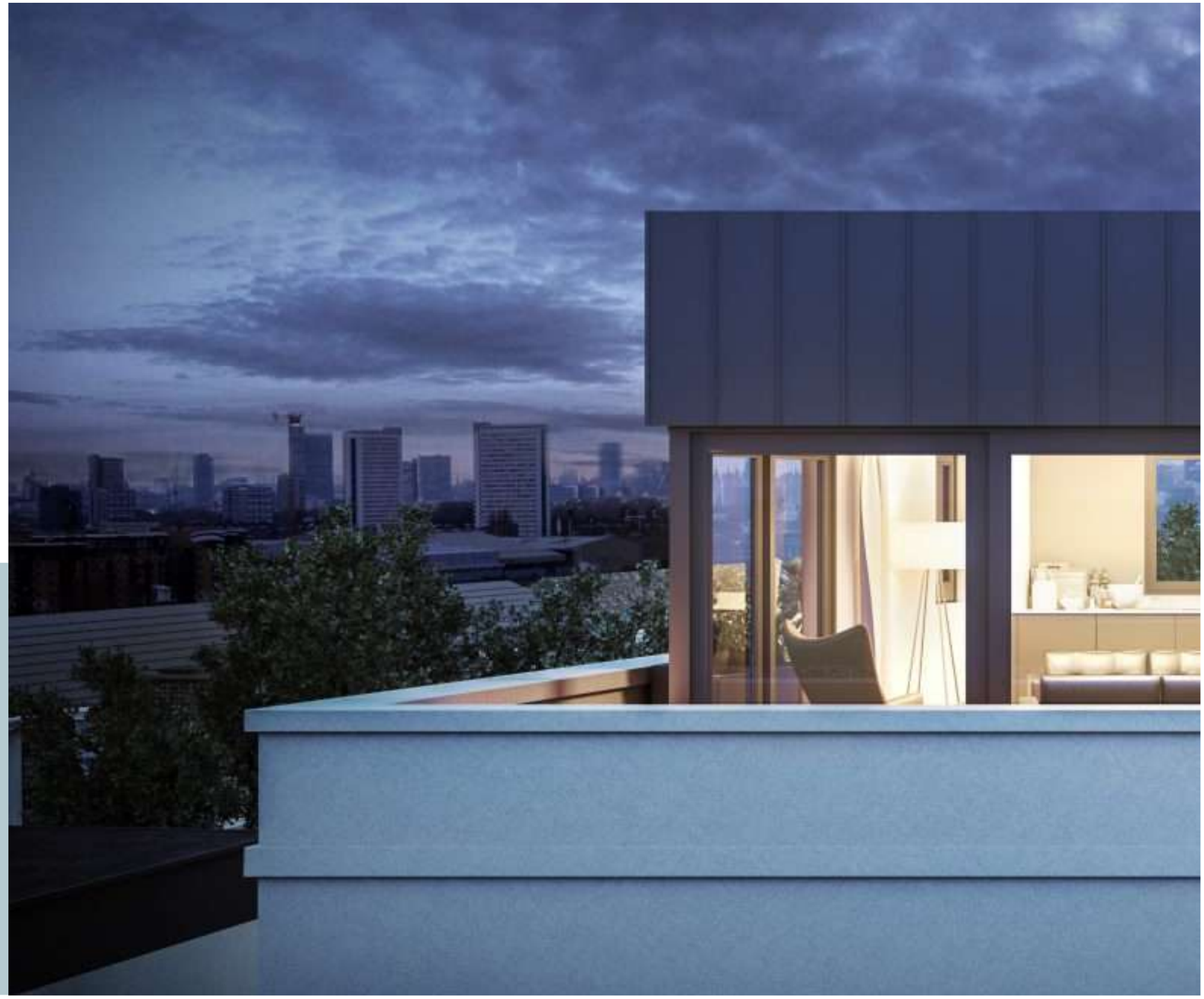
APEX AIRSPACE

DETERMINING VOID GAP

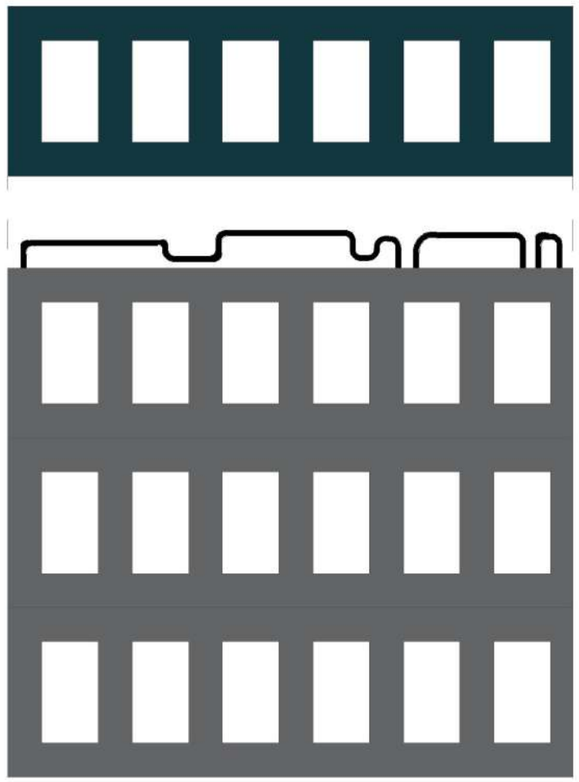
VOID GAP

Amongst the many complexities arising with airspace development, determining the ‘Void Gap’, can be a challenging one, involving multiple considerations. In simple words, Void Gap is the ideal distance between the top storey of the existing building, and the new storey being built. The need for a void gap can arise under varying circumstances; that can have multiple technical and legal implications.

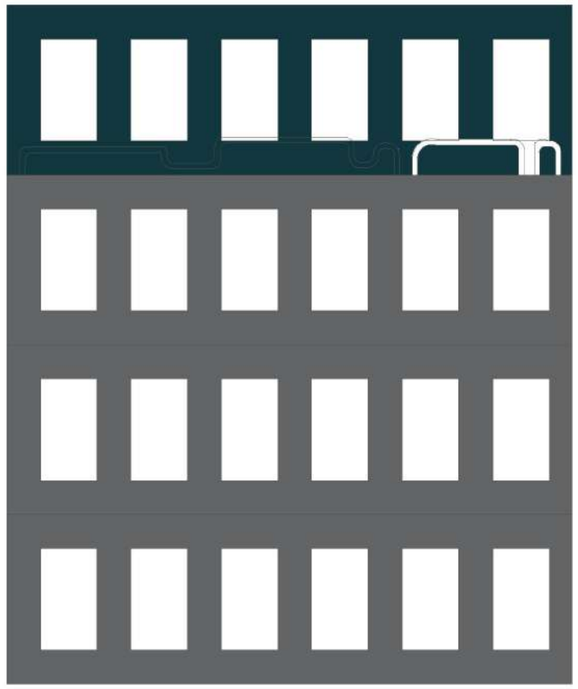
The rooftop of a building can be a complex structure, comprising of various vent pipes, plumbing lines, lift shafts, chimney stacks, aerial dishes and telecommunication wiring, to name a few. While relocating some of these is possible, some cannot be detached from their position. An example can be plumbing and drainage pipes, that are serving the existing building; extending or dismantling these to install a new system can be challenging not only in terms of cost, but can also add considerable risk to the existing building’s systems.



