AKIJ FOUNDATION SCHOOL

KERANIGANJ CAMPUS

By

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A thesis submitted to the Department of Architecture
in partial fulfillment of the requirements for the degree of
Bachelor of Architecture

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Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing degree at Brac University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.

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Approval

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Abstract

A school is a place where children spend most of their time and this institution can shape up a brighter future by shaping up students, teaching the proper way of life. Understanding child psychology is essential for Educational institutes like schools that help to make children more interactive with education without making restrictions on the thinking process rather than helping to boost up their imagination. Interaction with teachers or peers motivates a school going child to explore and gain knowledge more from their surroundings. This enhances learning, promote social development, also, creativity enriches. Through learning with nature, it will help new generation to attain skills than the bookish knowledge.

As the children of Dhaka city are being deprived of proper outdoor play spaces, schools should incorporate more open spaces for their physical and mental development. As, in the design approach I tried to solve those lacking by providing needed functions for an educational institute like school and thus, it will help the children of the city to have a healthy, educative, communicative and a creative life.

Keywords: school, child psychology and education, learning through play, differentiation on age groups, integration with nature, green fields and courtyards.

Acknowledgement

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List of Acronyms

NGO   Non-Governmental Organization

UNICEF   The United Nations Children's Fund

SACAP   The South African College of Applied Psychology

°C   Degree Celsius

GFA   Gross Floor Area

CHAPTER 1: INTRODUCTION

1.1 Project Background

In 1950, Sheikh Akijuddin founded the Akij group, which is now one of the largest industrial companies in Bangladesh. It started with the tobacco business but now this company expands them and industries under this conglomerate include textiles, food & beverage, cement, ceramics, printing and packaging, pharmaceuticals, consumer products, etc. They are focusing now on the educational sector, in Uttara, Manikganj, Mohammadpur, Mirpur they had already built some schools and colleges for that community. They have a new proposal for a school in Modhu city, located in Keraniganj where new housing development is planned for future urban settlement. In Keraniganj literacy rate is 51.8%; where males 56.4% and females 46.5% and it has educational institutions: primary school 112, secondary school 38, college 8, technical college 1, madrasa 14 [1].

Modhu city is a township development in Keraniganj, 15 km away from Dhaka city, for the citizens it offers all the infrastructural development there which includes housing facilities with secured living conditions. In this township development, the Akij group has decided to build an educational institute for the citizens living in the township project and for the surrounding area. Akij group will fund this project and students near the area will be benefited from this project, directly and indirectly, it will increase the literacy rate of Keraniganj as well as Bangladesh by providing quality education with a great environment along with an emphasis on extracurricular activities such as music, dance, drama, debate and quiz, arts and crafts, innovations in science, etc.

1.1.1 Introduction of Project

In Bangladesh, the national curriculum of education says, a citizen has to complete 12 years of compulsory education that includes 8 years of primary section and 4 years of higher section for further education. As education is a basic need of a human being, for developing a country education sector has to be properly developed and have enough opportunities for the citizens. Based on a study of macro-trends, it says that the literacy of Bangladesh has increased from 29.23% to 74.68%, in 1981-2019, (see fig-1) [2]. Though there are a lot of problems like drop-outs, not having quality full environments of education, not having a safer environment for female students, etc but literacy rate is getting higher day by day.

Figure 1: Literacy rate chart

(Data source: World bank, Chart source: Macro trends)

(https://www.macrotrends.net/countries/BGD/bangladesh/literacy-rate)

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There are a lot of schools and colleges are in Dhaka city and around the city, some of them are government schools and colleges, and others are mostly operated by private owners or NGOs. As mentioned before, most of the school or colleges does not have the quality environment or space for education, as the literacy rate the educational quality of our country is not getting higher. Some private owners or NGOs nowadays try to bring back quality education in their institutes, among them, Akij is one of the private companies which is trying to give their students a proper education through their institute by ensuring quality education.

1.2 Scopes and Targets to achieve the scopes

This project finds the impact created on students due to different teaching environment and how different age group students' needs different types of spaces for experience gathering. With the interaction of nature, it would encourage students improving their communication-interaction skills, methods of learning and broaden their imagination.

There are some aims of the client (Akij group) for their new school which they have followed in their other educational institutions, they are-

- To promote a strong involvement with culture, heritage and language.

- To develop students' creative skills.

- Encourage to build strong foundations for further academic knowledge.

- Focus on social awareness and issues.

These are the common aims and objectives which Akij group wanted to fulfill in their educational institute. The target of this project is to fulfill the requirements of the client which are mentioned before, as Akij group foundation is following some decorum's in their educational projects. Throughout the research and design process, the target of this project

would be to co-operate with the schooling process of Akij group foundation and also there are some other aims of this projects which will fulfill, they are-

- Climatic considerations will be taken as design considerations

- To focus on student's mental health growth

- Provide enough breathing spaces like, outdoor playgrounds and gathering spaces; corridors where students can enjoy their leisure times

- Creating more semi-open interactive spaces where students and teachers can share their thoughts and broaden their thinking

- Develop students' intellectual, creative and moral qualities as well as practical skills at the highest possible level.

1.3 Project Summary

Name of the Project: Akij foundation school

Implementer of the Project: Akij group

Location: Modhu city, Keraniganj, Dhaka

Site area available for the

Project Development: 4.3 Acre / 7 Bigha

Proposed built-up area

of the Project: 151026 sq. ft.

1.3.1 Proposed Program of the Project:

- **Classrooms**

  For elementary to higher secondary classes, this academy needs proper number of classrooms.

- **Administration**

  Administration office is needed for continuing the program correctly.

- **Teacher's room and training center**

  Teacher's room and training center is very important in any kind of academic project.

- **Laboratories**

  Different types of labs will help students in gathering knowledge by experiencing experiments.

- **Vocational classrooms**

  Vocational workshops are included in here for making students more experienced.

- **Recreational facilities**

  Auditorium, multi-purpose hall, library – these programs includes here.

- **Common facilities**

  Guest lounge, sick bed, prayer room, common room facilities are providing for the students and others.

- **Sports facilities**

  Indoor and outdoor game facilities are must in an academic project.

- **In house stationary shop and printing**

  Stationary shops and printing press are providing for the students.

- **Storage area**

  Proper amount of storage area is a must.

- **Ancillary facilities**

  Substation, generator room, guard room is very important in this type of project**.**

- **Parking**

1.4 Project Rationale

The educational sector is an important sector of Bangladesh and is directly related to the country's growth and progress. With a great number of populations to serve, many educational institutes are built but very few of them have quality educational environments which lead students to a healthier growth mindset and helps to bring up their point of interest. Mostly, for serving a lot of students every year, it is difficult for many of the schools to maintain a quality environment of study which turns out to be a threat to society because students in this time are being less interactive with others and less attractive to the social works, etc. If proper open spaces and fields can incorporate in schools, then the learning system can be turned from boring class-based lectures to interactive class lectures with experiments and a touch of nature which can help students to think bigger and broaden their mindset.

Akij group's aim is to build a school where students can learn through a friendly environment and as well as experience on their own. That's why they wanted to build this new school with very interactive spaces also, wanted to create some spaces which help parents and students both

build up their mindset. This school is not only for teaching syllabus-related education but also teaches moral values, physical, intellectual education to prepare themselves for the future. On the other hand, Modhu city is a township development growing in Keraniganj, it needs some necessary facilities for the housing development. The educational institute will encourage people more to live in this township. And as this site is near the city it will serve a lot of students around it. It will facilitate the township project with this akij foundation school by providing a playful environment for the students.

 Adding a twist to the project by introducing new functions that have been previously lacking from that area's other schools, people of this area will be benefitted from this school and students shall be more interested to come into school. It is aimed to be a place where students come not only to gain bookish knowledge but also, can enrich their mindset by taking place in different types of activities. In this way, the project can be beneficial in the future educational growth of Bangladesh with the added program along with the previous ones given by the client.

CHAPTER 2: LITERATURE REVIEW

2.1 Historical evolution of Education

From the start of hundreds and thousands of years, humans are being educating themselves through self-reliant play and exploration. Humans are using signs to express their feelings and show signs to accumulate intelligence and information, additionally, learn education by living their standard of living. Wall paintings, hieroglyphs, etc. have found a few years past that indicates the education or learning system at that time being. Early human beings were learning things from sharing food or assembling them, creating shelter, and so on, within which early

style of learning is included, they learned through learning language, inventing a weapon, feat the values behavior and non-secular rites or practices of a given culture. In sum, for a long amount of time, this was the training methodology of humans that was to follow their adults and learn from them. However, the human instincts to play and explore are so powerful that they can never be overwhelmed by a toddler. Over time for numerous reasons, some spiritual and a few seculars, the thought of universal, gradually education arose and gradually spread. In a research by Peter gray that discussed about how educative instincts of the hunter-gather community form education basis of this time [3]. People need to struggle with the surroundings they lived in, additionally with the animals and other humans back in thousand years back. Barbarian communities survived through learning and exploring nature and their method of life was centered on ability and information instead of labor as they foraged through the landscape to search for food and shelter. They educated their kids through an equivalent means that by permitting them the liberty to find out for themselves that instilled power. Later, agriculture was discovered, the approach to living had modified drastically. Rather than living a roving life and harvesting food from nature, the supply of food had become stationary for them. Dwellings of human settlement arose in addition because of the population and accumulation of property. For survival, humans had developed skills that grew into cultural and academic patterns and with the succeeding generations, the data passing from the one usually became progressively higher. Through these struggles for survival and enlightenment, humans have bit by bit developed the associate in the nursing education system for them to follow.

Peter gray mentioned in another writing that within the mid-17th century, in America, Massachusetts became the primary colony to mandate schooling and it declared the aim of that was to show kids into smart Puritans. Starting in 1690, kids in Massachusetts and adjacent colonies learned to scan from the New England Primer, identified conversationally as "The very little Bible of recent England"[4]. Now, during this time, the education system and its

method modified a great deal from the start and it currently becomes substitutable with school. By definition education currently defines the method of gaining data and developing the data, skill, mind, character. According to Wikipedia, Education means inculcating ethical values, positive thinking, the angle of serving, the angle of giving to society, and moral values these varieties of students are solely ready to bring changes in society [5].

Principally there are three styles of instructional systems within which informal education is related to learning noninheritable from social interaction and processes that crop up reception and equally the tactic of learning of the past came to be considered a case of informal education. The formal schooling system is why changing into standard, to understand the very fact one should grasp the historical perspective of schooling and in addition as different styles of instructional philosophies associated with colleges. The word school came from the Greek word "schole" and they have introduced an academic system that was dedicated to different age teams, they stressed education for associate in nursing early age to arrange themselves for war and physiological condition. For later half, they centered on philosophy and rhetoric aspects in preparation for public life. In different elements of the traditional world, distinguished samples of formal education were evident within the geographic area, China, and the Republic of India, and their systems of education usually stressed reading writing, and arithmetic. In the fifteenth century, step by step schools are began to develop their rules and laws and generated developed systems for them. Also, schools have begun to develop a course of study with the support of the printing press [6].

2.2 Child psychology and education

From many of the branches of psychology, child psychology focuses on a child's growth from the prenatal stage to adolescence. It focuses not only on how children are growing physically

but also their mental, social, emotional development grows accordingly. Jean Piaget is considered the founder of child psychology where he supported the idea that shows the thinking process of children is different from adults. Children are passing through different stages of emotional, social, and physical development throughout their childhood, which is one of his major contributions to understanding children's psychology. These days, psychologists discover that the psychology of a child is very complex and unique, however, there are various terms under approaching development. Albert Einstein announced that the invention was so simple that solely a genius may have thought of it [7]. There is some major context that we should consider in realizing child psychology which helps parents and teachers to understand children and how they can support them in their needs. Socio-economic context, cultural context, and social context play a vital role among these which shapes up against other things. Social context creates relations with the adults and peers and kids learn how to learn, develop, and help to think. Family, teachers, and the same age group make social context for children. Cultural context helps a kid to learn a set of values, ways of living, and customs throughout their lifespan; mainly from parents and their childcare patterns, kids learn cultural context. Though the socio-economic context is a bigger issue it also creates an impact on child psychology. Socio-economic context makes difference between lifestyles of different children, from a stable socio-economic background family a child can ensure fundamental things like health care or quality education whereas, on the other hand, it will be difficult for the others [7].

Research from SACAP explained some other basic areas of the child psychology that parents and teachers have to acknowledge for supporting kids' proper growth. These are-

• Development

• Milestones

- Behavior

- Emotions

- Socialization

The first basic area is development which includes physical, cognitive, social, and emotional development. They all are interlinked and this part mostly talks about how physically a child grows and along with that their cognitive or intellectual thinking grows. They started to gain knowledge from different sources; helps their imagination-reasoning and language skills. Confidence, trust, fear, or pride are all these kinds of senses of humor they learn under social and emotional development. Secondly, milestone developments explain how a child actor in which age and their problem-solving capacity or thinking capacity. By this developmental skill, kids started to show their common skills of communication, started to walk or grasp things. Another most important basic area of child psychology talks about developing behavioral patterns. Surroundings, peers learning can create an impact on kids' behavioral patterns in childhood. Any kind of problem in the family is directly linked to the upbringing of children's behavior. Sometimes children are difficult to handle which are their age norms but in other cases, it can also be connected with the health problems of that kid. In addition, children are very responsive to emotions, like how and why something happens, moreover, kids can recognize others feeling as well as shows their own whenever needed. From the very beginning of a child, very common emotions started to grow and over time they can share complex emotions through their works. This part is important to understand for parents at home and when they started to go to school, teachers should be aware of this also. Then, last but one of the most important ones is socialization development. It is interrelated to social development that involves learning social values and skills and implies that positively to family, society, school. From parents, they started to learn caregiving to others, and with time with peer

learning, they involve in knowledge gathering and attain skills. With other children, they learn how to communicate with them and keep social interactions through play. Through play, children develop other qualities like friendship, compromise, group work, and so on. Socialization of children is closely connected with play which is also connected with the other basic areas discussed before [8].

2.2.1 Learning through Play

Children develop life skills through play and communication skills among the family and peers. It is described as a more important learning tool than academics in an article published on January 17, 2012, in The Atlantic. It also stated that now a day's children do not have adequate spaces for play and the environment of their surroundings does not let them play as much they needed. While improved academics are a very important goal, it is also emphasized that the organic process of play should not be forgotten and therefore the edges of play should not be listed off in favor of academics. So, as to create healthy brain connections from the beginning, young kids would like responsive and wealthy social interactions with caregivers, combined with adequate nutrients and a setting free from toxins. Playful experiences supply a singular context for these auxiliary and wealthy learning experiences in early childhood. According to the authors, the socio-economical stage of a child creates a barrier to play. Underprivileged children have less access to school-based creativity activities and engage more in the family earning process or parents could not afford resources to engage in playing. Moreover, parents and children interact the most through play, and by this child can learn social skills and communication skills [9].

We want to acknowledge that its downfall can have an enduring impact. Decades of persuasive analysis have shown that while not playing, children's physical, social, emotional, and intellectual development is compromised. They are going to develop while not abundant

imagination and creative thinking. Their capability for communication is reduced and their affinity towards aggressiveness and violence can increase. In short, attribute as we've got identified it will be deeply modified, increasing several of the issues that are already afflicting youngsters and society. If we tend to do not invest life, we are going to notice ourselves investing way more in prisons and hospitals, because the incidence of physical, and psychological state, further as aggressive and violent behavior will increase [10].

2.2.2 Education paradigm

By a theory from online writing of Teaching for Transformation, it talks about various types of paradigms of education that shape the whole education structure and display the system of education. Paradigms of education are important because it shows the typology of teaching and outcomes by those teaching methods that can help to understand how students can learn by those teaching patterns and what types of the curriculum is being followed [11].

Between six types of education paradigms, behaviorism and cognitivism have the most influence in our education system, however, the most effective one for the education system is constructivism (see fig-2). Learning theories and applying them in designing schools were practiced in the early to mid-twenties, but this time, the education system just focuses on mass learning rather than ensuring what students need. These pedological theories are very important issues to think about and have to be applied and followed whether in designing a school or planning for an educational system [11].

Purpose of education	Desired outcome of learning	Key principles	Examples of medical education practices	Key theorists
BEHAVIOURISM				
To shape desirable behaviours	Change in form or frequency of observable behavior	Emphasis is on producing observable and measurable outcomes; student is a blank slate; teacher shapes behavior through reinforcement	Competency checklists; recall-based multiple choice examinations; repetition and reinforcement	Pavlov Skinner
COGNITIVISM				
For learners to remember and apply information	Perceiving information, processing, storing, and retrieving this information (memory) and applying it (transfer)	Emphasis is on structuring, organizing, and sequencing information in the mind to facilitate optimal processing.	Integrated instruction; test-enhanced learning; spaced practice	Neisser Sweller
COGNITIVE CONSTRUCTIVISM				
To enable learners to acquire and create new knowledge	Actively constructing knowledge on foundations of previous knowledge	Teacher facilitates the use of problem solving skills that allow learners to go beyond the information given	Productive struggle; contextual variation; dynamic assessment; problem-based learning	Piaget Vygotsky
SOCIAL CONSTRUCTIVISM (SOCIOCULTURAL)				
For learners to form identity and co-create knowledge	Co-constructing knowledge and norms through social interaction	Emphasis is on human relationships; learning through participation (activity) in social contexts (communities)	Cognitive apprenticeship; workplace-based learning; communities of practice	Lave & Wenger Brown & Duguid
HUMANISM				
For learners to develop the potential for self-actualization	Personal growth	Focus is on human freedom, dignity and potential; curriculum addresses affective and cognitive needs	Self-reflection; portfolio based assessments; self-directed learning	Rogers Maslow
TRANSFORMATIVE				
To create change agents who will improve societal structures	Changing ways of seeing (transformation)	Emphasis is on equity and social justice; learners are agents of change	Critical reflection/ reflexivity; dialogue; stories/narratives	Freire Kincheloe

Figure 2: Education paradigm

(Source: Teaching for Transformation)

(https://www.teachingfortransformation.com/paradigms-of-education/)

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2.3 Educational system in Bangladesh

By the time, this schooling system has fully grown in the Indian sub-continent, and also the education system that we tend to see in today's Bangladesh is largely inheritable from British-India. growth of education among the mass folks started throughout this era of time. However, Bangladesh's independence of 1971 opened the door for the country to adopt development methods in all sectors of human life, as well as education sector development. On January 2020, "The financial express" published a report that stated our country has undoubtedly created outstanding progress within the field of education over the previous few decades. The govt. policies relating to the development of this specific sector, community initiatives, and involvement of the non-government organizations (NGOs) put together, created this doable [12]. In Bangladesh, the education sector runs beneath the ministry of education, and a citizen should undertake twelve years of required education that consists of five years at primary education level and seven years at secondary education level and it again divided into three divisions-junior secondary, secondary, higher secondary level [13].

The main education system of Bangladesh is split into three sectors, they are-

- Primary level
- Secondary level
- Tertiary level.

undergraduate postgraduate

Doctoral degree
(PhD)
3-4

Master of Philosophy
(university)
2

Master's degree
(university)
1

Master's degree
(degree college)
2

Bachelor's degree honours
(university/college)
4

Bachelor's degree (Pass)
(degree college)
3

Entrance examinations

Higher Secondary Certificate (HSC)
(higher secondary education)
2

Diploma
(vocational education)
2-4

Secondary School Certificate (SSC)
(secondary education)
2

Certificate
(vocational education)
1-2

Junior secondary school
(junior secondary education)
3

Primary school
(primary education)
5

Figure 3: Education system of Bangladesh

(Source: Nuffic | 1st edition, October 2012, Version 1)

Also, educational board systems are supported the national course of study which has Bangla medium and English version and Madrassa education, another one relies on English-medium school that follows the international course of study of education.
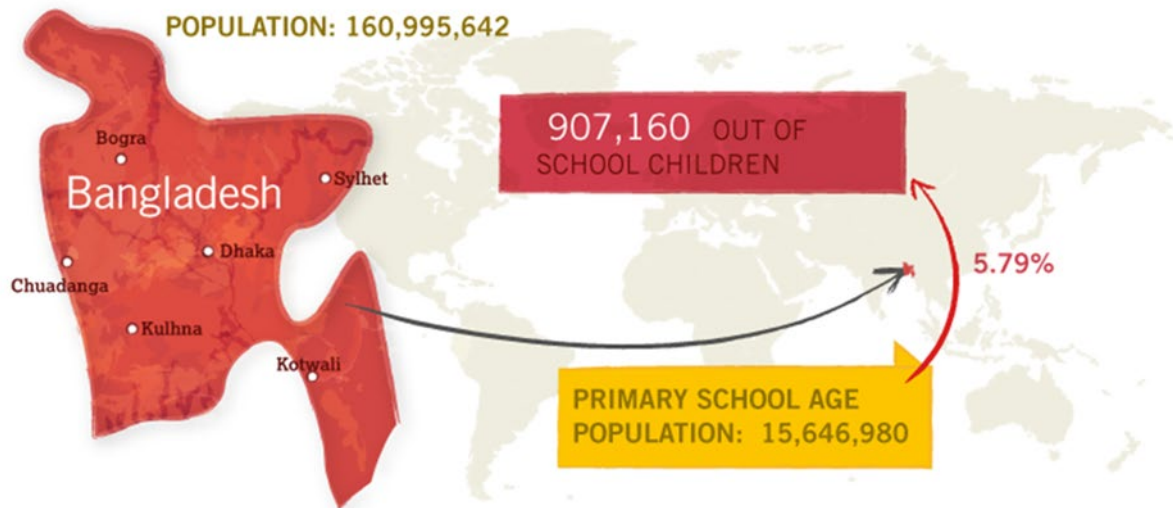
Figure 4: Educational statistics of Children

(Source: UNESCO institute for statistics - Current as of July 2016)

(https://educateachild.org/our-partners-projects/country/bangladesh)

In the capital of Bangladesh Dhaka, twenty-one million individuals live here and among them, roughly 40 % of the population are aged up to fourteen years old, but 600,000 of them are out of the academic system through education is that the basic need as a citizen of the country, according to UNICEF [14].

