

# ***INTERNATIONAL BOARDING SCHOOL WITH AN ECO-TECHNOLOGY ARCHITECTURE APPROACH IN SOUTH JAKARTA***

**Rafi Hafuza<sup>1,a)</sup>, Moch Fathoni Setiawan<sup>2,b)</sup>, Didik Nopianto A. Nugradi<sup>2,c)</sup>,  
and Eko Budi Santoso<sup>2,d)</sup>**

<sup>1</sup>*Student of Architectural Engineering, Faculty of Engineering, Semarang State University*

<sup>2</sup>*Architectural Engineering, Faculty of Engineering, Semarang State University*

Corresponding author : a) architect2020@students.unnes.ac.id

b) fathoni@mail.unnes.ac.id

c) didiknop@mail.unnes.ac.id

d) eko\_bs@mail.unnes.ac.id

**Abstract.** Educational innovation is an important factor for educational progress. Unfortunately, the implementation of educational innovation in Indonesia has not run smoothly as expected. This situation requires systemic reformulation by taking into account various factors such as political, economic, social and cultural factors. Judging from the importance of education, the combination of international schools and boarding schools is the right innovation choice in the current era. International Boarding Schools can be a way to create a generation that is advanced, independent, responsible and able to compete in developing science, technology and skills at an international level. By using an international curriculum and combining it with a boarding system in learning practices, it is hoped that the Indonesian generation can achieve a generation that is intelligent, independent and broad-minded. Not only about the educational aspect, International Boarding Schools can also be a solution to overcome traffic jam problems that occur, especially in big cities. With the Boarding system, parents no longer have to pick up and pick up their children to study at school, thereby reducing the quantity of motorized vehicles on the road. The construction of facilities in a city does not always go well and produce good results, many facilities are built which make the quality of the environment worse. Therefore, to reduce negative impacts on the environment, facilities to be built should apply an environmentally friendly design approach to reduce damage to the environment around the building in the short and long term. The international boarding school is planned on a site of 1,154 ha, on Letnan Jendral Soepeno Street, Kebayoran Lama, South Jakarta, Special Capital Region of Jakarta. The facilities at the school include classrooms, laboratories, dormitories and other supporting facilities that follow international school standards.

**Keywords:** *Educational, International, Boarding School, environment.*

## **INTRODUCTION**

According to UU No. 20 of 2003 <sup>(1)</sup>, every formal and non-formal education unit provides facilities and infrastructure that meet educational needs in accordance with the growth and development of students' physical, intellectual, social, emotional and psychological potential. Education is a conscious and planned effort to create a learning atmosphere and

learning process so that students can actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, nation and state.

Education is something that is needed by all levels of society. Starting from Indonesian people and foreign people who live in

Indonesia. Based on data from the DKI Jakarta statistical agency <sup>(2)</sup>, the South Jakarta region is an area that has a foreign population of 18,235 people out of a total of 36,004 foreign residents living in Jakarta, that is, around half of the foreign population in Jakarta lives in South Jakarta. Thus, a high educational need is created for foreign citizens living in South Jakarta. However, the educational needs of foreign nationals in South Jakarta cannot be responded to by the existing types of regular schools. There needs to be a type of school that can provide facilities, curriculum and learning systems with international classes.

The existence of shuttle activities in the education sector causes traffic jams in South Jakarta. Based on the results of an inventory of the South Jakarta Transportation Agency <sup>(3)</sup>, there are 10 schools in the South Jakarta area consisting of six high schools and four middle schools that do not have sufficient parking space, but have a high concentration of four-wheeled vehicles, causing traffic jams on the surrounding roads. There needs to be a response to this problem, one response that can be done is by implementing a boarding system for the type of school that will be planned. With the Boarding system, students who want to study at the school do not need to travel back and forth.

However, there are several other problems in the construction of the International Boarding School in the City of South Jakarta. According to Umi <sup>(4)</sup>, a boarding school is a boarding house for students, employees and so on, while a boarding school is living together in a building or complex. The City of South Jakarta is currently facing various environmental problems such as vulnerability to climate change, natural disasters, excessive use of land resources and low air quality. Therefore Therefore, there needs to be a response to the environment through the development of facilities and infrastructure that can overcome

or at least reduce the problems that have been mentioned.

