and potentially a referral under the same Act to the Commonwealth Department of Agriculture Water and the Environment (DAWE)

1.1 Purpose of this memo

This memorandum has been prepared to support and inform the environmental referral documents through a preliminary assessment of the potential noise impacts associated with operation and construction of the facility.

This technical memorandum presents the findings from the following activities in relation to the noise impact assessment:

– Review of proposed site and operations
– Establish preliminary construction noise limits for the proposed facility
– Establish preliminary environmental noise limits for proposed facility based on Zoning Levels
– Preliminary desktop assessment of operational and construction noise associated with the facility

1.2 Limitations

This report: has been prepared by GHD for GeelongPort and may only be used and relied on by GeelongPort for the purpose agreed between GHD and GeelongPort as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than GeelongPort 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. GHD disclaims liability arising from any of the assumptions being incorrect.

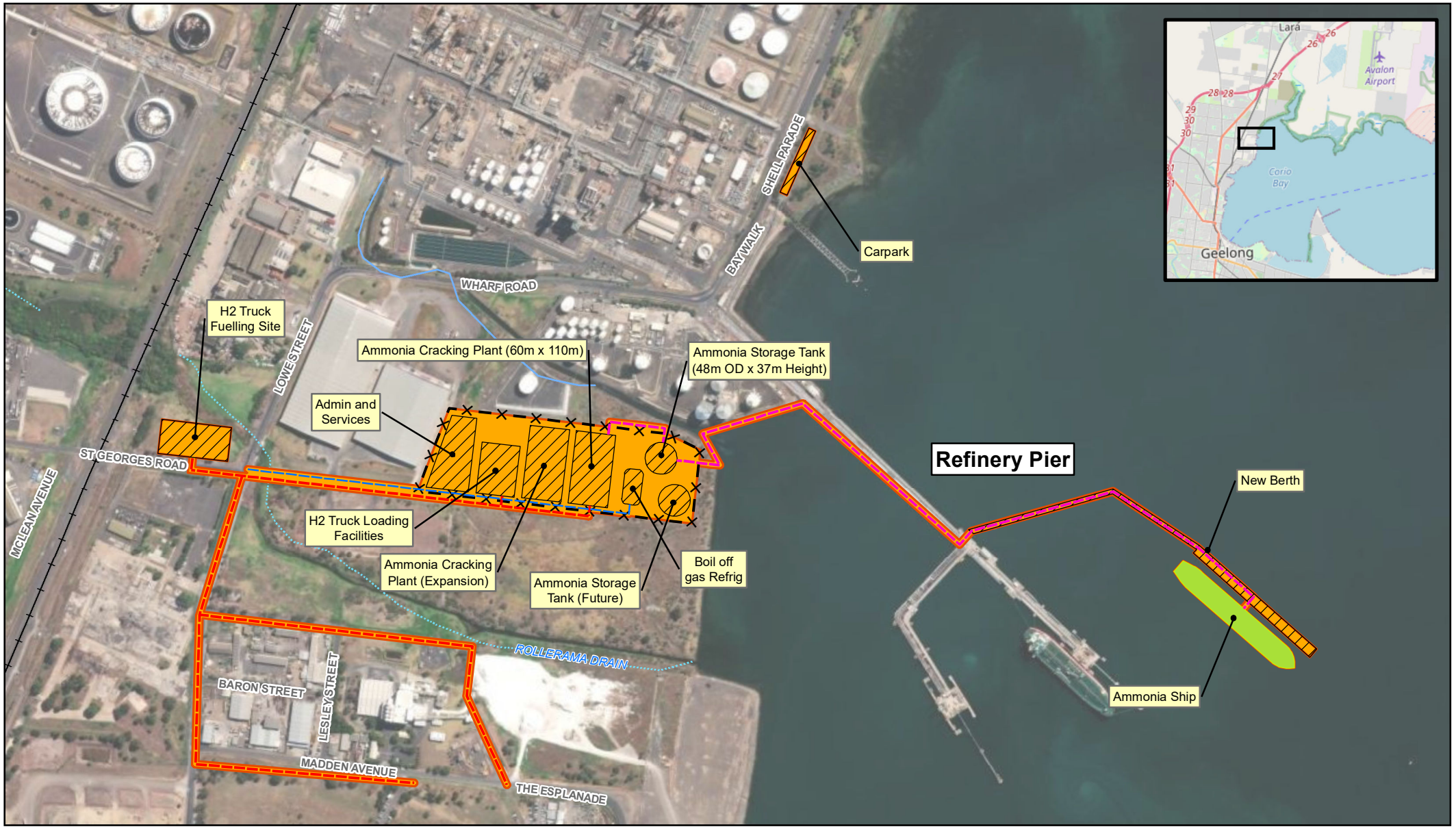
2. Project overview

GeelongPort propose to develop a facility at Port of Geelong to import liquid ammonia, produce hydrogen and nitrogen by ammonia decomposition (or cracking over a catalyst), and distribute hydrogen to potential offtake users within the Port of Geelong as well as in wider Victoria. Use of hydrogen for these industrial processes will present a strong offset for gas production and consumption needs. The site layout highlights the key process buildings, pipeline routes and structures, and allows for future expansion or alternative applications for the ammonia/hydrogen (Figure ***1***). The proposed site for the facility comprises approximately 7.5 hectares of land that is wholly owned by GeelongPort. The key project components comprise:

