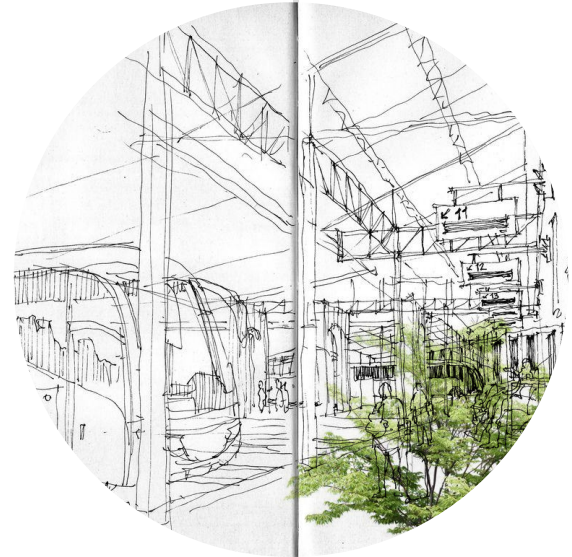


# A Seamless Transiting Experience Through Biophilia

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Design Portfolio



By Sakshi Mohapekar  
MA Interior Design | 2301363

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# CONTENTS

1. Contextual Recap	3
2. Site Introduction	5
3. History	7
4. Site Analysis	9
5. Biophilia and its Importance	11
6. Design Development	14
7. Spatial Analysis	16
8. Interaction drawings	24
9. Physical Model	25
10. Material testing and Prototypes	32
11. Renders	37
12. Reading sources	45
13. CV and Job Search	46
14. Professional Research	47
15. Networking	48
16. Bibliography	49
17. Appendices	51
18. List of Illustrations	53

# CONTEXTUAL RECAP

STUDIO PRACTICE

## ABSTRACT

The Space seeks to create an innovative, sustainable environment that promotes biophilia and energy-efficient design, enhancing the relationship between humans, culture, and nature. This immersive design framework aims to improve the quality of life and provide a safe, enjoyable commuting experience.

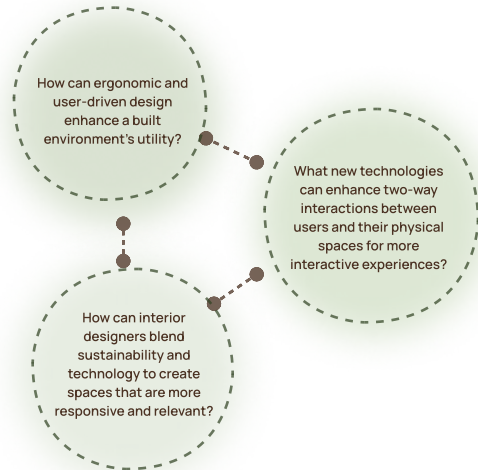


Fig. 1. Human Nature Connection, (2024)

## DESIGN PROPOSAL STATEMENT

My thesis focuses on redesigning London Victoria Coach Station using biophilic design to enhance the seamless commuting experience. By integrating natural elements, sustainable materials, and improved circulation, the project aims to reduce stress, boost well-being, and create a modern, eco-friendly transit hub.

# CONTEXTUAL RECAP

STUDIO PRACTICE

## PROBLEM STATEMENT

In polluted, transport-heavy urban areas, public spaces often become stressful and unhealthy. Incorporating biophilic design is crucial to improve air quality, reduce stress, and create healthier environments by reconnecting people with nature, ultimately enhancing well-being and resilience in these urban settings.

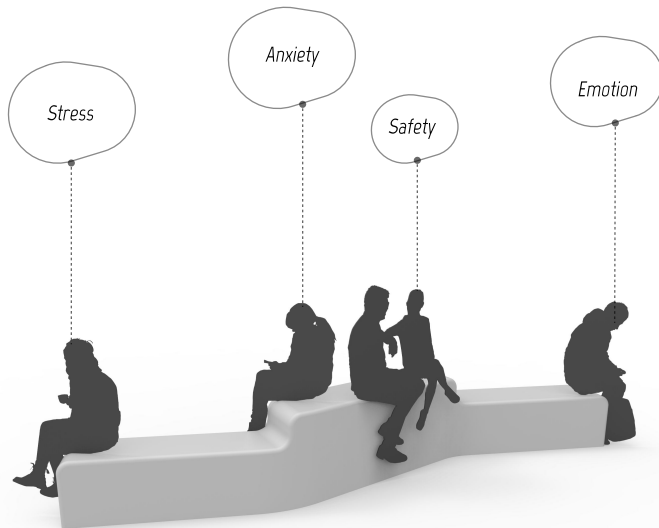


Fig.2. People emotion in Public Space, (2024)

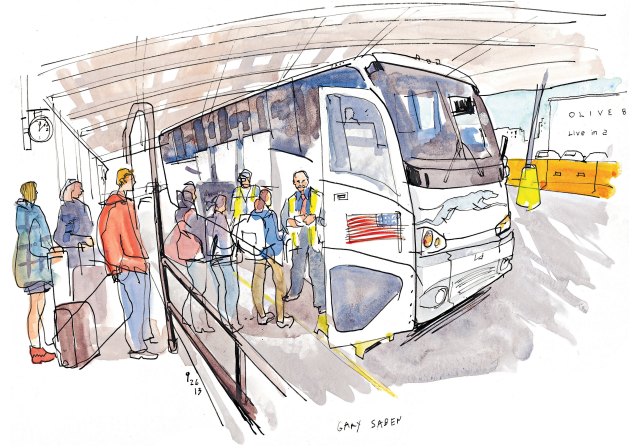


Fig.3. People in Transport hub, (2018)

## SOLUTION ?

Think of a Space where you feel most **Happy**, most **Calm** and most **Relaxed**

# SITE INTRODUCTION

UNITED KINGDOM | GREATER LONDON

The United Kingdom which includes England, Scotland, Wales, and Northern Ireland, is the 22nd-most populous country - important global city and financial centre. For administrative and political purposes, each country is divided into a number of counties, which are then subdivided into districts (*ConceptDraw, (2024)*).

**Greater London** is bordered by Hertfordshire to the north, Essex to the northeast, Kent to the southeast, Surrey to the south, and Berkshire and Buckinghamshire to the west.

It is known for its rich history, cultural attractions, economic importance, and cosmopolitan atmosphere, it is one of the most vibrant and diverse cities in the world (*London Authority, (2024)*).



Fig.4. United Kingdom Map, (2024)

# SITE PLAN

LONDON VICTORIA

Scale 1:500

The site is densely covered with residential, public transport and famous Buckingham palace nearby. The site analysis focuses on the traffic congestion and passengers travelling daily by rail or coaches.

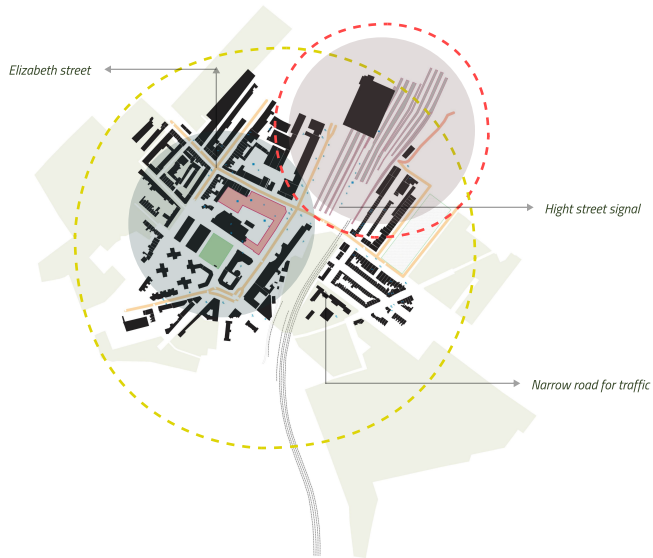


Fig.5. Night time traffic vision,(2024)



Fig. 6. Day time traffic vision,(2024)

# HISTORY

## LONDON VICTORIA COACH STATION

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

Art Deco building

In 1950, Original site expanded by 40%.

