SECTION 05.

TECHNICAL APPENDICES

5. TECHNICAL APPENDICES
5.1 AIR QUALITY AND NOISE

Air Quality

An air quality statement has been prepared in support of the planning application and is submitted as a separate document.

Baseline air quality conditions in the vicinity of the development are likely to meet the air quality objectives for NO2 1-hour, PM10 annual and 24-hour mean in both the construction and operational years.

Annual mean NO2 is likely to be exceeded in both the construction and operational years.

The assessment of air quality in relation to roads has determined that there will be a negligible impact on local traffic and therefore air quality as a result of construction and operational traffic.

The assessment of air quality in relation to the boilers within the development has determined that there will be a negligible impact on nearby sensitive receptors.

The assessment in relation to the boilers has determined that future receptors within the development will be exposed to concentrations in excess of the annual mean objective for NO2. However, it should be noted that these receptors are replacing current receptors on site.

The dust risk assessment has identified that construction activities may have occasional and minor dust soiling and health impacts on local receptors, but these can be minimised or removed with appropriate mitigation measures.

The air-quality-neutral assessment has identified that the proposed development meets the Mayor of London's requirements for air quality neutrality.

Noise Assessment

A noise assessment has been undertaken in support of the planning application and is submitted as a separate document.

The results of the noise assessment confirms that:

- The location of the residential accommodation forming part of the development is located in a suitable location, where planning permission will normally be granted. However, the design of the residential units will need to consider attenuation measures in order to achieve suitable internal noise conditions.
- Noise measurements have been used to set plant noise emission limits. The actual plant noise emissions will need to be assessed when details on the location and equipment have been decided.
- The vibration measurements completed indicate that the level of tactile vibration experienced in the offices and residential accommodation will meet the relevant criteria without the need to vibration isolate the building.
- Vibration measurements have confirmed that the worst-case levels of reradiated noise in the residential accommodation are at acceptable levels.

150 Holborn-Structural Summary report -Schematic Design

Clarke Nicholls Marcel have developed a structural scheme for the commercial redevelopment of the site bounded by High Holborn, Gray's Inn Road, Brooke Street and Fox Court

The development consists of two structural independent buildings:

- Commercial and office building
- Residential building

The two buildings are separated by a movement joint and they will have separate stability systems.

Structural framing

The main building is proposed to be an RC structure that consists of 8 levels, one basement level and roof skylight that covers atrium and sloped part of the building. The RC columns are spaced at 10.5 and 9 m throughout the building and therefore Post Tensioned (PT) slab will be used to support large spans. 350mm/425mm deep PT slab also supports 3m/4.5m edge cantilevers along the building and atrium perimeter. The cantilevers will carry the floor loads as well as heavy facade load and will act as staircase support at the central atrium.

There will be a number of internal features such as atrium staircases, small floor bridges and slab openings to fulfil functional and aesthetic intention. The atrium staircases will be designed as steel trusses spanning from one level to another.

The skylight will be a steel glazed frame structure with its own lateral stability.

The residential building is proposed to be a traditional RC structure that consists of 6 levels and one basement level.

Stability

Vertical loading of the main building is taken by the floor slabs and transferred into columns and walls. The force is thereafter taken down to and supported by new board pile foundation.

Lateral Stability of the main building is provided by two cores at the north side and steel braced system at the central atrium.

Stability of the residential building is separate of the main building and it relay on its own columns and floors for vertical stability and it own core walls for lateral stability.

Substructure

The form of basement and foundation design needs to take into account the site boundary line, existing basement walls and slab, close proximity to London underground and BT Telephone exchange.

Existing basement walls

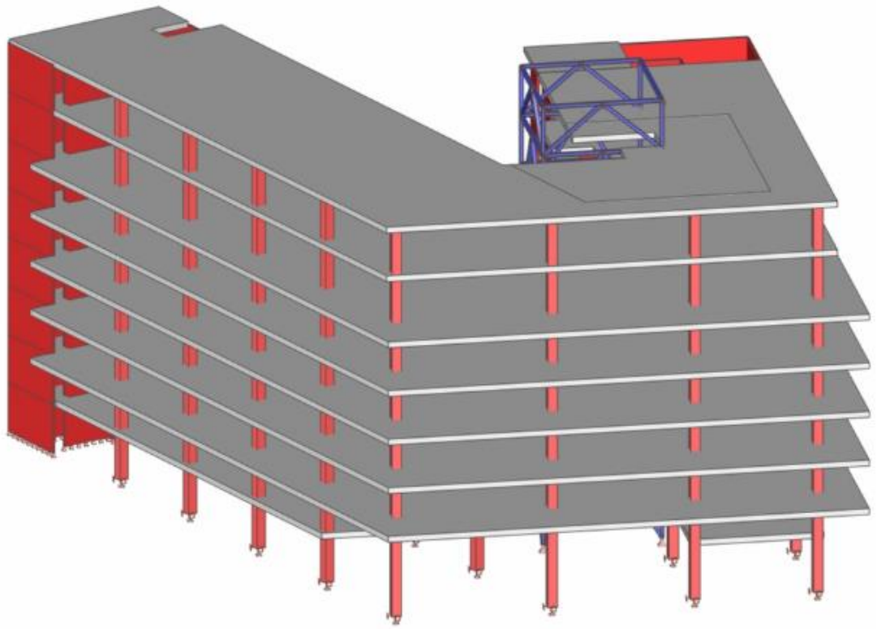
The existing basement walls will likely be used as temporary support to the rear of the footpaths during construction. The new basement wall will be constructed at the inner side of the existing wall and adequate waterproofing will be incorporated within the construction.

Existing slab

The existing basement slab will be largely demolished as the existing piles are cut down below ground level and new piles and piles caps constructed. It has been proposed that a new basement slab is constructed and monolithically connected with new basement walls.

Foundation

The new building will have piled foundations. The new pile arrangement will be coordinated with the existing pile layout, as the existing piles remain in the ground. A number of new pile caps will be designed for eccentric loading as they will have to bridge over the existing piles.



Structural model

Plant services

A centralised heating and cooling system serves the commercial offices and retail units with full fresh air plant located at basement level delivering fresh air to meet occupant needs. Heating and cooling the commercial tenant areas will be using fan coil units and/or 4-pipe radiant beams.

The residential units are currently designed as stand-alone with local MVHR units per apartment, however, the commercial base build has the flexibility to serve the residential units subject to appropriate heat and water metering arrangements.

With a client's brief to minimise plant at roof level, the basement hosts the majority of the base-build plant and equipment.