– New ammonia import berth as an extension of Refinery Pier in Corio Bay
– Transfer pipeline to an onshore storage facility
– Onshore storage facility for liquid ammonia (60m diameter storage tank(s))
– Catalytic cracking plant(s) to decompose ammonia into hydrogen and nitrogen
– Onshore distribution pipelines to potential industrial users either within the Port of Geelong or in adjacent industrial zones
– Vehicle refuelling facility (hydrogen)
– Carpark.

An options assessment was undertaken for alternative berth layouts to accommodate future imports of ammonia. The preferred berth layout is located within the existing dredge pocket and therefore no capital dredging is required.

It is understood that the facility would be built over 12 months and the new berthing facility would be built using materials shipped by marine transport.



LEGEND

- Hydrogen Off Take Route Options
- Ammonia Import Pipeline
- Road and Power Utilities
- Building/area
- Ammonia Ship
- Fence
- Concept layout footprint

Paper Size ISO A4

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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GeelongPort
GeelongPort Hydrogen Facility EES Referral

Conceptual site layout

Project No. **31-12559567**
Revision No. **0**
Date **26 Apr 2022**

FIGURE 1

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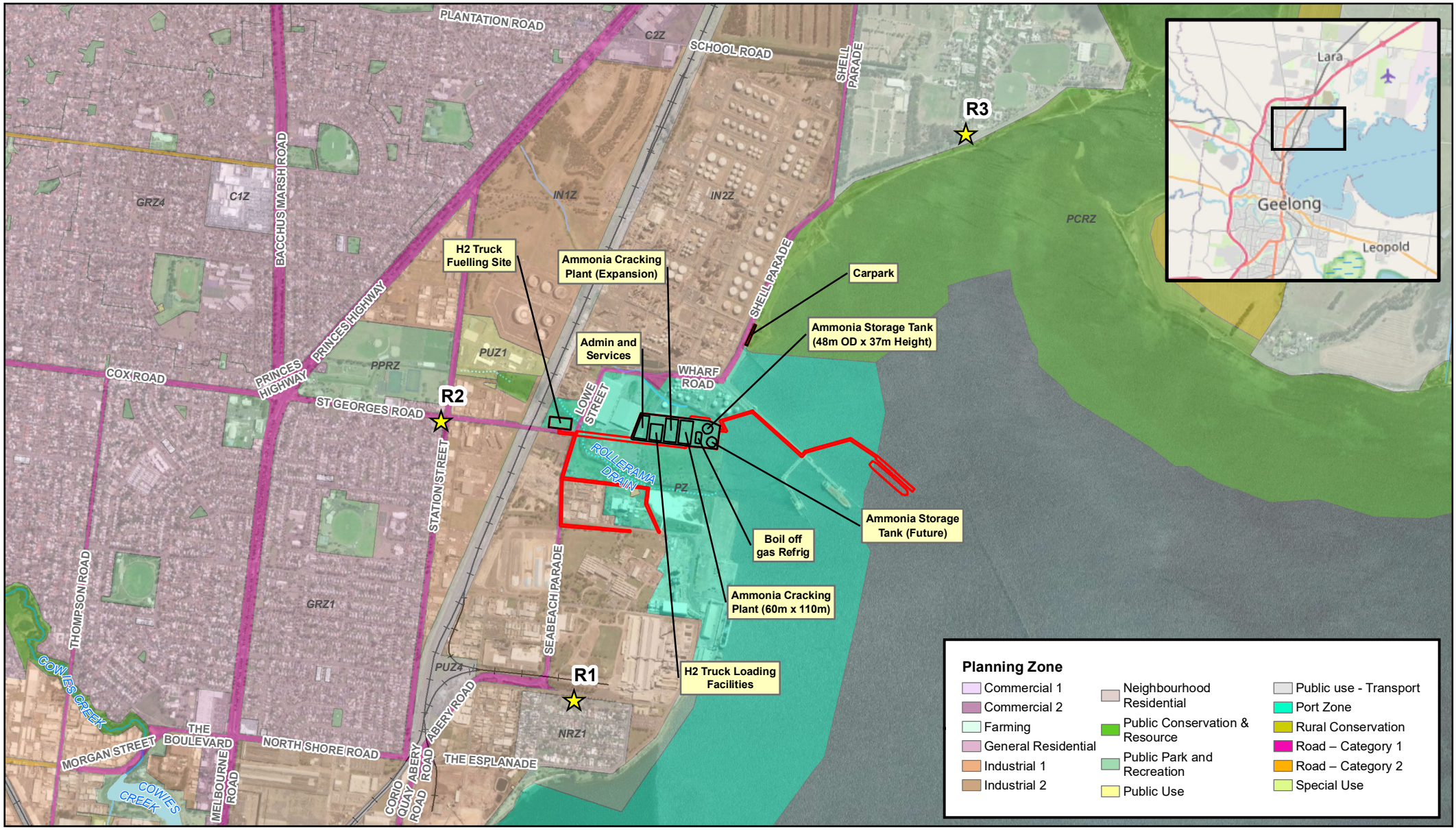
Data source: GHD, 2021;Vicmap; 2021. ESRI, World Imagery, 2021. Created by: fcarve

