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**Project Name:** Eden Boys

06/07/2022

## Your PV system from Eden Sustainable Ltd

### Address of Installation

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Cheetham Hill  
Manchester  
M8 8DT

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## Project Overview



Figure: Overview Image, 3D Design

## PV System

### 3D, Grid-connected PV System with Electrical Appliances

|                      |                             |
|----------------------|-----------------------------|
| Climate Data         | Cheetham, GBR (1996 - 2015) |
| Values source        | Meteonorm 8.1(i)            |
| PV Generator Output  | 103.5 kWp                   |
| PV Generator Surface | 501.8 m <sup>2</sup>        |
| Number of PV Modules | 225                         |
| Number of Inverters  | 4                           |

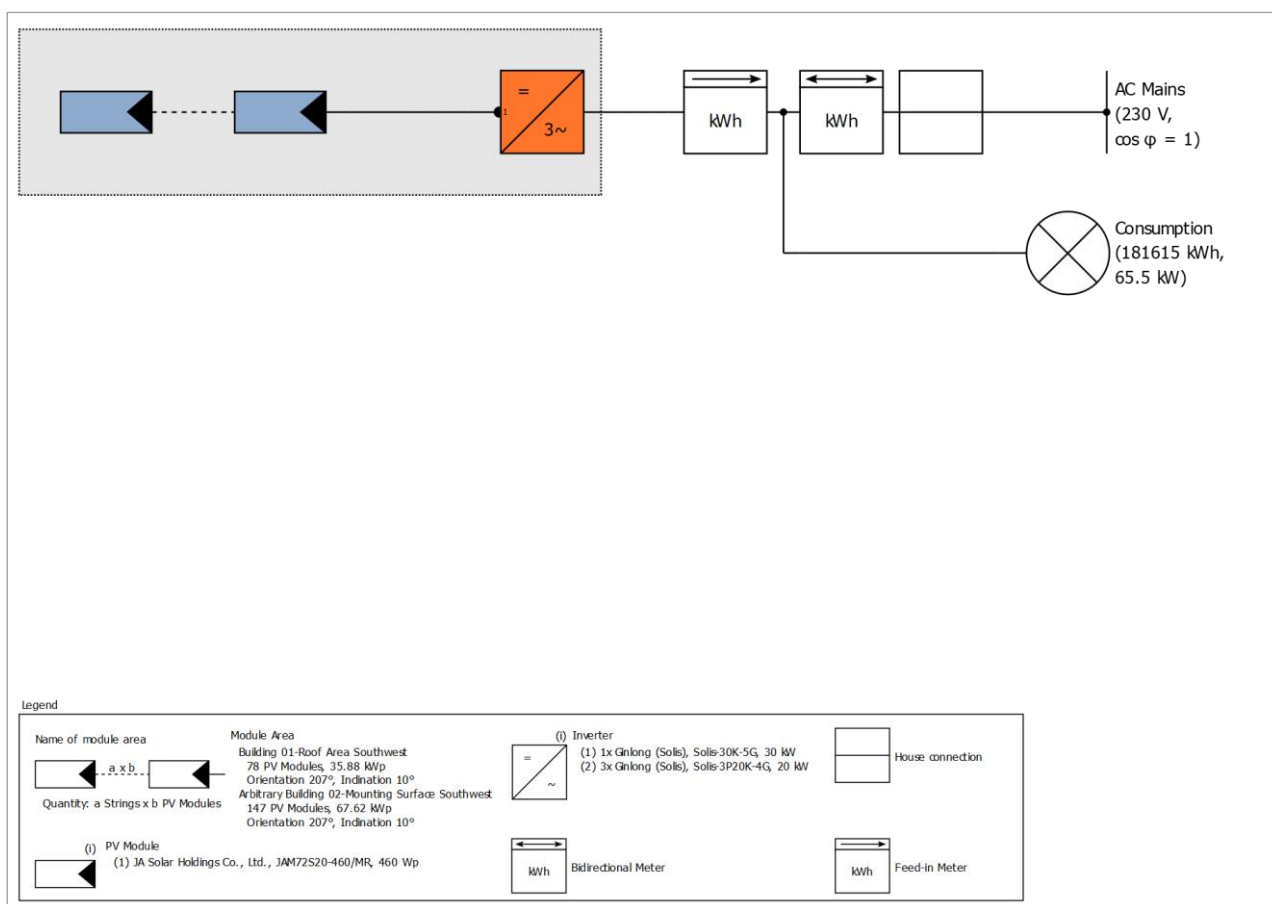


Figure: Schematic diagram

## Production Forecast

### Production Forecast

|                                   |                  |
|-----------------------------------|------------------|
| PV Generator Output               | 103.50 kWp       |
| Spec. Annual Yield                | 871.79 kWh/kWp   |
| Performance Ratio (PR)            | 83.01 %          |
| Yield Reduction due to Shading    | 3.5 %/Year       |
| PV Generator Energy (AC grid)     | 90,269 kWh/Year  |
| Own Consumption                   | 68,221 kWh/Year  |
| Down-regulation at Feed-in Point  | 0 kWh/Year       |
| Grid Feed-in                      | 22,048 kWh/Year  |
| Own Power Consumption             | 75.6 %           |
| CO <sub>2</sub> Emissions avoided | 42,408 kg / year |
| Level of Self-sufficiency         | 37.6 %           |

The results have been calculated with a mathematical model calculation from Valentin Software GmbH (PV\*SOL algorithms). The actual yields from the solar power system may differ as a result of weather variations, the efficiency of the modules and inverter, and other factors.

# Set-up of the System

## Overview

### System Data

|                |                                                         |
|----------------|---------------------------------------------------------|
| Type of System | 3D, Grid-connected PV System with Electrical Appliances |
|----------------|---------------------------------------------------------|

### Climate Data

|                                             |                             |
|---------------------------------------------|-----------------------------|
| Location                                    | Cheetham, GBR (1996 - 2015) |
| Values source                               | Meteonorm 8.1(i)            |
| Resolution of the data                      | 1 h                         |
| Simulation models used:                     |                             |
| - Diffuse Irradiation onto Horizontal Plane | Hofmann                     |
| - Irradiance onto tilted surface            | Hay & Davies                |

### Consumption

|                             |            |
|-----------------------------|------------|
| Total Consumption           | 181615 kWh |
| School 10000 m <sup>2</sup> | 181615 kWh |
| Load Peak                   | 65.5 kW    |

