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St George Illawarra CHPC

Lighting Performance Report

St George Illawarra Dragons Rugby League Football Club (SGIDRLFC)

Reference: P520547

Revision: 4

2023-08-18

Document control record

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Document control						aurecon
Report title		Lighting Performance Report				
Document code		SGID CHPC LPR	**Project number**		P520547	
File path		Https://aurecongroup.sharepoint.com/sites/P520547/5 Deliver Design/501 Engineering/Calculations and Analysis/Elec/Sportslighting/230818 St George CHPC Lighting Performance Report[4].docx				
Client		St George Illawarra Dragons Rugby League Football Club (SGIDRLFC)				
Client contact		Ryan Webb	**Client reference**		RW	
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier** (if required)	**Approver**
1	2022-07-29	Draft For Comment	EL	MR	MR	SB
2	2022-08-11	Final	EL	MR	MR	SB
3	2023-07-21	Draft DA Amendment Submission	EL	MR	MR	SB
4	2023-08-18	DA Amendment Submission	SB	MR	MR	SB
Current revision		**4**				

Approval			
Author signature		Approver signature	
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Title	Electrical Engineer	Title	Project Leader

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Appendices

1 Introduction

The St George Illawarra Rugby League Football Club intends to build a High Performance & Community Centre (HPCC) on the northern portion of University of Wollongong's Innovation Campus in North Wollongong.

The intent of the HPCC is to achieve a single site operation for the Dragons that supports high performance, delivers a functional and efficient operating environment that allows for operational growth and ongoing evolution of high-performance environments. The facility may also provide the local and regional community access to health, education and employment support programs.

The proposed works include:

- A community high performance centre for the St George Illawarra Dragons Rugby League Football Club (SGIDRLFC)
- Community Field
- NRL Field

The Club's vision and objectives for the HPCC facility were defined as follows:

- One club, unified
- A competitive edge in high performance
- Strengthen the regional rugby league ecosystem
- University partnership
- Community involvement
- Gender equity
- Universal access
- Innovation and Sustainability

The NRL Field which will be used exclusive by SGIDRLFC, will not be provided with floodlighting. The Community field which will be predominately used by SGIDRLFC but will also be available for a variety of community use, will be provided with floodlighting

This report has been prepared to provide an overview of the spotlighting requirements and design parameters for the Community Field.

2 Design Standards

2.1 Relevant Standards

AS2560.2.2021- *Sports Lighting, Part 2 Specific applications* Sets out design and performance requirements and recommendations for the lighting of specific outdoor and indoor sports areas. Whilst the standard covers a range of indoor and outdoor sports Section 2.6 provides specific guidelines for football (all codes) which includes Rugby League. Various Lighting Technical Parameters are provided for various levels of play ranging from Amateur to Professional level, and for various activities generally including training, match practise and competition.

AS4282:2019 - *Control of the obtrusive effects of outdoor lighting* Specifies requirements for the control of the obtrusive effects of outdoor lighting. It includes limits for the relevant lighting parameters to control these effects.

Sports lighting requirements for Televised matches are covered under *Free TV Operational Practice OP-31*, given the community field will not host any Televised competition matches OP-31 is not applicable and has not been considered in this report and will be considered in the design.

2.2 Illumination Levels

Illumination levels for the playing field will be as per the recommendations of AS2560.2.6.

Based on the briefing information provided by SGIDRLFC, it has been determined that:

- Highest applicable “Level of play” is semi-professional, given the SGIDRLFC first grade team will exclusive use the NRL with the community field utilised by junior teams.
- Type of play is “match practice” given the fields will be used for training purposes and will not host competition games

As per table 2.6.1 the community field shall be illuminated to achieve an average horizontal maintained illumination of 100lux.

Table 2.6.1 of AS2560.2.2021 also provides a number of additional lighting technical requirements which are shown in the below table

Table 2.6.1 — LTPs for football

Level of play	Average horizontal maintained illuminance ($\bar{E}_h$)	Minimum horizontal uniformity		Maximum uniformity gradient per 5 m[e]		Max. glare rating (GR)	Minimum colour rendering index (R_a)
		($E_{hmin}/\bar{E}_h$) (U_1)	(E_{hmin}/E_{hmax}) (U_2)	G	UG		
Amateur level							
Touch and tag	50	0.30[b]	N/A	N/A	N/A	N/A	65
Ball and physical training	50	0.30	N/A	N/A	N/A	N/A	65
Club competition and match practice	100[a]	0.50	0.30	50 %	2	50	65
Semi-professional level							
Ball and physical training	50	0.30[b]	N/A	N/A	N/A	N/A	65
Match practice	100	0.50	0.30	50 %	2	50	65
Semi-professional competition	200	0.60	0.40[c]	40 %	1.67	50	65
Professional level							
Ball and physical training	100	0.50	0.30	50 %	2	50	65
Match practice	200	0.60	0.40[c]	40 %	1.67	50	65
Professional competition	500	0.70	0.50[d]	25 %	1.33	50	65

[a] For competition level Australian Rules Football 150 lx is preferred where practicable to take account of contemporary viewing expectations of spectators.

