DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS REPORT

PROPOSAL	Material Change of use to allow night time tennis - installation of electric cabling and six (6) LED floodlights						
LOCATION	Lot 15722 (Reserve 7800) 1 Jerrat Drive, East Fremantle						
COST	\$270,000						
APPLICANT	East Fremantle Lawn Tennis Club Inc.						
LANDOWNER	Town of East Fremantle						
LOCAL GOVERNMENT	Town of East Fremantle						
MRS CLASSIFICATION	Parks and Recreation Reserve						
DECISION TYPE	Part 5, <i>Swan and Canning Rivers Management Act 2006</i> , Ministerial Determination						
ATTACHMENTS	1. Location map (one page)						
	2. External referral responses:						
	a) Town of East Fremantle (one page)						
	 b) Department of Water and Environmental Regulation – Contaminated Sites (two pages) 						
	c) Department of Water and Environmental Regulation – Environmental Noise (three pages)						
	3. Overall Site Plan (one page)						
	4. Electrical Services Layout (one page)						
	5. Lighting Plan (seven pages)						
RECOMMENDATION	APPROVAL WITH CONDITIONS						

1. INTRODUCTION

- 1.1 The Department of Biodiversity, Conservation and Attractions (DBCA) has received an application from the East Fremantle Lawn Tennis Club (the Club), proposing to install upgraded cabling and floodlights at the East Fremantle Lawn Tennis Club, 1 Jerrat Drive, East Fremantle (**Attachment 1**).
- 1.2 The proposal includes the installation of underground electrical cabling plus a new switchboard and six (6) LED floodlights to allow for the playing of night tennis on the five (5) existing western hard courts. Footings for the light poles were installed in 2010 under a previous development approval (SRT439-04). This development approval is no longer valid.
- 1.3 The subject land is contained within the Parks and Recreation Reserve under the Metropolitan Region Scheme.

- 1.4 The proposed development is to occur on land entirely within the Swan Canning Development Control Area and constitutes a material change of use, as it will allow the additional use of playing of tennis at night on the western hard courts. Therefore, the proposal requires an approval from the Minister for Environment in accordance with Part 5 of the Swan and Canning Rivers Management Act 2006 (SCRM Act).
- 1.5 Under delegation from the Director General, DBCA has prepared this draft report in accordance with section 75(2) of the SCRM Act.

2. CONSULTATION

Town of East Fremantle

- 2.1 The Town of East Fremantle (the Town) provides the following comments relating to the management of light spill and the potential impact at nearby residences:
 - It is strongly recommended that light spill investigations be undertaken before and after installation of the light towers to ensure that both surrounding residents and those on the north side of the river are not adversely impacted.
 - Should there be any issues with light spill after installation then the East Fremantle Lawn Tennis Club is to remedy the situation within 14 days of the complaint being communicated to the Club, to the satisfaction of the Town of East Fremantle.
 - The lights are not to operate between 10:30pm and 6am daily.
- 2.2 The Town's comments are provided in Attachment 2(a).

Department of Water and Environmental Regulation – Contaminated Sites Branch

- 2.3 The Department of Water and Environmental Regulation (DWER) Contaminated Sites advises that Lot 15722 on Plan 40472 (the site) was classified under the Contaminated Sites Act 2003 as *possibly contaminated investigation required* on 18 September 2012 and a memorial was placed on the certificate of title.
- 2.4 The classification was based on several soil, sediment and groundwater investigations undertaken between 2006 and 2007 for the East Fremantle Yacht Club which found antifouling agents (tributyltin) in river sediments. No detailed, or recent, soil, groundwater, or sediment quality investigations have been conducted at the site.
- 2.5 Based on available information, the site is not proposed for a more sensitive land use and therefore, DWER has no objection to the proposed works. Given the risk associated with potential disturbance of historical contaminants, DWER recommends an advice note be included with any approval.
- 2.6 DWER Contaminated Sites advice is included in Attachment 2(b).

Department of Water and Environmental Regulations – Environmental Noise

- 2.7 The proposal was referred to DWER for advice relating to potential noise disturbance from the playing of tennis at night.
- 2.8 DWER advises that while measuring noise from the existing lit courts (on the eastern side) would be the best way of assessing the impact of noise from the western courts proposed to be lit during the evening, it is recognised that measurement might be

difficult given the distance and background noise, particularly due to the presence of traffic on Preston Point Road.

- 2.9 DWER indicated that extrapolated results from monitoring of other similar tennis clubs indicates that the noise from the courts proposed to be lit in the evening at the East Fremantle Tennis Club is likely to comply with the assigned levels under the Environmental Protection (Noise) Regulations 1997.
- 2.10Accordingly, an advice note will be included to ensure the club is aware of its responsibilities to comply with the Environmental Protection (Noise) Regulations 1997.
- 2.11The advice from DWER is provided in Attachment 2(c).

Submissions from the notification of new proposal

- 2.12The proposal was listed on the DBCA website as a new proposal open for comment between 17 August 2023 and 28 September 2023. Two (2) submissions were received from members of the public.
- 2.13The first submission was an objection to the proposal. The letter states that the floodlit courts on the eastern side of the Club are currently under utilised, and therefore questions why the western courts would need to be lit also. The submitter also states that the sports ovals to the west of the Club are floodlit, and additional lighting of the western tennis courts would result in one continuous floodlit area, adding to visual night lighting pollution.
- 2.14The second submission was received by the Town from a resident objecting to the proposal because the light poles are excessive in height and will cause detrimental amenity impacts. In addition, the submitter contended the existing floodlit courts are under utilised and the lights are sometimes left on longer than they are being used. The letter also states that the lights will add to the impact from the existing floodlit playing fields nearby, and the power usage is environmentally conflicting.

3. RELEVANT POLICIES AND PLANS

- State Planning Policy 2.10 Swan-Canning River System (SPP 2.10)
- Corporate Policy Statement No. 42 Planning for Land Use, Development and Permitting Affecting the Swan Canning Development Control Area (Policy 42)
- Corporate Policy Statement No. 45 Planning for Miscellaneous Structures and Facilities in the Swan Canning Development Control Area (Policy 45)
- Environmental Protection (Noise) Regulations 1997
- Guide on the Limitation and Effects of Obtrusive Light from Outdoor Lighting Installations (2003)

4. ENVIRONMENTAL AND PLANNING CONSIDERATIONS

- Environmental protection
- Contaminated sites
- Visual amenity and lighting
- Noise management

5. BACKGROUND

- 5.1 The Club is located between Preston Point Road and Jerrat Drive in East Fremantle. The Club comprises 16 grass courts along the southern boundary closest to Preston Point Road, four (4) blue hard courts in the northeastern corner along Jerrat Drive and Petra Street (already lit), and five (5) plexipave (green) hard courts on the northwestern corner along Jerrat Drive.
- 5.2 The Club was identified as having low numbers of floodlit courts for its member base, and therefore has secured a State Government Club Night Lights Program (CNLP) grant of \$108,000 towards the upgrading of power and installation of sustainable LED floodlights on the five (5) western hard courts. Tennis Australia has also contributed \$40,000 in grant funding.