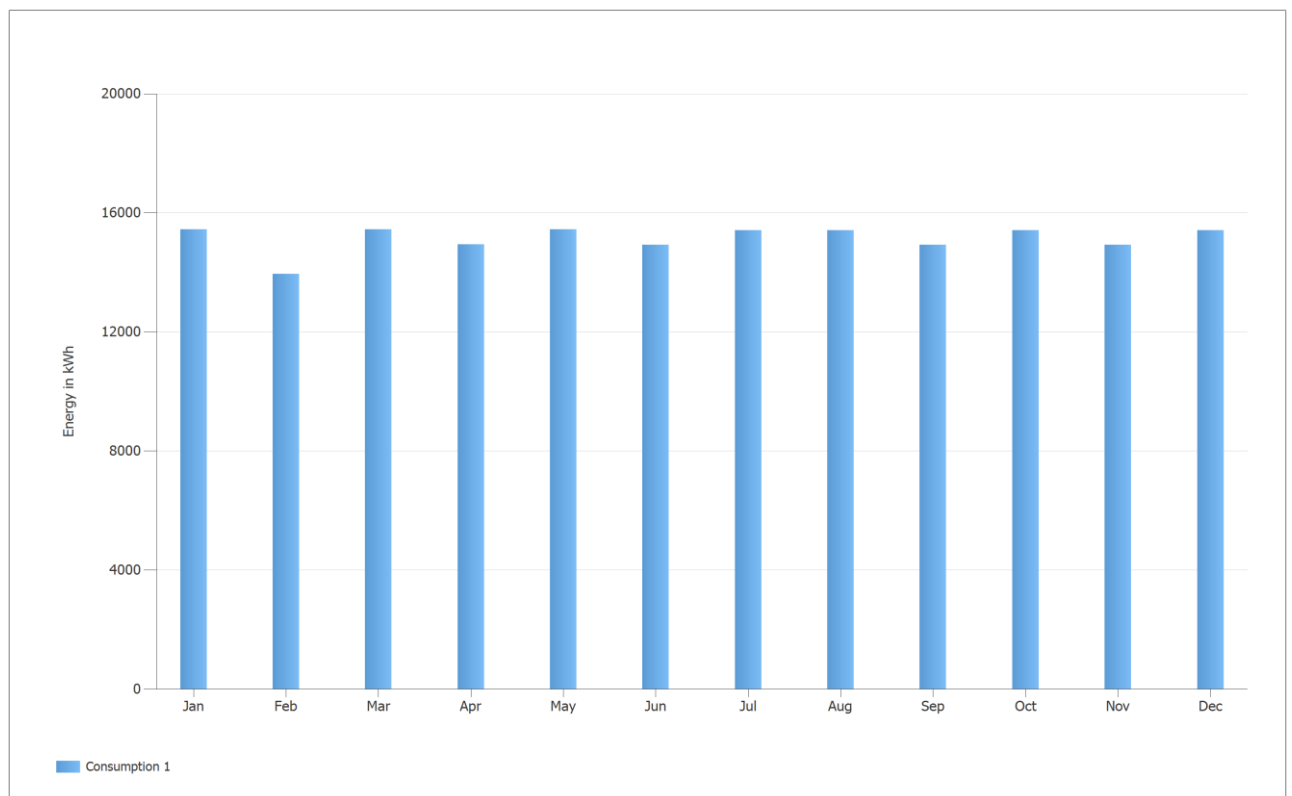


Figure: Consumption

## Module Areas

### 1. Module Area - Building 01-Roof Area Southwest

#### PV Generator, 1. Module Area - Building 01-Roof Area Southwest

|                      |                                 |
|----------------------|---------------------------------|
| Name                 | Building 01-Roof Area Southwest |
| PV Modules           | 78 x JAM72S20-460/MR (v4)       |
| Manufacturer         | JA Solar Holdings Co., Ltd.     |
| Inclination          | 10 °                            |
| Orientation          | Southwest 207 °                 |
| Installation Type    | Mounted - Roof                  |
| PV Generator Surface | 174.0 m <sup>2</sup>            |



Figure: 1. Module Area - Building 01-Roof Area Southwest

## 2. Module Area - Arbitrary Building 02-Mounting Surface Southwest

### PV Generator, 2. Module Area - Arbitrary Building 02-Mounting Surface Southwest

|                      |                                                     |
|----------------------|-----------------------------------------------------|
| Name                 | Arbitrary Building 02-Mounting<br>Surface Southwest |
| PV Modules           | 147 x JAM72S20-460/MR (v4)                          |
| Manufacturer         | JA Solar Holdings Co., Ltd.                         |
| Inclination          | 10 °                                                |
| Orientation          | Southwest 207 °                                     |
| Installation Type    | Mounted - Roof                                      |
| PV Generator Surface | 327.8 m <sup>2</sup>                                |

