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41/42 CHESTER TERRACE, LONDON
DESIGN REPORT
MECHANICAL & ELECTRICAL SERVICES

Martin Thomas Associates Ltd
Suite 3, Chatmohr Estate
Crawley Hill
West Wellow
Hampshire
SO51 6AP



DESIGN REPORT
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CONTROLLED DOCUMENT

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<i>Prepared by:</i>	T Jones / V Tudberry	A Jones	06/03/2013
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1. INTRODUCTION

41 and 42 Chester Terrace is to be redeveloped, the proposal being to merge the current semi-detached pair of dwellings into a single dwelling. This design report dated February 2013 provides an overview of the proposed mechanical & electrical services installation for 41/42 Chester Terrace, London.

The property is a Grade 1 listed building located on the edge of Regent's Park, London. Due to the listing and location, the proposed mechanical and electrical services design intent acknowledges this fact and consideration has been given to both internal and external environments in terms of aesthetics, acoustics, character of the property and neighbouring dwellings, whilst acknowledging our client's needs.

2. SCOPE OF WORK

The following services are considered within this report:

- Strip out of existing mechanical and electrical installations.
- Water supplies
- Fuel supplies.
- Space heating.
- Comfort cooling
- Domestic water services.
- Above ground drainage.
- Mechanical ventilation.
- Power Supplies
- Small Power & lighting
- Fire Alarm and detection system.
- Intruder Alarms
- Telephones & data
- Emergency lighting on the escape routes.
- Lightning protection and surge protection.
- CCTV surveillance system.
- Door-entry system.
- Communications.
- Home entertainment.
- TV/Radio reception.

3. DESIGN CRITERIA

As minimum statutory and good practice requirements the M&E engineering services design will be undertaken in accordance with (but not restricted to) the following standards, regulations, design guides, etc.:

- Building Regulations.
- IEE Regulations for Electrical Installations
- The Water Supply (Water Fittings) Regulations 1999.
- CIBSE Guides
- Gas Safe Regulations
- British Gas Council Codes of Practice
- Relevant HVCA Design Guidance Publications
- Relevant British and European Standards and Codes of Practice
- Relevant European Standards
- BSRIA Code of Practices
- Fire Precautions Act
- Specific Requirements of the Local Electricity, Gas and Water Authority
- Requirements of the Local Building Control and Fire Officers
- CDM Regulations.
- The Control of Substances Hazardous to Health Regulations
- Health and Safety at Work Act
- The Clean Air Act.
- Control of Pollution Act.
- The Asbestos Regulations.
- Energy Conservation Act

The overriding basic strategy for servicing Chester Terrace is to provide high quality, reliable, simple to operate, energy efficient and low maintenance services, whilst acknowledging the aesthetics and the surrounding environment.

4. DESIGN RESOLUTIONS OUTSTANDING

The following areas of design are subject to further consideration and input from specialists, impacts for which, within reason, have been considered within this submission.

- Kitchen layouts and ventilation requirements – to be designed by specialists.
- Sanitary ware selection.
- Relaxation room.
- Wine cellar –subject to specialist design
- CCTV requirements – subject to specialist design
- Audio/visual system requirements - subject to specialist design

5. INCOMING MAIN SERVICES

Gas Supplies

There are currently 2no. incoming gas supplies to the property, however it is noted the total installed load for the property will need to be increased. It is therefore proposed that the systems be rationalised into one incoming supply, with one single point of isolation for the incoming mains. This will be fitted with suitable metering and isolation facility in accordance with current regulations. In addition it is proposed that a gas solenoid shut off valve be installed which shall be linked into the proposed fire detection system.

Water Supply

There are currently 2no. incoming mains water supplies serving the proposed property. It is the intention to retain the supplies as per the existing installations to accommodate the needs to the property.

1no. existing supply will serve a cold water booster set and break tank to provide suitable pressure and volume to the occupied areas of the property, whilst the second incoming supply will provide a mains pressure system to supply the kitchen area only, thus providing a cold water supply to the kitchen whilst also ensuring that a cold water supply is available to the property at all times in the event of a power or pump failure.