3. Nearest noise sensitive receivers

A desktop review of aerial imagery and publicly available information has been undertaken aiming at identifying applicable nearest noise sensitive receivers to the site. The nearest identified noise sensitive receivers are summarised in Table 1 where separation distances are given from boundaries of the sites. The site location, identified noise sensitive receiver locations and key features are shown in Figure 2.

Table 1 Identified noise sensitive receivers

Receiver	Location	Approx. distance from main site boundary	Approx. distance from H2 Truck Fuelling Site
R1	East of Seabeach Parade and south of Sea Breeze Parade, North Shore VIC 3214	1,300 m	1,600 m
R2	Corner of St Georges Road and Station Street, Norlane VIC 3214	920 m	500 m
R3	Biddlecombe Avenue, Corio VIC 3214	1,850 m	500 m



LEGEND

- Sensitive Receptors
- Design - Buildings/areas
- Concept layout footprint

Paper Size ISO A4

0 250 500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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GeelongPort
GeelongPort Hydrogen Facility EES Referral

Sensitive receptors

Project No. **31-12559567**
Revision No. **0**
Date **26 Apr 2022**

FIGURE 2

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Data source: GHD, 2021;Vicmap; 2021. ESRI, World Imagery, 2021. Created by: fcarve

In accordance with the Environment Protection Regulations 2021 (EPR 2021), a noise sensitive area is defined as any part of the land within the boundaries of the land parcel which is within a distance of 10 metres from:

– External façade of the building for the following:
  - A dwelling (including a residential care facility but not including a caretaker's house)
  - A residential building
  - A noise sensitive residential use in accordance with Victorian Planning Policy definition which includes a community care accommodation, dependent person's unit, dwelling, residential aged care facility, residential village, retirement village or rooming house
– external façade of any dormitory, ward, bedroom or living room of one or more of the following:
  - A caretaker's house
  - A hospital
  - A hotel
  - A residential hotel
  - A motel
  - A specialist disability accommodation
  - A corrective institution
  - A tourist establishment
  - A retirement village
  - A residential village
– external façade of any classroom or any room in which learning occurs in the following building during their operating hours:
  - A child care centre
  - A kindergarten
  - A primary school
  - A secondary school

For rural areas, additional definitions apply for a noise sensitive receiver which is not relevant to this facility and hence not discussed further.

4. Legislation and guidelines

4.1 Construction noise (EPA Publication 1834)

Victorian EPA publication 1834 *Civil construction, building and demolition guide* dated November 2020 provides guidance to eliminate or reduce the risk of harm to human health and the environment through good environmental practice in relation to civil construction, building and demolition activities.

