

MANAGING DIRECTORS

MATTHEW PALAVIDIS
VICTOR FATTORETTO

DIRECTORS

MATTHEW SHIELDS
BEN WHITE



30-36 Bay Street, Double Bay

DA Acoustic Assessment

SYDNEY

A: 9 Sarah St

MASCOT 2020

T: (02) 8339 8000

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.

DOCUMENT CONTROL REGISTER

Project Number	20161365.1
Project Name	30-36 Bay Street, Double Bay
Document Title	DA Acoustic Assessment
Document Reference	20161365.1/0806A/R1/BW
Issue Type	Email
Attention To	Anka Property Group Pty Ltd

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	14/09/2016	20161365.1/1409A/R0/BW	JL		GW
1	8/06/2018	20161365.1/0806A/R1/BW	BW		BW

TABLE OF CONTENTS

1	INTRODUCTION	4
2	SITE DESCRIPTION	5
3	NOISE DESCRIPTORS	6
4	INTERNAL NOISE CRITERIA	7
4.1	AUSTRALIAN STANDARD 2107 - 2000	7
5	ENVIRONMENTAL NOISE SURVEY	8
5.1	TRAFFIC NOISE LEVELS	8
5.1.1	Measurement Location	8
5.1.2	Attended Noise Measurements	8
5.2	ANTIRETINAL NOISE LEVELS	8
5.2.1	Measurement Location	8
5.2.2	Attended Noise Measurements	8
5.3	MEASURED NOISE LEVELS	9
6	RECOMMENDATIONS	10
6.1	GLAZED WINDOWS AND DOORS	10
6.2	WALL CONSTRUCTION	11
6.3	ROOF / CEILING CONSTRUCTION	11
7	NOISE EMISSION ASSESSMENT	12
7.1	BACKGROUND NOISE MONITORING	12
7.2	NOISE EMISSION OBJECTIVES	13
7.2.1	NSW EPA Industrial Noise Policy	13
7.2.1.1	Intrusiveness Criterion	13
7.2.1.2	Amenity Criterion	14
7.2.1.3	Sleep Arousal	14
7.2.2	6.2.2.4 Protection of the Environmental Operation Act Regulation	15
7.2.3	Woollahra City Council DCP 2003	15
7.3	RESULTANT PROJECT NOISE EMISSION CRITERIA	15
7.4	MECHANICAL PLANT NOISE	16
7.4.1	Supply / Exhaust fans	16
7.4.2	Minor Plant	16
7.4.3	Condenser, Heating and Reverse Cycling Air Conditioners	16
8	CONCLUSION	17
	APPENDIX 1 - UNATTENDED NOISE MEASUREMENTS	18

1 INTRODUCTION

This report presents an acoustic assessment to accompany the development application for the proposed residential development to be located at 30-36 Bay Street, Double Bay.

In the report we have:

- Conducted an external noise intrusion assessment from traffic to determine the acoustic treatments required to achieve a reasonable level of amenity for future occupants.
- Conducted an external noise intrusion assessment from environmental noise including the Royal Oak Hotel to determine the acoustic treatments required to achieve a reasonable level of amenity for future occupants.
- Conducted background noise monitoring to determine noise emission goals for future use of the development to meet Council and NSW EPA Industrial Noise Policy acoustic requirements.

This noise assessment is based on the Group GSA Architectural drawings provided to this office dated 8/18/16.

2 SITE DESCRIPTION

The development site is located on the corner of Bay Street and Guilfoyle Avenue, Double Bay. The existing site consists of multistorey building.

The proposed development will include a 5 story development with ground floor commercial and 4 levels of residential use.

Potential noise impacts on the site are primarily traffic noise from Bay Street to the east of the site, and Guilfoyle Avenue to the north.

Figure 1 below details the site, unattended noise monitor and attended measurement locations.