## **METHODS**

This Architectural Design Report uses a descriptive method, by explaining, explaining and explaining the design requirements and conditions in planning and designing an International Boarding School with an Eco-technology Architecture Approach in South Jakarta. From the existing requirements and conditions, it is continued with collecting the data needed for planning and design. Then the existing data is analyzed and conclusions are drawn.

The conclusion of the discussion and analysis is in the form of basic concepts and things that need to be considered in building an International Boarding School with an Eco-technology Architecture approach in South Jakarta as a basis for designing the Final Architectural Project. Several things are done to create an Architectural Planning and Design Program related to planning and designing an International Boarding School using an Eco-technology Architecture Approach, namely by: Determining Design Ideas, Carrying out Identification. Implement Data Collection Procedures, analyze Data, create Synthesis or Design Concepts.

## **CONCEPT**

### **Overview of Architectural Concept**

#### **Emphasis**

This review serves as a basic reference to emphasize architectural concepts that influence international boarding school design. According to KBBI <sup>(5)</sup>, International means everything that concerns nations or countries throughout the world. In modern language usage, the term international is synonymous with the term "abroad". Based on the topic of planning and designing programs related to boarding schools, the author chooses to emphasize the concept of Eco-Technology Architecture. This concept is a building concept that maximizes the climate on

the site as building energy. This means that the building is designed to reduce the carbon footprint and have a more sustainable nature.

### Site Determination Criteria

According to Iskandar, 2009 <sup>(6)</sup>. Location is an area that can be generally recognized or limited, where an activity takes place. Apart from site regulations in Peraturan Menteri Pendidikan Nasional RI Number 24 year 2007 <sup>(7)</sup>, site selection is determined from the results of an analysis of alternative planning site selection in a predetermined area. The aspects that form the basis for assessing each site to be selected include the following: Utilities and Infrastructure : The site must have good utilities and infrastructure.

1. City Infrastructure or Utility : Important infrastructure and utilities provide electricity, dirty air removal, clean water sources, lighting, and others.
2. Accessibility: The ease and quality of accessibility at the site is quite an important consideration, because good access makes it easier for students, teachers or visitors to come to school.
3. Noise: a location with a low level of disturbance is needed to provide comfort for students and staff at the school.
4. Environment around the site: The site location is in a strategic area which is supported by supporting facilities other than transportation.

### Selected Sites



Figure 1 Selected Sites

Source : Google Earth, 2024

Location	: Jl. Letnan Jendral Soepeno, Kebayoran Lama, South Jakarta, Jakarta.
Area	: 1,154 ha
Functions	: School Building
KDB	: 40 %
KLB	: 5
KTB	: 55
KDH	: 30
GSB	
North	: GSJ 2 m
East	: GSB 2 m
South	: GSJ 5 m
West	: GSJ 5 m
Building Height	: 6 Floor

### Contextual Aspect Approach

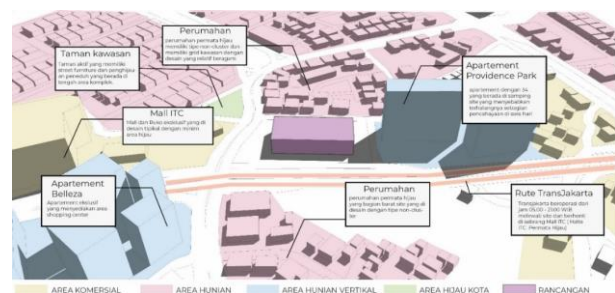


Figure 2 Site Analyst

1. Sun path: So that excess heat does not enter the building, the building mass is placed lengthwise in the direction of the sun from the eastern part of the site and vegetation and secondary skin are added.
2. Wind: to take advantage of the wind blowing on the site, the mass is formed openly and the building has wide air openings
3. View to Site and Noise: Placing the building at the back edge of the site for a good view to and from the building, site noise is relatively high coming from the protocol road in front of the site.