A centralised boosted domestic water system serves the commercial offices, with the retail units having direct utility metered water connections. The residential units are currently designed as stand-alone, however, the commercial base build has the flexibility to serve the residential units with appropriate water metering if required.

The entire system design has been based around the conservation of water through low water consumption sanitaryware and BMS linked leak detection which both provide the necessary credits for BREEAM.

The lighting design will be based on LED luminaires equipped with Digital Addressable Lighting Interface (DALI) control gear wired from the lighting distribution boards installed in the risers and a lighting control system. Lights will be linked to PIR's and daylight sensors in perimeter spaces to reduce energy consumption. The lighting control system will be capable of interfacing to audio visual equipment, blinds control and fire alarm system.

A life safety generator will be provided at basement level serving the fire-fighting lifts and basement smoke extract fans system.

Generally, the electrical and mechanical infrastructure distributes laterally at basement level to 2no. service risers within each core for vertical distribution to the various floor plates.

Roof

Photovoltaic panels

High level plant- (7th floor plant room with heat rejected to roof)

Hybrid dry air cooler

Future standby tenant generator

On Floor

Local electric domestic hot water

Ground floor

UKPN switch room

Basement

Air handling units

LTHW Boilers

Hot water calorifier for basement showers

Grey water harvesting tank room

Incoming IT/BT/Comms room

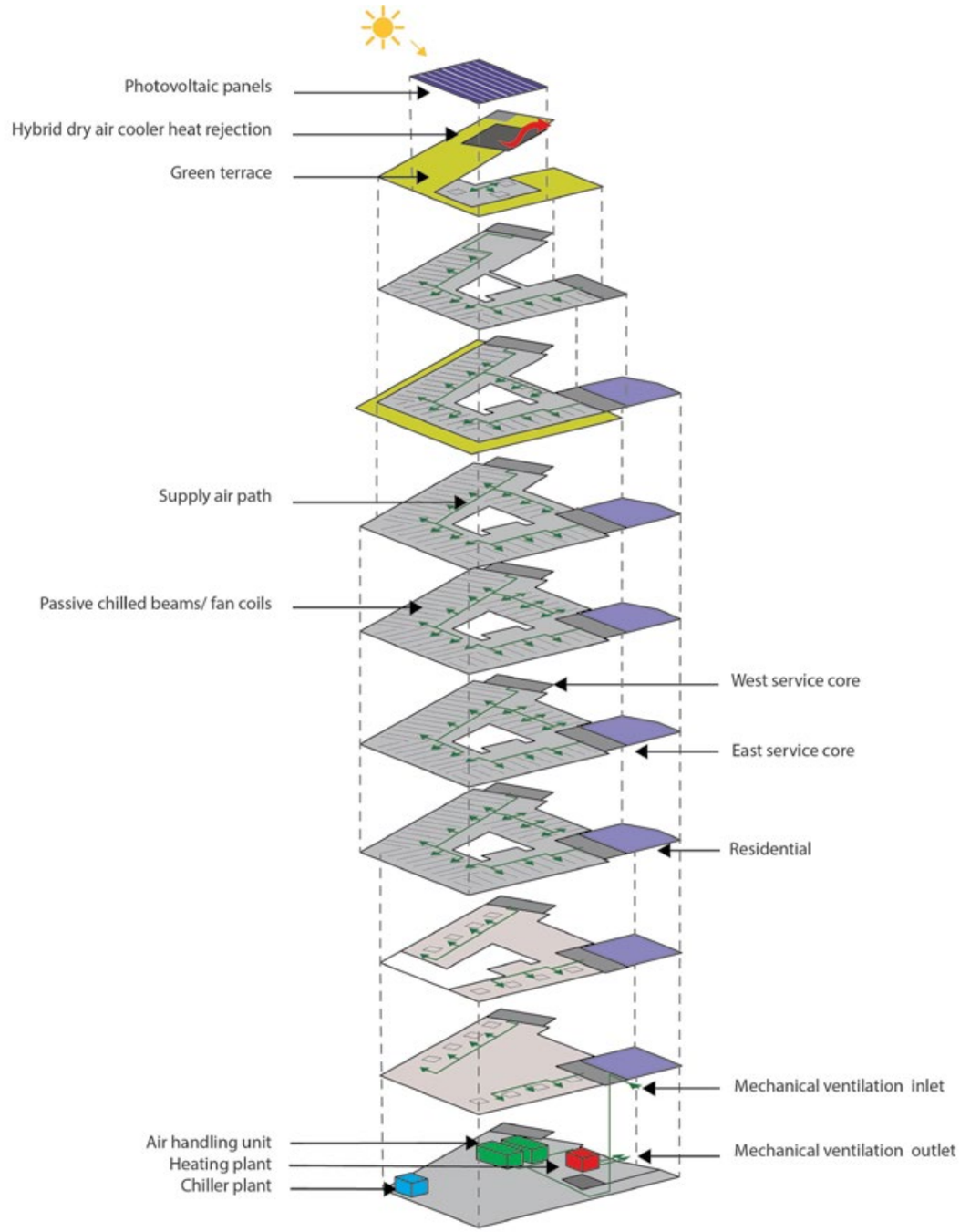
Sprinkler tank/pump/valve room

Chiller and chilled water pump room

Basement Smoke ventilation extract

Ancillary/ plant local ventilation

Life Safety Generator



Distribution of plant provision

5. TECHNICAL APPENDICES
5.4 SUSTAINABILITY

Certification

The environmental performance of the Project will be assessed using the Building Research Establishment Environmental Assessment Methodology (BREEAM) rating system, which is a world-renowned design and assessment methodology for sustainable buildings.

A pre-assessment has been carried out for the development based on the BREEAM 2014 New Construction scheme (which is the latest scheme), which shows the Project can achieve a BREEAM 'Excellent'. During the course of the project a BREEAM AP (Accredited Professional) will be employed to advise the design team and contractor on how to minimize the environmental impact of the project and achieve the stringent BREEAM criteria.

Management

Best practice site management techniques (e.g. air (dust) and watercourse pollution prevention measures) will be used to minimize the impact of the development during construction on the surrounding denizens. The development will target a CCS score of at least 35 to demonstrate exemplar practice.

Health & Wellbeing

The internal environment of the building will be a healthy and stimulating place to work through careful attention to the lighting and heating / cooling system design. Care will be taken to minimize VOC's and airborne pollutants to maximize the air quality. A central atrium and bespoke staircase will encourage active occupants and allow air to circulate.