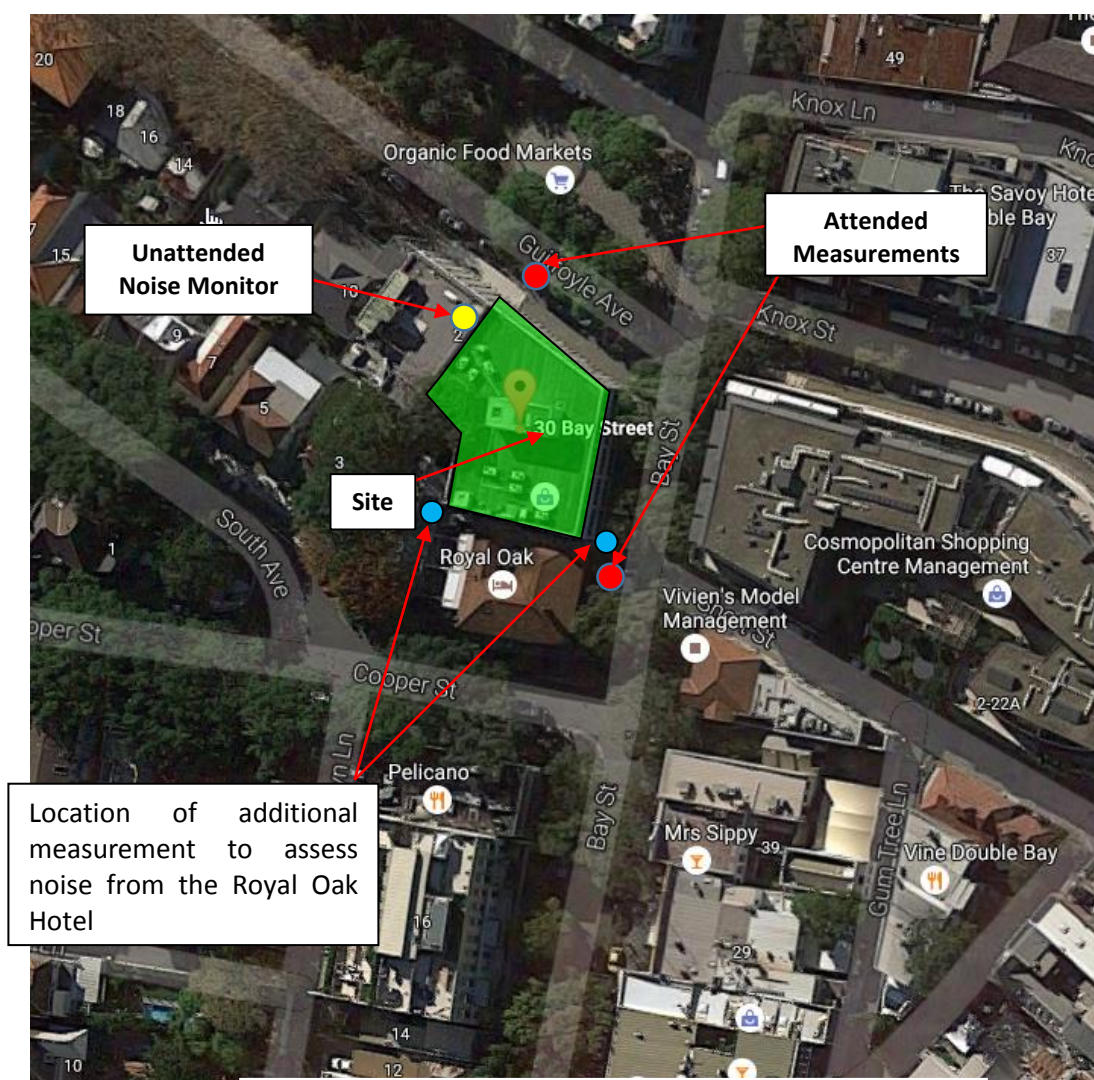


Figure 1 – Site Location and Noise Measurement Locations

3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise, three principle measurement parameters are used, namely L_{10} , L_{90} and L_{eq} .

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement interval.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise intrusion.

4 INTERNAL NOISE CRITERIA

Potential noise sources in the vicinity of the site are as follows:

- Bay Street to the east of the site;
- Guilfoyle Avenue to the north;
- The Royal Oak Hotel located to the south of the site.

Noise impacts should comply with the requirements of the Australian Standard AS2107 'Recommended Design Sound Levels and Reverberation Times for Building Interiors'.

4.1 AUSTRALIAN STANDARD 2107 - 2000

Internal noise levels for different areas within the proposed plastic surgery development will have to comply with the requirements of AS 2107 – 2000 “– *Recommended Design Sound Levels and Reverberation Times for Building Interiors*”. These are outlined in the table below.

Table 2 – Internal Noise Level Criteria

Space /Activity Type	Recommended Satisfactory Sound Level dB(A) L_{eq}
Bedrooms	35 L_{eq}
Living Rooms	40 L_{eq}

5 ENVIRONMENTAL NOISE SURVEY

5.1 TRAFFIC NOISE LEVELS

As part of this investigation, traffic noise from the surrounding perimeter roadways has been measured. The results of this measurement will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Attended traffic noise level measurements were conducted at the locations detailed in Figure 1.

5.1.1 Measurement Location

Attended traffic noise measurements were conducted at two locations at the existing site; one on Guilfoyle Avenue and the other on Bay Street. The measurements were taken approximately 4m from the kerb. The measurements were conducted between 8am-9am on the 22nd September, 2016. The Attended measurement locations are detailed above in figure 1.

5.1.2 Attended Noise Measurements

The attended traffic noise measurements were obtained using a Norsonics 118 Sound Level Analyser. The sound level analyser was calibrated at the beginning and the end of the measurement using a Norsonics Type 1251 Sound Calibrator. No significant drift was detected. All measurements were taken on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement periods.

5.2 ANTIRETINAL NOISE LEVELS

In addition to the investigation detailed above an environmental noise assessment from surrounding noise generation has been undertaken, including noise from the Royal Oak Hotel located to the south of the site. The results of this measurement will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Attended environment noise level measurements were conducted to the perimeter of the site to assess noise generated from the hotel during a busy Saturday night at the locations detailed in Figure 1.

5.2.1 Measurement Location

Attended environmental noise measurements were conducted at two locations at the existing site with exposure to noise generated from the Royal Oak Hotel. The measurements were taken during a busy Saturday night period on the 16th December, 2017 during the evening periods of 9pm to 10pm and again between 12pm and 1am.

The Attended measurement locations are detailed above in figure 1.

5.2.2 Attended Noise Measurements

The attended noise measurements were obtained using a Norsonics 118 Sound Level Analyser. The sound level analyser was calibrated at the beginning and the end of the measurement using a Norsonics Type 1251 Sound Calibrator. No significant drift was detected. All measurements were taken on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement periods.

5.3 MEASURED NOISE LEVELS

The following table presents the resultant noise levels at the proposed façades of the development.

Table 3 – Traffic Noise Levels at Proposed Building Façades

Location	7am-10pm -dB(A) L_{eq}(1hour)	10pm-7am -dB(A) L_{eq}(1hour)
At Ground Floor Bay Street	62	57
At Ground Floor Guilfoyle Avenue	58	53

Table 3 – Measured Noise Levels to the South from the Royal Oak Hotel

Location	Time Period	Measured Noise Level dB(A)
Bay Street	10pm-10.20pm	67
	12midnight-12.20am	66
To the South West of the proposed site	10.30pm-10.50pm	68
	12.30am – 12.50am	64

6 RECOMMENDATIONS

Traffic noise intrusion into the proposed developments was assessed using the measured external noise levels reported above as a basis.

Calculations were performed taking into account the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted. Acoustic treatment required to ensure compliance with the assessment criteria are detailed in this section.

Internal noise levels will primarily be as a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through the masonry elements will not be significant and need not be considered further.

The constructions necessary to achieve the noise levels are detailed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

6.1 GLAZED WINDOWS AND DOORS

The proposed glazing recommendations for this project are listed below. The windows will be satisfactory provided they meet the criteria listed below.

The proposed glazing thickness will satisfy all acoustic requirements of AS2107:2000. Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable.