Power supply

An existing three phase supply is provided by UK Power Networks to 41 and 42 Chester Terrace both entering at basement level. The cut outs are rated at 100Amps per phase.

In order to supply the anticipated electrical load to the building it is proposed to arrange for UKPN to remove the existing service to each building and provide a new single supply with a rating of 125kVA three phase brought into No 41 but configured to provide electrical services to the combined property.

Telephone

The existing incoming telephone services are fed from the street into the basement of each property. Arrangements will be made for a single service to be brought into the basement of No 41 and configured to serve to provide telephone services to the combined property.

6. EXISTING SERVICES

It has been assumed that the existing mechanical and electrical services to both buildings will be stripped out and removed from site.

7. PROPOSED NEW SERVICES STATEMENT

It is proposed for 41-42 Chester Terrace is that the existing floor structure be replaced throughout the property. This is detailed within the architectural and structural information.

The proposed primary services routes run vertical throughout the building, these being shown on the architectural layouts and indicated / notated on the attached services plans, as are plant areas. These will be developed further in conjunction with the architects in order to provide concealed but accessible services which can be maintained and / or potential for replacement in the future.

The horizontal services routes throughout the property are deemed secondary and not shown on plans. These being subject to further consideration, following confirmation of extent and location of internal fixtures and fittings.

It is noted that major builderswork openings or penetrations to the externals are shown on the attached layouts. Small bore pipe /cable routes (below 50mm dia) that may be required internally are yet to be determined and are subject to detail design. Penetrations to the existing internal fabric not shown, will be duly considered and designed out where practical and where required the feasibility of these will be considered prior to any works being undertaken. Where practical and feasible existing external penetrations will be reused.

8. ABOVE GROUND DRAINAGE

Noting that the internals to the building are to be reconfigured, and that the existing above ground drainage systems (where visible) appear to be run in UPVC plastic, it is proposed that the new installations be installed in UPVC to comply with current regulations and British Standards.

It is proposed that the larger bore pipework be installed in Friaphon sound attenuated drainage system and the smaller branch pipework be installed in conventional UPVC plastics suitably acoustically insulated where practical to prevent noise break out unless cast iron is used on the stacks. The new system will be routed to the external below ground drainage and co-ordinated with the architect and structural engineer.

Where systems pass through floors or fire protected areas, consideration shall be given to the use of fire collars or suitable fire treatment to prevent fire break out.

All systems shall be designed and installed in accordance with Building Regulations Part H, BS EN 12056 and relevant BS and EN standards.

9. HEAT GENERATION

Heat generation for the **Low Temperature Hot Water (LTHW)** heating and domestic hot water systems is to be predominantly provided by gas fired boiler plant. This will be suitably sized to accommodate the requirements of the property. The proposed gas fired boilers will be condensing type, and meet current standards. It is noted that the proposed installed capacity is to be in excess of 300kW and the system will be design to meet current regulations and guidelines. The system will be a sealed system, complete with suitable sized pressure, expansion and safety features to meet current requirements. Consideration will also be given to acoustics and fire risk for all installations.

Is it proposed that the primary flue for the installation be installed within an existing chimney, however this is subject to further investigation and detailed design – flues shall be installed to be unobtrusive and compliant with the clean air act with regards dispersion of combustion products.

It is proposed that the additional heating to the property be afforded from heat a VRF/VRV DX Heat recovery arrangement which will also offer comfort cooling to primary occupied areas.

All systems will be design and installed in accordance with all relevant British, European Codes and Standards.

10. SPACE HEATING

Space heating to the house is to be provide from a primary and secondary heat source. The primary heating system being a LTHW under-floor heating system. The secondary system will be provided by an air system, this will either be fed from the LTHW circuit or a VRF DX Heat recovery system.

It is proposed that all emitters be concealed and located to allow suitable heat distribution throughout.

The proposed space heating will be designed to provide room temperatures of 22°C in living rooms, 20°C in bedrooms and 23°C in bathrooms when -5°C outside, the criteria is subject to final client confirmation. Heating for the other spaces such as the Hamam and the Sauna will be developed in conjunction with the specialists.

