

"ONE FOR ALL" VILLAGE

Design for **Stroke Rehabilitation Center**

DEDICATION

To my family

Your love and tolerance will always be my strongest support, you are like the sunshine in my heart, warming me and protecting me so that I can summon the courage to move forward. I love you all forever.

To my teachers and seniors

Your guidance and spurs have guided me forward to explore the unknown and enjoy learning. I enjoy and appreciate being able to communicate with the best people in the world. I respect you all forever.

To my friends

Life is like a journey, and your company has beautified the scenery along the way and brightened the mood of experiencing the scenery. I appreciate you all forever.

CONTRIBUTORS



Zhipeng Lu | Committee chair

I would like to thank Dr. Zhipeng Lu for all your efforts helping my project to complete successfully. I enjoy being your student, you always prompting me to think independently, making me become better.



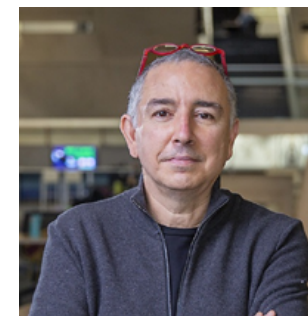
Ray Pentecost | Committee member

I would like to thank Dr. Ray Pentecost for all your professional healthcare design guidance and passionate encouragement. Your kind smile and passion and professionalism for healthcare design moved me deeply.



Chanam Lee | Committee member

I would like to thank Dr. Chanam Lee for your professional landscape design guidance and site planning advice. I am greatly inspired after every meeting we have.



Marcel Erminy | Studio professor

I would like to thank Prof. Marcel Erminy for all your professional guidance and instruction in the past academic year. Your patience and pursuit of detail will affect my future career.

Jason Fleming | HKS.Inc design leader

I would like to thank Jason Fleming for inspiring my conceptual design and professional advice on my project. Discussing design issues with you is one of the things I enjoy most.

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CHAPTER I. INTRODUCTION

ABSTRACT
BACKGROUND
EFFECT AFTER STROKE

BACKGROUND

This is the final study project (ARCH 608) for the Master of Architecture degree. The instructors for the project include the final study committee and studio professor. There are three professors in the final study committee - Dr. Zhipeng Lu (chair of the committee), Dr. Ray Pentecost (member of the committee) and Dr. Chanam Lee (member of the committee). All committee provides guidance for the project.

The studio professor is Marcel Erminy, and the professional advisor is Jason Fleming who is a design leader at HKS Inc. The projects spanned the full academic year from August 2022 to May 2023. The design process included three periods, project programming, schematic design, and development design.

This is a stroke rehabilitation center in Hedwig village, Houston, USA, with a total floor area of approximately 44,000 square feet and a total bed capacity of 48, where survivors usually stay for 5-7 days, providing stroke care and rehabilitation services as well as some emergency services. This project not only solves the noise problem of the site, but also gives survivors the experience of home rather than institutionalized

ABSTRACT

feelings by imitating the neighborhood environment around the site, incorporating the daily environment, possible behaviors, and psychological feelings into the stroke rehabilitation center project.

Keywords: Stroke rehabilitation, Non-institutional, Healthcare design, Humanistic care

EFFECT AFTER STROKE

FATIGUE 87%

PHYSICAL DISABILITY 80%

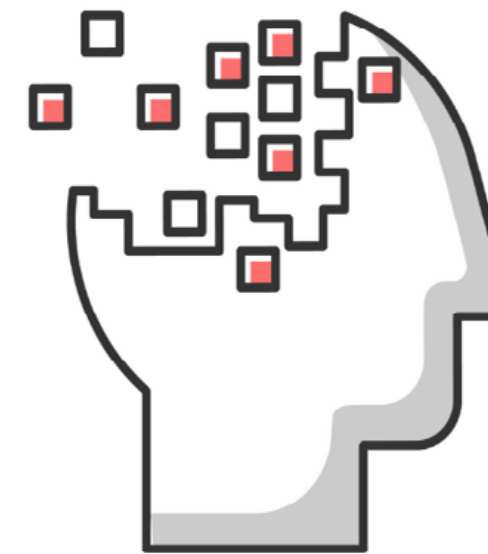
MEMORY 77%

DEPRESSION OR LOW MOOD 70%

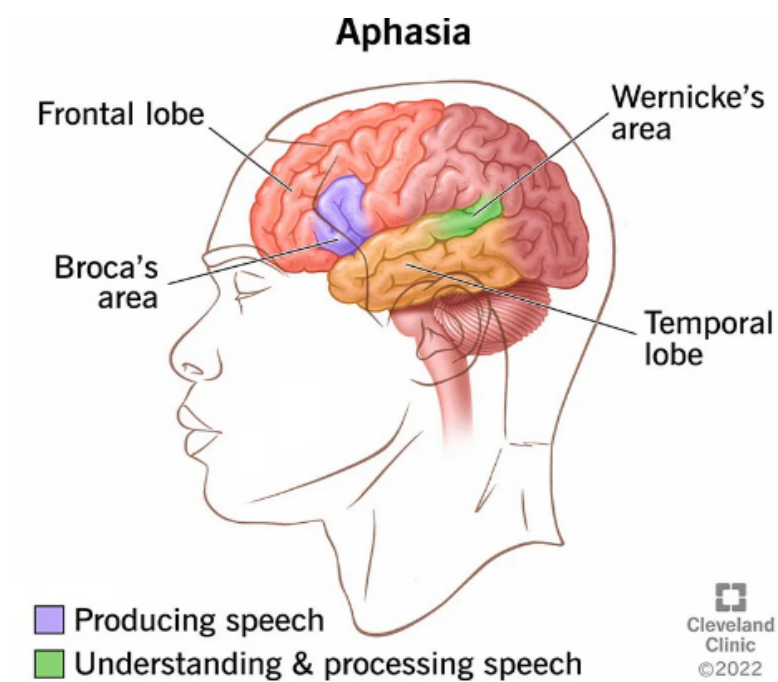
SPEECH & COMMUNICATION 60%

Data from Stroke Association 2017

The impact on survivors after a stroke is mainly in the form of physical loss of physical abilities as well as loss of memory, speech and thinking. In addition, there are also negative psychological effects on the survivor, who usually feels easily tired and depressed.



AMNESIA



EFFECT AFTER STROKE



Balance of privacy and nature connection

The survivor's space for rehabilitation and activities should find a balance or they can choose themselves to enjoy nature or more private space attributes. This optionality can be more flexible depending on the status of the survivor.

In other words, this project should be designed to give survivors the opportunity to interact with nature physically and psychologically while maintaining their privacy, rather than just exposing them to open space.



Balance between safety and social activity

Survivors' spaces should maintain a balance of security and social attributes. It is inhumane to confine survivors to beds or rooms for their safety, such as risk of falls, visual impairment, etc.



Even with limited mobility, survivors should enjoy the right to social attributes, which help stimulate the brain and accelerate recovery. Therefore, how to ensure safety in the social space will also be one of the important considerations of this project.

CHAPTER II. PROGRAMMING

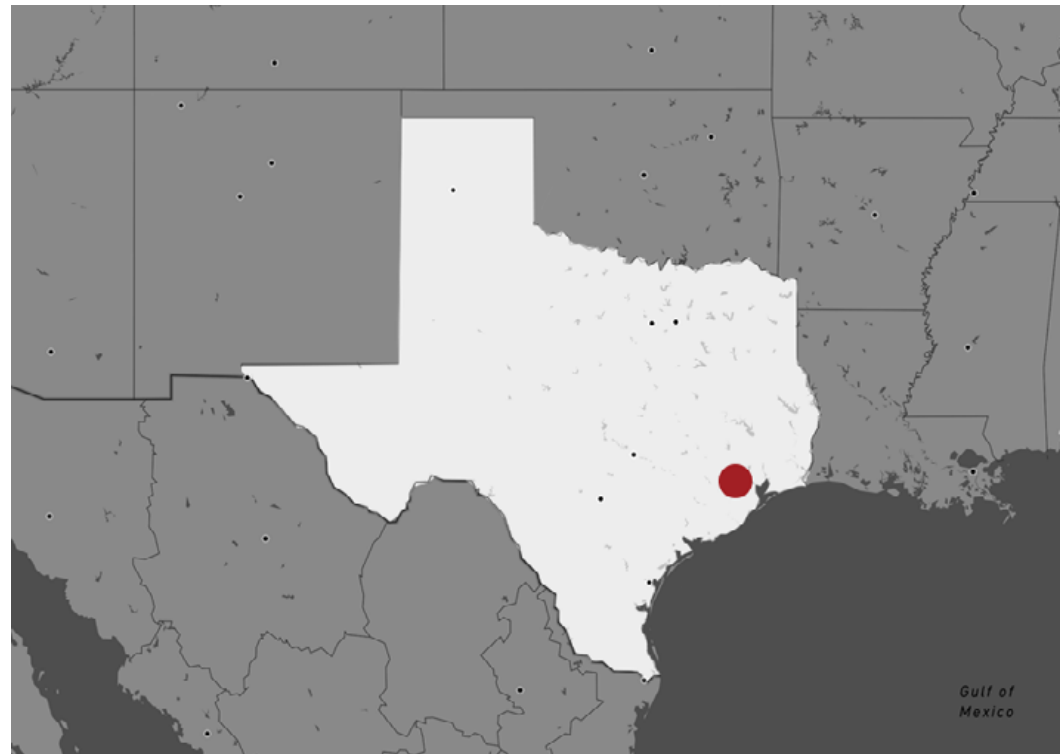
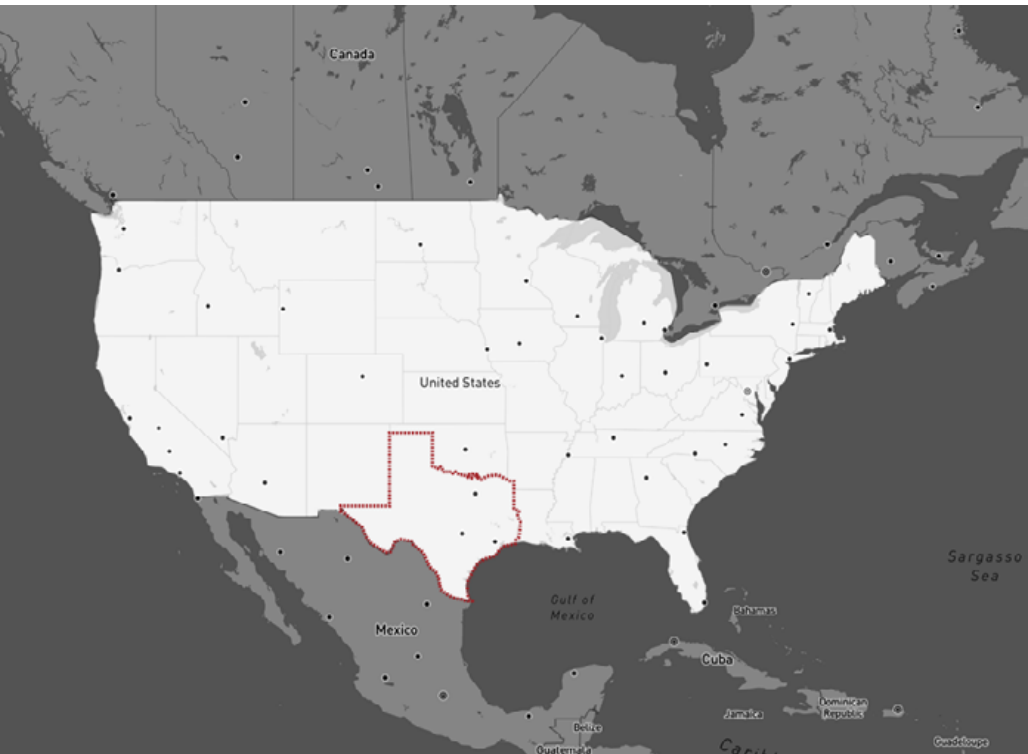
SPACE PROGRAMMING
SITE ANALYSIS

SPACE PROGRAMMING

Staff space	#	sq/ft 1	sq/ft all
Nurse station	8	250	2000
Staff lounge	1	200	200
Staff office	9	200	1800
Kitchen	2	300	600
Pharmacy	1	160	160
Soiled room	2	160	320
Locker	4	300	1200
Building support space	#	sq/ft 1	sq/ft all
Storage	6	200	1200
Air handle	1	220	220
Mechanics	4	200	800
ELEC	6	100	600

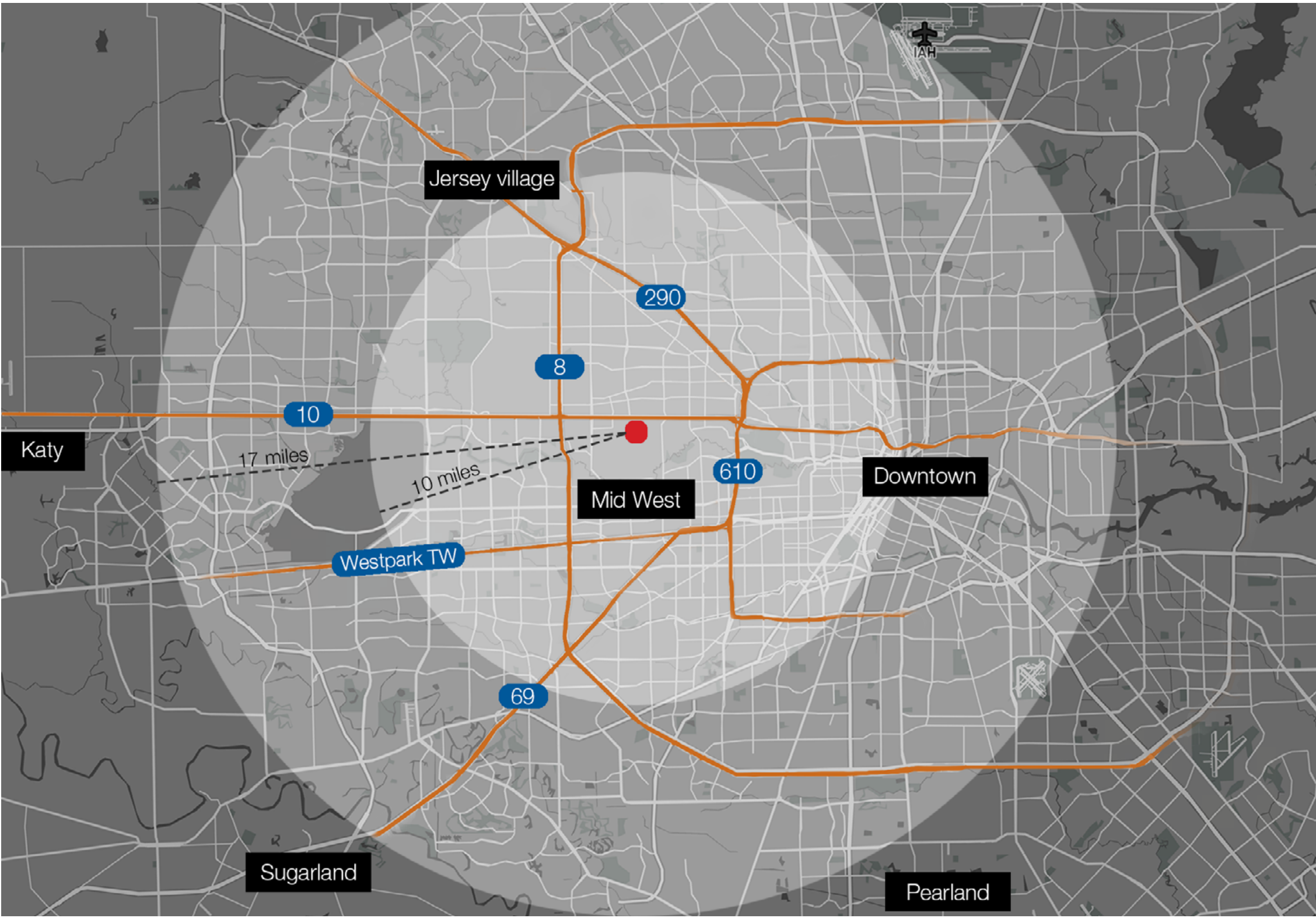
Survivors space	#	sq/ft 1	sq/ft all
Stroke survivors space unit	48	396	19008
Therapy	8	294	2352
Survivors' activity space	4	400	1600
Survivors' dining space	2	792	1584
Survivors' toilet	6	100	600
Stroke outpatient	8	130	1040
Athletic outpatient	3	130	390
Sport trauma	1	250	250
CT/CTA	2	550	1100
Ultrasound	1	300	300
Public space			5600
Total area			43924

