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ACOUSTIC REPORT

PROPOSED MIXED-USE DEVELOPMENT

1545-1551 BOTANY RD, BOTANY NSW

Date: 18th September 2014

File Reference: 2606R20140915asBotany.docx

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DOCUMENT CONTROL	
Project Title	<i>Acoustic Report: Proposed mixed-use development 1545-1551 Botany Rd, Botany NSW</i>
Project Number	2606
Document Reference	2606R20140915asBotany.docx
Document Path	Z:\ACOUSTICS\ACOUSTICS 14\Report\Building General\2606R20140915asBotany.docx
Issue Date	Thursday, 18 th September 2014
Revision	INT 17/09/2014 Issued for internal quality control
	V1 18/09/2014 Report issued to Client
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ACOUSTIC REPORT
PROPOSED MIXED-USE DEVELOPMENT
1545-1551 BOTANY RD, BOTANY NSW

CONTENTS

1.0 INTRODUCTION	4
2.0 THE PROPOSAL	5
3.0 NOISE SURVEYS	6
3.1 UNATTENDED NOISE LOGGING	6
3.2 ATTENDED NOISE MEASUREMENT	7
4.0 ACOUSTIC DESIGN CRITERIA.....	9
4.1 DWELLINGS WITHIN THE B4 MIXED-USE ZONE	9
4.2 NOISE FROM SURROUNDING INDUSTRY	9
4.3 BOTANY BAY DCP – PART 4C.....	10
4.4 PROJECT SPECIFIC NOISE CRITERIA.....	11
5.0 PRELIMINARY BUILDING ASSESSMENT	12
6.0 CONCLUSION	14

Table of Appendices

Appendix A	Aerial photograph – Image courtesy of Google Maps
Appendix B	Unattended noise survey complete logger graphs

1.0 INTRODUCTION

Koikas Acoustics Pty Ltd has been engaged by Dover Constructions Pty Ltd to prepare an acoustic report for the proposed development site at 1545-1551 Botany Road, Botany NSW. The proposed development application would see the existing commercial / warehouse buildings demolished and the construction of a new mixed-use retail residential development.

Botany Bay Local Environmental Plan 2013 (BB_LEP2013) Land Zoning Map LZN_002 currently identifies the site to consist of approximately 50% B4 Mixed-use zoning (to the front, or Botany Road half of the site), and 50% B7 Business Park (to the rear half of the site). Under the current land use zoning the proposed application would see residential building encroach the B7 Business Park zone.

The applicant is therefore seeking to partially modify the existing B7 Business Park zone to B4 Mixed-use under the Botany Bay LEP to allow the residential portion of the development to be located within a suitably qualified B4 Mixed-use zone.

Where residential dwellings are to be located within, or in close proximity to industrial premises, it is necessary to have that building designed to maintain a suitable level of acoustic amenity for future occupants. Assessing the likely level of industrial noise, and noise from other external noise sources in the area (road traffic and aircraft overflights) is the focus of this assessment report.

Residential noise amenity guidelines are contained within the Botany Bay Development Control Plan. A further draft noise control for dwellings located within a B4 Mixed-use zone is in the process of consideration with Botany Bay Council. This draft control has also been referenced within this report at the request of Council.

2.0 THE PROPOSAL

The proposed development site is located at 1545-1551 Botany Rd, Botany NSW. According to preliminary architectural design drawings, the site has a coverage of approximately 6000m². The proposal would seek to extend the B4 Mixed-use zone by a further 25 metres. This would allow sufficient space for all residential areas of the development to be included within the B4 Mixed-use zone and result in only the car park within the remaining B7 Business Park zone.

The development consists of three (3) main buildings:

- 3 storey mixed-use building consisting of ground floor retail and 2 residential floors above,
- 4 storey mixed-use building consisting of ground floor retail and 3 residential floors above, and
- 3 storey car park.

The 3 storey mixed-use building directly adjoins Botany Road, a significant and dominant source of environmental noise in the local area. The 4 storey mixed-use building is largely shielded from the road traffic noise by the front building and will therefore be subject to lesser levels of traffic noise.

Both mixed-use buildings will experience comparable levels of noise from aircraft flyover events associated with Sydney Airport. The airport is located to the west of the subject site at a distance of approximately 900 metres to the nearest runway (16L / 34R). This places the site marginally outside the ANEF 25 contour on the current ANEF 2033 chart. As per AS2021-2000, the site is conditionally acceptable for the proposed development. Aircraft frequenting runway 16L / 34R are commonly Boeing 737 and Airbus A320 type aircraft (37 to 38 movements per day), however there are on average 3 to 4 Boeing 767 movements per day. The 767 aircraft are significantly louder than the smaller 737 and A320 aircraft.

Industrial sites adjoin to the north-east, north-west and south-east. Residential premises are located to the south-west of the site across Botany Rd.

3.0 NOISE SURVEYS

3.1 UNATTENDED NOISE LOGGING

Two noise loggers were left on-site to measure the traffic, ambient and background noise levels. Measurements were conducted in accordance with the procedures and specifications outlined in AS1055 Acoustics – Description and measurement of environmental noise and AS2702 Acoustics – Methods for the measurement of road traffic noise.

Location 1	Traffic Noise Survey – Botany Rd
Logger:	Type 1 Svantek 957 (S/N 14574)
Location:	Installed on the awning over the entry to 1547 Botany Rd. This location was fronting the road corridor with an unobstructed view of passing traffic. The microphone was at approximately 4.5 metres above the ground.

Location 2	Ambient/Environmental Noise Survey
Logger:	Type 1 BSWA 801 (S/N 23190)
Location:	Installed at the rear of the subject site on the roof of the existing warehouse building. The microphone was at approximately 6 metres above the ground.

Measurement data was taken for the period between Thursday 4th and Wednesday 10th September 2014. The loggers were field calibrated with a reference level of 94dB at 1kHz (BSWA CA-106 calibrator S/N 44064) prior to and after logging. No system drift was recorded.

According to meteorological data published on the BoM website, high winds and rain were recorded during the first 4 days of the survey and also on the last day. This left only two full days of usable data from each survey. As per standard assessment procedures, all data potentially impacted by adverse weather conditions has been excluded from the published survey results.

Below is a summary of the noise survey results. Detailed logger graphs are attached in **Appendix B**.

Table 1. Summary of noise survey data			
Description	Period (T)	Measured noise level, dB(A)	
		Front of the site	Rear of the site
Ambient Noise Level LEQ	INP Day	70	58
	INP Evening	66	55
	INP Night	64	52
Rating Background Level L90	INP Day	55	49
	INP Evening	47	46
	INP Night	43	40
Traffic Noise LEQ (15HR / 9HR)	0700 - 2200	70	n/a
	2200 - 0700	64	n/a
Traffic Noise Max Leq 1hr	Day	71	n/a
	Night	68	n/a

NOTES

- 1: The NSW EPA Industrial Noise Policy refers to the following time periods, Day – 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays, Evening – 6pm to 10pm Monday to Sunday, Night – 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

DEFINITIONS

- Leq, T: The continuous steady state sound level that represents the same amount of acoustic energy as a varying sound level over the nominated period, T.
- L90, T: The 10th percentile minimum noise level over a defined monitoring period, T. Taken as the average minimum level on an analogue sound level meter.
- Leq, 15hr: The continuous steady state sound level that represents the same amount of acoustic energy as a varying sound level over a 15 hour measurement period of 7am to 10pm. Typically associated with traffic noise on major roads.
- Leq, 9hr: The continuous steady state sound level that represents the same amount of acoustic energy as a varying sound level over a 9 hour measurement period of 10pm to 7am. Typically associated with traffic noise on major roads.

3.2 ATTENDED NOISE MEASUREMENT

Site visits and attended noise measurements were conducted by Koikas Acoustics Pty Ltd to assess and quantify the level of noise currently being generated by surrounding industrial premises, from aircraft movements, from road traffic, and of the general ambient background noise in the area.

Observations made on-site during the daytime of 8th and 10th September, and in the evening on the 9th September 2014 was that the noise from surrounding industry was negligible and not measureable above the general ambient noise in the area which is dominated by road and air traffic.

Domestic aircraft (Boeing 737 and Airbus A320) noise levels were found to correlate well with the expected aircraft noise levels as determined in accordance with AS2021-2000. Both the site measured noise level and predicted noise level as determined from the standard were 70dB(A) $L_{A_{max}}$. The larger Boeing 767 aircraft are expected to be 9dB louder.

Similarly, attended background noise level measurements taken during the daytime and evening periods were found to be comparable to the recorded noise logger data as summarised below.

Table 2. Attended vs unattended noise survey data			
Description	Period	Measured noise level, dB(A)	
		Attended	Unattended
Background noise	Day	48	49
Background noise	Evening	45	46

4.0 ACOUSTIC DESIGN CRITERIA

4.1 DWELLINGS WITHIN THE B4 MIXED-USE ZONE

Botany Bay Council has prepared a draft control that is proposed to be included as an amendment to the existing DCP. The draft control relates to noise impacts within habitable rooms of dwellings in the B4 Mixed-use zone that are impacted by high levels of external noise, including that of noise from activities associated with a B7 zone. The draft condition states:

“Internal habitable rooms of dwellings within the B4 Mixed Use Zone which are affected by high levels of external noise are to be designed to achieve internal noise levels of 50dB(A) maximum. Development Applications which contain residential accommodation are to be accompanied by a noise assessment prepared by a suitably qualified acoustic consultant addressing the following:

- i. Address the noise requirements of the NSW Infrastructure SEPP in terms of road traffic noise;*
- ii. Address the requirements of Part 4A, 4B or 4C (Acoustic Privacy controls), depending on the type of residential accommodation proposed;*
- iii. Conduct detailed site attended audits during the day, evening and night periods to identify and assess noise from activities associated with the B7 zone;*
- iv. Assess noise from ground activities including aircraft take-off's and landing's at Sydney Airport referenced to each floor of the proposed building;*
- v. Where the height of the proposed development is higher than the existing height of the localised building stock (and the proposed development has a direct line of sight to the seaport) the acoustical assessment is to take into account noise from the operations of Port Botany;*
- vi. Confirm noise exposure levels for each floor of the proposed residential building;*
- vii. And confirm building noise controls for internal noise levels to satisfy the recommended noise criteria.*

4.2 NOISE FROM SURROUNDING INDUSTRY

Where a new mixed-use development is proposed adjacent to industrial sites within an existing B7 zone, the above draft control places the onus on the developer of the new mixed-use building to ensure satisfactory internal noise levels within habitable rooms of dwellings. The existing industrial premises are also subject to noise control requirements depending on the particular zoning of adjoining or nearby land. In this case, the area of the subject site currently zoned as B7 should not be experiencing noise levels in excess of 65dB(A) from the adjoining industry, and the B4 zoned area should not be experiencing industrial noise that exceeds the current background noise level by more than 5dB.

From our observations, noise from surrounding industrial premises is currently compliant with the above.

4.3 BOTANY BAY DCP – PART 4C

The DCP recommends that where a site is located in close proximity to a busy road, noise and vibration should be assessed in accordance with the **State Environmental Planning Policy (Infrastructure) 2007** and the **NSW DoPI Developments near rail corridors and busy roads, Interim guidelines**.

Both documents require that appropriate measures need to be taken to ensure that indoor noise levels of L_{eq} 35dB(A) to bedrooms at any time between 10pm and 7am, and L_{eq} 40dB(A) to anywhere else in the building (other than a garage, kitchen, bathroom or hallway) at any time are not exceeded. The DoPI document also allows that for naturally ventilated rooms, the indoor noise level must not exceed the indoor design criteria by more than 10dB.