4. Accessibility: There are two main roads to the selected site, the first is to the north of the site, namely Jalan Permata Hijau and the second is to the west and south of the site, namely Jalan Arterial Permata Hijau.
5. Vegetation: maintaining and adding vegetation to the site.

### **Architectural Concept Approach**

According to KBBI (8), technology is the entire means of providing goods necessary for the continuity and comfort of human life. According to Klaus Daniel (1997) (9), "Ecological Technology in Architecture" which is often called Eco-technology Architecture has the meaning of Architecture that uses environmentally friendly technology / Environmentally Friendly Technology. From these three main principles it can be concluded that Eco-technology is architecture with high or low technology that is integrated into the natural environment and used to create an optimal artificial environment.

According to Slessor's opinion (10), the study of Eco-technology buildings is seen from several groups of Eco-technology building concepts, namely:

**Structural Expression:** Eco-technology building studies by prioritizing building forms with sophisticated structures whose applications are integrated with nature.

**Sculpting with Light:** Eco-technology building studies focus on lighting systems, where buildings with light come alive by utilizing natural lighting to illuminate the building interior.

**Energy Matters:** The efficiency of the energy used is one of the focuses of Eco-technology building studies.

**Urban Responses:** Eco-technology buildings are studied by looking at the environmental context of the city or in other words looking at the city's response.

**Making Connections:** The focus of Eco-technology building studies is to create a relationship between design and the environment or by analogy with the form or function of the building.

**Civil Symbolism:** Building designs that reclaim the role of buildings as public symbols by taking different building forms to seek new values.

### **DESIGN RESULT**

The types of roofs used in designing the International Boarding School with an Eco-technology Architecture approach are gable roofs and non-concrete roofs, non-concrete roofs are used as field areas in the building. This is a response to the small footprint but requires quite a lot of space.

Based on the spatial circulation analysis, the building is designed to have one mass divided into 2 groups of spaces, namely the school room and the dormitory room. Meanwhile, the building parking area is divided into 2 parts, namely outer parking and inner parking, this is done to meet the need for large parking spaces in a narrow area.