SITE ANALYSIS - LOCATION

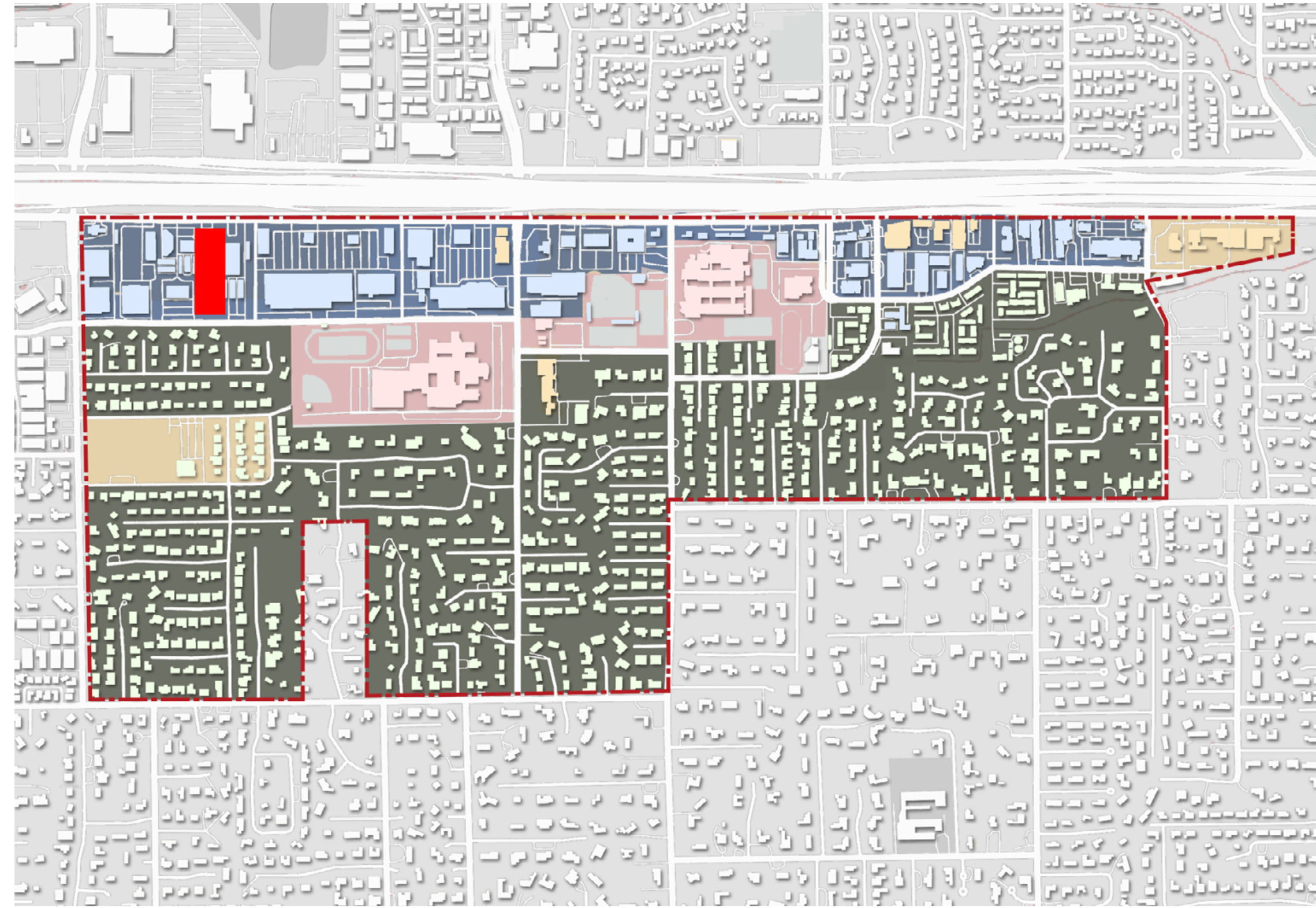
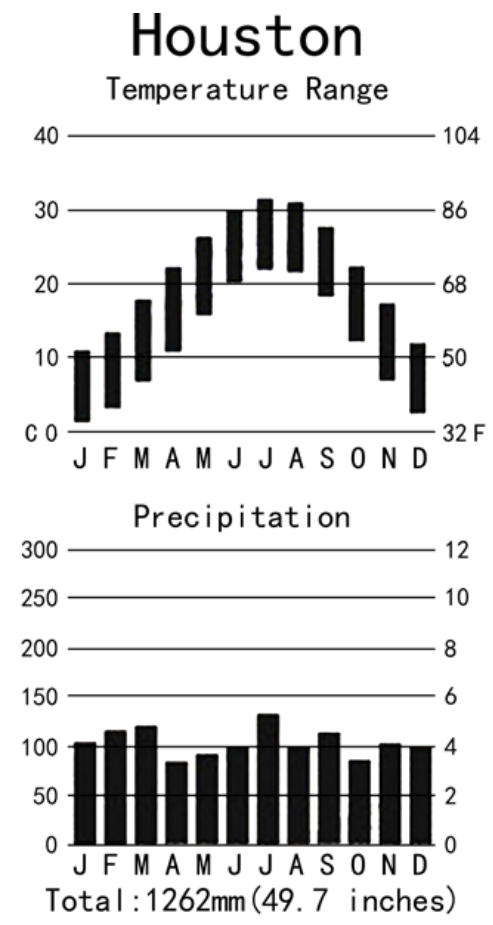
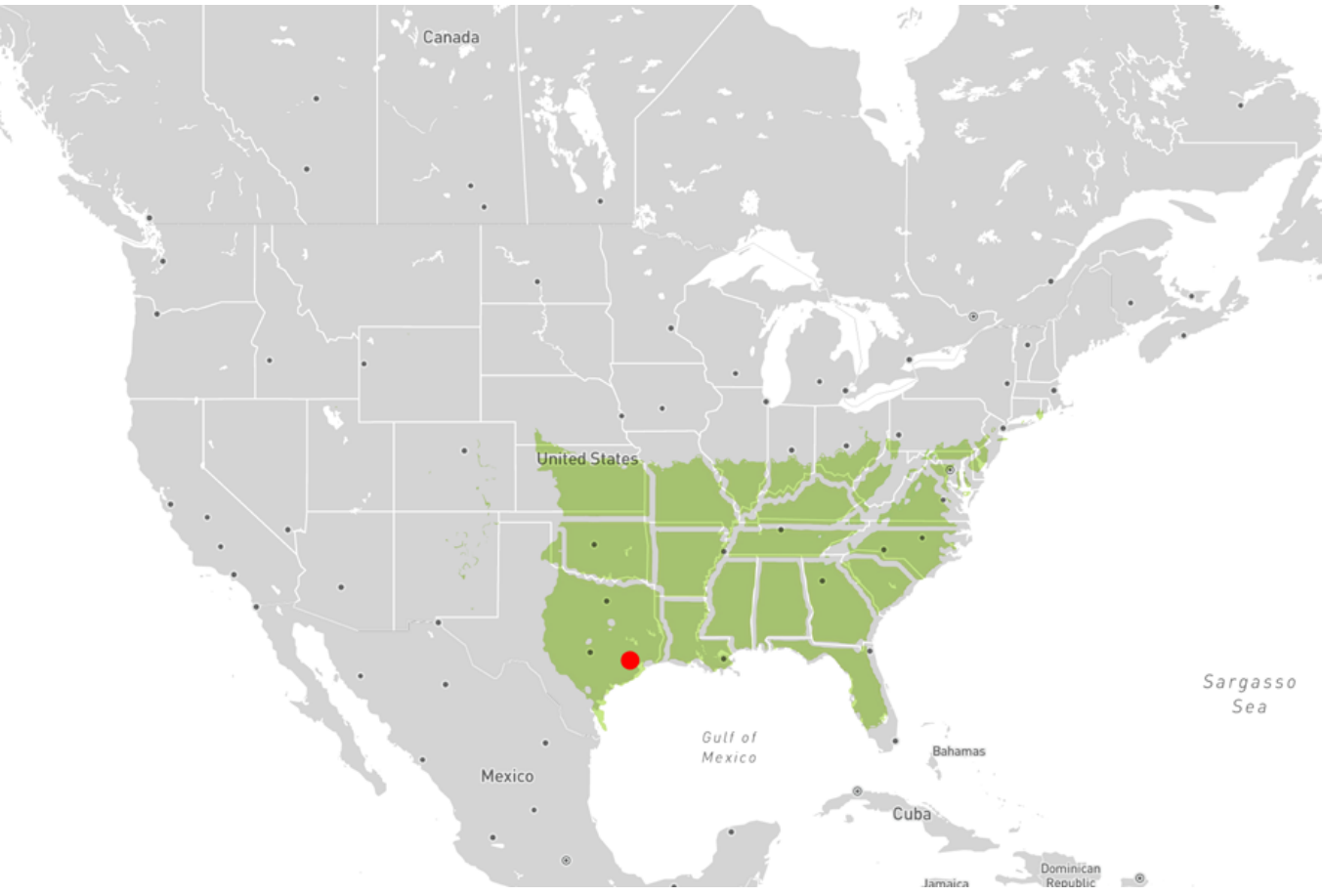


This project is located in Hedwig village, midwest Houston, Texas, USA, surrounded by Katy freeway, 8 freeway, 610 freeway, with abundant transportation resources. In addition, there is a general hospital within a 2 mile radius, but there is a lack of stroke related skilled nursing facilities.

- Site
- Main road
- Regional area



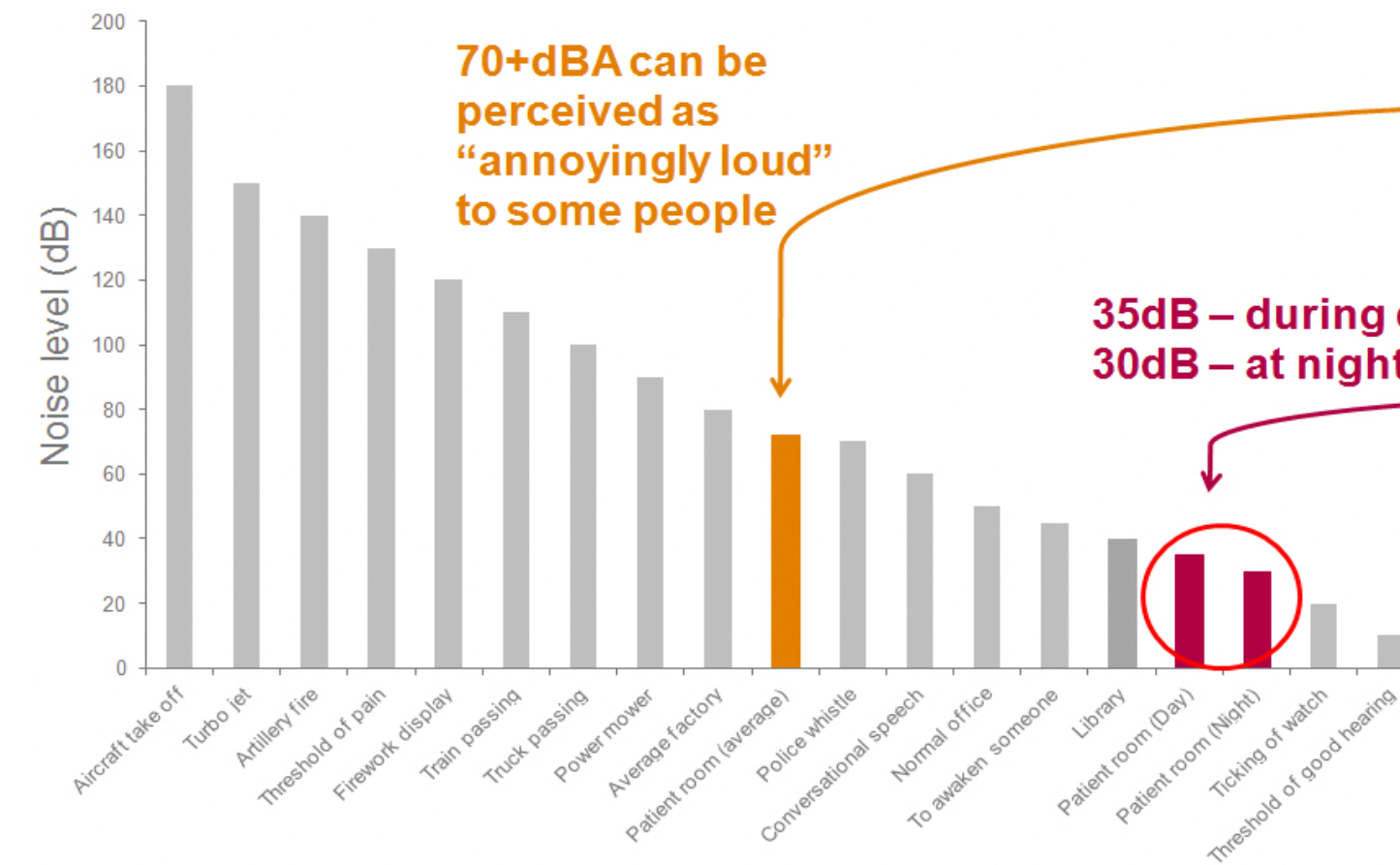
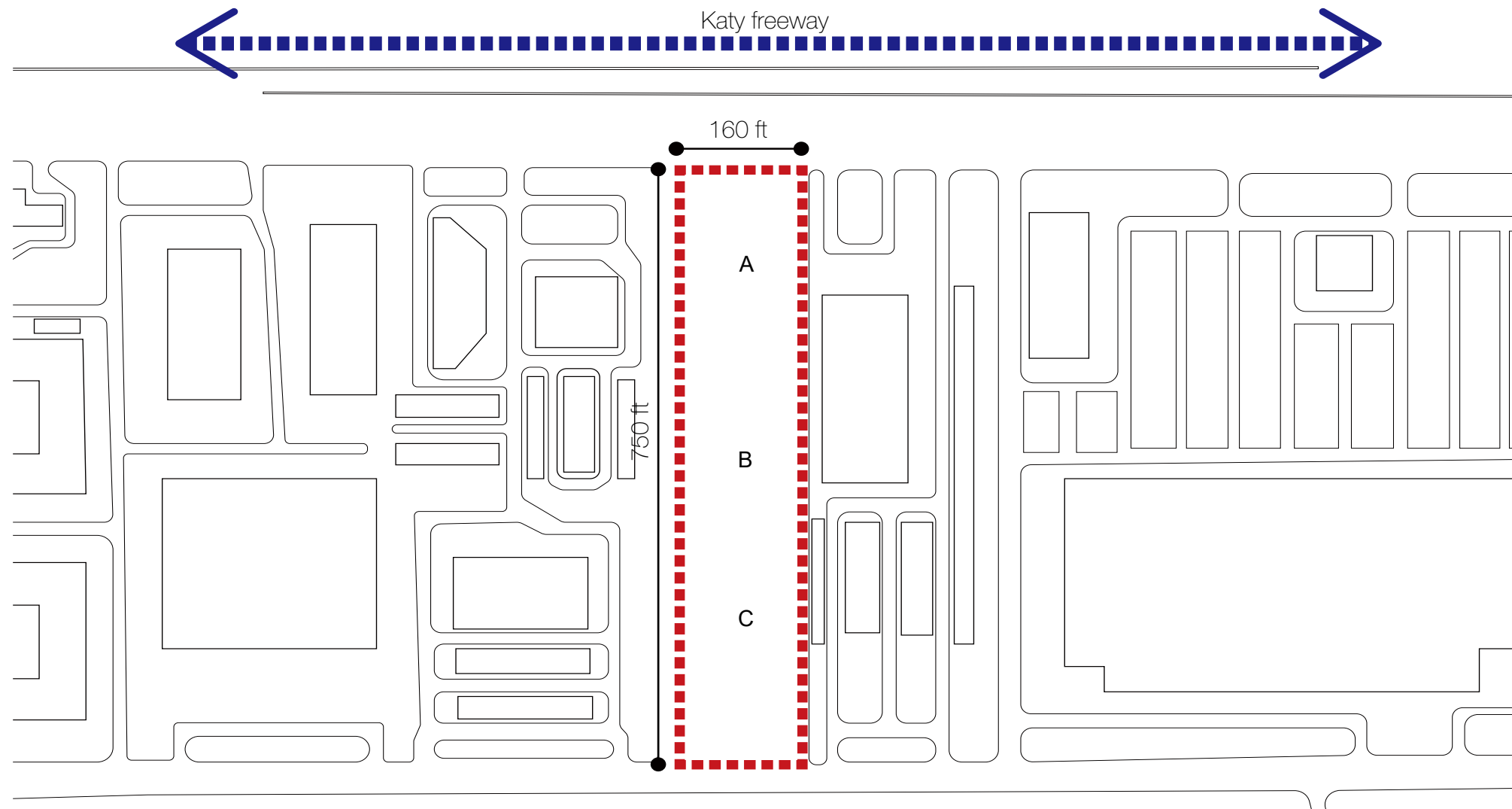
SITE ANALYSIS - HEDWIG



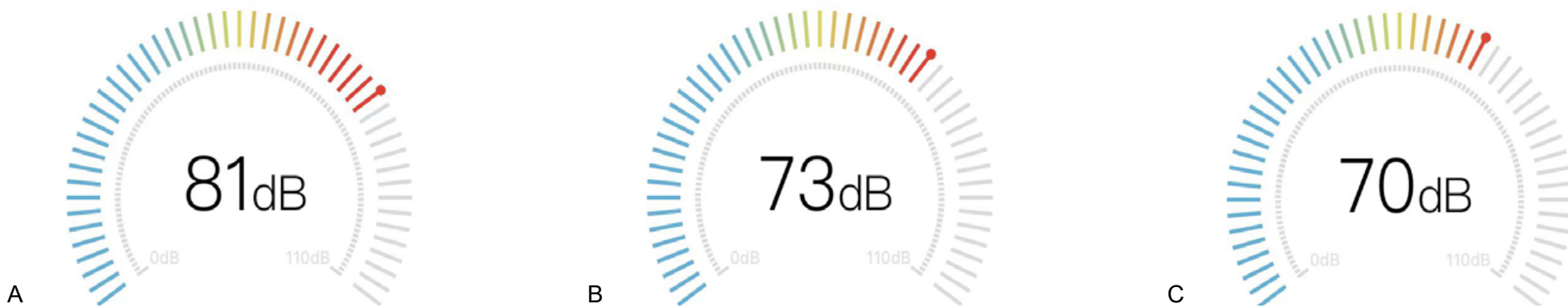
Hedwig village is located in west-central Houston, near south of Katy FW, with a total population of 2,651 (2021) and a mild and humid climate. The north side is mainly commercial and office areas, and the south side is mainly residential and educational areas.

- Hedwig Village
- Site
- Mix-use area
- Education area
- Comercial area
- Residential area

SITE ANALYSIS - CHALLENGES



Information from US Environmental Protection Agency

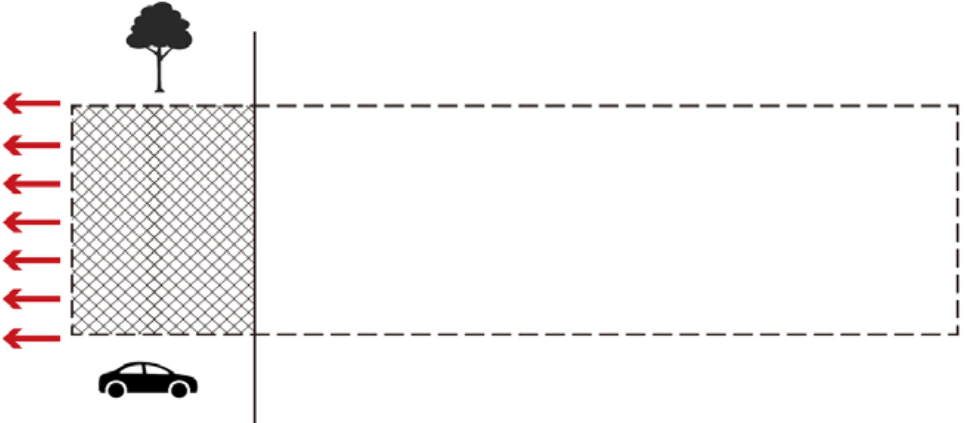
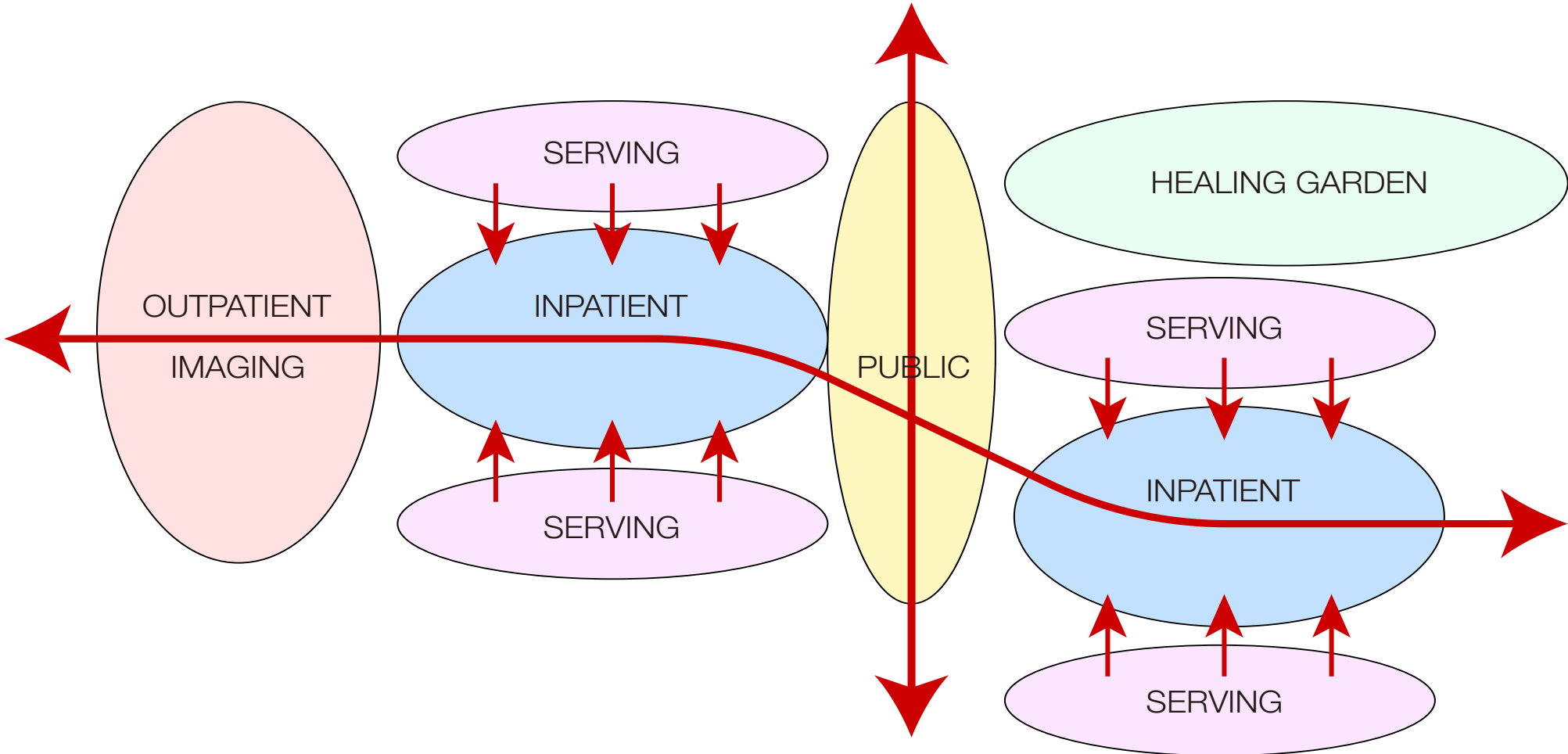


The site is adjacent to the Katy freeway with a speed limit of 70mph. According to the on-site noise testing of the site, the lowest decibel of the site is above 60. Therefore, the noise can be handled by using the length of the site to set back the building to the south side, tall trees, and building massing. Ultimately, the noise should be kept below 35 decibels.

