



1992 Technical Review Summary
by Darab Diba

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Assif Housing Complex

Marrakesh, Morocco



Architect

Charles Boccara
Marrakesh, Morocco

Client

E.R.A.C. Tensift
(Etablissement Régional d'Aménagement et de Construction de la Région du Tensift)
Marrakesh, Morocco

Completed

1982

I. Introduction

Assif is a northern suburb of the third expansion stratum of Marrakesh. The population of Assif has grown to 100'000 within 10 years.

In 1975, the *Etablissement Régional d'Aménagement et de Construction* (ERAC) Tensift, a government agency affiliated to the Ministry of Housing, was set up to create housing for the masses. The Assif complex, which encompasses 600 plots of land, was one of its first programmes.

Three hundred row-houses (individual family units) are included in the design, and the remainder are individual houses built by their owners. Later, in 1981, the same agency commissioned the design of 128 apartment units and a commercial centre as an extension to the project.

Following an introverted typology, the row-houses suggest the aspect of a villa on the street façades; the vocabulary includes a porch, a garage, front and rear gardens, loggia; and the apartment house solution attempts to reconcile traditional concepts of scarce housing, commercial and other neighbourhood activities around streets, passageways, a gallery, courtyards or plazas. Amenities such as the *riyadh* are also included (enclosed garden in the traditional typology). Individual apartment units are conceived on the model of traditional Arab houses.

The complex comprises housing facilities for 3'000 inhabitants, and is divided into: 191 two to three storey houses, 110 apartments, and 72 shops.

II. Context

a. Historical Background

Marrakesh was founded in 1062 by Yusif Ben Tashfin, the first ruler of the Almoravid dynasty. His son, Ali, built the Ben Youssef Mosque and the city wall. The Almohads (1146-1268) made Marrakesh the capital of their empire and it was during this period that the Koutoubia was built. The Merinids (1268-1520) neglected Marrakesh but they were succeeded by the Saadians (1520-1668) who endowed the city with the Badi' palace, the Ben-Youssef madrasa and the Saadians mausoleum.

From 1668 onwards, the Alawites, who resided in Marrakesh only occasionally, erected numerous buildings such as the palace of Bahia and Dar Si Sa'ïd at the end of the 19th Century. Later, the modern town was to develop, three kilometres from the Medina, with its wide avenues bordered with palm-trees, orange-trees and jacarandas.

When first created in the 11th Century, Marrakesh was a link on the caravan route that joins the south and the north of Morocco by way of the valleys up the Upper Atlas. Routes from the Tafilalt region and the Drâa valley also converged on Marrakesh.

Later, as the capital of the Almoravid and subsequently the Almohad empires (11th and 13th centuries), it became the seat of the unique authority ruling the entire Muslim West, including Andalusia. At that time, Marrakesh was a large metropolis, housing probably up to 100'000 inhabitants.

Between the 13th and the early 16th Century, Marrakesh experienced a period of decline due to the displacement further east (Algeria, Tunisia and particularly Egypt) of the roads carrying the African gold, as well as the relocation of Morocco's capital to Fez.

During the 16th and 17th centuries, under the Saadians, Marrakesh flourished thanks to the commerce of gold, and the conquest of Tombouctou by the Saadians.

Marrakesh is a dual city that comprises the Medina, or traditional town and the *Kasabah* or seat of power, the Imperial city. The Medina, as with every other Islamic city, is grouped around the congregational mosque; here the 12th Century Ben Youssef Mosque, whereas the focal point of the *Casbah* remains the royal palace and its annexes.

In the 20th Century a new urban area, the *Guéliz*, was created by the French (and for the French), following modern colonial architecture. After 1956, independence and the ensuing expansion of the city, peripheral districts (residential complexes, workers' towns, shanty towns) and industrial districts developed. Assif complex was also developed.

An evaluation of the urban expansion of Marrakesh can be defined within three hierarchical, peripheral phases which encircle the central node of Bab Doukala:

- Medina and *Casbah* (ancient traditional city).
- The *Guéliz* (1920-1956)
Second stratum conceived under the French protectorate; development follows colonial urbanism and architecture, within a modern typology.
- Safi/Assif (after 1956)
Third urban stratum, situated north of the Medina and the *Guéliz*; development follows a regional concept with an adapted architecture.

