



*by Ashraf Salama*

## **200 Units Housing Project**

*Wilal Djallal, Biskra, Algeria*



**Architect**

*Hany El Miniawy  
Aldel Rahman El Minawy*

**Client**

*Biskra Governorate*

**Design**

*1985*

**Completed**

*1988 - 1993*

## **I. Introduction**

This public housing project comprises two hundred units in Wilad Djallal town, located in the south-western part of the Biskra region in east-central Algeria. It is set in a mountainous desert area, characterized by scattered settlements and small villages, and serves a wide variety of middle-class families. The project as it was finally realized is the result of collaborative efforts between the architects and the local authority. With the clear aim of being responsive to the culture and environment of the region, the design and construction were developed over a period of more than ten years, based on social studies and surveys and a strong awareness of regional identity. During the course of the project, similar housing developments were built in the region by the same architects, employing the same technology, and adopting the same design features. The technology incorporates local construction techniques into standardized modern modes of construction. Through sensitivity to the climate and to the cultural traditions of the inhabitants, the reinterpretation of socio-spatial needs into a built form for public housing has resulted in a residential environment that is both functional and efficient.

## **II. Contextual Information**

### *a. Historical background*

In the early 1980s, the Algerian government initiated a decentralization policy, the purpose of which was to encourage regional governments to build new communities so that the population did not concentrate in the capital, Algiers, and new regions in the south could be developed. The government would donate the land and funds to encourage the establishment of moderate-cost housing projects. In turn, each local housing authority would be responsible for organizing and overseeing the processes involved in these projects in terms of design, construction and project management. For this project, Hany and Abdel Rahman El Miniawy (El Miniawy Brothers), who had first worked in Algeria in the mid-1970s, were invited by the Biskra regional government to develop preliminary studies in 1981, develop design concepts in 1983–84, followed by the concept development stage in 1985–86.

The Wilad Djallal Housing Project was seen as an opportunity to give local populations from different scattered settlements a place to live, as one of their constitutional rights, and to create a new community in a desert environment. Most of the prospective beneficiaries did not possess the means to purchase a decent home. The target users were not specified because of the wide range of people with different cultural backgrounds coming from small desert settlements; however, the population, like that of any North African region, has distinctive religious traditions, apparent in their cultural practices.

The Wilad Djallal Housing development is one of a number of projects carried out in the region between the early 1980s and the mid-1990s by El Miniawy Brothers in collaboration with the Biskra regional government. The aim of these initiatives was to create and develop residential environments that were responsive to local needs and could be effectively and sensitively reproduced in different parts of the Biskra region.

*b. Local architectural character*

The prevailing vernacular architecture is largely built from abundant local materials, the most common being *toufla*, a kind of desert mud that can be shaped into bricks of varying dimensions. Until the early 1970s, most buildings in the area were made almost entirely from this material, along with local limestone extracted from nearby mountains. The roofs were often constructed from palm trunks or formed brick vaults; later, it became common to build a concrete skeleton, infilled with *toufla* bricks, and roofed with reinforced concrete.

Evening activities take place on the roof, where most people sleep. However, the impact of the severe desert environment on buildings in the immediate area is evident, most of them being in poor condition. The dominant use of arches and arcades in the first floor of most residential buildings in the Biskra region is indicative of the need for shaded open spaces. The majority of the buildings are finished in shades of yellow and are often indistinguishable from the desert landscape.

*c. Climatic conditions*

This part of Algeria experiences extremely dry weather, with a low percentage of relative humidity. Winter temperatures range from 6 to 18°C and night temperatures drop to -5°C. Summer temperatures soar to between 38 and 48°C, with night temperatures of 16 to 20°C.

The area enjoys a limited rainy season from December to January, however, in recent years, the rainfall has been minimal. Usually, during the rainy season, there are moderate downfalls but not enough to sustain any kind of agricultural activity. Seasonal winds (*khamasièen*) cause sand storms in the region from mid-March to mid-May.

