



CANOLFAN SOAR

MERTHYR TYDFIL

Internal Environmental Monitoring Report (Nr.1)

Taliesin Conservation

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TALIESIN
CONSERVATION

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1.0 General

1.1 Brief:

Volute Architects engaged Taliesin Conservation Ltd to conduct an internal environmental monitoring phase on the lower ground floor of Canolfan Soar. The objective, as defined by Volute Architects, was to "better understand the performance levels of Relative Humidity" in preparation for redeveloping the ground floor for future use.

During our initial site visit on 18/09/2024, we identified significant internal environmental issues. Relative humidity and temperature readings were recorded at various locations, as follows:

- **Youth Room:** 73% RH / 19°C
- **Youth Room Store:** 90% RH / 18°C
- **Boiler Room:** 84% RH / 19°C
- **Meeting Room:** 91% RH / 18°C
- **Male W/C:** 77% RH / 18°C
- **Meithrin Room:** 66% RH / 19°C
- **Meithrin Room Stores/WC:** 67% RH / 19°C

These readings indicate conditions ranging from 'wet' to 'very wet'. As a result, we proposed installing data loggers in the specified areas to establish a baseline of the current internal environment. This would provide a comprehensive overview of the conditions within these spaces, informing the design of a bespoke, effective solution. Additionally, the loggers would be instrumental in assessing the performance of any proposed interventions once installed and in use.

Following approval to proceed, Taliesin Conservation installed monitoring equipment on 18/12/2024. This included a 4G router and seven alkaline battery-powered Ultra Radio temperature/RH loggers (EU), covering each of the identified rooms. Our remit is to provide 12 monthly reports over a one-year period, tracking environmental conditions and assessing how the rooms behave over time.

1.2 Address of Property Surveyed:

Canolfan Soar
 Pontmorlais (W)
 Merthyr Tydfil
 CF47 8UB

1.3 Client:

Lis McLean
 c/o Canolfan Soar
 Pontmorlais (W)
 Merthyr Tydfil
 CF47 8UB

**1.4 Survey Team Led By:**

Mike Williams
 MCI0B MSc WSA Sustainable Building Conservation

1.5 Date(s) of Survey:

This report covers the data recorded between December 18, 2024, and February 8, 2025.

1.6 Weather Conditions at Time of Survey:

Various. To be covered within the body of the report.

1.7 Current Use

Canolfan Soar is a Grade II-listed community facility located in Merthyr Tydfil, Wales. It includes a theatre and various other amenities and was converted from the closed, Grade II-listed Zoar Chapel, an eighteenth-century building, in the early 2000s.

1.8 Limitations

Standard Limitations are:

- Our survey is focused solely on the ambient relative humidity and temperature of the air and does not include readings related to the walls or contents.*
- The rooms in question are currently unoccupied, and the results may change once they are occupied.*
- Readings are collected remotely and do not involve any on-site visits.*
- Heating services—we have not inspected or tested any heating or plumbing services or associated ancillary equipment.*
- Electrical services—we have not tested electrical services or equipment as part of this report.*
- Electrical services should be examined and tested periodically by an NICEIC approved electrical contractor. Telecoms, security alarm, data management and cable television systems are not reported on.*

1.9 Location of Loggers

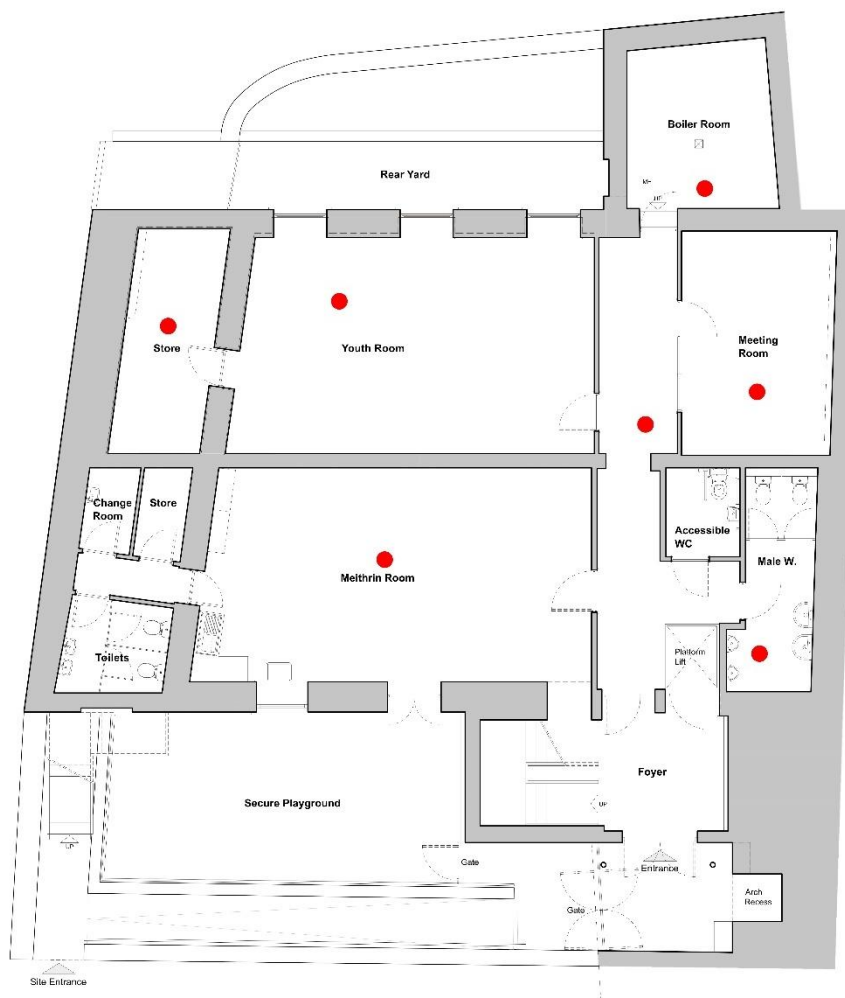


Fig. 1 – Location of Data Loggers at Basement Level

2.0 Findings and Observations

2.1 Introduction

This report presents the analysis of temperature, dew point and relative humidity (RH) data collected from a basement environment. The temperature and dew point are measured in degrees Celsius (°C), which represent the physical property of thermal energy within the space. The dew point, however, is the temperature at which air becomes saturated with moisture, causing water vapour to condense into liquid, typically resulting in the formation of dew, fog, or condensation. The Relative Humidity (RH) is expressed as a percentage (%) and refers to the ratio of the current water vapor content in the air compared to the maximum amount of water vapor that air could hold at the same temperature. This value is significant in evaluating air moisture levels, where RH of 100% indicates the air is fully saturated, and any further moisture will condense. RH is a key indicator in assessing comfort, indoor air quality, and the risk of mould growth, as excess humidity can promote the growth of microbial organisms. The data from this report will highlight the conditions of temperature and moisture within the basement and provide insights into potential needs for internal climate control.

2.2 Methodology

2.2.1 Data Collection

Data loggers recorded measurements every 10 minutes, tracking:

- Temperature (°C)
- Humidity (%RH)
- Dew Point (°C)

2.2.2 Data Processing

Prior to extraction, the dataset was cleaned to remove metadata, and timestamps were properly formatted. Numerical columns were standardised to ensure consistency.

2.2.3 External Weather Data

Historical weather data for Merthyr Tydfil was referenced to correlate external conditions with internal data.

2.2.4 Optimal Conditions

Temperature:

- Normal range: 18-22°C for comfortable occupancy.
- Observed values below 14°C are problematic, leading to discomfort and potential condensation issues on surfaces.

