

Air conditioning inspection report

Yorkshire Water Services Livingstone House, Chadwick Street LEEDS LS10 1LJ	Report number 0070-5258-0560-6490-3004
	Valid until 4 March 2025

Executive summary

This report should be retained as evidence that the required inspection has been undertaken, and it is recommended that consideration is to be given into implementing the report's recommendations aimed at reducing energy consumption.

Green Zone Surveys (UK) Ltd have been commissioned to undertake an inspection of the air conditioning systems and associated controls at:- Yorkshire Water Services, Livingstone House, Chadwick Street, LEEDS, LS10 1LJ on the 04/03/2020 @ 09:30.

Yorkshire Water Services occupy a five storey steel framed building of flat roof construction. Glazing is of a double standard, glazing incorporates solar film. Blinds installed. Lighting within the conditioned area provided by T5 fluorescent lamps and compact fluorescent lamps.

The maintenance office is served by a single split heat pump inverter system via a wall mounted unit, controlled via an infrared remote controller capable of daily only timer functions. Condenser unit mounted up a height within the basement car park.

An air cooled chiller located on the buildings flat roof provides a cooling coil to two air handling units which utilise heat recovery through the use of a thermal wheel, boilers provide a heating coil. AHU 1 serves the north side of the building, whilst AHU 2 serves the south side of the building. Chiller additionally provides a cooling coil to two pipe FCU's throughout the building, boilers provide a heating coil. Ground floor north is served by nine FCU's, ground floor south is served by nine FCU's, first floor is served by eighteen FCU's, second floor served by 20 FCU's, third floor served by 20 FCU's and 4th floor served by 20 FCU's. This system is controlled via a BMS system accessed via a PC located within a plant room.

Core activities within this building is "General Office-125W/sqm".

The total conditioned area is 3867sqm.

The Inspection and report were undertaken in accordance with CIBSE's methodology, Inspection of Air Conditioning Systems TM44: 2012 Edition by an inspector accredited to the National Occupational Standard and accredited by QUIDOS.

Sampling guidelines in CIBSE TM44 and the latest agreed CLG Air Conditioning Conventions.

- Packaged Systems: 10% of the total number of outdoor units must be inspected (including one of each make), with a minimum of three. An equal number of indoor units must be inspected.
- For central air handling plant, a minimum of ten units or 30%, whichever number is the greater, shall be inspected.
- Terminal units for centralised systems: a 2% sample of the total number of terminal units must be inspected with a minimum of 5 and a maximum of 20.

System 1; Single split heat pump inverter system serving the maintenance office (TOSHIBA, 2010).

Model: RAS-167SAV-E3. Serial number: 12400004. Cooling capacity: 4.40kW. Refrigerant charge: 1.08kg (R410A).

System 2; Air cooled chiller provides a cooling coil to two air handling units which utilise heat recovery through the use of a thermal wheel, boilers provide a heating coil. AHU 1 serves the north side of the building, whilst AHU 2 serves the south side of the building. Chiller additionally provides a cooling coil to FCU's throughout the building (TRANE, 2008).

Model: RTAC200. Serial number: EKN9568. Cooling capacity: 737kW. Refrigerant charge: 88kg (R134a).

AHU 1 (North): Supply fan: 7.5kW. Extract fan: 4.5kW. Cross sectional area: 1.17m². SFP: 2.87 (Unknown, est 2008).

AHU 2 (South): Supply fan: 7.5kW. Extract fan: 4.5kW. Cross sectional area: 1.17m². SFP: 2.87 (Unknown, est 2008).

The total installed cooling capacity of the systems on site is 741.40kW, with a total refrigerant charge of 89kg (R410A / R134a).

System assessed to be at NOS Level 4.

A number of opportunities are outlined within the report that should be considered to maximise efficiency.

While there is no mandatory requirement to carry out any recommendations, acting upon the advice within the report

may lead to a reduction in energy consumption and operating costs.

The primary aim of the Report is to give the building owner, or operator, information about the performance of the system and plant and to identify opportunities to save energy and cut operating costs.

This Report identifies any operating anomalies; no-cost/low-cost savings; capital investment opportunities; the size and appropriateness of refrigeration plant in relation to cooling loads and the effectiveness of current maintenance regimes.

Included within this report will be a description of the air conditioning services, system efficiencies and approximate sizing of the system compared to industry guidelines and suggested improvements, which could be made to increase the system efficiency.

The cooling requirements have been calculated in accordance with industry guidance and should not be treated as an in depth heat load calculation.

The Report is based on a visual inspection only. No equipment or plant was removed or stripped down.

Key recommendations

Efficiency

System RTAC200 has EER's of 3.05 which is equal to a B rating.

System RAS-167SAV-E3 has EER's of 2.8 which is equal to a D rating. On future replacement it is advised that the system is replaced with a more efficient type .

Installed split systems cooling capacity serving the maintenance office is oversized for its application, outside a 20% tolerance as recommended by CIBSE. However, this is less problematic as the system incorporates inverter driven compressors which can modulate power in accordance with demand.

Installed centralised systems cooling capacity serving open planned and cellular office located at floors ground to five is oversized for its application, outside a 20% tolerance as recommended by CIBSE.

Reduced efficiency results in increased energy use, operating costs and carbon emissions. Energy savings of 2-4% are possible for each degree the condensing temperature is reduced, by efficient and effective operation and maintenance of the air conditioning system and its controls.

The surveyed space has a lighting system with minimal heat gains (T5 fluorescent lamps and compact fluorescent lamps). It is advised that PIR occupancy sensors are installed to the lighting system within areas of low occupancy.

All inspected terminal unit heat exchangers, filters, diffusers and casing were seen to be in a clean and undamaged condition.

AHU filters displayed light signs of dust. AHU heat exchanger and dampers were seen to be in a clean and undamaged condition.

Condenser unit heat exchangers were seen in an undamaged condition. Light signs of dust observed on the units heat exchanger (unlikely to affect the systems performance / efficiency).

Minor damage observed to the chiller heat exchangers (less than 10%, unlikely to affect the systems performance / efficiency).

One of the most common causes of inefficiencies in an air conditioning systems are dirty components. An 8% decrease in airflow can increase energy consumption by up to 20%.

Inspected sections of refrigerant pipework's insulation were seen to be in a good condition with insulation intact.

Inspected sections of ductwork were seen to be in a good condition with insulation intact.

Ductwork conveying warm air should be insulated to conserve energy. Ductwork conveying cold supply air should be insulated to conserve energy and control condensation at the external surface. Recommendations for the specification and installation of thermal insulation and finishes are given in BS 5422: 1990 and BS 5970: 1992.

