

MANAGING DIRECTORS

MATTHEW PALAVIDIS
VICTOR FATTORETTO

DIRECTORS

MATTHEW SHIELDS
BEN WHITE



**Global Switch - Sydney East, 276 Pyrmont Street,
Ultimo**

**Stage 2 Construction Works - Extended Hours Noise
Impact Assessment**

SYDNEY

A: 9 Sarah St Mascot NSW 2020

T: (02) 8339 8000

F: (02) 8338 8399

SYDNEY MELBOURNE BRISBANE CANBERRA

LONDON DUBAI SINGAPORE GREECE

www.acousticlogic.com.au

ABN: 11 068 954 343

The information in this document is the property of Acoustic Logic Consultancy Pty Ltd ABN 11 068 954 343 and shall be returned on demand. It is issued on the condition that, except with our written permission, it must not be reproduced, copied or communicated to any other party nor be used for any purpose other than that stated in particular enquiry, order or contract with which it is issued.

TABLE OF CONTENTS

1	INTRODUCTION	4
2	SITE DESCRIPTION	5
3	CONSTRUCTION NOISE OBJECTIVES	8
3.1	ASSESSMENT CRITERIA	8
3.2	BACKGROUND NOISE MONTIORING	9
3.2.1	Measurement Equipment	9
3.2.2	Location	9
3.2.3	Weather Affected Noise Data.....	9
3.2.4	Measured Rating Background Noise Levels	9
3.3	CONSTRUCTION NOISE OBJECTIVES	10
4	PROPOSED WORKS TO BE CARRIED OUT.....	11
4.1	EXTENSION OF CONSTRUCTION HOURS PROPOSAL.....	11
4.2	PROPOSED WORKS	11
5	PREDICTED CONSTRUCTION NOISE LEVELS	13
5.1	DISCUSSION	14
6	RECOMMENDED MANAGEMENT CONTROLS	15
7	CONCLUSION.....	16
APPENDIX 1 UNATTENDED NOISE MONITORING DATA.....		17
APPENDIX 2 SAMPLE NOISE EMISSION CALCULATION		18

1 INTRODUCTION

This report presents an assessment of noise impacts associated with the proposed extended hours of construction works to be carried out within the stage 2 area of the Global Switch – Sydney East Stages 2 & 3 development at 400 Harris Street, Ultimo.

This report addresses noise impacts associated with the proposed works during the evening and night time periods (Category 2-4), and the formulation of acoustic treatments to ensure that noise emissions comply with City of Sydney Council's "*Construction Hours/Noise Within the Central Business District*" Code of Practice (1992) guideline.

The proposed construction hours associated with this assessment involve an extension from the approved construction period to midnight, Monday to Saturday.

ALC confirms that the proposed construction works during the extended hours period can comply with the City of Sydney council construction noise criteria, on the proviso that the acoustic treatments and management conditions nominated in this report are adopted.

2 SITE DESCRIPTION

The subject site is located at the corner of Pymont and Quarry Streets, adjoining the existing Global Switch – Sydney East Data Centre at 400 Harris Street, Ultimo, to the east. It is bounded by Pymont Street to the east, Quarry Street to the south and the existing Global Switch infrastructure to the west and north.

The site is being developed into a seven storey building (with one basement level), to form part of the Global Switch Sydney East infrastructure. The development is divided into 3 stages as illustrated in Figure 1 below.

Currently approved construction hours are 7.30am to 5.30pm Monday to Friday and 7.30am to 3.30pm on Saturdays. It is proposed to extend the existing approved construction hours until midnight Monday to Saturday, for internal fitout works within the **Stage 2 space only**. The proposed works are all within internal areas within the development and only commence after the façade along Pymont Street is fully installed (to provide weather proofing to fitout areas). A brief summary of the proposed internal fitout works will include;

- Construction of internal walls (light-weight, steel stud system).
- Installation of services.
- Installation of ceilings.
- Installation of access floor.
- Painting.
- Floor finishes.
- Install of doors and frames.
- Signage.
- Commissioning of services.

The existing multi-storey residential properties at 277 Pymont Street and 424 Quarry Street, Ultimo, located to the south of the subject site (across Quarry Street), are potentially the only affected surrounding receivers.

Existing Global Switch buildings adjoin the site to the north and west. The nearest affected receiver to the east is the future International Convention Centre development, currently under construction. Hence, the residential buildings to the south (277 Pymont Street and 424 Quarry Street) will be used as a basis for this extended hours assessment, as they represent the potentially nearest affected receivers during this period of works.