66 departure bays

new booking hall in 1961

In 1980, scheduled coach operations were deregulated

The demise of the National Bus Company, in 1988

Since 2000, Victoria Coach Station has come under the remit of Transport for London (TfL).



1932

Designed by Wallis, Gilbert & Partners during WW2

1956

Newly landed immigrants at Victoria Station, London.

1976

Control of the station transferred to London Regional Transport.

1990

London Coastal Coaches - End of an Era

1992

Victoria Coach Station was emblazoned with the distinctive Johnston font, as with other London Transport facilities.

2003

Major renovation and expansion work began





# SITE ANALYSIS

## RESEARCH AND SURROUNDING

### Co-ordinates

- Latitude: 51.4928
- Longitude: -0.14881

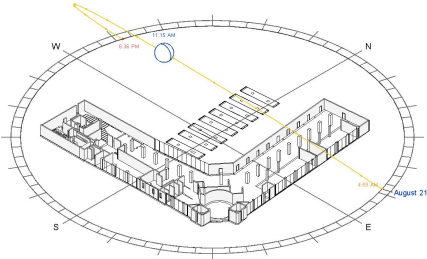


Fig. 12. Sun Path diagram, (2024)

**S** Serves a large number of passengers daily  
Equipped with essential amenities  
Connects seamlessly with London Underground,

**W** overcrowding and long queues, impacting comfort  
Located in a busy urban area, contributing to  
high noise levels and air pollution

**O** enhance passenger experience and well-being  
Opportunity to adopt green practices and renewable  
energy sources to reduce environmental footprint

**T** Aging infrastructure may require significant resources  
Economic challenges could reduce travel demand,  
impacting station revenue and operations.

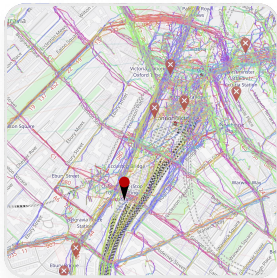


Fig. 13. Public GPS Traces, (2024)

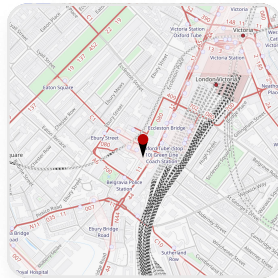


Fig. 14. Accessibility and Connectivity, (2024)



Fig. 15. Noise Levels, (2024)

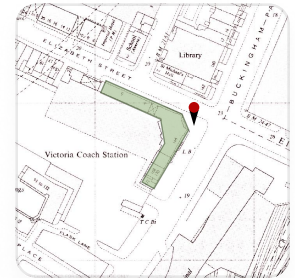
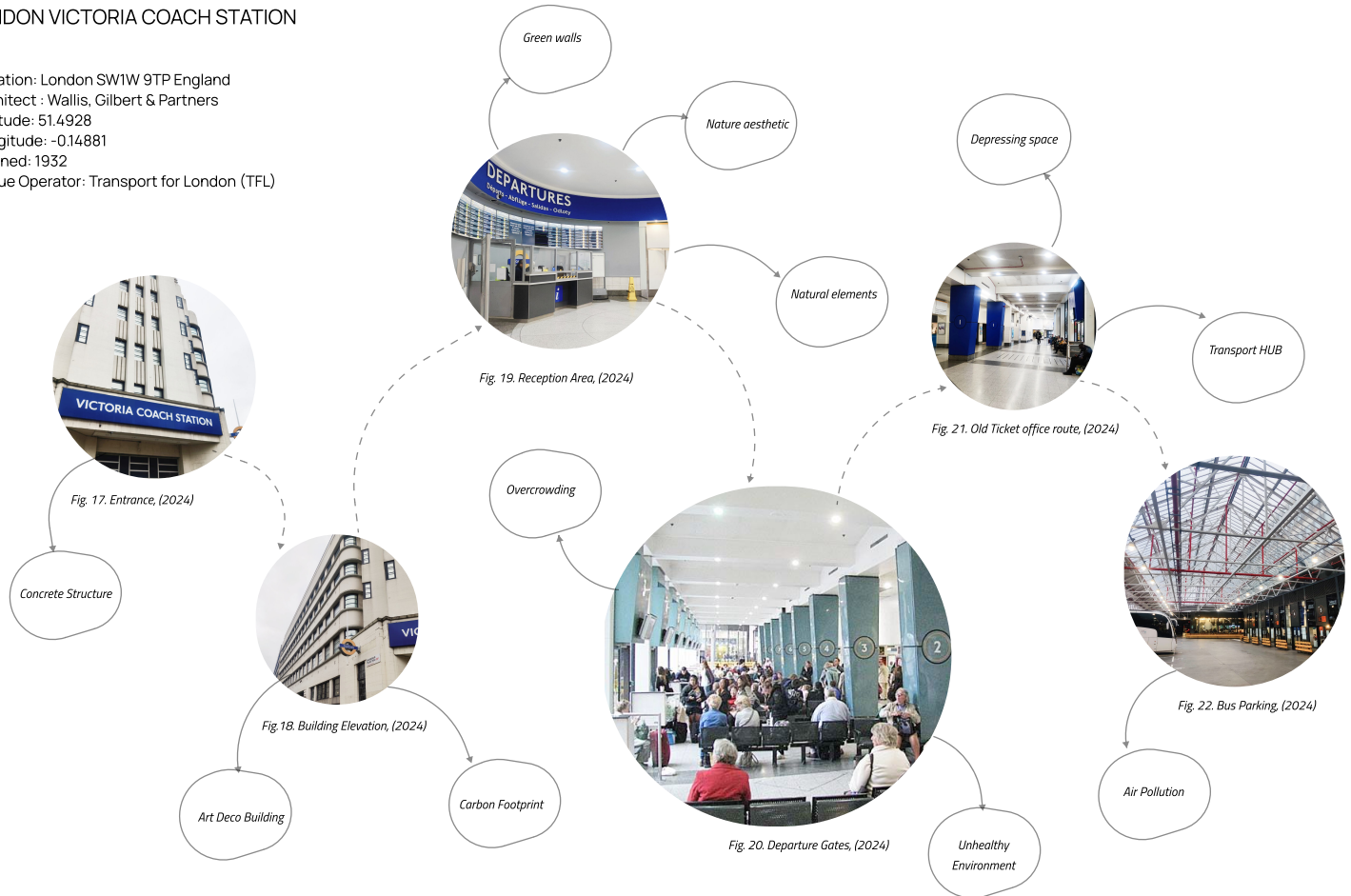


Fig. 15. Noise Levels, (2024)

# SITE ANALYSIS

## LONDON VICTORIA COACH STATION

- Location: London SW1W 9TP England
- Architect : Wallis, Gilbert & Partners
- Latitude: 51.4928
- Longitude: -0.14881
- Opened: 1932
- Venue Operator: Transport for London (TfL)



# BIOPHILIA AND ITS IMPORTANCE

## SPATIAL PLANNING

### About Biophilic Design

Biophilic design enhances occupants' connection to nature by incorporating elements of direct and indirect nature, as well as spatial conditions. →



### Attributes of Biophilic Design



Fig. 23.

Direct Experience



Fig. 24.

Indirect Experience



Fig. 25.

Place and Space

### The Nature-Human connection

My understanding of biophilic is that nature can improve our quality of living and can add a healthy longevity to the built environment. As a result, we → as designers can improve people's lives, thinking about their well being and understanding the problems to have a better future (See Appendix 1).



Fig. 26. Biophilic Design in Carbon-Neutral Buildings, (2023)



Why?

stress, well-being, creativity

Scope

- Natural Materials
- Living Plants
- Water Feature
- Recycles resources
- Promotes sustainability

## Case Studies

Largest living wall projects in Europe.



Fig. 27. Ashford Designer Outlet (2019)

At over **2,155 m<sup>2</sup>** and containing approximately **160,000 plants** a series of luxurious vertical gardens is the main cladding element of the £90M expansion of the **Ashford Designer Outlet** (Biotope, 2019) (See Appendix 2).