Humidity:

- Ideal range: 40-60% RH.
- Values exceeding 65% RH indicate excessive moisture, promoting mould growth and structural damage.

Dew Point:

- Safe dew points: Below **10°C** in winter to prevent condensation.
- Dew points above **12°C** increase the risk of mould growth and damp problems.

2.3 Youth Room

2.3.1 General Description

The Youth Room is situated on the northwestern side of the property at basement level, and it is characterised by its three windows. The windows are positioned along the northern exterior wall, in theory, allowing for some air exchange with the outside environment and potentially influencing both the temperature and relative humidity within the room. The room's layout and the presence of windows could affect the air circulation and moisture levels, particularly when weather conditions outside change. To capture the most representative data of the room's environmental conditions, the data logger was placed near the centre of the room at head height. This position was chosen to ensure accurate and consistent measurements of the temperature and relative humidity at an average level, avoiding any biases from areas potentially influenced by localised heat sources, drafts, or moisture from the windows.

2.3.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **16.80°C**, with recorded values ranging from a minimum of **14.63°C** (on 06/01/2025 at 13:15) to a maximum of **18.55°C** (on 04/02/2025 at 07:15). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **87.2% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **57.44% RH**, with values ranging from a low of **47.64% RH** (on 24/01/2025 at 15:35) to a high of **67.30% RH** (on 18/12/2024 at 22:45). Readings exceeded **65% RH** (risk level for mould growth) only **5.3%** of the time.

Dew Point:

The dew point averaged **8.29°C**, with the highest recorded value at **10.70°C** (on 18/12/2024 at 10:15) and the lowest at **6.20°C** (on 10/01/2025 at 16:35). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.3.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-3.5°C to 12.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is likely a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.3.4 Additional Calculations and Impact Analysis

2.3.4.1 Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **16.80°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **57.44% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **8.29°C**

2.3.4.2 Estimated Wall Temperature and Condensation Risk:

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)
- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W/m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K/W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 16.8°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: $1.2 \text{ W/m}^2\text{K}$
- Assumed Surface Resistance: $0.13 \text{ m}^2\text{K/W}$

$$T_{\text{wall}} = 16.8 - (0.13 \times 1.2 \times (16.8 - 6.7))$$

$$T_{\text{wall}} = 16.8 - (0.13 \times 1.2 \times 10.1)$$

$$T_{\text{wall}} = 16.8 - (1.57)$$

$$T_{\text{wall}} = 15.23^\circ\text{C}$$

Since $15.23^\circ\text{C} > 8.29^\circ$, condensation is unlikely under normal conditions. However, in colder corners or areas with thermal bridging, localised temperatures could drop below the dew point, leading to condensation risks.

2.3.5 Data Graph

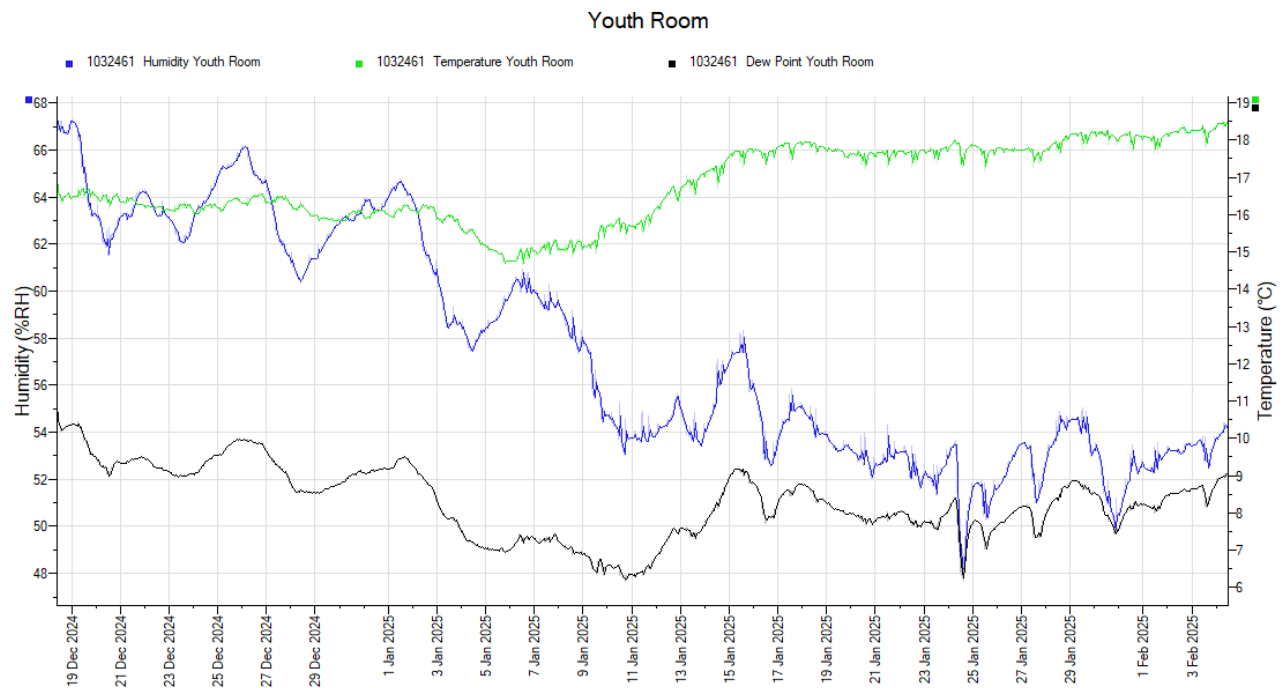


Fig.2 – Internal Environment Graph (Youth Room)

2.3.6 Conclusion

The Youth Room, given its current unoccupied state, remains relatively stable in terms of internal environmental conditions. However, this data is expected to change once the space is in use and background heating is introduced. With its existing windows, internal conditions can likely be managed effectively, either through proper user guidance or the installation of an automated control system.

One key concern worth highlighting is the humidity levels, which show spikes that mirror external conditions. This pattern suggests potential moisture infiltration, indicating that the space is not fully sealed from external influences. Any ingress of moisture should be thoroughly assessed, mitigated, and monitored before re-occupancy to prevent long-term issues such as damp and mould growth.

2.4 Youth Room Store

2.4.1 General Description

The Youth Room Store is located at basement level on the northwest side of the property, directly adjacent (west) to the Youth Room, and is fully enclosed by walls with no direct external openings. To ensure the most representative data of the room's environmental conditions, the data logger was strategically placed near the centre of the room. The enclosed nature of the space makes it particularly susceptible to humidity retention and limited air circulation.

2.4.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **12.15°C**, with recorded values ranging from a minimum of **10.06°C** (on 11/01/2025 at 11:28) to a maximum of **14.20°C** (on 18/12/2024 at 11:08 – the time of installation). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **100% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **77.89% RH**, with values ranging from a low of **74.46% RH** (on 24/01/2025 at 15:35) to a high of **81.56% RH** (on 18/12/2024 at 22:45). Readings exceeded **65% RH** (risk level for mould growth) **100%** of the time.