Figure 1: East Fremantle Lawn Tennis Club

- 5.3 The proposal seeks approval to install six (6) LED floodlights around the five (5) plexipave (acrylic) western hard courts (Courts 5, 6, 7, 8 and 9) to allow for the playing of night tennis to 10:30pm at night, seven days a week. The four (4) eastern blue hard courts have been similarly lit for over 30 years with play extending up to 10:30pm.
- 5.4 The lights will allow for the playing of tennis at night on five (5) additional courts, which is considered a material change of use as it constitutes an increase in the intensity and scale of the use of the premises.
- 5.5 The courts are booked through a system which programs the lights to come on only if the court has been booked. The court lights will switch off automatically when play has finished. Courts 5 and 6 will be on the same circuit and therefore switch on and off together, and courts 7, 8, and 9 will be on another circuit.
- 5.6 The proposed floodlights were initially approved in 2010, however the lighting was not installed at that time. Since that approval has expired, the installation of the lights requires a new approval. The proposal also involves the installation of a new switchboard and small distribution board.
- 5.7 The proposed light poles are located approximately 40m from the river, and at the top of an embankment approximately 15m high. The light poles are 15m tall and at least 75m from the nearest residence on the other side of Preston Point Road.

6. **DISCUSSION**

Environmental protection

- 6.1 Policy 42 aims to ensure that land use and development on and adjacent to the river system maintains and enhances the quality and amenity of the river environment. Development adjacent to the river should be carefully undertaken to prevent detrimental impacts to the foreshore area.
- 6.2 To allow for the installation of the floodlights, trenching is proposed to lay the new cabling. The cabling requires 140m of 600mm deep trenching. In addition, there will be 50m of 300mm deep trenching for the Book-a-court control cabling, and 30m of cabling run through an existing conduit under the carpark.
- 6.3 The location of the trenching is around 40m from the edge of the river and is at the top of an embankment 15m high. Direct impacts to the river from the trenching are unlikely. The applicant has advised that no vegetation (other than turf) will be removed or damaged as a result of the works. The trench will be backfilled and turf reinstated.
- 6.4 The new switchboard and distribution board installation will not require any additional excavation as they will be installed on 100mm platforms at ground level.
- 6.5 The footings for the light poles have previously been installed, so no further ground disturbing works are required. A work method statement can be required as a condition of approval to demonstrate that the trenching works can be undertaken with no impact to the foreshore.
- 6.6 The National Light Pollution Guidelines for Wildlife (DBCA, DCCEEW 2023) acknowledge the impact that the colour of lighting can have on wildlife and in particular, wildlife can be sensitive to blue light. The applicant has indicated that the selected LED lights will be 4000K, which is closer to yellowish light and preferrable for use near wildlife. In addition, the lighting plan indicates that the level of lighting will achieve 0 lux along the edge of the trees at the top of the escarpment.
- 6.7 Artificial light such as LEDs can have potentially negative effects on animal biorhythms, daily activity, and reproduction. However, although there are known bird species in the area such as black cockatoos and shorebirds, the nearest known roost is around 1km away and breeding around 6.5km away. Due to the limited number of tall trees adjacent to the tennis club, the impact to black cockatoos is not likely to be significant.
- 6.8 The Point Walter sandbar is within the line of sight of the tennis club, and light spill from the proposed new poles should be contained, particularly minimised towards the beach and water's edge, and should be consistent with the *National Light Pollution Guidelines for Wildlife*.
- 6.9 DBCA considers that the trenching activities should be carried out using mitigation measures to prevent fauna such as quendas from becoming trapped in the trench. This has been included in advice and conditions.

Visual amenity and lighting

6.10Policy 45 states that lighting in the Riverpark should be fit-for purpose so that it meets relevant Australian Standards and safety requirements while minimising light spill to areas within and immediately adjoining the DCA so that fauna, community enjoyment and visual amenity are not unacceptably affected. The lighting towers have the

potential to create light spill in the foreshore and river. Light spill could also potentially affect residences along Preston Point Road.

- 6.11The Club is located in an area known as the Preston Point Road North Recreational Precinct. The Preston Point Precinct Master Plan, endorsed by the Town in June 2020 recommended future lighting plans at the Club be supported. Adjacent sporting clubs in the same precinct (East Fremantle Lacrosse Club and East Fremantle Junior Football Club) have floodlit training on various evenings during the week. The proposed lighting will allow for the playing of tennis throughout summer into the evening when the temperature drops.
- 6.12The Club proposes to install four (4) 15m high light towers to courts 7, 8, and 9 and two (2) towers to courts 5 and 6. The poles are proposed to be tapered, multisided silver-grey galvanised steel. The poles themselves are unlikely to have a detrimental impact on the visual amenity of the location. Numerous sporting clubs along this stretch of the river already have similar lighting poles installed. While the additional six (6) will add to the potential impact it is expected to be minimal overall.
- 6.13The applicant has advised that the proposed lighting has been designed to be consistent with Australian Standard AS 2560.2:2021 Sports Lighting Part 2.1: *Specific Applications Lighting for outdoor tennis.* A Sports Lighting Assessment has been provided to demonstrate compliance with AS2560.
- 6.14In addition, the applicant has provided an Obtrusive Light Assessment, which is based on the light limiting parameters and guidelines from Australian Standard AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting. The objective of AS/NZS4282 is to provide a common basis for assessment of the likely effects of developments that involve the provision of outdoor lighting. The Obtrusive Light Assessment demonstrates that the lighting proposed for the Club is fully compliant with parameters for spill light, luminous intensity at vertical planes, threshold increment and upward light ratio for both non-curfew (6am to 11pm) and the more stringent curfew requirements (applicable between 11pm to 6am). The Obtrusive Light Assessment is included in the Lighting Plan which can be found at **Attachment 5**.
- 6.15The luminaires selected for the project have inbuilt glare and spill controls which direct the lighting towards the courts and away from the nearby vegetation, the river and the residences.
- 6.16The Town recommended that light spill investigations be undertaken before and after installation of the light towers to ensure that surrounding residents are not adversely impacted. The lighting plan provided is considered to be sufficient to meet this requirement pre-installation. In the event there are issues with light spill after installation, the Club can be advised that it may be requested by the Town to conduct a lighting audit to demonstrate that that the lighting as installed is in accordance with the relevant Australian Standards, particularly AS/NZS4282:2019. If the lighting is found to be non-compliant the Club will be required to remedy the situation within 14 days of a complaint being communicated to them.
- 6.17The Town also requested that the lights are not to operate between 10:30pm and 6am daily. This has been included as a condition of approval.
- 6.18The proposal includes the installation of a new switchboard 2000mm high, 950mm wide and 350mm deep, and a distribution board 1200mm high, 400mm wide and 400mm deep, along an existing wall on the southern end of Court 5. Both boards will

be painted Hawthorn Green which is the standard council-approved colour for switchboards and is considered appropriate for the location.

