London Road Fire Station

M&E Servicing Strategy



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Crookes Walker Consulting
Alberton House, 30 St Marys Parsonage, Manchester, M3 2WJ
Tel: 0161 834 9999 Fax: 0161 834 2066

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1.0 Introduction

1.1 General

London Road Fire Station (LRFS) is a Grade II* listed building, originally constructed in the early 1900's and is of significant historical value.

The redevelopment proposals include the provision of a hotel, workspaces and a variety of food and beverage (F&B) outlets.

1.2 Scope of Report

This report provides an outline description of the proposed M&E services, including main plant space requirements, principal building services distribution routes and typical examples of servicing strategies for the main building users (i.e. hotel, residential apartments, workspaces, bars and restaurants).

These descriptions are supported by the following drawings produced by Crookes Walker Consulting:

Drawing No.	Description
ME01	Basement Level Space & Volume
ME02	Ground Floor Space & Volume
ME03	1st Floor Space & Volume
ME04	2nd Floor Space & Volume
ME05	3rd Floor Space & Volume
ME06	Roof Level Space & Volume
ME27	Workspace Servicing Strategy plans and sections
ME29	Old Engine House restaurants servicing Strategy plans and sections

2.0 M&E Servicing Strategies

2.1 Introduction

To assist with understanding how the various end users (i.e. hotel, workspaces and F&B etc) are to be serviced, without impacting on the building's heritage status, the following sections provide a more comprehensive overview of the proposed M&E servicing strategies.

Crookes Walker drawings ME01-06 inclusive show main plant locations and service routes. Drawings ME26 and 29 shows in more detail how services are to be arranged in typical examples of the F&B and workspaces.

2.2 Utilities

None of the existing utility supplies are sufficient for the new development. New utilities are therefore necessary, with applications in progress based on the arrangements described below:

2.2.1 Water

The scheme is currently progressing on the basis of a single mains water incomer feeding into a break tank sized to serve the whole site.

From the break tank, it is intended that multiple boosted supplies will be distributed around the building, sub-metered by the landlord for each end user.

2.2.2 Gas

The scheme is currently progressing on the basis of a single gas incomer, with sub-metered landlord supplies to the various end users.

This approach has been adopted due to the difficulties in accommodating multiple gas meter rooms at ground or basement level, all ventilated directly to outside through the listed façade.

2.2.3 Electricity

The existing incoming electrical supplies are scattered around the building, primarily one for each wing and are generally unsuitable for re-use due to age and capacity.

A new ground level sub-station on the Minshull Street elevation is to be procured with a capacity of 1000 kVA.

Discussions are ongoing with ENWL as to the design, location and servicing arrangements.

2.2.4 Telecoms

BT Openreach have visited site and assessed the existing infrastructure.

Openreach have advised that there is currently provision for 200 separate analogue lines which terminate within the existing telephone exchange at basement level under the engine shed.

No Openreach fibre connections are currently present; however there is fibre available within the local area which could be brought into the building in the same location as the analogue lines.

2.3 Overall M&E Servicing Strategy

2.3.1 Existing Services

The former use of the building, coupled with the era within which it was designed and built, did not require the extensive M&E services one would normally expect to see in a building of this size.

Some plant spaces are present, but they are limited in size and generally located in the basement, with restricted direct access to outside. There are currently no roof plant areas, either internal or external.

There are currently no horizontal or vertical service routes of significant size, generally being limited to small service voids and holes for electrical cabling, heating pipework etc.

2.3.2 General Approach for New Services

The overall servicing strategy has been to utilise the least significant areas of the building for locating plant and for locating main service routes. As a consequence, the majority of plant items have been located internally within the basement and roof voids, making use of areas with less heritage importance.

Where this has not been physically possible to achieve, the design has progressed on the basis of making least impact by keeping plant sizes to a minimum and avoiding areas of highest architectural significance. Typical examples include:

- Main heat rejection plant located on roof of the new hotel extension, within a screened compound, thus avoiding significant intervention to the existing roof structures

For shell and core areas, where tenants will be responsible undertaking the final fit out, the strategy has been to provide all the necessary heating, cooling and ventilation facilities as part of the landlord's base build, to ensure that all tenant plant and services can be accommodated within the respective demises, without the need for the tenant to install additional equipment outside of their area. This strategy should avoid the future proliferation of small scale plant

(eg, fans, condensers etc) around the building, as tenants undertake refits or new tenants take occupation.