Dew Point:

The dew point averaged **8.4°C**, with the highest recorded value at **10.16°C** (on 19/12/2024 at 12:18) and the lowest at **6.12°C** (on 10/01/2025 at 16:35). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.4.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-3.5°C to 12.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.4.4 Additional Calculations and Impact Analysis

Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **12.50°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **77.89% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **8.40°C**

Estimated Wall Temperature and Condensation Risk:

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)
- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W/m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K/W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 12.5°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: 1.2 $\text{W/m}^2\text{K}$
- Assumed Surface Resistance: 0.13 $\text{m}^2\text{K/W}$

$$T_{\text{wall}} = 12.5 - (0.13 \times 1.2 \times (12.5 - 6.7))$$

$$T_{\text{wall}} = 12.5 - (0.13 \times 1.2 \times 5.8)$$

$$T_{\text{wall}} = 12.5 - (0.9)$$

$$T_{\text{wall}} = 11.6^\circ\text{C}$$

Condensation Risk Analysis

- **Wall Surface Temperature:** 15.23°C
- **Dew Point:** 6.04°C

Since $11.6^\circ\text{C} > 8.04^\circ$, condensation is unlikely under normal conditions. However, in colder corners or areas with thermal bridging, localised temperatures could drop below the dew point, leading to condensation risks, exacerbated by the high level of humidity.

2.4.5 Optimal Conditions

General guidelines state that optimal conditions for a storeroom are a stable temperature between 10–21°C, with relative humidity maintained within 40–60% RH to prevent mould growth and material degradation. The dew point should remain at least 2–3°C below the coldest surface temperature to avoid condensation. Consistently high humidity or fluctuating temperatures can lead to moisture buildup, making effective ventilation and climate control essential for preserving stored materials.

2.4.6 Data Graph

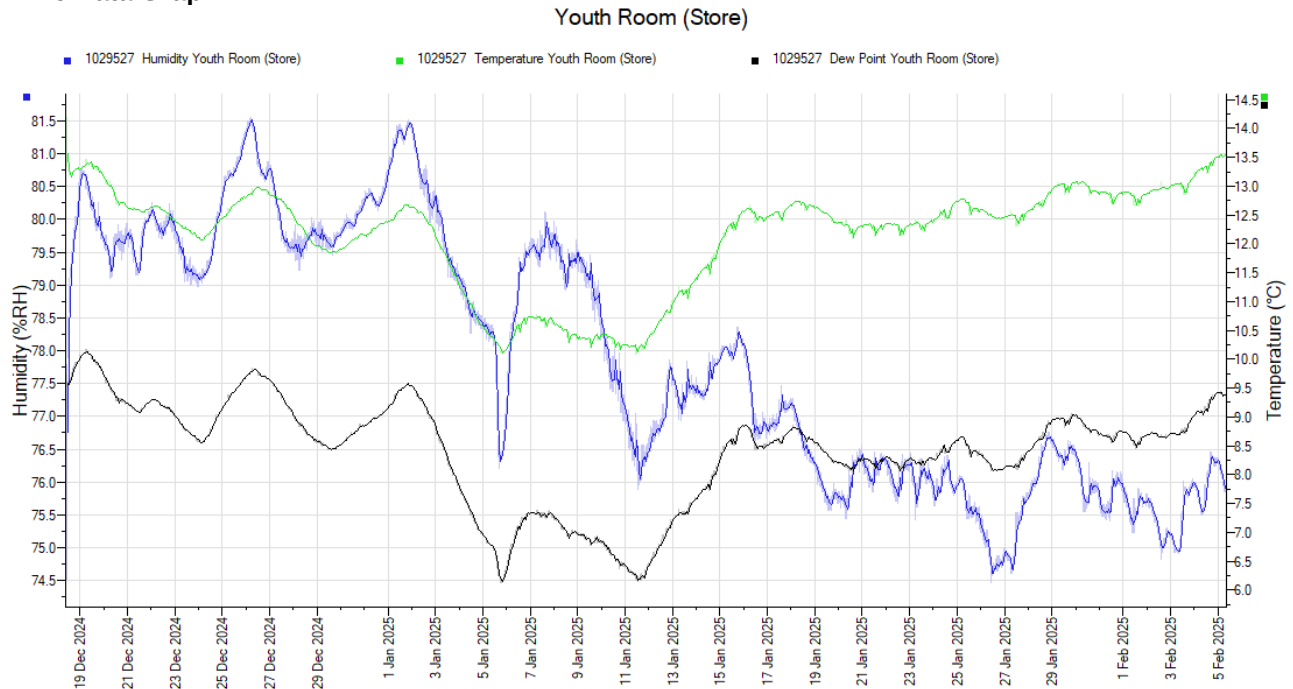


Fig.3 – Internal Environment Graph (Youth Room Store)

2.4.7 Conclusion

The Youth Room Store, in its current unoccupied state, exhibits consistently low internal temperatures and persistently high humidity levels. Unlike the main Youth Room, this space cannot benefit from natural ventilation from windows which has led to internal conditions that are inherently unsuitable for occupancy. Given the consistently high relative humidity and low temperatures, the risk of condensation, damp accumulation, and mould growth is significantly elevated.

A key concern is the fact that humidity levels remain critically high at all times, exceeding 65% throughout the monitoring period. This suggests a lack of adequate air exchange and possible moisture ingress from external sources. The correlation with external conditions indicates that the space is highly susceptible to environmental fluctuations, reinforcing the need for environmental control. Before considering re-occupancy or storage use, thorough moisture mitigation measures must be implemented to prevent long-term structural degradation and health risks.

2.5 Maethrin Room

2.5.1 General Description

The Maethrin Room is located on the southwestern side of the property at basement level and features one window and external doors along its southern exterior wall. These openings theoretically allow for some air exchange with the outside environment, which can influence both temperature and relative humidity within the room. The room's layout, combined with the presence of these openings, may impact air circulation and moisture levels, particularly in response to changing weather conditions. To obtain the most representative data on the room's environmental conditions, the data logger was placed near the centre of the room. This placement was chosen to ensure accurate and consistent measurements of temperature and relative humidity at an average level, minimising potential biases from localised heat sources, drafts, or moisture accumulation near the windows and doors.

2.5.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **15.25°C**, with recorded values ranging from a minimum of **13.28°C** (on 06/01/2025 at 13:15) to a maximum of **17.02°C** (on 04/02/2025 at 07:15). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **100% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **54.38% RH**, with values ranging from a low of **45.19% RH** (on 24/01/2025 at 15:35) to a high of **66.40% RH** (on 18/12/2024 at 22:45). Readings exceeded **65% RH** (risk level for mould growth) only **1.63%** of the time.

Dew Point:

The dew point averaged **6.04°C**, with the highest recorded value at **9.61°C** (on 18/12/2024 at 10:15) and the lowest at **3.01°C** (on 10/01/2025 at 16:35). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.5.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-3.5°C to 12.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.5.4 Additional Calculations and Impact Analysis

Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **15.25°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **54.38% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **6.04°C**

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)
- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W/m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K/W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 16.8°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: $1.2 \text{ W/m}^2\text{K}$
- Assumed Surface Resistance: $0.13 \text{ m}^2\text{K/W}$

$$T_{\text{wall}} = 15.25 - (0.13 \times 1.2 \times (15.25 - 6.7))$$

$$T_{\text{wall}} = 15.25 - (0.13 \times 1.2 \times 8.55)$$

$$T_{\text{wall}} = 15.25 - (1.33)$$

$$T_{\text{wall}} = 13.92^\circ\text{C}$$

Condensation Risk Analysis

- **Wall Surface Temperature:** 15.23°C
- **Dew Point:** 6.04°C

Since $15.23^\circ\text{C} > 6.04^\circ\text{C}$, condensation is unlikely under normal conditions. However, in colder corners or areas with thermal bridging, localised temperatures could drop below the dew point, leading to condensation risks.

