Shinjuku

Zen Heights

Diploma project

SHINJUKU ZEN HEIGHTS

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FAKULTA ARCHITEKTURY ČVUT V PRAZE

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Thanks

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Lastly, i would like to express my deepest gratitude to my family and friends. Without your support i would not be able to achieve what i did. It means the world to me.

Thank you.

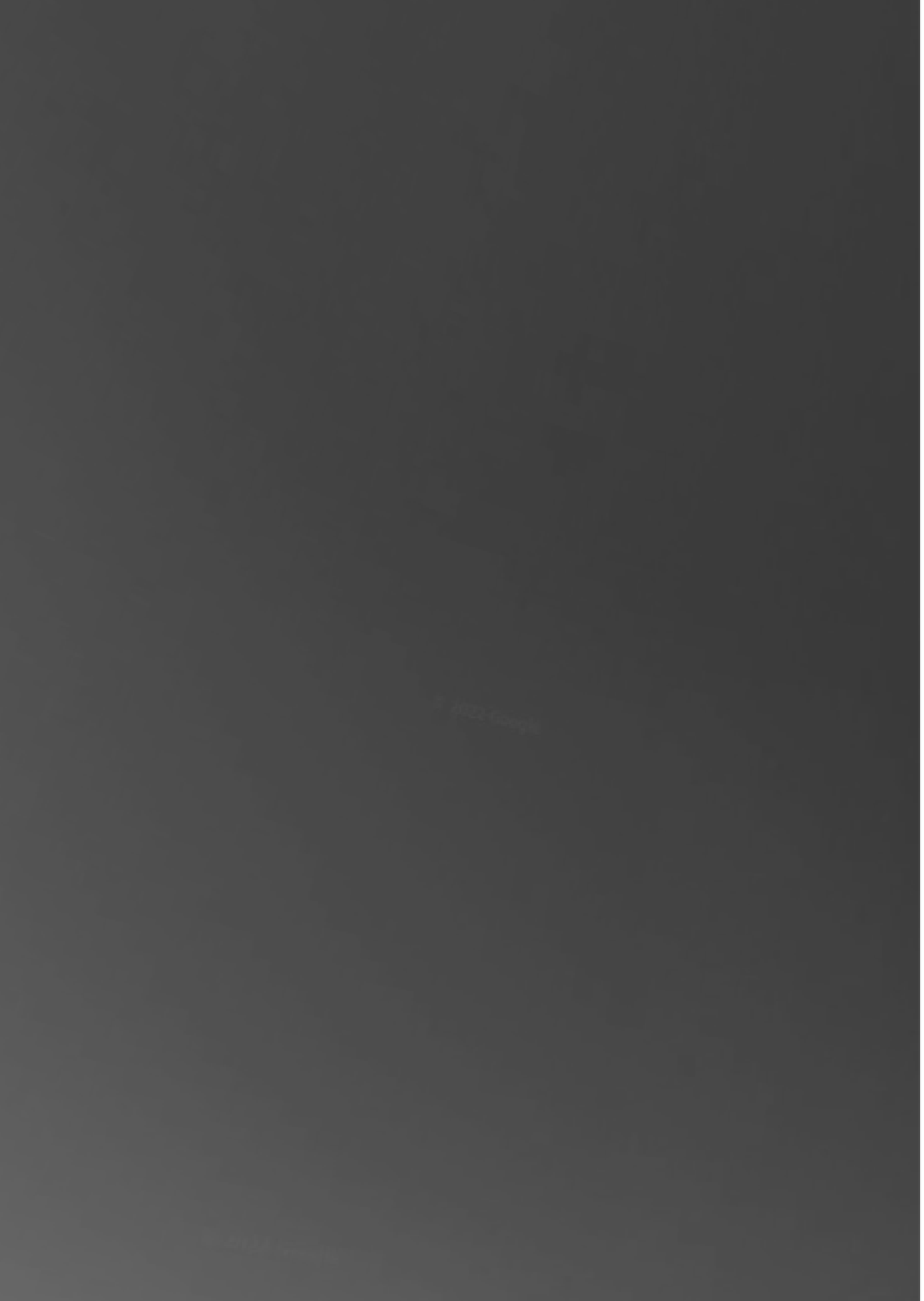
Content:

Introduction

The assignment of this diploma project is to design a multi-use, high-rise building in capital city of Japan - Tokyo.

The site is located in entertainment center of Tokyo - Shinjuku. Being in front of the busiest train station in the world, the aim is to design a building, which could serve visitors and residents while blending into japanese culture and japanese architecture with a touch of western style architecture. Since site is located in area which is planned to be international business district, the building reflects that by having hotel, office spaces, leisure and retail.

Necessary parts of the project were to analyse Japan and its culture, research norms, used typologies and common technical solutions for its difficulties.



Analysis

Analysis - general

a. History of Japan
Up to the present day, Japanese history is divided into 17 major periods or eras, including the paleontological age. These periods are marked by specific events, and their lengths vary.
The paleontological period, dating back to as early as 50,000 BCE, marks the arrival of the first inhabitants on the Japanese archipelago. This migration was possible due to natural land bridges, which were submerged again after the end of the last Ice Age. This period also saw the extinction of large game animals and a gradual shift towards hunting smaller animals, gathering, and fishing during the Jomon period, beginning around 14,000 BCE. Significant pottery with cord patterns, which give the period its name, has been discovered from this time.
The Yayoi period, starting around 1000 BCE, marked the introduction and use of bronze and iron tools and weapons from China and Korea, as well as the expansion of agriculture, particularly rice cultivation.
The Kofun period, spanning from 250 to 538 CE, is notable for its distinctive burial mounds in the shapes of circles or keyholes. The Daisenryo Kofun from this era is the second-largest burial mound in the world by area (80 hectares).
The introduction of Buddhism from Korea heralded the Asuka period (538–710 CE). This period is mainly known for the construction of Buddhist temples featuring architectural elements borrowed from China. A notable example is the Horyuji Temple, the world's oldest wooden structure (built in 607 CE).
From 710 to 794 CE, the Nara period saw the establishment of the first permanent capital in Nara. During this era, governance and administrative systems were developed. This period produced the first documented Japanese books and the construction of the largest wooden building in the world, the Todaiji Temple.


Fig 2. Horyuji temple

The Heian period began with the relocation of the capital to Heian-kyo (present-day Kyoto) in 794 CE and ended with the victory of the Minamoto clan over the Taira clan in the Genpei civil war in 1185 CE.

The Kamakura period marked the beginning of military rule. In 1192, the shogunate was established, transferring the governance of the country to the shogun and the samurai. This era saw the flourishing of defensive architecture.

The Muromachi period began in 1336 when Kyoto was conquered by the opposing samurai Takauji. The rest of the 14th century was relatively peaceful until the death of the next ruler, leading to several decades of civil wars. During the Sengoku period starting in 1467, firearms imported from Europe were also used. From 1568 to 1600, the unification of Japan took place.


Fig 3. Himeji castle (1333)


Fig 4. Drawing of Edo from 17th century

Edo Period (1600–1868)
The Edo period was a time of prosperity and flourishing in Japan. Beginning with the establishment of the new capital in Edo (modern-day Tokyo), this era marked a peaceful period from a military perspective. This allowed energy and resources to be invested in building roads, schools, and improving agriculture. In the 17th century, Japan's population doubled to 30 million. Increased access to schools, writing, and book purchasing among commoners contributed to higher literacy rates in both urban and rural areas. During this period, Japan remained under the rule of a military government and was isolated from the outside world, except for trade with Denmark, China, and Korea. Under external pressure (from the United States), Japan was forced to open its borders, leading to the overthrow of the temporary shogunate.

Meiji Period (1868–1912) began with the restoration of full governance to the emperor in 1868, replacing the shogunate. This era saw the incorporation of Western culture, technologies, literature, education, and other elements into Japan. Industrialization increased, and the country experienced economic growth.

During the Taisho Period (1912–1926), which included World War I, Japan managed to seize several islands from Germany. While the economy did not grow significantly, Japan's military expanded.

Showa Period (1926–1989) encompasses Japan's interwar conquests in East Asia, its defeat in World War II, and one of the greatest economic booms in modern history. Despite its wartime defeat and occupation until 1952, Japan rose to the second-largest economy in the world by 1968, behind only the United States. With immense support for industrialization, Japan became the largest producer of automobiles and a leading producer of electronics. Between 1984 and 1989, stock and land prices soared by 240%.
Heisei Period (1989–2019) began with Emperor Akihito's reign and the bursting of Japan's economic bubble in 1989. Over the following years, more than 5 million people lost their jobs and struggled to find new ones. Over 200,000 companies went bankrupt, and suicide became the leading cause of death among young men. Stocks fell by 80% and never returned to their 1989 levels. The 1990s are known as the "Lost Decade." Since then, the economy has stagnated, and by 2000, Japan was essentially living off the legacy of the previous 50 years. Depression and social withdrawal (hikikomori) from this period can still be felt today.
The Reiwa Period (2019–Present) began in 2019 with the reign of Emperor Naruhito.

Analysis - general

b. Geography of Japan and Administrative Division

Japan is an archipelagic country consisting of 14,125 islands. The four main islands are Hokkaido, Honshu, Kyushu, and Shikoku. Located in the Pacific Ocean, it is separated from China, Korea, and Russia by the Sea of Japan. Japan has a total area of 380,000 km², which is almost the same as Germany's 358,000 km².

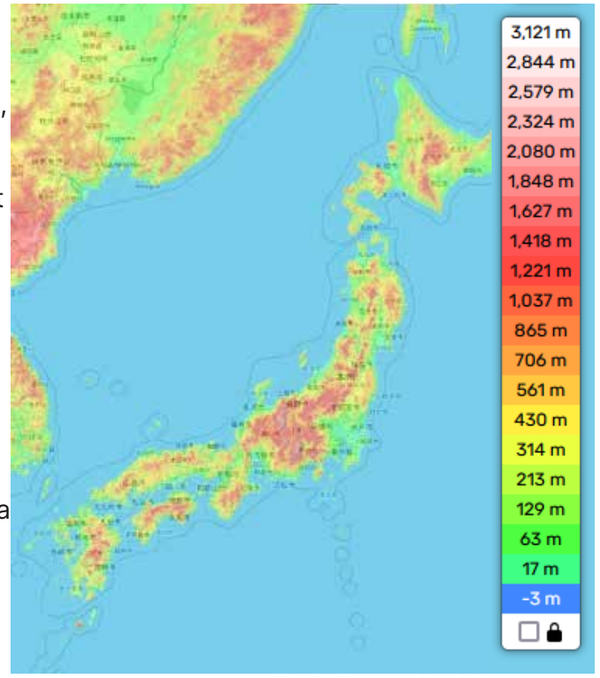


Fig 5. Topografy of Japan

Approximately 73% of Japan is mountainous, and 66% of the country is covered by forests. This results in dense urbanization in the limited flat areas between the mountains. The largest such area is the Kanto Plain, which is home to the world's largest metropolitan area—Tokyo, with a population of 37 million people. Japan as a whole has a population of 123 million, and the average age is 49 years (2024)[1].

The highest mountain in Japan is Mount Fuji, with an elevation of 3,776 m. The largest lake is Lake Biwa, with an area of 670 km², and the longest river is the Shinano River, which stretches 367 km.

From an administrative perspective, Japan is divided into 47 prefectures, which are the highest administrative divisions under the national government.
These include:
43 traditional prefectures (ken - regions),
1 metropolitan area (to - capital city) - Tokyo,
2 urban prefectures (fu - major urban zones) - Osaka and Kyoto,
1 circuit/region (do - district) - the northern island of Hokkaido.

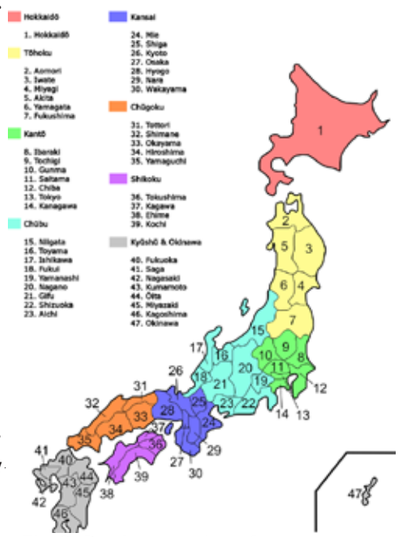


Fig 6. Regions and prefectures of Japan

Prefectures are further subdivided into sub-prefectures and districts. The smallest administrative units are municipalities—cities, towns, and villages, along with special city wards that collectively make up the capital, Tokyo.

Japan is also unofficially divided into eight regions: Hokkaido, Tohoku, Kanto, Chubu, Kansai, Chugoku, Shikoku, and Kyushu & Okinawa (represented by colors on fig 6).

Climate

Most of Japan falls under a humid subtropical climate, characterized by hot and humid summers and mild winters. However, due to Japan's geographical extent, its climate varies slightly.
Hokkaido: Due to its northern location, Hokkaido experiences long, cold winters and cooler summers, with significant snowfall in winter. Its climate is similar to Moscow.
Tohoku: This region receives slightly less snow than Hokkaido and experiences less rainfall than the southern parts of Japan.
Central Japan (Kanto, Chubu, and parts of Kansai): These regions belong to the humid subtropical climate zone, with substantial rainfall throughout the year. Their climate is comparable to Beijing.
Japanese Alps and Mount Fuji: These areas are cold year-round, with extensive snowfall during the winter months, resembling the climate of Bern.
Southern main islands (Shikoku and Kyushu): These regions have an oceanic climate with mild conditions throughout the year and minimal seasonal variations, similar to London.
Ryukyu Islands: Located south of the main islands, they have hot and humid summers and warm winters, akin to Bangkok.


Fig 7. Ishigaki (Okinawa) in summer


Fig 8. Goryokaku (Hokkaido) in winter

Natural Disasters

Japan is ranked as the 24th most disaster-prone country in the world[2]. Due to its location at the intersection of four tectonic plates, earthquakes are common, with over 1,000 occurring annually across all intensities[3]. Around 4–10 earthquakes per year reach an intensity of 5 or higher on the JMA scale[4].
In 2011, Japan experienced its largest recorded earthquake, with a magnitude of 9.1 on the Richter scale. This earthquake triggered a 40-meter-high tsunami along the coast of Iwate (Tohoku), resulting in the loss of 20,000 lives and causing the Fukushima nuclear disaster.
Japan also has 111 active volcanoes and averages 10 volcanic eruptions per year[5].

Despite these risks, Japan is one of the most advanced countries in the world when it comes to disaster prevention and preparedness.


Fig 9. Tsunami in Miyako (Tohoku), 2011


Fig 10. Eruption of Shinmoedake (Kyushu)

Analysis - housing

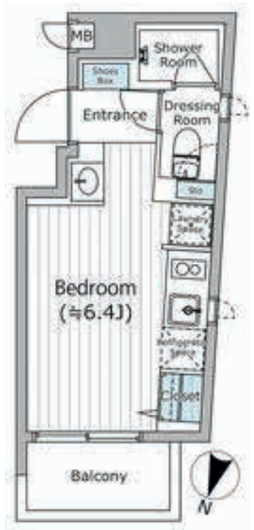
This section describes typical housing units, including room layouts, sizes, prices, construction years, and distances from the selected site for the diploma project in Shinjuku. The examples are located in Tokyo, the capital city, based on the current offerings of real estate companies (as of May 2024).

In the floor plans, the numbers indicate the common unit of area for apartments, “jyo”, often just “J”, which represents the size of a tatami mat (used for sleeping).

1 jyo = 1.65 m²
1 m² = 0.6 jyo

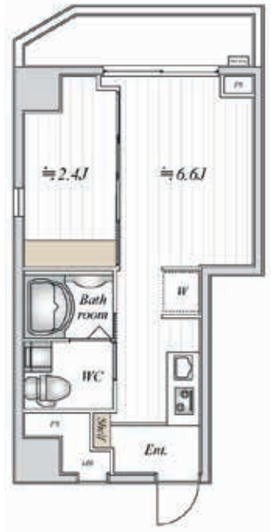
1R = 1 room (studio)
Typically includes an open entryway, compact walk-through kitchen, bathroom (or combined bathroom and toilet) and a single room. The total area is usually between 13–20 m².

Example:
Rent: ¥100,000/month (15,400 CZK)
Size: 18 m²
Year Built: 2023
Distance from the selected site in Shinjuku: 1.2 km



1K = 1 room + kitchen (1 + 1)
Typically includes an open entryway with kitchen, bathroom (or combined bathroom and toilet) and separated single room. The total area is usually between 13–25 m².

Example:
Rent: ¥127,000/month (19,500 CZK)
Size: 25 m²
Year Built: 2016
Distance from the selected site in Shinjuku: 1 km



1DK = dining+ kitchen (2kk)
Typically includes an open entryway, bathroom (or combined bathroom and toilet), kitchen with dining and separated single room. The total area is usually between 25–30 m². Room is usually 6,5 to 13 m² and kitchen with dining larger.

Example:
Rent: ¥137,000/month (21,000 CZK)
Size: 24,5 m²
Year Built: 2008
Distance from the selected site in Shinjuku: 1 km

1LDK = living + dining+ kitchen (2 + 1)
Typically includes separated room, living room and compact walkthrough kitchen or separated kitchen, an open entryway, bathroom amd toilet. The total area is usually between 25–35 m².

Example:
Rent: ¥312,000/month (48,000 CZK)
Size: 50 m²
Year Built: 2018
Distance from the selected site in Shinjuku: 0,9 km

1SK, 1SLK, 1SDK, 1SLDK = bonus storage
Same as before, but with additional storage, which can be size from closet to small room.

Walking closets are not included as storages.

Analysis - housing

2K = 2 rooms + kitchen (2 + 1)

Example:
Rent: ¥122,000/month (19,000 CZK)
Size: 24 m²
Year Built: 2023
Distance from the selected site in Shinjuku: 2 km

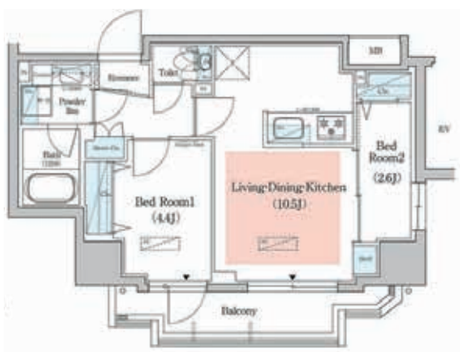
2DK = 2 rooms + dining, kitchen (3+kk)

Example:
Rent: ¥237,000/month (36,500 CZK)
Size: 41 m²
Year Built: 2016
Distance from the selected site in Shinjuku: 0,9 km

2LDK = 2 rooms + living, dining, kitchen (3+kk)

Example:
Rent: ¥240,000/month (37,000 CZK)
Size: 40,5 m²
Year Built: 2021
Distance from the selected site in Shinjuku: 0,9 km

3K and 3DK (and higher number of rooms in this lineup) are not common.



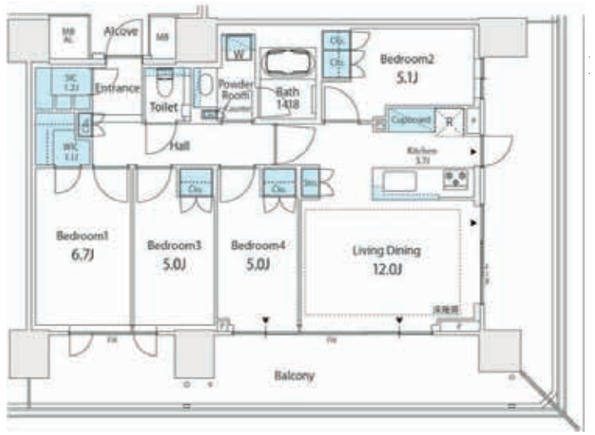
3LDK = 3 rooms + living, dining, kitchen (4+kk)

Example:
Rent: ¥310,000/month (47,500 CZK)
Size: 72 m²
Year Built: 2018
Distance from the selected site in Shinjuku: 3,3 km

4LDK = 4 rooms + living, dining, kitchen (5+kk)

Are not usually built near Shinjuku, recent only in the center and on the east side of Tokyo.

Example:
Rent: ¥402,000/month (62,000 CZK)
Size: 85 m²
Year Built: 2023
Distance from the selected site in Shinjuku: 8 km



5k+ new apartments are not available for rent across all of Tokyo (the newest ones are from 2002).
Houses are available for purchase, typically older (built around 1995), with prices ranging between ¥250–300 million (approximately 38–46 million CZK).
Example of a nearby property:

Type: 6LDK (6 rooms + Living, Dining, Kitchen)
Price: ¥418 million (approximately 64 million CZK)
Size: 205 m²
Year Built: 2019
Distance from the selected site in Shinjuku: 2.8 km

Analysis - housing

Here are listed some inspirations of apartment buildings built in Japan in last few years.

Toranomon Hills Tower, Tokyo, 2022

Kannai Blade Residence, Yokohama, 2021

Asahi Facilities Hotarugaike Dormitory KAEDE, Osaka, 2019

Akasaka Brick Residence, Tokyo, 2014

Astile SINJUKU III Building, Tokyo, 2020

FUKOSHA Apartment Building, Tokyo, 2017

Kita Aoyama Apartments, Tokyo, 2020

Sun City Kobe Tower, Kobe, 2018

Analysis - hotels

In Japan, there are three main types of hotels: traditional Japanese-style hotels, “Western-style” hotels adapted from the West, and special hotels. All average prices mentioned apply to Tokyo.
a) Japanese-Style Hotels

Ryokan
Ryokan are traditional, old-fashioned accommodations that have existed in Japan for centuries. They were particularly popular during the Edo period along intercity roads. Ryokan provided not only shelter but also meals (dinner and breakfast) and public baths (onsen), often located near natural hot springs.

The design and services of ryokan have remained largely unchanged to this day. Rooms are typically equipped with tatami mats, futons for sleeping, and often lack modern heating or cooling systems.

Ryokan are generally the most expensive type of hotel in Japan. The average price per person per night ranges between ¥12,000 and ¥30,000 (approximately 1,700 CZK to 4,400 CZK).


Typical Ryokan (Shimizu) in Kyoto


Typical room (washitsu) in Ryokan

Minshuku
Minshuku are typically family-operated accommodations where rooms are offered in a traditional Japanese style. Some minshuku provide dinner and breakfast, usually served in shared dining areas. Bathrooms are shared among guests.

The average price per person per night ranges between ¥7,000 and ¥20,000 (approximately 1,000 CZK to 2,900 CZK).


Example of Minshuku (Kuwataniya, Takayama)


Typical room in Minshuku

b) Western-Style Hotels

This category includes classic hotels, pensions, and hostels:

Hostels: Shared rooms with multiple beds, priced at up to ¥10,000 per night (approximately 1,400 CZK).
Pensions: Private rooms for individual guests with shared bathrooms, priced between ¥6,000 and ¥18,000 (approximately 900–2,600 CZK).
Hotels: Private rooms with en-suite bathrooms. Prices vary significantly but are generally up to ¥25,000 (approximately 3,600 CZK).


Typical room in japanese pension


Hotel room (Shinjuku Washington)

Among the most well-known types of special hotels is the capsule hotel. This involves renting a single bed—a capsule—in a shared room. The capsules can be closed from the inside, providing a cozy feel. The price is around 10,000 yen (1,400 CZK).

Another type is the love hotel, which offers rooms with larger beds, private bathrooms, and other amenities. The price for a night is usually between 10,000 and 20,000 yen (1,400–2,900 CZK).

An unusual type of hotel is the manga café. Most manga cafés are open 24/7 and offer private booths equipped with computers and futons, rentable for several hours. Additional amenities often include access to manga (comics), Wi-Fi, free drinks, and bathrooms. Prices vary depending on the duration and type of booth. For example, 9 hours in a lockable booth costs 3,500 yen (500 CZK).


Example of capsule interior


Cubicle in manga cafe

Analysis - hotels

Here are listed some inspirations of western-style hotels built in Japan in last few years.

Toggle Hotel, Tokyo, 2020

HOTEL NEXUS Hakata Sanno, FUKUOKA, 2020

Tokyo Garden Terrace Kioicho, Tokyo, 2016

Mitsui Garden Hotel Ginza Tsukiji, Tokyo, 2024

Hotel Koe Tokyo, Tokyo, 2018

The Okura Tokyo, Tokyo, 2019

Toranomon Hills Station Tower, Tokyo, 2023

Sakishima Cosmo Tower Hotel, Osaka, 2020

Analysis - retail

Larger areas (such as those for shops and offices) are often measured using the unit of area known as “Tsubo.” One Tsubo is equivalent to two tatami mats.
1 Tsubo = 3.3 m²
1 m² = 0.3 Tsubo

The average price for commercial spaces in Shinjuku is 11,000 yen per m² per month (1,700 CZK).
The lowest prices can be as low as 2,500 yen per m² per month (300 CZK).
The highest prices can go up to 30,000 yen per m² per month (4,600 CZK).

