



AUTISM EDUCATION AND TREATMENT CENTER

Nontapat Sriwanichpoom

A Thesis Submitted in Partial
Fulfillment of the Requirements
for the Degree of

Bachelor of Architecture

Department of Architecture School of Architecture and Design
ASSUMPTION UNIVERSITY

2016

AUTISM EDUCATION AND TREATMENT CENTER

Nontapat Sriwanichpoom



Department of Architecture
School of Architecture and Design
Assumption University
2016



Thesis Approved:

Date Assoc. Prof. Pralong Phirananda, DEAN

Date A.Suparath Valaisathien, Chairperson

Date A.Veera Leelapattanaputi, Thesis Supervisor

AUTISM EDUCATION AND TREATMENT CENTER

Nontapat Sriwanichpoom

74 Pages

January, 2016

Autism spectrum disorder is one of the disabilities that have problem with brain development. They cause problems in development of the behavior, communication and social interaction. The children with autism have difficulty learning and their daily life depends on the others. They require specific treatment and need to stimulate and develop their senses closely since they were young.

In Thailand, the number of people with autism seems to be increasing every year and most of them cannot get the proper service and there is still lack of effective schools for them. Moreover most of Thai people still lack knowledge about autism. These are the reasons why Thailand need to be concerned about this situation.

Autism education and treatment center thesis is mainly the place for the treatment and occupational training for every age of autism and the knowledge center about autism for parents, teachers and visitors who are interested. The location of the project is next to the Yuwapasart Hospital in Samut Parkarn, and the area of the project is 7509.4 sq.m. This thesis is scoped on the idea of the interaction of the architecture and sensory disability of autism, which aims to find the friendly environment for autism daily life by using architecture elements such as light, color, sound, texture, nature and quality of space.



Acknowledgement

This project outcome required a lot of guidance and advice from many fields of profession. The author would like to acknowledge every person who influenced and was involved with this thesis. The author would also like to thank all of following people and organizations that have been such great support with this thesis.

I would like to thank my thesis Advisor, A.Veera Leelapattanaputi who has been together with me for one whole year and providing me such a great support, and guidance throughout every part of this thesis which gives me a lot of knowledge and advice. He also gave me the new perspective to think beyond what people perceive.

I would like to thank all of these organizations that kindly give the research and specific information about the autism which was required for this thesis. These are Yuwaprasart hospital, Northlight center and Autistic Thai Foundation. Also The Rainbow Room Foundation need to thank A.Apikul Komesopa who kindly gave the support for my thesis.

I would like to extend my heartiest gratitude to all teachers, who take my classes and gave the advice and clarified my project in the right way and was patient enough to answer all my doubts and queries in order to complete the project.

Finally, the author would highly thank all of my friends and my family for good help and encouragement. They help me a lot during every part of this thesis process and successfully completing my final production.

Table of contents

| | Page |
|--|------|
| Acknowledgement | i |
| List of Figure | iv |
| List of tables | vi |
| Chapter 1: Thesis Introduction | |
| 1.1 Background of Interest | 1 |
| 1.2 Issue of Interest | 2 |
| 1.3 Objective of Proposal | 3 |
| 1.4 Hypothesis of Proposal | 3 |
| 1.5 Definition of Terms | 3 |
| 1.6 Thesis Statement | 4 |
| 1.7 Research Outline | 4 |
| Chapter 2: Literature Review | |
| 2.1 General concepts about autism | 4 |
| 2.2 Intervention | 6 |
| 2.3 Sensory Sensitivity | 7 |
| 2.4 Design criteria for autism by Segado Vasquez | 8 |
| 2.5 The impact of building design on children with autism by Teresa Whitehurst | 9 |
| 2.6 The simple principles of autism-friendly environment | 11 |
| 2.7 The autism ASPECTSSTM design index by Magda Mostafa | 12 |
| 2.8 Case Study | 13 |
| 2.9 Conclusion | 17 |
| Chapter 3: Contextual Proposition | |
| 3.1. District Selection Criteria | 18 |
| 3.2. Hospital Selection | 19 |
| 3.3 Site Selection | 20 |
| Chapter 4: Potential Design Response | |
| 4.1 Design Scope | 26 |
| 4.2 Program Analysis | 26 |
| 4.3 User Programing | 27 |
| 4.4 Activities and Space | 29 |
| 4.5 Space Summary | 29 |

Chapter 5: Building Technology

| | |
|------------------------|----|
| 5.1 Building Structure | 33 |
| 5.2 Finishing | 34 |
| 5.3 Acoustic design | 35 |
| 5.4 Building System | 36 |

Chapter 6: Design Schematic

| | |
|--------------------------|----|
| 6.1 Concept Development | 37 |
| 6.2 Design Development | 39 |
| 6.3 Schematic design | 40 |
| 6.4 Schematic design 1 | 42 |
| 6.5 Schematic design 2 | 43 |
| 6.6 Schematic design 3 | 44 |
| 6.7 Design Development 1 | 45 |
| 6.8 Design Development 2 | 49 |
| 6.2 Design Development 3 | 53 |

Chapter 7: Design Summary

| | |
|------------------------------|----|
| 7.1 Zoning Diagram | 57 |
| 7.2 Functional Diagram | 58 |
| 7.3 Façade design | 58 |
| 7.4 Ventilation and lighting | 60 |
| 7.5 Layout | 61 |
| 7.6 Plan | 62 |
| 7.4 Elevation | 64 |
| 7.5 Section | 65 |
| 7.6 Perspective | 66 |
| 7.7 Model | 70 |

Chapter 8: Thesis Conclusion

| | |
|--------------|----|
| Bibliography | 74 |
|--------------|----|

List of Figures

| | Page |
|---|------|
| Figure 2.1: Autism Behavior | 5 |
| Figure 2.2: The Pyramid of learning | 8 |
| Figure 2.3: Plan of Sunfield's Rowan and Oak House | 10 |
| Figure 2.4: Curve wall | 10 |
| Figure 2.5: Soft lighting | 11 |
| Figure 2.6: Entry-level plan and Sensory Zoning | 13 |
| Figure 2.7: The exterior of the Oakwood Home | 14 |
| Figure 2.8: The interior of the Oakwood Home | 14 |
| Figure 2.9: Green Sweetwater Spectrum Housing | 15 |
| Figure 2.10: Green Sweetwater Spectrum Housing | 15 |
| Figure 2.11: Australia Northern School for Autism | 16 |
| Figure 2.12: The interior of Australia Northern School for Autism | 16 |
| Figure 3.1: District Selection Criteria | 18 |
| Figure 3.2: Hospital that is service for Autism | 19 |
| Figure 3.3: Statistic of Autism in Yuwaprasart Hospital | 20 |
| Figure 3.4: Site Selection | 20 |
| Figure 3.5: Regulation | 21 |
| Figure 3.5: Possibility of Site | 21 |
| Figure 3.6: Site | 23 |
| Figure 3.7: West direction of the site | 23 |
| Figure 3.8: East direction of the site | 23 |
| Figure 3.9: Approach | 23 |
| Figure 3.10: In front of the site | 23 |
| Figure 3.11: In front of the site | 24 |
| Figure 3.12: Role house on the west side | 24 |
| Figure 3.13: Gas station on the east side | 24 |
| Figure 3.14: Transportation | 24 |
| Figure 4.1: Design Scope | 26 |
| Figure 4.2: Program analysis | 26 |
| Figure 4.3: Function in each program | 27 |
| Figure 4.4: User analysis | 27 |
| Figure 4.5: Organization chart | 28 |
| Figure 4.6: The schedule of the project | 28 |
| Figure 4.7: Study process | 29 |
| Figure 4.8: Pie chart show the percentage of each zone | 32 |
| Figure 5.1: Passive design | 33 |

| | Page |
|---|------|
| Figure 5.2: Gable roof structure | 33 |
| Figure 5.3: Wall section | 34 |
| Figure 5.4: Finishing of material | 34 |
| Figure 5.5: Material use in the project | 35 |
| Figure 5.6: Sound Absorber and Sound Diffuser | 35 |
| Figure 5.7: Building system | 36 |
| Figure 6.1: Autism spectrum disorders | 37 |
| Figure 6.2: Hyper and Hypo Sensitive | 38 |
| Figure 6.3: Ten principle of autism design | 39 |
| Figure 6.4: Learning space | 39 |
| Figure 6.5: Benefit of courtyard | 40 |
| Figure 6.6: Courtyard function | 40 |
| Figure 6.7: Design criteria | 41 |
| Figure 6.8: Zoning diagram | 41 |
| Figure 6.9: Orientation diagram | 42 |
| Figure 6.10: Schematic design 1 | 42 |
| Figure 6.11: Orientation diagram 2 | 43 |
| Figure 6.12: Schematic design 2 | 43 |
| Figure 6.13: Orientation diagram 3 | 44 |
| Figure 6.14: Schematic design 3 | 45 |
| Figure 6.15: First floor plan | 45 |
| Figure 6.16: Second floor plan | 44 |
| Figure 6.17: Third floor plan | 46 |
| Figure 6.18: Elevation | 46 |
| Figure 6.19: Section | 47 |
| Figure 6.20: Perspective | 48 |
| Figure 6.21: First floor plan | 49 |
| Figure 6.22: Second floor plan | 49 |
| Figure 6.23: Third floor plan | 50 |
| Figure 6.24: Basement plan | 50 |
| Figure 6.25: Elevation | 51 |
| Figure 6.26: Section | 51 |
| Figure 6.27: Sky view | 52 |
| Figure 6.28: Perspective | 52 |
| Figure 6.29: Ground floor plan | 53 |
| Figure 6.30: Second floor plan | 53 |
| Figure 6.31: Third floor plan | 54 |
| Figure 6.32: Basement plan | 54 |

| | Page |
|---|------|
| Figure 6.33: Elevation | 55 |
| Figure 6.34: Section | 55 |
| Figure 6.35: Sky view | 55 |
| Figure 6.36: Perspective | 56 |
| Figure 7.1: Zoning diagram 1 | 57 |
| Figure 7.2: Zoning diagram 2 | 57 |
| Figure 7.3: Functional diagram | 58 |
| Figure 7.4: Façade diagram 1 | 59 |
| Figure 7.2: Façade diagram 2 | 59 |
| Figure 7.5: Façade diagram 3 | 59 |
| Figure 7.6: Ventilation and lighting 1 | 60 |
| Figure 7.7: Ventilation and lighting 2 | 60 |
| Figure 7.8: Layout | 61 |
| Figure 7.9: First floor plan | 62 |
| Figure 7.10: Second floor plan | 62 |
| Figure 7.11: Third floor plan | 63 |
| Figure 7.12: Basement plan | 63 |
| Figure 7.13: Elevation | 64 |
| Figure 7.14: Section | 65 |
| Figure 7.15: Main approach | 66 |
| Figure 7.16: Basement plan | 66 |
| Figure 7.17: Sensory garden and Main playground | 66 |
| Figure 7.18: Activity area | 67 |
| Figure 7.19: Relaxing area | 67 |
| Figure 7.20: Sensory maze | 67 |
| Figure 7.21: Reception area | 68 |
| Figure 7.22: Roof garden | 68 |
| Figure 7.23: Art classroom | 69 |
| Figure 7.24: School corridor | 69 |
| Figure 7.25: Library area | 69 |
| Figure 7.26: Entrance | 70 |
| Figure 7.27: middle courtyard | 70 |
| Figure 7.28: Roof garden | 71 |
| Figure 7.29: Back side of the building | 71 |
| Figure 7.30: Courtyard | 72 |
| Figure 7.31: Skyview | 72 |

List of Table

| | Page |
|---|------|
| Table 2.1: The disability of Sensory | 6 |
| Table 2.2: Table show the example of the activity of sensory integration in each sense with the relationship with architectural element | 8 |
| Table 3.1: Site evaluation | 22 |
| Table 4.1: Table show the area requirement for each function | 29 |
| Table 4.2: Table show area requirement for each zone | 32 |



Chapter 1: Thesis Introduction

1.1 Background of Interest

In 2014 the number of autistic prevalence in Thailand is more likely to be increased. The research of Ministry of Public Health in Thailand said that “The children at the age of 0-18 in Thailand around 188,860 are autistic and only 15% of them are receiving treatment, in spite of the autistic able to be easily cured if start from the first three years.”¹

Autism is one of the disabilities that have problem with brain development. It cannot be clearly identified from the other diseases because the autism looks similar to normal people but they have problem in development of the behavior, communication and social interaction. The children with autism have difficulty in learning and their daily life depends on the others. They need to stimulate and develop their senses closely since they were young. The faster you know that your kid is autistic the better it is to develop your child easily.

The autism is not a disease that can be treated by medicine but somehow it can be treated by stimulating their senses as soon as possible continuously and in daily life, so that when they grow up they can help themselves and live with social environment normally, but if they are neglected, when they grow up there will be no chance for them to be normal.

So, they should have specialized schools for them to prepare the basic foundation for autism and improve the social ability of them and help them not to feel different from the normal children before they go out and live with the others in the society.

This thesis will focus on the study of the architectural design for autism, in order to present the space and environment in autism school that is suitable for sensory development. Therefore, this study will be used for educating of the increasing number of people with autism in the future.

¹ Thairath, “Autism Spectrum Disorder,” Happy Home Academy, Accessed August 2016, <https://www.thairath.co.th/content/336539>

1.2 Issue of Interest

Autism disability is involved with the sensory directly. The perception of the autism can separate in two categories which are hyperactive and hypoactive, which they have to balance their sensitivity. Calm space and motivated space should be concerned. Architecture is a straight way effect to people's feelings and senses. So, architecture for autism should provide special design and make the environment stimulate their senses.

The issues of interest are to study the spatial environment qualities required for autistic children's learning and quality of life. Provide program and function that have many kinds of therapy, and improve the children's sense by use architectural element.

- How architecture can interact with the autism personally in terms of architectural design that can integrate them with the society.

- The design of both exterior and interior of the environment arrangement based on the theory of lighting, coloring, space, material, and elements of architecture that is proper for autism.

- The needs of the function and facility that are required for autistic people.

- The various stimulations activity that affect both autistic people and architectural design.

1.3 Objective of Proposal

- To be the treatment center that gives the sensory development to people with autism in every age and gender by using sensory in architecture which is light, sound, color and texture.

- To provide the occupation training for adult with autism, so that they can live with normal people in the society.

- To create the parent and teacher community in order to share their experiences and give training for them to deal with people with autism properly.

- To extend the awareness about the condition of autism by create the research center in order to increase the knowledge about autism for society

1.4 Hypothesis of Proposal

- Architecture can improve and practice the sensory of people with autism by using light, sound, color and texture to help children development.

- Architecture can provide activities that make people with autism and normal people interact with each other in order to improve the social skill.

-The integration of internal space and external space can promote the learning experience for children with autism

1.5 Definition of Term

-Autism is a developmental disorder of children in which they have problems with the development skill in social interaction and communication within the proper age. The behavior pattern is repetitive activities and interests. These problems happen when they were young and it affects the limitation of daily life activities.² (Mr. Thaweesak sirirutraykha, 2549)

1.6 Thesis statement

"The autism education and treatment center is the place that provides education, rehabilitation, therapy service and community for exchanging experience of autism. The architecture suits for autism by focusing on the development of sensory by using the architectural elements which are light color sound and texture."

1.7 Research Outline

-Study autistic daily life in order to find the problem and collect the data to achieve the solution.

-Analyze and collect data such as case studies of the autism school and the health therapy center, internationally and locally, in order to understand the concept and space requirement.

-Literature review on space for autism, healing environment, space for learning, and senses in architecture or theories on these topic from the existing architecture or the conceptual building.

²Taveesak Siriratreaka, "Autism Spectrum Disorder," Happy Home Academy, Accessed August 2016, <http://www.happyhomeclinic.com/au02-autism.htm>

Chapter 2: Literature Review

This chapter is going to review the theories and research according to the topic of the autism and architecture design for autism by the Child and Adolescent Psychiatrists, architects and other professions in related field. All of the material will be about the specific information about autism and architectural design that is required and suitable for people with autism.

2.1 General concepts about autism

Autism is a developmental disorder of children which they have problems with the development skills in social interaction and communication within the proper age. The behavior pattern is repetitive activities and interests. These problems happen when they were young and it affects the limitation of daily life activities.³ (Mr. Thaweesak sirirutraykha, 2549)

Autistic children or the Autism Spectrum disorder, nowadays who take the treatment can develop further than the person who does not take the treatment. Each one will have a different symptom and has different learning ability. The serious case is that they cannot communicate at all, on the other hand they are genius.⁴

Autism Spectrum disorder covers many conditions of the development. There are three main conditions that can be commonly found in autistic people, which are

2.1.1 Communication and Language: They have difficulty in understanding and interpreting spoken language. Also, difficulty in facial expressions, tone and some may have restrictions on speech

2.1.2 Social interaction: They have difficulty in making relationships with other people around them and isolate themselves into their world. They may not understand the rule of society and only focus on their interest.

2.1.3 Play and repetitive behavior: They are difficult in adapting to the change of daily life. They may behave not properly such as shaking hands and head, tip toe while walking, cannot stay still, and making strange sounds and gestures.

³ Taveesak Siriratreaka, "Autism Spectrum Disorder," Happy Home Academy, Accessed August 2016, <http://www.happyhomeclinic.com/au02-autism.htm>

⁴ Anonymous, "Autistic People have Their own world", Mor chao Baan Magazeen issue 268, August 2001, Accessed August 2016, <https://www.doctor.or.th/article/detail/3121>

AUTISM

Persons with autism may possess the following characteristics in various combinations and in varying degrees of severity.



Figure 2.1: Autism Behavior

Image source: <http://onlineborders.org.uk/community/asdborders/some-facts-about-asd>

2.1.4 Sensory disability: Many people on the autism spectrum have difficulty processing everyday sensory information. Any of the senses may be over- or under-sensitive, or both, at different times. These sensory differences can affect behavior, and can have a profound effect on a person's life.

Normally there are mainly 5 senses which are sight, sound, touch, smell, and taste but there is also body awareness or proprioceptive and balance or vestibular. From the problem of the brain of autism, it makes them receive the senses differently from the normal people. Some of them are very sensitive to the senses, we call it oversensitive or hypersensitive but some of them are under sensitive or hyposensitive. This can occur in only one sense or many senses. These problems are an impact on perceptions of the autistic people to environment and interaction with surrounding.

Moreover, this sensory problem can affect their behavior such as when they hear loud noise children will close their ear and some people cry or run away. If the child is sensitive to touch they do not want people to touch them and cannot wear soft or rough clothes. On another hand who have under sensitive touch they might feel no pain and like to harm them self⁵

⁵Pratana Pintuwat, "Occupational therapy for special need", IQ kid online, Accessed August 2016, <http://www.iqkidonline.com/2010/08/31/autism-activity-therapy-autistic/>

Table 2.1: The disability of Sensory








| 7 SENSES | HYPER | HYPO |
|---|--|--|
|  | RESPONSIVE TO LIGHT CONCENTRATED IN DETAIL DIZZY | CANNOT SEPARATE COLOR BLUR VISION |
|  | RESPONSIVE TO TOUCH EASY PAIN | VIOLENCE PLAY LIKE TO HUG |
|  | RESPONSIVE TO SMELL | CANNOT SMELL |
|  | HEAR EVERY SOUND CANNOT BE SEPARATE SOUND | HEAR LESS NOISE LOVE CROWD AND LOUD |
|  | DETECT LOT OF TASTE SELECTIVE EATING | LESS TASTE LIKE SPICY DISH |
|  | FULLBODY MOVEMENT UNSKILL IN MUSCLE | CANNOT PITCH THEMSELVES WITH SURROUNDINGS |
|  | CANNOT MOVE FAST GRAVITATIONAL INSECURE | LIKE TO SWINGS AND FAST MOVEMENT |

Table source: <http://www.7senses.org.au/what-are-the-7-senses/>

2.2 Intervention

The treatment for autism spectrum disorder needs the multidisciplinary team approach which includes of Child and Adolescent Psychiatrist, Psychologist, Child Psychiatric Nurse, Speech Therapist, Occupational Therapist, Special Educator, Social worker,etc. The most important things are how the family takes the advantage of those therapies to take care of these children regularly.

There is no absolute or best way to cure autism but it needs the integration of the intervention by finding the most suitable way for each person. The research from Thaweesak sirirutraykha said that the guideline of the variety of the treatment can be concluded in to 10 guideline⁶

1. Family Supporting

2. Promote Strength ability

3. Promote Development

4. Behavior Change

5. Therapy Activity
6. Improve Speech

7. Improve Social Skills

8. Educational rehabilitation

9. Vocational Rehabilitation

10. Medicine

2.2.1 Early intervention program

Early intervention is a system of coordinated service that promote the child’s age appropriate growth and development and supports families during the critical early years.It also prepares children before transit to educational service such as school or inclusive school. It is a program that helps develop the children development in the early years to prepare and

⁶Taveesak Siriratreaka,“Intervention” Happy Home Academy, Accessed August 2016, <http://www.happyhomeclinic.com/au02-autism.htm>

support the risk of the disability of the children as soon as possible. They are focusing on giving the knowledge to the parent and family, and also provides the suggestion from the specialist to let the children get the improvement step by step to be normal.⁷

2.2.2 Floor time

Floor time is a special time for family involving with development of children in the environment of warm and fun. by letting Parent spent the time with them to stimulate development of children by using the activity that they have interest in. The children will be the leader of the activity and parent will come and create the situation for them to let them have conversation and learn to think and response.⁸

2.3 Sensory integration

"Sensory integration theory proposes that sensory integration is a neurobiological process that organizes sensation from one's own body and from the environment and makes it possible to use the body effectively within the environment. The spatial and temporal aspects of inputs from different sensory modalities are interpreted, associated, and unified. Sensory integration is information processing." (Dr.A.Jean Ayres, 1979)

The element of sensory is very important for promoting all kinds of development to be able to take academic learning which they have to combine all of senses together and use it at the same time. It consists of 7 senses that are needed for taking academic learning, which are vestibular, proprioception, texture, olfactory, visual, auditory, and gustatory.⁹

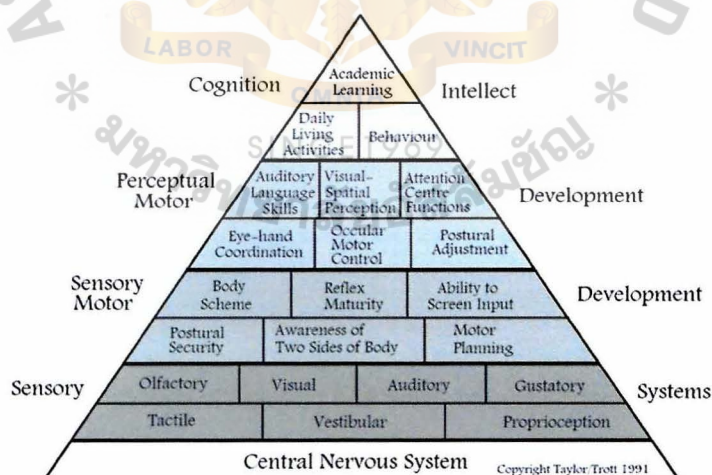


Figure 2.2: The Pyramid of learning

Image source: Williams & Shellenberger, 1-4

⁷ Benja Chonthanont, "Early Intervention : EI", Special Education Center of Lamphun, Accessed October 2016, <http://www.lpnspcial.com/articles/42167088/index.php>

⁸ Kingkao Pajari, "DIR/Floortime", Floor time Thailand, Accessed September 2016, <http://www.floortimethailand.com/images/info/interesting%20ari/SunAugust2011-12-6-4-DIR.pdf>

⁹ Panadda Wongjanta, "Sensory integration in people with autism", Piboon Prachasan School, Access September 2016, <http://www.pbps.ac.th/special/e-tap530426/01Sensory%20integration-ETAP.pdf>

Sensory integration is one of the therapies that help improve the sensory disability of autistic people by providing the activity that stimulate each sense to work properly. There will be active activity for those who are hyposensitive and calm down activity for those who are hyper sensitive.

