

Radical shifts and slow adaptations

The transformation of patterns of dwelling and urban planning since the discovery of oil in Dammam Metropolitan Area, Saudi Arabia

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RADICAL SHIFTS AND SLOW ADAPTATIONS

The transformation of patterns of dwelling and urban planning since the discovery
of oil in Dammam Metropolitan Area, Saudi Arabia

Dissertation

For the purpose of obtaining the degree of doctor
at Delft University of Technology

by the authority of the Rector Magnificus Prof.dr.ir. T.H.J.J. van der Hagen
chair of the Board for Doctorates

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Tuesday 23rd February, 2020, at 10:00 o'clock

by

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Abstract

F. Al-Kurdi: RADICAL SHIFTS AND SLOW ADAPTATIONS

The transformation of patterns of dwelling and urban planning since the discovery of oil in Dammam Metropolitan Area, Saudi Arabia (Under the direction of Dick van Gameren)

The main objective of this study is: to investigate the impact of the rapid evolution that occurred by several oil booms on the transformation of dwellings' patterns on all cities components and urban design; and to document its' effect on the home environment in Dammam Metropolitan Area, Saudi Arabia. It also enables the researcher to understand and describe the aspects that motivate people to adopt and refine the internal and external elements of their home environment and urban design. Finally, the study proposes guidelines and suggestion for urban space design and house form in Saudi neighbourhoods of the future.

The study plays a significant role in describing and understanding the development of house form and urban design. The research studies the house from the onset of residential settlements of the triplet cities of Dammam, Dhahran and Al-Khobar in the Eastern Province of Saudi Arabia until the contemporary period. Also, the research determines the main factors behind the changes within each period. The analysis of changes and their associated factors provides a framework for formulating the building regulation and housing policy to match the inhabitants' needs, for the sake of appropriate dwellings and planned residential neighbourhoods that meet the needs of the population.

It is essential to provide the designers and urban planners with the ability to understand the effect of urban design on continued socio-cultural values to respect them and create a high-quality, sustainable environment in their future design. In Summary, the research findings reveal that oil discovery period has had a dramatic effect on an urban design which has affected house forms. The divisions of lands, the street layout and even public utilities, the house form and layout, regarding overall space organisation, rooms, distribution, their utilisation and facades, all have already changed and then have slow adaptations along with the development of the region.

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Glossary

Development	The sustained high level of economic and social well- being or standard of living (quality of life) in a country. Development was traditionally defined as the ability of a country to advance economically, as measured by increments in its GNP per capita.
DMA	Dammam Metropolitan Area.
Globalization	The growth and intensification of political, economic, social and cultural relations across national borders.
Aramco HOP	Aramco Home Ownership Program found in 1951.
ICC	International Code Council
Identity	Distinguishing traits or characteristics of a person country.
KACST Migration	King Abdul Aziz City for Science and Technology The movement of individuals to within a society or large social organisation.
MOMRA	The Ministry of Municipal and Rural Affairs
MPWH	The Ministry of Public Works and Housing
The quality of Life	Standard of living.
Quota	A set amount
REDF	Real Estate Development Fund
SASO	The Saudi Arabian Standards Organization
SBC	Saudi Building Code
SNDB	The second National Development Plan
Sustainable Development	A concept of advancing people’s quality of life, assessing such advance regarding economic criteria as well as human dynamics, particularly the conversion and protection of the environment.
Technology	Technology is the use and application of scientific principles, to improve productivity, efficiency and the way of life of people.
Urban	A built up area.
The Urbanism	The movement of people from rural areas to cities and large towns.

The Ten Statements

These propositions are regarded as opposable and defensible, and have been approved as such by the promotor(s) [name (co)promotor(s)]

1. Biomimicry should be considered as an inspiring way to find innovative and sustainable solutions for housing design.
2. The transformation of the traditional neighborhood in Saudi-Arabia to the contemporary housing areas has been an almost accidental by-product of modernization. It is the result of general planning policies, arbitrary experiments and everyday life experiences.
3. Contemporary society in Saudi Arabia is characterized by a multiplicity of ethnic communities and needs to look for ways of planning and house constructions that do justice to all and can encompass everyone's specific needs.
4. Residents should be involved in planning and design of their home environment. Urban planning should not be wrought at government level in isolation from the public and its cultural needs. Only with the residents' involvement an affordable, reliable and sustainable, in other words, liveable home environment can be created.
5. In the age of technology, the actual working hours for people should not exceed four hours outside home. Most jobs don't require a constant presence at the workplace. This will benefit people's life in many aspects.
6. The kingdom of Saudi Arabia has vast deserts that are now free of any life. Sand may be the answer how these deserts can become a place to accommodate life, creating new desert cities. The sand can store solar energy, produce energy, and can be used as an ecologically friendly construction material.
7. The required four-sided external setbacks of detached houses in Saudi building and planning rules should be changed to only a one-sided setback. This setback should create a shaded pedestrian alley, still allowing for privacy, security and fire safety.
8. Replacing the pavement of all sidewalks with walkable solar cells will provide more than a duplication of the surface available for solar energy production in our contemporary cities.
Het vervangen van de bestratingen van trottoirs door beloopbare zonnepanelen zal het oppervlak beschikbaar voor de opwekking van zonne-energie in onze steden meer dan verdubbelen.
9. Government of Saudi Arabia should formulate a rule allowing absolute freedom for residents to achieve the privacy that deems appropriate to them away from the building regulations and housing codes, as long as not to hurt the neighbours or prejudice the security and safety.
10. In Saudi Arabia, architects must try to synthesize the traditional forms integrated with old norms with contemporary forms emerging from technology, to get what is called a new hybrid. This enables people to share their common socio-cultural values thus achieving the true architecture of the community.

The Ten Statements (Dutch Version)

These propositions are regarded as opposable and defensible, and have been approved as such by the promotor(s) [name (co)promotor(s)]

1. Bio-mimicry is een inspirerende wijze om vernieuwende en duurzame oplossingen te vinden voor het ontwerpen van woningen.
2. De transformatie van de traditionele woonbuurt naar de hedendaagse woongebieden in Saoedi Arabie is een vrijwel toevallig bijverschijnsel van de modernisering van het land. Het is de uitkomst van een generalistisch planningsbeleid, willekeurige experimenten en ervaringen uit het dagelijks leven.
3. De hedendaagse maatschappij in Saoedi Arabie wordt gekarakteriseerd door een veelvoud aan ethnische gemeenschappen, en moet op zoek gaan naar manieren van planning en woningbouw die recht doen aan ieder, en beantwoorden aan ieders specifieke behoeften.
4. Bewoners moeten betrokken worden bij de planning en het ontwerp van hun woonomgeving. Stedelijke planning moet niet het unieke domein zijn van de staat, zonder enige verbinding met de bevolking en haar culturele behoeftes. Alleen met participatie van de inwoners kan een betaalbare, betrouwbare en duurzame, ofwel, leefbare woonomgeving tot stand komen.
5. In dit tijdperk van hoogwaardige technologie zou er niet meer dan vier uur per dag buiten het eigen huis gewerkt hoeven te worden. De meeste banen vergen geen constante aanwezigheid op de werkplek. Dit zal ieders leven in veel aspecten verbeteren
6. Saoedie Arabie heeft uitgestrekte woestijnen vrij van enige vorm van leven. Zand kan het antwoord zijn op de vraag hoe hier leven een plek kan vinden en nieuwe steden in de woestijn gerealiseerd kunnen worden. Het zand kan zonne-energie opslaan, energie produceren, en gebruikt worden als duurzaam bouw materiaal.
7. De verplichte alzijdige externe setback van vrijstaande woningen in de Saoedische bouw- en planningsvoorschriften zou gewijzigd moeten worden in een eenzijdige setback. Deze setback kan een beschaduwde voetgangersruimte maken, waarbij privacy, veiligheid en brandveiligheid gewaarborgd zijn.
8. Het vervangen van de bestratingen van trottoirs door beloofbare zonnepanelen zal het oppervlak beschikbaar voor de opwekking van zonne-energie in onze steden meer dan verdubbelen.
9. De regering van Saoedi Arabie moet regels formuleren die bewoners de vrijheid geven hun privacy zo vorm te geven als zij zelf goed achten, zonder gehinderd te worden door regelgeving. Uiteraard zonder hiermee de privacy en belangen van de aangrenzende bewoners en de veiligheid te benadelen.
10. Architecten in Saoedi Arabie moeten proberen om traditionele vormen en oude waarden te verbinden met de mogelijkheden en uitkomsten van hedendaagse technologie, en zo te komen tot een nieuwe hybride. Dit maakt het mogelijk om gemeenschappelijke sociaal-culturele waarden te delen, en daarmee een echte gemeenschapsarchitectuur te realiseren.



Chapter I

Introduction

1. Introduction

1.1 Introduction

The rapid worldwide urbanisation that took place in the twentieth century resulted in a significant number of new urban settlements and housing districts in the major cities of Gulf countries. These new settlements are strikingly disconnected from traditional cultural patterns of housing. Since the 1960s, the Gulf region has witnessed the greatest share of housing developments on the Arabic peninsula¹. The rapid evolution created a high demand for planning strategies as a way to resolve issues arising from unprecedented urbanisation and the expansion of cities. Planning theorists and practitioners have often demanded increased attention and research into the consequences of rapid growth. Among these agencies in the Arab world there are: the Arab Urban Development Institute (AUDI), the Arab Town Organization (ATO), and the Organization of Islamic Capitals and Cities (OICC), among others.

However, until today there has been minimal research available exploring the impact of urbanisation processes in the Gulf coast area, specifically in the Eastern coastal cities of Saudi Arabia. It is crucial to learn about the growth and development of these cities, and to understand the challenges and opportunities their inhabitants face. The aim is to be well-informed regarding the causes of increasing urbanisation and its effects. In very general terms: it would be impossible to discuss urban livability without confronting the concept of urban planning as it affects city design and development.

Studies performed to date have almost exclusively focussed on traditional architecture, its meaning, and the associated loss of value during the modernisation of Saudi Arabia. However, development from tradition to the actual state of housing and urban planning in Saudi Arabia, especially for the East Coast cities, has yet to be studied. Modern Arab cities have taken on many and varied forms in regards to historical heritage, aesthetic qualities, functionality, performance and urban lifestyles.

Studies, such as those supervised by UNESCO and the Traditional Architecture Group of RIBA, have focused on the notion of pursuing sustainability by understanding traditional architecture,² Raymond discussed cultural identity when describing the Islamic and Arab city,³ and Sharifi and Murayama observed a simultaneous connection between traditional and contemporary aspects in the same cities.⁴ The emphasis of these studies is the offer of livable alternatives in a sprawling built environment. In addition, there is incitement to discuss the future of contemporary residential settlements. These studies have illustrated that traditional cities have encountered external forces that have altered their identity and the meaning attached

¹ Netton, Ian Richard, ed. *Arabia and the Gulf: From Traditional Society to Modern States*. London: Croom Helm. 1986. Held, Colbert C. *Middle East Patterns: Places, Peoples, and Politics*. Boulder, Colorado: Westview Press, 1989.

² Traditional Architecture Group of RIBA members, UNESCO World Heritage.

³ Raymond A., *Islamic city, Arab city: Orientalist myths and recent views*, *Brit Middle E Stud* 21, (1994): 3-18.

⁴ Sharifi, A., & Murayama, A. "Changes in the traditional urban form and the social Sustainability of contemporary cities: A case study of Iranian cities." *Habitat International* (2013) doi: 10.1016/j.habitatint.

to built spaces. These spaces are now being challenged by technological advances and globalisation as affected by the oil booms.

This thesis seeks to focus on the traditional and contemporary home environment of the Eastern Province in an attempt to understand how traditional villages have evolved in the large urban conglomerations of today while, in the process, losing multiple aspects of culture and tradition that are still considered of vital importance in SA society.

The study is punctuated with aspects drawn from the humanities and social and behavioural disciplines, as well as from particular elements of history, sociology and environmental psychology. A major point associated with this research is the links between housing and building regulations, and urban planning and design. The study will also discuss growth management, privacy regulations, redevelopment, environmental control and aspects of mobility.

This discussion takes place through the investigation and analysis of residential design, their relationship to urban design over the period between 1932 to the present day, as influenced by the consecutive oil booms.⁵ This period is viewed as the most significant in the development of contemporary Saudi Arabia.

The study could be defined as an archaeological investigation and as a reading of the changes in urban design and house form. A better understanding of the processes of change might create a new strategy merging traditional values in housing and urban planning with today's ambitions and realities. What can bring forth new strategies to acknowledge the values of the past and the necessities of today is not a simple opposition of tradition versus the process of modernisation, and its obvious detrimental effects, but a full understanding of all aspects leading to today's way of building and planning,

This study focuses on the role of settlement and how it shaped the built form of individual houses in the Dammam Metropolitan Area, by considering design across different periods, and taking into consideration economic and socio-cultural influences. Sometimes an intersection between residential settlements and housing is apparent, appearing to follow the pattern it did in traditional settlements. Rapoport upheld this as follows: "... it is sometimes difficult to separate dwelling and settlements.... particularly, in the case of communal dwellings, where dwellings and settlement are one."⁶ He also stated: "The dwelling and its parts are linked to many other settings in the neighbourhood, the settlement and beyond."⁷ Rapoport stated: "Any consideration of built environments must take into account not only the "hardware" but also people, their activities, wants, needs, values, lifestyles and other aspects of culture."⁸ The arrangement and

⁵ The time of the emergence of architectural development in the region of Dammam coincided with the discovery of oil. This period is important in the development of modern Saudi Arabia.

⁶Rapoport, A. On the Attributes of Tradition. In J. P. Bourdier and N. AlSaiyad (Eds.), *Dwellings, Settlements and Tradition Cross-Cultural Perspectives*, Lanhan: Univ. Press of America. (1989): 77-105.

⁷ Ibid.

⁸ Rapoport, A. 'Spatial Organization and the Built Environment' *Companion Encyclopedia of Anthropology: Humanity, culture and Social Life*, Routledge World Reference, London, UK. Ch. 17. (2002): 461.

- Previous research by the researcher studied the relationship between lifestyle and house form.

- Al-Kurdi, Feryal. *Lifestyle and House Form: The Case of Aramco Houses under Home Ownership in Dhahran*. Unpublished Master's dissertation, King Faisal University, Dammam, Saudi Arabia. 2004.

organisation of domestic spaces cannot be readily understood unless considering the surrounding built environment (neighbourhoods, streets, nearby housing units). Studies pertaining to the spatial organisation of the built environment are often performed based on two principal determinants, namely culture and nature.⁹ However, other aspects that influence the formation of the built environment include administrative factors, such as building regulations and housing codes. All these elements are part of the archaeological expedition intended to understand the state of housing in SA Eastern Province.

1.2 Previous Related Work

Before commencing research relating to today's challenges in the built environment, the problem addressed must be disseminated to small areas, to closely examine how all pieces fit together, before finding the requisite space to suggest a solution to this problem.

A good cook changes his chopper once a year—because he cuts. An ordinary cook, once a month because he hacks. However, I have had this chopper nineteen years, and although I have cut up many thousand bullocks, its edge is as if fresh from the whetstone. For at the joints there are always interstices, and the edge of a chopper being without thickness, it remains only to insert that which is without thickness into such an interstice. By this means the interstice will be enlarged, and the blade will find plenty of room.¹⁰

This intriguing quote is taken from Christopher Alexander and Serge Chermayeff's seminal study 'Community and Privacy', which aims to define what precisely is wrong with the design of the American suburbs, to outline principles behind a design approach that would create a more amenable human and urban environment. Their study combines analysis of the historical development of urban structures with the position of dwellings in the urban structure, accounting for the challenges unique to the 1960s, when the book was written. Their principal focus was on the detrimental aspects of traffic, and how best to bring together new models of suburban housing. This study follows a pattern and method of exploration that is analogous to theirs, but not identical.

Firstly, an understanding is required of the actual situation as regards housing design and planning in the Eastern Province of Saudi Arabia. The development of cities and housing in the Gulf region of Saudi Arabia is inextricably linked with the huge impact arising from the discovery of oil and its exploitation over the last 70 years. Prior studies of cities in Arab Gulf countries have been concerned with **the phenomenon of oil-related urbanisation**, which began to affect urban planning in the late 1960s.¹¹ The history of modernity in the region is closely, and almost exclusively, identified with this spectacular period of urban development. The expansion of cities at this time reflected the rapid evolution of the oil economy which

⁹ The term **Built Environments** not only refers to 'hardware', but also includes people, their activities, wants, needs, values, lifestyles and other aspects of culture.

¹⁰ Serge Chermayeff, Christopher Alexander. *Community and Privacy*, Serge Chermayeff Copyright, USA. 1965: 159.

¹¹ Al-Hathloul, S., and Anis-ur-Rahmaam. "The Evolution of Urban and Regional Planning in Saudi Arabia." *Ekistics* 52, no. 312 (May/June 1985): 206-12.

resulted in, and was defined by, increasingly centralised political systems. It is possible to refer to research in this area that included cities located on the Gulf area because of the similarities between them and the case-study area in terms of climate, architectural elements, and the topography of the city.

Previously, studies have been conducted examining modern urban life and its' integration with the history of the oil industry in the cities of the Gulf. These tell a historical story of cities' transformation towards urban development, revealing the influences of the oil boom in all aspects of life. In Al-nakib's book, she connects Kuwait's past and present across the bridge of oil. She traces the relationship between the urban fabric and practices in everyday life. The book concludes with a claim for a right to the city that will shape the city and utilise the spaces and home environment according to the surrounding environment, as well as inhabitants' needs and desires. The goal of this literature review is to compare the development of Gulf cities and the area to be studied in order to evaluate the similarities and differences associated with the oil boom.

Specialised studies dealing with the relationship between **the home environment and urban design** are few, and within the boundaries of Saudi Arabia were only relevant to the capital city of Riyadh. The majority of literature reviews are empirical, descriptive, and based on official data relating to demographic, socio-economic, ecological, and environmental conditions. Among these studies are *The Architectural Heritage of Saudi Arabia's Eastern Province*.¹² Vefik Alp illustrated all traditional types of houses in the Eastern Province of Saudi Arabia, while Abdelbaki Mohamed studied housing typology in Saudi Arabia in the Modern Period.¹³ Akbar, in his book *Elements of the Traditional Built Environment, in Crisis in the Built Environment: The Case of the Muslim City*, tried to go beyond merely documenting house forms to describe spatial arrangements and relationships within the home environment¹⁴ (see *Open Duplex House, An Open Building Application to Duplex Houses in Saudi Arabia*).¹⁵ The research explains urban modification from an administrative perspective. Furthermore, much of the literature is found to be policy oriented. Some studies correlate the architecture with political history and economic and environmental change.¹⁶ Al-Hathloul studies Saudi settlements from a historical and political perspective, identifying the evolution of the institutional process in response to settlement growth.

Human settlements were seen to be too closely tied to their environment. As a consequence, geographers and town planners concentrated on describing and interpreting changes in urban morphology at both the micro- and macro-levels. Urban designers emphasised the importance of micro-scale quality features as they **affect individuals' use and experiences of neighbourhood environments**. More studies on this scale can be likened to what Abadi and Masoud covered in their study: *The Evolution of Urban Planning in New*

¹² Ahmet Vefik Alp. *The Architectural Heritage of Saudi Arabia's Eastern Province*, King Fahd of Petroleum and Minerals, Dhahran. 1990.

¹³ Ibrahim, Abdelbaki Mohamed (ed). *Housing Typology at Saudi Arabia in the Beginning of the Twentieth Century*. In *Alam al-Bina*. Cairo: Center for Planning and Architectural Studies, (1999): 10-15/212.

¹⁴ Akbar, Jamel. *Elements of the Traditional Built Environment, in Crisis in the Built Environment: The Case of the Muslim City*. Singapore: Concept Media Pte Ltd. 1988.

¹⁵ Al-Saati, Maha. "Open Duplex House, An Open Building Application to Duplex Houses in Saudi Arabia." Master's thesis, Dammam/ King Faisal University, 2006, 19.

¹⁶ Al-Hathloul, Saleh, and Edadan Narayanan. "Evolution of Settlement Pattern in Saudi Arabia: a Historical Analysis." *HABITATINTL* 17, no. 4 (1993): 31-44.

*Emerging Countries, as compared with developed countries around the world.*¹⁷ Another paper dealt with Landscape and Urban Planning, considering urban planning and land topography in detail, as well as independent study.

Almost no studies have addressed the issue of evolution, or investigated the current status of Saudi Arabian cities in relation to **the impact of urban planning on their housing**.¹⁸ Most studies have concentrated on the evolution of urban and regional planning and urban growth management. Al-Hathloul is a famous researcher working in this field.¹⁹ Moreover, indeed, aside from a few studies, the majority of research agendas and studies focus on traditional, vernacular, or historical architecture. Studies are documenting the old form of houses as architectural elements in different kinds of buildings and the general urban fabric. Sometimes influences and comparisons exist between architectural elements and designs, such as are noted in the book *Architecture and globalisation in the Persian Gulf Region*, which observes changes in architecture and human settlements regarding environmental factors and particularity of place.²⁰ The book explores the Arabian Gulf under the auspices of globalisation in architecture, investigating how building and cities are being shaped as a result. The book is subdivided into three parts: 1. Western Coastline of the Persian Gulf, offering a brief history of the region and exploring the relationship between the discovery of oil and large architectural Gulf states between 1950 and 1980; 2. Eastern Coastline of the Persian Gulf, focusing on Iranian cities; and 3. Contemporary Design Approaches, discussing important issues in the Gulf area such as the effect of globalisation and climate on cultural identity.

To assess **the impact of the oil boom on the development of housing sector in oil cities** of Saudi Arabia, a study of the Aramco Oil Company, the only oil company in Saudi Arabia, will be connected to urban planning and house design decisions, particularly in the Dammam Metropolitan Area. Again, this will be the first study of this type.

A recent study was performed by Crinson and colleagues of Abadan, an Iranian oil city, analysing the effect of a colonial company town.²¹ The city grew from original bungalow compounds for British expatriate workers, comprising lines of huts for local labourers, and a native town under local municipal control, which later became very crowded. The Anglo-Iranian Oil Company used the architect Wilson's expertise to solve the physical problems created by the growth of Abadan in its revolutionary era, combining effects described by Iranian and British nationalists. A thorough review of the literature was completed by Hein and Sedighi when they studied the role of oil in shaping other Iranian cities, Khuzestan and Tehran. They

¹⁷ Abadi, Zeinab & Masoud, Sasan. "The evolution of urban planning in developing countries compared with developed countries", *Journal UMP Social Sciences and Technology Management* 3, no. 2, 2015.

¹⁸ Al-Dossary, Mona K. A study of Current Residential Building in Al-Khobar and the Forces that Shape them, unpublished thesis of philosophy, University of Bath. 2000.

Another study: Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished Ph.D. thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

¹⁹ Al-Hathloul, Saleh. "Riyadh Development Plans in the Past Fifty Years (1967-2016)." *Current Urban Studies* 05, no. 01 (2017): 97-120. doi:10.4236/cus.2017.51007.

- Al-Hathloul, S., Mughal, M.A. *Urban Growth Management-the Saudi Experience*, *Habitat International* 28, (2004):609-623.

- Al-Hathloul, Saleh. "Riyadh Architecture in One Hundred Years." Lecture, Darat Al-Funun, Amman, 2002.

- Al-Hathloul, S.A. & Al-Saied Mohammed. *New Cities in Saudi Arabia, Concentration or Spread for the Urban Development*, *Journal of King Saud University* (5), v.13, p.1-37. 2001. [Arabic edition].

²⁰ Golzari, Nasser, and Murray Fraser. 2016. *Architecture and Globalisation in the Persian Gulf Region*. London: Taylor and Francis.

²¹ Crinson, Mark. 1997. "Abadan: Planning and Architecture under the Anglo-Iranian Oil Company." *Planning Perspectives* 12 (3): 341-59. <https://doi.org/10.1080/026654397364681>.

explored how the oil revolution directly affected the form of the cities, playing a major role in urban development with the assistance of foreign powers. In conclusion, they stated:

Using the concept of the petroleum scape helps to analyse the roles of different oil actors global and national corporations; national and local governments; professional, industrial, and civic players; the public in creating these territories, built forms, and representations, and provides an opportunity to enrich our understanding of globalisation, multiple oil modernities, and architectural, urban, and environmental history and its impact on space through time.²²

The final sentence leads on to describing what this thesis intends to cover through its next chapters.

Studies specific to Saudi Arabia:

The transformation, rapid industrialisation, and massive urbanism of Saudi society after the discovery of oil was beyond belief in many aspects of life. Charsley noted this, stating, "... there is no single story of cultural change to be told, and the search for a single theory of cultural change must, in the end, prove fruitless, there are striking links and pattern always to be found".²³ **The quality of life** in Saudi Arabia has undergone significant changes. The lifestyle of residents has also been modified to suit developments. Akbar studied social change in the western region of Saudi Arabia in his thesis (*Home and furniture: Use and meaning of domestic space, Jeddah, Saudi Arabia*).²⁴ He found the traditional home environment was highly compatible with the use and lifestyle of occupants and their expression of identity. He noticed there was a strong relationship between lifestyle, cultural identity, and the domestic use of space and how furniture has changed over time, while Al-Naim studied the lifestyle of people in the Eastern Province, especially in Al-Hasa city.²⁵ His style was descriptive with a clear illustration. The link between the behaviour, customs, and traditions of the inhabitants was explained. He clarified the changes in spaces according to occupants' lifestyle.

Three Key Aspects:

From the more general literature and the case studies beyond the scope of this thesis, it is apparent that three aspects determine how houses are shaped and planned:

Privacy: The title of Alexander and Chermayeff's study, *Community and Privacy*, introduces the key aspect of privacy. Certainly, in Arab culture emphasis on privacy dominates daily life and the domestic environment; this is especially true in the Kingdom of Saudi Arabia. Abu-Ghazzeah discussed the physical mechanisms that people in Saudi Arabia use to communicate their concerns about privacy.²⁶ He concluded that people in Saudi Arabia make choices regarding territorial behaviour according to their adherence to

²² Hein, Carola, and Mohamad Sedighi. "Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran." *Architectural Theory Review* 21, no. 3 (2016): 349-74.

²³ Charsley, S. R. *Wedding Cakes and Cultural History*. London: Routledge, 1992: 101.

²⁴ Akbar, Sameer. *Home and Furniture: Use and Meaning of Domestic Space, Jeddah, Saudi Arabia*. Master's thesis, Newcastle University, 1998. Newcastle: Newcastle Library.

²⁵ Al-Naim, M. *Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia*, Unpublished Ph.D. thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

²⁶ Abu-Gazzeah, Tawfiq. "Privacy as the Basis of Architectural Planning in the Islamic Cultures of Saudi Arabia." In Faith and the Built Environment: Architecture and Behavior in Islamic Cultures. Süha Özkan, ed. Lausanne: Comportments. (1996): 93-111.

Islamic values and their self-identity. Further research was completed by Al-Hemaidi on the same subject, examining how residents deal with the privacy issues in their homes.²⁷ He learned that Saudi residents consider privacy an important issue. He observed responses to privacy violations in the form of neighbours' construction of additional fences or closure of openings between properties.

"Good languages are in harmony with geography, climate and culture."²⁸ Undoubtedly, the **climate is a second key aspect** determining the design of houses in the Middle East, and it plays a dominant role in shaping housing form and cities. Akan and Cakici supported this belief in their study of traditional Turkish houses. "This study represents a brief historical background of the Turkish house and explains how the different climatic conditions have influenced the home environment and plan types."²⁹ They compared three cases from different regions within Turkey. They observed that Middle Eastern cities have a hot and arid climate. This had a notable effect on most coastal cities in the traditional period, informing urban planning and house form. The common house form was not developed randomly, but according to the needs of residents, who preferred certain geographic locations for their houses. This conclusion arose from the paper titled: *Urban Smart Shading Devices based on Traditional Gulf Design. Case Study Located in A district on A hot Arid Climate City in Abu Dhabi*.³⁰ The majority of earlier research dealing with the climate change phenomenon and its impact on building form and urban planning does not relate to the Gulf region,³¹ and there is no specialised study describing the impact of climate on the proposed study area, the Dammam Metropolitan Area.

As a third aspect, planning and building regulations also inform house form in single-family houses in the context of Saudi Arabia. Al Hemaidi selected Riyadh, Tabuk and Haqil to carry out the survey.³² The study demonstrates the failure of applied planning regulations to promote an acceptable house form permitting a great enough degree of privacy protection. This recommendation comes from his research to find a solution to this problem, focusing on reducing the effects of privacy violations between neighbouring houses. He recommended modifying planning regulations to allow the building of villas without a setback from the back of lots. Another study, exploring the role of planning controls and building regulations in shaping the built form of one of the world's fastest-growing cities, Tehran, was conducted by Homeira Shayesteh and Philip Steadman.³³ Comparing among Paris, New York and Hong Kong and the historical and contemporary effects of regulations, the researchers combined features of historical investigation with

²⁷ Al Hemaidi, Waleed K. "The Dilemma of Regulation Privacy Planning Regulations, Privacy and House Form; The Case Study of Low-Density Single-Family Dwellings in Saudi Arabia." Doctor's thesis, University College London, 1996. Accessed October 24, 2016. <http://discovery.ucl.ac.uk/1349878/2/367834.pdf>.

²⁸ Alexander, Christopher, Sara Ishikawa, and Murray Silverstein. *A Pattern Language: Towns, Buildings, Construction*. New York: Oxford Univ. Pr., 2010.

²⁹ Er Akan, A., and F. Z. Cakici. *The Influence of Climate in the Formation of Traditional Turkish Houses*. Proceedings of Fifth International Postgraduate Research Conference in the Built and Human Environment, University of Salford, Manchester. Vol. 5. 2005. 338-47.

³⁰ Bande, Lindita, and Dalberto Cabrera. *Urban Smart Shading Devices Based on Traditional Gulf Design. Case Study Located in A District on A Hot Arid Climate City in Abu Dhabi*. Proceedings of First IEEE International Smart Cities Conference, Italy, Milano. 2015.

³¹ "Urban Adaptation to Climate Change in Europe 2016." *Climate Change and Law Collection*. doi:10.1163/9789004322714_cclc_2016-0201-010.

³² Al Hemaidi, Waleed K. "The Dilemma of Regulation Privacy Planning Regulations, Privacy and House Form; The Case Study of Low-Density Single-Family Dwellings in Saudi Arabia." Doctor's thesis, University College London, 1996. Accessed October 24, 2016. <http://discovery.ucl.ac.uk/1349878/2/367834.pdf>.

³³ Shayesteh, Homeira, and Philip Steadman. "The Impacts of Regulations and Legislation on Residential Built Forms in Tehran." *JOSS* 4, no. 1 (2013): 92-107. Accessed 2018. <http://joss.bartlett.ucl.ac.uk/journal/index.php/joss/article/view/158>.

some simple geometrical analyses of housing layout: “The paper uncovers the role planning codes have played not only in limiting and regulating but also, as an indirect effect, encouraging and introducing new types of house.”³⁴

The previous reviews of extant literature have revealed a relationship between the evolution in building environment and the oil boom in the case of some oil cities. Based on the current evidence, a major limitation exists pertaining to the evolution arising from the oil boom. Transformation of the following: urban planning, quality of life, local building policies as opposed to the colonial strategies arising from the oil booms, and building construction systems, are variables that will be studied from the traditional up to the contemporary period in the selected study area, coming under the influence of climate and privacy as consistent factors.

Reviewing the literature leads to the defining of the main research question: What was the impact of the oil booms in the Eastern Province of Saudi Arabia on the design and construction of the home environment in the Dammam Metropolitan Area? This can be observed by analysing the urban planning and the shifts which emerged in space levels in all housing types that occurred over stages of modernisation taking in consideration the most influential factors: privacy, climate, and building regulations.

1.3 Information Sources and Relevance to the Topic of the Research

The wide range of sources from which the information collected was derived comes from scientific papers, scholarly journal articles covering very topical issues, the latest research, and reviews of current literature that are very much related. Books and e-books have also been used. Specific books have been chosen to provide in-depth coverage of subjects. The information obtained in some books is correlated indirectly with the primary topic or has a direct relationship with the subtopics. The researcher also deduced meanings that share a close relationship with areas of concern.

Websites served as a useful source of information, particularly because of, for example, photos associated with current and well-known figures, places, and events that are not available in published books or papers. The information gathered contained data on various topics which may not be directly related to the research question, but which give insight into parallel or related issues that informed the research. The information helped to determine the context. The information also includes talks about the social, cultural and economic changes within society that directly or indirectly affected the urban design and house form. This context helps put the research into focus itself within a larger frame. The researcher considered the following criteria when evaluating the information sources obtained: accuracy, purpose and coverage. The chosen sources can also help clarify the point of view proposed in the thesis by identifying the theoretical and ideological sources that contributed to it.

³⁴ Ibid.

1.4 The Significance of the Study

The projected outcomes of this research can be divided into two groups; the first group revolves around the knowledge gained from the research (the ambition of the research), the second group discusses possible projection or speculation concerning the future. The research will be organised according to the following consecutive steps:

1. A comparative and descriptive analysis of the development phases of the urban planning of neighbourhood and house form typology, following design evolution after the oil booms in Saudi Arabia by chronological order. This will improve understanding of the relationships between urban design and the home environment, and the possibility of connecting them.
2. To clarify and identify recurring features and aspects of housing and urban design by providing a descriptive study of the lifestyle, the social situation affecting inhabitants, and their relationships with residential spaces as linked to urban design and housing regulations. This clarification will provide a comprehensive picture of the collected data, clarifying evolutionary changes and resistance in the design of housing units.
3. Taking this together, the study defines a reading of the development of urban design and house form over the last 60 years in the Dammam region. As detailed, written studies of changing house form are unavailable; the current research is based on findings from the site itself, identifying and reconstructing the development over time from traditional homes to contemporary modes of design and building. In this way, we can start to understand the successive changes and the effects they brought about. Observe the application of urban policies and building regulations and housing development in Saudi Arabia to establish the extent of the impact of these factors on house design.
4. Observe the application of urban policies and building regulations and housing development in Saudi Arabia, to find out the extent of the impact of these factors on house design.

These steps will then lead to the second group of intended outcomes:

1. Find a model that gives shape to dwellings that can address the requirements, demands and possibilities associated with design modification according to present-day inhabitants.
2. Suggest ways of restoring the urban fabric, communities, and housing as a cohesive configuration in a way that makes it possible to accept a new concept linking the past with the present, as a way to compose the future, and achieve a sustainable home environment.

In summary, this study explores issues of housing in the region today, presenting case studies of living neighbourhoods and dwellings during subsequent periods. The significance of the study lies in its ability to present issues and analyse problems, and concludes by offering future implications for resolving challenges.

1.5 Scope and Limitation

The thesis includes primary data gathered from first-hand surveys, and secondary data obtained from previously published research (books, journal articles, and periodicals).

Firstly, a detailed analysis of common dwelling types in the Dammam Metropolitan Area is required. A photographic survey of houses in different parts of the region, conducted at different times, is also needed to represent and identify development and change in housing typology. This would make it possible to ascertain factors intelligently, as well as define the processes that have shaped both housing and cities.

Access to urban planning history and the background of residential settlements is the second essential foundation stone of this thesis. It is important to collect facts about urban development, as determined by other researchers, the Five-Year Development plans in the Kingdom of Saudi Arabia, city maps, archival photos and plans from Aramco, as well as some specific books and websites.

The research covers locals' lifestyles and describes their behaviour in relation to their homes. Publications and information from the Central Department of Statistics have been drawn from official websites as a way to attain precise information concerning the population, focusing on numbers, growth rate, living standards, and other statistics. There is also a need for reference data informing building regulations and housing policy, to be obtained from the Saudi Building Code and Housing Ministry. This information will clarify matters by highlighting variable elements in the built environment.

This thesis requires exploration in the field as a way to study urban planning in selected neighbourhoods and housing units built in the Dammam Metropolitan Area from 1938 to the present.³⁵ The study will focus on privately owned low-rise buildings, in particular, detached units (villas), as limitations controlling samples in the thesis, as these are by far the most commonly built housing types in the Dammam Metropolitan Area.

As stated previously, this research was subject to certain limitations. The Metropolitan Area of Dammam has a relatively short history of development. The area has only recently attracted the interest of researchers. Another consideration is that much of the available information is incomplete and cryptic, some of it contradictory and not to be trusted. Where information has been used without verification, this has been noted.

The second major issue is that many of the traditional and transitional houses are currently occupied by foreign expatriates, making them difficult to access. Another important matter is the difficulty finding the original inhabitants of the traditional, transitional and modern houses, so as to collect reliable information regarding the changes during the tenancy period. To examine the settlements and current homes directly, the

³⁵ A commercial city of a triplet-city metropolis comprising Dammam, Dhahran and Al-Khobar located in the Eastern Province of Saudi Arabia.

researcher collected sets of drawings from different real estate offices and architectural practices located in the Dammam Metropolitan Area.

1.6 Main Objective of the Study

The primary objective of this study is to conduct a comparative analysis of the spatial and functional pattern of traditional, transitional, modern and contemporary urban design in the Dammam Metropolitan Area in Saudi Arabia. It aims to explore their effects on the home environment, and to understand and describe those aspects that motivate people to adapt and change over time, both the internal and external elements of their home environment.

This research presents a conceptual framework employing two theoretical distinctions. The first one concerns the concept of the neighbourhood as a system of settings in which certain activities takes place, influencing the physical aspects of space.³⁶ The second one concerns the concept of home and its meaning relative to spatial organisation.³⁷ The conceptual framework identifies several interfaces with cultural background and lifestyle,³⁸ taking into consideration how best to implement building regulations with privacy and climate factors as residents' primary demand. Finally, this analytical study will observe a possible role for urban design when determining housing form.

Evidence of urban design during different developmental periods globally reflects the relationship between the home environment and urban design. The central portion of this study covers the relationship between urban structure and planning on one side and house form on the other. It moves beyond an examination of the correlations of urban design and built environment features, to explore the house's spatial organisation, and to study and analyse the composite characteristics of urban design, which include infrastructure, street patterns, housing policy, and regulations. These factors might, then, have a significant impact on housing. Several urban design characteristics were drawn from four examples of neighbourhoods throughout the Dammam Metropolitan Area. These were collected for detailed study.

The Eastern region of Saudi Arabia passed through wide bounds of urban and architectural developments due to the continued economic growth from 1932, following the discovery of oil. In this region the home environment underwent considerable changes. This study addresses the residential built environment as affected by the discovery of oil and oil booms in the region. It will address the issue of the interdependent relationship between the development of urban planning of residential settlements and the emergence of the new neighbourhood and changes in the home environment which were affected by economic development

³⁶ Kallus, Rachel, and Hubert Law-Yone. "What Is a Neighbourhood? The Structure and Function of an Idea." *Environment and Planning B: Planning and Design* 27, no. 6 (2000): 815–26. <https://doi.org/10.1068/b2636>.

³⁷ Despres, C. 'The Meaning of Home: Literature Review and Directions for Future Research and Theoretical Development', *The Journal of Architectural and Planning Research* 8, no. 2, (Summer), (1991): 96-115.

- Rapoport, A. "Thinking about Home Environment", In Altman & Carol M. Werner, *Home Environments*, New York, *A Division of Plenum Publishing Corporation*, (1985): 255-286.

³⁸ Culture and lifestyle are quite frequently used in studies touching on the meaning of a dwelling.

after the oil booms. The study will concern itself with the physical and social values of urban design. The roles they play in enhancing and consolidating people's lives in their home environments raise the following question: Which values, or elements, will affect both urban design and housing form in the selected case studies, and do those values have the capability to endure over time? Rapoport highlights the importance of values in understanding physical forms. He states: "... the values and rule systems of different groups help understand the urban forms which their choices produce. Values thus affect the definition of problems, the data used, and solutions proposed."³⁹

The term 'built environment' is used throughout this research to refer to the interdependent relationship between the components of residential settlements, housing elements, cultural aspects and peoples' lifestyles. The built environment refers to the human-made environment, focusing on residents' activities, their values and needs, and built forms, to show artefacts produced as the output of building activities. Lawrence described the term, thus:

Built environment is an abstract concept employed here and in some of the literature to describe the products of human building activity. Thus, it refers, in the broadest sense, to any physical alteration of the natural environment in the form of construction by humans. Generally speaking, it includes built forms, which are defined according to buildings type (e.g. dwellings, temples or meeting houses), those created by humans as a means of shelter, to identify and protect the activity inside. Built forms also include spaces that are defined and bound, but not necessarily enclosed, such as the covered areas in a compound, a plaza, or a street.⁴⁰

The thesis will have a strong focus on privacy, as this is an influential factor in the social life of Saudi families. This value proceeds from religious beliefs and social legacies and traditions. However, privacy is also an issue that has proven decisive in the formation of the built environment globally. Serge Chermayeff and Christopher Alexander, focusing on the problems facing the North American suburb, discussed how to balance the human need for community and privacy.⁴¹ They aimed to find a principle of organisation to create a physical environment in which urban man can achieve equilibrium. However, the authors did not discuss the roles of culture and social structure in human affairs. In this research, the social and cultural aspects are considered important when evaluating the influences of traditional and contemporary residential settlements, as noted in this study.

This study will observe privacy by monitoring and examining its effects on particular study periods, and by detecting how it derives impact within the home environment. It will use case studies and data from other disciplines to produce guidelines, the objectives of which are to create a new approach to urban design, to be applied to new residential neighbourhoods, speculating as to the projected future needs of the housing

³⁹ Rapoport, A. *Human Aspects of Urban Form: Towards a Man-Environment Approach to Urban*, Oxford, Pergamon Press. (1977): 24.

⁴⁰ Lawrence, DL, and Low, SM. "The Built Environment and Spatial Form." Review of Annual Review of Anthropology. Web of Science Categories 19 (1990): 453-505. Accessed January 11, 2016. <http://www.annualreviews.org/doi/abs/10.1146/annurev.an.19.100190.002321?journalCode=anthro>.

⁴¹ Serge Chermayeff, Christopher Alexander. *Community and Privacy*, Serge Chermayeff Copyright, USA. 1965.

- In their book, the first eight chapters attack modern urban life, singling out automobiles, noise, suburban subdivision, destruction of nature, and lack of privacy. They included, sometimes explicitly, but more often implicitly, a theory about human needs not being efficiently satisfied within the present urban environment.

sector in Saudi Arabia. The study also aims to develop a set of recommendations regarding the future of the home environment in the Dammam Metropolitan Area to support both existing and future development. In this sense, the research is paralleling the aforementioned seminal study by Alexander and Chermayef.

The study can be abbreviated as follows:

Documentation:

- Collecting literature, documents and visual information of the physical and social arrangements that inform urban development in the Dammam Metropolitan Area.
- Identification of the physical and social aspects of the home environment (neighbourhoods, house form, and lifestyle) according to a proposed chronology.

Analysis:

- Investigation of the relationship between the spatial arrangements for houses and urban design in surrounding settlements.
- Exploration and comparison of the physical and social aspects of identity in the home environment from traditional to contemporary through the transitional and modern periods.

Evaluation:

- Construction of the spatiotemporal path of continuity, and changes in the spatial arrangement of the home environment in the Dammam Metropolitan Area.
- Assessment of the impact of the trajectory of modification and development of the spatial organisation and the use of dwellings over time in connection with their associated physical forms.
- Tracing the continued development associated with key physical and social aspects that influence the contemporary home environment in the Dammam Metropolitan Area.

1.7 Research Questions

The research questions for this study are as follow:

1. What was the impact of the oil booms in the Eastern Province of Saudi Arabia on the design and construction of home environment types in the Dammam Metropolitan Area?
2. Which factors played a role in the changes in the home environment's design and planning over the several stages of modernisation in the Dammam Metropolitan Area?
3. How did the shifts in house types influence traditional cultural, social values, and daily life within the domestic environment? What is the impact of the changes in house form on cultural development and quality of life (privacy, climate responsiveness) in the Dammam Metropolitan Area?
4. How did the several stages of modernisation, urban planning laws and strategies correlate with the spatial organisation of houses and their external features in the Dammam Metropolitan Area?
5. What was the relation between urban design policy, design and residents' needs, and home both initially and during the development stage?

6. Can the development of urban design and house form be taken further today, respecting cultural and social values, and at the same time affording answers to today's demands for sustainable/ ecologically sound urbanisation?

1.8 Study Focus Areas

The study focuses on the development of the home environment in the Dammam Metropolitan Area. It is an emerging city located in the Eastern region of Saudi Arabia. Dammam was formed in 1923 when a group from the Al-Dawasir tribe chose to move from Bahrain to the mainland.⁴² The city has been experiencing change since 1938 when Saudi Arabia began exporting oil in commercial quantities.⁴³ (Fig 1.1) Changes, involving multiple aspects, started increasing population numbers and income,⁴⁴ then the evolution that followed affected the level of urban planning in residential neighbourhoods, changing the shape of the familiar form of traditional houses.

This new settlement introduced a new land subdivision pattern, which contrasted with that in the old city. With the discovery and exporting of oil, the city faced a series of changes affecting its physical and social context. This development informed the initial question of the impact of these changes on urban design and house form.

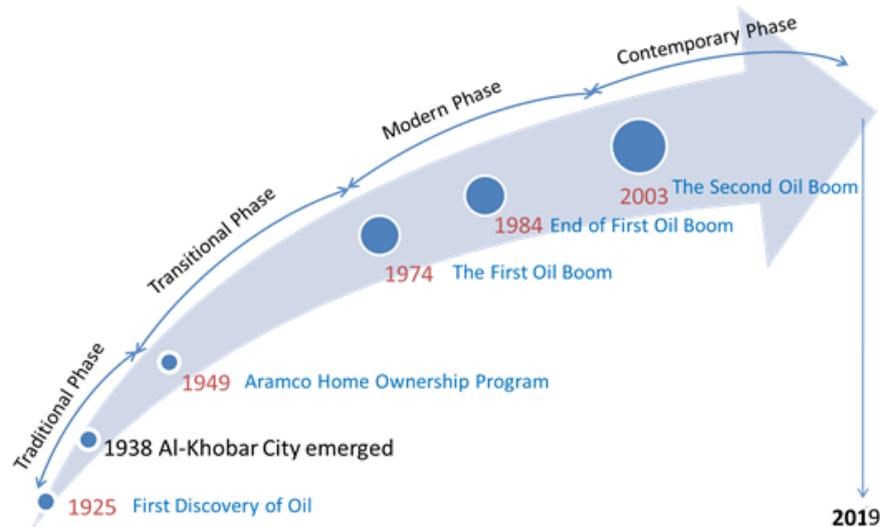


Fig 1.1: The sequence of evolution, which appeared in architecture and urban planning in Saudi Arabia.

⁴² Golzari, Nasser. *Architecture and Globalisation in the Persian Gulf Region*, Routledge, 2016.

⁴³ Ibid.

⁴⁴ Al-Naim, Mashary A., *Riyadh: A City of 'Institutional' Architecture*, The Evolving Arab city, edited by Yasser Elsheshtawy, Routledge, USA, 2008.

Al-Naim, Mashary, Shihabuddin Mahmud. *Transformation of Traditional Dwellings and Income Generation by Low-Income Expatriates: The Case of Hofuf, Saudi Arabia*, *Cities*, 24, no. 6, (2007.): 422-433.

Master's thesis, Dammam/ King Faisal University, 2006, 19.

Al-Said Fahad. *The Pattern of Structural Transformation of the Saudi Contemporary Neighborhood: The Case of Al-Malaz*, Riyadh, Saudi Arabia, 39th ISoCaRP Congress 2003.

Why Dammam Metropolitan Area?

Dammam Metropolitan Area is the study area. It is located in the Eastern Province of the Kingdom of Saudi Arabia. Saudi Arabia is an Arab country in the Middle East, and it occupies most of the Arabian Peninsula. The Eastern Province is one of the best-known oil regions along the Arabian Gulf.

Every region of Saudi Arabia has a unique topography, culture and identity, which influences both its architecture and city planning, but the legal system in them all is based on Islamic law (i.e. Sharia). The official language of Saudi Arabia is Arabic; however, there are thirteen main regional variants.⁴⁵ In the case study area, the dialect is Gulf Arabic.

Until the 1960s, the majority of the population was nomadic, but over 95% of the population now live a settled existence due to rapid economic and urban growth. The religion followed by 97% of the population is Islam.

The increasing size of cities and residential settlements have established that “the metropolitan region is now the functional unit of our environment, and it is desirable that this functional unit should be identified and structured by its inhabitants.”⁴⁶ This new form of cities allows citizens to live and work in vast, interdependent regions. The Dammam district has been designed as a metropolitan area, and organised as a major district containing three sub-districts, each comprised of many sub-sub-districts. (Fig 1.2)



Fig 1.2: The location of Dammam Metropolitan Area in relation of the Saudi Arabia, and the location of the Kingdome in relation to the rest of the world.

⁴⁵ Al-Bahah, Northern Frontier, Al-Jawf, Medina, Al-Qaseem, Riyadh, Eastern Region, Aseer, Ha'il, Jizan, Mecca, Najran, Tabouk. Central Department of Statistics, Kingdom of Saudi Arabia. Ministry of Economy and Planning, <http://services.mep.gov.sa/themes/Dashboard/index.jsp>. Accessed March 21, 2014.

⁴⁶ Lynch, Kevin. *The Image of the City*, the MIT Press, Massachusetts Institute of Technology, Cambridge, Massachusetts and London, England. 1960.112.

The Dammam Metropolitan Area is the third extended urban area in the Kingdom of Saudi Arabia, and is the main urbanised space in the Eastern province. The Eastern Province of Saudi Arabia extends from the northern border with Kuwait and Iraq to the southern border with Yemen and Oman. It constitutes the largest region in Saudi Arabia and was one of the first to undertake clear steps towards development. The Dammam Metropolitan Area is formed by three main neighbouring cities: Dammam, Dhahran, and Al-Khobar. “The metropolitan area of the triplet cities has an estimated population of 1.737 [million].”⁴⁷ Before the discovery of oil, the area had long been known as an important port and fishing area, exploiting its strategic location on the shore of the Arabian Gulf. Its importance also results from the presence of Saudi Aramco, the world's largest oil company, and the fact that the first Saudi oil field was discovered in Dhahran.

Due to its economic status, the Eastern region has undergone a complete transformation, having been the first region to be affected by economic growth and housing sector growth. The triplet cities of DMA are currently attempting to come to terms with the influence of globalisation. Malkawi states: “it cannot be denied that the impact of this trend on most Arab cities is significant”.⁴⁸ There has been a remarkable transformation of DMA cities since the first oil boom, and this has continued to the present day. In light of a persistent lack of awareness of traditional culture in the design and planning phases of Saudi cities, DMA serves as an efficient way of illustrating the current transformation of Saudi cities, symbolising the changes currently taking place in the major urban areas within Saudi Arabia.

The Dammam Metropolitan Area was selected for this study because the region has not been widely explored and analysed in previous studies. In addition, it is a suitable site to perform this study because it contains examples of all the developmental stages in the private home environment. This refers to the modernisation process witnessed in the three cities. The Dammam Metropolitan Area has undergone rapid changes over a short timeframe. These changes enable the researcher to absorb the evolution in the home environment.

1.9 Research Strategy

The study moves from a general to a specific perspective, namely from urban planning of the residential settlements to details of dwelling units and from high-level meanings (the development of built environment)⁴⁹ to middle-level meanings (socio-cultural values) and lower-level meanings (people's lifestyles and manifest functions).

⁴⁷ According to Booming Cities Indicators Workshop that held within the activities of the First Urban Planning Forum in Riyadh, 31st March 2016. Accessed in 2/04/016.

⁴⁸ Elsheshtawy, Yasser. *The Evolving Arab City: Tradition, Modernity and Urban Development*. London: Routledge, 2008.27.

⁴⁹ Rapoport, A. Levels of meaning in the built environment, In: F. Poyatos (ed.), *Cross-cultural perspectives in nonverbal communication*, C.J. Hogrefe, Toronto, (1988): 317-336. In his context, three levels of meaning in the built environment. High-level meanings are related to philosophical systems; middle-level meanings which are also called latent functions; lower-level meanings are every day and instrumental meanings and also called manifest functions.

This approach provides a useful reorganisation of information, collected under separate main headings, which renders them easy to understand and evaluate. These main headings are divided into chapters, according to chronology and spatial hierarchy, and range from the broad public perspective to the private, and finally to intimate details. (Fig 1.3)

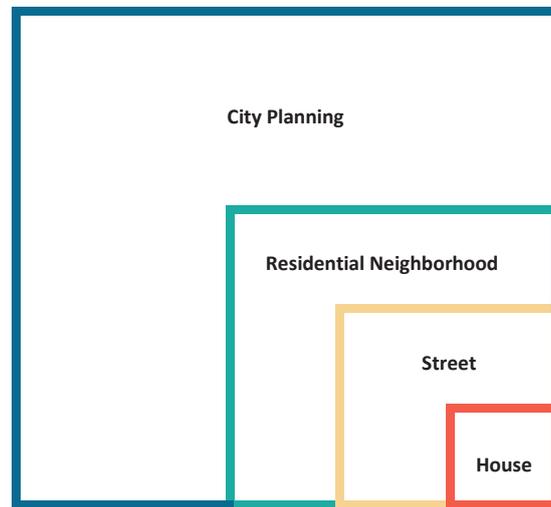


Fig 1.3: The hierarchical sequence used in this research.

1.10 Research Methodology

The research is identified by the analytical frame that considered time and levels of territory to describe the organisation of residential settlements and their low-rise dwellings. The study relied on observations, archival material and literature to compare the development of four selected housing projects in different periods: traditional, transitional, modern and contemporary, in the Dammam Metropolitan Area, the largest agglomeration in the Eastern Province of Saudi Arabia. The study will start with the traditional built environment of the Eastern Province as a framework to understand continuity and changes that have emerged in other patterns in the same area.⁵⁰ This study is based on a descriptive and comparative analysis dealing with both the typological and morphological components of the selected housing projects. The study implements a text-by-text scheme, describing biographical and historical information. It lists, point-by-point, similarities and differences between the relationships of the patterns of territory levels (public, semi-public, semi-private, private) It then combines the result of the study with the outcomes of the observations that were derived from in-depth study of the selected districts and their dwellings.

The study focuses on the development of the house form and neighbourhood not only in the present time but also digging into the past experience. It also observes the connection of the identity in the home environment with dominant factors in the region like privacy and climate. It is the core of this thesis, as it is anticipated to lead to a better understanding of the decisive aspects that inform a way forward in the design of our home

⁵⁰ (Traditions could maintain a certain continuity within a group) Rapoport, A. "Culture and Built Form - A Reconsideration." *D.G. Saile (Ed) Architecture in Cultural Change*, 1986, 157-75.

environment. The historical investigation will allow us to understand our past, which in turn supports our understanding of the present and ability to plan for the future. The lack of any previous study of the development of the house form in relation to neighbourhood planning made it necessary to follow this methodology. “Study the past if you would define the future.” (Confucius)

1.10.1 The Research Framework

The frame of reference includes the monitoring of developments that have been involved in urban planning, and within the home environment from the traditional period until the present. The research is guided by the objectives introduced at the beginning of this chapter. The analytical frame is developed to answer the question: What changes have been observed in the contemporary built environment since the traditional period? Hence, a comprehensive overview and brief study are listed here to explain the evolution in urban life and planning in Saudi Arabia and the Dammam Metropolitan Area, in particular, and to give an account and explanation of the meaning of the terms used in the research.

The relationship between the neighbourhood, homes, surrounding objects and spaces in different periods may create new meanings and identity. The first part consists of three chapters are dedicated to a detailed study of the traditional built environment, followed by a similar study of transitional and modern periods, and finally a separate chapter on the contemporary built environment. These examine how neighbourhoods have developed, contradict or interact with each other, and provide an analysis in words, diagrams, and images of dwellings, showing how house types and specifications change in each period. The aims of this thesis are to describe the changes and build a clear perception of the evolution of the home environment.

In the second part, the study addresses the physical behaviour and the lifestyles of people inside and outside their home environments in the Dammam Region during the period being studied. This approach extends beyond the professional boundaries of architectural research, introducing elements of sociology and anthropology to observe and explain the relationship between dwellings and urban planning design. While in the third part, the chapter includes the case-studies evaluating urban planning in traditional, transitional, modern and contemporary neighbourhoods and associated residential units.

The fourth part answers the research questions by studying and analysing the sequence of change in four patterns associated with residential neighbourhoods, linking them with the development of house forms. The study considers the interdependent relationship between the urban planning of residential settlements and architectural formation in the home environment, comparing the public and private sectors. The study identifies continuity and change in both urban design and house form in regards to spatial organisation, externally visible features, zoning, spatial interaction with residents and the ability to develop and make modifications.

Finally, the last part is the conclusion that includes a more speculative part: How can the study lead to general and technical design ideas for urban planning and housing forms. These ideas might encourage a return to traditional patterns in urban planning and architecture through a rediscovery of the history of the traditional

period and its impact on people's lifestyles, which keeps pace with contemporary trends by proposing a conceptual model of urban planning for future Saudi cities, and predictive methods to improve the home environment in Saudi Arabia. It also contains proposals for future research as a way to extend the scope of this study.

1.10.2 The Research Method Application

- Fieldwork

The researcher needs to discover the continuity and changes of traditional houses and neighbourhoods and compare them with those which were built later. The researcher also needs to observe the characteristics that dominate the home environment in the Dammam Area in all periods.

The researcher divides the period into four periods to classify the home environment located in the study field. All periods are identified with the same headings and arrangements. This classification will facilitate the description and comparison process. The researcher uses the house plans, photographs of the house, and the facilities of the neighbourhoods that surround the selected house.

The aim of this explanatory study is to identify the home environment and perceive the facts that have direct effects on each element of it, discover what are the policies that shaped this circumstance, and discern what forces interact to produce these circumstances.

- In-depth case study

The triplet cities of Dammam Metropolitan Area have undergone many changes from the beginning of the transitional period in 1949 until recent days. The cities remained with minimum changes during the traditional period until 1938 after the discovery of oil that helped the city of Al-Khobar to be established. The residential units also convey the changes that occurred in the region.

The selected case studies depend on the development periods (traditional, transitional, modern and contemporary) of the home environment that cover all the growth stages in the Dammam Metropolitan Area. Four case studies were chosen to cover the development stages in the selected time. This sampling frame covers all types and represents its society and environment in each period. Each case study has been analysed on two levels: the neighbourhood and the housing unit. Each level has been studied extensively according to the most affecting factors (privacy and climate) on the home environment in the region. The researcher chose the case studies according to their accessibility and suitability.

- Collecting Plans and Cadastral Survey

The researcher collected the chosen neighbourhoods' urban plans of modern and contemporary periods from the three municipalities of the triplet cities (Dammam, AL-Khobar and Dhahran) of Dammam Metropolitan Area. These plans show a cadastral survey of the residential blocks, services and facilities. Urban plans from traditional and transitional periods have been collected from other studies, old documents, and google maps.

The researcher used the previous experience of collecting house floor plans from traditional and transitional periods in her master's work. This collection also contains photographs and a lot of measuring sketches and participant observations. For the modern and contemporary periods, the researcher contacted many real estate and design offices in the region to collect home plans depending on their date of design and construction of the houses. The choice of plans depended on the most popular examples used by residents.

- **Observation and visual data collection**

The study used the observation method for the data that was collected in all stages. It gives the opportunity to provide rich, detailed descriptions of the social setting in the field notes and to view unscheduled events, improve interpretation, and develop new questions to be asked of informants.⁵¹ (DeMunck & Sobo, 1998).

Observation helped the researcher to identify relationships between the neighbourhoods and their resident units, also between the residents and their homes, and among the spaces inside the house. It helped to notice the physical information of the spatial organisation of the house in different periods, as well as the changes in the house facades. Observation used in this study monitored how people interacted with their home environment in a spatial context. The study used the observation mostly in the case studies when the researcher observed how people interacted with their internal and external domestic spaces by noticing their daily activities.

Using visual data collection like photographs and sketches in this study can illustrate the research concepts. It is an important source of data that reduced the need for a lot of explanation. Photographs also recorded the growth, continuity and changes of the external features of the home environment in each period. They show the type and form of urban and domestic elements in every home environment by recording similarities and differences over time.

- **The Data analysis**

Here is the step immediately before the conclusion. It focuses on the data from the case-studies and evidence from fieldwork, and then classifies them into main and secondary data. The main data contains the main theme of the research, while the secondary data plays a supporting role in providing important illumination to specific points. There is a clear link between the analytical frame and data. The interaction between the data and the analytical frame will refine the information to get the result.

In this study, there is the need to know how the home environment changed over time by constructing examples from traditional and contemporary periods. The objective is to investigate factors like climate and privacy and their effect on the home environment.

⁵¹ DeMunck, V. C. & Sobo, E. J. (Eds) (1998). *Using methods in the field: a practical introduction and casebook*. Walnut Creek, CA: AltaMira Press.

The basic data is classified into distinctive categories based on the most important event that caused changes in the region. Firstly, each category in this path consists of a series of information that is connected in a hierarchal sense. The researcher started with an analysis of the urban fabric according to its elements: streets, infrastructure and public services, and house form. Secondly, there is a detailed description of the influential factors on the spatial organisation of houses. This description details the most influential factors that shaped the physical characteristics of the home environment in the study area (privacy, climate, second oil boom, housing policy and building regulations). The description clarifies these factors by illuminating how people maintain, generate, and replace their meaning over time.

A spatial and visual analysis comes after that to investigate the impact of urban planning on house form and external features. The researcher illustrated the spatial organisation of urban planning of neighbourhoods and private house to a certain ordering category from the public to private spaces through semi-public and semi-private spaces. This classification came from the role of most influenced factors which were discussed before to understand the development of private homes in the Dammam Metropolitan Area. The study also analysed the external features which constitute the house exterior and which building techniques are used. This analysis demonstrates the main characteristics of the elements of the facade, the meaning by using them, and the continuity and changes that occurred over time.

1.11 Definition of Key Terms

This section outlines important fundamental concepts and terms, to help the reader understand the key terminology and concepts, particularly in the proposed classification of periods, as frequently used within the research. As described in the introductory section, the study focuses on the effect of the oil boom on urban planning and house form. Thus, from the outset examining the key concept of the oil boom and specifically the time frame. Furthermore, the study focuses on the innovation process that appeared in urban planning and house form. Hence, the key concept of different periods over the study period are discussed and defined at this point. Therefore, the term Aramco is defined as an important factor influencing urban design and house form with chief components and specifications.

- **First Oil Boom:**

After the First Oil Boom in 1974, the economic situation in Saudi Arabia changed dramatically: "... the 1974 real price was triple that of the year before.... Then, in 1979-80, it again increased substantially, to more than five times the price in 1973."⁵² Oil exports simultaneously expanded extensively. The government determined to use most of the growing oil income for massive development. The Oil boom reached maximum prosperity in 1984, and then the boom began to decline gradually due to many factors.

⁵² Verleger, Philip K., Jr. "The Determinants of Official OPEC Crude Prices." *Review of Economics and Statistics*. 1982. 64:177-83.
- http://wps.aw.com/aw_carltonper_modernio_4/0,9313,1424964-content,00.html. Last retrieved 13 March 2016.

The oil profits were intended to propel the Kingdom's investments to a minor extent in the late 1980s and early 1990s⁵³ (Fig: 1.4).

- **Second Oil Boom:**

The period since 2003 can be seen as constituting the second Saudi oil boom. This oil boom changed Saudi Arabia's strategic position, making it one of the largest and most powerful states in the Gulf.⁵⁴ Khan stated, "While analysts forecast that the year 2004 was going to be one of the best in economic terms, full-year data released by the Saudi Arabian Mandatory Authority and the government show that, in fact, 2004 was the second-best in Saudi economic history, after 1982, the peak of its second 'oil boom' era"⁵⁵ (Fig: 1.4).

- **Traditional Period:**

The term traditional in the Cambridge Dictionary means following or belonging to customs or ways of behaving that have continued in a group of people or society for a long time without change. Traditional also refers to usages that have been handed down from previous generations to the present day. The phrase "Traditional Period of Saudi Arabia", as stated in this thesis, relates to the time from the first discovery of oil in 1925 up to 1949, when Aramco introduced the Home Ownership Program as shown in Fig: 1.4. They termed buildings and houses that emerged in this period traditional, because they used local materials to structure the building's skeleton and its walls, as well as a method of construction that relied on accumulated experience.

- **Transitional Period:**

Transitional, according to the Cambridge Dictionary, means changing from one form or type to another, or the process by which this happens. Anis Ur-Rahman stated that the transitional period in Saudi Arabia is "The period from the 1950s to the 1970s was the time in which the physical development pattern in Saudi Arabia transformed due to the demonstration effect provided by the Aramco."⁵⁶

- **Modern Period:**

The modern period covers from the late 1970s until the 80s.⁵⁷ The expression of the modern period is what Derek McGovernat described as: "The post-1975 period manifests some emergent tendencies toward several of the second cycle of physical transformation."⁵⁸ Al-Naim also mentioned the modern

⁵³ The Library of Congress Country Studies; CIA World Facebook.

⁵⁴ Khan, Zahid H. "The Saudi Monetary System" in *Saudi Arabia Enters the Twenty-First Century*, edited by Anthony Shoult, 183-194. Westport: Praeger Publishers, 2003.

⁵⁵ Anthony Shoult. *Doing Business with Saudi Arabia*. GMB Publishing Ltd. 2006.183.

⁵⁶ Ur Rahman, Anis. *The Imperatives of Urban and Regional Planning: Concepts and Case Studies from the Developing World*. Lahore: Center for Urban, Regional, Environmental and Social-Studies, 2011. P.414.

⁵⁷ The Free Library. S.v. TWO things are hard to [...]. Retrieved Mar 02, 2016 from <http://www.thefreelibrary.com/TWO+things+are+hard+to+%5b...%5d.-a0347034123>.

⁵⁸ Ibid.

period in his paper: “We can argue that what happened was a process of identification where people strive to find for themselves a place in the modern era of the Saudi home environment.”⁵⁹

- **Contemporary Period:**

Contemporary in the Cambridge Dictionary means someone living during the same period as someone else. Hariri used the term contemporary when describing houses while writing his research.⁶⁰ He observed: “As a Saudi academician state, ‘our contemporary houses have no roots.’ What we have now is ornamentation in the facades rather than paying attention to the home interior and respecting the surrounding spaces.” This period is from the second oil boom in 2003 onwards.

- **Aramco:**

Aramco is a Saudi Arabian national petroleum and natural gas company, based in Dhahran. It was founded in 1933. “Aramco” was a shortening of the “Arabian American Oil Company”, a name selected by the earlier “California Arabian Standard Oil Company”, which was made obsolete by Texaco’s participation.⁶¹ “Saudi Aramco traces its beginnings to 1933 when a Concession Agreement was signed between Saudi Arabia and the Standard Oil Company of California (SOCAL). A subsidiary company, the California Arabian Standard Oil Company (CASOC), was created to manage the agreement.”⁶² In 1988 the company was recognised as Saudi Aramco, officially the Saudi Arabian Oil Company, which is most popularly known just as “Aramco”.

1.12 Definition of the Elements of Urban planning and Home Environment in Saudi Arabia

It is necessary to examine the components perceived as essential elements in the formation of urban planning to meet the aims of this thesis. These include city planning, streets, the residential neighbourhoods and home environment elements, and the possibility of conceiving of a relationship between city planning and housing form and meaning. In this study several basic terminologies have been used to establish precise meanings that reflect the perspective of house users in the Eastern Province of Saudi Arabia. The research employs a hierarchical sequence, ranging from the most comprehensive scale (city planning) to the most specific (house form and organisation); it also seeks to define terminology from both the public and private domain.

The home environment manifests the physical and social identity of people. Rapoport described the term “system of setting that has a particular environment quality”, adding, “.... which people choose (within given constraints) by lifestyle and ultimately culture to match their ideals, values, images and so on”.⁶³ The home

⁵⁹ Al-Naim, Mashary A. "Identity in Transitional Context: Open-Ended Local Architecture in Saudi Arabia," in Arch Net-IJAR: International Journal of Architectural Research, 2, no. 2. (2008). 136.

⁶⁰ The terminology used by the researcher to describe periods of time has been used in many other fields to describe architectural or historical periods.

⁶¹ Aramco History Retrieved Mar 02, 2016, from, <http://archive.aramcoworld.com/issue/200803/flash/75-facts/print.htm>.

⁶² Aramco Official Website, <https://www.saudiaramco.com/en/who-we-are/overview/our-history>. Accessed 5/5/2019.

⁶³ Rapoport, A. Levels of meaning in the built environment, In: F. Poyatos (ed.), Cross-cultural perspectives in nonverbal communication, C.J. Hogrefe, Toronto, (1988): 317-336.

environment refers to aspects of people's domestic lives that contribute to their living conditions. These aspects could be either physical conditions, social circumstances or psychological conditions. The physical conditions refer to urban design (the block arrangements, lot size, shape, and infrastructure), housing pattern and location. Looking at the housing context prior to analysis of it is essential. For the analytical work, two levels in the residential settlements of the home environment should be investigated:

1.12.1 City Planning

An urban region can be viewed as a combination of: 1) fixed, identifiable boundaries, such as major roads and geographical barriers and 2) subjective boundaries that are dependent on the characteristics and location of residents within neighbourhoods. Urban planning, as Feinstein defines it, is a design and regulation of the uses of space that focus on physical form, economic functions, and the social impact of the urban environment, and the location of different activities within it.⁶⁴ The urban planning of cities relates to both the development of open land and the redevelopment of existing parts of the city. Urban planning, as defined by the American Planning Association of Urban Planning, also called Planning or City and Regional Planning, is "a dynamic profession that works to improve the welfare of people and their communities by creating more convenient, equitable, healthful, efficient, and attractive places for present and future generations."⁶⁵

The Kingdom of Saudi Arabia is a sprawling country, and variances in its many built environments are associated with different historical, social, economic and political factors. Prior to the unification of the Kingdom, the country was divided into small principalities, which battled amongst themselves due to a lack of resources or limited religious and political unity. At that time, the population of the Arabian Peninsula lived in a state of instability, insecurity and hardship.⁶⁶

After the unification of the Kingdom of Saudi Arabia by King Abdul-Aziz,⁶⁷ it became apparent that security would be viewed as a high priority on the political agenda. Therefore, full powers were given to the principalities to manage the daily affairs of areas within the policy frameworks set out by the King. Saudi Arabia, therefore, evolved local systems to meet local requirements. A System of the Capital Secretariat and Municipalities was issued,⁶⁸ stipulating that municipalities needed to be responsible for organising and managing cities. Thus, the principalities were established,⁶⁹ dividing the Kingdom of Saudi Arabia into thirteen regions.⁷⁰ Each region was in charge of maintaining security and stability. At this time, security

⁶⁴ Susan S. Fainstein: Professor of Urban Planning, Harvard University. She is the author of *The City Builders* and others and Co-editor of *The Tourist City* and others.

⁶⁵ "American Planning Association APA". <https://www.planning.org/>. Accessed in 11/5/2015.

⁶⁶ Alexei Vassiliev. *The History of Saudi Arabia*, Saqi Books. 2013.

⁶⁷ Please refer to appendix A.

⁶⁸ The System of Capital Secretariat and Municipalities was issued in 1927. "Ministry of Municipal & Rural Affairs." Accessed May 12, 2015. <http://www.momra.gov.sa/>.

⁶⁹ The system of Inauguration princes issued in 1940.

⁷⁰ The Kingdom was divided into regions for the first time in the year 1981, then divided into 13 regions in 1992. "Central Department of Statistics and Information." *The System of Inauguration Princes Issued in 1940*. <http://www.cdsi.gov.sa/2010-05-08-09-59-55>, accessed in 12/5/2015.

concerns and the daily requirements of residents were priorities. At this stage, urban planning was viewed as unnecessary, and the terminology indicates that the parameters for urban planning had not yet been introduced.

In 1975, the agency of the Ministry of the Interior was transferred to the Ministry of Municipal and Rural Affairs to conduct the task of addressing the economic and social changes designed to accompany the economic boom.⁷¹ At this stage, the Ministry continued to address developments and local variables on a purely technical basis, failing to account for the opinions of the population, or to include them in local policies and decision making. Accordingly, urban and regional planning and the resulting residential plans did not reflect the views and aspirations of the population.

In 1991, a system of urban/city planning was introduced, designed to distinguish between levels of planning, dividing them into national, regional and local. The planning tasks designated at the national level were assigned to the Supreme Committee for Urban Planning. The Local Committee for City Planning and Coordination was also interested at the local level. However, all levels were overseen from the centre, although attention was directed towards urban and regional planning in the Kingdom and all the major regions and affiliated cities.

1.12.2 Residential Neighbourhoods

The ‘neighbourhood’ is a widely used term to describe an area that is identified as a component of the urban planning system. Additionally, research into interactions between land-use and transportation commonly use the term ‘neighbourhood’ as a synonym for the built environment or private society. However, the spatial definition of the neighbourhood has received minimal attention in the literature.

Therefore, we ask here, how we can best define a residential neighbourhood. In particular, what determines that neighbourhood’s characteristics? A residential neighbourhood can be defined as an area in which land use for housing units predominates. Units include single-family or multifamily housing units. A particular neighbourhood might choose to permit high-density land uses or low-density uses. Additionally, the area may be large or small.

The neighbourhood is one of the few representations of universal urban life, which range from the earliest cities to the present. It is also a social community, in which face-to-face interaction among members frequently takes place; thus, a neighbourhood is a geographically localised community within a larger city, district, or locality, which is characterised by similar or compatible land uses.

Neighbourhoods are typically recognised as such because of the social interactions that take place among people who are living close to each other. Neighbourhoods are identified by place names and are defined by boundaries comprised of major streets. Galster sets out a neighbourhood as a ‘complex commodity’ produced

⁷¹ Al-Shiha, Adnan & Al-Hariqi, Fahad. About activating areas system as a mechanism for urban planning in Saudi Arabia. 2000. [Arabic text]

by the same households,⁷² businesses, property owners and local governments that use it. A neighbourhood is a collection of spatially based attributes, including structural, infrastructural, demographic, class status, public services, environmental, political, and social interactivity.

A residential neighbourhood enables households to identify their local identity through their residential neighbours, children's schools and their relationship with the primary components of the neighbourhood. These groups create spatial clusters, some of which may be objectively recognisable.

In Saudi Arabia, the meaning of the term neighbourhood concentrates on urban fabric, as well as social services and environmental characteristics that meet the needs of the population in regards to social interactions. Ibn Khaldun states that a residential neighbourhood typically incorporates the necessities of humanity,⁷³ encourages communication between people and meets their needs, as well as cooperates with them to meet living requirements. Nomadic tribes moved into groups and arranged their tents in groups based on the membership of a clan. Later urban settlements were also characterised by the characteristics of shared interests, as people settled in villages and towns.

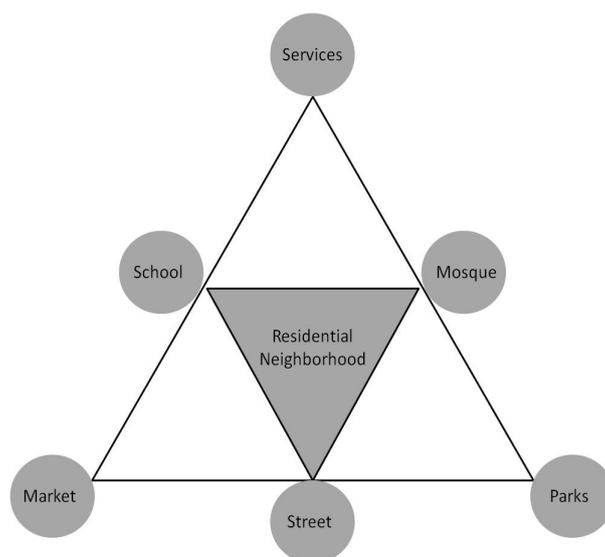


Fig. 1.4: The components of neighbourhoods.

The traditional neighbourhoods in Saudi Arabia were like bodies with a soul. The body consisted of the physical elements of the neighbourhood, such as its urban and architectural components (i.e. streets, squares, houses, mosques, markets, buildings and other services). (Fig. 1.4) Human relationships provided the spirit (social, environmental and utilitarian), and interactions between people. Thus the housing dispersed into the urban environment. The norms, traditions, and Islamic laws reinforced the patterns of interaction between people and the surrounding environment. Thus, the urban fabric is completed, allowing people and their physical and moral needs to blend with their home environment. This relationship began to decline gradually

⁷² Ibid.