Marrakesh population:	1982 census	470'000
	1992 census	1'425'000

Morocco population:	25'600'000
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b. *Local Architectural Character*

Different types of architecture are present in Marrakesh:

- *Traditional Architecture (dwellings, mosques, palaces, architecture of the Medinas and the Casbahs)*

The architecture is essentially based on earth construction; *pisé*, sun-baked mud brick, fired brick and occasionally stone. In popular constructions, the walls are made of red earth, the roofs of wood-beams covered with reeds, bushes, perches (young tree-trunks) and two layers of earth. The lines are generally simple and never result from elaborate arrangements or technical feats. Window apertures are small to avoid excessive heat penetration, as well as to provide privacy (introvert architecture), and are covered with wooden protection grids (*mashrabiyya*).

The geometry is generally simple, strong and based on the square and the rectangle, adequately adapted to the construction materials and the creation of the micro-climates of the inner gardens (patios and *riyadhs*). The dominant colour in Marrakesh is the reddish ochre of local earth. There are practically no vaults in the architecture, and domes, a current feature in other Muslim countries, are used very sparingly. The decoration, abstract in character, is lavish and executed in various materials: stone, fired brick, glazed ceramic, stucco (plaster), and wood.

- *Architecture of European influence (French protectorate period, 1920-1960)*

During the protectorate and after independence (1956), a number of buildings were erected in Marrakesh which hardly differ from constructions built in the same period in France (conception) and elsewhere in Islamic countries and the Third World (solid materials, pseudo-modernism). Perennial materials (concrete) replace temporary materials (earth), and the often cubic constructions, although more reliable and solid, generally lack cultural or constructional identity.

Yet, in this historic period, mention should be made of several realisations of the colonial architecture adapted to the climate and the environment, whose spaces respect the traditional typologies.

New contemporary architecture (adapted to the environment, 1975-1992)

This architecture seeks references to the country and its traditional typologies although it bears the influence of the movement of modern architecture. When compared with the level of architecture in the city of Marrakesh, this architecture of adapted quality - thanks to the options and support of the Ministry of Housing and particularly the Municipality of the city - is not insignificant, and by its regional conception, gives an interesting aspect to the city of Marrakesh, which has also been able to preserve its rich nature (palm-trees) and human scale.

In this new conscience, in this regenerative trend, Moroccans and French (who reside in Morocco) contributed equally.

c. Climatic Conditions

- Situation	Latitude	31°41' North
	Longitude	08°00' West
	Altitude	460 m

- Temperatures in °C

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Maximum	18.0	20.0	23.0	26.0	29.0	33.0	38.0	38.0	33.0	28.0	23.0	18.0
Minimum	05.0	07.0	09.0	11.0	14.0	17.0	20.0	20.0	18.0	14.0	10.0	06.0
Average	11.5	13.5	16.0	18.5	21.5	25.0	29.0	29.0	25.5	21.0	16.5	12.0

- Rainfall

About 280 mm per year with major variations from one year to another.

Autumn rains with peak rainfall in November

Spring rains with peak rainfall in March.

- Winds

The mild, humid trade winds from the north-east oppose the continental parching and sand-laden winds from the east and south (Sirocco, Chergui).

d. Immediate Surroundings of the Site

The Assif housing complex is located north of Marrakesh, atop the Medina, in the third new expansion stratum of the city, to the right of Safi Road and on the extreme left of the famous palm grove of the city. The environment consists of homogeneous residential fabric, uniform ochre-coloured landscape of one and two storey occidental type houses in an ordered, geometric urban typology. The proximity of the city's palm grove to the site allows the view of numerous palm-trees scattered throughout the site and which constitutes the green space and the principal appeal of the landscape.

e. Topography of the Project Site

Relatively flat land, with a slope of 2-3%.

