

SUSTAINABILITY

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ADAPTIVE
REUSE

ADAPTIVE REUSE

MA

INTRODUCTION

“For all things come from earth, and all things
end by becoming earth.”

—
Xenophanes

“Often when you think you’re at the end
of something, you’re at the beginning of
something else.”

—
Fred Rogers, Television Personality



(Figure 2, Expedition Superman, Nameera Najib. Image
courtesy of RISD Interior Architecture, 11/08/2020)

Adaptive reuse is the process of taking an old building or site, and reusing it for a purpose other than for what it was designed. Typically, it is closely related to historic preservation or conservation around cities with rich history, however it is becoming more popular as a sustainable way of building and designing. It is a critical process to ensure communities do not lose any history and do not use (or waste) more materials than necessary. This type of method in architecture can be more costly than starting over from scratch, however it is a designers goal to create with the people and world in mind, while finding a functional, cost cutting process.

“Adaptive reuse is a process that changes a disused or ineffective item into a new item that can be used for a different purpose. Sometimes, nothing changes but the item’s use.” (Australian Department of the Environ-

ment and Heritage, 2019). It is a way of taking buildings that are neglected and often being demolished, and repurposing them in a way that can benefit the environment. It is therefore inherently green, giving new life to an old and historic space while conserving resources and historic value. It is becoming more popular with firms and architects all over the world as a way of reaching sustainable goals and dealing with modern environmental problems. But above all, adaptive reuse offers the ability to keep a piece of history and its stories alive in a world where mass production and imitation is the norm. With hundreds of identical houses and commercial buildings with no individuality, going against the grain and building on an already unique story offers much more than just being sustainable.

(Figure 1, Super Normal, Yiren Mao MA '20. Image
courtesy of RISD Interior Architecture, 11/08/2020)

CASE STUDY 01

PARK HILL

BY URBAN SPLASH



Figure 3, Estate of mind: Politics, design and social housing. (2013, July 18)

HISTORY

The industrial revolution of the 19th century and commercial building boom of the 20th created an abundance of large, masonry buildings. These buildings worked perfectly for their time and purpose but as society changed they were no longer in need and often abandoned. These buildings are perfect for this idea of reuse, as most were built with a concrete frame and from reusable and abundant materials such as brick and wood. However often they were simply torn down, as a quick and easy way to restart. Although this idea is seen as 'progressive' it is not sustainable. Sustainability is one of the greatest challenges and implementations we can face as designers and human beings, which people such as Philip Johnson and Jane Jacobs can tell you. Activists all over the world are fighting for people to rethink how they are building and designing, fighting for history to be preserved and the future to be greener all at once.

CHALLENGE

Reusing old and existing buildings offer the opportunity to reduce carbon emissions, which would have been produced through destroying them. They are often made from materials with high thermal mass, such as concrete and brick, which offers good insulation whilst also preventing over heating in summer. With local and natural materials being used, they are easy to repair or improve upon and when they come to the end of their life can be recycled and converted into new materials easily and in the local area. Through re-using materials and recycling, there can be a drastic decrease in the need for transport of additional new materials, therefore reducing carbon emissions from vehicles and machines when transporting, destroying and reconstructing.

RESULT

An example of this critically important rejuvenation and invention is Park Hill, based in Sheffield. This is a perfect example in showing how reuse can offer a restoration in exterior and interior design and also in a way that has a social impact. Luckily the government agreed that this building had a future and it became a second grade building, allowing the concrete frame to be kept untouched, only added to and designed around. 'For architects, this means not only designing buildings which are deemed sustainable, but also regain rating and redeveloping old buildings in a sustainable manner which have failed over time, such as that of Park Hill' (Roger Hunt, 2020, February 10). And that is exactly what happened. It is now a colourful, inventive and inspiring block of flats, captivating the view and lives around it.

RESULT

Due to Park Hill already having the structure and framework in place, the need for new materials and work was drastically decreased, with only minor tests of the concrete structure required and small repairs carried out, for safety standards to be reached.

This building was lucky enough that the Government stepped in and certified its future, however when it comes to the decision of reusing or destroying, with other buildings the choice is not always as clear.

THE PROCESS OF ADAPTIVE REUSE

The first consideration is the case for reuse, as this is not always the right option. This involves considering all the reasons for adaptive reuse, such as cultural distinction, aesthetics and cost. Many structures become candidates for adaptive reuse simply because of their location. Examples of these can be seen in industrial areas all over the world, but especially in New York City. Factories such as in meatpacking districts are now being transformed into residential neighbourhoods through creative adaptive-reuse projects. (Dave Clark, 2008, April 1)

The next step and arguably one of the most important is financial cost. Unless it is a historic preservation, the cost will be very important, whether it is a private or public funded piece of work. Reusing an older structure can involve a lot of cost advantages, for example, lower establishment costs, little or no demolition required, land acquisition and most if not all utilities and services are already connected or just need modernisation. (Dave Clark, 2008, April 1)

Jagersberg water tower in Copenhagen is a perfect example of adaptive reuse that was used to save money, keep an iconic landmark and utilise the already installed amenities. Created by Dorte Mandrup, this water tower was turned into half student housing, with a protruding crystalline structure added to each unit, offering daylight and views of the city. It shows how reuse can offer a unique and creative space while giving something back to the building and planet. - (Sabrina Santos, 2016, March 17)