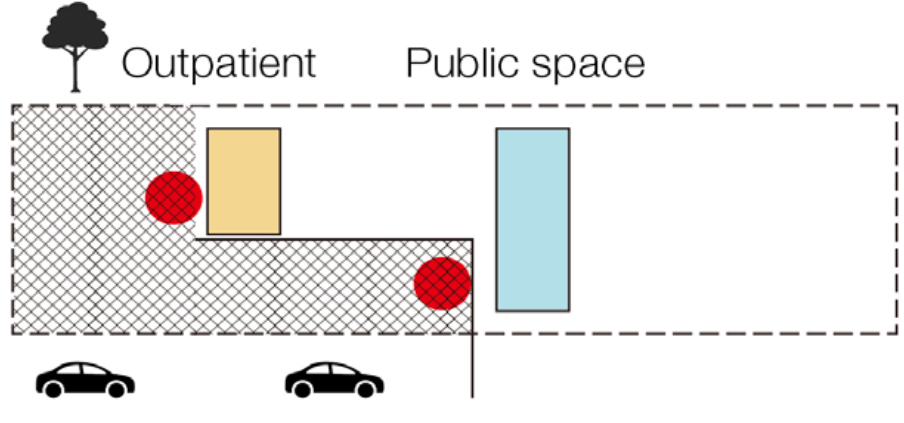
CHAPTER III. SCHEMATIC DESIGN

SITE SOLUTIONS
DESIGN OF MASTER PLAN
CONCEPT DESIGN

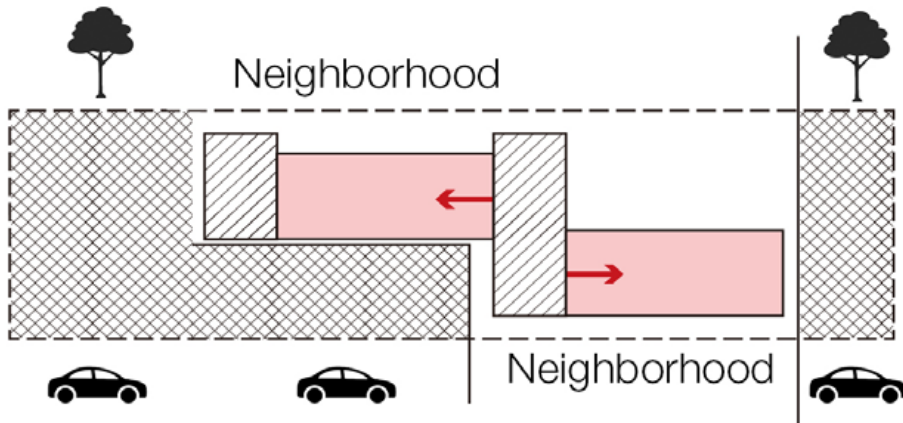
SITE SOLUTIONS



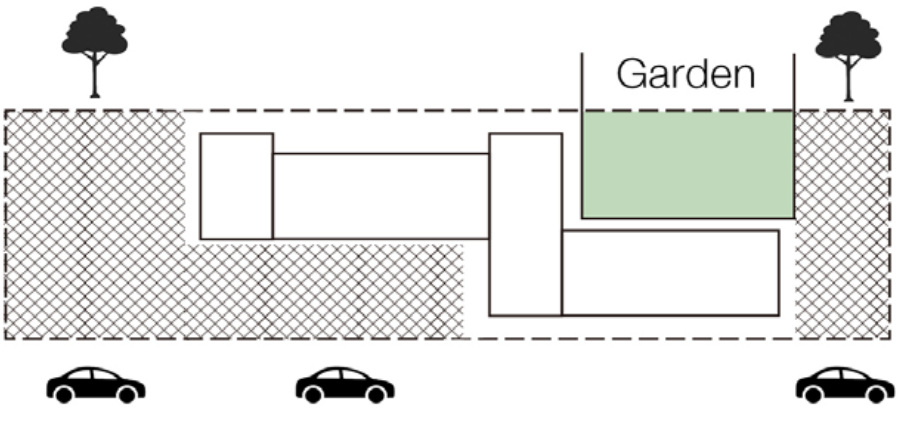
Setback on the side adjacent to the highway to reduce noise impact.



Separate external clinics and internal neighborhoods according to the noise.

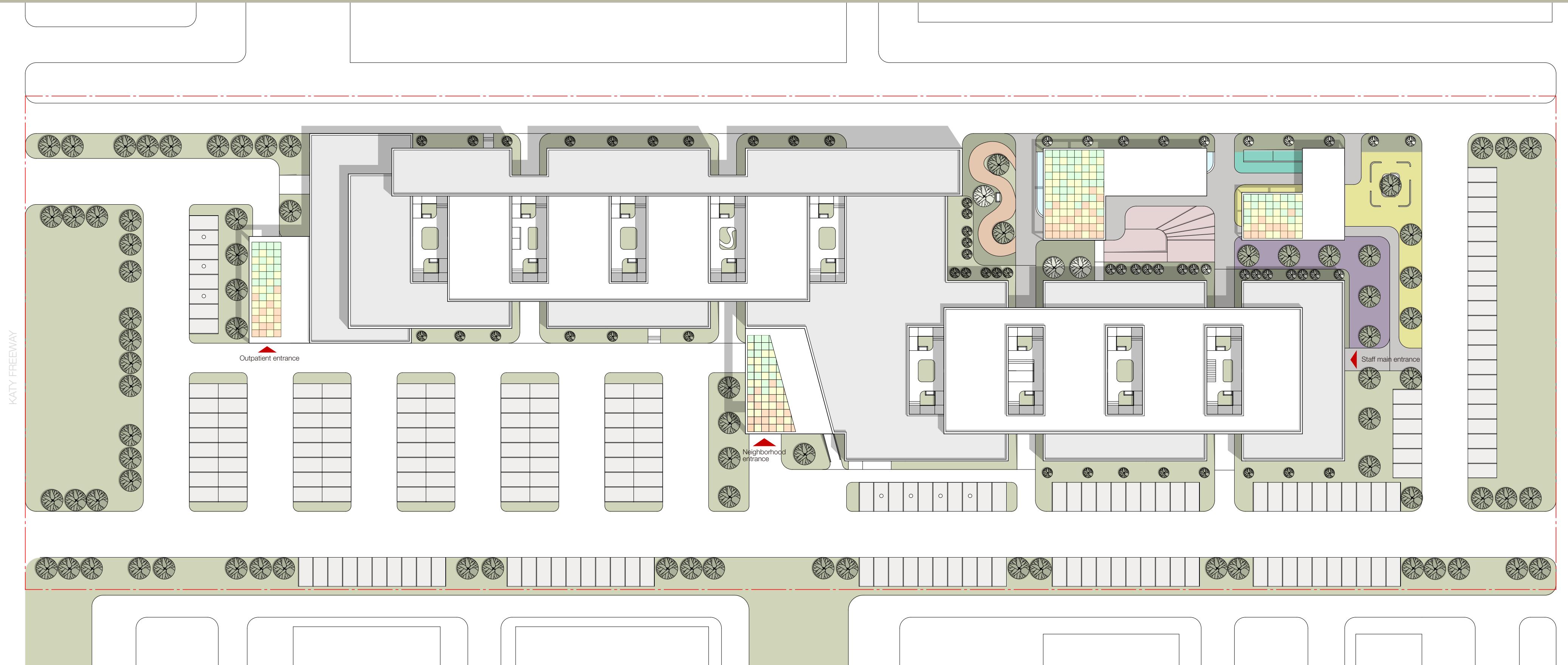


Neighborhood areas are placed between buildings to block noise and are located on both sides of the public space.



Divided by the building into quiet corners as a healing garden.

DESIGN OF MASTER PLAN

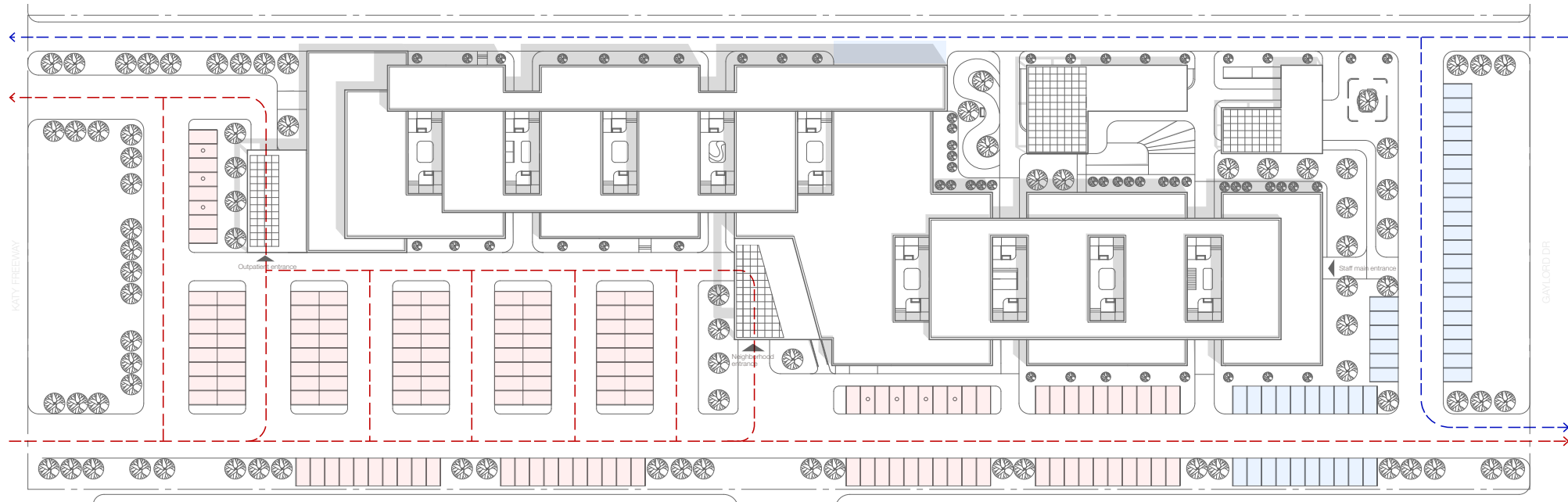


MASTER PLAN

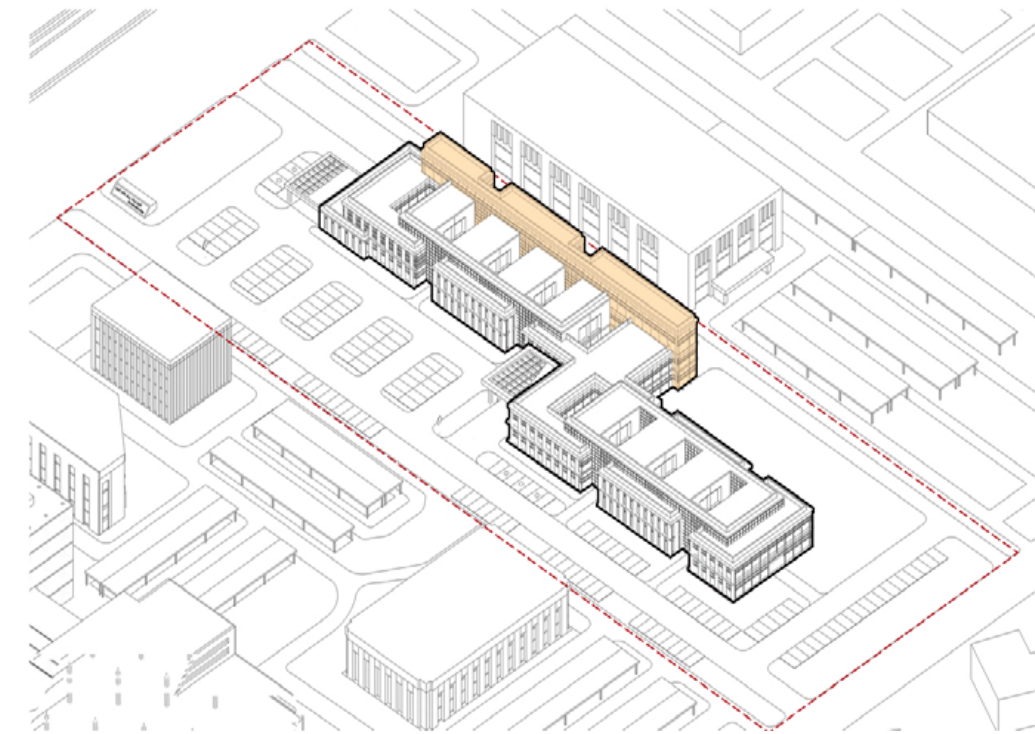
0 10' 30' 70'



