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TH511-02 01.06.04 F05 BN CNVIS Add5 Concrete pours (r6)

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Sydney Metro Chatswood to Sydenham – TSE Works - Concrete pours and Crawler crane operation

1 Introduction

1.1 Overview of works

This technical memorandum is an addendum to the report *Construction Noise and Vibration Impact Statement: Barangaroo Construction Site (Barangaroo CNVIS¹)* and has been prepared on behalf of John Holland CPB Ghella Joint Venture (JHCPBG) in accordance with the Construction Noise and Vibration Management Plan (CNVMP) [SMCSWTSE-JCG-TPW-EM-PLN-002012] for the Design and Construction of the Tunnel and Station Excavation (TSE) Works of the Sydney Metro City & Southwest Project (the Project).

JHCPBG has extended concrete deliveries and pours for the station structure at Barangaroo worksite to the morning shoulder (i.e. 6am to 7am), evening (i.e. 6pm to 10pm) and early morning (i.e. 4am to 6am) up to September 2021. These extended working hours are allowing the construction of the Barangaroo Station Box to be completed in a safe manner and to be completed on time avoiding any potential delays to the Project (see justification in Section 1.2). It is noted that from March 2021 only two early/late concrete pours each month are planned to be undertaken in the Barangaroo Station Box.

In addition to the previously approved concrete pours outlined above, JHCPBG is also proposing the following:

1. to undertake concrete pours from within the Hickson Road southbound lane closure area (CP7, see Figure 2-1) in March, April and May 2021 on these dates:
 - Saturday 27th March – 6am to 6pm;

¹ Sydney Metro City and Southwest – TSE Works, Construction Noise and Vibration Impact Statement: Barangaroo Construction Site, reference: TH511-02 01.06.04F01 BN CNVIS, revision 15, dated 24 April 2019

- Sunday 28th March – 6am to 6pm;
 - Monday 29th March – 8pm to 5am;
 - Tuesday 30th March – 8pm to 5am;
 - Wednesday 31st March – 8pm to 5am;
 - Wednesday 7th April – 8pm to 5am;
 - Thursday 8th April – 8pm to 5am;
 - Friday 9th April – 8pm to 5am ;
 - Saturday 10th April – 6am to 6pm;
 - Monday 12th April – 8pm to 5am;
 - Tuesday 13th April – 8pm to 5am;
 - Wednesday 14th April – 8pm to 5am;
 - Saturday 18th April – 6am to 6pm;
 - Monday 19th April 2021 – 8pm to 5am;
 - Tuesday 20th April 2021 – 8pm to 5am;
 - Wednesday 21st April 2021 – 8pm to 5am;
 - Monday 26th April 2021 – 8pm to 5am;
 - Tuesday 27th April 2021 – 8pm to 5am ;
 - Wednesday 28th April 2021 – 8pm to 5am;
 - Saturday 1st May 2021– 6am to 6pm.
2. to operate a crawler crane (which will replace the current tower crane) from mid-May 2021 until the end of September 2021 Monday to Friday from 7am to 10pm, Saturdays from 8am to 10pm and Sundays/Public holidays from 8am to 6pm (see location in Figure 2-1).

This memorandum has been prepared to address the potential construction noise and vibration impacts from the proposed crane operation, concrete deliveries and pours from March 2021 to September 2021. These works have been assessed in combination with all potentially concurrent works.

1.2 Justification for out of hours construction works

1.2.1 Concrete pours on site

The concrete for the Station Structure is subject to strict quality specifications and can only be poured up to a maximum ambient temperature of 32°C on a given day. In addition to this, concrete temperature at placement cannot exceed 26°C. During the summer period, experience has shown that a key component of the concrete mix such as the aggregate heats up quickly during the day when stockpiled prior to concrete batching. This limits the window within which concrete batching can occur on any one day and effectively requires all concrete deliveries to be completed by the early afternoon on hot days.

An early start of 4am allows for the required daily volume of concrete to be delivered before aggregate and concrete temperatures exceed the maximum allowable temperature. Extended hours up to 10pm also allow for concrete batching and deliveries to recommence in the late afternoon when temperatures cool down.