2.3.3 Servicing Strategy Considerations

Several fundamental issues were taken into consideration when formulating the services design solution:

a) The location of the building, surrounded on all sides by heavily trafficked roads, dictating the use of mechanical ventilation throughout.

b) Expectations of modern users of hotels, bars, restaurants etc requiring that some level of comfort cooling would be necessary, potentially throughout the building.

c) The requirement for an energy efficient solution, in the spirit of current guidance and legislation, engineered to meet the requirements of the end users, without impacting on the listed status of the building.

d) The need to provide a 'future proofed' design, to ensure future services fit outs, refurbishments etc could be performed without impacting on the historical features of the building.

2.3.4 Development of the Design

Various servicing strategies were considered during the design, assessing a number of centralised versus decentralised options.

Initial designs were based on a fully decentralised approach, with relatively small scale items of plant distributed around the building. The lack of existing, external plant space was a major drawback with this solution, requiring numerous interventions through the existing roof structure along all elevations, to accommodate local heating and cooling equipment,

The addition of the hotel extension into the scheme provided a convenient, flat roof area on which to accommodate primary heating/cooling plant, thus removing the need for plant distributed across the roof areas, and providing sufficient space to include the necessary screening to minimise the visual and acoustic impact on the development

This new, external roof area was of sufficient size to allow all heating and cooling to be carried out centrally, with associated distribution services piped to each end user. This created the opportunity to provide each area with the required heating and cooling capacity from a central source, without the need for tenants to install equipment outside of their demise.

2.4 Main Plant Areas

The principal plant areas are as follows:

Landlord's main plant

a) External cooling towers, located on the roof of the hotel extension, within a screened compound. Refer to CWC drawing ME06 for location and typical cross section.

b) Main gas fired boiler plant located internally within the pitched rood void of the London Road elevation, refer to CWC drawing ME06 for location and cross section.

c) Main sub-station and main LV switchgear, located on the Minshull Street Elevation as shown on CWC drawing ME02.

d) Mains water storage located within a basement plantroom, as shown on CWC drawing ME01.

Secondary plant areas

Numerous, smaller scale internal plant rooms for ventilation, domestic hot water, comfort cooling and electrical distribution equipment. These are generally located within the basement and pitched roof voids, using spaces with minimal or no heritage significance. Refer to CWC drawings ME01-ME06 inclusive.

It should be noted that no external space has been allocated for future tenant's equipment; tenants will be obliged to use services provided by the landlord as described in Section 2.3.4.

2.5 Main Services Distribution Routes

Horizontal distribution

In order to avoid sensitive areas, it is proposed to utilise back of house corridors, pitched roof voids and newly formed corridors to distribute landlord M&E services throughout the building.

Ventilation systems have generally been sub-divided into relatively small zones, each confined to a particular demise. Long runs of large, communal ventilation systems have therefore been minimised, thus avoiding the need for large holes through existing structure and unsightly ductwork obscuring internal, decorative features.

Vertical distribution

Vertical distribution has been achieved in a number of ways:

a) Use of existing, internal riser spaces wherever possible

b) Using existing service recesses around the perimeter of the courtyard, replicating their previous use as a route for pipework, drainage and ventilation ducting. Typical examples being the recesses along the

Fairfield Street courtyard elevation and the recess to the rear of the old bank, for services to the workspaces.

c) Using newly formed voids, arising from the reconfiguration of existing internal walls

d) Use of existing vertical openings in the hose tower

All principal service routes are shown on CWC drawings ME01 – ME06 inclusive.

Further details on ventilation deign are provided in Section 2.9 below.

2.6 Shell & Core Plant Space

The F&B areas will be serviced on a shell and core basis.

The overall design intent is to provide each tenant with sufficient services as part of the landlord's base build, to ensure they have no need to install additional services outside of their demise.