Here are listed some inspirations of retail buildings from last few years.

Louis Vuitton Ginza Namiki, Tokyo, 2021

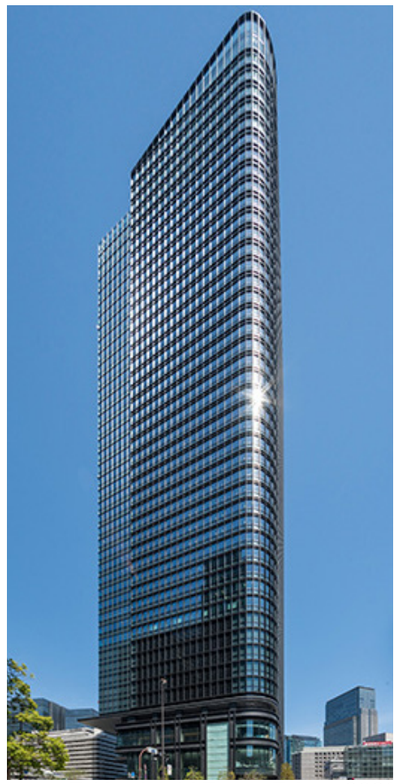
Shibuya Stream, Tokyo, 2018

Shibuya Hikarie, Tokyo, 2012

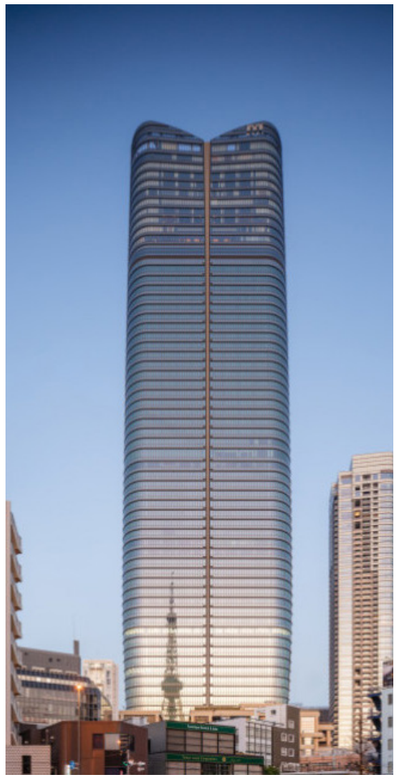
Sumitomo Fudosan Roppongi Grand Tower, Tokyo, 2016

Yomiuri Shimbun Building, Tokyo, 2013

JP Tower, Tokyo, 2013



Tokiwabashi Tower, Tokyo, 2021



Mori JP Tower, Tokyo, 2023

Analysis - site

Site is located in the capital city of Tokyo, in the Shinjuku area, right next to Shinjuku Station — the busiest train station in the world.

The parcel is bordered by Chuo-dori Avenue, Plaza Dori, and Nibangai Street.
The parcel measures 67 × 95 m, with an area of 6,395 m².

Across the road to the north stands the well-known school building Tokyo Mode Gakuen - Cocoon Tower, and slightly farther away are other high-rise buildings and a faculty hospital.
The parcel is surrounded by a shopping district to the south.
On the western side, there is a post office, the Tokyo Metropolitan Government Building, and Shinjuku Chuo Park.
Across the train tracks to the northeast is the well-known part of the city called Kabukicho.

Shinjuku Station is 6.5 km from Tokyo's main train station, approximately 20 minutes by train.

Site in Shinjuku

Fig 11. Aerial photo of Tokyo

Currently, an office building with 4 underground and 23 above-ground floors is under construction on the site. Construction began in April 2021 and is scheduled for completion in July 2025 (postponed to November). As of December 2024, work on the underground floors is still ongoing.

Fig 12. Design of building currently under construction

Fig 13. Ground plan of said design

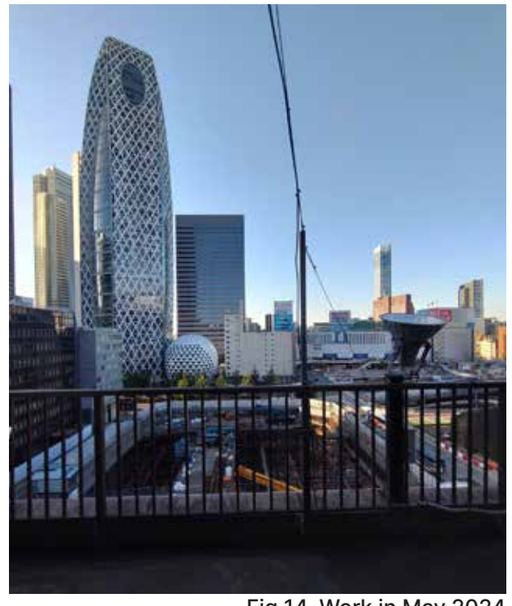


Fig 14. Work in May 2024

Analysis - site

In Japan, a zoning system is in place, dividing urban areas into several types to determine permissible uses for construction. There are a total of 12 categories under which various buildings are classified.

Additionally, cities are divided based on the maximum floor area ratio (FAR) and maximum building coverage ratio (BCR).

The floor area ratio is defined as the percentage of the total floor area of a building relative to the land area.
The building coverage ratio is defined as the percentage of the land area that can be covered by the building's footprint.

The selected site is located in a "neighborhood commercial zone," where all types of construction are permitted except for bathhouses and factories.

Since 2018, the site has been restricted to a maximum BCR of 80% and a maximum FAR of 1000%.
With a site area of 6,395 m², this allows for a maximum footprint of 5,116 m² and a total floor area of 63,950 m². (The current project under construction has a total floor area of 97,590 m²[6]. For "excellent projects," reasonable regulatory relaxations may be granted.)

According to the land-price map, the shopping district area has a value of 7,560,000 yen/m² (1.1 million CZK) as of January 2024.

Fig 15. Site with koeficients and type of zone

Examples of buildings	*Neighborhood commercial zone*
Houses, Houses with other small scale function(store, office, etc.)	
Kindergartens, Schools(Elementary, Junior High, Senior High)	
Shrines, Temples, Churches, Clinics	
Hospitals, Universities	
Stores(mainly selling dairy commodities)/Restaurants with floor space of 150m² max. on the first or second floor (excluding※)	
Stores/Restaurants with floor space of 500m² max. on the first or second floor (excluding※)	
Stores/Restaurants not specified above (excluding※)	
Offices, etc. not specified above	
Hotels,Inns	
Karaoke boxes (excluding※)	
Theaters, Movie theaters (excluding※)	
※Theaters, Movie theaters, Stores, Restaurants, Amusement facilities and so on, with more than 10,000m² of floor area	
Bathhouses with private rooms	
Independent garage with floor space of 300m² max. on the first or second floor	
Warehouse of warehousing company, Independent garage of other types than specified above	
Auto repair shop	G
Factory with some possibility of danger or environmental degradation	
Factory with strong possibility of danger or environmental degradation	

Fig 16. Zone and its regulations (yellow = allowed)

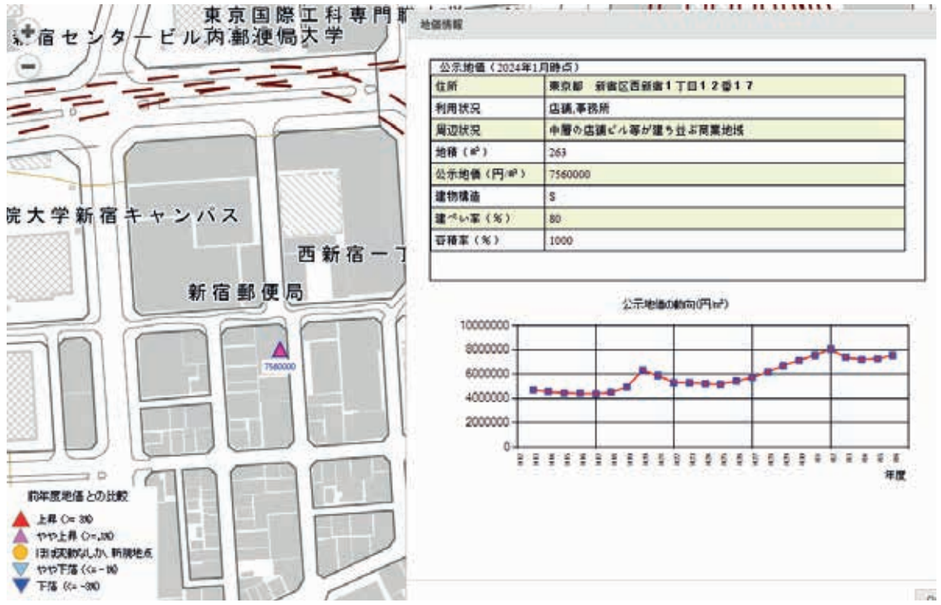


Fig 17. Price of land in the neighbourhood

Analysis - site

Fig 18. The original building located on the site (demolished in 2021)

Fig 19. Progress of work in March 2024 (with the redevelopment of Shinjuku Station West visible in the background)

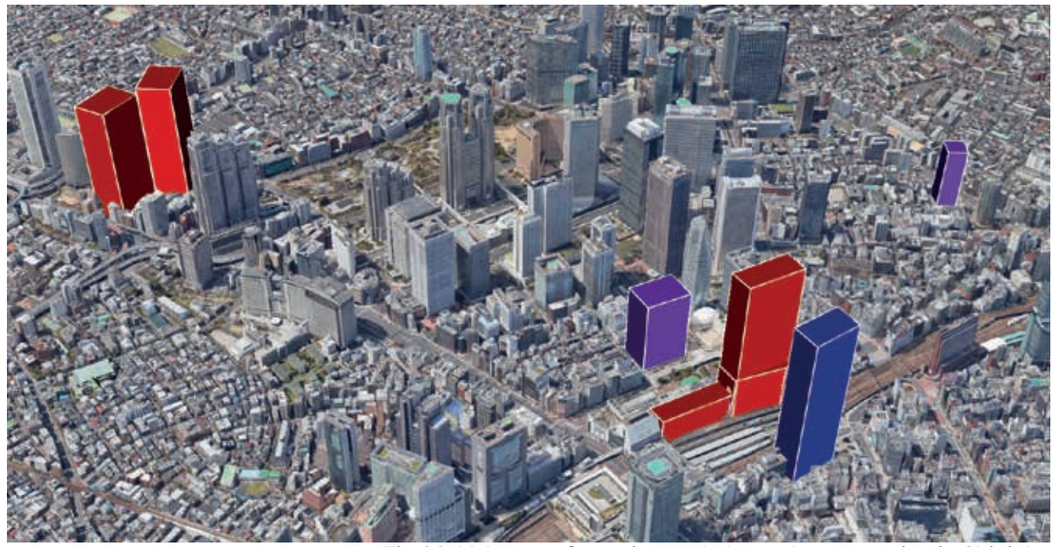


Fig 20. Volumes of ongoing and planned construction in Shinjuku

Purple - construction expected to finish in 2025
Red - construction expected to finish in 2030
Blue - planned

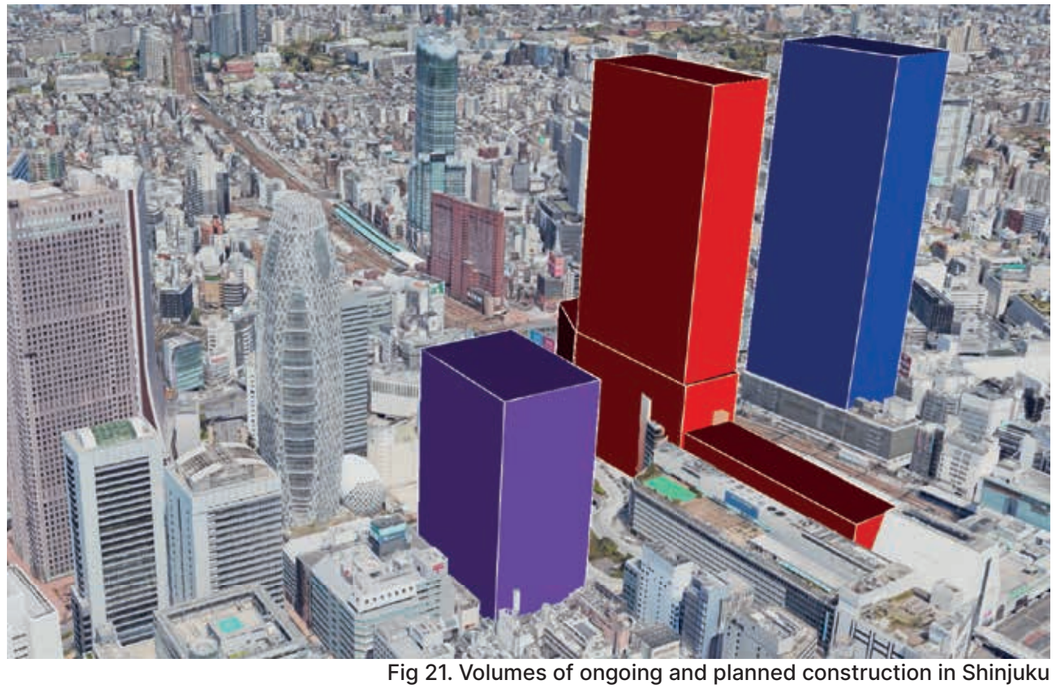


Fig 21. Volumes of ongoing and planned construction in Shinjuku

Analysis - site

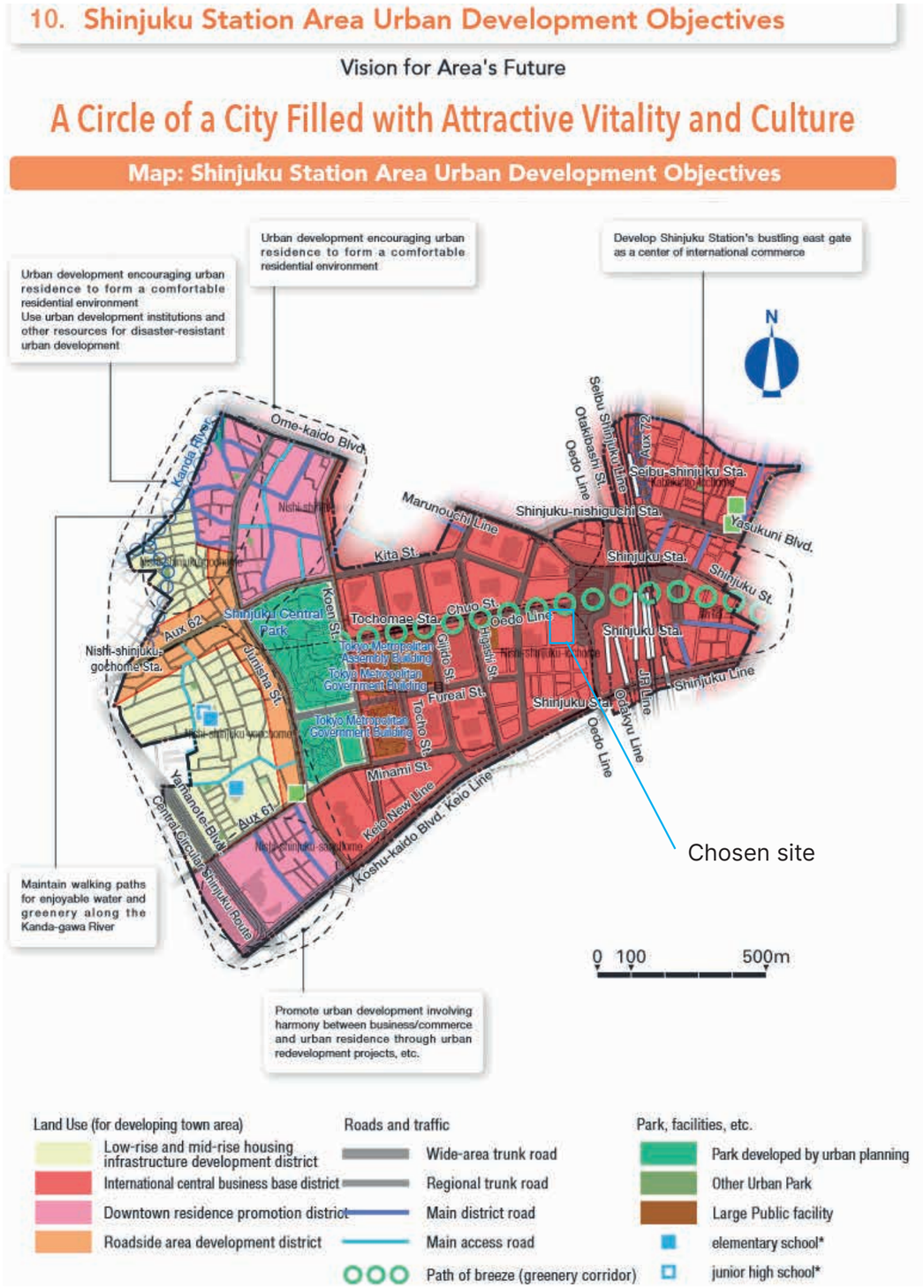


Fig 22. Planned development Shinjuku

According to the attached maps, the selected plot is located in a lively and densely populated area, identified as the “international central business district” in terms of development. The construction of the west-east section of Shinjuku Station is underway, where a 260-meter tall commercial and office building is planned.

Although a two-story road runs along the northern side of the plot and railway tracks are situated to the east, these factors have little impact on the foundation construction. Other buildings will not interfere with the plot, as can be seen from the ongoing development.

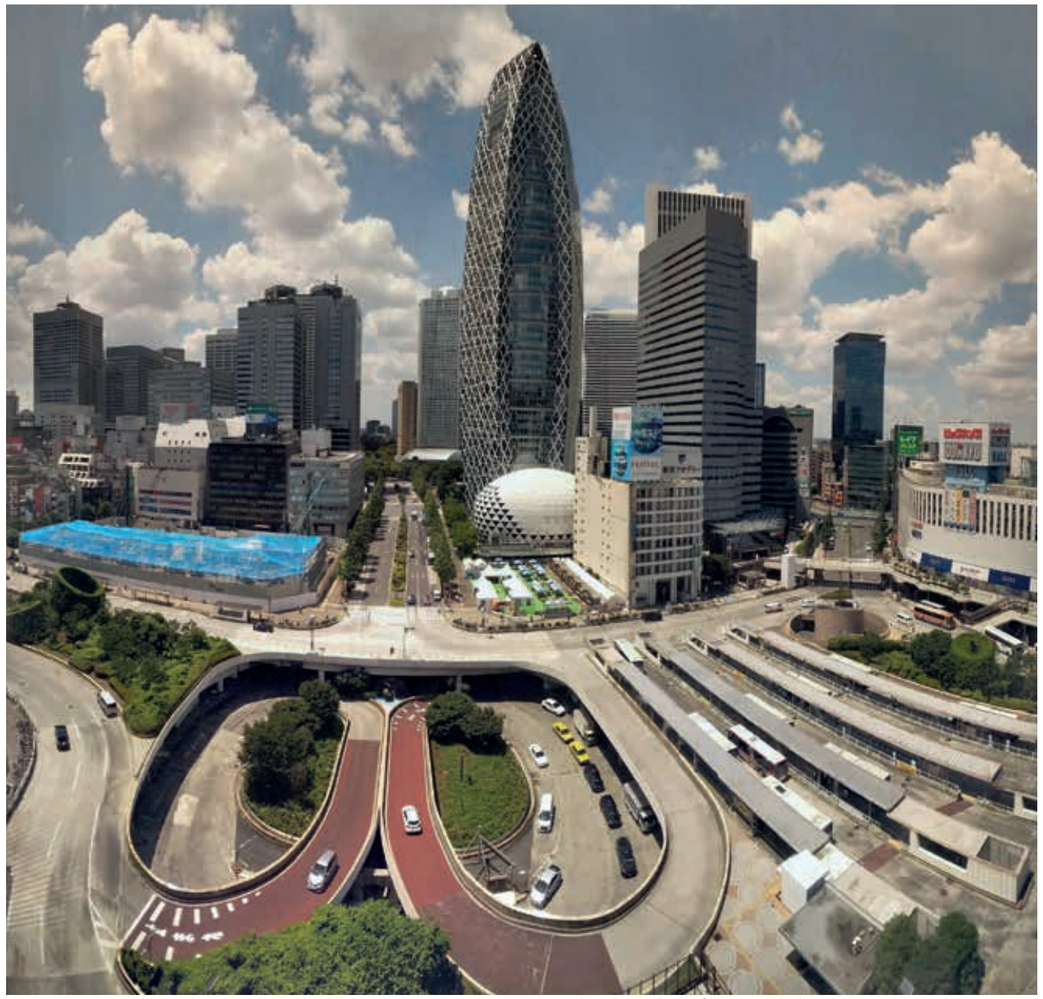
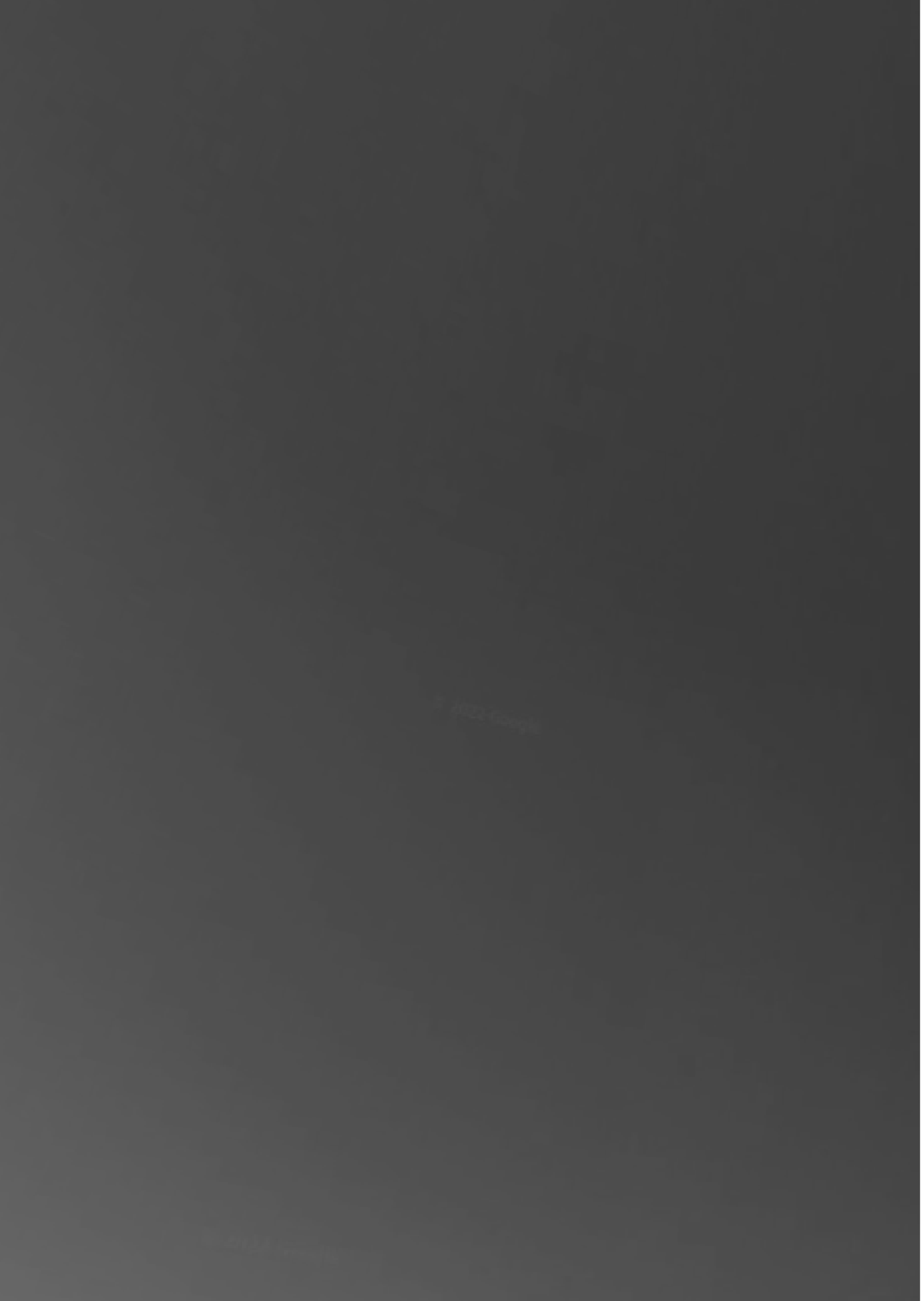


Fig 23. View from Shinjuku West station, 2021



Design

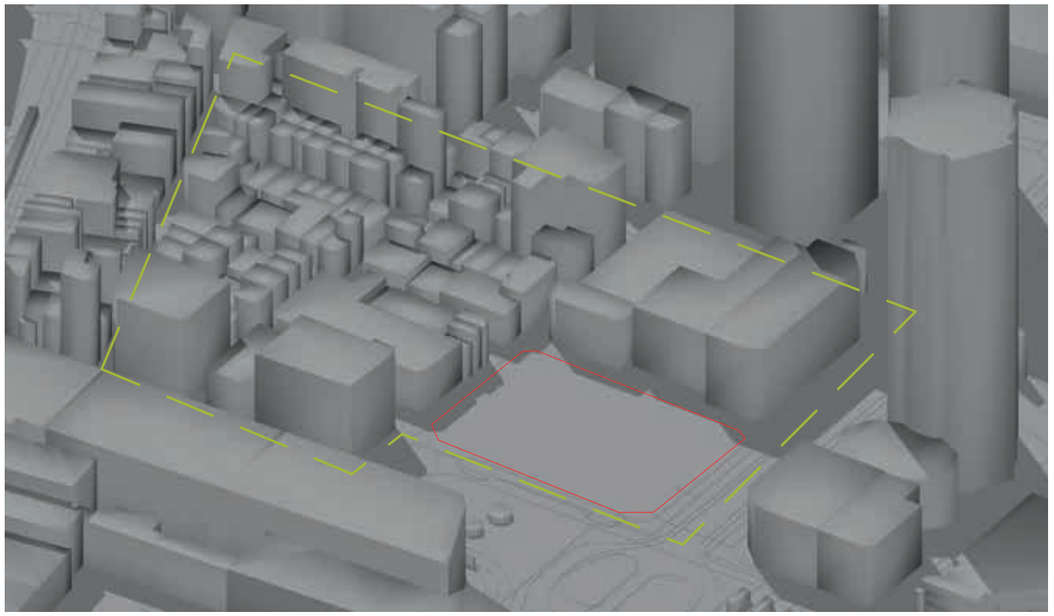
The project is located in Shinjuku, an entertainment center of Tokyo. Standing right infront of busiest train station in the world, the building aims to serve visitors and residents while blending into japanese culture and japanese architecture. The site is mostly flat and oriented to the cardinal directions. The tower is located on the north side.

