

CASE STUDY

TEMPORARY LIGHTING

- ▶ 100% OFF GRID
- ▶ MOBILE SOLUTION
- ▶ REMOTE MONITORING
- ▶ CATEGORY-V ROADWAYS

4.4 km

Bruce Highway | Mackay, QLD
NORTHERN ACCESS UPGRADE



GFS-400 TEMPORARY SERIES

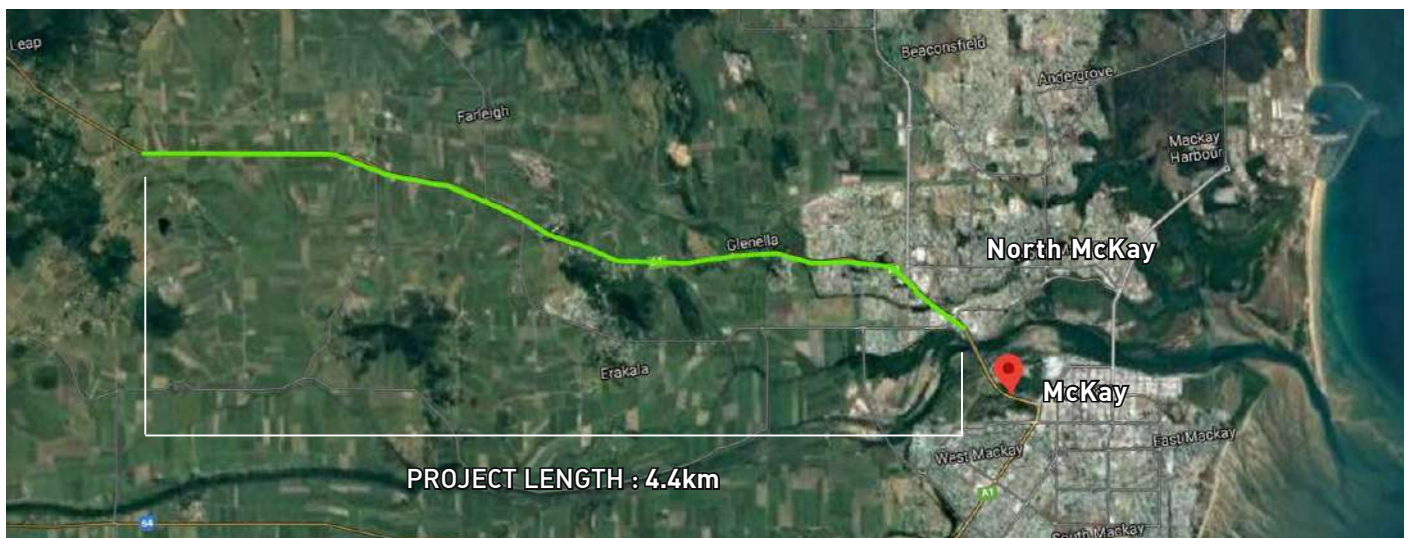
60W | 70W | 100W
11,220lm | **13,090lm** | 18,700lm

The GFS-400 series offers an environmentally friendly, off-grid solar option where traditional lighting is impractical or cost prohibitive. This product range is ideally suited for heavy duty road and highway applications up to category V-class lighting. All night operation at 100% brightness in any conditions.

PRODUCT SUPPLIED: 90 x GFS-400 Portable Solar Roadway Lighting Towers
SPECS: 70W @ 100% Power. Dusk to dawn operation / 7.1m mounting height
OPTIONS: SAM™ IoT smart connected monitoring and remote control package
Portable concrete block design engineered for cyclone Region C winds.



The use of a temporary lighting solution facilitated the provision of additional lanes during the construction phase of the project, leading to increased traffic flow efficiency and a reduction in travel time for motorists.



PROJECT LENGTH : 4.4km

Project Summary // Continued

The Bruce Highway access upgrade project will complete the missing link between Mackay Ring Road Stage 1 and the route to the Port via Sams Road to provide capacity for over 20 years. The proposed smart solar lighting towers conformed to the V category lighting specifications required.



