Orly-Rungis Area in France, a Case Study for a Global Underground Space Use Project

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1. INTRODUCTION

Few territories contain as many assets for a large and coherent development as the Orly-Rungis area, located 10 km to the south of Paris. After accommodating Orly airport and the Rungis national food market, this area has been filled up with business parks and logistic companies; it is criss-crossed by roads and motorways but poorly served by railways and it lacks a good metro link with Paris.

Today, thanks to its shape and existing facilities, it looks to be a strategic territory within the new “Greater Paris” project, launched one year ago by president Sarkozy [1] and may become the first business hub at 10 km south of Paris ring road.

2. THIS SITE HAS ALL THE NEEDS FOR SUCCESS

2.1. Geomorphology

A century ago, the Orly-Rungis area - a plateau between two valleys - was open country, 12-16 km south of the centre of Paris, crossed by the N 7 road to Lyons, Marseilles and Nice, and close to the N 20 road to Orleans and Toulouse: a flat plateau, about 85-90m in height, roughly 50 m higher than the alluvial plain along the Seine river upstream of Paris. Its geological section shows a surface layer of loess over a Champigny limestone stratum; below are some marls, gypsum and limestone strata.

The underground space of any relief, plateau, hill or mountain, provides many benefits by comparison to the subsurface of a flat plain: first, the gravity drainage of groundwater (if any; the higher volumes of a relief may even contain no water at all); power for pumps is thus avoided and inundation hazard minimized; second the possibility of level access, without the fear of going down (to hell?), and more importantly without the need of energy in order to exit by stairs or mounting ramps (think of a car with a flat battery in a deep car park); thirdly, any difference in altitude may provide enough power for natural ventilation. Moreover, behind steep slopes, the underground space may allow windows opening on free air and landscape.

This plateau has hosted a military airport since 1918, and from 1945 onwards became the civilian Orly airport which covers 1 528 hectares and is now the second Paris airport behind Roissy, with 26 millions passengers per year. In 1969 the wholesale food market of Paris left the very centre of the city (Les Halles), and was relocated just north of the airport: the Rungis Market (MIN), on 232 hectares, is now the world largest market of fresh products serving 18 million of European consumers. Both facilities are served by railways, roads and motorways, both radial and transversal with respect to Paris and the whole France territory.
2.2. Politics

The Orly-Rungis plateau is shared between Val-de-Marne and Essonne departments, and very close to the south-eastern tip of Hauts-de-Seine. 17 towns are thus more or less concerned. The whole area is owned by only five companies, one public (ADP, the Paris airport authority), two semi-public (SEMMARIS owns and manages the market, SOGARIS provides warehouses and logistics for the market), two fully private (SILIC business park and SENIA industrial park), mostly devoted to the transformation of food products. Together with a lot of hotels close to the airport terminals, these companies have joined into ADOR, an association aimed at enhancing the area as the first business centre around Paris.

The airport authority currently develops a huge real estate project in front of terminal South: Cœur d’Orly.
The government has formed a public authority EPA ORSA in order to study a sustainable redevelopment of a zone extending from Orly to the Seine river (the last letter A stands for amont which means upstream of Paris). All administrative levels are included, from the state to the smallest towns.

2.3. Ambitions and implications for this pole

Declared strategic and priority Territory by National and Regional Government (SDRIF), it is meant to become the first economic and interchange pole of the South of Ile-de-France Region, keeping in place all industrial activities in their diversity, and linked with the future pole of Excellence at Saclay. This implies the need for the airport to generate the development of a true airport city. In order to make a success of the future business quarter Cœur d’Orly and the high-tech SENIA quarter, it is absolutely necessary that the airport can be rapidly reached from Paris and the business quarters and linked by high speed railways to regional and European capitals.

As far as the Great Food Market (MIN) is concerned, its capacity of development and growth and the creation of an international agro alimentary business zone can only be envisaged if MIN can enlarge itself, be better connected internationally, and be accessible to its employees.
The essential question is above all that of accessibility. Such a pole must at the same time benefit the connections on different levels of the territory and thus be part of the international, regional and local network. And this must be the case as much for the transport of people as for goods. It must achieve a real fluidity of all movements. It must finally possess real estate reserves permitting to reorganize and extend itself.

