2.2.7 Building Log Book

P23-012 Wingates Plot 3

Bolton

Building Logbook | May 2024

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BUILDING LOG BOOK

Wingates Plot 3, Bolton

Project Ref	P23-012
Revision:	First Issue
Prepared by:	GAC / EBM / Winvic
Reviewed by:	Kane Fowler
FM Responsible:	CBRE Facilities & Management
Date	May 2024

This building log book is analogous to a car handbook, providing the facilities manager with easily understood information about how the building is intended to work. It also allows ongoing building energy performance and major alterations to be recorded.

Please ensure that this log book is kept up-to-date and in a readily accessible (designated) position, e.g., in the main building operations room. It contains important information for anyone carrying out work on the building and its services.

This log book is always kept in: ……

Electronic master is kept at: ……

Contents

1. Updates and Annual Reviews

The log book should be reviewed annually as part of the organisation's quality assurance system and an entry should be made for each review. Where the log book has been updated then the changed pages should be recorded.

Review date	Description of annual log book review and updates made	Pages updated or added	Facilities manager's Signature	Date
	Document handed over			

1. Purpose and Responsibilities

Purpose of a building log book

This log book is an easily accessible focal point of current information for all those working in the building. It has four main functions:

- **Summary of the building:** it is a summary of all the key information about the building, including the original design, commissioning and handover details, and information on its management and performance. In being a summary, it does not wholly duplicate or replace the O&M manuals. The log book is necessary for compliance with Building Regulations Part L2.
- **Key reference point:** it is the single document in which key building energy information is logged. It may be regarded as the hub document linking many other relevant documents. The log book should provide key references to the detail held in less accessible O&M manuals, BMS manuals and commissioning records. It should therefore be kept in a readily accessible (designated) position in the main building operations room and should not be removed without the approval of the facilities manager.
- **Source of information/training:** it provides a key source of information for anyone involved in the daily management or operation of the building and to anyone carrying out work on the building and its services. It is relevant to new staff and external contractors/consultants and may play a role in staff training and induction.
- **Dynamic document:** it is a place to log changes to the building and its operation. It is also used to log building energy performance and continual fine-tuning commissioning. It is essential that it is kept up-to-date. Alterations should only be made with the approval of the facilities manager and should be signed and dated by that person.

Further guidance on using building log books is given in Action Energy Good Practice Guide GPG 348: *Building log books — a user's guide*, available from www.actionenergy.org.uk

This building log book was prepared by:

Winvic Construction Ltd
Brampton House
Moulton Park
Northampton
NN3 6PZ

Dated: May 2024

Facilities manager responsible for log-book:……

Signed:……..

Contact No:……..

Signed:…… Date:…….

Key responsibilities of facilities manager:

— To ensure that the log book is correct and up-to-date at building handover and when passing it on to a successor
— To ensure that the log book is kept up to date on an ongoing basis including any changes to the building fabric, services, operation or management
— To ensure that building maintenance and energy performance are logged
— To ensure that all those working in the building are made aware of the information contained in the log book
— To ensure that the log book is always kept in its designated location.

2. Links to Other Key Documents

Document	Location
Emergency Procedures	Emergency Information section within the O&M Manual
Health and Safety	Health, Safety & Environment section within the O&M Manual
Schedule of Hazards Associated with Materials Used	Health, Safety & Environment section within the O&M Manual
Record Drawings	Within the O&M Manual
Equipment Log Books (e.g. Boiler log book)	With Equipment
Testing & commissioning certificates & reports	Building Services Verification, Sign Off Records & Testing & Commissioning within the O&M Manual
Plant & Equipment data	Manufacturers Literature sections within the O&M Manual

3. Main Contacts

Emergency Contact Name 1	
Emergency Contact Name 2	
Electricity Emergency Contact	0800 195 4141 (Electricity North West)
Gas Emergency Contact	0800 111 999 (CADENT)
Water Emergency Contact	0345 672 3723 (United Utilities)
Principal Designer Contact	Curran Webb Ltd Jim Curran 01386 765189
Building Services Design Contact Name	GAC Environmental Ltd - 01949 837531 EBM Electrical Services – 01536 407373
Principle Contractor	Winvic Construction Ltd. - 01604 678960
Mechanical Services Installer	GAC Environmental Ltd - 01949 837531
Commissioning Managers Name	Winvic- Kane Fowler - 07526178145
Electrical Services Installer	EBM Electrical Services – 01536 407373
O&M and Log Book Author Name	Winvic - Zoe Stanton
Mechanical & Electrical Consultant	N/A
Facilities Management Contractor Name	
Maintenance Contractor Name	

4. Commissioning, Handover and Compliance

Commissioning overview

CIBSE Commissioning Code	Followed? (Yes/No)	Certificate included in appendix? (Yes/No)
Code M: Commissioning Management	Yes	Commissioning Section O&M Manual
Code A: Air Distribution Systems	Yes	Commissioning Section O&M Manua
Code C: Automatic Controls	Yes	Commissioning Section O&M Manua
Code L: Lighting	Yes	Commissioning Section O&M Manua
Code R: Refrigeration	Yes	Commissioning Section O&M Manua
Code W: Water Distribution Systems	Yes	Commissioning Section O&M Manua

Commissioning results

Commissioning period **April to May 2024** **Signed:**	**1. Were the system and its controls installed as shown in the design drawings? (Yes/No)**	**2. Did operation meet the design specifications in all the required modes? (Yes/No)**	**3. Did the system operate efficiently in all modes? (Yes/No)**	**Comments/problems?** Where the answer is NO, indicate any commissioning problems or significant changes that have been made to the designs during (or as a result of) installation/commissioning, or any value engineering exercises, including any significant commissioning failures and remedial work that took place.
Water Chlorination	Yes	Yes	Yes	
External Services Test Sheets	Yes	Yes	Yes	
LTHW Pipework Test Certificates	Yes	Yes	Yes	
MCW, RWH & HWS Pipework Test Certificates	Yes	Yes	Yes	
AGD Pipework Test Certificates	Yes	Yes	Yes	
LTHW Water Balance Sheets	Yes	Yes	Yes	
LTHW Water Treatment Log Book	Yes	Yes	Yes	
Solar Hot Water Commissioning Certificate	Yes	Yes	Yes	
TMV Test Sheets	Yes	Yes	Yes	
Ventilation Air Balance Sheets	Yes	Yes	Yes	
WC Extract Air Balance Sheets	Yes	Yes	Yes	
AC Commissioning Sheets	Yes	Yes	Yes	
BMS Commissioning Certificate	Yes	Yes	Yes	
Rainwater Harvesting Commissioning Sheets	Yes	Yes	Yes	
Fire Damper Certificate	Yes	Yes	Yes	

Air infiltration

A building air pressure test was carried out on the 02/05/2024 and showed a measured air permeability of 1.67m3hr @50pa.which was within the specified target refer to building manuals for full rest report.