Figure 4, Dorte Mandrup's, Jægersborg Water Tower, Denmark

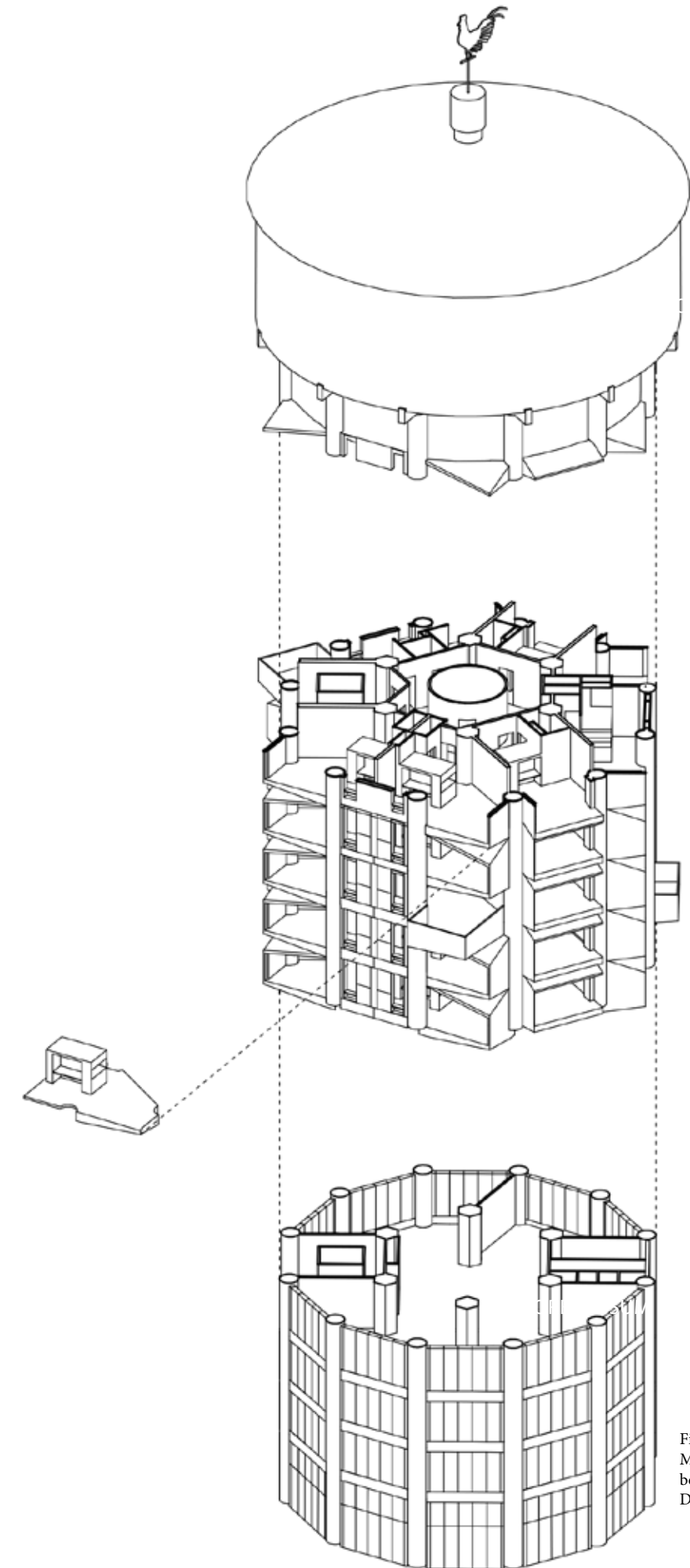


Figure 5, Dorte Mandrup's, Jægersborg Water Tower, Denmark

ADAPTIVE REUSE EXAMPLES



FIGURE 6, HOUSE OF VANS
LONDON; LONDON, UNITED
KINGDOM / TIM GREATREX



FIGURE 7, WOODEN
STRUCTURE AT LAUNCHLABS;
BASEL, SWITZERLAND / STEREO
ARCHITEKTUR



FIGURE 8, REFURBISHMENT
VIADUCT ARCHES; ZURICH,
SWITZERLAND / EM2N



FIGURE 9, PROFESSIONAL
COOKING SCHOOL IN
ANCIENT SLAUGHTERHOUSE;
CADIZ, SPAIN / SOL89

There is no checklist for whether to reuse, rehabilitate or destroy an old building, but what these examples do have in common is a goal, and that goal will determine whether this is the right path to take. Using examples of other reuse projects is always a good start, with most examples including industrial facilities, factories, strip malls, schools, churches, offices, hotels, condominiums, grocery stores, big-box retailers, theatres, and other facilities. Once the goal has been identified, an analysis of costs should be carried out, in addition to the budget comparisons between demolition/new construction and restoration. A detailed investigation of the building itself should be undertaken, including its repair history, showing which areas require work and how the building has behaved. This should be carried out by a design professional with the aid of a qualified team. (Dave Clark, 2008, April 1)

Once all these considerations have been taken into account and the necessary steps have been followed you will have all the correct information to determine if this is the best option to take. Adaptive reuse is becoming a popular option for many designers and architects as it offers a lower cost in labour and materials, whilst allowing the memories and culture associated with the building to be kept.

CASE STUDY 02

SHIPPING CONTAINERS



Figure 10, SEED, Jordana , 2021, March 3

OVERVIEWBUILD

It is not merely buildings which can be repurposed and the next section will examine how objects such as shipping containers, built to last a life time, can become other buildings in the form of adaptive reuse. This is because reuse is not confined to certain materials and objects, and my next conversation is going to explain how anything, even a simple steel container can be reused in an adaptive way to create a space and a home if people are creative enough.

These containers are designed to survive the test of time, they can live through any weather whilst being light and small enough to be moved and placed anywhere easily. Built with steel, shipping containers are long lasting, durable and can even be made rust resistant. These are all qualities needed to create a sustainable and functional home or building.

HISTORYTHE NEW PHENOMENA

The history of these containers begins with a man called Malcolm McLean who in 1937, after witnessing the difficulties of unloading and loading cargo onto the backs of trucks, decided to create a standardised container to help with this problem and other weight restriction issues. Selling his transport business to do so, he revolutionised transportation. (Discover Containers, 2020, December 30)

Even though shipping containers have been around for over 100 years, it is only in the last 10 that shipping container homes have been developed in the industry. This new use for containers has created quite a stir in the architecture and design community, with people using shipping containers to build homes, schools, museums, offices and even hotels in some of the most remote places in the world. They offer people a cheap, sustainable and adaptive option for building on small budgets, in difficult landscapes or just with the world in mind.

It is known that the construction industry is responsible for the consumption of half of all non-renewable resources , and therefore finding new and alternative options for construction is a huge concern(SmartCitiesDive, CS). Shipping containers is just one way we can help reduce this astonishing figure. A container can be purchased in America for \$2500, giving 300 square foot of living room, and of course several can be stacked together (SmartCitiesDive, CS). The space can be added to over time, changed in hundreds of different ways and fits, and offers a completely blank space for interior design ideas to run wild.

CASE STUDY EXAMPLE

CASA INCUBO

BY MARIA JOSE TREJOS



Figure 11, 12, 13, Casa Incubo, Maria Jose Trejos

INTRODUCTION

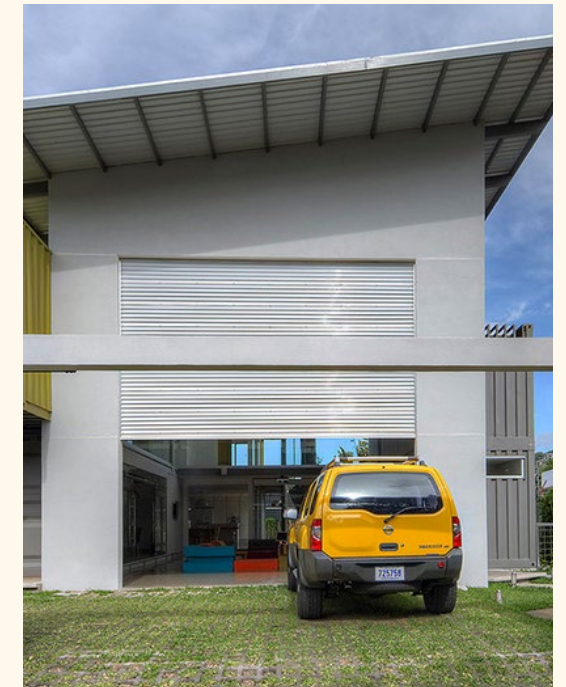
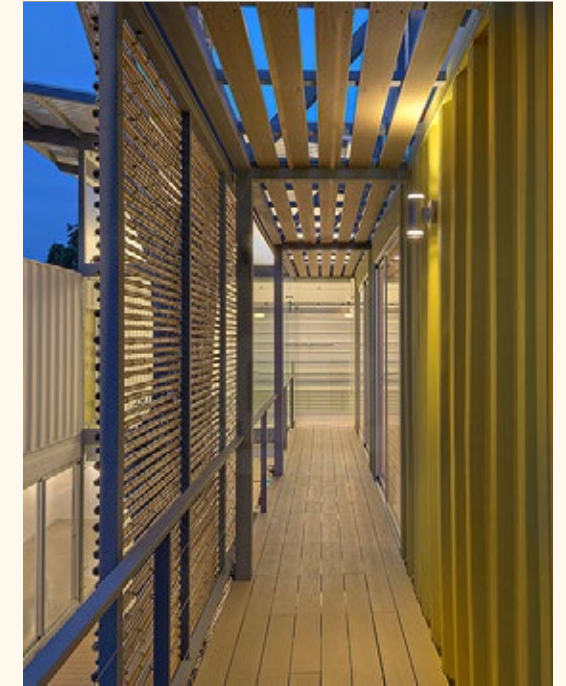
Casa Incubo can be used as a good example of a shipping container home because although it is made from shipping containers it also built to be sustainable in many other aspects inside as well.

BUILD

The house was designed around an old cedar tree that already lived on the plot and didn't need to be cut down. It is both a living and work space for the residents and had been designed for this. It can be redesigned and re-shaped easily to fit the owners needs, with a double height ceiling at the heart of the home and living area. The second floor features a strategically placed container that allows a porch and a terrace to be created. The third floor has a rooftop garden, ideal for relaxation and get-togethers. Bamboo was used for much of the decking and flooring as a way of using sustainable and abundant materials. The house will always have a strong industrial feel when built from shipping containers but there are many things that can be done to soften the harsh lines, colour or look. (

OVERVIEW

This house is designed with sustainability inside and out. A roof harvests rainwater and keeps the interior cool and cross-ventilation allows a pleasant ambiance to be maintained throughout the year, while natural light reduces energy consumption.



THE COMPARISON

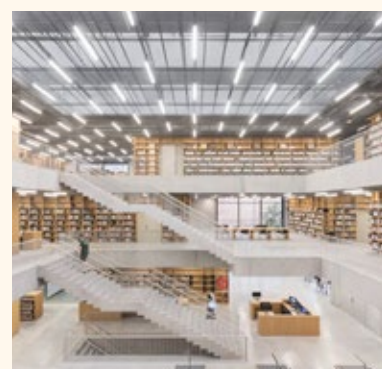
Park Hill and shipping containers are both considered adaptive reuse, in that they are creating something new from old, yet both are very different. In comparison, disused buildings offer advantages such as a foundation, utilities, services, history and even having walls and rooms already planned out, only needing little change. However the buildings historical structure may not be good or strong and often needs lots of repairs. Having a foundation already in place means little room for change if needs be, having to work around the existing structure to avoid demolition costs. Shipping containers offer a fresh start, as although they come in set shapes and sizes, they can be changed and placed together in unique and fitting ways, therefore offering a blank space to be created upon, allowing the designer to create based around the needs and wants of the building's owner. However none of the initial amenities and services are in place, and therefore will need to be installed along side planning permission and acquiring the land to build upon.



(14)



(15)



(16)



(17)



(18)



(19)



(20)



(21)



(22)



(23)

See relating numbers in bibliography for reference.

