

Prospective Strategies of High-rise Buildings Siting: Assessment of Impacts from Typological and Contextual Criteria

M.Sc.-Ing. Claire Saint-Pierre*

Dr. Vincent Becue**

Prof. Dr. Jacques Teller***

Prof. Dr. Youssef Diab****

* Université de Liège, LEMA, Liège, Belgium – claire.saint-pierre@eivp-paris.fr

** Université Paris-Est, EIVP, Paris, France – vincent.becue@eivp-paris.fr

*** Université de Liège, LEMA, Liège, Belgium – jacques.teller@ulg.ac.be

**** Université Paris-Est, EIVP, Paris, France – youssef.diab@eivp-paris.fr

ABSTRACT:

Cities are growing, changing, renewing. For over a century, these transformations were possible thanks to numerous technical and technological progresses. Among characteristic components of urban environment, the vertical construction is experiencing a mixed success, according to the regions, populations or cultures. Paris is one of the European cities showing the least enthusiasm concerning high rise construction on its territory and is having trouble to develop high-rise projects. Nevertheless, more projects of this kind are proposed but they are hardly approved. It is necessary to question oneself about the means to find a judicious establishment and an adapted program, allowing a good insertion of a tower in the urban fabric, at the building, district or city scale. The method based on a transversal approach, relates and analyses criteria, allowing the situation's assessment and the impacts' evolution of a tower project in the city. The duality form-function is predominating in high-rise buildings.

1 INTRODUCTION

At the beginning of the 21st century, sustainable development and parallels movements are more present in minds of public decision-makers, architects and urban planners. Following the growing concerns about the environment and the future of the planet, international conferences, environmental agreements and numerous local acting plans are rising for few decades. Cities have to face more and more challenges implying various fields concerned with sustainable development. Engineers, sociologists, politics, geographers, architects, urban planners and other actors are working on the possibilities to anticipate and ameliorate evolutions of cities. In the same time, the revival of the debate on high rise buildings in Paris leads us to question their implication in the sustainable city development and see how they could be the solution to present issues.

This article aims at evaluating the coherence of spacial organization of areas which could be appropriate for high rise buildings in the Parisian area. This objective would let us see if it is possible to understand an urbanized territory with high rise buildings, in analyzing its components as accessibility, centrality, density, form and mixity. The project's ambition is to give the best recommendations to the different actors, in order to develop projects with success or a development policy that would facilitate vertical urbanism. The objective will be to collect the best conditions to create the emergence of concrete suggestions, as sketches of special development, architectural ideas, implementation process, political and financial strategies, and dynamics to inspire, directly usable for the Greater Paris development.

The first part of the article handles the different elements of the context of this study with the presentation of the high rise issues in Paris and the major development axis of the new town planning scheme of Paris. Then the selection of criteria inherent to high rise buildings projects is presented in the second part. Finally, the Greater Paris Consultancy objectives are analyzed to identify possible applications of the method to chosen areas of the Greater Paris territory.

2 CONTEXT

High rise constructions are part of the urbanization phenomenon growing in European and international cities. They supply numerous discussions and debates, more or less animated, especially in Paris. High rise buildings have a singular history in Paris, which explains the disregard of towers that stays in Parisians minds. Moreover one of the leading modifications of the town planning scheme of Paris is the improvement of mixed urban areas. However, the Greater Paris consultancy which took place during the two last years, raised up questions concerning the future of the Parisian metropolis and some team are proposing several possible approaches to develop the city. Among them, the construction of high rise buildings could be an answer to different issues the city is facing.

2.1 High-rise in Paris

The debate about high rise buildings in Paris is a very old question which exists in the Parisian history for centuries. In the regulation, we found the first rules of proportions between elevation of buildings and width of streets in 1783-1784. Other rules about size, morphology and architectural style of buildings were established during the 19th century, especially with the urban remodeling of the city by Haussmann. Following the international architectural trend, the first high-rise constructions in Paris were built at the beginning of the 20th century. Nevertheless they do not compete with the first American skyscrapers.

