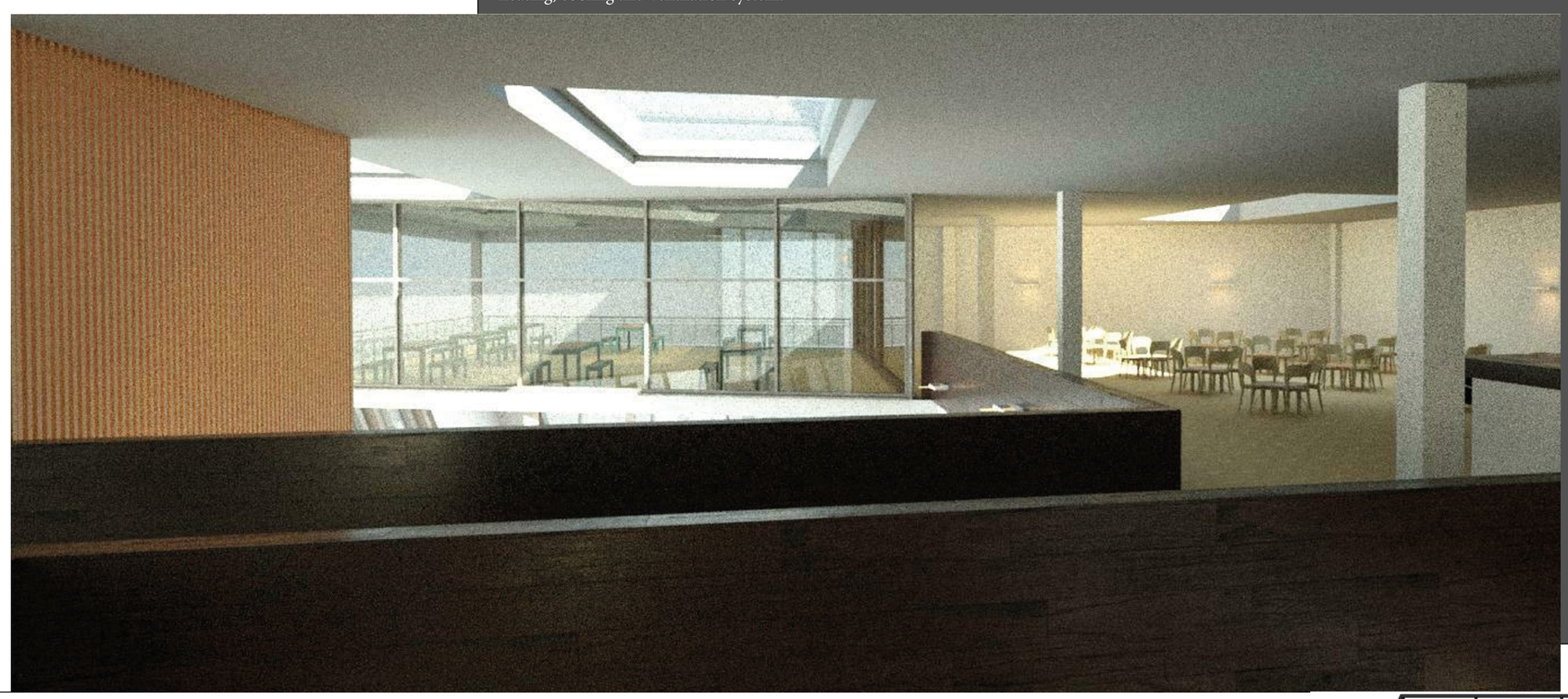
Cardiff Bay Performing Arts Centre

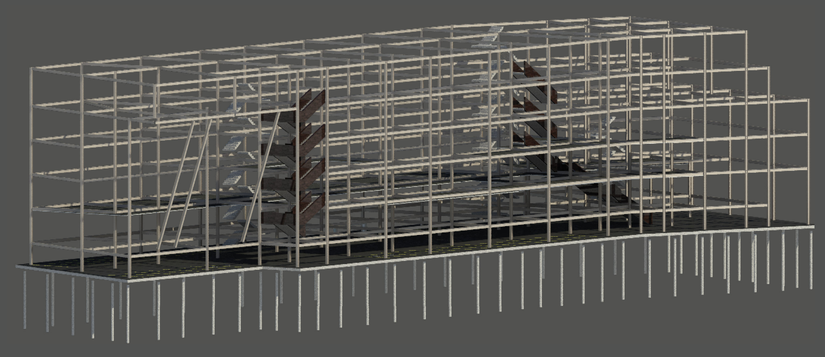
Located in the Welsh capitals outer city, this Performing Arts Centre will feature as one of the central attractions in Cardiff Bay. The building is 5 storeys high with an underground carpark which is accessed from the rear and each floor varies in area with voids in each level to maximise the capture of natural light.The Centre hosts a huge variety of arts, from performance arts to visual arts. The scheme houses a theatre and cinema for an experience never seen under the same roof before in the very popular area. The main entrance of the building is located on the South side of the Bay and it features a Plaza area with big seating areas, arts sculptures and water fountains.

The building has two opposing cladding types which were chosen to fit into the surrounding landscape and buildings. These are Slate Stonepanels from Taylor Maxwell and a vertical Garapa KD timber cladding. The timber cladding is a light shade and contrasts well with the darker thin slate. This aesthetic for the building is essential to fit into its environment as most of the surrounding buildings feature slat and/or timber as a cladding choice. These materials are sustainable as they are locally sourced, easy to maintain and are naturally found.

