

## Project name

Reading Police Station- Retail

As designed

Date: Wed Apr 08 15:09:49 2026

## Administrative information

## Building Details

Address: Address 1, City, Postcode

## Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

## Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

BRUKL compliance module version: v6.1.e.1

Foundation area [m<sup>2</sup>]: 817.39The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

|                                                                                       |                          |
|---------------------------------------------------------------------------------------|--------------------------|
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum   | 3.88                     |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum | 3.93                     |
| Target primary energy rate (TPER), kWh <sub>PE</sub> /m <sup>2</sup> annum            | 42.71                    |
| Building primary energy rate (BPER), kWh <sub>PE</sub> /m <sup>2</sup> annum          | 43.71                    |
| Do the building's emission and primary energy rates exceed the targets?               | BER > TER    BPER > TPER |

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

| Fabric element                       | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | First surface with maximum value         |
|--------------------------------------|-----------------------|----------------------|----------------------|------------------------------------------|
| Walls*                               | 0.26                  | 0.15                 | 0.15                 | BS000003:Surf[3]                         |
| Floors                               | 0.18                  | 0.1                  | 0.1                  | BS000003:Surf[0]                         |
| Pitched roofs                        | 0.16                  | -                    | -                    | No pitched roofs in building             |
| Flat roofs                           | 0.18                  | 0.1                  | 0.1                  | BS000003:Surf[1]                         |
| Windows** and roof windows           | 1.6                   | 1.2                  | 1.21                 | BS000003:Surf[2]                         |
| Rooflights***                        | 2.2                   | -                    | -                    | No roof lights in building               |
| Personnel doors^                     | 1.6                   | -                    | -                    | No personnel doors in building           |
| Vehicle access & similar large doors | 1.3                   | -                    | -                    | No vehicle access doors in building      |
| High usage entrance doors            | 3                     | -                    | -                    | No high usage entrance doors in building |

U<sub>a</sub>-Limit = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]U<sub>i</sub>-Calc = Calculated maximum individual element U-values [W/(m<sup>2</sup>K)]U<sub>a</sub>-Calc = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]

\* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

\*\* Display windows and similar glazing are excluded from the U-value check.

\*\*\* Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air permeability                             | Limiting standard | This building |
|----------------------------------------------|-------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 8                 | 3             |

## Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

|                                                                                              |       |
|----------------------------------------------------------------------------------------------|-------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | YES   |
| Whole building electric power factor achieved by power factor correction                     | >0.95 |

### 1- WSHP VRF

|                                                                                               | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-----------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                   | 2.64               | 3.21               | 0                  | -             | 0.75          |
| Standard value                                                                                | 2.5*               | 5                  | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system     |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. |                    |                    |                    |               |               |

### 2- WSHP VRF (Retail)

|                                                                                               | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-----------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                   | 2.64               | 3.21               | 0                  | -             | 0.8           |
| Standard value                                                                                | 2.5*               | 5                  | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system     |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. |                    |                    |                    |               |               |

### 1- Direct electric DHW

|                | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|----------------|--------------------------|-----------------------------------------|
| This building  | 1                        | -                                       |
| Standard value | 1                        | N/A                                     |

### Zone-level mechanical ventilation, exhaust, and terminal units

| ID                                                                                                                                       | System type in the Approved Documents                                 |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| A                                                                                                                                        | Local supply or extract ventilation units                             |
| B                                                                                                                                        | Zonal supply system where the fan is remote from the zone             |
| C                                                                                                                                        | Zonal extract system where the fan is remote from the zone            |
| D                                                                                                                                        | Zonal balanced supply and extract ventilation system                  |
| E                                                                                                                                        | Local balanced supply and extract ventilation units                   |
| F                                                                                                                                        | Other local ventilation units                                         |
| G                                                                                                                                        | Fan assisted terminal variable air volume units                       |
| H                                                                                                                                        | Fan coil units                                                        |
| I                                                                                                                                        | Kitchen extract with the fan remote from the zone and a grease filter |
| NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components. |                                                                       |

