Vipac Engineers & Scientists Ltd.
279 Normanby Rd, Port Melbourne, VIC 3207, Australia
Private Bag 16, Port Melbourne, VIC 3207, Australia
t. +61 3 9647 9700 | **f.** +61 3 9646 4370 | **e.** melbourne@vipac.com.au
w. www.vipac.com.au | A.B.N. 33 005 453 627 | A.C.N. 005 453 627

Vipac Engineers & Scientists

Melbourne Water

Dallas Tank Site - Rezoning for residential

Acoustic Report

30U-15-0067-TRP-365639-7

18 September 2015

Report Title: Acoustic Report **Job Title: Dallas Tank Site - Rezoning for residential**	
DOCUMENT NO: 30U-15-0067-TRP-365639-7 **PREPARED FOR:** Melbourne Water 990 LaTrobe Street Docklands, Victoria, 3008, Australia **CONTACT:** Mary Habla **Tel:** 61 3 9679 6913 **Fax:**	**REPORT CODE:** TRP **PREPARED BY:** Vipac Engineers & Scientists Ltd. 279 Normanby Rd, Port Melbourne, VIC 3207, Australia **Tel:** +61 3 9647 9700 **Fax**: +61 3 9646 4370
PREPARED BY: Author: Diana Gomez Olmedilla Acoustic Project Engineer	Date: 18 September 2015
REVIEWED BY: Reviewer: Xun Li Senior Acoustic Consultant	Date: 18 September 2015
AUTHORISED BY: Lucinda Bowden Acoustic Group Team Leader	Date: 18 September 2015
DISTRIBUTION **Copy No._____**	**Location**
1	Project
2	Client (PDF Format) Uncontrolled Copy
KEYWORDS: SEPP N1, ANEF, rezoning	

EXECUTIVE SUMMARY

Melbourne Water plans to rezone the land at 8-20 Phillip Street, Dallas and part of 22-28 Phillip Street, Dallas as shown in Figure 3-1, which will be referred to as the *subject site*. The site is flanked by Phillip Street to the south, Blair Street to the east, Inverloch Street to the west and Melbourne Water land to the north.

The land owned by Melbourne Water is currently classified as *Public Use Zone – Service and Utility (PUZ1)* hence, rezoning to facilitate future *Residential Use* development. The area subject to rezoning is covered by the Melbourne Airport Environs overlay – Schedule 2 ("MAEO2") as shown in Figure 3-1. This report presents recommendations to provide compliance with interior noise levels and outdoor areas for potential residents in the area subject to rezoning.

The interior noise levels are analysed upon the maximum aircraft noise exposure based on official information provided by the *Australian Noise Exposure forecast (ANEF)* for the Melbourne Airport, the *Melbourne Airport 2013 Master Plan* and the methodology presented in the *Australian Standard AS2021:2015.*

The standard *AS2021* presents tabulated aircraft noise levels based on long term noise monitoring and computer models by the Joint Standards Australia/Standards New Zealand Committee EV/11, Aircraft and Helicopter Noise. The aircraft noise levels used for this acoustic report and listed in *Tables 3.4 to 3.58* in the *AS2021* show noise levels not polluted by other noise sources (i.e. traffic, bird noise, etc.) and include meteorological effects. The following acoustic performance for the building envelope of residential developments at the subject site is sufficient to comply with the indoor noise criteria for future tenants:

- Minimum acoustic performance of the building envelope for sleeping areas is R_w 29 dB.
  Applicable for glazing, external walls and roof.
- Minimum acoustic performance of the building envelope for living areas R_w 24 dB.
  Applicable for glazing, external walls and roof.

The noise environment at noise sensitive areas for future residents has been investigated to comply with the *SEPP N-1* noise limits. During a site visit, Vipac identified control valves inside the Melbourne Water facilities as a potential noise source. An acoustic assessment has been performed based on the *SEPP N-1* noise policy to control the noise emissions from the control valves facility belonging to Melbourne Water. The noise emissions from the control valves station were measured handheld and monitored for a week period (Section 5.1). The *SEPP N-1* noise limit at night-time has been established in Section 5.2 The noise emissions from the control valves located 50 metres to the north of the proposed residential area have been assessed against the night-time noise limits according to the *SEPP N-1.* The following is recommended to comply with the *SEPP N-1* noise limit:

- Installation of a noise barrier 2.2 metres high, as presented in Figure 5-7.

Melbourne Water has advised that they will be erecting the noise barrier as recommended to decrease the noise at the subject site.

The recommendations presented in this report satisfy the acoustic environment at residential developments located in the *subject site* in compliance with the *AS2021:2015* (indoor noise levels) and the EPA Environment Noise Policy SEPP N-1.

TABLE OF CONTENTS

1 INTRODUCTION

Vipac Engineers & Scientists were commissioned by Melbourne Water to conduct an acoustic assessment for the noise environment at the Dallas tank site located at 8-20 Phillip Street, Dallas and part of 22-28 Phillip Street, Dallas as shown in Figure 3-1, which will be referred to as *subject site*.

This report presents information for the Planning Scheme documentation for rezoning the subject site, currently within a Public Use Zone, for residential purposes.

2 REFERENCES

- *State Environment Protection Policy (Control of Noise from Commerce, industry and trade) No. N-1 (SEPP N-1).*
- *Designation of types of zones and reservations in the metropolitan region planning schemes for the purposes of state environment protection policy (control of noise from commerce, industry and trade) No. N-1*, February 2002.
- *AS1055.1:1997 Acoustics-Description and measurement of environmental noise Part 1: general procedures.*
- *AS2021:2015 Acoustics- Aircraft noise intrusion – Building siting and construction,* Joint Standards Australia/Standards New Zealand Committee EV/11, Aircraft and Helicopter Noise
- Australian Noise Exposure Forecast for the Melbourne Airport, Airservices Australia.
- *Melbourne Airport 2013 Master Plan* prepared by the Melbourne Airport Authority, approved by the Commonwealth Minister for Infrastructure and Regional Development on the18th December 2013.
- *Broadmeadows Reservoir Site,* 8/10/2014, presented in Appendix A in this report.
- *Hume Melbourne Airport Environs Overlay*, MAP N0. 23MAEO, presented in Appendix B in this report.

The acoustic terminology is given in Appendix C.

3 BACKGROUND

It is understood that Melbourne Water plans to rezone the *subject site* which is bounded by Phillip Street to the south, Blair Street to the east, Inverloch Street to the west and Melbourne Water land to the north.

The area subject to rezoning is covered by the Melbourne Airport Environs overlay – Schedule 2 ("MAEO2") as shown in Figure 3-1. Hence, this report presents the maximum noise exposure for potential residents in that area and recommendations for the building construction to protect future residents inside their dwellings. The methodology presented in the Australian Standard *AS 2021:2015* has been adopted, covering acceptability of indoor spaces due to noise from aircrafts take-off and landing at Melbourne Airport.

Figure 3-1: Overlay of Melbourne Airport Environs Schedules 1 (MAEO1, purple shadow) and Schedule 2 (MAEO2, green shadow) on the area proposed for rezoning

Vipac Engineers & Scientists undertook a site visit on the 11th June 2015 to investigate the presence of commercial or industrial noise sources that could affect outdoor areas at the potential residences at the subject site. During a site visit, it was observed that a station containing two control valves and pipework located to the east of 17 Inverloch Crescent (inside Melbourne Water facilities) was a potential noise source. This report presents measurement data and recommendations to comply with the SEPP N-1 noise limits at the subject site at night-time.

4 AIRCRAFT NOISE INTRUSION AND BUILDING ACOUSTIC TREATMENT

According to the World Health Organisation, excessive noise can interfere with daily activities at home and during leisure time. It can disturb sleep and interrupt typical activities like talking, studying, and watching TV. In the metropolitan areas, common sources of noise are road traffic, noise from industrial activities and aircraft noise, among others.

For residential receptors under the flight path, aircrafts are a significant annoying noise source. Based on acoustic surveys, people are more disturbed by aircraft noise than road traffic noise at equivalent noise levels.

In Victoria Melbourne Metropolitan Area, the Melbourne Airport Authority has implemented the *Melbourne Airport 2013 Master Plan* which serves as a guideline for future development and planning of the Melbourne Airport activities for the 20 next years (reviewed every 5 years). The Aircraft Noise Management Strategy is presented in Chapter 12.2, including Melbourne Environs Overlays, ANEF curves and Noise Contours.