Noise management

- 6.19Policy 42 states that proposals should enhance and protect the character and landscape setting of the Swan Canning River system. Excessive noise from activities in the Riverpark can detract from the riverine environment and cause a nuisance to nearby residences.
- 6.20Given the intensification of the use of the tennis courts to include the playing of night tennis until 10:30pm, and the proximity of the residences along Preston Point Road, potential noise impacts are a relevant consideration. Noise from sporting fields is expected to comply with the requirements of the Environmental Protection (Noise) Regulations 1997, and the proposal was referred to DWER Environmental Noise for advice regarding the likelihood of the Club being able to comply with the regulations.
- 6.21DWER has indicated that noise monitoring of the existing lit courts might give some indication of the noise impacts of the additional courts, however, it was acknowledged that it is difficult to measure the impact of the noise on nearby residences, due to the distance and potential background noise, particularly from traffic on Preston Point Road.
- 6.22Noise data from recent monitoring undertaken at a similar, nearby tennis club was used by DWER to conservatively extrapolate the likely levels of noise experienced by the residences on the other side of Preston Point Road during the playing of night tennis. DWER concluded that the noise from tennis playing activities from the courts proposed to be lit in the evening at the Club is likely to comply with the assigned levels under the Environmental Protection (Noise) Regulations 1997.
- 6.23DWER's advice is at **Attachment 2(c)**. Accordingly, an advice note will be included to inform the Club that it is required at all times to comply with the Environmental Protection (Noise) Regulations 1997.

7. SWAN RIVER TRUST

- 7.1 In accordance with section 75(3A) of the SCRM Act, the Swan River Trust (the Trust) considered DBCA's draft report at its meeting on 21 May 2024. The Trust resolved to advise the Director General of DBCA that it supports the draft report and recommendation of approval, however recommended the inclusion of an additional condition to require the preparation and approval of an operations plan to clarify hours of operation and minimisation of lighting and noise.
- 7.2 The additional condition is included as **Condition 5**.

8. CONCLUSION

- 8.1 The proposed installation of six (6) LED floodlights and associated cabling and switchboard will allow for the playing of night tennis until 10:30pm at night. Information provided with the application demonstrates that the lights will be designed to minimise the light spill in the direction of the river and towards the residents on the other side of Preston Point Road.
- 8.2 Potential noise impacts from the additional tennis courts in use at night are expected to be minimal and are likely to be compliant with the Environmental Protection (Noise)

Regulations 1997. Environmental impacts during works are minimal and can be managed with appropriate conditions.

8.3 For these reasons, the proposal is recommended for approval, subject to conditions and advice.

9. RECOMMENDATION – APPROVAL WITH CONDITIONS

That the Director General of DBCA advises the Minister for Environment that the proposal at East Fremantle Lawn Tennis Club, Lot 15722 (Reserve 7800) Preston Point Road, East Fremantle, as described in the application received on 9 August 2023, and additional information received on 13 November 2023 be approved, subject to the following:

CONDITIONS

- 1. Approval to implement this decision is valid for two (2) years from the date of this approval. If substantial on-site works have not commenced within this period, a new approval will be required before commencing or completing the development.
- 2. All works are to be undertaken in accordance with a works method statement which is to be submitted to and approved by the Department of Biodiversity, Conservation and Attractions prior to commencement of works (Advice Notes 1, 2 and 3).
- 3. Prior to commencement of use, a lighting audit is to be conducted to demonstrate that the lighting has been installed in accordance with the approval and approved by the Department of Biodiversity, Conservation and Attractions.
- 4. Lighting of the western hard courts is to be switched off between the hours of 10:30pm and 6am Monday to Sunday (**Advice Note 6**).
- 5. The approved use is to be undertaken in accordance with an Operations Plan which is to be submitted to and approved by the Department of Biodiversity, Conservation and Attractions prior to commencement of use (**Advice Note 7**).
- 6. The authorised works shall not prevent public access along the foreshore reserve unless temporary closure is necessary for safety purposes. In the event the path is closed, a clearly signed, safe alternative route shall be provided.
- 7. Upon completion of the works, all waste materials shall be removed and the site cleanedup and reinstated to the satisfaction of the DBCA.

ADVICE NOTES

- 1. Notifications and documents required as a condition of this approval can be emailed to <u>rivers.planning@dbca.wa.gov.au</u>.
- 2. Regarding **Condition 2**, the work method statement shall describe how the authorised works will be managed to minimise potential environmental impacts and should include:
 - a. a description of how the contractor proposes to undertake the works
 - b. timeframes and responsibilities for tasks identified
 - c. contact details of essential site personnel, construction period and operating hours
 - d. management of any potential acid sulfate soils (PASS) that may be exposed during the works
 - e. detail of machinery and associated refuelling (noting that refuelling should take place outside of the Swan Canning Development Control Area if possible, or within an appropriate impervious bund)
 - f. public safety and amenity
 - g. containment of stockpiles of materials
 - h. areas of excavation and stockpiling of soil

- i. mitigation measures to prevent fauna such as quendas from becoming trapped in the trench during trenching works
- o. a detailed site map showing the location of any:
 - i. signage, including the contact details of essential site personnel
 - iii. perimeter fencing
 - iv. the laydown area and vehicle entry/exit points
 - v. on-site storage and bunding of materials and equipment
 - vi. proposed redirection of pedestrian traffic if required and
- p. any other matters considered relevant to the proposal not identified above.
- 3. Regarding **Condition 2**, the work method statement shall include a commitment that all contractors and personnel involved in the works, activities, operations and/or development approved by the Department of Biodiversity, Conservation and Attractions are familiar with the conditions and requirements of this approval at all times.
- 4. The applicant is advised that noise generated by the playing of tennis at the East Fremantle Lawn Tennis Club is required to comply with the Environmental Protection (Noise) Regulations 1997.
- 5. The tennis courts are located within an area registered with the Department of Water and Environmental Regulation as a 'contaminated site awaiting classification'. It is recommended that a management plan including an unexpected finds protocol be implemented in the event that any evidence of contamination is encountered.
- 6. Regarding **Condition 3** all lighting is to be installed in accordance with the lighting plan prepared by Sylvania Schreder dated 13 November 2023. In particular, it should be noted that:
 - a. lighting is to be designed to minimise light spill so that fauna, community enjoyment and visual amenity are not unacceptably affected
 - b. all lighting is to be consistent with the National Light Pollution Guidelines for Wildlife (DBCA, DCCEEW 2023) and
 - c. the LED lighting installed will be equivalent to 4000K correlated colour temperature.
- 7. With regard to **Condition 5**, the Operations Plan shall address (but not be limited to):
 - a. hours of operation
 - b. minimisation of lighting when not in use and
 - c. minimisation of noise from additional patrons, traffic and parking.
- 8. This development application has been granted in accordance with the *Swan and Canning Rivers Management Act 2006* and does not negate the need for the applicant to address the requirements of other legislation, including the Environmental Protection (Noise) Regulations 1997.

