LIGHTING ASSESSMENT

LIGHT SPILL IMPACT ASSESSMENT AND EXTERNAL LIGHTING STRATEGY FOR INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY DEVELOPMENT

ELECTRICAL SERVICES

JHA
CONSULTING ENGINEERS

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DOCUMENT CONTROL SHEET

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Prepared By

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Chloe Rich Jackson Environment and Planning Pty Ltd	REV DATE	[C] 28/07/2023			DATE	3/01/2024			

CONTENTS

1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

JHA Consulting Engineers have been engaged as the lighting consultant by Jackson Environment and Planning Pty Ltd to produce a report for Light Spill Impact Assessment and External Lighting Strategy for Mossvale Building. The report is primarily on three key areas with regards to lighting, namely:

- Roadway Lighting
- External Lighting for Buildings 1,2 & 3
- Obtrusive Lighting
- Impact of external lighting on 270 and 254 Oldbury Road, Sutton Forest

The Light Spill Impact assessment and External Lighting Strategy is to include the three created lots with proposed Buildings and the public areas along Bowman Road. No lighting will be installed on the lots that will remain undeveloped.

The main objective of the design will focus on a lighting proposal which can satisfy the requirement of:

1. Lighting design for internal roads and outdoor carpark in accordance with AS/NZS 1158.3.1:2020;
2. Lighting design in accordance with AS/NZS 4282:2019;

This report includes the following:

- A plan detailing the height, location, type of light fittings and the proposed hours of use.
- Demonstration of adequate external lighting to meet AS/NZS 1158.3.1:2020.
- Demonstrate compliance of obtrusive lighting to meet AS/NZS 4282:2019.
- Impact Assessment
- Proposed management & mitigation measures

2 OVERVIEW OF PROPOSAL

2.1 AUSTRALIAN STANDARDS

Study and assessment findings are conducted in accordance with;

- AS/NZS 1158.3.1:2020 - Lighting for roads and public spaces
- AS/NZS 1158.3.1:2020 – Lighting for roads and public spaces – Entry roadway
- AS/NZS 4282:2019 - Control of the obtrusive effects of outdoor lighting

As part of this report, lighting calculations for following areas are done:

1. General roadway lighting of Hutchinson Road & Bowman Road
2. External lighting for Building 1 including pedestrian lighting, external carpark lighting & vehicle movement lighting.
3. External lighting for Building 2 including pedestrian lighting, external carpark lighting & vehicle movement lighting.

4. External lighting for Building 3 including pedestrian lighting, external carpark lighting & vehicle movement lighting.
5. Obtrusive Lighting calculation at 10 Bowman Road, adjacent to the boundary of Lot 2.
6. Obtrusive Lighting calculation at 270 and 254 Oldbury Road, Sutton Forest.

Refer to Appendix A for Road lighting and non-obtrusive lighting calculations, proposed type of fittings, location of fitting & mounting height.

2.2 GENERAL ROADWAY LIGHTING

For a circulatory roadway system of this nature the standard recommends specific light levels suitable to a roadway that sees local roads or streets used primarily for access to abutting properties, including residential, commercial and industrial precincts. Figures 3.2.2 and 3.2.3 below are excerpts from the external lighting standard detailing the recommended external lighting category and subsequent light levels required to achieve these categories.

With the recommendation from Jackson Environment and Planning Pty Ltd to meet a minimum of PR5 lighting sub-category, JHA designed the lighting system for the main roadway of Hutchinson Road & Bowman Road.

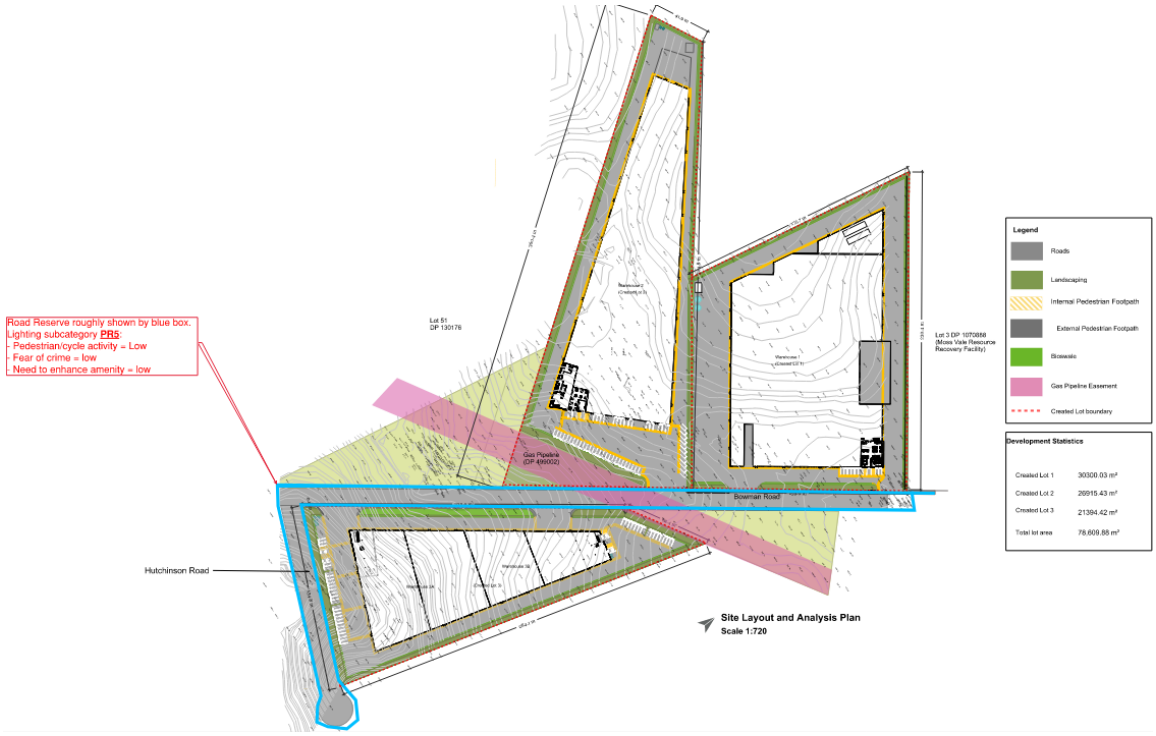


Figure 1- Recommended Area for Road Reserves Lighting

TABLE 2.1

LIGHTING SUBCATEGORIES FOR ROAD RESERVES IN LOCAL AREAS

1	2	3	4	5	6
Type of road or pathway		Selection criteria[a,b]			Applicable lighting subcategory[c,d]
General description	Basic operating characteristics	Pedestrian/ cycle activity	Fear of crime	Need to enhance amenity	
Collector roads or non-arterial roads which collect and distribute traffic in an area, as well as serving abutting properties	Mixed vehicle and pedestrian traffic	N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5
Local roads or streets used primarily for access to abutting properties, including residential, commercial and industrial precincts		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5
		N/A	N/A	N/A	PR6[e]
Common area, forecourts of cluster housing		N/A	High	N/A	PR1
		High	Medium	High	PR2
		Medium	Low	Medium	PR3[f] or PR4[f]
		Low	Low	Low	PR5

Figure 2- Recommended Lighting Categories for Road Reserves (taken from AS1158 part 3.1)

TABLE 3.3

VALUES OF LIGHT TECHNICAL PARAMETERS FOR ROADS IN LOCAL AREAS

1	2	3	4
Lighting subcategory	Light technical parameters (LTP)		
	Average horizontal illuminance[a,b] $(\bar{E}_h)$ lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})
PR1	7	2	8
PR2	3.5	0.7	8
PR3[e]	1.75	0.3	8
PR4[d,e]	1.3	0.22	8
PR5[d,e]	0.85	0.14	10
PR6[d]	0.7	0.07	10

Figure 3 – Subsequent Minimum Light Level for a PR5 category Light System (taken from AS1158 part 3.1)

2.3 EXTERNAL LIGHTING - BUILDING 1

During Operational hours (05:00 to 20:00) Jackson Environment and Planning Pty Ltd recommends a minimum of following sub-categories lighting system be installed:

- High Night time vehicle/pedestrian movements – PC1 lighting category
- Medium Night time vehicle/pedestrian movements – PC2 lighting category
- Outdoor parking that includes disabled parking – PCD lighting category

Outside operational hours (21:00 to 04:00) it is recommended to reduce the lighting in all spaces to Low Night time vehicle/pedestrian movements – PC3 lighting category.

JHA have designed the external lighting system for Building 1 to achieve the above requirement in compliance with AS1158.

