

From: Brendan Kelly
To: [James Fletcher](mailto:James.Fletcher@dwg.wa.gov.au)
Subject: Wildwood
Date: Tuesday, 27 February 2018 1:28:53 PM

From: Krish Seewraj
Sent: Tuesday, 13 February 2018 3:55 PM
To: Joanna Wilson <Jo.Wilson@busselton.wa.gov.au>
Cc: Brendan Kelly <brendan.kelly@dwg.wa.gov.au>; Owen Bennett <owen.bennett@dwg.wa.gov.au>; Teresa Gepp <teresa.gepp@dwg.wa.gov.au>
Subject: HPRM: Wakeboard Wake & Aqua Park – 342 Wildwood Road, Anniebrook

13th February 2018

Our Reference: PA18162, DWERT308~17

Your Reference: DA17/1002

To: City of Busselton

From: Department of Water and Environmental Regulation

Attention: Jo Wilson

RE: WAKEBOARD WAKE & AQUA PARK – 342 WILDWOOD ROAD, ANNIEBROOK

Dear Jo,

Thank you for referring this development application to the Department of Water and Environmental Regulation (DWER) for comment and further to continuing communications with the City of Busselton (CoB).

Firstly, the process of amalgamating functions of the former Department of Water (DoW), Department of Environment Regulation (DER) and Office of the Environmental Protection Authority (OEPA) into the combined DWER is occurring.

As such, the advice in this correspondence pertains only to water resource matters previously dealt with by DoW, in context of land use planning matters.

You will receive additional statutory and/or technical advice from other areas within DWER, specifically related to Water Licensing, Noise Regulations and Acid Sulfate Soils management.

BACKGROUND

A secure and sustainable water supply, together with satisfactory demonstration that potential impacts to water resources during construction and operational stages can be addressed and managed, are factors critical to the success of this project.

The proposed development, which includes the construction of three recreational lakes requires the excavation / construction of the lakes and a water supply to firstly fill the lakes and then maintain them.

Of particular importance is that the project site is located within, and proposes to source its water from, the Busselton-Capel Groundwater Area, proclaimed under the '*Rights in Water and Irrigation Act, 1914*'.

In terms of hydrogeology, the project site exists within the Vasse Shelf of the Southern Perth Basin and there are three recognised aquifer systems beneath the property:

- The Superficial aquifer (watertable), which is thin and possibly extends to a depth of 5-8m below ground level.
- The Leederville aquifer is a confined aquifer and underlies the superficial and may extend to a depth of 130m below the natural surface.
- The Sue Coal Measures formation occurs below the Leederville, may have a thickness of more than 700 metres and consists of sandstone, shale and some coal seams.

It is noteworthy that the Superficial and Leederville aquifer in the Dunsborough-Vasse subarea are fully allocated and it is also understood that the proponent has begun negotiations for groundwater trading.

Water is available for allocation in the Sue Coal Measures aquifer, however there are very few bores in these measures, data is limited and the ability to abstract water from this aquifer is variable.

The proponent has lodged applications for a licence to take groundwater from the Leederville and for exploratory purposes in the Sue Coal Measures aquifers.

DWER has completed a preliminary assessment of the Leederville application and the proponent has been notified of DWER's proposed decision to refuse the application, as the resource is fully allocated.

DWER has granted a licence to authorise exploratory drilling and groundwater investigations in the Sue Coal Measures, which is conditioned by the requirement to submit a Hydrogeological Assessment report following the completion of the drilling and aquifer testing program.

The outcome of the hydrogeological assessment will be used to evaluate the request for approval to extract groundwater from this resource.

A licence for dewatering purposes will also be required for any excavation to construct the lakes and the proponent has been instructed to undertake a hydrogeological assessment to evaluate the impact of this activity.

In considering its overall assessment of the groundwater related issues, DWER will seek a high level of professional hydrogeological review to assist the

construction management and water supply planning for the project, as the approval process progresses.

The matter of Water Licensing is being managed through DWER's Busselton Office.

PLANNING

With regards to land use planning advice, DWER acknowledges the preparation of relevant documentation, specifically: *'Wildwood Wake and Aqua Park Water Management Plan (v.3), Urbaqua, January 2018'* (Urbaqua).