The land proposed for rezoning is covered by the *Melbourne Environs Overlay Schedule-2* and subject to exposure to aircraft noise. Thus, the maximum aircraft noise exposure has been calculated based on official information provided by the Australian Noise Exposure forecast (ANEF) for the Melbourne Airport, the *Melbourne Airport 2013 Master Plan* and the methodology presented in the Australian Standard *AS 2021:2015*. The purpose of this section is to provide recommendations for the building envelope of future residences at the subject site guaranteeing an acoustic environment inside the residences acceptable under the regulation *AS2021.*

4.1 AUSTRALIAN NOISE EXPOSURE FORECAST

Based on the information provided by Melbourne Airport, the operational noise levels with three runaways at full capacity have been estimated at the subject site. Figure 4-1 presents the *Australian Noise Exposure Forecast (ANEF) N-contours* at that location for the current situation in 2015 (2 operational runways) and beyond 2018 (three runways).

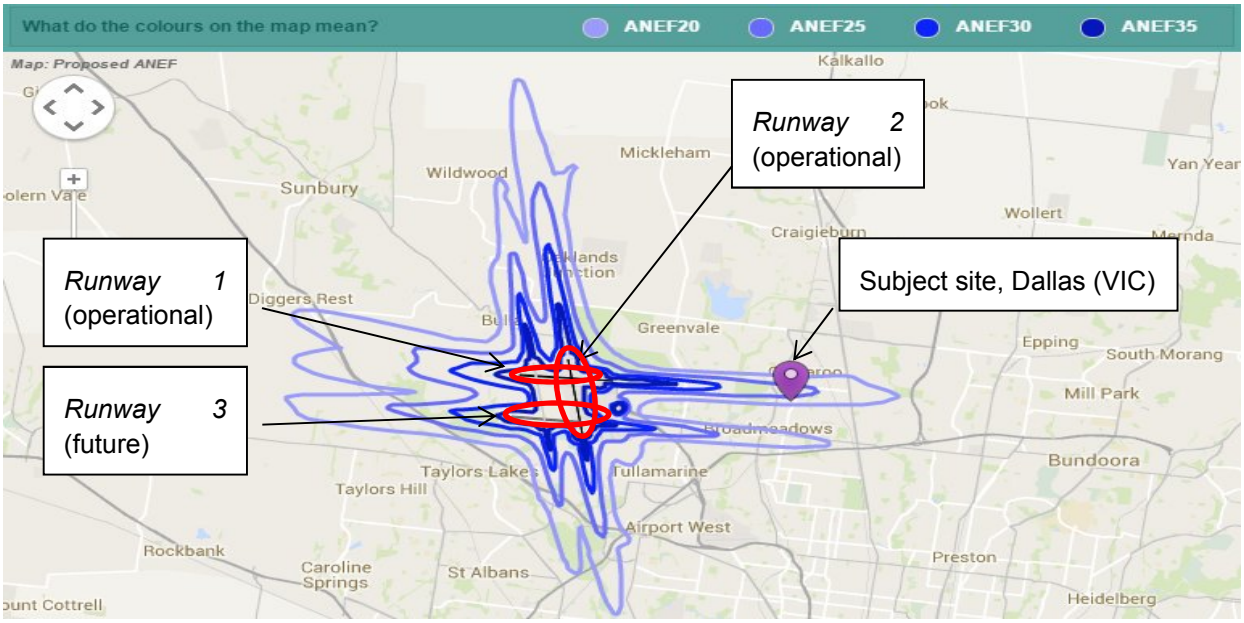


Figure 4-1: ANEF curves for the Melbourne Airport

*It is noted that the names of the runways have been chosen to help understanding this section but may differ from the official name.

4.2 MAXIMUM AIRCRAFT NOISE LEVELS

The standard *AS2021* tabulates aircraft noise levels based on long term noise monitoring and predictions. The aircraft noise levels used for this acoustic report are listed in *Tables 3.4 to 3.58* in the *AS2021*. Those noise levels include meteorological effects and are not polluted by other noise sources (i.e. traffic, bird noise, etc.). The information about typical airplanes in use in the Melbourne Airport can be found in the *Melbourne Airport 2013 Master Plan*.

The *Melbourne Airport 2013 Master Plan* appoints two main types of aircrafts for international and domestic flights, which have been considered for the maximum aircraft noise levels:

- Boeing 737-800 series for domestic flights;
- Boeing 777-800 and Airbus 330 for international flights.

AS2021 does not provide noise levels for aircrafts type Boeing 777-800, the most similar model found is Boeing 777-300 and has been used instead. It is noted that the maximum noise levels calculated for Boeing 777-300 and Airbus 330 are in the same order of magnitude at the subject site.

The maximum aircraft noise levels at the subject site are calculated upon the distance from the Melbourne Airport runways (existing 2 runways) to the site and are contingent on the type of aircrafts departing/arriving at Melbourne Airport. *Tables 3.4 to 3.58* in the *AS2021* detail the noise levels for a given distance and specific type of airplane. Table 4-1 presents the maximum noise levels calculated at the subject site for Boeings 737-800 and Boeing 777-300 according to *AS2021*.

Table 4-1: Maximum noise levels at the subject site

Maximum aircraft noise exposure			
	Take off	**Landing**	**Main noise contribution**
Domestic flights	72 dBA	67 dBA	aircrafts departing/arriving at *runway 1**
International flights	74 dBA	68 dBA	aircrafts departing/arriving at *runway 1**

Note*: according to the calculations, flight activity at the future *runway 3* will have an effect to the noise levels at the subject site; the main contributor at this location will be still *runway 1*.

The recommendations for the noise reduction of the building envelope are based on the maximum aircraft noise exposure due to international flights taking off *runway 1* at the Melbourne Airport, Table 4-1.

4.3 RECOMMENDATIONS FOR THE BUILDING ENVELOPE

The compliance of the minimum performance of the building envelope has been investigated based on *Appendix B* in the *AS2021,* where the aircraft noise reduction (ANR) for building elements is calculated from the loudest aircraft noise level and critical indoor design level. Table 4-2 presents the indoor design noise criteria for residential buildings.

Table 4-2: Indoor design sound levels for Houses and home units, ref. AS 2021.

	Sleeping areas, dedicated lounges	Other habitable spaces	Bathrooms, toilets laundries
Indoor design level dBA	50	55	60

It should be noted that the proposed rezoning area falls into the ANEF contours thus, the noise criteria presented in other standards such as *AS2107* are not suitable in this situation.

The ANR has been calculated following the *AS2021*, where the maximum noise level predicted corresponds to the loudest event shown in Table 4-1 and the interior noise criteria in Table 4-2. Table 4-3 presents the required ANR for a residential building at the subject site.

Table 4-3: ANR minimum required for building elements

Maximum noise level predicted [dBA]	Interior noise criteria Maximum indoor noise [dBA]	ANR min [dB]	Rw min [dB]
74	50 - Sleeping areas	24	29
74	55 - Lounge areas	19	24

The building materials of the building envelope shall have a minimum acoustic performance of R_w 29 dB for bedrooms and R_w 24 dB for living areas. That includes windows, walls and roof construction.

The recommendations are based on the assumption that windows and doors are shut.

All windows/doors should be well sealed (air tight) when closed with good seals such as acoustic seals around the perimeter. Any air gap will significantly reduce the performance of the glazing in terms of the ability to attenuate noise.

Likewise, roofs are a critical noise transmission path; lightweight ceiling constructions shall be evaluated when more detail is available to ensure tenants' noise comfort. Normally external walls (masonry or brick walls) will present a higher noise attenuation than glazing and roofs. The final construction should be evaluated by a qualified acoustic consultant.

Note: It is recommended that the performance of the building elements is evaluated in terms of spectral components of the aircraft noise and the final construction drawings for the proposed development. The accurate aircraft noise attenuation of each element depends on the surface area of the elements and reverberation time of the room, data not available at the submission of this report.*

5 INDUSTRIAL NOISE AND RECOMMENDATIONS FOR COMPLIANCE WITH SEPP N-1

The noise environment at the Dallas tank site consists of aircraft noise, road traffic noise and noise from the Melbourne Water control valves facility to the north of the site.

Noise measurements were made in the vicinity of the proposed area. Likewise, noise measurements of the control valves station were taken via handheld noise tests and unattended noise logging in the period 11th June 2015 to 18th June 2015.