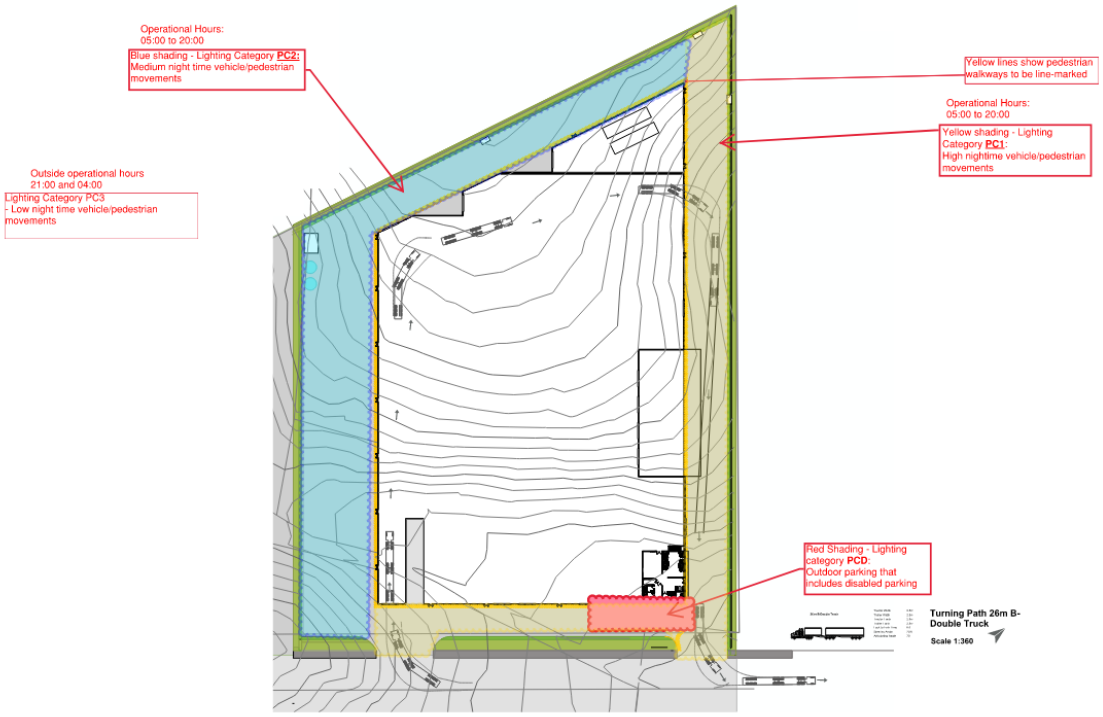


Figure 4 – External Area Lighting Building 1

TABLE 2.5

LIGHTING SUBCATEGORIES FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4
Type of area	Selection criteria[a,c]		
	Night time vehicle and/or pedestrian movements	Fear of crime	Applicable lighting subcategory[b]
Parking spaces, aisles and circulation roadways	High	High	PC1
	Medium	Medium	PC2
	Low	Low	PC3
Designated parking spaces specifically intended for people with disabilities	N/A	N/A	PCD
For any designated areas for pedestrians to cross	N/A	N/A	PCX

Figure 5- Recommended Lighting Categories for Outdoor Carparks (taken from AS1158 part 3.1)

TABLE 3.7

VALUES OF LIGHT TECHNICAL PARAMETERS FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] $(\bar{E}_h)$ lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PC1	14	3	8	3
PC2	7	1.5	8	1
PC3	3.5	0.7	8	—
PCD[d]	—	≥14 and ≥$(\bar{E}_h)$ [d]	—	—
PCX[e]	21	5	8	—

Figure 6 – Subsequent Minimum Light Level for a PC3 category Light System (taken from AS1158 part 3.1)

2.4 EXTERNAL LIGHTING - BUILDING 2

During Operational hours (05:00 to 20:00) Jackson Environment and Planning Pty Ltd recommends a minimum of following sub-categories lighting system be installed:

- High Nigh time vehicle/pedestrian movements – PC1 lighting category
- Outdoor parking that includes disabled parking – PCD lighting category
- Pedestrians crossing between car park and Building – PCX lighting category

Outside operational hours (21:00 to 04:00) it is recommended to reduce the lighting in all spaces to Low Night time vehicle/pedestrian movements – PC3 lighting category.

JHA have designed the external lighting system for Building 2 to achieve the above requirement in compliance with AS1158.

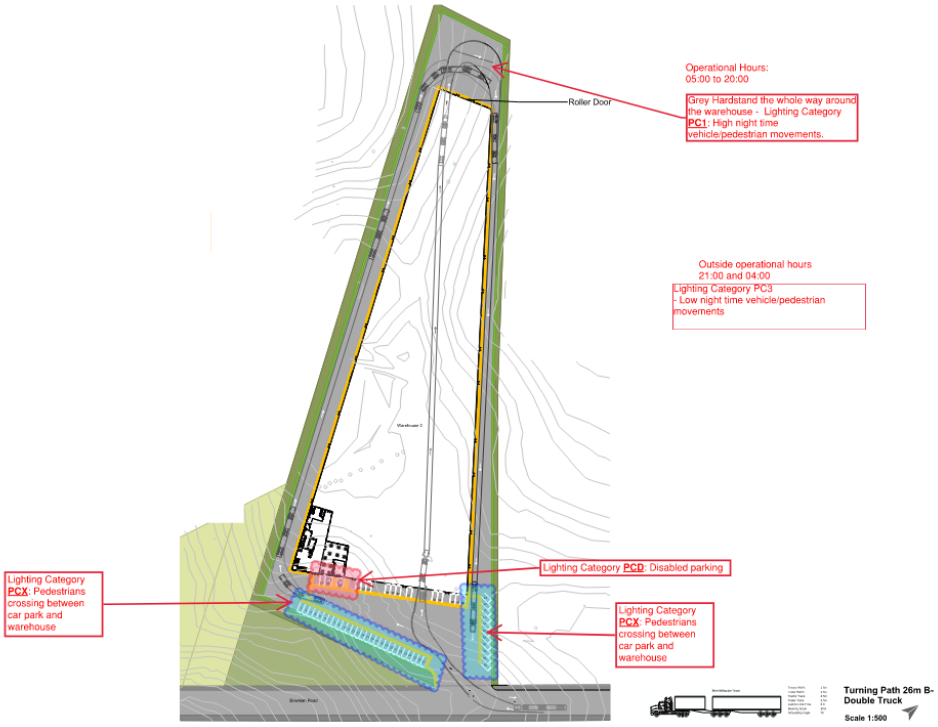


Figure 7 – External Area Lighting Building 2

TABLE 2.5

LIGHTING SUBCATEGORIES FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4
Type of area	Selection criteria[a,c]		
	Night time vehicle and/or pedestrian movements	Fear of crime	Applicable lighting subcategory[b]
Parking spaces, aisles and circulation roadways	High	High	PC1
	Medium	Medium	PC2
	Low	Low	PC3
Designated parking spaces specifically intended for people with disabilities	N/A	N/A	PCD
For any designated areas for pedestrians to cross	N/A	N/A	PCX

Figure 8- Recommended Lighting Categories for Outdoor Carparks (taken from AS1158 part 3.1)

TABLE 3.7

VALUES OF LIGHT TECHNICAL PARAMETERS FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] $(\bar{E}_h)$ lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PC1	14	3	8	3
PC2	7	1.5	8	1
PC3	3.5	0.7	8	—
PCD[d]	—	≥14 and ≥$(\bar{E}_h)$ [d]	—	—
PCX[e]	21	5	8	—

Figure 9 – Subsequent Minimum Light Level for a PC3 category Light System (taken from AS1158 part 3.1)

2.5 EXTERNAL LIGHTING – BUILDING 3

During Operational hours (05:00 to 20:00) Jackson Environment and Planning Pty Ltd recommends a minimum of following sub-categories lighting system be installed:

- High Nigh time vehicle/pedestrian movements – PC1 lighting category
- Outdoor parking that includes disabled parking – PCD lighting category
- Pedestrians crossing between car park and building – PCX lighting category

Outside operational hours (21:00 to 04:00) it is recommended to reduce the lighting in all spaces to Low Night time vehicle/pedestrian movements – PC3 lighting category.

JHA have designed the external lighting system for Building 3 to achieve the above requirement in compliance with AS1158.

