2019

XIWEN MA

FOREST IS THE THERAPIST

# Forest is the Therapist

## Physical Therapy Center at Mueller Community

Xiwen Ma

# COLOPHON

Final Project | 04. 2019

**Xiwen Ma**
Postgraduate in Architecture
Texas A&M University
Department of Architecture

With the guidance of the mentors:

**Michael O'Brien**
Texas A&M University-Department of Architecture
Center for Housing and Urban Development

**Kirk Hamilton**
Texas A&M University-Department of Architecture
Center for Health Systems & Design

**Chang-Shan Huang**
Texas A&M University
-Department of Landscape Architecture & Urban Planning
Center for Health Systems & Design

**Brian Gibbs**
Texas A&M University-Department of Architecture

ARCHITECTURE
TEXAS A&M UNIVERSITY

# CONTENT


01 **Dedication | Acknowledgment | Abstract**

07 **01 Introduction**
- Wellbeing + Nature
- Framework
- Therapeutic Modality
- Learning from Other Projects

17 **02 Generation**
- Background
- Site
- Program

25 **03 Design proposal**
- Concept
- Site
- Space
- Techinical

45 **04 Conclusion**

49 **Reference | Appendix | C.V.**

# DEDICATION

## To my family

I dedicate this work to my family and boyfriend. Their love has been the major spiritual support in my life.

A special feeling of gratitude to my loving parents, Guoying and Weiqiang whose words of encouragement and support throughout the process.

I dedicate this work and give special thanks to my boyfriend Xingjian for being there for me throughout the entire final project.

# ACKNOWLEDGEMENT

## Gratitude to all mentors

First and foremost I express my wholehearted thanks to my chair, Michael O'Brien, for his dynamic guidence, suggestions and encouragement throughout the project process. I am highly indebted to his perseverance, which helped me to present this work in the right perspective.

I express my deepest gratitude to my member, Kirk Hamilton, for his informative input and opinions from the field of healthcare facilities, healing architecture, and physcial therapy design.

I am very thankful to my member, Chang-Shan Huang, for providing me advice about landscape design that helped me greatly in this work.

I sincerely appreciate my studio instructor, Brian Gibbs, for his advise and useful technical support to carry out this final project.

I also want to thank Ray Pentecost for his instruction in programming approach and reserch in healthcare articles.

As a fianl word, I would like to thank each and every individual who has been a source of support and helped me to achieve my goal and complete my final project successfully.

# ABSTRACT

## Physical Therapy Center

The project is based on the vision of a healing architecture and the latest research about the future of physical therapy. The vision of placing patients in the center of their own treatment focuses on creating a positive working environment, the use of natural materials, and surroundings that stimulate activities within the physical therapy center. The design proposal is integrated into the project by reinforcing the potential of the site, using sustainable materials and merging the indoor and outdoor spaces, both physically and mentally.

The aspiration is not to create a physical therapy center with the appearance of a healing architecture, but to be a part of its surroundings and Mueller community. This three-story building includes the special parts of the program such as fitness center, interior garden, and therapy pool. These facilities are regularly used not only by patients but also their families and members of the local community.

**[ HEALTH ]**

A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

*1948 constitution of the World Health Organization (WHO 2003)*

# 01

# Introduction

Wellbeing + Nature
Framework
Therapeutic Modality
Learning from Other Projects

# INTRODUCTION

## Nature + Well-being

# QUESTION:

## How to create a therapeutic environment for patient and a stimulating place for community at the same time?

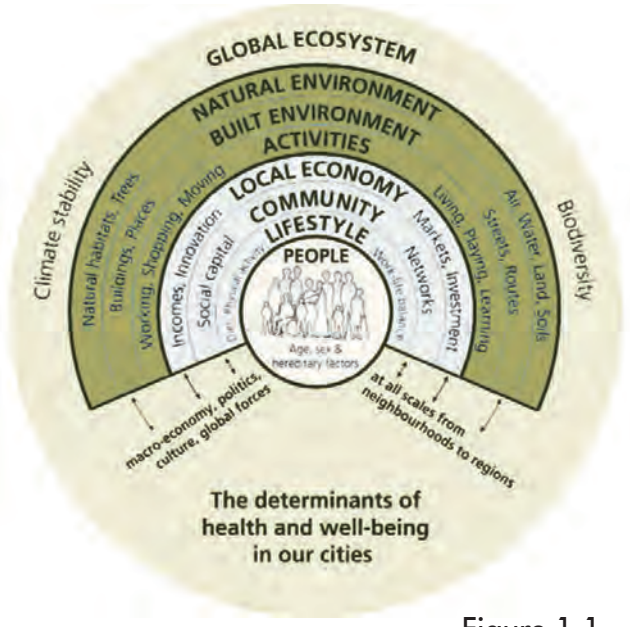



Figure 1.1

### Determinants of Health

Many factors combine together to affect the health of individuals and communities. Whether people are healthy or not is determined by both their circumstances and environment. To a large extent, factors such as where we live, the state of our environment, our income and education level, and our relationships with other people all have considerable impacts on health.[1]

### Health Equity

Healthy People 2020 defines health equity as the "attainment of the highest level of health for all people."

One of the primary goals of this project is to achieve health equity by eliminating health disparities and achieving optimal health for all Mueller residents. The physical therapy center addresses health equity through its program, research, and design.


Figure 1.2

### Celebrate the Strength of Muellller

Access to physical activity resources (e.g., parks, bike paths, playgrounds) may differ. Even when these resources are geographically close and appear accessible, some residents may encounter barriers which may limit the use of these resources.

Lack of universally accessible facilities for vulnerable population and those with mobility issues can be barriers. Thus, the location of new Physical Therapy Center is based on the public resources and context in Mueller community.

The first impression on visiting the site is that sunlight casts shadows among the trees. The starting point of the design work was to create a place where the building could blend into the natural environment.

### Forest is the Therapist

As a physical therapy center, the care concept is based on the idea that creating a stimulating environment increases the well-being of patients and facilitates a positive impact on their recoveries.

The "Forest" design concept aims to encourage people use their five senses to reconnect with nature.

The Forest Therapy concept of "forest bathing" is inspired by the Japanese practice of Shinrin-Yoku. Studies have shown broad health benefits: stabilizing and improving cognition and mood as well as strengthening the immune and cardiovascular systems.[2]

### Integrating Daylight with Design

Light is critical for a medical environment because it affects people's psychology and physiology. Several studies have shown the importance of light in reducing stress and fatigue, regulating circadian rhythms, speeding the patient's recovery, and reducing medical error. In addition, windows with adequate natural daylight in workplace increases staff satisfaction. Therefore, integrating light in the medical environment is beneficial to both patients and staff.

---

*Figure 1.1: A Health Map for the Local Human Habitat, Barton and Grant (2006) based on a public health concept by Dahlgren and Whitehead (1991).*

*Figure 1.2: 2017 Robert Wood Johnson Foundation.*

*1. Content adapted from Healthy People 2020 and CA Health and Safety Code.*

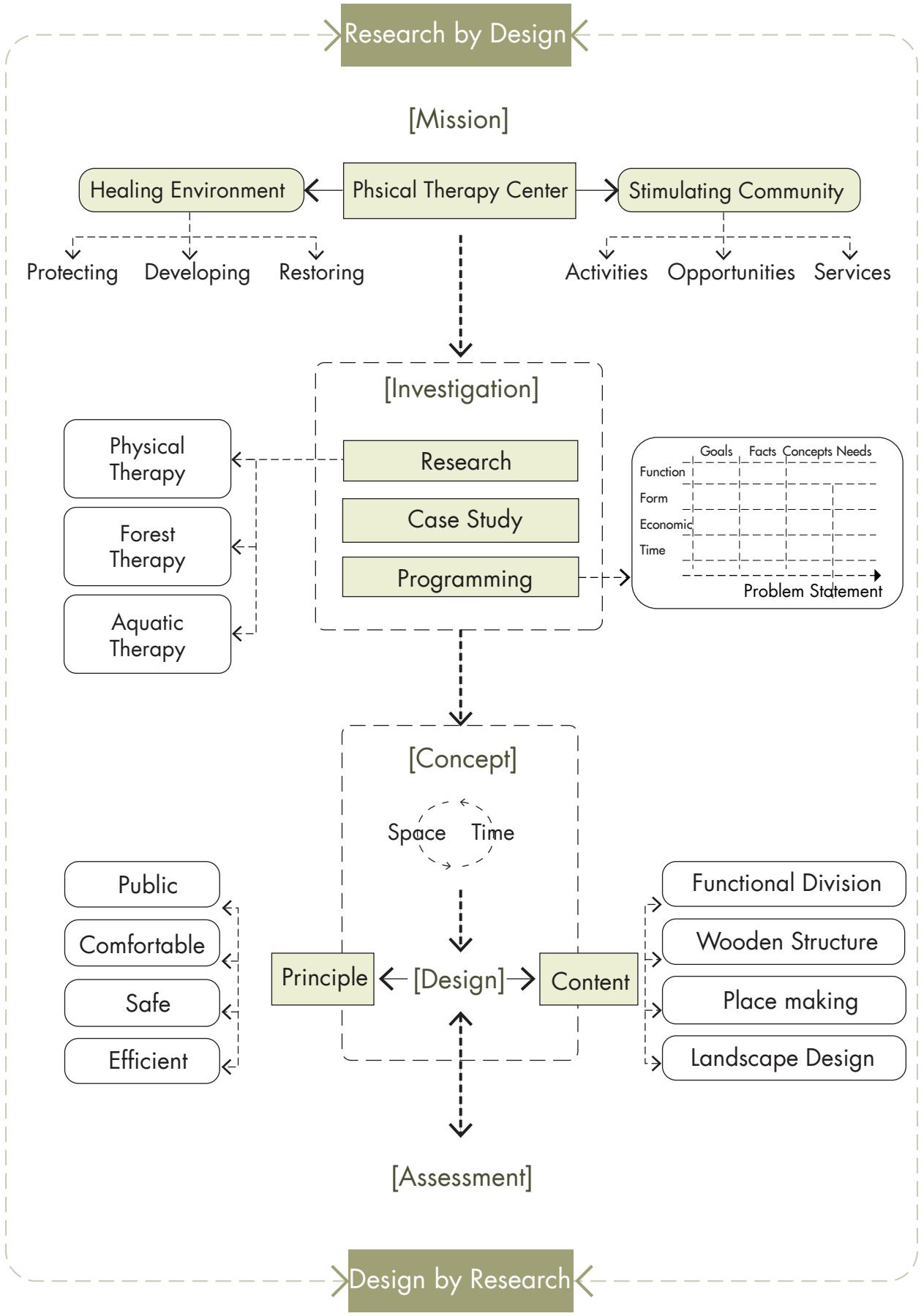
*2. Lee, J., Tsunetsugu, Y., Takayama, N., Park, B.-J., Li, Q., Song, C., .Miyazaki, Y. (2014). Influence of Forest Therapy on Cardiovascular Relaxation in Young Adults %J Evidence-Based Complementary and Alternative Medicine. 2014, 7.*

# FRAMEWORK

## Research & Design

This project is accomplished by the method of “research by design” and ”design by research”.

The first stage is to identify the mission of this project and then become familier with organization, operation, activities, and needs through Investigation. By this stage, a clear problem statement is generated to guide further design. A general concept follows the program as a response to the problem. A specific design approach in multiple dimension finally delivered. The assessment part could be further steps to acomlish the loop of design and research.