Energy

The building is being designed to conserve energy and reduce its operational carbon footprint, with an Energy Strategy based on the 'Be Lean, Be Clean, Be Green' hierarchy. This will be achieved through a combination of high performance building envelope and efficient building systems, and the integration of photovoltaic panels at roof level to generate renewable energy – demonstrating our commitment to achieving the 'Be Green' strategy level.

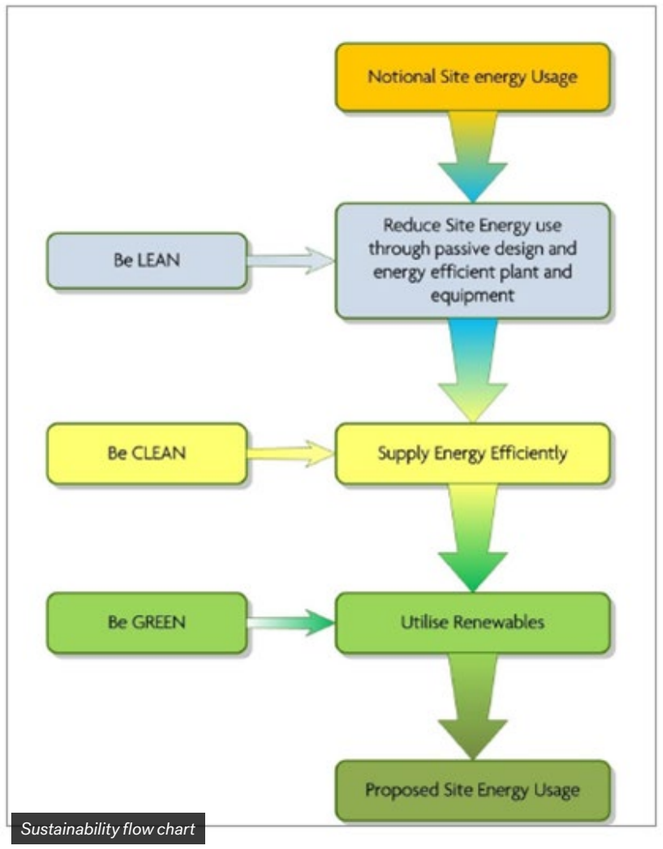
The building benefits from extensive energy metering and a comprehensive building management system to allow the energy usage to be minimised in use. The Energy Strategy Report shows that best in class mechanical and electrical system efficiencies together with a high performing building fabric significantly (21.8%) reduces carbon emissions'

Transport

The development is situated in a major transport hub with a Central line tube station meters from the main entrance, train stations within 500m and myriad bus routes, resulting in a Transport for London's (TFL) Public Transport Accessibility Level (PTAL) Accessibility Index (AI) score of 69.6. In addition, there are TFL bicycle docking stations nearby and the development is providing secure bike storage that meets London Plan requirements, as well as showers and lockers have been provided to providing high quality facilities to allow staff to cycle to work.

Water Use

The water usage of the building has been minimized by best practice water saving toilets and sanitary ware. Water metering linked to the building management system as well as leak detection systems and sanitary shut off systems prevent water being wasted unnecessarily by equipment malfunction. Grey water recycling will collect and treat waste water from all basins and showers, with this treated non-potable water distributed throughout the building to serve the landscape irrigation requirements and all WC and urinal flushing requirements.



Sustainability flow chart


Integrated PVs on un-shaded roof spaces

Provision of high quality cycle facilities

Materials & Waste

It is the intention that the building will use only materials that are certified under a Green Product Certification Scheme in order to minimize the embodied energy and associated environmental impact. This will ensure that materials used in the design are sustainably procured and will come from a supervised and responsibly sourced supply chain, using local supplies where feasible.

During both construction and operation, the development will be minimising the generation of waste through effective resource management and recycling/re-use targets

Land Use & Ecology

To enhance biodiversity along Holborn it is the intention to create vertical gardens, green roofs and terrace spaces that will allow and encourage local insect and wildlife to thrive within the urban landscape and contribute to reducing urban heat island effects

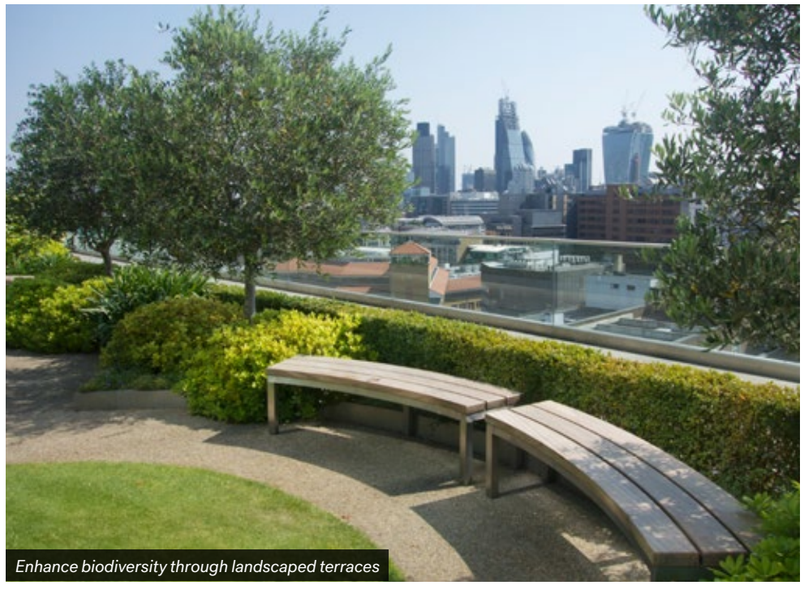
Pollution

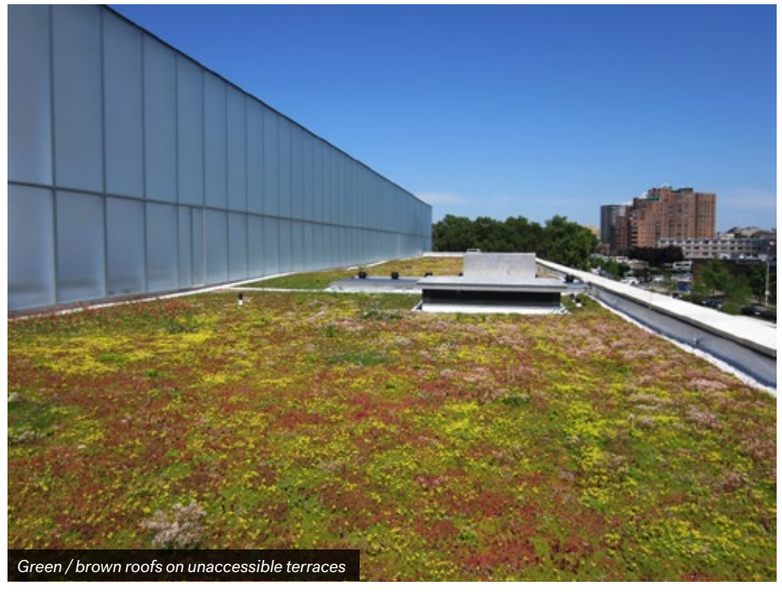
Pollution impacts have been minimized by the design of the building, with passive design measures achieving a high level of energy efficiency and thus reducing heating, cooling and lighting demands.