The debate about height is reintroduced by the architect Auguste Perret, and then followed by Le Corbusier in the 1920's. Because of very strict and precise regulations, all the high-rise construction's propositions stayed at the project state in France and Paris did not take part of the high rise competition which happened in the United States. In 1925, Le Corbusier established the "Plan Voisin", a proposition made of a set of towers in the center of Paris, that was not carried on. In the framework of the "Plus Grand Paris Plan" in 1932, several thinking about the planning of Paris and its suburb arose. Back then, the "principe de dalle" (suggested by François Coignet) with a dissociation of the highest street for pedestrians, and the lower street for transportation networks and services for buildings. This principle was applied for the construction of La Defense and the Front de Seine district. In the same development plan, the idea of creation of business center around Paris was justified for reducing city congestions.

The matter of height is not only about buildings form or its impact on its surroundings otherwise it would lie in an incomplete approach of urban processes. The debate has to be placed in a global questioning about the city which includes other matters such as density, quality of public spaces, types of activities and housing, and so on.

In the 1950's – 1960's, the large projects of Paris development were proposed to balance activities throughout the capital, to develop functional mixity in Paris outskirts, to create new urban centers and to clear the center of the city. The approval of the Urban Master Plan in 1967 revived the debate about high rise buildings, justified with new data on the population level, the economic growth and the emergence of industrial service. The high rise limit was removed and some projects were studied (as the Montparnasse tower, La Défense, etc.). Some exemptions were allowed for projects that go over the 31 meters limit according to landscape considerations and the respect of historical sites. Nevertheless, the construction of the Montparnasse tower generated a lot of rejects against towers and the regulation about high rise buildings was again reinforced. This is one example among others which demonstrates that the reject of towers is related to a location problem. Most of the towers are disconnected from their environment, from

public space, whereas their scale is not incompatible with the street scale. On the contrary, it is a question of connections. This proves the significance of the urban environment criteria and others (density, mixity, etc.) in high rise projects [1].

The zoning map of 1974 clearly defines building height for new urban development areas following strict conditions, according to the type of construction: if it consists of single equipment or if it is part of a global plan. The different height level limits currently in force are 25 meters in central zones and surrounding historical sites, 31 meters in intermediate zones, and 37 meters in some outlying district, presented on the following map from the town planning scheme of the city of Paris (Figure 1). Some districts are even subject to a lower limit (15 meters in Montmartre, 18 meters in the Butte-aux-Cailles) or higher, especially in sectorial areas (53 meters in the “Italie” sector).