The building consists of underground, base and a tower. Height of the base connects to the level of commercial block the site is part of. The tower height of 200 meters is visually blending into the cloud of skyscrapers nearby. Building combines essential urban functions on one vertical axis, creating balanced usage during the day.

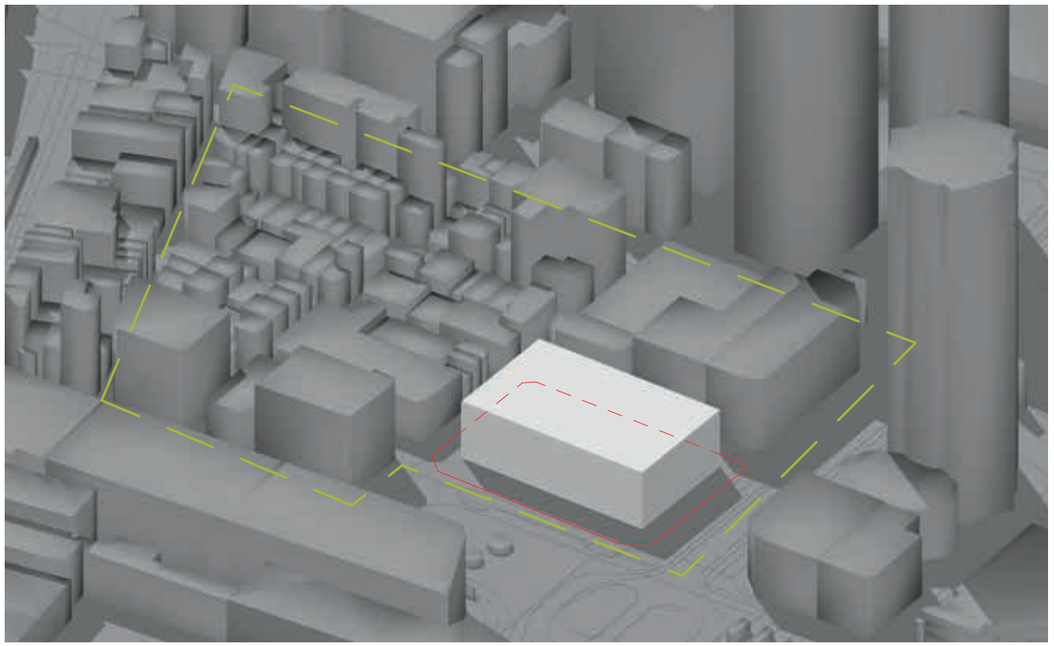
In the underground are located technical floor and 2 parking floors. First underground level is connected to the Shinjuku station and holds lobby and retail spaces. In the base of the building are located main lobbies, retail and spa spaces, above which is usable terrace for workers and visitors. Tower holds office floors, restaurants and hotel divided into long term, short term and presidential floor. On the roof is a pool that can be used by the guests.

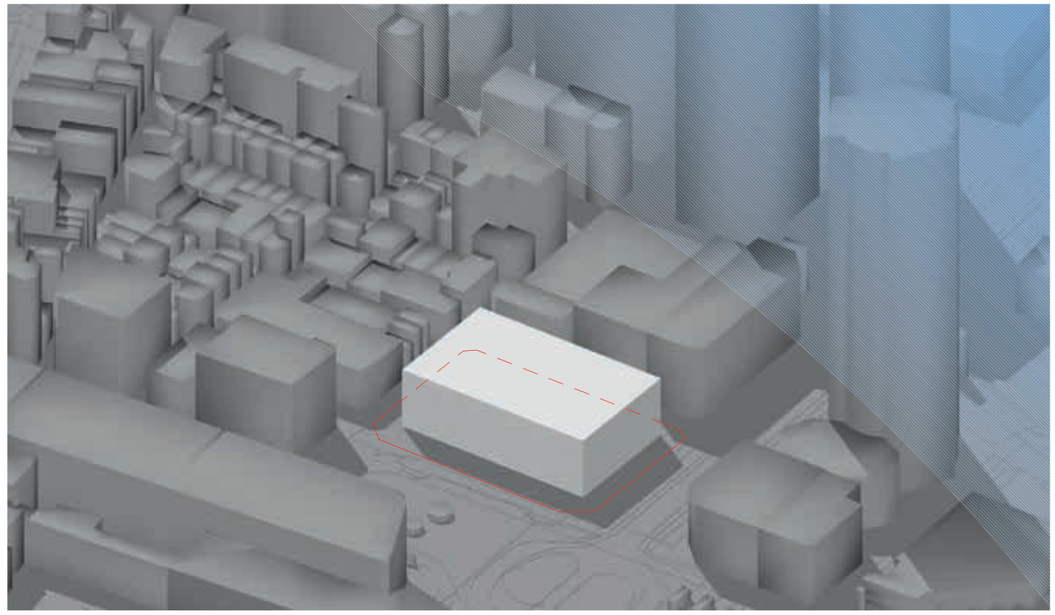
Accounting for the seismic activity, building is designed with reinforced concrete core, slabs and columns, while being divided from the ground by isolation bearings. Technical floors on the bottom and middle of the building ensure management of water, sewage and ventilation systems. Rain water from terrace is re-used and pool water is used in case of fire. Facade of the building is tilted to reduce overheating during the summer.

Volumetric concept

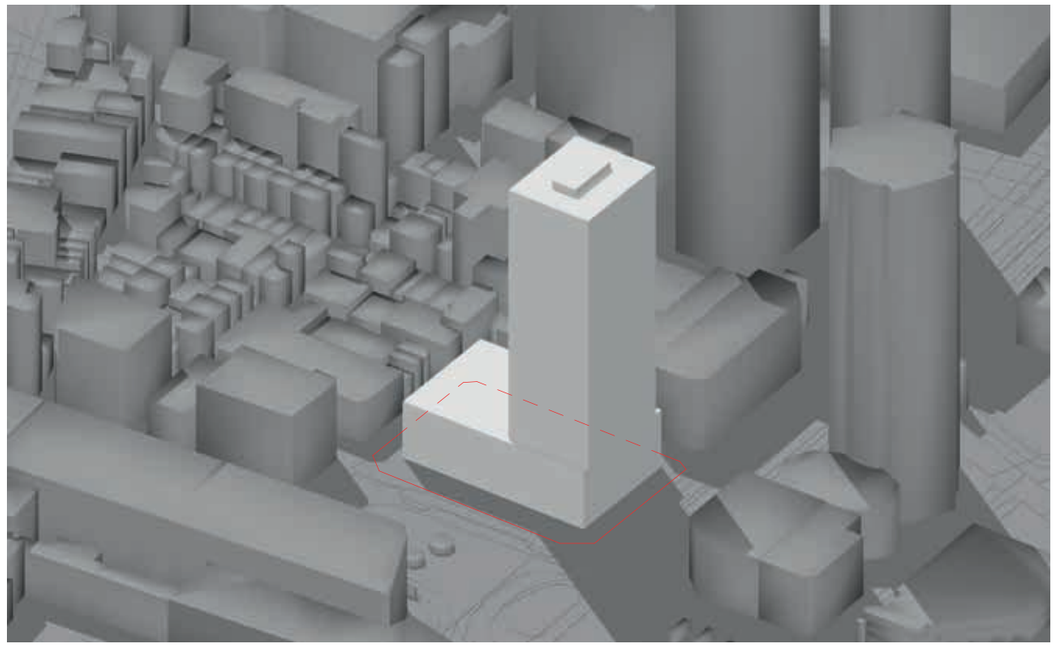


The site is part of medium-high shopping district. Thus, a base of 7 stories is designed, to enclose the district with similar high volume.
Main program of this volume will be retail, spa and lobby.

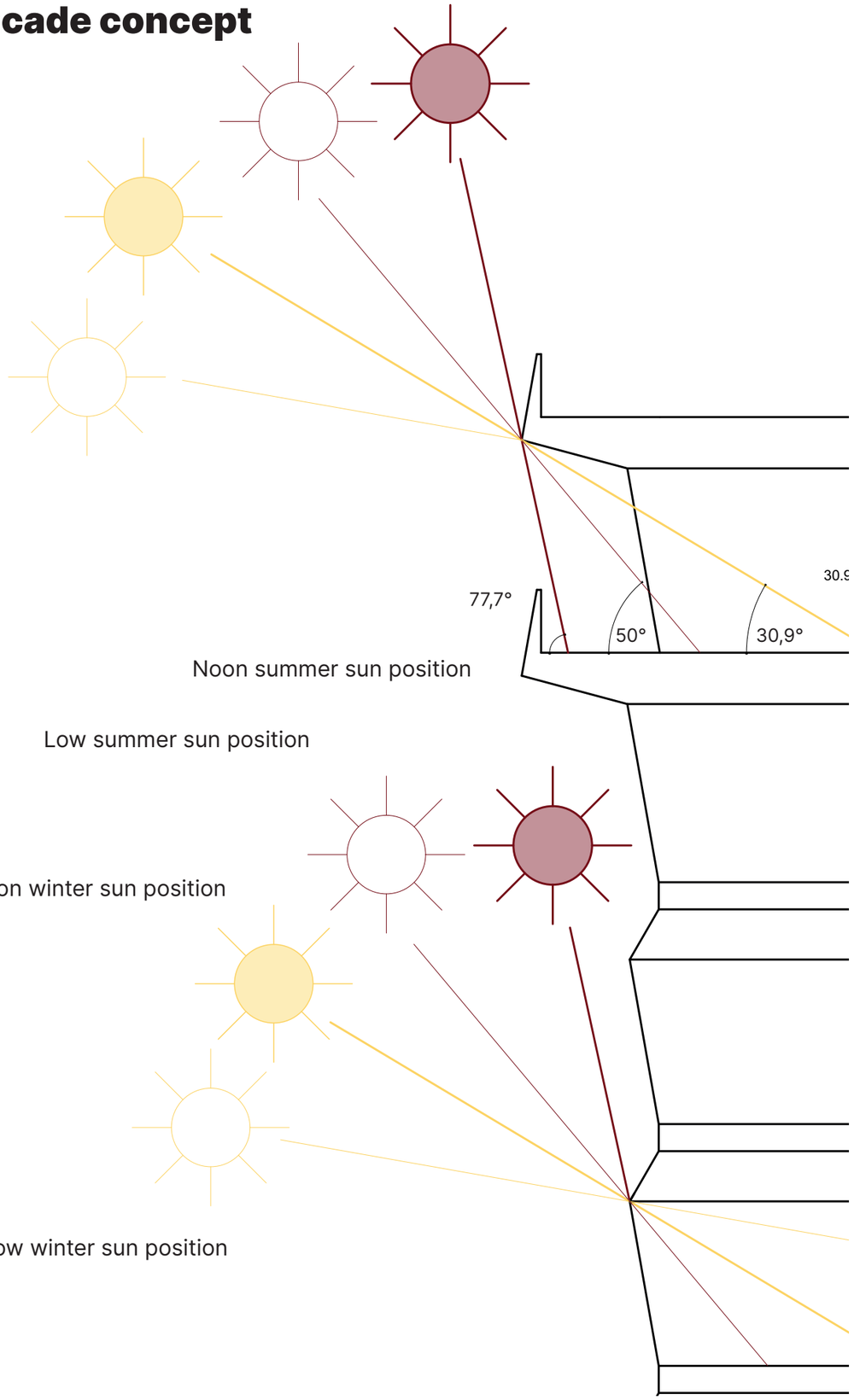


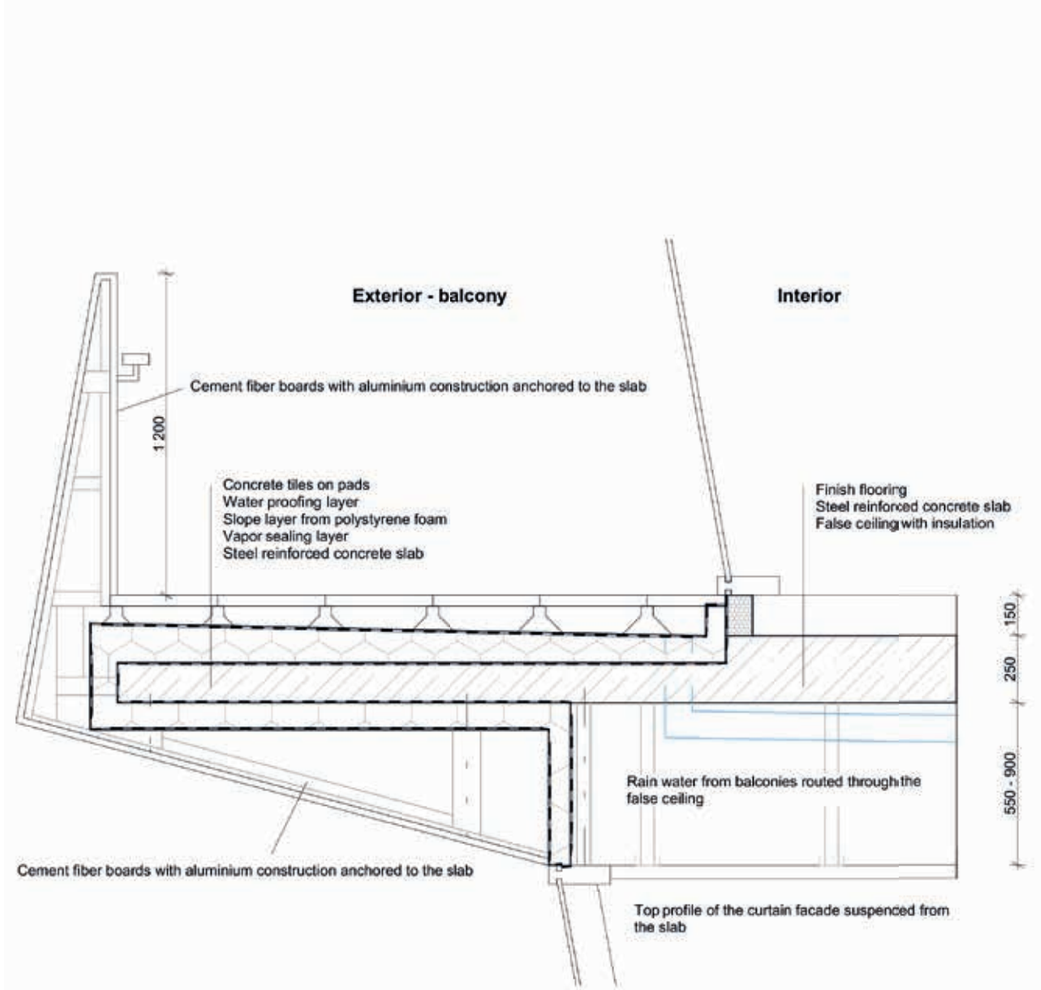


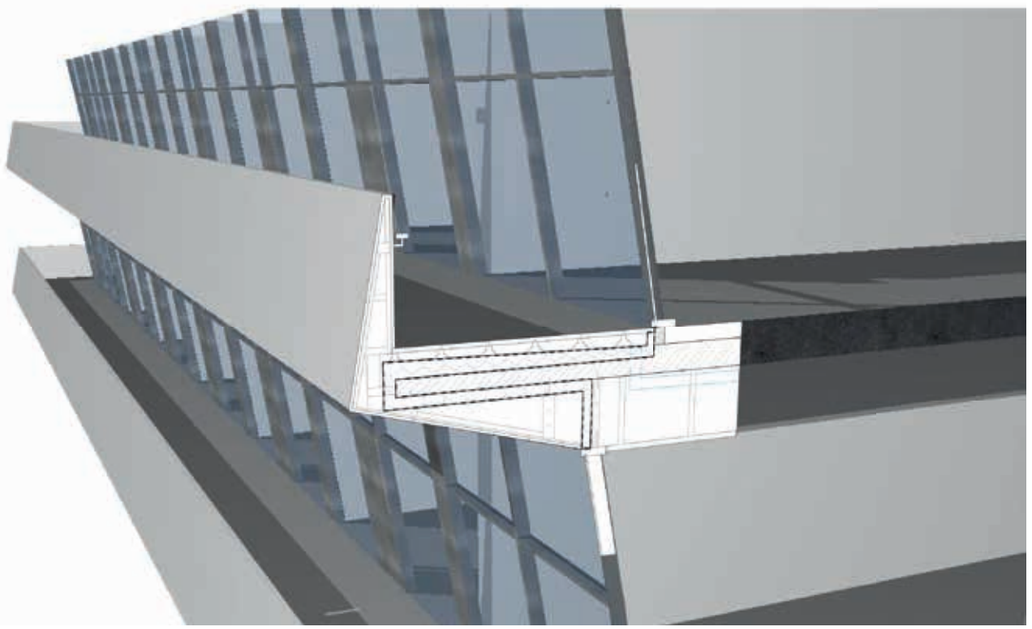
The site is on the corner of high-rise cloud on the north-west side. Thus, a tower is erected from the north side of the site. Height of the tower is 200m, slightly lower than surrounding high-rises to ensure clean curve panoramatic view from the city.



