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Manchester Metropolitan University

Ormond Building Council Chambers

230543

Feasibility & Options Appraisal

29th Sep 2023

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Document Revision History

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Contents

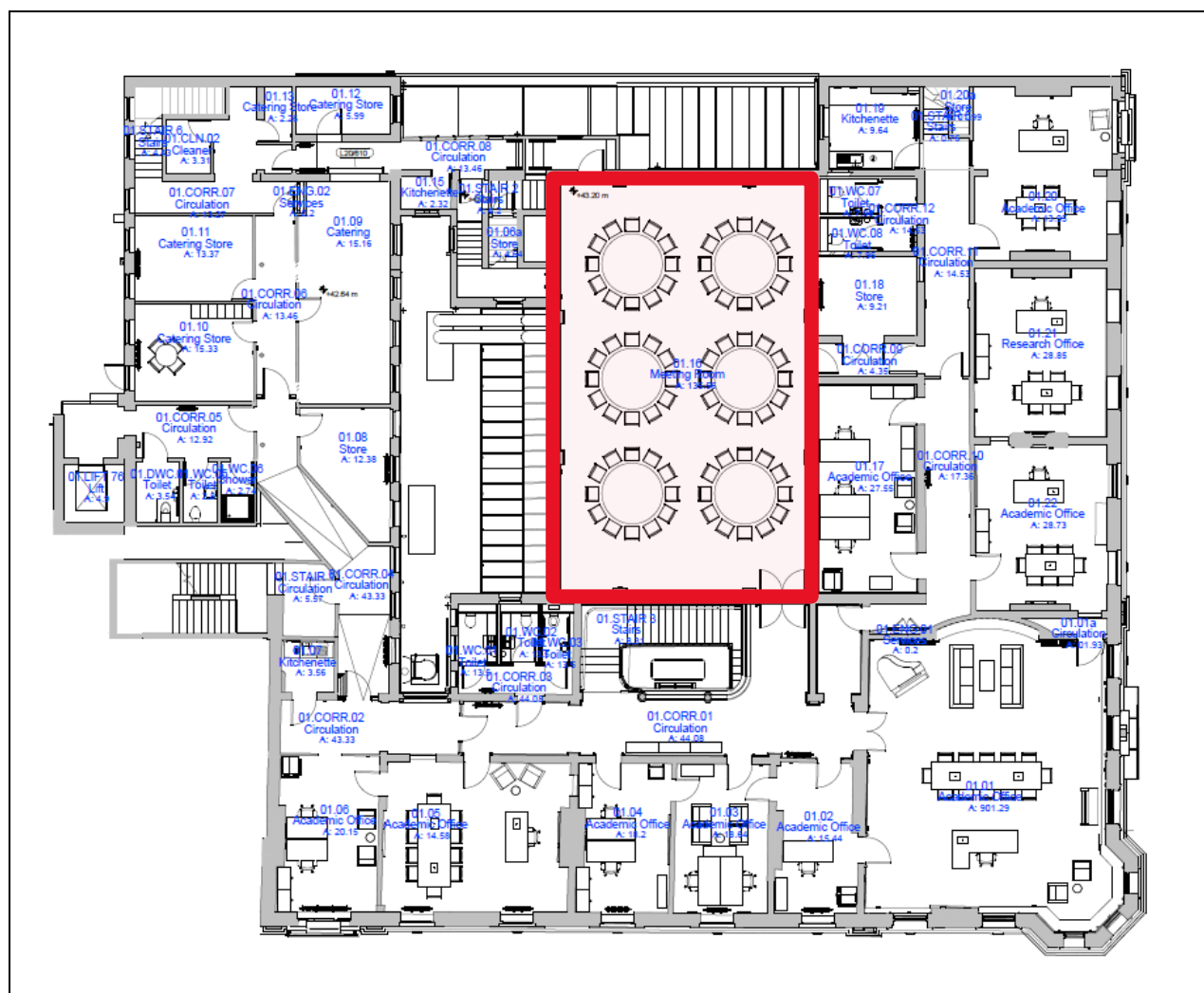
Section	Description	Page No
1.0	Introduction	4
2.0	Existing Services	5
2.1	Heating, Cooling and Ventilation	5
3.0	Proposals	6
3.1	Ventilation	6
3.2	Heating & Cooling Options Appraisal	7
3.2.1	Option 1 – From below	7
3.2.2	Option 2 – From low level	9
4.0	Recommendations	10
5.0	Electrical Modification Works Associated with Option 1 Works	11
6.0	Provision of New Floor Boxes to 1st Floor Council Chamber	13
7.0	New Radiator Considerations	14

Ormond Building

1.0 Introduction

Couch Perry Wilkes have been asked to prepare a Feasibility and Options Appraisal by Manchester Metropolitan University, to look at options to improve the Heating/Cooling and Ventilation to The Council Chamber on the First floor within the Ormond Building, as highlighted in the drawing below.