*d. Site context*

The site of the Wilad Djallal Housing Project lies in the south-western part of the Biskra region, approximately 120 kilometres from the city of Biskra, in an area characterized by scattered settlements and small villages. The site is triangular in shape and is encircled by roads. On the north side of the site is a major highway leading from Biskra towards the village of Sidi Khaled, then south-west towards Kasr El Hirane and Laghouat.

The area immediately around the site is dominated by residential buildings constructed in the 1980s. North of the site is a later housing project that reproduces the same design but in different materials and finishes. This development is composed of eighty units.

The site can be accessed by vehicles from the highway and from all the surrounding streets except from the north-eastern side. Landscaping is non-existent, but a minimal quantity of tiled walkways have been included for pedestrians. The surrounding natural landscape and desert formations are untouched.

e. *Site topography*

The site was uniformly composed of sloping sand. It slopes from east to west with a variance of 2.5 to 3 metres.

### III. Programme

a. *Objectives*

The government policy on decentralization, the need for public housing, and the growing population of the small desert settlements all led to the decision by the Ministry of Housing of Algeria to enable local authorities to develop housing projects in desert areas. As a result, the land was donated by the government, a budget allocated, and the project commissioned in collaboration with the housing authority of Biskra regional government.

The public housing project of Wilad Djallal was part of a larger programme that sought to accommodate the growing desert populations and create semi-urban environments in a mountainous desert region with an exceedingly hot, dry climate. In addition, the government aimed to encourage the relocation of an educated section of society and to develop the region in urban terms. The goal of the programme was to construct a large number of housing units, varied in surface area and contextually appropriate, in order to encourage people to move away from the crowded cities and/or to relocate other strata of society living in poor, primitive conditions in the nearby small desert settlements.

b. *Functional requirements*

The lasting impact of French Rule in Algeria is apparent in the model of apartment types proposed for the project by the Ministry of Housing which is nearly identical to the housing standards used in social housing programmes in France. The four types put forward were F2, F3, F4 and F5, the number indicating the quantity of closed rooms. All of the dwellings were to have utilities and a living space. Due to the limited budget, the target for the floor areas of the apartments was set at no less than 60 square metres and no more than 115 square metres.

Following the conceptual design stage, El Miniawy Brothers proposed modifications to the programme that initially seemed to be standardized and not to relate to the socio-cultural backgrounds of the expected inhabitants. They proposed trimming the areas of the closed rooms and adding 10 per cent more floor area in order to realize a domestic space that incorporated peoples' general needs. The intention was to create an environment that was similar to the one the inhabitants were used to. As a result, a guest room (*madiafa*) was added, in some cases with direct access from the front door of the apartment. In addition, two patio spaces were added: one central and directly linked to the *madiafa* and the apartment doorway, the other off the kitchen/utility space, intended for hanging out washing. The latter is often called the women's patio (*harim*). It was also proposed that some of the larger units be designed in a split-level (duplex) manner to suit the overall staggered effect of the proposed design.

With these amendments in mind, it would appear that the architects had critically appraised their brief based on social studies they had carried out. The amendments in turn opened up an avenue for the incorporation of traditional techniques exemplified by thick stone walls, wooden screens across openings, and systems to encourage airflow to improve the domestic microclimate. It is significant to note that the architects had key considerations in mind which influenced their approach to design: they were committed to criticizing and going beyond the so-called 'classic manner of solving mass-housing problems'.

#### **IV. Description**

##### *a. Project data*

The Wilad Djallal Housing Project comprises 200 units that vary in surface area. All of the units are two or three storeys above ground level. The complex is a staggered massing of cubic volumes with minimal articulation other than screened openings. Public spaces and walkways spatially separate the clusters of units. The built area of the 63,000-square metre site was increased at the request of the architects from 60 per cent to approximately 70 per cent of the whole. In addition to the built area, 15 per cent of the site was allocated for interior patios. The footprint of the complex is 45,000 square metres and the total combined floor area is approximately 85,000 square metres, including the ground floor.