THE MOVEMENT

The greenest building is the one that already exists

#RetroFirst

Figure 24, SAVE endorses the AJ's RetroFirst Campaign, 2020, March 5

Architects work in a sector of our economy that, worldwide, consumes a gigantic proportion of materials, 'almost all the planet's cement, 26 per cent of aluminium output, 50 per cent of steel production and 25 per cent of all plastics.' (Eatock, 2020). It is using up energy and resources whilst creating huge amounts of waste and emissions. 'the UK construction industry has much to be proud of, it produces no less than 35-40 per cent of the country's total emissions.' (Eatock, 2020)

It is therefore essential that we think of reuse as the only way forward, inspiring architects to help buildings that were built to last, do just that. But it isn't that simple, with one example being that VAT is 20% for a refurbishment and renovation job compared to 5% with a new build, it is therefore understandable why until now it hasn't been popular to reuse.

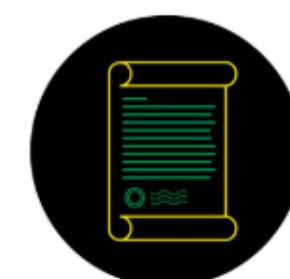
Therefore Will Hirst, along with other important individuals have created a campaign to prioritise retrofitting existing buildings over demolition and rebuild. They are trying to tackle the issues I have spoken about above and throughout my dissertation, creating a movement, spreading and inspiring awareness and even changing the law.

The three demands of RetroFirst



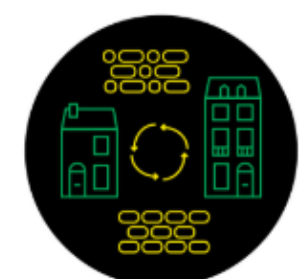
Tax

Cut VAT rate on refurbishment, repair and maintenance from 20 per cent to 5 per cent



Policy

Promote the reuse of existing building stock and reclaimed construction material by introducing new clauses into planning guidance and the building regs



Procurement

Stimulate the circular economy and support a whole-life carbon approach in construction by insisting that all publicly funded project look to retrofit solutions first

THE CONCLUSION

According to new research, construction is responsible for half of all the non-renewable resources we consume, meaning it is the least sustainable industry in the world. Demolition accounts for more than 90% of construction and demolition (C&D) waste in the US; up to 15% of materials delivered to build sites are not used and the UK's Environmental Agency responds to about 350 serious pollution incidents caused by construction every year (10 Worst Facts about the Environmental Impact of Construction, 2017). Although it can feel progressive to tear down the old in order to make room for the new, adaptive reuse is a process that can change this. It allows new to be created from old, without the need for destruction, by people being creative and coming together, a sustainable future can be realised in a way that is progressive. By joining the fight and movements, adaptive reuse can become the first option for architects and this destructive industry can see development whilst revolutionising the world.

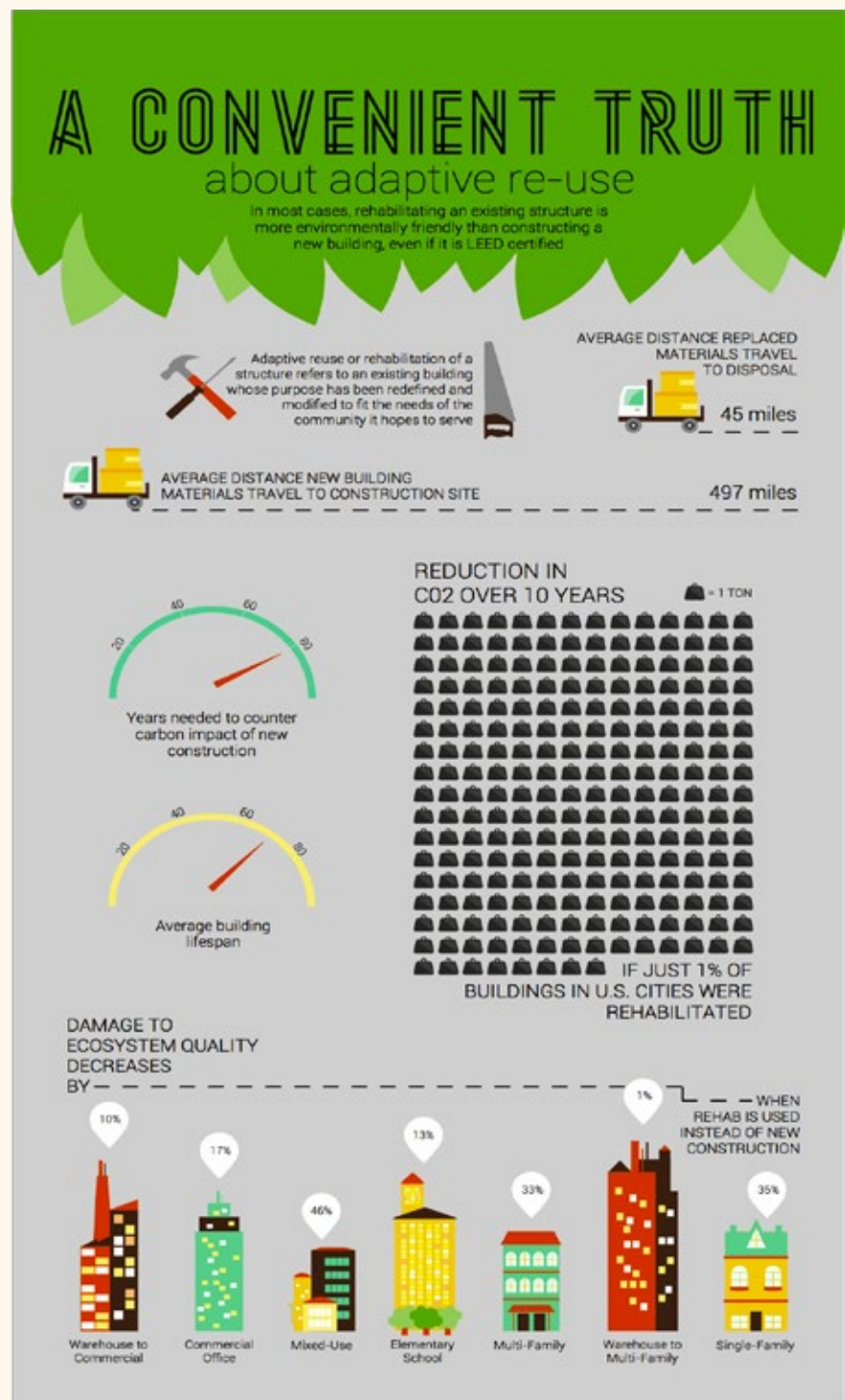


Figure 26,
Adaptive Reuse
Infographic

PROJECT DESCRIPTION

CONCEPT

A central hub for the exhibition of new ideas for the future of our built environments and green landscapes. Creating a space for education, inspiration and influence.

The building holds a large 3-storey interactive exhibition, exploring all things renewable and sustainable. It contains a large and adaptive conference centre to the back, designed to bring creativity and motivation in a world that is constantly changing how we speak and communicate with each other. A cafe downstairs offers a place for social gatherings with organic food and good coffee whilst the courtyard is a green area for relaxation and escape within the centre of an industrial city.

LOCATION

Statutory Address: SELLERS WHEEL, 151, ARUNDEL STREET

The building or site itself may lie within the boundary of more than one authority.

District: Sheffield (Metropolitan Authority)

National Grid Reference: SK 35523 86848

OVERVIEW

Heritage Category: Listed Building

Grade: II

List Entry Number: 1391987

Date first listed: 30-Mar-2007

Statutory Address: SELLERS WHEEL, 151, ARUNDEL STREET



PROJECT TIMELINE

WEEK 1

WEEK 2

WEEK 3

WEEK 4

WEEK 5

WEEK 6

WEEK 7

WEEK 8

WEEK 9

WEEK 10

WEEK 11

PROJECT KICK-OFF

PRODUCTION

FINAL

Project kick-off

Concepts presentation

Site Analysis

Research Into Sustainability

Exisitng Site

Proposal

Demolition

Vectorwroks Model Creation

Final Plans and Elevations

Technical Details

Final Visuals

SITE ANALYSIS BREAKDOWN

GREEN SPACES

Sheffield has more green spaces than any other city in Europe. Green spaces offer people a place to relax and recuperate, offering a variety of habitats for wildlife to grow.

UK LOCATION

Sheffield is central in terms of where it sits in the UK. Offering a fair chance for more people to visit. It has main motorway (access) running around the city and a large train station to accommodate travel to the rest of the country.

PARKING

Sheffield is brilliant for parking, having hundreds of car parks scattered all around. Next to the site is an outdoor car park whilst an indoor large NCP is further down the road.

TRANSPORT

Sheffield itself does not have an airport, however as the image below shows, it is surrounded by cities who do, offering short and easy transport from and to the city via train or car.

