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Abbey Road – Phase 2

Planning Condition 16, Photovoltaic Panel Submission



PREPARED BY:

Norman Bromley Partnership LLP
Bridge House
97 – 101 High Street
Tonbridge
Kent TN9 1DR

Telephone No. 01732 773737
E.Mail: mail@normanbromley.co.uk
Website: www.normanbromley.co.uk

PROJECT REVISION SHEET

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01	March 21	Comments included		MR	MR

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1.0 Introduction

This submission is provided as a response to planning submission 16, wording as follows:-

Prior to commencement of above ground works, drawings and data sheets showing the location, extent and predicted energy generation of photovoltaic cells and associated equipment to be installed on the building shall have been submitted to and approved by the Local Planning Authority in writing. The measures shall include the installation of a meter to monitor the energy output from the approved renewable energy systems. A site-specific lifetime maintenance schedule for each system, including safe roof access arrangements, shall be provided. The cells shall be installed in full accordance with the details approved by the Local Planning Authority and permanently retained and maintained thereafter.

2.0 System Description

The photovoltaic panel system shall comprise photovoltaic panels installed on the roof. Details of proposed PV panels included in Appendix A.

The photovoltaic panels shall be mounted on a KT Systems, S Dome mounting system. Details included in Appendix B.

The PV panels shall be installed to the roof and proposed layout in included in Appendix C.

The PV array shall provide a minimum output of 4.5 kilowatt peak (kWp) from renewable sources to the community centre and 11 kilowatt peak (kWp) from renewable sources to the health centre.

Inverter units shall be selected to suit the photovoltaic requirement and shall be located within the main LV intake for community centre and store cupboard in the health centre. The inverters shall be wired from the main panelboards with all outgoing ways installed to comply with the manufacturer's recommended cable arrangement. Separate inverter units to be installed to the health centre and community centre. Schematic diagram of distribution which indicates the PV connections and metering are included in appendix D.

A G59 relay and low carbon/kWh meter will be provided for each system to enable the systems to be interconnected to the grid installation.

3.0 PV Lifetime Maintenance Schedule

3.1 Solar Panel Maintenance Checklist

1. Check system output every month. This will be done by the users from the metering provided.
2. Watch out for any new shading. Shading is the downfall of PV, especially when modules are connected in a string and shading in one part limits the output of the whole. So keep an eye on any trees that have begun to overgrow since the system was installed and trim them back if necessary.
3. Clean once a year. See below for more detail.
4. Users to visually check every month to ensure birds are not nesting below the PV's.
5. Carry out electrical testing every 5 years.
6. A logbook of maintenance will be kept to record any maintenance on the system including inspections, cleaning or component replacements.

3.2 Instructions for Cleaning Solar Panels

Solar panels to be cleaned annually in late spring or summer, after the pollen has settled.

Choose a cooler day or start early in the morning, before the panels heat up.

First, clear off big debris like fallen leaves with a dry brush.

Lightly scrub the surface with warm or mildly soapy water to remove dust, dirt and droppings.

Rinse the panels off with the spray from a hose (not a pressure washer).

Dry with a window wiper or microfibre cloth.

The most important thing is to be as gentle as possible with the panels, since even tiny scratches or cracks can cause problems down the line.

3.3 Responsibility and Maintenance Access

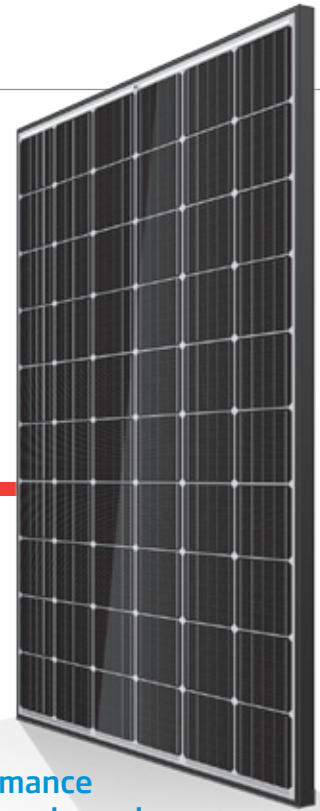
A logbook of maintenance will be kept to record any maintenance on the system including inspections, cleaning or component replacements. Camden have a dedicated maintenance team and have committed to undertaking inspections, maintenance and updating the logbook as required.