Handover

Handover took place on:	14 / 06 / 2024
End of defects liability period:	14 / 06 / 2025
The handover procedure was managed by:	Kane Fowler (M&E Manager)

The documents handed over are listed in section 3 – Key Documents

5. Overall Building Design

General description of building

The following mechanical services have been provided:

External Services

- External natural gas distribution pipework
- External mains cold water distribution pipework & entry location within the building

Main Offices

- Low Temperature Hot Water Heating Services, incorporating Air to Water Hydrobox Unit, Standard radiators and ceiling radiant panel heaters
- General Supply & Extract Ventilation systems, ductwork distribution incorporating attenuators, fire dampers, volume control dampers and room air terminals.
- Toilet extract ventilation system, ductwork distribution incorporating attenuators, fire dampers, volume control dampers and room air terminals.
- Air conditioning fan coil units internally located, ductwork distribution incorporating, volume control dampers and room air terminals.
- Rainwater Harvesting system to serve all WC appliances within the building and external bib tap, incorporating, pipework, valves, controls and thermal insulation.
- Mains cold water services system to serve all cold outlets within the building, incorporating, pipework, valves, controls and thermal insulation.
- Hot water services to serve all hot water outlets within the building, incorporating Air to Water Hydrobox Unit, Twin coil hot water cylinder, Solar hot water heating system, pipework, valves, controls and thermal insulation.
- Building Management & Energy Monitoring System
- An above ground drainage system to remove wastewater from all sanitaryware appliances throughout the buildings to drain.
- Thermal insulation to all domestic hot and cold-water services as necessary.
- The chlorination of all domestic hot and cold-water systems serving all new installations.
- Commissioning and balancing of all plant & equipment

The following electrical services have been installed:

- LV Main Panel Board, Sub Split Metered Power & Lighting Distribution Boards for the office and a warehouse and external services combined Power & Lighting Distribution Boards.
- Trunking system at back of LV Panel ties into basket system in ceiling voids via back of staircase 1.
- Primary cable basket containment systems within ceiling voids with secondary containment consisting of PVC conduit drops within wall fabric.
- Designated cleaner's sockets are installed within the perimeter walls. A Marshall Tufflex under floor power track system has been installed within the office areas to provide a flexible power solution, floor boxes have 1xTSSO with integral RCD protection & 4G data plate for future utilization. Hand dryer power supplies for future use by end client have been installed.
- Power supplies to mechanical equipment to include extract ventilation, electric panel heaters, water heaters, heating and cooling equipment and BMS system.
- Internal lighting with automatic presence / absence control, dimming facility within office areas.
- External lighting consisting of perimeter low level LED fittings to illuminate walkways to the side and rear of the building, high-level, high-power LED fittings to the front of the building to adequately illuminate the loading areas and lighting columns for the car park area.
- Emergency Lighting throughout the office and core areas, exit signage within the warehouse & external bulkheads above doors.
- Life safety systems include L1/P1 Fire Alarm, Accessible WC Alarm and Disabled Refuge System.
- 2 x dual Electric vehicle chargers are installed within car park.
- Testing & Commissioning of all services.

Client requirements

The services to the building have been designed in accordance with all relevant building regulations And the design criteria detailed below:

Mechanical Design Criteria

Design Criteria – Wingates Plot 3 Bolton

The following design parameters have been employed when carrying out of all design works.

External	
Winter	As per CIBSE Guide A table 2.5 for external temperatures not exceeded for more than 0.4% of year (use the 99.6% not exceeded column)
Summer	Based on Geographical location. As per CIBSE Guide A table 2.6 for external temperatures not exceeded for more than 0.4% of year (use the 99.6% not exceeded column).

Internal				
Area	**Temperature**		**Infiltration**	**Mechanical**
	Winter	***Summer***		
Offices	21°C ± 2°C	23°C ± 2°C	1 Air Change per hour	12l/s/p
Toilets	19°C ± 2°C			10 ach-1 (extract)
Stairs	18°C ± 2°C			
Tea Room & Kitchenette	As per offices			10 ach-1 (extract)
Frost	12°C ± 2°C			

Occupancy	
Offices	1 person per 7.5m²
Meeting Rooms	1 person per 7.5m²
Air filtration	
Open Plan Offices	1 ac/hr

Noise Criteria	Noise Level
Offices	40 – 45 dB Laeq 20
Toilets	45 – 50 dB Laeq 20
Plant Room	NR50
External	NR65 at 1m

Domestic Water Services	
Flow Velocity	Small Bore Pipework: <1.0m/s 15-50mm Pipework: 0.75 – 1.15m/s >50mm Pipework: 1.25m/s – 3.0ms

Special design features

The services are energy efficient based on high efficiency air handling unit, zoning of VRV comfort cooling/heating, high efficiency VRV heat pump cooling/heating systems, use of an energy monitoring system and high efficiency lighting.

Design assessment

In accordance with the requirements of the Building Regulations Part L2 carbon emissions were assessed using the carbon emissions method. This showed the annual carbon emissions of the building were proved to be no greater than that of from a notional building of the same size and shape designed to comply with the elemental method.

The assessment carried out on the building and issued to Building Control verified that the building fabric meets with the minimum performance levels stipulated and the plant and equipment selected for the M&E services systems were within maximum carbon emission limits. The submission to Building Control also demonstrated that the M&E systems were controlled in such a way the energy wasted was minimised.

Key interactions

The HVAC systems will interact with the building, zone and individual room occupancy to offer increased energy savings.

The VRV central controls system is paramount in ensuring that the high efficiency & modern technologies employed on this building are used to their maximum effect to maintain indoor air temperature and quality during variances in outdoor weather and occupancy changes. The offices are split into several heating/cooling zones throughout the building to ensure optimum conditions and energy efficiency.

Office lighting is controlled via PIR's with a maximum of 6 fitting / PIR. Daylight override is provided to the main offices consisting of perimeter zones to the windows 4m deep by 6m long maximum with adjustable level sensing to provide dimming to 10% of maximum.

The energy monitoring system is integrated to the energy saving controls employed within the building to provide monitoring, profile checks, logging and maintenance reporting.

Benefits and limitations of the design

Supply & extract ventilation to comply with building regulations has been installed to the occupied offices and areas, it should be noted that occupancy densities over the stated design criteria and occupancy levels figures may result in insufficient air quality to this space and this should be monitored, and corrective balancing measures taken to comply with building regulation Part F.

The building provides excellent natural lighting to the offices due to large expanses of external glazing and glazed partitions to internal cellular offices.

All temperature-controlled areas of the building are provided with individual controllers, the controllers operate the fan coils and can be used for mode selection, temperature adjustment, fan speed etc. The core areas are fitted with LTHW radiators or radiant panel heaters with temperature control.