The solar lighting towers provide safety for commuters during the project construction on period. The ideal solution for providing reliable, vandal resistant lighting that can be installed and relocated based on the ongoing requirements of the project. The light tower solution is suitable for applications that demand reliability and performance without the costs or noise of diesel powered lighting towers. The light output meets the AS1158 Category V lighting requirements for roads and freeways.

GFS-SAM (Solar Activity Monitoring) IoT Remote Monitoring & Control (Optional)

The GFS-SAM Smart connected lighting platform provides transport authorities a dashboard to monitor and control the solar lighting assets from a central management console. Each light tower communicates wirelessly via the LoRaWAN network to a gateway receiver on the 3G/4G network providing real time reporting and control of the system, including alerts for faults or outages.

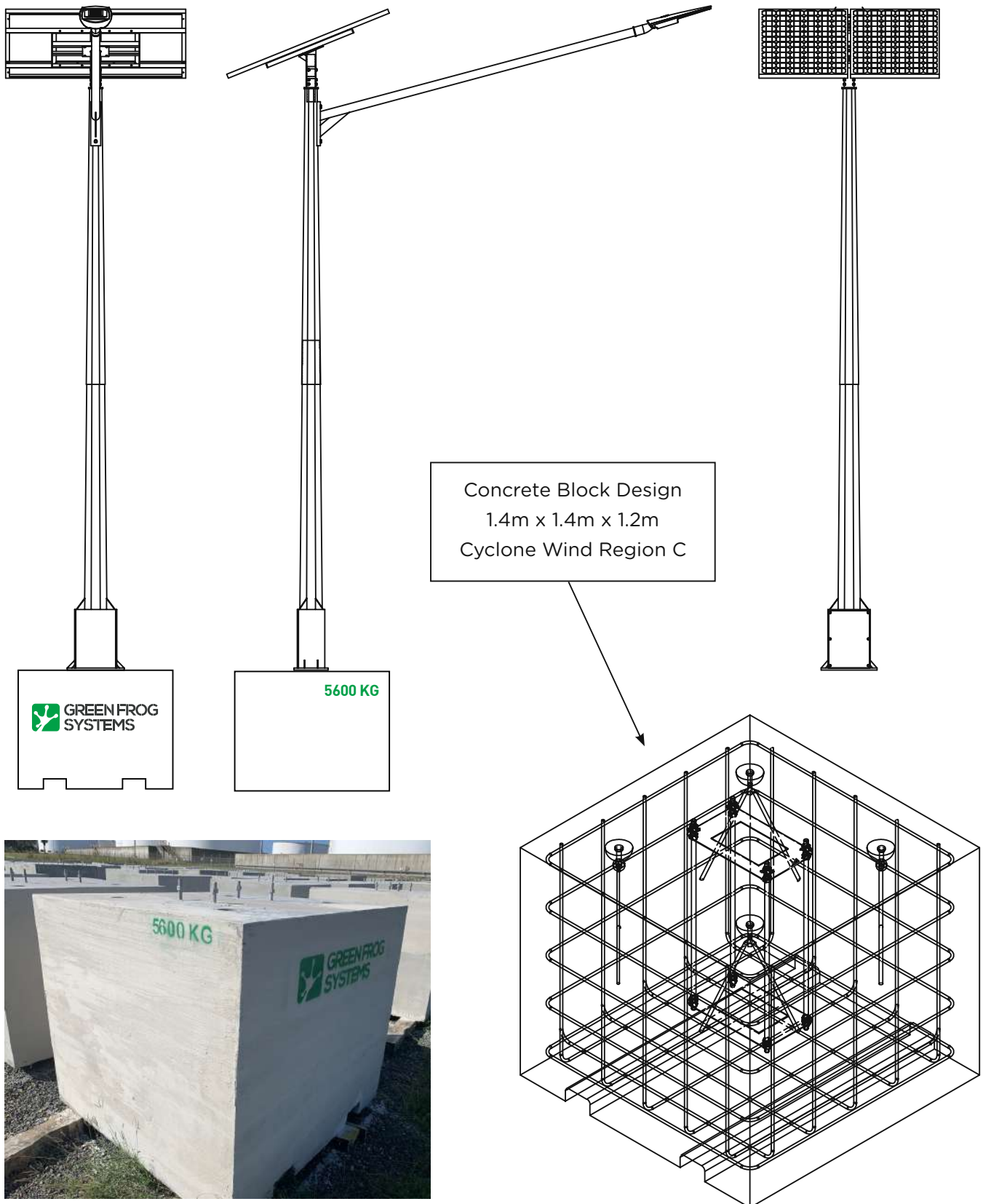
SAM provides significant efficiency improvements over the traditional phone in system for reporting failures and outages, which requires manual deployment of work response crews to physically diagnose and repair any issues on site. Instead the SAM system reports fault codes or failures with the ability to directly notify the appropriate response team to attend and address the issue.