This guide replaces the following previous guidelines and publications in relation to construction noise:

– Environmental guidelines for major construction sites (Publication 480, February 1996)
– Noise control guidelines (Section 2) (Publication 1254, October 2008)
– Noise from large residential subdivision or urban development sites (Publication 1264, November 2008)

4.1.1 Normal working hours

Civil construction, building and demolition related noise can potentially have adverse amenity and health impacts if not managed appropriately. All civil construction, building and demolition activities within Victoria are expected to minimise noise and vibration at all times.

EPA Publication 1834 provides recommended construction working hours for various project types including major infrastructure projects, commercial and industrial construction sites. The EPA recommended construction working hours for major infrastructure and commercial, industrial and demolition sites are presented in Table 2. Although no particular noise limits apply for works carried out during normal construction working hours, it is expected that noise is minimised through appropriate construction noise management practices.

Construction activities carried out before or after the recommended normal working hours are subject to the additional requirements presented in Section 4.1.2.

Table 2 Recommended normal construction working hours

Project type	Normal construction working hours
– Major infrastructure projects – Commercial and industrial construction and demolition sites – Commercial and industrial land subdivision	Monday to Friday: 7 am – 6 pm Saturday: 7 am – 1 pm

4.1.2 Construction works outside normal working hours

Where appropriate, works outside normal working hours may occur where:

– Noise and vibration are minimised as far as practicable
– Works are in accordance with local laws or with an approval
– Works are any of the following:
  - Low noise impact works
  - Managed impact works
  - Unavoidable works

Low noise impact works

Inherently quiet or unobtrusive works. For example, manual painting, internal fitouts and cabling. Low noise works do not have intrusive characteristics such as impulsive noise or tonal movement alarms. The relevant authority must be contacted, and any necessary approvals sought.

Managed impact works

Works where the noise emissions are managed through actions specified in a noise and vibration management plan (may be part of a broader environmental management plan), to minimise impacts on sensitive receivers. The noise and vibration management plan may need to be reviewed by a suitably qualified acoustic consultant or practitioner. Managed impact works do not have intrusive characteristics such as impulsive noise or tonal movement alarms.

The relevant authority must be contacted and any necessary approvals sought.

Unavoidable works

Works which pose an unacceptable risk to life or property or a major traffic hazard and can be justified. Includes an activity which has commenced but cannot be stopped. It will need to be demonstrated that planned unavoidable works cannot be reasonably moved to normal working hours. This requires additional consideration of potential noise and vibration generation activities and controls to minimise noise and vibration. These should be recorded within the noise and vibration management plan (may be part of a broader environmental management plan). The noise and vibration management plan may need to be reviewed by a suitably qualified acoustic consultant or practitioner

The relevant authority must be contacted and any necessary approvals sought. All affected sensitive receivers should be notified of the intended work, its duration and times of occurrence.

4.1.3 Outside normal working hours noise requirements

Where there are justified out of hours works as per the requirements outlined in Section 4.1.2, the schedule and associated noise requirements outlined in Table 3 are applicable.

Table 3 Outside normal working hours noise requirements

Time period	Construction noise requirements
Weekend / evening Monday to Friday – 6 pm to 10 pm Saturdays – 1 pm to 10 pm Sundays and Public Holidays – 7 am to 10 pm	Works duration up to 18 months Not to exceed background noise +10 dB Works duration more than 18 months Not to exceed background noise +5 dB
Night Every day – 10 pm to 7 am	Noise inaudible within a habitable room of any residential premises. Background noise +0 dB (refer to Section 4.1.4)

4.1.4 Recommended inaudibility criterion

Any justified construction works during the night period is required to be inaudible within habitable rooms of any residential premises. Inaudibility is the quality of not being perceptible by the human ear.

EPA Publication 1834 notes *inaudibility* inside habitable rooms as not a measurable criterion in dB relating primary to adequate scheduling of works. Adequate scheduling of works refers to undertaking noisy activities at less sensitive hours, and inherently quiet activities during the night.

However, for the purpose of the risk assessment to inform scheduling of works and construction noise management plans, EPA Publication 1834 provides a quantitative recommended noise criterion of “background +0 dB” as a suitable reference level for inaudibility. Where this approach is utilised, adjustments are applicable to consider the potential character of the noise that may increase its noise impact (e.g. tonality, impulsiveness).

EPA Publication 1834 notes, however, that the background +0 dB approach for inaudibility should not be used for compliance purposes.

4.1.5 Community information and consultation

Early engagement and consultation with the community, from planning and throughout the Project's development and construction, is key to minimising the impacts of noise.

The community is more likely to understand, tolerate and accept construction noise when appropriate engagement and consultations are made in an open and transparent manner and community views and opinions have been considered.