⁷³ Mohammad A.Qadeer. 'Urbanisation of Everybody', *Institutional Imperatives, and Social Transformation in Pakistan*, *The Pakistan Development Review*, 38: 4 Part II, (1999): 1193–1210.

as vast streets crossed residential neighbourhoods. The fabric of society was dismantled, and traditional neighbourhoods lost their identity and spirit.

In the Eastern Province, residential neighbourhoods were known as *Hay* or *Freej*. Defining the term *Freej*, Al-Naim said: “*Freej* as an environmental and social concept implies the sense of grouping and is considered as a reference for individuals and groups and link them with the whole community.⁷⁴ Most neighbourhoods include families that have the same lineage with many generations”. The meaning of *Hay* or *Freej* can also be said to refer to the homogeneous relationships between places involving shared values, norms, and habits. This meaning continued until the end of the transitional era, and then gradually began to fade as modern neighbourhood planning systems emerged over the next six decades.⁷⁵

1.12.3 The Street and its Status within the Neighbourhood

The definition of a street usually comprises both the physical and social elements of the living environment. It is a place used for vehicular movement, social contacts and civic activities. In general, a street is a paved public right of way in a built environment. It is also an open area of land that contains buildings comprising parts of the urban fabric, in which people might gather freely, interact, and move.

Grannis claims, “street networks are one of the primary tools that populations use to organise themselves in urban settings”, and that, “the network of territory [small, residential-type] streets give rise to a network of neighbourly relations”.⁷⁶ Eran Ben-Joseph described local residential streets in particular as central to the feeling of “community” and “belonging” within a neighbourhood.⁷⁷ These sources show the relationship of the street to the neighbourhood, and its effect on social life within the residential district.

A road's main function is transportation, whereas streets encourage public interactions. The street sustains a range of activities that are essential to people. Its roles are as frequent and assorted as its ever-changing position and character. Streets can be categorised as either main streets or side streets. Main streets are usually wide and large with a relatively high level of activity. Public and commercial interactions are more visible on main streets, and vehicles use them when travelling longer distances, while local streets are quieter, and often only used by residents, or for parking. Jane Jacobs wrote about the modes of interaction between people who live and work on a particular street,⁷⁸ terming them “eyes on the street”. She states that a sense of street community can reduce crime: “streets encourage the exchange of ideas, and make the world a better place.” Jacobs wrote that for a street to be a safe place, “there must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street.” (Fig 1.5)

⁷⁴ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.168.

⁷⁵ The modern neighbourhood planning system emerged in mid-seventies of the last century.

⁷⁶ Grannis, R. The importance of trivial streets: Residential streets and residential segregation. *American Journal of Sociology* 103(6), (1998.): 1530-1564.

⁷⁷ Eran Ben-Joseph. "Residential Street Standards & Neighborhood Traffic Control: A Survey of Cities' Practices and Public Officials' Attitudes". A working paper in the University of California at Berkeley. 1995.

⁷⁸ Jacobs, Jane. *The Death and Life of Great American Cities*, Vintage: Reissue edition (December 1, 1992).

In Saudi Arabia, mainly in the Dammam Area, the street within traditional neighbourhoods was called Sikka. The Sikka divided the neighbourhood into quarters, and each quarter into irregular sectors, while minor streets extended between the houses. There were two other kinds of streets: the cul-de-sac and the Sabat. The word Sabat is usually used to refer to a place underneath a bridge, a space that was either part of a central Sikka or a cul-de-sac. In the traditional period, the importance of the street depended on its type. This research will describe relationships between the street and its types according to the inhabitants, and study the influence of the street on the spatial distribution of the house.

In the contemporary period, the layout of the built environment completely changed from that in the traditional period. The streets' layout and the meaning of each type of street varied from those in the traditional period. The coming chapters will indicate the changes and factors that dramatically changed the conceptualisation of the street.

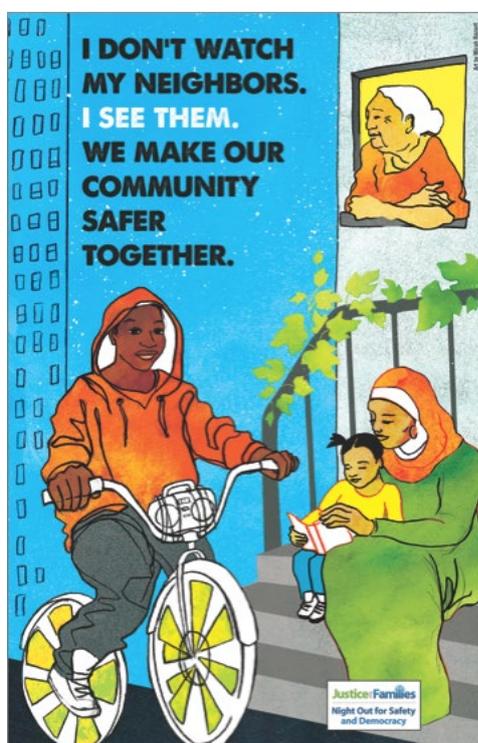


Fig 1.5: This poster shows an image that Jacobs would have loved: an older woman leans out of her window, surveying the street scene, while a young boy rides by on a bicycle and a mother and child read together on a stoop. “I don’t watch my neighbors,” says the copy. “I see them. We make our community safer together.”

1.12.4 A Home, Meaning and Use in Literature

To understand the internal arrangements that arise within the social and physical constraints that may influence the organisation and the use of space, this research studies the private home. Home in Werner’s definition is “the setting for the development and maintenance of a variety of interpersonal relationships...it provides an ideal setting in which to contemplate temporal and physical factors that are important in the

formation and progress of relationships.”⁷⁹ The study will focus on the private house to show the house type and reflect on maximum participation and time. Of course, this is not the case for apartment buildings, where most residents live temporarily. The meaning of home provides greater justification for how homes are shaped and used, which means that residents attach meaning to a home, which is shared and recognised by others, as a way to communicate their identity, status, and values.⁸⁰

Some of the available literature concerns the meaning and use of the home, thought of as a single topic. Despres reviewed the following meanings, which are all associated with the notion of home.⁸¹ Home is seen as a place of security and control. It is also a reflection of one’s ideas and values. It can further be defined as an area to be acted upon and modified. A place of continuity and permanence gained over time, a place of relationships between family members and friends, a centre of activity, a safe refuge from the world, an indicator of personal status, material structure, and finally, a place to own.

Lawrence confirms that the meaning and use of the word home⁸² differs from what it once was, due to the dramatic transformation and development of society, and the evolution of households. The demographic profile of societies has changed dramatically in most countries around the world, as has the structure of families and household composition.

Barbey points out that the basic meaning of home might still be relevant today,⁸³ but that this is combined with contemporary meanings that result from the integrated use of homes and services, including systems of communication used to achieve comfort, information and security. The meaning and use of the term home relates to culture as the behavioural aspects of people are driven by it, among other factors. It is, however, important to note that cultural forces have been diffused to a large extent, as much as they have become diversified. The meaning of culture itself has changed; it was once “commonly considered to be a monolithic and static concept that could inhibit change” whereas today it “refers to a relativistic and multi-dimensional concept with its components evolving over time.”⁸⁴ Lawrence and Barbey indicate that the meaning of home shifts over time. The difference that arises comes from the impact of the development of the surrounding environment and culture.

Home is described in the literature as an asset combined with or related to house, family, shelter, self, gender, and journeying. The term ‘home’ derives from the Anglo-Saxon word ham, meaning village, estate or town.⁸⁵ It is a place where space and time are controlled and ‘structured functionally, economically, aesthetically and morally’, and where domestic ‘communitarian practices’ are realised.⁸⁶ Home is a multi-dimensional concept

⁷⁹ Werner, C. M. “Home Interiors: A Time and Place for Interpersonal Relationships”, *Environment and Behavior* 19. (1987): 169-179.

⁸⁰ Moore, J. Placing home in context, *Journal of Environmental Psychology*, 20, (2000):207-217.

- Despres, C. ‘The Meaning of Home: Literature Review and Directions for Future Research and Theoretical Development’, *The Journal of Architectural and Planning Research* 8, no. 2, (summer), (1991): 96-115.

⁸¹ *Ibid.*, pp. 97-99.

⁸² Lawrence, R. J. ‘House Form and Culture: What have we Learnt in Thirty Years?’ in Moore, K. D. (Ed) *Culture-Meaning-Architecture: Critical Reflections on the Work of Amos Rapoport*, Ashgate, (2000): 65-80.

⁸³ Barbey, G. “Spatial Archetypes and the Experience of Time: The Impacts of Residential Design”, in Arias, E. G. (Ed) *The Meaning and Use of Housing*, Aldershot, Avebury, (1993): 112.

⁸⁴ *Ibid.*, 68.

⁸⁵ Hollander, J. ‘The Idea of a Home: A Kind of Space’, *Social Research*, 58 no.1 (1991): 31–49.

⁸⁶ Rapport, N. and Dawson, A. *Migrants of Identity: Perceptions of Home in a World of Movement*, Oxford: Berg. 1998.

or a multi-layered phenomenon.⁸⁷ As such, the house can be described as simply one aspect of the home. Moreover, it is generally recognised that the relationships between the terms house and home must be established in different cultural and historical contexts.

Home is where people typically spend the majority of their time; it is a common venue for social contact, and, for most people also a major financial and personal investment. In Saudi Arabia, people use *Bait* as the local name for *Maskan*. In Arabic-Islamic culture, there are several differences between *Bait* (house) and *Maskan* home. Al-Naim described this, saying, “House is related to the physical entity while the home is related to people who live in the house.”⁸⁸ The difference here is between the physical and the human, between products and the use and meaning of those products.

Every space inside the house also has a local name associated with the region of Saudi Arabia. Each name has specific meaning both physically and functionally in local people’s minds, with these having been developed and used for centuries. Rapoport states, “the world is made meaningful by meaning, classifying and ordering through some conceptual system.”⁸⁹

Psychological needs also play a vital role in defining the meaning of home, and the spaces and objects within it. Altman and Gauvain discussed this, stating, “Dwelling reflects the degree to which cultures and their members must cope with common dialectic oppositions, namely, individual needs, desires and motives versus the demands and requirements of society at large.”⁹⁰

⁸⁷ Wardhaugh, J. ‘The Unaccommodated Woman: Home, Homelessness and Identity’, *Sociological Review*, 47 no.1. (1999): 91–109.

- Somerville, P. ‘Home Sweet Home: A critical Comment on Saunders and Williams’, *Housing Studies*, 4. no.2. (1989): 113–118.

⁸⁸ Al-Naim, M. "Function and Aesthetic Harmony in the Built Environment." *Al-Qafila*, vol. 46, No. 1. 1997, 34-43 [Arabic Text].

⁸⁹ Rapoport, A. *Human Aspects of Urban Form: Towards a Man-Environment Approach to Urban*, Oxford, Pergamon Press. (1977): 108.

⁹⁰ Altman, I. & Gaurain M. *A Cross-Cultural and Dialectic Analysis of Homes*, in Liben. L. et al. (Eds.) *Spatial Representation and Behavior Across the Life Span: Theory and Application*, New York, Academic Press. (1981): 287.



Chapter II

General Context

2. General Context

2.1 Introduction

This chapter provides a thorough description of the factors that contribute to the creation of the built environment in Saudi Arabia. It also offers a general overview and historical evaluation of urban design developments in the Kingdom of Saudi Arabia as an introduction to this study's case study. Previous studies have covered the historical aspect of the development of Saudi Arabia in terms of architecture and urbanisation. These studies show that urban development and planning in Saudi Arabia are in disarray, and it is acknowledged that a more comprehensive approach to planning is needed. Researchers have also emphasised the restrictions on development created by cultural and social norms that are widely acknowledged. "Importation of Western technology and practices like urban renewal, subdivision planning or garden cities has not solved the problem. In many instances, the procedures exacerbated the situation or created new problems."¹ Al Hemaïdi agrees with this assessment: "It is now more than four decades since the introduction of the villa-style and its planning regulations, and this design is still unsuitable both for the cultural values of the residents and for the climate of Saudi Arabia."²

This chapter provides a comprehensive general overview of urban development in the Kingdom of Saudi Arabia, and describes the factors that impact urban development, with a particular focus on housing policy and building regulations. It then addresses the role of the Real Estate Development Fund (REDF) of the housing sector in Saudi Arabia and gives an overview of housing patterns, highlighting the qualitative shift in the housing sector and types of housing.

2.2 The Development of Settlement and the Appearance of Neighbourhoods in Saudi Arabia

The last seven decades have seen accelerated changes in terms of modernisation and technological developments. Modern and contemporary architecture and urban planning practices are part of the export-import package related to modern ideas and goods. This has naturally led to the embodiment of theories and values linked to modern architecture and urban design and structure. Saudi Arabia has been an adopter of imported architecture and new modes of urban planning.

¹ Costa, Frank J., and Allen G. Noble. "Planning Arabic Towns." *Geographical Review* 76, no. 2 (1986): 160. Doi: 10.2307/214622.

² Waleed, Al Hemaïdi K. "The Dilemma of Regulation Privacy Planning Regulations, Privacy and House Form; The Case Study of Low-Density Single-Family Dwellings in Saudi Arabia." Doctor's thesis, University College London, 1996. Accessed October 24, 2016. <http://discovery.ucl.ac.uk/1349878/2/367834.pdf>.

The random borrowing of designs into Saudi Arabia,³ under the umbrella of modernisation and technology transfer, has made it challenging for local traditions that manifest local economic and social values to develop.⁴ Stephen Ward provides a framework for understanding transnational flows of people and information that serves as an essential guide.⁵ His typologies of diffusion range from repressive imposition to selective borrowing of planning ideas from multiple sources. He argues that international linkages, the stream of concepts and practices, began at a very early stage in the evolution of modern planning. The results of this phenomenon are most apparent in recent building and urban planning processes and practices. This situation has led to recent developments and has facilitated the distortion of cultural values, destroying traditional heritage and architecture. This practice has also eliminated the potential to maintain and develop national and regional diversity in architecture and urbanism.

Like other countries in the Middle East,⁶ Saudi Arabia has three types of cities: the new planned and designed city which continue to evolve, like Al-Khobar and Dhahran, the urban renewal and/or remodelled historical city, like Jeddah, and the traditional city which has grown up spontaneously and expanded incrementally, like Riyadh and Dammam. The incrementally grown city with a traditional core is the most predominant type of city in the inhabited cities and villages in the Arab world and the Middle East today.⁷ This is obvious when we are talking about Dubai, Doha, and Abu Dhabi.

In the 1950s, roughly 40 percent of the population in Saudi Arabia was nomadic and resided in tents in highly dispersed patterns across huge geographical areas, across which they migrated with their camels, sheep, and goats to seasonal grazing lands to obtain access to water (Figs. 2.1). About 40 percent of the remaining population lived in villages and rural areas near oases, or the Asir highlands,⁸ and worked mainly in agriculture. The remaining 20 percent were urbanites, living in the ancient cities of Riyadh, Makkah, Medina, Jeddah, Taif, Unayzah, Ha'il and Hufuf⁹ (Figs. 2.2 & 2.3).

Traditional Settlements:

The old neighbourhoods in Saudi Arabia were walled and had dense residential areas with narrow paths. Some of these paths were, in places, covered by the upper stories of houses. Date palm gardens also surrounded them, and water wells and greenery were located between and in the neighbourhoods and towns.

³ Babsail, M.O., and J. Al-Qawasmi. "Vernacular architecture in Saudi Arabia: Revival of displaced traditions." *Vernacular Architecture: Towards a Sustainable Future*, September 11, 2014, 99-104. 2015. Accessed December 16, 2016. https://www.researchgate.net/profile/Jamal_AlQawasmi/publication/273142197_Vernacular_Architecture_in_Saudi_Arabia_Revival_of_Displaced_Traditions/links/56a6403608ae2c689d39e2b2.pdf?origin=publication_list.

⁴ The process of random borrowing associated with modernisation and development worldwide can be traced back to the first half of the 19th century and the influence of the Western European powers in the mid-1950s. This process was accelerated by the independent government in the Arab Muslim countries, particularly after the mid-1970s when oil revenues increased.

⁵ Ward, Stephen V. "The International Diffusion of Planning: A review and a Canadian Case Study." *International Planning Studies* 4, no. 1 (1999): 53-77. Accessed December 22, 2016. <http://www.tandfonline.com/doi/abs/10.1080/13563479908721726>.

⁶ Middle East countries are part of the Arab world. It means that we narrowed the limits of the circuit.

⁷ "Predicted Increased Migration to Cities in Asia and Emerging Countries." *Al Hayat Newspaper*. May 21, 2014. Accessed October 19, 2015. <http://www.alhayat.com/Articles/2501953/>.

⁸ Asir Highland is the Southwest Mountains of Saudi Arabia.

⁹ Nadav Samin. *Of Sand or Soil: Genealogy and Tribal Belonging in Saudi Arabia*, Princeton University Press. 1976. 40.

Mosques were within easy walking distance of dwellings. There was usually a large central mosque, a general market area and a government building that was typically a fort.



Fig 2.1: Nomadic Bedouins settled in groups, residing in tents.

Traditional neighbourhoods emerged from the association, close socialisation, the low or high affinity between groups of people and strong bonds within the neighbourhood; additionally, a traditional neighbourhood evolved that comprised adjacent houses in a chosen location within a geographical area. Residents in traditional neighbourhoods feel the same about their neighbourhood as they feel about their homes.¹⁰ In traditional neighbourhoods, the proximity of most of the community services and businesses to the residences enhances social interaction.

In the traditional concept, the neighbourhood was a part of the city where residents gathered together, united by a common language, ethnicity, religion, profession and vocation, and developed a cohesive community. Traditional neighbourhoods have practically enjoyed relative independence.

Transitional Neighbourhoods:

The growth of the oil industry in the 1950s brought about significant changes.¹¹ New cities such as Al-Khobar, Dhahran, and Dammam, the triplet cities of the Dammam Metropolitan Area, developed rapidly, while old villages and towns decreased in size.

Villagers left their homes to seek out new lives in the rapidly growing urban areas. This geographic mobility combined with occupational mobility, and saw Bedouins and villagers working side by side as salaried labourers. People from the old towns of the Eastern Province, such as Tarut and Qatif, also moved toward the newly developing cities of the Dammam Metropolitan Area, seeking opportunities for occupational change. This period is known as the transitional phase (Figs: 2.4 & 2.5). During this period some districts evolved like Al-Malaz in Riyadh city, and some emerged like Al-Khobar in the Eastern Province. Kevin Lynch defines a neighbourhood as a relatively large part of the city that enjoys the same characteristics.¹² Some

¹⁰ Sattari, Mohammad Ossein, Azita Rajabi, and Bahman Jahangiri. "A Study on The Concept of District or Neighborhood in Islamic Cities." *Indian Journal of Scientific Research (IJSR)*, 1st ser., 5 (2014): 296-304. Accessed November 26, 2016. Doi: 2250 -0138.

¹¹ Please refer to appendices A and B.

¹² Lynch, Kevin. *The Image of the City*. Cambridge, England: The MIT Press, (1960): 104-105.

neighbourhoods had physical boundaries and constituted semi-rural towns in the heart of the city like what happened in the Al-Mthloom, Al-Bahar, Al-Sham and Al-Yemen neighbourhoods in the old city of Jeddah.



Fig 2.2: The old city of Jeddah in 1938.



Fig 2.3: The old cities were walled also had date palm gardens with wells among neighborhoods.



Fig. 2.4: The transitional period was a phase of contrast between old and new in Tarut city in the Eastern Province of Saudi Arabia.



Fig. 2.5: The phase of integration of the old with the new.

Modern Neighbourhoods:

Later in the Modern Period, new neighbourhoods and the transformed areas of old ones came to depend heavily on automobiles. Such neighbourhoods sprawled over large areas and included quarters separated by open spaces, linked by wide freeways and major roads. (Fig: 2.6 & 2.7) The new urban fabric contrasted sharply with the urban scenes that remained. By 1992, 75% of the population of the Kingdom was classified as urbanites.¹³

The common thread linking residents in modern residential neighbourhoods is financial capability and occupation. In such neighbourhoods, due to the lack of deep bonds among residents, a lack of a sense of place and belonging, and weak social cohesion, there is no guarantee of long residency of the residents.

¹³ As with the four periods mentioned in chapter one, the traditional phase ended in 1949, at the same time the transitional phase started when Aramco commenced their Home Ownership Program. This period ended at the First Oil Boom in 1974 when the Modern phase started and remained until 2003. After that, the contemporary phase began with the Second Oil Boom, and we are still living in this period.

Contemporary Neighbourhoods:

In the Contemporary Period, after the second oil boom, the rapid rate of development continued alongside high population growth. At this time, internationally styled urbanisation became the principal factor affecting the architectural pattern and the planning of residential settlements in Saudi Arabia. (Fig: 2.8).

“Neighborhood feeling in contemporary urban environments, however, is less dependent on the sharing of the common close physical residential environment. Impact of urbanisation, the rise of mass society, modernisation, improved interconnectivity and the consequent increased socio-spatial mobility in the neighbourhood has been highly destructive.”¹⁴



Fig 2.6: The modern phase of urbanised development in Saudi Arabia.



Fig. 2.7: Riyadh, the capital of KSA showing parts of the contemporary neighbourhoods.

2.3 Urban Planning Development in Saudi Arabia and the Eastern Province after the Discovery of Oil

One can plot the urban changes in the Eastern Province, which contains the Dammam Metropolitan Area, along three main axes: a study of the stages of urban development, investigation of the changes in planning methodology, and the change in land use. The new planning approach in the Eastern Province coincided with the direction of urban planning in the KSA and so can be divided into four stages to represent the overall levels of urban change as follows:

¹⁴ Meenakshi. "Neighborhood Unit and its Conceptualisation in the Contemporary Urban Context." *Indian Journal of Scientific Research (IJSR)* 8, no. 3 (September 2011): 81-87. Accessed November 28, 2016. http://www.itpi.org.in/files/jul10_11.pdf.

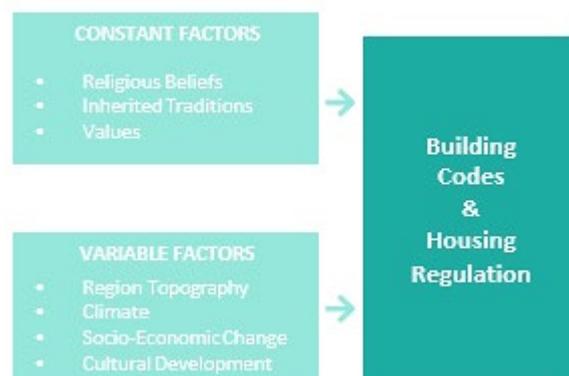


Fig 2.8: The types of factors that affect building codes and housing regulations.

2.3.1 First Stage

The first stage comprises the foundation of the municipalities and secretariats, with their subsidiary bodies (1947-1970); the modern urbanisation of KSA started during this period. The fundamental rules and regulations that were specifically linked to the growth of the urban environment also date from this time. The most significant system concerned the capital and secretariat systems and their municipalities. This was set up in 1938 during what is referred to as the Establishing Phase.¹⁵ Details regarding roads and buildings were released later in 1942. These systems represent the legislative planning of cities and their primary administrative and managerial efficiency.

At this stage, most cities in the Eastern province underwent change and development. Al-Hathlul stated: “As a result of the recognition of Dammam as the provincial capital of the Eastern Region in 1952, Hufuf lost its status as the central town of the area. Under the new functional dynamics, Dhahran became the suburban city, and Al-Khobar became the city for retail trading for the oil community.”¹⁶

In 1947, Aramco prepared land-subdivision plans and a city plan for many residential settlements. Al-Khobar was planned on a grid-iron pattern. Aramco launched its Home Ownership Programme (HOP) in 1949 and, as a consequence, the level of urbanisation in Dammam Metropolitan Area rose to 10% in 1950, increasing to 15% by 1963.¹⁷

At this stage, the notion of municipalities began to emerge, although the consequences of this remained unknown until the late 1960s. This phase of the land subdivision was also characterised by the introduction

¹⁵ Al-Qahtani, Hind, and Ahmed AlJarallah. *Digital documentation of urban growth in Saudi Arabia 1902 -2010*. Dammam: Dammam University, 2014.

¹⁶ Al-Hathloul, Saleh, and Edadan Narayanan. "Evolution of Settlement Pattern in Saudi Arabia a Historical Analysis." *Habitatintl* 17, no. 4 (1993): 31-44.

- Oil community is a local terminology refers to anything related to Aramco Company at that time like it's' Residential Camp in Dhahran, refineries and Oil wells.

¹⁷ Al Ankari, Khlid M. and El-S. El-Bushra, Eds. *Urban and Rural Profiles in Saudi Arabia*. Berlin, Gebrudern Borntraeger. 1989.

of new planning concepts by Saudi Aramco and their application in the cities of the Eastern Province and the Central Region.

2.3.2 Second Stage

This stage was termed the Urban Regional Planning phase (1970-1986) and marked a period of planned national spatial development in Saudi Arabia. The planned phase of urban and rural development began in 1970, with the preparation of the First Five Year Development Plan (1970-1975) by the Central Planning Organisation. At this stage, a national-level approach to local planning was adopted, in which the Ministry of Municipal and Rural Affairs (MOMRA) conducted five regional studies to formulate strategies for regional development.

The government's financial assistance in the construction of private housing units and investment assistance for commercial and residential designs was necessary to improve the building industry. The Saudi Real Estate Fund (REDF) was established in 1974. Later, in 1976, the action was taken to establish Master Plan Projects, and to authorise the MOMRA for Dammam and six other Saudi cities.¹⁸ The first National Spatial Strategy prepared by MOMRA in 1980, provided a basic framework for a balanced planning settlement in the country. This stage involved increased effort to develop a proper mechanism to inform urban planning.

2.3.3 Third stage

The third stage was one of significant development between 1986 and 1993. At this time, Comprehensive Regional Development Plans were produced for the country's metropolitan cities.¹⁹ These plans were more inclusive than those presented in earlier studies that put forward regional development strategies. The regional development continued throughout the Third and Fourth Development Plans stages.

At this stage, developments in the housing sector and other related sectors, such as the power generation and water sectors, were significant in realising the strategy of regional development. Also, there was an effort to redistribute the population from main cities, such as Dammam, to try and achieve regional balance, economic growth and distribution of national wealth.²⁰

2.3.4 Fourth stage

This stage is the current stage, dating back from 1993 to the present. MOMRA set out the strategic framework for development in the National Spatial Planning Strategy for settlements between 1980 and 2001, and the

¹⁸ The Ministry of Municipal and Rural Affairs

¹⁹ Metropolitan cities, according to the dictionary, is a term used for large cities with aq large population and numerous opportunities for employment.

²⁰ Crane D. Robert. "Planning the Future of Saudi Arabia: a Model for Achieving National Priorities" Praeger, New York. 1978.

National Spatial Strategy, from 1990-2010, and the National Spatial Strategy, from 1990-2010.²¹ This stage prioritises the efficient utilisation of infrastructure and utilities in the main cities and developed urban areas. To achieve the stated objectives, policies and regulations to promote structured physical development have been created.

These urban development stages are synchronised with the four development stages of the housing sectors in Saudi Arabia and the Eastern Province in particular. These stages started to develop following the first period of traditional housing when the Kingdom of Saudi Arabia was focused on internal reform, and it was necessary to pay attention to urban land demand, planning strategies, and housing issues all at the same time.

2.4 Dammam Metropolitan Area Growth Factors

The Dammam Metropolitan Area and the cities of the Eastern Province, in particular, have been subject to urban development since the beginning of the 1930s.²² This urban revolution can be identified by the sprawl of urban boundaries across vast areas at the horizontal level, and the change in all building forms, including housing, at the vertical level.

Various factors have influenced the rapidity of this urban growth. These can be divided into major and minor factors.

Major factors include:

1. Economic factors: The discovery of oil and the creation of Saudi Aramco hastened the growth of the Dammam Metropolitan Area. This area is now considered to be a centre of growth in Saudi Arabia and is the most prominent within the national economy, due to its relationship with oil.
2. Natural factors: Natural factors are tied to the geography of the area and are affected by growth. The Dammam Metropolitan Area is located on the coast and beneath it lie vast amounts of oil. It is adjacent to the Arabian Gulf, along which are located the majority of the ports of the Gulf countries.
3. Population growth: Population growth is a significant factor in urban development. The Dammam Metropolitan Area is known for its opportunities for employment, and the KSA encourages citizens to build private housing by granting loans to residents in all major cities, among them, Dammam.
4. Cultural traditions also influence the shape of the urban sprawl of the Dammam Metropolitan Area, as will be discussed later in this thesis.
5. Government control and intervention in planning.

²¹ Al-Hathloul, Saleh, and Edadan Narayanan. "Evolution of Settlement Pattern in Saudi Arabia a Historical Analysis." *Habitatintl* 17, no. 4 (1993): 31-44.

²² Al-Abdullah Mohammed Masoud. *Relevance of the Local People's Socio-Cultural Values in the Landscape Development of Recreational Sea Fronts of Saudi Arabia: The Case of Dammam*, Thesis submitted in fulfilment of the degree of Doctor of Philosophy in Landscape Architecture, University of Newcastle Upon Tyne, UK. 1998.

Minor factors include:

1. The impact of urban projects (Aramco projects, changes to the port, the Airport and other development projects) on the pattern of land use and development in city centres.
2. The gradual rise of living standards in the Kingdom of Saudi Arabia due to increasing per capita income.²³

2.5 The Definition of Building Regulations and Housing Policy in Saudi Arabia

Building regulations are the set of rules adopted by a building authority to control the process of construction of different types of buildings. The authorities provide fundamental design parameters that determine the type of sites which can be built upon, the building size, height and interior layout as well as design and construction details.²⁴

The Saudi Building Regulations set the national standards for residential and commercial developments in Saudi Arabia. Many people are under the mistaken impression that Building Regulations concern the quality of a building. While the regulations do contain a provision regarding the quality of materials and workmanship, this is only applicable where the quality has a direct impact on achieving the standards set by the rules.

A housing policy may be defined as government action to achieve housing objectives or government intervention in the housing field.²⁵ Studies show that most housing policies are linked with national economic objectives and focus on making the housing field attractive to investors to realise economic objectives.²⁶ One of the main aims of the housing policy of Saudi Arabia is to help people become homeowners through the Real Estate Development Fund (REDF) and the provision of affordable housing.

There have lately been increased calls for the application of housing regulations and policies in the built environment and urban design of Saudi Arabia.²⁷ This marks a shift in how urban development is perceived

²³ Asharaf, Abdul Salam, and Others. "Population Distribution and Household Conditions in Saudi Arabia: Reflections from the 2010 Census." *International Journal of Humanities and Social Science*, 3, no. 16 (August 2013): 258-63.

²⁴ According to Haviland building regulations "cover specific design and construction requirements, based on the occupancy, building height, floor area, availability of fire-fighting capacity, and other factors. They provide minimum standards to safeguard life, health, property and public welfare by regulating the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings within this jurisdiction".

- William A. Haviland. *Anthropology*, Fort Worth, TX: Harcourt, Brace, Jovanovich College Publishers. 1996.

²⁵ David Clapham. *The Meaning of Housing a Pathways Approach*, Policy Press at the University of Bristol, Chicago. 2005.

²⁶ Glossop, Catherine. "Housing and Economic Development: Moving Forward Together." *Centre for Cities*. November 2008. Accessed January 10, 2016. <http://www.centreforcities.org/wp-content/uploads/2014/09/08-11-06-Housing-and-economic-development.pdf>.

- Fadaak, Tarek Ali "Urban housing policy evaluation in the Kingdom of Saudi Arabia".1984. Dissertation and Theses. Paper 852.

- Jeddah Economic Forum 2013, *Housing of the Growing Population*. Publication. Jeddah: Ernst & Young, 2013.

- David, Smith A., and Freeman Angus. *Housing Markets and Policy Design in the Gulf Region*. Cambridge: Gulf Research Centre Cambridge, 2014.

²⁷ The calls come from conferences and workshops like the workshop held in the 12 & 13 July 2012 on the subject of Housing Markets and Policy Design in the Gulf Region. It is Workshop 13, Gulf Research Centre Cambridge. The workshop directors are Prof. Peter Williams and Angus Freeman. Published in 2014. Another held on 2005, *Low-Cost Building Systems in Urban Settlements Symposium*, with a subject of *A Comparative Analysis of Affordable Housing in Saudi Arabia*, by Dr Adel S. Al-Dosary. Freeman, A.

and addressed in the country and promotes a new urban agenda. The goal is ultimately to ensure that future cities can find a balance among the three core objectives: quality of life, economic competitiveness and environmental protection. The need to develop building regulation codes and housing policies to suit the needs of the Saudi community is increasingly being felt. "The existing standards and regulations are both out of date and out of context, relating more to Western countries from which they were originally adopted..."²⁸ Saudi Arabia needs to develop building codes for housing projects to keep pace with developments in the housing market. The Institute of King Abdul-Aziz City for Science and Technology recommends developing building codes to suit the requirements of Saudi Arabian society, to draw the attention of policymakers to the different dynamics at work in the housing market, and to close the gap between supply and demand due to extended cuts in government loans for housing.²⁹ This institute has funded some studies that promote the use of codes and have helped establish new ones. Today, homeowners cannot obtain a building permit unless they can prove that the application meets building codes accredited by the municipality.

In the early formative decades of the Kingdom, the central authority, set up after the unification of the country, was instrumental in merging the different building codes which were in place in various regions of the Kingdom. The central authority "has also led to policy failures when central decision-makers impose standardised programs without regard to local conditions and sensitivity to the differential impacts of the programs in different local settings."³⁰ Building codes and zoning regulations must address cultural, climatic and functional aspects of residential development, and also take socio-economic changes into account. Building codes should be sensitive to the fact that each region within the Kingdom differs geographically, socially and economically. What works for the east may not be suitable for the south of the country and vice versa.

2.6 Housing Policy and Building Regulations and their Applications in Saudi Arabia

Housing programmes in Saudi Arabia date back to the 1950s when two significant programmes were launched: the Aramco housing programme and the Al-Malaz housing project.³¹ The Al-Malaz suburb of Riyadh was built by the government in the 1950s, while the Aramco houses were built under the Aramco

Match or Mismatch? Housing Standards and National Affordability in the Gulf Cooperation Council. Conference on Urban Development and Planning in the Gulf Cooperation Council, University of Qatar, 1999. - See more at: <http://gulfresearchmeeting.net/index.php?pgid=Njk=&wid=MzY=&yr=2012#sthash.41NbY8nm.dpuf>.

²⁸ Drakakis-Smith, David. *Urbanization, Housing and the Development Process*, New York: New York St. Martin Press. 1980.

²⁹ Adams, Carolyn T. "The Decentralization of Housing," In *Government and Housing: Developments in Seven Countries*. Vol. 36. Urban Affairs Annual Reviews. New York, Sage Publications, 1990. 25.

- Mubarak, Faisal A. "Cultural Adaptation to Housing Needs: A Case Study, Riyadh, Saudi Arabia."

³⁰ Ibid.

³¹ Mubarak, F. A. "Cultural Adaptation to Housing Needs: A Case Study, Riyadh, Saudi Arabia." The IAHS Conference Proceedings, San Francisco, USA, (June 1-7, 1999).

- Al-Mayouf, Abdual-elah, and Abdallah Al-Khayyal. "Provision of Public Housing in Saudi Arabia: Past, Current and Future Trends." *J. King Saud Univ.* 23, no. 2 (2011): 59-68.

Home Ownership Programme of an oil company in the Eastern province of the Kingdom.³² The national government made both direct and indirect interventions in housing development. The direct approach involved the construction of high-rise public housing by the Ministry of Public Works and Housing (MPWH) and the provision of accommodation for civil and military personnel (Fig. 2.9). In cities such as Riyadh, government housing comprises at least 12.2% of the total housing stock.³³ This approach was criticised as it failed to consider socio-cultural aspects, such as the fact that the extended family structure means that each household must cater to a relatively large number of persons. The units provided for public housing were not built to accommodate large families and, therefore, people felt that these homes were not socially acceptable.

The indirect approach involved the setting up of a government-funded Real Estate Development Fund (REDF) that offered cash payments to recipients according to the construction phase. A similar approach was introduced by Aramco to house its Saudi labourers in the 1950s in Dhahran City. Foreign labourers and single Saudi labourers were housed in dormitories; married foreign workers and their families were housed in the outlying areas of planned oil towns, and married Saudi employees and their families were housed in nearby traditional oasis towns. The lack of proper housing for native (Saudi) workers led to the creation of shantytowns, where growing communities gave rise to dissent.



Fig 2.9: Ministry of Public Works and Housing (MPWH) constructed high-rise public housing and housing for its civil and military personnel as part of a housing development scheme in Saudi Arabia.

In the early 1950s, the Saudi government and Aramco set up a housing programme on government land through which Aramco provided zero-interest loans to its employees, amortised from the labourers' monthly earnings. By 1999, the number of single-family residential units built under Aramco's Home Ownership Programme reached 41,400.

The Aramco regulations made it difficult to have courtyards and impossible to link houses³⁴ for safety reasons and as a preventive measure against fire. This meant that houses with the traditional courtyard started to disappear gradually, making way for other contemporary building design forms.

³² The government aimed to attract its employees to Riyadh city. At the order of King Saud, a 500-acre suburb Al Malaz originated four kilometres to the north of the walled city. The Al Malaz, housing development project included 754 single-family detached houses (villas), 340 apartment units, a library, schools, fire station, markets and recreation and health facilities. The villas were sold to government officials on long-term loans, while the apartment units were rented at a nominal fee. The Al-Malaz planners followed a gridiron network with a hierarchical organisation of streets.

³³ Al-Riyadh Development Authority, MESTAR, Vol. 6, *Housing* (1996).

³⁴ Please refer to regulation no. 1, by this regulation the house must transform the interior court to the exterior 2-metre setback; gradually, the interior courtyard disappeared from the house form of the Eastern Province.

The following are some of the first regulations relating to the housing sector, many of which were adapted from Aramco Policies:

1. The building height should not be above 8 metres; setbacks must be 2 metres minimum from the boundary. The front elevation setback should be 1/5th of the street width from the border and up to 6 metres maximum; the ground and first floors should be on the same vertical surface level, and the area of the building should not exceed 60% of the land coverage (or 50% in some divisions).
2. It is prohibited to use any residential building as a shop, factory or for any use that leads to the emission of unpleasant odours without permission.
3. The owner of any land must plot his land using ground markers or a fence, not exceeding more than four arm lengths and having a thickness of no less than half an arm's length.
4. The roofs of all buildings should be robust enough to endure any climatic changes.
5. Any outward projection of the boundary wall onto the street should not exceed 45 cm.
6. Wall thickness
 - a. The thickness of reinforced concrete walls of a one-story building should be 20 cm.
 - b. The lower wall thickness of a two-story building should be 30 cm, and the upper wall thickness should be 20 cm.
 - c. Any building exceeding two floors must be adequately reinforced to hold the extra load.
7. Openings
 - a. Any room built as living quarters must have an opening or openings measuring no less than one-tenth of the floor area.
 - b. Any corridor that has a door opening onto it should be no less than 2 metres wide.
8. Floor area

Any room built for living purposes should be no less than 9 metres squared.



Fig 2.10: The Saudi Building Code.

The building regulations in Saudi Arabia are contained within the Saudi Building Code (SBC) (Fig. 2.10). It started with Royal Decree No. 7/B/3230 dated 11th June 2000 that allowed for the creation of a national committee composed of representatives of Saudi universities, the government and the private sector. The

Council of Ministers accepted the general plan of the National Committee in September 2001. One of the main objectives of the general plan was to develop a national building code for the Kingdom of Saudi Arabia.

The National Committee studied existing codes,³⁵ among them the building codes used in the USA, Canada and Europe, and sought the opinions of specialists from the government, Saudi universities and the private sector before drafting the Saudi Building Code.³⁶

The committee chose to adopt the International Code Council (ICC) as a basis for the Saudi Building Code. There was a noticeable expansion of the building and construction industry in the Kingdom. “Toward expanding the participation of all the specialists in the building and construction industry in the Kingdom through the governmental and private sectors, the universities and research centres, the National Committee took its own decisions related to code content by holding specialized meetings, symposiums and workshops and with the help of experts from inside and outside of Saudi Arabia.”³⁷ The National Committee decided to develop a specific code for Saudi Arabia with the help of experts from within and outside the Kingdom.

As part of the Seventh Development Plan 2000-2005, the National Committee of the Saudi Building Code was formed by a Council of Ministers’ Resolution to draw up the Saudi Building Code. The Council of Ministers’ Resolution approved the general plan of the committee which defined the general framework of the Saudi Building Code, including its administrative, legal, architectural, civic, health, mechanical, and electrical aspects. The committee comprised representatives from the ministries concerned (Fig: 2.11), the Institute of King Abdul Aziz City for Science and Technology (KACST), the Saudi Arabian Standards Organisation (SASO) and specialists from universities and the private sector.

2.7 The Role of the Real Estate Development Fund (REDF)

The government established the Real Estate Development Fund (REDF) in 1974 as a financing agency that helps give married Saudi residents and private developers the opportunity to participate in the construction of new housing units. The REDF was the only agency that offered real estate soft loans at the time. Applicants were required to provide proof of legal ownership of land in an approved land subdivision. Recipients were entirely responsible for the design and construction of their units. The REDF provided zero-interest loans for 25 years. The government supported the loans by setting up a system whereby 20% of the annual payment would be waived if paid within sixty days of its due time. Also, 30% of the loan amount would be reduced if the borrower repaid the loan in a one-off payment.

³⁵ The national committee finalized the Saudi building code. So, the ministry of municipal and rural affairs announced on 2020 that applying the Saudi building code for residential buildings will start to all residential buildings as a guideline, provided that the date for mandatory application will be announced at a later time.

³⁶ Saudi Building Code National Committee. Saudi Building Code, 2007.

³⁷ Ibid.

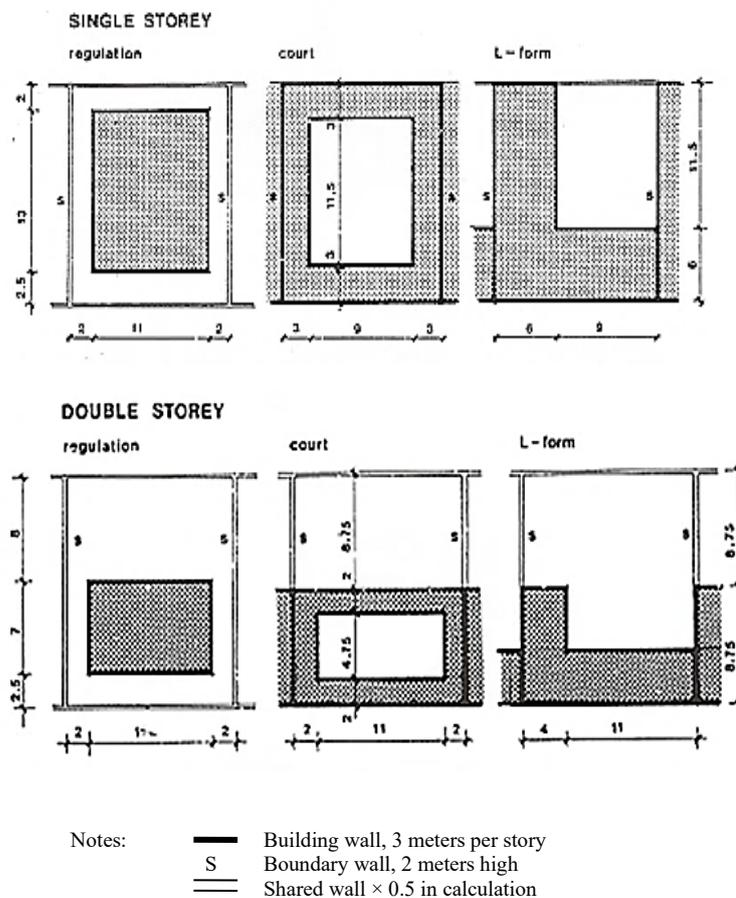


Fig 2.11: Boon J.J. comparison of area and perimeter for varying housing forms (houses under governmental regulation, traditional houses, and Aramco houses)

Property loans led to an increase in the number of rental units from 11% of the housing stock in 1974 to 42.2% in 1996.³⁸ New rental housing consists mainly of apartment buildings on main commercial streets, occupied by local families or low and moderate-income foreign households.

The REDF provided direct support to individuals who would then be responsible for the design and construction of their apartment buildings and compounds. In this way, this new estate agency provided the funds to recipients who could thus implement the Second National Development Plan (SNDP) from 1975 to 1980, which aimed to increase building stock, including housing units, industrial buildings, schools and hospitals.³⁹ “In 1991, the number of REDF-financed housing reached 85,878. By 1997, the total number of housing units built under the REDF loan system amounted to 490,000, benefiting 411,711 persons. REDF loans were used to construct 889,000 units between 1970 and 1990.⁴⁰ This step resulted in rising vacancy

³⁸ Ibid.

³⁹ “Ministry of Municipal & Rural Affairs.” Accessed May 12, 2015. <http://www.momra.gov.sa/>.

⁴⁰ The REDF contributed to the construction of 440,460 housing units comprising 67% of all residential units between 1975 -1990.

rates in the Kingdom's major cities including Jeddah, Dammam and Riyadh. In 1991, 67% of Saudi families owned their residence."⁴¹

2.8 The Development Sequence of Housing Policies and Building Regulations in Saudi Arabia

Saudi cities, such as the Dammam triplet cities, reflect new planning and building regulations.⁴² Al-Khobar was the first planned city in Saudi Arabia. The plan for Al-Khobar was drawn up in 1938 when King Abdulaziz requested a physical representation of an ideally planned city based on the regulations that were adapted from the Aramco Home Ownership Programme as applied to the Al-Malaz district in Riyadh.⁴³ That order came after Aramco built its housing project in Dhahran between 1938 and 1944. Housing policies and building regulations were developed following the planning of these two cities.

The research indicates that there appears to have been two main urban planning phases in Saudi Arabia, each with specific highlights. The first stage extended from the beginning of 1937 until the mid-1970s and comprised several phases: the start-up phase, the unilateral phase, the phase of the cities' master plan, the phase of the guidelines of the cities' master plans, and the detailed plans for the chosen areas.⁴⁴

There was a random spread of urbanisation in the 1960s due to the increasing number of immigrants coming to the major cities of Saudi Arabia in search of jobs. The population growth in these cities encouraged the government to plan the major cities, starting with Riyadh. Doxiadis Associates of Athens started their plan in 1971,⁴⁵ completed it in 1972, and got it approved by the Council of Ministers in 1973.⁴⁶

Their plan influenced the urban morphology of Riyadh and reinforced the north-south axis of the city, which still characterises its urban identity.⁴⁷ The plan followed the grid pattern. The planner believed that two by two kilometres is the most suitable area for a neighbourhood and set up the grid on that basis. The plan assumed that the city would expand within a 10-kilometre radius.⁴⁸ Once approval had been obtained, Riyadh became a huge construction site financed by the oil boom.

⁴¹ Mubarak, F. A. "Cultural Adaptation to Housing Needs: A Case Study, Riyadh, Saudi Arabia." The IAHS Conference Proceedings, San Francisco, USA, (June 1-7, 1999). 11.

⁴² The grid-iron city planning is evident in these three cities.

⁴³ Riyadh is the capital of Saudi Arabia, and it is located in the centre of the Kingdom.

⁴⁴ The building regulation was initiated by the statute of the Makkah Municipality and Municipalities which was issued in 1937 under the order No. 8723. The order granted the municipality of Makkah and other municipalities to be responsible for the supervision of the towns' organisation and enhance their setting in the public interest.

⁴⁵ A contract was signed between the Ministry of the Interior for Municipalities and Doxiadis Associates, Consultants on Development and Ekistics of Athens, Greece. The contract provided for the formulation of a Master Plan and a Program that would guide the development of the city of Riyadh up to the year 2000.

- Al-Hathloul, Saleh. "Riyadh Development Plans in the Past Fifty Years (1967-2016)." *Current Urban Studies* 05, no. 01 (2017): 97-120. doi:10.4236/cus.2017.51007.

- Doxiadis, C. A. EKISTICS – An introduction to the Science of Human Settlement. London: Hutchinson University Press. 1968.

⁴⁶ Mubarak, F. A. "Cultural Adaptation to Housing Needs: A Case Study, Riyadh, Saudi Arabia." The IAHS Conference Proceedings, San Francisco, USA, (June 1-7, 1999). 11.

⁴⁷ Al-Naim, Mashary A., Riyadh: A City of 'Institutional' Architecture, The Evolving Arab city, edited by Yasser Elsheshtawy, Routledge, USA. 2008.

⁴⁸ Al-Hathloul, Saleh. "Riyadh Architecture in One Hundred Years." Lecture, Darat Al-Funun, Amman, 2002.

The Doxiadis Master Plan for Riyadh adopted the car as the primary means of transportation (Fig: 2.12). Thus, streets were designed in a hierarchic pattern that included freeways linking the city with other regions in the Kingdom, expressways that served high-speed traffic within the city, arterial streets that served heavy traffic within the city, collector streets that linked the neighbourhoods, and local streets that crossed the neighbourhoods.⁴⁹

Al-Malaz was a milestone in the urban history of Riyadh and the Kingdom of Saudi Arabia as a whole (Fig: 2.13). It brought a new lifestyle to the city.⁵⁰ Al-Hathloul divides the urban development of Riyadh city into six stages: “The urban city development and its expansion and growth. It is divided into six stages the first and second stage set up the base for the city development up to the mid-1960s when al-Malaz is planned for the government employees; the third covers the Doxiadis master plan in the late 1960s; the fourth covers the oil boom of the mid-1970s and SCET’s update of the master plan; the fifth covers ADA efforts to manage the city’s urban growth in the 1980s and 1990s; the sixth covers the MEDSTAR project, its updates and the initiation of the Riyadh Public Transport Network (RPTN) in 2012.”⁵¹

The question that arises is why did Al-Malaz become a model for new patterns of planning and new types of lifestyle for the Saudi people. Al-Hathloul argues that, first of all, Al-Malaz was a housing project sponsored by the government for its employees, and as such, was an authoritative statement by the government on how a new neighbourhood should be planned. Secondly, the Al-Malaz neighbourhood was set up as a representation of modernity, in sharp contrast to tradition. It was a new project that used new materials and construction techniques. Thirdly, Al-Malaz, with its villas and promotion of a new lifestyle, captured the imagination of people who wanted to live in similarly planned neighbourhoods.⁵² It changed the local perception of a home to a villa (a detached house with an external yard). Riyadh became attractive to many people who migrated from other cities. The need for housing and infrastructure encouraged the government to establish more such planned cities.

The second stage of urban planning in the Kingdom of Saudi Arabia extends from the mid-1970s to the present time.⁵³ This period includes six phases: 1) the phase of defining the urban boundary, 2) the preparation of the cities’ master plans, 3) national urban estate strategies, 4) strategies for urban development for specific areas, 5) regional plans for zones, and 6) updates of the urban studies. These phases define the background

⁴⁹ Ibid.

⁵⁰ When the transfer of government ministries to Riyadh took place in the late 1950s, the government attempted to attract its employees to Riyadh. A 500-acre suburb Al Malaz. It located four kilometres to the north of the walled city. It was named the New Riyadh. The Al Malaz, housing development project, included 754 detached houses (villas) for single families, and 340 apartment units with a library, schools, markets, and recreation and health facilities. The Al Malaz planners followed a gridiron network with a hierarchical organization of streets.

⁵¹ Al-Hathloul, Saleh. "Riyadh Development Plans in the Past Fifty Years (1967-2016)." *Current Urban Studies* 05, no. 01 (2017): 97-120. doi:10.4236/cus.2017.51007.

⁵² Ibid.

⁵³ The Kingdom has undergone several stages of development involving various regions. These stages are concentrated on the elaboration of the whole of Saudi Arabia, while the four periods mentioned in the first chapter of this research focused on the stages that passed through the Dammam Metropolitan Area.

for the elaboration of the contemporary neighbourhood in Saudi Arabia. The different regulations influence the structure and pattern of the neighbourhood.

In 1976, the government asked French SCET International to review the Doxiadis Master Plan because the city of Riyadh began to expand beyond the plan.⁵⁴ The government sought a short-term operation proposal.⁵⁵ The Doxiadis Master Plan remained the primary plan for the city until the Council approved the SCET proposal in 1982. Following this project, the city of Riyadh implemented the grid system and became a city with a definite planning pattern.

The agency of the Ministry of Municipal and Rural Affairs for Urban Planning recognised the importance of having a clear planning style that would lead to the design of residential areas. Since 1994, the agency has teamed up with engineering and consultancy offices. These offices prepare plans for residential plots in planned neighbourhoods, also known as model districts, based on a set of goals, policies, planning and design considerations to be applied to land grants from government or any other private lands after approval is obtained from the owners.

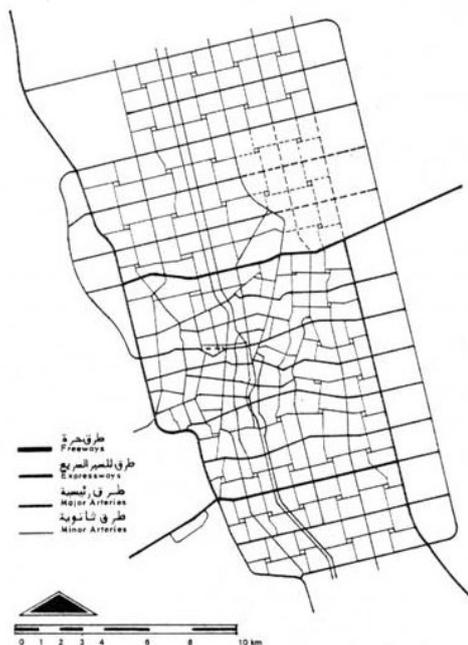


Fig 2.12: The Master Plan for Riyadh designed by Doxiadis Associates of Athens in 1972.



Fig 2.13: A layout plan of al-Malaz Housing Project.

⁵⁴ SCET International/SEDES of Paris. The SCET's expertise was in the development of urban and national infrastructure. Thus, they undertook an overall evaluation of services to support the expanding city and developed a revised expansion and phasing plan.
- Al Mogren, F. A. B. A. *Turning Points: City-Building in Riyadh and the Gulf*. Master Thesis, Cambridge, MA: Harvard University. 2016.

⁵⁵ Doxiadis, C. A. *EKISTICS – An introduction to the Science of Human Settlement*. London: Hutchinson University Press. 1968.

During the contemporary period, that is, during the 1980s and 1990s, modern building regulations and housing policies had moved away from the planning of Islamic cities. However, the architecture of dwellings continued to reflect essential Islamic principles and values such as privacy, the segregation of the sexes, and the values upheld by modern Saudi society and espoused by modern technology. Venturi describes the architecture of the 20th Century as being motivated by inclusivity rather than exclusivity.⁵⁶

The end of the contemporary period saw the beginning of a trend which sought to include elements of the cultural image of the traditional cities in Saudi Arabia within the building structures. The new traditionalism trend can be seen in the Diplomatic Quarter in Riyadh.⁵⁷ The Diplomatic Quarter is a successful example of a planning form which encompasses the traditional neighbourhood and institutionalises the new traditionalism in Riyadh.⁵⁸ (Fig: 2.15) The project drew attention to the identity of Riyadh and the question of architectural identity. These trends spread all over the Kingdom. Numerous projects were implemented in Saudi Arabia, which drew upon the Diplomatic Quarter experience to generate new ideas for the city (Fig: 2.15). Such projects have the potential to change the image of the city's residential and public environment.

The Diplomatic Quarter was developed to satisfy the decision of the government to combine all embassies located in Riyadh and Jeddah in the heart of Riyadh (Figs: 2.16 & 2.17). The area was selected to accommodate 30,000 people and 120 embassies. The quarter introduced the concept of the traditional Muslim city with a massive wall surrounding the numerous buildings around the central mosque and plaza. "Within this context, the Diplomatic Quarters built in the 1980s aside from any master plan has been pointed out by local scholars as an example of Riyadh's urban identity."⁵⁹ This district is built using morphological elements of the "traditional Arab city", as stated by Albert Speer III. However, as previously explained, the cluster is part of the Islamic urban fabric, and the dead-end roads are designed to develop the idea of living within a neighbourhood.

Al-Naim stated that: "the importance of this development stems from the urban concepts used. Reinterpreting the traditional design and generating a contemporary, traditional Arab town were seen as messages of the identity that Riyadh wanted to express."⁶⁰

In 2004, the Saudi Building Code was adopted with the issuance of the Royal Decree in 2000.⁶¹ The National Committee began the implementation of the general plan and prepared a final draft of the Saudi Building Code after getting the recommendation of the Saudi Arabian Standards Organisation and the Ministry of

⁵⁶ Venturi, Robert. *Complexity and Contradiction in Architecture*. New York: Museum of Modern Art. 1966.

⁵⁷ The Master Plan for the diplomatic quarter was prepared by the German firm Albert Speer & Partner (AS&P) and Al-Beeah Group was responsible for the urban design for the central area. It was built in a major spot on the Valley Hanifa; nearby the first Riyadh settlement called Al Dirriyah.

⁵⁸ In the mid-1970s, the Minister's Council established the Higher Executive Committee to supervise major development in Riyadh.

⁵⁹ Cardenas, Margarita. "The Diplomatic Quarters in Riyadh. A Western-shaped neighborhood in an Islamic city." *International Planning History Society Proceedings* [Online], Volume 17 Number 1 (29 June 2016)

⁶⁰ Al-Naim, Mashary A., *Riyadh: A City of 'Institutional' Architecture, The Evolving Arab city*, edited by Yasser Elsheshtawy, Routledge, USA. 2008.

⁶¹ Al-Shaalan, Abdullah. "Features of the Saudi Building Code." *Al-Jazirah Newspaper (Riyadh)*, August 06, 2014, 15287th ed. [Arabic Text]

Municipal and Rural Affairs. In 2012, only 60% of housing applied the Building Code as this was optional, and some standards are only gradually becoming mandatory.⁶² (Figs: 2.14)

Saudi Building Code Requirements	
201	Architectural
301	Structural – Loading and Forces
302	Structural – Testing and Inspection
303	Structural – Soil and Foundations
304	Structural – Concrete Structures
305	Structural – Masonry Structures
306	Structural – Steel Structures
401	Electrical
501	Mechanical
601	Energy Conservation
701	Sanitary
801	Fire Protection
901	Existing Buildings

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Fig 2.14: Two Pages from the Workshop 13 held in 2007 to improve the Saudi Building Code.

In 2010, Saudi Arabia established the first Green Building forum. Saudi Arabia has made a significant effort to keep up with the green trend. The Saudi Green Building Council was formed in 2009 to address the global environmental impact of various sectors in Saudi Arabia, including housing.

Saudi Arabia gave priority to affordable housing in its Five-Year Development Plan for 2010 - 2014. It pledged to build at least 1 million affordable housing units across the Kingdom. The system of regulations and policies witnessed many changes in recent years in an attempt to meet housing challenges. The Kingdom set up a new Ministry of Housing in July 2012 to improve the housing sector and enhance the Saudi real estate financing markets in conformity with *Shariah* laws.⁶³ The Real Estate Development Fund, constituted for the purpose, sanctioned nearly 11,666 housing loans to fund the construction of nearly 14,000 housing units across the Kingdom.⁶⁴ This number of houses has an impact on the form and types of houses being built,

⁶² Al-Abkey, Ahmed. "60% of the Housing Units Do Not Conform to the Mortgage for failing to Comply with «Code» Building." *Al-Sharq Newspaper*, July 3, 2012.

⁶³ Islamic religion laws.

⁶⁴ The Ministry of Housing.

changes housing requirements, and alters residential spaces and organisation. This area is considered to be a hot topic for research at the moment. This goes back to the increasing demand for affordable housing in Saudi Arabia, as its population growth continues to outstrip property market supply.



Fig 2.15: The urban plan of the Diplomatic Quarter in Riyadh, designed by Albert Speer & Partner.

2.9 Influences on Housing in Saudi Arabia

When exploring housing patterns in Saudi Arabia, the architectural values shared by people become apparent. In general, houses are places where people spend most of their time. Therefore, the house is intertwined with the shared Saudi experience of culture. Rapoport has researched and compared the cultural features of house typology.⁶⁵ He argues in his book, *House Form and Culture*, that functional or technical reasons cannot explain house type in isolation; culture is an essential factor alongside site topography, economic situation, and environmental conditions. Houses are shaped and arranged together to accommodate the social behaviour, cultural values, and shared preferences of the people who live in them. These requirements also affect the form of the buildings.

The general principles of house typology need to be studied, analysed and combined to determine patterns that are shared by different populations. This is because house types and their developmental sequence depend on the social and cultural situations in the houses. In traditional Saudi Arabian houses, the inhabitants' main cultural values and ethics are reflected in their spatial organisations.

Each house can be characterised according to different criteria. Each of these suggests a different general organisational type. The spatial organisation informs the kinds of spaces that a specific house type offers and determines how these spaces relate to one another. Housing typology is also evident as a physical system.

⁶⁵ Rapoport, A. *House Form and Culture*, Englewood Cliffs, N.J.: Prentice-Hall. *Geoforum*, 3, no 4, (1972): 99-100.

Thus, houses can be viewed in terms of construction, materials, and style, which relate to their facades and interiors. These spatial, physical, and stylistic systems function relatively independently of one another. However, it is necessary to understand each in order to understand how it can be adapted to create new forms.⁶⁶



Fig 2.16: The central Part of the Diplomatic Quarter.



Fig 2.17: One of the housing projects in the Diplomatic Quarter.

The house also exists in an urban planning context, which operates at several levels, namely that of a neighbourhood, town, city, country and the world as a whole. In this sense, people not only give meaning to the residence they live in but also to its macro setting and its ever-extending context.

Housing in Saudi Arabia can be categorised into the following divisions in terms of production: First, houses built by developers for investment purposes (renting or selling) including apartments, semi-detached houses and detached houses (villas).⁶⁷ Second, houses built and owned by the residents themselves, which may be palaces or private detached houses. Third, houses built by government ministries or agencies under the auspices of government housing projects such as apartment buildings and compounds.

In the Dammam Metropolitan Area, like in other cities of Saudi Arabia, houses are diverse in terms of their patterns, styles and shapes. Some houses reflect a desire to mimic the traditional form, others have renewed facades, and others differ on the outside but retain the normal traditional distribution of spaces on the inside. However, the majority of people prefer the modern type of house in its various forms. New types of houses emerged during the third decade of the last century (the 1930s -1940s) through the Aramco Home Ownership Programme. Houses owned by middle-income people comprise the vast majority of housing units in Saudi Arabia. Custom-built detached houses and semi-detached houses comprise the majority of dwelling units, despite the quotient diversity.⁶⁸ (Fig. 2.18)

⁶⁶ This research will elucidate how these systems have been adapted to accommodate new needs and demand in the coming chapters.

⁶⁷ These are common types of houses in contemporary Saudi Arabia.

⁶⁸ KACST. The King Abdul-Aziz City for Science & Technology, The King Abdul-Aziz City for Science & Technology (KACST) is an independent scientific organisation of the Saudi Arabian Government, established in 1977. The KACST established several national research institutes. 2005.

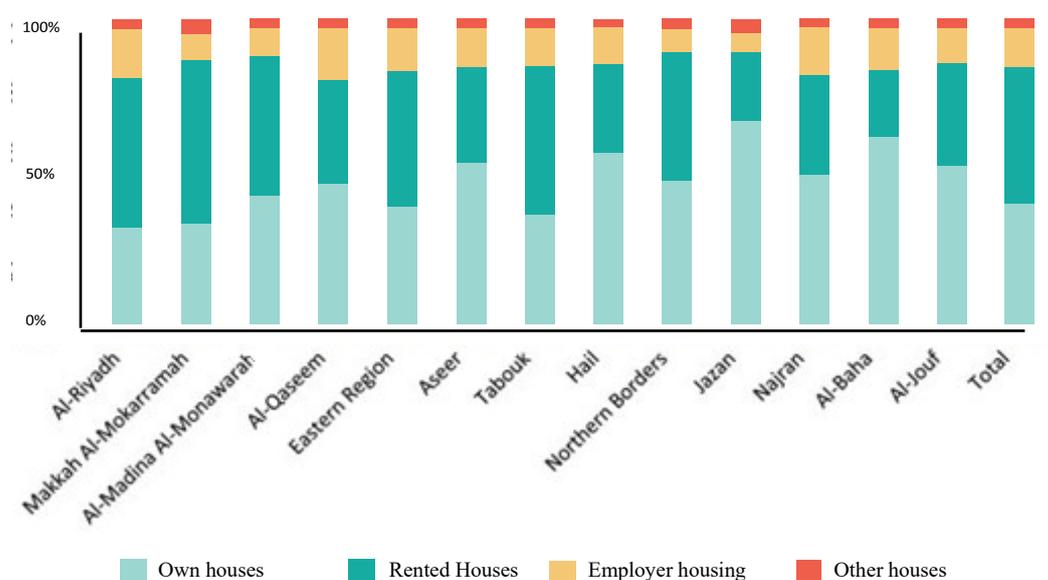


Fig 2.18: House Ownership Pattern within the Kingdom of Saudi Arabia in 2011.

2.10 Summary

This chapter included background information that helps shed light on the study area. It provides a prelude to the chapters that follow, which concern essential subjects related to the study.

It was necessary to give an overview of the developments that occurred in the residential settlements and the appearance of neighbourhoods in Saudi Arabia through different periods, namely: the traditional, transitional, modern, and contemporary periods. This information can be considered as an introduction to the evolution of the Eastern Province through four different stages. There have been both major and minor factors that have influenced the rapidity of this urban growth in the Dammam Metropolitan Area. The main factors discussed in this thesis are economic, demographic, natural, and cultural factors.

The definitions used in the building regulations and housing policy in Saudi Arabia are provided for ease of reference prior to the discussion of the applications of these regulations and policies to Saudi Arabian cities. It is important to note the active role played by the Real Estate Development Fund (REDF) in the land subdivisions and the district form. This Fund provides direct support to individuals who want to construct their apartment buildings and residential compounds. The aim of the REDF was to increase the building stock (industrial, hospitals, schools and all kinds of essential facilities that should be located in any developing city). A uniform code for land subdivision and buildings is needed to help preserve important traditions of a society that is being transformed in rapidly expanding Saudi cities.

Finally, this chapter covered an area of concern which was extensively used in this research. These points are considered to be an introduction to the case studies. The chapter showed the development sequence of housing policies and building regulations in Saudi Arabia and their effect on new, emerging cities. It also described the housing patterns that occurred in Saudi Arabia. The case study area has been outlined at the end of this chapter for ease of reference, as it will be continuously referred to in the coming chapters.



Chapter III

The Pattern of Traditional Neighbourhoods and their House Form

3. The Patterns of Traditional Neighbourhoods and their House Form

3.1 Introduction

Traditional architecture gives each region in Saudi Arabia its characteristics, reflecting its climate, cultural requirements, and topography. The closing years of the twentieth century saw a period of economic and social change in Saudi Arabia.¹ Many buildings and houses in traditional neighbourhoods were restructured and renovated in response to technological advancements and growing international competition in the local markets. In the wake of these changes, many traditional neighbourhoods were lost and not replaced.

This study presents an analysis of the development of neighbourhood planning in Saudi Arabia over time, particularly in relation to the Dammam Metropolitan Area. It is conducted from a design perspective rather than a historical perspective, and considers the development of house form and urban planning in a spatial, functional, and stylistic context. In this study, residential settlements are investigated in terms of the coordination of urban fabric, privacy, climate control, security, and safety.

The study aims to understand the design principles behind the spatial configurations, which have arisen from the traditional way neighbourhoods were planned, as well as the association between residential buildings and how they are affected by the city's urban design.² The traditional home environment must be considered in terms of its public and private domains. The public domain relates to the location of the house within the residential settlement, and its relationship to its external façade, the street, and other houses, whereas the private domain relates to spatial organisation, use of space, and human relationships.

3.2 Traditional Urban Planning of Neighbourhoods in the Eastern Province of Saudi Arabia in the Spatial, Functional and Stylistic Context

The principles of the religion of Islam play a key role in shaping the urban fabric of all the countries and cities in the Islamic middle east world. Saudi Arabia is one of those countries. Therefore, the form of the urban fabric of its traditional cities was the result of a mixture of many different factors which emerged in the region over an extended period. Benet emphasised this in his analysis of the ideology of Islamic urbanisation.³ He

¹Caused by a sequence of historical events in Saudi Arabia.

²A simple definition of 'residential neighbourhood' is found in Chapter II.

³ Benet, F. The Ideology of Islamic Urbanization, International, *International Journal of Comparative Sociology*, 4, 1963.

noted that “Islam is a predominantly urban religion, which thoroughly reshaped the urban structures of the world.”⁴



Fig 3.1: Aerial view of Dammam in 1950.

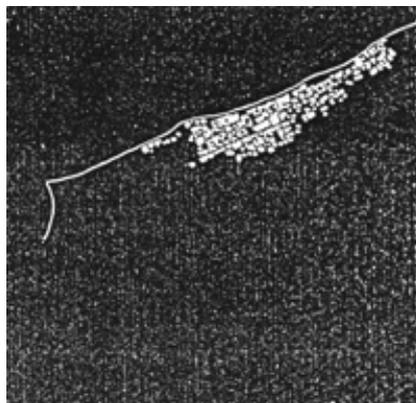


Fig 3.2: Map of traditional settlements in the Eastern Province shore of Saudi Arabia.

As an Arab-Islamic country, Saudi Arabia has strong architectural and urbanisation customs. The urban planning of traditional neighbourhoods in the Dammam metropolitan area was of a typically Arabic-Islamic pattern. The old neighbourhoods of the Eastern Province followed the traditional Gulf style.⁵ These residential settlements grew somewhat randomly, but were clearly defined by and in line with the daily life of the inhabitants. The heart of the settlements was defined by the main street, with or without a gate, and their borders were not strongly delineated. (Figs. 3.1 & 3.2) However, traditional neighbourhoods were very self-controlled and self-contained, with their mosques, shops, *souq* (local market), and water source. Traditional settlements had a similar town structure, with an evident shape and great coherence between dwellings and other components of the town. The social framework of Islam, with its socio-cultural interaction that supports the idea of unity, led to the creation of urban compactness in residential areas. According to Mortada, “Certainly urban compactness created by close or attached houses enables distances between the houses themselves and religious, educational, commercial and other facilities to be kept short.”⁶

Aerial photography and urban plans clearly show the compactness of the layout of these traditional settlements (Fig. 3.3), their physical continuity, and their adaptation to the topography. Every residential mass had a distinctive shape. In the physical sense, every residential component of the traditional neighbourhood formed one large, dense mass where houses, streets, and squares mixed to create irregular shapes and patterns.

Traditional neighbourhoods were mostly not defined by physical boundaries, which led to future urban expansion. Traditional zones were dense on an urban scale, where houses clustered together near the water

⁴ Many studies have investigated the impact of Islam on urban design and the specification of the Islamic Cities. Some of these studies are:

- Mortada, H. *Traditional Islamic Principles of Built Environment*. New York: Routledge Curzon, 2003.
 - Hakim, B.S. *Arabic-Islamic cities: Building and Planning Principles*. London, 1986.

⁵ All cities located on the Arabian Gulf Coast have almost the same style of architecture.
<http://www.catnaps.org/islamic/gulfarch1.html>. Accessed 3 March 2016.

⁶ Mortada, H. *Traditional Islamic Principles of Built Environment*. New York: Routledge Curzon, 2003.

source. The same extended family and tribe often inhabited houses in nearby residential areas. Therefore, some houses were found clustered slightly away from other houses, which indicated the establishment of a new tribe.



Fig 3.3: Every traditional settlement contains many residential parts called '*Freej*'. UAE, Dubai, Old Market.

This concept of the traditional neighbourhood is referred to as a *freej* in the language of the local people of the Eastern Province.⁷ The term *freej* implies a sense of grouping and is considered a reference point for individuals and groups that links them with the whole community. In most traditional neighbourhoods, each *freej* carried the family name of the group of people that lived in it. In terms of physical characteristics, all *freej* were similar, because they followed traditional Islamic urban patterns related to components, types of houses, and household clustering. According to Al-Naim:

All the quarters are divided into small repetitive units called *freej*. Every *freej* consists of a group of houses, a mosque, and sometimes a *madrasa*. The name of these *freej* were mostly derived either from their physical location, from an important trade or *métier* practiced in the *freej* or from the seat of an important family.⁸

Traditional settlements were divided by arterial and minor streets, which formed the residential areas that were termed neighbourhoods (*freej*). Shops and popular cafes were distributed along the main street, which passed along the rear of the houses. The shops of craftsmen and traders were also located in the market streets.

⁷ Al-Naim, M. *Continuity and Change of Identity in the Home Environment: Development of the Private House in Hofuf in Saudi Arabia*. Unpublished PhD thesis, the University of Newcastle upon Tyne, United Kingdom, 1998.

⁸ Naim, M.A. *Potentiality of the traditional house: A case study of Hofuf, Alhasa*. Doha: G.C.C. Folklore Centre, 1998.



Fig. 3.4: Old city of Tunis.



Fig. 3.5: Aerial view of ancient city, Ardakan, Iran.



Fig. 3.6: Old Riyadh. Early Muslim cities are similar in urban plans and their dwellings are similar in shape.

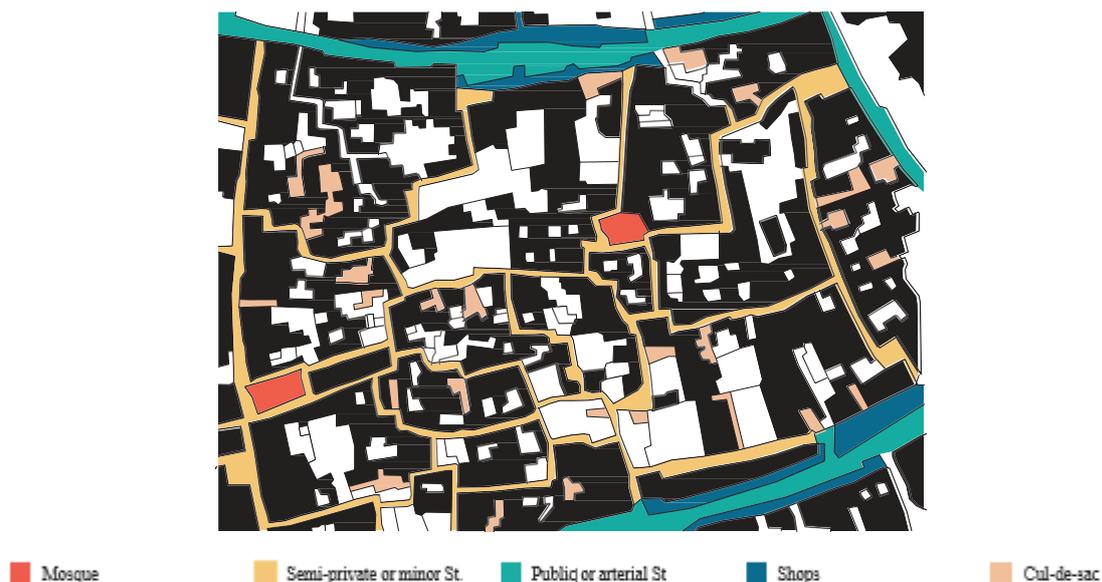


Fig 3.7: In traditional settlements, it was difficult to find physical boundaries between densely clustered residences.

Although ancient Arab cities were located in different areas with different religious doctrines, climatic conditions, and political and social influences, the urban fabric of their neighbourhoods and residential buildings had the same characteristics. All houses had the same external features, spatial form, number of floors, and components (Figs. 3.4, 3.5 & 3.6). Houses built in traditional neighbourhoods were attached together as units and clusters. The texture of the camouflage façade in traditional houses was quite individual and simple.⁹ On the other hand, patterns, colours, textures, of mud and stone, decorative patterns and rhythms of triangular openings in facades were slightly different. The residents either utilised the land they needed to

⁹ This is also derived from the principles and teachings of the Islamic religion that promote equity and equality.

build their dwellings or were forced to take the land that lay between dwellings; thus, it became difficult for pedestrians in the neighbourhood to distinguish the size or boundaries of the housing units. The houses were built in a cumulative manner: each resident built their house using the wall of the neighbouring house to form one of the external walls of their house, and so on until the whole settlement was complete. This construction method resulted in the creation of dense neighbourhoods with an intricate urban fabric.