THE SITE

Tamparis is set on Arundel Street in the centre of the city. Cafes, pubs and shops are all on its doorstep whilst The Moor and Fargate are a short walk away.

TRAIN STATION

The train station is just a 5 minute walk away, whilst local tram stops are about 5 - 10 minute walks away.



SUSTAINABLE RESEARCH

Habits you can change in your day to day life:

-  Tip 1: Bring your own shopping bag
-  Tip 2: Reduce the use of plastic bags for produce and bulk items
-  Tip 3: Bring your own food container
-  Tip 4: Carry a reusable water bottle
-  Tip 5: Pack a waste-free lunch
-  Tip 6: Bring your own cup
-  Tip 7: Slow down and dine in
-  Tip 8: Say no to disposable straws
-  Tip 9: Avoid heavily packaged foods
-  Tip 10: Share these tips with friends

Green Spaces

Trees

Sheffield is estimated to contain more than 4.5 million trees, giving it more trees per person than any other city in Europe. With over 250 public parks and 52 square miles of national park, Sheffield remains one of the greenest cities in the country.

Green Space and Mental Health

Research has shown how important access to green space is for mental well-being in urban environments. The Improved Well-being through Urban Nature (IWUN) project, involving members of the University of Sheffield's Department of Landscape Architecture, has shown the importance of green space for good mental health.

(Green Spaces | Sustainability | the University of Sheffield, n.d.)

Biodiversity

The University of Sheffield states "We're committed to maximising the ecological value of our green space for the benefit of a wide range of plants and animals. Biodiversity has an intrinsic value and is the earth's life support system. It provides essential services such as clean water and air, crop pollination, coal and timber, natural flood mitigation and helps alleviate the effects of climate change. Culturally, biodiversity provides opportunities for recreation and tourism and contributes to well-being."

(Biodiversity on Campus | EFM | The University of Sheffield,



Green Energy

On-site generation

Decisions over on-site generation are carefully considered to balance whether they are carbon - and financially -viable investments. Many roofs are not suitable for solar panels, however, green roofs which support the urban biodiversity are used for plants and other equipment, saving valuable internal space. They offer insulation which can lead to less energy being used to heat and cool the interior space whilst offering habitat opportunities for many different species not often found in city areas.

Geo-Exchange System

Another way of creating energy in a building is by a unique geo-exchange system. 14 boreholes will be drilled 200 metres deep below the building. These boreholes will use the ground as a battery to draw up heat or store heat into the ground depending on the time of year. This technology will significantly reduce the operational carbon footprint of the building. Water flowing through these boreholes will be brought to the surface at around 18 degrees centigrade, delivering a starting point for heating or cooling. This water will be heated to bring the building temperature to the required level. Heat will be distributed around the building using a combination of technologies, including traditional wet radiators, underfloor heating, and an air handling plant. The water is heated by a combined heat and power (CHP) engine which will generate both electricity and heat. As the energy available from the National Grid decarbonises, eventually, the CHP technology will be replaced by electrical heat pumps. It is anticipated that the rate at which the Grid is predicted to decarbonise will allow the University to utilise the gas-fired CHP for its full anticipated life span. Once a lower carbon alternative becomes available, we will look to replace the current system.

(Energy | Sustainability | The University of Sheffield, n.d.)

Food and Drink

Milk

Like meat, dairy has a huge impact upon greenhouse gas emissions. Sheffield has many businesses using local milk producers such as Cow Molly just 4 miles outside the city centre, offering lower emissions when moving the milk and supporting local businesses.

Disposables

A common issue found in food purchasing is the amount of single-use plastic involved in packaging. Options involve a coffee cup levy for single-use coffee cups with funds being ring-fenced for sustainability projects. This has shown evidence of increasing numbers of reusable cups being used.

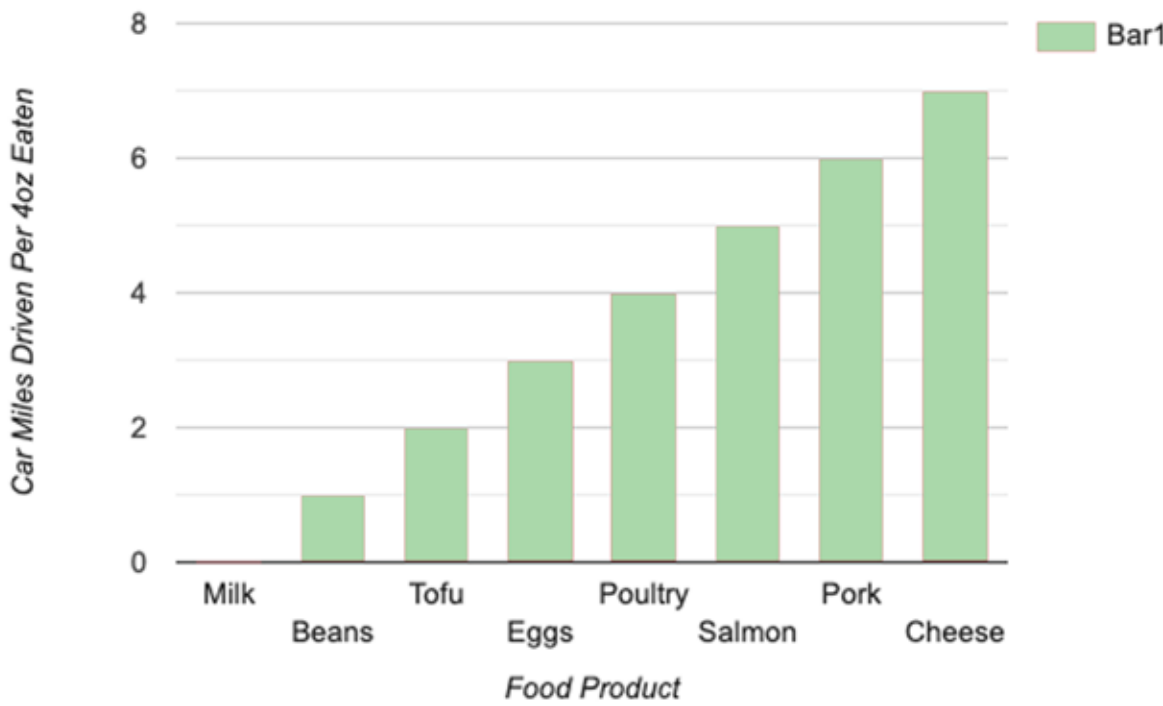
Beef And Lamb

Currently, 72% of the Earth's ice-free land is used to feed, clothe and support the Earth's population. Land use is clearly a huge issue, leading to habitat loss and reducing our number of carbon sinks.

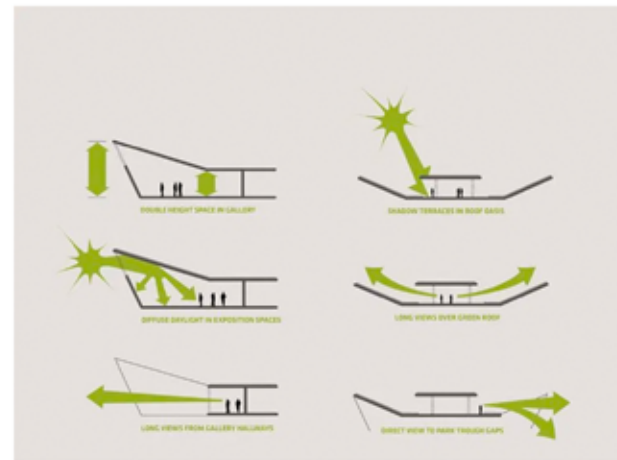
The meat industry is one of the biggest polluters with cattle in particular taking up large amounts of land for grazing. Cattle are also a huge producer of methane, a greenhouse gas many times more potent than carbon dioxide, producing the greatest environmental impact of any food type.

(Food and Drink | Sustainability | The University of Sheffield, n.d.)