All plant has been located to provide ease of maintainability

Key ‘dos and don’ts’

Do:

1. Monitor heating, cooling and ventilation via the controls to ensure good operation
2. Be aware of all risks
3. Monitor energy usage within the building, this will enable the facilities manager to adjust timed starts/holiday periods etc to avoid excessive energy waste.
4. Follow the manuals regarding regular maintenance
5. Consult the relevant person for advice and instruction if required
6. Employ specialists to service and maintain major plant items and systems including air handling units, heat recovery & ventilation units, rainwater harvesting system, VRV & Split type air conditioning systems and controls, this will ensure their continued efficiency and use.
7. Consult with control specialist to request further training and demonstrations, if necessary, this will ensure that the building management system is operating to its best with regards to the specific building.

Don’t:

1. Operate the plant 24 hours/day, seven days a week unless occupancy hours dictate this
2. Overheat the building
3. Leave heat generating equipment/machines left on unnecessarily and have energy saving features enabled as this will prevent your space from overheating and save energy
4. Open windows if cooling system operational.
5. Adjust set points or control logic from that set up without prior consultation with consultants or energy manager.

6. Summary of Areas and Occupancy

Occupancy and activities

The total number of occupants in the building is TBC (Based on core hours of use)

Main occupied areas	Weekday hours	Saturday hours	Sunday hours	Total hours/week	Flextime (Yes/No?)	Late working sometimes (Yes/No?)	No. of occupants
Office Block							

Insert a summary of the main activities in each different zone of the building. Insert a summary of the likely occupancy patterns including numbers of people and occupancy periods. As per tenant.

Floor areas

The total floor area is m^2 (based on gross floor area)

	% Of total area by servicing system						Total %	Total area (m^2)
Area type	Untreated	Naturally ventilated	Mechanically ventilated	Heating Only	Heating & Cooling	Heated & ventilated		
Office								
Reception	0%	0%	0%	100%	0%	0%	100%	41.5
Office	0%	0%	0%	0%	100%	0%	100%	202
Toilets	0%	0%	100%	0%	0%	0%	100%	21
Acc WC & Shower	0%	0%	0%	0%	0%	100%	100%	6.3
Corridors/Circulation	0%	0%	0%	100%	0%	0%	100%	72.1
Cleaners	0%	0%	100%	0%	0%	0%	100%	4.3
Total (%)	0%	0%	7.3%	32.7%	58.20%	1.8%	100%	**347.2**
Total area (m^2)			**25.3**	**113.6**	**202**	**6.3**	**346.7**	**347.2**

Tenancies

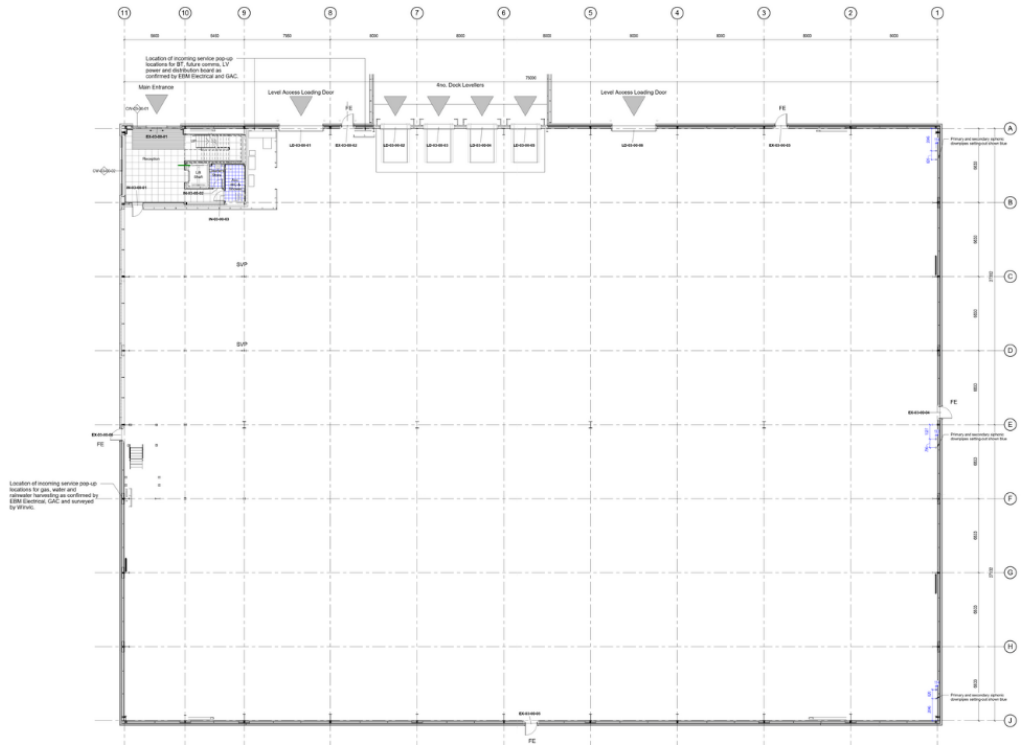
Not applicable

Separately managed and special areas

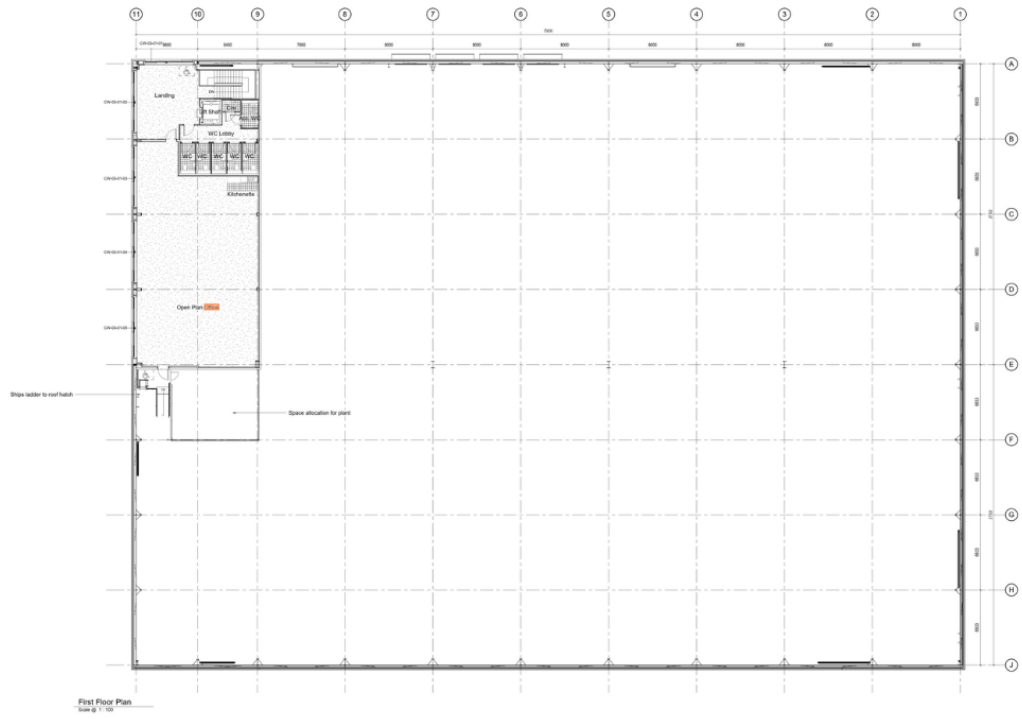
Not applicable

Floor plans

Ground Floor



First Floor



7. Summary of Main Building Services Plant

The main energy using plant installed at the site at handover is the VRV air conditioning system & Ventilation System

Main plant items are shown below. The operation & maintenance manuals provide further detail.