A Terminal in garden, Bangalore Airport



Fig. 28. Hanging Bells (2022)

Amidst the greenery, **Hanging bells** adorn even the light fittings. A biodiverse green wall awaits international passengers. 349 number of veils & 120 number of bells at Terminal 2 (Prasanna murti Desai, 2023).

# BIOPHILIC ELEMENTS

## GREEN WALL AND PLANTSCAPING

Green Furniture Concept helps to build community through the placemaking concept by designing public benches with shapes that invite physical interaction and open conversation. Lines flow and curve, allowing relaxation and easy communication (*Green Furniture, (2021)*).



Fig. 29. Curved Timber, (2020)

Curbed timber is an increasingly popular design choice due to the visual appeal and fluidity they bring to a space. The processes we have adopted to curve our timber products include Steam Bending and Kerfing (*Sculptform, (2020)*).



Fig. 30. Green wall , (2024)



Fig. 31. Green Furniture, (2021)



Fig. 32. Preserved Moses, (s.d.)



Fig. 33. Spider Plant, (s.d.)



Greenhouse Effect



Indoor Air Quality



Reduce SBS



Increase Productivity



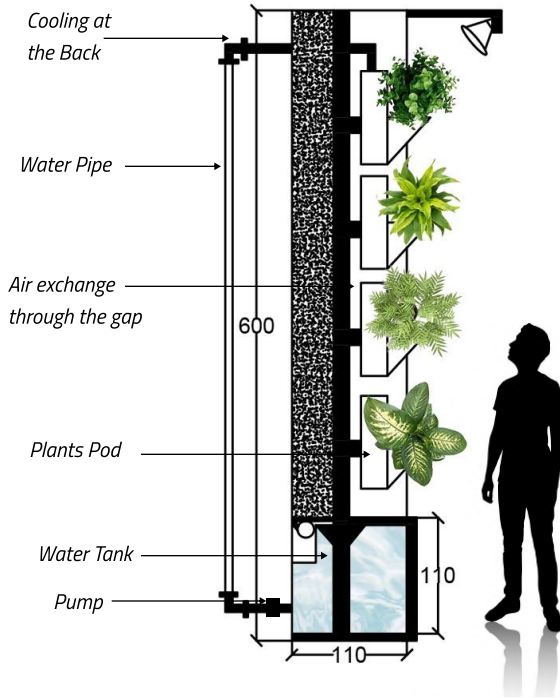
Noise Control

Fig. 34. Green wall Benefits, (2022)

# BIOPHILIC ELEMENTS

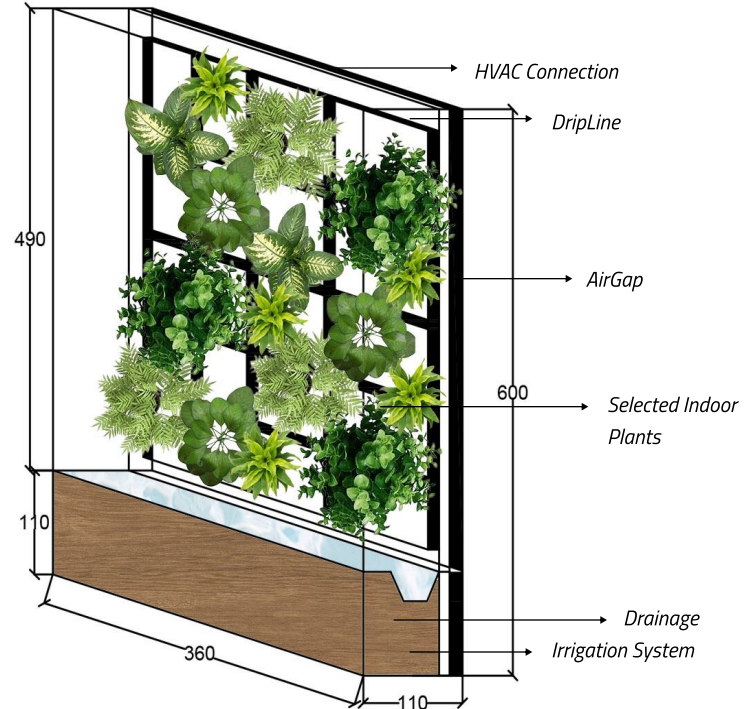
## GREEN WALL AND PLANTSCAPING

The concept of biophilic design includes integrated greenery. Plants and facade greening is for instance attributes within the element environmental features (Nicole Pfoser, 2024).



Scale 1:50

Fig. 35. Green wall Section, (2024)



Scale 1:50

Fig. 36. Green wall Elevation, (2024)

# DESIGN DEVELOPMENT

## CORE ELEMENTS

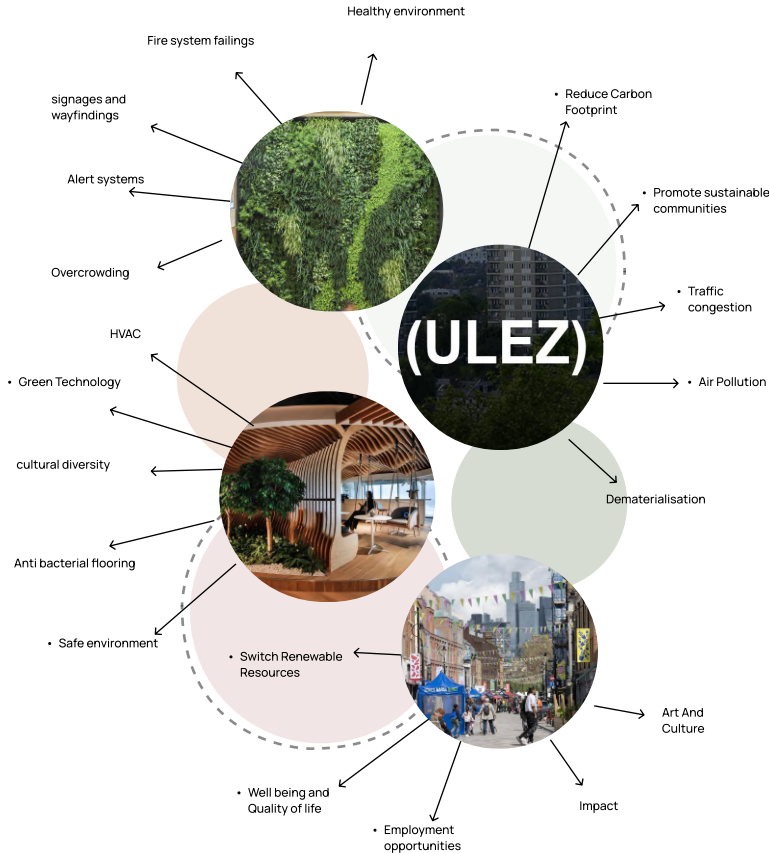


Fig. 37. Mayor of London, (2024)

## Affordable, Reliable, and Safe Transport Network

To achieve this vision, the Mayor is focusing on the most important issues facing our city. This includes:

- Make new buildings more **eco-friendly**, including installing **more green roofs and walls**.
- making transport more **affordable, better and greener**
- tackling air pollution to make the air we breathe **safe** for everyone
- making sure Londoners from all walks of life can enjoy **arts and culture**
- **Protecting and improving** London's outstanding green spaces; increasing the number of trees through projects including the **£9m Greener City Fund**.
- ensuring the **safety and security** of London
- encouraging London's **diverse communities to come together**.