In 2010, the administration beneath Prime Minister Sheikh Hasina shaped a commission to line up a couple of basic required goals to attain what was antecedently declared within the constitution in 2000. The fundamental goals of the national education system are shortly explicit as-

• Provide Free Education

• Create a unified educational program

• In addition to teaching students reading and writing, instill among students' values that may be the mark of the education.

• Instill in students a progressive and scientific outlook freed from superstitious notions and communalism and prepare them for any studies.

• As several students' primary education could also be, the very best level provides students with skills to enter a career or enter business schools.

• Increase enrollment and retention.

School type	No. of school	Total teachers			Total students		
		Total	Female	% of female	Total	Girls	% of girls
Govt. Primary School	38033	222652	144434	64.9	10188129	5252022	51.6
New Nationalized PS	25008	96460	47396	49.1	4483785	2278239	50.8
Total government school	**63041**	**319112**	**191830**	**60.11**	**14671914**	**7530261**	**51.32**
Regd. NGPS	193	771	464	60.2	38282	19611	51.2
Non-regd. NGPS	1744	6649	4716	70.9	256268	127112	49.6
School for Autistic	33	282	246	89.2	10652	5250	49.3
Ebtadaee Madrasah	2673	11673	2300	19.7	372277	181341	48.7
Kindergarten	16170	93799	54813	58.4	1988365	914016	46.0
NGO School	2512	5454	3764	69.0	210170	107898	51.3
Community School	120	405	322	79.5	16747	8679	51.8
Attached to High Madrasah	5526	19764	2812	14.2	871047	427341	49.1
Primary Sections of High School	1511	8301	4450	53.6	572751	295659	51.6
BRAC	7779	7798	7277	93.3	324438	185873	57.3
ROSC School	3818	3591	2867	79.8	106884	53751	50.3
Sishu Kollyan Primary School	133	410	277	67.6	15665	8284	52.9
Other Schools	3262	4875	2967	60.9	97519	48808	50.0
Total:	**108515**	**482884**	**279105**	**57.8**	**19552979**	**9913884**	**50.7**

Non-English medium school	108515
English medium school	196

Table 1: Number of primary education institutions, teachers and students, 2018

(Source: Wikipedia)

(https://en.wikipedia.org/wiki/Education_in_Bangladesh)

Currently, there is 13 sort of schools that are following the program and standards represented within the constitution. The table above is showing the information on the school that supported a survey in 2018 [15].

2.3.1 Educational condition in Keraniganj district

Keraniganj is located near the Buriganga river on the south-east side of Dhaka city with a population in total 603114; male 322732, female 280382 (by 2011 census of Dhaka city) and the literacy rate of this district is 51.8%. In the Keraniganj district, there are college 8, technical college 1, secondary school 38, primary school 112, madrasa 14; in which 102 of the primary schools are government primary schools and 10 of them are non-government primary schools [1]. In these educational instructions, they are not sufficient enough and not full filling enough the need of a citizen and those schools are mostly not built as per requirement or standards.

2.4 Design standards for a school

- **Planning and organization**

Figure 5: Types of planning for school
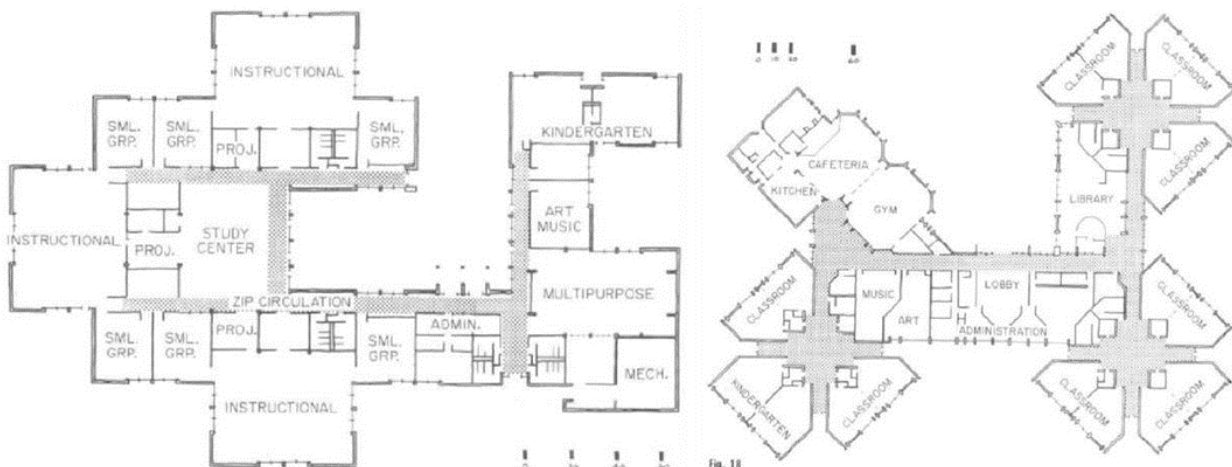
(Source: Neufert, 3rd edition)

Figure 6: Organizing spaces for children center

(Source: Neufert, 3rd edition)
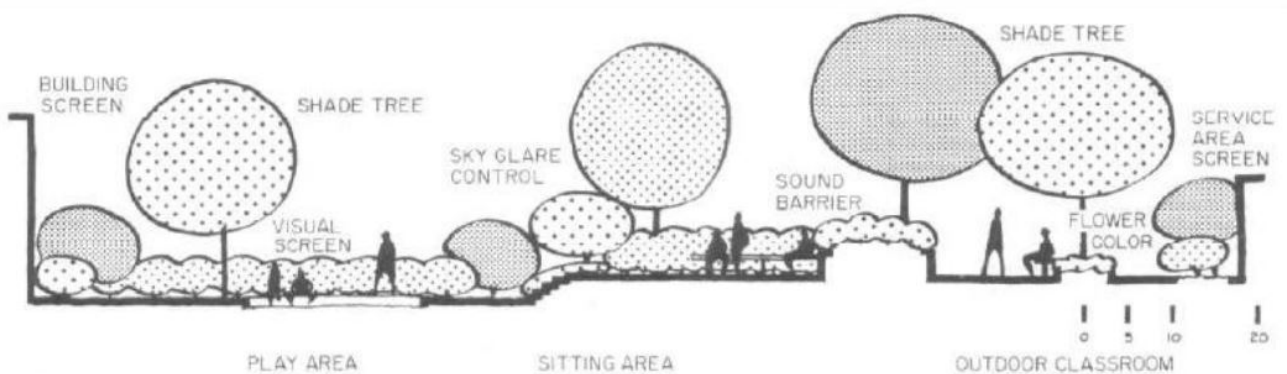
Figure 7: Indoor-outdoor space relation for school

(Source: Neufert, 3rd edition)

- **Classroom standards**

TABLE 4   Classroom Capacity for High Schools

Type of space	No. of units	Capacity of units	Total capacity
Classroom	19	x 27	513
Science laboratory	3	x 25	75
Commercial education	4	x 25	100
Home economics	2	x 25	50
Art	1	x 25	25
Shop	3	x 20	60
Band or chorus	2	x 35	70
Gymnasium, playroom	1	x 35	35
Gymnasium with partition	1	x 70	70
General education laboratory or study hall		x 35	
		Maximum capacity:	998
		Optimum capacity at 80 per cent utilization:	798

standard classroom
square or rectangular 65m²
with furniture in rows
and freely arranged furniture

32–40 places

(7) **Rooms and areas for general-purpose teaching**

30–36 places
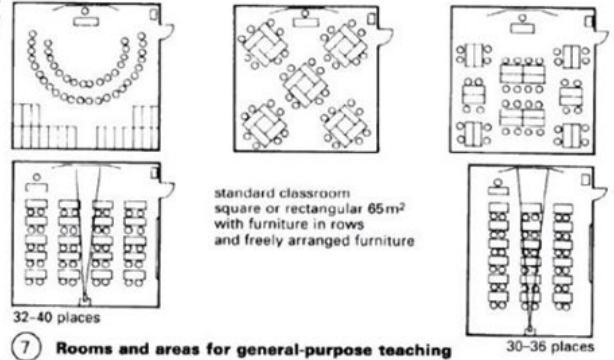
Figure 8: Standard for capacity of classroom

(Source: Timesaver, 3rd edition)

CONSTANT SIZE ROOMS

VARIABLE SIZE ROOMS

TEACHING CENTER
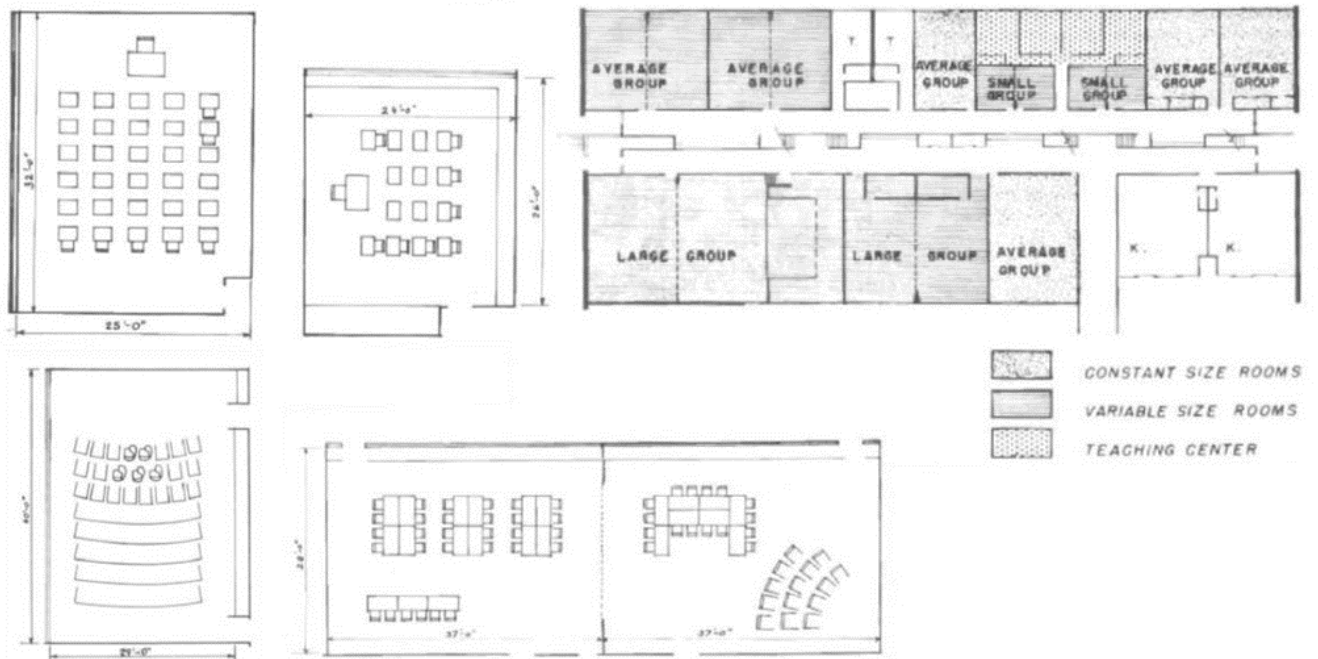
Figure 9: Various classroom dimensions

(Source: Timesaver, 3rd edition)

- **Laboratory standards**
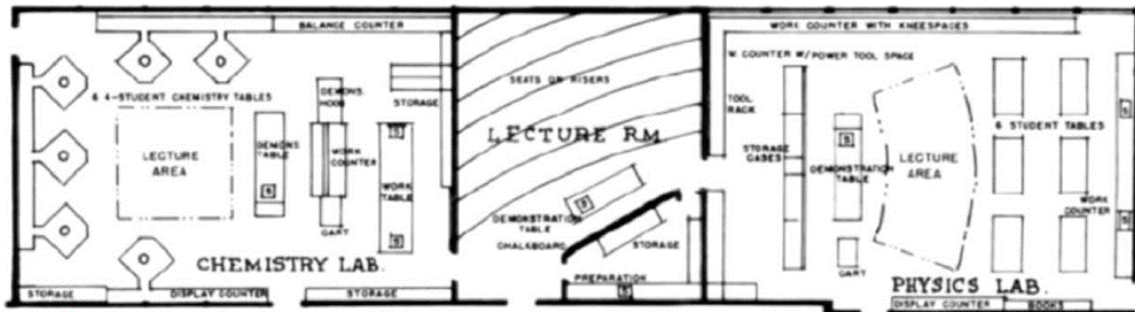
Figure 10: Standard for chemistry-physics lab

(Source: Timesaver, 3rd edition)
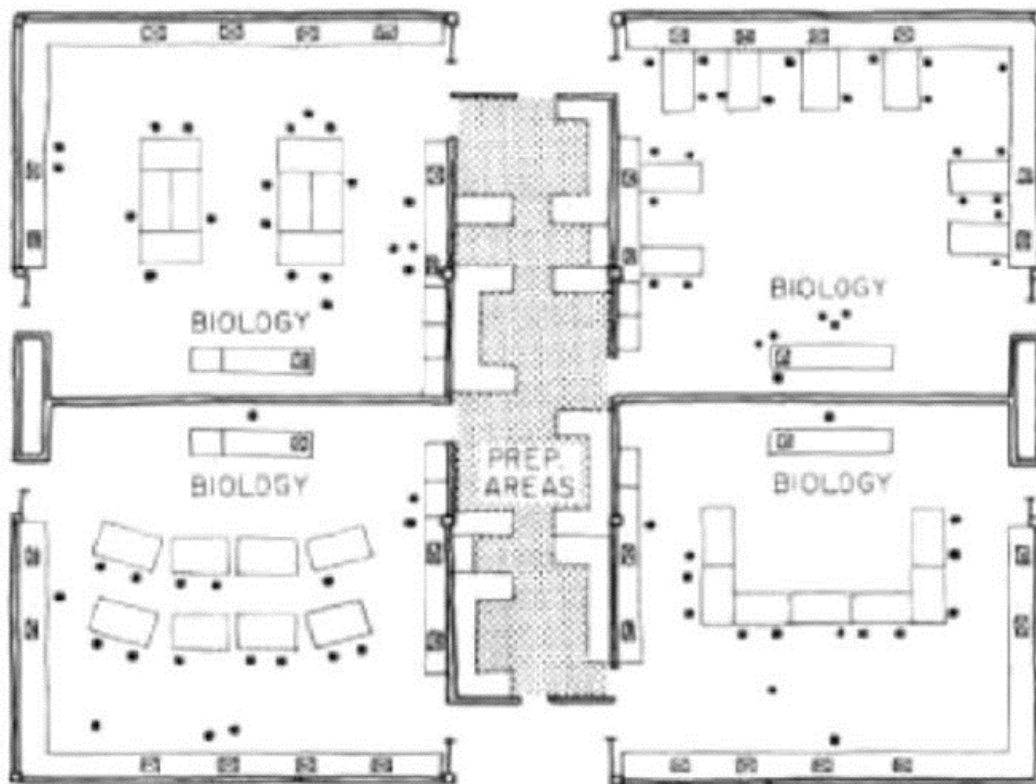
Figure 11: Standards for biology lab

(Source: Timesaver, 3rd edit)

CHAPTER 3: SITE APPRAISAL

The proposed site (see fig-12) is located Modhu city, phase-2 in the region of Keraniganj, is suitable for this school project. Keraniganj is located near the Buriganga river on the south-east side of Dhaka city with a population in total 603114; male 322732, female 280382 (by 2011 census of Dhaka city) and the literacy rate of this district is 51.8%. In the Keraniganj district [1].

The following are the reasons to be followed for the proposal:

- Modhu city is 8km far from Dhaka "0" point and takes almost 2 hours to reach here.

- Proposed plot is near the main road connected with Keraniganj main city, named as "Ati bazar road"

- Within 800m radium of this proposed site, there is one government primary school

- This phase-2 development focuses on developing housing and mixed-use structure.

Figure 12: Proposed site map

(Source: Author,2021; based on Google earth)

3.1 Site surroundings

3.1.1 Surrounding built forms

The site surrounding of the Akij school is still under developed area as it is a township project which named as Modhu city, Phase-2. Most of the area around the site just have a boundary wall for dividing a plot, surrounded with a lot of greeneries. Other sides of the plots mostly have 2-4 storied buildings.

3.1.2 Existing structure

There is no existing structure on the site right now.

3.1.3 Visibility of the site

The proposed site is visible from the normal eye level and linked from four sides of the site, north-south-east-west through road connection. Secondary road acts as main connection road for the plots and the proposed site it connects from the west.

3.2 Historical Development of the Site

It is said that from the Mughal time when Nawab Shaista Khan rules this sub-continent, his clerical staff called as "kerani" who stared to living this side of Buriganga river and the place is named after them. Keraniganj has population in total 603114; male 322732, female 280382 (by 2011 census of Dhaka city) [1].

Figure 13: District map of Keraniganj, Dhaka Division

(Source: Author,2021; based on Google earth)

3.3 Geographical Characteristics of the Site

3.3.1 Topology

Around this site there are mostly open fields, mostly on the east side, apparently, they are still now using for cultivation. The proposed site for school, is a flat land.

3.3.2 Vegetation around the site

The site is surrounded by green fields and trees mostly on the east, other sides have trees but, in less amount, than east side (see fig-14,15). This can force the consideration taking for design.

Figure 14: Vegetation map

(Source: Author,2021)
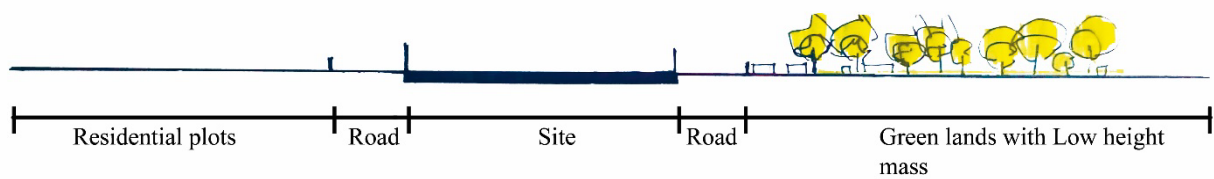
Figure 15: Section of the site

(Source: Author,2021)

Figure ground map of the surrounding of proposed site indicates the ratio of built-unbuilt situation right now (see fig-16).
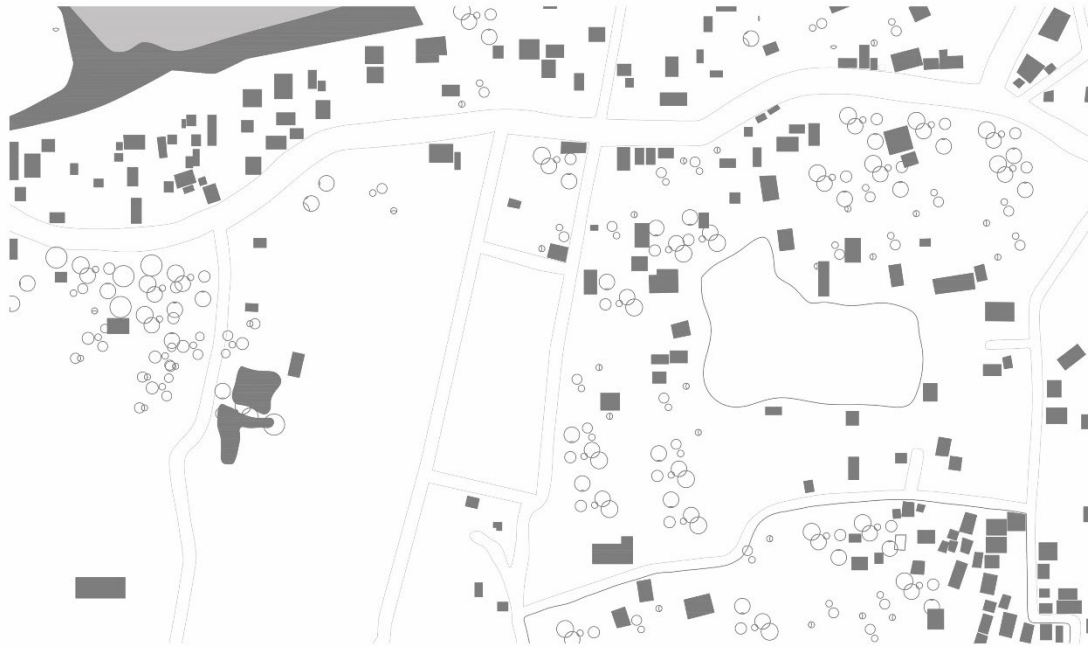
Figure 16: Figure ground map

(Source: Author,2021)

3.3.3 Soil condition

Modhu city, phase-2 is developed for mid-rise housing development, that is why the soil condition of this site is fairly good and its capacity is high enough to take loads of mid-rise structure.

