

PROJECT SPECIFICATIONS
The project requirements concern the design of a multifunctional high-rise building with a minimum height of 160 m in Eindhoven, in the Central Business District of the city, where other medium height buildings host mainly office facilities and commercial activities.

The project site is characterized by the passing through of the railway that constitutes a strong division between two parts of the city: the rail wing crosses the city dividing almost in the middle and separating what's surviving of the historical center which hosts nowadays the commercial part of the city, and the former industrial district, where Philips originally placed its productive center and where today several companies have set their business.
The two parts of the cities are connected, however, by a dense network of tunnels, both pedestrian and driveways, that in some cases host commercial activities.

The location of the project is in the northern part of the railway, in the 't Shimmet district, where there is the present Beurstegebouw, a convention center and multi-purpose space that is actually located on the site where the project is meant to be developed. Nearby there is an existing pedestrian tunnel underneath the train tracks that connects the construction site with the Piazza and the former commercial center. Piazza is a commercial center located in the main city square, where the commercial and tourist roads of the city converge. Here the shops continue in the tunnel and therefore in the pedestrian street that run along the project site.

Because of its location in the city center and the present surrounding buildings, high-rise development is desired in the site. The project should consist therefore of a gross floor area of 35.000-45.000 mcq.

The lot is adjacent to another building with office facilities distributed in three blocks joined at the basement by the parking garage. The commercial pedestrian street separates the two and is connected to the network of roads surrounding the buildings. The railway is really near to the lot and constitutes a visual and concrete barrier. Just crossing the adjacent tunnel, the bus terminal, the train station and the bicycles parking can be easily reached.



The analysis of the context evidenced the complexity of the circulation system in the location of the project. The lot is surrounded by large pedestrian and cycle routes, without the disturbance of the traffic letting people walk around the shopping areas.
The car paths are, instead, realized on a higher level confronted with the pedestrian ones: all the roads are elevated 4-5 meters above the ground level, and are passed through by the tunnels for bicycles and people. On a level even higher there is the railroad: where the rails run, the driveways go back to the ground and go through tunnels underneath the railway.

The lower levels are, consequently, dedicated to all those activities open to the public (the shopping center, the gym, the restaurant) surrounded by the square that echoes the near Piazza and works as a buffer zone between the building and the railway.

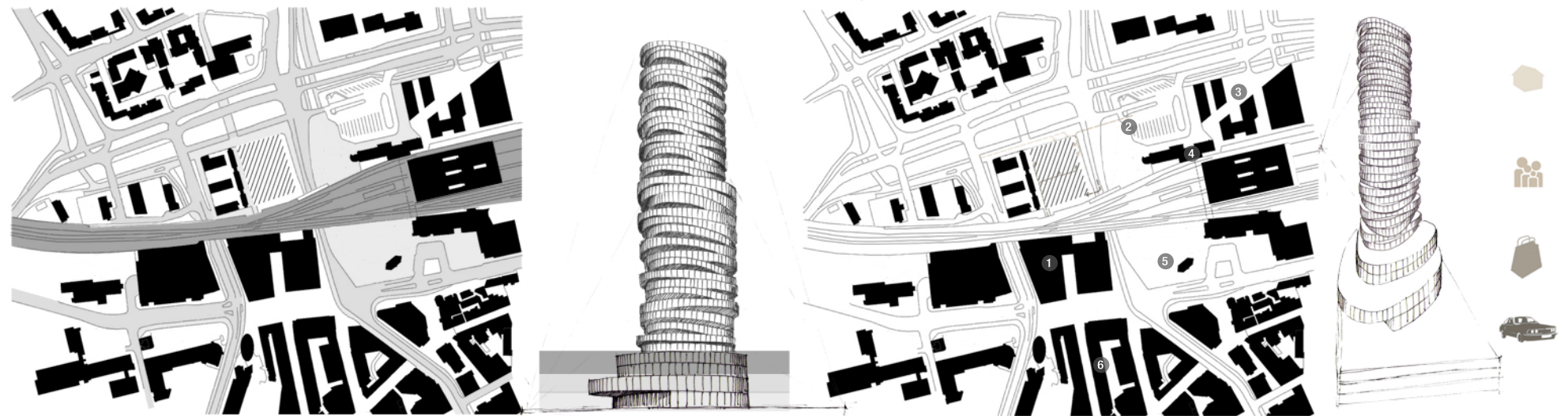
On the upper parts, the offices are located above the level of the car and the train traffic. In order to work again as a buffer body for the residential part, which is located at the highest levels in order to result protected by the noise and to have granted privacy and quiet, also assured by the relevant height of the building.

