Extension of the Wilson railway station in Prague:
Administration and service buildings for the Czech Railways

by
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Nikos Tornikidis, Department of Architecture
May 7, 1993

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Thesis Supervisor

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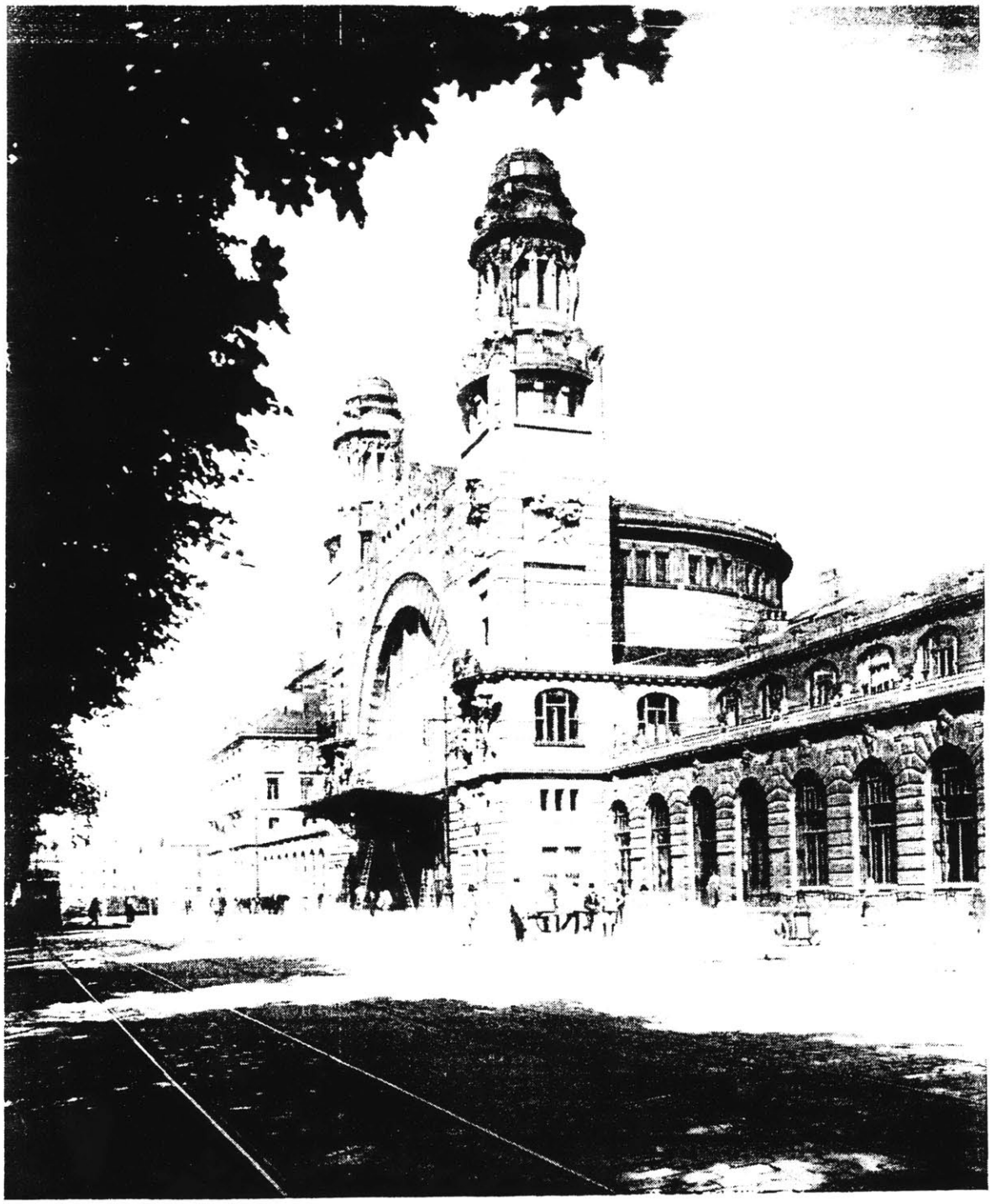
Chairman, Department Committee on Graduate Students

Contents:



Oldrich Karasek:
Praha v Promenach Svetla
Pragensia. Praha 1984

Fant's building during 1920

Prague today

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by
Nikos Tornikidis

Submitted to the Department of Architecture on May 7, 1993
in partial fulfillment of the requirements for the Degree of
Master of Architecture

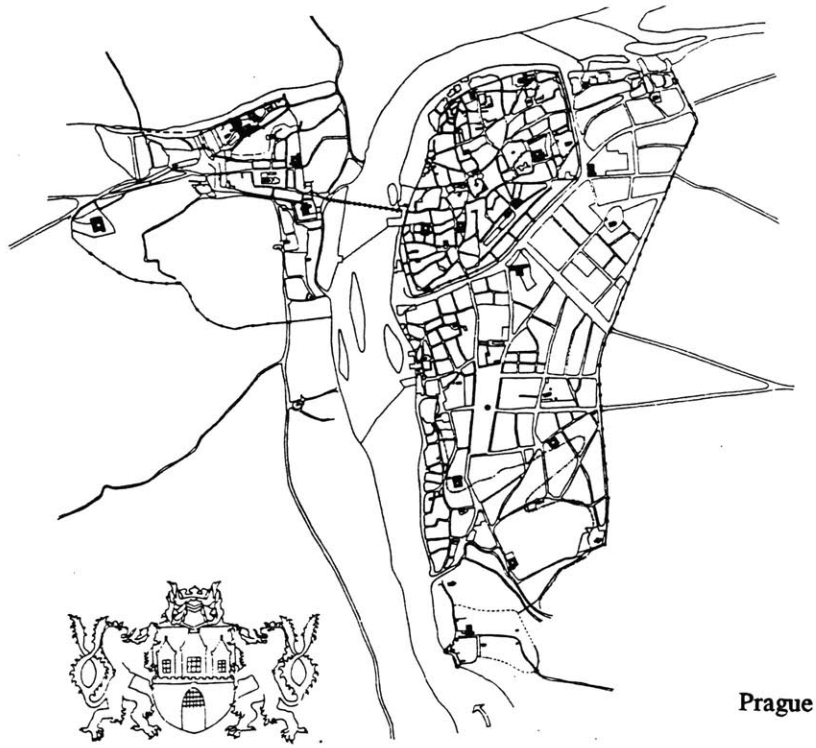
Thesis Abstract:

The project of the following design thesis attempted to address some Industrial Design issues (or in this particular case with the design in a semi-industrial environment - railway station) and how such an approach can be incorporated into a city tissue which follows a different pattern of behavior, formally and functionally. An isue that could be looked upon is how the two different, but in this case related, functional areas could coexist, making a railway station part of a city, as it was until the beginning of the 20th century when the notion of mass production was introduced. There are, however, two ways the problem of connecting the two separate entities can be looked upon, which are also identical with the two parts that could be followed when attempting to find a solution.

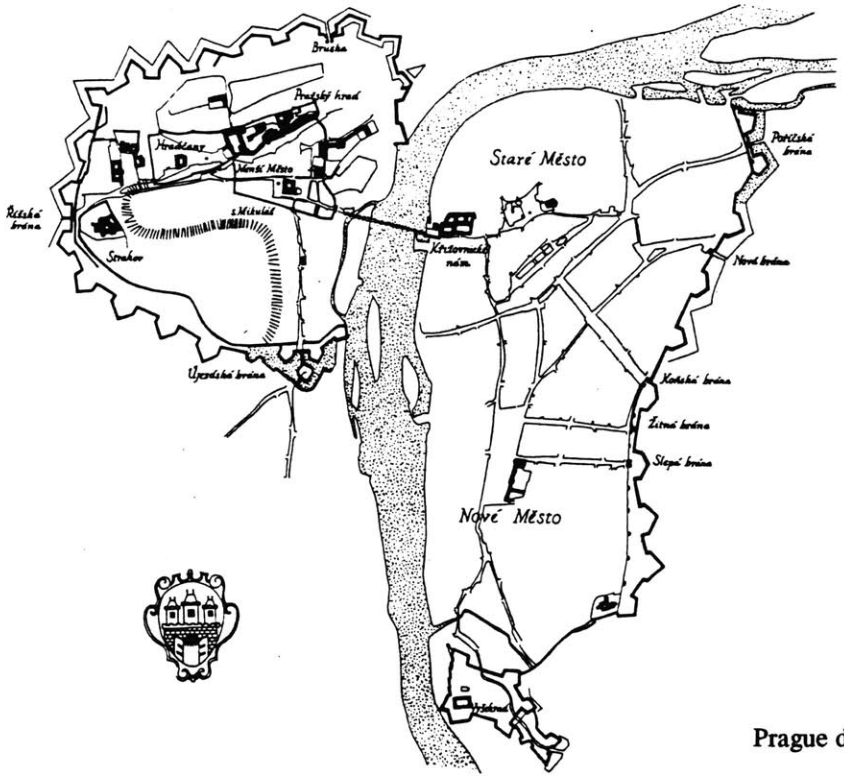
The first part, which is the part attempted to be solved in this project, has to do with the internal problems of the site (station area), how these problems are identified accordingly to the impact the city has on the site, and what solutions can be proposed in order the station to function more as a part of the city than as an entity of its own. After the completion of the first part, the second part of the problem should examine what impact the proposed intervention should have on the city itself, in order an exchange region to be created between the two entities. It should be added, however, that the two aspects can not be considered separately, and therefore when working on any of the two aspects one should consider the implications his or her decision will have on the following actions.

The production process started from manufacture production in the 19th century, when railway stations were a part of cities, played major role in their development , and for the most part were also constructed. After the Second World War railway stations become "servants" of the adopted mass production process, based on scale economies and resource allocation. Their scale changes and the behavior towards the cities that by then surrounded them had become more alien. After the 1980s, however, the new concepts of lean production, flexibility and differentiation brought back some of the characteristic of the manufacture era. Those characteristics are smaller, diversified facilities, tightly related to a particular region and easily adaptable to changes in the environment.

Thesis Supervisor: Maurice Smith
Title: Professor of Architecture



Prague during the 14th century



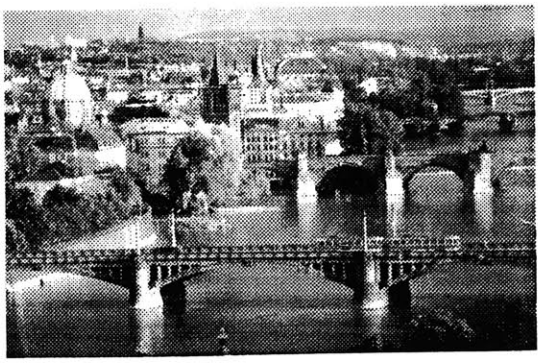
Prague during the 17th century

Background and Context:

Prague was the name of the site along both banks of the river Vltava, where during the Romanesque era three major towns developed. These were the Old Town, the Small Site and the New Town of Prague founded by Charles IV in 1348.

The three cities were surrounded by a stone medieval wall that was demolished later in the 16th century and substituted by a heavy Baroque fortification. The three cities had been developing inside their walls until the second half of the 19th century, when under the pressure of industrial expansion and housing development outside the walls and due to the changing political situation the fortification was demolished.

The main railway station of Prague, named then Francz Josef's was built just outside the line of the former Baroque fortification, on the east side of Prague during the late 19th century. However, during the first decade of the 20th century, on the site of the older -and by then inadequate station a new, Art Noveau building was constructed with an adjacent double arch steel shed, so characteristic of the newly emerging architectural style. The new station, originally named Wilson's, then Main, and today again Wilson's Station was up until the eighties the main railway connection of the city, serving primarily international traffic .



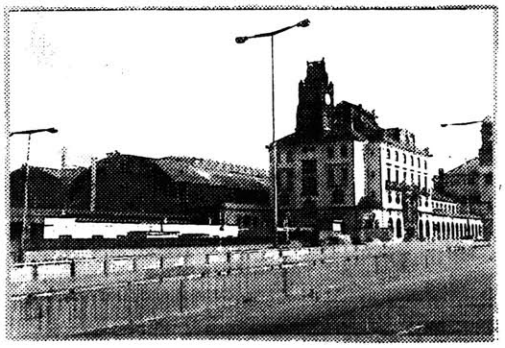
Prague

Fant's building today

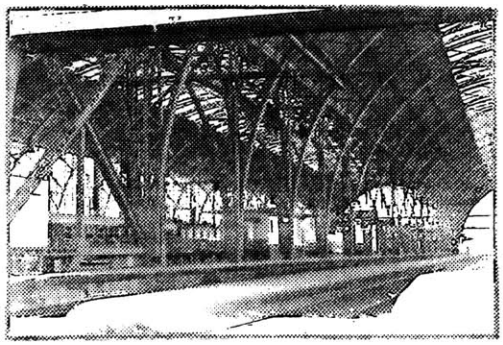
The double arch steel shed

Nowadays the station is entirely surrounded by the city. The existence of many other stations in Prague, and the geographic features of the site where the station is located, have helped to keep the scale and the territory of the whole complex much below the magnitude of other European stations of the same period.

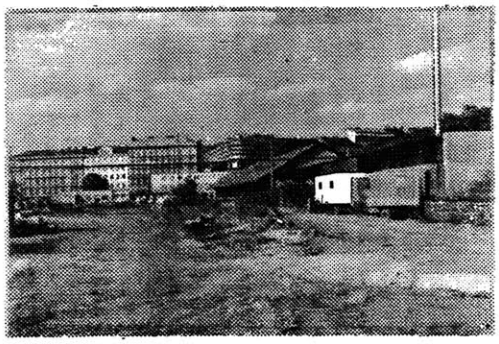
Today however, 80 years after the station started functioning in its current appearance, the decision has been made to increase its capacity from four to seven platforms. Since the station can not expand, not so much because of the city that surrounds it, but mainly due to the geografic characteristic of the site that very precisely determines its limits, the only remaining solution is to exploit the given site. This made it necessary to demolish existing structures on the station's east side that had sheltered most of its service functions. Furthermore, other adaptions on the premises of the station as well as on the historical Fant's building (the main Art Noveau building of the station 1901-09) created the need for a new service and administration space. In addition to the functions required by the station there is also a possibility of constructing other buildings, primarily for commercial use.



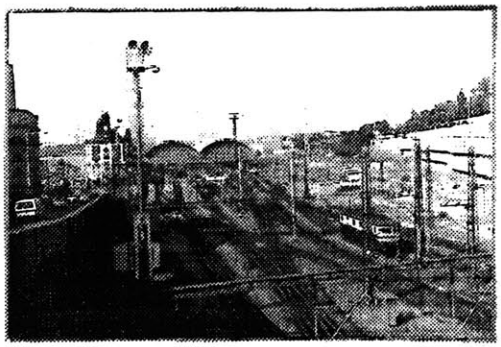
Fant's building from the north



The steel shed



The building site, looking north-east



The station from the south

Program:

The principle content of my thesis is, therefore, to design an extension to the existing facilities of the station, providing the required Service and Administration buildings for the Czech Railroads at the Wilson Station of Prague. The required buildings, however, will be only a part of a larger proposal which will have as an aim to establish within the given site an intermediate zone between the city and the station by allowing functions unrelated to the station itself to be situated there.

The functional requirements will be used only as a general guidelines since this project is more focused on the urban scale rather than on the scale of a particular building. They will be used for the identification of the place each building should be located and the scale of the building itself.

The general functional requirements as provided by the Authority of Railroad Constructions in Prague can be divided in four general groups:

1. Railway platforms:

- Three additional railway platforms.

2. Machiery:

- Space for the stations' electricity powered transportation trucks, their mainteneance, service and storage rooms.
- Space for the cleaning machine, lifting machine, two small trucks and a drezin.