Eating Smart



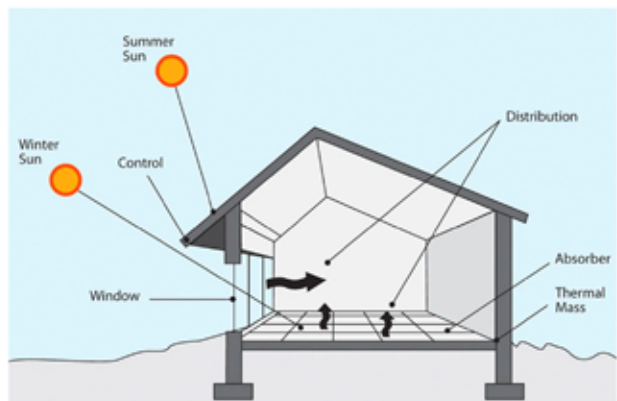
Sustainable Architecture Infographic



Introduction

Around half of all non renewable resources consumed across the planet are used in construction – this makes it one of the least sustainable industries in the world. This puts a lot of responsibility on architects and designers to play a key role in managing climate change. When we talk about sustainability in architecture we are looking at:

- How we design building
- How we construct buildings
- How we manage buildings



Building Elements

Wall Construction

Sustainable material choices

- Pre fabricated elements
- High thermal mass
- Low thermal mass
- Recyclable materials
- Recycled materials
- Easily constructed
- SIPs (Structural Insulated Panels)
- Air permeability
- Modular foundation systems

Wall Insulation

- High levels of insulation
- Recyclable materials
- High recycled content
- Airtightness
- High performance, low U-value

Ground Floor Construction

- Materials
- Recyclable materials
- Recycled materials
- Durable materials

Roof Construction

- Sustainable materials
- Durable materials
- Low U-value
- Green Roof – intensive or extensive – consider uses and benefits

Doors

- Low U-Value
- Any glazing tripled glazed Low E

Windows/Roof Lights

- High performance
- Low U-Value
- Triple glazed Low E

Finishes and Materials

It is very easy to suggest using recycled materials on a project wherever possible, but the reality of this is sometimes quite a challenge. Problems can arise due to client restrictions, material not fit for purpose, increased work in sourcing appropriate materials in necessary quantities etc. It is also important to know whether a recycled material will reach current building reg standards and any other associated British standards. If recycling and reclaiming is not an option in your project consider life cycle assessment of any specified material.

Some areas where recycled materials can be considered:

- Recycled glass as aggregate in paving
- Recycled glass in glass tiles and bricks
- Recycled plastic in wall linings, toilet cubicles, street furniture, signage and fencing
- Recycled plastic as aggregate in concrete street furniture or timber substitute in boards for internal furniture
- Floor finishes etc could incorporate reclaimed or recycled materials
- Cladding could incorporate eco/sustainable materials
- Consider the embodied energy of your materials

Mechanical and Electrical Strategies

Active Ventilation Strategy (mechanical)

- MVHR (Mechanical Ventilation and Heat Recovery)
- Termodeck
- Ground-Air heat exchanger system for controlled ventilation

Electrical Lighting

- Low Energy Lighting
- PV Panels to provide electricity
- Wind energy
- Reduce light pollution on any external lighting schemes

Electrical Lighting Zones/Controls

Incorporate varied lighting controls such as motion sensors to reduce energy consumption Primary Heating System

Biomass systems

Passive Design Strategies

Heating

- Thermal mass
- Passive Solar Design

Cooling

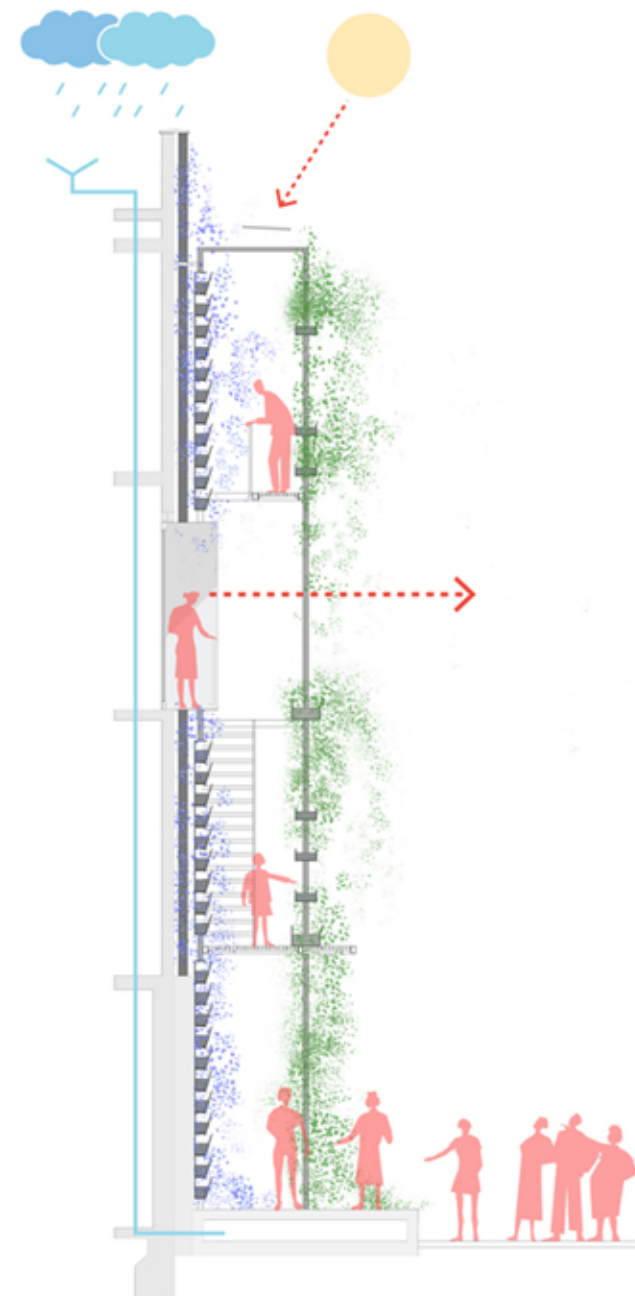
- Solar orientation
- Solar shading strategies
- Roof overhang, solar shades

Thermal mass

Allow for occupant control over window opening (this creates instant cooling when occupants require)

Lighting

- Design for natural daylight
- Solar orientation
- Surfaces to reflect light but not dazzle
- Ventilation
- Cross ventilation



Health and Wellbeing

Aside from materials, energy and the physical aspects of the building, another increasingly considered factor in green design is the health and wellbeing of the building user. Given that we spend a vast majority of our time in buildings, now more than ever, it is even more crucial that we design buildings that can offer a high level of comfort, this includes factors such as:

- Internal surface temperature
- Air temperature
- Relative humidity
- Air movement
- Air pressure
- Air quality
- Acoustic influences
- Visual influences

I would recommend further reading on this subject, particularly – Green Building Guidebook for Sustainable Architecture.

- Use FSC Certified wood
- Use durable materials
- Always strive for high building performance
- Construction Site
- Construction waste and demolition waste form an important part of the design process.

Statistics show that in some cases up to 40% of materials delivered to site leave in mixed skips to go to landfill. This problem has been address by waste separation, multiple skips and waste monitoring which has reduced the figure to 20%.

- Prefabricated elements can also reduce waste on site significantly.

- Energy and water consumption on site can be monitored and where possible recycle water use.

- Transport of construction materials and waste, where possible materials should be sourced locally, and waste disposed of locally.

Life Cycle Assessment

Life cycle cost analysis can be carried out along with a service life planning in order to improve your design, the specification and through life maintenance and operation. This testing and planning can result in improved energy consumption over the life span of the building, a reduction in maintenance requirements and frequency, extended life of the building fabric – and in the long term the dismantling and reuse of some of the building components.

THE SUSTAINABLE DESIGN HUB PROPOSAL

CONCEPT

My proposal is to showcase a world in which design can be fully sustainable, renewable and green. I will pick out key topics to exhibit on each floor and these topics can be easily updated and modified due to the spaces being flexible and adaptive.