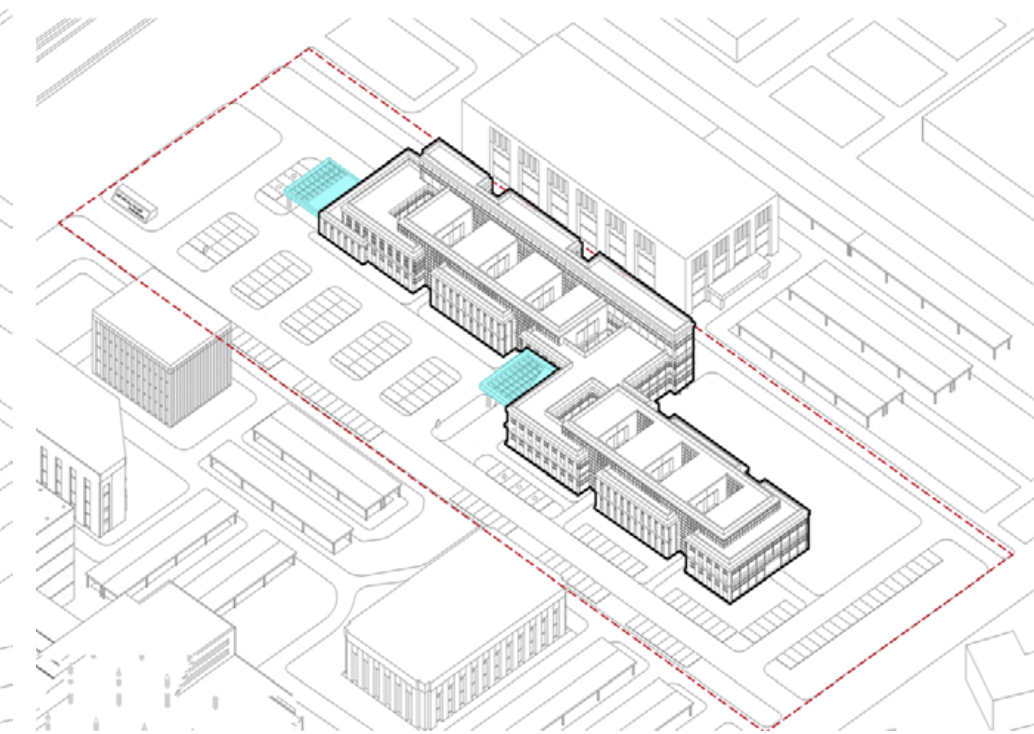
DESIGN OF MASTER PLAN



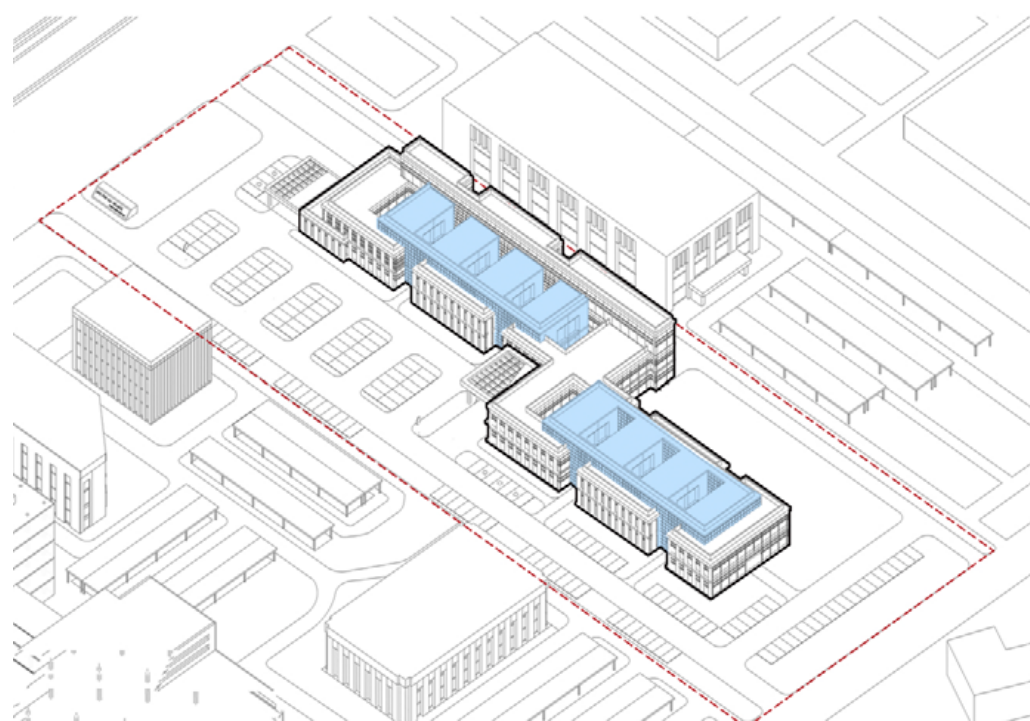
Visitor parking
 Visitor parking
 N



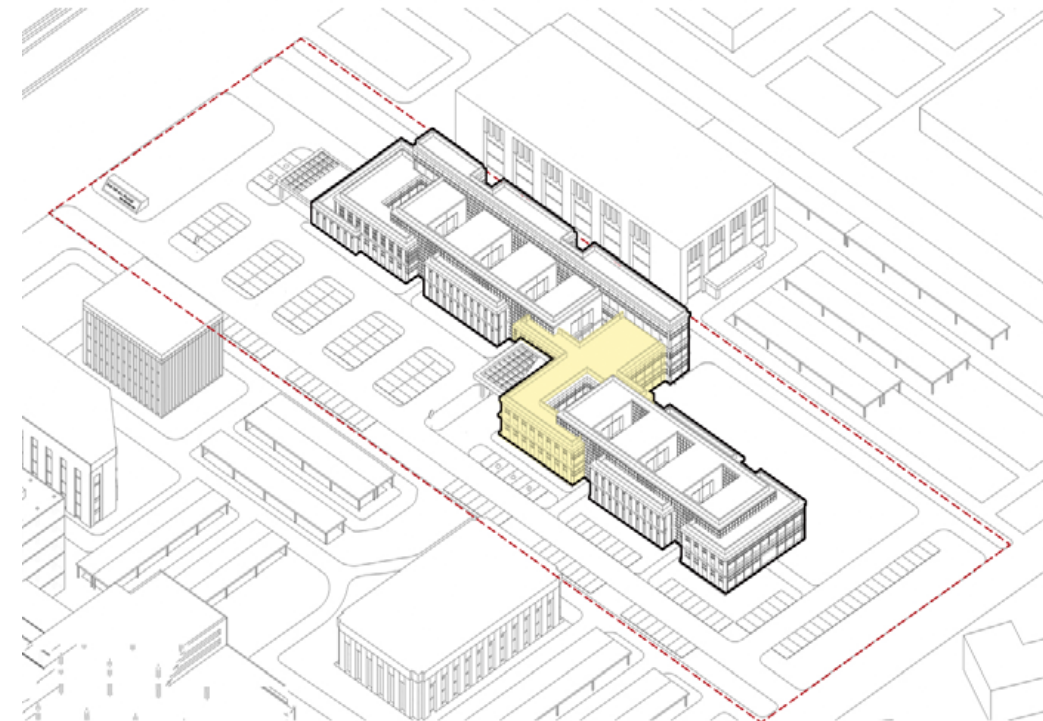
Building support



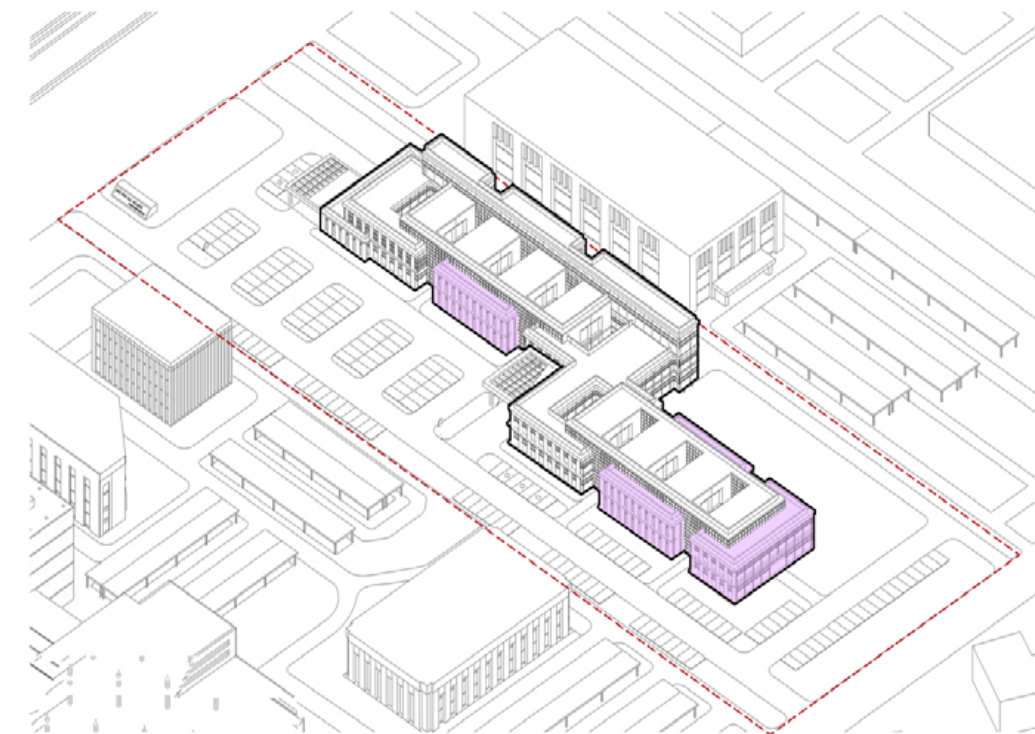
Drop off areas



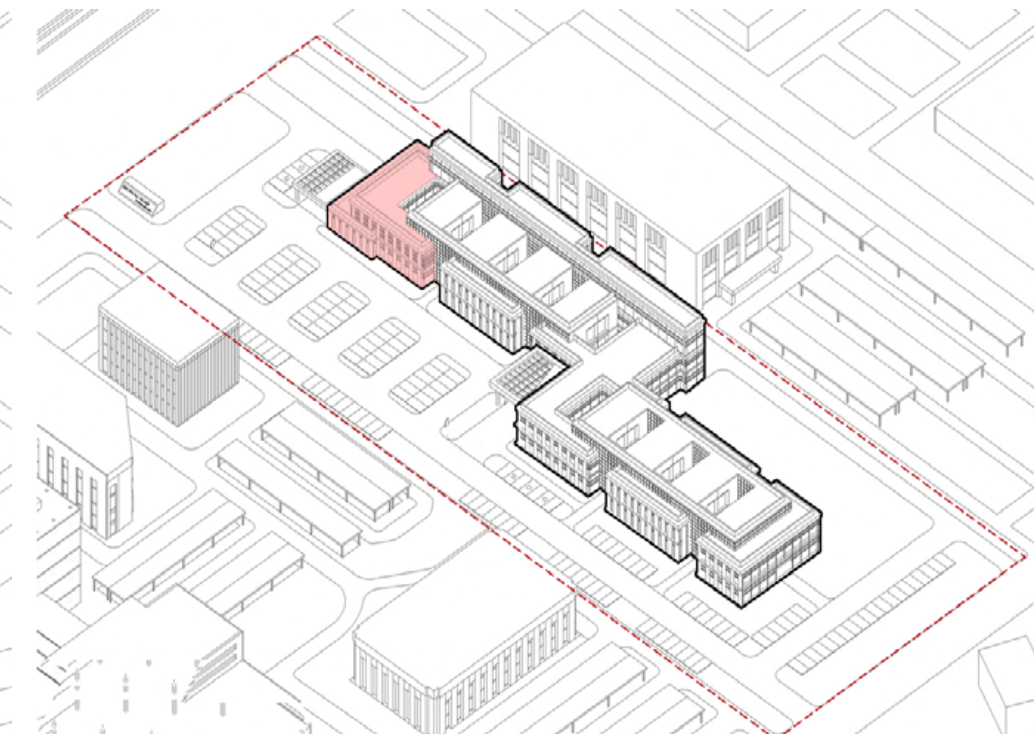
Inpatient unit



Staff and services



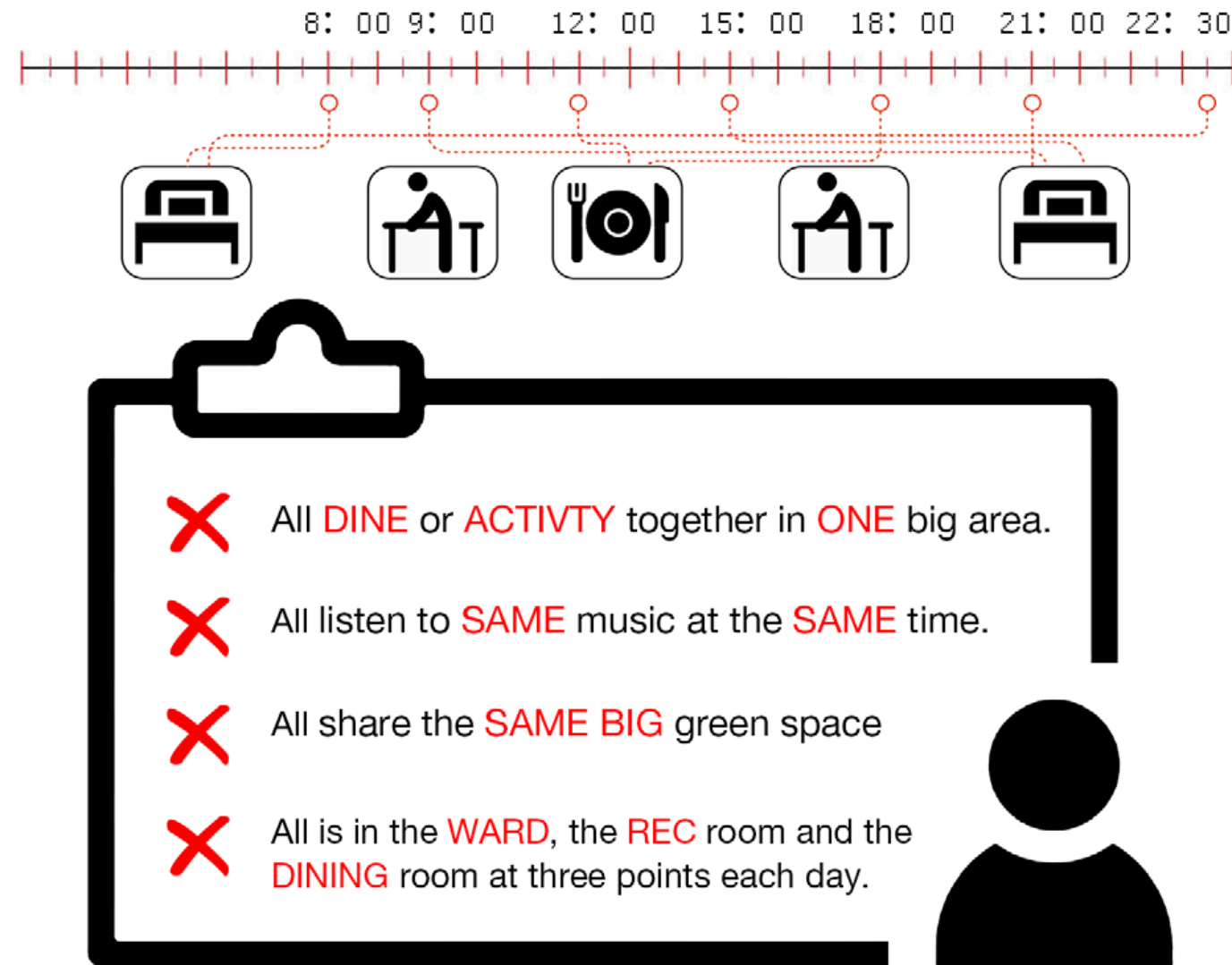
Public space



Outpatient and Imaging

CONCEPT DESIGN

Traditional facilities



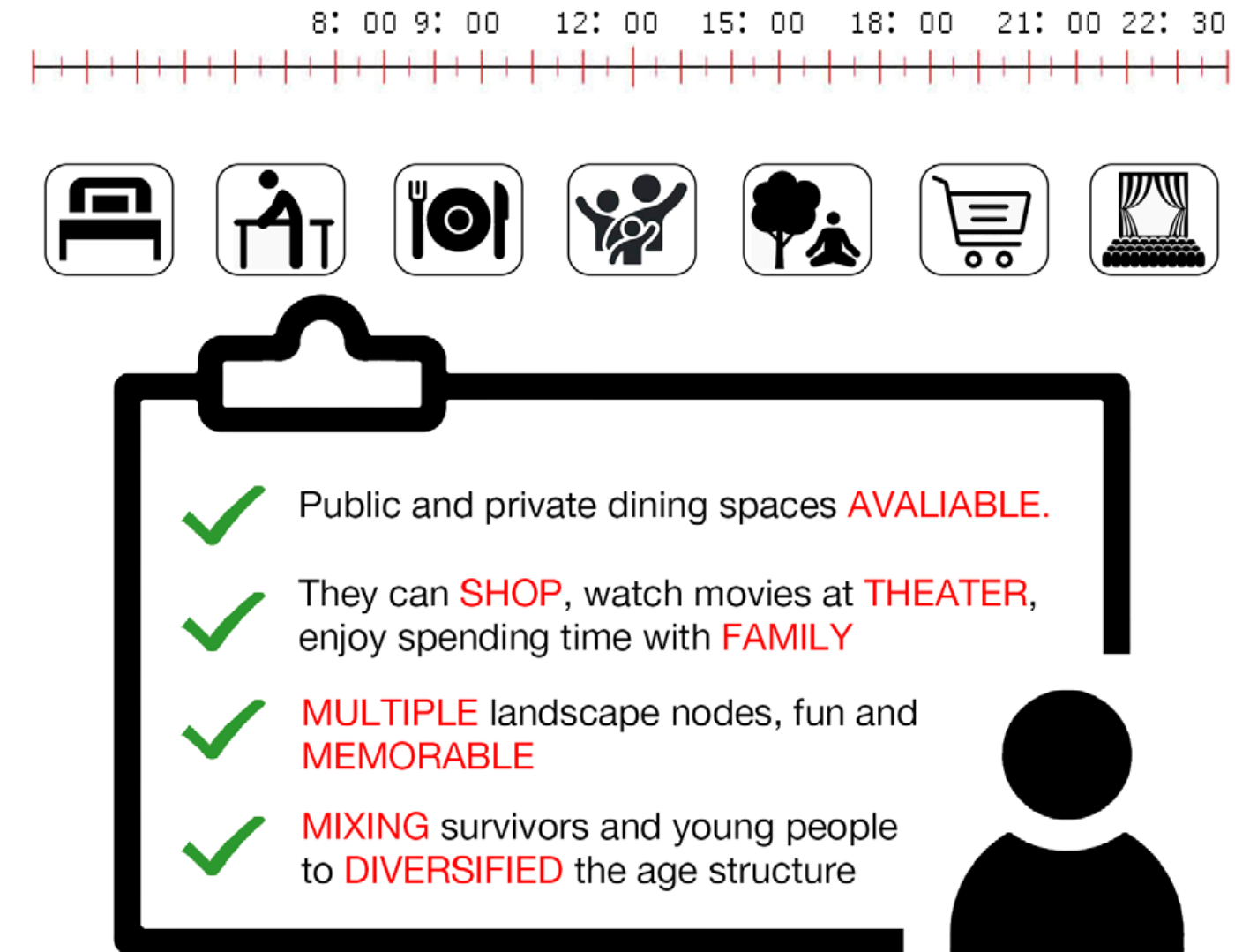
Not much attention who are you really

What is my life story?

Who am I?

What do I prefer to do?

"One for all" Village



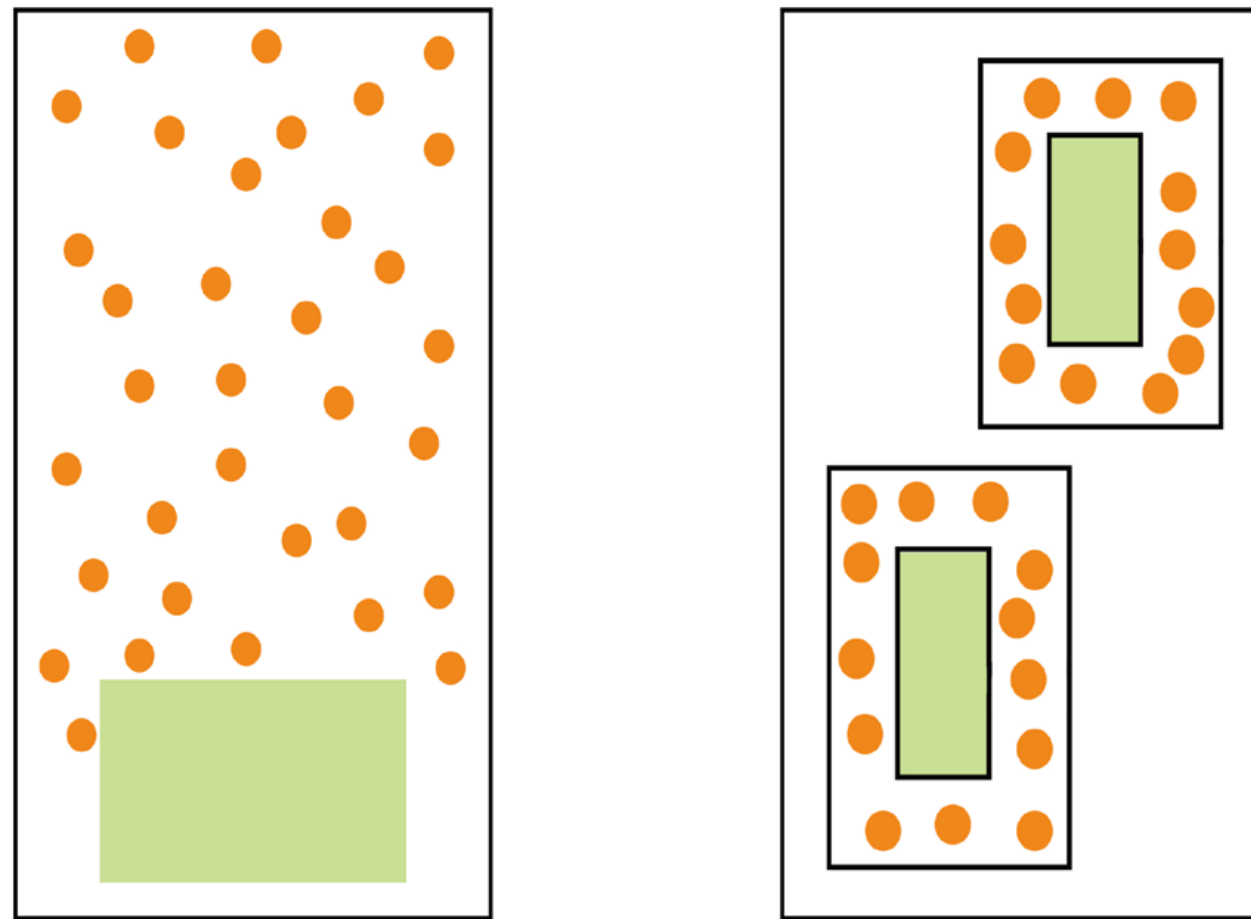
Non-institutionalization

Look as much like the outside world as possible

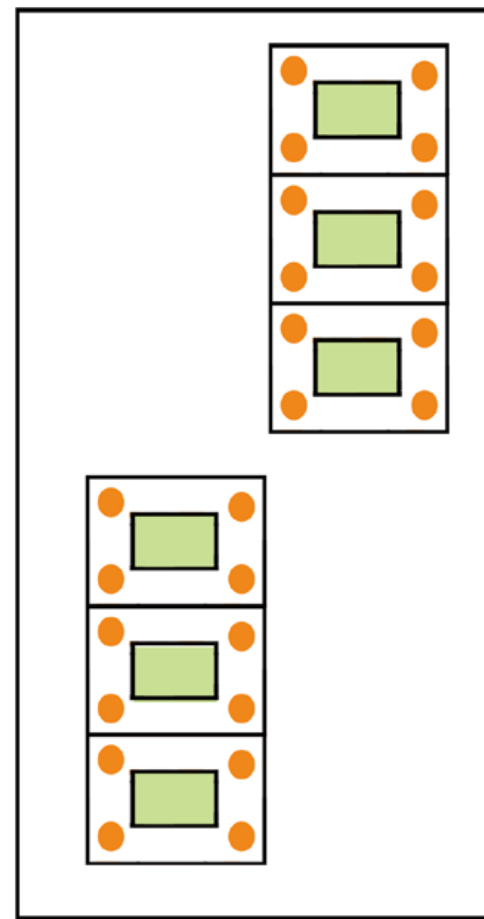
Survivors can have the power to make their own choices

