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Abbeylands Public Realm Works
Mechanical & Electrical Services
Stage 2a Report

Comhairle Contae an Chabháin
Cavan County Council

Ted Carroll

W1952

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“Abbeylands Public Realm”

1 INTRODUCTION:

Douglas Carroll have been appointed by Cavan County Council via dhb/Cooney Architects. Douglas Carroll will act as Mechanical & Electrical Engineers on this project. This Report will provide an overview on the Mechanical & Electrical Services installation infrastructure to all areas as listed.

- External Public Realm Area
- McIntyres Build
- O'Donoghue's Build
- Public Lighting (as issued under separate report)

The purpose of this document is to provide a description of the Mechanical & Electrical services infrastructure for the development around Abbeylands in Cavan Town.

This report is based on the assumption of a full services fit out for each building with Landlord & Tenant requirements to be determined at the next stage.

2 STANDARDS:

Legionella Control

The design shall ensure compliance with the following statutory guidance documents and relevant standards such as the following:

Technical Guidance Documents

CIBSE Guides

UK Health & Safety Commission Document (2000), Legionnaire's disease, the control of legionella bacteria in water systems (L8). Approved code of practice and guidance,

I.S.3218: 2013 + A1:2019 Fire Alarm Standard Documentation,

I.S.3217: 2013 + A1:2017 Emergency Lighting Standard Documentation

3 SUSTAINABLE FEATURES

3.1 LIGHTING & NATURAL DAYLIGHT

All habitable rooms shall have natural daylight as the principal source of light if available. Artificial lighting shall be used to supplement the available daylight in accordance with standards detailed in this document.

The geometry and distribution of glazing in the new building areas - which is the responsibility of the architect, in the first instance - will be carefully designed to provide a high level of natural light whilst avoiding glare and ensuring a good

quality of daylight distribution in the room. The glazing to south facing rooms might require internal shading to help limit overheating.

3.2 BUILDING ENERGY RATING:

Client Brief: The building is to achieve an Nzeb rating.

To achieve this, we have suggested the following U – Values.

(Architect to Confirm the final U Values)

Wall U-Values (W/m2K): 0.16

Roof U-Values (pitched roof – insulation at horizontal, ceiling level) - 0.14 W/m^2K

Roof U-Values (pitched roof – insulation on slope) – 0.14 W/m^2K

Flat Roof – 0.14 W/m^2K

Floor U-Values – 0.14 W/m^2K

Door U-Values

Glazed - 1.3 W/m^2K

Panel - 1.3 W/m^2K

Windows U-Values - 1.3 W/m^2K (G Factor of 0.6)

Building Air-Tightness - 3 $m^3/m^2/hr$ @50Pa

The scheme will include the installation of a dedicated air to water heat pumps to serve all areas to help achieve the required Nzeb rating.

3.3 NATURAL & MECHANICAL VENTILATION

A natural ventilation strategy is to be employed where practicable. An initial assessment has shown that all habitable rooms are to have rapid ventilation openings equivalent to 10% of their respective floor areas. Please note that modern buildings tend to overheat in summer if not properly naturally ventilated.

Where practicable, ventilation will rely on single sided natural ventilation via permanent wall vents and windows with opening sections with 2/3 of opening section at high level & 1/3 at low level on the façade. Where deeper plan rooms are concerned, cross ventilation will be employed with opening sections on either side of the façade.

Some internal rooms/areas will require mechanical ventilation where natural ventilation isn't possible due to the building layout. Mechanical Heat Recovery Ventilation (MVHR) will be used in these locations.

3.4 ACOUSTIC PERFORMANCE

Noise producing and noise sensitive spaces will be located, designed, and detailed to minimise noise interference between them and any adjacent habitable or routinely occupied space(s). Notwithstanding the above comments and bearing in mind the need to incorporate flexibility to permit future change, a minimum noise reduction of 40 dB is required between habitable/occupied spaces and other noise generating areas. Attenuation details for the building structure shall be the responsibility of the architect. Particular soundproofing treatment may be required in the plant room to limit the impact of the noise from the air source heat pump.

4 UTILITIES:

4.1 ESB NETWORKS

The development will require 3No. separate ESB metered supplies, as follows.