Figure 3 Situation

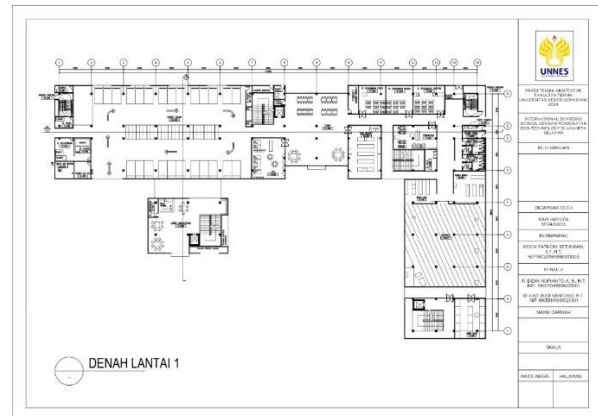


Figure 5 1st Floor Plan



Figure 4 Site Plan

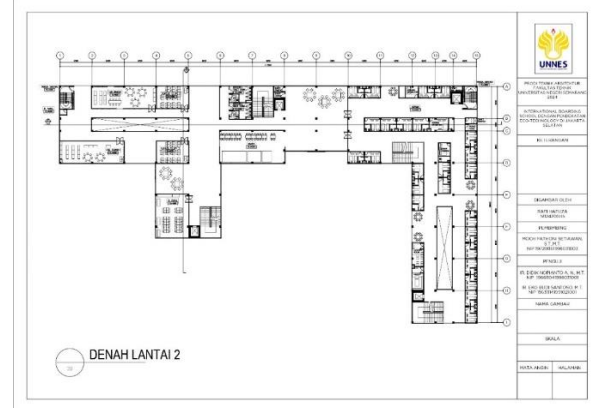


Figure 6 2nd Floor Plan

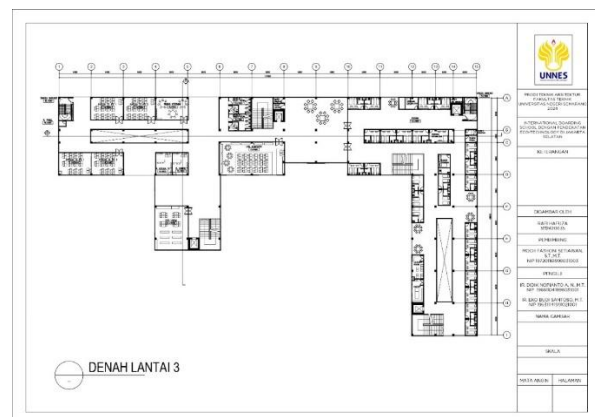


Figure 7 3rd Floor Plan

This first floor plan is the center of activity for the supporting spaces in the building, the supporting spaces can be used by all groups of building occupants. Meanwhile, on the second to fifth floors there are main rooms supporting teaching and learning activities. The plans of these four floors are typical with relatively the same use of space. The 6th floor of the building has the same function as the previous floors. However, on this floor there is a larger space and is not repetitive than the previous floor, namely the auditorium. In the school, the 7th floor is allocated as a rooftop which is used as a football field. This is intended to fulfill space needs that cannot be met in the landscape part of the building.