Be aware that poorly insulated pipe work can affect the efficiency of the air conditioning system. Exposed pipes will act like a heat exchanger and absorb or reject energy before the refrigerant reaches the indoor or outdoor unit reducing the performance of the air conditioning system. Always ensure pipework insulation is of the correct quality and standard as recommended by the manufacture and/or in line with good refrigeration installation practice.

Consider the savings that could be made by implementing an AHU free cooling regime during warmer months at this site. Operating the AHU fans during the night time will help lower the temperature of the building fabric prior to

occupancy and will reduce the operation hours of the air conditioning.

Consider raising the chilled water flow set point from 9 to 10°C so as to reduce energy consumption. The lower the chilled water flow temperature is set the harder and longer the chiller must operate to maintain that temperature. If the activities within a conditioned area relate to light office work then sufficient cooling will be provided, with an appropriately sized system, by maintaining a chilled water supply temperature of 10°C whilst also reducing the energy consumption required to maintain this flow temperature.

A degree increase in chilled water set-point could reduce plant energy usage by around 4%.

Excessive air leakage observed from the AHU access doors, this can reduce the systems efficiency.

Air handling units use belt driven fan motors. Consider retrofitting EC fan motors. EC fan motors provide a new inverter motor and high efficiency blade to provide maximum energy performance.

Maintenance

Inspected systems were seen to be in a good condition providing coolth as expected.

Continue to clean terminal units casing, diffusers, filters and heat exchangers along with condenser unit heat exchangers and AHU filters, heat exchangers and dampers during routine PPM visits.

FCU filters were seen to be in a clean and undamaged conditioned. However, filter of FCU111 was missing. Ensure all FCU's are inspected upon ensure filters are installed and are in a clean and undamaged condition.

It is advised that belts are correctly tensioned during routine PPM visits.

Consider installing manometers to the AHU. It is then advised that filters are changed on pressure drop.

Excessive air leakage observed from the AHU access doors, this can reduce the systems efficiency. It is advised that repairs are undertaken to ensure AHU doors are airtight.

Planned Preventative Maintenance (PPM) documentation was not available to review. However, from conversations with members of staff and observations made on the systems it is clear that regular maintenance is carried out at this site.

Maintenance is carried out by CBRE Managed Services Ltd twice a year plus call outs.

Maintenance contractor are adequately qualified. Refcom number: REF1011318.

Maintenance appears to be carried out to a good standard.

Controls

System serving the maintenance office is controlled via a infrared remote controller capable of daily only timer functions. Consideration to be given into upgrading the systems controller to a more sophisticated type capable of 7 day timer functions.

Consideration to be given into setting up 'off' only timers on systems controllers so the systems do not automatically start without manual activation by occupants within the area.

Centralised system serving the open planned and cellular offices is controlled via a BMS system accessed via a PC located within a plant room. This system is programmed to operate between the hours of 06:00 - 18:30 Monday to Saturday.

It is recommended that a study is completed on the occupancy profile of the building and it should be ensured that system time schedules match the occupancy hours of the building in all areas.

Inspected systems;

Maintenance office; Indicated day: Not set. Indicated time: Not set.

BMS; Indicated day: Wednesday. Actual day: Wednesday. Indicated time:09:36. Actual time: 09:36.

During routine PPM visits ensure systems are programmed to match the correct day / time.

At the time of the inspection the system serving the maintenance office was setup to operate at 22 Deg C within auto mode (efficient method of operating the system).

At the time of the inspection the BMS system was set up to operate the following temperatures; Ground floor south cooling set point: 25 Deg C. Ground floor north heating set point: 21 Deg C. Ground floor north cooling set point: 23 Deg C. First floor heating and cooling set point: 24 Deg C. Second floor north and south heating set point: 22 Deg C. Second floor north and south cooling set point: 24 Deg C. Third floor north and south heating set point: 22 Deg C. Third floor north and south cooling set point: 24 Deg C. Fourth floor north and south heating set point: 23 Deg C. Fourth floor north and south cooling set point: 25 Deg C.

The following set points will optimise efficiency: The Winter set point should be circa 19°C with the unit set to 'heating' mode. The Summer set point should be circa 24°C operating in 'cooling' mode. In Spring/Autumn the controller should be set to 'auto' mode with a set point range of 21°C - 22°C.

Improving heating / cooling temperature set points by one Degree can bring savings of 8 - 10% of annual heating / cooling consumption.

To reduce energy consumption consider operating the system in low fan mode.

Changes to control settings should not be made without a thorough investigation into the reason for making the change, the changes may not eliminate the problem, but only mask it and may lead to an increase in energy consumption.

Management

Consider placing notices alongside the local system controller to advise occupants on the method of control for efficient operation of the AC system.

Ensure that the person responsible for operation of the plant on-site is adequately trained in the efficient operation of the AC systems.

The client should be aware of the EU HFC (Hydrofluorocarbons) "Phase Down" particularly when considering future installations and system replacements. The client should always opt for systems which contain refrigerants with low GWPs (Global Warming Potential) such as R32 (GWP = 675 kgCO₂e). One immediate consequence of the "Phase Down" has been that prices of the refrigerants with high GWPs such as R407C and R410A are already increasing substantially making repairs more costly.

The client should be aware of the new F-Gas labelling legislation which came into force on 1st January 2017. By this date it is a legal requirement for all new systems to be clearly labelled with the following information: The type of refrigerant within the system, the weight of the refrigerant in the system, the GWP of the system refrigerant and the total GWP of the system.

The way that we calculate the frequency of mandatory leak checks and threshold values for a system that contains F-Gases has been changed. It is now based on equivalent tonnes of CO₂. This may mean that systems under the old F-Gas Regulations that did not need a mandatory leak check may now require one. Also systems that did not need an automatic leakage detection system fitted may now require one. Systems such as : stationary refrigeration equipment, stationary air-conditioning and heat pumps, stationary fire protection equipment and refrigeration units of refrigerated trucks and trailers are examples of systems included in F-Gas Regulations. For systems with less than 3kg charge, the 5 Tonne CO₂e threshold applies from 1st January 2017.

For more information, see: www.gov.uk/government/collections/eu-f-gas-regulation-guidance-for-users-producers-and-traders.

This site legally requires to hold a valid f-gas register and undertake leak checks for the following systems; RTAC200.

Evidence of leak checks could not be located. Ensure leak checks are carried out as required.