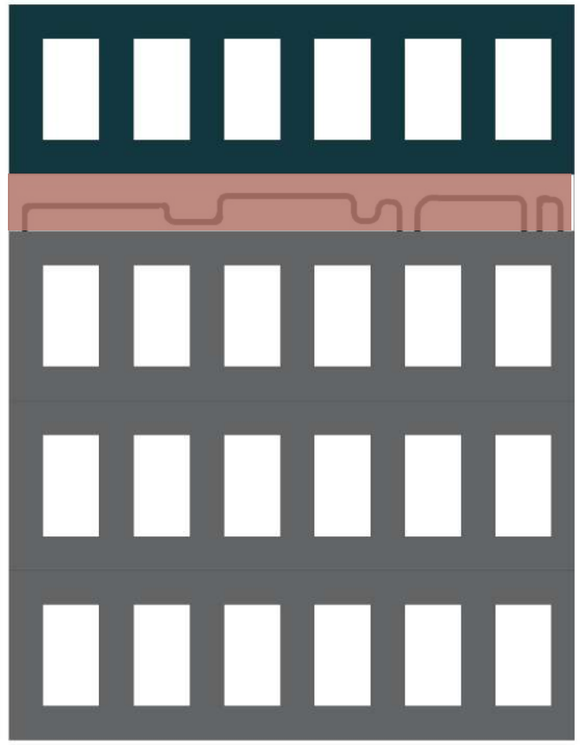
Under such circumstances, a Void Gap to keep existing structures enact seems a viable solution. However, a key consideration is the height of the gap, which not only keeps the essential structures in place, but also provides optimum access in case of any repairs or maintenance works required.



PIPES CAN BE OBSERVED RUNNING ALONG THE ROOF OF THE PRE-EXISTING STRUCTURE



TO ENSURE STRUCTURAL INTEGRITY AND SAFETY, IT IS NOT VIABLE TO PLACE A NEW FLOOR DIRECTLY ON TOP OF THE EXISTING ROOF.



THE DESIGN INCORPORATES A SPACE OR GAP TO ACCOMMODATE NECESSARY SERVICES

FIGURE 1.0 - VOID GAP ILLUSTRATION

MARION COURT - A CASE STUDY

Apex encountered this challenge in one of its projects at Marion Court where a five-storey existing building was designed for four penthouses. The roof of the building comprised of a network of drainage pipes for water flow from tanks to residential units, and to outlet drain pipes. It was technically and financially infeasible to relocate or dismantle the complex structure, hence a ‘Void Gap’ was considered an optimum solution. This would allow the drainage system of the existing structure to operate as before, without any disruption.