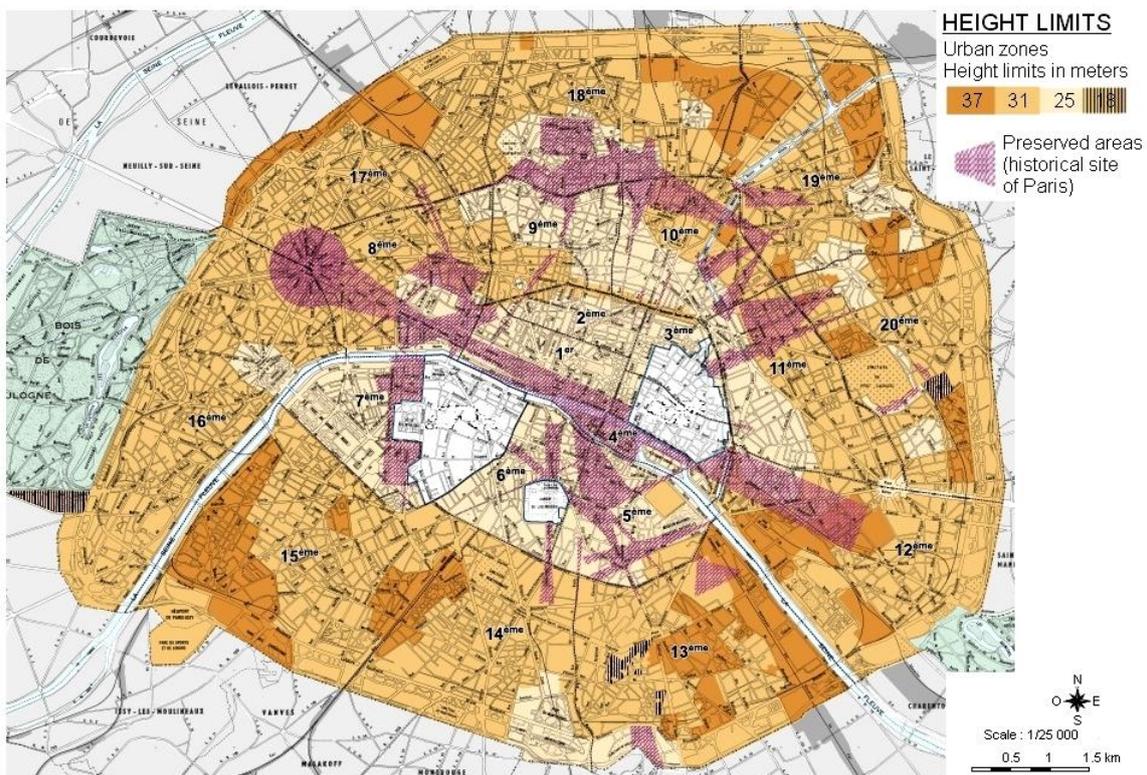


Fig. 1: Height limits map of Paris [2]

If the question of building towers inside Paris stayed unsettled for a long time, the recent projects of urban development (among them the propositions of the Greater Paris Consultancy) including high rise constructions, have indubitably revived the debate.

2.2 Form and mixity in the Planning Scheme of Paris

Since 2006, the new town planning scheme of Paris is effective and focused on three main axes:

- The smartening up of the city in considering historical sites and green spaces;
- The creation of job offers and the establishment of activities;
- The maintenance of social diversity in fighting disparities.

It is obvious to associate transversal themes to these objectives, such as form and mixity (social, functional, urban, etc.) [2].

Because of its historical evolution, the morphology of Paris stays rather uniform and most of the buildings are 6 to 8 floors high (which tally with Haussmanian buildings of the 19th century). Some low-rise houses are in very small and located zones (usually in the outer districts as we can see in light pink on the map of the Figure 2). Higher buildings were raised during the 20th

century. Buildings form in Paris is closely related to the period of construction and their function. Thus we can identify the following typical forms:

- Historical buildings (such as churches, places, gardens and palaces) from the Middle Ages;
- Most of medium buildings from the Haussmannian era (19th century);
- Cheap housing buildings from the beginning of the 20th century;
- Towers and high rise blocks from the 1970's;
- Medium buildings (with bulk close to Haussmannian building but with pure and cubic volume) from the 1980's;
- Large equipments from the end of the 20th century.