# THERAPEUTIC MODALITY

## Physical therapy treatment

Exercise

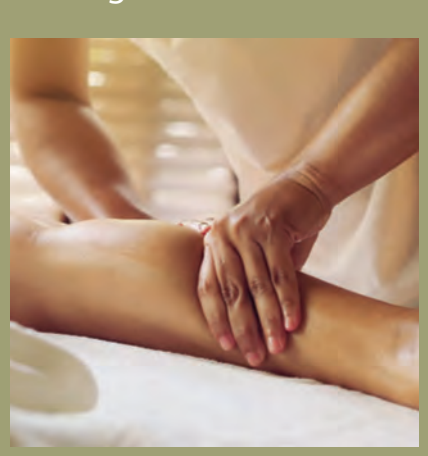
Ultrasound

Electrical Stimulation

Traction

Joint Mobilization

Massage



Heat

Ice

Iontophoresis

Laser & Light Therapy

Kinesiolog Taping

Whirlpool

# CASE STUDY

## 01 Community

### Punggol Neighbourhood and Polyclinic

Location: Singapore
Category: Community Center
Architect: Serie Architects
Area: 27000.0 sqm
Project Year: 2018

Oasis Terrace is a new generation of community centres developed by Singapore's Housing and Development Board to serve its public housing neighbourhoods. It comprises communal facilities, shopping, amenities and a government polyclinic.

The gardens play more than just an aesthetic role in the community; they are a collective horticultural project. By bringing residents together to plant, maintain and enjoy them, the gardens help nourish community bonds.

# CASE STUDY

## 02 Structure

### Believe in Better Building

Architects: Arup Associates Location: Osterley, Isleworth, Isleworth, Greater London, United Kingdom
Category: Other Facilities
Area: 3850.0 sqm
Project Year: 2014

The first multi-storey timber commercial office in the UK, it demonstrates the use of offsite prefabrication and timber construction to achieve a unique workplace in half the normal time-frame.

The building is an exemplar of sustainable design, focused on creating specific, holistic, integrated conditions for optimising the health and well-being of Sky's staff and visitors: quality day-lighting, air quality, natural material selection including the extensive use of natural wood, and a design that adapts itself to the user's requirements.

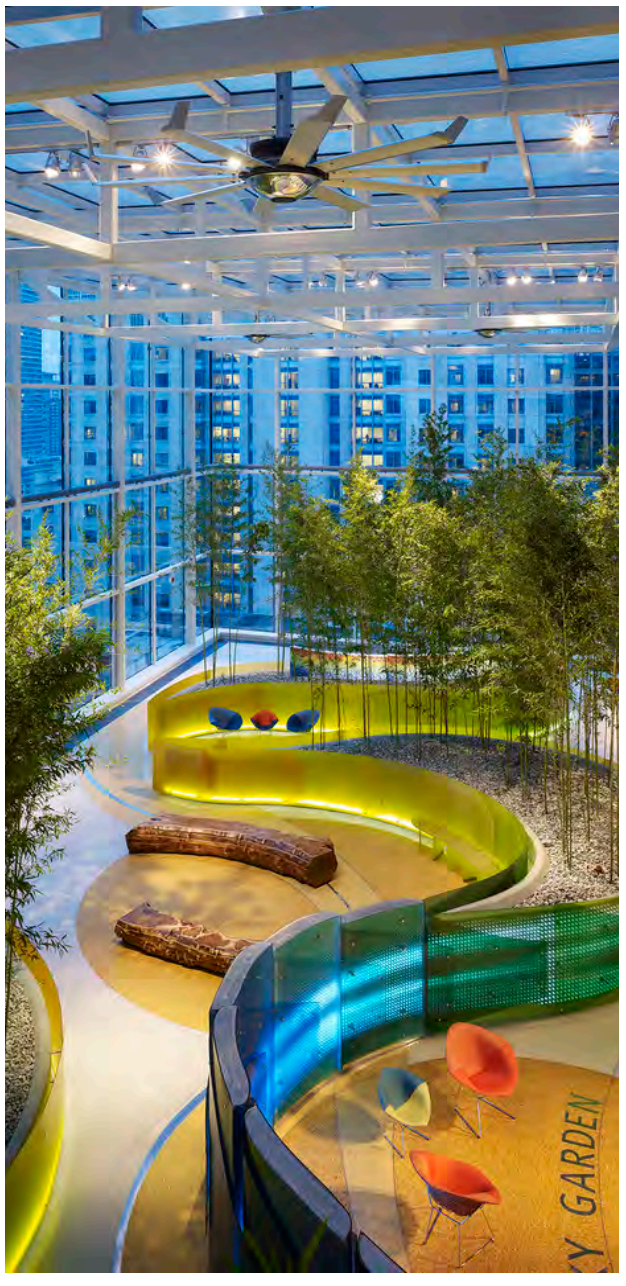
# CASE STUDY

## 03 Interior garden

### Ann & Robert H. Lurie Children's Hospital of Chicago

Location: Chicago, IL
Category: Hospital
Architect: Anderson Mikos, Solomon Cordwell Buenz, ZGF
Area: 116128.8 sqm
Project Year: 2012

Special features included in SCB's exterior scope of work are a pedestrian bridge to the central parking facility, two bridges to the adjacent Prentice Women's Hospital, a Sky garden, sky lobby and overlook. Interior features included in SCB's scope of work are a freestanding oval elevator bank, suspended whale exhibit, Captain Streeter coffee bar, aquarium, illuminated information desks, garden market-themed food court, healing garden, entertainment stage, and a tree house.




Nick Merrick © Hedrich

# CASE STUDY
## 04 Daylight

### Sports Hall in Vorarlberg

Architects: Dietrich | Untertrifaller architects, Bregenz/Munich/St. Gallen/Vienna
Location: Austria
Category: Sports hall
Area: 2435.0 sqm
Project Year 2014

The lighting concept was specially designed for the sports hall. Teamgmi developed a concept using the VELUX Daylight Visualizer and evaluated the incidence of light.Highly insulated building with 3-pane glazing. Special roof windows give the hall extensive daylight .

In addition to the static construction, the light guidance over the 56 light domes is very important, as it illuminates the entire playing field together with the light band in the façade. This also saves significant amounts of artificial light and contributes to energy efficiency.

© Dietrich

# Generation

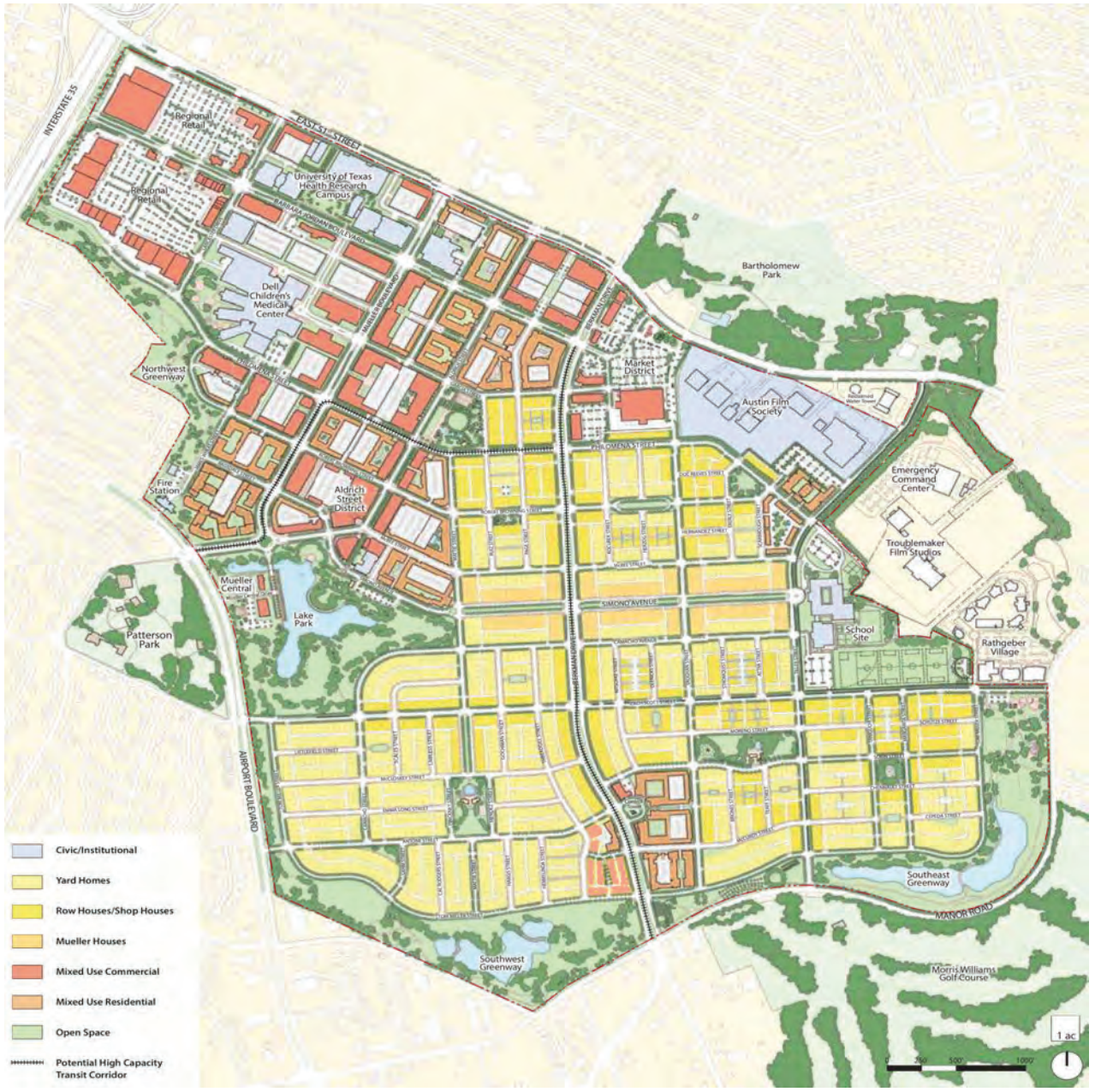
Background
Site
Program

# BACKGROUND

## Mueller Community, Austin

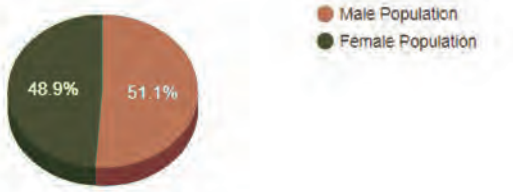
Mueller is a 711-acre Planned Unit Development (PUD) in the east-central portion of the city of Austin, Texas, United States. The project is in the process of long-term development on the former site of the Robert Mueller Municipal Airport. Mueller is intended to be a pedestrian-oriented, interactive mixed-use community, and a model for responsible urban planning and development.

The ambitious effort to redevelop Robert Mueller Municipal Airport into a mixed-use urban village in the heart of the city has helped Austin chart new directions. Mueller is envisioned as a sustainable community that is meeting extensive goals in housing and economic development.



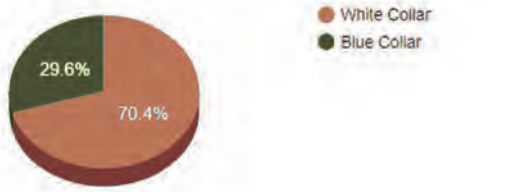
## Mueller Population Demographics

| | |
|---|---|
| Total Population | 35,963 |
| Male Population | 18,394 |
| Female Population | 17,569 |
| Percent Change Since 2000 | -0.8 % |
| Percent Change Since 2010 | 5.3 % |
| Median Age | 32.12 |



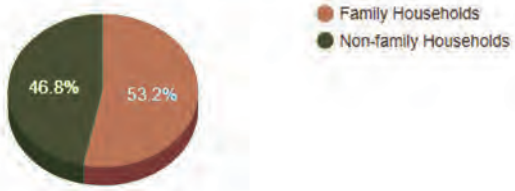

## Occupational employment in Mueller

| | |
|---|---|
| White Collar | 1,544 |
| Blue Collar | 648 |




## Number of Households in Mueller

| | |
|---|---|
| Total Households | 14,024 |
| Family Households | 7,462 |
| Non-family Households | 6,561 |
| Households With Children | 4,298 |
| Households Without Children | 9,726 |
| Average People Per Household | 2.37 |




## Mueller Education Statistics

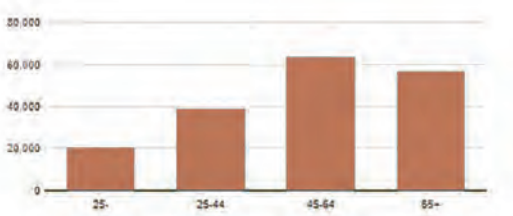
| | |
|---|---|
| No High School | 3,561 |
| Some High School | 1,999 |
| Some College | 4,589 |
| Associate Degree | 658 |
| Bachelors Degree | 5,472 |
| Graduate Degree | 2,827 |


## Marital Status in Mueller

| | |
|---|---|
| Never Married | 11,569 |
| Married | 6,694 |
| Separated | 1,627 |
| Widowed | 600 |
| Divorced | 1,688 |


## Household Income and Average Income in Mueller

| | |
|---|---|
| Median Income Under 25 | $20,979 |
| Median Income 25-44 | $39,272 |
| Median Income 45-64 | $63,875 |
| Median Income Over 65 | $57,088 |




The 711-acre Mueller site, vacated when Austin's airport relocated in 1999, is well on its way to becoming home to approximately 36,000 people, 13,000 permanent employees, 10,000 construction jobs, and approximately 140 acres of public open space.

