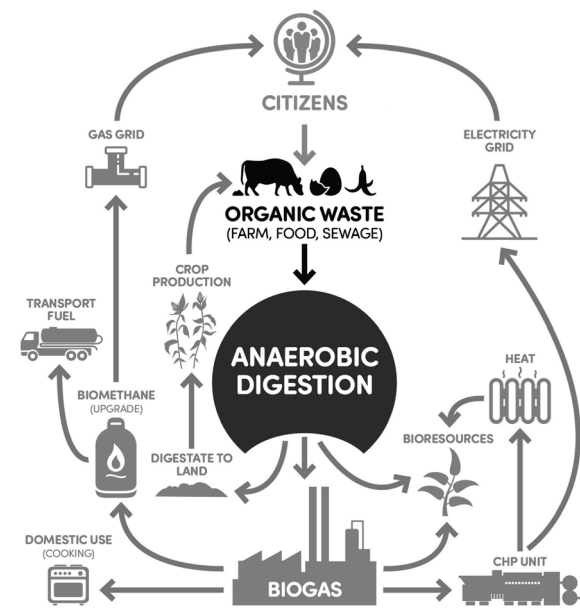


01 Anaerobic Digestion Plant & A Leisure and Social Community Hub

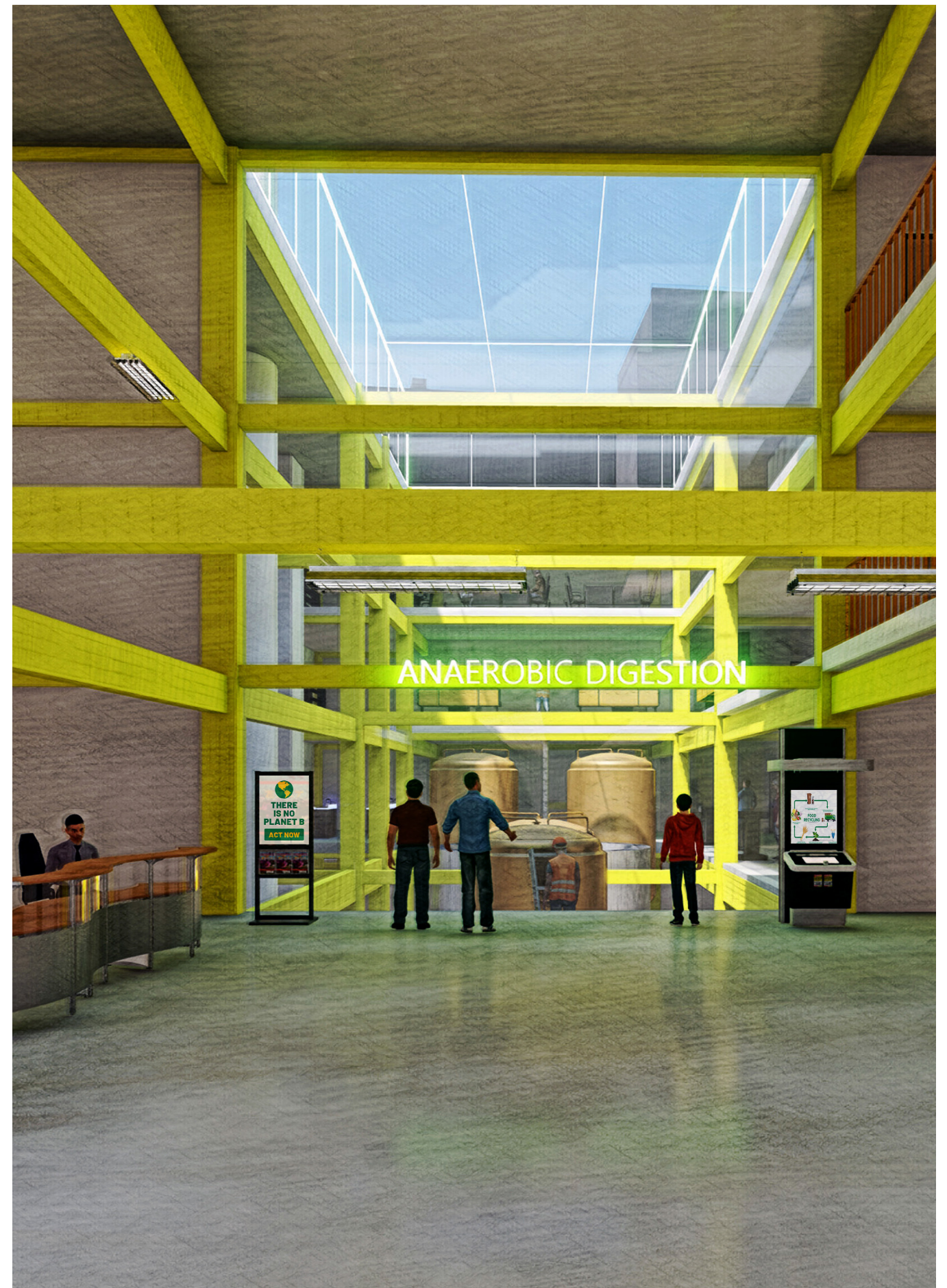
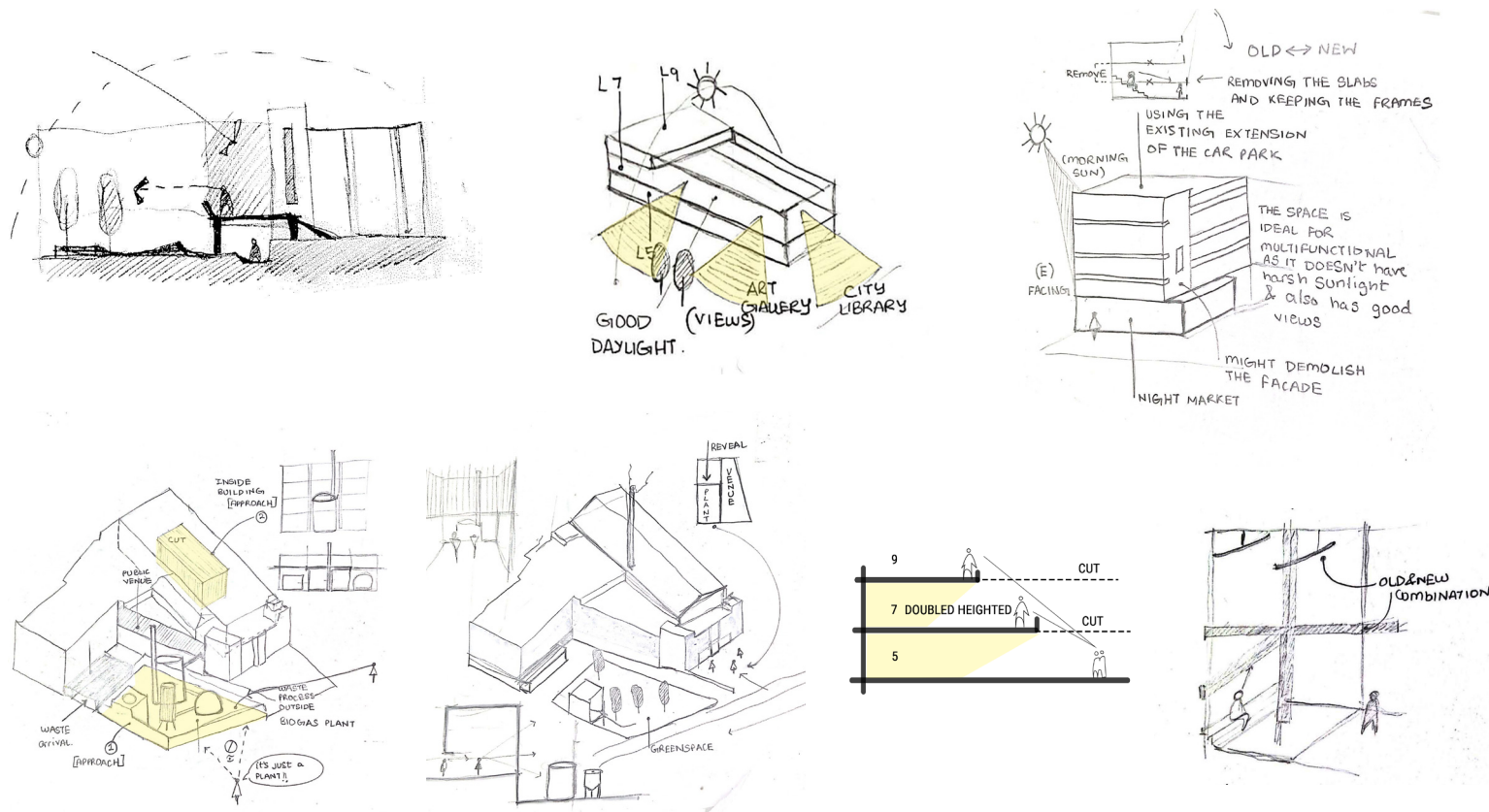
- **Notional Client:** Newcastle City Council
- **Location:** Newcastle Upon Tyne, UK
- **Estimated Budget:** £3,112,998.17