3.2.1 The Traditional Urban Fabric

This study explores the concept of the traditional neighbourhood regarding privacy, safety, and compactness, and seeks to understand how this system functioned in relation to the traditional home environment. In the traditional settlements of the Eastern Province of Saudi Arabia, the arrangement of the urban fabric had four different determinants: social structures, economic necessity, protection requirements, and climatic adaptations. The traditional settlements typically comprised limited residential sectors accompanied by a hierarchy of streets, alleyways, and dead-end streets (cul-de-sacs).¹⁰ The public buildings, such as the treasury and mosques, included the spatial components of public open spaces, congregational areas, public *souq* (market), and circulation routes, some of which included covered passageways (Figs. 3.7 & 3.8).



Fig 3.8: Dammam fifty-three years ago. The red circle shows the location of the mosque, and the green lines show the location of the local market (*souq*), which is on the way to the mosque.



Fig 3.9: Traditional urban fabric in a Dammam district in 1935, showing properties defined by wall enclosures.

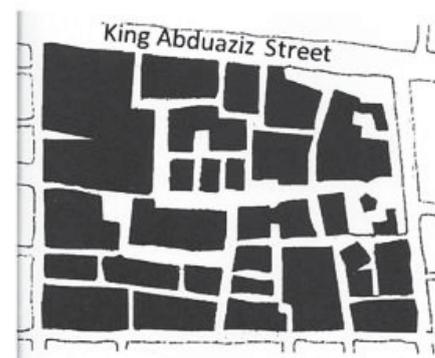


Fig 3.10: The composition of traditional old neighbourhoods in Dammam city.

¹⁰ Al-Hathloul, S. *The Arab-Muslim City: Tradition, Continuity and Change in the Physical Environment*. Riyadh: Dar Al-Sahn, 1995.

3.2.2 Privacy in Traditional Period

In traditional houses, the residents carried out construction in a cumulative style, with cluster configurations, working within *Shari'a* requirements, and observing the religious law.¹¹ When constructing their houses, the residents of traditional neighbourhoods respected their neighbours in accordance with *Shari'ah* laws. There is a chapter of the Islamic law that focuses on preserving housing rights between neighbours. For example: household doors are not allowed to open in front of neighbours' doors, and Islamic rule prohibits higher features such as roof terraces or balconies, because they are a source of visual intrusion to other houses. Thus, in traditional neighbourhoods, integrated development was achieved without violation of the privacy of adjoining properties or spaces. Every member of society could make equal use of public spaces and religious or commercial facilities. Traditional environments had mixed land use patterns,¹² with a heavy emphasis on social integration without prejudice toward privacy. This pattern strengthened social relationships among inhabitants, as land-use was fully integrated, and there was no need for a separate traffic system which might have disturbed the integrity of the community. Therefore, the organising principles evolved from the socio-religious precepts of the society, and the resulting built forms expressed that harmony.

3.2.3 Safety and Security in Traditional Period

The physical features of traditional neighbourhood elements established a specific network, whereby symbolic messages were exchanged between residents. The narrow cul-de-sacs led to large plazas between the houses, and any stranger who passed along the road was quickly noticed. Some elements of the traditional urban fabric restricted contact between inhabitants and strangers, and others invited it; public open spaces and plazas were directly connected with the settlement's entrances, so any guest or stranger entering the traditional settlement faced this open space which is the place where people gather and carry out their public interactions. The open plazas are the place where an acquaintance is made between the stranger and the local people. Here the residents come to know the reason why he entered the settlement, guide him, and host him in one of the houses. Thus, the security system which ensures the safety of the population uses the population itself. Al-Nowaiser considered security one of the most basic spatial-behavioural concepts which influences the spatial pattern of most traditional settlements.¹³

3.2.4 The Morphology and Compactness in Traditional Neighbourhoods

The spatial organisation of settlements in the Dammam metropolitan area, which at first seems relatively disorganised, reveals a group of organisational meanings and rules when considered in light of the customs, conventions, and religious rules which exist in the kinship system. A kinship system, in traditional settlements, fostered public relationships within the residential buildings, buildings which existed in coordination with all elements of the environment and with their surroundings. The design of dwellings and

¹¹ Prophet Mohammed's law.

¹² Land in the traditional period was used for residential purposes; part of it was also be used for public zones such as streets or plazas. Furthermore, the ground floor of the traditional houses could be turned into commercial shops.

¹³ Al-Nowaiser, M.A. Toward a Residential Zoning Regulation Approach for Saudi Arabia. *JAPR*, 132, 1996. pp.91–106.

the dimensions of the circulation spaces were two distinct features of traditional settlement architecture (Figs. 3.9 & 3.10).

Neighbourhoods were developed according to tribal and Islamic principles.¹⁴ The most notable characteristics of such communities were the 'dense morphology' and physical unity of the housing units, which allowed social interaction at the family level in private areas and at the group level in semi-private areas. The urban fabric established in the Eastern Province reflects a strong character that demonstrates self-defence and economic self-reliance.



Fig 3.11: Traditional urban pattern of Al-Dawasir neighborhood in Dammam.

The co-operation and closeness among people encouraged the construction of houses close to each other and limited the size of the neighbourhood's residential blocks. Thus, social interaction and unity led to the creation of urban compactness in residential areas (Figs. 3.11 & 3.12).

Brown, K. described the traditional residential quarter as:

... a cluster of households characterised by a particular quality of life –closeness- that is based on multiple personalities and common interests and an extension on contiguous spaces of a shared moral unity. Thus, the visual form of the quarter and the city, in general, has a cultural logic not regarding physical landmarks or layouts, but about conceptions of social relations.¹⁵

Maps or aerial photographs show the compactness of the urban plan, the physical continuity, the adaptation to the topography, and market areas of traditional cities. They also reveal that public open spaces (*barahat*) were usually not strictly defined (Figs. 3.11, 3.12, & 3.15).¹⁶

¹⁴ Design principles of the traditional neighbourhoods in the Eastern Province of Saudi Arabia were natural laws, religious and cultural beliefs, design principles stemming from Sharia Law, and social principles. These principles shaped the neighbourhood and gave it its final form.

- Saoud, R. *Introduction to the Islamic City*, 2001.

¹⁵ Brown, K. *The Use of a Concept: The Muslim City*. Proceedings of the Middle Eastern Cities in Comparative Perspective, Franco-British Symposium, London. London: Ithaca Press, 1986.

¹⁶ *Barahat*: The plural form of an Arabic word used to refer to the public open spaces in front of groups of houses.



Fig. 3.12: This illustration shows the residential blocks (parts) of the traditional neighbourhood and the physical attachment of dwellings as a result of social integration, which limited the size of neighbourhoods and reduced the distance between houses.

3.2.5 The Key Aspects of the Traditional Neighbourhood

In Al-Adama, Al-Dwasir, Amamrah, and other traditional neighbourhoods in the Eastern Province, the houses in residential settlements exhibited harmony but maintained their identity. All houses had the same external shape and features, facade, openings, and ornamentation. There was one consistent skyline, and no house exceeded the height of three floors. Only the minarets of the mosques were prominent above this line, to be conspicuous to pedestrians from a distance outside of the neighbourhood or from any place on the main road (Fig. 3.13).



Fig.3.13: Left: The skyline of a traditional neighbourhood in the Eastern Province.
Right: The minarets of the mosque penetrate the skyline of a traditional neighbourhood.

Inside the houses, there were different levels. Traditional houses were multi-floored and built with the intention of not overlooking the neighbours, in consideration of their rights. In addition, when the houses were constructed, privacy was preserved by ensuring that windows or doors did not face one another.

The dominant and familiar characteristic of the traditional neighbourhood was its system of squares or courtyards, roads, alleys, and cul-de-sacs. The houses of one clan usually clustered around a cul-de-sac or an open space known as a *baraha*. The cul-de-sac was the end of the circulation network. Connections between houses at the upper level — *sabat* — allowed women and children to move from one dwelling to another. The MOMRA report noted:

Small alleyways, or *Da'oos*, were developed. These came more from a need to separate properties of different families than from circulation or functional requirement. With the densification of the urban fabric, these *Da'oos* became a permanent semi-private circulation network in the later consolidation stage of development.¹⁷

3.3 The Traditional Street

The layout of the traditional neighbourhood, as part of the organic pattern of the town, was characterised by solid masses of connected houses broken up by narrow streets which would branch out irregularly into alleyways and cul-de-sacs. This irregularity came from the natural, organic growth of generations of extensions and infilling. The size and shape of the street changed according to need and depended on the number of houses constructed. The contextual requirements of culture and climate were also influential in the street layout (Fig. 3.14).

The narrow indirect streets provided an essential sense of unity (Fig. 3.15). They provided comfort to pedestrians, with a configuration that was climatically useful because cold layers of air gathered in them during the night and remained throughout the morning before the wind dispersed the cold air (Fig. 3.17). They also provided shade, not only for passers-by but also for the houses in the street, so that the exposure of the external walls to the sun's radiation was limited.

Streets in traditional communities were scaled for pedestrians. Most movements in these neighbourhoods were carried out on foot. Furthermore, traditional dwellings were small fronted, complex, and with deep entrances. The careful arrangement of overpasses (*sabat*) to frame views and the placing of decorative doors and windows along the narrow streets created a pleasant environment for pedestrians (Fig.3.20).

In the traditional environment, outdoor areas and streets were created in sequential order and integrated form. The streets gradually reduced in size and changed in character, form, and function — from the public to semi-public to the cul-de-sac, and eventually to a private patio for home access only. There were three types of streets. The first type was the main road, which was always located in the centre of a residential settlement, where the majority of public life occurred. It was wide enough for two people and their packed donkeys or camels to pass. The second type was the cul-de-sac, which was the semi-public property of the people living along with it. The third type was the area under the *sabat* — a room bridging a street or a cul-de-sac; columns

¹⁷ MOMRA (Ministry of Municipal & Rural Affairs). <http://www.momra.gov.sa>. Accessed 12 May 2015.

were required to support the *sabat*, with buttressing arches providing support and strength to exterior walls.¹⁸ This area often reflected the most private space located behind it (Figs. 3.19 & 3.20).

Each type of street had clear borders and an independent identity and functional characteristics, which limited access to unwanted strangers. Misconduct and crime in traditional societies were almost non-existent because of the influence of social factors and privacy controls, demonstrated by the location of doors and windows, and also the closed-ended roads, pathways, and winding alleys (Figs. 3.16 & 3.18).¹⁹



Fig. 3.14: Roads, alleys, and cul-de-sacs were the three types of street in traditional neighbourhoods of the Eastern Province.



Fig. 3.15: *Barahas* between neighbourhoods in the Eastern Province.



Fig. 3.16: Narrow and winding streets created shade.

Thus, the traditional neighbourhood evolved into an advanced, complete concept, including open spaces (*barahat*) (Fig 3.22). This aspect of the streetscape usually occurred where two or three narrow alleyways opened into a large public area or intersected with each other, and was used for children's playgrounds,

¹⁸ A *sabat* is a structure that bridges a public street. It was designed to provide additional space for the building to which it was attached. Islamic law recognises this concept, and there are specific guidelines governing its implementation.

¹⁹ Dhingra, M. and Chattopadhyay, S. Advancing Smartness of Traditional Settlements – Case Analysis of Indian and Arab Old Cities, *International Journal of Sustainable Land use and Urban Planning*, 2016, 3(4). pp.15-32.

gatherings, and festivities. However, a *baraha* could also be found between houses even in the absence of an intersection of main streets, and almost every neighbourhood (*freej*) had its *baraha*. Saleh Al-Hathloul described the *fina*, which — similar to the *housh* or *baraha* — was used for activities related to domestic life as well as to the community. It was also used for selling and producing goods.



Fig. 3.17: Street oriented to help the fresh sea breeze penetrate the traditional neighbourhood.



Fig 3.18: The orientation of door openings and windows in the houses of traditional cities reflected the importance of privacy.



Fig.3.19: A picture taken of the traditional neighborhood in Al-Ahsa city in the Eastern Province.

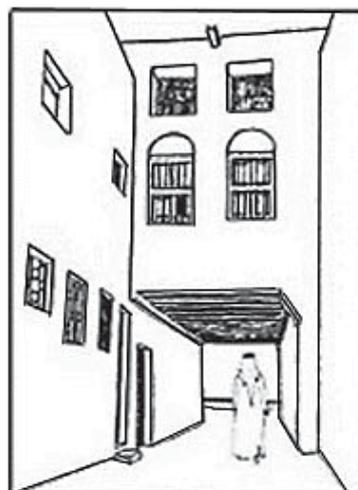


Fig.3.20: This picture illustrates a 'Sabat' in early 1986.



Fig. 3.21: A public street in the traditional neighborhood, full of activities.

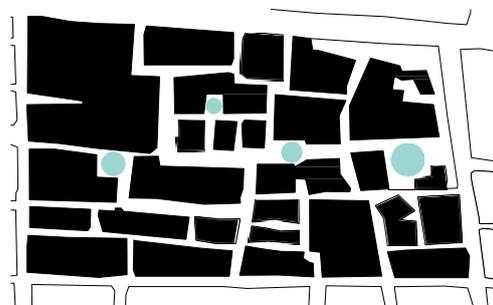


Fig 3.22: The blue circles show the location of 'barahas' which are found where two or three narrow alleyways open into a large public space or intersect with each other.

3.4 The Community Areas in Traditional Period

The community areas in traditional settlements were both concrete (the local market and mosques) and more abstract (*barahat* and main roads) representations of the socio-cultural characteristics of the region. They reflected the social interlinkage of the people who lived in them and moved around them. The urban organisation was related to the way in which the housing system developed outward, from the private to the public domain. The basic components of the public elements were the market (*souq*), mosque (*masjid*), school (*madrasa*). (Fig. 3.23).

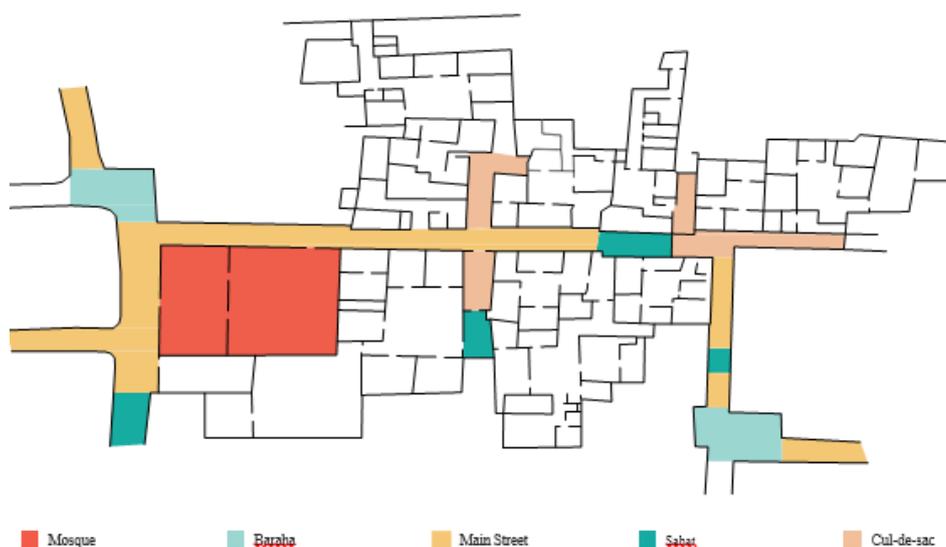


Fig 3.23: A neighbourhood quarter in the Eastern Province (Al-Hafouf) shows the main physical elements of every *freej*.

3.4.1 The Market (*Souq*) in Traditional Period

In the traditional neighbourhood environment, the main market was situated in the city centre, and other smaller markets or shops penetrated the residential areas (Fig. 3.24). This distribution of commercial activities made it possible for inhabitants to fulfil their daily shopping requirements without difficulty. The main *souq* was always situated close to the mosque because Muslims usually attend the mosque five times a day. In this way, the inhabitants of traditional neighbourhoods could make purchases on their way to and from the



Fig 3.24: A market (*souq*) in Al-Khobar city in the 1940s.

mosque. The location of the marketplace also promoted its social value rather than its significance as an economic institution.²⁰

Sometimes, commercial areas were shaded by temporary covers laid out over the street, which then became a local market. If the upper storeys of the houses were inhabited, the shops would be at ground level with only occasional storage above, and with a central passageway for pedestrians and shoppers (Figs. 3.25 & 3.26).

3.4.2 The Mosque in Traditional Period

The mosque was used not only as a place to worship but also for learning, public gathering, and other functions. The connection between humans and religion always resulted in the existence of mosques in each quarter of all residential settlements. Mosques were integrated with all levels of community worship — from the Friday mosque, or *Jame*, to local ones. The Friday mosque was usually located on a public street (Figs. 3.27 & 3.28), with a large yard in front where people could gather. The Friday mosque was bigger than an ordinary mosque, and its role was more comprehensive within society: occasional prayers and events were held there, along with daily prayers.



Fig 3.25: This picture shows camels on the way to a traditional market in Al-Khobar in 1949.



Fig 3.26: This picture shows the traditional market in Al-Khobar in 1958.



Fig 3.27: The traditional organisation of old neighbourhoods, showing the mosque as a focal point (Left: Doha City, late 1940s, right: old Dammam).

²⁰ Al-Hathloul, S. *The Arab-Muslim City: Tradition, Continuity and Change in the Physical Environment*. Riyadh: Dar Al-Sahn, 1995.
- Al-Hathloul, S, and Edadan, N. Evolution of Settlement Pattern in Saudi Arabia: A Historical Analysis. *HABITATINTL*, 17(4), 1993. pp.31-44.



Fig.3.28: The main mosque was always located on the central main shopping street in the traditional city.

3.5 Traditional Housing Types

In the traditional neighbourhoods of the Eastern Province, the first type of houses were huts called *barasti* (Fig. 3.29),²¹ which were inhabited by the Al-Dawasir tribe from Bahrain.²² As time progressed, each *barasti* was located within a courtyard and surrounded by a fence made from upright palm fronds, to establish privacy (Fig. 3.30). Later, these huts were replaced by courtyard houses constructed out of limestone, *faroush*, or burnt cement plaster (Figs. 3.31 & 3.33).

In traditional Arab cities, back-to-back houses formed clusters. The courtyard house emerged as an urban, rural, and Gulf prototypical phenomenon, and was the only type of traditional house in the Eastern Province (Fig. 3.32). In the courtyard house, the outdoor space was surrounded by the built interior; ultimately, the central courtyard became the heart of the house. This particular housing type had general physical features related to spatial organisation, construction materials, construction methods, and interior decoration. These features reflected directly on the overall visual appearance and environmental significance.²³



Fig.3.29: Huts (*barasti*) were a type of house popular in Al-Dawasir in the 1930s.



Fig.3.30: Overlapping the old *barasti* with courtyard houses.



Fig.3.31: Courtyard houses in the 1940s.

²¹ Huts with sloping roofs and walls of woven palm fronds, known locally as *barasti*, which provided good interior cross ventilation. The study does not address this type of housing.

²² The first tribe settled in Dammam city as immigrants who came from Bahrain.

²³ Al-Suliaman, S. *The Development in the Private Home in Al-Khobar*. Unpublished research, King Faisal University, Dammam, KSA, 2002.

- Al-Said, F. *The Pattern of Structural Transformation of the Saudi Contemporary Neighborhood: The Case of Al-Malaz, Riyadh, Saudi Arabia*, 39th ISoCaRP Congress 2003.

- Al-Said, F. *Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia*. Unpublished PhD thesis, University of Glasgow, Glasgow, 1992.

In the traditional environment, public spaces were collectively owned by the residents, who controlled and even maintained them. An individual could act freely as long as they did not harm their neighbours. The traditional courtyard house was a building designed by people, and in that sense, it symbolised human decisions and choices, and specific ways of living and doing things.

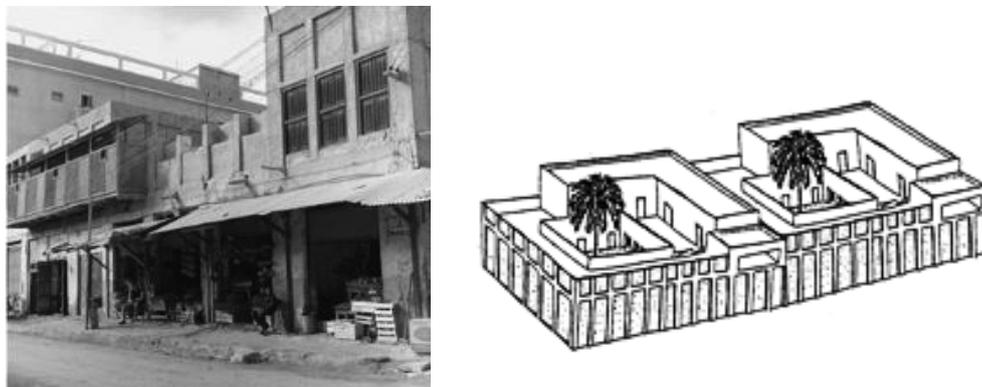


Fig. 3.32: The popular house form and exterior facade of the traditional house in the Eastern Province.

In the traditional era, the construction of houses and other public buildings followed the vernacular tradition of building according to acceptable socio-cultural norms, with the work carried out by master builders who knew the typical form of the house and the regulations that it should follow.

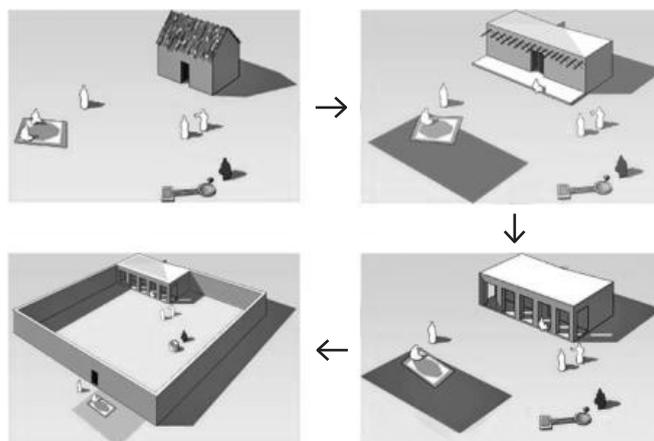


Fig. 3.33: Stages before the final form of a traditional Eastern Province house.

The traditional form of housing was economical and promoted social interaction between neighbours.²⁴ Sixsmith stated that traditional homes promoted social interaction because the male seating area, which was open the entire day, was a place to share news and knowledge, and the wide, open courtyard enabled

²⁴ The traditional houses were economical because the inhabitants used local construction materials and local workmen constructed the whole house.

- Sixsmith, J. Privacy, modesty, hospitality, and the design of Muslim homes: A ... [Incomplete]
 - Al- Taiash, K. *The Meanings and Values of Symbolism in Traditional and Contemporary Architecture*, Riyadh, 2008. [Arabic text] [Incomplete]

neighbours to gather and build relationships. Courtyard houses were one or two-storey structures (Fig. 3.34). The ground floor was the primary activity space of the house, and the first-floor formed part of the built-up area allocated for sleeping in the summer or for future expansion. The rooms surrounded a courtyard that was open to the sky, with almost all windows looking into this interior space. The courtyard house met the environmental, social, and symbolic needs of the Muslim family.

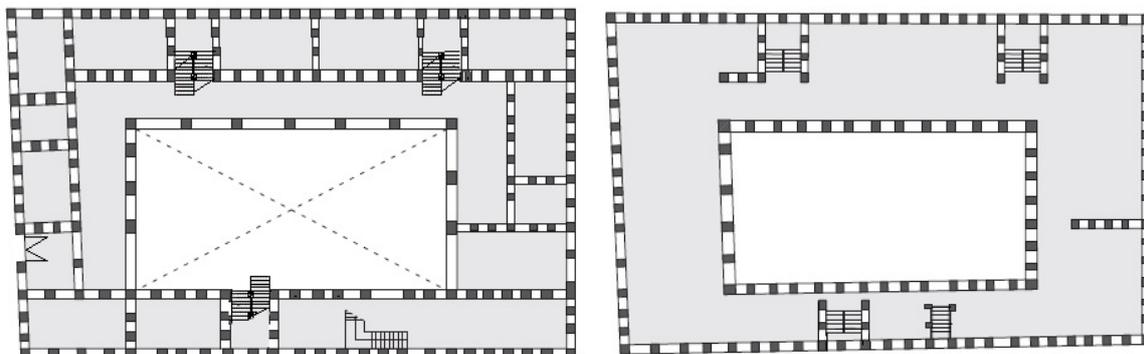


Fig 3.34: A plan of a traditional house in Damman.

An extended family lived in a single house, which was sometimes single storey with a roof level. The ground floor of most houses was entirely enclosed around one, or a maximum of two, central courtyards. Palaces and wealthy houses had several specialised courtyards,²⁵ such as a reception courtyard, a kitchen courtyard, an animal courtyard, and sometimes a business courtyard. The roof level of the house was a flat area surrounded by a wall and accessible for family use. After the death of the head of the household, the house was divided into small houses to allow for other future extended families. It was also possible for the brothers of the deceased to build housing units next door to each other, creating a composite group of units. The result was a private cluster unit within the residential quarter of the traditional neighbourhood (Fig. 3.35).

A traditional house in the Eastern Province had two domains: a public domain for guests, and a private domain for the family. The house could be divided into three main parts: a guest area, the family area, and, occasionally, an animal area. The front section was dedicated to the male reception areas, with a special entrance for men. The middle area of the house would be occupied by family members and connected on one side to the male areas. The family section contained multi-use spaces such as a *muraba* — a square room mainly considered, with the courtyard, as a symbolic space in the family part of the house, and a *liwan* — a rectangular utility room with an arch opening onto a living area or lobby in the traditional house (Fig. 3.36).²⁶ The kitchen, storage areas, toilet, and *samada* were located to the back of the house.²⁷

²⁵ In the case of Al-Hasa (a city located in the Eastern Province), the number of courtyards exceeds two.

²⁶ Al-Naim, M. *The Home Environment in Saudi Arabia and Gulf States*, Vol. 1: Growth of Identity Crises and Origin of Identity. Vol. 2: The Dilemma of Cultural Resistance, Identity. CRISMA working paper no. 7. Milan: Pubblicazioni dell' I.S.U. Università Cattolica. 2006, p.163.

²⁷ The animal section was called the *samada*.

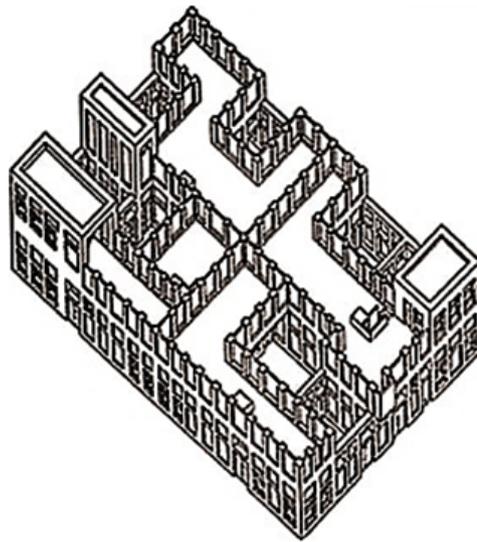


Fig.3.35: A four-unit cluster.

3.6 Observations about Spatial Organisation in Traditional Houses

The entrance door was designed to open onto a blank wall in order to block all views of the interior, and it did not provide direct access to the internal area. The entrance to the private part of the house was usually located at the farthest point from the guest entrance, along with one of the front facades, to provide maximum privacy. Usually, the main entrances were narrow and deep for acoustical purposes.²⁸ They functioned as a transitional area that allowed a guest's voice to pass through the house. A guest would stand at the front door, waiting for permission to enter the house.²⁹

The men's reception room tended to be located adjacent to, and directly connected to, the entrance lobby. Every house would have at least one reception area. Sometimes it had a separate toilet and staircase, which led onto a roof terrace. This reception room was the most decorated room in the house and was usually longitudinal and parallel to the street.

The roof terrace was another important area in traditional houses in the Eastern Province. During the hot and humid summer, the roof terrace was used as a sleeping area at night. Important occasions, such as weddings, were celebrated on the roof because of its large area. The roof would be divided into two or three sections and surrounded by high parapets, for men, women, children, guests, and the parents. Usually, there was a storeroom in which to keep the bedding.

The staircases were mostly located adjacent to the kitchen, toilet, or storage. Usually, there were two staircases: one towards the back of the house for the family, and the other next to the entrance for male guests.

²⁸ Akbar, J. *Support for Courtyard Houses in Riyadh, Saudi Arabia*. Published PhD, Cambridge, Massachusetts, USA. 1980.24

²⁹ Al-Naim, M. *Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia*, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

The staircase near the entrance led to the guest roof terrace. Typically, the first few steps had a wall only on one side. The staircase often led to the reception room on the first floor or the roof.

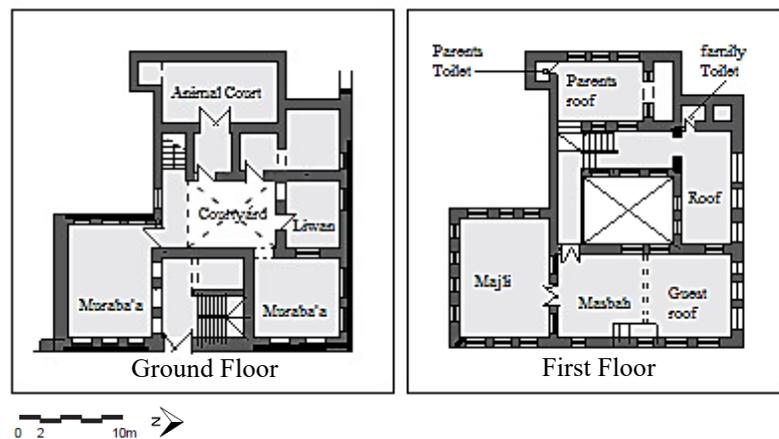


Fig 3.36: Another Example of a traditional house of the Eastern Province.

The traditional interior spaces of houses in the Eastern Province reflected a profound sense of hierarchy between men and women. The strict issues of segregation between the sexes resulted in the need for two doors to the house. Different entrances were paralleled in the interior spaces by separate men's and women's areas. There was also a high degree of separation between guests and family members, and between family members and the outside world. This separation was facilitated by a series of increasingly private areas that gravitated towards a central courtyard. (Fig. 3.36)

The kitchen was often located in a corner part of the house. It would be a small room with some grooves in the walls to store dishes. Frequently, there would be space next to the kitchen to store food, with specially built-in shelves to store dates and dry supplies.

The bathroom in these traditional houses did not meet sanitary requirements because of the shortage of water and lack of drainage. There was a toilet connected to an exterior septic tank located between the dining area and the reception hall. The bathroom in the traditional period usually consisted of two compartments: the first one for changing clothes, the other for bathing.

Most interior spaces were functionally non-specific; rooms could be used for any activity such as sleeping, eating, leisure or studying. According to Akbar, "this flexible use of living space is reflected in the absence of cumbersome furniture like tables and chairs."³⁰ Built-in wardrobes, niches, or chests were commonly used for storing away the rolled-up mats, rugs, sponge mattresses, and cushions used for sleeping.

The spatial organisation of the traditional house demonstrated the social and physical segregation between males and females both inside and outside the house. This separation means that there were two domains inside the house — for guests and family. The guest section consisted of the men's entrance, the front hallway

³⁰ Akbar, J. *Support for Courtyard Houses in Riyadh, Saudi Arabia*. Published PhD, Cambridge, Massachusetts, USA. 1980.31.]

(*dehreez*), and the male sitting area. The family space consisted of the central courtyard and the multi-purpose rooms (*muraba* and *liwan*), which were usually connected directly to the family courtyard (Figs. 3.37 & 3.38).

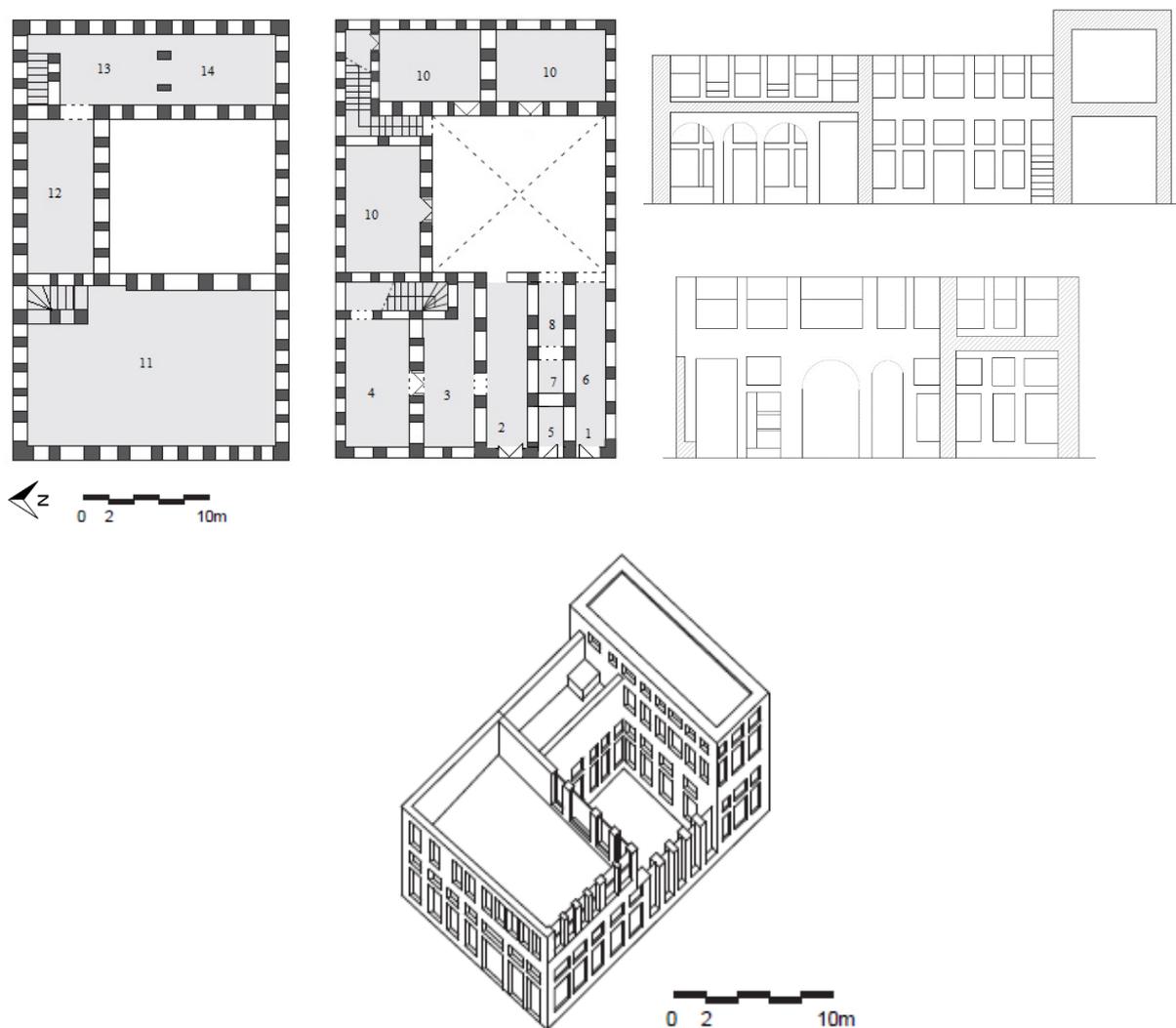


Fig. 3.37: Isometric plans and front elevations of a common house in the Eastern Province. This house was located in Al-khobar city.

1: Family entrance, 2: guest entrance, 3: guest entry hall, 4: men's seating area, 5: storage, 6: family entry hall, 7: storage, 8: kitchen, 9: courtyard, 10: multi-purpose room, 11: guests' roof terrace, 12: family roof terrace, 13 & 14: family roof terrace (*loggia*), toilets usually under the staircases.

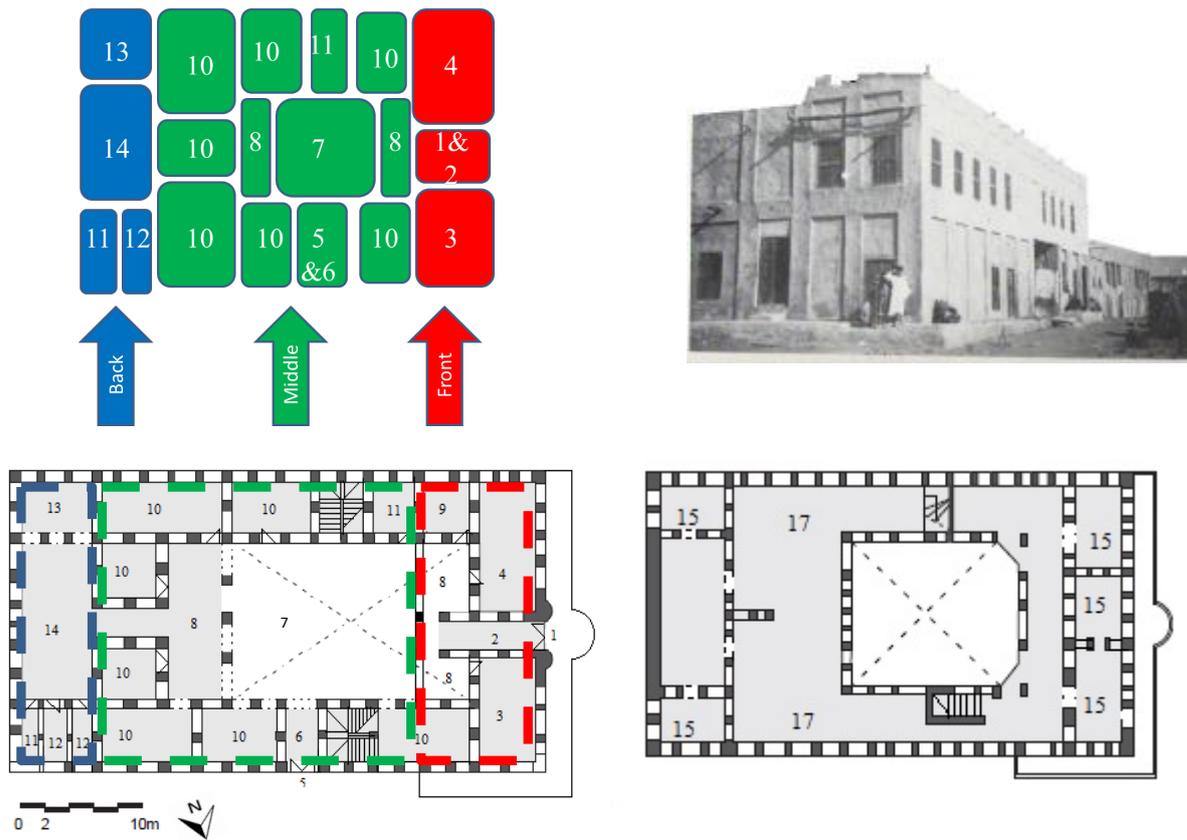


Fig.3.38: A very common traditional house design in the Dammam metropolitan area.

1: Men’s entrance, 2: men’s entry hall, 3 & 4: guest areas, 5: family entrance, 6: family entry hall, 7: courtyard, 8: *loggia*, 9: kitchen, 10: family area, 11, 12 & 13: toilets, servant’s room, and storage, 14: utility courtyard, 15: upper floor room, 17: open roof



Fig.3.39: Three elevations of three different traditional houses in Dammam show the similarity in facades.

The family spaces were connected with the male reception area by a transitional space called a *dehreez* (Fig. 3.40). There was also another transitional space between the family and animal areas, or between two units

in the housing cluster, called the internal *sabat* (Fig. 3.41). The third zone usually consisted of the service rooms, such as the kitchen and toilets, and the animal courtyard.

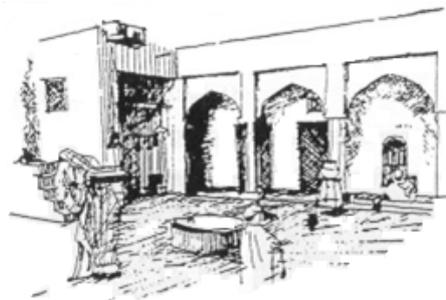


Fig.3.40: The family courtyard showing the *dehreez*.



Fig.3.41: The internal *sabat* between two houses.

The men's reception area — the *majlis* — was the most prominent place in the house. It was divided into three zones: the front, middle, and entry zones. Each zone was furnished with different materials according to importance and identity. The front area was the most important place for visitors, as it usually contained the coffee place (*wijagh*), and was thus situated at the front, near the entrance door (Figs. 3.42 & 3.43).

Al-Naim described the importance of the coffee place in his research:

...the coffee place, in this case, developed from a utilitarian place to a place conveying social meaning, either as an element used to express hospitality or as a perceptual element employed by people to reflect status by using it as a decorative background in the front zone in the *Majlis* hall.³¹

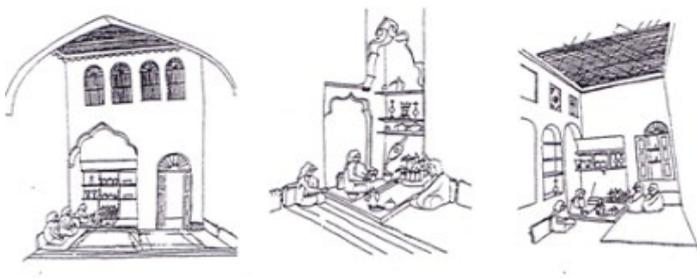


Fig.3.42: The *wijagh* (the coffee place) receiving guests in the men's reception area.



Fig.3.43: Men's sitting area showing the coffee place.

³¹ Al-Naim, M. *Continuity and Change of Identity in the Home Environment: Development of the Private House in Hofuf in Saudi Arabia*. Unpublished PhD thesis, University of Newcastle upon Tyne, United Kingdom, 1998. p.248.

3.6.1 The Courtyard: A Common Feature

The courtyard was a characteristic feature of the traditional house throughout the entire Eastern Province. The central courtyard was square or rectangular and sometimes quite large. It provided shade, but was built primarily to provide open-air to the family, as well as the necessary privacy. According to Oliver, “Dwellings are built to serve a variety of functions, but one of the most important is to create living conditions that are acceptable to their occupiers, particularly in relation to the prevailing climates”³² (Figs. 3.44 & 45). In this context, the courtyard was built according to a mechanism of ventilation that occurred over the course of the day and night. Courtyard surfaces were made of materials with a high capacity for storing heat, so the heat was exchanged between the courtyard house envelope and its environment. Then, because the sky cooled air had very high density, it sank down and accumulated inside the courtyard, which became cold. When the solar elevation angle was low, the impact of solar radiation was negligible, and the central open space was almost shaded. As soon as the sun rose, the outer layers of the courtyard began receiving the sun rays; as a result, the sunlit parts of the walls and floors received heat because the solar radiation progressively intensified. By noon, the courtyard floor was completely covered by direct sunlight, so the temperature increased remarkably. However, the heat was not very high because the mass of the structure that surrounded the courtyard lowered the ambient air temperature.³³

The courtyard was well-ventilated, shaded by plants or trees, and provided an outdoor living area for the family and a safe playground for the children. Courtyards were smaller in Al-Khobar and Dammam than in Qatif and Hofuf, because the houses in the latter two towns were higher and could reach up to four storeys.

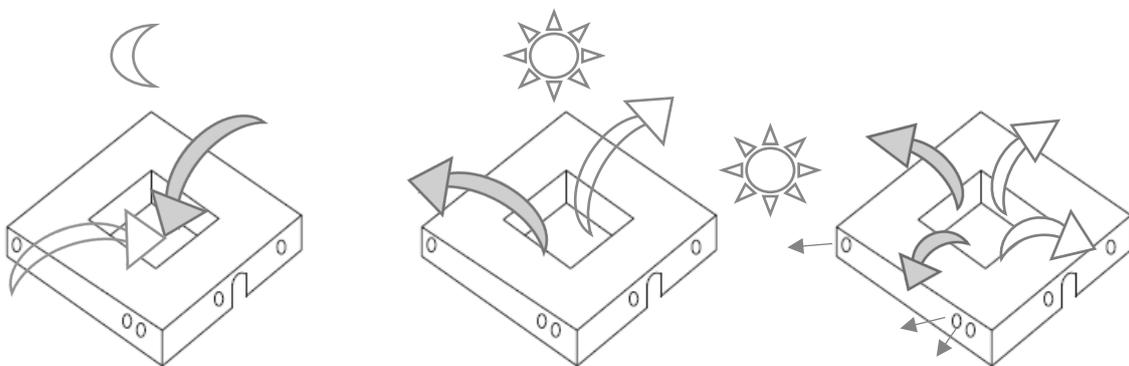


Fig 3.44: Diagrammatic explanation for the climatic behavior at night, noon, and in the afternoon.

3.6.2 The Covered Terrace (*Loggia*)

Loggias surrounded all houses courtyards in the Eastern Province on one, two, three, or even four sides (Fig. 3.46), providing an additional shaded outdoor living area in front of the actual living rooms. This was especially beneficial at noontime when the courtyards might receive the full impact of the harsh sun. The design allowed for air circulation around the courtyard. Additional well shaded, and well-ventilated *loggias*

³² Oliver, P. *Dwellings: The Vernacular House Worldwide*. London: Phaidon Press Ltd., 2003.

³³ Dunham, D. The courtyard house as a temperature regulator, *The New Scientist*, 8, 1960. pp.663-666.

(Fig. 3.46) were also distributed on the upper floor, particularly the roof. They were usually oriented towards and open to the North and East, in order to catch the cool breezes coming from those directions.



Fig 3.45: Images show the *loggia* with shade in the daytime.

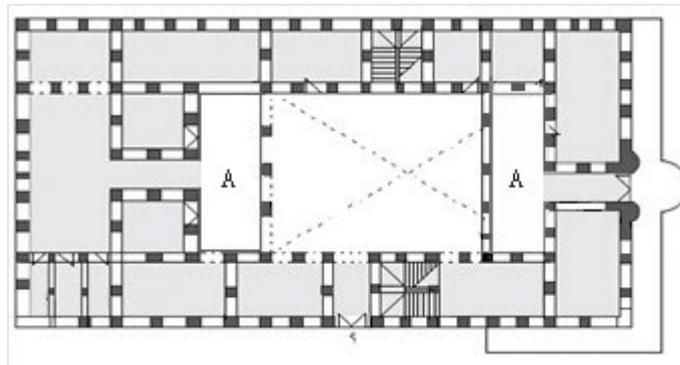


Fig.3.46: A ground floor plan of a house in Al-Khobar shows the terrace (*loggia*) around the courtyard.

3.6.3 Vents (*Badgeer*)

Vents (*Badgeer*) were also a common feature of the traditional local architecture in the Eastern Province (Fig. 3.49).³⁴ These vents were openings in the walls of a building, created by placing two intersecting partitions in each corner (Fig. 3.48). In Dammam and Al-Khobar, the vents were located within the walls of the ground floor or on the roof of the buildings. They provided ventilation within the house and on the roof without exposing the family to the public or disturbing the privacy of the home.³⁵

The use of wind towers, one of the most popular techniques to reduce the thermal discomfort due to hot weather in the Eastern Province, together with internal courtyards, allowed domestic activities to take place in a very comfortable atmosphere (Fig. 3.47).

³⁴ The first people who built Wind Towers (*Badgeer*) were the Iranians in the city of Langa.

³⁵ Aljofi, Egal. The Measures of Light Performance of Wind Catchers in Hot Climatic Zones, IACSIT International Journal of Engineering and Technology, 8:1, February 2016.

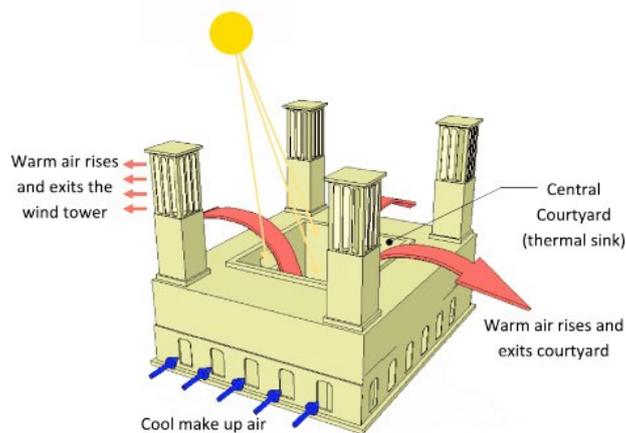


Fig.3.47: Air circulation through *badgeer* in courtyard houses in the Gulf region.

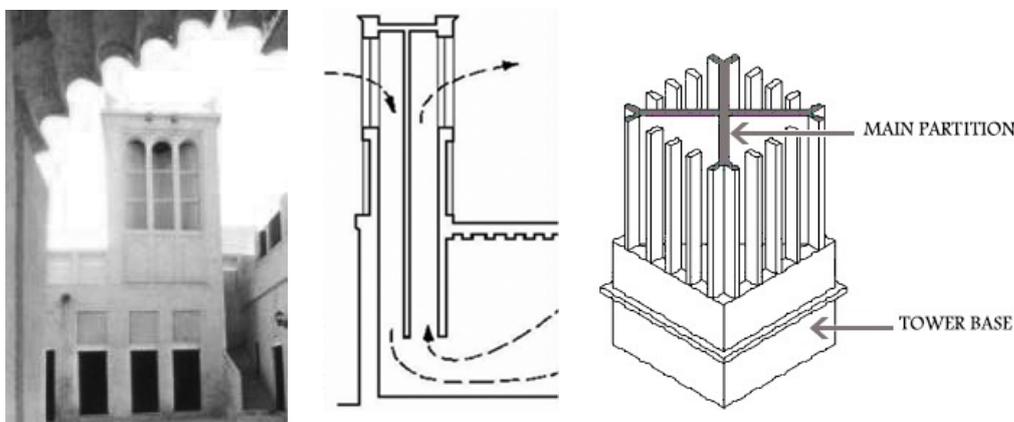


Fig. 3.48: Section and 3D drawing of a vent tower or *badgeer*.



Fig. 3.49: The first people who built wind towers (*badgeer*) were the inhabitants of the city of Langa, Iran.

3.6.4 External Features in Traditional Houses

The elevation of the traditional house in the Eastern Province took its final shape from Persian homes (Figs. 3.49, 3.50 & 3.51), an influence which arrived by way of commercial transactions between the two countries. The skeleton system played a significant role in the architectural image. The pillars gave a final look to the

traditional house façade with regard to the positioning of dividing walls, openings, and typical ventilation towers (*badgeer*).



Fig. 3.50: The façades of traditional houses in Dammam city.

Traditional courtyard houses and their external openings were oriented and designed to optimise ventilation and cooling from sea breezes. The openings were developed within the façade at the front of the traditional house, which opened onto the street to welcome and invite male guests. (Fig. 3.52). The large entrance door was a standard feature, emphasising the sharp segregating line between the external public and internal private. Doors were given unique decorative patterns which expressed the family status and identity. The decoration used over the entranceway symbolised invitation and respect for guests. The door had an opening above it, which was used to ventilate the entrance hallway (*dehreez*) (Fig. 3.55). The door opening itself was sometimes decorated, or above the door was ornamented with an engraved stucco panel (Figs. 3.53 & 3.54).

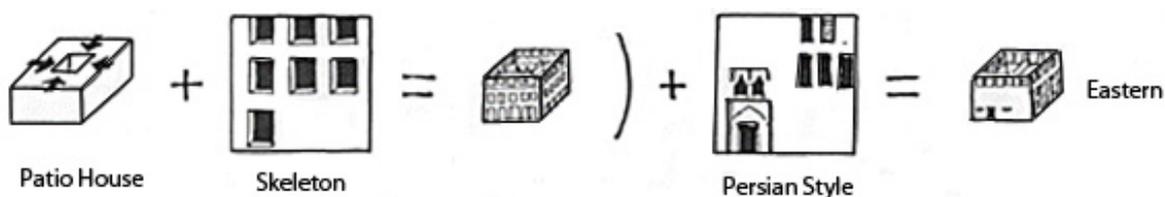


Fig. 3.51: The development of the traditional elevation of the Eastern Province houses.

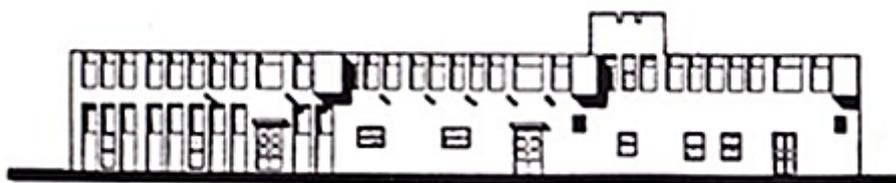


Fig. 3.52: An elevation of traditional house in Dammam.

The house façade was always a solid and plane surface that reflected the family's social status. The windows in the façade indicated the *majlis*, and a *riwaq* was located either on the ground or first floor. Windows were always placed in a linear organisation in the front façade of traditional houses and gave an indication of the space behind them. They were set at a low height where the men's reception area faced onto the street, and at a high level when the family zone was behind them.

The whole composition of the house facade communicated with the outside community and signified typical notions of Arabian hospitality,³⁶ whereby decorations on the door and the opened windows of the men's reception area (*majlis*) indicated the welcoming invitation and calling of guests.



Fig. 3.53: Traditional window with two sections to achieve privacy; the lower part has shutters.



Fig. 3.54: Traditional door with stucco ornamentation shows the status and richness of its owner.



The entranceway, or *dehreez*, was developed to maintain family privacy, as well as to provide maximum interaction between the external features of the house and the men's reception space (Fig. 3.55). It was L-shaped and divided into two zones. The outer zone became an extension of the street or cul-de-sac, furnished with a bench where male family members sat to invite visitors, and the inner area had a wooden door to separate the family section from the guest zone.

3.6.5 Decoration and Visual Elements in Traditional Façades

Although most houses were constructed in a similar way, many had small details that indicated the origin of their inhabitants. Some houses incorporated wooden balconies, similar to the ones found in the Western



Fig. 3.55: The entranceway (*dehreez*) in a traditional house.

³⁶ The tradition of hospitality in Arab countries varies from place to place. But the way of receiving guests — the separate guest area with a separate entrance from the rest of the house, and the area dedicated to coffee in the men's sitting area — was considered typical Arabian hospitality.

Province of Saudi Arabia. These elements were also used to show the economic status of a family, with richly decorated imported teak wood used for doors and windows.

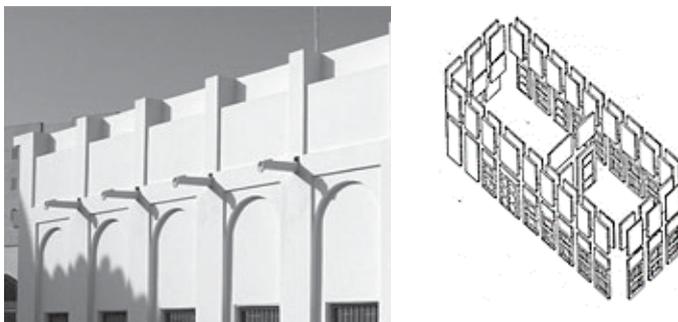


Fig. 3.56: The non-bearing elements of a traditional construction.

Therefore, the modular repetition of bearing elements on their facades was the most notable aspect of traditional buildings in the Eastern Province. Research has shown that, in some cases, the recessed non-bearing modules were plastered (Fig. 3.56), thus leaving a bare outer wall, although the relief character of the vertical posts was still visible from the inner side. The non-supporting elements that were placed in the gaps of the structural system formed dividing doors, windows, and vents.

The skeleton system allowed for independence when positioning the façade openings and typical ventilation slots (*badgeers*) and walls (Fig. 3.57). The doors and windows were mostly teak wood. Although the doors were richly decorated, windows were usually non-glazed with metal bars, and inward opening windows were wooden shutters. The dividing elements were fabricated out of either coral stone or *faroush*, mortared with *juss* obtained from dried sea lime crushed into smaller pieces and fired with wood.



Fig 3.57: These two pictures show the decorative elements used in traditional façades.



Fig 3.58: Shapes of traditional doors in houses of the Eastern Province.

Some geometric ornamentation appeared in the upper and middle-class houses. These ornamentations took a circular shape in the form of a star or gear wheel, or compact and repeated triangles and squares made decorative stripes. This decoration was made by carving the plaster with a sharp tool before drying (Fig. 3.57).

An emphasis was placed on the main entrances, where arches and plaster ornamentations were richly carved (Fig. 3.58). They tended to be 180–200 centimetres height and 120–140 centimetres in width. Wooden doors were skilfully worked and decorated with brass knockers and screw-tipped circular nails in straight and parallel lines. Arches took three forms: semi-circular, lobed, and pointed. Ventilation openings above doors and windows (*badgeers*) were embellished with cast-plaster lattice elements arranged in geometrically patterned squares.

Doors, windows, and built-in cabinets were made up of two solid wooden pieces (Figs. 3.57 & 3.58) that were carved and intricately decorated. Carved wooden screens sheltered upper-level balconies and windows from the public space and reduced the entry of the sun's rays. Wooden rainspouts were seen as a decorative feature on the roof.



Fig 3.59: Stucco ornamentations were used in some houses in the Eastern Province.

3.6.6 Structure and Materials in Traditional Houses

In traditionally built environments, townhouses were largely constructed using customary building practices based on a gathering of developed experience and adaptation to local resources.

Courtyard houses were constructed with burnt limestone brought from the sea (*hasa bahri*), which was used for foundations and pillars.³⁷ *Al-faroush* were installed between the pillars to act as walls, parapets, or partitions, with mortar used to form the cemented final shape. The structural system consisted of a skeleton with repeated load-bearing walls infilled with window elements. (Fig. 3.62)

³⁷ *Hasa bahri* means sea rocks.

For more definitions of Arabic terms, please refer to Appendix A.

The inhabitants of traditional houses in the Eastern Province tried to avoid the hot climate in different ways, such as by sleeping on the roof and using construction materials that absorbed the heat. The houses were built from a particular kind of rock called *faroush*, which was deposited by the sea as it retreated, then plastered in a white material called *juss* (Figs. 3.59 & 3.60). The inhabitants used palm tree trunks to shingle the roof. *Kandal* wood imported from India was utilised for the ceiling, and painted black.



Fig. 3.60: A house plastered in white material called *juss*.



Fig.3.61: Burnt limestone and cement plaster were used in construction.



Fig. 3.62: The recessed nonbearing modules.

3.6.6.1 Construction Materials in Traditional Houses

The building materials used for constructing traditional houses varied by region, as local construction supplies were often available. It is remarkable that with minor variations in style and materials, traditional buildings in the Eastern Province possessed common characters and features. The primary materials used in seashore settlements and traditional neighbourhoods were limestone and adobe (Fig. 3.61). Palm tree and tamarisk trunks, palm leaves, and gypsum (*juss*) were locally available building construction materials, whereas mangrove trunks, diverse timber, and bamboo were imported, mostly from the East.

Another traditional material used was *nura*, a product of calcine obtained from limestone and mainly used for finishing walls.³⁸ Calcine is converted sea-mud, which, together with water, can be utilised as a quick setting gypsum plaster.

³⁸ Al-Naim, M. *Continuity and Change of Identity in the Home Environment: Development of the Private House in Hofuf in Saudi Arabia*. Unpublished PhD thesis, the University of Newcastle upon Tyne, United Kingdom, 1998.

- Calcine is the same as lime.



Fig. 4.63: Traditional building materials with their construction methods.

3.6.6.2 Construction Methods in Traditional Houses

In the Eastern Province, almost all the buildings in the traditional period used similar structural systems and construction methods, consisting of a skeleton with rhythmic load-bearing columns and infill elements. They had straightened walls and appeared more organised geometrically. Most traditional houses were constructed by binding the property with a wall and then creating rooms along the inner walls according to need. This design process was likely the first of its kind in these traditional communities.

The foundation system for traditional buildings was a strip foundation of interlocking rocks and coral stone; it would be 0.90 to 1.00 metres wide and 0.90 to 1.20 metres deep. In most cases, the top of the foundation strip was levelled 0.20 metres below grade to receive an additional layer of mortared stones as a bed for the superstructure, 0.25 metres above grade.³⁹

The structural span would be about 3.00 metres at the most. Mangrove or tamarisk trunks served as beams for the ceiling of ceremonial spaces, such as the multi-purpose room (Fig. 3.64), and the locally plentiful palm tree beams were used for spanning the rest of the space. When mangrove or tamarisk trunks were used, a diagonal network of bamboo sticks and palm midribs was placed over the structural elements, overlaid by a layer of palm-leaf mats covered with mud and a layer of small stones and mortar. From underneath, the exposed wood was lacquered and shiny. When palm trunks were used, these were placed close together to allow alternating layers of stone and mud to be directly laid on top and finished with mortar (Fig. 3.63).

The columns were the vertical load-bearing elements, which in traditional buildings followed a modular measure of 1.00 to 1.50 metres, with exceptional spans of up to 3.50 metres in the case of *loggias* and terraces. In coastal settlements, the coral stone was cemented with *juss* mortar, and limestone was used inland. The

³⁹ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

- Ahme Vefik Alp. The Architectural Heritage of Saudi Arabia's Eastern Province, King Fahd of Petroleum and Minerals, Dhahran. 1990.
- Yarwood, John R. "Traditional Building Construction in a Historic Arabian Town." *Construction History* 15 (1999): 57-77. Accessed May 8, 2017. <http://www.arct.cam.ac.uk/Downloads/chs/final-chs-vol.15/chs-vol.15-pp.57-to-77.pdf>.

columns were mostly rectangular, but could also be circular or polygonal in conjunction with relevant parts of the house.



Fig. 3.64: The Elements of Traditional Construction in the Eastern Province.

Crossbeams broke the height of and braced the columns, thus forming rectangles that were filled with non-supporting materials. Lintels were used to span the 0.90 to 1.50 metre gaps between two vertical bearing elements to allow for window, door, and ventilation openings, and to horizontally tie the columns. (Fig. 3.65) These lintels were mostly made of palm tree trunks mortared between two columns; another method was to place lengths of tamarisk or mangrove timber secured with rope to form a bundle, which was then covered with a layer of stones to be mortared into a final rectangular shape. Arches were commonly used to mark the main gate and around the internal courtyard. Rounded arches were mostly typical of Dammam and Al-Khobar. The stylistic manipulation of the buildings created a beautiful and captivating image.

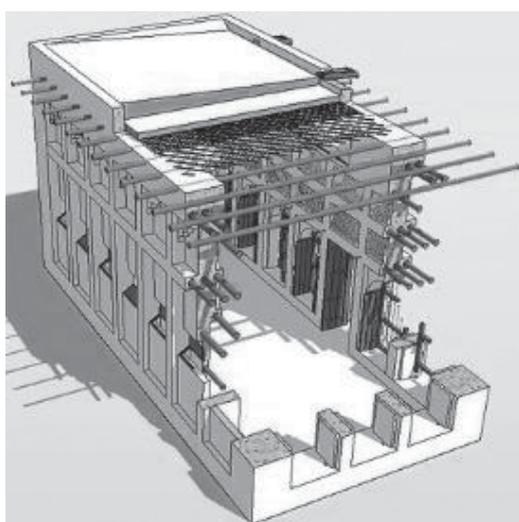


Fig. 3.65: The construction methods of traditional courtyard houses.

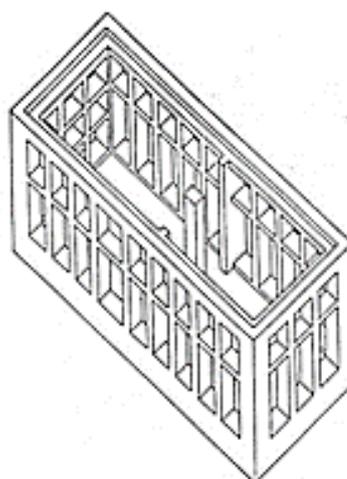


Fig. 3.66: The bearing elements of traditional construction.

3.7 Summary

This chapter has illustrated that the architecture of traditional dwellings reflected the climate, cultural requirements, topography, and social needs of this specific region, as well as the buildings' responses to the surrounding environments. The local building materials, construction methods, and craftsmanship reveal much about this period, and also reflect the external and internal influences on inhabitants' decisions regarding their settlements. It appears that traditional residential developments and houses were influenced by the key factors identified earlier in Chapter Two, which answer the research questions,⁴⁰ whereas minor factors relating to civilisation and development did not appear during this period and had no effect on settlement formation.

The similarities that occurred in traditional settlements were a kind of appreciation of space value and its micro-context (the settlements themselves). This appreciation was made evident by the zoning system and space pattern of the settlements and housing layout designs. The perceived wisdom of traditional settlement formation led to a sense of belonging and a desire to protect the environment. In addition, significant natural resources were considered a gift to be preserved; therefore, mosques and markets were built and placed near to or oriented around natural resources like farms and spring waters.

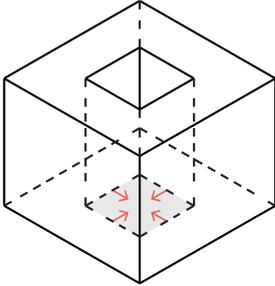
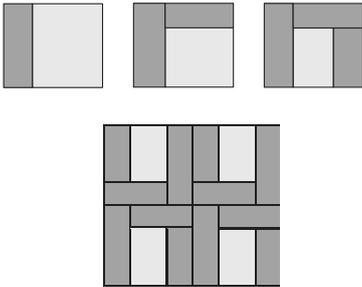
The features of a traditional built environment were influenced by the social principles of the inhabitants as well as Islamic laws. As a result, there was no need for an extensive regulatory mechanism to plan and regulate the environment; it worked efficiently due to the inhabitants' shared image of lifestyle and the accepted models of buildings and urban patterns.

The conclusion which can be drawn from this chapter and other studies of traditional cities, is that traditional towns and their specific features which still exist today reveal a high degree of cultural identity, continuity, and unity. The influence of the surrounding environment (settlement) on the spatial organisation of the houses and their functional relationship is evident.

Table 3.1: Characteristics of the Traditional Home Environment.

Characteristics of the Traditional Home Environment	
Characteristics of the Building Form	<ul style="list-style-type: none"> - Largely the outcome of customary building practices. - Based on an accumulation of locally developed experience. - Use of local resources.

⁴⁰ Please refer to Chapter II.

<p>Characteristics of the House Form</p>	<ul style="list-style-type: none"> - A courtyard house. - External features similar to each other. - Each house has two domains: public and private. - Similarities in building materials and techniques used for each house. - Each house divided into three parts: front, middle, and back.
<p>House Layout</p>	
<p>A Sequence of Growth of a Traditional Courtyard House</p>	
<p>Built by</p>	<ul style="list-style-type: none"> - Built by local people and the inhabitants.
<p>Funded by</p>	<ul style="list-style-type: none"> - Mostly funded by collective family savings.
<p>External Feature</p>	<ul style="list-style-type: none"> - Simple. - A result of the construction system.



Chapter IV

Neighbourhood and House Form in the Transitional and Modern Periods

4. Neighbourhood and House form in the Transitional and Modern Periods

4.1 Introduction

The Saudi home environment has undergone revolutionary changes since the discovery of oil in 1938. The way of life of many Saudi families also changed, with socio-economic consequences affecting the entirety of Saudi culture.¹ The planning system for residential neighbourhoods, from this time onwards, was one of the many such aspects of life that changed. In the late 1950s, neighbourhoods began to take different forms according to changes in the home environment; changes that are continuing.

In this thesis, the different urban planning phases that bridged the traditional and the contemporary periods will be identified and outlined to provide an overview of how development influenced residential neighbourhoods as a whole, and individual homes. This chapter will explore urban planning in neighbourhoods in the period after the traditional phase, from the early 1940s to the early 1980s, the transitional and modern periods of urban development. This historical study will explore the relationship between urban planning and house form by identifying the influential factors that emerged in each period, and then defining them as fixed and variable factors affecting the home environment.

The architectural features of the transitional and modern periods in the Dammam Metropolitan Area have not been addressed much by researchers, even though they are crucial periods that changed the identity of architecture in the region. Al-Naim described the transitional neighbourhood system and dwellings in an explanation of change and resistance in the identity of the home environment in Hofuf.² Al-Naim also addressed the change in house form seen in the modern period, using the term 'contemporary period'. In most research, there is a fusion between the transitional period and the modern, and between the modern and the contemporary periods.³ Al-Said studied the development of Al-Dawasir, a traditional neighbourhood in Dammam city, in different periods, dividing the transitional period into two stages, transitional and consolidate. The contemporary stage in Al-Said's study is from the 1950s until the 1970s, the same as the modern period in the present study.⁴

¹ Al-Harbi Thamer. The Development of Housing in Jeddah: Changes in Built Form from the Traditional to the Modern, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1989.

² Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

- Hofuf, also known as Al-Hasa, is the major urban centre in the Al-Ahsa Oasis and it pertains to the Dammam Metropolitan Area, Qatif, Jubail, Hafr Al-batin and other small cities the Eastern Province of Saudi Arabia.

³ Moustapha, Ahmed Farid. *Islamic Value in Contemporary Urbanism*. Proceedings of the First Australian International Islamic Conference, Australia, Melbourne. 1986. 1-52.

- Elsheshtawy, Yasser. *The Evolving Arab City: Tradition, Modernity and Urban Development*. London: Routledge, 2008.

⁴ Al-Said, Fahad. Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992.

This chapter will also describe Aramco's role in the evolution of the traditional urban environment. This role emerged when Aramco established its Home Ownership Programme, which included the planning of residential settlements and the design and construction of houses. The impact of the Aramco programme on the urban design of residential neighbourhoods and house form extended to all major cities in the Kingdom.

4.2 Neighbourhoods' Urban Planning in the Dammam Metropolitan Area (1938 - 1955) in the Transitional Period

Urban growth in the traditional period was tied to the life experience of the local people and their social norms, while urban growth in the transitional period was affected by the first oil boom. In the early period of oil industrialisation, extensive urban development was stimulated by Aramco in the surrounding traditional settlements of the Dammam Metropolitan Area. (Figs. 4.1 & 4.2). Migrants from both inside and outside the Eastern Province moved to the rapidly growing towns in anticipation of greater job opportunities and better services. "Consequently, shanty shacks or barasti towns sprang up, a negative by-product of intensive,⁵ non-planned urban growth, as the initial form of a residential neighbourhood in the transitional period (Fig. 4.3)."⁶



Fig 4.1: Dammam in 1972.



Fig 4.2: An aerial view of Dammam in 1958 shows that the traditional form of houses has merged into a gridiron plan.

In the 1940s, the Saudi population in both Dammam and Al-Khobar together reached 20,000 residents. The Saudi population first met new technological development with a negative attitude.⁷ The discovery of oil in the 1930s prompted King Abdul-Aziz to direct urban planning towards modernisation, and his mission and

⁵ Barasti: houses are usually built on a wooden frame made out of mangrove poles, split-palm trunk or any other available wood. The palm fronds are used in two forms, either as straight poles (approximately 1 m long) stripped of their leaves used for creating screens or with the leaves still on for roof thatch. The shape of palm-frond houses varies from square or rectangular flat-roofed buildings to triangular tent-like structures.

⁶ S. Kay and D. Zandi. *Architectural Heritage of the Gulf*, Dubai, 1991.

⁷ Al-Mubaraak, Faisal. "Oil, Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930s-1970." *Journal of King Saud University - Science* 11 (January 1999). <http://repository.ksu.edu.sa/jspui/bitstream/123456789/3076/1/.pdf>.

vision linked to rising oil income inevitably led to the modernisation of both the government and society. However, the change was too fast and dramatic to be comprehended by traditional society.

In the late 1930s, physical growth in the old towns in Dammam city continued to be organic, following the traditional pattern of Arab–Muslim cities with narrow and irregular streets. Later, transitional residential settlements began to appear in the Dammam Metropolitan Area, which contains Dammam, Al-Khobar and Dhahran. These cities first emerged when the Aramco Oil Company initiated housing projects in Dhahran (the Main Camp) between 1938 and 1944.⁸ The construction of the first oil camp began in 1938 in Dhahran, 18km south of Dammam. In the early years, the planning and growth of these three principal cities did not take any orderly pattern. However, when the physical development of the two cities, Dammam and Al-Khobar, increased substantially in the mid-1940s, the government began to play a role in controlling their layout.



Fig 4.3: Susan Webster, about mid-1950s. Behind her can be seen an early type of the traditional house.

From 1946, Aramco contributed to the emergence of modern Saudi neighbourhoods and settlements. The impact of Aramco’s operations on the major towns of the Eastern Province was illustrated in a quote from Twitchell when he described Dammam and Al-Khobar. He said: “the contrast between the tiny fishing village of Dammam and Al-Khobar, which I first visited in 1931, where limited gardens provided dates for trading, and the present thriving cities with estimated populations of 20,000 each, is almost miraculous.”⁹ Aramco planned the ‘labour cities’ of Dammam and Al-Khobar in the 1930s; then, the government began to plan more neighbourhoods in the early 1940s. A comprehensive national urban planning and housing policy in the modern period was not implemented until the 1970s. These planned communities represented direct intervention by the oil industry and the national government to cope with rapid urbanisation. (Fig. 4.5) Two kinds of towns emerged in this period: the early planned American oil towns in Dhahran, and the planned Saudi worker communities outside of the American Camp.

⁸ Al-Khobar and Dhahran cities emerged when the government and Aramco planned them after continued migration to Dammam by job seekers wishing to work for the oil company (Aramco). Please refer to chapters one and two.

⁹ Twitchell, K. S. *Saudi Arabia, With an Account of the Development of its Natural Resource*, Princeton: NJ Princeton University Press. 1958.



Fig 4.4: The aerial views show initial buildings at Aramco Camp with a grid-iron plan in Dhahran city.

Until 1947, the municipality requested the assistance of Aramco in producing a layout plan for the towns of Dammam and Al-Khobar. In response, the assessors prepared land subdivision plans based on a grid-iron pattern in Dhahran; the same network and grid-iron patterns were then developed in Al-Khobar and Dammam (Fig 4.4).

Aramco Reports Oil Output Rise in Arabia; Expects Dip in 1953 as Demand Levels Off

The Arabian American Oil Company had crude oil production of 301,860,885 barrels in Saudi Arabia last year, according to the company's report to the Saudi Arabia Government. This compares with an output of 277,962,605 barrels in 1951.

F. A. Davies, chairman of Aramco, observed that the increase in world demand for petroleum appeared to have leveled off and that some decrease in the rate of production could be expected this year.

The report disclosed that three oil-producing areas in Saudi

Arabia formerly regarded as separate fields were now considered a continuous oil accumulation and had been designated as the Ghawar field, containing forty-one producing wells. The company said it had fifty-six wells in the Abqaiq field, twenty-five in the Dammam field and nine in the Qatif field. The company drilled thirty-nine oil wells last year.

The company's refinery runs in 1952 amounted to 62,204,161 barrels, compared with 58,107,534 in 1951. Sales of refined products in Saudi Arabia rose to 1,002,000 barrels from 635,000.

The New York Times

Fig 4.5: Aramco projections in the New York Times, June 11, 1953.
(From the New York Times' free online archives.)

Most remaining structures from traditional settlements were demolished to open up new street layouts so that residential blocks could adhere to the grid pattern of the new plan. These settlements are the first examples of industrial towns built according to urban forms imported from the West that used Western urban planning criteria.¹⁰

¹⁰ Grid-iron plan is a type of city plan in which streets run at right angles to each other, forming a grid. The grid-iron planning is imported from the **United States**; the grid system was widely used in most major cities and their suburbs until the 1960s.

A year after Aramco had established the first camp for its employees in Dhahran city (Fig. 4.4), a second camp was built in Ras-Tanura.¹¹ Then, in 1944, a third camp was established in Abqaiq (Fig. 4.6).¹² The three camps all used the same grid-iron pattern in terms of the layout of the streets and residential blocks (Figs. 4.1 & 4.4).



Fig. 4.6: American Engineers in charge of residential services in (left: Ras-Tanura, right: Abqaiq).

Al-Khobar was a transitional city, and the first community to be wholly planned with an overall grid-iron pattern of streets. It provided the first example of street name signs and even initiated the convention of numbered avenues in KSA. Thus, the emerging city of Al-Khobar led the way by establishing a model that other Saudi Arabian cities would follow in subsequent decades.

After the development of the planning area in Al-Khobar and Aramco residential camps, the urban form of the new city was used to create a modern planning process for land subdivision in all cities throughout Saudi Arabia (Fig. 4.7).¹³ The Al-Malaz neighbourhood in the city of Riyadh was described by Al-Hathloul as a symbol of modernity,¹⁴ because of its planning system and use of building materials, which were in sharp contrast to those of traditional neighbourhoods (Fig. 4.8). The result of this development was the new, more significant urban patterns, known as ‘grid-iron’.¹⁵

¹¹ Ras-Tanura is a city located to the north of Dhahran.

