



Civic Centre Newport

L4W Roof PV Loading Assessment

Client: Newport Norse
Project Ref: CC2952
Report status: S2-P01

CAMBRIA

Report Control Sheet

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Project	Civic Centre Newport	
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Prepared by	C.Thomas	MEng (Hons)
Reviewed and authorised by	J.Spencer	BSc (Hons) CEng MICE

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Current issue

Status	Revision	Date	Description	Prepared by	Authorised by
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1 Introduction

- 1.1.1 Cambria Consulting Ltd have been appointed by Newport Norse, here after known as the Client, to review the implications of adding additional solar panels to the existing roof of the main building, above room L4W, specifically the corner between the south and central wing of the Civic Centre, Godfrey Road in Newport.
- 1.1.2 An initial non-intrusive inspection of the building was undertaken by James Spencer BSc (Hons) CEng MICE on Friday 29th August 2025. The following report presents the findings of our initial inspection and load assessment.
- 1.1.3 Our report findings are restricted to a desktop study only of the structural matters and we would state that we have not examined all parts of the building and are, therefore unable to state that any such component is free from defect. This assessment will be based on assumed general loading conditions, not by an assessment of elemental capacities.
- 1.1.4 This report does not constitute a full structural survey, whereby all structural elements are identified and investigated, and calculations undertaken for adequacy. This report is a structural appraisal report, undertaken specifically to review the additional loads proposed to be applied to the existing roofs. No intrusive opening up works were undertaken, and this report is therefore restricted to a visual inspection.
- 1.1.5 This report should be checked and verified by the Clients building insurers for adequacy of load comparison, as it does not constitute a full structural survey whereby existing structural elements are measures and check calculation undertaken to confirm capacity.
- 1.1.6 This report has been prepared exclusively for the named Client and their professional consultees; it may not be relied upon or reproduced by any third party without the prior written agreement of Cambria Consulting Limited.

1.1 Scope of Works

- 1.1.1 The following report will seek to determine the suitability of the roof structure to support a PV system. Only these areas will be considered as part of this report, and no other structural areas have been assessed. The report assesses the form of construction and capacity, and does not consider the condition, of which would be part of the building management strategy.
- 1.1.2 Our assessment as described above, and in associated appendices, relies on the site-specific snow, existing and design-imposed loads. The client is responsible for the selection of PV panel systems, Cambria Consulting has been appointed to provide the maximum loading the current roof system can take, not to design to a specific PV panelling system.
- 1.1.3 This assessment will undertake a load assessment to calculate the available load capacities of the current roof structures to withstand a PV system using the existing loads, the site-specific snow load and design-imposed loads that the buildings should have been designed for.
- 1.1.4 In this report a load replacement assessment will be undertaken to evaluate whether the load on the roof increases, decreases, or stays the same due to the proposed PV Panels.

1.2 Existing Structures

- 1.2.1 The area intending to have PV installations is highlighted in Figure 1-1 and Figure 1-2, the corner connecting the south wing and the central wing.