2.5.5 Data Graph

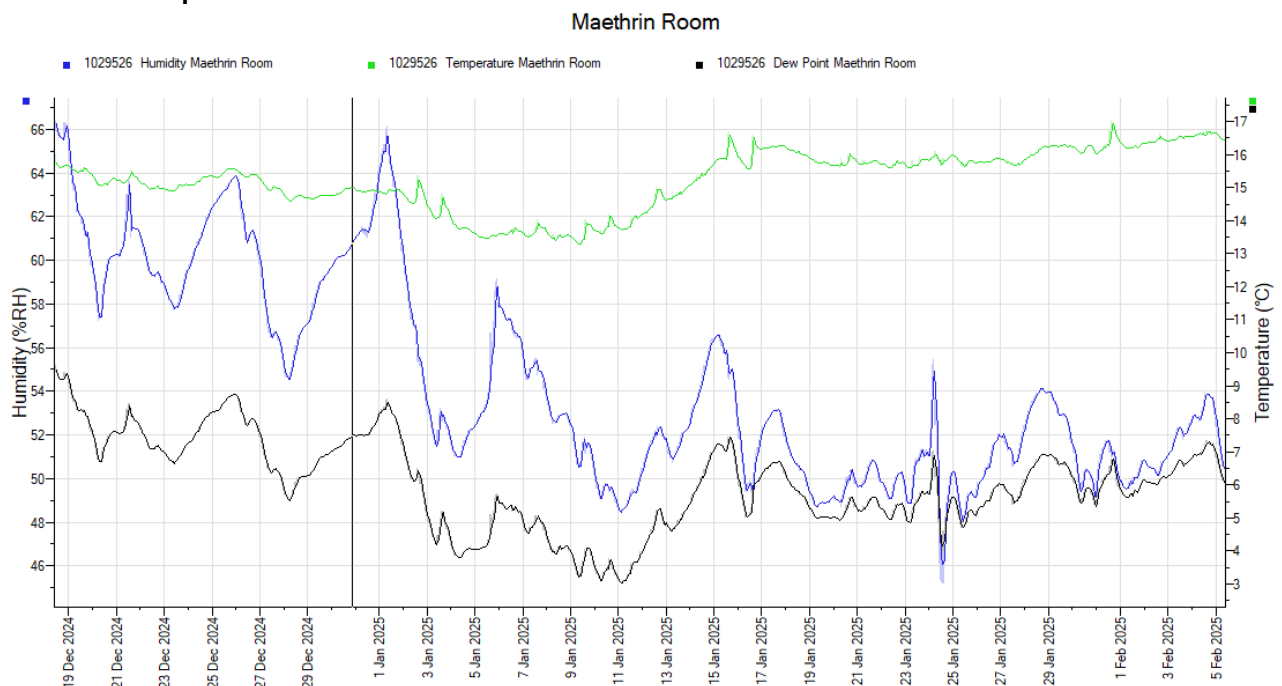


Fig.4 – Internal Environment Graph (Maethrin Room)

2.5.6 Conclusion

The environmental data collected for the Maethrin Room indicates that the space is consistently below the recommended comfort temperature and never exceeding the 18°C lower comfort threshold. This data suggests heat retention issues, particularly during nighttime. Given the room's lack of active use and lack of assumed background heating, such temperature trends are expected.

Humidity levels averaged within acceptable limits for indoor environments. However, occasional spikes above 65% RH indicate moments where moisture levels could contribute to mould growth. The average dew point of 6.04°C, combined with recorded lows down to 3.01°C, suggests that condensation may form on colder surfaces, potentially increasing the risk of dampness-related issues.

Overall, while humidity levels remain largely within a safe range, the persistent low temperatures and occasional high dew points suggest that condensation risks should be closely monitored. Addressing heat retention and improving ventilation will be key in preventing long-term damp and mould issues within the Maethrin Room.

2.6 Plant Room

2.6.1 General Description

The plant room, located at the northeastern part of the property at basement level, houses the building's mechanical equipment. It is fully enclosed with no direct external openings. Due to the presence of plant, positioning the data logger at the exact centre was not feasible. However, to obtain the most representative environmental data, it was placed as centrally as possible. The enclosed nature of the space, combined with the operation of the plant, makes it particularly prone to humidity retention and restricted air circulation.

2.6.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **17.66°C**, with recorded values ranging from a minimum of **15.98°C** (on 05/01/2025 at 17:58) to a maximum of **18.96°C** (on 05/02/2025 at 05:38). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **60.22% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **61.53% RH**, with values ranging from a low of **50.08% RH** (on 24/01/2025 at 13:58) to a high of **69.69% RH** (on 18/12/2024 at 22:38). Readings exceeded **65% RH** (risk level for mould growth) **27.03%** of the time.

Dew Point:

The dew point averaged **10.14°C**, with the highest recorded value at **12.01°C** (on 18/12/2024 at 22:38) and the lowest at **7.07°C** (on 09/01/2025 at 13:58). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.6.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-3.5°C to 12.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.6.4 Additional Calculations and Impact Analysis

2.6.4.1 Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **17.66°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **61.53% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **10.14°C**

2.6.4.2 Estimated Wall Temperature and Condensation Risk:

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)

- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W/m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K/W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 17.66°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: 1.2 $\text{W/m}^2\text{K}$
- Assumed Surface Resistance: 0.13 $\text{m}^2\text{K/W}$

$$T_{\text{wall}} = 17.66 - (0.13 \times 1.2 \times (17.66 - 6.7))$$

$$T_{\text{wall}} = 17.66 - (0.13 \times 1.2 \times 10.96)$$

$$T_{\text{wall}} = 17.66 - (1.71)$$

$$T_{\text{wall}} = 15.95^\circ\text{C}$$

Since $15.95^\circ\text{C} > 10.14^\circ$, condensation is unlikely under normal conditions. However, in colder corners or areas with thermal bridging, localised temperatures could drop below the dew point, leading to condensation risks.

2.6.5 Optimal Conditions

The optimal environmental conditions for a plant room are a temperature range of 10°C to 25°C, maintaining a balance to prevent overheating of equipment while avoiding excessive cooling that can lead to condensation. Humidity levels should be kept between 40% and 60% RH to prevent corrosion, mould growth, and electrical failures, as excessive moisture can compromise equipment integrity. The dew point should remain below 10°C to minimise the risk of condensation on cold surfaces, which can lead to component damage and operational issues.