3. General services:

- Workshops for individual services, their dressing rooms and bath rooms.
- Storage rooms.

4. Other:

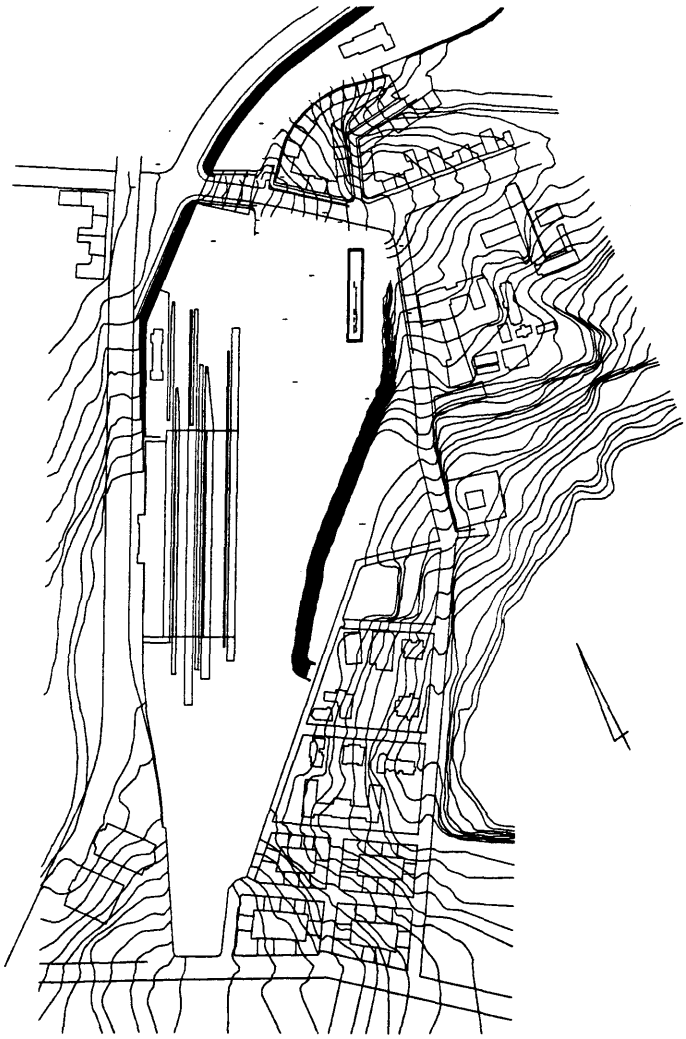
- Restaurant (300 patrons per day),
- Overnight bedrooms for the train crews (60 guests per day),
- Medical facilities (100 patiens per day)

Methodology:

Generally, the strategy for resolving a particular problem may be either predetermined or emergent. In the past, predetermined strategies tried to solve problems by quantifying product parameters and predetermining the solving process. One might say, they were both successful (with regards to the environment and conditions they were applied) and not successful (with regards to the generalization they persistently followed and their inability to adapt to shifts in existing parameters). On the other hand, the emergent strategies (or the flexible ones) allow for adjustment of the process to the required product, whose characteristics are therefore determined by the environment in which it will be positioned. The emergent strategies do not standardize each product on the basis of some general and arbitrary specifications derived from an average which was obtained from a set of different observations. Rather, they start from each particular problem and try to develop processes that will suit each problem.

All the processes of an individual designer will not be different, of course, the basic beliefs of their creators will be present. These are, however, mostly arbitrary or conceptual rules that give the product certain internal consistency rather than rule over its external environment.

Therefore, starting from where the product should be positioned and defining the goals that should be achieved in order to solve existing problems, initial objectives can be formed. Only general rules can be set before the implementation (design) starts and only during the design itself (incrementally) can these be specified further. Formulating a strategy (what) is important, but implementing it (*how*) brings results, which will otherwise stay only as written statements.



The existing situation 1:8500

The general design intention:

The first design decision should be such that the largest possible number of problems identified can be solved with the smallest possible number of moves. Thus, following this procedure and once the general guidelines are established, what remains is the routine work of matching functional requirements of each new function with the prespecified form of the building(s) which will shelter them.
Accordingly, the indentified problems of the site are:

- The connection of the geographically and functionally separated site to the city (it should be noted that each edge of the site requires different treatment as far as the city-station relation is concerned).
- The separation of the two parts of the city by the station occurred as the city was expanding creating a "dead" zone within the city since the station could not be walked across or used for other purposes than transportation .
- The lack of office space in the city, something that requires the maximal possible use of the territory within the given site (the changes of the two last years in the political map of Europe, in addition to the lack of office space increased the cost of office rentals above that of Vienna).

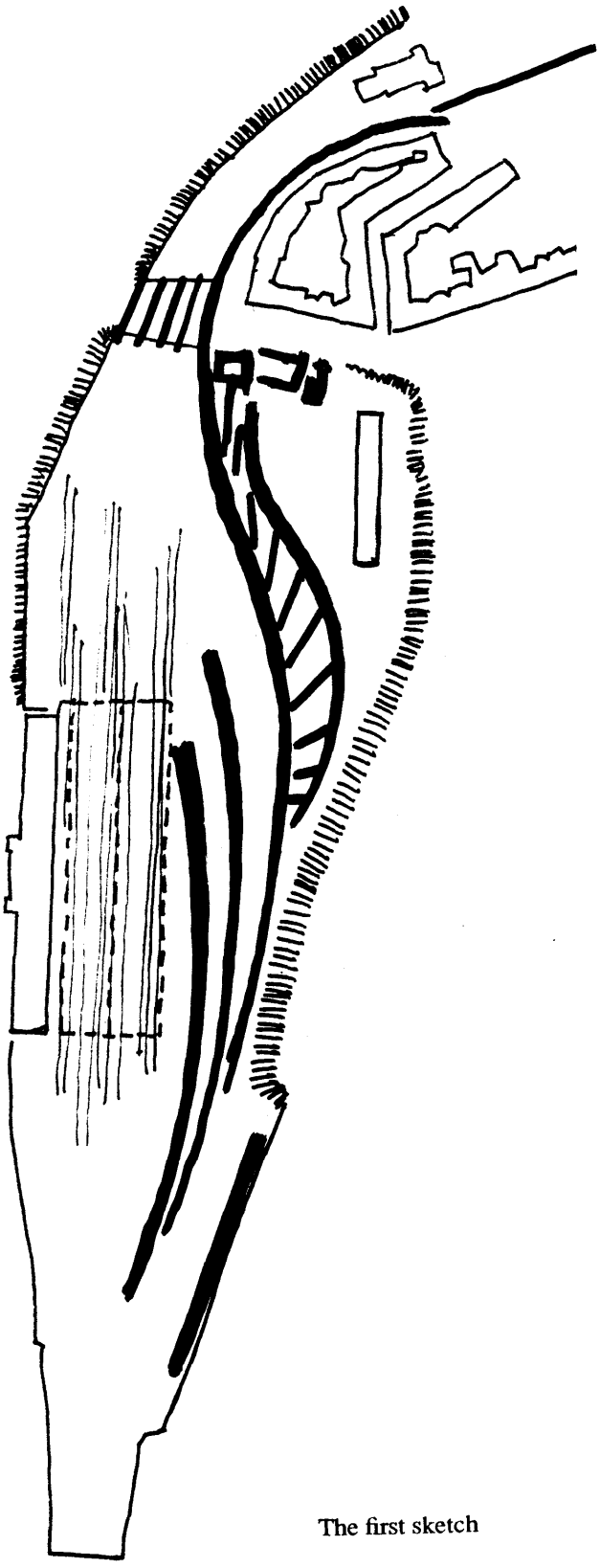
The general idea therefore was to create the so called "shifting muscle", or a set of shifting parts which would generate the diagonal direction across the area of the station, using the available territory more efficiently and connecting the only two points of access to the site, one from the existing station and the other from the street on the north side. In addition, a curve shape is given to the parts so the whole complex will respond more efficiently to the opposing power of the steep hill. Moreover, the edge of the last platform would extend (for example as a red concrete snake) along the rail lines across the bridge into the city. Thus the whole intervention would be enlarged, providing the necessary "dynamism" and to a certain extend a better interaction between the city and the station.

Design objectives:

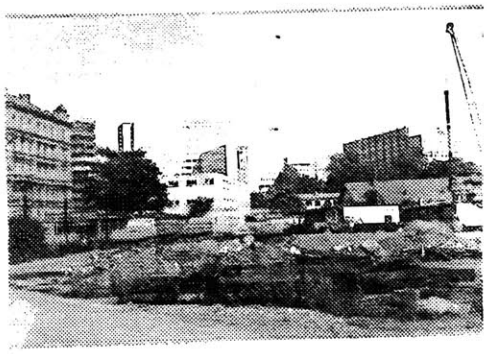
The approach followed by the authorities attempts to solve pieces of the larger problem on the east side of the station separately, (platforms first, service building second, office buildings third...) having as a main target an economic solution. The cost of the solution should however be regarded in the long term rather than the short term, especially when the site will serve mainly one function for an indefinite period of time.

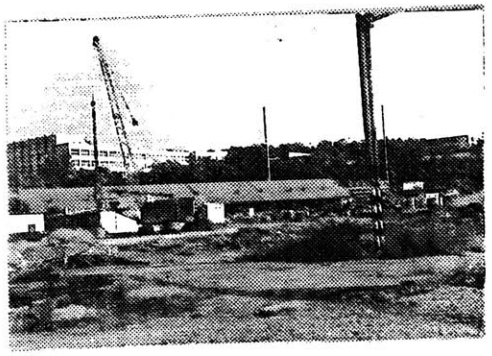
The connection between the site itself and the city, how the buildings making up the site can be understood as something different but related to the city; and how this relation could be displayed more efficiently, are some of the issues to which the design attempted to respond. The design's second goal is the configuration and coordination of the different activities within the site itself, attempting to resolve the internal problems as well as to integrate the site into the city by such means as direction, height, density and function (pg. 18).

As mentioned before, once the major problems are identified, one can start making general decisions about the situation of the buildings. Therefore, in accordance with the first identified problem, an attempt has been made to create as much access to the site from its northern part (the street) as possible (pg. 19, 22). Some may argue that a larger opening may be more suitable than a number of smaller ones, but in a city like Prague with a rich medieval past, the smaller scale and the unexpectedness of a sudden view is more appropriate.



The first sketch





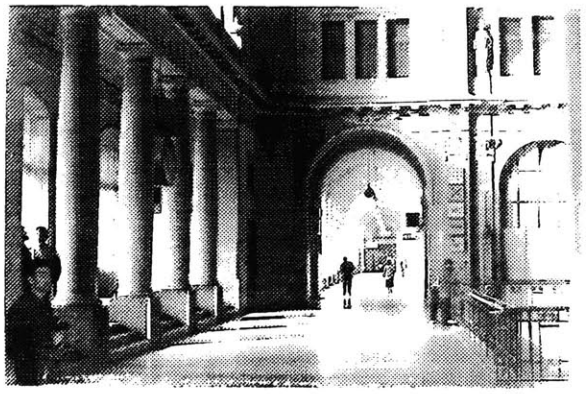
The street site on the north of the station

Smaller buildings are therefore located on a street site, which should shelter activities functionally irrelevant to the station itself. I propose (in accordance with the third problem) office buildings and a hotel on the street corner, since the site is also very close to the city center (pg. 22). The larger buildings, namely the administration (pg. 21) and service buildings (pg. 25), should be located inside the station area, since not only are they more associated with it, but because the need for easy access to them is not as important as for the office buildings. In the plan therefore, the scale of each object can indicate its use.

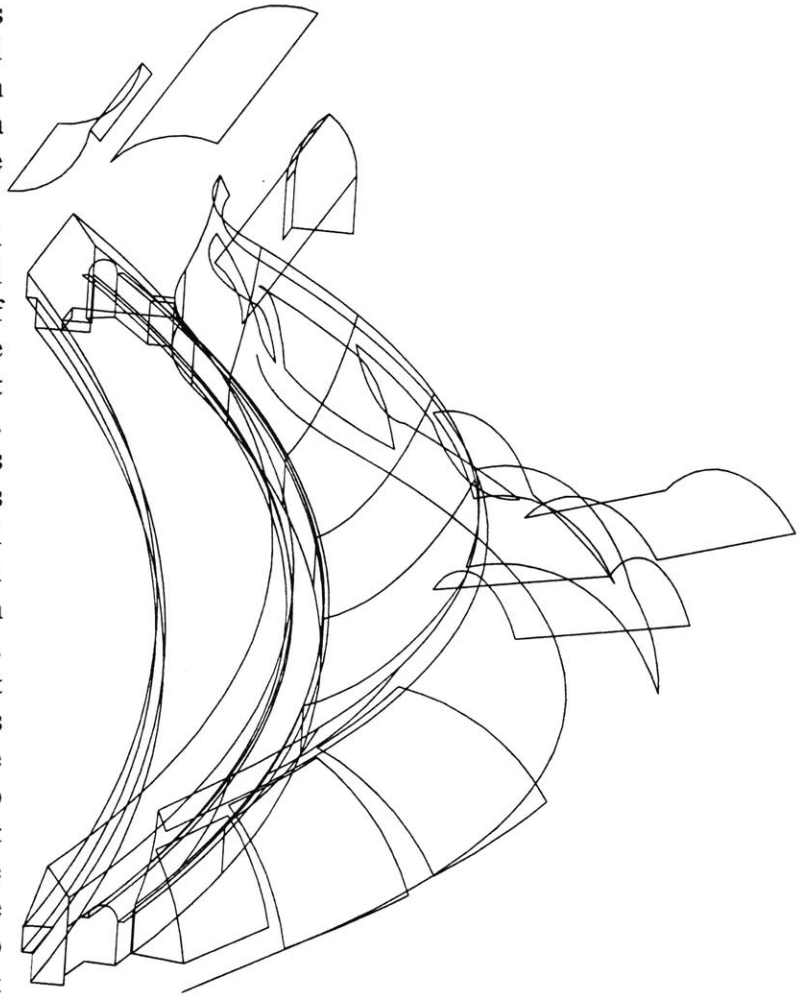
The administration building is located such that it can resolve several minor problems related to the internal relations of the site. It serves as an arrival area for citizens who come from the old station building through the three passages (pg. 20) and who will either take a train or will just continue on their way through the station. It also functions as an office building for the Railroad Authority. It provides the primary functions that a station building should (limited ticketing function, locker facilities, waiting areas, etc.) although these are located in other, pre-existing areas of the station and cover the demand. The decision to add some limited functions of this kind was based on the fact that the number (7) of the platforms is already too large and if someone approaches the station from the south side, he or she would have to go all the way across the station to purchase a ticket and return again if the train is leaving from platform number seven.

By designing the inside of the administration building as a number of separate structures, it is possible to assign each structure (or part) a different function. Thus, the first two parts (pg. 23, 27), nearest to the square and created in the middle of the site, are the public parts of the building, serving several station functions (ticketing, information, etc.). The remaining parts are reserved for administration functions (pg. 23, 24). In addition to the decision to propose the inside as a number of parts, the notion of buildings inside a building is expanded so that the inside parts are opened and remain only as platforms. This creates an internal public space for the "common citizens" that also functions as an intermediate zone between the outside and the inside buildings.