There are two key aspects of the development application from a land use planning perspective – i). Construction, and ii). Operational management.

- Construction

In context of the overall management and long-term protection of local groundwater, the primary water risk factor associated with the application is firstly the potential to intercept groundwater during construction activities.

Excavation is likely to expose the superficial groundwater resource to possible degradation by altering the hydrological regime and exposing it to pollution, whilst also potentially requiring dewatering management.

Urbaqua (s.8, p.20) states that a 'Construction Management Plan' (CMP) will need to be prepared to reduce the risk of damage to sensitive environments during earthworks and construction activities.

Key issues for consideration include the management of dewatering (including disposal) during excavation works, stormwater management of the construction site and the management of Acid Sulfate Soils (ASS).

The CMP should include specific sub-plans addressing the key issues in detail, i.e. a 'Dewatering Management Plan', 'Stormwater Management Plan', 'Erosion Management Plan' and 'ASS Management Plan'.

DWER recommends that any development approval be conditional upon the preparation of the CMP, prior to the commencement of any site works, to the satisfaction of the City of Busselton and DWER.

- Operational Management

DWER recommends the development of a 'Site Management Plan' (SMP) for ongoing operations of the facility, focussed on, but not limited to:

- Stormwater management in accordance with the *'Decision process for stormwater management in Western Australia, DWER, November 2017'*.
- Relevant issues as detailed in the *'Interim Drainage and Water Management Position Statement: Constructed Lakes, July 2007'*.

- Potable water supply for the facilities, i.e. the chalets, club house.
- Wastewater management.

In relation to wastewater management, the site is located on the boundary of a 'Sewage Sensitive Area', as defined in the (Draft) 'Government Sewerage Policy, November 2016', and it is noted and supported that the proponent proposes to use an aerobic treatment unit for wastewater management.

There are also ongoing landowner obligations to ensure that aerobic treatment units are regularly maintained in accordance with relevant health regulations.

RECOMMENDATIONS

In the context of water resource management DWER does not object to this proposal, however it is logical that this proposal cannot succeed without firstly securing a suitable supply of water both to fill and then maintain the lakes.

The following conditions are recommended to be applied to this development application:

- Prior to any ground disturbing activities commencing a suitable supply of water to both fill and then maintain the lakes must be secured.
- Prior to any ground disturbing activities commencing a Construction Management Plan must be developed to the satisfaction of the City of Busselton. This must include sub-plans addressing the following water considerations in more detail: dewatering, stormwater management, erosion and ASS management.
- Prior to any ground disturbing activities commencing a Site Management Plan must be developed to the satisfaction of the City of Busselton. This must include the following water considerations: stormwater management, potable water supply, wastewater management and in relation to the constructed lakes issues as detailed in the '*Interim Drainage and Water Management Position Statement: Constructed Lakes, July 2007*'.

DWER understands that the advance of the project, towards the point of Development Approval, under the '*Planning and Development Act 2005*', will require ongoing consultation with DWER.

If you have any questions please contact:

- General land use planning inquiries: Brendan Kelly 97264194 or brendan.kelly@water.wa.gov.au
- Water Licensing inquiries: Mr Owen Bennett 97810188 or owen.bennett@dwer.wa.gov.au
- Noise Regulations and Acid Sulfate Soils management inquiries: Teresa Gepp at teresa.gepp@dwer.wa.gov.au

Yours faithfully,

Krish Seewraj

Land Use Planning Program Manager
South West Region

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As per

Brendan Kelly

Senior Natural Resource Management Officer

Department of Water & Environmental Regulation, South West Region

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Disclaimer: This e-mail is confidential to the addressee and is the view of the writer, not necessarily that of the Department of Water and Environmental Regulation, which accepts no responsibility for the contents. If you are not the addressee, please notify the Department by return e-mail and delete the message from your system; you must not disclose or use the information contained in this email in any way. No warranty is made that this material is free from computer viruses.