¹² Abqaiq is a city located to the south of Dhahran.

¹³ Al-Said, Fahad. *Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia*, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992.

- Shihabuddin, Mahmud, and M. Al-Naim. *Identity Crisis Due to the Transformation of the Neighborhoods and Changing Characteristics in Our Traditional Dwellings: A Case for Two Muslim Cities Dhaka and Hofuf*. Proceedings of Housing Symposium 3. Riyadh: High Commission for the Development of Arriyadh. (2007): 37-56.

- Al-Naim, Mashary A., *Riyadh: A City of ‘Institutional’ Architecture, The Evolving Arab city*, edited by Yasser Elsheshtawy, Routledge, USA. 2008.

¹⁴ Al-Hathloul, S. *Tradition, Continuity and Change in the Physical environment: the Arab-Muslim city*. Unpublished doctoral dissertation, Department of Architecture, Massachusetts Institute of Technology, Cambridge, Massachusetts. 1981.

¹⁵ Mubarak, Faisal Abdul-Aziz M. *Urbanization, urban policy and city form: Urban development in Saudi Arabia*, Unpublished PhD Thesis, University of Washington, U.M.I. 1992. “In 1968, Doxiadis Associates, Consultants on Development and Ekistics of Athens, Greece, was contracted to prepare the first master plan for the city of Riyadh. The Plan introduced a set of zoning laws for the various land uses based on the assumptions that were derived from land market mechanisms in Western societies. It comprised a physical pattern of two-by-two square miles super-blocks. In short, it set an irrevocable process in which the grid has been institutionalized as the preferred pattern for Riyadh future growth, a progenitor to be emulated by other cities and towns.”

In the early 1940s and '50s, Saudi employees, therefore, had to rely on the company's architects and engineers to design their houses. To avoid the pressure of producing many different designs to order, the engineering office at Aramco prepared several design alternatives from which its customers could choose. Thus, a new housing standard, primarily intended for Aramco employees, emerged in the city of Dammam.



Fig. 4.7: Bulldozers dug out streets in preparation for the grid planning in Dammam Metropolitan Area.

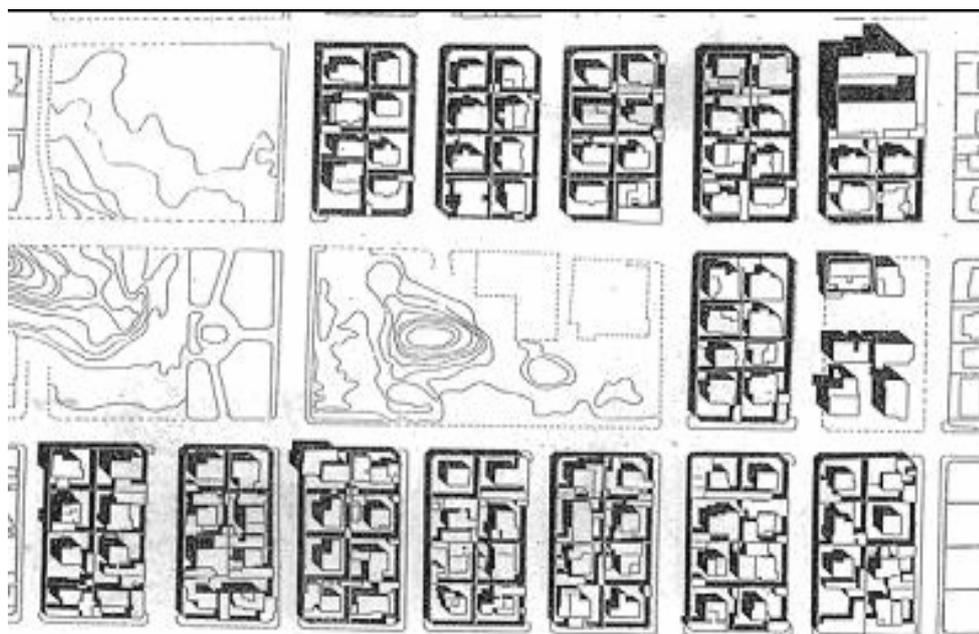


Fig. 4.8: Al-Malaz Neighborhood, 1970s.

Field noted, "It was with these developments, it is generally agreed, that the modern Eastern Province business centres of Dammam, Dhahran and Khobar, which was still a collection of *barasti* [structures built of makeshift materials] when the first petrol station was opened there in 1946, began their development as modern cities"¹⁶ (Fig. 4.9). For the first time, these projects introduced a new residential neighbourhood

¹⁶ Field, M. Saudi Arabia: The Eastern Province before Oil. Middle East International. 1978. 86 27-29.

concept. The irregular street layout was transformed into a grid-iron layout. Alongside this was a new image of homes with outside courts, built differently from the traditional houses.¹⁷ “It is possible to say that this early intervention has had a deep, but not immediate, effect on the native people.”¹⁸

4.2.1 Early Planned American Oil Town in Dhahran from 1930s to 1950s

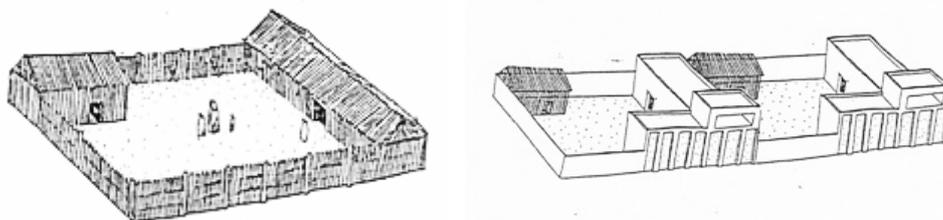


Fig.4.9: A *Barasti* found in the Eastern Province in 1935 (left) and 1947 (right).

As the workforce expanded alongside the development of the oil industry, Aramco planned and built a new town called the American Camp, next to the area of its administrative offices, to provide housing to its foreign employees.

Aramco constructed a major settlement on a hilly site in Dhahran 20km east of the Gulf shores for Aramco’s headquarters and the housing of the majority of Americans, not Saudis. During the 1950s, 6,400 Americans, including some with families, were hired in these towns. The majority of the houses came from the USA as prefabricated units and placed on the site following the urban planning of what was usual in American neighbourhoods in 1953. It was a ‘Little America’ on the Gulf shore. Nassir said, “Aramco housed employees by their ethnic, religious and racial origins... work, housing, eating and recreation.”¹⁹ The original Aramco housing area was limited, but in the late 1970s it expanded in the south-westerly direction (Figs. 4.10 & 4.11). The oil town known as the American Camp had a core containing the administrative area, as well as commercial, operational, and service areas. It was located in the industrial zone. In addition to the primary



Fig.4.10: A view of the Dhahran headquarters office building, 1952.



Fig.4.11: Aerial view of a residential section of American Camp in Dhahran, 1950s.

¹⁷ Al-Mubaraak, Faisal. "Oil, Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930's-1970." *Journal of King Saud University - Science* 11 (January 1999). <http://repository.ksu.edu.sa/jspui/bitstream/123456789/3076/1/.pdf>.

¹⁸ Al-Naim, Mashary A. "Identity in Transitional Context: Open-Ended Local Architecture in Saudi Arabia," in *Arch Net-IJAR: International Journal of Architectural Research*, 2, no. 2. (2008.):125-146.

¹⁹ Ajmi, Nassir. *Legacy of a Lifetime: An Essay on the Transformation of Saudi Arabia*, London: North Star Publishing. 1995.

operational area of the Aramco company, there were four other zones allocated for the residential area. The first was for senior staff and resembled the southwestern American tradition of planning and house design (Figs. 4.10 & 4.11).²⁰ The layout of Dhahran was a combination of the grid-iron style, curving streets and cul-de-sacs, and irregular blocks. Streets and walkways were paved and lit, and the area had all the required community services and recreational facilities, as well as controlled access to the camp. The recreational areas had an auditorium, a luxurious club that included bowling alleys, a library, dining area, and terrace for outdoor social functions. The American residential camp also included elementary and junior high schools and a hospital.

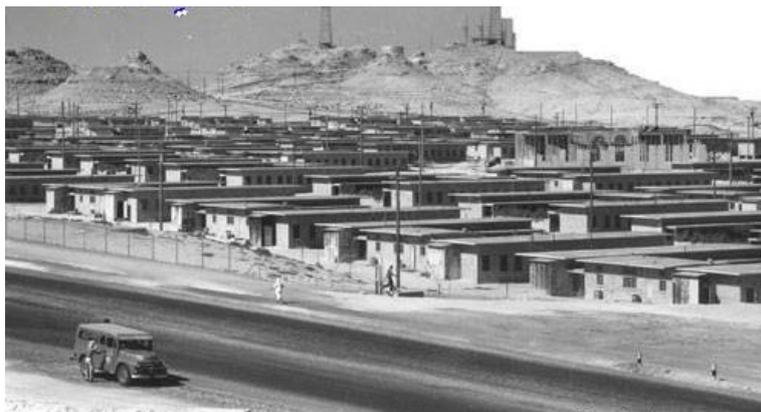


Fig.4.12: Side view of Aramco houses showing the grid-iron planning.

The camp for senior staff (in the American Camp)²¹ was created exclusively for American employees and their families. The dwelling units and the clusters formed attached or semi-attached units according to the needs of the population. In a published paper, Kimball described the first compound in the Eastern Province (the Aramco compound), following a visit to Aramco headquarters in 1956.²² Kimball described how the senior staff at the American Camp in Dhahran had all been imported from the United States: “No Westerner would have difficulty in identifying the senior staff “camp” as a settlement built by Americans in our southwestern tradition of town planning. It is an area of single-storey dwellings for employees and their families. Each house is surrounded by a small grassed yard usually enclosed by a hedge... Each town section is divided into five distinct sections that correspond to internal social divisions or economic functions. Their internal divisions reflected the bureaucratic structure of an American corporation, a division that is sharply accentuated by the coincidence of status levels and national origins.”²³ (Fig. 4.12)

²⁰ Al-Naim, M. *The Home Environment in Saudi Arabia and Gulf States*, Vol.1: Growth of Identity Crises and Origin of Identity. Vol. 2: The Dilemma of Cultural Resistance, Identity. CRISMA working paper no. 7. Milan: *Pubblazioni dell'I.S.U. Universita Cattolica*. 2006.

- Kimball, Solon T. “American Culture in Saudi Arabia”, *Transaction of the New York Academy of Sciences*, 18, no.5, (1956): 472.

²¹ The houses of the senior staff (American Camp) in Dhahran took shape and design of the American South-Western style as well as its neighbourhood’s planning. Kimball, who visited Aramco in 1956 described the American Camp: “No one westerner would have difficulty in identifying the senior staff ‘cam’ as a settlement built by Americans in our South Western tradition of town planning. It is an area of single-story dwellings for employees and their families).

²² Kimball, Solon T. “American Culture in Saudi Arabia”, *Transaction of the New York Academy of Sciences*, 18, no.5, (1956): 469-484.

²³ *Ibid*, 472.

4.2.2 Residential Camps in Dhahran City

Aramco constructed the second residential area, the Intermediate Camp, for those of its labour force who were primarily rated as semi-skilled and supervisory (Fig. 4.13). This group was classified as other nationals, expatriates from Arab, Mediterranean and African countries; they were confined to barracks-type buildings built of concrete and cement blocks. Another camp, called the general camp, occupied the third area of the Aramco towns. It was similar to the intermediate section and had modest recreational facilities. Both the general and the intermediate residential sections of the city were designed for Saudi and expatriate bachelors.

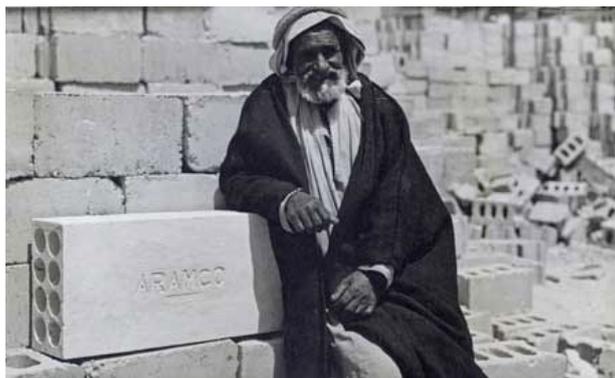


Fig.4.13: Bedouin watchman leaning on a gypsum building block made in Arabia; April 1946.

4.2.3 The Saudi Workers Community

Due to the vast cultural gap in the 1940s between the Americans who ran Aramco and the predominantly rural and nomadic Saudi labour force, Aramco considered adopting a policy of physical segregation. Ajmi explained that workers “were all segregated by nationality and grade.”²⁴

The Saudi neighbourhood was built by the residents themselves to house the Saudi labourers who worked for the oil company outside of the Aramco Fence (Fig. 4.14). This neighbourhood was neither well-planned nor welcomed.²⁵ It was an assemblage of haphazardly scattered residential structures built of makeshift scrap materials, palm-leaf *barastis* and cement blocks. As Saudi employees’ families were not considered in the construction or planning of the early Aramco towns, the only nearby places where Saudis could bring their families were these shantytowns. Aramco had left them no choice. Kimball noted, “Here, the employees, mostly Saudis, may bring their families. One can see occasional sheep, goats and burros, and the camels tethered nearby may belong to an employee or his visiting relatives, one also finds an incipient native market, perhaps a garage and gasoline pump, and other evidence of emerging indigenous community life. Both Aramco and the government are disturbed by these settlements, and efforts are underway to encourage their

²⁴ Ajmi, Nassir. *Legacy of a Lifetime: An Essay on the Transformation of Saudi Arabia*, London: North Star Publishing. 1995.

²⁵ Al-Naim, M. *Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia*, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

replacement by the development of planned Arab type towns through subsidies and other devices” (Fig. 4.18).²⁶



Fig.4.14: Number of Saudi workers in the 1950s.
In the middle, the Minister of Petroleum and
Mineral Resources, Ali Al-Naimy.

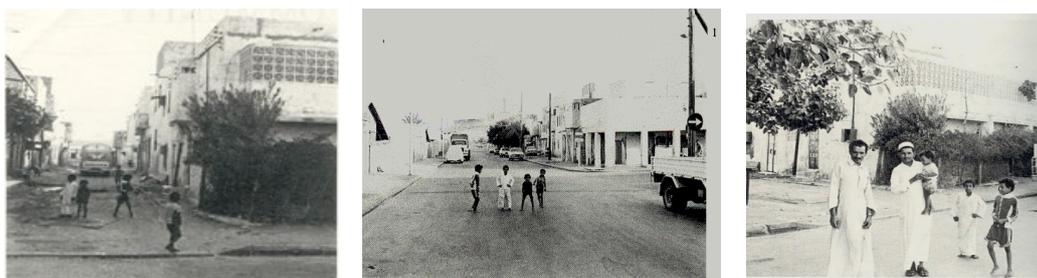


Fig.4.15: Views of residential Area of Saudi camp.

The Saudi Camp physically transformed the interior planning of each residential block from the grid pattern to the traditional irregular pattern; this gave the original type to the community (Fig.4.15). The character of the houses was similar to the vernacular courtyard housing of Dammam and Al-Khobar. In 1937, the government built a large mosque in the heart of the neighbourhood (Fig.4.17). The Saudi neighbourhood was planned with a grid-iron layout, and houses were built in the Eastern Province form, which included courtyards. Houses were also built inspired by the traditional houses in the Western Region of Saudi Arabia, with two or three storeys, like houses in Jeddah and Taif. The informal Saudi neighbourhood was no longer needed by Aramco, and it was demolished in the mid-1960s, though Aramco continued to expand and supply the Camp area with necessary services (Fig. 4.16). The Saudi neighbourhood was not suitable for what Aramco aimed for the overall and evolving appearance of the company; thus, the Saudi neighbourhood was located at the far side of the camp.

²⁶ Kimball, Solon T. “American Culture in Saudi Arabia”, *Transaction of the New York Academy of Sciences*, 18, no.5, (1956): 469-484.



Fig. 4.16: Houses of Saudi workers destroyed in the mid-1960s.

4.2.4 The Transitional Urban Fabric



Fig. 4.17: This market arose in the Saudi residential neighborhood adjacent to the American residential camp. A large mosque appears behind the market.

In the transitional period, urban planning in the Eastern Province provided hybrid neighbourhood forms, which were established next to traditional residential areas. These forms followed a grid-iron pattern, but the area inside each lot resembled local traditional forms, characteristic of irregular planning (Fig. 4.19). In a study of the growth of the original settlement in Dammam city, Al-Said noted, “that the areas grew in number from 56 to 250 residential units, and were mostly typical courtyard based residential houses.”²⁷ Al-Hathloul traced the process of change in Saudi Arabian cities, examining the development of an orthogonal grid as a street pattern and detached houses as a housing type.²⁸ A comprehensive investigation of housing developments in the Eastern Province shows that the new urban fabric expanded from the Aramco towns to other residential areas (Fig. 4.20).²⁹

²⁷ Al-Said, Fahad. *Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia*, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992.

²⁸ Al-Hathloul, Saleh. *The Arab-Muslim City: Tradition, Continuity and Change in the Physical Environment*. Riyadh: Dar Al-Sahn, 1995.

²⁹ Al-Mubaraak, Faisal. "Oil, Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930's-1970." *Journal of King Saud University - Science* 11 (January 1999). <http://repository.ksu.edu.sa/jspui/bitstream/123456789/3076/1/.pdf>.



Fig.4.18: A petrol station opened in the Eastern Province in 1946.



Fig.4.19: Saudi Aramco employees' neighborhood next to Aramco main camp and Saudi neighbourhood in 1946.

It is important to highlight that in the first two decades following the 1930s, several changes became apparent in local people's attitudes towards the new style of urban planning and architecture. Kimball characterises this as the first contact between native people and Western culture.³⁰ At this time, people refused to change and preferred to keep what they were familiar with. The neighbourhood constructed for Saudi Aramco employees near the Aramco Main Camp was a good example of this. Kimball stated that this community was "neither planned nor welcomed" by Aramco,³¹ and, in the same context, that "these settlements represent the attempt by Arabs to establish a type of community life with which they are familiar" (Fig. 4.21).³²



Fig.4.20: American style housing at Aramco's Main Camp in Dhahran. View of Aramco warehouses, Dhahran, late 1940s.

However, the new images of houses introduced by Aramco influenced local people and introduced new ideas in terms of developing their homes. It was not yet fully apparent to what extent the new designs broke away from traditional forms of the physical home environment. Fadan described the new image of the transitional urban fabric: "A completely different conception of a house, cluster, and neighbourhood has been introduced. It starts with the tiny details of the house construction, and spreads to the internal spatial organisation of the rooms, and finally to the external appearance and the relationship of the house to those in the neighbourhood."³³

³⁰ Kimball, Solon T. "American Culture in Saudi Arabia", *Transaction of the New York Academy of Sciences*, 18, no.5, (1956): 469-484.

³¹ *Ibid.*

³² *Ibid.*

³³ Fadden, Y. M. "The Development of Contemporary Housing in Saudi Arabia (1950-1983)." PhD diss., MIT Cambridge, (1983): 97.

In 1942, the Municipality of Al-Khobar was established, with two branches: Dammam and Dhahran. In 1947, the Dammam Municipality became independent.³⁴ The city of Dammam began to grow, planning an east-west road dividing the city into two parts.³⁵ The two parts developed in two phases; phase one was planned as grid-iron residential blocks of 90 x 180 metres. In 1950, the lot sizes became smaller, at 90 x 90 metres. In 1953, the lot sizes were reduced again to 45.5 x 45.5 metres. Each residential block comprised eight lots. The Dammam Municipality provided public services to the city, including roads, pavement, electricity, and water.

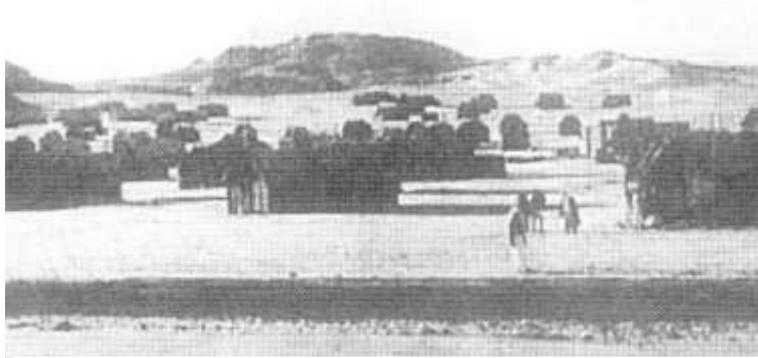


Fig.4.21: Saudi Camp in Dhahran between the 1930s and 1940s.

4.2.5 Privacy in Transitional Period

Residents of traditional neighbourhoods prioritised maintaining their privacy and tried to apply the same spatial organisation within the new residential blocks based on the grid-iron plans. It was evident from the Saudi housing district located next to the Aramco Main Camp that there was no difference in the house forms, façades, and spatial planning (Figs. 4.21 & 4.22). The area known as the Saudi Camp can be classified as a transitional (hybrid) neighbourhood, as it apparently followed a grid-iron street layout and traditional planning layout inside the residential blocks (Fig.4.23).

The Saudi employees tried hard to maintain their privacy within their home environments, and still inhabited traditional houses in which they could satisfy their socio-cultural requirements. The challenge that eventually arose was how to convince residents to leave the neighbourhood for the one planned by Aramco in Dammam city, as an alternative residential settlement.

³⁴ Al-Said, Fahad. Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia, Unpublished PhD Dissertation, University of Glasgow, Glasgow. (1992):220.

³⁵ Ibid.

- The governor of the East province prince Abdulah Bin Jalawy had requested the assistance of ARAMCO Planning office in providing a plan for the growing city of Dammam.



Fig.4.22: Aramco planned the Main Camp and constructed the employees' housing units in the 1940s.

The new urban planning of the city and the architectural design of the houses established norms and led to changes in local people's lifestyles. This form of development dominated building design until the 1960s when the problem of privacy became more exaggerated, as women could not leave the home space to the outer courtyard and setbacks without wearing the veil. The setbacks were non-private spaces, unlike the traditional Saudi courtyards, which were located in the middle of houses surrounded by home spaces, and so the residents chose not to use them. Some residents opted to extend their houses by building extra rooms to make them better suited to their residential and business needs.



Fig. 4.23: This picture shows clear change in the form of a wider street, which allowed intrusion on the privacy maintained by traditional houses.

4.2.6 Safety and Security in Transitional Period

In the transitional period, the focus was on neighbourhood planning and the provision of essential services; no study was conducted on the cultural, social and human factors that could make an area better suited to its occupants. In the transitional period, some families preferred to live together with their blood relatives as a group, but the grid-iron style of planning made this more difficult. Safety concerns were also not met by this design, because of the inability of the population to control the entrances and exits to the neighbourhood (Fig. 4.24).

School sites were located in the middle of the neighbourhoods, in accordance with municipal regulations. However, the planners failed to account for the fact that the multiple intersections in the centre of town rendered the environment around the schools unsafe for children. Some schools were also located on main roads or along roads without traffic lights, and there was a lack of paved areas designated for pedestrians.³⁶



Fig. 4.24: This picture shows vehicle access to new traditional neighbourhoods was no longer controlled by the population.

Some of the problems during this period resulted from the merging of random and systematic planning with the population's need to adapt their new residential environment to their lifestyle. The most significant of these problems was undoubtedly the lack of security.

4.2.7 The Morphology of the Transitional Neighbourhoods

In the transitional period, two kinds of housing arrangements were contained within a single residential block in the grid-iron pattern of urban planning. These had either a traditional organic distribution or were rigid rectangular plots, similar to those in the neighbourhoods developed by Aramco. The compact nature of the urban plans for transitional neighbourhoods was apparent within residential blocks, where a number of houses were built on a small residential block (6,000sqm) on the grid-iron plan. (Fig. 4.25) Consequently, "because of the existing lots subdivision (due to the ownership process and easement rights), the number of residential units has risen to more than 110 units."³⁷

In Saudi neighbourhoods, grid-iron road network plans allowed each residential block to be planned according to the inhabitants' land-related needs. As a result, the planning of the residential blocks in that period followed the traditional compact pattern. By contrast, the houses built at this time as part of the Aramco planning system were fewer and were less compact. Each residential block had 30-40 houses.

³⁶ Al-Jaman, Sami. Al-Yaum, "the Occasion to Run over Two Students" Al-Yaum Newspaper. "<http://www.alyaum.com/News/art/74688.html>" March 9, 2013. Accessed June 4, 2015.

³⁷ Al-Said, Fahad. Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992.

4.2.8 The Street in Transitional Period

In the transitional period, urban planning in the Dammam Metropolitan Area showed a clear mix between regular and irregular (crooked) streets. Regular streets were a critical element of the grid-iron design, which was used by the municipality at that time, while irregular streets were formed between traditional houses (Fig. 4.26), created by inhabitants within a single residential block (Fig. 4.27).³⁸

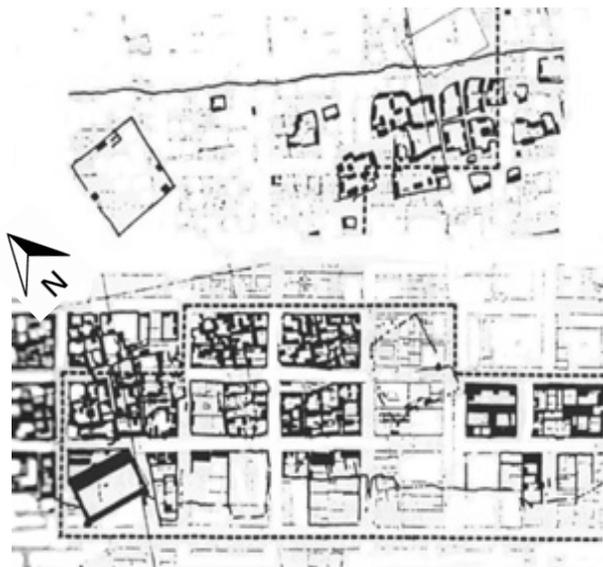


Fig.4.25: The transitional period shown in Al-Khobar Street plans from 1936-1947.



Fig.4.26: The narrow and irregular streets no longer fit the vehicles.

³⁸ Shiber, S.G. Report on City Growth in the Eastern Province, Saudi Arabia, In S.G. Shiber, Recent Arab City Growth, Kuwait. (1967) 45.

The new roads divided traditional quarters into small sections, each containing parts of the traditional neighbourhood *freej*. They broke down the social and physical boundaries that encircled the traditional environment. In the first planning phase of Dammam in 1947, the street width was 20-30 metres. In 1951, when the lots became smaller, the street width was kept the same, with the street width between residential lots averaging between seven and five metres.³⁹

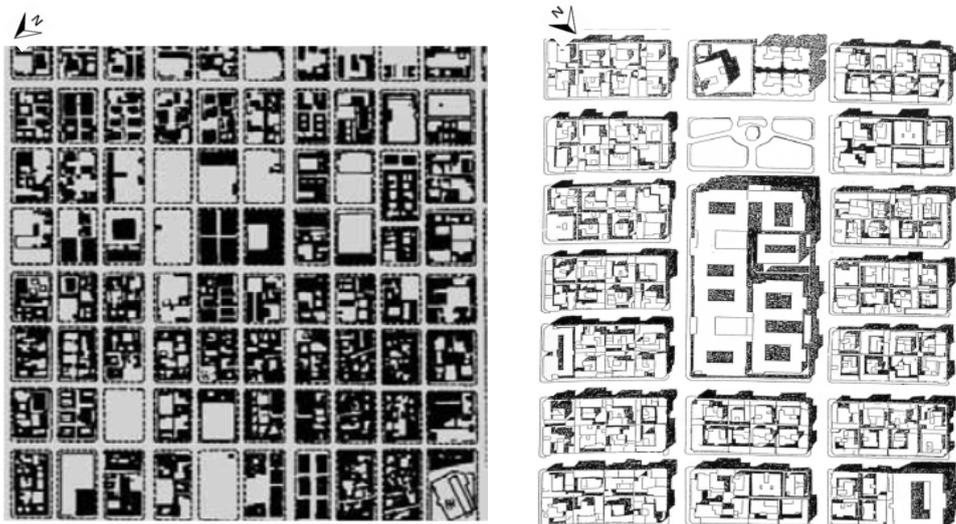


Fig 4.27: Planning system of Al-Khobar (left) and Al-Malaz (right) showing local Saudi people still using traditional house forms in large blocks.

Car ownership increased steadily from 1951, and then dramatically after the late 1950s when Aramco employees began to use them frequently (Fig. 4.28).⁴⁰ Cars travelled on the main roads between residential blocks in the grid-iron design, (Fig.4.29) and drivers also persisted in driving down the irregular streets between houses (Fig. 4.26), although this was difficult in traditional neighbourhoods. Thus, the existence of cars created a problem with the mixing of both types of planning. The encroachment of modern life and transportation on traditional neighbourhoods made the traditional home environment uninhabitable, and people began moving out of these areas into newly planned neighbourhoods.⁴¹



Fig. 4.28: Aramco Cars in the 1950s.



Fig.4.29: Al-Khobar, Eastern Province in the 1960s.

³⁹ Al-Said, Fahad. Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia, Unpublished PhD Dissertation, University of Glasgow, Glasgow. (1992): 230

⁴⁰ Cars Stories and Anecdotes. "http://shmalonline.com/?p=5713", January 19, 2013. Accessed March 6, 2016.

⁴¹ Al-Mubaraak, Faisal. "Oil, Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930's-1970." *Journal of King Saud University - Science* 11 (January 1999). <http://repository.ksu.edu.sa/jspui/bitstream/123456789/3076/1/pdf>.

4.2.9 The Community Area in Transitional Period

After the first oil boom, new settlements emerged that came to be called the ‘post-oil neighbourhoods.’ In 1953, the responsibility for public lands was given to the Municipality of Dammam. In 1959, the role of the Dammam Municipality was in providing public services under Aramco’s supervision. The neighbourhoods were established under Aramco HOP.⁴² Aramco worked hard to create and maintain safe and clean neighbourhoods, and it provided public services that were aligned with community priorities. Aramco tried to strengthen the community by working to meet basic needs central markets, mosques, and schools (Fig. 4.30).⁴³



Fig.4.30: Aramco provides basic services to the community.

4.2.9.1 The Market in Transitional Period

In the traditional period, the local market was a crucial area, in which people congregated, and it extended longitudinally between the residential quarters within the neighbourhoods. In the transitional period, the market was moved to a designated shopping street (high street)⁴⁴ (Fig. 4.30), which extended between some residential blocks, and where shops lined both sides of the street (Fig. 4.31).⁴⁵ The shops were typically located on the ground floor of transitional houses, forming a single and continuous shopping street. The population had to traverse a long distance on foot or use cars in order to get to the shopping area.⁴⁶

⁴² HOP: Home Ownership Program of Aramco employees.

⁴³ Saudi Aramco, Accessed June 14, 2017. <http://www.saudiaramco.com/en/home/news-media/news/strengthening-the-value-chain.html>.

⁴⁴ The main street of a town, especially as the traditional site for most shops, banks, and other businesses.

⁴⁵ Like Al-Swaiket (Prince Bandar bin Abdul-Aziz) shopping street in Al-Khobar city, King Saud street in Dammam city.

⁴⁶ Al-Said, Fahad. Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992.

- Al-Mubaraak, Faisal. "Oil, Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930's-1970." *Journal of King Saud University - Science* 11 (January 1999).

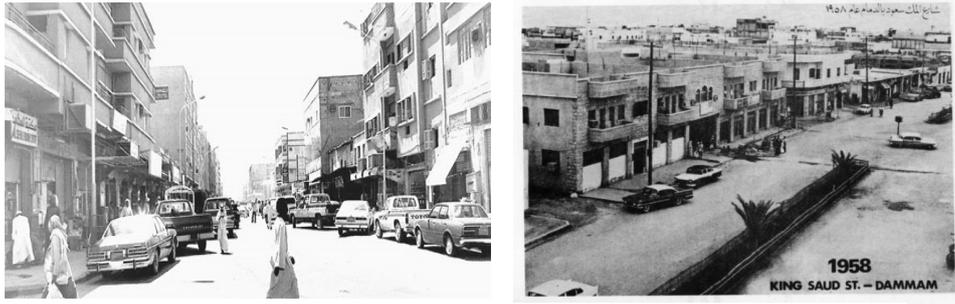


Fig.4.31: The market in the transitional period, King Saud Street in 1958.

4.2.9.2 The Mosque in Transitional Period

In the transitional period, some of the mosques in the grid-iron network design were located on the same street as the market. This type of planning seemed logical, as both destinations promoted social and cultural relationships between people. The mosques located in the market were larger than usual, and there was a platform for Friday and *Eid* prayers. Also, attendance five times a day at the mosque close to the market area was beneficial to local businesses.

In addition to the mosques located near the markets, there was a mosque in every residential quarter of each neighbourhood.⁴⁷ When the residential neighbourhoods were planned in the transitional period, several plots of land were left empty for services and utilities, including mosques; thus, almost every residential quarter has a mosque within walking distance (Fig. 4.32).



Fig.4.32: The mosque within the residential quarter in the transitional period.

4.9.2.3 Building Types in the Transitional Neighbourhood

As mentioned above, the transitional neighbourhoods were designed by Aramco for their employees, to accommodate their needs. The company initially planned neighbourhoods full of one or two-storey detached houses (Fig. 4.34). Several years later, other transitional neighbourhoods were developed, with medium to high-rise apartment buildings (Fig. 4.33).⁴⁸ The construction of traditional houses gradually began to

⁴⁷Please refer to pages 94 & 96 for more information about the size of neighbourhoods.

⁴⁸Please refer to Appendix (E) for more information about high-rise building that emerged at the Transitional period.

decrease, and new semi-residential and semi-commercial building types emerged in the cities of Al-Khobar and Dammam (Figs. 4.36 & 4.37). The majority of these buildings were relatively new. Also, service and government buildings appeared, such as schools and hospitals (for example, the Hospital of Muhamed Al-Dossary) in Al-Khobar city (Fig. 4.35), commercial agencies, and private companies, bringing different types of buildings. Those services were not integrated into the neighbourhood; they were scattered in different areas on the outskirts of the cities of Dammam, Dhahran and Al-Khobar.



Fig.4.33: Types of buildings in Dammam Metropolitan Area in the transitional period.



Fig.4.34: Two-storey private villas, in Labour City, Dammam in 1950s.



Fig.4.35: Muhamed Al-Dossary Hospital opened in Al-Khobar, 1962.



Fig.4.36: Some residential buildings, which appeared higher than three storeys, Al-Khobar, 1969.



Fig.4.37: A view over Labour City (Madinat Al-Ommal) shows new buildings in Dammam city, which were half residential and half commercial.

4.2.10 Transitional Housing Types

In the transitional period, the cities of Al-Khobar and Dammam sensed the need to develop urban planning. After the discovery of oil, they created entirely new urban neighbourhoods with new housing forms. Also at this time, the Aramco Home Ownership Programme (HOP) was initiated (in 1949). The programme was developed until 1953, when a new programme was designed primarily for Aramco's employees. (Fig. 4.38)

The traditional houses in the Dammam Metropolitan Area were abandoned over several stages of development. People slowly adapted to the changes in the new house form that emerged through the Aramco HOP and tried to absorb most of the alterations and modifications in a manner that reflected on the home environment.

The quick development that occurred to new houses had a general effect on the people in the region. The Aramco HOP required that any new house design be submitted for approval. At that time, a few of the Aramco architects designed some plan proposals for employees to choose from; Saudi families could either accept, reject, or adapt traditional houses to meet with the new designs.



Fig 4.38: A detached house (villa type) developed in the 1950s when the Aramco Home Ownership Program began.

Left: Engineers inspecting plans. Right: The first transitional neighbourhood in the Eastern Province (Dammam labor City).

This period in particular resulted in two prominent and conflicting trends in domestic architecture. The first was the traditional house form, which in general followed the style of existing traditional houses, with the same design and form without any development, featuring details associated with various patterns of inhabitants' behaviour inside the built environment. The second was detached houses, which represented the new conception of housing in Saudi Arabia.

In this period, the detached house was the type of house preferred by local people in the Dammam Metropolitan Area.⁴⁹ As a result of the grid-iron network pattern of land subdivision, houses were built in a rectangular form. The detached house was defined according to zoning regulations and setback requirements, and later became legitimised by Master Plans. The residents recognised a difference between the traditional houses that they had known all their lives and another type of house that had no definition other than 'new

⁴⁹There was difficulty in obtaining the plans that have been drawn from the foreign architects and provided by Aramco to its employees, who were given a choice as to which model suited them best. This difficulty was due to the company policy and high privacy that surrounds all its business.

house'.⁵⁰ This new kind of house differed from the traditional houses in materials, form, and spatial organisation (Fig.4.39).

Table 4.1: Housing Units (Occupied with Households), Households and Individuals by Type of Housing Unit and Administrative Area (1992).

Administrative Areas		Types of Housing							Total
		Villas	Traditional Houses	A flat in villa	Apartment	tent	Huts & Rural	Others	
Riyadh	No. of Houses	157396	94310	110733	168667	14623	2972	59857	608558
	No. of Family	158266	95445	111429	170110	14684	3031	62231	615196
	No. of Singles	1260322	611623	730974	768832	90599	9763	196001	3668114
Makah	No. of Houses	56426	288695	35347	355594	15434	14903	42401	808800
	No. of Family	56550	292078	35837	357724	15480	15099	43667	816435
	No. of Singles	377778	1655400	212697	1773976	98424	60115	124419	4302809
Eastern Province	No. of Houses	104782	89631	33972	111169	4494	4113	21309	369470
	No. of Family	104982	90873	34182	111700	4517	4148	21634	372036
	No. of Individuals	787451	697719	237659	527774	23210	24754	83884	2382451

Source: Ministry of Economy & Planning, Central Department of Statistics & Information, General Population Census and Housing.

In most designs, the courtyard was replaced by a family living space called the '*Sala*', which also acted as a foyer on the ground floor. All the other rooms on the ground floor were placed around it and could access it directly. Every house, according to the new housing regulations, should have strips of two-metre setbacks encircling the house. These setbacks forced houses to look outward for light and ventilation. Thus, a conflict arose between the need to establish privacy, and the location of exterior yards. This conflict was later resolved by either adjusting the house to achieve more privacy or by adjusting daily life to accommodate the new housing form in the name of modernity.

Darweesh observed that the land coverage limit of the building (not to exceed 60% of the lot) was another obstacle to creative design variations.⁵¹ Both the setback and land coverage limitations led to unusable narrow outdoor spaces that were exposed to solar radiation, dust, and the eyes of intruders. The boundaries, therefore, had to be protected by high walls.⁵²

From Table 4.1, it can be seen that the detached house was the single largest number of dwelling type. It was also the only type available in the private housing sector. The detached house represented modernity, and

⁵⁰ Al-Naim, M. Potentiality of the Traditional House: A Case Study of Hofuf Alhasa, Unpublished Masters Dissertation, King Faisal University, Dammam, Saudi Arabia. 1993.

⁵¹ Darweesh, Lena. Dweller-Initiated Changes and Transformations in Built environment: The Impact of Building Regulations. Unpublished MSC thesis. King Faisal University, Dammam, Saudi Arabia. 2003.

⁵² The height for the exterior wall according to municipality regulations is 3 metres.

people's attitudes were based on the stylistic association between 'modern,' as expressed in the modern house style, and 'good'.

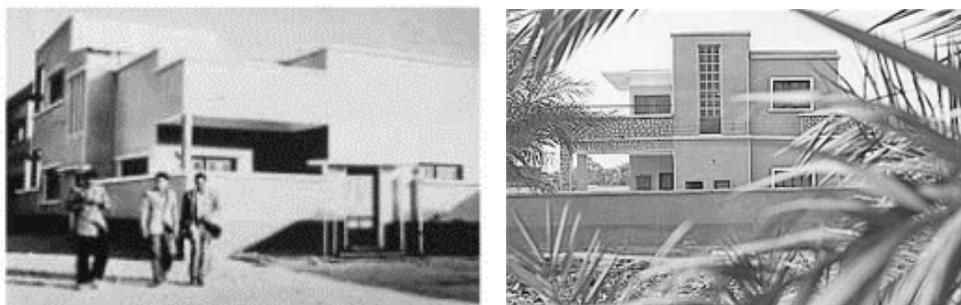


Fig 4.39: A common detached house in Dammam and Al Khobar cities (Labour City in the 1950s).

In the transitional period, some families still lived as extended families. The only difference was that the number of family members was fewer than in traditional houses. The homeowner typically had at least one of his parents and a married son still living in the same house. A married son would be designated the upper floor, and the homeowner's parents would have a dedicated room on the ground floor (Fig.4.40).

After construction, many of the houses were remodelled or renovated to meet users' needs and requirements. In Saudi Arabia, social and religious rules increased the use of boundaries and partitioned areas. The concept of privacy is minimally introduced and perceived in HOP houses; it can be achieved only in the location of the bedrooms, which are located at the back of the house, and the living rooms, which were typically in the far corners of the house.

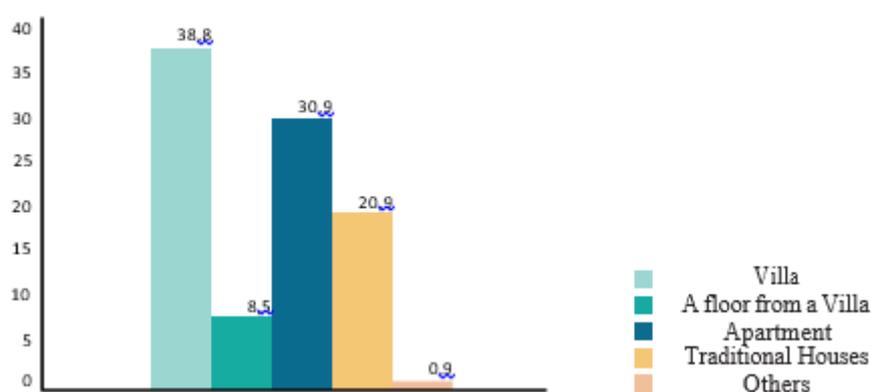


Fig 4.40: Ratio of housing types in different regions of Saudi Arabia, 1960-1970.

4.2.10.1 Spatial Organisation of Houses in the Transitional Period

As previously mentioned, the new developments in cities appeared immediately after the traditional period and included detached houses only, which were built according to Aramco standards and guidelines. The modern houses were developed under Aramco HOP (Fig.4.39) and were preferred by people as a means to express their financial status, their development, and the changes that had occurred in their lifestyle as a consequence of employment by the oil company.

Aramco began its HOP with one-storey detached houses; later, two-storey homes were designed. The lot area allocated was approximately 300-500m², while the built-up lots were approximately 150m². The houses adhered to the municipal legislation, the maximum height was eight to nine metres, and the setbacks were a maximum of two to three metres from the boundary (Fig. 4.39). The setbacks were essential and met the first set of governmental building regulations and housing policies set out in the First Five-Year Plan.

The detached houses (villa type) in the transitional neighbourhood comprised a single storey (Fig. 4.41),⁵³ and contained two bedrooms, a living room, a *Majlis* (men's guestroom), one kitchen, and one toilet. The two-storey houses that followed were identical to the one-storey house plans, with the same interior spatial components and organisation. According to Aramco standards and guidelines, each house should have one garage. Houses should be designed so that they cannot be divided in the future to rent or sell to other inhabitants.⁵⁴ The majority of the houses were designed so that the upper floor would be a repetition of the ground floor.



Fig 4.41: The common form of houses built in the transitional neighbourhood of Dammam under Aramco Home Ownership.

⁵³ Al-Kurdi, Feryal. The Labor City in Dammam: An Analysis of its House Forms, Advanced workshop ARAR 602. King Faisal University. 2002.

⁵⁴ Aramco would send their inspectors to every stage of construction. They would inspect to see that every house had only one circuit breaker and not more than one water meter.

In the transitional period, the kitchen moved to the central part of the house.⁵⁵ The dining room and the men's seating area were located at the front of the house (Fig.4.44), as they were in traditional houses. Toilets were moved from the back of the house to the middle space, next to the dining room and bedrooms, while the staircase remained in its central location. Some rooms were transformed from multi-use, such as the bedroom and dining room.⁵⁶

The men's seating area in some houses could be directly accessed from the setbacks, while in others a door led into the entrance hall. The dining room could be viewed from the same hallway. In the family area, the living room was often attached to the same entrance hallway (Figs. 4.42, 4.43 & 4.45).



Fig.4.42: Two-storey house in Labour City.

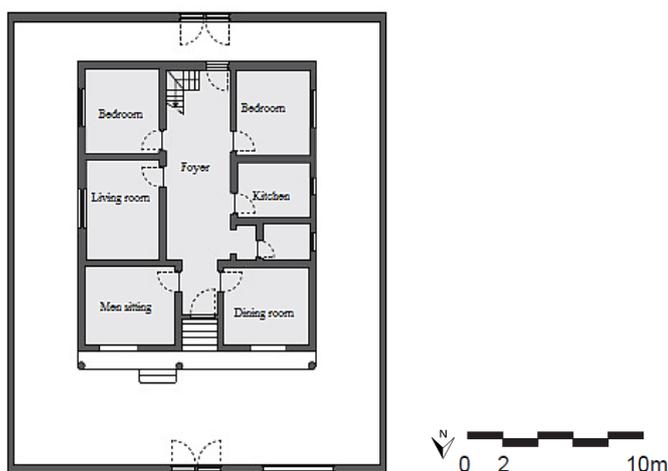


Fig 4.43: One-storey house in Labour City.

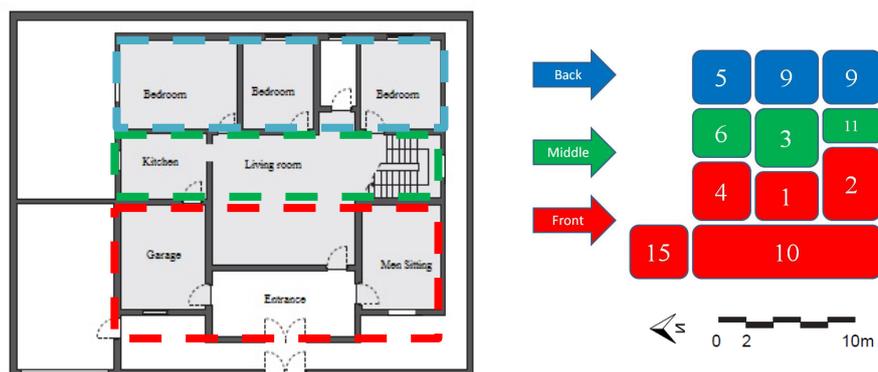
⁵⁵ The location of the kitchen used to be in the backstage of the traditional house in the Eastern Province.

⁵⁶ The family used the multipurpose room for sleeping in the daytime and in the winter season; there were no specific bedrooms in the traditional house.

New technology, such as air conditioning, hot water boilers, and refrigerators became common, while gas stoves were introduced at the end of this period and became essential home appliances enabling people to control the interior built environment (Fig. 4.50). These appliances encouraged people to change the courtyard found in the traditional houses into a sealed central hall in the transitional houses. The impact of modern technology was not limited to spatial change only; it also affected lifestyles and allowed residents to easily dispense with the traditional courtyard.



Fig 4.44: Men's seating area '*Majlis*' in the transitional period.



1: Living room, 2: Men Sitting Area (Majlis), 3: Living room, 4: Dining room, 5: Master bedroom, 6: Kitchen, 9: Bedroom, 10: External Courtyard, 11: Staircase, 15: Garage.

Fig 4.45: Typical spatial organisation of the Labor City houses.

4.2.10.2 External Features in Transitional Houses

The exterior elevations in the transitional period were affected by new ideas and materials imported from other countries. Mr Al-K'aki, was a wealthy Saudi who hired a Lebanese architect in the mid-1950s to build apartments. (Fig. 4.47). The architect was Niquilla Salem, who introduced the Mediterranean multi-storey apartment building style to the city of Al-Khobar. These new residential units were adorned with wide windows and doors, which opened onto wide, straight streets, to meet with the municipalities' building codes. The style adopted by Salem motivated the house owners in Labour City to imitate his external elevation (Figs. 4.46 & 8.48).

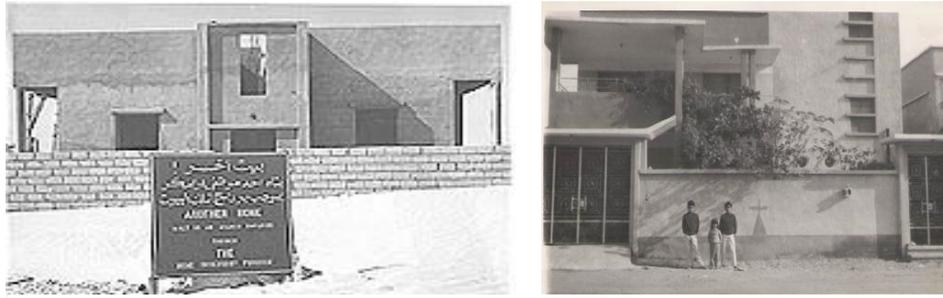


Fig.4.46: Two houses from the transitional period show big windows and balconies on the main façade.

The Aramco Home Ownership Programme required initial submission of house plans for approval. At that time, although many people required plans, there were very few engineers. The solution was to provide a number of house plans to every employee to enable them to select the design that best suited their family's needs. Consequently, most of the houses have similar façades and spatial design (Fig. 4.51).

Different external features were introduced to almost all transitional houses. These features included balconies, boundary walls, setbacks, entrance gates, parapet walls, and garages (Fig. 4.48). New housing features were established as integral components of modern houses over the course of the next development stage.



Fig.4.47: King Fahad Street in Al-Khobar city shows Mr Al-K'aki's apartments in 1968, located on the left of the photograph.

The courtyard shifted so that it was oriented outward in the form of setbacks two metres wide at the sides and five metres wide in the front yard. The setbacks were sometimes L-shaped or were distributed around the buildings (Fig. 4.49). Two-metre high boundary walls, decorated with perforated blocks, surrounded the outside courtyard. Where there was a garage, the setbacks were three metres wide on one side, a minimum of two metres at the rear, and between two and five metres for the front setback.



Fig.4.48: The exterior façade that was frequently used in the transitional period.

The garage was also introduced as a new component of the house in this period. The front fence opened the garage either to the right or the left. It was uncommon to have two garages. Corner lots could have a corner garage. The main entrance to the house was usually located in the middle of the front boundary wall. The exterior main door was a double door made of ornamental iron. The houses usually had one balcony, though sometimes two. The balcony was always placed above the main entrance, which was decorated with perforated blocks. There was an indication of a staircase located near the façade with repetitive windows or a mass projected from the house.

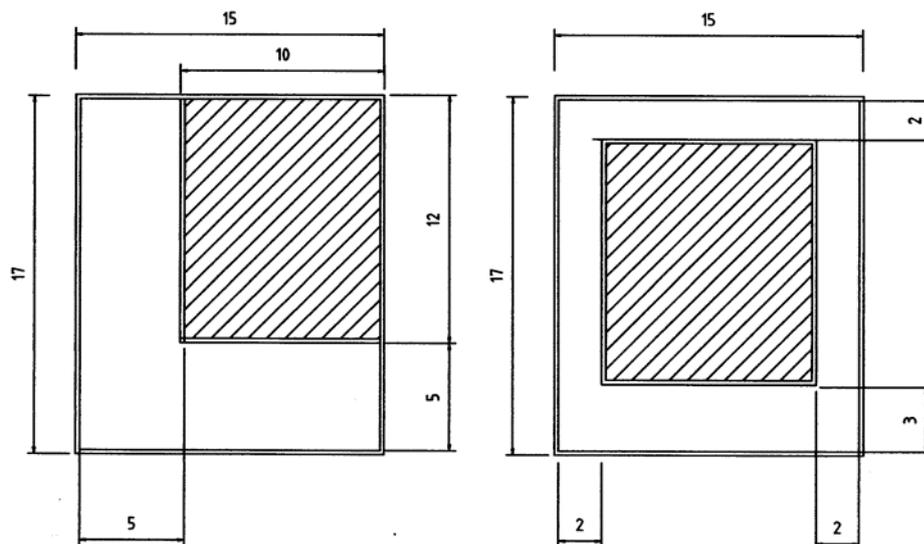


Fig.4.49: The shape of setbacks in labor city houses.

The flat roof was a clear feature of all houses in the transitional period. Usually, it was decorated with perforated blocks at the edge of the parapet wall. Some of the houses shared similar plans but had different façades, and vice versa, because the owners were limited to certain plans and elevations (Figs. 4.50 & 4.51). The openings in the façade varied from two windows to repetitive rectangular small windows. The windows had a wooden shutter to block out the sunlight.



Fig.4.50: This house shows the main and common features of the external elevation in the transitional period.



Fig.4.51: External elevations are typical of the transitional period.



Fig.4.52: New technology, like air conditioning, was added at the end of this period.



Fig.4.53: Gathering area for male residents in front of a grocery store, accessed from inside the house.

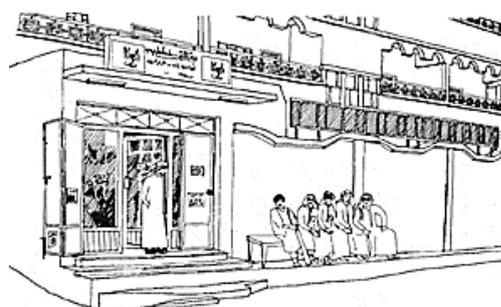


Fig.4.54: Gathering area for male residents in front of their houses.

Some homeowners opened small shops and grocery stores from their garages to serve other inhabitants of the neighbourhood (Figs. 4.53 & 4.54), especially in areas where the commercial centre was too far away to serve the nearby population. The residents used the pavement next to these stores to meet and talk (Figs. 4.53 & 4.54).

4.2.10.3 Structure and Materials in Transitional Houses

All new houses and buildings in this period were constructed with concrete blocks and reinforced concrete. The use of concrete structures and cement blocks was introduced in the Eastern Province in 1950 (Fig. 4.55).⁵⁷ Al-Naim stated that, “in the 1960s and ‘70s, the use of mud in construction stopped completely.”⁵⁸ Al-Elawy further stated, “This indicates how the visual taste of the local people was influenced by the new materials, which were associated from the beginning with wealth and education.”⁵⁹(Figs.4.56 & 4.57)



Fig.4.55: The construction materials that became popular in the transitional period. These pictures were taken in 1961.

A significant shift occurred in the perceptual identity of the private home by replacing a mud building system with concrete. Concrete-framed structures were used extensively in the construction of these houses. Columns were usually placed in the corners of every room. The infill that used was concrete building blocks, and the walls were finished with plaster inside and out, and then given a white finish using paint.



Fig.4.56: Skilled architects and builders were imported from Lebanon and Syria to build neighbourhoods during the transitional stage.



Fig.4.57: Skilled foreign labourers from Egypt and Syria trained Saudis in construction methods in the early period of development.

4.2.10.4 Decoration and Visual Elements in Transitional Façades

The façades of transitional period houses were free of decoration. The external elevations and walls were solid spaces with window openings. There was a common façade for transitional houses, with some minor modifications. When describing transitional houses in Al-Hofuf, a city in the Eastern Province, in the period

⁵⁷ When Mr. Ahmed Al-K'aki imported skilled builders from Lebanon and Syria to build large multi-storey apartment buildings with commercial spaces on the prosperous Khalid Street in Al-Khobar, as mentioned before.

⁵⁸ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

⁵⁹ Al-Elawy, I. S. The Influence of Oil upon Settlements in Al-Hasa Oasis, Saudi Arabia, Unpublished Ph.D., Dhahran, University of Dhahran, 1976. 367.

between the 1960s and 1970s, Al-Elawy stated, “the traditional decorations were not commonly used in these houses, not because they are ugly, but rather because people’s tastes have changed and coarsened.”⁶⁰ Al-Naim also explained that, “The emphasis was on the spatial organisation rather than the visual quality of the house, because the concrete image was enough for perceptual identity at that time.”⁶¹

The main entrance played a symbolic role in transitional houses. The entrances were simple and incorporated a house fence. The doors were made of metal decorated with metal floral or geometric patterns (Fig. 4.58); they typically comprised two doors protected with a canopy. The window frames were very simple, and rectangular concrete frames were placed around the windows individually or in sequence.

The perforated blocks covered vast areas of the exterior fence (Figs. 4.51 & 4.59) and balcony walls, and were used to allow residents to see outside the home while providing privacy by preventing passers-by from looking in.



Fig.4.58: The external main entrance of a house in Labour City.



Fig.4.59: This picture combines all the common materials used on façades in the transitional period.

⁶⁰ Ibid.

⁶¹ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

4.3 The Modern Aspects of Urban Planning and Architecture in the Damman Metropolitan Area (1970s-1980s)⁶²

The Eastern Province of Saudi Arabia has one of the most extended shores along the Arabian Gulf. The development that took place there over a period of two decades rapidly transformed what had been a mostly rural economy with a small population into one of the fastest-growing industrial regions in the Middle East.

The effects of the first oil boom in 1949, which coincided with rapid urbanisation, influenced the architecture of the region, affecting the lives of inhabitants throughout the Arab Gulf region and beyond. The majority of studies of cities in the Arab Gulf states are concerned with the phenomenon of oil urbanisation, which began to affect urban planning in the 1960s. The history of modernisation in the Eastern region can be almost exclusively identified by rapid urban development. The growth of cities reflects the early expansion of the oil economies and the increasingly centralised political system. Geographers and town planners, in particular, were concerned with describing and interpreting changes in urban morphology, at both the micro and macro levels.⁶³ The majority of these studies were both empirical and descriptive.⁶⁴

Al-Hathloul identified several factors that drove the transformation from a traditional to a modern format in Arab-Muslim cities in general: "Among these are the existence of certainly implied ideologies; changes in the scale of development, power and technology; and problems within the field of architecture and urbanism and their relationship to the Arab-Muslim context."⁶⁵

4.3.1 The Modern Urban Fabric

In Saudi Arabia, the unique traditional urban fabric was being systematically destroyed and replaced by the grid-iron streets and detached private dwellings from an entirely different cultural heritage. As stated in this chapter, the Aramco Home Ownership Programme was initiated in 1951. The oil company promoted the concept of the subdivision of land, modern grid schemes, and detached private dwellings, as well as the idea of centralised decision-making (Figs. 4.60 & 4.61).

⁶² In the late 19th century, modern urban planning began to develop in the world.

⁶³ Context of urban morphology can be divided into three groups again:

- First group is at a city scale, either contemporary or traditional.
- Second group is at a neighbourhood/district scale, and it is generally traditional.
- Third group is at street, square and open space scale, either contemporary or traditional. (Nevter Zafer, Sebnem Onal Hoskara)

⁶⁴ Vini, Nathan. "Residents' Satisfaction with the Sites and Services Approach in Affordable Housing." *Housing and Society Journals* 22, no. 3, (1995).

⁶⁵ Al-Hathloul, Saleh. *The Arab-Muslim City: Tradition, Continuity and Change in the Physical Environment*. Riyadh: Dar Al-Sahn, 1995.

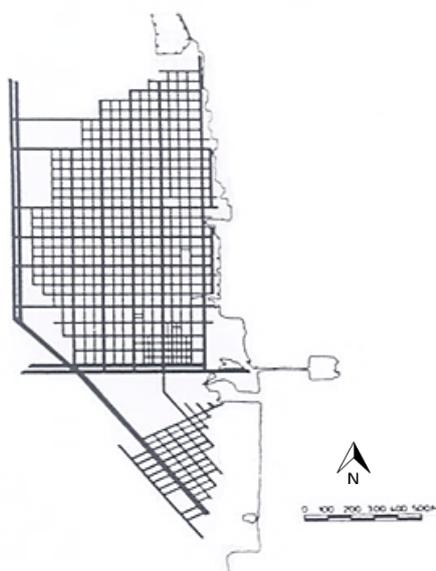


Fig 4.60: The grid-iron plan of the Al-Khobar network (1956-1966).



Fig 4.61: The grid-iron plan of the Al-Dammam network (1956-1966).

The extraordinary economic growth of Saudi Arabia during the oil boom period increased with the remarkable development of cities and towns. This quick growth created various problems across a whole range of municipal services and facilities. The government devised a programme of comprehensive urban, regional and national plans to manage these problems. As a result, in 1970, the Kingdom was divided into five planning regions, and the Five-Year National Plans system was instituted.

After this date, the Real Estate Development Fund (REDF) was established as a real estate financial institution intended to develop the private housing sector, and a Kingdom-wide housing survey was planned. In 1971, the General Housing Department was established and soon enlarged to form the Ministry of Public Works and Housing (Fig. 4.62).



Fig 4.62: An aerial view shows Al-Khobar in 1962.

The first Five-Year Development Plan covered 1970 to 1975 and was the government's first attempt at comprehensive development planning.⁶⁶ Its priority was to lay the groundwork for modern infrastructure for existing and new neighbourhoods.⁶⁷ Al-Ibrahim explained that, "until the 1970s, the majority of practising architects in Saudi Arabia were non-Saudi Arabs, mostly from Egypt, Syria, and Jordan."⁶⁸ He placed the blame on architects for supposedly importing into Saudi Arabia, from their countries, a style of housing that he considered inappropriate for Saudi Arabia, both environmentally and culturally.



Fig. 4.63: An aerial view shows a grid-iron pattern with several building blocks, each block is two lots deep, each square lot (typically) has a dwelling in the middle, and each dwelling is similar – two storeys high surrounded with a three-metre wall on all four sides.

The objective of the second Five-Year Development Plan (1975-80) was to build the infrastructure to support a modern country within half a decade. To accomplish this goal, the Kingdom accepted that it was dependent on the skills and products of Western and Far-Eastern economies; powerful architectural corporations and international construction companies established offices in the country, and foreign labour flooded into the emerging cities. This had an effect on the industrial and construction sectors.⁶⁹

The modern neighbourhood represented an entirely different land subdivision and street plan from the traditional neighbourhood, which informed the implementation of a new residential pattern. The general practice of subdividing land for most modern neighbourhoods was based on the widely applied urban grid pattern, which typically included equally spaced streets at right angles to one another, and blocks, every two lots deep (Fig. 4.63). The grid-iron plan consisted of rectangular blocks and large lots, mostly square. Each residential block had an area of 100 x 50 metres. The typical plot size was 25 x 25 metres, with some being up to 37.5 or 50 metres in width, and 25 metres in depth. The average lot size in the modern subdivisions has steadily increased over the years, and lot sizes of 500, 750 and 1000m² are typical in many new neighbourhoods in the Eastern Province.

⁶⁶ Fadden, Y. M. "The Development of Contemporary Housing in Saudi Arabia (1950-1983)." PhD diss., MIT Cambridge, 1983.

⁶⁷ Talib, K. Shelter in Saudi Arabia, Academy Edition, London, UK. 1984.128.

⁶⁸ Al-Ibrahim Mohammed Husein. The Criticism of Modern Architecture in Saudi Arabia, Journal of King Saud University, Architecture and Planning, vol. 2, (1990): 63-80.

⁶⁹ Al-Farsy, Fouad. *Modernity and Tradition, the Saudi Equation*. Routledge, 2009.

4.3.2 Privacy in the Modern Period

Following the development of the Riyadh Master Plan, a new Execution and Action Master Plan and developmental studies occurred in Riyadh.⁷⁰ A *Planning Regulations* report accompanied these plans. Part of this new document concerned privacy issues and stated that, “visual privacy is the most important factor determining the design of private homes in Saudi Arabia. Zoning regulations should provide a legal framework for safeguarding the privacy of each home and ensuring the full use of the property by its owner, according to Saudi traditions and jurisprudence.”⁷¹

The modern design of grid-iron neighbourhoods lacked balance between private and public spaces in the built environment. There is no hierarchy when moving from private space or street to a public zone with highways or high streets. In particular, the most notable features of the residential settlements concerned attempts to ensure privacy within spaces. The modern residential neighbourhoods had only two cumulative sequences of spaces. The house was an intensely private, isolated and closed area, while the street was a public space. The large gap and sharp separation between the private and public spaces keep all activities inside the house. It also reduces interactions with the external environment, a feature that has resulted in irresponsible attitudes towards the maintenance of external spaces.

4.3.3 Safety and Security in the Modern Period

The grid-iron network in the modern period lacked coordination within housing districts and led to the intermingling of residential and industrial areas, with the result that the positioning of hospitals and schools often created safety problems and health concerns for the residents of these cities and neighbourhoods.

In the Dammam Metropolitan Area, the majority of the neighbourhood planning relied on streets that were approximately 15-30 metres wide. Houses opened from their main entrance directly onto wide roads with constant traffic. This created a competitive environment, which meant a decrease in daily social interactions, as people met less frequently because walking in those roads was not as safe as in traditional neighbourhoods. The community centres also were far from their houses, and they needed a car ride to reach them. This may also lead to a higher incidence of crime. The absence of local shops and resources to serve residents’ needs resulted in isolated and infertile streetscapes filled with strangers moving about unpredictably.⁷²

4.3.4 Morphology and Compactness of the Modern Neighbourhoods

The population of the Dammam Metropolitan Area increased rapidly and dramatically over the period from 1970-1980, due to the concentration of development plans. This increase in population can be attributed to large-scale rural-urban migration and the immigration of non-Saudi labourers.⁷³ Saudi Arabia had a total

⁷⁰ Al Ankari, Khlid M. and El-S. El-Bushra, Eds. *Urban and Rural Profiles in Saudi Arabia*. Berlin, Gebrudern Borntraeger. 1989: 11.

⁷¹ Al-Said Fahad. *The Pattern of Structural Transformation of the Saudi Contemporary Neighborhood: The Case of Al-Malaz*, Riyadh, Saudi Arabia, 39th ISoCaRP Congress 2003.

⁷² Ibid.

⁷³ Table 4.2

population of 9.5 million, of which 15% were aged between 20 and 29 years, in other words, of marriageable age. This suggested a high likelihood that families would experience expansion.⁷⁴ The population growth and urbanisation rate, in particular, would rise, as would income level; this would generate greater demand for housing settlements and units.

The Kingdom's first and second development plans were based on a balanced growth strategy, and at least two-thirds of national income was to be invested in urban planning and building projects. In the first two plans, the impact of development was concentrated in cities such as Dammam, Al-Khobar, and Dhahran, which were small but rapidly growing. However, during the 1970s, Saudi Arabia experienced acute housing shortages, and increased demand, particularly in its major cities. Al-Ghamdi notes, "this apparently resulted from two primary factors: the dramatic and spontaneous demographic changes and the improvement in income levels."⁷⁵

Table 4.2: Distribution of total population in Saudi Arabia in percentages.

Area of Residence	1970	1975	1980
Metropolitan Centre (size of 100.000 person/ Centre)	20	35	42
Shares of small town	20	16	12
Shares of rural areas	60	49	46
Total	100	100	100

Source: Ministry of Planning (MOP), 1980. The third Five-Year Plan, MOP, Riyadh, Saudi Arabia, pp.56.

The grid-iron network system concentrates on functional and practical factors with the independence of its elements, which makes it contrary to the needs of Saudi society, which has a stable relationship with neighbours, and between male pedestrians who walk together to the mosque five times a day. The grid-iron network system has a weak relationship with its users, as they have no emotional or moral links to it. It emphasises financial benefits, intended to strengthen physical trends and consumer habits, reducing opportunities for people to interact with their surroundings and inhibiting the formation of social and civil connections.⁷⁶

4.3.5 Key Aspects of the Modern Neighbourhood

Modern neighbourhoods are not characterised by the fundamental requirements of land development, such as sidewalks, pavement roads, street lighting, and car parking, except for those in exposed locations between

⁷⁴ Ministry of Housing and Public Works. Patterns of Housing that were Prevalent at the Beginning of The Present Century, Saudi Arabia, housing in Saudi Arabia, the Aspirations and Achievements of One Hundred Years, Ministry for Housing Affairs within participation in the events to commemorate the centenary of the founding of the Kingdom. 1999. [Arabic text] pp. 3-12.

⁷⁵ Al-Ghamdi, Abdullah Mohammed. The Housing Cycle Theory with Regard to Housing Development in Saudi Arabia, JKAU: Eng, Sci, vol.7, (1995):59-67.

⁷⁶ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

the three cities of the Dammam Metropolitan Area.⁷⁷ The majority of modern neighbourhoods are located between the three most important roads linking Dammam, Al-Khobar, and Dhahran, which provide key transportation routes into the region. The modern neighbourhoods are characterised by wider streets than in the transitional neighbourhoods, and a medium population density; the lots in each area are roughly the same size, except for the corner lots, which are usually larger.

After three decades of neglecting the modern neighbourhood, in the late 1990s, the municipality began to recognise the need to implement many basic utilities and services. Modern neighbourhoods were initially built without schools (Fig. 4.66), sewers, water supplies, telephone lines, parks and playgrounds (Fig. 4.65), or central community areas.



Fig.4.64: Asphaltting, lighting and sidewalks in the neighborhood in 2013.



Fig 4.65: Playgrounds and parks emerged in 2011.



Fig.4.66: A tenanted house for a middle school for girls in Al-Rakah neighbourhood in 2009.



Fig.4.67: A school complex for girls in Al-Rakah neighbourhood in 2013.

4.3.6 The Street in the Modern Period

In 1960, road regulations were implemented by the Administrative Council of Ministers to apply to all the Kingdom's roads. As a result, there was a need to widen some of the existing streets: "The straightening of roads and their design are to be designated according to the map... Roads are to be planned according to the approved design, on the condition that this design is gradually implemented either when reconstructing dilapidated buildings or when constructing new ones. To be exempted from this are buildings whose removal is required by the public interest... Existing streets are to maintain their present condition unless the public

⁷⁷ Triplet cities are Dammam, Al-Khobar and Dhahran.

interest requires their widening according to the approved design in the town's map."⁷⁸ The conditions stated that newly widened streets should not exceed the stated widths; included in this was that the main streets not be narrower than 15 metres, the secondary streets not less than 8 to 12 metres, and alleys not less than 4 to 6 metres.

In the Dammam Metropolitan Area, certain features were typical in terms of land divisions. As stated above, layout plans were based on a grid-iron pattern, in which streets had back-to-back street-front plots. The main thoroughfares were designed to be 30 metres in width, secondary streets 20 metres, and minor streets between 10 and 15 metres (Fig. 4.70).⁷⁹

Al-Said described this time as "the turning point in Saudi Arabian contemporary built environment-physical pattern and regulations. It required planning of the land, a subdivision with cement poles, obtaining approval for this from the municipality, prohibited further land subdivision, controlled the height of the buildings, the square ratio of the built required setbacks..."⁸⁰



Fig.4.68: This picture shows the lack of sidewalks to serve pedestrians.



Fig.4.69: This picture of Al-Khobar was taken in 1958. It shows the appearance of streets in order to serve automobiles without attention to sidewalks.

It took 15 years before these regulations were fully applied in all Saudi cities.⁸¹ The street layout of most modern neighbourhoods has been designed to serve automobiles and encourage car use (Fig. 4.68). However, the domination of automobiles has had many negative impacts on traditional lifestyles. With the extensive use of the car, greater pressure is put on the road network. Many traditional social functions have had to be put aside to accommodate traffic. The residents of most modern neighbourhoods live in environments that are designed primarily to serve the requirements of drivers.

Furthermore, since all the streets in modern neighbourhoods are straight, and all the houses have set-backs equidistant from the street line, a repetitive street front is the result (Fig. 4.70). Views along the street are the same, with the buildings and the path in alignment. Indeed, the design manual for the Ministry of Foreign

⁷⁸ Al-Said Fahad. *The Pattern of Structural Transformation of the Saudi Contemporary Neighborhood: The Case of Al-Malaz, Riyadh, Saudi Arabia*, 39th ISoCaRP Congress 2003.

⁷⁹ Al-Said, Fahad. *Territorial Behaviour and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia*, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992. 258-9

⁸⁰ Ibid.

⁸¹ Al-Farsy, Fouad. *Modernity and Tradition, the Saudi Equation*. Routledge, 2009.



Fig.4.72: Neighbourhood planning in Dammam City in the Dammam Metropolitan Area shows the distribution of services and facilities.

4.3.7.1 The Market in the Modern Period

In the modern neighbourhood, each residential quarter has an area dedicated to services that have a place for a local market to serve residents (Fig. 4.73). The market is always located in the community centre, which most of the time is located in a zone not more than 1km away from the farthest house. However, for a long time, most of these neighbourhoods had no such services. In fact, many of the modern neighbourhoods entirely lacked services and facilities. The central market was the most-required service, making residential settlements more desirable places to live.

There were illegal encroachments on the land allocated by the government to facilities and services in the neighbourhoods of the modern period, such as parking lots in front of mosques, community centres and parks, which reduced the level of services provided to each district.



Fig.4.73: These services were found at the beginning of the contemporary period.

4.3.7.2 The Mosque in the Modern Period

The municipality allocated land for a mosque in every residential quarter of all districts. Residents built some of the mosques, but the majority of allocated sites were left empty and remained so, waiting for a donor to build the mosque. In the modern period, the number of mosques was too few, and, for some inhabitants, were located far away from their homes (Fig. 4.74)



Fig.4.74: Mosques in the modern neighbourhoods.

4.3.7.3 Building Types in the Modern Residential Neighbourhoods

The types of buildings that emerged from this period were mostly residential buildings, though there were also a few high-rise office buildings that appeared in the Dammam Metropolitan Area. Overall, there were more low-rise housing units than high-rise apartment buildings.⁸⁴ Affordable housing units were also introduced in this period, in the early 1980s.

In this period, the municipality set the boundaries for lots and distributed them to buyers or real estate developers without any infrastructure. As a result, modern neighbourhoods emerged without services and facilities, as mentioned above; they were simply empty neighbourhoods consisting of homes without any manifestations of urbanisation in the surrounding environment.

4.3.8 Housing Types in the Modern Period

Under favourable political and economic circumstances, there was rapid urbanisation, and a new kind of residential development emerged. The improvement of the national economy through increased oil production raised incomes, which had implications for the city's spatial structure, as higher-income residents began to experiment with new design styles and building materials. Gradually, the old mud houses were supplanted with new housing types under the government's housing policy and regulations.

⁸⁴Please refer to appendix E for more information about high-rise apartment buildings and affordable housing units

All housing types were affected in one way or another by the changes to settlement patterns that emerged alongside the kinds of modern development plans adopted by Saudi Arabian leaders in the 1980s. The people of Al-Khobar and Dammam criticised the form of their houses, expressing that "... an entirely different conception of a house, cluster, and neighbourhood has been introduced. It starts with the tiny details of the house construction, and spreads to the internal spatial organisation of the rooms and finally to the external appearance and the relationship of the house to those in the neighbourhood."⁸⁵

During the global spread of the modern, international style of architecture, Saudi architects called for the application of the same school of thought to all buildings, with no consideration of the local environmental and cultural needs of each region.⁸⁶ The elements of exterior façades, the construction materials, the size and shape of opening windows – all these factors were amongst the issues that Saudi architects paid no attention to. This model led to a broad global division into countries perceived as innovators, and those seen as imitators. In the 1980s, housing designs were mostly the responsibility of Aramco. However, over time, more models and styles were imported from foreign countries. Changes were evident in the exterior façades, although internal spatial arrangements retained the same organisation as houses from the transitional period.

Inside the Saudi houses of the modern period, the physical partition of space was based on a combination of activity, function, and gender. Walls were the most common physical boundaries inside a dwelling unit. The residential space was divided into rooms used by different people and separate housing functions. Gender-specific spaces and areas for guests were included in each dwelling unit.

During this period, four different categories of housing emerged: 1) mass housing; 2) private residential compounds; 3) apartment buildings; and 4) regular houses in the form of detached houses (villas), which were the main building type in Saudi Arabia.⁸⁷

There were also several types of detached houses: standard villas, deluxe villas, complex villas, and palaces. Detached houses were built in different sized lots, ranging from 400m² to more than 2000m². The majority of the villas had plot areas of between 400m² and 900m². Approximately half of the houses had an area of approximately 750m², classified as deluxe houses.

4.3.8.1 Typical Detached House, Definition and Types

A variety of detached houses appeared in the Dammam Metropolitan Area, as in the rest of Saudi Arabia. Based on their diversity of size, the houses can be categorised as follows:⁸⁸

⁸⁵ Fadden, Y. M. "The Development of Contemporary Housing in Saudi Arabia (1950-1983)." PhD diss., MIT Cambridge, 1983. 97.

⁸⁶ Taleb, Hanan M. "Towards Sustainable Residential Buildings in the Kingdom of Saudi Arabia." Proceedings of Conference on Technology & Sustainability in the Built Environment, King Saud University - College of Architecture and Planning, Riyadh. January 2010. Accessed May 2017. https://cap.ksu.edu.sa/sites/cap.ksu.edu.sa/files/attach/tsbe_5_e_02.pdf.