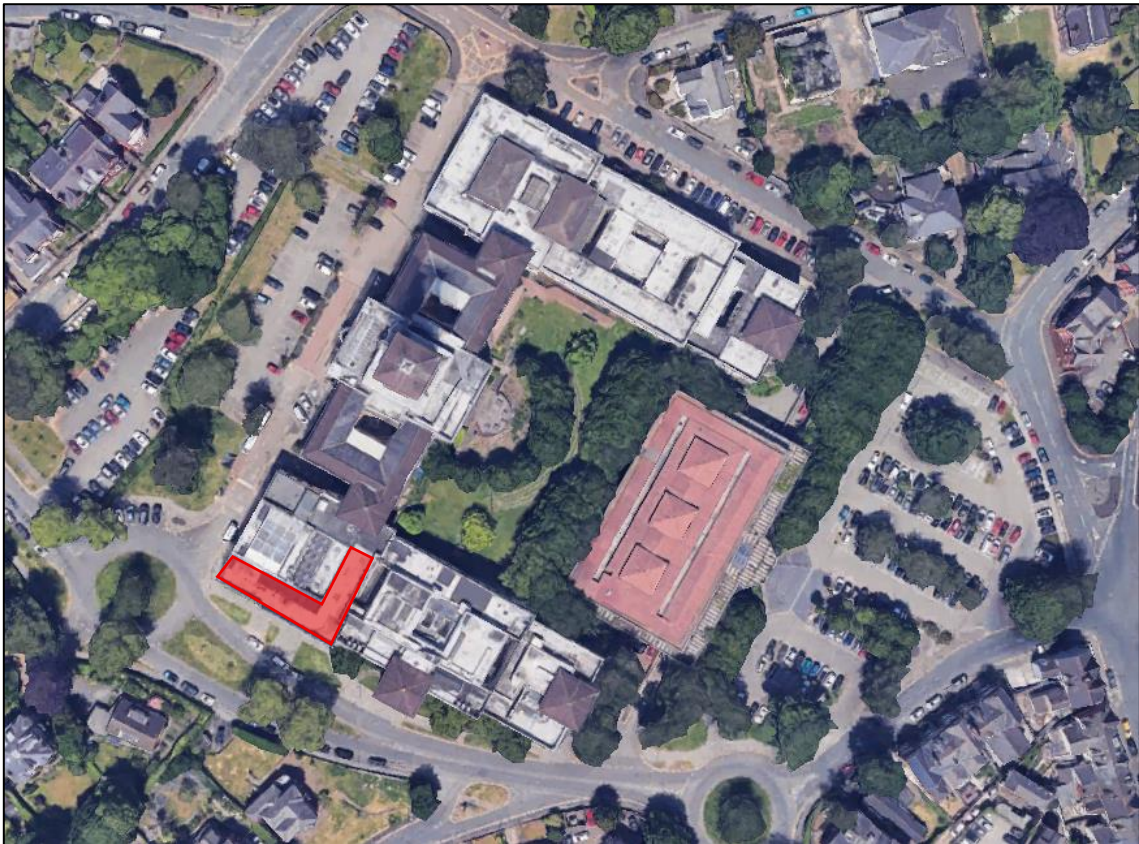


Figure 1-1 – Civic Centre Plan

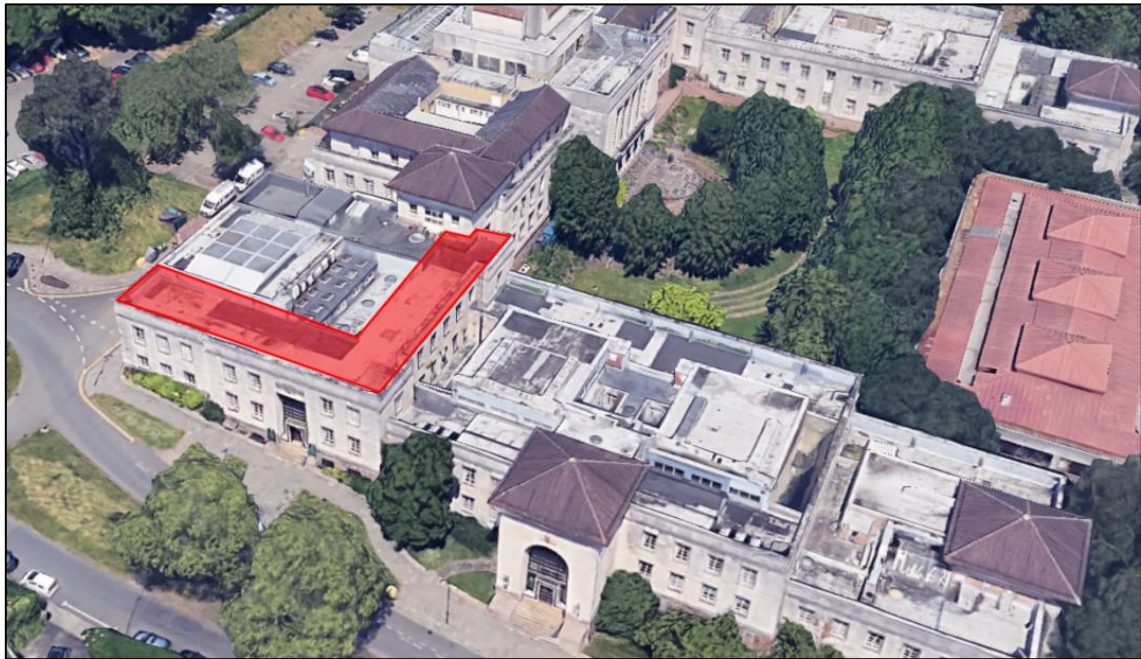


Figure 1-2 - Proposed Area of PV Installation

- 1.1.7 The roof comprises of a traditional built-up asphalt roofing system to provide the waterproofing layer required. Appendix C of this document contains the original Architectural Record of Design & Construction, which references Reinforced hollow brick flats by the Kleine Co. Ltd. This is the equivalent of a clay hollowpot construction. The area of roof identified for the installation of PV panels has recently had the asphalt waterproofing membranes reapplied.
- 1.1.8 The photographs identified below were taken at the time of the inspection noted above. The re-roofing works were being completed at the time of the inspection.