F-gas register could not be located. Ensure an f-gas register is located or created as soon as possible.

A valid f-gas register must include the following:

- The quantity and type of HFC refrigerants installed in each system;
- Any quantities of refrigerant added;
- The quantity of refrigerant recovered during servicing, maintenance and final disposal;
- Other relevant information including the identification of the company or technician who performed the servicing or maintenance, as well as the dates and results of leakage checks and leakage detection system checks.

Calculated AHU SFP does not comply with the Non-Domestic Building Compliance Guide. Further investigation required.

Implementing recommendations:

The recommendations are provided as an indication of opportunities that appear to exist to improve the air conditioning systems energy efficiency.

The recommendations are based on best practices from known information at the time of this report.

The recommendations are based on the assessor's knowledge of the system and its use.

Legal disclaimer:

The advice provided in recommendation reports is intended to be for information only.

Recipients of the recommendation report are advised to seek further detailed professional advice before reaching any decision on how to improve the energy performance of the building.

Further Information:

Carbon Trust has many self- help publications. Below are a few relevant documents: -

Carbon Trust Good Practice Guides.

GPG 348 – Guidance for use of logbooks.

GPG 112 – Monitoring & Targeting.

GPG 118 – Managing Energy Use.

GPG 306 – Energy Management Priorities.

CIBSE Publications – www.cibse.org.

BRE Publications – www.bre.co.uk.

F Gas Guidance –www.defra.gov.uk/fgas,<http://www.acrib.org.uk/MG7OLH18285>.

Department of Communities and Local Government - www.communities.gov.uk.

Subsystems inspected

VOL001/SYS001

Volume definitions	VOL001
Description	Single split heat pump inverter system serving the maintenance office
Effective rated cooling output	4 kW
Area served	Maintenance Office
Inspection date	4 March 2020
Cooling plant count	1
AHU count	0
Terminal units count	1
Sub system controls count	1

VOL001/SYS002

Volume definitions	VOL001
Description	Air cooled chiller provides a cooling coil to two air handling units which utilise heat recovery through the use of a thermal wheel, boilers provide a heating coil. AHU 1 serves the north side of the building, whilst AHU 2 serves the south side of the building. Chiller additionally provides a cooling coil to FCU's throughout the building
Effective rated cooling output	737 kW
Area served	Open planned and cellular offices located at floors ground to five
Inspection date	4 March 2020
Cooling plant count	1
AHU count	2
Terminal units count	5
Sub system controls count	1

Pre-inspection records requested

Essential records

These records were reviewed:

- Itemised list of installed air conditioning and refrigeration plant including product makes, models and identification numbers
- Cooling capacities, with locations of the indoor and outdoor components of each plant
- Description of system control zones, with schematic drawings
- Description of method of control of temperature
- Description of method of control of periods of operation.
- Floor plans and schematics of air conditioning systems.

Desirable records

These records were not available:

- Reports from earlier inspections of air conditioning systems, and for the generation of an energy performance certificate
- Records of maintenance operations carried out on refrigeration systems, including cleaning indoor and outdoor heat exchangers, refrigerant leakage tests, repairs to refrigeration components replenishing with refrigerant
- Records of maintenance operations carried out on air delivery systems, including filter cleaning and changing, and cleaning of heat exchangers
- Records of calibration and maintenance operations carried out on control systems and sensors, or BMS systems and sensors
- Records of sub-metered air conditioning plant use or energy consumption
- For relevant air supply and extract systems, commissioning results of measured absorbed power at normal air delivery and extract rates, and commissioning results for normal delivered delivery and extract air flow rates (or independently calculated specific fan power for the systems)

Optional records

These records were not available:

- An estimate of the design cooling load for each system (if available). Otherwise, a brief description of the occupation of the cooled spaces, and of power consuming equipment normally used in those spaces
- Records of any issues or complaints that have been raised concerning the indoor comfort conditions achieved in the treated spaces
- Where a BMS is used the manager should arrange for a short statement to be provided describing its capabilities, the plant it is connected to control, the set points for the control of temperature, the frequency with which it is maintained, and the date of the last inspection and maintenance
- Where a monitoring station, or remote monitoring facility, is used to continually observe the performance of equipment such as chillers, the manager should arrange for a statement to be provided describing the parameters monitored, and a statement reviewing the operating efficiency of the equipment

Cooling plants

Cooling plant 1

Unit Identifier	VOL001/SYS001/PS001
Component Identifier	VOL001/SYS001/PS001
Equipment Inspected	
Rated Cooling Capacity (kW)	4
Description (type/details)	Single Split Heat Pump Inverter Packaged System
Location of Cooling Plant	Basement carpark
Manufacturer	MITSUBISHI
Model/Reference	RAS-167SAV-E3
Refrigerant Charge (kg)	1
Refrigerant Type	R410A
Serial Number	12400004
Year Plant Installed	2010
Areas/Systems Served	Maintenance office

Note below any discrepancy between information provided by client and on site information collected, or any information of additional relevance to the cooling plant/system:

Cooling capacity = 4.40kW. Refrigerant charge = 1.08kg (R410A).

Approved sections

CS2.1 Is the refrigeration plant operational?

Yes

Plant was operational at the time of the inspection, providing coolth as expected.

CS2.2/a Is the area around the refrigeration plant clear of obstructions & debris?

Yes

Area around the refrigeration plant was seen to be clear of obstructions & debris Instigate regular inspections to ensure area and condenser are kept clean and debris free.

CS2.2/b Is the general condition of refrigeration and any associated central plant in good order?

Yes

Plant was seen to be in a good order. Follow the manufacturer's recommended maintenance guide to prolong longevity and ensure optimum performance. Instigate regular inspections to ensure system is kept in good working order.

CS2.2/c Is the condenser placed clear from warm air discharge louvres?

Yes

CS2.3/a Are compressors operational or can they be brought into operation?

Yes

The compressor is operational.

CS3.1/a Is the heat rejection plant operational?

Yes

No unusual noises / vibrations observed.

CS3.1/b Are condenser heat exchangers undamaged/ un-corroded and clean?

Yes

Condenser unit heat exchangers were seen to be in an undamaged condition. Light signs of dust observed (unlikely to affect the systems performance / efficiency). Continue to clean heat exchangers during routine PPM visits.

CS3.2/a Is the area around the heat rejection plant clear of obstructions & debris?

Yes

CS3.2/b Is the condenser free of any possibility of air recirculation?

Yes

CS4.1 Is the insulation on circulation pipe work well fitted and in good order?

Yes

Inspected sections of pipeworks insulation were seen to be in a good condition with insulation intact.