3.3.4 Landscape around the site

As this township development is not completed till now, this site is surronded by mostly with flat land and some waterbodies which has a connection with buriganga river on the east. As it is a urban infill site, open green areas are noticed in the north, east and south side (see fig:17-20).

27

Figure 17

Figure 18
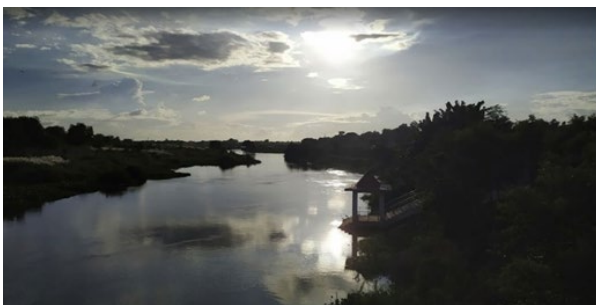
Figure 19

Figure 17-20: Landscaping condition

(Source: Author; based on Google map. Google earth)

Figure 20

3.4 Land-use Pattern of the Surroundings

Site surroundings does not have any historical structure near the proposed site area. Some ongoing housing construction are there on the new plots and in other area, mostly 3-4 storied buildings (see fig-21).

Figure 21: Land use and culture &community map

(Source: Author,2021)

3.5 Accessibility and Connectivity

Proposed site is surrounded by 4 roads from the four sides as mentioned before, from the west side 14m wide secondary road continues which connects different plots to the main primary

road on the north. Main road which is act as primary road that links modhu city with other areas of keraniganj, is named as "Ati bazar road" which is 30m wide (see fig-22). There are two more roads on the east and south side which acts as access road for neighborhood, these roads are 12m wide. As four roads connects this proposed land for the project, it is easily accessible from other areas and plots.
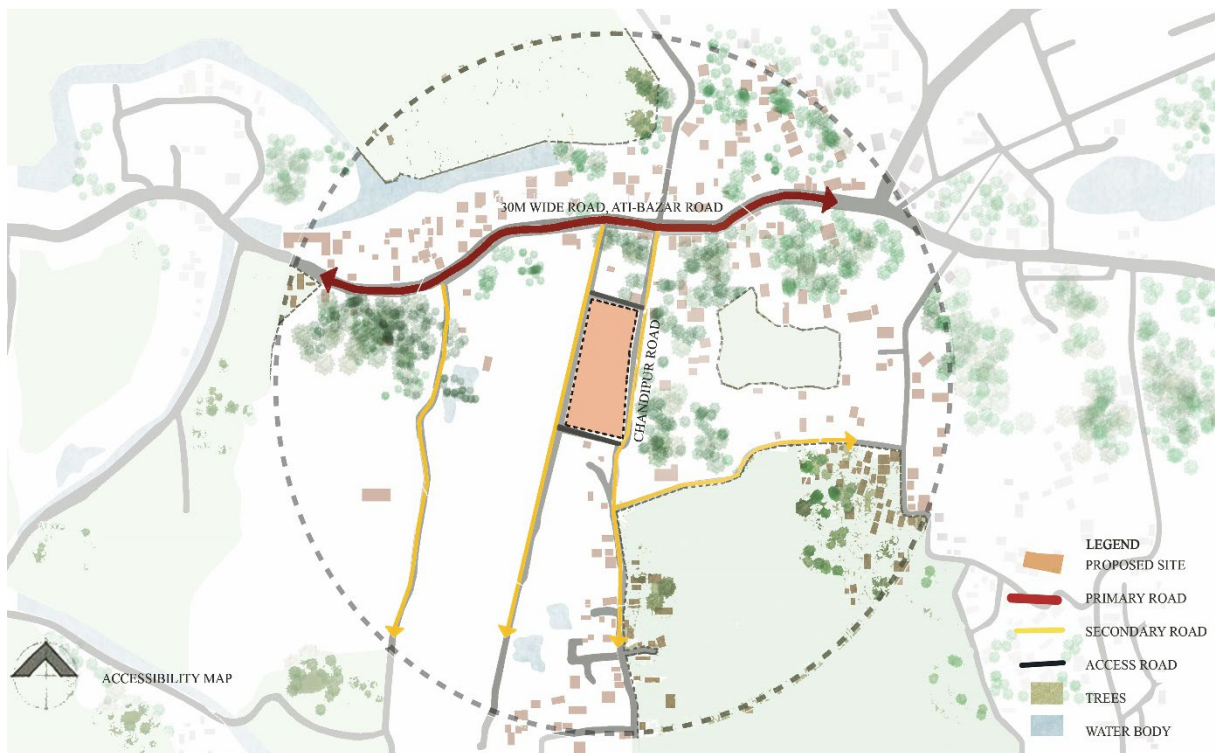
Figure 22: Accessibility and connectivity map

(Source: Author,2021)

3.6 Climatic Conditions

Keraniganj located in 23°41' on north latitudes and 90°20' east latitudes. Annual average temperature of Dhaka city is 36°C and minimum is 12°C. In this region, highest humidity is noticed on July and comparatively lowest humidity on March.
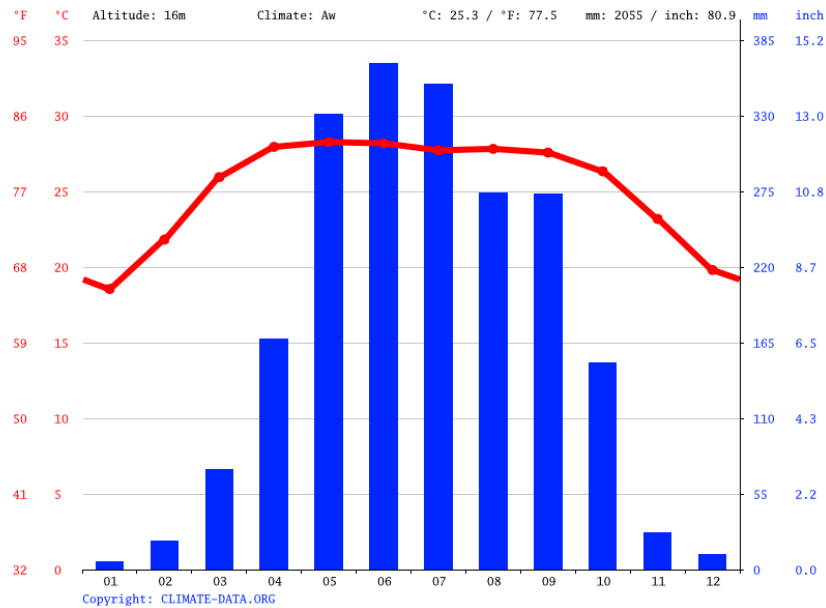
Figure 23: Average climatic graph of Dhaka

(Source: https://en.climate-data.org/asia/bangladesh/dhaka-division/dhaka-1062098/#temperature-graph)
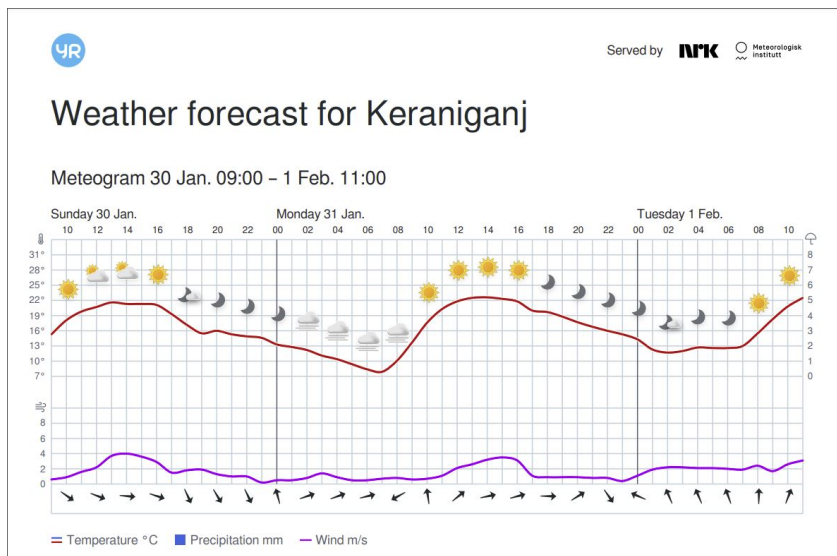
Figure 24: Temperature graph of recent times, Keraniganj

(Source: https://www.yr.no/en/forecast/graph/2-7645702/Bangladesh/Dhaka/Dhaka/Keraniganj)

31
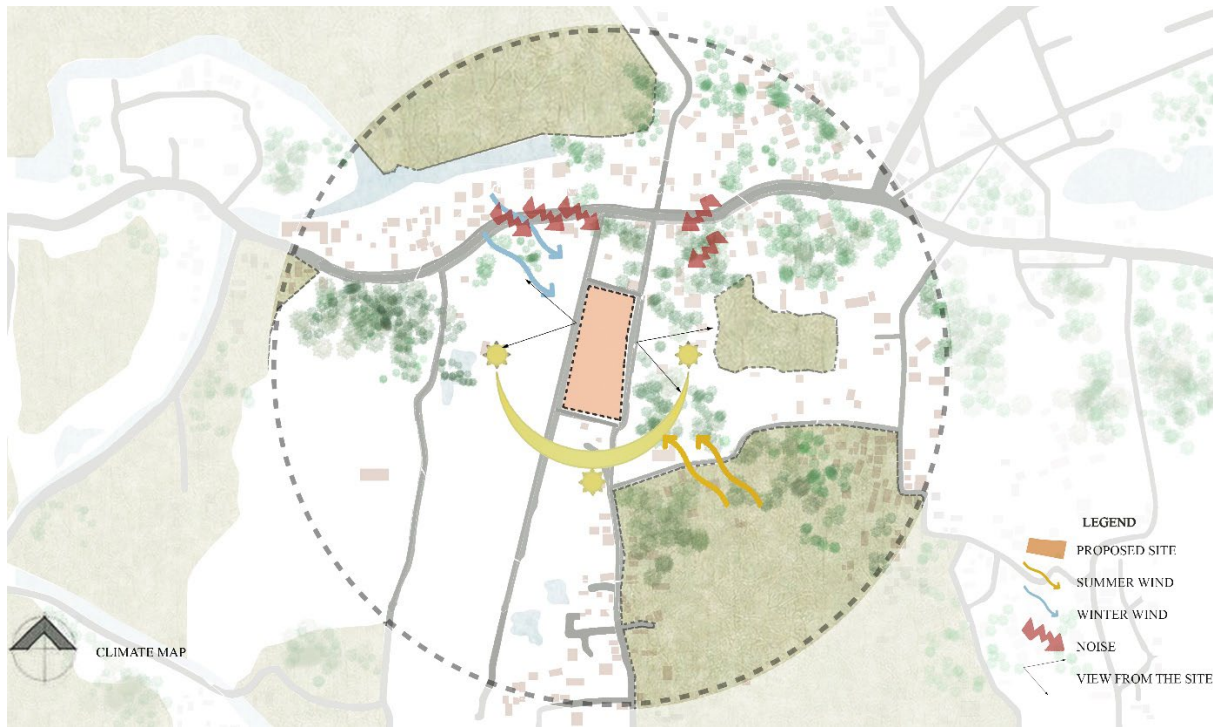
Figure 25: Micro-climatic map

(Source: Author,2021)

3.7 Socio-Cultural and Economic Contexts

Around the site, other areas of Keraniganj have festivals like folk festive, pohela boishak, other cultural festival as like any other districts of Bangladesh. Among these, there is a festive going here which is kite festival, as it is near Buriganga river, this kite festive is famous in these area as like kite festive in puran dhaka. As site situated in the residential-mixed use zone and it is still a bit far from the main city, surrounding areas are still have green cultivation land with low masses.

3.8 Images of Existing Site Condition

Site of akij foundation school is almost surrounded by residential plots mainly which are still now in developing condition (see fig-26), however, it is assuming that the plots will have mid-rise residential structures in upcoming future. Here are some site pictures to show condition of surroundings (see fig-27-32).

Figure 26: View map

(Source: Author,2021; images based on Google map, Google earth)

Existing condition of site

Figure 27

Figure 28

Figure 29

Figure 30

Figure 31

Figure 32

Figure 27-32: Existing site images

(Source: Asif ibn Rahman, Volumezero Ltd.)

CHAPTER 4: CASE STUDY APPRAISAL

This part of the paper, emphasizes different case studies of international school projects which have already been constructed and somewhat have a relation with the project "Akij foundation school", in targets to accomplished. These case studies that have been chosen have some unique features that are helping this project to think on other sides.

4.1   Farming Kindergarten

Farming kindergarten is a pre-school program focused on a separate age group of students. It is one of the prime examples of a sustainable educational structure in the tropical climatic region, also, it serves a large number of pre-school children at a time in a day. Some basic information of this project is giving below-

Year: 10/2013

Project type: Educational

Location: Dong Nai, Vietnam

Site area: 10,650 m2

GFA: 3,800m2

Principal Architect: Vo Trong Nghia, Takashi Niwa, Masaaki Iwamoto

Client: Pou Chen Vietnam

This kindergarten is beside of a big shoe factory and their focused user groups of this school is children of those shoe factory workers (see fig-33). It is well known for its strategies in design taken by architects that shows sense of sustainability, efficiency of cost and most importantly making an example for reply to the rapid urbanization that causes polluted ecosystem.

Figure 33: View from north-east with the shoe factory behind

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

Figure 34: View from south-west side

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

4.1.1 Environment and micro-climate

Vietnam was based on agriculture at past times but the growth of population creating massive problems to the environment and urban development grows in a way that effects the environment. For this rapid growth of urbanization, changes in climate and ecosystems. Though Vietnam has tropical climate, they are experiencing numerous problems these days like excessive flood in rural & urban areas, typhons, droughts are getting more intense, farming land are decreasing whereas it was their living was based on it [16].

Ho Chi Minh - Average temperatures						
Month	Min (°C)	Max (°C)	Mean (°C)	Min (°F)	Max (°F)	Mean (°F)
January	21	32	26.5	70	90	79.7
February	23	33	28	73	91	82.4
March	24	34	29	75	93	84.2
April	26	35	30.5	79	95	86.9
May	25	34	29.5	77	93	85.1
June	25	32	28.5	77	90	83.3
July	24	32	28	75	90	82.4
August	24	32	28	75	90	82.4
September	24	31	27.5	75	88	81.5
October	24	31	27.5	75	88	81.5
November	23	31	27	73	88	80.6
December	21	31	26	70	88	78.8
Year	23.7	32.3	27.95	74.6	90.2	82.5

Ho Chi Minh - Average precipitation			
Month	Millimeters	Inches	Days
January	15	0.6	2
February	5	0.2	1
March	10	0.4	2
April	50	2	5
May	220	8.7	18
June	310	12.2	19
July	295	11.6	23
August	270	10.6	22
September	325	12.8	23
October	265	10.4	21
November	115	4.5	12
December	50	2	7
Year	1930	76	156

Figure 35: Average climatic graph of Ho Chi Minh, Vietnam

(Source: https://www.climatestotravel.com/climate/vietnam)

Analyzing the climatic graph of this area based on the report of an average data collection from website, it is

- temperature is high all year around

- heat is quite muggy during summer monsoon

- average rainfall is 76inches [17].

4.1.2 User behavior and requirements

User group- For this project user group are kids of pre-school age within 2-4 years. This place is for kids to learn their roots by cultivating foods and experiencing a limitless playground open to the sky. Architect of this project discussed about focusing on child psychology by providing

a safer place to learn, socialize, exercise, moreover, to be just them, this project helps kids to grow [18]. Some main objectives taken by the architects was-

- to make the young inhabitants understand the importance of sustainable education and design

- learning through nature and growing food; going back to roots

- energy saving systems

- water recycles

4.1.3   Form and Function

This farming school has an interesting shape as pretzel shape or triple ring shape that integrates courtyard spaces in between as safer playgrounds and the curved roofs are also accessible for all which accommodates gardening facilities all through the roof of the building (see fig-36).
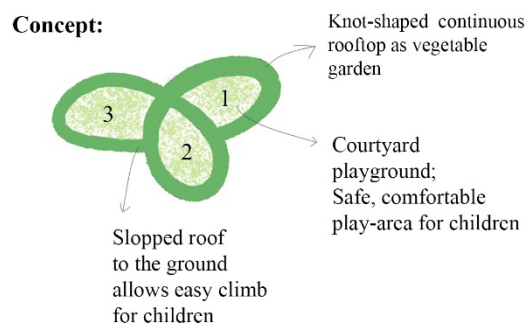
Figure 36: Form generation diagram

(Source: Author,2021; based on Archdaily)

All functions are incorporated under the curved roofs and it acts as slope for vertical circulation. This two storied school building have-

- classrooms,

- art workshops,

- gymnasium

- teacher's room

- services

Plans

1. Entrance
2. Infant classroom
3. Art workshop
4. Pre classroom
5. Gymnasium
6. Pre classroom
7. Teacher's room
8. Art classroom
9. Pre classroom
10. Courtyard
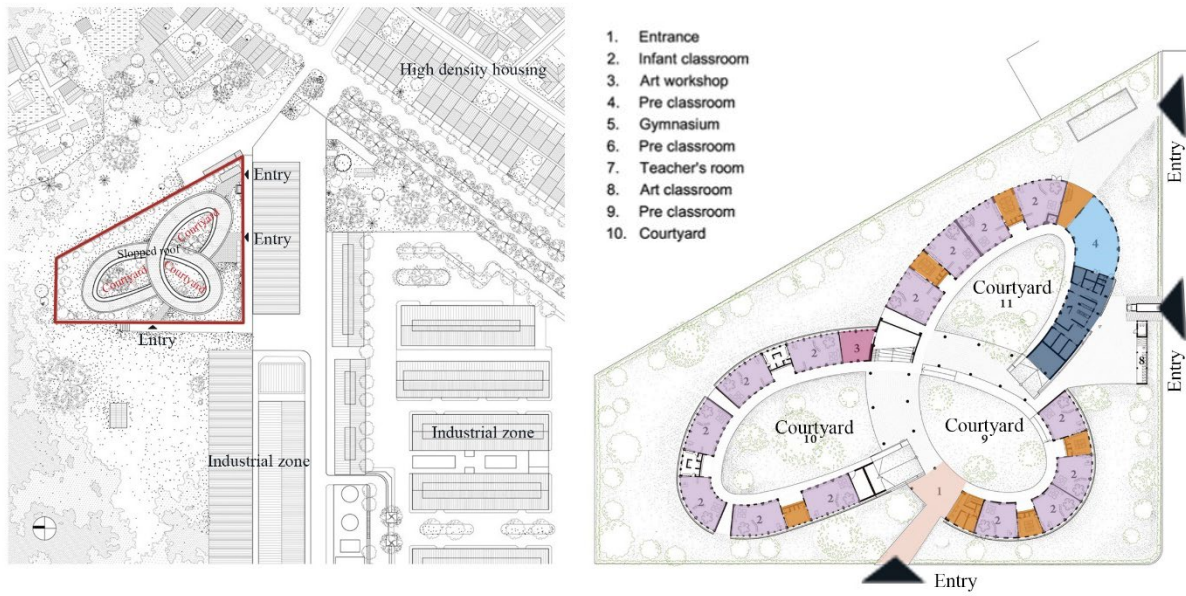
GF plan   1st floor plan