Community engagement, where relevant, should, as a minimum, inform people of:

– Why the noise will be generated (e.g. construction of essential infrastructure)
– The time of day they can expect the noise to take place
– The duration of noisy construction works (e.g. three weeks)

4.1.6 Preliminary non-standard hours construction noise targets

In the absence of background noise monitoring data, guidance in Australian Standards AS 1055.3 – 1997 *Acoustics – Description and measurement of environmental noise – Part 3 Acquisition of data pertinent to land use* is adopted as a guide to determine estimated average background noise levels. Note that the AS 1055.3 – 1997 is now replaced with the AS 1055:2018 from which the estimated background noise values are removed. However, for the purpose of this preliminary noise assessment and in the absence of any further background noise monitoring data at this stage, indicative background noise levels expected based on the guidance from AS 1055.3 – 1997 is considered appropriate.

Table 4 provides estimated average background sound pressure level (L_{A90}) for different areas containing residences in Australia adopted for this assessment.

Table 4 Estimated average background sound pressure level adopted as per AS 1055.3:1997

Receiver	Noise area category as per AS 1055.3	Description	Average background sound pressure level, L_{90} dB(A)	
			Monday – Saturday	Sundays and Public holidays
R1	R4	Areas with dense transportation or with some commerce or industry	7 am – 6 pm: 55 dB(A) 6 pm – 10 pm: 50 dB(A) 10 pm – 7 am: 45 dB(A)	9 am – 6 pm: 55 dB(A) 6 pm – 10 pm: 50 dB(A) 10 pm – 9 am:45 dB(A)
R2				
R3	R2	Areas with low density transportation	7 am – 6 pm: 45 dB(A) 6 pm – 10 pm: 40 dB(A) 10 pm – 7 am: 35 dB(A)	9 am – 6 pm: 45 dB(A) 6 pm – 10 pm: 40 dB(A) 10 pm – 9 am: 35 dB(A)

On the basis of the above, the preliminary construction noise targets have been established and are presented in Table 5.

Table 5 Preliminary non-standard hours construction noise targets

Receiver	Time period	Preliminary out of hours construction noise target, $L_{eq,15min}$ dB(A)
R1 & R2	Weekend / evening	60
	Night	45
R3	Weekend / evening	50
	Night	35

Note while the established non-standard hours construction noise targets presented in Table 5 should generally represent a conservative set of targets, these are indicative and established for the purpose of this preliminary noise impact assessment. The outside of standard hours (non-standard) construction noise targets presented in Table 5 are subject to further background noise monitoring at each relevant noise sensitive receiver.

4.2 Operational noise from industry

Noise from industry in Victoria is managed using the following document:

– EPA Publication 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) (EPA Victoria, 2021)

The Noise Protocol provisions have been incorporated into the Environment Protection Regulations 2021 (EP Regulation 2021), which have come into effect with the commencement of the amended *Environment Protection Act 2017* on 1 July 2021. The Noise Protocol provides a protocol for the purpose of determining noise limits for new and existing commercial, industrial and trade premises and entertainment venues as defined by the EP Regulations 2021. It sets the methodology for assessing the effective noise level to determine unreasonable noise under the provisions of EP Regulations 2021.

The Noise Protocol sets the maximum noise level allowed in a noise sensitive area from any commercial/industrial premise depending on the time of day, land use zoning and existing background noise levels. The applicable noise limits are established in accordance with Part I Section A of the Noise Protocol and is based on applicable zoning noise levels corrected for the outdoor background noise levels within the noise sensitive areas.

Applicable Noise Protocol zoning levels are established based on the designated planning zone or land use of the surrounding areas within the 70 m and 200 m radii of the assessment point within the noise sensitive area in accordance with Part I Section A-1.1 of the Noise Protocol for each day, evening and night period. The applicable day, evening and night time periods as defined in the EP Regulations and Noise Protocol are outlined in Table 6.

Table 6 Noise protocol time periods

Time period	Time
Day	Monday to Saturday (except public holidays) from 7 a.m. to 6 p.m.
Evening	Monday to Saturday, from 6 p.m. to 10 p.m.; and Sunday and public holidays, from 7 a.m. to 10 p.m.
Night	Any day of the week, 10 p.m. to 7 a.m. the following day

Background noise monitoring has not been undertaken at this early stage in the Project. However, due to the surrounding area of the project site being largely industrial, it is anticipated that background noise will be high and unlikely to be classified as low. Therefore, it is considered a conservative approach to classify the background noise level as neutral, for which noise limits will be equal to the zoning noise levels. The zoning levels for the nearest noise sensitive receivers, and subsequently the indicative noise limits for the site, have been established and are presented in Table 7.