DRAFT REPORT ENDORSED						
Signed: <u>F8tanlly</u>	Date: 27 June 2024					
Fran Stanley						
Executive Director (As delegate of the CEO)						



 YOUR REF
 2023/4596

 OUR REF
 IEM120385

 ENQUIRIES
 9339 9339



20 September 2023

Department of Biodiversity, Conservation and Attractions Parks and Wildlife Service Locked Bag 104 Bentley Delivery Centre Western Australia 6983 rivers.planning@dbca.wa.gov.au

Dear Sir/Madam,

Re: Installation of Cables and 6 LED Floodlights – East Fremantle Lawn Tennis Club – Application 2023/4596

Following a review of the proposed development at the East Fremantle Lawn Tennis Club the Town can make the following referral comments in relation to the development.

- 1. Electrical work must comply with Part 4 of the Health (Public Building) Regulations 1992 and a licenced electrician must certify all work and lodge a Form 5 with the Town of East Fremantle upon completion of the works.
- 2. The installation of LED lights has the potential to create a light spill nuisance at nearby properties. It is strongly recommended that light spill investigations be undertaken before and after installation of the light towers to ensure that both surrounding residents and those on the north side of the river are not adversely impacted.
- 3. Should there be any issues with light spill after installation then the East Fremantle Lawn Tennis Club is to remedy the issue within 14 days of the complaint being communicated to the Club, to the satisfaction of the Town of East Fremantle.
- 4. The lights are not to operate between 10.30pm and 6am daily.

If you have any queries regarding this matter do not hesitate to contact the Town of East Fremantle on 9339 9339 or by email at <u>admin@eastfremantle.wa.gov.au</u>.

Yours sincerely,

ANDREW MALONE Executive Manager Regulatory Services for



Your ref:	
Our ref:	DMO 397
Enquiries	
Email:	

Statutory Assessments Rivers and Estuaries Branch Department of Biodiversity, Conservation and Attractions 17 Dick Perry Avenue, Kensington WA 6151 Locked Bag 104, Bentley Delivery Centre WA 6983

By email rivers.planning@dbca.wa.gov.au

Dear Rivers and Estuaries Branch

DEVELOPMENT APPLICATION LOT 15722 JERRAT DRIVE EAST FREMANTLE.

I refer to your email dated 17 August 2023 to the Department of Water and Environmental Regulation (the department) regarding an application to the Department of Biodiversity, Conservation and Attractions for the proposed development of the above-mentioned lot.

As per the requirements under section 58(6)(a) of the *Contaminated Sites Act 2003* (CS Act), advice is required as to the suitability of the land for the proposed works. The department understands the proposed works are to install cables and floodlights at East Fremantle Lawn Club.

Land at Lot 15722 on Plan 40473 (the site) was classified under the CS Act as *possibly contaminated* – *investigation required* on 18 September 2012 and a memorial (reference number M66012) was placed on the certificate of title.

The classification was based on several soil, sediment and groundwater investigations undertaken between 2006 and 2007 carried out for the East Fremantle Yacht Club. The investigations found antifouling agents in the form of tributyltin in river sediments adjacent to a boat slipway. No detailed, or recent, soil, groundwater or sediment quality investigations have been conducted at the site as a whole.

Based on available information, the site is not proposed for a more sensitive land use. Therefore, the department has no objection to the proposed works at the site and recommends that the approval should not include a contamination condition.

However, given the risks associated with the potential disturbance of historical contaminants, the department recommends that the following advice note be applied to any approval granted:

Advice

The department recommends that a management plan including an unexpected finds protocol is implemented in the event that any evidence of contamination is encountered.

The site is not located within an area that is mapped as having a risk of encountering acid sulfate soils. The department therefore advises that no specific comment is required in relation to acid sulfate soil management during development.

If you have any queries in relation to the above, please contact Environmental Officer, Ivan Hodgson, on 6364 7707.

Yours sincerely

Centillee

Andrew Miller SENIOR MANAGER CONTAMINATED SITES Delegated Officer under section 91 of the *Contaminated Sites Act 2003*

27 September 2023

Tuesday, 23 April 2024 1:36 PM	1
RE: East Fremantle Tennis Club	
	Tuesday, 23 April 2024 1:36 PM RE: East Fremantle Tennis Club

[External Email] This email was sent from outside the department - be cautious, particularly with links and attachments.

OFFICIAL

OFFICIAL

Hi

While measuring noise from the existing lit courts at East Fremantle Tennis Club would be the best way of assessing the impact of noise from the courts on the western side that are proposed to be lit during the evening period, it is recognised that measurement might be difficult given the distance and potential background noise, particularly due to the presence of traffic on Preston Point Rd. However, as the noise sensitive receivers across from the Applecross Tennis Club and the East Fremantle Tennis Club are both similarly exposed to the courts the noise data that that is available for Applecross can be adapted to the East Fremantle location.

The table below sets out the extrapolation of the measured or predicted levels of tennis noise from the Applecross Tennis Club to residents on Preston Point Rd directly south, opposite the courts proposed for evening lighting at the East Fremantle Tennis Club. The extrapolation is conservative. Applecross distances are chosen to be the worst case for extrapolation purposes and adjustment for impulsiveness (where relevant) have been included, even though its presence at Applecross is unknown. The shoe squeaks and ball-hits are maximum levels, but the ball-hits have the potential to be present for long enough to require compliance with the LA1 assigned level. The general noise level is based on a predicted LA10 level but compared with all assigned level parameters, should the noise be present for less time. The lowest evening assigned levels have been quoted, however it can be noted that the premises numbering 176 to 186 Preston Point Rd would have assigned levels 2 dB higher due to their proximity to the sporting facility building (see Schedule 3 2(8) of the Environmental Protection (Noise) Regulations 1997).

opposite from the courts proposed for evening lighting at East Fremantle Tennis Club									
Parameter	Shoe squeak	Ball hit	General noise						
Distance to Applecross source [m]	53 ⁽¹⁾	53 ⁽²⁾	53 ⁽²⁾						
Distance to East Fremantle source [m]	71 ⁽³⁾	71 ⁽³⁾	71 ⁽³⁾						
Level at Applecross residents [dB(A)]	46	≤39 ⁽⁴⁾	38 ⁽⁵⁾						
Extrapolated level at East Fremantle residents [dB(A)] ⁽⁶⁾	44	≤37	36						
Adjustment for impulsiveness [dB] ⁽⁷⁾	+10	+10	+0						

Extrapolation using Applecross Tennis Club noise levels to estimate levels received at residents

Adjusted level [dB(A)]	54	≤47	36
Evening Assigned levels $L_{Amax}/L_{A1}/L_{A10}$ [dB] ⁽⁸⁾	55/50/40	55/50/40	55/50/40
Exceedance [dB] ⁽⁹⁾	-1/na/na	≤ -8/≤ -3/na	-19/-14/-4

Notes

- (1) From Applecross hard courts 13 & 14, the only source of shoe squeak.
- (2) Worst case is if prediction is from Applecross hard courts 13 & 14. If the source was from the closer synthetic courts extrapolated levels would be lower.
- (3) From edge of court area to residents directly opposite on Preston Point Rd.
- (4) Measured 42 dB(A) adjusted for background of 39 dB(A).
- (5) Highest level predicted in Eco Acoustics Applecross Tennis Club report dated 7 December 2023.
- (6) Using noise level reduction due to distance only.
- (7) A conservative approach is to assume impulsiveness, although unlikely to be present, given the distance.
- (8) Worst case evening assigned levels.
- (9) A negative or zero exceedance value indicates compliance. "na" is not applicable.