Table 1 of **AS2107-2000 Acoustics – Recommended design sound levels and reverberation times for building interiors** provides guidance on indoor noise level standards for commercial and residential areas not covered in the NSW DoPI.

Vibration caused by road traffic is not to result in regenerated noise within the dwellings that exceeds 40dB(A). The vibration from road traffic will not exceed this acoustic requirement.

C4 to C6 of Section 4C of the DCP requires that for new dwellings on land within the ANEF 20 contour, the design and construction of that building must be in accordance with the current Australian aircraft noise standard (AS2021-2000).

4.4 PROJECT SPECIFIC NOISE CRITERIA

Table 3. Summary of applicable criteria

Noise source	Location	Period	Indoor design noise level, dB(A) [BCA compliant ventilation, windows closed]	Indoor design noise level, dB(A) [Naturally ventilated, windows open]
Road traffic	Bedrooms ²	Daytime Night-time	40 35	50 45
	Living areas ²	Any time	40	50
	Bathrooms	Any time	50	60
	Retail	Business hrs	50	-
Aircraft	Bedrooms	n/a	50	-
	Living areas	n/a	55	-
	Bathrooms	n/a	60	-
	Retail	n/a	75	-

NOTES

1. The note to Table 3.1 in Section 3.6.1 Airborne Noise in the NSW Department of Planning, Developments near Rail Corridors and Busy Roads - Interim Guidelines 2008 states that the airborne noise is calculated as LAeq 15hr and LAeq 9hr
2. Ground borne noise, or regenerated noise, is not to exceed an LASmax noise limit of 40dB(A). Regenerated noise is typically only an issue where a particular room is well shielded from external airborne noise and is subjected to vibration impacts such as those from a rail tunnel.

Noise from the surrounding industrial premises has been assessed to be within the current industrial noise requirements of the NSW EPA Industrial Noise Policy recommendation of background + 5dB.

5.0 PRELIMINARY BUILDING ASSESSMENT

We have observed on-site and concluded that current levels of noise from surrounding industry is compliant both within the existing B7 Business Park zone (where industrial noise must be below 65dBA) and within the B4 Mixed-use zone (where industrial noise must be within background + 5dB).

The focus of the acoustic design must therefore be centred on limiting the noise transmission to indoor areas of the proposed buildings from external noise sources such as road and air traffic. To this end we have calculated the expected external façade traffic noise levels for both road traffic and air traffic. By knowing the external façade noise level, and the indoor design sound level requirement, it is possible to calculate the required Traffic Noise Reduction (TNR) and Aircraft Noise Reduction (ANR). Based on the published sound insulation performance of common construction materials, we can then determine whether the building can meet the acoustic requirements through incorporating commonly used building materials and construction techniques.

A summary of our preliminary findings are shown within Table 4.

Table 4. Preliminary assessment findings

TRAFFIC NOISE

External Leq 15 hour = 71dB(A) – Residential and 72.5dB(A) Retail ¹

External Leq 9 hour = 65dB(A) ¹

External Maximum Leq 1 hour = 71dB(A)

Required TNR to meet ISEEP - Bedrooms	31/30
Required TNR to meet ISEEP – Living areas	31
Required TNR to meet ISEEP – Bathrooms	21
Required TNR to meet ISEEP – Retail	22.5
Required TNR to meet draft DCP control – Habitable rooms	21

AIRCRAFT NOISE

External LASmax = 79dB(A) Boeing 767 short range – 3-4 ave daily departures on Runway 16L/34R

External LASmax = 70dB(A) Boeing 737 / Airbus A320 – 37-38 ave daily departures on Runway 16L/34R

Required ANR to meet AS2021 - Bedrooms	29
Required ANR to meet AS2021 – Living areas	24
Required ANR to meet AS2021 – Bathrooms	19
Required ANR to meet AS2021 – Retail	4

NOTES

1. Includes +1dB for forecast increase in traffic over 10 year planning period as required by AS3671.

With a maximum required noise reduction of 31dB for road traffic noise and 29dB for aircraft noise, it is our professional opinion that commonly used acoustically rated building materials will provide satisfactory noise insulation to result in the indoor design sound levels being achieved.

Typically this would involve using a suitably thick laminated glass for windows and glazed doors - solid core timber entry doors with acoustic perimeter and door bottom seals - external walls that are of solid masonry construction, or lightweight systems with multiple layers of cladding and insulation – solid concrete roof slabs, or pitched and framed roofs that incorporate suitable ceiling cavities with insulation and roof/ceiling cladding.

It will also be necessary for the buildings to include a suitably designed fresh air source to all habitable rooms. This is due to the fact that external windows and doors will need to be closed in order to meet the indoor design sound level requirements.

6.0 CONCLUSION

Koikas Acoustics Pty Ltd was commissioned to prepare a preliminary acoustic assessment report that would determine if the proposed development at 1545-1551 Botany Rd, Botany could reasonably and feasibly meet the acoustic design requirements of Botany Bay Council. We have based our findings on having the development designed to achieve the acoustic privacy requirements of the Botany Bay DCP and a proposed draft control that is in the process of Council consideration.

The development site is located in an area with existing industrial facilities adjoining to the north-east, north-west and south-east. Furthermore, Botany Road is a constant source of noise in the area and the nearest runway at Sydney Airport is located only 900 metres to the west. We therefore need to consider the potential impact this noise may have on future occupant of the proposed development.

From site visits conducted during the daytime and evening periods it was found that the surrounding industrial sites are currently not emitting noise that is significant, or measureable, above the existing ambient noise in the area. Therefore designing the buildings to insulate against the general ambient noise in the area should be the focus of any acoustic works.

Botany Bay DCP and the proposed draft control include planning guidelines to ensure the amenity of future occupants within a proposed development, and adjoining residents/land uses are not adversely impacted upon by way of noise. For this assessment we needed to ensure-

- Firstly, that noise from the surrounding industry was currently complying with NSW EPA noise planning controls, and that any noise emissions from the industrial sites were of a level that could readily be attenuated through the proposed building façade.
- And secondly, that noise from external noise sources in the area (Botany Road and Sydney Airport) was not of a level that would cause the proposed building façade to be excessive in terms of the construction materials and techniques required to achieve compliance with Councils noise controls.

Table 4 of this report shows that the noise reduction requirements for the building façade is 31dB (road traffic) and 29dB (aircraft). Due to the difference in spectrum noise levels of road and air traffic, it is not possible to conclude that designing to achieve the 31dB reduction for road traffic noise will also result in compliance for aircraft noise. However, in our opinion the recommendations for this particular development would likely be comparable for each scenario.

With a 31dB (road traffic) and 29dB (aircraft) maximum noise reduction requirement for the buildings, it is our professional opinion that typical acoustically rated building materials and construction solutions can be incorporated into the building design to achieve the indoor sound level requirements.

APPENDIX A

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APPENDIX A



APPENDIX

B

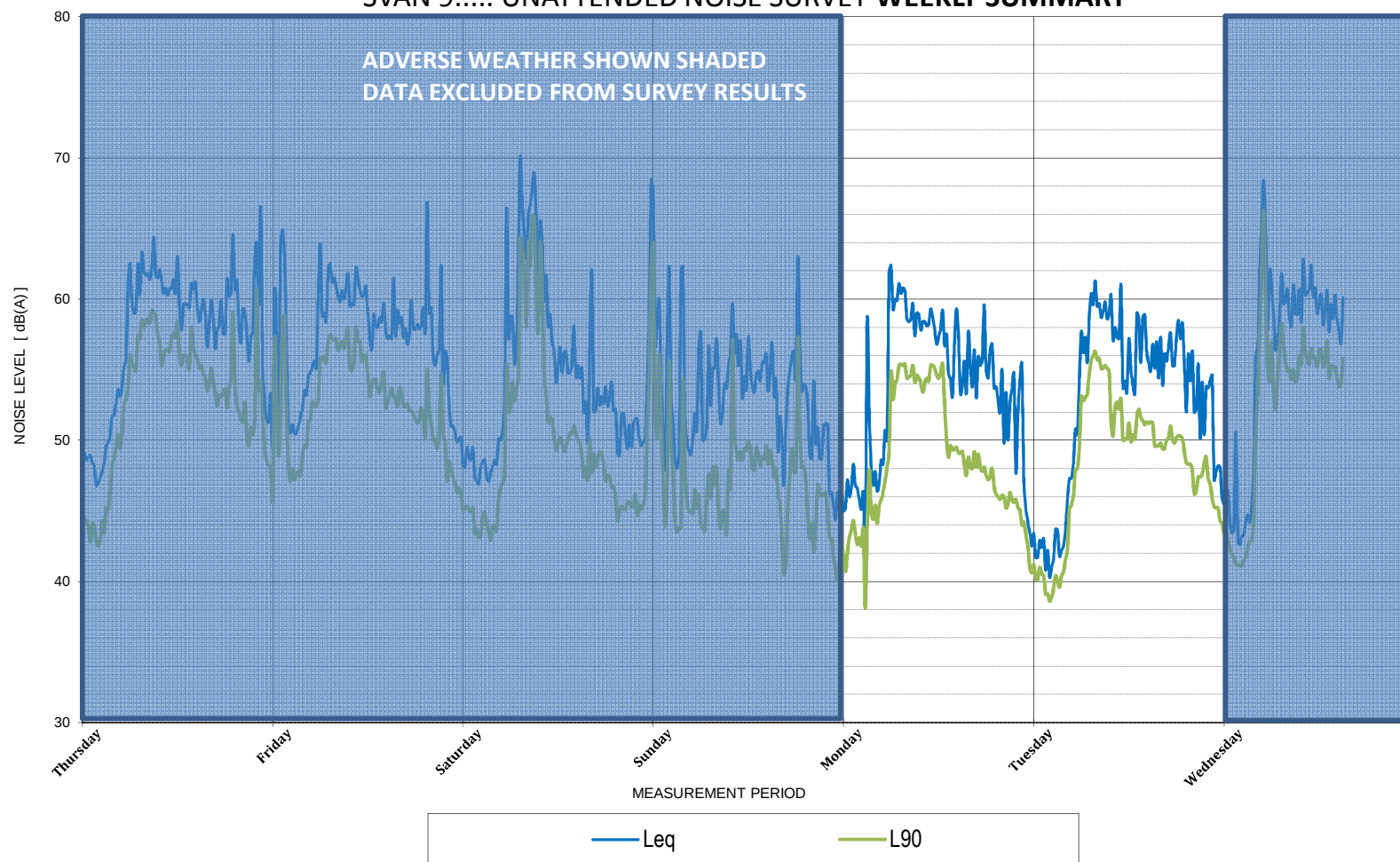
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B

APPENDIX

B

SVAN 9..... UNATTENDED NOISE SURVEY WEEKLY SUMMARY



SUMMARY OF AMBIENT NOISE LEVELS

	L90 Daytime	L90 Evening	L90 Nighttime
Day 1			
Day 2			
Day 3			
Day 4			
Day 5	48	46	41
Day 6	50	47	39
Day 7			
RBL	49	46	40

	Leq Daytime	Leq Evening	Leq Nighttime
Day 1			
Day 2			
Day 3			
Day 4			
Day 5	58	54	54
Day 6	58	55	50
Day 7			
Average	58	55	52