Appropriately Sized Cooling Plant

Installed Cooling Capacity (kW)	4.0
Occupant Density (m2/person)	4.0
Total Floor Area served by this plant(m2)	20
Total Occupants served by this plant	5
Maximum Instantaneous Heat Gain (W/m2)	125.0
The Installed Size is Deemed	More than expected

Notes and Recommendations

The current version of the Building Regulations Approved Document Part L documentation provides guidance suggesting that the plant should not be more than 20% oversized. This should be adopted as means of comparison to stay in line with current standards.

Installed cooling capacity of this system is 4.40kW. Total calculated cooling capacity of the conditioned area is 2.50kW (20*125/1000). Installed split systems cooling capacity serving the maintenance office is oversized for its application, outside a 20% tolerance as recommended by CIBSE. However, this is less problematic as the system incorporates inverter driven compressors which can modulate power in accordance with demand.

Refrigeration

Pre Compressor(°C)	0
Post Compressor(°C)	0
Ambient(°C)	0
The Temperature is Deemed	As expected
Refrigerant Type	R410A

Assess the refrigeration compressor(s) and the method of refrigeration capacity control

Inverter driven compressors which can modulate power in accordance with demand. . System has EER's of 2.8 which is equal to a D rating. Air on / air off temperature

samples were taken across the terminal unit heat exchanger. Refer to the terminal section for further details.

Are there any signs of a refrigerant leak?

No

No visual signs of water / refrigerant leaks detected.

Montreal/ODS/F-Gas controlled?

Yes

The system contains refrigerant controlled by the f-gas regulations. No requirement under f-gas regulations to undertake leak checks of this system / to hold a valid f-gas register. No requirement under f-gas regulations to install a leak detection system (system size less than 500T CO₂e).

It is advised that leak checks are carried out on a voluntary basis.

Notes and Recommendations

On future replacement it is advised that the system is replaced with a more efficient type .

Regular Maintenance

Is there evidence of regular maintenance?

Yes

Planned Preventative Maintenance (PPM) documentation was not available to review. However, from conversations with members of staff and observations made on the systems it is clear that regular maintenance is carried out at this site. Ensure PPM worksheets are stored onsite within a building log book.

Is the maintenance undertaken by suitably competent people and in accordance to industry guidelines?

Yes

Maintenance is carried out by CBRE Managed Services Ltd four times a year plus call outs. Maintenance contractor are adequately qualified. Refcom number: REF1011318.

Metering Comparison to appropriate energy benchmarks

Is metering installed to enable monitoring of energy consumption of refrigeration plant?

No

Recorded meter reading: 0

Is the refrigeration plant connected to a BEMS that can provide out of range alarms?

No

Are there any records of air conditioning plant usage or sub-metered energy consumption with expected hours of use per year for the plant?

No

There is no data available.

Is the energy consumption or hours of use excessive?

No

No records available.

Water Cooled Chillers (Cooling Towers & Evaporative Condensers)

Is the water flow through cooling towers or evaporative coolers even and efficient, and there is no loss of water?

No

Not applicable.

Is there a management regime in place to ensure that water is regularly checked and treated to ensure that there is no Legionella risk?

No

Not applicable.

Humidity Control

Is there separate equipment installed for humidity control?

No

Not applicable.

Cooling plant 2

Unit Identifier	VOL001/SYS002/PS001
Component Identifier	VOL001/SYS002/PS001
Equipment Inspected	
Rated Cooling Capacity (kW)	737
Description (type/details)	Air cooled chiller
Location of Cooling Plant	Flat roof
Manufacturer	TRANE
Model/Reference	RTAC200
Refrigerant Charge (kg)	88
Refrigerant Type	HFC 134a
Serial Number	EKN9568
Year Plant Installed	2008
Areas/Systems Served	Open planned and cellular offices located at floors ground to five

Note below any discrepancy between information provided by client and on site information collected, or any information of additional relevance to the cooling plant/system:

Cooling capacity = 737kW. Refrigerant charge = 88kg (R134a). F-gas register could not be located. Systems refrigerant charge assumed. Ensure refrigerant charge is confirmed before any action is taken.

Approved sections

CS2.1 Is the refrigeration plant operational?

Yes

Plant was operational at the time of the inspection, providing coolth as expected.

CS2.2/a Is the area around the refrigeration plant clear of obstructions & debris?

Yes

Area around the refrigeration plant was seen to be clear of obstructions & debris Instigate regular inspections to ensure area and condenser are kept clean and debris free.

CS2.2/b Is the general condition of refrigeration and any associated central plant in good order?

Yes

Plant was seen to be in a good order. Follow the manufacturer's recommended maintenance guide to prolong longevity and ensure optimum performance. Instigate regular inspections to ensure system is kept in good working order.

CS2.2/c Is the condenser placed clear from warm air discharge louvres?

Yes

CS2.3/a Are compressors operational or can they be brought into operation?

Yes

The compressor is operational.

CS3.1/a Is the heat rejection plant operational?

Yes

No unusual noises / vibrations observed.

CS3.1/b Are condenser heat exchangers undamaged/ un-corroded and clean?

Yes

Unit heat exchangers were seen to be in a clean condition. Minor damage observed to the chiller heat exchangers (less than 10%, unlikely to affect the systems performance / efficiency).

CS3.2/a Is the area around the heat rejection plant clear of obstructions & debris?

Yes

CS3.2/b Is the condenser free of any possibility of air recirculation?

Yes

CS4.1 Is the insulation on circulation pipe work well fitted and in good order?

Yes

Insulation were seen to be in a good condition with insulation intact.

Appropriately Sized Cooling Plant

Installed Cooling Capacity (kW)	737.0
Occupant Density (m2/person)	7.0
Total Floor Area served by this plant(m2)	3847
Total Occupants served by this plant	550
Maximum Instantaneous Heat Gain (W/m2)	125.0
The Installed Size is Deemed	More than expected

Notes and Recommendations

The current version of the Building Regulations Approved Document Part L documentation provides guidance suggesting that the plant should not be more than 20% oversized. This should be adopted as means of comparison to stay in line with current standards.

Installed cooling capacity of this system is 737kW. Total calculated cooling capacity of the conditioned area is 480.88kW (3847*125/1000). Installed centralised systems cooling capacity serving open planned and cellular office located at floors ground to five is oversized for its application, outside a 20% tolerance as recommended by CIBSE.