The Council Chamber is suffering from a lack of efficient heating and cooling following some recent works to refurbish the space, resulting in discomfort to the occupants. The design team had investigated the possibility that the controls system is the source of the issue, but it has since been confirmed that there is an additional issue with the heating/cooling system which is causing the ongoing problems, and which needs addressing.



Outline of Council Chamber on the first floor

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2.0 Existing Services

2.1 Heating, Cooling and Ventilation

The Council Chamber is serviced by a ventilation system and a separate Heating/cooling system. The drawing below outlines the existing arrangement which can be summarised as:

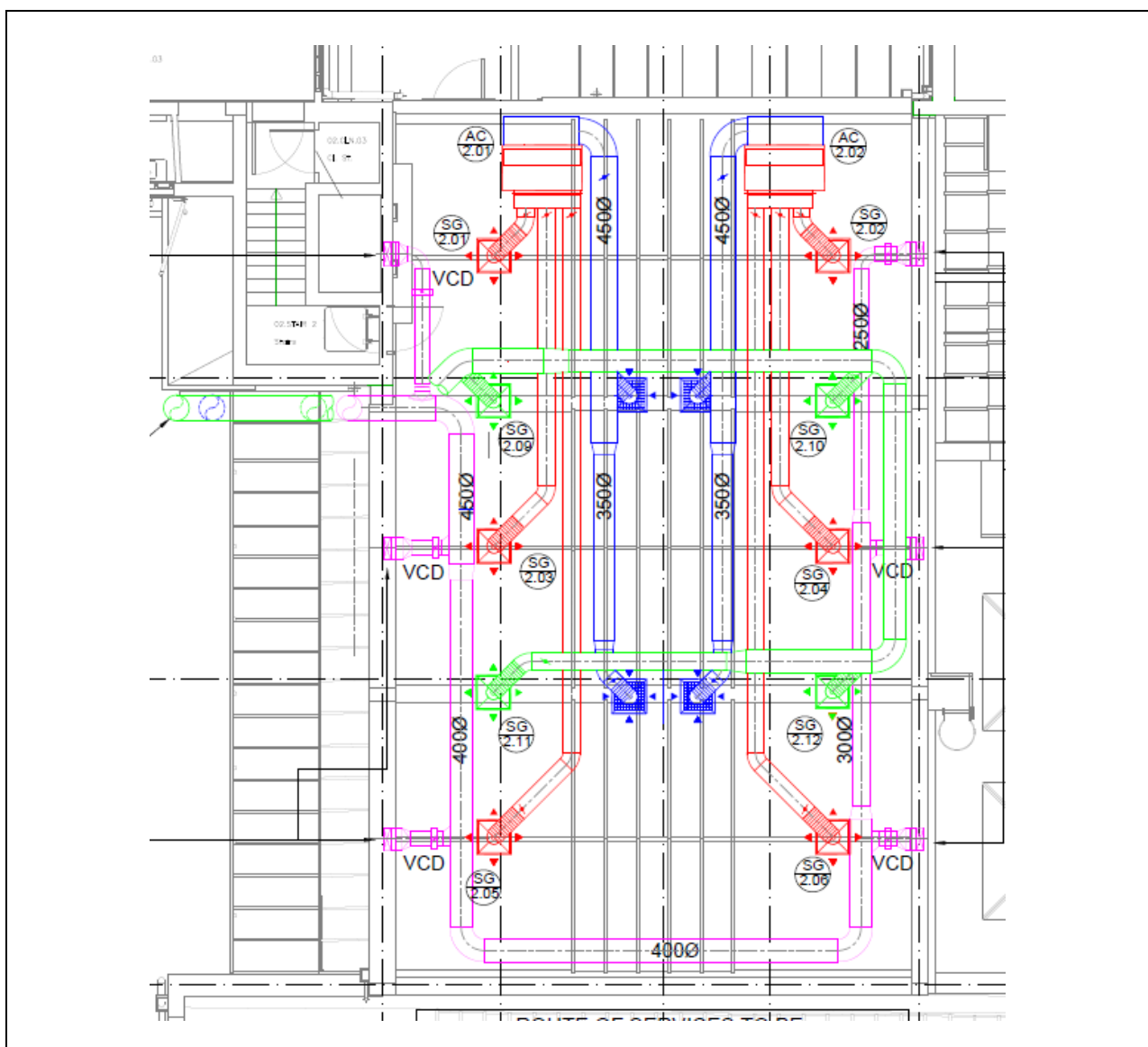
Green Ductwork – Ventilation Supply from external AHU in lightwell to ceiling grilles.