⁸⁷ This study concentrates on only low-rise detached house units. This does not mean that this thesis did not consider the apartment buildings as a type of house that existed in the Modern Period. There is enough study in the appendices.

⁸⁸ Through interviewing experienced construction parties (owners, contractors, A/E offices). Interviews provided indicators of the types of villas relative to the quality and the cost of building components.

- **Standard Detached House** with a plot size of 400-800m². These are constructed as a reinforced concrete structures, which allows for large rooms. This type contains three to four bedrooms, standard, or between five and seven bedrooms for a deluxe version.⁸⁹ Designed and built with low to high-quality finishes, such as marble tiles, with central air conditioning which allowed for larger windows without concern for heat or sandstorms, and filled with newly imported glass and other modern comforts. These offered a modern housing solution for the middle to upper-classes. Standard villas account for 60-65% of all homes built between 1975 and 1985, while the deluxe villas account for 25-35% of the villas in the Eastern Province at that time (Fig. 4.75).⁹⁰



Fig. 4.75: Standard detached house, one of the common detached houses in the Dammam Metropolitan Area.



Fig. 4.76: An example of a complex villa in Dammam Metropolitan area.



Fig. 4.77: A plot area of 3000m², built-up area of 1200m².

- **Complex Detached House:** a larger type of house, between 800-2000m² with high-quality and luxurious finishes and strict material specifications. It contains ten bedrooms and sometimes additional rooms. This type of villa accounts for 5-7% of the houses in the Eastern Province.⁹¹ (Fig. 4.76).

⁸⁹ More quality finishing in this type.

⁹⁰ Al-Ghamdi, Abdullah. The Quantitative Evolution of Housing Provision in Saudi Arabia, 1970-1995: from Acute Shortage to Excess Supply, JKAU: Eng. Sci., vol. 11 no. 1. (1999): 75-80.

⁹¹ Al-Khraif, Rshood. Urbanization and the growth of cities in Saudi Arabia during the period 1974-2004, Kuwaiti Geographic Society, Kuwait. 2007. [Arabic Text].

- **Palaces** are large residential units occupying large plots. They are larger than 2000m² and intended for royalty and wealthy families. In an earlier period in KSA, palaces were traditionally constructed of mud and stones, with rooms around a central courtyard without a garden, while the palaces that were built in the modern period were mainly constructed with contemporary technology and very high-quality finishes. They contain spacious reception areas, private spaces and services. This category of villa accounts for just 1-2% of the houses in the Eastern Province (Fig. 4.77).⁹²

4.3.8.2 Observation about Spatial Organisation of the Modern Detached Houses

In the current modern period, people are wealthier and more educated, and newly married couples prefer to own a separate house. Families are increasingly living physically apart from each other. This separation has influenced the spatial organisation of the private home. Since 1975, the home environment has been strictly controlled by government institutions, which have forced people to follow the setback regulations and imposed the requirement for detached houses. People have had no alternative than to accept detached houses and meet the setback regulations.

The principal method of financing the private housing sector is the Real Estate Development Fund (REDF), which was proposed in the second Five-Year Development Plan. It was established by Royal Decree in 1975 and made a significant contribution to the provision of new housing. However, some of the procedures undertaken have had a direct effect on the physical form of the resulting housing developments.

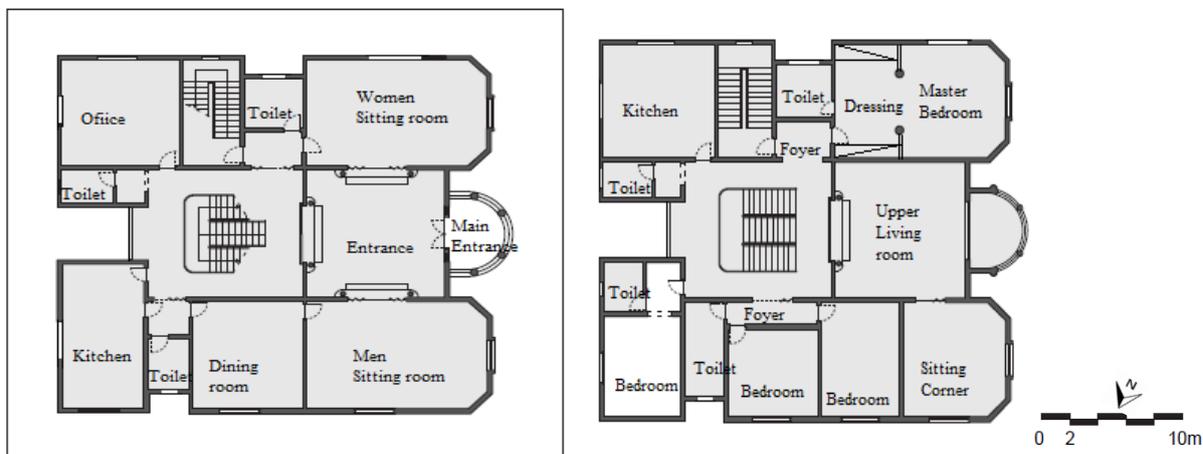


Fig 4.78: Two-floor plans showing the common residential spaces and their organisation in the modern period.

In the modern period, no one can build a house without obtaining full architectural and technical documents from a licensed design office. At the beginning of this period, design offices tried to provide the required documentation for the municipality without real architectural involvement.⁹³ In the early 1980s, the design profession became more prestigious, as many design offices were established by Saudi architects who employed foreign engineers from Syria and Egypt, who introduced new spatial arrangement styles and

⁹² Ibid.

⁹³ Most documents were copies with little modifications without architectural supervision.

approaches to the built environment in the Dammam Metropolitan Area. At this time, people knew what they needed from the domestic space, but they also required architects to advise them on the conceptualisation of housing form and façade design. It was easy for designers to introduce new ideas because people in the Dammam Metropolitan Area were entering into a modern way of life.

Similar spatial organisations were reproduced in the private homes in the Dammam Metropolitan Area, with slight differences. The men's seating area, the *Majlis*, remained in the same position within the house as it was in previous periods. However, the family area became more important than before,⁹⁴ especially, the living room. Women tried to express themselves in their houses by dedicating a special seating area to their guests also. The development of a women's reception space was relatively new at that time, and not every house had a separate entrance dedicated to this purpose.

The first floor was solely for bedrooms, while the ground floor was dedicated to hospitality in the reception rooms and common spaces for family activities. In the modern period, people began to refine their bedrooms over the first floor. The bedrooms were classified into three clusters which were designed as suites: a master bedroom, which was usually located above the men's reception area overlooking the front yard; a boys'



1: Main Entrance, 2: Men Sitting Area (Majlis), 3: Women Sitting Area, 4: Living room, 5: Guest Bedroom or Office, 6: Kitchen, 7: Staircase, 8: Family Entrance, 9: Dining room, 10: External Courtyard, 11: Garage.

Fig 4.79: Ground floor plans for two houses, showing the residential organisation in the modern period.

⁹⁴ This important change occurred because of the increase in women's role in house design, as a result of women's education and economic independence.

section, which contained two bedrooms and a toilet; and a girls' section, similar to the boys'. Of course, the sections and rooms depended on the number of family members.

The living room was located at the side of the house and had a direct opening to the setbacks. The men's seating area, the *Majlis*, with the *Muqalat* (the dining area) and toilets were located in a complex at the front zone of the house. The kitchen was located at one corner, but not the northern corner because of the prevailing wind (Fig. 4.78).

The size of the *Majlis* was small at the beginning of this period, as some families still used the Arabic style of seating furniture, but later they became bigger due to the use of sofas and side tables. The houses in this period had no bedrooms on the ground floor, except multi-purpose guest rooms. The *Muqalt* (dining room) was moved closer to the kitchen because of the need to serve guests without passing through the other rooms. The living room became more important and was being used as a reception room. The staircase was located near the family room and the family entrance. The staircase was moved to the centre or back of the house to link the ground floor with the first floor through the living room. Architects encouraged people to put a staircase in the middle of the house, developing new designs (Fig. 4.79).

4.3.8.3 Low-rise Mass Housing



Fig 4.80: An example of governmental mass housing in the Dammam Metropolitan Area.

The Kingdom of Saudi Arabia undertook the task of building mass housing units for its employees (Fig. 4.80) as separate single-storey units (villas), including the King Fahad University Housing, National Guard Housing (Fig. 4.81), King Fahad Hospital Housing, and many other developments.

The Saudi government initiated a large-scale affordable housing programme. The free land plot system provided land grants, ranging from 400 to 900m² each. In total, 1,200,000 plots were distributed by the municipalities to eligible people in different Saudi cities.⁹⁵ The programme did not include the lands on which housing projects were built, or the land distributed by the Ministry of Defence to its military personnel and civilians. The Ministries of Finance and National Economy, Industry and Electricity, and the Government Railway Organisation also distributed many plots to their respective employees.

⁹⁵ Jeddah Economic Forum. *Housing Growing Population*. Report. Jeddah: Ernst & Young, 2013. 5-19. Accessed December 24, 2016. [http://www.ey.com/Publication/vwLUAssets/EY_-_Housing_the_growing_population/\\$FILE/EY-Housing-the-growing-population.pdf](http://www.ey.com/Publication/vwLUAssets/EY_-_Housing_the_growing_population/$FILE/EY-Housing-the-growing-population.pdf).



Fig 4.81: National Guard Housing in Dammam.

4.3.9 The Introduction of Housing Compounds



Fig 4.82: Side view of one of the famous compounds in Al-Khobar.

Housing compounds appeared after the first oil boom (transitional period) in Saudi Arabia, especially in the Eastern Province. Aramco's Main Camp was among the first housing compounds, created for foreign expatriates who came to work for the company. In that period, it was confined to Aramco employees only. The shack settlements later turned into modern compounds (Fig. 4.82). This new town model of housing compounds had boundary walls with controlled access, which conformed to local tradition. In the modern period, the compounds expanded and spread. It also became a feature characteristic of the Eastern Province, distinguishing it from other cities (Fig. 4.83 and 4.84). They were built along the lines of Western models of neighbourhoods to reduce the sense of alienation, as well as to achieve maximum safety. Saudi citizens also preferred to live in small communities protected by high fences. There were also apartments in these compounds, usually inhabited by bachelors or small families.

Darweesh explained, "Both consist of a single type or a combination of several types of buildings and include shared outdoor spaces,⁹⁶ External circulation areas and additional amenities. Although camps and compounds were constructed to maintain cultural independence between the Saudis and expatriates, recently they are being built with the potential of conversion to Saudi occupation."⁹⁷

⁹⁶ The sentence refers to the shack settlements and compounds.

⁹⁷ Darweesh, Lena. *Dweller-Initiated Changes and Transformations in Built environment: The Impact of Building Regulations*. Unpublished MSC thesis. King Faisal University, Dammam, Saudi Arabia. 2003.

The core of the compound comprised the administrative, commercial (Fig. 4.85), operational and service area and was located next to the industrial area. In addition to the core of operations, there were four other sections, assigned for residential uses. The first was for the senior staff members and resembled the American south-western tradition of urban planning. In this section, the residential units were single-family, one-storey dwellings built of wood and stucco with a pitched roof; each house was surrounded by a yard and enclosed by a hedge. The senior staff housing units were mixed in style and size.



Fig 4.83: Aerial views of the Aramco Camp in Dhahran.

Dhahran was planned using a combination of the grid-iron style, with curving streets and cul-de-sacs and a pattern of irregular blocks (Fig. 4.83). At that time, streets and walkways were paved and lit, meeting all requirements for community services and recreational facilities. The residential camps for American employees included elementary and junior high schools, a hospital, a fire station and a large commissary. “By 1940, Dhahran had 95 family cottages and some dormitories and bachelor apartments. A commissioner, store-house, garage and various types of community support facilities, including a central air-conditioning plant and utilities, were constructed to provide for a fully self-contained family camp.”⁹⁸

The Aramco Main Camp was described here as an example which all compounds in the modern period typically followed. In general, the housing compound consisted of various layouts and dwelling units. There were three types of housing units: detached houses, attached houses, and apartments. The public and community services included shopping centres, healthcare dispensaries, clinics, mosques, and sometimes kindergartens, playgrounds, municipal and administrative units, and recreational centres and sports clubs for men and women. Some compounds had more facilities, such as schools, more than one mosque, a library and fire and police stations (Fig. 4.85). All other infrastructures, supporting elements and amenities were also provided, ensuring self-sufficiency. The intention with the compounds was to create housing areas that had a consistent urban form projecting a distinct, identifiable image.

⁹⁸ Caudill Rowlett Scott (CRS). Architects. Planners, Engineers. Dhahran Development Workbook. Beirut, Houston, New York, Los Angeles, January 1975.



Fig 4.84: An aerial view shows the prevalence of compounds in the Eastern Province and concentrated in the west side of Al-Khobar.

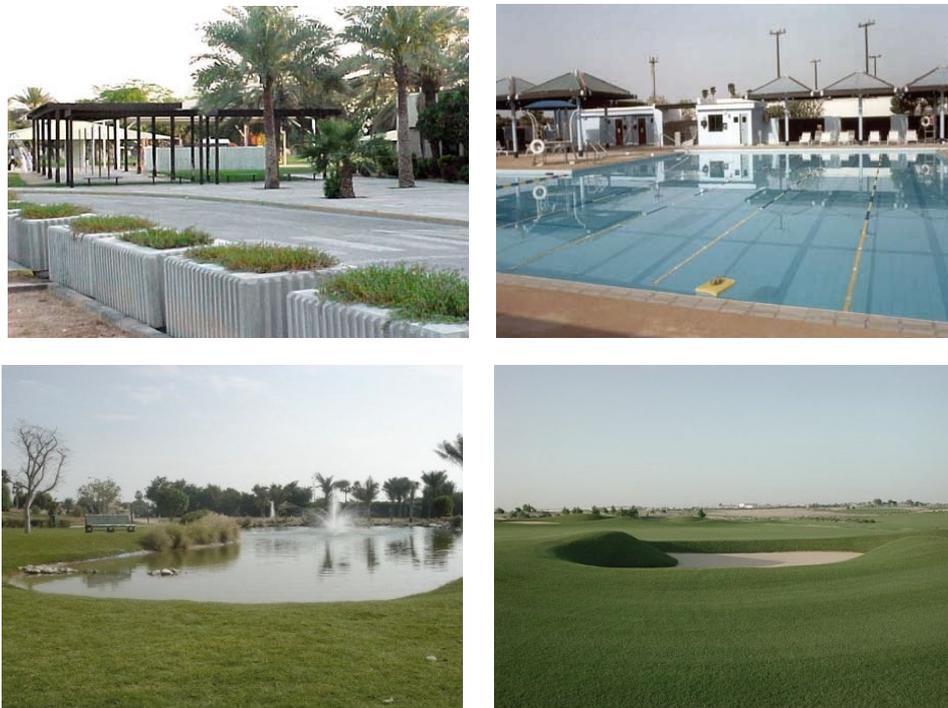


Fig 4.85: Services provided by Saudi Aramco at its residential compound.



Fig 4.86: Exterior shape and structure of the houses in the Aramco Compound showing the American Townhouse styles.

4.3.10 External Features in the Modern Houses

The majority of the houses had large outdoor spaces at the front, which became a characteristic of modern houses; the front garden became a standard and symbolic area. The external features of the modern house introduced new visual elements from different styles (Fig. 4.87). The façades of houses built in the 1970s contained many carved decorations and imported elements in various styles from around the world, and the building industry had a significant influence on the external façades. Some façades consisted of old elements from traditional houses and new elements in the latest styles.

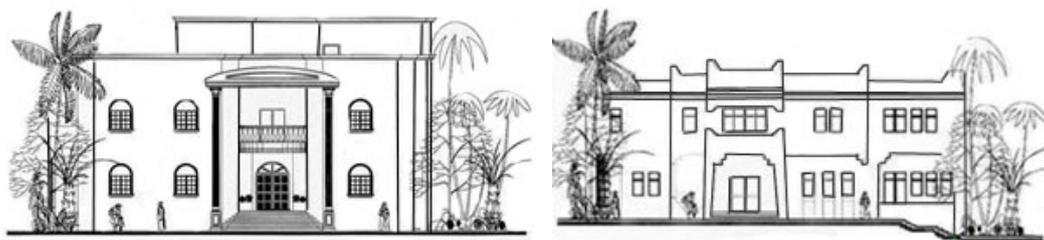


Fig 4.87: Two elevations occurring the in modern period.

In the early years of this period, most houses had one main entrance and a garage door, though it was later realised that another door was needed for female guests. Each house had a different design, which meant that the main gate also took on many different forms. All outer gates were covered with cement canopies (Figs. 4.88, 4.89 & 4.90). The relationship between the *Majlis* and the outer spaces remained as it had in the transitional period. Some houses in the modern period had setbacks that did not surround the house but were cut into by a garage or a shop.

In the early stage of the modern period, the window designs were simple and took on either a rectangular or an arched shape (Figs. 4.88 & 4.90). Most people installed steel or aluminium bars to protect the windows on the ground floor. People tried to personalise the façades using different coloured paint, or marble or granite coverings (Fig. 4.88).



Fig 4.88: A house constructed in the modern period.

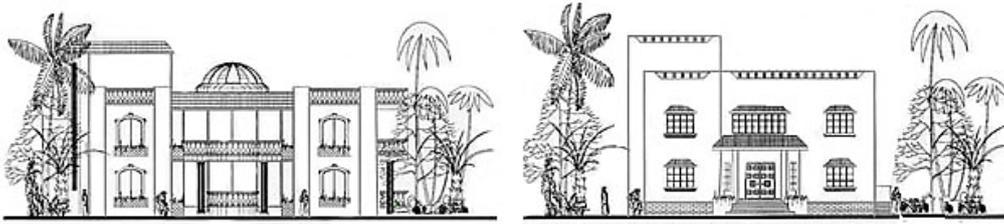


Fig 4.89: These two elevations show different shapes that appeared in the modern period.



Fig 4.90: Houses in 1978.



Fig 4.91: A house with a simple façade.

4.3.11 Structure and Materials in the Modern Houses

The structure and materials in the modern period were an extension of those introduced in the transitional period. New kinds of finishing materials also appeared and were especially preferred by the wealthier citizens. Al-Naim explained that, “The economic upsurge enabled many people to import construction materials. An almost completely new market developed to supply people with the needed materials, especially after the government introduced subsidies for private housing” (Figs. 4.87 and 4.89).⁹⁹

4.3.11.1 Construction Materials in the Modern Houses

Although the main construction material continued to be reinforced concrete, there were developments in finishing materials. In the late 1970s, concrete became a standard building material (Fig. 4.92), and people began to use marble tiles in addition to plastering and coarse spray painting to cover the façades of their houses. People constructed homes using concrete blocks to build the walls. In the late 1980s, a few people began to use bricks, due to their thermal resistance, but because of their high price compared with concrete blocks, they were not popular. In addition, metal pipes, Jordanian stone, national marble and granite began to be used in façades.¹⁰⁰ In the 1980s, the water pipes were installed externally, but in the 1990s they were incorporated into the walls.

⁹⁹ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

¹⁰⁰ Al-Assaf, Mansour. Houses’ designs from «mud houses» to consult an architect in new houses, Al-Riyadh Newspaper. No. 16699, 14th March 2014. [Arabic Text].

In the latter years of this period, oven-baked clay blocks became available; these offered the strength and durability of concrete blocks combined with greater heat insulation. However, they were not available throughout the Kingdom of Saudi Arabia, produced mainly in the Central Province of the Kingdom and distributed to other regions via trucks (Fig. 4.93). Thus, the cost was higher. Oven-baked clay blocks are produced via highly mechanised industrial processes and cannot be considered a traditional building material.



Fig 4.92: The construction materials used in modern period.



Fig 4.93: A house in the final stages of finishing in 1978.

4.3.11.2 Construction Methods in the Modern Houses

In the modern period, reinforced concrete construction became the dominant housing construction system in Saudi Arabia. (Figs. 4.94 & 4.95). Nevertheless, there was a wider choice of materials not used before the modern period, and many systems, such as electricity, sewage systems, and weather control devices, were developed to improve the quality of residential environments.

4.3.12 Decoration and Visual Elements in the Modern Façades

In the early part of this period, some residents introduced balconies to their houses; however, they did not intend to use them, and they were a visual element only. By the late 1980s, people commonly had unused outdoor spaces.



Fig 4.94: The picture shows a building under construction in the beginning of the modern period.



Fig 4.95: The picture shows an apartment building under construction in the modern period.

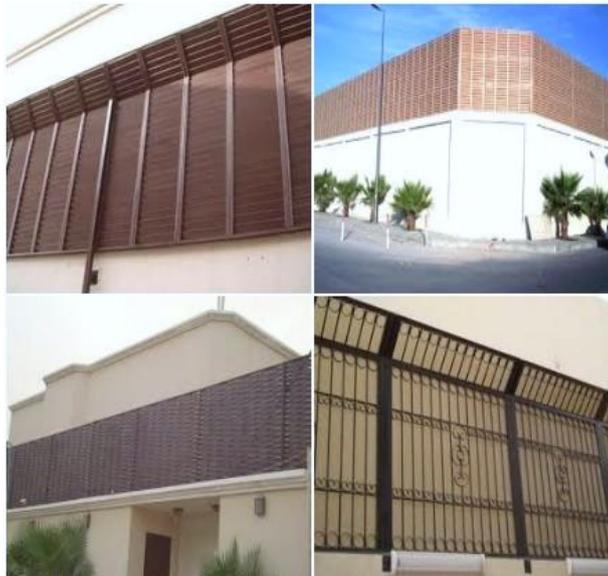


Fig 4.96: A barrier shield situated on top of the fence.

The design of the main gate for the house was intended to personalise the home and differentiate it from the family entrance gate, which was usually designed to be smaller and less decorative than the gate for guests, and sometimes consisted of only one door leaf. The exterior fence was simple and made of cement blocks with plain plaster and painted with one colour. Most people placed a screen on top of the fence to obscure their neighbours' views.

4.4 Summary

This chapter has studied the built environment from three perspectives. The first perspective is the spatial organisation, which relates to the kinds of spaces in neighbourhoods and houses and how these spaces relate to one another. The second perspective is physical systems, such as climate and privacy control. The third perspective is stylistic, which concerns the external features and materials. These perspectives can be used to answer the research question ('What are the changes that have occurred in houses, considering the impact of climate and privacy factors?')

This chapter has shown how the organisation of private compounds and houses that resulted from Aramco's direct impact on the region had a clear influence on the design of the detached houses of the Dammam Metropolitan Area in the transitional and modern periods. The first compound in the Eastern Province was the first planned American oil town. The Aramco residential compound was constructed because of the emergence of the oil industry and was a large settlement at a major oil operation site. Subsequently, all private residential compounds followed what Aramco did in its employee housing area. It has also been observed that oil booms played a direct role in the dramatic shift that occurred in the traditional, transitional and modern periods.

Table 4.3: General, physical and social features that influenced traditional, transitional (hybrid) and modern houses.

Features	Traditional Urban Planning	Hybrid Urban Planning	Modern and Contemporary Urban Planning
General Features	<ul style="list-style-type: none"> • Represents the old city • Limits in technology and transportation • Compactness of built forms and impeded sprawl • Internal organisation of space reflected climatic concerns • No central statues • No large-scale development • No master plans 	<ul style="list-style-type: none"> • Represents a period of indirect impact of Western culture • Beginning of direct impact of Western culture (oil discovery and exporting in 1938) • Expansion of the old city in all directions 	<ul style="list-style-type: none"> • First Building Regulations in Saudi Arabia were issued in 1960 • Governmental planning and master plans were introduced
Physical Features	<ul style="list-style-type: none"> • Irregular planning pattern • Circulation space was minimised, narrow and functionally proportionate to pedestrian flow • Streets and thoroughfares followed a clear, hierarchical organisation 	<ul style="list-style-type: none"> • The neighbourhoods were divided into large blocks planned in a grid-iron pattern. • Each block was called a <i>Hota</i> • Planning system similar to the early modern planning • Inner streets more regular 	<ul style="list-style-type: none"> • Grid-iron pattern in both main and inner streets • Small neighbourhoods • Several forms of grid pattern were applied • Some large neighbourhoods
Social Features	<ul style="list-style-type: none"> • Houses grouped and clustered to represent a social unit. • Usually, endogamous and blood relatives lived in one unit. • Courtyard houses designed to maximise privacy for residents 	<ul style="list-style-type: none"> • Social clustering continued because each extended family gathered in one or more blocks • In the early 1940s, groups of people moved to the oil cities • Some extended families moved to modern areas and established clusters in the existing quarters 	<ul style="list-style-type: none"> • Modern neighbourhoods were inhabited by labourers that moved from other cities • Form of social clustering found in some neighbourhoods. Many relatives with the same family name lived in the same area, such as Al-Mubarekeiah in Dammam • Social independence among detached, private dwellings, apartments and other housing types

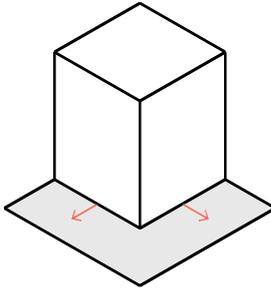
Source: Fieldwork.

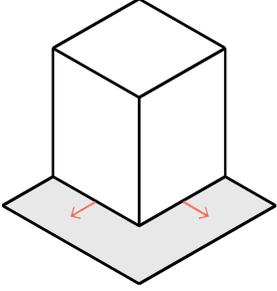
This chapter has highlighted the difficulties surrounding the issue of housing needing to adapt to sophisticated proposals, advanced building technology and modern ideas, whilst still meeting the economic, geographic and cultural needs of Saudi society, following the discovery of oil and subsequent development of the oil industry. The Kingdom of Saudi Arabia at this time was a society in which all of these aspects were undergoing rapid and profound transformation. The vigorous and legitimate desire of most government authorities and housing officials to achieve the objectives outlined in the development plans was clear. There

was a desire to improve the living standards of the Saudi people by providing them with the most modern housing models possible, and this was evident in the laws issued relating to urban planning and housing. In the modern period, however, it has been noted that residential neighbourhoods lacked the basic necessities for urban life.

The two tables (Tables 4.3 & 4.3) demonstrate the general, physical and social features of traditional, transitional (hybrid) and modern houses as observed from the fieldwork. This study has explored the meaning of house form and its features and observed the dramatic shift in the built environment throughout the period under study.

Table 4.4: Characteristics of the transitional and modern home environment.

Characteristics of the Transitional Home Environment	
Characteristics of the House Form	<ul style="list-style-type: none"> - Both traditional and new building systems, materials, and techniques. - New names appear for the house such as Nuss-Mussallah. - Solid mass with external courtyard.
A Sequence of Growth of a Hybrid House	<ul style="list-style-type: none"> - Vertical expansion and setback.
House Layout	
Built by	<ul style="list-style-type: none"> - Aramco and foreign contractors.
Funded by	<ul style="list-style-type: none"> - Funded by Aramco HOP and Family savings.
External Expression	<ul style="list-style-type: none"> - Simple and solid cement elements.
Characteristics of the Modern Home Environment	
Characteristics of the Building Form	<ul style="list-style-type: none"> - Free-standing detached houses using modern technology. - Detached houses, apartments, compounds in Dammam, Al-Khobar and Dhahran. - An assortment of building construction materials and finishing materials.

Characteristics of the House Form	<ul style="list-style-type: none"> - Different designs appeared for detached houses. - Wide range of house façades but could be classified by plastering materials such as textured façades, stone façades, granite Façadees, and white plastic painted façades (each material represents a specific period). - Houses must be designed and approved by professional architects and the municipality.
House Layout	
A Sequence of Growth of a Modern House	<ul style="list-style-type: none"> - Vertical growth
Built By	<ul style="list-style-type: none"> - Built by the government, real estate developers, private contractors.
Funded by	<ul style="list-style-type: none"> - Detached houses are funded by savings or REDF loans, family savings. Aramco saving.
External Expression	<ul style="list-style-type: none"> - Extroverted houses pursued individual expression through different styles and materials.

Source: Fieldwork.



Chapter V

The Pattern of Contemporary Neighbourhoods and their House Form

5. The Pattern of Contemporary Neighbourhoods and their House Form

5.1 Introduction

The Arab world is now mainly urban, with more than 58% of the population living in urban areas.¹ The last three decades of planned development have seen significant changes in Arab settlements in terms of, for example, transport links, land use patterns and living standards. The development of housing and urban planning started gradually since the exploration of oil. The great leap of development was after the first oil boom in the mid-1970s, while most of the changes in urban planning and housing development in the Gulf countries, which include Saudi Arabia, have occurred within the past 15 years.

Over the past three decades, significant growth in Saudi development has occurred due to the rapid migration of the population to the major cities. This rapid urbanisation has led to considerable inconsistencies between urban expansion and the number of inhabitants, particularly in the major cities. This has led to the inconvenient utilisation of infrastructure and growth in informal settlements. Moreover, the scattered nature of population settlements in these remote urban districts of Saudi Arabia has prevented their linkage to the standard facilities and service networks of urban areas.²

Urbanisation and modernisation have had far-reaching effects on the contemporary society of Saudi Arabia as a whole and the Eastern Province, in particular, mainly the Dammam Metropolitan Area. The Saudi environment is changing as social groupings readjust; economic growth has led to changes in people's status and category. The 1970s and 1980s saw rapid development as a result of the first and second Oil booms,³ during which the social and cultural situation continued to change while maintaining its customs and traditions. People adapted to this rapid development in every aspect of life between the 1990s and the present day. Saudi Arabia is still making considerable progress towards development.

This chapter examines contemporary urban planning and housing in the Dammam Metropolitan Area with regard to the functional and aesthetic aspects of their spatial organisation. In addition, it examines the extent to which this spatial organisation can meet the requirements of the population through a comprehensive description of the homes that have appeared. The focus is on low-rise detached houses and their internal and external characteristics.

¹ Elsheshtawy, Yasser. *The Evolving Arab City: Tradition, Modernity and Urban Development*. London: Routledge, 2008.29

² The population is concentrated in the main cities of Saudi Arabia like Dammam, Jeddah and Riyadh, as people have left their remote cities and villages (*Hijar*).

³ For more information, please refer to Chapter 1.

5.2 The Spatial, Functional and Stylistic Context of the Contemporary Urban Planning of Neighbourhoods in the Eastern Province of Saudi Arabia

The continued rapid pace of development and population growth (Fig. 5.1) has led urbanisation to become the principal factor affecting the patterns and planning of neighbourhood settlements in Saudi Arabia. Over the past 40 years, the social, economic and physical characteristics of Saudi Arabia, particularly the eastern region, have undergone enormous changes. In less than half a century, the country has been transformed from a nomadic and subsistence farming economy into a contemporary urban/industrial society as a result of the dramatic increase in national income, which can be attributed to the development of the oil trade and related industries.

In 1989, the approval by Saudi cities of an ‘urban boundary’, which was prepared by the Ministry of Municipal and Rural Affairs and the Council of Ministers after a three-year study,⁴ became another governmental determinant of neighbourhood transformation. Urban growth has been the most important consequence of this development. Small local towns have become main cities due to the migration of a vast number of local people from outside the developed cities.

Extensive infrastructural improvements have been made, such as the construction of highways and wide roads, which have become a leading feature of urban development.⁵ Main roads and streets that were once three to five metres wide are now as wide as 80 metres. The small, traditional zigzag streets and dense settlements have disappeared. Planned neighbourhoods with office buildings, shopping centres and modern types of housing have become characteristic features of contemporary neighbourhood development in Saudi Arabia. The contemporary neighbourhoods are smaller in size and much more crowded in terms of the number of inhabitants and the number of lots compared to neighbourhoods in the traditional, transitional and modern periods. (Table 5.1)

There is no doubt that contemporary urbanisation in the main cities in Saudi Arabia has many positive aspects, such as improved living standards and higher family and individual income, as well the revitalisation of economic life and the growth in literacy rates. “Urbanisation is a function of various ingredients of economic, social and political development processes spurred by a relatively resilient monetary economy, a shift from agricultural to non-agricultural employment, including that in industrial enterprises and services, the spread of social amenities and drastic changes in sociocultural systems which have transformed urban environments.”⁶ Urban growth in Saudi Arabia continues to be rapid. This is the most important factor in

⁴ Ministry of Housing and Public Works. *Housing for All: Commitments and Achievements in Saudi Arabia*, the Planning Ministry, Riyadh, Saudi Arabia, (1987): 3-12.

Ministry of Municipal and Rural Affairs. *Architectural Heritage in Saudi Arabia*, Agency for Urban Planning. 2002. [Arabic Text].

⁵ Ministry of Housing and Public Works. *Patterns of Housing that were Prevalent at the Beginning of The Present Century*, Saudi Arabia, housing in Saudi Arabia, the Aspirations and Achievements of One Hundred Years, Ministry for Housing Affairs within participation in the events to commemorate the centenary of the founding of the Kingdom. 1999. [Arabic text].

⁶ Impact of urbanisation on individual and household income, <http://collections.infocollections.org/ukedu/en/d/Jha15pe/6.html> (accessed July 07, 2017). United Nations Centre for Human Settlements (Habitat), Working Paper on Human Settlements, prepared for the Commission on Sustainable Development (unpublished). 1994: 47.

proper urban planning, as population growth requires an increase in the number and diversity of housing types to meet the growing need. Thus, it is necessary to rethink the current urban planning policy for new emerging neighbourhoods.

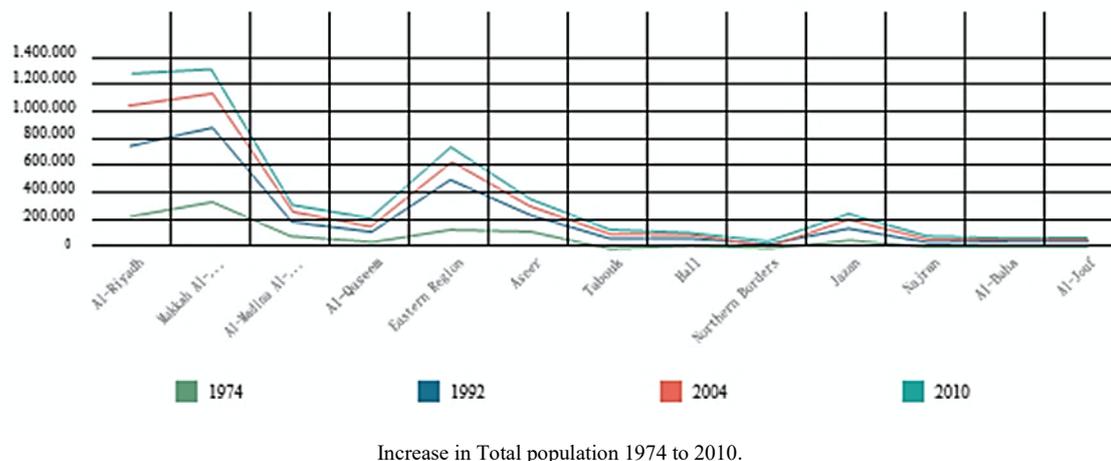


Fig 5.1: Population and household growth in the Eastern Province of Saudi Arabia from 1974 -2010.

An apparent shift from modern to contemporary is taking place in many areas. It is evident in urban development and the application of new structural technology and methods. There have been some efforts to modify housing policy and building codes. Since the 1970s, the adoption of Western patterns of urban development has affected Saudi Arabian architects and town planners because the Western model was widely recognised as modern, and as such, the westernisation that occurred followed the Modern Movement and its concepts. “Geographers and planners in the Arab world realise that a solution to many problems associated with rapidly expanding urban areas must be found in a synthesis of Western technology and traditional Islamic concepts of urban life. Importations of Western technology and practices like urban renewal, subdivision planning, or garden cities have not solved the problem.”⁷

On the other hand, some Arab architects and planners have consistently attempted to bring original urban forms in-line with the Arab-Islamic tradition. Working for public and academic institutions, they produced a body of literature that deals with their concern with recreating traditional living spaces in the city, although this did not apply on the ground at that time.⁸

In the field of public housing, various ministries sponsored new neighbourhoods for their employees, and whole new cities were built to accommodate military and industrial development, such as King Khalid Military City (KKMC) and the KSA Royal Commission for Jubail and Yanbu.⁹ There is now a trend to facilitate housing for citizens by creating residential quarters with integrated services, and to fully construct

⁷ Costa, Frank J., and Allen G. Noble. "Planning Arabic Towns." *Geographical Review* 76, no. 2 (1986): 160. Doi: 10.2307/214622.

⁸ Abdel Aziz Noor, M. M. Factors Underlying Traditional Islamic Urban Design, *Planning Outlook*, 24 (1981): 29-30.

- Mustapha A. F. and Costa F.J. Al-Jarudiyah: A Model for Low-Rise/High-Density Development in Saudi Arabia, *Ektistics* 287 (March–April) 1981): 100 -101.

⁹ Fadden, Y. M. "The Development of Contemporary Housing in Saudi Arabia (1950-1983)." PhD diss., MIT Cambridge, 1983.

- It is the Middle East Construction. KSA Royal Commission for Jubail and Yanbu, 1978.

homes before making them available for public ownership through the Real Estate Development Fund (REFD).

The housing sector of the third Five-Year Plan (1980-85) ¹⁰ accorded more attention to low-income and public employee housing. Interest-free loans continued to be offered for private residential development and for the development of rental units.¹¹ By the end of the plan, the country's city infrastructure was largely complete.

Table 5.1: This table shows the area of neighbourhoods from the traditional to the contemporary period. The numbers indicate the increasing order of neighbourhoods' size from traditional to modern then the total area tends to decrease again.

The period	Neighbourhood's Name	The Area, m ²
Traditional	Al-Adamah	0.969 km ²
	Al-Dawasir	0.471 km ²
	Al-Amamrah	0.409 km ²
Transitional	The Labour City (Dammam)	1, 47 km ²
	South Al-Khobar	1.83 km ²
	The Labour City (Al-Khobar)	1.7 km ²
Modern	Abdullah Fuad	1.9 km ²
	South Al-Rakah	2 km ²
	Dana North	2 km ²
Contemporary	Al-Saif	1.2 km ²
	Al-sadafa	1.03 km ²
	Al-Safa	1.3 km ²
	Dhahran Hills	1.1 km ²

Source: Measurements were taken from Google Earth.

The fourth Five-Year Plan (1985-1990) aimed for a decline in construction activity¹² as the municipal supply of housing exceeded demand. In rural areas, however, demand still outstripped supply. The Fourth Plan proposed a shift in activity to the countryside, along with a new emphasis on qualitative considerations and the efficient use of resources. This remains the focus regarding housing in the current fifth Five-Year Plan.¹³

In just four decades, construction on an enormous scale has radically changed urban and populated rural settlements; contemporary society has seen a move away from traditional structures and planning; the first Aramco survey of Al-Khobar was followed by the development trends of Dammam and today's cities. During

¹⁰ Ministry of Planning, 1980.

¹¹ Ministry of Planning, 1980.

¹² Ministry of Planning, 1985.

¹³ Ministry of Planning, 1990

this period, housing policy has been the result of centralised decision-making. These decisions have had a profound effect on Saudi society.

The urban concepts implemented in Al-Khobar are similar to those in Dammam and Dhahran. Nevertheless, there was a major difference between the two. In the case of Dammam and Al-Khobar, the urbanism projects, including planning, designing, and construction, were completed by government municipalities. Aramco planned and developed Dhahran city, and in the last five years, new neighbourhoods have been constructed by developers, such as Dhahran Hills and Al-Qayrawan in the city of Dhahran. ¹⁴

Since the beginning of urban planning in Dhahran city, projects led by Aramco and developers differed from government ones in terms of the process of designing the residential districts and their concern with infrastructure. Aramco took into account the topography of Dhahran, which is a hilly area. (Fig. 5.2). Urban planning, therefore, differed from the familiar grid-iron that is common in the eastern region. Contour lines for dividing the residential blocks were followed, and the residential blocks are not identical in terms of the number and shape of residential plots.

Following the second oil boom, the impact and appearance of cultural changes became more noticeable in the continued changes to building design, features and standards, as well as the impact on the physical environment. New images, life patterns, styles and accommodation requirements also assumed increasing prominence. Nowadays, the Dammam Metropolitan Area in the Eastern Province is characterised by a contemporary architectural neighbourhood, with a small green park closely surrounded by private residences, shops, schools for boys and girls in every district, and in many cases, mosques at the centre of a settlement.

Cities in the Dammam Metropolitan Area grew both upwards and outwards in the last quarter of the 20th century. Tall buildings constructed of steel and with elevators turned the old downtown areas with low-rise buildings into business districts with many office buildings, department stores and banks. The improvements in modern urban areas that have occurred over the past 20 years provided the new downtown areas with many workers and customers. High-rise buildings became widespread, residential neighbourhoods increased in number and widened, and there was a rapid border expansion along the main roads to link outlying neighbourhoods to the downtown area. The new neighbourhoods ranged from small areas of single and simple housing units inhabited by employees to beautiful residential suburbs scattered across the region. The increasing participation of women in the labour market in Saudi Arabia is expected to result in significant changes to the nature of the city as a whole.

¹⁴ These are names of contemporary neighbourhoods in Dammam Metropolitan Area.



Fig 5.2: Al-Doha district in Dhahran in the Eastern Province in Saudi Arabia.

Over the past two decades, the government of Saudi Arabia has adopted a new vision to develop contemporary cities.¹⁵ This trend is reflected in the attempts by planners to build new communities that are compact, walkable and based around community centres, reducing automobile dependence and reproducing many of the best features of early 20th century neighbourhoods and suburbs.

5.2.1 The Design Concept of the Urban Fabric of the Contemporary Neighbourhoods

Urban planning in Saudi cities can be identified by the process of the formation and transformation of residential settlements. The study of the neighbourhood as a unit of urban development could provide useful basic information to deal with the complexity of modernisation trends. There is a need to improve the understanding of changes in neighbourhoods. It is necessary to study the urban fabric of contemporary neighbourhoods in the Dammam Metropolitan Area in order to understand the effects of privacy, safety and security, morphology and compactness on the design of houses.

5.2.2 Privacy in the Contemporary Period

During the contemporary period, some traditional values continued to dominate social life in Saudi Arabia, such as the segregation between females and males, and privacy issues. There have been some minor changes in lifestyle, particularly in the major cities of the Kingdom, including the Dammam metropolitan cities, where economic and political transactions have increased openness to the outside world.¹⁶

¹⁵ Ibrahim, Abdulbaqi. *Continuity in urban development - Style, methodology and application in Saudi regions and cities*. Proceedings of Symposium of creativity and excellence in the urban development in the Kingdom within 100 years, The Ministry of Public Works and Housing, Saudi Arabia. 1999. 1-6. [Arabic Text]

¹⁶ Khaled Buraq, Essam Hanafi. "The Impact of the Environment on the Architectural Character of the Dwelling in the Kingdom," Fifth Saudi Engineering Conference, Makkah. Arabic reference. 1999.

There is minimal Western influence on moral trends in Saudi Arabia; people remain conservative, and privacy is a major societal concern. Modernisation is reflected in the physical environment of residential settlements. The attractions of the Western lifestyle have had an impact on the ambience of the city and the forms and façades of buildings. People are fascinated by the use of the Western design in their dwellings. As Boon noted, contemporary houses in Saudi Arabia are strongly influenced by colonial villas in the Middle East. The main concern of urban planning in Arab-Muslim societies remains residential privacy.¹⁷

It is sometimes apparent in contemporary neighbourhoods that planners did not consider privacy concerns. This disrespect is evident in the authorisation of high-rise office or residential buildings with six to eight floors. The presence of commercial blocks next to low-rise residential dwellings of a maximum of two floors means that residents are unable to use their outer yard (Fig. 5.3).



Fig 5.3: This picture shows some apartment buildings constructed next to a residential complex of small detached villas.

5.2.3 Safety and Security in the Contemporary Period

Planners involved in contemporary urban planning in the Dammam Metropolitan Area have attempted to address the mistakes that occurred in the modern period. They have sought to provide a dedicated kindergarten area located in the inner area on a street of no more than 20 metres in width. However, other schools are still found on arterial or wide roads with heavy traffic (Fig. 5.4).

The aim of footpaths established between contemporary residential blocks is only for separating buildings or blocks from each other and are not used for the main purpose of facilitating pedestrian traffic through the neighbourhood. This puts pedestrians at risk of traffic accidents. Furthermore, homes on the borders of the neighbourhood are still located directly on the highways, which increases the risk of the inhabitants and

¹⁷ Boon J.J., 1982. The Modern Saudi Villa: its Cause and Effect, Arabian Journal for Science and Engineering, V.7, No. 2, University of Petroleum and Minerals, Dhahran.

drivers being involved in traffic accidents (Fig. 5.6). A bypass road is needed as a local street leading to the houses.

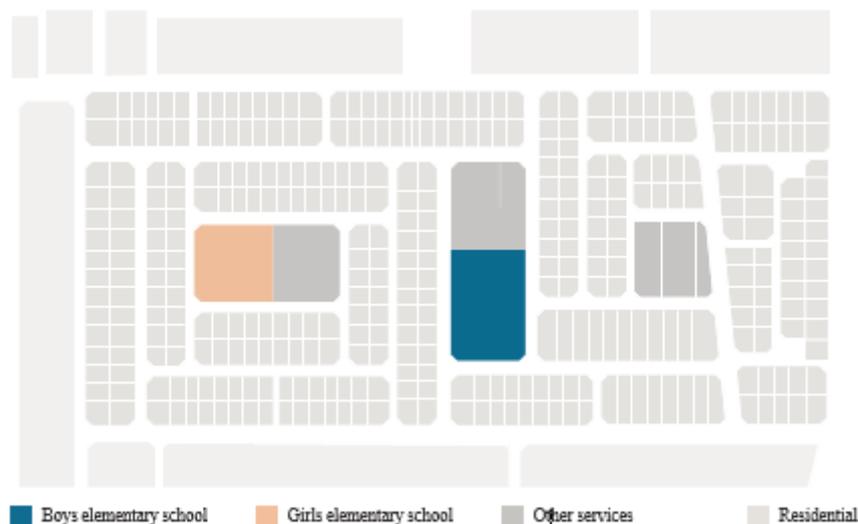


Fig 5.4: Al-Ariefi neighbourhood in Dammam city. The blue rectangle refers to the boys' elementary school; the pink rectangle refers to the girls' elementary school.

In contemporary residential settlements, some main streets have been extended a long distance without junctions or traffic lights, giving drivers the freedom to drive at high speeds without restrictions within the neighbourhood, which also has adverse implications for safety and security (Fig. 5.5).



Fig. 5.5: These pictures show newly planned streets in Dhahran in the Dammam Metropolitan Area; these are very long streets without traffic lights, pedestrian crossings, bridges, or speed bumps.

5.2.4 Morphology and Compactness in the Contemporary Neighbourhood

The most important issue in city planning is rapid population growth. In the contemporary period, cities in the Dammam Metropolitan Area began to suffer from overcrowding, squatter settlements, housing shortages, unemployment and a lack of urban infrastructure, services and amenities. These urban problems have put

municipalities and governments under stress, forcing planners and policymakers to seek new ways of managing urban growth (Table 5.2).

In contemporary urban planning in the Eastern Province, compactness can be used to reduce spatial ineffectiveness in inland areas, where 160 houses are built on a plot area measuring 180 metres by 360 metres.¹⁸ Urban compaction is the opposite of urban sprawl, which refers to the scattering of new settlements in suburban areas and their separation from other areas of unoccupied land. Urban sprawl has been criticised for the inefficient use of land resources and the lack of liveability and infrastructure. However, there is a shortage of good indicators that could be used to measure and monitor urban sprawl.

Table 5.2: The cumulative number of dwellings to be provided and the predicted family size by 2025 by administrative region.

	Planning Period					
	Years	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
The Eastern Province	Predicted population	3312200	3644260	4010355	4416073	4867294
	Predicted average family size	7	6-7	6	5-6	4-5
	Predicted number of families	511932	563255	392165	444771	504708
	Predicted Number of Dwellings that Must Be Replaced	23248	26365	29008	31922	35151
	Predicted demand new housing for in each period	53027	52863	58281	64588	71833

Source: Al-Hariqi F., J. Salagour, A. Al-Shieha, 2007.

5.2.5 Key Aspects of the Contemporary Neighbourhood

The government is currently no longer solely responsible for planning residential neighbourhoods in the Dammam area, but has instead allowed developers to enter real estate development. As a result, the municipality no longer has responsibility for neighbourhoods, and many have suffered from inadequate maintenance services, such as a lack of street cleaning and repairing damage to streets and pavements, as well as adjusting and operating street lighting.

¹⁸ Ibrahim, Abdulbaqi. *Continuity in urban development - Style, methodology and application in Saudi regions and cities*. Proceedings of Symposium of creativity and excellence in the urban development in the Kingdom within 100 years, The Ministry of Public Works and Housing, Saudi Arabia. 1999. 1-6. [Arabic Text]



Fig 5.6: Al- Rofan neighbourhood in Dammam, an example of contemporary urban planning in the region.

Local developers tend to plan neighbourhoods in the Dammam Metropolitan Area in a different style to that in the modern neighbourhoods. The developers have adopted the remaining vacant and unplanned land located in hilly areas or outside the urban boundary. The topography of the area has had a significant impact on the planning style of the neighbourhood. Urban planning uses some different patterns that are derived from the grid-iron pattern.

Most contemporary neighbourhoods are designed as narrow oblong residential blocks, which have encouraged developers to build residential complexes for investment. These projects have small housing units. As a result, the residential blocks in the contemporary period have more houses than the neighbourhoods with grid-iron planning (Fig. 5.6).

5.3 The Street in the Contemporary Period

Narrow and long streets with small lot sizes and a setback requirement are a result of urban planning, and government building regulations; outdoor spaces for children to play have decreased in number or ceased to exist. As a result, roads have become unsafe for both adult and child pedestrians. Most contemporary neighbourhoods have central pathways for residents to use, which should encourage them to walk. On the other hand, the paved walkways that connect parts of the neighbourhood with mosques and community centres have been neglected.¹⁹

¹⁹ The journey between mosques and homes is repeated five times a day and thus needs a safe and comfortable design.

In recent years, cars have become the primary means of transportation, which has affected the layout of contemporary neighbourhoods. Street design is based on car traffic. All roads have become public property, allowing cars to reach the doorstep of the house. Citizens have become resentful of having to use their car to carry out any activity in the neighbourhood (Fig 5.7).²⁰

It is worth noting that the municipality realised the need to find ample dedicated parking to avoid the confusion that prevails in crowded places, particularly downtown. The municipality has also focused on repaving pavements and pedestrian walkways, particularly the ones located on commercial streets. It has also imposed strict laws concerning vehicles parked on the pavement.



Fig 5.7: A main street in a contemporary neighbourhood (Al-Khobar, Eastern Province).

The new street pattern and street hierarchy are designed according to the shift away from public transport to the use of private cars. The importance of linking residential and industrial neighbourhoods to each other by highways, in addition to the lack of integrated service centres inside the neighbourhoods, have led the highways to be the widest roads and the streets between the houses to be the least wide. This type of street is not suited to local climatic and environmental conditions; nor does it integrate with the socio-cultural structure of the society. It is questioned whether the current street design is able to inhibit the passage of dust storms that currently pass and blow their heat and sand unimpeded through the town.²¹

5.4 The Community Area in the Contemporary Period

The idea of ‘community’ in contemporary neighbourhoods involves ongoing relationships between residents who use the various neighbourhood amenities, share certain common standards and values, and feel ‘at home’ in their neighbourhood. Cater and Jones argue that a community is “a socially interactive space inhabited by a close-knit network of households, most of whom are known to one another and who, to a high degree,

²⁰ Al-Qahtani, Hind, and Ahmed AlJarallah. *Digital documentation of urban growth in Saudi Arabia 1902 -2010*. Dammam: Dammam University, 2014.

- Tariq, Ismail & Alkhossan, Rashid. The development of Future Urban Plans for Urban Areas, According to the Expected Natural Growth (Dammam Metropolis a Case Study). 2010.

²¹ Afshari, Afshin, and Adalberto Del Bo. "Urban Smart Shading Devices Based on Traditional Gulf Design. Case-study Located in A District on a Hot -Arid Climate City (Abu-Dhabi)." *Proceedings of IEEE International Smart Cities Conference, Guadalajara, MX*. Accessed March 10, 2016. http://www.eletrica.ufpr.br/anais/isc2/2015/papersISC2_2015/100.pdf.

participate in common social activities, exchange information, engage in mutual aid and support and are conscious of a common identity and belonging together.”²² However, the situation is different in the community areas in the Dammam metropolitan area. The government dedicated areas in the centre of neighbourhoods and left their design and construction to developers and contractors. They did not take into account the needs of their users, as well as the conservative nature of Saudi society, and neglected to consider the impact of planning and design on the surrounding environment (Fig 5.8).



Fig 5.8: A contemporary neighbourhood in the Eastern Province shows the community area in the middle of the settlement.

5.4.1 The Market in the Contemporary Period

The market area in contemporary residential neighbourhoods is usually located in the centre of the neighbourhood to make it readily available to all residents of the community. The commercial area is often located near the central mosque and a nearby park. The market area usually remains empty until a developer who is interested in building it and renting out its shops can be found, since its construction is not within the jurisdiction of the municipality.

5.4.2 The Mosque in the Contemporary Period

The distribution and location of mosques in each neighbourhood are based on the need to have a mosque in every residential area within the neighbourhood to make it easier for people to frequent their local mosque.

²² Cater, J., and T. Jones. "Social Geography: An Introduction to Contemporary Issues." Review. SAGE Journals, 4585-588, 14 (December 1990): 586-88. Accessed February 3, 2014. <http://phg.sagepub.com/content/14/4/586.extract#>.

The Ministry of Islamic Affairs and Endowments oversees the construction of mosques, while people from different charities work to take care of the building and services (Fig 5.8).

5.4.3 Types of Buildings in Contemporary Neighbourhoods



Fig 5.9: Commercial building in the centre of the neighbourhood.



Fig 5.10: A governmental girls' school.

A variety of buildings are located in contemporary residential neighbourhoods in the Dammam Metropolitan Area, in addition to the housing and mosques. Each new neighbourhood contains schools for boys and girls, nurseries, commercial buildings that provide shops, and some banks that have opened a branch in every neighbourhood (Figures 5.9 and 5.10). The contemporary neighbourhoods have either government or private clinics. In some contemporary residential settlements' areas allocated for apartment buildings and residential towers built for investment purposes are located on highways on the borders of the district.

5.5 Housing Types in the Contemporary Period

After the second oil boom in Saudi Arabia and an increase in oil production, growth in the nation's cities seemed inevitable. Rising demand for built structures was expected. The government, Aramco (the oil company) and wealthy merchants' markets in Saudi Arabia opened up for external supplies of new building materials and modern techniques. At the same time, new architectural design concepts and styles were used with new construction materials and technologies.

Newly wealthy Saudis reject some of the traditional values as old-fashioned, such as the segregation between males and females, and the stringent privacy policy. In addition, the government modernisation programme has encouraged the adaptation of western behaviours and qualities through the application of housing policies and building codes.

It should be noted that houses have increased in complexity over the years, as is the case with life in general. The differences in the spatial layout of houses in the Eastern Province, and particularly in the Dammam metropolitan cities, corresponds with the changing economic and social context.

Some changes occurred in houses constructed in the late 1960s and 1970s, the beginning of the modern period. A third storey became more common, most balconies have been dispensed with, but they have been constructed for decorative purposes in some contemporary houses. Additional dedicated seating areas for women guests on the ground floor have been constructed.

Finishing materials began to appear but were at first just topical surface coverings that did not affect the design of the house. However, different shapes of houses designed by Italian and Greek architects became more widespread. Al-Sulaiman stated that, "People felt they were still ahead of their houses. After the big jump of abandoning, they were content with what they had. It was not the houses that were adapting to the people at this time, but the people were adapting to their new living environment."²³

During this period, several patterns emerged to enable the housing to fit the needs of the local people in this region, who included citizens, foreigners, small and large families, and single labourers. The types of housing currently seen in the Dammam Metropolitan Area are listed below. While there has been a decrease in the number of traditional houses and houses that emerged in the transitional period, architectural patterns and types of buildings in the modern period still exist alongside those from the traditional period.

5.5.1 Semi-Detached Houses

The semi-detached house (duplex) first appeared in the Eastern Province in Al-Khobar in 1992 before spreading to other cities and regions in Saudi Arabia.²⁴ Semi-detached houses appeared to provide a type of residence that differed from apartments, providing more privacy, a separate piece of land, private outdoor space for each unit, and services needed by all contemporary families, such as a separate room for the driver and maid and a garage for their cars. These services are not available with apartments. In the case of this type of housing, investors have looked to meet the needs of small families, single business people and employees who move between regions when commissioned to do so by their work.

Semi-detached houses always appear within groups of units. The semi-detached house usually stands on an area of land of between 200 and 400 square metres in size. It first emerged in the Eastern Province of Saudi Arabia. Semi-detached houses were built with the intention of achieving a balance between privacy and individuality. They are a smaller version of the houses that are built in the contemporary period, but have the advantage of being much more economical and thus more affordable.

In Saudi Arabia, the improved performance of the real estate market has sped up the construction of commercial houses in different parts of the country; they are offered for sale in both unique and similar designs.²⁵ After reviewing the shifts in the housing sector in the Saudi context, semi-detached houses are being constructed in increasing numbers by individual investors or developers (Fig. 5.11). As national

²³ Al-Sulaiman S. The Development in the Private Home in Al-Khobar. Unpublished research, King Faisal University, Dammam, KSA. 2002.

²⁴ The word duplex, a (US) and (Canadian) term, meaning a small house divided into two separate dwellings for two families, first appeared in 1922.

²⁵ "Reinventing Construction: A Route to Higher Productivity." Accessed August 4, 2017. <http://www.bing.com/cr1>.

investment in the housing sector has fallen, developers can take advantage of this fertile environment by providing houses as marketed goods.



Fig 5.11: A group of semi-detached houses under construction located in Dhahran.

This type of house is constructed by two kinds of real estate developers: comprehensive and specific developers. The large developers deal with more practical measures and work within the social and economic framework of middle-income families. However, specific developers not only construct houses, but may also pay attention to the smallest details, providing luxuries to their clients and designing houses to a full finish. This can prove very costly to middle-income families.

The developers of semi-detached houses aim to make the most of the land. (Figs. 5.12 & 5.3) Developers buy a plot of land, ranging in size from 390 to 900 square metres in size,²⁶ and then build houses of two to four different designs. Between eight and 30 units are usually provided in each project by small-scale developers, a figure that rises to more than 100 units for large-scale developers. Experts expected the total demand for this type of house in the Dammam Metropolitan Area to have reached 7 to 10% by 2015, increasing to 15% of the total houses in the area by 2025.²⁷ Occupants' satisfaction with their current semi-detached units was investigated by Al-Saati, who surveyed middle-income families with between two and eight people per household who employed a maid and sometimes a driver.²⁸ In total, 89.3% of residents had bought the house from private developers, whereas 10.7% had built the house themselves. Just over half (52%) of people had purchased the house in a finished state from real estate developers, while the rest had purchased semi-detached houses in a semi-finished state.

²⁶ This number is an estimated area for one residential block.

²⁷ Al-Harigi F., J. Salagour, A. Al-Shieha. *Estimate Number, Size and Type of Housing in Saudi Arabia for the Next Twenty Years*. King Abdul-Aziz City for Science and Technology, Jeddah. 2007.

- Al-Harigi, Fahad; Al-Sheeha, A.; Salagor, J. *Housing in Saudi Arabia: An Estimate of the Demand in the Regions*, King Abdul-Aziz City for Science and Technology (KACST) UN published Study. 2005.

- "Housing Projects." Ministry of Public Works and Housing, Deputy Ministry for Housing. Accessed April 21, 2012. <http://www.mpwh.gov.sa/e/index.html>.

- "Houses and properties in Dhahran, SA." Accessed February 20, 2012. <http://es.mapase.com/dhahran-107797>.

²⁸ Al-Saati, Maha. "Open Duplex House, An Open Building Application to Duplex Houses in Saudi Arabia." Master's thesis, Dammam/ King Faisal University, 2006, 19.



Fig 5.12: Two examples of semi-detached units sharing one wall, a common design that appears in the Dammam Metropolitan Area. Each unit is constructed on land area of 265 square meters.



Fig 5.13: An aerial view of some of semi-detached housing projects in the Al-Waha Neighbourhood, Al-Khobar, Dammam Metropolitan Area.

5.5.2 Triplex and Quadplex Units²⁹

The triplex unit is a new type of affordable housing that has appeared in the Dammam Metropolitan Area. The term triplex refers to a unit spread out over three floors, while a quadplex is spread out over four floors. A quadplex is a type of housing unit that is only located in the Al-Rakah neighbourhood in Al-Khobar city. The quadplex apartments of the Al-Rakah Manafe Project were constructed on residential land with a total area of approximately 20,000m². There are 12 units in each building, with an elevator, two annexes, a fire escape staircase, and a waste disposal area (Fig. 5.14).³⁰

²⁹ The triplex in the English dictionary is an adjective that has one sense: having three units or components or elements, while quadplex (quadraplex or quadriplex) is a building divided into four self-contained residences.

³⁰ A wide neighbourhood in which a variety of housing styles and sizes are found.

The units consist of three models. The first model has two bedrooms, a maid's room, a formal sitting room, a living room, three bathrooms, a kitchen and a laundry room with a total area of more than 143 m². The second has the same spaces, but the total area of the unit is smaller (138m²), while the third contains only two bedrooms, a large lounge, two toilets and a kitchen, with the same area (138 m²).³¹



Fig 5.14: Left: The Al-Rakah Manafe Project, a housing project of triplex apartments, in Al-Rakah, Al-Khobar, the Eastern Province. Right: One of the upper floor levels of the triplex project.

The number of freeholds furnished and serviced apartments in Saudi Arabia is likely to increase in the future. The number of freehold apartment buildings is currently increasing, and there are currently about over 7,000 furnished and serviced apartments in the Dammam Metropolitan area. During holiday periods, there is a significant demand for furnished flats in the region, since they are the most appropriate way of lodging Arab tourists due to a large number of family members. The freehold apartments are mostly sold to Saudis and non-Saudis who could own and rent their properties.

5.5.3 Observations on Spatial Organisation of Houses in the Contemporary Period

Semi-detached houses have become more widespread during this period, as this type of housing is suitable for middle-income or small families (Fig. 5.15). The general idea behind the spatial organisation of this kind of accommodation is the reason why many families prefer it. Most houses have the same floor plans. The ground and first floors are symmetrical in design.

The lots composed entirely of semi-detached houses are rectangular (Fig. 5.16). Spaces are organised according to their relationships with the main door. The majority of the semi-detached houses in the Dammam Metropolitan Area were designed according to the principle of public and private zones, and are arranged into the front, middle and back zones in response to privacy concerns (Fig. 5.17). Front zones have direct access to the main street and are always behind the main façade. The design of the central zones allows them

³¹ There was a difficulty with obtaining floor plans for the project.

to be accessed from the side setbacks through a second entrance, whereas the back zone usually overlooks the rear setbacks, and can be accessed by a service entrance.³²



Fig 5.15: An example of the semi-detached houses that are widespread in the Dammam Metropolitan Area.

5.5.3.1 The Ground Floor

The ground floor has the main entrance, men's sitting area and a dining room. These spaces belong to the front zone, while the family living room, an open kitchen or kitchenette and a staircase are located in the middle zone. A dirty kitchen and storage area are always located at the back of the house in order to push back the zones that people prefer not to show to their guests.

The house itself is surrounded by setbacks from three sides, with the widest at either the front or back to give the inhabitants a spacious area for outdoor activities. In the front yard, there is a separate driver's room with an en-suite toilet and a garage (Fig. 5.16).

5.5.3.2 The First Floor

The first floor contains the master bedroom, which is located in the front elevation of the house. It has an en-suite toilet and closet room. Two to four bedrooms with two to three toilets are either separated from the rooms or en-suite, and a hallway and a small kitchenette are located near to the staircase. The use of balconies appeared again in this period, particularly in semi-detached houses.

5.5.3.3 The Upper Annex

Houses built in this period have a roof floor that contains many of the spaces used after the amendment to the building regulations issued by the municipality.³³ The roof level now has the upper annexe, which contains

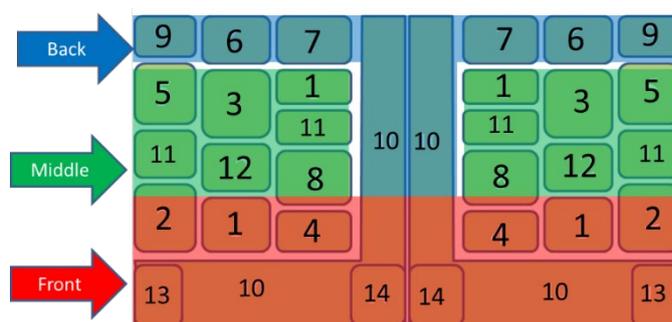
³² Al-Saati, Maha. "Open Duplex House, An Open Building Application to Duplex Houses in Saudi Arabia." Master's thesis, Dammam/ King Faisal University, 2006.

³³ The built-up area should not exceed 50% of the total area of the roof.

the laundry room and maid's room with its en-suite toilet, and sometimes an extra multi-purpose room (Fig. 5.16).



Fig 5.16: Spatial organisation of a semi-detached housing unit in a contemporary neighbourhood.



1: Entrance, 2: Men's sitting area, 3: Living room, 4: Dining room, 5: Staircase, 6: Open kitchen, 7: Dirty kitchen, 8: Women's sitting area, 9: Storage, 10: Courtyard, 11: Toilet, 12: Hallway, 13: Driver's room, 14: Garage.

Fig 5.17: Common spatial organisation of semi-detached housing in Contemporary Neighbourhoods.

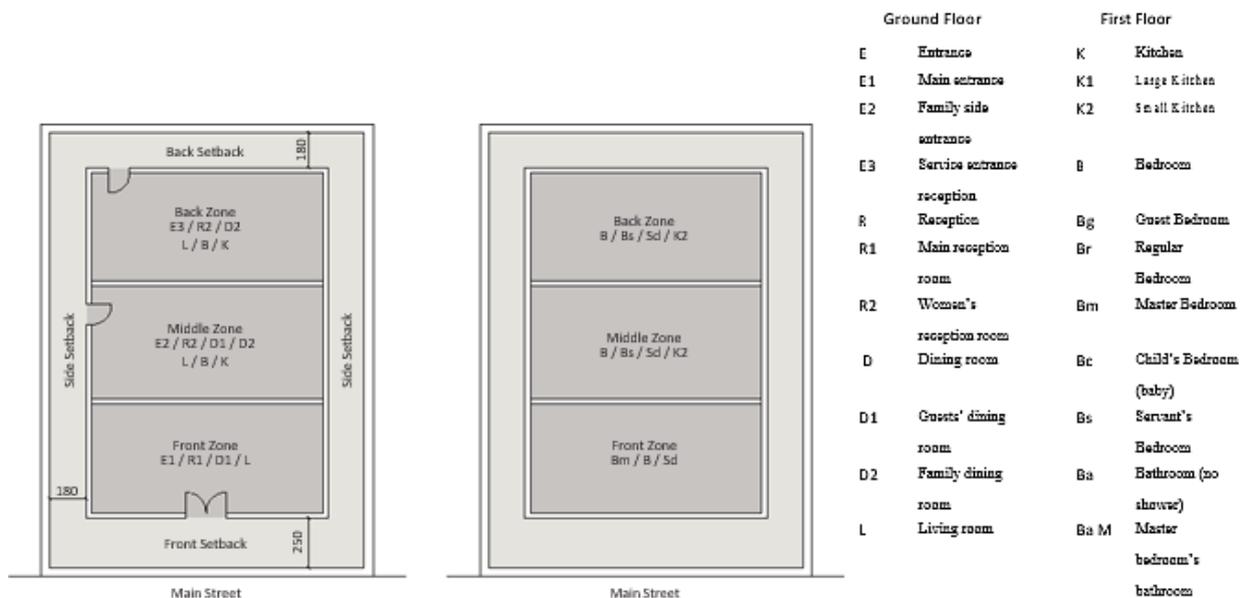


Fig 5.18: The common space locations found in the plans of the analysed houses.

5.5.4 The External Features in Contemporary Houses

In general, there have been a large number of changes to the external features of the housing sector in the Dammam Metropolitan Area in the contemporary period. There are no limits on the façades' models, particularly with the expansion of the market in façade elements and covering materials. Many modern, ancient and contemporary designs have emerged due to the advent of many different architectural styles.



Fig 5.19: These pictures show some common external features used in the Dammam Metropolitan area.

Some standard features characterise this period. Most houses use iron or aluminium for their outer main door because of its high durability and for aesthetic reasons, as both materials can be formed into a range of decorative shapes. Most garage doors are made of aluminium.



Fig 5.20: Iron and aluminum materials, which have become more widespread in the contemporary period, are used in main entrances in the outer walls.



Fig 5.21: An iron security grille is used to protect windows.

An iron security grille is also used to protect windows from breaking. This period saw an increase in the use of aluminium window shutters for the dual purposes of security and blocking out the sunlight (Fig 5.20).

The frequent use of glass in the cover façades has also become a feature of the contemporary period. The glass covers a vast area of some houses' façades in the contemporary period; double-glazing that keeps more heat out is used for this purpose (Fig 5.21); this also offers more insulation from sound and sunlight, and it is tempered against breakage. This window system complements the insulated external wall system by creating an envelope for the building that meets energy-saving targets.

In the contemporary period, municipal regulations state that the outer wall should always be built three metres high with simple decoration. During this period, there has been a clear change in the exterior fences used compared to those used in earlier times. As an integral element, these are of significant interest to designers, who have made considerable additions to the front façades to complete the house image.



Fig 5.22: Double-glazed windows protected by aluminum window shutters.

5.5.5 Construction Methods and Materials in Contemporary Houses

In the Dammam Metropolitan Area, the municipality requires people to follow building regulations and housing codes. The building enclosure system consists of a group of individual systems, such as walls, roofs, foundations, floors, windows and doors. The building envelope system can be further categorised as an opaque and transparent envelope system. This includes walls, roofs and floors, while the transparent envelope system includes windows, skylights and glass doors.

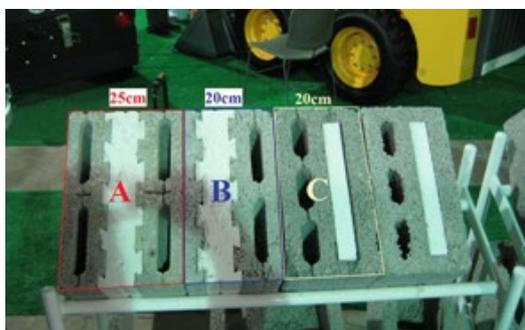


Fig 5.23: Different kinds of blocks used for construction in residential buildings in the Dammam Metropolitan Area.

The wall and roof systems use some materials that are carefully located to achieve particular aesthetic, structural, and thermal purposes appropriate to the hot and humid climate of the Eastern Province of Saudi Arabia. (Fig 5.23) Thermal insulation gives the freedom to enlarge interior spaces without fear of spreading the heat. This system was not adopted in the modern period. It is common for different building materials to be combined to achieve a particular function. For example, in walls, the materials can be arranged to create single-leaf solid walls with or without insulation. The insulation material is either located inside or outside,

depending on the principal material (Fig 5.24). The available finishing materials are assembled using contemporary styles and methods to give the façade the latest look.

Reinforced concrete is a typical construction system in residential buildings in the Dammam Metropolitan Area. The extent to which building materials are contemporary has affected the appearance of houses constructed during this period (Fig 5.25).

The roof system is the most important element of the exterior envelope. Flat roofs are widely used in Dammam and Al-Khobar, while sloped roofs are used in Dhahran.³⁵ As with walling systems, many roof types can be generated with a different arrangement of building materials. The cost and types of construction materials, as well as the construction methods, will affect the house form and the final price of housing units.



Fig5.24: This house is constructed of reinforced concrete and refractory bricks.



Fig 5.25: This house is constructed of reinforced concrete blocks, the common means of construction in the region.

Most houses were constructed using standard post and beam methods, relying on hollow concrete blocks and reinforced concrete. In a few cases, the units were made of prefabricated elements, with non-load bearing walls built with hollow concrete blocks (Fig 5.25). This type of construction method is chosen due to the ease of making later modifications to the non-structural elements.

5.5.5.1 The Building Structure in Contemporary Houses

A separate foundation is the most widely used type of footing in the construction of residential buildings.³⁶ However, raft footing is the most common foundation system in detached houses (villas) with basements. (Figures 5.26 and 5.27).

³⁵ Most houses in Dhahran built by Aramco HOP. The houses designed during the modern period adopted the Mediterranean style. The pitched roof is very common in this style.

³⁶ The wide use of separate footings may be indicative of the designers' consciousness about the need to provide reasonably priced foundation systems.



Fig 5.26: Architectural visualizations of typical detached houses in the Dammam Metropolitan Area.

Ground beams of 20x50 cm or 20x60 cm with uncoated reinforcing steel are usually used in villa construction. This measurement may reflect the standard size of walls used and work operations, since most walls use 20cm thick concrete hollow blocks, as shown in the walling system. The majority of residential buildings are built with columns of different sizes and shapes. This design element may require the thickness of columns to match the thickness of the internal and external walls, which are made with 20cm blocks.

Most of the houses in the contemporary period are built using solid slabs with a thickness ranging between 26cm and 32cm. The popularity of solid slabs could be attributed to their thermal insulation properties and the flexibility they offer when making changes to partition walls.



Fig 5.27: The common construction method applied in houses in the Dammam Metropolitan Area.

5.5.5.2 Wall Systems

The results show that the block unit is used in internal and external walls in residential buildings. Almost all the partition walls of buildings are made of hollow concrete blocks measuring 20cm x 20cm x 40cm. The use of this block size could be due to its reasonable quality and price, suitability for the column width, and appropriate thickness for insulation. It is expected that these types of cladding units will be widely used in future houses because of their energy-saving properties and the requirements set by official service providers, such as the electricity company. Residents found that blocks gave them more freedom in designing interior spaces with a lower cost than other materials, like precast concrete.

5.5.6 Decoration and Visual Elements in Contemporary Façades

Finishing materials are the building's first line of defence against heat, humidity and other destructive weather elements in the Eastern Province, particularly in Dammam cities. Durable exterior materials provide primary protection for concrete structural systems. Finishing materials are considered an interface between the environment and structural systems. Houses have used the new materials that have become available in Saudi Arabia since it opened up to world markets.

During this period, increased awareness has led to the involvement of four parties in building construction and the selection of finishing materials: architects and engineers, contractors, consultants, and owners. As well as being responsible for selecting materials, they are also attentive to the appropriateness of processes and factors relating to the selection and specification of finishing materials for concrete buildings in the Eastern Province according to cultural and climatic needs. They are concerned with material properties and durability, the availability of materials, ease of installation, the cost of materials, material installation location, suitability and performance of the material in hot and humid areas, maintenance and spare parts, and aesthetic elements.

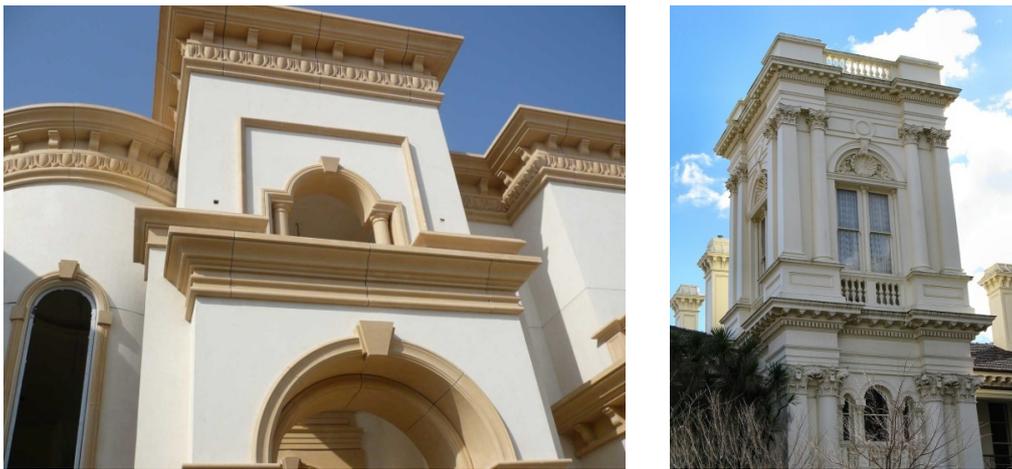


Fig 5.28: Some finishing materials commonly used in housing in the Dammam Metropolitan Area.