The acoustic instruments used for the measurements are presented in Appendix D. The measurement instrumentation was checked for calibration immediately before and after the sound pressure level measurements without significant drift. The weather conditions during the handheld measurements were dry with light breeze and taken in free field. The weather conditions during the long term noise monitoring have been checked with the weather observations from the Bureau of Meteorology station at the Tullamarine Airport, detailed in Appendix E.

5.1 NOISE MEASUREMENTS

5.1.1 BACKGROUND NOISE MEASUREMENTS FOR SEPP N-1 NOISE LIMITS

Vipac performed three site visits on 11th and 18th June 2015 in the morning, and on 17th June 2015 in the night period.

During the site visit at day-time, handheld measurements were avoided in the area proposed for rezoning due to noise from birds. The measurements were taken at a derived point (A1) and in the near field of the control valves, Section 5.1.2.

During the site visit at night-time, the location A1 was selected as a derived point for the background noise measurement, following the SEPP N-1 policy. It is noted that during the site visit at night-time, the noise emissions from the control valves at the closest residence were dominant over general background noise, thus noise observations were taken at the western boundary of the control valves site (location A2), at a distance of 15 metres to 17 Inverloch Crescent, Dallas. The ambient noise to the southern boundary between Phillip Street and 159 Blair Street was dominant by fan noise.

Figure 5-1 presents the location of the onsite observations.

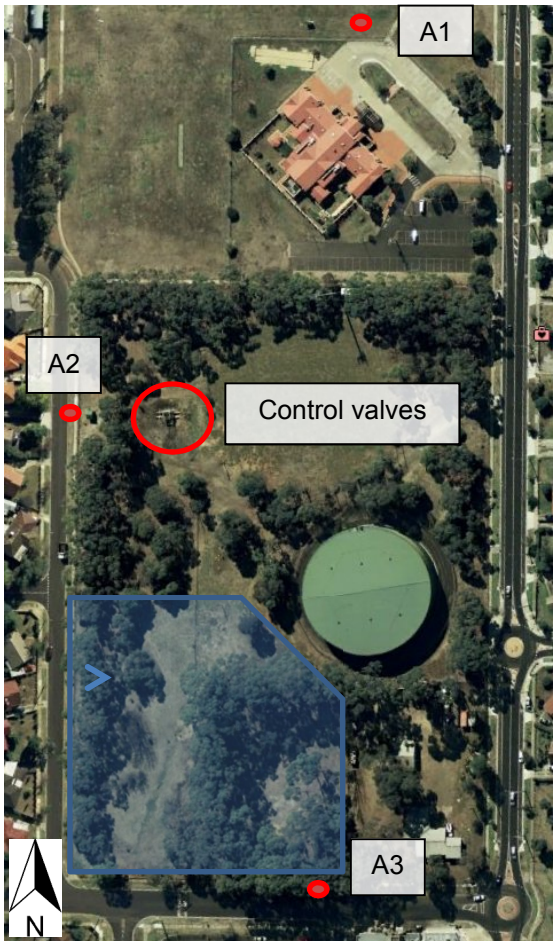


Figure 5-1: Location of the background noise measurements and the control valves facility

A1: derived point for the background noise measurements for the SEPP N-1 noise limits. Location chosen in accordance with the SEPP N-1 policy. Testing performed at night-time on the 17th June 2015 and day-time on the 18th June 2015.

A2: closest boundary to the control valves installation. The noise measurements were taken in the night on the 17th June 2015; the noise levels were dominant by the noise from the control valves inside the Melbourne Water facilities.

A3: southern boundary of the subject area. During the night-time testing, the noise environment was dominant by fan noise from 159 Blair Street. Data rejected for SEPP N-1 noise limits.

It is noted that during the visit on the 11th June 2015 (day-time), the acoustic environment on the land proposed for rezoning was dominant by birds' noise in the absence of aircraft noise. A noise logger was installed at the boundary with the control valves facility to monitor noise from the control water valves where the noise was dominant by the control valves. The data has been used to predict the control valves noise at future residences at the southern section at the subject site. Likewise, a derived point was selected for the calculations of the SEPP N-1 in accordance to the State Policy. Onsite observations at night-time led to reject measurements from location A3 (fan noise) and A2 (control valves noise) for background noise testing. The boundary along Blair Street was affected by those sources (audible); hence the testing was undertaken at location A1 (not audible).

Table 5-1 presents the noise levels measured.

Table 5-1: Noise levels measured [dBA]

Location	Date time (dd/mm/yyyy, hh:mm)	L_{AFmax}	L_{Aeq}	L_{A90}	Note
A1	17/06/2015 01:43 am	52	35	30	Night-time background measurement. General traffic noise. Duration 10 mins
A1	18/06/2015 08:31 am	71	53	51	Day-time background measurement. General traffic noise. Duration 20 mins
A2	17/06/2015 01:12 am	66	39	36	Noise dominant by control valves' noise. Noise levels recorded at the fence boundary with Inverloch Cres.15 metres from 17 Inverloch Cres Duration 5 mins. Measured by the logger 57 dBA
A2	17/06/2015 02:06 am	49	37	35	Noise dominated by control valves' noise. Noise levels recorded at the fence boundary with Inverloch Cres. 15 metres from 17 Inverloch Cres. Duration 3 mins. Measured by the logger 57 dBA

From the observation onsite at day-time there is heavy traffic along Phillip Street and Blair Street. At night time, the ambient noise was dominant by distant traffic in Hume Highway with occasional cars passing-by Blair Street.

The noise emissions at night time at the boundary with the nearest residence (17 Inverloch Crescent) were measured. The duration of the measurements was selected so that the noise environment was dominant by the control valves. The values have been used together with the logger observations and the near field tests on the 18th June 2015.

5.1.2 CONTROL VALVES FACILITY NOISE MEASUREMENTS

To assess the noise emissions from the control valves attended handheld measurements were undertaken in the early morning and a noise logger was installed at the fence to the south of the control valves facility. Figure 5-2 presents the current layout of the control valves facility.

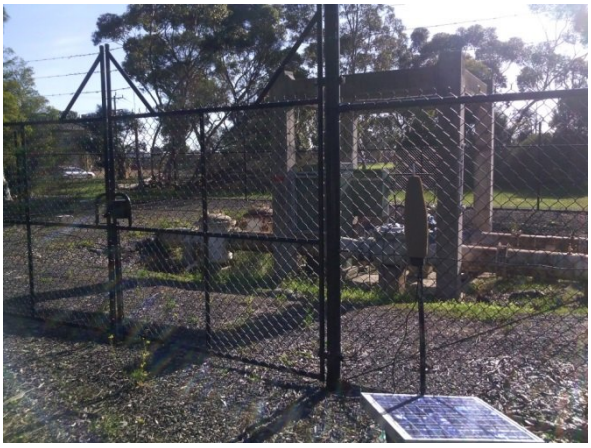


Figure 5-2: Control valves station and noise logger setup

5.1.2.1 ATTENDED NOISE MEASUREMENTS

Near field measurements were performed close to the control valves installation on 18th June 2015 in the period 7 am to 08:30 am. The scope of these measurements was to evaluate the noise from the Melbourne Water equipment for the SEPP N-1 assessment.

The noise levels recorded during the site visit on 18th June 2015 changed in a range ± 5dB. The maximum noise levels have been used for the environmental analysis, data checked with information recorded by the noise logger.

Figure 5-3 presents the control valves, Table 5-2 lists the noise levels measured.

