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SYDNEY OLYMPIC PARK P5

Noise Assessment for Filming Activities

19 August 2022

K25 Productions Pty Ltd

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1 Introduction

Renzo Tonin & Associates was engaged to undertake a noise assessment associated with the filming of an upcoming production to take place at the P5 parking area within the Sydney Olympic Park precinct.

As required by Sydney Olympic Park Authority (SOPA), the noise assessment is required to address the following noise issues:

- Noise generated from general filming operations, including noise from generators and people
- Noise generated by potential pyrotechnics
- Noise generated on site and on public roads due to traffic movements associated with the project
- Noise impacts during daytime and night time filming.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Project Description

2.1 Background Information

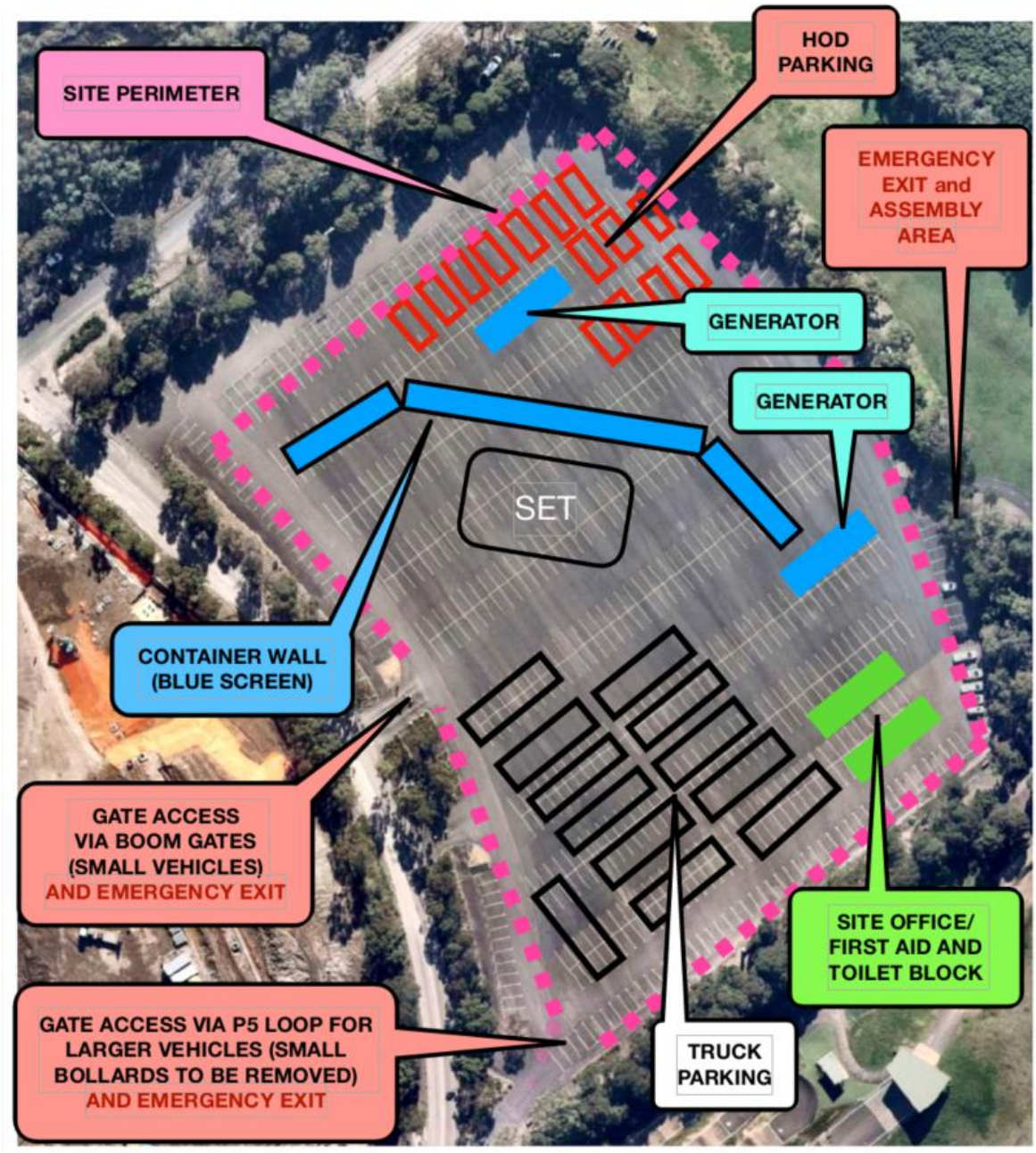
The subject site is the P5 parking area within the Sydney Olympic Park precinct. The subject site is proposed to be used as a green / blue screen filming area. This will facilitate the filming of all 'simulated' sequences whereby action conducted safely on the ground is made to appear to occur in environments that are impossible or unsafe. The set perimeter will include a wall of containers (seven high) that will support blue / green screen backgrounds.