Each room be individually thermostatically controlled by use of room sensors controlled from a BMS system. In addition it is proposed that the house be divided into suitable heating zones as required by the Building Regulations part L2A.

The heating system will be fed from the plant, as noted above. Main heating circulating pipework will be extended in insulated pipework throughout the property. Separate heating circuits will be provided to serve LTHW heating and Domestic Hot Water systems.

The heating primary pipework will be run in either copper or steel tubing, subject to detailed design. Secondary circuits being run in either copper or suitable plastic to avoid unnecessary impact on existing fabric. Final Underfloor heating circuits being run in plastic as recommended by the underfloor specialists.

Hot works will not be permitted due to the fire risk to the house, jointing will therefore be carried out in a push / press fit system depending upon the pipe system.

11. DOMESTIC WATER SERVICES

There are currently 2no.incoming mains water supplies to the house and both of these will be retained for reuse.

It is proposed that a mains pressure system be afforded to the kitchen areas, and a boosted supply be provided to the remainder of the property. This system will be provide with a magnetic / electro-magnetic water softener to allow potable water to all catering faucets.

The boosted supply will be designed to ensure that equal pressure for both the hot and cold water services is provided throughout the property. The system will comprise suitably sized cold water storage tanks in accordance with current guidelines, and suitably sized hot water cylinders. The Hot Water systems will be unvented arrangements fitted with suitably designed safety features to comply with current regulations.

It is proposed that the boosted water supply to the remainder of the property be provide with a salt / resin bead permanent softener arrangement. The installation will be designed to comply with Building Regulations Part G requirements to provide 'wholesome' water throughout the property – final selection of type of installation to be agreed with the client.

The estimated total storage capacity of hot water will be approx. 800 litres, this volume is required when the house is full and all baths / showers are required simultaneously. The total storage capacity will be confirmed during detailed design and subject to selection of final fixtures and fittings. The location of cylinders is subject to final plant selection, however it is currently proposed that these be located within the basement/vault plant area.

A series of secondary hot water circulation pipework will be extended from the cylinders and distributed to the various water fittings throughout the house. This circulation will ensure that hot water is available at taps quickly thereby avoiding water wastage, whilst also providing compliance with recommendations and guidance regards Legionella.

It is proposed that all primary domestic water services be installed in copper tube or plastic depending upon the accessibility of the pipework, all/any external pipework will be carried out in blue MDPE.

Bib taps with hose unions will be provided around the garden for watering, the location of these outlets are to be determined. The installation will be fully compliant with WRAS 1999 Water regulations.

Where bidets are considered, the installations will be fully compliant with the requirements of WRAS 1999 Water regulations and other relevant guidelines.

12. VENTILATION

Ventilation will be provided in accordance with Building Regulations part F where deemed practical and feasible.

It is proposed that a level of mechanical supply and extract ventilation be provided to the property to accommodate the needs of individual rooms.

Extract ventilation will be afforded to the kitchen(s), utility room, toilets, bathrooms and shower rooms. Where practical, installations will be combined to provide better efficiencies. This however is subject to confirmation with detailed design.

Supply and extract fans will generally be located in the roof space discharging to atmosphere via existing tiles vents / grille arrangements, or subject to design capacity, proposed new tile vents.

It is proposed that fans be either switched with the lighting or have PIR/humidity control, subject to location and system arrangement. Consideration will be given to local isolation switches and timers for a pre-set run-on period after they have been turned off.

Extract in the kitchen will be reviewed in conjunction with the selection of the cooker and the kitchen fit out.

It is proposed that a whole house positive pressure system be considered to provide fresh air into the property via the central core. This will be designed to offset mechanical extraction rates.

Consideration will be given to the linking of all mechanical ventilation equipment to the proposed fire alarm system. This is subject to further investigation and consultation.

13. COMFORT COOLING

A comfort cooling system is to be considered to serve primary occupied areas. It is proposed that a hybrid VRF DX Heat Recovery system be employed. Internal units to be concealed and suitably sized to accommodate the area served. These to be either concealed wall or concealed ceiling mounted units.