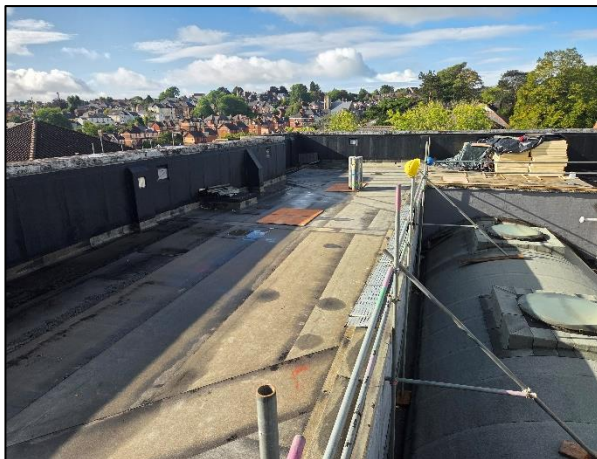


Figure 1-3 – Civic Centre Roof and Parapet



Figure 1-4 – Civic Centre Parapet



Figure 1-5 – Civic Centre Roof and Parapet

2 Proposed works

2.1.1 It is proposed for the south/eastern edge of the south and central wing to use a ballast fixed solar panel system (Eurener, MEPV 500 solar panels and fixing specification to be confirmed).

2.1 Loading

Existing Loading

Dead

No change to structure

Imposed

- ▶ Flat roofs and roofs up to and including 10°, including an allowance for loose snow up to 0.6m in depth (CP3:Chapter V:1944) 1.44 kN/m²

Proposed Loading

Dead

- ▶ Solar Panels
 - ▷ Eurener MEPV 500 0.13 kN/m²
 - ▷ Ballast fixing system (weight unknown – assume 0.17kN/m²)

Imposed

- ▶ Snow (Site specific refer to Tedds calc in Appendix) 0.28 kN/m²
- ▶ Snow Drift due to Parapet (Site specific refer to Tedds calc in Appendix) 0.70 kN/m²
- or
- ▶ Flat roofs and roofs up to and including 10°, including an allowance for loose snow up to 0.6m in depth (CP3:Chapter V:1944) 1.44 kN/m²

2.2 Analysis

Load Comparison

2.2.1 The original snow load calculations for the building are expected to have followed CP3: Chapter V:1944, so this check has been conducted using CP3: Chapter V:1944.

Roof slope and access	Uniform (kN/m ²)	Point (kN)
Flat roofs and roofs up to and including 10°, including an allowance for loose snow up to 0.6m in depth	1.44	1.07*
For lightweight roofs where design and location render it in no circumstances likely to be accessible other than for maintenance	0.72 [†]	NA
Sloping roofs greater than 10° and up to 65°, with a snow load measured on plan	0.48	NA
For incidental or maintenance loads: → where slope is such that workmen could stand directly on the roof	NA	0.89
→ where slope is such that workmen would have to use a ladder or similar laid on the covering	N/A	0.44
* Applied uniformly per foot (0.3m) width on roof slabs or coverings † No loading allowance for roofs over 65°		

Table 2-1 - Imposed Load for roofs as given in CP3: Chapter V:1944

- 2.2.2 The uniform roof snow load is 0.28kN/m^2 , assuming a flat roof with no parapets. The load of the PV panels can be 'offset' by using allowance for the site-specific snow load against the CP3: Chapter V:1944 imposed load the roof should be designed for as a minimum (1.44 kN/m^2) in accordance with structural codes of practice, thus the combined load of the PV panels and supporting system, with ballast is within the capacity of the roofing system.
- 2.2.3 Snow drift is expected adjacent to the circa 2m high parapet along the perimeter of the building, this has been calculated to be a maximum load of 0.70kN/m^2 . Assuming a PV system total weight of 0.30 kN/m^2 , the allowable combined load capacity for installation will be 1.00 kN/m^2 . This is within the load capacity of the original roofing structure.
- 2.2.4 As no other variables are to change i.e., additional roof cladding, etc., the increase in loading due to the PV panels is considered OK, providing there is a limit on the access provided for imposed maintenance access load, for cleaning etc during snow drift events.
- 2.2.5 Upon completion of the final PV system specification, this is to be provided to Cambria Consulting Ltd for validation of specification and positioning of the system prior to installation.