- McIntyres Building
- O'Donohues Building
- External Public Realm Area

Applications will be made to the ESB for a new supply to each building within the development along with the External Public Realm Area with allowance being made for an ESB substation on site. The proposed substation location is adjacent to the O'Donohues building.

We estimate at this stage a max demand of circa >100kVA for the development c/w electric air to water heat pumps to provide heating to the buildings.

4.2 GENERATOR

There is no allowance for any back-up generator to the site.

4.3 SITE WATER

Site water is part of the Structural/Civil engineer's scope of works & is outside Douglas Carroll scope of works. It is intended that there are 2No. metered water supplies to the development.

- McIntyres Building
- O'Donohues Building

Any allowance for water to the External Public Realm Area is not in the Douglas Carroll scope of works with no sub-meters for sub-tenancies within the buildings.

4.4 OUTSIDE LIGHTING & POWER

Allowance to be made for site lighting to Abbey Street, the Burial Ground and any walkways on site through to the adjacent streets which will be taken from the local public lighting supply. See separate Public Lighting Report

Any external power supply requirements to be determined at Design Stage. No power to the External Public Realm Area has been allowed for at this stage.

4.5 EXTERNAL EMERGENCY LIGHTING

Emergency lighting will be provided, to allow lighting to external muster points, as advised by the fire consultant.

These locations will be determined at design stage.

5 MECHANICAL SERVICES

5.1 CENTRAL HEATING PLANT

Air Source Heat Pumps will be located internally in the plant room of the building. The heat pump units will need external ducting to the outside air. This will be achieved via a ducted louvre in the plant room that terminates on the front façade of the building. Each building will require a separate plant room installation for the heat pump.

5.2 COLD WATER STORAGE TANKS

Cold water storage tanks are to be located in the internal plant area with a dedicated Format 30 tank mounted internally and a dedicated booster pump also housed within the internal plantroom. A dedicated boosted cold-water supply will be delivered to all areas.

5.3 HEATING PIPEWORK

The system shall consist of steel pipework routed within the ceiling void to radiators ad radiant panels from local manifolds and final pipe connections to drop to radiators in designated pipe drops/box outs. This will be controlled on a room-by-room basis from 2-port motorised valves and temperature sensors. All temperature sensors for the radiator heating system shall be wired back to a BMS system. Each separate floor will have an independent metered connection from the main heating plant and pipework. Energy Meters will be installed on the heating pipework entering each individual floor so each tenancy will have their own individual heating use recorded. It is assumed that there will be a separate tenant on each floor. This is to be determined at Design Stage.

5.3.1 RADIATORS / RADIANT PANELS

Heating shall be distributed to panel radiators throughout most areas of the property. Radiators within public areas shall be low surface temperature (LST) type radiators, with front facing grilles. The LST Radiators will not be recessed but fixed to a wall locally with pipework box outs where required.

The circulation areas will be served by Radiant Panels at High Level with pipework contained in the ceiling void.

5.4 COLD, MAINS AND HOT WATER SERVICES

The buildings shall be fed from new dedicated mains, with separate mains connections for both the O'Donohues & McIntyres Building. There will be a single water meter per building.

Hot water services shall be generated by instantaneous electric under sink water heaters throughout O'Donohues & McIntyres Building. The water heaters will be fed by the boosted cold-water supply.

All WHBs shall be fitted with TMV – integral taps. All internal pipework shall be copper with foil back insulation.

5.5 VENTILATION

The scope of works shall include the installation of local mechanical extract from each toilet area and internal wet rooms. Toilet areas shall be fitted with simple extract fans discharging horizontally at the floor level served or vertically through the roof.

Local toilet extract fans controlled via occupancy sensors and will terminate in wall louvres. All ductwork to be TGD Compliant.

Mechanical Heat Recovery Ventilation (MVHR) shall be provided to internal occupied rooms, including meeting rooms, some offices, reception areas and to larger spaces which do not achieve the recommended window opening areas to achieve sufficient purge ventilation. To prevent the risk of overheating, MVHR units shall be provided with a summer bypass function.

An extract fan controlled via a temperature stat will be installed in the dedicated Comms Room of each building.