KEY TOPICS

Climate change and how it is affecting the world

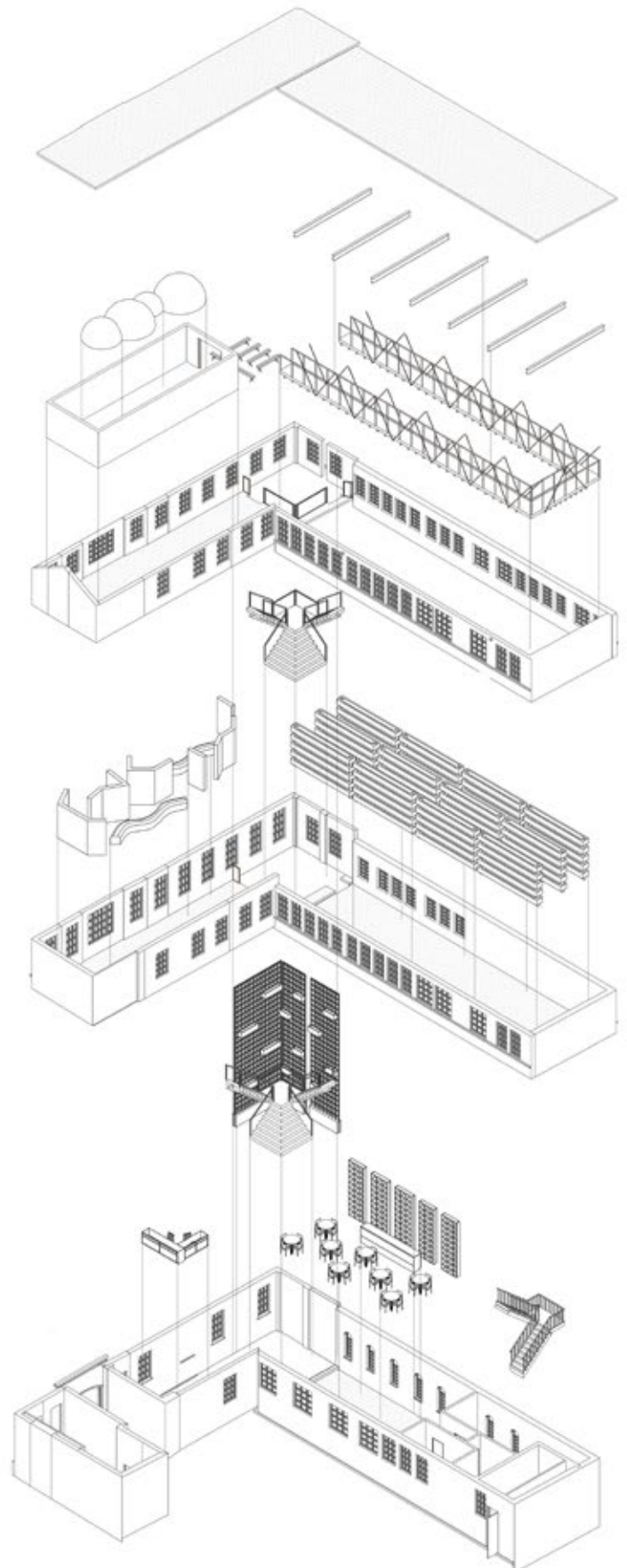
- An immersive experience room, designed with a large seating area in the middle whilst a video is projected onto each wall.
- The video can be easily changed and the seating can be added to.

Built Environment issues, projects and ideas

- A typical exhibit including boards of information and activities surrounded by seating opportunities.
- The board information can be easily edited and swapped out with little need to change the layout or seating.

The future of urban farming

- For my urban farming exhibition I want to create an interactive area, offering people a chance to engage or simply watch. A living farm will be created with a walkway above.
- This will be harder to change however the entire idea will need constant care and the way people engage can be shifted and changed up.



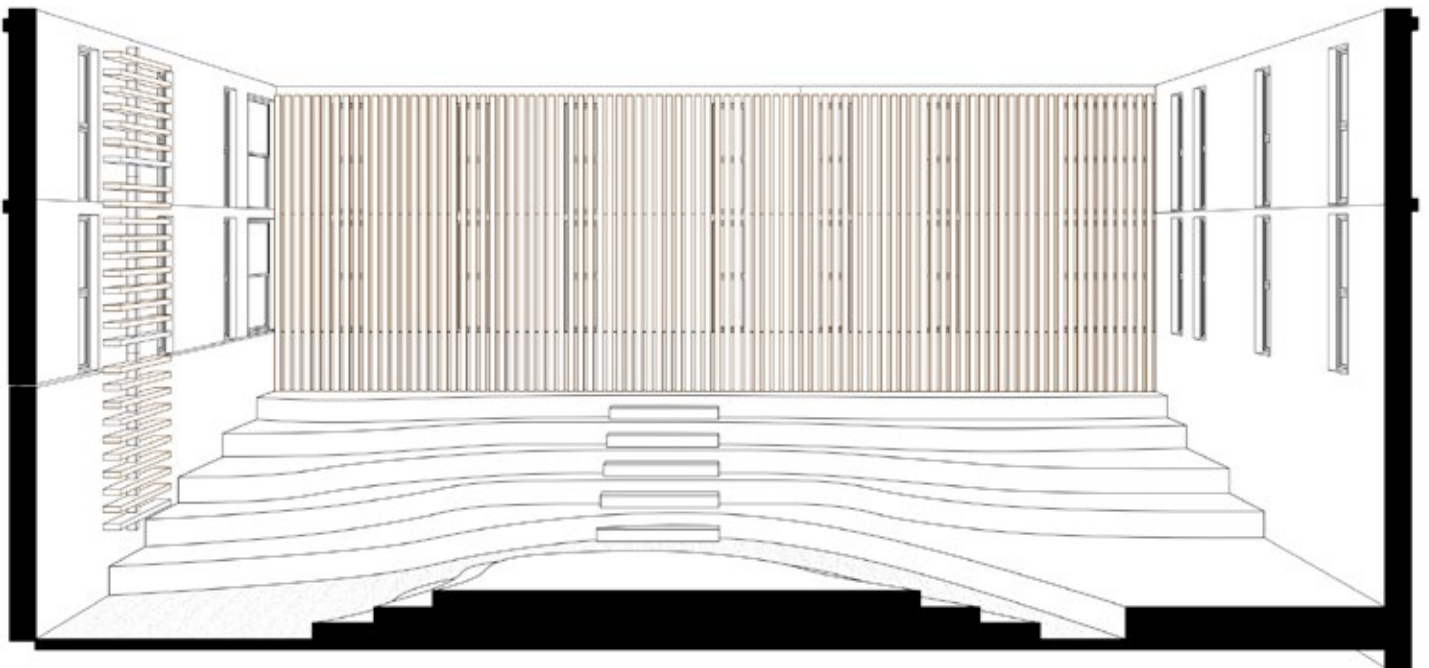
THE LECTURE THEATRE PROPOSAL

CONCEPT

My proposal is to create a theatre for education, lectures and conferences in a space that is inspiring, creative and brings the audience a little bit closer to nature, using sustainable and natural materials that either originated on the property or were sourced locally.

A SEATING LANDSCAPE

This idea came from my love for topographic maps. I have used these often in my designs and use these maps to help create functional lighting by understanding the way in which the room will be used. When I have worked out where the space will be the busiest and most populated I can use this information to plan how the different areas will be planned and lit, to ensure that they work within the room, and for the people using the space.

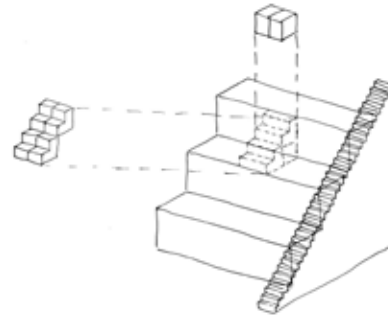


DESIGN DETAILS



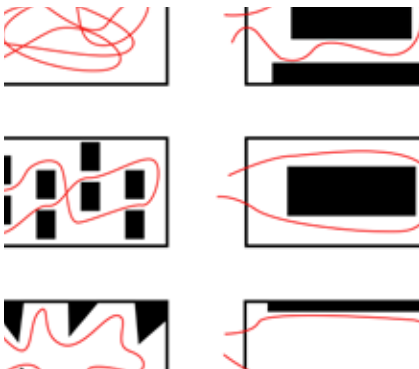
GREEN ROOF

When it comes to roofing, green roofs are, without doubt, one of the more visible signals that you have built a sustainable home. There is a lot of cynicism that they don't actually serve enough 'eco purpose' to be worthwhile, but they do have some genuine benefits.



MODULAR SEATING DEVELOPMENT

My original seating design was created to offer a functional and modular seating option, allowing for different group sizes, but when it came down the detail, I discovered that the sizing didn't work and the seating would need a machine to assemble, which isn't practical.



EXHIBITION RESEARCH: MOVEMENT AND LAYOUTS

This research was important to understand how spaces are used in an exhibition to showcase different objects and information. It allowed me to decide what would be the best design for my idea within the available space.



STYLE BOARD AND DESIGN

Biophilic design is a concept used within the building industry to increase occupant connectivity to the natural environment through the use of direct nature, indirect nature, and space and place conditions.

