

# The Project Hospital Specialist Of Orthopedic And Traumatology

Endi Martha Mulia<sup>1</sup>, Syamsulsyah Lubis<sup>2</sup>, Jefri<sup>3</sup>

<sup>1,2,3</sup>Architectural Studies Program, Faculty of Civil Engineering and Planning  
T. D. Pardede Institute of Science and Technology, Medan, Indonesia

\* Corresponding author:

Email: [endimartha@istp.ac.id](mailto:endimartha@istp.ac.id)

---

## Abstract.

*Orthopedics is a branch of medicine that studies various functions and disorders that can occur in the musculoskeletal system. WHO reports that musculoskeletal disorders are the second most common disease worldwide after influenza. In North Sumatra, the prevalence of joint disease in populations over 15 years is 5.4% (around 778,500 people). While traumatology is a subspecialist of orthopedics specializing in dealing with injuries due to accidents or violence and surgical treatment. Indonesia is reported to have increased the number of traffic accidents in 2018 by 10% from the previous year with 25,000-30,000 victims. From the data above, the need for orthopedic and traumatology health services is high, but in Indonesia there are only 3 orthopedic and traumatology specialist hospitals. In North Sumatra, there are no orthopedic and traumatology specialist hospitals yet, so the idea of planning and designing an Orthopedic and Traumatology Specialist Hospital with facilities that support the management of patients with diseases related to the musculoskeletal system and wound management both caused by musculoskeletal disorders and caused by accidents and violence.*

**Keywords:** hospital, specialist, orthopedic, traumatology

---

## I. INTRODUCTION

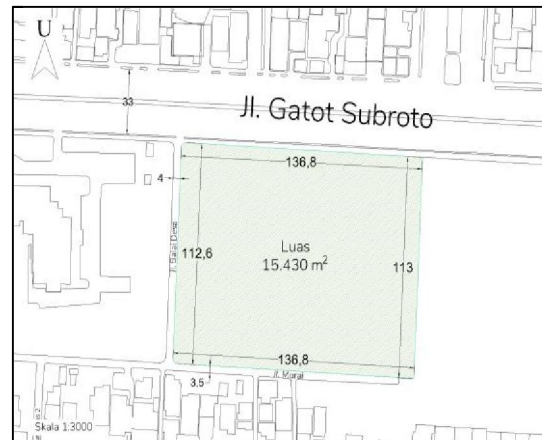
Tourism is a very important sector in a country, because it can improve economic conditions. To develop tourism, there must be adequate infrastructure and facilities in order to attract the attention and interest of tourists. Tourists are the most important part of tourism because it will be a marketing tool that has potential (Ginting and Wahid, 2015). Tourism directly is to produce something that attracts tourists to spend and increase economic value. This can be a factor in the increase in wages / salaries of tourism employees. The advantage indirectly is to do suppliers in the form of handicrafts by the surrounding community so as to increase the profits of the tourist area (Kristiningrum, 2014). Tourism in Indonesia is many and diverse, one of the most interesting is natural tourism. The existence of beautiful and cool natural potential is very difficult to obtain in urban areas because the dense population growth rate, exhausting work activities, and air full of pollution, can cause stress that will affect human health. Responding to this, to restore the health of workers, seniors, and others, they need the freshness of the soul and body and lodging accommodations that present beautiful scenery with cool air and have recreational facilities so as to change the lifestyle that is accustomed to being done in the city. For that, it is very important to design a Resort Hotel to support this desire. The design of hotel resorts is done with the approach of "New Tourism Development" responding to the natural potential available so that it can make a large contribution to a region if managed properly and professionally. In addition to natural potential, local community activities can also be highlighted such as agriculture, handicrafts and others that can support tourism activities. Based on data from Global Burden of Disease, disability due to musculoskeletal disorders increased by 45% over the past decade (Storheim & Zwart, 2018). The incidence of musculoskeletal disorders does not have a percentage estimate specifically for the entire disease group but from riskesdas 2018 data, the prevalence of joint disease in general in the Indonesian

population over 15 years is 7.3% (about 19,345,000 people with an estimated population of Indonesia in 2018 as many as 265,000,000 people). In North Sumatra alone, the prevalence of joint disease in the population over 15 years of age is 5.4% (about 778,500 people with an estimated population of North Sumatra in 2018 amounting to 14,415,400 people).