Source: Greater London Authority, (2024)

# DESIGN DEVELOPMENT

## CORE ELEMENTS

### Employee Benefits And Impact

- Reducing the emissions from London's public buildings will take comprehensive efficiency upgrades, renewable energy use and sustainable transit promotions.
- Improved understanding between contractors, leading to more efficient and innovative ways of working.
- Improved relationship with all stakeholders and Cost savings through energy efficiency and reduced maintenance (*Transport for London, (2021) (See Appendix 3).*)

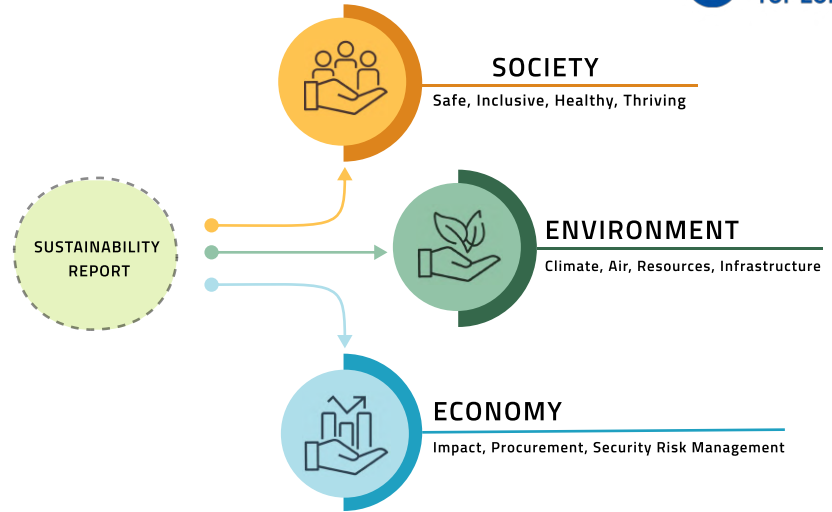


Fig.38. Sustainability goals, (2024)



Fig. 39. TFL Corporate Environment Plan, (2024)

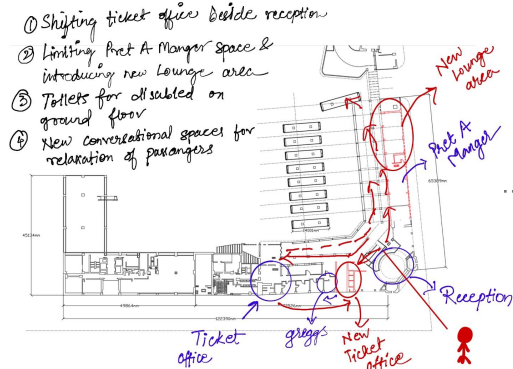
### Green Infrastructure

Protect, Connect, and Enhance the Green infrastructure including biodiversity, habitats, ecosystem on our estate (*Transport of London, 2021) (See Appendix 4).*

# SPATIAL ANALYSIS

## CIRCULATION

### BEFORE



The main objective of the space planning is focusing on the easy circulation of commuters and increasing the seating space for commuters to pass the transiting time of the journey (See Appendix 5).

### AFTER

- Passenger buys a ticket and goes through the gate
- Passenger who already has a ticket goes to the Pret or Lounge area till the bus arrives
- Passenger who has a connecting bus rests at the waiting area opposite to office

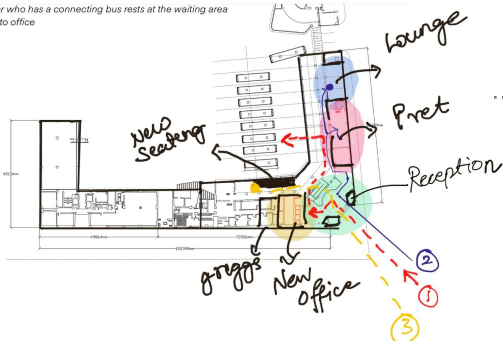
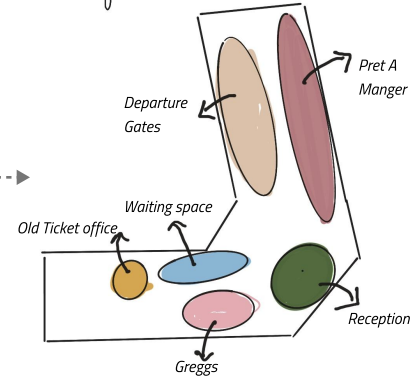


Fig. 40. Conceptual Sketch, (2024)

Before



after

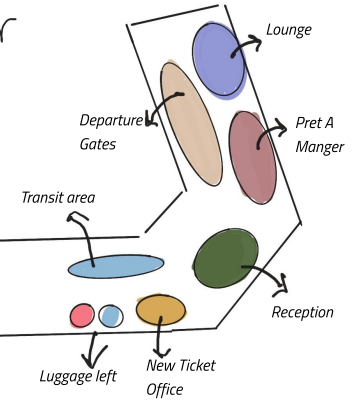


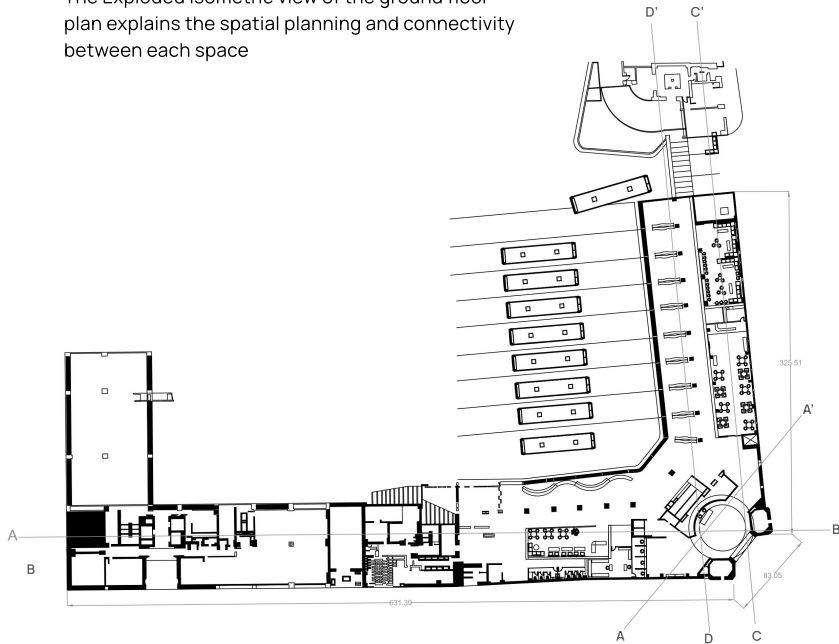
Fig. 41. Circulation sketch, (2024)



# ISOMETRIC VIEW

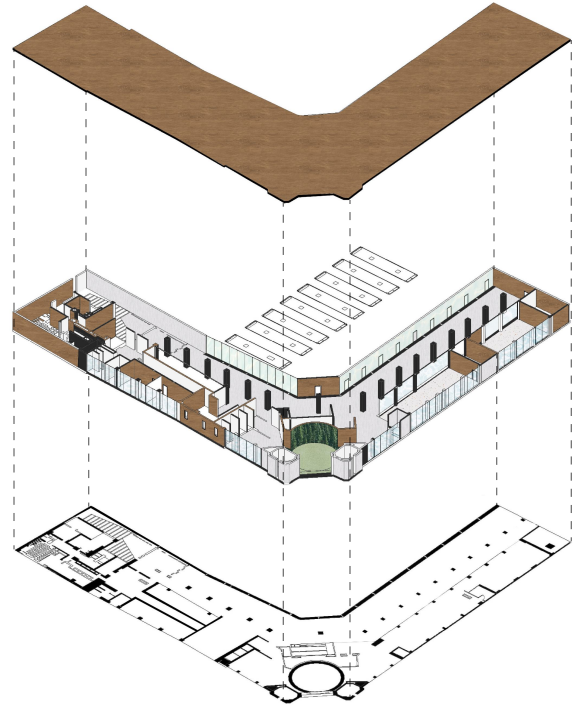
## EXPLODED SITE VIEW

The Exploded isometric view of the ground floor plan explains the spatial planning and connectivity between each space



Scale 1:200

Fig. 4.2. Floor Plan detailed drawing, (2024)



Scale 1:1

Fig. 4.3. Site Isometric view, (2024)

# FLOOR PLAN

SCALE 1:200

The Ground Floor Plan incorporating biophilia in the transport hub for the easy access to the passengers and wellbeing of people creating a positive impact on the environment.

1. Reception
2. Pret A Manger
3. Departure Gates
4. Lounge
5. Ticket Office
6. Luggage Left
7. Coworking Cafe
8. Toilets
9. Transit Waiting Area



Fig. 44. Floor Plan, (2024)

# SECTION

SCALE 1:50

The Section through the reception and front view of the London Victoria Coach station with the installations of Green wall at the entrance of the space depicts the nature and human connection.