| Zone name           | SFP [W/(l/s)] |     |     |     |   |     |     |     |   |   | HR efficiency |          |
|---------------------|---------------|-----|-----|-----|---|-----|-----|-----|---|---|---------------|----------|
| ID of system type   | A             | B   | C   | D   | E | F   | G   | H   | I |   | Zone          | Standard |
| Standard value      | 0.3           | 1.1 | 0.5 | 2.3 | 2 | 0.5 | 0.5 | 0.4 | 1 |   |               |          |
| Basement Police Rm  | -             | -   | -   | 1.2 | - | -   | -   | -   | - | - | -             | N/A      |
| GF Block B Retail   | -             | -   | -   | 1.1 | - | -   | -   | -   | - | - | -             | N/A      |
| GF Block A Retail 1 | -             | -   | -   | 1.1 | - | -   | -   | -   | - | - | -             | N/A      |
| GF Block A Retail 4 | -             | -   | -   | 1.1 | - | -   | -   | -   | - | - | -             | N/A      |
| GF Block A Retail 2 | -             | -   | -   | 1.1 | - | -   | -   | -   | - | - | -             | N/A      |
| GF Block A Retail 3 | -             | -   | -   | 1.1 | - | -   | -   | -   | - | - | -             | N/A      |
| GF Block A Retail 5 | -             | -   | -   | 1.1 | - | -   | -   | -   | - | - | -             | N/A      |

| Zone name                         | SFP [W/(l/s)] |     |     |     |   |     |     |     |   | HR efficiency |          |
|-----------------------------------|---------------|-----|-----|-----|---|-----|-----|-----|---|---------------|----------|
| ID of system type                 | A             | B   | C   | D   | E | F   | G   | H   | I |               |          |
| Standard value                    | 0.3           | 1.1 | 0.5 | 2.3 | 2 | 0.5 | 0.5 | 0.4 | 1 | Zone          | Standard |
| GF Convenience Food Store (chill) | -             | -   | -   | 1.1 | - | -   | -   | -   | - | -             | N/A      |
| GF Convenience Food Store         | -             | -   | -   | 1.1 | - | -   | -   | -   | - | -             | N/A      |

| General lighting and display lighting |  | General luminaire | Display light source |                      |
|---------------------------------------|--|-------------------|----------------------|----------------------|
| Zone name                             |  | Efficacy [lm/W]   | Efficacy [lm/W]      | Power density [W/m²] |
| Standard value                        |  | 95                | 80                   | 0.3                  |
| Basement Police Rm                    |  | 150               | -                    | -                    |
| Basement Non-Resi Bike Store          |  | 150               | -                    | -                    |
| Basement Non-Resi Refuse Store        |  | 150               | -                    | -                    |
| GF Block B Retail                     |  | 150               | 100                  | 1.2                  |
| GF Block A Retail 1                   |  | 150               | 100                  | 1.2                  |
| GF Block A Retail 4                   |  | 150               | 100                  | 1.2                  |
| GF Block A Retail 2                   |  | 150               | 100                  | 1.2                  |
| GF Retail LV Switchroom               |  | 125               | -                    | -                    |
| GF Block A Retail 3                   |  | 150               | 100                  | 1.2                  |
| GF Block A Retail 5                   |  | 150               | 100                  | 1.2                  |
| GF Convenience Food Store (chill)     |  | 150               | 100                  | 1.2                  |
| GF Convenience Food Store             |  | 150               | 100                  | 1.2                  |

**The spaces in the building should have appropriate passive control measures to limit solar gains in summer**

| Zone                              | Solar gain limit exceeded? (%) | Internal blinds used? |
|-----------------------------------|--------------------------------|-----------------------|
| Basement Police Rm                | NO (-27.1%)                    | NO                    |
| GF Block B Retail                 | NO (-43.2%)                    | NO                    |
| GF Block A Retail 1               | NO (-29.6%)                    | NO                    |
| GF Block A Retail 4               | NO (-23.7%)                    | NO                    |
| GF Block A Retail 2               | NO (-65.7%)                    | NO                    |
| GF Block A Retail 3               | NO (-38.7%)                    | NO                    |
| GF Block A Retail 5               | NO (-5.5%)                     | NO                    |
| GF Convenience Food Store (chill) | NO (-33.8%)                    | NO                    |
| GF Convenience Food Store         | NO (-2.1%)                     | NO                    |

### Regulation 25A: Consideration of high efficiency alternative energy systems

|                                                                                        |     |
|----------------------------------------------------------------------------------------|-----|
| Were alternative energy systems considered and analysed as part of the design process? | YES |
| Is evidence of such assessment available as a separate submission?                     | YES |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Floor area [m <sup>2</sup> ]                          | 1753.1 | 1753.1   |
| External area [m <sup>2</sup> ]                       | 2044.4 | 2129.1   |
| Weather                                               | SWI    | SWI      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 3        |
| Average conductance [W/K]                             | 679.97 | 694.73   |
| Average U-value [W/m <sup>2</sup> K]                  | 0.33   | 0.33     |
| Alpha value* [%]                                      | 9.97   | 10       |

\* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

## Building Use

| % Area | Building Type                                                   |
|--------|-----------------------------------------------------------------|
| 94     | <b>Retail/Financial and Professional Services</b>               |
|        | Restaurants and Cafes/Drinking Establishments/Takeaways         |
| 6      | <b>Offices and Workshop Businesses</b>                          |
|        | General Industrial and Special Industrial Groups                |
|        | Storage or Distribution                                         |
|        | Hotels                                                          |
|        | Residential Institutions: Hospitals and Care Homes              |
|        | Residential Institutions: Residential Schools                   |
|        | Residential Institutions: Universities and Colleges             |
|        | Secure Residential Institutions                                 |
|        | Residential Spaces                                              |
|        | Non-residential Institutions: Community/Day Centre              |
|        | Non-residential Institutions: Libraries, Museums, and Galleries |
|        | Non-residential Institutions: Education                         |
|        | Non-residential Institutions: Primary Health Care Building      |
|        | Non-residential Institutions: Crown and County Courts           |
|        | General Assembly and Leisure, Night Clubs, and Theatres         |
|        | Others: Passenger Terminals                                     |
|        | Others: Emergency Services                                      |
|        | Others: Miscellaneous 24hr Activities                           |
|        | Others: Car Parks 24 hrs                                        |
|        | Others: Stand Alone Utility Block                               |

## Energy Consumption by End Use [kWh/m<sup>2</sup>]

|                 | Actual       | Notional     |
|-----------------|--------------|--------------|
| Heating         | 2.27         | 1.45         |
| Cooling         | 13.36        | 7.25         |
| Auxiliary       | 2.97         | 2.16         |
| Lighting        | 9.6          | 16.65        |
| Hot water       | 1.74         | 1.57         |
| Equipment*      | 51.73        | 51.73        |
| <b>TOTAL **</b> | <b>29.93</b> | <b>29.08</b> |

\* Energy used by equipment does not count towards the total for consumption or calculating emissions.

\*\* Total is net of any electrical energy displaced by CHP generators, if applicable.

## Energy Production by Technology [kWh/m<sup>2</sup>]

|                              | Actual   | Notional |
|------------------------------|----------|----------|
| Photovoltaic systems         | 0        | 0        |
| Wind turbines                | 0        | 0        |
| CHP generators               | 0        | 0        |
| Solar thermal systems        | 0        | 0        |
| <i>Displaced electricity</i> | <i>0</i> | <i>0</i> |

## Energy & CO<sub>2</sub> Emissions Summary

|                                                     | Actual | Notional |
|-----------------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ]       | 129.71 | 135.42   |
| Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ] | 43.71  | 42.71    |
| Total emissions [kg/m <sup>2</sup> ]                | 3.93   | 3.88     |

| HVAC Systems Performance                                                          |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|-----------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|------|
| System Type                                                                       | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEFF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |      |
| [ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|                                                                                   | Actual            | 39.4              | 54.9               | 4.4                | 6.7               | 2.1           | 2.46          | 2.28             | 2.64             | 3.21 |
|                                                                                   | Notional          | 47.7              | 37.6               | 4.8                | 2.3               | 1.3           | 2.78          | 4.63             | ----             | ---- |
| [ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|                                                                                   | Actual            | 20.4              | 121.7              | 2.3                | 14.8              | 3.3           | 2.46          | 2.28             | 2.64             | 3.21 |
|                                                                                   | Notional          | 13.4              | 135.8              | 1.3                | 8.1               | 2.4           | 2.78          | 4.63             | ----             | ---- |
| [ST] No Heating or Cooling                                                        |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|                                                                                   | Actual            | 0                 | 0                  | 0                  | 0                 | 0             | 0             | 0                | 0                | 0    |
|                                                                                   | Notional          | 0                 | 0                  | 0                  | 0                 | 0             | 0             | 0                | ----             | ---- |

### Key to terms

|                   |                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------|
| Heat dem [MJ/m2]  | = Heating energy demand                                                                               |
| Cool dem [MJ/m2]  | = Cooling energy demand                                                                               |
| Heat con [kWh/m2] | = Heating energy consumption                                                                          |
| Cool con [kWh/m2] | = Cooling energy consumption                                                                          |
| Aux con [kWh/m2]  | = Auxiliary energy consumption                                                                        |
| Heat SSEFF        | = Heating system seasonal efficiency (for notional building, value depends on activity glazing class) |
| Cool SSEER        | = Cooling system seasonal energy efficiency ratio                                                     |
| Heat gen SSEFF    | = Heating generator seasonal efficiency                                                               |
| Cool gen SSEER    | = Cooling generator seasonal energy efficiency ratio                                                  |
| ST                | = System type                                                                                         |
| HS                | = Heat source                                                                                         |
| HFT               | = Heating fuel type                                                                                   |
| CFT               | = Cooling fuel type                                                                                   |