Top level details in a Geographic context.

GFS-400 Temporary // Design // Concrete Block Design

Standard system includes optimal LED mounting height of 7.1m with 3.0m LED outrigger. Installed on a concrete block designed for region C cyclonic wind conditions. The concrete blocks are movable using either c-channel forklift tine lifting points or crane lift 'Swift Lift' lifting lugs for easy relocation.

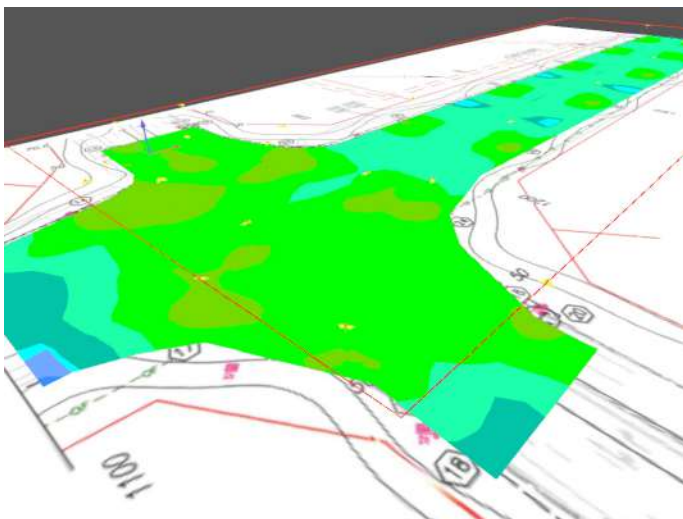
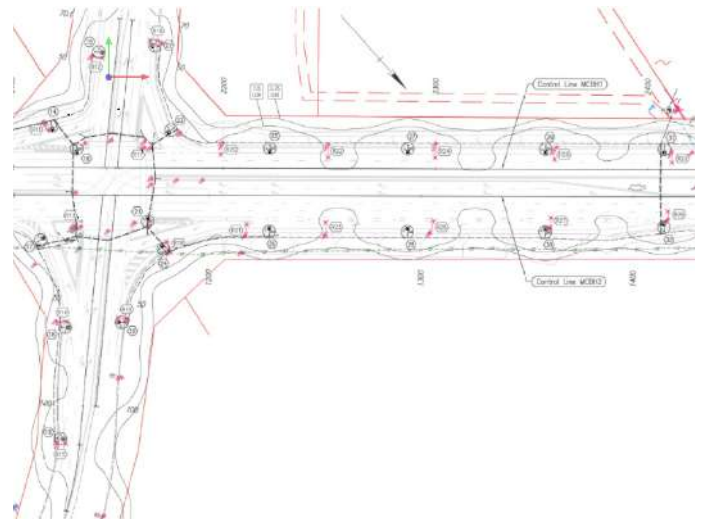
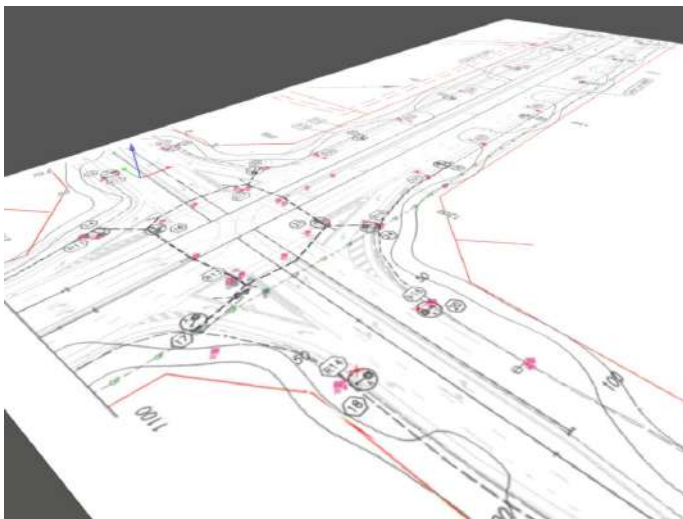