Refrigeration

Pre Compressor(°C)	0
Post Compressor(°C)	0
Ambient(°C)	0
The Temperature is Deemed	As expected
Refrigerant Type	HFC 134a

Assess the refrigeration compressor(s) and the method of refrigeration capacity control

Inverter driven compressors which can modulate power in accordance with demand. . System has EER's of 3.05 which is equal to a B rating. Air on / air off temperature

samples were taken across the terminal unit heat exchanger. Refer to the terminal section for further details.

Are there any signs of a refrigerant leak?

No

No visual signs of water / refrigerant leaks detected.

Montreal/ODS/F-Gas controlled?

Yes

The system contains refrigerant controlled by the f-gas regulations. Requirement under f-gas regulations to undertake leak checks of this system / to hold a valid f-gas register. No requirement under f-gas regulations to install a leak detection system (system size less than 500T CO₂e).

Evidence of leak checks could not be located. Ensure leak checks are carried out as required. This site legally requires to hold a valid f-gas register and undertake annual leak checks. F-gas register could not be located. Ensure an f-gas register is located or created as soon as possible. A valid f-gas register must include the following: - The quantity and type of HFC refrigerants installed in each system; - Any quantities of refrigerant added; - The quantity of refrigerant recovered during servicing, maintenance and final disposal; - Other relevant information including the identification of the company or technician who performed the servicing or maintenance, as well as the dates and results of leakage checks and leakage detection system checks.

Notes and Recommendations

No recommendations.

Regular Maintenance

Is there evidence of regular maintenance?

Yes

Planned Preventative Maintenance (PPM) documentation was not available to review. However, from conversations with members of staff and observations made on the systems it is clear that regular maintenance is carried out at this site. Ensure PPM worksheets are stored onsite within a building log book.

Is the maintenance undertaken by suitably competent people and in accordance to industry guidelines?

Yes

Maintenance is carried out by CBRE Managed Services Ltd four times a year plus call outs. Maintenance contractor are adequately qualified. Refcom number: REF1011318.

Metering Comparison to appropriate energy benchmarks

Is metering installed to enable monitoring of energy consumption of refrigeration plant?

No

Recorded meter reading: 0

Is the refrigeration plant connected to a BEMS that can provide out of range alarms?

No

Are there any records of air conditioning plant usage or sub-metered energy consumption with expected hours of use per year for the plant?

No

There is no data available.

Is the energy consumption or hours of use excessive?

No

No records available.

Water Cooled Chillers (Cooling Towers & Evaporative Condensers)

Is the water flow through cooling towers or evaporative coolers even and efficient, and there is no loss of water?

No

Not applicable.

Is there a management regime in place to ensure that water is regularly checked and treated to ensure that there is no Legionella risk?

No

Not applicable.

Humidity Control

Is there separate equipment installed for humidity control?

No

Not applicable.

Air handling systems

Air handling system 1

Unit	VOL001/SYS002/CSAHU002
Component	VOL001/SYS002/CSAHU002
Areas or systems served	South
Discrepancies noted	
Location of plant	Flat roof
Manufacturer	Unknown
Systems served from cooling plant	VOL001/SYS001/PS001
Year installed	2008

CS1.5 Specific fan power

Estimate the specific fan power (SFP) of air movement systems.

Are air flow rates and system pressures available from commissioning data?

Yes

The current version of the Building Regulations Approved Document Part F and Part L documentation provide guidance on limiting values. This should be adopted as means of comparison to stay inline with current standards. Supply fan: 7.50kW. Extract fan: 4.50kW. $12\text{kW} \times 0.7 = 8.40\text{kW} = 8400\text{W}$. Cross sectional area: $1.17\text{m}^2 \times 2.5\text{m} \times 2 = 2.93\text{m}^3/\text{s} = 2930\text{L/S}$. $\text{SFP} = \text{W/L/S} = 8400 / 2930 = 2.87\text{W/L/S}$.

The calculation used was: 2.87

CS6.1, CS6.2, CS6.3: Filters

Are air intake and filter conditions acceptable?

Yes

Filter displayed light signs of signs of dust (unlikely to affect the systems performance / efficiency). Ensure filters are thoroughly cleaned during routine PPM visits.

Have filters been changed according to current industry guidance?

Yes

Filters appear to be changed accordingly.

Is the filter differential pressure gauge, where fitted, working?

No

Manometer not fitted.

CS6.5 Condition of heat exchangers

Are heat exchangers in good condition?

Yes

Heat exchanger was seen to be in clean and undamaged condition.

The assessor made the following notes and recommendations:

- No recommendations.

CS6.6 Refrigeration leaks (if DXCoil installed)

Are there any signs of a refrigerant leak?

No

NO visual signs of leaks observed.

The assessor made the following notes and recommendations:

- Ensure leak checks are carried out twice a year as required. F-gas register could not be located. Systems refrigerant charge assumed. Ensure refrigerant charge is confirmed before any action is taken.

CS6.7/a Fan rotation

Does the fan rotate in the correct direction?

Yes

Air is being delivered to diffusers.

Is the speed control or modulation operational?

No

CS6.7/b Fan and control

Note the fan type, and method of air speed control. Check the setting and operation of any fresh air/recirculation dampers.

Belt driven fan motor.

The assessor made the following notes and recommendations:

- It is advised that belts are correctly tensioned during routine PPM visits. Consider retrofitting EC fan motors. EC fan motors provide a new inverter motor and high efficiency blade to provide maximum energy performance. To reduce energy consumption consider operating the system in low fan mode.

CS6.8 Heat recovery

Identify whether the systems have any energy conservation facilities, e.g. heat recovery, free cooling sequence, and check for evidence that such facilities are/have been functioning.

Heat recovery utilised through the use of thermal wheels. Consider the savings that could be made by implementing an AHU free cooling regime during warmer months at this site. Operating the AHU fans during the night time will help lower the temperature of the building fabric prior to occupancy and will reduce the operation hours of the air conditioning.

The assessor made the following notes and recommendations:

- No recommendations.

CS6.9 Air leakage

Observe the air handling plant and visible air containment including ductwork, floor or ceiling plenums and builders' work shafts for signs of excessive leakage and energy loss.

Excessive air leakage observed from the AHU access doors, this can reduce the systems efficiency. It is advised that repairs are undertaken to ensure AHU doors are airtight. Inspected sections of ductwork insulation were seen to be in a good condition with insulation intact.

The assessor made the following notes and recommendations:

- Ductwork conveying warm air should be insulated to conserve energy. Ductwork conveying cold supply air should be insulated to conserve energy and control condensation at the external surface. Recommendations for the specification and installation of thermal insulation and finishes are given in BS 5422: 1990 and BS 5970: 1992.