[b] A value of 0.40 is preferred where practicable for new installations.

[c] Where two or more fields are adjacent and with luminaires operating simultaneously U_2 may be reduced to a minimum value of 0.30 (the adjacent field may be lit to a greater or lesser level).

[d] Where two or more fields are adjacent and with luminaires operating simultaneously U_2 may be reduced to a minimum value of 0.40 (the adjacent field may be lit to a lesser level).

[e] For Australian Rules Football the limit for G may be increased by 5 % at points that are within 5 m from the outfield boundary but they should not be in the goal area (within the 50 m arc), i.e. around the perimeter wings only. For Soccer the limit for G may be increased by 5 % at one point only (or 2 or 4 points if there is scheme symmetry) but they should not be in the penalty area, or the corner points. For Rugby the limit for G may be increased by 5 % at one point only (or 2 or 4 points if there is scheme symmetry) but they should not be either side of the try line.

2.3 Spill lighting

AS4282 sets out the maximum spill lighting permitted to neighbouring properties and provides separate requirements for curfew (11pm to 6am) and non-curfew hours. As the Sports Lighting is not proposed to be used after 11pm compliance will be assessed on the non-curfew requirements only. The development area has been assessed to be Environmental Zone A3 – Medium district brightness and hence a 10 lux maximum vertical illuminance on the windows of neighbouring residential properties applies.

Whilst AS4282 specifies that the limitation applies at the either the existing building line, or 10m from the property boundary (which ever is closer to the lighting installation), calculations in detailed design will be completed directly at the property boundary as a conservative approach. Additionally, the spill lighting calculations undertaken at detailed design will not consider any natural barriers to the spill lighting such as boundary fences and vegetation.

A full spill lighting report will be submitted upon completion of the lighting design, demonstrating compliances with all technical requirements. Calculation will be carried out using standard industry software (AGi32), calculation methods will be as per the requirements of the standard.

TABLE 3.1

ENVIRONMENTAL ZONES

Zones	Description	Examples
A0	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 other commercial areas Residential areas abutting commercial areas
TV	High district brightness	Vicinity of major sports stadium during TV broadcasts
V	Residences near traffic routes	Refer AS/NZS1158.1.1
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

TABLE 3.2

MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS

Zones	Vertical illuminance levels (E_v) lx		Threshold increment (TI)		Sky glow
	Non-curfew	Curfew	%	Default adaptation level (L_{ad})	Upward light ratio
A0	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

3 Proposed Equipment

The Community Field is proposed to be lit using the Philips OptiVision LED gen3.5. Phillips are a leading sportlighting manufacturer with LED floodlights installations in many major stadia throughout the world. The latest fitting within their premium sportlighting range the “OptiVision LED gen 3.5” can be provided with integrated spill lighting control solutions where louvers are integrated into the fitting to precisely control the light distribution of each individual LED module to its intended location which greatly assists in achieving compliance with AS4282 Spill Lighting requirements.

Product data

General information	
Lamp family code	LED2200 [LED module 220000 lm]
Light source color	740 neutral white
Light source replaceable	Yes
Number of gear units	1 unit
Driver/power unit/transformer	Power supply unit with DALI interface
Driver included	Yes
Optical cover/lens type	Polycarbonate bowl/cover clear
Luminaire light beam spread	5° - 11° x 121°
Control interface	DALI
Connection	Connection unit 5-pole
Cable	-
Protection class IEC	Safety class I

Flammability mark	For mounting on normally flammable surfaces
CE mark	CE mark
ENEC mark	ENEC mark
Warranty period	3 years
Optic type outdoor	Asymmetrical axis angle 32° wide beam
Constant light output	No
Number of products on MCB of 16 A type B	-
EU RoHS compliant	Yes
Light source engine type	LED
Service tag	Yes
Product family code	BVP528 [OPTIVISION LED GEN3.5 LARGE]