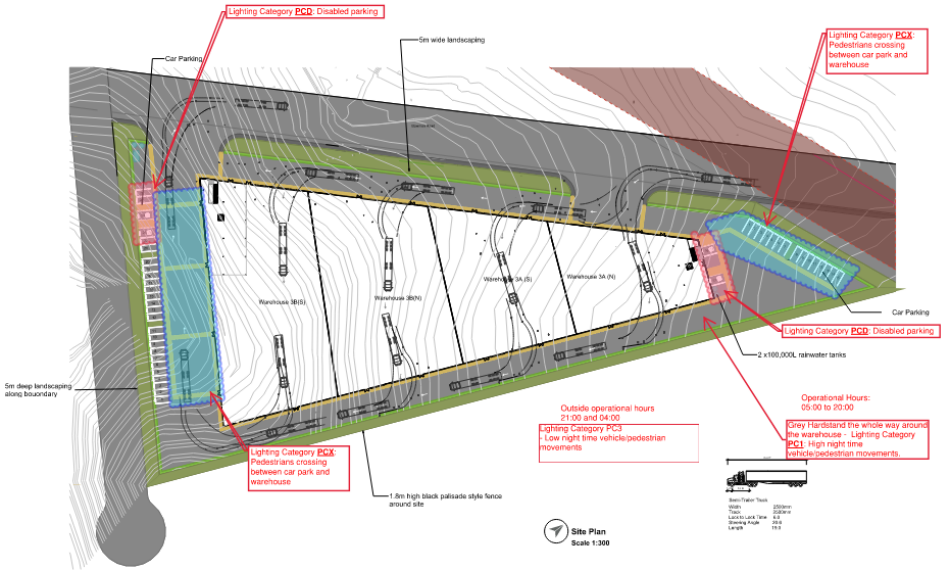


Figure 10 – External Area Lighting Building 3

TABLE 2.5

LIGHTING SUBCATEGORIES FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4
Type of area	Selection criteria[a,c]		
	Night time vehicle and/or pedestrian movements	Fear of crime	Applicable lighting subcategory[b]
Parking spaces, aisles and circulation roadways	High	High	PC1
	Medium	Medium	PC2
	Low	Low	PC3
Designated parking spaces specifically intended for people with disabilities	N/A	N/A	PCD
For any designated areas for pedestrians to cross	N/A	N/A	PCX

Figure 11- Recommended Lighting Categories for Outdoor Carparks (taken from AS1158 part 3.1)

TABLE 3.7

VALUES OF LIGHT TECHNICAL PARAMETERS FOR OUTDOOR CAR PARKS (INCLUDING ROOF-TOP CAR PARKS)

1	2	3	4	5
Lighting subcategory	Light technical parameters (LTP)			
	Average horizontal illuminance[a,b] $(\bar{E}_h)$ lx	Point horizontal illuminance[a,b] (E_{Ph}) lx	Illuminance (horizontal) uniformity[c] Cat. P (U_{E2})	Point vertical illuminance[a,b] (E_{Pv}) lx
PC1	14	3	8	3
PC2	7	1.5	8	1
PC3	3.5	0.7	8	—
PCD[d]	—	≥14 and ≥$(\bar{E}_h)$ [d]	—	—
PCX[e]	21	5	8	—

Figure 12 – Subsequent Minimum Light Level for a PC3 category Light System (taken from AS1158 part 3.1)

2.6 OBTRUSIVE LIGHTING

Obtrusive Lighting calculation for the adjacent property at 10 Bowman Road, adjacent to the boundary of Lot 2 The proposed lighting design complies to AS/NZS 4282:2019 (control of the obtrusive effects of outdoor lighting specifically to A1 Dark) while required lighting levels are achieved for roadways and external area of buildings.

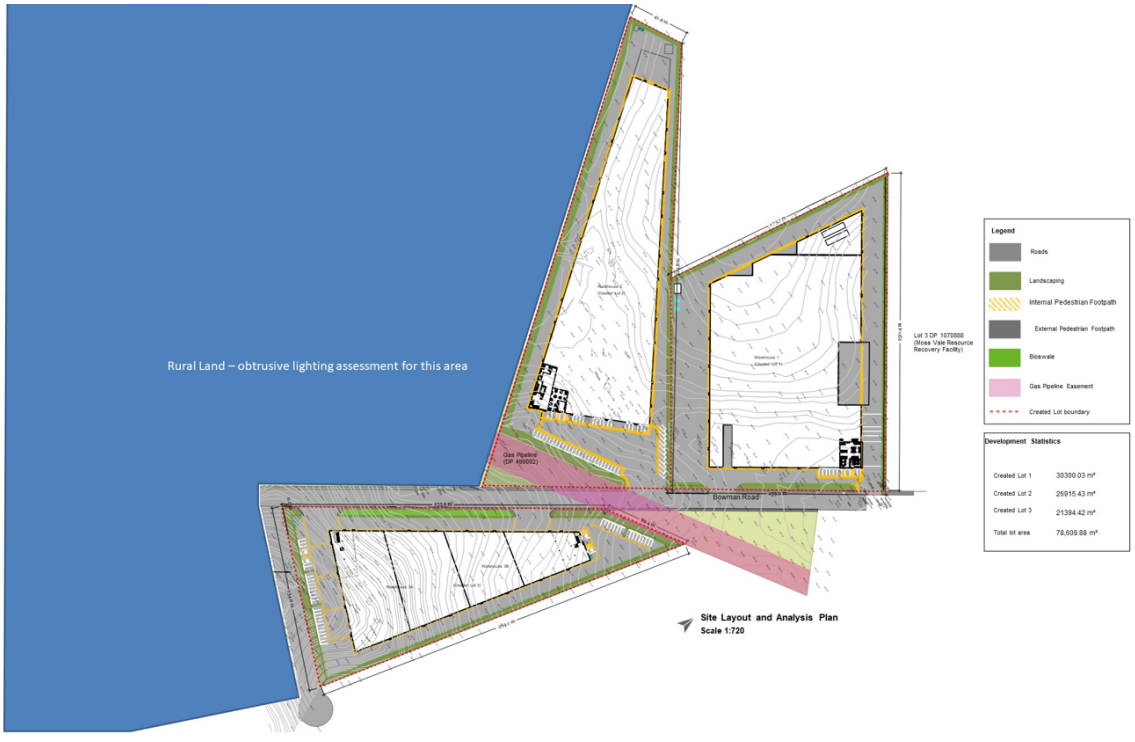


Figure 13 – Obtrusive Lighting – Rural land

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

NOTE: Recreational areas are not considered commercial.

Figure 14- Recommended Lighting Zone for Obtrusive Lighting (taken from AS4282 part 3.1)

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

NOTES:

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

2 Refer to AS/NZS 1158.1.1.

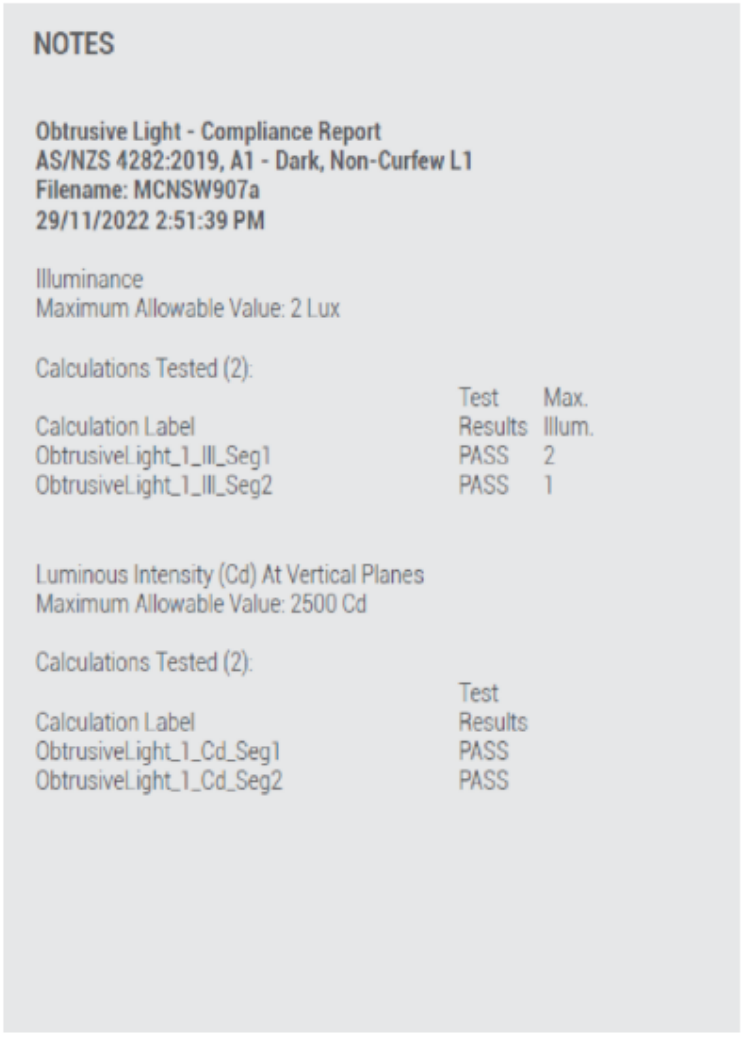
3 Refer to AS/NZS 1158.3.1.