The entrance of the parking is located in the South-West part of the area, where the driveway drop to the ground level and is therefore connected to the lot, in order to leave free from the traffic the pedestrian and cycle paths that surround the site.

The project is developed, according to the requirements, with a 3-level parking under the ground level, able to host the vehicles of resident and working people. The building is meant to be a mixed-use building hosting both residential, office and commercial facilities.

The first four levels are dedicated to the shopping facilities: this is the public part of the project that preserves the commercial vocation of the former street side and continues the commercial path that starts from Catharijneplein. Together with the shops other public functions are here based, such as a gym at the third level and a panoramic restaurant at the fourth.

The first levels are freely accessible to the public since their space is separated from the access and the services of the offices and of the residential floors. The access to this area is connected and made a whole with the before square, developed together with the project in order to make easily accessible and recognizable the commercial public area of the building: this is left free from the building in order to create a "welcome zone" for the public coming from Piazza commercial center and this constitutes a gateway to the shopping center of the building. The access to the latter is fluid with the open space and can be closed/maintained open according to the season, creating in summer a pleasant covered open space.

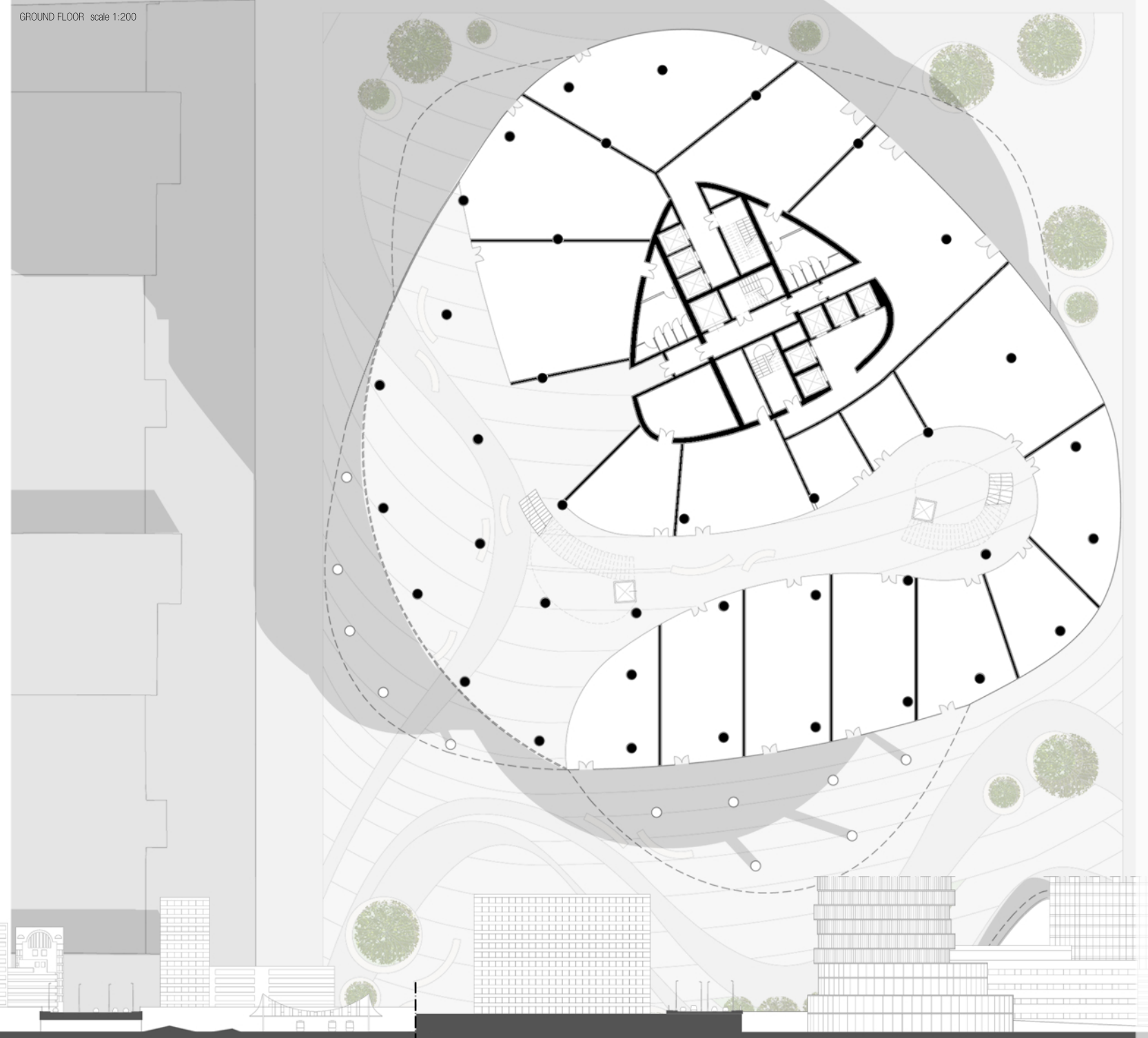


A NEW SKYSCRAPER FOR EINDHOVEN
DESIGN APPROACHES TO FORMAL DEFINITION

UNIVERSITÀ POLITECNICA DI MILANO
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Degree in Architecture (P.L. ENG.)

Masters Degree Thesis of **LUCIA D'AMATO** ID 703331
Supervisor: Prof. Andrea ROLANDO Politecnico di Milano
Assistant Supervisor: Prof. Mario SASSONE Politecnico di Torino