Figure 37: Plans of farming kindergarten

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

Figure 38: Exterior views of the kindergarten

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

Typology of spaces-
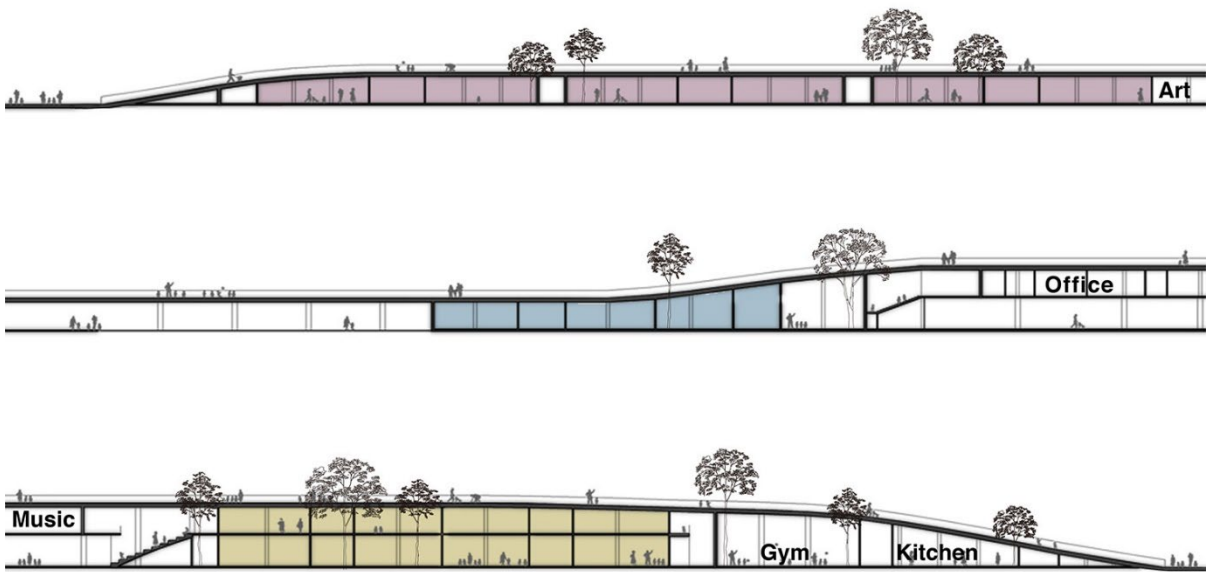
Figure 39: Types of spaces in section

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)
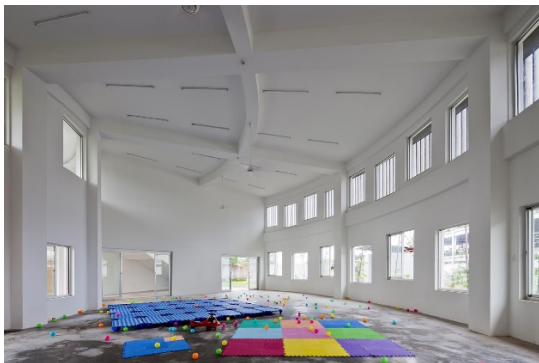
Figure 40: Art workshops

Figure 41: Integrated courtyards

Figure 42: Classrooms

Figure 43: Safer play areas

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

4.1.4 Horizontal and vertical circulation

In this school mass, staircases and ramps are used for vertical circulation to the upper floors and the whole massing is connected with shaded corridor spaces (see fig-44).

Figure 44: Main staircase & connected corridor

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

4.1.5 Utility planning

In this particular project, architects applied strategies to save energy and making to use the recycled water (see fig-45). For that, there is no air conditioning system there and for proper air light ventilation, they designed the mass narrow, convertible windows and louvres are used to break direct sunlight [19].

Green roof   Existing trees   Operable windows   Deep eaves

Solar water heater   Green facade on louvers   Recycle water from factory
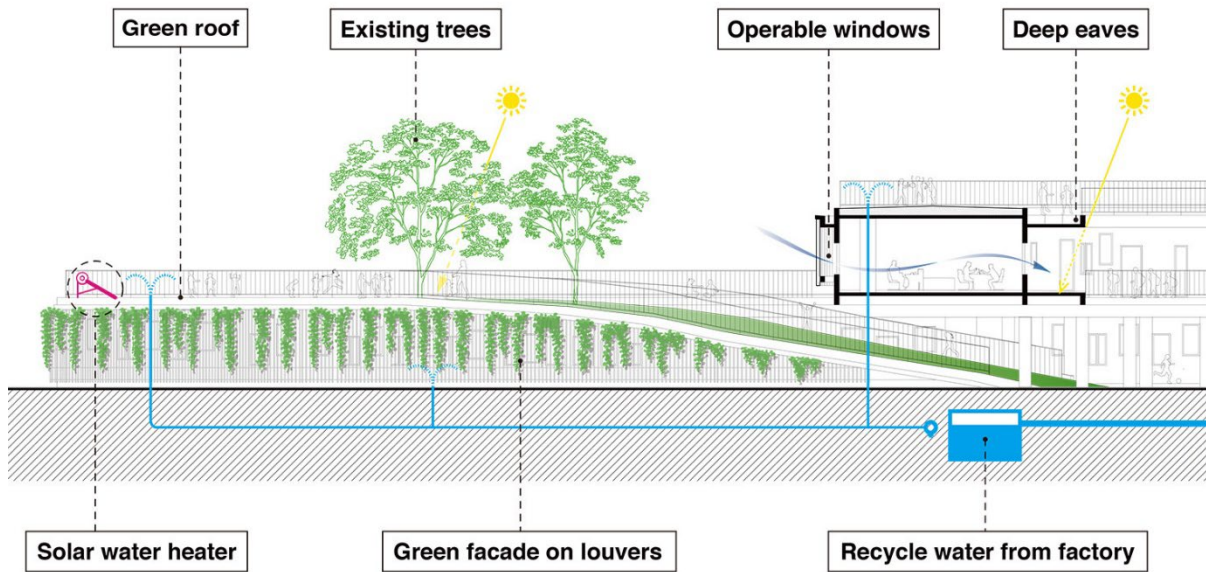
Figure 45: Exterior views of the kindergarten; Strategies

(Source:https://www.dezeen.com/2014/11/11/farming-kindergarten-vo-trong-nghia-architects-vietnam-vegetable-garden/)

4.1.6 Strategies

There are two major strategies that have been taken for farming kindergarten stated by architects on a report published in archdaily. As environment of Vietnam is getting polluted day by day, architects try to incorporate some environmental strategies in it, like-

- Water-recycling; recycling water are being used for gardening and other purposes
- Incorporating green roof and green buffer; cutting the direct sunrays that makes this building survive without air-conditioning system
- Vegetable gardens; helps kids to grow own food
- Vertical louvres at the exteriors; reduce glare and ensure filtered daylight in classrooms
- Minimum footprint on the ground

It also cost efficient in construction process by choosing these strategies, they are-

- Using local materials; bricks & tiles

- Low-tech construction method was used [19].

4.1.7 Design detailing

Figure 46: Roof Structure to support load

Figure 47: Roof garden detailing

Figure 48: Entry of the school

Figure 49: Exterior louvre detail

(Source: https://www.archdaily.com/566580/farming-kindergarten-vo-trong-nghia-architects)

4.2 The British School

In India, there is an architectural firm Morphogenesis who stated that while designing "the British school" they try to incorporate Indian culture and heritage to this school project to keep the Indian soul in an international outlook. It has different age group students with a large number. Basic information of this project is given below-

Year: 2016

Project type: Educational

Location: New Delhi, India

Site area: 21,521 m2

Built area: 19,625m2

Architect: Morphogenesis

This elementary and middle school situated in centrally at new Delhi and their focused user groups of this school is from surrounding area's children, main challenge was to incorporate double students than before. In the past phase of this school building, 650 students can occupy but now it gained the capacity up to 1300 students.

Figure 50: Exterior of the school

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis?ad_medium=gallery)

Figure 51: Entrance of the school

(Source:https://www.archdaily.com/891016/the-british-school-

morphogenesis?ad_medium=gallery)

4.2.1 Environment and micro-climate

New Delhi located in the northern hemisphere of the earth so that average temperature here is

29 °C and monsoons starts here in September. Also, the precipitation rate of new Delhi is

12.01". in winter season, temperature goes down to 5°C. [20]
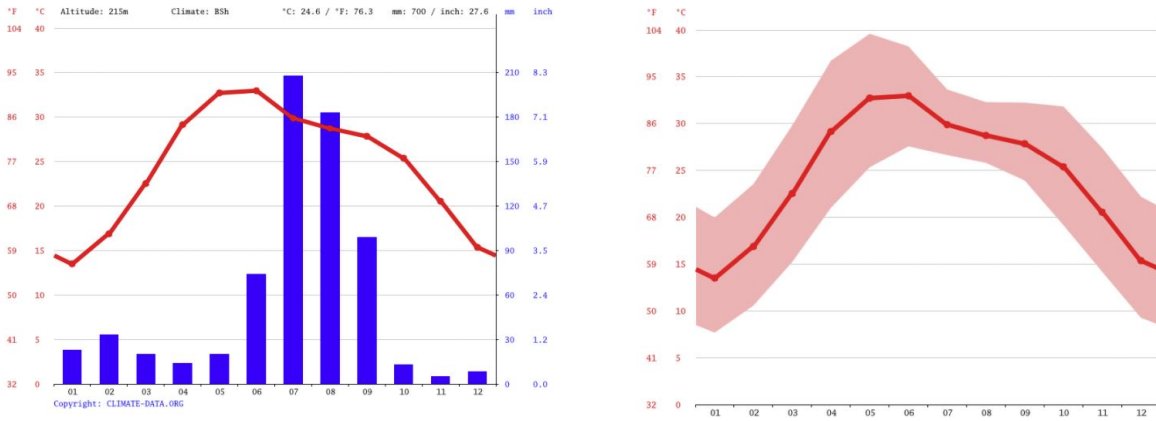
Figure 52: Average climatic graph of New Delhi

(Source: https://en.climate-data.org/asia/india/delhi/new-delhi-30/#climate-graph)
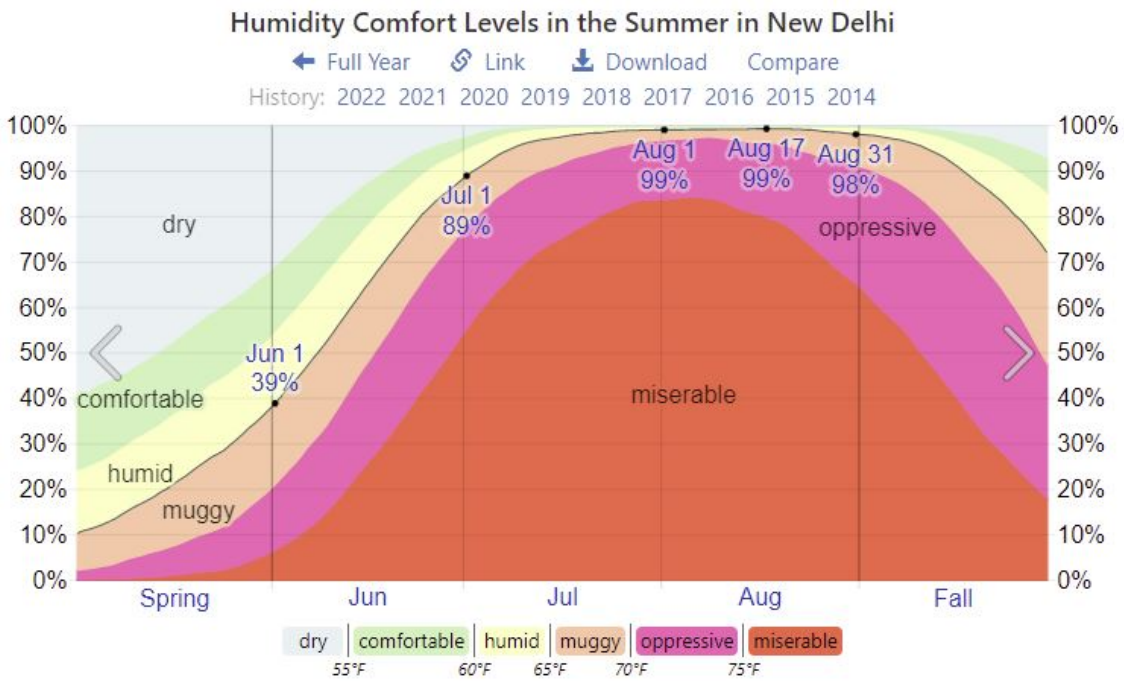
Figure 53: Humidity comfort graph of New Delhi

(Source: https://weatherspark.com/s/109174/1/Average-Summer-Weather-in-New-Delhi-

India#Figures-ColorTemperature)

4.2.2   User behavior and requirements

User group from age 3-18, students of elementary to middle school are the focus group in this school project. This project connects with the culture deeply with the touch of social norms from which students of this school can build themselves aware of social and cultural norms. Several breakouts space is designed in a way so that students can get involved into social activities. One of the challenges was to build the new school on the existing site without disrupting the existing school stated by the architects of the project [21].

4.2.3   Form and Function

Architects approached to this design of school by dividing them into two phases. In the phase 1, existing school mass were being used for accommodating existing functions and in 2nd phase, after demolishing the existing massing, new flexible module for school are being placed [22].
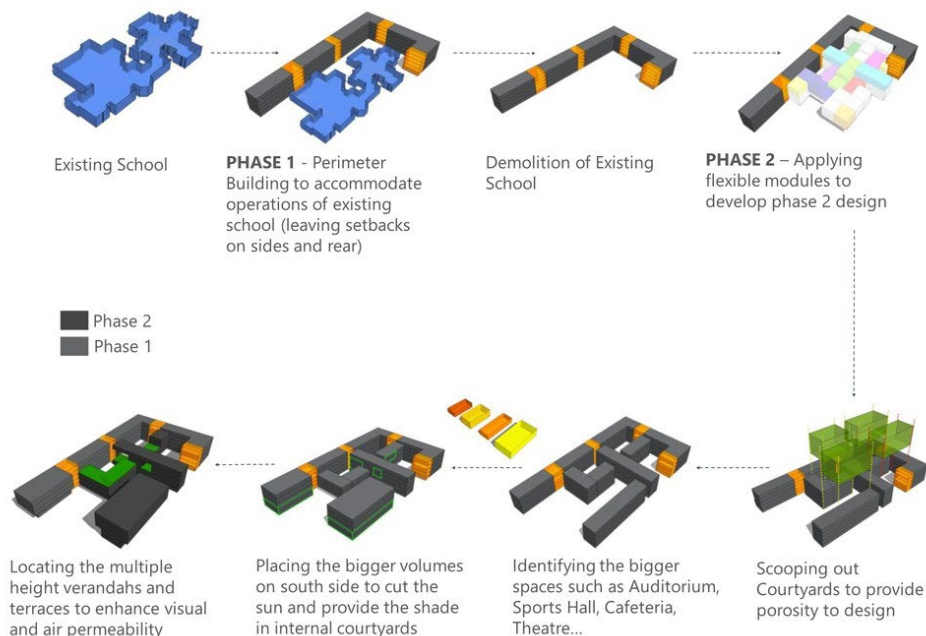
Figure 54: Form generation of British school

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

Plans

01. PRIMARY SCHOOL PLAYFIELD	06. CAFETERIA COURT	11. BLEACHERS	16. STAGE	21. AUDITORIUM SPILL-OVER PLAZA
02. BASKETBALL COURT	07. QUIET PLAY	12. NURSERY FREE PLAY AREA	17. TREE HOUSE	22. SUNKEN RAIN GARDEN
03. TENNIS COURT	08. BOARD GAMES	13. NUMBER TRACK	18. SPLASH POOL	23. TODDLERS EXTENDED DECK
04. VOLLEYBALL COURT	09. LABYRINTH	14. PIZZA GARDEN	19. SWIMMING POOL	24. ENTRANCE
05. FOOTBALL FIELD	10. LIBRARY SPILL-OUT	15. STORY TELLING COURT	20. POOL DECK	

Figure 55: GF plan

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

This school has-

- classrooms,

- sports facilities

- labs

- art wing with performing art center

- several creative open spaces

- convertible multifunctional spaces

- swimming pool facility

GF plan

First floor plan

Fourth floor plan

Legend
- Classrooms
- Services and vertical connections
- Cafe
- Library
- Play area
- Swimming pool
- Offices
- Drama rooms
- Seminar rooms
- Lab
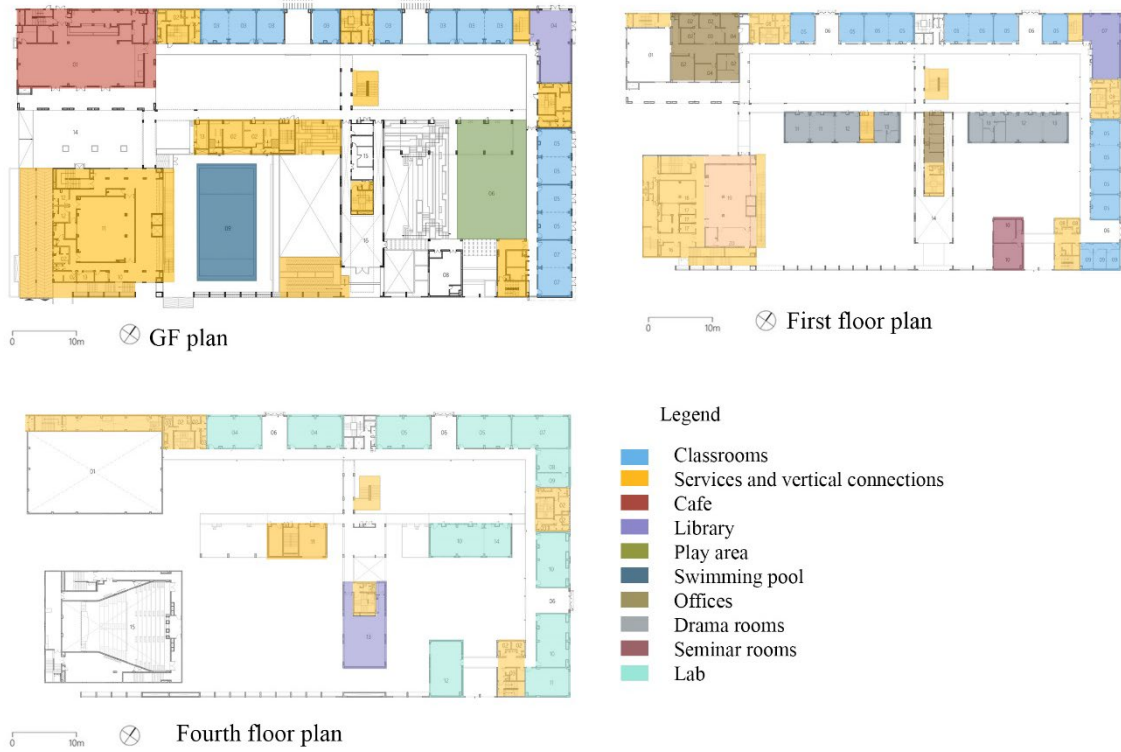
Figure 56: Other floor plans

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

Figure 57: Functional spaces

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

Typology of spaces-

Figure 58: Corridor connection with play space

Figure 59: Swimming pool with shading

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

Figure 60: integrated play space

Figure 61: Shaded courtyard spaces

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

4.2.4   Horizontal and vertical circulation

Proper amount of vertical connections is noticed in this project as well as linking the functions with corridors are example of horizonal circulation here. As this is a four storied school building, there is a need of fire stairs which is incorporated in the design as well as lift also acts as vertical circulation along with staircases [22].