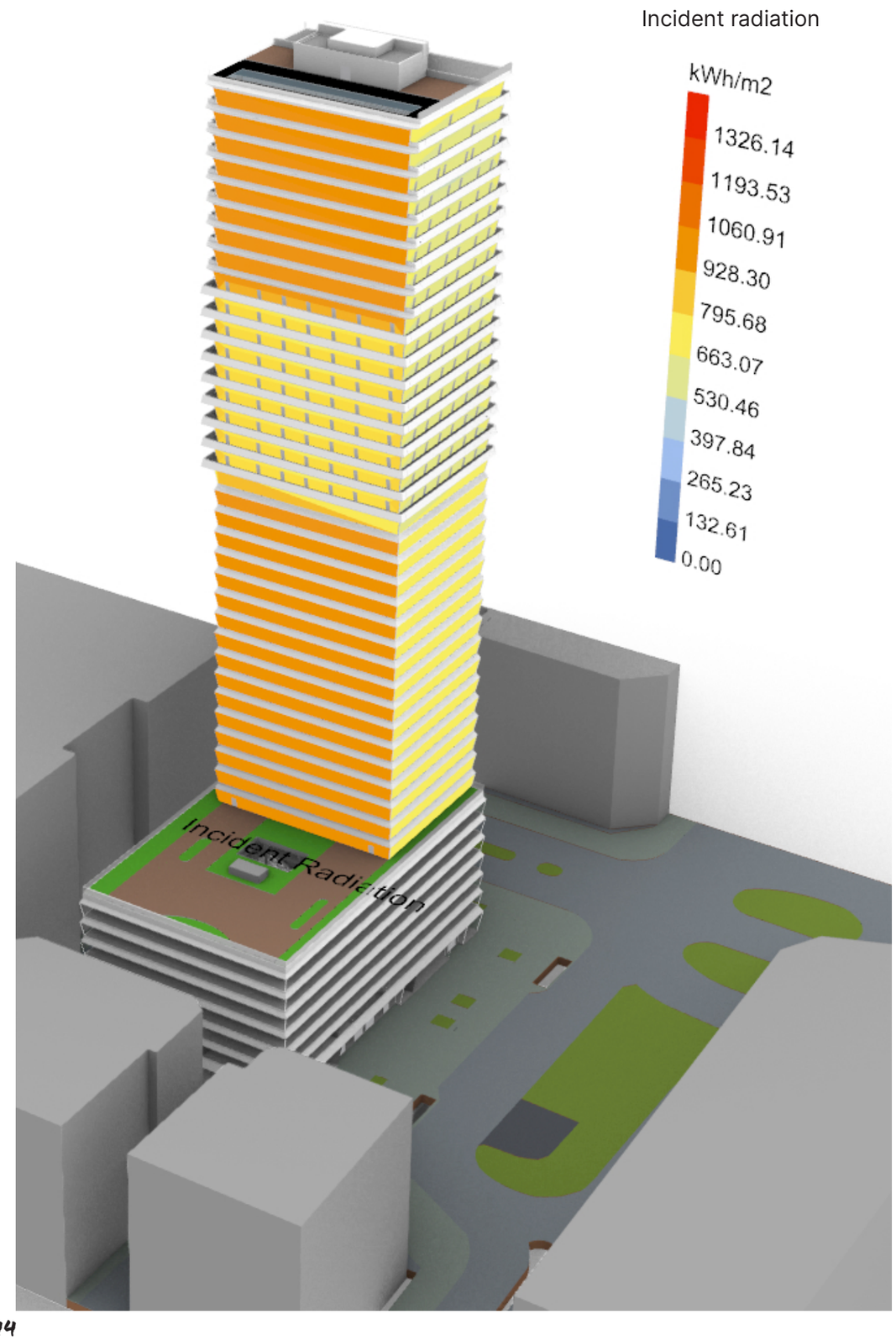
Facade concept

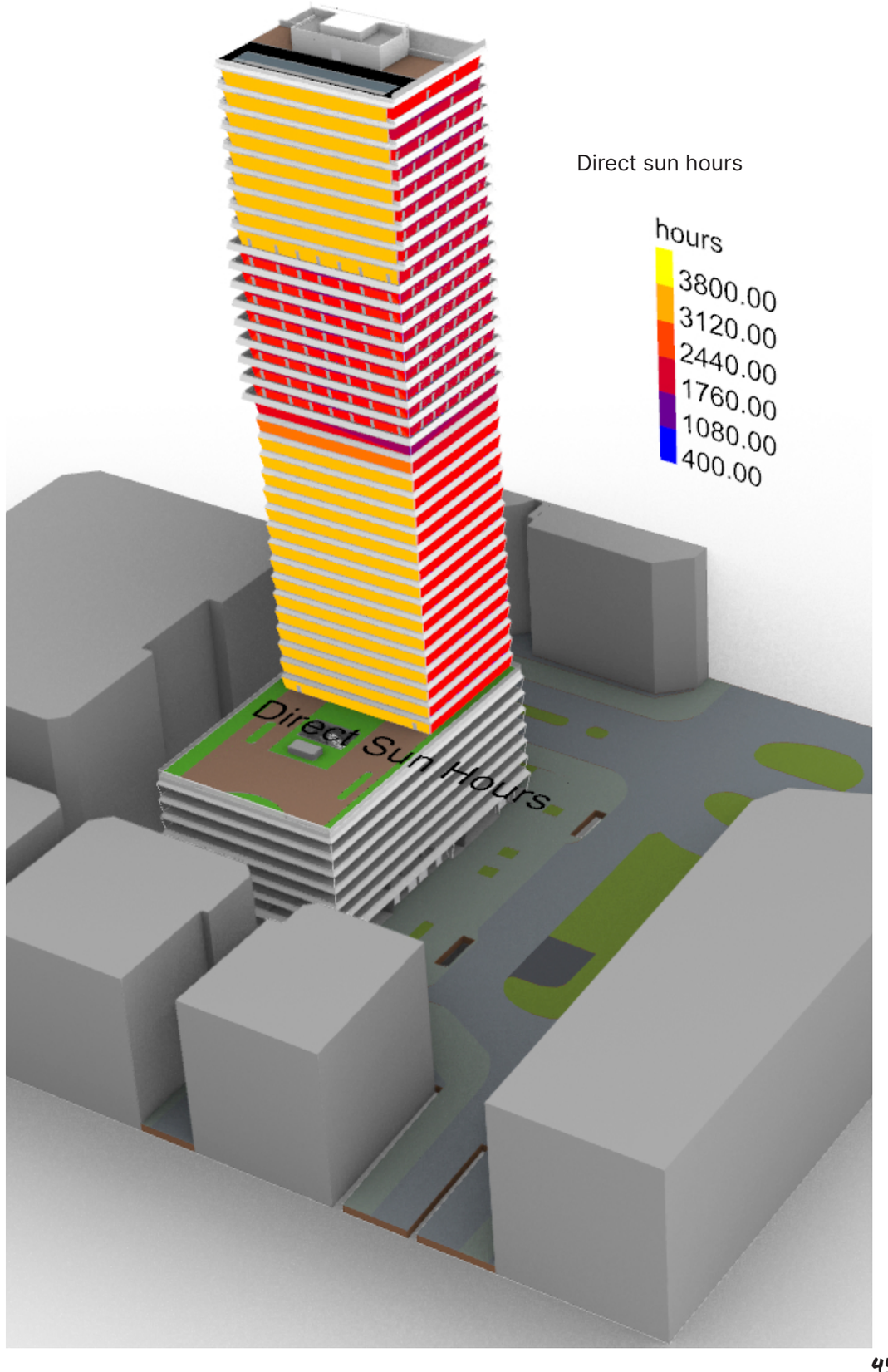




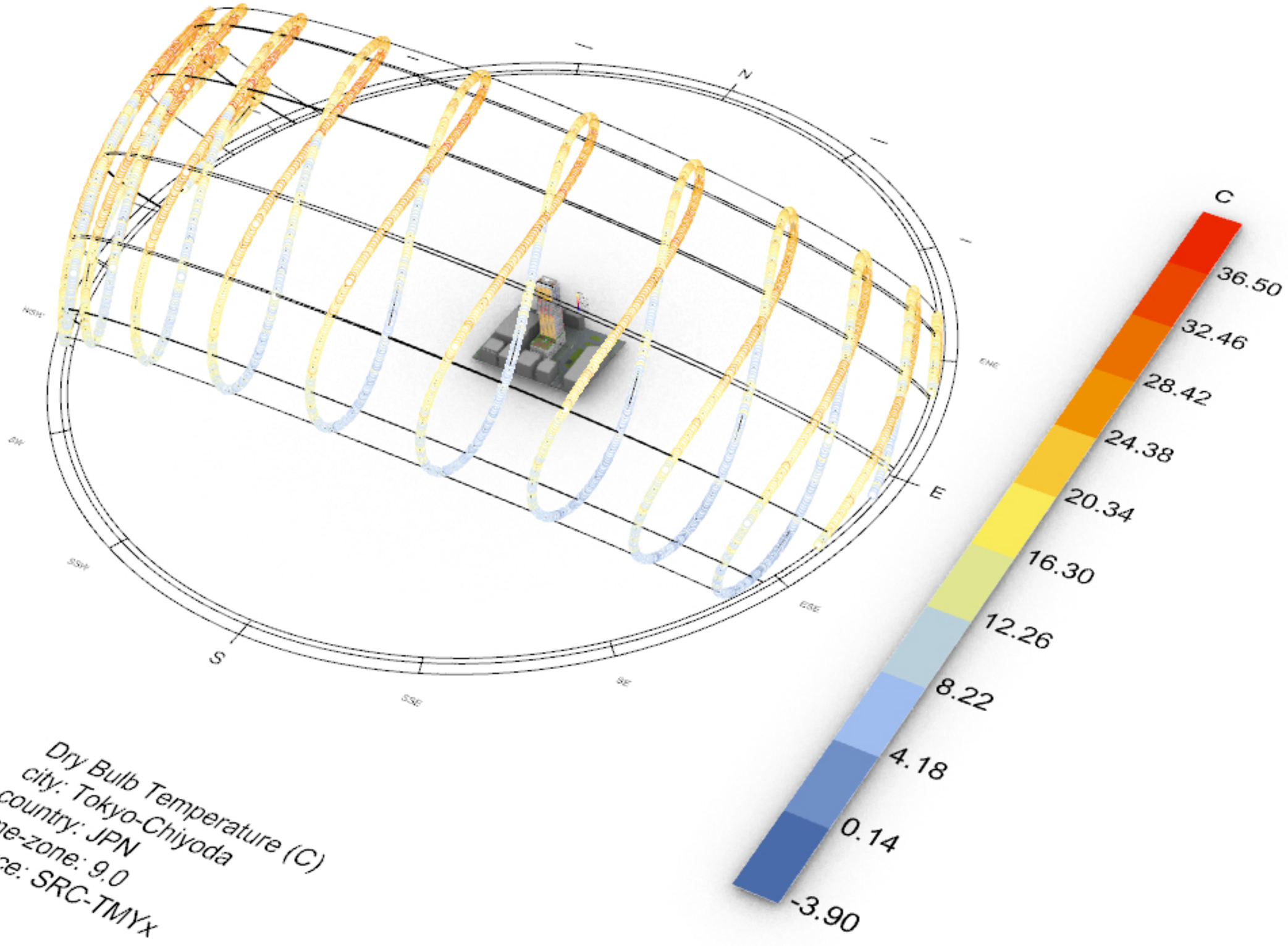


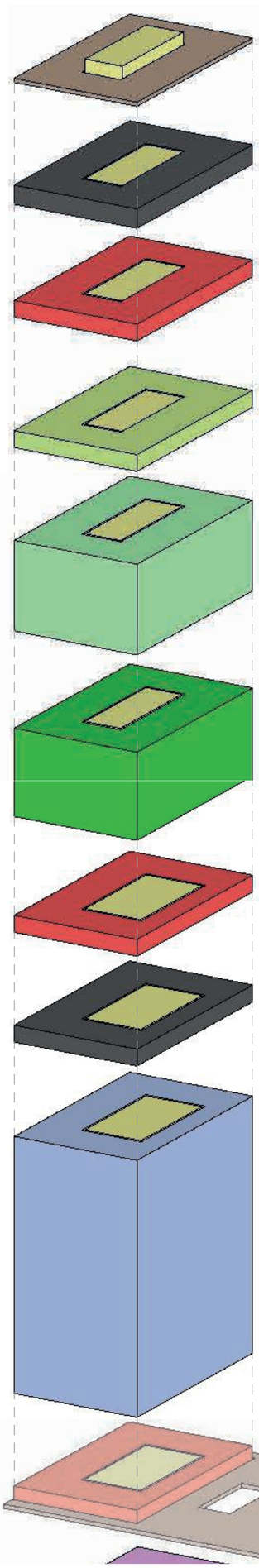
Facade analysis





Facade analysis





42nd floor - Roof with pool

41st floor - Kitchen and changing rooms

40th floor - Sky restaurant

39th floor - Presidential floor

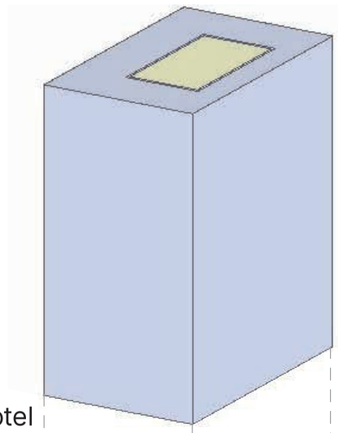
34-38th floor - Short term hotel

25-33th floor - Long term hotel

24th floor - Hotel sky lobby

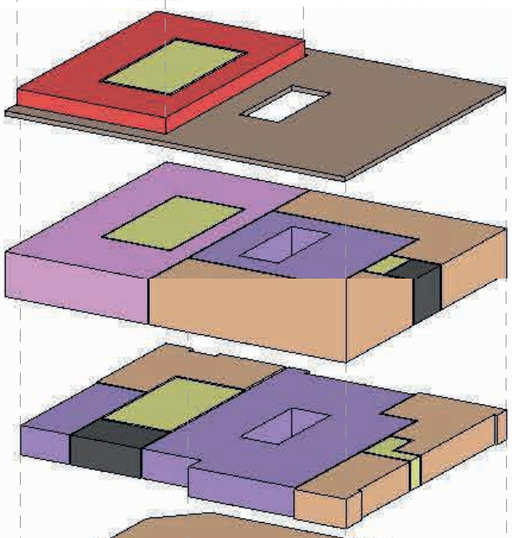
23th floor - Technical floor

9-22nd floor - Office floors



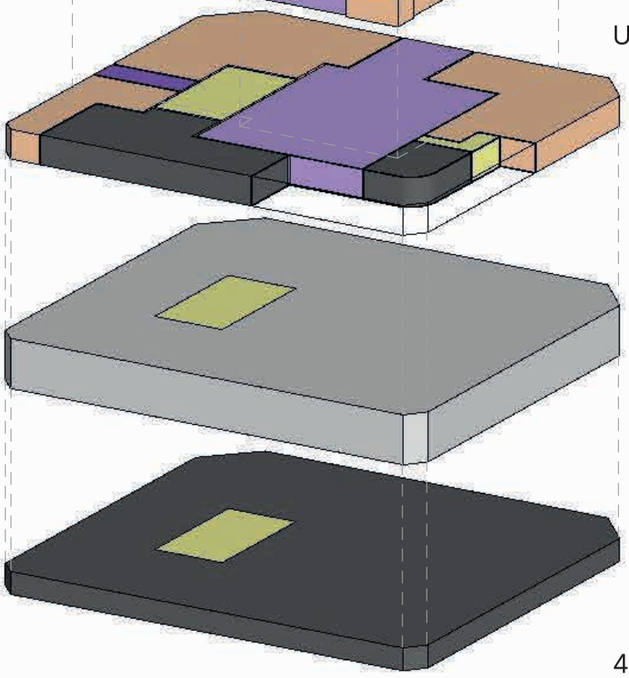
Purple - Lobby
Orange - Retail
Yellow - Core
Pink - SPA
Black - Utility

8th floor - Buffet and terrace



2-7th floor

Ground floor

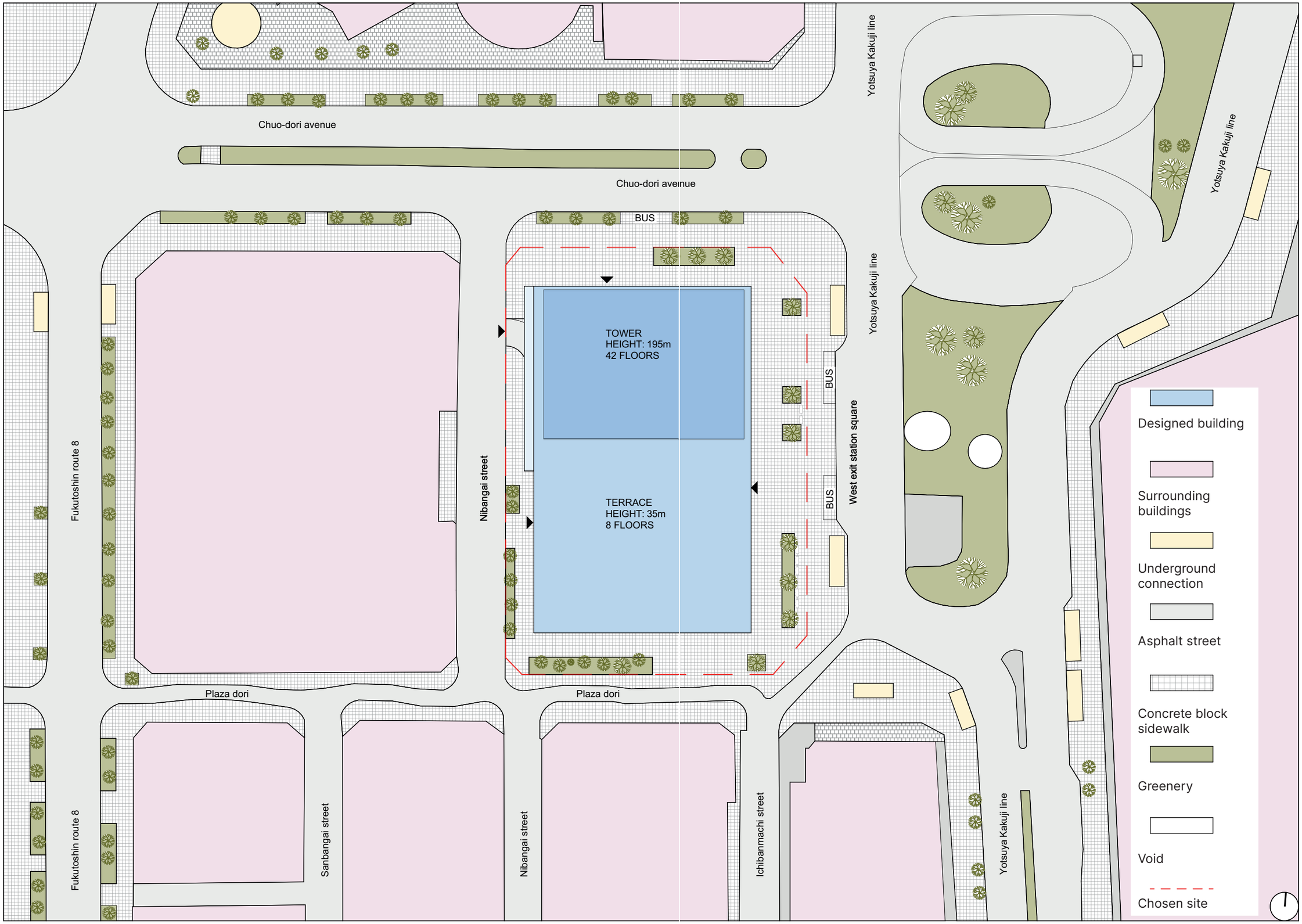


Underground floor

3-2nd Underground Parking

4th underground Technical floor

Situation 1:800



Foundation solution

Due to the risk of earthquakes, it is necessary to separate high-rise buildings from the ground. This allows the building to “slide” rather than sway during an earthquake, reducing movement in the upper floors. This is achieved using so-called “isolation bearings,” which are pads made of steel discs and elastic rubber. These pads bear the building’s load while isolating it from the ground.

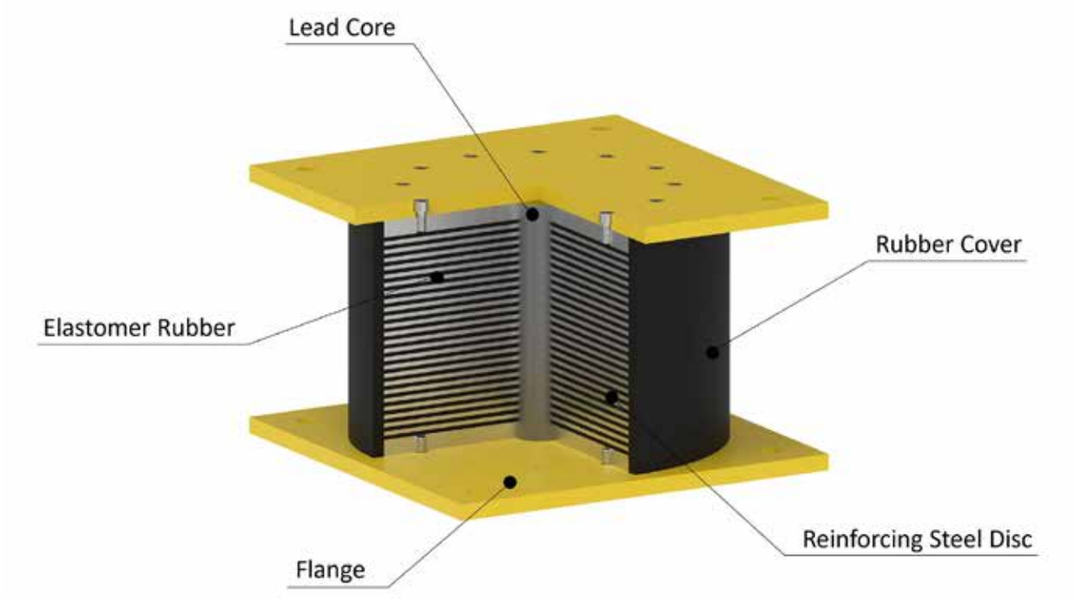


Fig 24. Isolation bearing

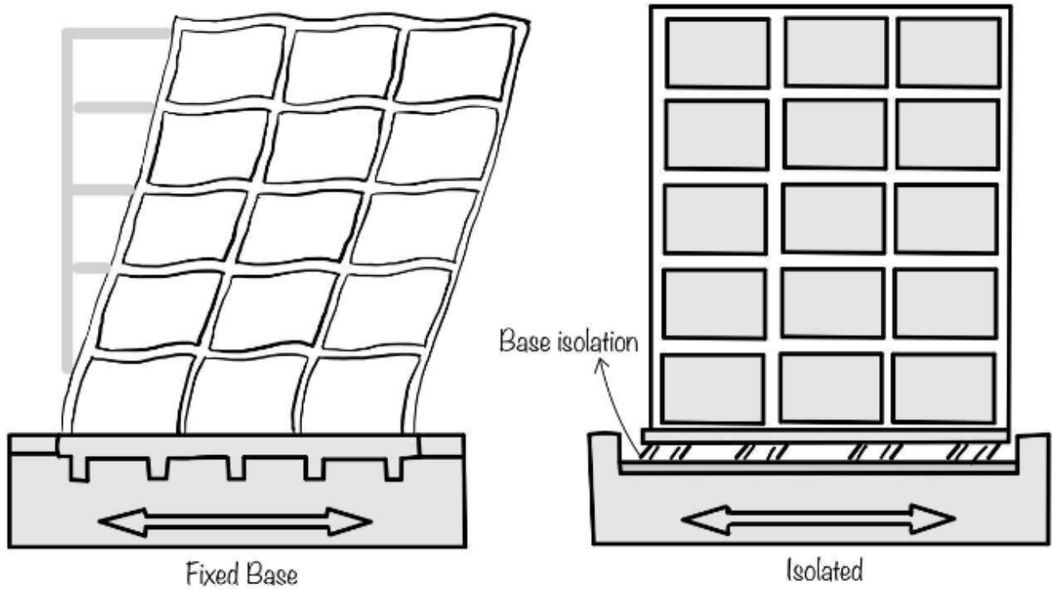
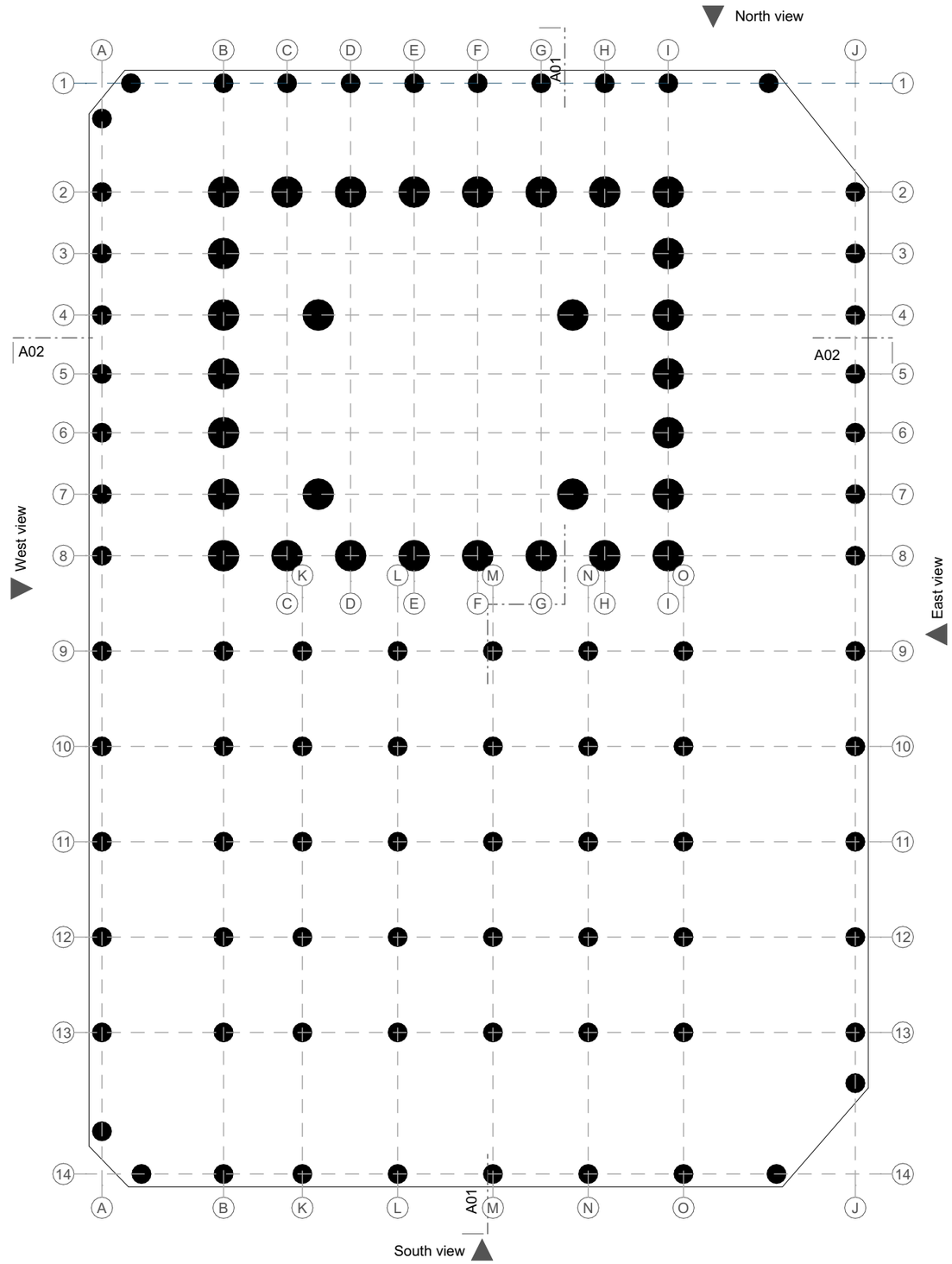
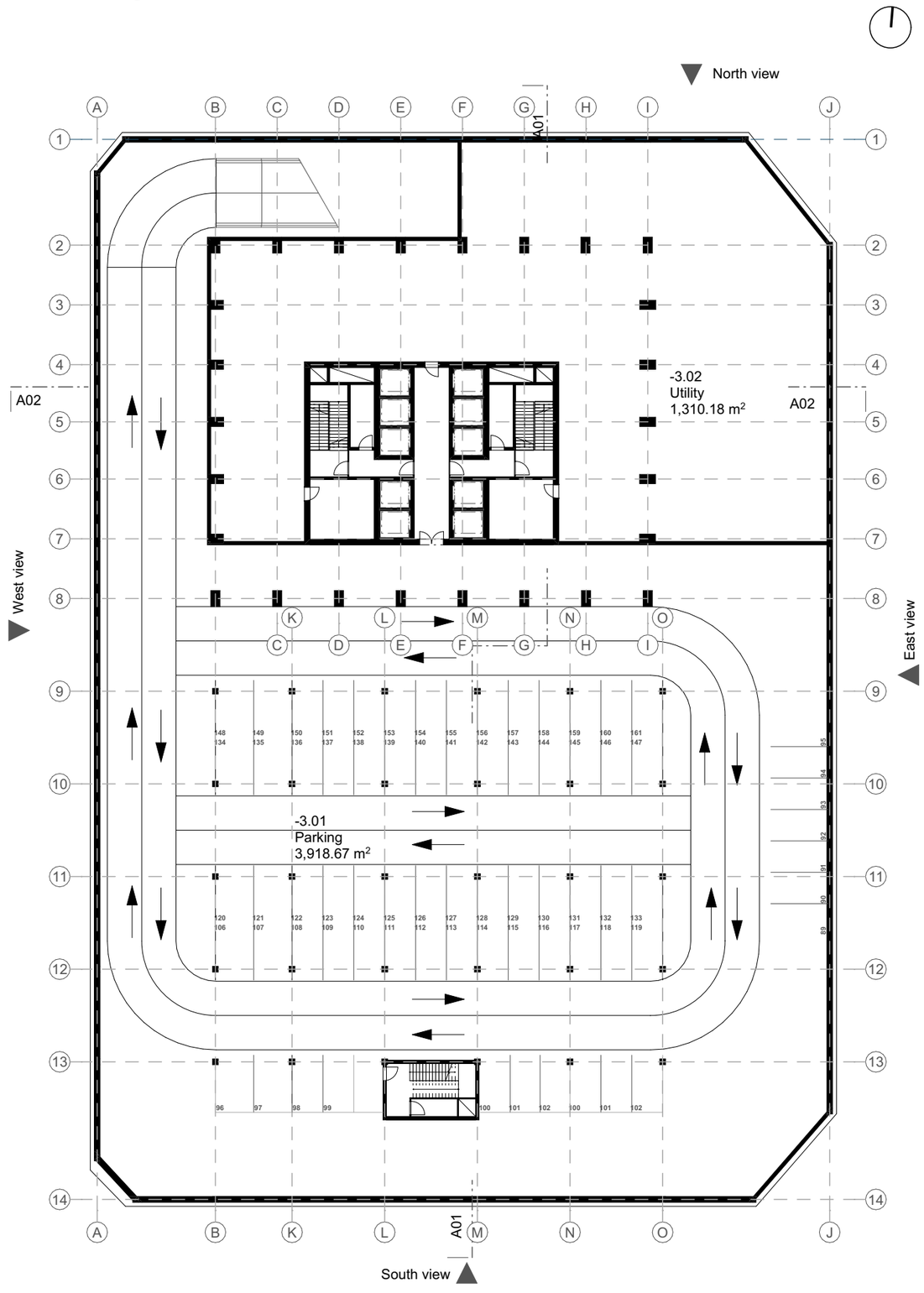