Some new materials have become widespread and gained a significant share of the market: Glass Reinforced Concrete (GRC), Glass Reinforced Plastic (GRP) and Glass Reinforced Gypsum (GRG). It is uncommon to see a house without any of these materials, as they are easy to install, appropriate to the local weather, are polymorphic with the possibility of their application, even after construction of the house is finished, and are available at a reasonable price.

Glass Reinforced Cement (GRC) can be used in structural or decorative products, such as decorative screens, A/C covers, cladding panels, column capitals, bases, vaults, planters, permanent formwork and a full range of custom-made applications (Fig 5.28). Glass Reinforced Plastic (GRP) is used in structural lightweight cladding panels, weather-resistant cantilever ceilings, vaults, modular buildings, car park shades, water tanks, sewage holding tanks, fountains and translucent domes. Finally, glass-reinforced gypsum (GRG) is a special

kind of gypsum used for permanent interior applications, such as cornices, mouldings, flat ceiling column capitals, arches and domes.



Fig 5.29: The GRC material applied on the whole façade of houses.

These materials have changed the concept of simplicity in façades with their potential for the application in the smallest details. The inconsistency in choosing decorative elements on windows, doors, columns and capitals is apparent. The selection of composite units is sometimes exaggerated, although the choice of more than one style in the design of a single house is always available.

Modern materials have facilitated the application of any type or style of architecture on the façades of houses, which has made some residents aware of the possibility of reviving the traditional models and styles of local architecture (Figs. 5.30 & 5.31). When the design is integrated with the development of construction techniques and new materials, houses can easily refer to traditional models.



Fig 5.30: The traditional style used in contemporary houses, taking advantage of modern materials and techniques. This house is located in the Al-Safa Neighbourhood in Dammam City.



Fig 5.31: Another example of imitating the traditional style in the façade of the house. This house is located in the Al-Sulaimanieah Neighbourhood in Dhahran City.

5.6 Summary

Urban and regional planning in the Dammam Metropolitan Area in the Eastern Province of Saudi Arabia changed considerably during the 1980s as new solutions were developed. The government improved urban development plans after reviewing what was appropriate for the region. The development of major urban planning during the 1970s and early 1980s paved the way for the normalisation of the relationship between planning and implementation. In addition, efforts were made, through research,³⁷ to find innovative solutions for existing and anticipated challenges in the development process.

Contemporary residential settlements and their houses are affected by both major and minor factors that influence rapid urban growth. City development is affected by economic, natural, population and cultural factors, as well as the effects of government regulations aimed at controlling urban development. Contemporary neighbourhoods with their streets and community areas still follow the same regulations and systems as those used in the modern period. The population has become more flexible in their dealings with privacy, and more understanding of how to deal with the surrounding climate when they plan and how to achieve the safety and security needed in their houses.

In the Eastern Province, traditions and social norms of the traditional period still inform the form and use of housing space. This influence was gradually lost by the time that the contemporary semi-detached (duplex) house was introduced. Uses and adaptations made over the years had slowly moved back towards traditional

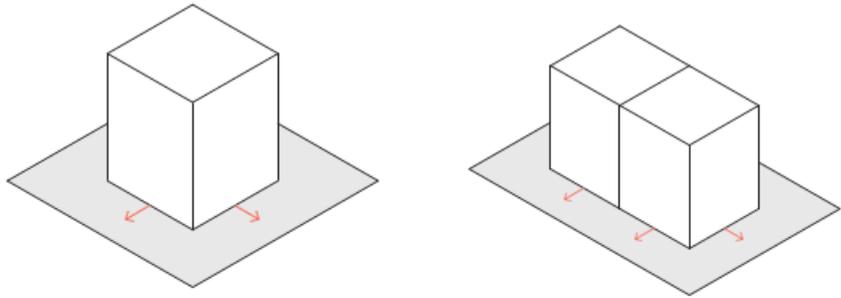
³⁷ Al Ankari, Khlid M. and El-S. El-Bushra, Eds. *Urban and Rural Profiles in Saudi Arabia*. Berlin, Gebrudern Borntraeger. (1989): 3-13.

- Al-Dossary, Mona K. A study of Current Residential Building in Al-Khobar and the Forces that Shape them, an unpublished thesis of philosophy, University of Bath. 2000.
- Al-Harigi, Fahad; Al-Sheeha, A.; Salagor, J. Housing in Saudi Arabia: An Estimate of the Demand in the Regions, King Abdul-Aziz City for Science and Technology (KACST) unpublished Study. 2005.
- Al-Hathloul, Saleh. "Riyadh Development Plans in the Past Fifty Years (1967-2016)." *Current Urban Studies* 05, no. 01 (2017): 97-120. DOI:10.4236/cus.2017.51007.
- Al-Hathloul, S., Mughal, M.A. Urban Growth Management-the Saudi Experience, *Habitat International* 28, (2004):609–623

values. However, this shift was superficial and not comparable to the strong influence that values linked with traditional houses had, which had been handed down for many generations since the continuity was lost.

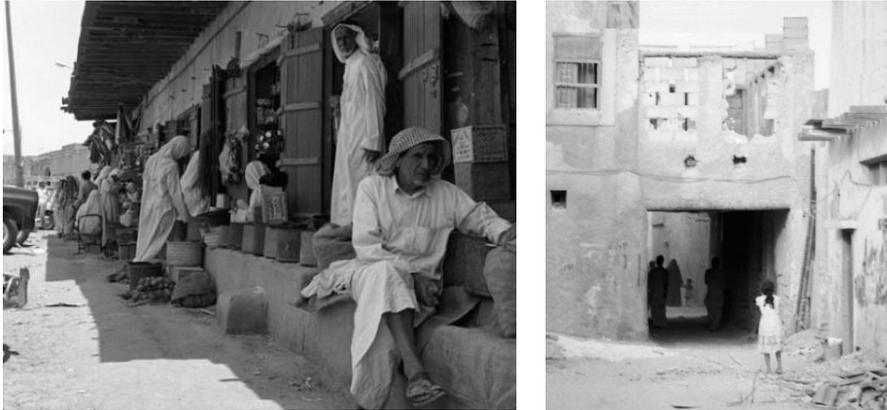
Many common characteristics appeared in the contemporary period. These characteristics are listed under building form, house form, house layout, the developer, and external features, as shown in the following table:

Table 5.3: Characteristics of the Contemporary Home Environment.

Characteristics of the Contemporary Home Environment	
Characteristics of Building Form	<ul style="list-style-type: none"> - Free-standing buildings using the same modern technology. - Detached villas, serviced apartments and semi-detached houses are the main types of housing in the Dammam Metropolitan area. - An assortment of contemporary building materials and the finishing materials. Glass cladding system characterises this period.
Characteristics of House Form	<ul style="list-style-type: none"> - Houses take many shapes, designs and styles with the support of contemporary technology and materials. - A wide range of house façades - Detached houses, semi-detached houses and freehold apartments are the most common housing types in this period.
House Layout	
Growth Sequence of a Contemporary House	<ul style="list-style-type: none"> - Horizontal growth continues, but at a slower pace than in the modern period - Vertical growth in buildings became more dominant.
Built by	<ul style="list-style-type: none"> - Built by the government, real estate developers, investors or private owners. - Houses designed by specialised architectural offices using professional Saudi or non-Saudi architects.

Funded by	- Houses financed by personal savings, REDF loans or mortgages.
External Expression	<ul style="list-style-type: none"> - Obvious displays of status. - Annexes with extra rooms may be built on the roof after the modification of building regulations. - Two spaces are constructed in the external setbacks; one for a driver with an en-suite toilet and an informal men's sitting room with an en-suite toilet.

Source: Fieldwork.



Chapter VI

The Impact of Anthropological Factors on House Patterns

6. The Impact of Anthropological Factors on House Patterns

6.1 Introduction

The term 'architectural anthropology' describes the bridge between the two disciplines, which aims to explain the relationship between people and their built environment. Building activities reflect cultural understandings, beliefs, practices, values, and ideas of relatedness. Therefore, 'architectural anthropology' offers a mutual relationship between the spatial organisation, cultural factors and anthropology.

There is a considerable body of literature detailing the relationship between social interactions and spatial forms of the built environment. In the review 'Spatial Organisation of Built Environment and Anthropology',¹ Rapoport highlights three questions: (1) Which characteristics of people as members of a class and various social groups, or as individuals, influence the shaping of the environment? (2) What effect does the environment have on individuals and groups under varying sets of conditions, what are the circumstances, and why? (3) What are the mechanisms that link people and environments together?² From the answers to these questions, it is evident that every space in the built environment has a purpose and meaning.

Some studies seek to explain household relationships with the built environment by focusing on relationships, development cycles, and gender relations, which are embedded in larger social processes that cut across individual domestic units. This analysis concentrates on the way people manage the built environment to meet their particular social needs and desires. Goody brought critical attention to the remarkable variability in household composition.³ Changing lifestyles provide continuous alteration of spatial configurations in dwellings. Prussin studied dwellings in six villages in Ghana, outlining the contribution of historical, economic, technological and social, organisational factors to each of the morphological patterns found.⁴ Habraken emphasised that a designer should not design buildings and force people into them; rather, they should consider parameters in their designs that reflect people's lifestyles and common conventions.⁵

¹ Lawrence's research has examined relationships primarily in the domestic sphere, including household and neighbourhoods, and has been concerned largely with issues of dwelling plans rather than style, construction materials and technology.

- Lawrence, DL, and Low, SM. "The Built Environment and Spatial Form." Review of Annual Review of Anthropology. Web of Science Categories 19 (1990): 453-505. Accessed January 11, 2016.

<http://www.annualreviews.org/doi/abs/10.1146/annurev.an.19.100190.002321?journalCode=anthro>

- Morgan's assertion that the form of the primitive dwelling is a direct expression of the organisation of the cooperating kin-group that occupied it.

² Rapoport, Amos. Culture and Environment. Accessed August 08, 2017. https://www.cmu.edu/ARIS_3/text/text_rapoport.html.

³ Goody, Jack. *The Developmental Cycle in Domestic Groups*. London: Cambridge University Press, (1971): 53-91.

⁴ Prussin, L. *Architecture in Northern Ghana: A Study of Forms and Functions*. Berkeley: Univ. Calif. Press. 1969.

⁵ Habraken, J. Questions that will not go away: Some Remarks on Long Term Trends in Architecture and their Impact on Architectural Education. Keynote Speech: Proceedings of the Annual Conference of the European Association of Architectural Education-EAAE. Hania, Crete, Greece. (2003): 32-42.

To understand more about the reasons for the construction of designated spaces and the requirements that allow them, Rapoport stated, "Any consideration of built environments must take into account not only the hardware but also people, their activities, wants, needs, values, lifestyles and other aspects of culture".⁶ The spatial organisation of spaces cannot be understood without considering other aspects directly related to them. Thus, this study considers lifestyle and housing code regulations, although these may not be emphasised or addressed explicitly. It is necessary to introduce the definition of the spatial organisation of housing in the context of the demographic anthropology study in the Eastern Province of Saudi Arabia.⁷

This chapter closely examines the nature of the relationship between inhabitants of the Dammam Metropolitan Area and their domestic forms, with specific features related to social organisation. It considers the family background, which includes the following: the family size, housing demography, household income and occupation structure, professional background and education. This chapter also includes a basic description of the family lifestyle and related human behaviour which occurs in houses.

6.2 Family Background in the Dammam Metropolitan Area

The utilisation of space in the house is affected by the family who inhabits it. Their background influences how they interpret elements within the interior and exterior spaces. Studying family backgrounds in the Dammam Metropolitan Area helps identify the beliefs and values of the people utilising the house.⁸ In this study, the case study areas are described in a way that connects lifestyle, urban design and architectural elements.

6.2.1 Population Growth

According to data from the Central Department of Statistics of Saudi Arabia, the population of Saudi Arabia has expanded dramatically since 1970. Before then, a high proportion of the population was rural. After 1970,⁹ however, the population distribution experienced a new trend in the form of a shift from rural to urban areas. In fact, it can be argued that the rapid growth in the size of the Saudi Arabian population witnessed between the 1950s and the 1990s occurred mostly in urban areas. The urban population increased from 5.9% to 48.7% of the total population of the country between 1970 and 1980.¹⁰

⁶ Rapoport, A. 'Spatial Organization and the Built Environment' Companion Encyclopedia of Anthropology: Humanity, culture and Social Life, Routledge World Reference, London, UK. Ch. 17. (2002): 461.

⁷ Anthropological demography is a speciality within demography which uses anthropological theory and methods to provide a better understanding of demographic phenomena in current and past populations. Its genesis and ongoing growth lie at the intersection between demography and socio-cultural anthropology and with their efforts to understand population processes, mainly fertility, migration, and mortality.

- Bernardi, L. *An introduction to anthropological demography*, Rostock: Max Planck Institute for Demographic (MPIDR Working Paper, WP 2007.

⁸ Gachogu, Lucy W. "Importance of Anthropology in Architecture." Academia. June 6, 2014. Accessed December 20, 2016. https://www.academia.edu/7304841/Importance_of_anthropology_in_architecture.

⁹ Al-Batel Abdullah H. Population Growth and Economic Development in Saudi Arabia, Scientific Journal of King Faisal University (Humanities and management sciences), Vol. 6 No.2. 2005,1426.

¹⁰ Al-Otaibi Abdullah. The Aspiration for Housing in Jeddah Saudi Arabia, Postgraduate Researcher, the University of Newcastle upon Tyne, UK, 6, no. 1. 2004. [Arabic Text].

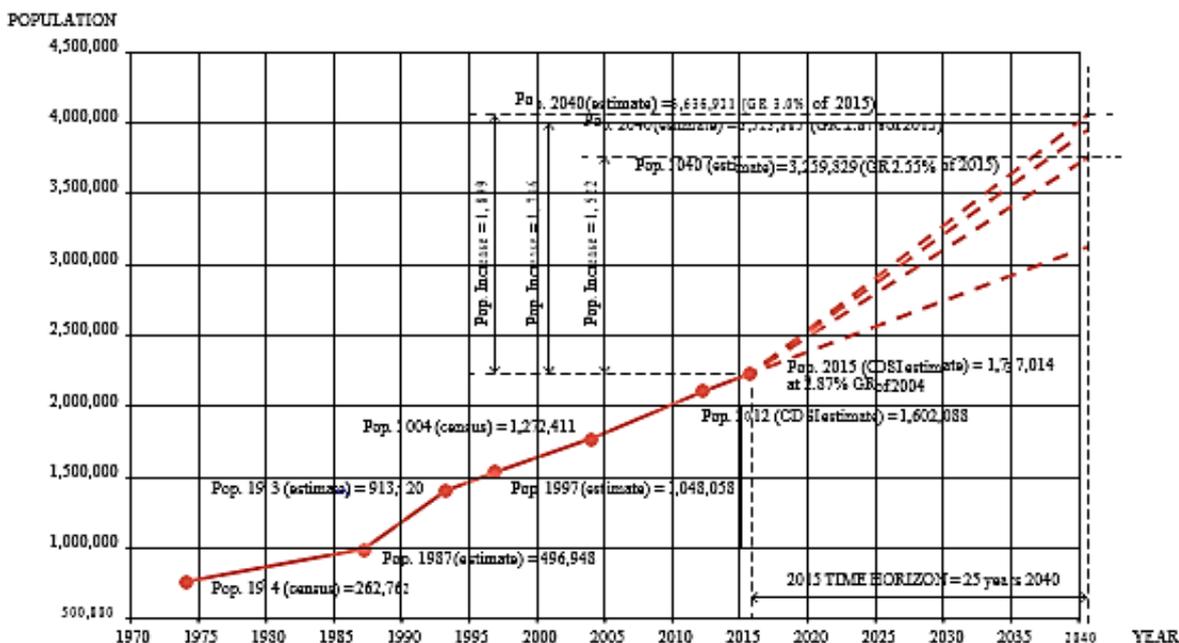


Fig 6 .1: History and projection of population growth in Damman Metropolitan Area 1974-2030.

The increase in the urban population continued at a high rate throughout the 1990s. In 1992, 77.2% of the total population, and 68% of the Saudi population lived in urban areas.¹¹ Stronger growth was forecast over the 14-year period of 2007 to 2020, as a larger proportion of Saudi society reached marriageable age (Fig. 6.1). This is in addition to the continued influx of expatriates and foreigners into Saudi Arabia due to the country's economic boom. Given the above, it was expected that the total population of Saudi Arabia would expand by 10.2 million people to reach 33.7 million by 2020.¹² The Damman Metropolitan Area, which contains the three cities of Damman City, Al-Khobar and Dhahran, has a combined population of 1,737,244.¹³

6.2.2 Family Size

Presently, the majority of households in Saudi Arabia are comprised of medium-sized Saudi families. The average family, defined as all family members in the household, excluding friends and helpers, consists of seven members. While one-quarter of families are considered small (with a family size of up to three members), one-third are medium (with a family size of four to five), and 40% are large (with a family size of six or more people). The average Saudi family size was expected to be an average of five people per occupied housing unit by 2020.¹⁴

¹¹ Al-Hathloul, Saleh, and Abdel-Rahman Mohammed. "Rationalize Urban Growth: The Urban Boundary as a Way to Guide Urban Development in Saudi Arabia the Integration of Social and Municipal Services, Riyadh." Arab Urban Development Institute 1 (1993): 31-62.

¹² Ministry of Planning. Population Census and NCB. Riyadh, Saudi Arabia, 2004.

¹³ "Indicators of the prosperity of the cities of the city of Damman in the first urban planning forum." *The Regions*, March 31, 2016. Accessed June 12, 2017. <http://almnatiq.net/219779/>. [Arabic Text]

¹⁴ Figures are generalized to all regions of the Kingdom, including the Eastern Region.

According to Table 6.1, the number of family members occupying a traditional house in 2007 was approximately seven, and the family members in a detached house (villa) were approximately seven to eight members. Flats housed six to seven people and families comprised an average of four people per apartment. Thus, in 2007, the number of family members that depended on housing units ranged from between four and eight members.¹⁵

Table 6.1: Housing units occupied by Saudi in 2007.

Dammam Metropolitan Area	Type of Housing Unit						
	Total	Other	Apartment	A Floor in Traditional House	A Floor in Villa	Villa	Traditional Houses
Housing Units	459875	8004	174599	6698	32708	159762	78104
Households	459875	8004	174599	6698	32708	159762	78104
Individuals	2780176	33604	776292	41288	217921	1202900	508171

Source: Demographic Survey in 2007.

A demographic study of Saudi society conducted by TNS in 2001-2002 identified that Saudi society is gradually moving towards smaller, nuclear families.¹⁶ The average size of Saudi families is currently about seven members, which is less than the typical family size in previous generations; the average in the 1970s was ten family members.¹⁷

Nowadays, the average family size in Saudi Arabia is still significantly higher than that in many other countries, especially Western industrialised countries, where the average number of family members is four people or fewer. As Nolan and Lenski state, "In most industrial societies, birth rates have dropped substantially below the level required to keep populations at their present size. To maintain stable populations, women in industrial societies today must have about two children each, and the fertility rate in almost every industrial society is below this figure."¹⁸

6.2.3 Housing Demography

Family structure and composition is a dimension that overlaps substantially with a subfield of demography known as domestic demography. This embraces several aspects of social demography, which is in contrast with how most housing research begins. Myers states, "housing demography can be usefully classified into

¹⁵ Al-Harigi F., J. Salagour, A. Al-Shieha. *Estimate Number, Size and Type of Housing in Saudi Arabia for the Next Twenty Years*. King Abdul-Aziz City for Science and Technology, Jeddah. 2007.

¹⁶ TNS has more conversations with the world's consumers than anyone else and understands individual human behaviours and attitudes across every cultural, economic and political region of the world.

¹⁷ Biega, B. "TRAVEL to SAUDI ARABIA in the 1970s." Bill Biega's History Essays. May 2005. Accessed May 2, 2016. <http://biega.com/arabia.html>.

¹⁸ Nolan, P. & Lenski, G. *Studying Human Societies: A Primer and Guide*, Oxford University Press; 10 Stg editions. 2008.

four foci:¹⁹ household formation and composition, housing choices, housing construction and inventory change, and spatial patterns and consequences.”²⁰

Household formation and composition has taken its place as the most critical factor in housing demography. It is used to describe the basic configurations of the Saudi family, through which the interrelationships between family members and other families in the Saudi social system can be understood. In a Saudi family during the Traditional Period, family authority was concentrated among the elders, both male and female descent was traced through the male line. Family members lived in proximity to one another, spouses were chosen from within the same tribe, extended family, or the same social group, and men had multiple wives.²¹

There was adult gender separation within traditional Saudi extended families. The primary male roles were traditional; they served as providers and protectors of their families, working outside the home. The women served as managers within the home, but limitations on the role of women in the home were not always strictly applied.

Scores of children were evident in small towns and rural environments. From an early age, children were linked not only to their nuclear families, but also to their extended families. From the age of twelve to sixteen, boys and girls were groomed by society for traditional adult roles.

The traditional Saudi extended family structure could be described as tribal and patrilineal regarding lineal descent,²² in which the kin of both sexes was related through the men only. It could also be described as patriarchal, in that the father or grandfather had legal power, which supported his authority. Relatives tended to live near to one other, even in the major cities that expanded horizontally more than vertically.²³ Interaction among relatives could, therefore, be achieved with ease. The extended family usually included three generations: grandparents, sons/fathers and daughters/mothers, and children, in which the grandfather was the head of the family regarding the authority structure.²⁴

In the traditional family, decisions to marry were usually taken by both families. Although fathers were believed to play a significant role in decision-making regarding this issue, in reality, mothers played a more significant, although hidden, role in this decision.²⁵ It was possible for one traditional house to include the parents, sons with their wives, grandchildren, and unmarried daughters. This means the total number of family members in a traditional courtyard house could be from 10 to 15 members.

¹⁹ Foci: Plural of Focus.

²⁰ Myers, D. Housing demography linked demographic structure and housing markets, the Board of Regents of the University of Wisconsin System. 1990.

²¹ Islam permits a man to have up to four wives, but only as long as the wives are treated equally. In practical terms, this usually requires them to be provided with separate residences.

- Long, David E. Culture and Customs of Saudi Arabia (Cultures and Customs of the World). Westport, London: Greenwood, 2005.

²² Patrilineal: relating to or based on a relationship to the father or descent through the male line.

²³ Achoui, Mustafa M. "The Saudi Society: Tradition and Change." In Families Across Cultures A 30-Nation Psychological Study, 435-41. Ch.32. 2006: Cambridge University Press.

²⁴ Georgas, J. Family: Variations and changes across cultures. In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), Online Readings in Psychology and Culture (Unit 13, Chapter 3), Center for Cross-Cultural Research, Western Washington University, Bellingham, Washington USA. 2003.

²⁵ Sangeeta, Dhani, & Shaikh, Aziz. "The Muslim Family." WJM Western Journal of Medicine 173, no. 5 (2000): 352-56. Accessed April 12, 2015. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1071164/>.

In the Transitional Period, the extended family unit was remarkably resistant to western cultural norms in the face of modernisation. Core values were deeply held and did not shift rapidly over time; proud, closed and extended family units were maintained. The culture's desire for firm adherence to customs and traditions based on the extraordinary strength of traditional Islamic social, economic and political values and culture was never altered by contact with urbanisation.²⁶

In this period, the average number of family members was 10,²⁷ and the number of children ranged from six to eight. Grandparents, or a single grandparent, would prefer to live with any son who could take care of them in his house. The use of home-workers, such as maids and drivers, was not yet commonplace, due to the size of the house being manageable compared with modern and contemporary houses. Additionally, the idea of introducing strangers to live with the Saudi family inside the house was not yet accepted, and women had limited access to out-of-home jobs.

Marriages were commonly contracted between cousins or close families from the same tribe, region or town. However, with the phenomenon of urbanisation and the population explosion, endogamous marriage is likely to continue to decline. This tradition makes marriage between ordinary families a stressful affair and can cause relationships to be severed between relatives.²⁸

In the Modern Period, Saudi society retained its great respect for age and seniority. Elderly family members were still accepted, and younger family members expected to respect them. As urbanisation and the trend of moving to the cities continued to spread, modern families struggled to maintain their tradition of living as close as possible to their relatives. They still tended to live in adjacent properties to create a family complex whenever possible, which happened in the Al-Mazrouiah and Al-Mubarakieah neighbourhoods of Dammam City.

Women began working outside the home after receiving an adequate education, qualifying them to work as teachers or doctors. The higher educational qualifications of parents and the rise in inflation and cost of living led to a significant reduction in the average number of children per family; consequently, the average number of family members declined to seven people. Meanwhile, families began to bring in servants to assist with housekeeping, due to parents going out to work and the increase in the size of the house. In modern times, the prevalence of nuclear families increased, comprising 67% of the total population in 1996.²⁹ They often live a considerable distance from their parents' homes, due to their new lifestyle, working type, and the urban planning of new cities and residential settlements.³⁰

²⁶ Long, David E. "The Role of the Extended Family in Saudi Arabia." Saudi -Us Relations Information Service. March 10, 2003. Accessed September 22, 2013. <http://susris.com/2003/03/10/the-role-of-the-extended-family-in-saudi-arabia/>.

²⁷ Biega, B. "TRAVEL to SAUDI ARABIA in the 1970s." Bill Biega's History Essays. May 2005. Accessed May 2, 2016. <http://biega.com/arabia.html>.

²⁸ Metz, H. C., ed. Saudi Arabia: A Country Study. Washington: GPO for the Library of Congress, 1992.

²⁹ "ArRiyadh Urban Indicators 2009 / 1430 H." High Commissions of Development of ArRiyadh. Accessed December 2015.

http://www.arriyadh.com/Eng/Content/Tab2/AboutArRiy/getdocument.aspx?f=/openshare/Eng/Content/Tab2/AboutArRiy/ArRiyadh-Urban-Indicators-2009---143.doc_cvt.htm.

³⁰ Ibid.

In the Contemporary Period, there have been changes in the economic and social environment, with rapid modernisation and greater openness to the outside world (globalisation), as well as ongoing sustained economic development in Saudi Arabia. These changes have had an enormous impact on the contemporary Saudi family, and in 2004, 75% of the total population was comprised of nuclear families. In addition, there has been a sharp reduction in the number of extended families making up households.

Gender roles are changing with rapid modernisation. There appears to be more male acceptance of women's participation in different professional careers outside of the home. Married women still take on some traditional roles inside the home, but recently, women have become employed in all areas of work outside.

6.2.3.1 Household Income and Occupation Structure

Household income and occupational structure have to be addressed when studying the family background of the inhabitants in the Dammam Metropolitan Area. Household income reveals the general economic situation in each period. The term occupational structure "referred to the aggregate distribution of occupations in society, classified according to skill level, economic function, or social status."³¹ The term has been defined and analysed applying multiple classificatory outlines, which cluster the same professions together based on specific standards such as skill, employment status and function.

6.2.3.1.1 Household Income and Occupation Structure in the Traditional Period

In the Traditional Period, families' incomes came primarily from crafts and trade. This era was characterised by vocational work, such as agriculture, fishing and any occupations related to daily human life. Men (the heads of the household and their sons) worked outside the home, while the majority of women were housewives; some working in a trade selling ladies' clothes. A room in the corner of the house next to the women's entrance was allocated for this purpose. Household income was received on a daily basis. It was barely adequate for the requirements of the family. One Saudi Riyal, which is small in number but has a high value, was sufficient to cover the family's requirements for a single day.³²

6.2.3.1.2 Household Income and Occupation Structure in the Transitional Period

After the first oil boom, the nature of business in Saudi Arabia changed. Many craftsmen joined Aramco. Households converted from craftwork to employment, which required the payment of a monthly salary to the employee for their work. This salary was higher and steadier than the previous daily wage.

Women in this period stopped conducting business from their home for two reasons: firstly, family income became sufficient to achieve their needs; and secondly, there was a transition to new homes and modern residential neighbourhoods, which were not well-positioned to allow trade.

³¹ "Occupational structure." A Dictionary of Sociology. Encyclopedia.com. (January 22, 2017). <http://www.encyclopedia.com/social-sciences/dictionaries-thesauruses-pictures-and-press-releases/occupational-structure>

³² Saudi Currency.

6.2.3.1.3 Household Income and Occupation Structure in the Modern Period

There were definite changes in the occupational structure of the population in Saudi Arabia between 1974 and 1992, from the Transitional to the Modern Periods. The percentage of those employed in government service and the private sector increased from approximately 25% in 1974 to 48% in 1992.³³ There was a distinct trend among the population towards increasingly working in the public and private sector. During the economic boom in the 1980s, all professional sectors in Saudi Arabia flourished, except for the agricultural sector, which was due to higher production costs. The annual income per capita in the early 1980s was about 14,773 USD,³⁴ which greatly helped to improve living conditions; meanwhile, householders were able to secure private houses, send their children to private schools and employ servants.

Table 6.2: Percentage of economic structure (professional) in the Eastern Province of Saudi Arabia.

Economic activity	1974	1992
Agriculture	43%	7.7%
Mining and Industry	6%	9.7%
Construction	8.5%	15%
Trade	8.6%	14%
Transportation	4.9/5	4%
Services (Government and private sector)	25.3%	48%

Source: Demographic Survey 1974-2007.

Note: A large proportion of agriculture in this period in the Eastern Region included Al-Hasa and Qatif, which were famous for agriculture at that time.

Women's education continued in different fields and disciplines; they worked only as doctors, nurses and teachers, although the teaching profession was the popular profession among women at that time because this kind of work is traditionally carried out only in the morning when children are at school. Women's work contributed to raising the standard of living for their families.

6.2.3.1.4 Household Income and Occupation Structure in the Contemporary Period

The average monthly household income in Saudi Arabia has increased since 2001 to approximately SAR 6,600, with large families having the largest (approximately SAR 7,450), followed by average households (approximately SAR 6,400) and finally small families (approximately SAR 5,500). "These numbers, compared to those from 2001, reveal that the largest growth in MHI has been seen in smaller families – a growth of 58% – in comparison with the medium-sized families, which saw an increase in proportion of only 10%, and the large families, which have grown by 4% since 2001."³⁵ People with high earnings are likely to enjoy the greatest freedom regarding the choice of where to live.

³³ De Bel-Air, Françoise. "Demography, Migration and Labour Market in Saudi Arabia." *Gulf Labour Markets and Migration*. 2014. Accessed July 12, 2015. http://gulfmigration.eu/media/pubs/exno/GLMM_EN_2014_01.pdf.

³⁴ "Real Income of Citizens Has Not Changed since the 1980s." *Al-Yaum E. Newspaper*. January 31, 2012. Accessed February 2, 2014. <http://www.alyaum.com/News/art/42251.html>. [Arabic Article].

³⁵ "Saudi Arabia's Demographics - the Winds of Change." *Saudi in Focus*. September 19, 2006. Accessed June 3, 2015. <http://www.saudiinfocus.com/en/forum/showthread.php?p=3034>.

The percentage of average monthly spending on necessities (particularly food) has decreased, and the percentage of average monthly spending on non-essentials has risen. Low-income and middle-income families have imitated the consumption behaviour of high-income ones. However, low-income and middle-income families have not noticed significant improvements in real living standards, as their income in real terms has not changed since the 1980s.³⁶

The greatest demand for permanent accommodation is for affordable middle-income housing. Not all of a family's income will be spent on purchasing/renting a house. It is estimated that around 40-45% of a person's monthly salary in Saudi Arabia is apportioned for housing needs.³⁷ Also, the absence of widespread mortgage availability limits the ability to purchase housing. Another estimate is that 65% of Saudi families currently own their primary residence.³⁸

6.2.3.2 Professional Background and Education

6.2.3.2.1 Family Professional Background and Education in the Traditional Period

In the past, traditional families had insufficient education. They sent their sons to *Al-Kottab*. These places were located either in mosques or private areas allocated to the teaching of the Quran. All boys were expected to complete their learning of the Quran by reading and writing. By the end of their time spent learning the Quran, students were able to read and write. At this time, women's reading and writing skills were weak. However, later, women demanded the right to educate their daughters as they did their sons, initially by sending them to a lady referred to as *Al-Shaikha*. The first boys' schools opened in 1941-42, while the education of girls in a school setting was still taboo.³⁹

6.2.3.2.2 Family Professional Background and Education in the Transitional Period

In the Transitional Period, boys continued their education in public schools through high school (Fig. 6.2). The first university in Saudi Arabia, King Saud University,⁴⁰ was established on 7th November 1957. King Fahd University of Petroleum and Minerals was the first university opened in the Eastern Province, on 9th February 1965. This meant that a number of engineers, doctors and additional basic professionals graduated to practice the professions that existed at that time. Some craftsmen still existed in this period.

The schooling of girls was forbidden until 22nd October 1959, when a royal decree was issued allowing the establishment of government schools for girls. Literary and scientific disciplines were taught to help graduating girls obtain work in the education sector.

³⁶ "Real Income of Citizens Has Not Changed since the 1980s." Al-Yaum E. Newspaper. January 31, 2012. Accessed February 2, 2014. <http://www.alyaum.com/News/art/42251.html>. [Arabic Article].

³⁷ "The Real Estate Sector in Saudi Arabia." Samba Real Estate. April 10, 2006. Accessed October 26, 2014. <http://jeg.org.sa/data/modules/contents/uploads/infpdf/589.pdf>.

³⁸ Ibid.

³⁹ A lady who is a specialist in teaching the Quran to girls.

⁴⁰ Saud Of Saudi Arabia - Wikipedia, https://en.wikipedia.org/wiki/Saud_bin_Abdulaziz_Al_Saud (accessed August 16, 2017).

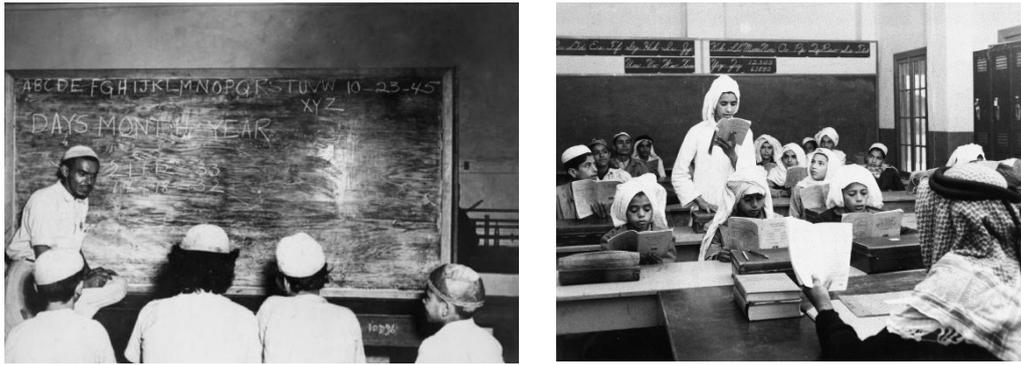


Fig 6 .2: Education in the early modern time (the Transitional Period).

6.2.3.2.3 Family Professional Background and Education in the Modern Period

In the Modern Period, smaller families had more savings from their income and as a result, tended to be better educated than the medium and large families. This was true for both genders; 38% of women and 45% of men in small families were graduates, compared with 22% of females and 31% of males of bigger households.⁴¹

Saudis of all generations quickly adopted western popular culture because of their great passion for learning and living the urbanised lifestyle. Saudi families sent their sons from a young age to learn foreign languages and encouraged them to work abroad for a period of time. They then returned with an open-minded personality. The information technology revolution eliminated some of the physical customs and traditions that traditionally accompanied some of the norms and customs. The major milestone was the implementation of formal education in the Eastern Province. The education of girls started with primary schooling, which was then extended to the secondary level. Girls were eventually able to go to university in the 1970s.

The provision of training and education programs in Saudi Arabia was limited. A combination of many foreigners arriving to work and the lack of the Saudi workforce in various fields resulted in a significant number of scholarships being awarded to students to complete their education abroad. As a result, scores of Saudis left in the 1960s and 1970s to be educated.

6.2.3.2.4 Family Professional Background and Education in the Contemporary Period

In the Contemporary period, educational opportunities expanded to levels previously unknown in Saudi Arabia. The number of potential job seekers exceeded the growing number of available jobs, creating high unemployment (12.1%).⁴² Many young women have newly acquired skills and are seeking to enter the marketplace. However, expectations have been raised beyond what was even imaginable just a few decades ago. Women are taking jobs in the education sector, as well as the area of health as nurses and doctors.⁴³ Recently, more fields have been opened to them, and there is a new openness in the availability of access to

⁴¹ Patric, Buchanan J. "Saudi Arabia's Demographics – the Winds of Change." Saudi in Focus. September 19, 2006. Accessed March 8, 2016. <http://saudiinfocus.com/en/forums/topic/saudi-arabias-demographics-the-winds-of-change>. Press.

⁴² Saudi General Authority for Statistics. <https://www.stats.gov.sa/ar/820>. Accessed August 8, 2017.

⁴³ In 1968/69, Saudi Arabia had four technical institutes for girls, including nursing schools, with a total of 457 girls enrolled. Mulligan Collection, February 1970.

many scholarly disciplines. Moreover, foreign scholarships for higher education have equalised opportunities for both genders.

6.3 Family Lifestyle in the Dammam Metropolitan Area

Despite all the western influences and urbanisation introduced into Saudi Arabia since the early 1930s, Saudis' social lives still revolve around the home and family unit to an enormous extent. The combination of rapid population growth, high wealth and the impact of Western culture has led to a lessening in traditional Saudi cultural values; for example, emphasis on preserving the extended family and women-only working in the home has lessened. However, privacy remains paramount in the private and public space. The traditional social system is increasingly challenged by rapid modernisation and constant social change.

According to Rossi, "at a macro level, the distribution of households across housing units is the result of a match between individuals' housing needs and their ability to satisfy these needs."⁴⁴ Housing preferences are driven in part by demographic factors, such as progression through the lifecycle. A person's lifestyle normally reflects their behaviour, attitudes or world view, and would include patterns of social relations and entertainment.⁴⁵ Knowledge about people's lifestyle helps to maximise user satisfaction with the end product of their built environment. This chapter illustrates the daily life of the inhabitants of the Dammam Metropolitan Area, and then links this information to the urban design requirements of residential neighbourhoods.

This chapter will elucidate the changes that happened to the inhabitants' lifestyle in the Dammam Metropolitan Area from the Traditional period to the Contemporary period. It has explained the effect of lifestyle on domestic spaces: "Some of the consequences are changing the configuration of internal spaces to accommodate multiple uses or change in use, upgrading partitions to provide the required visual and sound privacy between spaces, dividing or adding up spaces, modification of front and rear gardens to accommodate family and guests' entertainment activities and changing the arrangement of spaces. These changes aim to adapt properties to suit the user's local lifestyle."⁴⁶

6.3.1 Traditional Social Lifestyle⁴⁷

In general, the traditional lifestyle in the Dammam Metropolitan Area, as in other parts of Saudi Arabia, was tough and simple. People lived in groups, supporting each other to have better lives and to navigate challenges. Religious affairs and conduct characterised the relationships of mutual interest. The emphasis was always on the group and not the individual; thus, exhibiting traits common in collectivistic societies. It is important to also understand the traditional society as one that relied on Islamic teaching for its citizens'

⁴⁴ Rossi, P. H. *Why Families Move*. New York: Macmillan, 1955.

⁴⁵ Alden Jr Speare, Sidney Goldstein, William H. Frey. *Residential Mobility, Migration, and Metropolitan Change*, Ballinger Publishing Company. 1975.

⁴⁶ Sidawi, B. "A Theoretical Framework for the Implementation of Building User's Lifestyle in ND Cad System." 599. Proceedings of 3rd Int'l ASCAAD Conference on Embodying Virtual Architecture, Egypt, Alexandria. ASCAAD-07, 2007.

⁴⁷ Extensive studies on this subject by Al-Naim, Al-Kurdi and others.

way of life. The Quran and Sunnah were the sources of the citizens' daily behaviour in all aspects of life.⁴⁸ These included conduct with family and neighbours, as well as economics and education.

Two main factors influenced the traditional community and social interactions besides the spatial and physical characteristics of the traditional home environment: time and location of activities. Time was generally related to the daily acts of worship and annual religious festivals or climatic seasons.⁴⁹ In traditional families with limited finances, in the Eastern Province, men would cater for their family's needs and work outside the house, while women were responsible for the house and the children.⁵⁰ The social lives of these communities were an integral part of their lifestyle patterns, acting as the bond that connected groups together, and provided social security.

The strict segregation between men and women was respected in all social arenas. There were even special times allocated to the gathering; usually in the afternoon, when men visited each other following the '*Fajr*' prayer,⁵¹ and in the afternoon and early evenings when they returned home from their work. However, social relationships were limited. Women confined visiting times only to the morning or after the '*Asr*' prayer when their men were at work.

6.3.2 Transitional Social Lifestyle

In the Transitional period, social life in the Dammam metropolitan area was clearly exposed to change as a result of economic developments in the region, which jumped from simple to modern civilian life. The social development of any society is a complex phenomenon, with some interrelated dimensions differing in importance according to time and location, among other things.

The rate of social change that Saudi Arabia has experienced up until the present day has been almost as fast as its economic growth. In the 1950s, the government was drawing the population towards modernisation by encouraging education among people, intensifying the training of workers and employees. The traditionalists displayed strong resistance to all that was new and unknown, (Fig. 6.3) while others closely followed every new idea offered by modernity. The Saudis began to pursue modernity, not wanting to feel left behind. Al-Naim explained the clash between traditional and modern culture, through the term "cultural resistance",⁵² mentioning that this resistance is part of an acculturation process that occurs when two groups of different cultures are in constant contact.

This period is characterised by the fact that men whose jobs previously consisted of craft and trade became employees at the Aramco oil company, which made clear and significant differences to the lives of the individuals and the communities in and around the Dammam Metropolitan Area.

⁴⁸ Prophet Muhammad's way of life viewed as a model for Muslims.

⁴⁹ Such as Eid Aladha and fasting of Ramadan.

⁵⁰ Al-Shabat, A. Al-Khobar the Interface of Eastern Region, Al-Khobar, Hajr li Al-Entaj Al-Fanni wa Al-E'lami. (1999): 180. [Arabic text].

⁵¹ Morning prayers.

⁵² Al-Naim, M. "Architecture and culture: Critical Studies on Arab Architecture". Riyadh: Al-Riyad: Al-Yamama Publishing Inc., 2005. [Arabic Book].

The majority of women in this period were housewives, and the children were sent to school. Visits and social events among women often took place in the morning, before the children returned from school. The men were responsible for meeting the families' needs, and for travelling the long distances between home and local markets.

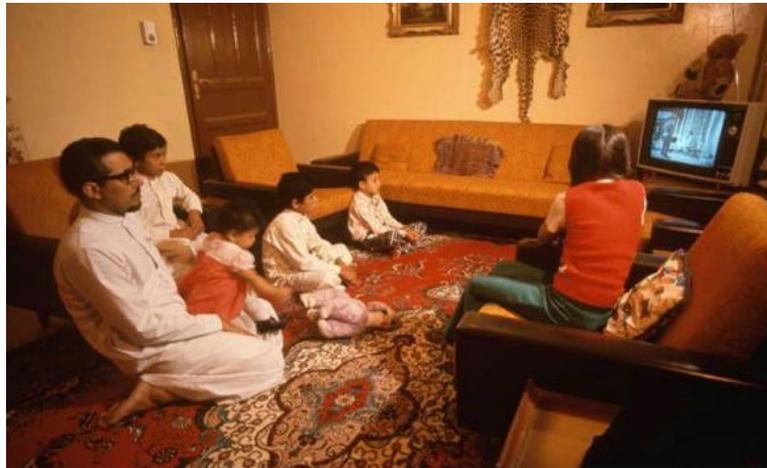


Fig 6.3: Saudi family in the transitional period, still sitting on the floor despite there being sofas in the room.

6.3.3 Modern Social Lifestyle

Many Saudi students, some taking their families with them, went to foreign countries to study and train for extended periods; the different lifestyle they experienced abroad had an impact on them. On their return, they were seen as the elite who would lead the country into modernity. What they had seen, however, strengthened their feeling that Saudi Arabia was far behind the rest of the world, and this led them to embrace every modern development as it became acceptable. As they were regarded as role models, the rest of the population followed these changes.

Most men in the case study region worked at the Aramco Company. They began their day at 7:00 am, and they returned home at around 4:30 pm. Women at that time began to go out to work as teachers or doctors. It became imperative for children of both sexes to go to school. The legal age to enter school was seven years. Families were not interested in pre-school education, so pre-school age children stayed at home until private schools opened up.

With no public cinemas permitted in Saudi Arabia, television became a primary source of entertainment, including satellite television. It was very popular for families in modern times to take picnics every Friday,⁵³ often at the Gulf Sea coast on the east side of the Damman Metropolitan Area, or in the desert located to the western side of the city. They returned home after the '*Maghrib*' prayer, in preparation for the new school and workday.⁵⁴ Shopping malls and restaurants did not yet exist.

⁵³ Ibid.

⁵⁴ All meaning of Arabic words are explained in Appendix C: Vocabulary and Terms of Building Design Elements in Arabic Language and their Meanings.

6.3.4 Contemporary Social Lifestyle

In recent times, the broader social world of women has increased their confidence to influence their environment. The daily activities of women are now very diverse. Housework has been taken off their hands by maids, and this has left them free to participate in other activities. Most non-working women are actively involved in the education of their children, visiting their friends and relatives and shopping. Others are involved in charitable work, while working women have no time for the niceties of social relations, except during their holidays.

The presence of religious drivers facilitates the movements of family members. Most social life in the present day begins after the '*Maghrib*' prayer and can last until midnight,⁵⁵ to avoid the sun's heat in the daytime. Most family members are not bound to their work at this time of day, and many shopping malls and restaurants remain open until midnight. Men usually meet one another at '*diwaniyas*' after '*Esha*' prayer.⁵⁶

Going out to eat has become a favourite pastime in recent years due to the absence of other social and cultural entertainment and the abundant presence of restaurants serving a wide variety of Arab and international cuisine. The government has supported this social activity.⁵⁷ Sporting events are solely for the entertainment of men, who like to watch football matches, visit soccer stadiums, or watch the matches in coffee shops, while also engaging in sporting activities themselves. There are also commercial private men's clubs for all classes. Recently, women have been free to go to ladies 'health clubs' located in hotels, hospitals, or in specialised buildings with a high level of privacy. These have begun to spread in the main cities.⁵⁸

6.4 Human Spatial Behaviour in Houses of the Dammam Metropolitan Area

Human spatial behaviour is defined as the interaction of people within their residential environment; including perceptual, affective and symbolic processes that may not necessarily be related to actions.⁵⁹ In this context, researchers in the environmental field have sought to answer a basic question: How do people use the space around them to organise social interactions and vice versa? In an attempt to respond to this issue, this chapter and the coming chapters will focus on two basic points regarding how space is used: spatial concepts and personal space. These two points can be clarified by showing the relationships between home spaces and residents.

The spatial concept refers to the residents' behaviour as it is linked to the ownership of a particular geographic location, over which they have precision and control. This involves determining a location and installing signs to show that the area is private property. This justifies the defence of the space when used by others.

⁵⁵ Sunset prayers.

⁵⁶ Formal reception room used for male guests, either special quarters in each other's homes or a residence rented for the occasion.

⁵⁷ "Countries and Their Cultures, Saudi Arabia." Accessed November 9, 2014. <http://www.everyculture.com/Sa-Th/Saudi-Arabia.html>.

⁵⁸ Al-Mutairi, Mowaidhi. "Establishment of the first women's health and sports center licensed in Saudi Arabia." *Al-Eqtadiah*, June 03, 2013. Accessed May 11, 2017. http://www.aleqt.com/2013/06/03/article_760359.html.

⁵⁹ Francescato, G., *Meaning and Use: A Conceptual Basis*, [w:] Arias, E.G. (ed.) *The Meaning and Use of Housing*, Aldershot, Sydney: Avebury 1993, s.35-49. 7.

Behaviour within the framework of the spatial concept comprises the organisation of social interaction between people and assists them in the performance of many quality functions. It creates a set of rules that simplifies the forms of daily social interactions, based on a set framework. In addition, the boundaries of these spaces help to maintain a sense of individual privacy.⁶⁰

Shukri, in her research into Adaptivity of Housing Compounds of King Faisal University in Dammam,⁶¹ found that every house is modified by adding spaces or changing spatial arrangements according to inhabitants' spatial behaviour and lifestyles. This means people's lifestyles differ, even when they share the same religion, customs and traditions. Rapoport stated that lifestyle is defined as the integration of all cultural, material, spiritual and social aspects, which best explains variations in form.⁶²

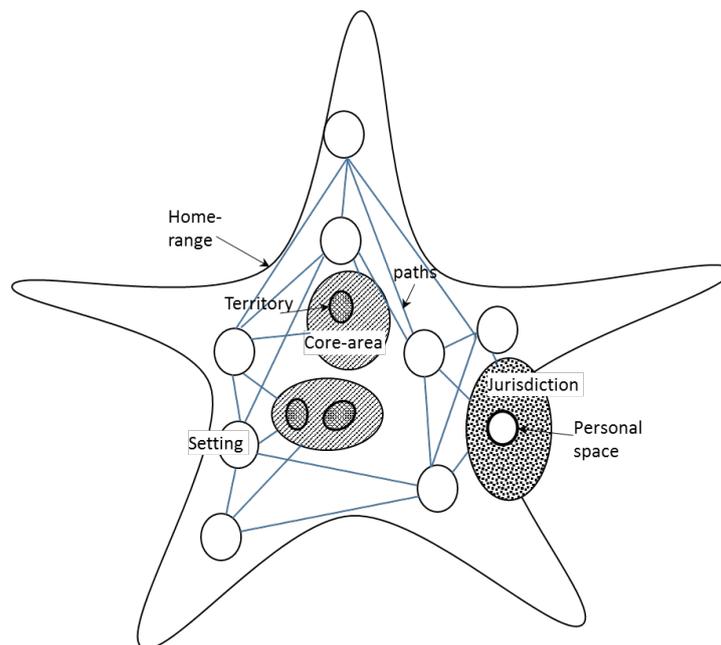


Fig 6.4: Home-range, Core-area, Jurisdiction and personal space. (Based on Rapoport, 2002.)

In the connection between spaces and users' behaviour, these spaces are called territory and considered part of a larger system. "This concept of territories can be related to several other concepts: 1) Home-range: The usual extent of regular movement definable as a set of behavioural setting and linking paths. 2) Core-areas: These are those areas within the home-range that are most commonly used, and best known. 3) Jurisdiction: An area 'owned' or controlled for a limited time only and by some agreed rules. 4) Personal Space: The moveable 'bubble' of space surrounding an individual."⁶³ The relationship between these is demonstrated in (Figure 6.4).

⁶⁰ It must be noted that the goal of social behaviour in the framework of the spatial concept does not necessarily mean that a person should stay alone but aims to control the approach of a person within a particular designated area. Finally, behaviour within the framework of the spatial concept allows information to be communicated about ourselves, along with the forms and nature of our concerns.

⁶¹ Shukri, Mai. Adaptivity of Mass-Housing Compounds: Case Study: King Faisal University Compound, Dammam, Saudi Arabia, Unpublished Master's Thesis, King Faisal University, Dammam, Saudi Arabia. 2002.

⁶² Rapoport, A. House Form and Culture, Englewood Cliffs, N.J.: Prentice-Hall. Geoforum, 3, no 4, (1972): 47.

⁶³ Rapoport, A. 'Spatial Organization and the Built Environment' Companion Encyclopedia of Anthropology: Humanity, culture and Social Life, Routledge World Reference, London, UK. Ch. 17. (2002): 486.

The spatial organisation has fluctuated over time and involves movement. These changes depend on a combination of the value of home spaces and space users. For example, traditional houses can have a home-range without territories, while modern and contemporary houses have jurisdiction as a dominant feature. The idea of movement is fundamental because space as a component of the built environment can be organised or moved through house levels (front, middle and back) according to the users' lifestyle. These movements have both ritualistic and practical dimensions. Space can also be organised or ordered as being closed or open, public or private, specialised or unspecialised.

6.4.1 Human Spatial Behaviour in Traditional Houses

Architects and planners have conducted considerable research in traditional architecture.⁶⁴ They continue to discover the broad relationships between culture and the built environment by describing the variation in, and distribution of, built forms within a particular culture or region, or across cultures. Many of these studies seek to explain the physical features of the built environment, such as exterior form, interior plan and decoration, as well as specific building elements that represent the influence of multiple social and cultural factors within particular cultures.

In traditional communities, the spatial organisation of traditional houses was simple. Activities were organised and coordinated in very complex ways, according to elaborate rules. This order and organisation would then be expressed through physical means, resulting in the built environment. The organisation of space cognitively precedes its material expression and setting, the houses being planned according to users' lifestyle before being built. The traditional built environment was characterised by multipurpose spaces and pathways between houses, shaded streets, commercial areas, gathering and farming areas.⁶⁵

Traditional houses at that time were built on the basis of the users' needs. The houses were still in use until the time of the first oil boom when the inhabitants' lifestyle began to change. Spaces were still used, and activities took place continually in every space. People have used spaces in traditional houses symbolically and practically. Some important social values dominated the traditional society of Saudi Arabia and affected physically built environments.⁶⁶ The front zone with its spaces has a symbolic meaning of hospitality. The name of these front spaces was linked with guest hospitality. It took an explicit name, men sitting area (*Majlis*), which indicated the exact action being held in the space, it is a jurisdiction space. At the same time, other spaces are multi-purpose and have taken their name from their shapes, such as the *Muraba* which means square. This is considered to be a family territory.

⁶⁴ Andersen, K. B. *African Traditional Architecture*. Nairobi: Oxford Univ. Press. 1977.

- Ardelan, N., Bakhtair, L. *A sense of Unity. Persian Architecture*. Chicago: Univ. Chicago Press. 1973.

- Knapp, R. *China's Vernacular Architecture: House Form and Culture*, Honolulu: Univ. Hawaii Press. 1989.

⁶⁵ Abedi, Mahmoud, and Hosein Soltanzadeh. "The Interaction between Tradition and Modernity in Contemporary Architecture of Persian Gulf States: Case Study of United Arab Emirates." *International Journal of Research in Humanities and Social Studies* 1, no. 1 (November 2014): 24-34. Accessed April 12, 2017. <http://www.ijrhss.org/pdf/v1-i1/5.pdf>.

⁶⁶ What applies to Saudi Arabia also applies to the Eastern Province.

The house has a combination of private spaces (personal spaces) and more public spaces, because of the large number of extended family members who dwell in traditional houses. The core-area of the traditional houses was the interior courtyard, where the majority of the residents' activities were held. The traditional houses had a flow of movement that kept the female members of the house away from the men's sitting area, to ensure privacy. Male guests had very limited movement within their territory in the front zone. The home-range of the traditional houses extended to the adjacent street and plaza where the male residents gathered with their neighbours in front or near to their homes.

6.4.2 Human Spatial Behaviour in Transitional Houses

Education occurred in parallel with the economic boom that took place in this period, propelling the populace from a rural and nomadic lifestyle to a modern urban civilised format. This transformation of people's social and economic lives affected their lifestyle and their behaviour in relation to the spatial arrangements of their houses.

The residents forced themselves to adapt their behaviour according to the new built environment. Some distinctions in the spatial organisation of traditional houses disappeared, such as the interior courtyard, *Liwan* and *Muraba* (the multi-purpose rooms) and the *loggia*. Some new distinctions later developed; for example, the central living room became the core area in place of the interior courtyard. The majority of daily activities took place in the living room, when the family gathered for three daily meals, watched television, studied and undertook other activities.

During the transitional period, the residents displayed a new attitude towards their built environment, adapting their everyday activities to match their new lifestyle as Aramco employees, contrary to what had happened in the Traditional period. The residents then followed the rules that were imposed by Aramco related to working days and hours, holidays and the design of houses.

Men in the transitional period communities were less able to meet with and visit one another because the men's sitting area in the front zone (Jurisdiction) was very close to the middle zone. The middle zone contained the central family living area without transitional space, which meant less privacy. Later, some residents closed off the front areas allocated for use by male guests, separating them from the rest of the house by adding an interior wall, then adding a side door as a secondary entrance for the family. Women also become very limited in their movements within the transitional neighbourhoods because of new urban design, which did not provide a safe environment for women to move about in. All family members spent the majority of their time indoors.

During the Transitional Period, people left their homes because they did not fulfil their behavioural and cultural needs. Transitional houses became cramped, especially when the children grew up, married and had children of their own. The families who wanted to remain in the transitional houses for longer needed to increase the built area of the house, by constructing more rooms either in the setbacks or in the roof area.

Goody highlighted the internal variability of the household composition. Variability in the form of shifting sizes and relationships as people experiencing life cycle changes provide a possible and continuing motive for adjusting the spatial configuration of dwellings.⁶⁷

6.4.3 Human Spatial Behaviour in Modern Houses

In this period, the designs of private houses were mostly derived from western designs, not taking local traditions and norms into account. Building regulations had been extensively applied. The result was a further divergence from the traditional house form, reflecting the ever-increasing changes in the behaviour of the population. Building regulations had an impact on the lifestyle of the residents who were forced to follow them. The residents had adapted their behaviour according to the modern urban fabric, the house form and its spatial arrangements.

Houses in the Modern period had fewer symbolic spaces and more specified rooms. In this period, many activities were held at home, and rooms were allocated for those activities; for example, study rooms, a television room, children's play area, offices, and storage rooms. Large areas of the rooms were left for male and female guests, and the living room became smaller than it had been in the Transitional period. The area allocated for guests became larger than the family section. Thus, the family gathering area became smaller than in the previous period.

The required attention to privacy in Saudi society encouraged residents to employ the upper floor for sleeping purposes, while the ground floor was a dedicated living area for receiving guests. The kitchen and dining room were also located on the ground floor. The majority of daily activities took place in the living room due to its location being near to the main entrance, the kitchen, and other services.

In this period, it can be seen how the use of domestic spaces became specialised by gender. Influences on the built environment included changes in women's lives. These were represented in dwelling form, the daily activities which took place, and how gender differences controlled the built environment. More personal spaces and jurisdiction appeared in modern houses. Home-range was only within the house's fence, while the core area was still in the living room on the ground floor.

6.4.4 Human Spatial Behaviour in Contemporary Houses

The spatial structure of contemporary cities and human spatial behaviour became much more complicated than in traditional urban models and concepts. The complexity arose from a combination of many considerations. Building regulations change constantly; developers produced many homes without evaluating present needs, many systems then overlapped with the residential framework, and the rapid development of technical matters. In the contemporary houses of the Dammam Metropolitan Area, new functional spaces

⁶⁷ Goody, Jack. *The Developmental Cycle in Domestic Groups*. London: Cambridge University Press, 1971, 53-91. (Orig. Published, 1958).

appeared as a result of more home activities. This meant more personal spaces. Nowadays, space is organised in increasingly complex ways, and marked out ever more clearly and firmly.

In contemporary houses, space is segmented, and locations according to zones (front, middle and back) have been slightly changed. In this period, the spatial organisation of the built environment is affected by residents' behaviour and activities, as it had been in the Traditional period. The exception here is in the case of non-specialised real estate developers intervening for investment purpose only, not to solve housing problems.

During this period, building regulations have been undergoing continuous modifications. The government has sought to alter the regulations according to social, environmental and economic factors. The change in building regulations would mean that possible changes must be applied for housing properties. As a result of these modified regulations, the residents have enough flexibility in their domains to be able to incorporate future changes into the houses that they live in. They can build more rooms onto the house roof, or convert it to a roof garden; they can also extend the area of the first floor as a cantilever, as the side is located in front of the street. The residents have introduced many home spaces not previously present as a result of individuals' contemporary lifestyles. These have been accompanied by understanding and awareness of their needs and desires; for example, a laundry room, game room, home theatre, a back kitchen, and small sitting areas.

According to users' lifestyles, some spaces in the house can be opened up partially or entirely into other spaces. This occurred in the men's sitting area, dining and living room, as well as between the kitchen, living room and the women's sitting area. Many of the relationships between the spaces are controlled by the users' perceptions of their behaviour in the space and how to use it. The territory borders have faded between the public zone (guest area) and the semi-public zone (the family area). The jurisdiction spaces in the contemporary house are larger than in the modern house.

The distance between the men's sitting area and the formal dining area can be a very short or long distance. This also applies to the distance between girls' and boys' bedrooms and between children's bedrooms and their parents' bedroom, according to their perception of privacy and how to apply it. The distance between the maid's room and house rooms, the driver's room and the main entrance can also vary. Therefore, the paths between spatial organisations have become shorter than in all previous periods.

6.5 Summary

This chapter outlined residents' lifestyles in the Dammam Metropolitan Area, and their behaviour within the spatial organisation of the built environment. The study included family background, lifestyle and behaviour in their domestic spaces, covering the four periods from traditional to contemporary. As Salama highlighted when studying the lifestyle of residents in affordable homes, "the significance is not only to obtain information about the owner but also of integrating information about the users, family, future housing

preferences and current house characteristics, to build a complete picture of the user's lifestyle."⁶⁸ This chapter reveals that 'Lifestyle' describes some physical, psychological, social and spiritual interactions between the users and their built environment.

The architects in the present period came to understand that they need to study users' lifestyles regarding physical, psychological, social and spiritual dimensions. This will guarantee that the architectural product becomes more human, adaptable, flexible and sustainable. Users need comfortable space in terms of configuration, dimension, size, area, form and shape, known as the physical dimension, while the psychological dimension is represented by the need for space that provides leisure and regarding colour, privacy, isolation from noisy spaces and a feeling of security and safety. Architects and designers must take care to factor in the social dimension, which refers to the need to provide spaces for socialising and gathering of residents with their relatives, neighbours and friends. The previous chapters have shown the importance for the inhabitants of the Dammam Metropolitan Area of the spiritual dimension that should be found in spaces that respect religion, values and norms.

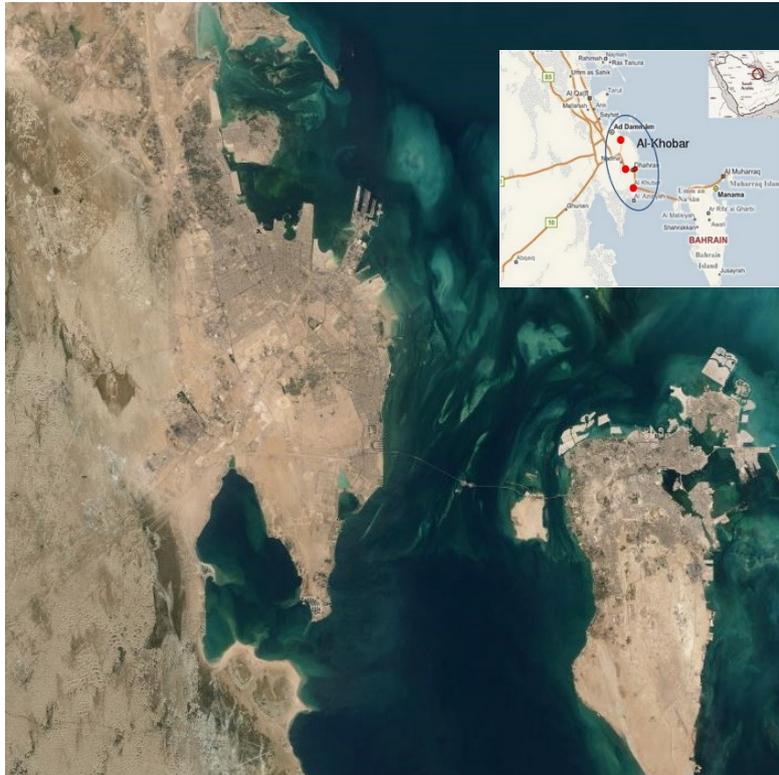
The study shows that contemporary houses have much less symbolic essence and sentimental value than homes in traditional neighbourhoods. Goody agreed when stating, "that the fit is much closer in a society where the houses are built from mud than where they are constructed from a more permanent material, such as stone".⁶⁹ Goody also argued that annual rebuilding activities give people an opportunity to make adjustments to accommodate changes in household organisations.

When the spatial organisation of contemporary private houses do not consider residents' lifestyles, there may be harmful consequences. The impact will be on the social interactions between users within the house. The provision of ideal and correctly designed houses to users cannot be achieved without considering their present needs and future preferences, and incorporating them both into the design process.

Finally, this chapter sought to clarify common attributes and personality traits of the Saudi people over the past four periods by describing the lifestyle, social interactions and relationships of the inhabitants of the Dammam Metropolitan Area with residential spaces. This clarification provided a comprehensive picture of the collected data, helping to clarify evolutionary changes in the design of housing units.

⁶⁸ Salama. A.M. A Lifestyle Theories Approach for Affordable Housing Research in Saudi Arabia, College of Environmental Design. Emirates Journal for Engineering Research, 11 (1), (2006): 67-76.

⁶⁹ Goody, Jack. *The Developmental Cycle in Domestic Groups*. London: Cambridge University Press, 1971. (Orig. Published 1958).



Chapter VII

The Case Studies: The Phases from Traditional to Contemporary

7. The Case Studies: The Phases from Traditional to Contemporary

7.1 Introduction

Having described the time periods relevant to the Dammam Metropolitan Area, and the properties that characterised each in previous chapters, some examples of the built environment from each period are presented as case studies in this chapter. This study will focus on case studies of houses within urban planning, establishing the impact of urban planning elements on house design during the development stages.

The study scope will include the effects of housing policies and development in the Dammam Metropolitan Area, in particular reflecting influences on the evolving forms of houses. The case studies are classified into four main phases according to both historical and economic development: (1) traditional, (2) transitional, (3) modern, and (4) contemporary.¹

The Dammam Metropolitan Area underwent four stages of development as it transformed from a primitive fishing settlement to a major regional city: (1) The traditional Period: the city of Al-Khobar as it emerged in 1938, before the discovery of oil, until the Aramco HOP in 1949. (2) The Transitional Period: this continued from 1949 until the first oil boom in 1974. (3) The Modern Period: from 1974 until the end of the last century, when the Saudi oil economy began to diminish. (4) The Contemporary Period: beginning with the Second Oil Boom in 2003 and continuing to the present.²

This chapter will address the urban planning categories that emerged in the Dammam Metropolitan Area as follows: (1) land planning, (2) building regulations, (3) population density, (4) land dimensions, (5) demographic development, (6) types of development of neighbourhoods and houses, and (7) land-use efficiency.

The criteria set in determining the case-study selection were that the house must be owned by a Saudi family, preferably average, middle-income families. The selection of the in-depth case studies also depended on the development of the home environment within the time classification, as divided according to the four periods stated above.

This approach supports the objective of the study, which is to provide a clear perspective concerning the development of the private home within selected neighbourhoods. The four cases were chosen to cover home

¹ The time to periods date from 1925, before the oil discovery, up to the present day. This classification is explained in chapter one.

² Please refer to figure (1.6) in chapter one.

environments built between 1938 and the time of writing. The selection of the case studies was determined by their suitability in terms of size and type, in addition to their availability and accessibility.³

After the descriptive study of the four cases, this chapter has a comparative analysis of different periods as a synthesis of the case studies. This comparison leads to an understanding of how various physical aspects of urban planning have affected house form, and an evaluation of their importance, recognising that other factors also impact house form, urban fabric, street specifications, infrastructure and public services. The analysis has addressed urban planning as a physical factor that can be controlled; thus, it is essential to dismantle and understand its constituent elements to try to link these with the evolution in housing. The comparative study also has functional diagrams analysing each housing and urban planning element. After studying and observing many cases similar to the selected ones, some of the cases are identical where others simply share the same features, design or arrangement according to activity territories. The diagrams are drawn up to generalise each scheme of the case studies.

7.2 The Reasons for Selecting the Study Area

The study area was selected due to the availability of certain factors supporting the main thesis topic. The three selected cities (Dammam, Al-Khobar and Dhahran) are located in the Eastern region of Saudi Arabia, and have been exposed to economic booms, which influenced housing and urban planning. The considerable leap from one phase to another is apparent in this region, and offers the possibility to observe developments and changes. Each period extends over approximately 22 years.

The selected cities are located in one of the faster-developing areas, and the first area affected by economic growth in the Eastern Province in Saudi Arabia. The four suggested periods of housing, from traditional to contemporary, span approximately sixty years, so one can readily observe the changes that occurred over that time. Although the Dammam Metropolitan Area is the third extended region in the Kingdom of Saudi Arabia, it can be used as a model for other cities in the Kingdom. A further factor is related to the ease of observing changes and constantly monitoring updated information and documents. This is a practical factor due to the selected region being the researcher's homeland.

7.3 The Impact of Climate and Privacy in the Case-Study Areas

7.3.1 The Impact of Climate

According to the Köppen classification, Dammam has a hot desert climate.⁴ The temperatures range from moderately cold to warm in winter, to scorching in the summer. Rainfall in Dammam is sparse and occurs in

³ There were some difficulties identifying case studies, especially from the earlier period, because many of the homes have already been demolished or totally renovated, meaning the original features have been lost. Another problem is that some houses had unknown original inhabitants.

⁴ The Köppen climate classification is one of the most widely used climate classification systems. Hot desert climates feature high maximum temperatures of over 40 °C and can even soar to over 45 °C. During colder periods of the year, night-time temperatures can drop to freezing or below.

small quantities in November, December and January. Dust storms, although unusual in the past, now occur more frequently in summer and autumn, originating from the deserts of the Arabian Peninsula or North Africa.

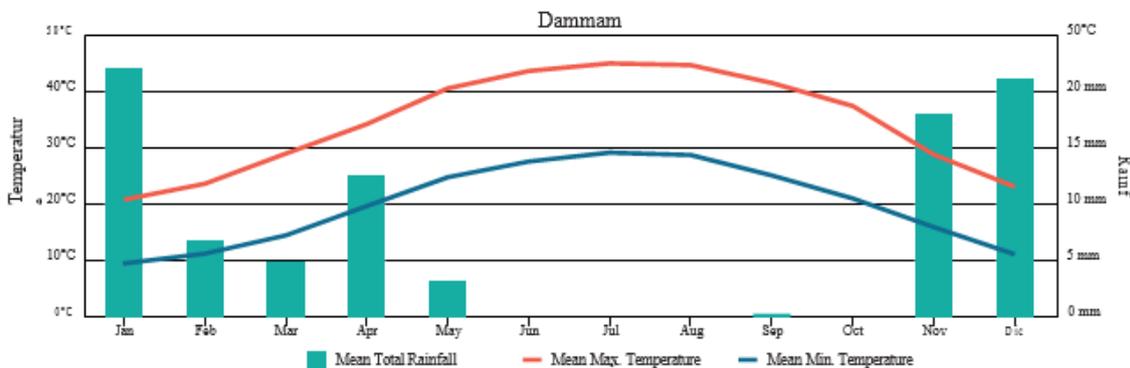


Fig. 7.1: Climatological Information for Dammam Metropolitan Area.

Within the Dammam Metropolitan Area, residents have modified dwelling units to achieve maximum climatic comfort, along with cultural compatibility. For example, the design and building materials of traditional houses were revealed as highly effective methods of protection from harsh weather conditions.⁵ (Fig. 7.1) The influence of climate on these houses can be observed in the form of windows, air vents, peep-holes and hatches.⁶ The weather has a visible impact on the organisation of space and the façades of buildings, both past and present, although new technologies now help to control the home environment in additional ways. The study will examine how both the inhabitants and the weather influenced the design of homes in various periods.

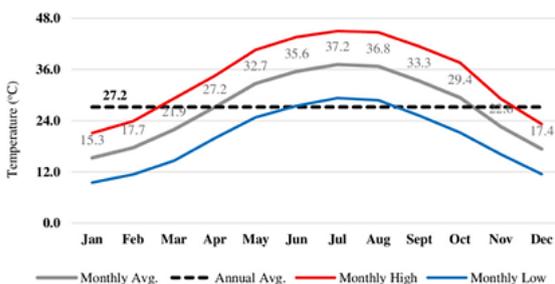


Fig. 7.1a: Temperature information for Dammam Metropolitan Area.



Fig. 7.1b: The relative humidity levels for Dammam Metropolitan Area.

Thick mud walls added insulation against the high solar radiation. Small and few recessed windows were shaded due to the large thickness of the walls and brought in indirect daylight, thereby reducing direct heat. The thick roof also provided insulating value against direct heat. The small narrow courtyards were shaded most of the day, which helped in cooling the warm air. Ventilators or high openings in the walls were provided in rooms with high ceilings, such as in men’s living room or men’s majles, and these helped in warm air

⁵ Limestone finished in plaster, which provides the basic material for housing; it gave excellent insulation against the heat of the sun.
⁶ Anis-ur-Rahmaan, Busbra and A. Al-Shaye, Innovation Diffusion in Housing: A Conceptual Probe in Saudi Arabia, King Saud Univ. vol. 2, Architecture and Planning, Riyadh. (1990):3-21.

exhaust of the room. In some exceptional cases, these houses had dropped ceilings of cloth or other materials (reed or mat), making the room cooler. Roof hatch in the kitchen or the men's majles on top of coffee making space, etc., also helped warm air exhaust and thereby cooled the indoor environment. These techniques were continued during later periods to some extent, but the air-conditioning system's arrival had changed the house patterns to a great extent.

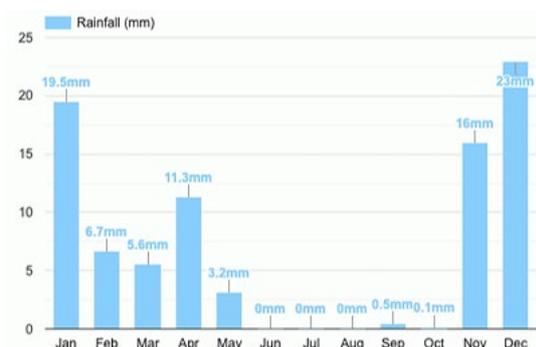


Fig. 7.1c: The average of rainfall in Dammmam Metropolitan Area.

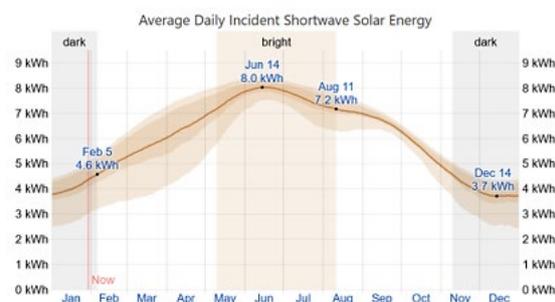


Fig. 7.1d: The average of solar radiation for Dammmam Metropolitan Area.

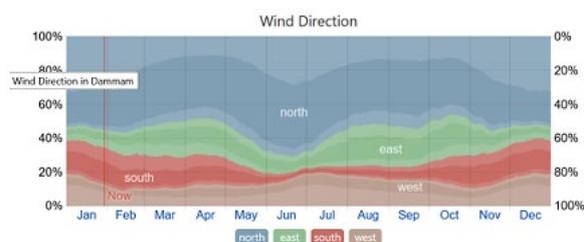


Fig. 7.1e: The wind direction for Dammmam Metropolitan Area.

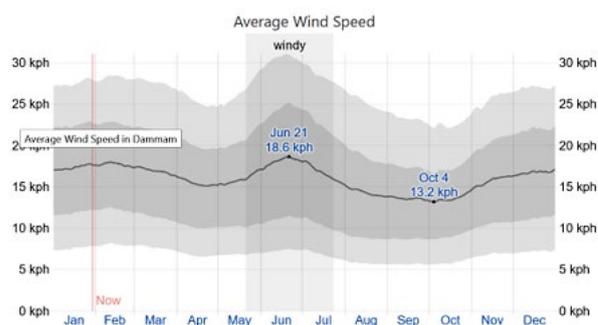


Fig. 7.1f: The average of wind speeds for Dammmam Metropolitan Area.

7.3.2 The Impact of Privacy

Home is the most private domain in public built environment. It has many spaces with varying levels of privacy. The importance of the home in Arab-Islamic culture symbolises the importance of respecting people's privacy and personal space.⁸ This study monitors the impact of privacy in the house with regard to spatial organisation.