SUMMARY OF TRAFFIC & MISC. NOISE LEVELS

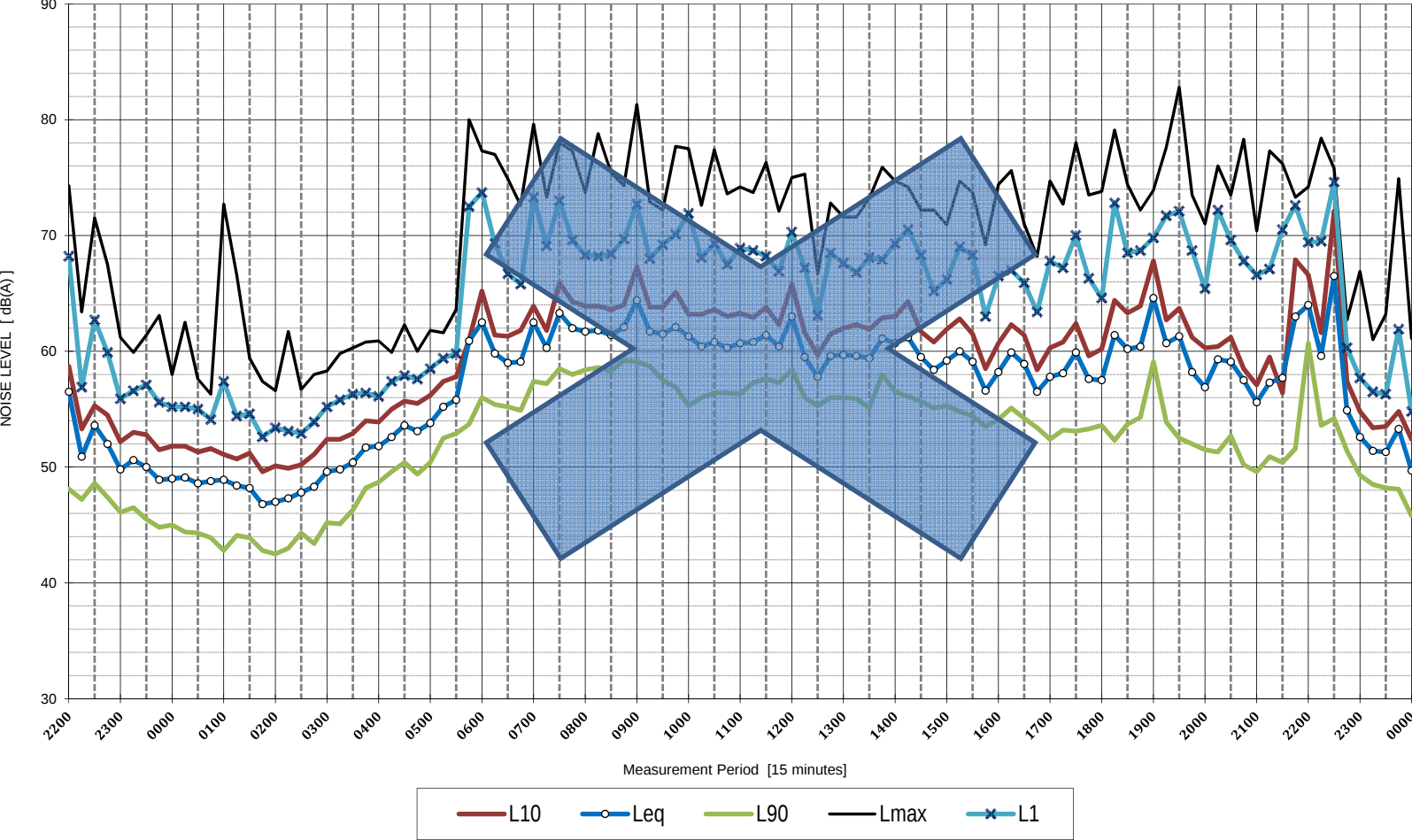
Leq 15 hrs	0700-2200	57	dB(A)
Leq 9 hrs	2200-0700	52	dB(A)
Leq 24 hrs	0000-2400	56	dB(A)
L10 18 hrs	0600-2400	58	dB(A)
max Leq 1 hr	0700-2200	59	dB(A)
max Leq 1 hr	2200-0700	56	dB(A)
Maximum noise events as defined in the Environmental Noise Management Manual			
7 day average - [Lmax - Leq ≥ 15]			

* Sundays and Public Holidays the hours change to 0800

WEEKKLY SUMMARY

Descriptpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800*	14	28	36	41	43	44	40	31	18	49
10% min L90 Evening	1800-2200	10	26	33	38	41	42	35	23	15	46
10% min L90 Night	2200-0700*	7	21	28	33	35	36	30	20	13	40
10% min L90 Period	0000-0700	8	21	29	33	35	36	30	20	13	41
10% min L90 Period	0700-0000	10	25	33	38	40	42	35	23	14	46
Leq 15 hours	0700-2200	26	38	45	52	52	51	46	39	30	57
Leq 9 hours	2200-0700	18	32	39	45	47	47	44	38	32	52

SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

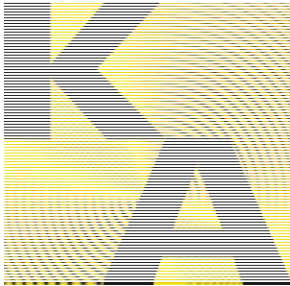
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L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

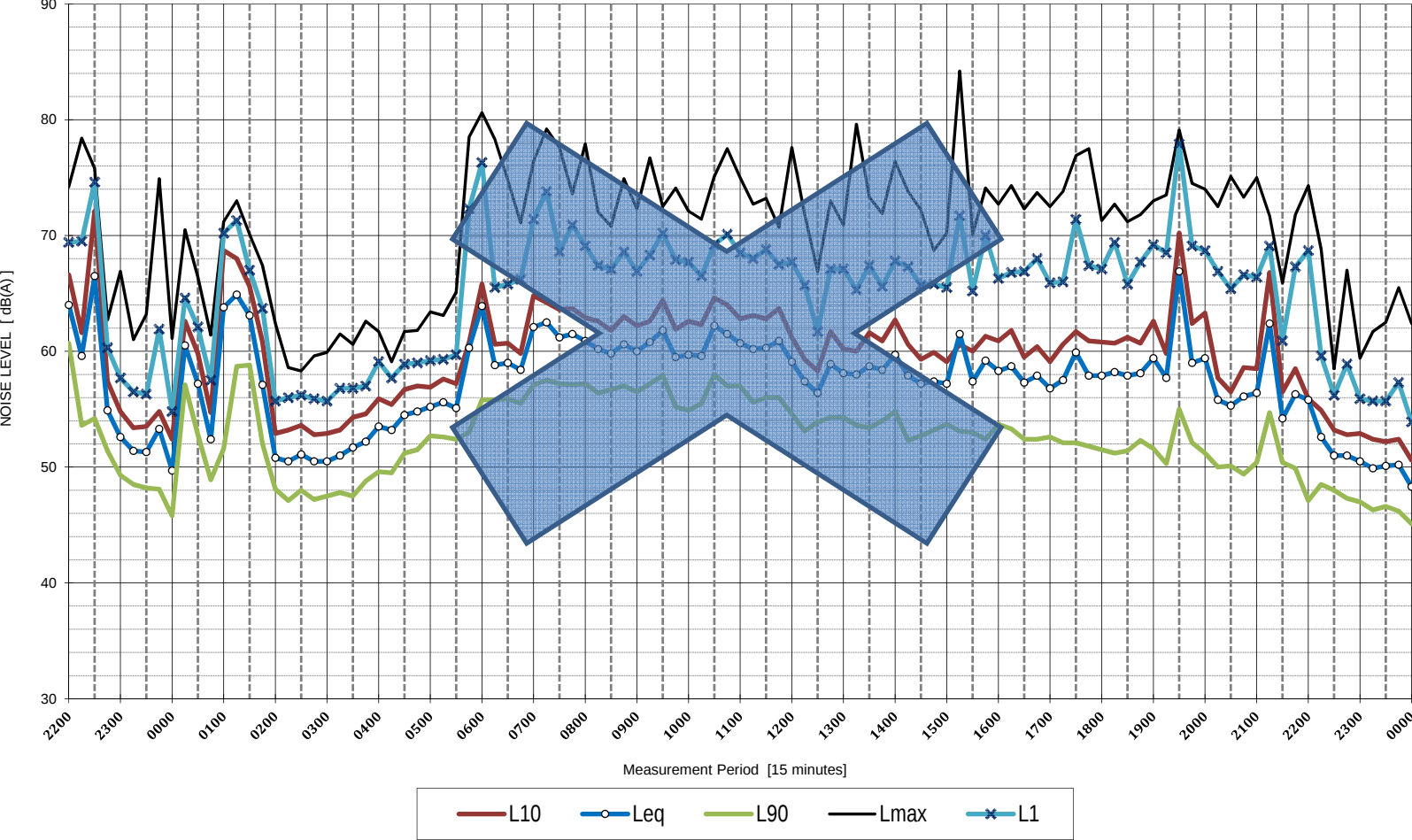
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

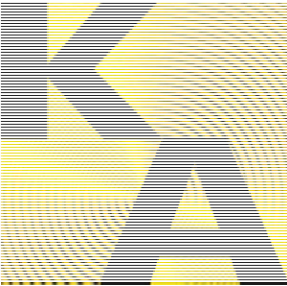
Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

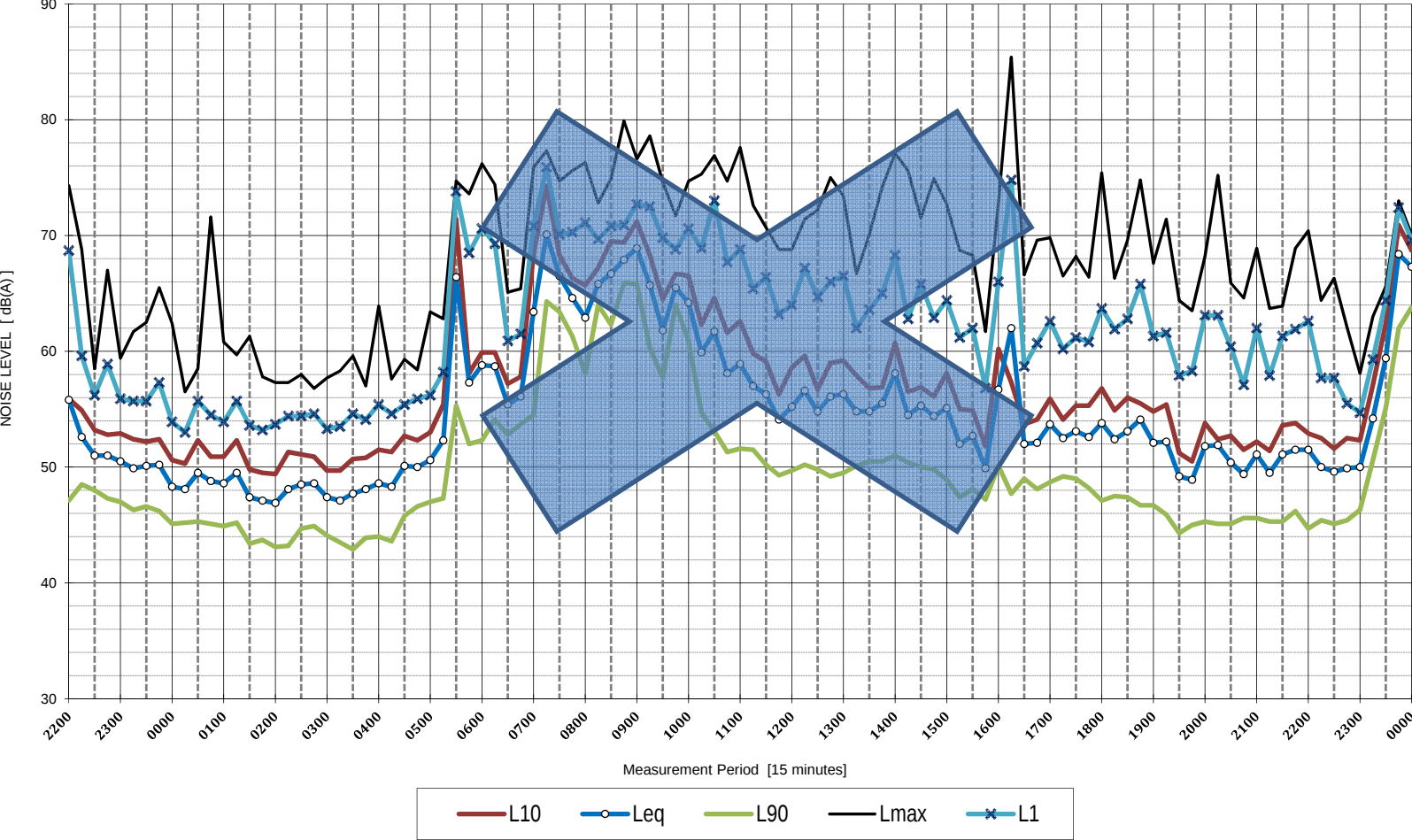
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