Figure 62: Colorful staircase

Figure 63: Deeply shaded corridors

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

4.2.5   Utility planning

In this particular project, architects applied strategies to save energy. Architects of morphogenesis firm talks about the strategies they have followed in this particular project.[23] Those two strategies are-

- minimum mechanical system through planning

- traditional passive cooling method for reducing energy consumption (see fig- 64)

51
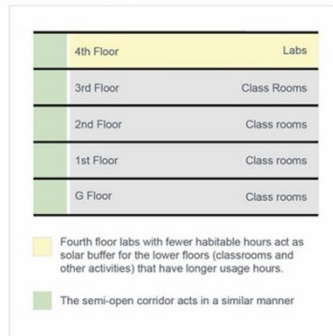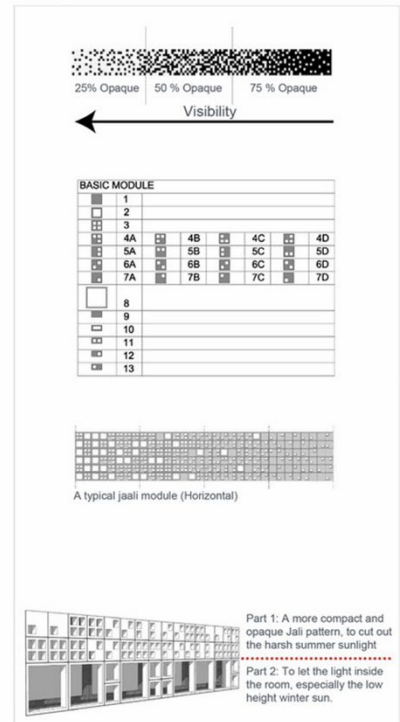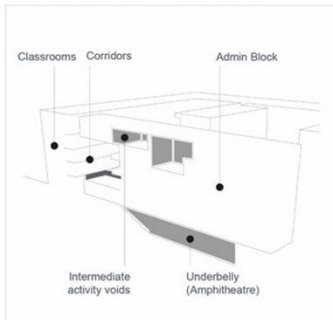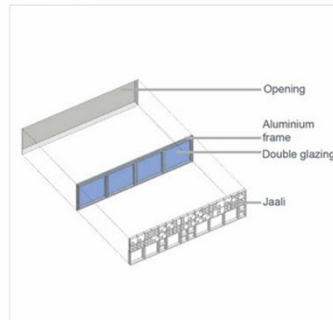
Strategies

Figure 64: Strategies

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)
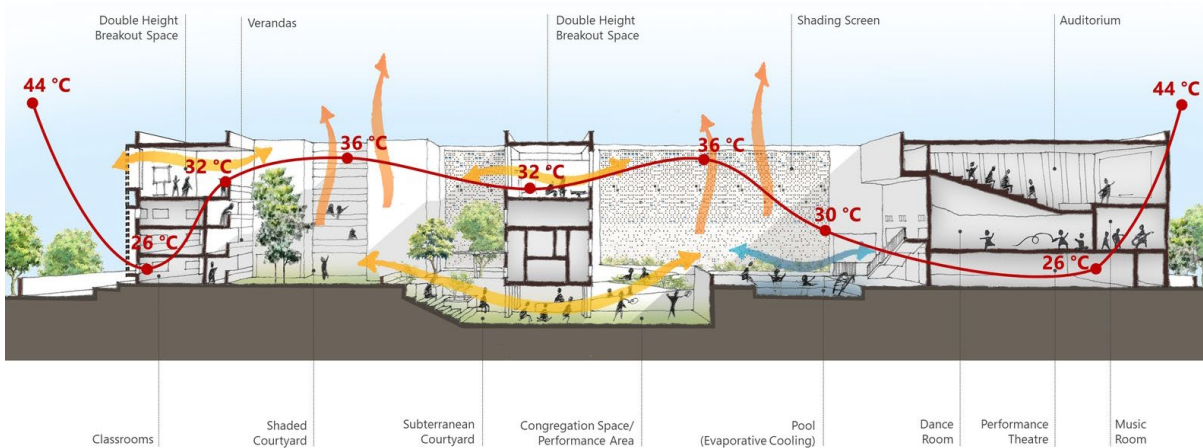
Figure 65: Diagram of heat decreasing

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

52

Taking inspiration from ancient "chaupals" (outdoor gathering spaces) in India, some congregation areas square measure designed to sit down within the shade of mature trees. protective recent trees, making bioswales, rain gardens, and a noticeable freshwater harvest home system, consciously illustrate demonstrative property [22].

4.2.6 Detail design

Figure 66: Perforated exterior wall

Figure 67: Gathering spaces

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

Figure 68: Swimming pool area

Figure 69: spaces in front of library

(Source: https://www.archdaily.com/891016/the-british-school-morphogenesis)

4.3 Mount Si High School

Mount Si's campus is encircled by two mountains and also the Snoqualmie river, that creates

a floodway, for this reason, the campus has got to be elevated above the flood levels. Also, for

the elevated floor level, the campus maximizes views of the mountain vary. By making social

and informal learning spaces at a range of scales, it honors individual and cluster activities

equally. Some basic information about the project are-

Year:	2019
Project type:	Educational
Location:	Snoqualmie, Washington, US
Site area:	358,000 m2
Architect:	NAC Architects

This three storied school building designed by NAC architects who decided to elevate the

ground floor for which, this school is named as elevated campus that elevated in each sense of

the word: educationally, experientially, and virtually.

Figure 70: Campus view from street

(Source: https://www.archdaily.com/952023/mount-si-high-school-nac)

Figure 71: Freshman block

(Source: https://www.archdaily.com/952023/mount-si-high-school-nac)

4.3.1 Environment and micro-climate

Geographically, this school site is located where two mountains and a river is already there. The site is redeveloped to own the bulk of the new school are created within the NE portion of the location and wrapping around the east and south sides of the present sports stadium. The southern portion of the location are dilated to accommodate new baseball and softball fields, surface visitors and workers parking and, bus drop loading. The bulk of the parking is settled below the new school structure in an open-air garage. off-site enhancements at Schusman Avenue SE are anticipated on the west property line. least off-site enhancements are needed on SE park Street or Meadowbrook way SE [24].

4.3.2 User behavior and requirements

In this school, user group are high school going students and it connects with the natural elements of the site more. It also focuses on technological engagements and encourage interaction through shared spaces, also, architects wanted to create depth and texture experience through choosing building materials.

Site analysis-

Figure 72: Site zoning of Mount Si High school

(Source: https://www.nuffic.nl/sites/default/files/2020-08/education-system-bangladesh.pdf?fbclid=IwAR0u7vee_RaeQhf8u66pZK_UyQ0JKlaxWUg5Tpb0PNJHY7BGKP--IpqZDgc)
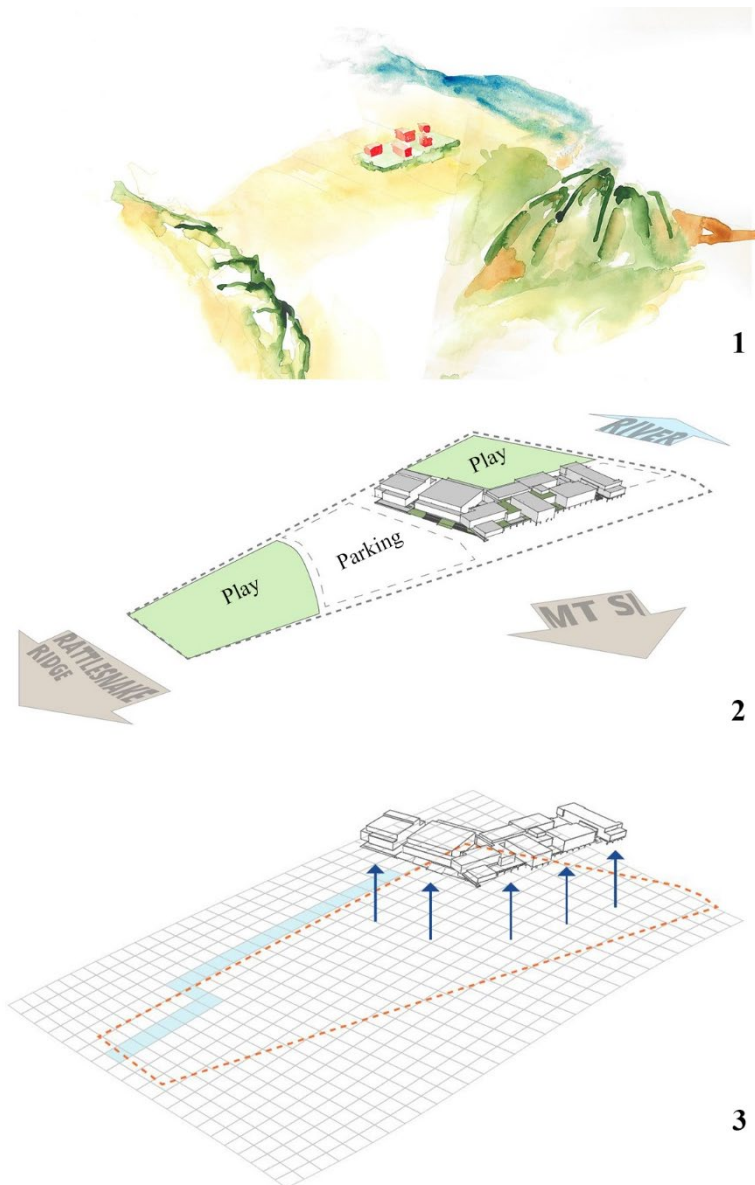
Figure 73: Site zoning of Mount Si High school

Considerations-

- site requires compact school design

- elevating the mass for flood protection

- view to the mount hills

- proper floodway requirements

- proper play structures incorporate

4.3.3   Form and Function

Orientation of spaces
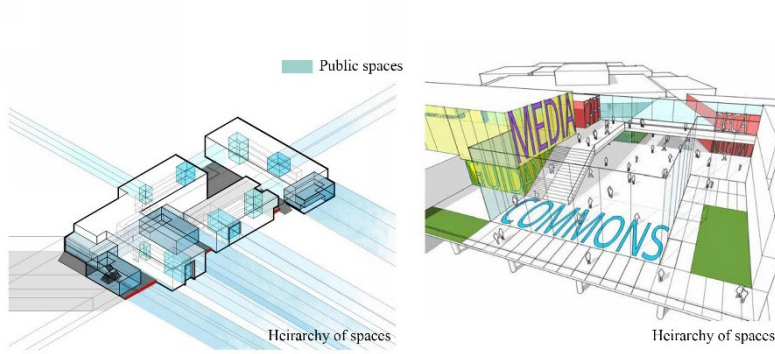
Figure 74: Zoning

(Source: https://www.nuffic.nl/sites/default/files/2020-08/education-system-bangladesh.pdf?fbclid=IwAR0u7vee_RaeQhf8u66pZK_UyQ0JKlaxWUg5Tpb0PNJHY7BGKP--IpqZDgc)

Plans

Figure 75: Site plan and plan & another floor plan

4.3.4   Utility planning

Structural condition-

Soil reinforcement is achieved with stone column mats of 3' diameter stone columns 50 to 60 feet deep. The footings are set on high of the strengthened soils with standard unfold footings. The outdoor garage level is composed of concrete columns and post-tension concrete block. The buildings atop area unit of structural steel with brace frame and composite metal deck/ concrete slabs.

4.3.5   Design detailing
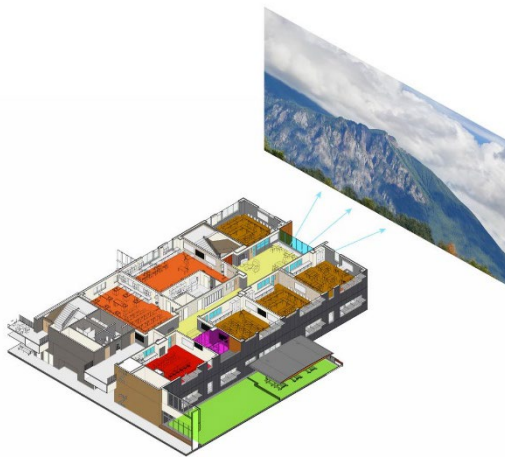
Figure 76: Classrooms orientation towards mountains

Figure 77: Classrooms orientation towards mountains

(Source: https://www.archdaily.com/952023/mount-si-high-school-nac)

CHAPTER 5: PROGRAM APPRAISAL

Akij foundation aimed to establish a school that serves the newly developing city on the outskirts of Dhaka city, that serves the children from these housing plots as well as the children of the surrounding area as there is no such quality school in that area. This part covers the required amount of space allocation for different programs proposed by the clients and also for the additional programs needed in this project. As there was no detailed program layout, the program brief is prepared after understanding client's need along with understanding the project through case studies and researches.

5.1 Proposed program from the client

Akij foundation aimed to focus on the student's classroom quantity and quality, how much they can serve by this school building. Also, they have a proposal for separate classrooms from class 3-10 for girls and boy and also, their initial proposal was a 9 storied school building that serves more than 2000 students with 2 separate fields for girls and boys.

5.1.1 Program Rationale

After studying various school projects, it will be very effective if the program suggested by the client can slightly change. As client wanted to facilitate more students of that community, so that, classes of this school can be divided into two shifts rather than making divisions in classrooms for girls and boys. It can help to get even more students than expected at a time as well as classrooms do not need to get divided. Also, for a school of a lot of students there need to be proper green spaces to play and building height should not exceed over 6 stories for an urban settlement with a large number of capacities. Moreover, given program list of the client does not have any requirements for cafeteria but in a school campus for a large number of students there need to be cafeteria for all which can be used by teachers' students and also by

guests. Additionally, multi-purpose space can be used as indoor games whenever it needed; multi-purpose space can be convertible at any time. This makes those spaces more useable and vocational classes can be take place in multi-purpose area or in the club rooms, that turns these spaces useable very well.

5.1.2 Initial functional Zoning

Ground floors will occupy by the administrative functions mostly and other functions like prayer space and a common lounge. Most public functions will be in these spaces. Then, at the next level, there will be recreational facilities for the students and others. Educational facilities will continue on the other floors. These functions are provided by the client and can be divided into these 3 sections which will have more sub-sections in detailed design developments (see fig-78).

Educational Block
    -Classrooms
    -Labs
    -Extra curricular activity room

Recreational Block
    -Auditorium
    -Library
    -Cafeteria
    -Swimming pool
    -Multi-purpose with indoor games

Admininstration and other facility Block
    -Administrative Office
    -Executive office
    -Teacher's zone
    -Shops
    -Etc.
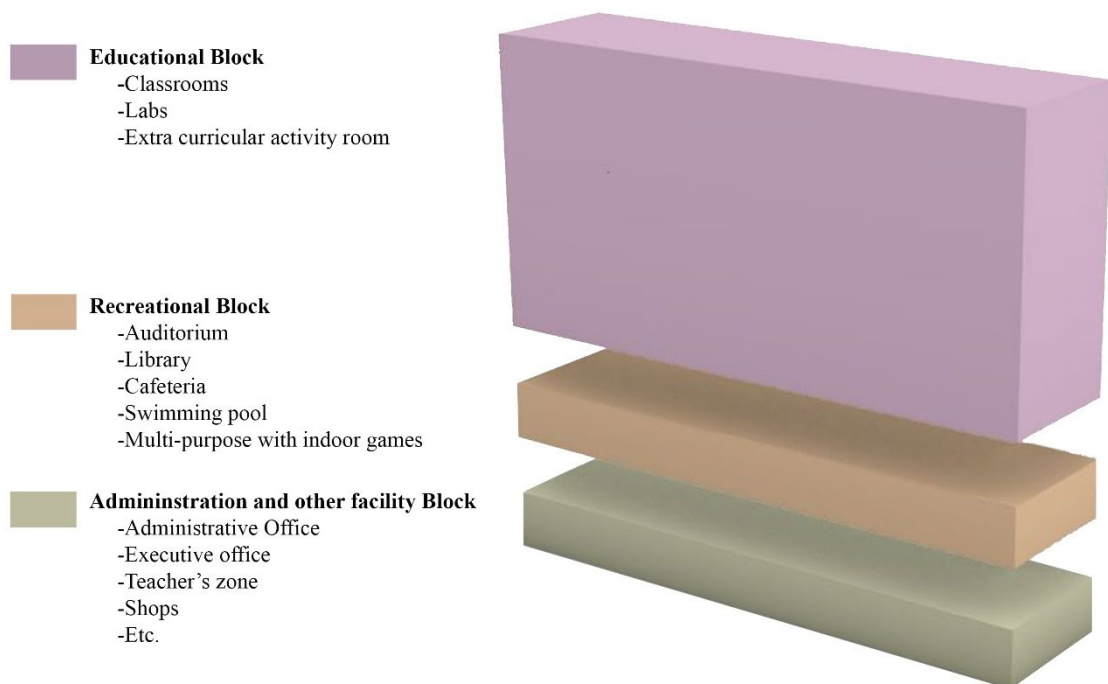
Figure78: Initial functional zoning diagram

(Source: Author,2021)

5.2 Probable User group

5.2.1 Targeted audience (Age group)

In this project, three different age groups are being focused on,

- Elementary division (2-5 years)

- Primary division (6-11 years)

- Secondary division (12-16 years)

This different type of user group requires some functional differences and uses of spaces used by them are varies from others (see table-2). Taking place in any activities in these age group students are given below-

Age (2-5 years)	Age (6-11 years)	Age (12-16 years)
Playful spaces	Interests in different equipment	Club activities
Open classrooms	Playground activities	Indoor-outdoor games
Interesting spaces &colors	Gardening & other activities in nature	Social works involvements
Interaction and co-operative learning	**Self-activity and creativity through social involvements**	**Focuses on own interests &learning by exploring outdoor**

Table 2: Activities by different age groups

(Source: Author,2021)

63
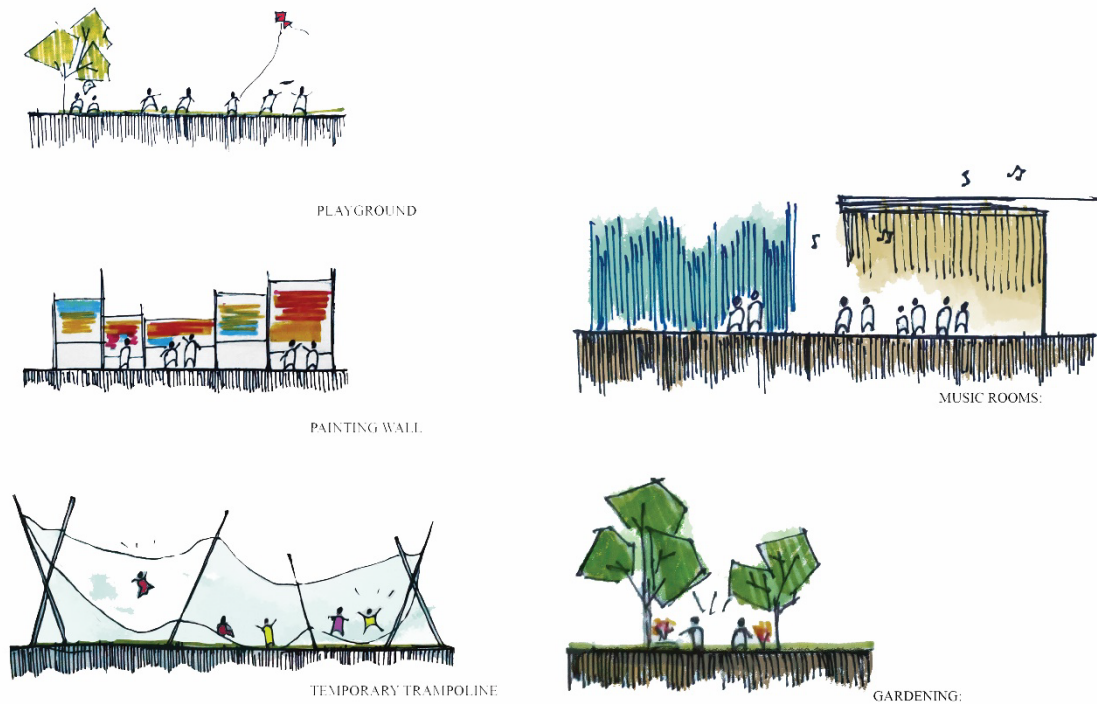
Figure79: Activities by different age group students

(Source: Author,2021)

5.2.2 Functional flow for different classrooms

Mainly two types of functional flow variation can be there because of different age group users. Kindergarten classrooms needs more open spaces within the classrooms and connected to playrooms directly or indirectly. There functional flow should be more fluent than other classrooms. In primary-secondary classrooms, group learning spaces are getting smaller than from the kindergarten one and individual learning spaces are bigger here, also, this does not require interlinked play space rather than having connections with the play fields or gathering areas, are more appreciated (see fig-80-82).