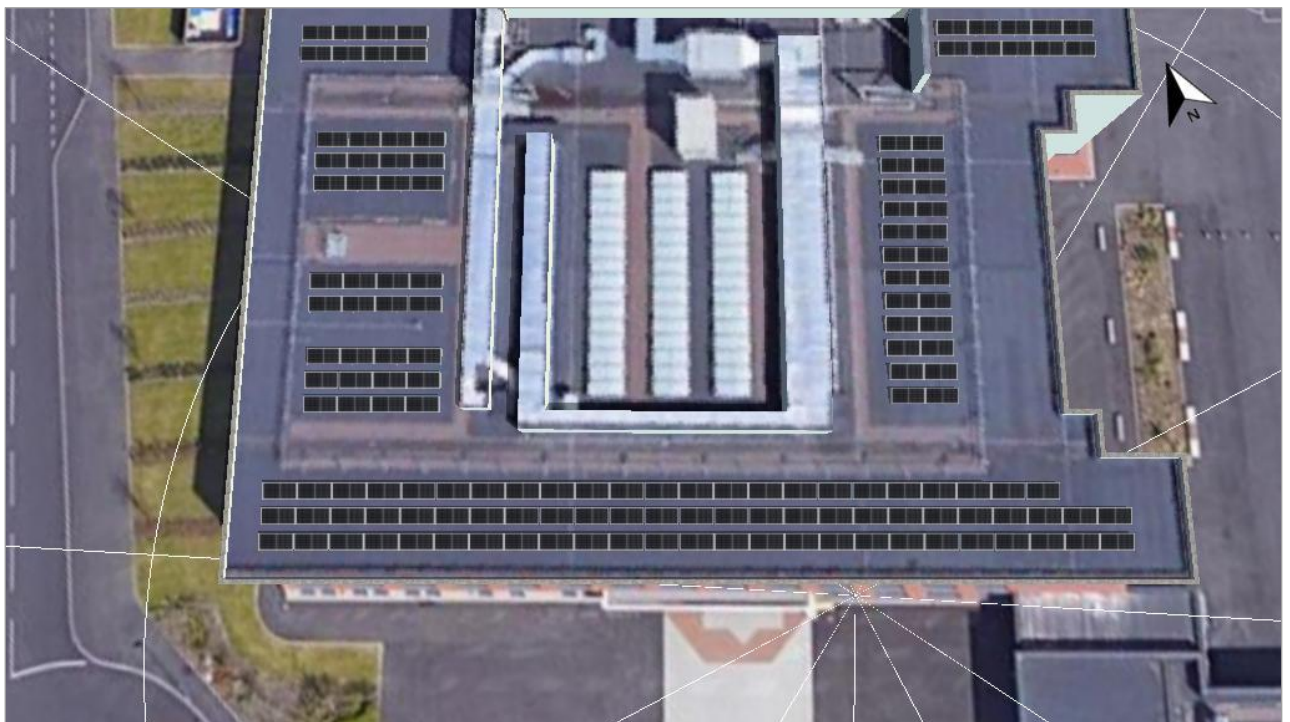


Figure: 2. Module Area - Arbitrary Building 02-Mounting Surface Southwest

## Horizon Line, 3D Design

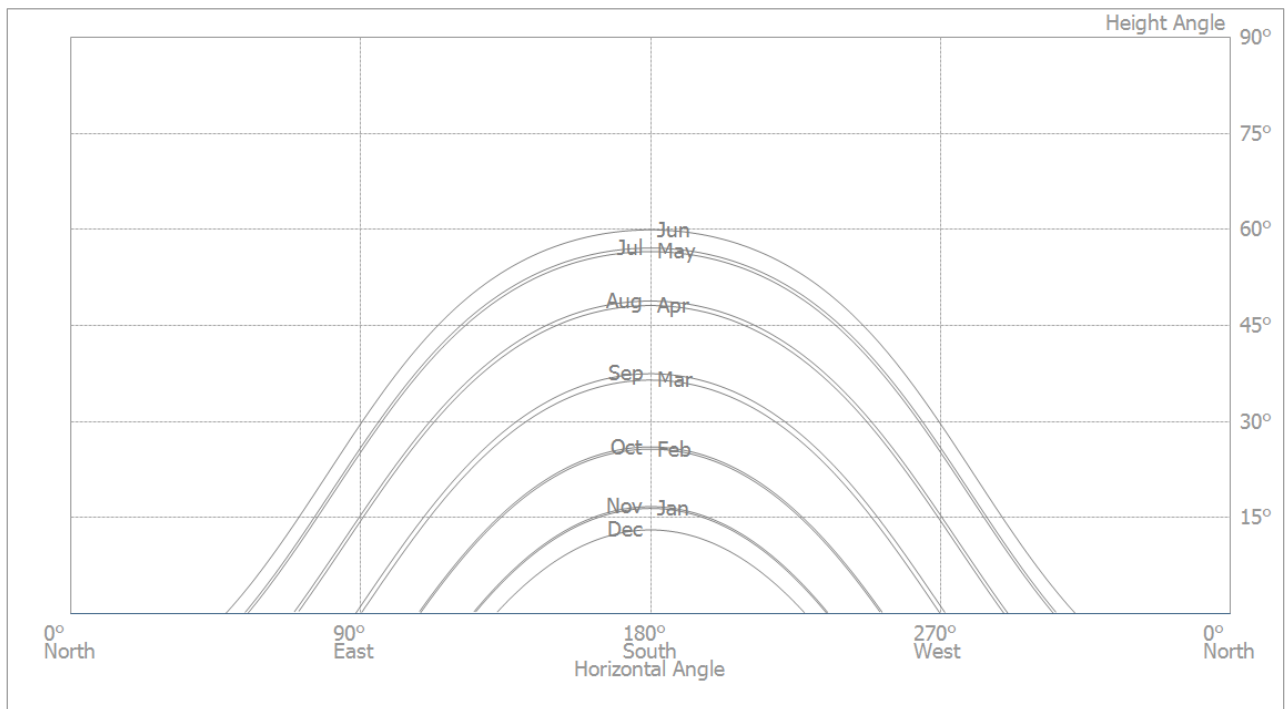


Figure: Horizon (3D Design)

## Inverter configuration

### Configuration 1

|               |                                 |
|---------------|---------------------------------|
| Module Area   | Building 01-Roof Area Southwest |
| Inverter 1    |                                 |
| Model         | Solis-30K-5G (v1)               |
| Manufacturer  | Ginlong (Solis)                 |
| Quantity      | 1                               |
| Sizing Factor | 119.6 %                         |
| Configuration | MPP 1: 2 x 13                   |
|               | MPP 2: 2 x 13                   |
|               | MPP 3: 2 x 13                   |

### Configuration 2

|               |                                                  |
|---------------|--------------------------------------------------|
| Module Area   | Arbitrary Building 02-Mounting Surface Southwest |
| Inverter 1    |                                                  |
| Model         | Solis-3P20K-4G (v1)                              |
| Manufacturer  | Ginlong (Solis)                                  |
| Quantity      | 3                                                |
| Sizing Factor | 112.7 %                                          |
| Configuration | MPP 1: 2 x 16                                    |
|               | MPP 2: 1 x 17                                    |

## AC Mains

### AC Mains

|                                         |       |
|-----------------------------------------|-------|
| Number of Phases                        | 3     |
| Mains voltage between phase and neutral | 230 V |
| Displacement Power Factor (cos phi)     | +/- 1 |

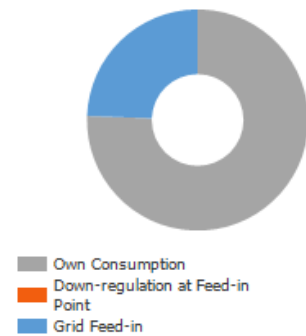
# Simulation Results

## Results Total System

### PV System

|                                   |                  |
|-----------------------------------|------------------|
| PV Generator Output               | 103.50 kWp       |
| Spec. Annual Yield                | 871.79 kWh/kWp   |
| Performance Ratio (PR)            | 83.01 %          |
| Yield Reduction due to Shading    | 3.5 %/Year       |
| PV Generator Energy (AC grid)     | 90,269 kWh/Year  |
| Own Consumption                   | 68,221 kWh/Year  |
| Down-regulation at Feed-in Point  | 0 kWh/Year       |
| Grid Feed-in                      | 22,048 kWh/Year  |
| Own Power Consumption             | 75.6 %           |
| CO <sub>2</sub> Emissions avoided | 42,408 kg / year |

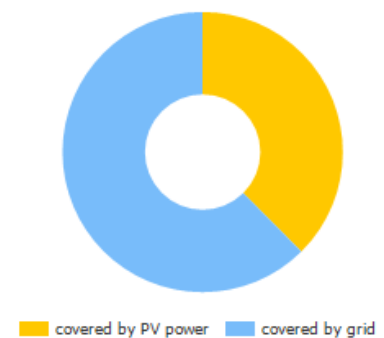
PV Generator Energy (AC grid)