Figure 5-3: Near field measurement locations

Table 5-2: Noise levels measured [dBA]

Location	Date time (dd/mm/yyyy, hh:mm)	L_{AFmax}	L_{Aeq}	Comments
H	11/06/2015 11:18 am	66	58	Dominant by control valves noise Duration 20 seconds Measured by the logger 58 dBA
H	11/06/2015 11:19 am	75	68	Dominant by aircraft landing Duration 30 seconds Measured by the logger 68 dBA
H	18/06/2015 07:31 am	62	57	Dominant by control valves noise Duration 5mins Measured by the logger 57 dBA
A	18/06/2015 07:39 am	67	63	Dominant by control valves noise Duration 2 mins
B	18/06/2015 07:47 am	62	61	Dominant by control valves noise Duration 20 seconds
C	18/06/2015 07:48 am	55	55	Noise dominant by control valves noise Duration 1 minute
D	18/06/2015 07:48 am	58	54	Dominant by control valves noise Duration 20 seconds
E	18/06/2015 07:49 am	55	54	
F	18/06/2015 07:49 am	59	54	
G	18/06/2015 07:50 am	56	55	
H	18/06/2015 07:50 am	58	57	Dominant by control valves noise Duration 20 seconds Measured by the logger 57 dBA
I	18/06/2015 07:51 am	60	58	Dominant by control valves noise Duration 20 seconds
J	18/06/2015 07:52 am	56	53	
K	18/06/2015 07:52 am	58	56	
L	18/06/2015 07:53 am	57	54	
M	18/06/2015 07:53 am	60	55	
N	18/06/2015 07:54 am	63	62	

**It is noted that the duration of the measurements was chosen to represent specific events i.e. aircraft flying and constant water load around the control valves facility dominant over traffic.*

From Table 5-2 it can be seen that the noise emissions were dominant by the northern control valve on Figure 5-3. The data and the site observations have been used to estimate the maximum noise levels at the fence when the water load is high in both control valves.

5.1.2.2 UNATTENDED NOISE MONITORING AT THE FENCE OF THE CONTROL VALVES FACILITY

Long term noise monitoring was performed in the period from 11 am on 11th June 2015 to 8 am on 18th June 2015. The noise logger was set to record events every second to identify airplanes landing/taking off from Tullamarine airport to exclude these for the environmental noise assessment. The noise logger was located at the fence next to the control valves station and was affected by airplanes; traffic along Inverloch Cres. and Blair Street; and noise from birds on the trees nearby.

Figure 5-4 below presents the noise levels recorded $L_{AeqT=1\ minute}$ during the whole noise monitoring period. The time interval 1 minute has been chosen to identify events happening in the area. The data is affected by airplanes, bird noise and engine noise from trucks or light vehicles accelerating mainly on Blair Street, according to the onsite observations. From Figure 5-4 the following noise trends can be seen:

- The average noise level varies between 45-70 dBA, with individual peaks happening at all time periods.
- A recurring event happens every night in the period 23 pm to 00 am approximately; the event is characterized by stable sound pressure level of 60 dBA and duration 1 hour.
- Drops in the noise levels trends from 8 am to 17 pm on the 12th June 2015; in period 8 am to 16 pm on the 15th June 2015; in the period 8 am to 14 pm on 16th June 2015; and finally drops in the noise levels in the period 00 am to 13:30 pm on 17th June 2015.

Given the changeable noise conditions in the site, the analysis of the control valves noise emissions has been focused in the night period and correlated with onsite observations at night-time on 17th June 2015.

Figure 5-5 on page 18 presents $L_{AeqT1=minute}$ for the nights with favourable weather conditions in the period 22 pm to 7 am. The conclusions from Figure 5-5 are listed:

- The noise levels for the nights of the 15th June 2015, 16th June 2015 and 17th June 2015 follow a similar trend:
    - Noise levels $L_{Aeq,30\ mins}$ 57 dBA (no aircraft noise included) averaged in the night period.
    - Noise levels $L_{Aeq,30mins}$ 60 dBA, L_{A90} 59.5 dBA (no aircraft noise) averaged in the period 23:00 pm to 00:39 am approximately.

  The recurrent noise source in the period 23 pm to 00:30 am has been identified as noise from the control valves by listening to the noise files. The peaks shown in the period 16th June 2015 23:00 pm to 17th June 2015 00:32 am correspond to airplanes.
- The typical nigh-time noise environment presents a noise environment similar to the onsite observations on the 18th June 2015, leading to the conclusion that only the northern valve was working at full load during the measurements.
- Following SEPP N-1, intermittency adjustment does not apply.

