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An alternative social housing project

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This project was originally presented to the public national competition Caixa - IAB Award 2006 and intended to be a qualified alternative to what has been built in our country in the social housing field. Accordingly, the project provides solutions not just to the individual residential units but also for the whole set of units, conforming buildings, and their relationships with the surroundings. The examples we know of in our country, in most cases, are unable to solve these two points concurrently: whether the residential units have quality but the urbanistic aspect of the whole is poor or the whole is qualified but the units are not.

This proposal aims at simplifying the creation of architectural ensembles that configure good quality neighborhoods which would be sustainable over time and make efficient use of land, all without generating excessive density. However, urban quality is not independent from the design of the individual residential units.

Accordingly with the purpose of providing housing at the lowest possible cost, without giving up of a minimum quality standard, we understand that flexibility is a major attribute of any multi-family housing project. The proposed solution incorporates this concept in two equally important ways. On the one hand, each unit could have its internal distribution modified by its dwellers' initiative, within a well-defined architectural frame, simply opening or closing doors and sliding panels. On the other hand, the very definition of units' sizes and their arrangement per floor could be left open until the end of the construction since spatial and services structures allow the formation of different sizes of apartments - the project consists of 58, 78 and 98 m² units yet larger apartments could be easily created. This means that users could acquire the unit within their financial scope.

Another unusual aspect of the proposal would be, instead of traditional apartments, the availability of residential space area that would be fitted with the equipments that users wished within the possibilities offered by the project.

The proposal intended to fit the PAR 6 SM Program (an official residential leasing program for purchasing units before construction) of the public bank Caixa Econômica Federal. However, matching features as comprehensive as those established by Caixa within proposals aimed at housing innovation and evolution is a difficult task. Most probably we were overly optimistic about this proposal's compatibility to what Caixa has been sponsoring in Brazil.

Place

The chosen site is located at 350 Benjamin Constant St., Niterói, RJ, covering an area of 36.357 m² in an upward sloping terrain. This was one of the sites offered by Caixa Econômica Federal for the competition.

A system for housing

The proposal is not exactly a specific housing project to a precise location although, ultimately, it comes to be.

We propose a system whose embryo is the unit's cell. These cells can compose different size buildings, which could be grouped differently, resulting in housing ensembles adaptable to a wide variety of sites and urban situations.

The housing cell

Flexibility and habitability are the main attributes of the proposed units. Use flexibility since spaces are not tied to a particular activity and transformation over time, following the changes in residents' life.

The proposal consists of dual orientation units composed by three parallel stripe-like spaces. The two peripheral stripes are aimed at extended use activities (sleeping, eating, living etc.) and are served by technical cores (kitchens, bathrooms and closets) located in the inner stripe, which is not bound, *a priori*, to any of the extended use spaces (Figure 1).

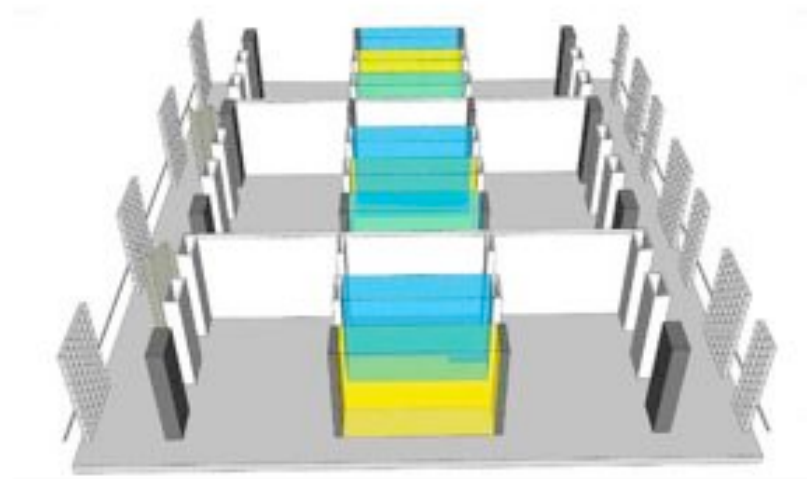


Figure 1. 3D scheme of a typical apartment.

Each stripe has 3.6m of depth and variable width. In the other direction the modulation is 90cm. This allows alternating technical cores with corridors that serve whether as transversal circulation or as necessary space for using these cores.

All three types of service cores have the same dimensions (3,60m x 2,75m x 0,90m) and integrated sliding or pivot doors and house strictly equipment and cabinets. Thus, the resulting spaces between them earn a dual character: when the core doors are open the interstitial space acts as private sector, and when these doors are closed space joins the common area (Figure 2).