GFS-400 Temporary // Technical Specification

Model	GFS-400
LED	60W (Standard)
Lumens	11,220lm (Standard)
CCT	4000K (Standard) Optional 3000K
CRI	>70
LED	CREE X-PG Adjustable angle
Lens	Dual lens offering evenly distributed illumination Impact rating IK10
Optics	T3 135° x 85° (Standard) Optional T5 110° x 135°
Operational Run Times	60W / 70W— Operates all night 100% until dawn 100W— Operates at 100% for 4hrs then dims to 20W until dawn
Solar Panel	454W(p) mono-crystalline 21% efficiency impact resistant tempered glass. Protective stone guard on back of panel and anti bird spikes, fixed 20° angle
Pole	6m Octagonal high strength hot dipped galvanised steel (AS4680 Standards RPEQ Certified)
LED Outrigger	3m
LED Mounting Height	7.1m total (5.9m LED height + 1.2m concrete block)
Block (Concrete Base)	Concrete Block 1.4 x 1.4 x 1.2m—Region C RPEQ Certified Fixed with Swift Lift type Lifting Lugs / Forklift tine channel
Battery	2x Sealed high quality VRLA GEL 110Ah batteries (220AH total) with waterproof IP68 connectors *5-6 years expected life / 5 nights backup
Charge Controller	MPPT (maximum power point tracking) charging with 99% tracking efficiency monitor & temperature, short circuit protection. Programmable custom settings available
Operating Temp. Range	-20°C to 60°C / -4°F to 140°F
Certifications	AS/NZS 1158 V5 Category Roadway ISO9001:2015 Quality assured company AS60598 Aust certified LED UL E349212 LED, UL3135 Cabling, UL1598 / UL9750 Complies to RPEQ Certification for Queensland
Warranty	5 year warranty / 25 year solar panel warranty / 5 years battery defect performance warranty
Options	<ul style="list-style-type: none">• 70W 13,090lm / 100W 18,700lm• 3000K CCT• Anti -climbing spike collar• Twin Head LED / 180° / 90° configurations• Outdoor rated ON / OFF switch• IoT SMART CITY READY Using optional GFS-SAM monitoring and control system

Light Modeling // Lighting Standard // AS1158 Category V5

The light modeling simulations for the project provided the supporting data simulations to ensure that the six (6) lanes of bitumen would receive uniform light distribution and meet the minimum lux level requirements for this type of roadway.



GFS-400 Temporary // Project Outcome



ABOUT GREEN FROG SYSTEMS

Green Frog Systems are leaders in innovative solar lighting technologies. Established in Australia 2011, the company designs and manufactures world-class solar street and pathway illumination systems and is committed to the continual development of leading edge, sustainable solar lighting and energy storage advancements.

Green Frog Systems mission is to consistently provide our clients with a highly reliability solar lighting solution, providing safety, security and access to public spaces more economically than mains powered equivalents.

The increasing popularity towards renewable energy options has allowed the company to rapidly expand into the USA, New Zealand and the UK. Green Frog Systems worldwide list of clients includes Government, mining, oil & gas, industry and commercial infrastructure; a testament to the quality of the company's products.