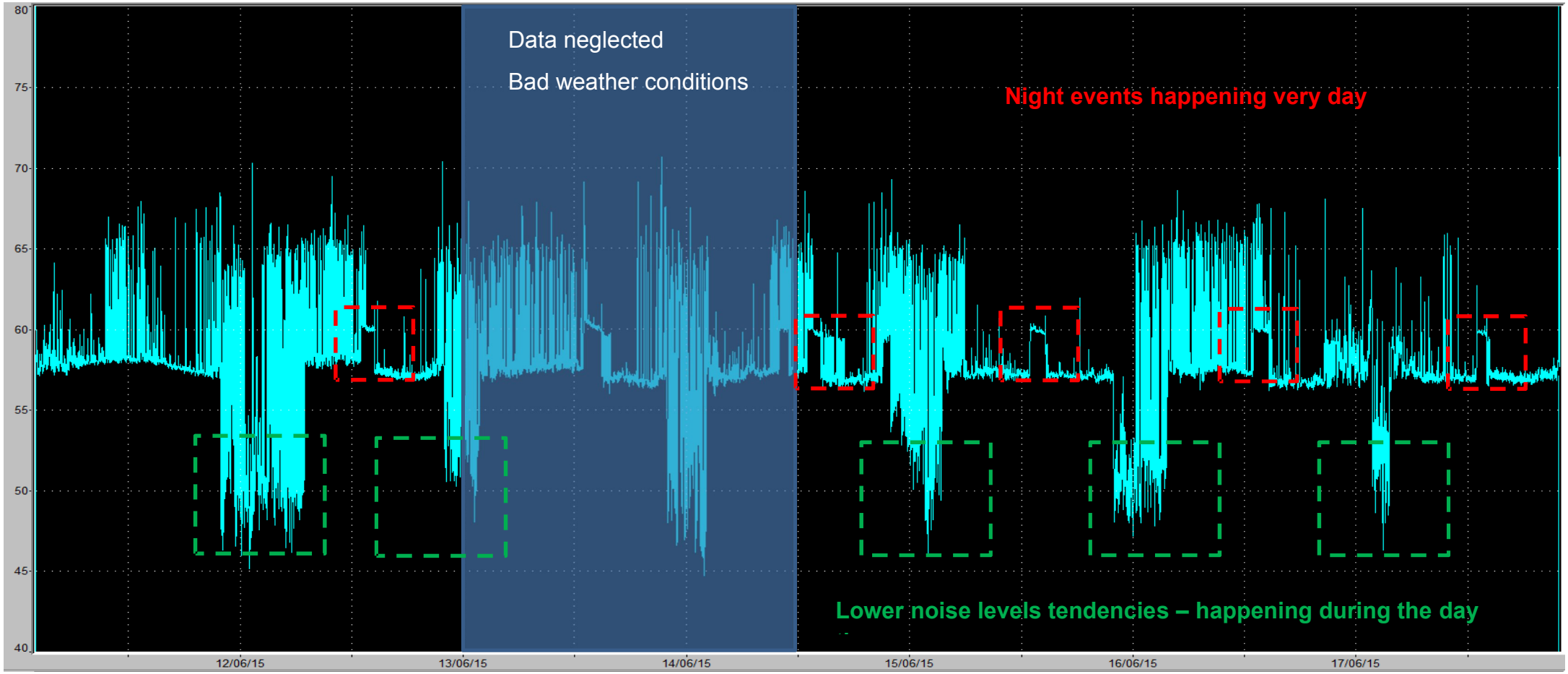


Figure 5-4: $L_{AeqT=1min}$ monitoring period 11th to 18th June 2015

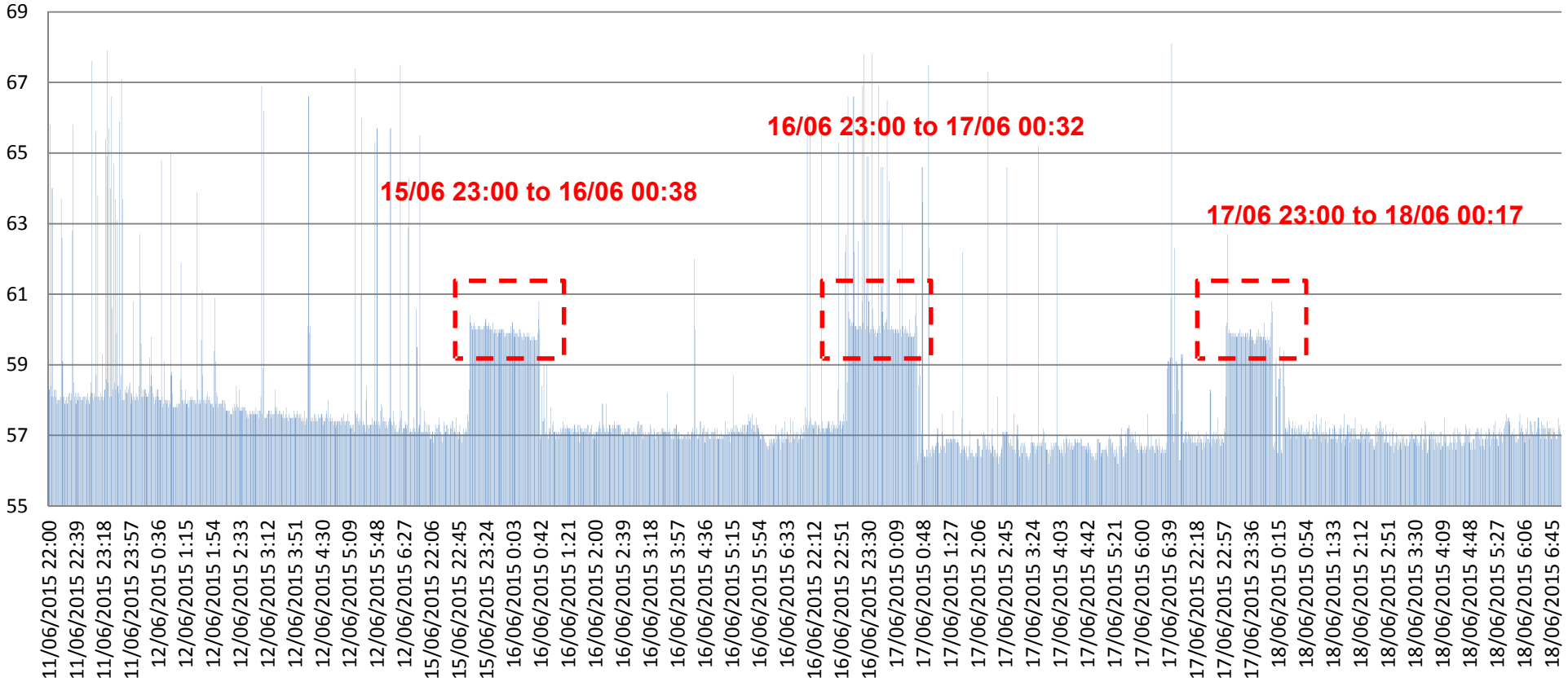


Figure 5-5: $L_{Aeq,T=1\ minutes}$ noise logger at the fence of the control valves facility for selected days at night time

5.2 EPA NOISE LIMIT AT NEARBY RESIDENTS

To assess the noise impact from the control valves facility in the vicinity of the proposed rezoning area, noise limits were determined in accordance with *State Environment Protection Policy (Control of Noise from Commerce, industry and trade) No. N-1* (SEPP N-1). The SEPP N-1 noise limits are determined for each of the day, evening and night time periods, based on a zoning level function of the local planning scheme around the noise sensitive receiver and adjusted where relevant for background noise conditions at the actual site. Table 5-3 summarizes the periods of time for SEPP N-1:

Table 5-3: Periods of time presented by SEPP N-1

	Monday - Friday	Saturday	Sunday
Day time period	07.00 am to 18.00 pm	07.00 am to 13.00 pm	
Evening period	18.00 pm to 22.00 pm	13.00 pm to 22.00 pm	07.00 am to 22.00 pm
Night time period		22.00 pm to 07.00 am	

The Planning Scheme map for determination of the Zoning Levels at the subject site is shown in Figure 5-6. The nearby zones comprise the Special Use Zone Schedule 4 Corinella Crescent Educational Establishment (SUZ4); Public Park and Recreational Zone (PPRZ); Public Use Zone services and utility area (PUZ1); Industrial 3 Zone (IN3Z); Commercial 1 Zone (C1Z) and General Residential Zone (GRZ1).

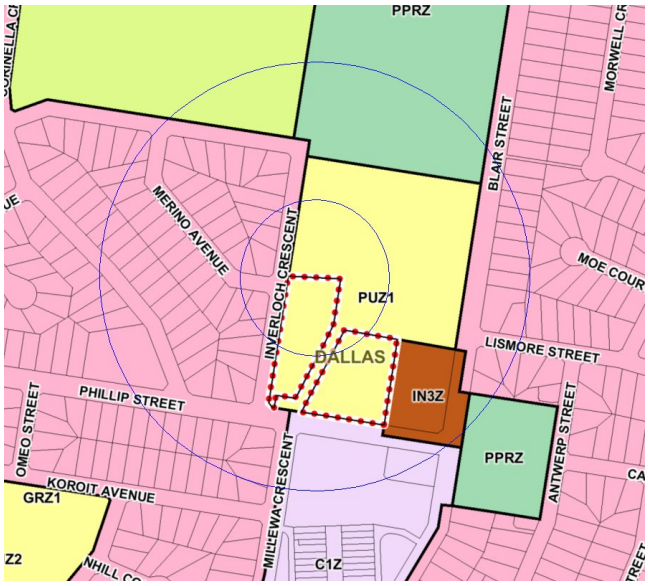


Figure 5-6: Land use and zoning map for the closest residents nearby the control valves station

The background noise levels were measured at the derived point in Gibbs Reserve (Section 5.1.1) for the calculation of the noise limits at the boundary with the control valves' station. Due to the noise trends evaluated in Section 5.1.1, the noise limit has been established for the night time period, which is the most stringent time period for SEPP N-1.

Table 5-4: SEPP N-1 Noise limit (dBA) for the night time period

Time period	$L_{90,\ 10min}$ (dBA)	Zoning level	Background noise classification	Noise limit, dBA
Night	30	39	Neutral	39

5.3 RECOMMENDATIONS TO COMPLY WITH SEPP N-1 NOISE LIMITS

The predictions of the noise emissions from the control valve station at the proposed boundary are based on the noise levels observed onsite, correlated with the noise logger and summarized below:

1. From the site visit on the 18th June 2015, the noise levels at the southern fence of the control valves' station were L_{Aeq} 57 dBA, resembling the noise levels at night-time recorded by the noise logger except from the period 23:00 pm to 00:30 am.
   However, it was noticed that the northern valve was dominant with noise levels recorded L_{Aeq} 64 dBA in front of that valve (Section 5.1.2.1). Hence, the water load at the northern valve is assumed to be high.
2. The noise logger presents noise trends from the control valves recurrent every night in the period 23:00 pm to 00:30 am (approximately). The noise level corresponds to L_{Aeq} 60 dBA.
3. The hypothesis of two control valves working simultaneously at high load is considered for maximum noise emissions.

Based on the conclusion of two control valves working at high load at night time (period 22 pm to 7 am), the noise levels have been estimated at the façade of a double storey building located at the subject site, directly facing the control valves' station at a distance of 50 metres.

It is recommended that the following noise control measures are implemented to control the noise transmission from the control valves facility to the proposed residential boundary to comply with 39 dBA noise limit, as shown in Table 5-4.

- Install a noise barrier around the control valves facility at the current fence. The minimum height of the noise barrier shall be 2.2 metres. The perimeter of the noise barrier is shown in Figure 5-7.

Figure 5-7: Noise barrier proposed

It is noted that from Table 5-1 in Section 5.1.1, the noise emissions at night time on 17th June 2015 complied with the noise limit at 17 Inverloch Crescent. Nevertheless, under the conclusion of high water load in both control valves, it is recommended to extend the noise barrier to the west of the control valves' station (as shown in Figure 5-7) to ensure compliance. The barrier shall be R_w 30 dB, solid (not perforated) and sealed air tight at the bottom and corners to prevent sound transmission through gaps. Suitable barrier construction materials include glass, steel, polycarbonate sheets.

The barrier can be located at the existing fence, although it is recommended that its installation is closer to the noise source (control valves), if practicable. Besides, if the noise barrier is located closer to the control valves, it is likely that the height of the noise barrier could be lower than 2.2 metres.

6 CONCLUSIONS

Vipac Engineers & Scientists has conducted an acoustic assessment for the noise environment at the subject site located at 8-20 Phillip Street, Dallas and part of 22-28 Phillip Street, Dallas as shown in Figure 3-1.

The land owned by Melbourne Water is currently classified as *Public Use Zone – Service and Utility (PUZ1)* hence, rezoning into *Residential Use* is sought in order to enable the site to be sold for residential development. The area subject to rezoning is covered by the Melbourne Airport Environs overlay – Schedule 2 ("MAEO2") as shown in Figure 3-1.