Main plant	Location	Input (kW)	Output (kW
Condenser Unit REYQ14U	External Condenser Unit Compound	10.8	
Air Handling Unit	Plant Deck	2.96	

SYSTEMS:

Mechanical Services

Drawings:

Description	Drg No:
LTHW Heating Ground & First Floor Main Office	P23012-GAC-BR-ZZ-DR-M-1000
Domestic Water Services Ground & First Floor Main Office	P23012-GAC-BR-ZZ-DR-M-2000
AC & Ventilation Ground & First Floor Main Office	P23012-GAC-BR-ZZ-DR-M-3000
Above Ground Drainage Services Ground & First Floor Main Office	P23012-GAC-BR-ZZ-DR-M-4000
Plant Deck Mechanical Services	P23012-GAC-BR-XX-DR-M-6000
External Services	P23012-GAC-EX-XX-DR-M-7000

External Services

Natural Gas Installation

A new 90mm MDPE gas service has been taken from the incoming services location within the Warehouse area of Unit 3 to the site boundary where it has been left capped off for future connection.

At the incoming service location, the 90mm MDPE adapts to 80mm steel below ground before rising above ground into the warehouse. The incoming service is left with blank flange for future connection.

Domestic Cold-Water Services

A new 63mm MDPE water main has been installed to the site from the main road to the site boundary. This main terminates with water meter and isolating valve provided by the water authority on the boundary.

From the outlet of the water authority water meter 63mm protecta-line pipework is installed to the incoming service location within the warehouse, all pipework being laid below 1000mm from the finished ground level and surrounded by sand for protection. A major water leak detection meter has been installed at the water authority meter position.

At the entry point to the building the protecta-line pipework converts to 42mm Copper, the incoming service is complete with stopcock, double check valve, draincock, water leak detection meter, isolation valve & water leak detection solenoid valve. A water conditioner has been installed on the incoming supply in the warehouse. From the water conditioner the pipework rises to serve equipment on the plant deck and services on the ground and first floors.

Controls

The following water meters have been supplied complete with pulsed output units which are connected to the Building Management Control Panel and utilised for logging purposes:

- Boundary Water Meter (Shippers)
- Boundary Water Meter (Leak Detection)
- Main Office Water Meter in Warehouse (Leak Detection)
- Rainwater Harvesting System top up water meter in Warehouse (Plant Deck)
- Hot Water Meter (Plant Deck)

Main Offices

Heating Services

Heating to the First-Floor offices is provided by VRV air conditioning system.

A low temperature hot water radiator heating system has been installed to serve ancillary areas on the ground and first floors.

The main plant consists of an air to water hydrobox unit located on the plant deck. Pipework from the hydrobox unit feeds a low loss header from which the following circuits are taken

a) Constant Temperature Circuit to the radiators on the Ground and First Floors and frost coil of the Air Handling Unit
b) Constant temperature circuit to the domestic hot water cylinder

A dosing pot has been installed between the Hydrobox unit and low loss header

LPHW is circulated around the radiator circuit via a single head circulating pump.

Water treatment chemicals have been added to the LPHW heating system to inhibit the growth of microbiological organisms, limit the buildup of scale and prevent corrosion all in accordance with BS 7593:2006

The main distribution pipework serving the radiators has been concealed within ceiling void, service risers and walls wherever possible.

All pipework has been thermally insulated to BS5422.

The radiators are of the standard or ceiling LTHW radiant panel type. Radiators are provided with thermostatic radiator valves fitted to the flow pipework and lockshield valves fitted to the return for each radiator.

Controls

The heating is monitored and controlled from the BMS Control panel located on the plant deck

The LTHW pressurisation unit is permanently powered from the BMS Control Panel and operates under the dictates of its own integral controls.
The pressurisation unit common fault is monitored by the BMS and is also indicated on the control panel fascia.

Ventilation Systems

General Supply & Extract Ventilation Systems

Supply and extract ventilation are provided by a packaged air handling unit (AHU01) as manufactured by Mansfield Pollard and is located on the plant deck.

The unit is provided with insulated fresh air intake which have been connected to a fresh air plenum box mounted to an external weather louvre (L1.01) c/w bird mesh grille which is integrated with the building façade.

The unit is provided with exhaust air ductwork which travels through the plant deck at high level and rises up and connect to a roof cowl.

Supply ductwork from the air handling unit is routed through the plant deck into the first-floor offices ceiling void with branches taken off terminating to ceiling mounted supply air diffusers as denoted on the record drawings.

The return air to the air handling unit is via ductwork installed within the first-floor ceiling void terminating to ceiling mounted extract grilles as denoted on the record drawings.

Attenuators have been installed immediately before and after the air handling unit to ensure noise levels within the space are within acceptable levels and specification.

The system is complete with all necessary VCDs for balancing purposes.

All penetrations through the offices fire compartments are fitted with standard fusible link type fire dampers and are complete with access door.

The air handling unit is provided with a frost coil fed from the LTHW C.T radiator circuit

All ductwork has been installed to the requirements of DW144

Controls

The air handling unit operates from its own integral control panel and interfaces with the BMS control panel located on the plant deck.

The air handling unit operates on a fixed time basis.

The air handling unit is interlocked with the fire alarm system and will be disabled when the fire alarm system is activated.

Ground & First Floor Toilet Extract Ventilation

Toilet extract ventilation is provided via a twin fan extract fan unit (EF1.01) located on the plant deck and is as manufactured by Systemair.

Exhaust ductwork from the extract fan is routed through the plant deck at high level and connects to the air handling unit general exhaust ductwork.

Extract ductwork is routed through the plant deck into the first-floor offices ceiling void and service risers to the ground floor with branches taken off terminating to ceiling mounted extract air valves as denoted on the record drawings.

Final connection from ductwork to air valves is via flexible ductwork

The system is complete with all necessary VCDs for balancing purposes.

All penetrations through fire compartments are fitted with standard fusible link type fire dampers and are complete with access door.