Table 4 – Glazing Recommendations

Orientation	Room	Element	Glazing Thickness	Acoustic seals
Facing the Royal Oak hotel to the south	All Room types	Glazing	Double glazing similar to a 6/12/10;OR 10.38mm laminated glass	Yes
All other locations	All Room types	Glazing	6mm float	Yes

In addition to meeting the minimum glazing thickness requirements given, the design of the window mullions, perimeter seals and the installation of the windows/doors in the building openings shall not reduce the STC rating of the glazing assembly below the values nominated in the table above. Note that mohair type seals will not be acceptable for the windows requiring acoustic seals.

The window/door suppliers should provide evidence that the systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum listed STC requirements. Also, the glazing installer should certify that the window/doors have been constructed and installed in a manner equivalent to the tested samples.

Table 5 – Minimum STC of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum STC of Installed Window	Acoustic Seals Required
6mm float	29	Yes
10.38mm laminated glass	35	Yes
6/12/10	36	Yes

6.2 WALL CONSTRUCTION

The proposed and existing masonry wall construction for the development will be acoustically acceptable. All wall cavities are to be insulated with minimum 75mm thick, 14kg/m³ glasswool.

6.3 ROOF / CEILING CONSTRUCTION

All proposed light weight or concrete roof constructions are acoustically acceptable without additional treatments.

7 NOISE EMISSION ASSESSMENT

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users are not adversely affected.

Potential noise sources which should be assessed are:

- Noise generated by mechanical plant, typically air-conditioning and carpark fans.

The nearest potentially affected noise receivers are:

- The residential dwellings immediately to the east and west of the proposed development site.

Noise emission criteria will be determined based on the following documents

- NSW EPA Industrial Noise Policy;
- Protection of the Environment Operations Act Regulation 2000;
- Woollahra City Council DCP 2003.

7.1 BACKGROUND NOISE MONITORING

Background noise levels for the site were obtained using an unattended noise logger.

The monitoring was conducted using an Acoustic Research Laboratory's noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted.

The measurement was conducted from the 12th to the 19th September 2016. Refer to the aerial photo in figure 1 for the noise monitor location.

The measured background noise levels are summarised in the table below.

Table 7 - Measured Background Noise Levels

Description	Day Noise Level 7am to 6pm (dB(A))	Evening Noise Level 6pm to 10pm (dB(A))	Night Noise Level 10pm to 7am (dB(A))
Minimum Repeatable Background L _{90,15min}	43	42	40

7.2 NOISE EMISSION OBJECTIVES

Noise emissions from the development will have to achieve the following requirements.

7.2.1 NSW EPA Industrial Noise Policy

The NSW EPA Industrial Noise Policy, has two criteria which need to be satisfied namely Intrusiveness and Amenity. These are described below:

- *Intrusiveness Criteria* - This guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.
- *Amenity Criteria* - This guideline is intended to limit the absolute noise level from all “industrial” noise sources such as mechanical plant to a level that is consistent with the general environment.

The EPA’s Industrial Noise Policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

7.2.1.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Section 6.1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 8 – Intrusiveness Noise Emission Goals

Location	Period/Time	Intrusiveness Noise Emission Goal dB(A) $L_{eq}(15min)$
Nearby Residences	Day (7am-6pm)	48
	Evening(6pm-10pm)	47
	Night(10pm-7am)	45

7.2.1.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The NSW EPA Industrial noise policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different areas. They are rural, suburban, urban and urban/industrial interface. This site is categorised by suburban receivers.

For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

Table 9 – Amenity Noise Emission Goals

Location	Period/Time	Amenity Noise Emission Goal dB(A) $L_{eq}(\text{Period})$
Nearby Residences – Suburban Receiver	Day (7am-6pm)	55
	Evening(6pm-10pm)	45
	Night(10pm-7am)	40

7.2.1.3 Sleep Arousal

To minimise the potential for sleep arousal the L_1 (1 minute) noise level of any specific noise source must not exceed the background noise level (L_{90}) by more than 15 dB(A) outside a resident's bedroom window between the hours of 10pm and 7am.

The L_1 noise level is the level exceeded for 1 per cent of the time and approximates the typical maximum noise level from a particular source. Where the typical repeatable existing L_1 levels exceed the above requirement then the existing L_1 levels form the basis for sleep disturbance criteria.

7.2.2 6.2.2.4 Protection of the Environmental Operation Act Regulation

Protection of the Environmental Operations regulation limits the noise levels associated within the operation of domestic air conditioning criteria during night time periods which is presented below:

Protection of the Environmental Operations (Noise Control) Regulation 2000-Sect 52

52 Air Conditioners

(1) A person must not cause or permit an air conditioner to be used on residential premises in such a manner that it emits noise that can be heard within a habitable room in any other residential premises (regardless of whether any door or window to that room is open):

- (a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or*
- (b) before 7 am or after 10 pm on any other day.*

7.2.3 Woollahra City Council DCP 2003

Section C 5.10.11 of the Woollahra City Council DCP 2003 states:

“External condensers and air conditioning units are to be located and screened in order to minimise noise impacts on neighbours. In this regard noise emissions must not exceed the background noise level when measured at the boundary of the development site.”

7.3 RESULTANT PROJECT NOISE EMISSION CRITERIA

Based on the requirements stated in the sections above, table 11 provides a summary of the assessment criteria applicable to the future residential development at the project site. The assessment criteria are also based on the background noise monitoring data conducted at the proposed development location.

Table 10 – Environmental Noise Emission Criteria

Time Period	Assessment Background Noise Level dB(A) L_{90}	Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria Background + 5 dB(A) $L_{eq}(15min)$	Woollahra City Council DCP Criteria Background + 0 dB(A) $L_{eq}(15min)$	EPA Criteria for Residential Condensers	EPA Criteria for Sleep Disturbance dB(A) $L_1(1minute)$
Day	43	55	48	43	N/A	N/A
Evening	42	45	47	42	N/A	N/A
Night	40	40	45	40	Inaudible within neighbouring premises	55

7.4 MECHANICAL PLANT NOISE

As detailed plant selections for the proposed development are not available at this stage it is not possible to carry out a detailed examination of the ameliorative measures that may be required to achieve the noise targets.