III. Description

a. *Conditions Giving Rise to the Programme*

The Moroccan Ministry of Housing was established in 1972. Set up in 1974 under the tutelage of the Ministry of Housing, the ERAC (*Etablissement Régional d'Aménagement et de Construction*) are independent operational institutions established in every city throughout Morocco, assisting the provision of social housing.

Programmes of collective housing are studied on site in every region opting for economic, social, technical and constructional procedures adapted to the environment.

Assisted by banks and government endorsed national credits, real estate promotion mainly relies on the private sector, and this provides the ERAC's the possibility of self-sufficiency on an economic level.

As action is taken independent of central authorities, bureaucratic procedures are shortened, so that remarkable speed of execution and approach modes are achieved.

In 1976, the Director of ERAC Tensift Marrakesh, Mohammed Alami Nafakh Lazraq set up a study project for the Daoudiat District in the north-west of Marrakesh. The programme for the study comprised the construction of 191 villas, 110 apartments, and a commercial gallery of 70 local shops.

In 1976, topographical, technical and architectural studies were initiated under the direction of ERAC, and the architect Charles Boccara was invited to conduct the conception and design of the project. Construction of the complex was completed in 1982. Down-payments from house buyers cover 80% of costs while the remainder, 20%, is provided by the CIH (*Crédit Immobilier et Hôtelier*), a credit organism endorsed by the government.

In exchange for a down payment of 30% of the total cost, buyers reserve their dwellings from plans at the early stages of construction; another 50% is paid upon completion, and the remaining 20% is provided by a national bank credit.

The land value is conceived on a national low-cost base, and the construction modes, materials and equipment aim at low-cost popular realisation. Following an economic and social census classment, every inhabitant may obtain one such dwelling. In view of the payment facilities and prices, this offers favourable conditions to the people concerned.

Sociological diversities, modes of living, local parameters, or the specific characteristics of land and real estate markets of the towns where the institution intervenes, imply a varied array of products from which no single solution is excluded.

ERAC Tensift Marrakesh has also realised housing complexes equipped for self-help construction and individual or collective units. To reaffirm the individual's right to housing, operations aimed at lowering the levels of income necessary for accession to ownership have been undertaken: ready to finish apartments; embryonic housing; utilisation of local materials; when the employment of such techniques generated economy and quality.

ERAC regulates the real estate market by the construction of large numbers of low-cost house units which are sold at low prices. This has the effect of an institutional restraint on the growth of land prices. Constructions are realised with due care and respect for the forms and materials of the country's cultural heritage. Modernism often conciliates with traditional affiliation.

In his numerous visits to the Ministry of Housing (Rabat) and the ERAC's in the cities, as well as to the completed projects, the Technical Reviewer ascertained the efficiency of the ERAC approach. By often quite original procedures which are nonetheless adapted to the regions concerned, they provide the populous with adequate housing of interesting architectural quality.

b. *General Objectives*

In the framework of territorial management projects and governmental collective housing policy; to provide housing for the people, in whose social tradition, house ownership is an important priority.

In the framework of urban collective equipments in the Islamic community, the house (*bays*) – the haven of peace, meditation and regeneration – occupies a foremost position. Koranic allusions, the Narratives (*Hadith*) concerning the home, are innumerable. In the individual's life, the provision of shelter for one's family is a primary aim that regulates other communal activities. And the Moroccan, traditionally a builder, has ever devoted particular care for his own house, his own private space; he directs his economic activities toward the ideal of an active social life.

c. *Functional Requirements*

Housing facilities for 3'000 inhabitants, divided into:

- 191 two to three storey houses
- 110 apartments
- 72 shops.

The figures (number of inhabitants, number of dwellings) proposed in Assif programme were studied in relation with the land plot and the surface area proposed in the framework of a plan of urban development for the city.

d. *Building Data*

The central volume seated on arched colonnades houses the apartments and the shops are placed on the periphery of the block. This four-storey central volume has a rectangular interior garden, and enjoys green areas and trees. The villas are located in the adjacent streets around the central volume which dominates the site.

The villas involve variations in volumes which differentiate and individualise the dwellings. This gives diversity and engenders lively perspectives through the streets.