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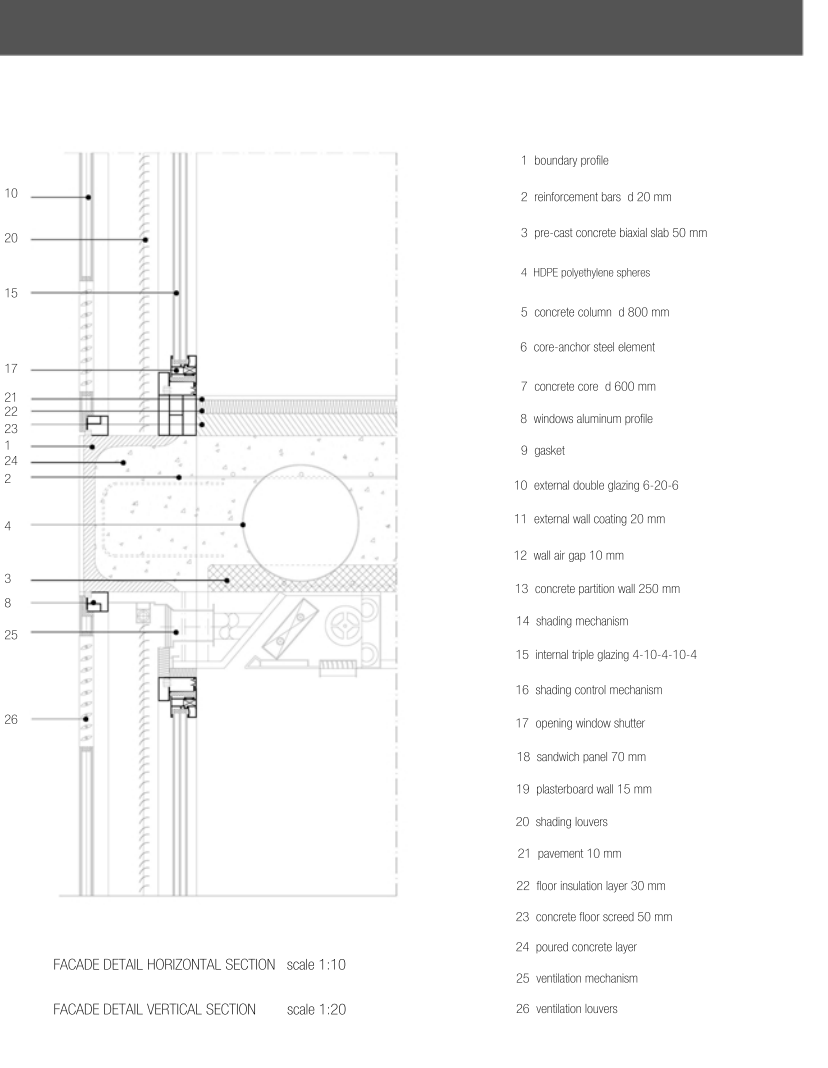
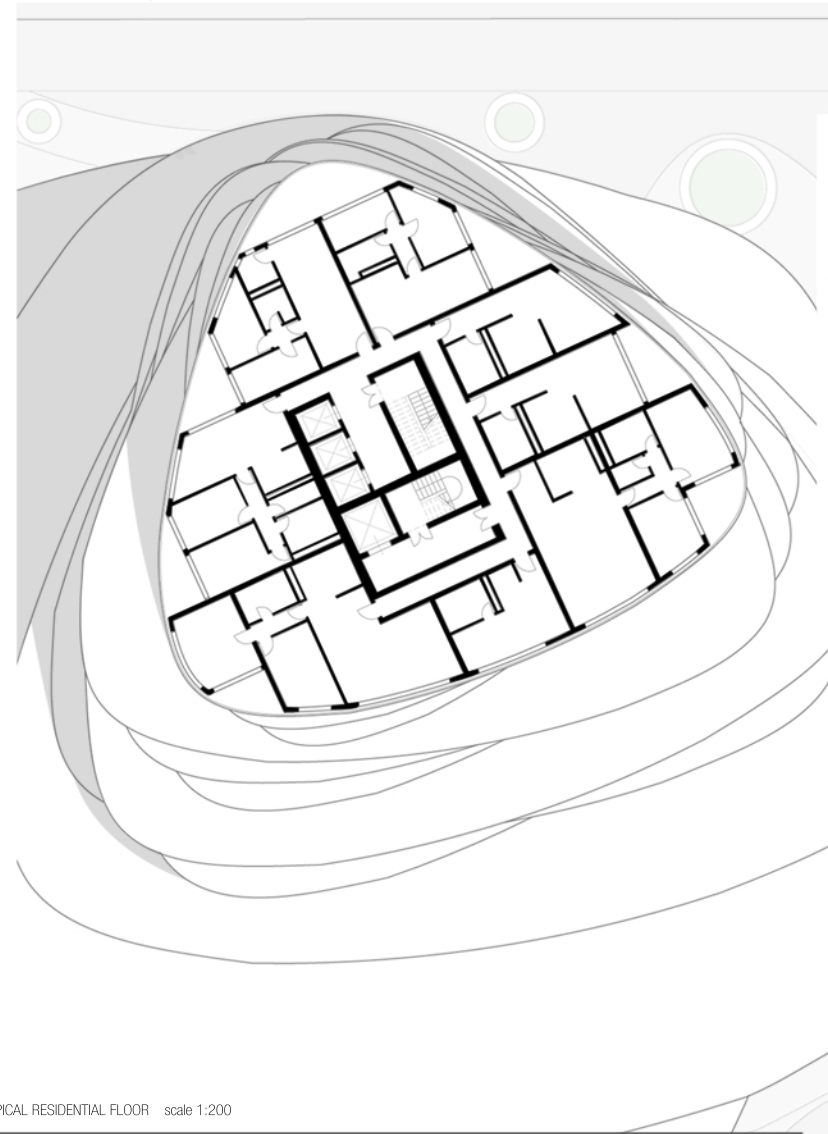
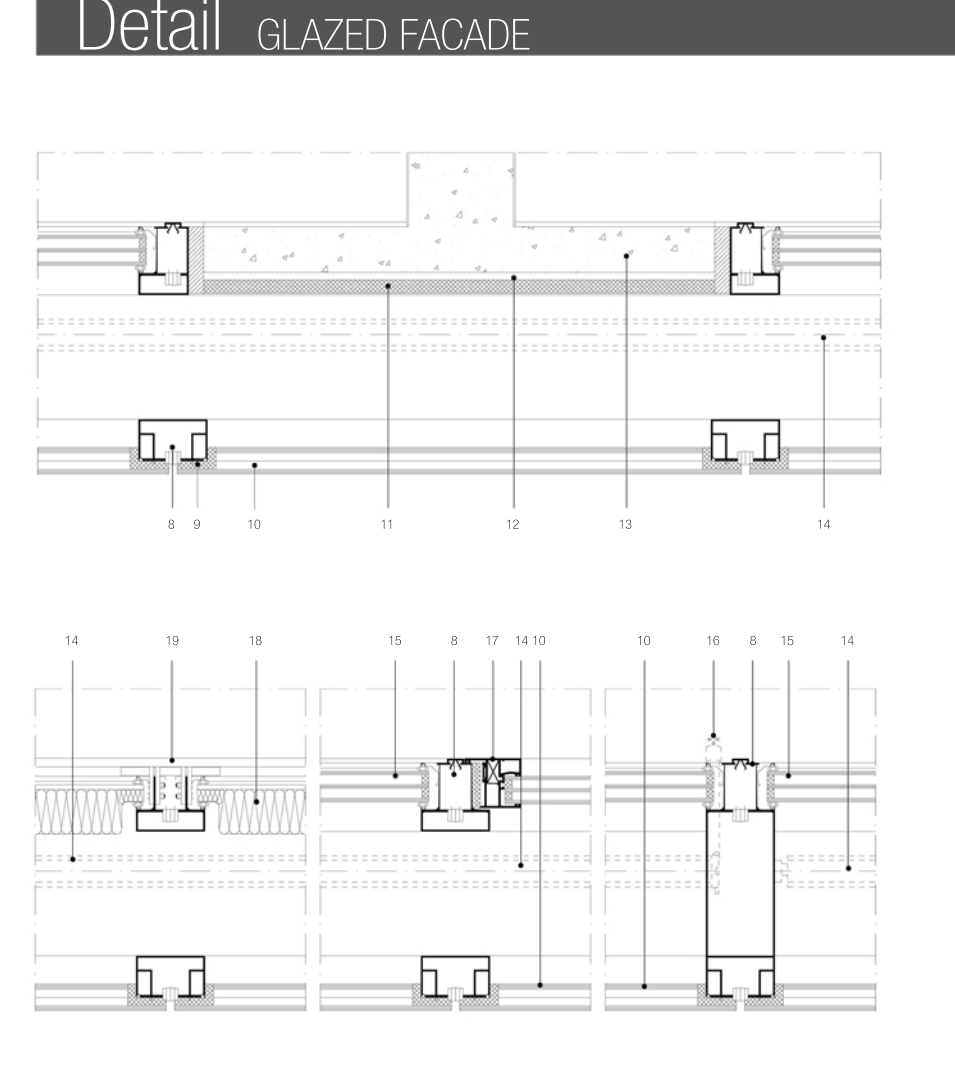
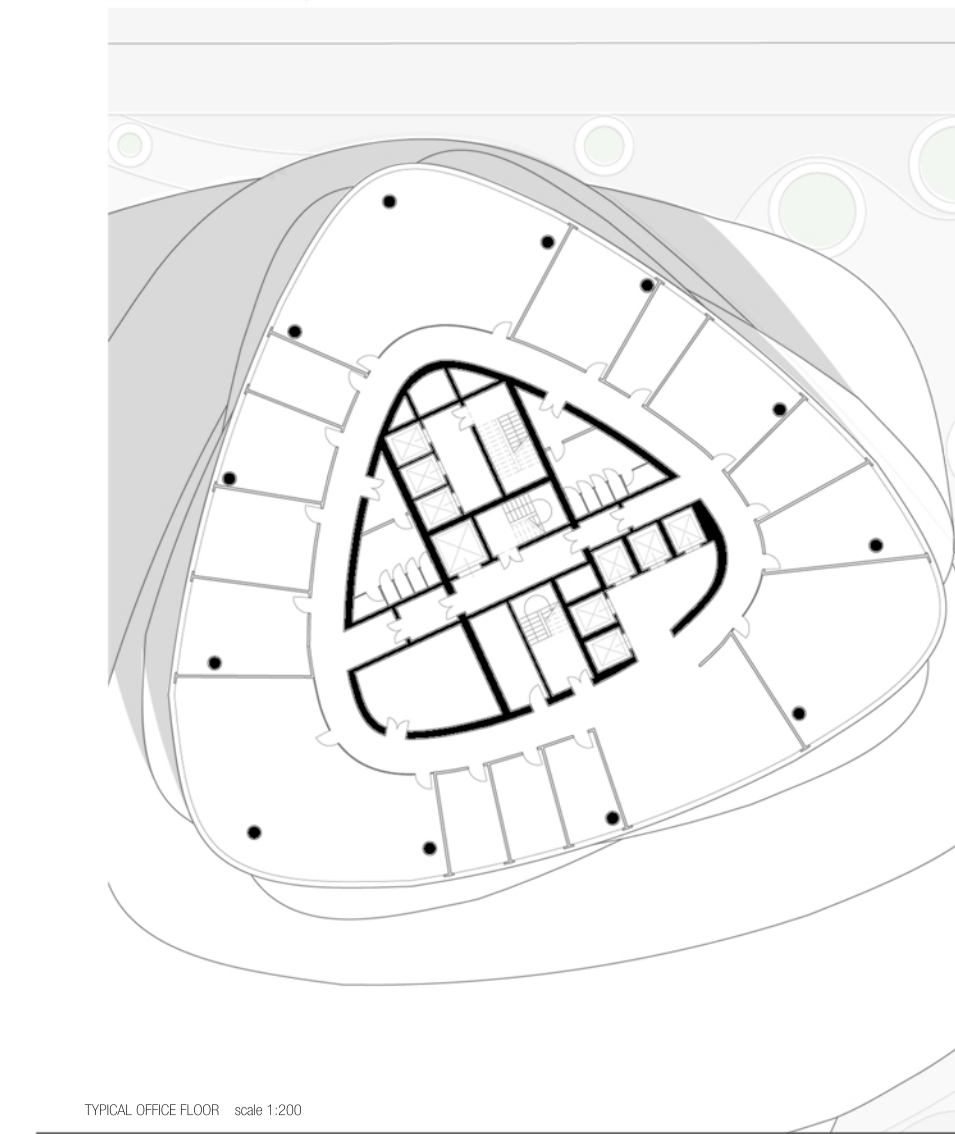
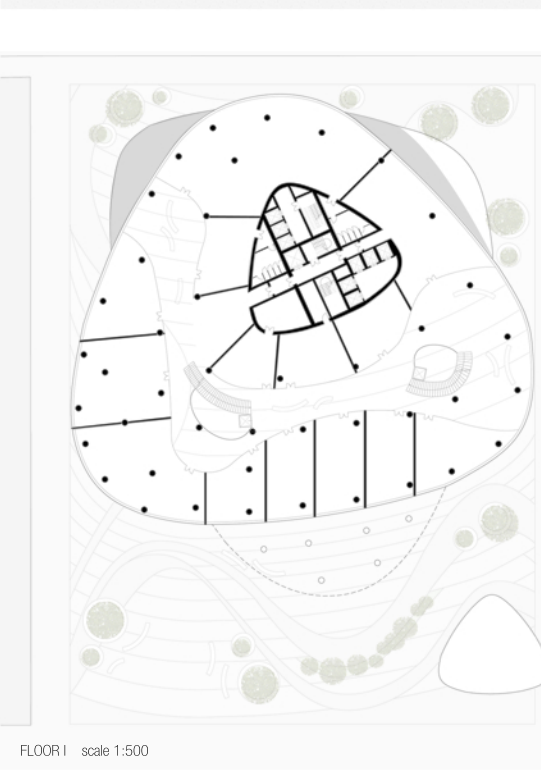
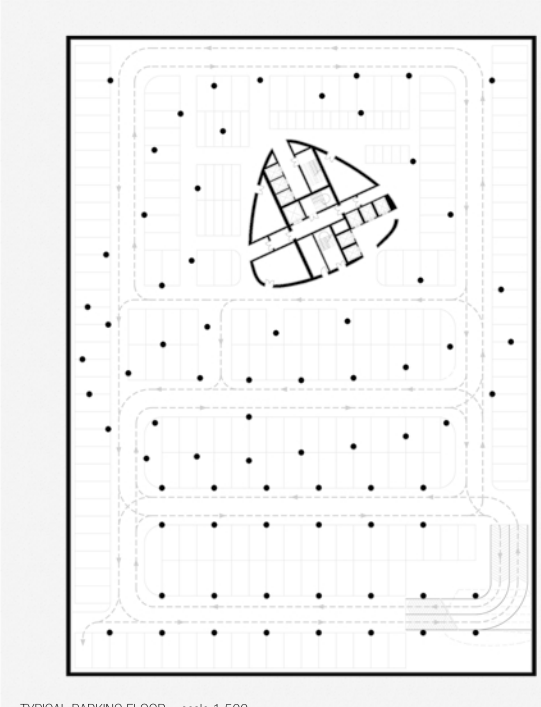
The 18 levels above the first four are occupied by offices, which have an independent distribution system, as outlined before, as well as an independent entrance, in the North-West side of the building. The choice of placing in this wing of the lower the entrance of the office part, as well as of the residential, as will be later discussed, is first mainly to working people needs. In fact most of the people that would use the building would use as well public transport to come to their job place. For those coming by car the underneath parking provide a direct access to the lifts and the stairs that connect all the floors, while for those using public transportation means, the recognition of the access is facilitated by the location of the entrance that faces the tunnel connecting the project site with the near bus and train station. Coming from this area, where also a big bike parking is provided, the access is immediately visible and accessible.

