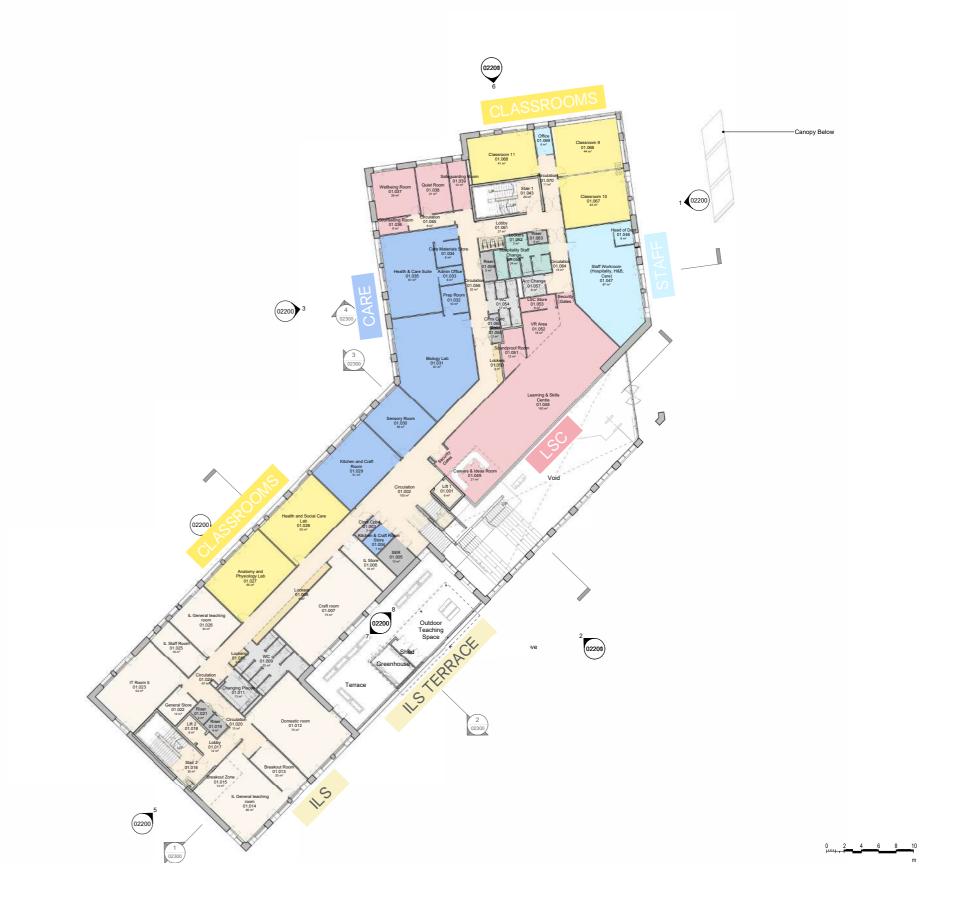
4.20.2 First Floor

Arriving on the first floor via the main accommodation stair brings students directly outside of the LSC. Enclosed via a glass partition on the corridor side, the LSC overlooks the atrium in an open balcony arrangement.

The remainder of the first floor is taken up by the Care department to the West, general teaching provision and staff work areas to the North and the Independent Living Skills (ILS) department to the South.

The ILS is fully connected to the main spaces of the college, but positioned in a way that allows a degree of privacy, with its dedicated external teaching space as a terrace accessed directly from ILS classrooms.



First Floor





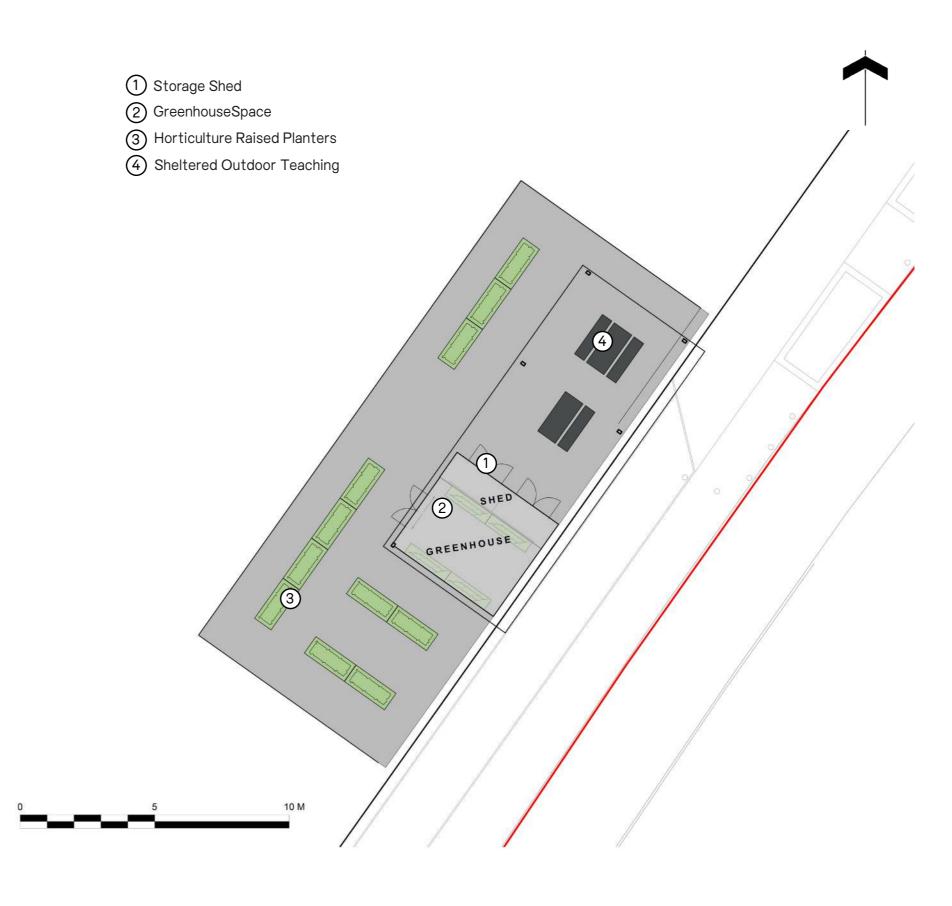
4.20.3 First Floor Terrace

Due to space limitations at ground level, the Independent Living Skills external garden space has been accommodated via a terrace at Level 01.

The terrace will provide opportunities for independent learning, teaching and growing with the provision of raised planting beds, a covered seating area, a greenhouse and a shed. The details of the greenhouse and shed are part of the architectural structure.

