tigerlight | HIGH-PERFORMANCE INDUSTRIAL LIGHTING

Case Study

NSW Port Authority's PORT BOTANY FORESHORE PATH runs for 2km along the foreshore of Botany Bay. Tigerlight's off-grid solution was Mako area lights powered by new SOLO solar engines. As Sydney Airport is in close proximity, it was vital that the lighting complied with Obtrusive Lighting Standards.

PORT AUTHORITY OF NEW SOUTH WALES

Summary

The 2km-long cycleway was lit by 81 x Mako area lights programmed to 20W output. These pole-mounted fittings were paired with new SOLO solar engines, with 160W panels and 130Ah batteries. Maximum autonomy is 4.5 days.

This installation met the strict Obtrusive Lighting Stardards, due to the fact that the path is adjacent to Sydney Airport..

Challenge Faced

NSW Port Authority wished to upgrade old solar lights and panels on 81 existing poles, improving light levels along the 2km stretch, and increasing battery autonomy.

Tigerlight's in-house MIES illumination engineers were tasked with meeting these important standards:

- CASA Manual of Standards Part 139 - Chapter 12 Section 9.144 Zones A, B, C & D for obtrusive lighting in close proximity to airport runway.
- AS1158.3.1:2020 Table 3.4 PP3 for Pathways and Cycleways

Solution

A total of 81 x 5.5m poles were fitted with:

- 81 x Mako fittings, programmed to 20W lamp power. T2M optical lenses were selected to maximise the light spread between poles.
- 81 x SOLO solar engines with 160W bi-facial solar panels and 130Ah batteries.

SOLO solar engines are fully programmable and can adjust the paired lamp's output to maximise the autonomy in different solar conditions.

The 20W output of the Mako lights and the 130Ah batteries in the SOLO engine were well-matched to produce autonomy of 4.5 days on a full charge.

Excellent light levels and uniformity were achieved at 20m spacings.

Tigerlight's precision optic control easily met the following standards:

- CASA MOS139 for upward waste light and glare
- AS4282:2019 for Obtrusive Lighting
- AS1158.3.1:2020 Table 3.4 PP3 for Pathways and Cycleways.