Plant will be acoustically treated to prevent noise emissions from adversely impacting the surrounding properties in conjunction with the criteria detailed in this report. This may include selecting the quietest plant practicable, or treating the plant with enclosures, barriers, duct lining and silencers, etc as required to comply with the sound level recommendations.

Experience with similar projects indicates that it would be possible to achieve the requirement with appropriate treatment of the plant. General requirements for a number of potential plant items on the site are expanded on below.

7.4.1 Supply / Exhaust fans

Supply and exhaust fans may be located within the plant rooms or in rooftop plant areas. These units typically emit high noise levels and require acoustic treatment such as silencers and internal lined ductwork. Silencer requirements would be determined once fan selections have been completed.

7.4.2 Minor Plant

Other minor plant items, such as bathroom or kitchen exhaust fans, may also be required. These items typically emit relatively low noise levels and may require minimal acoustic treatment of a standard nature, such as internally lining of ductwork.

7.4.3 Condenser, Heating and Reverse Cycling Air Conditioners

It is at the construction design stage that consideration should be given to the placement of external air conditioning/ heating/ reverse cycle air conditioning units.

The location of heating/cooling units is the most important factor to ensure noise is not going to be intrusive. The location and selection of the proposed units associated with the development will be conducted such that noise impact to both the future residential tenancies and existing receivers will comply with the relevant EPA criteria of the noise standard less 5dB(A) and compliance with this standard inside any other unit in the same complex .

8 CONCLUSION

This report presents our acoustic assessment for the proposed residential development to be located at 30-36 Bay Street, Double Bay. Noise intrusion from traffic onto the future occupants of the development has been assessed in accordance with Australian Standard AS2107:2000. Provided the acoustic treatments in Section 5 are adhered to, the internal noise levels will satisfy the requirements of the criteria.

An additional assessment of noise generated from the operation of the Royal Oak Hotel to the south of the site has been undertaken and the recommended building constructions included in Section 5 of this report include those required to ensure a suitable internal noise level to protect the amenity of future residence.

Noise emission criteria for the development site have been determined based on background noise logging data, NSW EPA Industrial Noise Policy, the Protection of the Environment Operation Act Regulation and the Woollahra City Council DCP. The resultant criteria are presented in Section 6. Noise from mechanical plant items associated with the proposed development should comply with these criteria. Detailed design of mechanical plant items should be carried out during the CC stage.

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

Yours faithfully,

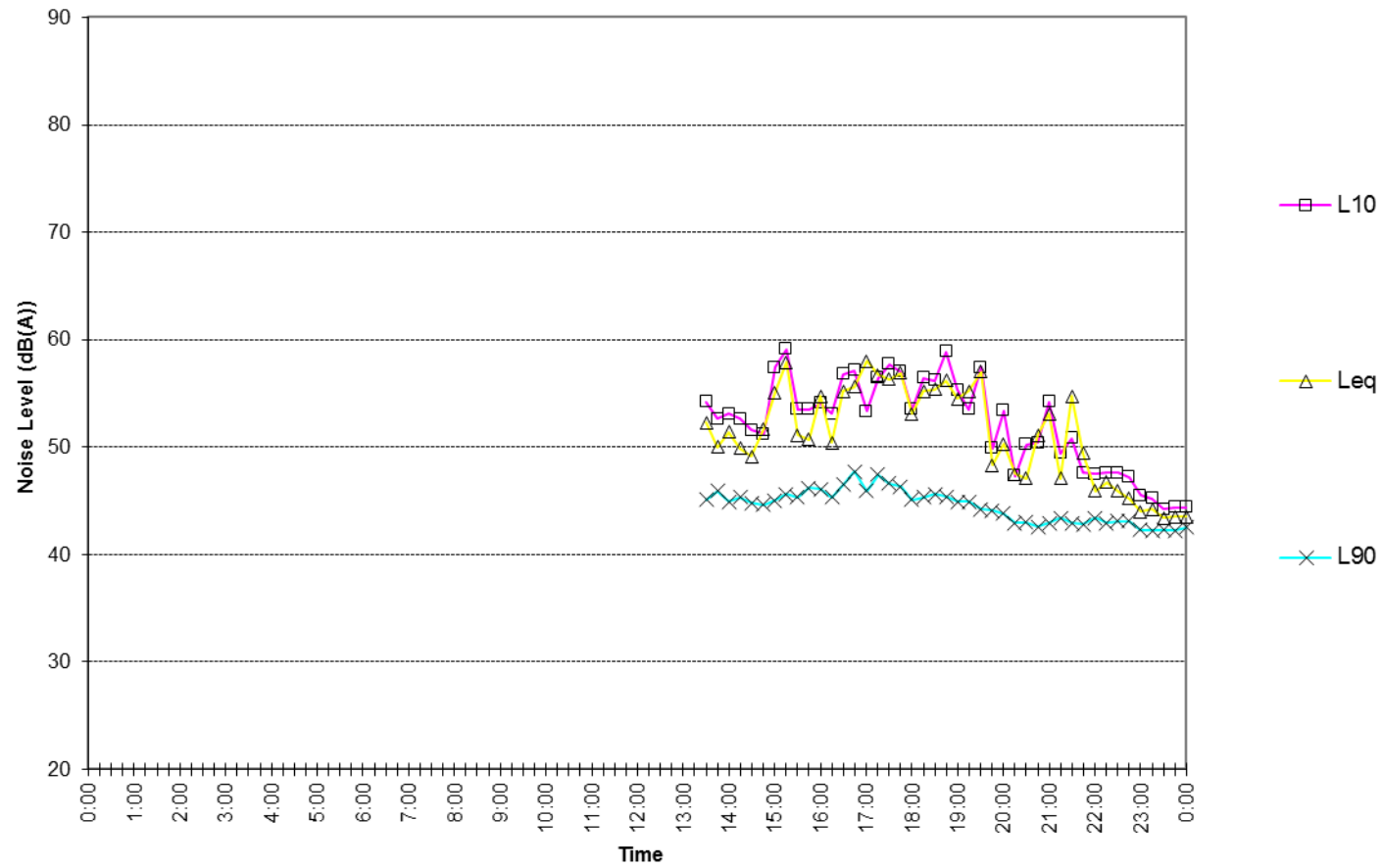
A handwritten signature in dark ink that reads "B.G. White." The signature is written in a cursive, slightly slanted style.