4 Refer to AS/NZS 1158.4.

5 N/A means 'Not Applicable'.

6 For an internally illuminated sign in an A2 zone, $L_{ad} \leq 0.25$ cd/m^2.

Figure 15- Subsequent Light Level of A2 Zone for Obtrusive Lighting (taken from AS4282 part 3.1)



NOTES

Obtrusive Light - Compliance Report
AS/NZS 4282:2019, A1 - Dark, Non-Curfew L1
Filename: MCNSW907a
29/11/2022 2:51:39 PM

Illuminance
Maximum Allowable Value: 2 Lux

Calculations Tested (2):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight_1_Ill_Seg1	PASS	2
ObtrusiveLight_1_Ill_Seg2	PASS	1

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

Calculations Tested (2):

Calculation Label	Test Results
ObtrusiveLight_1_Cd_Seg1	PASS
ObtrusiveLight_1_Cd_Seg2	PASS

Figure 16- Designed Obtrusive lighting Compliance Report

3 EXISTING ENVIRONMENT

SAAS is seeking to create an industrial subdivision that will include land from the property at 2 Bowman Road, Moss Vale (Lot 1, DP103123 and Lot 2, DP1070888), and a small portion of the adjacent property at 10 Bowman Road (Lot 51, DP130176). buildings are proposed to be constructed on three of the created lot.

The property at 2 Bowman Road is a split zoned site comprising two Lots: Lot 1, DP103123 (Lot 1) and Lot 2, DP1070888 (Lot 2) (Figure 1). Lot 1, DP103123 is located on the opposite side of Whites Creek to the remainder of the property. It is approximately 0.8ha and consists entirely of C3 (Environmental Management) land zoning. No development is proposed on this portion of land.

Lot 2 covers an area of approximately 14.2ha and is divided into three areas separated by a road and gas pipeline easement. The Lot consists of the following land use zones:

• IN1 General Industrial;

• IN2 Light Industrial; and
• RU2 Rural Landscape.

The adjacent property at 10 Bowman Road (Lot 51, DP130176) is a 48-hectare rural property, adjacent to the western boundary of Lot 2. An area of approximately 12,500m2 in the north-east portion of the Lot is zoned IN1 and is proposed to be incorporated into the industrial subdivision and building development (Figure 1). The remainder of the property is zoned RU2.

All building development will be located within the IN1 and IN2 zones in the northern portions of the site. No works are proposed within the RU2 Rural Landscape zones.

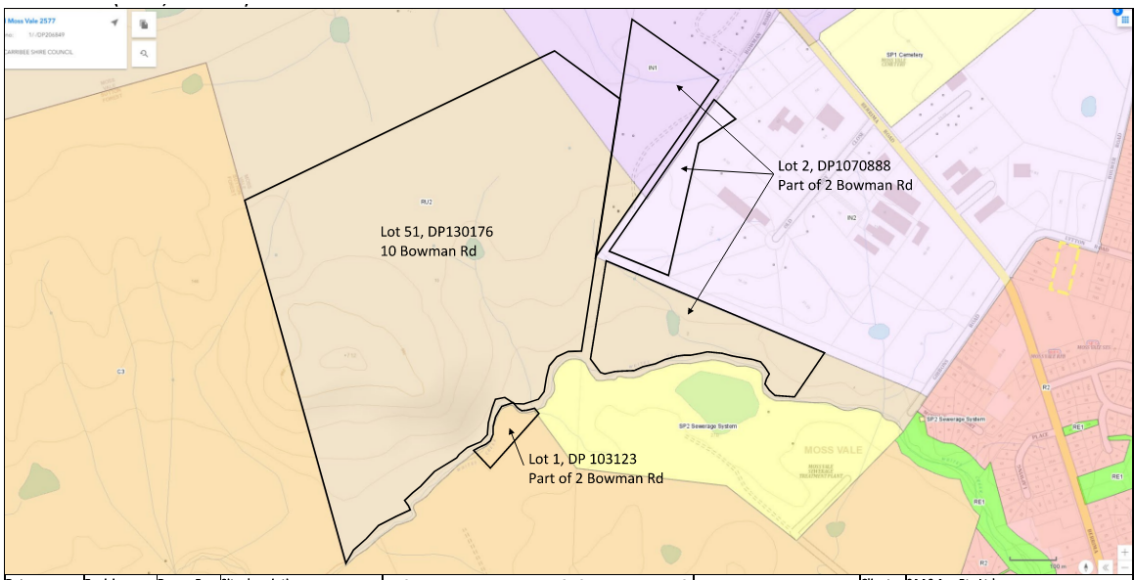


Figure 17-. Current property boundaries and land use zoning for 2 Bowman Road, Moss Vale NSW 2577 (Lot 1, DP103123 and Lot 2, DP1070888) and 10 Bowman Road (Lot 51, DP130176)

4 REDUCING THE IMPACT OF EXTERNAL LIGHTING TO 270 AND 254 OLDBURY ROAD, SUTTON FOREST

In accordance with AS/NZS 4282:2019 – JHA's design is able to achieve conformance to A2 - Low District Brightness, Non-Curfew L1. A2 is defined (via Table 3.1) as sparsely inhabited rural and semi-rural areas.

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

Figure 17- Table 3.1 Environmental Zones

The maximum allowable illuminance for this category is 5 lux and for both areas calculated, JHA's design has achieved a 1 lux value indicating a PASS value on this requirement. This is calculated at 10m beyond the site boundary as per AS/NZS 4282:2019 – Control of the obtrusive effects of outdoor lighting.

The aforementioned properties and surrounding zoned areas are beyond the 10m site boundary and are therefore not affected or incorporated in these calculations.

In addition, the lighting products used are full cut-off luminaires which limit the uplight component and mitigate/reduce sky glow. Furthermore, they are using asymmetric optics and are positioned horizontally flat with zero-degree tilt. This assists in achieving the required 0% Upward Waste Light Ratio and helps to maintain controlled illumination without distributing light into opposing and boundary properties.

Based on this assessment, and the recommended lighting strategy outlined in this report, nil lighting impacts are expected to heritage properties located at 254 and 270 Oldbury Rd, Sutton Forest.

5 IMPACT ASSESSMENT

In order to comply with the external lighting standard JHA recommends installation of new lighting system with high efficiency and optically controlled LED pole mounted lighting.

The use of pole mounted lighting takes advantage of illuminating from a height, which provides better light distribution along roadways, making for a much safer environment for places with pedestrian/vehicle interactions. The installation of pole mounted lighting will minimise the number of light fittings required to illuminate the roadway and provides more uniform light. This enables better visibility for drivers and pedestrians through the minimisation of light pooling around the light source.

6 PROPOSED MANAGEMENT AND MITIGATION MEASURES

JHA recommends that all pole mounted lighting should be located on the pedestrian side of the road to maximise light distribution on the pedestrian part of the roadway. It is recommended that a pole light with a type I or type II lighting distribution with sharp rear light spill cut-off is used to provide controlled uniform light along the length of the roadway, whilst minimising any spill to neighbouring buildings.

The height and number of poles has been chosen for the most optimised solution. The reserve road area is illuminated using 12m poles using asymmetric optics with 0 degree tilt while the area surrounding the building is illuminated using 6.5m, 10m & 11m poles using asymmetric optics with 0 degree tilt.

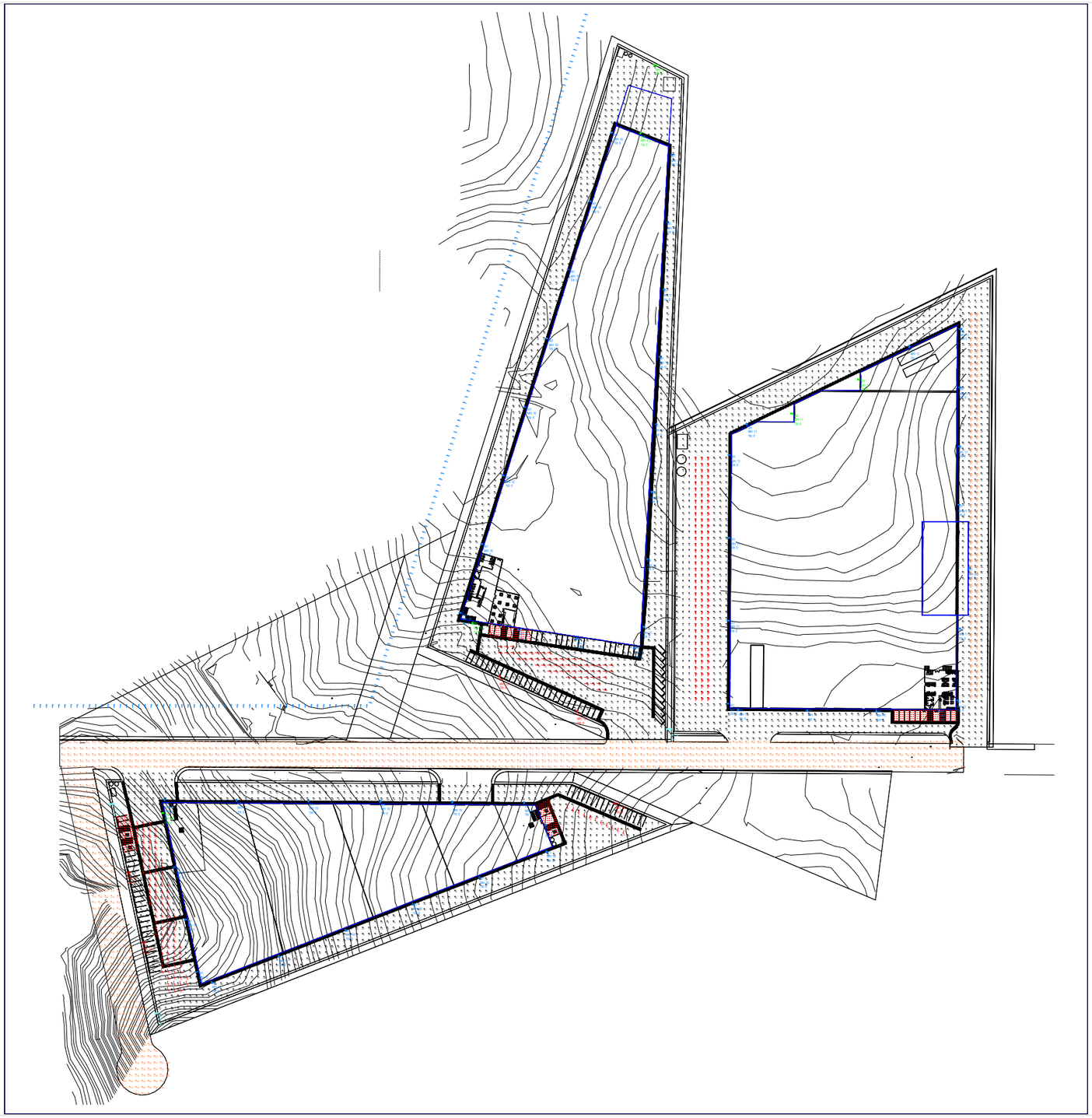
The use of asymmetrical flood lighting also provides a localised lighting solution that complies with the control of obtrusive effects of outdoor lighting. This provides sufficient illumination creating a safe localised environment with clear occupational visibility and low glare risk.