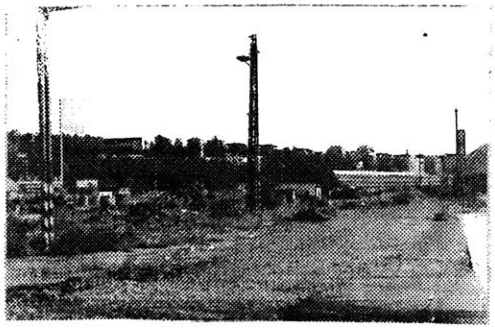
Structurally, the external covering is made of insulated metal sheets lying on segments of arches of the same radius, making it possible for the structure to be assembled out of the same primary part (pg. 31). The structure uses metal tubes as horizontal supports and trusses composed of metal tubes as vertical supports (the reason for using metal tubes is their behavior during tension and compression in all directions). The external building or the skin that surrounds the inside structures is structurally independent of the inside. Thus, we have two independent structural systems that behave in accordance with the formal character of the whole structure and make it possible to arrange for a number of different types of internal organization.



The interior of the Fant's building

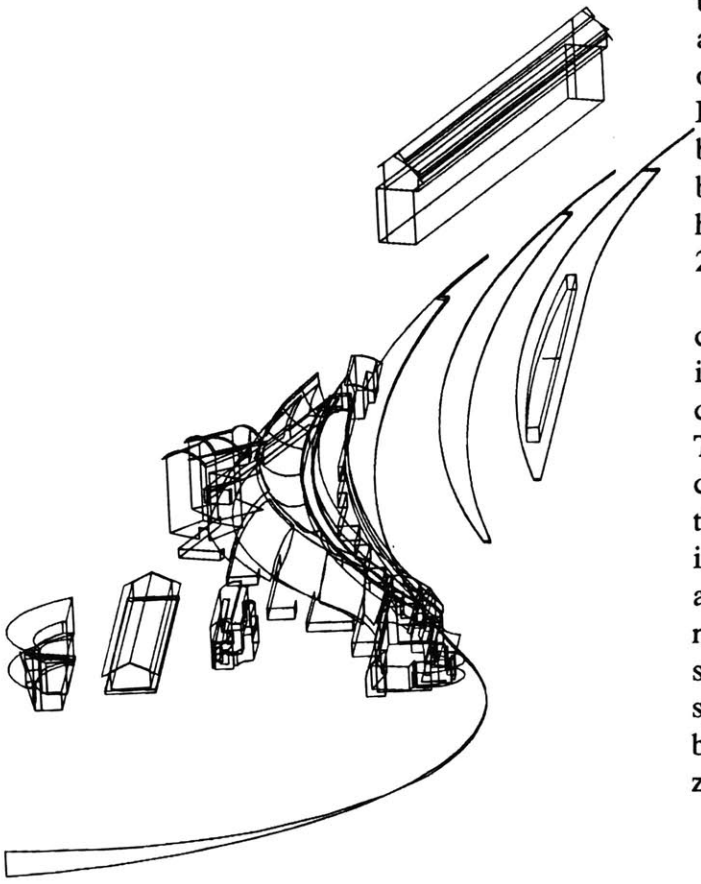


Administration building - covering



The building site from the north with the support wall

The service and machinery building is located at the most difficult place with respect to access. The building is attached to the east side of the station and its structure also serves as a 25 meter high support wall (pg. 29 section E-E). Located near the trucks, it enables easy access to the lower level by the heavy machinery used in the station. This proposition is made, knowing the functional difficulties arising from locating the station's service functions in three vertical layers . However, it must be acknowledged, that by doing so, the otherwise useless space can be exploited for a use which by itself does not provide any revenue for the station as the office buildings on the north side do. In addition to this, on the top of the building (structural wall) a row of buildings can be built, which would have direct access to the street (pg. 25, 26).



In addition to the functional connection of the station to the city, it should be added that a formal connection should also take place. Therefore structures of the same character should be located outside the site itself announcing to the incidental passer-by the existence of a larger whole. The "spilling" of the new buildings inside the city is the same principle as the open public space inside the administration building. It creates an intermediate zone between two separate entities.

Therefore, a reasonable site for such an intervention could be outside the station's main Art Nouveau building on the west side. Here a semi-underground structure is located (pg. 28 section B-B) serving as a main entrance to the station where other functions associated with the station (info., ticketing, restaurants, etc.) are also located. A structure at that place would function as an announcement to someone of what to expect when he or she heads from the old facilities to the proposed east addition. By streching above ground it would also connect the existing inside world with the outside, providing again an intermediate zone and a vertical connection between the street and the building.

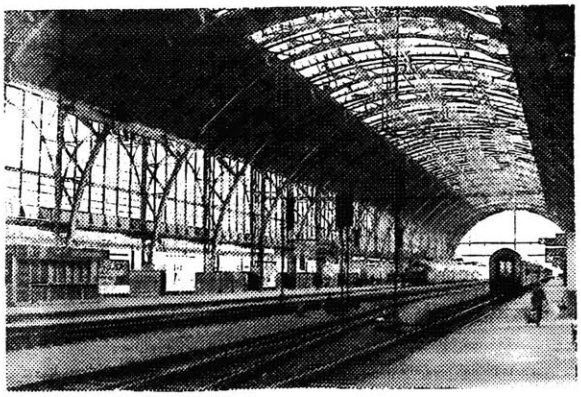
Access:

As access is the major issue in this problem, I would like to describe briefly the proposed solution. As mentioned in a previous section (see pg. 9), a diagonal path across the station is to be created in order to serve travelers and random passers by who use it in order to get from one part of the city to another. Thus, the existing underground passages do not end when they reach the last platform (pg. 20), but lead into the interior of the administration building.

Once arriving there, one can continue either upstairs towards the small square or straight into the double level underground garage located underneath the square. From the garage itself there is a major exit by ramp and staircase directly to the square and a number of exits to each building above it, serving the office space users.

An attempt is also made to allow access to the site from the largest possible number of directions. On the basis of this decision, buildings towards the street at the north side of the station are detached from each another allowing pedestrian access (pg. 19, 22). In addition, a secondary access is proposed from the east side, descending the hill along the last building of the complex (pg. 22). After crossing the rail lines, a pedestrian would arrive at an existing building which would be altered to shelter the remaining functions (restaurant, medical facilities and sleeping facilities for the train crews).

Today's main entrance to the station

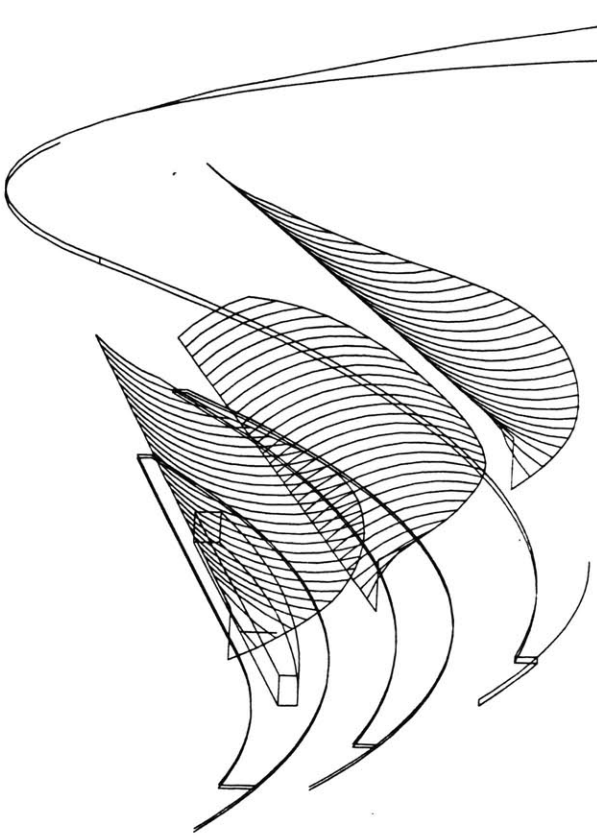


The use of Autocad:

One of the objectives of the project was to explore the use of CAD in architecture and to learn more about its pros and cons. Having a tendency to use quite complicated and curved shapes, I hoped that AUTOCAD would help me with the technical problems that often arise, and would enable a more accurate presentation of the original ideas. Even though, it can not be denied to be true, what has to be said is that the pros and cons when using CAD are equally weighted against each other, and one should be very careful not to be captured by the technology and driven away from conventional thinking.

Even an user accustomed to this media (meaning, that when using it, there is no need to think about commands but can concentrate solely on the design itself), will finally acknowledge that there is still a great difference between this and conventional methods.

Except for the obvious advantages that CAD has, such as accuracy (which can also be a disadvantage), relative ease of data manipulation (ease in making the same change in various drawings), the opportunity to produce different drawings from a single one (developing from a model plans and sections or vice versa), and nteraction between those drawings here are also some advantages.

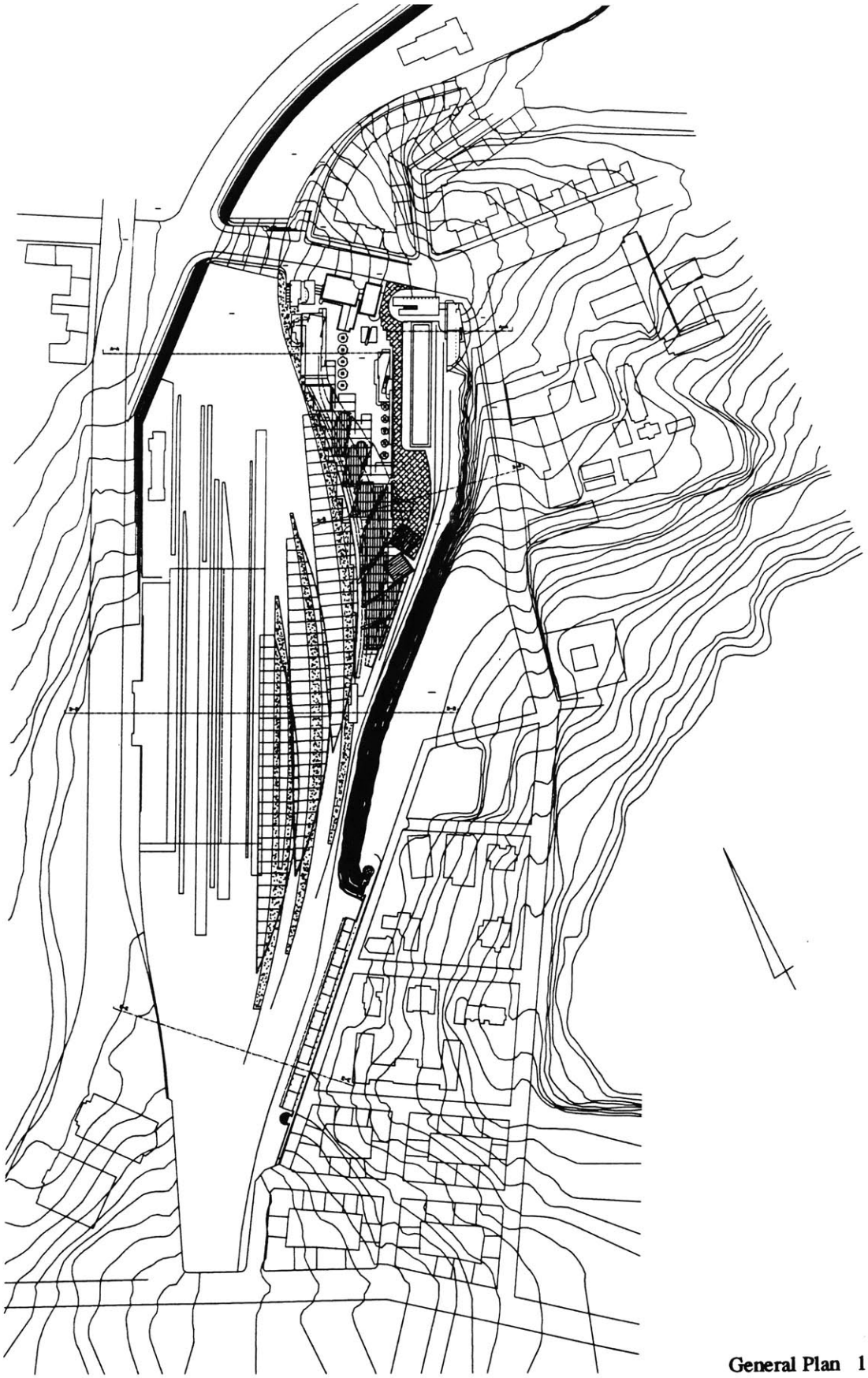


The covering of the new platforms.

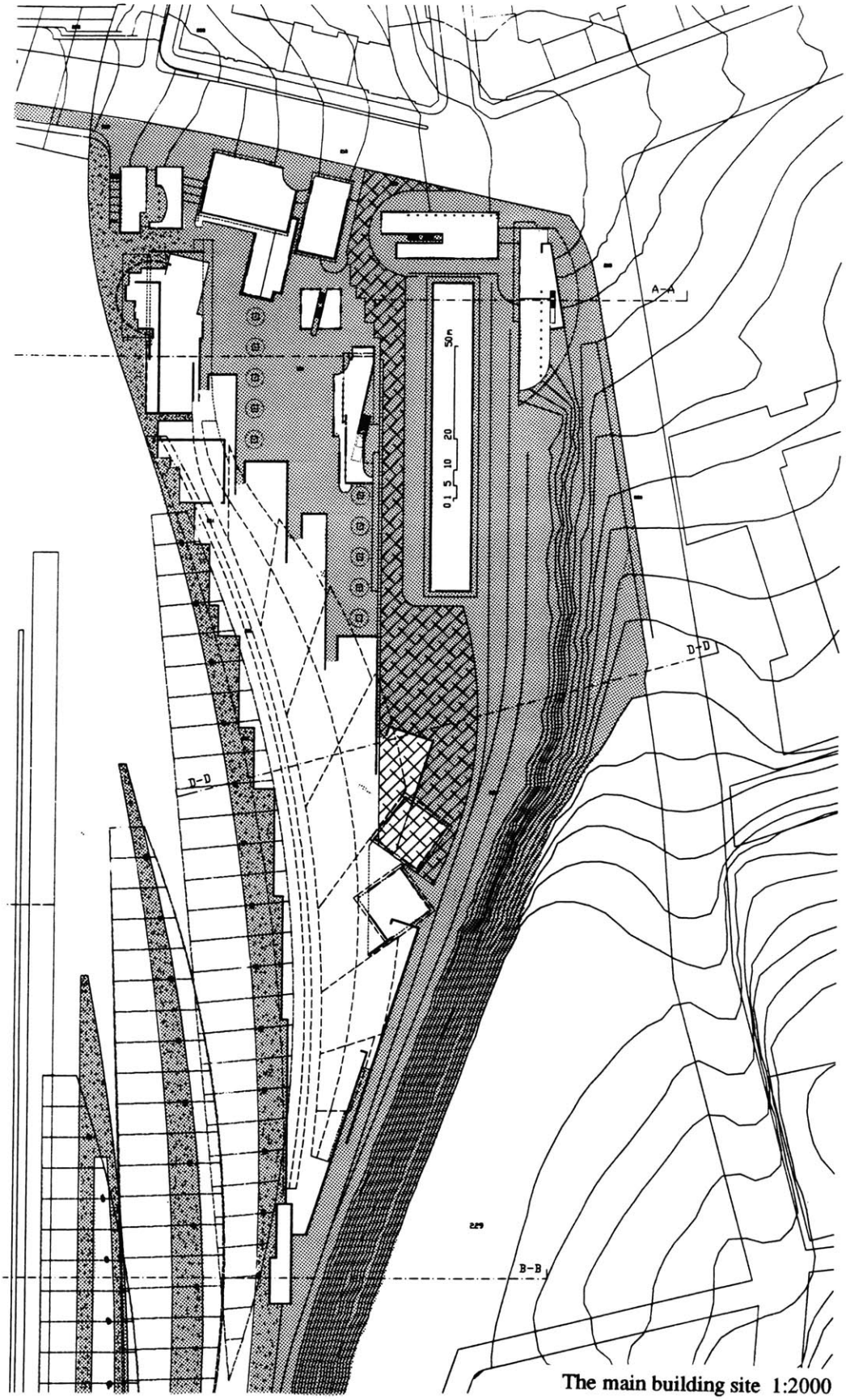
The most significant attribute I have found in CAD is perhaps the way it shows how separate objects and building systems used in design create a whole. Similarly it could be said that its use (even though in a certain sense limited if compared with conventional methods) made me to think much more about the different components of a drawing (or building systems) and their interaction than the conventional methods would. Consequently, primarily designs composed of geometrical forms or those seeking racionalization in design may find an ally in CAD systems .