In addition, throughout the works program there is potential that concrete pours will be required outside standard operating hours to manage the interface between overhead crane operation and the proposed works. Undertaking the concrete pours during a later shift (6pm-10pm) and early morning (4am to 7am) will eliminate potential hazards that arise from cranes and ensure safety standards are maintained.

These extended working hours will allow the construction of the Barangaroo Station Box to be completed on time avoiding any potential delays to the Project.

1.2.2 Concrete pours on Hickson Rd

In accordance with EPL condition L4.7(ii), concrete pours on Hickson Road would require a Road Occupancy Licence (ROL) which would only be granted by the road network operator outside standard construction hours.

2 Construction noise assessment

2.1 Construction activities

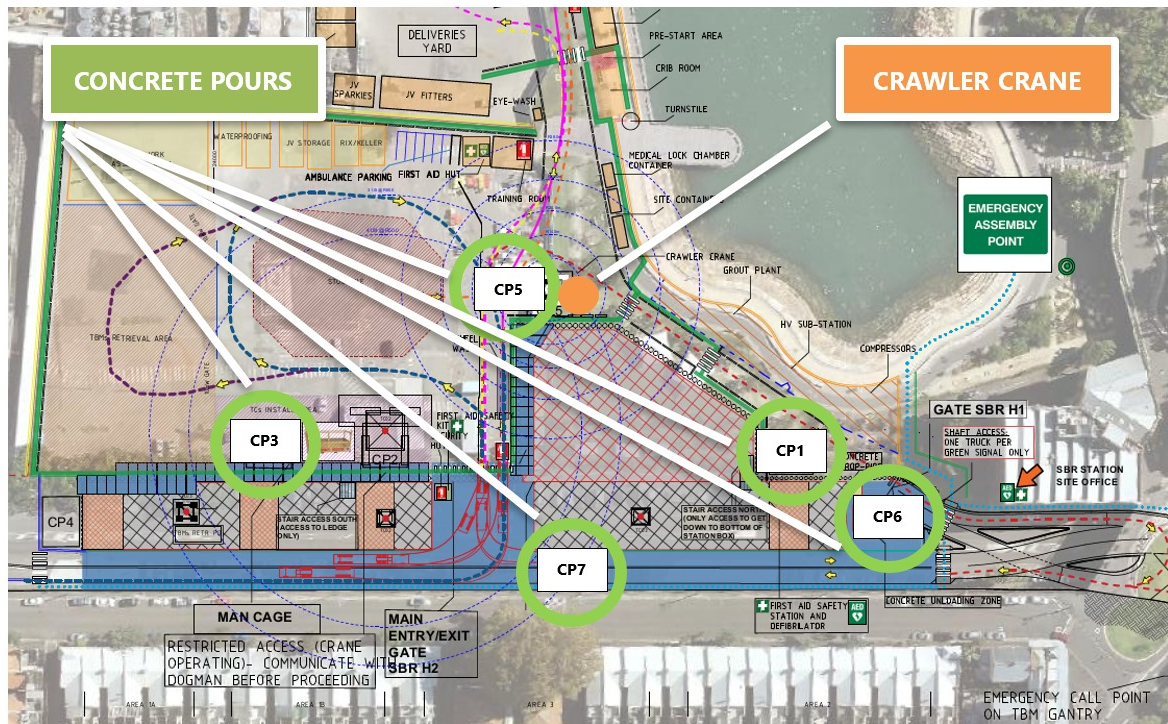
Key details regarding the location and layout of the noise generating plant that will operate during the proposed works were informed by the Environmental and Construction Teams (Figure 2-1). Table 2.1 presents the list of plant and associated sound power levels that are proposed to be used for these works.