## II. PROJECT DESCRIPTION

Project is a class C specialty hospital that provides services in the field of special health of musculoskeletal systems and injuries due to accidents and violence located in the city of Medan. This hospital can be used as a referral for patients who experience disorders of the musculoskeletal system or patients victims of accidents and violence who need further treatment. The Orthopedic and Traumatology Specialist Hospital

The Orthopedic and Traumatology Specialist Hospital Project is located at Jalan Gatot Subroto, Simpang Tanjung Village, Medan Sunggal Subdistrict, Medan, Indonesia. The project will be built on an area of 15,430m<sup>2</sup>. The width of Jalan Gatot Subroto is 33m, the width of Jalan Balai Desa is 4m, and the width of Jalan Murai is 3.5m.



**Figure 1.** Project Location

Based on the Medan City Wilaya Spatial Plan, the site used for the planning and design of the Orthopedic and Traumatology Specialist Hospital project belongs to the SBWP zone, a sub zone of High Density Housing (including land provisions for hospitals). With the High Density Housing sub zone, the site has a maximum Building Base Coefficient (KDB) of 80%, a maximum Green Open Space (RTH) of 15% and a maximum Building Floor Coefficient (KLB) of 3.2. The maximum building height limit is 4 (three) floors / 18 (eighteen) meters. The width of the building is at least 5m and the length of the building is at least 6m or the ground floor area of the building is at least 36m<sup>2</sup> with a minimum side and rear border of 1.5m. The potential of the site is inferred from the match to the criteria for the selection of the project location of the Orthopedic and Traumatology Specialist Hospital, namely:

- 1) The location of the project is on the Gatot Subroto primary arterial road which is prone to accidents and the location is easily reached by the community.
- 2) The project location is directly connected to the 2-way highway so that it is easily reached by private vehicles and public transportation.
- 3) Located in a densely populated residential area so that it is easily accessible to the surrounding community.
- 4) Supported by infrastructure such as pedestrians in front of the site and utilities such as PLN, PAM, and drainage.
- 5) The area of the site that supports project activities is 1.54ha.

### III. PROJECT ANALYSIS

#### A. Analysis of Buildings Around the Site

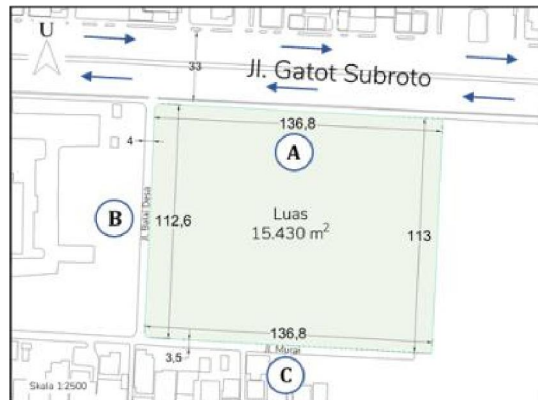


Source: Personal Analysis, 2019

Figure 2. Analysis of buildings around the site within a radius of 1km

The location of the site is easily reached from the city center and is in a strategic area with various types of facilities / facilities around the site.