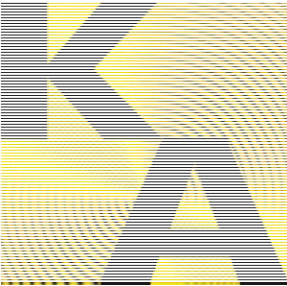
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L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

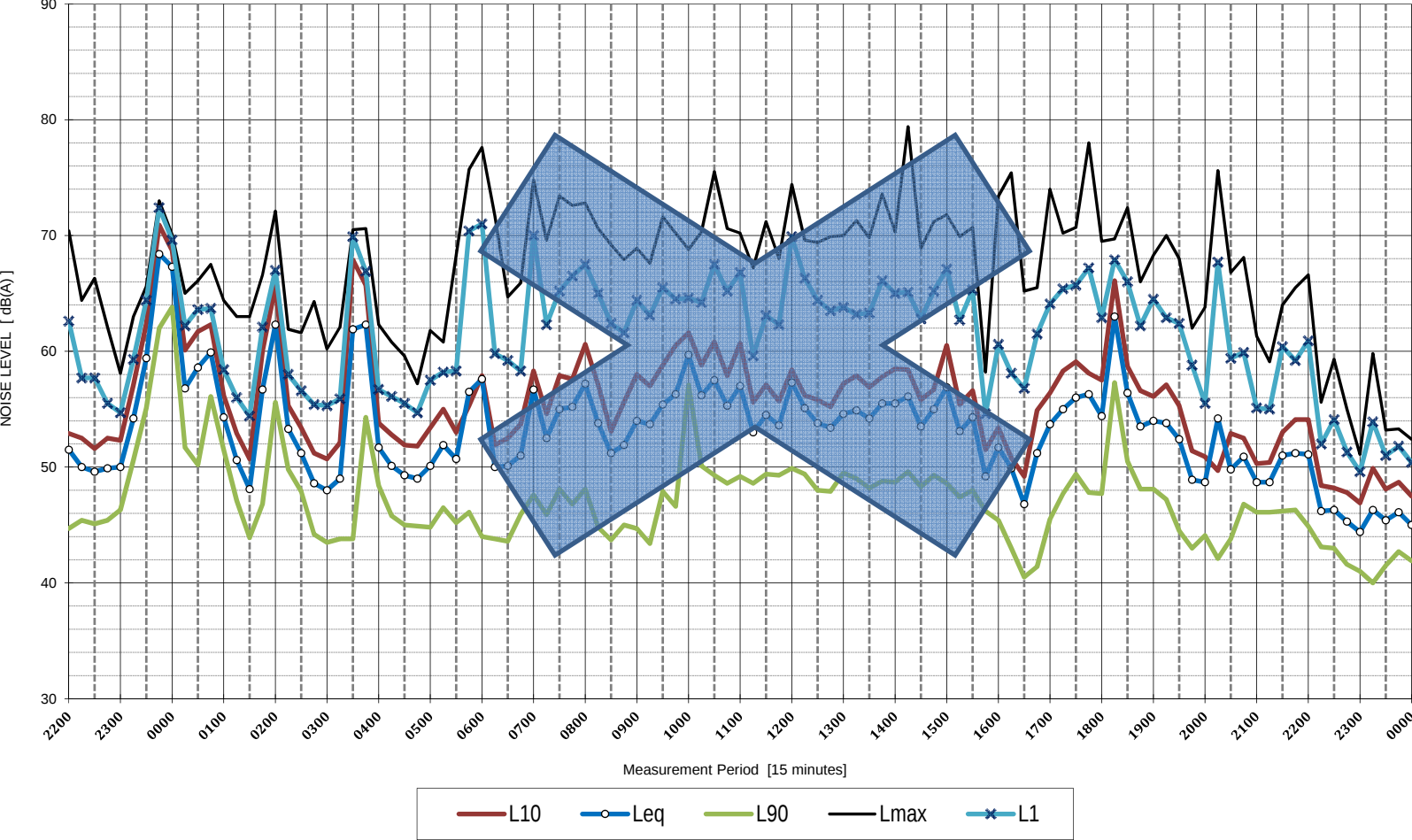
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

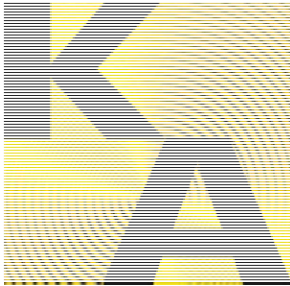
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L90 Daytime	0800-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0800		dB(A)
Leq Daytime	0800-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0800		dB(A)

TRAFFIC & MISC. NOISE METRICS

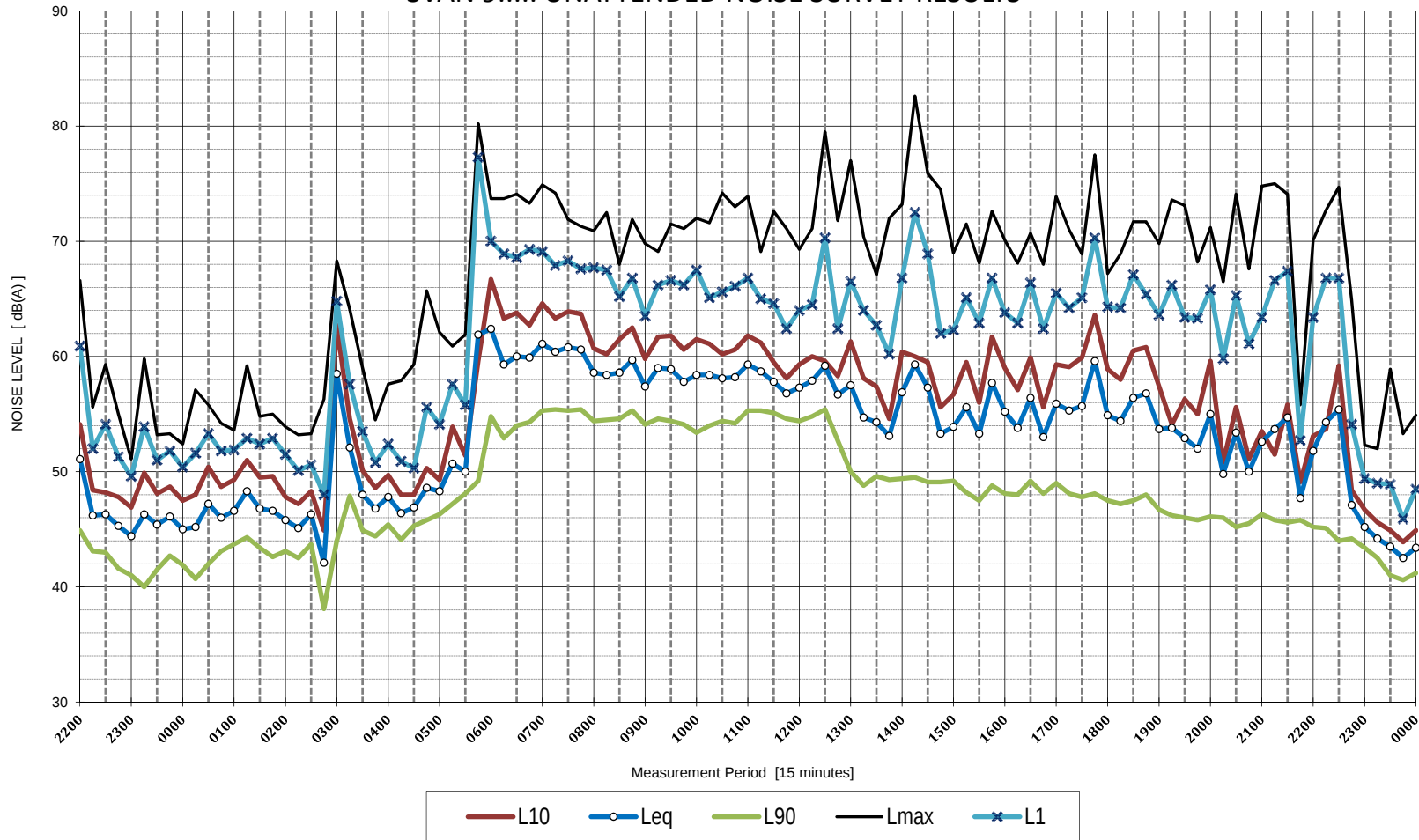
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	48	dB(A)
L90 Evening	1800-2200	46	dB(A)
L90 Nighttime	2200-0700	41	dB(A)
Leq Daytime	0700-1800	58	dB(A)
Leq Evening	1800-2200	54	dB(A)
Leq Nighttime	2200-0700	54	dB(A)

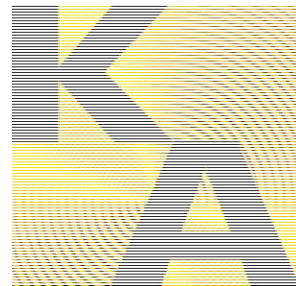
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	57	dB(A)
Leq 9 hours	2200-0700	54	dB(A)
Leq 24 hours	0000-2400	56	dB(A)
L10 18 hours	0600-2400	58	dB(A)
max Leq 1 hour	0700-2200	59	dB(A)
max Leq 1 hour	2200-0700	57	dB(A)