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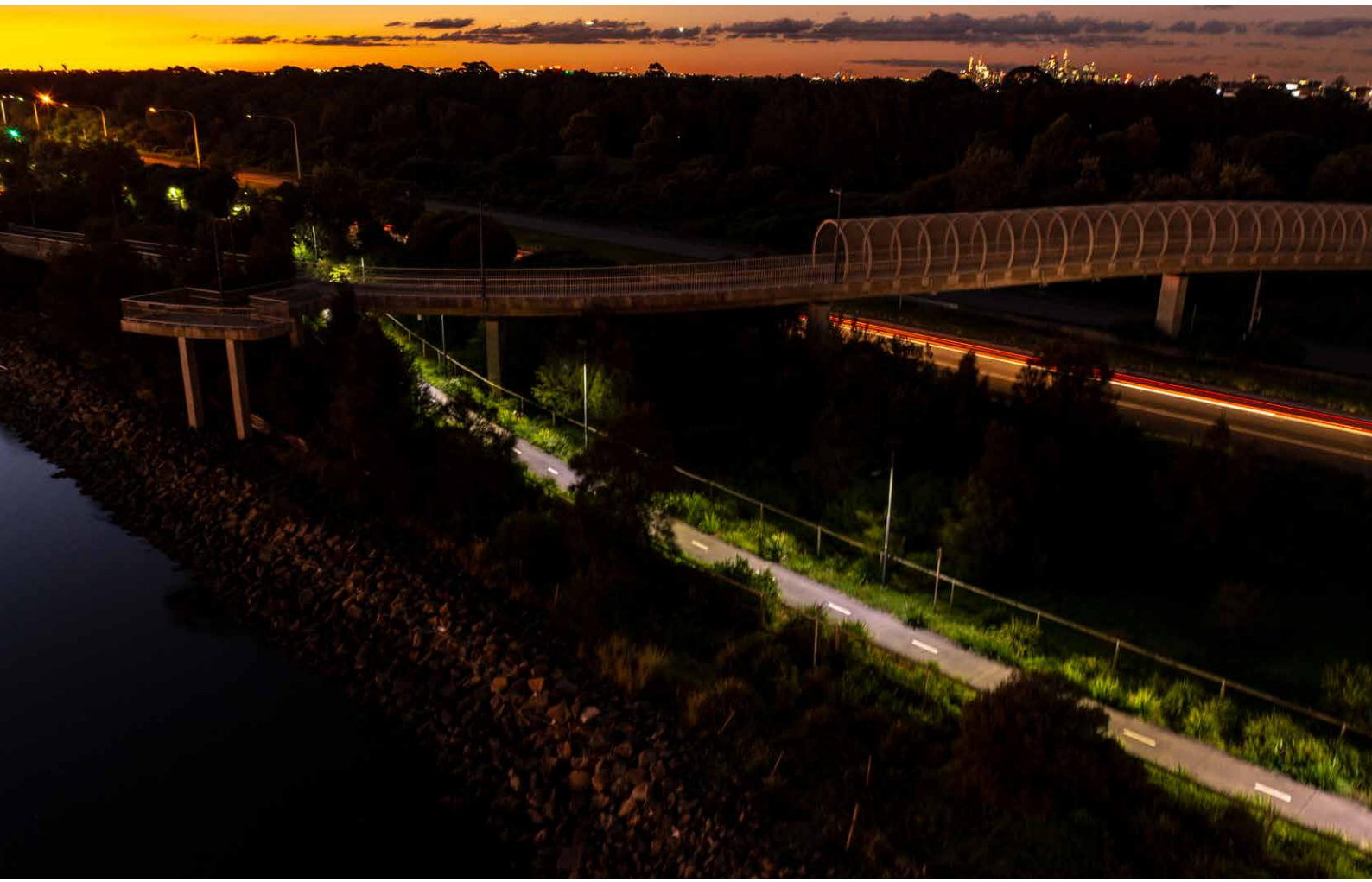
SOLO SOLAR ENGINE



Above: Excellent uniformity and lux levels along the 2km pathway stretching around the shore at Port Botany opposite the freight terminal and Sydney Airport. Fittings were installed at 5.5m and spaced every 20m . The lighting plan met standard AS1158.3.1:2020 Table 3.4 PP3 for Pathways and Cycleways..

Below: SOLO 160W/130Ah solar engine coupled with Mako area light programmed to 20W (half the maximum output) to achieve the required light levels while providing autonomy of 4.5 days on a full charge.

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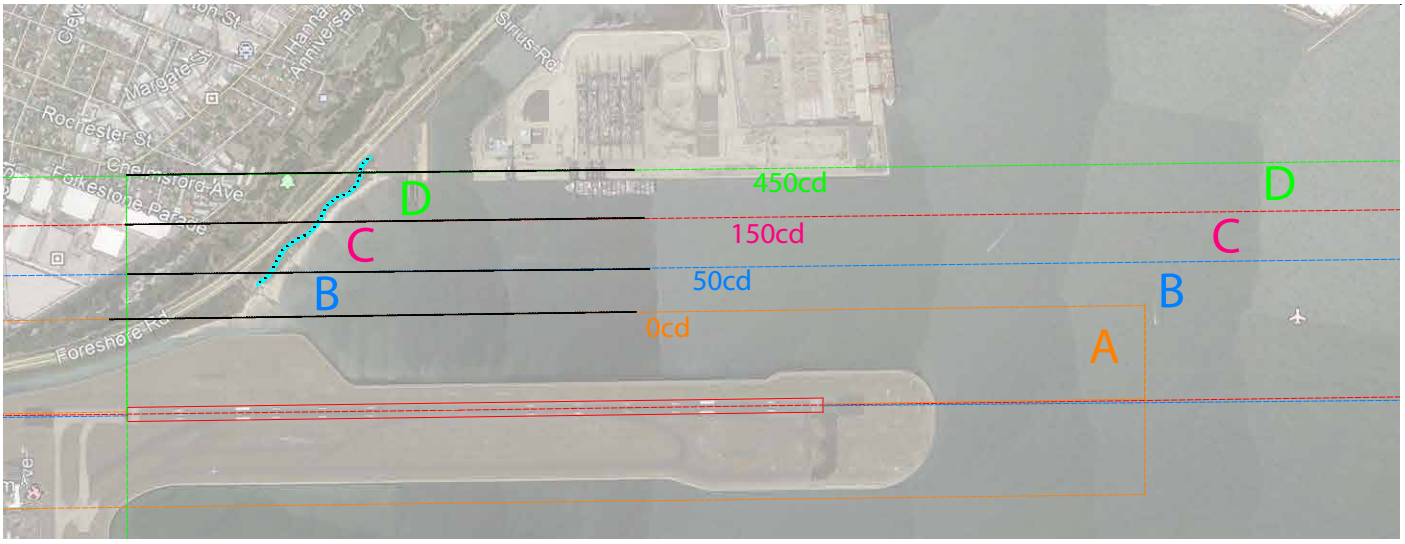
SOLO SOLAR ENGINE