2.6.6 Data Graph

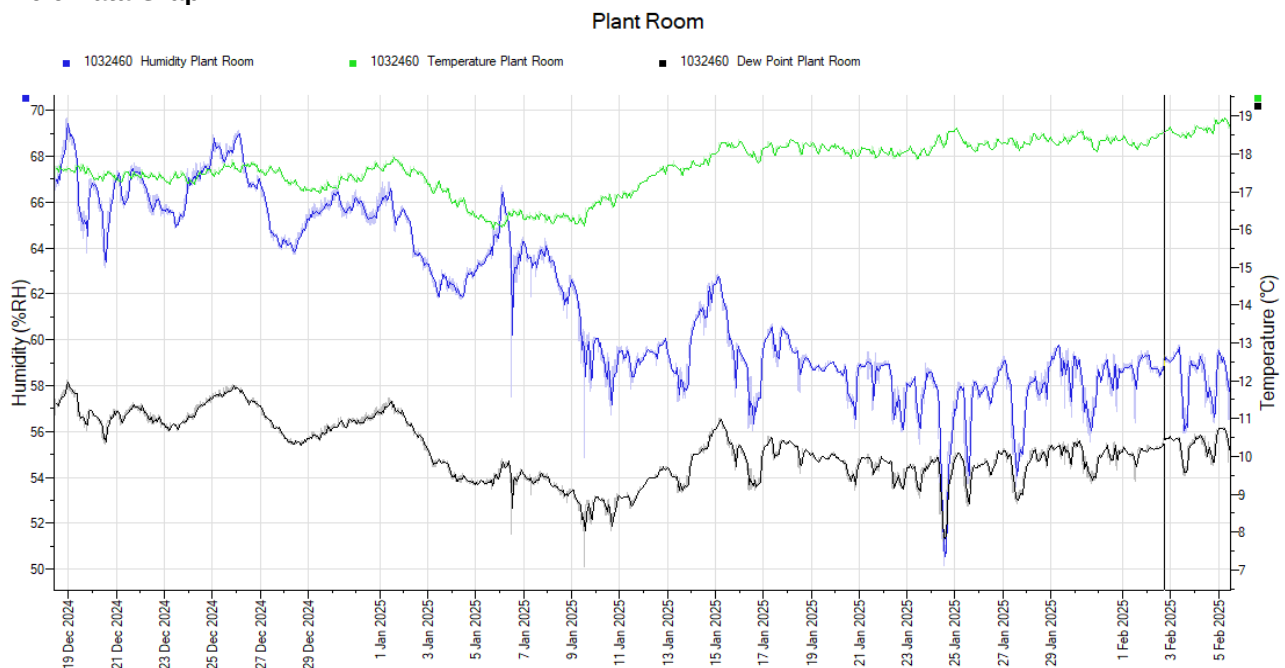


Fig.5 – Internal Environment Graph (Plant Room)

2.6.7 Conclusion

The environmental data for the plant room, indicates that temperatures remain relatively stable, with an average of 17.66°C. While the temperature fell below 18°C for 60.22% of the recorded period, comfort is not a primary concern in this space. Instead, maintaining stable conditions to protect mechanical equipment is the key priority.

Humidity levels averaged 61.53% RH, generally within an acceptable range. However, readings exceeded 65% RH for 27.03% of the time, increasing the risk of condensation and potential corrosion of equipment. Given the enclosed nature of the space and limited ventilation, moisture retention is a concern.

The average dew point of 10.14°C, with peaks reaching 12.01°C, suggests a heightened risk of condensation on cooler surfaces, which could contribute to dampness and long-term deterioration of plant equipment. To mitigate these risks, maintaining controlled ventilation and humidity management strategies is essential to ensure the longevity and efficiency of the mechanical systems housed within the room.

2.7 Meeting Room

2.7.1 General Description

The Meeting Room is situated on the northeastern side of the property at basement level, and it is fully enclosed with no direct external openings. Positioning the data logger at the exact centre was not feasible. However, to obtain the most representative environmental data, it was placed as centrally as possible. The enclosed nature of the space, combined with the operation of the plant, makes it particularly prone to humidity retention and restricted air circulation.

2.7.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **16.57°C**, with recorded values ranging from a minimum of **16.03°C** (on 24/01/2025 at 14:57) to a maximum of **16.89°C** (on 05/02/2025 at 10:58). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **100% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **69.93% RH**, with values ranging from a low of **58.2% RH** (on 24/01/2025 at 15:27) to a high of **79.06% RH** (on 28/01/2025 at 15:47). Readings exceeded **65% RH** (risk level for mould growth) only **97.68%** of the time.

Dew Point:

The dew point averaged **11.05°C**, with the highest recorded value at **12.92°C** (on 28/01/2025 at 15:47) and the lowest at **7.82°C** (on 24/01/2025 at 15:27). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.7.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-3.5°C to 12.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.7.4 Additional Calculations and Impact Analysis

2.3.4.1 Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **16.57°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **69.93% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **11.05°C**

2.7.4.2 Estimated Wall Temperature and Condensation Risk:

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)
- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W/m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K/W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 16.57°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: 1.2 $\text{W/m}^2\text{K}$
- Assumed Surface Resistance: 0.13 $\text{m}^2\text{K/W}$

$$T_{\text{wall}} = 16.57 - (0.13 \times 1.2 \times (16.57 - 6.7))$$

$$T_{\text{wall}} = 16.57 - (0.13 \times 1.2 \times 9.87)$$

$$T_{\text{wall}} = 16.57 - (1.54)$$

$$T_{\text{wall}} = 15.03^\circ\text{C}$$

Since $15.03^\circ\text{C} > 11.05^\circ\text{C}$, condensation is unlikely under normal conditions. However, in colder corners or areas with thermal bridging, localised temperatures could drop below the dew point, leading to condensation risks.

2.7.5 Data Graph

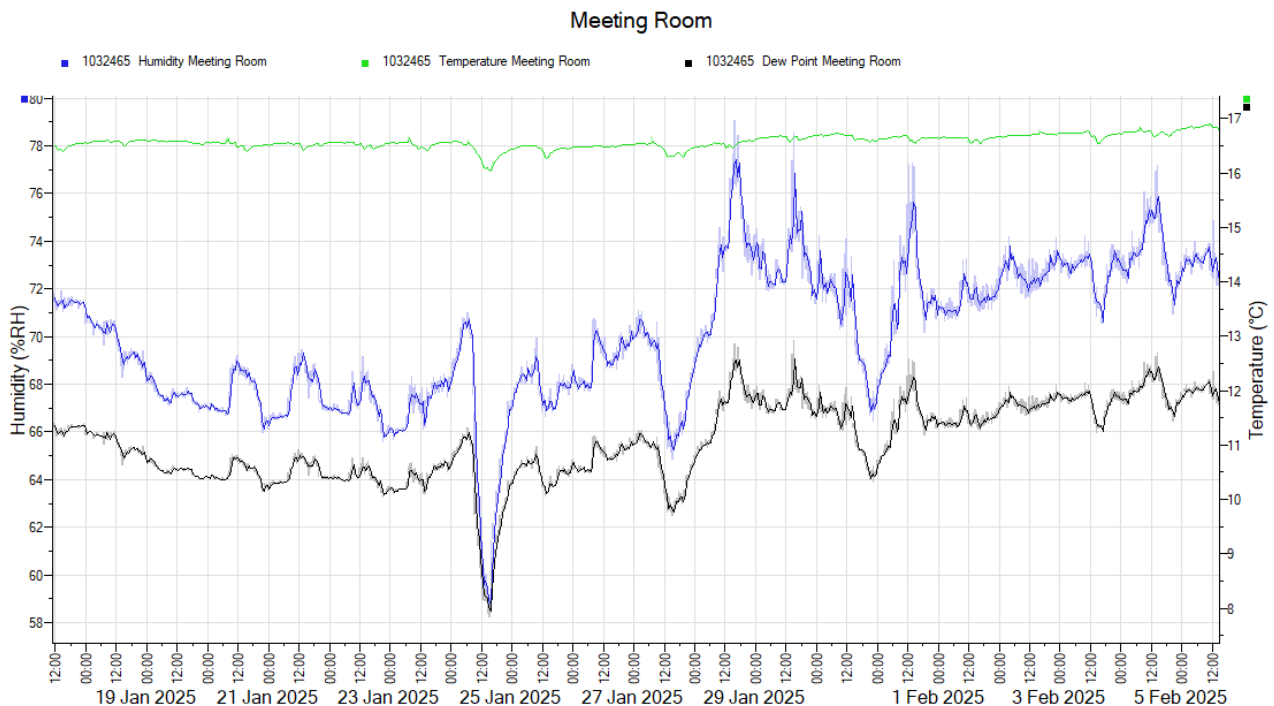


Fig.6 – Internal Environment Graph (Meeting Room)

2.7.6 Conclusion

The Meeting Room, despite being consistently cool, remains relatively stable in terms of temperature. However, with an average of 69.93% RH and all readings exceeding 65% RH, humidity is a significant concern. These conditions indicate persistent moisture retention, increasing the risk of condensation and mould growth. Additionally, the fluctuations consistent with external conditions indicate possible moisture ingress.