Your ref: DA17/1002
Our ref: CEO38/18
Enquiries: Teresa Gepp
Phone: 6364 6989
Email: teresa.gepp@dwer.wa.gov.au

Mr Mike Archer
Chief Executive Officer
City of Busselton
Via email: city@busselton.wa.gov.au

Attention: Joanna Wilson

Dear Mr Archer

DEVELOPMENT APPLICATION – LOT 40 WILDWOOD ROAD ANNIEBROOK

I refer to your letter dated 4 January 2018 requesting comment from the Department of Water and Environmental Regulation (DWER) on the above development application for a Wakeboard and Aquapark at the above location.

On 1 July 2017 the Department of Environment Regulation (DER) merged with the Department of Water and the Office of the Environmental Protection Authority to create the Department of Water and Environmental Regulation (DWER). Please note that the advice in this correspondence relates only to matters previously dealt with by the DER. You may receive additional advice from other areas within DWER.

The subject land is located in a low-lying area where the groundwater table is within two metres of the surface. Considering site-specific information, the risk of acid sulfate soil being present at this location is significant. Given the nature and extent of works proposed, if the application is approved, DWER recommends the following acid sulfate soil condition be imposed:

Condition [x]

An acid sulfate soils self-assessment form and, if required as a result of the self-assessment, an acid sulfate soils report and an acid sulfate soils management plan shall be submitted to and approved by the Department of Water and Environmental Regulation before any soil excavations or dewatering are commenced.

Where an acid sulfate soils management plan is required to be submitted, all works shall be carried out in accordance with the approved management plan. (Department of Water and Environmental Regulation).

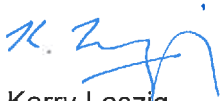
Advice note

Condition [x] makes reference to an “acid sulfate soils self-assessment form”. This form and guidelines referred therein can be obtained from the Department of Water and Environmental Regulation’s website www.dwer.wa.gov.au.

Technical expert advice has also been prepared by DWER experts regarding the acoustic assessment provided with the development application. The interpretation of this technical expert advice, and decisions about how the advice it contains should be considered in undertaking regulatory functions, are matters for the recipient organisation to determine.

Should you wish to discuss any aspects of this correspondence please contact Planning and Advice Coordinator, Teresa Gepp, on 6364 6989.

Yours sincerely



Kerry Laszig
DIRECTOR
SCIENCE AND PLANNING (ENVIRONMENT)

14 February 2018

Att.



Government of **Western Australia**
Department of **Water and Environmental Regulation**

Technical Expert Advice

Review of Environmental Noise Assessment Report –
Wildwood Wake and Aqua Park, Lot 40, 342 Wildwood
Road, Anniebrook – prepared for the City of Busselton

Department of Water and Environmental Regulation

Version: Final

February 2018

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Acknowledgements

For more information about this report, contact
Environmental Noise, Department of Water and Environmental Regulation

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1. Expert's details

Personal details: Author

Name	Christine Ng
Employer	Department of Water and Environmental Regulation
Position title	Environmental Noise Officer
Field of expertise	Environmental Noise

Qualifications and experience

The qualifications and experience and technical capability relevant to the provision of this advice are as follows:

Qualification

Qualification	Year Obtained	Additional Comments
Graduate Diploma	2015	Occupational Safety and Health
Bachelor of Science	2006	Environmental Health

Professional experience

Employer	Position	Tenure
Department of Water and Environmental Regulation	Environmental Noise Officer	2017 - present
Department of Environmental Regulation	Noise Regulation Officer	2015 - 2017
Town of Cambridge	Acting Coordinator Compliance	2015
Town of Cambridge	Environmental Health Officer	2014 - 2015
City of Vincent	Environmental Health Officer	2011 - 2014
Town of Vincent	Acting Senior Environmental Health Officer	2011
Town of Vincent	Environmental Health Officer	2007 - 2011

2. Purpose of this report, limitations and disclaimer

This is technical expert advice prepared by experts employed within the Department of Water and Environmental Regulation for the purposes set out in the “Advice summary details” and should not be used for any other purpose.

The State of Western Australia and Department of Water and Environmental Regulation and their servants and agents expressly disclaim liability, in negligence or otherwise, for any act or omission occurring in reliance on the information contained in this document, or for any incident or consequential loss or damage of such act or omission.

In preparing this report the technical experts have considered the request made, the information and materials provided in support of the request, literature relevant to the field, and other evidence the expert is aware of and can access through their expert capacity.