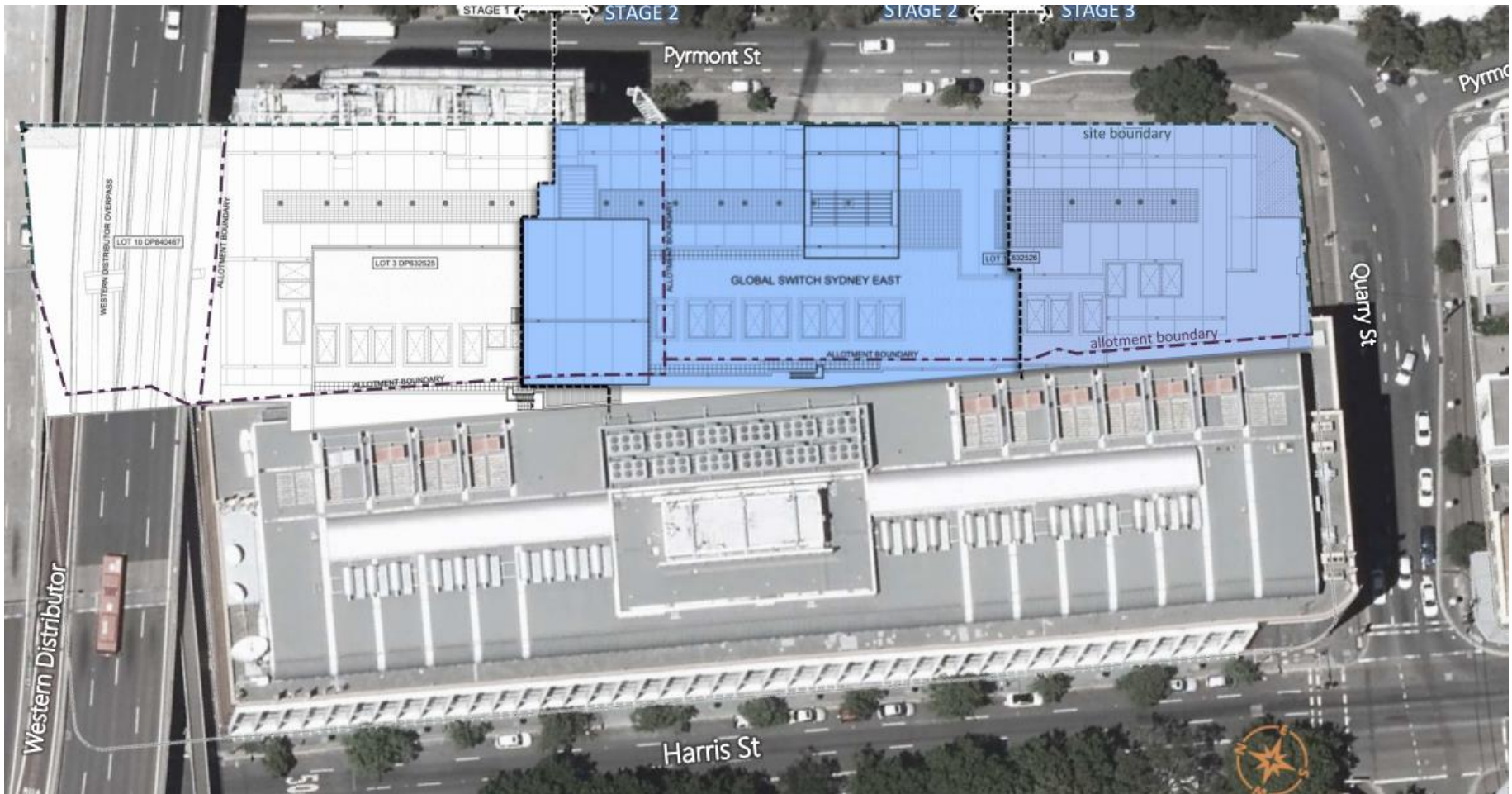


Figure 1 – Site Plan

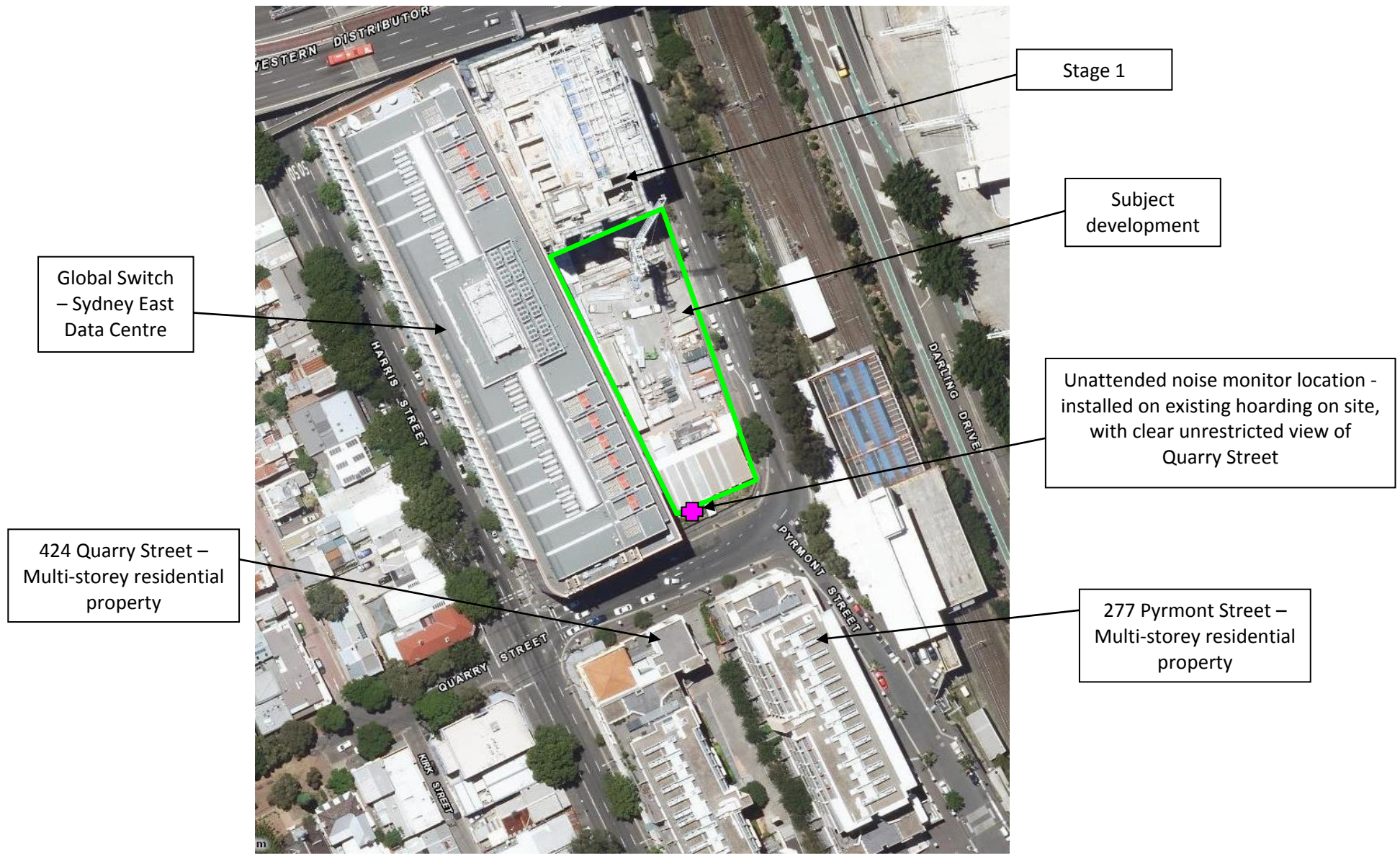


Figure 2 – Site Description (source: SixMaps)

3 CONSTRUCTION NOISE OBJECTIVES

3.1 ASSESSMENT CRITERIA

Criteria relating to construction noise within the City of Sydney are outlined in the City of Sydney “Construction Hours/Noise Within the Central Business District” Code of Practice (1992). Construction noise during all periods of the day as detailed in the code are as follows:

Table 1 - Categories of Working Hours and Noise Criteria

Day	Time Zone	Category	Noise Criteria
Monday to Friday	00.00 – 07.00	4	Background + 0dB(A)
	07.00 – 08.00	1	Background + 5dB(A)
	08.00 – 19.00	1	Background + 5dB(A) + 5dB(A) To be determined on a site basis
	19.00 – 23.00	2	Background + 3dB(A)
	23.00 – 24.00	4	Background + 0dB(A)
Saturday	00.00 – 07.00	4	Background + 0dB(A)
	07.00 – 08.00	1	Background + 5dB(A)
	08.00 – 17.00	1	Background + 10dB(A)
	17.00 – 23.00	2	Background + 3dB(A)
	23.00 – 24.00	4	Background + 0dB(A)
Sundays and Public Holidays	00.00 – 07.00	4	Background + 0dB(A)
	07.00 – 17.00	3	Background + 3dB(A)
	17.00 – 24.00	4	Background + 0dB(A)

In addition, the following requirements are adopted.

- Australian Standard 2436-2010 “Guide to Noise Control on Construction Maintenance and Demolition Site”. The requirements stipulated in Section 3 of the standard will be followed.

Section 3 of AS 2436 states that care shall be taken in applying criteria that normally would be used to regulate noise emitted from industrial, commercial and residential premises to construction, particularly for those activities which are transitory and of short duration. For the control and regulation of noise from construction sites AS2436 nominates the following:

- That reasonable suitable noise criterion is established.
- That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes on parts of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours.
- The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the building site.

Based on these criteria the following procedure will be used to assess noise emissions:

- Predict noise levels produced by the typical internal fitout works activities at the sensitive receivers.

- Noise emissions during the night time period at residential locations should achieve the background + 3dB(A) criteria for Category 2 hours and background + 0dB(A) criteria for Category 4 hours.

3.2 BACKGROUND NOISE MONITORING

Background noise levels have been determined from monitoring on site.