- The task is to design a Recycling facility with a public venue in oldest existing straight ramped multi-storey car park (Now demolished).
- The recycling centre (Anaerobic Digestion facility) will be located in the heart of Newcastle, UK and will specialise in recycling food waste (organic waste).
- The recycled product (Renewable Energy) will be reintroduced into the public venue and will interact with the local community through redistributing, educational, and cultural amenities, and change the way people think about food waste.

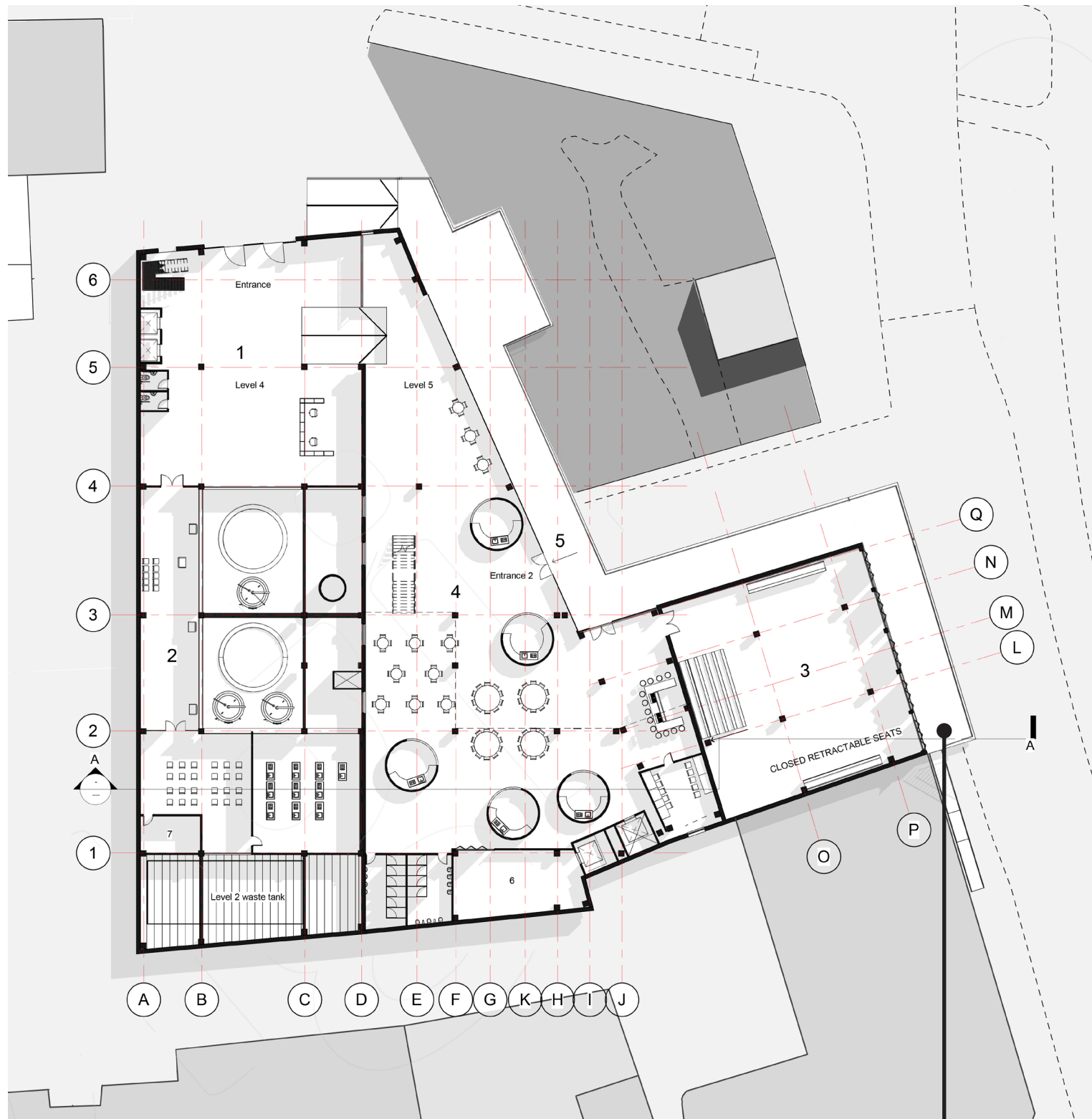


Food Recycling process

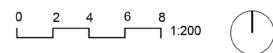
Earlier Concept diagrams



ENTRANCE Perspective- The public will be able to see the vibrant yellow painted pre-existing columns and the energy plant activities upon entering the building. The purpose of painting the existing columns yellow is to give a sense of enthusiasm while also making the location memorable because of it's colour.



1:200 Scale Floor Plan showing level 4-5

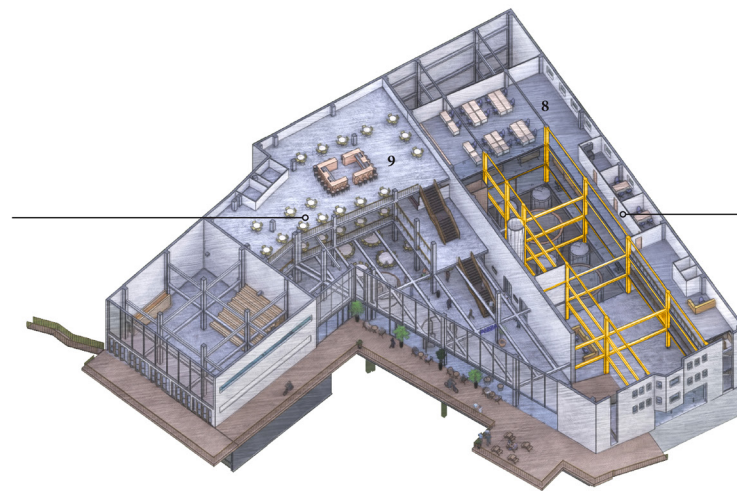


- 1- FOYER
- 2- EDUCATION AND TRAINING SPACE
- 3- Multifunctional Auditorium
- 4- Food Hall with flexible food stalls
- 5- External wooden Platform linked to Food Hall and Auditorium space
- 6- Storage for temporary stalls and auditorium equipments
- 7- Storage for education and training space
- 8- Green room