Section AA'

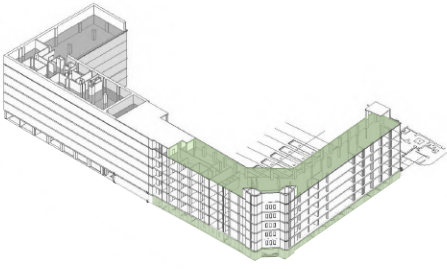


Fig. 45. Isometric Site view, (2024)

Fig. 46. Section AA', (2024)

# SECTION

SCALE 1:50

Section BB'



Fig. 47. Section BB', (2024)

# SECTION

SCALE 1:50

Section CC'



Fig. 48. Section CC', (2024)

# SECTION

SCALE 1:50

Section DD'



Fig. 49. Section DD', (2024)

The 2 way Section of the departure gates from the Pret A Manger and from the Bus parking view is to understand the experience and passengers movement in the space. The Redesigned ground floor departure gates gives a calming sense to the passengers while entering the station as well as while leaving the space after they board the coaches.

# ELEVATION

SCALE 1:200



Fig. 50. Site Elevation, (2024)

# INTERACTION DRAWINGS

## IDEATION PROCESS

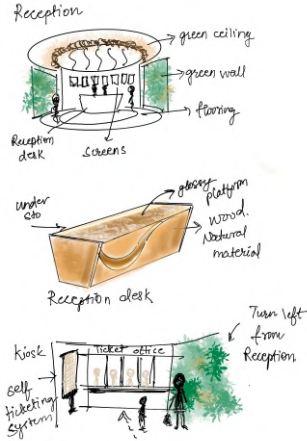


Fig. 51. Reception, (2024)



Fig. 52. Departure Gates, (2024)

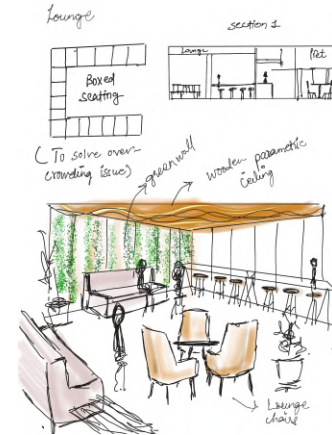


Fig. 53. Lounge, (2024)



Fig. 54. Reception Conceptual Render, (2024)

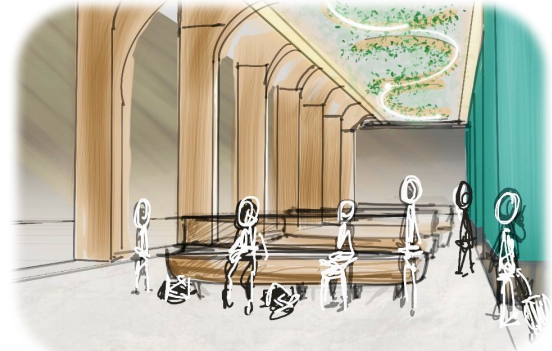


Fig. 55. Departure gates Conceptual Render, (2024)



# PHYSICAL MODEL

LAZER CUT

Scale 1:200 lazer cut model



Fig. 56. Front View, (2024)



Fig. 57. Back view, (2024)



Fig. 58. Departure Gates, (2024)



Fig. 59. Left Elevation, (2024)

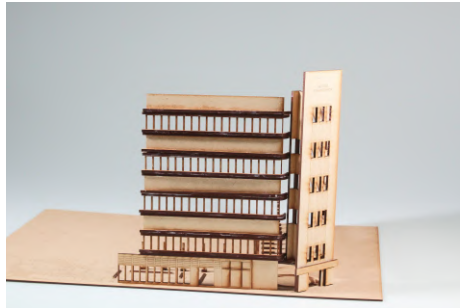


Fig. 60. Right Elevation, (2024)

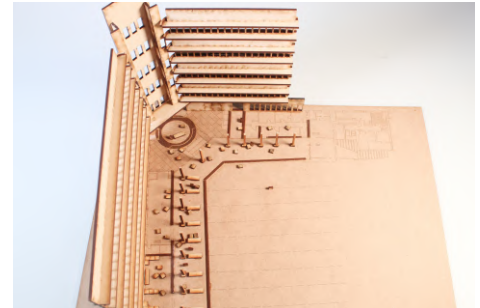


Fig. 61. Top View, (2024)

# SPACE CIRCULATION

## STOP MOTION IMAGES

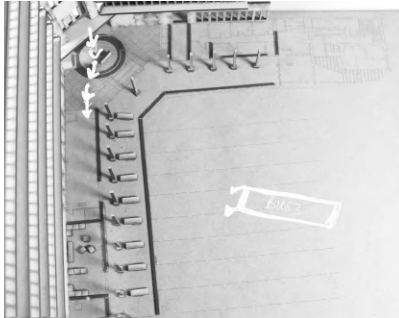


Fig. 62. Passenger entering from reception (2024)

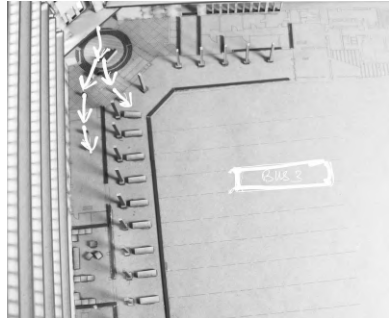


Fig. 63. Passenger moving ahead to pret (2024)

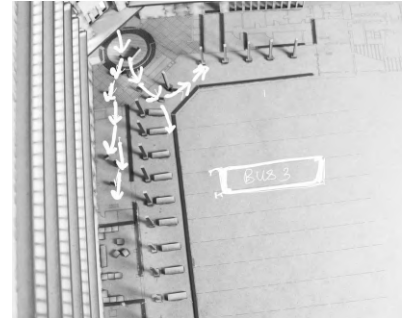


Fig. 64. Passenger moving to transit area (2024)

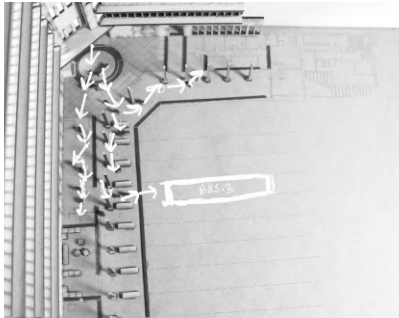


Fig. 65. Passenger crowd increased gradually (2024)

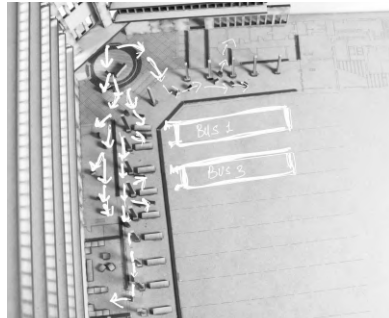


Fig. 66. Crowd dispersing in the space, (2024)

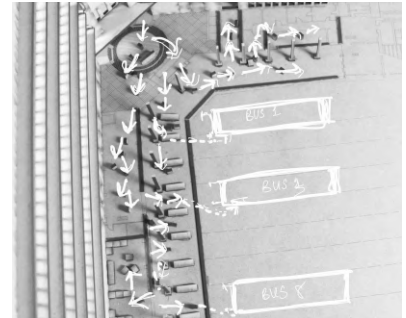


Fig. 67. Overcrowding at peak hours, (2024)

# RELAXATION EXPERIENCE

## SEATING ERGONOMICS

### WHY?

The seating highlights the relationship between passengers' relaxation time before and after their journey. The extended hours on National Express coaches result in discomfort, making the seating a key issue for passengers during travel.