Control of each unit will be via the BMS to avoid conflicts with the proposed underfloor heating system. Units will be capable of providing cooling and heating.

The internal units will be connected to a single external condenser arrangement (multiple units). This will offer greater flexibility and load diversification of internal capacity to optimise energy efficiency.

Control of the systems will be linked to the BMS to optimise heating and cooling operations.

Acoustic performance of both internal and external units will be noted to comply with recommendations as set out in the Acousticians report. Noting that the aspiration will be to provide betterment of the requested conditions.

14. ELECTRICAL DISTRIBUTION

Electrical distribution cupboards will be established at basement and third floor levels.

A new main switchboard will be installed in the basement electrical cupboard together with distribution boards to serve lighting and power circuits to the basement and ground floor levels.

Sub-main cables will be taken from the basement switchboard to serve distribution boards in the third floor electrical cupboard to supply lighting and power circuits to the first, second and third floor levels.

The method and type of wiring depends upon the life span demanded of it, and the choice has implications in respect of cost, ease of installation and flexibility as well as future maintenance.

Distribution boards will incorporate MCBs generally and RCBOs for socket outlet circuits and feeds to circuits outside of the house. Spare MCBs will be provided for future use.

Sub-circuit wiring will be provided from the the distribution boards to serve lighting and power circuits throughout the building.

Suggested wiring systems worth consideration are:

- Domestic quality “twin and earth” “zero halogen low smoke”, OHLS cable.
- Durable fire-rated FP200 “Low Smoke Zero Halogen” cable.
- Mineral Insulated Copper Covered (MICC) cable with OHLS sheath.

OHLS wiring is considered to have a life span of approximately twenty to thirty years, but of course there are numerous examples of such wiring lasting considerably in excess of this. The vulnerable part of OHLS wiring is where it terminates in light fittings or accessories. Unless suitable precautions are taken, heat soon hardens the insulation and results in the system requiring re-wiring.

The disadvantage of the “twin and earth” option is that the cable is not mechanically protected and future re-wiring requires disturbance to the building and its finishes. The advantages are lower installation cost and greater flexibility for future modifications.

MICC wiring is non-ageing, comprising of pure copper and magnesium oxide only, and providing precautions are taken to avoid mechanical and heat damage at termination points, and that the standard of installation is of the highest, then this form of wiring will survive for many years longer than OHLS or other forms of synthetic wiring.

MICC has the additional advantage of presenting fewer fire risks than other forms of wiring and it is resistant to damage from rodents.

A compromise between standard cable and MICC is the durable LSZH cable mentioned above which has good fire rating and offers greater protection to mechanical damage than standard cable. It is considerably less expensive than MICC, but slightly more expensive than standard domestic cable.

Our recommendation would be to utilize durable fire-rated FP200 “Low Smoke Zero Halogen” cable for this project.

15. LIGHTING & SMALL POWER

The layout for socket outlets, lighting sockets and lighting points will be reviewed once layouts are provided from the Interior Designer.

The lighting system will be a combination of wall mounted fixtures, pendant luminaires and recessed downlights. Wall mounted 5A outlets will also be provided controlled from wall switches for table lamps, standard lamps, etc.

A Lutron lighting control system will be provided throughout the house controlled from local room key pads to give dimming and scene setting facilities. The system will also be linked into the Crestron whole house control system.

A generous number of socket outlets data and AV outlets will be provided to allow flexibility for future furniture layout changes.

The finish of small power outlets and light switches has yet to be determined.

Emergency lighting will be installed on the escape routes and at distribution board positions.

Escape lighting will be carefully coordinated with the lighting design.

External lighting will be provided to the landscaped areas of the grounds in accordance with the Landscape designers proposed layouts and controlled from the Crestron control system.

16. INTRUDER ALARMS AND CCTV

A new intruder alarm system will be installed throughout the house in compliance with current Association of Chief Police Officers, ACPO, requirements.

It is recommended that a security consultant is appointed to review the design and scope of the system, develop the requirements of the scheme by discussion with the client and risk assessments to determine the grade of cover necessary.