Mueller is an area in East Austin, Travis County, Texas with a population of 35,963. There are 18,394 male residents living in Mueller and 17,569 female residents.

The total number of households is 14,024 with 2.37 people per household on average. Total household expenditures in Mueller are below the national average.

The median age of the current population is 32.12 with 6,694 people being married and 15,484 being single.

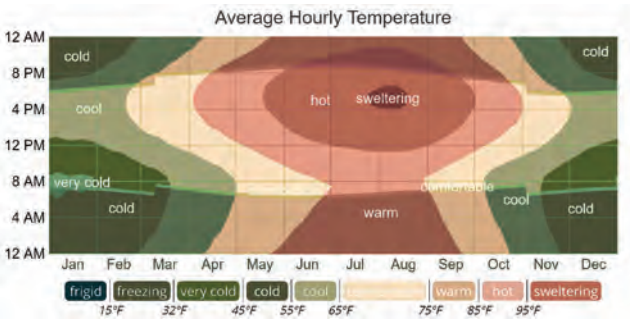
The employment numbers show that there are 70% white collar employees and 30% blue collar employees in Mueller.

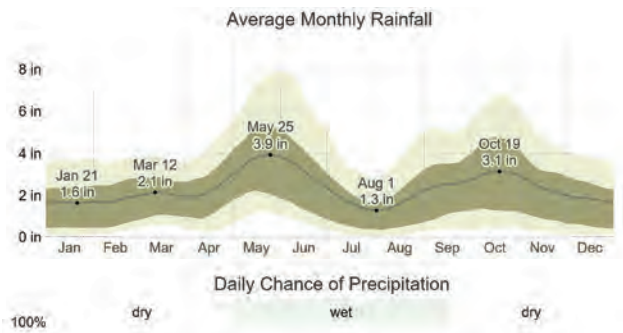
# SITE

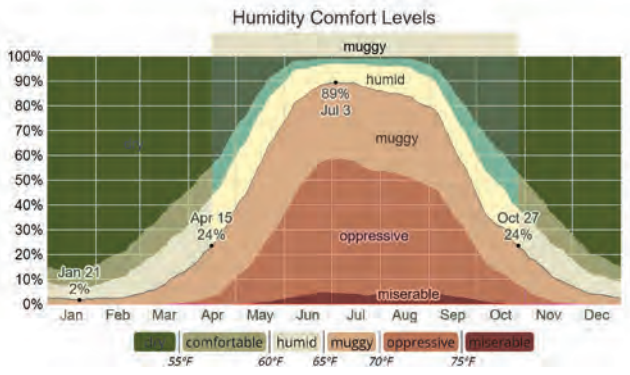
## Current situation


Adjacent to the axial road of Mueller, the physical therapy center is located in a residential area where a community linear park is planned for the public. The first impression on visiting the site is that sunlight casts shadows among the trees. The starting point of the design work is to create a place where the building could blend into the natural environment.

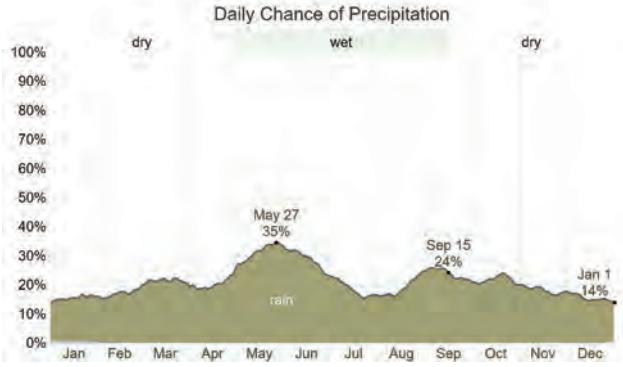
In Austin, the summers are hot and oppressive; the winters are short, cold, and windy; and it is partly cloudy year round. Over the course of the year, the temperature typically varies from 43°F to 97°F and is rarely below 30°F or above 102°F.

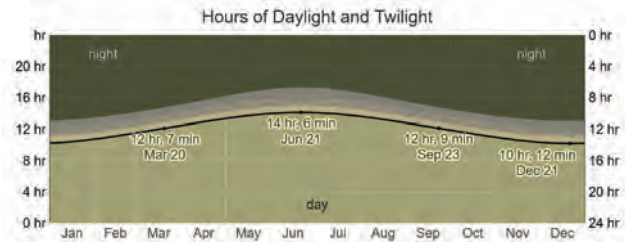


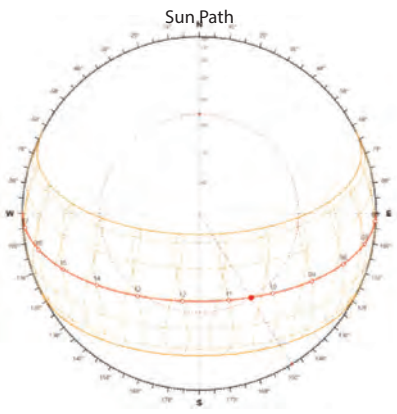



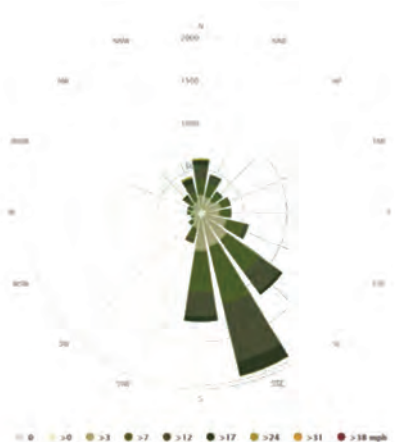



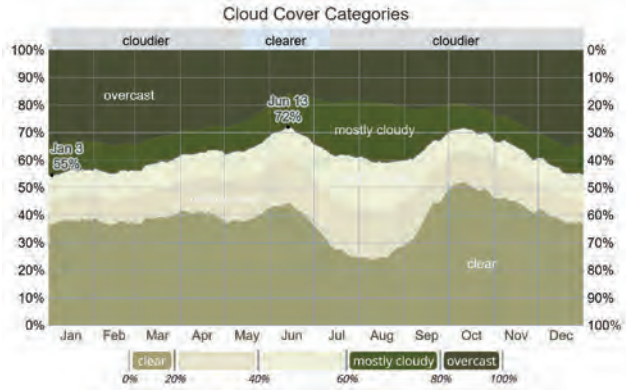

Wind Direction

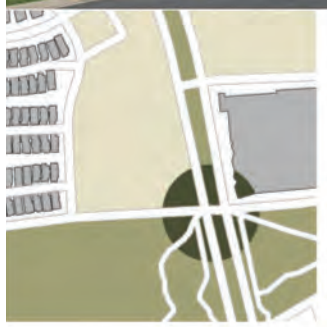




Public Corner

Bus stop

Bicycle lane

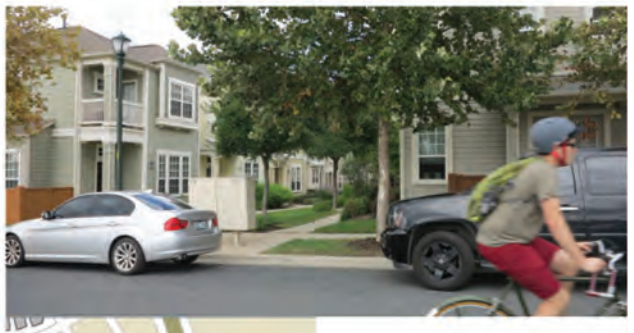
Sidewalk

Tower park

Linear park

Apartment elevation

Housing elevation



Parking

# PROGRAM

## Human-Centered Design

"Design for whom?" might be the primary question when we are talking about design. During design process, I paid close attention to who I was designing for: the future users of the space.

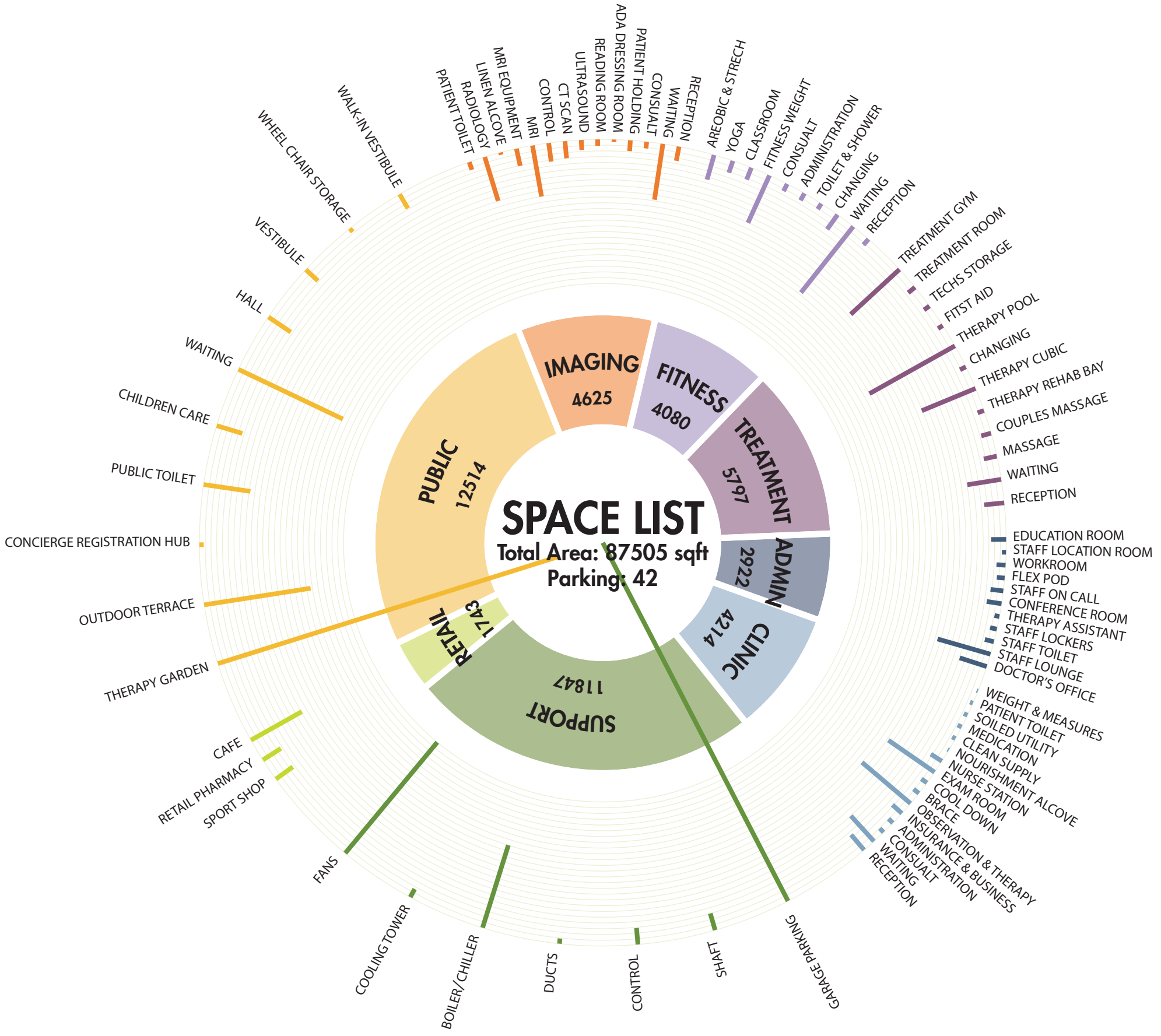
This project's programming is based on the Pena's Problem Seeking method to achieve a clear problem statement. This will guide the following design.