3 Recommendations

- 3.1.1 The proposed increase in loading for the PV installation can be 'offset' by utilising the typical imposed load the roof should have been designed for, of 1.44 kN/m². We would recommend that access to the roof must be strictly prohibited during snow drift events and that maintenance activities should be limited to 1 or 2 personnel.
- 3.1.2 The proposed PV is suitable for installation across the area of roof highlighted in Figure 2-3.

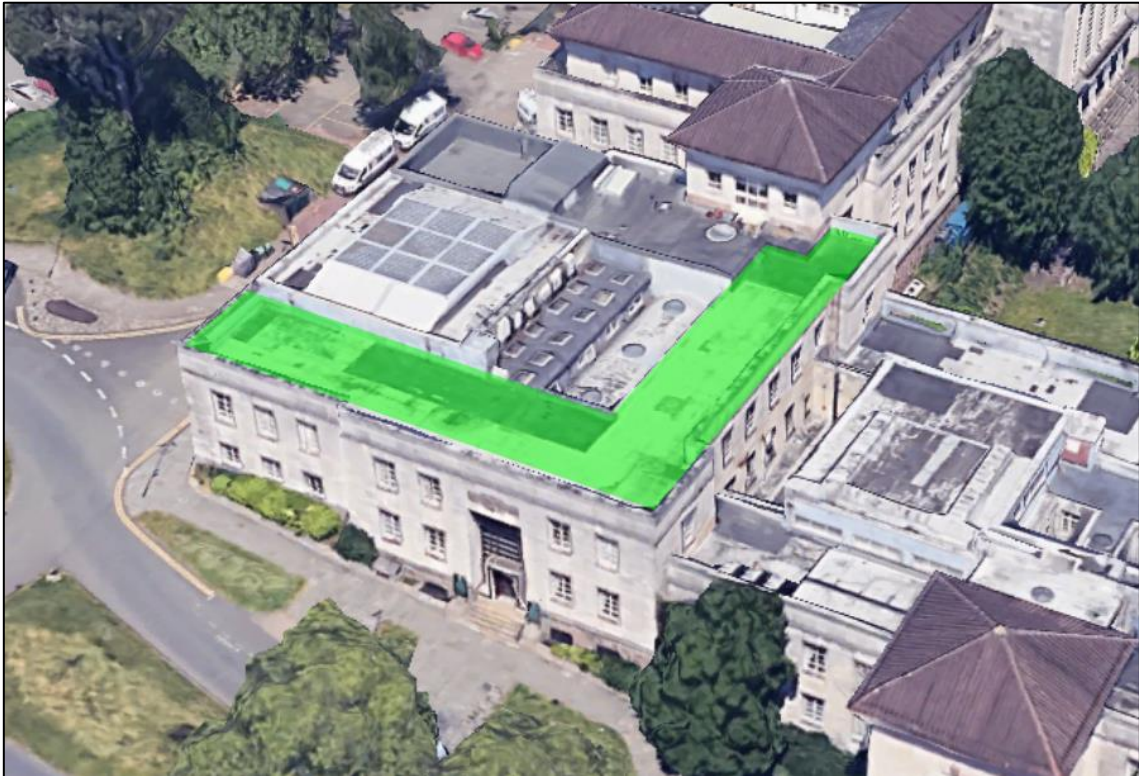


Figure 3-1 - Areas recommended for PV

- 3.1.3 Any maintenance personnel undertaking works on the roof should prepare their own RAMS prior to any works being undertaken on the roof. It is assumed should any maintenance personnel access the roof where unavailable, they would be safeguarded from falls by the existing parapet and full PPE as required.
- 3.1.4 No stacking of materials should be allowed during installation or operation, during installation workers should be spread out to minimise additional imposed loading on the roof.
- 3.1.5 These details should be stated in the O&M manual, so access to the roof is always limited below the allowable capacities.
- 3.1.6 All panels should be installed strictly in accordance with the chosen PV panels and specific guidance.
- 3.1.7 Final PV System Specification to be provided to Cambria Consulting Ltd for validation prior to installation.