The disadvantages on the other hand are also significant. So far no scientific invention can be a substitute for human artistic instinct. The use of a pencil for example, on a piece of trace paper provides us with some inherent characteristics of a drawing (differentiation in line thickness, texture, color, brightness, etc.), that contain much more information than any line drawn with electronic media. The time needed to input all the preliminary data in the machine in order to start the actual drawing is often the same as if a set of working models was developed. In addition, during the actual design, while drawing each line, you can think about the entire process and each line has a different meaning depending on what it denotes. When working with a machine, on the other hand, you have to restrict your behavior accordingly to the abilities of the particular machine hence loosing much of the creativity otherwise contained in the design process.

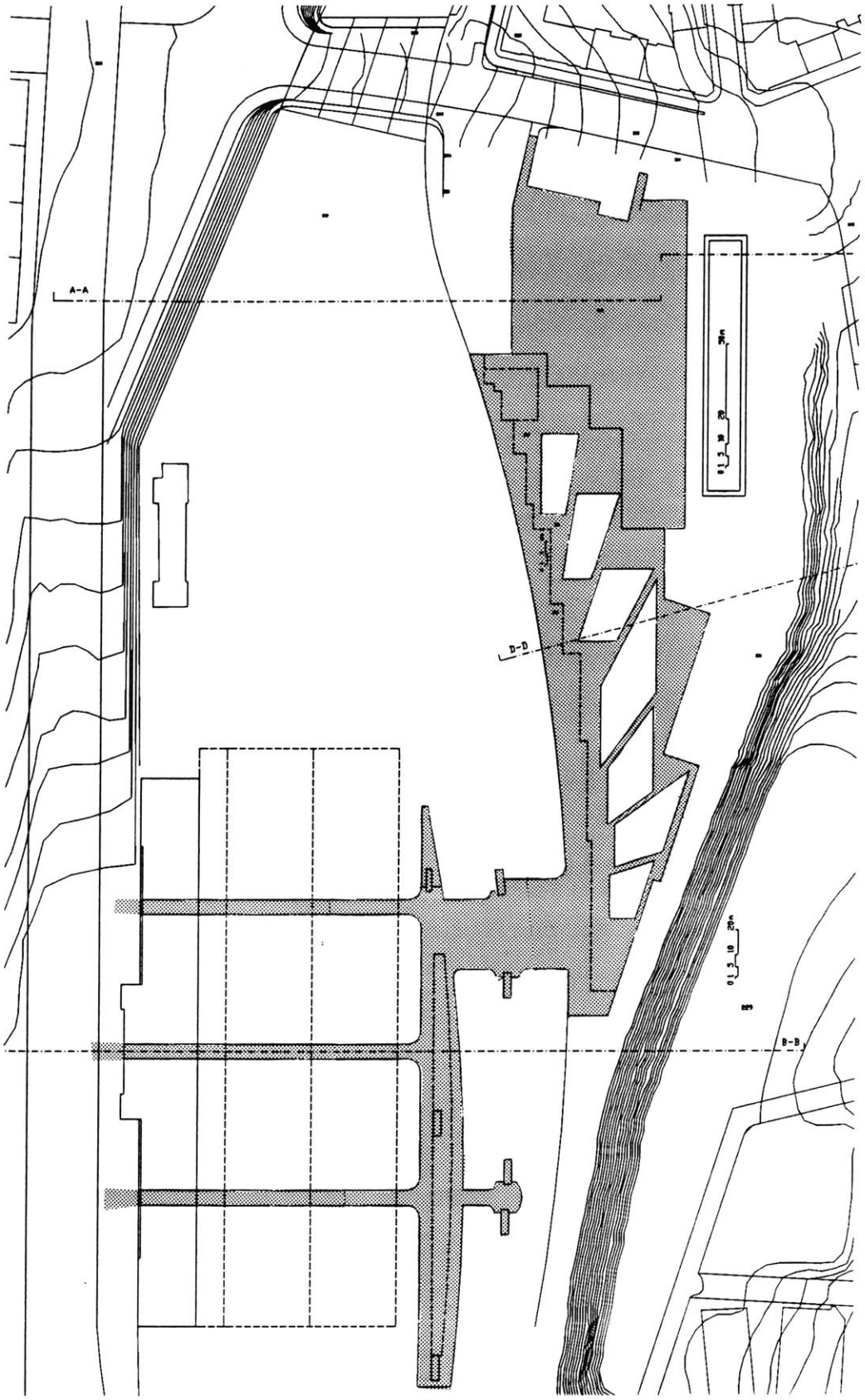
Therefore, in my opinion, even though AUTOCAD is a useful tool it should be used with caution and only as a tool. One should always start with conventional methods and use them until all the significant design decisions are made. AUTOCAD can be then used, primarily to record data so minor changes can be made in the future and other means of presentation of a particular work (such as animation) may be explored.



General Plan 1:5000

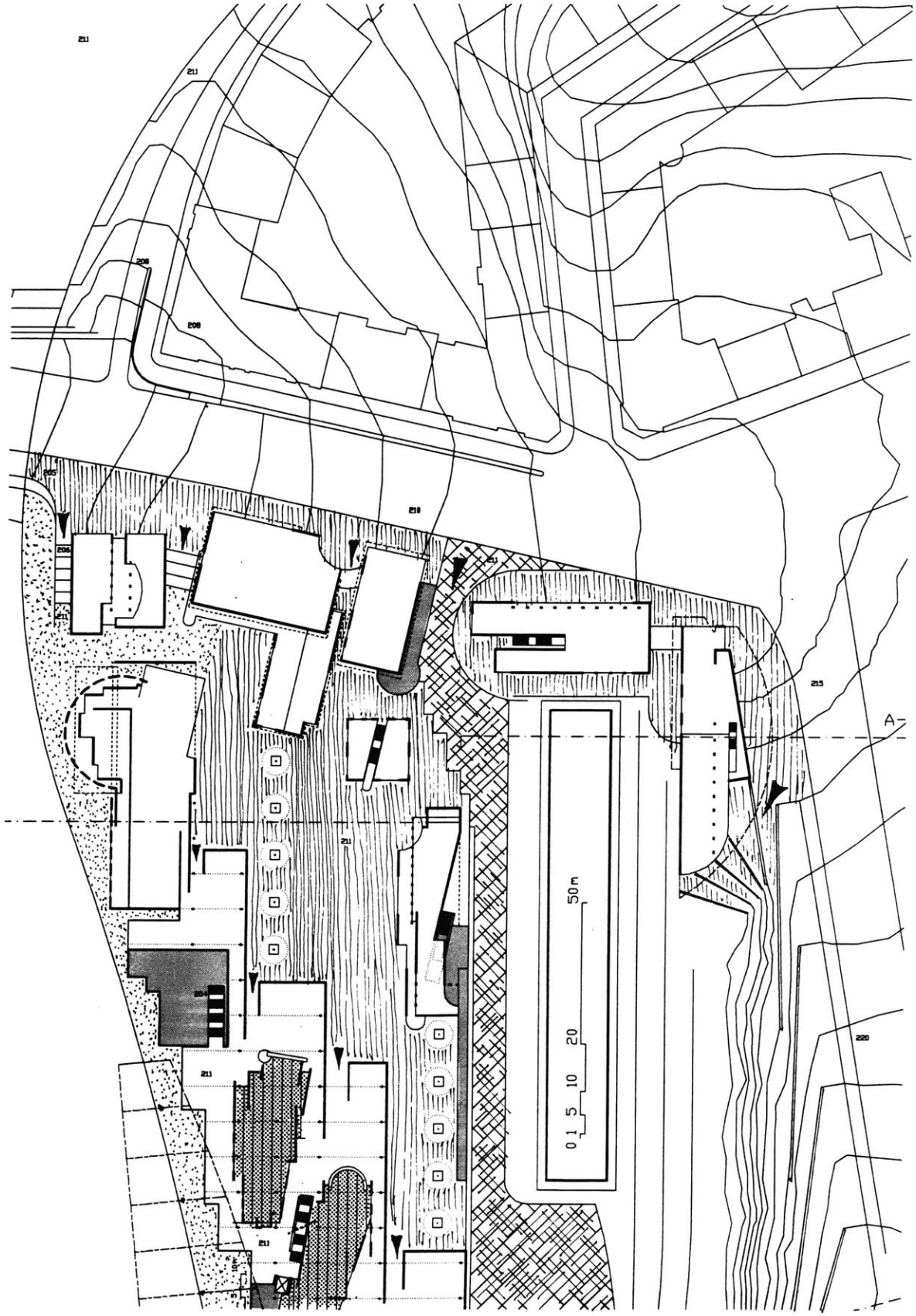


The main building site 1:2000

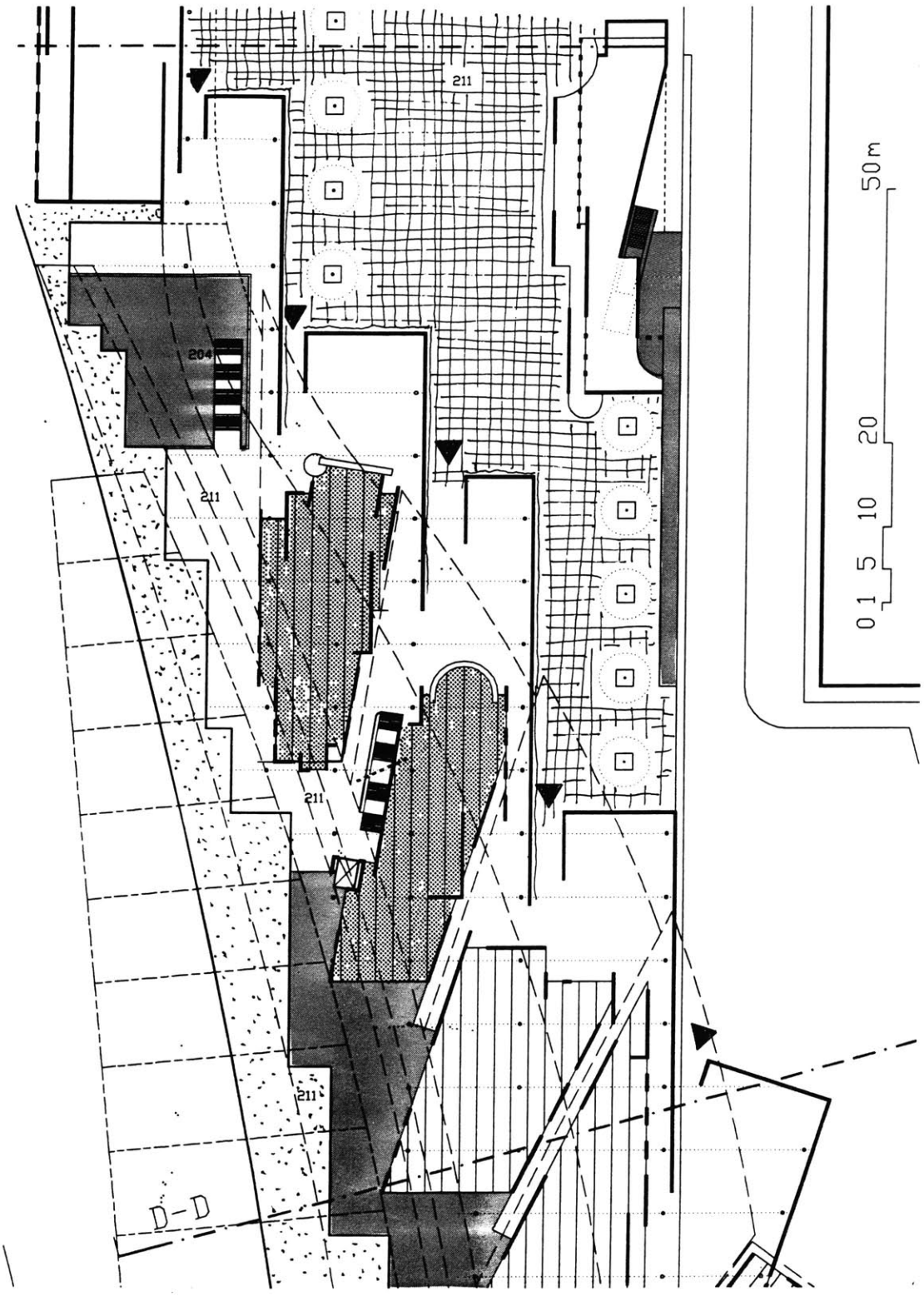


Underground passages to the lower level of the Administration building and the garage 1:2500