Landlord's central plant will provide the main source of heat rejection and heat input for these areas, from which a series of pipework circuits will distribute heating/cooling water (referred to as condenser water), to all parts of the building, onto which each F&B end user may connect their own equipment.

For F&B ventilation, it is proposed to allocate internal, air handling unit plant space, complete with louvered openings to outside for general supply and extract ventilation, including landlord installed ducting for kitchen and WC extract routed to rooftop exhaust locations.

2.7 Plant Screening

The external plant area on the hotel extension roof, will be visually and acoustically screened to minimise visual impact and to control noise levels to within acceptable standards as defined in the acoustic design report.

The design and specification of acoustic screening will be developed in conjunction with an acoustician.

2.8 Main Servicing Strategies

2.8.1 Landlord's Central Plant

The principal means of heating and cooling will be via landlord's centralised plant. This plant will connect into a common condenser water loop, which will distribute around the site to serve the hotel and F&B spaces.

The hotel and F&B tenants will be able to connect local heating/cooling equipment into this system, to suit their own requirements. This methodology does not require tenants to install equipment outside of their area, consequently there should be no proliferation of visible, small scale fans, condensers etc as the building occupancy varies over the years.

Heating will be provided by gas fired boiler plant, split into two parts. One part will operate on high efficiency; gas fired condensing boilers, providing heat input into the condenser water loop. The remaining part will operate on conventional, higher temperature, high efficiency boilers, providing heating for the generation of domestic hot water, and space heating in workspaces.

Heat rejection from the condenser water loop will be provided by new cooling towers, designed in accordance with HSE guidance and local authority requirements.

The areas allocated for the plant described above are shown on CWC drawing ME06.

2.8.2 Hotel and bars

The services layouts for hotel rooms are shown on CWC drawings ME03-ME06 inclusive.

Hotel guestrooms will be heated and cooled via fan coil units, typically concealed within a guestroom bulkhead or ceiling void. These fan coil units will be refrigerant based, heat recovery VRF type.

Heating and cooling for the bar/restaurant spaces will be either via VRF type fan coils or local air handling units.

Heating and cooling to each fan coil unit or ahu will be provided by a local, water cooled condenser(s), connected to the landlord's main condenser water pipework loop, which will act as a heat source and/or heat rejection facility.

Selected rooms will be provided with electric underfloor heating in the bathrooms, to suit hotel operator's requirements.

The generation of domestic hot water will be via local plate heat exchangers, distributed throughout the hotel demise, with primary heating via the higher temperature boiler heating circuit.

All areas will be provided with mechanical fresh air supply and extract ventilation, typically provided by heat recovery type air handling units located within the pitched roof voids – refer to section 2.9 for further details.

2.8.3 Workspaces

The services layouts for a typical workspace are shown on CWC drawing ME27.

Workspaces will be heated by connections from landlord's heating distribution pipework serving traditional, cat iron type radiators. The heating supplies will include energy metering.

As an option, local water cooled condensers will be provided to allow comfort cooling to be installed if required by the occupiers.

The generation of domestic hot water will be via either communal plate heat exchangers, with primary heating via the higher temperature boiler heating circuit, or local, undersink type electric heaters.

All workspaces will be provided with mechanical fresh air supply and extract ventilation, via local, heat recovery ventilation units located within each unit, ducted to roof or wall mounted terminals.

2.8.4 Bars/Restaurants

General servicing routes for F&B areas are shown on CWC drawings ME01 and ME02.

Heating and comfort cooling will be provided by a combination of water cooled heat pump units or traditional cast iron perimeter radiator heating all served via connections from landlord's pipework distribution from central plant, installed as part of the landlords base build.

The generation of domestic hot water will be via local plate heat exchangers, with primary heating via the higher temperature boiler heating circuit.

General fresh air ventilation will be provided via combined supply/extract heat recovery ahu's located in pre-designated, internal plant rooms. Kitchen extract will be ducted to exhaust at roof level via designated service routes – refer to 2.9 for further details.