In line with Camden Borough preferences, available roof spaces are utilised as green roof terraces, all inaccessible un-shaded roof spaces utilise photovoltaic panels (which produce electricity while further reducing the CO^2 footprint of the building), and inaccessible shaded roof spaces are to be a green / brown roof that minimizes heat loss whilst also reducing surface water runoff.

Flood risk analysis has identified that the site is in a low-risk location. Sustainable urban drainage systems (SuDS) for the development have been utilised in accordance with the London Plan to ensure that surface water run-off is managed as close to its source as possible, with measures such as green roofs and attenuation tanks analysed for feasibility.

Close proximity to established public transport options


Enhance biodiversity through landscaped terraces


Green / brown roofs on unaccessible terraces

5. TECHNICAL APPENDICES
5.5 BIODIVERSITY AND ECOLOGY

Biodiversity and Ecology

A Preliminary Ecological Appraisal report has been prepared for the planning application and this has been submitted as a separate document.

Biodiversity is promoted and protected within the development. To ensure that the site ecology is protected and enhanced, a Suitably Qualified Ecologist has undertaken an ecology survey (including bat survey and arboricultural survey).

The ecology survey identified that the habitats present within the site boundary are dominated by buildings and hardstanding of low or negligible ecological value, with the only significant vegetation being two London plane trees and one rowan tree.

With regards to fauna, no animals were noted and the only birds seen were feral pigeons which are of low conservation importance.

An Arboriculture survey was undertaken that identified that the two London plane trees on Gray's Inn Road are remote from the core of construction activity and only require minor pruning to provide a separation between them and the building. In addition, the one rowan tree on Holborn is not of exceptional quality and provides an opportunity to replace the tree with a specimen of greater merit (e.g. English oak, liquidambar, tulip tree or hornbeam) in the long-term.

A bat dusk activity survey was undertaken and no bats were observed emerging from 150 Holborn indicating the site has a very low level of bat activity. The static detector installed on the 6th floor did not record any bats and it is therefore considered highly unlikely that bats are roosting within the building, despite bat roosting opportunities.

There are no statutory or non-statutory designated sites within a 1km radius of the site and thus redevelopment is unlikely to in any adverse effects on ecological designations.

The National Planning Policy Framework sets out that opportunities to incorporate biodiversity in and around developments should be encouraged. Within the London Borough of Camden's Replacement Unitary Development Plan (2006), Strategic Policy 8 concerns the Natural Environment stating that the Council will 'seek to protect and enhance the Borough's open space and conserve and enhance the Borough's biodiversity.'

However, given the existing urban location and high level of general disturbance at the site, the opportunities for enhancement are limited. Nevertheless, there is the opportunity to incorporate features that will result in a net biodiversity gain for the site.

The proposed building will not result in any loss of ecologically valuable habitats or features; with the following recommended ecological enhancements to be incorporated into the final design:

- The roofs of the residential block are designed to be covered by green roofs (an extensive sedum roof system is proposed), with the Level 8 floor of the office building including a substantial roof garden that will incorporate a variety of natural and adaptive vegetation types that will suit the local environment and attract indigenous wildlife to the urban landscape. These roof terraces will include a pavilion feature to provide shading for people visiting them, along with strategically located trees and other shade structures;
- Within the passageway and backyard shared surface, there is a vertical garden proposed as a ribbon of walled vegetation along the project boundary;
- Although the tree survey and bat surveys did not indicate that there were either protected trees or nesting bats within the site, they advised design, construction or operational measures to implement to minimise any ecological impacts. Ecological features will be incorporated into the design, adding ecological value to the site by providing habitats (e.g. bird boxes) and resources for a variety of species (principally, invertebrates, birds, bats).

Existing Internal Courtyard

Plane Trees on Gray's Inn Road

BASEMENT


Plant
Plant
Plant
Bike Storage
Plant
Retail
Changing facilities
Storage
Retail
Plant