Attenuators have been installed immediately before and after the extract fan to ensure noise levels within the space are within acceptable levels and specification.

Cross talk attenuators have been installed as required to the ductwork system between WC walls on the first floor as denoted on the record drawings.

All ductwork has been installed to the requirements of DW144.

Controls

The twin fan extract fan is connected to its own controller with auto changeover panel which provides fan rotation and change over operation on fan failure. The fan is also connected and controlled from the BMS control panel located on the plant deck.

The system is interlocked with the fire alarm system and will shut down on fire alarm activation.

Air Conditioning & Comfort Cooling

First Floor Offices

The first-floor offices are served with the installation of a variable refrigerant volume refrigeration system capable of providing simultaneous heating and cooling to the space.

The VRV fan coil units have been installed within the ceiling void.

The VRV fan coil units comprise of an air filter, heat exchange coil, centrifugal fans, drain pan and removable underside access panel.

A BS branch controller has been installed located on the plant deck which is connected to an external condenser unit via refrigeration pipework.
Refrigeration pipework is taken from the BS branch controller to feed each fan coil unit. The branch controller determines whether heating or cooling is provided from the fan coil.

Conditioned air is delivered into the areas via supply air ductwork which travels from the fan coil units and terminates onto swirl air diffusers mounted within the suspended ceiling as denoted on the record drawings. All ductwork has been installed to the requirements of DW144 and is thermally insulated to BS 5422 and identified in accordance with BS 1710.

Fresh makeup air is delivered the rear of the fan coil units by ductwork terminating onto swirl return air grilles all as denoted on the record drawings

Final connection from ductwork to supply diffusers or return air grilles is via flexible ductwork

A condenser unit is connected to the branch selector and fan coil units and is located in the ground floor external condenser compound.

All refrigerant pipework has been installed utilising soft/medium drawn copper tubing and is complete with the appropriate headers and joints, and is insulated with a closed cellular foam insulation to prevent heat loss and heat gain and is also vapour sealed to prevent the formation of condensation on the pipe surface in accordance with BS EN 378:

u-PVC condensate pipework has been installed within the ceiling void and connects to all indoor units. The condense drains terminate with 32mm Hepworth HepVo dry traps to local soil stacks.

Controls

The VRV indoor units are provided with temperature sensors & controller mounted within the area's as detailed on the record drawings and are connected and controlled from a central I-Touch control panel located on the plant deck.

The system is interlocked with the fire alarm system and will shut down on fire alarm activation.

The I-Touch control panel provides the user but is not limited to the following functions

- Run & Stop Operation
- Set Time and Date
- Set Up Timers for individual zones / groups
- Changing temperature set point
- Alarm Monitoring

Domestic Water Services

Main Offices

Cold Water

A new 63mm protecta-line cold water main enters the building within the ground floor warehouse and is complete with stop cock, double check valve, draincock, water leak detection water meter linked to the energy monitoring control panel, isolation valve and water leak detection solenoid valve. From this incoming location, the mains cold water adapts to 42mm copper. A water conditioner has been installed on the incoming supply in the warehouse. From the water conditioner the pipework runs within risers and ceiling voids to serve the following

- Rainwater Harvesting System combi unit on the plantdeck
- Mains cold water feed to the LPHW expansion vessel on the plant deck
- Mains cold water feed to the hot water cylinder on the plant deck
- Shower, WHB's and sink outlets on the Ground and First floors

All WHB and Sink outlets are complete with service valves.

To assist in BREEAM credit collection toilet PIR detection is fitted to each space and linked to two port control valves, on detection the valves will open to allow water to fill cisterns and basins, during periods without occupation the valves will remain closed.

All pipework where concealed, within voids and risers is fitted with phenolic thermal insulation with identification applied in accordance with the specification.

Rainwater Harvesting System

A rainwater harvesting scheme has been installed to serve the following areas:

- Main Offices WC appliances on the Ground and First Floors
- External bib tap

Rainwater is collected at roof level and connected via the gravity downpipes to the inlet of a 5,000-litre external underground rainwater storage tank located adjacent the Warehouse.

The water discharges into the storage area of the tank through an inlet calmer. Any rainwater discharged into the tank whilst full will be diverted to drain from a tank connection.

The pump chamber of the tank is fitted with a 600mm diameter access turret for on-going maintenance and inspection. The system is provided with a twin pump booster set (Run & Standby) and UV filter.
The main storage chamber is fitted with an overflow to discharge excess water to drain and encourage the removal of floating particles within the tank.

The system is complete with an automatic controls system to monitor and control the entire rainwater system, all floats, pumps, micro switches and solenoid valves are wired back to the control unit located on the plant deck.

From the pumped discharge isolating valve copper pipework distributes within service risers and ceiling voids to serve all sanitary appliances on the Ground & First floors with service valves fitted within 300mm of the appliance.

All pipework where concealed, within voids or risers is fitted with phenolic foam thermal insulation with identification applied in accordance with the specification.

To assist in BREEAM credit collection PIR detection is fitted to each space and linked to two port control valves, on detection the valves will open to allow water to fill cisterns, during periods without occupation the valves will remain closed.

Controls

The Rainwater harvesting system is a packaged unit complete with inbuilt controls and will be available for continuous automatic operation. The control panel is monitored via the BMS for faults and an alarm will be initiated on a rainwater harvesting system alarm condition.

The UV filter is monitored by the BMS for a fault status that is also indicated on the control panel fascia

Hot Water

Domestic hot water is provided from a VRV Hydrobox air to water heat pump system as manufactured by Daikin and a solar panel system incorporating a 300-litre solar twin coil hot water storage cylinder as manufactured by AO Smith and is located on the plant deck, The Hydrobox unit is interconnected to the VRV condenser unit.

Hot water flow & return pipework is installed from the hot water storage cylinder within service risers and ceiling voids to all points of draw off, service valves have been installed to all WHB's and cleaners sink outlets within 300mm of the appliance.

TMV3 thermostatic blending valves have been installed to all wash hand basins to limit the hot water temperature to 43°C

The return pipework is fitted with a hot water secondary return pump located on the plant deck

Controls

Water meters have been installed throughout the systems and all are monitored and recorded by the energy monitoring controls.

The hot water system operates when its time zone is active. Once active, the heating is controlled by the BMS to maintain a hot water return temperature of 60°C.

The hot water secondary pump runs continually to circulate hot water around the system and eliminate stagnation.

The secondary pump is monitored for water flow failure on the BMS and the control panel fascia.

The solar heating temperature is monitored by the BMS.

The solar heating system is monitored by the BMS for a fault status that is also indicated on the control panel fascia.

Sterilization

The water systems have been sterilised and chlorinated in accordance with BS6700 and local water company requirements.

Building Management & Energy Monitoring Control System

An energy monitoring system, consisting of an intelligent controller and associated interface devices monitor and control the mechanical services.