Pink Ductwork – Ventilation Extract from existing grilles in wall at high level to external AHU.

Red Ductwork – Heating/Cooling supply air from the 2no Heat Pumps located in the roof void.

Blue Ductwork – Heating/Cooling extract air from the room back to the 2no Heat Pumps in roof void.

Note: The Blue Extract grilles are NOT in the location shown. They are around the perimeter of the room with the other grilles – see later photo.





Existing supply and extract diffusers in Council Chamber ceiling

There are 2no issues with the current arrangement:

1. The grilles are close together and so have the potential for short circuiting i.e., supply air goes back into the extract without mixing in the room.
2. All the air movement happens at high level. The units are too noisy when running at a higher volume to project air into the occupied zone.

This results in the system running on a lower setting and not penetrating effectively the occupied zone and subsequently having a limited effect.

3.0 Proposals

3.1 Ventilation

From the existing ductwork size and AHU data, the supply air peak flow is likely to be around 600 litres per second. Based on 12 litres per second for each person as a good, recognized level, this would allow for 50 people.

The Chamber rarely has this level of occupancy and so consideration needs to be given to automatically lower the fan speed to save energy and reduce noise depending on conditions.

It is proposed that a speed controller and inverter is fitted to the existing AHU Supply and Extract fans with new Air quality sensors to detect poor air conditions.

This will reduce energy consumption and noise levels in the Chamber.



Existing AHU serving the Council Chamber

3.2 Heating & Cooling Options Appraisal

The conditioned air needs to get into the space at low level and there are 2no potential options to deliver this, bearing in mind the sensitive nature of the space/building.

3.2.1 Option 1 – From below

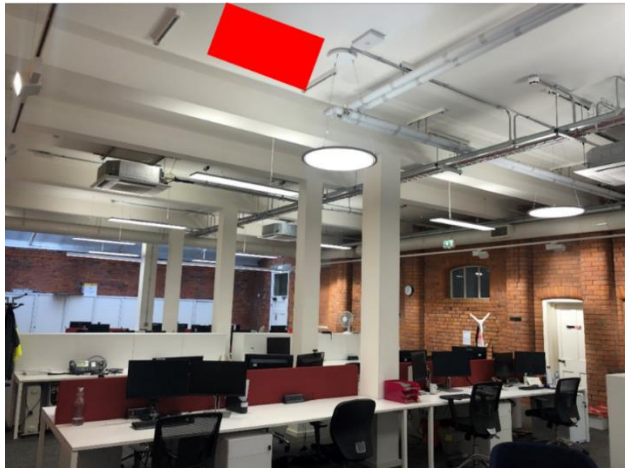
From viewing the open plan space on the floor directly below the Chamber, ground floor level – there is an exposed ceiling with cassette units mounted at high level. New units and associated duct work could be located here to serve the Council Chamber above via floor grilles. This will also make the units easier to maintain. New heat pumps units are to be located within the ginnel, where the existing, outdated units are currently placed. The new floor diffusers and grilles are to be designed in a light grey colour which gives them a subtle appearance, blending in with the carpet without distracting attention from the historic fabric within the Council Chamber. The number of diffusers and grilles will be kept to a minimum for minimal intrusion to historic fabric.

The existing ventilation supply and extract ductwork shall remain in the Council Chamber ceiling and continue to supply fresh air via existing grilles. The existing redundant ductwork associated with air-conditioning would be removed, freeing some congested roof space; however, the grilles would be left in situ to prevent disturbance to the ceiling. No damage to be cause to ceiling light during strip out works.