5.5.1 SMOKE DAMPERS

A fusible link type fire damper will be required for vertical ducting routes between floors or any ductwork that passes through a fire wall horizontally. There is no allowance for motorised smoke dampers on the project.

5.5.2 AIR CONDITIONING

No air conditioning will be provided.

5.6 SOILS AND WASTES

A soils and waste installation shall be designed to serve all sanitary ware outlets. Above ground soils and waste shall form part of the Douglas Carroll scope of work.

All below ground floor slab drainage shall be within the Civil Engineers scope.

5.7 FIRE FIGHTING

Portable fire extinguishers shall be installed throughout subject to fire consultant review and recommendations.

5.8 CONTROLS

A dedicated BMS shall be installed for the O'Donohues & McIntyres Buildings. The system shall be a Cylon system and shall have sufficient capacity to be extended for any future additions. The BMS shall control the room by room heating controls, MVHR and the local extract fans. The BMS shall also monitor all heat meters, water meters & electrical meters.

There shall be a PC to control each of the systems with locations to be agreed with the Design Team.

5.8.1 HEATING CONTROLS

Each heat pump system shall be provided with the following control functions:

- The heat pump shall be enabled by any of the timed scheduled zones calling for heat.
- Weather compensation, through both the modulation of the boiler firing rate and adjustment of the mixing valves.

The control system shall determine the most appropriate time to turn the system on by monitoring the external temperature and the room temperature point. Once the building is up to temperature the heat pumps shall be controlled as follows. The heat pump is capable of receiving a set point temperature from the control system. As the external temperature increases, the heat pump flow set point temperature shall reduce in order to maximise the system efficiency of the heating plant. The controls system must use the system load to modulate the boiler to provide the maximum efficiency for the active load.

Control of the heating to any area shall be available from a controller located within the area.

Energy Saving Features: If the external temperature rises above 15ºC then the heating system and all pumps shall revert to an off state to prevent pump circulation losses. The controls system shall contain a current sensor on the return cable from each circuit. This relay shall sense whether all the heating motorized valves are closed on the associated zone circuit. If all valves are in a closed position, then the heating system and all associated pumps shall turn off. The system shall remain off for at least a ten-minute period to avoid short cycling.

Zone Control: Each heating system in the building is provided with a single pumped circuit, and the zoned control system is provided by grouping the local room control valves into appropriate zones.

A seven-day time schedule shall be provided for each zone. An overall exception schedule shall be provided for a full calendar year to allow management of the system.

When a zone calls for heat, the zone valves on the associated circuit and the primary pump shall be enabled. After a one-minute delay, the circuit pump shall be enabled and after a further two-minute delay, the heat pump shall be enabled. All rooms are provided with local room temperature control through the use of motorized two port valves connected to the heating branches serving each room.

A 230V power supply shall be provided to a room controller that will display the room temperature and allow the user to adjust the temperature set point.

A 230V power supply shall then be taken from the controller to feed the two-port valve.

5.8.1.1 HOT WATER CONTROLS

Local DHW heaters to be instantaneous and do not require controls as they provide hot water instantly when called upon.

5.8.1.2 EXTRACT FAN CONTROL

All small fans, except for the kitchen extracts will operate under the dictates of local automatic PIR control. Kitchen and canteen extracts will be provided with integral fan controls. All fans to be monitored on the BMS.

5.8.1.3 LIGHTING CONTROLS

The design parameters are those defined in the Chartered Institution of Building Services Engineers lighting code. Light switching in all rooms shall be arranged so that individual banks can be separately switched.

An automatic lighting control system shall be provided in all non-critical areas, including toilets. The lighting system shall comprise of absence detection with day light control in all offices, corridor, toilets, and store areas. PIR Detectors shall generally operate with a ten-minute delay, i.e. No movement in the room for ten minutes will result in the lighting being switched off. The detectors in toilet areas shall operate with a five-minute delay, i.e. No movement in the room for five minutes will result in the lighting being switched off. The light level sensors shall be programmed as follows:

The average working plane illumination levels as stated above shall be constantly maintained. Each sensor shall adjust the illumination levels of the lights / row of lights connected as required. · Where day light levels are above the required illumination levels lights shall be switched off.