Fig 25. Concept of isolation bearing

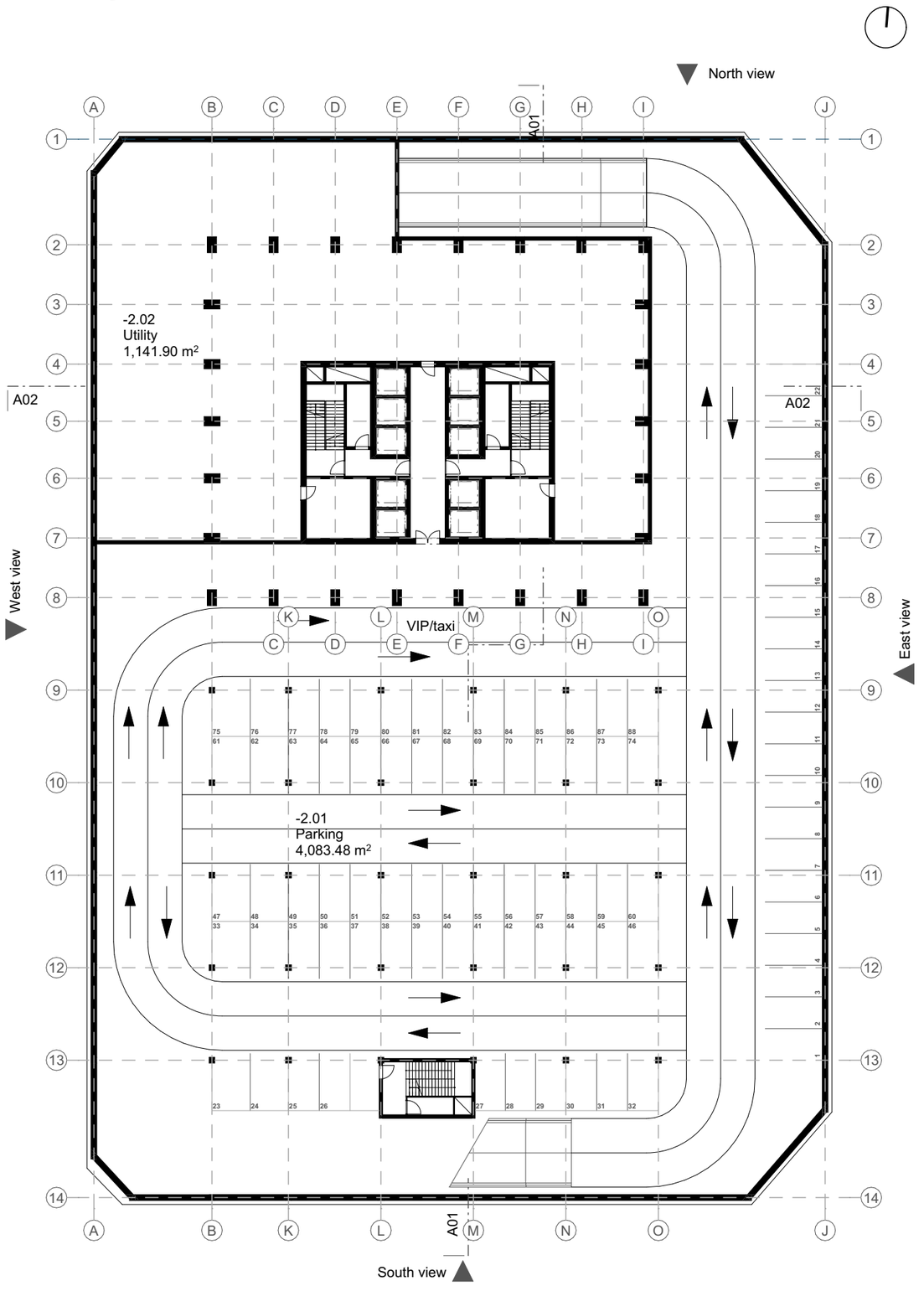
Foundation 1:450



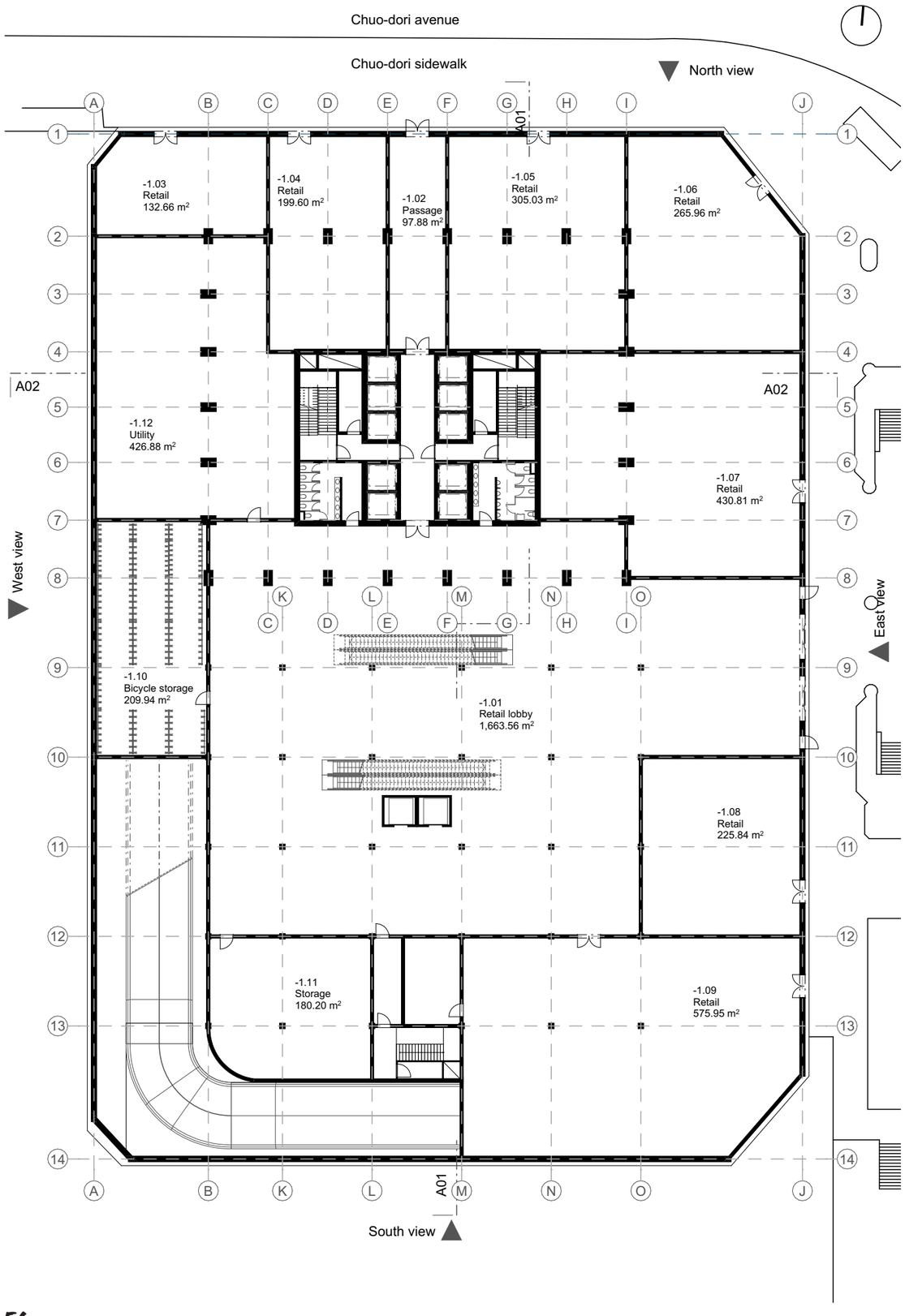
3rd underground floor 1:450



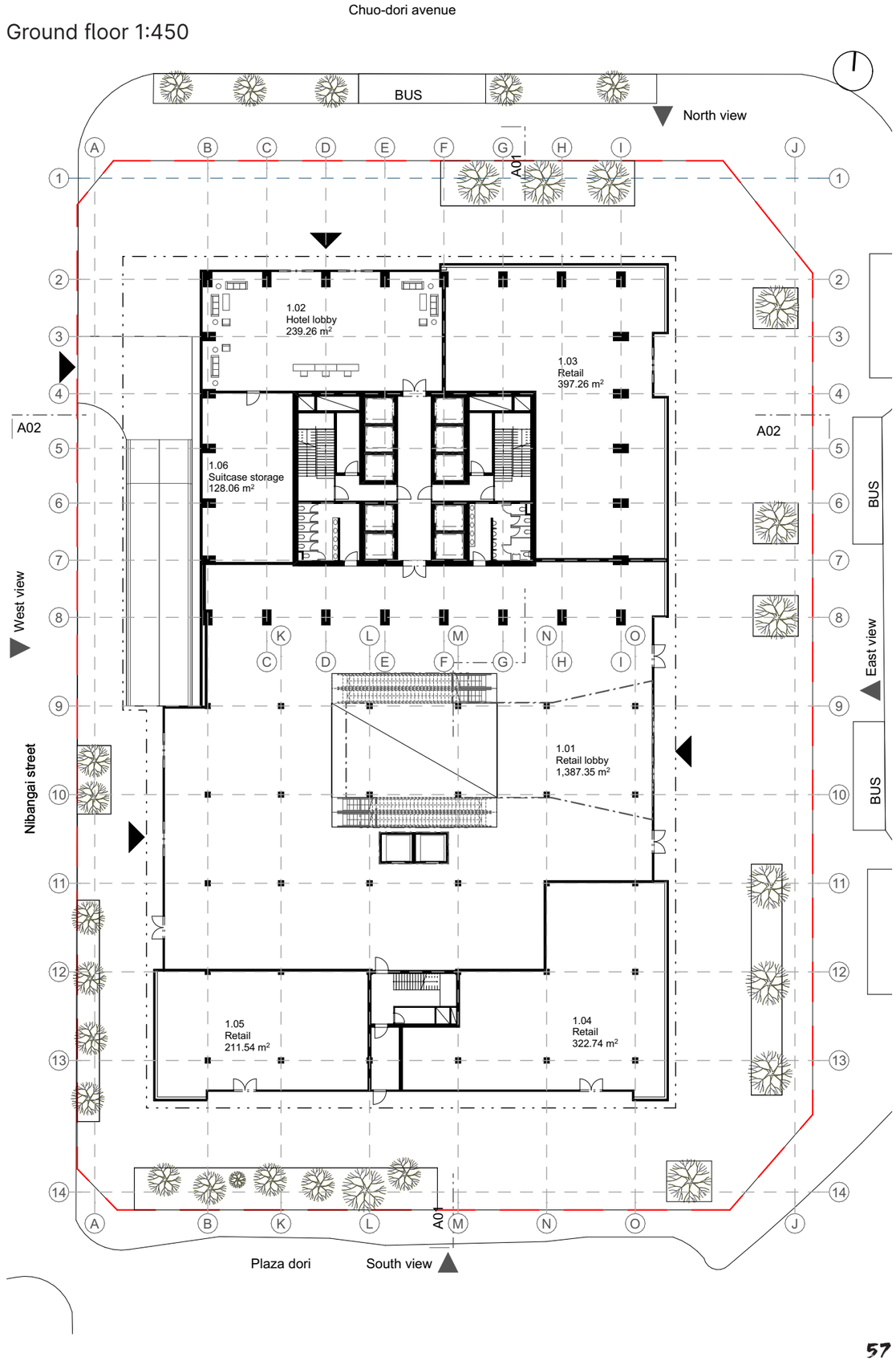
2nd underground floor 1:450



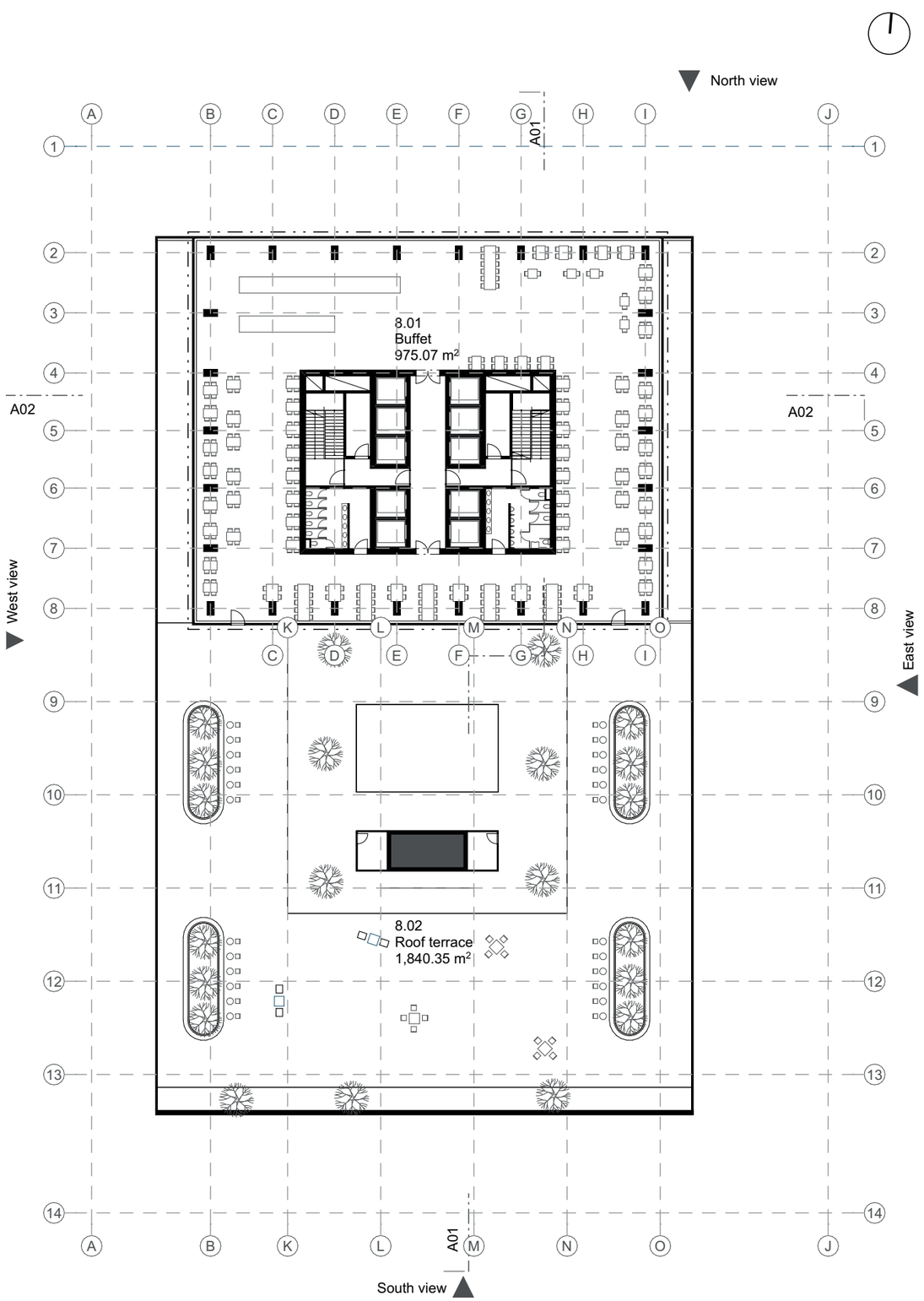
Underground floor 1:450



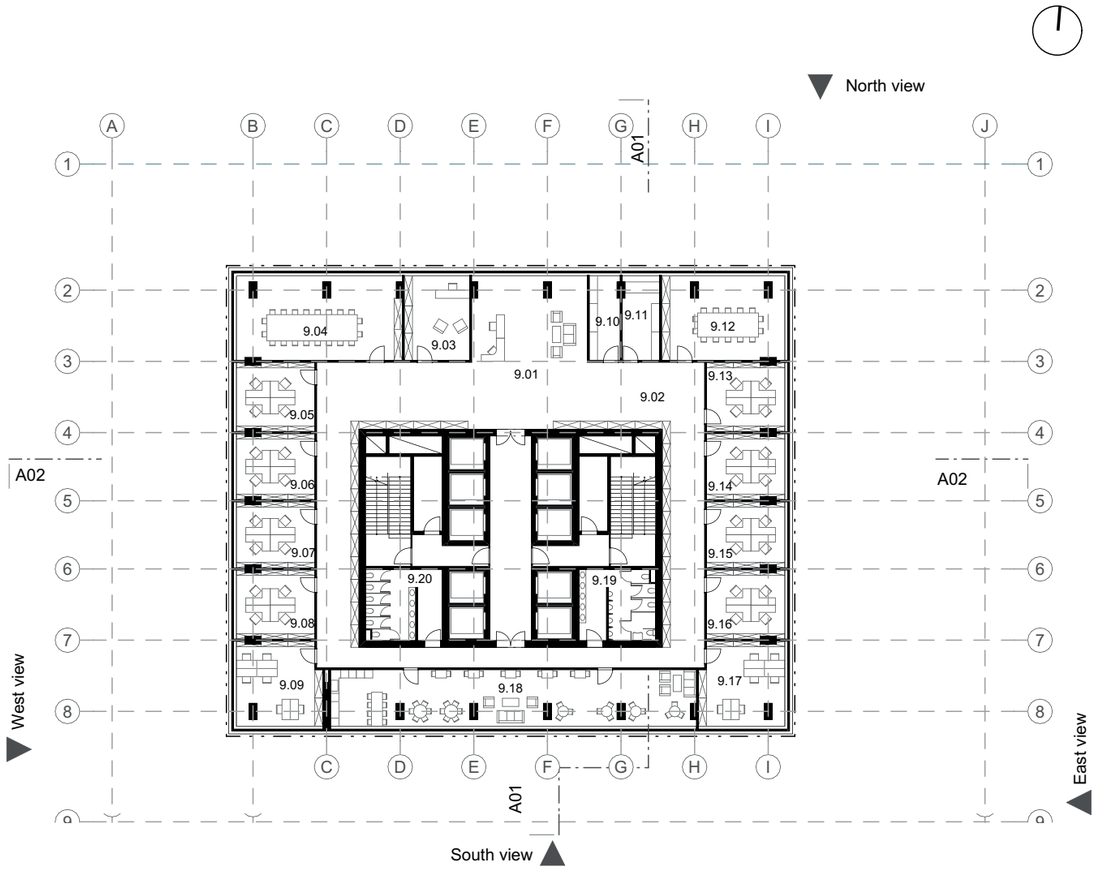
Ground floor 1:450



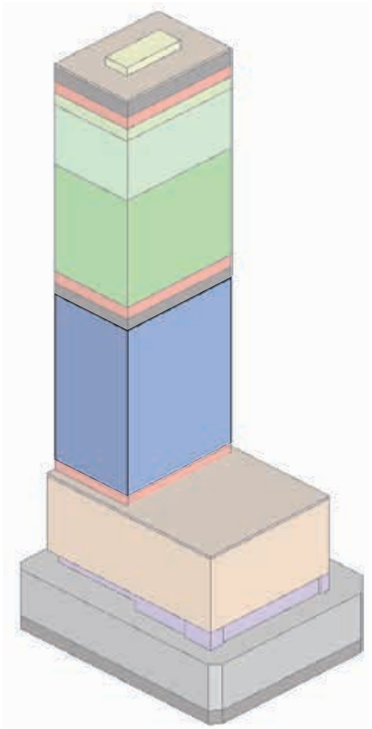
Terrace floor 1:450 (8th floor)



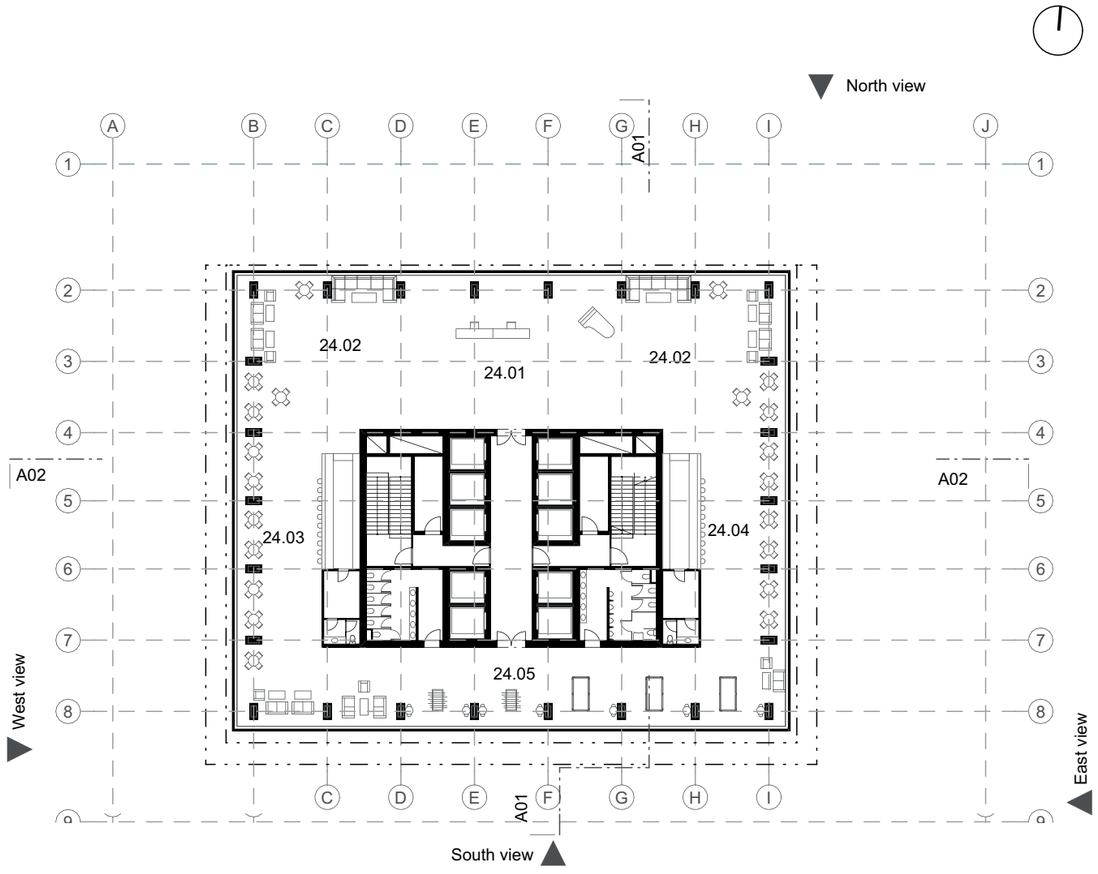
Office floor 1:450 (9-22nd floor)



