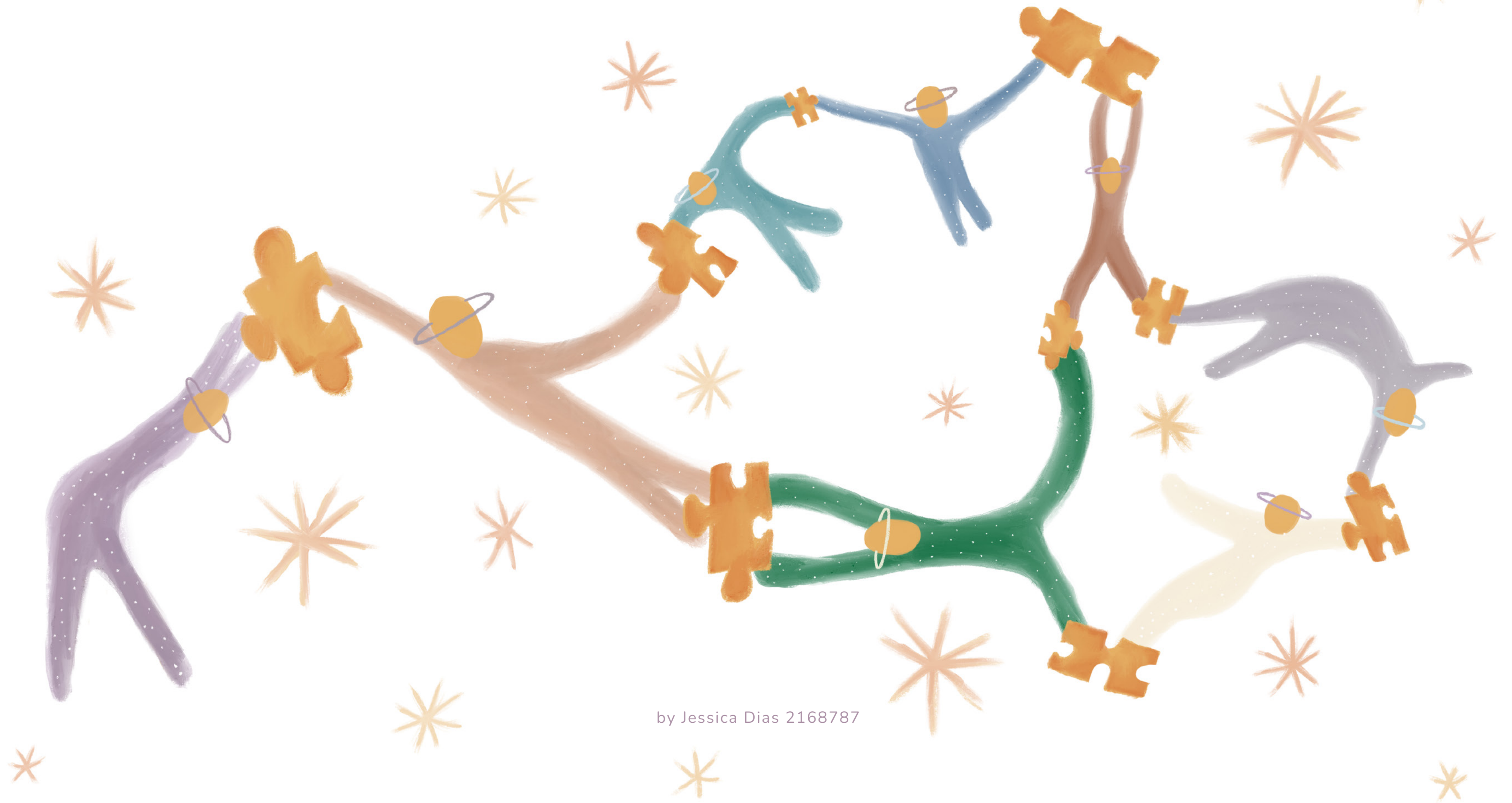


a bridge to belonging

an inclusive living and day care community in Benoni, South Africa for adults with autism spectrum disorder (ASD)



by Jessica Dias 2168787

A research report proposal submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Architecture (Professional).

declaration

I, Jessica Teixeira Dias (student number 2168787), am a student registered for the degree of Master of Architecture (Prof.) in the academic year 2024.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of ideas or words in my writing.



21/02/2025

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To my uncle Tony and everyone else on the spectrum,
may the world embrace your uniqueness and offer you the chance to thrive.

0. abstract

Recognising the challenges faced by families of special needs individuals as their children transition into adulthood, this research aims to bridge the gap in services for adults with autism spectrum disorder by establishing tailored support communities that address their unique needs. Furthermore, it seeks to develop a design approach that prioritises the well-being and comfort of individuals with autism, encouraging their sense of belonging.

The methodology will include a combination of quantitative and qualitative research methods. The quantitative research will involve questionnaires and a comprehensive desktop review of site analysis, statistics, literature, and precedents. The qualitative research will involve a combination of fieldwork and interviews. Site visits, precedent visits, observations, and photographs will provide firsthand insights into existing facilities and the experiences of individuals with autism. Email communications and semi-structured interviews with various participants will gather diverse perspectives on the topic.

The design will take on a holistic approach to supporting its users, which primarily includes the residents, day program participants, and their families. The principal focus of the proposed development will be a learning and therapy centre, complimented by a residential and communal component. Additionally, the development will include a public park and commercial spaces for vocational opportunities. The primary research will delve into the realm of environmental psychology, exploring frameworks such as place attachment and place identity theory, the sense of home, and sensory processing theory. The secondary themes will include prospect and refuge theory, deinstitutionalisation, ergonomics, and sustainable practices. To fully understand the needs of the users, the research will also examine the delivery of services required by the National Healthcare Act for persons with intellectual disability.

The proposed architectural style prioritises clarity and simplicity to create a comfortable home-like environment that minimises sensory overload. This approach offers a promising pathway toward promoting social inclusion for individuals with autism. By cultivating community engagement while respecting the need for privacy and moments of solitude, the design aims to create a haven that is both inclusive and supportive.

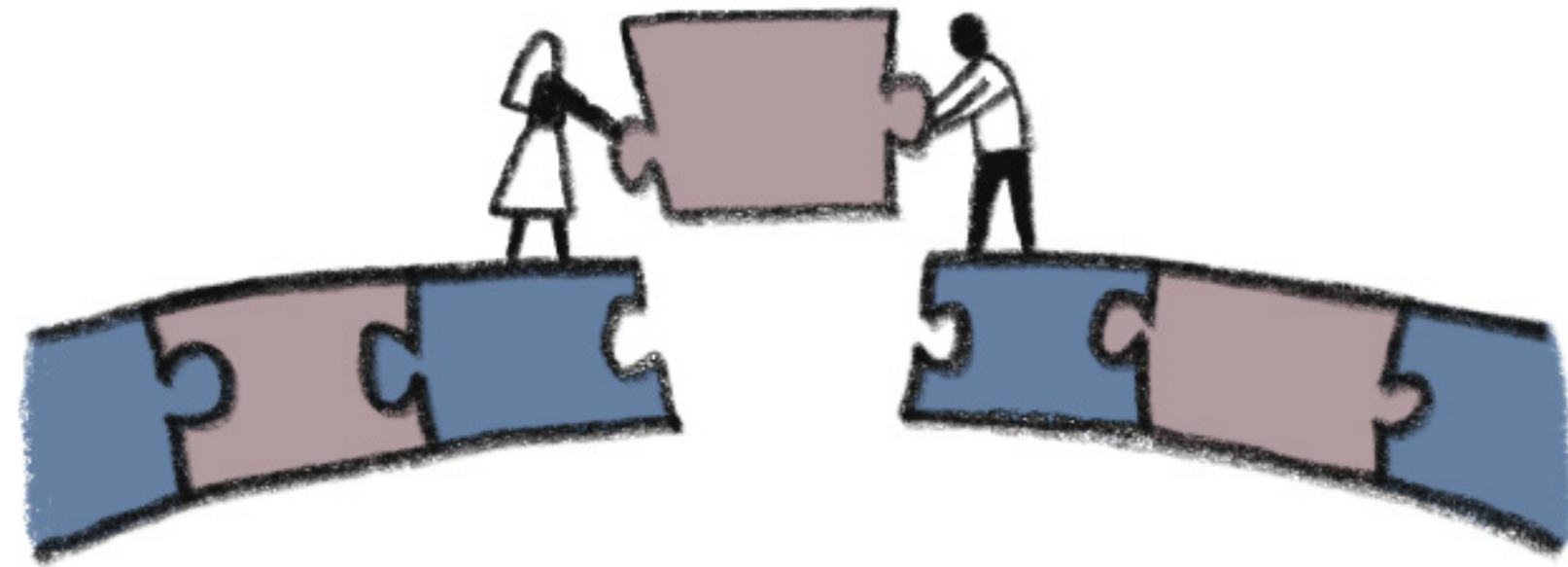


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1.

introduction and motivation

“Ink” by Morgan Harper Nichols

They said, all you have to do
is follow the rules on this page,
but then they wrote down the rules
in invisible ink.

So the only way
that I could learn
what was on the page
was to study how the rule-makers think.

I spent decades
in the halls of their libraries.
Studying their idioms
crossing t’s, dotting i’s.
I learned to lower and raise
my voice at the right times
and prepare a face
to “look me
in the eye.”

But no matter how hard I tried,
I could never see
the invisible ink on this page.
I just wanted to see
if it held the fine print
about talking too much,
or “be yourself, but not THAT way.”

Then someone said,
“well, with invisible ink
all you need is a UV light.
Simply hold it up to the page
and then you can read everything just fine.”

So I went out and bought a UV light,
ready to read this fine print I didn’t know,
and then, from the corner of the room
they all laughed,
and said, “are you serious?
The actual page was just a joke.
How can’t you see
that we were just messing with you?
The rules are things you just... know.”

So I backed out of the room
and I wish I could tell you I left
having said something clever
or made some speech.
Something about
embracing our differences
and how to make room
for people like me.

But in reality, I left that room
hiding behind the same old mask I’m used to...
the one they tell you
you don’t have to wear,
but... you do.

I left that room
even more mystified
about how the rule-makers
make rules,
and how they think.
But I also left that room
deciding
that when I tell my story
I will tell it
in the **blackest of inks.**

(Nichols, 2023)

The opening poem, “Ink” by Morgan Harper Nichols, offers a glimpse into the experience of a person living with autism spectrum disorder (ASD). It captures the essence of what it feels like to be an outsider, to enter spaces that aren’t designed for neurodiversity. The term “neurodiversity” recognises that each person’s brain develops uniquely, and views individual differences as strengths rather than impairments. The term “neurodivergent” is used to describe individuals who think and experience the world differently. Autism is one of the most well-known neurodivergent conditions (Gregory, 2022). Those who identify the societal “rules” as “...things you just... know” would be considered neurotypical. Neurotypical individuals are persons whose neurological development and behaviours fit the social norms. Due to the predominance of neurotypical individuals, our world is largely designed to suit their needs. This leaves neurodivergent individuals at a disadvantage, with their needs often being neglected.

“The Autism community in South Africa is a small one, but it is often described as “overlooked”, even though Autism is currently estimated to affect 2% of the South African population.” (Hako, 2022). That is approximately 1.2 million people in our country alone. This translates to a general rate of 1 in 50, which is double the global average of 1 in 100.

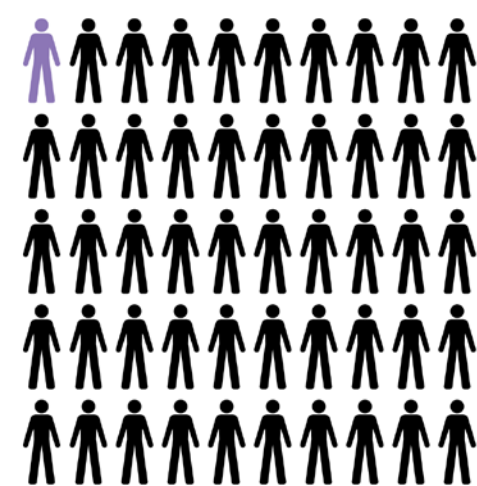


figure 2: ratio of individuals with autism to neurotypical individuals (Dias, 2024)

This statistic underscores the significant portion of the population who are forced to navigate a world designed by and for neurotypical “rule-makers”.

To begin the narrative of this thesis, I have an uncle with autism who is 38 years old; he lives with my grandmother and has never had any strong bonds outside of his family relationships. Due to limitations in understanding autism spectrum disorder in the 1980s, he was mischaracterised as a problem child until recent decades. The academic and social challenges made it difficult for him to continue attending school after standard 6 (grade 8). Since then, he has been at home. He prefers to spend most of his time here and often escapes to his room anytime someone visits. Certain behaviours, like frequent handwashing, were initially difficult for his loved ones to understand. During a family holiday, the overwhelming surroundings of a new environment became too much for him to manage, leading him to wander away for some time. However, he also possesses remarkable skills, like instantly calculating the day of the week for any past date. My uncle has a rich internal world and experiences the external world in a unique way that may be difficult for others to understand. His journey with autism has highlighted the importance of understanding individual needs and creating environments for all members of society.

Supporting a loved one with autism presents unique challenges. Finding suitable care can be difficult, especially when balancing individual needs with comfort and safety. Limited employment opportunities for individuals who require significant support, like my uncle, further emphasizes the need for comprehensive support systems. As our family navigates these challenges, particularly considering my grandmother’s aging, the question of long-term care becomes increasingly pressing. This experience has become a strong motivator in my desire to create and encourage spaces designed to meet the specific needs of adults facing similar challenges as my uncle.

1.1. research aims

Building upon the preceding discussion, this research seeks to explore what it means to tell the stories of individuals with autism “... in the blackest of inks” through architecture and design.

Given the limited options for specialised care in South Africa, this research aims to provide tailored support and services for adults with ASD by means of an inclusive living and day care community in Benoni, South Africa. Rather than creating a centre that caters to all disabilities, concentrating on a single disability allows for a more effective and conscientious design approach with the user’s well-being at the forefront. The proposal aspires to motivate inclusive and intentional design practices that better serves the needs of users. This will be conducted by investigating the concept of a comfortable environment for individuals on the autism spectrum, focusing on the visual and sensory aspects, and ultimately developing a clear architectural language that nurtures a sense of belonging.

The proposed architectural style aims to foster a calm and familiar atmosphere by adopting a communication style that resonates with its users. For many people with autism, honesty is a core value that guides their behaviour (Sabel, 2022). Communication goes beyond person-to-person interaction; hence the building should also communicate directly and honestly with its users. Along with this, the architectural approach emphasizes the qualities of ‘home’, integrating meticulous ergonomic and interior design together with sensory-friendly and biophilic design features.

This project is inspired by the Apricot Tree nonprofit organisation in Benoni, a day care centre that offers specialised care services for young learners with intellectual, developmental, and physical disabilities. As these learners grow into young adults and seek to carve out their roles in society, families who are part of the organisation feel there is a lack of supportive environments where their loved ones can find a sense of belonging (‘About Our School – Apricot Tree’, no date).

The organisation’s owners, along with its community members, dream of establishing a spacious assisted living facility for adults with disabilities. Therefore, this project will ultimately become an extended mission of the Apricot Tree nonprofit organisation, taking on a holistic approach to supporting its residents, day program participants, their families, and the community.

1.2. methodology

The methodology will include a combination of quantitative and qualitative research methods.

The quantitative research will involve questionnaires and a comprehensive desktop review of site analysis, statistics, literature, and precedents to develop a thorough understanding of the research.

The qualitative research will involve a combination of fieldwork and interviews. Site visits, precedent visits, observations, and photographs will provide firsthand insights into existing facilities and the experiences of individuals with autism. Email communications and semi-structured interviews with various participants will gather diverse perspectives on the topic. These participants may include architectural professionals, allied health professionals, a teacher at a special needs school, family members/caregivers of persons with autism, Benoni community members, and organisation founders.

1.3. understanding autism spectrum disorder

Before diving into the design technicalities, it is essential to better understand autism. Autism spectrum disorder (ASD) is a neurodevelopmental disability that affects a person's behaviour and social skills. It involves challenges with communication, social interactions, and repetitive behaviours (CDC, 2023).

Autism begins at birth and is usually noticeable within the first three years of a child's life (Lord et al., 2000). Statistics show that approximately one in one hundred children are born with autism, affecting five times as many boys as girls (Frith, 2008). It is unique to each individual and the extent to which it affects them varies. Some people have mild ASD and can function efficiently in society, while others have severe ASD and require substantial support (CDC, 2023).

Autism is a heterogenous condition, meaning no two individuals are the same, but there are common signs and symptoms that provide a consistent understanding and diagnosis of the disorder. As a means of regulating their emotions when over/under stimulated, individuals with autism may exhibit sensory seeking or sensory avoidant behaviours. Those who are sensory seeking actively seek out sensory input to self-soothe. Common sensory seeking behaviours include rocking, making loud noises, fidgeting, or pacing back and forth. On the other hand, those who are sensory avoidant withdraw from overwhelming stimuli to unwind. These behaviours aren't fixed and depend on the circumstances, the individual's preferences, and their emotional state (Esposito, no date).

The condition shows a contrast between exceptional aptitude and subsequent deficiencies in social domains. Some of these deficiencies may include an inability to develop strong relationships, a delay in or lack of language development, following unexplainable routines, and repetitive movements (Lord et al., 2000).

In Uta Frith's book "Autism: a very short introduction", she offered a perspective that moved me deeply:

"What I learned right at the beginning is that with autism nothing is what it seems at first glance. Just because a child with autism doesn't respond to your overtures, doesn't mean that the child rejects you. The reasons for not responding are much deeper. Further, just because a child can remember words and pictures does not mean that they can remember names and faces of people.

One of the most startling realizations that hit me was that being autistic could be in many ways worse than being born blind or deaf. Autistic children—barring exceptions—can see and hear, often exquisitely well. But, while blind and deaf children can still receive and respond to social signals through a special sense, autistic children don't have this sense."

(Frith, 2008, p. 3)

The discussion goes on to say that it's difficult for others to imagine not having this "special sense". However, autistic persons do still learn how to react to social signals, only in their own unique way that is not considered the social norm. The developmental journey for autistic children is far more complex than for those who naturally adapt to the standard cultural and societal structures. Autistic individuals must find their own unique ways to navigate the world, requiring different supports to thrive.

1.4. the three levels of autism spectrum disorder

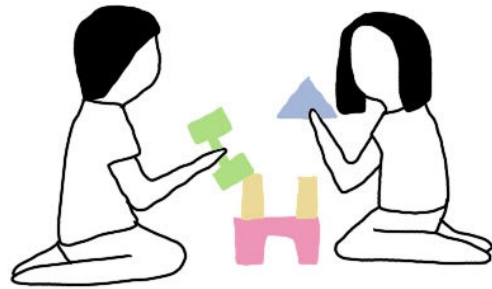
As outlined above, autism encompasses differing degrees, from mild to severe with many shades in between. The majority of situations have both frustrating and difficult aspects in addition to rewarding and fascinating ones.

To put it simply, there are three levels of ASD, outlined in the fifth edition of the Diagnostic and Statistical Manual (DSM) of Mental Disorders (Rudy, 2024). The levels are associated with how much support individuals need in their daily life. Categorising individuals within these levels is only appropriate within a medical context by means of a neurotypical lens, as many individuals experience a blend of traits across levels. Focusing solely on the DSM label risks overlooking their unique strengths and needs, possibly hindering their potential and fostering misunderstanding.

Autism diagnoses are assigned based on a person's current level of functioning, but these levels can change over time as individuals develop new skills and manage co-existing conditions such as anxiety, depression, and trauma. While these levels help determine support needs, they don't capture the unique personality and behavioural variations within the spectrum, necessitating individualised support plans (Rudy, 2024). While there is no cure for ASD, providing the right support can increase an individual's independence and facilitate their development, improving their social and learning skills (Mayo Clinic Staff, 2018).

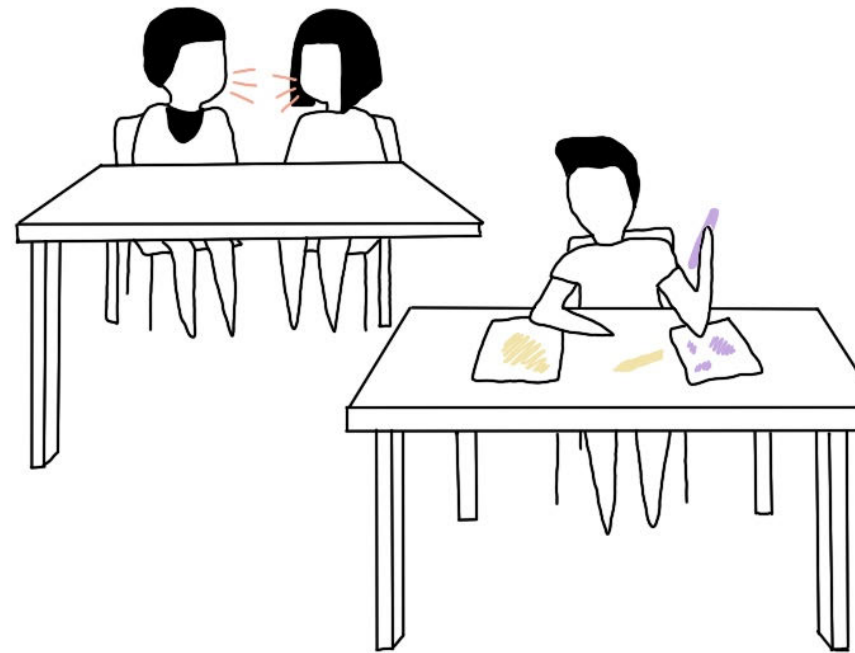
The three levels of support are outlined on the following page and provide a basic framework on which to explore the complexities of autism. The design will be guided by these levels; the residential component will focus on individuals with severe autism (level 3), while the day program will be open to individuals of all levels.

ASD level 1



Level one ASD encompasses individuals who require minimal support. While they can communicate verbally, social interaction with neurotypical people can be challenging. They might struggle with social cues or saying the right thing at the right time. Social anxiety and the effort to appear neurotypical (masking) can lead to burnout. Difficulty transitioning between activities, planning, and achieving age-appropriate independence are also common (Rudy, 2024).

ASD level 2



Level two ASD requires substantial support. Social interaction and communication can be difficult, with challenges understanding social cues and masking being more pronounced than in level one. Transitions and changes in routine can be stressful. Repetitive behaviours, often used for self-regulation, may be more noticeable and differ from what's considered typical. This increased need for self-regulation stems partly from a societal structure not designed for neurodiversity (Rudy, 2024).

ASD level 3



Level three ASD requires very substantial support. Individuals with this diagnosis face significant challenges in communication, social interaction, and managing change. Their difficulty expressing themselves verbally and/or with body language and their high need for self-regulation often leads to social awkwardness and a preference for solitary activities (Rudy, 2024).

figure 3: sketches portraying levels of support for individuals with autism (adapted from Zoe, 2024)

1.5. the autistic lens: exploring the world differently

Persons with autism are hypersensitive to sensory stimuli, making it difficult to process the whirlpool of information that their brains receive. This often leads to sensory overload and ultimately anxiety, outbursts, and social withdrawal. The purpose of the charrette is to understand the way people with autisms perceive the world. It helps us to grasp the meaning of the project and explore the impact that a calming, comfortable, and secure environment can have for individuals with ASD. The topography of Rynfield sets the scene, indicating the real-world connection to the abstract collage. Because the element of water is associated with peace, the water bodies connect to the centre, being the site (which later in the project moved slightly but is still within Rynfield), showcasing a feeling of ordered calm amongst the chaos. The calm is represented by smooth, transparent circles that progressively increase in size and height towards the centre, reflecting the journey of personal growth as individuals find their place in the world. The wooden sticks on which they rest portray soft, natural materials and elements that evoke a sense of ease. The bright colours, jagged lines, messy shapes, uneven textures and hard, sharp nails represent the chaotic and often overstimulating world that can be challenging for persons with ASD to navigate. The collage describes a multi-sensory experience. The light and shadows created by this jungle of different forms evokes contrasting emotions, confusion and fear versus a sense of direction and ease. Autism provides a distinct lens through which individuals experience the world, and this collage is an attempt to share that viewpoint and help others to understand. It aims to represent the harmony individuals with ASD can achieve within the haven when their needs and preferences are met, helping them to navigate a complex world while finding their sense of belonging and self-discovery.



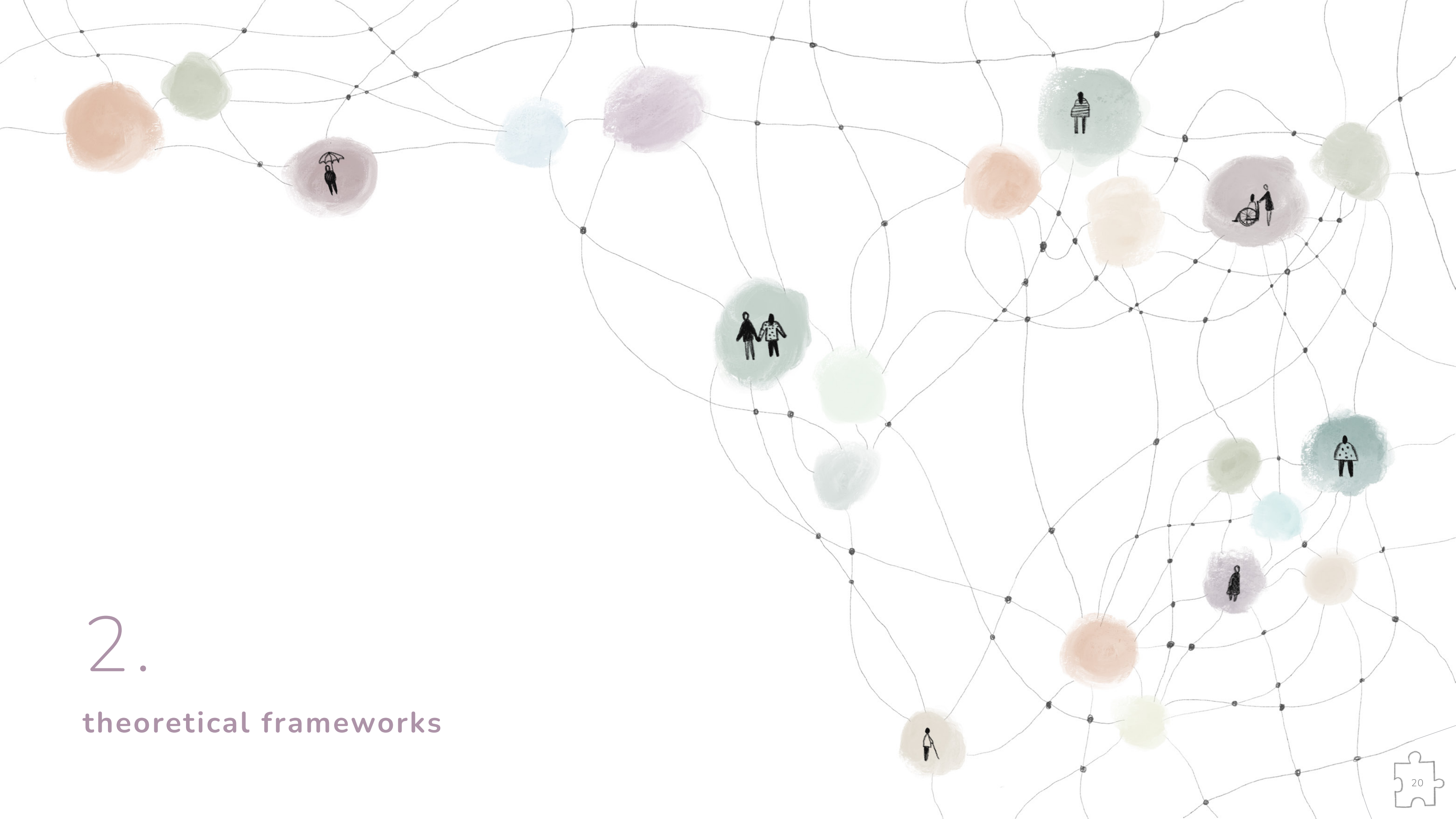
figure 4: photographs of charrette collage demonstrating the experience of individuals with autism
(Dias, 2024a)

1.6. research question

How can architectural design promote a sense of belonging and comfort for neurodiverse individuals, particularly those with autism, in residential and community settings?

2.

theoretical frameworks



Designing for individuals with autism requires careful consideration of sensory sensitivities and social needs within the environment. Therefore, the research will delve into the realm of environmental psychology, which is the study of the intricate connections and transitions between humans and their physical surroundings (Gifford, Steg and Reser, 2011). Through the interactions between people and their environment; people change their environment, and their environment changes them. Environmental psychology groups a person and their environment as one holistic body and recognizes the exchange between the two (Gifford, Steg and Reser, 2011). A deeper understanding of the relationship between persons with autism and their environment will enable us to design spaces that meet their specific needs and preferences.

Hence, the **primary research** will focus on **sensory processing theory**, **place attachment and place identity theory**, and **the sense of home**.

Within the **secondary themes**, the research will explore the **prospect-refuge theory**, a spatial framework centred on creating a sense of safety and control, an important aspect in this context. Central to creating a homely environment that encourages self-discovery and personal growth within a complex world is the principle of **deinstitutionalisation**.

The accompanying diagram illustrates the relationships between these theories within the context of this research.

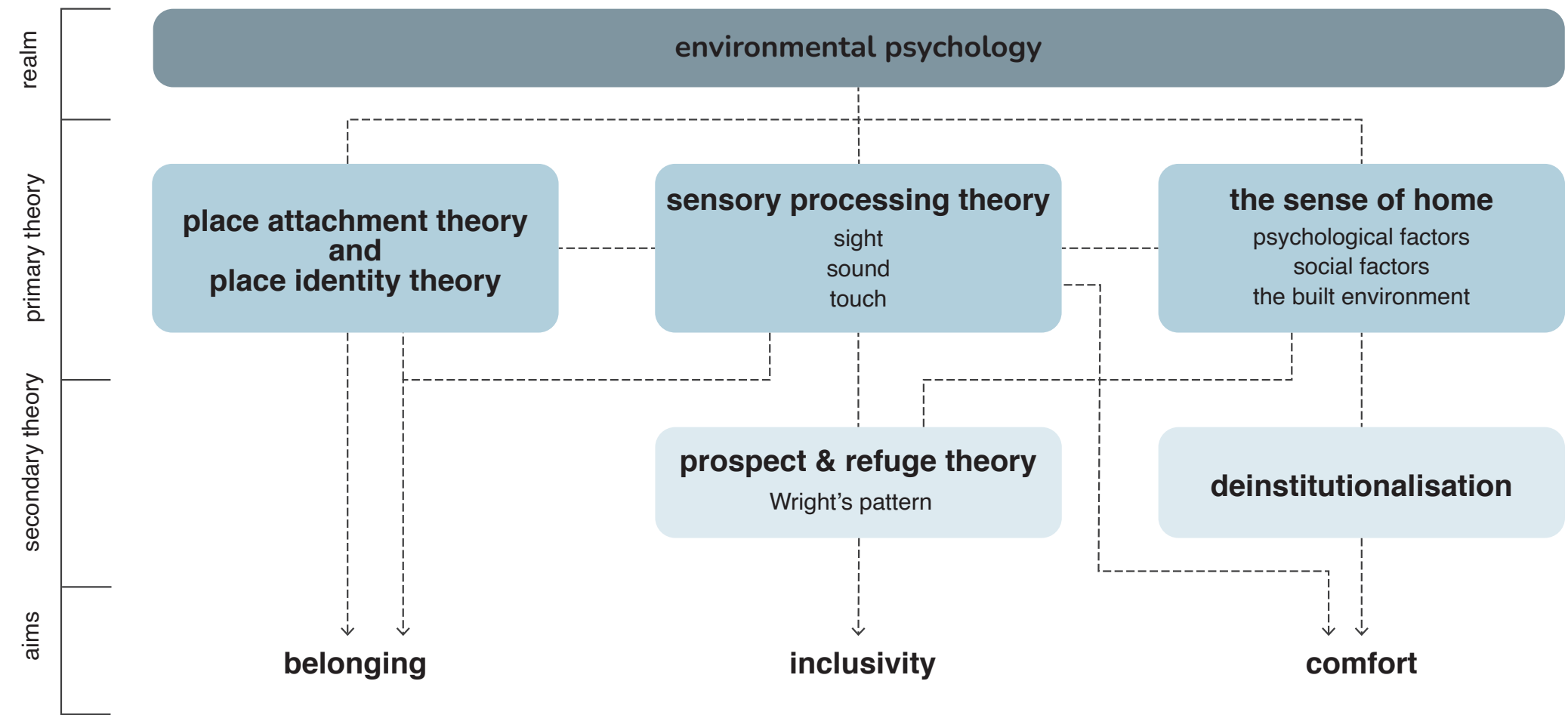


figure 5: diagram of theories and their relationships (Dias, 2024a)

2.1. sensory processing theory

description

Sensory processing refers to the way the nervous system interprets the senses and transforms them into behavioural responses (Kristina Gasiewski and Mary Jane Weiss, no date). This theory is first and foremost when it comes to autism-specific design. To create comfortable environments for persons with autism, we need to understand how they perceive the world through their senses.

Persons with autism often have abnormal responses to incoming sensory information. Their capacity for sensory integration (the combined processing of all the senses) is impaired. This is usually expressed as being hyper-sensitive (overreactive) or hypo-sensitive (under reactive) to surrounding stimuli. Abnormal sensory processing can cause persons with ASD to express strange behaviours (Kristi Gaines et al., 2016).

relevance to research aim

The processing of sensory integration involves the identification, integration, organisation, and utilisation of sensory information that helps a person interact with their surroundings. People whose sensory information is not integrated have sensory integrative dysfunction (SID). This can cause confusion, frustration, and challenges in expressing oneself effectively. Integration fosters effective development in areas such as language, attention, motor skills, academics, and social relationships. Therefore, by means of sensory-based interventions and providing opportunities to develop adaptive behaviours, we can help individuals with autism to better process sensory information and in turn, learn more effectively.

theory exploration and design applications

The five senses (sight, sound, smell, taste, and touch) respond to stimuli from outside the body. Numerous exercises and tools are used in the treatment of SID to improve fine motor skills, vestibular and sensory stimulation, balance, coordination, and directionality (Kristi Gaines et al., 2016).

Sensory-friendly design can further support development. This research will prioritise the study of visual, auditory, and tactile sensory processing, explored in the following paragraphs:

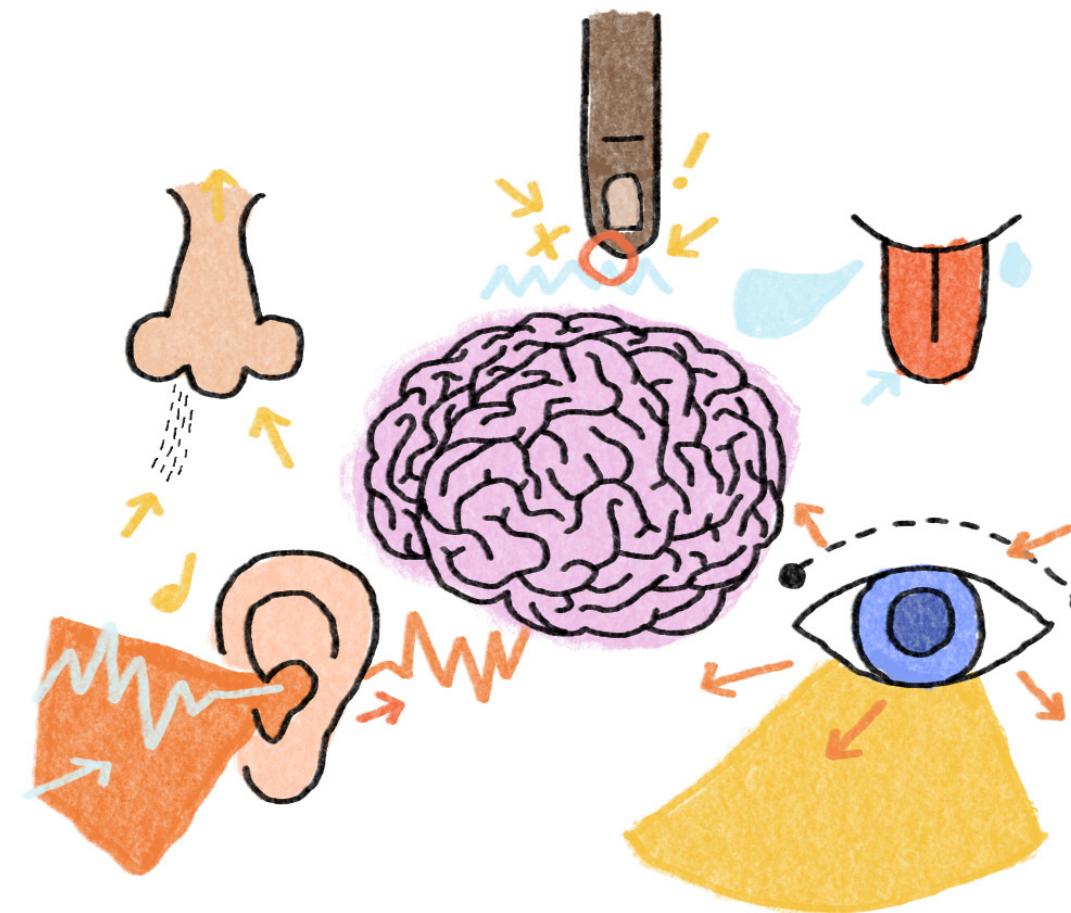


figure 6: the five senses (adapted from DrAfter123, 2015)

Sight

Sight is a critical sensory system. While those with visual hypersensitivity may notice everything in the environment, those with visual hyposensitivity may struggle to see things in their environment.

Light largely impacts the visual experience of a space, light is either natural or artificial. According to studies, spaces with only artificial light can cause stress and discomfort in users. **Natural light** is generally preferable, but **openings** should be carefully placed to avoid distractions from the outside. Adjustable blinds or curtains can help to control light levels (Kristi Gaines et al., 2016).

Colour psychology is another important aspect of sight. Some people may find bright colours exciting, while others find them to be overwhelming. The colour wheel is divided into warm (red and yellow) and cool (blue and green) colours, each with specific spatial properties. Warm colours generally evoke a sense of smaller, warmer, louder spaces, while cool colours evoke a sense of larger, cooler, quieter spaces. Research shows that **light, warm, neutral colours** are best for sensory processing. The strategic use of colour can help with wayfinding and focus (Kristi Gaines et al., 2016).

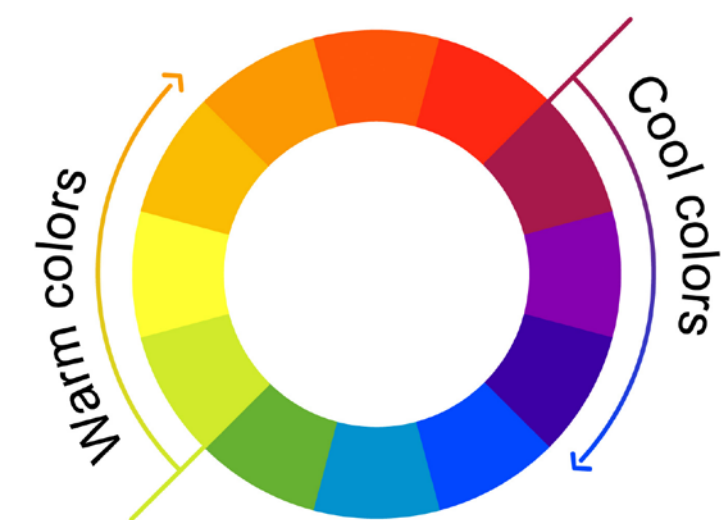


figure 7: the colour wheel (colorsexplained, 2022)

The spatial layout impacts the way a person visually experiences a space. The method of **spatial sequencing** involves designating spaces/rooms to specific functions or activities so that individuals know what to expect when entering the space. For example, multi-sensory rooms, also known as sensory integration spaces, provide a controlled environment for people to engage their senses. Escape spaces, on the other hand, provide an escape from overwhelming stimuli.

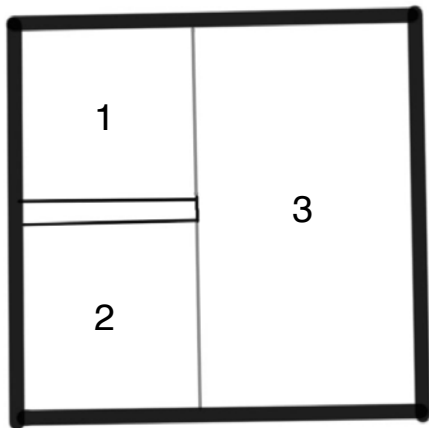


figure 8: plan demonstrating spatial sequencing (Dias, 2024a)

The **design elements** (space, shape, form, mass, line, texture, pattern, light, and colour) and **principles** (scale, proportion, balance, rhythm, emphasis, and harmony) are mainly visual aspects that can enhance the experience and appeal of an environment. These concepts can be translated into architecture to create efficient autism-specific designs (Kristi Gaines et al., 2016). The tables alongside outline the potential applications of the elements and principles of design in the built environment for individuals with ASD. Although these applications presented in the book ‘Design for Autism Spectrum Disorders’ by Kristi Gaines et al. are centred on designing for children with autism in learning environments, they offer valuable insights that can be adapted to this project:

Element	Application
Space	Furniture selections are the appropriate size for the user.
Shape and form	The use of the golden mean/section (e.g. dado moulding placed between 1/2 and 1/3 the height of the wall.
Mass	Massing is grouping components to give a more solid appearance.
Line	Lines form the walls, floors and ceiling of a room. Examples include a ceiling or floor pattern, or bookshelves.
Texture	Walls, floors, and furniture have rough or smooth texture. Finishes that reflect light and create glare should also be avoided such as matte paints, wall coverings and surfaces. For example: Carpet instead of highly polished tile.
Pattern	Pattern may be seen in fabric, carpet, wall, and floor coverings.
Light	Two sources: Natural and artificial light. Correctly placed windows and skylights are necessary to prevent undesirable solar heat gain and visual discomfort. Appropriate window coverings will also help to control harsh natural light and resulting glare/reflections. Lighting should be flexible (dimmers, multiple switches).
Colour	Walls, floors, and decorative elements where colour may be applied. Personal preference is important. For the visually hyper-sensitive bright colours and bold patterns can be distracting and painful. Softer hues, neutral colours, subtler patterns/textures. Most research indicates that light, warm, neutral colours are best. Colours found in nature are most soothing. Visually hypersensitive individuals can focus on extraneous detail and become distressed by high amounts of colour. For visually hypo-sensitive students, colour can be used for wayfinding or as a tool to locate objects in the classroom. For example, coloured tape can be used to delineate pathways around the room.

figure 9: design elements and their applications in the built environment (adapted from Kristi Gaines et al., 2016)

Principle	Application
Scale	Furniture selections are the appropriate size for the user.
Proportion	The use of the golden mean/section (e.g. dado moulding placed between 1/2 and 1/3 the height of the wall.
Balance	Symmetrical balance could be achieved by the placement of student desks as a mirror image on both sides of the room. Radial balance may be achieved using round tables with chairs for students. Asymmetrical balance may be achieved with objects of similar visual weight balanced from a central dividing line.
Rhythm	Repetition: Repetition of colour, flooring, patterns, rows of seats, windows, doors. Progression: Shapes on floors, walls, and ceilings progressing from small to large or vice versa, shades of colour; hallway with many doors. Transition: Crown or dado moulding placed without interruption, floor borders. Opposition/contrast–Cabinetry, window frames, angular shapes placed next to rounded shapes.
Emphasis	Chalk board or white board in the front of the classroom, workstations. Fireplace or bed in a residential space.
Harmony	Unity and variety are needed to achieve harmony. Unity is achieved through colour scheme, consistent furniture styles, background materials have similar feeling. Use of pattern, value, textures are consistent with the master plan. Variety may bring diversity through differing colours, textures, and the contrast of materials. Variety must have order to prevent confusion.

figure 10: design principles and their applications in the built environment (adapted from Kristi Gaines et al., 2016)

Sound

Multiple studies have identified auditory processing difficulties as the most prevalent issue for individuals with ASD. While those who are hyposensitive to sound may seem oblivious to sounds or surrounding activities, those who are hypersensitive to sound may be easily distracted by or overreact to sounds. Background noises are generally distracting, highlighting the necessity for quiet sleeping, learning, and escape spaces (Kristi Gaines et al., 2016).

Sound absorption is greatly influenced by the materials used in construction. Hard surfaces should be avoided as they reflect sound and cause reverberation (echoing). This can be lessened by including **sound-absorbing materials** like acoustic panels or carpets.



figure 11: wooden acoustic panels (WoodUPP, 2024)

In addition to materials, the architectural design can also influence noise levels. Key elements include **careful HVAC and window placement, ceiling heights/design**, and **insulation**. While well-placed windows can minimise noise transmission from outside, high ceilings can intensify reverberation. Ceilings between 2.7-metres and 3.6-metres usually create the most ideal acoustic conditions. The figure below demonstrates a ceiling design used to reflect sound and reduce reverberation. When it comes to determining the specific amount of sound-absorbing materials needed for a space: “the area of sound absorbing materials should be approximately equal in area to the floor area of the room” (Kristi Gaines et al., 2016, p128).

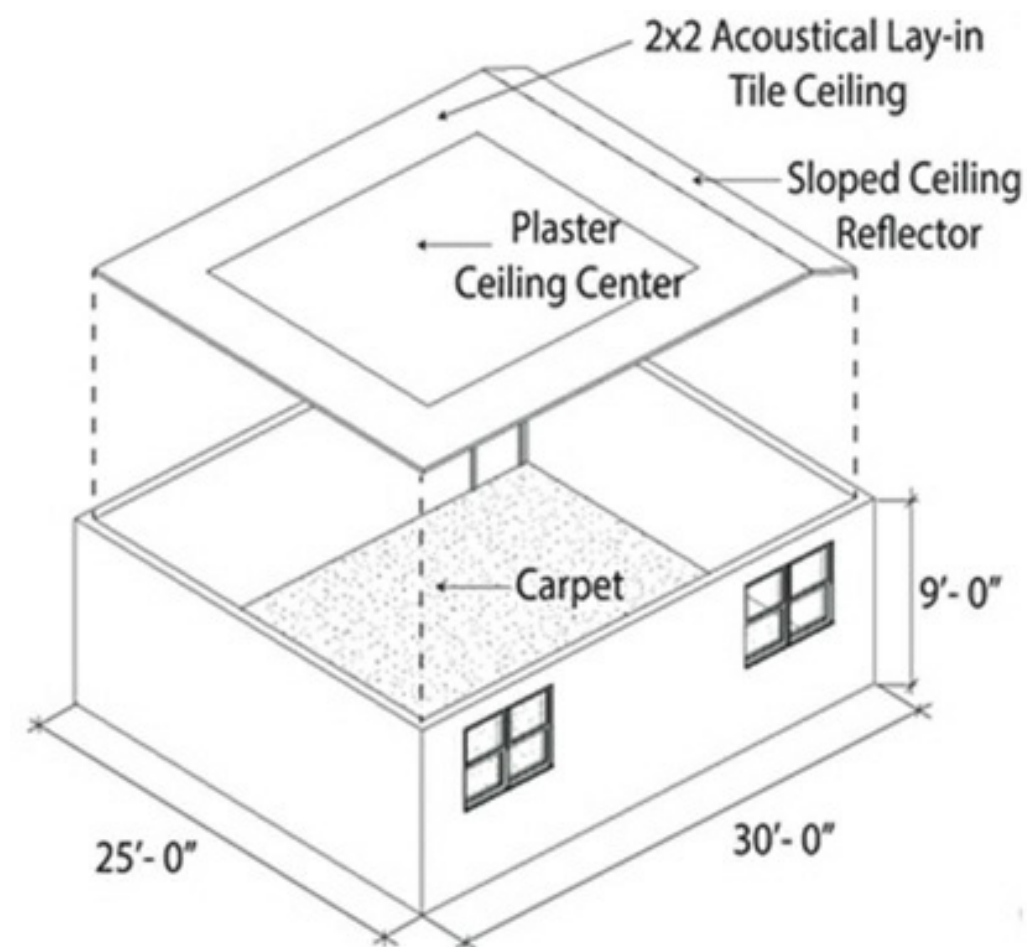


figure 12: ceiling design to reduce reverberation (Kristi Gaines et al., 2016).

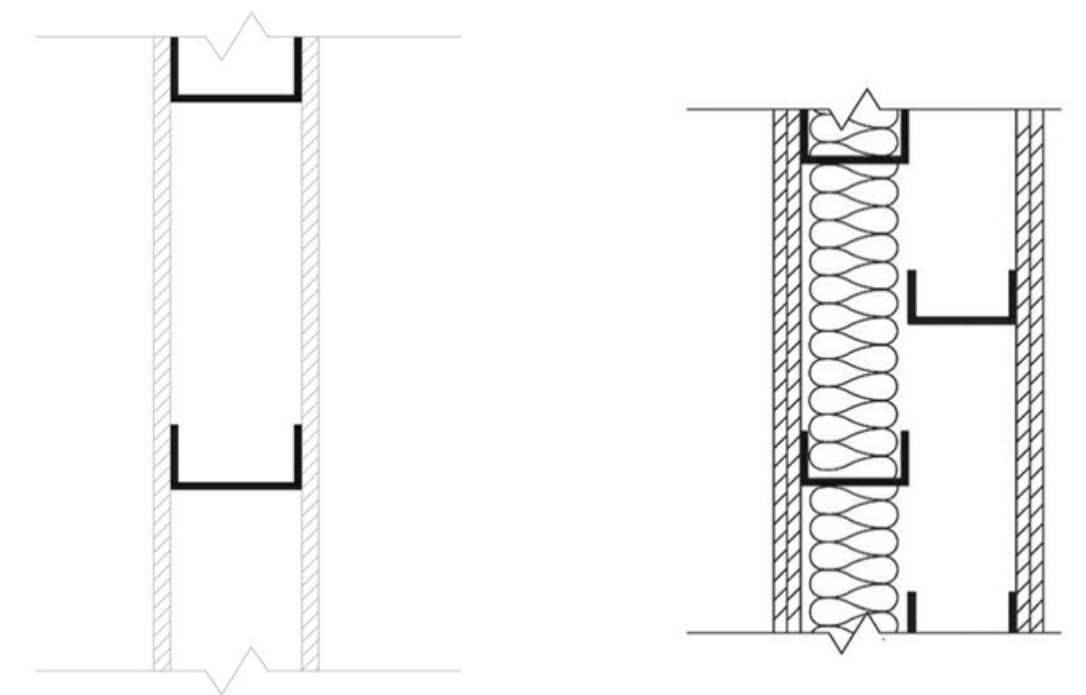


figure 13: sections showing a poorly insulated wall (left) vs. a well insulated wall (right) (Kristi Gaines et al., 2016).

Furthermore, even the smallest details can contribute to noise reduction. For example, the use of tennis balls as chair leg coverings in a classroom:

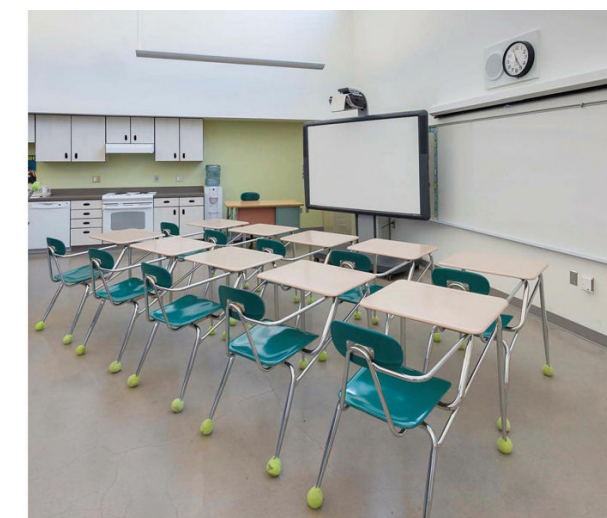


figure 14: ceiling design to reduce reverberation (Kristi Gaines et al., 2016).

Touch

Tactile sensitivity is a prevalent characteristic in persons with autism. ASD can cause individuals to be either extremely or deficiently sensitive to touch, which can alter their perception of pressure, pain, temperature, and textures.

Hands-on learning can be highly beneficial for persons with autism. Tactile materials can help to develop and activate the senses. Studies reveal that individuals with autism generally prefer smooth materials to hard ones. Therefore, providing a **range of tactile experiences** can encourage users to explore their environment and gain independence.

However, some individuals may struggle with tactile defensiveness, a condition in which a person's tactile system is underdeveloped or working improperly. This can cause them to feel overwhelmed when exposed to many textures at once (Kristi Gaines et al., 2016). While providing beneficial opportunities for sensory exploration, it's important to avoid overstimulation through excessive sensory input in one space. A **diverse and consistent material palette** should be maintained throughout the design process.

The concept of personal space relates to the sense of touch. Maintaining personal space is often crucial for people with autism. In order to ensure their comfort, **individuals should be able to ease into a public space and retreat when necessary**. Providing **private nooks** or 'cocoons' can help vulnerable individuals to withdraw and relax when feeling overwhelmed in social settings. Incorporating therapy rooms, arts and craft rooms, and indoor and outdoor recreational areas can foster tactile sensory development and engagement (Kristi Gaines et al., 2016).

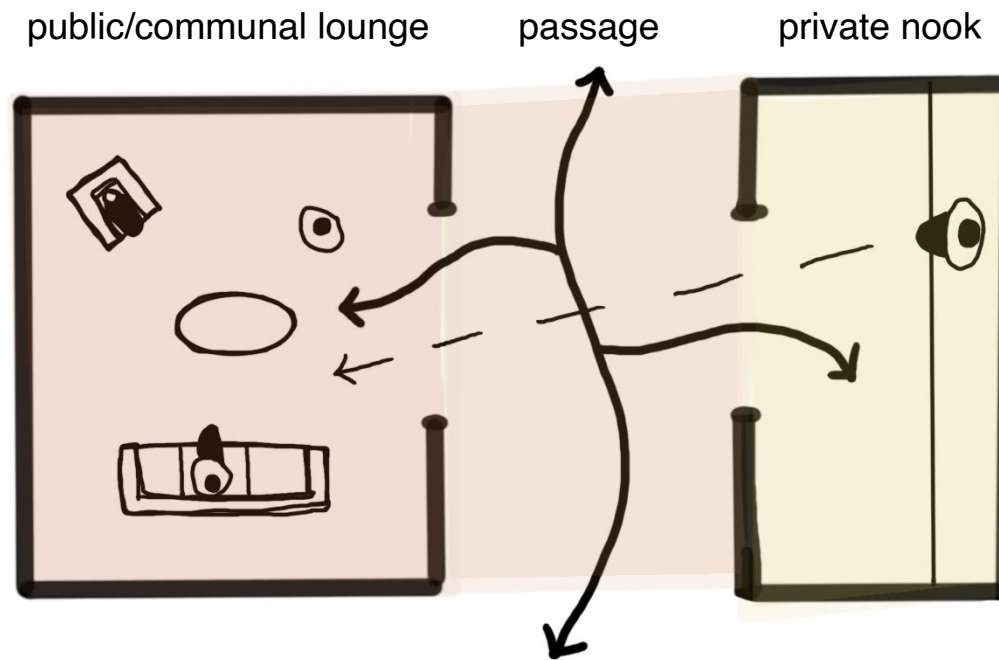


figure 15: plan sketch demonstrating the provision of private nooks in public settings (Dias, 2024d)

By considering the above-mentioned insights on the different senses and their effect on persons with autism, the following design strategies can be applied to create sensory-friendly environments:

1. Designing to promote routine

Individuals with autism enjoy and benefit from routine. Compartmentalising spaces and routine-based layouts can help them navigate daily life and encourage self-sufficiency. This involves creating an organised space with clear walkways and designated areas for specific activities. Additionally, the spaces can be set up with appropriate adjacencies to accommodate the typical sequence of events. The figure below demonstrates how the design supports a standard morning routine: a) personal hygiene, b) getting ready, and c) tidying the room before leaving (Kristi Gaines et al., 2016).