Appendix A – Snow Loading Calculations

Project Newport Civic Centre L4W				Job no. CC2952	
Calcs for Flat Roof Snow Loading				Start page no./Revision 1	
Calcs by JS	Calcs date 03/10/2025	Checked by	Checked date	Approved by	Approved date

SNOW LOADING TO BS6399:PART 3:1988

TEDDS calculation version 1.0.03

Site location

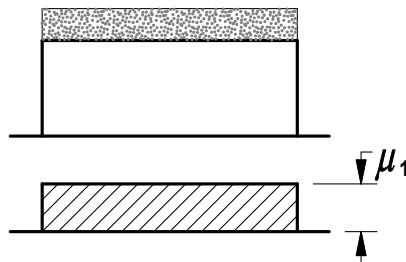
Location of site **Newport**
Site altitude **A = 40 m**

Calculate site snow load

From BS6399:Part 3: 1988 - Figure 1. Basic snow load on the ground

Basic snow load $s_b = 0.35 \text{ kN/m}^2$
 $s_{alt} = 0.1 \times s_b + (0.09 \text{ kN/m}^2) = 0.13 \text{ kN/m}^2$
 Site snow load $s_0 = \max(s_b, s_b + s_{alt} \times (A - (100 \text{ m})) / 100 \text{ m}) = 0.35 \text{ kN/m}^2$

BS6399:Part3:1988 Cl.6.2



Uniform loading

Roof geometry

Roof type **Flat**
Angle of pitch of roof $\alpha = 0.0 \text{ deg}$

Calculate uniform snow load

From BS6399:Part 3: 1988 - Figure 2. Snow load shape coefficients for flat or monopitch roofs

Snow load shape coefficient $\mu_1 = 0.80$
 Uniform roof snow load $s_{d1} = \mu_1 \times s_0 = 0.28 \text{ kN/m}^2$

BS6399:Part3:1988 Cl.5

Project Newport Civic Centre L4W				Job no. CC2952	
Calcs for Flat Roof Drifted Snow Validation				Start page no./Revision 1	
Calcs by JS	Calcs date 03/10/2025	Checked by	Checked date	Approved by	Approved date

SNOW LOADING TO BS6399:PART 3:1988

TEDDS calculation version 1.0.03

Site location

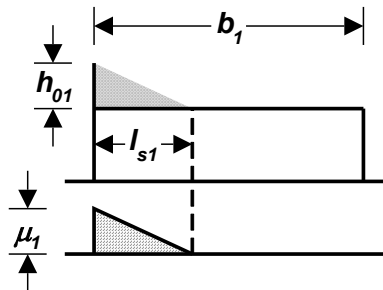
Location of site **Newport**
Site altitude **A = 40 m**

Calculate site snow load

From BS6399:Part 3: 1988 - Figure 1. Basic snow load on the ground

Basic snow load $s_b = 0.35 \text{ kN/m}^2$
 $s_{alt} = 0.1 \times s_b + (0.09 \text{ kN/m}^2) = 0.13 \text{ kN/m}^2$
 Site snow load $s_0 = \max(s_b, s_b + s_{alt} \times (A - (100 \text{ m})) / 100 \text{ m}) = 0.35 \text{ kN/m}^2$

BS6399:Part3:1988 Cl.6.2



Roof geometry

Length of roof $b_1 = 8.000 \text{ m}$
 Parapet height $h_{01} = 2.000 \text{ m}$

Calculate snow load

From BS6399:Part 3:1988 - Figure 6. Snow load shape coefficients and drift lengths at abrupt changes in roof height and parapets

Length of drift $l_{s1} = \min(5 \times h_{01}, b_1, 15 \text{ m}) = 8.000 \text{ m}$
 Snow load shape coefficient $\mu_1 = \min(2 \times h_{01} / (s_0 \times 1 \text{ m}^3/\text{kN}), 2 \times b_1 / l_{s1}, 8) = 2.00$
 Roof snow load $s_{d1} = \mu_1 \times s_0 = 0.70 \text{ kN/m}^2$