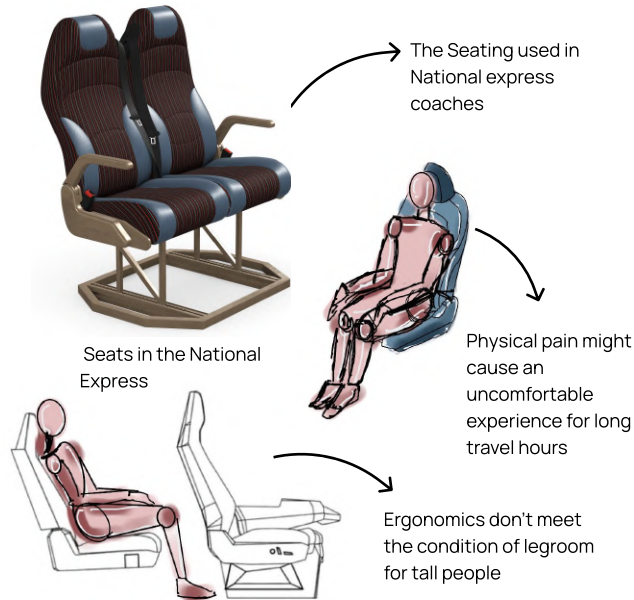
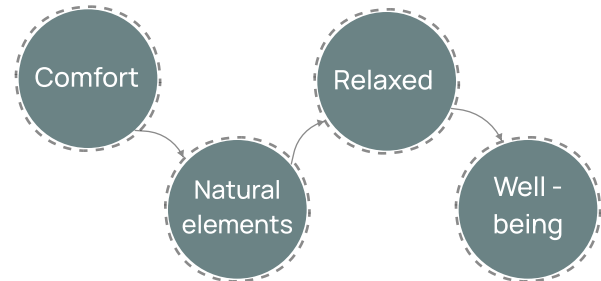


Fig. 68. Conceptual Seating Ergonomics, (2024)



Fig. 69. Overcrowding at Departure gates, (2024)

The **Key problem** of the space is the **concrete and compact environment** that offers unpleasant environment. Incorporating Biophilia can enhance the passengers travel experience as well as can result in employee benefits.



# RELAXATION EXPERIENCE

## SEATING ERGONOMICS

Scale 1:1

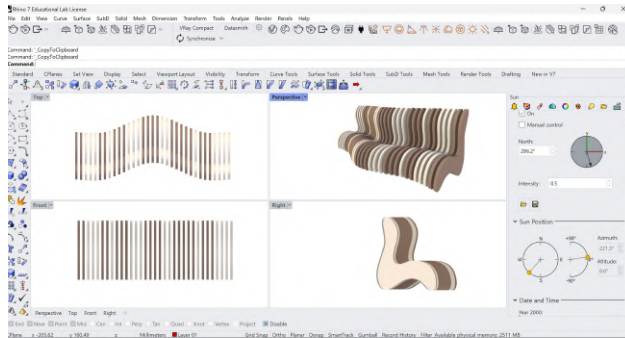


Fig. 70, Rhino Modelling of Biophilic seating (2024)

## Material and texture



Baltic Birch Wood is Durable, Strong, with consistent grains. It is Sourced from sustainably managed forests and is suitable for both functional and decorative applications in public spaces.

Fig. 72, Baltic Birch Plywood, (2024)

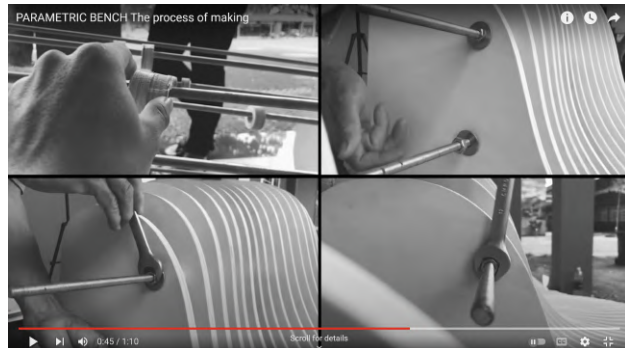


Fig. 71, Production process for the bench, (2024)



Fig. 73, Final look of the Biophilic Seating, (2024)

# SEATING MODEL

3D PRINTED



Fig. 74. Side view, (2024)



Fig. 75. Top view, (2024)



Fig. 76. Front View, (2024)



Fig. 77. Side view, (2024)



Fig. 78. Parts of Seating, (2024)



Fig. 79. Perspective view, (2024)

3D printed seating for the departure gates area

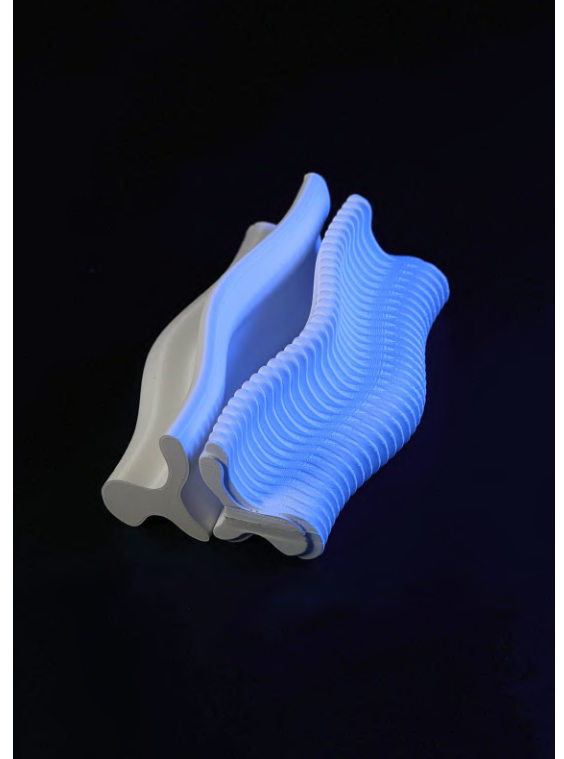


Fig. 80. Final Seating arrangement of the biophilic seating, (2024)

# PRET CHAIR

ELEGANT AND SUSTAINABLE

## WHY?

The Pret Chair draws inspiration from Parisian café chairs, offering a simple and elegant design that suits any café setting. Crafted from sustainable materials, the chair is also designed to be stackable, making it ideal for compact spaces.

## BRANDING

Pret's core branding features a signature red color and wooden textures on surfaces like furniture and walls. Reflecting these brand values, the Pret chair is designed with red fabric upholstery and a coffee wood base.

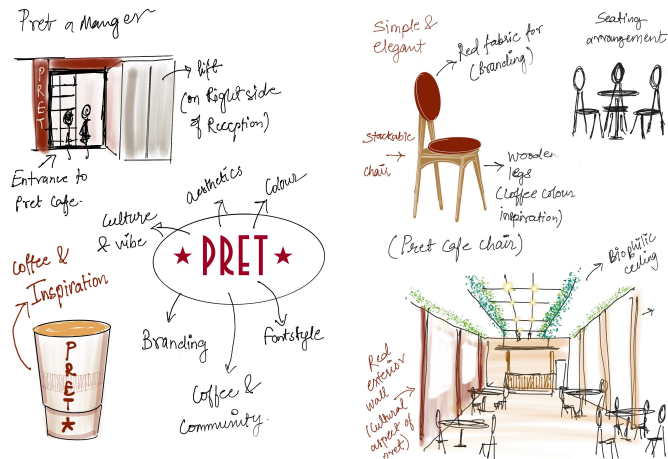


Fig.81. Conceptual sketch of Pret Chair, (2024)