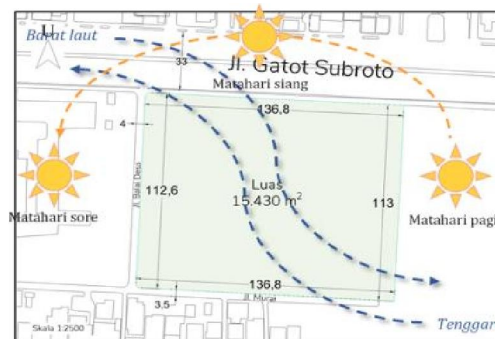
#### B. Project Entrance Analysis



Source: Personal Analysis, 2019

Figure 3. Alternative analysis of entrance

#### C. Analysis of the Sun and Wind



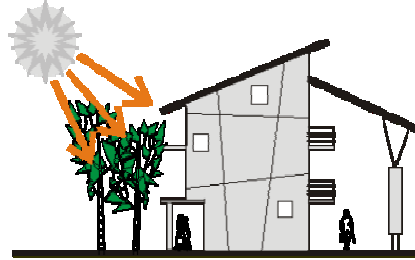
Source: Personal Analysis, 2019

Figure 4. Analysis of the sun and wind

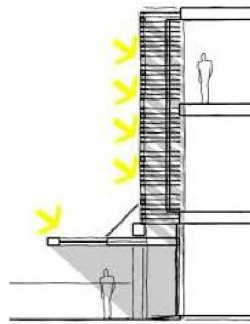
The location of the site is in Indonesia which is a tropical country with year-round solar irradiation. Sunlight can be used as a source of natural indoor lighting and a source of vitamin D for patients.

However, continuous sun exposure can cause discomfort. Some ways that can be done to reduce the intensity of sunlight are:

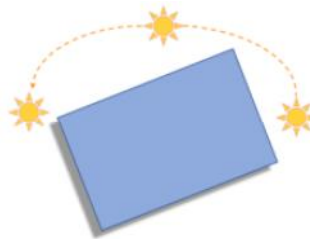
1. Utilize vegetation as a sunlight filter and shade



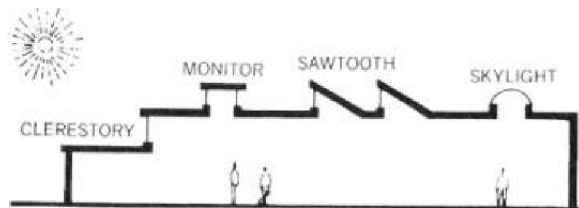
2. Use of sun shading such as grilles, tritisan or canopy on the façade of the building.



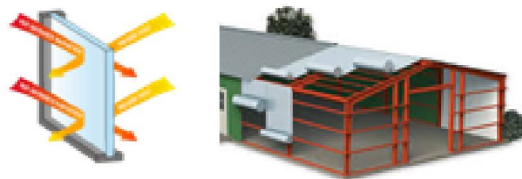
3. Regulate the orientation of the building so that sunlight is utilized optimally.



4. Application of openings such as skylights and clerestory windows so that not all sun exposure enters the room.



5. Use materials such as low e glass and aluminum foil insulation that can reduce the heat that enters the building.



Winds blow from the northwest to the southeast of the site and vice versa. The intensity of wind gusts from the southwest is potentially higher than the southeast wind because the existing conditions of the northwest-southwest side of the site are directly adjacent to the highway, while on the southeast side it borders empty land. To maximize the wind that enters the site can be done by:

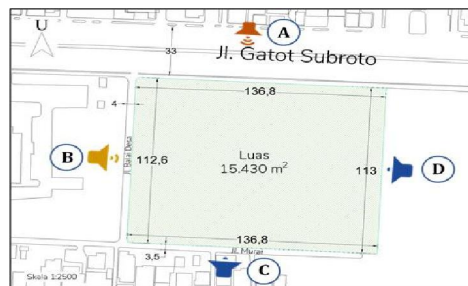
- 1) Regulate the intensity of the wind that enters the site with a vegetation filter.
- 2) Orientate the building in such a way that the wind passing through the site can be utilized.

#### IV. CONCLUSION

From the results of the analysis above, the methods that will be used to limit sunlight and excess wind on the site are as follows:

- 1) The north and west sides are planted with vegetation that can break up the wind and shade.
- 2) Regulate the orientation of the building so that sunlight and wind can be utilized optimally.
- 3) Use low e glass to reduce the heat that enters the building and canopy as sun shading.

#### D. Noise and Dust Analysis



**Source:** Personal Analysis, 2019

**Figure 5.** Noise and Dust Analysis

Side A has a high level of noise and dust because it is the main road that is always passed by vehicles both day and night and activities around the site that also cause noise pollution in the surrounding environment.

Side B has a moderate level of noise and dust caused by the activity of two-wheeled vehicles that are quite high, especially during the day.

Side C has a low level of noise and dust because it is rarely passed by vehicles.

Side D has a low level of noise and dust because it borders empty land.

Here are some alternatives to minimize noise and dust:

- 1) Give distance between the building and the source of noise and dust.
- 2) Use vegetation or fences as buffers.
- 3) Elevate the elevation of the site.
- 4) Use building materials that can muffle sound.