The modern look continues through to the inside of the building where wood is a very prominent material. Different types were used to give different aesthetics throughout the building. The sky bar viewing area offers quite possibly the best view out onto the bay water from 5 storeys high. The main atrium space houses a big timber and green feature wall which runs from level 1 to levels 5 and 4. Simplicity and sustainability are the main focuses of the design and these can be seen in every aspect of the building.

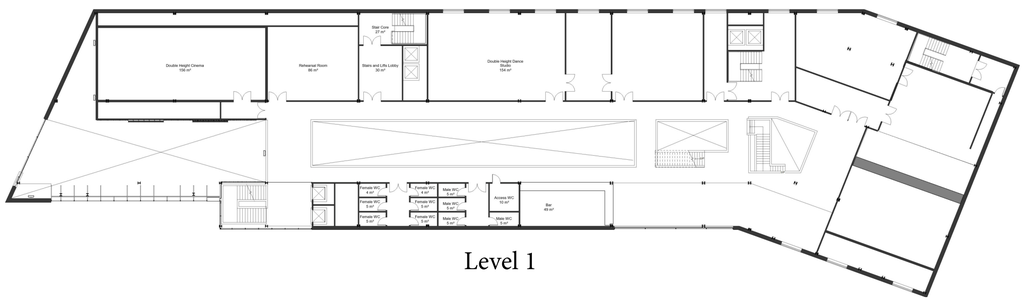
The Performing Arts Centres design features an IKO Permaphalt Green Roof. This is one of the only green roof systems featured on a buiding in Cardiff Bay. Due to the development of Cardiff Bay growing rapidly, this was chosen to redevelop the natural ecosystems that would have featured on the land that was excavated during construction. This in turn improves outdoor air quality and can also reduce energy costs for the buildings HVAC system. The green roof system will keep the roof temperature cooler in the Summer months and will add extra insulation for the Winter months which will reduce loading on the heating, cooling and ventilation system.