This report presents recommendations to provide compliance with interior noise levels and outdoor areas for potential residents in the area subject to rezoning.

The interior noise levels are analysed upon the maximum aircraft noise exposure based on official information provided by the *Australian Noise Exposure forecast (ANEF)* for the Melbourne Airport, the *Melbourne Airport 2013 Master Plan, Australian Standard AS2021:2015* and are presented in Section 4. The inputs for the calculation are tabulated aircraft noise levels based on long term noise monitoring and computer models by the Joint Standards Australia/Standards New Zealand Committee EV/11, Aircraft and Helicopter Noise. The following acoustic performance for the building envelope of developments at the subject site is sufficient to comply with the indoor noise criteria for future tenants:

- Minimum acoustic performance of the building envelope for sleeping areas is R_w 29 dB.
  Applicable for glazing, external walls and roof.
- Minimum acoustic performance of the building envelope for living areas R_w 24 dB.
  Applicable for glazing, external walls and roof.

The noise environment at noise sensitive areas for future residents has been investigated to comply with the *SEPP N-1* noise limits. During a site visit, Vipac identified control valves inside the Melbourne Water facilities as a potential noise source. An acoustic assessment has been performed based on the *SEPP N-1* noise policy to control the noise emissions from the control valves facility belonging to Melbourne Water. The noise emissions from the control valves station were measured handheld and monitored for a week period (Section 5.1). The *SEPP N-1* noise limit at night-time has been established in Section 5.2 The noise emissions from the control valves station located 50 metre to the north of the proposed residential area have been assessed against the night-time noise limits according to the *SEPP N-1.* The following is recommended to comply with the *SEPP N-1* noise limit:

- Installation of a noise barrier 2.2 metres high, as presented in Figure 5-7.

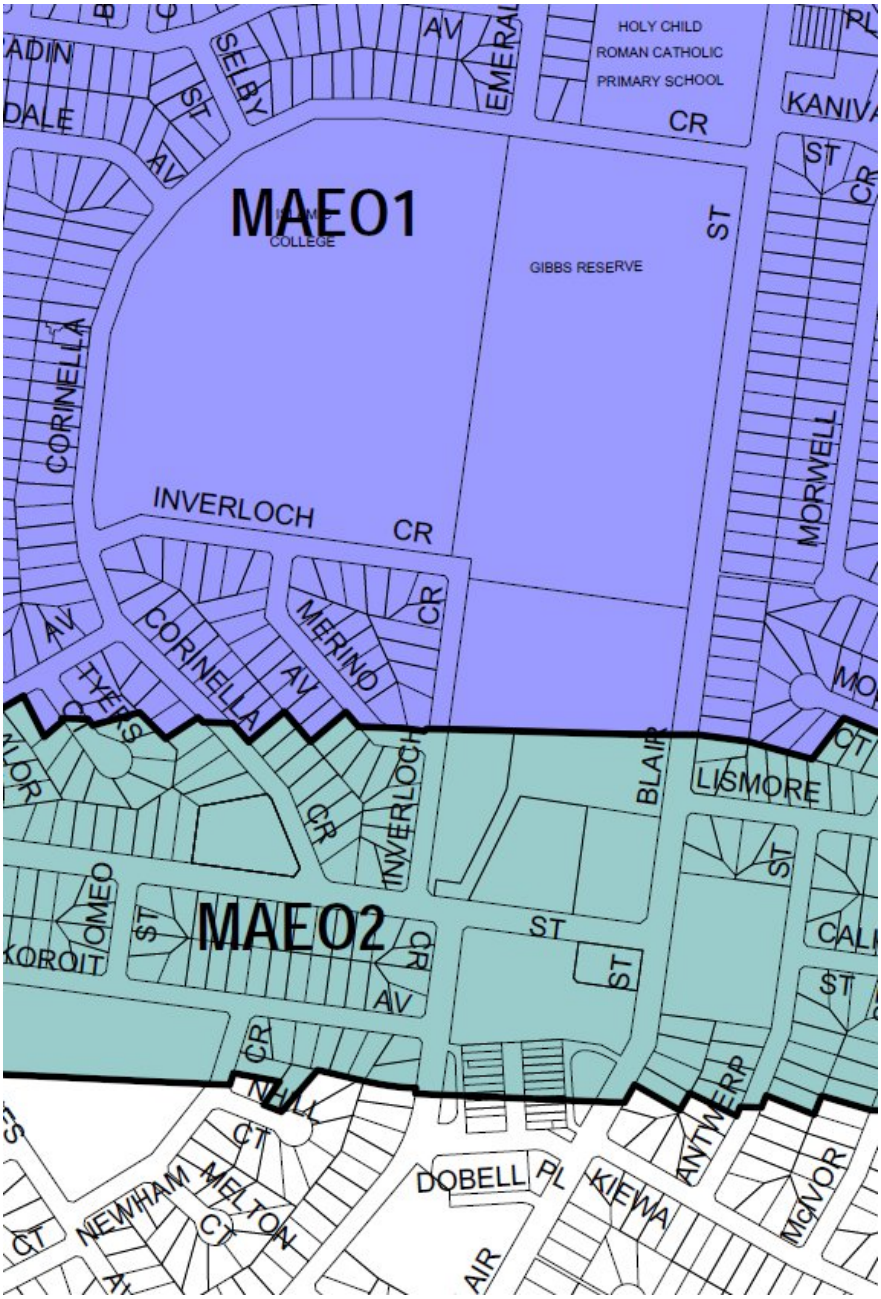
Melbourne Water has advised that they will be erecting the noise barrier as recommended to decrease the noise at the subject site.

The recommendations presented in this report satisfy the acoustic environment at residential developments located in the *subject site* in compliance with the *AS2021:2015* (indoor noise levels) and the EPA Environment Noise Policy SEPP N-1.

Appendix A **MELBOURNE WATER TANK SITE DALLAS – KNOWN BY MELBOURNE WATER AS THE "BROADWEADOWS RESERVOIR SITE"**

18 September 2015

Appendix B ENVIRONS OVERLAY



Appendix C GLOSSARY OF TERMS

Term	Definition
dB	Decibel Magnitude of the sound pressure level.
dBA	A-weighted Decibels. The 'A'-weighting adjusts the measured levels to better reflect the sensitivity of the human ear to different frequencies.
$L_{Aeq,T}$	The A-weighted continuous equivalent sound pressure level. It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.
$L_{A90,T}$	The A-weighted sound pressure level exceeded for 90% of the measurement period. L_{A90} is used in Victoria as the descriptor for background noise level.
$L_{Amax,T}$	The maximum A-weighted sound pressure level, measured at a given location over a specified time period (T).
Sound pressure level	The ratio in decibels (dB) of the sound pressure at a given receiver position to a reference pressure of 2.10^5 Pa. The sound pressure level depends, amongst other parameters, on the sound power level of the source and the distance separating the source and the receiver.
ANR	Aircraft Noise Reduction. *Represents the arithmetic difference between the aircraft noise level at a site and the indoor design level*, according to AS2021.
Rw	Weighted sound reduction index. A measure of the sound insulation performance of a building element.