- Overall site area: 6 ha
 - Ground floor 21'800 m²
 - Total floor area 39'000 m²
- Apartments:
 - 2 bedrooms 70 m²
 - 3-4 bedrooms 120 m²
- Villas:
 - 28'000 m² built on land of 40'000 m²
 - 3 bedroom, in two storeys.

e. *Evolution of Design Concepts*

Response to Physical Constraints, Climate

Marrakesh has a relatively warm climate. It is essential to create shaded areas; cool micro-climates afforded by interior gardens. In Assif, these are found in the central volume of the apartments as well as in the villas.

Light is another element to be controlled for balanced utilisation of the living spaces. Small windows, well recessed into the façades and protected by wooden grilles, adequately modify the heat and the light.

Response to User Requirements, Spatial Organisation

In response to the variety of socio-economic groups, the four-storey central volume embodies various types of apartments of varying areas, while in the adjacent streets, small one-family villas cover the site.

- Apartments

As a protection from exterior life, and for the sake of an inner micro-climate, the apartments share a common interior garden enjoying water and trees; the courtyard forms a fresh oasis and distributes currents of filtered air all over the façade of the apartments.

In order to assure individualised, private access paths to the apartments, various entrances lead from the alleys to the interior garden, from where, judiciously located in its corners, stairways assure vertical circulation and take good advantage of the chosen geometry. In the stairways and along the corridors that lead to the apartments, the same care for a sinuous, private, individualised path exists, giving shape to entry and reception spaces to each apartment.

The plan of the apartments is a synthesis of local and modern typologies. It is characterised by a separation between the private, secluded, living quarters and the public areas essentially related to daily life and the reception of guests.

The apartments are well separated and no apartment overlooks another.

- Villas

The villas are mostly on two levels: the ground floor comprises the living space, reception room, and kitchen, while the first floor groups the bedrooms. The terrace is also used for some daily activities, and hollow cylinders are set up outdoors to screen drying clothes.

The villas are situated slightly in recess of the roads, and by hierarchical arrangement of, courtyard, garden, entry, porch and hall, provide the necessary quiet and calm. In every villa, an interior garden situated opposite the entry from the street creates a refreshing, highly attractive oasis, further enhanced by the palm-trees, in front of the living and reception rooms.

The volumetric conception of the villas, involves plots that house users of varying family densities, and this results in individualised spatial compositions of high visual and functional interest.

Formal Aspects: Massing, Articulations, Decorative Features, Use of Traditional Motifs

Human scale has been maintained in the entire conception of Assif complex, and this creates a good continuation of the urban panorama. The typologies and spatial formations reflect major elements of the environment of the Arab house.

- Magic and mystery in the circulations.
- Accentuated height of public spaces and reception areas.
- *Riyadh* and patio, provision of a space that enjoys water and plants.
- Hierarchy of spatial sequences, from profane/public to sacred/private.
- Treatment of angles.

The housing units, whether apartments or villas, have individual differences and variations in their plans, volumes and spaces. This mixture of various spaces and volumes is a significant factor in the conception of the ensemble.

Assif displays *mamouni* grids (*mashrabiyya*), plaster *mowrés* with traditional patterns (*muqarnas* type) and hand-made *zellige* panels (made up of small tesserae of ceramic tile arranged in geometrical patterns) placed inside and on the balconies as complements to the architectural volume.

Landscaping

Marrakesh is the city of the palm-trees. Assif had a large number of palm-trees scattered throughout the site. No tree was felled. All the palm-trees were numbered, recorded and utilised in the conception and layout of the project.

In several place one encounters axes which have been displaced to respect existing palm-trees. The palm-trees can be considered significant, living elements within the composition.

f. Structure, Materials, Technology

Structural Systems

Loadbearing walls reinforced with concrete stiffening members

- Walls 25 cm
- Concrete stiffening members 15 x 15 cm

Materials

- Foundations Stone (blue granite) from the Guéliz.
- Principal Structural Elements Traditional clay bricks.
- Infill Hollow bricks.
- Façade facings Traditional bricks and *tadelakt* (lime render, dyed throughout the mix, rubbed with soft soap and smoothed with a pebble from the *oued*).
- Floors/Grounds Beams and *hourdis* hardcore.
- Ceilings Decorative staff or plaster.
- Roofing/Covering Multi-layer insulation and cement tiles.
- Render and finishes Earth-coloured plaster of earth and lime added with an ochre-coloured oxide.
- Decoration Traditional wood work, *zelliges*.