# Problem Statement

The contradiction within the site has brought conflicts between:

**People & Vehicles**
**Residents & Patients**
**Oppressive weather & Comfortable environments**

| | Goals | Facts | Concepts | Needs |
|---|---|---|---|---|
| **Function** | Patient: Reduce stress<br>Family: Confidence<br>Staff: Pride<br>Building-nature: be a part<br>patient-resident: socialization<br>pedestrian-vehicle: separate | Research<br>Data collection<br>Building Code | Human-centered design<br>Involuntary activities<br>community equity | Function<br>Area<br>Details |
| **Form** | Be part of the regular community life<br><br>Stimulating environment<br><br>Sustainable | Research<br>Data collection<br>Building Code | "Forest bathing"<br>Nature contacting<br>Durable material | Function<br>Area<br>Details |
| **Economic** | Initial budget:<br>Appeal investment<br>Operating costs:<br>Long-run development<br>Life cyclecosts:<br>Sustainable | Research<br>Data collection<br>Building Code | Community build<br>Moneymaker & moneybags<br>From cradle to cradle | Function<br>Area<br>Details |
| **Time** | Present:<br>Developing healthy Community<br><br>Future:<br>Celebrate community strength | Research<br>Data collection<br>Building Code | Stimulating | Function<br>Area<br>Details |




*100 sqft per space

Design creates culture.

Culture shapes values.

Values determine the future.

*Robbert L. Peters*

# 02

# Design Proposal

Concept
Site
Space
Technical

Special attention was paid to making the facility accessible by walk. Visitors to the building are encouraged to linger, meet with colleagues, take a class in the fitness center, or take a coffee or work break.

# CONCEPT

## Forest is the therapist

The care concept is based on the idea that creating a stimulating environment increases the well-being of patients and facilitates a positive impact on their recovery. To achieve a balance of context, needs, and architectural forms, design strategy is not to imitate nature, but rather to use natural materials and forms to generate certtain qualities of a forest.

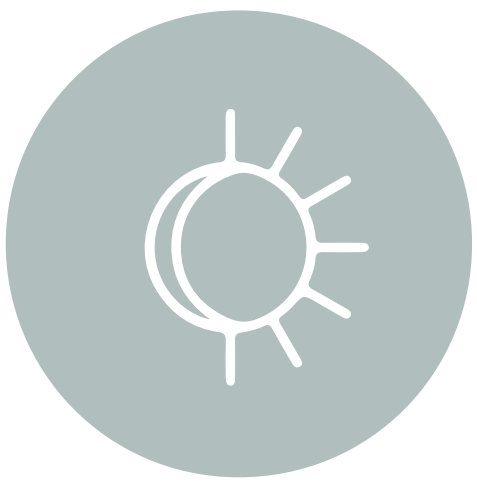
The project is conceptualized in an abstract forest, represented by a series of wooden columns, beams, branches and other construction components. Forest Therapy is a concept of "forest bathing", which is a slow, mindful walk in the woods or a nature area where people use their five senses to reconnect with nature.

## Health equity:
## Being part of the community

## Structure:
## Creating a column forest

## Nature:
## Interacting with nature

## Lighting:
## Integrating daylight



# SITE

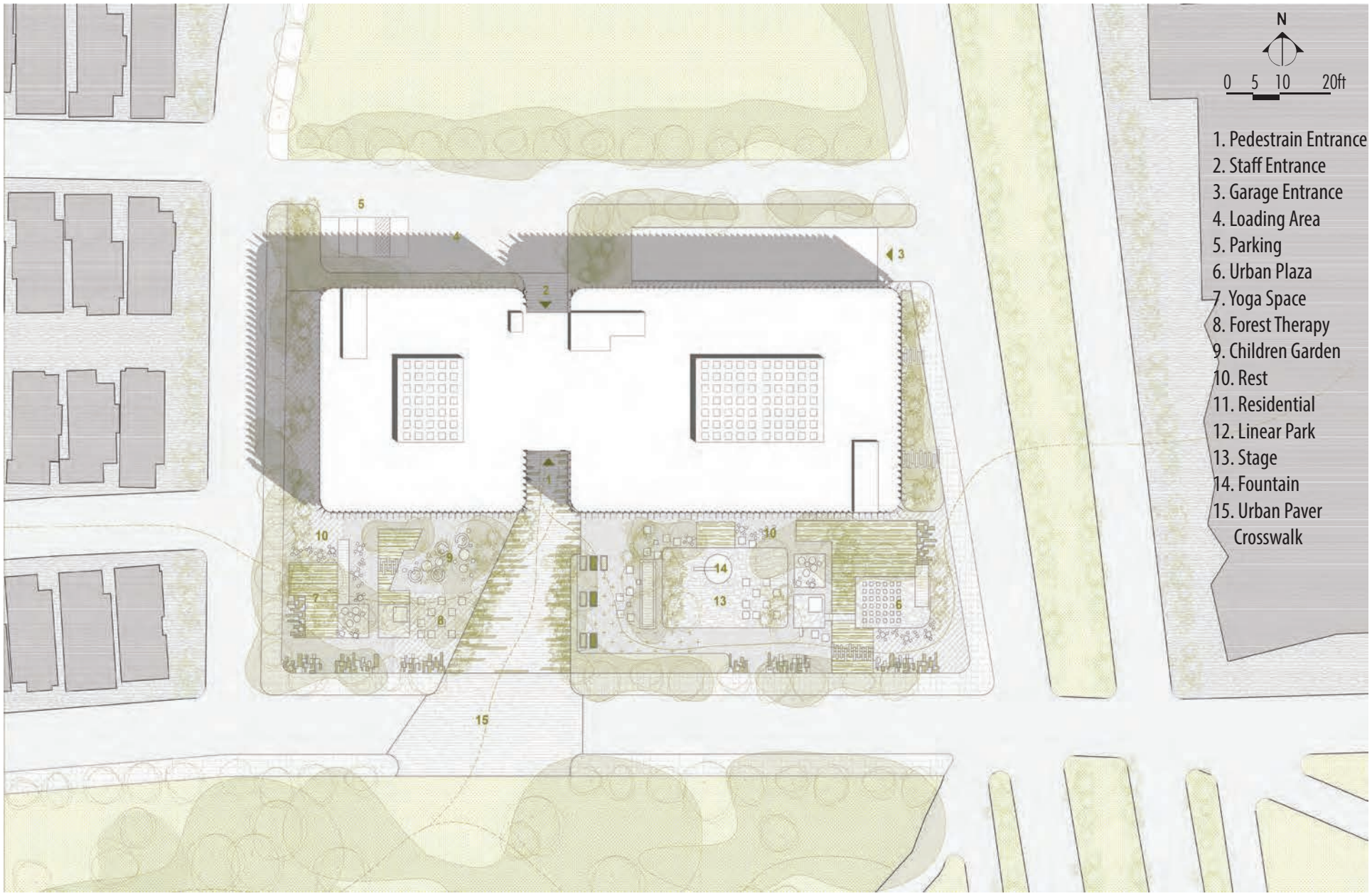
## Nature is the therapist

*Urban dwellers brought to a natural environment for a few days had:*

***Less mental fatigue***
***Less irritability & accidents***
***Increased problem solving***
***Increased concentration***

(*Herzog et al. 1997*)

**Making therapy part of regular community life, not secluded to a place of illness.**

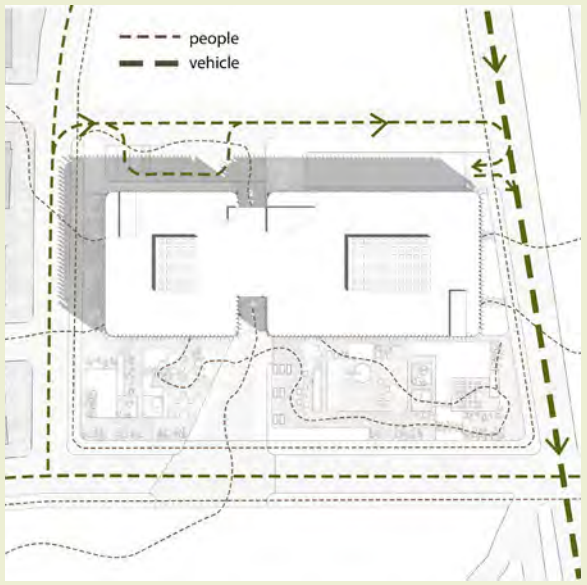


# Health equity:
# Being part of the community

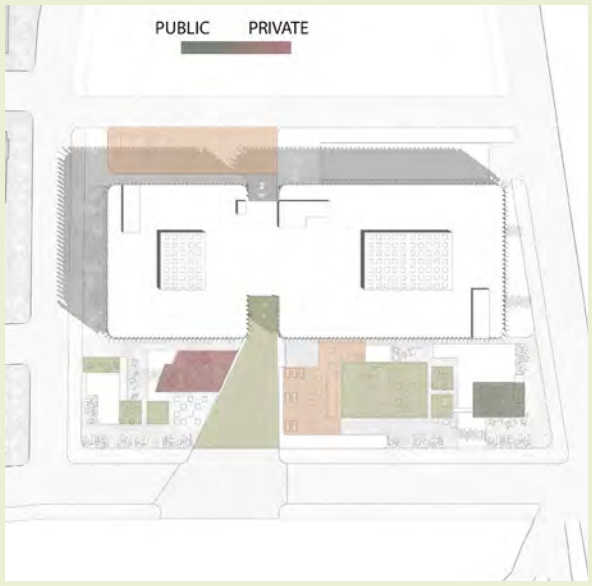
The project offers positive spaces to serve its neighbourhoods. A crosswalk directs people from linear park into the site where they can find urban plaza, yoga, forest therapy, children garden and exercise space.

By bringing residents together to stimulate acitivities, the project help nourish community bonds.

Context




Conectivity




Public

Yoga Space

Children garden

# SPACE

## Garage

### Health equity:
### Being part of the community

For providing more open space to public and blended into suroundings, the parking is located on the garage level.