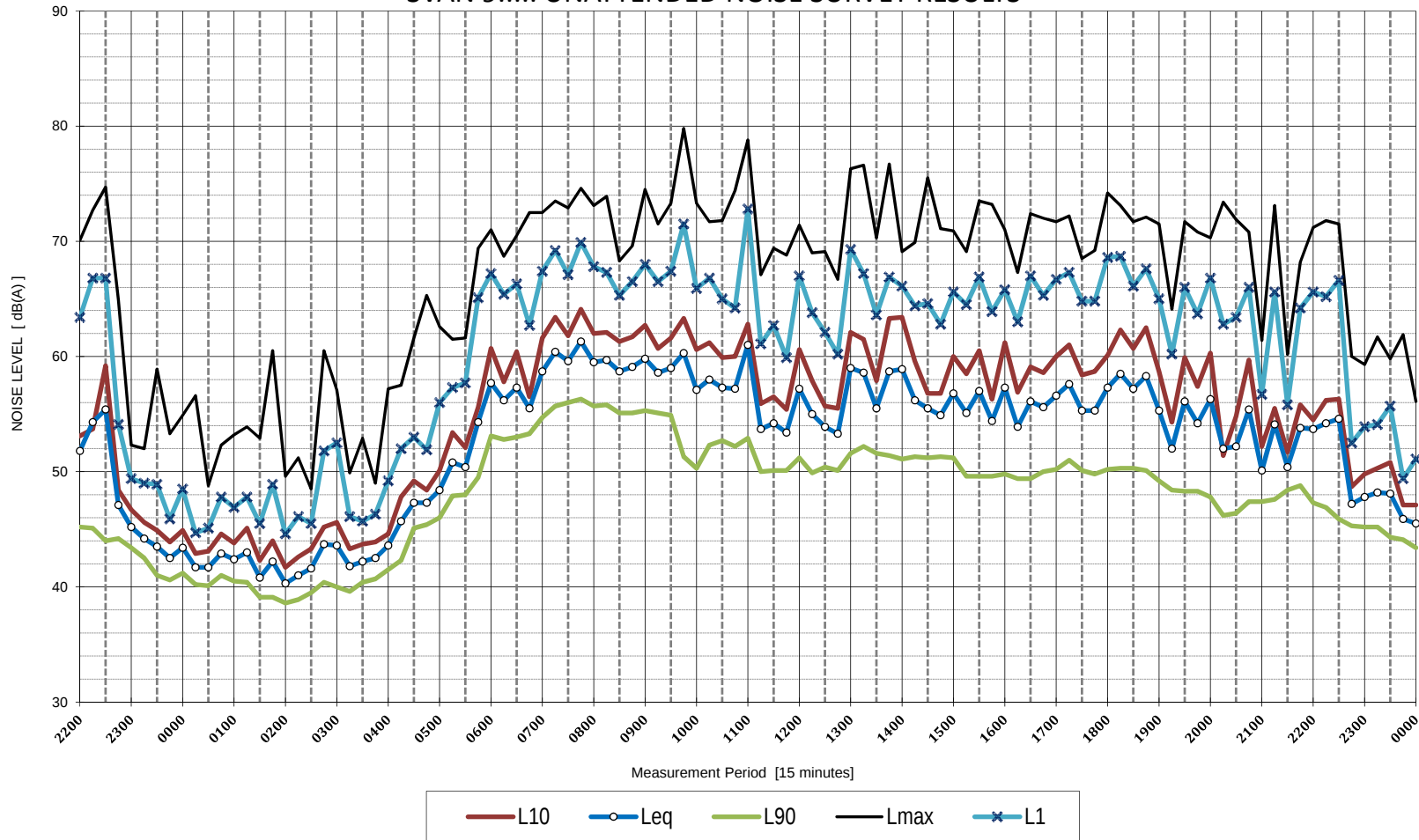
Maximum noise events as defined in the Environmental Noise Management Manual [$L_{max} - L_{eq} \geq 15$]	3
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Frequency [Hz]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	13	27	35	40	43	44	39	30	16	48
10% min L90 Evening	1800-2200	10	24	32	37	40	42	35	23	14	46
10% min L90 Night	2200-0700	7	22	29	34	36	37	32	21	14	41
10% min L90 Period	0000-0700	10	23	31	35	37	37	32	22	15	42
10% min L90 Period	0700-0000	9	24	32	37	40	41	35	23	13	45
Leq 15 hours	0700-2200	25	38	45	52	51	50	46	39	28	57
Leq 9 hours	2200-0700	18	33	40	46	48	48	46	41	35	54



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	50	dB(A)
L90 Evening	1800-2200	47	dB(A)
L90 Nighttime	2200-0700	39	dB(A)
Leq Daytime	0700-1800	58	dB(A)
Leq Evening	1800-2200	55	dB(A)
Leq Nighttime	2200-0700	50	dB(A)

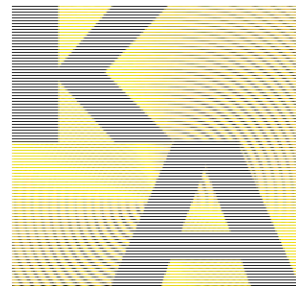
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	57	dB(A)
Leq 9 hours	2200-0700	50	dB(A)
Leq 24 hours	0000-2400	56	dB(A)
L10 18 hours	0600-2400	58	dB(A)
max Leq 1 hour	0700-2200	59	dB(A)
max Leq 1 hour	2200-0700	54	dB(A)

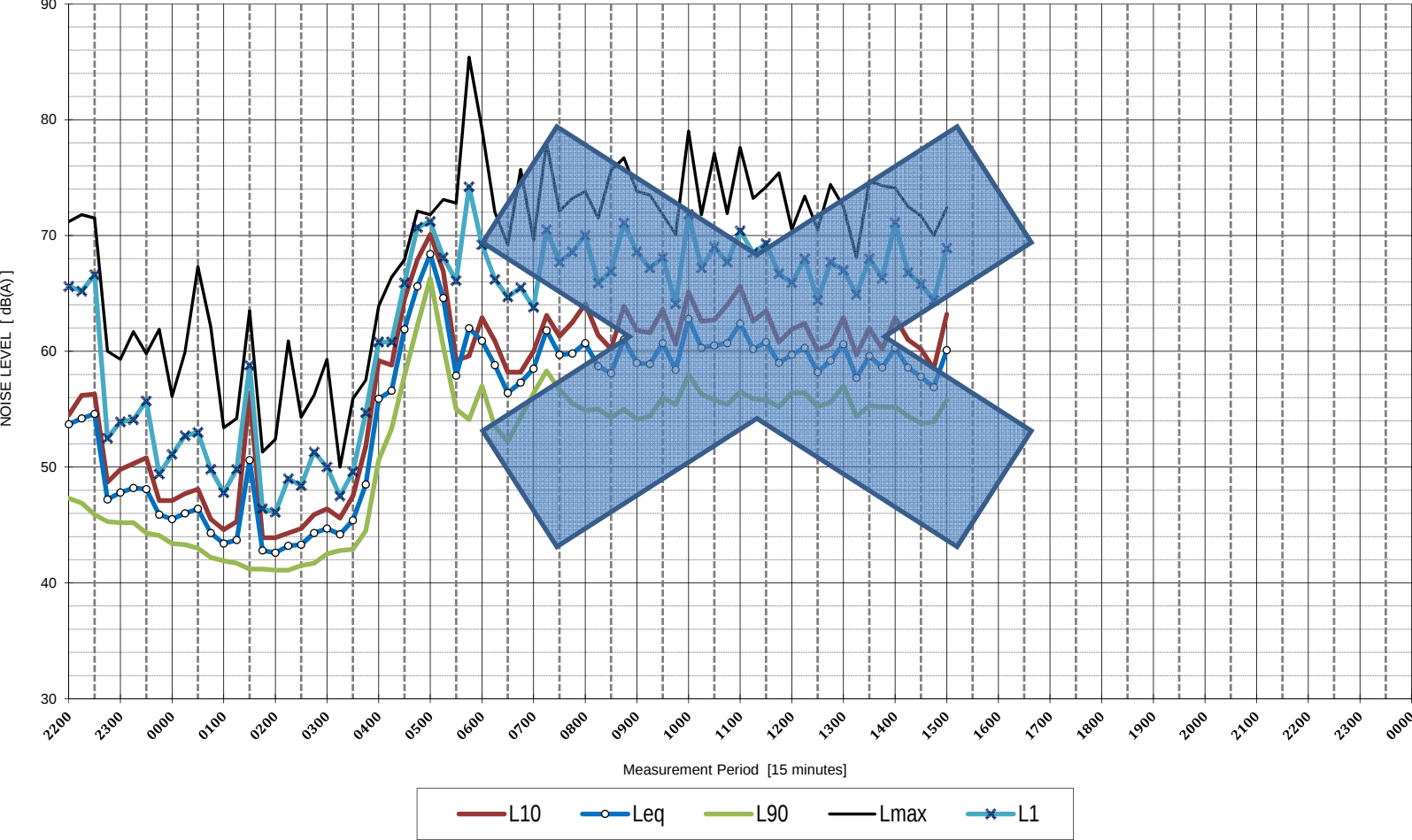
Maximum noise events as defined in the Environmental Noise Management Manual [$L_{max} - L_{eq} \geq 15$]	10
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Frequency [Hz]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	15	29	37	42	44	45	40	32	20	50
10% min L90 Evening	1800-2200	11	27	34	39	41	43	35	24	16	47
10% min L90 Night	2200-0700	7	21	27	32	34	35	28	18	12	39
10% min L90 Period	0000-0700	6	20	27	32	34	35	28	18	12	39
10% min L90 Period	0700-0000	11	27	34	39	41	42	35	24	15	46
Leq 15 hours	0700-2200	27	39	45	52	52	51	47	40	32	57
Leq 9 hours	2200-0700	17	32	39	45	45	45	39	33	22	50



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

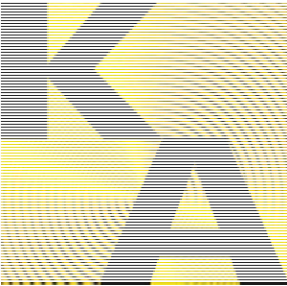
Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

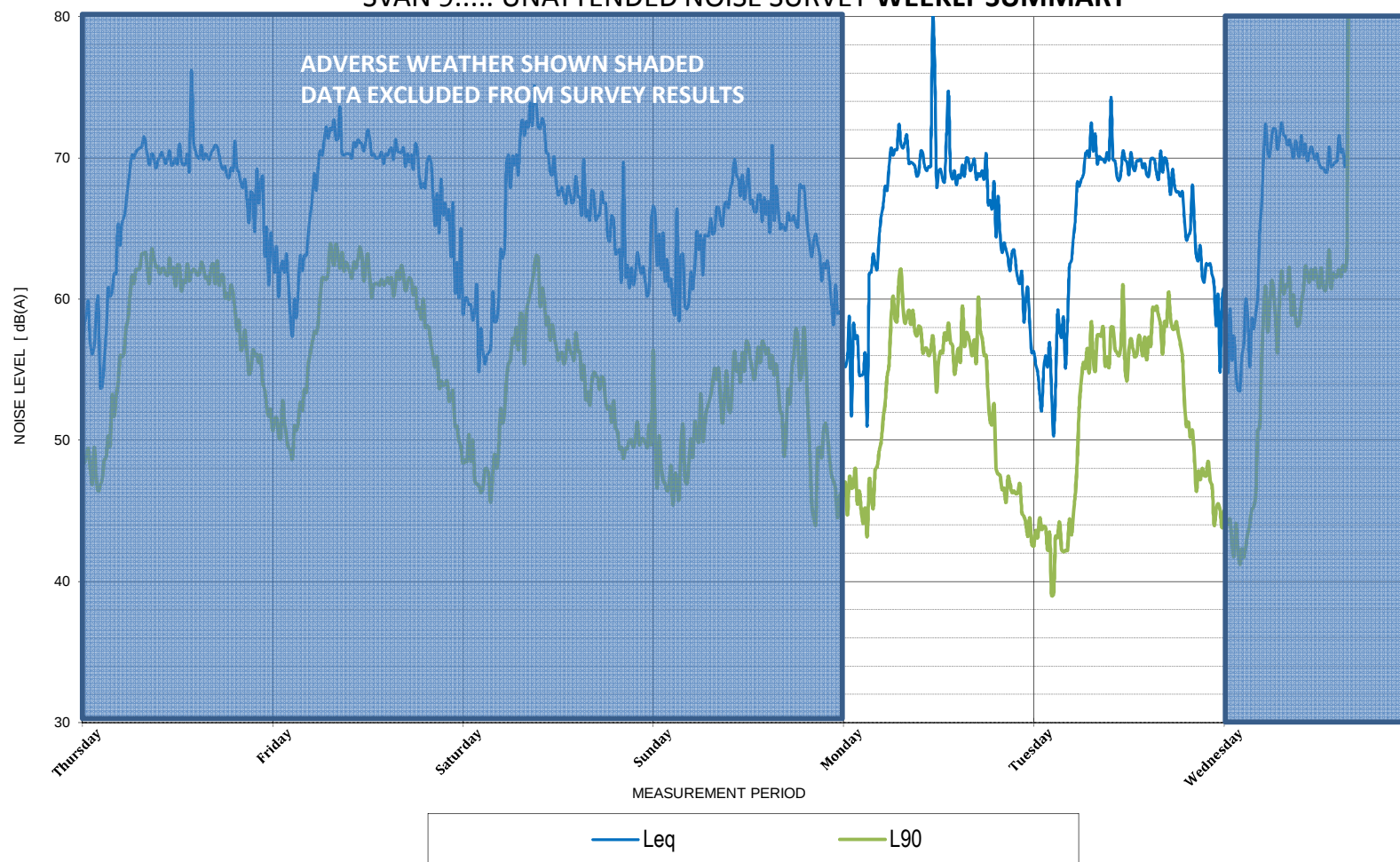
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY WEEKLY SUMMARY