LIGHTING PLAN & COMPLIANCE WITH CASA'S OBTRUSIVE LIGHTING STANDARD

The precision of the T2M optical lensing on the Mako area light directs approx 100% of the light output downwards onto the pathway surface and surrounds, with negligible light spill.

Pictured below is an extract from the Obtrusive Lighting compliance report produced by Tigerlight's in-house MIES lighting engineers showing the locations of the defined zones (A, B, C, D) around Sydney Airport's Runway 3.

Importantly, the analysis shows readings of 0.0 for light spill above the height of the light fittings, as required for compliance against the CASA standards for airport runway surrounds.



Luminaire Location Summary

LumNo	Label	X	Y	Z	Orient	Tilt	Switched
1	MS2T	2395.194	2422.775	5.5	313.409	0	On
2	MS2T	2411.578	2435.063	5.5	313.409	0	On
3	MS2T	2425.146	2450.166	5.5	313.409	0	On
4	MS2T	2437.177	2468.854	5.5	332.127	0	On
5	MS2T	2446.393	2487.029	5.5	342.23	0	On
6	MS2T	2455.865	2504.181	5.5	326.959	0	On
7	MS2T	2465.081	2522.101	5.5	313.409	0	On
8	MS2T	2478.904	2535.412	5.5	313.409	0	On
9	MS2T	2495.8	2548.468	5.5	303.046	0	On
10	MS2T	2515.512	2561.012	5.5	296.781	0	On
11	MS2T	2533.698	2569.695	5.5	297.697	0	On
12	MS2T	2550.245	2581.491	5.5	313.409	0	On
13	MS2T	2563.516	2595.908	5.5	315.349	0	On
14	MS2T	2575.312	2613.766	5.5	318.328	0	On
15	MS2T	2586.289	2630.969	5.5	340.575	0	On
16	MS2T	2594.317	2649.319	5.5	340.908	0	On
17	MS2T	2605.13	2666.03	5.5	313.409	0	On
22	MS2T	2620.039	2679.464	5.5	313.409	0	On
23	MS2T	2636.423	2691.097	5.5	296.323	0	On
24	MS2T	2655.919	2698.469	5.5	276.938	0	On
25	MS2T	2674.105	2708.463	5.5	313.409	0	On
26	MS2T	2687.376	2722.88	5.5	313.409	0	On
27	MS2T	2698.681	2739.919	5.5	344.011	0	On
28	MS2T	2704.087	2758.596	5.5	353.586	0	On
29	MS2T	2707.692	2778.912	5.5	350.688	0	On
30	MS2T	2715.229	2797.753	5.5	313.409	0	On
31	MS2T	2728.663	2811.679	5.5	313.409	0	On

Obtrusive Light - Compliance Report
CIVIL AVIATION SAFETY AUTHORITY - STANDARDS PART 139 - CHAPTER 9 FIG 9.21-1
Filename: BTNY BY GE 1
23/03/2021 11:08:18 AM