Table 2.1: Construction activities and applicable sound power levels

| Activity | Key plant and equipment | Assessment period | | | | Timing | | Sound power level, dB(A) | |
|--|-------------------------------|-------------------|---------|---------|--------|----------------------|---------------------|--------------------------|-------------------|
| | | Day | Day OOH | Evening | Night | March – Mid May 2021 | Mid May – Sept 2021 | L _{Aeq} | L _{Amax} |
| On-site concrete pours (CP1, CP3, CP5 and CP6) | Concrete agitator (unloading) | 1 | - | 1 | 1 | √ ² | √ ² | 108 | 111 ¹ |
| | Concrete truck (delivery) | 4 p.h. | - | 4 p.h. | 4 p.h. | √ ² | √ ² | 106 | 111 ¹ |
| Hickson Rd concrete pours (CP7) | Concrete agitator (unloading) | 1 | 1 | 1 | 1 | √ | | 108 | 111 ¹ |
| | Concrete truck (delivery) | 4 p.h. | 4 p.h. | 4 p.h. | 4 p.h. | √ | | 106 | 111 ¹ |
| Crane operation | Crawler crane (LTR100) | 1 | 1 | 1 | - | | √ | 100 | 105 |

- Notes:
- As per the Barangaroo CNVIS, it is assumed that air brake silencers are to be correctly installed and fully operational for any heavy vehicles.
 - Only 2 early and late concrete pours each month are planned to be carried out

Figure 2-1: Construction activities and locations



During standard construction hours, the proposed works would be carried out concurrently with the concrete works inside the station box (scenario S5) assessed in the *Barangaroo CNVIS*.

2.2 Predicted construction noise levels

Noise results are summarised in Table 2.2 and Table 2.3. These predicted noise levels included the recommended mitigation measures presented in Section 2.3.1.

Table 2.2: Predicted construction noise levels at the closest noise sensitive receivers from March 2021 to mid-May 2021

| Address | NCA | Type of receiver | Predicted noise levels LAeq,15min | | | | | | ICNG NMLs | | | | Existing noise levels, LAeq,15min | | | External equivalent NMLs | |
|---------------------------------------|-------|------------------|-----------------------------------|---------------------------------------|---------------------------|-------------------------|------------------|-----|-----------|---------|-------|-----|-----------------------------------|-------|---------|--------------------------|--|
| | | | S5 ¹ | On-site concrete pours ^{2,4} | Hickson Rd concrete pours | Cumulative ³ | | Day | Day OOH | Evening | Night | Day | Evening | Night | CoA E37 | CoA E41 | |
| | | | | | | SH ⁵ | OOH ⁶ | | | | | | | | | | |
| 17 EDWARD STREET BALMAIN EAST | BN_06 | Residential | 45 | 35 | 35 | 46 | 38 | 59 | 54 | 54 | 46 | 55 | 55 | 49 | 70 | 55 | |
| 18-18A HIGH STREET MILLERS POINT | BN_03 | Residential | 48 | 52 | 45 | 54 | 53 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 34-34A HIGH STREET MILLERS POINT | BN_03 | Residential | 45 | 51 | 47 | 53 | 52 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 40-40A HIGH STREET MILLERS POINT | BN_03 | Residential | 48 | 54 | 44 | 55 | 54 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 65-69 KENT STREET MILLERS POINT | BN_03 | Residential | 47 | 49 | 45 | 52 | 50 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 89-105 KENT STREET MILLERS POINT | BN_03 | Hotel | 46 | 48 | 39 | 50 | 49 | 60 | 60 | 60 | 60 | 61 | 64 | 51 | 80 | N/A | |
| 35-37 BETTINGTON STREET MILLERS POINT | BN_02 | Hotel | 48 | 46 | 54 | 55 | 55 | 60 | 60 | 60 | 60 | 61 | 64 | 51 | 80 | N/A | |
| 24 MUNN STREET BARANGAROO | BN_02 | Residential | 45 | 45 | 47 | 51 | 49 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |

Notes:

- 1) S5 scenario includes concrete works for station during standard construction hours described in the *Barangaroo CNVIS*
- 2) This is the worst-case scenario of all potential concrete pour at CP1, CP3, CP5 and CP6 locations (on-site concrete pours)
- 3) Cumulative impacts include all concurrent work activities.
- 4) These predicted noise levels included the recommended mitigation measures presented in Section 2.3.1.
- 5) Cumulative impacts during standard construction hours which include scenario S5, on-site concrete pours and Hickson Rd concrete pours
- 6) Cumulative impacts outside standard construction hours which include on-site concrete pours and Hickson Rd concrete pours