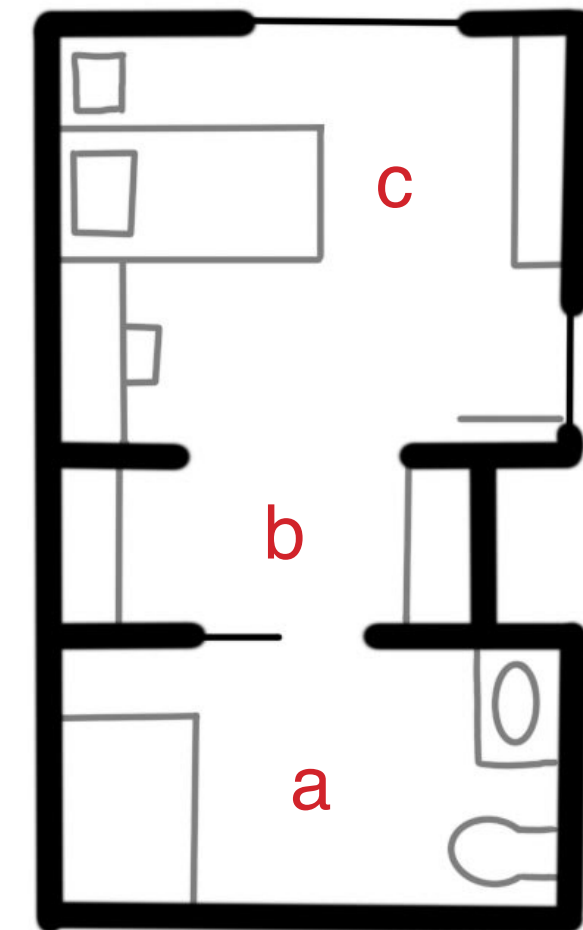


figure 16: plan sketch demonstrating designing for routine (adapted from Kristi Gaines et al., 2016).

2. Designing for predictability

Supporting independence is key to empowering people with autism, which can be achieved by providing users with spaces that are easy-to-navigate. Clear sightlines, distinct architectural elements, hierarchical arrangements, symmetry, and clearly defined spaces are design strategies that can help individuals to find their way and therefore learn independence. This is because it allows users to predict their surroundings. Being able to examine the space or predict its atmosphere before entering allows the user to grasp and prepare for the activities and interactions (Kristi Gaines et al., 2016). The following diagram illustrates how symmetry can foster a sense of predictability and ease when moving through the space:

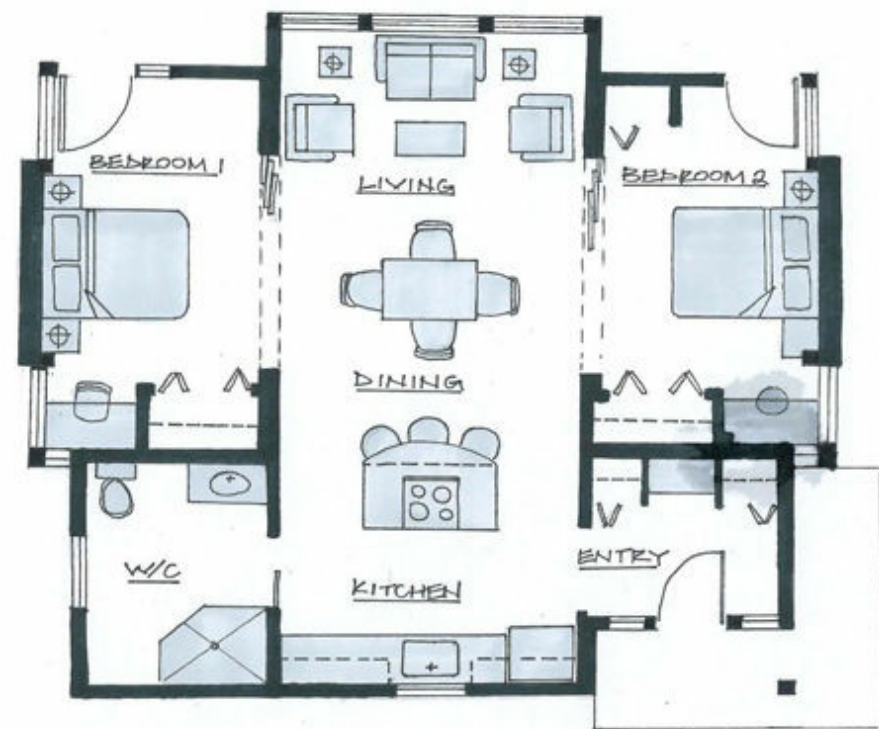


figure 17: symmetrical floor plans provide predictability (Kristi Gaines et al., 2016)

3. Communication of purpose

Creating spaces that clearly communicate their purpose can help individuals with autism to understand the expected behaviours of the space and in turn, feel confident and comfortable within it. Carefully placing furniture and fittings can support cognitive clarity and navigation. For example, providing distinct spaces for food storage, preparation, and cleaning in a kitchen helps individuals with autism to understand the function of the space and the way things are done. This can be further enhanced with labels (Kristi Gaines et al., 2016).

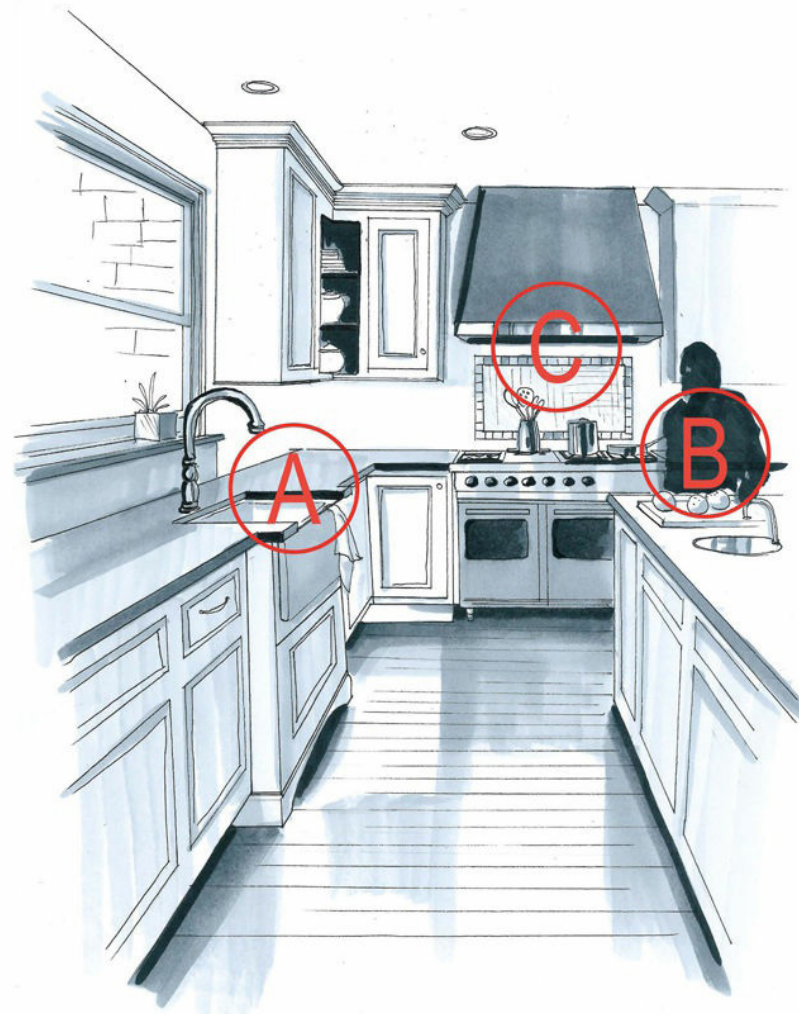


figure 18: careful placement of fixtures to indicate function and sequence of events (Kristi Gaines et al., 2016)

4. Wayfinding

Clear access points, recognisable landmarks, and organised spaces can help individuals find their way through and form mental maps of their surroundings as they remember important features. Visual cues and memorable design elements, such as distinct forms, textures, shapes, and colours can aid in orientation. Transitions between spaces should be clearly defined by a change in flooring, ceiling heights, wall colours, textures, and lighting. Additionally, halfway points that promote interaction are useful to provide a space to rest or pause and contemplate on where to go next (Kristi Gaines et al., 2016).

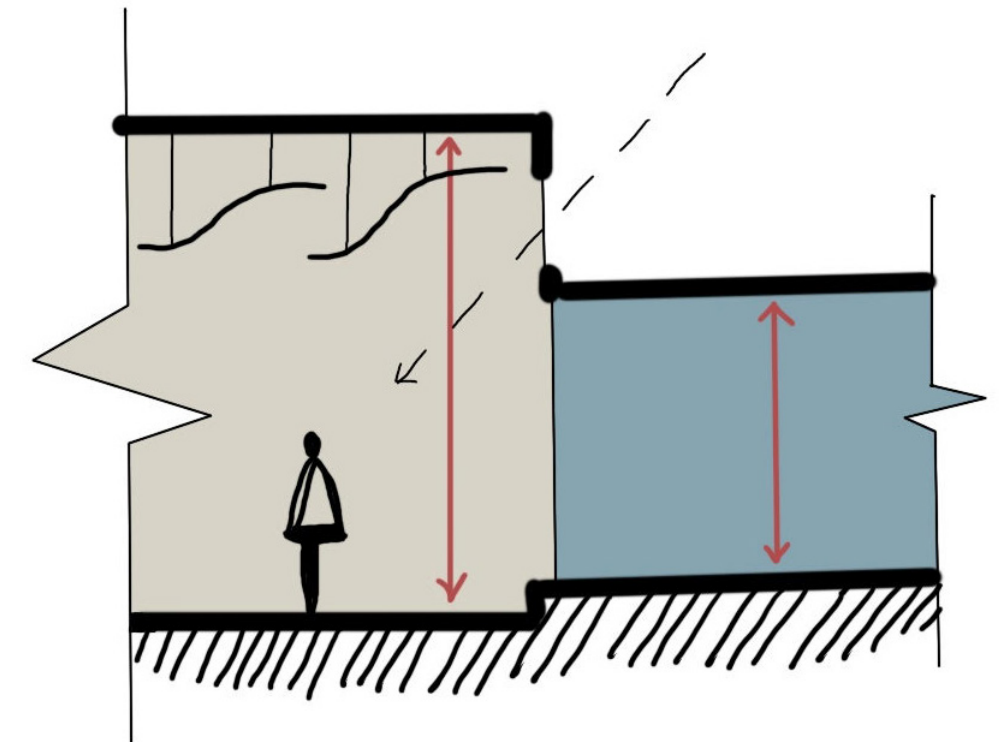


figure 19: section demonstrating interesting design features and changes in ceiling heights, wall colours, and lighting to aid in wayfinding (Dias, 2024f)

5. Designing for social interaction

Because persons with autism don't always conform to the social norms, it's important to design spaces that understand their social needs. This brings us back to giving individuals with autism the chance to preview the space before entering so that they know what to expect. This can be done by creating positive and negative spaces and providing homelike environments. Positive spaces are meant for social interaction and hanging out, and usually have a warm and inviting atmosphere. Fireplaces are a classic feature used in positive spaces to draw people into the heart of the home. Negative spaces are those reserved for circulation and provide opportunity to observe the positive spaces (Kristi Gaines et al., 2016).

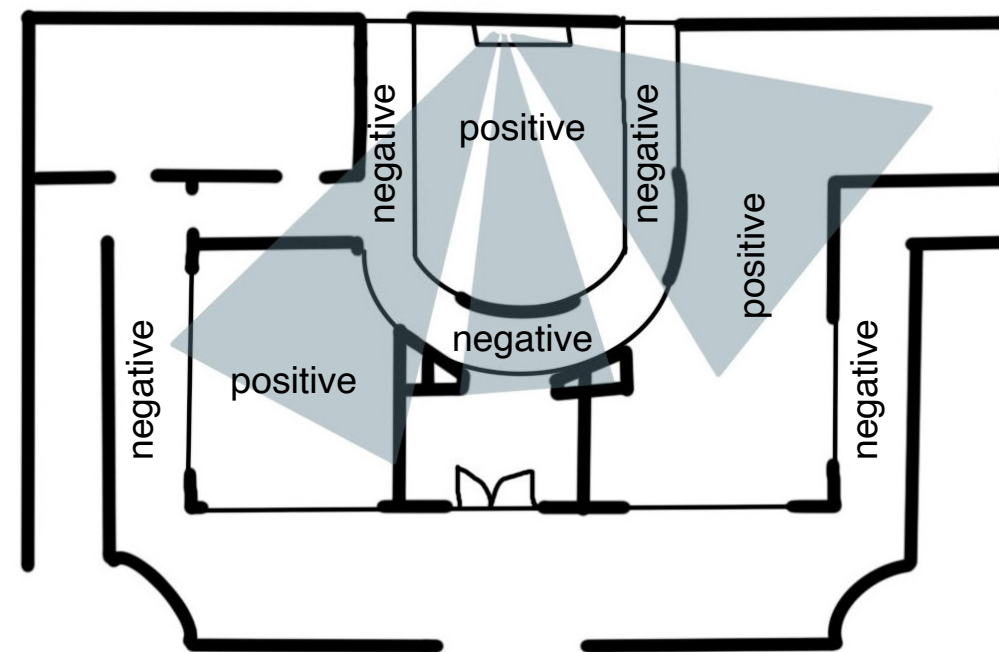


figure 20: plan sketch demonstrating positive and negative spatial adjacencies (adapted from Kristi Gaines et al., 2016)

6. Spatial understanding

Unlike neurotypical individuals who view environments as a whole picture, those with autism perceive their environment in fragments. Salingaros' biophilia design philosophy emphasizes the value of creating spaces that are both complex and organised as an attempt to help individuals with autism make better sense of their surroundings. This can be achieved by incorporating structured spatial patterns and grouping objects together to form a whole (Kristi Gaines et al., 2016).

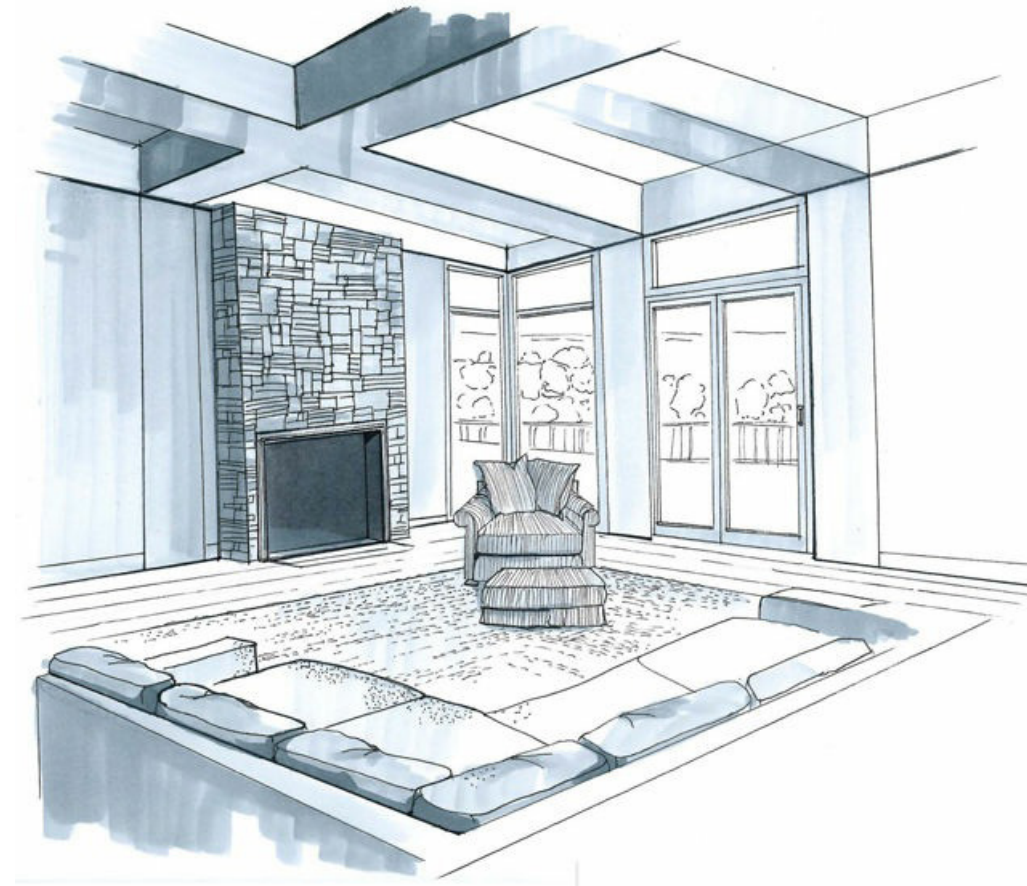


figure 21: defining areas with rugs and ceiling structures (Kristi Gaines et al., 2016)

7. Designing for motivation and encouragement

Although order, safety, and predictability are key to designing for persons with autism, it's also necessary to incorporate elements of exploration and excitement. Providing spaces that offer change and stimulate curiosity encourages personal development. This project will incorporate gardens for individuals to wander. Outdoor spaces can be particularly inspiring for individuals with autism, providing a sense of calm while offering opportunity for discovery. The strategic use of spatial features for interior environments, including textures, patterns, colours, and varying heights can also add moments of surprise (Kristi Gaines et al., 2016).



figure 22: sensory garden allowing for exploration (Rogers, 2024)

2.2. place attachment and place identity theory

description

Place attachment theory is a multi-dimensional concept that describes the emotional bond between a person and a place. Places hold memories, feelings, and experiences that become cherished parts of our personal stories. One can be attached to a place because of its meaning or because of personal preference. Positive experiences lead to stronger attachment. The concept cannot be defined as a simple cause-and-effect relationship but is rather a mutual relationship between behaviour and experience (Purwanto and Harani, 2020).

We develop a strong sense of attachment to places when we fill them with artifacts that hold memories and express our personalities. In the same way, familiar artifacts in foreign places breed a sense of comfort. The tripartite model of place attachment, shown below, breaks down the dimensions of people, processes, and place. The first dimension of place attachment is the person who is attached and whether they are attached through individual or collective experiences. Collective experiences could be historical or cultural contexts. The second dimension is psychological processes; how emotions, thoughts, and interactions come together and manifest our attachment to places. When we're separated from a comfortable place, it can trigger emotions like sadness and longing. The third dimension is the place itself. The nature of the place has two sides; the rootedness of its physical character and the social bonds that form within it.

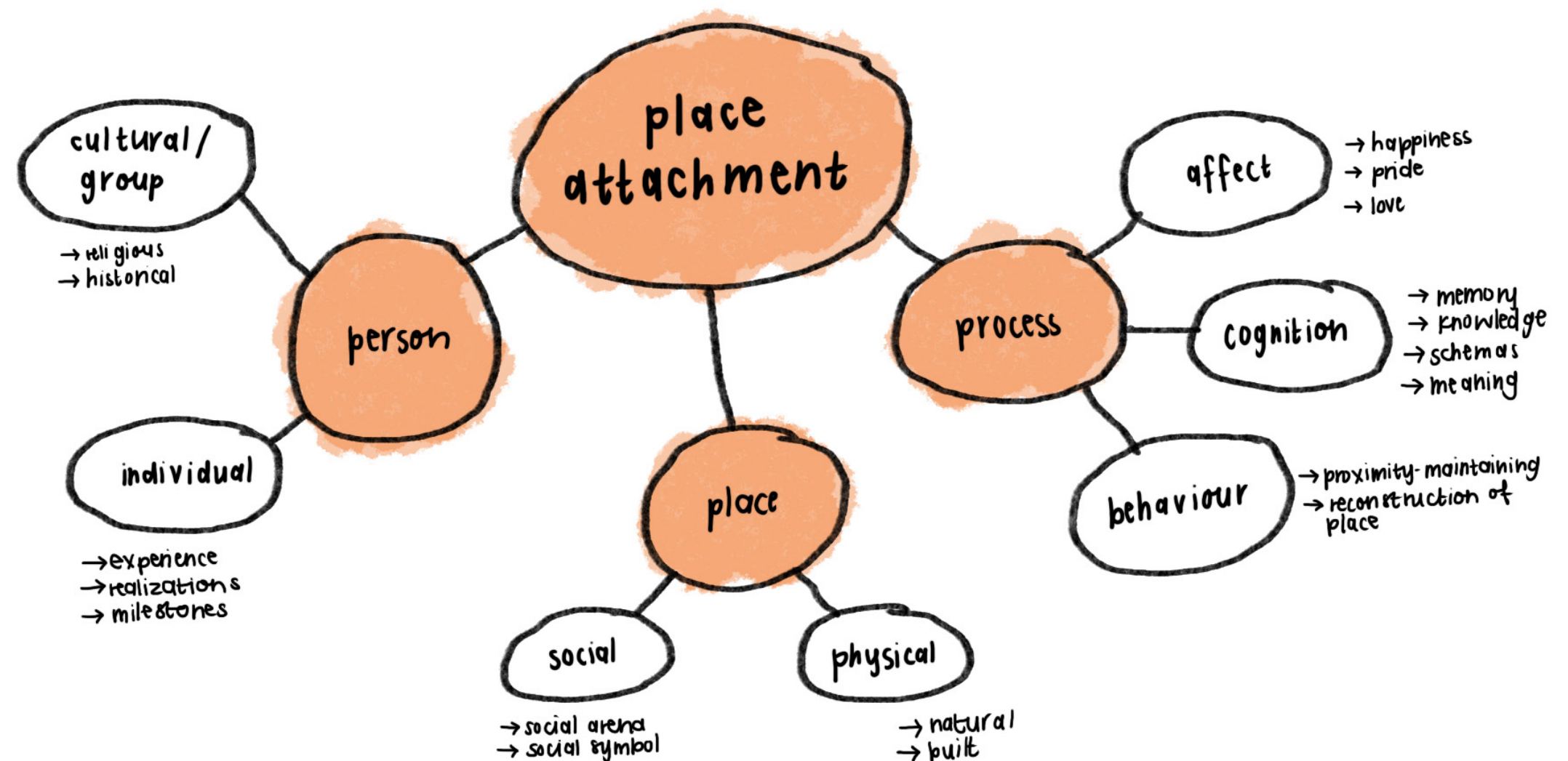


figure 23: Tripartite model of place attachment (adapted from Purwanto and Harani, 2020)

In company with place attachment theory is place identity theory. Identity is the uniqueness that distinguishes a person from everyone else. The term 'place identity' captures the essence of a place by considering both its shared similarities with other places and what makes it one-of-a-kind. Like the concept of 'genius loci', which is the intangible quality and spirituality of a place, place identity theory symbolizes a place's undeniable character. It is the collection of beliefs, feelings, and ideas we associate with a particular place (Vecco, 2020). Both place attachment and place identity are subjective, depending on each person's experience.

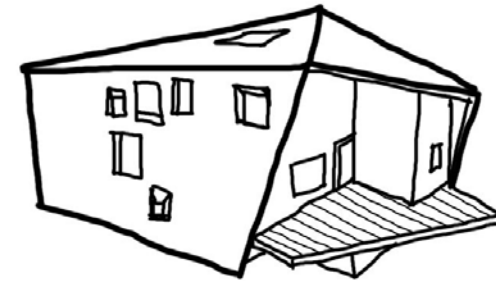
relevance to research aim

Place attachment and place identity theory are central to this research, as they explore the importance of creating environments that individuals with autism feel connected to. A sense of belonging and comfort can significantly improve the wellbeing of individuals with autism, allowing them to relax and flourish.

theory exploration and design applications

A 2020 study in Semarang, Indonesia, conducted by Edi Purwanto and Arnis Rochma Harani, revealed people's place attachment and place identity by having a group of 120 architectural students sketch a mental map of their community, the public Simpang Lima area. These mental maps naturally shared some landmarks while also revealing unique details reflecting each participant's personal experiences. This tool, known as the community mental map, helps to understand how people connect with and experience their surroundings. Through the analysis of these mental maps, the researchers discovered that every element the participants had identified had cognitive backgrounds and fell into one or more of the following categories: it had a **unique and distinctive shape**, it had a **strategic location** and was used as a marker, it had an **emotional link**, or it was a **meeting point for community activities**. The most recognised elements were those encompassing all four, indicating a strong sense of place

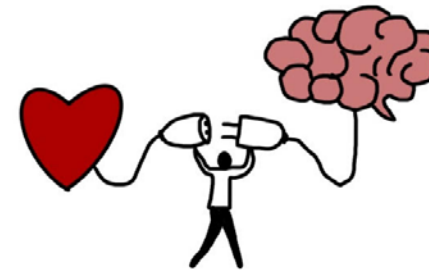
attachment. Furthermore, accessibility also became an important factor as it is onerous to explore and connect with a place if it is difficult to navigate (Purwanto and Harani, 2020).



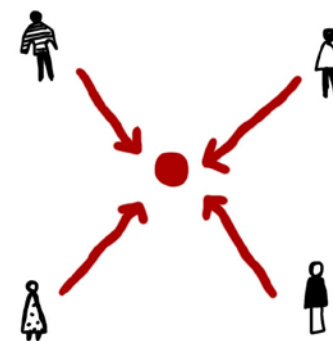
unique and distinctive shape



strategic location



emotional link



meeting point

According to the study, a district's unique features have a big influence on how well individuals remember it. A place's identity is shaped by its distinctive spatial arrangement and obvious landmarks, which help to create a sense of place and direction.

A reference categorises the following typologies that typically have a strong sense of place attachment and identity according to their physical and social aspects. **Safe places:** spaces with strong emotional connections that provide stability. **Socialisation:** spaces such as a plaza with a firmly established community. **Transformative settings:** places where personal memories have taken place. **Recovery site:** often a natural, serene setting that encourages rest. **Validating places:** spaces with cultural importance and shared meaning. **Disappearing places:** places that are dilapidating or vanishing due to environmental, societal, or cultural changes. (Smith, 2017, as cited in Purwanto and Harani, 2020).

To promote connection and transformative moments, the design will feature gathering spaces. The tranquil gardens will offer opportunities for relaxation and exploration.

figure 24: elements forming strong mental maps (adapted from yih lee, 2018 and Shutterstock, 2023) (Dias, 2024c)

This study strengthens the link between individual experiences, mental maps, and our relationships with places. It adds to the knowledge that designing a communal village with a strong sense of place goes beyond just brick and mortar. It is essential to comprehend how the users will relate to their surroundings.

Considering the importance of clear structure and predictability for autistic individuals, the village design should prioritise a **simple and intuitive master plan**. This allows residents to easily form mental maps of the space, fostering a sense of control and familiarity. A **radial layout**, for instance, could serve as a central hub with well-defined pathways branching outwards. Additionally, all areas should be universally accessible to guarantee inclusion. This is advantageous to all people, not just those with physical disabilities. Clear pathways and uncluttered spaces, for example, may also be beneficial for people with autism spectrum disorder, even though their main difficulties are cognitive. Altogether this promotes effortless pedestrian movement and reinforces a sense of order and control for all.

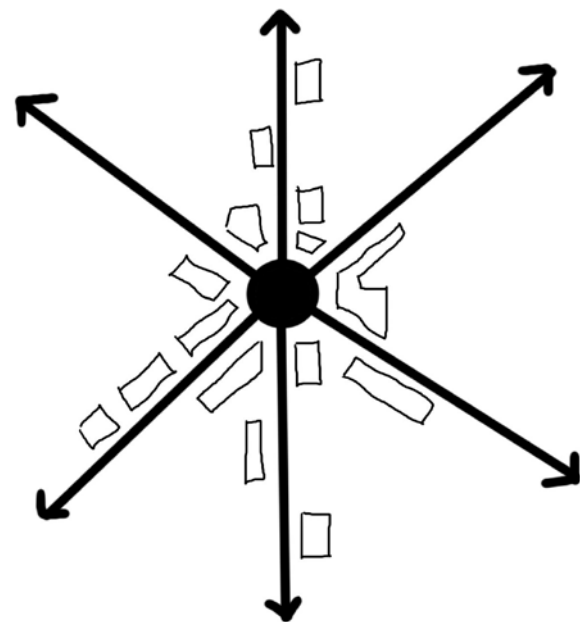


figure 25: diagrammatic plan of a radial layout (Dias, 2024c)

Feeling connected to a place is often rooted in a sense of control and ownership. Encouraging residents to personalise their spaces through **adaptable elements** (such as chalkboard walls, designated flowerbeds, hanging systems, and **flexible layouts** that can be changed according to individual needs) are small design considerations with great impact. It breeds a sense of familiarity and comfort, making the village feel more like home. During my visit to Lethabo le Khutso, I found it interesting how each resident customised their room. Wall décor featured family photos, and furniture choices reflected personal preferences for comfort and familiarity. This brings me to a favourite quote of mine by Victoria Margrethe Bencsik which illustrates how personal belongings can turn a house into a home:

“I love all of my carefully selected objects in my home. Some of them have been with me from the house I grew up in, some come from the South in USA. Some come from my life in NYC. Some come from my time in France, and some are from this life, the one I’m living now in Oslo. I really like to view my home as an extension of my brain. If your home has no personality, who are you? At least for me, in my home, my objects are like silent witnesses to my stories. Like chapters in the autobiography of my life. I love it. I love my home. A representation of all the lives lived in this life.”

(Victoria Margrethe Bencsik, 2024)

We all deserve to thrive in our living spaces, whether we live independently or with additional support. My visit to The Apricot Tree School also demonstrated an emphasis on **designated spaces for personal belongings**. Each student is assigned a locker, highlighting the importance of dedicated storage as emphasised by the teacher. This emphasis suggests a strong sense of possessiveness among the students regarding their

belongings. This alignment between my observations at Lethabo le Khutso and Apricot Tree underscores the innate human need for **personalisation** and a **feeling of control** over one’s immediate surroundings, even in shared spaces.



figure 26: designated storage for individuals at Apricot Tree (Dias, 2024b)

To create safe environments for individuals with autism, it’s necessary to consider the principles of place attachment and place identity theory. The implementation of communal areas in the village will foster a shared sense of ownership among residents, thereby promoting social interaction and collaborative success. Furthermore, allocating spaces for communal festivities and traditions enables residents to create shared memories that strengthen their connection to the community village. This enables the village to forge a distinct place identity. Beyond these powerful spaces, the village’s character can be further distinguished by incorporating a well-known landmark or a unique architectural language. One way to achieve this is by carefully selecting materials and design elements that complement the surrounding context and contribute to the overall identity of the space. By incorporating **landmarks, clear layouts, adaptable spaces, distinctive features**, and **memorable meeting points**, the design becomes more welcoming and easier to navigate. This fosters a sense of belonging and empowers individuals with autism to thrive within their community.

2.3. the sense of home

description

Place attachment is intrinsically linked to the sense of home. The sense of home involves a deep connection and sense of grounding that has a major impact on our mental health (Arul Selvan, 2023). Home provides a haven for self-discovery and authenticity in a complex world.

relevance to research aim

By exploring the concept of home and its significance, we can gain insights into how to create a sense of rootedness and warmth in both the residential and communal settings to improve the quality of life of individuals with autism.

theory exploration and design applications

A research study by M.D. Rijnaard et al. investigated the elements impacting the sense of home in the context of nursing homes. While nursing homes for the elderly and those catering to individuals with autism spectrum disorder (ASD) serve different populations, there are significant parallels between the two that can inform the design of inclusive environments.

Nursing homes or assisted living facilities are challenged with balancing their clinical role with the need to create a home-like environment that enhances residents' overall well-being (Rijnaard et al., 2016). Moving to an assisted living community can be a life-changing experience, this transition can cause anxiety for those who do not adapt well to change. Lethabo le Khutso implements a thoughtful transition program, encouraging new participants to integrate into the space gradually. This usually involves initial short visits with loved ones, progressing to day visits, overnight stays at the respite centre, and eventually moving in full-time. Developing

a sense of home is a multifaceted phenomenon that is shaped by psychological factors, social aspects, and the built environment (Rijnaard et al., 2016). A closer examination of these three themes will reveal further insights.

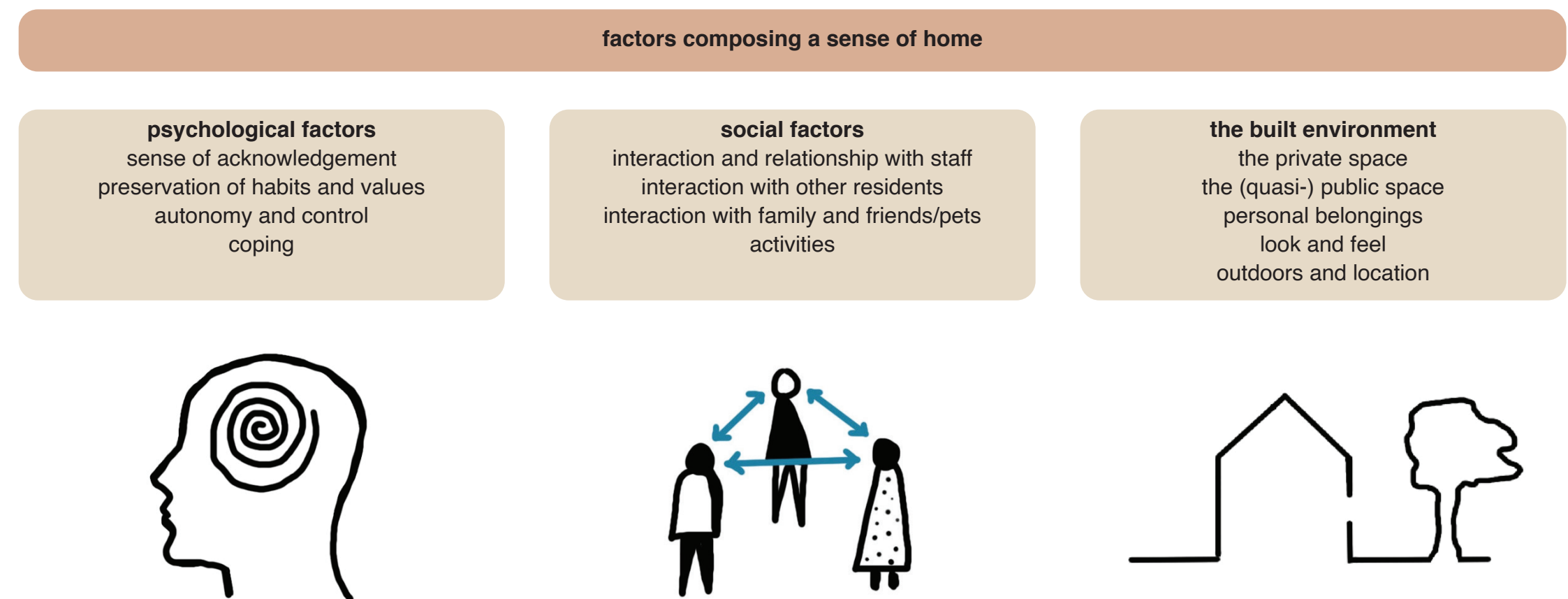


figure 27: outline of the factors composing a sense of home (adapted from Rijnaard et al., 2016)

Firstly, psychological factors include the sense of acknowledgment, preservation of one's habits and values, autonomy and control, and coping. Residents feel acknowledged when caregivers prioritise resident-centred care, and they feel more valuable when they are respected, seen and heard. People with autism benefit greatly from routine and familiarity. Giving residents the freedom to carry out their regular routines and errands within their private sphere will make them feel more at home. This entails honouring their spiritual practices as well as their individual preferences and sensory sensitivity. **Autonomy** and **control** are essential for long-term care residents.

Part of feeling at home is having the choice to do what you want to do and go where you want to go. The **freedom of movement** is, therefore, necessary for residents to be able to easily access their neighbourhood by walking or utilising a taxi service. The freedom to decorate and furnish their own areas gives them a sense of stability and ownership, with something as small as being able to drill holes in the walls providing a feeling of permanence. New residents naturally adjust at different paces. Those struggling to adjust may be less likely to **personalise** their space, reinforcing feelings of displacement. The design challenge is to create a space that, even for people who are opposed to change at first, feels comfortable and invites them to participate in their new life.

Group living situations could result in unwanted socialisation which could undermine residents' sense of autonomy, and so it is important for residents to be able to control who they allow in and out of their personal space (Rijnaard et al., 2016). With that said, **controlled access** and **thresholds** should be carefully considered. People value their independence. Creating a setting that feels like home promotes self-reliance and lessens the sense of dependency that comes with staying in a standard healthcare facility.

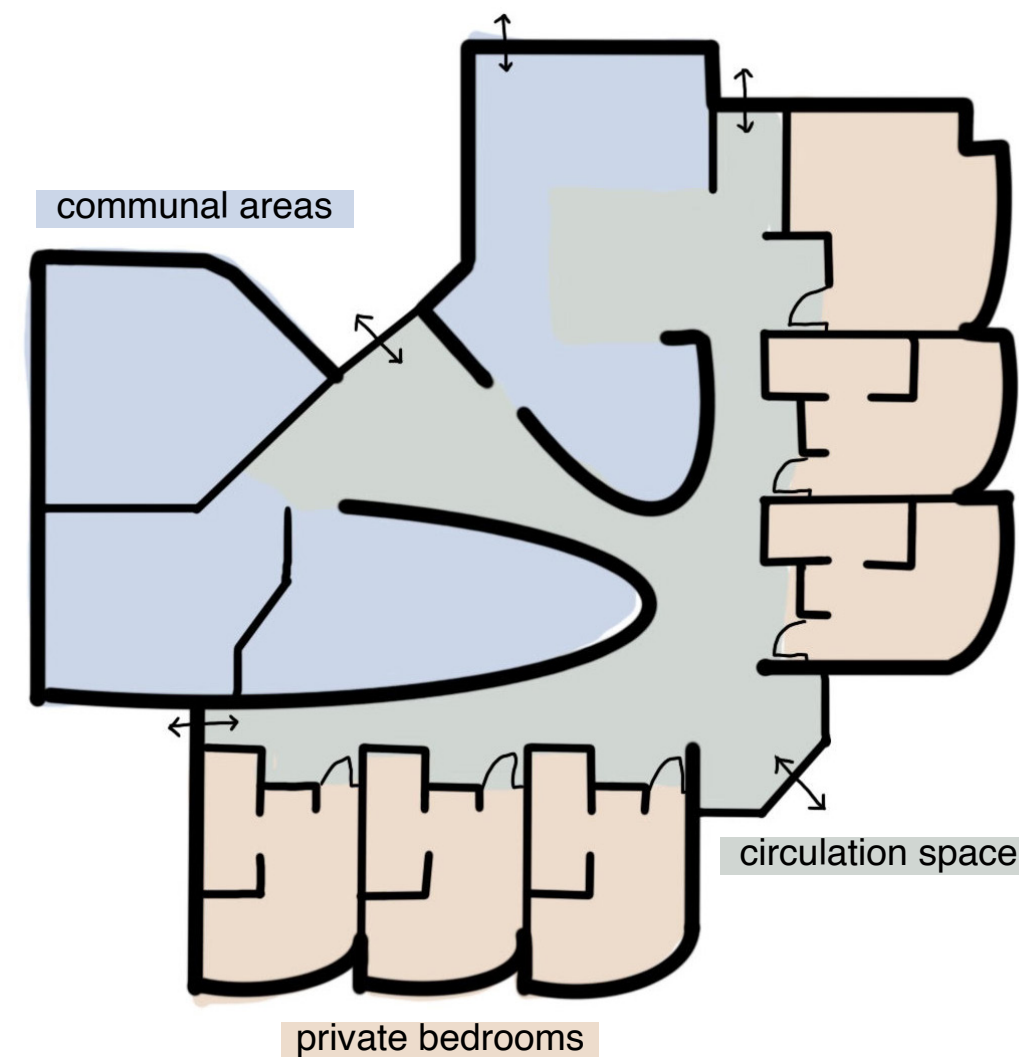


figure 28: diagrammatic plan of Nottingham Regional Society for Autistic children and adults (adapted from Kristi Gaines et al., 2016).

The plan above illustrates how **circulation spaces can be used to create thresholds** between private bedrooms and communal areas, eliminating the need for traditional passageways.

Secondly, social factors include relationships with staff, fellow residents, family and friends, pets, and activities. Humans have a deep-rooted need to belong. 'Belonging' is defined as feeling comfortable as part of a group that has welcomed you. A sense of community and social ties are essential to belonging and to a person's well-being.

An atmosphere that feels like home is created by friendly staff interactions, privacy awareness, and resident involvement in everyday tasks. The study found that staff wearing casual attire is preferred in the nursing home as it encourages equality. This is because staff uniforms might lead to a power imbalance (Rijnaard et al., 2016). Similarly, places with intentional architectural design can convey a feeling of community and eliminate unequal power relations. According to the South African National Healthcare Act (NHA) for Intellectual Disabilities, all buildings falling under the categories of Group homes and/or Supported Independent Living Units must be single storey (Motsoaledi, 2018). To ensure a truly inclusive environment, all residential units, regardless of their purpose being for individuals on the spectrum or for staff, should **prioritise accessibility** and **promote a sense of equality** among residents and staff.

Limited staff can result in impersonal care, underscoring the necessity of sufficient staffing numbers. According to the NHA, the caregiver-to-resident ratio should be no less than 1:5, but as recommended the manager at Lethabo le Khutso, a ratio of 1:3 is better suited for the specific needs of the autism community (Motsoaledi, 2018). It goes without saying that involving the family is also essential. Staff, residents, and families naturally form an integrated network of support with the interests of the residents at the forefront. This family-like dynamic can be encouraged through thoughtful design solutions, such as allowing for users to share homemade meals in communal kitchens instead of big-unit kitchens. Likewise, family members reported feeling more a part of the group in smaller settings. In this regard, **smaller group houses** would be more practical.

Socialising with other residents in group homes can have both advantages and disadvantages. Social interactions might lead to disagreements when there is an uneven distribution of genders or cognitive disparities. According to data collected by the Centre for Disease Control and Prevention (CDC) in 2018, the estimated male to female ratio in autism is 4:1, although other studies suggest a ratio closer to 3:1 (De Goede, 2022). Lethabo le Khutso currently provides care for 20 residents, with a male majority of 17 residents, and 3 female residents. The manager observed that there have been challenges with social dynamics among some residents, and so residents who don't work well together are separated during workshops. The design should be able to **accommodate several different group activities at once**. According to clause 16.20 of the NHA, "separate accommodation must be provided for children and adults, if housed in the same facility, and provide for gender separation in sleeping and ablution areas" (Motsoaledi, 2018, p149). Given the abovementioned demographics, the design should offer **separate residential areas for men and women, reflecting the 3:1 ratio**.

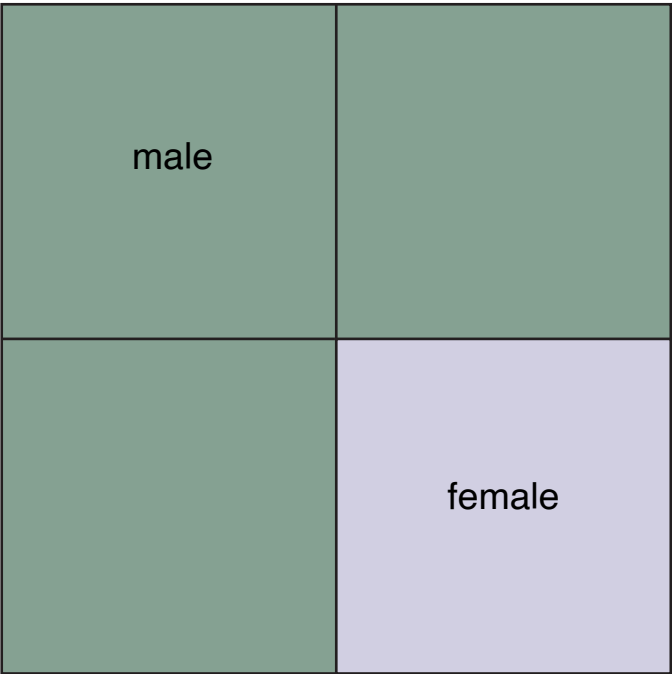


figure 29: diagram reflecting the male to female ratio (Dias, 2024d)

Residents in the nursing home found joy in partaking in activities with the broader community. This includes ventures outside of the facility, such as walks around the neighbourhood, sports, and fishing. On site there is a more fundamental need to tailor activities to residents' individual needs, skills, and preferences, including offering customised options or private activities with family members. These activities, like cooking classes, arts and crafts, and floristry, can nurture their creativity and provide fulfilling opportunities to connect with the home environment.

Pets can play a valuable role in creating a warm and welcoming home environment. While the study highlights the positive impact of pets in fostering comfort and social interaction, introducing live animals in a group home setting might be challenging due to potential agitation for some residents. An alternative approach could involve incorporating a designated pet area or designing elements that **attract wildlife**, such as bird feeders, to create a more biophilic environment.

Lastly, the built environment includes the private space, the (quasi-) public space, personal belongings, technology, look and feel, and the outdoors and location.

Having a private space, whether single or shared, is associated with "home". Personalisation and a sense of ownership are made possible by private spaces. While autistic individuals often find fulfilment in spending time alone, social interaction can be enriching. The design should facilitate and encourage social engagement between neighbours by placing **communal and outdoor areas in key locations**. Communal living areas should be **spacious** to prevent overcrowding and ensure easy movement, especially for those with mobility limitations. Bathrooms play a major role in daily routines, making them a highly functional space within a home. It is common for autistic individuals to experience anxiety when going to the bathroom, and so it is important to make this space comfortable (Bennie, 2019).

The (quasi-) public space refers to the indoor space that is shared by residents, also known as indoor communal spaces. Achieving a **harmonious balance between communal and private areas** is crucial when designing group homes. As identified earlier, smaller residential layouts help people feel like they belong, and they are not just a number. Typical residential layouts have **distinct lines separating public and private spaces**, forming clear boundaries between spaces for interaction and spaces for solitude. Even while quasi-public spaces promote social engagement, large communal rooms that lack privacy can be overpowering. **Including quiet areas** or nooks in these common areas provides residents with a place to withdraw for peaceful contemplation or private discussions without having to retract to their bedrooms. Though small and tucked away, these locations must have **good lighting** and be easily accessible in an emergency (Rijnaard et al., 2016). Balancing resident privacy and safety is challenging; communal spaces should be designed to facilitate natural oversight by staff, perhaps through **sightlines**, while still feeling open and encouraging resident interaction.

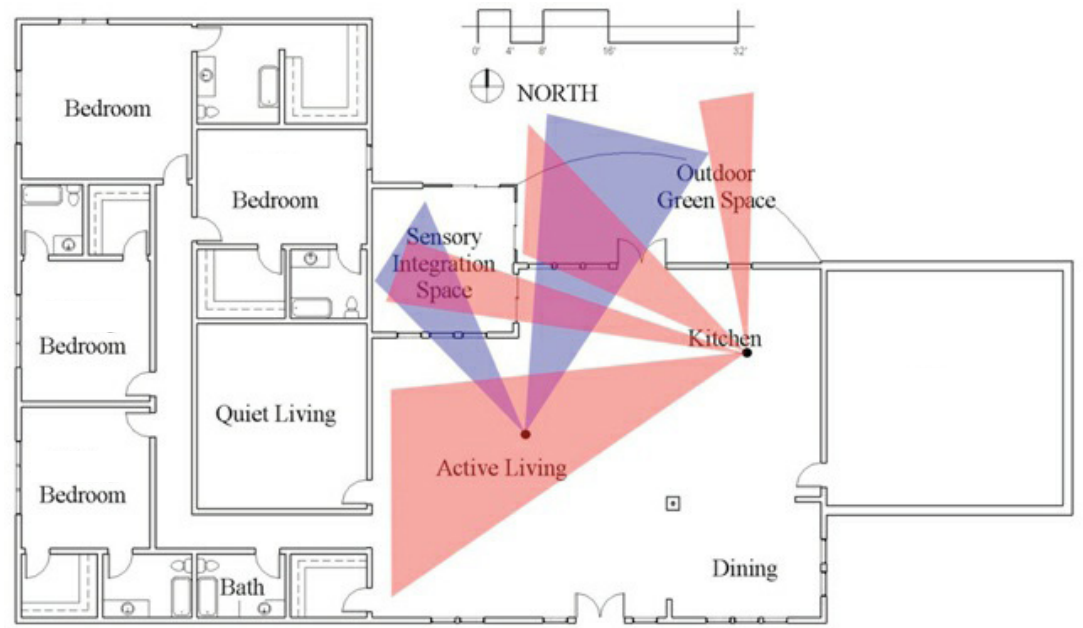


figure 30: designing for staff observation in the communal spaces of a group home (adapted from Kristi Gaines et al., 2016).

The importance of resident well-being has been well established. This extends beyond the physical walls of the house and into the surrounding landscape. Being able to walk for leisure and/or exercise within the safety of the community is necessary, and so **dedicated walking trails** can improve the physical health of the users; these should preferably be **shaped like a circle** to prevent dead ends. Tranquil sensory gardens and serene areas could be scattered between the village to improve the walking experience.

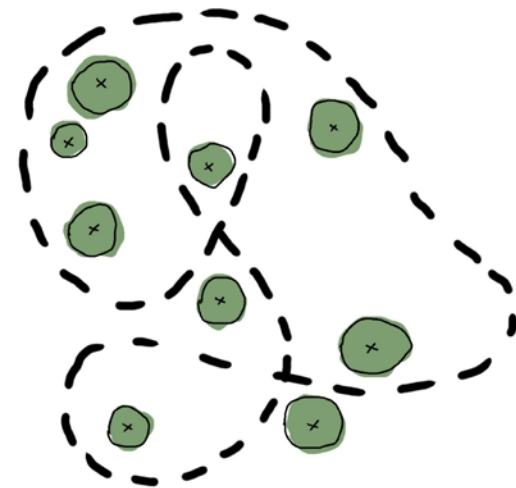


figure 31: infinite outdoor walking trail (Dias, 2024f)

To reiterate, being able to customise a space with one's personal belongings strengthens self-identity and fosters a strong emotional connection to the environment. Residents value the control that comes with arranging and organising their space to their liking and incorporating special pieces from their previous home to comfortably move into their new one. Another important aspect to consider as part of the built environment is technology. Technology is constantly evolving and is "always advantageous to special needs," in the words of the Apricot Tree NPO founder. Novel care technologies like iPads can empower residents by facilitating communication and offering cognitive learning tools. In Fleming's study, television sets were a favourite amongst residents providing them with insight to the outside world and a comfortable distraction (Fleming et al., 2015, as cited by Rijnaard et al., 2016).

Creating a home-like atmosphere goes beyond functionality. Although function over form is imperative in this context, according to the founder of Apricot Tree, the look and feel is also important. Studies and interviews with residents and professionals highlight the importance of sensory experiences and avoiding a clinical feel. Cleanliness, organisation, and a welcoming environment is essential, with simple features like flowers in the garden adding a delightful personal touch (Cooney, 2012, as cited by Rijnaard et al., 2016).

In addition, the research also suggests that comfortable and functional furniture that caters to individual needs is key. The ability to arrange furniture to personal preferences fosters a sense of control for residents and allows for flexibility in communal spaces.

While the concept of 'a sense of home' is multifaceted, a successful community living centre should weave together all the relevant aspects (social, psychological, and architectural) to create a holistic outcome. The domestic spaces should accommodate three main objectives: **routines**, **responsibilities**, and **reflection**. Although research is still in its early stages, some characteristics of Dutch small group homes, such as their emphasis on privacy, resident **opportunity for choice**, and autonomy, appear to play a major role in establishing a homey atmosphere (Rijnaard et al., 2016).

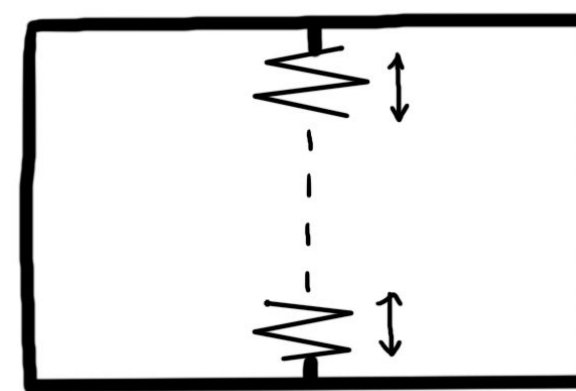


figure 32: sketch plan demonstrating flexible/adaptable spaces created with stacking doors (Dias, 2024l)

2.4. prospect and refuge theory

description

Another way of establishing a sense of control through architecture is the prospect and refuge theory. Physical barriers are not the only thing that make a place seem safe and secure. Environmental psychologists have studied the prospect-refuge theory, which explains why people feel more secure in some settings. It is the idea of being able to see (prospect) without being seen (refuge). The right balance between the frame and the view is important to create a sense of security, whether real or perceived. The diagram alongside illustrates this theory.

relevance to research aim

Understanding prospect and refuge theory can help design environments that create a sense of safety and control for persons with autism.

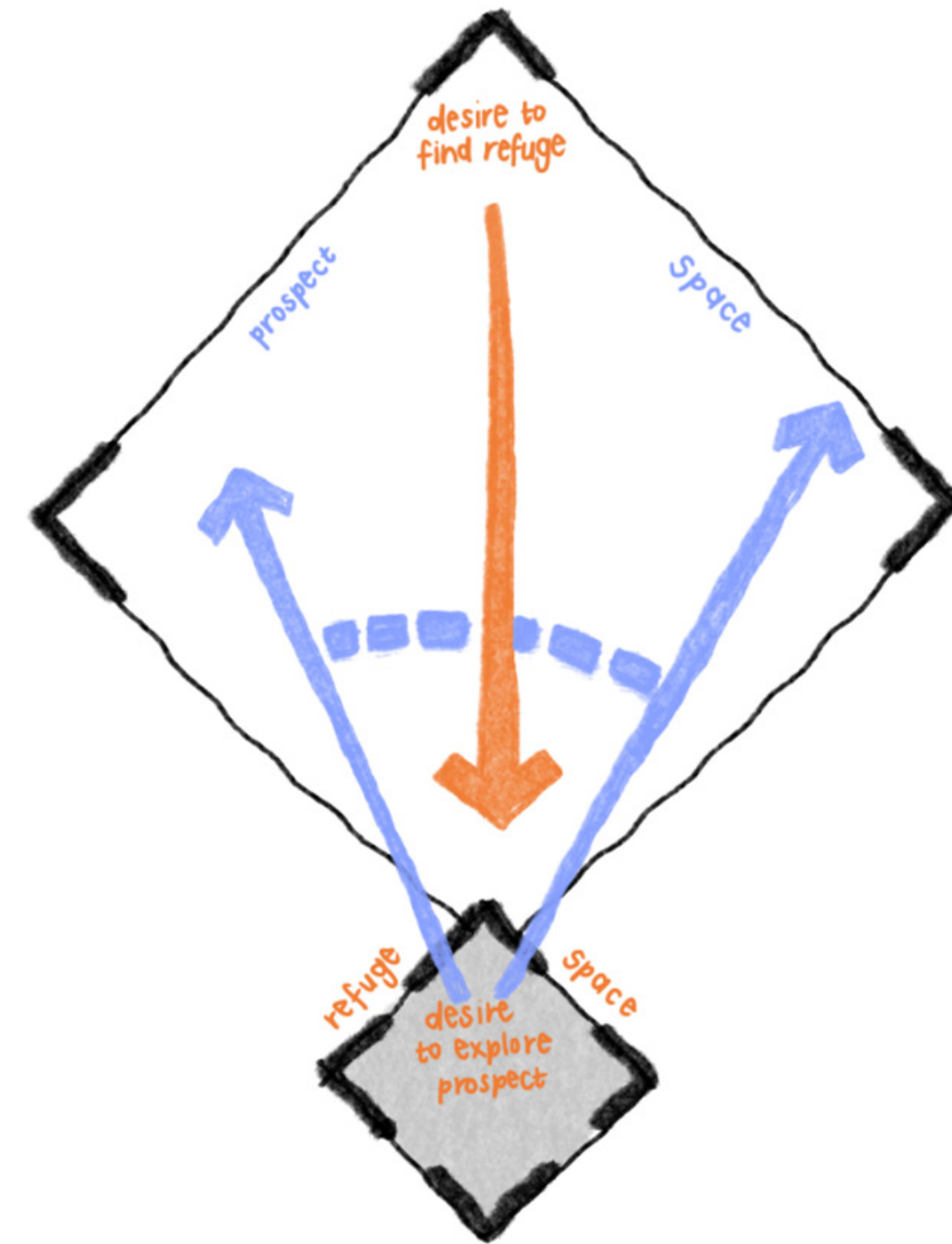


figure 33: diagram explaining prospect and refuge theory (adapted from Slocombe, 2019)

theory exploration and design applications

According to Appleton, an academic and poet who pioneered the theory, a person's perception and comfort is largely influenced by its spaciousness to allow for exploration, its layout and scale, and the availability of natural light. To these conditions, he adds "hazards", referring to potential threats or risks that can impact environmental preference. He hypothesizes that an equivalent ratio between prospect, refuge, and hazard symbols creates "balance" in a space/landscape (Dosen and Ostwald, 2013).