Table 7 Indicative noise limits

	Zoning level / Indicative noise limit, dB(A)		
Receiver	**Day**	**Evening**	**Night**
R1	59	53	48
R2	60	53	48
R3	57	50	45

4.2.1 Cumulative noise

It is noted that noise from neighbouring industrial sites already contribute to the existing noise environment in the area. As the Noise Protocol sets noise limits for which cumulative noise from all commercial/industrial premises applies, for the purpose of this preliminary noise impact assessment, it is considered appropriate for the noise emissions from the proposed facility to meet 5 dB below the established noise limits to manage noise creep in the area.

4.2.2 Characteristic adjustments

Following a preliminary review of the expected site operations at this stage of the project, it is noted that the expected equipment required for the facility may exhibit tonal noise. In accordance with Section 3.4 of the Noise Protocol, penalties should be applied to noise from an industrial source which contains annoying characteristics such as tonal noise.

As per the Noise Protocol, the following tonality adjustments apply:

– When the tonal character of the noise is just detectable, then the adjustment should be +2 dB;
– When the tonal character of the noise is prominent, then the adjustment should be +5 dB.

While this adjustment should be made when tonal noise is noticeable at the noise sensitive receivers, it is considered appropriate to adopt a conservative approach at this early stage in the project and assume a 5 dB tonality penalty to apply to noise emissions from the site. A detailed tonality assessment is recommended in following stages of the project to assess if such penalties are applicable to relevant noise sensitive receivers.

4.2.3 Preliminary project criteria

Cumulative noise from the proposed GeelongPort facility and the surrounding industrial plant is required to comply with the Noise Protocol noise limits established in Table 7. As the existing noise environment includes noise from the surrounding industrial facilities, noise emissions from the GeelongPort facility should not exceed 5 dB below the established Noise Protocol noise limits.

Additionally, as the site is expected to contain tonal noise, a +5 dB penalty is expected to apply to noise emissions from the site.

As the facility may operate at any time throughout the day, the Project shall comply with the most stringent night time noise limit. Table 8 presents a summary of the established preliminary noise criteria for the operation of the GeelongPort facility. Note while the established noise limits presented in Table 8 should generally represent a conservative set of targets, these are indicative and established for the purpose of this preliminary noise impact assessment. The noise limits presented in Table 8 are subject to further background noise monitoring and assessment of cumulative noise levels at each relevant noise sensitive receiver.

Table 8 Preliminary GeelongPort facility noise criteria

Receiver	Noise Protocol noise limit, dB(A)(1)	Cumulative noise adjustment	Characteristic (tonality) adjustment	Preliminary GeelongPort facility noise criteria, L_{eq} dB(A)
R1	48	-5 dB	-5 dB	38
R2	48			38
R3	45			35

Notes:
(1) Based on most stringent Noise Protocol night time noise limit

5. Potential noise impacts

5.1 During construction

5.1.1 Impact identification

It is understood that the construction period for the proposed facility would last up to a year. Access to the proposed onshore facilities would be via St. Georges Road with the construction materials for the new berth likely to be shipped by marine transport, which is not expected to impact the key roads identified.

The onshore infrastructure, such as the storage facility for liquid ammonia and the catalytic cracking plant, is anticipated to consist of steel tanks and prefabricated steel framed buildings that will sit on concrete slabs. Additionally, piling may be required for the onshore storage tanks and for the new offshore berth. As such, construction equipment such as excavators, concrete trucks, tandem trucks, water carts, cranes and piling are expected.

Using typical construction equipment Sound Power Levels adopted from the Australian Standard AS2436:2010 *Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites* (Standards Australia, 2010), construction noise impacts as a sound pressure level can be estimated using the distance attenuation relationship as described in the book *Engineering Noise Control: Theory and Practice* by Bies, D.A. and Hansen, C.H., as follows:

$$SPL\ or\ L_p = SWL - 20\log(d) + 10\log(Q) - 11[dB]$$

Where:

SPL = Sound pressure level at the distance d from the source

SWL = Sound power level of the source

d = Distance (m) between source and receiver

Q = Directivity index (2 for hemispherical propagation)

Propagation calculations take into account sound intensity losses due to hemispherical spreading (i.e. distance attenuation), but additional minor losses such as atmospheric absorption, directivity, ground absorption and shielding are ignored in the calculations. Generally, the greatest construction noise impacts are expected at distances less than 100 m. Typical noise levels at various distances from potential construction plant are shown in Table 9.