2.3.1 The guild line of sensory integration for autism

The guild line of sensory integration for autism can be separated into each sense and it can be used depending on each symptom of autistic people, which they can know from the observation of the behavior of the patient. Such as children that like hurt them self or knocking things, shook their hand. It shows that these children have problem with their proprioceptive system.

Table 2.2: Table show the example of the activity of sensory integration in each sense with the relationship with architectural element








| SENSES | ACTIVITY | ARCHITECTURE ELEMENT | SENSES | ACTIVITY | ARCHITECTURE ELEMENT |
|---|--|--|---|--|---|
|  | <ul style="list-style-type: none"> Finding things Comparing objects Matching objects Separating overlapping objects Playing with optical illusion | <ul style="list-style-type: none"> COLOUR LIGHT REFLECTION MATERIAL |  | <ul style="list-style-type: none"> Swinging, spinning Active movements like jumping, hopscotch, rolling downhill | <ul style="list-style-type: none"> SLOPE STEP BRIDGE SWING PLAYGROUND |
|  | <ul style="list-style-type: none"> Brushing over the skin with different textures/brushes Creative wall with different surfaces made of sandpaper, wool, cotton wool balls, dried peas Playing with play dough, mud, clay, water, and sand Rolling over grass, snow, sand, | <ul style="list-style-type: none"> TEXTURE VARIETY OF MATERIAL SENSORY FLOOR (GRASS, SAND, ROCK,) |  | <ul style="list-style-type: none"> Clap our hands together with our eyes closed, Write with a pencil and apply with correct pressure, Navigate through a narrow space. Judge distances so we don't run into things | <ul style="list-style-type: none"> MOVEABLE FURNITURE/WALL TAMPORINE CLIMBING YOGABALL |
|  | <ul style="list-style-type: none"> An echo-box to walk into and talk A walk-in quiet box / room Headphones (with/without any music, noises) Musical instruments like drums, xylophones, gongs, triangles etc. Flow of water | <ul style="list-style-type: none"> WATER FALL AIRCONDITION MUSIC ROOM ACOUSTIC SIZE OF ROOM MATERIAL THAT CAN MAKE SOUND |  | <ul style="list-style-type: none"> Smell tubes (insert herbs, essential oil, flowers) Smell boxes. They contain different smells are used blind-folded Walk through Sensory Gardens | <ul style="list-style-type: none"> THE LOCATION OF THE WC, KITCHEN, GARBAGE VENTILATION (SMELL/NON-SMELL) SENSORY GARDEN |
| | | |  | <ul style="list-style-type: none"> Tastes: sweet, bitter, sour, salty and umami. | |

Table source: ¹ Panadda Wongjanta, "Sensory integration in people with autism",

2.4 Design criteria for autism by Segado Vasquez

Because of the difficulty of learning and being of autistic people, the design of the architecture should be suit for them in order to make them comfortable to stay and study. From the research of Prof.Segado Vasquez in the book name "Recent Advances in Autism Spectrum Disorders - Volume II" talk about the design criteria for autism that can be concluded into¹⁰

Imagination: People with autism have a limitation of imagination, so they have difficulty or nervousness when changing activity or when they move from one space to

¹⁰ Prof. Segado Segado Vasquez, "Recent Advances in Autism Spectrum Disorders - Volume II", CC BY 3.0 license March 6, 2013.

another. In order to help them the architecture should look for a clear structure in the building, as well as providing elements that give it certain order and unity, in such a way that the building can be easy to read and predict.

Communication: The difficulty in verbal and non-verbal communication, they need the visual support for communicating and pictographs or photographs of objects, people, etc. are usually used. The building environment can use color coding, for example, of different elements that may also help to improve communication

Social interaction: It is necessary to provide the space to allow and encourage social interaction. The space should not be too large nor too small, in order to interact with each other more closely, and space need to be wide open spaces. So, that is the interaction take place without getting too close.

Sensory difficulties: Because of the sensitivity of the senses of the people with autism, the architecture should be careful when design with color (not too bright and not too dark), texture or pattern, acoustic properties, lighting should use soft light and avoid the fluorescent strip light. Multi-sensory stimulation rooms allow people with autism to adjust their sensory perceptions and also reduce anxiety at specific moments

Behavior and safety: The behavior problem also happens many times in people with autism, and may lead to aggressive conduct. So, the design should be concern in material, railing, electrical device, bathroom fitting, tile or the element that potentially dangers.

In conclusion, the architectural design for autism should respond to the disability of people with autism by creating the environment that encourage them to develop each disability and support the facility need for them.

2.5 The impact of building design on children with autism by Teresa Whitehurst

The research of Teresa Whitehurst, the development officer at the Sunfield School, a residential building for autism in England, said about the requirement and design element for each space that suit and is proper for people with autism can be concluded into these following details.¹¹

-Circulation space: Make circulation spaces which make a good useable space. Create a simple and clearly understood geography not force them to be close to each other, let children find their way in their school. Provide areas for play and seating. And to prevent them from running, use the color in wall and floor to help them navigate.

¹¹Teresa Whitehurst, "The impact of building design on children with autistic spectrum disorders" Good Autism Practice, Vol. 7 issue. 1, May 2006

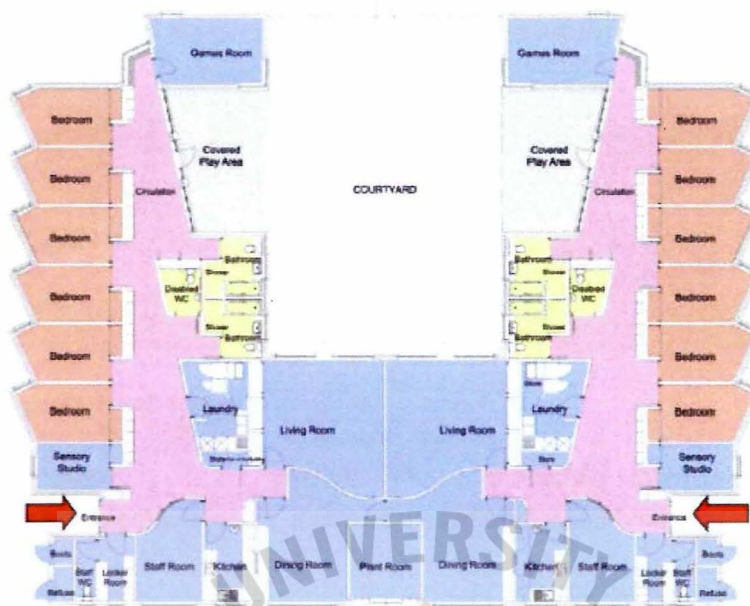


Figure 2.3: Plan of Sunfield's Rowan and Oak House

-Curved walls: Not only making environment safer but helping children to move easily through various area of the building.



Figure 2.4: Curve wall

-A range of communal areas: Provide a different type of the common room to suit with different types of activity such as lounge, dining room, activity room. The room should be at the end of the circulation space and get the excellent view of court yard.

-Outdoor space: Create an enclosed courtyard incorporation covered areas. This provides a safe outdoor environment for the children and locate at the center of the building to let the children play independently while still being observed by staff, and provide the canopies which help continuity of the space and can be shelter for playing even when raining.

-High level window: To prevent the risk of the children climbing out of the window, and give the ventilation and sunlight into the room by not disturbing the children in side of the room

-Soft lighting: Use the soft light or indirect light, avoid using fluorescent light because it can disturb the people who are hypersensitive to non-flickering compact lighting



Figure 2.5: Soft lighting

-Material: Material should be carefully chosen to maintain warmth and reduce noise also easy to clean. It should avoid the reflection material.

-Color schemes: Avoid the strong color and pattern. Gray has been widely used as this has been shown to be a neutral and non-reflective color which provokes neither a positive nor negative reaction.

2.6 The simple principles of autism-friendly environment by Simon Humphreys

Simon Humphreys is a qualified architect who has designed a number of buildings for people with autism, including schools, residential units and day care facilities. He also has an older brother with autism. He suggests that buildings for autism should be follow these simple principle¹²

-A sense of calm and order: People with autism cannot separate the noise, shape and space easily. The complexity of the building can cause stress and discomfort. The calm, clear, and order sense of environment can help them reduce tension.

-Good levels of natural light and ventilation: The level of the light can create different environment for people with autism. The high even level can help to assist in the visual understanding and feel like they are close to nature. Also the ventilation can make balance healthier environment and it can reduce frustration and anxiety.

-Reduction of detail: (complex detail may be too visually stimulating for people with autism) The small detail can distract people with autism and sometime can be obsessed. If the design of a building reduces the need for complex visual detail it will be more restful.

¹²Humphreys, Simon. "AUTISM AND ARCHITECTURE", Autism London, Accessed November 2016, http://www.autismlondon.org.uk/pdf-files/bulletin_feb-mar_2005.pdf

-Good proportion: The Golden Proportion from the Greek development can be possible to give pleasing to people eyes and also benefit to people with autism. From this pleasure of proportion and it may manifest in their behavior.

-Proxemics: (the amount of space that people feel it necessary to set between themselves) People with autism need more space to move around. And the building should be as large as possible to reduce the sense of unrest for them.

-Containment: (ensuring that people with autism are safe and secure in their environment) it is necessary to ensure that people with autism are safe and secure in their environment. They should have the secure boundaries. They are subtle, natural but securing it will allow possibilities for the person to wander at ease and also allow staff and carers to be more relaxed when this happens. Freedom of movement can be extremely liberating.

-Easily managed, durable materials: They can be extremely demanding on building. The building detail should be durable. Therefore it is important that the specification of materials reflect this without resorting to an institutionalized feel. It is perfectly possible to detail a building using a limited pallet of materials to meet this demanding need.

-Good observation: The space should be able to observe the movement of the people with autism. And the design should be possible without being obvious, which will help their wellbeing and this can only benefit the person with autism.

-Good quality acoustic: People with autism are extremely sensitive to noise and they cannot differentiate the sound and noise. It is possible to design a space that has good sound qualities through good proportion as well as detail materials that assist in good acoustic

2.7 The autism ASPECTSSTM design index by Magda Mostafa

Dr. magda mostafa, associate professor in the department of construction and architectural engineering at the American university in Cairo, created seven aspects for autism design index to be tool for design architectural environments for people with autism. Which is¹³

1. **Acoustics** are the most important part of sensory that would affect the environment and behavior. Sense of the calm will create well-being feeling toward residents and staff. The choice of materials brings the look and warmth of the building and it affects senses in the building. This calls for the reduction of the internal and external noise sources such as cavity walls, soundproofing and sound absorbent materials. And use Flotex design, or durable and robust product for floor. This could make activities higher focus, according to the acoustic theory because of less background noise.

¹³ Mostafa, Magda. "ARCHITECTURE FOR AUTISM: Autism ASPECTSS™ in School Design", archnet, Accessed Jan 2017, <http://archnet.org/system/publications/contents/9101/original/DTP101584.pdf?1394201760>

2. **Spatial Sequencing** is to organize the space and daily routine of the user with the smooth transitions from one space to another space and organize it in a logical order based on typical schedule use of the spaces.

3. **Escape Space** is to provide a breathing space for the autistic from the overstimulation from surrounding or their environment. It should be intimate in scale and can range from the completely physically and visually enclosed to the subtly defined.

4. **Compartmentalization** define and limit the sensory environment of each activity, organize the enclosure using walls and partitions to the moderate enclosure using carefully placed furniture and color, pattern and finishing material to define each space

5. **Transition Spaces** allows for the sensory shift from one space to another space or activities with avoiding stimulation and abrupt of changes in function.

6. **Sensory Zoning** grouping in 2 criteria, High-stimulus and low stimulus, for autism. Organize according to their sensory quality rather than typical architecture of function.

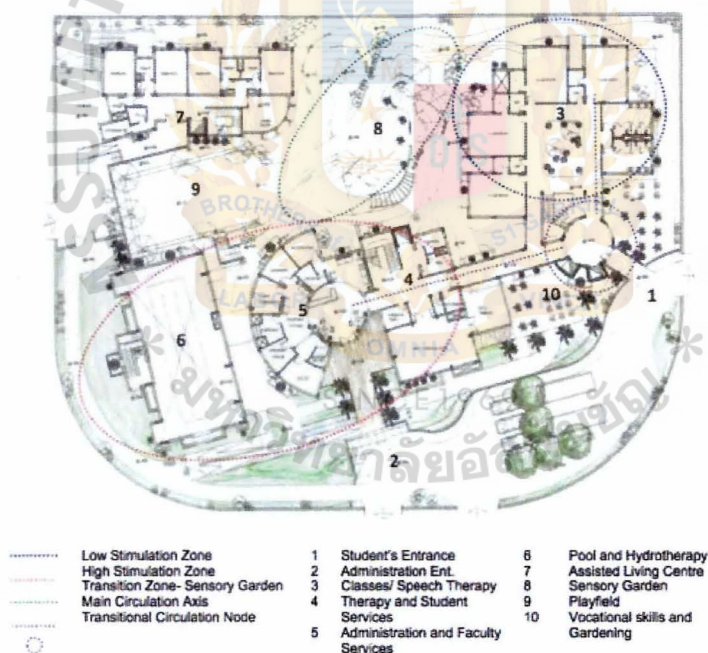


Figure 2.6: Entry-level plan and Sensory Zoning

7. **Safety** is the most concern for children with autism, the safety considerations should be taken at all part of the building system such as material choices, surfaces, bathroom fittings, electrical devices, metal door fittings, railings, exterior carpentry, tiles, protective barriers, furniture, fixtures etc.

2.8 Case Study

2.7.1 Case Study 1: Oakwood Home for Adults with Autism



Figure 2.7: The exterior of the Oakwood Home

ARCHITECT: Medical Architecture

The design of Oakwood emphasizes its inward-looking aspect: Vertical timber cladding wraps protectively around the external facade and allows the building to sit comfortably in its woodland setting. The interior spaces open onto a light but secure central courtyard, providing natural daylight and views into soft landscaping.



Figure 2.8: The interior of the Oakwood Home

The design aims to provide reassuring features with carefully graduated territory. Ceiling heights are varied to enhance the sense of personal space and delineate privacy. Wide thresholds and curved walls are used to soften the experience of joining the interpersonal realm. Seating in corridors overlooking the courtyard garden provide controlled stimulus and moderate the features of a therapeutic environment. The interior design uses wood surfaces for warmth and familiarity, while acoustic finishes dampen high-frequency noise.¹⁴

¹⁴ "Oakwood Home for Adults with Autism", Medical Architecture, Accessed November 2016, http://www.medicalarchitecture.com/projects/oakwood_adult_autism_unit/

Character of this project

This project focus mainly on the inward looking inside of the project and to create the sense of privacy and secure and use the soft tone color of the material which is wood to make it feel comfortable to people with autism. Moreover the lighting was concerned; indirect light was used in the every part of the project.

2.7.2 Case Study 2: Green Sweetwater Spectrum Housing



Figure 2.9: Green Sweetwater Spectrum Housing

ARCHITECT: Leddy Maytum Stacy

Sweetwater Spectrum is a new housing development designed expressly for autistic adults as a safe home that can offer them a purpose and develop more independence. Inside the compound there are four 3,250 sqft. four-bedroom homes that include a common area as well as a bedroom and bathroom for each resident. Residents have access to a greater community center, therapy pool & spa, a fitness room, an orchard, and organic gardens.

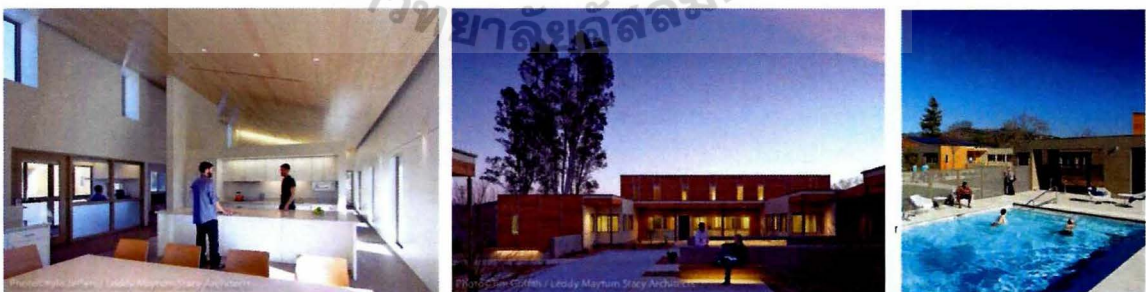


Figure 2.10: Green Sweetwater Spectrum Housing

The buildings' design makes use of natural ventilation, day lighting, high R-value insulation in walls and roofs, high-performance insulated windows, low-reflective "cool" roofs, solar tube

skylights at interior halls, solar shading, energy efficient lighting, appliances and mechanical systems, induction cook tops, and a building management system.¹⁵

Character of this project

This project act as the community center for the autism that prove the therapy and fitness for autism and provide an organic garden to be and activity for autism. Moreover they concern with the daylight and mechanical systems for the whole project.

2.7.3 Case Study 3: Australia Northern School for Autism



Figure 2.11: Australia Northern School for Autism

ARCHITECT: Paul Hede

This school is designed around the student, their needs and the schools pedagogy. It will guide the design of adult environments for students when they move into community. Reuse a former the school site and give small learning environments with outside access for calming and separated play.



Figure 2.12: The interior of Australia Northern School for Autism

Internally classrooms have limited windows aimed at the outside, limited internal distractions and subdued earthy color. The design reflects a unique brief and creates a living building that

¹⁵ [Bridgette Meinhold](http://inhabitat.com/green-sweetwater-spectrum-housing-helps-adults-with-autism-gain-their-independence/), "Green Sweetwater Spectrum Housing Helps Adults with Autism Gain Independence", Inhabitat, Accessed November 2016 <http://inhabitat.com/green-sweetwater-spectrum-housing-helps-adults-with-autism-gain-their-independence/>

breaks down for student into smaller, calmer, separated zones, dynamic interplay between its external spaces and internal arteries.¹⁶

Character of this project

The project is concerning the autism friendly design which is minimum distraction, use subdued color, and make student easy understand the zoning. The project is clearly separate the student in each age and well organize by separate the learning and playing space clearly

2.9 Conclusion

From all of the material found that each of people with autism is have different disability and different symptoms. The treatment of each person is very delicate and sensitive. The surrounding environment affect directly to the daily life activity of people with autism. So, the architecture should be able to control the environment to make their life easier, and it should encourage them to practice and develop their social skill by having the interaction of the space. Moreover the facility and safety should be concern in every detail also with the quality of space for all of the staffs who can help better result for treatment.



¹⁶Hede architect, "Australia Northern School for Autism", Accessed November 2016, <http://www.hedearchitects.com.au/Northern-School-for-Autism/>

Chapter 3: Contextual Proposition

3.1. District Selection Criteria

There is six criteria for district selection



Figure 3.1: District Selection Criteria

- (1) Autism users
 - Considering the number of the autism user from the hospital that already serve people with autism. Also this project needs the support from the hospital to easily get service from specialist and doctor.
- (2) Facility
 - Determine about the infrastructure system such as electrical system, water supplying system, etc.
- (3) Site surrounding
 - Considering about the proper environment around the site that is suitable for the people with autism. The project focus on the learning and teaching space which it need the quiet and safety location. People with autism need the quiet place away from the city and disturbing area which will distract them.
- (4) Local community
 - The main user of project will focus on the local people
- (5) Accessibility
 - The site should be easy and not complicated to access and avoid the heavy traffic in order to prevent the air pollution and noise pollution.
 - Link to the hospital, the user can be able to walk from the hospital to the project.
- (6) Site
 - The size of the site should be appropriate for the total are of the project. Because the project contain all age of the user, the shape of the site should be easily to manage in order to separate each user not to disturb each other.

3.2 Hospital Selection

3.2.1 Related Facility around Bangkok

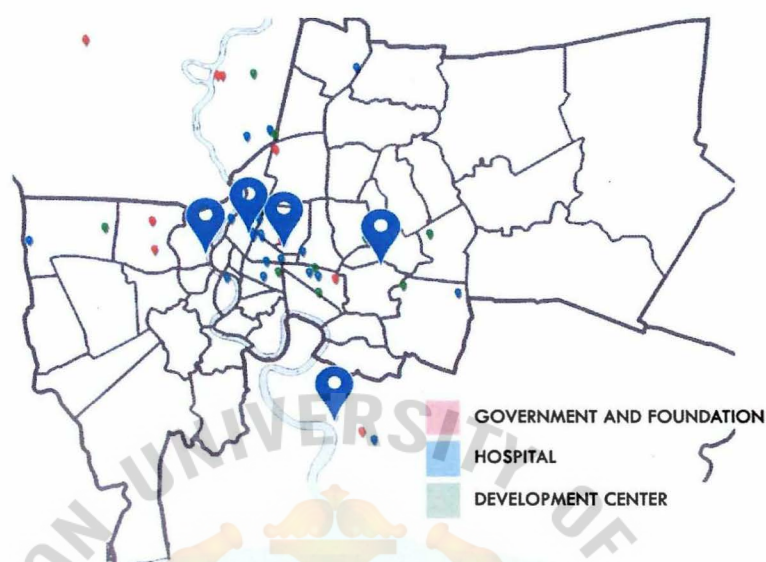


Figure 3.2: Hospital that is service for Autism
image source

1. Ramathibodi hospital
270 Rama IV road Toong Payathai Rachathewi Bangkok 10400 Phone: 02 201 1000
2. Siriraj Hospital
2 Thanon Wang Lang, Bangkok Noi, Bangkok 10700 Phone: 02 419 7000
3. Rachanukul Hospital
Din Daeng Road, Din Daeng, Khet Din Daeng, Bangkok, 10400 Phone: 02 245 4601
4. Samitivej Srinakarin
488 Srinakarin Rd Suan Luang, Bangkok 10250 Phone: 02 022 2222
5. Yuwapasart Waithayopatum Child and Adolescent Psychiatric Hospital
61, Soi Tesabal 19. Paaknum, Meaung, Samutprakarn, 10270 Phone: 02 384 3381-3

From the survey the most proper hospital is the Yuwapasart Waithayopatum Hospital, because this hospital is the first and the only child and adolescent psychiatric hospital in Thailand. Also this hospital is most popular and the best in special needs for children.