3.2.1 Measurement Equipment

Unattended noise monitoring was conducted using an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

3.2.2 Location

The noise monitor was installed on the existing construction hoarding installed on site, along Quarry Street. The monitor was installed at maximum distance from any stationary noisy construction plant (generators, hoists etc.), with the mic positioned to have a clear unrestricted view of Quarry Street.

3.2.3 Weather Affected Noise Data

The measured background noise levels have been corrected for meteorological conditions (excessive wind and/or rain), as required by Section 3.4 of the EPA Industrial Noise Policy. Exceedances of the 5m/s average wind speed limit of the EPA were noted and corrected for in determining the background noise levels. These areas are noted in the logging data in Appendix 1.

Periods of adverse weather have been eliminated when determining the rating background noise level at the site, which are presented in Table 2.

3.2.4 Measured Rating Background Noise Levels

Background noise levels recorded during the aforementioned monitoring periods are presented in the following Table.

Table 2 – Rating Background Noise Levels

Measurement Location	Measurement Period	Rating Background Noise Level dB(A) $L_{90(\text{period})}$
Monitor Location (along Quarry Street)	Monday – Friday 7pm to 11pm Saturday 5pm to 11pm (Category 2)	57
	Monday – Friday 11pm to 7am Saturday 11pm to 7am (Category 4)	54

3.3 CONSTRUCTION NOISE OBJECTIVES

The construction noise objectives for this assessment have been established from the background noise monitoring in conjunction with the requirements of City of Sydney Council guidelines.

Table 3 – Construction Noise Objectives

Receiver Location	Category	Rating Background Noise Level dB(A) $L_{90}(\text{period})$	Construction Noise Objective dB(A) $L_{Av \text{ max}(15\text{mins})}$
Residential Properties along Quarry Street	2	57	60
	4	54	54

4 PROPOSED WORKS TO BE CARRIED OUT

This study includes works associated with the internal fitout of all seven levels of stage 2.

4.1 EXTENSION OF CONSTRUCTION HOURS PROPOSAL

The existing approved hours of construction are as follows;

“All building work shall be restricted to within the hours of 7.30am to 5.30pm Monday to Friday and 7.30am to 3.30pm on Saturday with no work on Sundays and/or public holidays. Measures shall be undertaken to ensure no adverse noise or amenity impacts occur to any residential premises”.

It is proposed to extend these construction hours to include:

- 5.30pm to Midnight Monday to Friday; and
- 3.30pm to Midnight Saturday.

4.2 PROPOSED WORKS

We have been advised of the typical equipment/processes anticipated to be used for the proposed internal fitout works

Table 4 – Proposed Works

Activity	Task Description	Noise Sources
Internal Fitout Works	Interior fitout including new ceilings and partition walls, surface finishes and services	Mobile scaffolds, hoists and scissor lifts, power tools, nail guns and hand tools

The A-weighted sound power levels for the typical loudest equipment/processes to be used during these stages are outlined in the table below.

Table 5 – Fitout Activities and Noise Levels

Equipment / Process	Sound Power Level dB(A)
Scissor Lift	106
People hoist (new – located internally at south east corner of stage 2)	96
Drilling	94
Angle grinders	109*
Nail Gun	101*
Impact drill	106*

* - includes 5 dB(A) addition for tonal/impulsive characteristics of noise source

The noise levels presented in the above table are derived from the following sources:

1. On-site measurements.
2. Table D2 of Australian Standard 2436-1981 & Table A1 of Australian Standard 2436-2010.
3. Data held by this office from other similar studies.

5 PREDICTED CONSTRUCTION NOISE LEVELS

Noise associated with the Stage 2 internal fitout works have been predicted based on the following assumptions and parameters;

- These works may be undertaken during the Category 2 and 4 hours, Monday to Saturday.
- All internal works will only commence after the external façade is installed (as the façade will reduce noise emitted from the construction activities).
- The internal fitout works may coincide with the staged level construction of stage 3 (no fitout is proposed to this stage – shell and core only). For the purpose of assessment, we assume that there is no solid partition separating Stage 2 from Stage 3 (although this will ultimately be constructed, it may not be complete at the time of the proposed after hours works).
- Fitout works are significantly quieter than demolition or general construction works, given:
 - Impact tools which generate the majority of noise during the demolition works are not used during the fit-out e.g. Jackhammers, excavators, bulldozer etc.
 - High noise generating appliances such as angle grinders or circular saws are used sporadically to cut certain materials and are not used for long periods as jackhammers and the like.
 - The majority of works involved with the fit-out will include fixing, painting and finishes.

On this basis, internal fitout works have been assessed for the following modelling parameters:

- Noise sources will include:
 - Operation of scissor lifts and new people hoist;
 - Sporadic angle grinding and circular saw;
 - Impact drilling;
 - Fixing of surface finishes.

The predicted noise levels are presented below. A sample calculation is included in Appendix 2.

Table 6 – Predicted Construction Noise Levels

Activity	Construction Appliances	Receiver Location	Predicted Noise Level dB(A)_{L_{av} max(15mins)}	Construction Noise Criteria dB(A) _{L_{av} max(15mins)}	Complies
Fitout Works	<ul style="list-style-type: none"> - Sporadic angle grinding or circular saw - Tiling and wall finishes - Impact drilling - Operation of mobile platforms - Miscellaneous hand tools 	424 Quarry Street, Ultimo	43 – 49	54*	Yes
		277 Pymont Street, Ultimo	45 – 51		

*Compliance with the category 4 noise objective will also result in compliance with the category 2 noise objective.

5.1 DISCUSSION

Noise predictions from the proposed works during the extended hours period have been conducted and indicate the following:

- The proposed fitout works will be a minimum 3dB(A) below the Category 4 construction noise criteria and will have minimal acoustic impact on surrounding residential receivers.
- The proposed fitout works will be a minimum 9dB(A) below the Category 2 construction noise criteria and will have minimal acoustic impact on surrounding residential receivers.

On this basis, the proposed construction works will comply with the extended hours construction noise criteria during Category 2 and Category 4 periods on the proviso that the recommended management controls in section 6 are adopted.

6 RECOMMENDED MANAGEMENT CONTROLS

The following management controls are recommended to ensure that noise emanating from the site during construction works comply with the noise emission criteria.

- Jackhammering operations should not occur during the proposed extended hours period.
- Angle grinding works within 10m of Stage 2 and 3 boundary must only be undertaken in Category 2 periods or during normal construction hours. They should not be undertaken during Category 4 times (11.00pm to 7.00am Monday to Saturday).
- The external façade along Pymont Street must be fully installed and sealed airtight prior to the commencement of any fitout works.
- No fitout works are not to be undertaken external to the building.
- Any cutting in slabs or hobs should be conducted during normal construction hours.
- Materials handling is only permitted within the stage basement level. No handling operations must be carried out at street level.
- An after-hours contact number of the Site Manager is to be advertised outside the building site, so that residents and other interested parties may contact him, should they believe a noise breach is occurring.

7 CONCLUSION

This report presents the assessment of noise impacts associated with the proposed extension of construction hours for the stage 2 internal fitout works, on the Global Switch – Sydney East Stages 2 & 3 development at 400 Harris Street, Ultimo.