Acoustic Logic Consultancy Pty Ltd
Ben White

APPENDIX 1 - UNATTENDED NOISE MEASUREMENTS

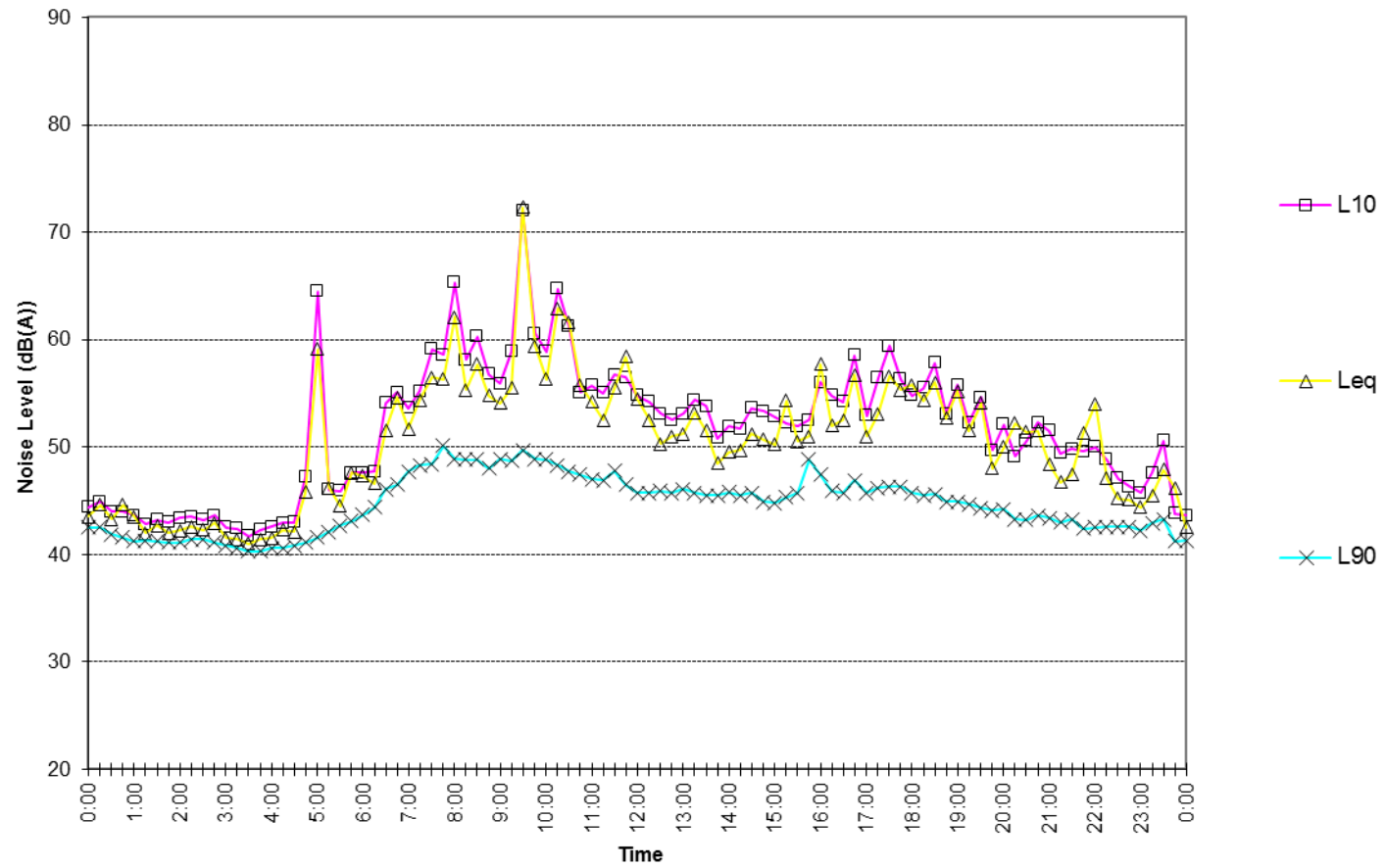
Bay St. Double Bay

Monday September 12, 2016