The high dew point values further highlight potential condensation risks, particularly on cooler surfaces. Given these factors, improving ventilation and moisture control will be essential to maintaining a healthier internal environment and preventing long-term damp issues.

2.8 Toilets

2.8.1 General Description

The toilet area is located on the southeastern side of the property at basement level and is fully enclosed with no direct external openings. Due to the layout, placing the data logger at the exact centre was not feasible, but it was positioned as centrally as possible to capture the most representative environmental data. The fully enclosed nature of the space, combined with the inherent moisture levels typical of a bathroom, makes the area particularly vulnerable to humidity retention and restricted air circulation.

2.8.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **14.03°C**, with recorded values ranging from a minimum of **12.95°C** (on 10/01/2025 at 17:42) to a maximum of **16.31°C** (on 18/12/2024 at 10:12 – the date of installation). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **100% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **86.82% RH**, with values ranging from a low of **71.35% RH** (on 18/12/2024 at 10:12 – the date of installation) to a high of **90.41% RH** (on 21/02/2025 at 21:02). Readings exceeded **65% RH** (risk level for mould growth) **100% of the time**.

Dew Point:

The dew point averaged **11.86°C**, with the highest recorded value at **12.90°C** (on 26/12/2024 at 08:02) and the lowest at **9.95°C** (on 24/01/2025 at 13:12). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.8.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-2°C to 11.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.8.4 Additional Calculations and Impact Analysis

2.8.4.1 Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **14.03°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **86.82% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **12.90°C**

2.8.4.2 Estimated Wall Temperature and Condensation Risk:

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)
- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W}/\text{m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K}/\text{W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 14.03°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: 1.2 $\text{W}/\text{m}^2\text{K}$
- Assumed Surface Resistance: 0.13 $\text{m}^2\text{K}/\text{W}$

$$T_{\text{wall}} = 14.03 - (0.13 \times 1.2 \times (14.03 - 6.7))$$

$$T_{\text{wall}} = 14.03 - (0.13 \times 1.2 \times 7.33)$$

$$T_{\text{wall}} = 14.03 - (1.14)$$

$$T_{\text{wall}} = 12.89^\circ\text{C}$$

Since $12.89^\circ\text{C} > 11.86^\circ\text{C}$, condensation is unlikely under normal conditions. However, in colder corners or areas with thermal bridging, localised temperatures could drop below the dew point, leading to condensation risks. With the lowest recorded temperature at 12.95°C , condensation is highly likely, especially when indoor humidity levels are elevated.

2.8.5 Data Graph

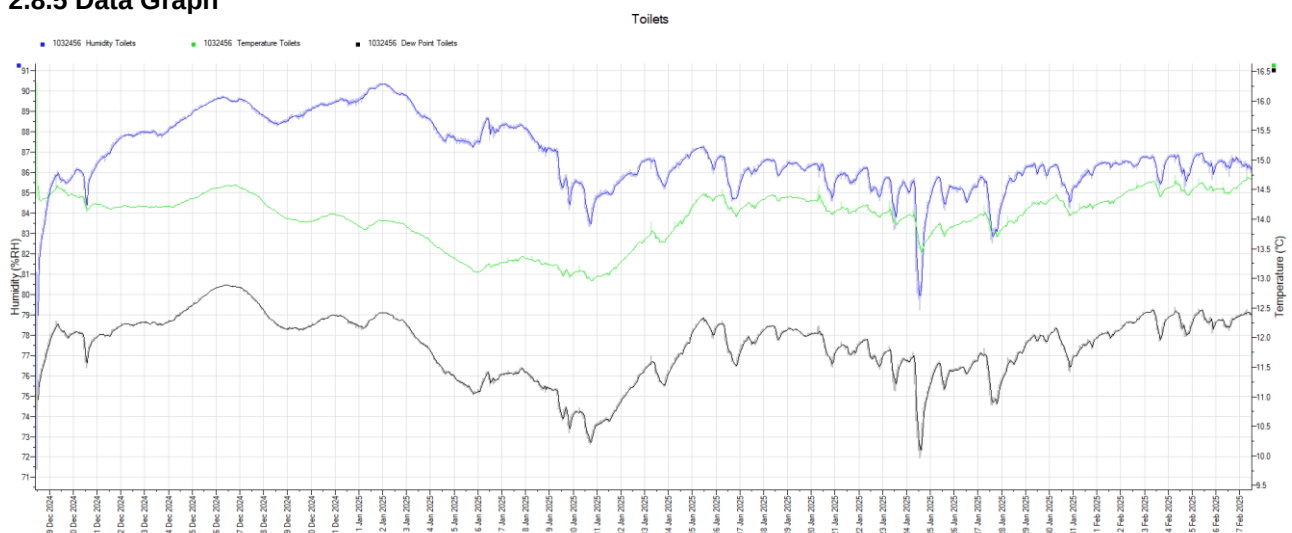


Fig.7 – Internal Environment Graph (Toilets)

2.8.6 Conclusion

The toilet area exhibits persistently high humidity levels with all recorded RH values exceeding 65% and an average of 86.82% RH. Moisture retention is a major issue, increasing the likelihood of condensation and mould growth. The highest recorded temperature and lowest humidity occurred during installation when

people were present, likely due to the heat generated by occupants and increased air movement. However, once the space was left unused, temperatures dropped, and humidity levels rose again, creating a persistently damp environment.

Additionally, suspected water ingress is likely exacerbating the humidity problem. The presence of excess water entering the space adds to the moisture load, making it more difficult to control humidity levels. An unused toilet is particularly prone to high humidity due to a lack of ventilation, moisture retention from residual water and damp surfaces, and the absence of heat sources. Without regular air circulation, condensation can form on cooler surfaces, and porous materials may absorb and retain moisture. These conditions create an environment that encourages mould growth and structural deterioration. The consistently high dew point values further emphasise the risk of condensation, particularly on cold surfaces. Without adequate ventilation or temperature regulation, damp conditions will persist, highlighting the urgent need for improved moisture control to prevent long-term damage.

2.9 Hallway

2.9.1 General Description

The hallway serves as a central corridor that connects all the rooms in the basement, making it a key feature of the layout. It has an external aperture, namely an external doorway that provides access to the basement, which can influence the temperature and humidity within the space. These openings can lead to fluctuations in environmental conditions, particularly when the door is opened or closed, potentially introducing outdoor air and moisture into the basement. To ensure the most accurate representation of the hallway's overall environment, the data logger was placed centrally within the space. This location provides a balanced view of the temperature and humidity, accounting for the varying conditions near the external openings and more stable areas of the hallway.

2.9.2 Internal Environment Data Trends

Temperature:

The average internal temperature was **15.59°C**, with recorded values ranging from a minimum of **13.79°C** (on 09/01/2025 at 20:38) to a maximum of **17.10°C** (on 18/12/2024 at 10:12 – the date of installation). These fluctuations indicate moderate insulation, but the lower temperatures at night suggest heat retention issues. The temperature fell below **18°C** (considered the lower limit for comfort) **100% of the time**, making the room frequently too cold for comfortable occupancy. Given the lack of use and assumed background heating, this is expected.