Professor Grant Hildebrand of the University of Washington had a background in both architecture and art history. He studied the spatial patterns of Frank Lloyd Wright's domestic architecture, leading him to prospect-refuge theory. He saw a recurring theme in Wright's houses: a thoughtful balance between open spaces with fireplaces (providing refuge) and expansive windows or terraces (providing prospect, a view of the surroundings). Hildebrand claimed that our enjoyment of an architectural space is largely dependent on our ability to feel safe and see our surroundings. Hildebrand refers to Wright's repeated arrangement of elements as "Wright's pattern". Wright's design of the Arthur Heurtley House, completed in 1902, is the first instance in which he finds all thirteen of the pattern's characteristics together:

"The major spaces are elevated well above the terrain they overlook. The fireplace is withdrawn to the heart of the house [...] emphasised by a low ceiling edge and flanking built-in seating and cabinetwork. The ceiling forward of the fireplace zone sweeps upward into the roof [...]. There are interior views to contiguous spaces seen beyond architectural devices. Glass and glazed doors are located on walls distant from the fire. A generous elevated terrace lies beyond. The exterior consists of deep overhanging eaves, an evident central chimney, broad horizontal groupings of window

bands, and conspicuous balconies or terraces. The connection from exterior to interior is by means of a long and circuitous path."

(Dosen and Ostwald, 2013, p16).

The plans of the house are shown below:

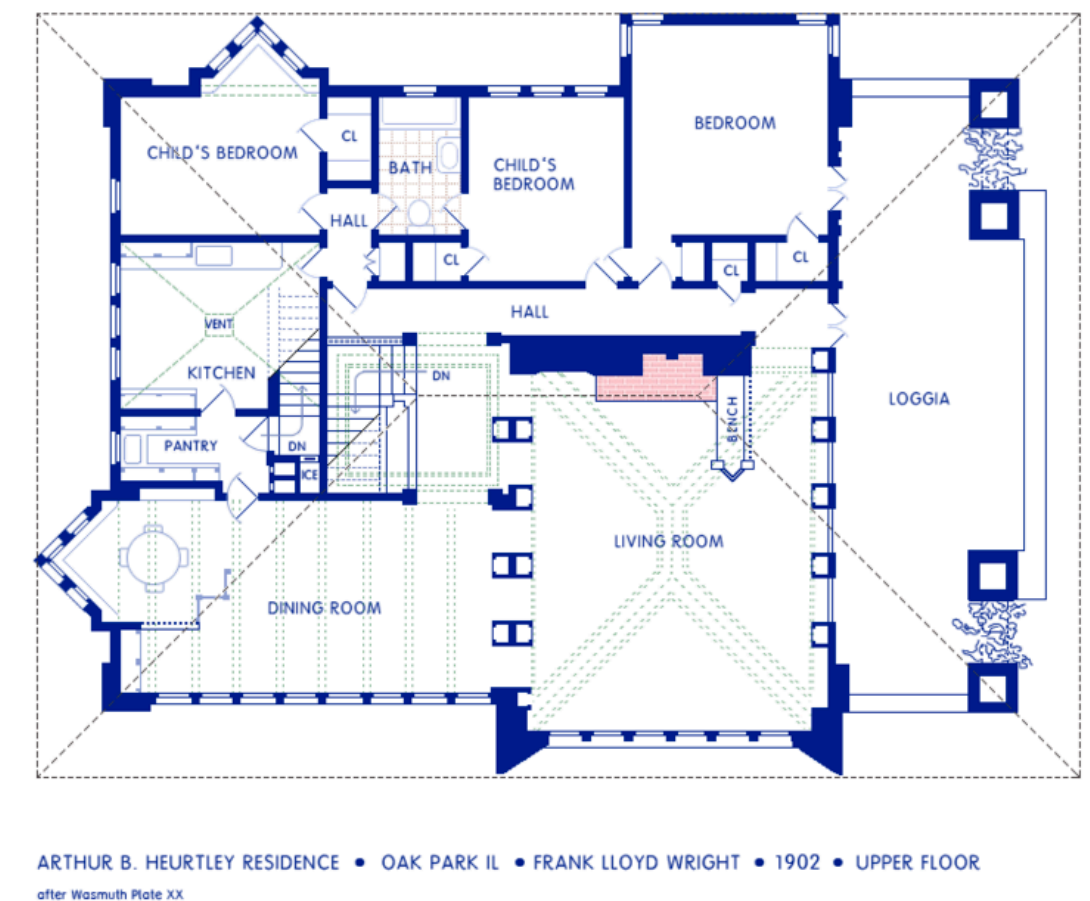
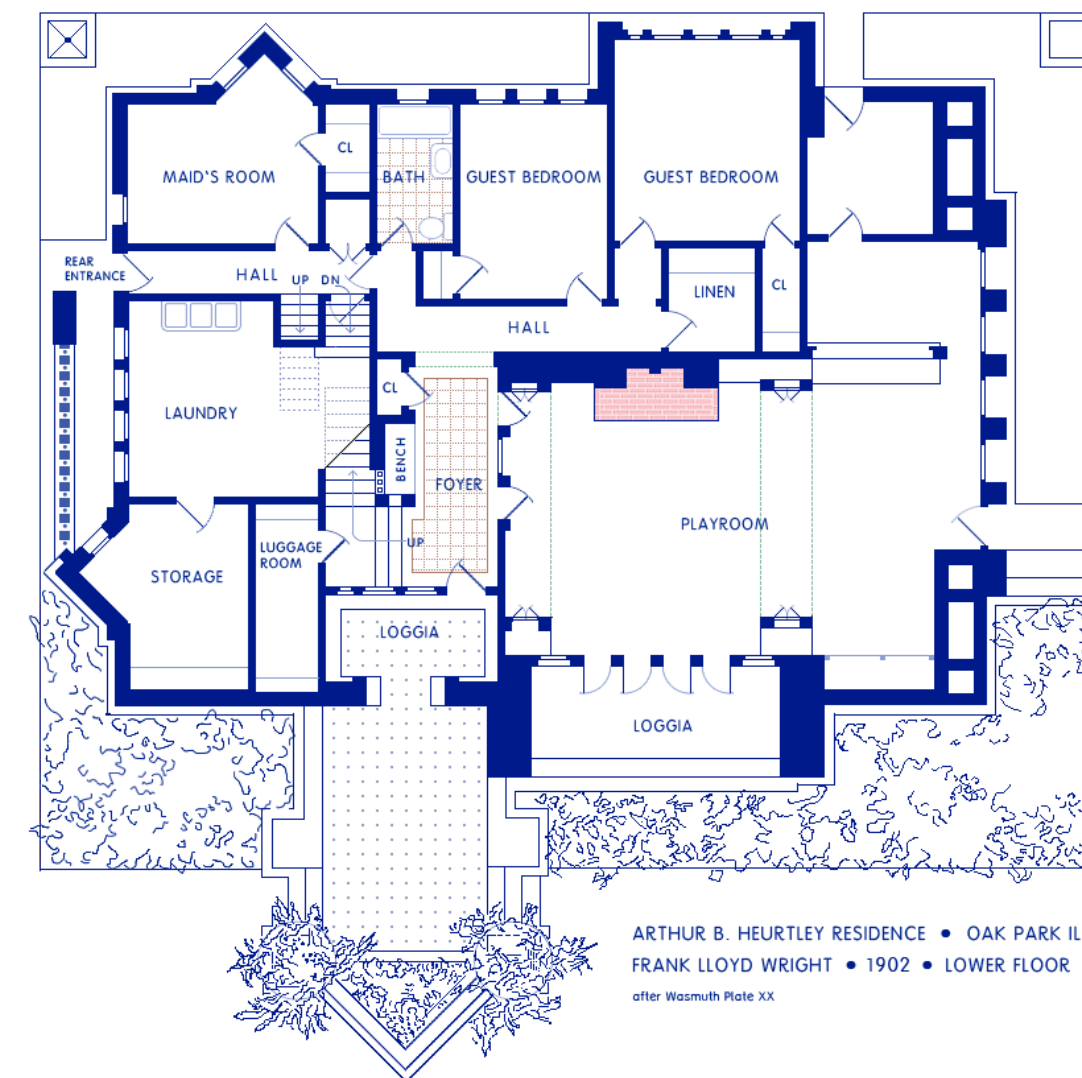


figure 34: Lower and Upper floor plan of the Arthur Heurtley House by Frank Lloyd Wright (Freiluft, 2023)



figure 35: exterior view of the Arthur Heurtley House (Frank Lloyd Wright Foundation, n.d.)



figure 36: interior view of the Arthur Heurtley House (Murphy, 2019)

Interestingly so, Hilderbrand thinks that Wright himself may have been unaware of these patterns. While Wright did not employ every characteristic in every one of his houses, most of his significant designs had 10 or more of them.

The table below shows the thirteen characteristics of Wright’s pattern and how they contribute to the prospect-refuge theory:

Characteristics	Prospect	Refuge	Complexity
major spaces elevated	yes	-	-
withdrawn fireplace	-	yes	-
low ceiling	-	yes	-
built-in seating and cabinetwork	-	yes	-
ceiling sweeping upwards into roof	yes	-	-
interior views to contiguous spaces	yes	-	yes
glass and glazed door	yes	-	-
generous elevated terrace	yes	-	-
deep overhanging eaves	yes	yes	-
evident central chimney	-	yes	-
horizontal window bands	yes	-	-
conspic u ous balconies or terraces	yes	-	-
connection of exterior to interior/circuitous path	yes	-	yes

figure 37: table demonstrating Wright’s Pattern, as identified by Hilderbrand (Dosen and Ostwald, 2013).

Hildebrand elaborated on this theory, suggesting that pleasant environments have a sense of complexity and order, enticement (the desire to explore), and even a touch of peril (perceived danger). For these components to function well, though, an intriguing setting or a spacious interior is necessary. What one individual considers complex may be considered orderly by another. The important thing is that the design is **adaptable**, providing **different levels of security and openness** to match the resident’s mood. It’s this deliberate elemental balance that turns a room from useful to enjoyable. In a landscape, a reachable place of refuge or a visible escape route makes promotes a feeling of safety and control (Ruddell and Hammitt, 1987, as cited by Dosen and Ostwald, 2013). The conclusions drawn by Hildebrand include that “human pleasure is a legitimate architectural purpose” and that prospect and refuge spatial conditions are “keys to our appropriate habitation” (Dosen and Ostwald, 2013).

The table below shows the characteristics of Hilderbrand’s elaborated prospect-refuge theory:

Category	Prospect and refuge		Complexity and order		Enticement	Peril
Relationship	mutually complementary		coexistent (depends on individual)			
Attribute	expansive, bright	small, dark	high level	high degree	desire to explore	handling danger
Symbolism	intrinsic pleasure when observing	hiding, safety	overwhelming; movement allows choice	pleasure	view (light) and opportunity for movement	source of pleasure
Meaning	fundamental to habitable space		key to aesthetic approach		fundamental to habitable space	

These design guidelines can be used to create a design that meets the requirements of its residents in a variety of ways. **Lower ceilings** in particular spaces, for instance, can promote a feeling of secure containment (Dosen and Ostwald, 2013). This makes it possible for users to find comfortable spots throughout, whether they are in the mood to find refuge or to explore. While social interaction can be stimulating, people with autism occasionally prefer calmer areas to unwind and regulate. Therefore, **strategically placing breakout areas** throughout is crucial. These refuge spaces should provide views of their surrounding prospects. As mentioned earlier, providing opportunities for individuals to observe their surroundings from a safe vantage point can help them prepare for social interactions and activities. Additionally, design elements that provide occupants control over sensory input, such as **adjustable lighting and quiet corners**, allows them to move within or change their environment to suit their needs. The prospect-refuge can be valuable in both domestic and communal settings.

figure 38: table demonstrating Hilderbrand’s characteristics (Dosen and Ostwald, 2013).

2.5. deinstitutionalisation

description

Studies reveal that persons who are used to living in institutions may find it difficult to adjust to a community environment due to a lack of social skills. One of the key takeaways from the 2006 United Nations Convention on the Rights of Persons with Disabilities is the freedom to live independently and in a location of one's choosing. Moving individuals with disabilities and mental health issues from institutions to community-living arrangements that support independent decision-making and full participation in society is known as "deinstitutionalisation." This process has been happening in Scandinavia, the UK, the USA, Canada, and Australia since the 1960s, but at varying times and at varying speeds (McCarron et al., 2019). While some countries are just getting started, others have almost completely switched to community care. Countries starting the process are often slowed down by issues such as lack of funding, legal obstacles, and the need for staff training (Beadle-Brown, Mansell and Kozma, 2007).

relevance to research aim

The research considers the theory of deinstitutionalisation to learn to create environments where individuals feel valued and included, rather than merely a number within an institution. Deinstitutionalisation empowers individuals by promoting self-sufficiency and reducing feelings of dependence.

theory exploration and design applications

The process of deinstitutionalisation is not as simple closing institutions that lack individualised support. It is about developing quality community environments that foster social inclusion, autonomy, and a good quality of life for all. Although community life can increase social interaction, it is not guaranteed that residents

will feel included, find a sense of belonging, embrace the change, or find deeper connections (Beadle-Brown, Mansell and Kozma, 2007).

Research reveals that persons with severe disabilities experience less social inclusion, less engagement in purposeful activities, and have fewer opportunities for choice in community settings. Part of the architectural challenge is to mitigate these trends and ensure that all individuals on the spectrum feel welcome and experience the benefits of communal living.

Hence, quality community care requires adequate support that caters to the specific needs of each person. Self-directed support is a philosophy that allows for persons with disabilities and their families to determine the kind of support they need, instead of leaving this to professionals. A step towards thorough individualised care could be a collaboration between family and professionals; family offers irreplaceable love and compassion for the routines and preferences of a loved one, while a professional offers objective opinions and valuable knowledge. Moreover, prioritising the creation of **family-friendly spaces** where residents and their loved ones can enjoy time together is a key consideration. Additionally, **accessibility** and resident wellbeing are crucial to building a healthy community (Beadle-Brown, Mansell and Kozma, 2007). Residents dislike a sterile, hospital-like environment (van Dijck-Heinen et al., 2014, as cited by Rijnaard et al., 2016). Freshness and cleanliness are important, but they should be achieved in a way that feels warm and inviting (Rijnaard et al., 2016). This suggests the use of **warm and natural materials and textures** that foster a home-like environment.

Circling back to the idea of place attachment in the context of a nursing home, when a supported living community is **situated in a familiar area**, the residents experience a greater sense of belonging (Rijnaard et al., 2016). According to studies, residents in large cities are less likely to feel at home than people who live in their hometown or old neighbourhood, where they may be nearer

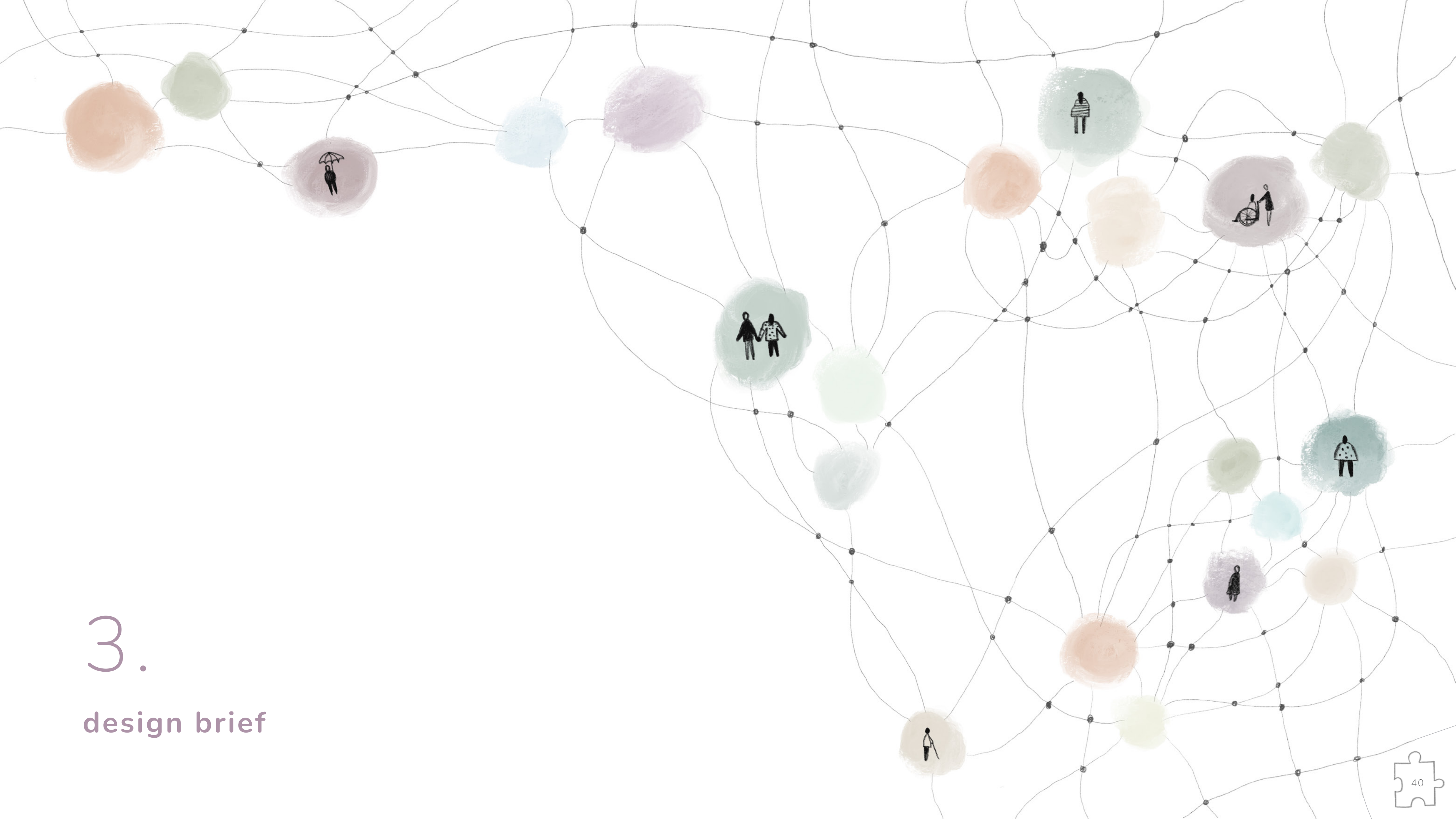
to familiar landmarks and loved ones. The inviting suburb of Rynfield provides an appropriate setting for neighbourhood engagement, with ample recreational activities and natural landscapes nearby.

On a larger scale, the large site allows for plenty of outdoor space. Residents and caregivers alike value the ability to spend time outdoors, and simply having a **view from their room** is a significant factor in resident satisfaction. The type of view itself seems less important than having one, suggesting a general desire for connection with the outside world (Rijnaard et al., 2016). By prioritising **familiarity, access to nature**, and **opportunities for outdoor engagement**, communal homes can create a more home-like environment for their residents.



figure 39: connection to nature (Dias, 2024b)

By analysing the reasons for and benefits of deinstitutionalisation, the design should keep these resident preferences in mind to create community living centres that foster a sense of belonging and well-being.



3.

design brief

3.1. brief

Many individuals with autism requiring extensive support in South Africa find themselves in all-inclusive special needs facilities that may not adequately address their unique needs and preferences. The project objective is to create an inclusive support network that empowers adults with autism. The project is inspired by the Apricot Tree nonprofit organisation, a day centre for children and young adults with disabilities and should expand upon their commitment to building a more inclusive society. The design will be informed by environmental psychology principles, encompassing frameworks such as sensory processing theory, place attachment and place identity theory, the sense of home, prospect and refuge theory, and deinstitutionalisation.

The site is situated in the friendly and quiet neighbourhood of Rynfield, Benoni, the home of Apricot Tree. The large site area allows for opportunities for future growth and the preservation of green spaces that encourage community engagement and social integration.

The development will include a public park, day care centre, and a private residential component.

The residential component will focus on providing 24/7 care for those with significant support needs, while the day program will be open to individuals of all levels of support, from those who require minimal assistance to those who require more intensive care. The day care program will exist within the learning and therapy centre and extend into communal areas to encourage social interaction. This centre will include an admin and medical block, classrooms, therapy and sensory rooms, family rooms, activity spaces, and a multi-purpose hall.

The project will also accommodate on-site vocational opportunities contributing to sheltered employment. Sheltered employment refers to employment in a workshop, at home, or a regular work

environment for persons with disabilities. It is non-competitive and offers appropriate assistance and opportunities for individuals with disabilities to engage in meaningful employment and experience economic independence (Krainski, 2021). These vocational activities will include large vegetable, tea, and herb gardens, nurseries, a laundromat, café, market, arts and crafts studio, and other commercial spaces that generate income for residents, participants, and the facility.

The primary focus of this thesis is the learning and therapy centre, along with the residential component. While the remaining aspects of the project will be explored conceptually, they contribute to the overall vision of the development.

3.2. South African National Healthcare Act for persons with intellectual disability

According to the South African National Healthcare Act, 2003 (policy guidelines for the licensing of residential and/or day care facilities for persons with mental illness and/or severe or profound intellectual disability) from the Department of Social Development, the following delivery of services is required: (Motsoaledi, 2018)

These outlines provide valuable insights into the spatial requirements for this type of facility in South Africa and should be considered during the design process. I have selected the most relevant information for this research.

Facilities and Infrastructure Norms and Standards	
16.2	The residential facility or day care facility should have a water reservoir with water to last for at least three days.
16.3	The facility must comply with National Building Regulations, contained in Government Notice R2378 published in Government Gazette No 12780 of 12 October 1990, with regards to ventilation and lighting.
16.5	The residential care facility or day care facility must have a secure perimeter wall or fence to ensure safety and security.
16.6	Access to the facility must be security controlled.
16.7	The layout and design of the residential care facility must provide for sleeping areas, residential caretaker sleeping area, ablution, rehabilitation and recreation room, dining room, family visits room, medical procedures room, food storage/pantry, cooking area/kitchen, laundry, refuse storage area, storeroom, reception and administrative office.
16.11	Must protect users harming themselves/others or property.
16.12	The layout and design must allow for easy supervision and observation.
16.13	The layout and design should provide enough space for mobility to freely move within the facility.
16.15	The facility must provide for the privacy of mental health care users.
16.17	Fire precautionary measures and management procedures should be in accordance with the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977).
16.19	All areas must be clean, safe, and reflect as much as possible the preferences of the users living there.
16.20	Separate accommodation must be provided for children and adults, if housed in the same facility, and provide for gender separation in sleeping and ablution areas.
17.7	The proprietor/manager must establish and maintain clinical assessment and treatment services management systems, facilities, structures, and operational procedures that give effect to appropriate medical, psychiatric, nursing, psychological, and occupational therapy management, as per acceptable clinical practice, as well as to national and provincial policies and guidelines regarding standard treatment guidelines and essential medications appropriate for the level of service.

figure 40a: the South African National Healthcare Act, 2003 (adapted from Motsoaledi, 2018)

Functional area	Norm	Standard
Type of facility	Day care	This is a non-residential facility that offers daytime activities and social contact for mental health care users and persons with intellectual disability, including development and stimulation / training programmes (incl. self-help skills).
	Community Residential Care	A residential facility that provides long-term care, treatment, and rehabilitation to mental health care users who are not able to live with their families and/or independently. The infrastructure standards for residential facilities remain the same but will be adapted according to the number of users, the type of service and the needs of the users.
	Group homes	Group homes provide supported accommodation to mental health care users who cannot live independently due to their temporary/permanent mental incapacity, social integration or occupational placement challenges. It also provides the opportunity for mental health care users who have been previously institutionalized to gradually reintegrate into community living.
	Supported Independent /assisted Living Units	This term refers to the ongoing support in the form of individual or group supervision and instruction in basic skills of everyday living that mental health care users receive in the community.
	Halfway House, Group homes and Supported Independent Living Units	ALL BUILDINGS MUST BE SINGLE STOREY 2-3 bedrooms accommodation, floor space at least 18 m² per bedroom or according to the General Principles of Universal Design Policy (2005). OR Hostel type/Dormitory style accommodation at least 15m² per resident - except head of bed all sides 0.6m from walls and unobstructed space between beds of 1,2m or according to the General Principles of Universal Design Policy (2005). OR Maximum of 4 beds per room. Floor area not less than 7,5m² per bed or according to minimum Local Government By-Laws requirement OR Minimum floor area of any user's room must be 10m² and single rooms shall have a minimum wall length of 2.6m.
		- Doors wide enough to accommodate mobility devices and wheelchairs - Ramps for wheelchairs and mobility devices - No stairs - Toilets, baths, and showers designed to fit wheelchair and mobility devices - Non-slippery floors - Emergency routes clearly identified, visible during the night, and accessible for wheelchairs and other mobility devices
	Staff rest rooms and toilets	- Lockers for all staff - Hand wash basins with soap for the prevention of cross infections - Toilets for the staff and their visitors
	Examination/ treatment rooms	Examination/treatment rooms must have: - Privacy of users to be ensured - Well-ventilated area - Enough shelving and cupboards for various stock items - Wash hand basin with hot and cold running water - Non-slip and non-shining floor

		- Painted in light coloured, washable paint - Equipped for first aid and emergency situations - Lock-up facility for all medication and scheduled drugs with separate areas for medicines and bandages
	Passages/ Steps/ Staircase/ Ramps	- Outside passages covered for protection against elements - Corridors at least 1.8m wide and ideally provided with hand railing along the length of at least one wall - All corridors and ramps must have a non-slip floor surface and adequately lit and fitted with effective handrails - All steps must not be higher than 130mm or narrower than 355mm
	Bathrooms	- Bathroom facilities must be provided in the ratio of one [1] bath or shower to at least every ten [10] residents. - Back-up supply of water available and functional. - Bath positioned in such a way that users have adequate access and effective handgrips installed. - At least one [1] hand wash basin with constant thermostatically controlled hot and cold-water supply must be provided in each bathroom complex. - Walls and ceiling of the bathroom complex must be painted with light coloured, durable, washable paint. - Floors must be covered with a non-slip, non-shining surface.
	Toilets	- One [1] toilet for at least every ten [10] residents of each gender. - A floor area of not less than 2.8m². - A minimum width of 1.6m and a door with a width not less than 800mm. - Effective support rails must be provided in the toilets. - A urinal must be provided in the toilet complex where a facility is developed to be used by more than one male resident. - Non-shining flooring and easy to clean. - Painted in a light coloured durable and washable paint. - Toilet areas must be well ventilated.
	Toilets for visitors	Community residential facilities must have: - Separate toilet facilities for male and female visitors. - Hand wash basin supplied with constant hot and cold water.
	Sluice rooms	Sluice rooms in residential and frail care facilities must: - Have a minimum floor area of 15m² and a minimum width of 5m² - Be well ventilated - Provide a constant supply of hot and cold water - Be equipped with a combination slop hopper sink with a wash facility for bedpans/ urinals - Equipped with an impervious receptacle of adequate capacity with a close-fitting lid for soiled dressings to be removed by a recognized medical waste service provider - Reasonably accessible from bedrooms for people with disabilities - Equipped with a hand wash basin - Wall area behind slop hopper sink and hand wash basin must be supplied with a back splash plate or area must be tiled - Be painted in a washable, durable light-coloured paint - Floors must be washable - Have storage space for cleaning materials
	Laundry and ironing room	The laundry and ironing room in residential facilities must have: - Well-ventilated laundry area - accessible and adequately equipped for washing and ironing.

		- Walls must be painted with durable, washable and light-coloured paint. - There must be a separate storage area with slated shelves for clean linen.
	Kitchen	Kitchen must have: - A minimum floor area of 16m² for at least 32 residents. - The floor area must be calculated at 0.5m² per resident or according to Local Governments By-Laws minimum requirements to a maximum size of 90m². - Washing-up area separate from the food preparation area. - Separate food preparation basin - Separate pot wash basin - Hand wash basin for staff hand washing. - Impervious, easy-to-clean work surfaces in all areas - A facility to maintain perishable food at a temperature below 10°C - Sufficient suitable storage space for crockery, cutlery, and kitchen utensils
	Dining hall	A dining area must have: - A minimum floor area of 1.5m² per resident with adequate passages and aisles - Approved, suitable, and safe artificial heating system in the dining areas - Non-slip, non-shining floors - Well-ventilated area
	Recreation area/lounges	- The floor area of not less than 1.5m² per resident as per the Local Government By-Laws - This area must be designed and situated in such a way that it can also be used for occupational therapy
	Storage facilities	- There must be adequate storage facilities for linen, furniture, suitcases, cleaning detergents, medicines, and any harmful substances
	Admin office	- The facility must have suitable, furnished administrative offices on the premises.
	Proper and adequate ventilation/ Heating/ Cooling/ lighting	- The office must have proper and adequate ventilation, heating/cooling and lighting. - Must have adequate cross ventilation. - Must have proper lighting, not glazing. - Safe heating and cooling system in the rooms and the dining areas. (Heating system position in such a way not to jeopardize the safety of the residents and not damaging any of the structures of the building).
	Secure and safe environment	Secure and safe environment must have the following: - Windows and doors must be adequately protected or guarded to ensure the safety of residents. - Emergency exits and routes practical and clearly identified and visible at night. - Controlled access to facility. - Support railings on one side of corridors. - Non-slip and non-shining flooring surfaces. - Security of personal effects of staff and residents - Security and control over medication - Existence of emergency and disaster plan - Fire-fighting equipment in accordance with the Occupational Health and Safety Act 85 of 1993 - Individual lockers for staff personal items - Individual lockable cupboards for each resident

	Therapeutic environment	- Access to an area to undertake private discussions and interviews
	Functional, sufficient furniture and equipment	- There must be beds with mattresses, cupboard for private, safe and lockable chairs, bedpans etc. - Care equipment, e.g., crutches, wheelchairs - Catering equipment must be available - Laundry equipment must be available - Maintenance equipment - Furniture and equipment for staff requirements - There must be staff rest rooms - Appropriate first aid emergency equipment - Sanitation: clean drinking water, cooking and catering facilities, laundry facilities/washing facilities, nursing facilities/areas, recreational facilities/areas - Secure environment appropriate for the needs of the individual - Grounds are wheelchair or mobility device accessible - Designated smoking area

figure 4b: the South African National Healthcare Act, 2003 (adapted from Motsoaledi, 2018)

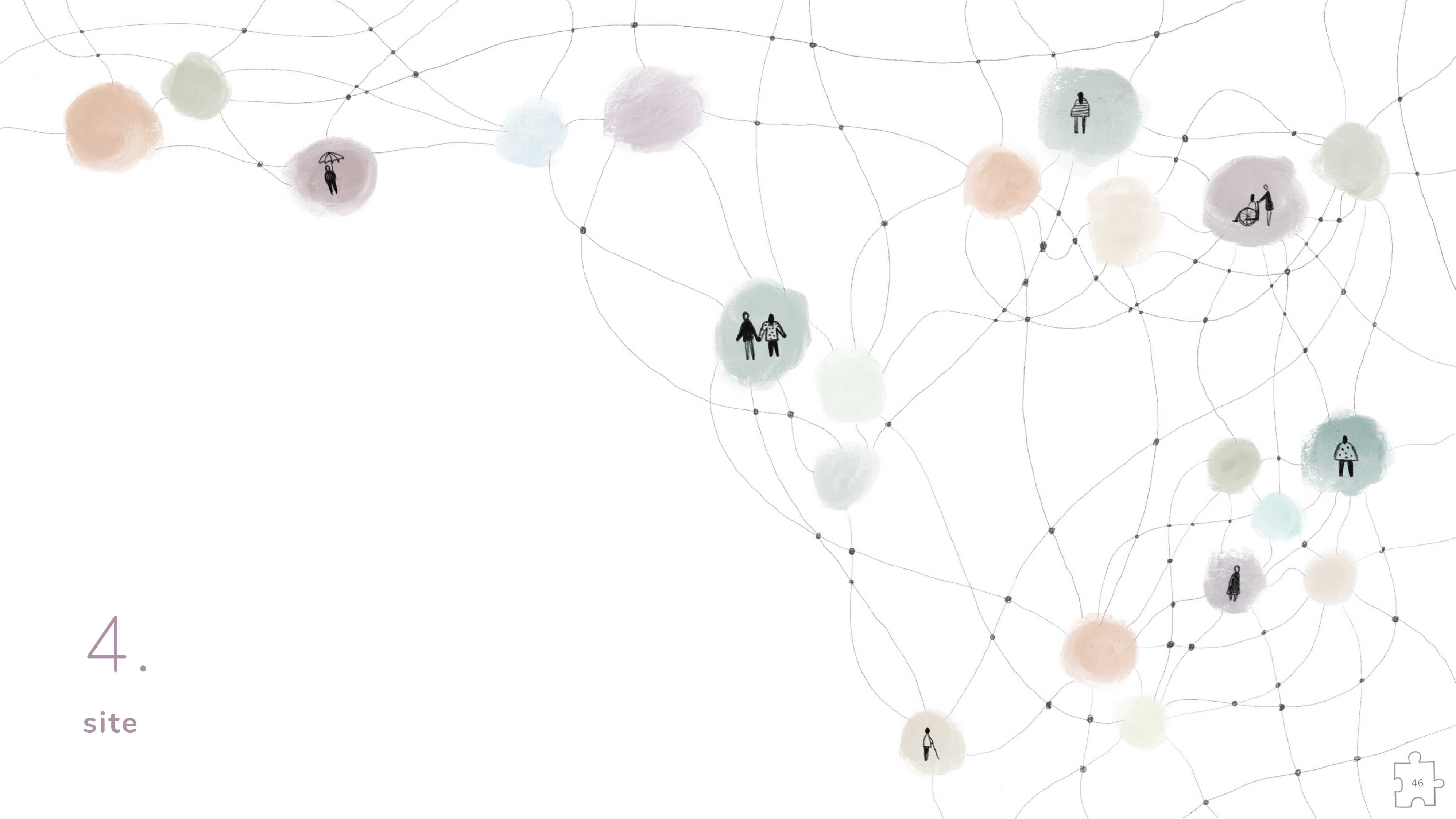
3.3. programming

The programming diagram illustrates the spatial relationships between different areas and how the water features can serve as focal points for community interaction and connection between the gardens and buildings.



figure 41: programming diagram (Dias, 2024k)

4. site



4.1. context selection: Rynfield, Benoni

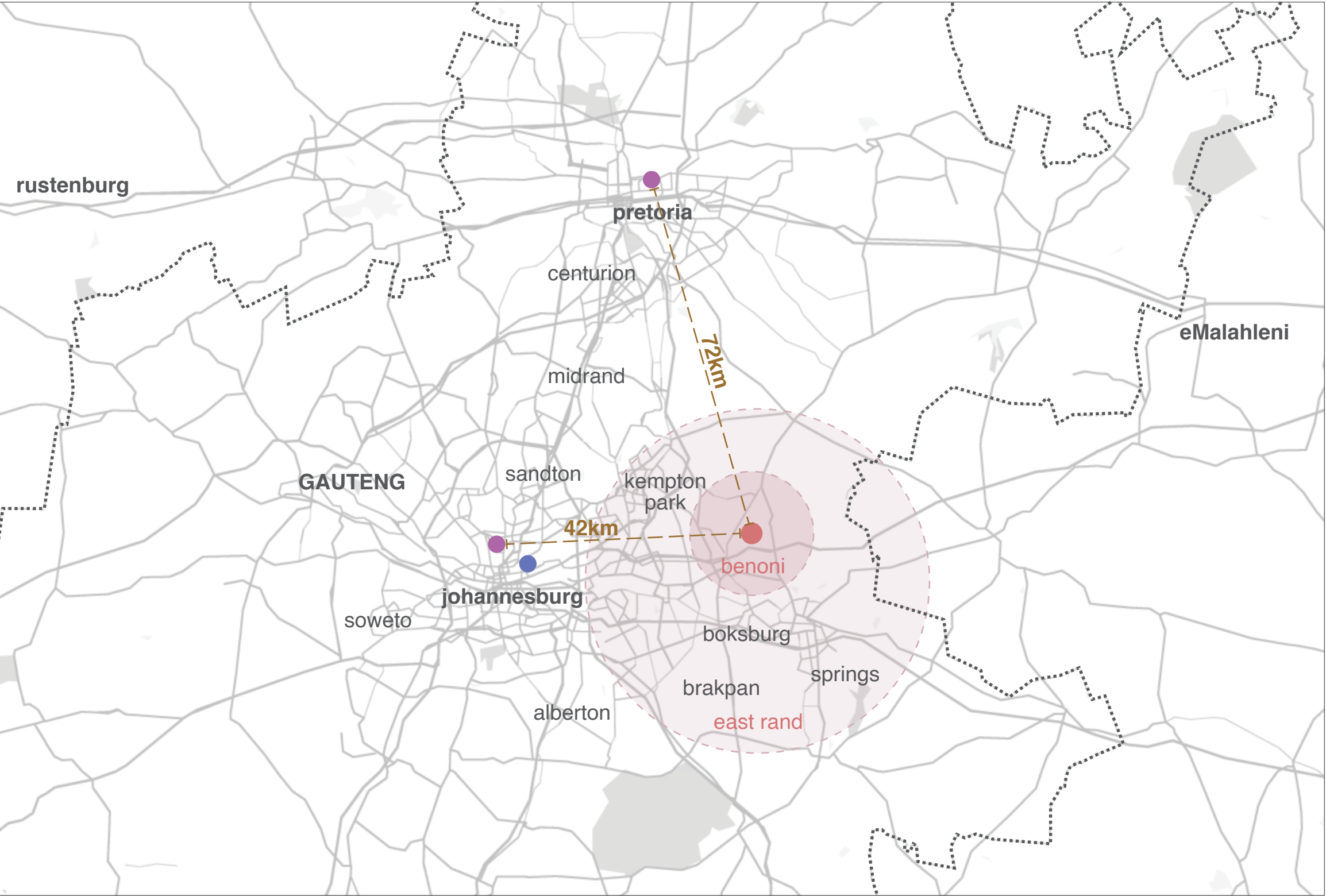
It's fair to say that a truly inclusive environment extends beyond the boundaries of its site. Given the importance of a tranquil and supportive setting, the chosen location should be in a peaceful neighbourhood that facilitates the integration of individuals with ASD into the urban environment.

This leads us to the chosen site, which is in the peaceful, family-oriented residential suburb of Rynfield, Benoni. The site offers an ideal combination of accessibility, community, and serenity.



(all maps on the following pages are adapted from googlemaps, 2024)

figure 42: Rynfield, Benoni axonometric view (adapted from googlemaps, 2024)



- key
- site
 - residential facility for adults with autism
 - organisations supporting autism
 - border of Gauteng
 - distance

Despite the need for autism-specific services, **the East Rand currently lacks accessible options**. While Lethabo le Khutso in Pretoria and the Adult Programme for People with Autism in Sandton offer residential care, they are both located outside of the East Rand. These are the only two autism-specific residential facilities in Gauteng. Furthermore, there is only one autism-specific day facility for adults in Parktown. This scarcity of services highlights the urgent need for more accessible options within the East Rand.

context map:
Gauteng, South Africa



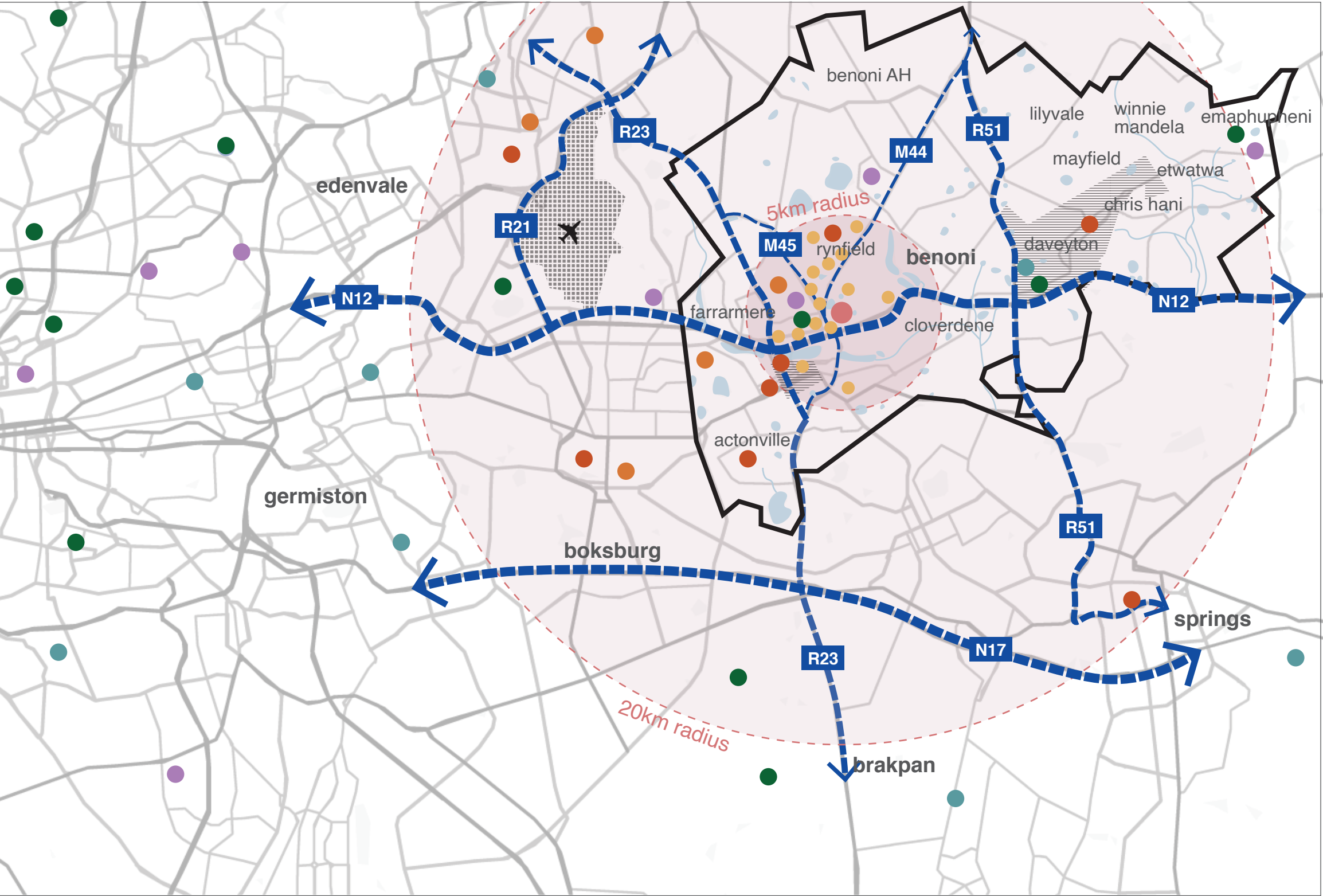


Benoni forms part of the Ekurhuleni Metropolitan Municipality (EMM), with Rynfield located in region C. According to the 2012 census, region C has a population of about 401, 270 people (GIBB, 2015). Considering that 2% of South Africa’s population has autism, this suggests that there are approximately 8,025 people with autism in this area alone. While many can function independently, there is a significant need for support services.

The Ekurhuleni Biodiversity and Open Space Strategy (EBOSS) aligns with this project’s goal as it emphasizes the significance of accessible open spaces for the “physical and psychological needs of the community” (GIBB, 2015, p13). Rynfield’s central position in the East Rand and Ekurhuleni together with its proximity to the central business districts of Benoni and Daveyton makes it an excellent location from a strategic standpoint.

context map:
Ekurhuleni Metropolitan Municipality



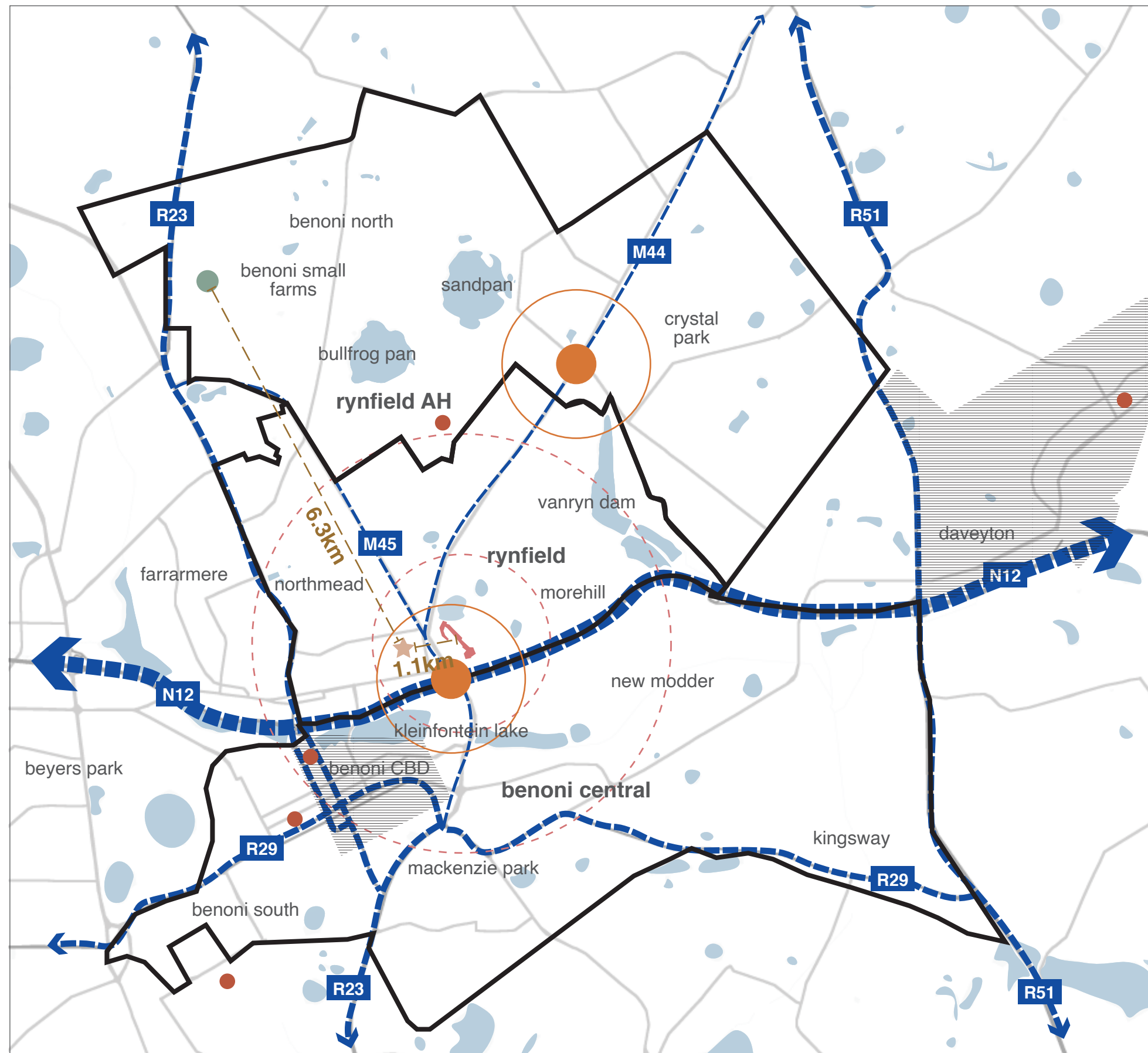


- key
- site
 - border of benoni
 - national roads
 - provincial roads
 - metropolitan roads
 - OR Tambo International Airport
 - water
 - CBD
 - hospital
 - medical centre
 - therapist
 - assisted living facility for persons with disabilities
 - support organisation for persons with disabilities
 - support for children with autism

Benoni is well-connected by major roads, such as the N12, R51, and R23 highways. The area has plenty of healthcare facilities, including hospitals, medical centres, and therapists specialising in various fields, such as occupational therapy and physiotherapy. Benoni’s reputation as “the city of lakes” is fitting, with many bodies of water dotting the landscape. While the East Rand has a fair amount of support organisations and assisted living facilities for adults with disabilities, Benoni only has three. The region’s existing support services are primarily focused on children.

context map:
East Rand, Johannesburg





- key
-  site
 -  national roads
 -  provincial roads
 -  metropolitan roads
 -  water
 -  border of suburb
 -  secondary node
 -  CBD
 -  distance
 -  Apricot Tree NPO
 -  Apricot Tree desired site for assisted living facility
 -  hospital

The site is located near one of Benoni's secondary nodes; the intersection of the N12 and M44 highways. While the N12 highway separates Benoni CBD and Rynfield, the M44 provides easy access to both areas. The project's location offers the best of both worlds: the convenience of a nearby CBD combined with the tranquillity of a residential area rich with natural beauty. This provides opportunities for recreation, relaxation, and wildlife observation. More importantly, the site has three hospitals within a 7-kilometer radius. The tranquil environment, enhanced by the lakes, promotes healing and wellness.

Given the project's close connection to Apricot Tree, it is important for the location to be nearby for easy staff movement and collaborative community initiatives. While Apricot Tree's desired site for a general assisted living facility is 6.3km away, the proposed site for this autism-specific community is at a much more convenient 1.1km distance.

context map:
Rynfield and surrounding suburbs



Preceding a closer examination of the site, it is essential to fully understand its past. The history of Benoni, particularly its periods of hardship and achievement, provides essential context and a deeper understanding for the project.

4.2. the historical context of benoni

Dating back to 1852, after the Sand River Convention granted them independence, “Boers” (meaning “farmers” in Afrikaans) from the Cape Province settled on land North of the Vaal River. Ten years later, four of these farmers and their families arrived in the Benoni area where they found lush grasslands with ever-flowing springs. They named their farms accordingly: Rietfontein (the reedy spring), Kleinfontein (the little spring), Vlakfontein (the shallow spring), and Modderfontein (the muddy spring).

Benoni’s history is a unique story of struggle and prosperity. Founded in 1881, the name “Benoni”, meaning “Son of My Sorrow” in Hebrew, reflects the initial challenges of establishing land boundaries. Some believe Surveyor-General Johan Rissik, tasked with naming the farms at the time, drew inspiration from the biblical story of Rachel’s childbirth in Genesis 35:18 that says, “And it came to pass as her soul was in departing (for she died) that she called his name Benoni, but his father called him Benjamin.” (Humphriss and Thomas, 1968, p. 28). The challenging birth could mirror the early struggles of the new settlement. Another theory suggests Rissik saw a parallel between the biblical Benoni, born into hardship in a complex world, and the budding farm grappling with its own challenges.



figure 43: one of the first photos taken in Benoni (Norval family, n.d.)

The official discovery of gold was recorded in 1887. As seen in the general plan alongside, the main gold reef ran through the four abovementioned farms that were later all bought by hopeful mining companies whose ventures quickly failed. The harsh isolation and poor living conditions only added to the disappointment.

Despite the fiasco, the discovery of gold attracted a diverse population from across the globe, making Benoni a diverse cultural town (Norval, no date). People from various population groups made a significant impact on the history of the town, namely the Afrikaans, *Bantu* (meaning “people”), British, Chinese, mixed race, Greek, Indian, and Jewish people. The main contributors being the Afrikaners, the Britons, and *Bantu* communities from Central Africa who provided essential labour in the mines, alongside the Jewish community. This diversity, with their clashing religions and backgrounds led to social unrest. A General from the town once said, “Some of the most difficult passages of my life have been due to the turbulent people of this little place.” (Humphriss and Thomas, 1968, p. 2). The non-white population significantly outnumbered the white, and inter-tribal conflict was common.

Unlike other gold discoveries, Benoni didn’t experience a massive rush. South Africa’s annual reef claim system benefitted the government but offered prospectors little reward for their hard work. Most miners worked for small companies that quickly failed, leading to a small and unstable population. Even larger companies in the mid-1980s couldn’t overcome the area’s isolation and political turmoil. This instability continued until the Anglo-Boer war, a bitter colonial war between the British colonists and the Boers in South Africa from 1899 to 1902, which brought some unexpected benefits. Despite the Boers burning down mining plants in Benoni, many of the victorious British troops and their families settled here.