Food Hall FL 3 Bar

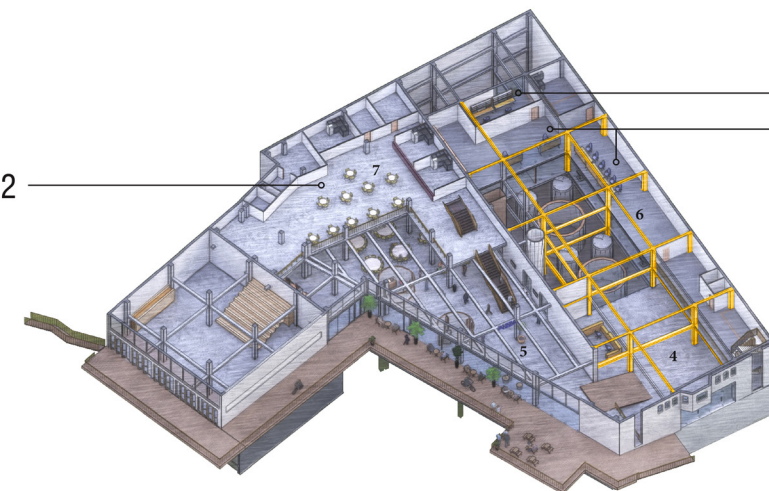
Offices



LEVEL 5-6-7

Food Hall FL 2

Waste management
Control room



LEVEL 5-6-7

Food Hall FL 1

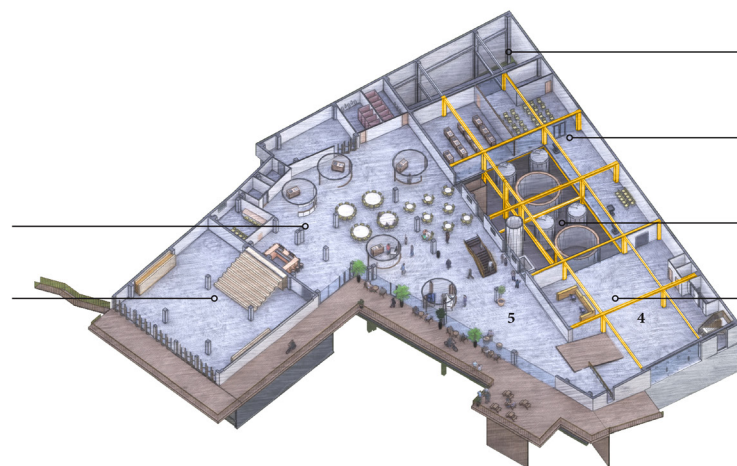
Waste storage

Education &
Training

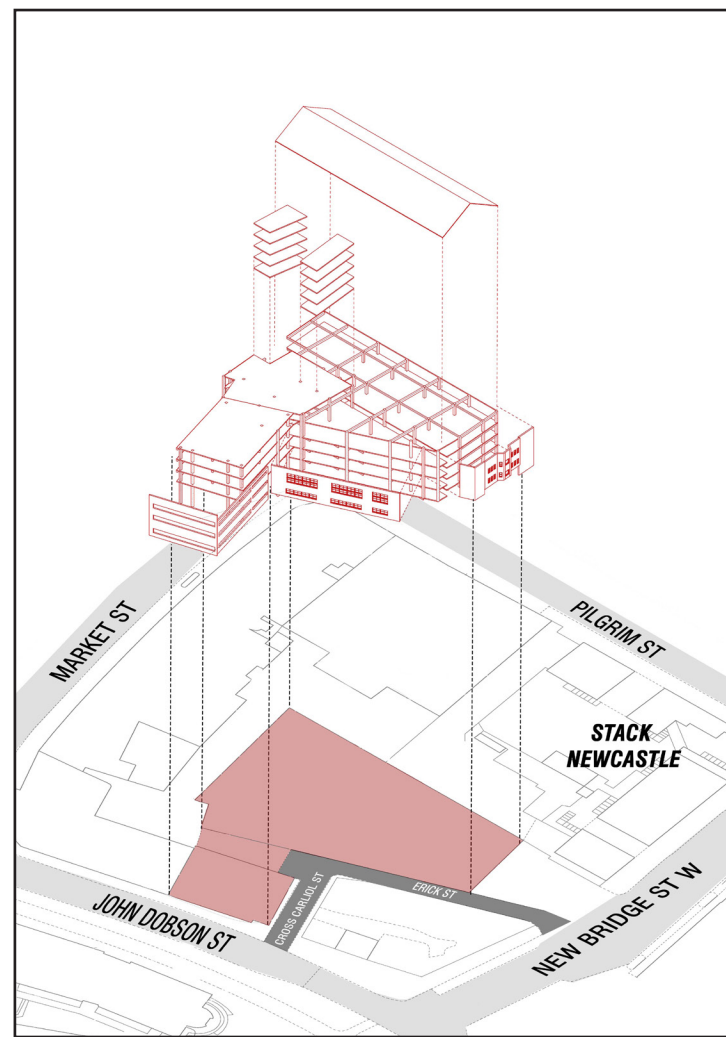
Biogas plant

Multifunctional Hall

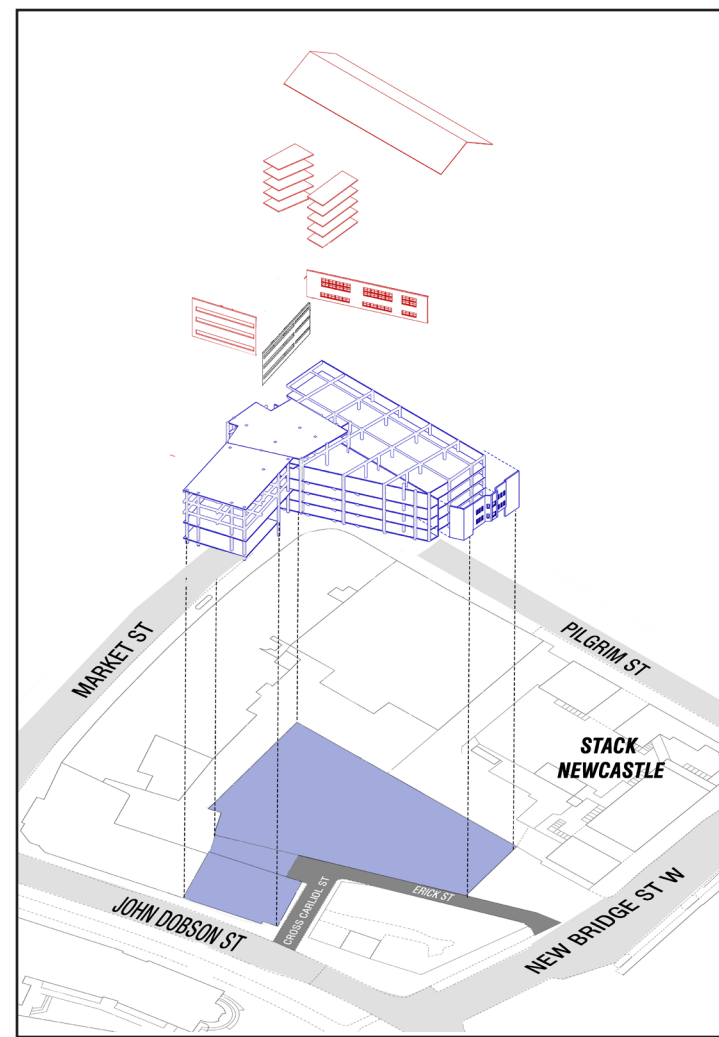
Foyer



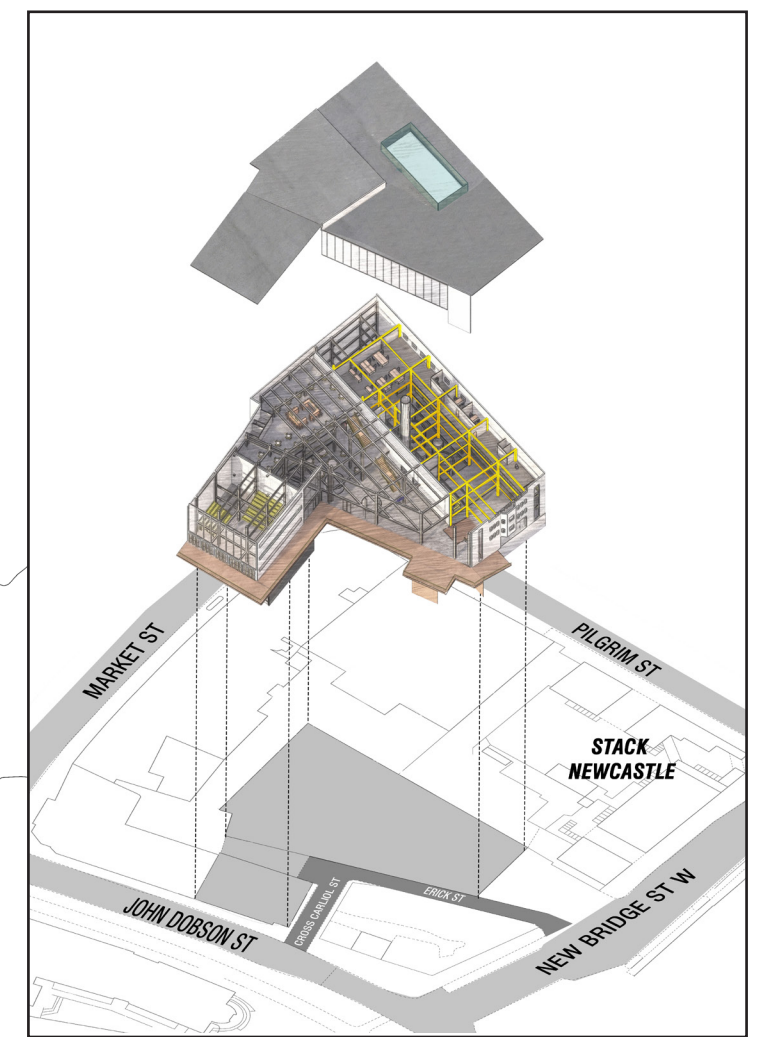
Axonometric illustrating the interiority and cuts made to the existing building, as well as the levels are marked in line with the existing, so the entrance starts from level 4 since the levels 1,2,3 