5. TECHNICAL APPENDICES

5.6 GENERAL ARRANGEMENT DRAWINGS

GROUND

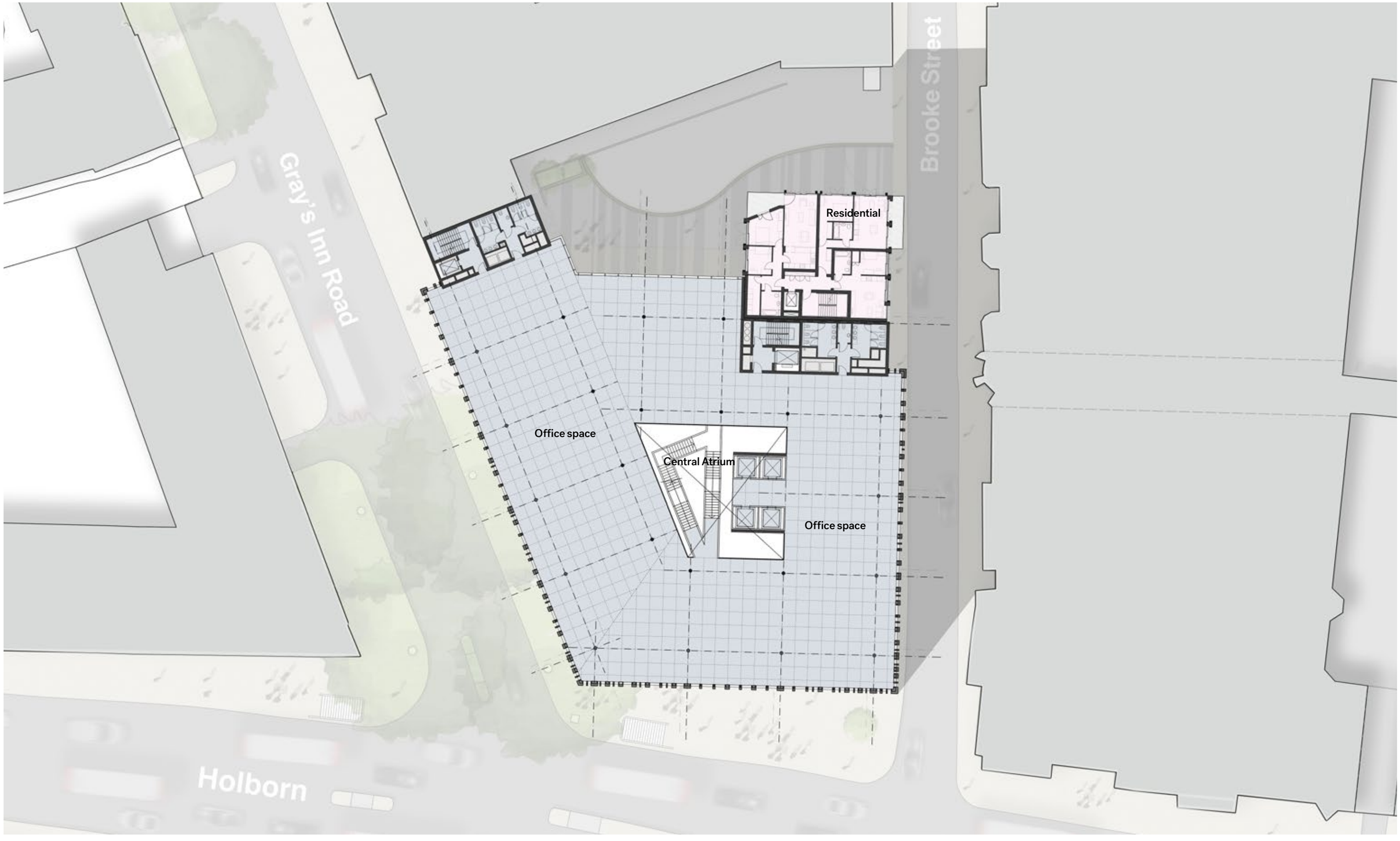
LEVEL 01


Gray's Inn Road
Brooke Street
Holborn
Office space
Office space
Central Atrium
Double height
Double height frontage