The report is based on the information provided to the experts, which is summarised in the “Advice summary details”. Relevant materials that were not provided could materially change the advice. The requesting organisation needs to use appropriate judgment about the information that is relevant to the request, and the possible implications of any information that was not provided.

Where requests made require input from more than one area of technical expertise, the advice will be provided separately. Each advice will consider technical issues relevant to the specific field of expertise. No effort is made to integrate the issues raised by different technical fields. It is the responsibility of the regulatory organisation requesting the advice to determine how to weight the various matters they need to consider, and the relevance of the advice on any particular matter to making their decisions.

The interpretation of this technical expert report, and decisions about how the advice it contains should be considered in undertaking regulatory functions are matters for the recipient organisation to determine. The Department of Water and Environmental Regulation accepts no responsibility for the use or misuse of the advice, or the consequences of decisions made in reference to it.

The advice provided is limited to technical expert advice, and author(s) **have not** considered any aspect of regulatory matters that could come within the scope of legislation administered by the Department of Water and Environmental Regulation, either currently or at some time in the future. As such, the report does not purport to represent the Department of Water and Environmental Regulation’s views on how such matters may be considered by the Department of Water and Environmental Regulation in its regulatory capacity. If advice is required on the Department of Water and Environmental Regulation’s position on how it would consider matters relevant to its regulatory functions, a separate request for advice must be made.

3. Advice summary details

TO:	City of Busselton
PREPARED BY:	Christine Ng
REVIEWED BY:	Peter Popoff-Asotoff
SUBJECT	Review of Lloyd George Acoustics, Wildwood Wake and Aqua Park Environmental Noise Assessment Report – Prepared for City of Busselton

* The details of these experts is summarised under Expert’s details.

This advice was prepared for the City of Busselton in response to the request dated 4 January 2018. Advice is provided according to the scope below.

Scope of advice
The City of Busselton has requested comments on the Environmental Noise Assessment report, submitted as part of a development application for a Wakeboard and Aqua Park, specifically in relation to control of noise from private or external ski boats and general noise emissions from the premises.

In support of this request, the City of Busselton made the following materials and documents available. These materials form the basis of this technical expert advice.

Material / document name	Type of resource / description	Date supplied (if different from original request)
Letter and supporting documents from Cameron and Tamara Akers to the City of Busselton (Reference No. DA17/1002)	Proposal description prepared by applicant (26 December 2017)	
Environmental Noise Assessment (Reference No. 17104184-02)	Prepared by Lloyd George Acoustics (8 January 2018)	
Traffic Statement Version V1a (Reference No. 948)	Prepared by Riley Consulting (15 December 2017)	

In preparing this advice I have considered the information provided with the request as well as:

- The *Environmental Protection (Noise) Regulations 1997* (Noise Regulations);
- Reviewed Google Maps imagery of the development sites and surrounds;
- Reviewed the City of Busselton Intramaps imagery of the development sites and surrounds.

The Environmental Noise Assessment prepared by Lloyd George Acoustics (LGA) in January 2018 (the Report) has been reviewed and the advice is as follows –

3.1 Sound levels

While the sound power levels (SWL) for the noise sources associated with the proposed development listed in Table 3-2 of the Report seem reasonable, the list of noise sources is incomplete when compared to the information provided in the proposal description prepared by the applicant. Additional noise sources that may be relevant to the proposed development include, but are not limited to, the following:

- Air conditioner unit for each chalet (total 6 chalets);
- Electric motors, pumps, and/or aerator for effluent disposal;
- Water pump for water slides in water playground (Aqua Park);
- Coolroom refrigeration for the restaurant/clubhouse;
- Tools in small workshop and ground maintenance equipment in boat storage.

Although these potential noise sources are likely to have low SWLs the cumulative impact especially during night time periods may need to be addressed.

The proposed development is forecast to generate approximately 291 vehicle movements to the surrounding road network per day according to the Traffic Statement Report. The average number of vehicle movements per hour is estimated at 24 vehicles, following the proposed 12 operating hours (see Figure 3.2 below). Given that the ambient noise level in this rural area is likely to be low, the City may wish to consider whether the impact of noise due to the increase in vehicle movements should be assessed.