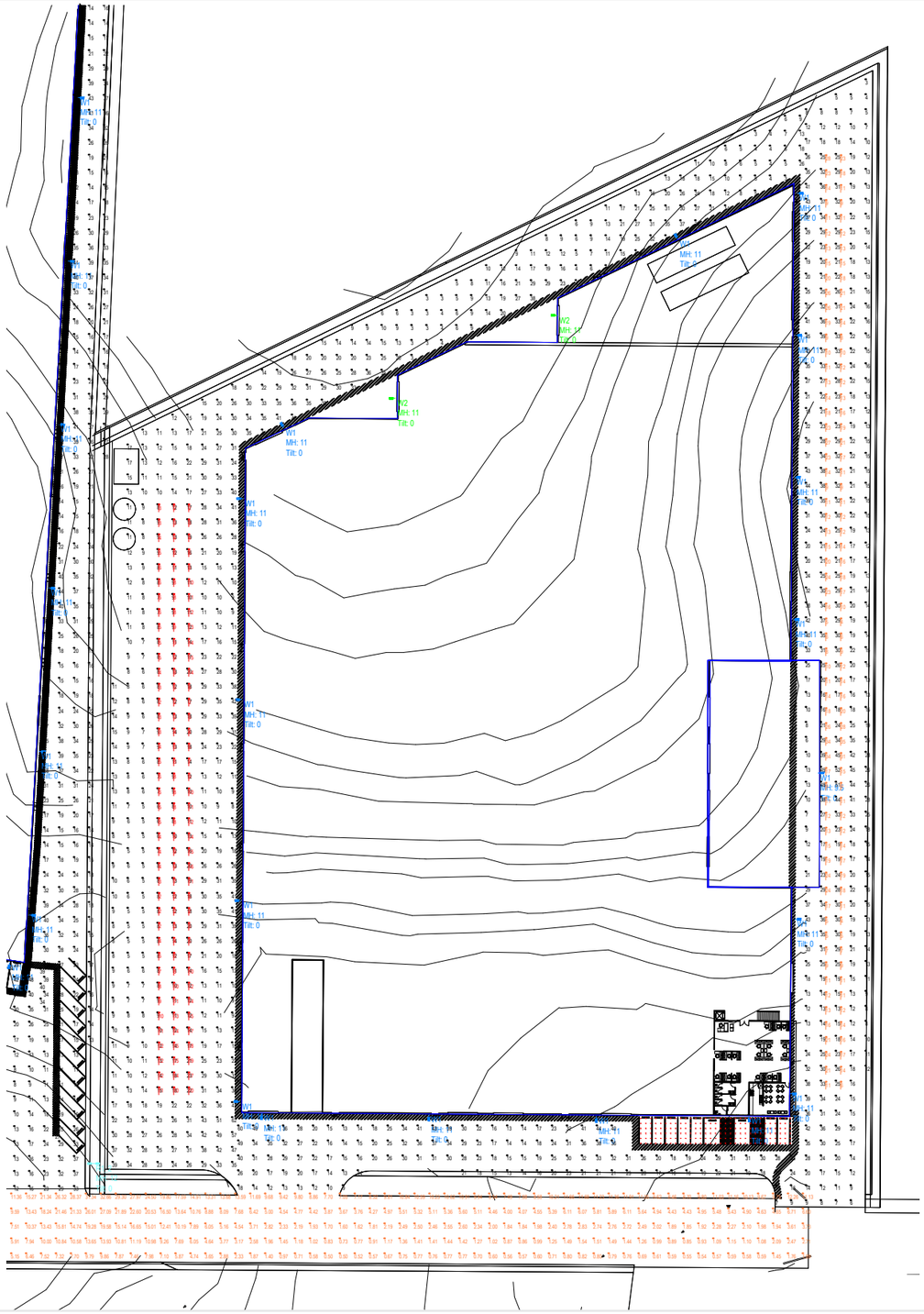
7 CONCLUSION

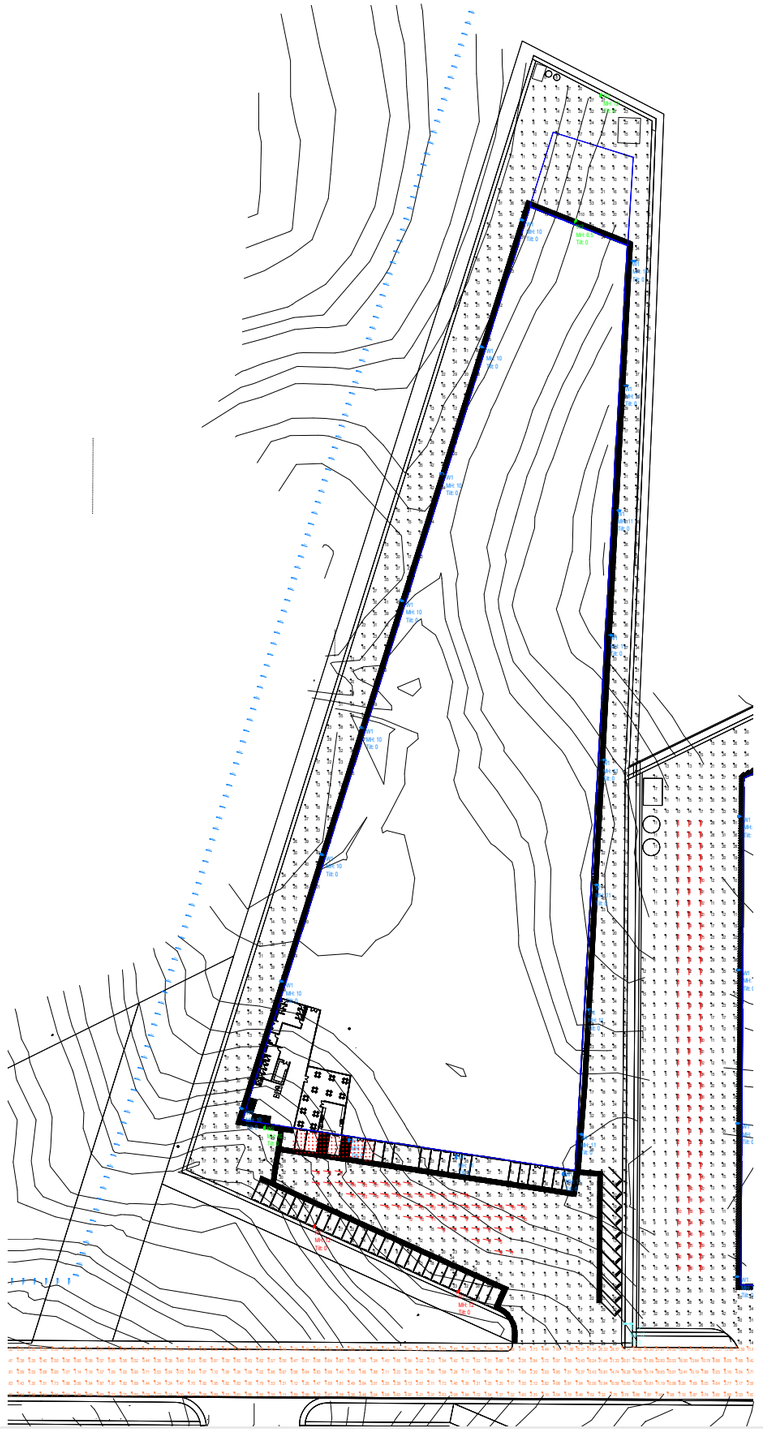
When selecting pole mounted light fittings, careful consideration must be taken to ensure that the light spill from the fittings is controlled away from abutting areas. Poorly controlled lighting may result in obtrusive lighting. JHA recommends that optically controlled LED pole mounted light fittings are used along the roadways and within the complex to mitigate the risk of obtrusive lighting. The use of optically controlled LED lighting will also provide much better uniformity of light distribution across the roadway, greatly increasing visibility for both drivers and pedestrians.