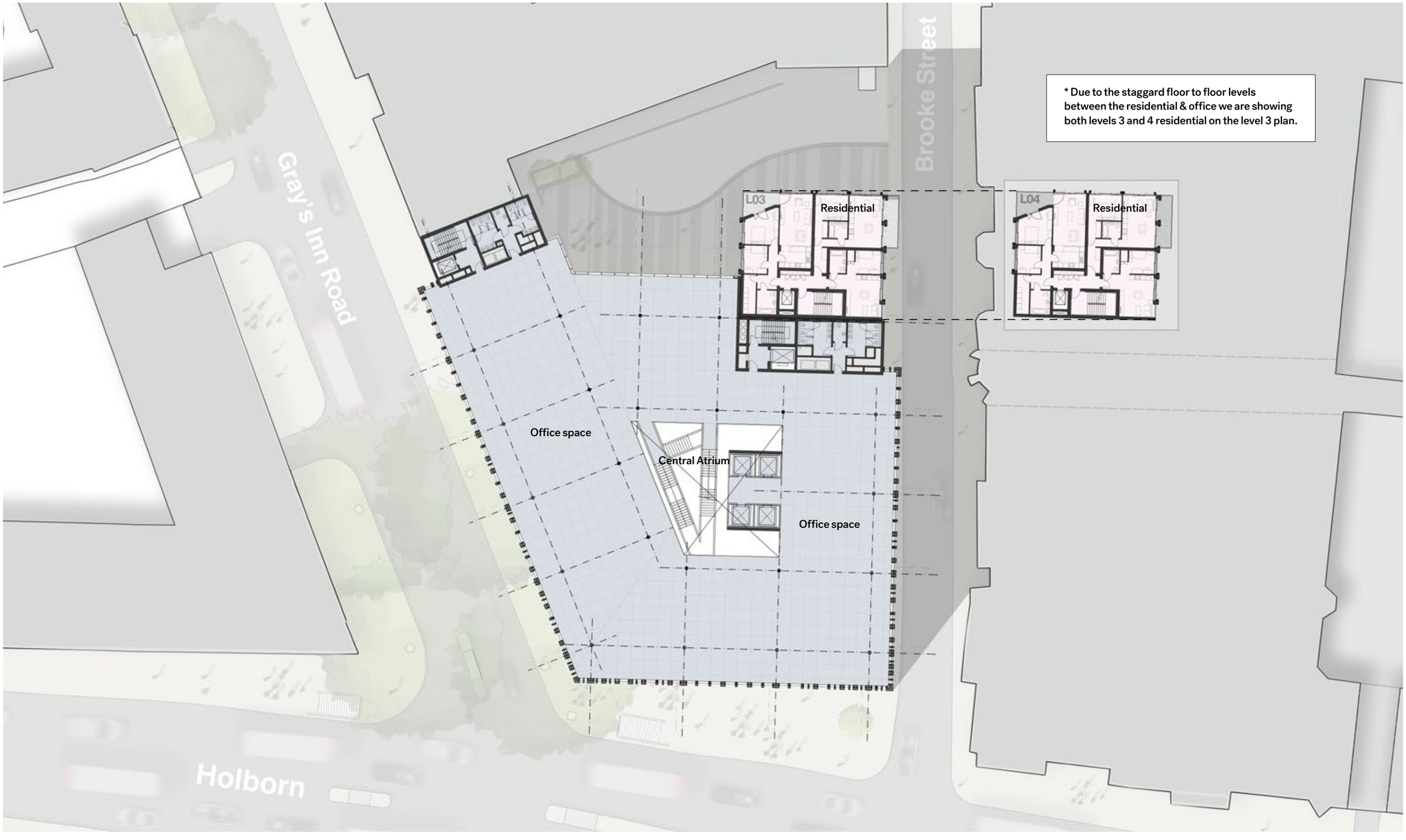
5. TECHNICAL APPENDICES

5.6 GENERAL ARRANGEMENT DRAWINGS

LEVEL 02



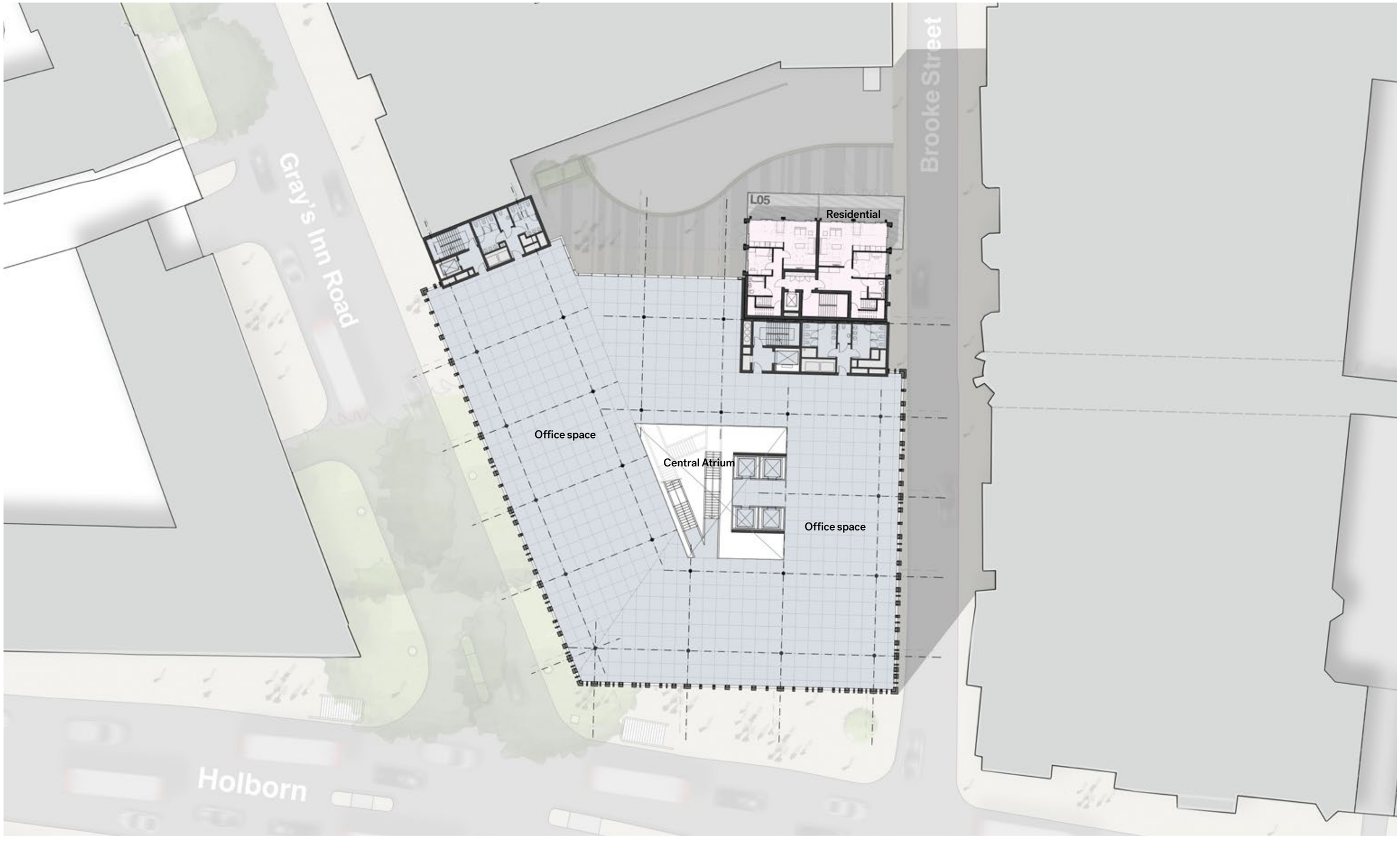
LEVEL 03


Gray's Inn Road
Brooke Street
Holborn
L03
Residential
L04
Residential
Office space
Central Atrium
Office space
* Due to the staggard floor to floor levels between the residential & office we are showing both levels 3 and 4 residential on the level 3 plan.