Yuwaprasart Waithayopatum is 150- bed child and adolescent psychiatric hospital in the Department of Mental Health Services, Ministry of Public Health. Founded in 1963 by Dr. Prasit Harinasute, its first director, it is first and only child and adolescent psychiatric

hospital in Thailand. The hospital is located on the outskirts of Bangkok at Suhhumvit Road, Samutprakarn. The hospital's site was donated by Senior Doctor, laung-Waithayesarankul.¹⁷

Also the number of the patient each year is very high from the statistic of the hospital shows the number of the people with autism from the 2011-2015 is around 20,000 each year. So this hospital is potentially encouraging the user to come to this project easily.

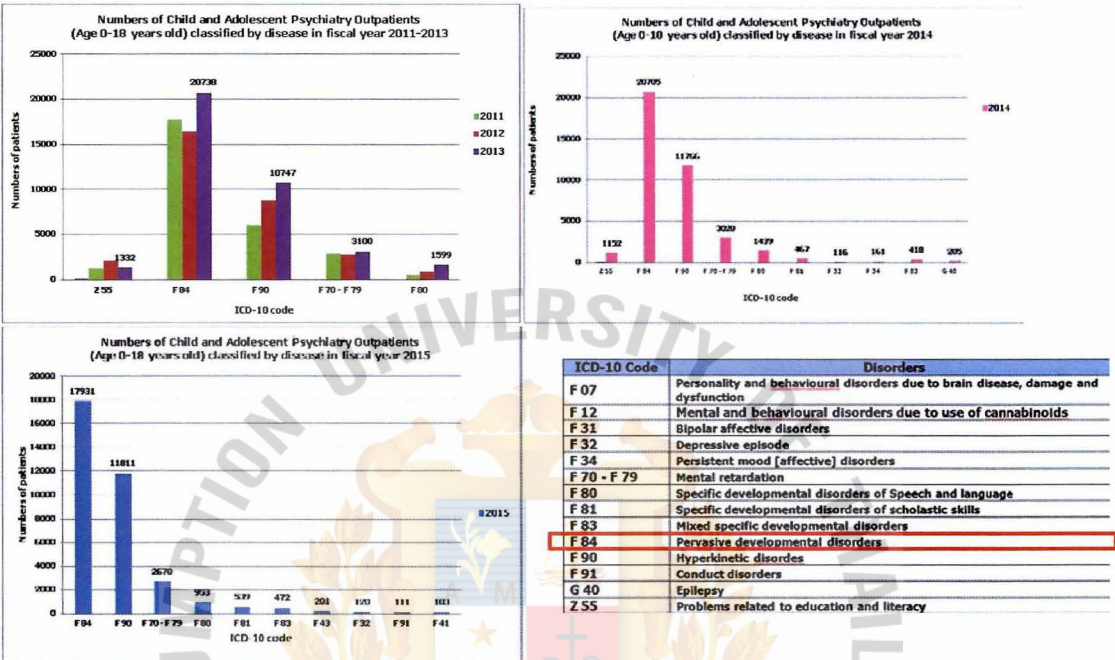


Figure 3.3: Statistic of Autism in Yuwaprasart Hospital
image source: <http://ycap.go.th/th/>

3.3 Site Selection



Figure 3.4: Site Selection

¹⁷ “History”, Yuwaprasart Waithayopatham, Accessed September 2016, <http://ycap.go.th/eng/index.php/about-us/history>

The site is located near by the Yuwaprasart Waithayopathum hospital. This site is located nearby central of Samut Parkarn on the Sukhumvit road, which is in between BTS Thai royal navy academy school station and BTS Erawan musem station. The site surrounding with the large community have 4 schools and one temple.

3.3.1 Law and Regulation

The site is in the dark brown area in the land use map which is the high density residential area, and have no limited with the FAR and OSR. This location is in the area that limited in the building height not more than 100 m.



Figure 3.5: Regulation

3.3.2 Possibility of site

There are 4 possibility of the site in this area. The site selection will consider in many condition which is mainly on the distance from the hospital and the site, the access from the main road, public utility, size of land, away from crowded area, safety and approach.



Figure 3.5: Possibility of Site

3.3.2.1 Site 1

Good point: Locate on the opposite of the hospital. It has a largest areas 11,362 sqm. It is easy to access from the main road and has a nice approach.

Bad point: Far away from hospital and nearby the gas station. The site is near by the traffic noise.

3.3.2.2 Site 2

Good point: Locate in the soi. It is far away from the car noise. And near by the community

Bad point: Small area 5,562 sqm. It is far away from the hospital.

3.3.2.3 Site 3

Good point: it has suitable site and locate far away from noise and have the nice view at the back of the site.

Bad point: The site has the irregular shape. It is far away from the hospital.

3.3.2.3 Site 4

Good point: It is directly connect to the hospital and easy access. This site has a nice approach and suitable site area 7,509.4 sqm.

Bad point: near the traffic noise and locate next to the gas station.

Table 3.1: Site evaluation

| | WEIGHT | SITE 1 | SITE 2 | SITE 3 | SITE 4 |
|------------------------|--------|--------|--------|--------|--------|
| NEAR BY HOSPITAL | 3 | 3 (9) | 2 (6) | 1 (3) | 4 (12) |
| EASY ACCESS | 2 | 3 (6) | 2 (6) | 1 (3) | 4 (8) |
| PUBLIC UTILITY | 2 | 3 (6) | 2 (4) | 2 (4) | 4 (8) |
| SIZE OF LAND | 2 | 4 (8) | 1 (2) | 3 (6) | 2 (4) |
| AWAY FROM CROWDED AREA | 1 | 3 (3) | 3 (3) | 4 (4) | 2 (2) |
| SAFTY | 1 | 3 (3) | 2 (2) | 2 (2) | 4 (4) |
| APPROACH | 2 | 4 (8) | 2 (4) | 2 (4) | 4 (8) |
| SUMMARY | | 43 | 27 | 26 | 46 |

According to the scoring of the site the most proper site is the SITE 4. This site is connecting directly to the hospital.

3.3.3 Features of site



Figure 3.6: Site

The site area is approximately 7,509.4 sqm. the width of the site approximately 80m and length 100 m. It is in an empty land next to the right side of hospital and the site is between the row house and the shell gas station. The access of the site is from the Sukhumvit road.

3.3.4 Perspective of site



Figure 3.7: West direction of the site



Figure 3.8: East direction of the site



Figure 3.9: approach



Figure 3.10: In front of the site



Figure 3.11: In front of the site



Figure 3.12: role house on the west side



Figure 3.13: Gas station on the east side

3.3.5 Transportation



Figure 3.14: Transportation

Source: Google Earth. 2016. Samut Prakarn. 13°36'48.4"N 100°35'37.3"E Accessed November 2016,
<https://www.google.co.th/maps/place/13%C2%B036'48.3%22N+100%C2%B035'37.0%22E/@13.6134981,100.5938103,672m/data=!3m1!1e3!4m5!3m4!1s0x0:0x0!8m2!3d13.613418!4d100.593596?hl=en>

3.3.5.1 Bus transportation: 365 1141 25 Air conditioned bus 102 142 507 508 511 536

3.3.5.2 Sky train transportation: Travelling by green line train and taking off at Baring station to catch buses. You can take 365, 1141, 25, air conditioned 102, 142, 507, 508, 511, and 536

3.3.5.2 Personal car

Drive along the Sukhumvit road to Samut prakarn the project is connect directly with the road



Chapter 4: Potential Design Response

4.1 Design Scope

Design scope will concern about the sensory disability of the Autistic people, which they have the hypo and hyper sensitivity. The project will provide two different space which is high stimulus space and low stimulus space.

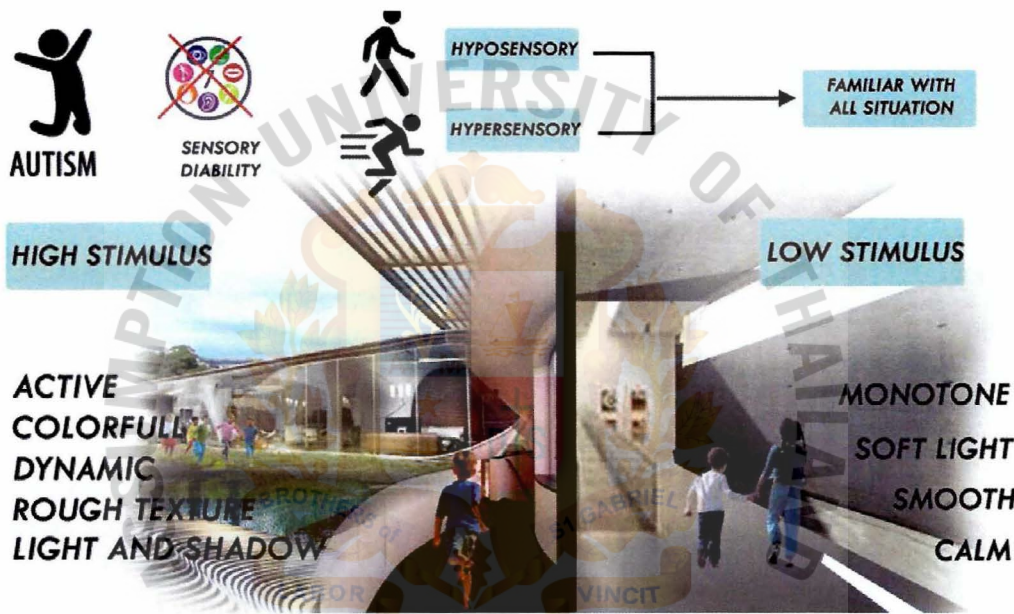


Figure 4.1: Design Scope

4.2 Program Analysis

The autism education and treatment center is the place that provides education, rehabilitation, therapy service and community for exchanging experience of autism. This project will focus on 4 main functions

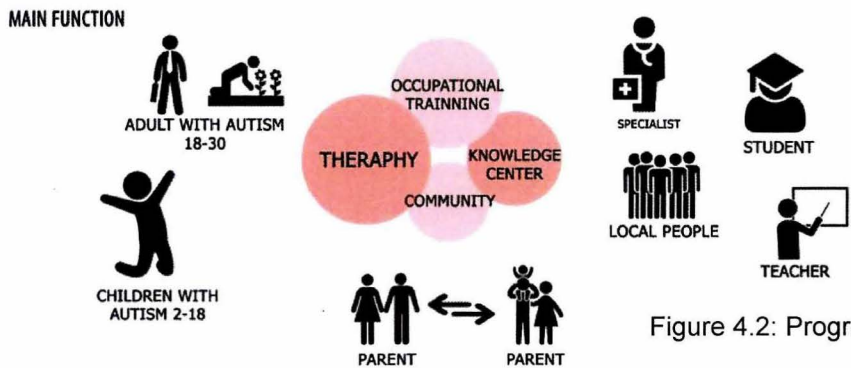


Figure 4.2: Program analysis

- 1. Treatment center that gives the sensory development to people with autism in every age and gender.
- 2. Occupation training for adult with autism so they can be able to live with normal people in the society
- 3. Parent and teacher community in order to share their experience and give training for them to deal with people with autism properly.
- 4. Researching center to enlarge the awareness about the condition of autism by creating the research center in order to increase the knowledge about autism for society

FUNCTION OF EACH PROGRAM



Figure 4.3: Function in each program

4.3 User programming

4.3.1 Users Analysis

| NUMBER OF STAFF | | NUMBER OF USER | | TOTAL USER | |
|----------------------------|-----|---------------------------|-----|------------|-----|
| MANAGEMENT PART | 28 | CHILDREN WITH AUTISM 2-18 | 200 | CUSTOMER | 400 |
| CHILDREN DEVELOPMENT PART | 53 | ADULT WITH AUTISM 18-30 | 100 | OFFICER | 115 |
| OCCUPATIONAL TRAINING PART | 17 | PARENT | 100 | TOTAL | 515 |
| MAINTENANCE PART | 17 | | | | |
| TOTAL | 115 | TOTAL | 400 | | |

Figure 4.4: User analysis

This project will serve for the children with autism at the age of 2-18 around 200 per day, and the adult with autism around 100 per day. And the ratio of the parent and children is 1:1 and ratio of the officer and people with autism is 1:8 which is around 115 people. In conclusion, the user in this project will be around 500 people.

4.3.2 Organization Chart

The project will be under control by the ministry of public health of Thailand. The project will divide into 5 departments, which is children administrator part, development part, specialist, occupational therapist, and management part.

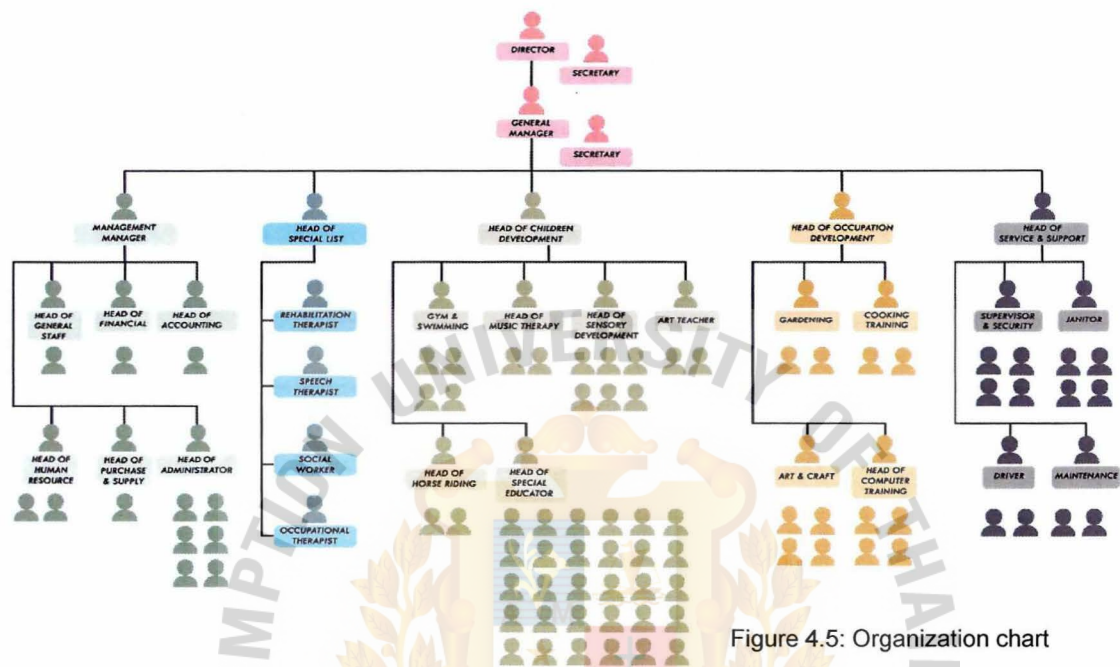


Figure 4.5: Organization chart

4.3.3 Program Analysis



Figure 4.6: The schedule of the project

The teaching program will separate into 2 sessions, morning session (9:00 – 12:30) and afternoon session (13:00 – 16:30). And Monday – Friday will be class for kid and Saturday – Sunday is for parents.

4.4 Activities and space

This project provide all of the necessary program of the autism therapy and prepare children with autism before they go to the normal school, which is sensory development, and communication and social skill. Moreover it'll be able to train them about the daily life skill.

The process of the training will be step by step start from the evaluation the disability of each person then create the learning program according to their problem. After finish course they will evaluate the progress of each children and then create a new program to fit with each children situation.

STUDY PROCESS

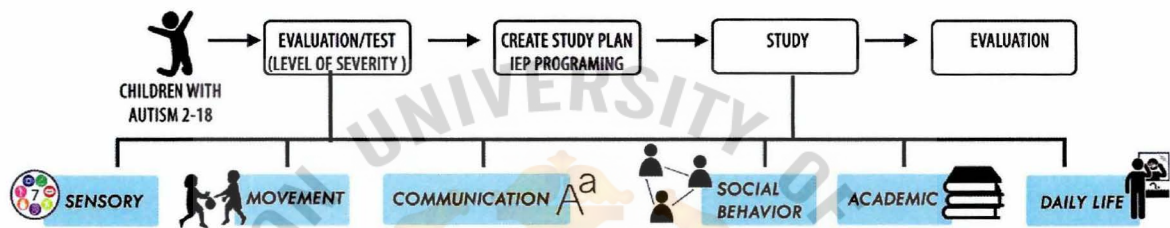


Figure 4.7: Study process

4.5 Space Summary

The program of the project will divide into main 5 parts which are development part, occupational training part, researching part, public part and management part.

Table 4.1: Table show the area requirement for each function

| DEVELOPMENT AND STUDY ZONE FOR CHILDREN WITH AUTISM | | | | | | | |
|---|--|-----------------|------------|------------|----------|-------|------|
| FUNCTION | | USER | NO.OF USER | NO.OF ROOM | AVG.AREA | TOTAL | REF. |
| SENSORY ZONE 5 OFFICER | | | | | | | |
| SENSORY INTEGRATION ROOM | | TEACHER+AUTISM | 1+6 | 2 | 50 | 100 | |
| MULTI-SENSORY ROOM | | TEACHER+AUTISM | 1+6 | 2 | 36 | 72 | |
| MUSIC THERAPY ZONE 3 OFFICER | | | | | | | |
| INDIVIDUAL CLASS ROOM | | TEACHER+ AUTISM | 1+1 | 3 | 4 | 12 | |
| BAND REHERSAL ROOM | | TEACHER+ AUTISM | 1+6 | 2 | 40 | 40 | |
| MUSCLE DEVELOPMENT 5 OFFICER | | | | | | | |
| FITNESS | | TRAINER+ AUTISM | 10 | 1 | 50 | 50 | |
| SWIMMING POOL | | TEACHER+ AUTISM | 20 | 1 | 100 | 100 | |
| WC | | | 10 | 1 | 64 | 64 | |
| | | | | | | | |
| TOTAL | | | | | | 438 | |

| | | | | | | | |
|--|-------|-----------------|------------|------------|----------|-------|------|
| CIRCULATION 30% | | | | | | 131.4 | |
| | | | | | | 569.4 | |
| SPEECH DEVELOPMENT / REHABILITATION / SPECIAL EDUCATION 40 OFFICER | | | | | | | |
| CLASS ROOM(2-7) | | TEACHER+ AUTISM | 6 | 15 | 52 | 780 | |
| CLASS ROOM(7-18) | | TEACHER+ AUTISM | 6 | 10 | 52 | 520 | |
| CLASS ROOM(18-30) | | TEACHER+ AUTISM | 6 | 5 | 52 | 260 | |
| TEACHER OFFICE | | TEACHER | 40 | 1 | 120 | 120 | |
| LIFE SKILL 1 OFFICER | | | | | | | |
| HOUSE / CONDO | | TEACHER+AUTISM | 5-6 | 1 | 50 | 50 | |
| | | | | | | | |
| TOTAL | | | | | | 1,730 | |
| CIRCULATION 30% | | | | | | 519 | |
| | | | | | | 2,249 | |
| OCCUPATION TRAINING FOR ADULT WITH AUTISM | | | | | | | |
| ART AND CRAFT | | TEACHER+ AUTISM | 6-8 | 2 | 62 | 124 | |
| COMPUTER LAB | | TEACHER+ AUTISM | 12 | 3 | 46 | 138 | |
| COOKING | | TEACHER+ AUTISM | 6 | 2 | 60 | 120 | |
| OFFICE SKILL | | TEACHER+ AUTISM | 12 | 2 | 60 | 120 | |
| MUSIC ROOM | | TEACHER+ AUTISM | 6 | 3 | 53 | 106 | |
| | | | | | | | |
| TOTAL | | | | | | 608 | |
| CIRCULATION 30% | | | | | | 182.4 | |
| | | | | | | 790.4 | |
| | | | | | | | |
| | | | | | | | |
| OUTDOOR ACTIVITY | | | | | | | |
| FUNCTION | | USER | NO.OF USER | NO.OF ROOM | AVG.AREA | TOTAL | REF. |
| PLAYGROUND (2-5) | 60 | AUTISM | 20 | 1 | 60 | 60 | |
| PLAYGROUND (6-12) | 80 | AUTISM | 20 | 1 | 80 | 80 | |
| BASKETBALL FIELD | 28*15 | AUTISM | 20 | 1 | 420 | 420 | |
| JOGGING TRACK | | AUTISM | 20 | 1 | | 50 | |
| BICYCLE TRACK | | AUTISM | 20 | 1 | | 100 | |
| HORSE RIDING | | AUTISM | | 1 | | 500 | |
| | | | | | | | |
| TOTAL | | | | | | 1,210 | |
| CIRCULATION 30% | | | | | | 363 | |
| | | | | | | 1,573 | |
| PUBLIC ZONE FUNCTION | | | | | | | |
| LOBBY AND WAITING AREA | | ALL | 100 | 1 | 160 | 160 | |
| FRONT OFFICE AREA | | OFFICER | 2-4 | 1 | 40 | 40 | |
| GALLERY | | ALL | | 1 | 150 | 150 | |
| MULTI PURPOSE AREA (SEMI | | ALL | 200 | 1 | 300 | 300 | |

| | | | | | | | |
|--------------------|--|--------------|---------------|-----------|-------------|---------|--|
| OUTDOOR) | | | | | | | |
| MINIMART | | ALL | 15 | 1 | 40 | 40 | |
| LIBRARY | | ALL | 15-20 | 1 | 200 | 200 | |
| | | | | | | | |
| | | | | | | | |
| AUDITORIUM | | ALL | 300 | 1 | 300 | 300 | |
| RESTAURANT | | ALL | 100 | 1 | 300 | 300 | |
| COFFEE SHOP | | ALL | 15 | 1 | 46 | 46 | |
| TOILET | | ALL | 10 | 1 | 60 | 60 | |
| | | | | | | | |
| TOTAL | | | | | | 1,596 | |
| CIRCULATION 30% | | | | | | 478.8 | |
| | | | | | | 2,074.8 | |
| MANAGEMENT ZONE | | | | | | | |
| OFFICE WORKER | | | | | | | |
| DIRECTOR ROOM | | OFFICER | 1 | 1 | 12 | 12 | |
| MANAGER ROOM | | OFFICER | 1 | 1 | 12 | 12 | |
| ADMINISTRATOR ROOM | | OFFICER | 20 | 1 | 67.2 | 67.2 | |
| MEETING ROOM | | OFFICER | 10 | 1 | 40 | 40 | |
| OFFICE LOUNGE | | OFFICER | 8-10 | 1 | 40 | 40 | |
| SPECIALIST OFFICE | | OFFICER | 5 | 1 | 35 | 35 | |
| STORAGE | | OFFICER | 1 | 1 | 25 | 25 | |
| TOILET | | OFFICER | 10 | 1 | 64 | 64 | |
| | | | | | | | |
| TOTAL | | | | | | 295.2 | |
| CIRCULATION | | | | | | 88.56 | |
| | | | | | | 383.76 | |
| SERVICE ZONE | | | | | | | |
| SECURITY OFFICE | | OFFICER | 8 | 1 | 25 | 25 | |
| BACK OF HOUSE | | OFFICER | 2 | 1 | 100 | 100 | |
| PUMP | | | | | 50 | 50 | |
| M&E | | | | | 50 | 50 | |
| | | | | | | | |
| TOTAL | | | | | | 225 | |
| CIRCULATION 30% | | | | | | 67.5 | |
| | | | | | | 292.5 | |
| | | | | | | | |
| PARKING | | 7,932.86/120 | 66.10=67 CARS | 67*15 sqm | 1,005+1,005 | 2010 | |
| TOTAL | | | | | | 2,002.5 | |
| | | | | | | | |

| PART USER | AREA,(sqm) |
|----------------------|------------|
| CHILDREN DEVELOPMENT | 569.4 |
| CLASS ROOM | 2249 |
| OCCUPATION TRAINING | 790.4 |
| OUT DOOR SPACE | 1,573 |
| PUBLIC PART | 2,074.8 |
| MANAGEMENT PART | 383.76 |
| SERVICE PART | 292.5 |
| CAR PARK | 2010 |
| TOTAL | 9,942.86 |