The extrapolated results indicate that the noise from tennis playing activities from the courts proposed to be lit in the evening at the East Fremantle Tennis Club is likely to comply with the assigned levels under the Environmental Protection (Noise) Regulations 1997.

Regards

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Department of Water and Environmental Regulation Prime House, 8 Davidson Terrace, JOONDALUP WA 6027 Locked Bag 10, Joondalup DC, WA 6919



Subject: East Fremantle Tennis Club

Hi

Thank you very much for your time today to discuss the East Fremantle Tennis Club proposal for additional lighting for the facilitation of evening tennis. As you are aware, the club have been advised that the additional use of the courts would need to comply with the Environmental Protection (Noise) Regulations 1997. In your experience, would you expect that the playing of tennis on an additional four (4) courts would present a problem for the club in terms of compliance with the noise regulations?

Kind regards

Rivers and Estuaries Branch | Department of Biodiversity, Conservation and Attractions 17 Dick Perry Avenue, Technology Park, Western Precinct, Kensington 6151 Locked Bag 104, Bentley Delivery Centre WA 6983 P: rivers.planning@dbca.wa.gov.au Web: https://www.dbca.wa.gov.au/swan-canning-riverpark

CARING FOR THE SWAN CANNING RIVERPARK

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Г	LEGEND WESTERN POWER UNI PILLAR
	SITE MAIN SWITCHBOARD
	DISTRIBUTION BOARD
E	EXISTING U/G CONDUIT
P	POWER CONDUIT
Ρ	POWER PIT
-×	CIRCUIT BREAKER
× – × –	RCBO
KWHR	kWH METER
<i></i>	THREE PHASE LINE
O (EF1)	EXISTING FLOODLIGHT FOOTING 600 DIA x 2000 DEEP
O (FF2)	EXISTING FLOODLIGHT FOOTING
1090	

DRAWN S.SHRESTHA	DESIGNED A.HOEHN		
CHECKED A.HOEHN	DATE 9-Jun-23		1 E.U1 2
APPROVED A.HOEHN	scale 1:500 @	(A1)	BEST PROJECT N° 2122.109
THIS IS A CARD DRAWING			



The luminaire specified for this project is the Sylvania RAPTOR GEN 3 floodlight.

For technical information on this product, please select the weblink below or via the QR code above.

https://au.schreder.com/en/products/raptor3-sports-floodlighting

REPORT CONTENTS:

This report provides for the following:

* Client brief

- * A sports lighting solution for East Fremantle Lawn Tennis * Acknowledging the relevant sections from Australian Standard AS2560.2:2021, Sports Lighting
- * An assessment for Obtrusive Light in accordance with Australian Standard AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting.

CLIENT BRIEF:

* LED Upgrade

* 15m poles

- * Designed to comply with the requirements of AS2560.2:2021: Lighting for Tennis Club Competition play - 350/250lx
- * AS/NZS4282-2019 Obtrusive Light Evaluation assess for: Pre-Curfew

* AS/NZS4282 Compliance required

DISCLAIMER:

1. No CAD drawing, or site dimensions, were supplied with the design brief. All calculations are based on a scaled aerial image. Whilst every intent is maintained to provide dimensional accuracy, a scaled aerial image will always introduce inaccuracies. We provide this calculation as a close settimate of expected lighting levels. Prior to installation all calculations should be confirmed with accurate site measurements, preferably a surveyed CAD drawing with relevant field markings and surrounding residential boundaries.

2. This scheme is subject to the accuracies and tolerances of lighting systems described within Australian Standard AS/NZSS3827, Lighting System Performance Accuracies and Tolerances.

 The contractor must confirm pole location details 2 weeks prior to the date of installation of the footings. This will allow for any required fine tuning of the design and finalisation of luminaire aiming details.



Overall Site View

SVI VANIA Schréder	This design calculation is based upon specified parameters supplied	REV	DATE	COMMENTS	DESIGNER	PROJECT	TITLE	REVISION
Experts in lightability"	by one cares, and action being in place associated by its, as declared in this document. In practice, the accuracy of the values will differ due to environmental variations such as actual luminaire positioning.	RD	30/08/2023	Original design	C TAME	East Fremantle Lawn Tennis	Site location	R1
Sabrádor Australia Phy Ltd	non surface miliotance, supply soltage, local luminaire ambient temperature, obstacles/furniture, etc. These results are also subject to normally accessed enformerits trainances, and calculation/somma	R1	13/11/2023	Curfew Assessment Included		Courts 5-9		SHEET
Bldg 4A Parklands Estate 21-23 South St	uncertainties. Schwder Australia provides this calculation without any representation	R2						A3
Rydalmere NSW 2116 Australia T 1300 489 780	or warranty of any kind. The company shall be under no liability to the Customer for failure to attain such performance (game unless the performance) of the descention of the customer in the second state of	R3				CONTACT	DOCUMENT NO	
www.sylvania-schreder.com	perturbative to the worker supports is spectratory guarantees in entropy and any such written guarantee shall be subject to recognised manufacturing variations and tolerances applicable to the Goods.	R4				Steve Cox	0251116CTR0.AGI	PAGE NO.
ABN 17 604 331 937		RS				scox@sylvania-schreder.com		Page 1017

DESIGN NOTES: SPORTS LIGHTING ASSESSMENT

This Sports Lighting Assessment is based on the Light Technical Parameters and Guidelines from Australian Standard AS2560.2:2021, "Sports Lighting Part 2 Specific Applications".

The lighting design is to comply with the requirements of Section 2.11, Tennis: Club Competition & commercial. The Light Technical Parameters (LTP) are as follows:

* Average horizontal maintained illuminance:

- PPA: 350lux | TPA: 250lux * Minimum horizontal uniformity U1 (Min/Ave):
- PPA: 0.60 | TPA: 0.30
- * Minimum horizontal uniformity U2 (Min/Max): PPA: 0.40 | TPA: 0.20
- * Maximum glare rating (GR): 50

Calculation grid points are established in a horizontal plane, covering the field of play, in accordance with Table 2.11.2 and Figure 2.11.1 from AS2660.2:2021. This being a grid of size 2m x 2m at 1m above the level of the playing surface.

The luminaire height above the field of play has been taken as indicated, acknowledging the height recommendations within Table 2.11.3 from AS2560.2:021. This assessment does not take into consideration the topography of the site. An analysis of the site topography should be considered when determining the actual heights of each pole.

Poles have been located in accordance with the recommendations of <Figure 2.11.3/Figure 2.11.4> from AS2560.2:2021, based on a six pole arrangement.

Glare rating has been calculated at observer positions in accordance with Figure 2.11.6 from AS2560.2:2021. We have used a surface reflectance of 20% for coloured courts, as specified in Table 2.11.5.

This assessment does not take into consideration the effect of topography or the obstructive effect from buildings, trees, fences etc.