From this location all pulsed output sub-meters on the water, electricity and future gas meter can be read.

The energy monitoring control panel is located on the plant deck.

Above Ground Drainage

The sanitaryware is connected to a vented above ground drainage system comprising uPVC/muPVC vertical soil stacks. The drainage system is vented to atmosphere.

Throughout the system, access points have been provided on all vertical discharge stacks at each floor level and at changes of direction to assist in the maintenance of the system and the clearing of blockages.

The drainage from all sanitary appliances and mechanical equipment has been connected to the above ground gravity drainage system as well as the condensate from air conditioning units.

All sanitaryware is fitted with proprietary traps and the branch pipes have a minimum nominal size of 32mm to washhand basins, 40mm to sinks and 110mm to WC's.

All penetrations above 100mm through floors are fitted with fire collars

SYSTEMS:

Electrical Services

Drawings:

Description	Drg No:
LV SCHEMATIC	P23012-EBM-03-XX-DR-E-0830
GROUND & FIRST FLOOR CONTAINMENT LAYOUT	P23012-EBM-03-XX-DR-E-0430
GROUND & FIRST FLOOR SMALL POWER LAYOUT	P23012-EBM-03-XX-DR-E-0330
GROUND & FIRST FLOOR LIGHTING LAYOUT	P23012-EBM-03-XX-DR-E-0130
GROUND & FIRST FLOOR FIRE ALARM LAYOUT	P23012-EBM-03-XX-DR-E-0230
LIGHTNING PROTECTION LAYOUT	P23012-EBM-EX-XX-DR-E-0934
EXTERNAL LIGHTING LAYOUT	P23012-EBM-EX-XX-DR-E-0931
EXTERNAL ELEVATIONS	P23012-EBM-EX-XX-DR-E-0930

Description of Systems:

Main Switchgear & Distribution

From the external DNO transformer (ENW) a 550kva supply has been installed via 7 X 1C 400MM² 90° THERMOSETTING NON-MAG XLPE/PVC/AWA/PVC with 3 X 1C 70MM² 6491B GRN/YEL CPC. This has been installed to an ACB unit approximately 15m away from the transformer inside a separate GRP enclosure backing onto the transformer GRP. From this ACB unit there is 2 X 1 X 4C 240MM² 90° THERMOSETTING XLPE/LSF/SWA/LSF plus 1 x 185MM² 6491B GRN/YEL CPC installed to the LV Panel situated inside the warehouse.

Containment

Primary containment consists of metal clad trunking running from the LV distribution board located in the warehouse to cable baskets installed at high level within the ceiling voids of each floor. This is routed up the external wall cladding rails and behind Stair core 1 into the ceiling voids at each level. The baskets are suspended from the roof structure via the use of traditional rod and Unistrut.
Secondary containment consists of PVC conduit drops within walls.
External cables run within ducting in the ground.

Small Power

General small power is provided via the use of floor boxes consisting of 1 X TSSO with RCD module and data plate ready for future data wiring. Cleaners sockets are provided throughout the building and are wall mounted. Circuits are wired in LSF multicore cables installed upon cable baskets/trays and in PVC conduits within walls, floor boxes are energised via 40A SP busbars.
Power supplies are provided for Hand Dryers within each toilet. Fused connection units located high level with outlet below at hand dryer height for future use.

Lighting & Emergency Lighting

The internal lighting within the core/office areas consists of LED 600mm x 600mm recessed modular fittings, LED circular recessed downlights and LED surface amenity bulkheads and exit blades.

All lighting is controlled via automatic presence / absence detection and switching to meet Part L requirements of the building regulations.
Lights are powered via a plug-in arrangement to either individual or multi way lighting control modules for ease of future isolation and maintenance.
Emergency lighting is integral to the general lighting with emergency key switch test switches located adjacent each distribution board within the warehouse
Illuminated exit signage provided to escape routes.

External Lighting

The external lighting consists of low level building mounted LED fittings providing perimeter lighting around walkways with high level high output building mounted LED fittings providing lighting for car park areas and loading bays. The service yard is covered by column mounted high output LED fittings.
The external lighting circuits are fed from the main distribution boards and controlled via an external photocell and digital timer.

Fire Alarm

The automatic fire detection system provides L1 coverage throughout the core & office area with M coverage within the warehouse area with scope for expansion in accordance with BS 5839.
The main panel is located within the reception area.
The devices within the office & core area sit on one loop with a spare loop available for future warehouse.
The fire alarm is interfaced with the Lift and the BMS system.

Accessible WC Alarms

An accessible WC alarm is installed to the accessible WC's on the ground and first floors. Both systems provide audio visual activation indication local to the toilets which are situated in the core area. Each system alarm consists of a red pullcord, rest button and audio-visual indicator.

Disabled Refuge

A disabled refuge system is installed with points located at the top of the office stairwell within the core area.
The main panel is located within the reception area adjacent the fire alarm panel.

Lightning and Surge Protection Systems

Lightning protection has been installed as per the strike risk assessment.
Lighting protection has been installed to meet the requirements of BS 62305.
Surge protection is installed within the main MCCB panel board.

Mechanical Services Power

Power supplies have been installed to mechanical equipment to include ventilation, water heaters, heating and cooling systems & BMS.

Earthing & Bonding

Designed and installed as per the specification and in accordance with the current IET Wiring Regulations BS7671:2018 (18th Edition).
Main earthing conductor incoming Main MCCB Panel Board.
Supplementary bonding incoming water services, structural steel, lightning & gas.

Testing, Commissioning & Certification

The entire electrical installation works shall be inspected, tested and commissioned and certificated in accordance with all relevant British Standard Specifications and Codes of Practice IET Wiring Regulations BS7671:2018 (18th Edition).

8. Occupant Information

Your working environment

Main Office

In order to achieve a good working environment, it is important that you understand how to control the building services in your space.

The I-Touch central controller controls and monitors all air conditioning systems; however, local control is available to air conditioning units as required.

Heating:

Heating to First Floor Office area's is provided by Daikin VRV ducted fan coil units. The units are controlled from the space & an I-Touch central controller located on the Plant Deck and once set up and maintaining conditions correctly this controls should not be changed without authorisation.

Set the temperature you require and then leave it for a while to see how the temperature settles down. Make minor adjustments if necessary but don't alter them too much as the system may overcompensate and you will get too hot/cold. Avoid over heating the space as this waste's energy and the resulting CO_2 emissions contribute to global warming.

Ancillary Area's

Your working environment is heated by a low temperature hot water radiator and ceiling radiant panel heating system.

Set the temperature you require and then leave it for a while to see how the temperature settles down. Make minor adjustments if necessary but don't alter them too much as the system may overcompensate and you will get too hot/cold. Avoid overheating the space as this waste's energy and the resulting CO_2 emissions contribute to global warming.