Raised Planters - Comfortable working height with easy wheelchair access

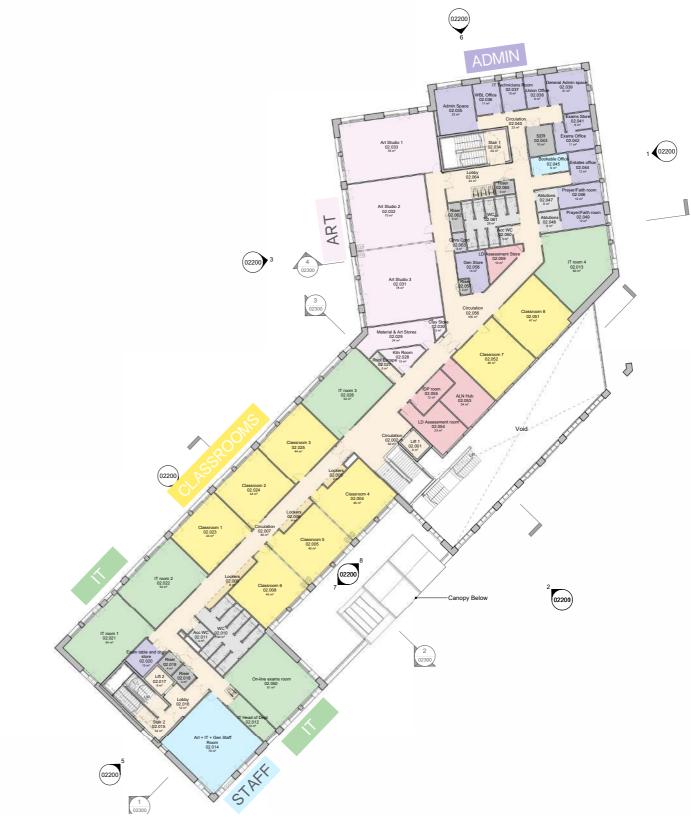




4.20.4 Second Floor

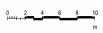
The floor contains a cluster of general classrooms and IT rooms as well as the Art and Design department to the North-West. The art studios are positioned next to each other, allowing the two spaces to function independently or to be opened up into a large gallery space as needed.

The remainder of the floor is taken up by the Admin areas to the North and North-East and learning support spaces overlooking the atrium.



Second Floor



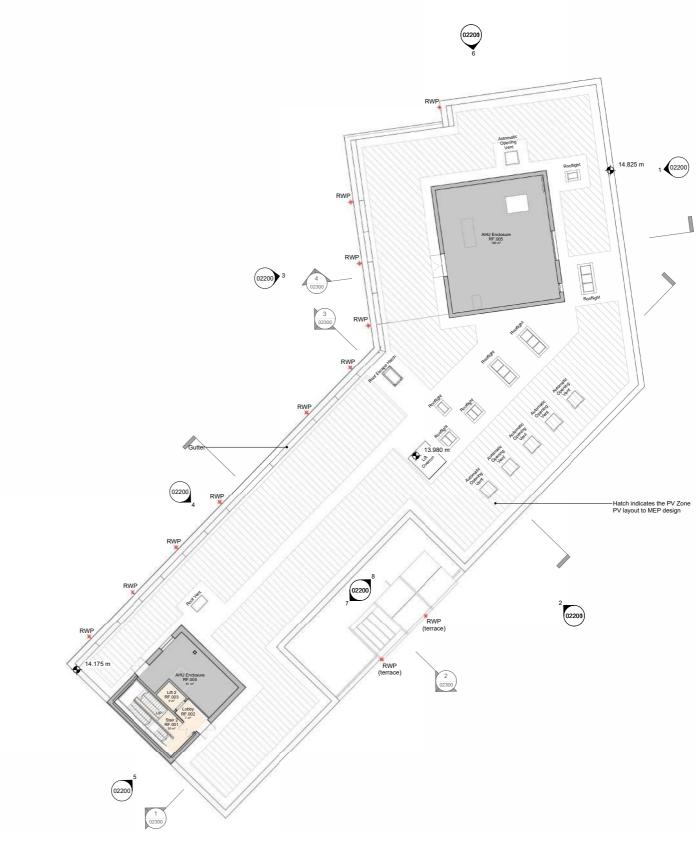




4.20.5 Roof

The roof is a flat roof with falls of min 1:80, directed towards the courtyard/car park side which allows most of the rain water pipes to be located on this elevation as indicated.

Access to the roof is provided via a permanent stair and goods lift on the South side. This is required for safe maintenance access as the roof contains two AHU enclosures and extensive PV coverage. A min parapet height of 1.1m has been provided to the main roof, which will ensures safety and conceals the PVs from view.