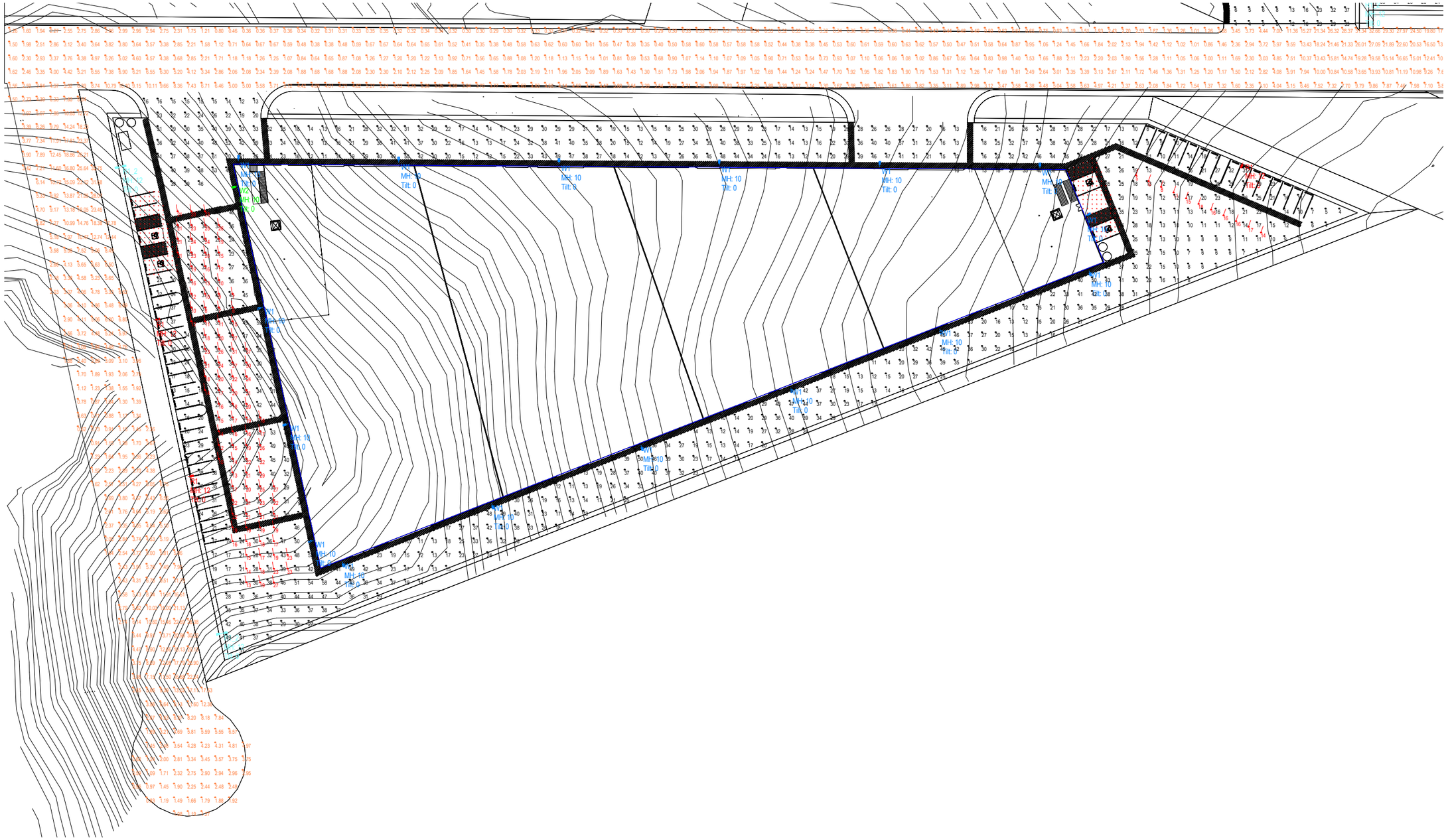
Based on this assessment, and the recommended lighting strategy outlined in this report, nil lighting impacts are expected to heritage properties located at 254 and 270 Oldbury Rd, Sutton Forest.