The proposed area for filming will accommodate HOD parking, lighting cranes, catering facilities, toilet blocks, truck parking, containers and site office / First Aid sheds in areas marked on the site plan. The filming area is to be contained within a security fence with security staff on site 24/7.

Production support vehicles and trailers will be moved onsite only on filming days. The crew will arrive and leave in their private vehicles only on filming days. Other technical facilities will remain on site permanently during the filming period and these would be generators, demountable offices, toilet block, catering marquee and similar ancillary structures.

The proposed site plan is shown in Figure 1.

Figure 1 – Proposed Site Plan



2.2 Regulatory Requirements

Accordingly, noise and vibration impacts are assessed in accordance with the following policies:

- NSW 'Noise Policy for Industry' (NPfI – EPA, 2017)
- NSW 'Road Noise Policy' (RNP – DECCW, 2011).

2.3 Receiver Locations

The nearest affected receivers were identified through aerial maps and are presented in Table 2.1.

Table 2.1 – Receiver Locations

ID	Address	Description
R1	9 Blaxland Avenue, Newington	Residential property located approximately 520 m west of the subject site
R2	11 Bennelong Parkway, Wentworth Point	Residential property located approximately 350 m north-east of the subject site
R3	1 Showground Road, Sydney Olympic Park	Commercial property located approximately 530 m south of the subject site
R4	Narawang Wetland[1]	Ecological receiver location to the north of the subject site. This location will be assessed as a passive recreational receiver.
R5	Nuwi Wetland[1]	Ecological receiver location to the north east of the subject site. This location will be assessed as a passive recreational receiver.
R6	Haslams Creek[1]	Ecological receiver location to the south of the subject site. This location will be assessed as a passive recreational receiver.

Note 1. As per advice provided by SOPA, in the absence of any noise standards for ecological receivers, human noise limits are generally used as a surrogate. In the context of human use, this receiver would be considered a passive recreational receiver.

Figure 2 provides details of the site, surrounds and receiver locations.

2.4 Hours of Operation

Filming will occur between Wednesday 5 October 2022 and Friday 17 March 2023. The number of shooting days is estimated to be 25 to 30 days. Each of the filming days are of 10 hours duration. Daytime filming will take place between 7am and 5pm while night time filming would commence at 7pm and be completed by 5am.

Figure 2 – Site, Surrounds and Receiver Locations

3 Existing Noise Environment

Background noise varies over the course of any 24 hour period, typically from a minimum at 3am in the morning to a maximum during morning and afternoon traffic peak hours. Therefore, the NPfI requires that the level of background and ambient noise be assessed separately for the daytime, evening and night-time periods. The NPfI defines these periods as follows:

- **Day** is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
- **Evening** is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
- **Night** is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays & Public Holidays.

The identified residential receivers (R1 and R2) surrounding the subject site are all classified as suburban under NPfI guidelines. The Rating Background Levels (RBLs) adopted for the project are based on previous noise monitoring in the areas surrounding the subject site, undertaken by GHD and Acoustic Logic and presented in the following publicly available noise assessment reports:

- "Metropolitan Remand and Reception Centre REF: Noise and Vibration Impact Assessment" prepared by GHD, dated August 2018.
- "Wentworth Point Marinas – Block E: Noise Impact Assessment" prepared by Acoustic Logic dated 14 October 2014.

Based on the above reports, applicable RBLs used for this assessment are presented in Table 3.1 below.