F3 schemes formed the majority of the units in the project, accounting for about 50 per cent, while F4 types accounted for 30 per cent, and F2 and F5 units each represent 10 per cent.

##### *b. Evolution of design concepts*

As the target population for the project was unspecified, it was difficult to define the design imperatives and criteria pertaining to the users, so the architects conducted social surveys and met with some of the expected occupants to investigate their cultural traditions, lifestyles and spatial requirements. This was motivated by the request of the Biskra regional government for a preliminary conceptual design study. As a result of this process, the architects were able to determine and define an architectural programme that met the standards imposed by the housing authority while at the same time satisfying the requirements of the expected users.

The location was selected by the regional government of Biskra, while the precise siting of the project, its orientation, and the distribution of units were determined by the physical surroundings, particularly the existing buildings and the highway. It is important to note that the highway at the time of design and commencement of construction was not fully paved and was not a major road. In 1987, it became a major regional road, leading to the south-west.

Climate was the most influential factor on the design of the project. This was addressed by staggering the masses of the complex and projecting the rooms on the upper floors to maximize shade. The small, narrow openings, with wooden screens similar to *mashrabiyya*, allowed for minimal thermal gain. The use of thick stone walls also helped create cooler interiors. The staggered units and the close proximity of the clusters supplied the idea of developing hierarchical spaces and creating shaded walkways.

It appears that the modifications made by the architects to the original programme have increased the quality and quantity of social spaces. The intention was to provide a more responsive spatial organization that corresponded to the socio-spatial requirements of the expected users.

The clustered massing of cubic volumes is simple and is emphasized by the use of unfinished limestone. Façades are mostly solid with minimal voids that are articulated by wooden screens. A local device called a *claustra*, composed of densely overlapping gypsum screens of traditional shapes, is used in the upper section of handrails on the patios and stairs. The exterior patios serve as public spaces between the volumes and are intended for general social interaction. Different levels of privacy were incorporated into the design of the individual units to sensitively take account of the local traditions of this Muslim community.

Limited attention has been paid to landscaping. The pavements and some pedestrian paths are tiled with inexpensive steel-crete tiles which are readily available and are durable. Outdoor spaces are devoid of any soft-scape elements and are often articulated with hard surfaces such as pavement and tamped sand.

Of significance to the assessment of the Wilad Djallal Housing Project, it should be noted that the site to the north of the scheme has been developed using the same design and architectural treatment and its eighty housing units are regarded as an extension of it. The project has been reproduced in several settlements in the region but with different spatial arrangements, including the Sidi Khaled housing project which comprises one hundred units.

c. *Structure, materials, technology*

Lime-sand stone extracted locally was used for the construction of the load-bearing walls that are 40 to 50 centimetres thick. Thus, the stone acts as both a basic structural system and as infill. Double walls are used in southern and western façades. Partitions of interior walls are non-load-bearing and are 20 centimetres thick. Some interior walls are constructed of lime-sand stone and some are built of *tufla* bricks.

Floors, roofs and beams are made of reinforced concrete, as are the interior and exterior staircases. Since the exterior walls are made of stone, exterior finishes were unnecessary, so no finishing materials or renderings have been used. Mortar used for stone bonding is composed of cement and pulverized lime-sand stone. Painted plaster is used to finish interior walls, and cement tiles with coarse pebbles are used for flooring.

The choice of these materials should be seen in the broader context of the wide range of resources available for the construction of houses and the government policy of developing mass-housing projects. The architects insisted on the use of stone as a basic construction material, which was unusual in public housing projects at the time.

Due to the simplicity of the construction system, non-skilled labourers were given the opportunity to take part in stone laying and other construction tasks, thereby providing training opportunities on construction techniques. First, stone walls were built a storey high to the level of the first floor; reinforced concrete beams, manually cast on site, were then lifted and positioned over the stone walls; steel ribs and members for floors were arranged and fixed to the beams; and finally

cement concrete was poured over to shape the floors. The same process was repeated on the upper floors. In order to resist the frequent earthquakes, steel posts were imbedded in the stone walls. The corners of the units and clusters were tied together with the beams acting as supporting elements.