The PV's are located on a flat roof which is accessed via an access hatch and pull down steps. A man safe system will be provided to provide safe access to the PV's for maintenance and cleaning.

APPENDIX A - PROPOSED PV PANELS

Honey^M PLUS⁺ MODULE

TSM-DD05A.08 (II)



60 CELL
MONOCRYSTALLINE MODULE

280-315W
POWER OUTPUT RANGE

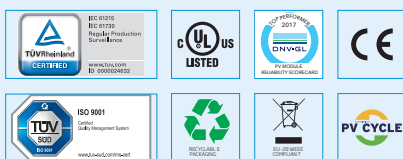
19.2%
MAXIMUM EFFICIENCY

0/+5W
POSITIVE POWER TOLERANCE

Founded in 1997, Trina Solar is the world's leading comprehensive solutions provider for solar energy. We believe close cooperation with our partners is critical to success. Trina Solar now distributes its PV products to over 60 countries all over the world. Trina Solar is able to provide exceptional service to each customer in each market and supplement our innovative, reliable products with the backing of Trina Solar as a strong, bankable partner. We are committed to building strategic, mutually beneficial collaboration with installers, developers, distributors and other partners.

Comprehensive Product And System Certificates

IEC61215/IEC61730/UL1703/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gas Emissions Verification
OHSAS 18001: Occupational Health and Safety Management System



Excellent low light performance on cloudy days, mornings and evenings

- Advanced surface texturing
- Back surface field
- Selective emitter



Maximize Limited Space with high efficiency

- Up to 192 W/m² power density
- Low thermal coefficients for greater energy production at high operating temperatures



Good aesthetics for residential applications

- Dark mono cells
- Black frame



Highly reliable due to stringent quality control

- Over 30 in-house tests (UV, TC, HF, and many more)
- In-house testing goes well beyond certification requirements
- All modules have to pass electroluminescence (EL) inspection
- PID resistant
- 1000 V UL/1000 V IEC certified

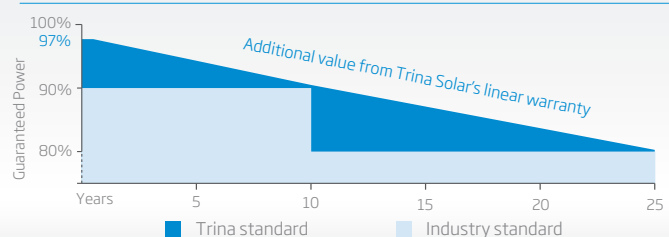


Certified to withstand challenging environmental conditions

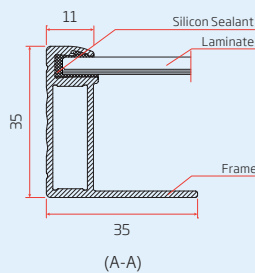
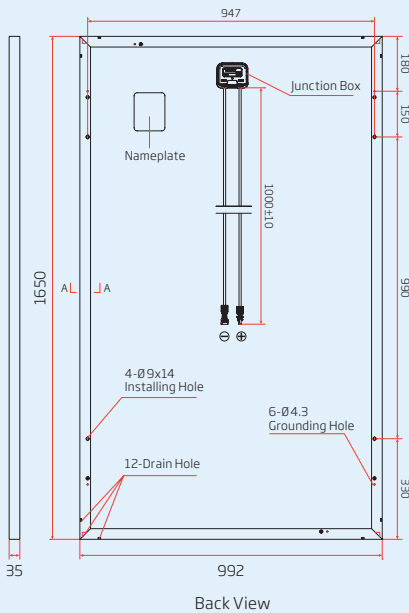
- 2400 Pa wind load
- 5400 Pa snow load
- 35 mm hail stones at 97 km/h
- Ammonia resistance
- Salt mist resistance
- Resistance to sand and dust abrasion