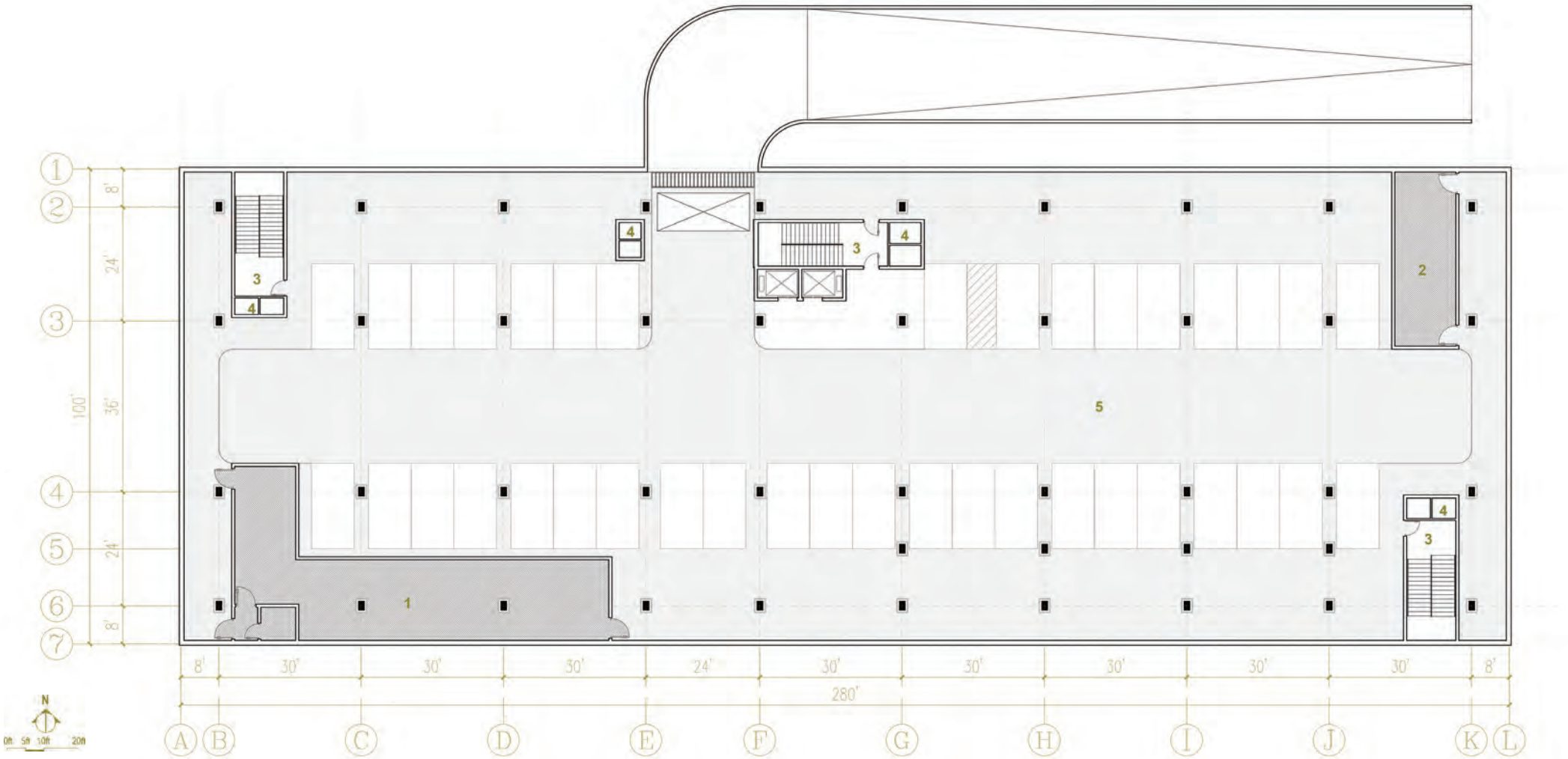
### Structure:
### Creating a column forest

Following the "Forest" concept, concrete columns at garage level are shaped in a wedge form to create a “column forest”. The arch concrete beam also help to generate a forest scenario.

### Lighting:
### Integrating daylight

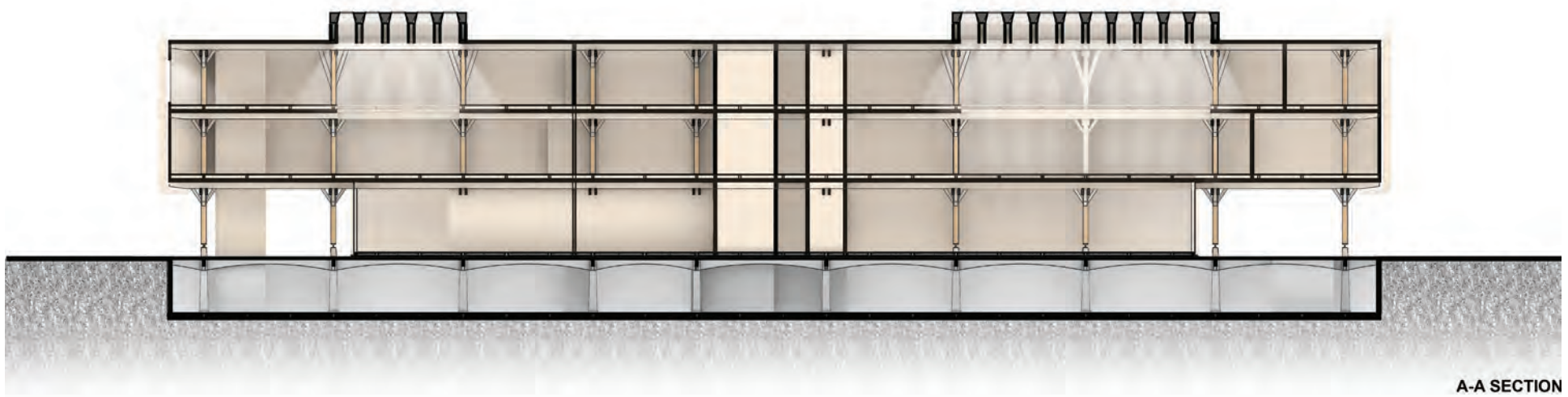
TGP FIRELITE structural glass panel mounted in the ground provide refraction of daylight into the garage underground.

At night an inverted effect occurs: artificial light radiates from the garage underground, penetrating upward through the glass panels.



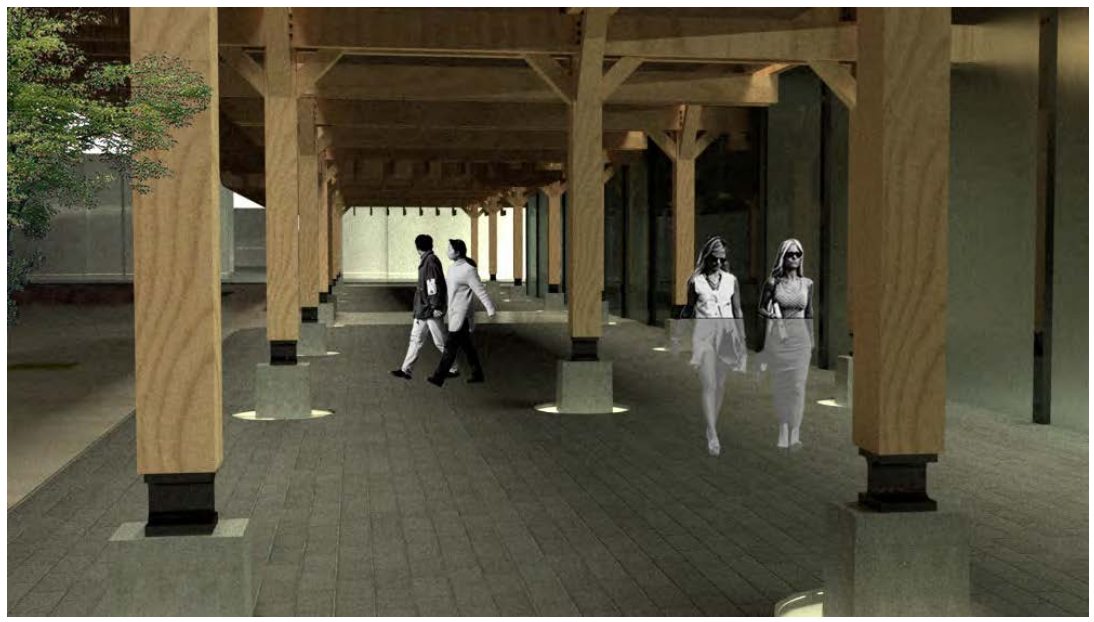

-1 Floor Plan

1. Boiler / Chiller
2. Storage
3. Fire Stair
4. Shaft
5. Parking



A-A SECTION

# SPACE
## Ground Floor



### Health equity:
### Being part of the community

The exterior appearance is a series of vertically rhythmic wooden panels which create a vertical pattern to conceptualize a thick wood. To help the main building cblend into its

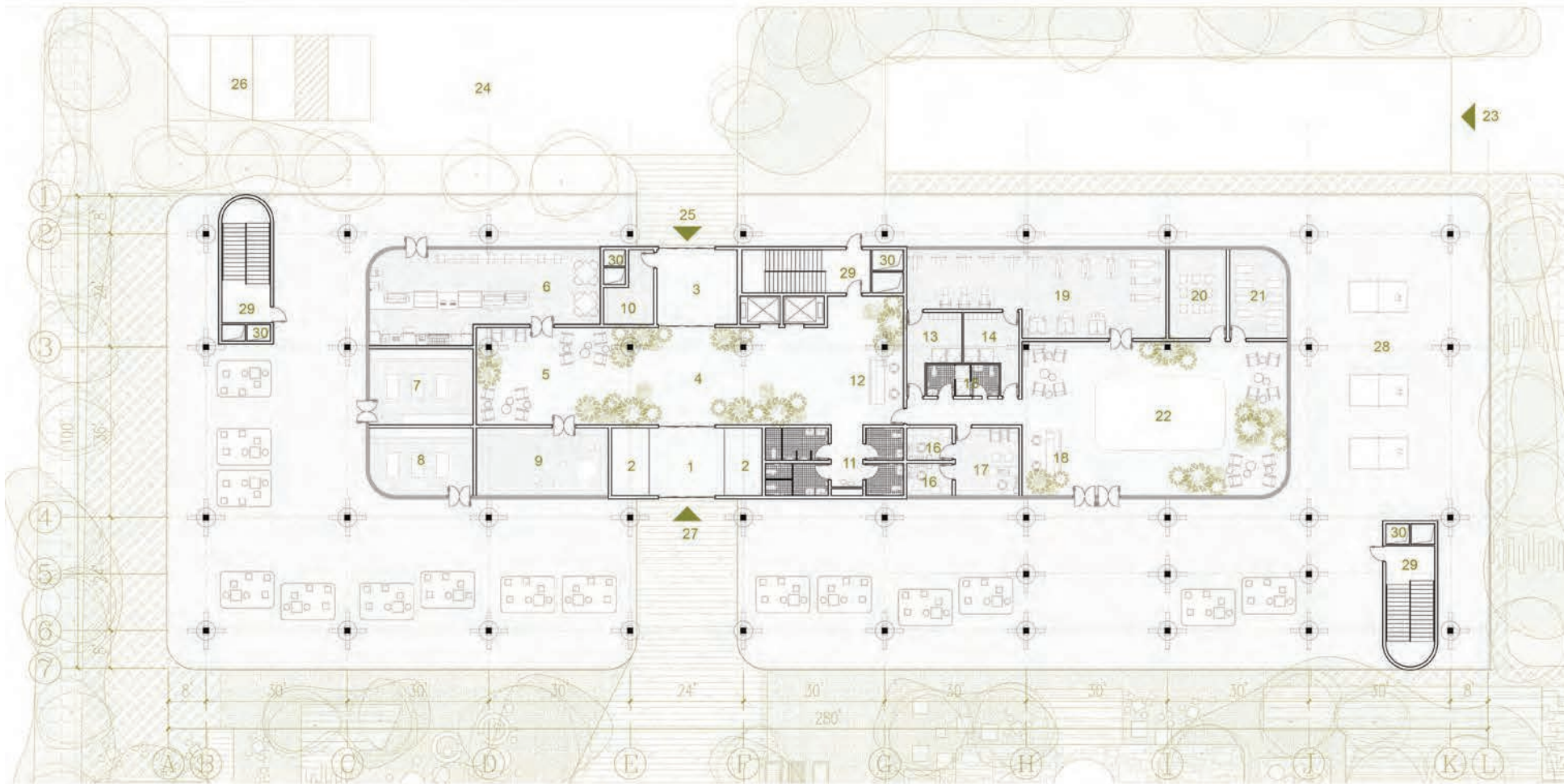
### Structure:
### Creating a column forest

Columns changefrom concrete to timber with a steel connection at ground level. The glass penetration in the ground provides space for the column to express a “roots down, shoots up” concept.