Kindrgarten   Primary-High school

LEARNING SPACE
PLAY SPACE (INDOOR)
INDIVIDUAL SPACE
GROUP LEARNING SPACE

LEARNING SPACE
EXPERIMENTS
INDIVIDUAL SPACE
GROUP LEARNING SPACE
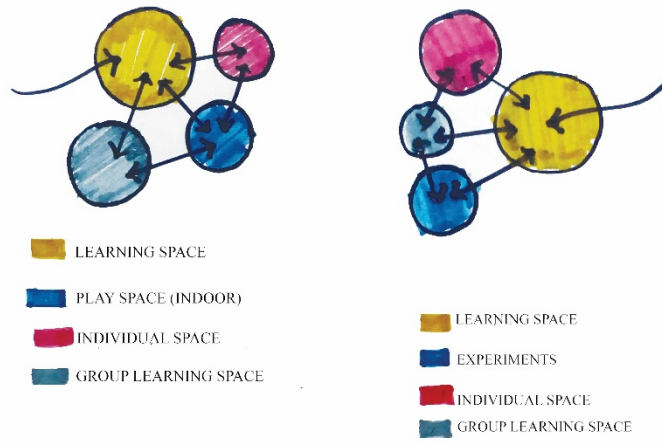
Figure80: Functional flow of classroom

(Source: Author,2021)

Interaction → Education → Recreation → Learning through nature& play
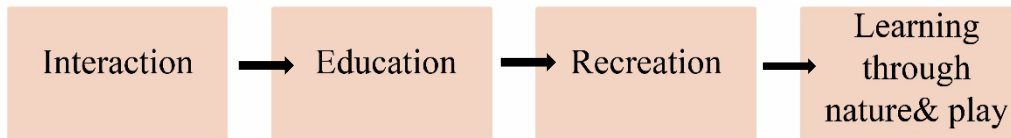
Figure81: Flow of functions

(Source: Author,2021)
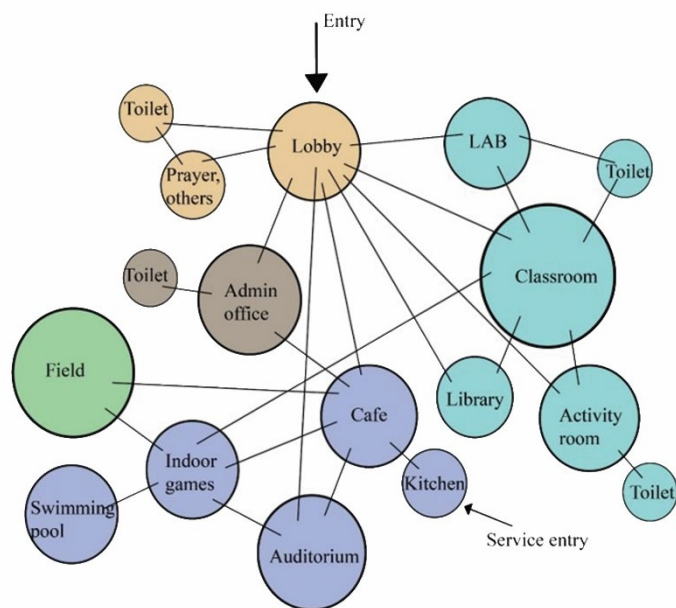
Figure82: Bubble diagram

(Source: Author,2021)

5.3 Detailed program layout

5.3.1 Educational block

Educational block includes Classrooms from playgroup to class10. In elementary division, classrooms need more space per student than the primary and secondary classrooms. Educational clock divided into-

- Classrooms

- Vocational classrooms

- Laboratories

- Extra-curricular activity area

Figure83: Diagram of how classroom climate works

(Source: *https://www.semanticscholar.org/paper/Complicating-How-Classroom-Climate-Works-%3A-the-Tsukada-Perreault/e1aed2ad3b802f99eed680d154ac7f892b4ad027*)

There will be more than 45 classrooms to serve 1600 students at a time and vocational classrooms will help to make students more experienced. Labs of Physics, chemistry, biology, Home economics, and agriculture will also be there. In the extra-curricular segment, different types of activity rooms, music rooms, drama rooms, language learning rooms will occupy.

PROPOSED PROGRAMS		no.	sqm/person	no. of persons/users	Total (sq	Total (sqft)
Classrooms						
	Elementary division(Playgroup-nursery)					
	Classrooms	10	3.3	20	650.0	6994
	Regular (class 1-2)	6	3.3	30	585.0	6295
	Toilet (male)	1		190	7.5	81
	Toilet (female)	1		190	7.5	81
	Primary-Secondary division					
	Regular (class 3-10)	35	2.3	40	3220.0	34647
	Toilet (male)	5	0.1	750	30.0	323
	Toilet (female)	5	0.1	750	30.0	323
TOTAL					4530.0	48743

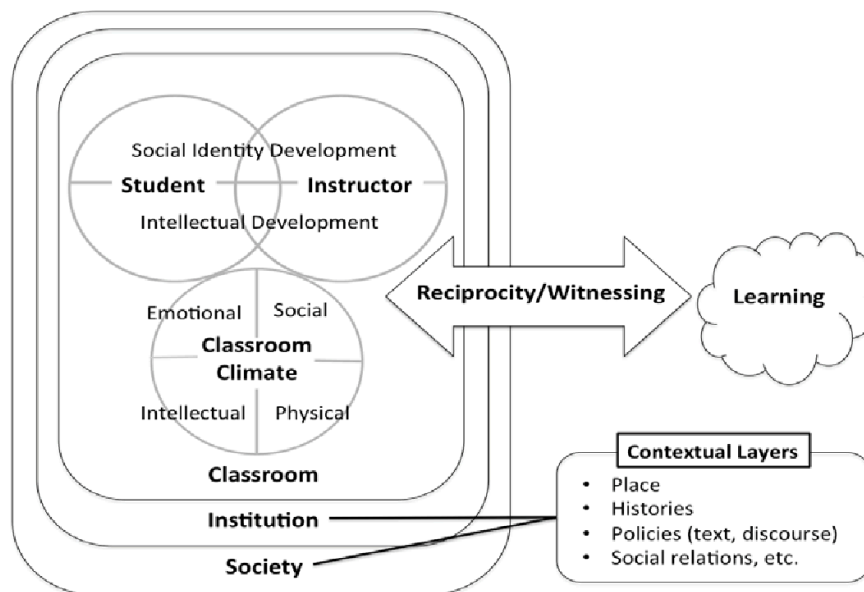| **Vocational Classrooms**						
	Classrooms	3	2.5	20	150.0	1614
	Storage	1			9.3	100
	Instructors room	1		5	9.0	97
TOTAL					168.3	1810

PROPOSED PROGRAMS		no.	sqm/person	no. of persons/users	Total (sq	Total (sqft)
Laboratories						
	Physics lab	2	2.8	30	166.8	1795
	Biology lab	2	2.8	30	166.8	1795
	Chemistry lab	2	2.8	30	166.8	1795
	Agriculture/Home Econom	2	2.5	20	100.0	1076
	Storage	2			18.5	199
	Instructors room	3			27.0	291
	Lecture space	8			111.0	1194
	Preparation space	8			111.0	1194
TOTAL					867.9	9339

5.3.2 Recreational block

Students are passing more than 6-7 hours in a school campus for learning, which required a few facilities to give a mental relief from the educational pressure and also helps to create self-esteem in them. In a school campus, it needs to have certain recreational facilities like-

- Cafeteria

- Library

- Swimming pool

- Indoor games room

- Outdoor play field

- Auditorium

- Multi-purpose spaces etc.

PROPOSED PROGRAMS		no.	sqm/person	no. of persons/users	Total (sq	Total (sqft)
Extra curricular activities						
	Activity room	5		15	372.0	4000
	Arts & crafts class	2		30	148.5	1600
	Music & Drama	2		30	148.5	1600
	Language room	1		15	74.0	800
	Storage	1			37.2	400
	Audio visual room	1		15	74.0	800
	Toilet(male)	1		50	2.0	22
	Toilet(female)	1		50	2.0	22
TOTAL					858.2	9243

These facilities make them being active and helps to improve their mental health and physical health (see fig-84).

Figure84: Relation between physical activity and mental health

Source:https://www.dlgsc.wa.gov.au/department/publications/publication/the-relationship-

between-organised-recreational-activity-and-mental-health

PROPOSED PROGRAMS		no.	sqm/person	no. of persons/users	Total (sqm)	Total (sqft)
Recreational Facilities						
Auditorium (250 people)						
	Ticket Counter	2			13.0	140
	Reception/Lobby	1	0.9	100	90.0	1163
	Main Seating	1	1.1	250	277.5	2987
	Stage	1			100.0	1075
	Back Stage	1			60.0	650
	Green Room	2			55.8	600
	Toilet	2			4.5	50
	Storage	1			40.5	430
	Projection Room	1			29.3	315
	Equipment Room	1			29.3	315
	Toilet (Male)	1		125	8.5	91
	Toilet (Female)	1		125	8.5	91
TOTAL					716.7	7907

Multi-purpose spaces can be used as different program spaces if designed in a way that it could convert into 2 divisions by using partitions. These types of spaces can be used for yoga classes or for any club programs or others.

	Multi-purpose hall with Indoor games space					
	Hall space	1	0.9	200	180.0	1937
	Storage	1			36.0	387
	Lobby area	1	0.9	100	90.0	968
	Carom Boards	5			10.0	108
	Table Tennis	6			120.0	1291
	Board Games(chess)	8			58.0	624
	Waiting Area	1	0.9	10	9.0	97
	Storage				36.0	387
	Toilet(Male)	1		100	3.8	40
	Toilet(Female)	1		100	3.8	40
TOTAL					546.5	5880
	Swimmimg pool					
	Pool area	1			170.0	1829
	Locker room	2			70.0	753
	Toilet(male)	1			10.1	109
	Toilet(female)	1			6.1	66
	Storage	1			36.0	387
TOTAL					292.2	3144

	Library					
	Reception	1			9.0	97
	Issuing section	1			18.5	199
	Librarian's office	1	2.0		23.5	253
	Locker room	1			9.2	99
	Storage	1			18.5	199
	Book shelves and seating				185.0	1991
TOTAL					263.7	2837
	Cafeteria(500 people)					
	Dining Area	1	1.1	500	530.0	5703
	Kitchen	1			75.0	807
	Storage (Dry&wet)	1			36.0	387
	Toilet (Male)	1		250	9.5	102
	Toilet (Female)	1		250	9.5	102
	Toilet (Staff)	1		10	3.5	38
TOTAL					663.5	7139

5.3.3 Administrative block

This block includes the offices that will provides and maintains all the rules and regulations of the school campus. All the necessary functions and information will be provided through this

block to the students and the public. Administration part will operate into some sun-sections like-

- Teacher's room

- Teacher's training center

- General office rooms

- Executive office rooms

Office meeting, seminars are included in this block. Overall, this block includes some other functions like,

- Public reception space

- Visitors' lounge

- Meeting room

- Security room

- Storage area

PROPOSED PROGRAMS		no.	sqm/person	no. of persons/users	Total (sq	Total (sqft)
	Administration office					
	Office	2	12.5	2	50.0	538
	Visitor's Lounge	1	0.9	15	13.5	145
	Staff room	1		10	55.0	592
	Storage	1			18.5	199
	Maintanance room	1			18.5	199
	Security	1		2	9.3	100
	Toilet	2		20	7.4	80
TOTAL					172.2	1853

Executive office						
	Principal's office	1			1	45.0	484
	Attached toilet	1			1	3.0	32
	Vice pricipal's office	1			1	35.0	377
	Attached toilet	1			1	3.0	32
	Headmaster's office	1			2	90.0	968
	Attached toilet	1			2	7.4	80
	Sectretary's room	1			1	14.0	151
	Break room	1				9.5	102
	Reception	1				1.0	11
	Visitor's lounge	1	0.9		5	4.5	48
TOTAL						212.4	2285

PROPOSED PROGRAMS	no.	sqm/person	no. of persons/users	Total (sq	Total (sqft)
Teacher's room and training center					
	Workstation	2		45	275.0	2959
	Lounge	1	0.9	15	13.5	145
	Meeting room	1		30	55.5	597
	Training center	3		75	138.8	1493
	Toilet(male)	1		45	3.1	33
	Toilet(female)	1		45	3.1	33
TOTAL				488.9	5260

5.3.4 Other facility block

In a school campus, there need to be a space for sick students and also emergency medical center. Prayer spaces for teachers and students for both male and female is also a necessary facility. Moreover, this campus will facilitate their students with in-house stationary shops and printing shops. Ancillary facilities are also included within this section. For school bus and students' private vehicles there need to be some car parking area also.

PROPOSED PROGRAMS	no.	sqm/person	no. of persons/users	Total (sq)	Total (sqft)
Other facilities					
Check-up room	1		2	18.5	200
Recovery room	1		4	23.2	250
Tiolet	1		2	5.5	60
Foyer	1	0.9	5	4.5	48
Prayer Space	1	0.72	30	21.6	232
Ablution space	1		5	9.375	101
Toilet	2		20	7.4	80
Stationary shop	1		25	30	323
Printing Shop	1		20	25	269
TOTAL				145.1	1563

PROPOSED PROGRAMS	no.	sqm/person	no. of persons/users	Total (sq)	Total (sqft)
Ancillary facilities					
Substation	1			37.2	400
Generator room	1			37.2	400
Water-reserver	1			92.95	1000
Caretaker residence	1			74.35	800
TOTAL				241.7	2600
Parking (50 cars)					
Car			50	750	8073
TOTAL				750.0	8073

5.3.5 Total Built Area:

Total		
PROPOSED PROGRAMS	Total (sqr	Total (sqft)
Total area	11943.7	120821
Circulations (30%)	2985.93	30205
Total built area	14929.6	151026

CHAPTER 6: DESIGN CONSIDERATIONS

This section keeps its focus on the considerations that is necessary for this project "Akij Foundation School". Dividing works into different segments which includes proper data set, environmental effects on the proposed site, zoning of the proposed programs.

Figure 85: Proposed site map

(Source: Author,2021; based on Google earth)

6.1 Effects of environment

6.1.1 Contextual analysis of site

As this township development is not completed till now, this site is surronded by mostly with flat land and some waterbodies which has a connection with buriganga river on the east. As it is a urban infill site, open green areas are noticed in the north, east and south side of the proposed site. The site is surrounded by green fields and trees mostly on the east, other sides

have trees but, in less amount, than east side that can force the consideration taking for design. Some ongoing housing construction are there on the new plots and in other area, mostly 3-4 storied buildings (see fig-86).
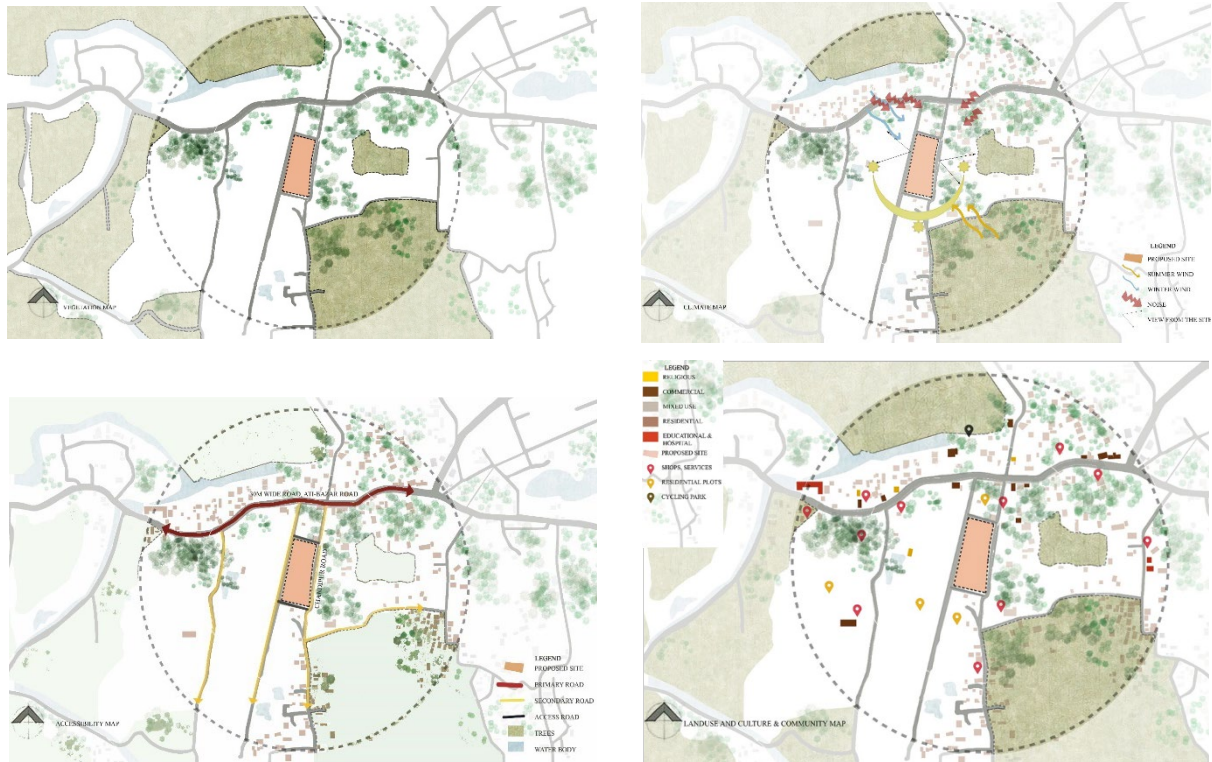

Figure 86: Site contextual mapping

(Source: Author,2021)

6.1.2 Sun path diagram

Sun path diagram shows in the climate map, determines wind flow from the southern and south eastern part of the site in summer. Sun rays time and direction is also indicating on that map (see fig-25).

6.2 Zoning

Facilities that can serve public are arranged at the entries so the project so that parents or others can come to the school for any kind of information related to this school with proper security measurements. Since most of the function are semi-private in this school projects, they are placed in a certain distance from the public and private functions. Classrooms are placed in a way so that no outsiders can easily access there, with proper security management only students and teachers can occupy the classrooms areas. Play areas are placed in such way that children from any classrooms can experience and enjoy throughout all the zones and spaces. Semi private zones are placed so that it can act as the linkers to private zones and public zones (see fig-).
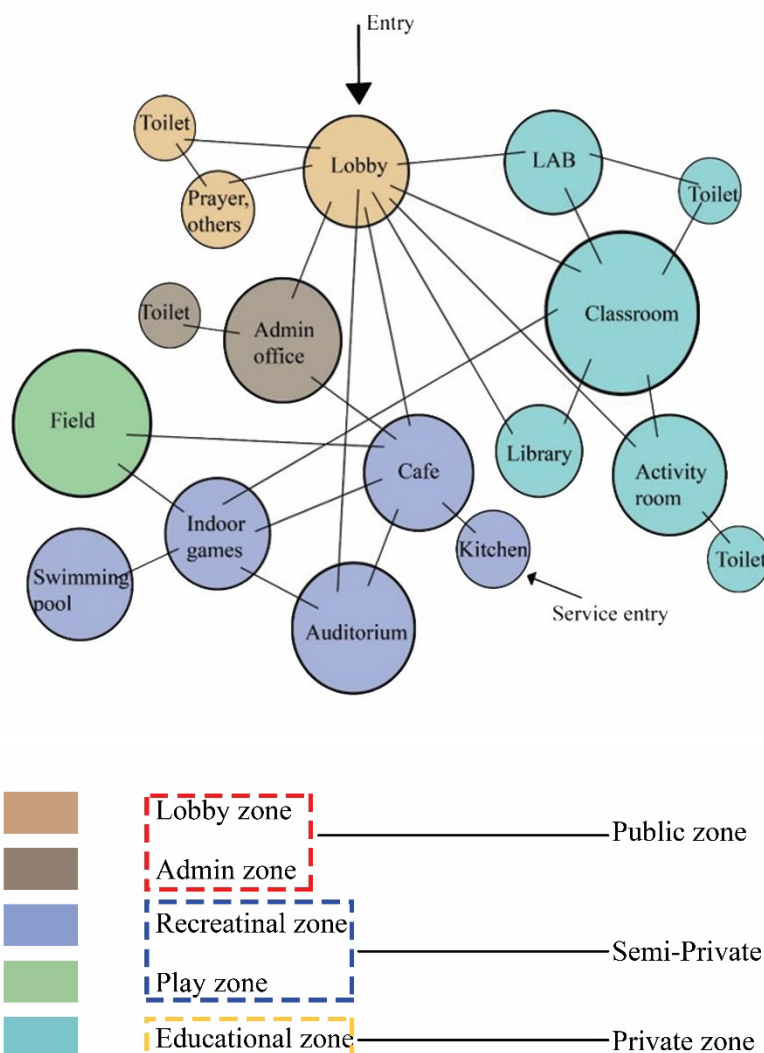
Figure87: Zoning diagram

(Source: Author,2021)

CHAPTER 7: DESIGN SUGGESTIONS

By this part of the paper, it will focus on the conceptual planning and design development process for designing "Akij foundation school". Design of a school is a project with a lot of responsibilities with making interesting spaces for the students to make them feel playful, interactive, as well as, making them interested to studies learning through nature. The main focus of designing this school project is to-

- create learning spaces in such a way that it helps to bring back and boost up students thinking process and broaden their mind. Also, changing the education system into knowledge gathering by first-hand experience through nature.