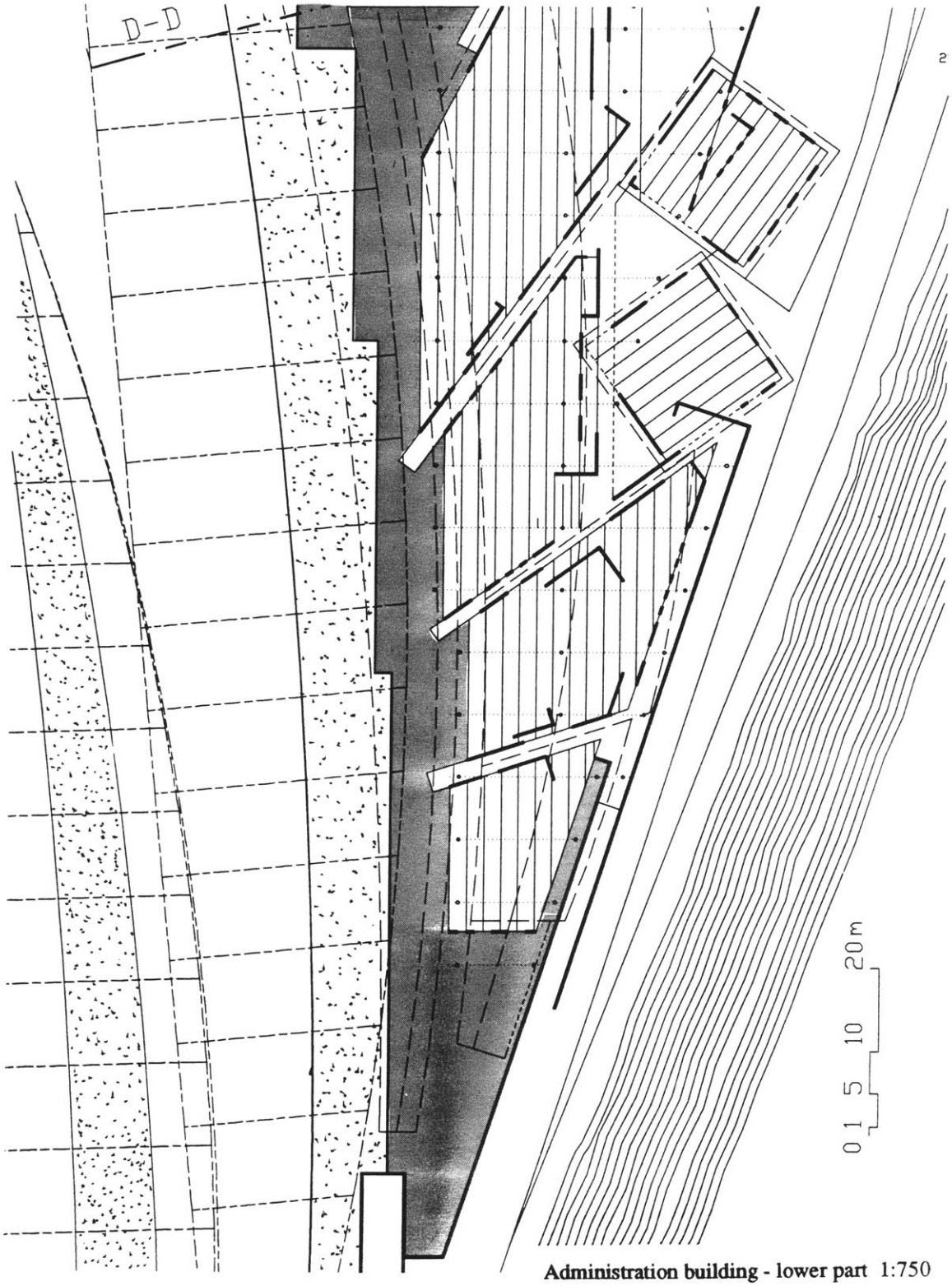
The Administration building 1:1500



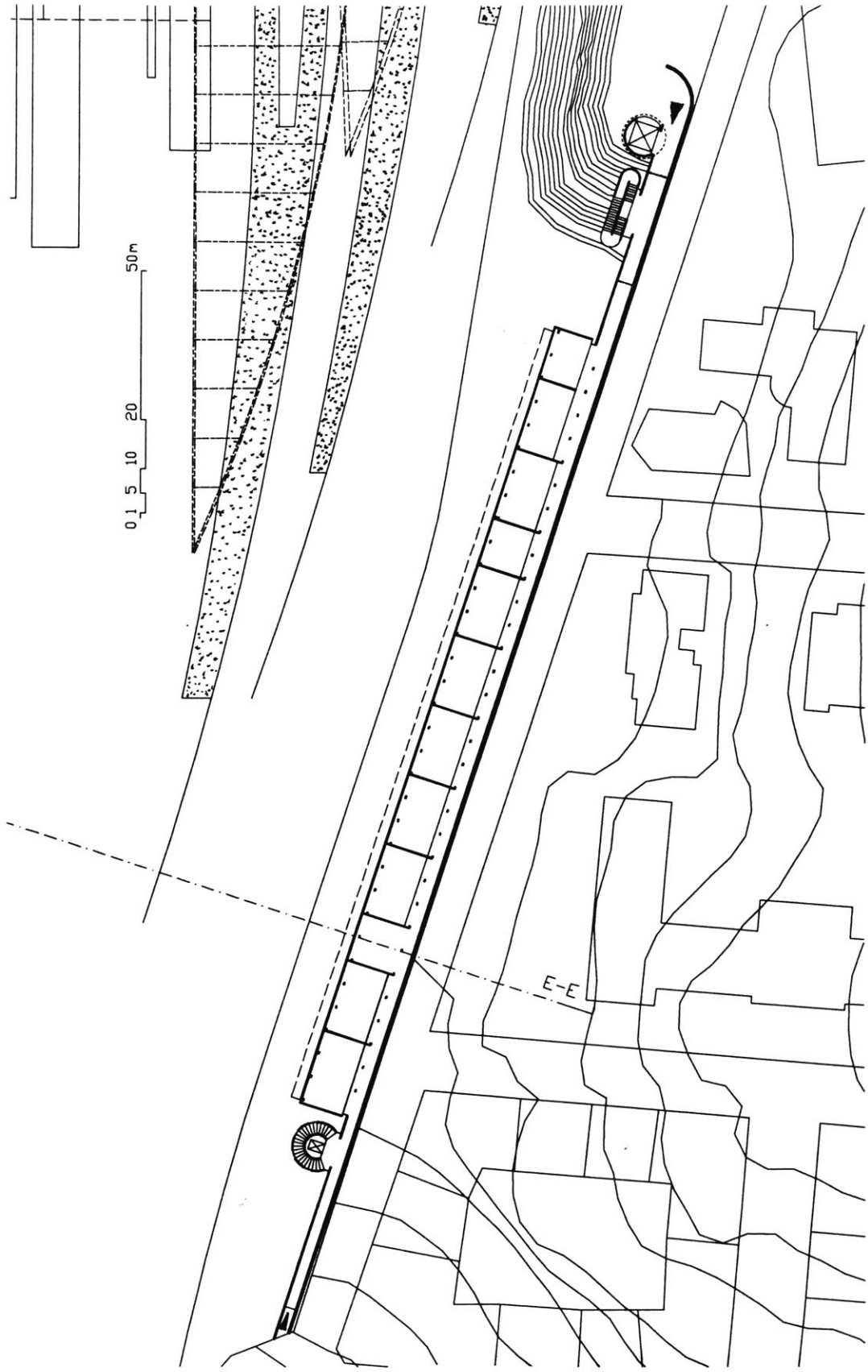
The main public space of the site 1:1250



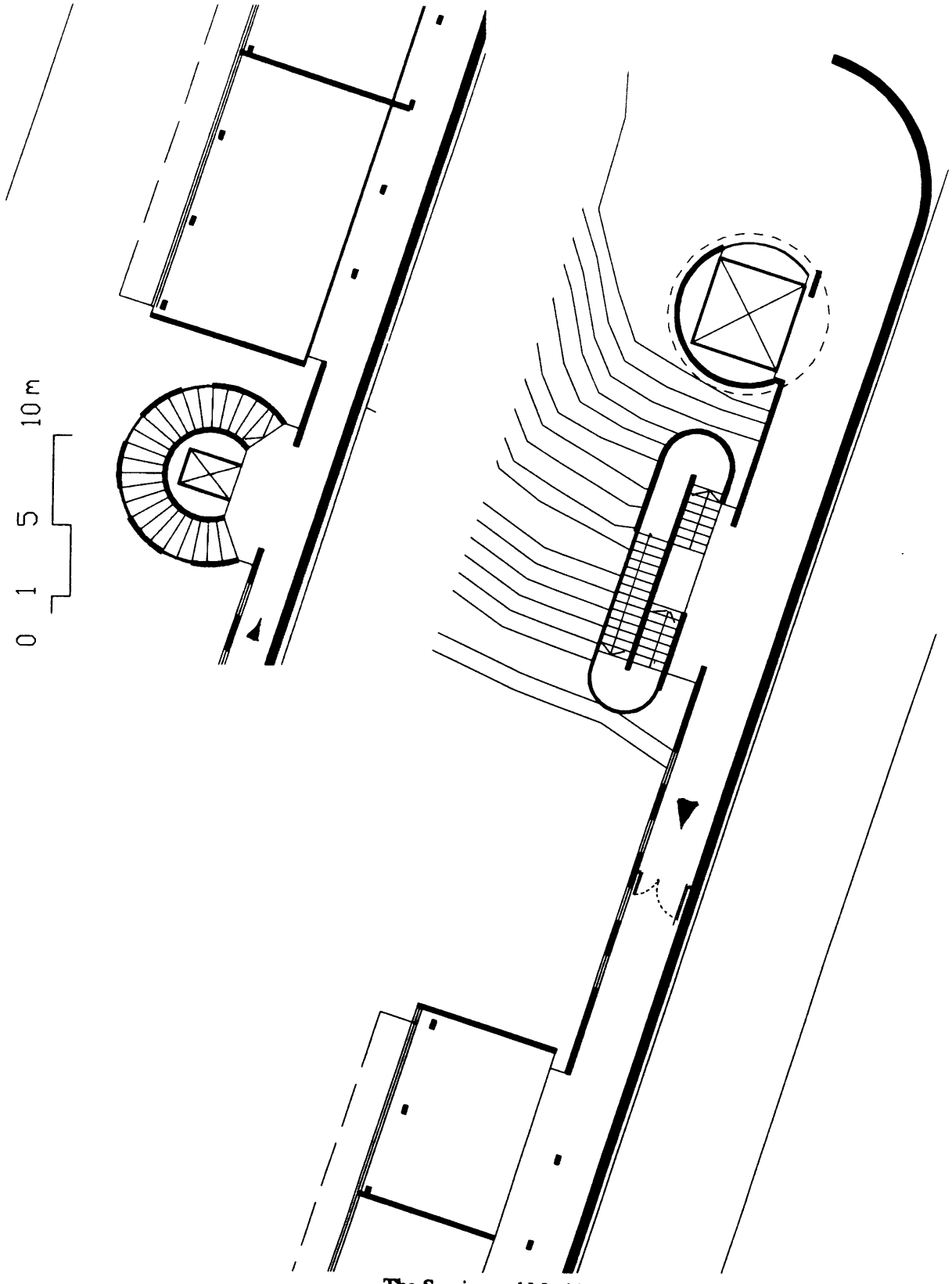
Administration building - upper part 1:750



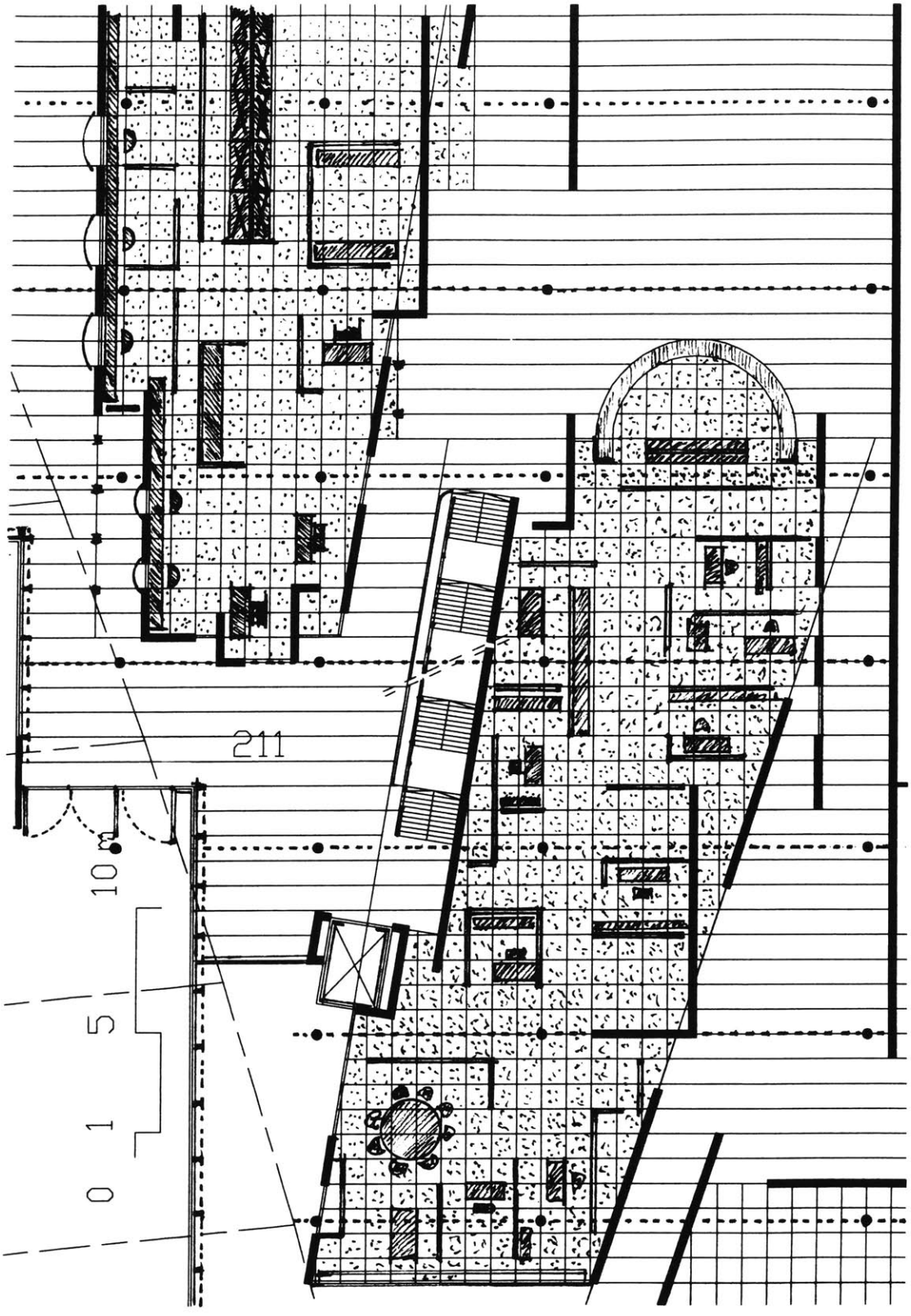
Administration building - lower part 1:750



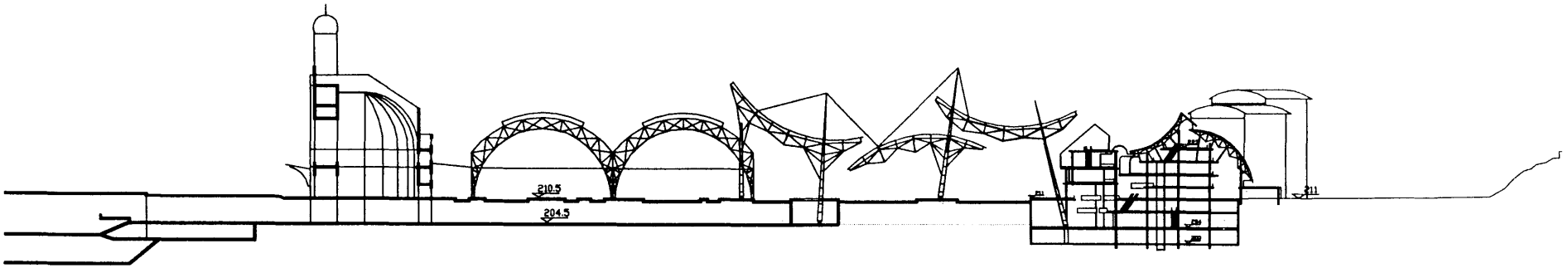
The Service and Machinery building 1:1250



The Service and Machinery building, details of its access 1:500

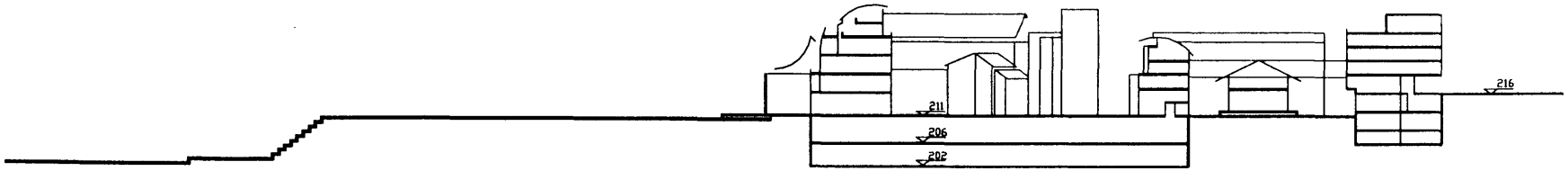


The first two parts of the Administration building 1:250



B-B

1 5 10 20 50m



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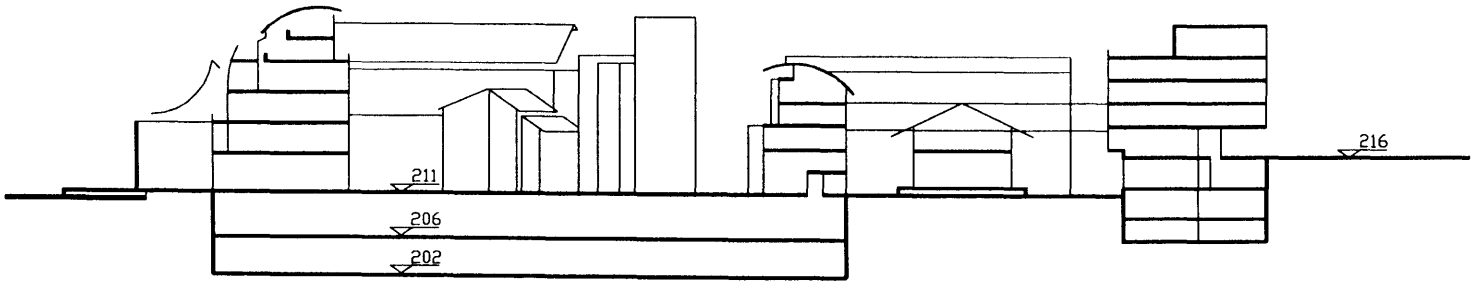
A-A