CONCEPT DESIGN

Traditional facilities

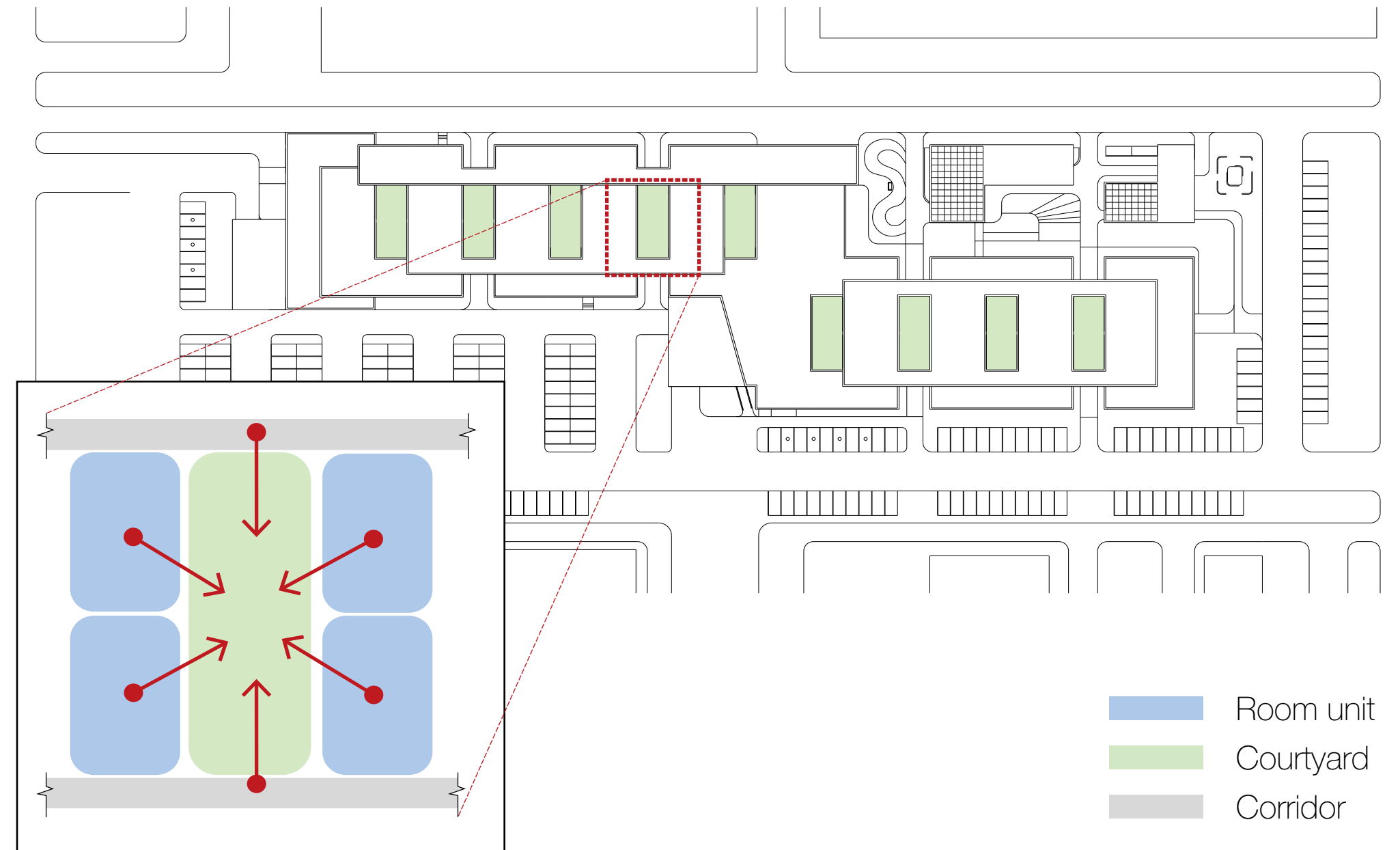


"One for all" Village



Traditional medical and health facilities usually have a single large area of green space, and some rooms have good landscape orientation. However, this is unfair to other rooms. In the 'One for all' Village, all room units face the inner courtyard, which not only isolates noise through building massing but also provides fair landscape resources.

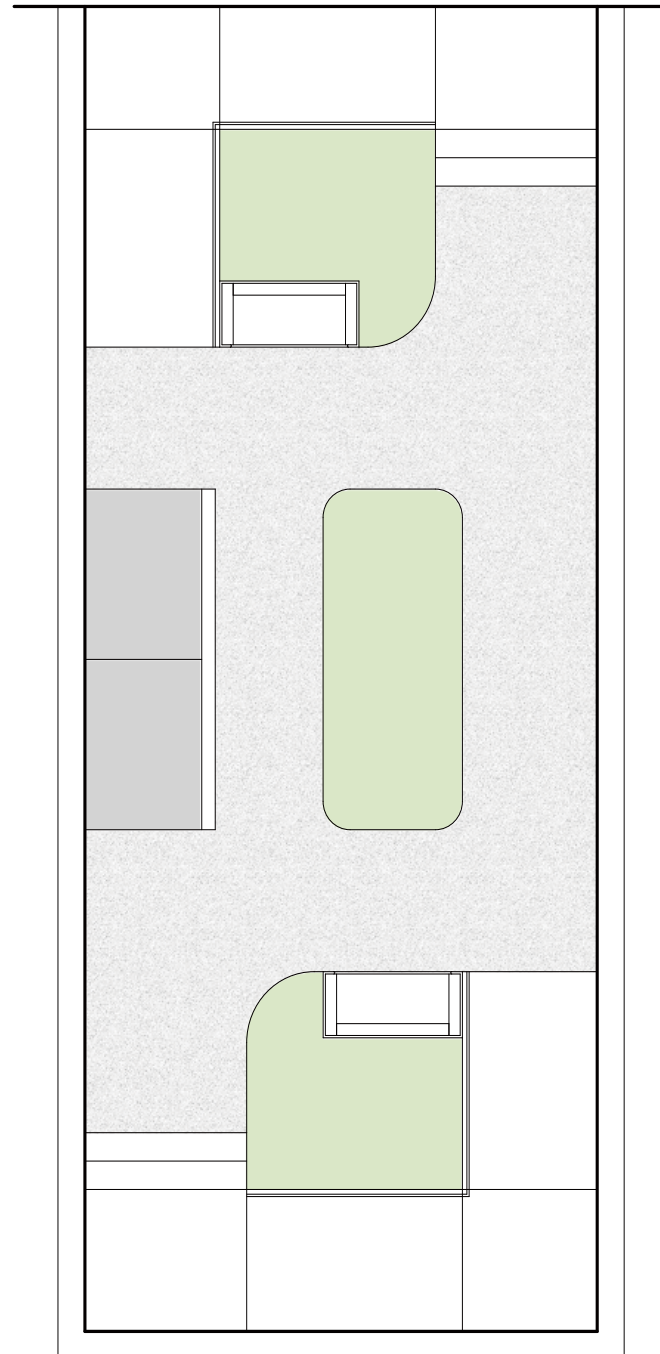
Four unit share one courtyard



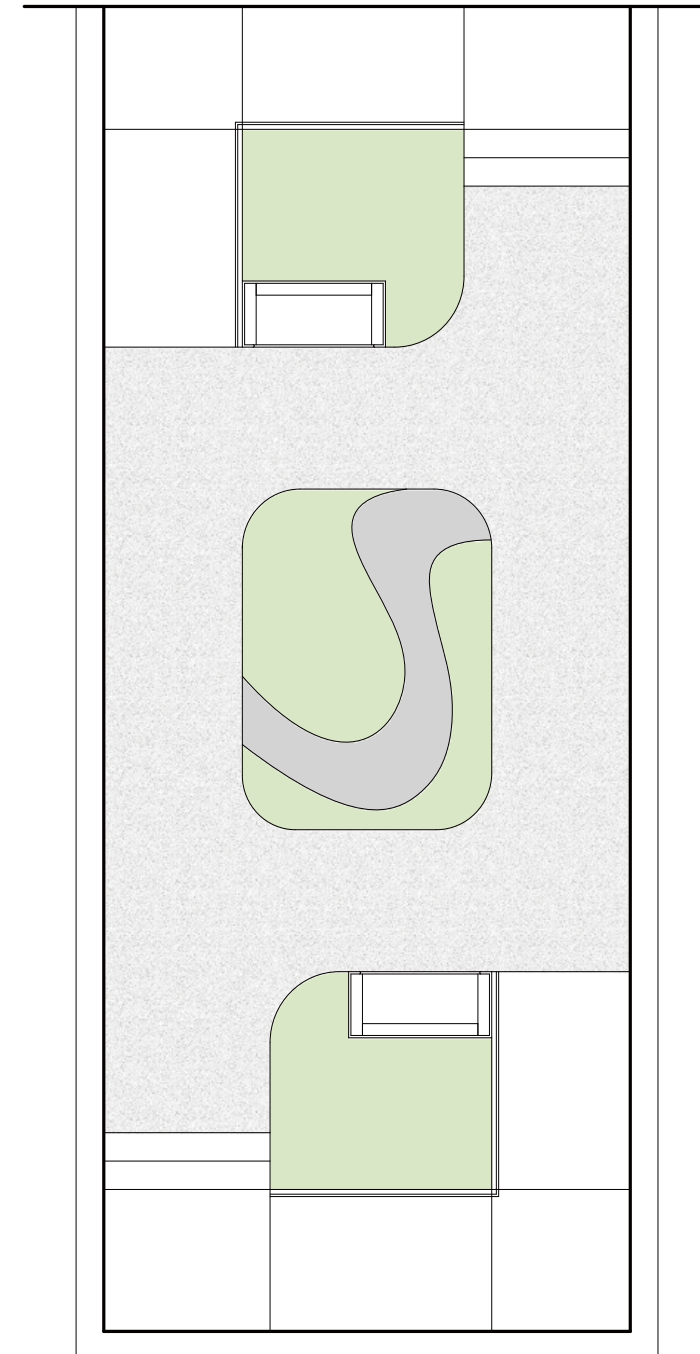
The room units are hidden between the building blocks to block noise from the highway, and each of the four room units will share an atrium, each with its own unique body and character to stimulate survivors memories and better way-finding giving each room ample sunlight and views while ensuring privacy.

CONCEPT DESIGN

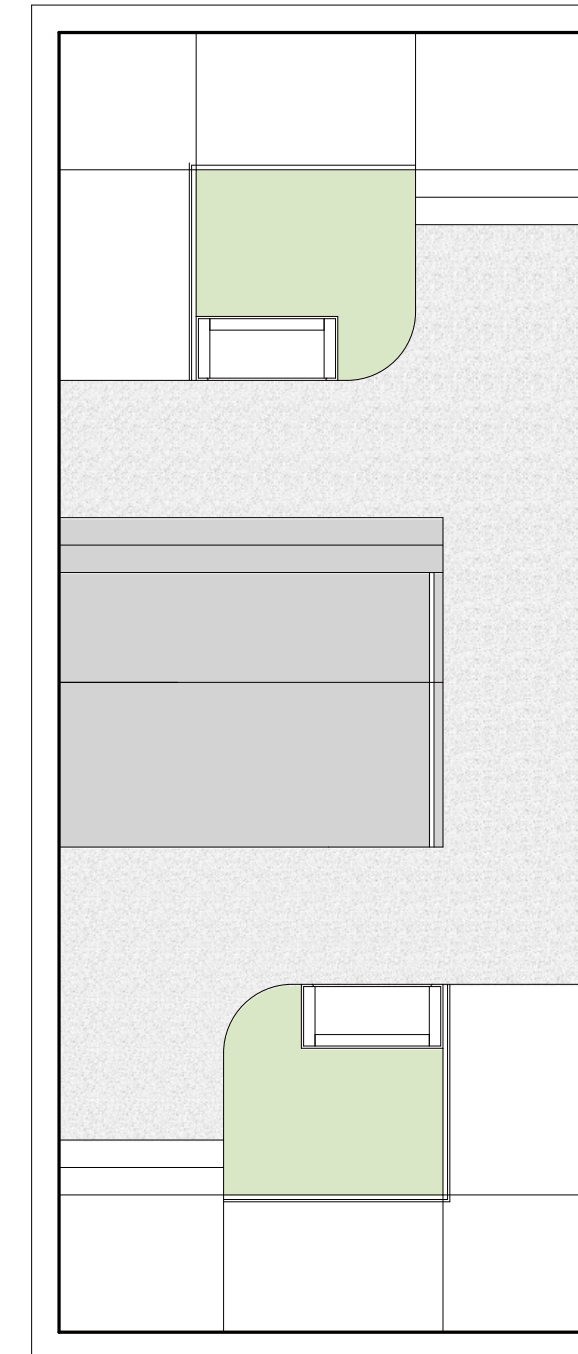
Types of each courtyard



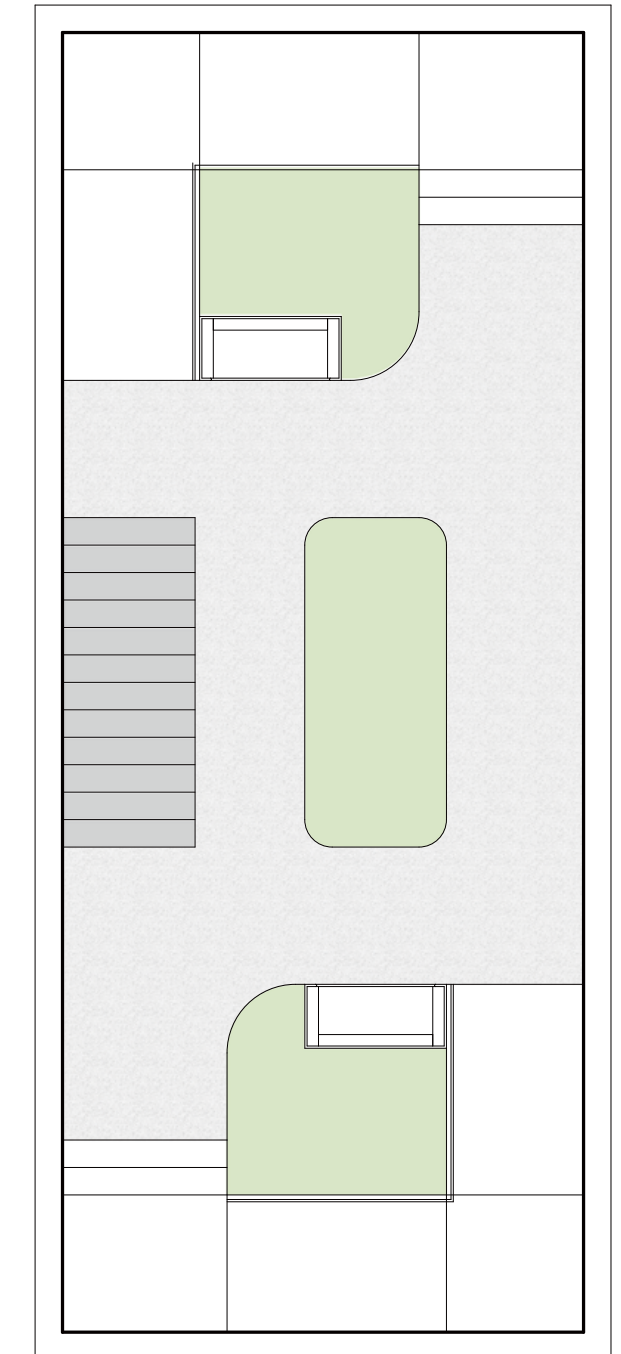
Level 1: Ramp



Level 2: Curve



Level 3: Platform



Level 4: Stairs

Each inner courtyard has its own spatial form and varies in difficulty for survivors, such as ramps, curved paths, etc. This is similar to a crossing game, giving the space a sense of fun.