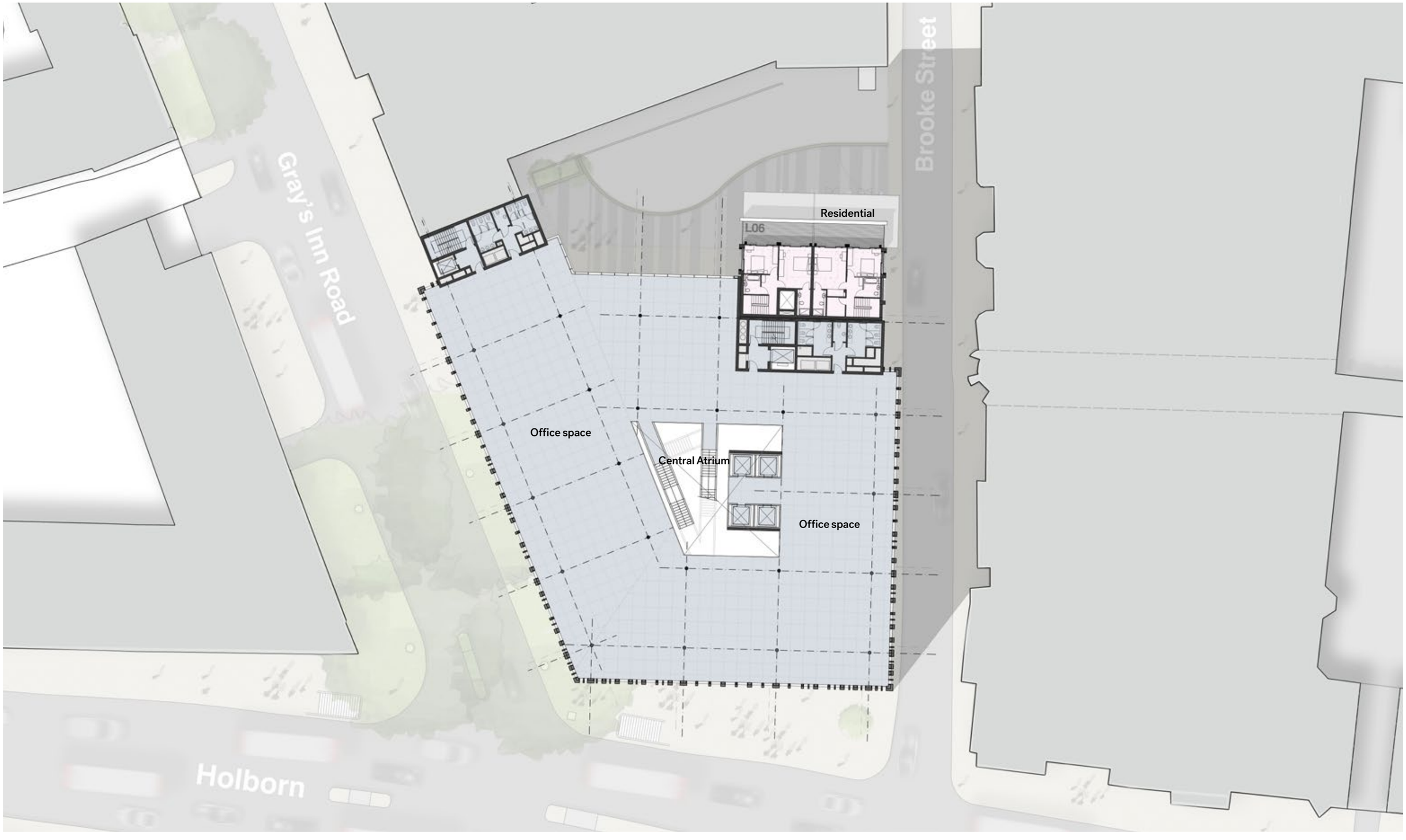
5. TECHNICAL APPENDICES

5.6 GENERAL ARRANGEMENT DRAWINGS

LEVEL 04



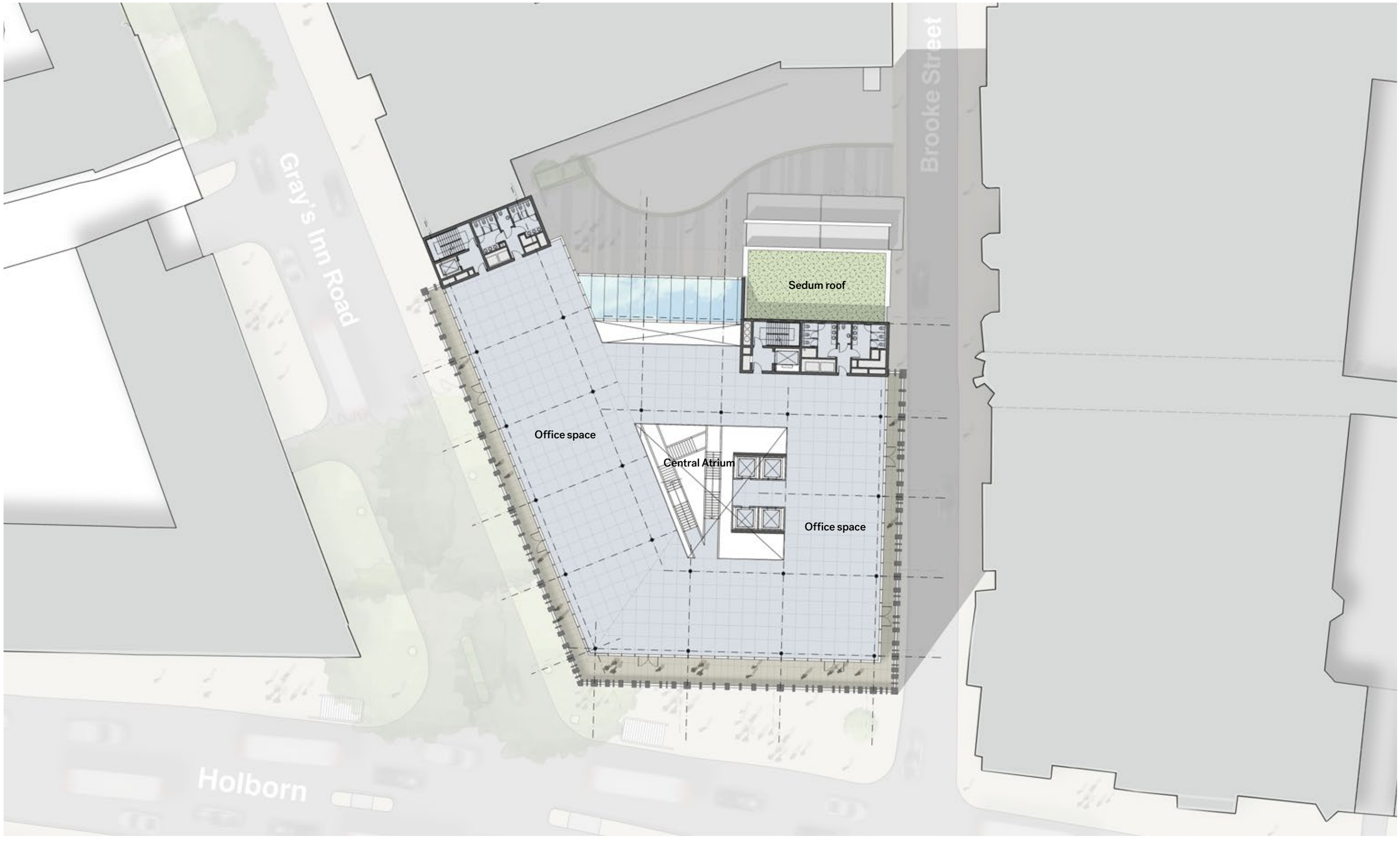
LEVEL 05


Gray's Inn Road
Brooke Street
Residential
L06
Office space
Central Atrium
Office space
Holborn