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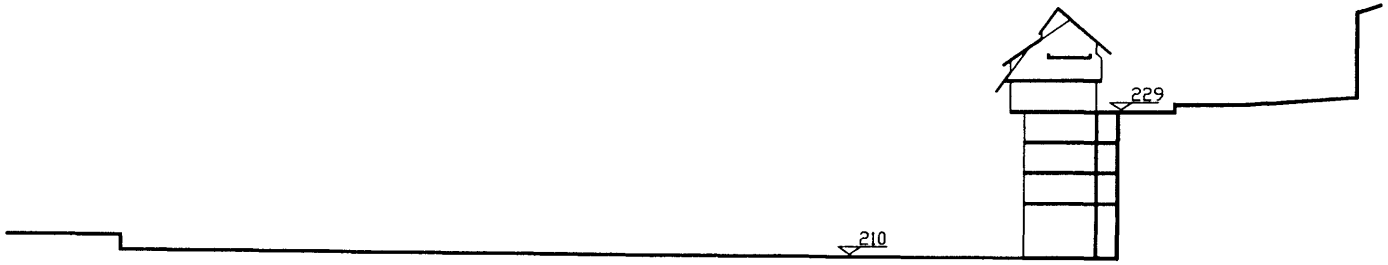

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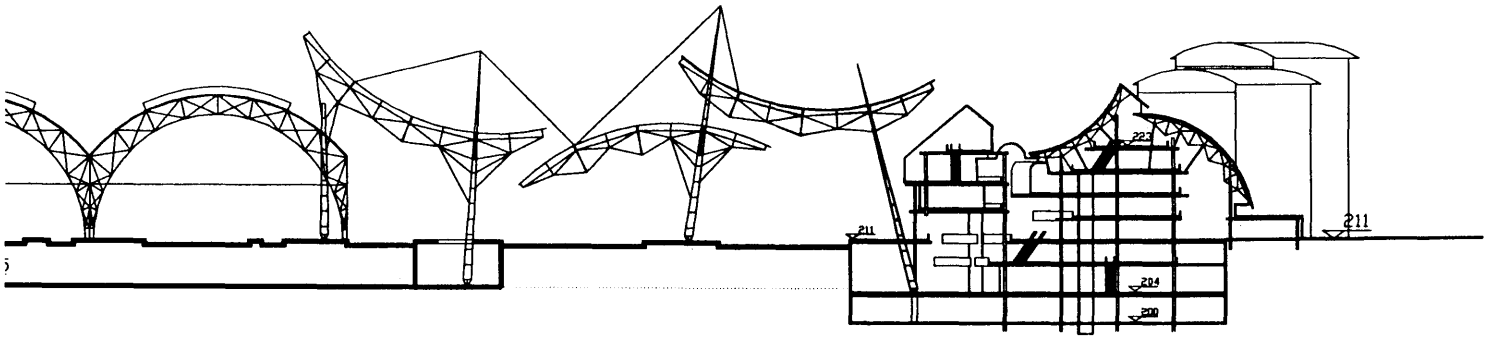

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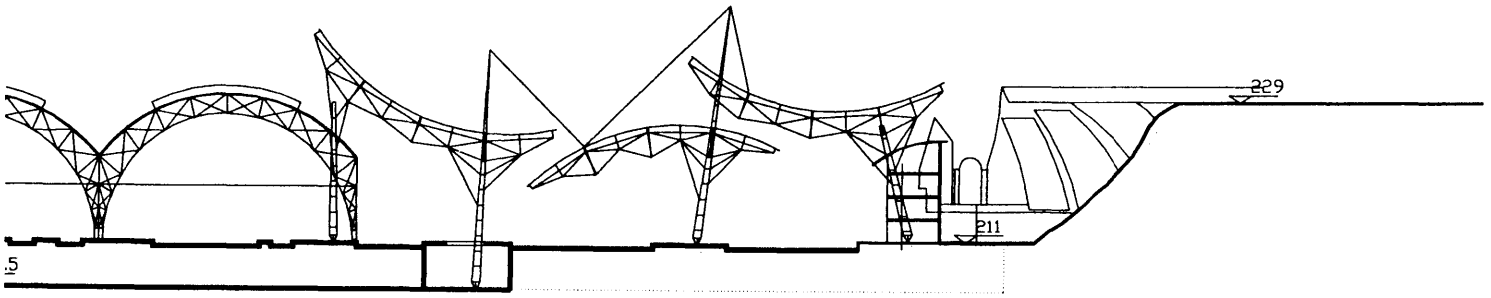

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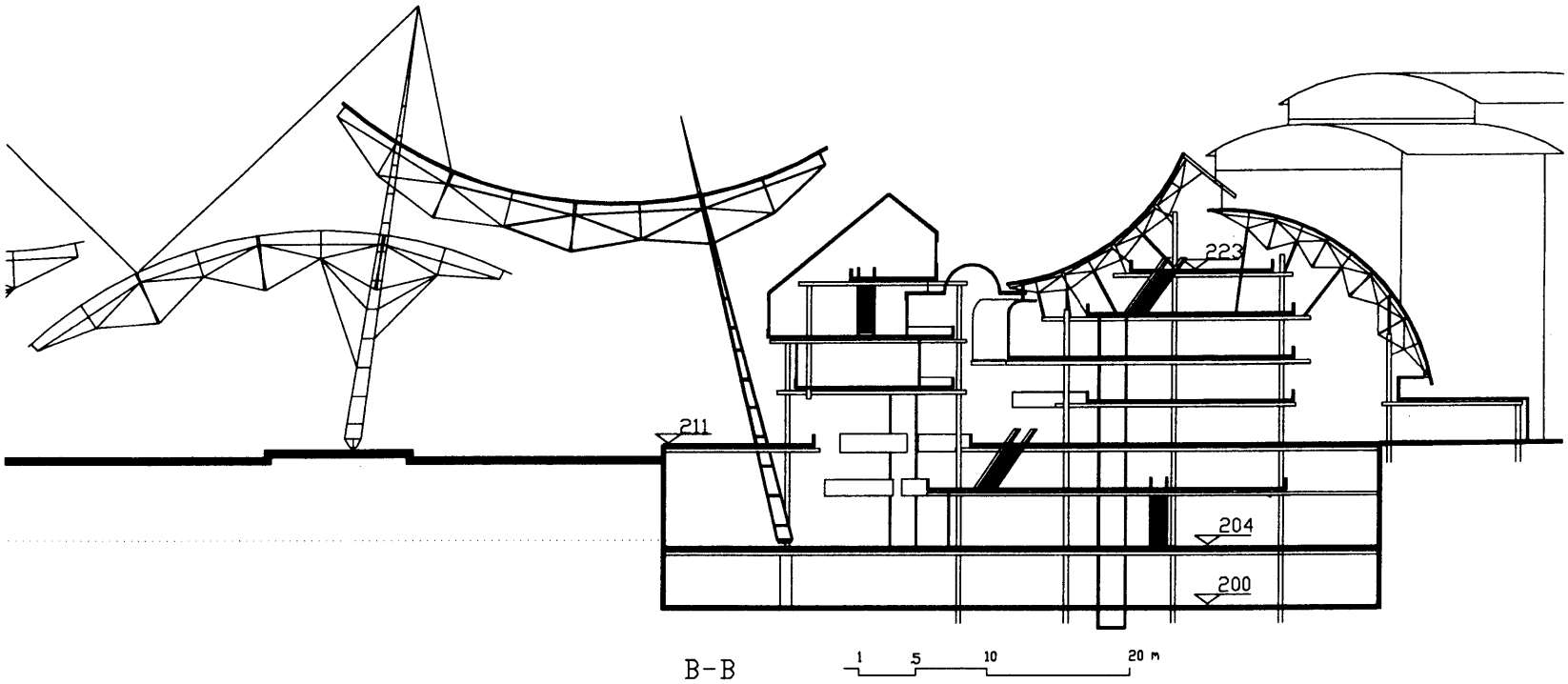