3. **NO PROJECT HAS YET TAKEN FORM**

3.1. **The consultation of Five Teams for « Greater Paris »**

In face of these stakes, five of the ten architect teams of the « Greater Paris » project have been consulted to think freely about the future of the Orly Rungis area. In spite of this relative freedom and the specific topography of the site, on which most of the teams are agreed, proposals from architects are limited by constraints. However, some of them explicitly designate the hillsides of the Seine and the Bievre valleys as major limitations to mobility. The industrial character of the site and the enormous size of the zone are mainly seen by architects as obstacles to an urban development.

3.2. **The issues of this exercise**

While the site requires a profound restructuration, the possibilities seem very limited. Indeed, a fundamental restructuration, which would solve the main problems and involve a real qualitative leap (as high as the ambitions), is not part of any proposals. Is it therefore necessary to give up a global restructuring project, in which the ideas and the scale are adapted to the regional planning perspectives? Is this space so full that we can only work on the interstices or call into question the very nature of their functions?

3.3. **The underground solution**

Even if Rungis market or Orly airport seem to be impenetrable entities and not belong to any urban life, the presence of such places of active and diverse employment is an opportunity and a rare advantage of this site. But one must find the means of accepting this industrial presence and resolve the problems of the cutting-up of the urban fabric, which is not so much imposed by this presence as by the brutality and lack of connection of the surrounding networks. Contrary to classical analyses, the problem does not arise from so many large industrial and commercial plants using lots of surface space but from the fact that all of them are on one and the same level, forming a huge and compact layer together with the access roads and railways. The only solution is to organize in levels, to argue in spatial terms and not just on the surface. Unfortunately, nobody thinks about the huge space reserve and development potential offered by underground space; that is why they cannot answer the problems and meet the ambitions. Instead of taking space as 2D, as city planners used to do, one has to consider it in 3D.

3.4. **The advantages of an underground project**

Technically, the Orly-Rungis plateau provides ideal conditions: its location with no danger of flooding, self-draining, accessible on level terms from the valley floor – it is a true case-study for the use of a huge volume of available space.

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Legally, its organization into large zones where the property belongs in each case to one and only one operator favors a global underground project.
Economically, the presence of big operators permits the sharing of equipment and infrastructure and thus financial savings.
In terms of decision-making, the big operators of the pole, be they owners and/ or administrators of the different sites have decided at the end of 2002 to create an association, ADOR, to promote the Orly-Rungis pole, in response to the wishes of the elected representatives of the Department.
But nobody has realised, neither planners nor decision-makers nor anyone else, that the subsurface may be integrated inside a global way of reasoning, thus all propositions of development of this pole content themselves with mere surface solutions.

4. ANOTHER APPROACH

4.1 The legal situation of the pole favors the development of the surface and underground in their entirety.

ADOR unites the six major economic players, which means that in the case of underground use that if these economic structures agree together (and when there are only six, a common interest is more easily found) on the projects which meet the objectives of the government, the use of the underground avoids the usual major restraints: one avoids a design of the occupation of the underground which is connected with the public entities on the surface one avoids the dependency on the limits of ownership, one avoids a legion of expropriation procedures of the underground underneath the surface properties, and one avoids the necessary « protection layer » between the surface property and the underground equipment.
This situation permits to conceive freely the best project in relation to the needs and to the program; its size equals the total volume of the big owners (or concessionaries) and the public entities.
It permits the existing equipments to enlarge themselves by diving into their underground to meet the underground networks. A joint property of the underground space may be envisaged, or indeed any other form of division of the volume.

4.2 Let’s imagine an underground ZAC (Zone d’Aménagement Concerté)

The procedures of surface development define a territory, inside which a strategic program is worked out which assures a financial balance between buildings with commercial potential and common equipment and infrastructure. This approach, usual on the surface, is far too rarely used for underground development in France, where the approach to the project includes only very exceptionally a territory in its entirety. With the exception of, notably, the district of the old Paris Food Market (Les Halles)! Why not do the same thing in the district of the New Food Market of Rungis?
In the underground, more than elsewhere, the sharing of equipment, infrastructure, and works permits a sharing of costs among all operators, and allows to argue for investment on a territorial scale, rather than the cost of one-off works. In approaching the development of this territory in such a way, it is possible to restructure the whole zone in a truly profound fashion, and to assure a shape which offers a really spectacular development.