Predicted noise levels from the fitout works indicate compliance with the construction noise emission requirements of the City of Sydney Council's "*Construction Hours/Noise Within the Central Business District*" Code of Practice (1992) guideline, on the proviso that that the recommended management controls detailed in this report are adopted.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,



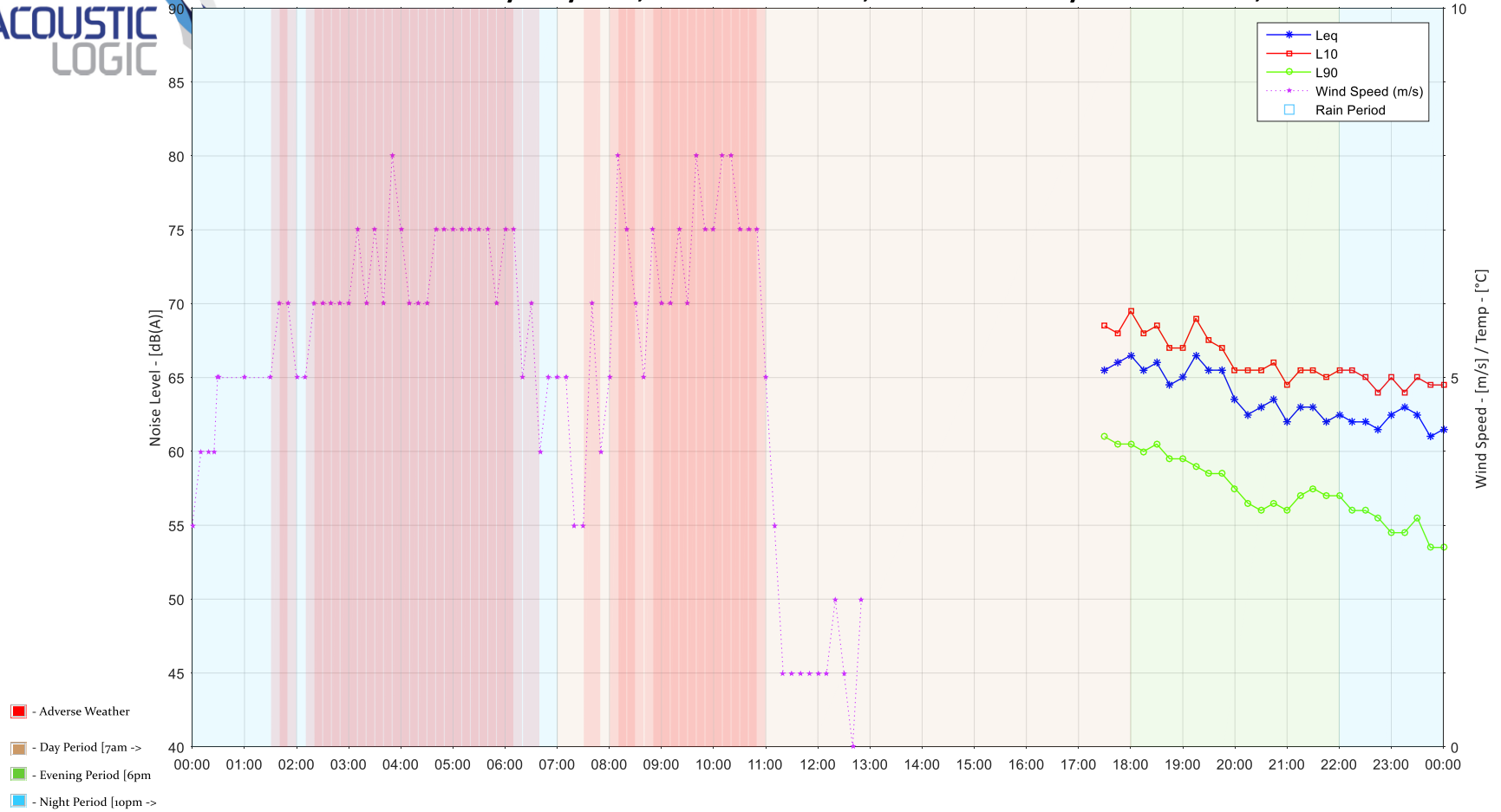
Acoustic Logic Consultancy Pty Ltd
Yogendra Kalkunte

APPENDIX 1

UNATTENDED NOISE MONITORING DATA

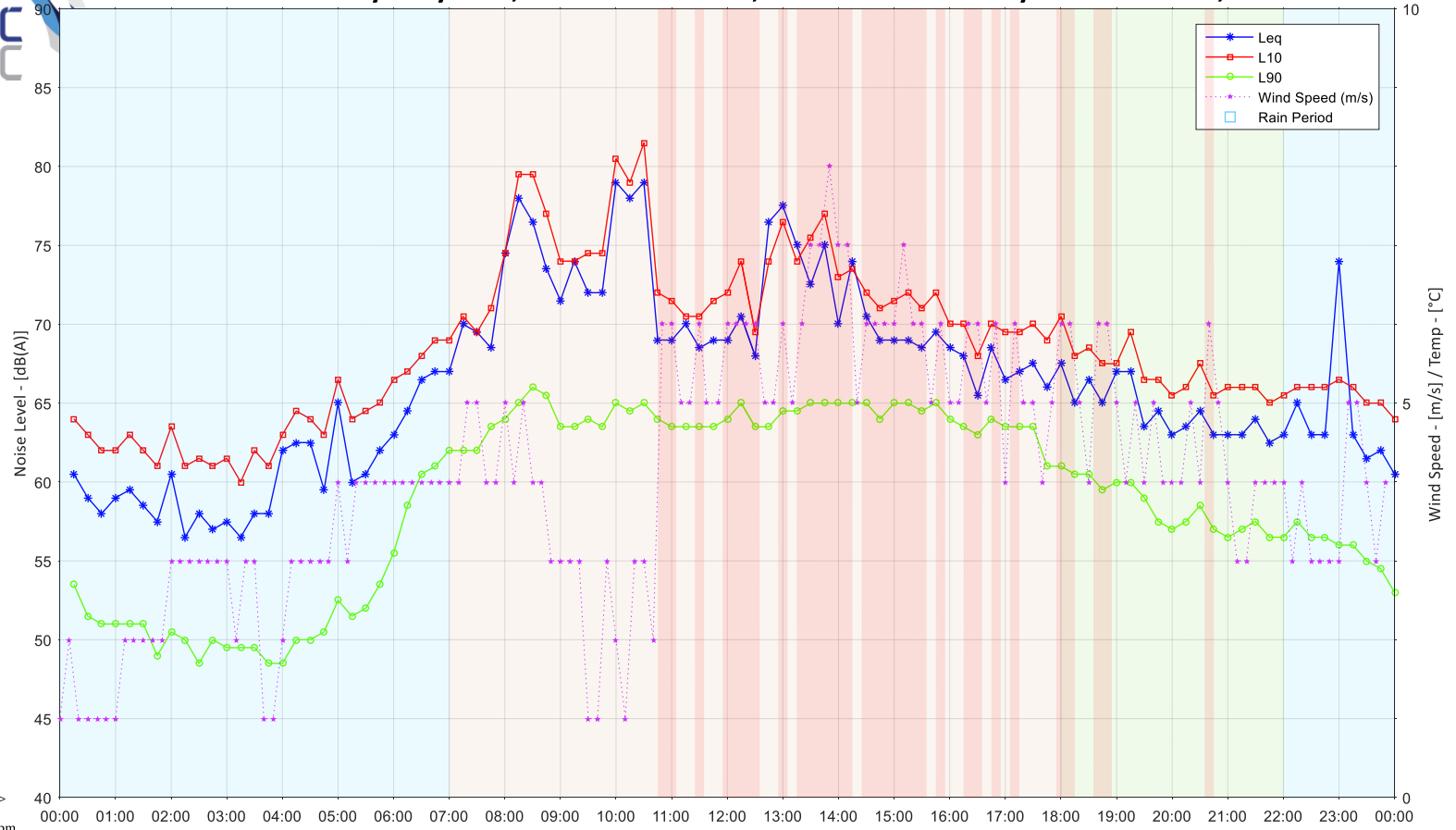


Global Switch - Sydney East, 400 Harris Street, Ultimo: Tuesday 15 November, 2016