Project: GP			
Scene: All On			
Label	CalcType	Reflect.	Мах
GR Max CRT 5	Glare Rating	25	39
GR Max CRT 6	Glare Rating	25	36
GR Max CRT 7	Glare Rating	25	38
GR Max CRT 8	Glare Rating	25	38
GR Max CRT 9	Glare Rating	25	39

Calculation Summary: All Luminaires On											
Project: Playing Area											
Scene: All On											
Label	CalcType	Units	Avg	Max	Min	U1	U2	UG	PtSpcLr	PtSpcTb	Grid Z
01 Court 9 PPA	Illuminance	Lux	431.58	504	348	0.81	0.69	1.18	2	2	1
01 Court 9 TPA	Illuminance	Lux	414.59	534	303	0.73	0.57	1.18	2	2	1
02 Court 8 PPA	Illuminance	Lux	482.15	560	357	0.74	0.64	1.12	2	2	1
02 Court 8 TPA	Illuminance	Lux	453.90	560	317	0.70	0.57	1.12	2	2	1
03 Court 7 PPA	Illuminance	Lux	464.82	506	383	0.82	0.76	1.18	2	2	1
03 Court 7 TPA	Illuminance	Lux	453.92	533	310	0.68	0.58	1.19	2	2	1
04 Court 6 PPA	Illuminance	Lux	461.54	627	382	0.83	0.72	1.13	2	2	1
04 Court 6 TPA	Illuminance	Lux	448.71	543	281	0.63	0.52	1.23	2	2	1
05 Court 5 PPA	Illuminance	Lux	388.51	512	279	0.72	0.54	1.26	2	2	1
05 Court 5 TPA	Illuminance	Lux	364.61	540	225	0.62	0.42	1.28	2	2	1

Luminaire Sc	hedule									
Project: Lum	Project: Luminaires									
Scene: All On										
Symbol	Qty	Label	Description	Lum. Watts	Total Watts	LLF				
	12	SR4H757A0LG3 Im	SR4H757A0LG3 RAPTOR GEN 3 1200W A0 Asymmetric CRI70 5700K	1193.55	14322.601	0.900				

Light Loss Factor (LLF):

A Light Loss Factor (LLF), accounting for LED lumen and dirt depreciation, of 0.9 has been used for all RAPTOR GEN 3 luminaires. This is derived from a combination of the following:

 * Luminaire Dirt Depreciation (LDD) - 0.92, based on a 60-month cleaning cycle (per AS2560.1:2018 Table 4.1)
 * Lamp Lumen Depreciation (LLD) - 0.971 (L97.1) @ 20,000 burning hours.

Luminaire Arrangement:

* Light pole LP1-6 - as indicated within the design

SVI VANIA Schréder	This design calculation is based upon specified parameters supplied	REV	DATE	COMMENTS	DESIGNER	PROJECT	TITLE	REVISION
Experts in lightability"	by the cleent, and other design inputs assumed by us, as decases in this discusser. In practice, the accuracy of the values will differ due to environmental variations such as actual luminaire positioning.	RD	30/08/2023	Original design	C TAME	East Fremantle Lawn Tennis	Technical details and results	R1
Sabrédar Australia Dty Ltd	non surface militations, supply soltage, local luminaire ambient temperature, obstacles/furniture, etc. These results are also subject to normality uncented information interances, and resistation/programm	R1	13/11/2023	Curfew Assessment Included		Courts 5-9	All On	SHEET
Bldg 4A Parklands Estate 21-23 South St	uncertainties. Schweder Australia provides this calculation without any representation	R2						A3
Rydalmere NSW 2116 Australia	or warranty of any kind. The Company shall be under no liability to	R3						
T 1300 489 780	performance of the Goods supplied is specifically guaranteed in writing.					CONTACT	DOCUMENT NO.	PAGE NO.
www.sylvania-schreder.com	and any such written guarantee shall be subject to recognised manufacturing variations and tolerances applicable to the Goods.	84				Steve Cox	0251116CTR0.AGI	Page 2 of 7
ABN 17 604 331 937		RS				scox@sylvania-schreder.com		Fage 2 01 /

^ Lamp Lumen Depreciation (LLD) - 0.971 (L97.1) @ 20,0

Light poles labelled LP1 to LP6.

LP6 diament inter LP4 LP5 [15M] [15M] [15M] 2 OV 3 OV 1 OV Switching modes based on this zone only Court 9 Court 8 Court 7 Court 6 Court 5 318 267 250 243 251 378 334 303 310 339 319 317 318 319 322 342 310 333 377 445 396 322 291 281 310 380 363 340 324 341 359 352 341 334 331 333 339 349 363 368 344 354 388 436 476 505 441 376 335 338 376 398 398 376 331 282 270 262 266 354 356 350 348 383 397 387 370 361 357 357 359 366 378 403 416 397 383 399 431 463 480 447 409 382 401 411 417 415 403 381 331 295 279 265 469 468 445 444 446 459 363 386 410 448 446 432 410 450 341 400 397 395 397 403 419 461 440 422 433 443 440 434 427 424 409 380 322 288 260 405 426 451 476 476 466 445 443 442 444 450 462 484 496 493 477 472 482 495 429 434 463 468 463 487 450 444 434 411 355 289 251 449 451 469 437 447 471 486 487 481 476 469 456 424 369 295 237 396 409 424 451 478 489 496 488 485 485 487 492 498 507 503 494 469 464 482 505 491 398 410 439 471 496 513 525 522 521 522 523 526 531 520 504 480 454 447 389 464 490 476 454 455 473 494 505 508 503 491 465 424 365 295 231 379 387 401 431 466 501 526 544 546 546 546 549 551 547 529 504 471 445 435 449 472 469 455 454 471 497 519 531 528 505 466 416 356 290 227 372 382 899 429 466 504 533 553 558 558 558 560 560 557 533 504 470 445 434 442 463 464 448 449 468 500 527 543 540 512 466 410 347 285 226 372 382/399 429 466 503 534 553 557 558 558 560 560 557 533 505 471 446 436 444 464 464 449 450 469 501 527 543 540 512 465 409 346 285 227 379 386 401 430 465 501 528 544 546 545 546 547 549 547 529 506 474 448 438 454 476 470 455 456 474 499 521 532 525 503 464 414 353 287 225 389 397 408 438 470 496 514 523 521 518 519 521 525 529 520 505 485/460 452 470 495 477 454 458 476 498 508 508 501 488 462 421 359 288 226 395/ 408 421 449 479 491 496 489 486 482 482 484 489 496 506 506 500 477 471 488 509 440 450 476 490 490 482 474 465 450 418 360 286 233 471 3/6 403 422 448 477 479 468 451 444 440 439 441 445 457 480 496 497 482 478 486 495 455 436 437 467 474 467 458 448 440 427 400 341 281 246 470 447 426 434 446 443 435 426 419 401 366 310 282 256 342 364 385 407 449 448 435 410 399 394 393 394 399 414 466 466 442 442 444 460 489 453 411 382 400 413 419 415 398 369 314 288 273 261 358 357 350 347 383 400 389 370 361 356 355 356 363 373 396 409 390 380 401 435 467 364 340 323 341 361 335 331 330 332 337 443 376 335 333 375 369 316 274 264 259 365 341 354 390 440 $\square A$ Switching modes based on this zone only LP3 LP2 LP1 [15M] [15M] [15M] 2 OV 3 OV 1 OV REV DATE DESIGNER PROJECT TITLE SYLVANIA Schréder Experts in lightability