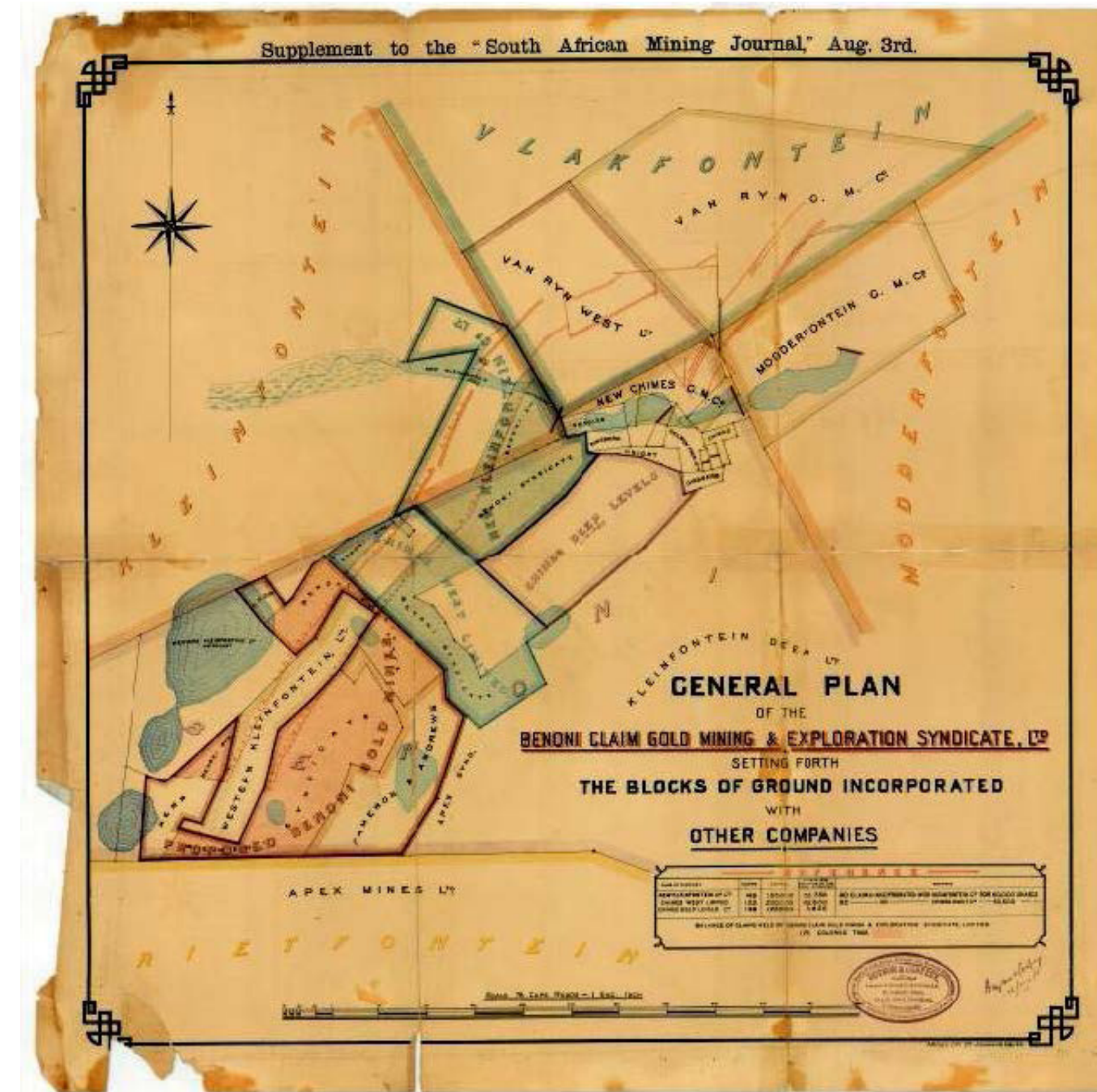


figure 44: general plan of the Benoni claim gold mining (Keith Gardiner, n.d.)

Sun-dried clay bricks, known as “green bricks”, formed the first homes between the mines, built with stone foundations and corrugated iron roofs. Easy to make from local clay, these bricks were initially popular but prone to wash away in heavy rains. As a result, wood and iron structures became the dominant building style. The National Bank, that was built in 1895 and still stands today, was made from more durable stone from the nearby quarry held together by a mud mixture called “daga”.

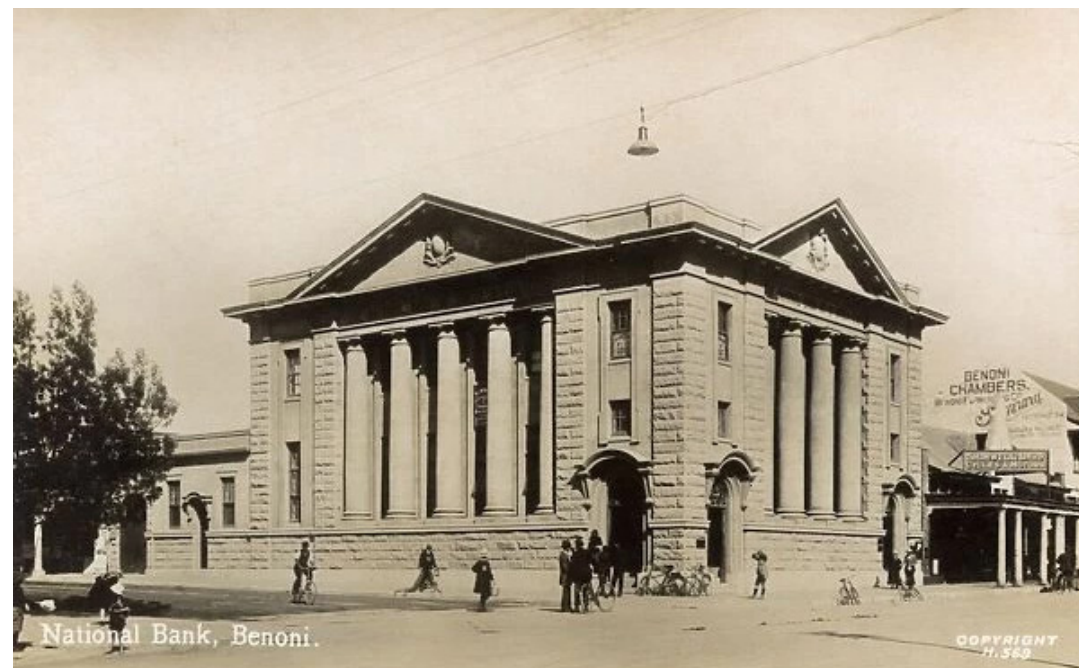


figure 45: the National Bank, Benoni, circa 1930 (Mary Evans Prints Online, n.d.)

Single men on the mines lived in long rows of single rooms, sharing communal facilities. Private boarding-houses provided them with meals, fostering a sense of community outside of work hours. The harsh living conditions and the transient nature of work took a toll on many miners, contributing to feelings of despair, isolation, and a lack of belonging. This goes to show that a sense of belonging extends beyond shared facilities. A strong community culture is essential to bringing people together. The impersonal nature of rows of single rooms can create a sense of detachment, which this project seeks to avoid.

While senior mining officials enjoyed spacious homes, ordinary miners and their families lived in blocks of cramped wood-and-iron houses each containing two bedrooms, a dining room, small kitchen, and a little stoep. They had no bathrooms. The commercial populations were generally better off than the miners but lacked basic municipal services. They had to build their own shacks with no inspections of structural integrity. Disease spread easily in the town due to contaminated milk, water, and cold winters. The lack of healthcare facilities was a harsh reality with the first hospital, the New Kleinfontein hospital, only established in 1903. These difficult circumstances led to many preventable deaths.



figure 46: New Kleinfontein Hospital, Benoni, circa 1930 (Keith Gardiner, no date)

While the non-white population significantly outnumbered the white population, they faced segregation. The *Bantu* community established their own settlement known as the Kleinfontein location, where living conditions were overcrowded and harsh, with dwellings constructed from corrugated iron sheets or unfired brick with thatch roofs.

Through many forced removals and relocations, the *Bantu* community were eventually given a permanent home in Daveyton.

This township was developed with low-cost housing consisting of precast concrete units. Importantly, Daveyton also granted *Bantu* residents the right to trade and participate in local governance. Despite past hardships, the community demonstrated resilience and prosperity (Humphriss and Thomas, 1968).

Benoni remained a quiet, almost forgotten settlement known to surrounding towns as an “inaccessible village” (Humphriss and Thomas, 1968, p. 45). However, economic recovery in 1909 marked a turning point, initiating a period of vibrant activity and growth. Many societies developed in this time, with men still largely outnumbering women in the community. World Wars 1 and 2 undoubtedly left their mark on Benoni. While the wars themselves brought disruption, the post-war eras experienced significant economic booms. Along with other major events, such as Rand Revolt in 1922, this is a testament to the town’s recurring triumphs and setbacks.

Hence, following these events and the construction of the town hall in 1923, a well-known critique of authority, known as Snowden, wrote this poem titled “Beautiful Benoni”. The poem paints a picture of the historical conditions of the town:

“Beautiful Benoni” by Snowdon

Benoni has a Council, particularly dense,
Highly educated, with little common sense.
A man who is intelligent may not know a lot,
Yet puts in common practice the wisdom he has got.
While our Council’s boosting Benoni’s beauty spots,
Our beautiful location festers, dies and rots.
They object to spending money: though many lives are lost,
Through rotten sanitation, they say, ‘Look at the cost.’
One day an epidemic will devastate this town, God knows who’ll be among those who are stricken down.
Our sidewalks are a terror, unpleasant to the feet,
With so much motor traffic you cannot use the street.
Our top dam is a desert, the bottom one a bog,
If you enjoy the odour, surely you’re a hog.
Our market is a swindle, the dealers take the lot,
For humble single buyers, they do not care a jot.
In a market lavatory, a woman died one day,
Nearly ten days after, they carted her away.
Our town hall cost a fortune, yet the windows open in,
You don’t need too much learning to know that is a sin.
That rotten dam at Westdene, why don’t they plant some trees,
Then go to the location and kill the bugs and fleas.
Let us have a Council of men who think and act,
See that on the 27th the present lot are sacked

(Humphriss and Thomas, 1968, p. 232)

Later, under Apartheid rule from 1948 to 1994, Benoni reflected the racial segregation of the era. Black residents were forced to live in designated townships like Daveyton and Wattville, while Indians resided in Actonville. Benoni itself was reserved for white residents only. Thankfully, today Benoni is a more integrated community (Gauteng Happenings, no date).

While gold mining eventually declined, Benoni reinvented itself into a thriving centre for industry, agriculture, and services. It also became a service hub for nearby towns like Brakpan and Springs. (Gauteng Tourism Authority, 2022). The chairman of a mining company, Sir George Farrar, initiated the urban beautification of the burgeoning mining town in 1904. Minewater was diverted into marshlands, creating a network of reservoirs that have become a thriving habitat for various fish species (SAVenues.com, no date). The serene lakes that now dot the town, earning it the nickname “City of Lakes”, have created a joint culture for fishing, boating, and leisurely outdoor activities (Norval, no date). This reinvention led to greater integration and a renewed sense of community. The discovery of gold attracted people from diverse backgrounds, creating a population that has evolved from a segregated past to a more united and multicultural present (Gauteng Tourism Authority, 2022). This heterogeneous society has naturally fostered a rich tapestry of ideas and beliefs. However, the community has managed to coexist peacefully, embracing the shared experience brought about by the lakes. Today, Benoni has a variety of experiences for its residents and visitors; from horse stables (having the most per square kilometer in the southern hemisphere) to a concentration of prestigious schools, to museums, dams, shopping malls, spacious surroundings, and a wildlife park (Norval, no date). The diverse beliefs and perspectives in Benoni have created a community that values diversity and inclusion. The lakes represent Benoni’s past as a mining town and have historically strengthened their community bonds. This presents the opportunity to utilise water bodies and parks as a means of building between neurotypical and neurodivergent (specifically those with autism) individuals, reinforcing the theory of place identity.



figure 47: Korsman conservancy, Benoni (blyplekke, n.d.)

Moreover, at the heart of this project lies the concept of isolation and the human desire to belong. By examining the historical isolation of Benoni and the segregation that took place within it, particularly against mine labourers mainly consisting of the *Bantu* community, the project explores parallels between the social isolation and challenges faced by individuals on the autism spectrum.

Both groups can struggle with a sense of not belonging and navigating a world that doesn't always accommodate their needs. The needs of mine labourers were often disregarded, and they were intentionally marginalised. However, by acknowledging this shared experience, the project seeks to build bridges of understanding and explore how lessons from Benoni's formative history can inform a more inclusive society for everyone, including those with disabilities. Incorporating historical elements by using shared design elements, such as materials, water bodies, and parks, is a way of honouring the past while embracing the future. These landmarks can aid in wayfinding and create a sense of place attachment. Similar to the mining communities, the design program will emphasize shared spaces but also create opportunities for social interaction, personal growth, skill development, and sheltered employment. By empowering individuals with autism, we can follow the example of the *Bantu* community, who thrived when given more rights and opportunities.

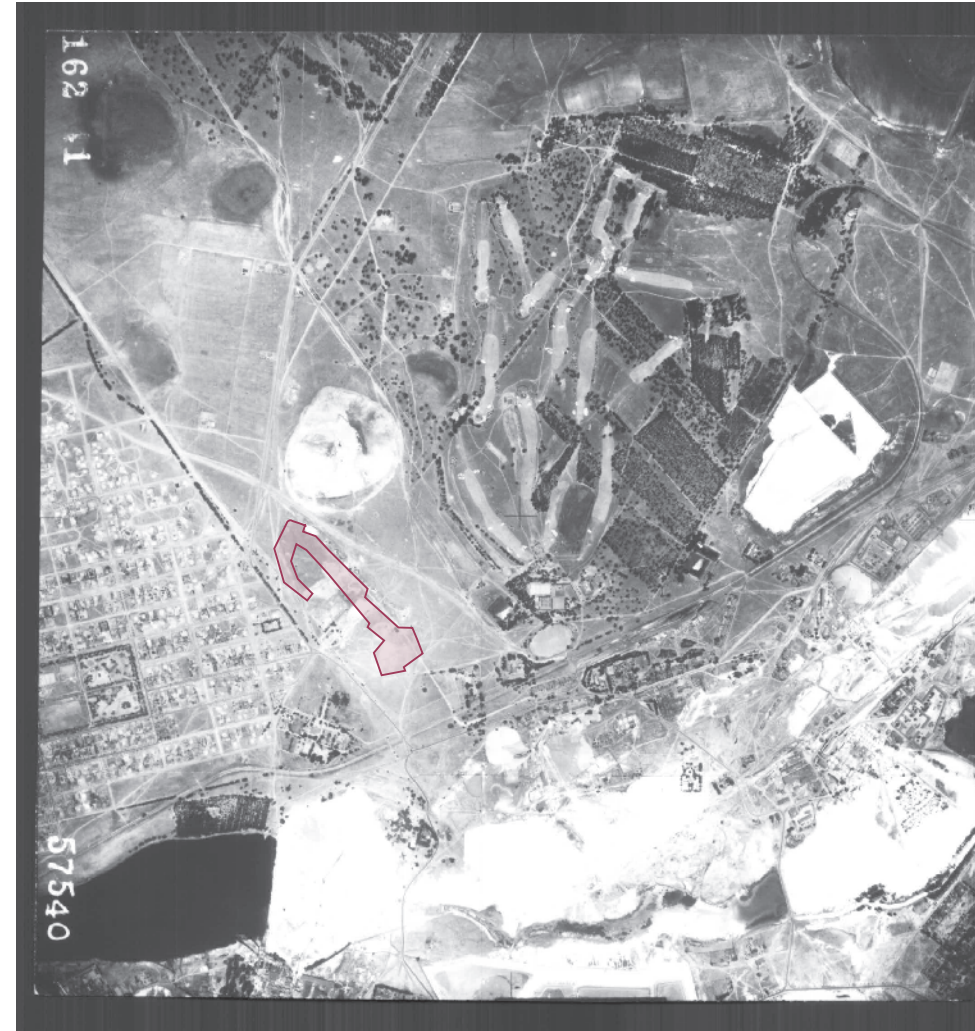
With a better understanding of the historical context of Benoni, we can now conduct a more in-depth analysis of Rynfield and the proposed site.

4.3. the urban development of Rynfield, Benoni



1938

North of the site, a large, open site contained a manmade pan. The land towards the south was being used for manufacturing. The Benoni CBD, southwest of the site, was already a well-developed urban area. To the west of the site, Northmead was undergoing development, while Rynfield, including the site and its northeastern surrounds, remained largely undeveloped and open. The Van Ryn Golf Club (Benoni country club) had already been running for over three decades (Top 100 Golf Courses, no date, p. 100).



1941

Portions of the land appear to be used for tree farming. The major travel routes were already evident. A well-worn sand road ran north of the site, connecting to the main road (N12). The area surrounding the site remained largely untouched.



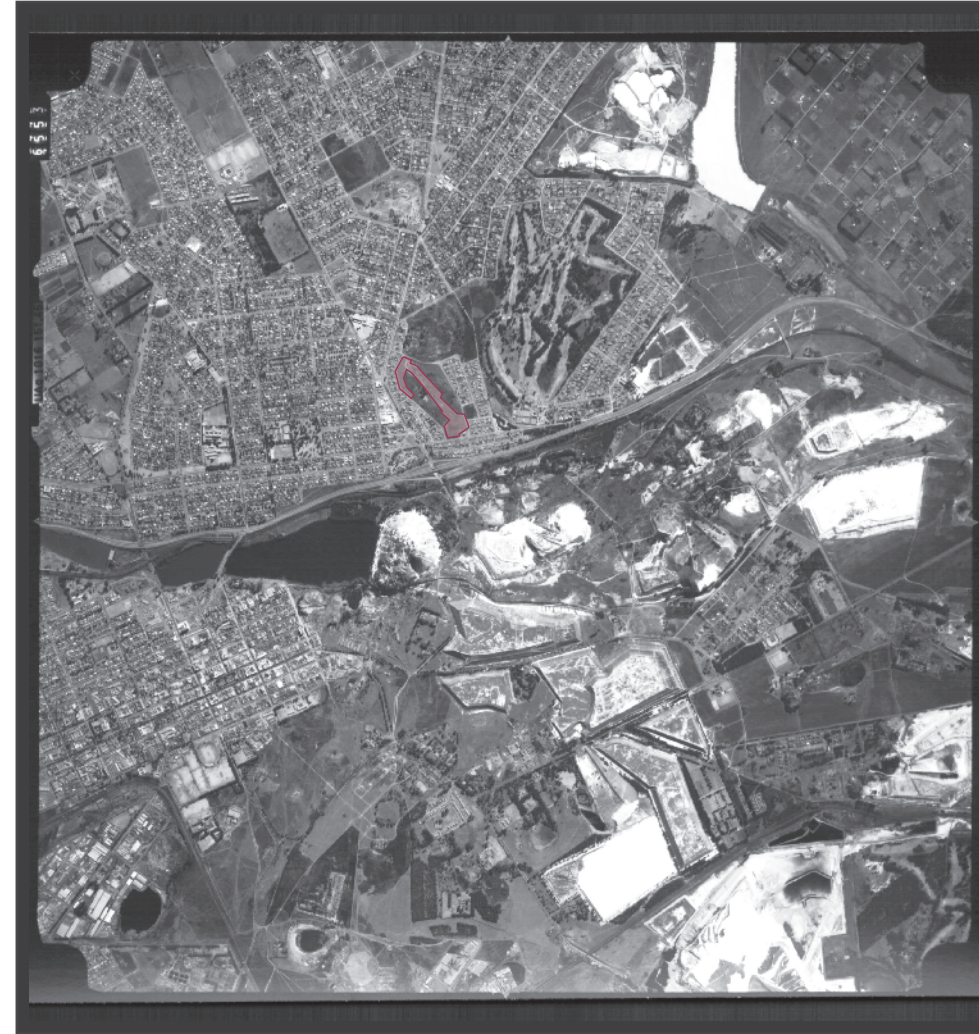
1954

Rynfield underwent significant development between 1941 and 1954, with land being divided into smaller plots. Northmead also experienced rapid growth. Construction began for the Vanryn dam to the northeast of the Benoni country club and golf course.



1968

The main road was widened and transformed into a major highway (N12). As development shifted eastward, Rynfield's plots became increasingly occupied by 1968. The Bunny Park was built for the children. Development took place to the west and south of the site. The sewage treatment plant was built near the soon-to-be Vanryn dam.



1972

The N12 was fully established. The pan to the north was now largely covered in marsh and vegetation. Development occurred on the east of the site, but not directly along its edge. New developments include Benoni High School and Northmead Mall. The site and its surrounds seem to be used as a park with footpaths forming across the open land.



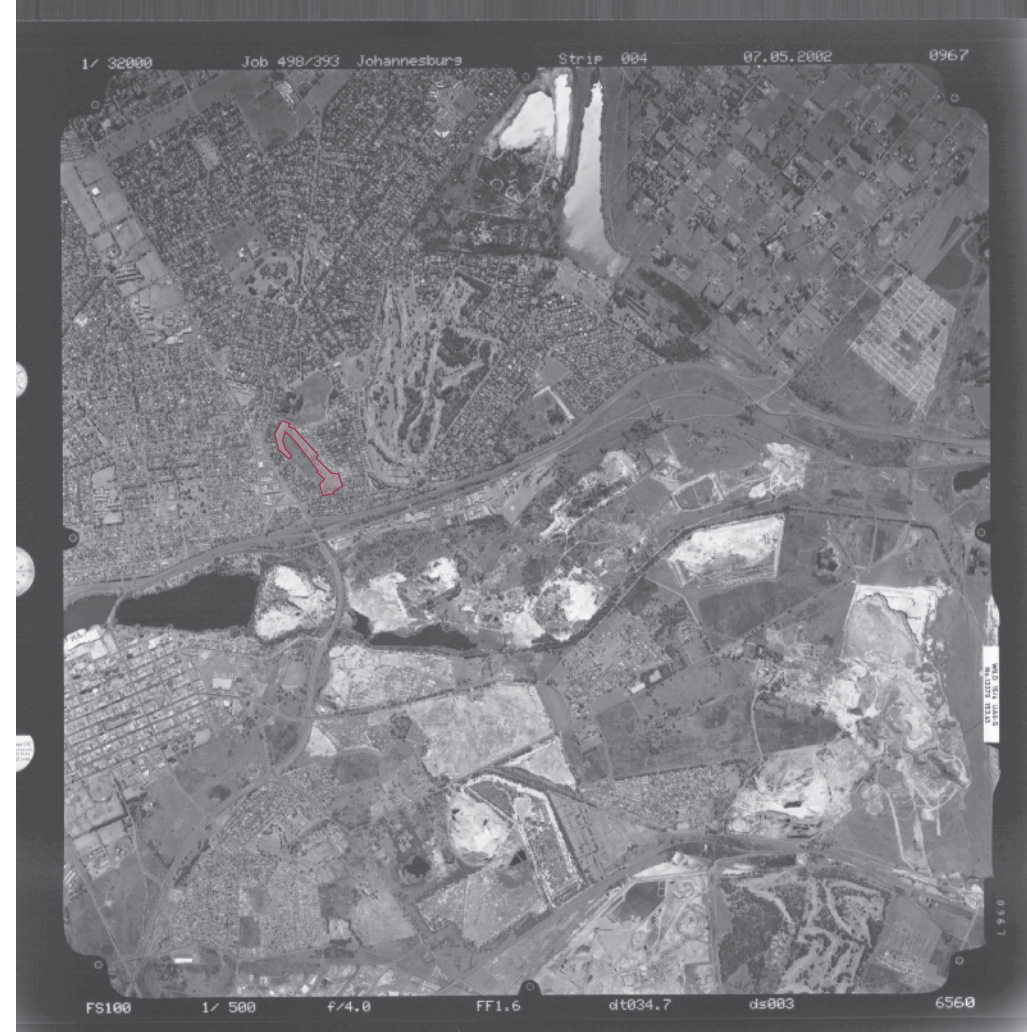
1989

The Vanryn dam was completed and filled. Industrial development began south of the N12 highway.



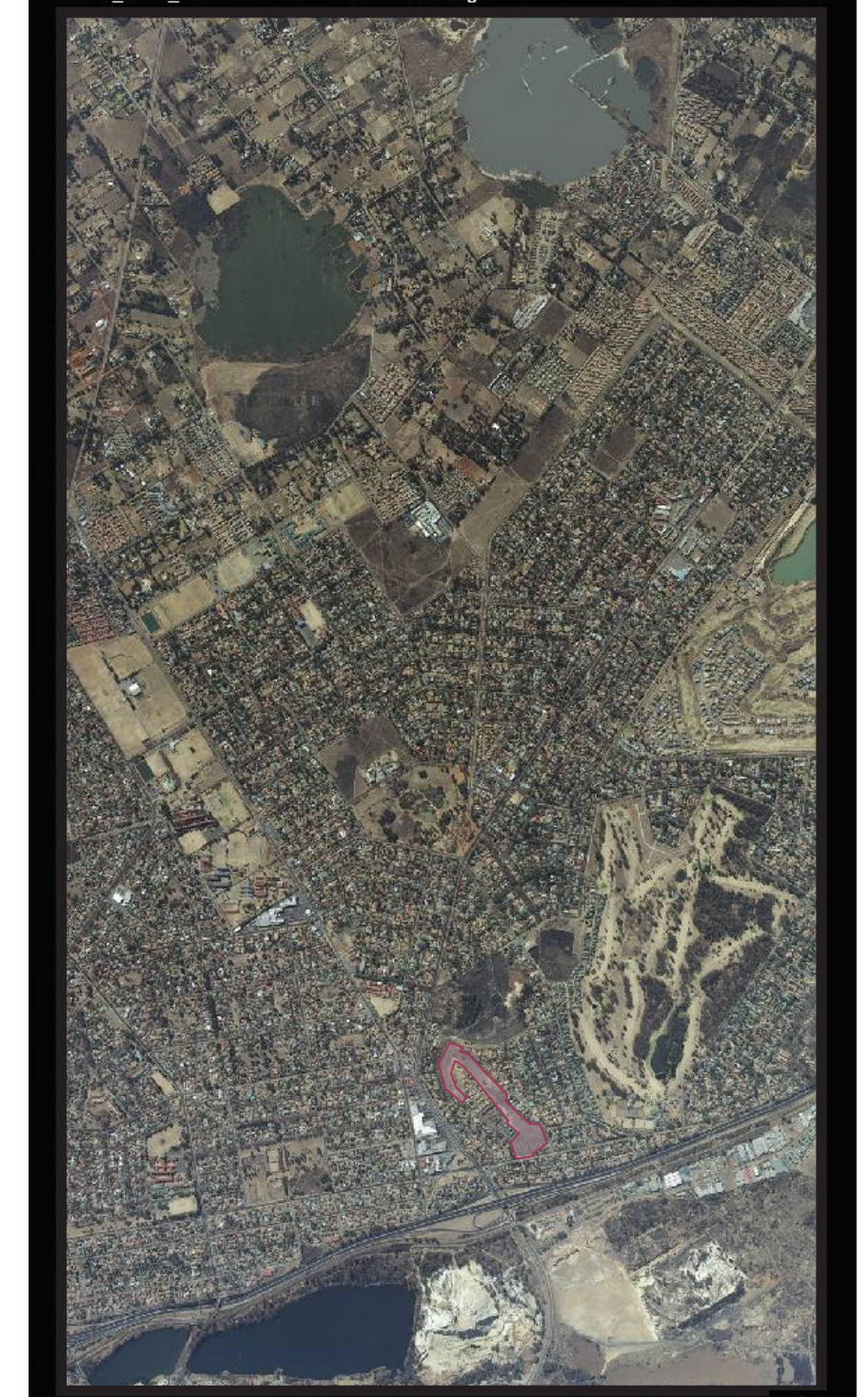
1996

Development along the eastern edge of the site took place. Further industrialisation occurred to the south of the N12 highway.



2002

Chief A Luthuli Park, a lower income area adjacent to Daveyton, emerged in the eastern sector.



2018



2024 (current)

The upmarket Ebotse Golf Estate emerged as a residential development surrounding the Vanryn dam. Rynfield now primarily comprises agricultural and residential land with an appreciable amount of recreation. The commercial and community hubs are concentrated along main roads. The Benoni CBD remains predominantly industrial, commercial, and residential.

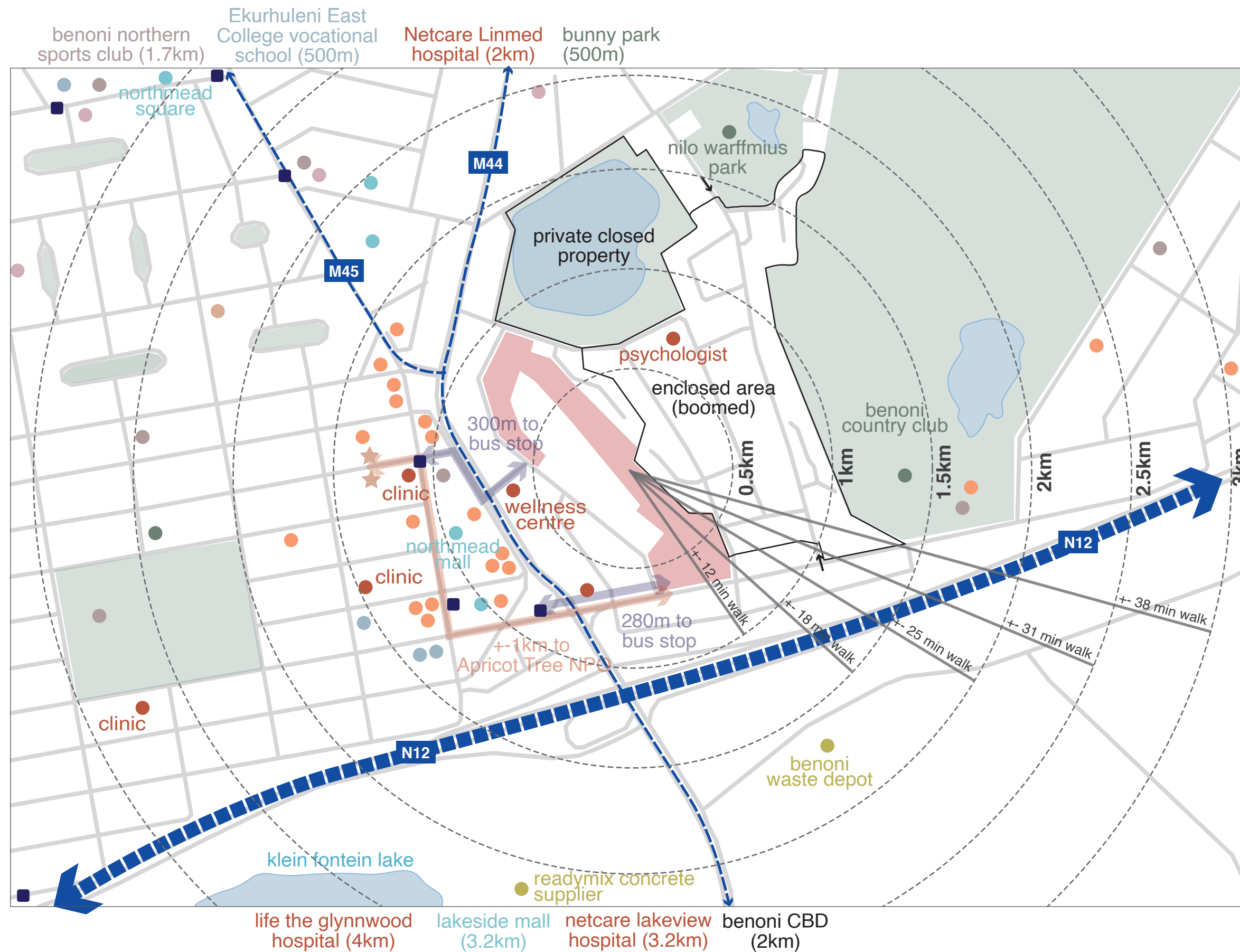
figure 48: maps of Rynfield, Benoni through the years (CDNGIPortal, 1938-2024)

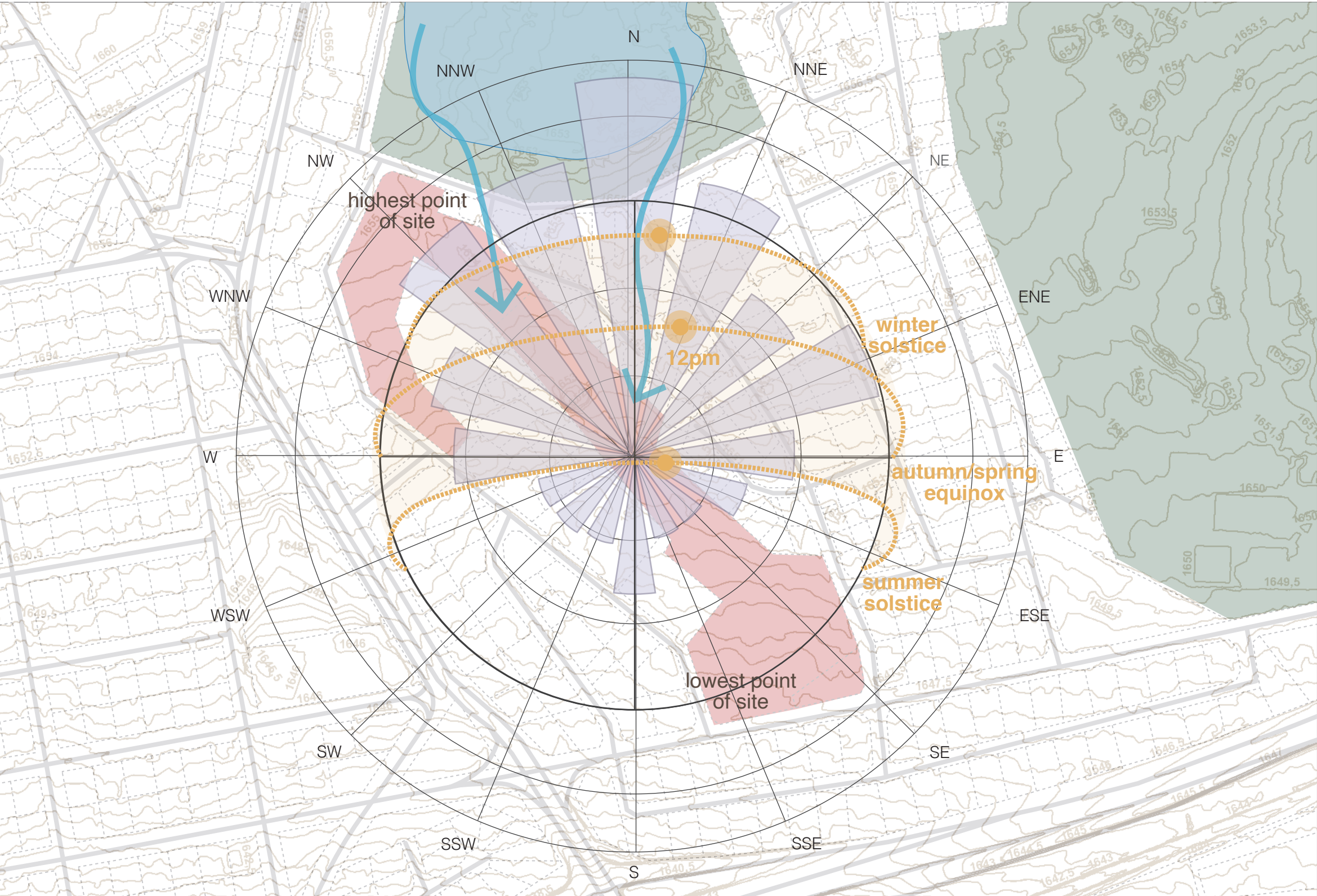
4.4. a closer analysis of the proposed site

As illustrated on the next page's context map, the site is nestled between residential homes and situated near major highways. There are several amenities within walking distance which encourages resident/participant autonomy. Additionally, there are two bus stops within 300-metres of the site providing easy access to public transportation. Northmead Mall and its surrounding commercial hub is a mere 450-metres away. There is marsh pan to the north of the site that is unfortunately a private closed property. This could potentially be opened up and serve as a public park, which would significantly enhance the project's value and user experience. The area offers a variety of parks and recreational activities for participants to explore. The Benoni Country Club, for example, is just 800 meters away and provides opportunities for sports, dining, and various activities. Regarding education, the Ekurhuleni East College Technical and Vocational School, located just 3km away, offers practical training opportunities for participants. In addition to the nearby hospitals, there are several medical clinics and other healthcare services available in the area. The N12 highway acts as a barrier, separating the site from the industrial activities on the other side.

The 69,451 square metre site will accommodate communal spaces, residences, and a park that blends into the peaceful neighbourhood. Neighbouring residents and institutions, including retirement villages and schools, can volunteer at the centre. This initiative aims to seamlessly integrate into the suburban society while also encouraging community engagement through on-site activities.

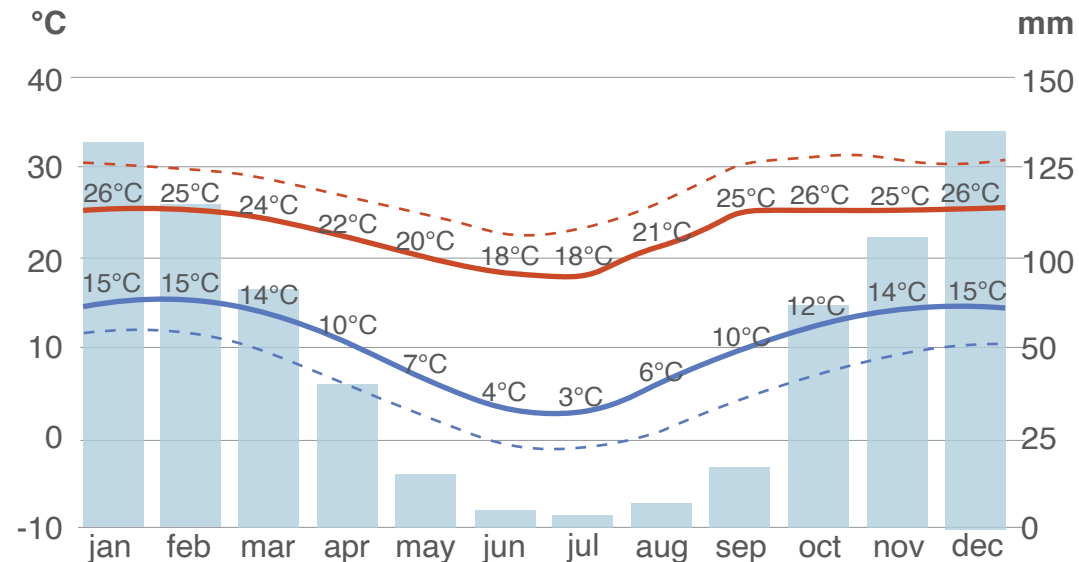
(all maps on the following pages are adapted from googlemaps, 2024)





micro-scale map:
environmental analysis

scale 1:5 000



graph:
average temperatures and precipitation (Benoni)



- key
- water
 - enclosed area
 - controlled access to enclosed residential area
- zoning
- residential
 - agricultural
 - business
 - private open space
 - community facility
 - industrial
 - social services
 - public services
 - agricultural (original) social services (new)
 - residential (original) social services (new)

micro-scale map:
zoning

scale 1:5 000



Situated amidst residential homes and bordered by an enclosed residential area to the east, the site offers a tranquil atmosphere. An enclosed residential area borders the east end of the site. The nearby business hub is easily accessible across the M44.

The site comprises of three properties: two large agricultural pieces of land and a small residential property. These three properties will be consolidated and rezoned for social services to accommodate this project. This will allow for the clinic, residential component, learning and therapy centre, commercial spaces, nurseries, and park to exist simultaneously.

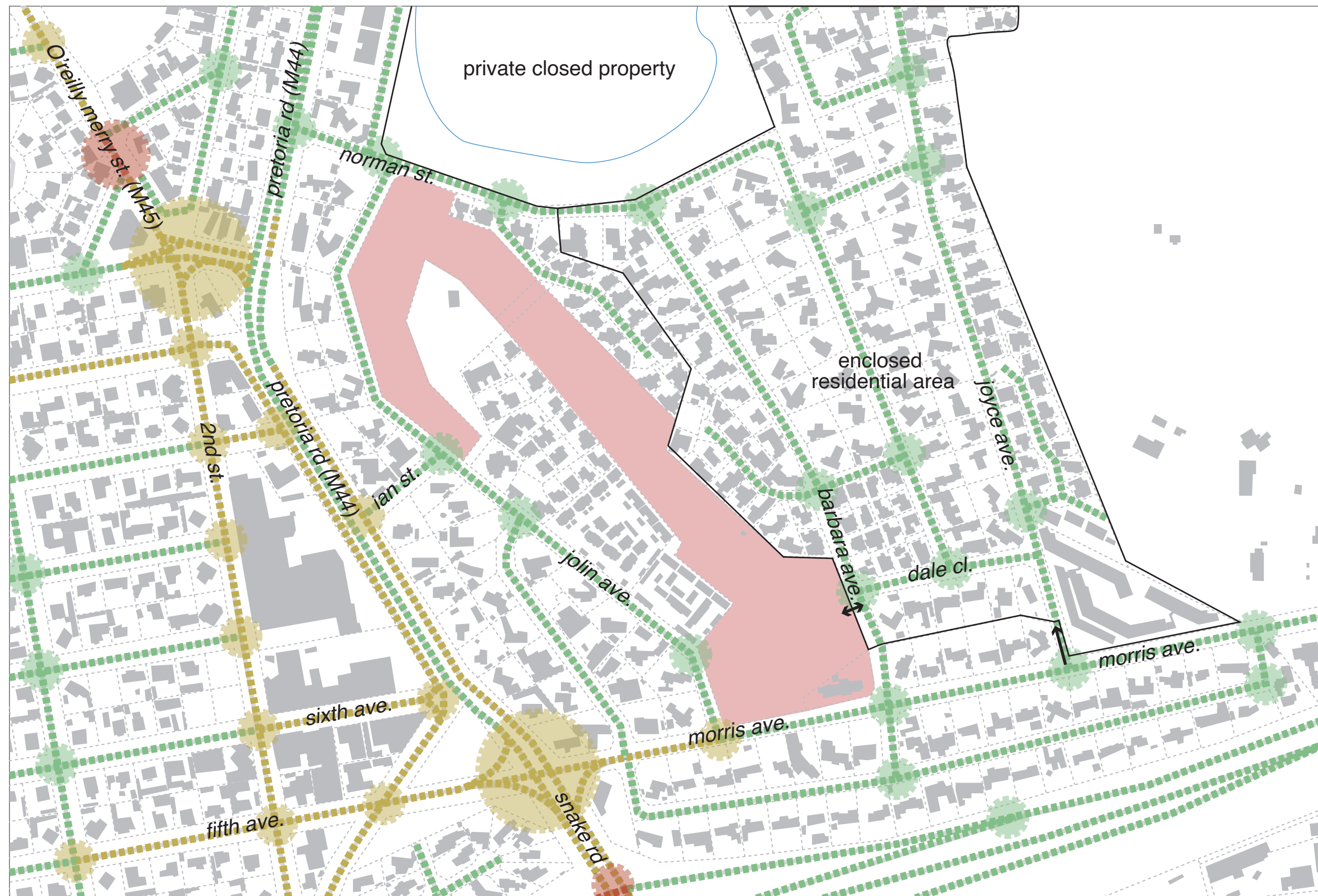
According to the Regional Spatial Development Framework, the land is designated as an urban development area. This means that the land use planning should support economic growth and employment, and will mostly be made up of residential development, social services, and services that contribute to a sustainable urban lifestyle (i.e. medical centres, educational facilities, nurseries etc.) (GIBB, 2015).

To achieve sustainable urban development, the following guidelines are recommended and should be considered during the design process:

- walkable neighbourhoods
- fostering a sense of place
- interconnected streets that accommodate walking, cycling, and driving
- diverse housing types and erf sizes
- environmental integration of green spaces and stormwater management
- integration of open spaces into the urban fabric

(GIBB, 2015).

The site and its gated boundaries currently create a physical divide between the residential neighbourhood. This presents an opportunity to use this project to unite the neighbourhood.



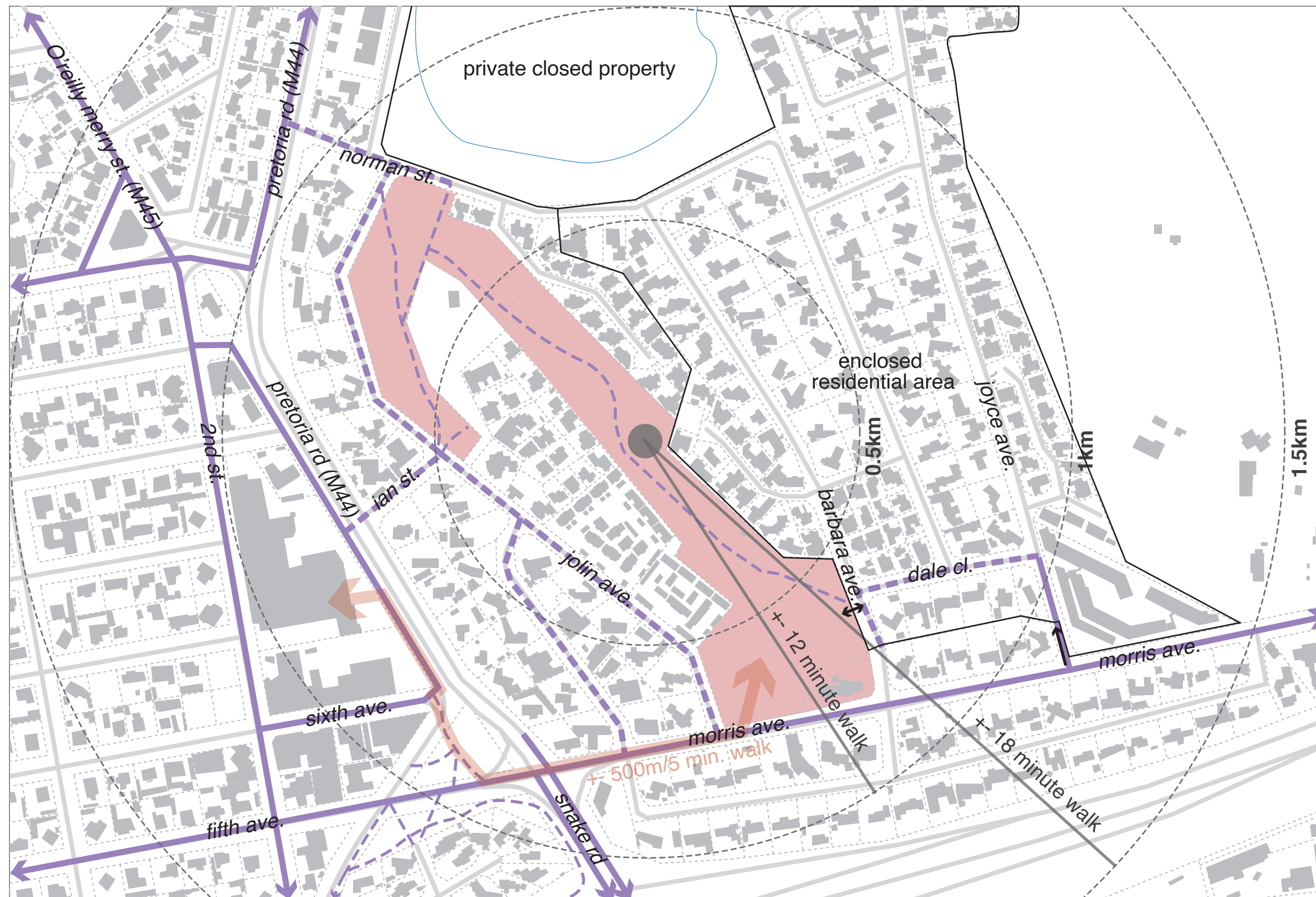
- key
- light traffic
 - moderate traffic
 - heavy traffic
 - building footprints
 - water
 - property boundaries
 - enclosed area
 - controlled access to enclosed residential area

The site is bordered by quiet residential roads, except for Morris Avenue which leads to Pretoria Rd (M44). The southern end of the site is more easily accessible via Morris Avenue and is suitable for public activities due to its proximity to the business hub and the Benoni Country Club. The northern end is quieter and is therefore ideal for more private and residential uses. The enclosed residential area is only accessible to vehicles via Joyce Avenue (from the north and south). Barbara Avenue, a quiet street, forms a dead end at the site's boundary.

micro-scale map:
typical vehicular traffic

scale 1:5 000





key

- paved pedestrian paths
- - - relevant roads used for vehicular and pedestrians (no paths)
- - - footpaths
- - - walking distances
- pedestrian route between site and northmead mall
- building footprints
- water
- - - property boundaries
- enclosed area
- controlled access to enclosed residential area

The northern and southern ends of the site have easy access to the business hub. However, the northern access requires participants to walk along the road, as there is no designated pedestrian pathway. To ensure safety, the design should offer both access points, while subtly encouraging the use of the southern route. Northmead mall is just a 5-minute walk from Morris Avenue, which also provides easy access to other important amenities such as the Benoni Country Club.

There are well worn footpaths through the site, suggesting its use from when it was open. Preserving these paths is essential to providing access between the northern and southern ends of the site, reducing the need for residents to walk along surrounding roads. The direct controlled access into the enclosed residential area on the east should be maintained as it enhances accessibility and acts as a gateway to connecting the community. This area provides participants with a safe area for walking.

micro-scale map:
pedestrian movement

scale 1:5 000





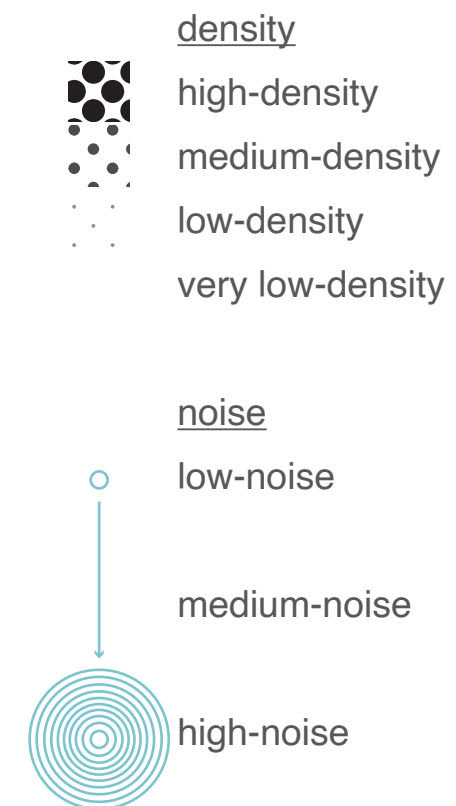
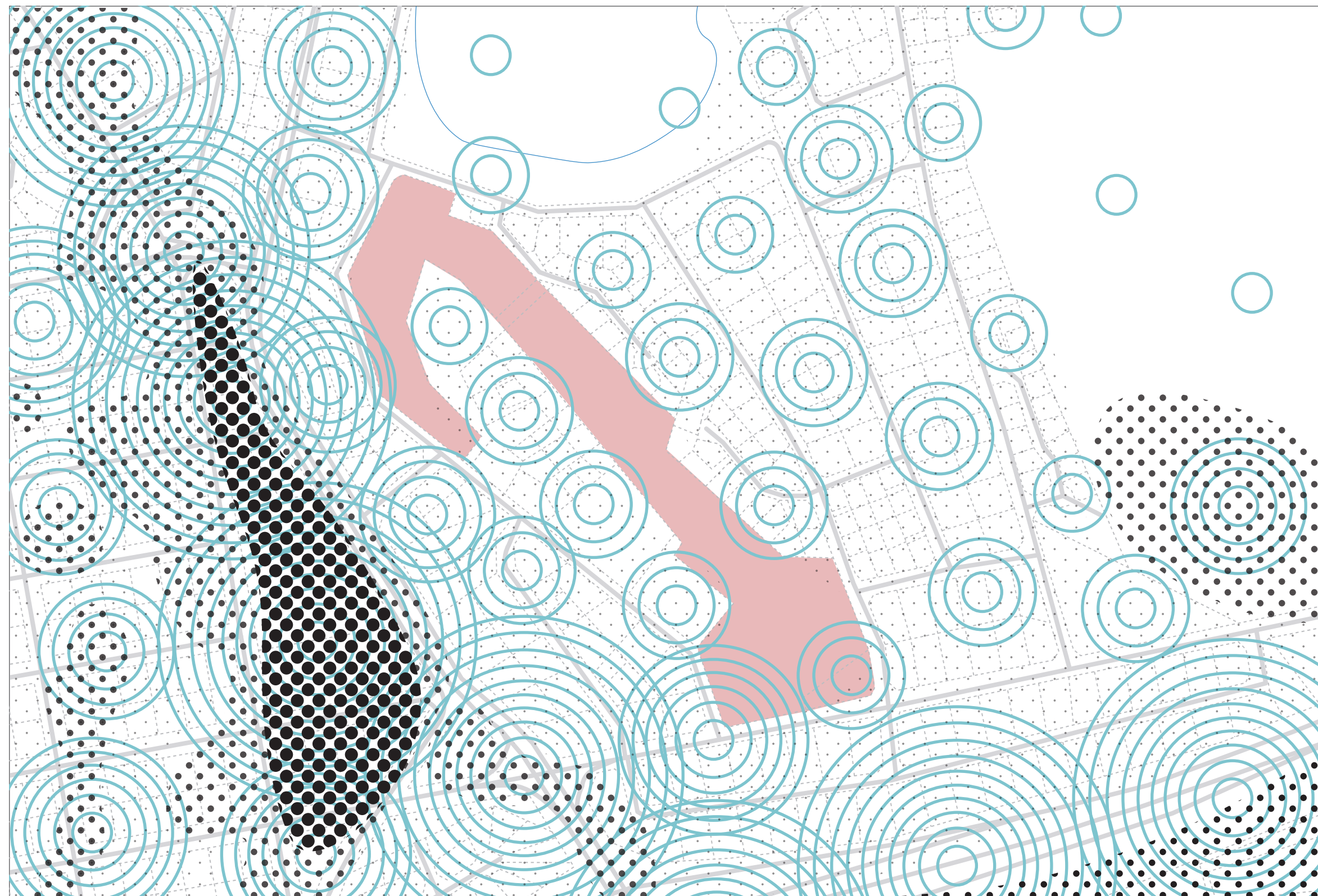
- key
- building footprints
 - property boundaries

This map illustrates the abundance of open space in the area, along with the existing maintenance shed in the centre and a house on the south-eastern corner of the site, both of which will be demolished to accommodate this project. It is important to preserve the sense of greenery and openness of the site and its surrounds. The property boundaries on the site reveal a narrow alleyway connecting the two agricultural sites on the north side, which could suggest an intended link between the two sides of the residential neighbourhood.

micro-scale map:
figure/ground relationship

scale 1:5 000





The levels of density and noise were determined by the volume of vehicular and pedestrian traffic, as well as the zoning designations of the surrounding area. The southern and western ends of the site will experience higher noise levels, while the northern and eastern ends will be much quieter.

Given the potential impact of noise and crowds on people with autism, the layout should strategically position public and private zones to optimise their functionality and minimise discomfort. Public zones should therefore be located towards the south and west, while more private zones should be towards the north and east.

micro-scale map:
density and noise

scale 1:5 000



4.5. site identity

Rynfield's architectural style is characterised by gable and hip roofs, often covered in tiles or sheeting. The area has many residential complexes, ranging from traditional brickwork styles to more contemporary Tuscan designs. The typical home facades are either brickwork, plastered and painted, or a combination of the two. The older homes are mostly single-storey, while the newer homes are either single or double-storey. Raised foundations and covered entrances are common design features.

Northmead Mall's modern design features flat roofs and a neutral colour palette. The overall character of Rynfield is defined by its open space, greenery, and calm atmosphere.

The Apricot Tree NPO has transformed a traditional Benoni house into a modern facility while preserving its welcoming and homelike character.

The neighbouring Benoni Country Club exhibits a natural aesthetic with influences from the Dutch Colonial Revival (green Dutch gable roof made from metal) and Edwardian (wrought iron balustrades with ornate designs) architectural styles.