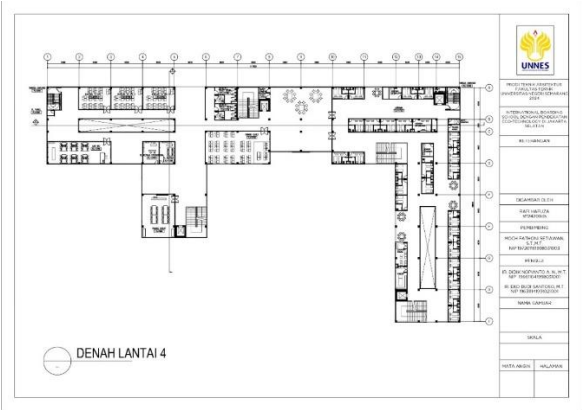


Figure 8 4th Floor Plan

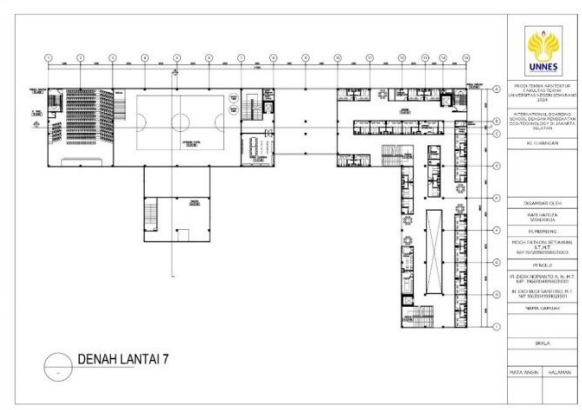


Figure 7 7th Floor Plan

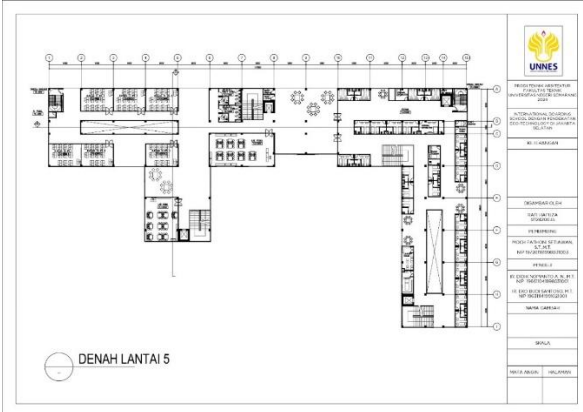


Figure 6 5th Floor Plan

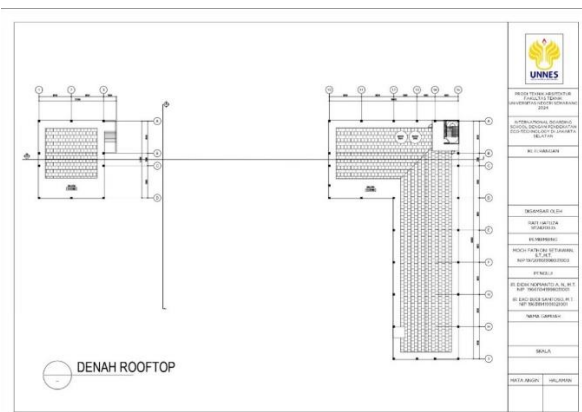


Figure 8 Rooftop Plan

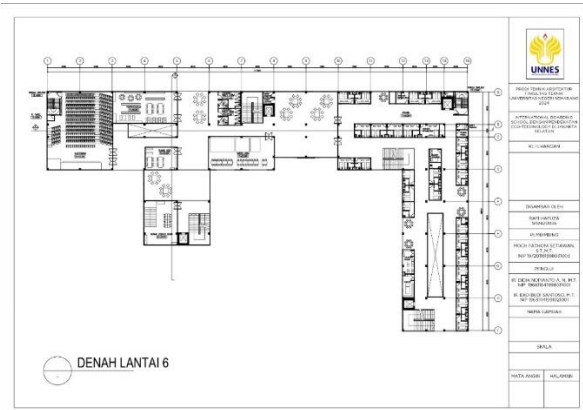


Figure 10 6th Floor Plan

The building view is divided into 4 parts, namely front view, back view, right view, and left view.