Appendix D ACOUSTIC INSTRUMENTATION

Table D. Instrumentation used in this report

Type	Serial number	Calibration due
B&K 2250 Type 1 integrating sound level meter	2690200	06/12/2015
Larson Davis CA250 Calibrator	0788	04/03/2016
Duo	10296	12/12/2013

Appendix E WEATHER OBSERVATIONS

Table E-1: Weather observations 11/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
11/06/2015 0:00	135	11	3	0	11/06/2015 12:00	90	6	2	0
11/06/2015 0:30	112.5	11	3	0	11/06/2015 12:30	67.5	7	2	0
11/06/2015 1:00	90	9	3	0	11/06/2015 13:00	112.5	6	2	0
11/06/2015 1:30	112.5	13	4	0	11/06/2015 13:30	112.5	6	2	0
11/06/2015 2:00	247.5	7	2	0	11/06/2015 14:00	135	4	1	0
11/06/2015 2:30	0	0	0	0	11/06/2015 14:30	180	6	2	0
11/06/2015 3:00	292.5	9	3	0	11/06/2015 15:00	157.5	6	2	0
11/06/2015 3:30	292.5	7	2	0	11/06/2015 15:30	157.5	7	2	0
11/06/2015 4:00	0	6	2	0	11/06/2015 16:00	180	13	4	0
11/06/2015 4:30	337.5	7	2	0	11/06/2015 16:30	157.5	13	4	0
11/06/2015 5:00	0	0	0	0	11/06/2015 17:00	157.5	15	4	0
11/06/2015 5:30	0	0	0	0	11/06/2015 17:30	180	9	3	0
11/06/2015 6:00	0	7	2	0	11/06/2015 18:00	180	11	3	0
11/06/2015 6:30	0	7	2	0	11/06/2015 18:30	180	7	2	0
11/06/2015 7:00	0	9	3	0	11/06/2015 19:00	0	0	0	0
11/06/2015 7:30	0	9	3	0	11/06/2015 19:30	0	0	0	0
11/06/2015 8:00	0	9	3	0	11/06/2015 20:00	0	0	0	0
11/06/2015 8:30	0	15	4	0	11/06/2015 20:30	0	0	0	0
11/06/2015 9:00	0	13	4	0	11/06/2015 21:00	0	0	0	0
11/06/2015 9:30	0	9	3	0	11/06/2015 21:30	0	2	1	0
11/06/2015 10:00	0	6	2	0	11/06/2015 22:00	0	4	1	0
11/06/2015 10:30	0	0	0	0	11/06/2015 22:30	0	0	0	0
11/06/2015 11:00	90	9	3	0	11/06/2015 23:00	0	9	3	0
11/06/2015 11:30	112.5	9	3	0	11/06/2015 23:30	0	9	3	0

Table E-2: Weather observations 12/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
12/06/2015 0:00	0	9	3	0	12/06/2015 12:00	22.5	9	3	0
12/06/2015 0:30	337.5	9	3	0	12/06/2015 12:30	67.5	6	2	0
12/06/2015 1:00	337.5	6	2	0	12/06/2015 13:00	45	6	2	0
12/06/2015 1:30	0	11	3	0	12/06/2015 13:30	112.5	9	3	0
12/06/2015 2:00	0	11	3	0	12/06/2015 14:00	112.5	11	3	0
12/06/2015 2:30	0	11	3	0	12/06/2015 14:30	112.5	13	4	0
12/06/2015 3:00	0	11	3	0	12/06/2015 15:00	112.5	11	3	0
12/06/2015 3:30	0	13	4	0	12/06/2015 15:30	112.5	9	3	0
12/06/2015 4:00	0	15	4	0	12/06/2015 16:00	90	11	3	0
12/06/2015 4:30	0	15	4	0	12/06/2015 16:30	90	11	3	0
12/06/2015 5:00	0	13	4	0	12/06/2015 17:00	90	9	3	0
12/06/2015 5:30	0	9	3	0	12/06/2015 17:30	135	9	3	0
12/06/2015 6:00	0	11	3	0	12/06/2015 18:00	0	0	0	0
12/06/2015 6:30	0	13	4	0	12/06/2015 18:30	0	0	0	0
12/06/2015 7:00	0	9	3	0	12/06/2015 19:00	0	0	0	0
12/06/2015 7:30	22.5	7	2	0	12/06/2015 19:30	22.5	4	1	0
12/06/2015 8:00	45	11	3	0	12/06/2015 20:00	0	0	0	0
12/06/2015 8:30	45	9	3	0	12/06/2015 20:30	0	0	0	0
12/06/2015 9:00	45	7	2	0	12/06/2015 21:00	337.5	6	2	0
12/06/2015 9:30	67.5	9	3	0	12/06/2015 21:30	0	9	3	0
12/06/2015 10:00	22.5	7	2	0	12/06/2015 22:00	0	15	4	0
12/06/2015 10:30	0	7	2	0	12/06/2015 22:30	0	17	5	0
12/06/2015 11:00	0	9	3	0	12/06/2015 23:00	0	19	5	0
12/06/2015 11:30	45	7	2	0	12/06/2015 23:30	0	24	7	0

Table E-3: Weather observations 13/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
13/06/2015 0:00	0	19	5	0	13/06/2015 12:00	0	30	8	0
13/06/2015 0:30	0	24	7	0	13/06/2015 12:30	0	26	7	0
13/06/2015 1:00	0	26	7	0	13/06/2015 13:00	0	26	7	0
13/06/2015 1:30	0	26	7	0	13/06/2015 13:30	0	26	7	0
13/06/2015 2:00	0	28	8	0	13/06/2015 14:00	0	20	6	0
13/06/2015 2:30	0	28	8	0	13/06/2015 14:30	0	20	6	0
13/06/2015 3:00	0	26	7	0	13/06/2015 15:00	22.5	22	6	0
13/06/2015 3:30	0	28	8	0	13/06/2015 15:30	0	19	5	0
13/06/2015 4:00	0	28	8	0	13/06/2015 16:00	22.5	19	5	0
13/06/2015 4:30	0	26	7	0	13/06/2015 16:30	0	11	3	0
13/06/2015 5:00	0	28	8	0	13/06/2015 17:00	22.5	11	3	0
13/06/2015 5:30	0	28	8	0	13/06/2015 17:30	22.5	13	4	0
13/06/2015 6:00	0	28	8	0	13/06/2015 18:00	0	13	4	0
13/06/2015 6:30	0	28	8	0	13/06/2015 18:30	0	17	5	0
13/06/2015 7:00	0	28	8	0	13/06/2015 19:00	0	15	4	0
13/06/2015 7:30	0	28	8	0	13/06/2015 19:30	0	17	5	0
13/06/2015 8:00	0	28	8	0	13/06/2015 20:00	0	20	6	0
13/06/2015 8:30	0	24	7	0	13/06/2015 20:30	0	19	5	0
13/06/2015 9:00	0	28	8	0	13/06/2015 21:00	0	17	5	0
13/06/2015 9:30	0	28	8	0	13/06/2015 21:30	0	20	6	0
13/06/2015 10:00	0	28	8	0	13/06/2015 22:00	0	20	6	0
13/06/2015 10:30	0	26	7	0	13/06/2015 22:30	0	20	6	0
13/06/2015 11:00	0	24	7	0	13/06/2015 23:00	0	17	5	0
13/06/2015 11:30	0	26	7	0	13/06/2015 23:30	0	17	5	0

Table E-4: Weather observations 14/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
14/06/2015 0:00	0	17	5	0	14/06/2015 12:00	45	11	3	0
14/06/2015 0:30	0	19	5	0	14/06/2015 12:30	45	11	3	0
14/06/2015 1:00	0	19	5	0	14/06/2015 13:00	22.5	9	3	0
14/06/2015 1:30	0	19	5	0	14/06/2015 13:30	45	7	2	0
14/06/2015 2:00	0	17	5	0	14/06/2015 14:00	90	11	3	0
14/06/2015 2:30	0	17	5	0	14/06/2015 14:30	90	13	4	0
14/06/2015 3:00	337.5	15	4	0	14/06/2015 15:00	90	13	4	0
14/06/2015 3:30	0	17	5	0	14/06/2015 15:30	90	13	4	0
14/06/2015 4:00	0	19	5	0	14/06/2015 16:00	90	13	4	0
14/06/2015 4:30	0	20	6	0	14/06/2015 16:30	90	15	4	0
14/06/2015 5:00	0	20	6	0	14/06/2015 17:00	90	11	3	0
14/06/2015 5:30	0	20	6	0	14/06/2015 17:30	90	9	3	0
14/06/2015 6:00	0	20	6	0	14/06/2015 18:00	0	0	0	0
14/06/2015 6:30	0	19	5	0	14/06/2015 18:30	90	7	2	0
14/06/2015 7:00	0	20	6	0	14/06/2015 19:00	112.5	7	2	0
14/06/2015 7:30	0	22	6	0	14/06/2015 19:30	67.5	7	2	0
14/06/2015 8:00	0	20	6	0	14/06/2015 20:00	22.5	7	2	0
14/06/2015 8:30	0	22	6	0	14/06/2015 20:30	22.5	9	3	0
14/06/2015 9:00	0	19	5	0	14/06/2015 21:00	337.5	7	2	0
14/06/2015 9:30	0	19	5	0	14/06/2015 21:30	0	0	0	0
14/06/2015 10:00	0	17	5	0	14/06/2015 22:00	0	0	0	0
14/06/2015 10:30	0	15	4	0	14/06/2015 22:30	0	0	0	0
14/06/2015 11:00	22.5	9	3	0	14/06/2015 23:00	0	7	2	0
14/06/2015 11:30	45	13	4	0	14/06/2015 23:30	0	9	3	0