The site photographs on the following pages help to develop a better sense of the site and its surrounds.

figure 49:

a: house in Monte Pulciano complex (googlemaps, 2024)

b: house on ray street (googlemaps, 2024)

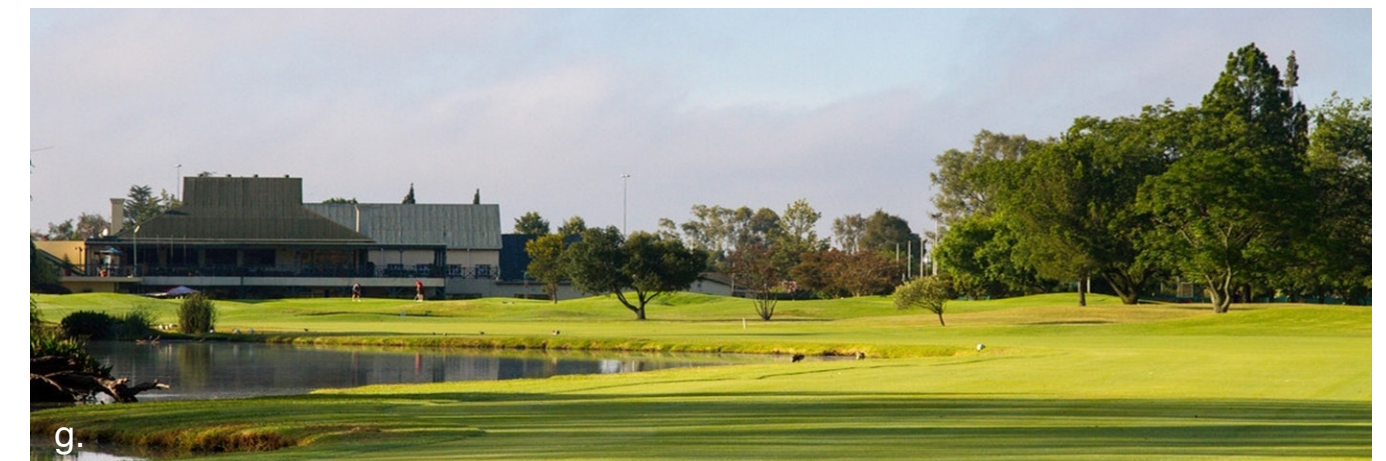
c: Earl's court complex (googlemaps, 2024)

d: Apricot Tree NPO (googlemaps, 2024)

e: Northmead Mall (lekkeslaap, 2024)

f: Park in Rynfield (Dias, 2024)

g: Benoni Country Club (Greenside Golfer, 2024)





Norman Street



Norman Street



Norman Street

figure 50a, b, c: site photographs (Dias, 2024l)



Jolin Avenue



Jolin Avenue



Jolin Avenue

figure 50d, e, f: site photographs (Dias, 2024l)



corner of Morris Avenue and Jolin Avenue



corner of Morris Avenue and Jolin Avenue



Morris Avenue

figure 50g, h, i: site photographs (Dias, 2024l)



corner of Morris Avenue and Barbara Avenue



Barbara Avenue



Barbara Avenue

figure 50j, k, l: site photographs (Dias, 2024l)



Barbara Avenue



Barbara Avenue



Barbara Avenue

figure 50m, n, o: site photographs (Dias, 2024l)



Barbara Avenue



Barbara Avenue



Barbara Avenue

figure 50p, q, r: site photographs (Dias, 2024l)

4.6. conclusions

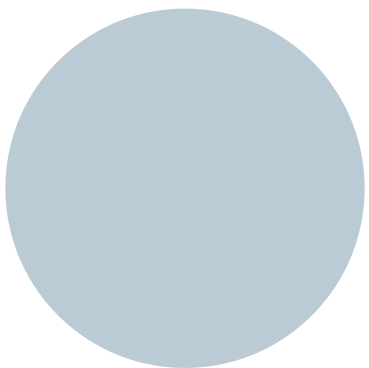


figure 51: diagram of water (Dias, 2024e)
water features as landmarks that honour Benoni’s legacy of being ‘the city of lakes’ and foster a serene environment.

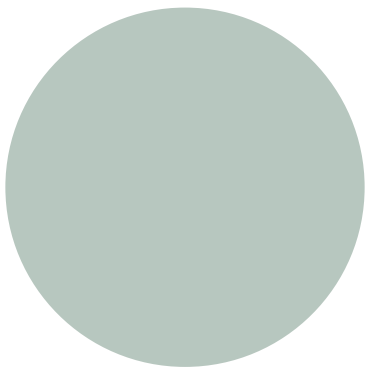


figure 52: diagram of green spaces (Dias, 2024d)
green spaces/parks to foster community connections and form thresholds/buffer zones between public and private.

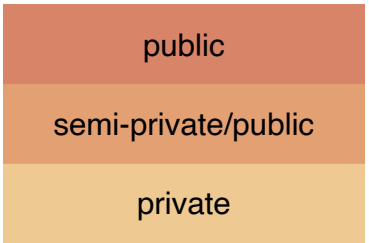


figure 53: diagram demonstrating the hierarchy of spaces (Dias, 2024d)
establishing a hierarchy of public, semi-private/public, and private zones from small scale to large scale.

The map on the following page provides a visual representation of the site analysis conclusions.

The public spaces are strategically positioned on the noisier southern and western ends of the site, close to major transport routes including the N12 highway, the business hub, and other amenities. The semi-private zone (learning and therapy centre) is situated towards the north in a quieter but still accessible area. Public zones are placed on either side of the semi-private zone, allowing easy flow of people through the site. The northern edge should consider the potential connection to the marsh pan across the road. The private zone (residential and communal areas) is situated in the north-eastern corner, offering a tranquil and secluded setting. The medical clinic is conveniently placed between the semi-private and private zones, with easy access to Pretoria Rd (M44) that leads to the nearest hospitals.

The main public access point is on the busier Morris Avenue, while residents in the surrounding complexes and enclosed area can access the semi-public park through private access points. The project’s central park is accessible to both participants and the public, offering a tranquil retreat within the community. The site’s public zone and the neighbouring residential zones create a buffer. By preserving the existing pedestrian routes and integrating the park into the site, it can encourage locals to use the space and foster a strong sense of community.

(the map on the following page is adapted from googlemaps, 2024)



- key
- property boundaries
 - building footprints
 - water
 - border of enclosed area
 - public zone
 - semi-private zone
 - semi-public park
 - private zone
 - access point (size = importance)
 - primary pedestrian path/access
 - - - - - important pedestrian paths
 - medical clinic
 - ↔ potential connection
 - link across the site
 - community connections

micro-scale map:
conclusions

scale 1:5 000



5.

precedent studies

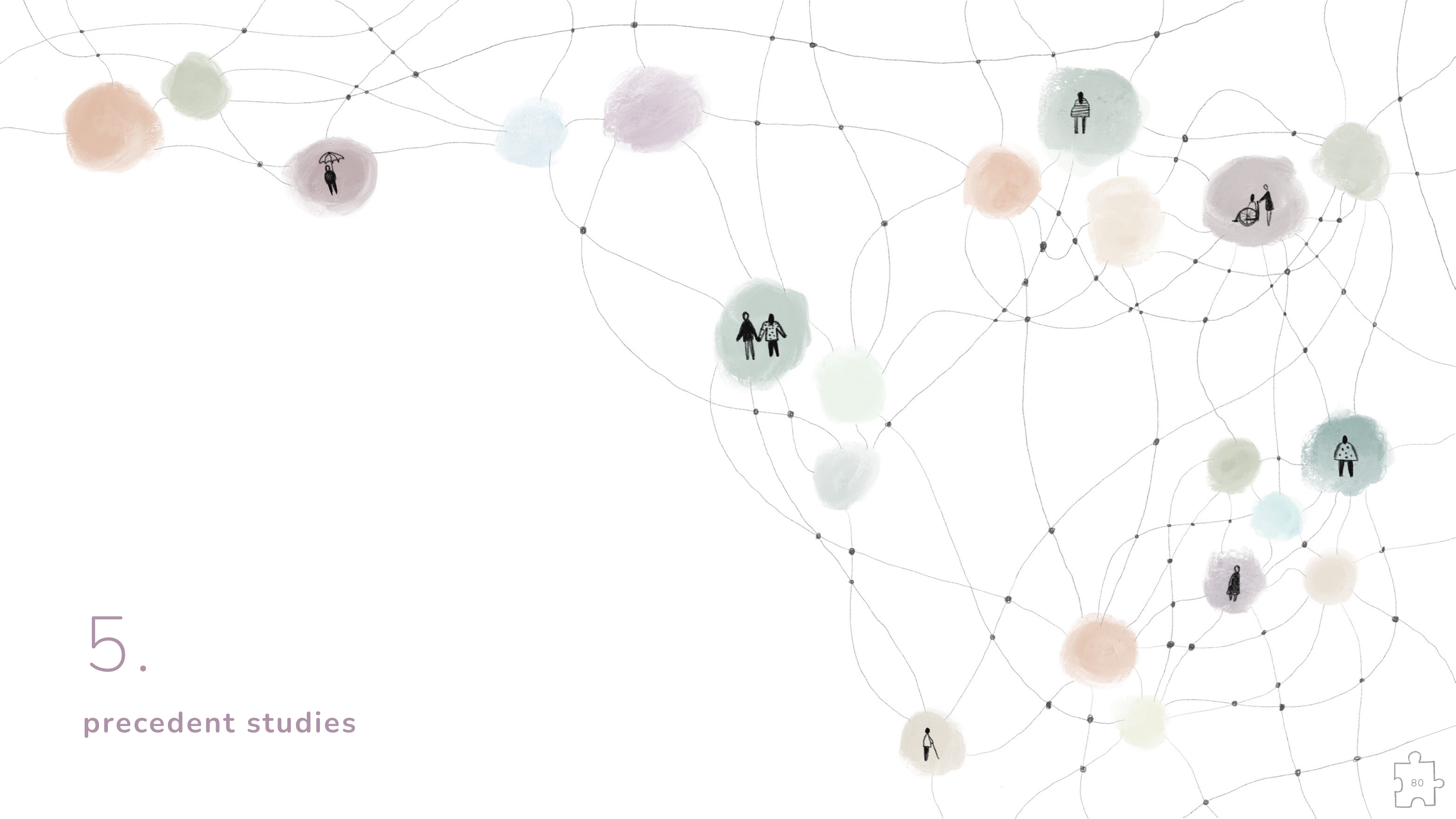




figure 54: location of precedents on the world map (Vecteezy, n.d.)

5.1. Apricot Tree Non-Profit Organisation

Special needs facility in Rynfield, Benoni



figure 55: Apricot Tree logo (Apricot Tree, 2024)

The Apricot Tree centre is a specialised school for children, and more recently young adults, with intellectual and developmental disabilities. They offer individualised support plans (ISP's), recognising that everyone is unique and requires different support to grow.

The NPO's vision for the future is to expand on their current day care model, the founders' dream is a live-in facility that will better serve those with intellectual and developmental challenges, including those on the autistic spectrum. One of their major objectives is to establish a nurturing environment where people with mild ASD can guide and help their peers with more severe ASD.

Apricot Tree's commitment to inclusion has been a significant influence on this project. Therefore, the research seeks to learn from their expertise and apply their principles to create more inclusive spaces.

My recent interview with the founders of Apricot Tree emphasized the difficulties in providing comprehensive care to people with a range of needs and the value of on-site vocational training to promote independence and lessen vulnerability. They stressed the significance of promoting integration and changing how society views people with impairments. For example, working with businesses that require basic labour that includes repetitive tasks and vestibular activities.

The following design considerations were identified and deemed as necessary; accessible features that include wide doorways (min. 900mm for single doors), ramps, few steps, level floors (no tiles), and wheelchair design throughout.

All materials should be durable and easy to maintain and clean, like vinyl floors and aluminium/stainless steel. Colours and materials should be chosen carefully, they have chosen off-white painted walls and natural wood vinyl floors to create a calming and natural feel. Using high ceilings, obvious escape routes, and secure surroundings to create safe and comfortable spaces.

It is important to ensure sufficient ventilation and to form strong connections between inside and outside by means of large openings, natural materials, and plenty natural light. Diffused artificial lighting and sensory-specific spaces can mitigate sensory overload.

Create adaptable areas for different support levels, ranging from independent flat-like quarters to open-plan hostel-style spaces. Additionally, the founders stressed the need to always prioritise function over form.

In general, the founders hope to create a facility that challenges societal stereotypes and fosters integration while offering people with intellectual and developmental impairments a secure and encouraging environment. Apricot Tree's knowledge of designing for individuals with disabilities offers valuable insights into ergonomic best practices.

One of the founders, an engineer, provided a preliminary design concept that demonstrates clear and easy circulation, a simple and orderly layout, central communal areas, and dedicated learning spaces with convenient access to bathroom and changing rooms. The design also emphasizes quiet gardens, distinct public and private zones, and a hierarchical spatial organisation.

The symmetrical design promotes easy navigation and a sense of place. It separates learning and therapy spaces from public and commercial areas, while placing residential units in more private areas. The design incorporates green spaces throughout.

This preliminary design is shown on the following page:

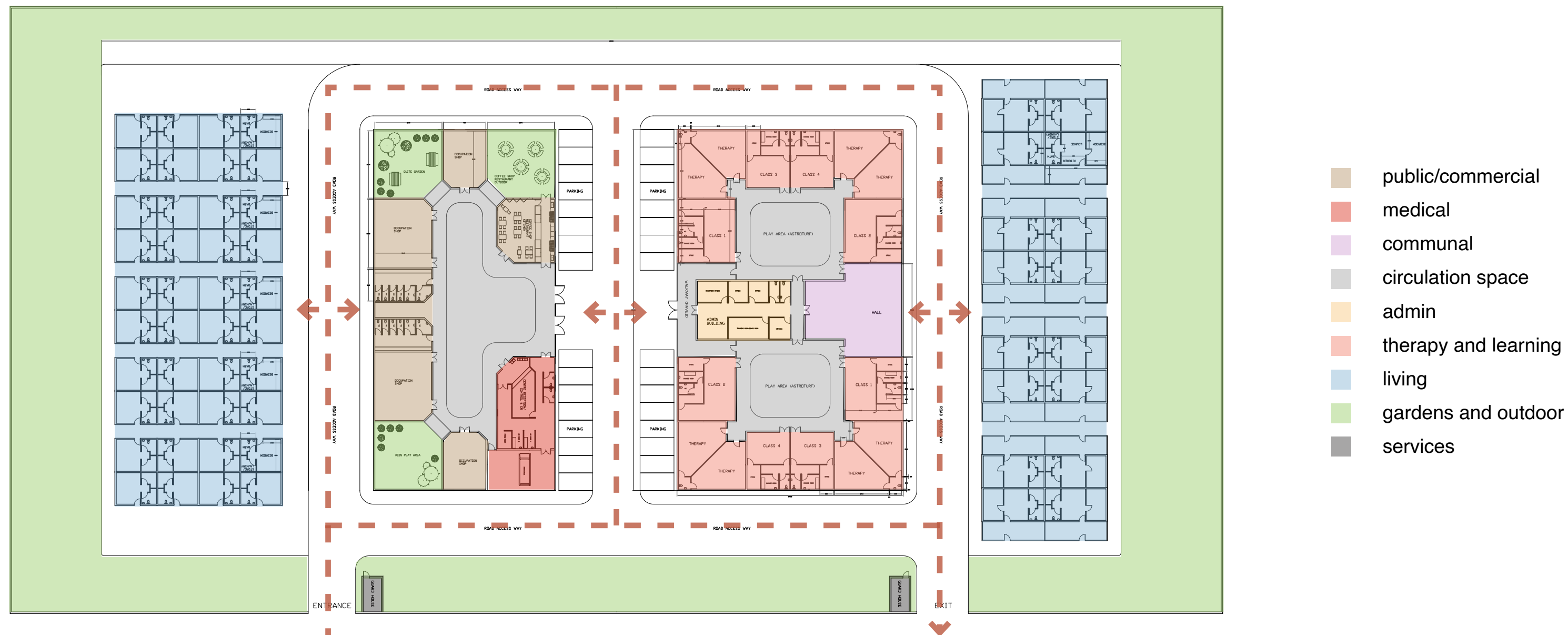


figure 56: Apricot Tree founder's prelim design of the live-in centre (adapted from Brandsch, 2016)



figure 57a: multi-sensory room (Dias, 2024)

The multi-sensory room (shown above) contains soft floor mats, sensory boards, and diffused lighting with blackout curtains that allow one to control the lighting.



figure 57b: calming room (Dias, 2024)

The calming room contains soft play mats and bubble machines that decrease anxiety levels.

figure 57: Apricot Tree NPO interior and exterior photographs (Dias, 2024)



bathroom figure 57c: (Dias, 2024)

Bathrooms contain changing areas and tiles on the wall (easy to clean).



figure 57d: lounge area (Dias, 2024)

Communal spaces and relaxation nooks with natural light provide users with comfortable spaces to gather or to find refuge.



figure 57e and f: physical activity rooms (Dias, 2024)

Physical activity rooms require structural elements which equipment can be attached to or strung from. These areas still feel 'homely'.



figure 57g: learning/workshop spaces (Dias, 2024)

Learning spaces are large and adaptable. High ceilings help with claustrophobia. Individuals prefer seats where they can observe the room (prospect and refuge) to feel more in control and at ease when learning.



figure 57h, i, j, and k: outdoor recreation area (Dias, 2024)
Outdoor recreation areas are covered to avoid exposure to harsh sunlight when outside for long periods of time. Outdoor play/activity areas and textured objects aid with motor skills, social skills, and sensory integration therapy.



figure 57l: outdoor seating (Dias, 2024)
Covered outdoor relaxation seating areas provide refuge.



figure 57m: sensory garden (Dias, 2024)
Quiet gardens offer tranquil retreats for therapy and solitude, where students can connect with nature. The calming influence of greenery is evident in their enjoyment of these spaces. Designed with accessibility in mind, soft grass surfaces and seamless integration with the natural environment, including birdlife, create a serene and inclusive atmosphere.

5.2. Sweetwater Spectrum Community

Housing project in Sonoma, United States
Architects: Leddy Maytum Stacy Architects

With Autism being the fastest growing disability in the United States, affecting 1 in 88 children, there is a critical shortage of residential options for these individuals as they transition to adulthood. In the next decade alone, nearly half a million individuals will face this dilemma.

Developed in 2009 by a group of families with autistic children, autism professionals, and community leaders this project serves as a “new national model of supportive housing for adults with autism” in the United States, offering a fulfilling and dignified lifestyle. The site is approximately 11 000 square meters providing a permanent home for 16 adults and their support staff. The community is strategically nestled near the Sonoma town square and public transport, providing a safe environment for independence. The focus extends beyond safety, fostering community engagement through volunteer opportunities and outreach programs.

The 300 square meter residences offer comfort and privacy, featuring four bedrooms each with en-suite bathrooms, along with spacious common areas. There is also a 215 square meter community centre providing the residents with exercise and activity rooms, a teaching kitchen, a therapy pool, spas, as well as an urban farm, orchard, and greenhouse (ArchDaily, 2013).



figure 58a, b, and c: exterior views (ArchDaily, 2013)



- 1 welcome building
- 2 parking
- 3 house
- 4 stormwater treatment bio-swale
- 5 community centre
- 6 the common: plaza and lawn
- 7 therapy pool and spas
- 8 orchard
- 9 trash
- 10 storage building
- 11 irrigation well
- 12 greenhouse
- 13 organic farm
- 14 fire access road

figure 59: site plan (ArchDaily, 2013)

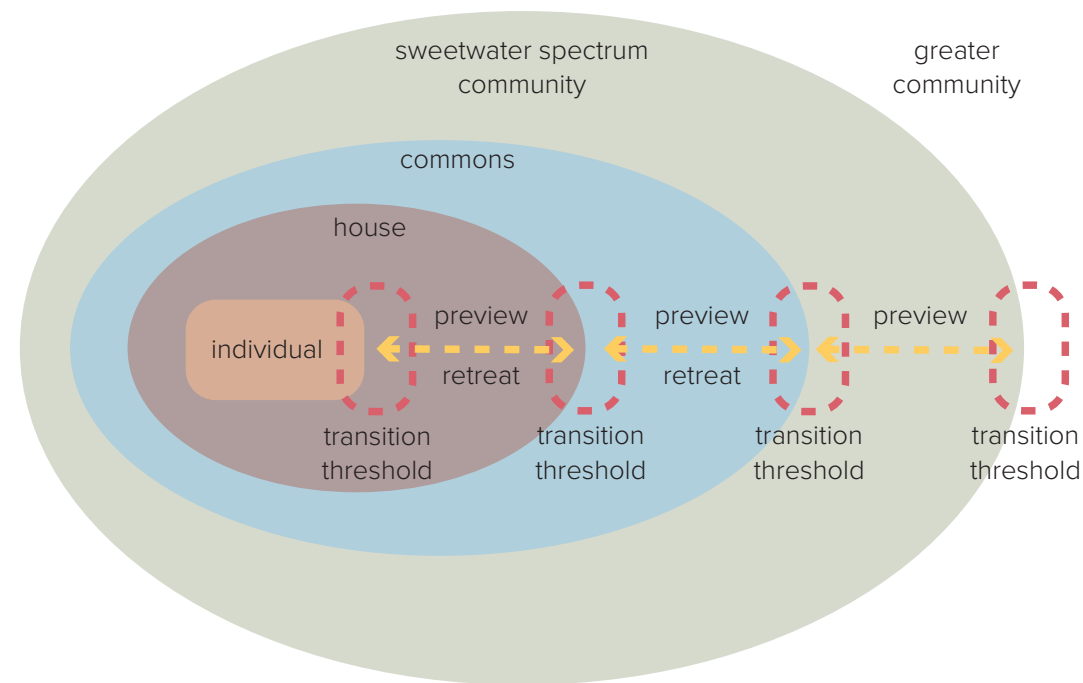


figure 60: concept diagram (adapted from ArchDaily, 2013)

The concept diagram demonstrates the nested experiential hierarchy that fosters a sense of belonging within a layered structure; residents can experience comfort in their individual rooms, connect with housemates, and then expand their interactions to the greater community centre and surrounding neighbourhood.

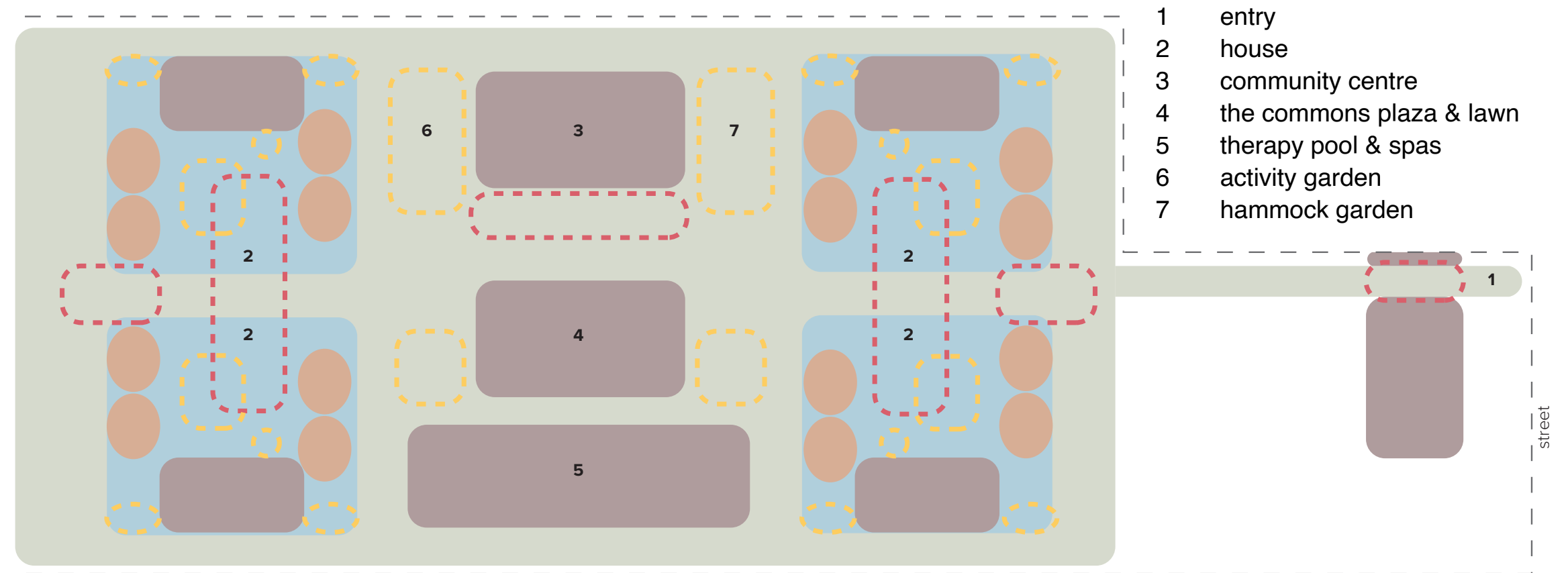


figure 61: plan diagram (adapted from ArchDaily, 2013)

The plan layout is well-organised with definitive transition thresholds between public and private spaces, providing clarity and predictability while navigating the space.

Residents can preview activities in the community spaces before choosing to engage or they can tuck away into a quiet space, such as the hammock garden, to unwind.

Serving as a gentle buffer zone, the community welcome building (entry) sits slightly away from the close-knit community, bridging the gap between the vibrant outside world and the peaceful inner world (ArchDaily, 2013).



figure 62a: plaza (ArchDaily, 2013)



figure 62b: common areas (ArchDaily, 2013)



figure 62c: community centre views (ArchDaily, 2013)

- | | | | |
|---|--------------------------|----|----------------------|
| 1 | teaching kitchen | 8 | staff office |
| 2 | common area | 9 | art prep and storage |
| 3 | fitness centre | 10 | pantry |
| 4 | storage | 11 | hammock garden |
| 5 | utility room | 12 | plaza |
| 6 | restroom | 13 | activity garden |
| 7 | library and quiet alcove | 14 | bio-swale |

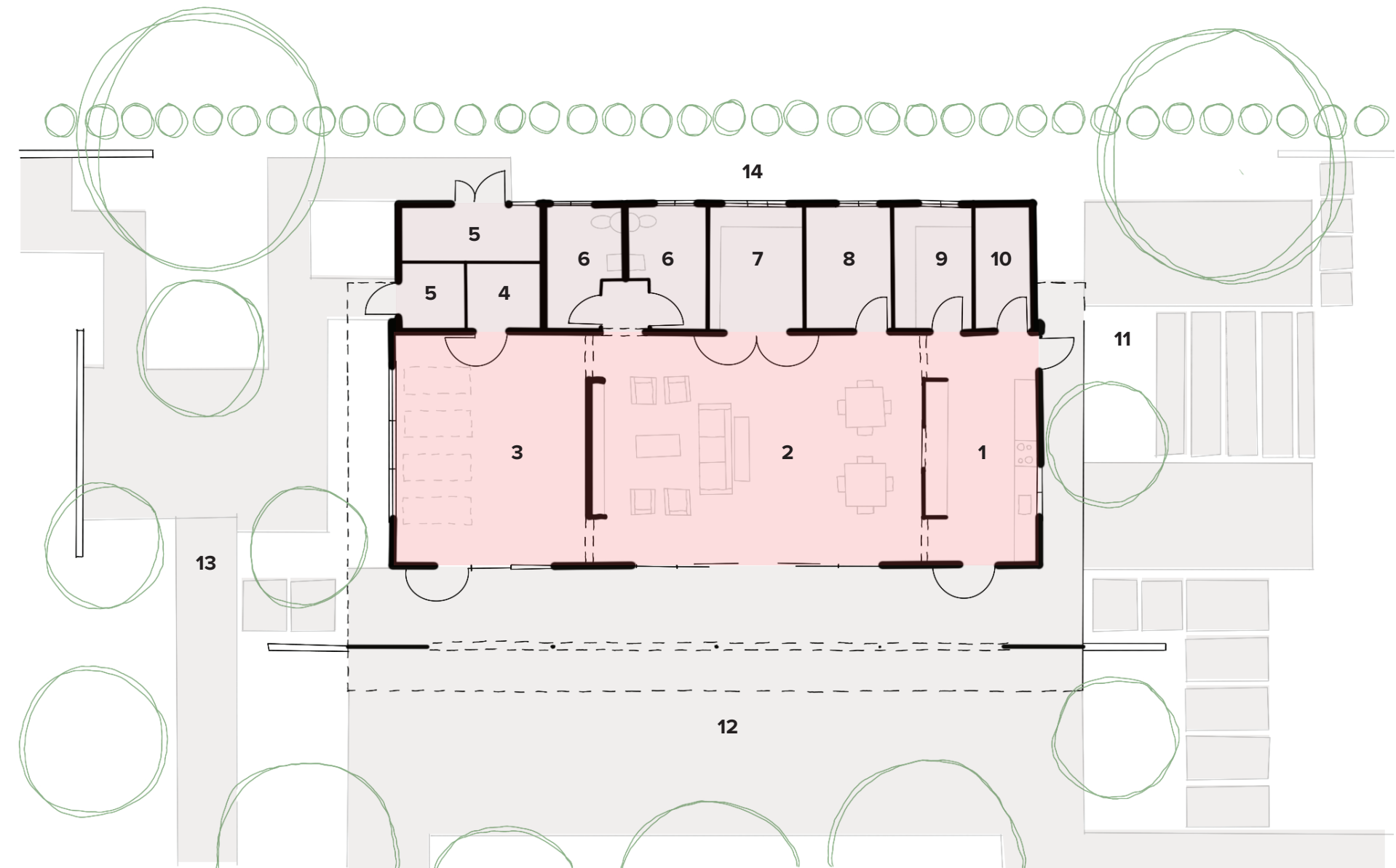


figure 63: community centre floor plan (adapted from ArchDaily, 2013)



figure 64a: exterior view (ArchDaily, 2013)



figure 64b: living room (ArchDaily, 2013)



figure 64c: kitchen and dining room (ArchDaily, 2013)



figure 64d: residential building views (ArchDaily, 2013)

- | | | | |
|---|----------------|----|-------------------------|
| 1 | entry court | 10 | laundry room |
| 2 | porch | 11 | staff bathroom |
| 3 | entry | 12 | dining terrace |
| 4 | staff office | 13 | kitchen and dining room |
| 5 | hall | 14 | living room |
| 6 | bedroom | 15 | terrace |
| 7 | bathroom | 16 | utility room |
| 8 | closet | 17 | bio-swale |
| 9 | skylight above | | |



figure 65: typical residence floor plan (adapted from ArchDaily, 2013)

The community prioritises safety and wellbeing, using durable materials that are healthier for the environment and for the users. The subdued colours, clean finishes, and indirect lighting create a serene environment throughout. All the homes share a similar design, allowing residents to feel comfortable when visiting each other or relocating within the community.

The design embraces inclusivity, with spacious living areas and access for everyone, regardless of age or disability. From building materials that promote healthy indoor air to acoustic features and energy efficient climate control, every detail prioritises user experience and comfort. Since ceiling fans can be disruptive for some, a radiant heating and cooling air system with low-velocity airflow ventilation controls the indoor temperatures while maintaining a calm environment (ArchDaily, 2013).



figure 66a: exterior view (ArchDaily, 2013)



figure 66b: exterior view (ArchDaily, 2013)

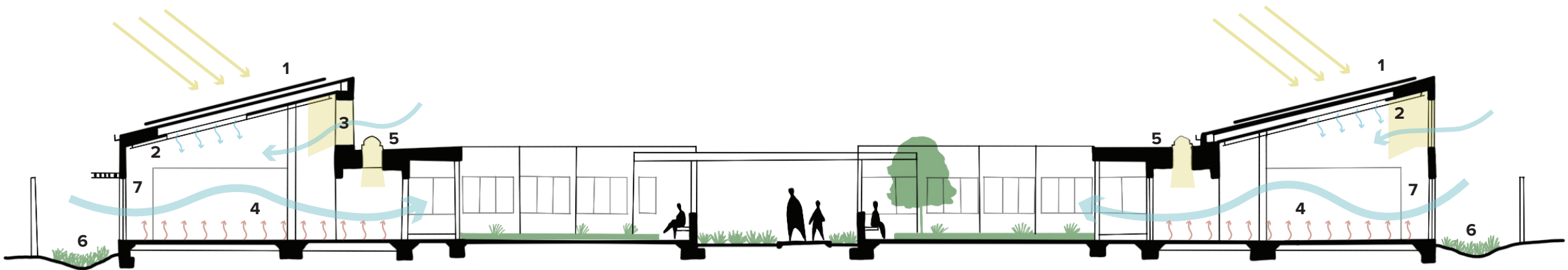


figure 67: section aa (adapted from ArchDaily, 2013)

Targeted to meet the US Green Building Council LEED Gold standards, the project pushes the boundaries with on-site energy generation (PG&E Zero Net Energy Pilot Project).

The buildings are designed to maximise natural light and ventilation, while solar panels harness renewable energy. To further enhance energy efficiency, the project incorporates high R-value insulated walls and roofs, high-performance insulated windows, low-reflective “cool” roofs, solar tube skylights, overhangs for sun control, trellises and operable exterior sunshades, high-efficiency air-to-water heat pumps, energy efficient light fixtures, Energy Star appliances, and a building management system. Water conservation is key, with low-flow plumbing fixtures, an on-site well for irrigation, bio-swales to manage stormwater runoff, and drought-tolerant plants. Sustainable practices extend to nontoxic building materials, and recycling construction waste (ArchDaily, 2013).

- 1 organic farm
- 2 irrigation well
- 3 cool roof
- 4 natural ventilation
- 5 daylighting
- 6 drought tolerant plants
- 7 solar hot water panels
- 8 solar pv panels
- 9 stormwater filtration bio-swale
- 10 sun control
- 11 radiant floor system
- 12 pool solar panels
- 13 high performance windows
- 14 solar tube skylights
- 15 high R-value exterior walls and roof
- 16 permeable paving



figure 68: sustainability diagram (ArchDaily, 2013)

5.3. The Sensory Box™

The Sensory Box™ is a portable Multi-Sensory Therapeutic Environment (MSTE) developed by a team of experts from Bellavista school and HUBO Studio in Johannesburg, Gauteng

The sensory box is designed as a portable multi-sensory therapeutic environment (MSTE) that “offers a powerful tool for people who experience sensory disorders, anxiety or other dysregulation that may be linked to transitions, trauma, learning disabilities, hospital stays, brain injury, mental health challenges, developmental delay, autism or dementia” (The Sensory Box™, 2023)

One of the architects on the team at Hubo studios envisions the sensory box as a sanctuary for neurodiverse individuals to regulate their senses. Designed to counteract the overwhelming exterior environment, the box allows users to control the sound, lighting, and temperature inside.

The elliptical pod is made from a durable but soft material, offering a tactile and visually calming environment. The floor is a matt PVC material with a 2mm foam layer inside, providing a soft base. The ribs form part of the structure, which is inflated by a compressor that also creates white noise, blocking out exterior noise.

The core design principles, such as the play of light, soft edges, adjustable acoustics, texture, colour, shape, volume, scale, ergonomics, and thresholds can be applied to larger architectural designs. Understanding that a one-size-fits-all strategy is insufficient to accommodate neurodiversity, the architect highlights the significance of creating inclusive and adaptable spaces.

These ergonomic principles can be integrated into the design.

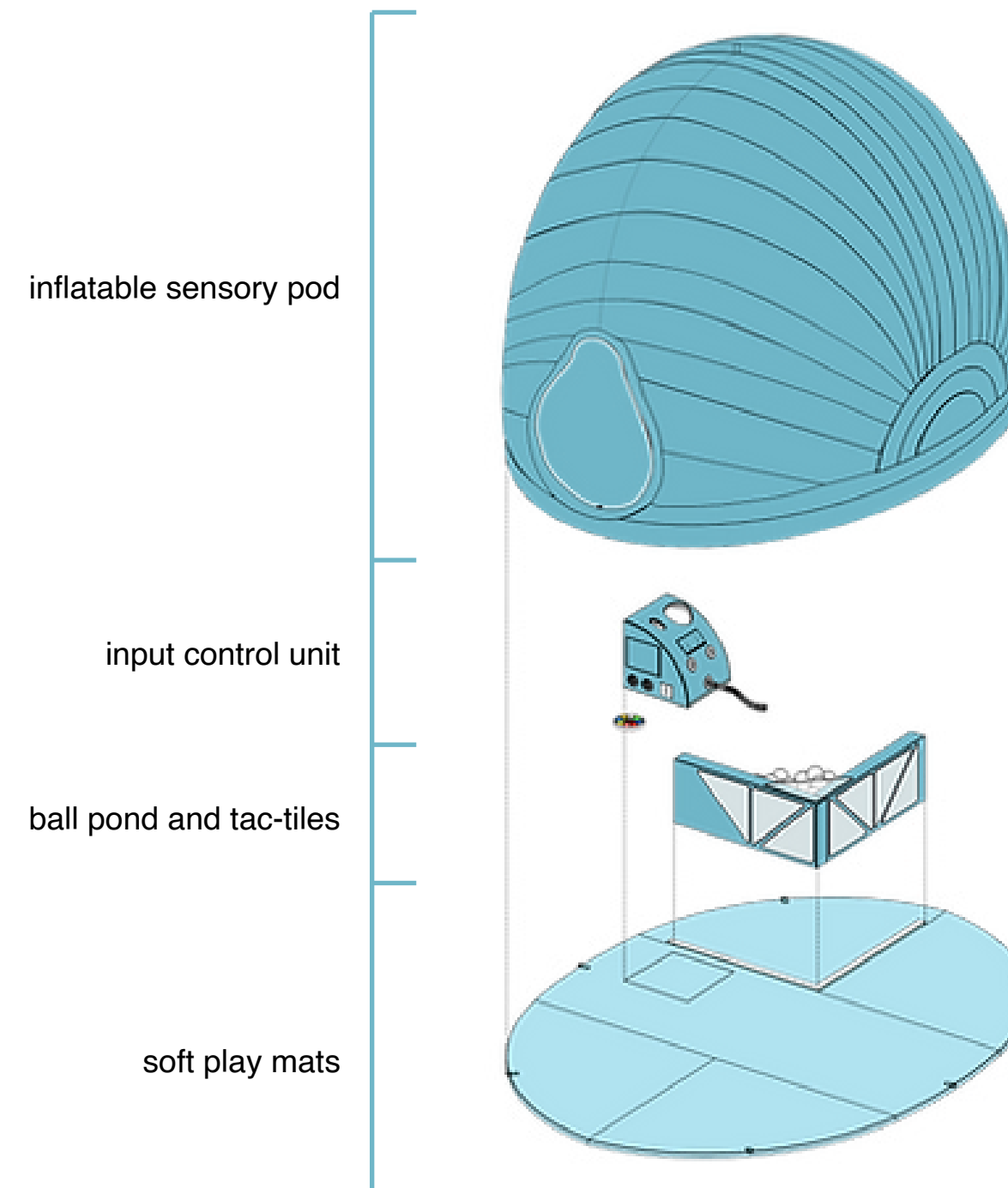


figure 69: exploded axonometric diagram of the sensory box (the sensory box, 2023)

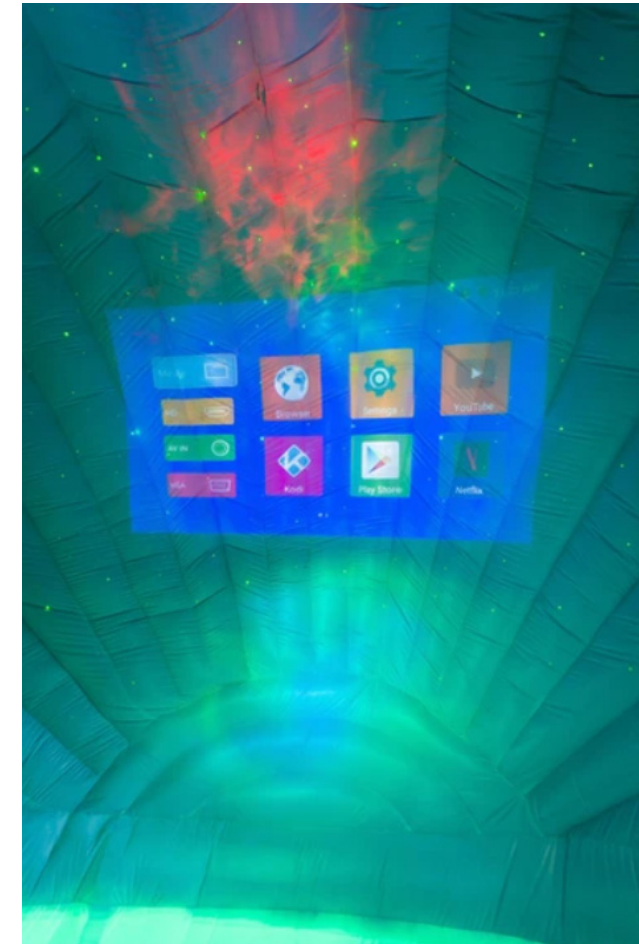


figure 70: photographs of the sensory box (the sensory box, 2023)

5.4. Lethabo le Khutso

Autism adult care facility and residence in Pretoria, Gauteng

Lethabo le Khutso, meaning “long awaited place of peace and happiness”, is a daycare, residence and vocational stimulation for adults with Autism. The organisation was established in 2002, being the third autism-specific centre for adults in South Africa (Lethabo Le Khutso, 2024).

The general manager at Lethabo Le Khutso refers to their centre as a benchmark facility, catering primarily to individuals with severe support needs. It is in a residential area that is **strategically near a hospital**. Operating as a privately-run facility with partial government funding, it has expanded from a single residential property to comprise three adjacent houses. This layout allows for **specialised care within individual units**, each equipped with essential facilities, living quarters, and workshop spaces. The facility strives to prevent overcapacity to maintain the quality of care. Although deinstitutionalisation is being pushed for by society, many communities aren't ready to handle the integration of people who require extra help. Autism requires individualised care, making it a disability that requires expensive resources. The facility emphasizes routine-based programs and simplicity. The general manager finds that the approach of ‘**less is more**’ works well for the occupants.

The master plan demonstrates how the garden serves as a central gathering space for the three adjacent houses, highlighting the benefits of **smaller-scale, community-focused living arrangements**. This layout provides a secure and private ‘cocooned’ outdoor area for residents to explore. This approach can help avoid the negative connotations associated with institutionalisation, while also facilitating easy oversight and management.

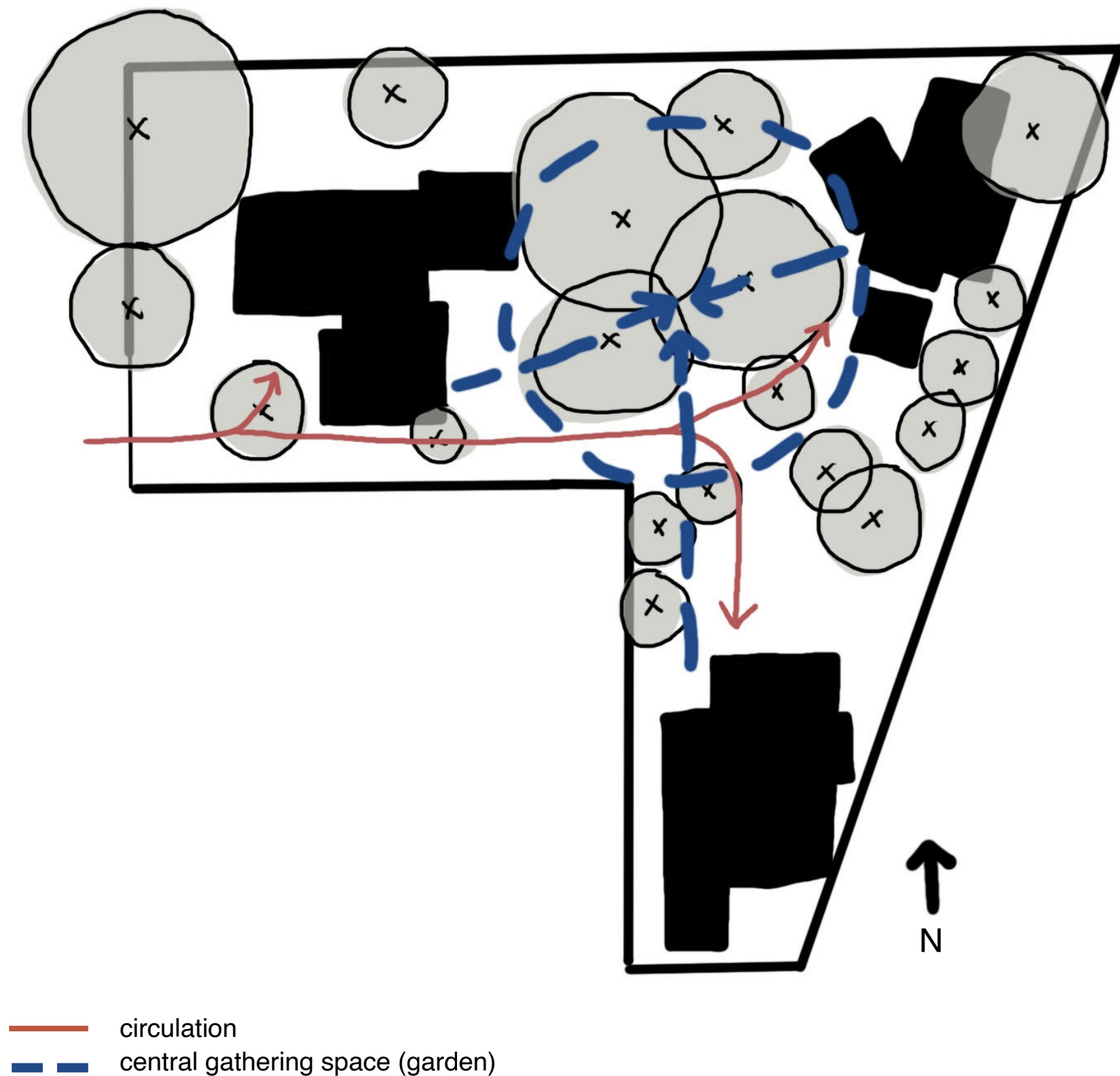


figure 71: master plan sketch (Dias, 2024)

The diagram below illustrates the concept of community and oversight as applied to the layout of the buildings, which can be incorporated into the design.

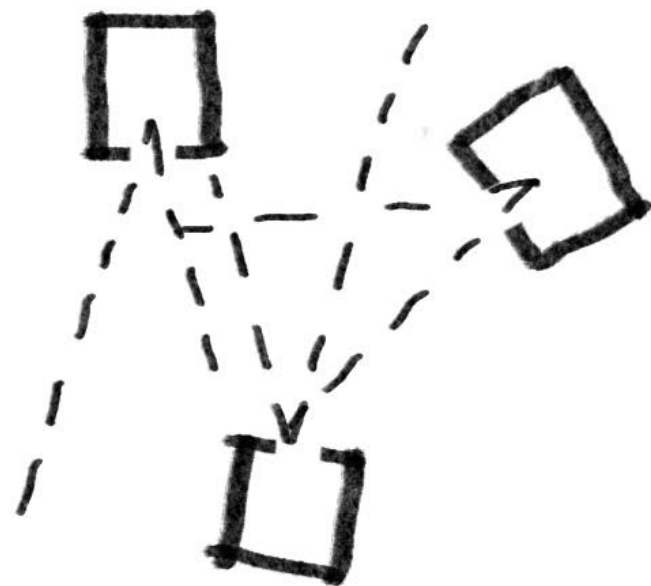


figure 72: diagram showing interaction between residences (Dias, 2024)

The plan alongside shows one of the three houses and demonstrates central corridors for circulation, storage areas, spacious and universally accessible bathrooms, communal kitchens and lounges, workshop spaces, and primarily single bedrooms with some shared bedrooms. It's important to note that these buildings were adapted from existing residential houses to meet the needs of the facility.

Residents should have the flexibility to engage with the community or retreat to their private spaces as desired.

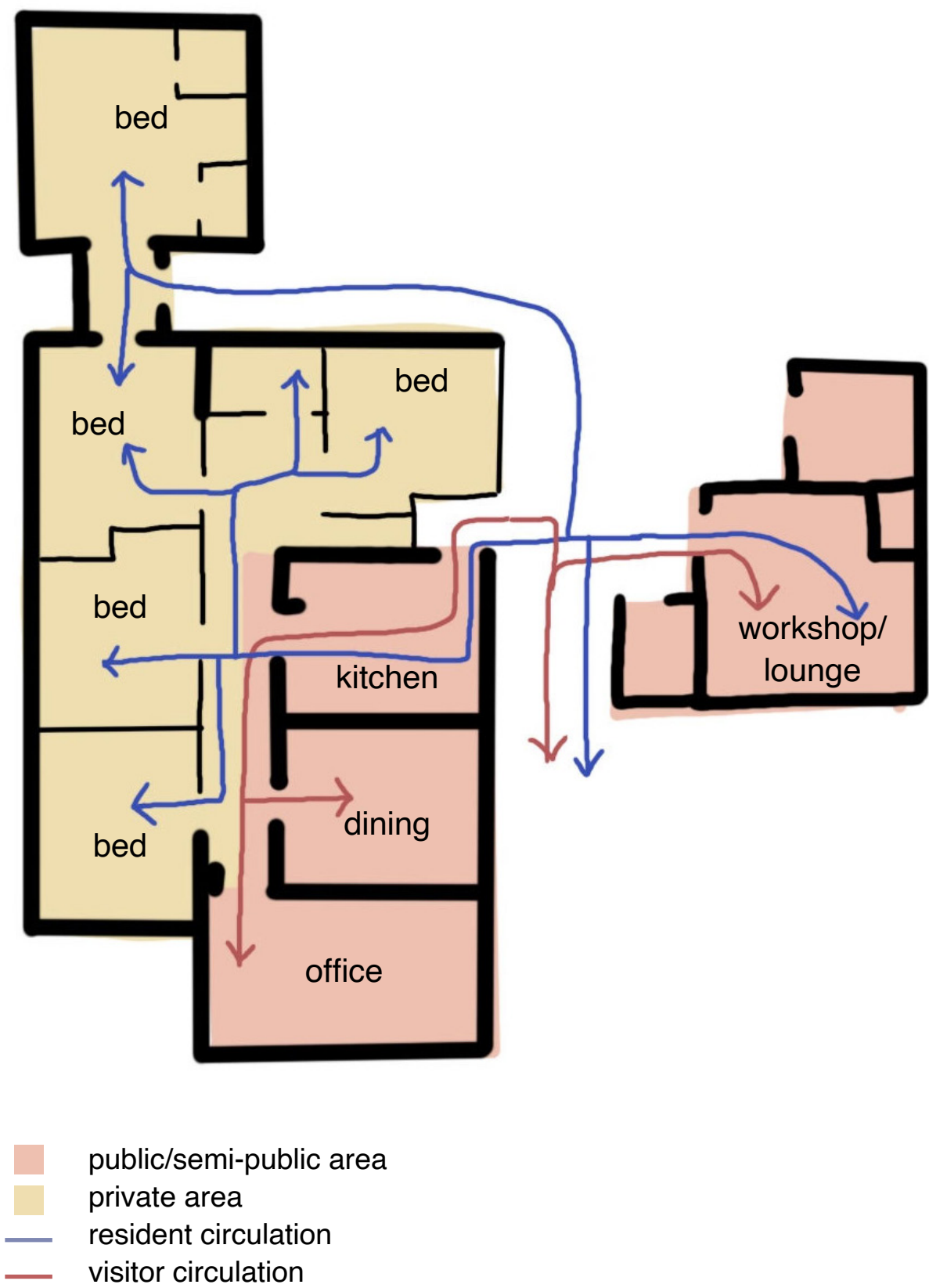
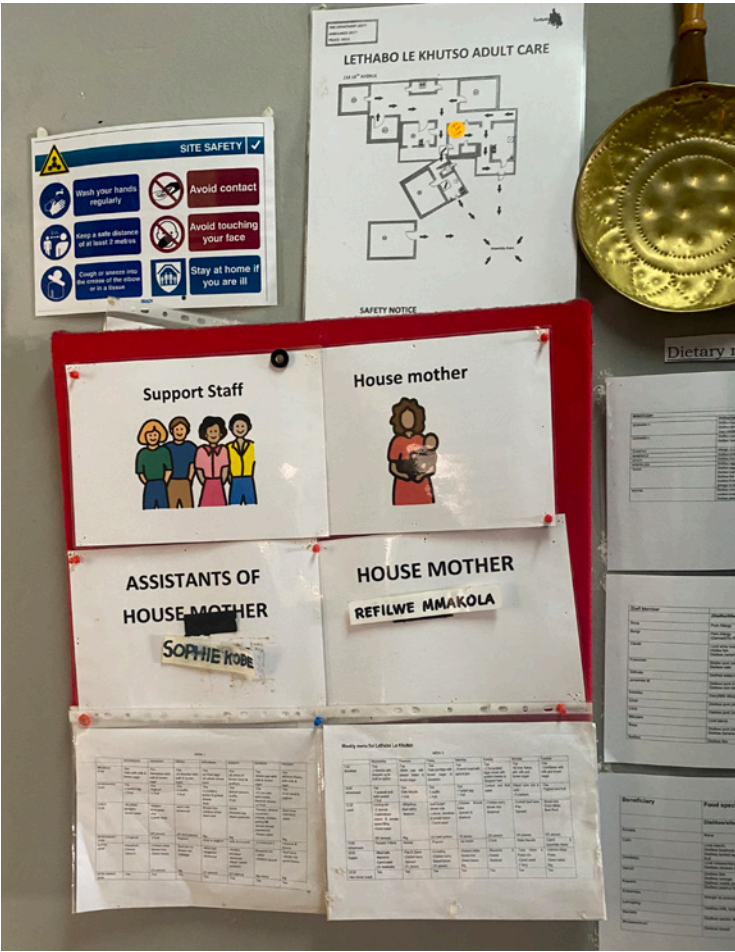


figure 73: plan sketch (Dias, 2024)



figures 74a and b: exterior views (Dias, 2024)
The facility has plenty outdoor space, including tranquil gardens, trampolines, swings, an enclosed pool area, and upcoming vegetable gardens.



Workshop program					
Theme: Animals: Wild					
Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:20-8:30	Good Morning: Attendance & Orientation (date & day, weather, holidays)				
8:30-08:45	Prayer: Our Father Scripture Songhymn for the day	Prayer: Our Father Scripture Songhymn for the day	Prayer: Our Father Scripture Songhymn for the day	Prayer: Our Father Scripture Songhymn for the day	Poem & Song A Lion came to sea & in the jungle
	Cross Motor Activity & Games				
08:45-9:15	Audio Book	Walk around block (TPW & Abana)	Walk around block LLK Workshop	Shredding	Colour for wordsearch/ mural matching
9:15-10:45	The Wild Craft	Rhythm and Dance with Neta	The Wild Craft	Audio Book	Scavenger Hunt
10:45-11:00	Movement: Activity & Hygiene				
11:00-11:30	Movement: Cube 1	Dance along song	Poem & Song	Movement: cube 2	Poem and Song
11:30-13:00	Teatime				
13:00-14:00	Lunch				
14:00-15:30	Sensory Boxes To use for game Pop bubble wrap	Sensory Boxes To use for game Pop bubble wrap	Sensory Boxes To use for game Pop bubble wrap	Sensory Boxes To use for game Pop bubble wrap	Sensory Boxes To use for game Pop bubble wrap

figures 74c and d: signage (Dias, 2024)
Signage throughout the facility informs the residents of their weekly programs and helps with communication.



figures 74e and f: exterior views (Dias, 2024)
Paved walkways guide residents through the sensory gardens, leading to the separate communal houses



figures 74g and h: interior workshop spaces (Dias, 2024)

The workshop spaces contain kitchenettes and easy access to disabled bathrooms. Neutral colours ensure that users are not overstimulated in their learning environment. Sensory boards are used to help with activities.



figure 74i: nursing room (Dias, 2024)

Each house contains a nursing room with a patient bed and medicine cabinets.