are basements, from which I have taken down the level 3 so as to accommodate the food waste delivery trucks.



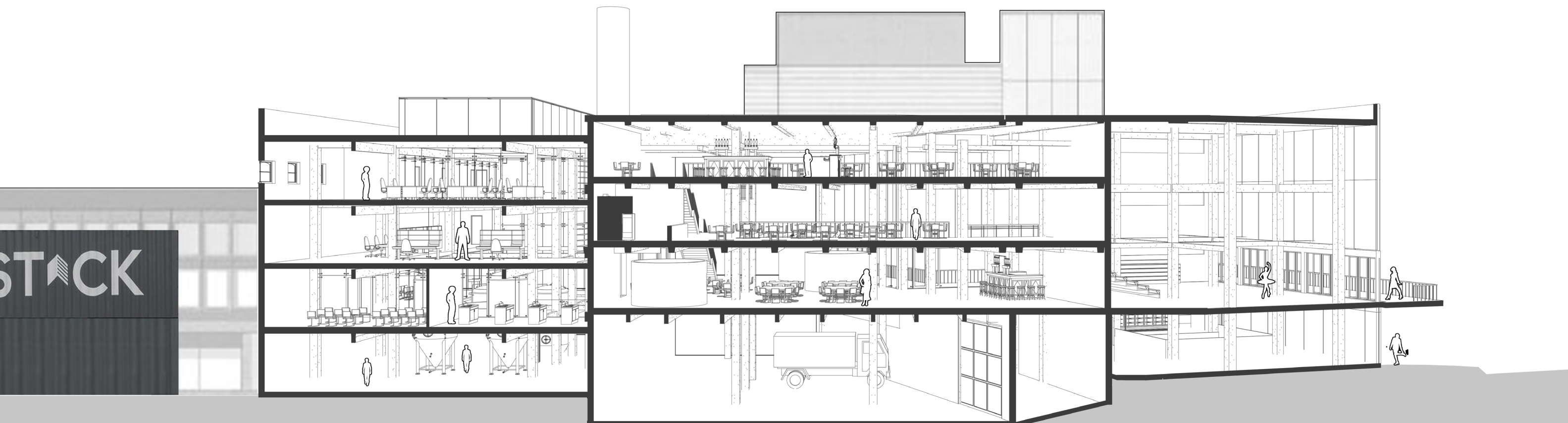
Existing

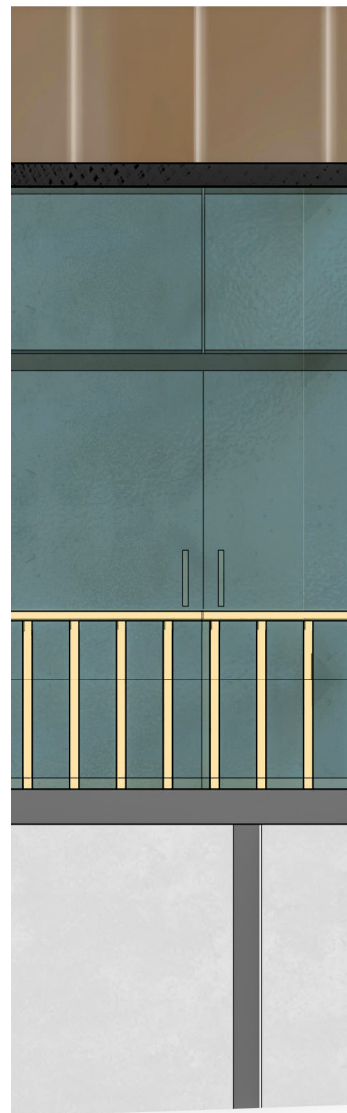
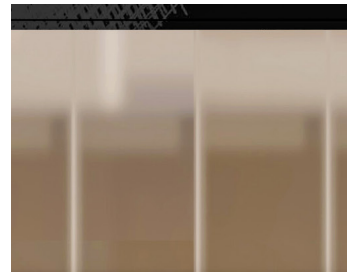
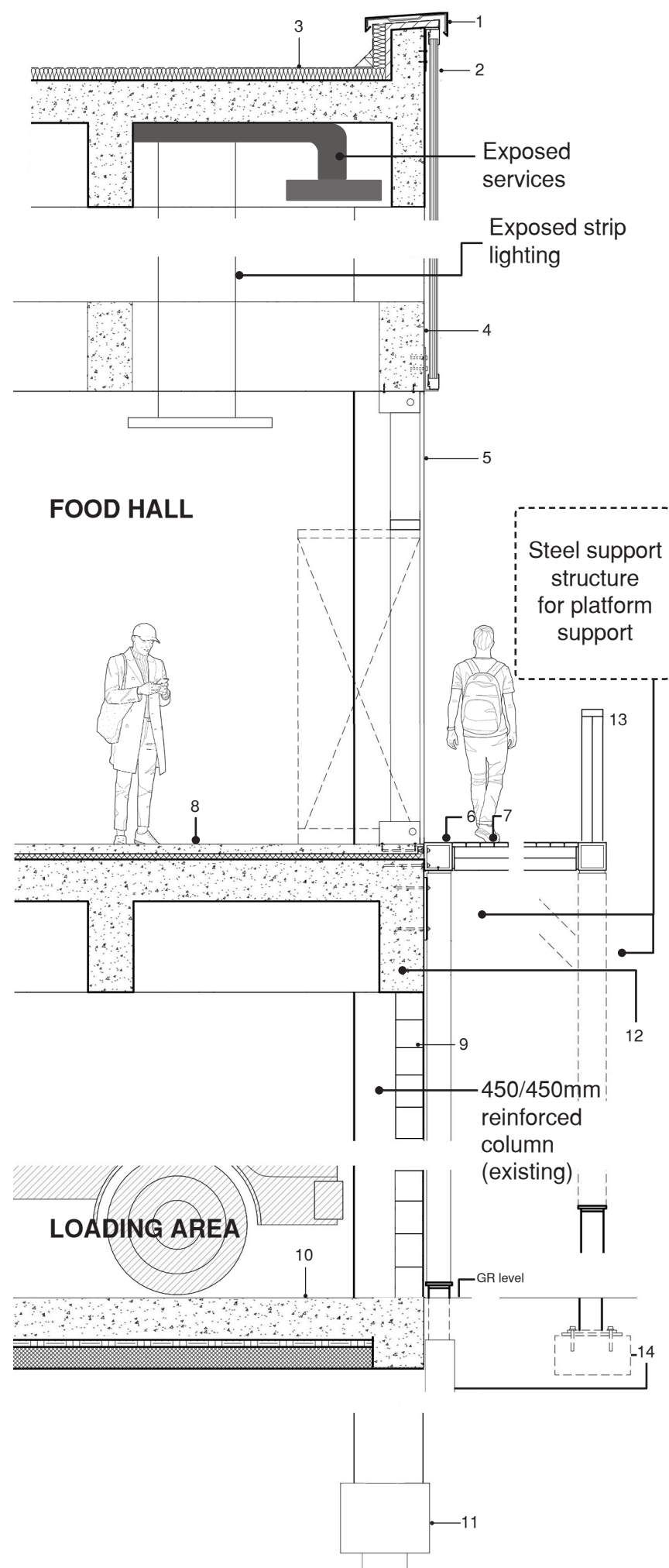


Retained and Demolished



Cutbacks and Final





FOOD HALL FL 1 INTERIOR

- By leaving the services and existing frames exposed and the facade built of polycarbonate and translucent material, a mix of old and modern materials is created, giving interest while also linking back to the Dex car park's existing conditions.