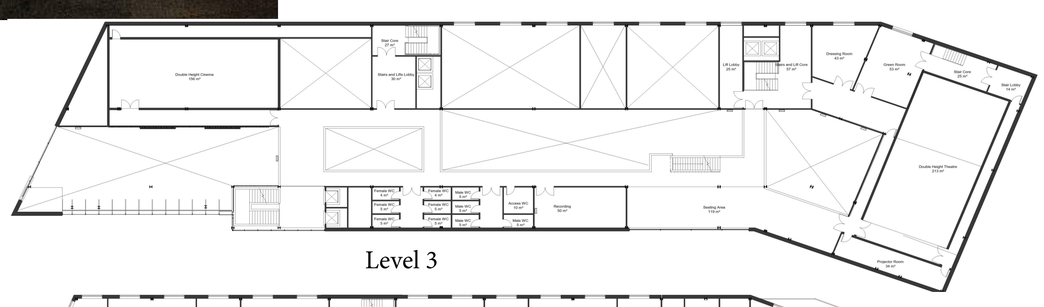


The buildings structural frame is designed to be steel. Each structural column is a 254x254x73mm I-section and wherever possible they are run from the foundation floor slab to the roof level. The only exemption to this is the tiered section of structure on the East side as the columns are supported from a deeper beam to spread the load. Each structural beam used is a 305x165x40mm and these dont vary throughout the building other than the tiered section.The steel frame structure is supported from a 300mm floor slab which has a ground beam running on the exterior perimeter. Under the ground beam are sets of piles that are grouped in pairs to support the structure above. Ontop of the level 0 floor slab is a carpark topping which is resistant to cracking, movement and excessive wear due to the level 0 carpark being in use at all times to the public.