Based on the preliminary review of the expected construction activities, and typical noise levels for various equipment presented in Table 9, the following is noted:

– Construction noise during standard hours are unlikely to result in significant community reaction to noise. For this a typical construction noise level of 75 dB(A) is considered during standard construction hours.
– Construction works outside standard hours will likely result in noise levels above the preliminary targets outlined in Table 5 indicating that management of construction noise outside of standard hours will be required with implementation of projects specific noise mitigation measures

Table 9 Typical construction plant and equipment noise levels at various distances from source

Source	Sound Power Level, dB(A)	Sound Pressure Levels, dB(A), at Various Distances (m)						
		15 m	80 m	100 m	200 m	500 m	1000 m	2000 m
Asphalt Paver	108	76	62	60	54	46	40	34
Backhoe with Auger	106	74	60	58	52	44	38	32
Bulldozer	108	76	62	60	54	46	40	34
Compactor	113	81	67	65	59	51	45	39
Concrete Pump Truck	108	76	62	60	54	46	40	34
Concrete Saw	117	85	71	69	63	55	49	43
Crane (Mobile)	104	72	58	56	50	42	36	30
Excavator	107	75	61	59	53	45	39	33
Front End Loader	113	81	67	65	59	51	45	39
Grader	110	78	64	62	56	48	42	36
Hand Tools (Pneumatic)	116	84	70	68	62	54	48	42
Jack Hammers	121	89	75	73	67	59	53	47
Piling (bored)	111	79	65	63	57	49	43	37
Piling (Impact Sheet) (Lmax)	137	105	91	89	83	75	69	63
Roller (Vibratory)	108	76	62	60	54	46	40	34
Truck (>20 Tonne)	107	75	61	59	53	45	39	33
Truck (Dump)	117	85	71	69	63	55	49	43
Truck (Water Cart)	107	75	61	59	53	45	39	33
Vehicle (Light Commercial e.g. 4WD)	106	74	60	58	52	44	38	32

5.1.2 Recommendations

Based on the anticipated construction equipment and distances between the site and the nearest noise sensitive receptors, the following is recommended for the construction phase of the Project:

– Although there are no specific construction noise targets for normal working hours and levels are not expected to result in significant community reaction to noise, EPA Publication 1834 requires construction noise to be minimised at all times. As such, it is expected that construction noise is minimised through appropriate reasonable and feasible construction noise management practices during normal working hours.
– A construction noise management plan (or a noise-specific section within the Construction Environmental Management Plan (CEMP)) be developed to detail relevant noise mitigation measures for management of construction noise
– Should works occur outside of normal working hours, the relevant authority must be contacted, and any necessary approvals sought for Low Noise and Managed Impact works. For unavoidable works, the relevant authority must be contacted and any necessary approvals sought and all affected sensitive receivers should be notified of the intended work, its duration and times of occurrence. A construction noise and vibration management plan should be developed for any works outside of normal construction hours to address the requirements of the EPA Publication 1834.

5.1.3 Limitations

The following limitations should be noted for the preliminary construction noise assessment:

– Background noise monitoring has not been conducted, which is required to establish the outside normal working hours construction noise targets. The weekend/evening and night noise targets have been established for this preliminary assessment based on assumed background noise levels.
– Any shielding provided by buildings has not been accounted for
– Noise impact assessment is preliminary in nature due to the early stage of project design and limited design information

5.2 During operations

5.2.1 Impact identification

Ammonia cracking facility

At this stage in the project, specific equipment required are likely to change as the Project progresses especially after addressing any regulatory requirements and improvements are made regarding the decomposition process and required equipment.

However, the following main noise sources are expected for the facility:

– Compressors
– Pumps
– Pressure Reducing Valves
– Air Conditioning
– Truck Movements

It is noted that building/equipment siting is likely to change as the Project progresses, and additional equipment may end up being required such as flares and exhaust stacks for ammonia cracking.

Based on the established preliminary project operational noise criteria and utilising the distance attenuation calculation for a preliminary operational noise assessment, it is expected that a noise level of 46 dB(A) at the main site boundary would result in compliance with the most stringent preliminary project operational noise criteria for the development.

Based on the expected noise emissions from the facility, it is considered that achieving 46 dB(A) at the main site boundary is unlikely without the implementation of specific noise mitigation measures in the facility design.