Table E-5: Weather observations 15/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
15/06/2015 0:00	337.5	7	2	0	15/06/2015 12:00	0	20	6	0
15/06/2015 0:30	0	11	3	0	15/06/2015 12:30	22.5	15	4	0
15/06/2015 1:00	0	13	4	0	15/06/2015 13:00	22.5	11	3	0
15/06/2015 1:30	0	13	4	0	15/06/2015 13:30	45	9	3	0
15/06/2015 2:00	337.5	11	3	0	15/06/2015 14:00	22.5	11	3	0.2
15/06/2015 2:30	0	13	4	0	15/06/2015 14:30	22.5	17	5	0
15/06/2015 3:00	0	11	3	0	15/06/2015 15:00	22.5	13	4	0
15/06/2015 3:30	337.5	4	1	0	15/06/2015 15:30	112.5	9	3	0
15/06/2015 4:00	0	11	3	0	15/06/2015 16:00	157.5	7	2	0
15/06/2015 4:30	22.5	9	3	0	15/06/2015 16:30	90	11	3	0
15/06/2015 5:00	292.5	6	2	0	15/06/2015 17:00	90	13	4	0
15/06/2015 5:30	0	0	0	0	15/06/2015 17:30	90	11	3	0
15/06/2015 6:00	0	0	0	0	15/06/2015 18:00	90	13	4	0
15/06/2015 6:30	0	0	0	0	15/06/2015 18:30	67.5	9	3	0
15/06/2015 7:00	0	9	3	0	15/06/2015 19:00	0	7	2	0
15/06/2015 7:30	0	9	3	0	15/06/2015 19:30	22.5	7	2	0.2
15/06/2015 8:00	0	9	3	0	15/06/2015 20:00	45	4	1	0.6
15/06/2015 8:30	0	9	3	0	15/06/2015 20:30	0	0	0	0
15/06/2015 9:00	0	0	0	0	15/06/2015 21:00	0	0	0	0
15/06/2015 9:30	337.5	11	3	0	15/06/2015 21:30	315	7	2	0
15/06/2015 10:00	0	11	3	0	15/06/2015 22:00	0	7	2	0.2
15/06/2015 10:30	0	17	5	0	15/06/2015 22:30	0	7	2	0.4
15/06/2015 11:00	0	13	4	0	15/06/2015 23:00	0	0	0	0.4
15/06/2015 11:30	0	17	5	0	15/06/2015 23:30	0	0	0	0.2

Table E-6: Weather observations 16/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
16/06/2015 0:00	0	0	0	0.2	16/06/2015 12:00	337.5	9	3	0
16/06/2015 0:30	0	0	0	0.4	16/06/2015 12:30	0	17	5	0
16/06/2015 1:00	45	7	2	0.4	16/06/2015 13:00	0	17	5	0
16/06/2015 1:30	90	9	3	0.4	16/06/2015 13:30	0	22	6	0
16/06/2015 2:00	90	9	3	0.6	16/06/2015 14:00	337.5	15	4	0
16/06/2015 2:30	90	9	3	0.4	16/06/2015 14:30	315	15	4	0
16/06/2015 3:00	90	13	4	0.2	16/06/2015 15:00	315	13	4	0
16/06/2015 3:30	90	13	4	0.4	16/06/2015 15:30	337.5	13	4	0
16/06/2015 4:00	90	11	3	0.2	16/06/2015 16:00	337.5	11	3	0
16/06/2015 4:30	0	0	0	0.2	16/06/2015 16:30	0	9	3	0
16/06/2015 5:00	67.5	11	3	0.8	16/06/2015 17:00	0	11	3	0
16/06/2015 5:30	0	0	0	0	16/06/2015 17:30	0	13	4	0
16/06/2015 6:00	0	0	0	0	16/06/2015 18:00	0	11	3	0
16/06/2015 6:30	0	0	0	0.2	16/06/2015 18:30	0	11	3	0
16/06/2015 7:00	0	0	0	0	16/06/2015 19:00	0	13	4	0
16/06/2015 7:30	0	0	0	0.2	16/06/2015 19:30	0	13	4	0
16/06/2015 8:00	90	7	2	0	16/06/2015 20:00	0	17	5	0
16/06/2015 8:30	90	9	3	0	16/06/2015 20:30	0	15	4	0
16/06/2015 9:00	90	9	3	0	16/06/2015 21:00	0	20	6	0
16/06/2015 9:30	45	9	3	0	16/06/2015 21:30	292.5	9	3	0
16/06/2015 10:00	0	4	1	0	16/06/2015 22:00	315	11	3	0
16/06/2015 10:30	0	7	2	0	16/06/2015 22:30	337.5	9	3	0
16/06/2015 11:00	292.5	6	2	0	16/06/2015 23:00	337.5	7	2	0
16/06/2015 11:30	270	7	2	0	16/06/2015 23:30	337.5	7	2	0

Table E-7: Weather observations 17/06/2015

Day/time	Wind			Rain (mm)	Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s			Direction	km/hr	m/s	
17/06/2015 0:00	292.5	7	2	0	17/06/2015 12:00	225	13	4	0
17/06/2015 0:30	270	13	4	0	17/06/2015 12:30	180	13	4	0
17/06/2015 1:00	270	6	2	0	17/06/2015 13:00	202.5	13	4	0
17/06/2015 1:30	0	0	0	0	17/06/2015 13:30	180	17	5	0
17/06/2015 2:00	0	0	0	0	17/06/2015 14:00	180	15	4	0
17/06/2015 2:30	0	0	0	0	17/06/2015 14:30	157.5	17	5	0
17/06/2015 3:00	0	0	0	0	17/06/2015 15:00	180	13	4	0
17/06/2015 3:30	0	0	0	0	17/06/2015 15:30	180	13	4	0
17/06/2015 4:00	0	0	0	0	17/06/2015 16:00	180	19	5	0
17/06/2015 4:30	0	4	1	0	17/06/2015 16:30	180	15	4	0
17/06/2015 5:00	0	0	0	0	17/06/2015 17:00	180	13	4	0
17/06/2015 5:30	0	0	0	0	17/06/2015 17:30	180	13	4	0
17/06/2015 6:00	0	0	0	0	17/06/2015 18:00	180	13	4	0
17/06/2015 6:30	0	9	3	0	17/06/2015 18:30	180	15	4	0
17/06/2015 7:00	0	0	0	0	17/06/2015 19:00	180	17	5	0
17/06/2015 7:30	0	0	0	0	17/06/2015 19:30	180	13	4	0
17/06/2015 8:00	0	0	0	0	17/06/2015 20:00	180	17	5	0
17/06/2015 8:30	0	0	0	0	17/06/2015 20:30	180	15	4	0
17/06/2015 9:00	0	0	0	0	17/06/2015 21:00	180	15	4	0
17/06/2015 9:30	0	0	0	0	17/06/2015 21:30	180	15	4	0
17/06/2015 10:00	0	0	0	0	17/06/2015 22:00	180	17	5	0
17/06/2015 10:30	225	4	1	0	17/06/2015 22:30	180	15	4	0
17/06/2015 11:00	225	15	4	0	17/06/2015 23:00	180	13	4	0
17/06/2015 11:30	202.5	13	4	0	17/06/2015 23:30	157.5	15	4	0

Table E-8: Weather observations 18/06/2015

Day/time	Wind			Rain (mm)
	Direction	km/hr	m/s	
18/06/2015 0:00	135	24	7	0
18/06/2015 0:30	135	24	7	0
18/06/2015 1:00	135	26	7	0
18/06/2015 1:30	157.5	20	6	0
18/06/2015 2:00	157.5	19	5	0
18/06/2015 2:30	157.5	20	6	0
18/06/2015 3:00	157.5	20	6	0
18/06/2015 3:30	180	17	5	0
18/06/2015 4:00	180	19	5	0
18/06/2015 4:30	180	15	4	0
18/06/2015 5:00	180	15	4	0
18/06/2015 5:30	180	13	4	0.4
18/06/2015 6:00	180	13	4	0.6
18/06/2015 6:30	180	15	4	1.2
18/06/2015 7:00	180	15	4	1.2
18/06/2015 7:30	180	13	4	1.2
18/06/2015 8:00	157.5	19	5	1.2