Level 0



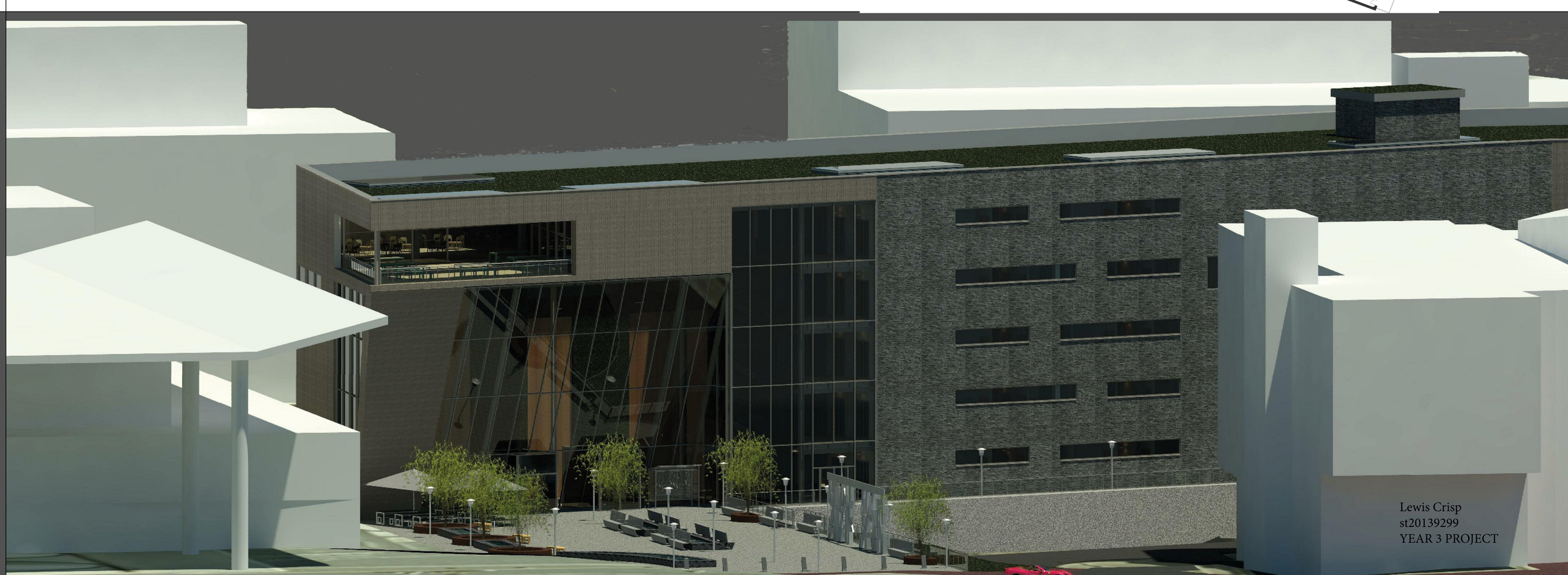
Level 1



Level 3

Level 4

Level 5



Lewis Crisp
st20139299
YEAR 3 PROJECT

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ST20139299
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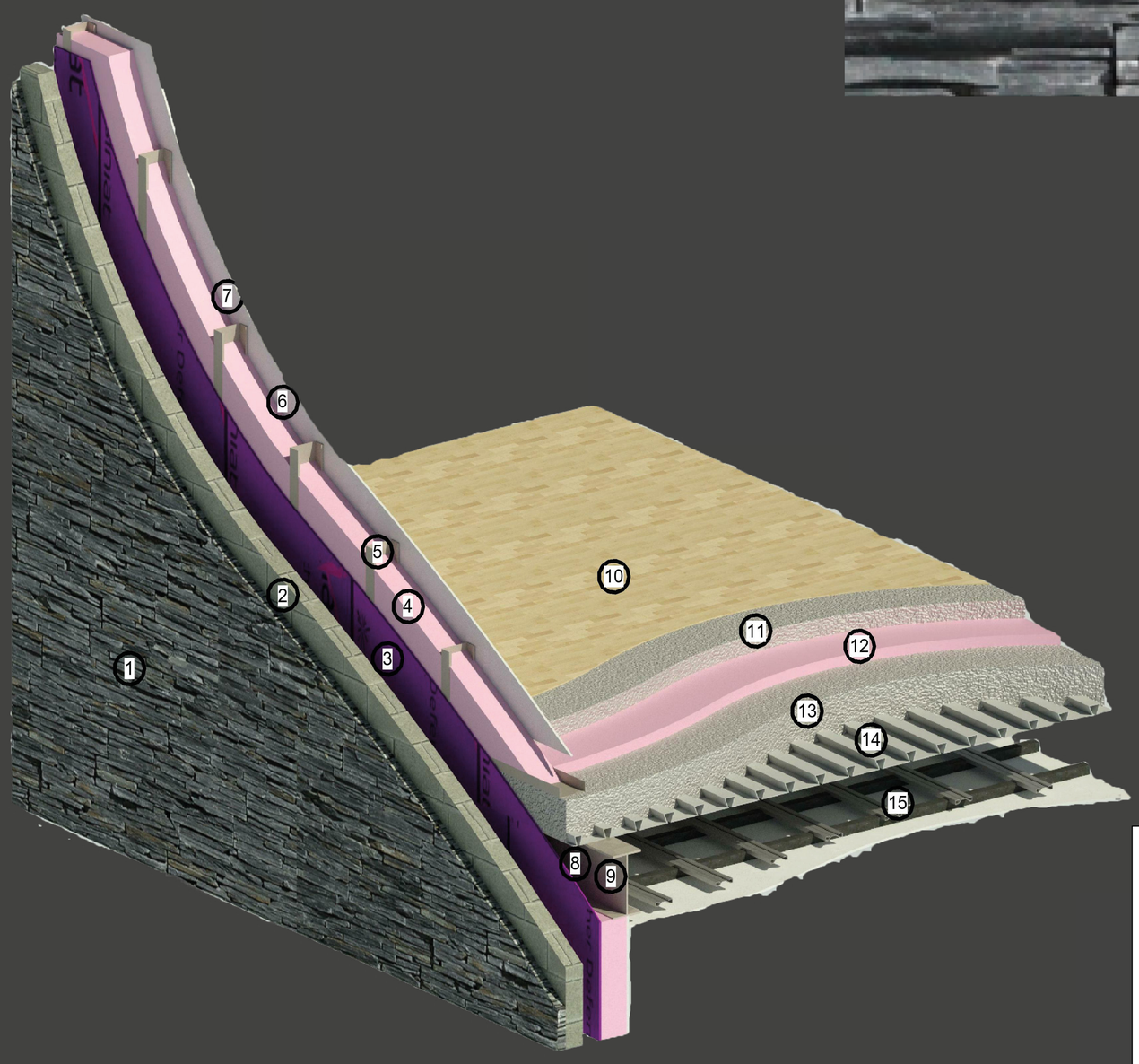
ENVIRONMENTAL STRATEGY