### Appliances

|                                |                  |
|--------------------------------|------------------|
| Appliances                     | 181,615 kWh/Year |
| Standby Consumption (Inverter) | 38 kWh/Year      |
| Total Consumption              | 181,653 kWh/Year |
| covered by PV power            | 68,221 kWh/Year  |
| covered by grid                | 113,432 kWh/Year |
| Solar Fraction                 | 37.6 %           |

Total Consumption

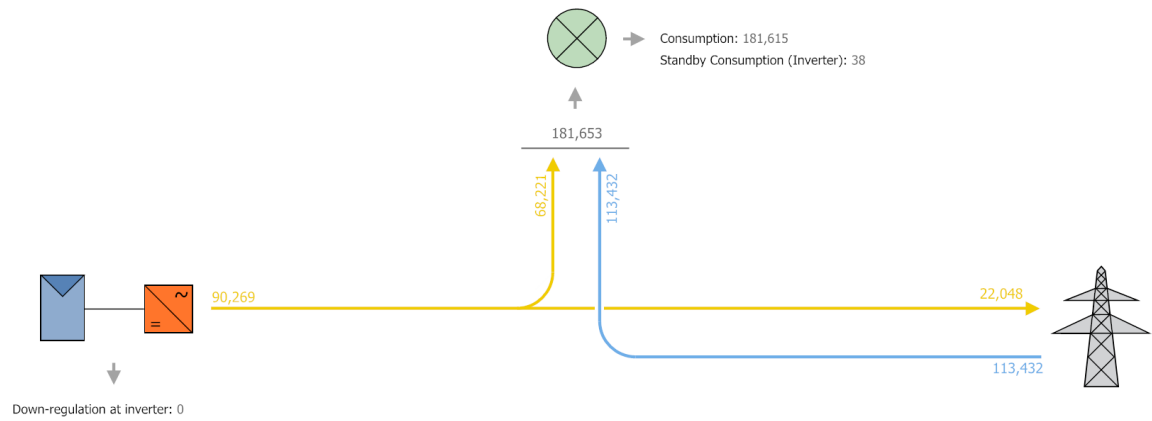


### Level of Self-sufficiency

|                           |                  |
|---------------------------|------------------|
| Total Consumption         | 181,653 kWh/Year |
| covered by grid           | 113,432 kWh/Year |
| Level of Self-sufficiency | 37.6 %           |

## Energy Flow Graph

Project: Eden Boys



All values in kWh  
Small deviations in the totals can occur due to rounding  
created with PV\*SOL