CS 7.1, CS7.2 Outdoor air inlets

Locate the inlets for outdoor air. Note any significant obstructions or blockages to inlet grilles, screens and pre- filters. Note where inlets may be affected by proximity to local sources of heat, or to air exhausts.

Clean and unobstructed.

The assessor made the following notes and recommendations:

-

Air handling system 2

Unit	VOL001/SYS001/CSAHU001
Component	VOL001/SYS001/CSAHU001
Areas or systems served	North
Discrepancies noted	
Location of plant	Flat roof
Manufacturer	Unknown
Systems served from cooling plant	VOL001/SYS001/PS001
Year installed	2008

CS1.5 Specific fan power

Estimate the specific fan power (SFP) of air movement systems.

Are air flow rates and system pressures available from commissioning data?

Yes

The current version of the Building Regulations Approved Document Part F and Part L documentation provide guidance on limiting values. This should be adopted as means of comparison to stay inline with current standards. Supply fan: 7.50kW. Extract fan: 4.50kW. $12kW \times 0.7 = 8.40kW = 8400W$. Cross sectional area: $1.17m^2 \times 2.5m \times 2 = 2.93m^3.s^{-1} = 2930L/S$. $SFP = W/L/S = 8400 / 2930 = 2.87W/L/S$.

The calculation used was: 2.87

CS6.1, CS6.2, CS6.3: Filters

Are air intake and filter conditions acceptable?

Yes

Filter displayed light signs of signs of dust (unlikely to affect the systems performance / efficiency). Ensure filters are thoroughly cleaned during routine PPM visits.

Have filters been changed according to current industry guidance?

Yes

Filters appear to be changed accordingly.

Is the filter differential pressure gauge, where fitted, working?

No

Manometer not fitted.

CS6.5 Condition of heat exchangers

Are heat exchangers in good condition?

Yes

Heat exchanger was seen to be in clean and undamaged condition.

The assessor made the following notes and recommendations:

- No recommendations.

CS6.6 Refrigeration leaks (if DXCoil installed)

Are there any signs of a refrigerant leak?

No

No visual signs of leaks observed.

The assessor made the following notes and recommendations:

- Ensure leak checks are carried out twice a year as required. F-gas register could not be located. Systems refrigerant charge assumed. Ensure refrigerant charge is confirmed before any action is taken.

CS6.7/a Fan rotation

Does the fan rotate in the correct direction?

Yes

Air is being delivered to diffusers.

Is the speed control or modulation operational?

No

CS6.7/b Fan and control

Note the fan type, and method of air speed control. Check the setting and operation of any fresh air/recirculation dampers.

Belt driven fan motor.

The assessor made the following notes and recommendations:

- It is advised that belts are correctly tensioned during routine PPM visits. Consider retrofitting EC fan motors. EC fan motors provide a new inverter motor and high efficiency blade to provide maximum energy performance. To reduce energy consumption consider operating the system in low fan mode.

CS6.8 Heat recovery

Identify whether the systems have any energy conservation facilities, e.g. heat recovery, free cooling sequence, and check for evidence that such facilities are/have been functioning.

Heat recovery utilised through the use of thermal wheels. Consider the savings that could be made by implementing an AHU free cooling regime during warmer months at this site. Operating the AHU fans during the night time will help lower the temperature of the building fabric prior to occupancy and will reduce the operation hours of the air conditioning.

The assessor made the following notes and recommendations:

- No recommendations.

CS6.9 Air leakage

Observe the air handling plant and visible air containment including ductwork, floor or ceiling plenums and builders' work shafts for signs of excessive leakage and energy loss.

Excessive air leakage observed from the AHU access doors, this can reduce the systems efficiency. It is advised that repairs are undertaken to ensure AHU doors are airtight. Inspected sections of ductwork insulation were seen to be in a good condition with insulation intact.

The assessor made the following notes and recommendations:

- Ductwork conveying warm air should be insulated to conserve energy. Ductwork conveying cold supply air should be insulated to conserve energy and control condensation at the external surface. Recommendations for the specification and installation of thermal insulation and finishes are given in BS 5422: 1990 and BS 5970: 1992.

CS 7.1, CS7.2 Outdoor air inlets

Locate the inlets for outdoor air. Note any significant obstructions or blockages to inlet grilles, screens and pre- filters. Note where inlets may be affected by proximity to local sources of heat, or to air exhausts.

Clean and unobstructed.

The assessor made the following notes and recommendations:

-

Terminal units

Terminal unit 1

Unit	VOL001/SYS001/PSTU001
Component	VOL001/SYS001
Description of unit	Wall mounted unit
Cooling plant serving terminal unit	VOL001/SYS001/PS001
Manufacturer	TOSHIBA
Year installed	2010
Area served	Maintenance office
Discrepancies noted	

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Pipework was seen to be in a good condition with insulation intact.

Is the ductwork adequately insulated?

No

Not applicable.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

No visual signs of water / refrigerant leaks. Units diffuser, heat exchanger, casing and filter were clean and undamaged during the inspection. System was adequately providing coolth. Air on: 19.7 Deg C. Air off: -3.8 Deg C.

The assessor made the following notes and recommendations:

- No recommendations.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

Is there evidence of tampering with diffusers?

No

No evidence of tampering with diffusers.

Are chilled and hot water being supplied to terminals simultaneously?

No

Not applicable.

Are there are any records of occupant complaints regarding air distribution?
No

Maintain a complaints log and show to service personnel.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?
No

Is the position of partitioning or furniture adversely affecting performance?
No

Furniture is correctly placed and it is not interfering with performance.

Is the control and operation adequate?
Yes

The assessor made the following notes and recommendations:

- Refer to control section.

Terminal unit 2

Unit	VOL001/SYS002/PSTU001
Component	VOL001/SYS002
Description of unit	Ducted fan coil unit
Cooling plant serving terminal unit	VOL001/SYS002/PS001
Manufacturer	Unknown
Year installed	2008
Area served	Second floor plan office
Discrepancies noted	

CS4.1 Insulation

Is the pipework adequately insulated?
Yes

Pipework was seen to be in a good condition with insulation intact.

Is the ductwork adequately insulated?
No

Ductwork was seen to be in a good condition with insulation intact.

CS4.2 Unit condition

Are the terminal units in good working order?
Yes

No visual signs of water / refrigerant leaks. Units filter was seen to be in a fairly clean undamaged. System was adequately providing coolth. Air on: 26.3 Deg C. Air off: 7.8 Deg C.