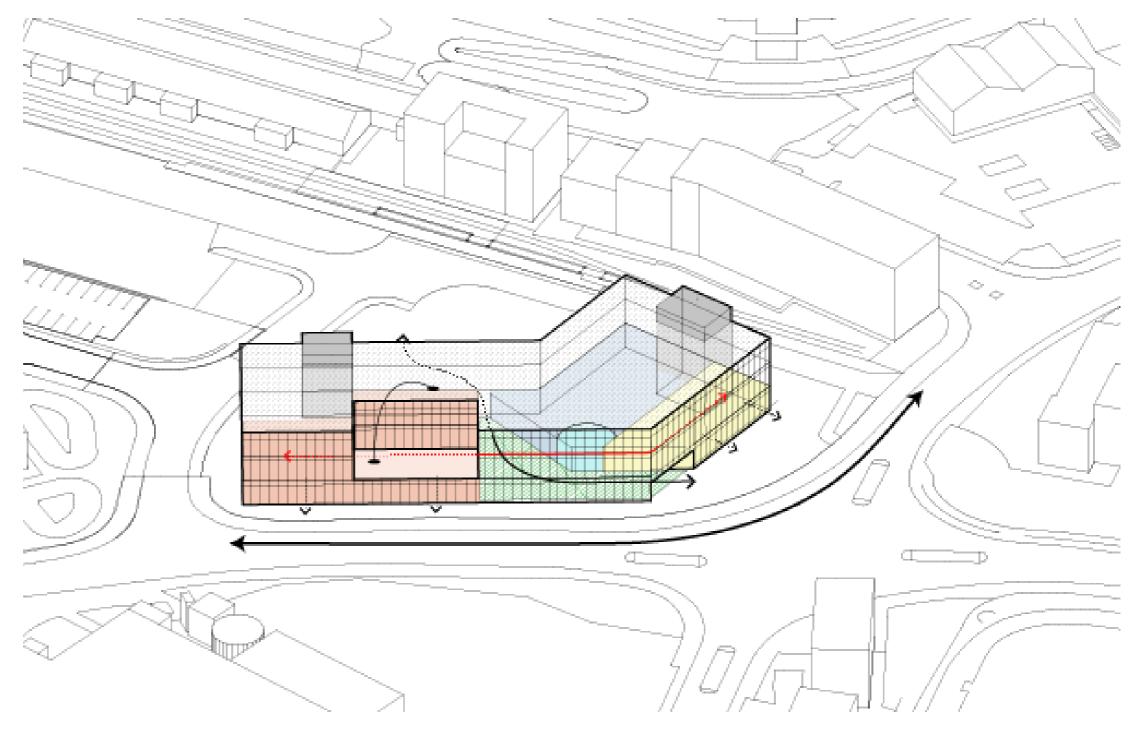


4.21 External Appearance

The CaVC Barry Waterfront Campus is a key building and one of the final developments for the regeneration of Barry Waterfront and the Innovation Quarter. It was important to the local authority development team that a building of this type of education use would provide a beneficial impact on the surrounding area, infrastructure, and overall regeneration. The building is not only to be used by the students but also to be used by the community. Therefore, the facade proposals have been developed to provide a building which is welcoming and community focused.

The aspiration for the building is for it to be of a civic quality that provides a sense of place. The building is on a key route on Ffordd Y Mileniwm to and from Barry Island, so it was important that the development was back of pavement and this side of the building showcased activities within and provides the sense of place. Having the building back of pavement helped create the "shop front" for community-engaging parts of the building, such as the hair salons and restaurant. The building is slightly set back from Hood Road to provide space for outdoor seating for the restaurant and the arrival plaza outside the main entrance.

The massing of the building was an important consideration as it is a key building within the IQ regeneration. The proposal is three storeys; however the ground floor is taller than the upper floors to emphasise the public and commercial parts of the building. Generally, the floor-to-floor heights of an education building are higher than those of a typical office or residential building, so along with the tall parapet, the building height sits well within the surrounding context.



External Appearance and Massing Key Considerations Diagram



4.22 Existing Context

There are both new and refurbished historic buildings in the Barry Waterfront and Innovation Quarter. The Innovation Quarter regeneration plan includes a material palette that new buildings have taken into consideration. A Heritage Statement can be found as part of the application. The Pumphouse, located north of the site, is a Grade II listed building. Situated between the site and the Pumphouse is a recently built residential building called Junction House. Junction House is part of the Goodsheds development, which comprises of a new building constructed using offsite modular units and the refurbishment of the old railway sheds and trains. All the buildings in this area feature red brick façades with dark grey or black metal cladding.

To the south, there are new commercial and residential developments that also have red brick with grey and black metal cladding. The large supermarket to the south is predominantly clad in timber with dark grey cladding. To the east, there is a new primary school that has a red brick façade with black and white metal cladding. Further down Ffordd Y Mileniwm, the residential buildings feature white render, but the most prominent material remains red brick.



Pumphouse, Barry Innovation Quarter



Former railway sheds, Hood Road



Junction House Resi, Barry Innovation Quarter



Railway shed, Barry Station



Former railway sheds, Barry Innovation Quarter

4.23 Proposed Facade Approach

In our initial discussions with the local authority, they have been open to change in the material palette outlined in the *IQ Design Guidance*' provided that the chosen materials and colours are not arbitrary. The proposal for BWC is for the building to be primarily constructed of brick with elements of profiled metal cladding. Although this is the same materiality as the surrounding buildings, which ensures it is complimentary to the existing context, the intention is to provide a modern take on it, suitable to a forward looking education facility, through colour, composition, and feature brick detailing. The images on this page show aspirational example projects.

The current proposed colour is a buff/grey brick with complimentary metal elements in gold colour. The aspiration is to create a landmark building, and a thoughtfully placed grey/buff structure will achieve this by providing a striking visual contrast to the surrounding red brick buildings. This contrast, and the modern shape and colour of the cladding, can make the new college a focal point, enhancing its presence and establishing a unique identity within the streetscape. Interestingly, the contrast can also heighten the appreciation of the existing red brick architecture, making the red tones appear richer and more vibrant.

The college have further expressed a desire for commonality of appearance and brand recognition between the two new sites (Advanced Technology Centre and Barry Waterfront Campus). Sigange will aid this, however, preferred colours, materiality and cladding profiles have been selected for both sites with this aspiration in mind.

The elevation drawings in this section of the DAS show all the key elements of the building and are shown in current preferred colour, however, all colours are subject to further stakeholder consultation and feedback.

4.24 Façade Development

The main entrance, located at the corner of Ffordd Y Mileniwm and Hood Road, is emphasised via a full-height recess which enters directly into the full-height atrium. The atrium has tall feature glazing, and, with the tall entrance, it helps provide a civic appearance to the building. The rhythm of the atrium glazing and panelling continues around the building at ground-floor level, where Hair & Beauty and Hospitality are located to provide views in and out of the active frontage. Where a solid facade is required on the ground floor, there bays continue the rhythm of the curtain walls via feature brick panels. The car park entrance located in the north is emphasized with a recess and the entrance also leads to the atrium.

The metal panelling complimenting the glazing fenestration provides a contemporary aesthetic to the building. It is profiled to create a dynamic rhythm of shadows. The panelling will also be used to highlight certain areas and features of the façade, such as the main entrance and canopies.