Figure: Energy flow

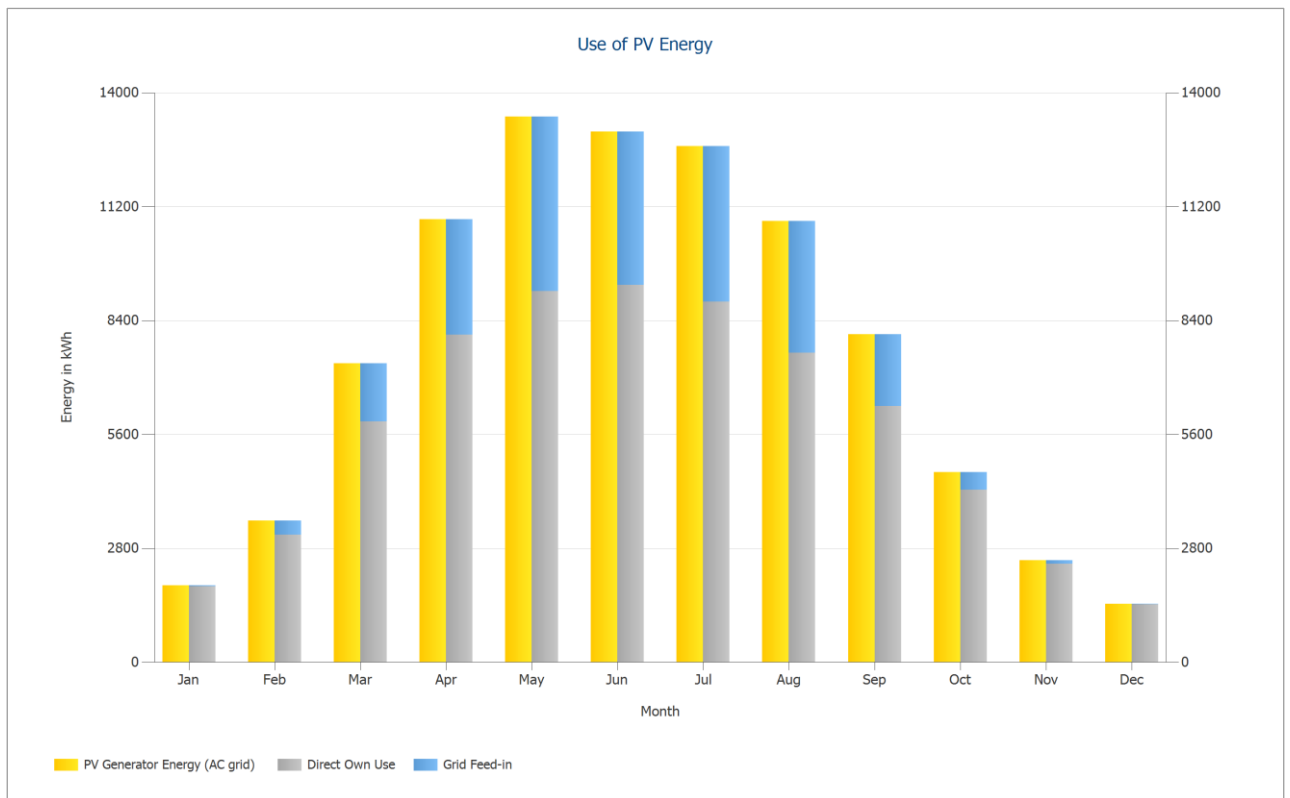


Figure: Use of PV Energy

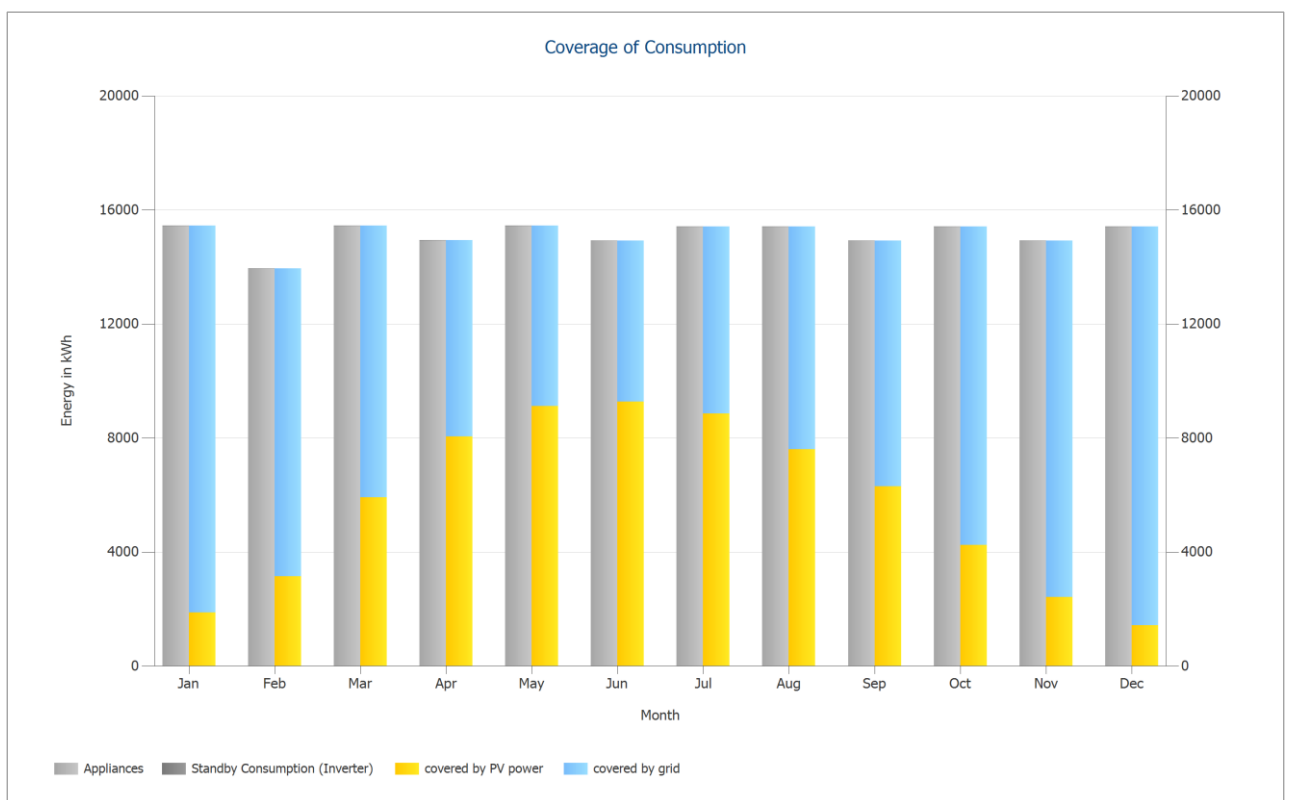


Figure: Coverage of Consumption

# Plans and parts list

## Circuit Diagram

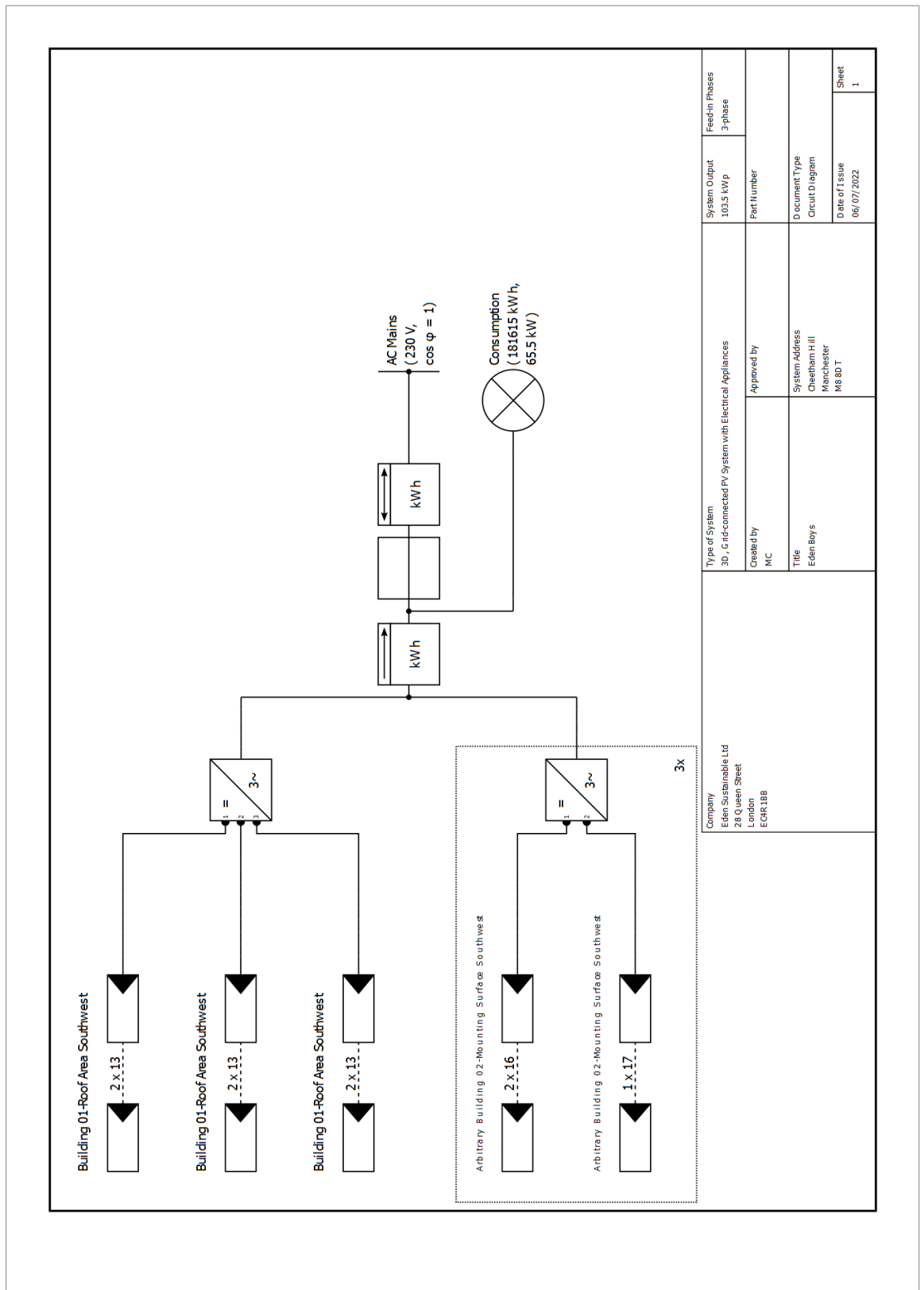


Figure: Circuit Diagram

## Overview plan

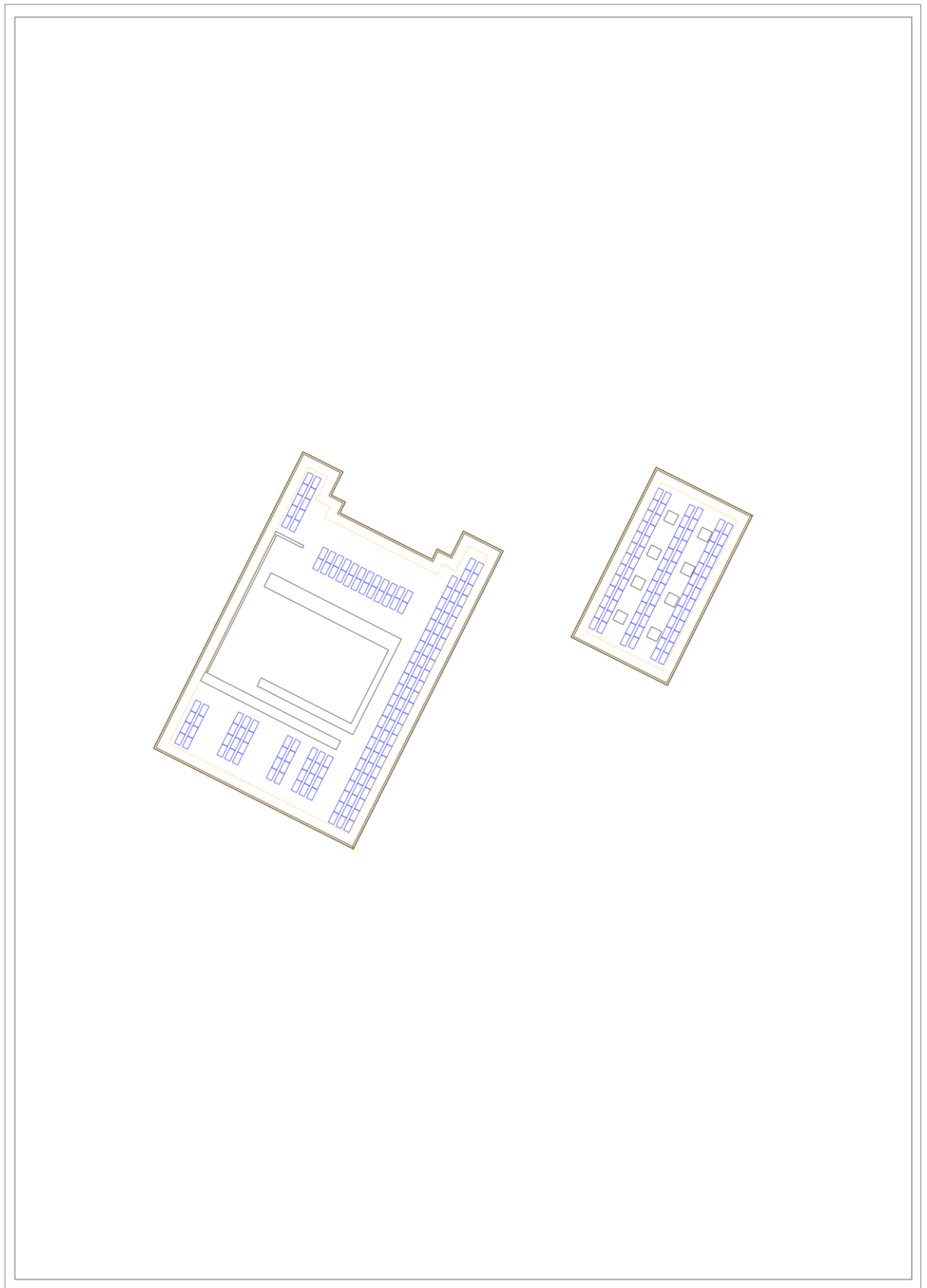


Figure: Overview plan

## Dimensioning Plan

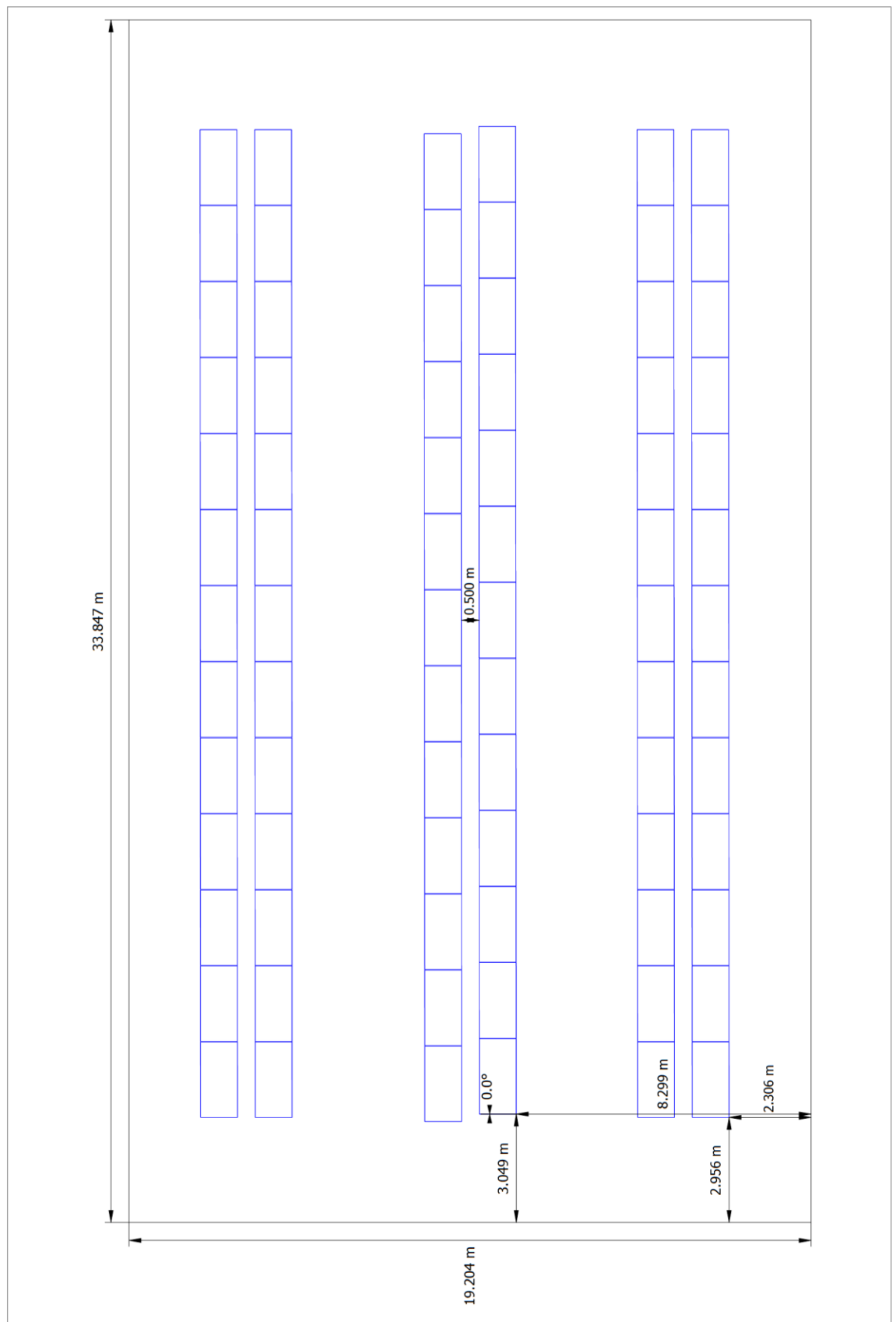