- focusing on the psychology of the students

- creating more pocket spaces where various activities can take place and students can engage in that which creates interaction between peers, teachers, objects, nature and overall tries to develop the vision of a child.

7.1 Conceptual analysis

7.1.1 Derivation of concept

Concept for this project comes from the different needs of different age groups of students as mentioned before (see table-2). Another important concept is to focus on the different paradigm of education which is not being focused, constructivism. Constructivism talks about the education system which helps to make students more into education by nature and they do not feel restrictive and their imagination boost up by this. Following this, it also helpful to notice and works with the psychological pattern of students (see fig-).
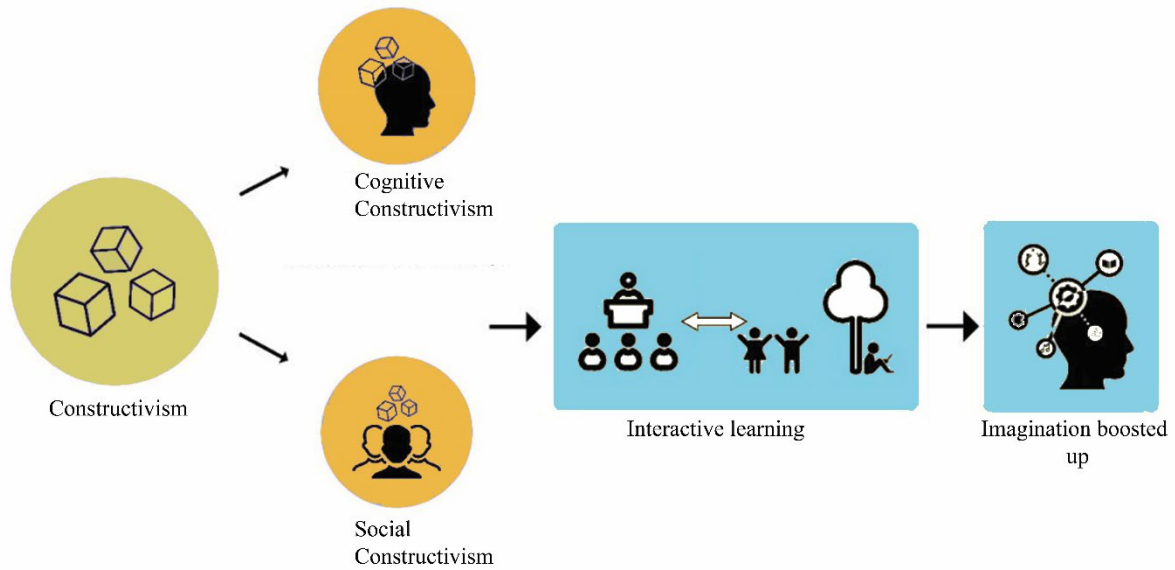
Figure88: Constructivism and children

(Source: Author,2021)

7.1.2 Concept of classroom arrangements

I have decided to think again of the arrangements of classroom to create gathering spacing by making staggering patterns. This incorporates green space with the built structures and creates a relation in between. Spaces like this encourage different age group students to take parts in different activities (see fig-).
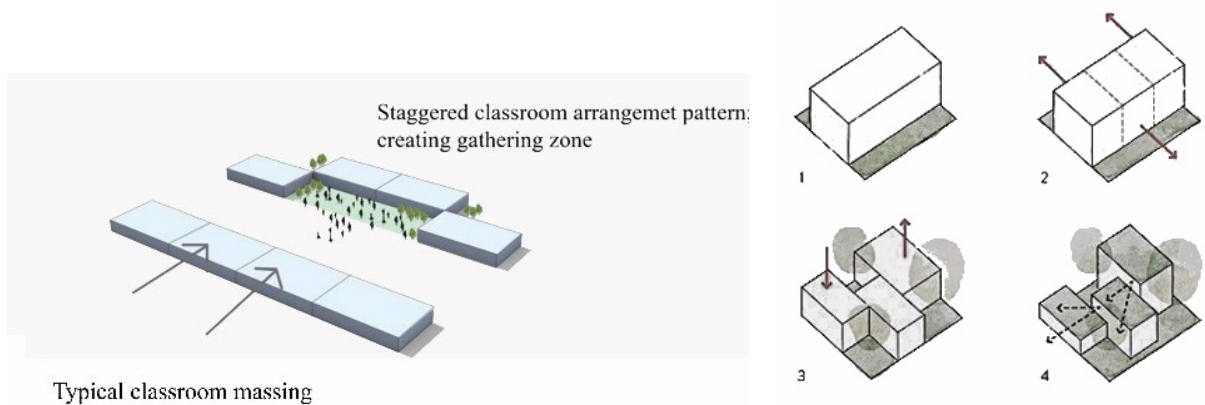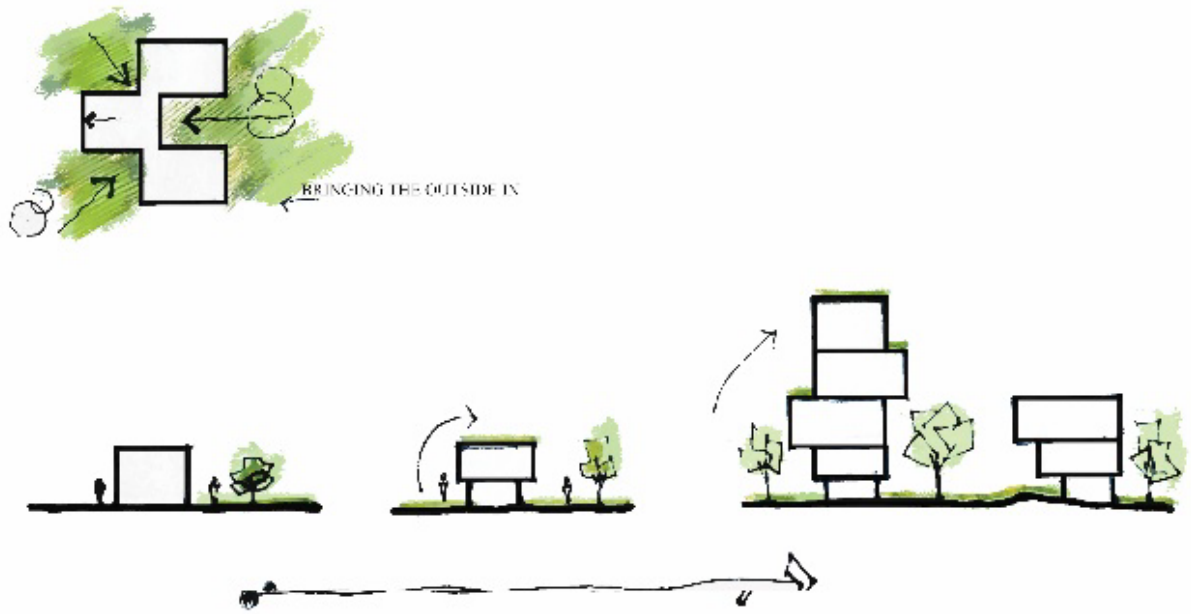

Figure89: Concept of classroom staggering

(Source: Author,2021)

Figure90: Incorporating nature with massing

(Source: Author,2021)

7.1.3 Conceptual sketches

Interaction with nature

Gathering spaces to boost
up imaginationg and creativity

Figure91: Concept of classroom staggering

(Source: Author,2021)

Conceptual sketches show my initial thoughts and visions towards the school design process that I have tried to implement in to my design development (see fig-).
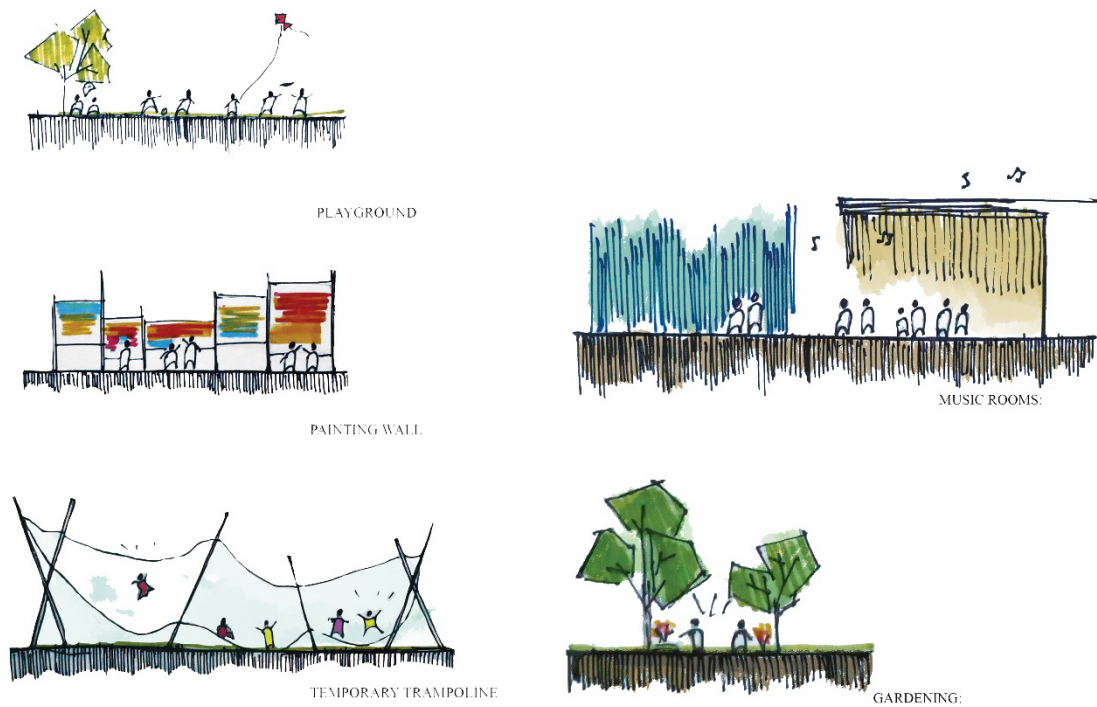
Figure92: Activity generating spaces

(Source: Author,2021)

7.2 Form generation

Taking the considerations in design development process that was discussed before, form generation of this project generates like this.
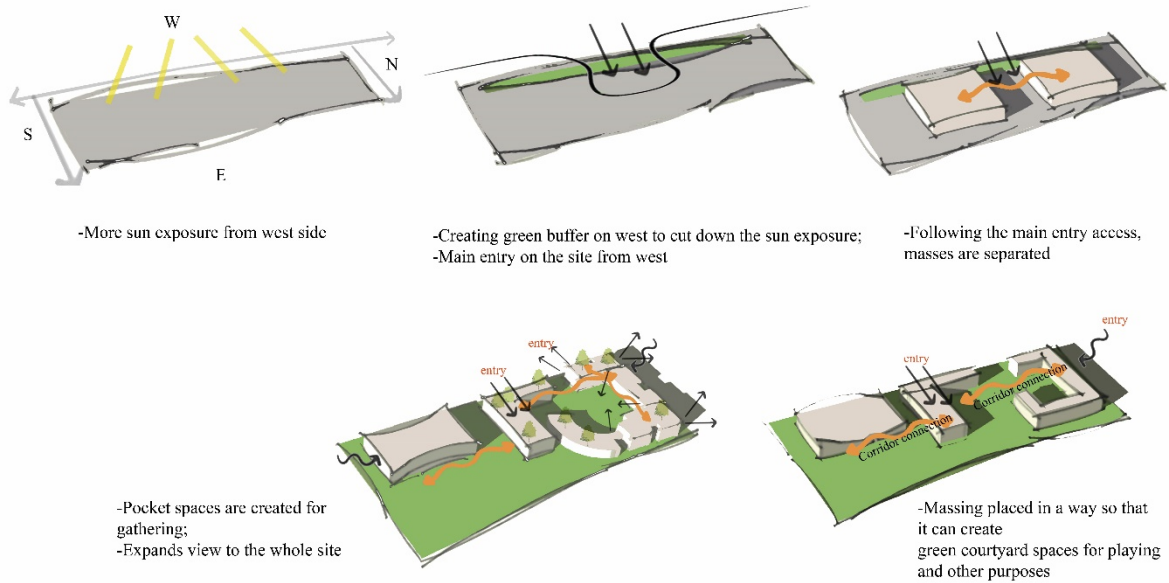

Figure93: Form generation

(Source: Author,2021)
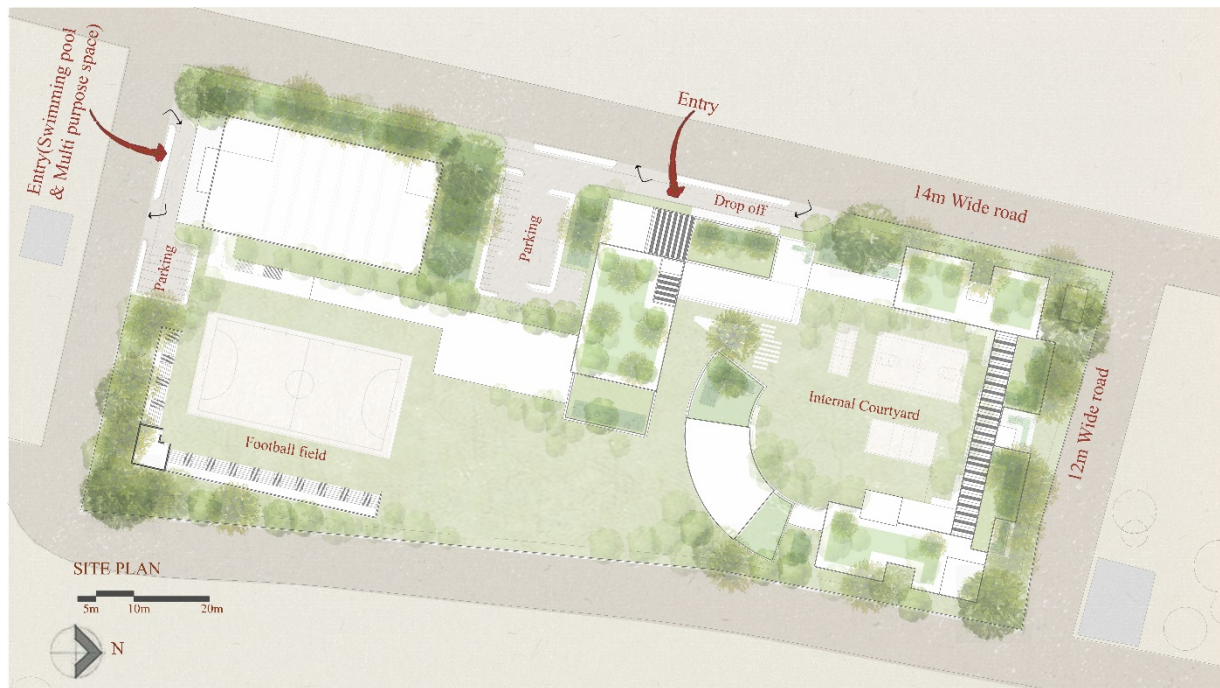
7.3 Drawings

7.3.1 Plans

Site Plan

Figure94: Site plan

(Source: Author,2021)

This site plan shows the top view of the school project which shows the roof of school building, green roof of the structure is also showing here. Site considerations, site forces and landscaping decisions are making this project to stand out. Relation with the roads are showing here.

Ground Plan

Figure95: Ground Floor plan
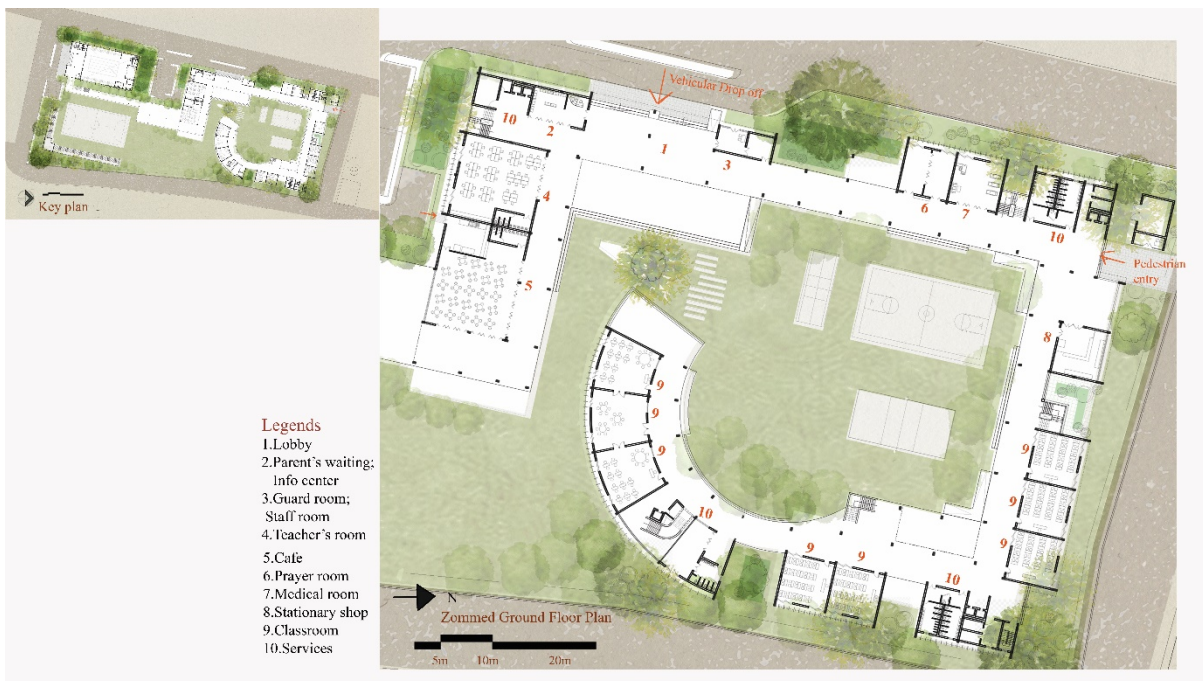
(Source: Author, 2021)

Figure96: Zoomed ground floor plan

(Source: Author,2021)

The ground floor plan was designed initially inspired from the site boundary of the project. Keeping the zoning properly, functions are placed in a way so that public, semi-private and private functions can work correctly. The northern part is more private zone where classrooms and functions that will occupied by mostly students are placed. Keeping the playground integrated with the classroom massing is showing in the ground floor plan design (see fig-).

Placing the fields in a way that follows standard orientation direction and players get advantages from this orientation of fields. Corridor connects all the functions properly with creating pocket courtyard like spaces after a while. Corridors also can be the learning space for the students and making interactions with teachers and peers (see fig-). I try to incorporate kindergarten student classroom block in different way by generating a curved mass that integrated with the other classroom masses. It keeps those kindergarten students more interactive with a proper security and making integrated courtyard like play spaces for them where temporary activity can generate as mentioned before (see fig-).

In other floors plan shows the continuation of the functions wherever needed. On the upper floors I try to create more pocket like spaces by chiseling out the form and that ensures more view and openness to the mass ultimately (see fig-). Second floor, where I incorporate a bridge that links classrooms with the library function and enough vertical connections are ensured to make it more playful and blend with the nature (see fig-). In this design, I try to fuse nature in every single possible way that makes me to take the design of making green roofs so that the structure can be sustainable as well as it cools down the entire structure in summer season (see fig-).