### Nature:
### Interacting with nature

The fitness center can be accessed by the main entrance which opens to the urban plaza and is aimed at the public.

The transparent facade encourages patients to interact with natureand engage in more physical activities.




1st Floor Plan

1. Walk-In Vestibule
2. Wheel Chair Storage
3. Vestibule
4. Hall
5. Waiting
6. Cafe
7. Retail Pharmacy
8. Sport Shop
9. Child Care
10. Gaurd
11. Public Toilet
12. Registration Hub
13. Female Changing
14. Male Changing
15. Toilet & Shower
16. Administation
17. Consualt
18. Reception
19. Fitness Weight
20. Classroom
21. Yoga
22. Areobic & Strech
23. Garage Entrance
24. Loading Area
25. Staff Entrance
26. Parking
27. Pedestrain Entrance
28. Exercise Area
29. Fire Stair
30. Shaft

The centrally located entrance zone grants the visitors an overview of the building to minimize confusion and encourage a sense of security. The stairwell separate the vertical access from entrance space.

The ground floor serves as a foyer with reception, cafeteria, shops, and child care. These functions have been reduced to a minimum so that the largest part of floor space is reserved for the fitness center.

# SPACE
## Second Floor

### Structure:
### Creating a column forest

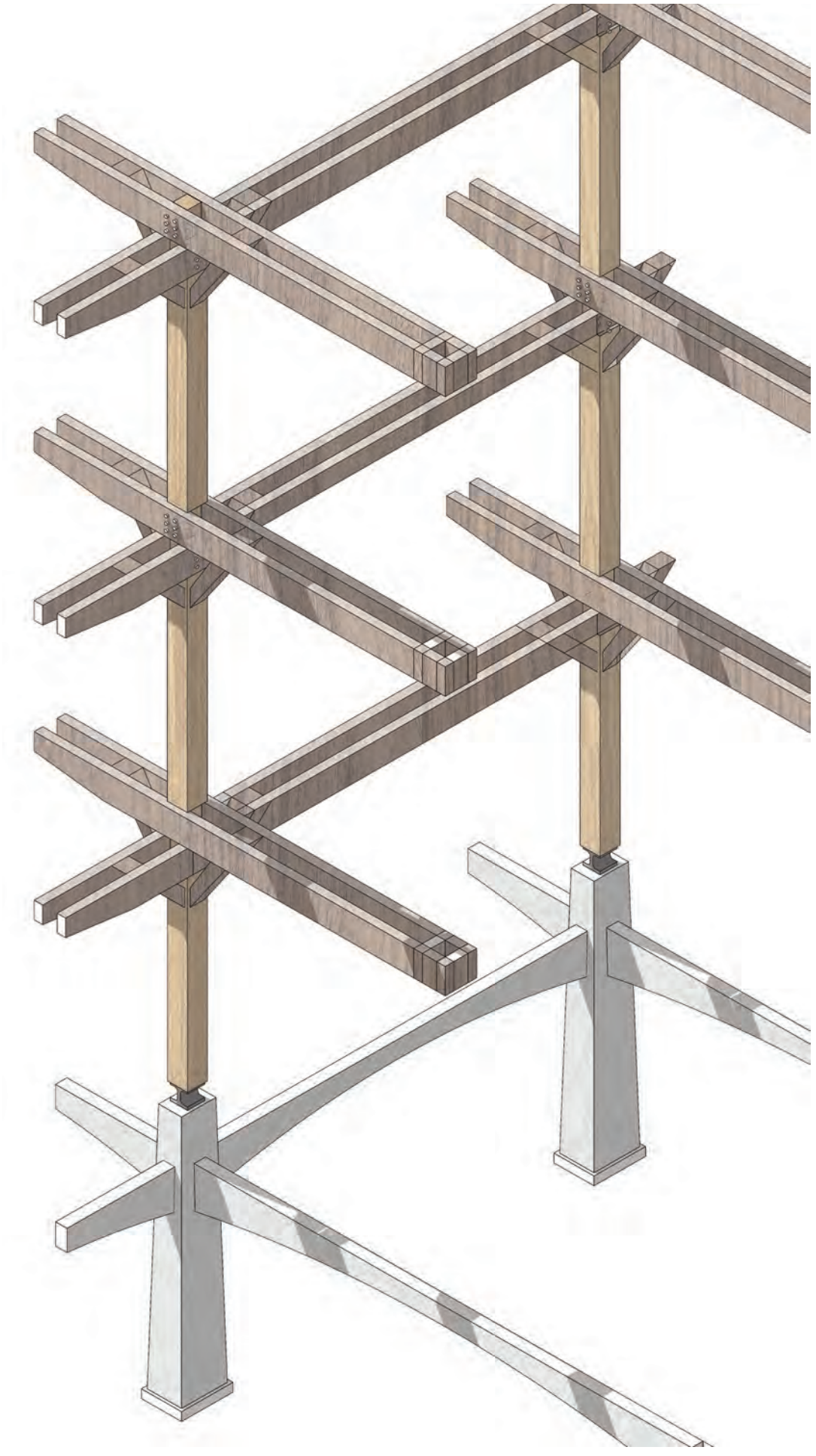
The wood columns are designed in shape of a tree trunk with branches that support the loads from beams. The “trunks” bear  the loads from the double-layer beams down to the truncated pyrimidal bases, creating an abstract forest.

### Nature:
### Interacting with nature

Wood serves as a natural humidity controller in this environment: when the indoor air is extremely dry, it will release moisture, and it will absorb moisture when the indoor air is too humid.

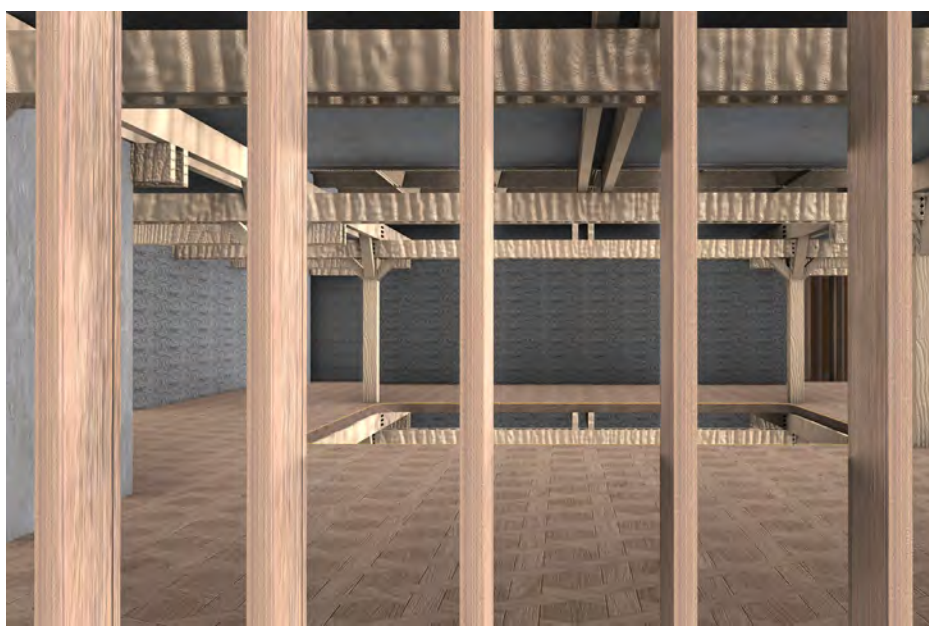
### Lighting:
### Integrating daylight

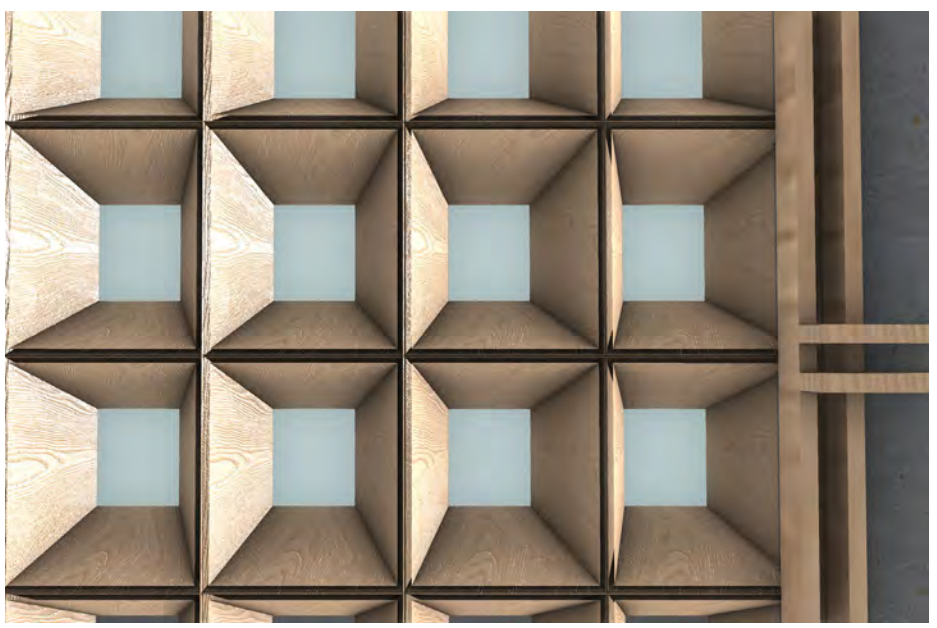
An atrium in each side of building illuminates the building in a soft way. Natural light reflected by wood surfaces give the building a character of the warmth and peace.




2rd Floor Plan

1. Public Toilet
2. Waiting
3. Reception
4. Observation
5. Brace
6. Cool Down
7. Exam room
8. Nurse Station
9. Nourishment Alcove
10. Clean Supply
11. Medication
12. Soiled Utility
13. Patient Toielt
14. Weight & Measures
15. Fire Stair
16. Therapy Cubic
17. Doctor's office
18. Staff Lounge
19. Therapy Assistant
20. Staff Toilet
21. Staff Lockers
22. Conference Room
23. Education Room
24. Consualt
25. Administration
26. Staff on Call
27. Reading Room
28. Patient Holding
29. ADA Dressing Room
30. Ultrasound
31. CT Scan
32. Control
33. MRI
34. MRI Equipment
35. Linen Alcove
36. Radiology
37. Flex Pod
38. Workroom
39. Staff Location Room
40. Outdoor Terrace
41. Shaft





# SPACE
## Third Floor

### Structure:
### Creating a column forest

The heavy timber structure remains visible yet meets fire code requirements.

### Nature:
### Interacting with nature

An interior healing garden located on the top floor with skylight provides a stimulating area for patients' physical activities, which speeds up their recoveries.