The system will comprise of magnetic contacts on external doors and vibration sensors on vulnerable windows, movement sensors in key internal areas, keypads to operate and maintain the system, internal sounders and external strobe/sounder boxes.

The system will be connected to a monitoring station providing automatic Police response in the event of an alarm.

The requirements for the CCTV surveillance system have yet to be defined but it is assumed the main entrance doors will be provided with coverage.

Access control will be provided to the main and rear entrance doors. The system will be operated from wall mounted control stations at each level of the house and from the telephone system.

17. FIRE ALARM & DETECTION SYSTEM

A new fire alarm & detection system will be installed throughout the house in compliance with current Building Regulations requirements.

It is recommended that a fire engineering consultant be appointed to review the requirements of the scheme and confirm the category and grade of system to be installed..

The system will provide automatic detection to vulnerable areas including corridors and escape routes. Adequate audibility throughout the house and visual indication of the status of individual detectors will be provided.

The system will be connected to a remote receiving centre providing automatic Fire Brigade response in the event of an alarm.

18. AUDIO DISTRIBUTION, HOME CINEMA, DATA/TELEPHONE and TV RECEPTION

It is recommended that a specialist audio visual system company be appointed to review the requirements of the scheme and provide a specification for the complete Audio Visual, TV reception and Data/Comms systems.

Audio Distribution and Home Cinema

A centralised audio visual distribution system will be provided to all principle rooms in the building.

The full extent of the system is yet to be defined but it is assumed it would provide the following facilities:

- Television reception and distribution.
- Sound system with local control.
- Data and telephone system.

It is proposed to install a home cinema system in the third floor. This room will have surround sound and projection equipment.

The system will be controlled via a Crestron whole house control system to integrate the functions of the audio/video/lighting control systems via simple in-wall touch panels, small hand-held remotes, the Lutron lighting keypad or control via a web browser across a regular IP network. In addition WiFi based iPad or iTouch devices can also be used.

Telephone and Data

A telephone and data cabled infrastructure will be provided for normal communication, to connect alarm systems and for broadband internet access.

Data/telephone outlets will be installed from data patch panels in the basement and third floor electrical cupboards to interconnect telephones and personal computers within the house.

Internal cabling will be carried out in CAT6 data cabling for telephones and data outlets. Cables from outlet positions within the building will terminate at a main DP position where an external "BT" connection will be made.

The layout of telephone/data outlets will be reviewed once layouts are provided from the Interior Designer. A generous number of outlets will be provided to allow flexibility for future furniture layout changes.

A small "telephone exchange" may be required to allow intercommunication between telephone handsets and to provide interface with the door-entry systems.

The client will need to appoint a data company to install the telephone switch and router into the patch panel, to patch the incoming lines to outlets within the house and to configure the system.

Television Reception

The AV specialist will arrange for the provision of SKY reception, UHF and VHF signal transmission from a roof position to the central distribution location equipment and thence to outlet positions throughout the building.

Outlet positions are as shown on the floor plans and the central distribution location shall be installed within the roof void.

19. LIGHTNING PROTECTION & SURGE PROTECTION

An initial risk assessment has been carried out in accordance with BS62305 to assess the need for a lightning protection system. This shows lightning protection to be recommended. The decision to provide lightning protection lies with the client and his insurers but if required the layout of tapes and down conductors will be developed in conjunction with the architects and reroofing work to enable tapes where possible to be hidden from view.

Lightning surge protection will be provided on the incoming power supply and communication cables in order to minimize the risk of damage to systems and equipment in the event of direct or adjacent ground lightning strikes.

APPENDIX A

DRAWNG SCHEDULE

99460 – ME001 – Mechanical and Electrical Services to External Elevations

99460 – ME002 – Basement Indicative Builderswork

99460 – ME003 – Ground floor Indicative Builderswork

99460 – ME004 – First Floor Indicative Builderswork

99460 – ME005 – Second Floor Indicative Builderswork

99460 – ME006 – Third Floor Indicative Builderswork