SUMMARY OF AMBIENT NOISE LEVELS

	L90 Daytime	L90 Evening	L90 Nighttime
Day 1			
Day 2			
Day 3			
Day 4			
Day 5	56	46	45
Day 6	55	47	42
Day 7			
RBL	55	47	43

	Leq Daytime	Leq Evening	Leq Nighttime
Day 1			
Day 2			
Day 3			
Day 4			
Day 5	71	66	64
Day 6	70	65	63
Day 7			
Average	70	66	64

SUMMARY OF TRAFFIC & MISC. NOISE LEVELS

Leq 15 hrs 0700-2200 70 dB(A)

Leq 9 hrs 2200-0700 64 dB(A)

Leq 24 hrs 0000-2400 68 dB(A)

L10 18 hrs 0600-2400 71 dB(A)

max Leq 1 hr 0700-2200 71 dB(A)

max Leq 1 hr 2200-0700 68 dB(A)

Maximum noise events as defined in the Environmental Noise Management Manual

7 day average - [Lmax - Leq ≥ 15]

32

* Sundays and Public Holidays the hours change to 0800

WEEKKLY SUMMARY

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800*	21	32	38	44	48	52	49	43	34	55
10% min L90 Evening	1800-2200	15	27	33	38	41	42	38	34	29	47
10% min L90 Night	2200-0700*	10	23	31	35	37	39	35	29	25	43
10% min L90 Period	0000-0700	11	24	31	35	37	39	35	29	25	43
10% min L90 Period	0700-0000	14	26	33	38	40	42	38	33	29	46
Leq 15 hours	0700-2200	33	48	50	57	62	66	64	59	55	70
Leq 9 hours	2200-0700	27	42	45	51	55	60	58	53	49	64

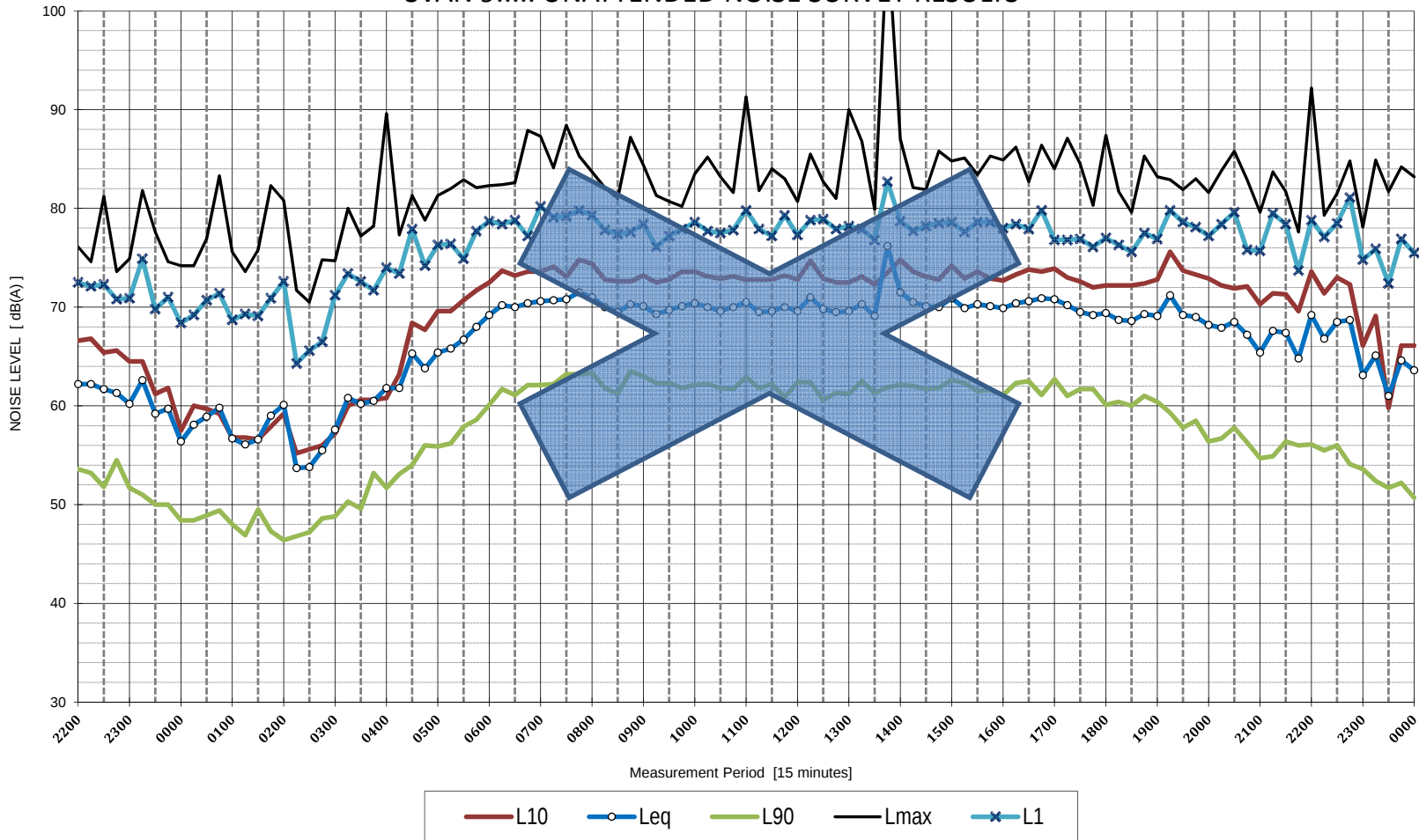
Frequency [Hz]

DAY 1

LOGGER LOCATION: 1547 Botany Rd - Awning fronting traffic

DATE: Thursday, 4 September 2014

SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

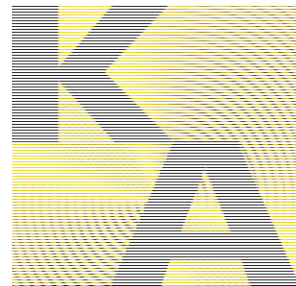
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

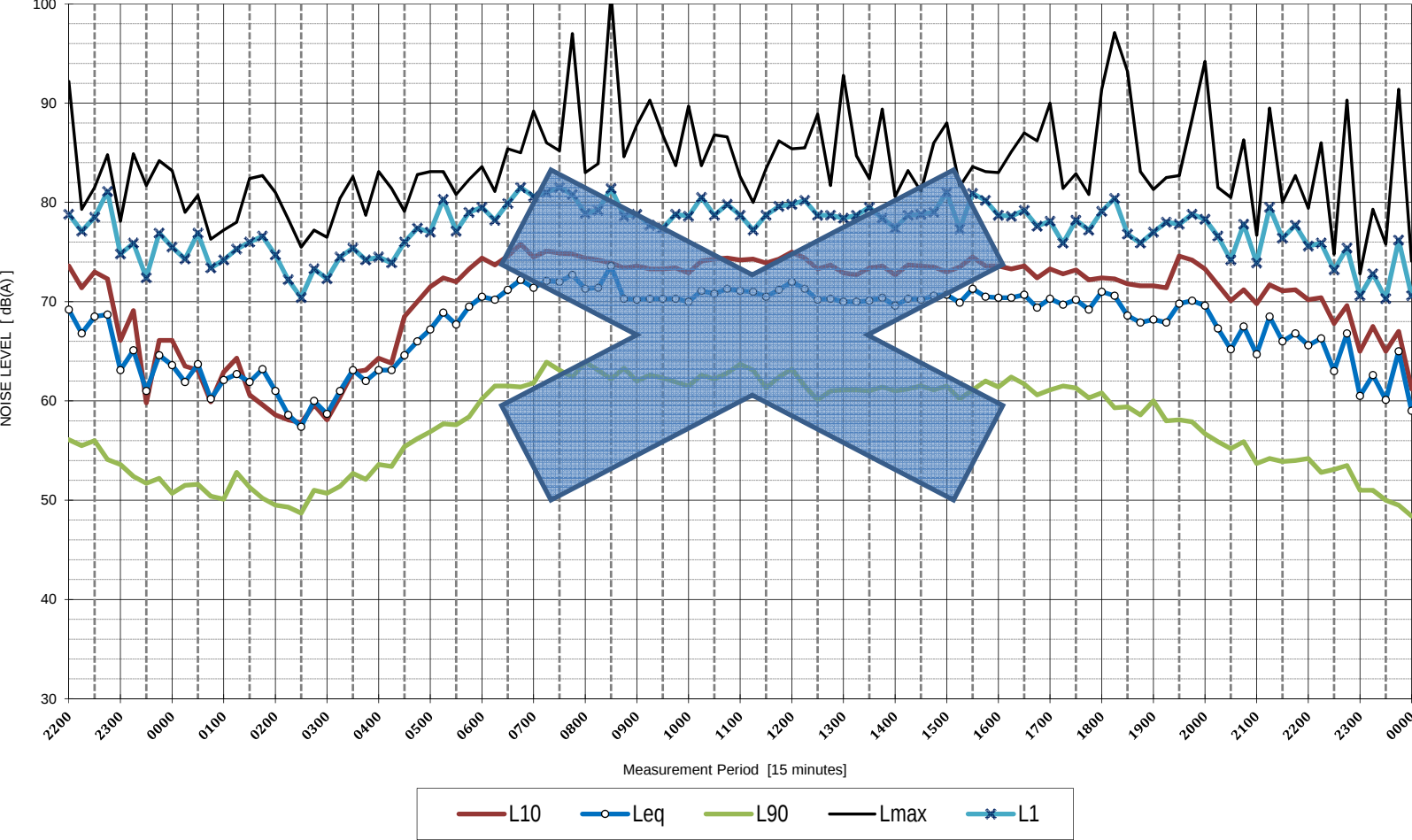
Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Frequency [Hz]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

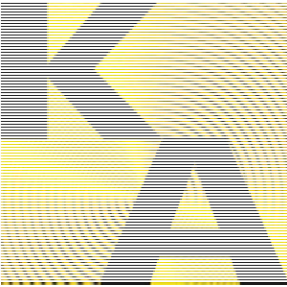
Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