2.8.5 Back of house areas

Background heating will be provided by a combination of water cooled heat pumps and traditional radiators.

Extract ventilation from service corridors, refuse stores etc will be ducted separately to roof level exhaust locations.

2.9 Ventilation Strategy

Due to the close proximity of heavily trafficked roads on all sides and the associated risks of noise* and poor air quality, a mechanical ventilation strategy will be adopted throughout.

As a minimum standard, all ventilation systems will be designed to comply with Building Regulations Part F.

*Refer to acoustic reports provided by Sandy Brown Associates.

2.9.1 Hotel

A series of heat recovery air handling units will be provided in the pitched roof voids of the hotel areas, ducted to provide each

guestroom and the public areas with tempered fresh air and bathroom/general extract ventilation.

All ventilation plant will be internal, connected to atmosphere via roof mounted, weatherproof louvres, with intakes and exhausts physically separated to minimise recirculation. Refer to CWC drawing ME06 for AHU locations.

Ductwork distribution will be via new and/or existing internal risers, no hotel ductwork will be routed outside of the building.

2.9.2 Workspaces

Each workspace will be provided with a heat recovery ventilation unit.

These units will be located within each of the premises, concealed within a utility room or cupboard, ducted to serve the main occupied spaces.

All fresh air and exhaust connections will be ducted from wall or roof mounted terminals, utilising newly formed, internal service risers for vertical duct distribution. Ventilation terminals are shown on CWC drawing ME27.

2.9.3 General F&B Areas

General supply and extract ventilation will be provided by heat recovery air handling units, located in pre-designated plant rooms, all located at basement level.

Connections to outside for general fresh air and exhaust will be achieved via louvres installed by the landlord, at ground level, utilising existing pavement light openings in the courtyard facades. The design intent is for fresh air to be drawn from the courtyard side, with general exhaust via similar pavement lights on the street side.

Locations of F&B ventilation plantrooms are indicated on CWC drawings ME01 and ME02. These drawings include a typical detail of the pavement light ventilation described above.

2.9.4 Kitchen extract

Kitchen extract will be provided to specific F&B spaces by landlord installed ducting, designed and constructed in accordance with current industry guidance, such as HVCA DW 144 and DW 172 and CIBSE guidance document TM21 minimising air pollution at air intakes.

The ducts will be terminated at roof level in a location designed to minimise risks of contamination of air inlets and openable windows. Refer to the following CWC drawings for details of kitchen extract routes:

a) Basement and ground floor old engine room via gable end of Fairfield Street elevation – Drawing ME01 & ME06

b) Hotel basement kitchen extract – Drawing ME06

The inlet end of each kitchen extract duct will be capped off just within the respective tenant's demise; ready for future extension during the tenant's fit out.

The tenant will be responsible for installing the extract fan and the necessary air treatment and filtration. The design, installation and maintenance of such systems will be governed by landlord's fit out guidance and local authority requirements.

2.10 Lighting Strategy

Within the building, all light sources will be of the highly efficient LED type to provide the lowest possible energy consumption and minimum maintenance.

Internal luminaires shall be chosen which are sympathetic to the aesthetic constraints of the building with emphasis on appropriate design and colour temperature for the surroundings and use.

Automatic lighting controls shall be utilised wherever possible to reduce energy consumption with a preference for the use of Absence Detection (manual on / automatic off) wherever suitable.

Emergency lighting will be installed throughout all public spaces to provide safe egress for occupants in the event of a local or major power failure, this shall be in accordance with BS5266-1:2016.

Externally, additional lighting is proposed to the main elevations, intending to highlight the significant features of the building. This will be designed in accordance with the recommendations of ILP Guidance Note GN01: Guidance Notes for the Reduction of Obtrusive Light.

Luminaires as close as possible in appearance to the original fittings shall be used above feature entrances.

Within the courtyard a scheme will be installed which provides for safe enjoyment of the space for patrons and staff whilst being as unobtrusive as possible.

Other external luminaires shall be either ground mounted or installed in such a manner as to be as unobtrusive as possible.

All external luminaires shall have LED light sources and shall be controlled via time clocks and photocells.