Electricity and sewerage are provided to all the units and are linked to the existing local networks. Underground reservoirs are the only source of water in the region. These reservoirs exist at two levels, one 15 metres below ground and the other much deeper down. The former has been partially polluted by inefficient drainage systems so the latter is used. Water is pumped up from the reservoirs and stored in municipal tanks that are linked to the units. The water is unpurified and unfiltered and so is only used for washing, bathing and for the removal of sewage. Reportedly, water comes out of taps at 50 to 60°C and there is no piped cold-water supply. For drinking, bottled water is used.

*d. Origins of technology, materials, labour force, professionals*

The origins of the technology utilized in the Wilad Djallal Housing Project lie in the analysis that was part of the preliminary design studies undertaken by the architects. The technology derived from resistant approaches used in the construction of public housing schemes, coupled with a desire to erect a housing complex that was appropriate for the climatic conditions and sympathetic to the construction traditions of the region. The resistant approach adopted in the construction of the project was seen by the architects as a balance between constructional and building traditions and the standards and norms enforced by the government. Thus, a combination of load-bearing stone walls and reinforced concrete has been employed. The modularity and simplicity of this 'resistant technology' was easily undertaken and replicated in other parts of the Biskra region once some of the units at Wilad Djallal had been completed. It is important to note that any visual links that might exist between the cubic volumes of the complex and forms of traditional houses is likely to be unintentional.

The use of stone and *tuf* bricks in this climate was a natural choice, characteristic of the region, and so it satisfied an important design objective which was to use local materials appropriate to the architecture of the area. Cement was used in the construction of beams and roofs, and, when mixed with pulverized lime-sand stone, as mortar. It was also used as a base for floor tiles. Other materials used in construction included timber for doors and *mashrabiyyas*; these were made locally in Biskra workshops. Glass blocks were not used in the Wilad Djallal project but were used in the replicated project at Sidi Khaled for natural lighting.

It was the goal of both the housing authority in Biskra and the architects to develop regionally inspired architecture and not to fall into the trap of designing and constructing poor idealizations of Western concepts.

*Labour force*

The labour force consisted entirely of local people.

## *Professionals*

Most of the professionals were of North-African origin. The contractors were a local company, Intercom. The client, the housing authority of Biskra regional government, was represented by Abdel Aziz Merrakchi, a civil engineer who was also involved in supervising construction in the early stages of the project. The architects were Egyptians. Having lived in Algeria and this region in particular since the mid-1970s, the El Miniawy brothers had a strong sense of the region's architectural identity and local cultural traditions.

## **V. Construction Schedule and Costs**

### *a. Project history*

Since the early 1970s, the Central Ministry of Housing of Algeria had planned to construct public housing projects in different desert regions; however, this intention was not realized until the mid-1980s.

The Wilad Djallal Housing Project was conceived among other housing developments built in the region. The government donated the land for the project in 1980 and the housing authority of the Biskra regional government was assigned to carry out the technicalities for the project at that time. In 1981, El Miniawy Brothers were invited to produce initial design studies. Throughout that year, the architects conducted social surveys and drew up the preliminary proposals. Because of delays in the allocation of the budget for the project, the regional government of Biskra could not proceed with the development until 1984 when El Miniawy Brothers were asked to develop preliminary design schematics which took several months to be approved. Finally, in April 1985, the architects were commissioned to develop a complete design proposal, a stage that took nine months and ended in January 1986.

Due to financial difficulties, construction did not begin until March 1988. It is significant to this assessment to note that, using a very limited budget allocated by the local housing authority of Biskra, the period between 1984 and 1988 saw the construction of a few units in the immediate vicinity of the site to test the design concepts and to canvass feedback from the expected target population.

The Wilad Djallal project was constructed incrementally and took five years to be completed, however, no records delineating the number of units that were built in different construction phases between 1988 and 1993 were seen. Occupancy began after the completion of each phase, and the project was completed in 1993 followed immediately by full occupancy.