Traditional houses had separate male and female entrances, which continued throughout the later periods and still is visible in many contemporary houses. A separate outer courtyard for guests or men and an inner or private one for family or female is also a common spatial arrangement in traditional houses. Privacy also dictated having separate formal living rooms (majles) such as men's majles and female's majles in the house. The screened openings or rowshan (similar to mashrabiya) was an effective way of having airflow yet have

⁸ Sandıkcı, Özlem, and Gillian Rice. *Handbook of Islamic marketing*. Cheltenham: Edward Elgar, 2013: 75.

privacy in the female quarters. In traditional mud houses, usually, the female quarters were located at the back of the houses. Later on, with the addition of more stories, the female quarters moved to upper levels. As is visible in some Eastern Province houses, the roof area in the cooler night times was also divided into female and male spaces with a partition in between. Again, in some houses, separate stairs were incorporated for female and male occupants. In the houses of the later periods, privacy remained a significant issue too. In modern and contemporary periods, the addition of secluded living quarters of household helpers was made in the backside of the ground floor or on the topmost floor to maintain the privacy of the residents.

7.4 Identifying the Case Studies

The primary focus of the current study is on the interdependence of the morphological properties of the individual living unit (i.e., house form) and the pattern of residential settlement (i.e., neighbourhoods) within traditional, transitional, modern and contemporary built environments.

This chapter aims to take **an analytical and descriptive approach** to the study of both urban planning and house form. It will focus on neighbourhoods and is based on developments occurring in the Eastern region, as a way to identify the impact of urban planning on house design. Four residential settlements from the Dammam Metropolitan neighbourhoods were selected to conduct a detailed case study (Fig. 7.2), based on the following factors:

1. The classification and division of the periods in which neighbourhoods developed.
2. The location and topography of the land.
3. The developers and their role in the neighbourhoods.
4. Zoning and spatial organisation and the key aspects of each neighbourhood.
5. The urban growth of the neighbourhood.
6. Types of buildings.

The case studies will focus on privately-owned and detached residences. The analysis will cover the following points:

1. The location of the house
2. The size of the house
3. Spatial organisation
4. External features
5. Space relations and circulation
6. Climate
7. Privacy

A large number of elements and features can be discussed when describing a house, or the neighbourhood in which it is located (Fig. 7.3). However, the researcher focused on some salient points for the purposes of this research.



Fig. 7.2: Residential neighbourhoods of the case studies in relation to the chronology of urban evolution in the Dammam Metropolitan Area.

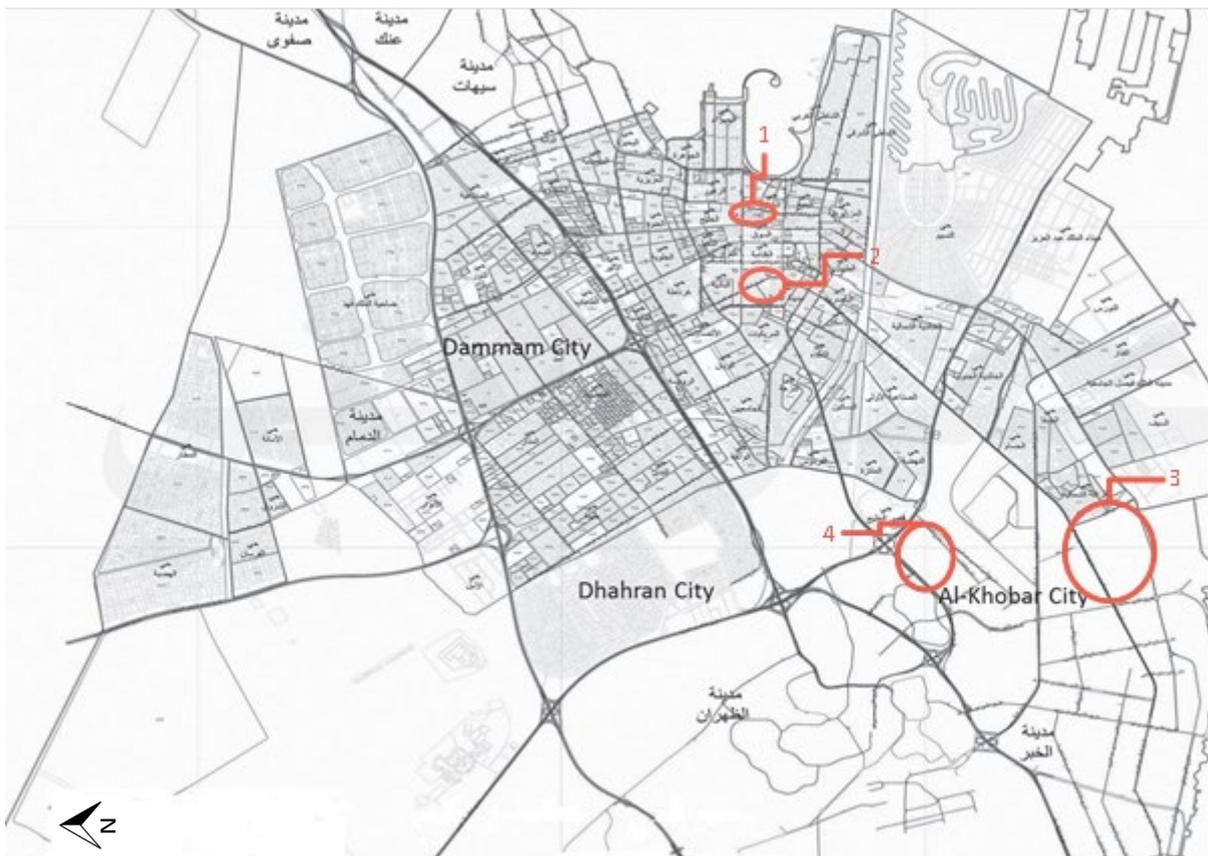


Fig. 7.3: A further plan showing the residential neighbourhoods of the case-studies in Dammam Metropolitan Area.



Fig. 7.4: This map shows the location of Damman City in Saudi Arabia.

7.4.1 The First Case Study: Houses from the Traditional Period

7.4.1.1 The Neighbourhood: Name, Location and Land Topography

Al-Amamrah in Damman city.⁹

The pre-modern period (i.e. before the 1940s), is known as the Traditional Period, and during this period Damman city became the first settlement on the Arabian Gulf coast. This case study analyses a traditional settlement which is now located in the centre of Damman city, within the Damman Metropolitan Area (Fig. 7.4). This traditional community occupies the central district of the city,¹⁰ between King Abdul Aziz Street and King Fahd Road. The neighbourhood is in the form of a rectangle, with its east side close to the coast of the Arabian Gulf. The old traditional area in Damman represents the Al-Dawasir, Al-Amamrah, Souq and Al-Adama neighbourhoods, and covers an area of approximately 500 square km (Figs. 7.5 & 7.6).

7.4.1.2 The Neighbourhood's Developer

The settlements developed organically, resulting in an irregular layout of dwelling units and family territorial holdings. Some of the property boundaries in the old Damman area were not fully documented by the government, but were clear to inhabitants according to conventions known as *Urf*.¹¹ Thus, there was no need for estate agents or mediators. This area is located in the heart of Damman City, and planners have recently allowed this traditional neighbourhood to remain without the need for restructuring, while mapping the city of Damman and adopting a plan for new residential neighbourhoods.

⁹ It is the other part of the Al-Dawasir traditional neighbourhood. In fact, Al-Amamra is considered part of the Al-Dawasir tribe.

¹⁰ The Community in sociology refers to a district populated by a group of people of any size whose members share the same culture, language, laws, and traditions. It also relates to a social group sharing common characteristics or interests, sometimes regardless of their location.

¹¹ *Urf*: Recurring practices which are acceptable to people of sound nature. For more information, see appendix: C.



Fig.7.5: The location of the Traditional Neighbourhoods in Damman city.



Fig. 7.6: The location of the first case study.

The picture below demonstrates how the traditional area has been left as an area of flat land, free from buildings, as it was considered a random residential area soon to be removed (Fig. 7.7). There has been no attempt by the government to maintain the ancient forms of the houses, and the municipality has cleared away most of the ramshackle houses, and those that have been abandoned.

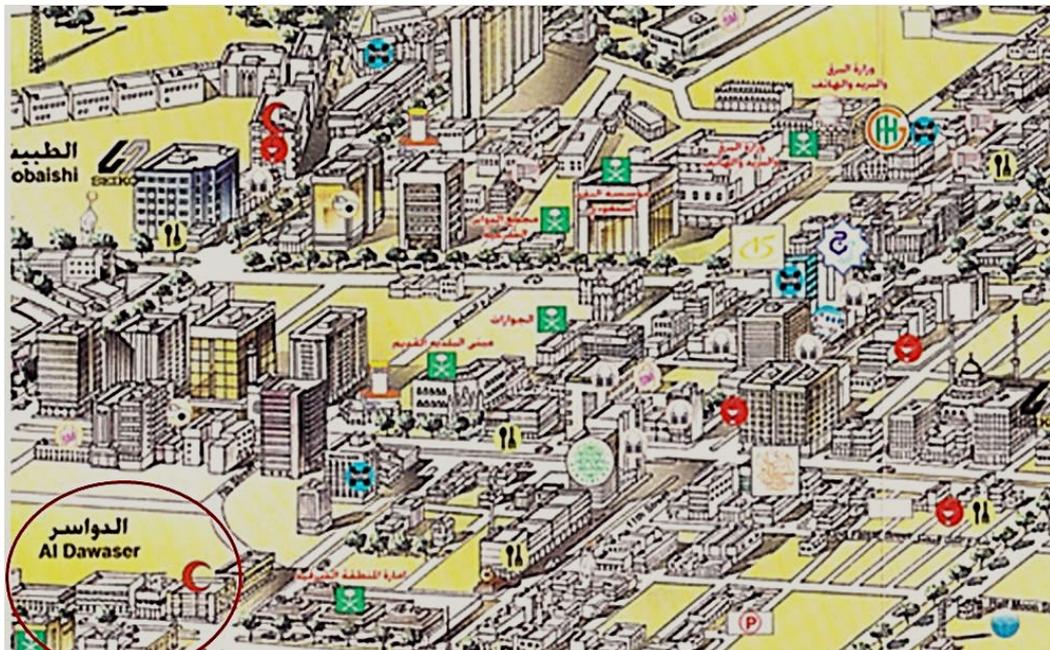


Fig. 7.7: The circled area identifies Al-Dawasir and Al-Amamrah traditional settlements. The map shows only the modern buildings and houses in the region (1997).

7.4.1.3 The Original Residents of the Neighbourhood, their Occupation and Income



Fig.7.8: Coastal settlement showing a traditional occupation and fishing boats, Dammam city.

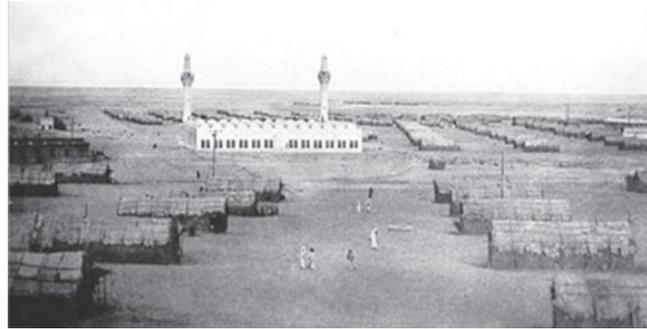


Fig.7.9: The *Braiti* of Saudi residents near the American camp.

Dammam was originally a small fishing settlement with a population of approximately 1,350. The Dawasir and Al-Amamrah tribes founded the first neighbourhood in Dammam, and their settlement lasted for several decades. Approximately 500 families of the Al-Dawasir tribe lived in Bahrain, having been displaced to the East Coast of Saudi Arabia in 1921. They built the cities of Dammam and Al Khobar. The population made a living from fishing and pearl diving, and later by buying and selling items from merchant ships (Fig. 7.8), and relying on income from businesses and craftwork, up until the discovery of oil.

7.4.1.4 Urban Fabric, Zoning and Land Utility



Fig.7.10: The urban fabric, with irregular streets and alleys, in the Al-Amamrah Neighbourhood in both the traditional and contemporary periods.

In the Al-Amamrah traditional neighbourhood, there were no central plazas or large-scale developments. The traditional part of Dammam lacked a master plan and governmental controls, along with those apparatuses typical of modern urban planning.

The Dammam traditional community began as a small hamlet of 300 residential huts with sloping roofs (Fig. 7.9),¹² with only wealthy merchants able to afford houses built of limestone. The city was a product of both natural and human-made factors, a process known as autonomous urbanism. A network of irregular walkways

¹² Mubarak, Faisal A. "Urbanization, Urban Policy and City Form: Urban Development in Saudi Arabia." Un Published PhD's thesis, University of Washington, 1992. P.132.

crossed the houses, linking the neighbourhoods of Dammam city. The settlement consisted of a group of houses clustered together to create a single neighbourhood, known as a 'freej'. The *freej* belonged to one family or tribe, because families traditionally preferred to live near each other (Fig. 7.12).



Fig.7.11: Residential communities clustered together for one tribe.



Fig.7.12: A group of houses clustered together in the Al-Amamrah Neighbourhood for one clan from the Traditional Period. It is still standing.

Traditional settlements reflected the different clans and ethnic groups residing in Dammam city. (Al-Amamrah was a clan that diverged from the Al-Dawasir tribe, clans from the Hawajer tribe, and clans from the Khawalid tribe.) Each residential quarter contained residential complexes for one clan (Fig. 7.11),¹³ made up of an extended family. The organic development of a complex urban fabric in Al-Amamrah and Al-Adama came about through the interaction of several factors, including climate, society and culture, its coastal location, and its topography (Fig. 7.10).

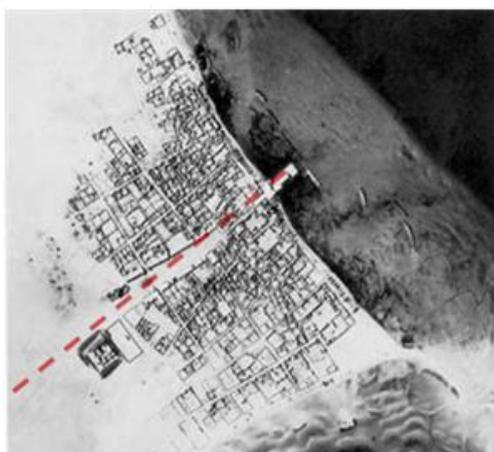


Fig.7.13: View of Dammam in 1935 shows the main street of the city between the seashore and the water well.

¹³ A Clan is often synonymous with a family or extended family; but a tribe often includes multiple extended families.

The street layout in both neighbourhoods was located according to the need to provide shade and shelter from the heat and humidity between houses. Narrow winding streets afforded the necessary shade for pedestrians, primarily children and women, who lacked other means of transport. Streets were oriented to facilitate the penetration of fresh sea breezes, to alleviate the oppressive heat during long hot (and humid) summer months.

The relationship with the sea and marine activities strongly influenced the Al-Amamrah traditional neighbourhood and its urban structure. Early maps and aerial views reveal a strong connection between the seashore and the local *souq* (market) and water well (Figs. 7.13 & 7. 15), both of which were located on the same axis, perpendicular to the seashore.



Fig.7.14: The network of streets in the Al-Amamrah Neighbourhood.



Fig.7.15: The strong link between the seashore and the market.



Fig.7.16: People gathered around the water well in Dammam city.

There was a further axis parallel to the seashore, linking the villages with each other, and with the main mosque, nearby farms, and water sources (Figs. 7.16 & 7.17). The majority of the land area was principally residential, with limited land available, and farms were located outside the residential area. The market had a significant number of shops managed by the local population (Fig. 7.18). The market was combined with a central open area, *Baraha*, and included a closed area for valuable goods.¹⁴

¹⁴ The market always combined with the *Barahas* (plazas) because it was a place not only for buying and selling but also for meeting and gathering.



Fig.7.17: A sketch showing a main mosque located on a main axis of the traditional settlements.



Fig.7.18: Dammam's old market.

7.4.1.5 Urban Growth

The linear growth and development of the city persisted along the coast. At this stage, the physical shape of the streets was being created by constructing an increasing number of buildings and houses, with semi-private open spaces remaining between residential plots. The street width was approximately 5 to 7 metres on average (Fig. 7.19). The number of houses increased to over 110, creating dramatic changes in their original formation.

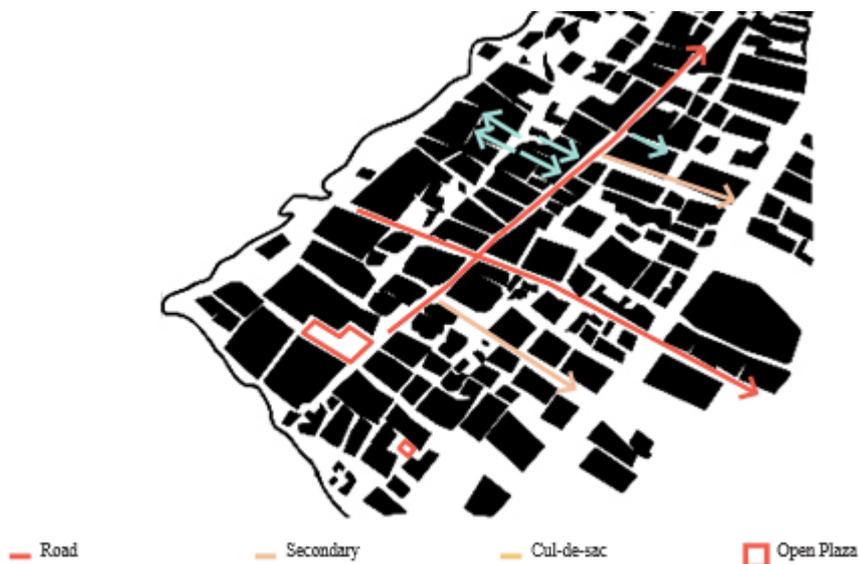


Fig. 7.19: Types of streets and paths between houses and residential quarters in Al-Amamrah Neighbourhood.

From 1965 onwards, the typical dense, inward-looking, traditional towns were replaced with the new city (Fig. 7.20), transforming the area from small villages to a sizable town. The city was largely shaped by an immigration of labourers from other cities, seeking to achieve a better standard of living by working for the oil company. Dammam's subsequent urban growth spread out from the location of the first oil well. These opportunities continued to attract migrants for decades, all of whom lived in the area and influence the future of the settlement. Additionally, the Saudi government chose to convert Dammam City into an urban area, constructing a new railway to Riyadh in 1950, along with a new port. Furthermore, in 1952, the central

government transferred its regional offices from Hufouf to Dammam(Fig. 7.21). The construction, along with the creation of roads, broke down the compact nature of traditional settlements in Al-Amamrah, Al-Dawasir and Al-Adamah, as more migrants settled near to the oil company's drilling operations.

One of the challenges facing the urban fabric of old Dammam concerned the advent of the motor cars, used by Aramco employees and several wealthy tradespeople. This ingress of vehicles into a residential area afforded roads priority over other aspects of urban development and planning. As the use of cars increased, the roads in the old city were widened to create other settlements in the Eastern Province.



Fig.7.20: The penetration of urban growth, with new types of houses, throughout the Traditional Neighbourhood of Dammam City in the Eastern Province.



Fig.7.21: The Ministry of Finance in Dammam City, 1952, after the central government transferred its regional offices from Hufouf to Dammam.

Today the district has the same planning issues, although most of the houses were demolished and later replaced by high rise residential buildings. These buildings house a huge number of people requiring essential services and facilities to ensure their quality of life. However, the neighbourhood has become very crowded, with a high number of residents using cars but struggling with inadequate parking (Fig. 7.22).

The location of mosques in these traditional neighbourhoods has remained the same (Fig. 7.23). The majority are located on wide streets that divide the quarters of the neighbourhood from each other. These wide streets are also typically full of shops.



Fig.7.22: There are not enough parking spots for residents' cars. The streets are void of necessary services and facilities.



Fig.7.23: The main mosque location.

7.4.1.6 The Study of the Traditional House and its Location

The plans and main elevation of traditional houses were at the discretion of the inhabitants, matched the socio-economic description of the inhabitants and were related to the layout of surrounding traditional houses in Dammam city. Single foreign workers inhabited the majority of the houses in the older traditional areas from the 1980s onwards, as the original inhabitants and locals moved away to live in new neighbourhoods and modern houses.¹⁵

7.4.1.7 The Location of the House of Case Study No. 1

The house was located in the middle of the Al-Amamrah neighbourhood, in the heart of Dammam city (Fig. 7.24), within the Dammam Metropolitan Area. The community consisted of 53 residential blocks, of a variety of sizes and shapes and subdivided into smaller plots that were mainly privately owned. Each block had varying numbers of houses. Many of the traditional houses have now been demolished and replaced by apartment buildings.

This neighbourhood had irregularly shaped street patterns. The streets were too narrow to accommodate two cars passing each other, or even a single car and pedestrians. The streets differ in shape and size according to the location of each home within its lot, and include wide streets, secondary streets, and alleyways. In areas where there are large blocks, houses were sometimes built in the centre and tended to include a cul-de-sac, providing access. Some plazas (*baraha*) were scattered inside one residential block, between clusters of houses and in front of the mosque (Fig. 7.25).



Fig.7.24: The location of case study no. 1 within the Al-Amamrah Neighbourhood.

The case study house was located at the start of the secondary street dividing the residential block in two (Fig. 7.26). It is apparent that a house is a unit from its residential cluster. The researcher studied the house as a single unit, due to the inability to gain access to the surrounding houses.

¹⁵ Ahmed, Farouq. "AL-Amamrah Neighbourhood: An Old Sea City and visitors' place." *Al-Yaum*, November 16, 2009. Accessed July 22, 2017. <http://www.alyaum.com/article/2716964>.



Fig.7.25: The mosque is located on the boundaries of the residential block.



Fig.7.26: An aerial view of the Al-Amamrah neighbourhood shows the location of the traditional case study house within the residential block.

7.4.1.8 Size of the House in Case Study No. 1

The house was constructed on a lot of approximately 220 square metres. The built-up area occupied all the land area on the ground floor. The upper level was planned as a roof area, its area equal to the ground floor area (apart from the interior yard). The house consists of eight rooms around an inner courtyard. There were two multi-purpose rooms, with the other rooms dedicated to guests and services.



1: Family and female entrance. 2: Male guests' entrance. 3: Storage. 4: Male sitting area 5: Female sitting area 6: Toilet 7: Central courtyard. 8: *Loggia*. 9: Kitchen. 10: Male *dehreez*. 11: Multi-purpose room. 12: Family and female *dehreez*. 13: Sleeping area on roof. 14: Sleeping area on roof.

Fig.7.27: Ground Floor of traditional case study house.

Fig.7.28: First Floor of traditional case study house.

7.4.1.9 History of Inhabitation in Case Study No. 1

The selected house is now outdated, and so, after the original owners left, it was rented out to foreign workers. The number of original inhabitants is unknown, with the house now being inhabited by single labourers sharing rooms. The number of occupants ranges from 3-6 people sharing a single room. The original inhabitants were Saudi citizens, and had about nine children according to one of their neighbours. The total number of original family members was, therefore, eleven people.

7.4.1.10 Spatial Organisation in Case Study No. 1

The house consisted of one floor and a roof level. It was a simple traditional house, comprising a single housing unit around a central courtyard. The house had two entrances, one of which was the northern door, designed for family members and female guests. This led indirectly to the central courtyard. The other entrance, the southern door, was for male guests and opened into the male reception area. The two doors were located at the corners of the house, providing maximum privacy; they, therefore, did not require the presence of a high wall (or barrier) between the two entrances. The entrance had a reception area that was a semi-private zone separating the public area (i.e. the street) from the private area (i.e. the central courtyard). The corridors were narrow and sufficiently deep to enable soundproofing. (Figs. 7.27 & 7.28)

The courtyard was square and surrounded by a *loggia* on the left-hand side, a staircase on the right, and rooms on the other sides. All rooms had direct access to the courtyard, apart from the male sections. The interior courtyard played a social, climate and privacy role. The *loggia* was a covered open space that was used as an open living room throughout the year, apart from winter.

The ground floor consisted of two multi-purpose rooms: one for the parents and the other for their children. These rooms were used for sleeping, eating, receiving guests and for recreational purposes. Multi-purpose

rooms were free from large pieces of furniture (e.g., sofas, chairs or tables), but contained built-in cupboards to store the necessary mats and cushions.

The kitchen was located in the right corner, as close as possible to the staircase, to facilitate access to the roof. There was a storeroom next to the kitchen for grains, dates and other food supplies. The space under the staircase was used as a toilet, sheltered by the walls surrounding the stairs. The staircase not only allowed vertical circulation but was also an air well that ventilated the courtyard using the '*badgeer*' system.

The male reception area was located directly next to the men's entrance, parallel to the street. The '*majlis*' had a specific area called '*wijagh*' for making tea and coffee without the need of assistance from women. It was situated opposite the door and surrounded by built-in shelves for the pots and cups. This room could be used by family members for recreation, or for the father to relax during the daytime, away from the noise of the children.

Female guests were welcomed via the family entrance, and could sit either in the interior courtyard or in one of the multi-purpose rooms. If there were men present in the courtyard or inside the house, women guests were received in the female formal sitting room in the front zone.

The roof was divided into two parts (Fig. 7.29): one was for guests, and the other for the parents and their children.¹⁶ The roof was used as a sleeping area on hot summer nights, and the family also used it for celebrations (e.g., weddings or religious feasts, such as *Eid*).

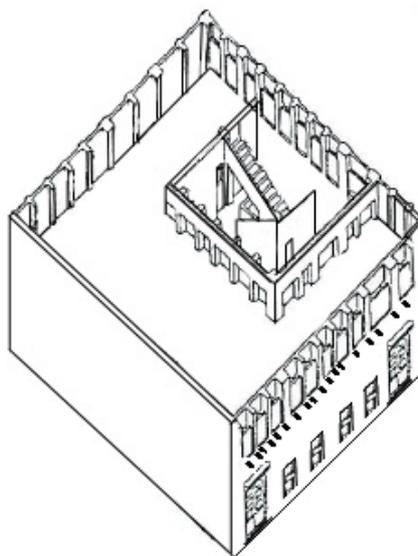


Fig. 7.29: This illustration shows a 3-D drawing of the selected traditional case study house in its original condition.

¹⁶ In this case, the researcher is not sure about the location of the roof part that was dedicated to guests or family. The roof is all open without boundaries. It is currently used for storing rubbish.

7.4.1.11 Impact of Climate on the House Form

The courtyard provides a microclimate within the internal home space. Residents migrated throughout the house throughout the day and the year to find comfort in the hot climate (e.g. the north side of the house in summer, south in the winter, the ground floor during the day, the roof at night). Most of the rooms were modular, adapted to multiple uses and containing flexible furniture.

The interior spaces are frequently large with high ceilings and are connected to the outside through upper-level vents and wind channels, permitting an outward flow of heated air from the interior. External exposure is provided through interior courtyards and by screened exterior windows. The orientation of the building openings is away from the sun and towards the north or west whenever possible.

7.4.1.12 Impact of Privacy on the House Form

Complete privacy is the outstanding hallmark of an individual house. Privacy is sought in Traditional houses from both the natural environment and the human world. Consequently, the traditional house has few openings to the outside. Entrance doors are located away from the main street and do not directly face the opposite neighbours. Above eye-level windows (approximately 1.75 m high) are located on the lower floors with small openings; these higher-level windows have a timber lattice screening. The houses in the area are all of similar heights and windows never directly face opposite neighbours. The interior courtyard is not directly visible to the internal home spaces of neighbouring houses. There is a clear separation of male and female guest areas to maintain the privacy and safety of women. Floors, walls, and roofs should not allow the penetration of voices into neighbourhood dwellings and streets, especially those of women. Internal spaces are divided into four zones to achieve privacy: private, semi-private, semi-public, and the public that connects through the courtyard.

7.4.1.13 External Features in Case Study No. 1

The original exterior façade of the house has changed over time, due to the requirements of new residents, governmental services need for access to the neighbourhood, and the installation of modern home appliances. The house had only one main elevation facing the street, and the two entrances were located on the same façade. The original house has disappeared as a result of renovation processes, re-restoration and re-painting over time. However, the external elevation appears to have had a lowish wall, characterised by a segmented parapet on the upper-level of the outer wall. The outer wall was constructed of pillars filled with burned limestone, then coated with mud to create the final look of the façade. The floor levels are emphasised by mangrove trunks, which were used in the construction of the ground floor ceiling (Fig. 7.32).



Fig.7.30: Signs of traditional elements remaining on the front elevation of the traditional case study indicate the original appearance.

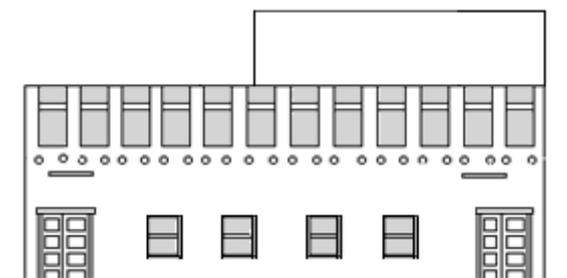


Fig.7.31: A drawing shows the original front elevation of the traditional case study house.

The door consists of two panels made of cast iron, and decorated with simple ornamentation. The doors are framed with mud plaster canopies and washed with white gypsum (Fig. 7.30). The ground level door is placed two steps down from the street. The size of the house, the number of external windows and the little external decoration reveals the residents to have been middle-class, or slightly lower.

There are only a small number of windows along the exterior façade. These are on the ground floor, where the male guest rooms were located. (Fig. 7.31) There is a small opening on top of the exterior doors to ventilate the reception halls. The windows are rectangular and have two wooden panels in the style of shutters and open inward, as they are protected from the outside by steel bars for security reasons.



Fig. 7.32: The original appearance of traditional façades in Al-Khobar (early 1940s).

7.4.1.14 Space Relationships and Circulations in Case Study No. 1

Many of the functional relationships between the different spaces in a traditional house were arranged in response to the street and neighbours (Fig. 7.32), with home areas separated and classified into public, semi-public, semi-private and private.

In this case study, the public zone of the house has two entrances (i.e., one for the family and one for male guests), each having his or her reception corridors known as 'dehreez'; neither of the entrances and reception corridors directly link to each other. The male and female guest sitting areas are in the semi-public zone, located at the front of the house. The courtyard and the surrounding *loggia* were placed in the semi-private area in the middle zone. The multi-purpose rooms (i.e., the 'Muraba' and 'Liwan') were considered to be the private spaces of the house, and the services consisting of the toilet, kitchen and storage are located in the back zone.

As evident from the house's ground floor plan, there was clear isolation of the male guest area from the rest of the house. In the traditional period, families often received male and female guests at the same time and frequently. As a result, the house designated the front zone for guests, along with separation between the two entrances to their reception halls, to ensure segregation between the genders.

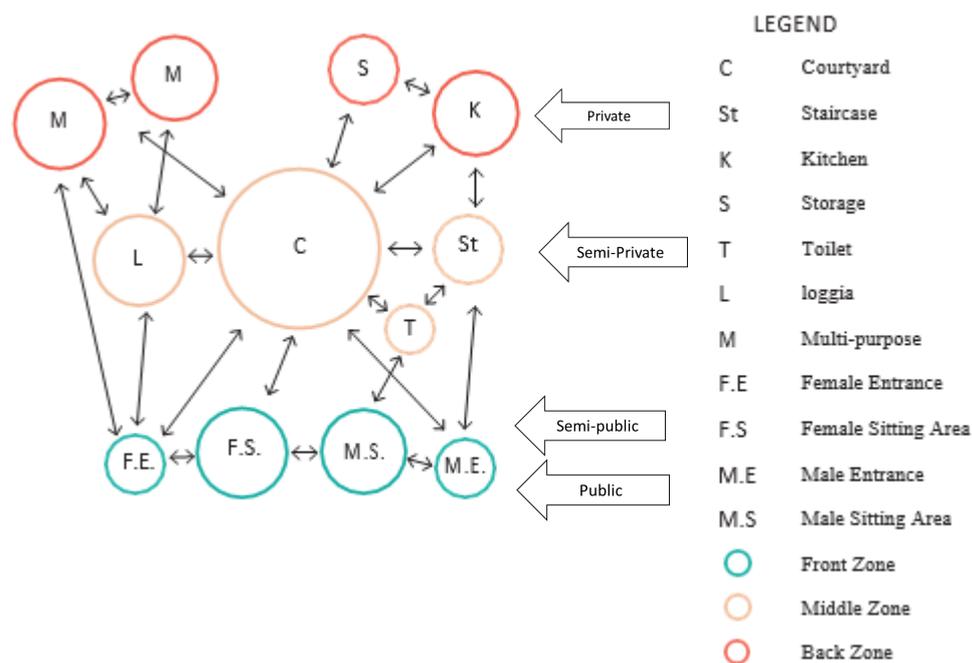


Fig.7.33: The space relationship of the traditional case study.

The circles represent the house spaces with respect to the proportions of each space, with the arrows revealing the movement and the relationships between them all.

The majority of the family's activities took place in the central courtyard, which was located in the heart of the house, while the services were located at the back, and guest zones at the front. This division is indicated by Al-Naim in his classification of house spaces by the front,¹⁷ middle and back in the traditional houses of Hofuf city.¹⁸

¹⁷ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

¹⁸ Hofouf was one of the main cities that represent the Eastern Province in the traditional Period.

This house, like other houses in the traditional period, was comprised of three main zones (i.e. front, middle and back) (Fig. 7.33). All zones had mutually beneficial relationships,¹⁹ and each had a unique relationship with the urban elements surrounding the house.²⁰ The front zone had the most active relationship with the street, and, in particular, the male section, with its' outer door remaining open during the day to receive male guests. There was less openness associated with the female and family section of the front zone.

In the middle zone, the link between female guests and the family section was stronger than in the male area. This was due to the housewife receiving neighbours and relatives in the informal seating area of the internal courtyard, leaving the front seating area free to receive unfamiliar female guests for more formal purposes. The middle zone had a medium relationship with the street, and the family members (or female guests) could pass through the front zone before leaving the house.

The staircase was located in the middle zone, affording vertical circulation for family members to connect to the sleeping area on the roof during the summer, and additional seating areas. The female members used the staircase to contact neighbours without using the street, thereby achieving a higher level of privacy. The back zone held a strong relationship with the middle zone, and with the stairs, and had a weak relationship to the street (Fig. 7.34).

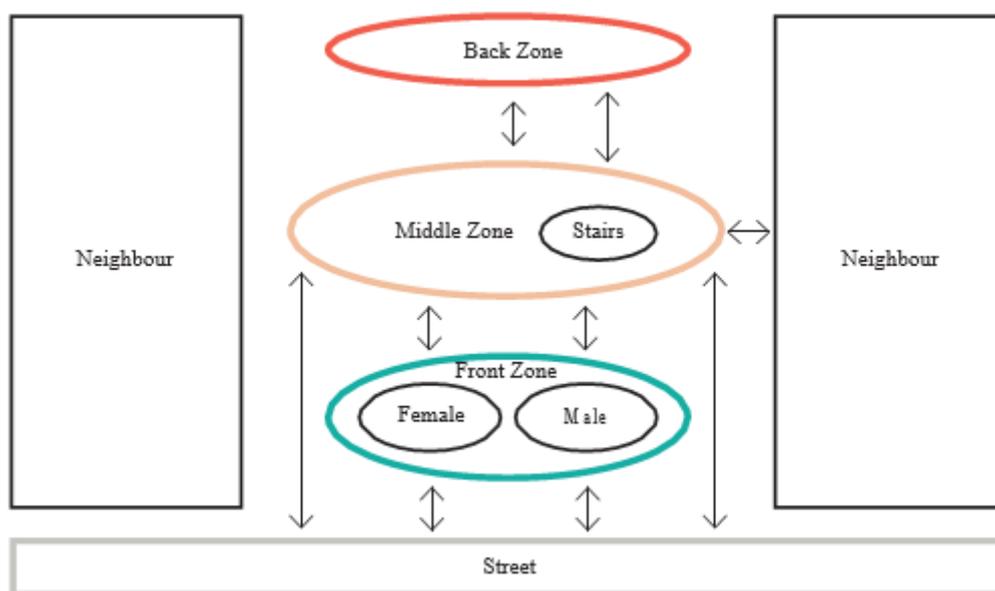


Fig.7.34: Relationships among the zones of the traditional case study house, and with the street and neighbours.

¹⁹ Please refer to figure 7.33.

²⁰ Please refer to figure 7.34.

7.4.2 The Second Case study: The Transitional Period

7.4.2.1 Name, Location, and Land Topography of the Neighbourhood

Madinat Al-Ommal (The Labour City).



Fig.7.35: The location of Madinat Al-Ommal (Labour City) in Dammmam Metropolitan Area in relation to the seashore of the Arabian Gulf.

This area is one of the Aramco residential neighbourhoods under HOP. Labour City (Madinat Al-Ommal) is located in the heart of Dammmam City (Fig. 7.35), where the neighbourhood takes the form of a hexagon. The eastern and western sides are the tallest, the northern section contains three sides of the Hexagon, and the south shore is the smallest. Madinat Al-Ommal is located on a flat area adjacent to the coast of the Arabian Gulf (Fig. 7.36), and thus there is some occasional flooding in some parts of the neighbourhood (Fig. 7.37).



Fig.7.36: The topography of the Madinat Al-Ommal neighbourhood. The photograph has been taken from Dammmam Mass Housing.



Fig.7.37: The tidal phenomenon has made the seawater reach the houses of Madinat Al-Ommal (Labour City). This shows that this neighbourhood was very close to the seashore.

7.4.2.2 The Neighbourhood's Developer

Aramco chose a large plot of land outside the old town of Dammam to construct their first residential neighbourhood. In 1953 (Fig. 7.38), Aramco announced a new Home Ownership Programme for its employees, encouraging them to build (or purchase) houses as part of the first phase of a homeownership programme in Dammam city. The company developed plots intended for free distribution to employees, each containing infrastructure on land provided by the government (Figs. 7.39 & 7.40). The majority of Saudi employees working at the Aramco Main Camp preferred to buy their homes in Dammam.



Fig.7.38: R. L. Mestrezat (on the left) was in charge of residential services in Dhahran. Here is studying a housing plan with C. F. Heywood, who was responsible for coordinating all Aramco community services.

During the same year, the company initiated a Housing Loan Plan to support Saudi employees in obtaining funds to build or purchase family housing within their local communities.²¹ The schedule of loans was closely related to the level of salary, with low-paid employees qualified to borrow up to a maximum of SR 20,000, while higher income groups could borrow up to SR 80,000.²² Loans were repaid by a regular monthly salary deduction of up to 20%.²³

²¹ In addition to this scheme, ARAMCO established a Guarantee Rental Plan. To encourage local contractors to build housing for sale to its Saudi employees, the company guaranteed to pay the rent for a five-year period on any such properties which contractors failed to sell. The housing loan scheme and the guaranteed rental plan enabled the company's employees to live with their families in their local communities in all cities and towns of the Eastern Province.

²² At that time the housing loan for Aramco employee was 50 times employee's salary plus 150,000 SR if the lot was in Aramco's neighbourhoods and 200,000 SR if the lot was not in one of its neighbourhoods.

²³ Al-Nuaim, Abdullah. "Improving Living Environments for the Low-Income Households Saudi Arabia." Best Practice Is One of the Best Practices for Human Settlements. Accessed June 10, 2016. <http://www.vcn.bc.ca/citizens-handbook/unesco/most/mideast3.html>.



Fig.7.39: Land surveying before planning Eastern Province.



Fig.7.40: Planning and asphaltting the streets by Aramco.

7.4.2.3 The Original Residents of the Neighbourhood and their Occupation and Income

All the inhabitants of Labour City were Saudis working for Aramco. The company distributed the plots to their employees according to the length of service and also grades. An employee became eligible for a HOP loan once all of the following requirements had been fulfilled: (1) the employee was a Saudi male national; (2) he was aged between 20 and 58 years old (Gregorian); (3) he was either married or a bona fide head of a household; (4) his performance in his job was satisfactory; and (5) he had at least four continuous years of service with Saudi Aramco. During the transition period, Aramco employees received the highest salaries in the Kingdom and typically had a higher income than other workers.²⁴

7.4.2.4 Urban Fabric, Zoning and Land Utility

Between the 1950s until the early 1970s, Dammam entered the transitional stage (Figs. 7.41 & 42), while preserving some traditional aspects. With the support of Aramco, the municipality gained control of the conurbation's streets and building regulations. They divided Dammam into two different urban patterns: (1) the traditional core area, containing the neighbourhoods of Al-Dawasir, Al-Amamrah, Al-Adama and Souq Area; and (2) an area comprised of new districts surrounding this core area in four directions, described by MOMRA as follows:²⁵

The introduction of the Western model of institutions and organisation caused some radical transformation in the Dammam urban environment. Dammam, throughout the 1940s and 1950s, had remained a relatively compact city. In the 1960s, four new urban design features appeared, which were: (1) wide boulevards and venues; (2) suburban or satellite developments beyond the traditional perimeter of the city; (3) free-standing villa models, as well as 'modern' building materials and techniques (cement and Ferroconcrete frame); (4) foreign engineers and architects providing professional services in the region.

²⁴ "Kingdom of Saudi Arabia in modern time Local situation in the 1970s and early 1980s." Al-Marefa. February 26, 2017. Accessed August 21, 2017. <http://www.marefa.org>. [Arabic Text]

²⁵ The Ministry of Municipal and Rural Affairs. MOMRA, (1981):6-24.

The case study neighbourhood was located nearest to Aramco offices in Dhahran city. Aramco created housing units for their employees, and once an employee had achieved the eligibility requirements for a HOP loan, he received a home loan and the option to select one of the following: (1) a vacant lot, or (2) a lot allowance. Eligible employees under the Home Ownership Programme were given three choices to enable them to own a house in Madinat Al-Ommal: (1) construct a house on a free,²⁶ private, or purchased lot; (2) buy a ready-built house or self-owned house; or (3) complete a partially built house. The majority of homeowners chose the first option. When available, three sizes of free lots were assigned to eligible employees, based upon the following loan limits (Table 7.1).

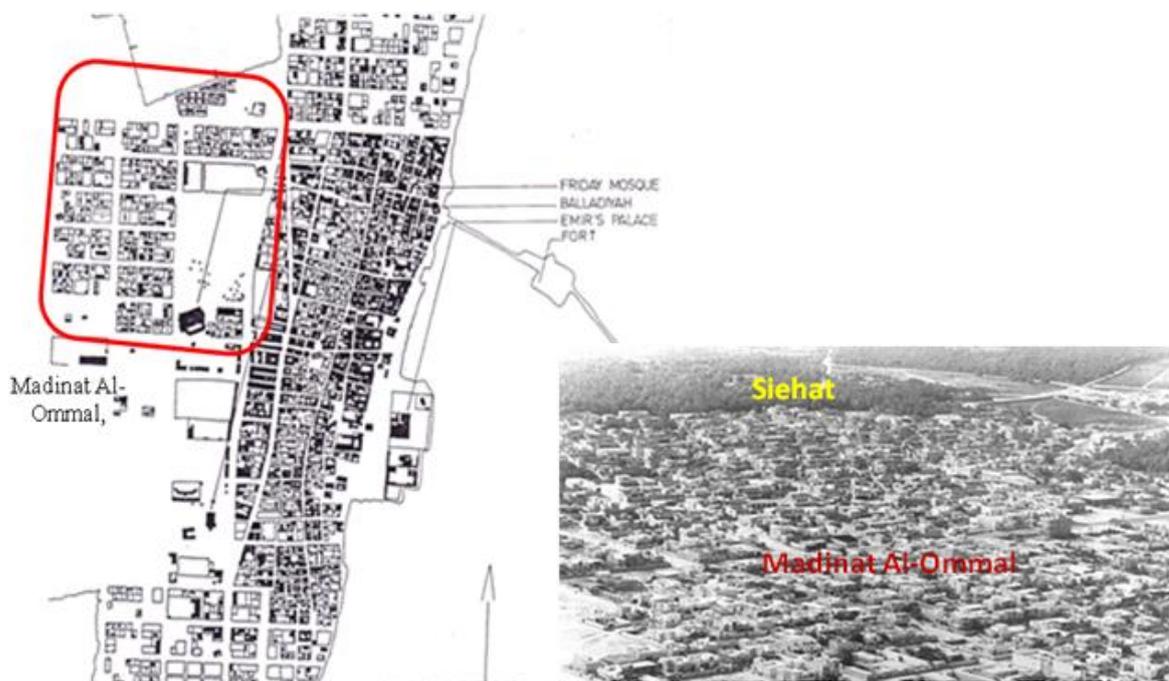


Fig.7.41: Damman plan from 1956 shows Madinat Al-Ommal, the new neighbourhood, on the left.

Fig.7.42: An aerial view of a comprehensive neighbourhood for Labour City (southeast - northwest), inhabited by the staff of the Arabian American Oil Company (Aramco), compared with traditional homes at the western edge of the town, built mostly of stone and clay.

Aramco designed and constructed a new city thoroughfare along the shoreline, with a street width of between 70 feet (21.3 metres) and 100 feet (30.4 metres), branching from the main road to form major arterials. The interstice blocks were subdivided into rectangular lots of 300 feet (91.4 metres) by 600 feet (182.8 metres). In 1947, the land subdivision by Aramco added 400 acres of planned area to the organic design of the traditional area of the city.²⁷ Labour City was laid out in a gridiron pattern, with back-to-back street-front plots, ranging from 15 × 17.5 m to 20 × 20 or 25 m. The spaces required for facilities were distributed across the neighbourhood along the outside border of the neighbourhood.

²⁶ Free lots were developed by the Company and could be acquired as they become available in certain urban areas.

²⁷ 400ac = 1.6187e+6 m².

In 1947, in response to a request from Prince Saud Bin Abdullah Bin Jalawi, Aramco designed a plan for Labour City first, and then it continued successively at Dammam city, responding to proposed and expected development. The design depended upon dividing the land into linear residential units intersected by roads from 70 to 100 feet wide. The planning included a main road parallel to the seacoast. The rapid increase in population resulted in rapid urban development (Figs. 7.43 & 44).



Fig.7.43: The urban fabric and zoning of Labour City (Madinat Al-Ommal).

Table.7.1: Sizes of free lots distributed by Aramco to their employees in Labour City (Madinat Al-Ommal).

Home Loan Limit (SR)	Lot Category
Up to 345,599	Small (300 sq.m.)
345,999-477,599	Medium (400 sq.m.)
477600 and above	Large (500 sq.m.)

Source: Aramco HOP.



Fig.7.44: View over Labour City (Madinat Al-Ommal).

Aramco provided services to the community to meet the needs of the population; including a school complex for girls in the centre of the neighbourhood (Fig. 7.48). Mosques were also distributed in each part of the neighbourhood (Fig. 7.47), along with two parks for each half of the district. There was a patch of empty land rented out for medical use. However, the neighbourhood lacked football fields and recreational or social centres for youths and young people (Fig. 7.45), because the attention at that time was not on sports or socialisation.

Some essential services were missing from the Labour City neighbourhood, including places for shopping and groceries, community and cultural centres (Fig. 7.46). Urban planning in the Transitional Period concentrated only on the residential sector to meet the urgent need. As city planning depended entirely on the use of vehicles (even to move within the neighbourhood), urban planning ignored the need of the residents to walk safely between their houses without using a car (Fig. 7.49).



Fig.7.45: The Labour City neighbourhood lacked football fields and recreational or social centres for adolescents and young people.



Fig.7.46: Streets in Labour City followed a grid-iron network.



Fig.7.47: Mosques in Labour City were always located on the commercial street. The Green Circle shows some shops near each other.



Fig.7.48: School complex for boys in the Labour City neighbourhood, the blue circle shows the mosque located on the same street.



Fig.7.49: Plan of Madinat Al-Ommal (Labour City) showing the distribution of the lots and location of services.

7.4.2.5 Urban Growth and Transformation

As the workforce expanded in response to the expansion of the oil industry, temporary field camps were developed into permanent dwellings. Consequently, Aramco planned and built Labour City in the Dammam Metropolitan Area to provide housing units for their employees.

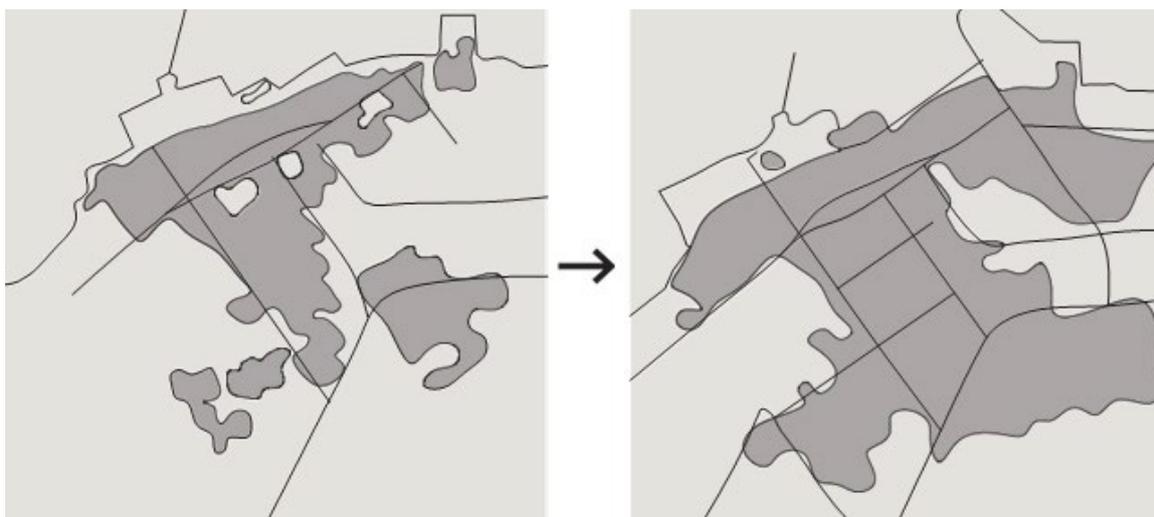


Fig.7.50: A zoning plan showing the development subsequent to the establishment of Labour City (Madinat Al-Ommal) in 1963-1973.



Fig.7.51: Dammam urban development phases until 1960s.

The majority of the houses in the Transitional Period consisted of housing units that had been planned and built by Aramco's HOP. In recent times, most of these houses have been completely transformed to either commercial or investment residential buildings or rented to single foreign labourers as a housing solution for those on limited incomes.

By the 1950s, Dammam was experiencing continuous growth (Fig. 7.50). The municipality was forced to extend its grid-iron network to accommodate the increasing demand for residential lots, due to the ongoing migration to the Eastern Province by those seeking the promise of work. This increase in population resulted in an additional 525 acres of grid-ironed land (Phase 2 in (Fig. 7.48)).²⁸

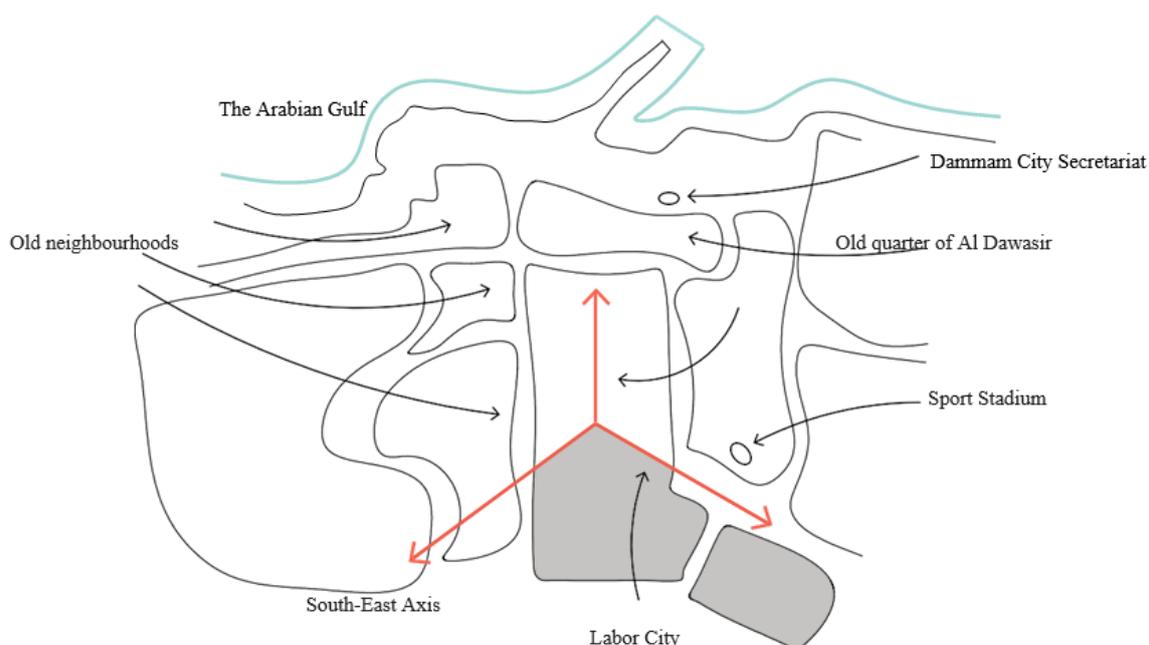


Fig.7.52: Dammam urban development axis and phases in the 1960s.

²⁸ Ac = 2.1246e+6 m², 1 Ac = 0.00404686 km².

Lot sizes were considerably reduced at this time (to dimensions of 150 by 300 feet, approximately equal to 45 by 90 metres) due to the emphasis on vehicular access resulting in the circulation space taking up 55% of total land use, while private lot size was around 250 – 300 square meters. The core area of Dammam grew greatly in just a few years, from 170 to 925 acres (Phase 3 in (Fig. 7.48)).²⁹ Indeed, by the mid-1950s, Aramco's employee population had reached 20,400; comprising 3,000 Americans, 13,400 Saudis and 3,000 from other nationalities.³⁰ The number of houses in Labour City reached 1700 (set against a total of 2800 houses constructed by the company during the 1960s in other Eastern Province's cities). Accordingly, the residential area began to increase substantially (Figs. 7.51, 7.52 & 7.53).



Fig.7.53: The development phases in Labour City in Dammam.

7.4.2.6 The Study of the Transitional House

This study will focus on the new and emerging housing model that emerged in Labour City (Madinat Al-Ommal) in the Dammam Metropolitan Area after the traditional period. The study delivers a comprehensive investigation of the design of the houses, detailing (1) internal organisation, (2) external features, (3) the size of rooms, (4) the impact of climate, and (5) the impact of privacy.³¹

7.4.2.7 The Location of the House of Case Study No. 2

The case study property is located in Labour City (Madinat Al-Ommal), in Dammam city, within the Dammam Metropolitan Area. The house is located in a residential part of the neighbourhood, on the east side of Labour City (Madinat Al-Ommal) and is adjacent to the Prince Mohammed Bin Fahad Stadium and the Town Planning Office (Fig. 7.54). The house is set between neighbouring houses on either side and overlooks a local street that is 15 metres wide. The house is bordered at the rear by a narrow alleyway of approximately 5 metres wide (Fig. 7.55).

²⁹ Al-Hathloul, S. Tradition, Continuity and Change in the Physical environment: the Arab-Muslim city. Unpublished doctoral dissertation, Department of Architecture, Massachusetts Institute of Technology, Cambridge, Massachusetts. 1981.

³⁰ Mubarak, Faisal A. Oil Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930s – 1970s, King Saud University, J. King Saud Univ., 11, Arch. & Planning (1998): 31-51.

³¹ During the study, there was a problem gaining access to the houses in this area because they are either empty or inhabited by expatriates, except in the case of houses converted to a private company or institution. This was referred to in the section covering the scope and limitations of the study in chapter one.



Fig.7.54: The rectangular border shows the area to be studied and the location of the house.



Fig. 7.55: Types of streets bordering the residential block and the housing unit chosen as the case study.

7.4.2.8 The Size of the House in Case Study No. 2

The plot size of this house is 430 square metres.³² The ground floor area is approximately 196 square metres, and the first floor is 210 square metres. The first-floor area has additional space for small balconies in front of the living room and master bedroom. The rooms are medium in size, ranging from 36 square metres to 12 square metres. The largest rooms are the living rooms, the male seating area, and the main room on both the

³² The average size of plots in a residential block of the Labour City neighbourhood is about 300 square metres for the smaller lots, up to 500 square metres for the large ones.

ground and first floors. The area covered by each of the bedrooms and the dining rooms is between 20 and 33 square metres. Services (i.e. kitchen and toilets) are between 9-12 square metres.

7.4.2.9 History of Inhabitation in Case Study No. 2

It is difficult to know the identity of the original residents because it is occupied by a private company. However, the average number of family members can be estimated from the number of bedrooms, comparing this estimation with the average number of household members in the Transitional Period. This leads to the conclusion that the house was occupied by between 8 and 10 individuals.

7.4.2.10 Spatial Organisation in Case Study No. 2

The house consists of two storeys. The traditional internal courtyard and surrounding rooms no longer exist, and the central open-air space has been moved outside and setbacks around the house. The house is thus forced to look outwards for both light and ventilation.

The house is divided into three zones: (1) The front zone is dedicated to male guests' reception and seating areas (known as *Majlis*), along with a dining room, *Moqalat*, and a toilet; (2) the middle zone is limited to the area of the living room and kitchen; and (3) a back zone for bedrooms and bathrooms. The staircase is located at the front elevation to a side position, near to the outer walls. The main façade has two balconies at the edge of both sides.

The house has only one main entrance, via the staircase well, which leads to a central hall. The foyer takes on the role of the heart of the house, affording access to all the rooms on the ground floor. In the Transitional houses, the family living room replaces the function of the central courtyard, and the *Liwan* of traditional houses. In the Transitional Period, the living room was used to collect family members together, in addition to hosting women guests. This room served as a multi-purpose room, with the majority of family activities taking place there. This similarly happened in a Traditional Period when family members used to gather in the central courtyard in the daytime and used the multi-purpose rooms for receiving women guests, sleeping, and taking meals, especially in the winter time.

This home is an example of a household distributed over two floors (Figs. 7.56 & 7.57). The first floor had a similar design to the ground floor, and contained one master bedroom overlooking a local street, and balcony. A toilet serves the master bedroom and living room. In this period, the idea of an en-suite toilet did not exist yet. The family members and women guests had the use of two toilets. The first floor also had a living room with its balcony located on the opposite side of the master bedroom, on the same main façade of the home. The remaining bedrooms were distributed over the remainder of the floor. The household of the family that dwelt on the first floor received male guests in the men's sitting area located on the ground floor, because it was often the case that the upper house dweller was the son of the owner. The house lacked a roof terrace, but had two balconies.



Fig. 7.56: Ground floor plan in transitional case study house.

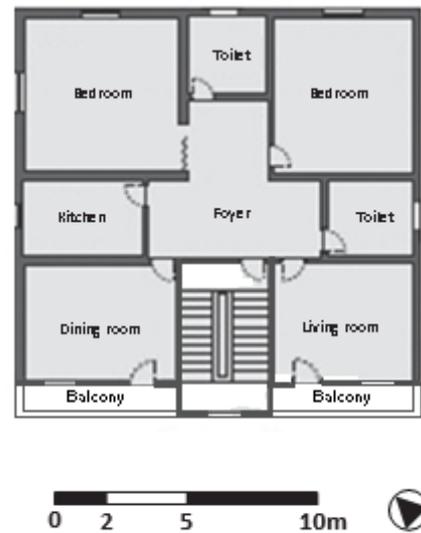


Fig. 7.57: First floor plan in transitional case study house.

7.4.2.11 Impact of Climate on the House Form

In the Transitional Period, a gridiron system for streets replaced the intricate irregular patterns of older neighbourhoods. No longer does the street benefit from the passive shading that is an inherent characteristic of Traditional neighbourhoods. Transitional neighbourhoods contain detached houses with side setbacks and front yards. Thus, the climate benefit of attached houses is lost.

The new gridiron system did not give any consideration to the orientation of the house, as was the case with Traditional houses. The Transitional houses lost their introverted character and were exposed to direct sunlight and consequently suffered from overheating. There was no longer any need to move rooms according to day or night, and the seasons, as fans and air conditioners were used to control the microclimate of the house.

7.4.2.12 Impact of Privacy on the House Form

There was a clear lessening of privacy in Transitional houses relative to traditional ones. They were built outward and exposed to public view. The houses were built at different heights, and erected adjacent to each other. The house has an external yard, which is contrary to Saudi norms and traditions. This led to privacy becoming an issue, with women being unable to sit in this yard, as to do so would mean they would be exposed to the surrounding neighbours. Therefore, the setbacks (i.e. the exterior yard) remained empty. However, some houses built additional rooms to exploit the unused outside space. Others raised the wall of the house above three meters. Akbar states: These setbacks have no redeeming value, and have destroyed the value of open spaces between buildings. These spaces are never used; they will be only ever be used for future

extensions.³³ Balconies had the same issue; most balconies were closed and covered with wooden or metal panels to ensure their isolation from the street.

7.4.2.13 External Features in Case Study No. 2



Fig. 7.58: A sketch shows the original elevation of the transitional case study house.



Fig.7.59: The façade of the transitional case study house.

The new image of a detached house aimed to reject the form of the traditional house, as Saudi families chose to demonstrate their increased prosperity. The houses revealed an explicit model of domestic architecture that represents this transitional period. The detached house is known as a ‘villa type’, and is one that emerged in Labour City and obliterated the traditional form.

In this dwelling, the courtyard was moved outward, to become external, and a strip of setbacks 2 metres wide, apart from the front and the side setbacks were located in front of the garage area, which is varied. The setbacks extended around the house structure, and were surrounded by boundary walls up to 2 metres high. The border wall has a parapet wall with perforated blocks, which were commonly used at that time. The garage is a new feature, taking a side place on the front setback, with standard manual doors that were later replaced by automatic doors. The front boundary wall contains one central opening as the main entrance, made of two leaves of aluminium and ornamented with a floral design (Figs. 7.58 & 7.59).

The façade of the house is symmetrical, with four horizontal windows allocated to lighten the stairwell. There are two balconies decorated with perforated blocks. The façade is merely plastered and painted with plain paint (Fig. 7.58).

7.4.2.14 Space Relationships and Circulations in Case Study No. 2

This house resembles many homes within Labour City, in particular its organisation of domestic space and exterior features. It has a central area used as a foyer to facilitate access to surrounding rooms. The foyer takes the place of the internal courtyard in traditional houses, providing a large enough area to add sofas and a TV cabinet to allow family members a place to gather when the house lacks a living room.

³³ Akbar, Jamel. *Elements of the Traditional Built Environment, in Crisis in the Built Environment: The Case of the Muslim City*. Singapore: Concept Media Pte Ltd. 1988.163.

The kitchen was moved from the back zone in the traditional house to the middle zone in the transitional house. The dining room was introduced in this period, and is located in the front area, next to the male seating area. There is evidence of a merging of zones: the front zone is no longer isolated from the home, while the kitchen and toilets are located in the middle and back zone, depending on the requirements and preferences of the inhabitants. With the increase in electrical appliances, storage disappeared from transitional houses.

This house has the potential to be divided into two different floors, with a floor rented out or gifted to one of the family's sons upon marriage. Both floor plans are typical regarding the arrangement of space and the number of rooms. The staircase is located separately and isolated by a discrete door from the rest of the rooms.

The flow of the circulation between the rooms has been increased, due to the allocation of a particular function to each space in the house. The movement has been increased between the back and middle zones, although it remains weak between the front and other zones.

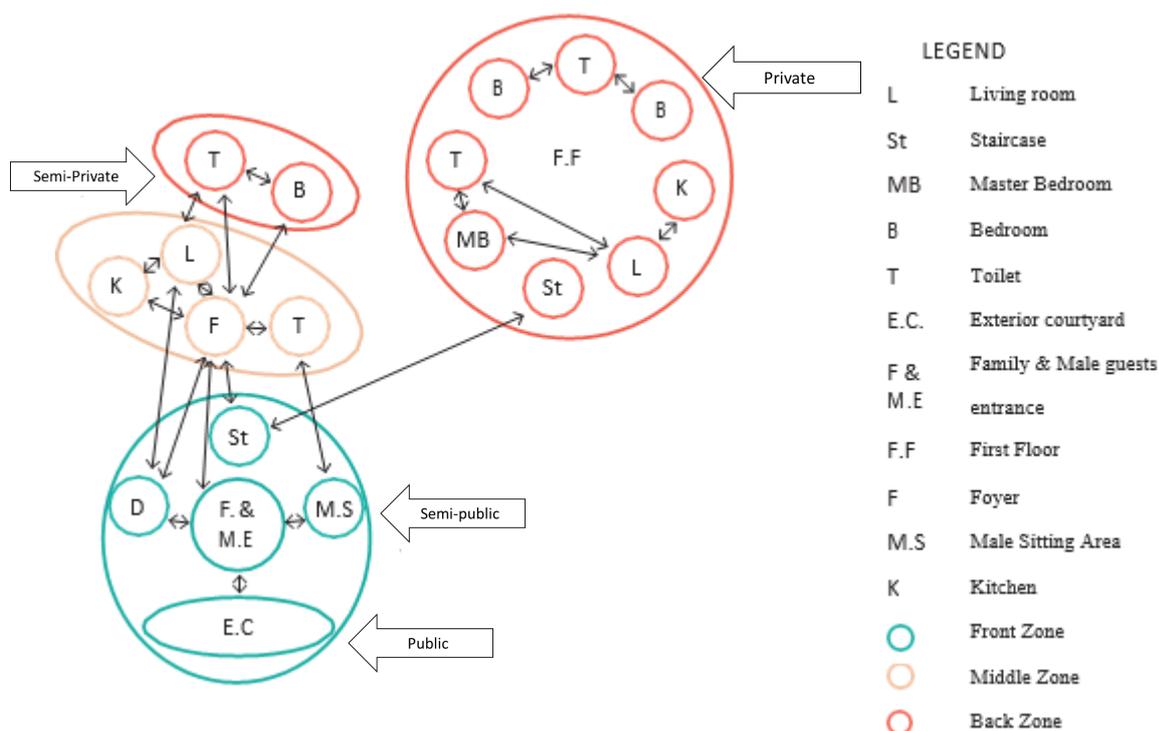


Fig.7.60: Space relationship within the transitional case study house. The circles show the house spaces with respect to the dimension of the spaces, arrows show the movement with the relationships between them.

There was a front courtyard, which served as a transitional space between the public zone (street) and the semi-public zone (the male sitting area and the formal dining, *Moqalat*), which represents the front zone. The move from the public to semi-public zones in Transitional houses was the same as in the Traditional house. There was a direct interaction between the street and the semi-public zone in the Transitional houses.

The staircase was isolated from the house, but located between the front and middle zones. The stairwell lies at the intersection point between the horizontal circulation through the entrances and the vertical circulation

leading to the first floor. The foyer, kitchen and toilet serving male guests are located in the middle zone and considered a semi-private area.

The bedroom, the living room, and the second toilet are located in the back zone and considered a private area. The foyer is considered as a node leading to semi-public, semi-private, and private zones. This space creates a serious issue in terms of privacy requirements(Figs. 7.60 & 7.61).

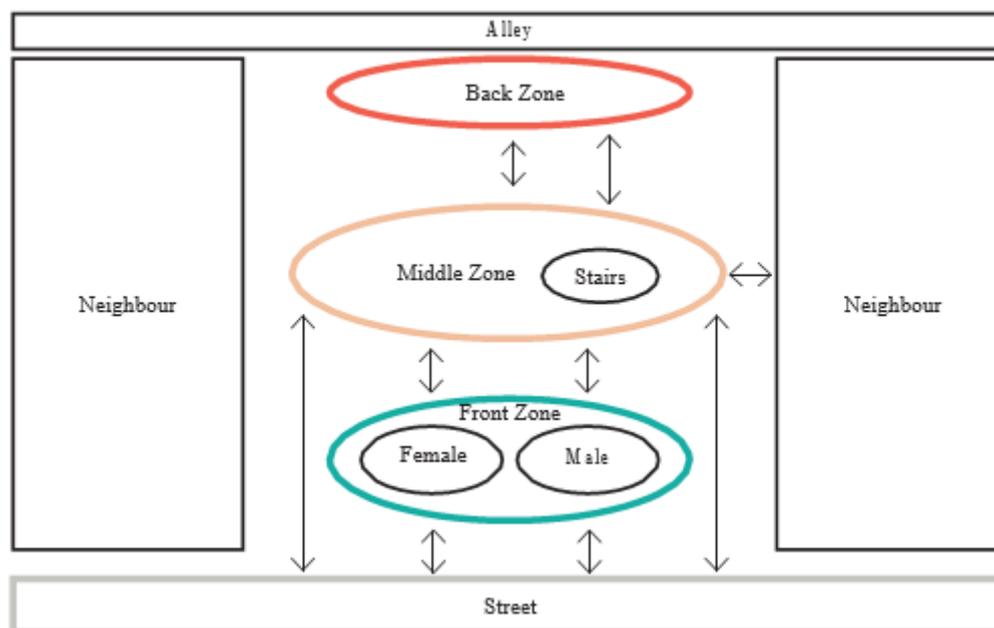


Fig.7.61: Zones and street relationships of the transitional case study house.

7.4.3 The Third Case Study: The Modern Period

The third case study is located in the Al-Rakah neighbourhood. This neighbourhood was chosen as an example of Modern neighbourhoods developed between 1955 and the end of the 1980s. It was the first planned neighbourhood involved in the expansion of Al-Khobar in the direction of Dammam city.

7.4.3.1 Name, Location, and Land Topography of the Neighbourhood

The neighbourhood of Al-Rakah South is located between Dammam and Al-Khobar cities. This district is characterised by a geographical location in the centre of the triangle (Fig. 7.63), which links the triple major cities of Dammam, Al-Khobar and Dhahran.



Fig.7.62: The location of each of the following neighbourhoods: Al-Rakah South and North, Saudi Airlines neighbourhood and Al-Montazah neighbourhood.

The Al-Rakah neighbourhood is bordered by the seashore of the Arabian Gulf to the east, and the northern Al-Rakah neighbourhood to the north, the Al-Khobar-Dammam highway to the west, and the Al-Montazah neighbourhood to the south. Al-Rakah south was planned on flat land (Fig. 7.62).

7.4.3.2 The Neighbourhood's Developer

In the Modern Period, modes of transportation and systematic intervention and large-scale urban production were under the sponsorship of a powerful central state following the second oil boom. In Saudi Arabia, comprehensive master planning dates to the 1970s, with many modern neighbourhoods appearing during that period, particularly in the cities where there was an oil boom. Al-Rakah began to emerge in the early eighties, when the municipality chose to sell lots located on the outskirts of Al-Khobar, seeking expansion towards Dammam city. The municipality began to award land to buyers before completing essential utilities. The Saudi Airline company also took a vast area of accommodation for its employees. The government developed the remainder of the neighbourhood.

7.4.3.3 The Original Residents of the Neighbourhood, their Occupation and Income

The residents of Al-Rakah neighbourhood were comprised of a majority of employees from Saudi Arabian Airlines and their families, in addition to residents of Al-Khobar city wishing to move to a new area with larger dwellings. The houses surrounding the neighbourhood were inhabited by families, who were not themselves employees of Saudi Airlines. To the south, Al-Rakah was inhabited by the middle classes.

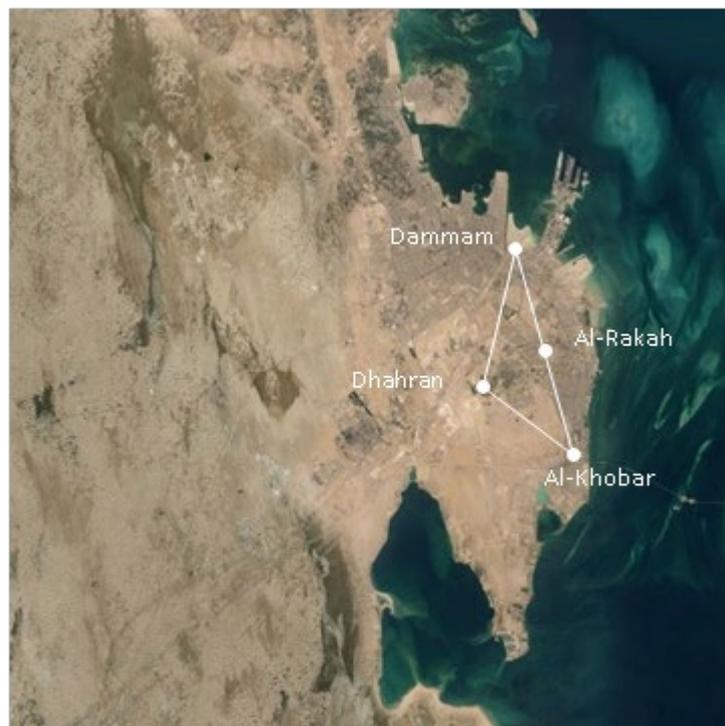


Fig.7.63: The location of Al-Rakah south neighbourhood.

7.4.3.4 Urban Fabric, Zoning and Land Utility

The area of Al-Rakah is planned as a modified grid-iron subdivision plan, in which streets run at right angles to one another for residential buildings. The planners observed what they had learned from the grid iron planning in Al-Khobar city. Ur Rahman notes: “Al-Khobar stands out in the history of urbanism in Saudi Arabia; taken as a model for many years... It was, however, the first community to be wholly planned and the first to have an overall grid-iron pattern of streets”.³⁴

The physical pattern of Al-Rakah follows the grid iron-plan (Fig.7.65), with a hierarchy of streets and rectangular blocks. The larger lots are concentrated in the neighbourhood's centre and at its boundary (Fig.7.64). A typical lot size is 20 x 25 metres, with some being larger, reaching up to 20 x 50. There is a consistent depth of 50 metres in almost all blocks.

The majority of houses in Al-Rakah are two-storeys high. Some land was left empty for a considerable amount of time, due to the municipality dedicating such areas for commercial and educational purposes, or mosques and parks. The building regulations and housing codes of Saudi Arabia during that period were subject to some restrictions (i.e. the size of house lots, and the frontage length of a house). Moreover, the rooftops were required to be free from housing annexes, and the setbacks to be two metres from the boundary of each lot.

³⁴ Anis-ur-Rahmaan, Busbra and A. Al-Shaye, *Innovation Diffusion in Housing: A Conceptual Probe in Saudi Arabia*, King Saud Univ. vol. 2, Architecture and Planning, Riyadh. (1990):3-21.

These restrictions ensured that houses were built in the planned neighbourhood according to the demands of urban planning, as developed by the Ministry of Municipal and Rural Affairs.



Fig.7.64: The location of Al-Rakah south neighbourhood.

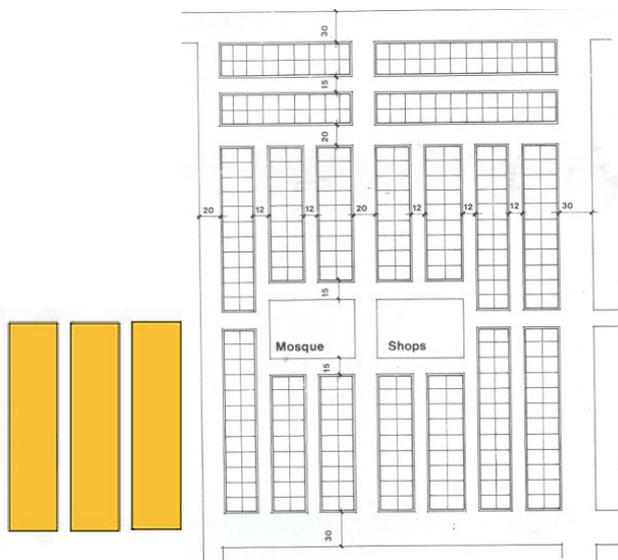


Fig.7.65: A diagram showing similarities in the configuration of the grid iron of Al-Rakah to that of Al-Khobar.



Fig.7.66: The excesses of residents in Al-Rakah neighbourhood in utilising the public space adjacent to the outer wall of the house.

The municipality created building regulations to control the kind of buildings that could be erected on a residential plot, and the activities for which they could be used. In this district, the spaces required for facilities and services were left in the central block of the neighbourhood, which had been entirely lacking in

community services until 2008.³⁶ When residents needed to fetch groceries or other shopping, they had to leave their area using their cars. Some residents turned the garage into a small local shop or added a room in the corner of the house for this purpose. This exterior change was viewed as an investment, and as a contribution to helping families obtain what they needed from grocery stores, bakeries, repair shops, stationery stores (Fig.7.67).



Fig.7.67: Corner of a house in Al-Rakah turned into a shop to serve the residents of the neighbourhood.



Fig.7.68: Lack of municipal utilities in Al-Rakah neighbourhood.

7.4.3.5 Urban Growth and Transformation

The area between Dammam and Al-Khobar appeared unrefined and was uninviting to urban development. A few years later, large industrial buildings were built in this area, along with major roads to Al-Khobar, giving the impression that the area was expanding (Fig.7.69). At this time, a large number of residential districts were established, along with residential compounds for foreign workers (Fig.7.70).