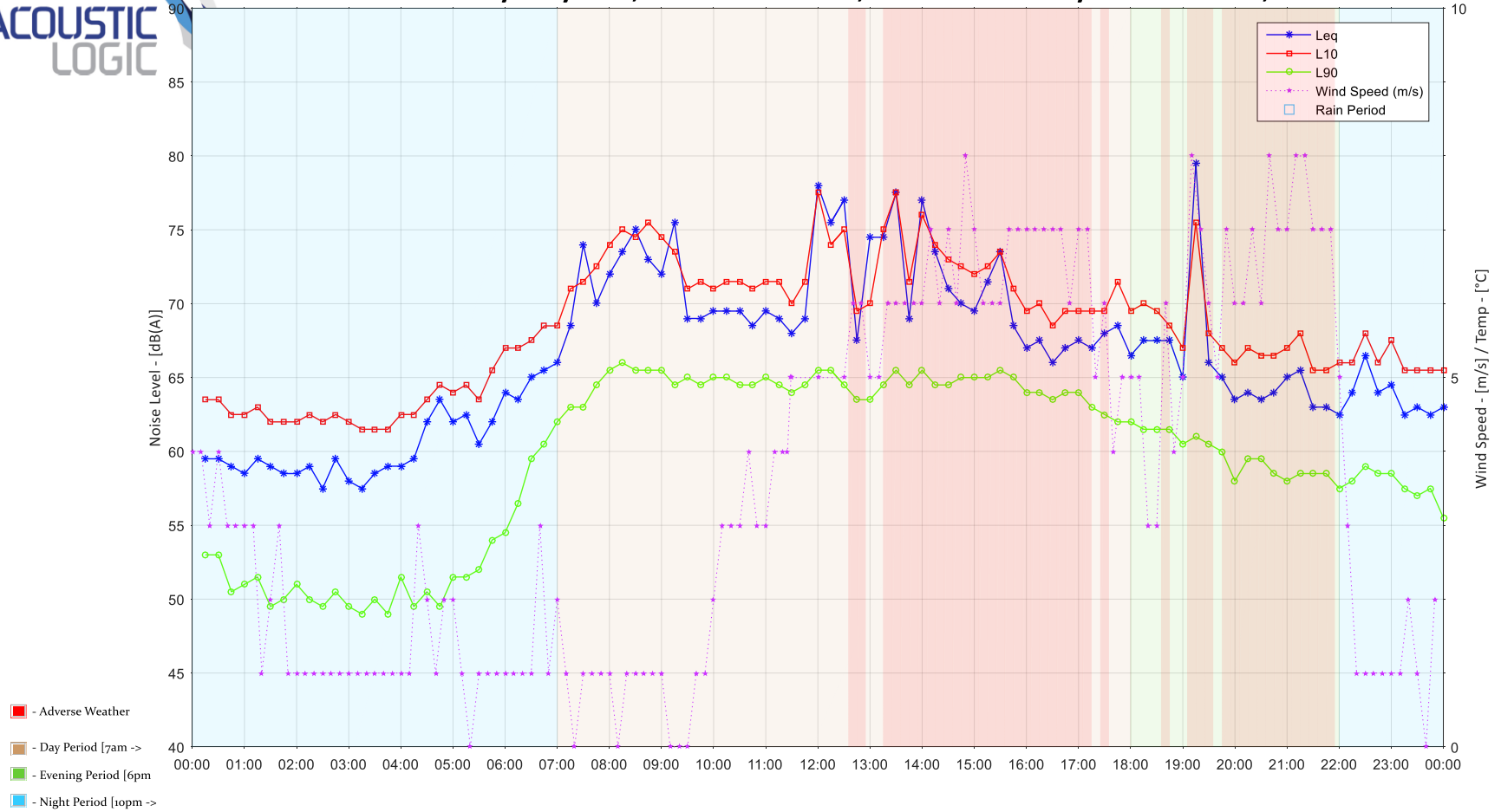
Global Switch - Sydney East, 400 Harris Street, Ultimo: Wednesday 16 November, 2016



- - Adverse Weather
- - Day Period [7am ->]
- - Evening Period [6pm]
- - Night Period [10pm ->]