With sustainability in mind throughout the design stages, the buildings environmental strategy is very effective. The green roof is the most sustainable part of the external envelope as there are many environmental benefits that come with it. To name a few of them:
1. Saves energy heating building in the Winter due to extra insulation
2. Saves energy cooling building in the Summer due to the roof being a colder temperature
3. Recreates the natural ecosystem that was destroyed whilst excavating site back onto the building
4. Slows down the path of rainwater into gutter systems which leads to less maintenance
5. Photosynthesis can re-occur meaning improved air quality
6.Reduced Construction costs: no requirement for screed on the deck, reducing the overall weight imposed; fewer rain-water outlets; decreased rainwater drainage system capacity; reduced requirement for storm water attenuation within the SUDs scheme for the site.
7.Increases lifespan of waterproof membranes

All materials used are sustainable due to them being locally sourced, recyclable and having a longer lifespan than most alternatives.

The buildings heating and ventilation is controlled via High Efficiency HVAC. HVAC is a system that takes used and polluted air out of rooms in the building, filters it and then re disributes the fresh air into rooms that require heating, cooling or a cleaner air supply. HVAC is one of the most sustainable strategies available and has many benefits. These are:
1. Improves air quality
2. Sves costs on heating, colling and ventilating
3. Provides comfort throughout the building
4. High efficiency systems use up to one-third less energy



3D DETAIL OF SLATE STONEPANEL WITH SFS INNER MEETING INTERMEDIATE FLOOR

1)-JET DARK THINSET Z-SHAPE SLATE STONEPANEL CLADDING PANELS

2)-100MM TARMAC MEDIUM DENSITY BLOCKWORK

3+6)-12.0MM SINIAT WEATHER DEFENSE BOARD

4)-150MM GYPROC THERMALINE IINSULATION U VALUE= 0.18 W/M2K

5)-KNAUF VERICAL SFS STUDS

7)-25MM(2X12.5MM) KNAUF ACOUSTIC PLASTERBOARD

8)-ROCKWOOL TCB HORIZONTAL CAVITY BARRIER

9)-HOT ROLLED STEEL BEAM 305X165X40MM

10)-ENGINEERED OAK WOOD FLOOR FINISH 5MM

11)-80MM FLOATING SAND CEMENT SCREED WITH WET UNDERFLOOR HEATING SYSTEM

12)-50MM KINGSPAN KOOLTHERM K103 FLOOR BOARD INSULATION

13+14)-200MM CONCRETE CAST IN-SITU FLOOR SLAB WITH COMFLOOR 51+ STRUCTURAL DECK

15)-RIGITONE ACOUSTIC CEILING BOARD AND SUSPENDED CEILING

The internal features of the building create a modern look but also provides an environmental feel throughout. The timber feature wall in the main entrance shows off how this building is part of the natural environment. The timber stips make their way up from level 1 to level 5 and this replicates how a tree would rise up as it grows. The use of a green wall also contributes to this feel. The green wall inside the building is a real planting system which needs to be maintained. However, this maintenace is the little price to pay for the benefits that come with such a feature. The green wall adds positivity to the buildings big open atrium space and adds life to the building. The feature improves internal air quality through photosynthesis in the production of Oxygen from Carbon Dioxide and this uplifts the occupants mood, health and wellbeing. This pure, breathable air can be used to filter through to rooms that arent in reach of the feature via the HVAC system and this is the main benefit to both. The green wall is placed very strategically as its the first thing you see as you walk in but also that its right infront of the big slanted curtain wall that allows all of the natural light into the main atrium space. This helps with the plants growth and function as the sun is needed for groth and photosynthesis. The big open spaces in this design allow light to be absorbed in every corner of the building.