OptiVision LED gen3.5

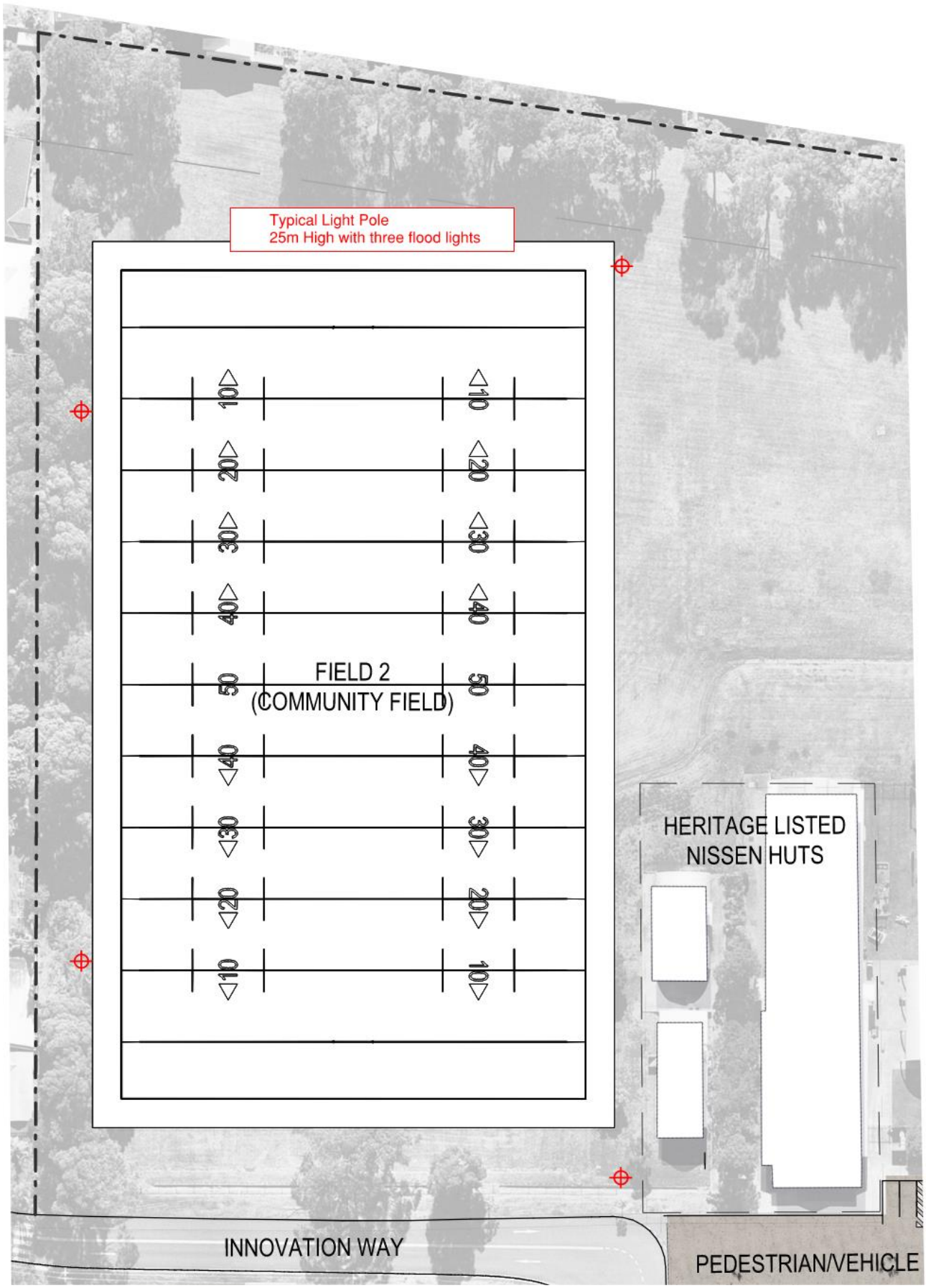
Integrated spill light control solutions (LT, BL & LO) for asymmetrical beam

4 Conclusion

The community field will be illuminated to achieve an average horizontal maintained illumination of 100lux as per Table 2.6.1 of AS2560.2.

The sports lighting design will ensure that a vertical illumination of 10 lux is not exceeded on the windows of neighbouring residential properties applies in accordance with AS4282. Compliance with this requirement ensures that neighbouring properties will not be exposed to unreasonable levels of spill lighting as a result of the sports lighting. A spill lighting report will be compiled for the design to demonstrate compliance.

Appendix A – Preliminary Lighting Plan



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