Cooling:

Your First Floor Offices working environment is conditioned with Daikin VRV ducted fan coil units. The units are controlled from the space & the I-Touch central controller located on the Plant Deck and once set up and maintaining conditions correctly this controls should not be changed without authorisation.

Set the temperature you require and then leave it for a while to see how the temperature settles down. Make minor adjustments if necessary but don't alter them too much as the system may overcompensate and you will get too hot/cold. Avoid over cooling the space as this waste's energy and the resulting CO_2 emissions contribute to global warming.

Ventilation:

All First-Floor office areas are ventilated from an Air Handling Unit located on the Plant Deck which uses the heat extracted from the areas and uses this to temper the incoming air to provide the adequate air changes needed.

Ground & First floor toilets are ventilated from a twin fan extract fans located on the Plant Deck

Windows:

All windows contain double glazed units to avoid overheating and excessive heat loss.

Shading:

Simple blinds are to be employed to reduce solar gain within the occupied spaces.

Office equipment:

Ensure that P.C.'s, printers, machines etc. are not left on unnecessarily and have energy saving features enabled as this will prevent your space from overheating and save energy.

Simple energy 'dos and don'ts'

- Avoid blocking radiators or ventilation grilles with furniture and books as this will result in a lack of heating/ventilation.
- Set thermostats to the required temperature then leave them alone. Do not use them as ON/OFF switches.
- Do not overheat your space as these increases running costs and causes extra emissions of CO_2 into the external atmosphere, contributing to global warming.
- Only switch the lights ON as and when necessary as they result in significant emissions of CO_2 into the external atmosphere, contributing to global warming.
- Shut windows at night for security purposes and to prevent heat loss that could make your space cold when you come in the next day.
- Switch off all manually controlled fans and equipment when not in use; designate a person to ensure this is carried out.
- Ensure that P.C.'s, printers etc. are not left on unnecessarily and have energy saving features enabled as this will prevent your space from overheating and save energy, thereby reducing CO_2 emissions to the external atmosphere.

9. Metering, Monitoring and Targeting Strategy

Metering schedule

The following provides a list of meters and design estimates of the likely end use consumptions. See Action Energy General Information Leaflet GIL 65: *Metering energy use in new non-domestic buildings,* for an example, including how to arrive at a good metering schedule. A copy is provided on the CD-ROM associated with CIBSE TM31 and printed copies are available from (www.actionenergy.org.uk). CIBSE TM22 also provides a means of assessing energy use in buildings.

Total estimated incoming fuel			Electricity: kHz/yr. Other: Litres					
Energy			**Meters**		**Method**		**Meter location**	
Type of incoming energy	Main end-use	Estimated end-use consumption (kHz/yr.)	Meter no./code	End use/ area/system/ circuit or tenancy to be measured	Measurement method and calculation where appropriate	Estimated consumption through each meter (kHz/yr.)	List of meters	Location
Water			22M347487		Direct		Shipper Main meter	Boundary
Water			23 004600		Direct		Leak Detection Main Meter	Boundary
Water			23 004418		Direct		Leak Detection Sub Meter Main Office	Warehouse
Water					Direct			
Water			22 045640		Direct		Hot water meter	Plant Deck
Electric			1650000375381 / LLF803		Direct		Incoming Meter	ACB
Electric			HGR965C		Direct		Incoming Meter	LV Panel
Electric			HGR96EWC		Direct		PV	LV Panel

10. Building Performance Records

(Not more than three pages)

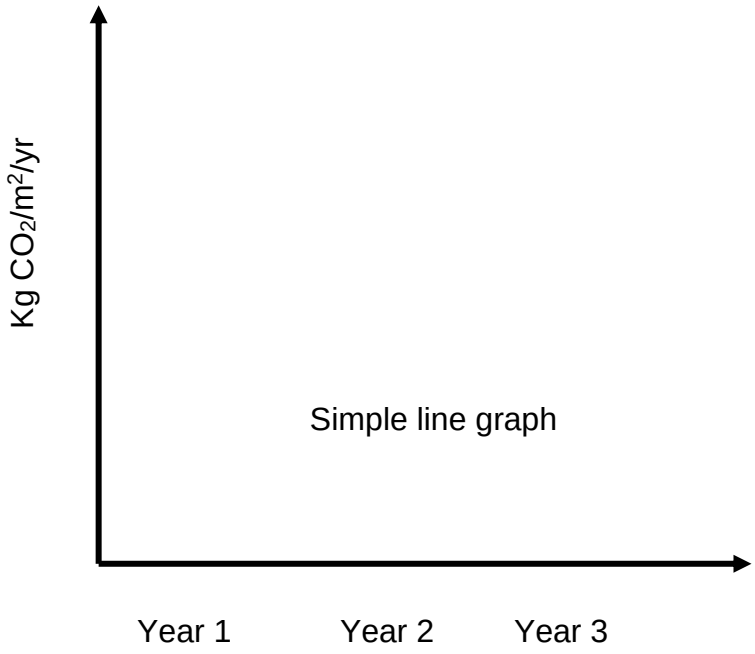
Overall annual energy performance

Summary of overall annual electricity, fossil fuel consumption and CO_2 against simple benchmarks. Examples of these calculations and tables are shown in Good Practice Guide GPG 348: *Building log books – a user's guide*. A copy is included on the CD-ROM associated with CIBSE TM31; printed copies are available from (www.energyaction.org.uk).

Building energy performance for period from *[date]* to *[date]* **Based on a treated floor area of *4027* m²**							
Fuel	**Quantity**	**(A)** (kW·h)	**(B)** **CO_2 ratio**	**€** (kg CO_2)	**(D)** **Actual** (kg CO_2/m^2)	**€** **Design estimates** (kg CO_2/m^2)	**(F)** **Good practice benchmark** (kg CO_2/m^2)
Gas							
Electricity							
TOTAL							

Ensure that actual consumption figures do not include estimated bills and ensure they relate to a full exact 12-month period. (If not then record actual and adjust by number of days missing/extra). Use the total gross floor area shown in section 5. Multiply column (A) by column (B) to get (C) then divide by treated total building floor area to get (D) for comparison with benchmarks in columns € and (F). One overall performance indicator can be established by totalling column (D). Avoid adding column (A) as the fuels have different costs and CO_2 factors.