Humidity:

Internal humidity levels averaged **53.84% RH**, with values ranging from a low of **43.52% RH** (on 24/01/2024 at 13:58) to a high of **67.94% RH** (on 18/12/2024 at 23:38). Readings exceeded **65% RH** (risk level for mould growth) only **1.73%** of the time.

Dew Point:

The dew point averaged **6.22°C**, with the highest recorded value at **10.80°C** (on 18/12/2024 at 10:18 – the date of installation) and the lowest at **2.20°C** (on 24/01/2025 at 13:48). Higher dew points indicate an increased risk of condensation on cold surfaces, contributing to dampness.

2.9.3 Correlation with External Weather Conditions

Temperature:

External temperatures in Merthyr Tydfil ranged from **-2°C to 11.1°C** during this period. The presence of multiple sub-zero days, particularly in early January, suggests that the building's insulation plays a crucial role in maintaining internal temperatures above freezing. However, the significant difference between external and internal temperatures indicates possible heat loss and inefficient thermal retention.

Humidity & Precipitation:

December and January saw significant rainfall, with relative humidity outdoors often exceeding **85% RH**. Internally, spikes in humidity mirrored these wet periods, emphasising that external moisture infiltration is a contributing factor. Additionally, on colder days, condensation risks increased due to the large disparity between the internal dew point and external air temperature.

2.9.4 Additional Calculations and Impact Analysis

2.9.4.1 Calculation of Reported Values:

- **Average temperature:** (Sum of all recorded temperatures) ÷ (Number of readings) = **15.59°C**
- **Average humidity:** (Sum of all recorded humidity values) ÷ (Number of readings) = **53.84% RH**
- **Average dew point:** Calculated using Magnus-Tetens approximation based on temperature and humidity = **6.22°C**

2.9.4.2 Estimated Wall Temperature and Condensation Risk:

We estimate the internal wall surface temperature using the thermal resistance method:

$$T_{\text{wall}} = T_{\text{inside}} - (R_{\text{si}} \times U \times (T_{\text{inside}} - T_{\text{outside}}))$$

Where:

- T_{wall} = Wall surface temperature (°C)
- T_{inside} = Average Internal air temperature (°C)
- T_{outside} = Average External air temperature (°C)
- U = Assumed Wall U-value ($\text{W/m}^2\text{K}$)
- R_{si} = Internal surface resistance ($\text{m}^2\text{K/W}$), typically 0.13 for solid walls

Given Values:

- Average Internal temperature: 15.59°C
- Average External temperature: 6.7°C
- Assumed U-value of solid masonry wall: 1.2 $\text{W/m}^2\text{K}$
- Assumed Surface Resistance: 0.13 $\text{m}^2\text{K/W}$

$$T_{\text{wall}} = 15.59 - (0.13 \times 1.2 \times (15.59 - 6.7))$$

$$T_{\text{wall}} = 15.59 - (0.13 \times 1.2 \times 8.89)$$

$$T_{\text{wall}} = 15.59 - (1.39)$$

$$T_{\text{wall}} = 14.20^\circ\text{C}$$

Since $14.2^\circ\text{C} > 6.22^\circ\text{C}$, condensation is highly unlikely under normal conditions.

2.9.5 Data Graph

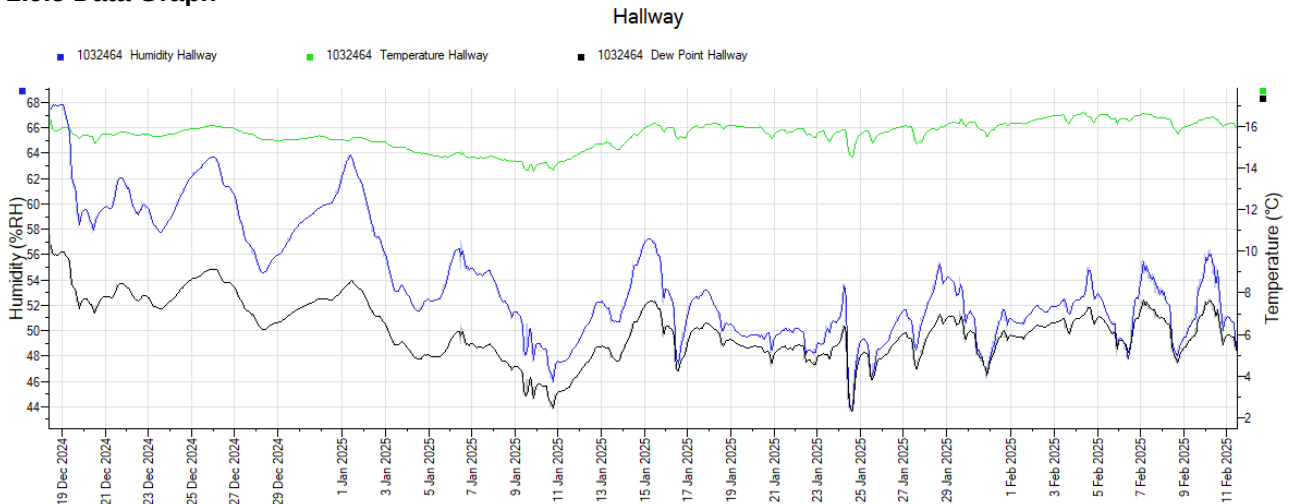


Fig.8 – Internal Environment Graph (Hallway)

2.9.6 Conclusion

The environmental conditions in the hallway indicate a relatively stable and moderate climate, with an average temperature of 15.59°C and consistent temperatures below 18°C throughout the monitoring period. While this is not optimal for occupancy, no background heating is present. The relative humidity (RH) averaged 53.84%, with only 1.73% of readings exceeding 65% RH, suggesting that overall moisture levels in the space are under

control. The dew point values, ranging from 2.2°C to 10.8°C, remain within a range that minimises the risk of condensation, with an average dew point of 6.22°C.

Overall, the hallway appears to have a balanced internal environment, with no significant moisture issues or risks of condensation. The relatively low humidity and controlled dew point levels indicate that the space is adequately ventilated and that there is little concern for mould growth or damp conditions. Maintaining proper airflow and temperature regulation will help sustain these favourable conditions.

3.0 Conclusion

The environmental monitoring provides a comprehensive understanding of the temperature, humidity, and dew point variations across different rooms over the specified period. The data highlights several key trends, such as temperature fluctuations, high humidity levels, and elevated dew points, which indicate potential issues that need to be addressed for optimal room conditions moving forward.

3.1 Effect of Occupants on Room Conditions:

Human occupancy significantly affects temperature and humidity:

- Each person emits 60-80W of heat, increasing room temperature.
- A single person releases 50-100g of water vapor per hour through respiration and perspiration.
- 20 people can add 1-2 kg of moisture per hour, potentially raising relative humidity by 5-10% if ventilation is insufficient.
- With 20 occupants, the relative humidity would frequently exceed 65% RH, further increasing mould growth risk and condensation.
- CO₂ levels will also rise, emphasising the need for mechanical ventilation to maintain air quality.

It is important to note that all rooms are currently unoccupied, which means that the environmental conditions described above may not fully reflect typical usage scenarios. Therefore, this factor should be carefully considered when designing a mitigation strategy, as the presence of occupants, their activities, and equipment in the space could significantly alter the thermal and humidity conditions, affecting the overall performance of the proposed solutions.