3.2 Noise impact assessment

While the Report determines the major noise emissions from the facility it does not profess, and makes no attempt, to assess the noise *impact* due to the operation of the Wakeboard and Aqua Park. Assessment of noise impact requires the assessment of:

- a) All the noise sources on site (the worst case scenario); and
- b) An evaluation of the change that the development will have on the existing acoustic environment.

The worst case scenario is generally assumed when all components of the operation (equipment and plant) are operational at once. As no SWL data has been provided for the noise sources identified above, it is assumed not to have been modelled. As the facility offers accommodation it is likely that all six chalets would have an individual air conditioner unit installed which may potentially be operating all night. As it appears that these sources have not been included in the modelling, the assessment underestimates the levels received at the nearby noise sensitive receivers. A true estimation of the impact can therefore not be made.

As the ambient noise level in this rural area is likely to be low the impact of the proposal would also depend on the emergence of the noise from the new facility above the existing background and its level of dominance. It is highly likely that the dominant noise source will be from the proposed development. Background levels could be measured to assist in determining the noise impact as a result of the proposed development.

3.3 Predicted noise levels

The predicted noise levels presented in Figure 5-4 of the Report result from the model that assumes that two ski boats are operating with wind from a westerly direction. The Report has not demonstrated if two ski boats can practically comply with the assigned levels with wind from all directions. Although the prevalent wind may be from the south to a westerly direction during a considerable portion of the daytime, easterly winds are also likely to be common.

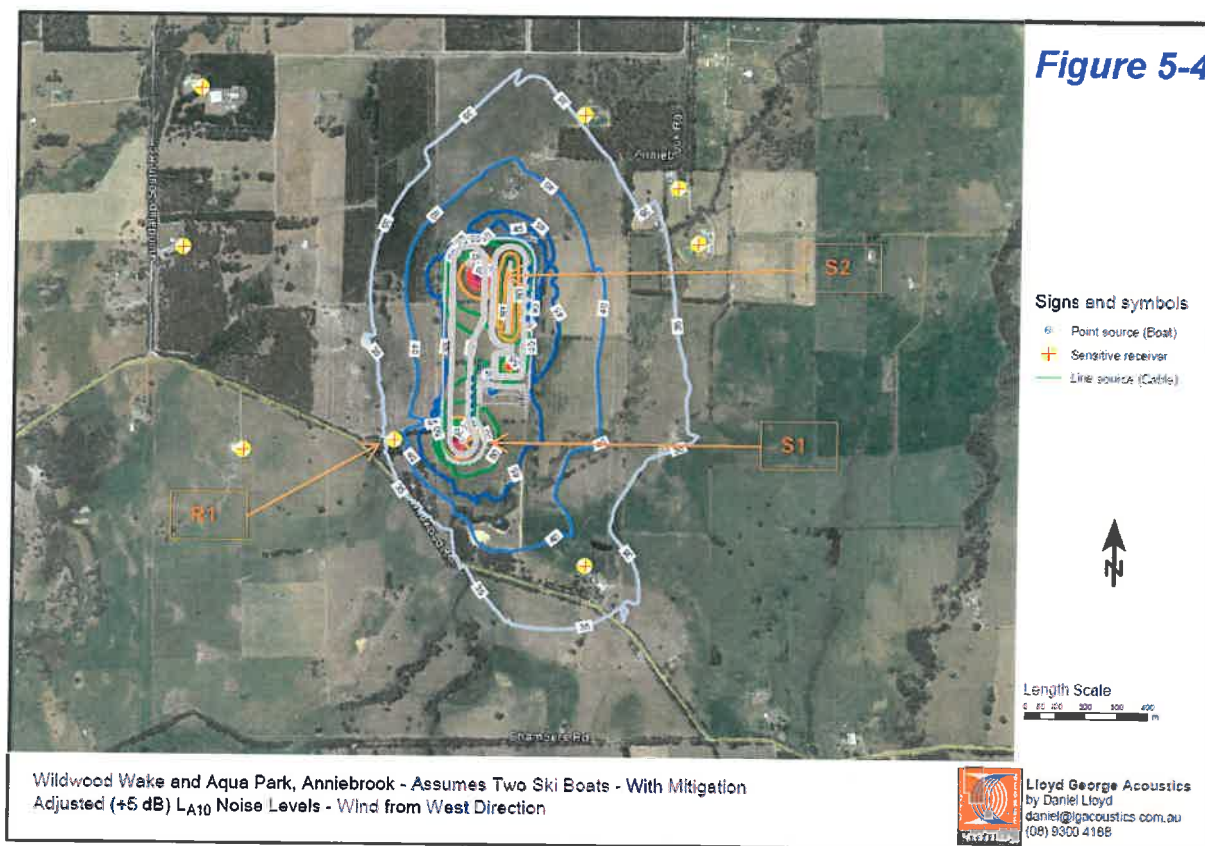
Generally, the most significant determinant of the received noise level is the distance from the source to the receiver. Consequently, the noise level received by the closest noise sensitive receiver typically determines whether compliance is achieved.