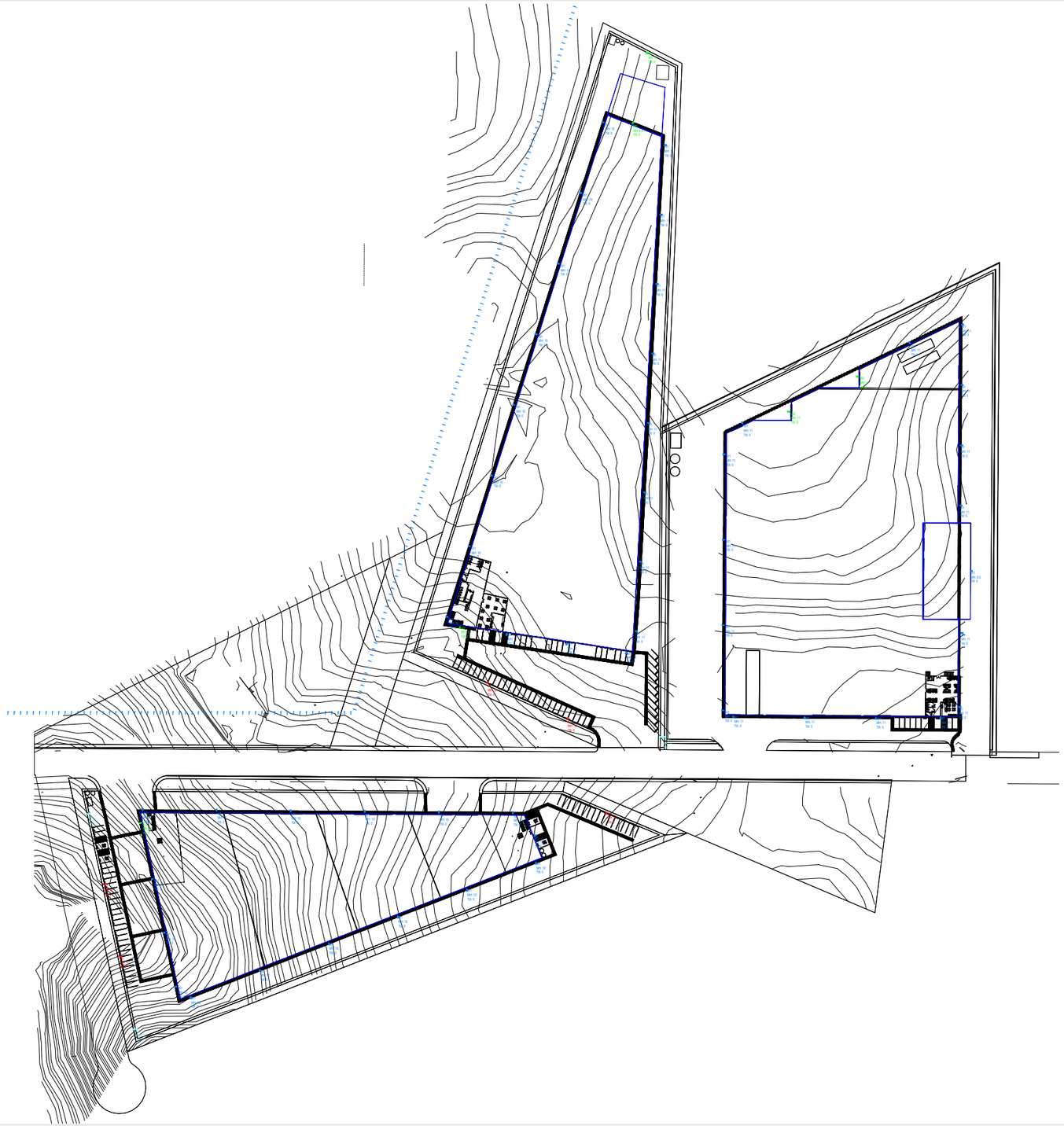
APPENDIX A

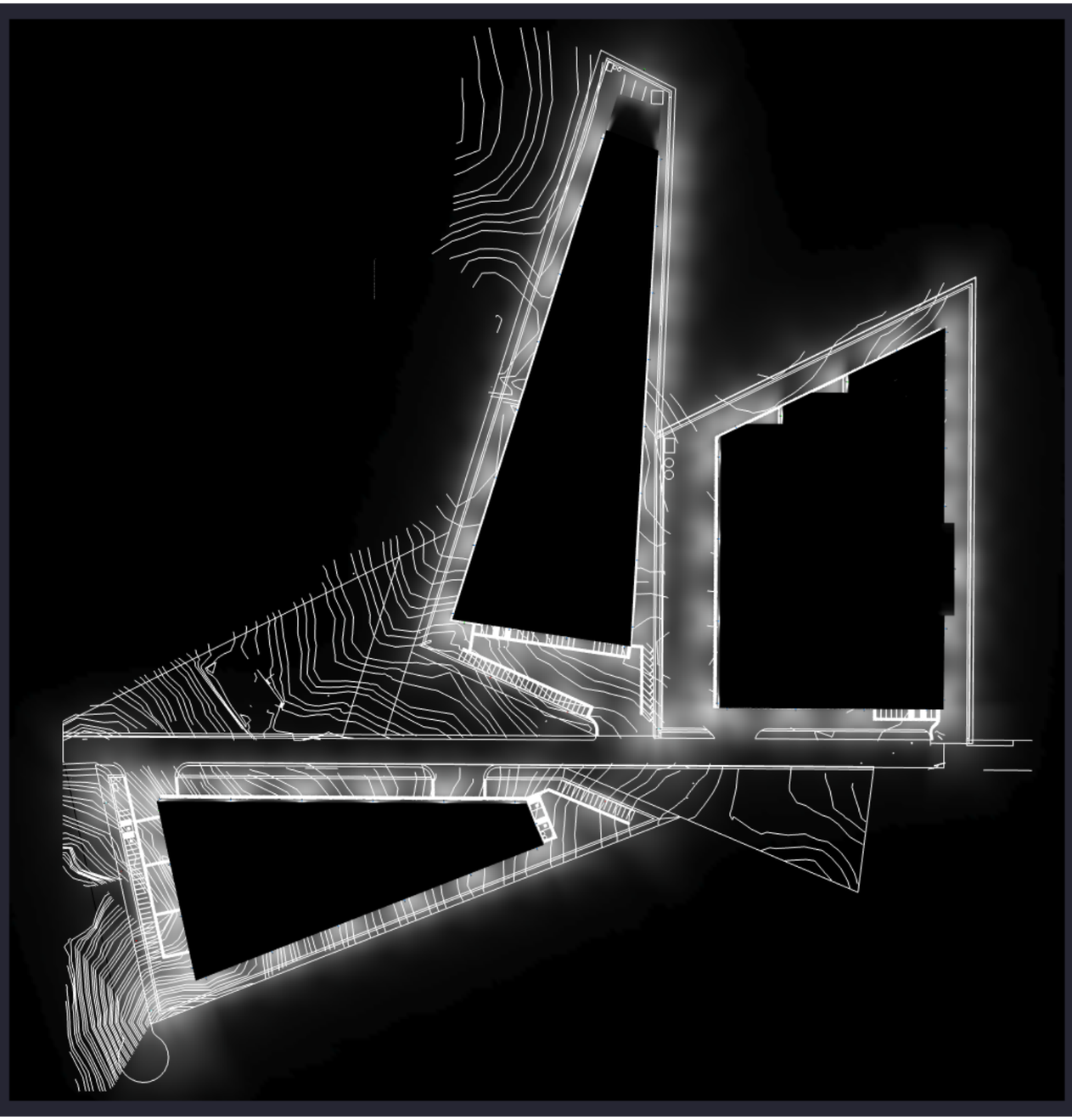


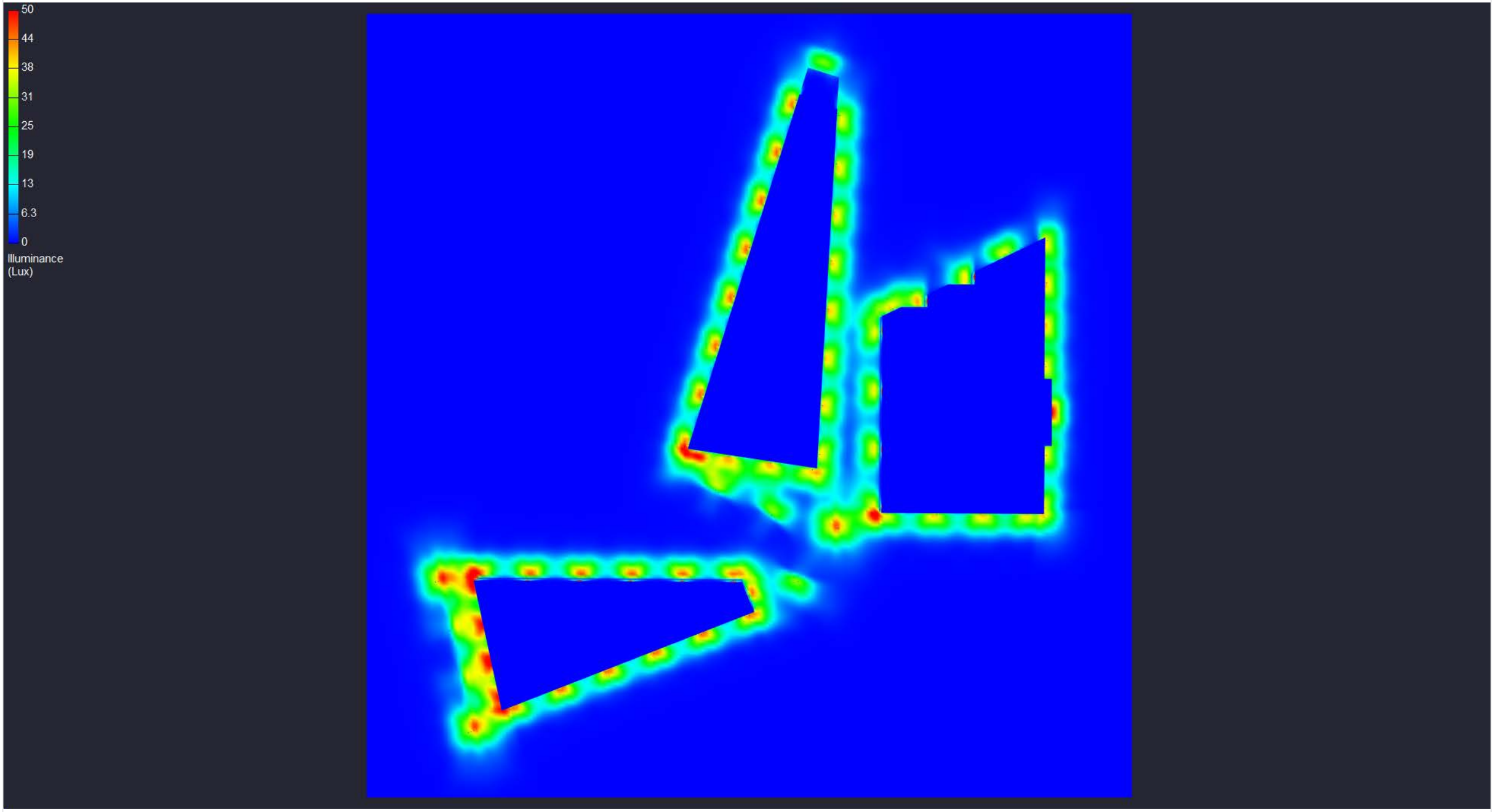


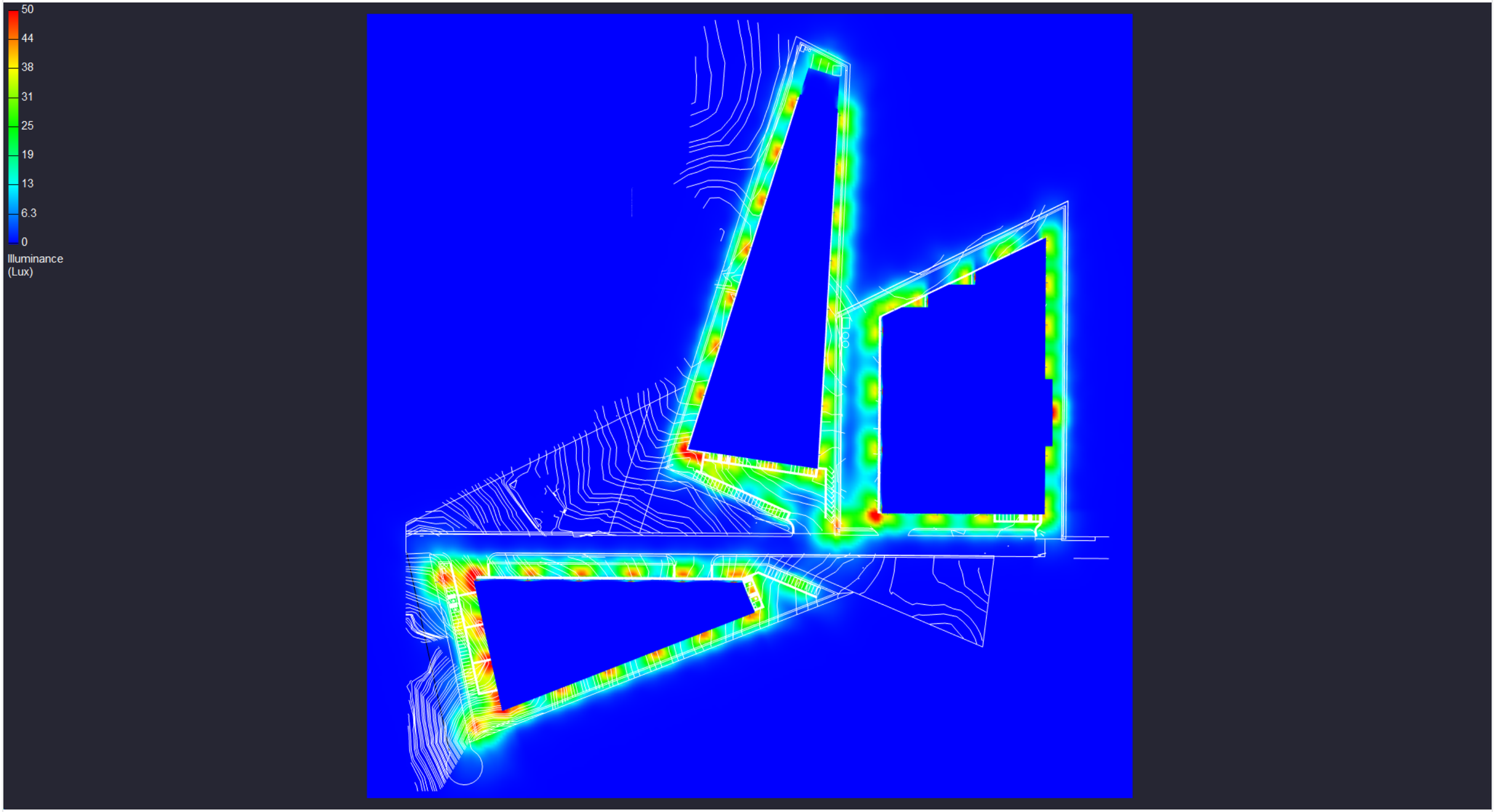









50
44
38
31
25
19
13
6.3
0
Illuminance
(Lux)


50
44
38
31
25
19
13
6.3
0
Illuminance
(Lux)

ROOM SUMMARY			
Mounting Height (m)	**Ceiling Height (m)**	**Reflectance (C\W\F)**	**Tilt**
AS SHOWN	N/A	N/A	AS SHOWN

CALCULATION SUMMARY											
Label	**CalcType**	**Units**	**Avg**	**Max**	**Min**	**Min/Avg**	**Min/Max**	**Max/Avg**	**PtSpcLr**	**PtSpcTb**	**Calc Height**
ObtrusiveLight_1_Cd_Seg1	Obtrusive - Cd	N.A.	808.42	2099	325	0.40	0.15	2.60	3	3	N.A.
ObtrusiveLight_1_Cd_Seg2	Obtrusive - Cd	N.A.	798.36	2843	152	0.19	0.05	3.56	3	3	N.A.
ObtrusiveLight_1_Ill_Seg1	Obtrusive - Ill	Lux	0.93	1	0	0.00	0.00	1.08	3	3	N.A.
ObtrusiveLight_1_Ill_Seg2	Obtrusive - Ill	Lux	0.27	1	0	0.00	0.00	3.70	3	3	N.A.
ROADWAY	Illuminance	Lux	4.59	32.75	0.29	0.06	0.01	7.14	3	3	0
WH 1 PC1	Illuminance	Lux	23.00	60	3	0.13	0.05	2.61	3	3	0
WH 1 PC2	Illuminance	Lux	16.55	62	3	0.18	0.05	3.75	3	3	0
WH 1 PCD	Illuminance	Lux	27.17	44	15	0.55	0.34	1.62	1	1	0
WH1 VERTICAL 1 PC1	Illuminance	Lux	14.97	35	4	0.27	0.11	2.34	3	3	1.5
WH1 VERTICAL 1 PC2	Illuminance	Lux	7.63	19	2	0.26	0.11	2.49	3	3	1.5
WH2 - PC1	Illuminance	Lux	23.29	110	4	0.17	0.04	4.72	3	3	0
WH2 - PC1 VERTICAL	Illuminance	Lux	11.34	21	5	0.44	0.24	1.85	3	3	1.5
WH2 - PCX	Illuminance	Lux	26.70	46	10	0.37	0.22	1.72	3	3	0
WH2 - PDC	Illuminance	Lux	35.58	45	25	0.70	0.56	1.26	1	1	0
WH3 - PC1	Illuminance	Lux	25.67	70	4	0.16	0.06	2.73	3	3	0
WH3 - PC1 VERTICAL 1	Illuminance	Lux	12.91	18	5	0.39	0.28	1.39	3	N.A.	N.A.
WH3 - PC1 VERTICAL 2	Illuminance	Lux	19.02	37	6	0.32	0.16	1.95	3	3	1.5
WH3 - PCD 1	Illuminance	Lux	24.86	38	18	0.72	0.47	1.53	1	1	0
WH3 - PCD 2	Illuminance	Lux	37.92	51	18	0.47	0.35	1.34	1	1	0
WH3 - PCX	Illuminance	Lux	35.88	54	19	0.53	0.35	1.51	3	3	0

LUMINAIRE SCHEDULE								
Qty	**Label**	**Arrangement**	**Total Lamp Lumens**	**Lum. Watts**	**LLF**	**Description**	**Total Watts**	**Tag**