3.2 Key Findings

- **Temperature:** Throughout the basement, internal temperatures frequently fell below 18°C (the lower comfort limit), with temperatures ranging from 13°C to 19°C across all rooms. The lack of consistent heating and limited insulation likely caused these drops, leading to a cold environment in all areas. Notably, the rooms with less frequent air exchange, such as the Youth Room Store, Toilet, and Meeting Room, experienced slightly higher temperatures but still remained below comfort levels for prolonged periods.
- **Humidity:** The internal relative humidity (RH) varied significantly across rooms, with the Youth Room Store (77.89% RH) and the Toilet (86.82% RH) showing the highest average levels. In these spaces, humidity levels were consistently above the 65% RH threshold, indicating a heightened risk for mould growth. Conversely, the Youth Room, Maethrin Room, and Hallway had lower RH averages (around 54-69%) with fewer instances exceeding the mould risk level, likely due to the external apertures such as windows and doors. While some rooms showcased more stable levels such as the Meeting Room (69.93% RH), they are still particularly concerning given the lack of ventilation.
- **Dew Point:** Dew points were generally higher in spaces with limited airflow (Youth Room Store, Plant Room, and Toilet) and more variable in the rooms with windows (Youth Room and Maethrin Room). High dew points, particularly those exceeding 10°C, signal an increased risk of condensation on cold surfaces, exacerbating dampness and mould risks. The Plant Room, in particular, had an average dew point of 10.14°C, with frequent condensation risks due to the enclosed space and mechanical equipment.

3.3 Interrelationships Between Rooms:

There were distinct patterns of correlation between rooms in terms of temperature, humidity, and dew point. For example, the Youth Room and Maethrin Room shared similar temperature profiles, which is likely due to both having external openings and both being on the west of the property. These rooms saw a similar pattern of relative humidity fluctuations. In contrast, the Youth Room Store and Plant Room, both more enclosed, had consistently higher humidity and dew point levels, illustrating the role of limited ventilation and higher moisture retention in these spaces.

3.4 External Weather Influences:

External weather conditions during the monitoring period, including cold temperatures and periods of rain, had a notable impact on internal environmental conditions. Cold weather coupled with high external humidity likely resulted in condensation on cold surfaces in areas with poor insulation and inadequate heating. Clear trends of increased humidity and dew points during simulated weather conditions were observed in most rooms, particularly those on the northern and eastern side (Youth Room, Plant Room, and Meeting Room). This external influence likely played a significant role in the internal humidity spikes, especially in spaces with inadequate ventilation or where moisture from outside could accumulate, suggesting the possibility of water ingress. Combined with limited airflow in certain rooms, this possible ingress of moisture may have likely led to elevated indoor moisture levels, creating an environment conducive to dampness and an increased risk of mould growth.

3.5 Initial Considerations and Recommendations

Moving forward, we will continue to monitor the internal environmental conditions over the 12-month period to capture seasonal variations and assess the long-term impact of external weather conditions and potential water ingress. This extended monitoring will provide a comprehensive dataset, allowing us to identify persistent patterns in humidity, temperature fluctuations, and the influence of external conditions on internal environments. The findings from this ongoing assessment will inform the development of a targeted mitigation strategy, ensuring that any future interventions—such as ventilation improvements, insulation enhancements, or waterproofing measures—are based on a thorough understanding of the building's environmental behaviour.

To address the issues identified so far and establish a more stable and optimal internal environment moving forward, the following considerations should be taken into account. Note: The dataset is not yet complete, and recommendations may change as monitoring continues.

Given the fluctuating internal conditions in response to external weather patterns, it is evident that any moisture ingress should be identified and remediated if present. Without addressing potential sources of water infiltration, even the most advanced ventilation or dehumidification strategies may struggle to maintain stable conditions. Tanking may be an option to consider as it is designed to prevent water from penetrating through walls, typically in basements or areas prone to damp or water ingress. It involves applying a specialised slurry or membrane to the surfaces, creating a barrier that stops water from entering the building. Tanking can be an effective remedy for water ingress, as it directly seals the structure against moisture. However, for it to be fully effective, it must cover all walls and be applied continuously without any gaps. If only some walls are tanked, water can still find its way into unprotected areas, potentially forcing moisture into sections of the building that are not sealed. Therefore, to ensure complete protection, all walls exposed to potential water ingress must be treated with tanking.

Improved ventilation strategies should be implemented, especially in rooms with limited air exchange (e.g., Youth Room Store, Plant Room, Toilet). This could include the installation of mechanical ventilation systems to reduce humidity and control the dew point. It was noted that many of the rooms are equipped with air conditioning units. While these units are primarily used for cooling, their functionality could potentially be amended to aid in expelling moist air. This may involve adjusting system settings to increase ventilation modes or incorporating dedicated exhaust functions that direct humid air outside rather than recirculating it. Additionally, modifying the condensate drainage system (if present) could improve moisture removal efficiency. Integrating built-in humidistats would enable the units to activate automatically when humidity levels exceed a set threshold, helping to regulate indoor conditions. The feasibility of these modifications would need to be assessed and confirmed by an M&E engineer.

A smart environmental control system can be implemented to automatically manage humidity levels by integrating wireless data loggers with expulsion systems. These loggers continuously monitor conditions such as temperature and humidity and transmit real-time data to a central hub. When moisture levels exceed or fall below predefined thresholds, the system can trigger ventilation or air extraction units to expel humid air and

restore optimal conditions. Currently, the basement data loggers operate using a combination of 4G and radio signals, meaning a similar networked approach can be extended throughout the building. By integrating a central hub within the reception area computer, the system could process incoming data and send automated activation commands to connected air handling or extraction units. One solution may be a Building Management System (BMS) with IoT-enabled sensors and controllers. This type of system is configured to wirelessly receive data from the loggers and control mechanical ventilation accordingly. This type of system could integrate the existing data loggers with a BMS-based control hub located at reception. This would enable automated expulsion of humid air when necessary, reducing reliance on manual intervention. A feasibility assessment by an M&E engineer should be conducted to determine the best integration approach, ensuring compatibility with existing HVAC infrastructure.

Alternatively, a more simplistic method could be used by integrating smart plug sockets connected to the modified air conditioning units. These smart plugs can be linked to the data loggers and programmed to turn devices on or off when humidity levels move outside the optimal range. This approach provides a cost-effective and easily implementable solution without requiring a full BMS setup.

Given that internal temperatures frequently fell below 18°C and fluctuate in line with external conditions, the property would benefit from a more consistent heating solution, particularly in rooms where low temperatures impact comfort and moisture levels. Consideration should be given to integrating background heating systems or increasing insulation in areas with significant heat loss. Improving insulation in rooms with frequent temperature drops will help mitigate condensation risks. Additionally, implementing moisture-resistant materials in areas prone to dampness (such as the Toilet and Youth Room Store) will help protect surfaces from damage and prevent the growth of mould.

3.6 Summary Table of Environmental Data

Room	Average Temperature (°C)	Average Humidity (%)	Average Dew Point (°C)	Highest Humidity (%)	Highest Dew Point (°C)	% of Time RH >65%
Youth Room	16.80	57.44	8.29	67.30	10.70	5.3%
Youth Room Store	12.15	77.89	8.40	81.56	10.16	100%
Maethrin Room	15.25	54.38	6.04	66.40	9.61	1.63%
Plant Room	17.66	61.53	10.14	69.69	12.01	27.03%
Meeting Room	16.57	69.93	11.05	79.06	12.92	97.68%
Toilets	14.03	86.82	11.86	90.41	12.90	100%
Hallway	15.59	53.84	6.22	67.94	10.80	1.73%

Table.1 – Summary Table of Environmental Data