BS6399:Part3:1988 Cl.7.4.3

Appendix B – PV Data Sheet

CIVIC CENTRE

Godfrey Road, Newport, NP20 4UR, United Kingdom | 5 Sept 2025



SYSTEM OVERVIEW

 70 PV modules

 1 Inverter

 35 Optimizers

FINANCIAL OVERVIEW

System Price

£ 41,612

SIMULATION RESULTS



Installed DC Power
35.00 kWp



Max Achieved AC Power
25.00 kW



Annual Usable Solar
Production
29.66 MWh



Annual CO₂ Emission Saved
5.73 t



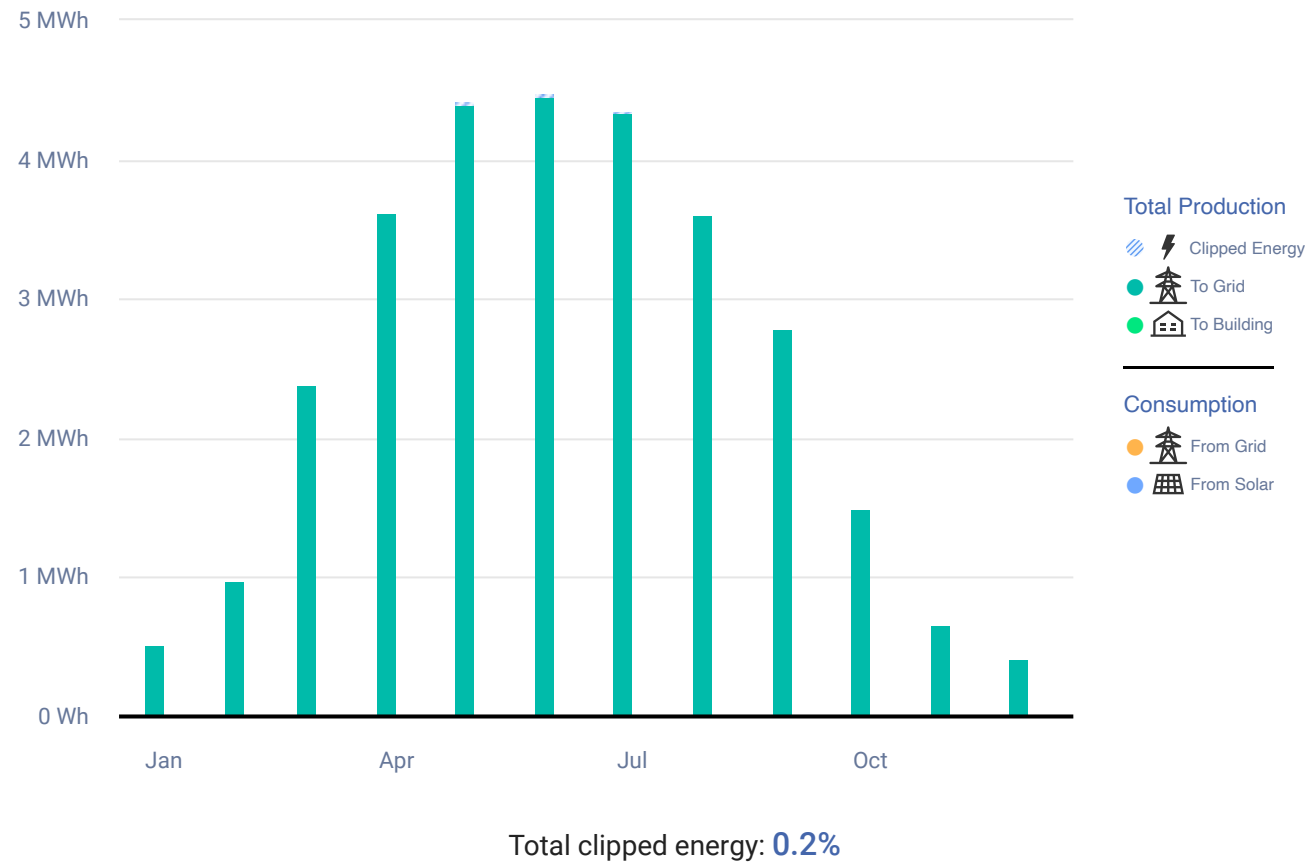
Annual Equivalent Trees
Planted
263

CIVIC CENTRE

Godfrey Road, Newport, NP20 4UR, United Kingdom | 5 Sept 2025



ESTIMATED MONTHLY ENERGY



PV MODULES

# Module	Model	Peak power	Racking type	Orientation	Azimuth	Tilt
24	Eurener, MEPV 500 (NEXA Double Glass Bifacial)	12 kWp			209°	15°
46	Eurener, MEPV 500 (NEXA Double Glass Bifacial)	23 kWp			208°	15°
Total:	70	35 kWp				