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	Ride 44 Parklande Estate 21-2	2 South	h St

Bldg 4A Parklands Estate 21-23 Sout Rydalmere NSW 2116 Australia T 1300 489 780

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ABN 17 604 331 937

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cy of the values will differ due tual luminaire positioning.	RD	30/08/2023	Original design	C TAME	East Fremantle Lawn Tennis	Tennis: Club Competition & commercial.	R1
ge, local luminaire ambient These results are also subject rances, and calculation/program	R1	13/11/2023	Curlew Assessment Included		Courts 5-9	All On	SHEET
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shall be under no liability to n performance figures unless the	R3				001/7107		
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	RS				scox@sylvania-schreder.com		Page 3 of 7



Label	CalcType	Reflect.	Max																			
GR Max CRT 5	Glare Rating	25	39								Calculation Summary: All Lu	minaires On										
GR Max CRT 6	Glare Rating 25 39							Project: Playing Area														
				-							Scene: Courts 5-6											
Luminaire Schedule											Label	CalcType	Units	Avg	Max	Min	U1	U2	UG	PtSpcLr	PtSpcTb	Grid Z
Project: Luminaires								04 Court 6 PPA	Illuminance	Lux	372.14	494	262	0.70	0.53	1.27	2	2	1			
Scene: Courts 5-6											04 Court 6 TPA	Illuminance	Lux	350.89	525	208	0.59	0.40	1.28	2	2	1
Symbol Qty Label	Des	cription		Lum. Watts Total Watts LLF			Total Watts LLF			05 Court 5 PPA	Illuminance	Lux	386.03	506	278	0.72	0.55	1.26	2	2	1	
4 SR4H757A0	4H757A0LG3 Im SR4H757A0LG3 RAPTOR GEN 3 1200W A0 Asymmetric CRI70 5700K 1193.55 4774.2 0.900				4774.2 0.900			05 Court 5 TPA	Illuminance	Lux	361.63	530	224	0.62	0.42	1.28	2	2	1			
-					REV	DATE		COMMENTS	DESIGNER	PROJECT		TITI F				(· · · · ·			REVIS	SION
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Experts in lightability**			this document. In to environmental	practice, the accuracy of the values will differ due variations such as actual luminaire positioning,	RD	30/08/2023	Original design		C TAME	East Fremantle Lawn Tenr	nis	Technical details and results						RI				
			room surface refa temperature, obst	ectance, supply voltage, local luminaire ambient tacles/furniture, etc. These results are also subject	R1	13/11/2023	Curfew Assessment Included			Courts 5-9		Courts 5-6									SHEE	ET
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WWW.sylvania-schreder.com			and any such write manufacturing var	ten guarantee shall be subject to recognised riations and tolerances applicable to the Goods.	R4					Steve Cox		0251116CTR0.A	GI								Pa	ge 4 of 7

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DESIGN NOTES: OBTRUSIVE LIGHT ASSESSMENT

The Obtrusive Light assessment is based on the light limiting parameters and guidelines from the Australian Standard AS/NZS4282:2019 "Control of the obtrusive effects of outdoor lighting".

To claim compliance with the Standard, calculations must comply with the following light limiting parameters:

- * Spill light (Illuminance (lux))
- * Luminous Intensity At Vertical Planes (Candelas (cd))
- * Threshold Increment (TI) * Upward Light Ratio (ULR)

Refer to image opposite for all assumed spill light, luminous intensity and threshold increment boundaries.

Calculations are initial (LLF = 1), representing the worst-case scenario and assume Pre-curfew conditions in accordance with AS/NZS4282:2019.

This calculation has assumed the site to fall within environmental category, Zone A3 Medium District Brightness, as per Table 3.1 within AS/NZS4282:2019.

The relevant light technical parameters for spill light, threshold increment and upward light ratio are taken from Table 3.2 within AS/NZS4282:2019. Refer to next page for light technical parameters.

The relevant light technical parameters for luminous intensity are taken from Table 3.3 within AS/NZS4282:2019. All luminaires are aimed to comply with Level 1 control limits. Refer to next page for light technical parameters.

Calculations use a scaled aerial image to estimate assumed property boundaries and roadways. A surveyed drawing, highlighting property boundaries and surrounding roadways, should always be used to verify calculation locations.

See following page for relevant definitions and calculation parameters taken from AS/NZS4282:2019.

Obtrusive Light - Compliance Report ASI/029 4282/2019, A3 - Medium District Brightness, Curtew Flename: 0251116CTR0 A84282 131112023 10.12-20 AM

Illuminance Maximum Allowable Value: 2 Lux

Calculations Tested (1):

Test Max. Results Illum. PASS 0 Calculation Label South Spill Boundary_III_Seg1

Luminous Intensity (Cd) At Vertical Planes Maximum Allowable Value: 2500 Cd

Calculations Tested (1): Calculation Label South Spill Boundary_Cd_Seg1 PASS

Threshold Increment (TI) Maximum Allowable Value: 20 %

Calculations Tested (3): Adaptation Test Luminance Results 1 PASS Calculation Label Jerrat Dr_TI Preston Point Rd_TI_1 Preston Point Rd_TI_2 PASS

Upward Waste Light Ratio (UWLR) Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 % Test Results: PASS

Project: UWLR						
Scene: All On						
Label	UWLR					
Unward Waste Light Ratio	0.000					

AS/NZS4282:2019 Software Compliance Report

	h.	2504	LP2 LP3 1050g tx 3 gV to tx	rendet lead or the area off	Last Fr	ménie ante Ch
Preston Point Rd Pr	्र्र्र्र्र् eston Point Rd ब - ग व ग व ग व	Preston Poi		r r r r r r r r ton Point Rd	Preston Point Ro	4 4

Lumina	Luminaire Schedule								
Scene:	All On								
Qty	Description	LLF							
12	SR4H757A0LG3 RAPTOR GEN 3 1200W A0 Asymmetric CRI70 5700K	1.000							

SYLVANIA Schréder	This design calculation is based upon specified parameters supplied but the client and other design income assumed to up as detailed in	REV	DATE	COMMENTS	DESIGNER	PROJECT	TITLE	REVISION
Experts in lightability"	by the control, and scheme longer optical assessment by the , as uncased in this documents, in practice, the accuracy of the values will differ due to environmental variations such as actual luminaire positioning.	RD	30/08/2023	Original design	C TAME	East Fremantle Lawn Tennis	AS/NZS4282:2019 Obtrusive Light Report	R1
Sabrédar Australia Dtu Ltd	room surface inflactance, supply voltage, local luminaire ambient temperature, obstacles/furniture, etc. These results are also subject to normalise screamed absorbergetic telescenaes and relivation/incomeran	R1	13/11/2023	Curfew Assessment Included		Courts 5-9		SHEET
Bldg 4A Parklands Estate 21-23 South St	uncertainties. Schwder Australia provides this calculation without any representation	R2						A3
Rydalmere NSW 2116 Australia T 1200 489 780	or warranty of any kind. The Company shall be under no liability to the Customer for failure to attain such performance figures unless the	R3				CONTACT	DOCUMENT NO	
www.sylvania-schreder.com	performance of the Goods supplied is specifically guaranteed in writing, and any such written guarantee shall be subject to cognised manufarturing surplicing and transmost another to the foods	R4				Steve Cox	0251116CTR0 454282 AGI	PAGE NO.
ABN 17 604 331 937		RS				scox@sylvania-schreder.com		Page 6 OT 7

DESIGN NOTES: AS/NZS4282 DEFINITIONS AND CALCULATION PARAMETERS

The Obtrusive Light assessment is based on the light limiting parameters and guidelines from Australian Standards AS/N254282-2019, "Control of the obtrusive effects of outdoor lighting". To claim compliance, calculations must comply with the light limiting parameters specified by AS/N254282:2019 for Spill Light, Limitons limitshity, Threshold Increment and Upward Light Ratio.