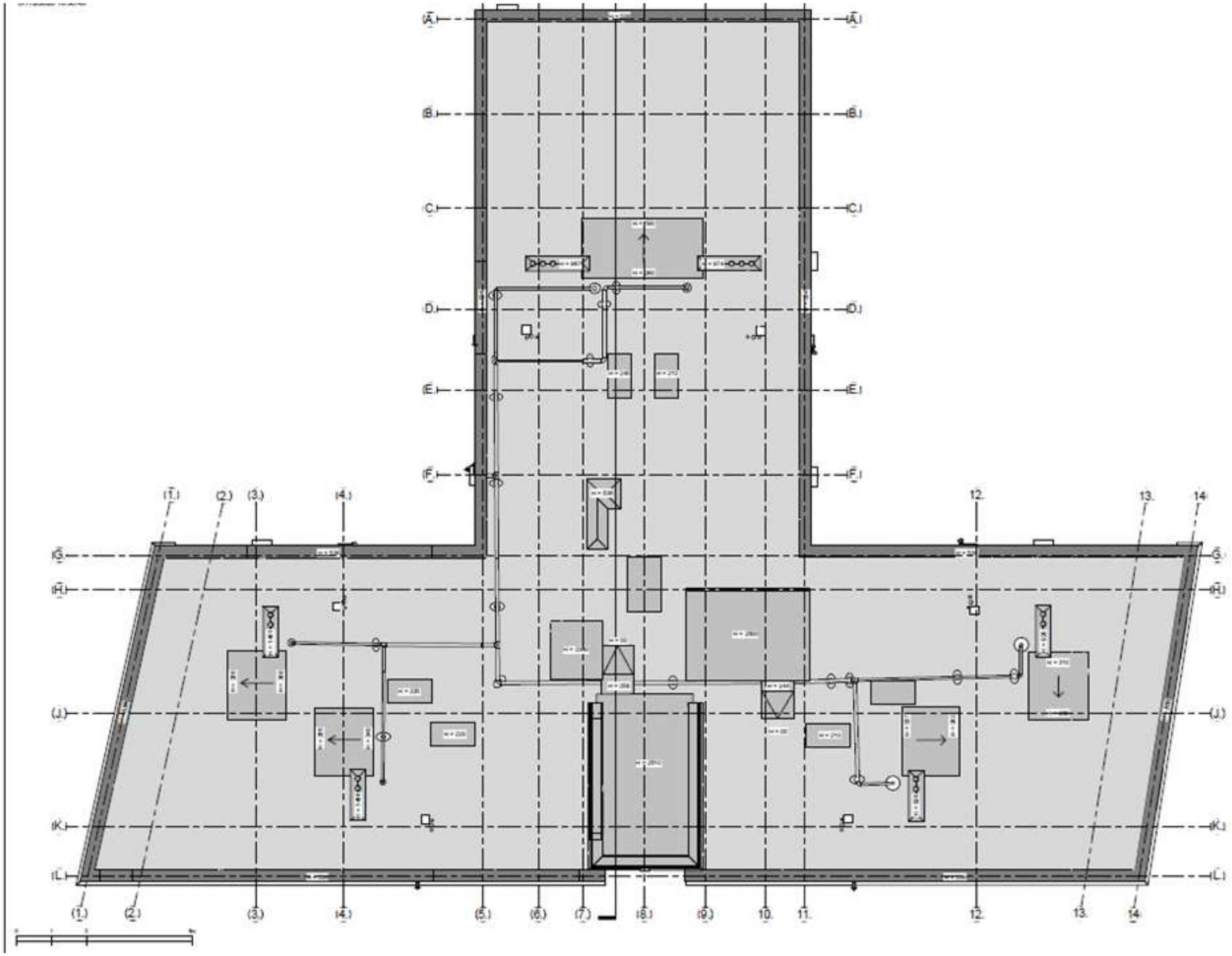


FIGURE 2.0 - MARION COURT'S PLUMBING CEILING PLAN

FIGURE 2.1 - DETERMINING VOID GAP OF MARION COURT, OCT 2022

Apex proceeded initially with a 300mm gap to support the new structure, built using light gauge steel (LGS) frame on structural steel frames, supported from the existing load bearing elements of the original building. However, the height was not sufficient for access for any repair and maintenance works that might be required in future. Hence the height of the void gap was eventually increased to 900mm, and access points were carefully incorporated in the new floor. Many times, the void gap will need to be supported with columns or supporting structures within, however this was not required in the case of Marion Court.