Table 2.3: Predicted construction noise levels at the closest noise sensitive receivers from mid-May 2021 to September 2021

| Address | NCA | Type of receiver | Predicted noise levels LAeq,15min | | | | | | ICNG NMLs | | | | Existing noise levels, LAeq,15min | | | External equivalent NMLs | |
|---------------------------------------|-------|------------------|-----------------------------------|---------------------------------------|------------------------------|-------------------------|------------------|-----|-----------|---------|-------|-----|-----------------------------------|-------|---------|--------------------------|--|
| | | | S5 ¹ | On-site concrete pours ^{2,4} | Crane operation ⁷ | Cumulative ³ | | Day | Day OOH | Evening | Night | Day | Evening | Night | CoA E37 | CoA E41 | |
| | | | | | | SH ⁵ | OOH ⁶ | | | | | | | | | | |
| 17 EDWARD STREET BALMAIN EAST | BN_06 | Residential | 45 | 35 | 37 | 46 | 39 | 59 | 54 | 54 | 46 | 55 | 55 | 49 | 70 | 55 | |
| 18-18A HIGH STREET MILLERS POINT | BN_03 | Residential | 48 | 52 | 50 | 55 | 54 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 34-34A HIGH STREET MILLERS POINT | BN_03 | Residential | 45 | 51 | 50 | 54 | 54 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 40-40A HIGH STREET MILLERS POINT | BN_03 | Residential | 48 | 54 | 51 | 56 | 56 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 65-69 KENT STREET MILLERS POINT | BN_03 | Residential | 47 | 49 | 49 | 53 | 52 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |
| 89-105 KENT STREET MILLERS POINT | BN_03 | Hotel | 46 | 48 | 46 | 52 | 50 | 60 | 60 | 60 | 60 | 61 | 64 | 51 | 80 | N/A | |
| 35-37 BETTINGTON STREET MILLERS POINT | BN_02 | Hotel | 48 | 46 | 45 | 51 | 49 | 60 | 60 | 60 | 60 | 61 | 64 | 51 | 80 | N/A | |
| 24 MUNN STREET BARANGAROO | BN_02 | Residential | 45 | 45 | 45 | 50 | 48 | 60 | 55 | 50 | 45 | 61 | 64 | 51 | 70 | 55 | |

Notes:

- 1) S5 scenario includes concrete works for station during standard construction hours described in the Barangaroo CNVIS
- 2) This is the worst-case scenario of all potential concrete pour at CP1, CP3, CP5 and CP6 locations (on-site concrete pours)
- 3) Cumulative impacts include all concurrent work activities.
- 4) These predicted noise levels included the recommended mitigation measures presented in Section 2.3.1.
- 5) Cumulative impacts during standard construction hours which include scenario S5, on-site concrete pours and crawler crane operation
- 6) Cumulative impacts outside standard construction hours which include on-site concrete pours and crawler crane operation
- 7) Crane will not operate at night

As can be noted from Table 2.2, noise levels from concrete pours on Hickson Road are predicted to be below the internal NMLs in the Planning Project Approval (PPA) Condition E37, PPA Condition E41 and all relevant ICNG NMLs at all locations, except for one residential property (34-34A HIGH STREET MILLERS POINT) where predicted levels are marginally above the night-time NML (i.e. < 2 dB). Cumulative noise impacts including on-site concrete pours and concrete works for the station are expected to be below the internal NMLs in PPA Condition E37, PPA Condition E41 but above the evening and night-time ICNG NMLs.

As can be noted from Table 2.3, noise levels from the operation of the crawler crane are predicted to be below the internal NMLs in PPA Condition E37, PPA Condition E41 and all relevant ICNG NMLs at all locations, except for one residential property (40-40A HIGH STREET MILLERS POINT) where predicted levels are marginally above the night-time NML (i.e. 1 dB). It is noted that the crane will not operate during the night-time period. Cumulative noise impacts including on-site concrete pours and concrete works for the station are expected to be below the internal NML in PPA Condition E37 but above the internal NML in PPA Condition E41, the evening and night-time ICNG NMLs.