Historical Building Performance Graph



CIBSE TM22: *Energy assessment and reporting methodology* provides software to help assess building energy performance using either a simple or a detailed approach. This includes benchmarks for a variety of buildings. A wider range of benchmarks is available in the series of Energy Consumption Guides produced by Action Energy

(www.actionenergy.org.uk), e.g. ECG19: *Energy use in offices*, and CIBSE Guide F: *Energy efficiency in buildings*

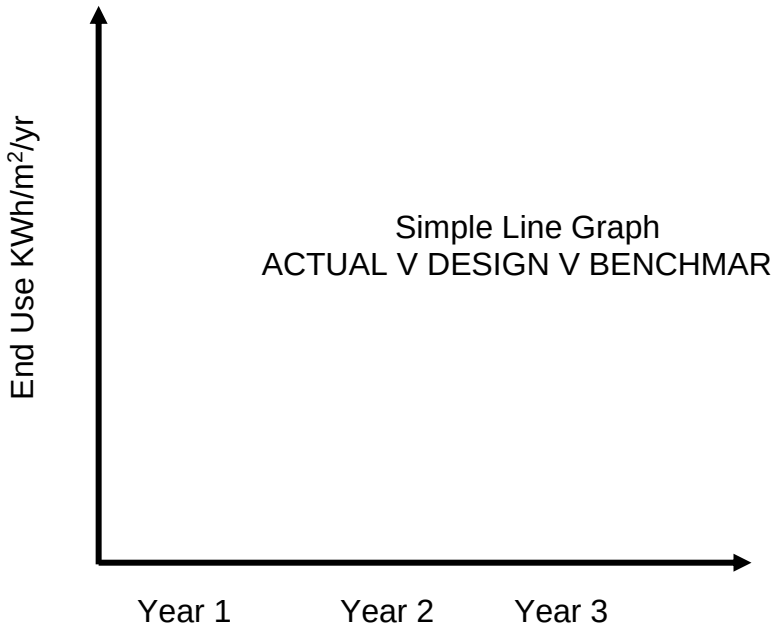
Energy end use comparison

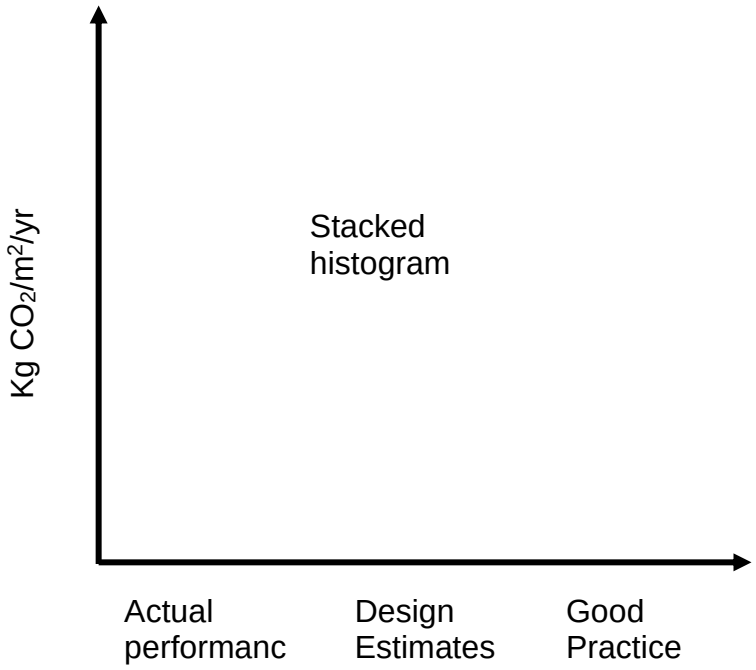
Annual summary of actual metered consumption per square metre and the design team's estimates versus benchmarks broken down by main end-uses. Examples of these calculations and tables are shown in Good Practice Guide GPG 348: *Building log books – a user's guide*. A copy is included on the CD-ROM associated with CIBSE TM31; printed copies are available from (www.energyaction.org.uk).

Building energy performance for period from *[date]* to *[date]* **Based on a treated floor area of *6688* m²**					
Fuel type	**Main end use**	**Actual** Metered incoming consumption ((Kw·h)/yr)	**Actual** Sub-metered main end use energy consumption ((Kw·h/m²)/yr)	**Design estimates** Main end use energy consumption (Kw·h/yr	**Good practice benchmark** Main end use energy consumption ((Kw·h/yr)
Electricity	Incoming				
	Lighting				
	Machines				
	General Power				
	Pumps & Fans				
	VRV Heat & Cool				

Keep the fuels separate as they have different costs and CO_2 emissions

Historical Graph of End-Use Performance





References

a. *Energy efficiency in offices* Energy Consumption Guide ECG19 (Action Energy) (2000) (www.actionenergy.org.uk)

(2) *Energy Assessment and Reporting Methodology – Office Assessment Method* CIBSE TM22 (London: Chartered Institution of Building Services Engineers) (2003)

(3) *Building log books — a user's guide* GPG 348 (Action Energy) (2000) (www.actionenergy.org.uk)

11. System of Maintenance

Emergency maintenance action

Emergency Contact No. 1 **Emergency Contact No. 2**

Maintenance overview

The building is managed by a specialist maintenance contractor and they are responsible in ensuring the correct periodic and preventative maintenance regimes are followed to ensure correct plant and system operation.

Maintenance review

Review period …… **Signed:** ……	**1. Are you reasonably satisfied with the maintenance on this system? (Yes/No)**	**2. Is this system capable of working in all the required modes? (Yes/No)**	**3. If not, is this due to poor maintenance? (Yes/No)**	**Comments/problems?** e.g. maintenance not carried out (give reason) Indicate any major changes to the general arrangement for maintenance including any changes in maintenance regimes or contracts
Above Ground Drainage				
LTHW Heating System				
Air Handling Unit				
Air Terminals & External Louvres				
Dampers (VCD's And Fire)				
Toilet Extract Fan				
Air Conditioning Systems Inc Controls				
External Condenser Units				
Water Management Procedures				
Rainwater Harvesting System				
Hot Water Heating Systems				
Thermostatic Mixing Valve				
Building Management & Energy Monitoring System				

Maintenance/plant failures

Facilities manager to insert a summary of any major plant failures and how these relate to the maintenance regimes or contracts. This should describe what happened, when, why and what action was taken to overcome the problem.

12. Major Alterations

Any major alterations made to the building, its services, its operation or management should be logged below, e.g., Controls upgrade, changes in use, new management regime etc. Each change should be signed and dated by the facilities manager alongside the other page numbers of the log-book that have been updated/added to reflect the alteration.

Description of alteration	Other log book pages updated or added	Signed	Date

13. Results of In-use Investigations

Defects liability work

Facilities manager to insert a summary of any major remedial work in the period between practical completion (handover) and the end of the defect's liability period

Post occupancy evaluations

Facilities manager to insert a summary of any post occupancy evaluations, e.g. investigations of energy performance and/or occupant satisfaction.

Surveys

Facilities manager to insert a summary of results from any maintenance, condition or energy surveys.

Appendix: Relevant Compliance and Test Certificates

This appendix should act as a focal point to hold copies of all relevant key certificates/test reports etc, including:

Please refer to mechanical and electrical operation and maintenance manuals volume D1 for all relevant commissioning and test results applicable to the main contract.