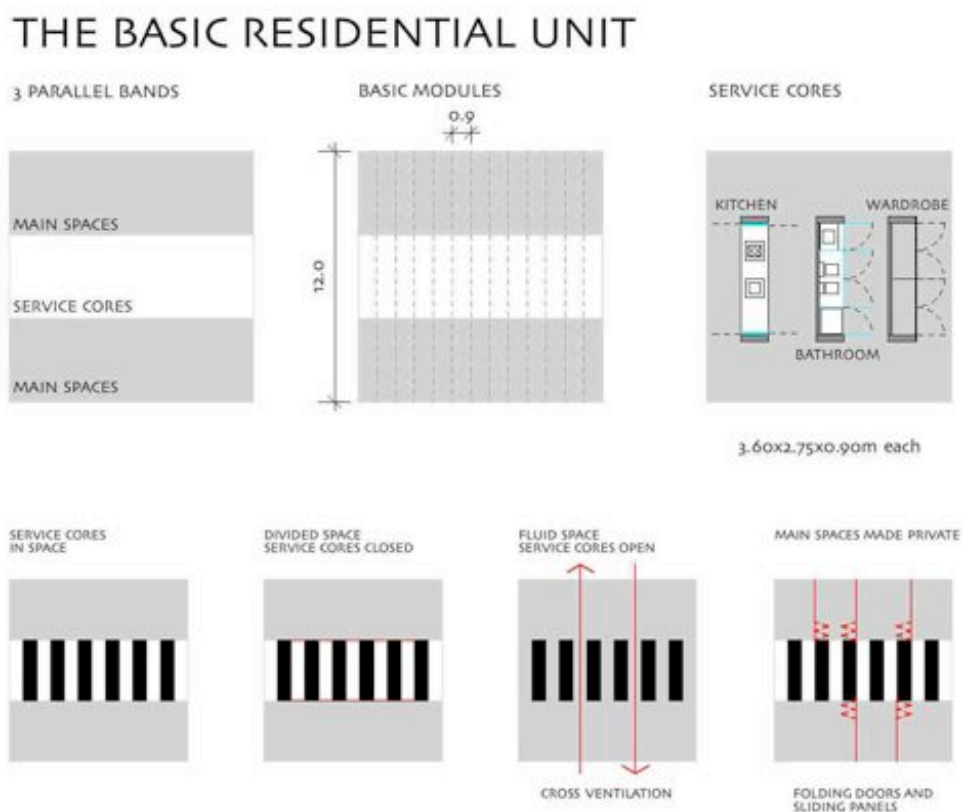


Figure 2. Basic housing unit - schemes.

This represents space saving and overcoming the traditional concept of pre-defined and static service elements. Ideally, these cores would be industrialized, allowing reduction of costs and increasing alternative choices, but they can also be made by traditional methods.

The arrangement in parallel stripes combined with the core doors and with folding and sliding panels allows great flexibility for configuring the living spaces and the circulation within them.

Thus, the difference among the three types of apartments is not in their plan configuration but in the number of modules and cores each one of them contains (Figure 3).



Figure 3. Standard units - layouts.

The service cores would not be built on site but come ready for installation in the construction, as for instance a prefabricated kitchen. The core containing toilet facilities, as all equipment occupy separate cubicles, provides variety of use. It can be used as a traditional bathroom - by opening both doors at the core edges - or individually (Figure 4). The same principle applies to the cores with kitchen facilities and wardrobe/deposit: the movement of its doors determines whether adjacent space will be used for circulation or be restricted to activities related to that core (Figures 5 and 6).

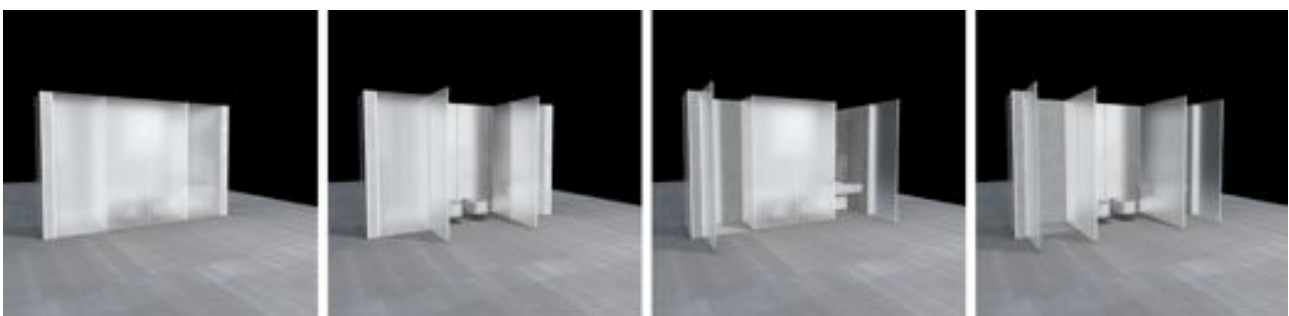


Figure 4. Sanitary core.



Figure 5. Kitchen core.

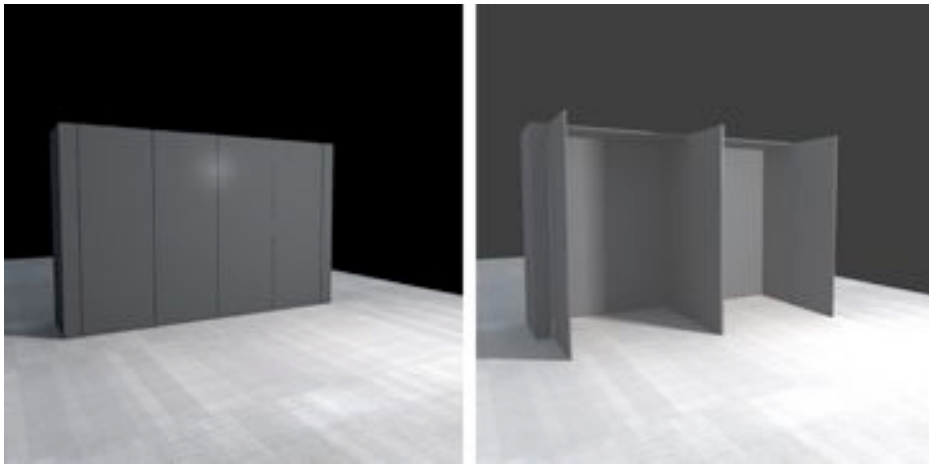


Figure 6. Wardrobe/deposit core.