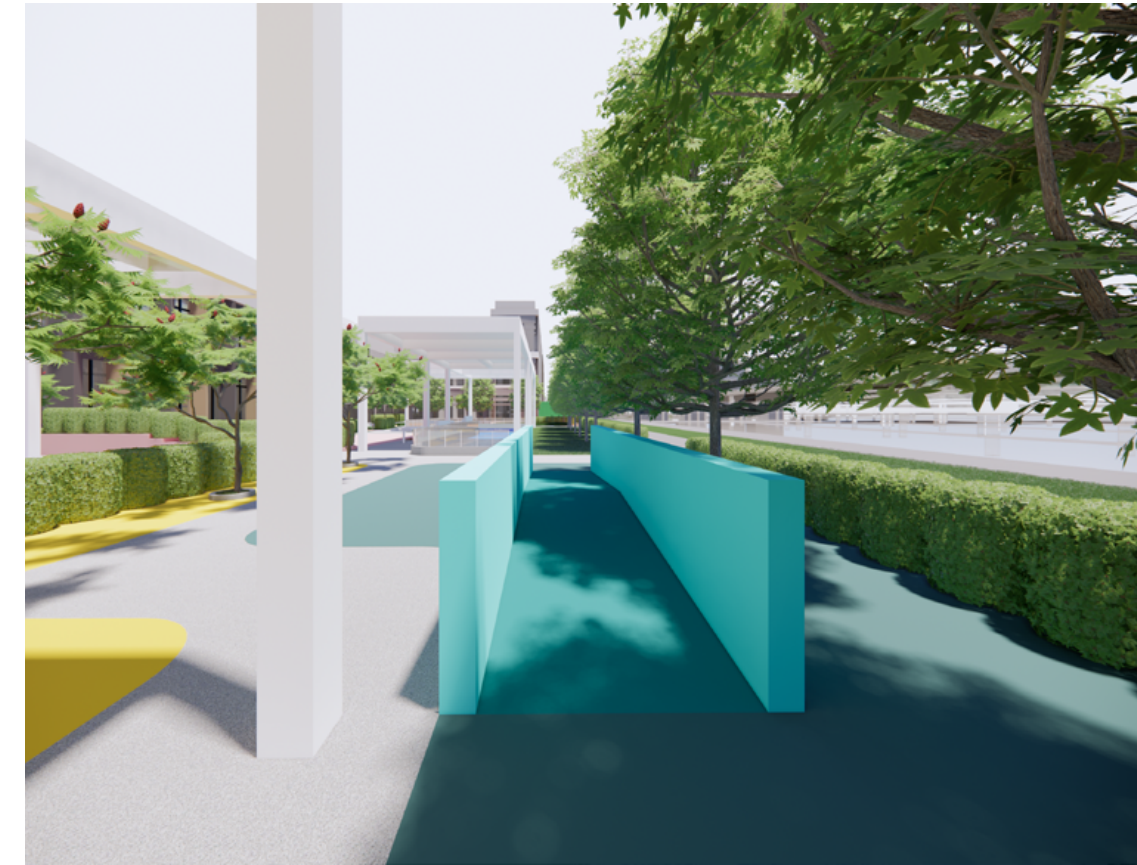
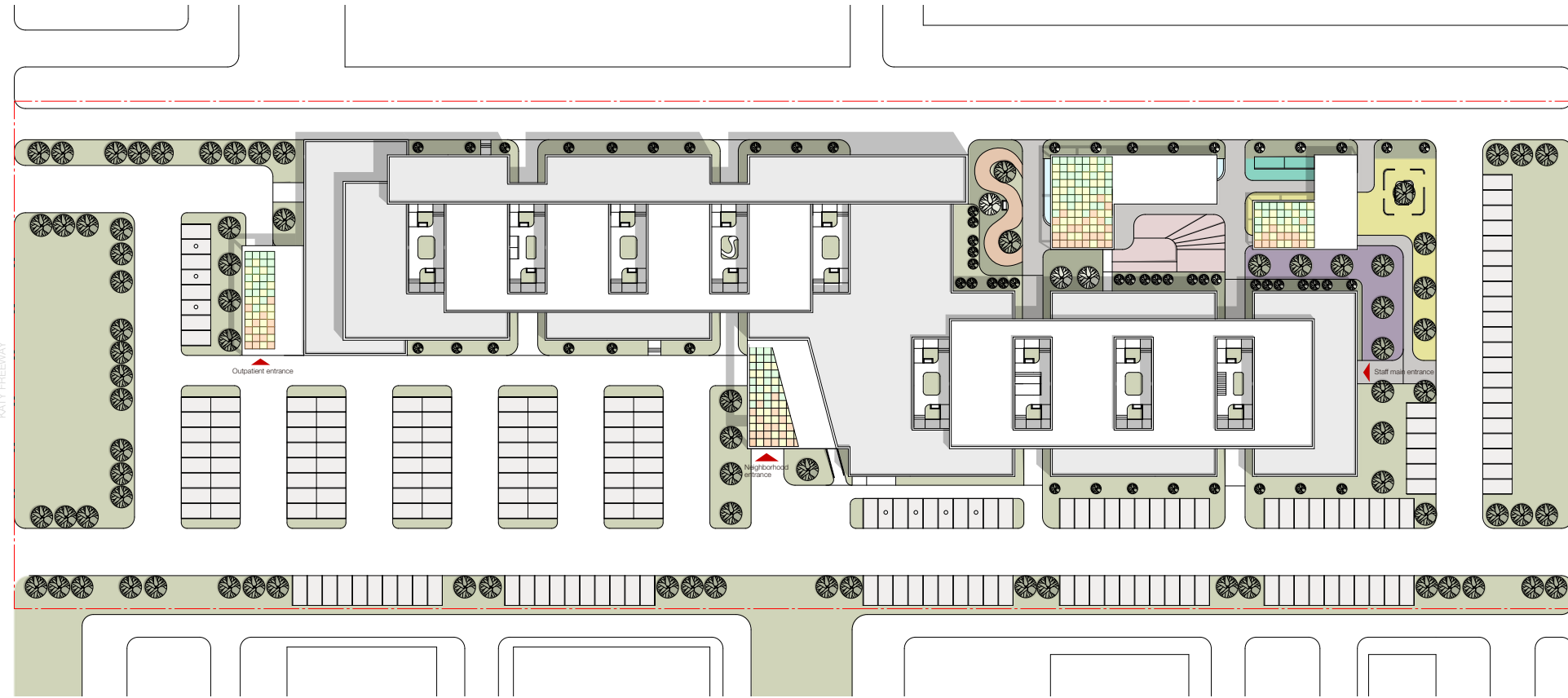
In addition, different inner courtyards can also bring better way-finding for survivors. Its ramps, platforms, and other structures can serve as landmarks to stimulate the memories of survivors.



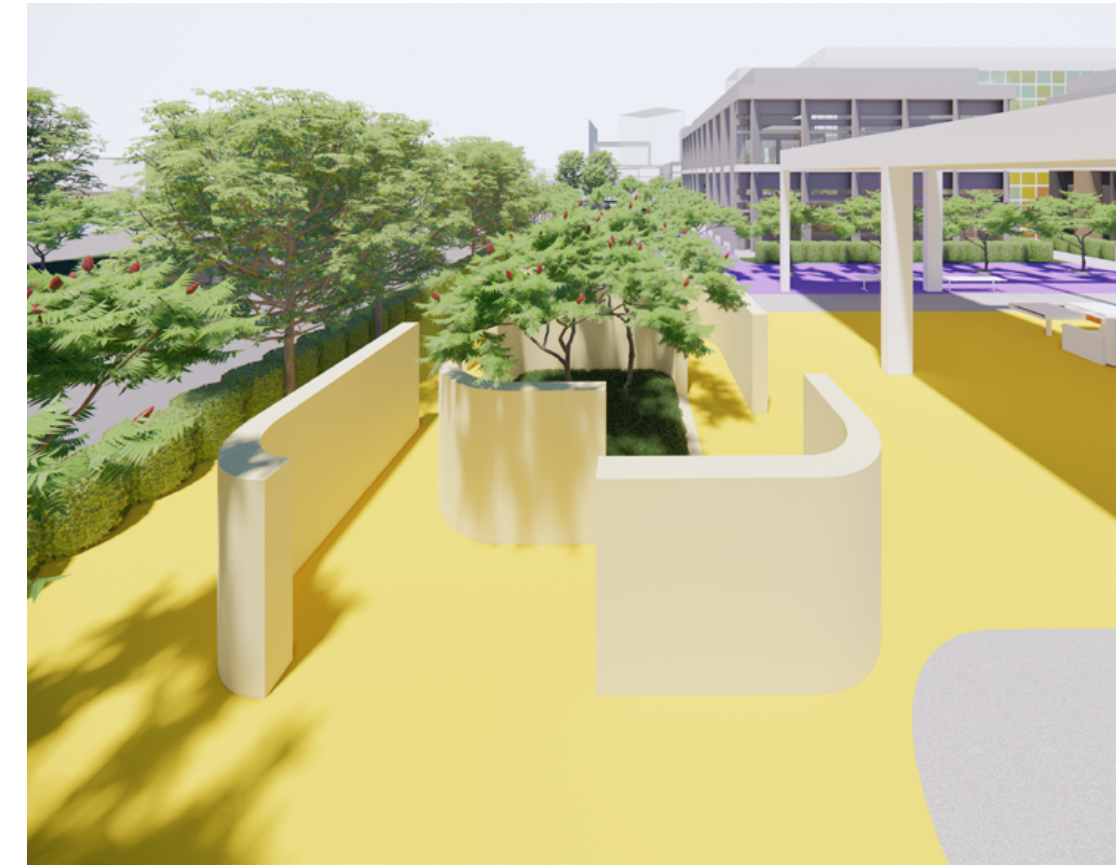
Perspective of inner courtyard

CONCEPT DESIGN

Storyline of healing garden



Level 2: Ramp



Level 3: Maze

The external healing garden is divided into different areas by different colors. Each color represents a task for survivors. For example, orange curved roads, red steps, and so on. Each color represents different levels of difficulty, and when survivors can complete the most challenging task, it means they can graduate from the 'One for all' Village, which eliminates the sense of institutionalization and the better way-finding for survivors.



Level 1: Flat



Level 4: Curve

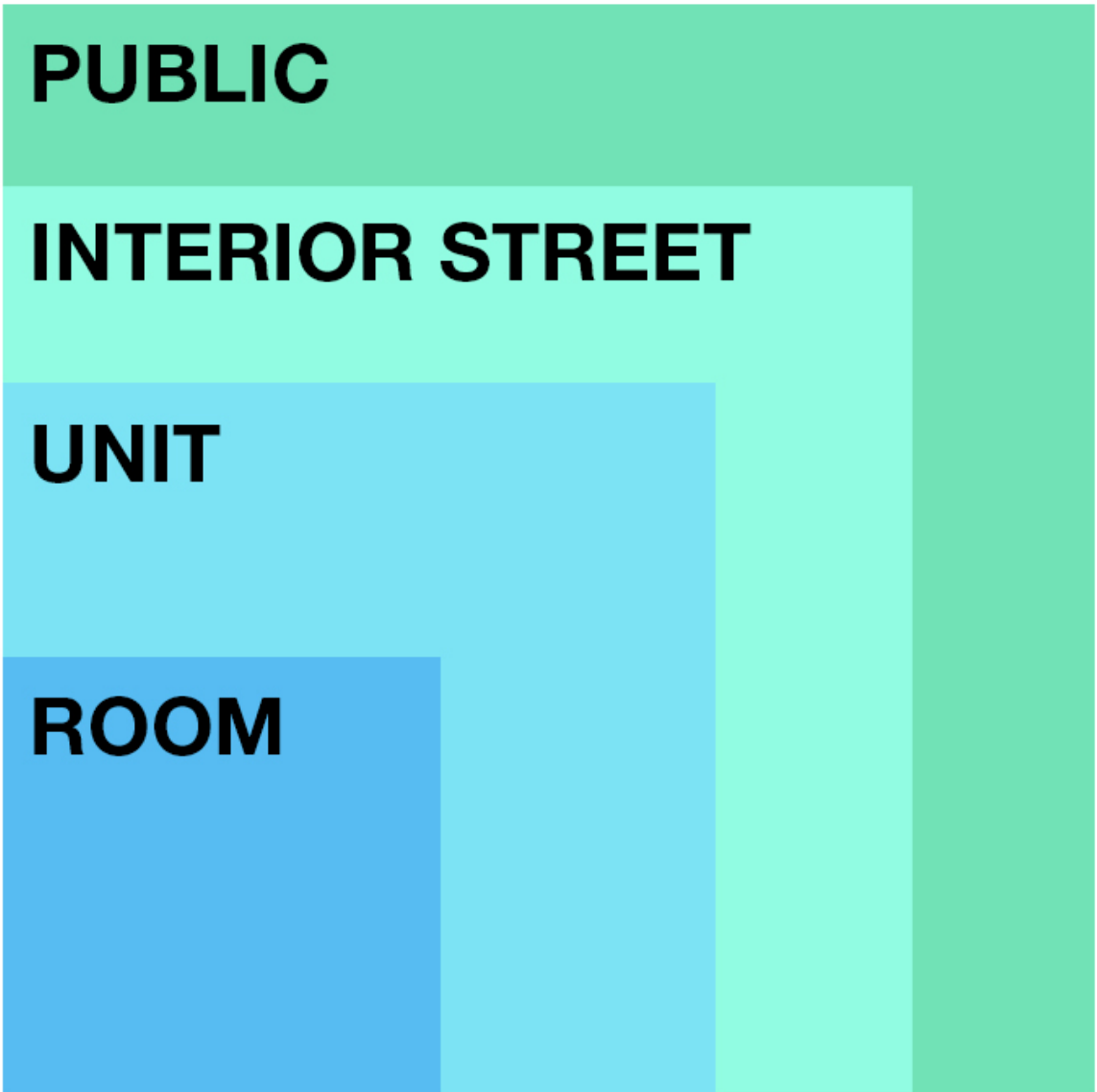


Level 5: Stairs



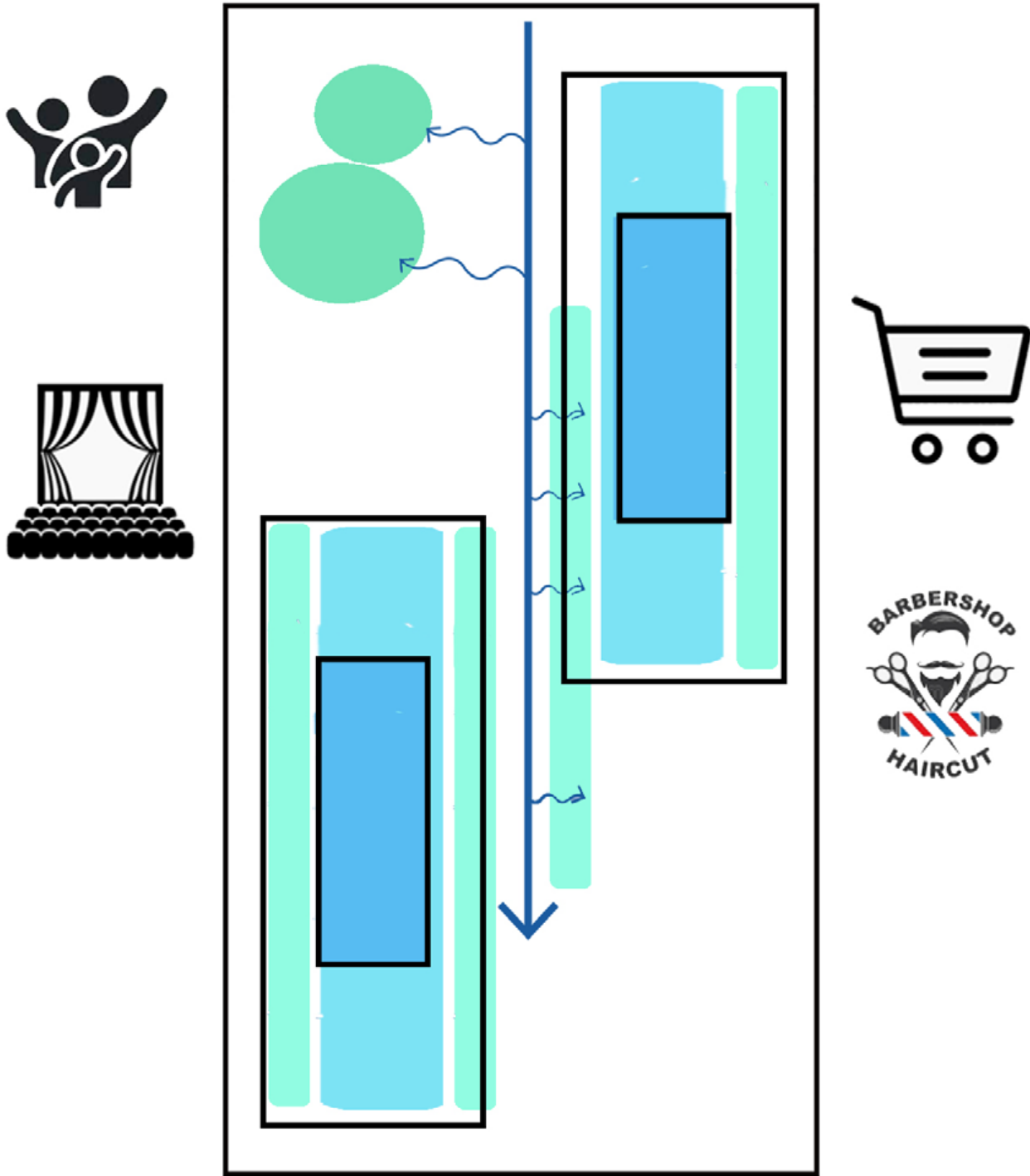
Perspective of external healing garden

CONCEPT DESIGN



PRIVATE

PUBLIC

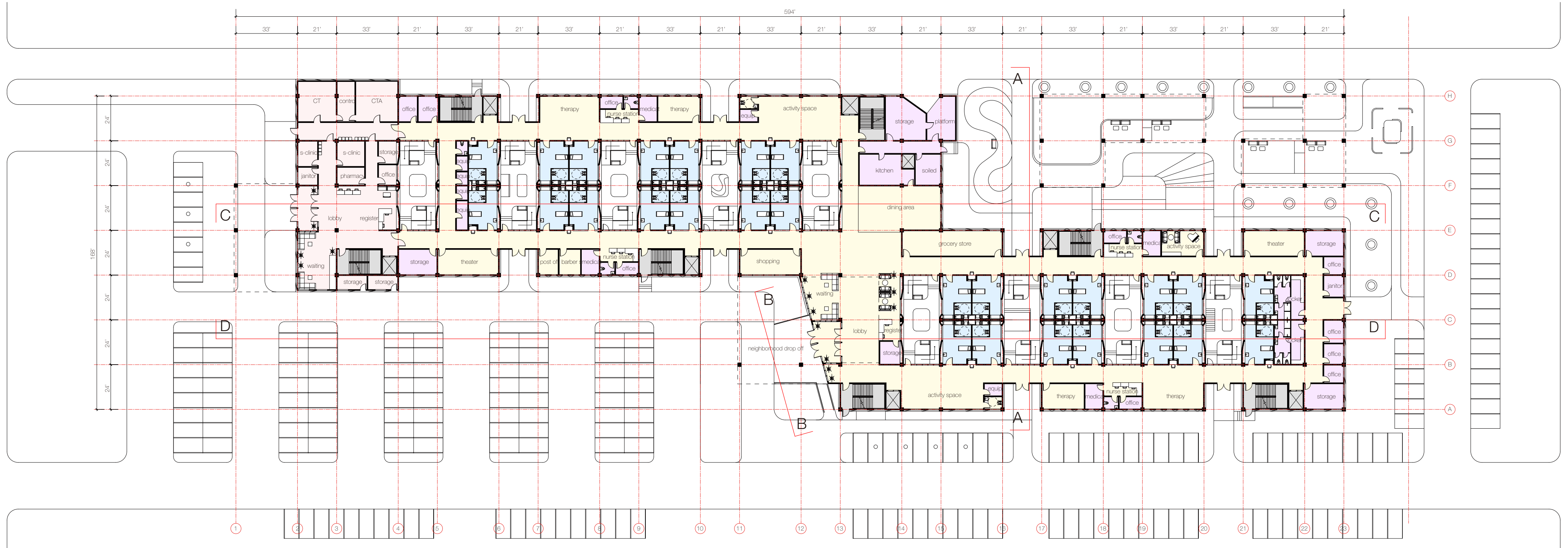


The two neighborhoods are connected by a central street. The central street is lined with cinemas, post offices, gamerooms, barber stores, grocery stores, souvenir stores, etc, to stimulate the memory of the survivors by imitating the daily activities of the neighborhoods around the project, and to accelerate recovery by practicing daily activities.