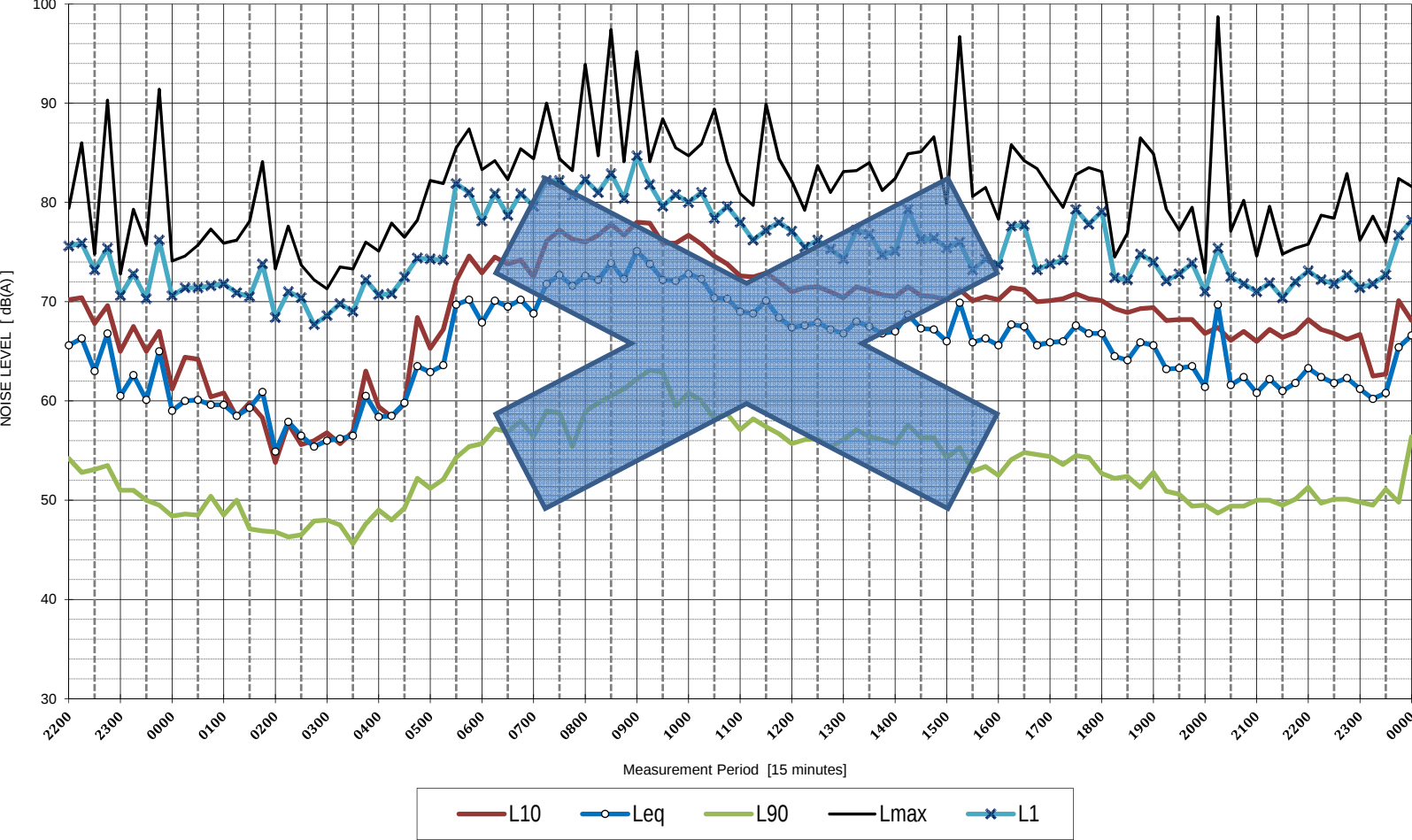
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

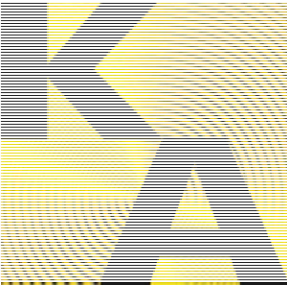
Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

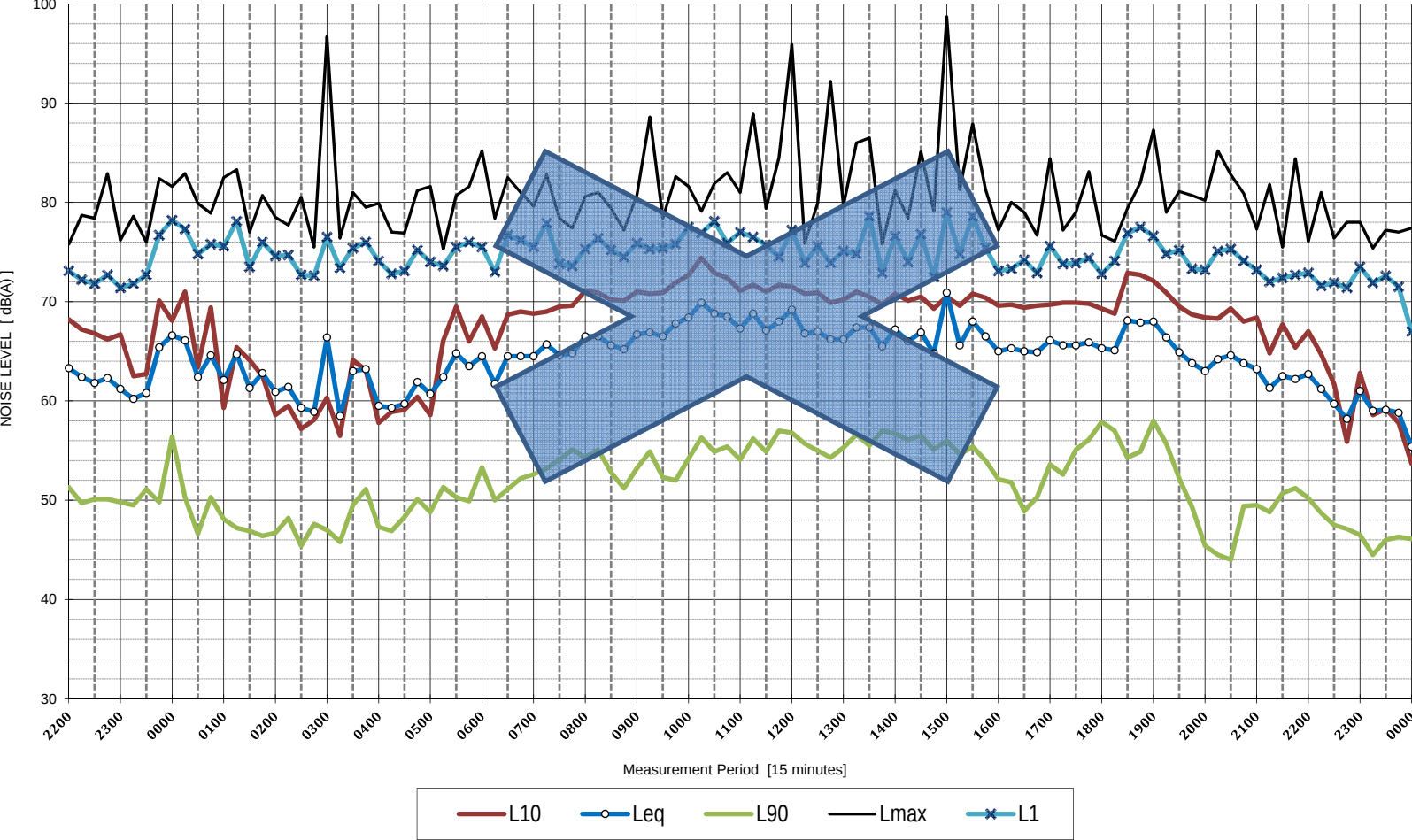
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined in the Environmental Noise Management Manual [$L_{max} - L_{eq} \geq 15$]	
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Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

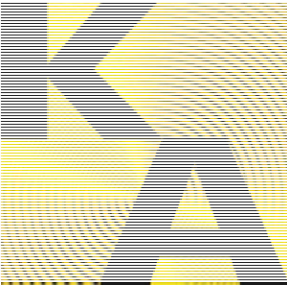
Descriptor	Period	Level	Units
L90 Daytime	0800-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0800		dB(A)
Leq Daytime	0800-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0800		dB(A)

TRAFFIC & MISC. NOISE METRICS

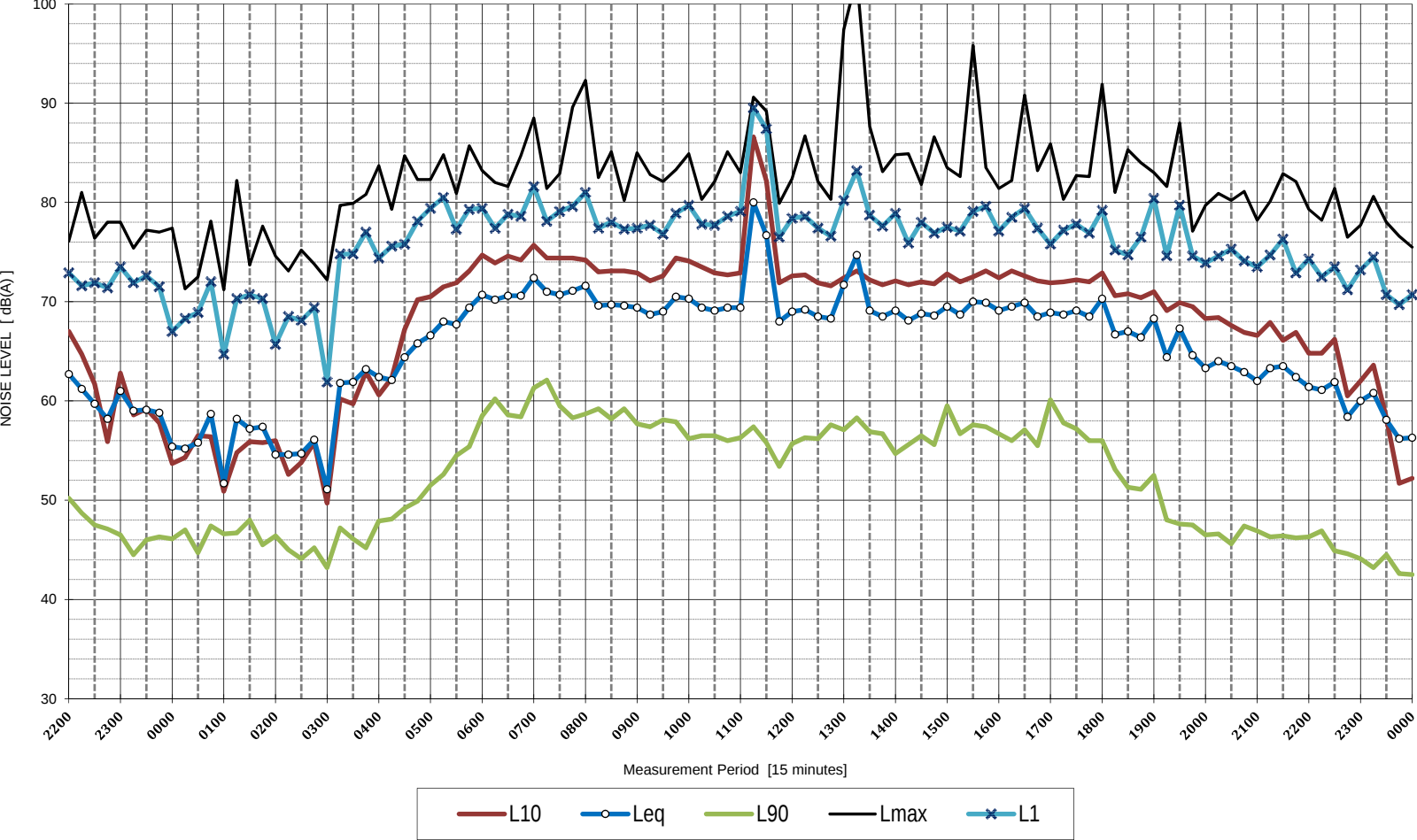
Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [$L_{max} - L_{eq} \geq 15$]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