The theme of flexibility extends to the possibility of dividing the extended use spaces through sliding or folding panels (Figures 7 and 8), to the central stripe permeability (Figure 9) and to the use of built-in beds, a type of furniture that allows spaces to be used as living rooms or workplaces during the day and as bedrooms at night, extending the use of the unit (Figure 10).



Figure 7. Flexibility example 1.

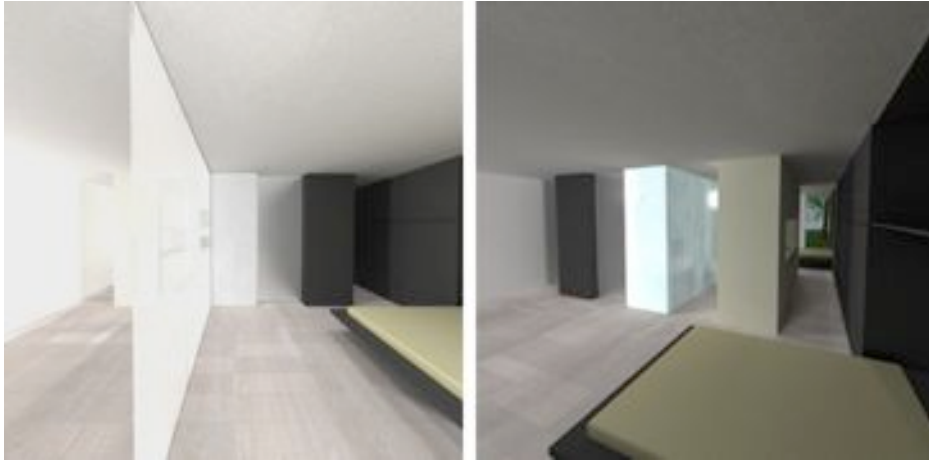


Figure 8. Flexibility example 2.

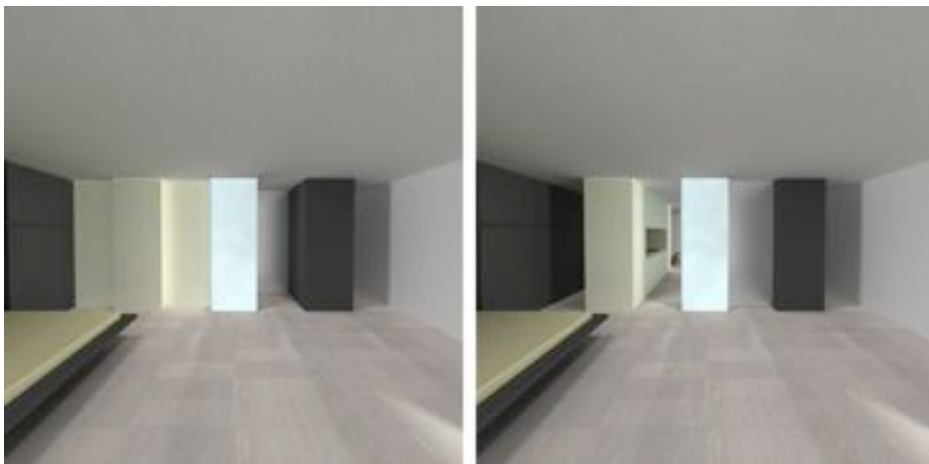


Figure 9. Flexibility example 3.



Figure 10. Wardrobe modules with built-in beds.

As a demonstration of the many occupation possibilities for such proposed spaces, we made alternative studies for apartments with 58, 78 and 98 m², ranging from 1 to 4 bedrooms - to use conventional nomenclature (Figures 11, 12 and 13).