Table 3.1 – Applicable RBLs, dB(A)

Receiver	Corresponding Monitoring Location	Day	Evening	Night
R1 – 9 Blaxland Avenue, Newington	17/3-5 Blaxland Avenue, Newington [1]	51	46	37
R2 – 11 Bennelong Parkway, Wentworth Point	Wentworth Point Marinas – Block E [2]	50	46	44

Notes:
1. Based on acoustic report prepared by GHD – "Metropolitan Remand and Reception Centre REF: Noise and Vibration Impact Assessment", dated August 2018
2. Based on acoustic report prepared by Acoustic Logic – "Wentworth Point Marinas – Block E: Noise Impact Assessment", dated 14 October 2014

4 Operational Noise Assessment

4.1 Operational Noise Criteria

Noise impact from the operation of the site is assessed against the NSW 'Noise Policy for Industry' (NPfI). The assessment procedure in terms of the NPfI has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for residences and other land uses.

In accordance with the NPfI, noise impact should be assessed against the project noise trigger level which is the lower value of the project intrusiveness noise levels and project amenity noise levels.

4.1.1 Intrusive Noise Impacts

According to the NPfI, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the $L_{Aeq,15\ min}$ descriptor) does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15\ min}$ Intrusiveness noise level = Rating Background Level (RBL) plus 5 dB(A)

Based on the RBLs presented in Table 3.1, the intrusiveness noise levels for the residential receivers are presented in Table 4.1.

Table 4.1 – NPfI Intrusive Noise Levels at Residential Receivers, dB(A)

Receiver	RBL			Intrusiveness Noise Level, $L_{Aeq,15\ min}$		
	Day	Evening	Night	Day	Evening	Night
R1 – 9 Blaxland Avenue, Newington	51	46	37	56	51	42
R2 – 11 Bennelong Parkway, Wentworth Point	50	46	44	55	51	49

4.1.2 Protecting Noise Amenity

The project amenity noise levels for different time periods of a day are determined in accordance with Section 2.4 of the NSW NPfI. The NPfI recommends amenity noise levels ($L_{Aeq,\ period}$) for various receivers including residential, commercial, industrial receivers and sensitive receivers such as schools, hotels, hospitals, churches and parks. These "recommended amenity noise levels" represent the objective for **total** industrial noise experienced at a receiver location. However, when assessing a **single** industrial development and its impact on an area, "project amenity noise levels" apply.

The recommended amenity noise levels applicable for the subject area are reproduced in Table 4.2 below.

Table 4.2 – Recommended amenity noise levels, dB(A)

Type of Receiver	Noise Amenity Area	Time of Day	Recommended amenity noise level, $L_{Aeq,}$
Residential	Suburban	Day	55
		Evening	45
		Night	40
Commercial premises	All	When in use	65
Passive recreation (e.g. national park)	All	When in use	50

Notes:
1. Daytime 7am to 6pm; Evening 6pm to 10pm; Night-time 10pm to 7am
2. On Sundays and Public Holidays, Daytime 8am to 6pm; Evening 6pm to 10pm; Night-time 10pm to 8am
3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period
4. The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration.

To ensure that the total industrial noise level (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level that applies for each new industrial noise source is determined as follows:

$$\mathbf{L_{Aeq,period}\ Project\ amenity\ noise\ level = L_{Aeq,period}\ Recommended\ amenity\ noise\ level - 5\ dB(A)}$$

Furthermore, given that the intrusiveness noise level is based on a 15 minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the $L_{Aeq,period}$ level to a representative $L_{Aeq,15minute}$ level in order to standardise the time periods.

$$\mathbf{L_{Aeq,15\ min} = L_{Aeq,period} + 3\ dB(A)}$$

The policy, in accordance with the NPfI, applies an adjustment of (+3 dB) to the recommended noise levels ($L_{Aeq,period}$) in order to standardise the time periods for the intrusiveness and amenity noise levels. The project amenity noise levels ($L_{Aeq,15\ min}$) applied for this project are reproduced in Table 4.3.

It is noted that the residential receivers in the vicinity of the site have been categorised as being in a 'rural' area in accordance with Table 2.3 of the NPfI.