Construction Technology

A traditional simple construction system with concrete and brick. Traditional lifting techniques and artisanal building occupations.

Building Services, Site Utilities

Current equipment, water pipes, electricity.

- Plumbing Traditional plumbing.
- Hot water Individual electric accumulators in kitchens and bathrooms.

Professionals

- Architect Charles Boccara, a French architect of Tunisian origin who has lived in Morocco since 1970.
- Contractor Koutoubia Co. and Assalam Co. (Both Moroccan enterprises).
- Consultant Maroc Structure, Moroccan enterprise.
- Others Numerous Moroccan artisans linked with artisanal skills unions.
Mohamed Meneguy (*zelliges*).
Aomar Guebbas (stucco carvings).
Ba Rahal (chiselled and paint wood works).

IV. Construction Schedule and Costs

a. History of the Project

1972	Creation of the Ministry of Housing (Rabat).
1974	Creation of the ERAC's.
1976	First topographic, technical, economical study by the director of ERAC. Tensift Marrakesh (Mohammed Alami Nafakh Lazraq).
1976-77	Preliminary discussions with the architect, Charles Boccara.
1977-79	Conception: Onset 1978 Completion 1980
1978	Construction (individual dwellings): Completion 1980
1980	Construction (multi-family dwellings): Completion 1982
1980-83	Occupation date of building: Individual 1980 Multi-family 1983

b. Total Cost and Main Source of Finance

	Moroccan Dirhams	US Dollars
Total Cost	67'000'000	7'450'000
Cost per m ²	1'500	167 (sale price)
Financing	73% private capital 27% public capital	(down payments of clients/buyers) (<i>Crédit Immobilier et Hôtelier, CIH</i>) (<i>Crédit National</i>)

c. *Comparative Cost*

The m² price of MAD 1'500 (USD 167) paid by house purchasers represents approximately half the price on the real estate market of Marrakesh in 1983.

For the quality offered the sale price is advantageous and welcome; it may be counted as a positive experience for future ERAC constructions.

d. *Qualitative Analysis of Costs*

Moroccan Dirhams

Land	800'000	
Infrastructure	1'600'000	
Materials	26'000'000	
Labour force	21'000'000	
Fees	1'800'000	
ERAC	15'800'000	(Finance costs and intervention)
Price per m ²	1'500	(Sale price to the clients/buyers)

e. *Maintenance Costs*

Moroccan Dirhams

US Dollars

- Apartment (per month per apartment) 50 to 70 6.5 to 8
- Villa (per month per villa) 100 to 150 11 to 16
- The collective charges include maintenance, water, and municipality services. This is considerably lower than in other housing complexes.
- With no expense for collective technical equipment (heating, chiller), every resident pays an individual electricity bill for his own household appliances (hot water accumulator, air cooler) Energy consumption is recorded on private meters.

V. **Technical Assessment**

a. *Functional Assessment*

The apartments and villas function well. The ensemble, including the shops, the commerces, the squares, the fountains, form a coherent entity with a good distribution of functions, for both public and private areas.

b. *Climatic Performance, Lighting, Ventilation, Acoustics*

Lighting, ventilation and acoustics function satisfactorily. The interior courtyards and gardens create micro-climates and zones of natural calm and refreshment. The well-proportioned windows adequately filter the light and the heat, important elements in the climate of Marrakesh.

c. *Choice of Materials, Level of Technology*

The materials, bricks, cement, lime plaster, ceramic, wood, are well chosen and appropriated to the construction and local technologies. The architect has a thorough knowledge of traditional techniques, and this enabled him to draw on a wealth of techniques and materials, in the most appropriate way.

d. *Ageing and Maintenance Problems*

The complex is entirely sound and no constructional deficiency is conspicuous. The maintenance problems are minimal. It is one of the ideas included in the concept/design to limit maintenance costs to the extent possible.