The following points are also noted:

- The noise predictions in this CNVIS represent a realistic worst-case scenario when concrete pour operations occur at worst-case intensity throughout the assessment periods.
- Actual noise levels can often be less than the predicted levels presented in this CNVIS when measured over the assessment period due to:
 - variation in the operating state of the concrete agitator during the delivery;
 - the final delivery orientation of the concrete agitator within the delivery area compared with each receiver;
 - variation in the noise levels from different concrete agitators.

In accordance with PPA Condition E32 and APPENDIX A2 of the *Sydney Metro City and Southwest Construction noise and Vibration Strategy*, additional mitigation measures are to be considered (e.g. at-property treatment, temporary relocation, other forms of mitigation where impacts are predicted to be long term and significant).

At-property treatments and temporary relocation for the noise affected receivers were considered, however, they were deemed unreasonable for the following reasons:

- Concrete pours on Hickson Road and crane operation are predicted to be below internal NML in PPA Condition E41 and marginally above relevant ICNG NMLs.
- Exceedances of PPA Condition E41 are mainly driven by the OOH on-site concrete pours which will be infrequent from March 2021 (only two early/late concrete pours each month).
- Cumulative noise impacts are expected to marginally exceed the internal NML in Condition E41 (i.e. 1 dB). This is not considered significant.

- On-site concrete pours will not be carried out throughout the entire night. Pours will stop by 10pm and will only recommence from 4am.
- Predicted noise levels at the closest noise sensitive receivers from OOH on-site concrete pours are similar or lower than the existing ambient noise levels L_{Aeq} during the morning shoulder (6am to 7am) and evening (6pm to 10pm) periods (see Table 2.2 and Table 2.3).
- Implementation of at-property treatment is a relatively long process (i.e. at least one year). Considering the duration of the proposed works, noise affected receivers would receive acoustic treatments after the proposed works are completed.
- Temporary relocation is not a feasible option due to the duration of the proposed works.

Recommended mitigation measures are presented in Section 2.3.1.

2.3 Noise mitigation and management

2.3.1 Specific mitigation measures

During the assessment of the works Renzo Tonin & Associates played a key role in assisting JHCPBG to determine the feasible and reasonable physical noise mitigation measures required to reduce noise impacts from the operation of the site. In accordance with the *Barangaroo CNVIS*, the following noise mitigation and management measures are recommended to reduce potential noise impacts from the concrete delivery works:

- Set up relevant traffic management measures to minimise the use of air brakes when leaving the site;
- Air brake silencers are to be correctly installed and fully operational for any heavy vehicles;
- Minimise unnecessary acceleration on site;
- Alternative reverse alarms, such as 'quackers' will be installed on all plant, where practicable and safe to do so.

Additionally, a temporary partial enclosure with 12mm plywood and noise blankets on scaffolding will be installed at the on-site concrete pour locations to minimise the noise impact to the closest noise sensitive receivers. This has been included in the noise model. This partial enclosure has been designed to provide a minimum of 10dB reduction. Noise monitoring and site inspection will be undertaken to confirm this level of noise attenuation is achieved.

2.3.2 Noise monitoring

Attended noise monitoring will be undertaken to verify that the construction activities are consistent with the assessed noise modelling scenarios and that noise levels resulting from construction works are not higher than the levels predicted in this CNVIS. Attended monitoring on private property is subject to obtaining the property owner/occupier's consent (where required).

Attended noise monitoring will be undertaken in the NCAs most impacted by the works. The nominated monitoring locations are identified in Table 2.4, and have been selected as they present the best opportunity to validate the predicted noise levels.

Table 2.4: Nominated verification monitoring locations

| NCA | Nominated receiver address | Monitoring location at 1 m from |
|-------|----------------------------------|---------------------------------|
| BN_02 | 24 MUNN STREET BARANGAROO | Southern facade |
| BN_03 | 40-40A HIGH STREET MILLERS POINT | Western facade |
| BN_06 | 17 EDWARD STREET BALMAIN EAST | Eastern facade |
| OSR | 89-105 KENT STREET MILLERS POINT | Western facade |

Note: Monitoring on private property is subject to owner consent and where relevant, occupier consent. If property access is denied, monitoring will still be carried out outside property boundaries.