LINEAR PERFORMANCE WARRANTY

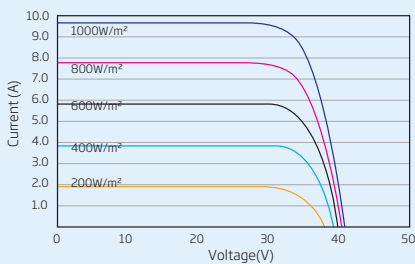
10 Year Product Warranty · 25 Year Linear Power Warranty



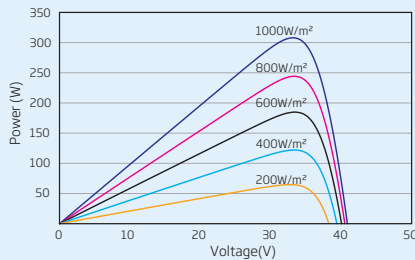
DIMENSIONS OF PV MODULE TSM-DD05A.08 (II) (unit: mm)



I-V CURVES OF PV MODULE (305W)



P-V CURVES OF PV MODULE (305W)



ELECTRICAL DATA @ STC	TSM-280	TSM-285	TSM-290	TSM-295	TSM-300	TSM-305	TSM-310	TSM-315
Peak Power Watts-P _{MAX} (Wp)*	280	285	290	295	300	305	310	315
Power Output Tolerance-P _{MAX} (W)	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5	0/+5
Maximum Power Voltage-V _{MPP} (V)	31.7	31.8	32.2	32.5	32.6	32.9	33.2	33.3
Maximum Power Current-I _{MPP} (A)	8.84	8.97	9.01	9.08	9.19	9.28	9.37	9.46
Open Circuit Voltage-V _{OC} (V)	38.4	38.5	38.9	39.6	39.8	40.0	40.2	40.5
Short Circuit Current-I _{SC} (A)	9.42	9.51	9.66	9.68	9.77	9.85	9.94	10.0
Module Efficiency η_m (%)	17.1	17.4	17.7	18.0	18.3	18.6	18.9	19.2

STC: Irradiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM1.5
* Measuring tolerance: ±3%

ELECTRICAL DATA @ NOCT	TSM-280	TSM-285	TSM-290	TSM-295	TSM-300	TSM-305	TSM-310	TSM-315
Maximum Power-P _{MAX} (Wp)	209	212	216	220	223	227	231	235
Maximum Power Voltage-U _{MPP} (V)	29.4	29.5	29.9	30.1	30.2	30.5	30.8	30.9
Maximum Power Current-I _{MPP} (A)	7.10	7.21	7.24	7.30	7.38	7.46	7.53	7.60
Open Circuit Voltage-U _{OC} (V)	35.7	35.8	36.2	36.8	37.0	37.2	37.4	37.6
Short Circuit Current-I _{SC} (A)	7.61	7.68	7.80	7.82	7.89	7.95	8.03	8.10

NOCT: Irradiance at 800 W/m², Ambient Temperature 20 °C, Wind Speed 1 m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline 156.75 × 156.75 mm
Cell Orientation	60 cells (6 × 10)
Module Dimensions	1650 × 992 × 35 mm
Weight	18.6 kg
Glass	3.2 mm, high transparency, AR coated and heat tempered solar glass
Backsheet	White
Frame	Black Anodized Aluminium Alloy
J-Box	IP 67 or IP 68 rated
Cables	Photovoltaic Technology Cable 4,0mm², 1000 mm
Connector	EU Countries: 28 MC4 / UTX / TS4, Non-EU Countries: 28 QC4 / TS4

TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	44°C (±2K)
Temperature Coefficient of P _{MAX}	- 0.39%/K
Temperature Coefficient of V _{OC}	- 0.29%/K
Temperature Coefficient of I _{SC}	0.05%/K

WARRANTY

10 year Product Workmanship Warranty

25 year Linear Performance Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box:	30 pieces
Modules per 40' container:	840 pieces

MAXIMUM RATINGS

Operational Temperature	-40 to +85°C
Maximum System Voltage	1000V DC (IEC) 1000V DC (UL)
Max Series Fuse Rating*	15 A (Power ≤ 285 W) 20 A (Power ≥ 290 W)
Mechanical Load	5400 Pa
Wind Load	2400 Pa

*DO NOT connect fuse in combiner box with two or more strings in parallel connection

APPENDIX B – PROPOSED PV MOUNTING ARRANGEMENT



Slovenia
Installation: 150 kW | S-Dome System



Slovenia
Installation: 150 kW | S-Dome System

Mounting systems for solar technology



SERVICE-HOTLINE
+49 (0)7159 42059-0
www.k2-systems.com

Produktblatt S-Dome System | GB7 | 1014 | Subject to change
Product illustrations are exemplary illustrations and may differ from the original.