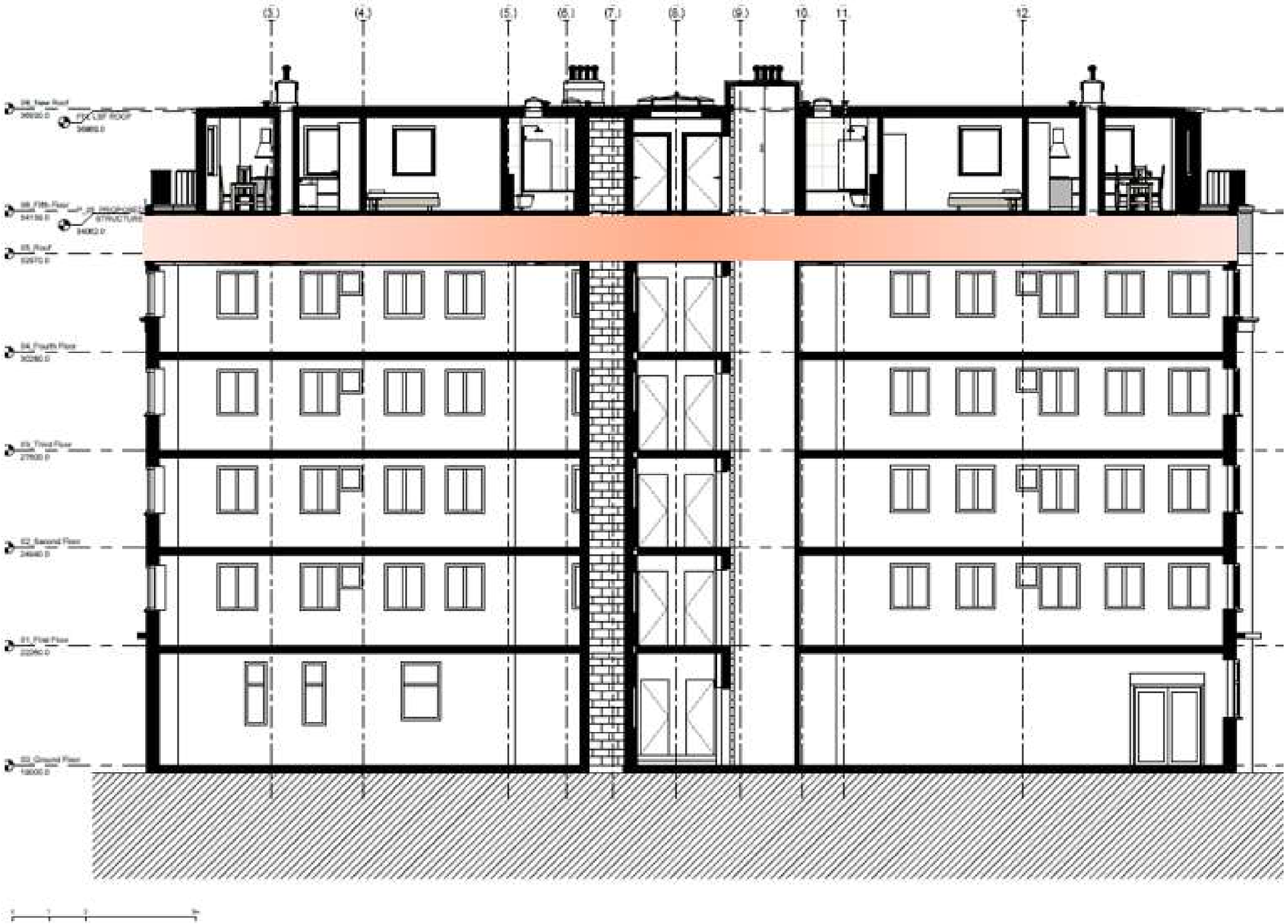


FIGURE 2.3 - MARION COURT'S SECTION AA, VISUALIZING 900 MM WIDE VOID GAP

Many other considerations can arise as the need for a Void Gap is identified. Increasing height of the building can increase the probability of disproportionate collapse, requiring new structures to be built for structural robustness. For taller buildings, a void gap can change applicable Building Regulations. An example is the similar case of Marion Court, whereby gap height had to be carefully determined, so as to fulfill the purpose, while ensuring height of the building does not exceed 18m, which would have required corresponding change in Fire Strategy of the building.