The assessor made the following notes and recommendations:

- No recommendations.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

Is there evidence of tampering with diffusers?

No

No evidence of tampering with diffusers.

Are chilled and hot water being supplied to terminals simultaneously?

Yes

Are there are any records of occupant complaints regarding air distribution?

No

Maintain a complaints log and show to service personnel.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

Is the position of partitioning or furniture adversely affecting performance?

No

Furniture is correctly placed and it is not interfering with performance.

Is the control and operation adequate?

Yes

The assessor made the following notes and recommendations:

- Refer to control section.

Terminal unit 3

Unit	VOL001/SYS002/PSTU002
Component	VOL001/SYS002
Description of unit	Ducted fan coil unit
Cooling plant serving terminal unit	VOL001/SYS002/PS001
Manufacturer	Unknown
Year installed	2008
Area served	Second floor plan office
Discrepancies noted	

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Pipework was seen to be in a good condition with insulation intact.

Is the ductwork adequately insulated?

No

Ductwork was seen to be in a good condition with insulation intact.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

No visual signs of water / refrigerant leaks. Units filter was seen to be in a fairly clean undamaged. System was adequately providing coolth. Air on: 26 Deg C. Air off: 7.5 Deg C.

The assessor made the following notes and recommendations:

- No recommendations.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

Is there evidence of tampering with diffusers?

No

No evidence of tampering with diffusers.

Are chilled and hot water being supplied to terminals simultaneously?

Yes

Are there are any records of occupant complaints regarding air distribution?

No

Maintain a complaints log and show to service personnel.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

Is the position of partitioning or furniture adversely affecting performance?

No

Furniture is correctly placed and it is not interfering with performance.

Is the control and operation adequate?

Yes

The assessor made the following notes and recommendations:

- Refer to control section.

Terminal unit 4

Unit	VOL001/SYS002/PSTU003
Component	VOL001/SYS002
Description of unit	Ducted fan coil unit
Cooling plant serving terminal unit	VOL001/SYS002/PS001
Manufacturer	Unknown
Year installed	2008

Area served

First floor plan office

Discrepancies noted

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Pipework was seen to be in a good condition with insulation intact.

Is the ductwork adequately insulated?

No

Ductwork was seen to be in a good condition with insulation intact.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

No visual signs of water / refrigerant leaks. Units filter was missing. System was adequately providing coolth. Air on: 25.2 Deg C. Air off: 6.8 Deg C.

The assessor made the following notes and recommendations:

- Ensure filter is replaced as soon as possible.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

Is there evidence of tampering with diffusers?

No

No evidence of tampering with diffusers.

Are chilled and hot water being supplied to terminals simultaneously?

Yes

Are there are any records of occupant complaints regarding air distribution?

No

Maintain a complaints log and show to service personnel.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

Is the position of partitioning or furniture adversely affecting performance?

No

Furniture is correctly placed and it is not interfering with performance.

Is the control and operation adequate?

Yes

The assessor made the following notes and recommendations:

- Refer to control section.
-

Terminal unit 5

Unit	VOL001/SYS002/PSTU004
Component	VOL001/SYS002
Description of unit	Ducted fan coil unit
Cooling plant serving terminal unit	VOL001/SYS002/PS001
Manufacturer	Unknown
Year installed	2008
Area served	Fourth floor plan office
Discrepancies noted	

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Pipework was seen to be in a good condition with insulation intact.

Is the ductwork adequately insulated?

No

Ductwork was seen to be in a good condition with insulation intact.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

No visual signs of water / refrigerant leaks. Units filter was seen to be in a fairly clean undamaged. System was adequately providing coolth. Air on: 23.7 Deg C. Air off: 7.2 Deg C.

The assessor made the following notes and recommendations:

- No recommendations.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

Is there evidence of tampering with diffusers?

No

No evidence of tampering with diffusers.

Are chilled and hot water being supplied to terminals simultaneously?

Yes

Are there are any records of occupant complaints regarding air distribution?

No

Maintain a complaints log and show to service personnel.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

Is the position of partitioning or furniture adversely affecting performance?

No

Furniture is correctly placed and it is not interfering with performance.

Is the control and operation adequate?

Yes

The assessor made the following notes and recommendations:

- Refer to control section.

Terminal unit 6

Unit	VOL001/SYS002/PSTU005
Component	VOL001/SYS002
Description of unit	Ducted fan coil unit
Cooling plant serving terminal unit	VOL001/SYS002/PS001
Manufacturer	Unknown
Year installed	2008
Area served	GF canteen
Discrepancies noted	

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Pipework was seen to be in a good condition with insulation intact.

Is the ductwork adequately insulated?

No

Ductwork was seen to be in a good condition with insulation intact.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

No visual signs of water / refrigerant leaks. Units filter was seen to be in a fairly clean undamaged. System was adequately providing coolth. Air on: 26.5 Deg C. Air off: 6.2 Deg C.

The assessor made the following notes and recommendations:

- No recommendations.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

Is there evidence of tampering with diffusers?

No

No evidence of tampering with diffusers.

Are chilled and hot water being supplied to terminals simultaneously?

Yes

Are there any records of occupant complaints regarding air distribution?

No

Maintain a complaints log and show to service personnel.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

Is the position of partitioning or furniture adversely affecting performance?

No

Furniture is correctly placed and it is not interfering with performance.

Is the control and operation adequate?

Yes

The assessor made the following notes and recommendations:

- Refer to control section.
-

System controls

Control for VOL001/SYS002

CS8.1 Is the zoning appropriate in relation to anticipated cooling demand?

Yes

Activity: "General Office". The surveyed space has a lighting system with minimal heat gains.

The assessor made the following notes and recommendations:

- No recommendations.

CS8.2 Note the current indicated weekday and time of day on controllers or BMS against the actual time.

The assessor made the following notes and recommendations:

- Building management system was programmed to match the correct day / time.

CS8.3/a Note the set on and off periods (for weekday and weekend if this facility is available with the timer).

The assessor made the following notes and recommendations:

- Centralised system serving the open planned and cellular offices is controlled via a BMS system accessed via a PC located within a plant room. This system is programmed to operate between the hours of 06:00 - 18:30 Monday to Saturday. It is recommended that a study is completed on the occupancy profile of the building and it should be ensured that system time schedules match the occupancy hours of the building in all areas.

CS 8.3/b Is there a shortfall in timer capabilities?

No

Capable of 7 day timer functions.