Table 4.3 – NPfI Project Amenity Noise Levels, dB(A)

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended Noise Level	
			$L_{Aeq,\ Period}$	$L_{Aeq,15\ min}$
Residence	Suburban	Day	55 – 5 = 50	50 + 3 = **53**
		Evening	45 – 5 = 40	40 + 3 = **43**
		Night	40 – 5 = 35	35 + 3 = **38**
Commercial premises	All	When in use	65 – 5 = 60	60 + 3 = **63**
Passive recreation (e.g. national park)	All	When in use	50 – 5 = 45	45 + 3 = **48**

Notes:
1. Daytime 7am to 6pm; Evening 6pm to 10pm; Night-time 10pm to 7am
2. On Sundays and Public Holidays, Daytime 8am to 6pm; Evening 6pm to 10pm; Night-time 10pm to 8am
3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

4.1.3 Summary of Project Noise Trigger Levels

In accordance with the NPfI the project noise trigger level, which is the lower (i.e. more stringent) value of the project intrusiveness noise level and project amenity noise level, has been determined and reproduced in Table 4.4 below.

Table 4.4 – Project Noise Trigger Levels, dB(A)

Receiver ID	Address	$L_{Aeq,\ 15min}$ Project Noise Trigger Levels		
		Day	Evening	Night
R1	9 Blaxland Avenue, Newington	53	43	38
R2	11 Bennelong Parkway, Wentworth Point	53	43	38
R3	1 Showground Road, Sydney Olympic Park	63 (When in use)		
R4	Narawang Wetland	48 (When is use)		
R5	Nuwi Wetland	48 (When is use)		
R6	Haslams Creek	48 (When is use)		

Notes:
1. Daytime 7am to 6pm; Evening 6pm to 10pm; Night-time 10pm to 7am
2. On Sundays and Public Holidays, Daytime 8am to 6pm; Evening 6pm to 10pm; Night-time 10pm to 8am
3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

4.2 Operational Noise Sources

The following table lists associated activities and plant and equipment likely to be used at the subject site and their corresponding sound power levels.

Table 4.5 – Typical Activities, Plant and Equipment & Sound Power Levels

ID	Plant Description	Sound Power Level[1], dB(A) re. 1pW	
		$L_{Aeq,15\ min}$	L_{Amax}
Filming Activities			
1	Generator (2 in total)	94 (each)	97
2	Knuckle boom (4 in total)	98 (each)	101
3	Trucks (15 in total, assume 4 operating for 5 minutes in worst case 15 minutes)	98 (each)	110
4	Manitou all terrain forklift (3 in total)	103 (each)	111
5	Male Shouting (assume 5 at any one time)	99 (each)	104
6	Female Shouting (assume 5 at any one time)	93 (each)	98
Pyrotechnics			
7	Use of Pyrotechnics (assume explosion over 2 seconds)	114	140

Notes: 1. Based on sound power level data from past projects and/or Renzo Tonin & Associates' acoustic database

The sound power levels for the plant and equipment presented in the above table are provided by the manufacturer, the client, information from past projects and/or information held in our library files.

4.3 Operational Noise Assessment

Noise emissions were predicted by modelling the noise sources, receiver locations, topographical features of the intervening area, and possible noise control treatments using the CadnaA (version 2021 MR 2) noise modelling computer program. The program calculates the contribution of each noise source at each specified receptor point and allows for the prediction of the total noise from a site.

The noise prediction models takes into account:

- Location of noise sources and receiver locations;
- Height of sources and receivers;
- Separation distances between sources and receivers;
- Ground type between sources and receivers (soft); and
- Attenuation from barriers (natural and purpose built).

It is assumed that filming activities can only be undertaken during calm weather condition. Therefore noise predictions assumed calm conditions and does not consider adverse weather conditions.

Table 4.6 below present the predicted noise levels for the worst-case scenario based on concurrent operation of all the plant and equipment shown in Table 4.5.

Table 4.6 – Predicted $L_{Aeq,15\ min}$ Operational Noise Levels at Residential Receiver Locations, dB(A)

Receiver Location	Project Noise Trigger Levels			Predicted Operational Noise Levels		Comply? (Yes/No)
	Day	Evening	Night	Filming Activities	Filming Activities + Pyrotechnics	
R1 – 9 Blaxland Avenue, Newington	*53*	*43*	*38*	38	**40**	No
R2 – 11 Bennelong Parkway, Wentworth Point	*53*	*43*	*38*	35	35	Yes
R3 – 1 Showground Road, Sydney Olympic Park	*63 (When in use)*			26	27	Yes
R4 – Narawang Wetland	*48 (When in use)*			43	43	Yes
R5 – Nuwi Wetland	*48 (When in use)*			44	44	Yes
R6 – Haslams Creek	*48 (When in use)*			45	46	Yes

Notes: 1. Bold font denotes exceedance of Project Noise Trigger Level

Based on the predicted operational noise levels presented in the table above, predicted noise levels at the nearest receivers generally comply with the nominated criteria for all time periods during filming activities. Receiver R1, would experience up to 2 dB(A) exceedance during the night period for filming activities when pyrotechnics are used.