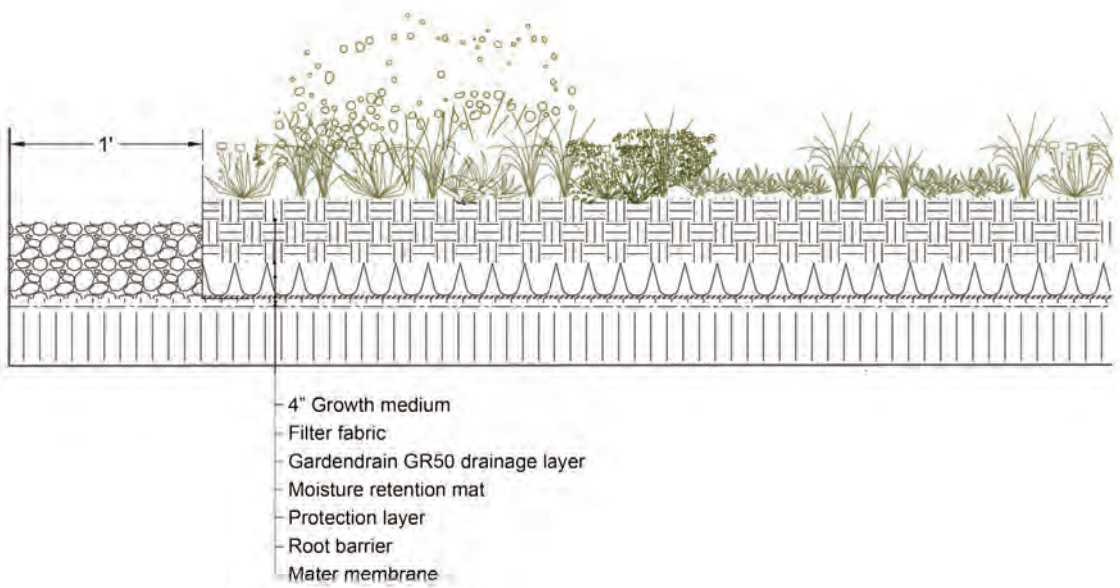
### Lighting:
### Integrating daylight

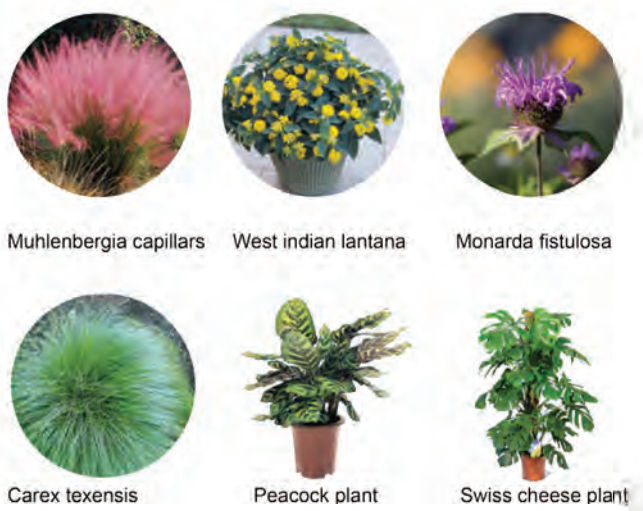
The atrium is lit by a daylight from above . The daylight gaps with etched glass panels inlaid allow light penetrates through roof round the building, casting stratified beams over the various wooden structural components.


Interior Therapy Garden


3rd Floor Plan

1. Public Toilet
2. Waiting
3. Reception
4. Massage
5. Couples Massage
6. Therapy Rehab Bay
7. Jacuzzi
8. Sauna
9. Female Changing
10. Male Changing
11. Techs Storage
12. Therapy Pool
13. First Aid
14. Treatment Gym
15. Staff on Call
16. Consualt
17. Administration
18. Staff Lounge
19. Therapy Assistant
20. Staff Toilet
21. Staff Lockers
22. Doctor's office
23. Fans
24. Therapy Garden
25. Outdoor Terrace
26. Fire stair
27. Shaft



# WALL SECTION

**Roof**
PVC fully adhered membrane
1/2" Cement fiber board
6" XPS R-30 extruded polystyrene
Sure-flex PVC flashing
9" 7-ply cross-laminated timber panel

**Structural Ceiling**
1'6" x 6" gluelam beam
Cable tray & sprinkler
Lighting

**External Wall**
2' Acetylated wood shading
7/8" Cor-Ten steel panels
2" Continuous insulation rockwool
1/2" gympsum sheathing
Hollow structrual steel tube @ 6" O.C
5 1/2" fiberglass batt
Exterior steel studs @ 16 O.C
5/8" gypsum wall board

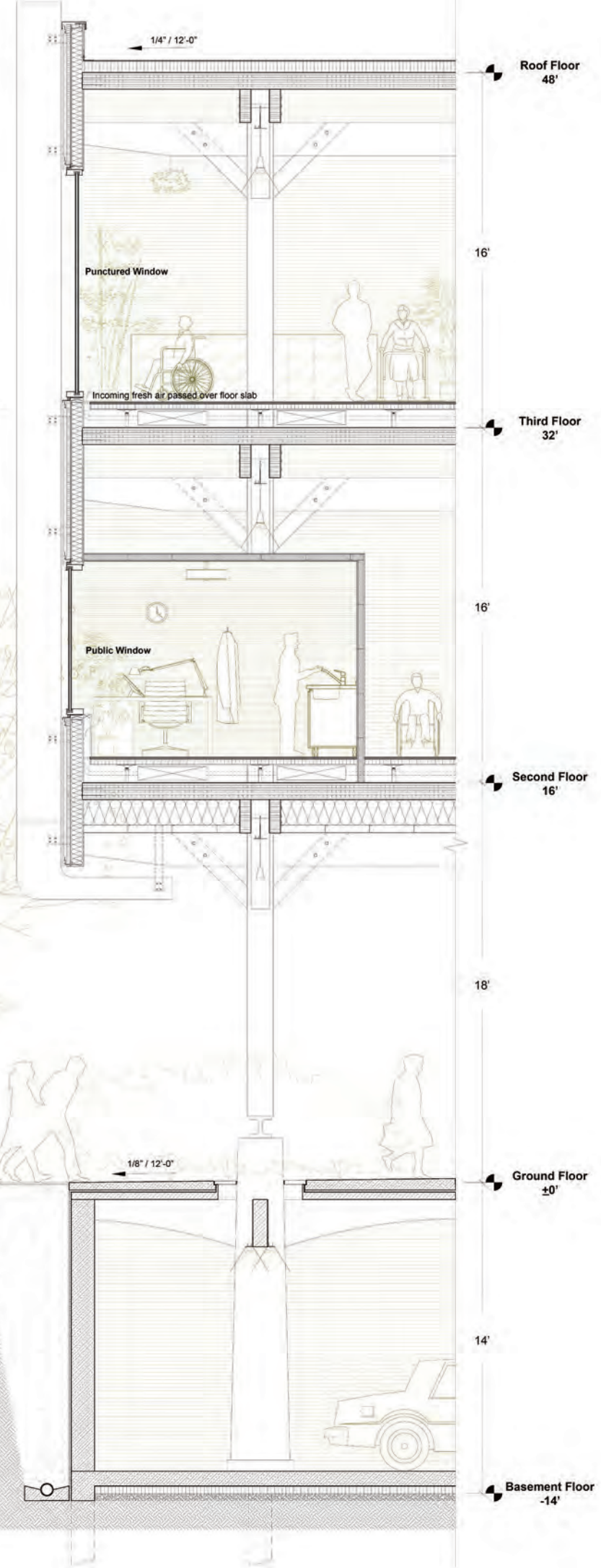
**Interior Wall**
3" partition wall
Interior steel studs
5/8" gypsum wall board

**Intermediate Floor**
1/2" Vinyl Tile
3/4" parallel laminated timber panel
2x4 joist @ 16 O.C
Access floor support
Rigid sub-frame with utility chase
1/4" acoustical underlayment
9" 7-ply cross-laminated timber panel
1'2" rigid insulation
Exterior steel studs
5/8" gypsum board

**Ground Floor**
4" topping
R.S. sealant
1" TGP FIRELIYE glass 90 min
1" XPS protection board
90 mil EPDM adhere to slab
4" concrete slab

**Basement Wall**
90 mil EPDM adhere to protection board
1" XPS protection board
1' 1/2" prefabricated concrete wall

**Basement Floor**
8" Polished concrete slab
Vapor barrier
3"XPS R-30 extruded polystyrene
4" gravel




0 1ft 2ft 5ft 10ft

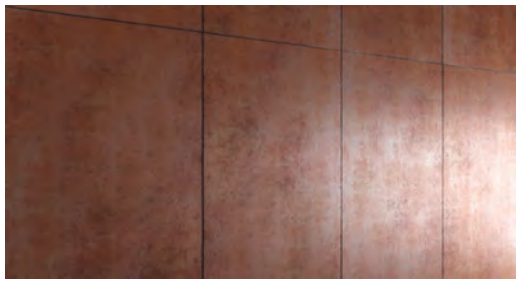
# FACADE

**Accoya modified shading:**

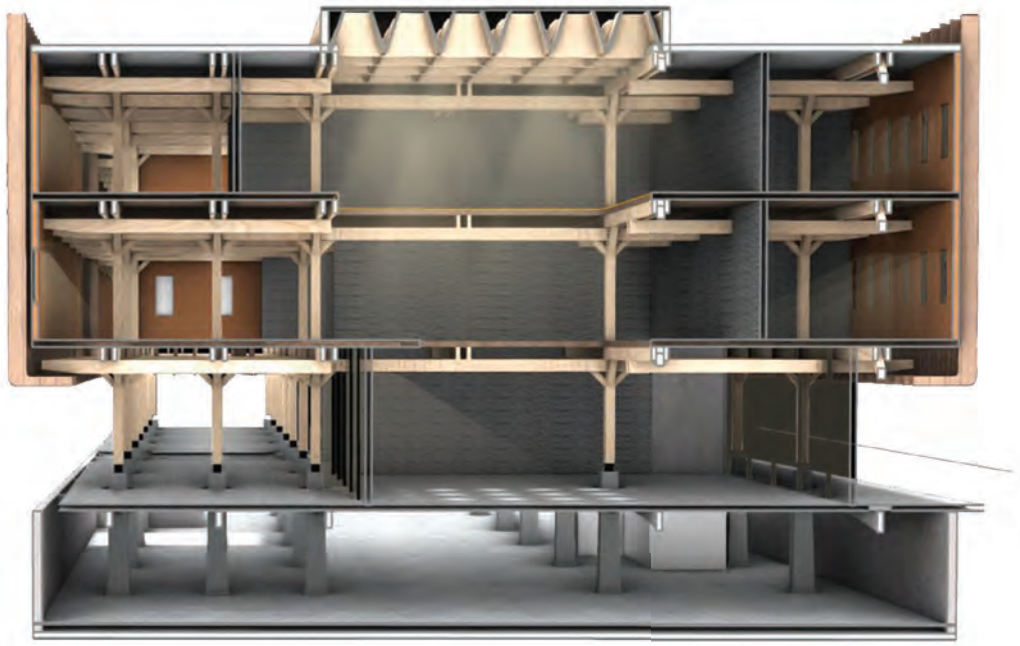
- Dimensionally stable
- Outstanding durability
- Design flexibility
- Improved aesthetics

**Corten rainscreen cladding:**

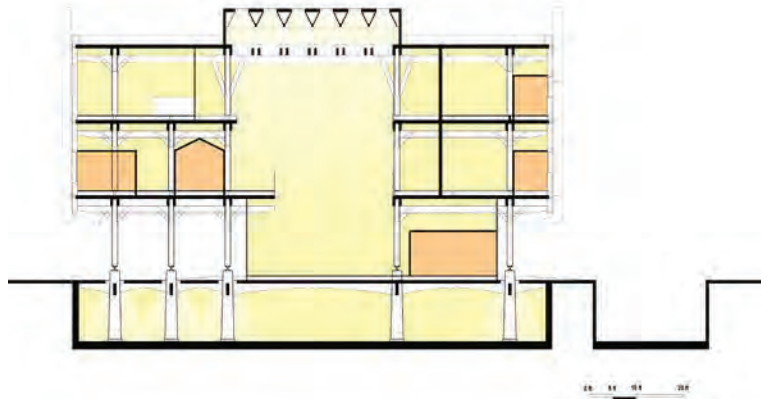
- Natural weathering properties
- Steel self-repairs after abrasions
- Recycled material
- Low solar reflectivity
- Reduced installation costs