Ormond Building



New floor grilles in the Council Chamber.
Size and number of penetrations kept to a minimum to reduce damage to historic parquet floor.



AC unit position at high level on floor below the Council Chamber.



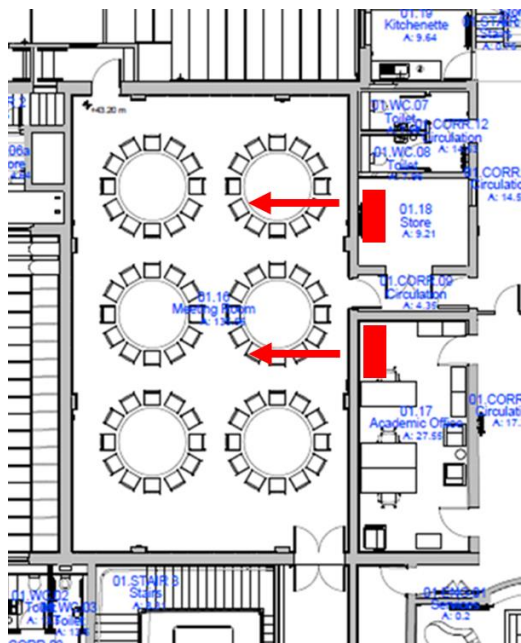
Existing condenser units in the ginnel to be replaced by new heat pumps.

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3.2.2 Option 2 – From low level

In this option we would look to mount the Units vertically in the adjacent office and storeroom with outlets at low level within the wooden paneling. The units would blow air into the Chamber at low level either via new grilles or the existing grilles. To enable the most effective air distribution, this option would look to renew the existing, historic grilles, resulting in the loss of some historic fabric.

Air can be returned via the existing grilles at high level. These are currently being used for extract ventilation so ductwork serving these grilles will need to be redirected to the now redundant ceiling grilles, and new ductwork would be required to connect these grilles to the new AC units in the adjacent office and storeroom.

	AC units mounted vertically in adjacent store and office at low level would take up useful space in adjacent rooms.
	Existing grilles at high and low level in Council Chamber. To repurpose existing grilles, historic wall fabric and woodwork to be disturbed.



Close up of existing grille at low level in Council Chamber.

Existing grilles would be stripped out and replaced with new diffusers.

4.0 Recommendations

Pros of option 1:

1. Supply air from the grilles can be quiet and provide efficient heating/cooling.
2. Easy maintenance of AC units.
3. Floor diffusers/grilles would be subtle to limit impact on the appreciation of the historic character of the Council Chamber'.

Cons of option 1:

1. New penetrations within the floor of the Council Chamber/ceiling of the open plan office at ground floor level below will cause harm to the historic parquet floor. Reference should be made to the floor build up that should be informed by the structural engineer's survey who may require further works.
2. Existing services in ground floor at high level will require removal, reinstatement and relocation.

Pros of option 2:

1. Minimal ductwork required.
2. No relocation of existing ground floor services.

Cons of option 2:

1. Performance of existing grilles is limited 'and as such the replacement of the historic fixtures would be recommend'.
2. Difficulty in providing noise attenuation.
3. Penetration through existing historic wooden paneling of high architectural significance.

The CPW Recommendation is option 1 with new AC units located at high level on the floor below and serving the space via new floor diffusers. This will be the best performing solution as it distributes the air evenly around the space, leave the AC units more accessible and any noise issues can be designed out. Whilst the creation of new openings in the floor of the Council Chamber for the installation of the grilles and diffusers will cause some harm to historic fabric, this option is considered as the least intrusive and most effective in terms of improving the environmental quality of the room. Intervention to historic fabric will be undertaken sensitively and with as minimal intrusion as possible throughout the construction phase.