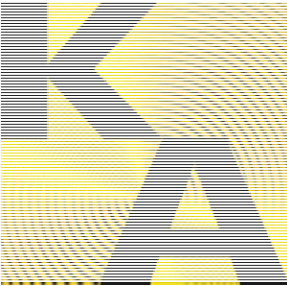
Descriptor	Period	Level	Units
L90 Daytime	0700-1800	56	dB(A)
L90 Evening	1800-2200	46	dB(A)
L90 Nighttime	2200-0700	45	dB(A)
Leq Daytime	0700-1800	71	dB(A)
Leq Evening	1800-2200	66	dB(A)
Leq Nighttime	2200-0700	64	dB(A)

TRAFFIC & MISC. NOISE METRICS

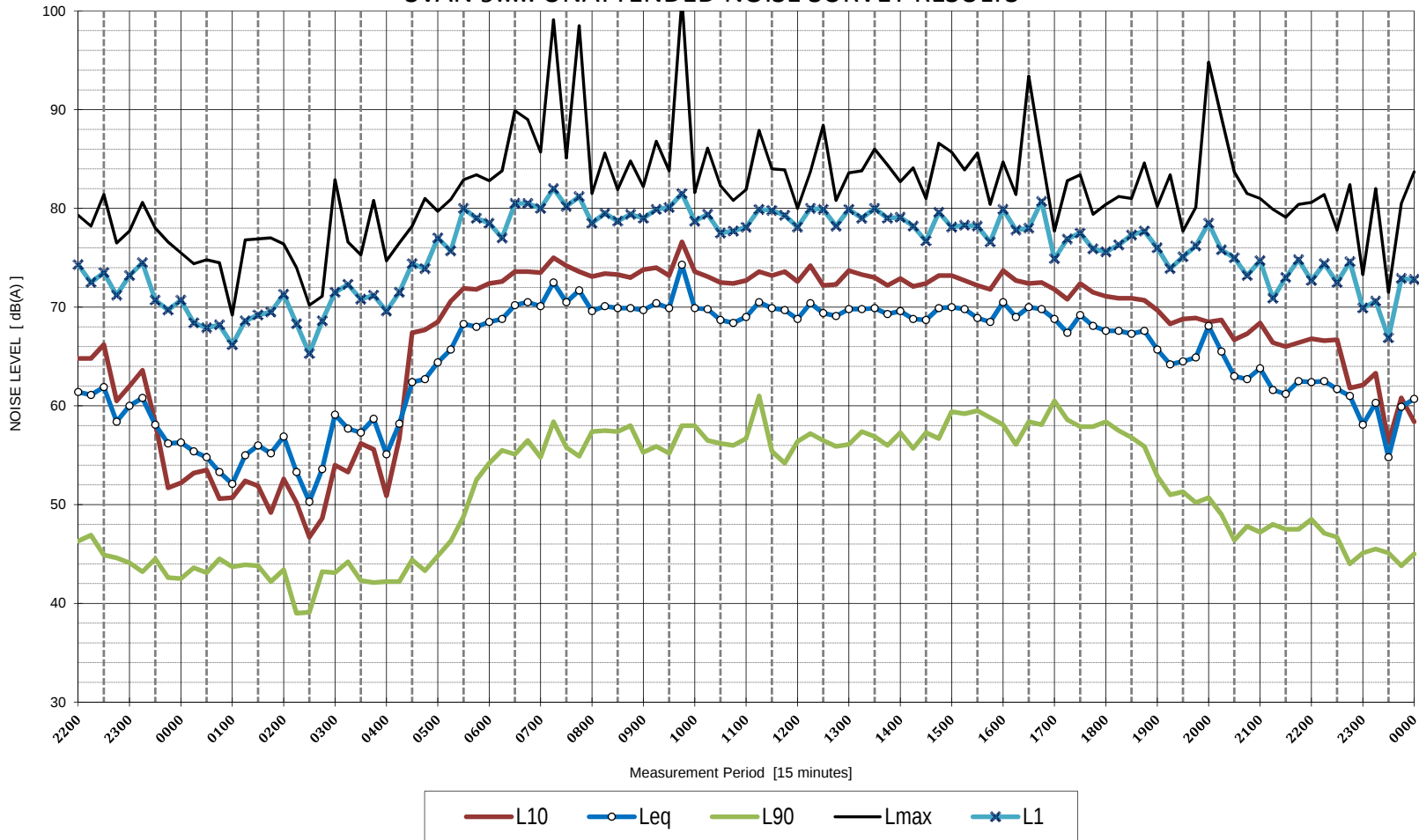
Leq 15 hours	0700-2200	70	dB(A)
Leq 9 hours	2200-0700	64	dB(A)
Leq 24 hours	0000-2400	69	dB(A)
L10 18 hours	0600-2400	71	dB(A)
max Leq 1 hour	0700-2200	72	dB(A)
max Leq 1 hour	2200-0700	69	dB(A)

Maximum noise events as defined in the Environmental Noise Management Manual [$L_{max} - L_{eq} \geq 15$]	30
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Descriptor	Period	Frequency [Hz]										Total A
		31.5	63	125	250	500	1000	2000	4000	8000		
10% min L90 Daytime	0700-1800	21	32	37	43	48	52	50	43	33		56
10% min L90 Evening	1800-2200	14	25	32	36	40	42	38	33	29		46
10% min L90 Night	2200-0700	11	24	32	37	39	41	36	29	25		45
10% min L90 Period	0000-0700	13	26	33	37	39	40	35	29	25		45
10% min L90 Period	0700-0000	13	25	32	36	40	42	38	33	28		46
Leq 15 hours	0700-2200	33	48	50	57	62	66	64	60	56		70
Leq 9 hours	2200-0700	27	42	44	51	56	60	59	55	50		64



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	55	dB(A)
L90 Evening	1800-2200	47	dB(A)
L90 Nighttime	2200-0700	42	dB(A)
Leq Daytime	0700-1800	70	dB(A)
Leq Evening	1800-2200	65	dB(A)
Leq Nighttime	2200-0700	63	dB(A)

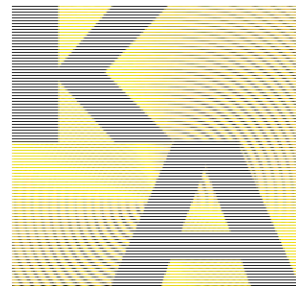
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	69	dB(A)
Leq 9 hours	2200-0700	63	dB(A)
Leq 24 hours	0000-2400	68	dB(A)
L10 18 hours	0600-2400	71	dB(A)
max Leq 1 hour	0700-2200	71	dB(A)
max Leq 1 hour	2200-0700	67	dB(A)

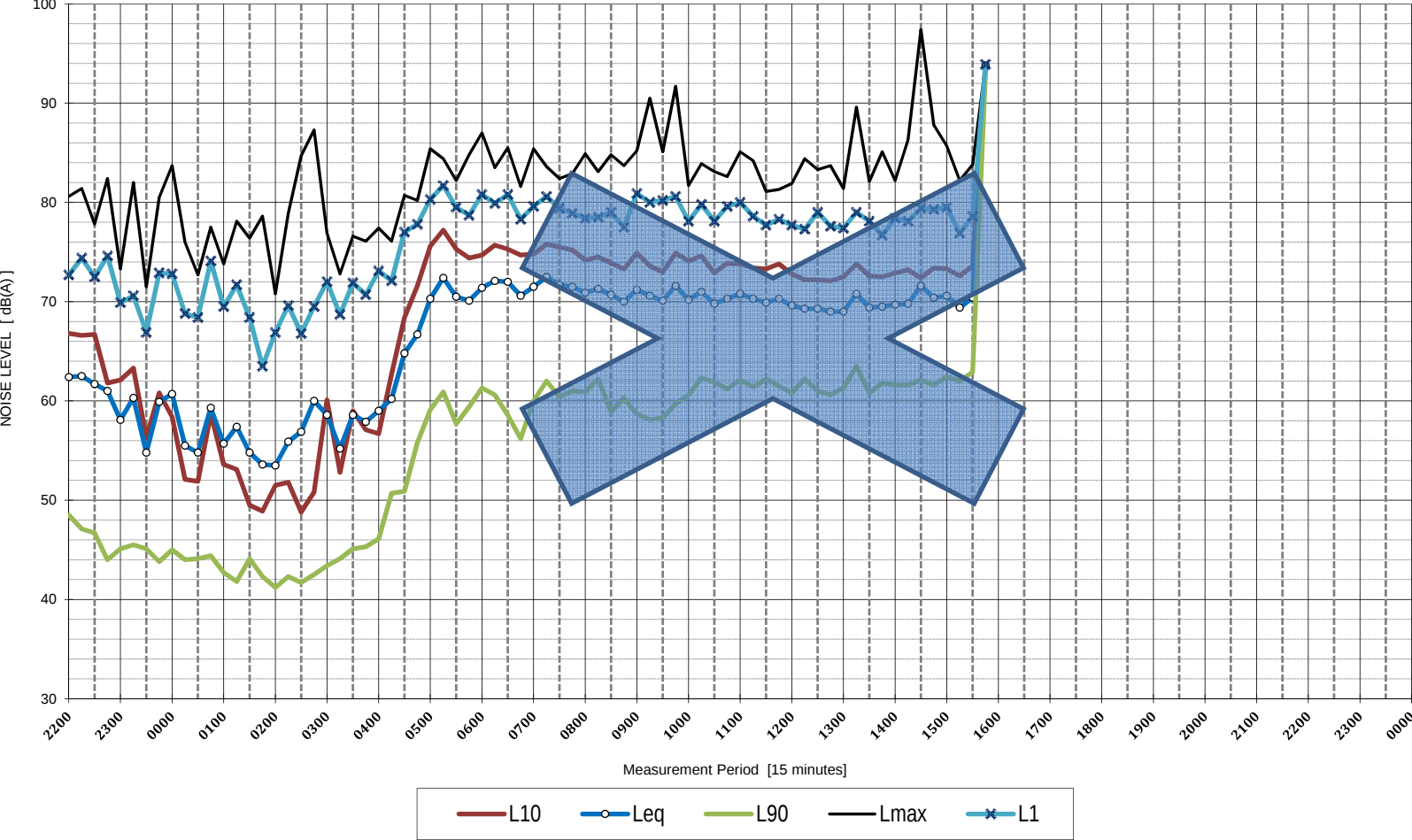
Maximum noise events as defined in the Environmental Noise Management Manual [$L_{max} - L_{eq} \geq 15$]	34
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Frequency [Hz]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	22	33	39	44	48	51	49	43	35	55
10% min L90 Evening	1800-2200	16	28	34	39	41	43	38	34	29	47
10% min L90 Night	2200-0700	9	22	29	33	36	38	34	28	24	42
10% min L90 Period	0000-0700	9	23	29	33	36	38	34	28	24	42
10% min L90 Period	0700-0000	15	28	34	39	41	42	38	33	29	47
Leq 15 hours	0700-2200	33	48	50	57	61	65	63	58	52	69
Leq 9 hours	2200-0700	27	43	45	51	55	59	57	52	46	63



SVAN 9..... UNATTENDED NOISE SURVEY RESULTS



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	dB(A)
Leq 9 hours	2200-0700	dB(A)
Leq 24 hours	0000-2400	dB(A)
L10 18 hours	0600-2400	dB(A)
max Leq 1 hour	0700-2200	dB(A)
max Leq 1 hour	2200-0700	dB(A)

Maximum noise events as defined
in the Environmental Noise
Management Manual [Lmax - Leq ≥ 15]

Descriptor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										