To estimate if compliance is possible under less favorable wind conditions, a calculation can be made assuming the closest noise receiver (labelled R1 in Figure 3.1 below), the location of ski boats (labelled S1 and S2 in Figure 3.1) and using a SWL LA_{10} at source for a ski boat on the straight as 103 dB(A) as detailed in Table 3-2 of the Report for both boats. The proposed wall/barrier blocks the line of sight for S1 but not for S2, hence a barrier reduction is applicable for S1 only. Table 3.1 below presents the estimated levels received at R1 for ski boats S1 and S2 based on geometric spreading only. While a moderate reduction for the presence of a barrier is included, predicted levels do not include atmospheric or ground absorption or positive or negative enhancement due to meteorological conditions.

Table 3.1 Calculated noise levels for two ski boats, with proposed mitigation adjusted, at the closest noise receiver (R1). The LA10 sound power levels at source is assumed to be 103 dB(A) for both boats.

Noise source – ski boat	Distance (approx.) between ski boat and R1 [m]	Predicted level (approx.) [dB(A)]	Predicted level -5 dB reduction for wall/barrier [dB(A)]	Predicted level +5 dB adjustment for tonality [dB(A)]
S1	216	48	43	48
S2	608	39	39	44

Figure 3.1 Predicted noise levels assuming two ski boats with mitigation adjusted (+5 dB) LA10 noise levels when winds have westerly component (from the LGA Report).



The logarithmic summation of the two ski boat levels as received at receiver R1 as presented in Table 3.1 is approximately 49 dB(A). While the practicability is unknown, a more effective barrier might reduce this level to approximately 47 dB(A).

Table 3.2 below indicates that the calculated noise level exceeds the assigned noise levels at R1 for all time periods.

Table 3.2 below presents the assessment of two ski boats operating at once against the LA10 assigned noise levels.

Time of day	Calculated level for two ski boats operating at once [dB(A)]	LA10 assigned level [dB]	Compliance assessment
0700 to 1900 hours Monday to Saturday	49	45	Exceeds
0900 to 1900 hours Sunday and public holidays	49	40	Exceeds
2200 hours on any day to 0700 hours Sunday and Public holidays	49	35	Exceeds

Figure 3.2 below shows that the proposed operating hours for the boat lake are typically between 0700 and 1900 public holidays (except Sunday). This is provided in the proposal description submitted to the City by the applicant.

Figure 3.2 Proposed operating hours provided by the applicant

3.11 PROPOSED OPERATING HOURS
 The proposed operating hours for the facility are as follows and are seasonally adjusted.

		Sun	Mon	Tue	Wed	Thu	Fri	Sat
Boat Lake Open Time	Holiday	9:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM
	High	9:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM
	Low	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM
	Public Hol	9:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM
Boat Lake Close Time	Holiday	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM
	High	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM
	Low	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM
	Public Hol	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM	7:00 PM
Cable Lake Open Time	Holiday	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM
	High	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM
	Low	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM
	Public Hol	-	-	-	-	-	-	-
Cable Lake Close Time	Holiday	6:00 PM	6:00 PM	6:00 PM	6:00 PM	8:00 PM	8:00 PM	8:00 PM
	High	6:00 PM	6:00 PM	6:00 PM	6:00 PM	8:00 PM	8:00 PM	8:00 PM
	Low	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM
	Public Hol	-	-	-	-	-	-	-

Typical operating hours are 10am-6pm for the cable lake however these hours may be extended to 8pm in the summer months depending on demand. Typical operating hours are 7am-7pm in summer for the boat lake however these hours will be reduced in the low season due to water temperature and the length of the day. Opening and closing times may be adjusted at short notice dependent on weather.