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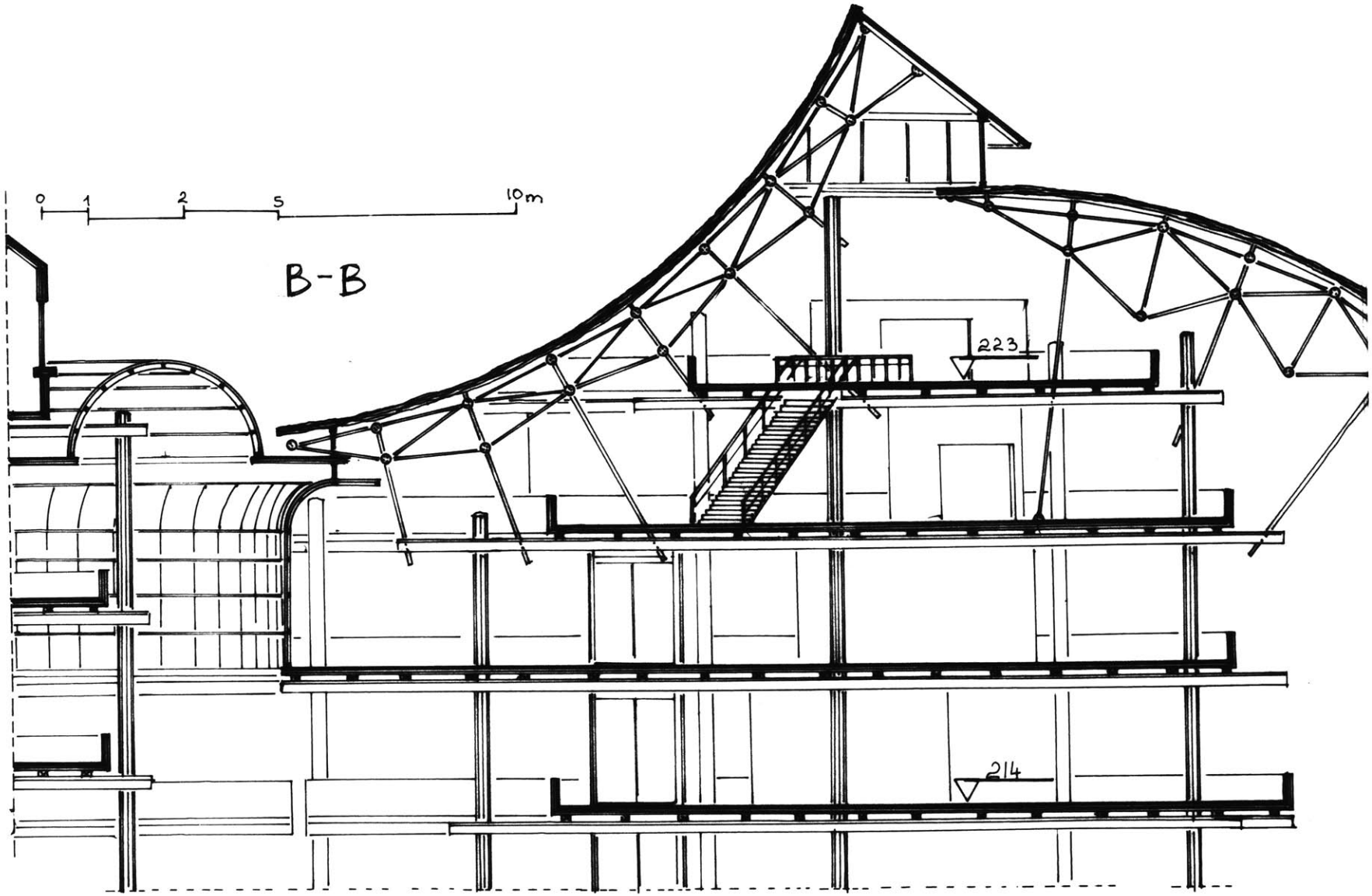
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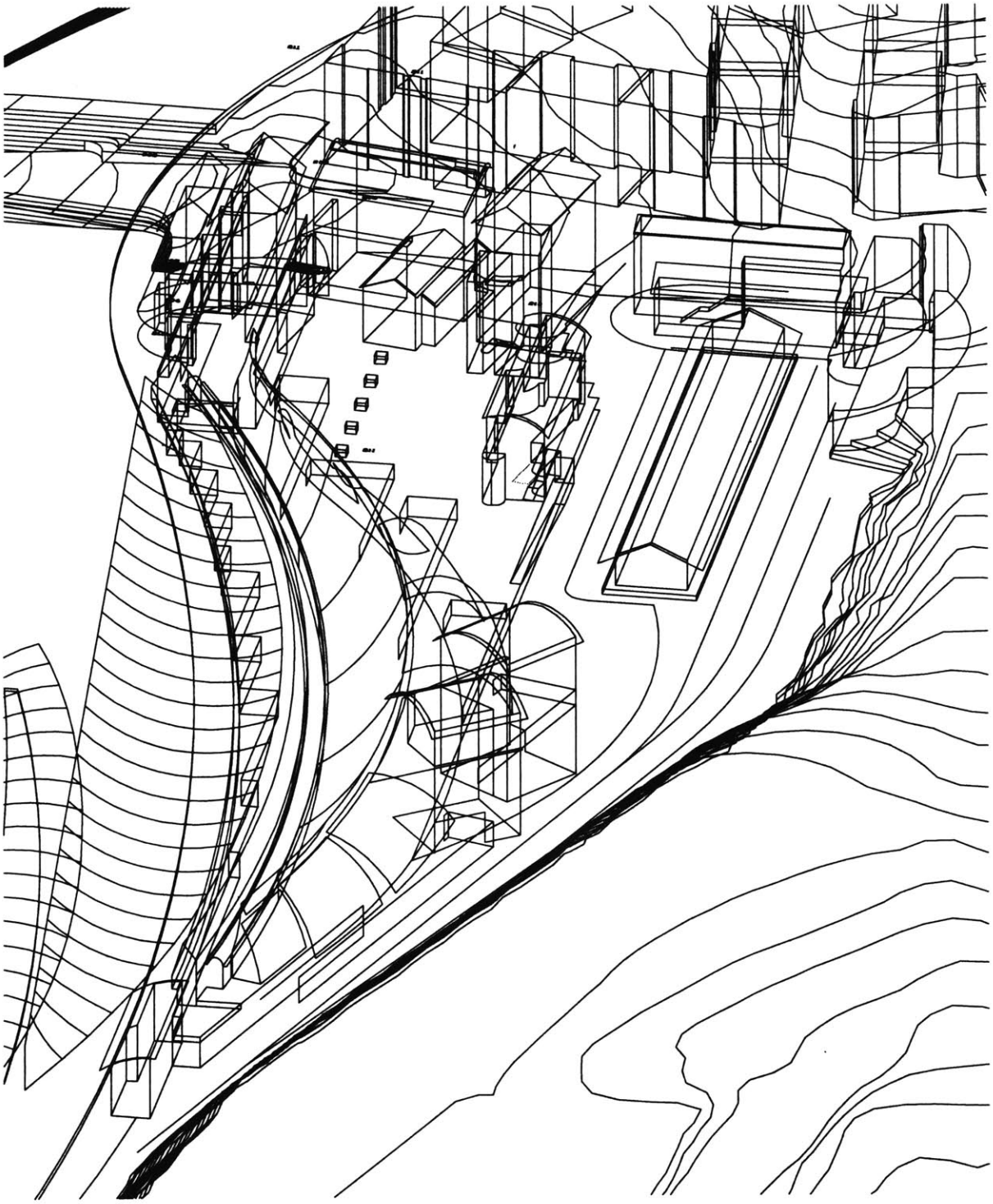
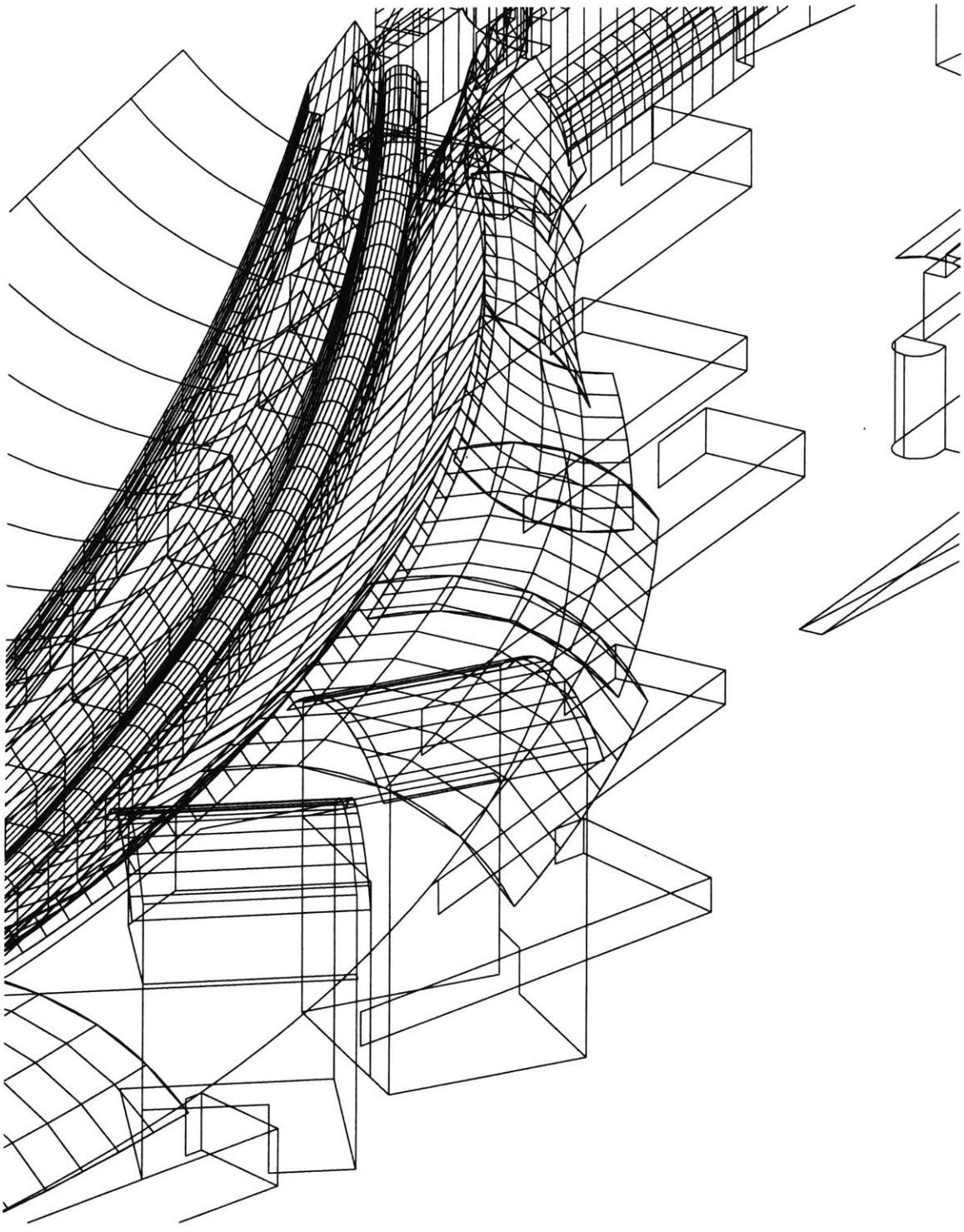
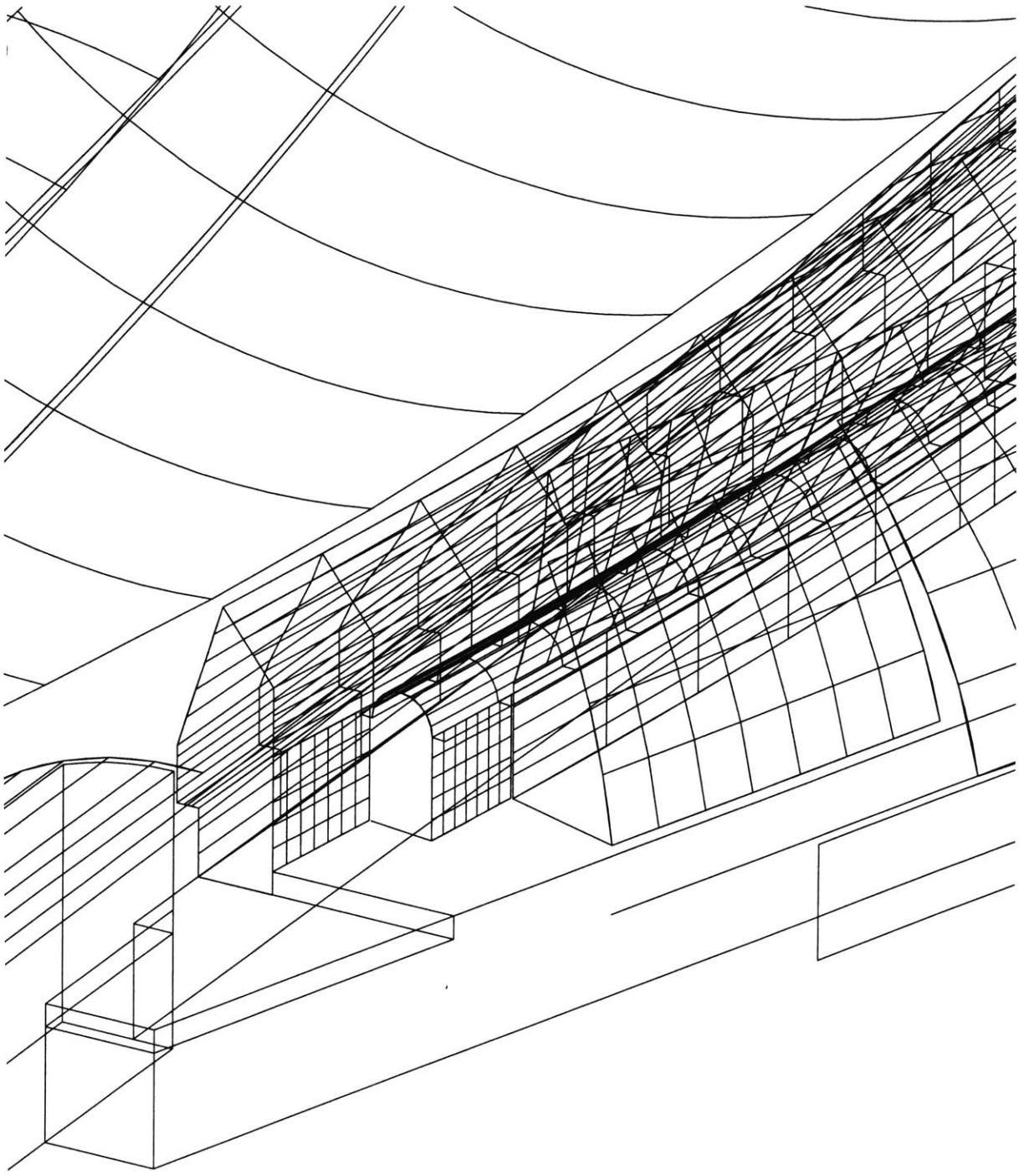
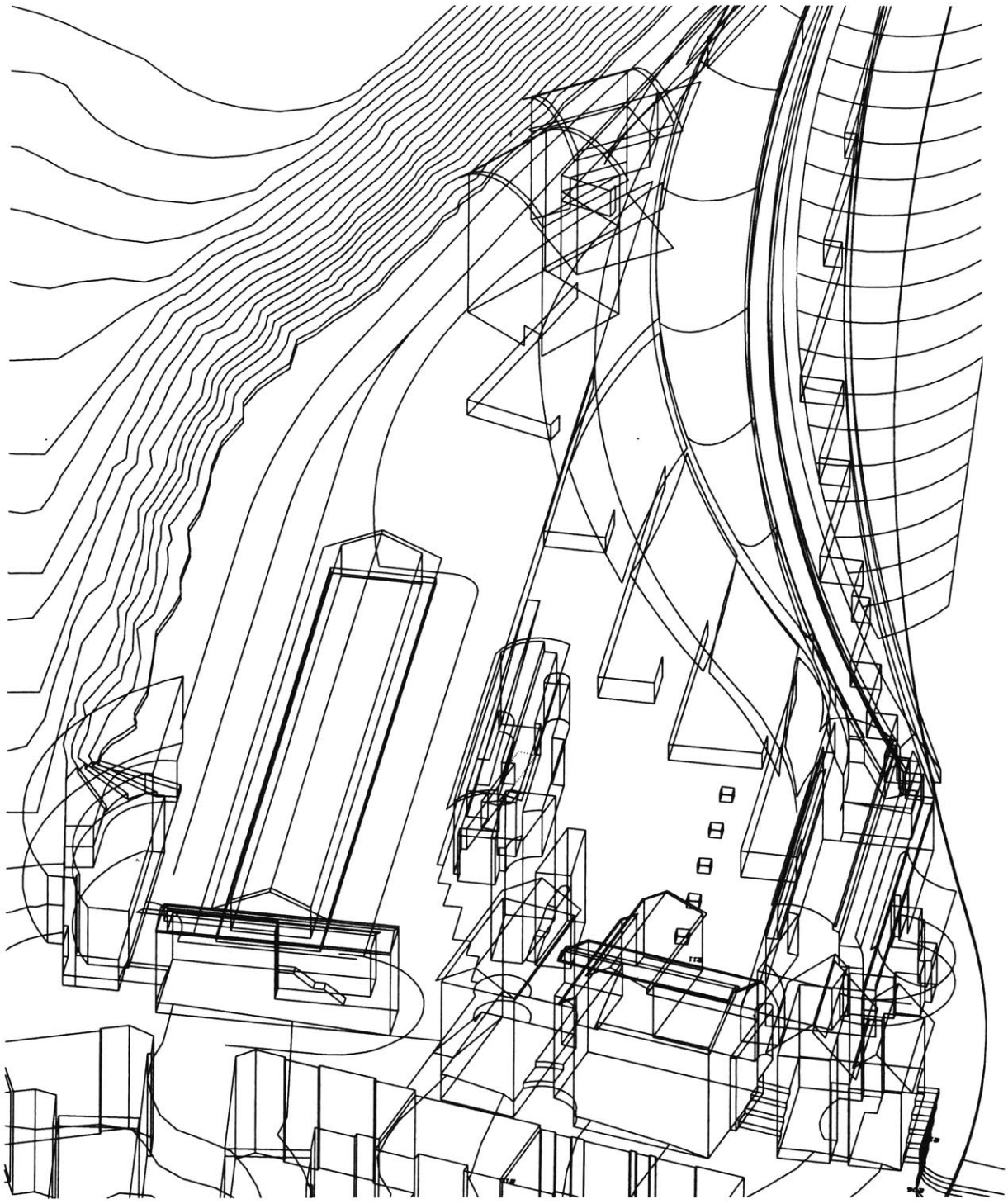
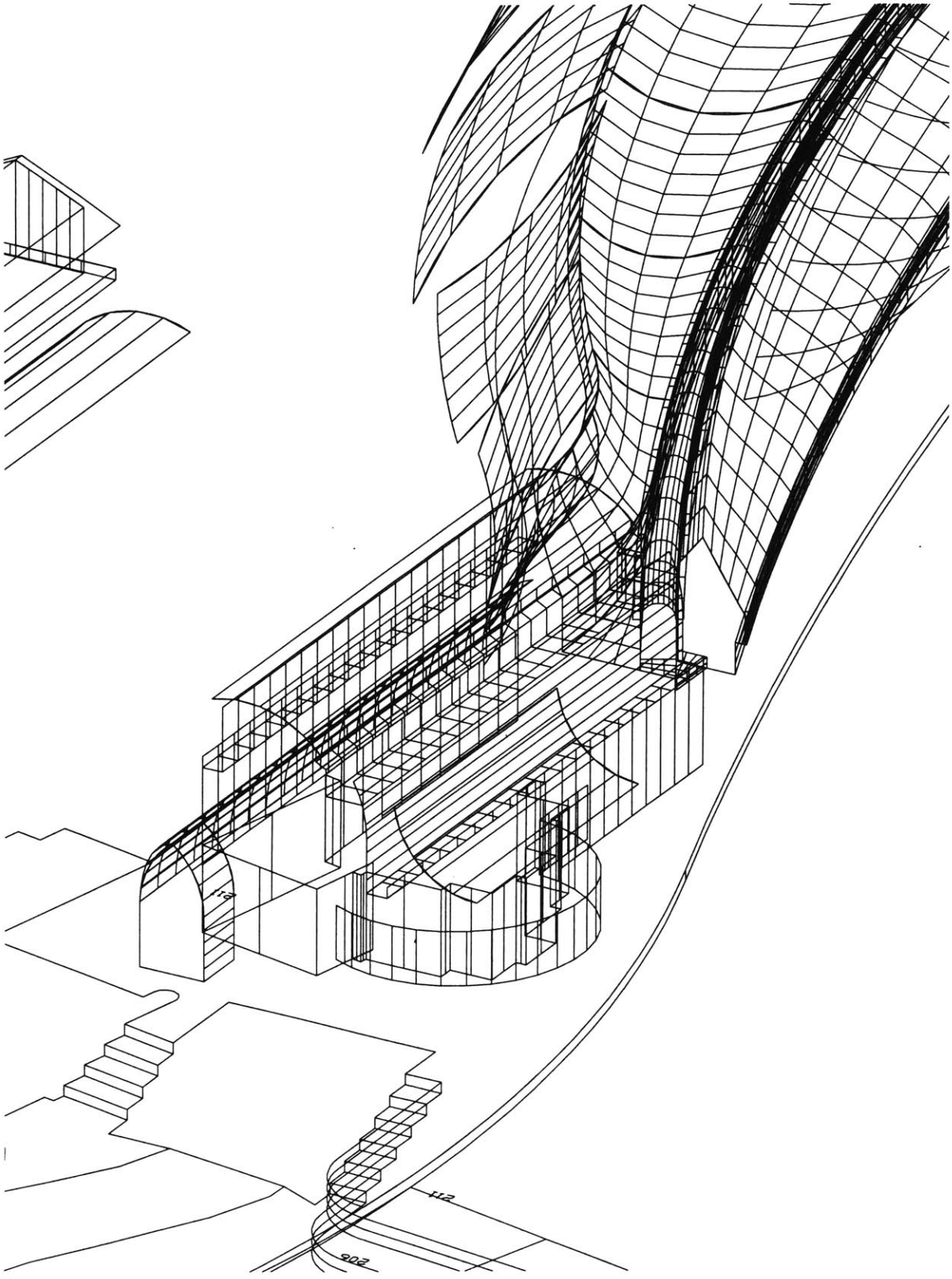
223
214