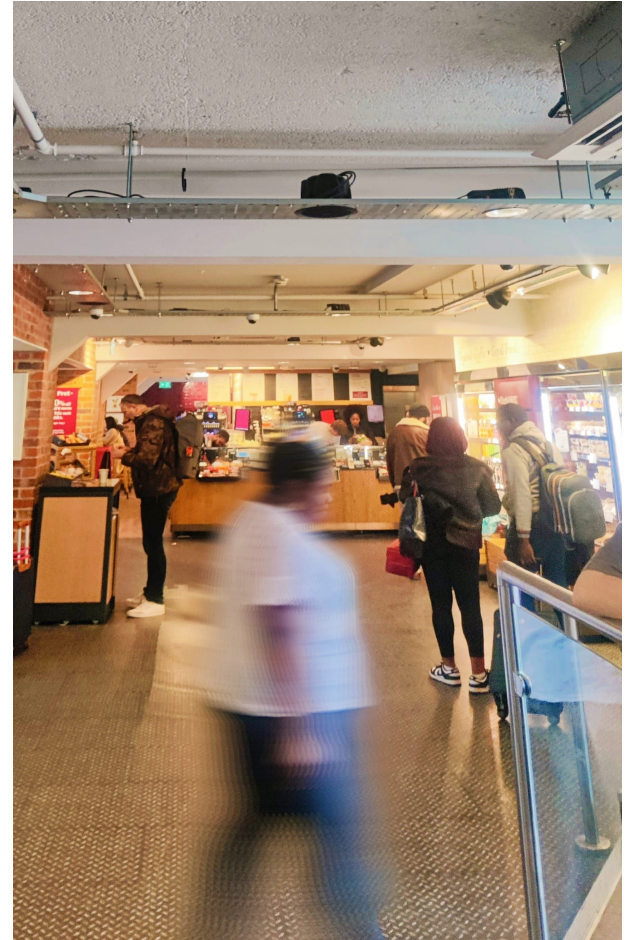


Fig. 82. Pret A Manger space in London Victoria (2024)

# PRET CHAIR

TECHNICAL DRAWING

SCALE 1:50

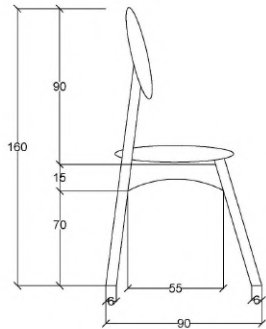


Fig. 83. Side View, (2024)

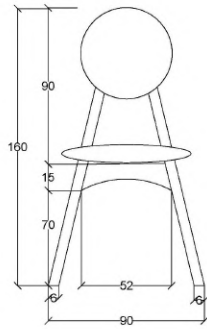


Fig. 84. Elevation, (2024)

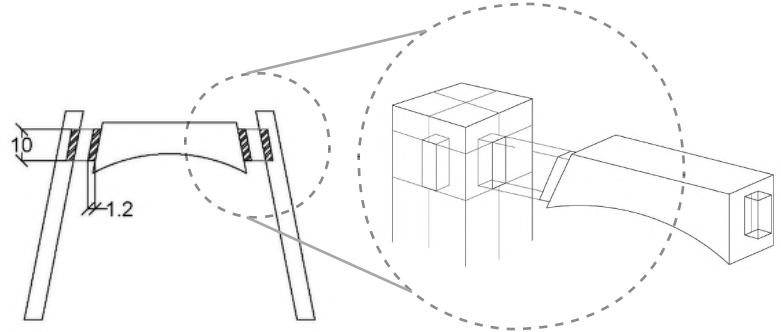


Fig. 85. Mortise and Tenon Joinery detail, (2024)



Fig. 86. Rendered View of Pret Chair, (2024)



Fig. 87. Exploded View of Pret Chair, (2024)

# MATERIAL TESTING

## PROTOTYPES AND JOINARIES

SCALE 1:1



Fig. 88. Half Lap Joint, (2024)

### Half Lap Joint

- Simple and versatile joint
- Strength- 136-227 kg

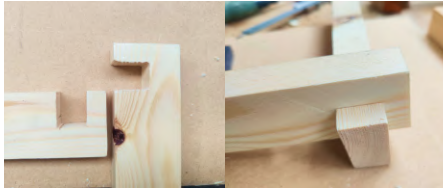


Fig. 89. Groove Joint, (2024)

### Groove Joint

- Requires precise cutting of the groove to ensure a snug fit,
- Strength- 68-136 kg

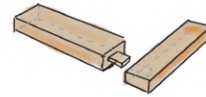


Fig. 90. Bridle Joint, (2024)

### Bridle Joint

- Slightly more complex to construct
- Strength- 180-360 kg

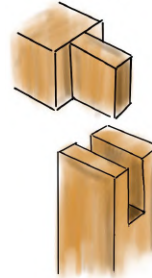
mortise & tenon joint



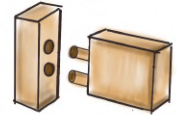
Pocket Hole Joinery



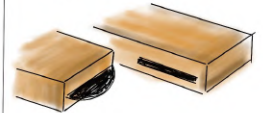
Bridle joint



Dowel joints



Biscuit Joint



Half lap Joint.

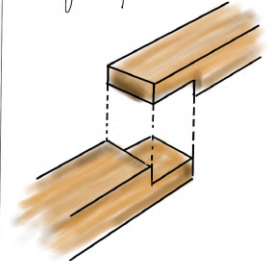


Fig. 91. Exploded View of Pret Chair, (2024)



# MATERIAL TESTING

## PROTOTYPES AND JOINARIES

Exploring types of Joinaries for the seating area



Fig. 92. Wood measurement, (2024)



Fig. 93. Wood cutting, (2024)



Fig. 94. Joinery alignment, (2024)



Fig. 95. Half Lap Joint section, (2024)

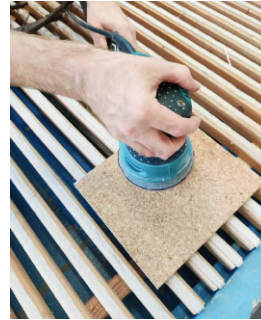


Fig. 96. Sanding of Cork, (2024)



Fig. 97. After Sanding look, (2024)



Fig. 98. Finishing Oil, (2024)

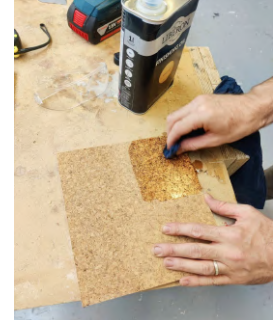


Fig. 99. Final look, (2024)

# MATERIAL TESTING

## CHAIR MAKING



Chair legs and Base



Clamping



All Joints fitted



Front portion glued



Base from Bottom



Ergonomics Testing with miniature human model

Fig. 100. Pret Chair making, (2024)

Work in Progress for a miniature model of the PRET chair. Experimentation with half scale model to understand ergonomics and sustainability of the furniture.



Fig.101. Wood workshop, (2024)

Using softwood as the primary material for the Pret chair highlights its strength and durability, making it suitable for any spatial environment. The chair's construction was guided by the expertise of the wood workshop tutor.

The simplicity of the chairs makes it capable for mass manufacturing and uses less time and effort with techniques such as DIY.



Fig.102. Hot water steam, (2024)



Fig.103. Dry the wood, (2024)

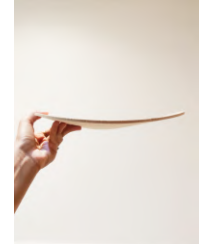


Fig.104. Bend to form the shape, (2024)

The DIY technique is used for the base and upholstery of the chair using the MDF as the main material.

## DIY - DO IT YOURSELF

# PRET CHAIR

FINISHED PRODUCT



Fig. 105. Perspective view, (2024)



Fig. 106. Back view, (2024)



Fig. 107. Side view, (2024)



Fig. 108. Joinery detail, (2024)



Fig. 109. Finished Product of Pret chair, (2024)

The miniature model of Pret Cafe Chair

Scale 1:50

# MATERIAL TESTING

## FABRICS AND TEXTURES



Fig.110. Camira fabrics, (2024)

# camira

Camira Fabrics is a leading textile manufacturer known for producing high-quality fabrics, particularly for commercial and transportation applications. Their production process emphasizes innovation, combining traditional weaving techniques with advanced technology. They are committed to sustainability, using recycled and renewable materials, and implementing eco-friendly practices across their manufacturing. Camira's fabrics are designed for durability, making them ideal for demanding environments like buses, where they offer comfort, aesthetic appeal, and robust performance against wear and tear. Their textiles often feature flame retardancy and stain resistance, meeting rigorous safety and durability standards in public transportation (Camira, (2024).

SAFE, SUSTAINABLE, REUSABLE, AFFORDABLE

### PRODUCTION AND MANUFACTURING



#### Shrinkknit technology

knitted to a larger dimension than a chair's frame to apply a flexible fit according to the chair (Camira, (2024).



#### zero-waste manufacturing

each textile component is created to exact measurements using just two basic inputs – yarn and electricity – to ensure an environmentally benevolent, waste-free method of production (Camira, (2024).