Table 4.2: Table show area requirement for each zone

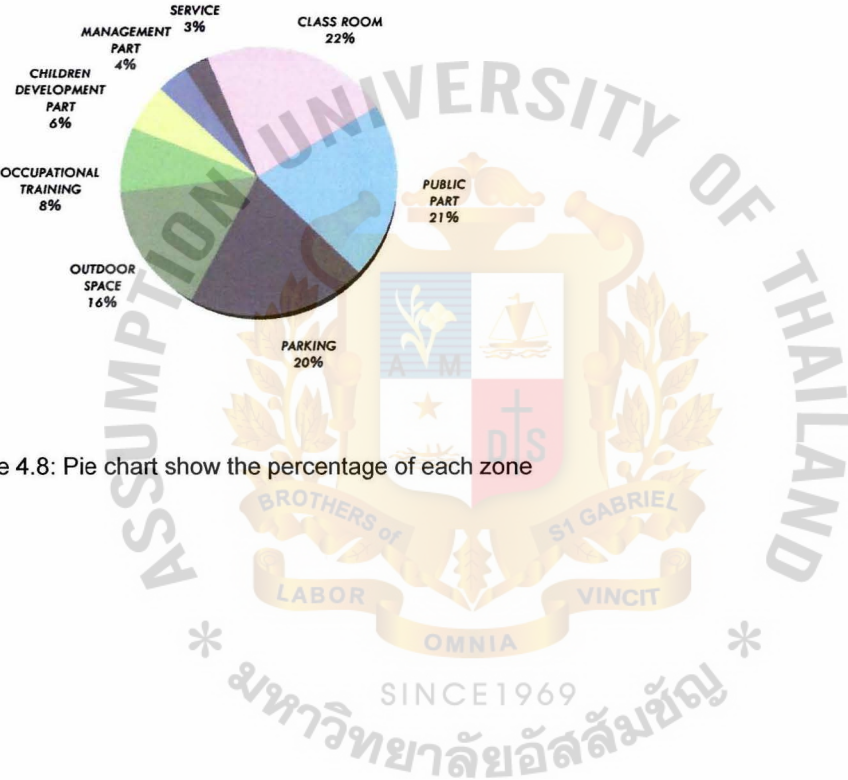


Figure 4.8: Pie chart show the percentage of each zone

Chapter 5: Building Technology

5.1 Building Structure

The building in this project will use the passive design to be the main requirement of the project, to control the day lighting design and the thermal comfort of the building for reducing the energy use of the building and also with the temperature of the building that is proper for the learning space for people with autism. It consists of the building orientation, passive cooling and day lighting design.



Figure 5.1: Passive design

The building use the column and beam structure with the gable roof. The most finishing is the timber.

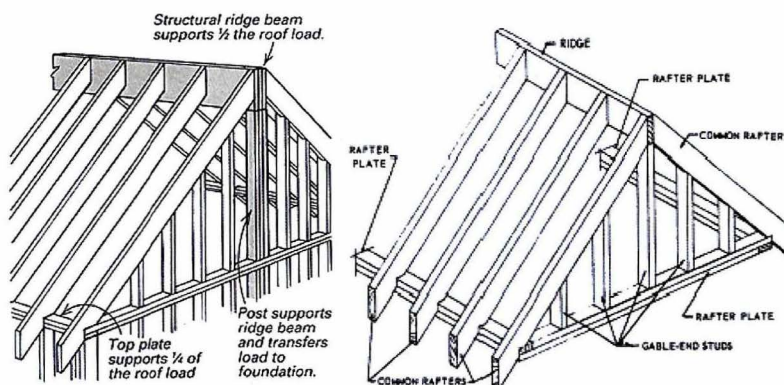


Figure 5.2: Gable roof structure¹⁸

¹⁸Engineer training "Gable roof structure", Accessed November 2016, <http://engineeringtraining.tpub.com/14069/css/Flat-And-Shed-Roof-Framings-214.htm>

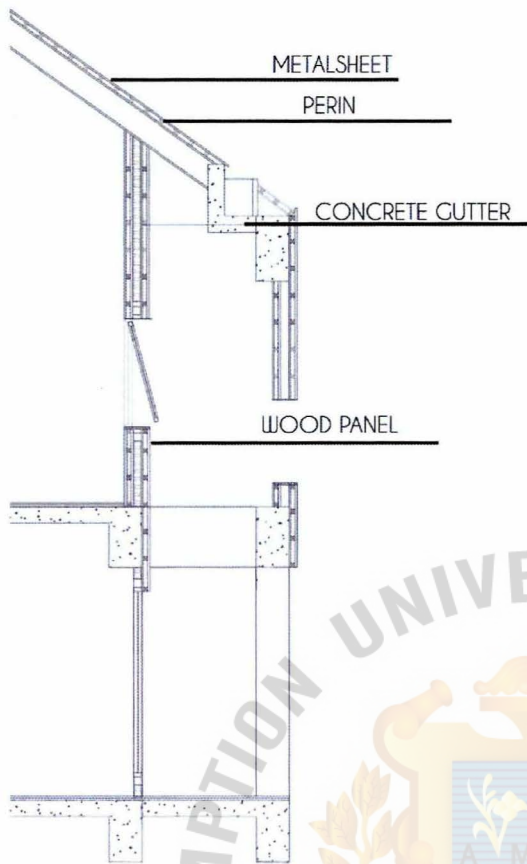


Figure 5.3: Wall section

5.2 Finishing

About the material, people with autism need the sensory development in the finishing of the material that is affect the sense of touching and the senesce of sight. So it needs variety of the material to let them touch to improve their sense. Moreover it should avoid the reflecting material to prevent the distraction from the reflecting floor or wall.

WALL

SENSORY WALL



FLOOR

VARAITY OF MATERIAL



Figure 5.4: Finishing of material

- NON REFLECTION
- MONOTONE COLOR
- LESS DETAIL



Figure 5.5: Material use in the project

5.3 Acoustic design

Sound Absorber

These sound absorbing acoustical panels and soundproofing materials are used to eliminate sound reflections to improve speech intelligibility, reduce standing waves and prevent comb filtering. Typical materials are open cell polyurethane foam, cellular melamine, fiberglass, fluffy fabrics and other porous materials. A wide variety of materials can be applied to walls and ceilings depending on your application and environment. These materials vary in thickness and in shape to achieve different absorption ratings depending on the specific sound requirements.¹⁹

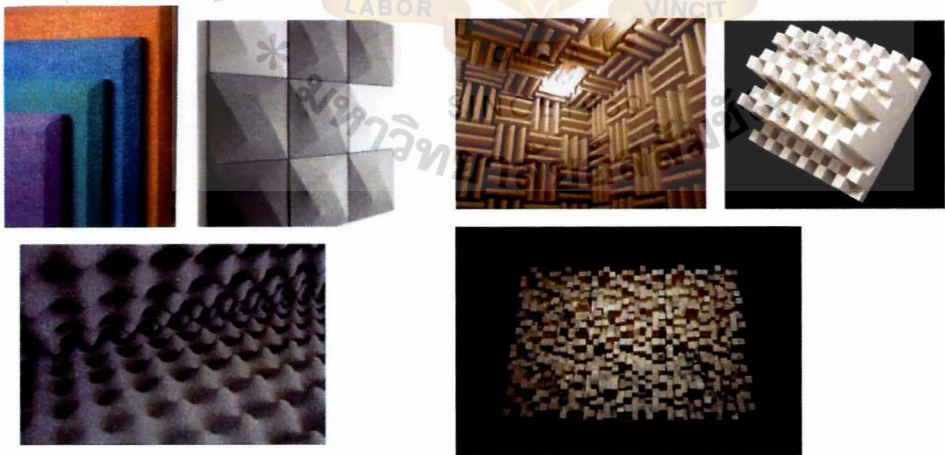


Figure 5.6: Sound Absorber and Sound Diffuser

¹⁹ Acoustics first, "Sound Absorber", Accessed November 2016, <http://acousticsfirst.com/sound-absorbers.htm>

5.3 Building System

5.3.1 Building system

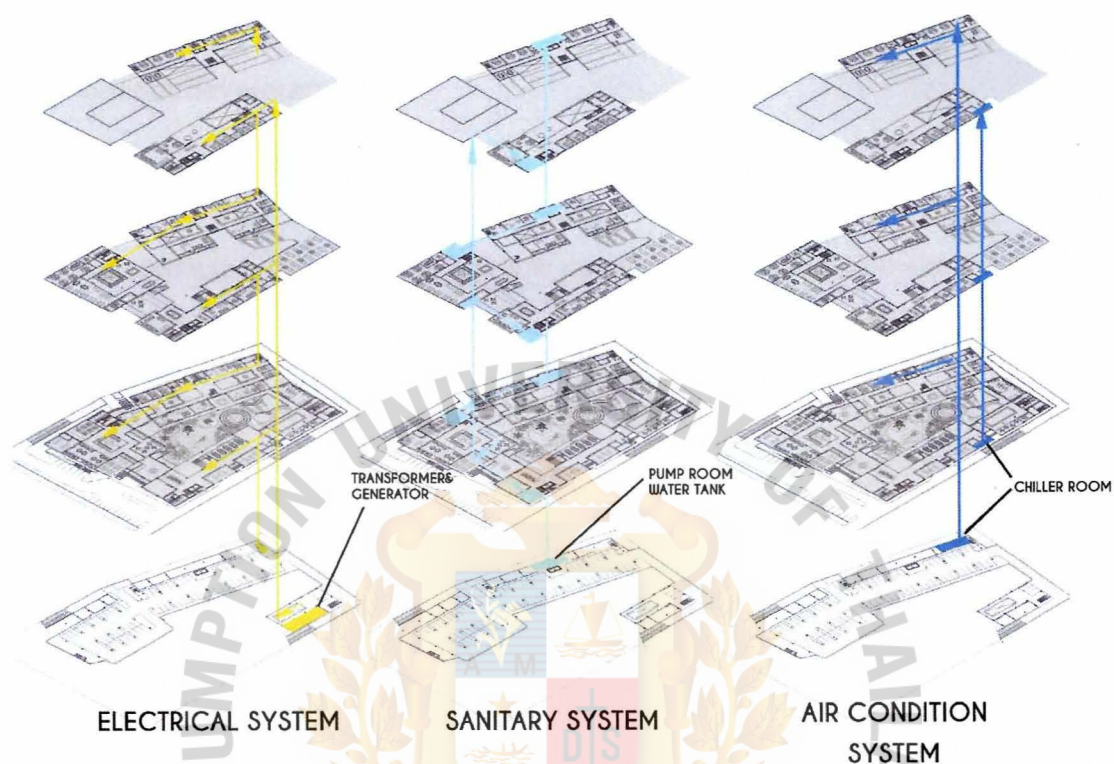


Figure 5.7: Building system

Chapter 6: Design Schematics

6.1 Concept development

The concept is mainly from the disability of people with autism which are three main symptoms which are social interaction problem, communication problem and restricted repetitive behavior. Each problem has the certain requirement.

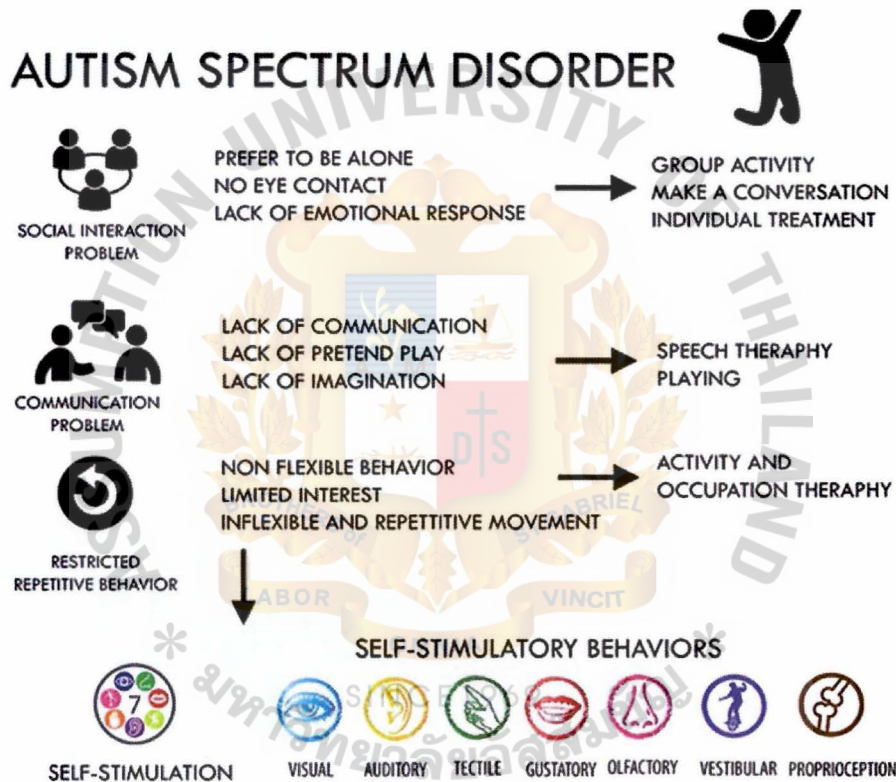


Figure 6.1: Autism spectrum disorders

For the social development, the children need more motivation than normal children because they are not interested in surrounding around them self. So the architecture should be able to encourage the user to interact with each other.

For the communication development, the architecture should be able to communicate to the user in term of circulation and planning. It should be clear and easy to understand for people with autism. For the repetitive behavior which refer to the sensory disability of each person, they need the proper space for training each sensory disability.

6.1.1 Main idea

The main idea of this project is to provide the sensory training in every part of the project, which the user can easily encourage to practice anytime and anywhere. Also, create the sense of journey to let the children explore the new experience, in order to balance the hyper and hypo sensitive of the sensory problem.

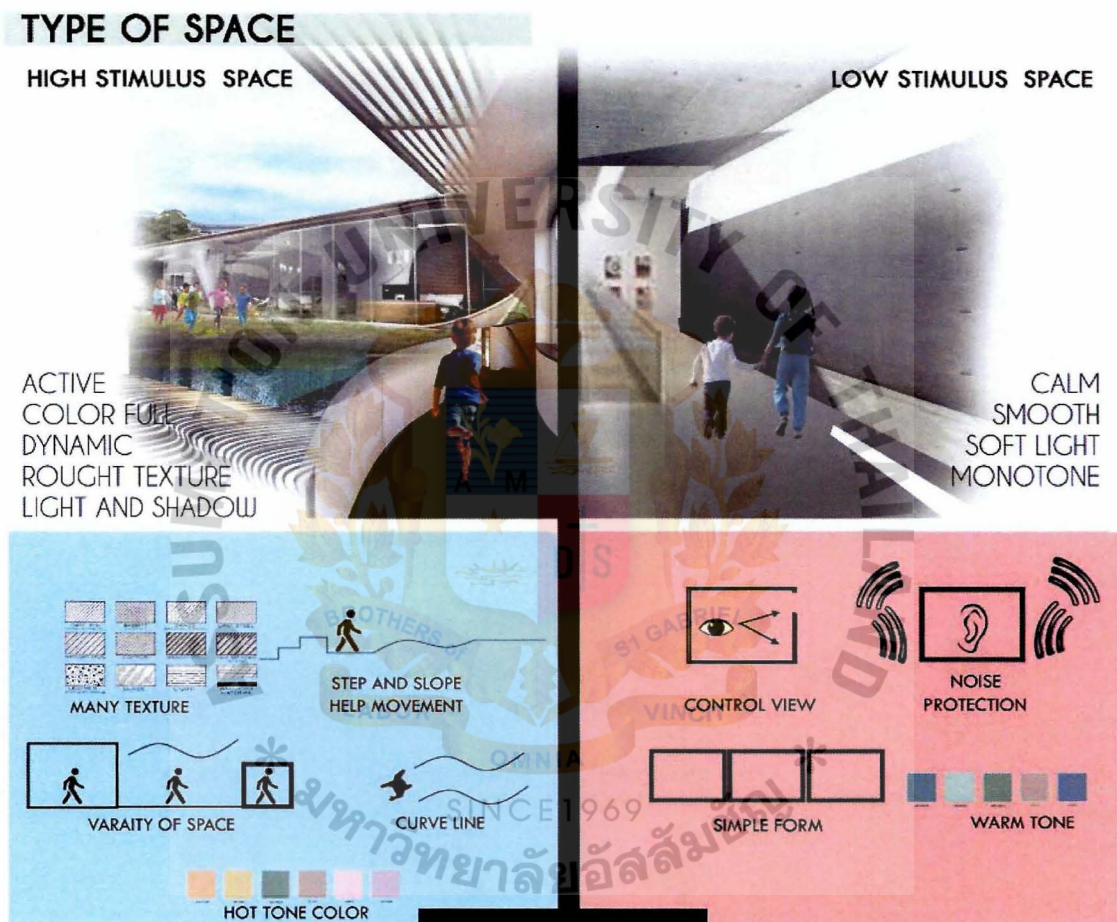


Figure 6.2: Hyper and Hypo Sensitive

The concept "The sensory journey" will be the main idea to create a new experience of the seven senses to let the people with autism familiarize with the every situation in the normal world, by using the architectural element which is light, sound, texture, and smell to create the learning environment for them.

6.2 Design development

In order to achieve the concept of sensory journey not only the space for training that need to be concerned it also needs the autism friendly design which contain some of requirement. There are ten simple principles of the autism design from the Teresa Whitehurst research.²⁰



Figure 6.3: Ten principle of autism design

This project provide all kind of learning experience which contain learning, playing, interaction, experience space. Each space can improve each type of children development.

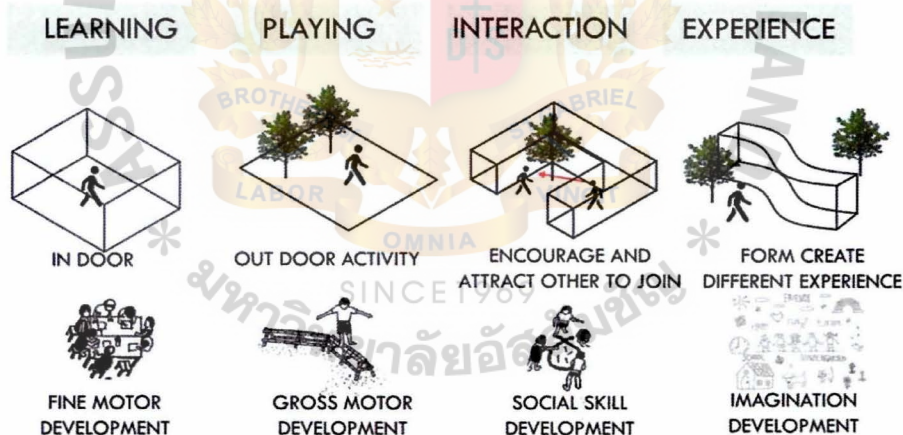


Figure 6.4: Learning space

Using the benefit of the courtyard to be the main planning of the building and create the enclosure space for safety and controllable space for the children with autism. It also give the sense of interaction of space that can encourage the children to have a conversation and interaction easier.

²⁰ Teresa Whitehurst, "The impact of building design on children with autistic spectrum disorders" Good Autism Practice, Vol. 7 issue. 1, May 2006

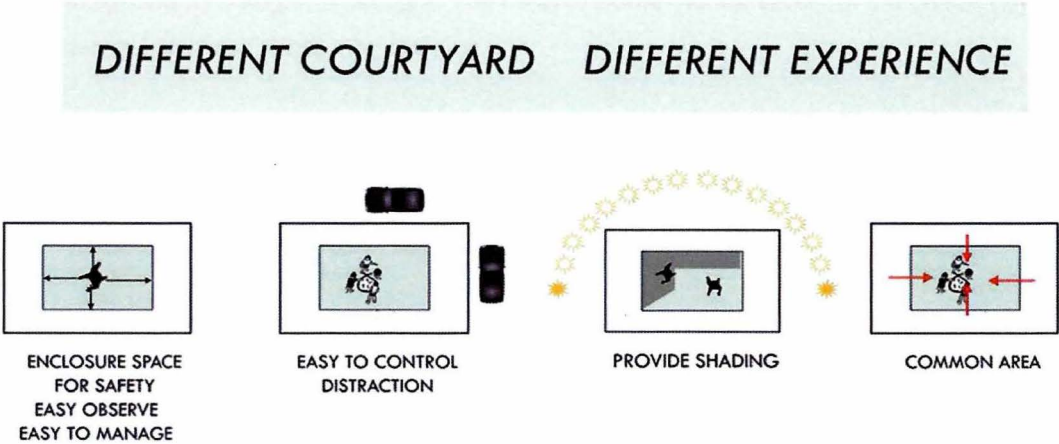


Figure 6.5: Benefit of courtyard

The project will create many courtyards that each courtyard have their own character and have the different training program for children. Each courtyard will separate into seven sensory development for each courtyard.