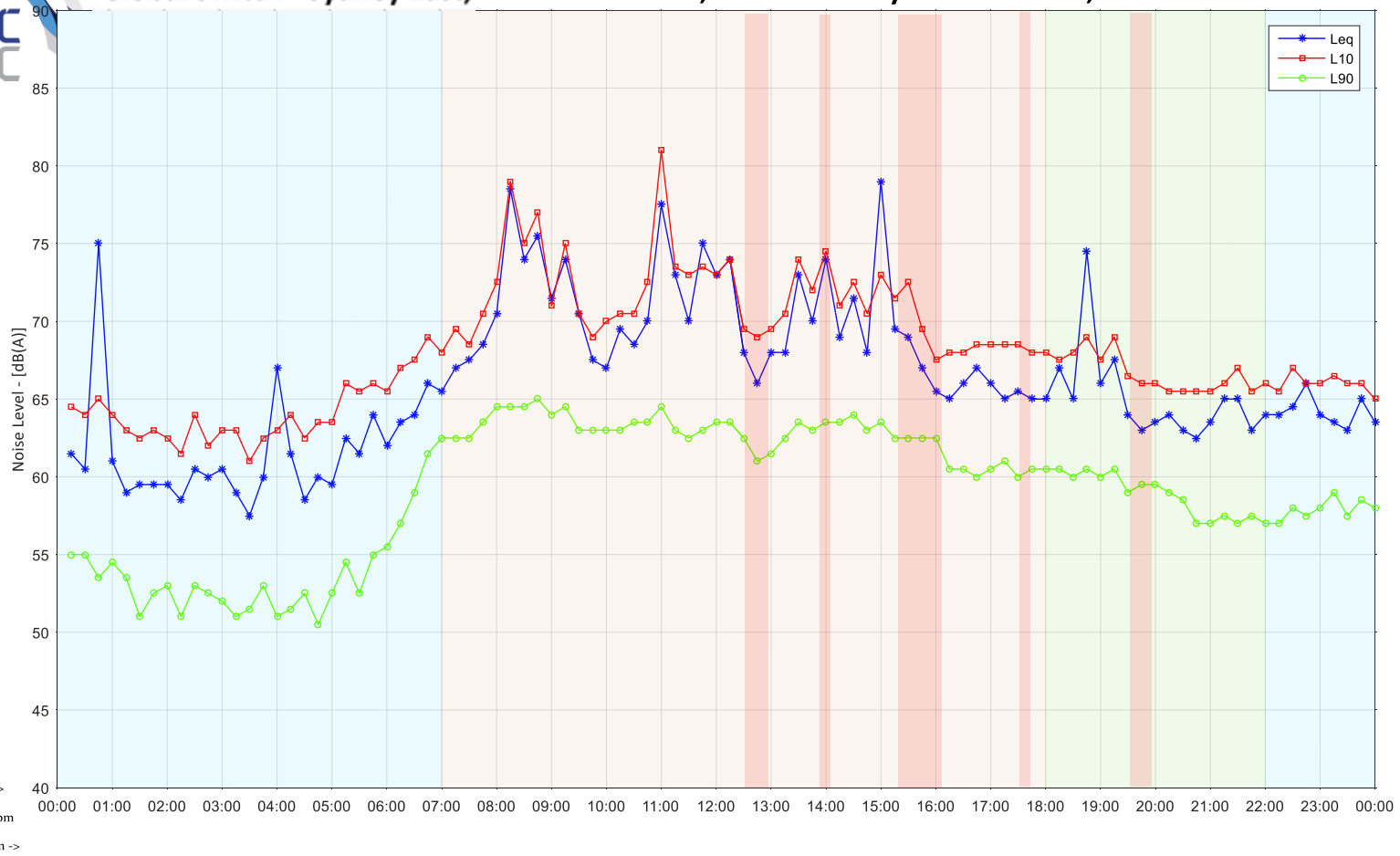


Global Switch - Sydney East, 400 Harris Street, Ultimo: Thursday 17 November, 2016