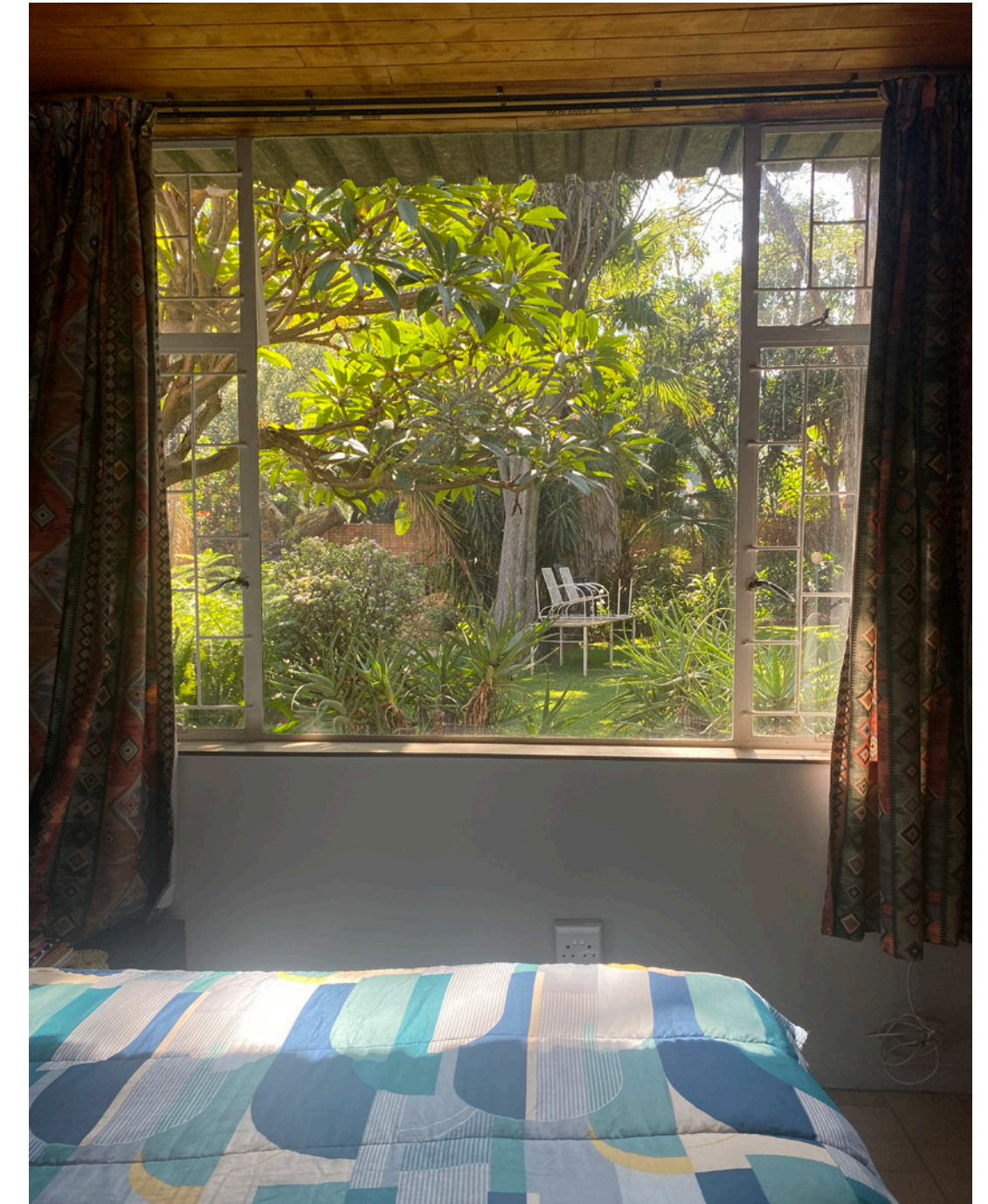
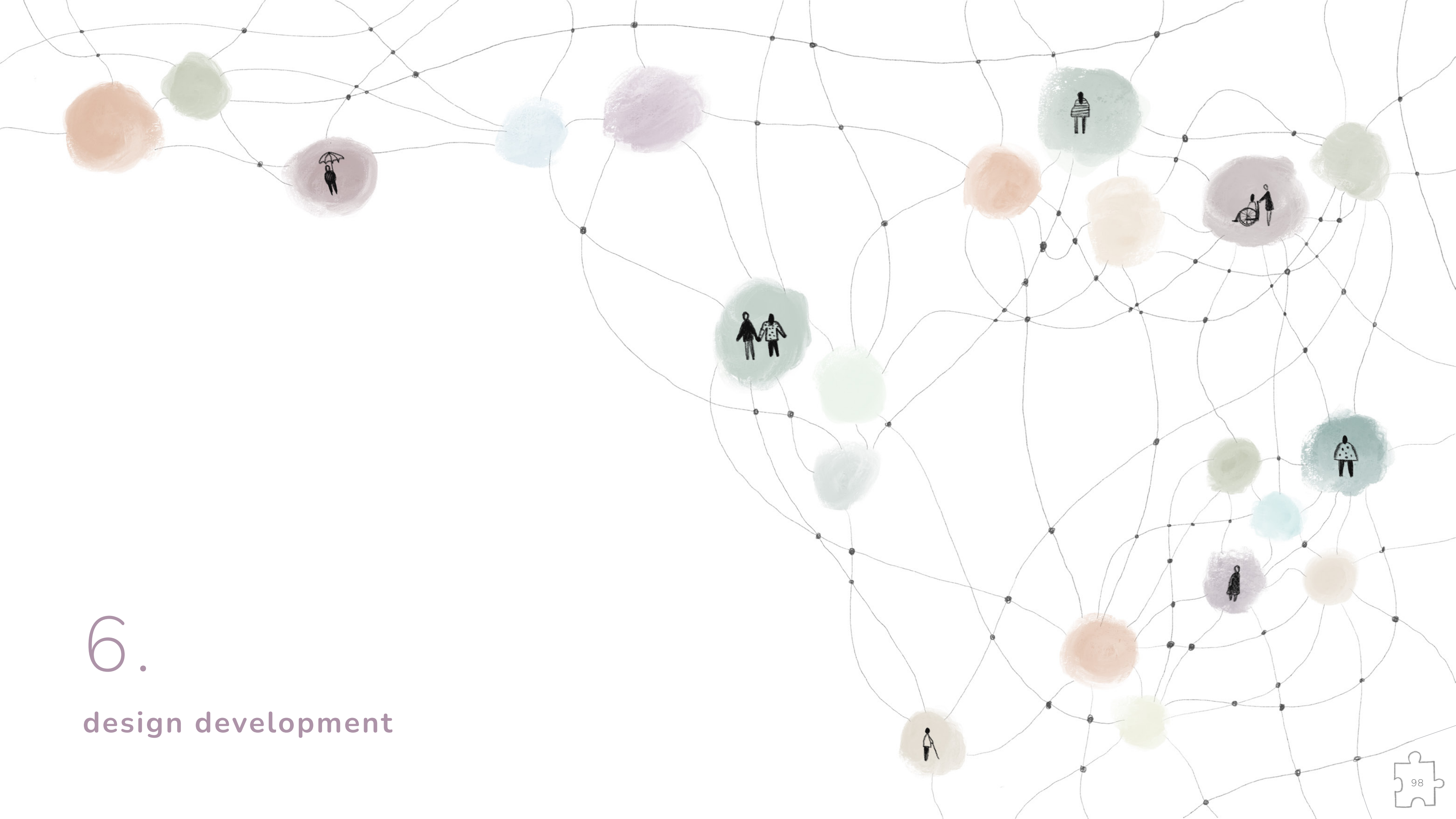


figure 74j: view from bedroom (Dias, 2024)

Bedrooms have views of the exterior gardens and provide a serene environment for residents to find solitude.

figure 74: Lethabo le Khutso interior and exterior photographs (Dias, 2024)



6.

design development

6.1. materiality

The rich history of Benoni, which was established using clay bricks, stone, iron, and wood, provides a distinctive basis for the architectural design of the new community. These traditional materials could be a recurring theme, not only paying tribute to the past but also forging a tangible connection between historical periods. Incorporating a variety of materials with distinct textures can create a richer and more engaging sensory experience. A neutral colour scheme that avoids overwhelming the senses while still creating visual interest is important. The use of natural materials like stone and wood contributes to a warm and inviting atmosphere.

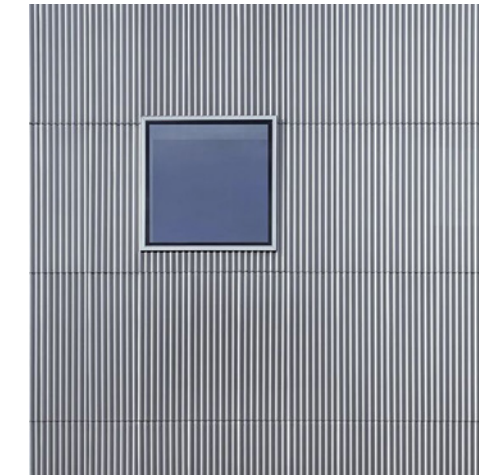
The use of gable and hip roofs, reminiscent of traditional Benoni homes and the Benoni Country Club, can contribute to a more homelike feel. The new village community can create a unified and historically appropriate architectural style by carefully incorporating these components, a true celebration of Benoni's spirit. When locals associate these unique characteristics with the village, the residents' sense of place attachment deepens.

By carefully considering these qualities, the village becomes more than just a place to live; instead, it fosters a vibrant community where residents are made to feel at home.

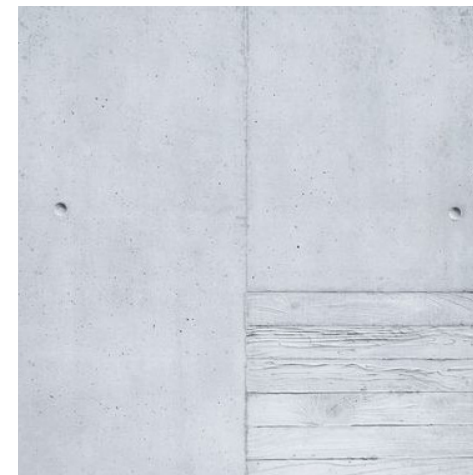
figure 75: material palette
stone (Culturedstone, 2024)
aluminium sheeting (Russo, 2018)
concrete (hydearchitects, 2022)
wood (flyingarchitecture.com, n.d.)
brickwork (Ruby light face brick, 2023)
neutral plaster (www.rakceramics.com, 2024)



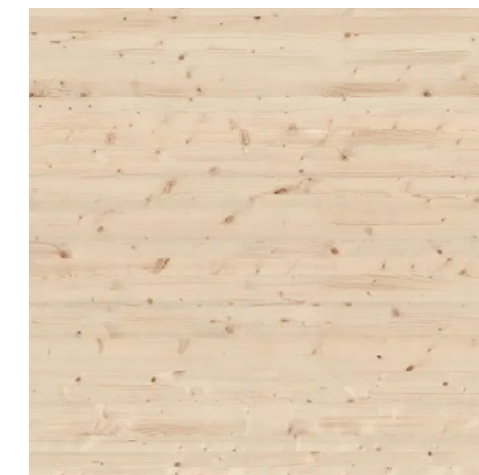
stone



aluminium sheeting



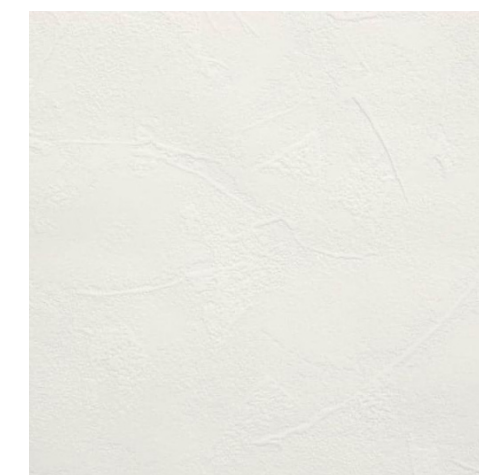
concrete



wood



brickwork



neutral plaster

6.2. design elements and principles

Drawing upon our exploration of design elements and principles and the insights gained from studying individuals with autism, we can propose the following design recommendations:

The charette collage alongside explores the visual elements of colour, texture, harmony, line, pattern, shape, form, and rhythm. The pastel and dull colours along with the natural materials create a calming atmosphere. Soft textures like wood and fabrics evoke a sense of warmth, safety, and home. White and blue together with the cotton wool represents the need for medical assistance that is subtly integrated into the design. The pins represent order, while the strings connecting them symbolise the importance of routine. Geometric and organic shapes provide a sense of clarity and control.

Together, these elements and principles contribute to a harmonious and balanced feel.



figure 76: charette: colour, texture, harmony, line, pattern, shape, form, rhythm (Dias, 2024)

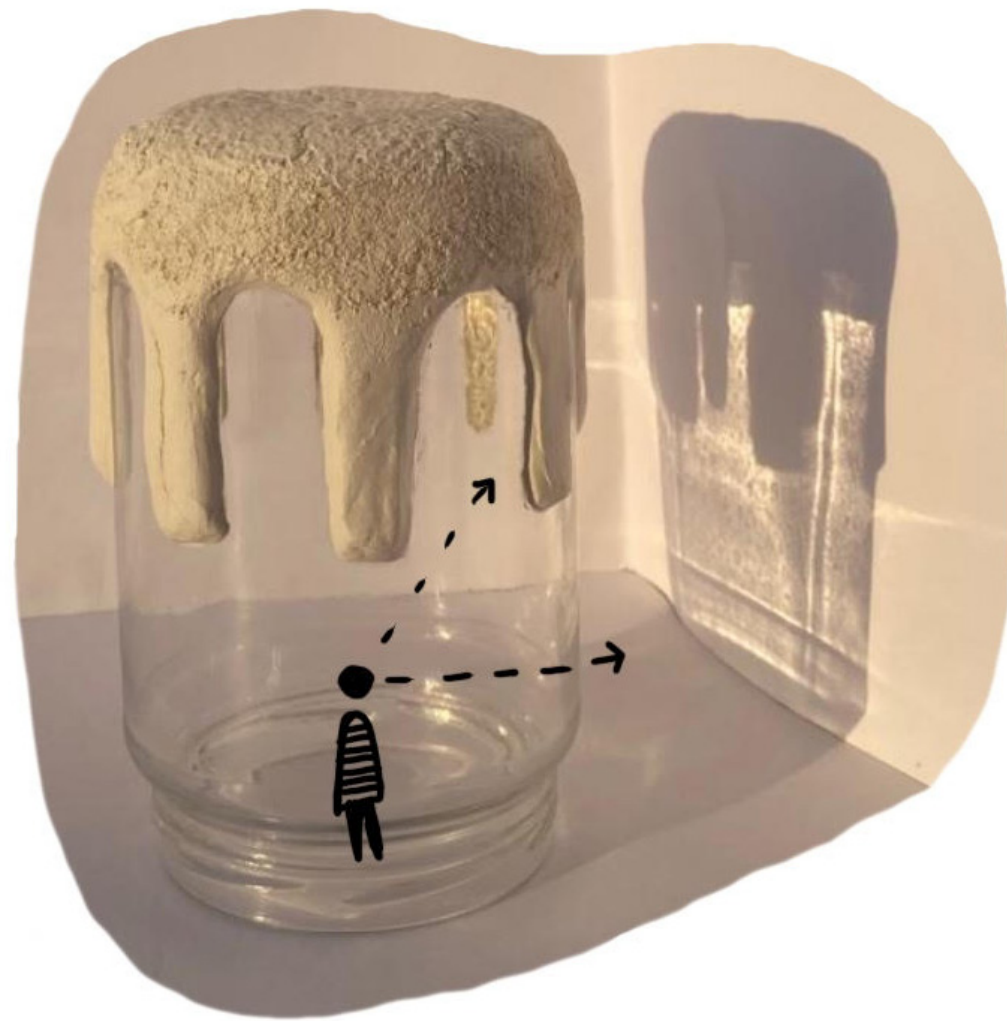


figure 77a: charrette exploration of form, light, texture, colour (Dias, 2024)

The charrette showcases how strategic lighting can create visually engaging spaces, while distinctive forms and textures can aid in wayfinding and orientation. Maintaining strong connections between indoor and outdoor spaces is essential for creating a calm and welcoming atmosphere. Neutral colours can further contribute to this sense of tranquility.

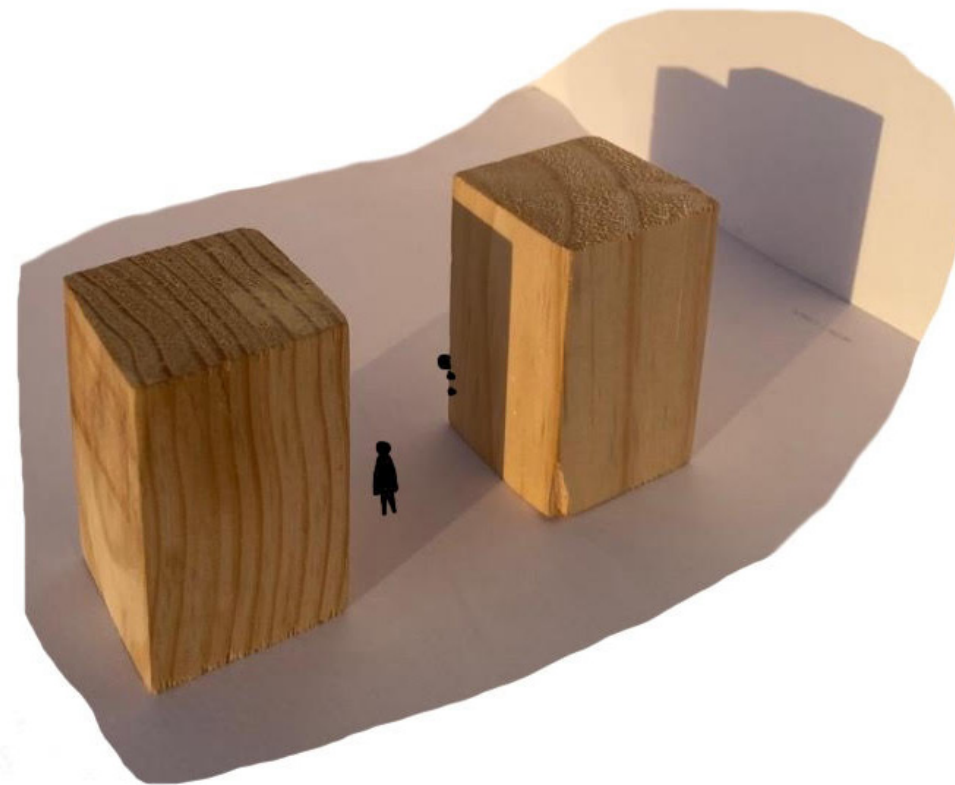


figure 77b: charrette exploration of proportion, scale, balance and harmony, texture (Dias, 2024)

By carefully considering proportion, comfortable heights, and the use of natural materials, the design can create visually appealing and welcoming spaces that promote a sense of connection to the outdoors.



figure 77c: charrette exploration of proportion, scale, mass, space, texture (Dias, 2024)

While maintaining a single-storey design, the project can experiment with scale, mass, and volume to create visually distinct and engaging spaces that aid in navigation and exploration.

6.3. concept development

all drawings on the following pages are done by author (Dias, 2024)

place identity: → Benoni Houses

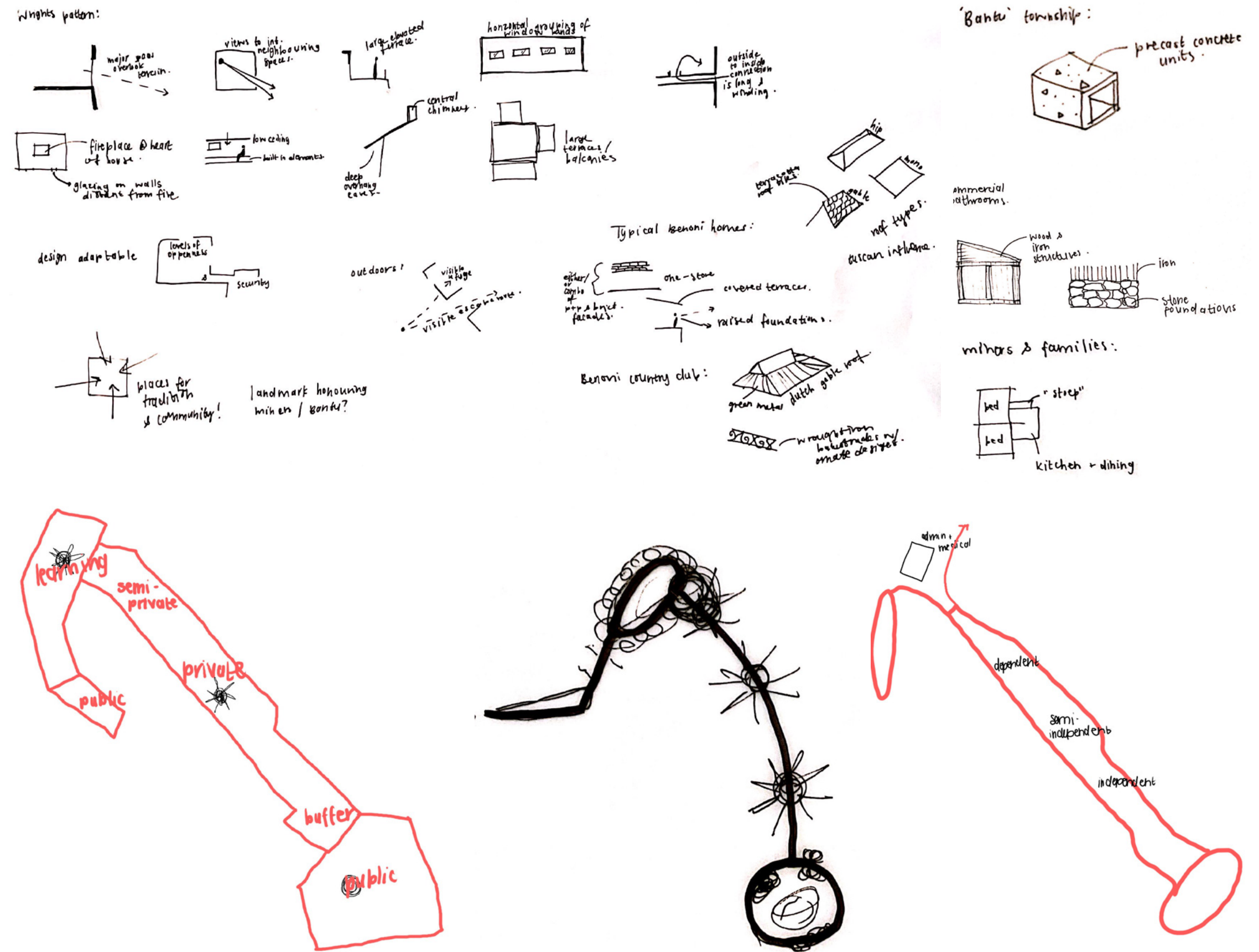
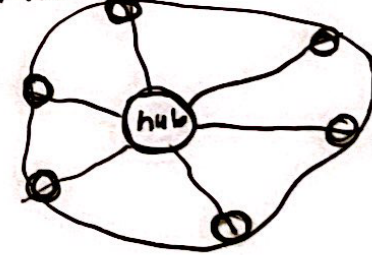
- shared characteristics w/ other places
- it's own 'one-of-a-kind' character.

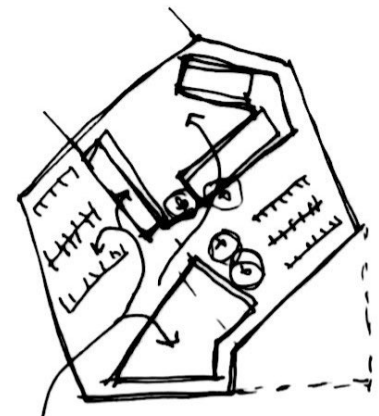
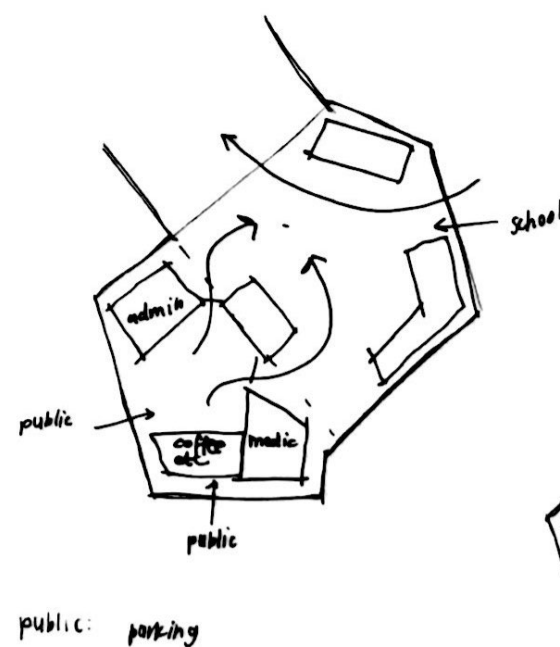
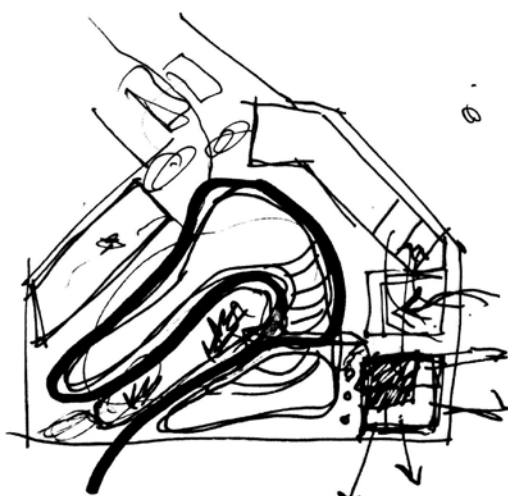
strong place attachment:

- safe place
- socialisation.
- transformative (memories).
- recovery (rest, serenity, nature).
- Validating (cultural importance, shared meaning.)
- disappearing places.

easy mental maps

radial layout





school admin, other housing admin. Benoni → "city of lakes"

use the reservoir as a design feature!

2 admin blocks needed?

close connection to mall

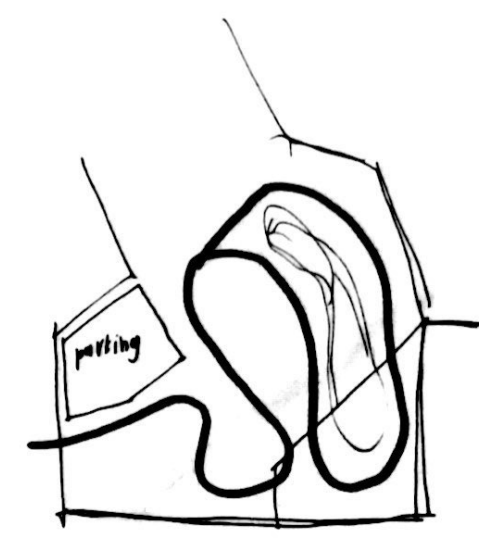
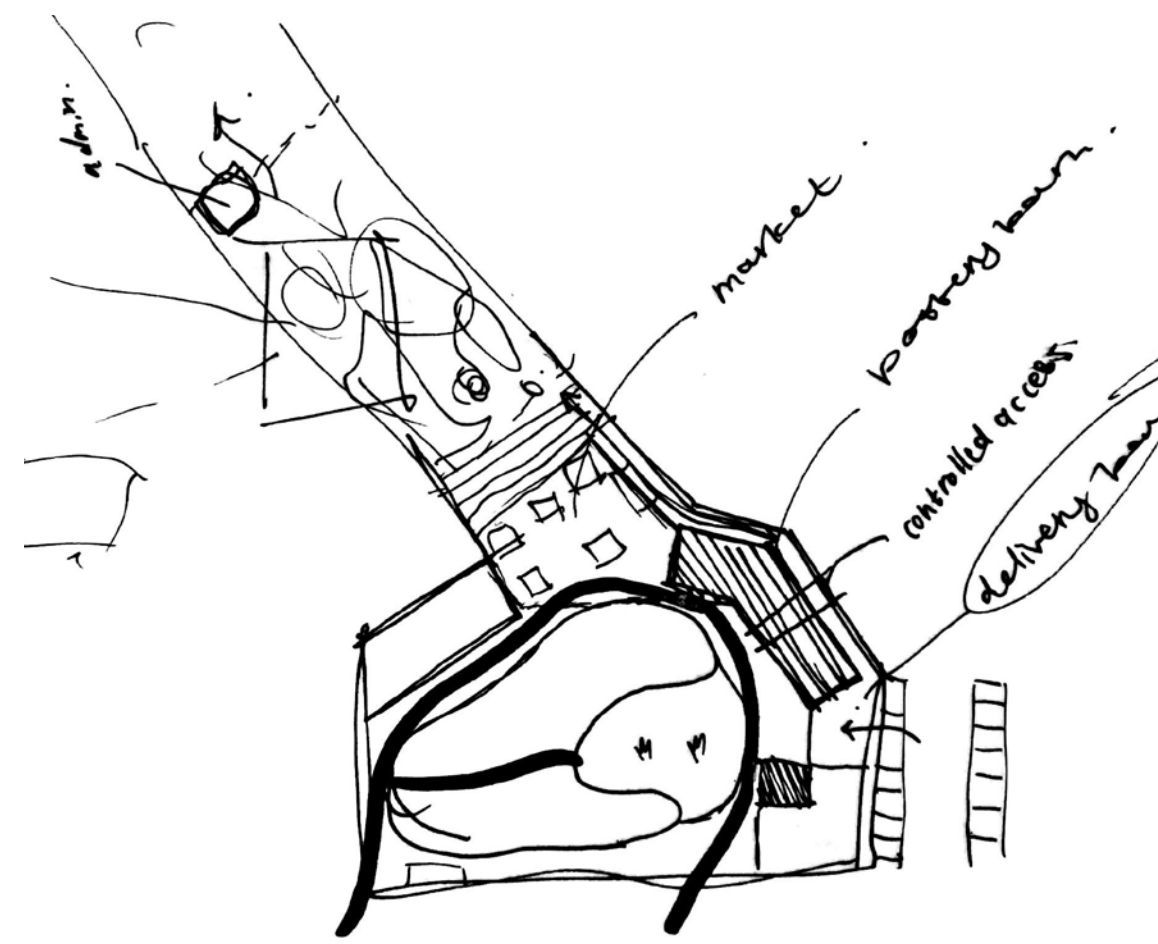
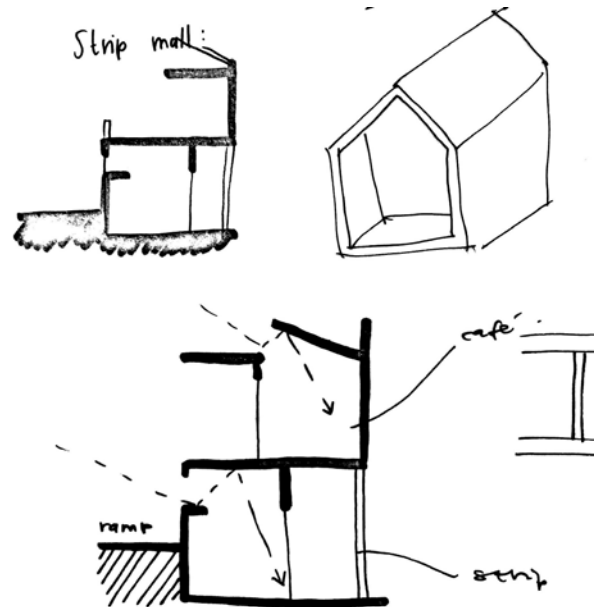
school

gardenings

house

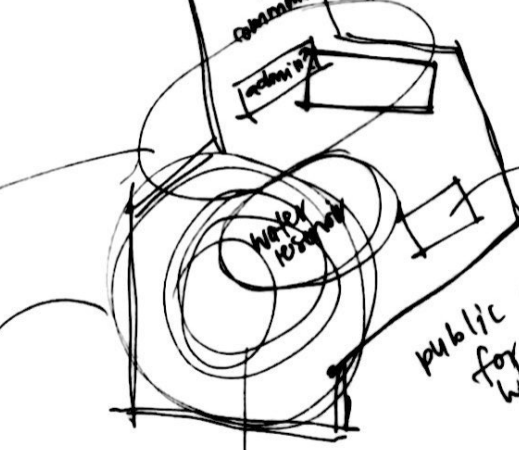
interact w/ park across

comm. unit



good spot for gardening (available to coffee shop, nursery + buffer zone to public area)

public park

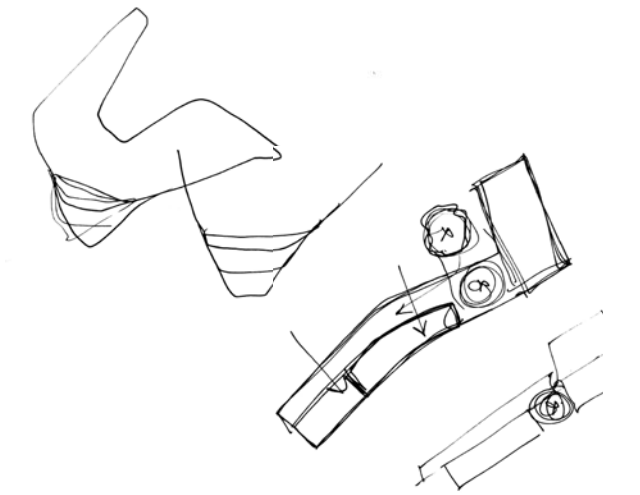


pottery barn florists etc.

public area for markets, kitchen etc. where they work

reservoir @ lowest point to collect water can also provide to surrounding neighbourhood

water reservoir + labyrinth



6.4. preliminary design

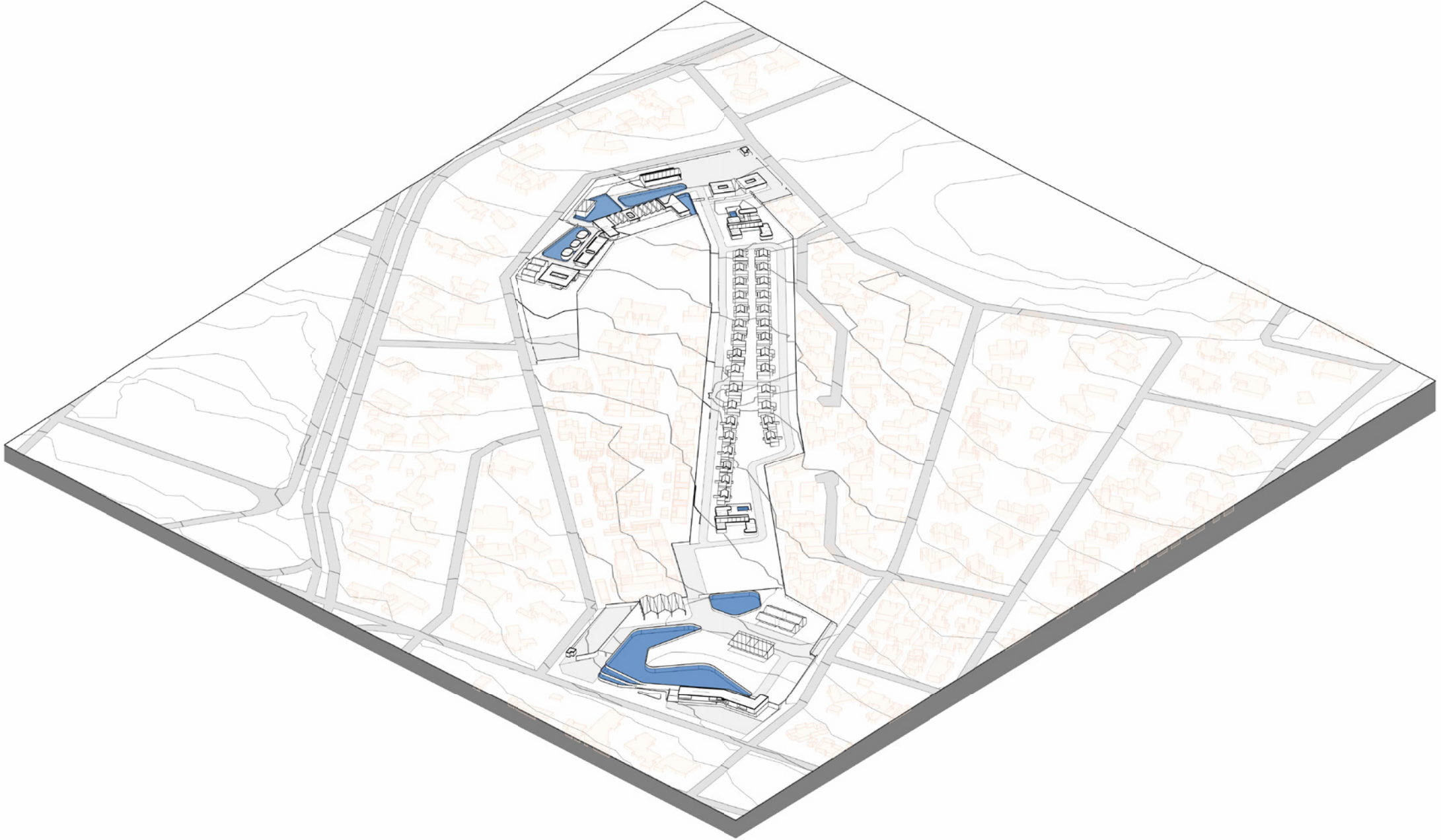
The single-story design promotes a sense of equality among residents and staff, as it accommodates the specific needs of autistic participants. By playing with volume and light, the centre creates a welcoming, village-like atmosphere that encourages exploration. Water features and reservoirs provide a calming sensory environment, creating memorable landmarks for wayfinding and connecting the therapy and learning spaces. Quiet zones such as the library and some therapy spaces are placed on the water.

The design incorporates buffer zones, using green spaces and communal areas to transition from public to private areas. To blend traditional Benoni styles with modern elements, the centre features pitched and flat roofs.

The medical centre is centrally located for easy access by residents and therapists. The public park, situated near the business side, attracts locals and offers opportunities for interaction through vocational activities like pottery, flower arranging, and the market. The commercial strip mall and coffee shop provide additional employment opportunities for autistic individuals.



master plan (Dias, 2024)



This design development represents an initial draft and may not fully align with the now developed concept of using the centre of the site as a park to connect the neighbourhood (sketched below). While the early stages of the design considered accommodating all levels of support in the residential sector, the project will now focus on providing support for dependent care levels within the living facility.

The initial design encompassed all components of the project. However, following this development, the focus will shift towards the learning and therapy centre and the residential component as mentioned earlier in this document. The remaining public section and park will remain part of the overall master plan.

The residential and communal component will be designed to make up a cohesive layout, as shown in black below, that will create a private area for residents that links to the quieter neighbourhood park. This park creates a buffer between the public park on the south end, and the semi-private and private zone on the north end of the site. Therefore, mostly the design in the centre of the site will change.

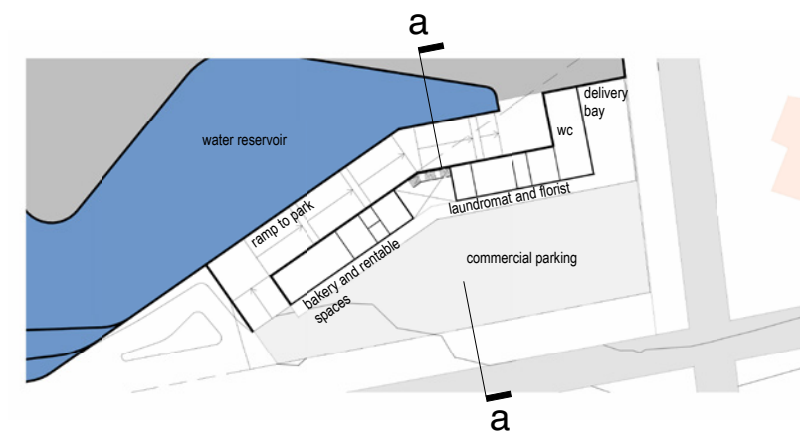


master plan sketch representing intended changes (Dias, 2024)

axonometric view of the entire site (Dias, 2024)



public first floor plan (Dias, 2024)



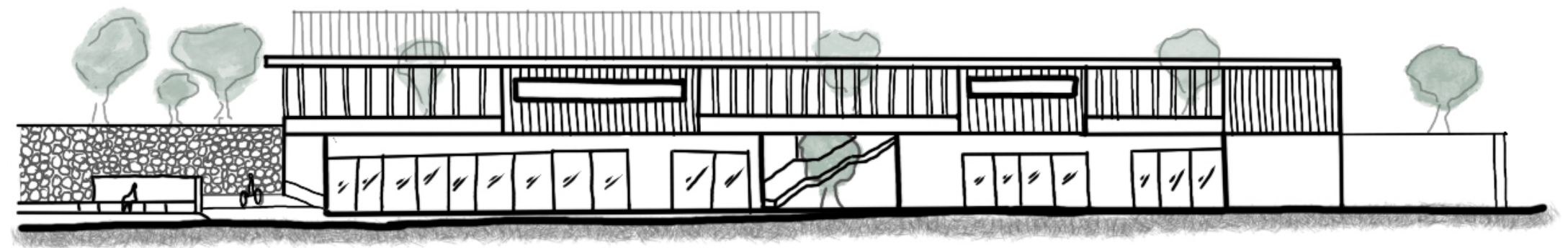
public ground floor plan (Dias, 2024)



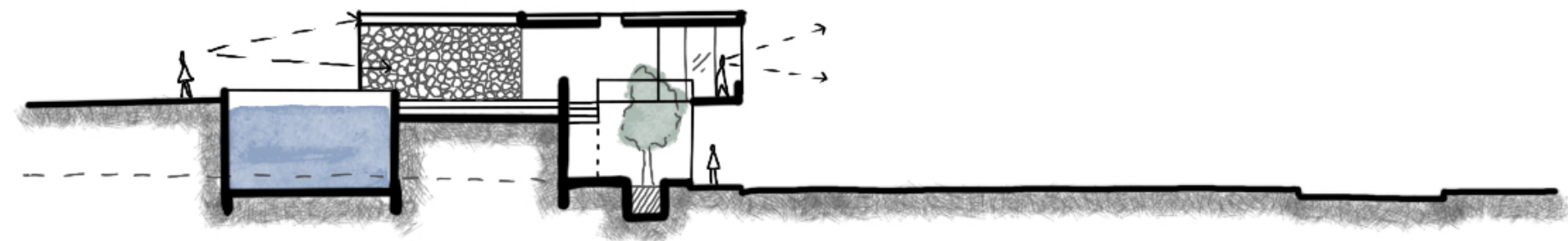
The elevated park creates separation between the street and the facility, ensuring controlled access. This safety measure is essential for facilities serving individuals with intellectual disabilities, especially at night. The commercial strip mall, situated at the lowest point, is the only two-storey building. It features ramp access and a rooftop café and restaurant with views of the park. The park itself is fully accessible with ramps throughout, both landscaped and concrete. A controlled entrance on the eastern side allows easy access for local residents.

The water features and elevated park create a safe, inviting, and memorable public space that offers views of the surrounding neighbourhood, encouraging the public to engage and relax.

The building materials, including wood, concrete, aluminum, and brickwork, complement the surrounding architectural style of Rynfield, Benoni.



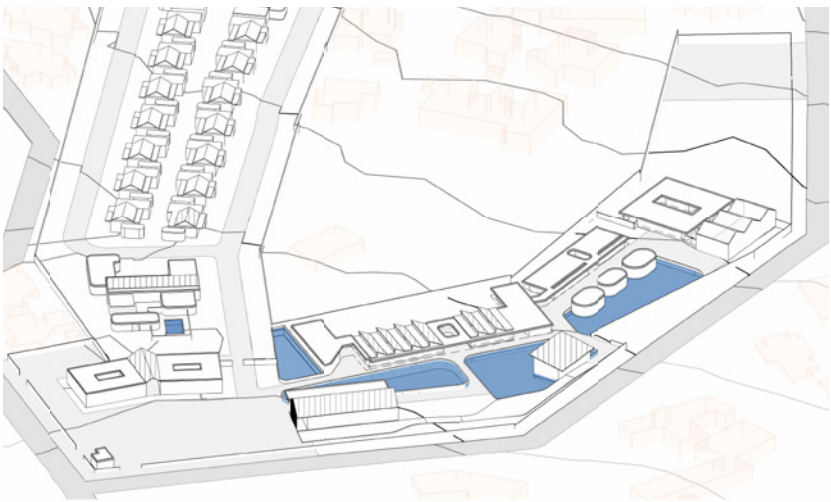
south elevation of commercial strip mall (Dias, 2024)



section aa (Dias, 2024)



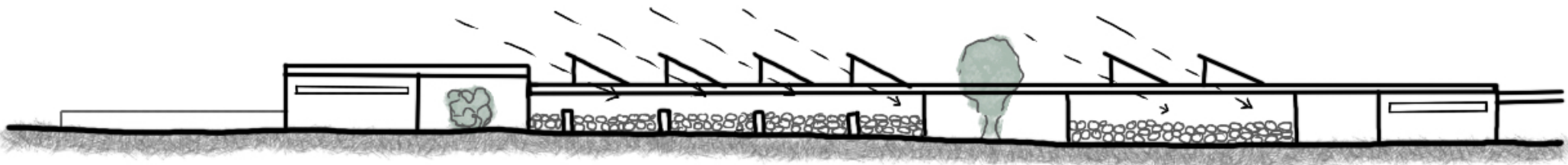
learning and therapy centre ground floor plan (Dias, 2024)



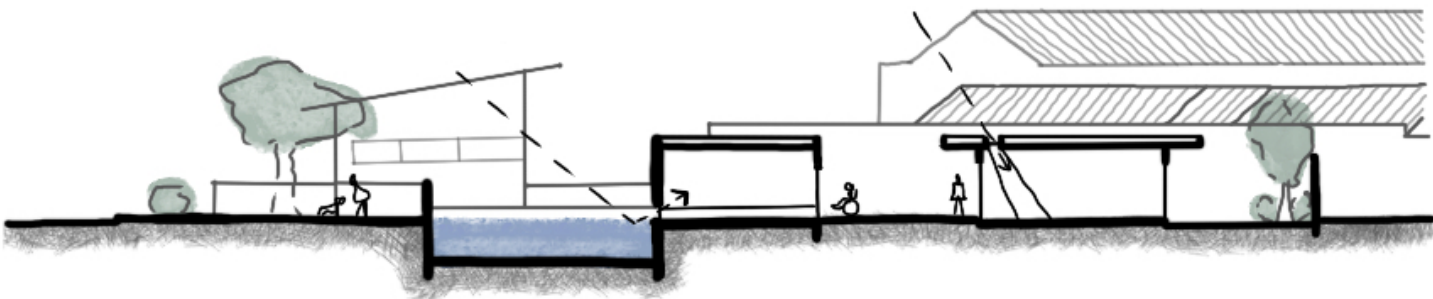
axonometric view of learning and therapy centre (Dias, 2024)

The learning and therapy centre is designed to be a tranquil environment, enhanced by the calming influence of the water features. The building creates private courtyards and sensory gardens, while the water features connect the various spaces. The southern nursery and wellness centre together with the multipurpose hall on the north act as buffers, providing a sense of privacy and tranquility within the centre.

The interplay of light, form, and textures will create a visually stimulating and engaging environment for individuals with autism, encouraging exploration and discovery.



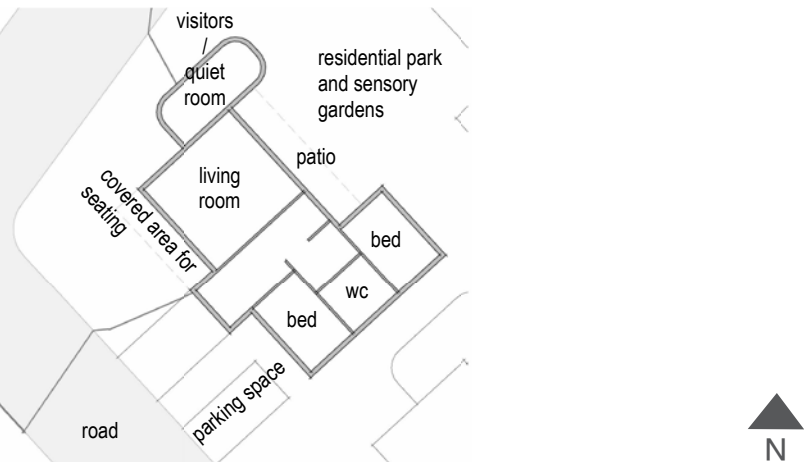
west elevation of classrooms and workshops (Dias, 2024)



section bb (Dias, 2024)

The communal area serves as a connection between the administrative, learning, and therapy areas and the more private residential units. It includes a pool with controlled access and is designed for easy staff supervision. The communal area features a hierarchical layout, transitioning from communal spaces to more private areas, including quiet nooks overlooking the gardens.

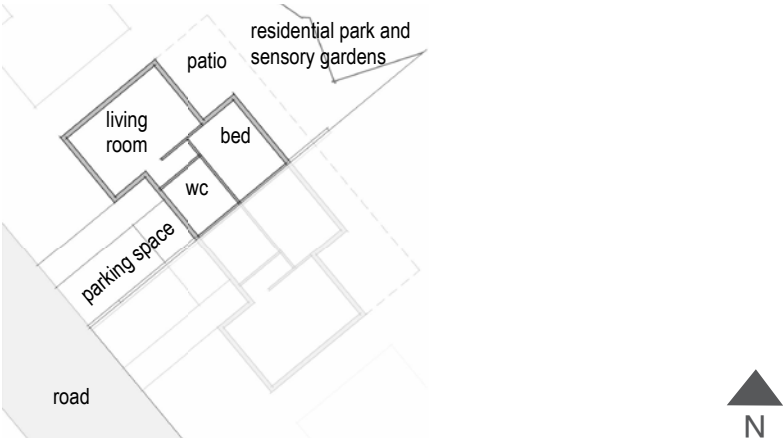
The residences offer varying levels of independence, ranging from significant support to minimal support. While only significant support residences will be accommodated going forward, the goal is to maintain consistency in the design of staff and support houses to promote equality and a welcoming, home-like atmosphere. The design incorporates ergonomic principles to enhance comfort and functionality.



plan of dependent living units and single respite quarters (Dias, 2024)



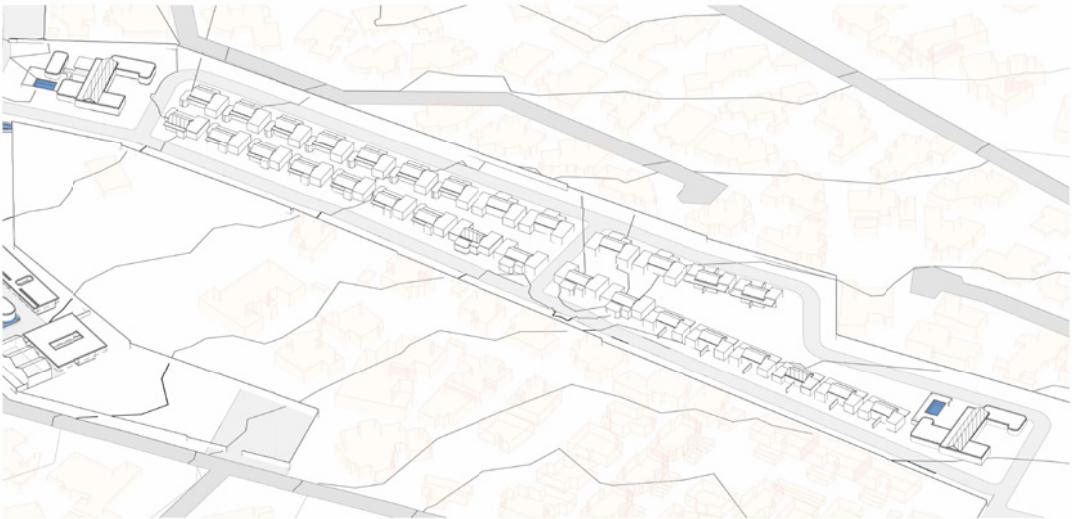
plan of semi-dependent living units and shared respite units (Dias, 2024)



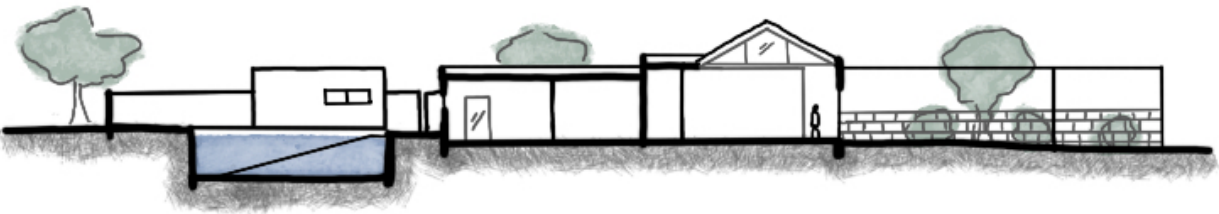
plan of independent living units and caretaker's single living units (Dias, 2024)



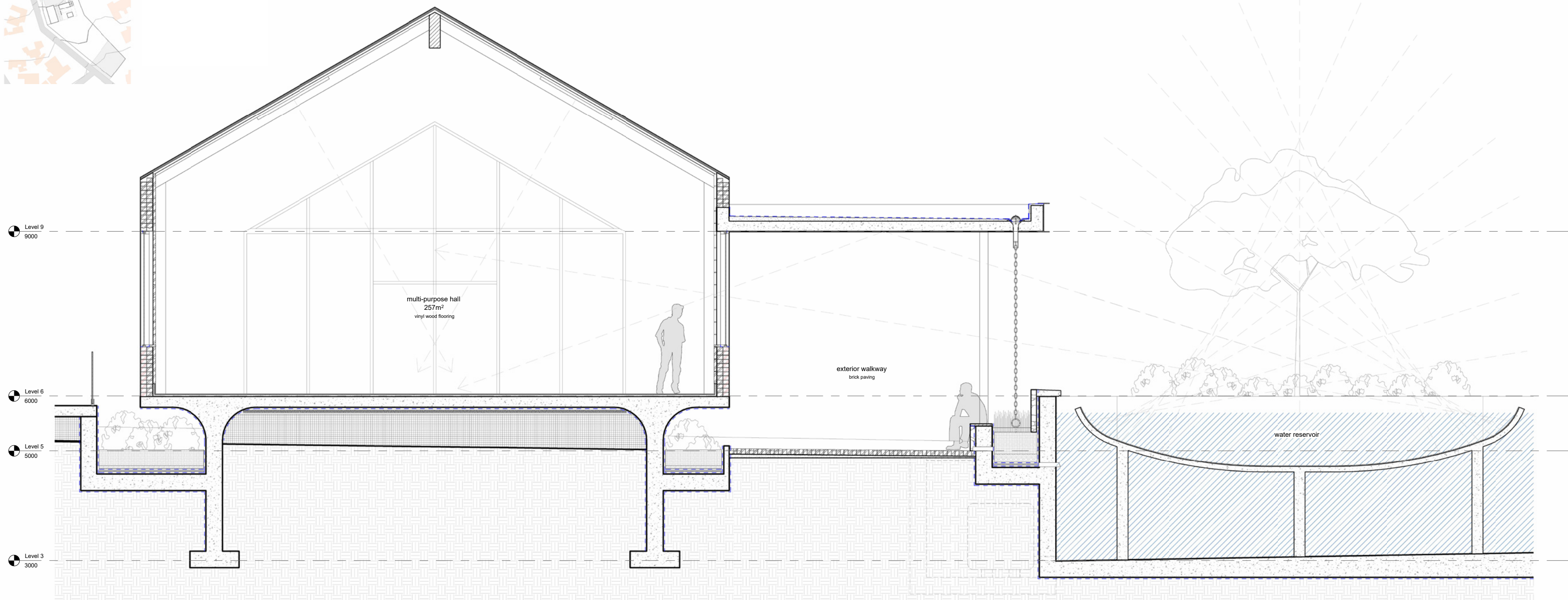
communal building ground floor plan (Dias, 2024)



axonometric view of residential component (Dias, 2024)



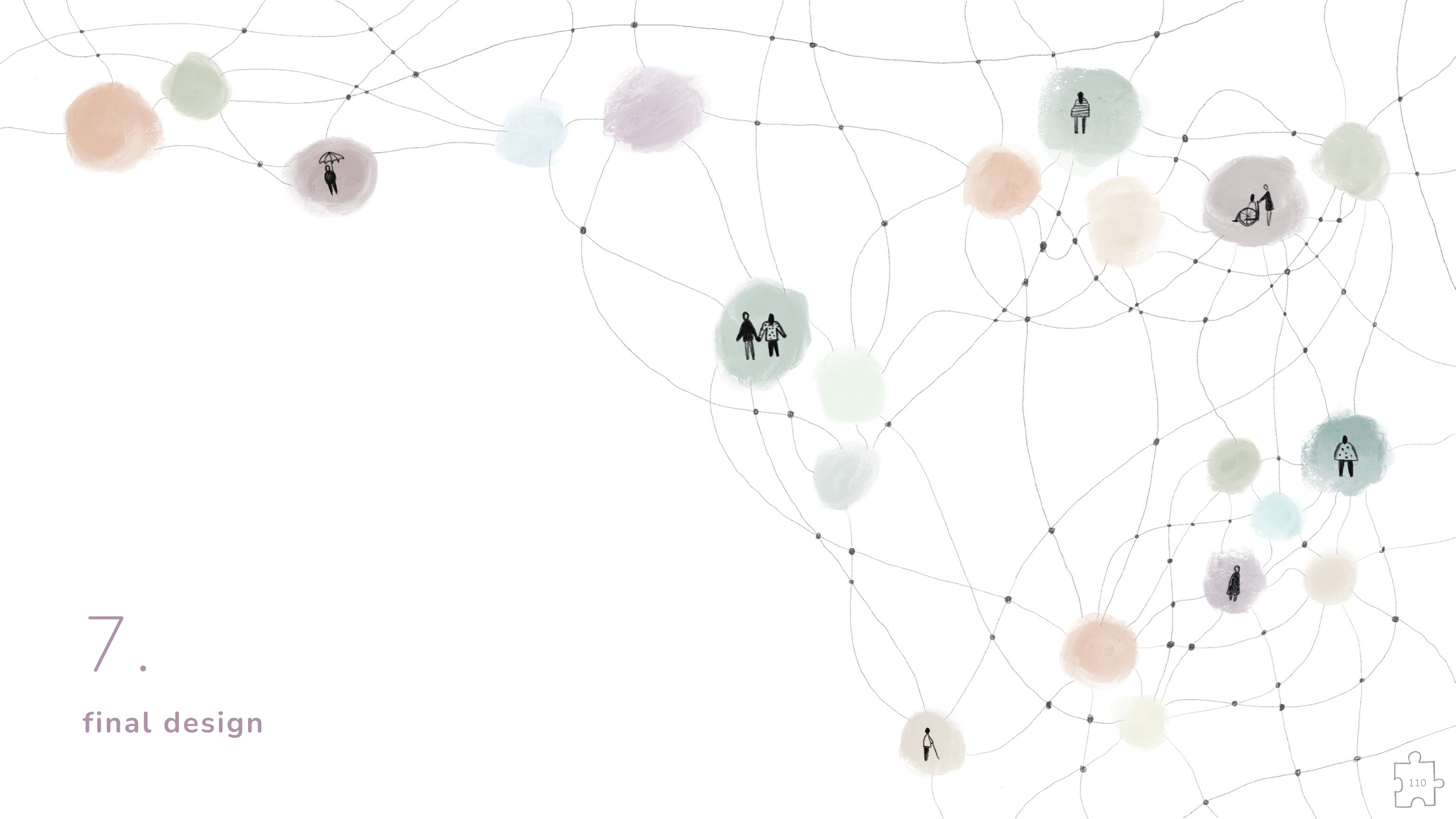
section cc (Dias, 2024)



technical systems section through multi-purpose hall and water reservoir (Dias, 2024)

7.

final design





Key findings from the site analysis directly shaped the spatial organisation of the precinct. The public park buffers the site's noisier southern and western edges, with an elevated landscape providing controlled access and panoramic views. The quieter north houses the semi-private learning and therapy centre, with easy access to Northmead mall. The tranquil north-eastern corner accommodates the private residential and communal zones. A centrally located medical clinic bridges the semi-private and private areas, with convenient access to main routes.