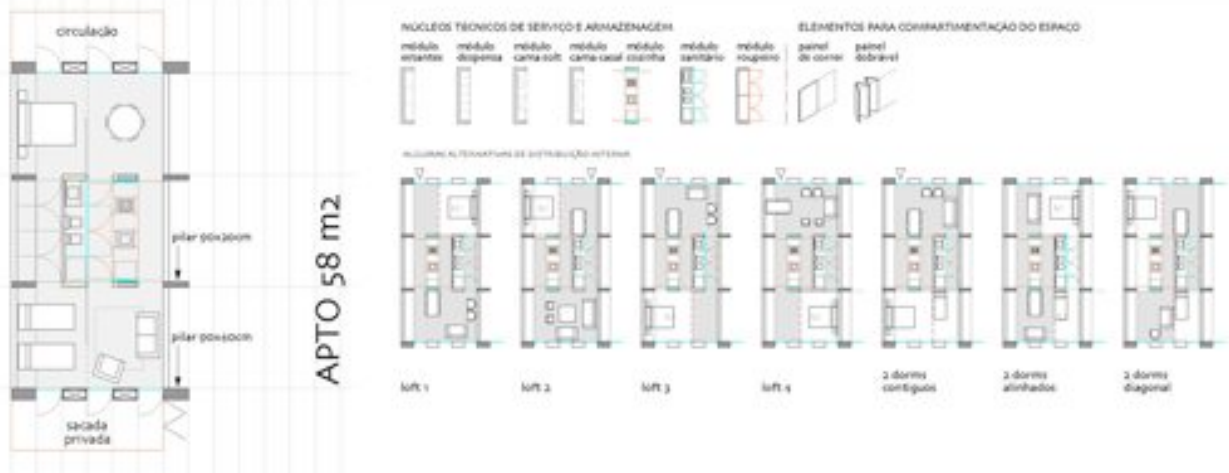


Figure 11. 58m2 apartment and some variants.

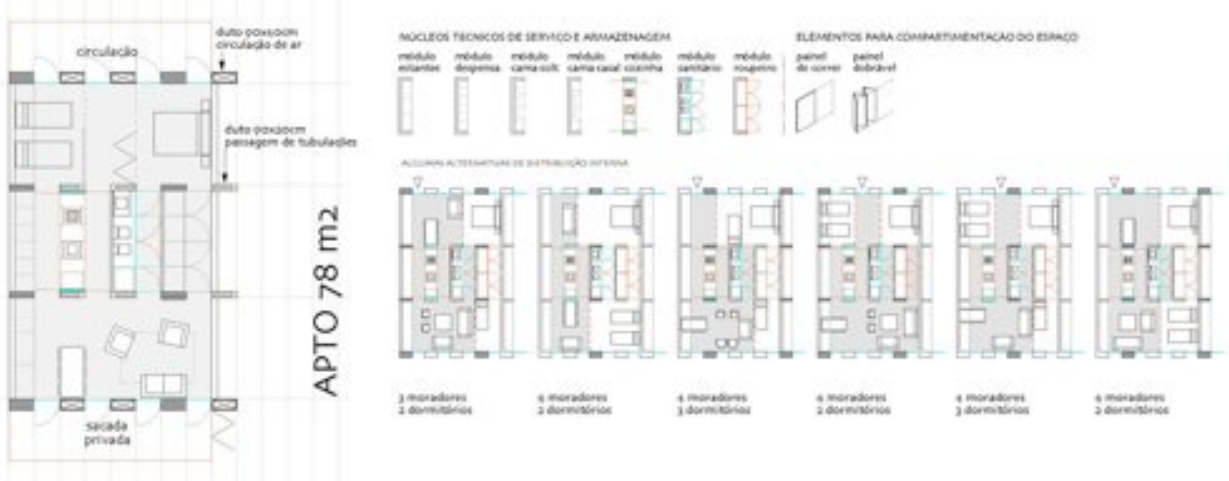


Figure 12. 78m2 apartment and some variants.

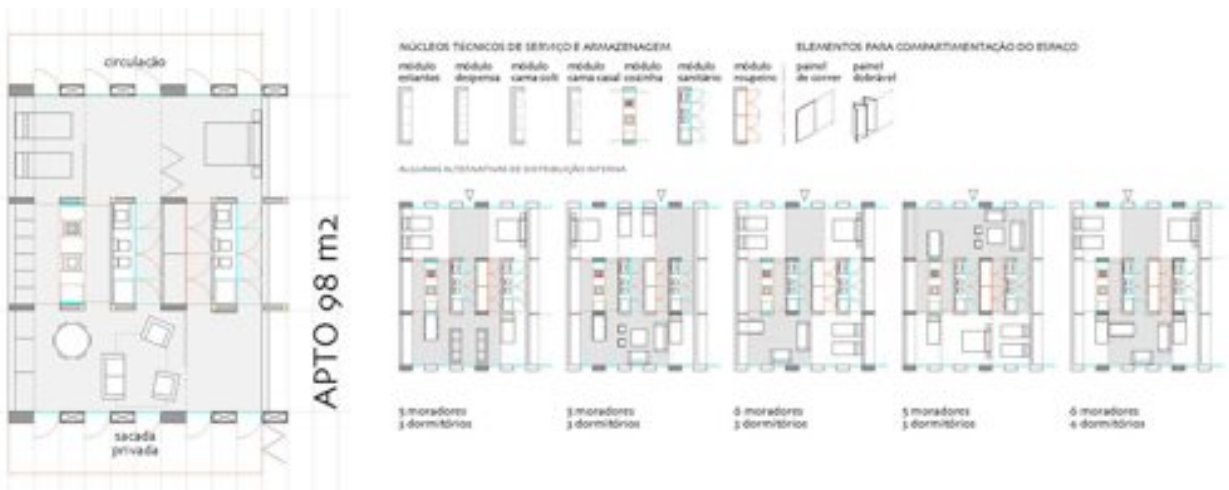


Figure 13. 98m2 apartment and some variants.