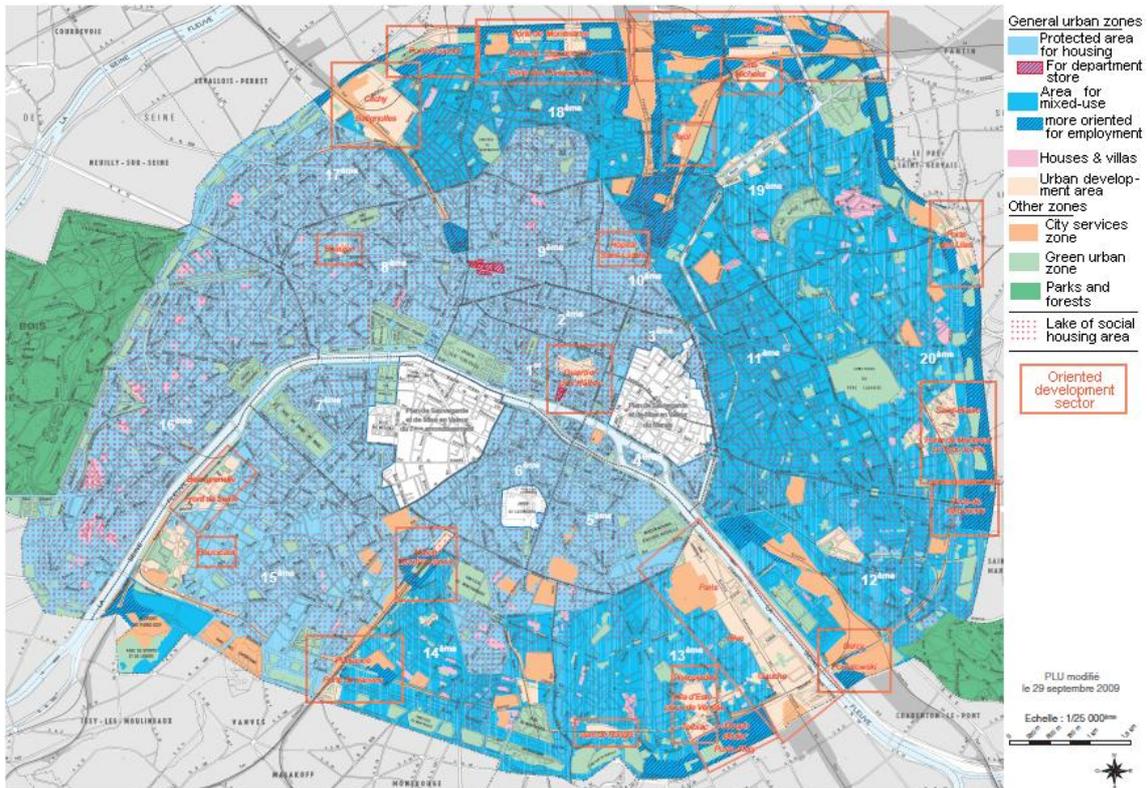


Fig. 2: Synthesis map of the planning scheme of Paris [2]

Since the Parisian population is of 2,193,030 inhabitants and the employment rate is of 1,684,657 employees, it seems that mixity between housing and activity exists and encouraged at the city and district scale (as the map above indicates) but more buildings are dedicated to housing. However, mixed-use programs are not as developed in Paris as in other cities (Chicago for example). The Parisian urban fabric is consequently only composed of single function buildings. In Paris, the 147 registered towers are lodging various - but single - functional activities and are either isolated or grouped. The table 1 presents the main high rise buildings in Paris and in its close outskirts [3, 4].

Mixity is one of the main factors in the development and rehabilitation of districts. Different existing types of mixity allow supporting the objectives of the new town planning scheme:

- Social mixity and housing mixity are interacting, which help to maintain diversity and fight against inequalities;
- Mixity of urban functions can stimulate jobs creation and activities establishment;
- Mixity of urban morphologies can contribute to the smartening up of the city and to the preservation of historical sites and green spaces.

To succeed a mixed-use high rise building project, it is necessary to think about the co-activity of urban functions in the immediate surroundings and the analysis of the special organization.

Moreover, a spontaneous densification, non organized and only based on functional demand, is inadequate and dangerous for local resources. Indeed this development does not evaluate the global impacts of the spatial organization of the city of Paris territory. Therefore, it is possible to state with more arguments the optimum size of buildings since they would host a mix of various functions. It is a matter of qualifying tower projects in their global evolution while considering new needs of the society [5].

Table 1: Main high rise buildings in Paris

	Function	0	50	100	150	200	(m)
Group of towers							
La Défense	Offices (few hotels and residential)						
Front de Seine district (15°)	Residential (few hotels and offices)						
Olympiades (Italy district – 13°)	Residential						
Gare de Lyon (12°)	Offices						
Isolated towers							
Porte de Bagnolet (20°), tour Levant, tour Ponant	Offices				II (122 m)		
Library F. Mitterrand (4 buildings)	Library			III (79 m)			
Tour Montparnasse (15°)	Offices					I (210 m)	
Porte Maillot (17°), Hotel Lafayette	Hotel				I (137m)		
Tour Zamansky (Jussieu – 5°)	Education			I (90m)			

- Heights of towers of the group
- I Height of the isolated tower

This would allow developers and local actors to accept and think about mixing functions in their projects. We can rightfully question if high rise buildings could contain a cultural space, restaurants, an auditorium, shops, etc. as well as public spaces at the ground floor. The only problem consists in the lack of culture and the shyness of investors. Furthermore, when we compare different urban operations (San Francisco, Chicago, and London), we remark the quality of high rise buildings is when they are not isolated from public space, whereas in Paris they are all single-function high rise buildings [6].

Moreover, to succeed mixity it is necessary to make high rise buildings evolve in time. For example, some floors allocated to social housing should be able to be transformed in high standing apartments. Flexibility is implying certain knowledge of all the existing functions on the city of Paris territory. Finally, the lack of research on vertical urbanism, the lack of economical and ecological studies on their cost and maintenance, the lack of sociopsychological studies on life in high rise, the lack of comparison between dense districts without towers and districts with groups of towers in Europe, make us to evaluate and propose certain opportunities for areas where high rise buildings could be inserted in Paris [7].