Scale 1:20 Part Section and Elevation

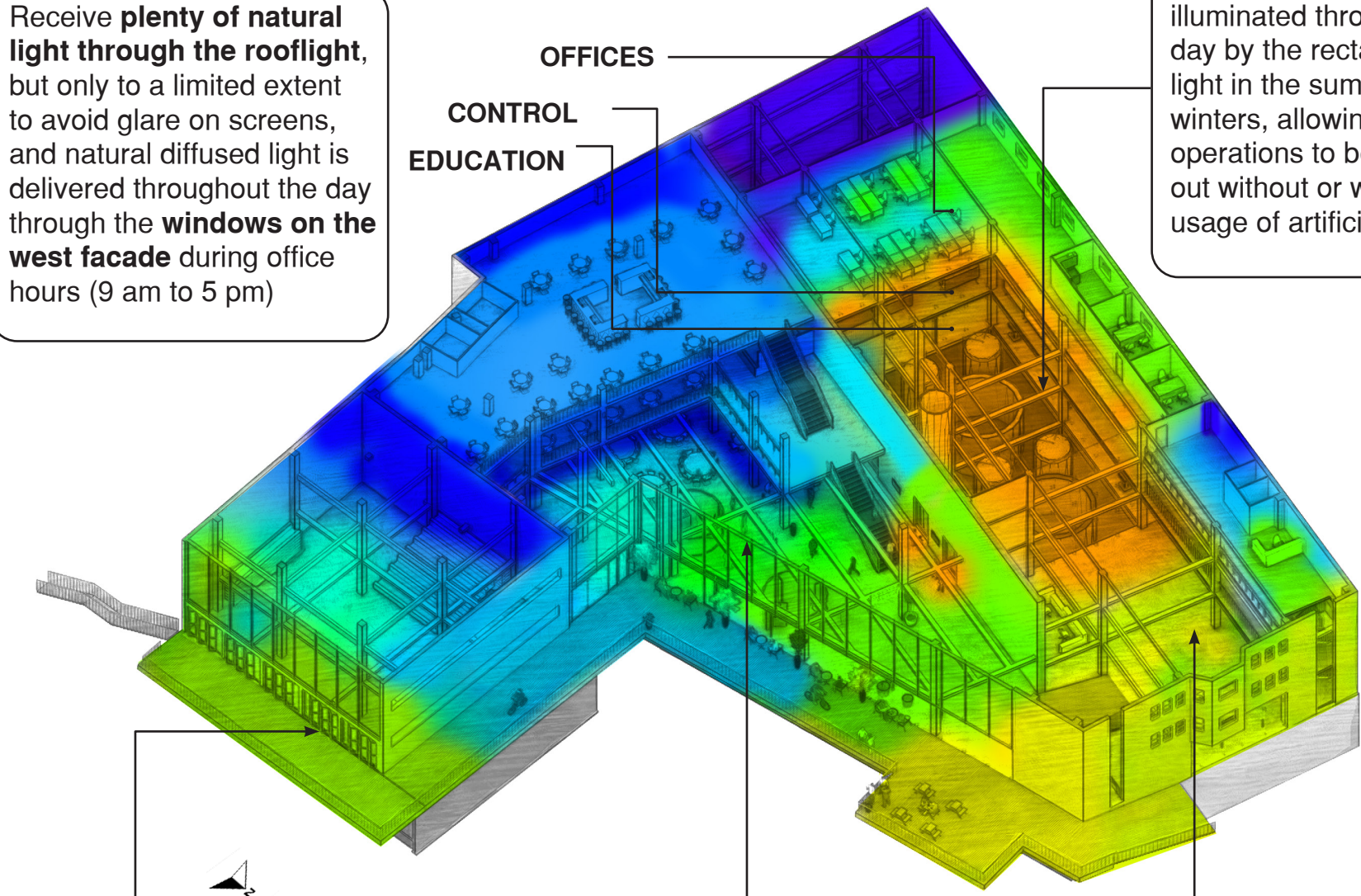
- Aluminium Coping (Graphite black)
Clip
20mm Marine Ply, breather membrane
90mm Rigid thermal insulation (Rockwool HARDROCK Multi-Fix)
- RODECA Polycarbonate cladding 60mm (Crystal) with
Rodeca Frame (Graphite black)
30mm ventilation gap
- Fully Adhered single ply non-bitumous roofing membrane
90mm rigid insulation
Breather membrane
300mm existing concrete slab
- Exposed concrete retained frame primary and secondary beam and no slab on top (slab removed and beams kept)
- Pilkington Planar insulated glass units with glass mullion system 200/19mm rectangular glass mullion
- 20/20/5mm coated steel SHS
- 100/30 mm whitewood spruce timber planks
- 70mm Polished concrete screed
40 mm Rockwool rigid insulation
300mm existing reinforced concrete slab
- 200mm thick Concrete masonry wall, paint finish
- 300mm existing reinforced concrete slab ground bearing
- Pile foundation
- 600/300 existing reinforced concrete beam
- 160/40mm wooden handrail
- Concrete individual footing support for steel structure

Visual Comfort and Lighting Design

DAYLIGHT INTENSITY DIAGRAM

The office, control, and education areas

Receive **plenty of natural light through the rooflight**, but only to a limited extent to avoid glare on screens, and natural diffused light is delivered throughout the day through the **windows on the west facade** during office hours (9 am to 5 pm)



BIOGAS PLANT

The Biogas Plant is naturally illuminated throughout the day by the rectangular roof light in the summers and winters, allowing the plant's operations to be carried out without or with minimal usage of artificial lighting.

BREEAM: Daylighting

- The site being surrounded by high rise buildings receives very less sunlight
- The daylighting in the building is increased with the help of polycarbonate facade and rooflight.

Artificial Light:



Borde CCT Pendant

Foyer, Food Hall

These lights will be hung from the exposed concrete beams and will maintain the original aesthetic of the Dex car park.



Ecophon Dot

Offices, control room and education space

MULTIPURPOSE HALL

The Multifunctional Hall receives natural diffuse light **facing east** throughout the day due to its occasionally occupied character and also darker room requirements, and the materials selected to maximise the light include polycarbonate facade and Oak frame sliding doors with insulated glass in between.