Luminous Intensity (Cd) Per Luminaire
Maximum Allowable Value: 0 Cd
Control Angle: 93 Degrees

Luminaire Locations Tested (27)
Test Results: PASS

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 0 Cd

Calculations Tested (4):
Test
Calculation LabelResults
ObtrusiveLight_ZONE D_Cd_Seg1PASS
ObtrusiveLight_ZONE C_Cd_Seg1PASS
ObtrusiveLight_ZONE B_Cd_Seg1PASS
ObtrusiveLight_ZONE A_Cd_Seg1PASS

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Min/Avg	Min/Max
ObtrusiveLight_ZONE A_Cd_Seg	Obtrusive - Cd	N.A.	0.0	0	0	N.A.	N.A.
ObtrusiveLight_ZONE A_Ill_Se	Obtrusive - Ill	Lux	0.0	0.0	0.0	N.A.	N.A.
ObtrusiveLight_ZONE B_Cd_Seg	Obtrusive - Cd	N.A.	0.0	0	0	N.A.	N.A.
ObtrusiveLight_ZONE B_Ill_Se	Obtrusive - Ill	Lux	0.0	0.0	0.0	N.A.	N.A.
ObtrusiveLight_ZONE C_Cd_Seg	Obtrusive - Cd	N.A.	0.0	0	0	N.A.	N.A.
ObtrusiveLight_ZONE C_Ill_Se	Obtrusive - Ill	Lux	0.0	0.0	0.0	N.A.	N.A.
ObtrusiveLight_ZONE D_Cd_Seg	Obtrusive - Cd	N.A.	0.0	0	0	N.A.	N.A.
ObtrusiveLight_ZONE D_Ill_Se	Obtrusive - Ill	Lux	0.0	0.0	0.0	N.A.	N.A.

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description
	27	MS2T	SINGLE	2965.5	0.850	SA020MAKO-T2M-50K 20W LED TYPE II MEDIUM ASYM 5000K IP67

SOLO Engine 160/130

160W PANEL | **130Ah BATTERY**

Solar panel:	160W
Battery rating:	130Ah / 1560Wh
Charge duration:	10 hours
Discharge duration:	Up to 72 hours
IP ratings, compartment	
- battery:	IP66
- controller:	IP68
IK Rating:	IK08
Weight inc bracket:	34kg
Spigot diameter:	92mm
Dimensions mm: inc bracket	1066L x 712W x 223H
Also available:	SOLO Engine 60/52 60W panel / 52Ah battery

SOLO SOLAR ENGINE

FACTORY PROGRAMMABLE OUTPUTS

- 100% output dusk to dawn
- Programmable staged dimming options
- 100% for set period after sunset, then dim to a set dim mode
- Tailored programming to suit site specific needs.

MAKO LED AREA LIGHT

- 20W/30W/40W nominal lamp power
- 5,400 lumens (40W) at over 140 lumens per watt
- 40W replaces up to 150W HID
- 40W (max) LED module with high-performance LEDs
- Polycarbonate lenses, with 11 different options
- Corrosion-resistant polyester coating
- Sleek, rounded shape reduces material build-up
- IP67 and IK10 rating.

MAKO by tigerlight

34mm spigot entry

COMPATIBLE TIGERLIGHT FITTINGS - PLUG & PLAY INSTALLATION

SOLO solar engines power each of these fittings on a simple plug & play basis with connector cabling supplied.

Lamp power is pre-set between 10W and 60W, during the programming process prior to delivery.

Options available include lensing, CCT, exterior colours.

MAKO	MEGA FLOOD	STREET LIGHT	MAKO BULKHEAD	SENTRY WALLPACK
P/N: SLMAKOSOLO	FLSOLO	SLSOLO	SLBULKSOLO	FLWPSOLO

Lamp power is determined in response to two factors:

1 The light levels required for the particular lighting task as determined by the lighting plan.
2 The sunlight available in the particular location will have a critical effect on battery autonomy and the ability of the fitting to meet the required operating hours.

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