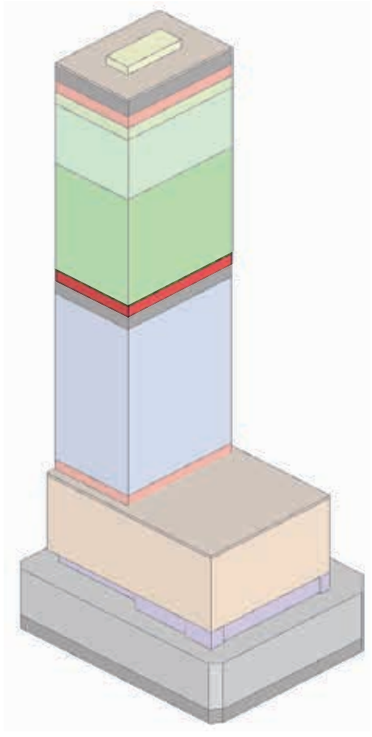
Rooms in office floor		
Nr	Name of the room	Area (m2)
9.01	Reception	95.77
9.02	Corridor	239.75
9.03	President office	30.00
9.04	Meeting room	76.09
9.05	Office	29.18
9.06	Office	27.89
9.07	Office	27.89
9.08	Office	29.18
9.09	Office	38.43
9.10	Storage room	14.06
9.11	Print room	17.19
9.12	Conference room	56.56
9.13	Office	29.18
9.14	Office	27.89
9.15	Office	27.89
9.16	Office	29.18
9.17	Office	38.43
9.18	Break room	111.32
9.19	Toilet men	29.57
9.20	Toilet women	29.57
		1,005.03 m²



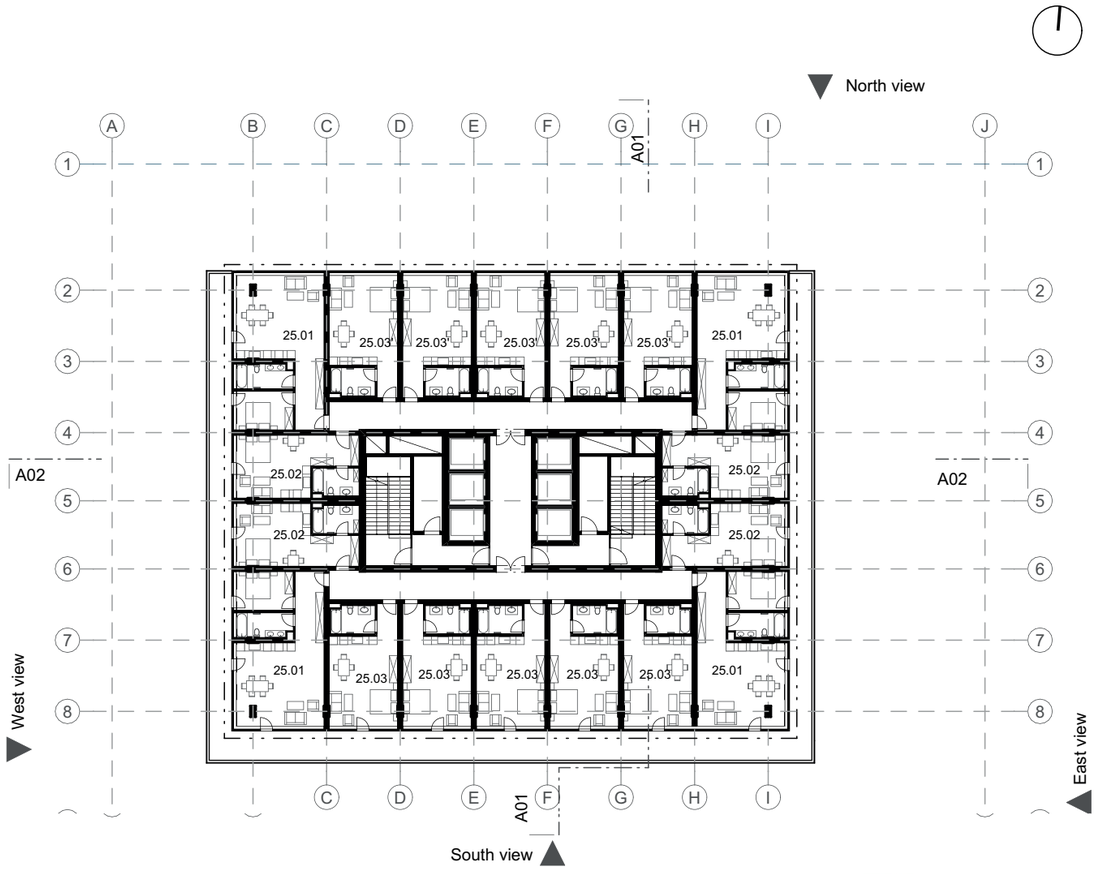
Hotel sky lobby floor 1:450 (24th floor)



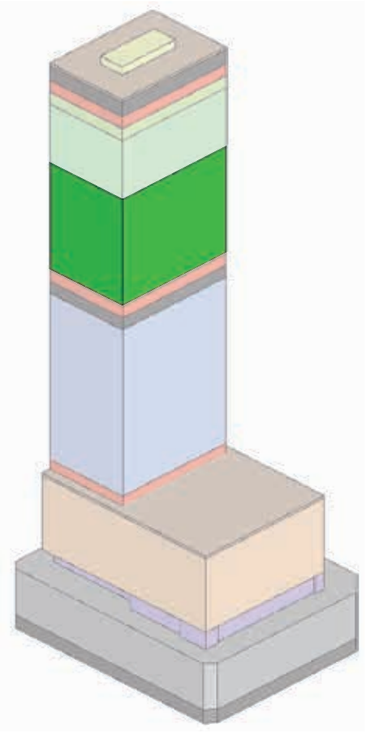
Hotel sky lobby floor		
Nr	Name of the room	Area (m2)
24.01	Reception	116.64
24.02	Lounge	337.59
24.03	Cafeteria	144.00
24.04	Bar	144.00
24.05	Enternaiment area	229.82
		972.05 m²



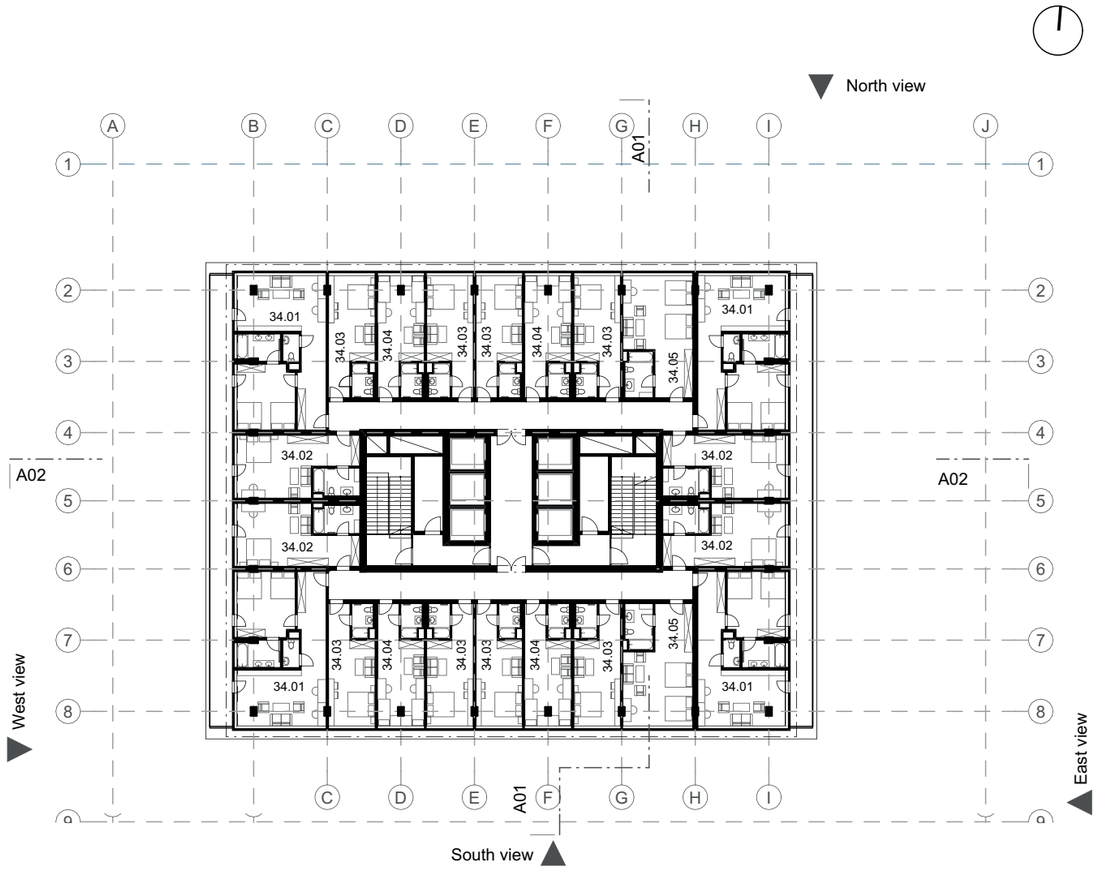
Long term hotel floor 1:450 (25-33th floor)



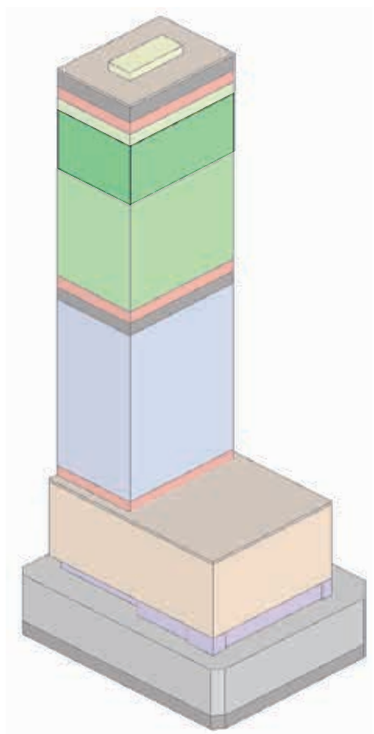
Long term hotel apartments		
Nr.	Name of the room	Area (m2)
25.01	Corner apartment	73.05
25.01.01	Entrance	11.25
25.01.02	Living room	39.20
25.01.03	Bedroom	11.79
25.01.04	Bathroom	7.24
25.01.05	Balcony	20.89
25.02	Side apartment	41.40
25.02.01	Entrance	7.99
25.02.02	Living room	25.07
25.02.03	Bathroom	6.77
25.02.04	Balcony	8.98
25.03	Main apartment	45.18
25.03.01	Entrance	3.78
25.03.02	Living room	33.00
25.03.03	Bathroom	6.46
25.03.04	Balcony	12.46



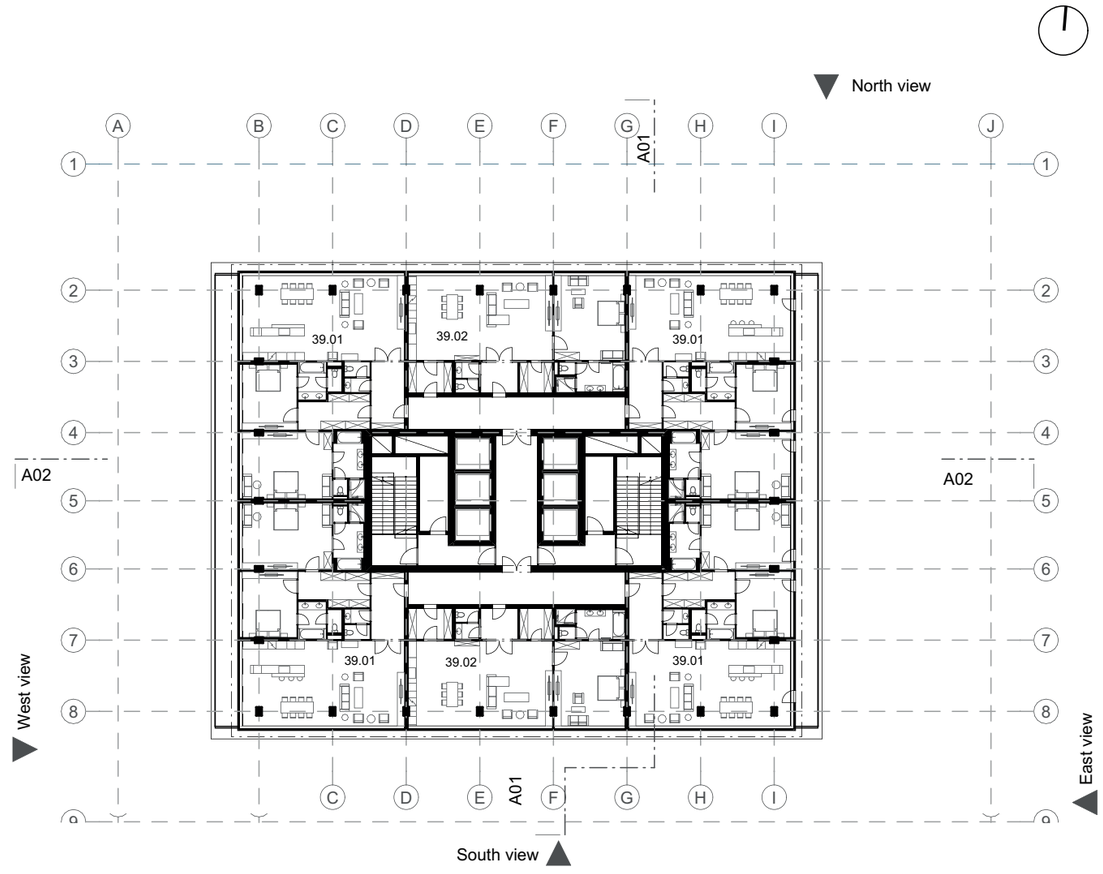
Short term hotel floor 1:450 (34-38th floor)



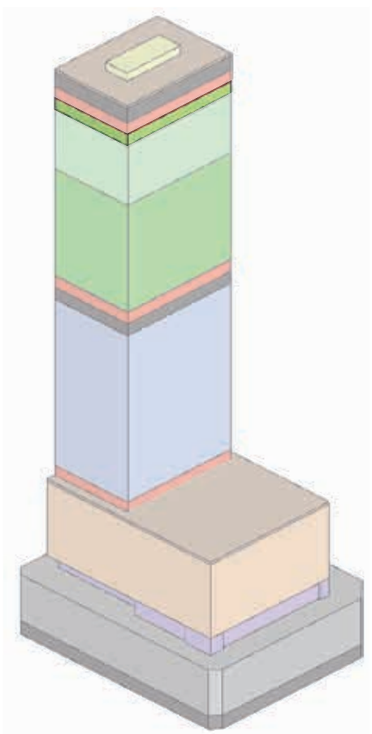
Short term hotel apartments		
Nr.	Name of the room	Area (m2)
34.01	Corner apartment	73.83
34.01.01	Entrance	14.27
34.01.02	Living room	26.69
34.01.03	Bedroom	20.24
34.01.04	Bathroom	6.04
34.01.05	Toilet	2.40
34.01.06	Balcony	20.89
34.02	Side apartment	41.58
34.02.01	Entrance	8.17
34.02.02	Bedroom	25.07
34.02.03	Bathroom	6.77
34.02.04	Balcony	8.98
34.03	King bed room	30.66
34.03.01	Bedroom	25.67
34.03.02	Bathroom	3.67
34.04	Twin room	30.66
34.04.01	Bedroom	25.67
34.04.02	Bathroom	3.67
34.05	Family room	45.90
34.05.01	Entrance	9.94
34.05.02	Bedroom	27.62
34.05.03	Bathroom	6.77



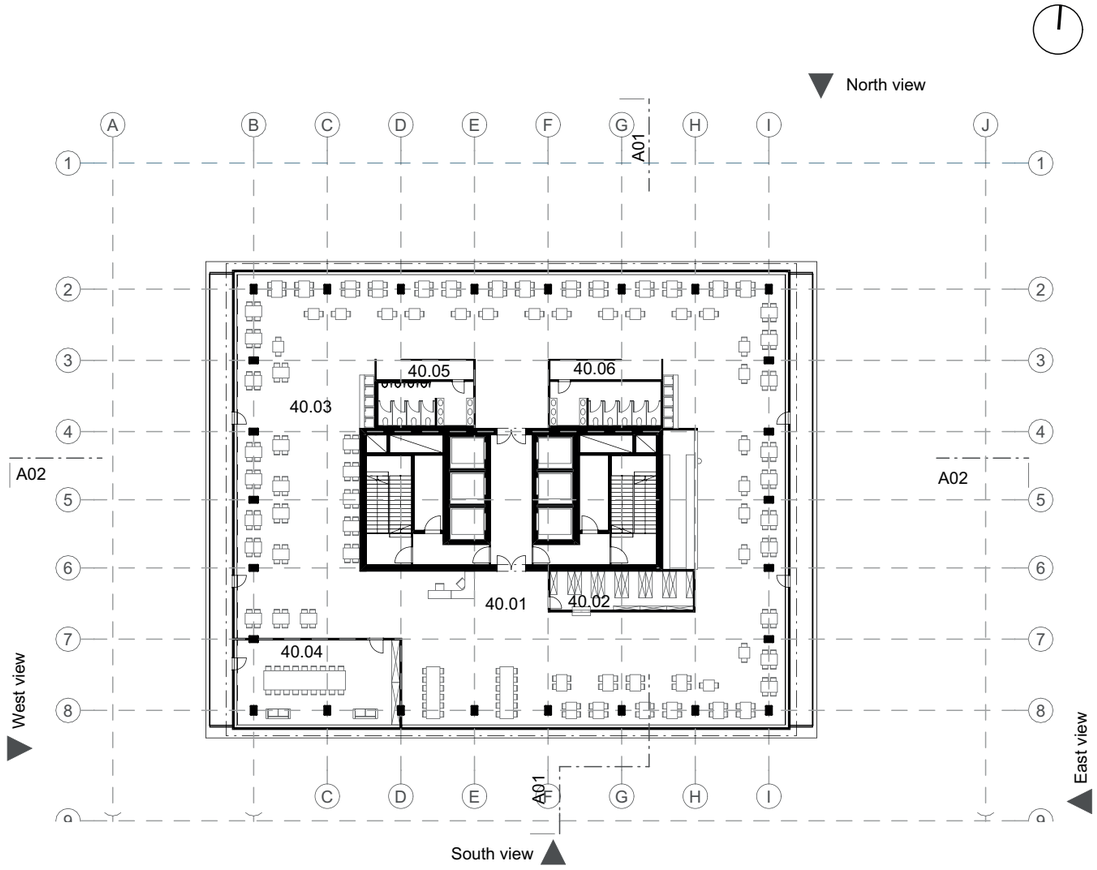
Presidential hotel floor 1:450 (39th floor)



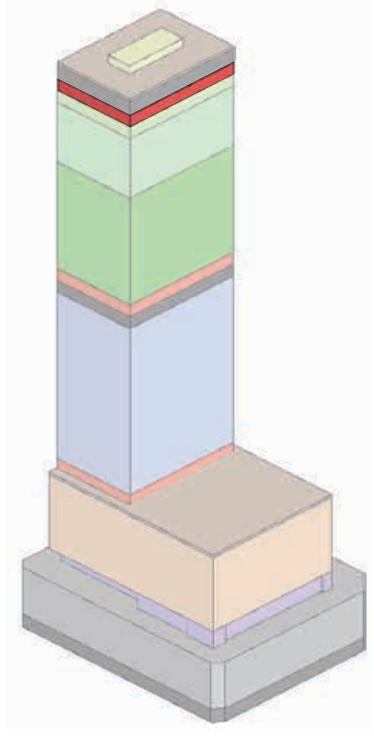
President apartment floor		
Nr.	Name of the room	Area (m2)
39.01	Corner apartment	179.38
39.01.01	Entrance	12.07
39.01.02	Living room	74.10
39.01.03	Closet	12.49
39.01.04	Main bedroom	32.22
39.01.05	Bedroom	19.30
39.01.06	Main bathroom	10.77
39.01.07	Bathroom	7.61
39.01.08	Toilet	4.20
39.01.09	Balcony	29.87
39.02	Side apartment	137.34
39.02.01	Entrance	6.26
39.02.02	Living room	65.72
39.02.03	Closet	5.40
39.02.04	Bedroom	32.16
39.02.05	Bathroom	11.64
39.02.06	Storage	7.44
39.02.07	Toilet	3.83



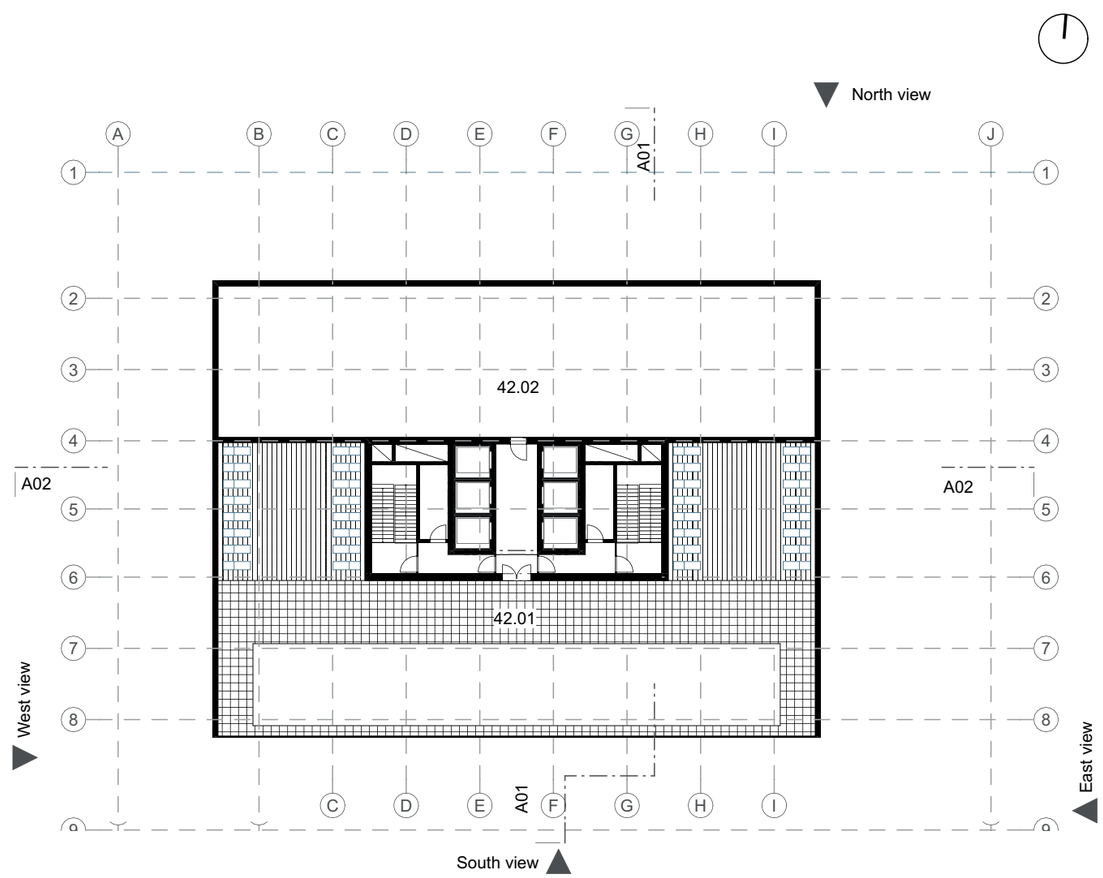
Sky restaurant floor 1:450 (40th floor)



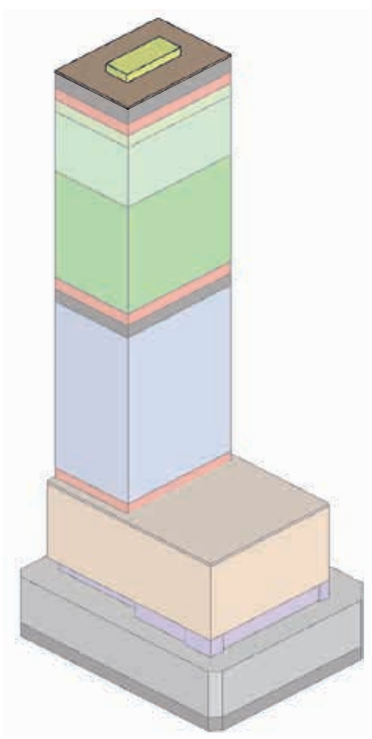
Restaurant floor		
Nr.	Name of the room	Area (m2)
40.01	Reception	53.73
40.02	Dress room	30.13
40.03	Restaurant	781.48
40.04	VIP room	74.27
40.05	Toilet men	37.41
40.06	Toilet women	42.67
		1,019.68 m²