Artificial lighting in night sourced by the reserve from biogas plant making it a renewable source of energy

3 FLOORS OF FOOD HALL

The food hall's natural light is increased with the use of insulating polycarbonate and glass facade, and because there is no direct solar gain during the afternoon hours that is Lunch Hours, the light that is transmitted inside the area is a softer diffused light, creating a comfortable atmosphere. The upper floors are of the food hall receive minimum lighting and use artificial lights to maintain the relaxed lighting conditions

FOYER

Combination of plenty of natural light from the rooflight and diffused light from windows on the north facade create a very comfortable environment in the foyer

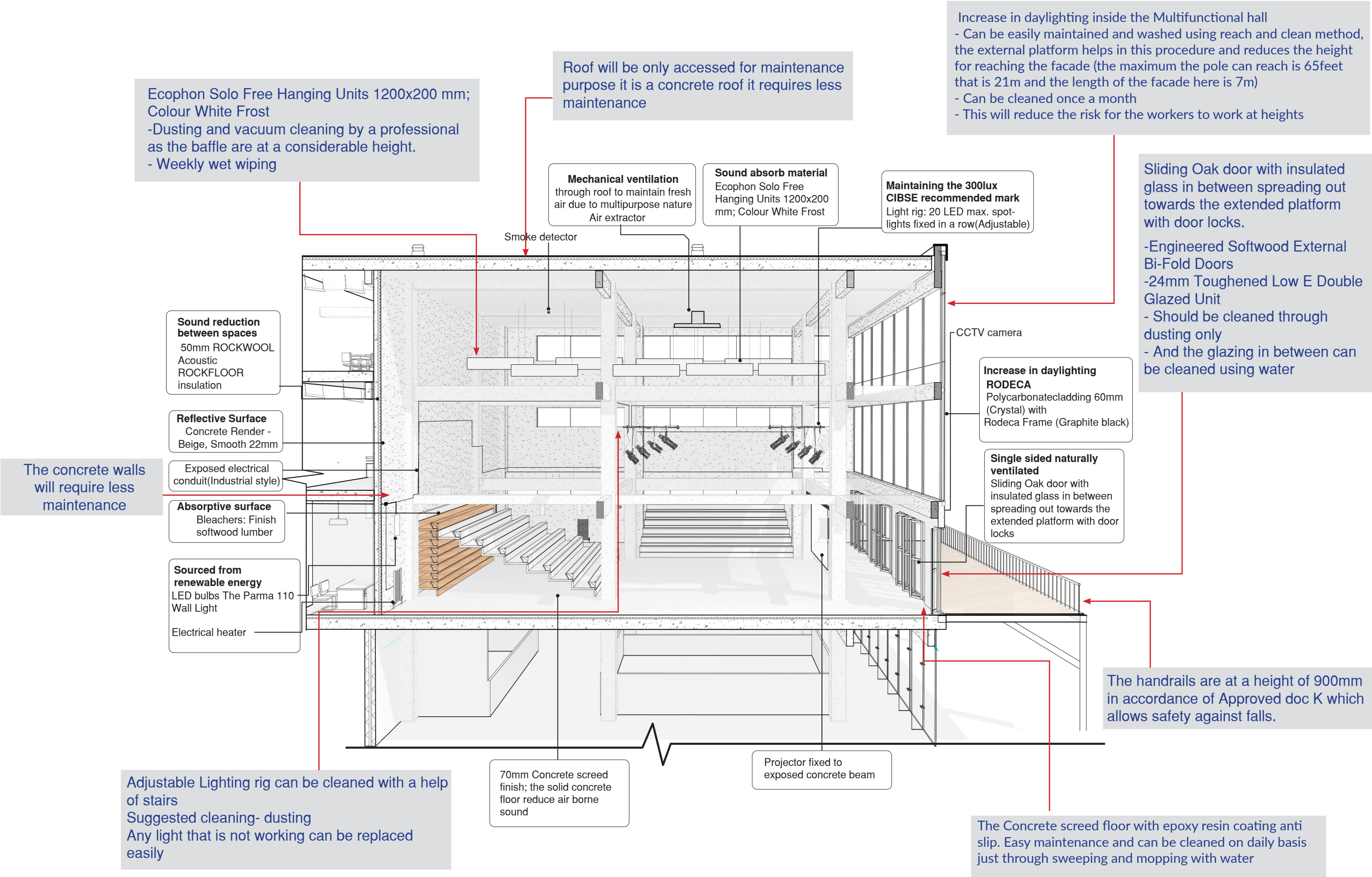


RECOMMENDATIONS

Recommended maintained illuminance levels (Lux) in accordance with CIBSE Environmental Design Guide (Butcher and Craig, 2016)

- Food Hall- Night Club,public house, cafeteria - 200 lux
- Food preparation and cooking -500 lux
- Multi-purpose Hall- 300 lux
- Changing room/Dressing room - 300 lux
- Foyers- 200 Lux
- Offices
- Staff offices with computers -300 lux

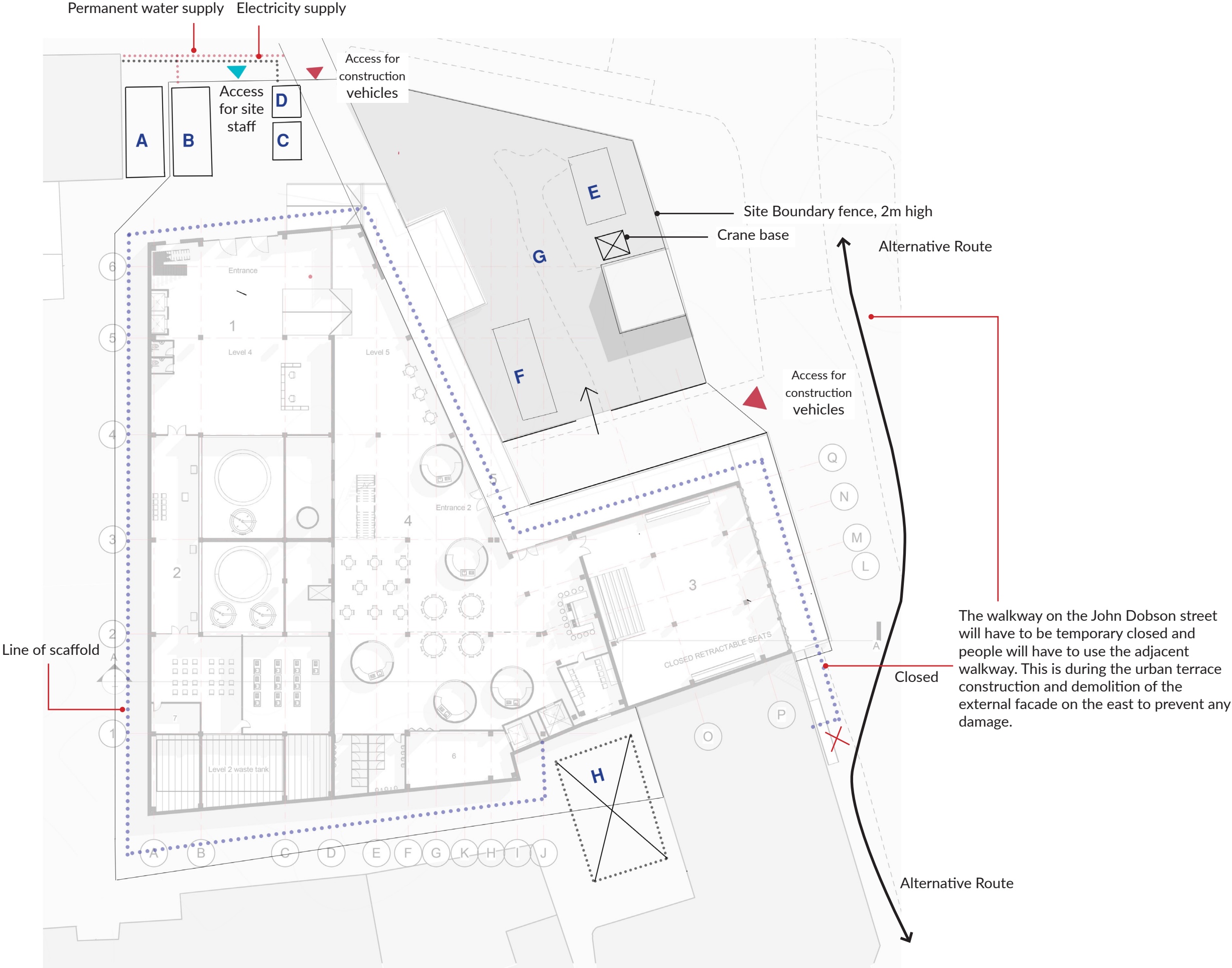
Internal finishes and services integration and Occupancy Considerations



Pre-construction Health and Safety plan

Health and Safety Executive (2006). Health and safety in construction.