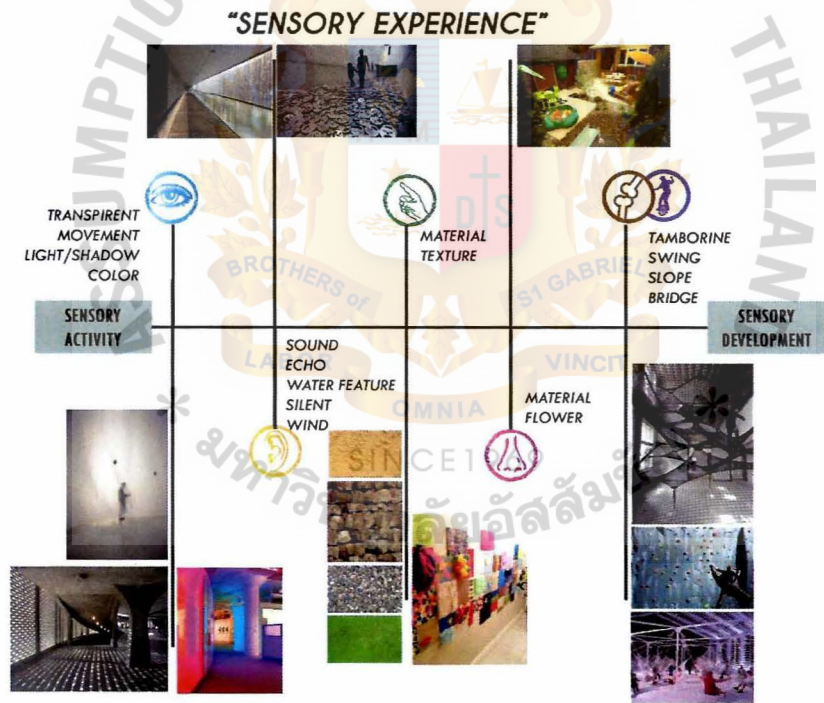


Figure 6.6: Courtyard function

6.3 Schematic design

6.3.1 Design criteria

The first schematic design start from the criteria that suit for people with autism, which is clear planning, simple and easy to understand. Circulation should be direct and no crossing circulation. Control environment to avoid the distraction. The building should concern the

natural lighting by using indirect light. The most important is the safety of the children by create the internal court surrounded by building.

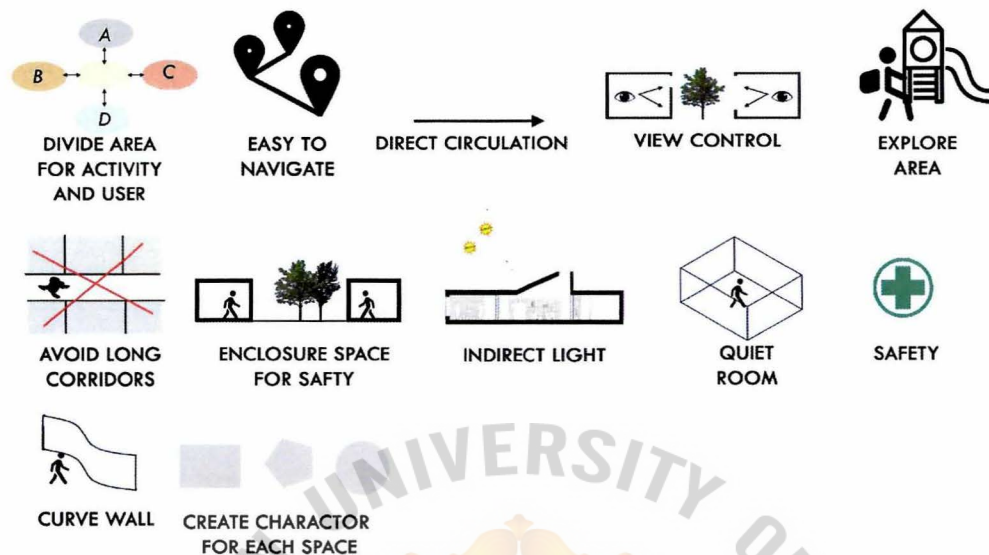


Figure 6.7: Design criteria

6.3.2 Zoning

The zoning are divided into 4 zones which is Public and common area, Children development, Occupational therapy and Special education. The common area locate at the front of the site to be the main access for the project. The children development and special education locate at the back of the site because it needs the pivacy space which is quiet and less distraction. The occupational therapy locate near the public area to encourage the adult with autism and normal people to have conversation and interaction to improve the social skill.

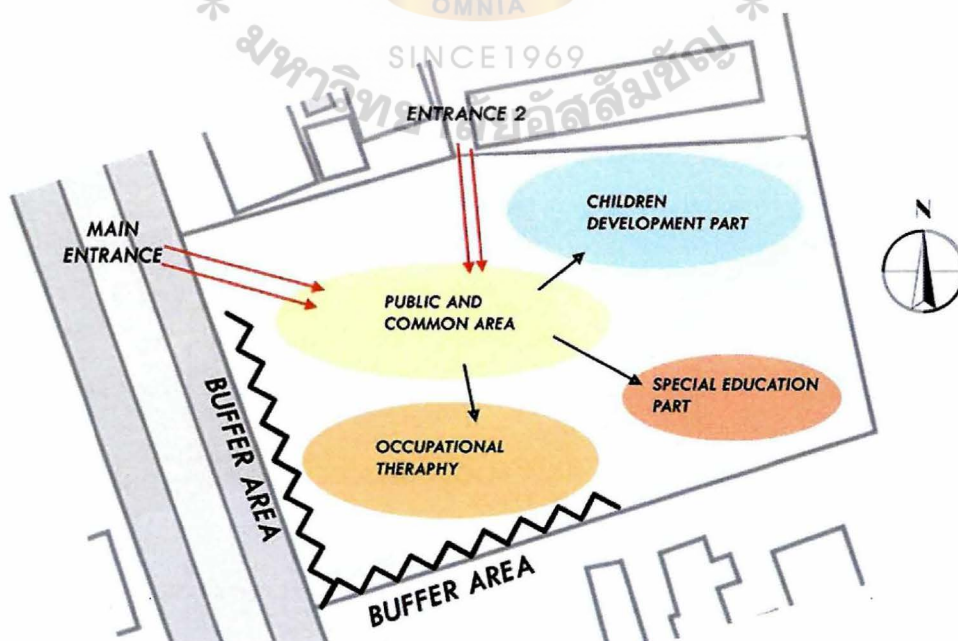


Figure 6.8: Zoning diagram

6.4 Schematic design 1

The first schematic start from the separate four zoning clearly and use the public zone to connect all zoning together. The space between each zoning can be the out door court. Then create the courtyard in every zone.

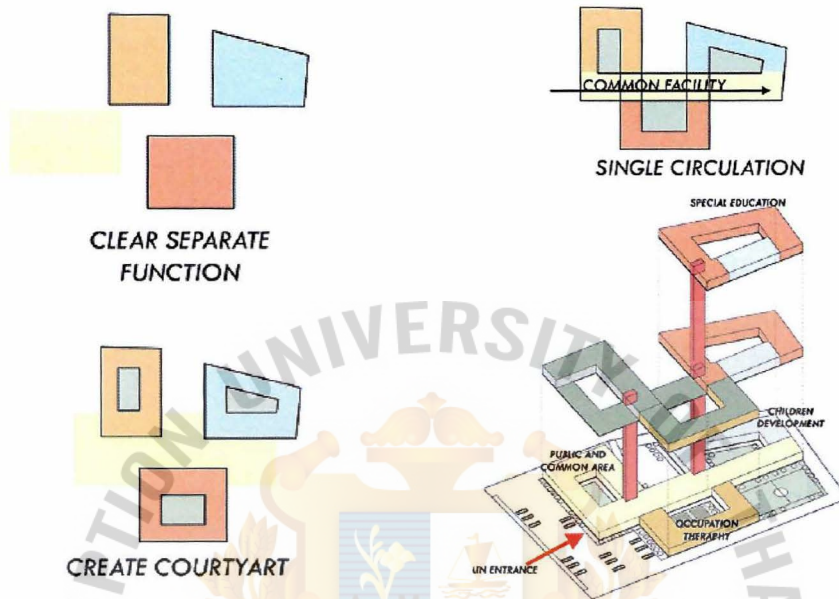


Figure 6.9: Orientation diagram

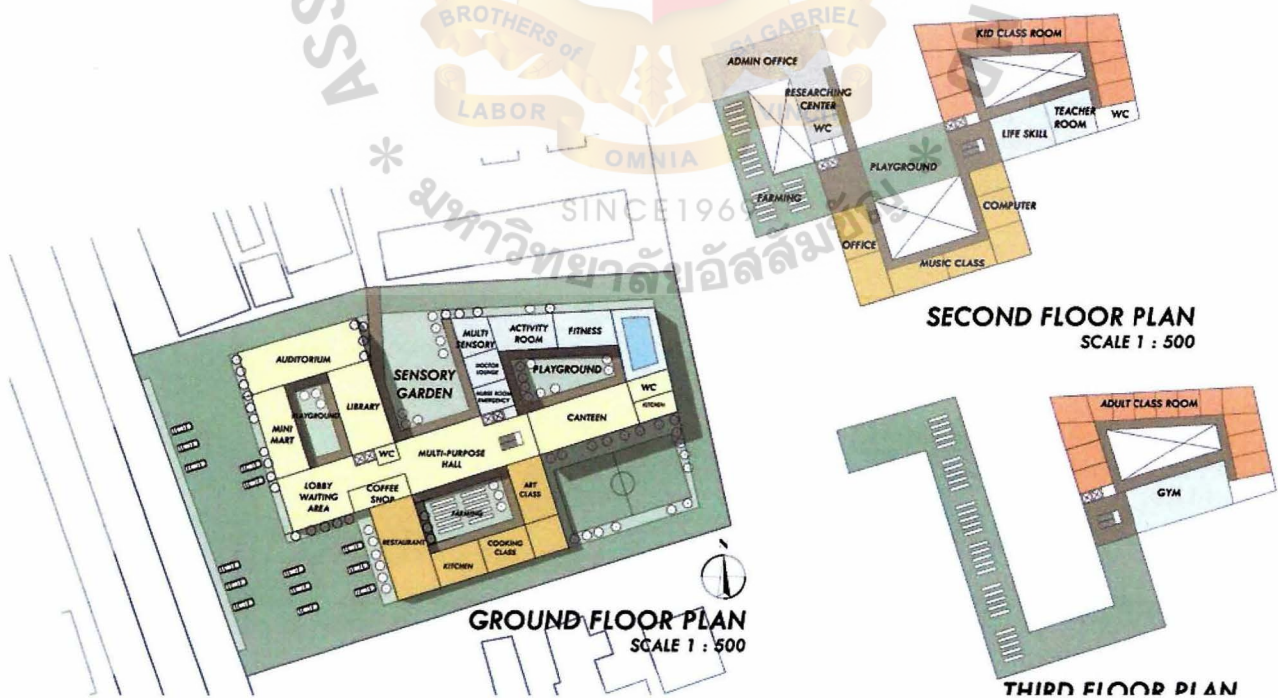


Figure 6.10: Schematic design 1

6.5 Schematic design 2

The second schematic is based on the clear separation of zoning group all of the sensory zone in the middle of the project for the easy management and the safety of the children. Use the loop circulation to connect all of the zone together.

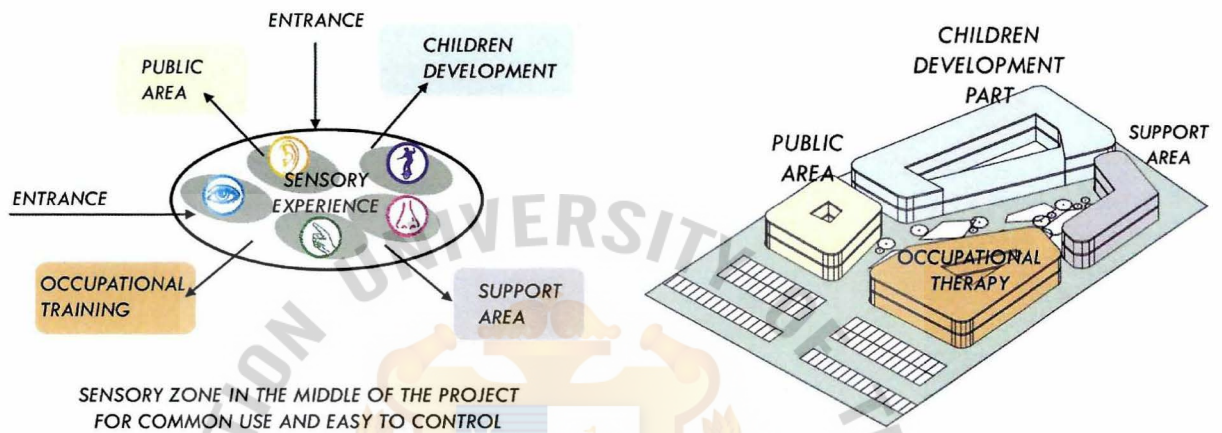


Figure 6.11: Orientation diagram 2

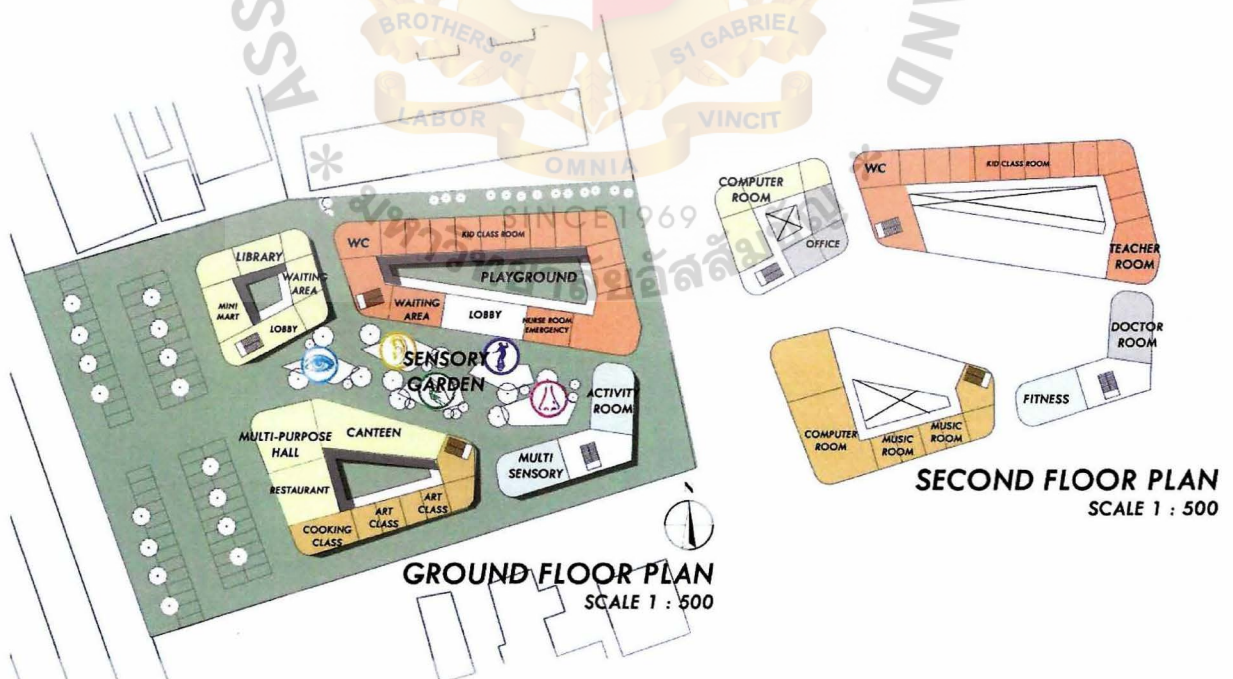


Figure 6.12: Schematic design 2

6.6 Schematic design 3

The third schematic still separate zoning and use the the sensory zone as the loop circulation to connect all building together. Make the loop as the enclose space in the middle to make more safety.