Moreover, I try to stagger the massing in vertically as well so that wind flow from southern and south eastern side do not face any kind of blockage and all classrooms and functions can get adequate light and ventilation.
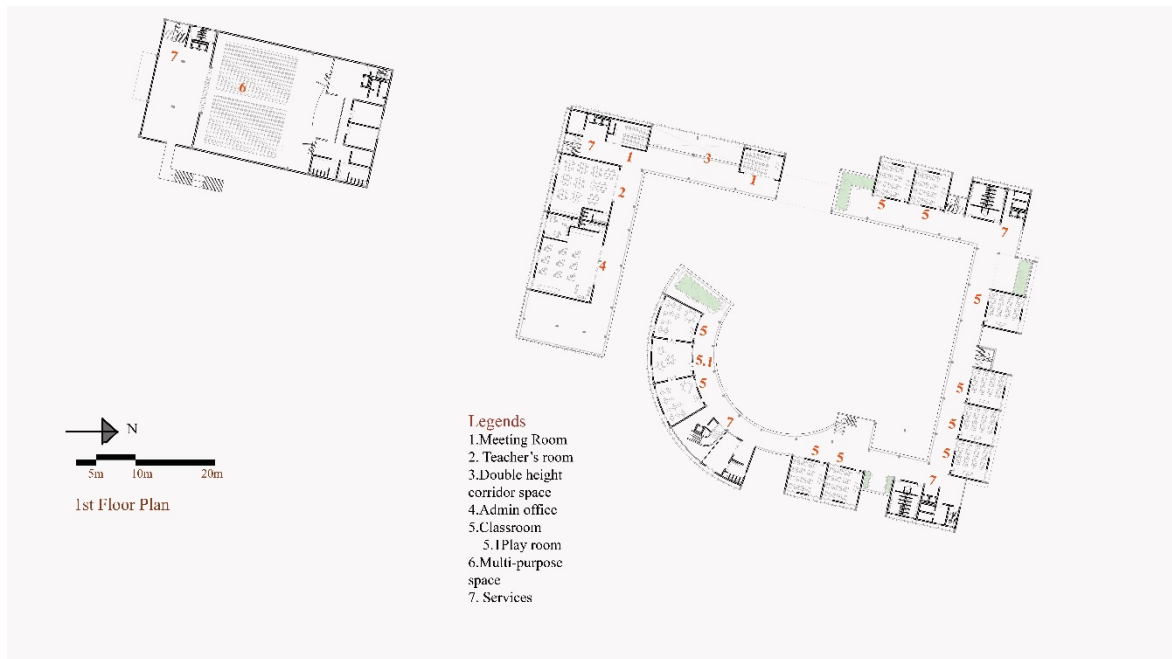
First floor plan

Legends
1. Meeting Room
2. Teacher's room
3. Double height corridor space
4. Admin office
5. Classroom
   5.1 Play room
6. Multi-purpose space
7. Services

1st Floor Plan

N
5m   10m   20m

Figure97: First floor plan

(Source: Author,2021)

Other floor plans

Legends
1. Art room
2. Music room with terrace
3. Library
4. Activity clubs
5. Classrooms
6. Services

2nd Floor Plan

N
5m   10m   20m

Figure98: 2ⁿᵈ floor plan

(Source: Author,2021)

85

3rd Floor Plan

N

5m 10m 20m

Legends
1.Labs
2.Activity clubs
3.Classrooms
4.Services
5.Gren roof and terrace

4th Floor Plan

N

Figur99: 3rd & 4th floor plan

(Source: Author,2021)

86

Figure100: 3ʳᵈ floor plan(zoomed)

(Source: Author,2021)

N

3rd Floor Plan

5m   10m   20m

Legends
1.Labs
2.Activity clubs
3.Classrooms
4.Services
5.Gren roof and
terrace
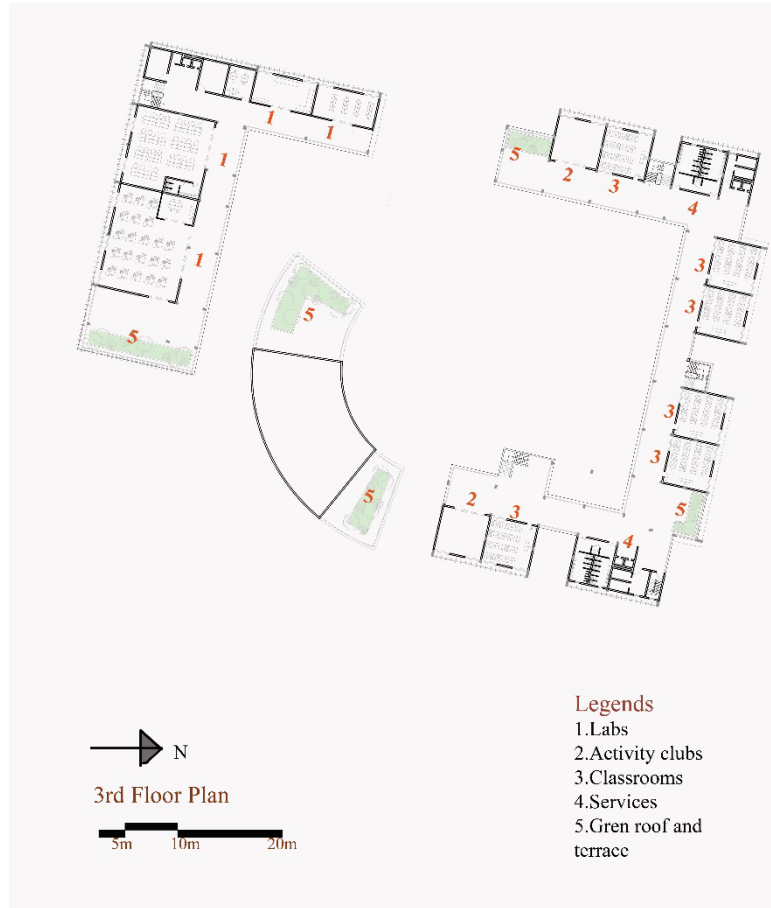
Figure101: 4ᵗʰ floor plan(zoomed)

(Source: Author,2021)

N

4th Floor Plan

Legends
1.Labs
2.Activity clubs
3.Classrooms
4.Services
5.Gren roof and
terrace
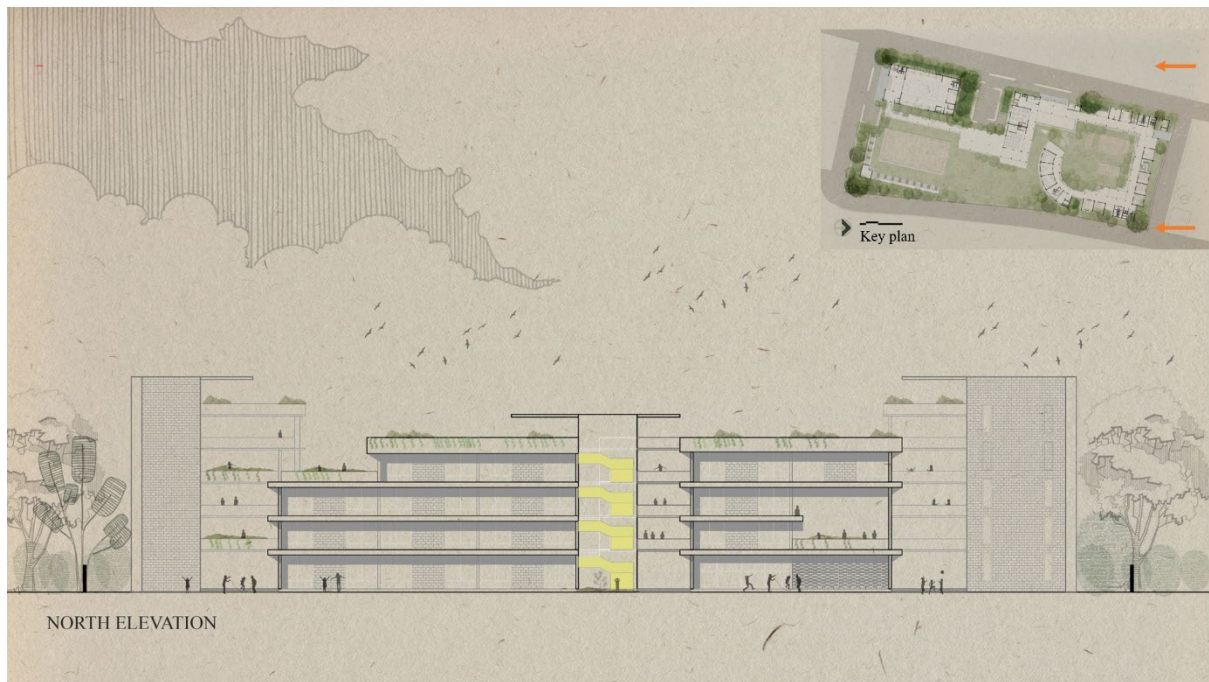
7.3.2 Elevations

Figure102: North elevation

(Source: Author,2021)
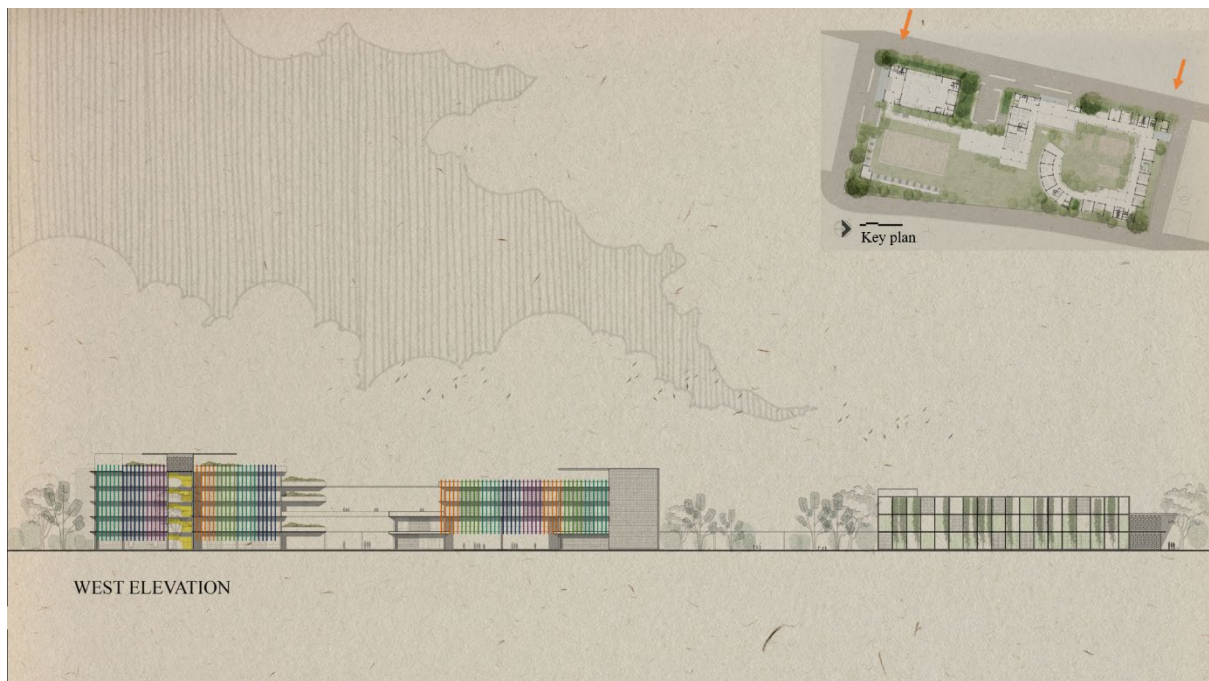
Figure103: West elevation

(Source: Author,2021)

7.3.3 Sections

Figure104: Section AA'

(Source: Author,2021)
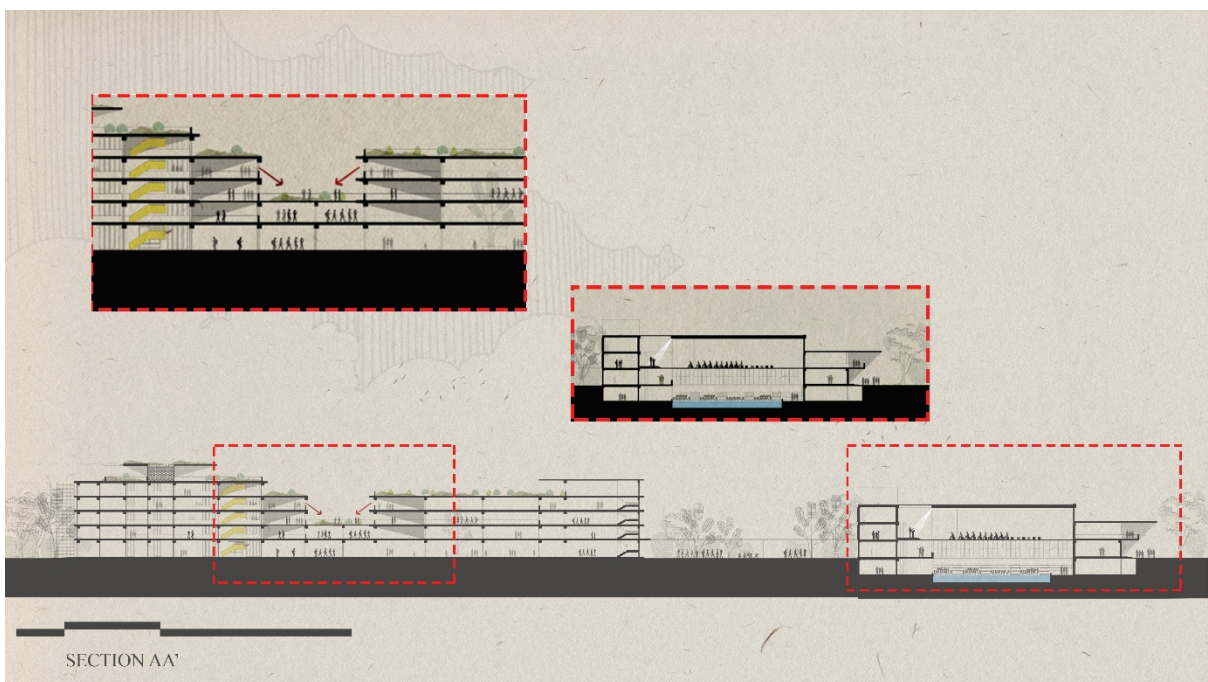
Figure105: Section AA' (Zoomed spaces)

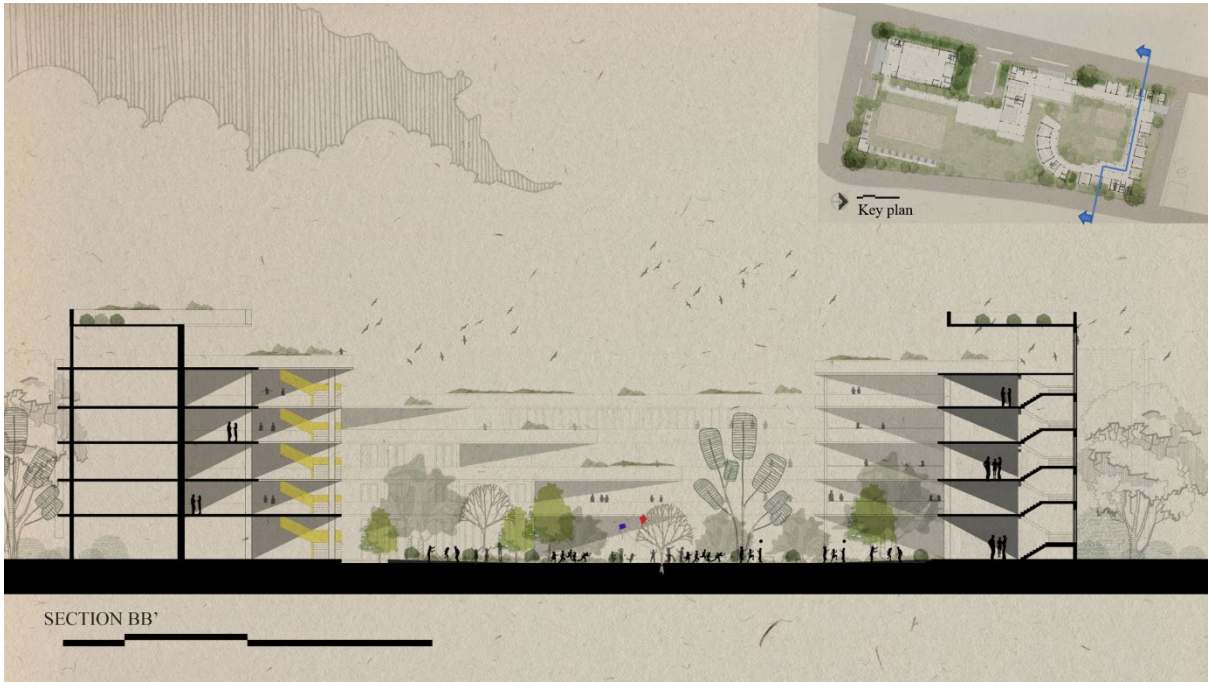(Source: Author,2021)

Figure106: Section BB'
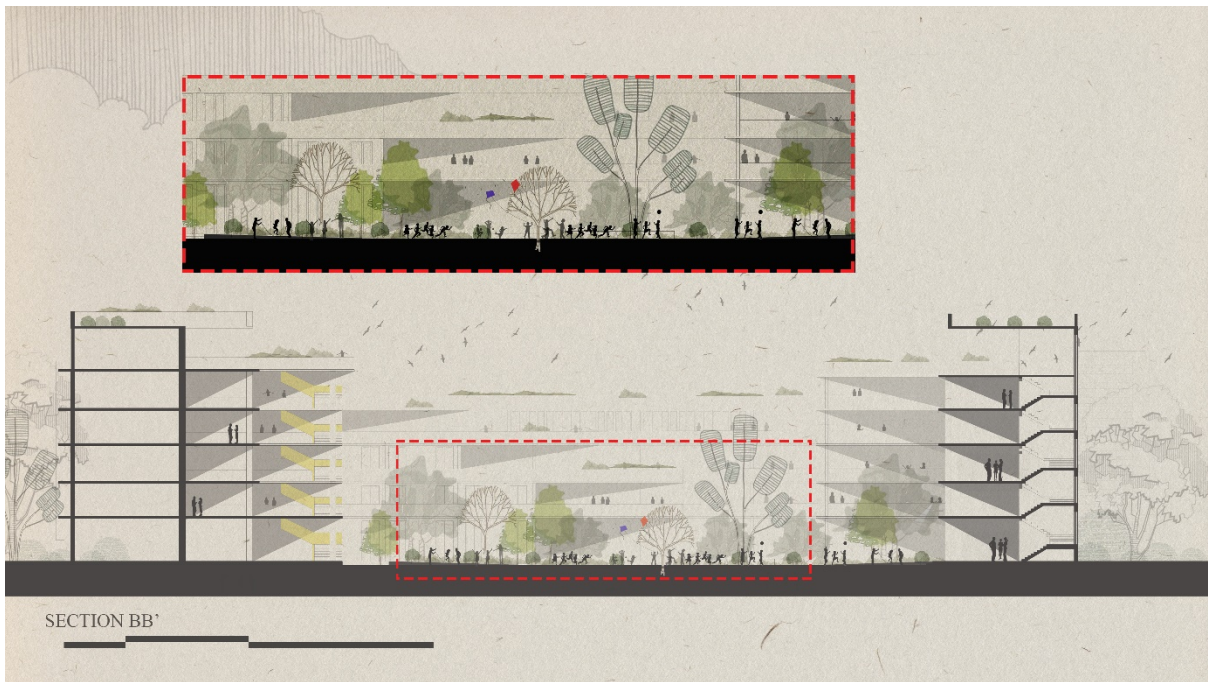
(Source: Author,2021)

Figure107: Section BB' (Zoomed spaces)

(Source: Author,2021)

7.4 Rendered images

Figure108: View from the west

(Source: Author,2021)

Figure109: Perspective view of School building

(Source: Author,2021)

Figure110: Perspective view of Admin building

(Source: Author,2021)

Figure111: Football field with gallery seating; Multi-purpose building

(Source: Author,2021)

Figure112: Colorful staircase and corridor relation; interactive spaces for students

(Source: Author,2021)

Figure113: Corridor relation with the integrated courtyard; outdoor play space & relation with nature

(Source: Author,2021)

Figure114: View from front of library function; visual relation with masses

(Source: Author,2021)

Figure115: Integrated playground; relation with classroom masses

(Source: Author,2021)

94

Figure116: South-west side from top view

(Source: Author,2021)

7.5 Conclusion

Designing of a school should be done much more seriously as this is where a child can shape up their mind for future and prepare themselves for a better living standard, given the rest of the world is gaining progress regarding proper education with the appropriate knowledge of child psychology. Akij foundation school can be the new address for students of that area and also can be an example of integration with nature and learning through play process. A school project like this will amidst the residential entities of that area which holds great potential to inspire the community people. It carries the positive thinking, relation with the nature and broaden outlook to the community as well. Nevertheless, one of the main purposes of this project is to make people appreciate the approach that have taken to design this, combining the education system with the nature and understanding the psychology of children's, along that, giving proper recreational spaces and functions.

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Appendix A.