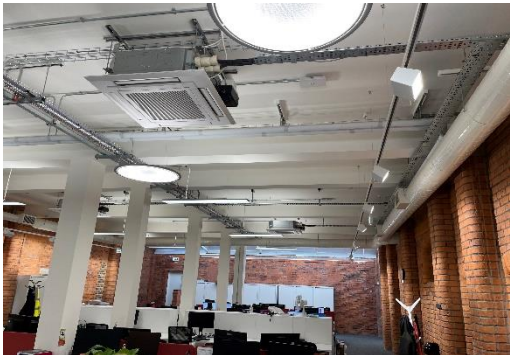
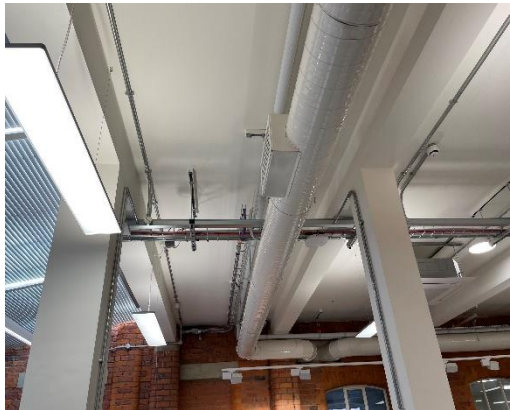
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5.0 Electrical Modification Works Associated with Option 1 Works

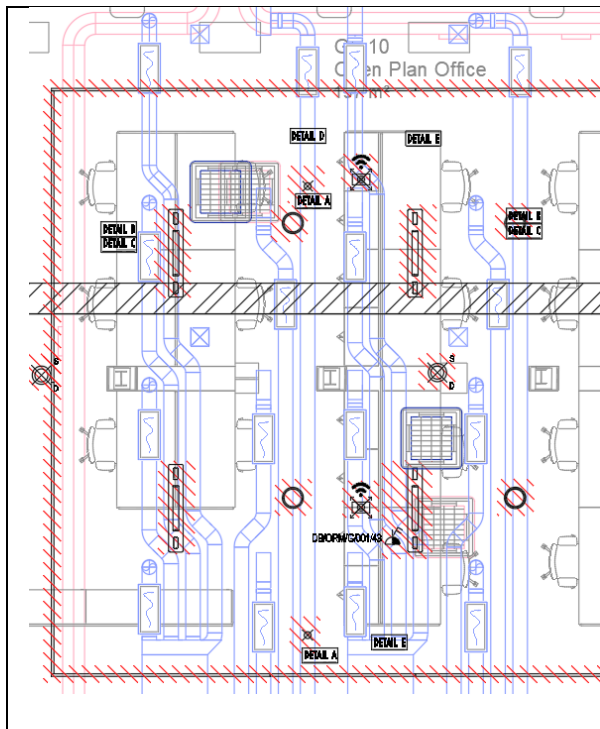
The installation works that will take place in order to provide heating and cooling to the 1st floor Council Chamber will require the existing electrical services to the ground floor ceiling to be removed and re-installation of the services following the installation of the proposed ductwork. Other services are likely to require repositioning works.

The services to be removed and re-installed are likely to consist of Lighting, Emergency Lighting, Lighting Controls, WiFi Access Points, mechanical power supplies and secondary conduit containment.

The services that will likely be repositioned are the fire alarm detectors, these will be repositioned in accordance with the specialist recommendations in order that they will operate effectively following the installation of the ductwork.

	Photograph shows Existing services to be removed and re-installed. Services are likely to consist of Lighting, Emergency Lighting, Lighting Controls, WiFi Access Points, mechanical power supplies and secondary conduit containment.
	Existing fire alarm smoke detector to be repositioned to prevent clashes with the proposed ductwork.

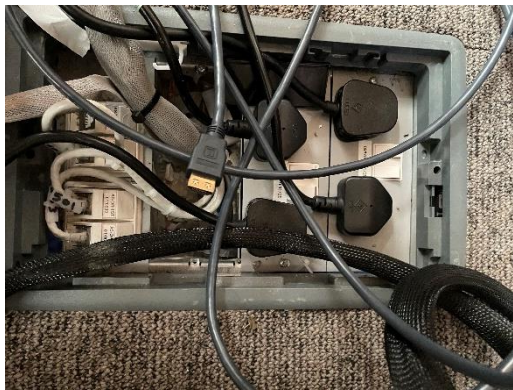
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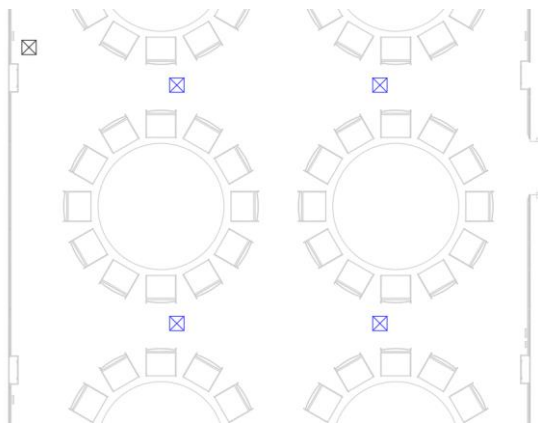
Drawing indicates the existing electrical services that are to be removed to allow the installation of the new ductwork (shown in blue). Services will be re-instated following the installation of the ductwork.