Liverpool John Moores University by Sheppard Robson



Vejen Town Hall by Transform



The International Rugby Experience by Niall McLaughlin

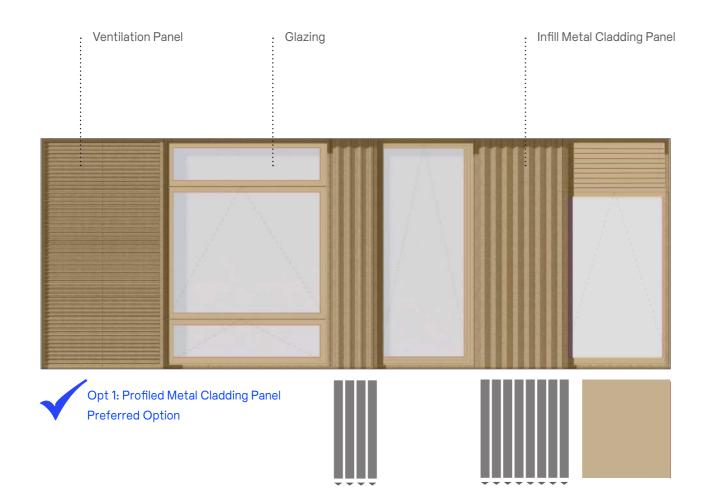


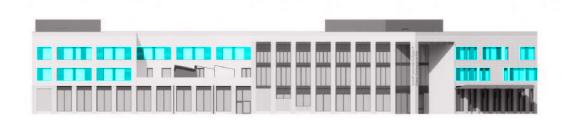
16 Church Street by Taylor Maxwell



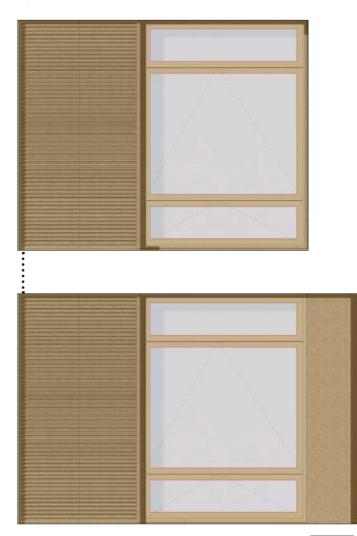
4.24.1 Punched Windows

The windows to the upper floors are mainly for teaching rooms and the window design is typical for an education building. However, due to the noise from Ffordd Y Mileniwm, acoustic purge vents have been developed for the natural ventilation required. Most of the teaching rooms are on the north side of the building, which benefit from being away from the street noise and south-facing daylight. All the building's windows and façades have been developed with the engineers with the help of an energy model to achieve the correct daylight levels, ventilation, and energy use.

