

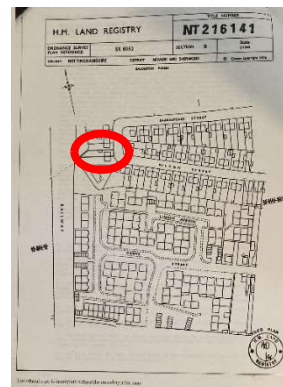
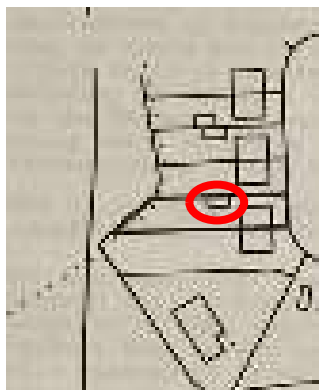
Aim: - To fit photovoltaic (PV) cells to reduce carbon footprint by generating and using green energy, saving an estimated 872 Kg of CO₂ each year.

Site address: - 87 Milton Street, Balderton, Newark, Nottinghamshire, NG24 3AP.

Current site details: -

Currently a large 914 by 318 cm breeze block (walls) and timber (roof) structure exists on the site. The structure is south facing which lends itself to PV generation. The roof structure is a “flat” roof with a small angle (~2.5 degrees) to allow water run off which goes into an onsite soakaway.

Detailed images of current site location



Proposed installation details and considerations: -

10 off PV cells are to be installed, each cell has the following dimensions 1722 x 1134 x 30 mm. The PV panels are dark in colour to minimise its effect on the external appearance of the building.

Once fitted the PV cells will not overhang the existing structure in any direction. The property is not in a conservation area nor on a site designated as a scheduled monument. It is not a listed building or within the curtilage of a listed building.

The PV cells will be fitted as close as possible (without causing shading to the PV cells) to the land on the side of 87 Milton Street to minimise / cause no effects on neighbouring properties.



Example images of some mounting structures temporary placed on existing structure.

Height consideration: -

Item	Height (cm)
Maximum existing building height	257
Mounting structure height	39
PV cell height	3
Total height worst case	299

Fitment and use and end of life considerations: -

Fitment will be carried out within one day by a reputable approved PV solar provider, no additional access will be required to fit the panels. There will not be the need for any equipment that generates noise, dust or any other potentially harmful emissions during the fitment or use. The panels will be removed as soon as possible once they have reached the end of their life and no longer generating electricity.

Block Diagram of Site and Surrounding Properties

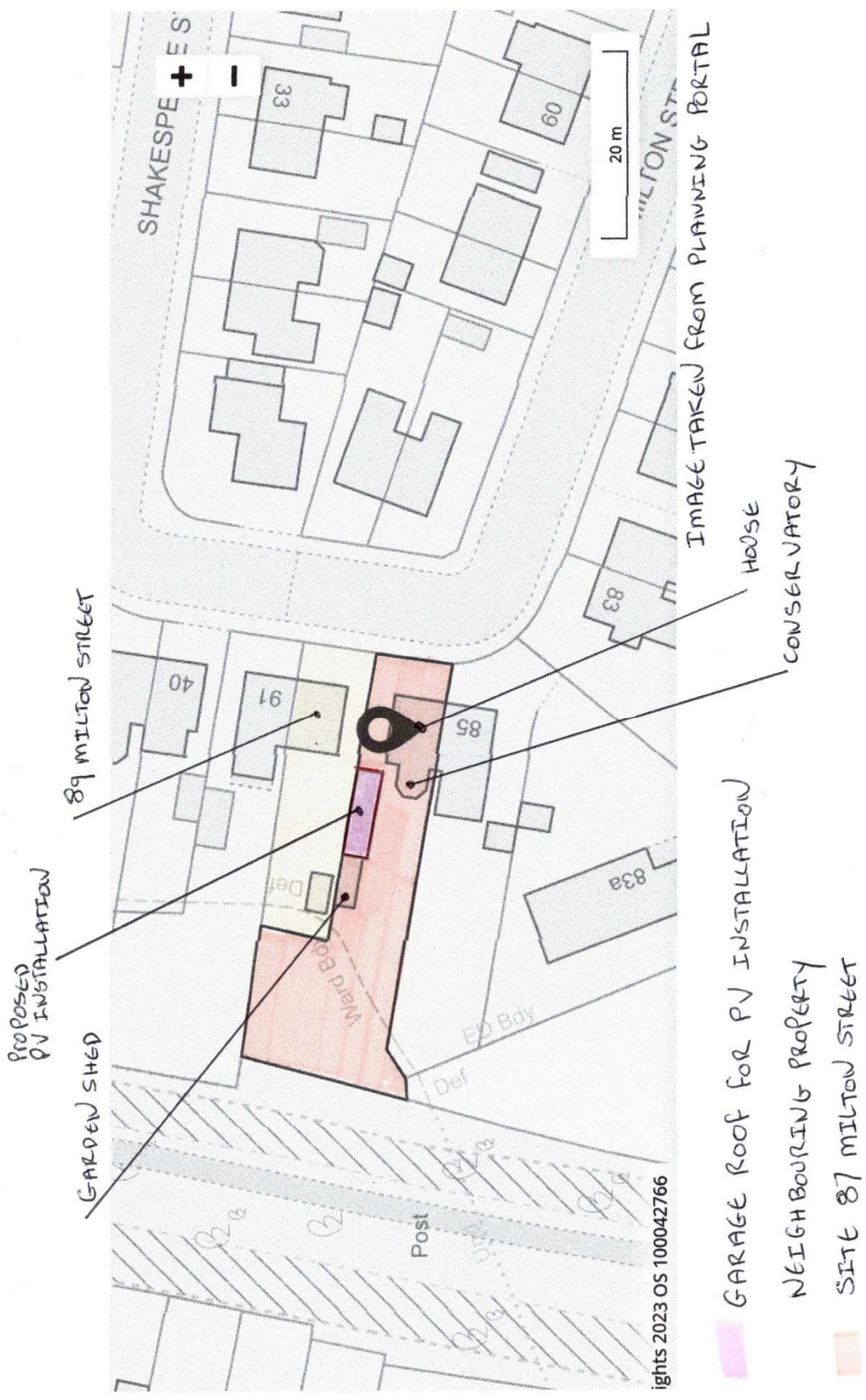
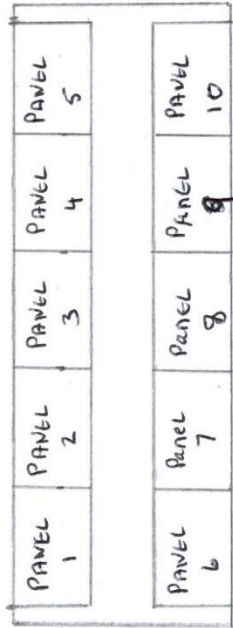