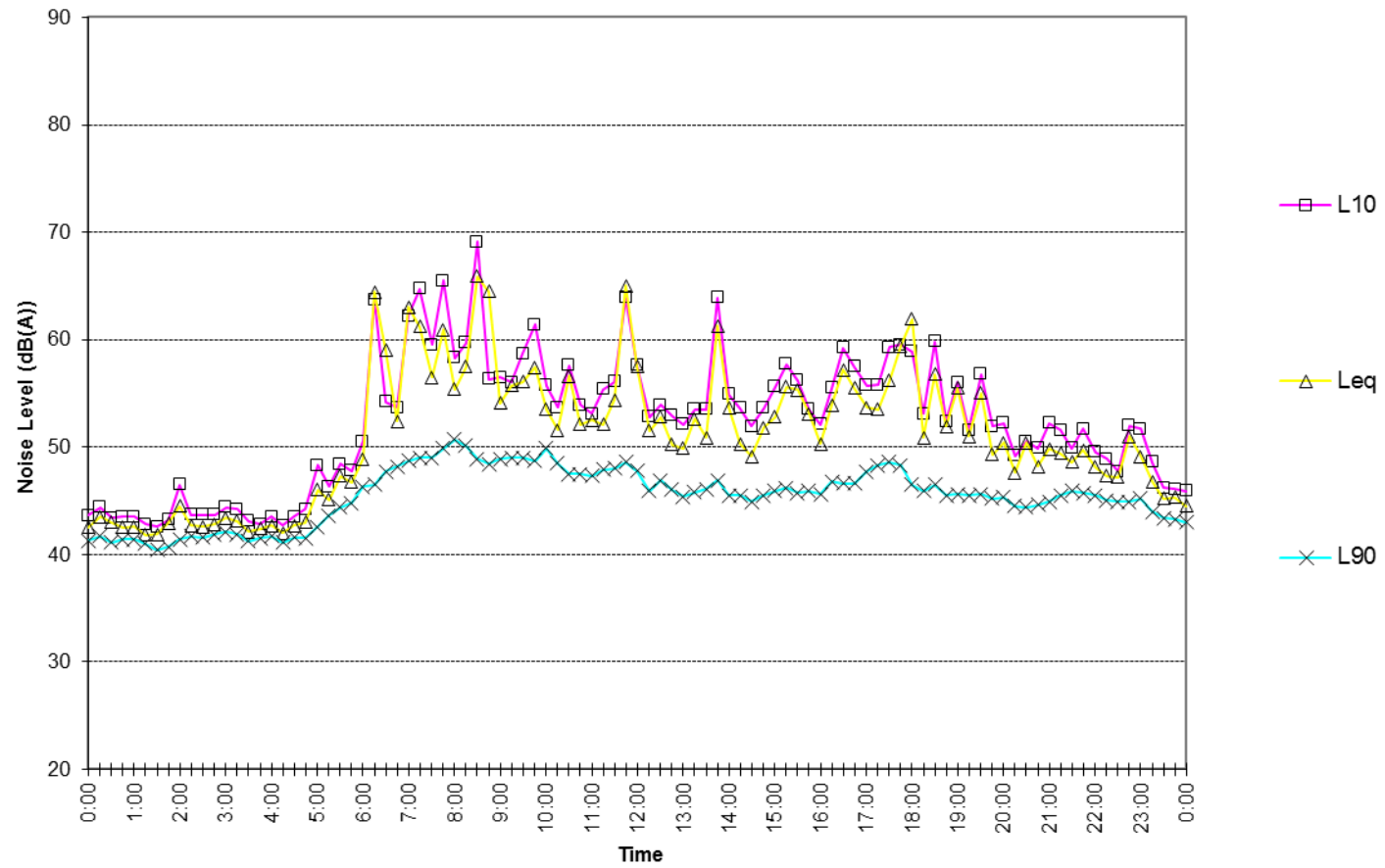
Bay St. Double Bay

Tuesday, September 13, 2016



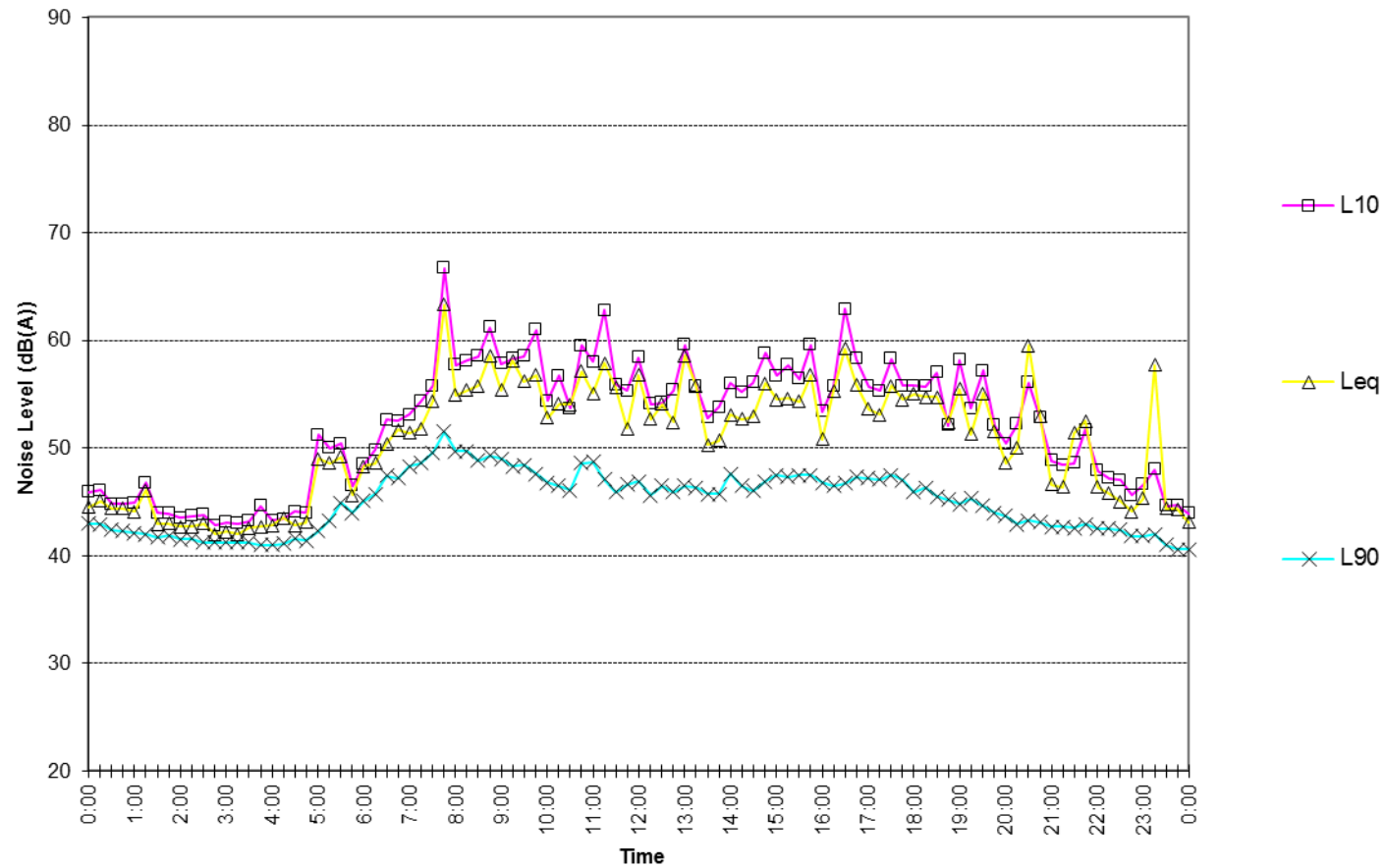
Bay St. Double Bay

Wednesday September 14, 2016