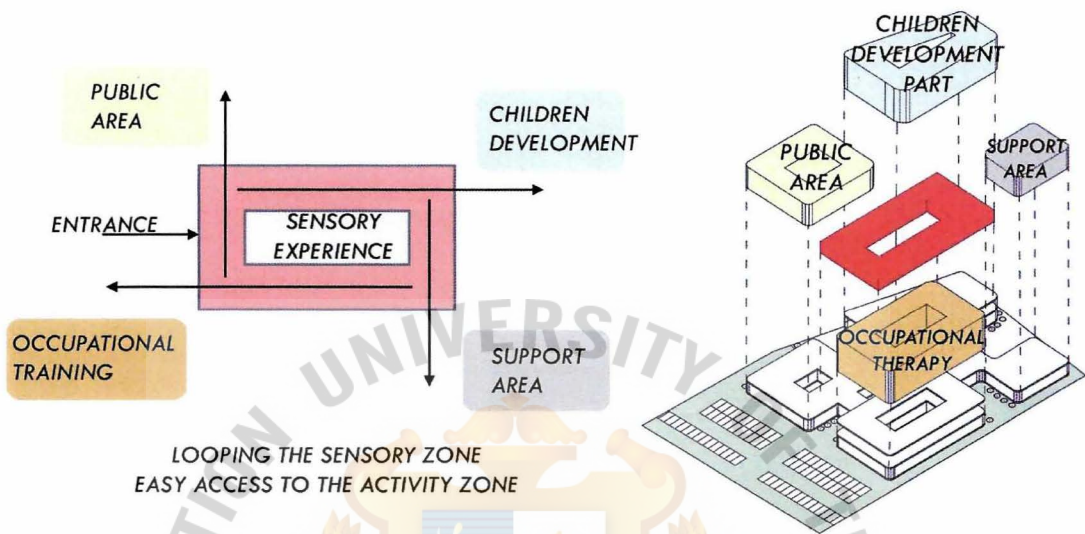


Figure 6.13: Orientation diagram 3

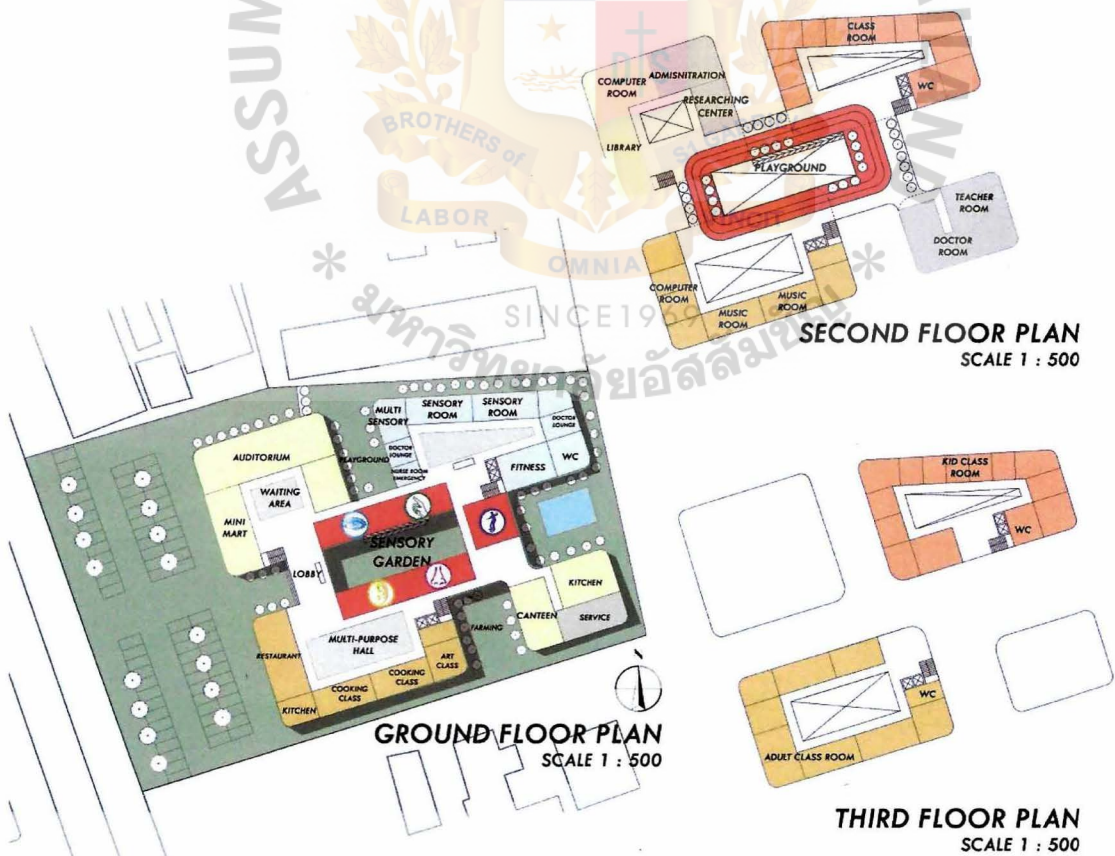


Figure 6.14: Schematic design 3

6.7 Design development 1

6.7.1 Plan

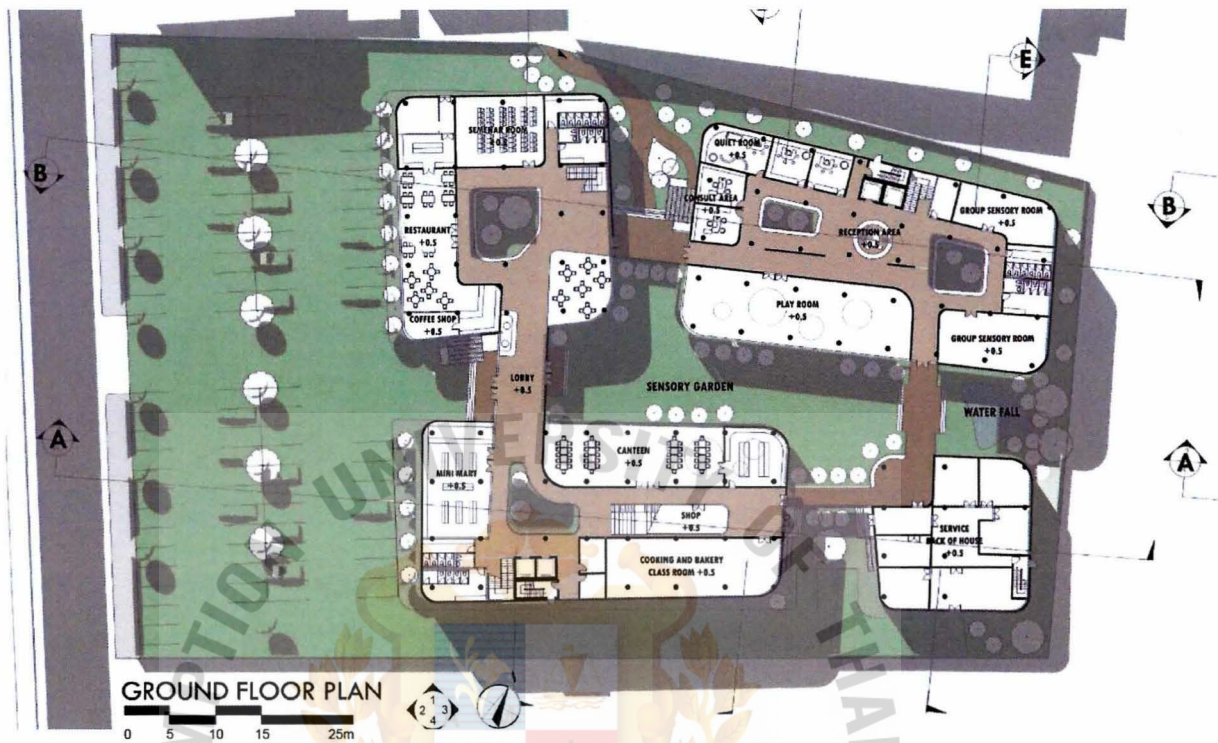


Figure 6.15: First floor plan

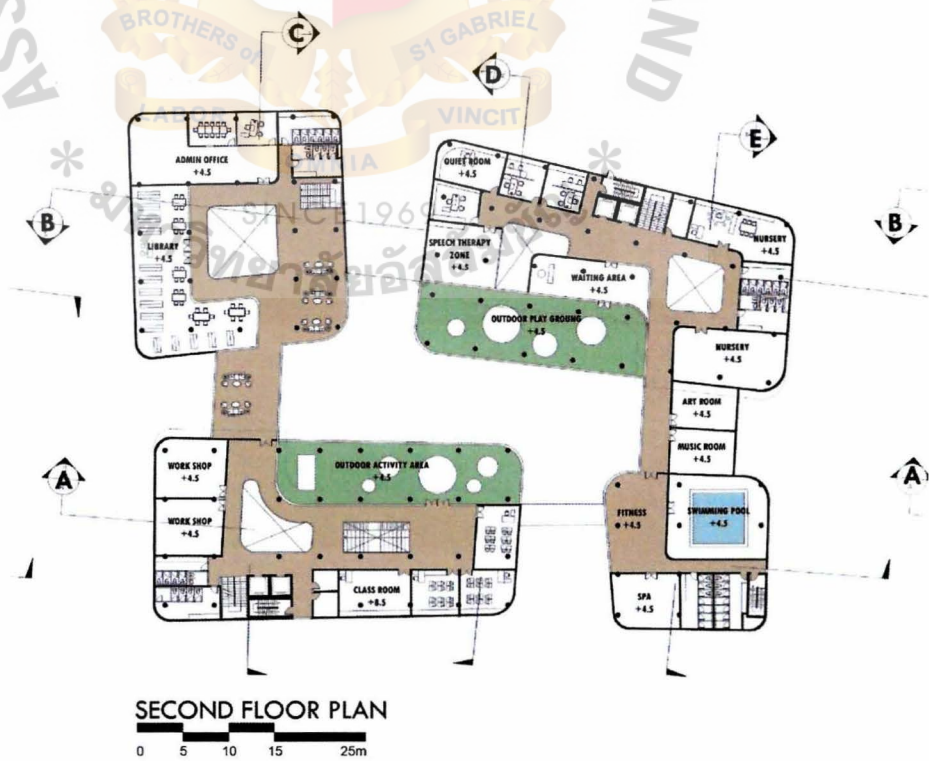


Figure 6.16: Second floor plan

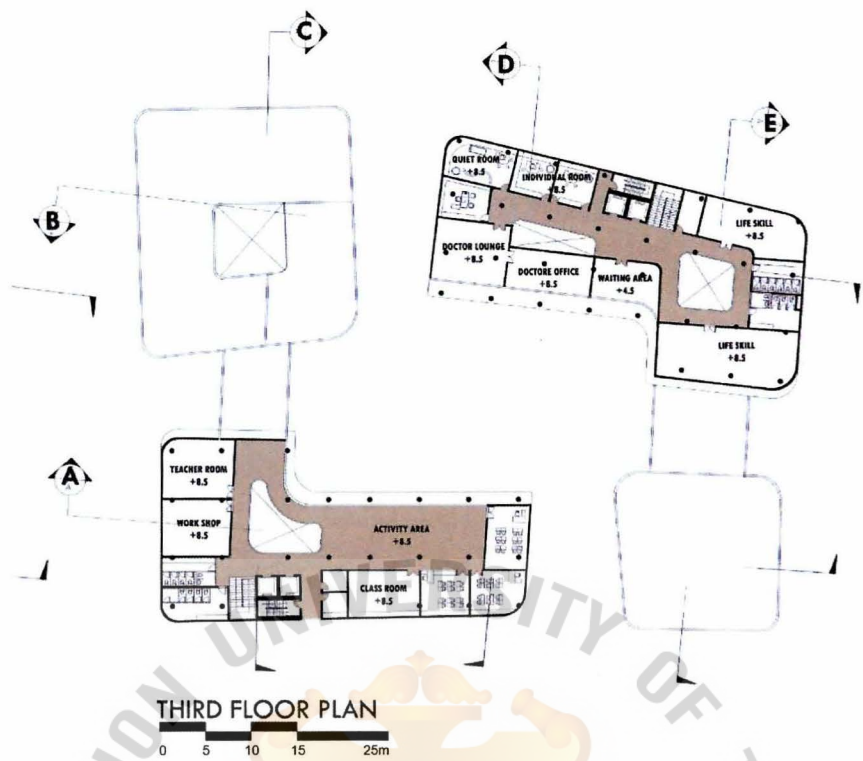


Figure 6.17: Third floor plan

6.7.2 Elevation

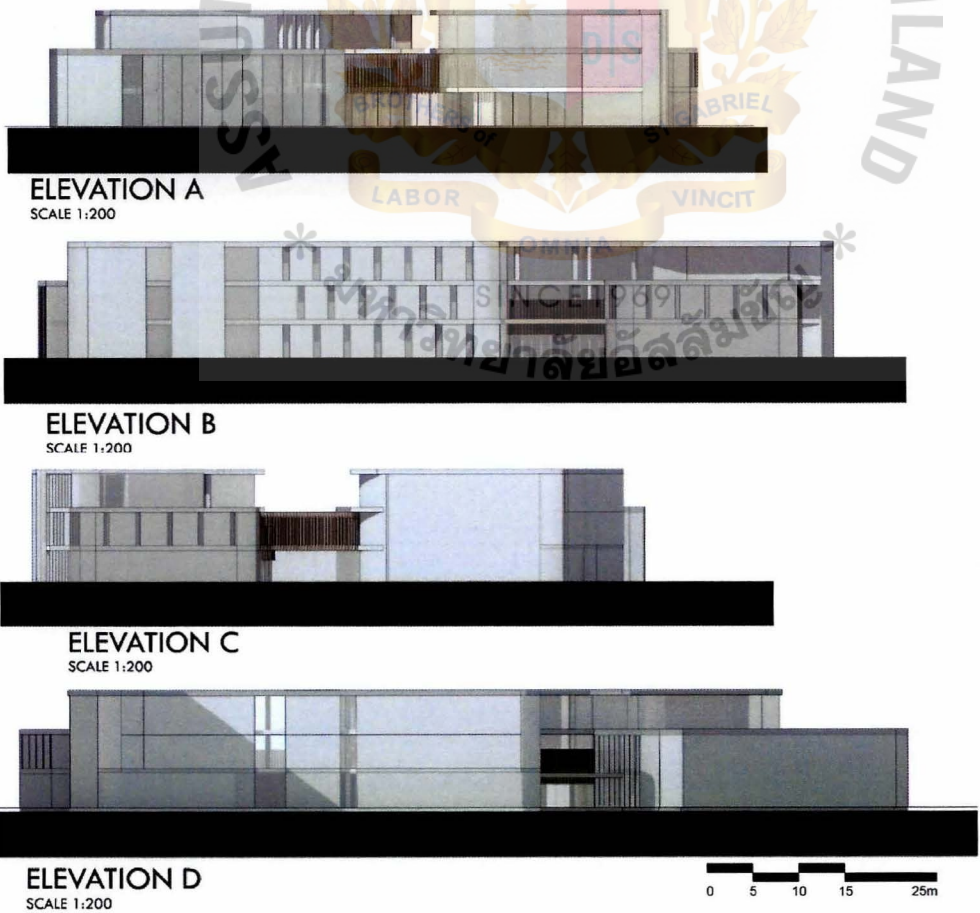


Figure 6.18: Elevation

6.7.3 Section

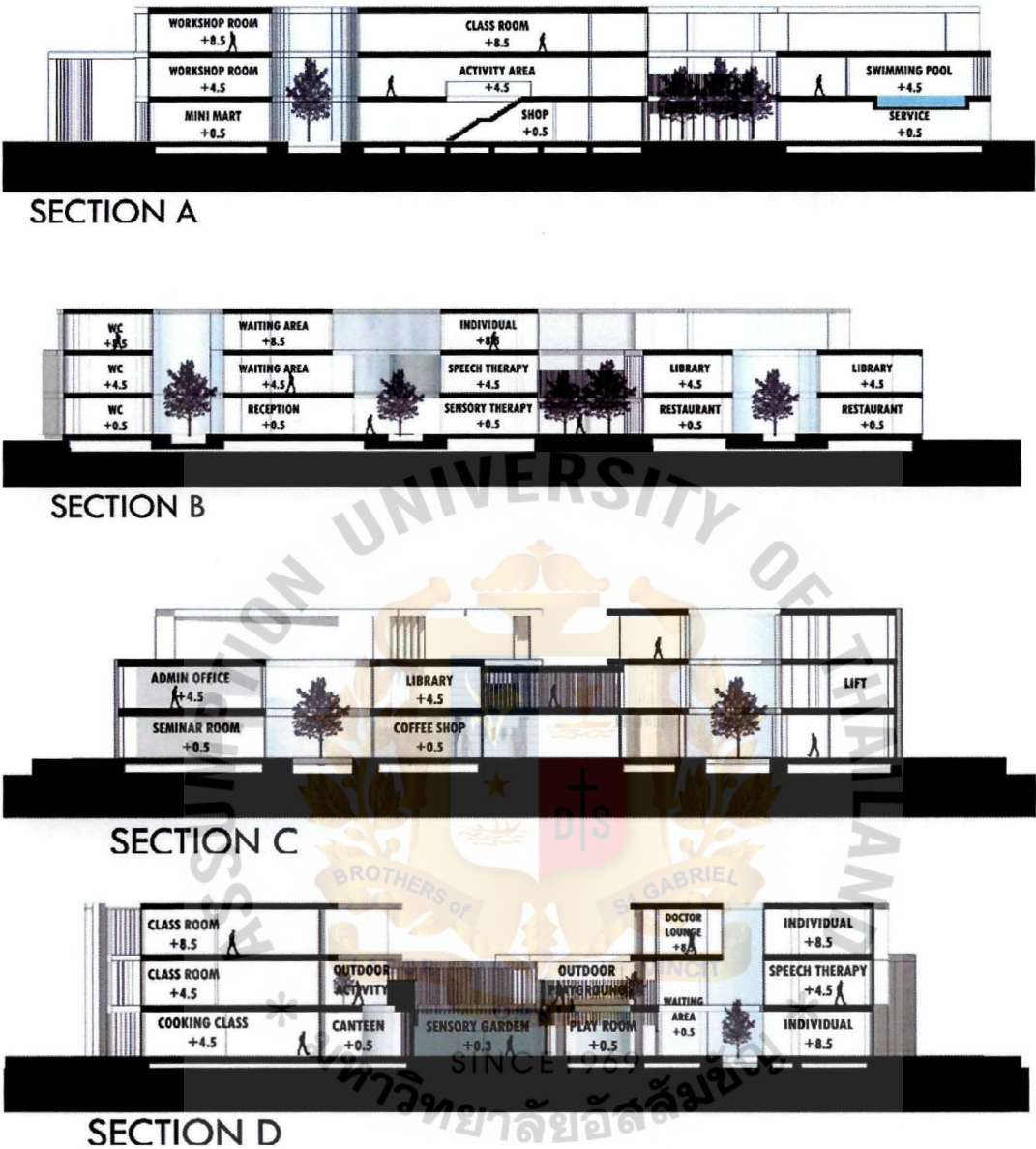


Figure 6.19: Section

6.8 Design development 2

6.8.1 Plan

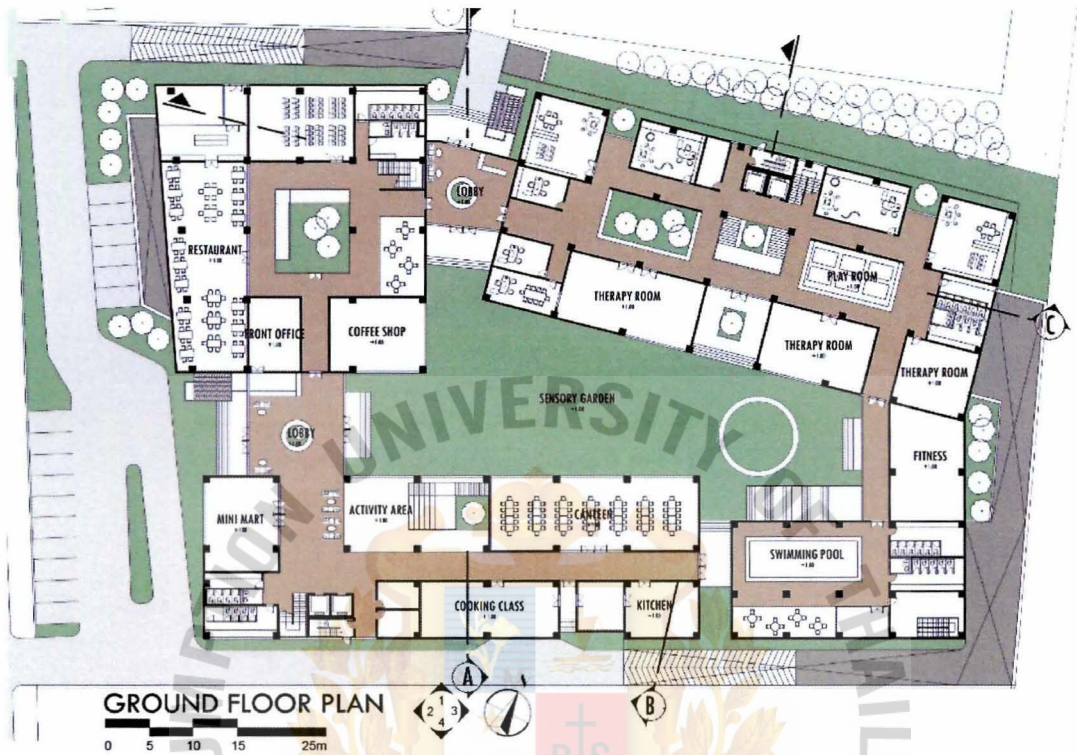


Figure 6.21: First floor plan



Figure 6.22: Second floor plan

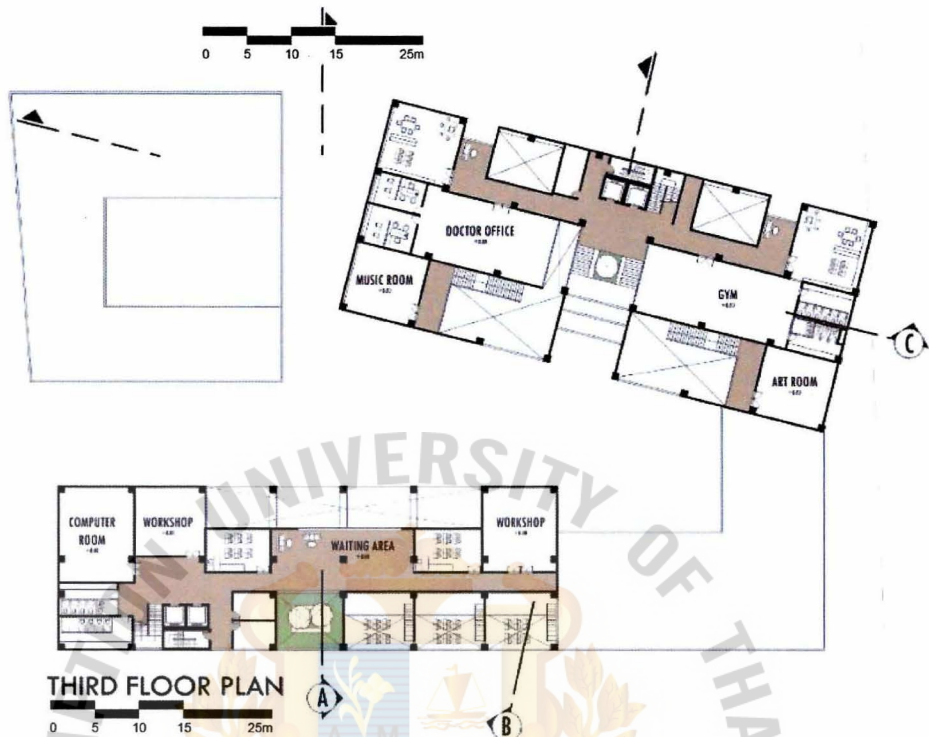


Figure 6.23: Third floor plan

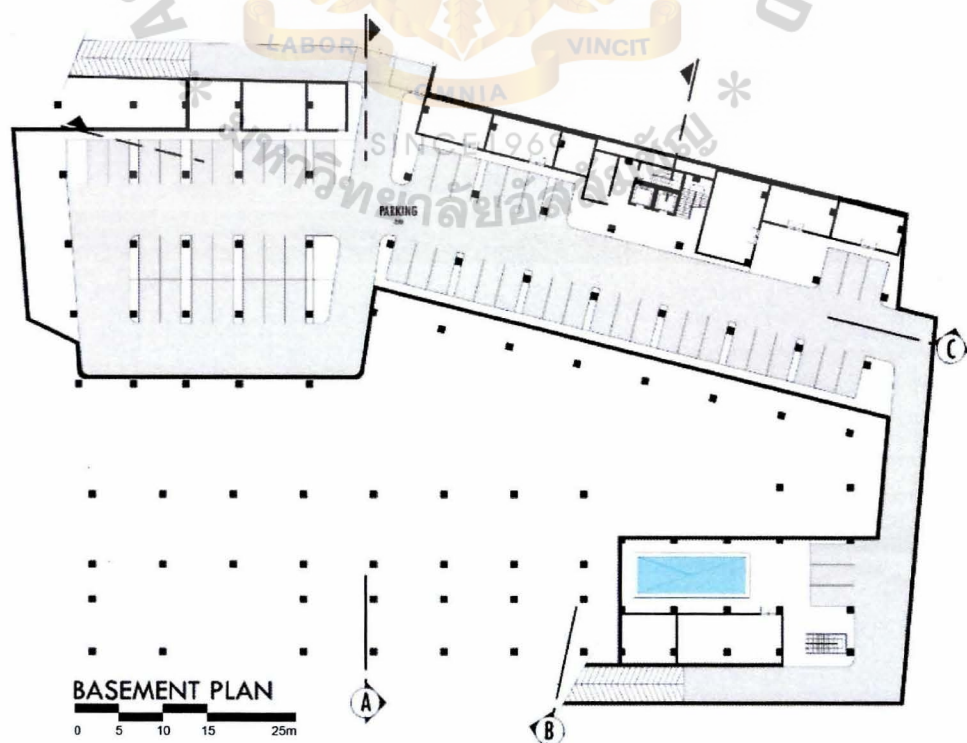


Figure 6.24: Basement plan

6.8.3 Elevation

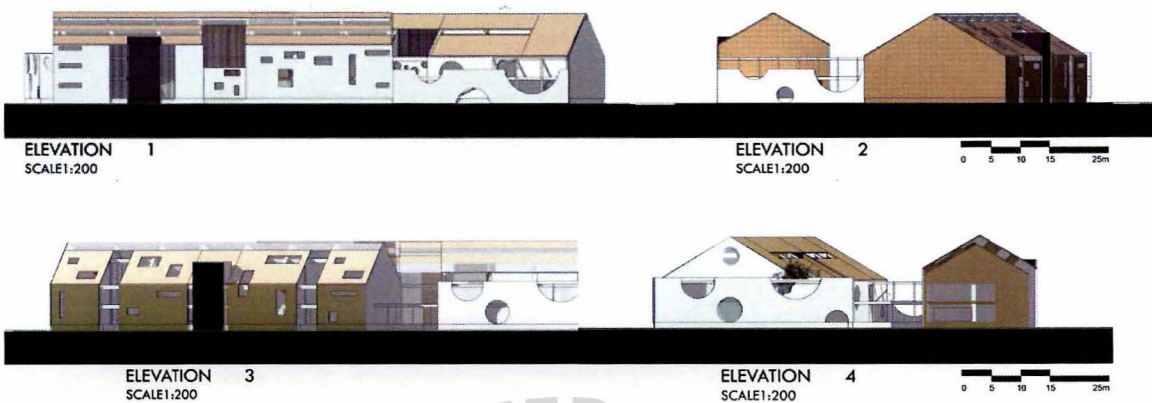


Figure 6.25: Elevation

6.8.4 Section

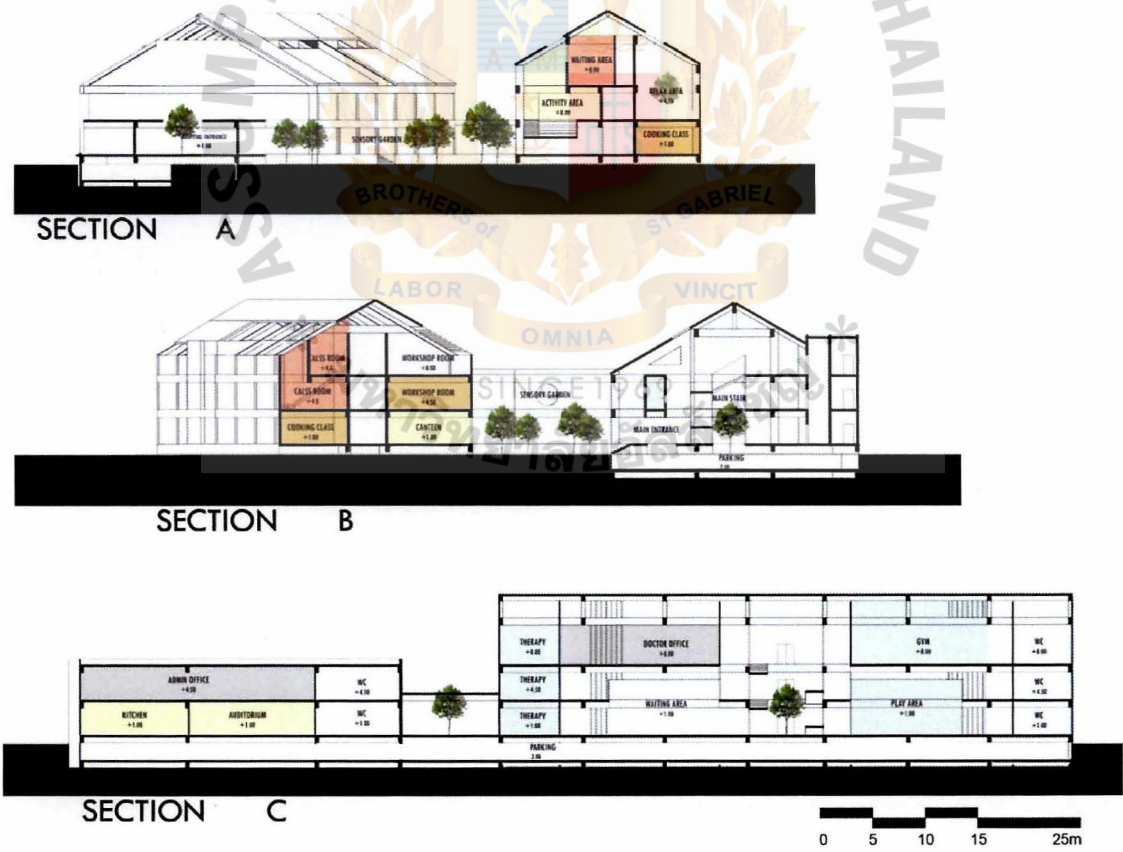


Figure 6.26: Section

6.8.5 Perspective



Figure 6.27: Sky view



Figure 6.28: Perspective

6.9 Design development 3

6.9.1 Plan

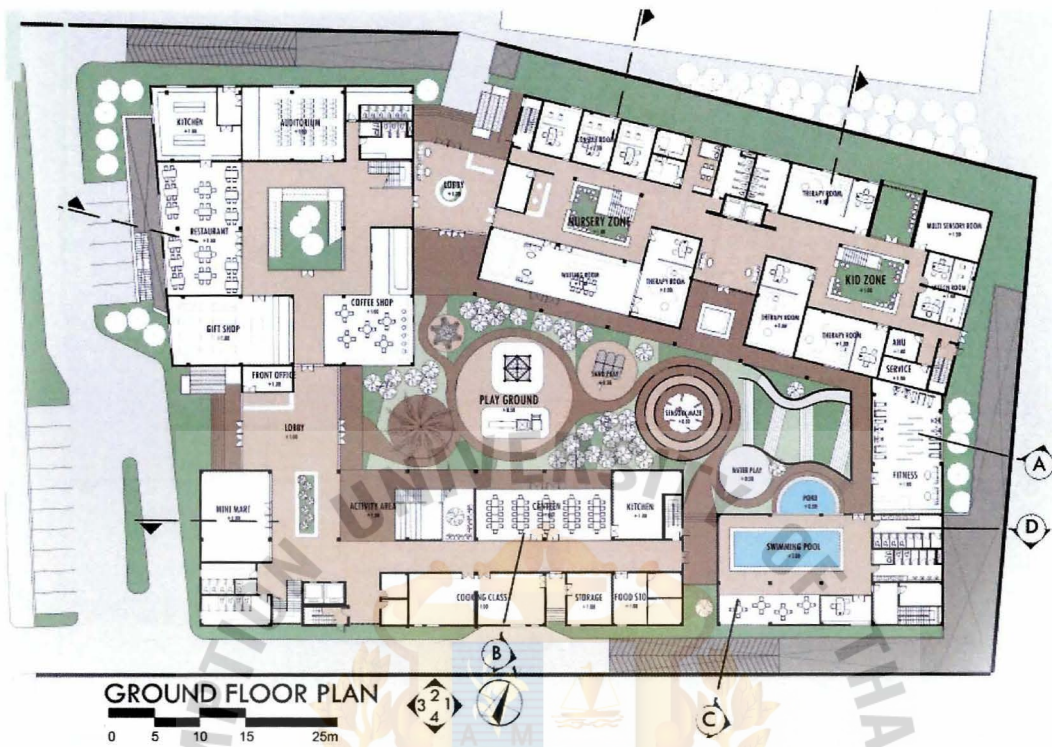


Figure 6.29: Ground floor plan



Figure 6.30: Second floor plan



Figure 6.31: Third floor plan

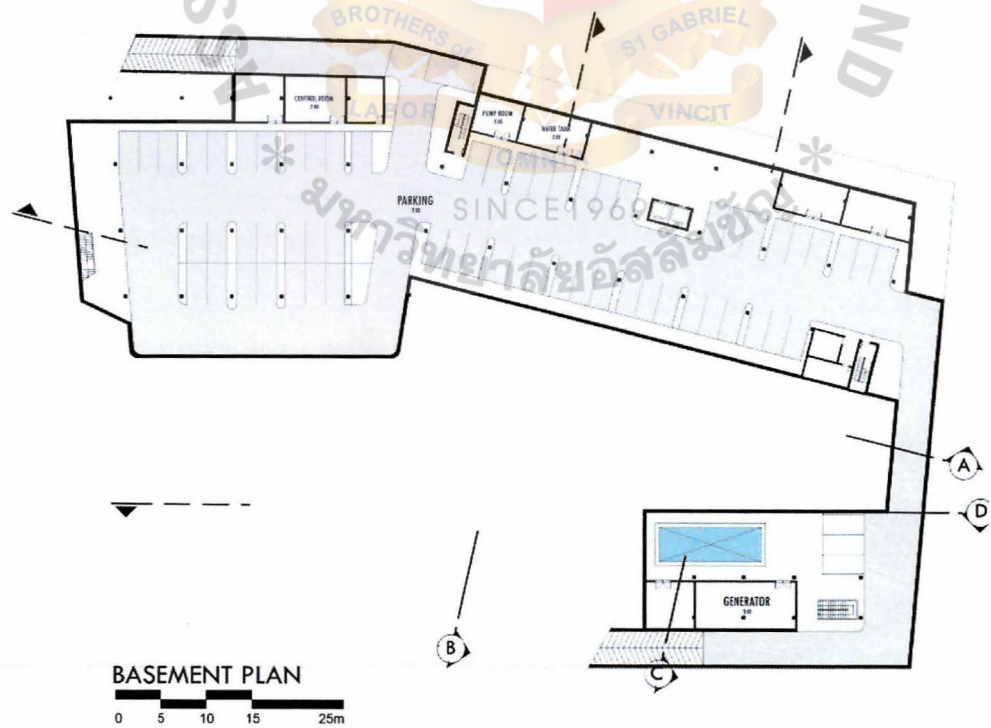


Figure 6.32: Basement plan

6.9.2 Elevation



Figure 6.33: Elevation

6.9.3 Section

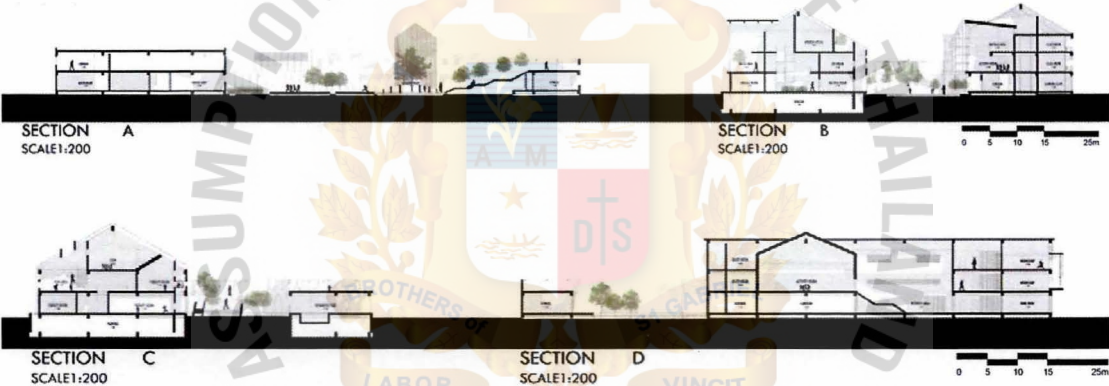


Figure 6.34: Section

6.9.4 Perspective

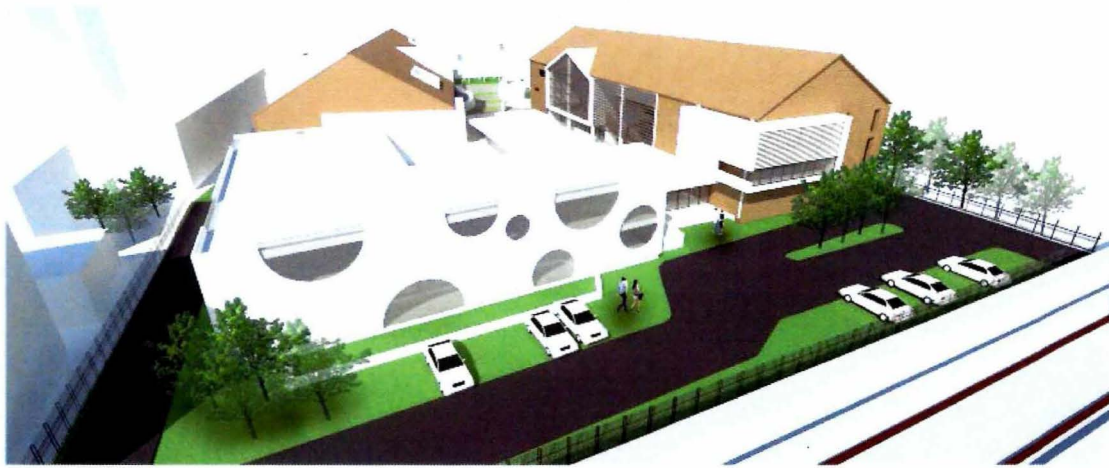


Figure 6.35: Sky view



Figure 6.36: Perspective

มหาวิทยาลัยอัสสัมชัญ
SINCE 1969

Chapter 7: Design Summary

7.1 Zoning diagram

The zoning are divided into 4 zones which are Public and common area, Children development, Occupational therapy and Special education. The common area locate at the front of the site to be the main access for the project. The children development and special education locate at the back of the site because it need the pivity space which quiet and less distraction. The occupational therapy locate near the public area to encourage the adult with autism and normal people to have conversation and interaction to improve the social skill.