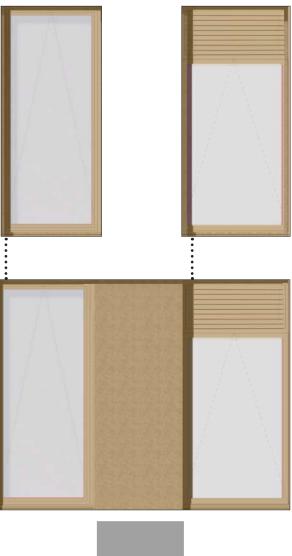


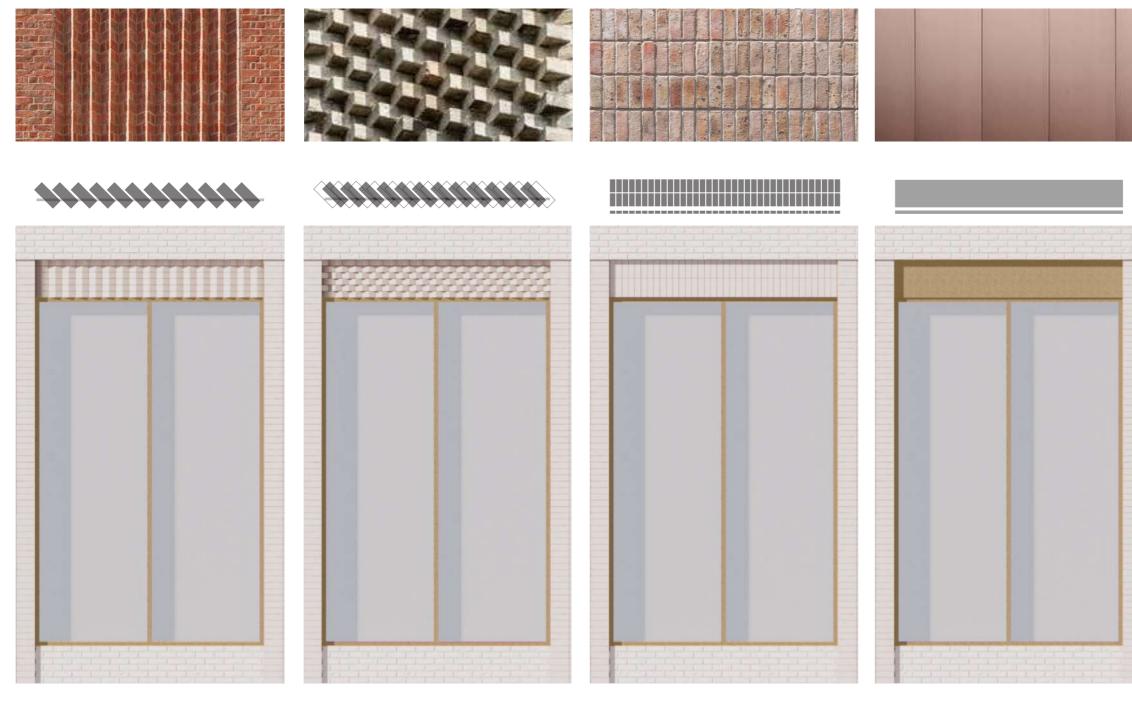


Opt 3: No Infill Panel



Opt 2: Flat Metal Cladding Panel





Opt 1: Pleated Brick

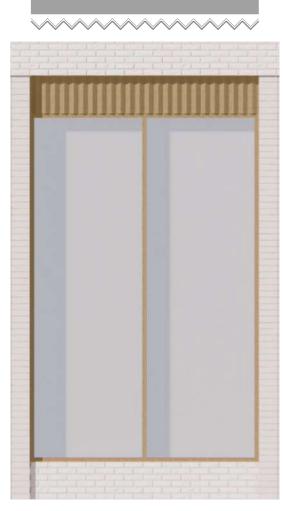
Opt 2: Sawtooth Brick

Opt 3: Soldier Course

Opt 4: Flat Metal

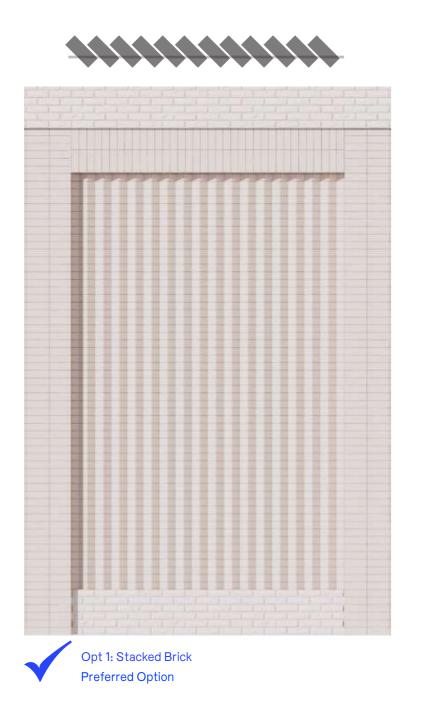


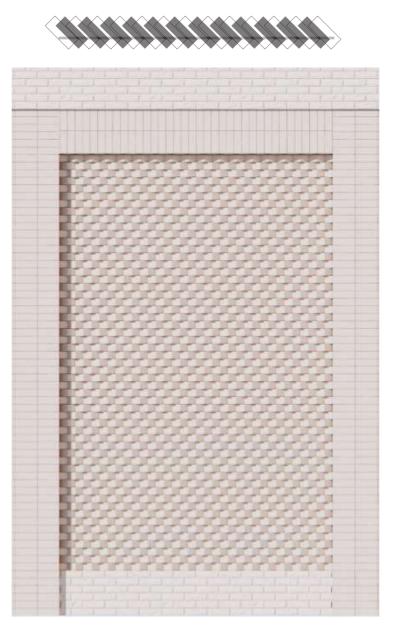










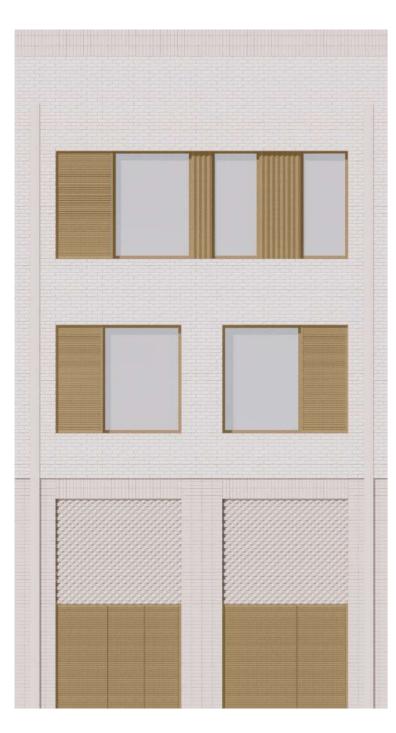


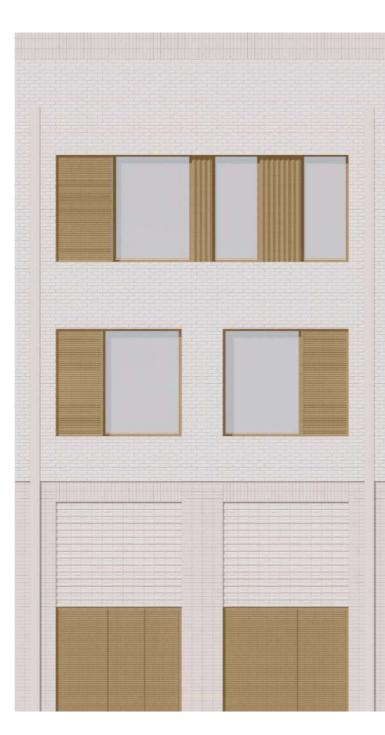
Opt 2: Sawtooth Brick

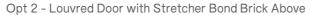
Opt 3: Stretcher Bond



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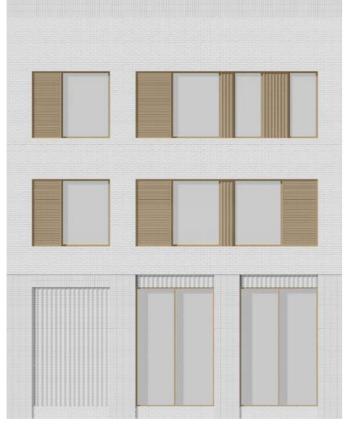




Opt 1 - Louvred Door with Sawtooth Brick Above



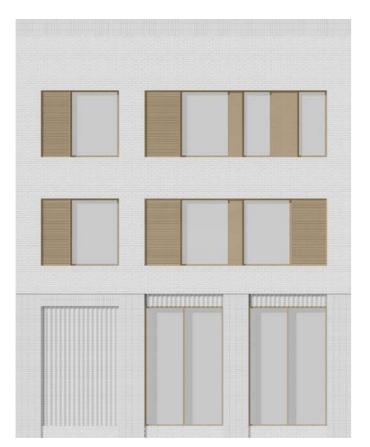
4.24.5 Full Bay Study



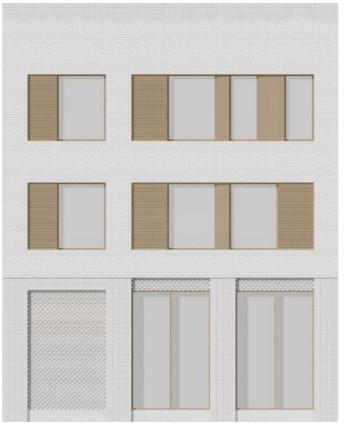




Option 1



Option 2

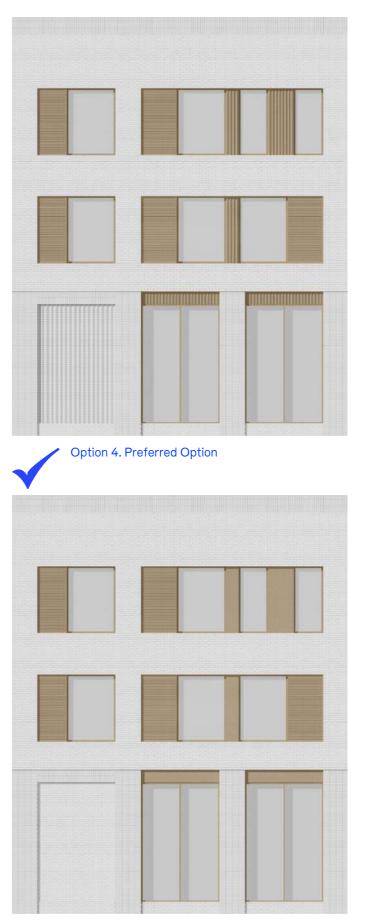


Option 6

Option 3



Option 5



Option 8

4.24.6 External Canopies

Two external canopies are proposed.

The ground floor canopy is set away from the building, in front of the restaurant. It provides external seating and shelter for the restaurant. Shielded from the road on one elevation by a clear screen and bordered by soft landscaping it creates a dynamic and inviting arrival place on Hood road.

The first floor canopy, located on the terrace provides space for external teaching. The terrace is designated for use by the Independent Living Skills department where students will practice various gardening activities under the supervision of staff. The canopy contains three functions: a greenhouse, shed and covered external classroom space.