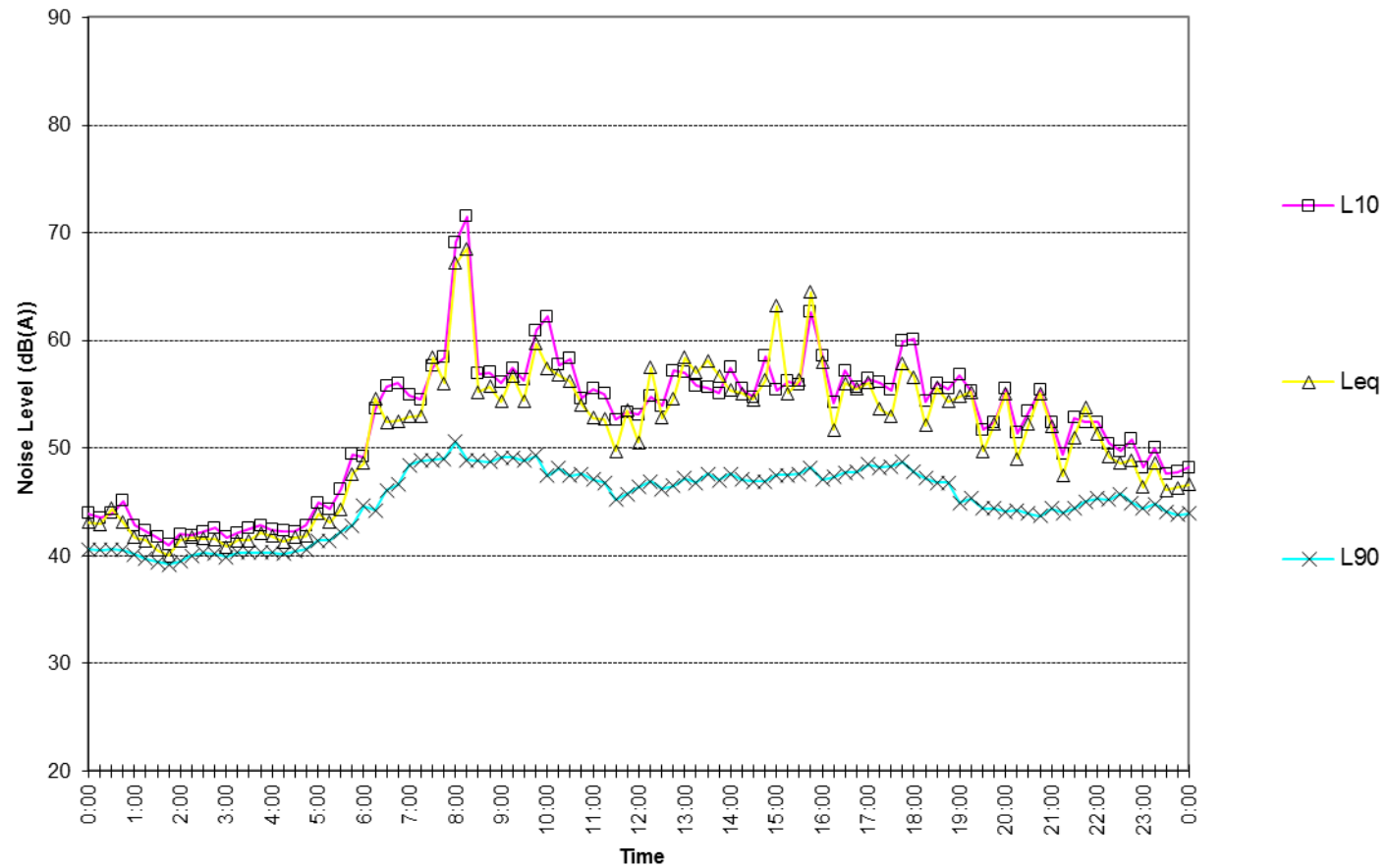
Bay St. Double Bay

Thursday September 15, 2016



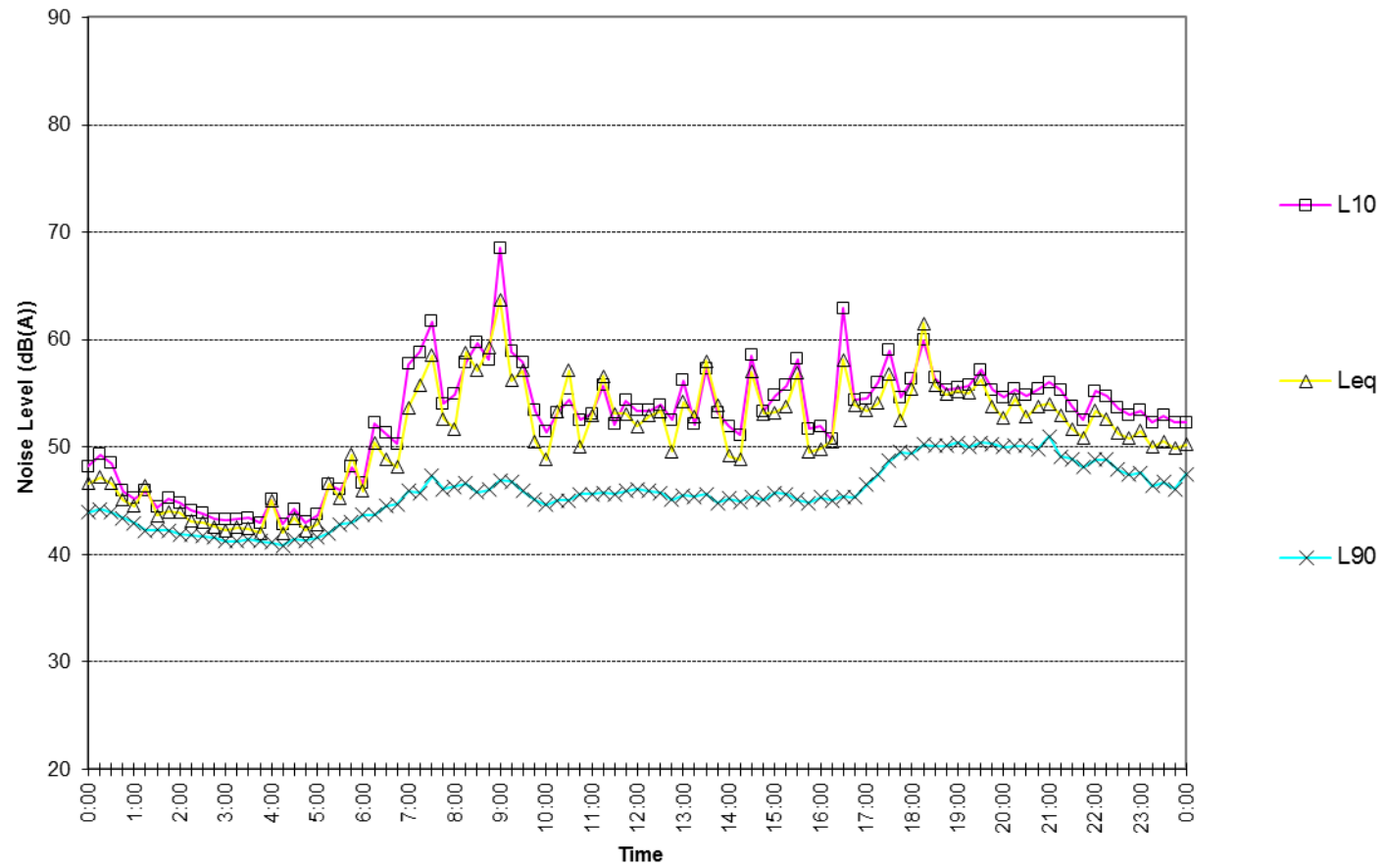
Bay St. Double Bay

Friday Septmebr 16, 2016