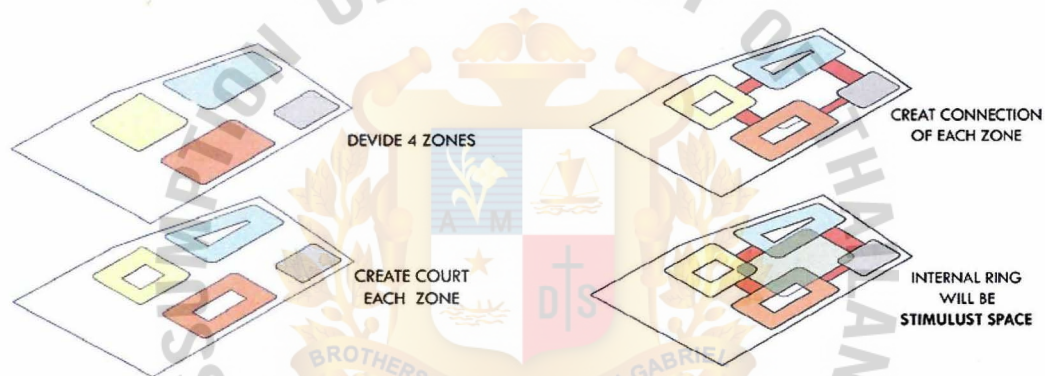


Figure 7.1: Zoning diagram 1

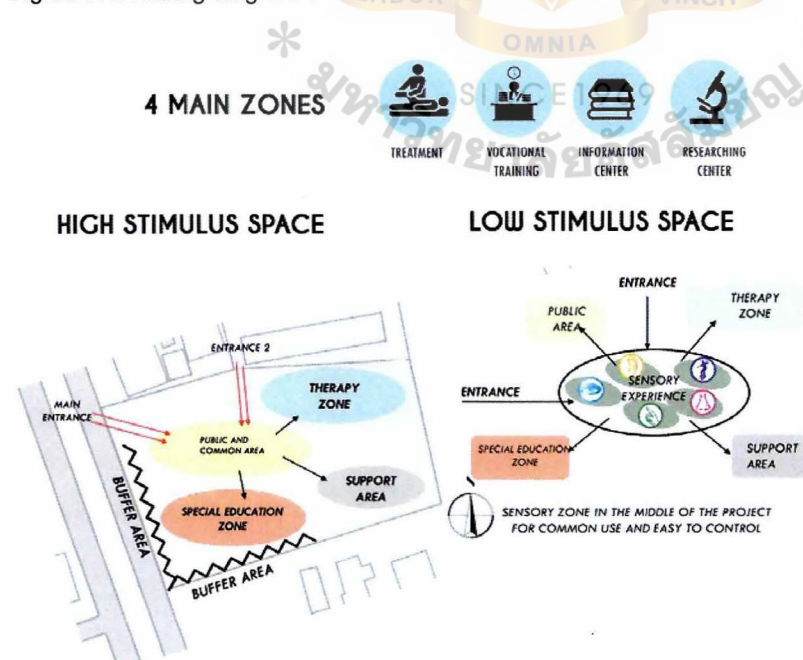


Figure 7.2: Zoning diagram 2

7.2 Functional diagram

For the function in side of each building, in the public building will contain public function which is restaurant, coffee shop, auditorium, library and the admin office. For the therapy building will separate in 4 zones in side by the age of the user which is nursery, children, teenager and activity zone. For the special school building will provide the school classroom and the work shop area

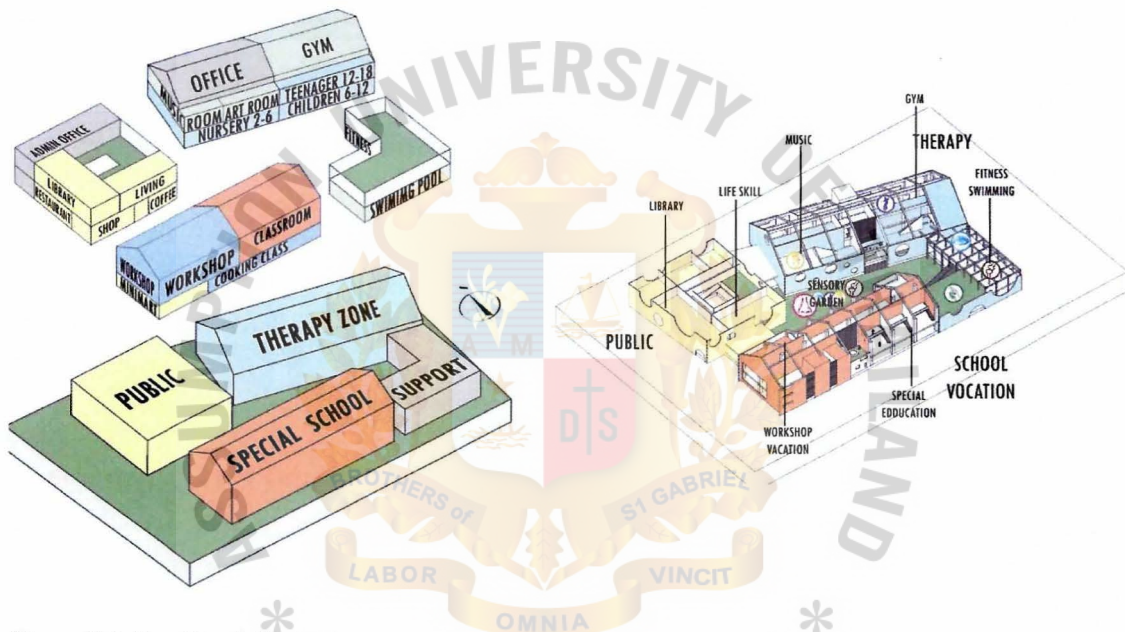
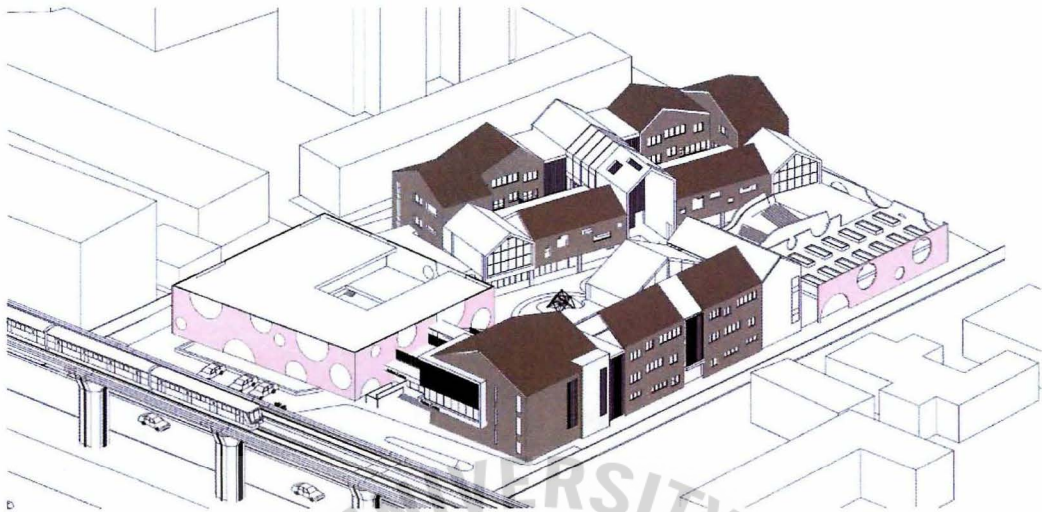


Figure 7.3: Functional diagram

7.3 Façade design

Designing façade is important because it can help people with autism to easily recognize the building. The façade can create the character to each building. The wooden gable roof stand for the therapy room and classroom, the white gable roof stand for the activity room and the circular façade stand for the common facility.



DIFFERENT LANGUAGE HELP AUTISM EASY TO
RECOGNIZE AND UNDERSTAND THE BUILDING

Figure 7.4: Façade diagram 1



Figure 7.2: Façade diagram 2

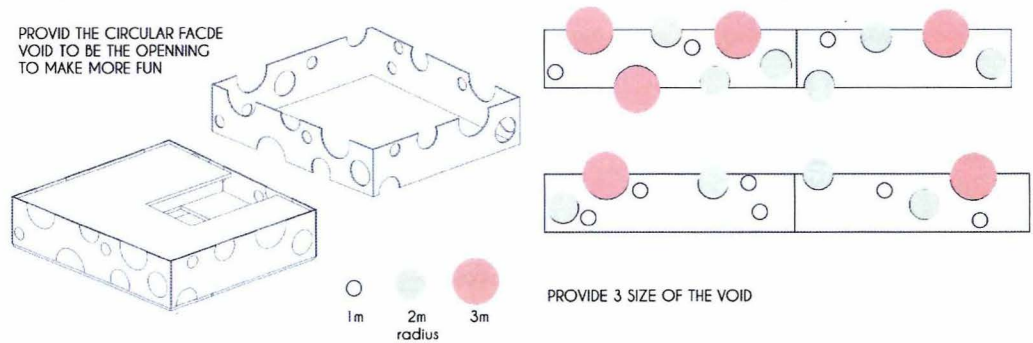


Figure 7.5: Façade diagram 3

7.4 Ventilation and lighting

People with autism prefer the natural lighting and ventilation. The building is designed to have the double façade on the side that sun travel pass to provide the indirect light come in the classroom, and also provide the opening in different place between outer façade and inner façade to control the view to avoid distraction to the user. Moreover, it provide the opening on the roof to let the hot air release on the top of the space.



Figure 7.6: Ventilation and lighting 1

In the special school provide the sky light and the glass floor on the third floor in order to let the light pass through the second floor space.