3 IDENTIFICATION OF INHERENT CRITERIA

3.1 High rise building regulations comparison from three cities

Town planning schemes, building codes and zoning maps of three cities were finely analysed to determine which criterion were the most influent in the construction of high rise buildings. Chicago, San Francisco and London were chosen with historical and cultural justifications. Chicago is one of the first cities which started the construction of high rise buildings at the end of the 19th century. The city is commonly known as the birth place of skyscrapers. After a devastating fire, the reconstruction of the city was an opportunity to redevelop a new planning scheme and regulations were progressively elaborated. The fundamental criteria in the Chicago Building Code are functions and constructions types, listed in tables. All the height and volume limits are based on these tables. Multifunction and mixity are also specified criteria of the Building Code. Recent considerations on energy efficiency were added to the code and make Chicago one of the first cities to apply these environmental regulations.

Even if San Francisco is a typical American city with its financial district consisting of high rise buildings, it was not as easy to build them since there was a strong movement against towers in the middle of the 20th century, fearing a “manhattanization” of San Francisco. Consequently, very strict rules were established concerning height and bulk of buildings. There are charts, tables and maps which precise height and bulk limits in function of the district area and the characteristics of the buildings. Others essential criteria, precious to the city, are the skyline and view quality. Indeed, several plans develop the idea of emphasizing the hills in avoiding podium effects with large scale buildings at the top of the hills, and preferring thin high rise buildings with graduated heights instead. This layout also allows maintenance a good view and light access for more buildings.

The particularity of London is its absence of strict regulations about height limits or locations. Nevertheless, all the development plans and general plans are made of policies and guidance that promoters are supposed to follow as much as possible. We can notice that the flexible nature of these policies generate numerous negotiations between local, regional authorities and promoters about large projects. Concerning high rise buildings, one of the most important criteria is the protection of Landmark Viewing Corridors which were established to ensure a view of historical buildings from several places and the emphasize of the skyline (for example the St Paul’s Cathedral or the Westminster Palace). The accent is often focused on the possible increase of attractiveness and dynamism of the area where a high rise building would be located.

A parallel study was carried out on Environmental Impact Assessments of towers, to identify the criteria taken into account, and also on the regulations of the city of Paris to attempt understanding why the situation is a little more complicated when the matter of high rise buildings comes.

3.2 Identification of inherent criteria

From the analysis of the three cities urban regulations and the EIA items, we noticed that nine criteria were recurring and furthermore related to each others. Indeed there is, for example, a close relation between the form of a building with its energy efficiency or the daylight accessibility, or the urban morphology is having impact at different scales: it would determine the building form and could be part of the skyline of the city. Two criteria seem to be crucial in the process of a high rise construction on the Parisian territory: form and function. They create a strong duality, which stands out from the set of criteria. All the links and potential impacts are summarized in the following scheme (Figure 3).