### *b. Total costs and main sources of financing*

According to the architects and Abdel Aziz El Marakshi who represented the housing authority of Biskra, the Wilad Djallal project was completely funded by the government of Algeria and an amount equivalent to approximately 5.6 million USD was allocated. However, it has been impossible to determine the actual cost of the project since records were not accessible from the

Algerian authorities involved in the project. According to the architects, the budget breaks down as follows:

|                    |                |
|--------------------|----------------|
| Infrastructure:    | 560,000 USD.   |
| Labour:            | 2,670,000 USD. |
| Materials:         | 2,000,000 USD. |
| Landscaping:       | 170,000 USD.   |
| Professional fees: | 170,000 USD.   |

*c. Comparative costs*

It is not that significant to look at direct comparisons between the cost of the Wilad Djallal project and similar projects since the material technology employed in Wilad Djallal is considered unusual compared to the conventional construction techniques used in other schemes. The initial cost per square metre was 66.50 USD. However, it is vital to note that, as the budget was estimated in 1988 and the project was completed in 1993, it is believed that actual costs increased by at least 25 per cent due to inflation, shown by the changing prices of materials and the increasing costs of labour.

*d. Maintenance costs*

Although maintenance and ongoing costs were available from neither the architects nor the local authority, one should note that there are traces of water damage on the walls. This may have been caused by either rainfall or underground water. Some stones on the corners of façades and external stairs are crumbling and some wooden screens have been destroyed due to inappropriate use. These problems are by no means related to questions of design but should be addressed.

## **VI. Technical Assessment**

*a. Functional assessment*

The planning and design of the Wilad Djallal Housing complex appears to follow a rational approach to deal with public housing environments. The conception of the exterior structures seems to be a classical adoption of a rigid modular system. The planning of the project employs traditional concepts appropriate to desert environments, epitomized by a number of semi-hierarchical public spaces. On the one hand, semi-covered spaces and walkways are realized in order to provide shaded areas for public gatherings and social interaction; on the other, the texture and colour of the stone achieves a pleasing visual integration into the setting.

The design of the interior environment follows the standards imposed by the housing authority. It is, however, crucial to note that the architects have added a carefully thought out spatial organization based on the social studies they undertook at an early stage. Privacy appears to be one of the most important determinants of the design. It is achieved by either horizontal or vertical isolation of living spaces and the *madiafa* in one zone, with family bedroom spaces in the other.

The spatial organization of internal spaces and the two patios seem to relate successfully. The central patio in each unit establishes the desired circulation needed for privacy, while the other patio designated for women seems to match the needs of most inhabitants. The clustered structure that both visually and physically links these patios provides more opportunities for social interaction.

Due to the difficulties inherent in the design and planning of any public housing project where the needs of the target population cannot be comprehensively defined, it can be argued that the precise societal needs and social aspirations of the inhabitants, from different and varied backgrounds, cannot be fully comprehended. In some of the units in the Wilad Djallal complex, the inhabitants had made alterations to and extensions of their units in order to provide more room and additional facilities, thereby accommodating their changing needs.

*b. Climatic performance*

As mentioned before, climate was an extremely influential factor in the design. The use of thick walls and in some cases double walls, the staggering of masses that provided a considerable amount of shade on the exterior walls, the proximity between the units, and the minimal and narrow openings covered by wooden screens were all capitalized upon to allow for minimal thermal gain. All of these devices have contributed to the creation of a comfortable domestic environment. According to interviews undertaken with some inhabitants, the temperatures inside the units differ dramatically from the exterior climate, by 10°C.

Air-captors were designed and constructed to provide a cooler domestic climate, however, many of them have been removed or blocked by the inhabitants as they allowed sand to be blown in. It should be noted that, in the original design, the architects included filters to block the sand and shutters that could be adjusted according to the season and the direction of the wind. Their omission may relate to the insufficient budget allocated, in the view of the housing authority, for complementary works.