Near to the office entrance the apartments' entrance is located, for the same reasons, to which that of the privacy from the commercial/public part of the site is added: the residential floors are located at the last 18 levels of the buildings and their distribution system is again separated from that of the office part of the building.

The underground is exploited for the realization of the parking spots with a three levels parking space, also useful to reach the solid ground for foundations placing. The considerations about the parking are of fundamental importance because of the huge designed construction.

Limiting the traffic flow increasing by encouraging the use of alternative ways of moving, not only by the nearness to the public transportation stops, but also by organizing the lot accesses according to the main walking people flows, is meant to significantly reduce the number of cars that need to be hosted for parking. The designed parking as an area that cover the entire lot in order to bring the advantage, where geological limits does not exist preventing the exploitation of underground spaces (some considerations will be done in the foundation dimensioning paragraph), of being sufficiently large to bear the tension stresses caused by wind along the building's height. The foundations have been therefore exploited to create some underground parking levels to host conveniently almost all the cars belonging to permanent users of the building.

The choice about the distribution of the functions in the vertical direction, with the subdivision of the building in three parts, a public basement, a semi-private central body and a private crown, has been driven by the context: the presence of the railway and of the elevated roads creates, in fact, a barrier that imposes to rise over a certain level in order to be protected by the noise created by the train passage.



Formal definition WIND LOAD

The choice concerning the shape of the building and the triangular form of the same is derived from considerations about the wind forces that acts on the same building. As visible from the graph, the project area is interested by windy phenomena with a prevalent direction: since wind blows mainly and with the greatest force from South-West, the choice about the orientation of the building, freely positioned according to the surrounding fabric, is mainly influenced by considerations about the possibility of having a "strong side" of the triangular shape toward the main wind direction. The chart shows the variance of the wind direction and strength during the year in Eindhoven: the red shape individuates the percentage of the distribution of the area in which the wind forces acts more and vary during the period of time taken into consideration.

Considerations about the wind effect and its direction have been taken into account in order to conciliate the form of the building. The shape of the floors derives from geometrical considerations upon the stiffness of the triangular form and the advantages that it brings according to the wind direction. Placing the triangular form with one of its angles toward the windward side of the building, the project is meant to expose less plain surface as possible to the direct wind blowing. This proposal has the aim of reducing the stress on the facade that would be caused by the wind blowing on a perpendicular surface. Placing the triangle vertex toward this direction, that, as evident from the graph, is the South-West direction, as the aim, then, to "break" the direct wind flow. Moreover, the underformability of the triangle should assure that the wind effect on the building wouldn't act negatively on the facades causing undesired stresses on the glazed envelope.