TECTONICS: STAIRS AND PLANT WALL

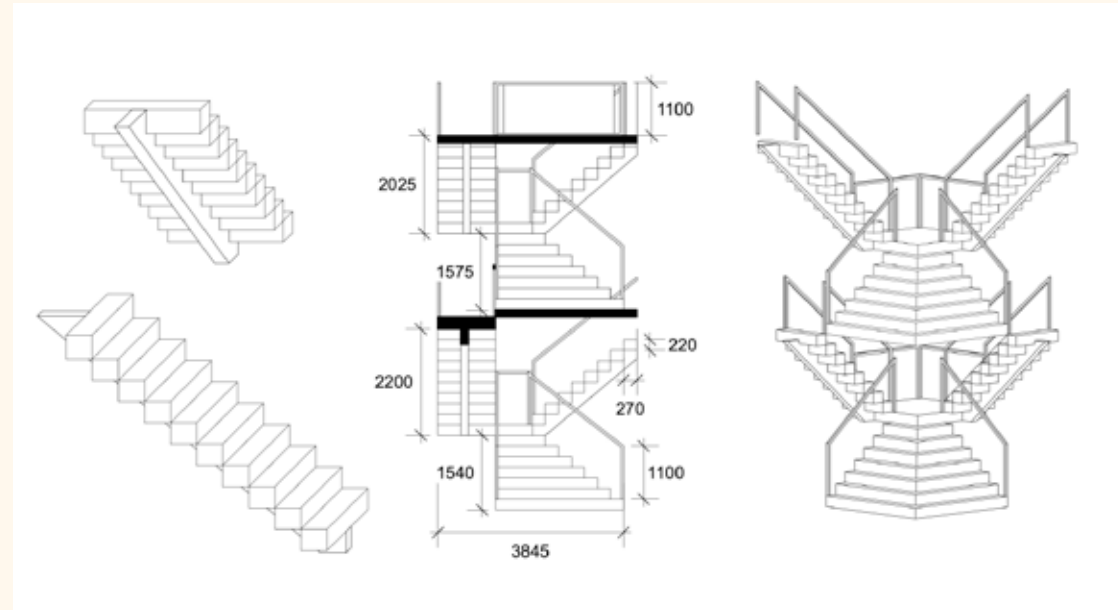
CENTRAL STAIRCASE

EXHIBITION



STAIRS

I wanted the stairs of my exhibition to be a statement, using minimalistic colours and shapes to form a unique overall look that winds up and offers different paths. I wanted the stairs to be seen on entry and from most areas of the exhibition. I therefore placed the staircase in the central point which can be seen from both halves of the building. It acts as a connection between the exhibitions, offering the guests the opportunity to travel to where they please in a free flowing space.



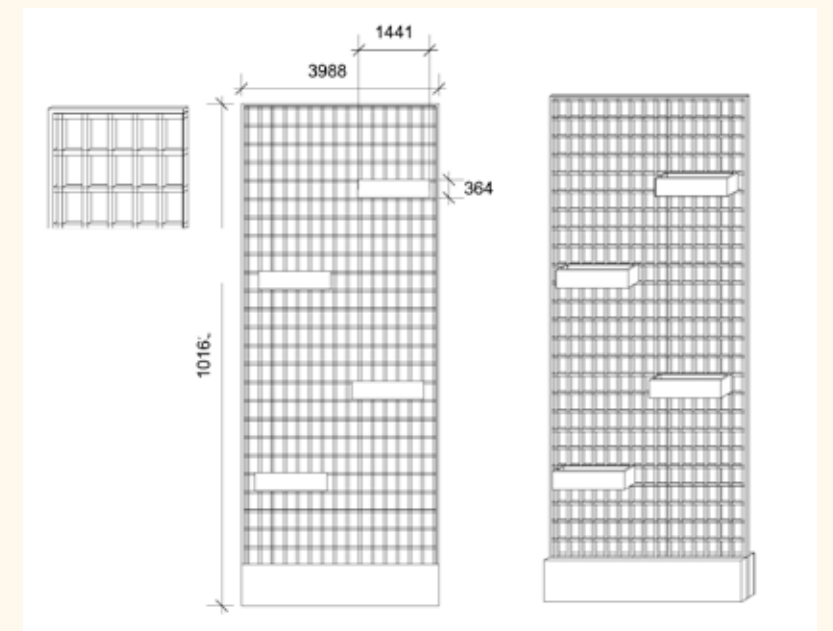
WALL

The type of plant/green wall I have chosen to use is a steel frame and cable design, this style fitted with my needs and wants for the building and exhibition. Features included it being thin to allow it to fit behind the stairs and wall, I wanted it to be made from locally sourced materials and offer minor fitting needs to prevent the building being damaged in the process.

In terms of care, this wall does not need an irrigation system and can be watered manually, with the roots growing in focused areas such as plant pots scattered up the wall or in the base.

It will be made from steel, this is a locally sourced material and can be recycled infinitely, costing less and offering a durable and robust structure.

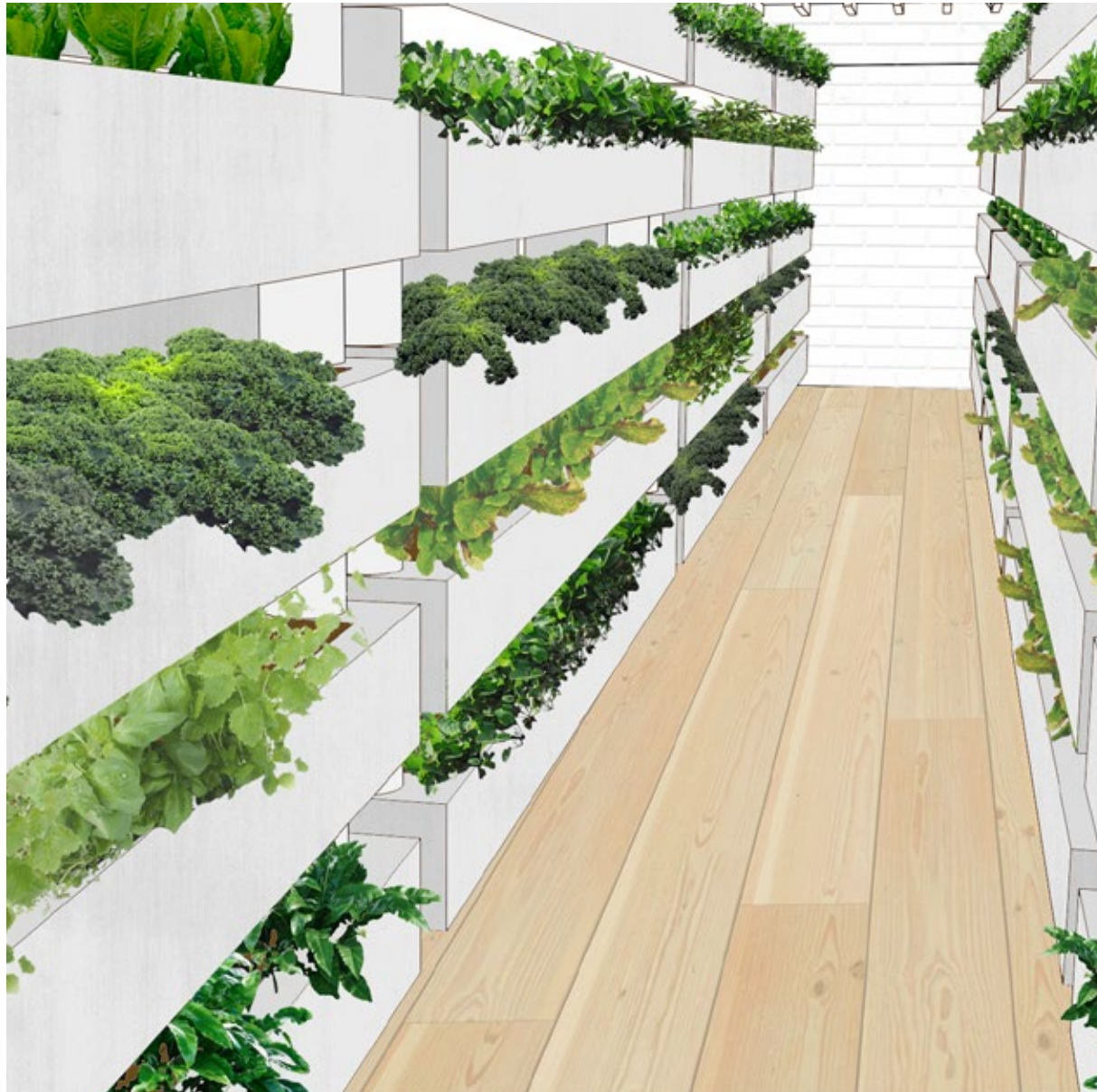
In terms of safety the structure is screwed to the wall to prevent tipping or falling. It is screwed in a small amount of areas up all three walls causing little damage to the existing wall behind.