6.0 Provision of New Floor Boxes to 1st Floor Council Chamber

There will also be the provision of new floor boxes complete with data and power provisions to enhance the use of the Council Chamber.



Photograph shows the existing floor box located adjacent to the presentation pedestal. The new floor boxes will be selected to match the existing installed floor box.

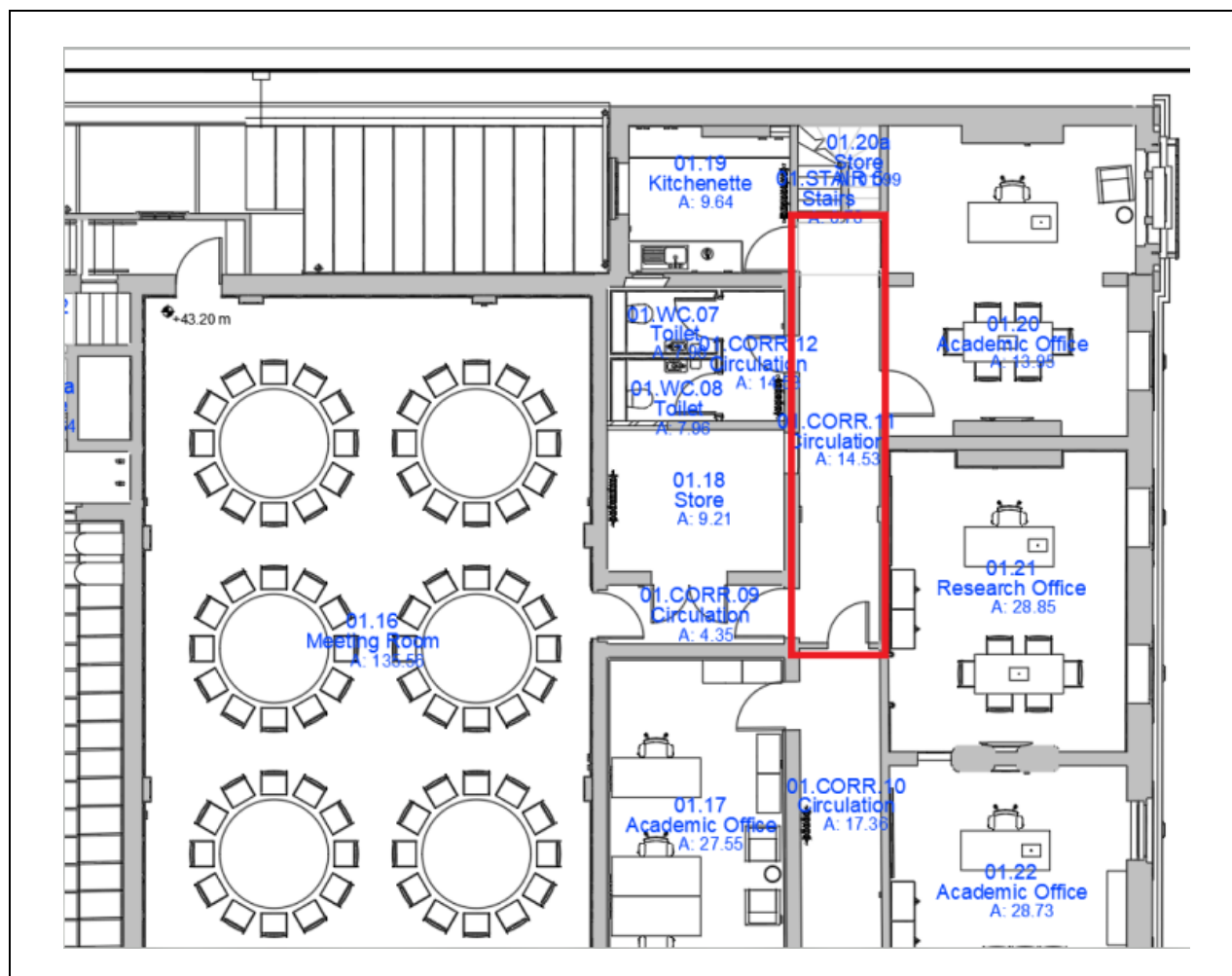


Drawing indicates:

1. Location of the existing floor box (black).
2. The proposed location of four new floor boxes (blue) which will require new penetrations through the historic parquet floor. These are needed to provide power and network connection to portable computers for Council Chamber occupants.

7.0 New Radiator Considerations

A new radiator is required in the corridor on the first floor as shown below. This space does not currently have any heating mechanism which causes discomfort to the people using it. The location for the new radiator is considered such that it provides efficient heating and required minimal disturbance to the historic building fabric.



Outline of corridor where new radiator is to be installed.

New heating flow and return pipes are to branch from existing pipes on the ground floor at high level. New pipes would come up directly under the new radiator through the floor so that there is no visible pipework in the corridor. This strategy is consistent with existing radiator pipework throughout the building. The new radiators and TRVs to match the existing radiators closely for uniformity.

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Example of existing pipework penetrating ground floor ceiling to serve radiator above.

New pipework to match the detail shown.



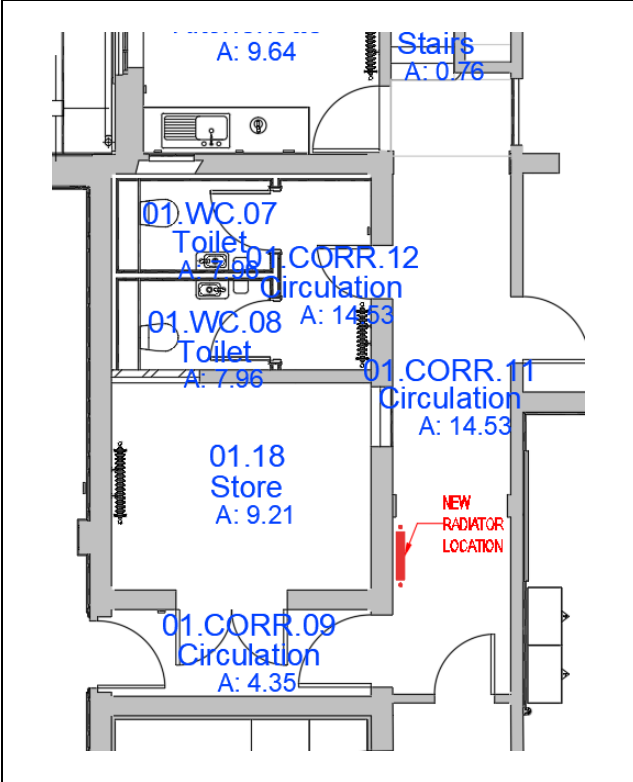
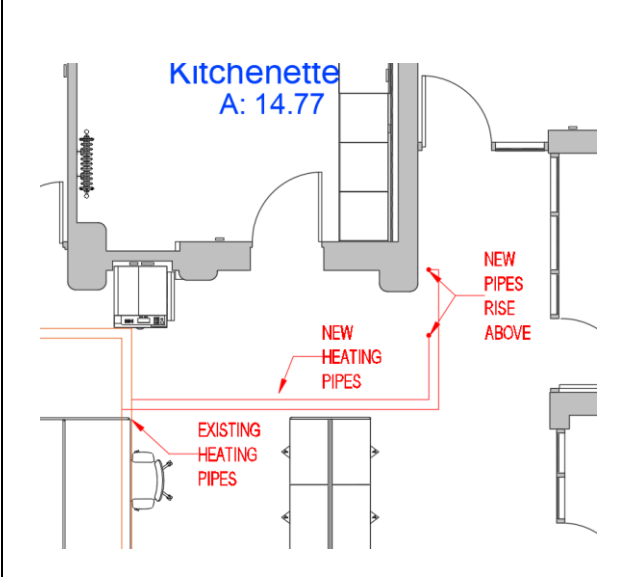
Example of existing radiator.