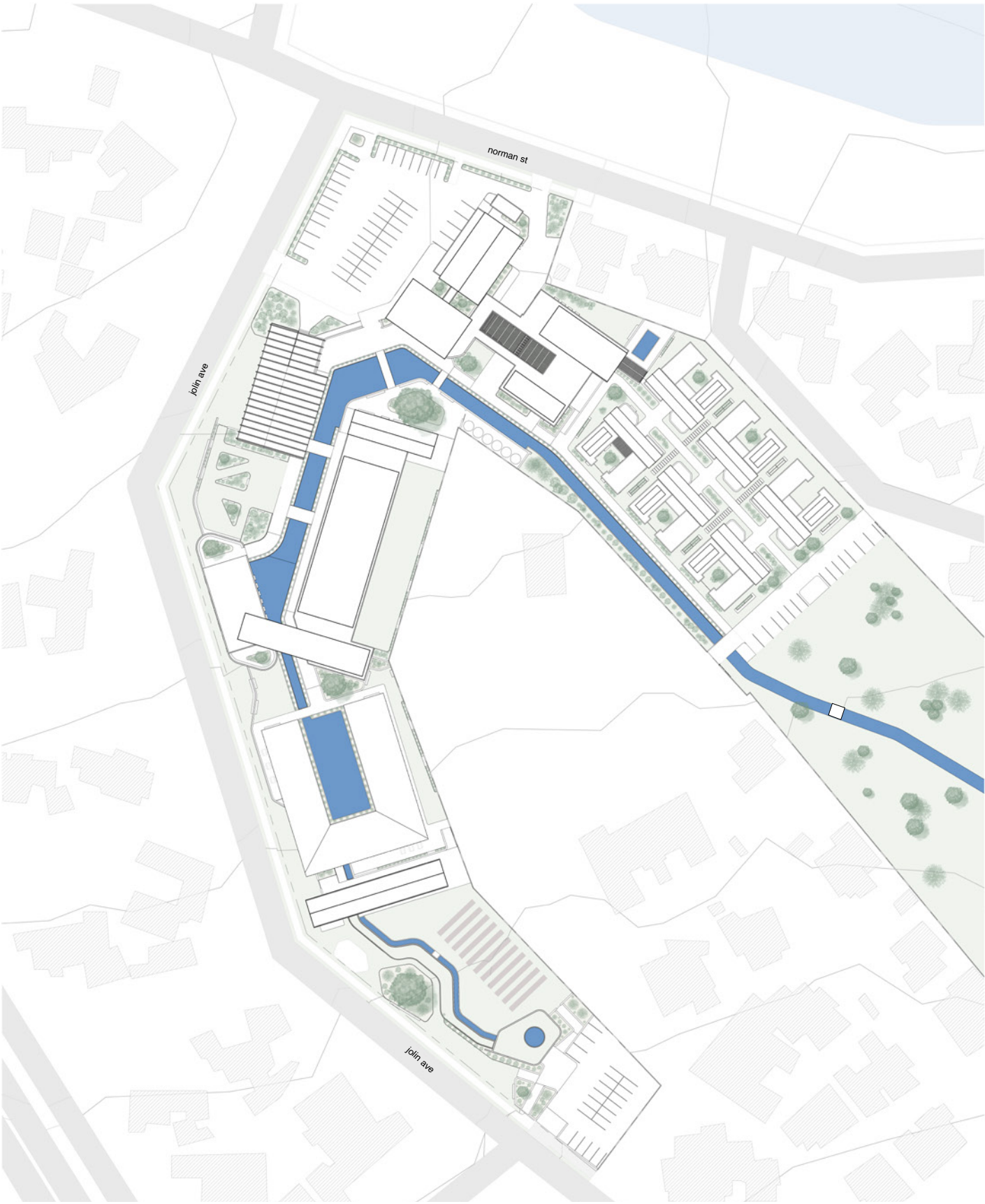
A shared neighbourhood park fosters community, bridging the divide between residents and the public while acting as a buffer between the public park on the south and private living areas (significant support living units) on the north. A controlled-access road beneath the private living area connects the neighbourhood, facilitating controlled interaction between residents with ASD and their neighbours. The neighbourhood park also allows for future expansion, such as additional support housing.

The waterway anchors and unifies the site, guiding users along an existing footpath and creating a serene sensory experience. On the elevated northern private property, a marsh pan, along with rainwater harvesting, becomes the water source. The water's downhill flow through the ponds provides natural filtration, creating a valuable water resource for the precinct and surrounding neighbourhood. The design of the waterway seamlessly integrates with the site's contours, using ramps to navigate gentle level changes.

Instead of a single large building, the design divides functions into smaller, more human-scale buildings, enhancing wayfinding and understanding of purpose for a more intimate user experience. The modular design allows for future flexibility, enabling individual buildings to be easily adapted to changing needs and allowing for phased construction.

final master plan (Dias, 2024)





final roof plan (Dias, 2024)





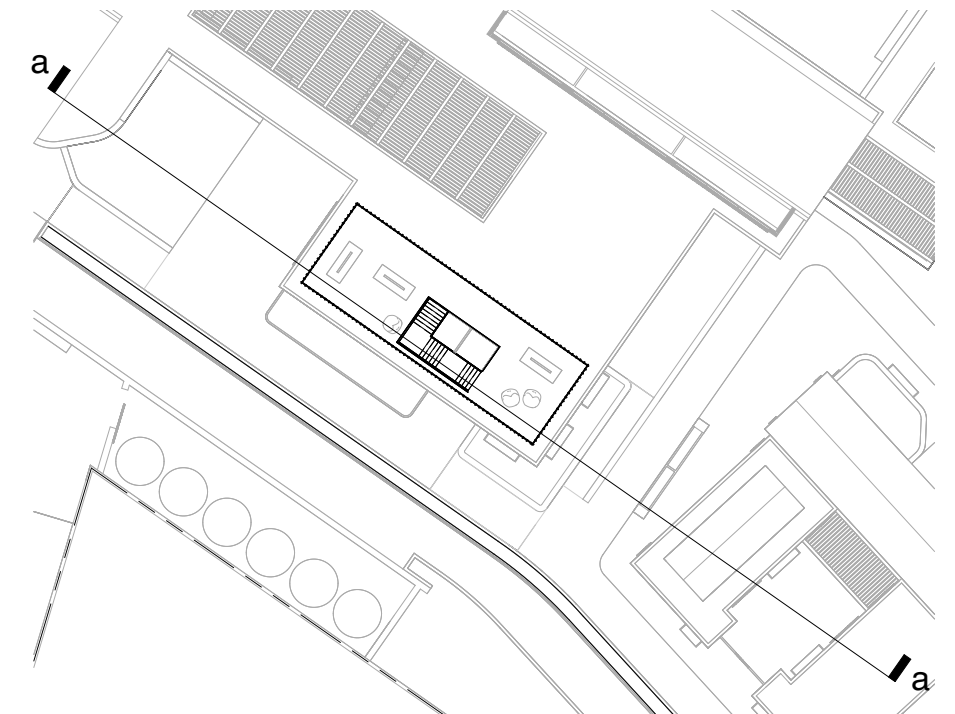
final ground floor plan: full (Dias, 2024)

The ground floor plan is organised around the main entrance, situated between the administration building and the multipurpose hall. Upon entering, a prominent pond serves as a visual focal point, orienting users and directing circulation east, south, or towards a central courtyard to find refuge. Throughout the site, the design strategically incorporates secluded pockets, often nestled between buildings, providing quiet retreats where individuals can find respite and observe their surroundings from a tranquil vantage point.

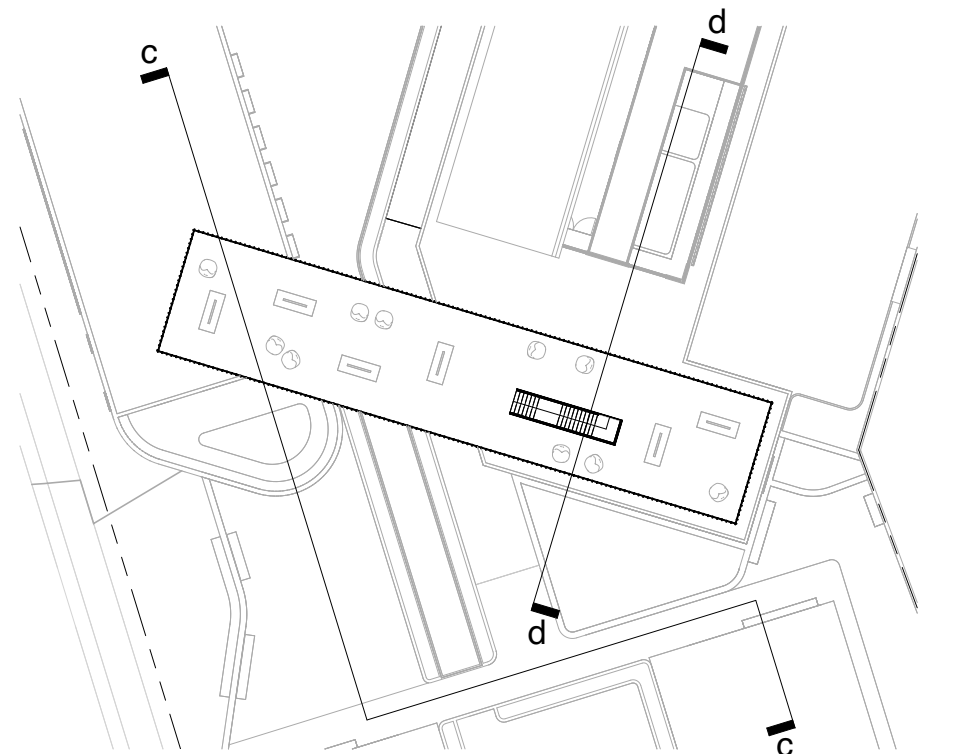
The administration building and clinic, while connected by a bridge through courtyards, maintain distinct identities to facilitate clear functional differentiation. The emergency room is conveniently located near the service entrance on Norman Street. The multi-purpose hall, positioned to overlook the sensory courtyard, is readily accessible to visitors. This courtyard, richly planted and featuring intimate seating areas, provides a tranquil outdoor retreat for reflection and observation.

The precinct adheres to NBR regulations for individuals with intellectual disabilities, maintaining a single-story design for all habitable spaces. However, to accommodate diverse needs, two optional elevated refuge areas are provided. Enclosed by timber slats, these retreats offer quiet, elevated spaces for observation and reflection. Throughout the site, the natural warmth of timber serves as a visual cue, signalling spaces designed for retreat and tranquillity.

admin building 1 admin reception 2 women's bathroom 3 men's bathroom 4 storage 5 meeting room 6 office 7 staff room clinic 8 clinic reception 9 doctor's consultation room 10 homeopath's consultation room 11 waiting nook 12 emergency room 13 sluice room 14 dispensary 15 staff courtyard 16 guardhouse 17 emergency bay 18 back/service entrance 19 main entrance 20 family/visitor's room 21 multi-purpose hall 22 outdoor patio	23 side entrance 24 refuge courtyard 25 water storage tanks learning block 26 technology room 27 quiet room 28 skill development workshop 29 breakout space 30 small classroom 31 quiet/reading nook 32 large classroom 33 outdoor communal dining /lounge area 34 stairs to refuge area 35 communal dining room 36 kitchen 37 activity garden 38 sensory garden library 39 library courtyard 40 seminar room 41 library 42 library reception	therapy block 43 geometric multi-sensory room 44 organic multi-sensory room 45 therapy room 46 occupational therapy room 47 therapy block reception 48 indoor therapy pool 49 gym 50 physiotherapy room 51 wellness studio 52 wellness centre courtyard 53 delivery entrance 54 teahouse 55 greenhouse 56 tea, vegetable, & herb garden 57 small neighbourhood park 58 entrance pavilion communal building 59 entrance foyer 60 guest bathroom 61 staff office 62 pantry 63 communal kitchen 64 communal dining	65 communal lounge 66 private courtyard 67 enclosed pool area 68 outdoor communal dining /lounge area 69 communal courtyard significant support living unit(s) 70 entrance foyer 71 patio 72 quiet room 73 lounge 74 kitchen 75 bedroom 76 closet 77 bathroom 78 private patio 79 private garden patch 80 courtyard 81 pond 82 vehicular access through complex 83 road through complex clubhouse garden 84 road through site
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final first floor plan:
communal building refuge space (Dias, 2024)



final first floor plan:
learning and therapy centre refuge space (Dias, 2024)



The semi-private zone (learning and therapy centre) transitions to the more private areas (living) on the northeastern edge. The administration building connects to the communal building, a space designed for leisure, social interaction, and family visits. It features family rooms, multi-sensory rooms, and a central courtyard. Multi-sensory spaces are integrated throughout the site for easy access. The communal building also offers quiet nooks, a private garden, another optional elevated refuge area, and a controlled-access pool.

The living areas currently comprise six identical units, each housing a caretaker and three individuals requiring substantial support. This standardized design fosters familiarity during visits. Each unit features a central entrance foyer for preparation and a balanced, symmetrical layout for easy navigation. The public living spaces lead to private passages branching off on either side, each passage housing bedrooms and a small multi-sensory room.

The bedroom layout promotes routine, leading from the bedroom to the closet and private bathroom. All bedrooms are identical, ensuring equity between caregivers and residents and allowing for flexible arrangements. The height of bedroom ceilings can vary, with some featuring low ceilings and others featuring high, pitched roofs. This customization can be tailored to individual preferences on a building-by-building basis.

- | | | | |
|----------------------------------|-------------------------------|--------------------------|---|
| admin building | 16 guardhouse | 31 quiet/reading nook | 68 outdoor communal dining |
| 1 admin reception | 17 emergency bay | 32 large classroom | /loungue area |
| 2 women's bathroom | 18 back/service entrance | 37 activity garden | 69 communal courtyard |
| 3 men's bathroom | 19 main entrance | 38 sensory garden | |
| 4 storage | 20 family/visitor's room | library | significant support living unit(s) |
| 5 meeting room | 21 multi-purpose hall | 39 library courtyard | 70 entrance foyer |
| 6 office | 22 outdoor patio | | 71 patio |
| 7 staff room | 23 side entrance | communal building | 72 quiet room |
| | 24 refuge courtyard | 59 entrance foyer | 73 lounge |
| clinic | 25 water storage tanks | 60 guest bathroom | 74 kitchen |
| 8 clinic reception | | 61 staff office | 75 bedroom |
| 9 doctor's consultation room | learning block | 62 pantry | 76 closet |
| 10 homeopath's consultation room | 26 technology room | 63 communal kitchen | 77 bathroom |
| 11 waiting nook | 27 quiet room | 64 communal dining | 78 private patio |
| 12 emergency room | 28 skill development workshop | 65 communal lounge | 79 private garden patch |
| 13 sluice room | 29 breakout space | 66 private courtyard | 80 courtyard |
| 14 dispensary | 30 small classroom | 67 enclosed pool area | |
| 15 staff courtyard | | | |

final ground floor plan: portion 1 (Dias, 2024)





The quiet sensory garden leads to the concrete monolith library, bounded by courtyards that offer tranquil reading and observation spaces. The library's well-balanced interior design, including its flooring, intuitively guides users through designated study, breakout, and shelving areas. Overlooking the water, timber window pockets provide further opportunities for quiet reflection. The use of timber again signals these spaces as a places of calm and solitude.

The learning block, situated across from the library, features its own garden for outdoor learning and activities. Like the administration building, a linear pathway divides the building into two sections, housing classrooms on either side. This pathway offers breakout spaces and quiet nooks, allowing individuals to prepare before entering classrooms and to observe the classroom environment through strategically placed doors and interior windows.

To accommodate individual sensory needs, classrooms offer a mix of high and low ceilings, providing a variety of spatial experiences. The large classrooms are designed with a clear sequence: an entry foyer, a breakout space, and the main classroom area, promoting a sense of routine and predictability. The southern end of the building accommodates a communal kitchen and dining area for day participants, extending to an adjacent outdoor space for dining and repose.

- | | | | |
|------------------------|-------------------------------|---------------------------------|--|
| 2 women's bathroom | 28 skill development workshop | library | 49 gym |
| 3 men's bathroom | 29 breakout space | 39 library courtyard | 50 physiotherapy room |
| 4 storage | 30 small classroom | 40 seminar room | 51 wellness studio |
| | 31 quiet/reading nook | 41 library | 52 wellness centre courtyard |
| 21 multi-purpose hall | 32 large classroom | 42 library reception | |
| 22 outdoor patio | 33 outdoor communal dining | | 81 pond |
| 23 side entrance | /lounge area | therapy block | 82 vehicular access through complex |
| 24 refuge courtyard | 34 stairs to refuge area | 43 geometric multi-sensory room | 83 road through complex clubhouse garden |
| 25 water storage tanks | 35 communal dining room | 44 organic multi-sensory room | 84 road through site |
| | 36 kitchen | 45 therapy room | |
| learning block | | 46 occupational therapy room | |
| 26 technology room | 37 activity garden | 47 therapy block reception | |
| 27 quiet room | 38 sensory garden | 48 indoor therapy pool | |

final ground floor plan: portion 2 (Dias, 2024)





The therapy block, arranged in a U-shape around a serene shallow pond, houses another two multi-sensory rooms at either end. These rooms, indicated by timber exterior wall panels, are designed to offer sensory experiences tailored to individual needs. Featuring soundproof walls, blackout capabilities, and customisable lighting, temperature, and sound settings, these rooms provide a safe and controlled environment. They both feature entry foyers that minimise light intrusion from the door.

The organic and geometric shapes of the rooms cater to different preferences, while soft, tactile materials and sensory features, such as bubble machines and sensory walls, enhance the experience. Pocket windows with adjustable louvres allow for controlled natural light and views of the surrounding environment. The interior render of the organic multi-sensory room provides further insight into the space.

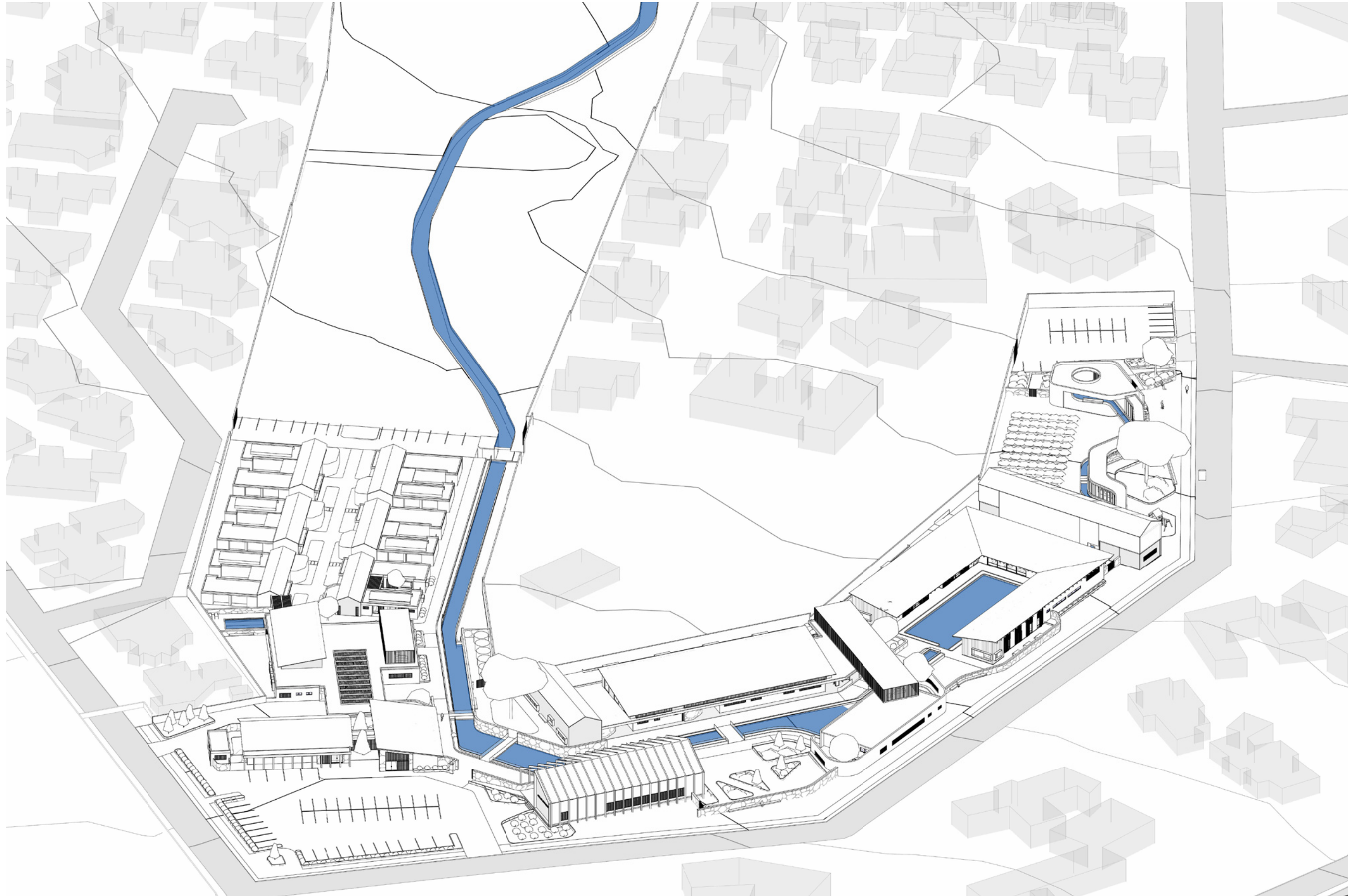
The general and occupational therapy rooms open out to a private outdoor space, while the wellness studio, gym, and physiotherapy rooms have direct access to their own outdoor areas, allowing for activities to be taken outside as needed.

The therapy block is situated near the serene greenhouse that overlooks the tea, herb, and vegetable gardens. This greenhouse, complete with a teahouse and a dedicated delivery entrance, offers a tranquil setting for participants to engage in gardening activities and contribute to the precinct.

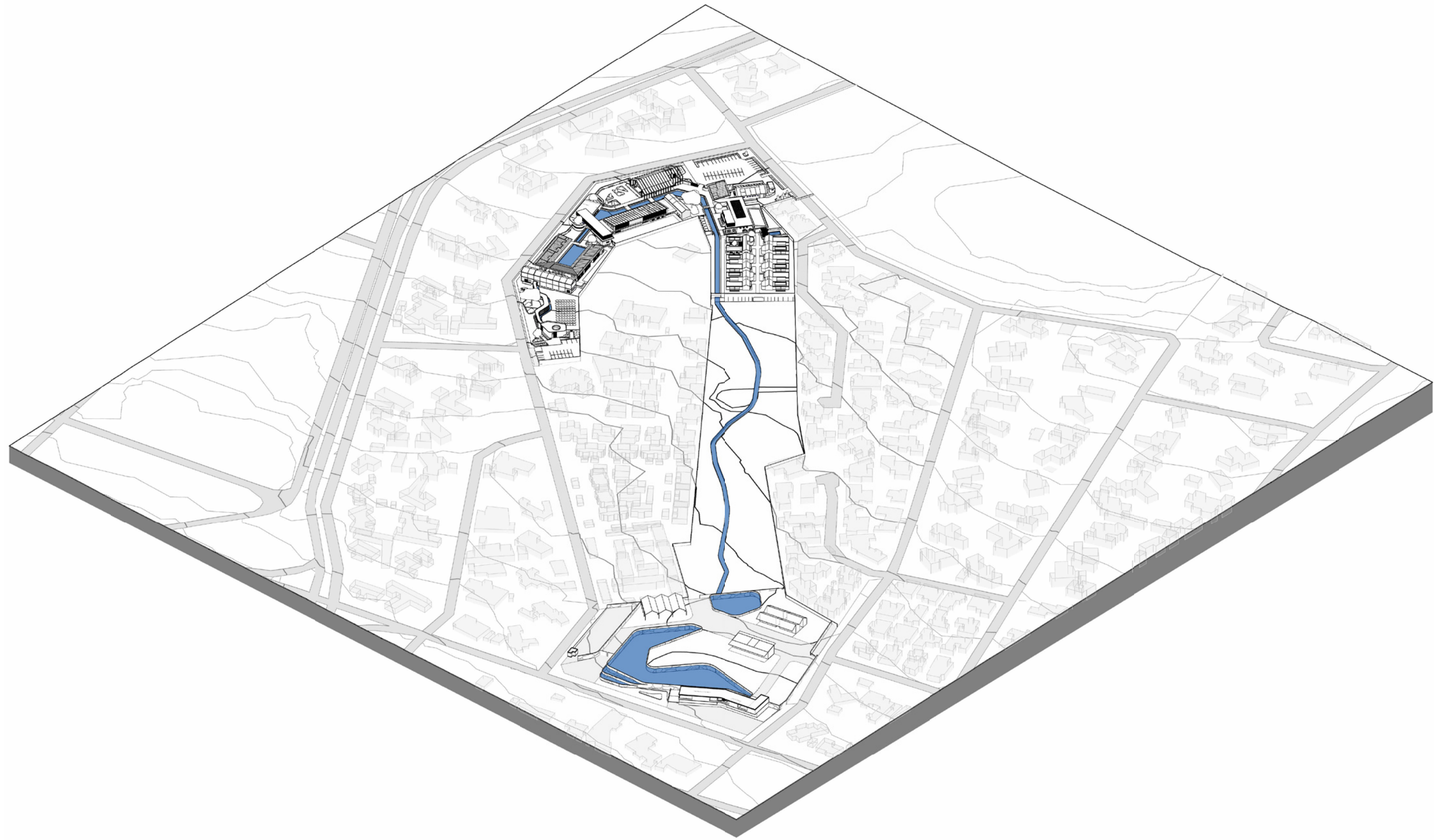
A meandering covered pathway connects the greenhouse to the entrance pavilion, a monolithic structure that marks the southwestern entry point to the site. This design allows visitors to access the greenhouse, teahouse, and therapy centre without disturbing the main learning and living areas. The pathway, winding along the water and gardens, offers a calming sensory-rich experience and creates a public park for the neighbourhood, providing a space for relaxation, play, and waiting for transportation. This entrance provides participants with convenient walking access to Northmead Mall and other amenities.

final ground floor plan: portion 3 (Dias, 2024)

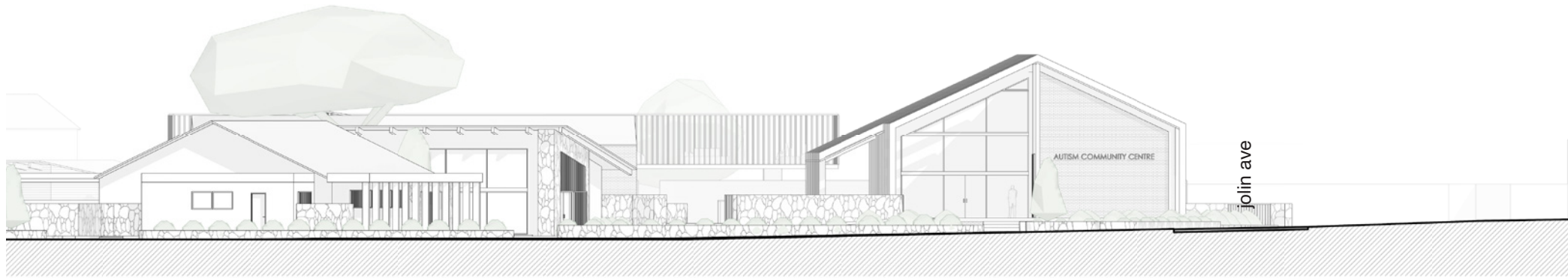




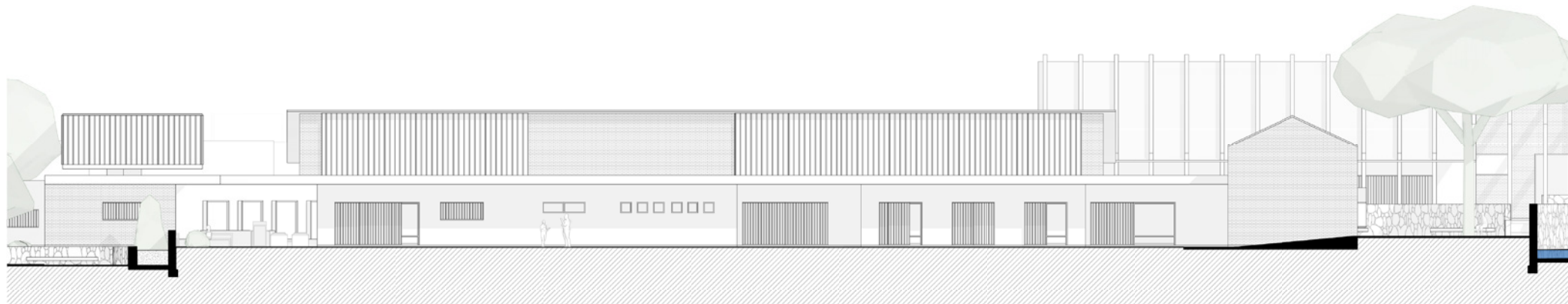
orthographic view: learning and therapy centre and living centre (Dias, 2024)



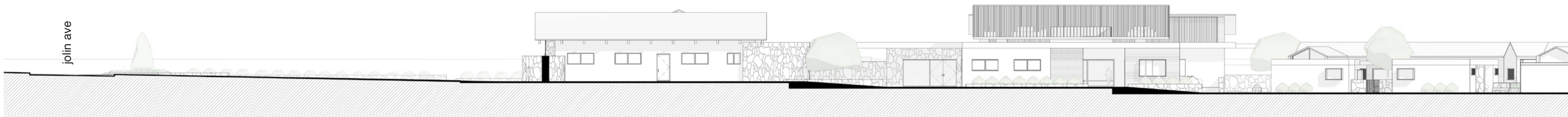
orthographic view: entire precinct (Dias, 2024)



final north elevation: admin block and multi-purpose hall (Dias, 2024)



final east elevation: learning block (Dias, 2024)

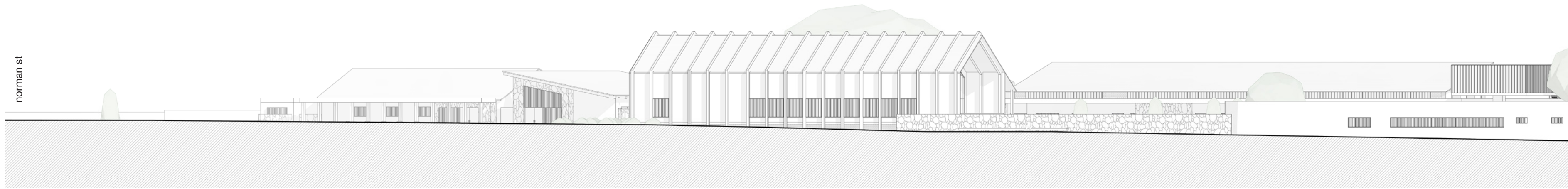


final south elevation: admin block, communal building, and a living unit (Dias, 2024)

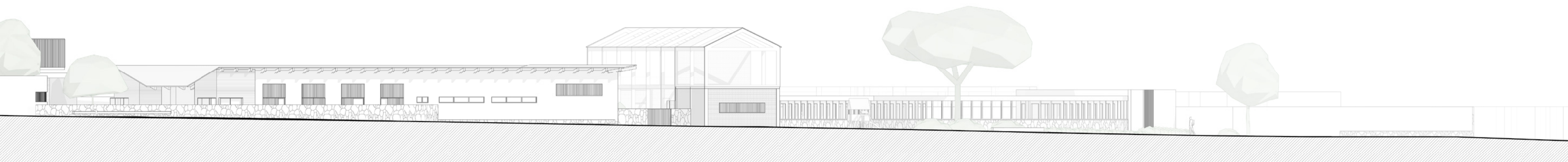
The buildings employ varying heights to differentiate between public and private spaces. Public spaces are taller, while private spaces, such as the houses, are lower. The pitched roofs, like those found in Rynfield homes, create a familiar, homely atmosphere and strategically direct natural light into the spaces.

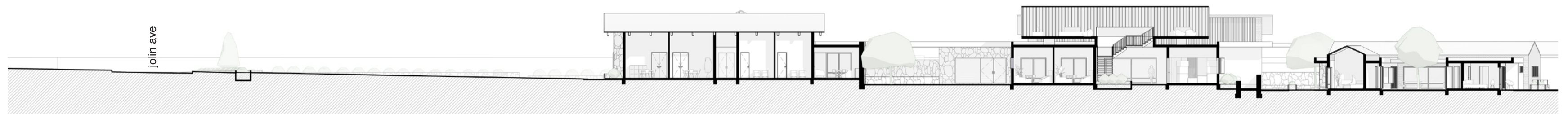
A consistent material palette of stone, textured plaster, timber, aluminium, and concrete is used in diverse ways to create a sense of familiarity while still distinguishing different areas.

Sliding doors are used to maximize space, while timber slatted louvres provide adjustable shading and create a permeable connection between indoors and outdoors. This allows for personalised comfort, adapting the space to each individual's needs.

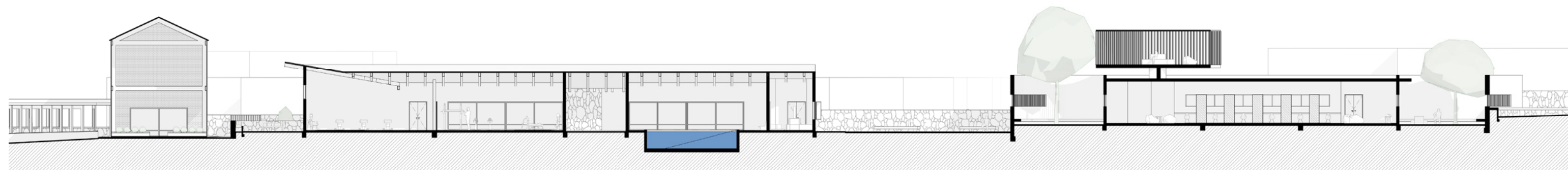


final west elevation (Dias, 2024)

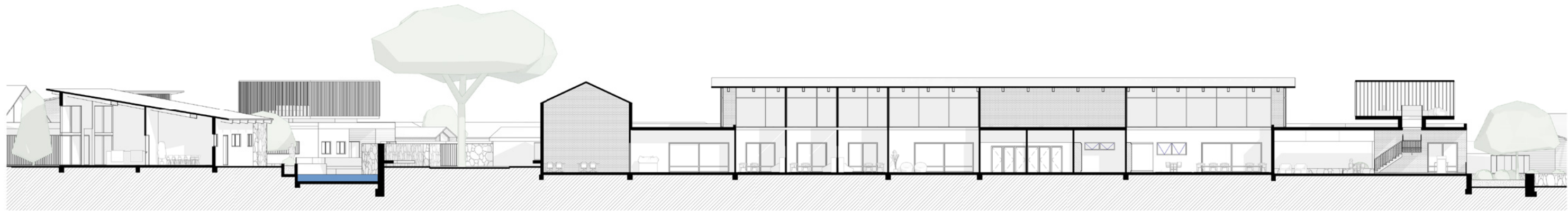




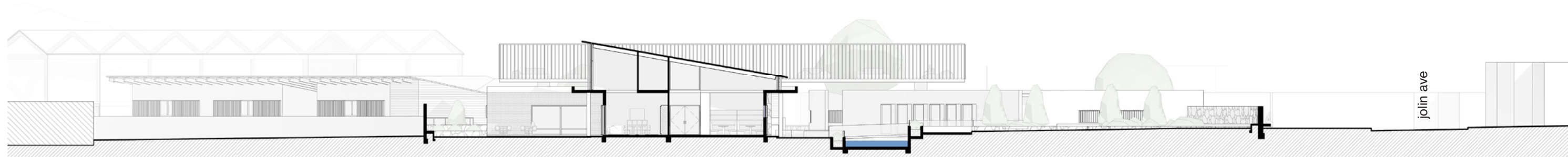
final section aa (Dias, 2024)



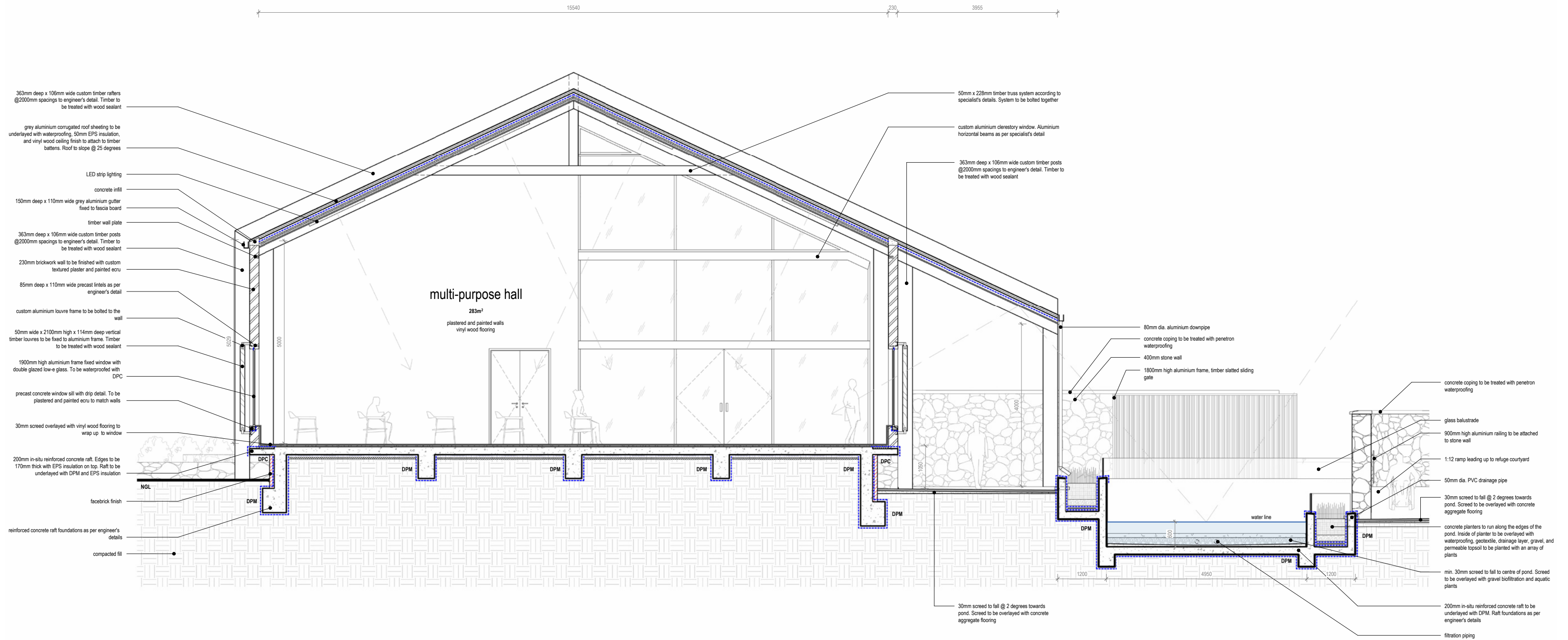
final section cc (Dias, 2024)



final section dd (Dias, 2024)



final section ee (Dias, 2024)



final section bb:
technical section through multi-purpose hall and pond (Dias, 2024)



exterior view: multi-purpose hall and admin block entrance (Dias, 2024)



exterior view: waterway between the library and learning block (Dias, 2024)



exterior view: refuge area above library and learning block (Dias, 2024)



interior view: multi-purpose hall (Dias, 2024)



exterior view: entrance pavilion and neighbourhood park (Dias, 2024)



exterior view: communal courtyard (Dias, 2024)



exterior view: therapy block (Dias, 2024)



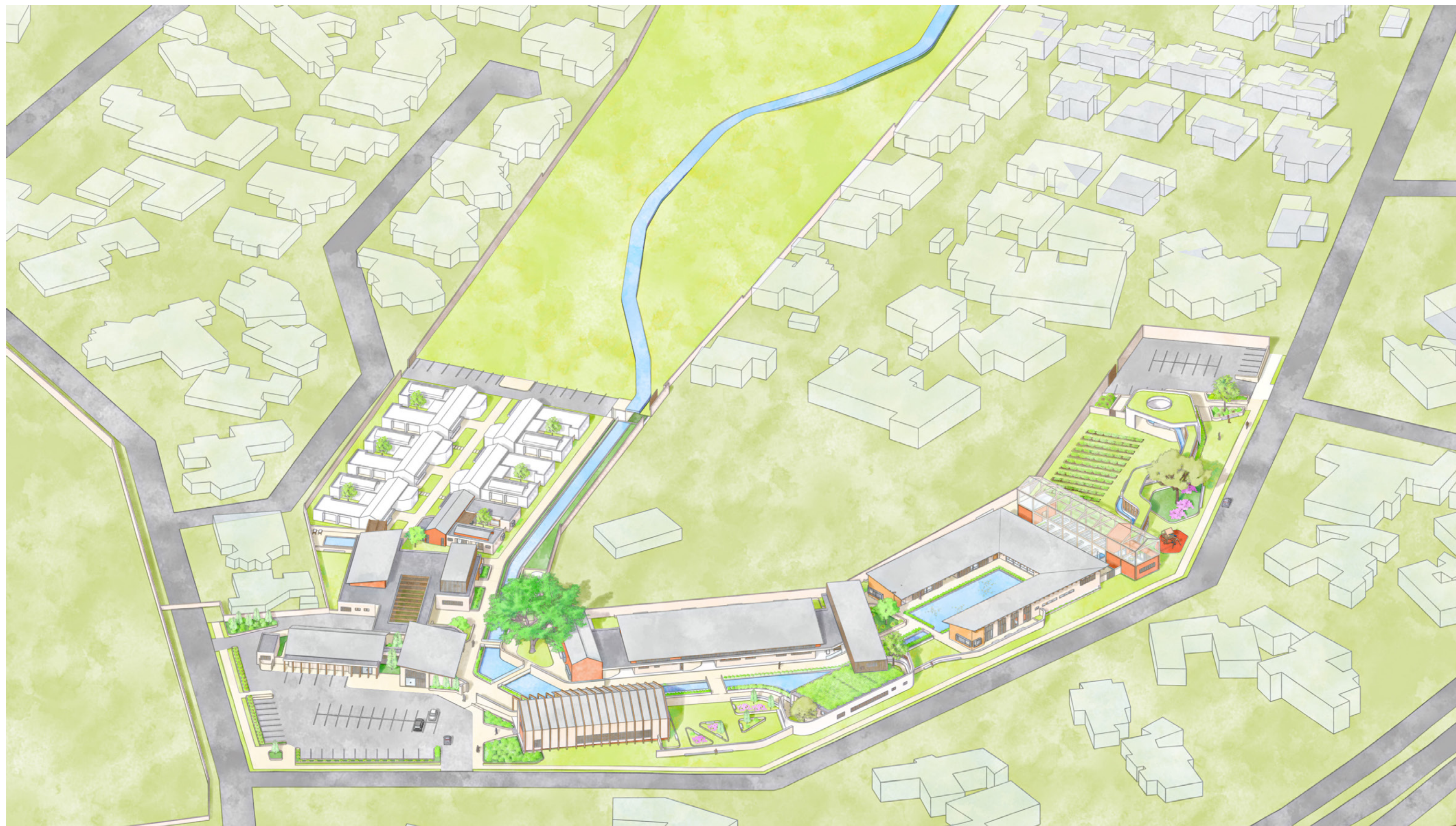
interior view: wellness studio overlooking the therapy block (Dias, 2024)



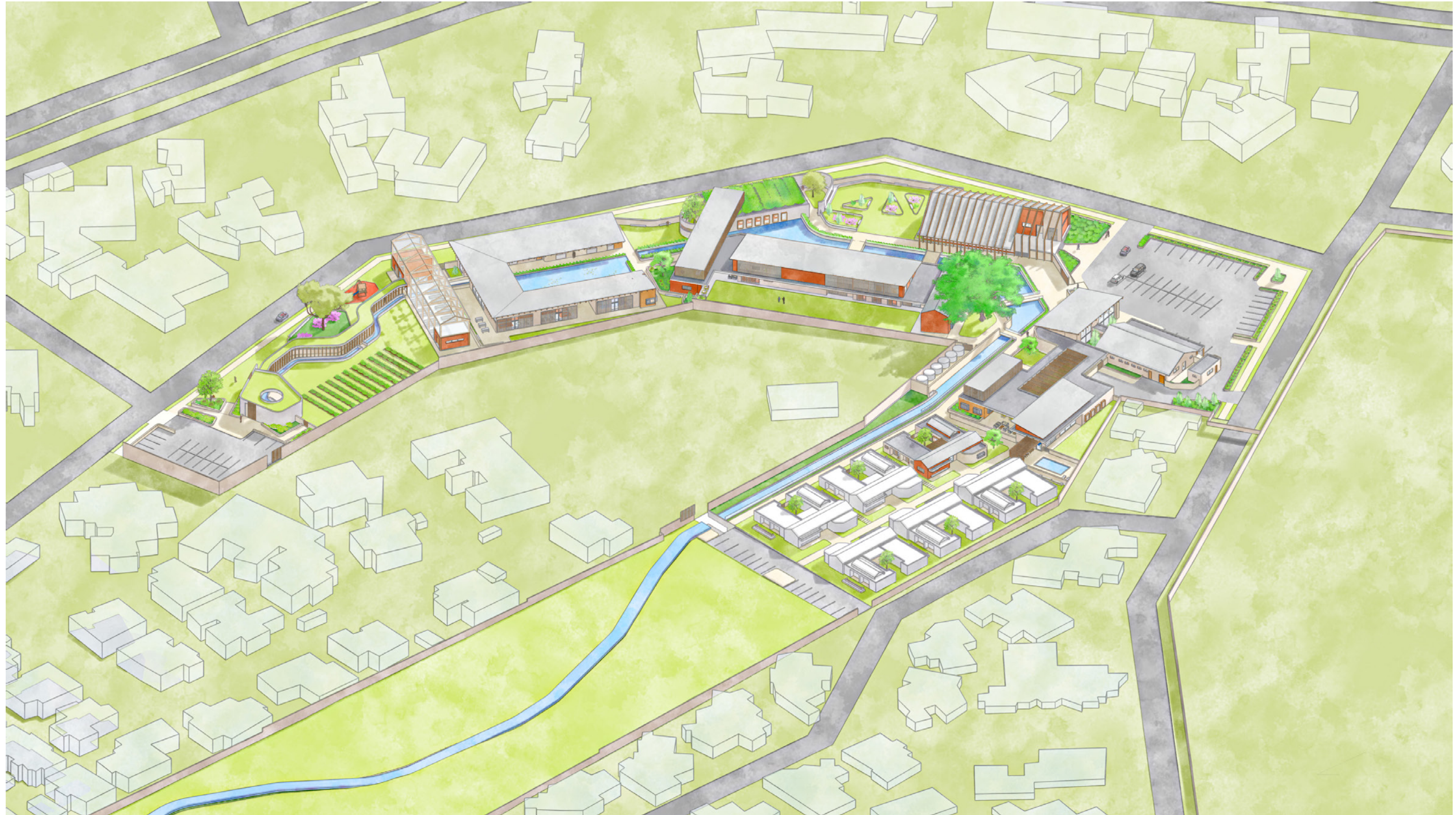
interior view: organic multi-sensory room in the communal building (Dias, 2024)



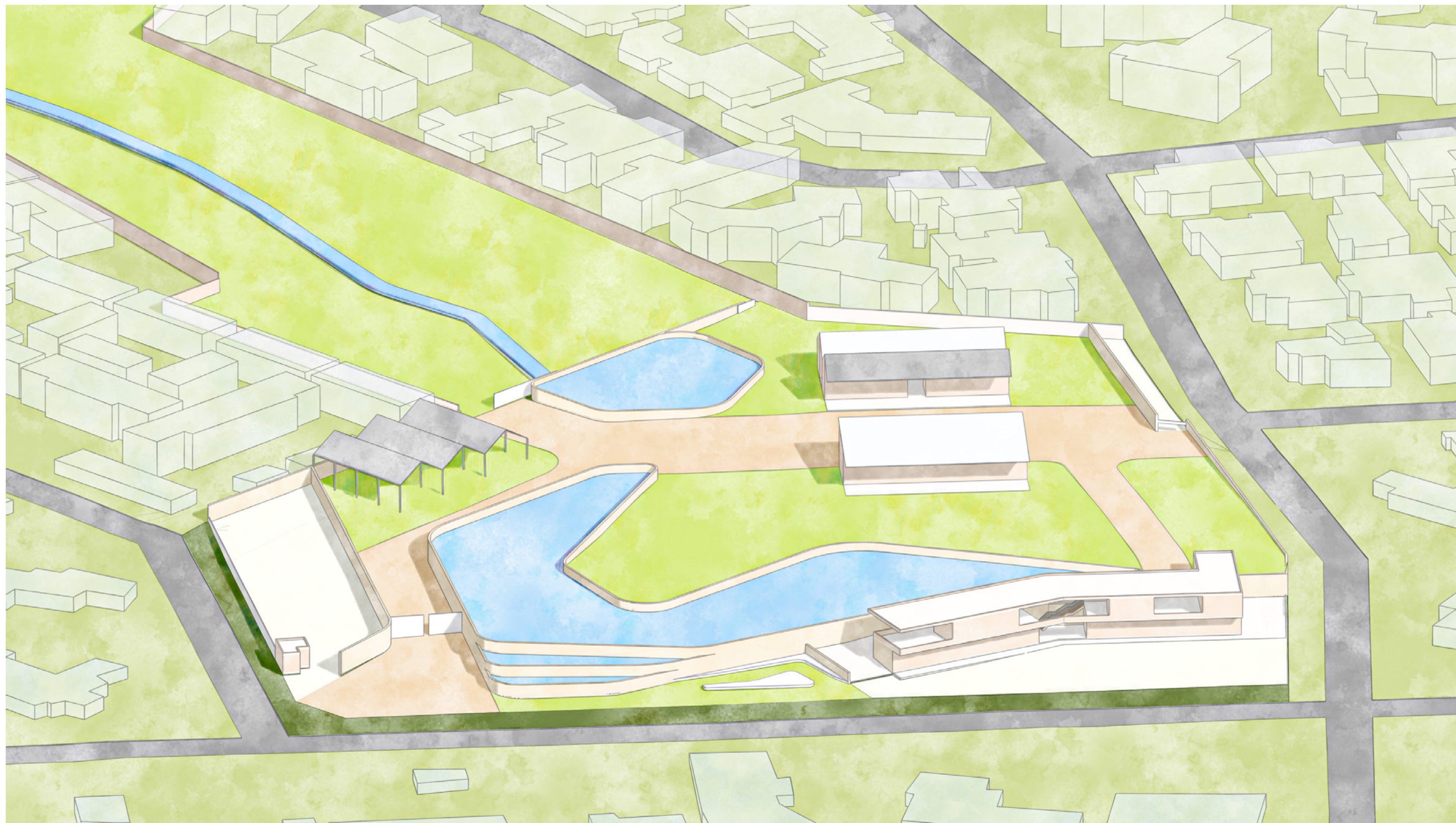
interior view: large classroom (Dias, 2024)



orthographic view from the north eastern direction (Dias, 2024)



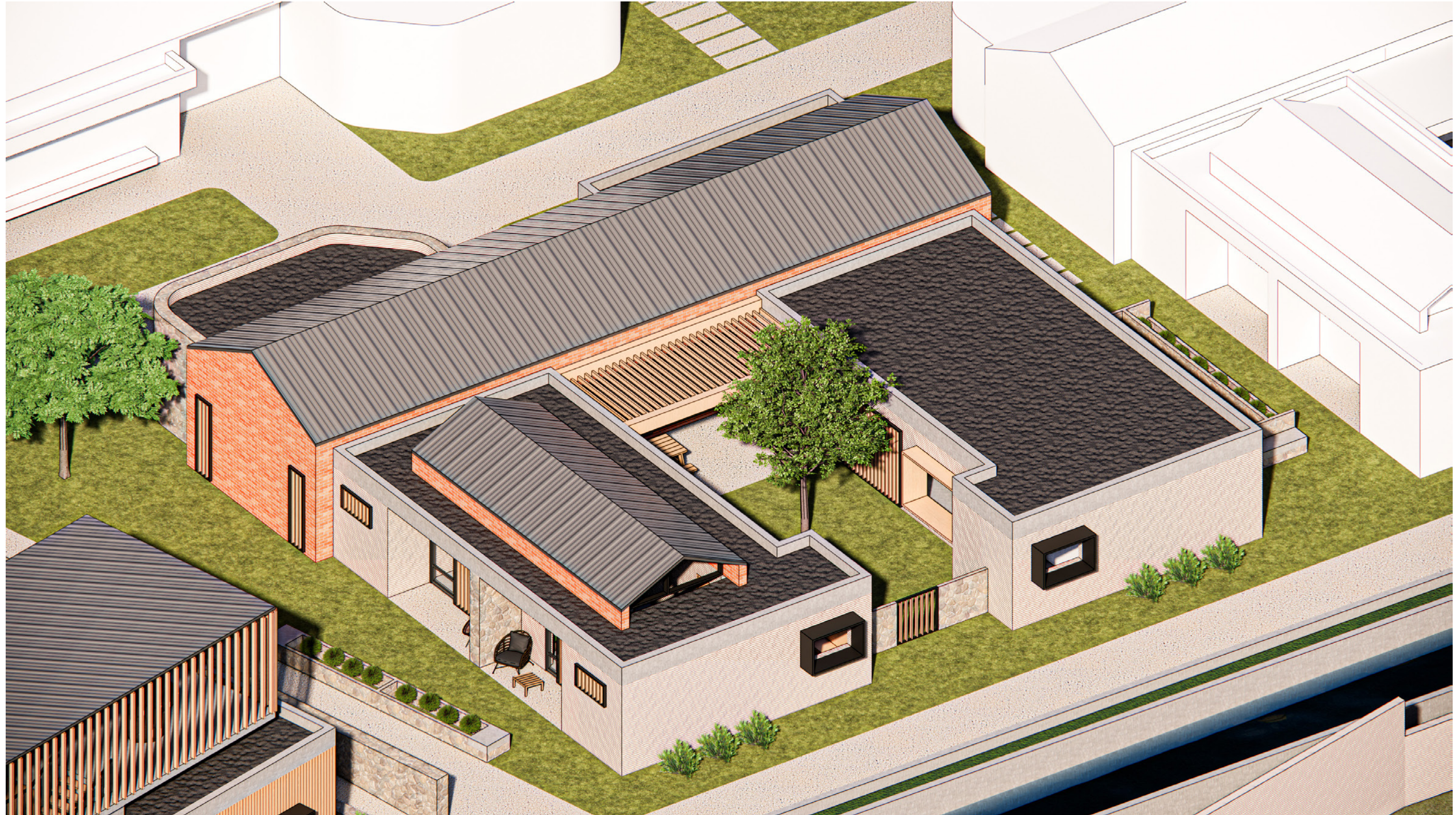
orthographic view from the south western direction (Dias, 2024)



orthographic view from the south: public park (conceptual) (Dias, 2024)



orthographic view: front of significant support living unit (Dias, 2024)



orthographic view: back of significant support living unit (Dias, 2024)



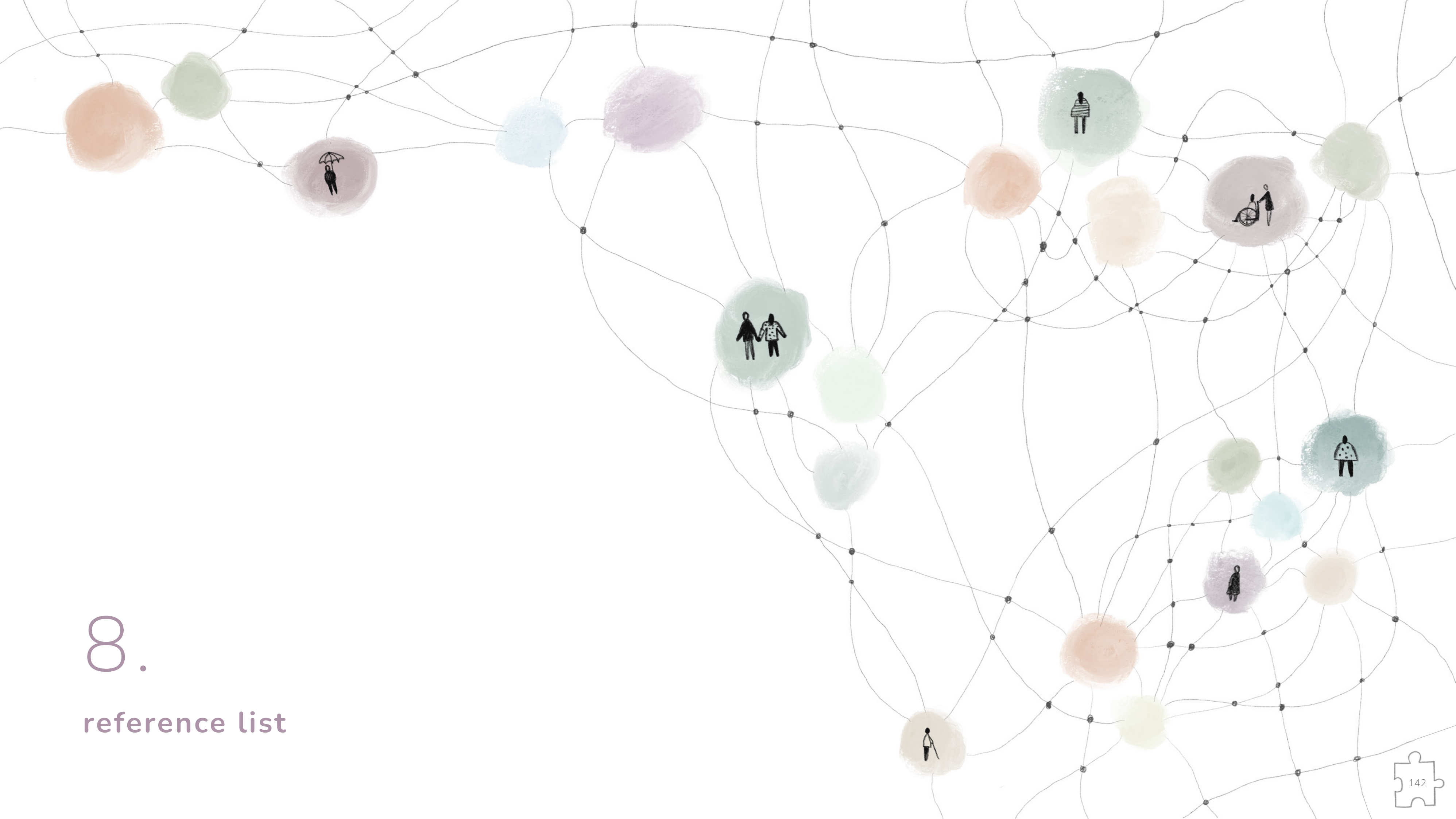
photograph of final physical model (Dias, 2024)



final presentation (Dias, 2024)

8.