5.8.1.4 NATURAL VENTILATION CONTROLS

There will be a requirement for controls for automated opening sections to meet the ventilation requirements

6 ELECTRICAL

6.1 MAINS DISTRIBUTION

The development will require 3No. separate ESB metered supplies, as follows;

- McIntyres Building
- O'Donohues Building
- External Public Realm Area

Each building will have its own dedicated Electrical Switchroom c/w a Main Distribution Board (MDB). The External Public Realm Area will be fed from the MDB via mini pillars. Exact requirements (power etc) will be determined at Design Stage.

Landlord and Tenant requirements for each building will have to be determined at Design Stage.

If segregated as so, a Sub Distribution Board will be required for each Landlord and Tenant Area. These will be located throughout the floor levels in electrical cupboards.

Any Kitchen requirements will also have to be determined at Design Stage in terms of building loads for ESB Applications.

6.2 CONTAINMENT

The main containment routes are understood to run along an exposed slab ceiling. If voids are present, the minimum depth of ceiling void required in corridors shall be 400mm. Containment will be provided for fire alarm, data, submains and trunking for final circuits.

All conduits will be steel and recessed.

6.3 LIGHTING SERVICES

6.3.1 GENERAL LIGHTING

Lighting requirements will be determined at Design Stage once all requirements and finalised.

6.4 EMERGENCY LIGHTING

A new addressable emergency lighting system shall be installed to all areas of each building, in compliance with IS:3217.

6.5 FIRE ALARM

A fire alarm system will be provided to all areas of the buildings in accordance with IS:3218. Each building will have a dedicated fire alarm panel. Fire alarm cause and effect needs to be developed. Fire walls need to be confirmed.

6.6 DADO TRUNKING

Dado trunking will be provided to all desks within office and administration areas to accommodate power and data points. Exact requirements to be determined at design stage.

6.7 GENERAL SERVICES INSTALLATION

Twin power outlets shall be provided throughout with outlets generally mounted on twin compartment dado trunking.

Each workstation shall have 2No. twin outlets.

6.8 DATA INSTALLATION

Separate Comms Cabinets will be provided for each of the buildings as detailed below.

1 no. floor mounted 47U Comms Cabinet will be provided in the IT/Comms Room (location TBC)

RJ45 Cat 6A cabling is to be provided to wall and floor outlets throughout.

Each workstation shall have 4No. data outlets.

All Active IT Hardware will be provided by the clients IT department.

WIFI cabling infrastructure will be provided throughout with the WIFI device provided by the client.

Any tenant Comms requirements are not allowed for within this design. That will be the responsibility of each said tenant.

6.9 TV INSTALLATION

There shall be no TV system installed.

6.10 DISABLED CALL

A disabled WC call system shall be installed to all disabled toilets throughout, linked back to the main reception.

6.11 DISABLED REFUGE

A disabled call alarm system shall be installed to all stairwells throughout, linked back to the main reception.

6.12 PA

There shall be no PA system installed.

6.13 CCTV

A CCTV system shall be allowed for to cover each building perimeter and access points linked to recorder, screens etc. in the respective Comms Room. Exact requirements to be determined at design stage. CCTV to the Public Realm Area has not been allowed for.

6.14 PASSENGER LIFT

There is 1no. passenger lift allowed for in the central primary circulation area in each building.

<u>630KG / 8PERSON LIFT</u>

- Use: Transporting wheelchair users and general public
- Internal Lift Shaft Dimensions: 2400W x 2800D mm
- Internal Lift Cabin Dimensions: 1400W x 2400D x 2100H mm
- Door Dimensions: 1100W x 2100H mm
- Pit Depth 1400mm
- Headroom on last floor (FFL) to underside of lifting beam 3850mm

6.15 LIGHTNING PROTECTION

A full Lightning Protection System shall be provided.

6.16 INDUCTION LOOP SYSTEM

A full Induction Loop System at Main Reception shall be provided. Exact requirements to be determined at design stage.

6.17 SECURITY SYSTEM

A full sitewide Security System shall be provided. Exact requirements to be determined at design stage.

7 EXCLUSIONS

Site Water

Active IT Services

Below Ground Soils and Wastes

VAT

Preliminaries

White Goods

Sanitary Ware

Window Actuators

Electrical Door Maglocks

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