The lighting design must determine whether light limiting parameters are to be calculated assuming Pre-Curfew or Curfew conditions. For example, Pre-Curfew conditions may be applicable up to a time slot of 10pm therefore, Curfew conditions will be applicable at a time slot from 10pm to 6am. We note, the actual time frame for Pre-Curfew conditions will be set by the Controlling Regulatory Authority.

Spill Light:

- * The calculation plane, being a vertical grid facing the site, is generally determined at the building line of the potentially affected dwelling/s.
- * Property building lines are assessed at their assumed locations, as shown on previous page.
- * In the case where the building line is greater than 10m from the relevant property boundary, the calculation plane shall be located 10m from the property boundary.
- * Spill light has been calculated in a vertical plane, facing the site from a starting height of 1.5m. The calculation grid size is 5m(L) x Im(H), where boundaries are greater than 20m from nearest pole. The calculation grid size is 2m(L) x 1m(H) where boundaries are less than 20m from nearest pole.
- * Light limiting parameters must not exceed values highlighted in Table 3.2 within AS/NZS4282:2019.

Luminous Intensity:

- * The direct view of bright luminaires from normal viewing directions can cause annoyance, distraction, and discomfort. The luminous intensity of a luminaire, in a nominated direction, is an indicator of this effect.
- * All new installations require luminaires to be aimed to meet Level 1 Control Limits. Level 1 being the highest form of control afforded to luminaire aiming. Where the reuse of existing infrastructure, or a modified installation, does not permit Level 1 control, Level 2 control is applicable.
- * Luminous Intensity has been calculated on the same vertical plane at coincidental points, as per the Spill Light grids noted above. Light limiting parameters must not exceed values highlighed in Table 3.3 within AS/NZS4282:2019.

Threshold Increment:

- * The effects on transport system users (e.g., motorists, railway lines) normally involve a reduction in the ability to see caused by disability glare from bright light sources. The relevant indicator for transport system users is Threshold Increment.
- * Threshold Increment has been calculated on all surrounding roadways, as shown on previous page, in accordance with Table 3.2 within AS/NZS4282:2019.

Upward Light Ratio (Sky Glow):

* The amount of flux from a luminaire that is emitted above the horizontal, directly into the night sky, calculated as a ratio and expressed as a percentage, is known as the Upward Light Ratio (ULR). Maximum limits as per Table 3.2 within AS/NZS4282:2019.

TABLE 3.1

	ENVIRONMENTAL ZONES								
tones	Descriptions	Examples							
AO	Intrinsically dark	UNESCO Starlight Reserve, IDA Dark Sky Parks. Major optical observatories No road lighting - unless specifically required by the road controlling authority							
A1	Dark	Relatively uninhabited rural areas No road lighting - unless specifically required by the road controlling authority							
A2	Low district brightness	Sparsely inhabited rural and semi-rural areas							
A3	Medium district brightness	Suburban areas in towns and cities							
A4	High district brightness	Town and city centres and the commercial areas Residential areas abutting commercial areas							
TV	High district brightness	Vicinity of major sports stadiums during TV broadcasts							
v	Residences near traffic routes	Refer AS/NZS 1158.1.1							
R1	Residences near local roads with significant setback	Refer AS/NZS 1158.3.1							
R2	Residences near local roads	Refer AS/NZS 1158.3.1							
R3	Residences near a roundabout or local area traffic management device	Refer AS/NZS 1158.3.1							
RX	Residences near a pedestrian crossing	Refer AS/NZS 1158.4							

NOTE: Recreational areas are not considered commercial

TABLE 3.2

.......

Zones	Vertical Illuminar (Ev) Ix	ce Levels	Thresh	old Increments (77)	Sky Glow	
	Non-curfew	Curfew	- 56	Default adaptation level (L ad)	Upward light ratio	
AO	See Note 1	0	N/A	N/A	0	
A1	2	0.1	N/A	N/A	0	
A2	5	1	20%	0.2	0.01	
A3	10	2	20%	1	0.02	
A4	25	5	20%	5	0.03	
TV	See Table 3.4	N/A	20%	10	0.08	
v	N/A	4	Note 2	Note 2	Note 2	
R1	N/A	1	20%	0.1	Note 3	
R2	N/A	2	20%	0.1	Note 3	
R3	N/A	4	20%	0.1	Note 3	
RX	N/A	4	20%	5	Note 4	

NOTES:

1. For A0, Ev shall be as close to zero as practicable without impacting safety considerations

- 2. Refer to AS/NZS 1158.1.1
- 3. Refer to AS/NZS 1158.3.1
- 4. Refer to AS/NZS 1158.4
- 5. N/A means 'Not Applicable'.

TABLE 3.3

	Luminous intensity (1), cd						
zone	Non-curfew L1	Non-curfew L2	Curfew 0 500 1 000 2 500 2 500	Curfew			
AO	See Note	See Note	0				
A1	2 500	5 000	500				
A2	7 500	12 500	1 000				
A3	12 500	25 000	2 500				
A4	25 000	50 000	2 500				
TV	100 00	150 000	0				

NOTE: For A0, / shall be as close to zero as practicable without impacting safety considerations

SYLVANIA Schréder	This design calculation is based upon specified parameters supplied by the client, and other design incurs assumed by us, as detailed in	REV	DATE	COMMENTS	DESIGNER	PROJECT	TITLE	REVISION
Experts in lightability"	this document in practice, the acouracy of the values will differ due to environmental variations such as actual luminaire positioning.	RD	30/08/2023	Original design	C TAME	East Fremantle Lawn Tennis	AS/NZS4282:2019 Definitions and Parameters	R1
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Bldg 4A Parklands Estate 21-23 South St		R2						A3
Rydalmere NSW 2116 Australia T 1300 489 780	or warranty of any kind. The Company shall be under no liability to the Customer for failure to attain such performance figures unless the model of the state of	R3				CONTACT	DOCUMENT NO	
www.sylvania-schreder.com	and any such written guarantee shall be subject to recognised manufacturing variations and taleances applicable to the book.	R4				Steve Cox	0251116CTR0 AS4282.AGI	PAGE NO.
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