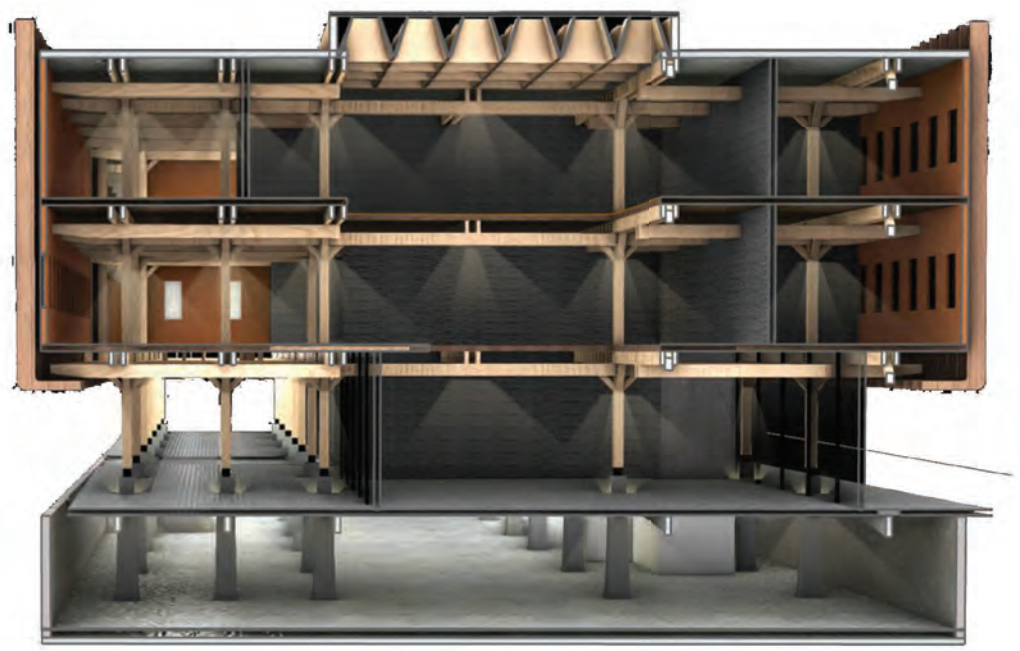


# LIGHTING

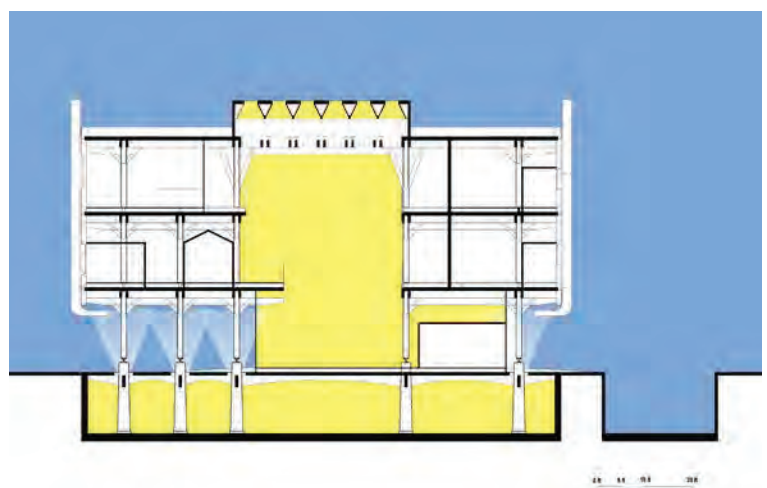


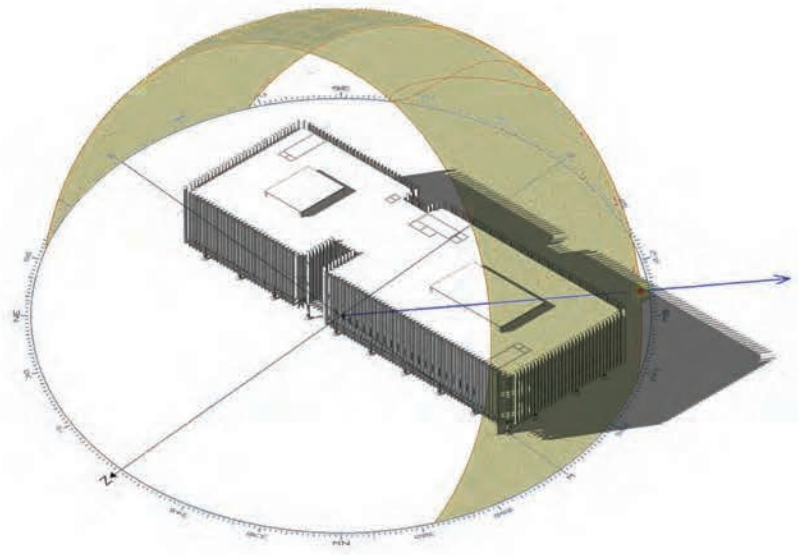
Natural light in day time



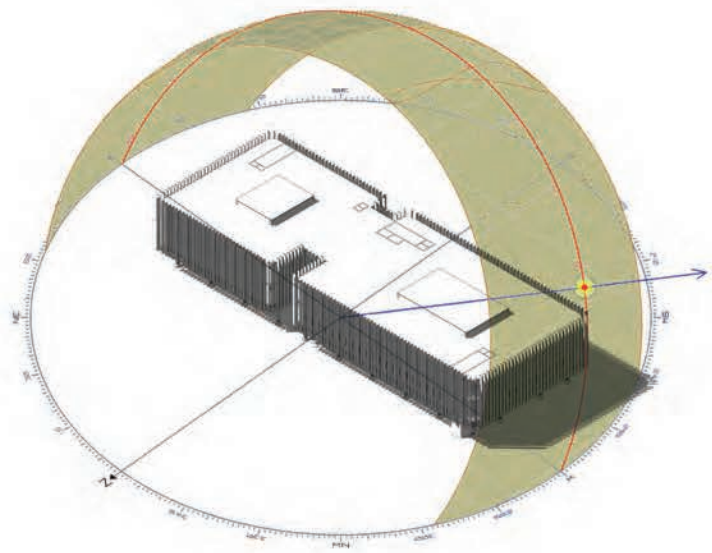


Artificial light in night time

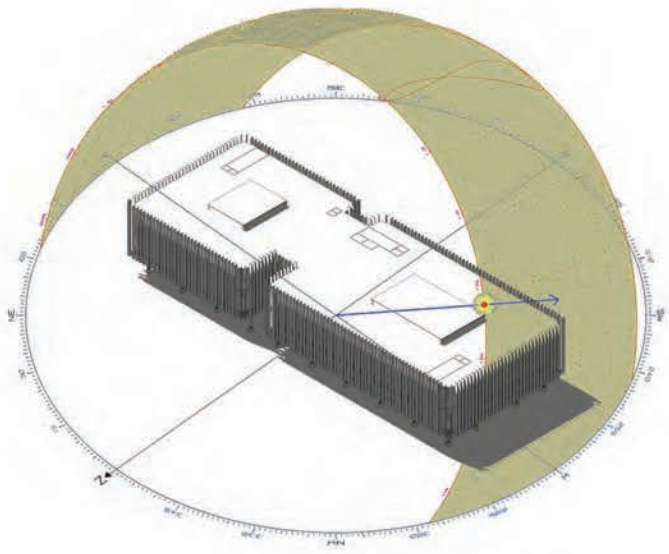




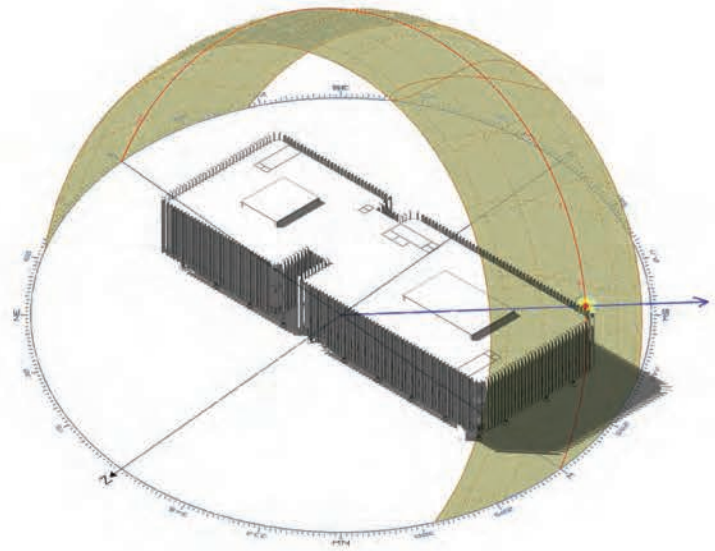
Winter Solstice



Spring Equinox



Summer Solstice



Autumn Equinox

# Conclusion

# CONCLUSION

How to create a therapeutic environment for patient and a stimulating place for community at the same time is a big challenge in this project. While, the challenges also as the opportunities, give the answer in this project.

One biophilia hypothesis implies that people have an inherent tendency to contact with nature. [1] Inspired from the "forest" concept, Timber was the natural choice for the construction material. On the technical considering, timber used indoors will stabilize moisture content. The use of natural light and views foster a healthy interior environment, while sunscreens, shading and efficient glazing enhance energy efficiency within the building.

Opening portions of private spaces for public use is a strategy for promoting spatial equity within a community, offering members from all sectors of the community the opportunity to access and enjoy space in the urban landscape. Special attention was paid to making the facility accessible by walk. Visitors to the building are encouraged to linger, meet with colleagues, take a class in the fitness center, or take a coffee or work break.

As a human-centered design, the building aims to inspire an integrated structure for delivering high-quality services. Design process is focused on users' needs and satisfaction. Patients who needs physical therapy are vulnerable and sensitive for negative impactions. Patients' family members sometimes are a neglected group, while they play an indispensable role in the healing process. The design incorporates special emphasis on waiting spaces and zones that can provide space for stress management, relaxation, and respite. Through the use of planting, wood material, and natural lighting, a stimulating environments strategy promotes intuitive wayfinding that guides users to clinics, with public areas provided to weave wellness and health education opportunities throughout.

This project consolidated wellness, prevention, and restoring functions to create an approachable physical therapy center. Clinics for physical therapy included in this building, along with ancillary support spaces such as radiography and consulting offices for nutrition, wellness, and education services. A diverse partition format with standardized key rooms provides flexibility for the future, encouraging efficient performance and staff utilization.

---

*1. Kellert, S.R., and E. O. Wilson 1993*

# XIWEN MA

979-264-8684
mxw930408@tamu.edu
2250 Dartmouth DR. APT 917,
College Station,TX, 77840

## EDUCATION

2011.09 - 2012.09 Urban Planning

2012.09 - 2016.07 Bachelor of Architecture
School of Architecture and Urban Planning, Beijing University of Technology, China

2017.09 - current M.Arch Candidate
College of Architecture, Texas A&M University

## PROFESSION

2014.02 MAD Architects
Intern architects. Residential project. (Plan & section drawings, Renderings)

2014.07 - 09 Beijing Institute of Residential Buildign Design & Research Co.,Ltd
Intern architects. Hotels project. (Plan & elevation design, presentation package)

2016.07 - 11 Crossboundaries Architects
Intern architects. HOUSE VISION Project. Educational project. Participate project.

2017.02 - 08 CoBuilding Architects, Urbanists & Consultants Co.,Ltd
Assistant architect. Commercial project. Residential project. Exhibition design.

## ACADEMIC

2015.01 “Jurong VISION 2050” International Forum on Urbanism
Winter school. Future urban development in Singapore

2018.02 SES Student Healthcare Design Competition
TAMU team. Resilient architectrual design

2018.02 - 06 UIA Public Health Group International Comperition - Honourable Mention
Leader of project. A Moudular Prefabricated Community Health Centre

2018.11 AIA/AAH STERIS Student Design Charrette
TAMU team. Neorological specialty

## HONOR

Texas A&M University Scholarship Endowed by Edward J. Romieniec

## PROFICIENCY

Photoshop
Illustration
AutoCAD
Sketchup
Vray Render Engine
Revit Architecture
Rhino
Lumion
UCL Depthmap

Sketching
Water Color
Oil painting
Model Making
Photography
GIS