1	R3	Single	22068	156.1	0.800	FEEZE L ASY4_0 80 LED 3000K	156.1	FEEZEL_4080H_3070
3	R1_2	Back-Back	22068	156.1	0.800	FEEZE L ASY3_0 80 LED 3000K	936.6	FEEZEL_3080H_3070
5	W2	Single	22068	156.1	0.800	FEEZE L ASY4_0 80 LED 3000K	780.5	FEEZEL_4080H_3070
52	W1	Single	22068	156.1	0.800	FEEZE L ASY3_0 80 LED 3000K	8117.2	FEEZEL_3080H_3070
5	R1	Single	22068	156.1	0.800	FEEZE L ASY3_0 80 LED 3000K	780.5	FEEZEL_3080H_3070

NOTES

Obtrusive Light - Compliance Report
AS/NZS 4282:2019, A2 - Low District Brightness, Non-Curfew L1
Filename: MCNSW907a - REV 2
2/02/2024 4:31:02 PM

Illuminance
Maximum Allowable Value: 5 Lux

Calculations Tested (2):

Calculation Label	Test Results	Max. Illum.	
ObtrusiveLight_1_Ill_Seg1		PASS	1
ObtrusiveLight_1_Ill_Seg2		PASS	1

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 7500 Cd

Calculations Tested (2):

Calculation Label	Test Results
ObtrusiveLight_1_Cd_Seg1	PASS
ObtrusiveLight_1_Cd_Seg2	PASS

Upward Waste Light Ratio (UWLR)
Maximum Allowable Value: 1.0 %

Calculated UWLR: **0.0 %**
Test Results: **PASS**

TYPE R1

FEEZE L POLE MOUNTED (SINGLE)

Versatile area light with smart driver options
Multiple sizes, beam spreads, and outputs
Multiple mounting options

CODE: FEEZEL_3080H_3070

TYPE R3

FEEZE L POLE MOUNTED (SINGLE)

Versatile area light with smart driver options
Multiple sizes, beam spreads, and outputs
Multiple mounting options

CODE: FEEZEL_4080H_3070

TYPE R1_2

FEEZE L POLE MOUNTED (BACK TO BACK)

Versatile area light with smart driver options
Multiple sizes, beam spreads, and outputs
Multiple mounting options

CODE: FEEZEL_3080H_3070

TYPE W1

FEEZE WALL MOUNTED

Versatile area light with smart driver options
Multiple sizes, beam spreads, and outputs
Multiple mounting options

CODE: FEEZEL_3080H_3070

TYPE W2

FEEZE WALL MOUNTED

Versatile area light with smart driver options
Multiple sizes, beam spreads, and outputs
Multiple mounting options

CODE: FEEZEL_ FEEZEL_4080H_3070