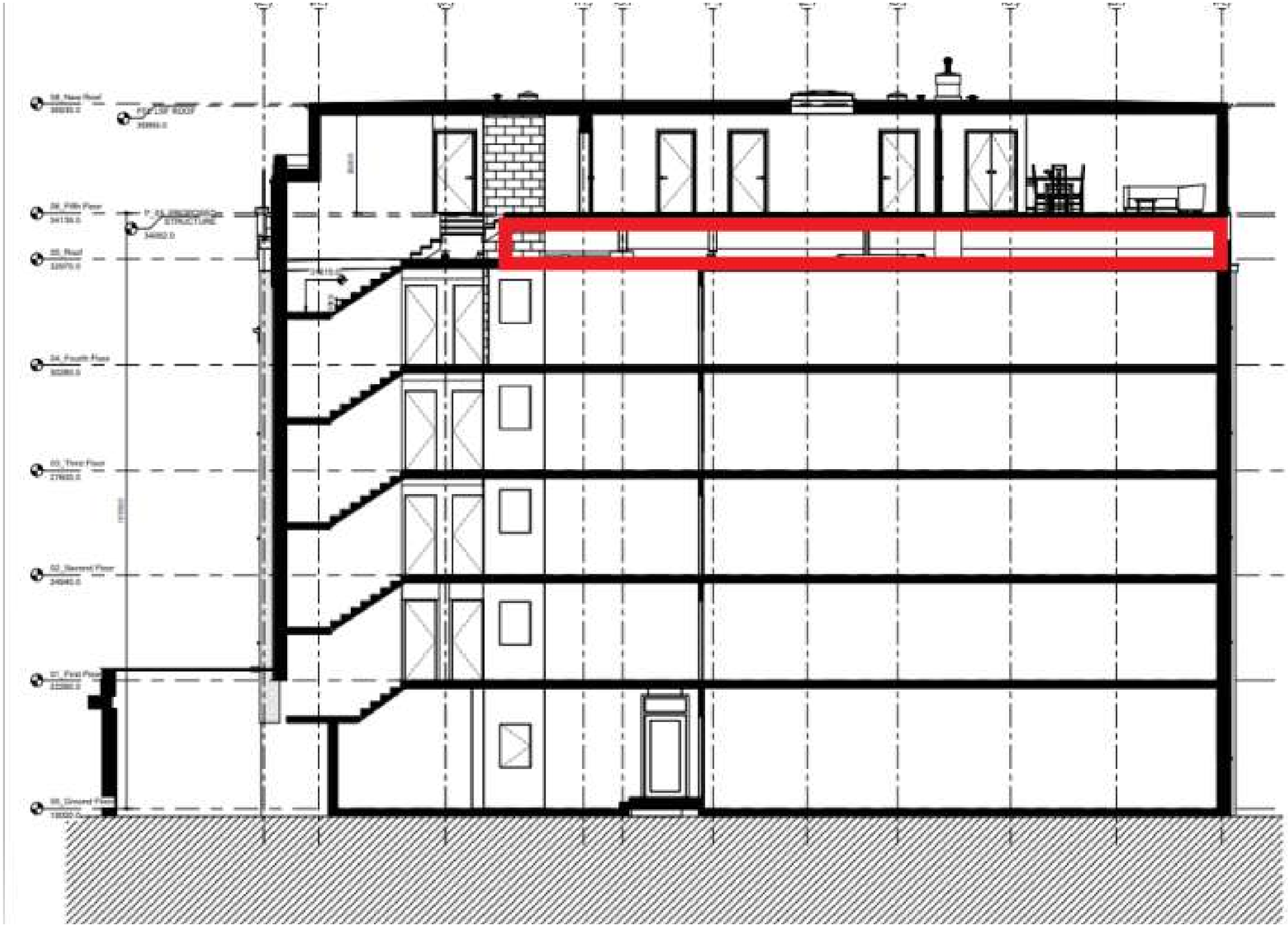


FIGURE 2.4 - MARION COURT'S SECTION AA', VISUALIZING 900 MM WIDE VOID GAP

CONCLUSION

A void gap is imperative for airspace projects under certain circumstances, to avoid complications pertaining to co-existence of existing and new structure. Determining the height and corresponding design considerations can be challenging for developers. Buildings need to be designed to ensure existing systems are preserved and extensions are built to ensure structural robustness and compliance to building regulations.