## ABRASION TEST

An abrasion test measures a material's resistance to wear and surface damage caused by friction or rubbing.



Fig.111. Camira fabrics, (2024)



Fig.113. Sandpaper, (2024)

## WHY CAMIRA?

1. Fabrics used for Coaches and Underground
2. Sustainable and reliable.
3. Zero waste policy.
4. Recycled and upcycled materials.
5. Eco friendly



Fig.112. Scrapping fabric, (2024)



Fig.114. Wear and tear of fabric, (2024)

Camira Fabrics testing shows that after 47-80 scrapes with sandpaper, the fabric begins to show signs of wear but remains strong and does not tear completely (See Appendix 6).

# RECEPTION

RENDER



## MOODBOARD



*Fig.116. Reception Moodboard, (2024)*

The main textures for the reception area are wood at ceiling and green wall to bring an uplifting and calming experience at the Entrance for the people creating a positive impact on health and wellbeing

# RECEPTION

RENDER



# LUGGAGE LEFT

RENDER



# DEPARTURE GATES

RENDER





# DEPARTURE GATES

RENDER

The main gates are designed by a green furniture inspired by Glugam wood and biophilic ceiling that inspires the sustainable steps for the space.



# PRET CAFE

RENDER

The Pret A Manger is redesigned by a cultural touch of the cafe and its branding. The seating is updated with eco friendly fabrics and sustainable elegant chairs. The space gives a cultural yet a modern touch .



# PRET CAFE

RENDER

Showcasing the Pret chair within the café setting, highlighting its simplicity and elegance while reflecting the cultural significance of the space as a hub for social interaction.



# LOUNGE

## RENDER

The extension of earlier pret cafe is transformed into a lounge with a green wall and boxed sofas for passengers to solve the overcrowding problems. The space is sustainable and aesthetically appealing for the new travellers.



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# APPENDECIES

## Appendix 4

### TfL Sustainability report

### TfL Sustainability Framework

Doing the right thing locally and globally

**Society**  
We aspire to deliver the Mayor's Transport Strategy which sets out the Mayor's plans to transform London's streets, improve public transport and help to create thriving communities across London's 32 boroughs and the City of London. We have developed action plans that detail how the Mayor and TfL will achieve the Mayor's Transport Strategy vision and proposals.

**Environment**  
Our sustainability framework is underpinned by the three pillars of sustainability – society, environment, and economy – and these form a triple bottom line across our entire operations. Our social sustainability demonstrates the social value of our transport services, beyond the economic benefits, in improving the lives of Londoners and creating thriving communities, while our financial, sustainability and environmental sustainability are positively linked.

**Economy**  
We will build our financial sustainability by focusing our capital investment on a green recovery and by making progress on reducing the wider environmental costs of our activities. This will accelerate our progress towards decarbonising transport by 2030 and increase our overall environmental sustainability. We must democratise food security on sustainability and we expect the same from our suppliers, the stakeholders and partners we work with.

The TfL Sustainability Report sits within our strategic reporting framework. It sets out the sustainability benefits of everything we do across our organisation both internally and externally, but it does not cover all the London-wide efforts to deliver the Mayor's Transport Strategy, which can only be fully realised by the collective efforts of all public bodies working with many organisations, such as government and London boroughs.

## Appendix 6

### Camira Fabrics sample order

camirafabrics.com info@camirafabrics.com  
to me

**camira**

Thank you for your order.

Your order number is **Q1641-41535-5D3MS**

Hi Sakshi

We hope you enjoy your samples, when you're ready to purchase you can now sign up for a trade account, check stock availability and buy fabric straight from our website. [www.camirafabrics.com](http://www.camirafabrics.com)

Sample orders and **large** purchases placed via the **website** are placed and processed immediately. Placing orders via our offline team can take up to 3 business days to be processed and delivered.

## Appendix 5

Transport for London official letter and original floor plans received over email.

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Requests for internal review should be addressed to:

Information Access Manager  
Floor 7, Windsor House  
42-50 Victoria Street  
London  
SW1H 0TL

E-mail: [foi@tfl.gov.uk](mailto:foi@tfl.gov.uk)

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Water Lane  
Wilmslow  
Cheshire  
SK9 5AF

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- Figure. 42. Mohapekar. S. (2024)- *Floor Plan detailed* [Photograph] In possession of: the author: Canterbury
- Figure. 43. Mohapekar. S. (2024)- *Isometric View* [Photograph] In possession of: the author: Canterbury
- Figure. 44. Mohapekar. S. (2024)- *Floor Plan* [Photograph] In possession of: the author: Canterbury
- Figure. 45. Mohapekar. S. (2024)- *Isometric view* [Photograph] In possession of: the author: Canterbury
- Figure. 46. Mohapekar. S. (2024)- *Section AA'* [Photograph] In possession of: the author: Canterbury
- Figure. 47. Mohapekar. S. (2024)- *Section BB'* [Photograph] In possession of: the author: Canterbury
- Figure. 48. Mohapekar. S. (2024)- *Section CC'* [Photograph] In possession of: the author: Canterbury
- Figure. 49. Mohapekar. S. (2024)- *Section DD'* [Photograph] In possession of: the author: Canterbury
- Figure. 50. Mohapekar. S. (2024)- *Elevation* [Photograph] In possession of: the author: Canterbury

# LIST OF ILLUSTRATIONS

- Figure. 51-55. Mohapekar. S. (2024)- *Interaction Drawings* [Photograph] In possession of: the author: Canterbury
- Figure. 56-61. Mohapekar. S. (2024)- *Physical model- lazer cut* [Photograph] In possession of: the author: Canterbury
- Figure. 62-67. Mohapekar. S. (2024)- *Space circulation- lazer cut* [Photograph] In possession of: the author: Canterbury
- Figure. 68. Mohapekar. S. (2024)- *Conceptual seating ergonomics* [Photograph] In possession of: the author: Canterbury
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- Figure. 73. Mohapekar. S. (2024)- *final look of biophilic seating* [Photograph] In possession of: the author: Canterbury
- Figure. 74-80. Mohapekar. S. (2024)- *Seating model 3D printed* [Photograph] In possession of: the author: Canterbury
- Figure. 81. Mohapekar. S. (2024)- *Conceptual sketch of pret chair* [Photograph] In possession of: the author: Canterbury
- Figure. 82. Mohapekar. S. (2024)- *Pret A manger spacee in london victoria* [Photograph] In possession of: the author: Canterbury
- Figure. 83-87. Mohapekar. S. (2024)- *Pret chair technical drawing* [Photograph] In possession of: the author: Canterbury
- Figure. 88-95. Mohapekar. S. (2024)- *Joineries and Prototypes* [Photograph] In possession of: the author: Canterbury
- Figure. 96-99. Mohapekar. S. (2024)- *Cork material testing* [Photograph] In possession of: the author: Canterbury
- Figure. 100-104. Mohapekar. S. (2024)- *Chair making process* [Photograph] In possession of: the author: Canterbury
- Figure. 105-109 Mohapekar. S. (2024)- *Finished chair product* [Photograph] In possession of: the author: Canterbury
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- Figure. 115. Mohapekar. S. (2024)- *Reception Render* [Photograph] In possession of: the author: Canterbury
- Figure. 116. Mohapekar. S. (2024)- *Reception moodboard* [Photograph] In possession of: the author: Canterbury
- Figure. 117. Mohapekar. S. (2024)- *Reception render* [Photograph] In possession of: the author: Canterbury
- Figure. 118. Mohapekar. S. (2024)- *Luggage left render* [Photograph] In possession of: the author: Canterbury
- Figure. 119-122. Mohapekar. S. (2024)- *Departure Gates render* [Photograph] In possession of: the author: Canterbury
- Figure. 123-128. Mohapekar. S. (2024)- *Pret Cafe Render* [Photograph] In possession of: the author: Canterbury
- Figure. 119-121. Mohapekar. S. (2024)- *Departure Gates render* [Photograph] In possession of: the author: Canterbury
- Figure. 129-132. Mohapekar. S. (2024)- *Departure Gates render* [Photograph] In possession of: the author: Canterbury