- A** Car park for site staff, site visitors
- B** Resting facilities, mess and drying facilities
- C** Portable Toilets with temporary drain connection
- D** Timekeeper, site office
- E** Cement store and area for mixing
- F&H** Scaffold storage
- G** Area where trucks can load the demolition waste to keep the site clear



Building regulations: Part B (Fire Safety)

Information taken from Approved document B: Buildings other than Dwellings



Layout is done in such a way that there no rushing while escaping the building

B1 Warning and escape

1:5 : Automatic fire detection and alarm systems should be provided in non residential occupancies where a fire could break out in an unoccupied part of premises (e.g storage area)

Table 2:1- Offices, shops, and commercial buildings have a maximum travel distance of 18m if travel is only allowed in one direction and 45m where travel is available in more than one way.

Table 2:2
Minimum number of escape routes and exits from a room

The building will have several exits because of the different venues with different levels of occupancy ranging from anywhere 60-400 people, so the minimum escapes routes of 3 will be followed but can be more. In this project there are 6 exits in total

The escape stairs in the food hall have a width of 1500mm more than the minimum requirement and the possible people served here would be anywhere around 200-220

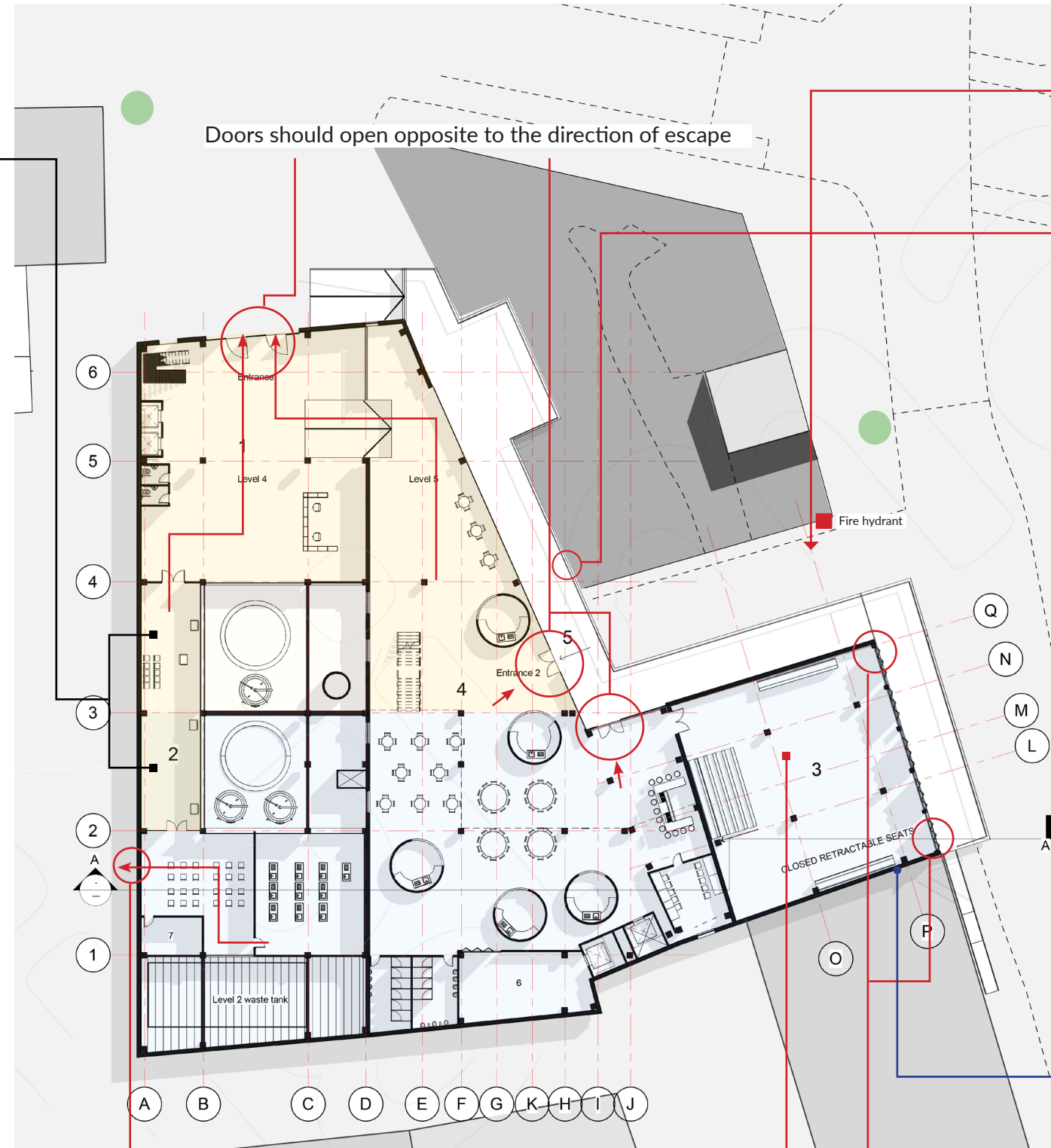
Table 3.1 Minimum widths of escape stairs

Situation of stair	Maximum number of people served ⁽¹⁾	Minimum stair width (mm)
1a. In a 'residential (institutional)' building (unless the stair will only be used by staff)	150	1000 ⁽²⁾
1b. In an 'assembly and recreation' building and serving an area used for assembly purposes (unless the area is less than 100m ²)	220	1100
1c. In any other building and serving an area with an occupancy of more than 50	Over 220	See note 3
2. Any stair not described above	50	800 ⁽⁴⁾

Table 2.3 Widths of escape routes and exits

Maximum number of people	Minimum width (mm) ⁽¹⁾⁽²⁾⁽³⁾
60	750 ⁽⁴⁾
110	850
220	1050
More than 220	5 per person ⁽⁵⁾

Assembly Points -



A alternative escape should also be considered here because as the chances of fire in the Kitchen workshop is more and the travel distance from kitchen to possible escape is very far this will also reduce rushing in event of fire

The bi-folding doors can also be used for escape

Alternative fire escape door to be considered for quick escape

B5: Access and facilities for fire service

- There is a lot of space for the fire fighters, also enough space to turn around
- The use of fire hydrant
- A staircase of 1500 or more should also be considered for quick escape as the food hall is very vulnerable to fire and also most of the people will be accommodated in that space

B2&B3: Internal Fire spread (Linings & Structure)

- As the interior walls are made of pre-cast concrete panels they resist fire for safe evacuation, it reduces the spread of fire from one room to another.
- Precast walls were used on to inside because of it's impact resistance and also because of noise of plant
- Also the internal Pilkington fire-resistant glass partitions are also non combustible reducing the spread.
- The floors and intermediate walls are made of concrete will also help stop the spread of fire from one to another.

B4: External Fire spread

- The external walls are cladded with Pilkington Pyroclear (E glazing), and RODECA Polycarbonate cladding 60mm (Crystal) with Rodeca Frame (Graphite black) B-s1,d0 which can resist fire.
- The existing structure is reinforced concrete frame which is non combustible and withstand the fire for a long time before collapsing.