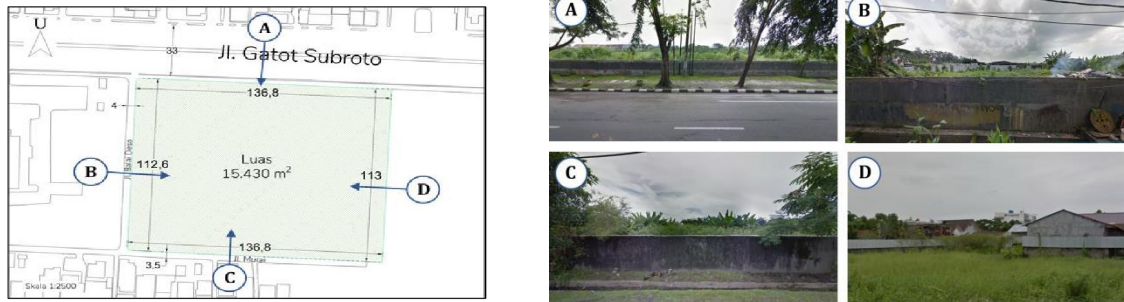
#### Conclusion:

Based on the results of the analysis, then the way to be applied to reduce noise and dust:

- 1) Provide distance between the building and the source of noise and dust, where the empty area can be used as a parking lot or park.
- 2) Plant vegetation that can have the ability to muffle noise and absorb dust.
- 3) Use materials that can muffle sound in buildings.



## E. View Analysis



Source: Personal Analysis, 2019

**Figure 6.** View analysis into the site

Views A, B, and C show vacant land on the site bordered by brick walls.

View D shows residential houses and vacant land.

View A and B can be seen clearly because they are directly adjacent to the highway so that it can be made more attractive in the following ways:

- 1) Orient the building across the direction of the view inward so that the perspective of the building is more visible.
- 2) Create a more attractive open area on the site.
- 3) Limiting the view by making massive fences and hedges.



Source: Personal Analysis, 2019

**Figure 7.** Analysis of the view outside the site

View A is quite interesting because it faces Gatot Subroto street

View B and C are less attractive, there is only a view of a resident's house.

View D is less attractive because it faces vacant land with unkempt grass.

To overcome the view that is less attractive can be done by:

1. Reducing openings in less attractive areas.
2. Make a fence from a row of vegetation.
3. Create artificial views that can be in the form of gardens, fountains, and statues.

### Conclusion:

To maximize the view outside the site can be done by:

1. Aperture is maximized in view A.
2. In views C and D, it can be overcome by making artificial views or hedges so that it adds aesthetic value to the site.

## F. Parking Analysis

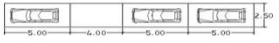
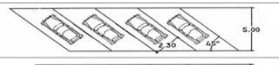
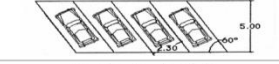
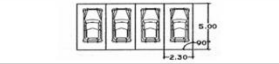
Parking is a basic facility for the convenience of managers and visitors. The criteria in designing a parking lot are:

1. Capacity according to need.
2. Clear circulation.
3. Easily accessible from outside and from inside the site.
4. Do not interfere with other ongoing activities on the site.

Commonly used vehicle parking systems include:


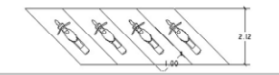

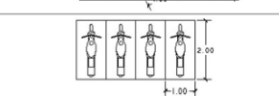
1. Car park

**Table 1.** Types of car parking

Parkir paralel (180°)	
Parkir 45°	
Parkir 60°	
Parkir 90°	

2. Motorcycle parking

**Table 2.** Types of motorbike parking

Parkir paralel (180°)	
Parkir 45°	
Parkir 60°	
Parkir 90°	

## Conclusion:

Based on the table of types of vehicle parking above, the parking system that will be used for cars is 90° and 45 parking. For motorcycle parking that will be used is 90° parking.