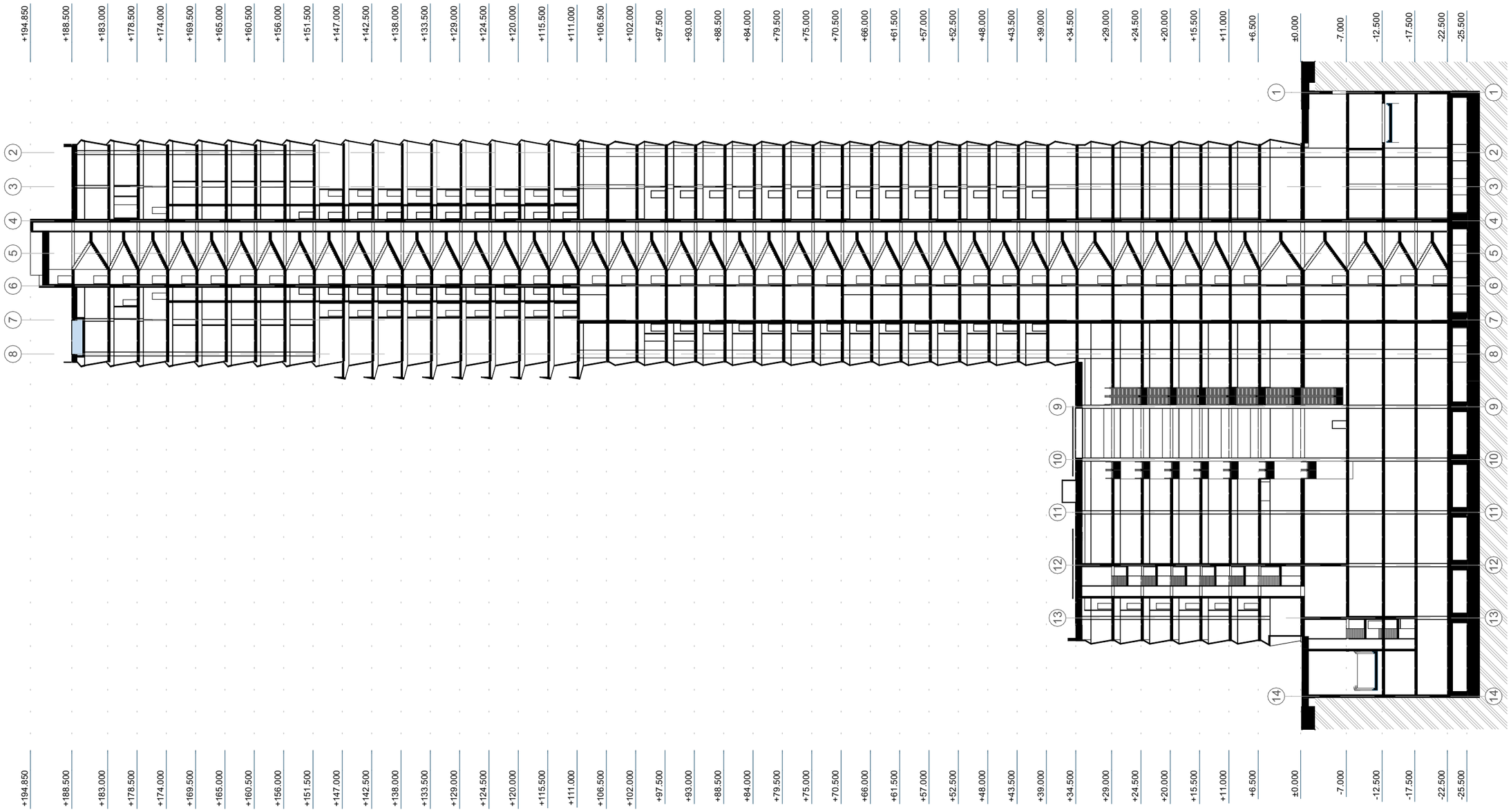
Roof 1:450 (42nd floor)



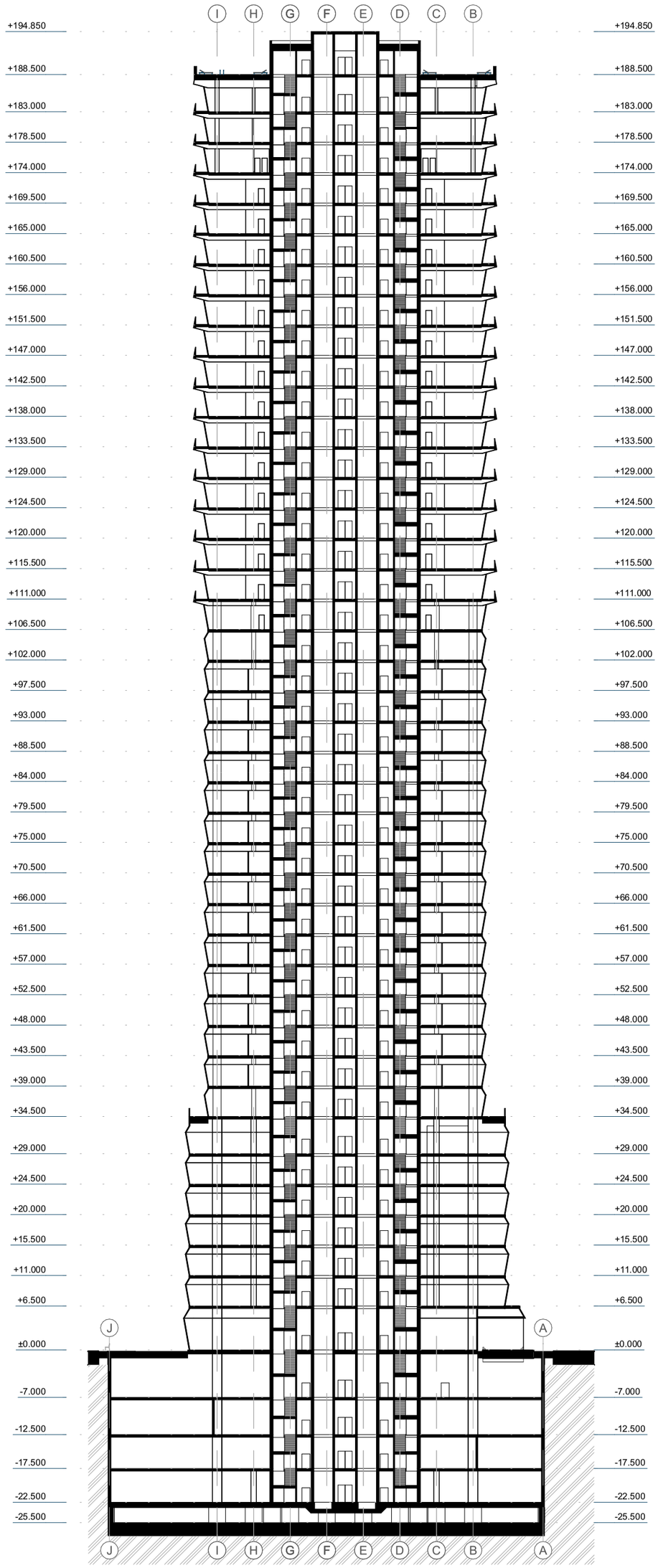
Roof rooms		
Nr.	Name of the room	Area (m2)
42.01	Roof terrace	717.11
42.02	Utility	486.74
		1,203.85 m²



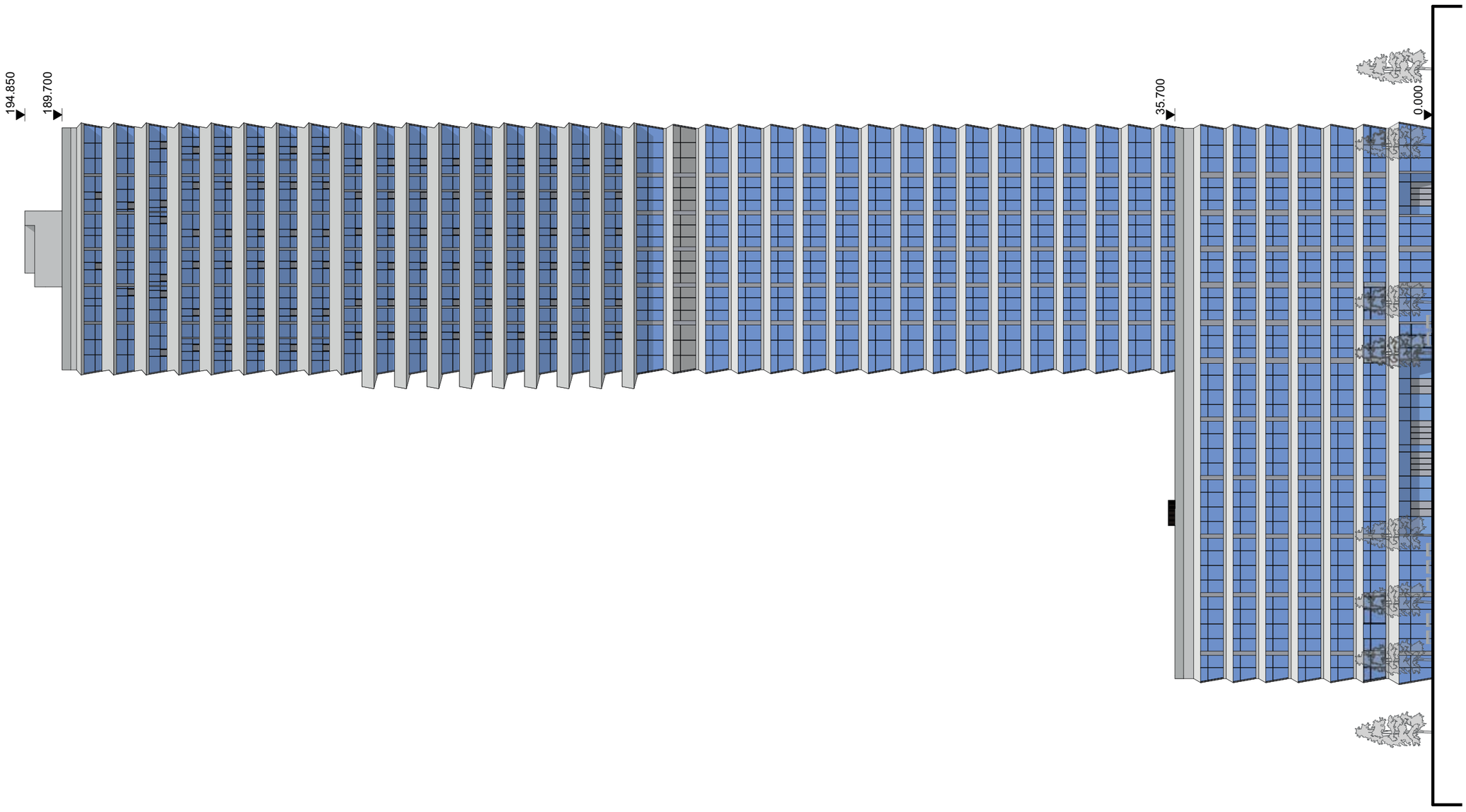
Section A01 1:650



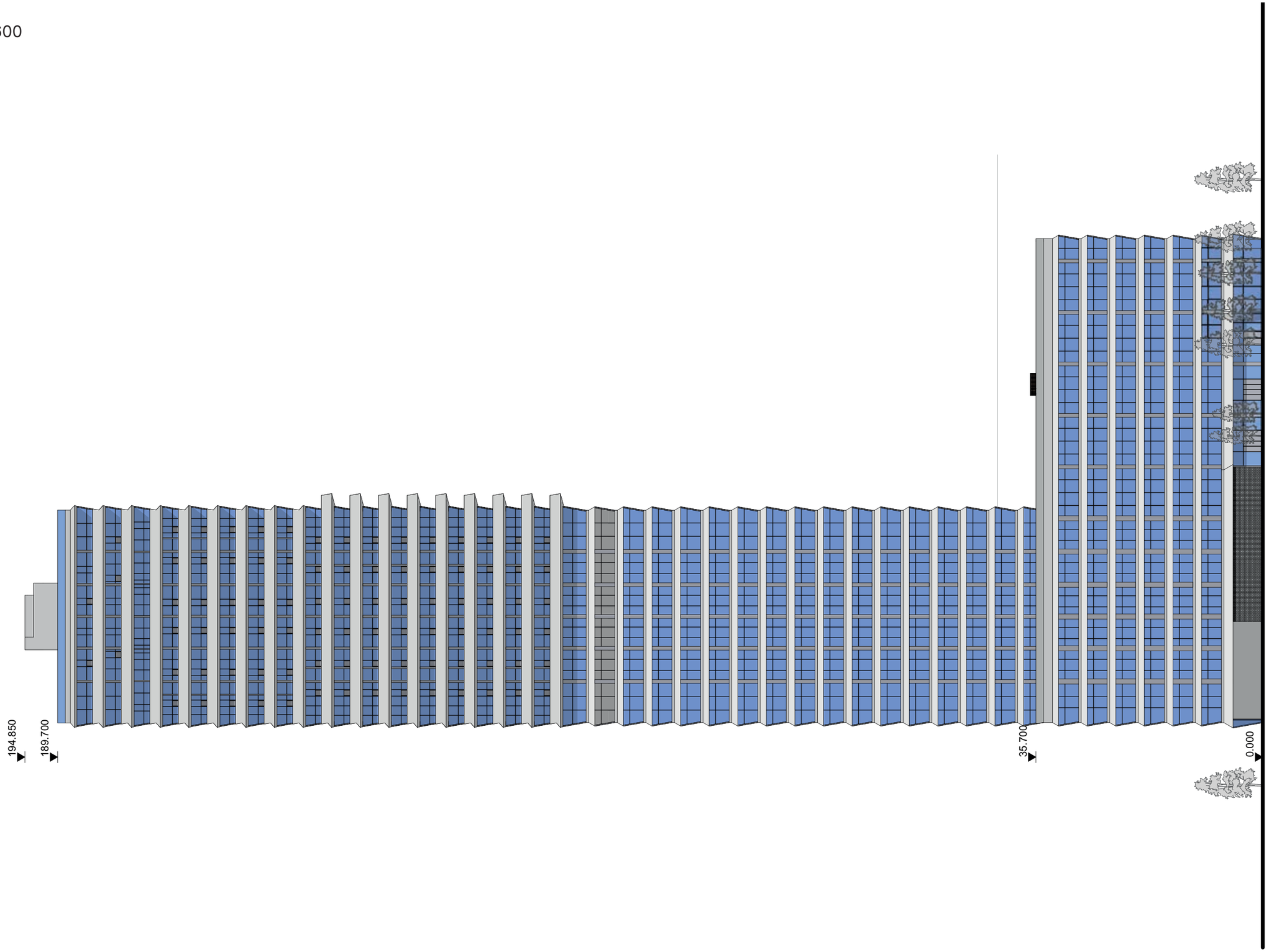
Section A02 1:650



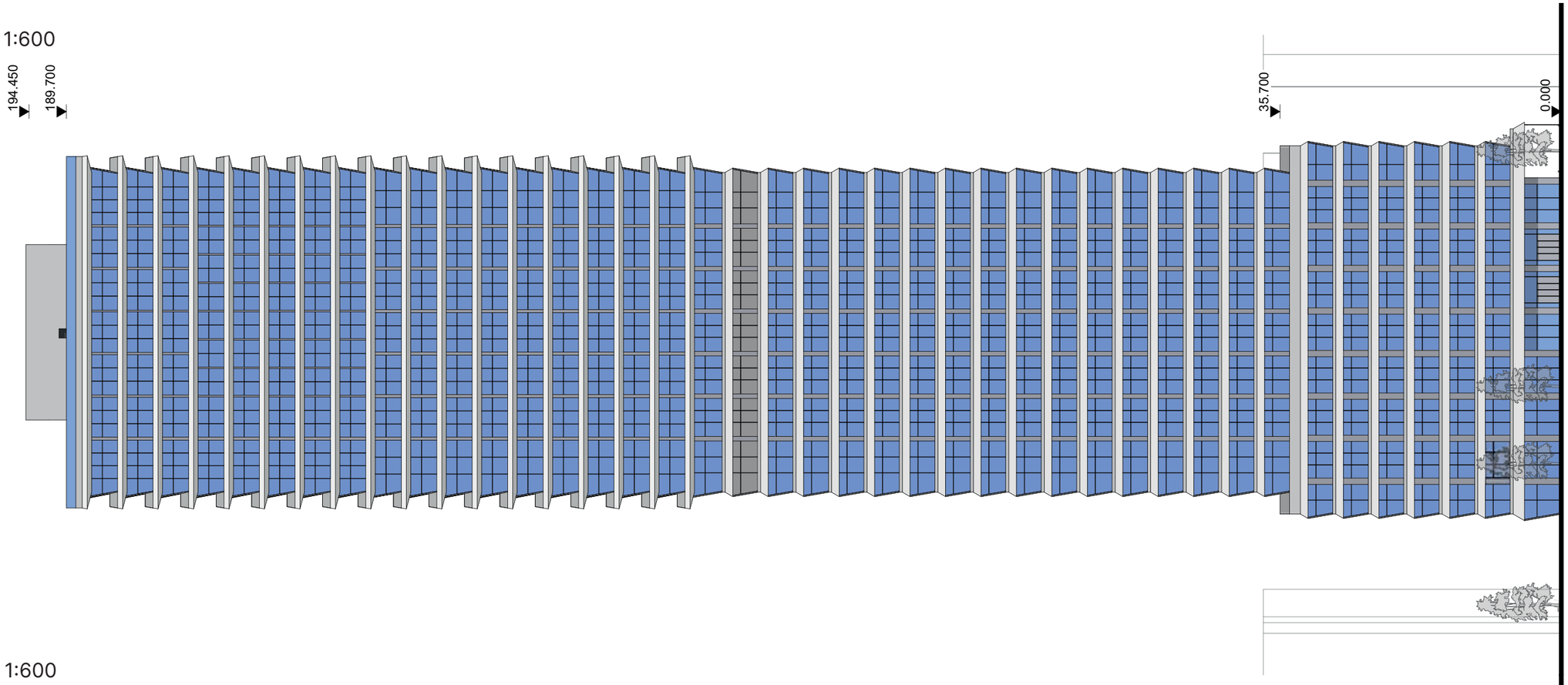
East elevation 1:600



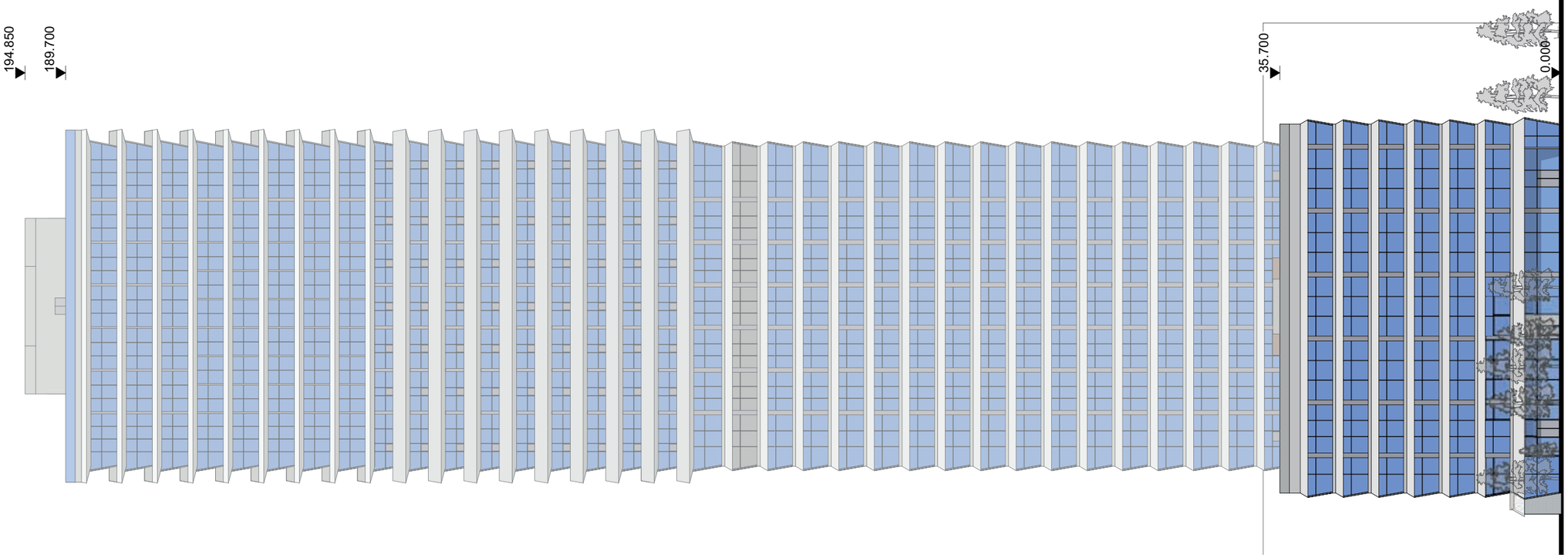
West elevation 1:600



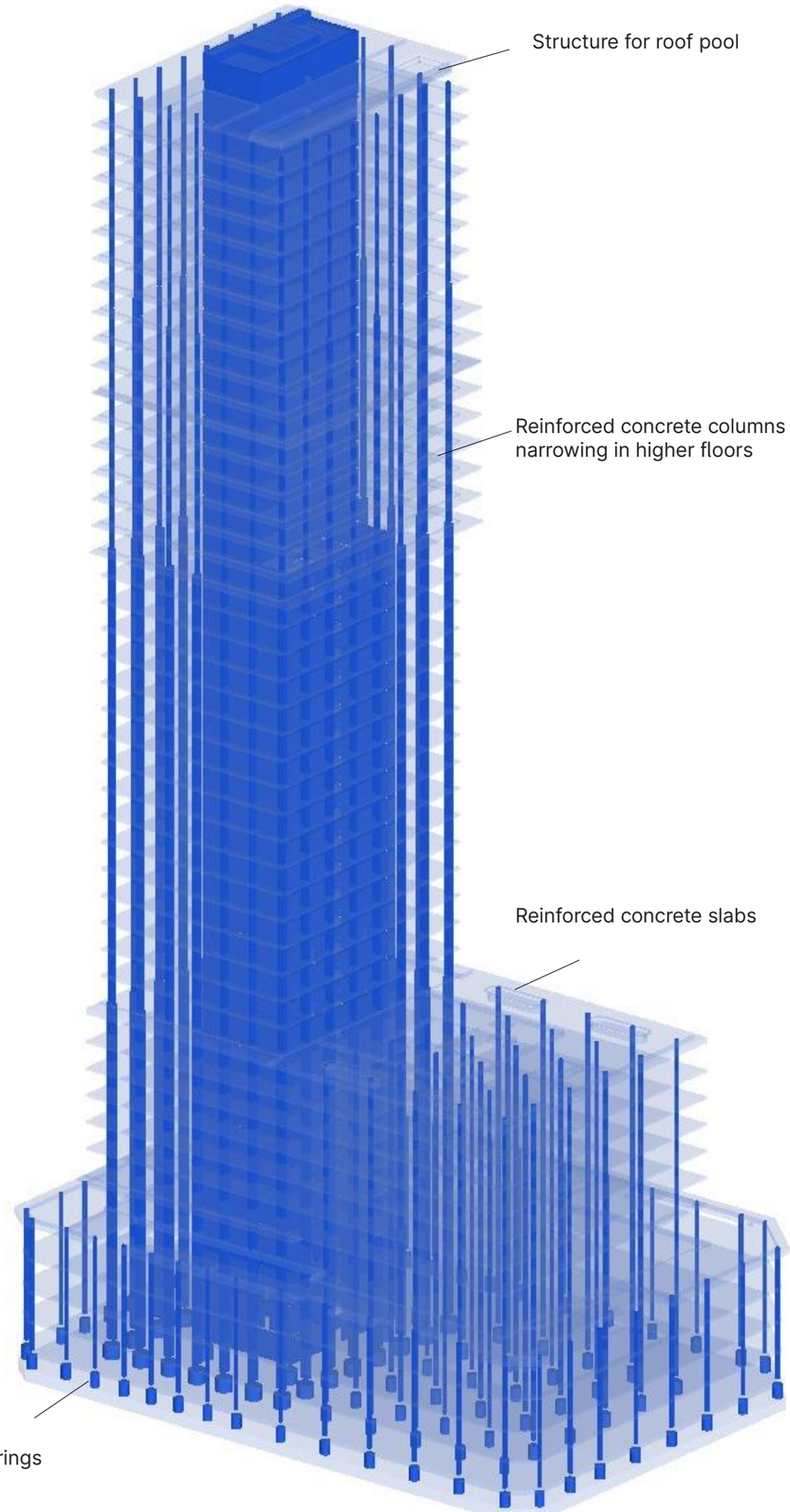
North elevation 1:600

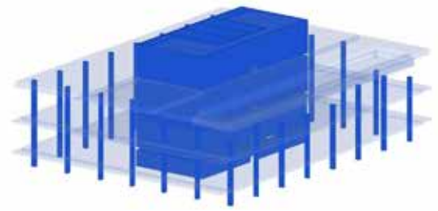


South elevation 1:600

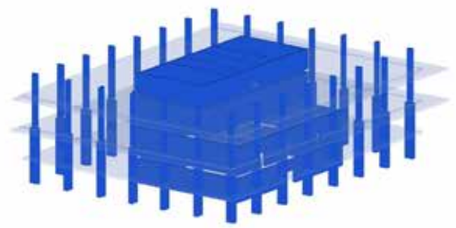


Structure

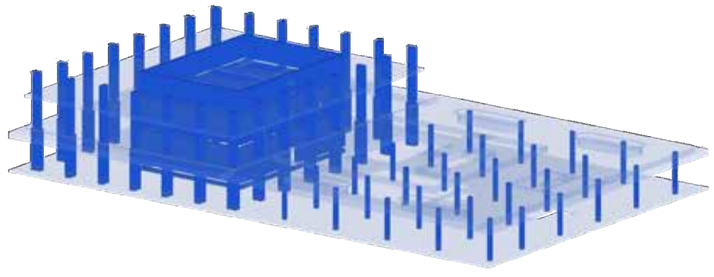




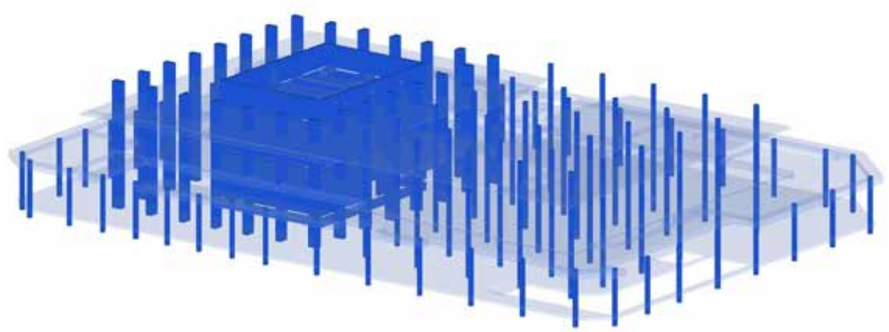
Upper half of tower - reduced core and column dimensions