H2 Truck Fuelling site

The H2 Truck Fuelling site noise sources are expected to generally consist of mainly compressors, fuel delivery system and vehicle movements through the site. Based on previous measurements of similar facilities, noise emissions from the H2 truck fuelling site is expected to comply with the preliminary project criteria at relevant noise sensitive receivers for the proposed H2 truck fuelling site location. Therefore, negligible risk is expected from the H2 truck fuelling site in relation to noise emissions. Any noise emissions from the facility are expected to be readily managed through incorporation of good practice design and treatments of the facility.

5.2.2 Recommendations

Based on the preliminary acoustic assessment and previous experience with industrial sites and likely sizes of mechanical equipment required, noise mitigation should be considered for the ammonia cracking facility area as the design progresses to ensure that the relevant noise limits are achieved. Potential noise mitigation measures that can be considered include:

- Enclosing noisy equipment with due consideration of the construction build-up to ensure appropriate noise attenuation.
- Appropriate equipment siting to utilise any shielding from buildings
- Appropriate selection of equipment, with noise emissions and consideration of noise character (tonality) being an important consideration in equipment selection
- Consideration of further noise attenuation measures such as acoustic louvres, silencers, absorption or local barriers

It is expected that the relevant noise limits can be achieved with the implementation of noise mitigation measures for the facility. A detailed operational noise assessment is therefore recommended at later stages of the project to enable assessment and design of project specific measures to control noise emissions from the facility in accordance with provisions of the Victorian Noise Protocol. The noise assessment is expected to also include consideration of appropriate background noise monitoring and cumulative noise assessment to enable development of project specific noise limits and noise mitigation measures.

5.2.3 Limitations

It should be noted that there are many unknowns at this early stage in the project. As such, the following limitations should be noted for the preliminary operational noise assessment:

- The operational noise criteria has been established based on zoning levels. It is understood that the existing noise in the area is relatively high, which may increase the relevant noise limits for the Project
- Any shielding provided by buildings has not been accounted for
- Only the above major noise sources have been considered (i.e. no flares or exhaust stacks have been considered)
- Noise impact assessment is preliminary in nature due to the limited project information

6. Further investigations

Based on the preliminary noise assessment, the following further investigations are recommended to be conducted to ensure that noise emissions from the construction and operation of the facility comply with the relevant noise limits and targets:

– Noise monitoring at the nearest noise sensitive areas, which may increase the noise limits for the Project and gain a better understanding of the existing noise levels in the area from neighbouring industrial facilities
– A detailed environmental noise assessment of the facility once equipment sizes/capacity/selections/siting have progressed to ensure a more in-depth assessment, which will enable appropriate noise mitigation measures to be considered in the facility design
– A detailed construction noise assessment of the facility if works are expected to occur outside of normal working hours
– Development of a construction noise management plan (or a noise-specific section within the Construction Environmental Management Plan (CEMP)) to detail relevant reasonable and practical measures to minimise construction noise and vibration from the facility at all times

7. Conclusion

7.1 Construction noise

Construction noise should be minimised as far as practicable during normal and outside of normal working hours through the implementation of reasonable and feasible noise mitigation measures, in line with the requirements of EPA Publication 1834.

Should construction works occur outside of normal working hours, the relevant authority must be contacted, and any necessary approvals sought for Low Noise and Managed Impact works. For unavoidable works, the relevant authority must be contacted and any necessary approvals sought and all affected sensitive receivers should be notified of the intended work, its duration and times of occurrence.

As such, it is recommended that a construction noise management plan (or a noise-specific section within the Construction Environmental Management Plan (CEMP)) be developed to detail relevant mitigation measures for management of construction noise and vibration.

For any works outside of normal construction hours, subject to relevant approvals, the construction noise management plan should demonstrate measures addressing the specific requirements of the EPA Publication 1834 for works outside of standard hours.

7.2 Operational noise

Based on a preliminary operational noise assessment, noise associated with the operation of the proposed facility has a risk of exceeding relevant environmental noise limits at the nearest noise sensitive receivers. However, it is expected that noise emissions from the operation of the facility can be managed to relevant limits via incorporation of appropriate noise mitigation measures in the design of the facility.

7.3 Further investigations

Further assessment of noise emissions from the proposed facility is recommended to be undertaken as the Project progresses to ensure that appropriate noise mitigation measures are considered in the design and construction stage to comply with the relevant noise limits and targets for the site.

Regards

Justin Cheah
Acoustic Engineer