## REFERENCE

- [1] De Chiara, Joseph. (1973). Time-saver Standards for Building Types.
- [2] Neufert. 1990. Data Arsitek Jilid II.
- [3] Siregar, C. 2004. Farmasi Rumah Sakit: Teori & Penerapan, Jakarta: ECG.
- [4] Ketaren, A. 2013. Skripsi: Perancangan Rumah Sakit Orthopaedi Di Kota Malang (Tema: Analogi Kerangka Tangan). Malang: Universitas Islam Negeri Maulana Malik Ibrahim.
- [5] Milawati, R. 2016. Skripsi: Perancangan Rumah Sakit Orthopedi dan Traumatologi di Kabupaten Sidoarjo (Tema: *High Technology Architecture*). Malang: Universitas Islam Negeri Maulana Malik Ibrahim.
- [6] Pedoman Teknis Bangunan Rumah Sakit Kelas C Kementrian Kesehatan Republik Indonesia.
- [7] Keputusan Menteri Kesehatan Republik Indonesia Nomor 1204/MENKES/SK/X/2004.
- [8] Peraturan Menteri Kesehatan Republik Indonesia Nomor 56 Tahun 2014 Tentang Klasifikasi dan Perizinan Rumah Sakit.
- [9] Peraturan Menteri Kesehatan Republik Indonesia Nomor 340/MENKES/PER/III/2010 Tentang Klasifikasi Rumah Sakit.

- [10] Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2016 Tentang Persyaratan Teknis Bangunan dan Prasarana Rumah Sakit.
- [11] Undang-Undang Republik Indonesia Nomor 44 Tahun 2009 Tentang Rumah Sakit.
- [12] Undang-Undang Republik Indonesia Nomor 36 Tahun 2009 Tentang Kesehatan.
- [13] SB Sihombing (2021), Analisis Efektivitas Penghawaan Alami Pada Rumah Susun (Hunian) (Studi Kasus: Rumah Susun Kayu Putih), *Jurnal Sains Dan Teknologi Istp* 15 (1), 70-77  
[Http://ejournal.istp.ac.id/index.php/jsti/article/view/66](http://ejournal.istp.ac.id/index.php/jsti/article/view/66)
- [14] Un Halawa, D Sinabariba, Sb Sihombing (2019), *Resort Tepi Pantai Nias Selatan*, *Jurnal Sains Dan Teknologi Istp* 12 (1), 80-93 [Http://ejournal.istp.ac.id/index.php/jsti/article/view/34](http://ejournal.istp.ac.id/index.php/jsti/article/view/34)
- [15] J Tantri, Iphp Sibarani, Sb Sihombing (2019), *Apartemen Cbd Polonia*, *Jurnal Sains Dan Teknologi Istp* 12 (01), 99-105
- [16] Itl Ritonga, Emm St (2019), *Pusat Perbelanjaan Kawasan Pesisir Belawan*, *Jurnal Sains Dan Teknologi Istp* 11 (2), 174-186 [Http://ejournal.istp.ac.id/index.php/jsti/article/view/22](http://ejournal.istp.ac.id/index.php/jsti/article/view/22)
- [17] Sb Sihombing (2021), Analisis Efektivitas Penghawaan Alami Pada Rumah Susun (Hunian) (Studi Kasus: Rumah Susun Kayu Putih), *Jurnal Sains Dan Teknologi Istp* 15 (1), 70-77  
[Http://ejournal.istp.ac.id/index.php/jsti/article/view/66](http://ejournal.istp.ac.id/index.php/jsti/article/view/66)
- [18] Un Halawa, D Sinabariba, Sb Sihombing (2019), *Resort Tepi Pantai Nias Selatan*, *Jurnal Sains Dan Teknologi Istp* 12 (1), 80-93 [Http://ejournal.istp.ac.id/index.php/jsti/article/view/34](http://ejournal.istp.ac.id/index.php/jsti/article/view/34)
- [19] J Tantri, Iphp Sibarani, Sb Sihombing (2019), *Apartemen Cbd Polonia*, *Jurnal Sains Dan Teknologi Istp* 12 (01), 99-105
- [20] Itl Ritonga, Emm St (2019), *Pusat Perbelanjaan Kawasan Pesisir Belawan*, *Jurnal Sains Dan Teknologi Istp* 11 (2), 174-186 [Http://ejournal.istp.ac.id/index.php/jsti/article/view/22](http://ejournal.istp.ac.id/index.php/jsti/article/view/22)