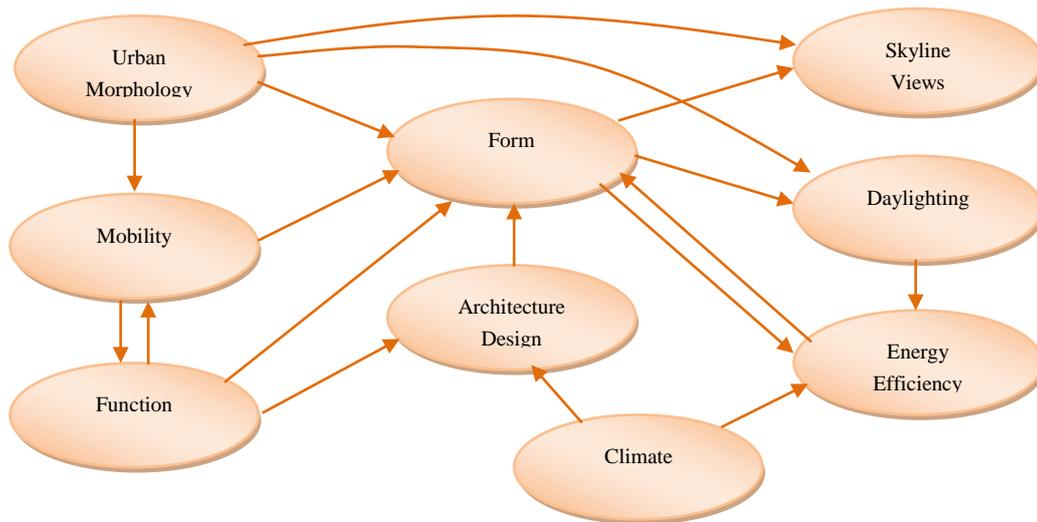


Fig. 3: Relations between the nine identified criteria

4 THE GREATER PARIS CONSULTANCY

Started at the beginning of the year 2008, the Greater Paris Consultancy was composed of ten multidisciplinary teams who worked on two axes: “The metropolis of the 20th century, after-Kyoto” and “prospective analysis of the Parisian urban area”. The main themes that represent the major stakes of the metropolis development concerning in particular mobility and transportation, green areas, equipments, business centers, etc. The city of Paris became strongly dense. So in order to evolve and make its citizens able to in the city (to find accommodation, to work, to have access to services, etc.), the city of Paris has to connect with its outskirts and elaborate mutual projects with its surrounding territories.

Several proposition of urban scheme are presented in the results of this consultancy. Some of them are proposing to replace centralism with polycentrism and to multiply urban centers in completing and improving the existing transportation network, and developing the city following a multifunctional vertical and horizontal networking (LIN and Rogers teams). The architect Richard Rogers considers the compacity as the first rule of contemporary urbanism. Proximity generate time saving in transportation and energy efficiency, and enhance mixity of populations and cultural diversity. To obtain a good compacity, he suggests to identify and exploit the mutation capability of unused (or underused) territory and to reinforce the green belt which would define the edge of the city and contain it (to limit its random expansion). Compact polycentrism will based on existing nodes of the suburbs adjacent to Paris and reinforce connections between the center and these polycenters and develop circumferential links. Each pole will have all the necessary elements for an urban life but also a proper identity that provide a feeling of both local and metropolitan belonging.

Others emphasize the importance of existing functional links between centers, interposed to a radial system of the metropolis that make its suburb subservient to the center, as the rhizomes of Portzamparc’s team. Then the centers become more attractive and an excellent place to locate mixed-use high rise buildings (Figure 5).

Others are proposing to intensify the functional mixity development and to work on renewing districts, to face the urban spreading. They also mention the densification at all scale, varying typologies for multiple uses, especially in the construction of mixed-use high rise buildings. The architect Jean Nouvel is presenting the stakes and advantages of towers which would allow “an entire mixity and integration of renewable energies”. Its team also proposes to renovate and embellish the existing towers (Figure 4). They advocate mixity and density to “build without spreading” [4, 8].



Fig. 4: Embellishment of the Olympiades district by Jean Nouvel [9]



Fig. 5: Christian Portzamparc's new Europe-Aubervilliers train station [9]

5 CONCLUSION AND PROSPECTIVE

In Paris, the form of a building is most of the time defined according to the function inside. The main identified functions are housing, offices, business, hotels, services and cultural equipments. Each activity is implying a specific form which could be houses, small medium or high rise block of flats, or towers. Nevertheless, the actual trend is to enhance mixity to develop the city. It is obviously already offered at the city and the district scale, but to refine even more this diversity of activities and make public spaces more dynamic and attractive, it has to come down the building scale.

This analysis of the form-function duality shows that the city models proposed by the architects of the Greater Paris Consultancy seem to be appropriate for an optimized development on the territory of Paris and its suburb. However, as long as the height regulations will be restricted, these projects will not be achieved. Architects, planners, politics, citizens have to keep on discuss in order to find the best compromise between all the localization criteria (such as preserving historical sites and views, allowing the best access to day lighting, respecting districts identities, facilitating good mobility, etc.).

The form-function duality is only a part of the whole system of criteria. Further experimentations will be carried out for analyzing and understanding the relationships that are apparent between the seven other criteria (Figure 3), how they interact and which impact they could have on the location of high rise buildings in Parisian agglomeration.

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