Reference is made to Tables 4.1 and 4.2 of the NPfI, which states that exceedances of up to 2 dB(A) are considered negligible and would not be discernible by the average person. Therefore, noise impacts at Receiver R1 due to the filming activities including the use of pyrotechnics is considered to be in compliance and would not warrant receiver based treatment of controls. Therefore, no further reasonable and feasible noise mitigation measures are required to reduce operational noise impacts.

4.4 Sleep Disturbance Assessment

To assess the likelihood of sleep disturbance, the potential of maximum noise level events from premises during the night-time period has been considered in this assessment. In accordance with the NPfI, a detailed maximum noise level event assessment should be undertaken where the subject development night-time noise levels at a residential location exceed:

- $L_{Aeq,15\ min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

Where there are noise events found to exceed the initial screening level, further analysis is undertaken to identify:

- The likely number of events that might occur during the night assessment period,
- The extent to which the maximum noise level exceeds the rating background noise level.

The sleep disturbance noise levels for the project are presented in Table 4.7.

Table 4.7 – Sleep Disturbance Assessment Levels, dB(A)

Receiver location	Night period 10pm – 6am	
	Assessment Level $L_{Aeq,15\ min}$	Assessment Level L_{AFmax}
R1 – 9 Blaxland Avenue, Newington	37 + 5 = **42**	37 + 15 = **52**
R2 – 11 Bennelong Parkway, Wentworth Point	44 + 5 = **49**	44 + 15 = **59**

Table 4.8 below presents a summary of the predicted sleep disturbance noise levels at residential receivers during the night time period from 10pm to 7am.

Table 4.8 – Predicted Sleep Disturbance Noise Levels from Subject Site, dB(A)

Receiver Location	Predicted $L_{Aeq,15min}$ Noise Level			Predicted L_{AFMax} Noise Level			Complies?
	Assessment Level	Filming Activities	Filming Activities + Pyrotech-nics	Assessment Level	Filming Activities	Filming Activities + Pyrotech-nics	
R1 – 9 Blaxland Avenue, Newington	*42*	38	40	*52*	46	**65**	**No**
R2 – 11 Bennelong Parkway, Wentworth Point	*49*	35	35	*59*	46	48	Yes

Notes: 1. **Bold** font denotes exceedance of sleep disturbance

Based on the predicted sleep disturbance noise levels presented in the table above, predicted noise levels at the nearest residential receivers generally comply with the assessment level for filming activities. Receiver R1 would experience up to a 13 dB(A) exceedance of the L_{AFmax} Assessment Level for filming activities including the use of pyrotechnics.

Current literature concerning sleep disturbance due to noise indicates that the main noise characteristics that influence sleep disturbance are the number of noisy events heard distinctly above the background level, the emergence of these events and the highest noise level.

From the research on sleep disturbance to date, the following is concluded:

(i) L_{Amax} (the maximum A-weighted noise level) internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep

(ii) one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

It is therefore concluded that internal traffic noise levels of 45 dB(A) and up to 55 dB(A), may have the potential to impact sleep but are unlikely to cause awakenings. On the assumption that there is a 10 dB(A) outside-to-inside noise sound transmission loss through an open window, the above indicate that external traffic noise levels of L_{Amax} 55 to 65 dB(A) are unlikely to cause awakening reactions.

Therefore, the L_{Amax} level of 65 dB(A) predicted at Receiver R1 during the use of pyrotechnics is unlikely to cause awakening reactions. Furthermore, given that the use of pyrotechnics at the subject site would

be a rare occurrence, the potential for sleep disturbance is considered low. However, where possible the use of pyrotechnics at the subject site should be scheduled for the day and evening periods.

Furthermore, the Proponent will notify nearby residents at the following stages:

- At least 72 hours prior to any night time filming.
- At least 72 hours prior to any use of pyrotechnics.
- Notification would be via mail and/or electronic communications and would include details of the relevant proponent contact and complaints procedure.