Due to the use of 50 centimetre-thick stone walls, there is acoustical privacy and so the neighbouring inhabitants cannot hear each other, a standard that is rarely achieved in public housing. Lighting inside the spaces is remarkably good.

Overall, the climatic performance of the complex is efficient and successful in this harsh and ferocious climate. Unlike most other public housing projects built in the region at the same time as Wilad Djallal, the use of air conditioning is very limited; only a small number of inhabitants have installed window units. Electric fans are used in most of the units during the summer season, while few inhabitants use electric heaters since the winter season is only two to three months long.

*c. Choice of materials, level of technology*

Generally speaking, the choice of materials and the level of site-related technology are fundamental to the project. Both are among the most successful aspects of the project. The combination of local materials and traditional construction techniques with cement and reinforced concrete can be termed 'resistant technology'. Stone-wall construction recalls traditional

construction techniques and thereby asserts a sense of place through the project, while reinforced concrete relates to technological advancements that cannot be ignored or avoided. Thus, these two combined approaches to construction reflect the spirit of the time. The choice of this 'resistant technology' can be regarded as an exploratory process in the search for a new local identity. Another positive feature of this technology is that it avoids the use of heavy machinery in construction.

The stone layering is accurate and neat, which is noteworthy given the nature of the complex as a government funded public housing project. However, cracking and crumbling were observed on some of the exterior walls. These are the result of inappropriate alterations made by the inhabitants.

*d. Ageing and maintenance*

To date, the structure and most of the physical elements of the complex appear to have survived well in the face of the harsh climate and the inhabitants' demands. Nonetheless, one cannot predict to what extent physical problems might arise as a result of the poor maintenance provided by the local authority of Wilad Djallal. Very limited maintenance is provided, as shown by the fact that rubbish collection does not occur on a daily or regular basis. Although some attempts have been made by individual inhabitants to maintain the quality of their units, much damage has occurred due to improper maintenance and illegal modifications.

It is important to the appraisal of the project to note that, in physical terms, the appearance of the public face of the Sidi Khaled complex, which was developed by the same architects using a similar design and the same construction materials and techniques, is very well maintained even though it also falls under the jurisdiction of the Wilad Djallal local authority. This can be explained by the different cultural backgrounds of the inhabitants.

*e. Design features*

The overall massing of the complex responds to the socio-spatial needs of the inhabitants. Although the complex is a staggered massing of cubic/geometric volumes, the heights and colours of the exterior walls allow the project to blend in with the natural landscape of the region. This is based on the assumption that architectural forms should not compete with natural environments but should complement them. To summarize, a number of design features can be identified:

- the use of stone walls
- the staggered effect of volumes
- the minimal articulation of façades
- the use of screened openings
- the introduction of interior patios
- the utilization of external staircases
- the introduction of a semi-urban fabric via shaded walkways and exterior spaces.

## **VII. Users**

### *a. Beneficiaries of the programme*

The project serves a wide variety of the population of the Biskra region as well as other populations from different regions, many of them being former inhabitants of small desert settlements and some coming from semi-urban areas. Although there are no official records of the population profile, a general impression is that the users are from the educated middle class, working in local government administration or as schoolteachers or drivers, with a few building workers. The average age is about forty years old. Average income is approximately 150 USD per month.

### *b. Users' and professionals' response*

Despite the modifications and alterations made by the users to the units, their response was positive. The response of the professional community is also positive. Although they like the project, some of the professionals argued that the government standards did not satisfy the users' needs, even after the modifications and additions made to the programme by the architects. The replication of the project can be considered a direct indication of its success. It has also been praised in regional and international publications and in architectural magazines.

## **VIII. Persons Involved**

The client of the project was the regional government of Biskra, represented by Abdel Aziz Merrakchi. Mohamed Hammi was the inspector/supervisor on behalf of the regional government. The architects were Hany and Abdel Rahman El Miniawy, and Bishir Kahla was the site supervisor on behalf of the architects.

**Ashraf M A Salama**

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