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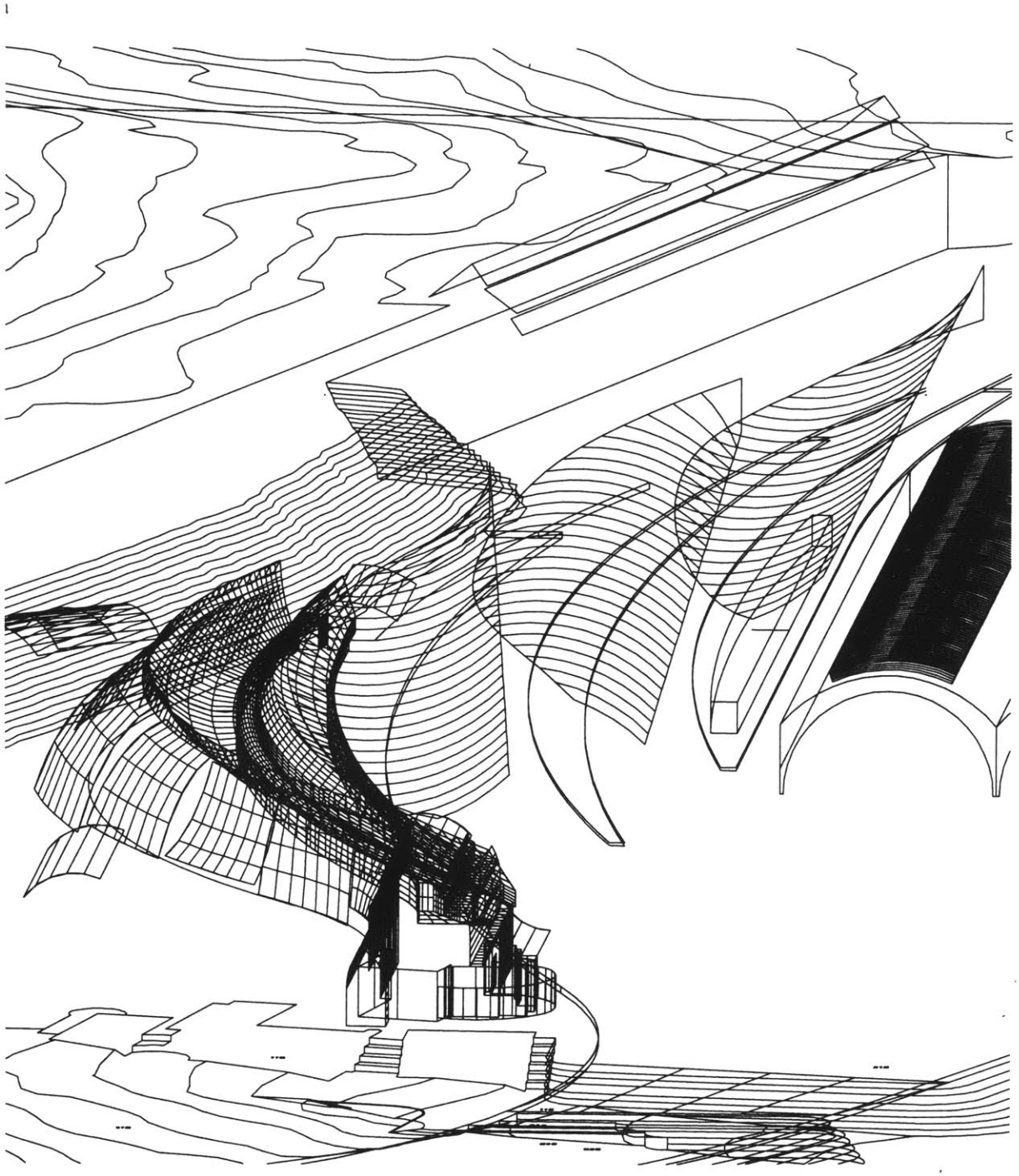

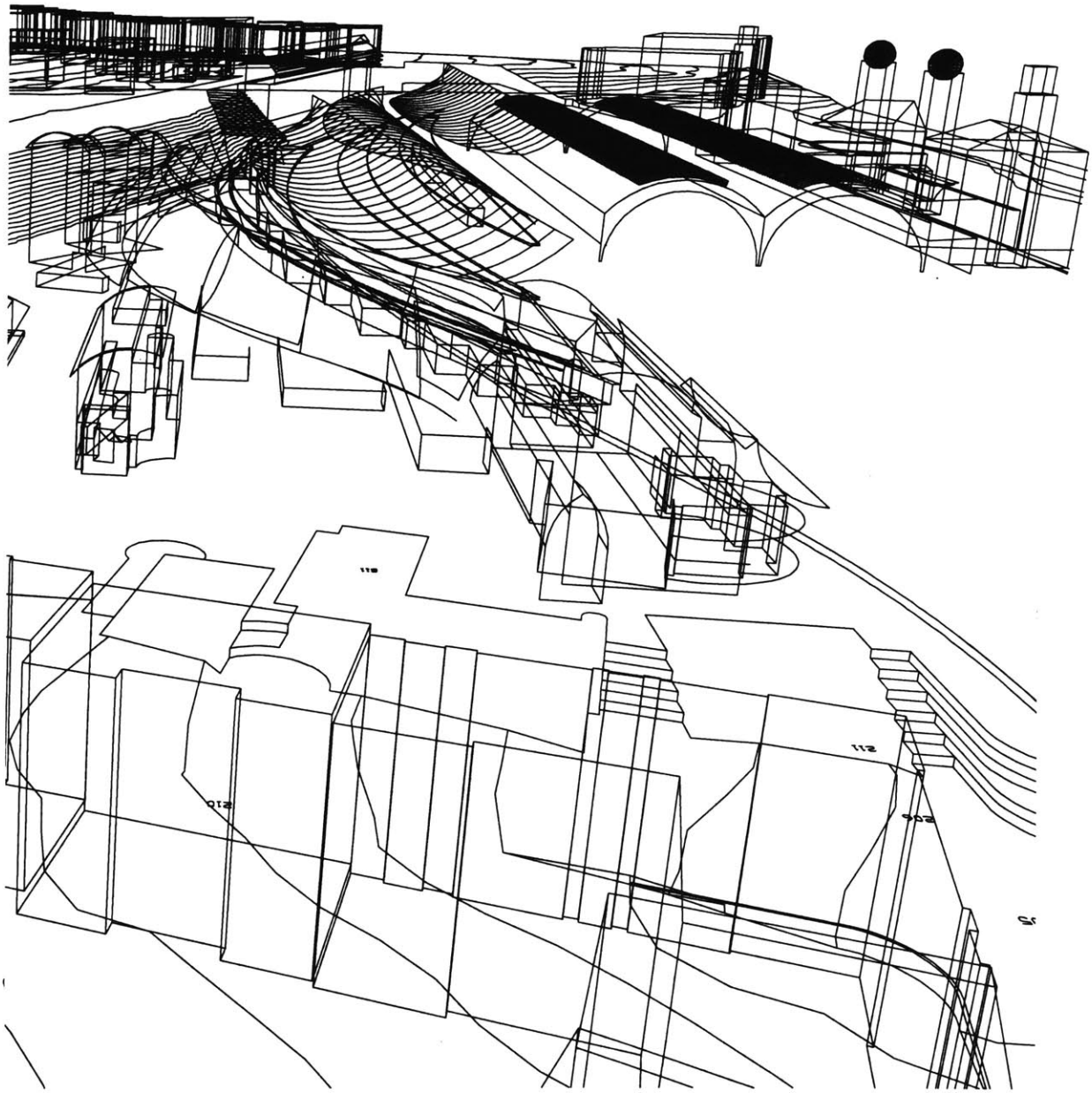

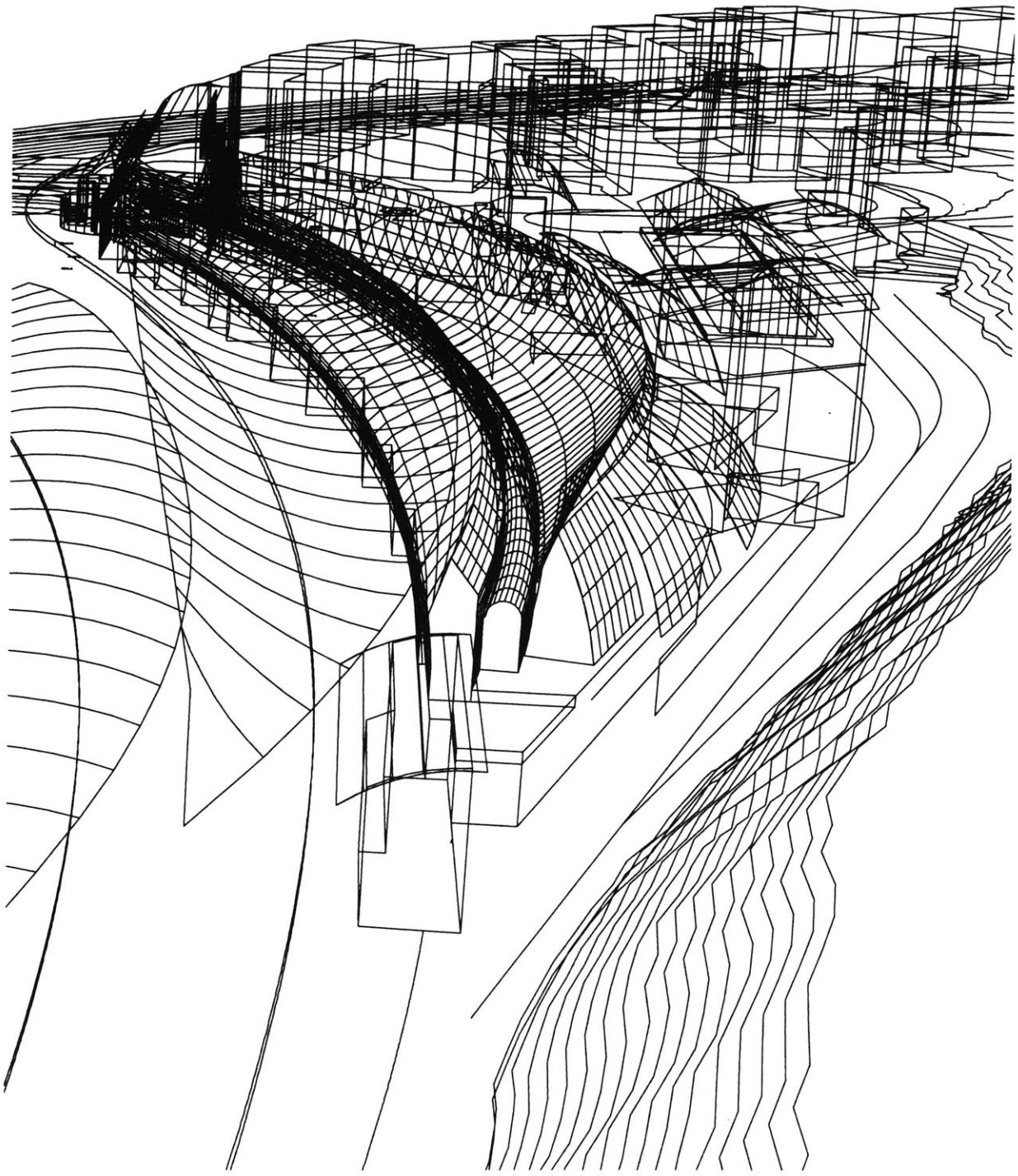

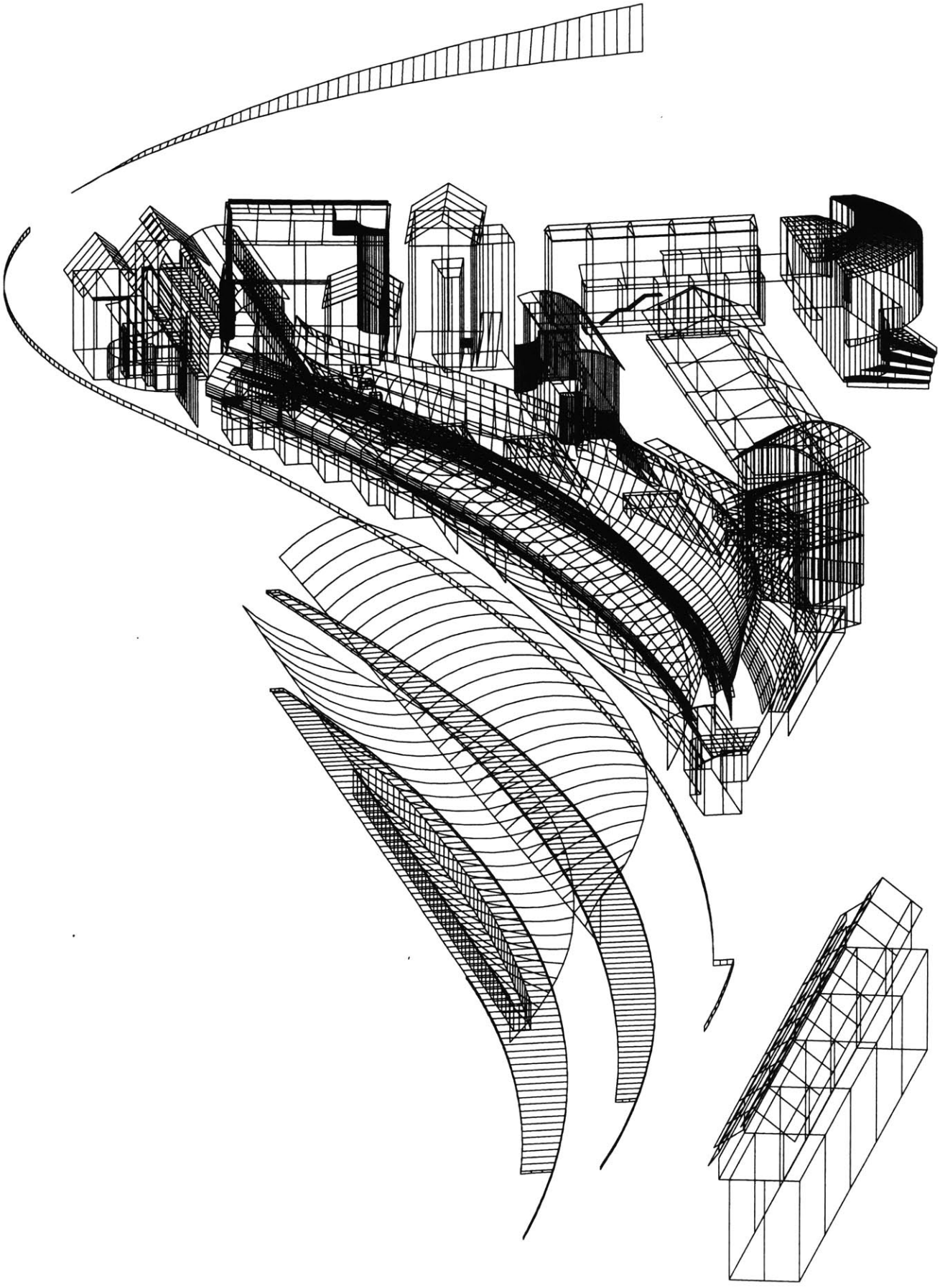

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