Materials and colours for both canopies are proposed to match the rest of the elevation palette.



ILS Terrace Canopy Design Intent

<image><image>





4.24.7 Full Elevation

The preferred elevation elements and full bay combination are represented in a rendered Ffordd Y Mileniwm elevation below. Additional elements such as indicative design for the entrance signage and terrace and restaurant canopy are also highlighted.



4.25 Proposed Elevations and Materials

The external material palette has been carefully considered to provide an architecture which is robust, fit for purpose and which compliments the surrounding buildings and landscape.

The proposed materials are:

1. Grey buff brick – providing a robust, civic identity to the building. Other colours were considered during the development process as can be seen in images on the right.

2. Gold metal cladding – used to clad plant enclosures on the roof, as detailing between windows and to heads of curtain walls.

3. Gold metal work – window, curtain wall and door framework and ancillary trims.

4. Glass – provided with solar control coating and a neutral appearance

5. External metal canopies for restaurant outdoor seating and first floor terrace teaching areas.

Colours and brick types shown throughout the document are indicative. Exact colour references, cladding and brick product are to be determined.







Buff Grey Brick. Preferred Option





Buff Yellow Brick



Red Brick







Same colour swatches photographed in different light

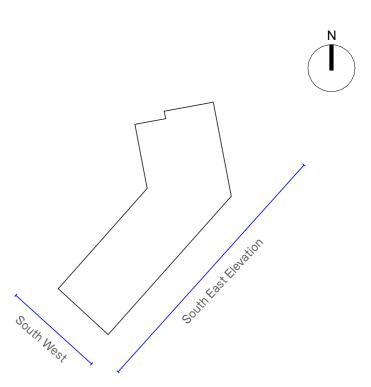
Profiled Cladding Options



South West Elevation



South East Elevation







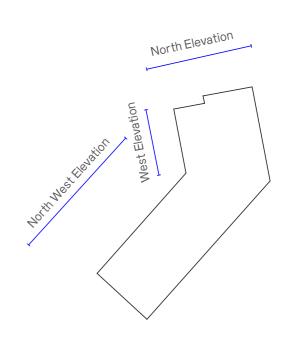
North Elevation



West Elevation



North West Elevation



Ν





Ν



5.0 SUSTAINABILITY STATEMENT

5.1 Approach

The project aspiration is that the BWC building will deliver a net zero carbon in operation building. A net zero carbon in operation building is a building that is highly energy efficient and powered from renewable energy sources. The NZC carbon target will influence all aspects of the design from façade detailing, U-value calculation, passive measures such as daylight, ventilation, shading, and renewable technologies to reduce energy.

The project is working to a maximum embodied carbon target set at 800 kgCO2e/m2 GIA (A1-A5). This relates to the building en-masse, including substructure, super structure, façades and finishes. Material specification will be assessed and measured as the design develops in order to highlight any elements with a substantial impact.

Summary of Environmental Measures 5.2

Passive systems:

- Highly efficient façade
- Building orientation and perimeter space optimised to maximise daylight
- Natural ventilation throughout for summer
- Acoustic louvres for BWC

Active Systems:

- Mechanical ventilation with heat recovery during winter
- All electric building, with the exception of catering teaching areas which have specific teaching curricula (energy use in these areas is likely to be small in comparison to the rest of the building)
- High efficiency ASHPs for space and water heating
- High efficiency lighting with daylight linked controls
- Sophisticated controls and energy management system
- Efficient water fittings with leak detection
- Heat scavenging from ICT server rooms
- Waste-water heat recovery from shower blocks
- Demand control in kitchen ventilation (where possible)

Renewables:

- Heat scavenging from ICT server rooms
- Waste-water heat recovery from shower blocks
- Demand control in kitchen ventilation (where possible)

5.3 **Specification of Materials**

To align with the agreed BREEAM targets, specification of materials will consider a number of sustainability aspects, including:

Timber – all timber and timber-based products used during construction must be legal and sustainable timber (following the UK Government's definition as outlined in the Central Point of Timber (CPET) 5th Edition of the UK Government Timber Procurement Policy (TPP))

Volatile Organic Compounds (VOCs) – at least three out of the five product types listed in BREEAM Hea 02 shall meet the emission limits, testing requirements and any additional requirements listed in the Hea 02 criteria in order to achieve one credit for Hea 02 Emissions from Construction Products

Responsible sourcing certifications – specifications will require that more than 20% of available BREEAM Mat 03 points will be achieved through procurement of materials from manufacturers with a BREEAM Mat 03-recognised responsible sourcing certifications for their products (e.g. BES 6001, ISO 14001 certification).

The BREEAM Mat 01 Life Cycle Assessment (LCA) options appraisal will also investigate the embodied carbon impact associated with key building elements. Where possible, alternative material specifications will be modelled for materials which are found to have a substantial impact, in order to allow for the environmental impacts of different specifications to be considered in decision-making, alongside other factors.

5.4 BREEAM

Barry Waterfront Campus aspires to achieve a BREEAM Excellent rating which reflects the commitment to a holistic sustainability approach for the project from inception through construction and in-use energy consumption. The project has been registered with the BRE and is being assessed against BREEAM 2018 UK New Construction. The target scoring required to achieve this rating was agreed at a BREEAM pre-assessment workshop, and this continues to be adjusted and refined in line with design development. Scoring is being tracked via a live tracker, TrackerPlus. At the time of writing, the target scoring is as follows:

Target	Potential
76.57%	93.84%
Excellent	Outstandin

All minimum standards required for the Excellent rating are targeted, and the required 70% threshold is exceeded with a scoring buffer.

Ig	



Environmental Engineering 5.5

In order to minimise the buildings overall energy usage and CO2 emissions a three-stage approach has been adopted to the design of colleges and their associated systems. The three stages are:

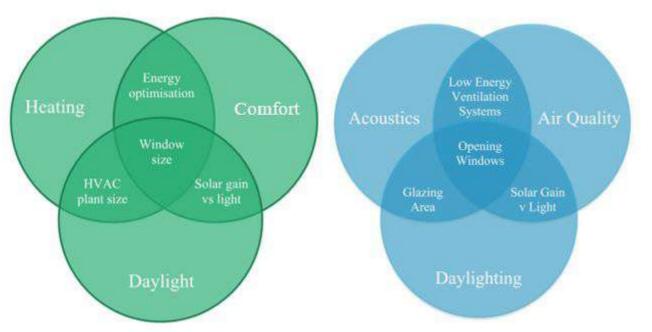
Passive design – reduce the need for energy from the offset

Active Design - supply energy efficiently and recover energy wherever practical

Use of renewable technologies

5.5.1 **Passive Design**

The building orientation has been considered in order to provide the optimum balance of direct solar gain that could lead to overheating against beneficial solar gain in winter. This also requires balancing against daylight requirements to give the best combination of natural light vs energy vs comfort.