Buildings

The elementary and neutral nature of the units solution - two spaces with centralized technical cores - allow them to be linearly grouped forming bars of different sizes that can be rotated, folded and turned into various orientations.

The circulation system consists of vertical circulation cores that could be disposed either within or at the edges of the buildings, associated with corridors / balconies along the buildings. Thus, the apartments are open to horizontal circulation on one side and to private balconies on the opposite side.

The way floor plans and construction system were conceived allows great flexibility in the vertical disposition of the apartments types, so sections can be varied, as seen below (Figure 14). Whenever possible, the ground floor of each building would be used to non-residential activities: shops, workplaces, nurseries etc. (Figure 15).



Figure 14. Urban unit - schemes.

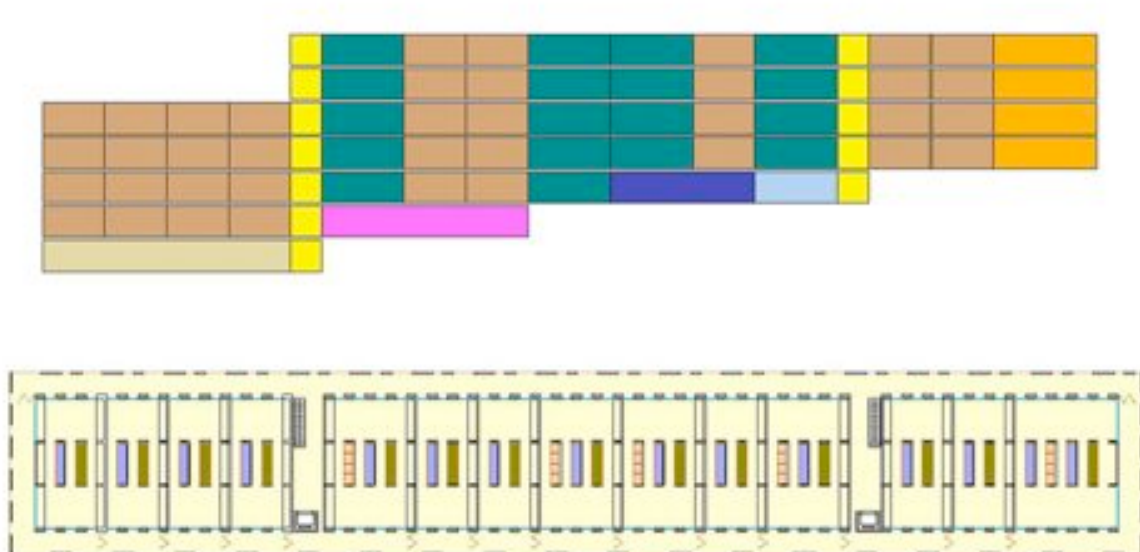


Figure 15. Urban unit - schematic plan and section.

The urbanistic project

The proposed ensemble aims at creating conditions for a dignified and more comprehensive life for its inhabitants. Accordingly, there must be a balance between the quality of units and open spaces, essential when it comes to social housing.

The placement of buildings seeks to create a real place, where the open spaces dedicated to leisure, meeting and contemplation, foster a sense of community, security and high self-esteem.

Thus, the five buildings are arranged following the slope in order to generate terraces, parks and sports fields, in different degrees of privacy. A hierarchy of open spaces was created with a main square in the center and smaller areas between the blocks receiving several activities.

The presence of automobiles was not excluded from the project but limited to its peripheral area, where the parking lots are. In other situations, parkings could be under the buildings (Figure 16 and 17).



Figure 16. Location and overall elevation.



Figure 17. Location: distribution of uses.

Constructive system

It consists of two outer rows of 40x90cm pillars, 90cm apart each other, creating spaces to install doors and windows, and two interior rows of 20x90cm pillars equally spaced every 90cm.

Some are precast massive pillars, forming a structural grid whose module is 5,40 x 3,80m between axes. The others are hollow precast pillars which serve for air circulation (external pillars) and for plumbing. This way, electrical and hydro-sanitary installations distribution is organized and future modifications are simplified (Figures 1, 11, 12 and 13).

The flat slabs are 25cm thick with 3.6m internal spans and 2m cantilevers.

Habitability / natural conditioning

Two aspects for natural conditioning are essential considering Niterói's climate: avoiding direct solar incidence and ensuring air circulation and renewal.

Solar shading is ensured through the cantilevered slabs surrounding each building along with perforated concrete blocks (cobogós) panels. On the balconies, rollup awnings offer an additional protection that can be controlled by users (Figure 18).