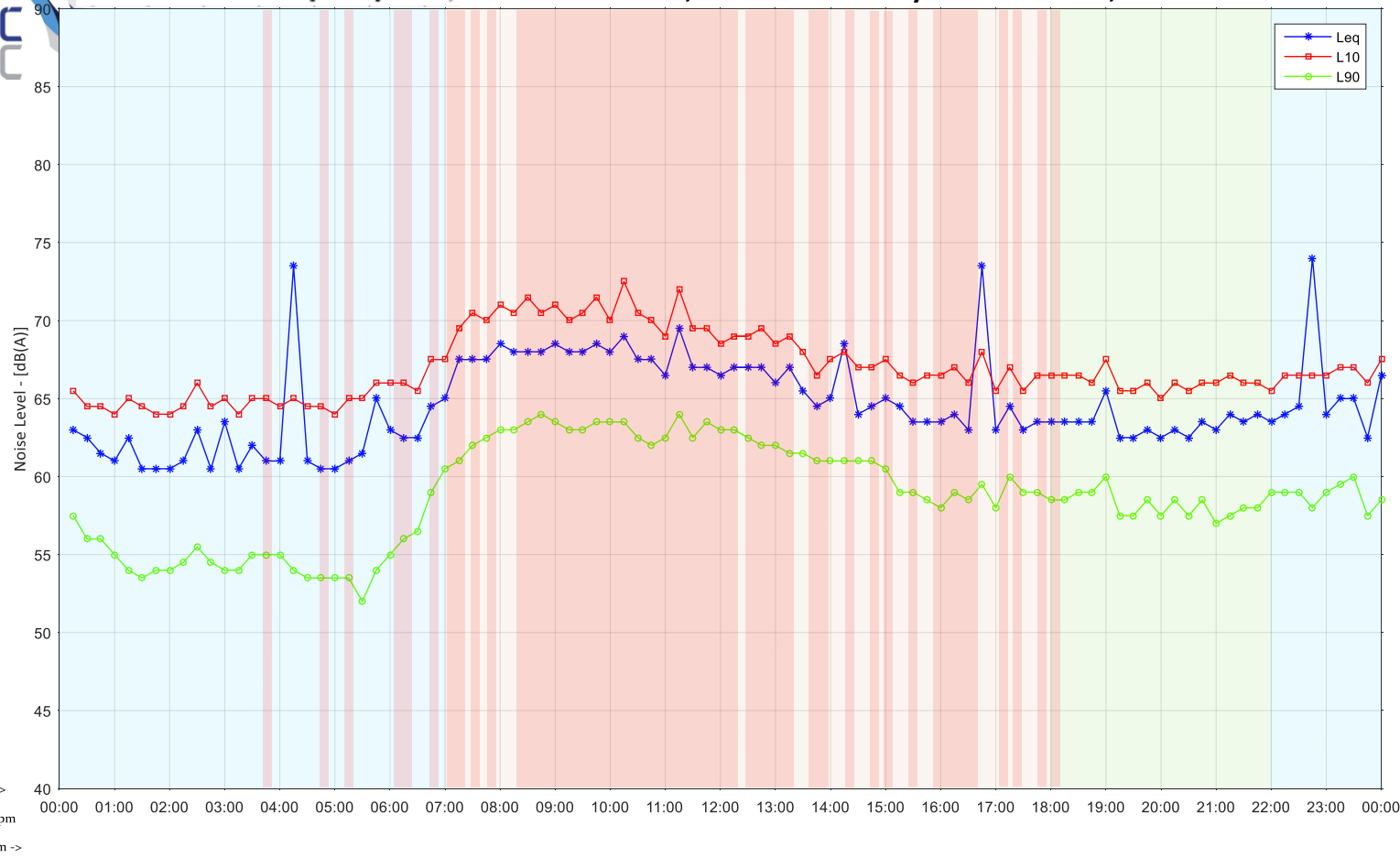


Global Switch - Sydney East, 400 Harris Street, Ultimo: Friday 18 November, 2016



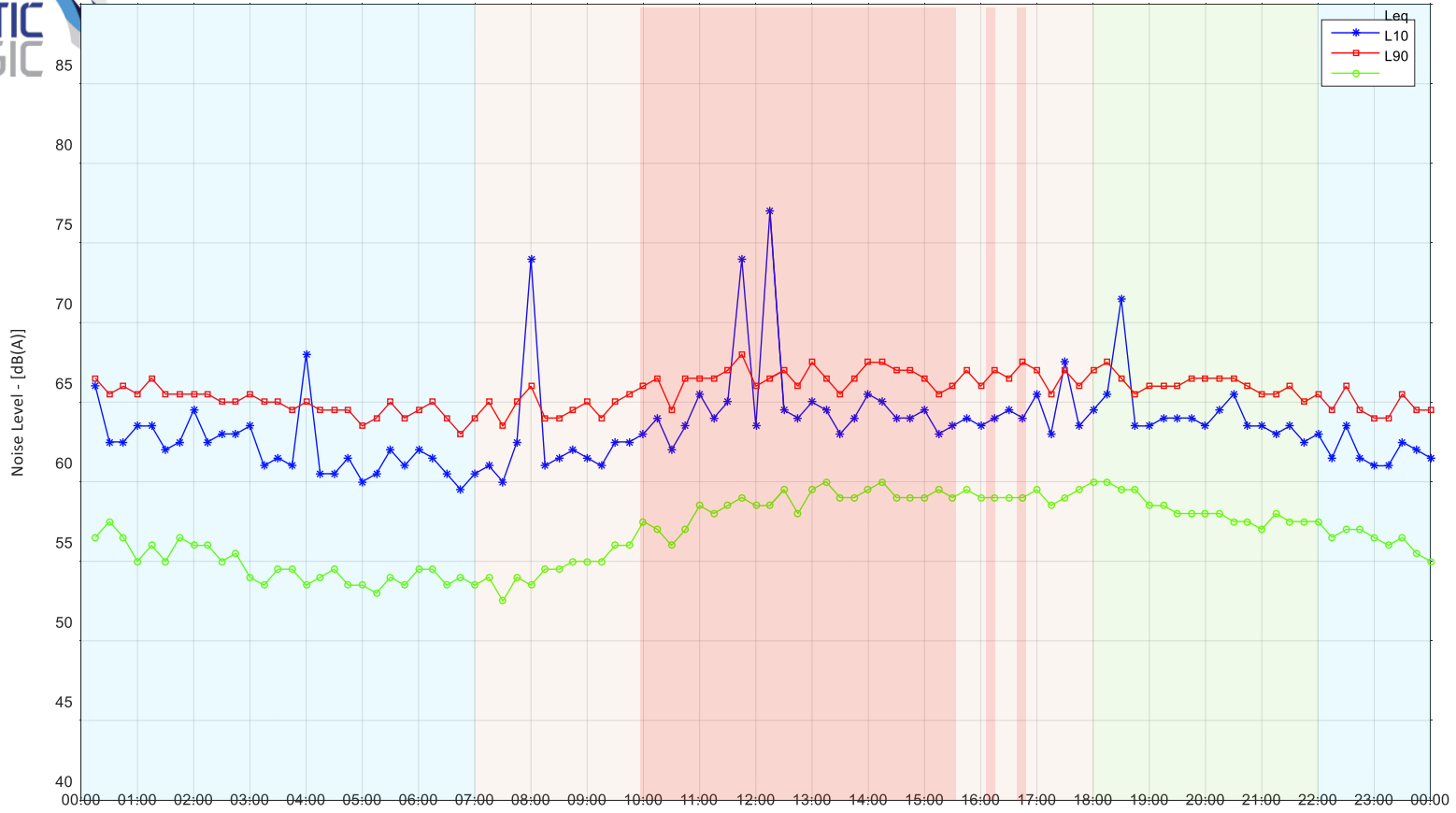


Global Switch - Sydney East, 400 Harris Street, Ultimo: Saturday 19 November, 2016





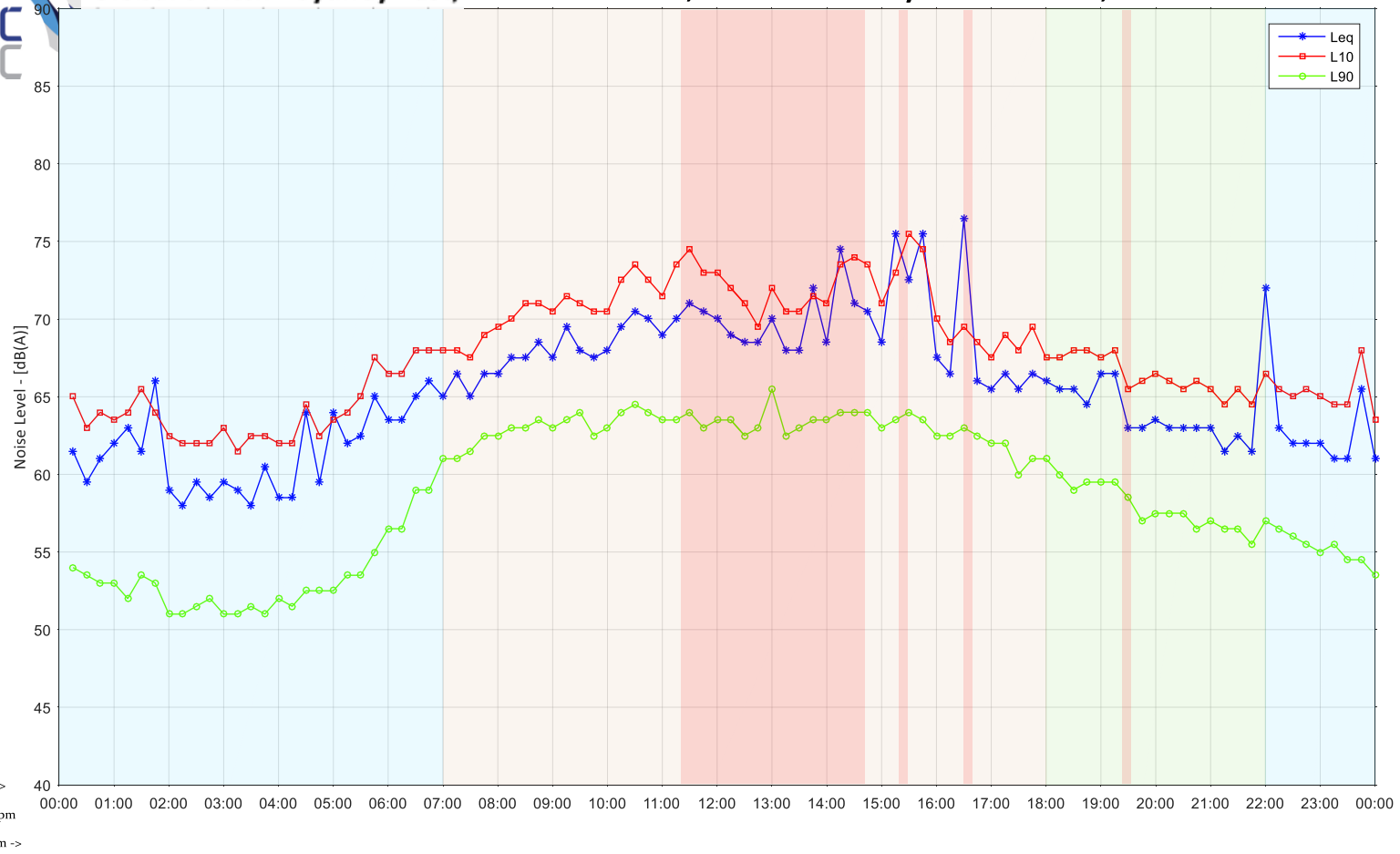
Global Switch - Sydney East, 400 Harris Street, Ultimo: Sunday 20 November, 2016



- 6pm]
- > 10pm]
- 7am]