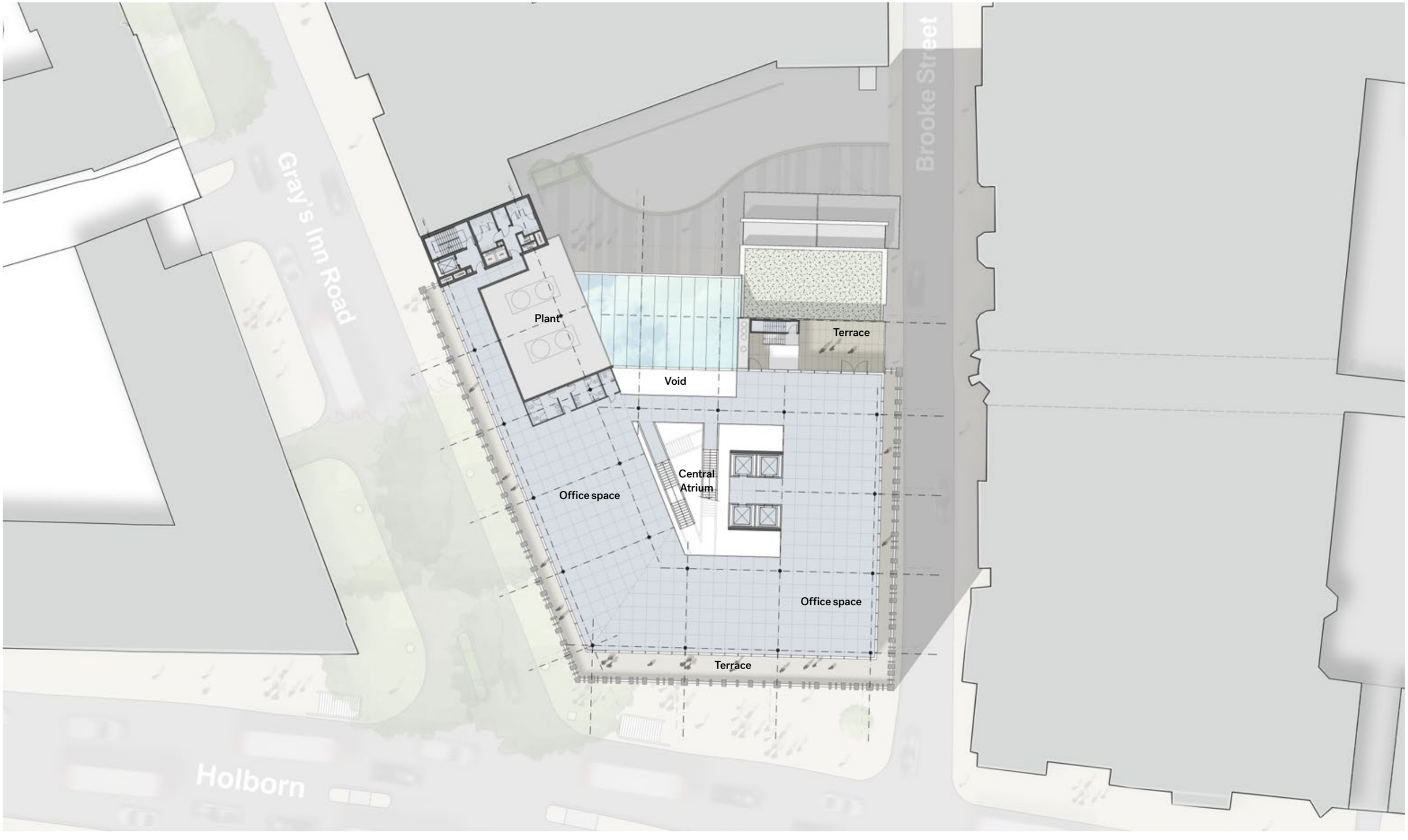
5. TECHNICAL APPENDICES

5.6 GENERAL ARRANGEMENT DRAWINGS

LEVEL 06



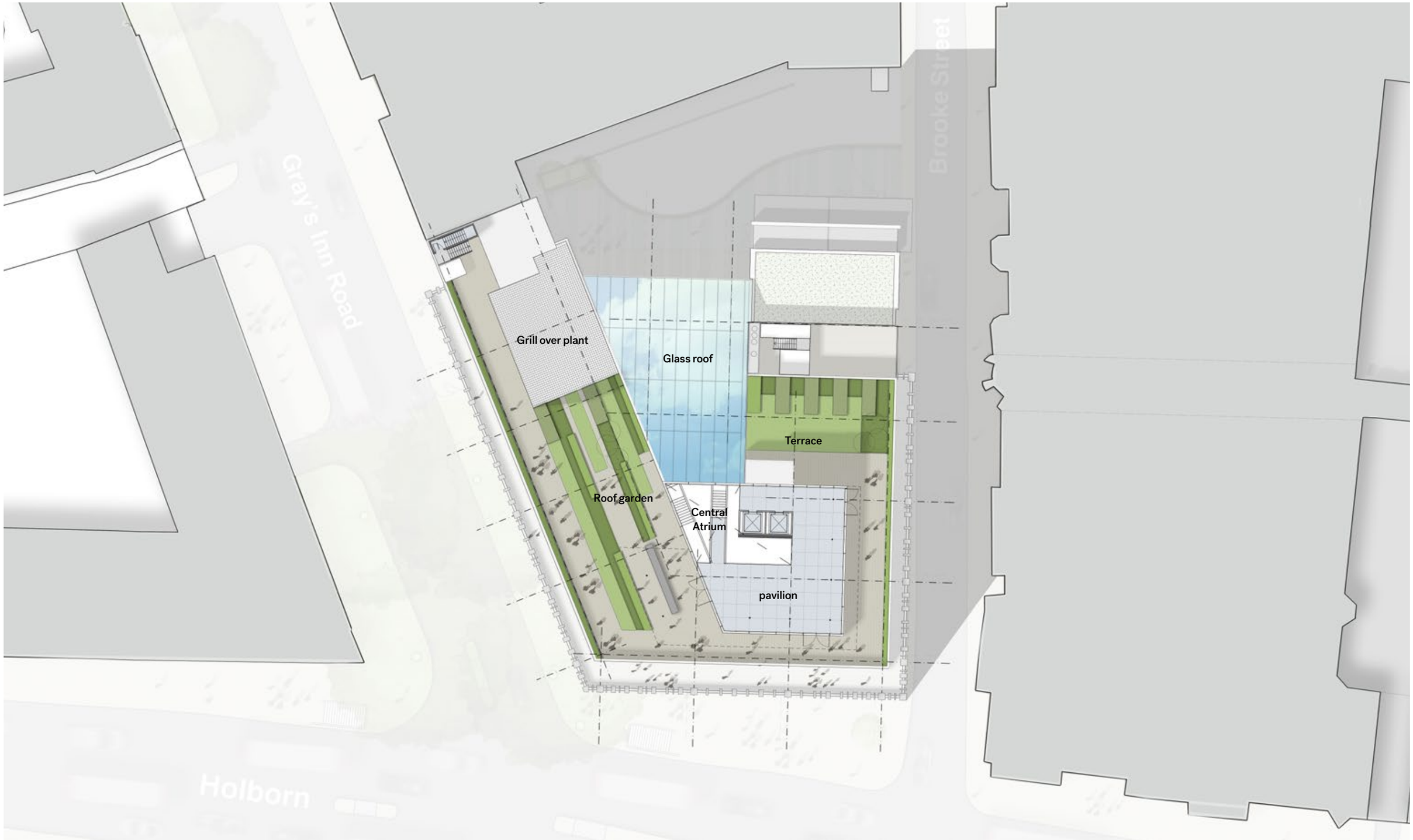
LEVEL 07


Gray's Inn Road
Brooke Street
Holborn
Plant
Terrace
Void
Central Atrium
Office space
Office space
Terrace

5. TECHNICAL APPENDICES

5.6 GENERAL ARRANGEMENT DRAWINGS

LEVEL 08



LEVEL ROOF