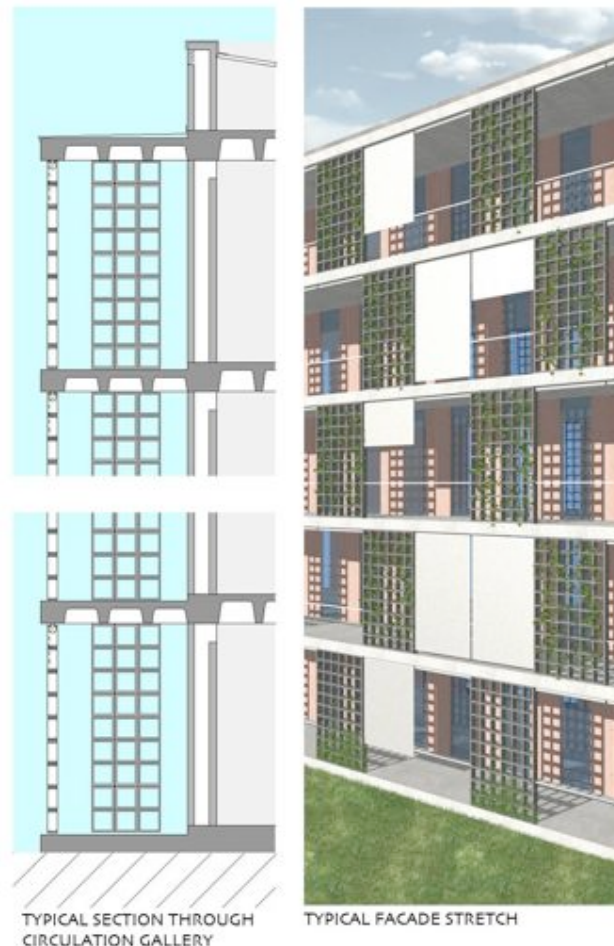


Figure 18. Detail section and solar shading solution.

The air renewal happens in two ways: by cross ventilation as each apartment has two opposite facades, and through a natural convection system that utilizes the hollow pillars forming the apartments' vertical limit. Passing through underground rainwater tanks, refreshed air is admitted at the base of some of these pillars. The exhaustion of warm vicious air is done through vents located at the top of other peripherals pillars, near the slabs, taking advantage of air upward movement (Figure 19).

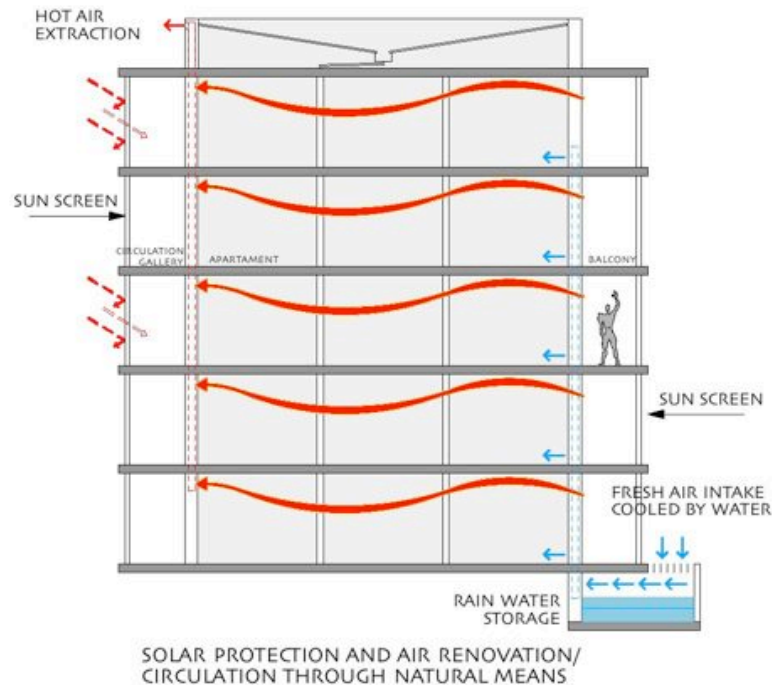


Figure 19. Solar shading scheme and air circulation / renewal.

Sustainability

In addition to solar shading and use of natural ventilation, a series of measures were taken to reduce waste and pollution, obtaining maximum efficiency in the use of non-renewable resources and preserving nature in its all aspects.

Solar power: taking advantage of the high incidence of solar radiation typical of the region, all water heating would be done through solar heating systems placed on buildings' roofs.

Rainwater: stored in tanks located in the underground of buildings, pluvial waters would refresh the air that enters the units and be used for watering vegetation planted on the ground. Pluvial water would also be stored in containers located on the roofs for use in toilet-flushing in the apartments.

Clean sewage: wastewater would be recycled for use in all cleaning services and for washing residents' cars.

Garbage separation.

Controlled use of electric power.

Permeable floors in the external areas; paved areas would have a predominance of elements that ensure its permeability.

Estimated budget

It is estimated that each 58m² apartment would cost approximately R\$ 28.000,00 and R\$38.000,00 the 78m² ones.

Epilogue

It is necessary making a comment on the competition in which the above described project was entered.

The current social housing programs in Brazil allocate resources to build a significant number of residential units. But these programs are unconcerned with the final product's quality since the projects are left in the builders' hands. Our bureaucrats forget that the housing problem - and especially social housing - is not a merely quantitative question. It includes not only the quality of residential units but their whole set. Quality in the sense of urban spaces that are created and infrastructure that must be provided for those places to become real neighborhoods and not mere dormitories.

The Caixa Econômica Federal - funding agency for most social housing projects in Brazil - has held since 2004 competitions in order to "bring good ideas to social housing field". This is an official recognition that social housing's quality is very low. However, every two years Caixa awards several projects and does nothing with them but to leave them in some drawer in Brasilia.