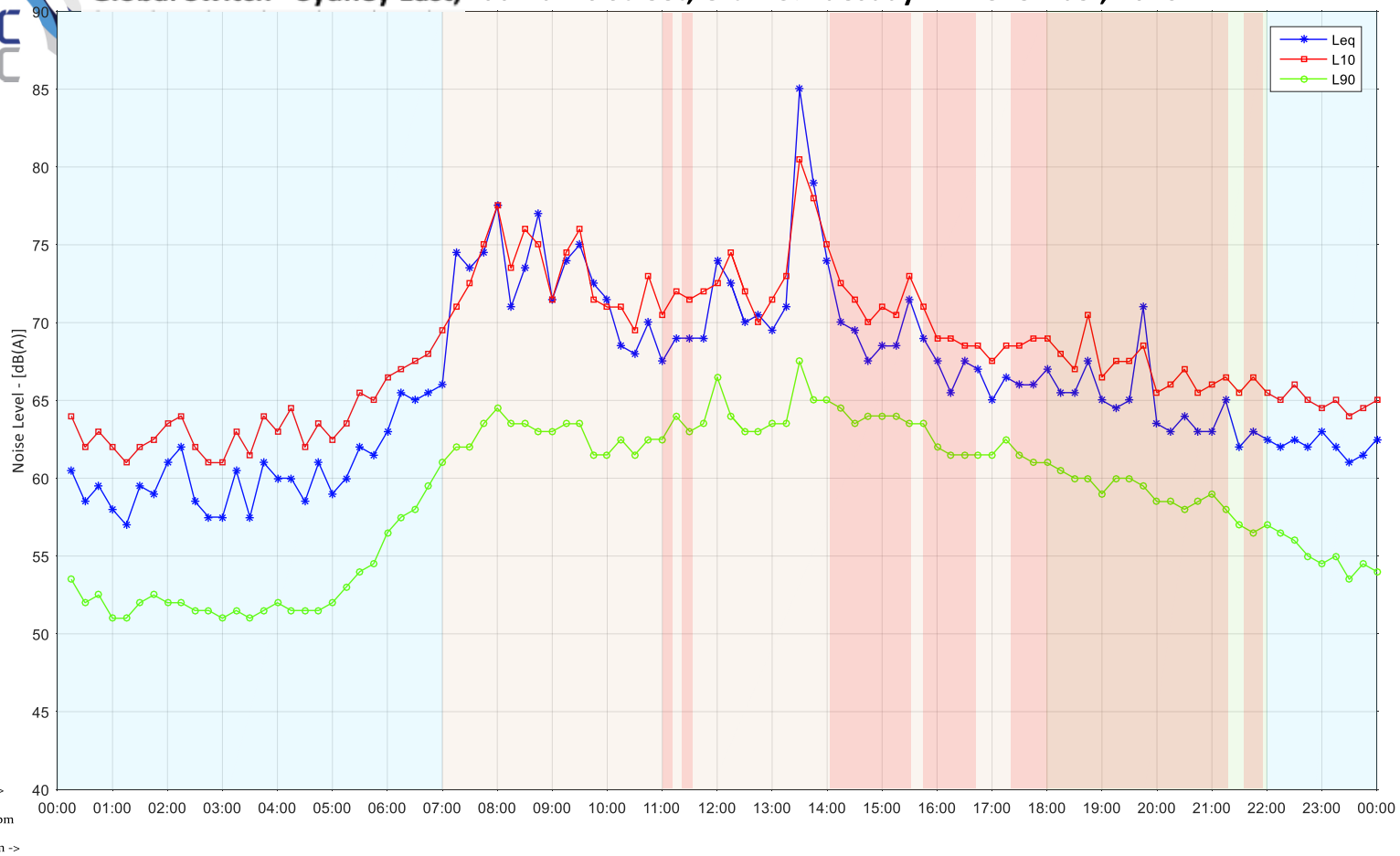


Global Switch - Sydney East, 400 Harris Street, Ultimo: Monday 21 November, 2016

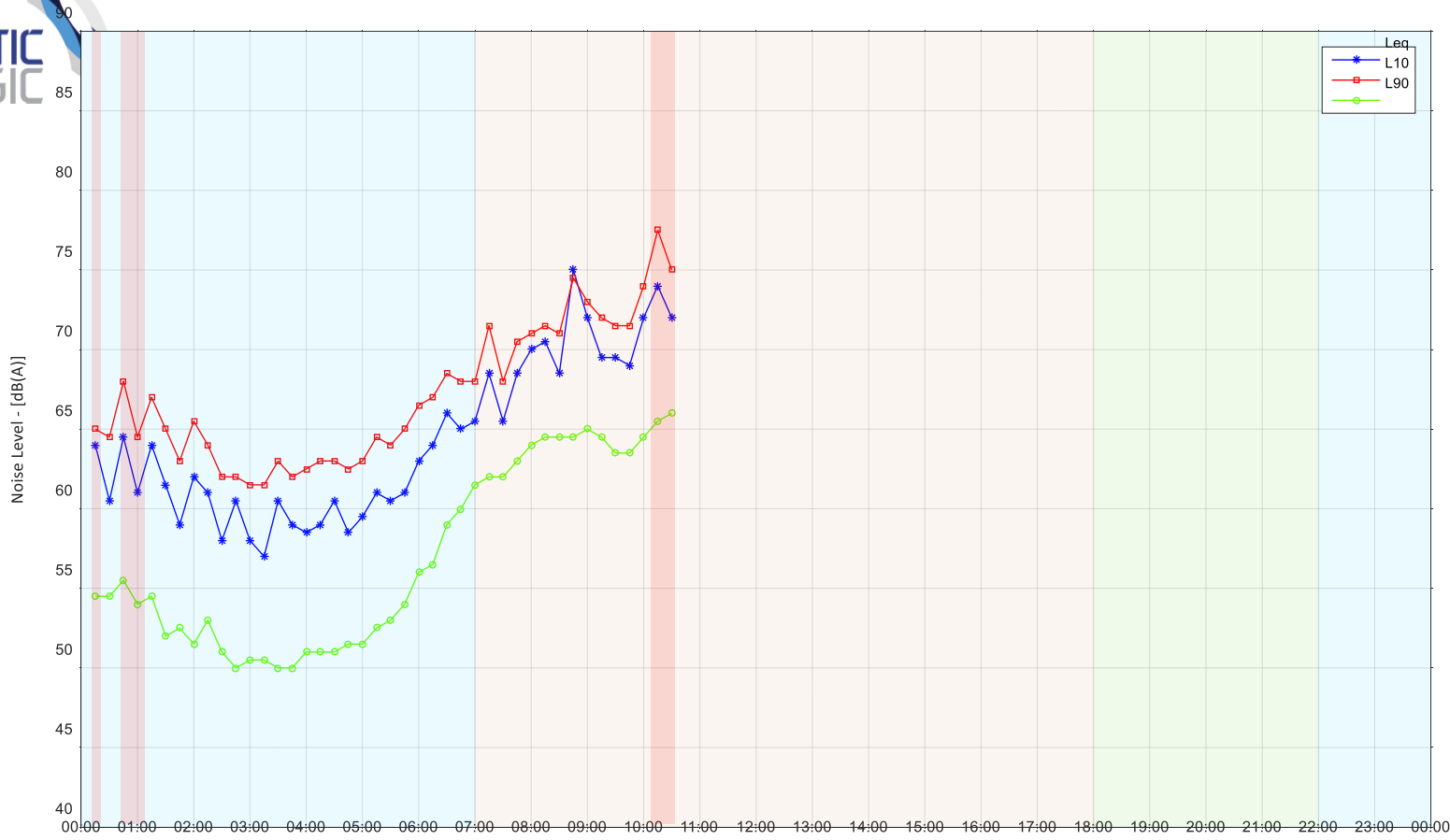




Global Switch - Sydney East, 400 Harris Street, Ultimo: Tuesday 22 November, 2016



Global Switch - Sydney East, 400 Harris Street, Ultimo: Wednesday 23 November, 2016



- 6pm]
- > 10pm]
- 7am]

APPENDIX 2

SAMPLE NOISE EMISSION CALCULATION

The following is a sample calculation used to predict the noise level for the residential receivers at 277 Pyrmont Street, from the proposed fitout works.

1.	Noise source (Angle Grinders):	109 dB(A) SWL
2.	Room correction (Sound Pressure Level of SPL within fitout space, open to stage 3 and along the south façade of the development – approx. 50mx30m)	-15dB
3.	Plane Distance Correction (worst case assumption works occurring within 10m of stage 2 & 3 boundary 10m x 30m zone – approx. 60m from centre of plane)	-44dB
4.	Resultant Noise Level	50dB(A)