TECTONICS: URBAN FARM AND WALKWAY

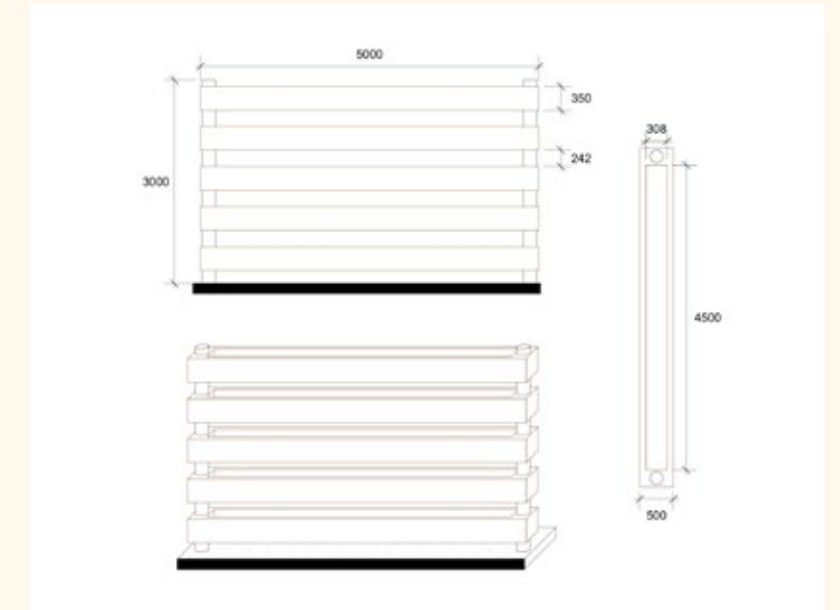
MAIN EXHIBIT

EXHIBITION



FARM

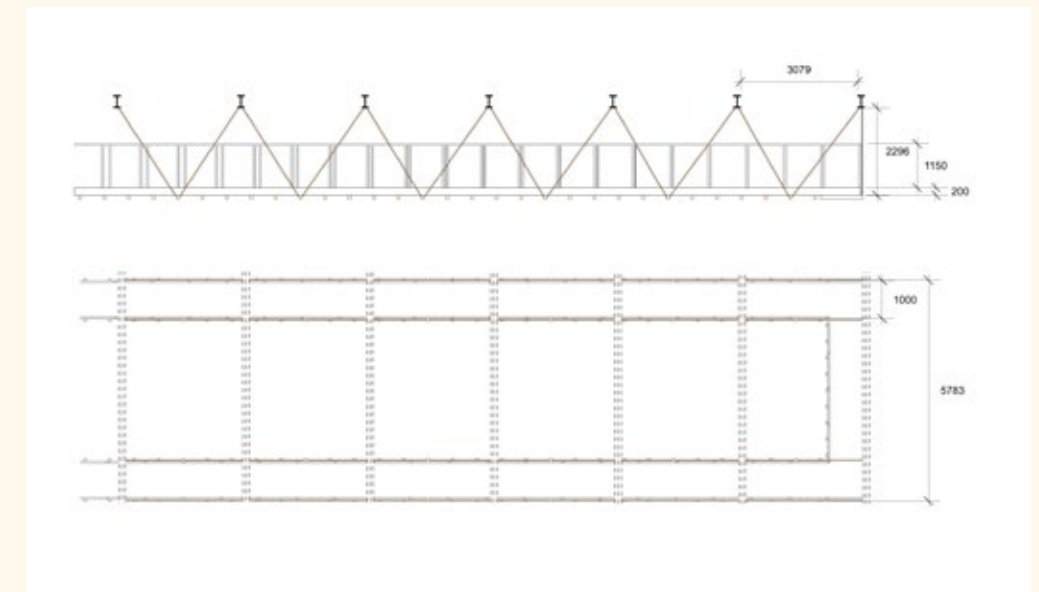
Urban farming is a rather new idea and is being developed constantly, with new ideas arising every month. Urban farming involves growing plants indoors instead of outside and involves using space more efficiently otherwise this process does not work out in terms of money spent. Different ideas have been developed, with the most recent being vertical farms. This involves a vertical plant bed encased with a plastic holed cover to allow growth on all sides instead of just the top. However this requires the room to be designed with air and CO₂ control and the correct light for the plants. Whereas my design allowed for less production but a much more easily controlled set up for care of the plants, with lighting being controlled above each. This farm is automatically controlled, however farming knowledge is needed to understand the vegetation needs and for any extra care.



WALKWAY

This walkway will offer the guests the opportunity to walk above the urban farm, giving a view of the process and how it works. Whilst watching the farmers at work. It will open visitors' eyes to the future of farming and hopefully show that anyone can do this.

The walkway is built from steel which is a durable and sustainable material. It can be locally sourced and locally recycled at the end of its use. The colour of the walkway is grey which I have used so that attention is not detracted from the farm underneath.

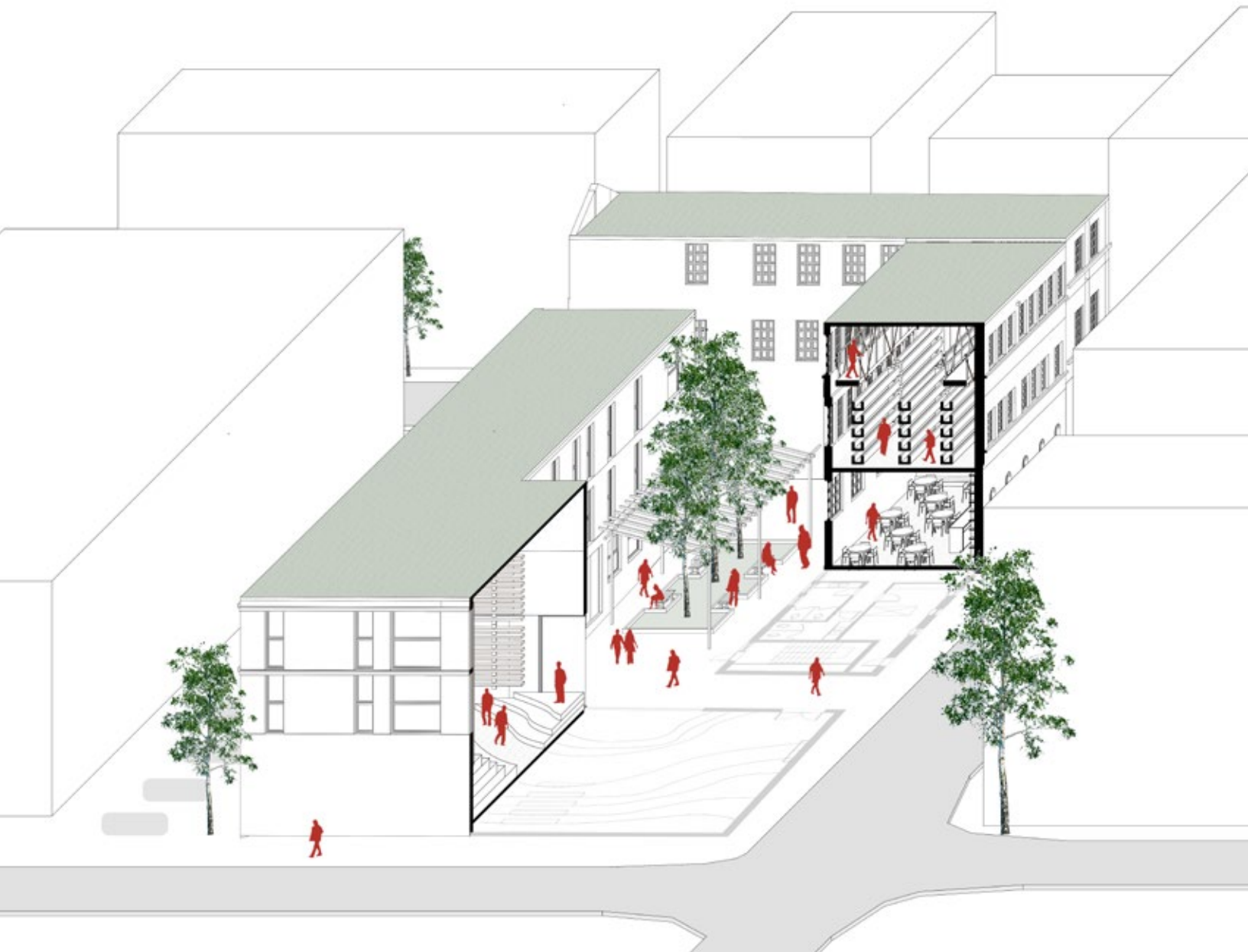


CRITICAL REFLECTION

The key process I used throughout my project concentrated on research. I constantly returned to research so that I could create a project that was factual and technically correct. Creating a research info-graphic offered me that first look into what I wanted to include and the information I needed. When I designed my urban farm, stairs, green wall and walkway for example, structural knowledge was paramount and allowed me to create exactly what I imagined.

My lecture theatre allowed me to bring in a Biophilic design style, using natural materials and a curved landscape design to create a unique seating experience that brings the visitor closer to nature. A green wall at the back and large windows at the front, looking out at the courtyard, brings in the outdoor world. The seating offers wider areas for groups and smaller areas for individuals, filled with comfortable cushions and blankets.

My project offered me a chance to learn and gain experience in all things sustainable; from architecture and construction to agriculture and the environment. I created a project that focused on the idea of showcasing how the building was built to what it exhibited, educating and inspiring, fulfilling my aim.



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