While abroad there are hundreds of competitions for social housing projects that are built, in Brazil - with an acute need for quality in this sector - the main responsible institution takes the liberty to hold competitions that lead to nothing while keeps funding the construction of dormitory neighborhoods with terrible quality.

Note: This proposal received no comments from the judging commission.

Project: Edson da Cunha Mahfuz, Manuel Cerdá Perez

Collaborators: Pau Batalla, Ana Paula Alcantara Gomes e Franco Barella

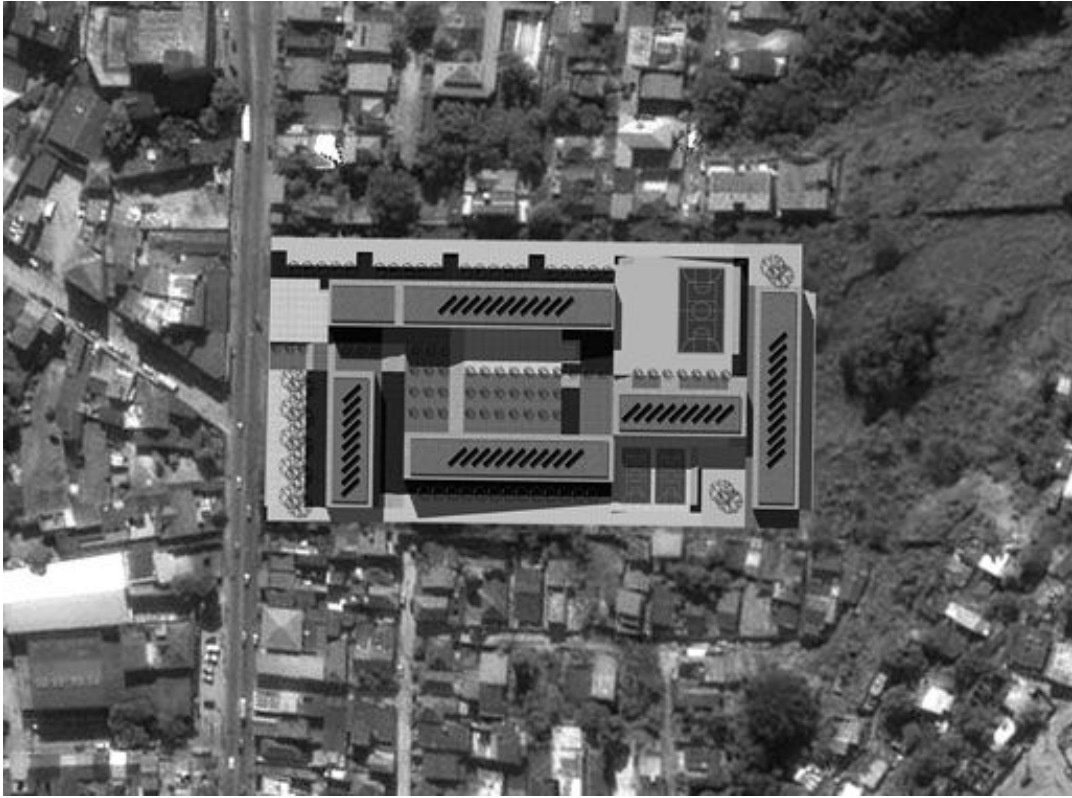


Figure 20. Ensemble location in Niteroi's context.



Figure 21. Top view.



Figure 22. Top view.