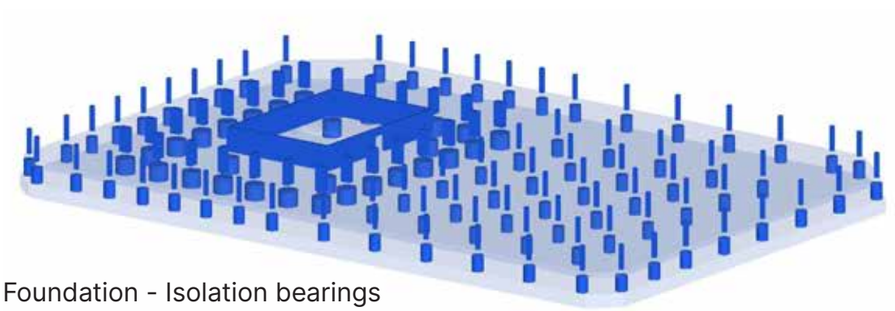
Bottom half of tower - full size core and increased column dimensions



Base - Reduced foot size of the building

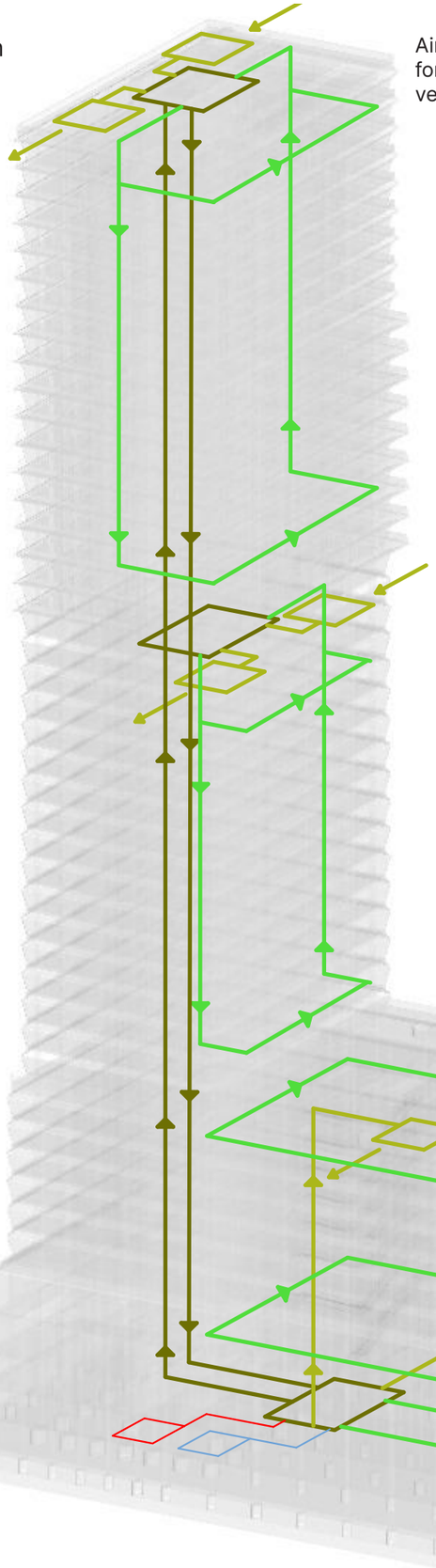


Underground floors - Core and columns situated above isolation bearings



Foundation - Isolation bearings

Ventilation



Air intake on the roof
for hotel floors connected to roof ventilation unit

Partial vent branch

Air intake and outlet

Main vent branch

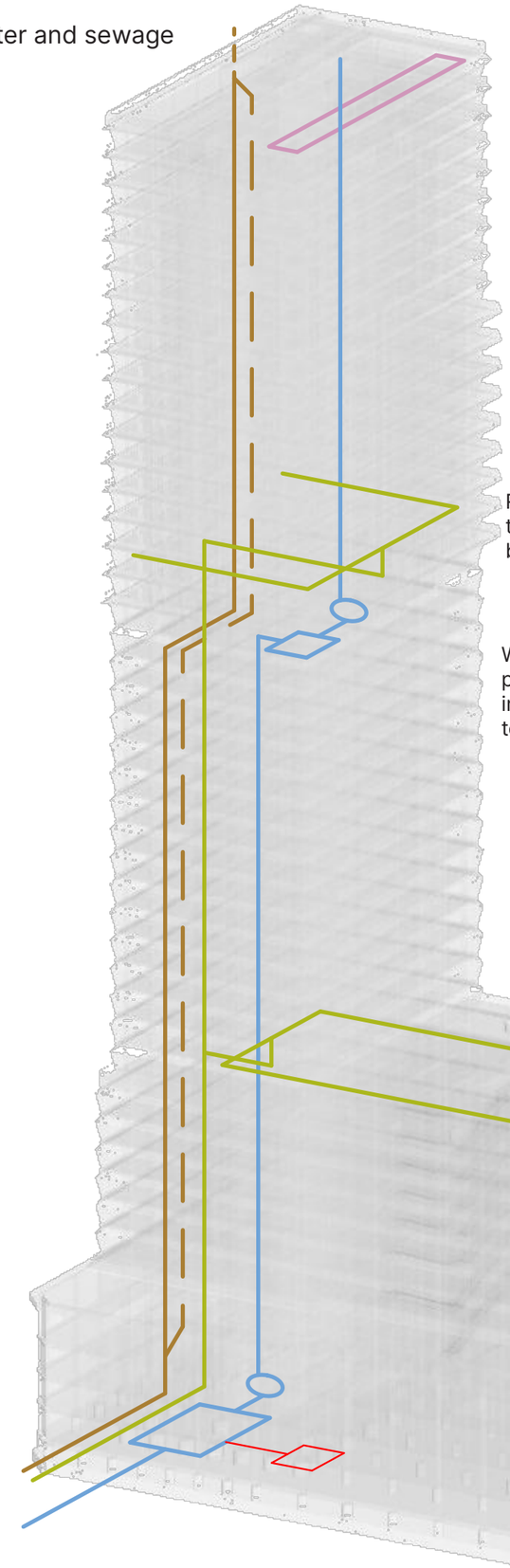
Air heating

Air cooling

Air intake on technical floor
for office floors connected to secondary ventilation unit

Air intake on terrace
for base and underground floors connected to the main ventilation unit on the underground technical floor

Water and sewage



Water from roof pool connected to sprinklers as fire water

Fire water

Water

Rain water

Main sewage branch

Sewage branch vent

Water heater

Rain water from balconies driven through the main core of the building

Water tank connected to water pump on technical floor, pumping the water to the upper half of tower

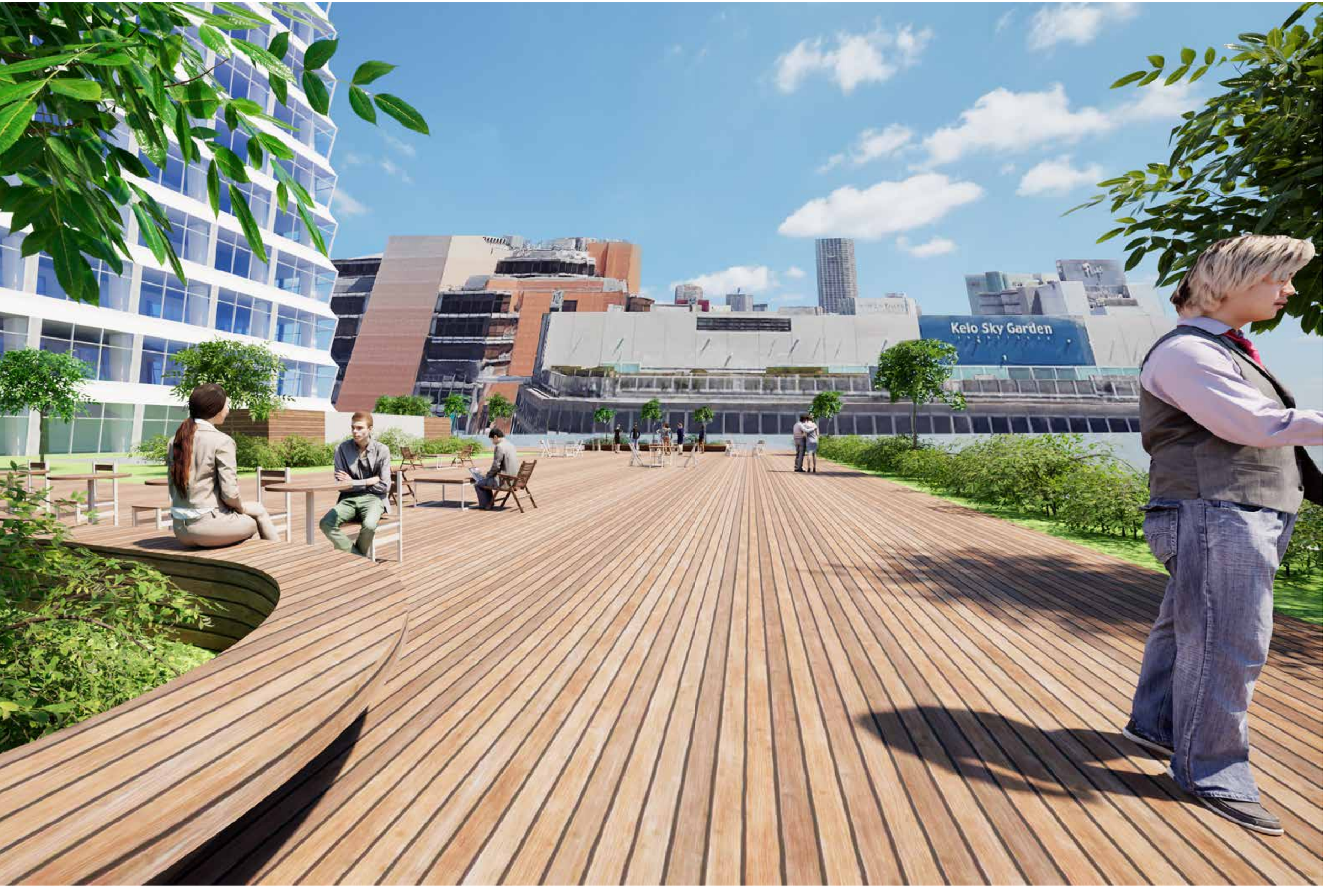
Rain water from terrace driven through the main core of the building

Aerial from west side

Aerial from east side

Street-level view from west side

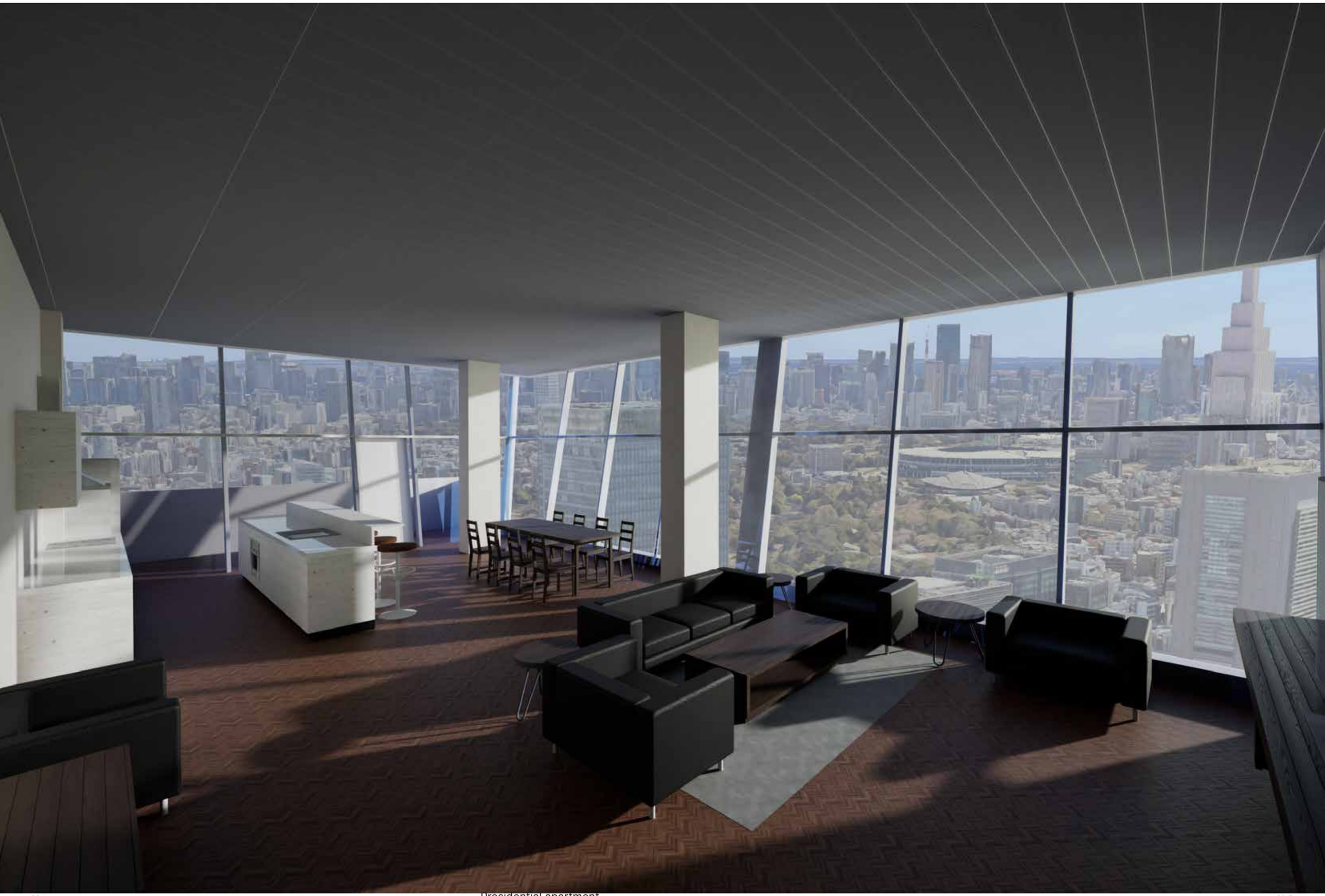
Street-level view from west side



Terrace view with Shinjuku station in the background

South view from Yodobashi

View from the roof overseeing the city center



Presidential apartment

Resources and attachments

Resources

Image sources:

Fig 0: Japan world map. pngegg. Retrieved June 2, 2024, from https://www.pngegg.com/en/png-idjvp

Fig 1: Matsuura, T. (n.d.). Relationship Between a Declining Birthrate/Ageing Population and Happiness. ChuoOnline. Retrieved June 3, 2024, from https://yab.yomiuri.co.jp/adv/chuo/dy/research/20230602_en.php. Fig 2: http://artpictures.club/autumn-2023.html

Fig 3: Stephan Audiger (n.d.). Himeji Castle. Hotels.com. Retrieved June 2, 2024, from https://th.hotels.com/go/japan/himeji-castle

Fig 4: View of Edo. Wikimedia Commons. Retrieved June 3, 2024, from https://cs.wikipedia.org/wiki/Edo#/media/Soubor:Edo_P.jpg

Fig 5: Japan topographic map. topographic-map.com. Retrieved June 3, 2024, from https://en-gb.topographic-map.com/map-63nz4/Japan/?center=38.58253%2C141.21826&zoom=6

Fig 6: Regions and prefectures of Japan. Wikimedia Commons. Retrieved June 3, 2024, from https://en.wikipedia.org/wiki/Geography_of_Japan#/media/File:Regions_and_Prefec-tures_Japan.png

Fig 7: Best Places to Stay in Okinawa. Snow monkey resorts. Retrieved June 3, 2024, from https://www.snowmonkeyresorts.com/smr/kyushu/best-places-to-stay-in-okinawa/

Fig 8: Hoshi no Yume Illumination. Travel Hakodate. Retrieved June 3, 2024, from https://www.hakodate.travel/en/events/the-star-illumination-of-goryokaku/

Fig 9: Tsunami No Japão - Miyako City Hal. YouTube. Retrieved June 3, 2024, from https://youtu.be/41VgOZb-9aY?si=ZsMoIzpH7vWjneLs

Fig 10: Mannen, Kazutaka & Hasenaka, Toshiaki & Higuchi, Atsushi & Kiyosugi, Koji & Miyabuchi, Yasuo. (2020). Simulations of Tephra Fall Deposits From a Bending Eruption Plume and the Optimum Model for Particle Release. Journal of Geophysical Research: Solid Earth. 125. 10.1029/2019JB018902.

Fig 11: Tokyo. THE EUROPEAN SPACE AGENCY. Retrieved June 3, 2024, from https://www.esa.int/ESA_Multimedia/Images/2018/03/Tokyo

Fig 12 + Fig 13: Nishi-Shinjuku 1-chome District Project. High-rise apartments and buildings. Retrieved June 5, 2024, from https://bluestyle.livedoor.biz/archives/52497358.html

Fig 14: @raitasancamp. (2024). West Exit under development. Twitter. Retrieved June 5, 2024, from https://twitter.com/raitasancamp/status/1789226325003358711

Fig 15: Urban Land Use Planning System in Japan. Ministry of Land, Infrastructure, Transport and Tourism. Retrieved June 6, 2024, from https://www.mlit.go.jp/common/001050453.pdf

Fig 16: Zoning Map. MapExpert. Retrieved May 26, 2024, from https://cityzone.mapexpert.net/ZoneMap?L=13123&N=%E6%B1%9F%E6%88%B8%E5%B7%9D%E5%8C%BA

Fig 17: Land Price Map. MapExpert. Retrieved May 26, 2024, from https://landprice.mapexpert.net/LandPrice?L=13123&N=%e6%b1%9f%e6%88%b8%e5%b7%9d%e5%8c%ba

Fig 18: Nishi-Shinjuku 1-chome District Project. High-rise apartments and buildings. Retrieved June 5, 2024, from https://bluestyle.livedoor.biz/archives/52497358.html

Fig 19: @ebina_osg (2024). Shinjuku today. Twitter. Retrieved June 5, 2025 from https://twitter.com/ebina_osg/status/1639121226890375168/photo/1

Fig 20 + 21: @kmz Aconcagua 9. Japan Building Projects. Skyscraper city. Retrieved June 5, 2025 from https://www.skyscrapercity.com/posts/136865750/

Fig 22: Shinjuku City Comprehensive Plan. Shinjuku city. Retrieved June 1, 2024, from https://www.city.shinjuku.lg.jp/content/000257303.pdf

Fig 23: @dtakura (2021). Shinjuku West Exit. Twitter. Retrieved June 2, 2024 from https://twitter.com/dtakura/status/1421310271310598150/photo/1

Fig 24: Earthquake-Resistant Construction: How Base Isolation Can Protect Buildings. Ring-Feder. Retrieved July 12, 2024, from https://blog.ringfeder.com/earthquake-resistant-construction-how-base-isolation-can-protect-buildings

Fig 25: What are the types of base isolation devices. eigenplus. Retrieved July 12, 2024, from https://www.eigenplus.com/what-are-the-types-of-base-isolation-devices/

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3 Japan earthquakes, retrieved May 25, 2024 from https://www.nature.com/articles/d41586-024-00010-1
4 Number of major earthquakes, retrieved May 23, 2024 from https://www.statista.com/statistics/1166128/japan-yearly-number-of-major-earthquakes/
5 Notable japanese volcanic eruptions, retrieved May 23, 2024 from https://www.slideshare.net/slideshow/notable-japanese-volcanic-eruptions/16742303#10
6 Notice of construction, retrieved May 29, 2024 from https://bluestyle.livedoor.biz/archives/52497358.html

České vysoké učení technické v Praze, Fakulta architektury

Zadání diplomové práce

Mgr. program navazující

jméno a příjmení: Pavel Svoboda

datum narození: 23.05.1999

akademický rok / semestr: ZS 2024/2025
studijní program: Architektura a urbanismus
ústav: 15116 - Ústav modelového projektování
vedoucí diplomové práce: prof. Dr. Henri Hubertus Achten

téma diplomové práce: Shinjuku Zen Heights

zadání diplomové práce:

1/ popis zadání projektu a očekávaného cíle řešení

Zadání se nachází před hlavní vlakovou stanicí Shinjuku, v hlavním městě Japonska – Tokiu. V rámci DP zde bude navržena výšková budova v kontextu s blízkou zástavbou.

2/ Pro AU/ součástí zadání bude jasně a konkrétně specifikovaný stavební program

Program budovy bude víceúčelový. Součástí bude komerční prostor, kancelářský, hotel a SPA.

3/ popis závěrečného výsledku, výstupy a měřítka zpracování

Součástí odevzdání budou plachty a portfolia v rozsahu dle požadavků FA ČVUT. Práce bude zpracována v rozsahu studie.

Odevzdány budou následující výkresy:

Půdorysy typických podlaží
Řezy
Pohledy
Princip konstrukčního řešení
Vizualizace

4/ seznam dalších dohodnutých částí projektu (model)

Model v měřítku dle dohody s vedoucím DP.

Datum a podpis studenta 17.9.2024

Datum a podpis vedoucího DP 16-9-2024

Datum a podpis děkana FA ČVUT **registrováno studijním oddělením dne** 16. 9. 2024

ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE
FAKULTA ARCHITEKTURY

AUTOR, DIPLOMANT: Pavel Svoboda
AR 2024/2025, ZS

NÁZEV DIPLOMOVÉ PRÁCE:
(ČJ) SHINJUKU ZEN HEIGHTS

(AJ) SHINJUKU ZEN HEIGHTS

JAZYK PRÁCE: ANGLICKÝ

Vedoucí práce:	**prof. Dr. Henri Hubertus Achten** **Ústav: 15116 – Ústav modelového projektování**
Oponent práce:	Ing. arch. Pavel Hladík, MA, Ph.D.
Klíčová slova (česká):	Japonsko, výšková budova, polyfunkční budova, šikmá fasáda
Anotace (česká):	Tento diplomní projekt prezentuje design mixed-use výškové budovy umístěné před vlakovým nádražím Shinjuku ve městě Tokyo. Návrh má 4 podzemní podlaží, nadzemních podlaží je v soklové části 8 a v části věže 42. V budově je navržen prostor pro parkování, retail, spa, kanceláře, restaurace a hotel. Budova je obohace na o přístupnou terasu a střešní bazén. Budova je opatřena sešikmenou fasádou pro redukci přehřívání budovy.
Anotace (anglická):	This diploma project presents the design of a mixed-use high-rise building located in front of Shinjuku Station in Tokyo. The proposed structure includes 4 underground floors, 8 podium floors, and 42 tower floors. The building features spaces for parking, retail, a spa, offices, restaurants, and a hotel. It also incorporates an accessible terrace and a rooftop pool. The building is designed with a sloped facade to reduce heat gain.

Prohlášení autora

Prohlašuji, že jsem předloženou diplomovou práci vypracoval samostatně a že jsem uvedl veškeré použité informační zdroje v souladu s „Metodickým pokynem o etické přípravě vysokoškolských závěrečných prací."

V Praze dne
10.1.2025

podpis autora-diplomanta