CIVIC CENTRE

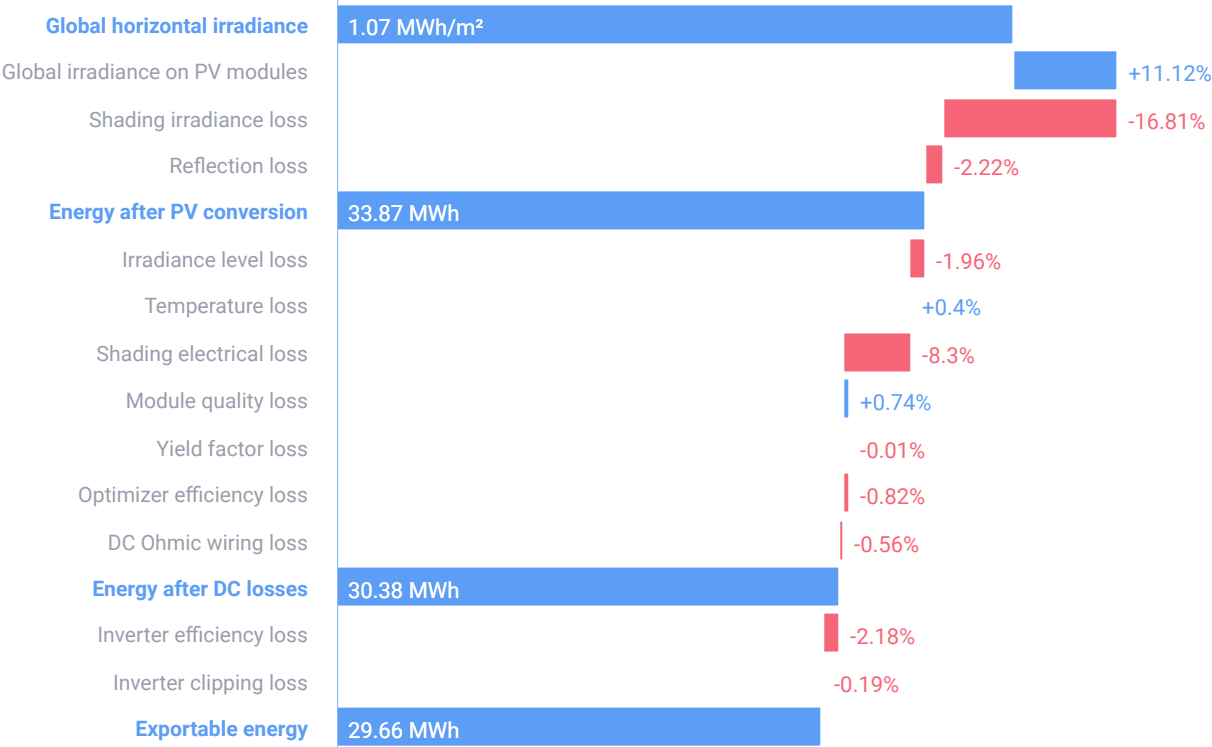
Godfrey Road, Newport, NP20 4UR, United Kingdom | 5 Sept 2025



ELECTRICAL DESIGN

Inverters & Storage	Strings per inverter	Optimizers per string	PV modules per string
 1 x SE25K 33.83kW 135% Oversizing	1 x string	16 x S1000 (2:1)	32
	1 x string	19 x S1000 (2:1)	38

SYSTEM LOSS DIAGRAM



CIVIC CENTRE

Godfrey Road, Newport, NP20 4UR, United Kingdom | 5 Sept 2025



SIMULATION PARAMETERS



LOCATION & GRID

Time zone	BST (London)
Weather station	Bristol/Lulsgate (30 km away)
Station altitude	189 m
Station data source	Meteonorm 8.2
Grid	400V L-L, 230V L-N



LOSS FACTORS

Near shading	Enabled
Albedo	0.20
Bi-Facial Albedo	0.30
Soiling/Snow	0%
Incidence angle modifier (IAM), ASHRAE b0 param.	0.05
Thermal loss factor U_c (const) Flush mount	20
Thermal loss factor U_c (const) Tilted	29
LID loss factor	0%
System unavailability	0%