Perimeter façade has been maximised to promote natural daylight and ventilation. This will improve health and wellbeing as well as reducing the reliance on artificial lighting.

Natural ventilation has been implemented throughout the building where possible (during the summer) as it is a fully passive means of ventilation.

Furthermore, a strong emphasis has been placed upon the fabric design to minimise thermal bridging and reduce air leakage so that not only will the building perform well at construction it shall continue to perform well for many years to come.

Active design 5.5.2

Highly energy efficient plant will be installed in the building to minimise energy use still further. The allelectric building (with exceptions noted in 5.2) will use highly efficient Air Source Heat Pumps (ASHPs) to deliver space heating and Domestic hot water. Domestic hot water heat pumps will utilise CO2

refrigerant to further lower their Embodied carbon.

To further minimise heat loads during the winter, mechanical ventilation will be implemented so that any air entering or leaving the building will be via a heat recovery device as per Passivhaus principals. The Mechanical ventilation systems have been designed to have the lowest possible fan energy.

Highly efficient lighting shall be provided with manual on and automatic off absence detection controls, with daylight dimming controls to further reduce lighting energy loads.

A highly sophisticated controls system will be implemented to ensure the any mechanical systems operate as efficiently as possible. For example, demand control ventilation that only operates when required by occupancy or CO2 levels. Furthermore, all systems will be metered with data fed back to an Energy Management System to itemise all energy within the building so that plant can be optimised over the lifetime of the building.

5.5.3 Renewables

The photovoltaic array design required to achieve net zero carbon (NZC) in operation has been developed and is substantial in size, occupying a large percentage of the roof space and other site canopies. As only limited grid export is possible, a battery storage system has been proposed for the scheme to improve the expected on site usage of energy generated to around 92% for BWC.

5.5.4 Water Efficiency Plan

There is an environmental and carbon footprint associated with potable water consumption, this is attributed to the energy and resources that are required to extract, treat, and pump this water from its source to where it is needed.

The follow measures will be implemented to minimise potable water use.

- Conservation measures e.g. WCs with low water volume dual flush cisterns, low water use appliances and fittings, flow restrictors, plus automated supply shut-off where practical
- A leak detection system(s) for management of water consumption through metering & monitoring via the BMS
- A rainwater harvesting system has been developed for the college to reduce potable water demand.

A hierarchical approach has been used to define the storm water drainage strategy for the proposed development's runoff in compliance with 'Statutory standards for sustainable drainage systems designing, constructing, operating and maintaining surface water drainage systems 2018'.

Building Ventilation Strategy 5.5.5

In order to achieve the NZC aspiration of the building a combination of natural ventilation (in the summer) and mechanical ventilation (during the winter) will be provided.

Natural ventilation is generally achieved using single sided ventilation for teaching spaces, and "crossflow" ventilation for ICT, (and other areas with expected high heat gains). Cross flow ventilation is achieved using the centralised atrium to draw air through classrooms.

During the winter, windows will be closed to prevent cold air entering the building and local Hybrid Ventilation Heat Recovery units (HVHRs) will supply and extract air to the classrooms. The units will include high efficiency heat exchangers (~45% efficiency) to recover heat from the exhaust air and temper the incoming air as required by BB101 to minimise cold draughts. This provision of air will be supplied to mix and distribute evenly in the classroom.

5.5.6 Heating and Cooling Strategy

The college's space heating requirements will be fulfilled by a series of air source heat pumps (ASHP's) located externally. A thermal storage buffer vessel will be included on the primary return side to meet the minimum system water content required by the ASHP's. This water content is required to limit the on/off cycling of the units and to aid with the defrost cycles during cold weather.

The mechanical cooling within the college will be limited wherever possible. There are some areas within the building such as the IT server rooms, Hair & Beauty department, Bakery and Production Kitchen which will experience high heat gains and it is proposed to provide some mechanical cooling services. The Independent Living Skills department will also require mechanical ventilation due to the acoustic issues presented by the site and the sensitive nature of the SEN spaces within the department.

Cooling shall be provided through heat scavenging cooling systems that will re-purpose heat into the heating system where possible. A DX backup system will be provided for cooling resilience.

5.5.7 Energy Usage

The college has been designed to meet an aspiration operational net zero carbon target, whereby the operational energy consumed on site (both regulated and unregulated) should be generated by an extensive roof mounted solar photovoltaic (PV) array, augmented with a battery system.

In addition, the college has been designed to minimise energy demands through extensive modelling and assessment of the building (in line with contract requirements, the BREEAM assessment and a detailed energy prediction study).

BWC	
Electricity	kWhr/year
Predicted Consumption	556,450
Predicted PV generation	269,038



6.0 ACCESS STRATEGY

Access and Inclusion 6.1

The proposals have been designed to meet the requirements of current Building Regulations, The Equality Act and other relevant regulations and standards, including those accessibility standards specific to Welsh policy.

To promote equality and diversity, the following measures have been identified within the proposals:

- All toilets provided will be gender neutral and self-contained
- Provision of a faith room
- Adjustable laboratory and kitchen furniture
- Provision of induction loops in line with the requirements of the Equality Act 2010
- Project Co raises further criteria for the facilities which is listed below:
- Way-finding should be logical, easily understood and signage should be clear.
- Buildings should be accessible to all students, staff and visitors with ALN, and/or disabilities.
- Buildings should cater for the needs of people with impaired sight or hearing.

The above have been considered when designing the circulation both in proposed width and layout of corridors, stair and lift locations. The criteria will further inform the design at later stages as finishes and signage strategies are considered in more detail.

Access to Site 6.2

Access to the main building entrance is either from the plaza along Ffordd Y Mileniwm, or the rear plaza from the car park. The front along

Ffordd y Mileniwm and Hood Road will remain publicly accessible with access to the main entrance, restaurant and hair & beauty. The management of students and users into the building will be controlled via the entrances to the front and rear of the building.

The main vehicular access into the site will be via Ffordd Y Mileniwm. Access into the car park is controlled via an automatic rising arm barrier that will have an intercom connected to reception.

The gate to the car park will remain open during working hours and be closed during out of hours. An automated rising arm barrier, which will be connected to reception via the intercom, has been included in the proposals to control vehicular access into the car park during the working hours.