The assessor made the following notes and recommendations:

-

CS8.4 Identify and assess zone heating and cooling temperature control sensors. Are the sensor types and locations appropriate in relation to heating and cooling emitters, heat flows or likely temperature distributions in the zone or space?

Yes

Sensors are wall mounted.

The assessor made the following notes and recommendations:

- Location and type, adequate.

CS8.5 Note the set temperature in each zone for heating and cooling in relation to the activities and occupancy of zones and spaces in relation to the manager's intent.

The assessor made the following notes and recommendations:

- At the time of the inspection the BMS system was set up to operate the following temperatures; Ground floor south cooling set point: 25 Deg C. Ground floor north heating set point: 21 Deg C. Ground floor north cooling set point: 23 Deg C. First floor heating and cooling set point: 24 Deg C. Second floor north and south heating set point: 22 Deg C. Second floor north and south cooling set point: 24 Deg C. Third floor north and south heating set point: 22 Deg C. Third floor north and south cooling set point: 24 Deg C. Fourth floor north and south heating set point: 23 Deg C. Fourth floor north and south cooling set point: 25 Deg C. The following set points will optimise efficiency: The Winter set point should be circa 19°C with the unit set to 'heating' mode. The Summer set point should be circa 24°C operating in 'cooling' mode. In Spring/Autumn the controller should be set to 'auto' mode with a set point range of 21°C - 22°C.

CS8.6 Note whether a 'dead band' is, or can be, set between heating and cooling.

The assessor made the following notes and recommendations:

- AHU north and south have set point of 20 Deg C with a dead band of 3 Deg C. Efficient method of operating the system.

CS8.7 Do the sub system controls integrate effectively with the overall system control strategy?

Yes

The assessor made the following notes and recommendations:

- Refer to "Advice and comments on control of AC sub system(s)" for further details.

CS8.8 Assess the means of modulating or controlling air flow rate through the air supply and exhaust ducts.

The assessor made the following notes and recommendations:

- To reduce energy consumption consider operating the system in low fan mode.

PS3.6 Are guidance notices visible or controls available to inhibit use of cooling equipment whilst windows are open or cooling/heating is on?

Yes

No guidance displayed.

The assessor made the following notes and recommendations:

- Ensure that the person responsible for operation of the plant on-site is adequately trained in the efficient operation of the AC systems.

Control for VOL001/SYS001

CS8.1 Is the zoning appropriate in relation to anticipated cooling demand?

Yes

Activity: "General office". The surveyed space has a lighting system with minimal heat gains.

The assessor made the following notes and recommendations:

- No recommendations.

CS8.2 Note the current indicated weekday and time of day on controllers or BMS against the actual time.

The assessor made the following notes and recommendations:

- Maintenance office; Indicated day: No set. Indicated time: No set. During routine PPM visits ensure systems are programmed to match the correct day / time.

CS8.3/a Note the set on and off periods (for weekday and weekend if this facility is available with the timer).

The assessor made the following notes and recommendations:

- 7 day timer functions not being utilised. Consideration to be given into setting up 'off' only timers on systems controllers so the systems do not automatically start without manual activation by occupants within the area.

CS 8.3/b Is there a shortfall in timer capabilities?

Yes

Capable of 7 day timer functions.

The assessor made the following notes and recommendations:

- Consideration to be given into setting up 'off' only timers on systems controllers so the systems do not automatically start without manual activation by occupants within the area.

CS8.4 Identify and assess zone heating and cooling temperature control sensors. Are the sensor types and locations appropriate in relation to heating and cooling emitters, heat flows or likely temperature distributions in the zone or space?

Yes

Sensors are located within the return air.

The assessor made the following notes and recommendations:

- Location and type, adequate.

CS8.5 Note the set temperature in each zone for heating and cooling in relation to the activities and occupancy of zones and spaces in relation to the manager's intent.

The assessor made the following notes and recommendations:

- At the time of the inspection the system serving the maintenance office was setup to operate at 22 Deg C within auto mode (efficient method of operating the system). The following set points will optimise efficiency: The Winter set point should be circa 19°C with the unit set to 'heating' mode. The Summer set point should be circa 24°C operating in 'cooling' mode. In Spring/Autumn the controller should be set to 'auto' mode with a set point range of 21°C - 22°C.

CS8.6 Note whether a 'dead band' is, or can be, set between heating and cooling.

The assessor made the following notes and recommendations:

- If possible consider setting a "dead band" of 2 - 3 Degrees C above & below a set point of 21 Degrees C.

CS8.7 Do the sub system controls integrate effectively with the overall system control strategy?

Yes

The assessor made the following notes and recommendations:

- Refer to "Advice and comments on control of AC sub system(s)" for further details.

CS8.8 Assess the means of modulating or controlling air flow rate through the air supply and exhaust ducts.

The assessor made the following notes and recommendations:

- System has a four speed fan motor. To reduce energy consumption consider operating the system in low fan mode.

PS3.6 Are guidance notices visible or controls available to inhibit use of cooling equipment whilst windows are open or cooling/heating is on?

Yes

No guidance displayed.

The assessor made the following notes and recommendations:

- Consider placing notices alongside the local system controller to advise occupants on the method of control for efficient operation of the AC system.

Assessor's details

Assessor's name	Karl Sharpe
Email	karl@greenzonesurveys.com
Assessor ID	QUID201500
Employer/Trading name	Green Zone Surveys (UK) Ltd
Employer/Trading address	Second Floor Cobalt Business Exchange Cobalt Park Way Newcastle Upon Tyne NE28 9NZ
Accreditation scheme	Quidos Limited
Accreditation scheme telephone	01225 667 570
Accreditation scheme email	info@quidos.co.uk

Inspection certificate

[See the air conditioning inspection certificate for this property. \(/energy-certificate/2560-6097-0506-0300-4805\)](#)

Other reports for this property

If you are aware of previous reports for this property and they are not listed here, please contact us at dluhc.digital-services@levellingup.gov.uk or call our helpdesk on 020 3829 0748 (Monday to Friday, 9am to 5pm).

There are no related reports for this property.

[Help \(/help\)](#) [Accessibility \(/accessibility-statement\)](#) [Cookies \(/cookies\)](#)

[Give feedback \(https://forms.office.com/e/hUnC3Xq1T4\)](https://forms.office.com/e/hUnC3Xq1T4) [Service performance \(/service-performance\)](#)

OGL

All content is available under the [Open Government Licence v3.0 \(https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/\)](https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/), except where otherwise stated



ht (<https://www.nationalarchives.gov.uk/information-management/re-using-public-sector-information/uk-government-licensing-framework/>)