CHAPTER IV. DEVELOPMENT DESIGN

DESIGN OF FLOOR PLAN
FACADE AND SECTION DETAILS
INPATIENT ROOM UNIT DESIGN

1F FLOOR PLAN



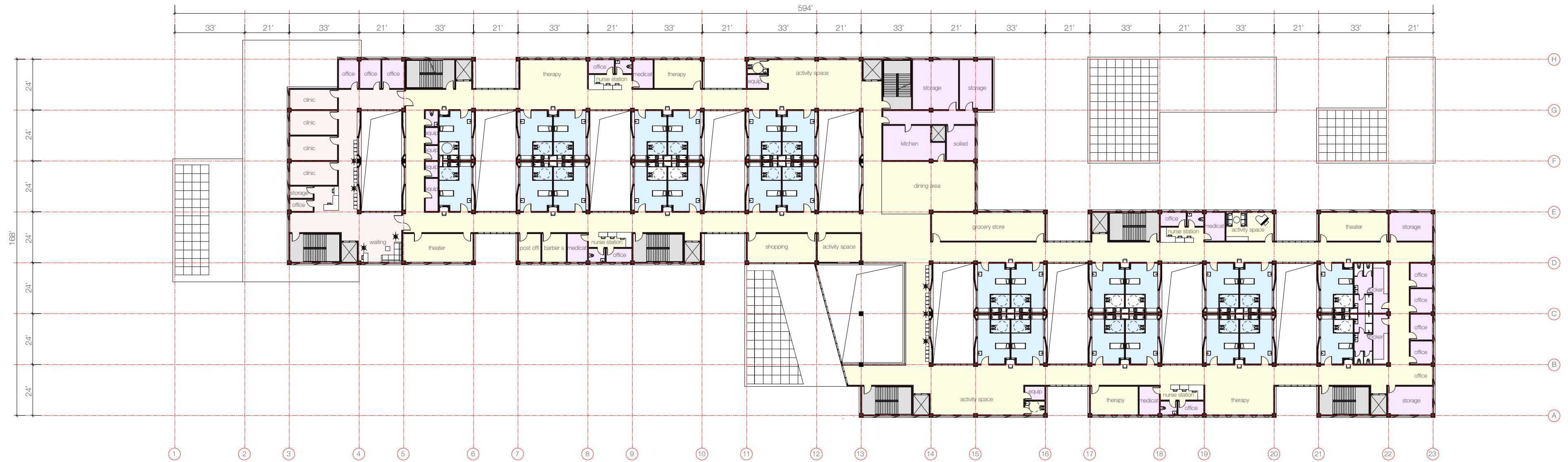
- Outpatient
- Inpatient
- Public
- Staff/Support
- Building support
- Transportation

1F FLOOR PLAN

0' 8' 24' 56'



2F FLOOR PLAN



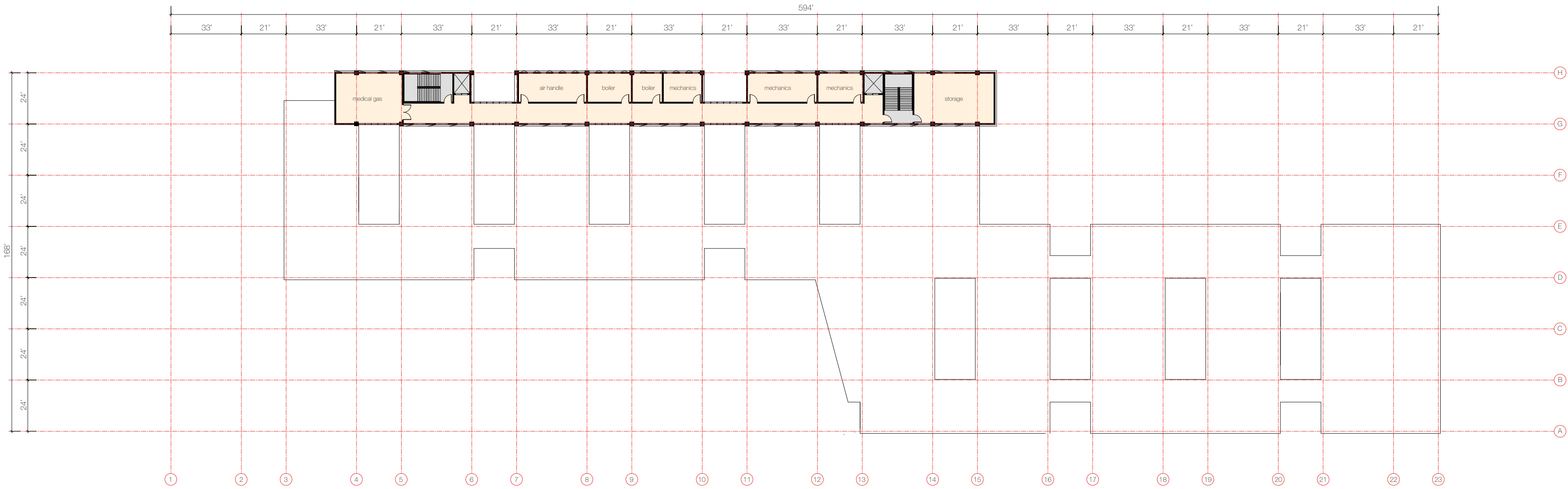
- Outpatient
- Inpatient
- Public
- Staff/Support
- Building support
- Transportation

2F FLOOR PLAN

0 8' 24' 56'



3F FLOOR PLAN

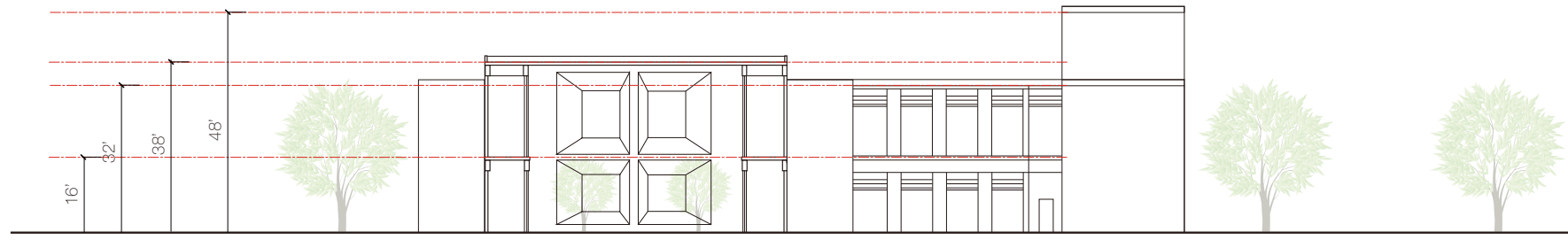


- Outpatient
- Inpatient
- Public
- Staff/Support
- Building support
- Transportation

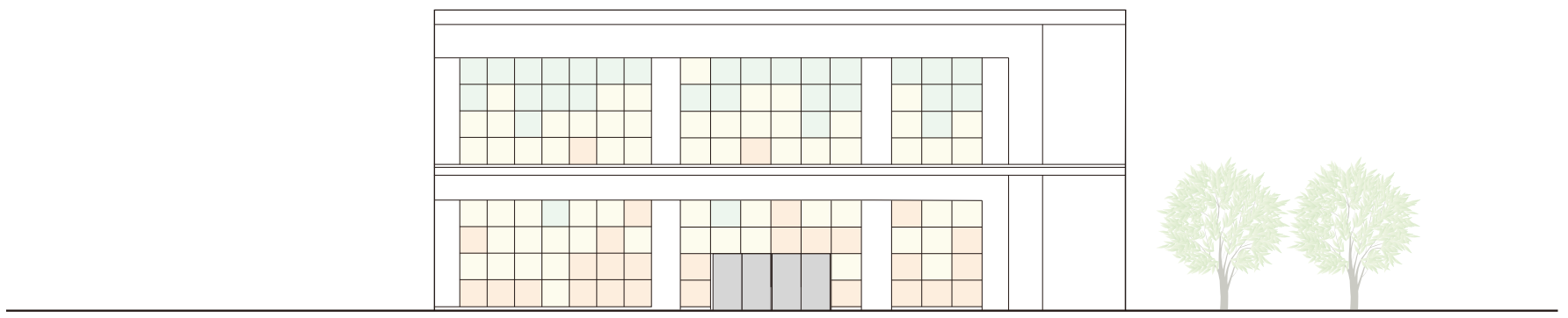
3F FLOOR PLAN



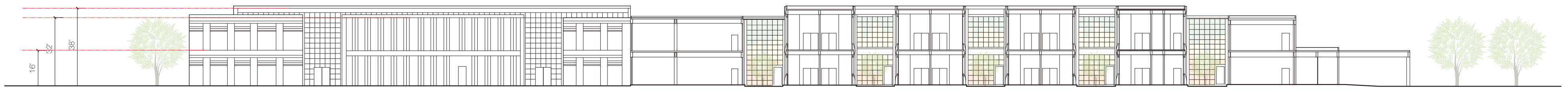
FACADE AND SECTION



A-A SECTION 0 8' 24' 56'



B-B ELEVATION 0 4' 12' 28'

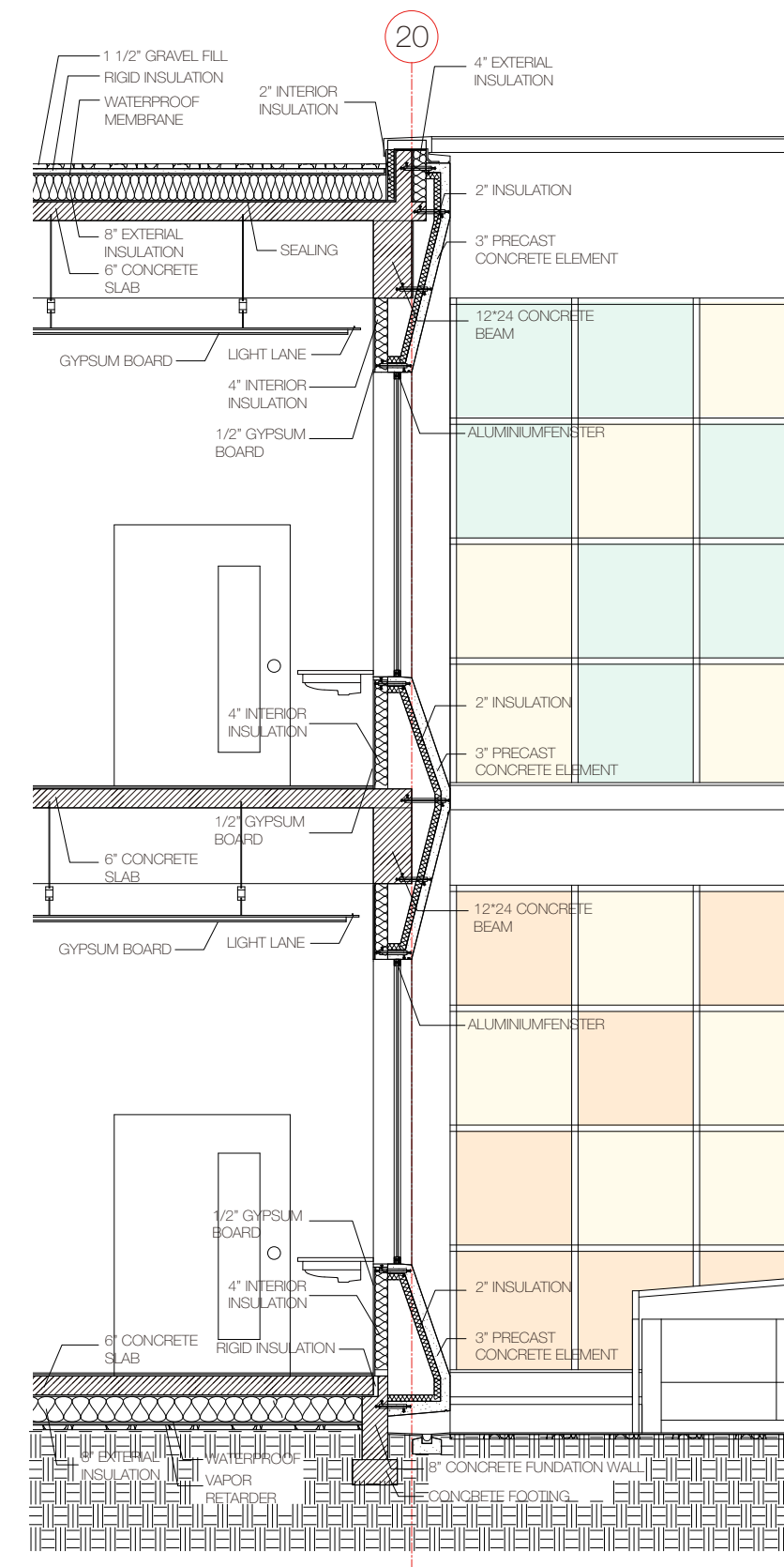
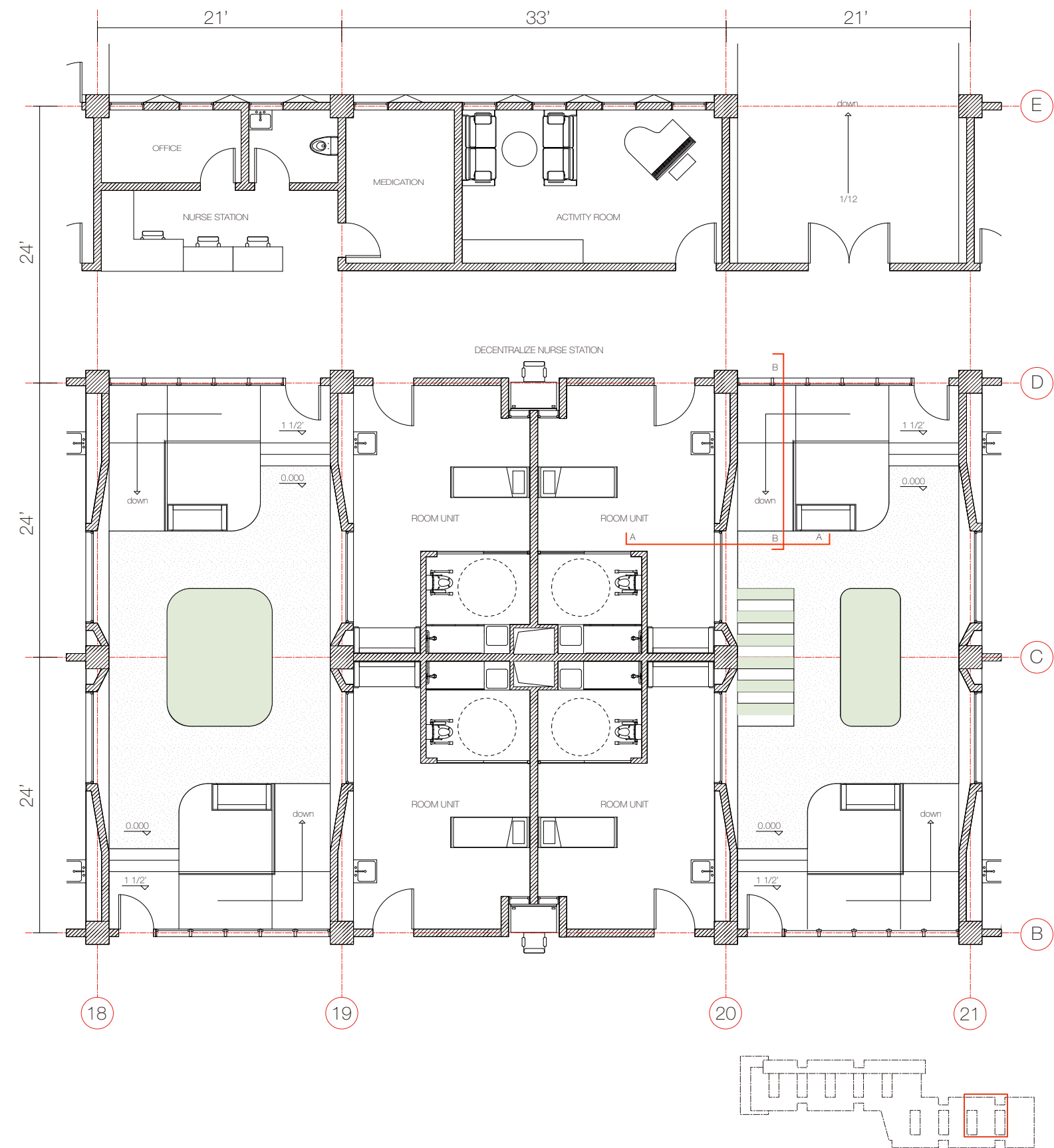


C-C SECTION 0 8' 24' 56'

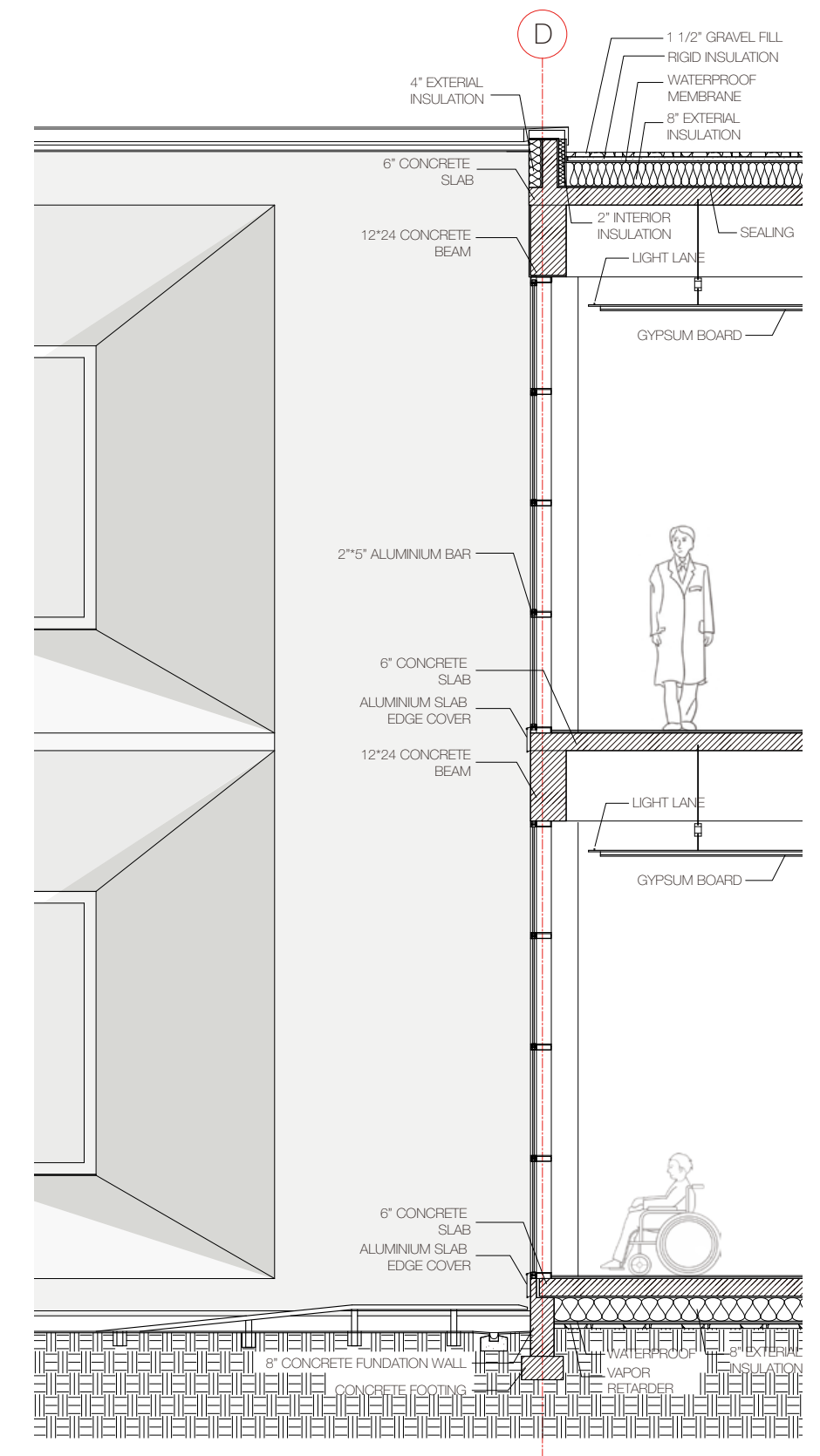


D-D SECTION 0 8' 24' 56'