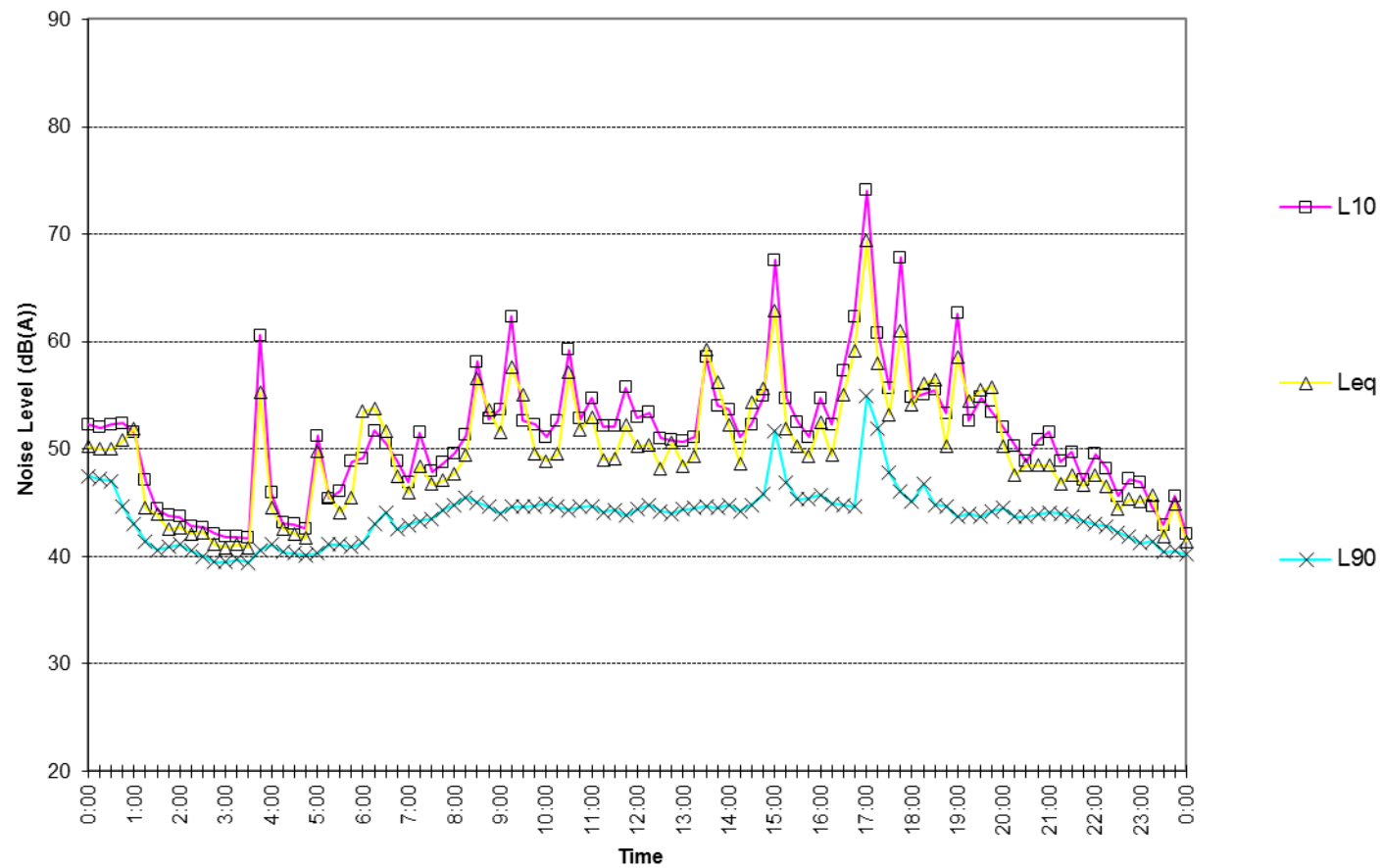
Bay St. Double Bay

Saturday September 17, 2016



Bay St. Double Bay

Sunday September 18, 2016



Bay St. Double Bay

Monday September 19, 2016