Parking Provision 6.3

The proposals include 93 parking spaces, including 4 disabled bays and 10 Electric Vehicle Charging Points. A drop off/ pick up bay has also been included for minibus access.

Cycling Provision and Amenities 6.4

Cycle parking is located along the northern boundary. 160 long stay cycle spaces have been proposed using two tier bike racks within an enclosure. 10 short stay cycle parking is located to the front entrance.

6.5 **Public Transport Amenities**

The location of the BWC site sits within part of substantial built up area with a range of bus routes offering up to 6 buses per hour.

Service Vehicles, Refuse Lorries, 6.6 **Fire Engines etc**

An additional through-route has been provided to the north of the building. This route will accommodate refuse, delivery, fire and maintenance vehicles. This route will predominantly be used as a one-way route, accessed via Hood Road. Service access to the sprinkler tank compound is via the car park.

6.7 Internal Accessibility

The building layout and finishes will be designed to be fully usable by occupants with a range of accessibility needs including mobility needs, SEN needs, sight/hearing needs.

When specifying finishes which are of a suitable robustness for a College, the design team will also specify to the correct level of slip resistance for floors.

Teaching spaces will have desks suitable for wheelchair users (dropped benches in Science Labs) and all teaching rooms will have space for wheelchairs to turn. Desks and counters will have dropped height sections for wheelchair users.

Hearing loops etc. will be identified on the services engineers information.

Main thoroughfare corridor widths have been stipulated by Brief, and are generous to allow for peak flow at busy times of the day. These wide corridors will help to support the normal functioning of the College (occasional removal of large furniture etc). Corridors will as a minimum meet, and often significantly exceed, the widths required in Approved Doc. Part M for wheelchair accessibility.

6.8 **Emergency Escape**

The corridors will form the principal horizontal means of escape around the building and as such will be designed to meet fire regulations. There will be regular cross-corridor doors as required by the regulations. These will be held-open by détente devices linked to the fire alarm.

The fire strategy has been designed using guidance document BB 100:2007. The fire strategy report will be submitted by the fire consultant as part of the Building Regulations application.

6.9 Horizontal Circulation

Horizontal circulation is organised in a simple, easy to navigate straight route with accommodation on either side of it.

On the North leg of the building, the circulation splits in two with teaching accommodation on one side and back of house functions to the center of the building. Both routes meet at the North stair.

Corridor widths, stipulated by the brief, are generous. The circulation experience is further varied by introducing generous glazed screens next to every teaching or staff room door, which provide borrowed daylight as well as larger glazed screens which allow to look into spaces such as the LSC.

6.10 Vertical Circulation

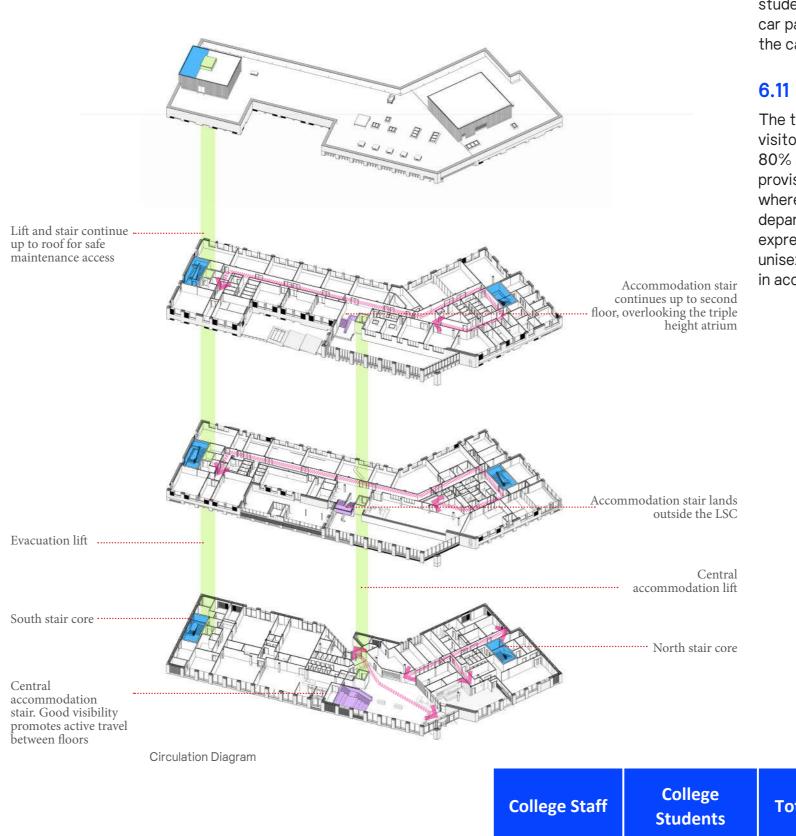
The main mode of circulation between the three floors will be the central accommodation stair located within the atrium of the building. This stair changes character as it moves up between floors and facilitates natural wayfinding through strong visual links, encouraging users to use active travel between floors (stairs rather than lifts). It provides visual activity within the space and opportunity for architectural expression. Due to the atrium's position on the façade, the stair will be visible externally, making the atrium elevation lively and dynamic.

In addition to the accommodation stairs, the building is served by two stair cores and two lifts.

The stair cores are located at the North and South ends of the building, allowing direct access to departments situated at either end.

One lift is proposed within the South core. This lift will function as an evacuation (predominantly for the ILS department located at the South leg of the first floor) and goods lift (providing access to the roof level).

The central lift in the atrium, facing the car park entrance is envisioned as the primary means of



	79	855	934	747	934	47
WC Prov	ision Calculation Table	I				

access to the ILS department. The majority of students are expected to be dropped off in the car park and make their way into the building using the car park entrance.

I1 WC Accommodation

The toilet provision is based on 79 staff (including visitors) and 855 student occupancy assuming 80% at peak occupancy with no separate staff provision except within staff changing rooms where specifically requested by the college during departmental consultation. As the college have expressed their preference for self-contained unisex toilets (Superloos), a 25% uplift is provided in accordance with BS6465.

Assumed +	Superloos			
Total Peak Occup. U	25%	1 WC		
(80%)	Jplift	per 20		

enquiries@sheppardrobson.com www.sheppardrobson.com

77 Parkway London NW17PU T: +44 (0)20 7504 1700

City Tower **Piccadilly Plaza** Manchester M1 4BT T: +44 (0)161 233 8900

93 West George Street Glasgow G2 1PB T: +44 (0)141 285 3100

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