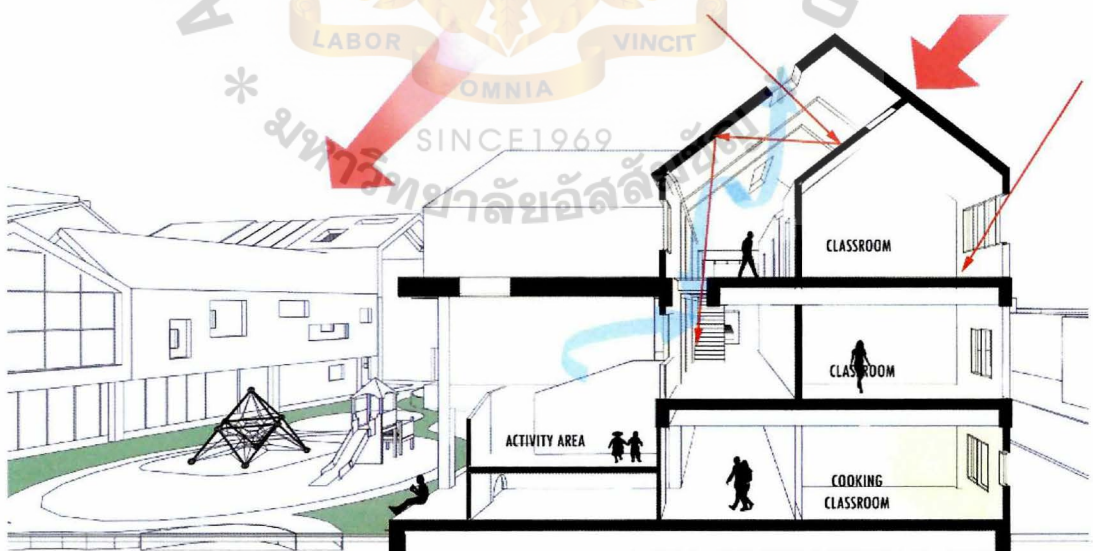


Figure 7.7: Ventilation and lighting 2

7.5 Layout

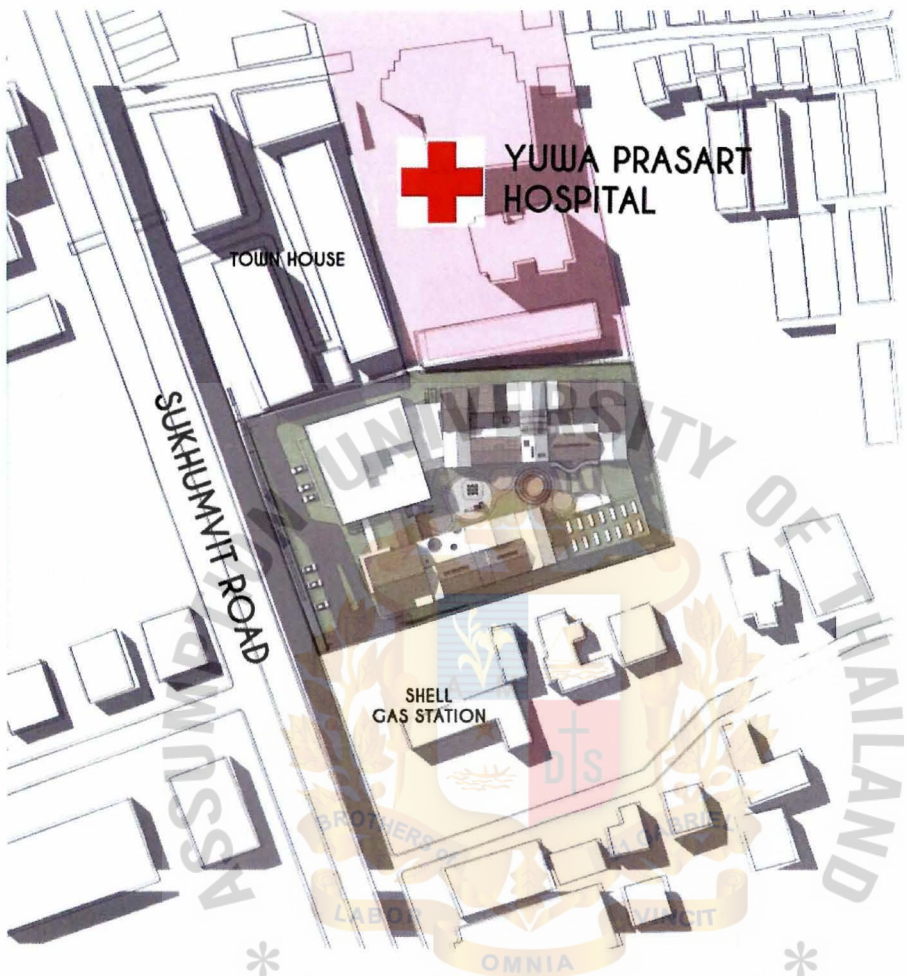


Figure7.8: Layout

7.6 Plan

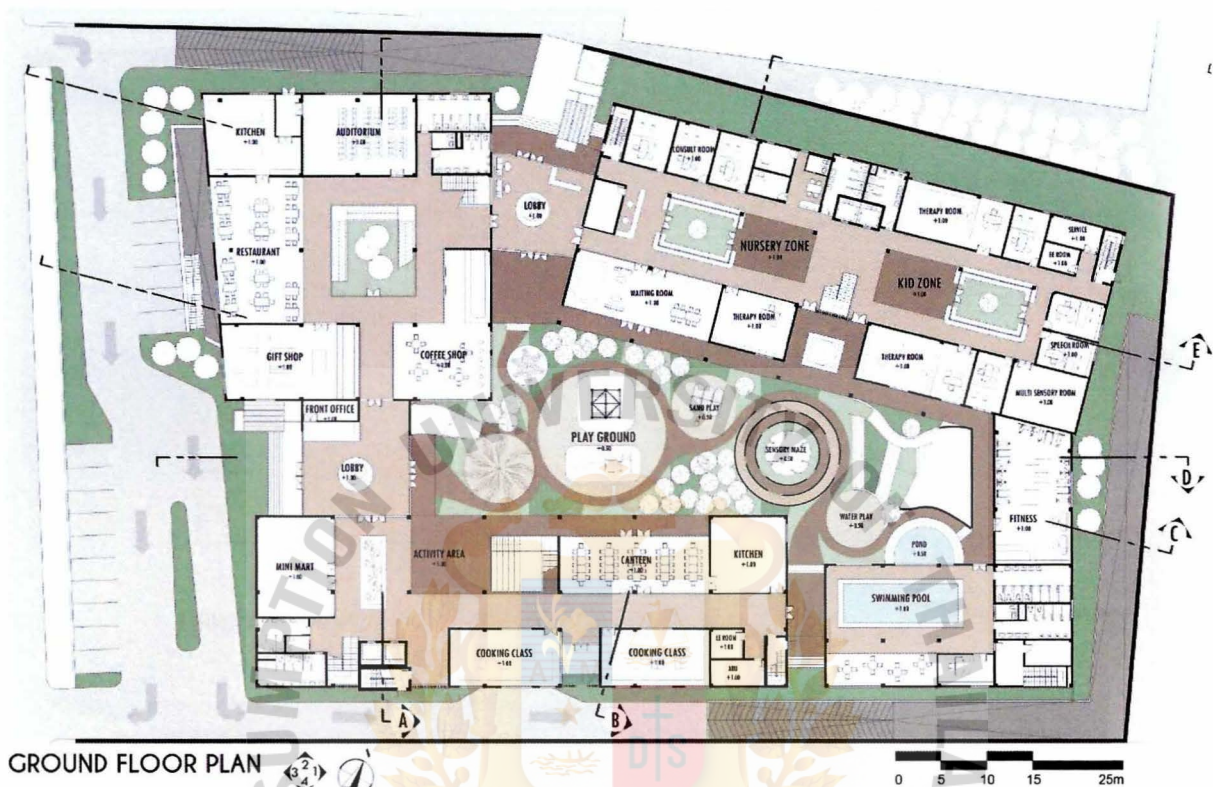


Figure 7.9: First floor plan



Figure 7.10: Second floor plan

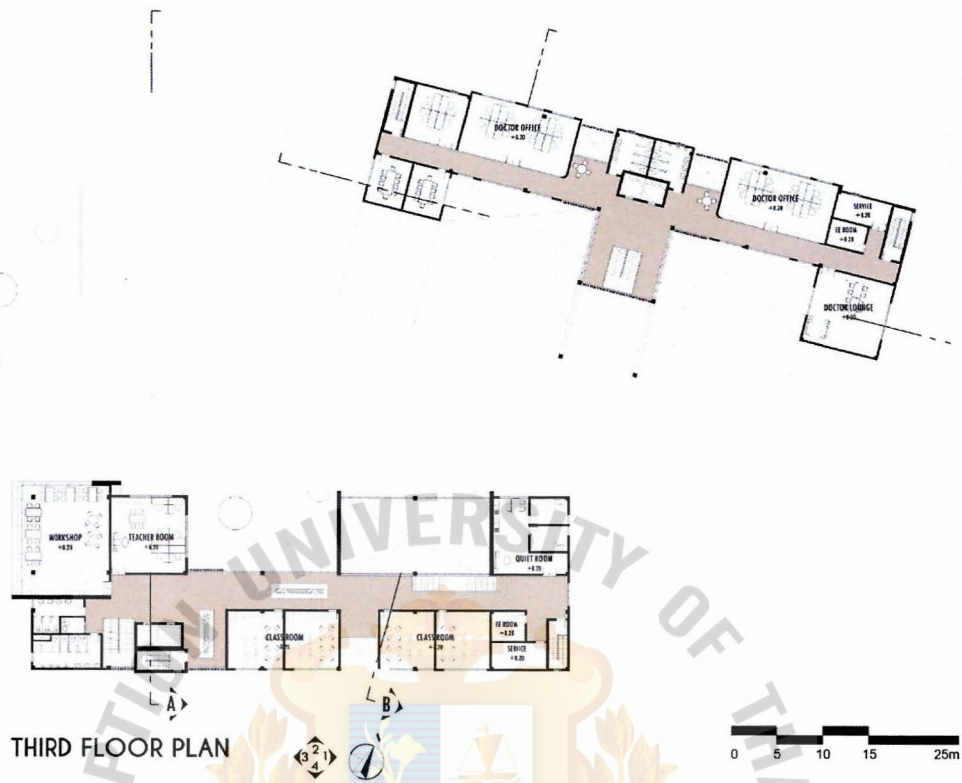


Figure 7.11: Third floor plan

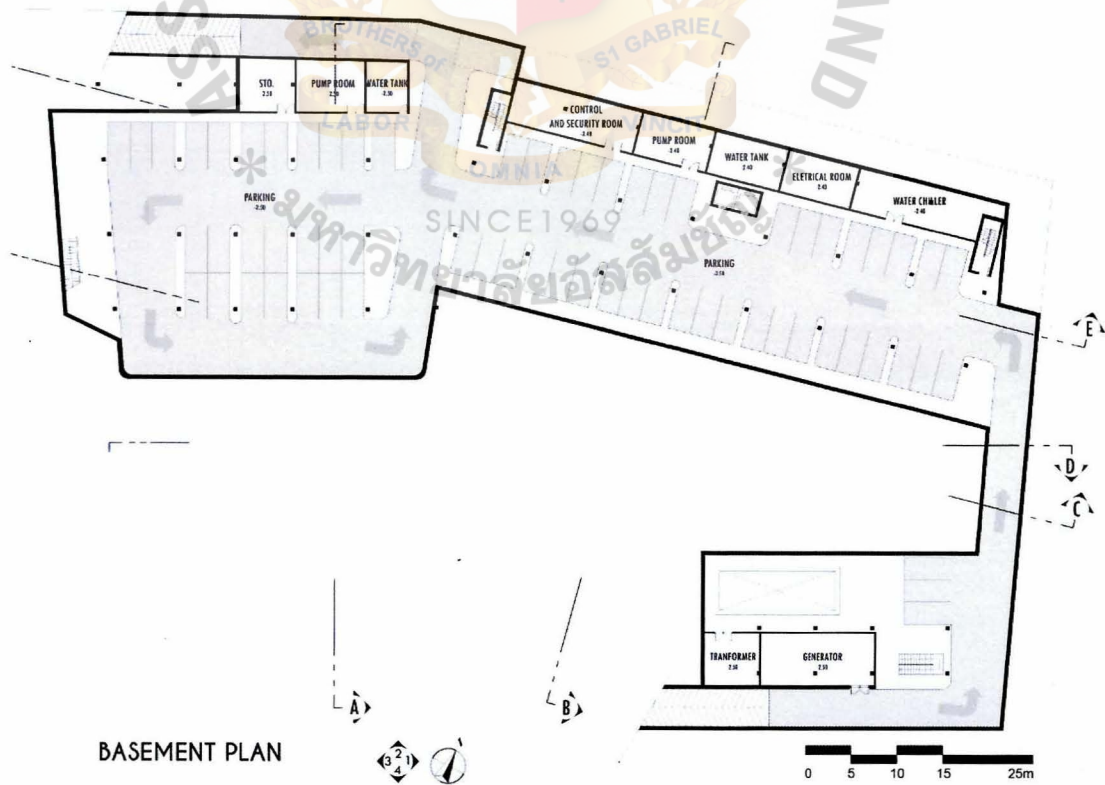


Figure 7.12: Basement plan

7.6 Elevation

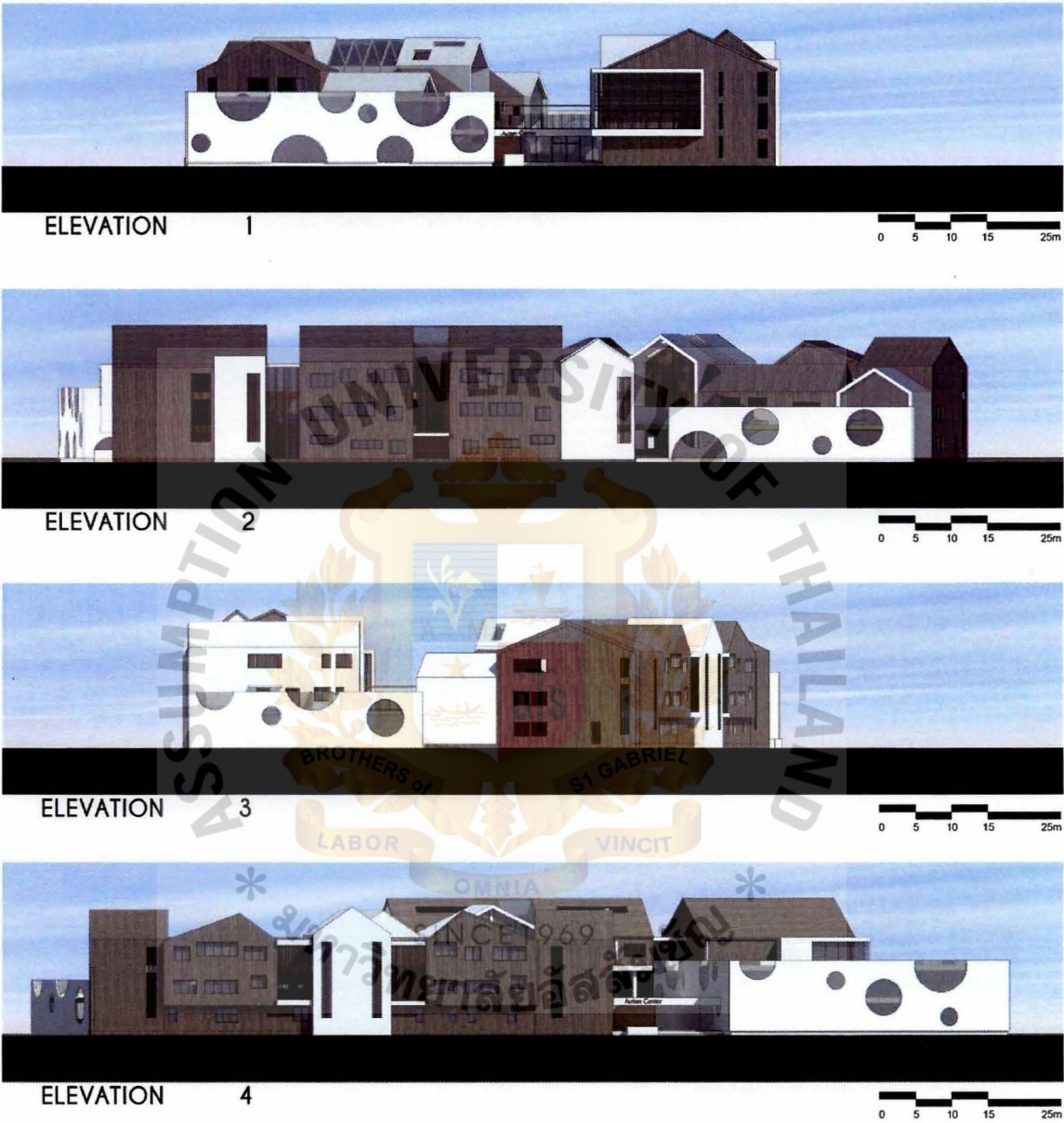


Figure 7.13: Elevation

7.6 Section



Figure 7.14: Section

7.6 Perspective



Figure 7.15: Main approach

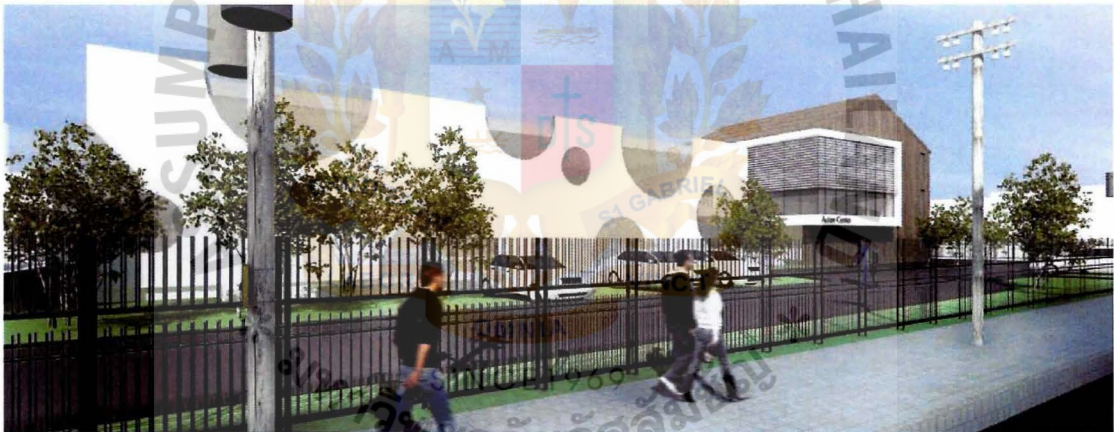


Figure 7.16: Basement plan



Figure 7.17: Sensory garden and Main playground

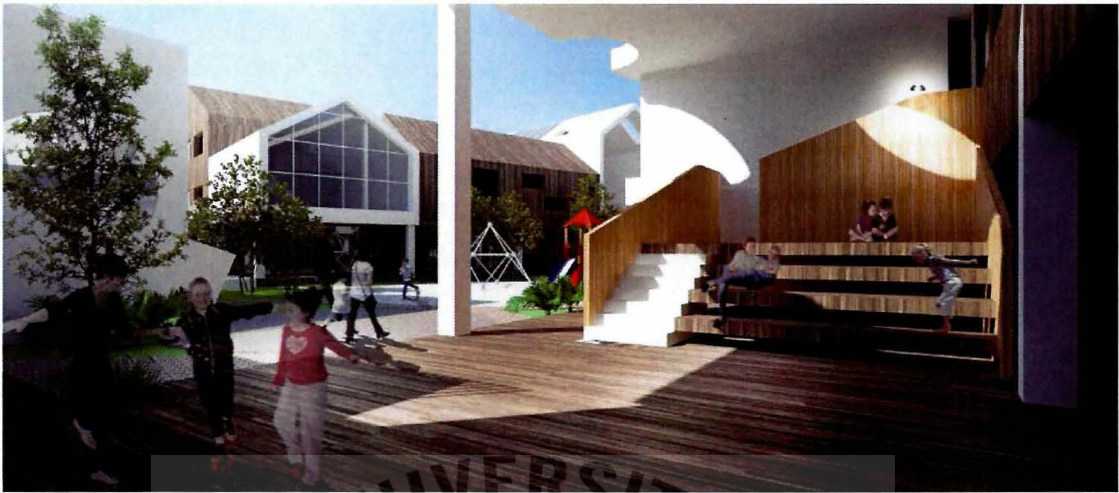


Figure 7.18: Activity area

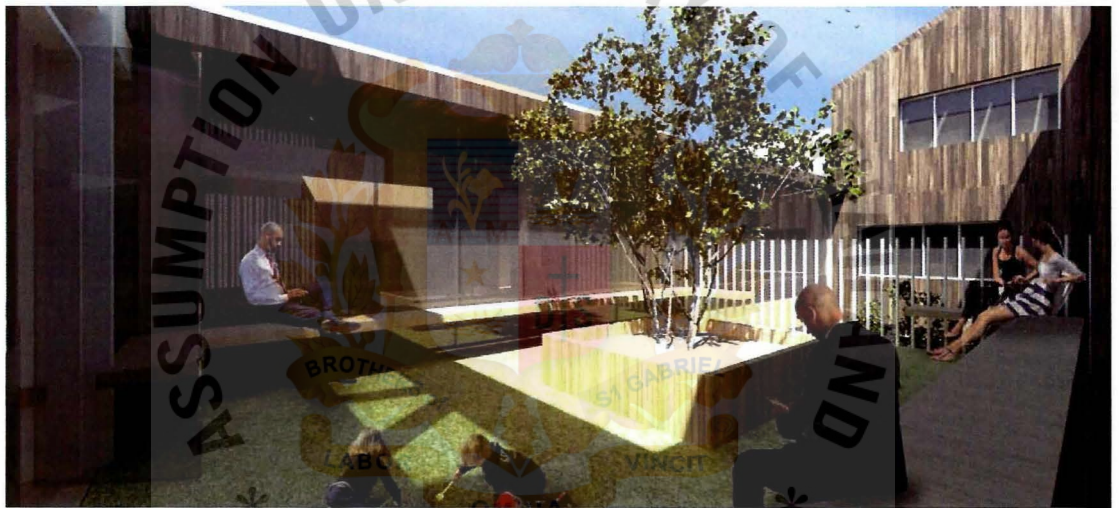


Figure 7.19: Relaxing area



Figure 7.20: Sensory maze



Figure 7.21: Reception area



Figure 7.22: Roof garden



Figure 7.23: Art classroom



Figure 7.24: School corridor



Figure 7.25: Library area

7.7 Model



Figure 7.26: Entrance



Figure 7.27: middle courtyard



Figure 7.28: Roof garden



Figure 7.29: Back side of the building



Figure 7.30: Courtyard



Figure 7.31: Skyview

Chapter 8: Thesis Conclusion

This thesis achieve the idea of the sensory intregation which include all of the senses of human. It also provide the learning space that can control the environment which can avoid the distraction around the site, which everypeople with autism can use the space to play and learn to improve their ability of living in daily life. Moreover the architecture can introduce the social space that can bring normal people and people with autism to have interaction to bring them out of their world.

Everone have their own needs and wants, which the architecture should respond to the need of each user. For people with autism their world are different form normal people like us. They see, hear and smell things different form us. So the architecture for Autism needs the special character that suit to their behavior and perception. To make their difficult life easier and help them to adjust and improve their ability to survive in the normal world with the normal people. Even though Autism sprectrum cannot be cured but they can live the world with us as the normal people.

Even though the architecture cannot cure the autism spectrum but architecture can help them to live easier and give their opportunity to be like normal people.



BIBLIOGRAPHY

Book Resources:

Brand, Andrew. "Living in the Community Housing design for Adults with Autism" A.J. Paron-Wildes, "Sensory Stimulation and Autistic Children", Implications Vol. 06 issue 04

Scott, Iain. "Designing learning spaces for children on the autism spectrum", GAP celebrating the first 10 years of the journal edit by Glenys Jones, 2009

Vasquez, Segado Segado. "Recent Advances in Autism Spectrum Disorders - Volume II", CC BY 3.0 license March 6, 2013.

Whitehurst, Teresa. "The impact of building design on children with autistic spectrum disorders" Good Autism Practice, Vol. 7 issue. 1, May 2006

Thesis Reference Resources:

Seangsutho, Siriluk. "Prototype classroom for autistic children", 5-7, Bachelor of Engineering, Engineering Ramkumhang University 2008

Tantiphaichit, Nattakun. "Playground for Autistic Children", Master of Landscape Architecture Program in Landscape Architecture Silpakorn University 2013

Wongwal, Rongrong. "Architecture and Children Movement", Master of Architecture, Department of Architecture Silpakorn University 2011

Web Resources:

Anonymous, "Autistic People who have their own world", Mor Chao Ban, accessed October 14, 2016 <https://www.doctor.or.th/article/detail/3121>

Anonymous, "What are the 7 Senses", 7 senses foundation, accessed August 2016 <http://www.7senses.org.au/what-are-the-7-senses/>

Autism awareness Thailand, "Red Flags of Autism", http://www.autismawarenessthailand.com/AUTISM_AWARENESS_THAILAND/Red_Flags.html, Access August 2016

Breaver, Christopher. "Autism-Friendly Environments". Christopher Breaver, accessed September 25, 2016, <http://www.kolpene.fi/img/kuntoutusyksikko/The-Autism-File-2010%20-Autism-Friendly-Environments.pdf>

Chonthanont, Benja. "Early Intervention: EI", Special Education center in Lumpang, accessed October 14, 2016, <http://www.lpnspecial.com/articles/42167088/index.php>

Hede architect, "Australia Northern School for Autism", Accessed November 2016, <http://www.hedearchitects.com.au/Northern-School-for-Autism/>

Meinhold, Bridgette. "Green Sweetwater Spectrum Housing Helps Adults with Autism Gain Independence", Inhabitat, Accessed November 2016 <http://inhabitat.com/green-sweetwater-spectrum-housing-helps-adults-with-autism-gain-their-independence/>

Raising Children Network, "Sensory sensitivities and ASD", raisingchildren, accessed November 12, 2016, http://raisingchildren.net.au/articles/autism_spectrum_disorder_sensory_sensitivities.html

Sirirutraykha, Thaweesak. "Autism Spectrum Disorder," happy home clinic, accessed August 10, 2016, <http://www.happyhomeclinic.com/au02-autism.htm>

The national autistic society, "What is Autism," The national autistic society, accessed September 25, 2016, <http://www.autism.org.uk/about/what-is/asd.aspx##See>

The national autistic society, "Sensory different," The national autistic society, accessed September 25, 2016, <http://www.autism.org.uk/about/behaviour/sensory-world.aspx>