K2 SYSTEMS
FLAT ROOF SYSTEMS
S-DOME SYSTEM

S-DOME SYSTEM

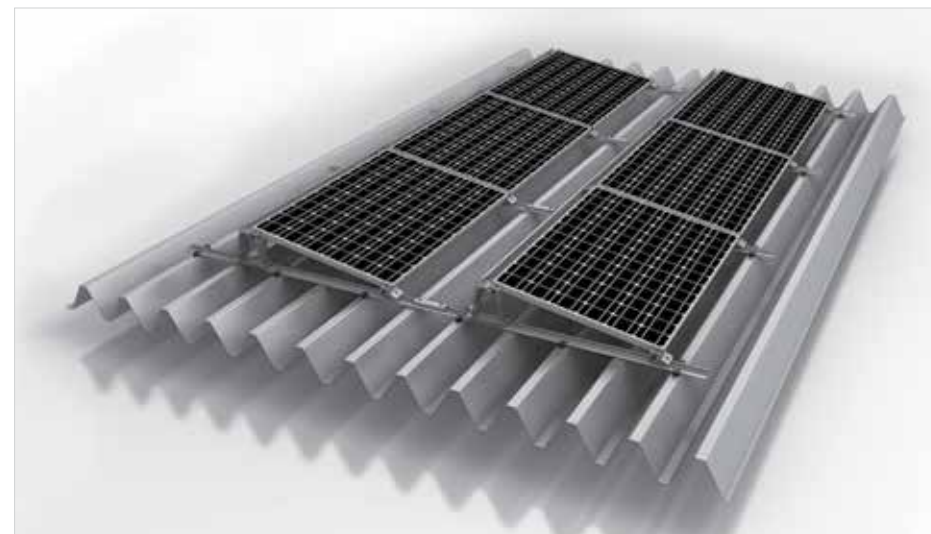
- Ideal for roofs with low ballast potential and with or without a parapet
- Very easy to install, because of just a few simple K2 Dome system components with optimum accessibility
- Reduced assembly time
- Very attractive price-performance ratio
- Available at 10° elevation angle
- Aerodynamically optimised with wind breaker on reverse enabling minimal ballast; tested in a wind tunnel by leading structure aerodynamicists
- K2 SpeedRail as base
- K2 building protection mats, specially coated for secure and durable roof support on virtually all membrane roofs, K2 Scale or K2 Porter for simple and quick installation of ballast
- Static proven solution using the K2 Base Planning Software

Technical data

Field of application	Flat roof to 5°
Roofing	Foil, trapezoidal and bitumen roof
PV modules	Module attachment by corner clamping, observing module manufacturer recommendations
Module orientation	Horizontal
System orientation	South-east to south-west
Material	Aluminium (EN AW-6063 T66)
Connecting elements	Stainless steel screw A2-70
Weight/m ² module surface	without module, without ballast approx. ca. 4 kg
Roof connection	Laying with potential ballasting, no roof penetration
Static principles	Calculation principles in accordance with Eurocode 9 - dimensioning and construction of aluminium structures using wind tunnel tests
Load assumption in accordance with	DIN EN 1991 (Eurocode 1)
Systemkomponenten	K2 SpeedRail, K2 S-Dome, K2 Dome SD, End and Middle Clamp Sets, M K2, K2 Porter/ K2 Scale/ K2 Scale XL, Wind-breaker, K2 Solar building protection mat, K2 Allen bolt



Explosion drawing



K2 S-Dome System on Trapezoidal sheet

APPENDIX C – PROPOSED PV LAYOUT

APPENDIX D - ELECTRICAL SCHEMATIC