Notifications would allow residents to understand the timing/nature of impacts, identify any concerns with the proponent to allow for management/mitigation measures, and allow residents to plan ahead.

5 Road Traffic Noise Assessment

Noise impact from the potential increase in traffic on the surrounding road network due to the operation of the subject site is assessed against the NSW 'Road Noise Policy' (RNP). The RNP sets out criteria to be applied to particular types of road and land uses. These noise criteria are to be applied when assessing noise impact and determining mitigation measures for sensitive receivers that are potentially affected by road traffic noise associated with the construction and operation of the subject site, with the aim of preserving the amenity appropriate to the land use.

Based on information provided by the client, the assumed worst case traffic vehicle movements during filming days are presented in the following table.

Table 5.1 – Summary of Assumed Traffic Volumes During Filming Days

Vehicle Type	Day 7:00am 10:00pm Movements (two-way)	Night 10:00pm 7:00pm Movements (two-way)
Light Vehicle (car / 4WD)	Up to 600	Up to 200
MRV/HRV	Up to 45	Up to 15
Total	**645**	**215**

Traffic accessing the subject site will be predominantly via Hill Road. Occasionally there would be trucks transporting equipment from the studio on Baywater Drive, via Hill Road and then onto to the subject site (assumed to be no more than 2 trucks per hour).

5.1 Road Traffic Noise Criteria

Based on functionality, Hill Road is categorised as a sub-arterial road and Baywater Drive is categorised as a local road. For existing residences affected by additional traffic on existing sub-arterial and local roads generated by land use developments, the following RNP road traffic noise criteria apply.

Table 5.2 – RNP Road Traffic Noise Criteria, dB(A)

Road Category	Type of Project/Land Use	Assessment Criteria, dB(A)	
		Day 7:00am – 10:00pm	Night 10:00pm – 7:00am
Freeway/arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,15\ hour}$ 60 (external)	$L_{Aeq,9\ hour}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq,1\ hour}$ 55 (external)	$L_{Aeq,1\ hour}$ 50 (external)

Further to the above, the RNP states the following for land use developments generating additional traffic:

*"For existing residences and other sensitive land uses affected by **additional traffic on existing roads generated by land use development**, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'."*

5.2 Predicted Road Traffic Noise

Results of the road traffic noise predictions are presented in the table below. It is noted that the predicted noise levels represent the traffic noise contribution from the vehicle movements associated with the subject site only and does not take into account existing traffic noise levels due to existing general traffic flows, as existing traffic volumes along Hill Road and Baywater Drive are unknown.

Table 5.3 – Predicted Road Traffic Noise Contribution Levels Along Public Roads, dB(A)

Receiver	Criteria	Traffic Movements	Speed (km/h)[1]	Distance to Road[2]	Predicted Noise Level	Exceed?
Residences on Hill Road	$L_{Aeq,15\ hour}$ 60	As per Table 5.1	50	17 m	52	No
	$L_{Aeq,9\ hour}$ 55	As per Table 5.1	50	17 m	47	No
Residences on Baywater Road	$L_{Aeq,1\ hour}$ 55	2 trucks per hour	50	17 m	47	No
	$L_{Aeq,1\ hour}$ 50	2 trucks per hour	50	17 m	47	No

Notes: 1. Based on posted speed limit
2. Based on closest typical distance from facade of dwelling to the road

From the above table, it can be seen that road traffic noise level contributions from the vehicle movements associated with the subject site are at least 3 dB(A) below the applicable noise criterion based on dwellings being approximately 17 m from the roads.

Furthermore, as the predicted levels are 3 dB(A) less than the traffic noise criterion, it is not expected that the traffic noise contribution from the operational traffic would result in an exceedance of the traffic noise criterion and/or increase the existing traffic noise levels by more than 2 dB(A).

Therefore, traffic noise levels as a result of subject site would not adversely contribute to the existing traffic noise levels at the most affected residences along the surrounding roads.

6 Conclusion

Renzo Tonin and Associates has completed a noise assessment for the proposed filming activities at the P5 parking area within the Sydney Olympic Park precinct.

Noise emissions from filming activities were generally predicted to comply with the nominated criteria at all nearest affected receivers.

Road traffic noise impacts due to additional traffic generated during the proposed operations on residential properties along the access routes were found to comply with the relevant RNP criteria.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 110dB Operating a chainsaw or jackhammer 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.