Appendix C – Architectural Record of Design & Construction



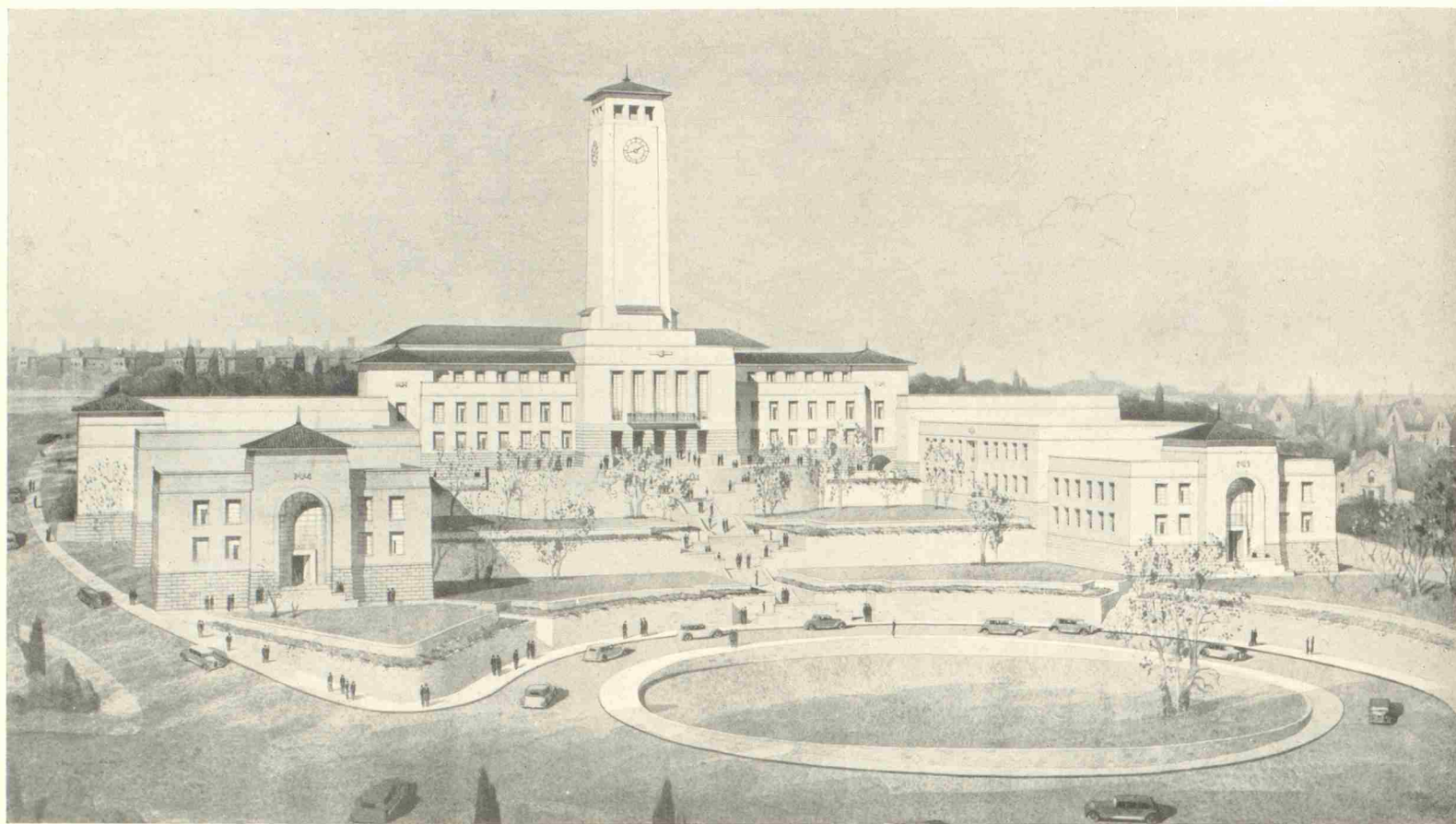
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NEWPORT CIVIC CENTRE. T. CECIL HOWITT, ARCHITECT

PLANNING OUTLINE

TYPE OF BUILDING

Municipal Offices, Assembly Hall, Law Courts and Police Station. Job was commenced in January this year and the two flanking wings are in course of erection.

SITE AND SURROUNDINGS

The site slopes steeply towards the south, approximately 80 ft. run back to front. The site is thickly wooded and is situated centrally within the Tower.

NATURE OF PROBLEM

Providing separate groups of buildings on the steep slopes giving imposing entrance features to the roadway surrounding the site on all sides.

ACCOMMODATION

The Civic Suite with Reception Room and Council Chamber, Committee Rooms, etc., Town Clerks Department, Municipal Departments and Rates Offices, Assize Courts, Police Courts, Police Station, with Cells, etc., Assembly Hall and Refreshment Room.

GENERAL DESIGN

Buildings grouped symmetrically and dominated by a Tower at centre. Portland Stone faced buildings in simple lines with a tendency towards severity relieved by roofed tower features and imposing arched entrance windows and doors.

FURTHER POINTS

Separate car access road within site for Council Suite.

CONSTRUCTION OUTLINE

FOUNDATIONS : Pier and lintol construction on sloping rock strata.

STRUCTURE : Brickwork mainly. Steel frame at Tower only. **WALLS :** Brick and stone.

ROOF : Reinforced hollow brick flats by the Kleine Co. Ltd. ; Roman tiles to Tower.

FLOORS : Reinforced hollow brick throughout, designed and constructed by the Kleine Co. Ltd.

CEILINGS : Slung plaster. **PARTITIONS :** Hollow tile.

WINDOWS : Steel casements. **DOORS :** Flush panel hardwood.

STAIRS : Precast concrete with solid balustrades and bronze handrails.

HEATING : Low pressure hot water.

FINISHES : Hardwood panelling and floors to dados of large rooms.

COST : £400,000 approx. (2s. per cubic foot).