SECTION DETAILS



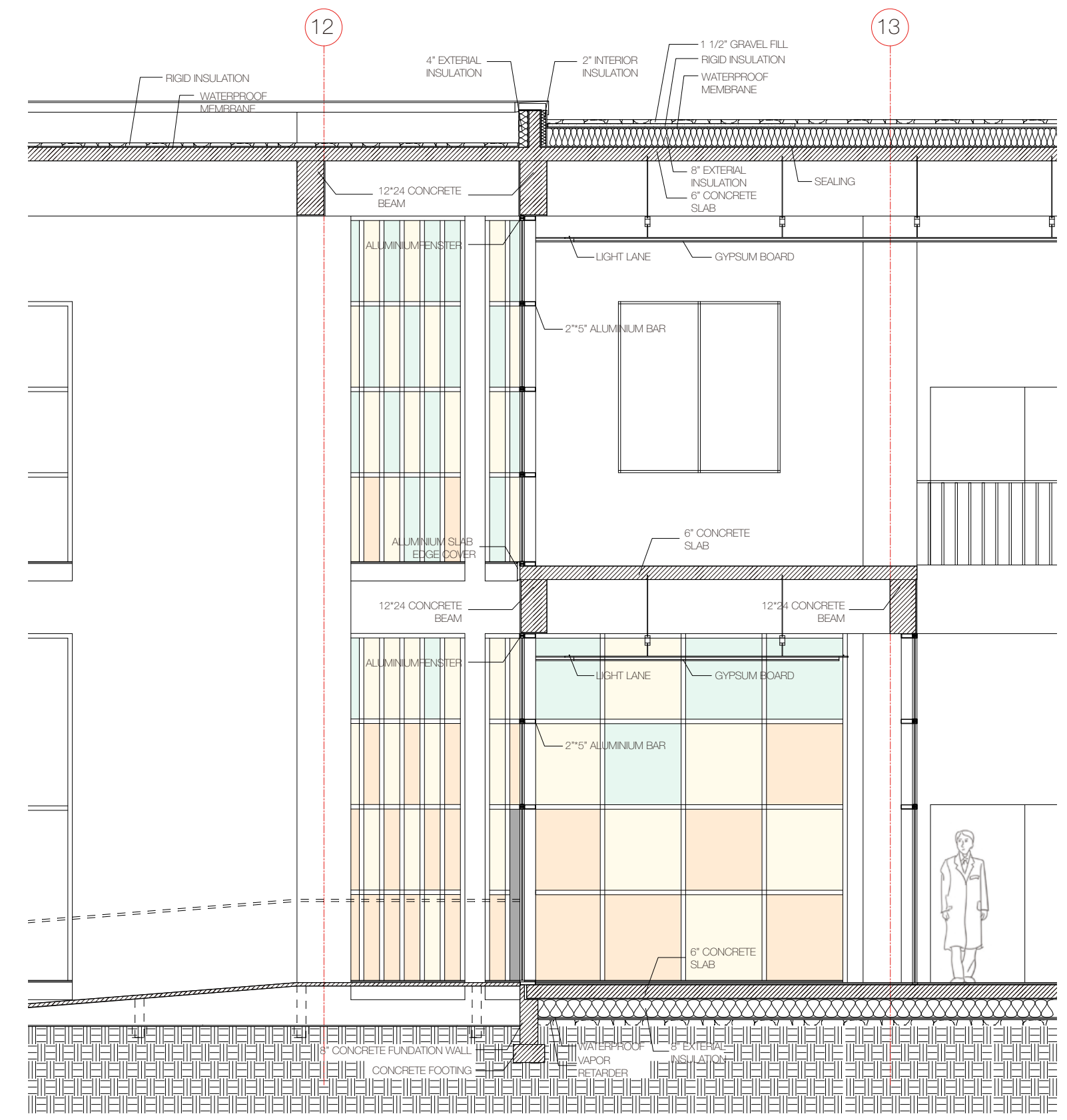
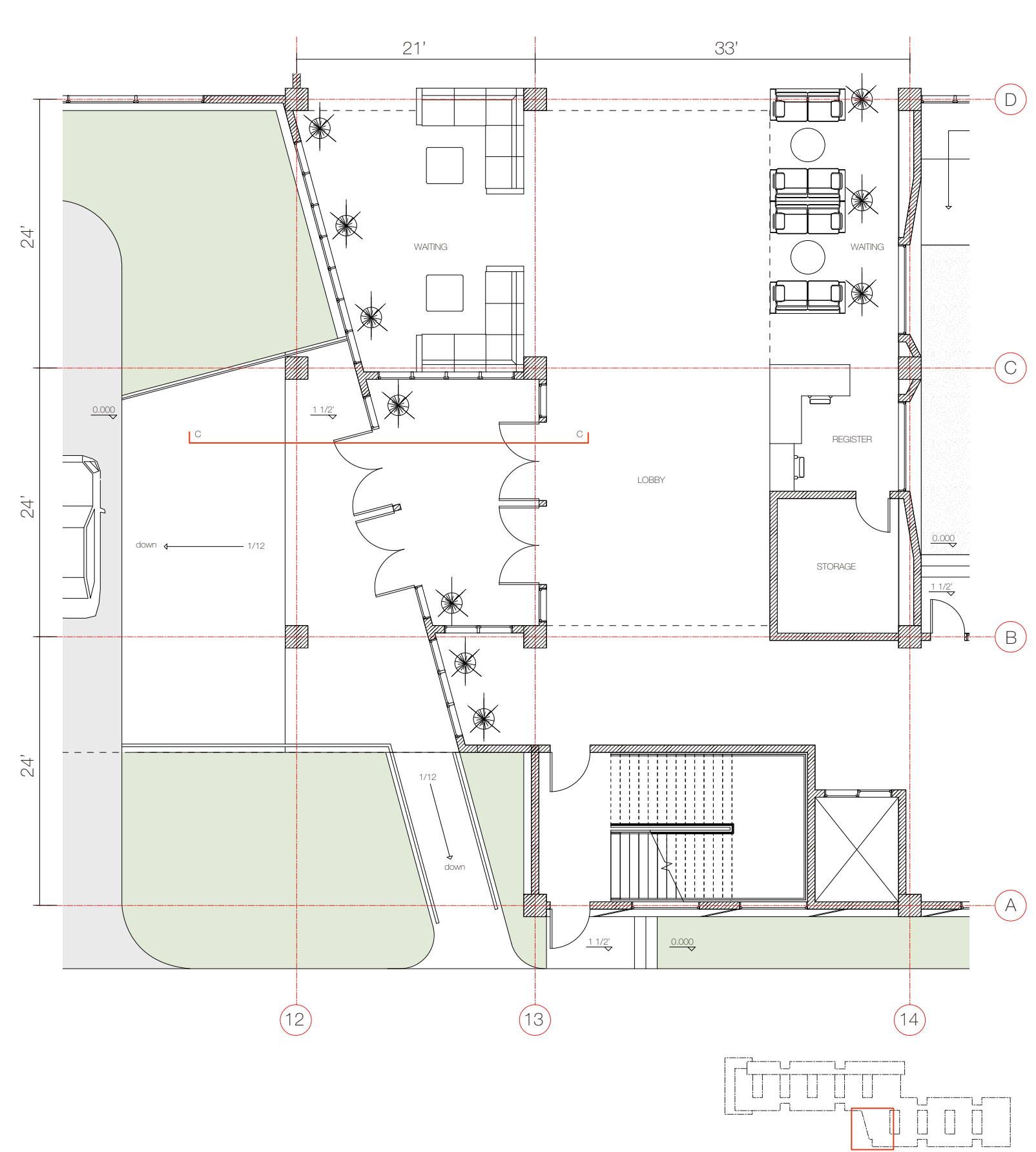
A-A SECTION DETAILS



B-B SECTION DETAILS

0 1' 3' 7'

SECTION DETAILS



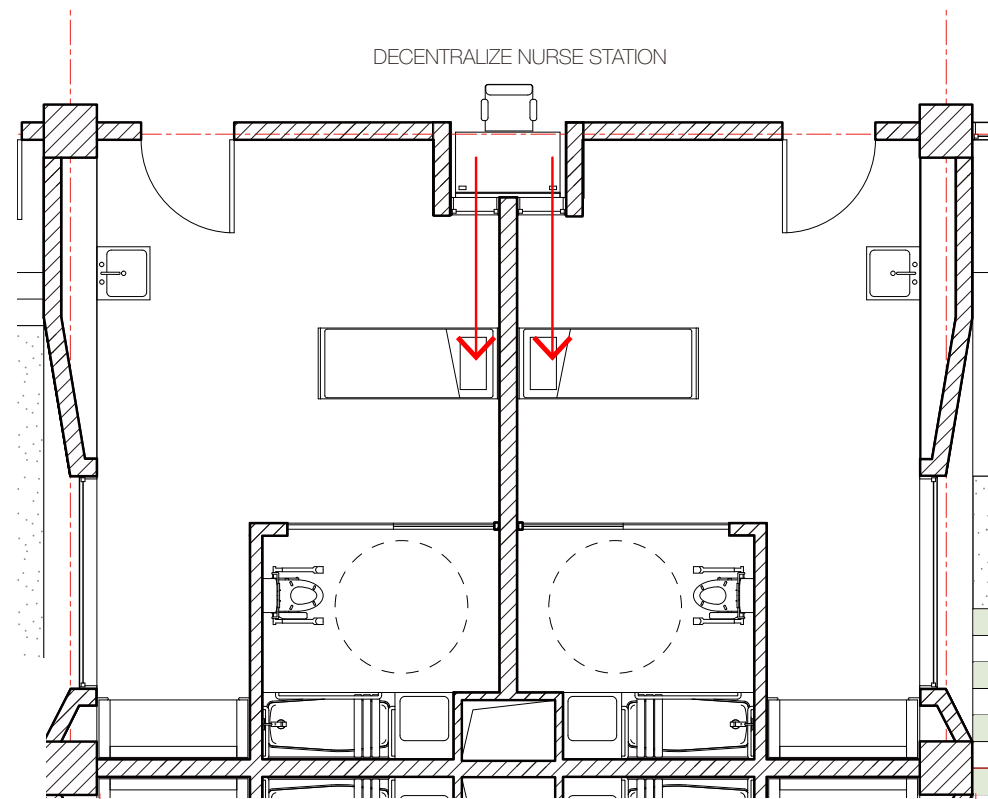
C-C SECTION DETAILS

0 1' 3' 7'

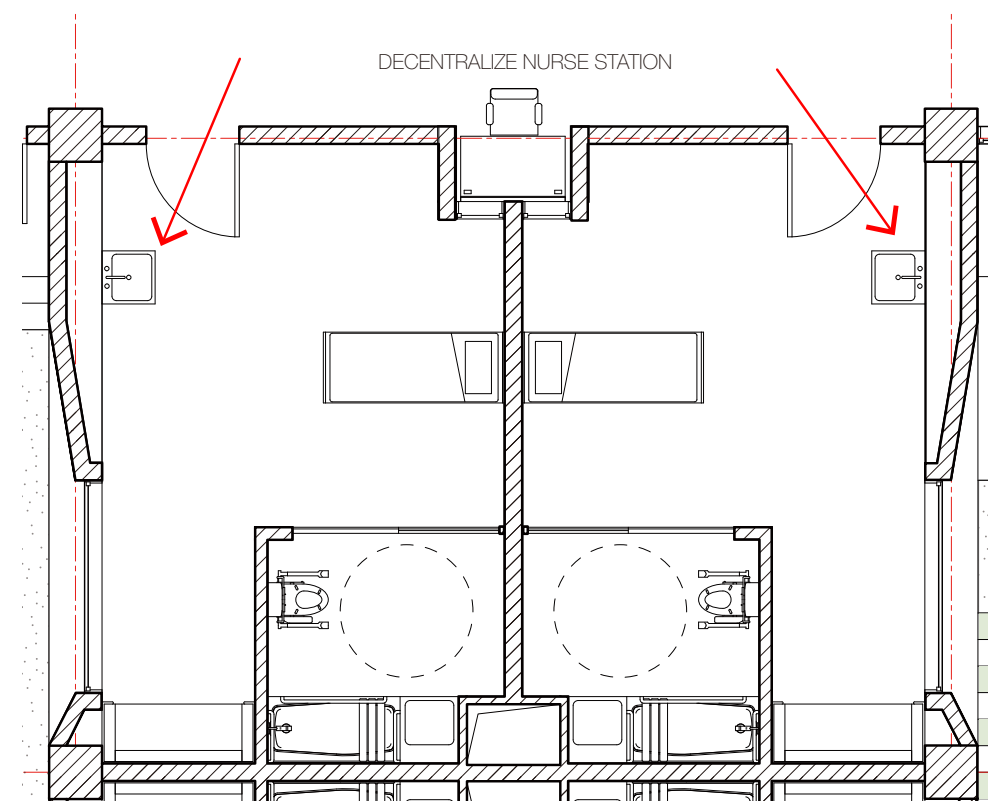


Perspective of neighborhood entrance

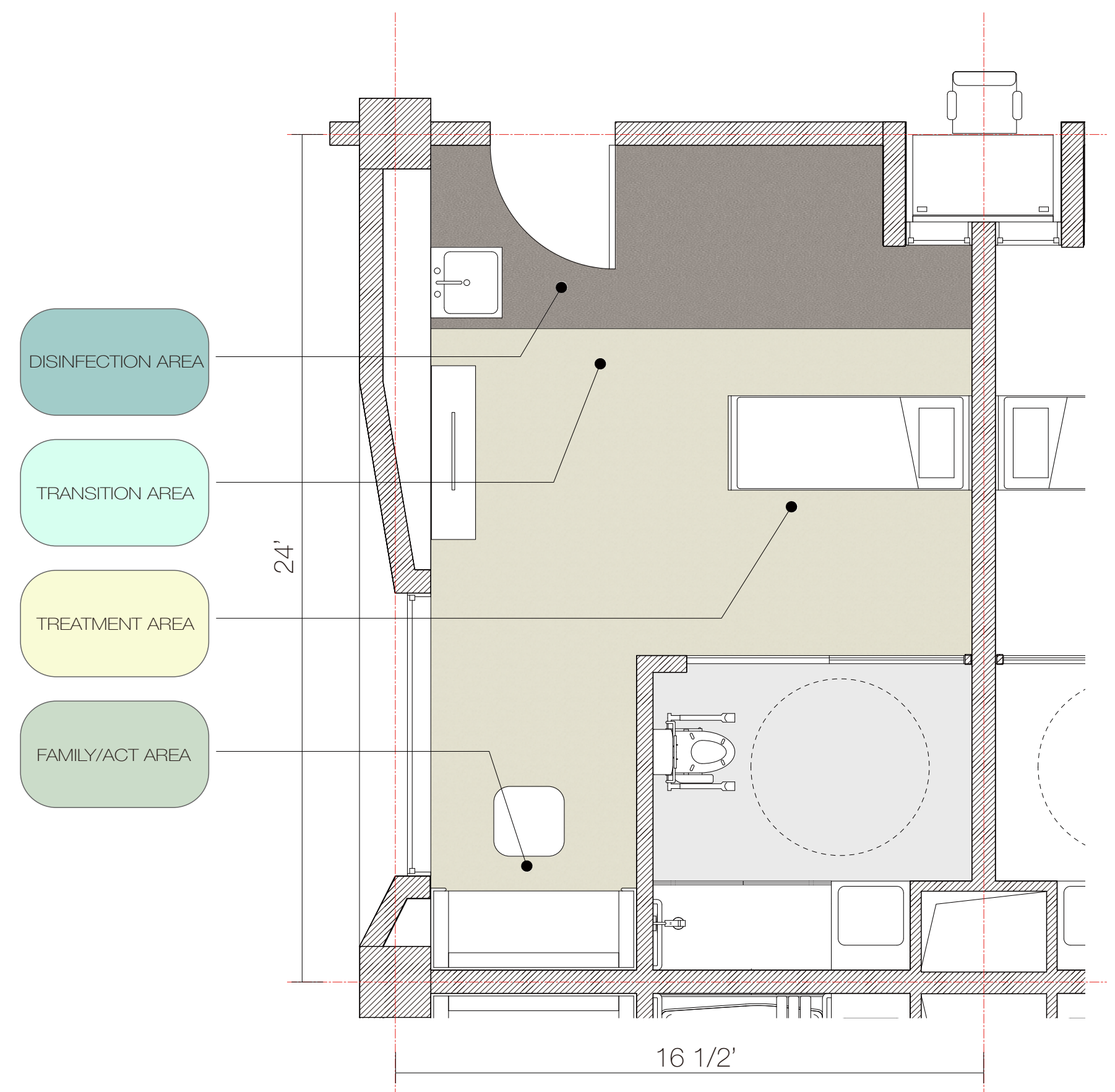
INPATIENT ROOM UNIT DESIGN



View from staff straight towards survivors face for safety



View from door straight towards wall for privacy





Perspective of inpatient room unit

CHAPTER V. CRITICAL THINKING

CARITICAL THINKING
CONCLUSION

CRITICAL THINKING



According to Texas medical building regulations, the visual distance between wards should not be less than 20 feet to ensure patient privacy. Due to site limitations, the width of the inner courtyard in this project is 21 feet. Although this just exceeds the minimum standard in the regulations, the narrow width may affect the lighting of the inner courtyard.



Further research is needed on the design of centralized and decentralized nursing stations. When I participated in the AORN Reinventing OR workshop held in San Antonio in 2023, many professional nurses told me that they did not like to divide the nursing station into different areas due to resource allocation issues. In addition, sometimes they increase their daily walking distance due to the design of decentralized nursing stations.

CONCLUSION

This is a stroke rehabilitation center in Hedwig village, Houston, USA, with a total floor area of approximately 44,000 square feet and a total bed capacity of 48, where survivors usually stay for 5-7 days, providing stroke care and rehabilitation services as well as some emergency services. This project not only solves the noise problem of the site, but also gives survivors the experience of home rather than institutionalized feelings by imitating the neighborhood environment around the site, incorporating the daily environment, possible behaviors, and psychological feelings to the stroke rehabilitation center project.

Daily physical behaviors and psychological activities contribute to the thinking and physical recovery after a stroke. The project also gives maximum humanistic care to the survivors. The medical staff can let the survivors freely choose the route they want to take, the songs they want to listen to, the levels they want to challenge, the indoor courtyard they want to visit, the outdoor healing garden they want to visit, etc. according to their recovery. In addition, the design of the façade color and interior space environment stimulates the visual experience of the survivors, and the simple way-finding and landscape attributes with landmark and storyline are also convenient and interesting for the survivors and their families.

CHAPTER VI. CAREER PLANNING

REFERENCES
CAREER DEVELOPMENT PLANNING

REFERENCES

Gaps in care for patients with memory deficits after stroke: views of healthcare providers, Eugene Yee Hing Tang, Christopher Price, Blossom Christa Stephan, 2017, BMC Health Services Research

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CAREER PLANNING

At present, I am about to obtain a Master's degree in Architecture from Texas A&M University. Afterwards, I plan to obtain LEED AP and NCARB certificates to become a professional architect in the United States, focusing on healthcare design and creating an efficient and comfortable environment for people around the world.

I am used to and enjoy teamwork. Being needed by a great team is what I aspire to be. Technically, hand drawing, modeling, concept design, renderings and animation are my best advantages. Keep passion, keep positive, keep focus and keep learning.

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