Figure 9 Front Elevation

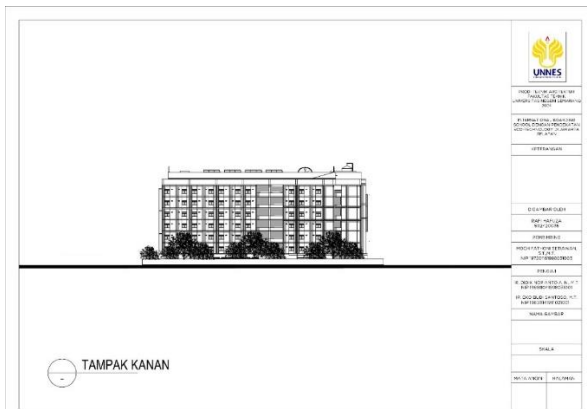


Figure 10 Right Side Elevation

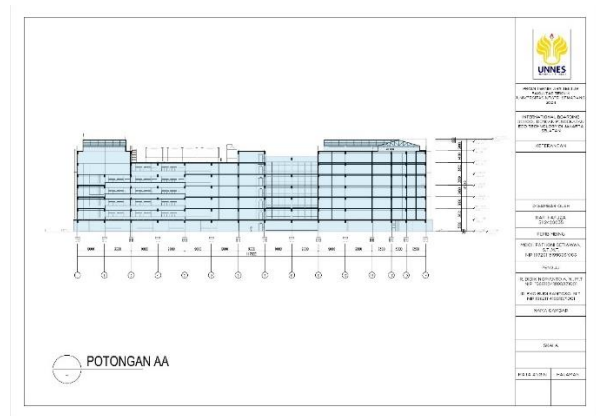


Figure 13 AA Section

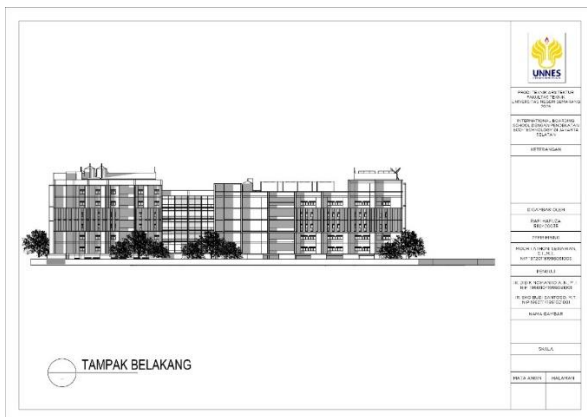


Figure 11 Back Elevation

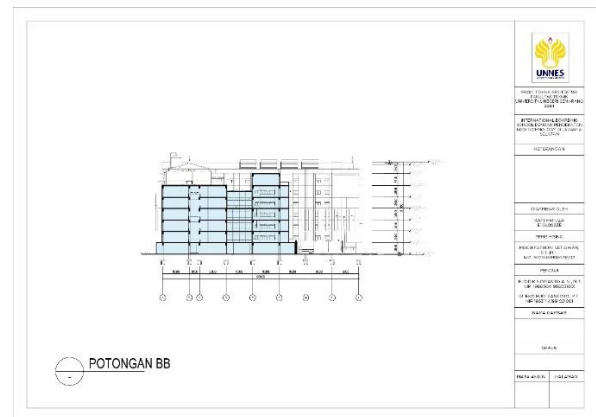


Figure 18 BB Section



Figure 12 Left Side Elevation

Building Cutting from 2 sides, namely the horizontal side and the vertical side, the horizontal side of the building shows the elevation of the building from the right end to the left end, while the vertical side of the building shows the left side of the building.

From the perspective of the outer space of the building, the building is designed around a field to create a shady space and away from sources of surrounding noise. The placement of the building's mass also helps air circulation flow well and makes the visual feel more spacious.



Figure 14 Exterior School Perspective



Figure 20 School Field Area

The interior of the building is designed with a main color scheme of cyan and pastel orange which symbolizes happiness or creativity. The interior of the building is designed in harmony between the rooms, namely by having the same color tone.



Figure 15 Classroom Area



Figure 16 Dormitory Area

## CONCLUSION

International Boarding School with an Eco-technology Approach in South Jakarta is the design of educational facilities with the concept of environmentally friendly technology in order to create buildings that can respond to the environment and can accommodate the needs of

the community regarding facilities and infrastructure that can support education in South Jakarta. Educational facilities with good facilities will create a generation that is intelligent, competent, independent and qualified. With the analysis that has been carried out, the selected site is on Letnan Jendral Soepeno Street, Kebayoran Lama, South Jakarta, Special Capital Region of Jakarta.. This site has criteria that are in accordance with International Boarding School planning with an Eco-technology Approach starting from the area of the site, the environment around the site, and the use of land on the site. There is great hope that with the planning of an International Boarding School in South Jakarta, it will better accommodate the educational needs of Indonesian citizens and foreign nationals residing in Indonesia.

## REFERENCES

1. "UU No. 20 Tahun 2003 tentang Sistem Pendidikan Nasional [JDIH BPK RI]."
2. [https://jakarta.bps.go.id/jumlah penduduk asing di DKI Jakarta](https://jakarta.bps.go.id/jumlah-penduduk-asing-di-dki-jakarta), 2024.
3. [https://nasional.kompas.com/Antar-Jemput ke Sekolah Salah Satu Penyebab Kemacetan](https://nasional.kompas.com/Antar-Jemput-ke-Sekolah-Salah-Satu-Penyebab-Kemacetan), 2013.
4. Umi Kholidah. "Pendidikan Karakter dalam Sistem Boarding School di MAN Wonosari Gunung Kidul Yogyakarta, Skripsi, Fakultas Tarbiyah dan Keguruan UIN Sunan Kalijaga, Yogyakarta," (2011): 16.
5. "International – Online KBBI 2023".
6. Iskandar, M. 2009. Evaluasi Sebaran Lokasi Fasilitas Pendidikan Sekolah Menengah Pertama dan Sekolah Menengah Atas di Kota Bogor, Tesis Program Studi Perencanaan Wilayah Kota, Sekolah Arsitektur Perencanaan dan Pengembangan Kebijakan. Bandung Institut Teknologi Bandung.
7. <https://peraturan.bpk.go.id/permendikbud-no-24-tahun-2007>
8. "Teknologi – Online KBBI 2023".



9. Klaus Daniel, Low tech, light tech, high tech, 1997
10. Catherine Slessor. Eco-tech: Sustainable Architecture and High Technology, 1997.