4.3 The birth of a new concept

As early as 1992, the authors studied how one might benefit from the subsurface, and three early projects were proposed below the plateau:
- an underground extension of the express metro serving all three airport terminals (West and South passenger terminals and the freight terminal);
- an underground extension of Rungis market, with service roads and railways at a lower underground level, directly linked with the roads and tracks along the Seine.
- and why not some use of the huge currently sterile surfaces in between the runways and taxiways of the airport? underground streets could serve "islands" of industrial, business or commercial buildings located in craters, without any access to the classified airport platform...

Since then, the project has been extended to cover a high speed (TGV) train station under the airport (just between two passenger terminals), making it a perfect hub for fast transportation at both national and international level.

4.4. Today main proposals (Fig. 3)

Figure 3: View of dense future urbanisation of the Orly-Rungis plateau

Locating underground the main road and rail networks will allow level links with the main arteries along the Seine valley [4, 5]. That would apply to the service of the Market and the industrial park (as they are now connected). It would include a direct express metro link (RER) to three airport stations, one freight and two passenger terminals. The main east-west railway tracks shall be designed to accommodate TGV trains with an underground station below the airport, halfway between passenger terminals South and West.

Multi level multi purpose "logistics platforms" may be designed on several levels for any kind of transfer rail-road, rail-rail, road-road, air-rail, air-road, and for any size, from delivery inside cities to long distance thanks to the many networks available.
Great volumes of warehouse space at fixed temperatures, over or below zero Celsius, may be located not only to store the goods of the MIN, but also to extend and serve all the logistics zones in between the market and the airport along the model of the industrial parks of Kansas City underground. Excellent examples, indeed, can be seen in Kansas City, where more than 30 business parks gather 400 companies on more than 2 million square metres, most of them devoted to logistics. Thanks to its favourable relief and geology, Kansas City [2] is the real core of the food and many other commodities market in the US.

Underground storage of hazardous materials such as fuels may be located deeper, liberating the Seine valley from dangerous industrial sites.

Between the airport and the market, railway tracks trench should be turned into open air sport and leisure facilities, benefiting underground services on either side.

Conversely, as most of existing buildings are low rise, offices and flats could be situated inside taller buildings, provided separate access can be guaranteed through walkways at levels over or below grade.

Only such novel uses of underground space can liberate enough area at grade for designing a new urban environment, and so associate a major economical centre with a place for an agreeable urban life.

4.5. A Pioneer Project

The Market of Rungis distributes 65% of its capacity in the Paris Region. On all levels the transport of goods implies firstly the collection of goods and then repartition to the distributors. In an urban zone, the more dense it grows the more fluidity becomes necessary for the transport of people as much as for goods. The problem of distribution “to the last kilometer” is more evident from Rungis than from elsewhere.

The configuration of the plateau, the global and multi-purpose concept of development offers an opportunity for organization of an underground distribution departing from Rungis. This should profit from the new tunneling and structures of the future underground metro line by coupling it a network of small goods containers to the passenger transport.

The RATP (Régie Autonome des Transports Parisiens), is already thinking about such coupling which could galvanize old and new districts around the stations, both well provided and well frequented.

Originally the market pavilions were designed to accommodate goods trains under ground to the cold storage facilities (the volume of a whole metro station underneath the airport is still awaiting today the prolongation of Line 7 of the Paris metro.

If such a project would be realized, the Orly-Rungis pole could add to its development the pioneer and exemplary dimension of a territory organized to take into account both all the available space, above and below, and at the same time all the vital and human functions.

5. CONCLUSIONS

Few territories gather so many favourable advantages for an integrated surface and subsurface development than the Orly-Rungis plateau: rather flat surface over valleys on both sides, small number of surfaces.

The solution lies in a reversal of the traditional way of thinking: instead of going down from the surface, here one goes up from the valleys and from underground stations to the surface facilities.

It is time to take a new step in city planning: the “top” is decidedly not a lid, the subsurface may open up to light and free air.

There are many obstacles, into the heads, and from economical points of view, but not from techniques and utopias. The only way ahead is to convince. And this is the task we have given ourselves!
“There is plenty of room at the bottom”: this sentence of physics Nobel Prize Feynmann, at a Caltech conference in 1959, applied to the nanotechnologies, at the bottom of the dimensional scale. It applies better and better at the bottom of any territory: there is plenty of room underground. Can we earn how to use it better?

REFERENCES