Table 3.3 below assesses the predicted noise levels for public holidays at the closest noise receiver, R1, for the following scenarios presented as noise level contour plots in Figures 5-2 and 5-3 of the Report –

- Scenario 1: Assumes one ski boat operating at the south end (with a positive wind direction) as shown in Figure 5-2; and
- Scenario 2: Assumes one ski boat operating at the north end (with a positive wind direction) as shown in Figure 5-3.

Table 3.3 Assessment against the relevant public holiday LA₁₀ assigned levels for Scenarios 1 and 2 as described above.

Scenarios	Predicted level at R1	LA ₁₀ assigned level for the proposed operating hours for public holidays		Compliance assessment	
		0700 to 0900 hours	0900 to 1900 hours	0700 to 0900 hours	0900 to 1900 hours
Scenario 1	40	35	40	Exceeds	Marginal
Scenario 2	35>R1>40	35	40	Exceeds	Complies

In this instance, compliance with the Noise Regulations is likely to be achieved for Scenarios 1 and 2, if the open time for the boat lake is amended from 7am to 9am for all public holidays.

3.4 General comment

Note that while the Report has only modelled for one type of boat, other boats will be able to use the facility. Compliance with the Noise Regulations is not definitive as the noise levels of other boats that may use the facility are unknown.

In addition to the information in the “Purpose of this report, limitations and disclaimer” section, important limitations relevant to this specific advice are detailed under “Specific limitations of this advice” below.

4. Specific limitations of this advice

Technical expert advice in any field is subject to various limitations. Important limitations to the advice include:

- no attempt has been made to verify the modelled levels with computer modelling; and
- calculated values are estimates only.

5. Expert's details

Personal details: Reviewer

Name	Peter Popoff-Asotoff
Employer	Department of Water and Environmental Regulation
Position title	Principal Expert Environmental Noise
Field of expertise	Environmental Noise

Qualifications and experience

The qualifications and experience and technical capability relevant to the provision of this advice are as follows:

Qualification

Qualification	Year Obtained	Additional Comments
Grad. Dip. – Curtin University	1993	Computing
BSc. – Murdoch University	1983	Physics

Professional experience


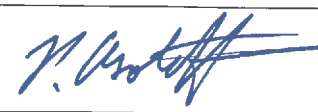
Employer	Position	Tenure
Department of Environment Regulation	Principal Expert Noise Regulation	2016 – present
Department of Environment Regulation	Senior Manager	2015 – 2016
Department of Environment Regulation	Manager	2013 – 2015
Department of Environment and Conservation	Manager	2012 – 2013
Department of Environment and Conservation	Acting Manager	2008 – 2011
Department of Environment and Conservation	Environmental Noise Officer	2006 – 2008
Department of Environment	Environmental Noise Officer	2003 – 2006
Department of Environmental Protection	Environmental Noise Officer	1997 – 2003

Other – Publications/memberships/associations etc.

Publications:

- Peter Popoff-Asotoff, Jonathan Holgate and John Macpherson, “Which is Safer – Tonal or Broadband Reversing Alarms?” *Proc. of Acoustics 2012 Fremantle* 126, 1-7, (2012)
- Jingnan Guo, John Macpherson and Peter Popoff-Asotoff, “Further Investigations of Low-Frequency Noise Problems Generated by Freight Trains” *Proc. of Acoustics 2012 Fremantle* 64, 1-8, (2012)
- Sun Hongmei, Rhys Fenton, Peter Popoff-Asotoff, Jingnan Guo, and John Macpherson, “Evaluation of noise emissions from an evaporative air conditioning unit and their environmental impact” *Proc. of Acoustics 2012 Fremantle* 132, 1-6, (2012)

Signatures

Author Name Christine Ng	Signature 
Position Environmental Noise Officer	Date 14/2/2018
Reviewer Name Peter Popoff-Asotoff	Signature 
Position Principal Expert – Environmental Noise	Date 15/2/2018