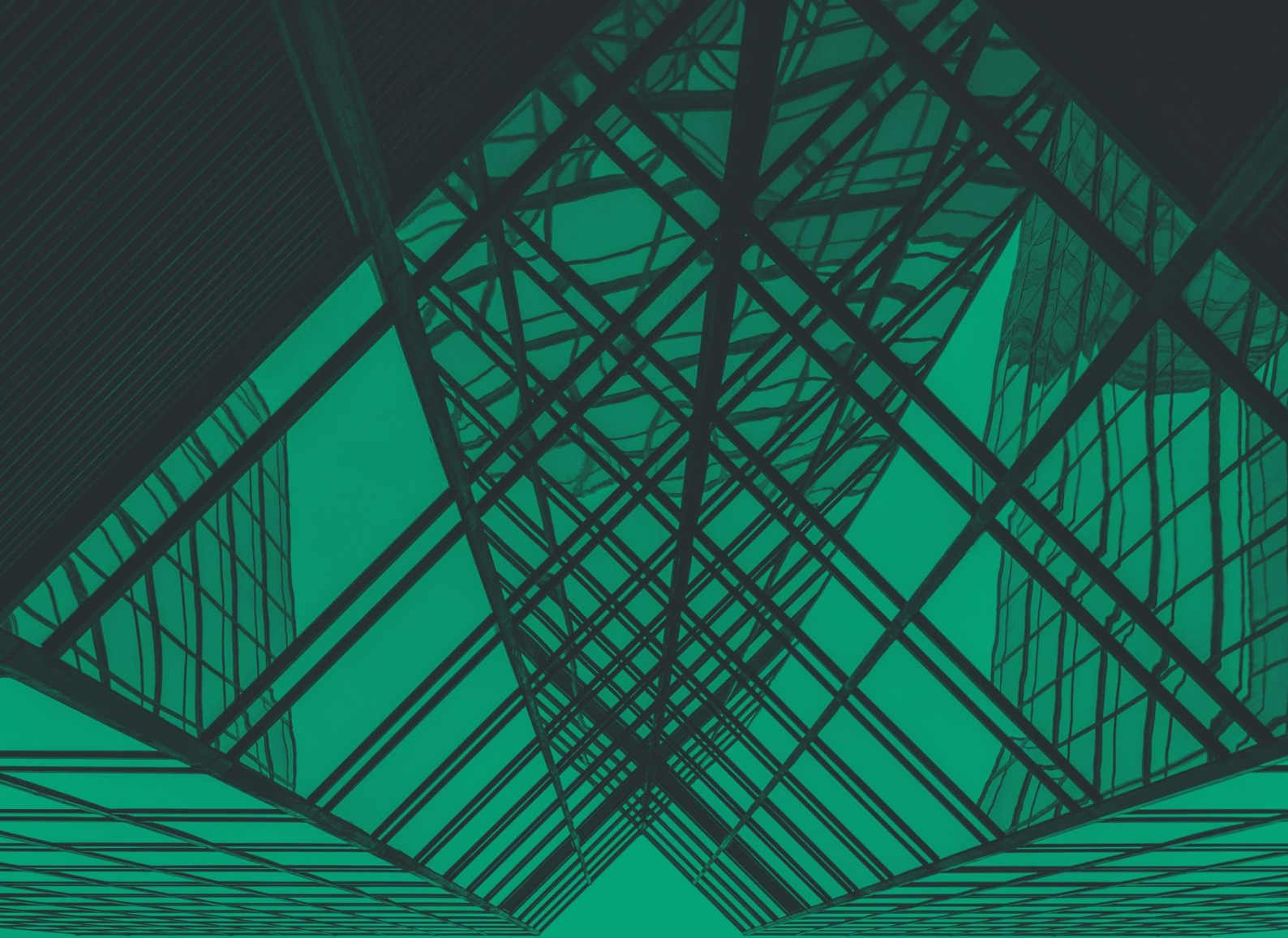
All associated pipework runs at high level on floor below and rises directly under the radiator and therefore is not visible.



Example of new radiator panel closely matching the existing.

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	New radiator location in the corridor directly above open plan office on the ground floor.
	Approximate location of new heating pipework branches from existing.



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