If verification monitoring shows that the external noise levels are consistently above the predicted levels, investigation will be undertaken to understand the cause of the exceedance and additional mitigation and management measures will be implemented in accordance with Sydney Metro City and South West Noise and Vibration Strategy.

2.3.3 Consultation with affected receivers (PPA Condition E33)

As outlined in Section 5.4.1 of the *Barangaroo CNVIS*, consistent with requirements in PPA Conditions E33, JHCPBG will continue to consult with potentially affected stakeholders including business and residential receivers regarding specific mitigation measures applicable to the construction works at the Barangaroo site.

2.4 Construction related road traffic assessment

Construction traffic has been previously assessed in the *Spoil haulage CNVIS addendum* and considered to have minor impact on public roads used to access and exit the site. The proposed work activities at Barangaroo worksite have been coordinated and planned so that the maximum number of truck movements on site during all assessment periods does not exceed what has already been assessed in the *Spoil haulage CNVIS addendum* (i.e. 8 trucks per hour).

Therefore, consistent with the conclusions of the *Spoil haulage CNVIS addendum*, construction traffic due to the proposed works is expected to have minor impact on surrounding public roads.

2.5 Other assessments

The proposed works are not vibration intensive and so construction vibration or ground-borne noise impacts have not been further considered in this addendum assessment.

3 Conclusion

This technical memorandum is an addendum to the report *Barangaroo CNVIS* to review the potential noise and vibration impacts for the proposed concrete pours and crane operation at the Barangaroo worksite. These works have been assessed in combination with all potentially concurrent works occurring at the site.

Noise levels from concrete pours on Hickson Road are predicted to be below the internal NMLs in PPA Condition E37, PPA Condition E41 and all relevant ICNG NMLs at all locations, except for one residential property (34-34A HIGH STREET MILLERS POINT) where predicted levels are marginally above the night-time NML (i.e. < 2 dB). Noise levels from the crawler crane are predicted to be below the internal NMLs in PPA Condition E37, PPA Condition E41 and all relevant ICNG NMLs at all locations, except for one residential property (40-40A HIGH STREET MILLERS POINT) where predicted levels are marginally above the night-time NML (i.e. 1 dB). It is noted that the crane will not operate at night. Cumulative noise impacts including on-site concrete pours and concrete works for the station are expected to be below the internal NML in PPA Condition E37 but above the internal NML in PPA Condition E41, the evening and night-time ICNG NMLs. It is noted that the noise predictions in this CNVIS represent a realistic worst-case scenario when concrete operations occur at worst-case intensity throughout the assessment periods. Actual noise levels can often be less than the predicted levels presented in this CNVIS when measured over the assessment period.

Construction traffic due to the proposed works is expected to have a minor impact on surrounding public roads. The proposed works are not vibration intensive and so construction vibration or ground-borne noise impacts have not been considered further in this addendum assessment.

Noise monitoring will be undertaken on a regular basis to verify compliance with the predicted noise levels.

The consultation and notification process in accordance with PPA Condition E33 will continue and from now on will also include these additional out-of-hour works.

Document control

| Date | Revision history | Non-issued revision | Issued revision | Prepared | Instructed | Authorised |
|------------|---|---------------------|-----------------|-------------|-------------|------------|
| 17.01.2020 | Issued | - | 0 | M. Tabacchi | M. Tabacchi | B. Carlyle |
| 21.01.2020 | Addition of CP3 and CP6 | - | 1 | M. Tabacchi | M. Tabacchi | B. Carlyle |
| 03.02.2020 | Update following AA's comments | - | 2 | M. Tabacchi | M. Tabacchi | T. Gowen |
| 05.05.2020 | Including night-time operations | - | 3 | M. Tabacchi | M. Tabacchi | B. Carlyle |
| 18.03.2021 | Inclusion of additional concrete pours at CP7 and crane use | - | 4 | M. Tabacchi | M. Tabacchi | B. Carlyle |
| 19.03.2021 | Minor edits | - | 5,6 | M. Tabacchi | M. Tabacchi | B. Carlyle |

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We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

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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 115dB Limit of sound permitted in industry 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 L _{eq} 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. |