Figure: Building 01-Roof Area Southwest

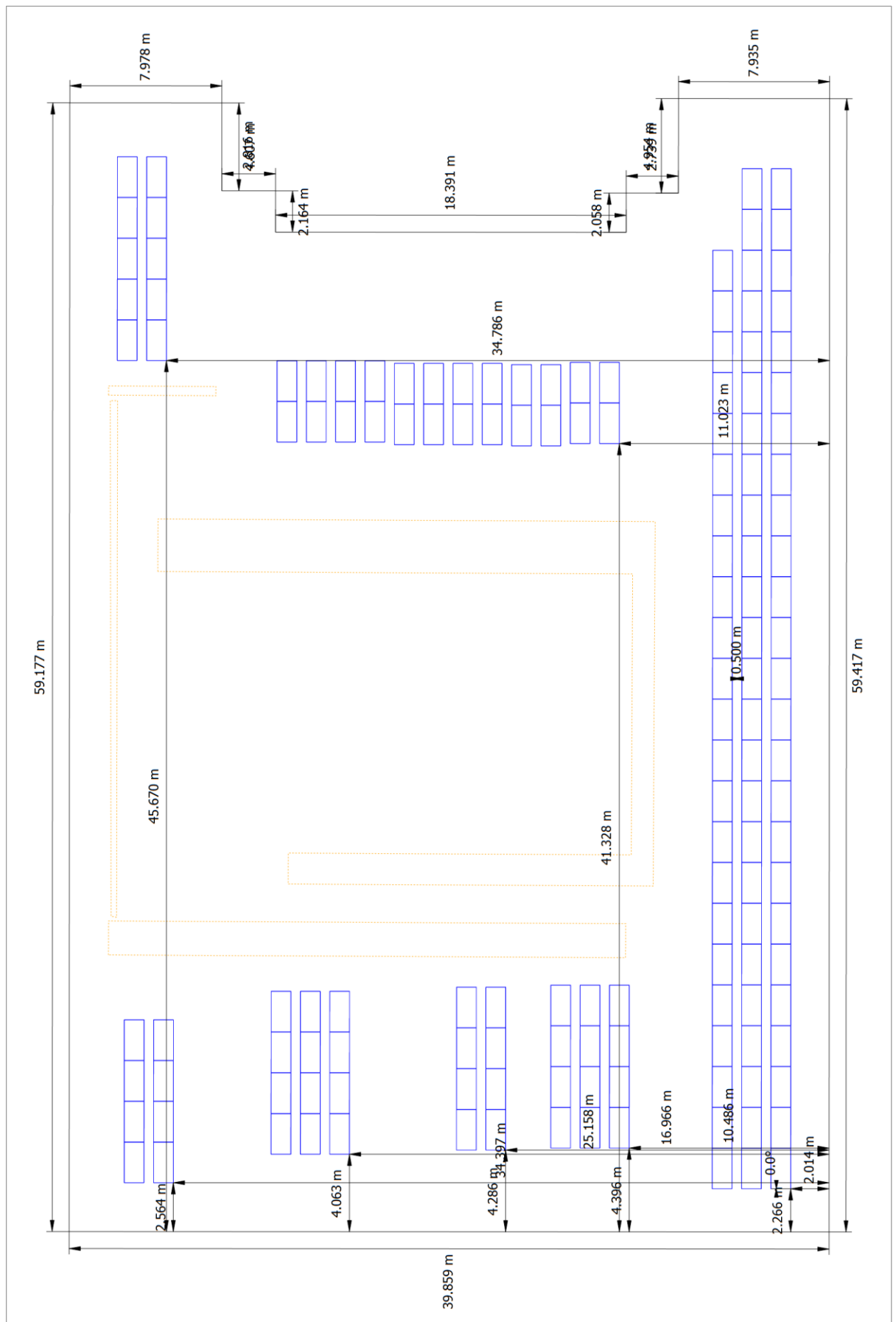


Figure: Arbitrary Building 02-Mounting Surface Southwest

## String Plan

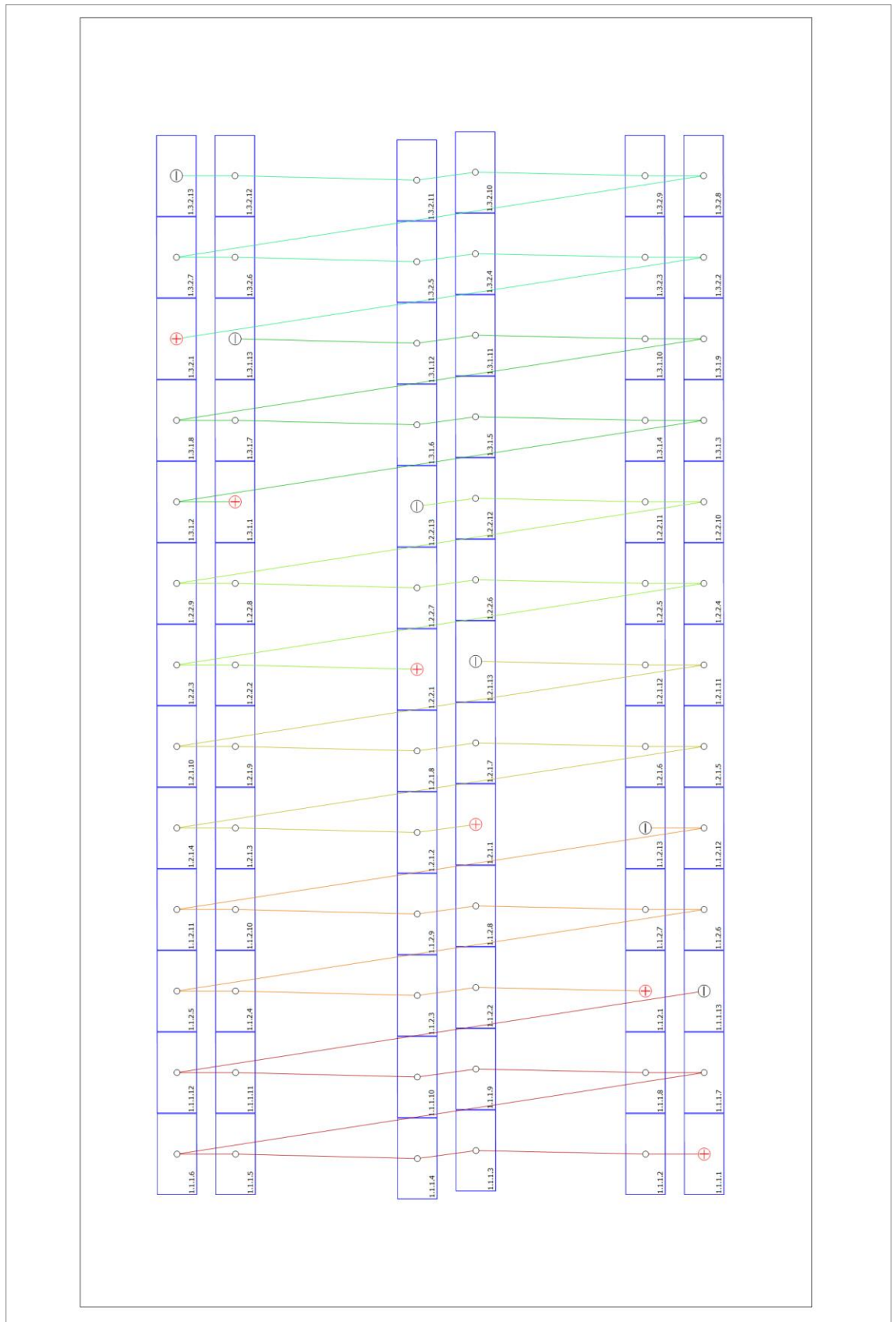
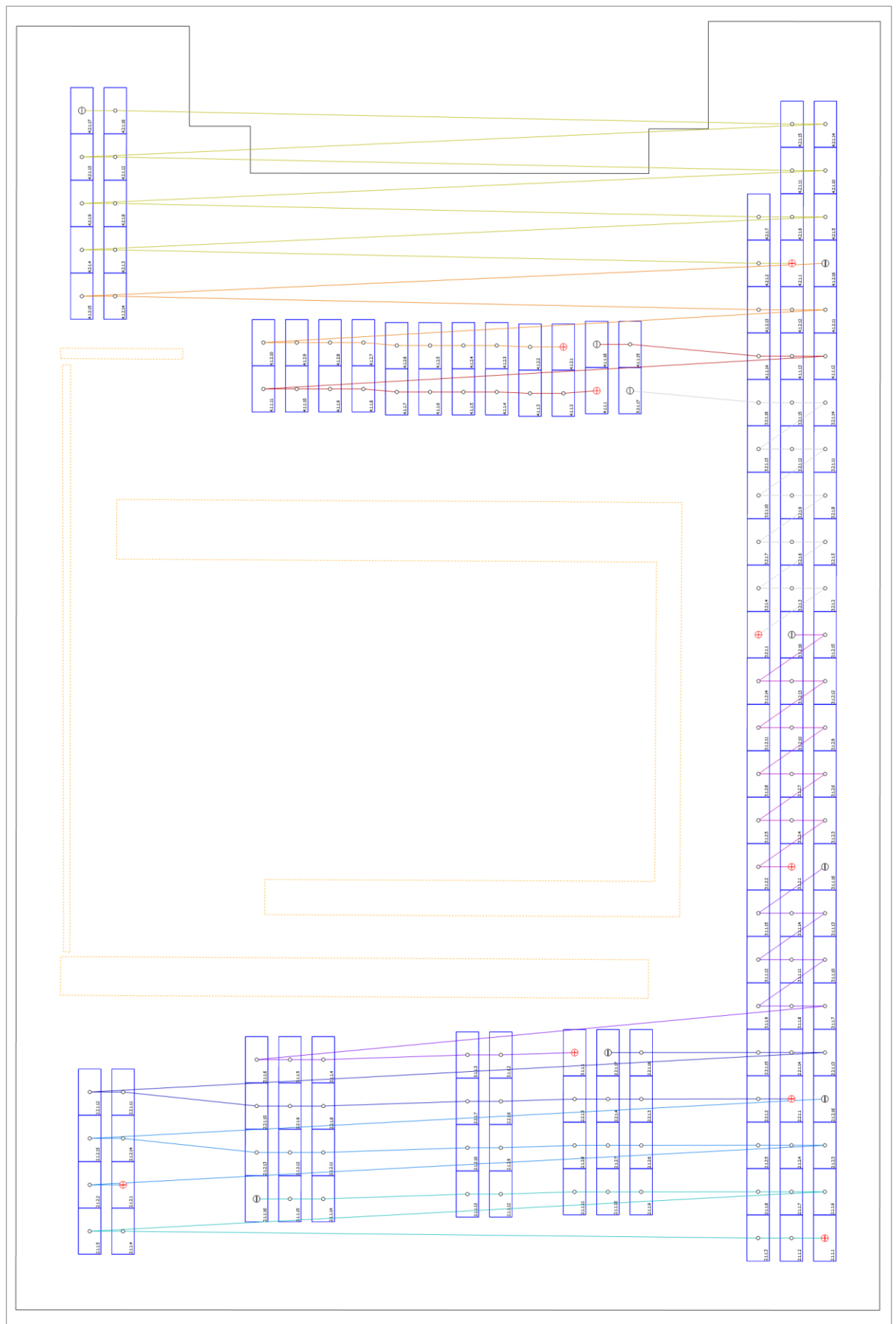


Figure: Building 01-Roof Area Southwest



## Parts list

### Parts list

| # | Type       | Item number | Manufacturer                | Name                | Quantity | Unit  |
|---|------------|-------------|-----------------------------|---------------------|----------|-------|
| 1 | PV Module  |             | JA Solar Holdings Co., Ltd. | JAM72S20-460/MR     | 225      | Piece |
| 2 | Inverter   |             | Ginlong (Solis)             | Solis-30K-5G        | 1        | Piece |
| 3 | Inverter   |             | Ginlong (Solis)             | Solis-3P20K-4G      | 3        | Piece |
| 4 | Components |             |                             | Feed-in Meter       | 1        | Piece |
| 5 | Components |             |                             | House connection    | 1        | Piece |
| 6 | Components |             |                             | Bidirectional Meter | 1        | Piece |

# Screenshots, 3D Design Environment



Figure: Screenshot01