IMAGE TAKEN FROM PLANNING PORTAL

DETAILED GARAGE ROOF PLAN

(Scale 1cm = 1m)



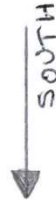
(View from on top)



SOUTH



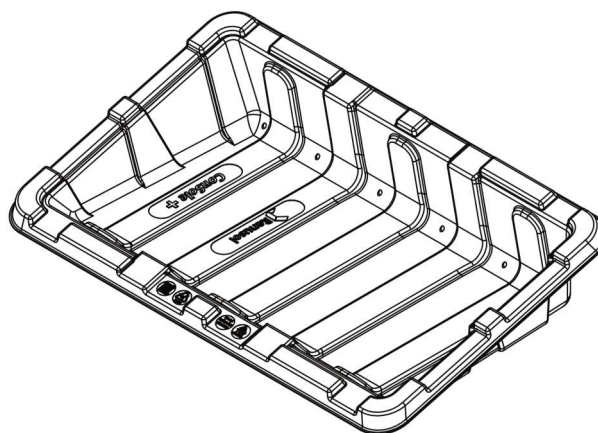
(SIDE VIEW)



SOUTH

DRAWN AS WORST CASE PANELS MAY BE BROUGHT CLOSER TO THE CENTRE OF THE ROOF.

Technical data sheets from mounting and PV cell suppliers



System Datasheet

CS+

General

System	Freestanding ballasted PV mounting system
Scope of delivery	CS+ tub, mounting profiles and fixing material
System warranty	10 years
Application area	Flat roofs, landfills, open spaces, green areas (excluding hydrogen sulphide exposure)
Dimensions	Width: 1.730mm, depth: 1.100 mm, height: 390mm
Roof slope	max. 5° without additional measures
Ambient temperature range	-30°C to +50°C

System properties

System orientation	East-West, South
Material	HDPE, aluminium and stainless steel
Module tilt	15°
System weight approx.	≈ 7,9 kg
Friction coefficient	$\mu = 0,5$ is to be determined and ensured upon installation surface.
Minimum edge distance	1,5 m
Maximum snow load on the roof	2,5 kN/m ²

Certifications

TÜV	ID1111212485 according to 2PfG
Wind loads	Determined in wind tunnel tests by Ruscheweyh Consult GmbH
Fire resistance	MPA Dresden
UV resistance	KIMW Kunststoff Institut Lüdenscheid

Services

PV layout	Provided by Renusol
Ballast plan	Provided by Renusol

CS+ 03 | 2021

Hi-MO **5m**

LR5-54HPB 400~420M

- Suitable for distributed projects
- Advanced module technology delivers superior module efficiency
 - M10 Gallium-doped Wafer
 - Integrated Segmented Ribbons
 - 9-busbar Half-cut Cell
- Excellent outdoor power generation performance
- Aesthetic appearance with all black module design