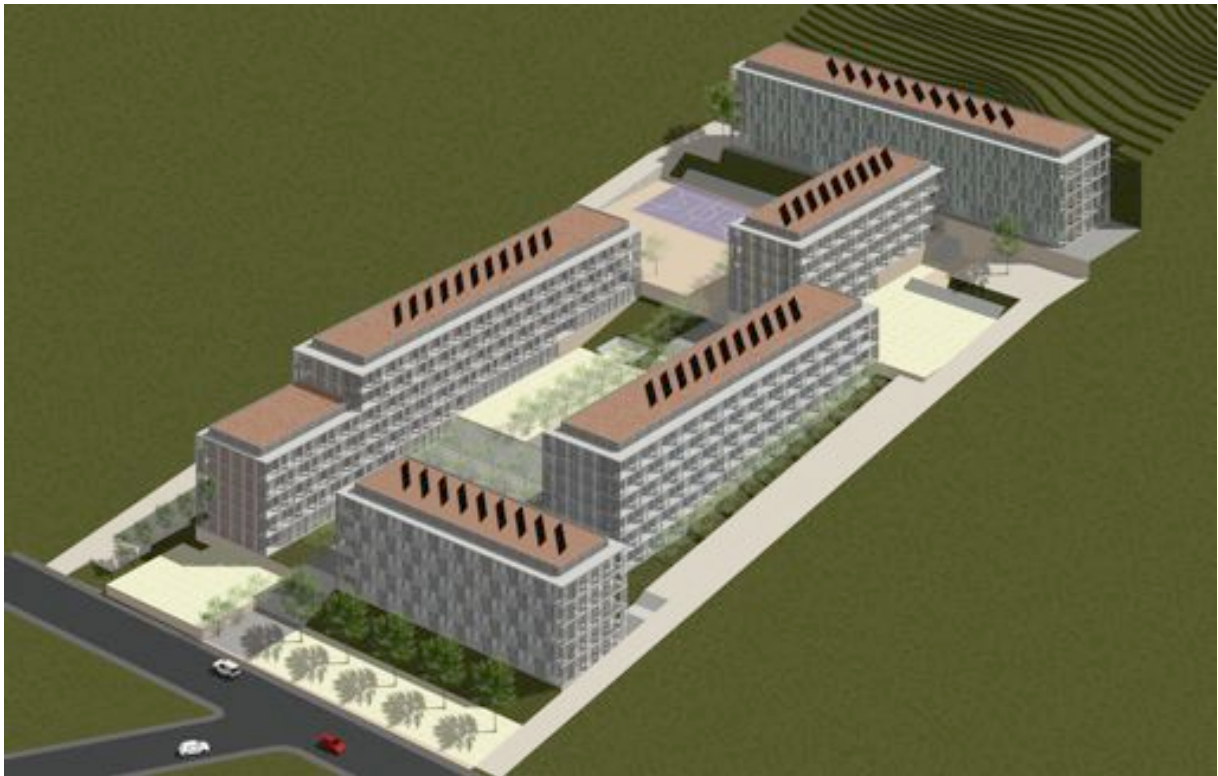


Figure 23. Top view.



Figure 24. Ensemble view from the access avenue.



Figure 25. Main access.



Figure 26. View of the main semi-public space from the ground level.

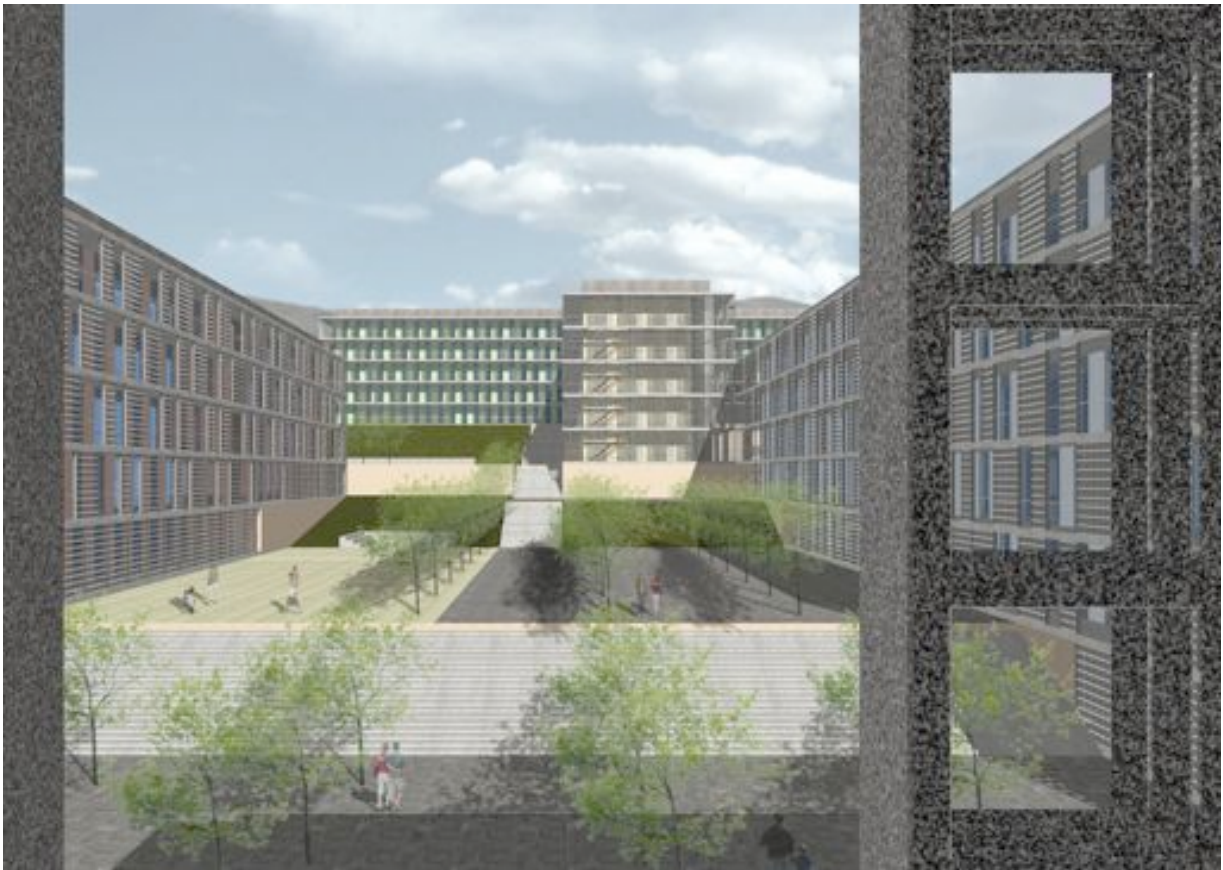


Figure 27. View of the main semi-public space from the circulation gallery of a surrounding building.



Figure 28. View of the main semi-public space from the circulation gallery of a surrounding building.



Figure 29. View of an open space between two buildings.



Figure 30. Ensemble view from the building at the most extreme and higher point.



Figure 31. Buildings circulation gallery always focusing public spaces.