— This is a reinforced concrete wall to stop the spread of fire from harming the adjacent property

HM Government

The Building Regulations 2010

Access to and use of buildings

APPROVED DOCUMENT

M

VOLUME 2 – BUILDINGS OTHER THAN DWELLINGS

M1 Access to and use of buildings other than dwellings

M2 Access to extensions to buildings other than dwellings

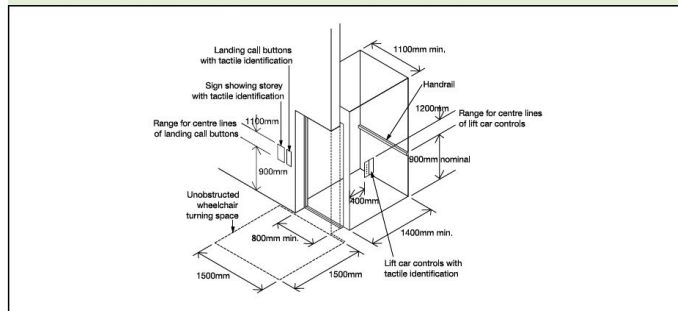
M3 Sanitary conveniences in extensions to buildings other than dwellings

For use in England www.bes.gov.uk ONLINE VERSION

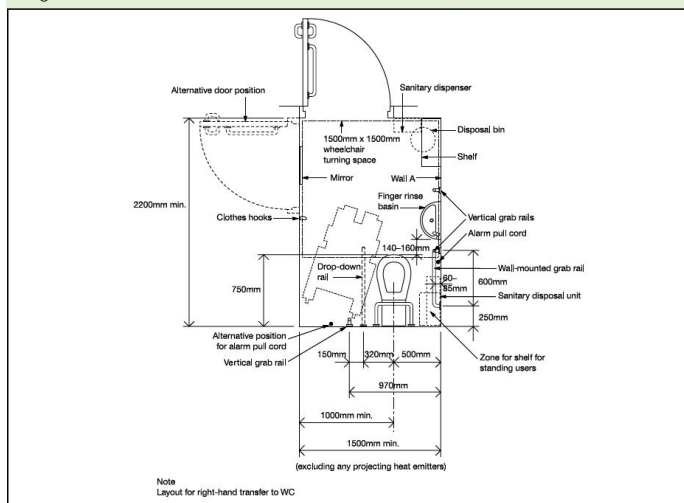
2016 edition
published January 2016

3.34 D,G, H: Passenger lift design

- Diagram 11 Key dimensions associated with passenger lifts



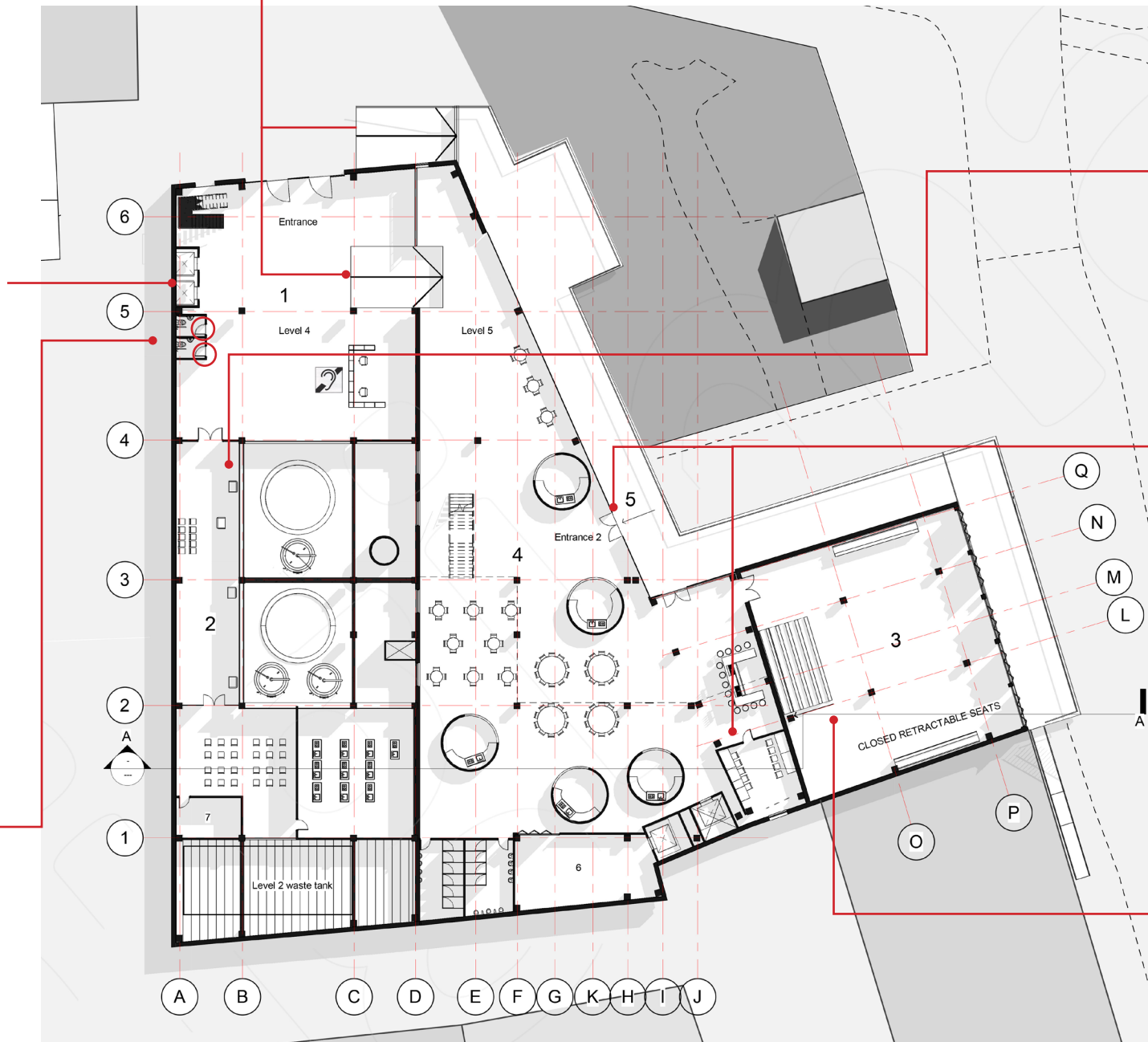
- Unisex accessible toilets in the foyer
- Complying the minimum size 1500x2200mm
- Doors have to open outwards
- Grab rail provisions in these toilets

Diagram 18 **Unisex wheelchair-accessible toilet with corner WC**

According to the limit for ramp gradients the maximum gradient 1/12 corresponds to an angle of 4.74 degrees. So the gradient with an angle of 8.69 degrees will require assisted support for wheel-chair access

Going of a flight	Maximum gradient	Maximum rise
10m	1:20	500mm
5m	1:15	333mm
2m	1:12	166mm

For goings between 2m and 10m, it is acceptable to interpolate between the maximum gradients, i.e. 1:14 for a 4m going or 1:19 for a 9m going (see Diagram 3).



The design layout is created from the beginning with the goal of making it accessible to all. As a result, internal ramps connecting to the food hall, as well as slip resistant ramps on the exterior are considered for maximum accessibility to all spaces including the urban terrace. Furthermore, all internal public spaces are located on the ground and first floors, which are accessible via a non-slip ramp clad with marble composite planks.

- To be located to be easily accessible
- Two work surface heights for standing/sitting visitors
- Clear manoeuvring space in front desk-1400 deep x2200 wide

The reception is easily accessible and clearly visible on entry. And an induction loop sign will be placed right at the entrance.

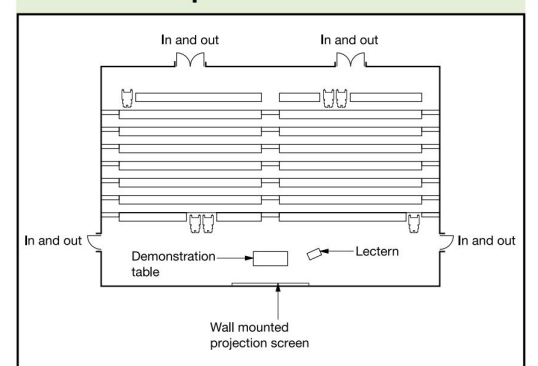
- **Corridors should have a unobstructed width of 1800mm so that two wheelchairs can pass each other comfortably.**

- **Door Accessibility**

Doorways should have a minimum clear width of 800mm
All single doors in this scheme have a clear with of 800mm
Double doors have a clear width of 1800mm

Wheelchair accessibility must be considered in the multifunctional hall

Diagram 13 An example of wheelchair spaces in a lecture theatre



In this design, the exposed frames are bright yellow, the walls are white, and the floor is greyish, which is ideal for visually impaired people because it creates a clear separation between the floor, frames, and walls.