Maintenance charges (MAD 50) for the apartments and (MAD 100) for the villas, can be considered a real success. Particularly when one considers the cleanliness of the site, how well the complex functions and the maintenance of the green spaces.

Maintenance costs are limited. Seven year spans should be suitable for eventual renovation and maintenance (paint-work and plaster-work). Technical equipments, which are limited, cause no problems. Windows and frames hold very well. No cracks were noticed. The complex remains solid and in good state. In no dwellings were traces of rain-water infiltration visible.

e. *Design Features: Massing and Volume, Articulation of Spaces, Integration into Site*

While the variable composition of the villas on the site follows the profile of the streets and the natural scenery (palm-trees), it also offers spatial interest, diversity and animation, as well as sensible views of the minimal interior spaces. The spatial apertures are diverse and colourful. The scale, texture and colour of the buildings are in perfect harmony with nature and the articulations of the villas constitute different pleasant spaces of light and shadow.

By its imposing, rigorous geometry, the central volume (apartments and shops), built of brick with arcades and colonnades, provides the visual link with the centre, the heart of the ensemble. Very sensibly conceived, the human scale of this central volume is perceived differently the four storeys it contains and is harmoniously integrated.

The architect has accomplished a successful fusion of his knowledge and his memory of traditional Moroccan building, in which human scale, and respect and love for nature are prominent.

As observed from a distance of three kilometres, the panorama of the site reflect this intention to integrate the complex with neighbouring buildings, nature, and the local textures and colours.

VI. Users

a. *Description of Those Who Use the Place*

The tenants of the apartments belong to the small *bourgeoisie* and middle management: young technicians, artisans, workmen, and shopkeepers who earn medium to low medium incomes; monthly salaries varying between MAD 2'000 and 3'000 (USD 220 to 330).

The tenants of the villas include the *bourgeoisie*, middle executives, shop-owners, professors, administrative officers, engineers, specialised technicians and architects who earn monthly salaries that vary between MAD 4'000 and 7'000 (USD 440 to 780).

Commerce/Shops of the Complex

The commerce/shops around the central volume of the apartments house various activities, including:

- Butcher
- Bakers
- Grocery shop
- Furniture restorer
- Electrician

- Candy shop
- Tobacconist, films, cassettes
- Barber shop
- etc.

The shop owners are satisfied with business in the Assif housing complex.

b. Response to the Project

People are very satisfied. The price/quality ratio is very advantageous and the residents are perfectly aware of the fact. Favourable re-payment systems and limited maintenance expenses are other interesting factors.

From interviews with tenants, it appears that some have opted for the dwelling as their first acquisition early in life (young couples, young families), and they aspire to own a small, individual house. The villas are another matter. The proprietors are highly satisfied and look upon the dwelling as for life.

The shops and the 70 small commerces that surround the ground floor of the apartments building take care of the inhabitants' various needs.

VII. Persons Involved

Client/Developer	<ul style="list-style-type: none"> - Mohammed Alami Nafakh Lazraq, Ministry of Housing, ERAC Tensift Director (1977-89). - Abdessatar Elamrani Jamal, General Secretary, Ministry of Housing. - Municipality of Marrakesh.
Credit	<ul style="list-style-type: none"> - CIH, <i>Crédit Immobilier et Hôtelier</i> (27% credit granted).
Design	<ul style="list-style-type: none"> - Charles Boccara, architect, author of the project.
Consultant/ <i>Bureau d'Etudes</i>	<ul style="list-style-type: none"> - Maroc Structure.
Contractors	<ul style="list-style-type: none"> - Assalam Enterprise. - Koutoubia Enterprise. - Belkhalfi s.a. Enterprise.
Principal Craftsmen	<ul style="list-style-type: none"> - Mohamed Meneguy (<i>zelliges</i>). - Aomar Guebbas (stucco carvings). - Berrada (floor tiles). - Ba Ranal (carved woods, painted woods). - Tahar Moktar Oujdani. - Moustapha Maatallah.

Darab Diba
Marrakesh, May 1992