12

12-year Warranty for
Materials and Processing

25

25-year Warranty for Extra
Linear Power Output

Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730

ISO9001:2015: ISO Quality Management System

ISO14001: 2015: ISO Environment Management System

ISO45001: 2018: Occupational Health and Safety

IEC62941: Guideline for module design qualification and type approval

LONGI



21.5%
MAX MODULE
EFFICIENCY

0~3%
POWER
TOLERANCE

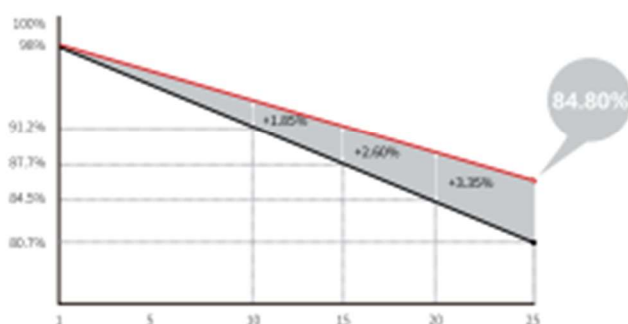
<2%
FIRST YEAR
POWER DEGRADATION

0.55%
YEAR 2-25
POWER DEGRADATION

HALF-CELL
Lower operating temperature

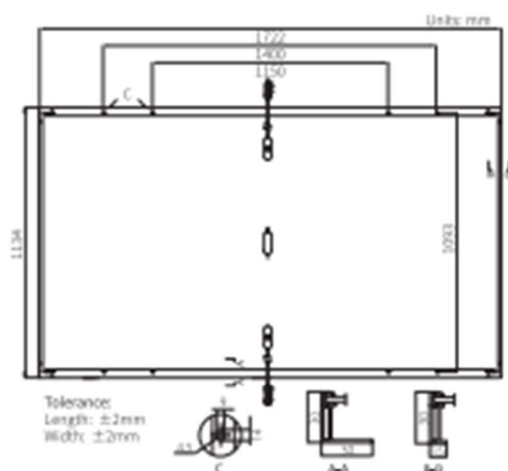
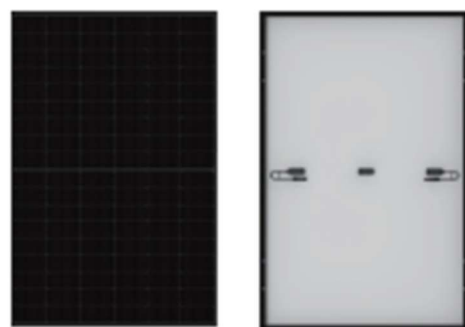
Additional Value

25-Year Power Warranty



Mechanical Parameters

Cell Orientation	108 (6×18)
Junction Box	IP68, three diodes
Output Cable	4mm ² , ±1200mm length can be customized
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	20.8kg
Dimension	1722×1134×30mm
Packaging	36pcs per pallet / 216pcs per 20' GP / 936pcs per 40' HC



Electrical Characteristics

STC: AM1.5 1000W/m² 25°C NOCT: AM1.5 800W/m² 20°C 1m/s Test uncertainty for P_{max}: ±3%

Module Type	LR5-54HPB-400M		LR5-54HPB-405M		LR5-54HPB-410M		LR5-54HPB-415M		LR5-54HPB-420M	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (P _{max} /W)	400	299.0	405	302.7	410	306.5	415	310.2	420	313.9
Open Circuit Voltage (V _{oc} /V)	36.90	34.70	37.15	34.93	37.40	35.17	37.65	35.40	37.89	35.63
Short Circuit Current (I _{sc} /A)	13.72	11.09	13.78	11.14	13.84	11.19	13.91	11.24	13.97	11.30
Voltage at Maximum Power (V _{mp} /V)	30.94	28.74	31.18	28.96	31.42	29.19	31.66	29.41	31.90	29.63
Current at Maximum Power (I _{mp} /A)	12.93	10.40	12.99	10.45	13.05	10.50	13.11	10.55	13.17	10.59
Module Efficiency(%)	20.5		20.7		21.0		21.3		21.5	

Operating Parameters

Operational Temperature	-40°C ~ +85°C
Power Output Tolerance	0 ~ 3%
V _{oc} and I _{sc} Tolerance	±3%
Maximum System Voltage	DC1000V (IEC/UL)
Maximum Series Fuse Rating	25A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Fire Rating	UL type 1 or 2 IEC Class C

Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

Temperature Ratings (STC)

Temperature Coefficient of I _{sc}	+0.050%/°C
Temperature Coefficient of V _{oc}	-0.265%/°C
Temperature Coefficient of P _{max}	-0.340%/°C