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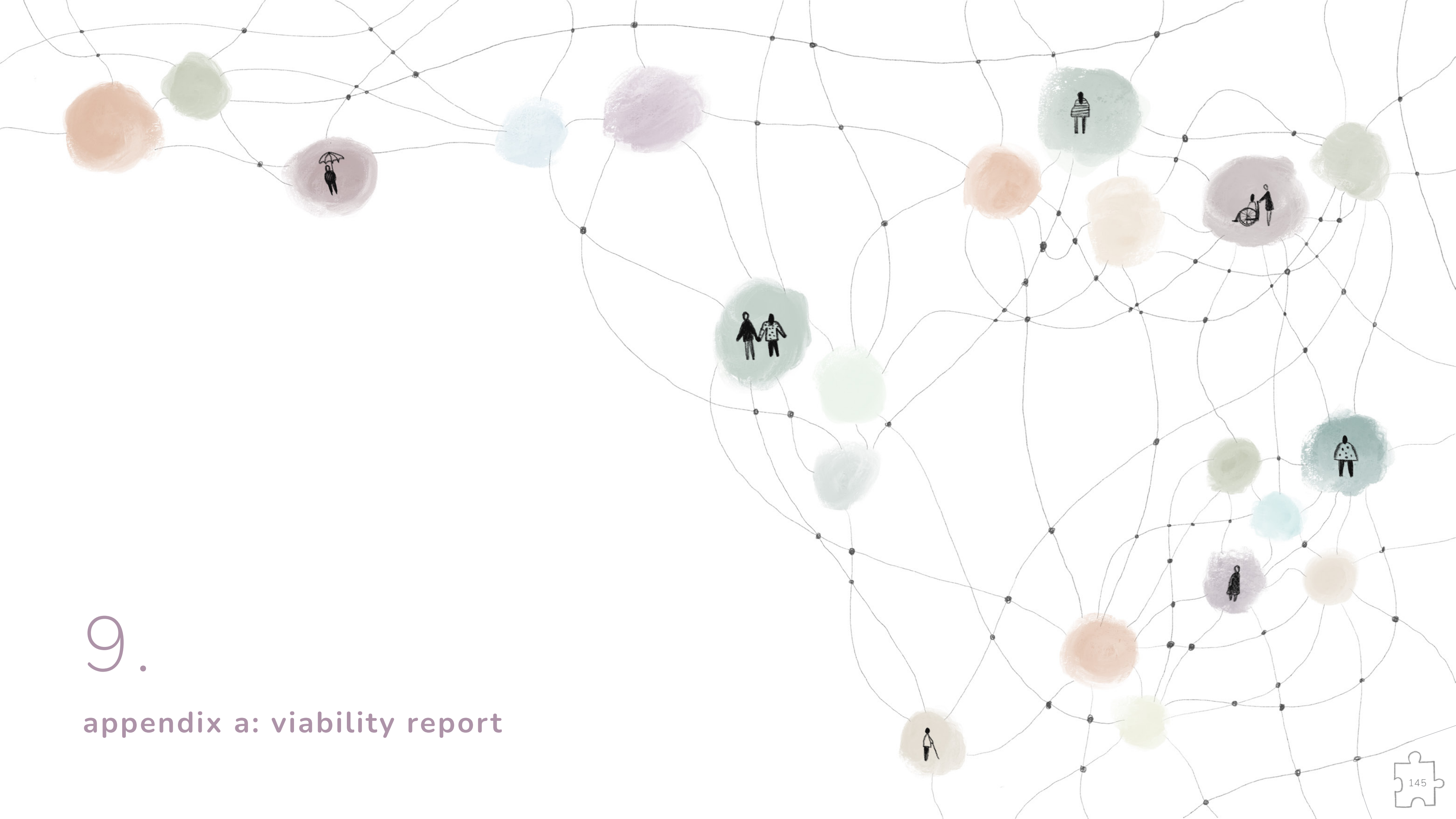
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9.

appendix a: viability report

Please note that this viability report was prepared prior to the submission of the design development, and therefore certain aspects of the concept have evolved.

9.1. project information

The proposed design is an independent/semi-independent living community in Benoni, South Africa for individuals with autism spectrum disorder. The centre will provide a caring environment for people with varying cognitive and/or physical abilities to engage in community activities, practice vocational skill development, and contribute to the supportive labour market through sheltered employment.

The site is an extensive piece of agricultural land that stretches between Morris Avenue and Norman Street in the residential suburb of Rynfield, Benoni. It is in close proximity to the N12 and R23 highways, Benoni CBD, public amenities, as well as green and aquatic landscapes.

The centre will provide housing options for adults with different levels of support, learning spaces and therapy rooms dedicated to the development of the participants, communal spaces that encourage social interaction between the residents and the broader community, and a small medical facility for basic healthcare and emergency situations. The community garden will include vegetable, herb, and tea gardens, helping to provide a food source and support the program's financial sustainability. These gardens will be irrigated by on-site water harvesting systems, with the aim of minimizing the environmental footprint.

Sensory elements will be thoughtfully integrated to create a stimulating yet calming atmosphere. Durable, sustainable materials and a cradle-to-cradle approach will ensure a holistic environment built to make a change.

Brief

The project brief works towards creating a nurturing community for adults with ASD, designed to feel like a safe and enriching village. The village should evoke a sense of home, offering both tranquillity and the kind of positive excitement the world can bring. Here, residents can embrace an independent live-work-play lifestyle within the secure and vibrant community. The different living quarters (namely: independent, semi-independent, and dependent living quarters, single and shared respite quarters, as well as caretaker's single and shared living quarters) will be nestled between the peace and quiet of other residential stands and complexes, connected by walking paths through sensory gardens and all surrounded by abundant outdoor space and connected to communal spaces for the residents. The more public programming, such as the admin block, learning spaces, services, and medical facilities will be positioned towards the outer ends of the site. The project is committed to fostering independence, social connections, well-being, and a sense of belonging, creating a place where adults with autism can truly thrive.

Client and stakeholders

The client is the Apricot Tree Nonprofit organisation that inspired the project. The school offers specialised day care services for young learners with intellectual, developmental, and physical disabilities. As these learners grow into young adults and seek to carve out their roles in society, families who are part of the organisation feel there is a lack of supportive environments where their loved ones can find a sense of belonging ('About Our School – Apricot Tree', no date). The organisation's owners, along with its community members, dream of establishing a spacious assisted living facility for adults with disabilities. To bring this vision to life and to address the issue of limited funding that leads to all-inclusive special needs facilities, this project prioritises a specific disability group. By providing tailored services, it aims to build a model for future, inclusive, and intentional design that better serves its users. Therefore, this project will become an extension of the Apricot Tree NPO, serving adults within a specific disability group within the organisation.

The client will raise 20% of the projects funding through fundraising efforts, with the remaining 80% coming from stakeholders, listed on the following page:

▸ **Investec Property Fund (30%)**

The Investec Property Fund invests, develops, and manages exclusive properties. The company partners with brokers, developers, renters, and investors to design spaces that benefit the unique needs of users and their communities. They will play a significant role in developing the residential units (independent living quarters, semi-independent living quarters, dependent living quarters), offering them a stable long-term return on their investment through predictable rental income. They are happy to receive 50% of the monthly profits made from the rent, with the other 50% going to the organisation. The housing model could potentially be replicated for future developments, maximising positive impact.

▸ **Apricot Tree (20%)**

As the client of the project and the main contributor (other than the Investec Property Fund), Apricot Tree will buy the land and cover the caretaker's residential units and all the respite quarters. They will acquire the funds from internal fundraising activities. This will allow them to provide their support staff with living quarters, and to receive income from the respite quarters. They will also receive 50% of the rent from the residential units, the full rent from the businesses on-site, and care fees from residents/their families to keep the centre running.

▸ **National Lotteries Commission South Africa (16.5%)**

The NLC serves as a grant funder, supporting registered Nonprofit Organisations with funds to build projects that improve lives. Their focus is on sustainable development within impoverished communities and safeguarding vulnerable populations by providing integrated holistic services. Because of their commitment to a strong social impact and community focus, they will fund the establishment of the community facilities including the community gardens, on-site services, and lifestyle spaces such as family rooms, communal dining areas, the multi-purpose hall etc.

▸ **Citi Foundation Grant (8%)**

The Citi Foundation Grant takes on a “more than philanthropy” approach to improving the quality of life in low-income communities, creating job opportunities for the youth, and recreating vibrant communities through innovative design solutions. Because of their focus on inclusion, they are passionate about the centre and want to contribute 8% to the construction of and equipment for the learning facilities (this includes classrooms, libraries, therapy rooms etc.)

▸ **Department of Social Development South Africa (5%)**

The Department of Social Development South Africa is a government department is committed to social change by creating better lives for poor, vulnerable, and excluded people in our society. They provide grants to NPO's that will contribute to their greater vision for South Africa and want to cover the remaining construction costs of the learning facilities together with the Citi Foundation grant.

▸ **Disability Rights Fund (4%)**

The Disability Rights fund collaborates to provide grants to organisations that support individuals with disabilities. Their funding is directed towards the admin and services portion that will keep the centre running, this includes the admin block, security quarters, and services.

▸ **Benetton Insurance Brokers Benoni (3%)**

Benetton Insurance Brokers is already a sponsor for the Apricot Tree NPO. They will offer support related to risk management and legal matters, such as insurance for the facility. In terms of their donation, they will sponsor the therapy pool and contribute towards the community gardens.

▸ **Metskill Training company (2%)**

Metskill Training company is already a sponsor for the Apricot Tree NPO. Understanding the importance of lifelong learning, they will sponsor the construction and stocking of the library.

▸ **Hammond Pole Attorneys (2%)**

Hammond Pole Attorneys is already a sponsor for the Apricot Tree NPO. They will offer support related to risk management and legal matters, such as resident contracts. In terms of their donation, they will partner with Apricot Tree to cover any outstanding costs.

▸ **Trinergy Health and Fitness Centre (1%)**

Trinergy is already a sponsor for the Apricot Tree NPO. They will sponsor the equipment needed for the community gym.

▸ **Activize Apparel (0.5%)**

Activize Apparel is already a sponsor for the Apricot Tree NPO and will partner with Apricot Tree to cover any outstanding costs.

▸ **Netcare Linmed Hospital (5%)**

The Netcare Linmed Hospital is a private institution also located in Rynfield, Benoni. Recognising the need for autism support services in the community, Netcare Linmed (which currently doesn't have a dedicated neurodevelopmental clinic) is partnering with Apricot Tree to bring this vital resource to the project site. Therefore, they are sponsoring the construction costs and equipment of the on-site medical facilities.

▸ **Pick n' Pay Northmead Mall (3%)**

Pick n Pay is excited about the economic and sustainable potential of the project and have decided to sponsor the construction of the community market, vegetable garden, and herb garden. They've further solidified their commitment by pledging to purchase fresh produce grown by the residents, creating a thriving local food system.

9.2. site

site selection

The chosen site offers an ideal combination of accessibility, community, and tranquillity. Situated near major highways for convenient travel, it's just an 850-meter walk (12 minutes) from the original Apricot Tree NPO, fostering seamless staff and participant movement. Residents can enjoy independence with Northmead Mall's shops and bus stop that is just 450 meters away, while the Benoni Country Club, just 800 meters away, provides opportunities for sports, dining, and various activities. Nestled amidst serene walkways and surrounded by houses, the site offers a peaceful ambiance, further enhanced by the broader Rynfield area's greenery, parks, dams, and pans. Despite its tranquillity, the location remains close to the Benoni CBD for added convenience.

The agricultural zoning allows for on-site farming and vegetable gardens, promoting a sustainable lifestyle. The ample space allows for the creation of expansive gardens and residential units that seamlessly blend with the existing quiet neighbourhood. Residents' well-being is ensured by the presence of three hospitals within a 7-kilometer radius, with many other healthcare and therapeutic professionals readily available in the area.

site information and ownership

The site is a portion of the Vlakfontein 69-IR farm in the residential suburb of Rynfield, Benoni. The large piece of land stretches between several residential erven from Norman Street(N) and Jolin Avenue(W) to Morris Avenue(S) and Barbara Avenue(E).

Erf no:	R/80/69-IR
Portion no:	80
Township:	Vlakfontein 69-IR
Area:	69 451,81 sqm
Coverage:	5% (34 72,59 sqm)
Zoning:	Agriculture

For this project, the erf's zoning needs to be updated to Residential 4, which includes dwelling units, residential buildings, old age homes, social halls, institutions, places of instruction, restaurants, and special uses.

Apricot Tree will purchase the site from the current owners to expand their organisation.

rights and constraints

Ekurhuleni Town Planning Scheme

With the new zoning of Residential 4, the following rights and constraints apply:

Street boundary:	3m
Other boundaries:	2m per storey (to a maximum of 10m)
Height in storeys:	3
Coverage:	60%
FAR:	1.2
Density:	Greater than 60 dwelling units/ha

May be increased by means of written consent:

Max. height in storeys: as per policy

Max. coverage: 90%

9.3. feasibility and financial viability

land cost

To get a preliminary sense of land cost, I researched comparable sales on Property24. I found a vacant agricultural land in Rynfield that is currently listed at R1 450 000 for 1 hectare.

Assuming a similar market value for the client’s property (which is approximately 6.9451 hectares), a rough estimate of the land cost would be:

Estimated Land Cost = Area (hectares) x price per hectare
= 6.9451 hectares x R1 450 000/hectare
= R10 070 395

operational costs per month

Category	Cost	Amount (R)
Admin	Staff salaries (1 receptionist, 3 admin clerks, 12 cleaning staff)	111 300.00
Learning	Staff salaries (10 teachers, 1 librarian, 4 occupational therapists, 2 physiotherapists, 2 therapists)	572 000.00
Lifestyle	Staff salaries (5 chefs) Produce/Groceries (for approx. 160 people)	40 000.00 240 000.00
Semi-Independent Living	Staff salaries (8 caregivers)	64 000.00
Dependent Living	Staff salaries (15 caregivers)	120 000.00
Shared respite quarters	Staff salaries (2 caregivers)	16 000.00
Single Respite Quarters	Staff salaries (5 caregivers)	40 000.00
Community Garden	Staff salaries (3 gardeners)	15 000.00
Security Quarters	Staff salaries (4 security guards)	24 000.00
General	Taxes (income x Public Benefit Organisation Properties tax rate of 0.00263) Variable costs (30% of income)	6 632.00 658 500.00
Total		1 907 432.00

construction funding

Source	Sponsor	%	Amount (R)
Grants	National Lotteries Commission South Africa	16.5	10 060 809.00
	Citi Foundation Grant	8	4 877 968.00
	Department of Social Development South Africa	5	3 048 730.00
	Disability Rights Fund	4	2 438 984.00
Donations	Benetton Insurance Brokers Benoni	3	1 829 238.00
	Metskill Training company	2	1 219 492.00
	Hammond Pole Attorneys	2	1 219 492.00
	Trinergy Health and Fitness Centre	1	609 746.00
	Activize Apparel	0.5	304 873.00
Investments	Investec Property Fund	30	18 292 380.00
	Pick n’ Pay Northmead	3	1 829 238.00
Owner Financing	Apricot Tree	20	12 194 920.00
Self-sustaining Project	Netcare Linmed Hospital	5	3 048 730.00

monthly income generation

The project’s revenue stream will be multifaceted, encompassing monthly rent from residential units and commercial spaces, program fees from participating residents/families, the market, and produce sales, as well as income from the respite centre.

Category	Rate	Amount (R)
Day program (7 days a week)	R400 per day (approx. 40 participants)	480 000.00
Independent Living	R15 000 per resident	300 000.00 (50% to Investec) 150 000.00
Semi-Independent Living	R20 000 per resident	480 000.00 (50% to Investec) 240 000.00
Dependent Living	R30 000 per resident	450 000.00 (50% to Investec) 225 000.00
Shared respite quarters	R1500 per guest per day	360 000.00
Single Respite Quarters	R2000 per guest per day	600 000.00
Community Garden	Approx. R50 000 per 1 hectare of land.	100 000.00
Commercial spaces (art studio, coffee shop, medical facility etc.)	Rent	40 000.00
Total		2 195 000.00

After covering all the monthly operational costs, the scheme generates a monthly profit of R287 568.00. With that said, the project is financially viable.

professional fees

In terms of the construction costs, the following was calculated as per the 2022/23 AECOM Property and Construction Africa Cost Guide Handbook:

Space	sqm	Cost Estimate (R)
Admin	80	930 000.00
Learning	972	10 470 000.00
Lifestyle	710	6 800 000.00
Independent Living	900	10 800 000.00
Semi-Independent Living	808	8 164 800.00
Dependent Living	855	8 550 000.00
Shared respite quarters	202	2 020 000.00
Single Respite Quarters	200	2 000 000.00
Caretaker's single living quarters	360	4 320 000.00
Caretaker's shared living quarters	207	2 509 800.00
Community spaces	330	2 950 000.00
Medical	118	850 000.00
Services	225	360 000.00
Security Quarters	40	250 000.00
Total	6 007	60 974 600.00

According to the Final Guideline Professional Fees, issued in terms of Section 34(2) of the Architectural Professional Act No. 44 of 2000, the following applies:

Complexity: High
Cost Bracket: 8 (from R40 000 001.00 to R130 000 000.00)
Primary Fee: R5 230 998.63
Secondary Fee (on balance over): R40 000 001.00
Additional %: 12.33%

Secondary fee:
= (Applicable value of works – Secondary fee on balance over) x additional %
= (60 974 600.00 – 40 000 001.00) x 12.33%
= R2 586 168.06

Therefore, the Professional fee is:
= Primary fee + Secondary fee
= 5 230 998.63 + 2 586 168.06
= R7 817 166.69
(In this case, I, the architect, am the principal agent)

Therefore, the development cost is:
= Land acquisition + Professional fees + Building construction costs
= 10 070 395.00 + 7 817 166.69 + 60 974 600.00
= R78 862 161.70

appointment of professional fees between the work stages

Work Stage	Proportion of Fee (%)	Fee portion amount (R)	Cumulative Total (%)	Cumulative fee amount (R)
1	2	156 343.33	5	390 858.33
2	15	1 172 575.00	20	1 563 433.34
3	20	1 563 433.34	40	3 126 866.68
4a	10	781 716.67	60	4 690 300.01
4b	20	1 563 433.34	70	5 472 016.68
5	30	2 345 150.01	97	7 582 651.69
6	3	234 515.00	100	7 817 166.69

9.4. social viability

The project targets the diverse demographics of Benoni to create a positive social impact. With a significant young population (20.3%), it will cater to the needs of families with children. The large working population (72.1%) promotes the use of features that attract working professionals. The growing elderly population (7.6%) prompts senior-focused elements within the project. These different groups present many volunteer opportunities for the centre.

Taking a closer look, the dependency ratio of 38.7 suggests a population in need of support services. Along with children and elders, this could include disabled individuals in need of inclusive environments. While a good portion of the population completed matric (38.8%) and higher education degrees (23.9%), it's important to acknowledge that 10.6% of individuals only completed primary school. This might indicate challenges with adapting to new routines or more challenging environments, which could be a sign of autism spectrum disorder (ASD). The population of highly educated individuals presents the opportunity for innovative solutions to social challenges, such as the semi-independent/independent living community.

The population diversity highlights the need for inclusive design and services within the project. By understanding the population characteristics, including educational background and potential need for support, the facility can clearly address the specific needs and aspirations of Benoni's residents to create a socially viable outcome.

9.5. implementation

contract for procurement

The project will make use of a traditional design-led competitive tender procurement process. The architect will finalise the design with the client's approval, and then detailed construction documents are created. These documents are used to solicit tenders from qualified contractors, ensuring a fair and cost-effective selection process for the best value on the project.

contracting methods

The following contracts will be used:

- JBCC Suite of Building Agreements
- PROCSA Client Consultants Agreements
- SAIA Client Architect Agreement

Professional regulations include the following:

- South African Council for the Architectural Profession
- SACAP Professional Code of Conduct

construction methods

The construction methods will prioritise sustainability with a tribute to Benoni's mining past. The buildings will mainly be constructed from recycled and locally sourced materials, potentially incorporating wood and/or iron details for a historical touch. To ensure longevity, durable and low-maintenance materials will be selected, while exploring locally available resources like clay bricks made in Benoni. This approach minimizes transportation emissions and honours the town's brickmaking history. The project will be designed with energy efficiency in mind, using elements such as openings that optimise natural light and water-saving fixtures. A comprehensive waste management plan will be implemented throughout construction for a cradle-to-cradle approach, and

efforts will be made to minimize environmental disruption. By combining sustainable practices with an ode to Benoni's history, the development will not only be functional but also reduces the environmental impact and celebrates the town's heritage.

the professional team

To ensure the project's success and to create a functional, sustainable, and legally compliant facility, it is crucial to assemble a team of skilled professionals. The team is listed below.

Design and Planning Team:

- **Urban Designer and Town Planner:** These specialists will consider the project's impact on the surrounding community and ensure it aligns with the town's development plans.
- **Land Surveyor:** The land surveyor will accurately measure and map the project site, ensuring clear property boundaries and up-to-date SG diagram(s).
- **Architect:** The architect is responsible for translating the project's concept into a functional and aesthetically pleasing design.
- **Engineers (Civil, Mechanical, Electrical, Geotechnical):** This team of specialists will ensure the structural integrity, safety, and functionality of the building from various aspects. The civil engineer focuses on the foundations and structural elements. The mechanical engineer designs the heating, ventilation, and air conditioning systems which all need to be efficient but also subtle to ensure a stimulating environment. The electrical engineer is responsible for the energy and lighting systems. The geotechnical engineer assesses the soil conditions for optimal foundation design.
- **Quantity Surveyor:** This cost expert plays a crucial role in estimating project costs, managing budgets, and ensuring value for money throughout the construction process.
- **Landscape Architect:** Together with the architect, the landscape architect will assist in designing the surrounding green spaces, integrating them seamlessly with the building,

promoting environmental sustainability, and ensuring pleasant sensory experiences.

- **Fire Consultant:** This specialist, together with the architect, will design and implement fire safety measures to meet all the necessary building codes and provide occupant safety.

Legal Team:

- **Attorneys:** Legal experts will navigate contracts and ensure compliance with all necessary regulations.

Construction Team:

- **Project Manager:** The project manager ensures that the project is on time, within the budget, and that the construction and design outcome is as intended.
- **Contractor:** The contractor oversees the construction process, coordinating with subcontractors, and ensuring the project is completed on time, within budget, and according to specifications.

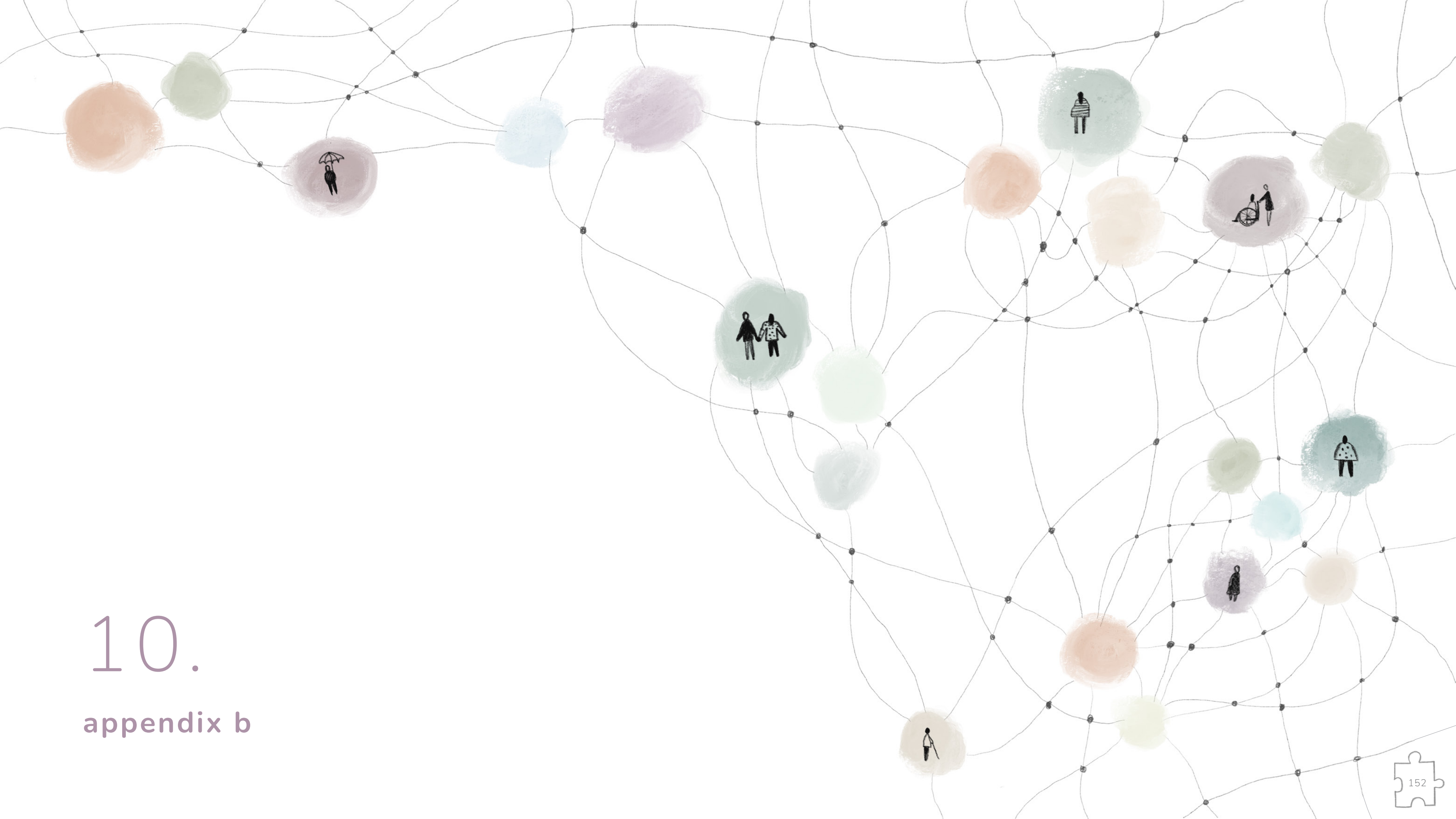
Additional Considerations:

- **Health Inspector:** A health inspector might be involved in the final stages to ensure compliance with health and safety regulations for designing for persons with disabilities.

The abovementioned team of experienced professionals will collaboratively ensure that the project adheres to best practices, regulations, and environmental responsibility.

9.6. conclusion

In conclusion, the analysis presents a strong case for this project's viability and sustainability. Benoni's diverse demographics offer a promising target market, financials demonstrate profitability, and the focus on recycled materials, local resources, and energy efficiency minimizes environmental impact. Additionally, it honours Benoni's heritage through careful material selection. This project has the potential to be not just functional but also a valuable and sustainable addition to the surrounding community.



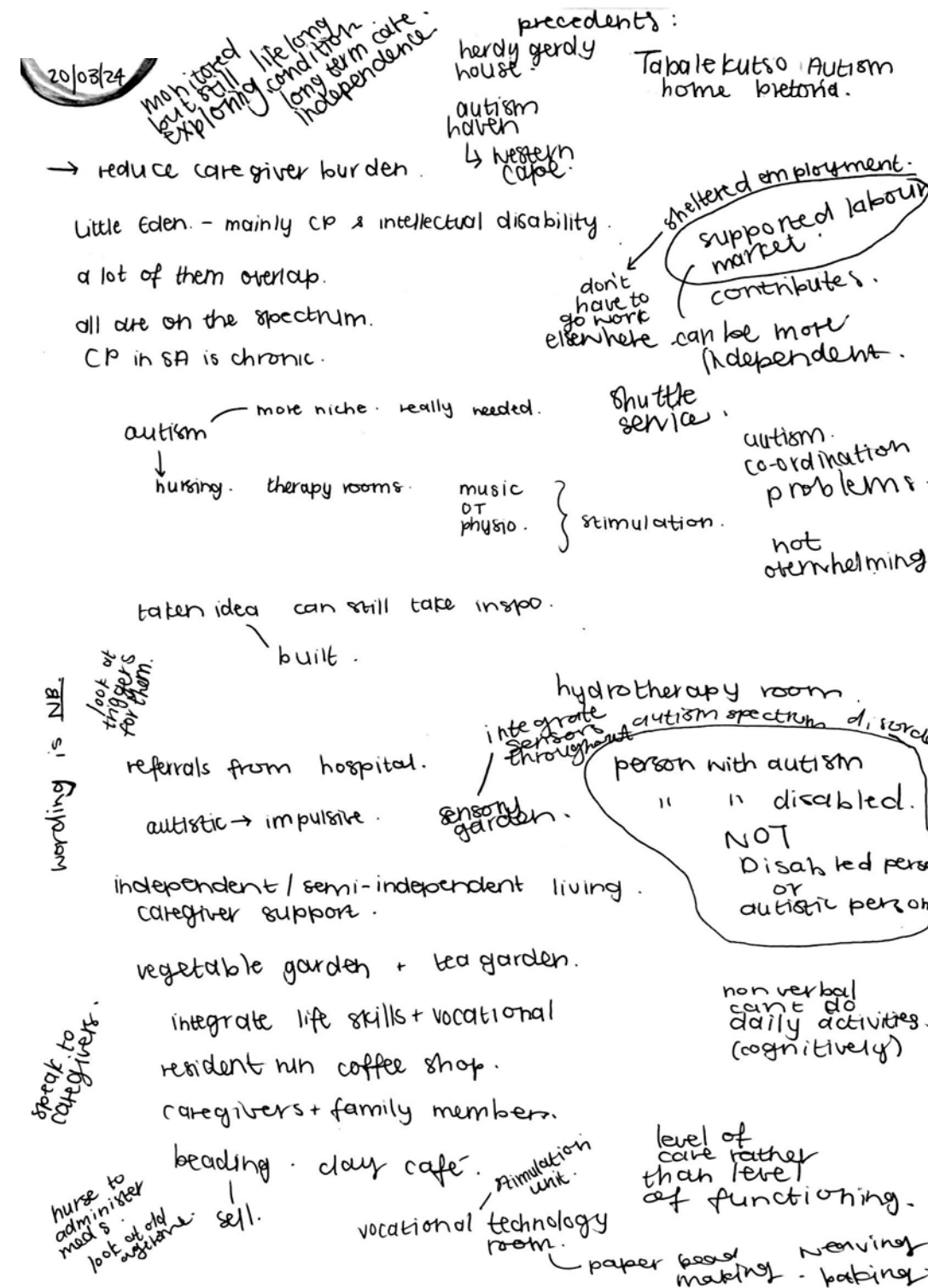
10.

appendix b

10.1. interviews

occupational therapist
20/03/2024

This interview helped me refine my research focus, concentrating on the specific needs of individuals with autism and understanding the essential considerations when designing for disabilities.



Choosing a site: quiet. nature views.
proximity to amenities.
local businesses or schools.
transport.

Site options: bunny park.
between Belvedere School & Farramere community centre.
Belfast Rd.
fairchild ave. by water.
Korsman bird sanctuary.

priorities: nature / water.
proximity to amenities.
transport.
gym? be able to walk!

by CR Smart park:
→ park
→ ebotse market in the park.
→ overlooking van Ryn dam.
→ ebotse right there.
→ behoni country club nearby.
→ Rynfield square 3km walk (safe).
Northmead mall also close.
→ Rynpark also close by.

manager at Apricot Tree NPO 22/04/2024

The interview included an on-site visit to the Apricot Tree NPO, where I gained valuable insights into the physical spaces and the specific requirements and preferences of individuals with autism.

22/04/24.

Visit to Apricot Tree

Route no. otw to LinMed - how NOT to!

→ CV1 - present in a sensory room.
- seeing more & more.

Junior side - under Gr. R.
senior side - 7 yrs - Gr. 2-3.

double glazing - padded walls - sound.
3 or 4 all diff.
and love water.

Sensory integration!

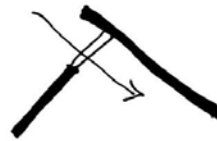
- parents.
structured.

Gathered info after visit:

- Independent: own place
- semi-independent: house mom. own rooms. shared living + kitchen. } most needed
- dependent: caregiver + individual share a room. own place - but w/ a caregiver. } not as many
- multi-sensory room is for when they are overstimulated / understimulated.
- Communal area / kitchen. they love their lunch time together.
- Kitchens need islands, easy to work around (also w/ wheelchairs).
- Do design for wheelchairs (old autistic individuals) + easier to walk up ramps. (sometimes their mobility is weak / they have a bad day.)
- doors are NB. need control (unlock from outside).
- floors in classrooms is like rubber that wraps up to skirting thermal properties.
- Squishy floors in sensory rooms. - being able to control lighting is NB! one w/ light & one w/ out?
- Love gardens + sensory garden. calming. lots of trees for shade. edible plants. Grass NB.
- lots of storage. Medicine storage controlled. (ASD mds. will go & fiddle & eat.)
- Lots of gates! controlled access! they are runners.
- hall mustn't echo. big space to run around.
- idea: potential central indoor/outdoor atrium for controlled play? feels outside but not outside? (for rain, dark etc)

- behaviour boards for communication.
- planting beds (diff heights) some-like to stand or sit or sit w/ carer.
- Bathroom anxiety. Make it a nice place.
 - still need railings + space.
 - + bed for changing
 - taps like malls - stop running automatically.
- high vs. low ceilings.
 - ↓
 - don't like echo's.
 - ↳ more controlled + warm.
- emergency room they know to go to if they cut themselves / something (routine).
- classrooms w/ seating in calm corners can sit together or apart.
- lockers / areas to keep their belongings.
- day care vs. respite vs. living.
- controlled water pps.
- trees ball running through branches on steel set up - sound + visual stimulation.
- "butterfly class" "lion class"
 - classes split in more sensory / academic etc.
- beams w/ things to hang from ceilings (hammocks, exercise equipment, etc.) motor room mustn't feel like gym.
- they love swings! inside outside!
 - adult jungle gym?
- lots of trees for shade & shadows
- chill area w/ individual seats (like sitting alone)

- animals? (own thought).
- emergency area (fits) - not really cause just needs to happen on the spot.
 - but.
 - needed for smaller emergencies / severe fits
- ponds, water NB!
- Water conservation + jojo's needed.
 - own thought:
- Look at Autism place across Waverly school.
- Respite - chests under bed. Not staying for long
- pitched roof in respite centre.
 - natural light - padding + insulation!



architect at Hubo Studio designers of The Sensory Box 31/05/2024

By personally experiencing the sensory box, I gained valuable insights into the ergonomic considerations and subtle details essential for designing spaces that stimulate and engage individuals with autism.

Hubo Interview

21/05/2024.

State of regulation. - aim.

Neurodiverse struggle to process - constantly dysregulated & agitated.

come in, have control, immerse in safe space.

threshold. control music as well.
crawl in. good for therapy.

more focused in box vs. outside box.

user transport.

used for therapies. Want to isolate triggers.

Floor - PVC material - normal play material.
(matt vs. glossy).
1mm foam layer inside.
or 2mm
2 mats that fold.

Pod - Rip stop material. (parachute material).
durable but soft.

Ribs form part of structural element.
compressor keeps structure inflated.

air vent at top - can open & close.

outdoor temp. regulation.

4. how would you apply to building?

play of light, materials, texture, hard vs. soft.

play on space - not std. room.
rounded elements
soften edges.

compressor
muffles white noise.
blocks out
ext. noise

Allows for hyper bouncing off walls.

pod can be attached to mat so don't escape.

Claustrophobia - perception to leave helps.

look at precedent.
facade is not plaster.
Linksfield King David have this building.
niche in educational spaces. colourful & playful.
+ studio space + yards: arts & culture centre.

apply sensory elements to designs.

acoustics. texture. colour. shape. volume.

tactiles inside. little offshoot.

1. No direct experience.
accessibility ease of access routes.

2. working in sensory box helps design spaces around neurodiverse
sense of control and independence NB!
small things - e.g. of door handle.
thresholds.

LC. nursery school. - arch elements: scale of items.
eg: stairs for their heights. lowered door handles.
little village for them.
no play in std. school environment.

prosperity refuge theory NB!
ease of space.

4. trying to design a space that makes them feel included!

neurodiverse don't feel welcome especially in SA.

accessibility. regulatory elements
one size doesn't fit all.

adaptability NB!

colours - diff. perceptions for everyone.
people look @ in 1 dimension.
eg: (red - danger.)
but here you can change.

light room
& dark room
but is much cheaper
concept built off snoozlin rooms.
↓
designed for alcohemics indivi-
duals.
Netherlands

like hotpod yoga. - go try on bigger scale

in pod, can stand.
elliptical shape to stand wherever.

manager at Lethabo le Khutso 21/05/2024

This interview highlighted the critical need for autism-specific residential facilities for adults, emphasizing the unique requirements, ergonomic considerations, and spatial planning necessary to meet their specific needs.

Lethabo le Khutso - Interview w/ general manager. + close by hospital
[Unita school started it - branched from there. Nonyana - Independent Living facility. - independent care. LUPFA - Kempton Park. SIVANT] chose position based on this.

don't have here → not highly intellectual individuals. adults vs. children are different.

Group facility → need to be ready for that.

est. 2002. 1st excl. autism day care & res development in country!

partially subsidised by dep. of health. fully private.

day care & res. options. 2 facilities. 3 residences. 3 workshops. need is growing.

3.6k p/m meals all inclusive (charging half of what non-subsidised org's charge). 7.1k p/m. all inclusive except clothing & toiletries.

20 residents in 2 houses. expanding to adj. property to expand to 30 people

Facility like this in res. area. All pushing for deinstitutionalisation but communities are not very ready. Neighbours not very welcoming - always court cases & fighting @ first. object to rezoning. → [special residential] (traffic, noise (potential psychos)) try to minimise complaint

autism more exp. than other disabilities because of individualised care.

1 carer per no more than 3 people. Can't afford full time services - therapists etc. security is NB.

idea: swimming. horse riding therapy. restricted access. good community support.

consider epilepsy factor.

18th st. border street of corp + res. communal area.

no definite hours, come & go as please for day care. res. go home mostly every 2nd weekend. scheduled medication NB.

epilepsy increasing.

Times for day care: 6am to whenever. depends on parents. off. start 8:30am.

Residents can go home whenever - can every weekend. must go at least 1 weekend a month.

Autism - problem is money. Independent living not viable in SA. (low disability grants)

snings. trampolines. check. caution. sometimes less is more. keep it simple - safe.

Whole facility sensory.

Need to raise funds for extra stuff. Need basic requirements (eg. fire) to get funding.

Staff:

2x management staff.
perm. nurse.
OT.
Social worker.
caretakers (most).
2x house mothers - cooking.
1x gardener.

Autism SA org. National body. → conference.

San Michelle Home - great advocate.

Routine is good but change is also good. Routine based program. Don't want it to become dull.

Do markets - but don't make. sell w/ profit.

No pressure on producing. skills development & personal care & leisure.

Program from Kho Khutso.

holidays drive program for week - eg: mother's day.

Simple but enjoyable.

gap in research. addressing it. a lot of research in world, not a lot in SA.

They are a BENCHMARK FACILITY

Crescent House, Midrand. → village idia.

Is the country ready? to deinstitutionalise? community + hospital NB.

3 levels - totally dependent (fine w/ group living arrangement). 1 & 6 ppl in 1 house.

prescribed no. of caregivers from dep. of social dev. or dep. of health.

Social dev. focuses on mine - Not dep. of health.

founders of the Apricot Tree NPO

08/06/2024

This interview provided a comprehensive understanding of the design features at Apricot Tree that contribute to a comfortable and welcoming environment for users, emphasizing the importance of ergonomic considerations.

Apricot Tree Interview

21. look at ^{website's} brochure.
Refer if needed (network).
Come in now & then to see (process).
Autism intertwined with others.
Higher functioning pull up lower functioning.
Occile ^(severe) do simple vocations.
Higher functioning help run facility.
- NS → safety & tolerance.
Push to limits. Don't have expectations.
Diff. program for each individual.
22. Excursions for inclusive part.
↳ eg: shopping, gym. also spreads awareness.
Information boards.
fundraisers (intimately involved).
include in all spaces.
- * Sheltered employment * available but doesn't fit realm.
still too exposed (what is available).
- In Australia - special needs included w/ std. schools.
SA culture hides special needs.
first-class accomm. - respectful spaces for all.
(de-institutionalisation)
- triple A architect designed school -
- Logwood school - 90% down syndrome.
started with ds.
- sheltered employment - safety, security, pull in businesses that require basic labour. eg: pick n' pack.
repetitive tasks, routine is massive.
vestibular activities.
- bigger rooms + classrooms for wheelchairs.
sliding doors (wheelchairs) don't take up space.
→ Need 900 doors!

Windows open higher than wheelchair (don't knock).

Direct fluorescent onto ASD inds.
epileptic inds. don't work.

Diffused light onto roof. (don't see stroke in lights).
rather than directly down.

high ceilings don't matter, they don't see it.

Floors they use in hospital theatres. soft. go up on wall.
tarket vinyls.

all vinyl - waterproof.
(no laminates - they lift).

bars inside.

panel heaters covered.

Normal disabled bathrooms.

bespoke taps that fit hands.

high shelving doesn't work. ~~barriers~~

Autism need changing rooms. (lower functioning).

space for wheelchairs.

liability cover.

surveillance. where? not in personal spaces.

steps & ramps.

↳ gated.

Minimal stepping area inside.

mobile clip ramps.

fire extinguishers low.

function needs to outweigh form.

stainless steel on corners (protective).

maintenance & longevity.

aluminium - maintenance good!

stainless steel balustrades.

tiles grooves - not dead!

bathrooms tiled all the way.
* wet areas no baths.

Gayle Barnard
architect.

old age homes
similar.

materials:
hygienic.
& easy to maintain
NB!

think of hoist rails.
rafters need to be able to hold them.

Insulation.

flat panels heaters are ~~the~~ best.
infrared lamps, or.

Sensory rooms. UK leading.
multiple rooms for diff. senses — stimulating.
rather than one size fits all.
eg: bubble tube.
calming.

Wifi NB. iPad + tech for communications.
pod speaker in ceilings.

tech. advantage of special needs.
→ research.

Very natural environment inside. bringing outside in.

N+E side. from inside can see out. sunlight control.
from out can't see in.

Big access areas + escape routes.

have to have bigger rooms than you think you need.
extra half a meter makes a huge diff.
room spatial understanding

keep roof high 3.5 - 4m roof. less claustrophobic.

boxes for calming.

LOTS of storage

high tables (adjustable for wheelchairs).

everything is bespoke.

everything - does it work for this space?

Go watch video on website.

diff. realm for each.

low func. hostel open plan. rooms spaced out on perim. central communal area.
medium. - more like flat. ext. centre for communal act.
own kitchenette for eg.

Ergonomics

4. colours. see before.

off white.

colour palette targets specific people only.
cleanliness.

plain + natural wood. natural environment.
doors highlighted to SEE.

things to focus on standout (colour).
bright. plugs. covered.
bright to see not to touch.

Natural coloured blinds.

don't close room in.

bright side of plain.

basic foundation. work on that foundation.

No murals.

anxiety already overstimulates them.

10.2. questionnaires

family member of an individual with autism
06/06/2024

A bridge to belonging:
an independent/semi-independent living community in Benoni,
South Africa for people with autism spectrum disorder (ASD).
A research report for the University of the Witwatersrand by Jessica Dias

I, anonymous agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me, I understand what this study is about. YES NO

I understand that I can volunteer to take part in the study. YES NO

I agree that the interview/focus group/other activity may be video recorded. YES NO

I agree that direct quotations from my interview/focus group/other activity may be used by the researcher in their research report. YES NO

I understand that individuals identified as vulnerable, specifically those under the age of 18 and/or those with disabilities, will not be included in the research data collection process. YES NO

I agree that my dissertation will remain anonymous (my name or other identifying data will not be used by the researcher in their research report. YES NO

I hereby grant consent for the researcher to conduct participant observations on me, which may include observations of my work, daily routine, and emotional responses related to the topic, during interviews or any other data collection activities. YES NO

I agree that other researchers may use the information I provide in my interview/focus group/other activity (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on. YES NO

signature signature
name of participant name of researcher
06/06/2024 date date

A bridge to belonging:
an independent/semi-independent living community in Benoni,
South Africa for people with autism spectrum disorder (ASD).
A research report for the University of the Witwatersrand by Jessica Dias

Questionnaire for family members/caregivers of persons with autism/other intellectual disabilities:

Please state your relationship to the individual with ASD/intellectual disabilities:

Father

Please feel free to skip any questions you do not have answers to or are uncomfortable discussing.

1. How does the physical environment of your home/community impact the daily life of your loved one with a disability?

The physical environment is crucial to accommodating our son's ASD. This is because we need to make allowances in order for him to function better and give him a better quality of life.

For example: his own sitting and TV
: a special needs classroom at church.

2. What are some of the main challenges you encounter in accessing supportive environments for your loved one with a disability?

Vary typically of ASD, noise and over stimulation are our two most difficult challenges. It's not possible to avoid these two factors; us humans are noisy, busy beings!

3. From your perspective, what features or accommodations would you like to see incorporated into community spaces to better support individuals with ASD/other intellectual disabilities?

At a shopping mall, it would be so helpful to have "pause areas" or "quiet zones" for special needs customers. Possibly with a few chairs and couches and a work cubicle / station or two.

At restaurants, they could configure the seating to allow for more private seating options AND put up sound absorbing / attenuating materials on the walls to absorb noise and reduce sound bouncing around within the restaurant.

4. How do you believe architectural design can contribute to enhancing the quality of life for individuals with ASD/other intellectual disabilities and their families?

Small allowances, as mentioned, can make a really big difference! The individual with the disability is happier, the family supporting are more at ease and more likely to return to places that are considerate and cater for people with ASD.

The measures mentioned are not major ito design but should be thought about during design stage.

5. What are your perceptions of the current availability of supportive environments for individuals with disabilities in the Benoni community?

For physically disabled people, there is pretty good support ie: ramps and elevators.

No allowances have been made at any shops or restaurants for people with ASD struggling to deal with noise and over stimulation.

Our church is the exception, but it took a long time to get a suitable space built.

6. In your opinion, what role should the community play in creating inclusive spaces for individuals with ASD/other intellectual disabilities?

Just as physically disabled people have been accommodated over time, so too should those with ASD/ intellectual disabilities.

A big factor is that physical disability is VISIBLE whereas ASD etc is NOT VISIBLE. This poses a major challenge as the community needs to be educated. However, architectural design can lead the way making allowances for people with ASD and society will follow.

7. How do you believe architectural design can contribute to creating a more inclusive and welcoming community for individuals with diverse needs?

I think I've already answered that.

8. Do you have any additional comments or advice that you believe would be valuable for this research, which might have been overlooked? If so, please expand:

Nothing further to add. Lead the way!

Thank you for the opportunity.

10.3. research report documents

ethics approval



20 August 2024

Jessica Dias
2168787

TO WHOM IT MAY CONCERN

RESEARCH ETHICS APPROVAL

Title of research project: **A bridge to belonging: an independent/semi-independent living community in Benoni, South Africa for people with autism spectrum disorder (ASD).**

This letter serves to confirm that the Ethics application for the above titled study has been approved. The researcher has been granted clearance to proceed with the research study or project.

Protocol/clearance number is: **SOAP013/03/2024**

Yours sincerely

Motsei Choabi
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change of title approval



Reference: Ms Nicoleen Potgieter
E-mail: facultyregistrar.ebe@wits.ac.za

16 January 2025
Person No: 2168787
TAA

Dear Miss Jessica Dias

Master of Architecture (Professional): Change of title of research

I am pleased to inform you that the following change in the title of your Research Report for the degree of **Master of Architecture (Professional)** has been approved:

From: **A bridge to Belonging: an independent/semi-independent living community in Benoni, South Africa for people with autism spectrum disorder (ASD).**
To: **a bridge to belonging: an inclusive living and day care community in Benoni, South Africa for adults with autism spectrum disorder (ASD).**

Yours sincerely

A handwritten signature in black ink that reads "Potgieter".

Ms Nicoleen Potgieter
Faculty Registrar
Faculty of Engineering and the Built Environment