The Al-Rakah neighbourhood was founded as a result of a desire to expand urbanisation outside the city of Al-Khobar, while high-density residential developments increased in the south-west section of Al-Khobar.³⁹

³⁶ Services were only provided to the central block of the modern neighbourhood, and not further extended due to complications arising between the government and developers over the provision of services in residential neighbourhoods.

³⁸ The lack of developers in Saudi Arabia and the Private sector at the time meant that the privatization process was not adopted.

³⁹ It is named Al-Thoqba

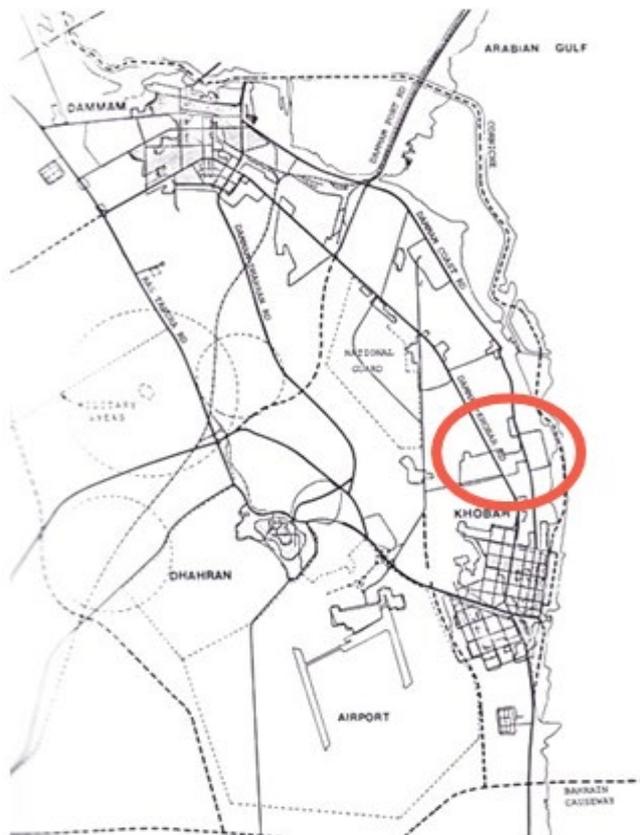


Fig.7.69: Dammam Metropolitan area urban growth in 1978.

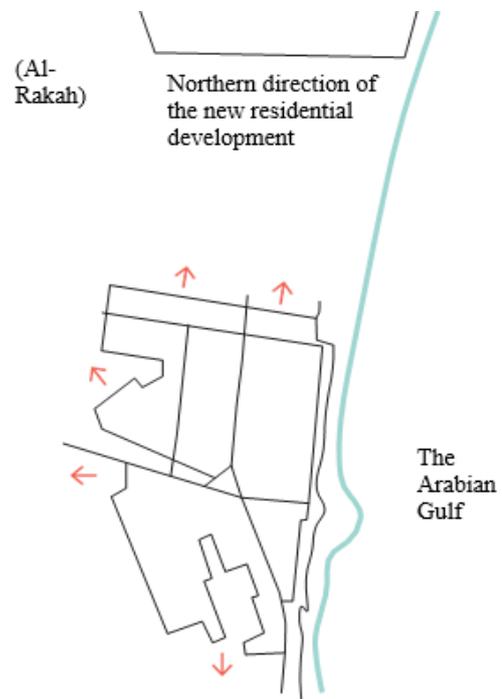


Fig 7.70: Direction of growth of Al-Khobar city during the early 1980s, towards the north to create a new neighbourhood called Al-Rakah.

Two further residential neighbourhoods also emerged during the growth of the Al-Rakah residential district. The first expansion was from the Al-Mutlaq neighbourhood (comprising mainly transitional forms of houses), and this was followed by the Al-Montazah neighbourhood in the late 1990s (with contemporary house forms). These two neighbourhoods formed a barrier to the expansion of Al-Rakah south, towards the north and south. Therefore, development was limited to the use of empty land. Many vacant and unused areas of land remained, affording the potential for future expansion (Fig.7.72).

Al-Rakah south contains 530 houses for employees of Saudi Arabian Airlines, along with approximately 450 houses outside the scope of Saudi Airlines (Fig. 7.77). Most of these houses are two-storey buildings. The neighbourhood includes high-rise office buildings that exceed seven storeys, and is located on the highway between Dammam and Al-Khobar. There is also a commercial road along the northern border of the neighbourhood, which provides all the services required by the residents.



Fig.7.71: Urban mass in the 1980s within the administrative boundaries of Dammam Metropolitan.



Fig. 7.72: This photo demonstrates the prevalence of vacant and untapped land.

In recent decades, the central area was reserved for community services (e.g. supermarket, bakery, laundry and restaurants) (Figs. 7.75 & 7.76) along with a school complex for boys and girls. The neighbourhood had four main mosques which were spread throughout the area (Figs.7.73 & 7.74).



Fig. 7.73: Boys' school in Al-Rakah South.



Fig. 7.74: One of the main mosques in Al-Rakah South.



Fig. 7.75: The community facilities and service of Al-Rakah South.

7.4.3.6 The Study of the Modern House and its Location

The house is located in the section holding Saudi Airline housing. This section covers twelve equivalent residential blocks, and is similar in terms of the area and number of lots. Each block has 18 houses that are equal in size. The house is located exactly in the centre of the block to the east (Fig. 7.78).



Fig. 7.76: The location of basic services in Al-Rakah South.



Fig. 7.77: The location of the two types of houses in Al-Rakah South.



Fig.7.78: The location of the Modern case study house in the Al-Rakah Neighbourhood.

7.4.3.7 The Size of the House of Case Study No. 3

The house stands on a rectangular plot that is 23 metres deep, 20 metres wide, and 2 metres from the road verge. The total built area for both floors is 312 square metres (Fig. 7.79) .

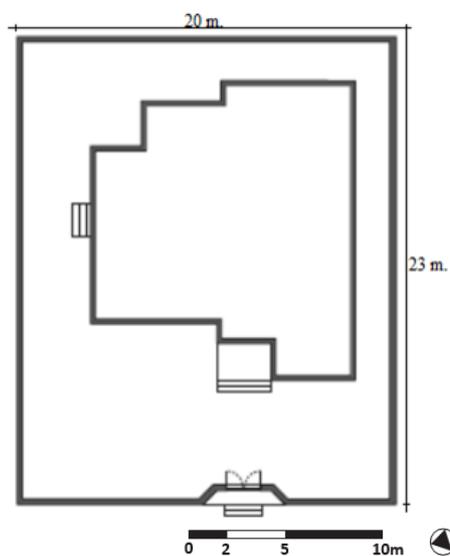


Fig. 7.79: The size and shape of the lot area for the modern case study house.

7.4.3.8 History of Inhabitation in Case Study No. 3

The house was inhabited by a former employee of Saudi Arabian Airlines Company and his family, consisting of his wife, five children and his parents. Two maids served the family. The wife works in a school, and the grandparents are retired.

7.4.3.9 Spatial Organisation in Case Study No. 3

The dominance of the detached house in the Dammam Metropolitan Area encouraged their development by increasing the number, size, and function of residential spaces. This development enabled the house to be separated into two storeys, each intended for different activities. The ground floor specialised in receiving guests and services, while the first floor was devoted entirely to bedrooms, closets, and toilets. This in-house modification emphasised the newly acquired cultural values of affluence and abundance, leading to the enlargement of the guest reception area, and its frontal positioning by customising the reception area for men, sitting area and dining area, along with a zone for receiving women guests.

A large family room was located in the heart of the house and served as a meeting place for all those at home, particularly in the absence of a living room. The staircase was located adjacent to the living area, linking the bedrooms above with the living rooms below (Fig. 7.80).

There was an intermediary space that served as a reception area before entering the living room. The kitchen was situated between the dining room and living room, enabling the family to use the dining room in the absence of guests. There was a room located at the south-east corner, away from the male seating area. This was used to receive female guests. Two toilets served both corners of the house, with one inside the house for family members and female guests, and the other next to the main entrance to serve male guests.

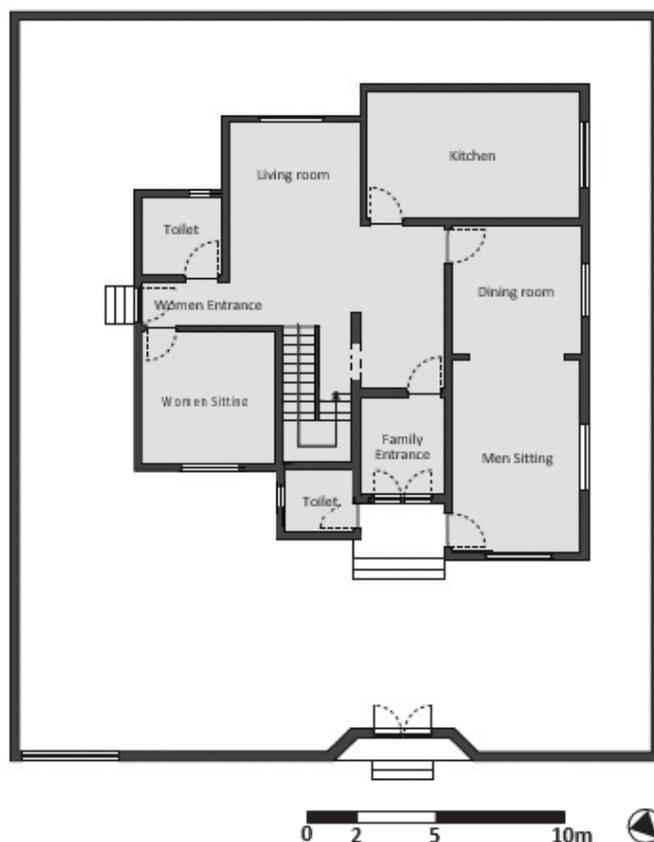


Fig.7.80: The ground floor spatial organisation of the modern case study house.

There was no longer any space for bedrooms on the ground floor, as all were located on the first floor, including a guest bedroom (Fig. 7.81). The family maintained their privacy by isolating their private lives away from visitors. The first floor contained only three bedrooms, served by two toilets. The roof covered the same area as the first floor, and was flat with a constructed roof over the staircase.

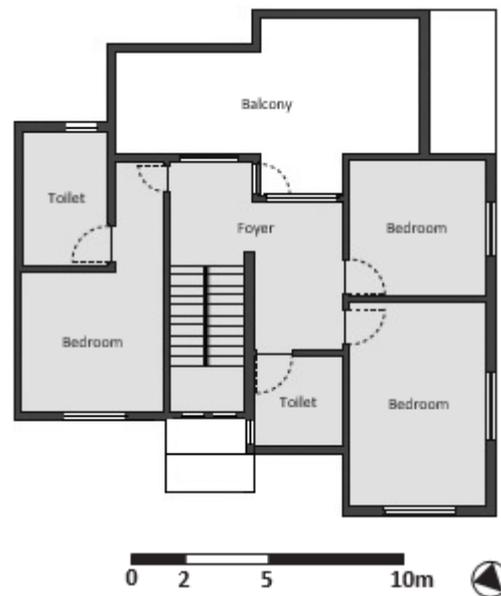


Fig.7.81: The first floor spatial organisation of the modern case study house.

7.4.3.10 Impact of Climate on the House Form

The gridiron urban planning system in the Modern Period remained in constant growth. The same type of detached houses with side setbacks and front yards appeared in this period as had been common in the Transitional Period. The effect of sunlight and external heat remained, without any attempts from architects or residents to address the issue. In this period, residents started to import new air conditioning systems to control the uncomfortable microclimate in their houses. It was noted that the use of the balconies remained somewhat limited.

7.4.3.11 Impact of Privacy on the House Form

The concept of privacy in the Modern Period was similar to that in the Transitional Period. Inhabitants organised themselves within the modern house according to its spatial arrangement. They tried to modify some spaces to meet the high demand for privacy. When residents had an opportunity to become involved in the design process for their own houses, they tried to arrange for indoor space to satisfy some of their privacy requirements. On the other hand, when they did not have options for such involvement, and the houses did not meet their needs, they rearranged the use of existing space and added new spaces where possible.

The residents aimed to add additional metal panels onto exterior walls in an attempt to have more privacy from nearby neighbours. The women's sitting area moved from the semi-public zone into the semi-private

zone. The house had another male sitting area in the public zone outside the house (*Diwanyah*). The existing men's sitting room inside the house was located in the semi-public zone, supporting a new area specifically for men that could be used as a dining room (*Moqalat*). This change in the location of the male sitting area limited men's ease of entry to the house. The family constructed a room on the roof for the maid, away from the private family zone, to ensure privacy, both for the family and the maid.

7.4.3.12 External Features in Case Study No. 3

The house's entrance was visible from the street. It was emphasised by the canopy, which was positioned to afford privacy to anyone waiting before entering the house. This is because the houses in the Modern Period were located in local streets, which were open to transients, whether pedestrians or vehicle passengers. The canopy also provided a decorative element to emphasise the main gate and offer light for pedestrians, because streets in the Modern Period were generally void of street lighting poles in the first phase of neighbourhood development. A heavy main entrance door emphasised the sharp line between the access from the street (i.e. public) and the setback (i.e. private).

The house has one garage on the left side of the boundary wall. The setbacks for the existing house are empty, surrounded by solid walls three metres high. The residents decided to place an aluminium fence on top of the boundary wall as a further barrier on the left side, to prevent their neighbour's windows overlooking their front yard (Fig. 7.82).



Fig.7.82: The main façade of the case study house in Al-Rakah.

Two years previously there were changes made inside, as the family built an extra male sitting area in the outside courtyard for receiving male guests adjacent to the exterior boundary wall to the right of the main gate. This room (*Diwaniyah*) was constructed of light-weight materials and shaped like a tent. This form of the new structure appears to have been built on a long span, avoiding columns in the central part, as well as offering fast and straightforward construction. This modern 'tent' echoes the design of male sitting areas in traditional homes and Bedouin tents (Fig. 7.83). It imitates the setting, the place to serve coffee '*wijagh*', and

even the patterns used to decorate the space. The remainder of the front courtyard was a garden area, and car parking was located in front of the garage door. The façade of the house is very simple, containing two large windows mediating stairwell openings. The façade is covered with beige coloured marble tiles.

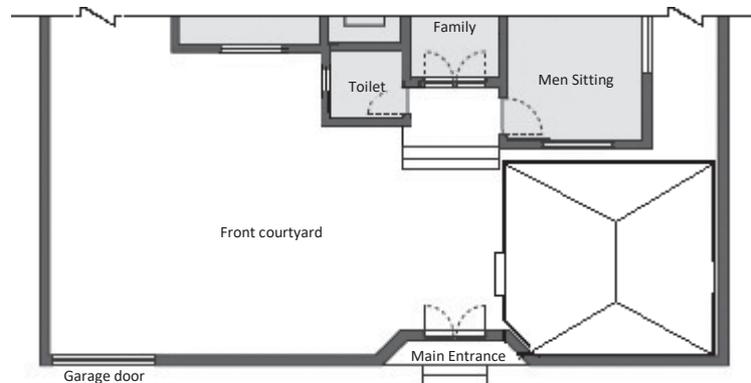


Fig. 7.83: The space for *Diwaniah* in the modern tent is located in the front yard in the modern case study house.



Fig. 7.84: The first floor of third case study after modification.

7.4.3.13 Space Relationships and Circulation in Case Study No. 3

The emergence of features of the formal modern Saudi villa became evident by the late 1970s, and the beginning of the 1980s. At this point, some spaces were rearranged either vertically or horizontally. A dining area (*Mugallat*) was located closer to the kitchen. The living room was used as a reception area to receive female guests when male guests were present. The staircase was placed in front of the living room, close to the family entrance, away from the left setback. There was a room near the minor entrance on the left side, dedicated to receiving female guests. This room was placed on the reverse side of the men's seating area. All

the bedrooms were situated on the first floor, and the need for additional bedrooms led the family to create them by modifying balconies on the first floor (Fig. 7.84).

After about ten years of residence at home, the number of people increased, becoming older. The residents decided to convert the upper balcony to create an extra two rooms: one being a bedroom, and the other a dressing room. Eventually, the dressing room was transformed into a bedroom to meet the needs of the growing family.

A large family room was located in the heart of the house. This tended to serve as a meeting area for all those in the home, particularly in the absence of a living room. The staircase was located adjacent to the living area, as a result of the growing relationship between the bedrooms at the top and the living rooms below.

There was an intermediary space used as a reception area prior to entering the living room. The kitchen was situated between the dining room and the living room, enabling the family to use the dining room in the absence of guests. There was a room located in the south-east corner, away from the male seating area. This was used to receive female guests. Two toilets served both corners of the house, with one inside the house for family members and female guests, and the other next to the main entrance to serve male guests.

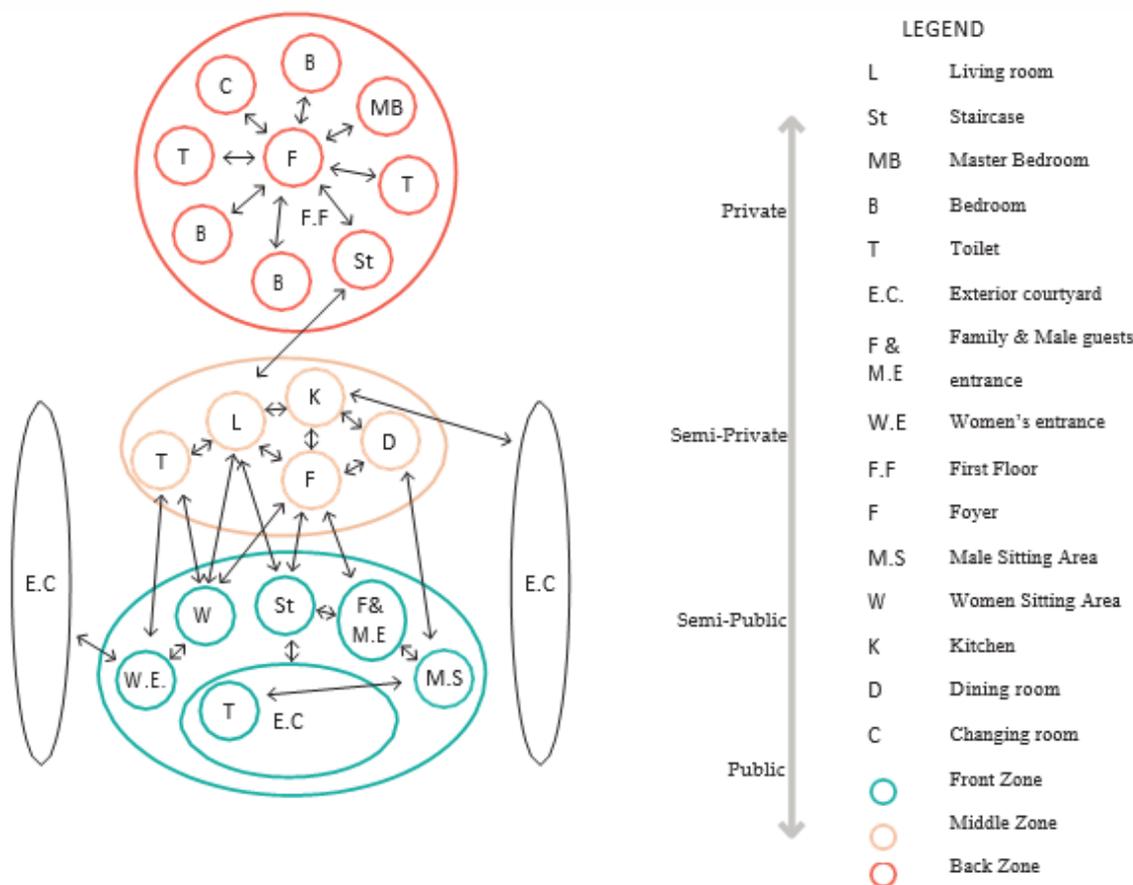


Fig.7.85: Organisation of spaces and relationships within the case study in the modern Period.

There was no longer any space for bedrooms on the ground floor, and all were now located on the first floor, including a guest bedroom. The family was interested in maintaining their privacy by isolating their private

spaces away from visitors. The first floor contained only three bedrooms, which were served by two toilets. The roof occupied the same area as the first floor. The roof was flat, with a constructed roof for the staircase.

In the mid-1980s, as a result of the increasing area of the home environment, families began to hire servants (e.g. maids and drivers), leading to the need to establish privacy for both servants and family members. In this house, a room and a bathroom were added to the roof area for use by the maids.

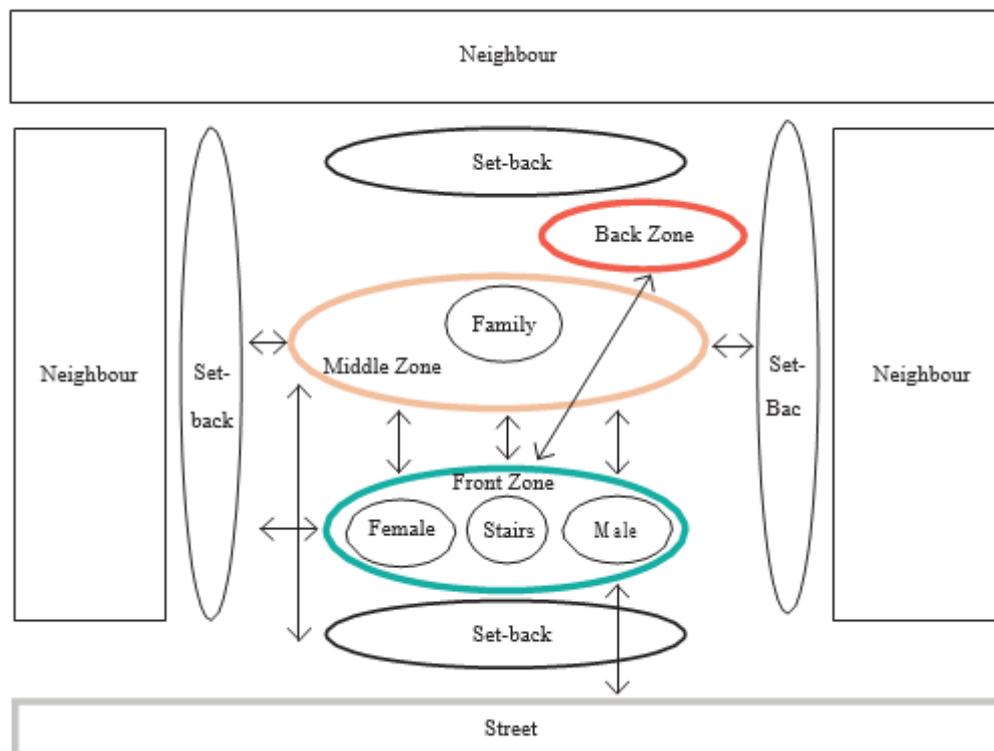


Fig.7.86: The relationships between the case study house and the street in the modern Period.

Three setbacks and a front courtyard surrounded the house. The setbacks were considered an interstitial barrier between the house and neighbours. The front courtyard was a transitional space between streets, which represented the public zone and the semi-public zone (the guests' receiving area). The most common area for outdoor activities was the front courtyard, because it was far from the neighbours' view, despite also being near to the local street. All the zones have the accessibility to reach setbacks without having to pass through the areas next to them. The family zone (semi-private zone) could also serve as a transitional area between the semi-public and the private zone (Figs. 7.85& 7.86).

7.4.4 The Fourth Case study: The Contemporary Period

7.4.4.1 Name, Location, and Land Topography of the Neighbourhood

The fourth case study is located in Tilal Al-Doha, or the Doha Hills. The neighbourhood was selected from among contemporary and emerging districts at this time. It is considered one of the first contemporary communities in Dhahran city, and is positioned within the Dammam Metropolitan Area (Fig. 7.87).

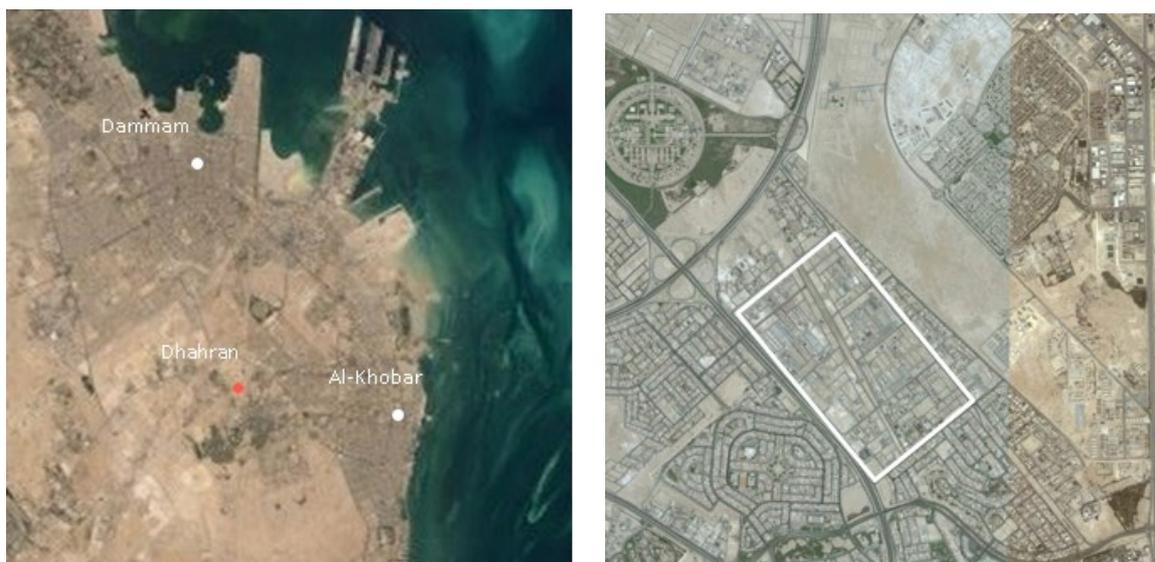


Fig. 7.87: The city of Dhahran, its location on the eastern part of Saudi Arabia map and within the Dammam Metropolitan Area and neighbourhoods.

The total area of Tilal Al-Doha is located within Dhahran city. Dhahran city had an estimated population of 138,135 in 2012.⁴¹ Dhahran city has been Saudi Aramco's headquarters for 80 years, and is the first (and largest) gated compound in the region, with over 9,700 residents.⁴² Dhahran city is built on hilly and rocky ground (Fig. 7.88, 7.89 & 7.90). The first productive oil wells in Saudi Arabia were drilled in this area, so the city has experienced only limited expansion, because Aramco owns most of the land.

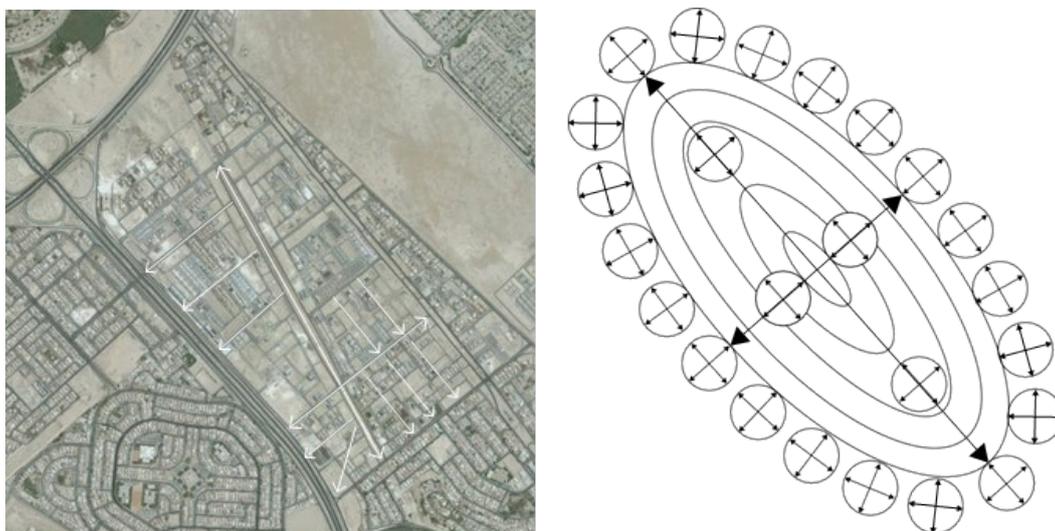


Fig.7.88: The Topography of Tilal Al-Doha.

⁴¹ This number is in the last census, which was made available by the Saudi General Authority for Statistics.

⁴² Houses and properties in Dhahran, SA. <http://es.mapase.com/dhahran-107797>, accessed in 20/3/2015.



Fig.7.89: Top: A hill in Dhahran City.
Below: Aramco Company constructed on Dhahran hills.

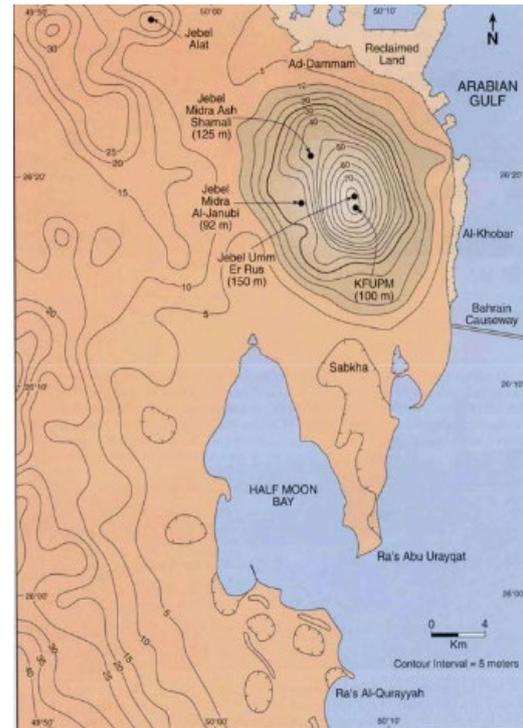


Fig.7.90: The topography of Dhahran city within the Dammam Metropolitan Area.

7.4.4.2 The Neighbourhood's Developer

Tilal Al-Doha was planned and developed by private a real estate development company called Al-Mousa. After Al-Mousa had finished planning the area and supplying it with essential services (i.e. lighting, asphaltting, and the paved footpaths with essential utilities), it was handed over to the municipality.

7.4.4.3 The Original Residents of the Neighbourhood, their Occupation and Income

The goal of developers is to build housing units for middle-income workers, primarily Aramco employees, through bank financing, mortgages or payment by instalments.

7.4.4.4 Urban Fabric, Zoning and Land Utility

The Contemporary Period describes a phase of economic stability, termed the stage of rationality. This period started when the Kingdom began to address both urban growth and the restructuring of its financial resources and dependence on oil as the main source of finance. This stage is known as the reconsideration stage in urban planning, and its impact is clear in the neighbourhoods in Dhahran city planned recently. Currently, Dhahran contains 31 residential neighbourhoods. Neighbourhoods in the Contemporary Period are smaller in size, and population density is higher than in those neighbourhoods that emerged in the Modern Period.



Fig.7.91: The neighbourhood of the Tital Al-Doha with fragmented parallel subdivision.

The urban planning design of the neighbourhood adopted the form of fragmented parallel subdivision, which depends on rectangular residential blocks, with a limited hierarchy of streets. “The fragmented parallel pattern has blocks that are reconfigured into long, narrow rectangles and L-shapes. Although this pattern has an almost equal street length as the grid, it reduces the number of blocks and access points as well as interconnectivity and choice of routes.”⁴³ The rectangular residential district is divided into two parts that take the shape of a triangle with a bevelled head. The two triangles oppose each other, and are separated by a paved footpath that runs along both sides of the quarters of the triangles (Fig. 7.91). There are four more minor footpaths which are located perpendicular to the central one (Fig. 7.92). A continuous pedestrian footpath system provides several direct routes, which facilitate access to neighbourhood facilities (i.e. parks, public transit, stores and services). The pedestrian system is overlaid on the streets. The area in which the residential blocks are located varies, along with the diversity of the area of land within each plot. The district contains 103 residential blocks, ranging from 10,108 square metres to 21,904 square metres. The neighbourhood contains 87 residential blocks and 16 commercial blocks for investment purposes.

⁴³ Rifaat, Shakil Mohammad, Richard Tay, and Alexandre De Barros. "Urban Street Pattern and Pedestrian Traffic Safety." *Journal of Urban Design* 17, no. 3 (2012): 337-52. doi:10.1080/13574809.2012.683398.

Five arterial streets bound the residential area, 40 and 50 metres wide. Four streets are located at the outer boundary, and one main street divides the neighbourhood into two triangular halves. The collector streets vary between 15, 18 and 20 metres (Fig. 7.93).

The district contains four schools: two elementary and two middle schools, separated for boys and girls. The planner reserved the area on the south-west of the neighbourhood for residential investment and commercial buildings. Until now, the district has only four mosques, one in each quarter (Fig. 7.94). The residents must travel by car to reach them.



Fig.7.92: One of the footpaths in the Tilal Al-Doha.



Fig.7.93: Right: one of the arterial streets. Left: the collector street in Tilal Al-Doha.



Fig.7.94: A mosque located in the north-west quarter of Tilal Al-Doha neighbourhood.

7.4.4.5 Urban Growth and Transformation

This area arose after the emergence of several surrounding neighbourhoods. This means that the neighbourhood has no chance for greater expansion because it is surrounded by Aramco-owned properties and residential neighbourhoods on all sides (Figs.7.95 & 7.96). The neighbourhood still has many empty residential blocks, while other blocks have been divided into semi-detached houses, which are set in lots not exceeding 200 square metres. This means that the population density in some areas is higher than in others.

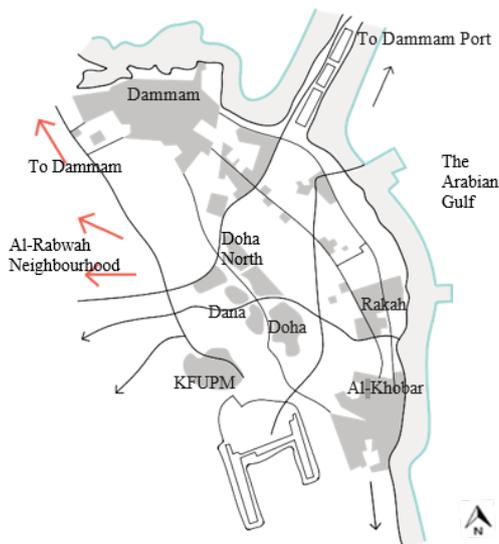


Fig.7.95: Urban mass within the administrative boundaries of the Dammam Metropolitan Area.

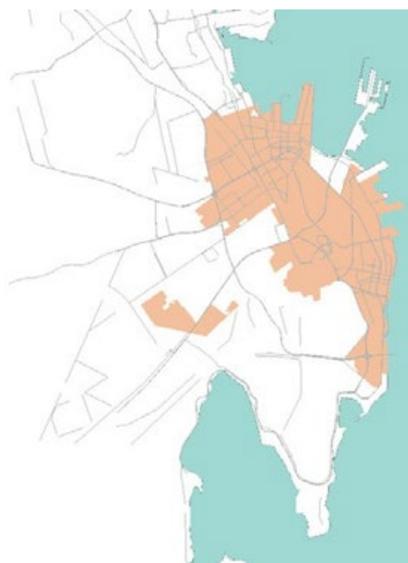


Fig.7.96: Urban mass in 2010 within the administrative boundaries of Dammam Metropolitan Area.

Buildings in the Tilal Al-Doha neighbourhood are range from commercial buildings, residential investments, and private residential dwellings. Developers have been interested in building housing on several levels, including duplexes, free-standing villas, and high residential buildings with four floors.

A strip of commercial buildings is located on the west side of the area, and can be rented as private shops. A small mall has been built in one corner of the community. Land for mosques has been distributed around the Tilal Al-Doha, where only one mosque is currently under construction; this is located in the north-west of the neighbourhood.

7.4.4.6 The Study of the Contemporary House and its Location

The house is located in a housing project in the Tilal Al-Doha Neighbourhood. The housing project was constructed by a Saudi company, called Dhahran Emaar, which specialises in real estate development. The house is located on lot No. 61 in a residential block in the south-east of the neighbourhood. The house is one of 25 housing units and faces east. It backs onto the edge of a long footpath (Fig.7.98). The house is located on empty land that is gradually sloping towards the south (Fig.7.97).



Fig.7.97: Tilal Al-Doha Neighbourhood shows Emaar Housing Project.

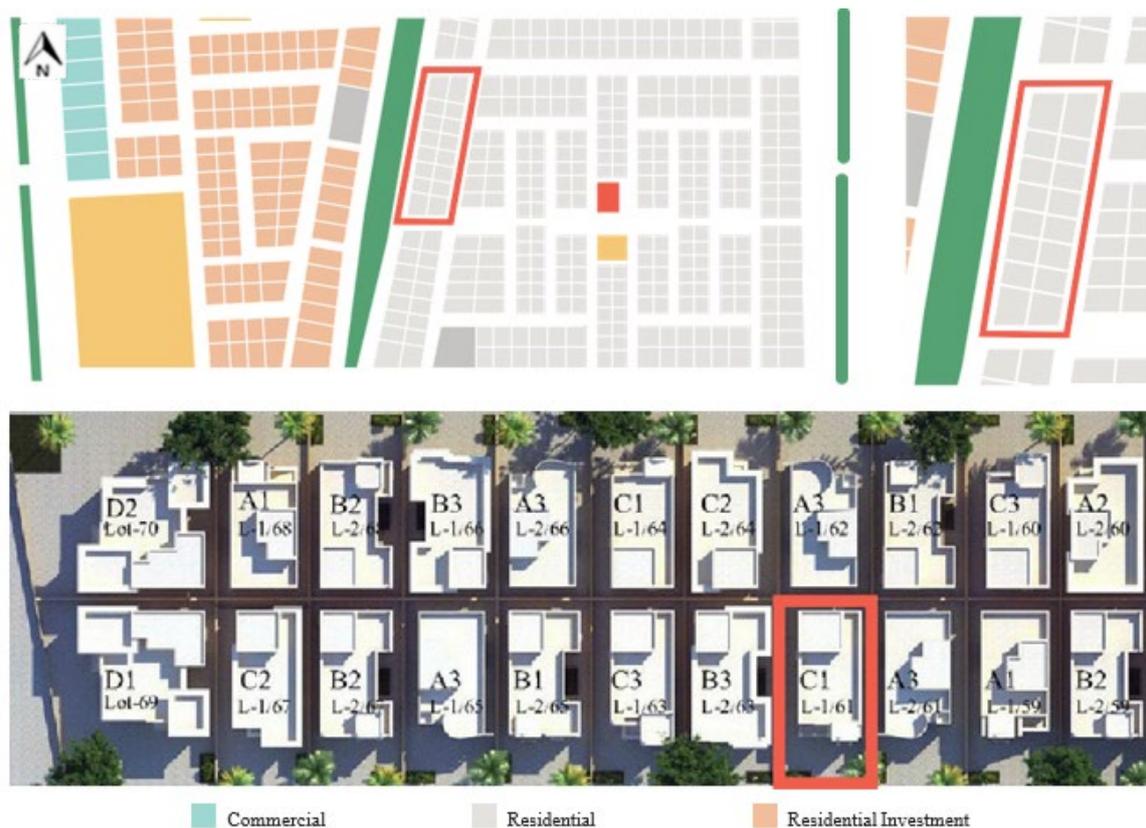


Fig.7.98: One of the Free-Standing detached house projects in the Tlal Al-Doha Neighbourhood.

7.4.4.7 The Size of the House in Case Study No. 4

The house is constructed on a plot with an area of approximately 450 square metres. It is a rectangular shape of 16.5 x 27 metres. The smaller side serves as the main façade of the house.

7.4.4.8 History of Inhabitation in Case Study No. 4

This house is inhabited by a family of seven members (the parents, their three boys, and two girls) along with their servants, a maid and a driver.

7.4.4.9 Spatial Organisation in Case Study No. 4

The house contains two floors, along with an annexe area on the roof deck and the front courtyard. The house has one main entrance which leads to the front courtyard. The ground floor has three entrances: the main entrance serving the male seating area, the entrance at the side serving the family and female guest area, and the back entrance serving the kitchen area (Fig.7.99).

The front zone is related directly to the front courtyard. This space contains the main entrance, the reception hall, and the male sitting area. The middle zone includes the female sitting area and the dining room, and can

be used for both family members and guests.⁴⁴ Additionally, female guests can be received in the family's living room. The back area always includes the kitchen and any private living spaces that the family does not want to be viewed by guests, e.g. the staircase, the kitchen, and the living room.

On the first floor, the master bedroom is a suite (Fig.7.100). It has a spacious en-suite bathroom and a closet area. There is a balcony in front of the master suite. This floor has three more bedrooms, the one next to the master bedroom has one en-suite bathroom, while the other two bedrooms share the third toilet. On this floor, there is a second living room, which can be used as a playroom or a study room for the children. There is an additional staircase serving the maid's room, and a laundry room located on the roof annexes. This staircase provides additional privacy for family members by isolating the roof area from the family area.

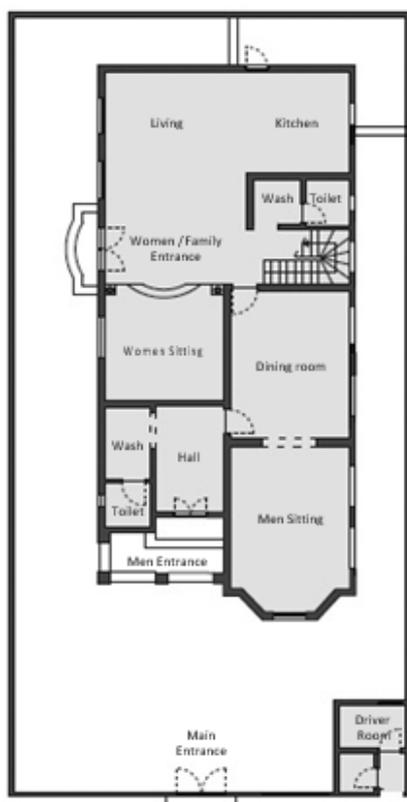


Fig.7.99: The ground floor of a case study house in the contemporary Period, Tlal Al-Doha Neighbourhood.

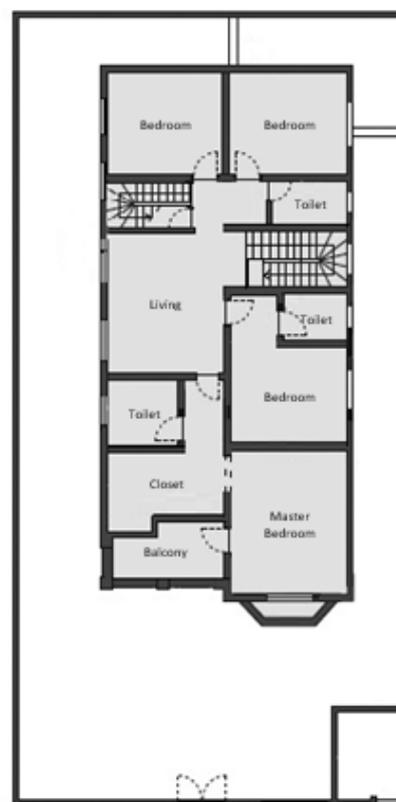


Fig.7.100: The first floor of a case study house in the contemporary Period, Tlal Al-Doha Neighbourhood.

After the latest building regulations were implemented⁴⁵, the municipality allowed an additional 50% to be added to the building space on the roof-deck. This additional area was allowed reflecting the decrease in the area of residential land and the need to increase the built-up area suitable for a higher number of family members. Having more rooms on the roof became legal during the Contemporary Period, which marked a change from the Modern Period. The annexed area in this house is a storage space, a laundry area, and the maid's room served with a toilet. A further annexe has been built in the front courtyard adjacent to the garage

⁴⁴ In case the family receives male guests that use the whole area dedicated to them in the front zone.

⁴⁵ The latest Saudi Building Codes, established in 2007. <http://www.sbc.gov.sa/books.htm>.

for the driver. This annexe has a door opening directly onto the street, to give the highest degree of privacy for women, so they have freedom of movement inside the courtyard of the house, as the driver is considered a stranger (Fig.7.101).

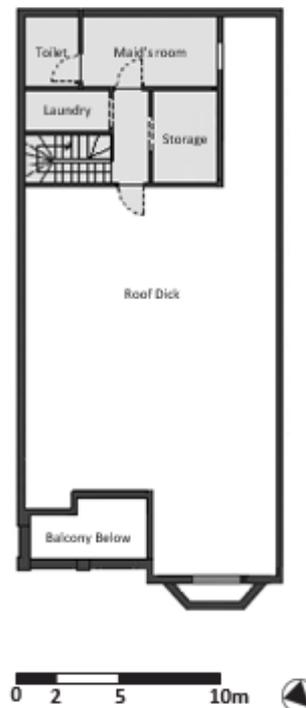


Fig.7.101: The annex floor of a case study house in the contemporary Period, Tilal Al-Doha Neighbourhood.

7.4.4.10 Impact of Climate on the House Form

The past two decades have brought significant changes for members of the architectural profession. Architects, with a vision, came to understand that houses must be climatically responsive. Excessive use of glass, use of reinforced concrete, and heavy reliance on mechanical air conditioning had become commonplace. The contemporary houses, in contrast, are designed with a compact layout to reduce heat gain and loss. Passive thermal performance options were adopted using thermal insulation inside the wall. There is a limitation on using large windows and balconies. The house has a covered half area of the roof, which had been exposed to heat and sunlight when empty.

7.4.4.11 Impact of Privacy on the House Form

Privacy is a key socio-cultural and religious element that influenced the design of houses in all previous periods. In contemporary houses, there are clear attempts to resolve privacy issues, taking into account the former decline in their application inside the house.

The setback in contemporary houses creates an unused outdoor space, as it lacks the required level of privacy. The entrance area is the primary connection point and transitional space between the house and the street. It

is also considered an intermediate area between the internal private domain and the external public domain. In this contemporary house, a change of direction is apparent in terms of the family and female guests' entrance, which opens onto side setbacks rather than the front yard.

The arrangement of the internal spaces in the contemporary house affords privacy, while also establishing a connection between public and private spaces, and the transitional levels in between. The interior spaces are classified according to their interaction with the outside elements, as follows: public spaces, semi-public, private and semi-private. The privacy between the semi-private zone and the private zone is lessening, so there is no clear barrier between the women's sitting area and the family area.

Some spaces were introduced in contemporary houses to ensure privacy between zones. There is an additional staircase that serves the maid's room, and a laundry room located off the roof annexe. This staircase provides additional privacy for the family by isolating the roof area from the family area. A separate room for the driver, with a door that opens directly onto the street, also provides greater privacy for women using the front yard.

7.4.4.12 External Features in Case Study No. 4



Fig.7.102: Left: The proposed external façade of the case study house in Tilal Al-Doha Neighbourhood. Right: The existing case study house façade.

In this housing project, the owner receives the house before the finishing stage. He has the freedom to choose either the proposed façade that he received in the ownership contract or any other design that he prefers. (Fig.7.102) The main façade of the house has one balcony that overlooks the local street, with a railing made of steel bars. The balcony was built for decorative purposes and is used as a canopy for the entrances below. Previous studies and experiments have shown that balconies cannot be used in Saudi Arabia.⁴⁶ The designers utilise balconies to give the feeling of more space in the upper areas, particularly when large glass windows serve as doors opening onto them. There are also large rectangular glass windows distributed on the main façade, and to other exterior elevations. The side setbacks are less spacious than the two metres previously

⁴⁶ Baswaid, Amal. "Controversy about the Phenomenon of the Disappearance of Saudi «balconies»." Al-Sharq Al-Awsat News Paper. January 3, 2002. Accessed November 13, 2014. <http://classic.aawsat.com/details.asp?issueno=8435&article=80581#.VEU8mhZ1HMI>.

allocated. The front courtyard leads to the men’s sitting area, and is four metres wide, while the side setback leads to the family and women guests’ entrance.

The house is painted in a high resistance beige colour, echoing the façades and colour schemes of the other houses in the housing project. The house has only one main entrance, established in the centre of the surrounding wall and without a canopy. A further opening appears at the side of the outer fence to allow access to the driver’s room. Two PVC water tanks are placed in the staircase well at the higher level of the house to maintain the flow of water. The position of the tanks can be seen from the street.

7.4.4.13 Space Relationships and Circulations in Case Study No. 4

The diversity of activities taking place within a single residential space in the Modern Period has diminished in the Contemporary Period. Every area has become dedicated to a single activity. Earlier, in the Modern Period, the family living room combined day-to-day activities (e.g. gathering, studying and watching television). In the contemporary house, when the family receives both male and female guests, the living room serves as a dining area for female guests. The kitchen in the Modern Period combined a dirty kitchen, storage, pantry, laundry room and an area for a clean kitchen. In the contemporary period, there is a place designated for each of these functions.

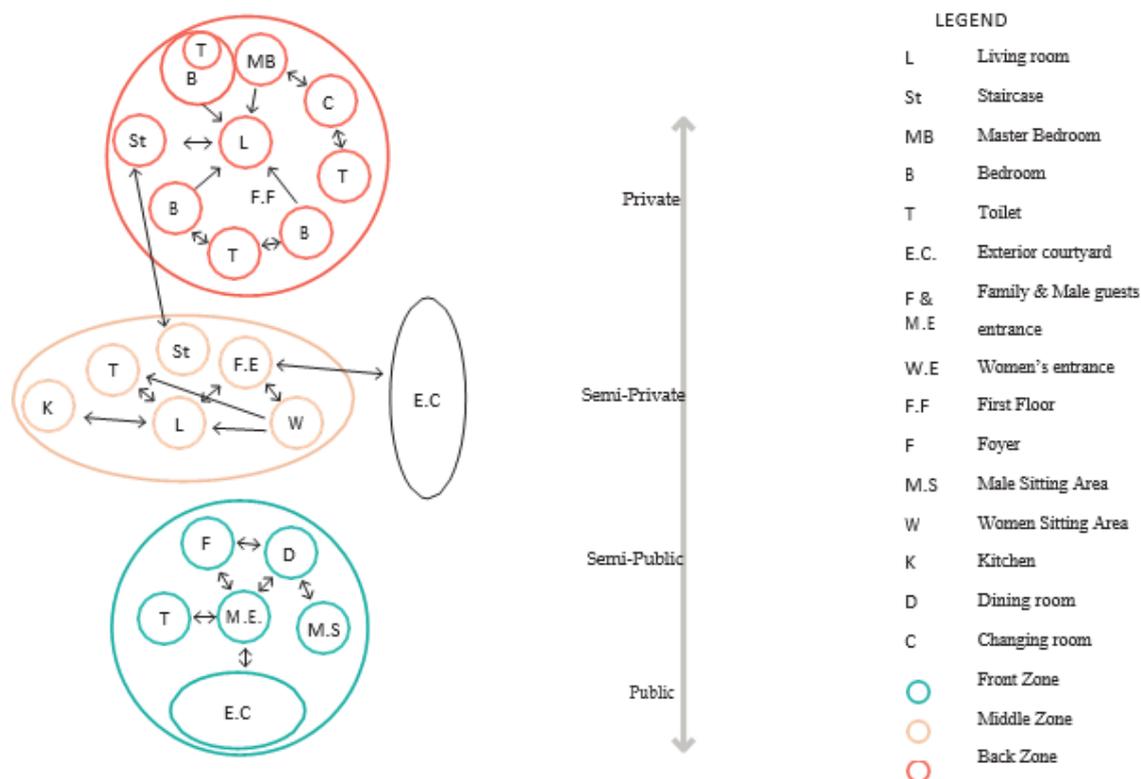


Fig.7.103: Spatial Organisation of the contemporary case study house, the Tilal Al-Doha Neighbourhood.

The relationships between spaces on the same level are active and flowing, while the interactions between the spaces on different levels have reduced, through a process of specialisation in which each space in the

house is given a function. The first floor is considered an entirely private level. It contains bedrooms and toilets, as well as the space for the living room and for children to gather in. The ground floor is designed mostly for receiving guests, the living room on this floor could be either a dining room for women guests or a formal living room for receiving relatives (Fig.7.103).

The situation is similar to that in the Modern Period. The relationship between the house zones, street, and neighbours remains the same. Attention to services and facilities in the urban design of the residential neighbourhood has increased the interaction between the population and the surrounding environment. This encouraged the developer to minimise the built-up areas of the home.

The borderline between the semi-public zone (containing the men's reception area) and the semi-private zone (with the dining room and female guests' area) has become weaker. This was also the case between the middle zone, and the back zone, which emerged as one zone, especially as the kitchen was open to the living room and the women's sitting area, which became an open space not surrounded by walls on all sides (Fig.7.104).

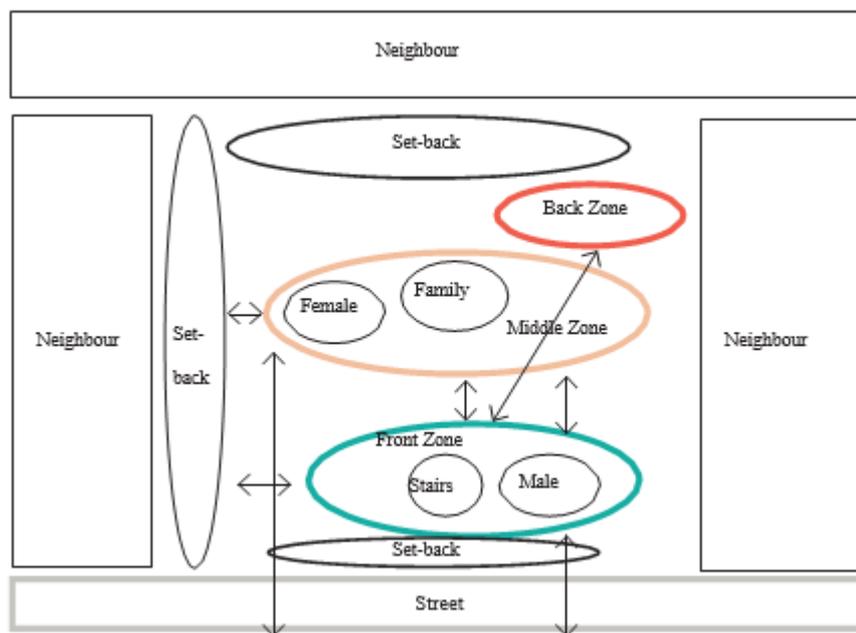


Fig.7.104: The relationships between the case study house and the street in the Contemporary Period.

7.5 A Comparative Analysis of the Case-studies

7.5.1 The Settlements' Urban Planning

Urban growth affects residential settlements, which in turn affects residents; specifically, to the extent that they are unable to relate to their habitat. In the Dammam Metropolitan Area, continual and rapid physical development occurred across scattered residential neighbourhoods and housing projects. The region is now

in a state of continuous urban sprawl.⁴⁷ This development transformed the physical form of the region into a residential development, a strip of contemporary neighbourhoods linking the major urban centres of the Eastern Province of Saudi Arabia.

7.5.1.1 The Traditional Urban Fabric

The traditional urban fabric of the Al-Amamrah, Al-Adama, and Al-Dawasir neighbourhoods, located in the city of Dammam, is characterised by organic, narrow winding street patterns, with a similar arrangement of housing plots that formed and were distributed according to Islamic law, *Fikh Al-Muamalat*.⁴⁸ The introductory chapter of Akbar's article in Elsheshtawy's book, *Planning Middle Eastern Cities*, explains the principles of land ownership rights in Islamic law⁴⁹. In Islam, the concept of ownership is managed with absolute precision. The rights of the property owner are specified in *Shari'ah* law, which is upheld by the issuance of rules and regulations. Consequently, owners and other individuals are guided not to abuse power and authority accorded to them.

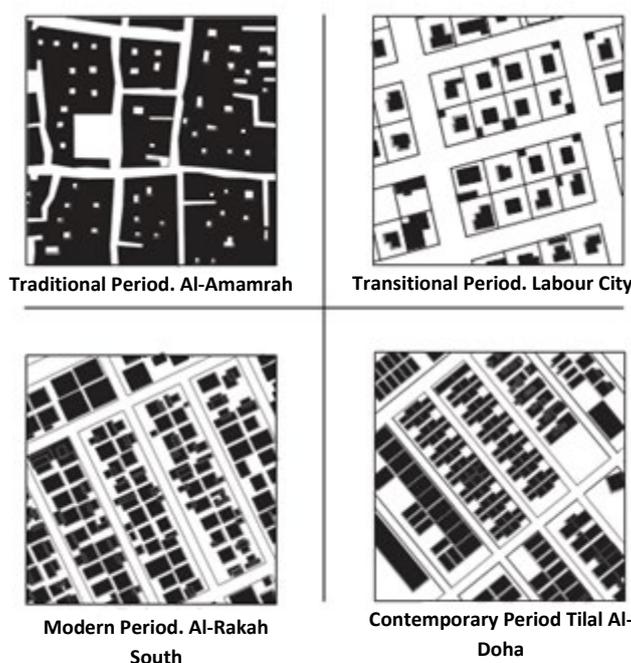


Fig 7.105: The ratio between solids and voids in different neighbourhoods of the Dammam Metropolitan Area.

Traditional settlements did not evolve according to a predetermined layout; rather, the slower rate of change in traditional settlements allowed contextual factors to play a basic role in shaping the human environment.

⁴⁷ Al-Hathloul, S., Edadan, N. *Urban Development in Saudi Arabia Challenges and Opportunities*, Dar Al Sahan, Riyadh, Saudi Arabia. 1995.

- Al-Hathloul, Saleh, and Abdel-Rahman Mohammed. "Rationalize Urban Growth: The Urban Boundary as a Way to Guide Urban Development in Saudi Arabia the Integration of Social and Municipal Services, Riyadh." *Arab Urban Development Institute 1* (1993): 31-62.

⁴⁸ Fikh Al-Muamalat: The jurisprudence of civil and commercial transactions in Islamic law.

- Nasr Faried. *Fikh Al-Muamalat Al-Madanieah and Al-Tejarieah fi Al-Sharieah Al-Eslamieah*, fifth edition, Al-Tawfiquieah, Egypt. 1998. [Arabic book].

⁴⁹ Elsheshtawy, Yasser. *The Evolving Arab City: Tradition, Modernity and Urban Development*. London: Routledge, 2008.

Traditional settlements evolved corresponding to the accumulated and inherited building tradition, which arose from cultural and natural factors, such as residents' lifestyles, privacy, climate, and construction methods and skills, which all affected the form of settlements. Where there is accumulated urban growth, residential neighbourhoods are densely populated. Notably, there are more populated (solid) spaces in neighbourhoods than traffic paths and public areas (void) between houses, as the primary function of the neighbourhood and reason for its construction is housing. The property occupancy percentage is approximately 85 percent (Fig. 7.105).⁵⁰

Traditional neighbourhoods in this area feature a central system, whereby houses are centred around mosques, markets (*sucs*), and schools (*madrassa*). As noted by Stefano,⁵¹ “the formation of the urban structure is not subject to the purely quantitative division of large space into smaller fragments but based on an incremental or 'organic' aggregation process, originating in the definition of socially relevant micro-spaces which are then connected to larger units. The enclosure of voids by correlated solids, repeated in countless variations, is the generating principle of urban form”. Cities thus develop gradually, without 'formalised' planning, but rather according to a general concept of harmony, unity and livability.

The spatial structure of the traditional urban fabric appears to have developed from a lack of planning. The structures of the houses are planned, but the planning principles for the city, in general, are flexible enough to allow for a degree of diversity. These principles were applied by residents within a recognised socio-religious framework, arising from the limited confines of civic planning. The city is described as a self-organising organism, rather than a static design product.

7.5.1.2 The Transitional Urban Fabric

In transitional residential settlements, as represented by Labour City, there are two factors shaping neighbourhood design. First is the complete rejection of the urban development schemes that accompanied the first oil boom, and the urbanisation of much of the population, who had originally migrated from their homeland in search of work and housing. The Home Ownership Program, offered by Aramco to their employees, helped them to own houses in a way stipulated by the company. These two factors meant that residents had a minor role in making decisions relating to their residential settlement. This represents a radical shift from the traditional form of a residential neighbourhood to a new, developed form. Aina notes that “...During this period, imported modern technologies and planning models were introduced to the country without due consideration of the local traditions and sociocultural factors”.⁵²

It can be deduced from Figure 8.2 that the density ratio of transitional settlements is 1:5 of the density of traditional neighbourhoods.⁵³ This new spatial model leads to the construction of freestanding, low-density

⁵⁰ Al-Said, Fahad. Territorial Behavior and the Built Environment: The Case of Arab-Muslim Towns, Saudi Arabia, Unpublished PhD Dissertation, University of Glasgow, Glasgow. 1992.

⁵¹ Bianca, Stefano. *Urban Form in Arab World*. London, Thames & Hudson. 2000.

⁵² Aina Y.A., A. Al-Naser and S.B. Garba, Towards an Integrative Theory Approach to Sustainable Urban Design in Saudi Arabia: The Value of Geo Design, Environmental Sciences. 2013.

⁵³ Al-Hemaidi, Waleed Kassab. "The Dilemma of Regulating Privacy: Planning Regulations, Privacy and House Form; The Case Study of Low-Density Single-Family Dwellings in Saudi Arabia." Master's thesis, University of London, 1996. 93

detached houses, or "villa" dwellings.⁵⁴ Each residential block contains between 8-12 houses; the occupancy ratio became approximately 50 percent of that in traditional neighbourhoods. The houses sit within wide span residential blocks; each block is rectangular and has two rows of six houses; the whole row of houses overlooks a local street.⁵⁵ The city developed according to the same approach across the entire Dammam Metropolitan Area.

To summarise, the transformation of Arab cities from the traditional to a transitional form can be described as a radical shift from a rural texture of pedestrian scale to an urbanized pattern of vehicular scale, and from an informal, integrated physical environment to a formal fragmentation of the physical environment.

7.5.1.3 The Modern Urban Fabric

The period between 1980 and 2000 is one of the most critical stages in the evolution of the built environment of the Dammam Metropolitan Area. During this time, planners and architects sought to apply their expertise and learning from previous experiences, such as from city planning in the Al-Khobar and Aramco neighbourhoods. The majority of the residential settlements established in the Dammam Metropolitan Area within the Modern Period were developed by the government,⁵⁶ except for Al-Doha and Al-Dana in the city of Dhahran, which were developed by Aramco. The 1970s marked the beginning of a greater degree of urban transformation, as a result of the economic boom and the introduction of the Five-Year Development Plan. After this time, the government commenced a campaign of modern urban planning and systematic intervention in urban production.⁵⁷ In this period, one of the most prominent issues affecting the Eastern region of Saudi Arabia was inflation,⁵⁸ which affected all aspects of life, including urban development. Inflation resulted in bad infrastructure, urban spread in major cities, and the concentration of the population in urban centres.

Planners during this Period tried to reuse and adapt the gridiron network from the Transitional Period; they sought to avoid a large number of intersections between residential blocks, and enlarged a block that contained eight houses in Al-Khobar to hold 18 houses, as in the case of the area South of the Al-Rakah. Consequently, the ratio of solid to void in the modern gridiron network was less than the initial ratio for Labour City in Dammam; the built areas represent 60 percent, the streets comprise 35 percent, and the remaining 5 percent is made up of open spaces, such as parks.

Modern urban development in the Dammam Metropolitan Area was characterised by similar features to transitional urban planning. It included the same open-ended streets and an unconfined gridiron network,

⁵⁴ Eben Saleh M. A. "A Vision for Directing Future Planning Efforts: The Case of Villages of South Western Saudi Arabia", *Habitat International* 5172. 2002.

⁵⁵ Farlex Dictionary: Local Street - a street that is primarily used to gain access to the property bordering it.

⁵⁶ Al-Khobar was founded by the order of King Abdul-Aziz after the establishment of building regulations in 1938.

⁵⁷ Eben Saleh M. A. "A Vision for Directing Future Planning Efforts: The Case of Villages of South Western Saudi Arabia", *Habitat International* 5172. 2002.

⁵⁸ Saudi's inflation rate reached about 34 percent in 1973. This period was associated with an oil price boom.

- Bangi, Hussain Saleh. *Causes of inflation in Saudi Arabia*. 1979.

- Nazer, Yousef. "Causes of inflation in Saudi Arabia." *The Business and Management Review* 7, no. 3 (April 2016): 147-54. Accessed August 25, 2017. http://www.abrmm.com/myfile/conference_proceedings/Con_Pro_65194/conference_71654.pdf.

which lacked important community and recreational services located towards the new outlying districts of the main cities. The situation was similar in other parts of the Kingdom.

7.5.1.4 The Contemporary Urban Fabric

Tilal Al-Doha, which is located in the Dammam Metropolitan Area, specifically the city of Dhahran, represents the contemporary urban pattern, and was mainly driven by economic considerations and formalised planning legislation. The contemporary model of urban design encourages a general use of space and the fragmentation of functional spaces. As happened in Tilal Al-Doha neighbourhood, there is a central area dedicated to public use. This area was designed later to serve as a public walkway surrounding a park and children's playground. This stage of urban development in the Dammam Metropolitan Area is called the 'reconsideration stage' of Urban Planning.⁵⁹

The physical organisation of the contemporary neighbourhood accords to a defined plan, based on different strategies, implemented to avoid mistakes made in previous neighbourhoods in the Modern and Transitional Periods. However, further mistakes and failures have emerged since the neighbourhood became inhabited, such as the failure to plan the residential area with suitable infrastructure, services, and facilities. This occurred because real estate development was limited to municipalities and government companies only.

Neighbourhood planners attempted to modify the gridiron network planning method, which had previously been a common planning technique for the Dammam Metropolitan Area. Instead, they planned the neighbourhood according to fragmented parallel subdivisions, with hierarchical streets and long rectangular residential blocks. Each block contains between 18 and 24 houses.



Fig 7.106: Each block in the Tilal Al-Doha now has a larger number of houses.

⁵⁹ Al-Asad Mohammad. "The Contemporary Built Environment in the Arab Middle East", Viewpoints Special Edition Architecture and Urbanism in the Middle East, The Middle East Institute, (2008): 25- 27.

- Al-Naim, M. Conservatism versus Modernism: Hesitant Urban Identity in Saudi Arabia, Viewpoints Special Edition Architecture and Urbanism in the Middle East, The Middle East Institute, (2008.): 28-32.

Today, the cost of real estate is higher than it was a decade earlier. Accordingly, the width of the street had decreased from 15 to 12.5 metres. The width of the residential block had also reduced, which affected the layout of the residential districts.

In general, when land within the new district was taken to auction, real estate speculation was the dominant feature; consequently, the largest share of the land was sold to real estate developers. Since the developers' only concern was profit, they divided the land up as far as possible to build residential housing projects. As a result, the housing lots became smaller, around 200 square metres for duplex houses, or between 400 and 450 square metres for detached villas. In addition, the shape of the lots became more linear; i.e. the length to width ratio increased (Fig. 7.106).

To make the greatest profit from the neighbourhood, a large part of the residential quarter was left for commercial purposes, contrary to what had been the case in neighbourhoods during the Modern Period. The neighbourhood comprised vertical housing projects plus horizontal housing. The majority was made up of both attached and detached houses, in addition to large villas on bigger lots that could not be divided into smaller plots.

An examination of this neighbourhood in the case study chapter reveals the ratio of occupation density is 65 percent for the 'buildings' area, with the remainder being made up of streets and open public areas. The occupancy ratio is higher than before, due to the presence of high-rise residential apartment buildings, and a large number of small-sized houses.

7.5.2 Analysis of the street

Design Classes of Urban Streets

	Cul-de-sac	Urban Local	Urban Collector	Urban Arterial	Urban Expressway
Traditional	Y	Y	Y	Y	N
Transitional	N	Y	N	Y	N
Modern	N	Y	N	Y	Y
Contemporary	N	Y	Y	Y	Y

Fig 7.107: Types of street according to the neighbourhood classification in this study. (N: No, Y: Yes)

The form and mass of the houses corresponds to the scale and types of streets and blocks within the residential settlements. The municipality regulations and standards informed the design of the streets inside the residential settlements in Saudi cities. The street widths are classified according to function as follows: Urban

Expressway (40 metres and more), Urban Arterial or Minor streets (30 meters), Urban Collector (16-25 metres), Urban Local streets (12-16 metres) and Cul-de-sac (less than 12 meters).⁶⁰ In the Dammam Metropolitan Area, five kinds of streets are evident: urban express, urban arterial, urban collector, urban local and cul-de-sac (Fig. 7.107).

7.5.2.1 Streets' Specifications in the Traditional Neighbourhoods

In traditional neighbourhoods, the circulation systems were of an irregular character; thus, most of the street patterns in these cities are arranged in a complicated network. The width of the roads in these traditional residential settlements varied according to their function and location; for instance, the narrower lanes were located within the residential quarter (the *Sekkah*) (Fig. 7.108), while wider streets served the mosque and narrower streets were found in shopping areas, where they were used to transport goods in carts dragged by donkeys. The irregular street pattern reflects an adaptation to the local climate, maximising areas of shade. The traditional streets provided inhabitants with usable public spaces immediately after they left their homes, and open piazzas were surrounded by a group of houses creating a desirable place for children to play, and an area for social interaction (Fig. 7.110 and 7.111).

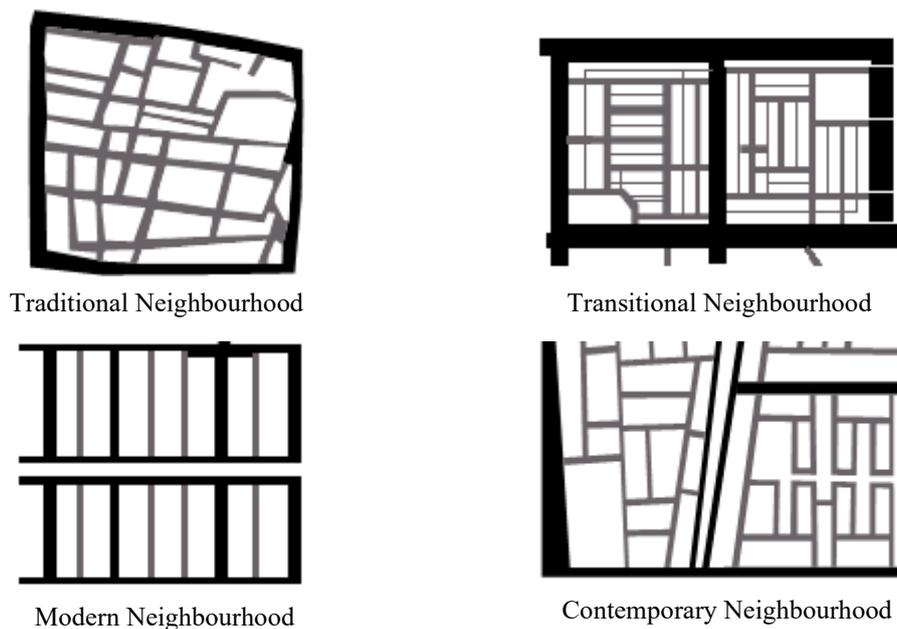


Fig 7.108: Types of streets in the four case studies (the residential settlements in Dammam Metropolitan Area).

In the broad streets around the Al-Amamrah neighbourhood, which include the Central Market, one side was shaded by residential houses. The construction took into account the movement of the sun to create maximum shade on one side of the street. This protected shoppers from direct sunlight. In the traditional neighbourhood, all the details of everyday life were reflected in the elements of urban design (Fig. 7.109).

⁶⁰ Engineering design manual for roads, Ministry of Municipal and Rural Affairs.



Fig 7.109: Hierarchy of streets in the Al-Amamra settlements in the Dammam Metropolitan Area.

7.5.2.2 Street Specifications in the Transitional Neighbourhoods



Fig 7.110: The street scene of the city of Al-Khobar in the traditional Period, Dammam Metropolitan Area, Saudi Arabia.

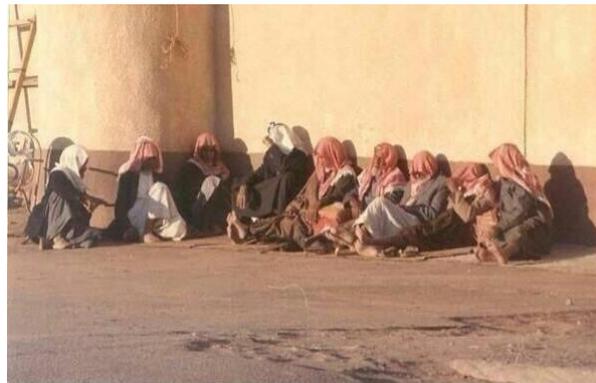


Fig 7.111: A male social gathering in open piazzas in Traditional Neighbourhoods.

In one transitional neighbourhood in Labour City, the Madinat Al-Ummal, there was a radical transformation of the streets. All roads and streets were straightened, with multiple intersections added. Aramco applied a hierarchy of streets: 30-metre-wide arterial roads linked neighbourhoods, 20-metre-wide connector streets stretched across neighbourhoods, and local streets, 15 metres wide, connected residential blocks. Finally, there were cul-de-sacs or semi-private streets located between houses, which did not allow cars. The streets were generally three times wider than they had been in the traditional neighbourhoods (Fig. 7.107).

In the transitional period, families did not yet have drivers, and still observed traditional customs, whereby women and children would walk on the streets. Each morning, employees would travel to work on buses

belonging to Aramco's contractors or by taxi. The majority of the children travelled to school by bus, or walked on foot, unless their father was able to take them to school on his way to work (Fig. 7.112).



Fig 7.112: Most of the children in the Transitional Period went to school on school by buses or on foot.

In contrast to traditional settlements, children faced many dangers in the transitional settlements, due to the large number of intersections arising from the urban gridiron planning, the lack of traffic lights, streets without pedestrian markings, and narrow sidewalks without shade in scorching temperatures (Fig. 7.113).

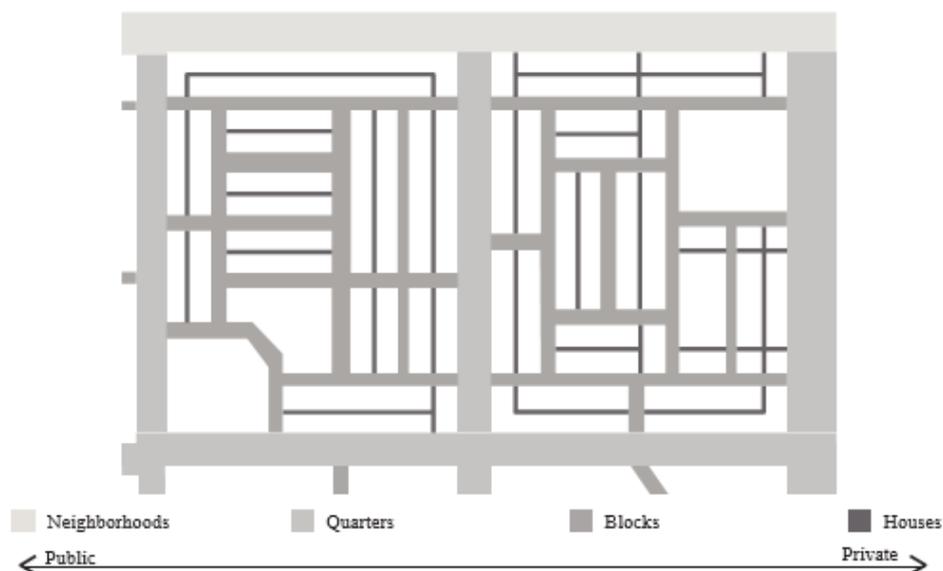


Fig 7.113: Types of streets in the Labour City.

7.5.2.3 Streets' Specifications in Modern Neighbourhoods

In the modern period, the cities of Saudi Arabia expanded out into vast areas of desert, creating urban sprawl; this resulted in cities that no longer had delineated boundaries and specific characters. This encouraged the continued use of vehicles, and city planning priorities facilitated the daily use of cars by individual travellers

on a large scale. In these cities and neighbourhoods, social, cultural, and economic relationships were affected by the use of cars, versus walking, when travelling to schools, mosques, and shops (Fig. 7.108).

Public transportation in the Dammam Metropolitan Area remained underdeveloped. Public buses were only used by Asian and Arab migrants.⁶¹ The sidewalks were not frequently used by pedestrians, due to the high external temperature and lack of shaded areas. In some cases, sidewalks were used as extra parking for cars, further blocking pedestrian use. The municipality left the areas in front of houses without paving, which people could then utilise according to their needs, but in spite of this, they sometimes exploited sidewalks as extra parking for their cars (Fig. 7.115).

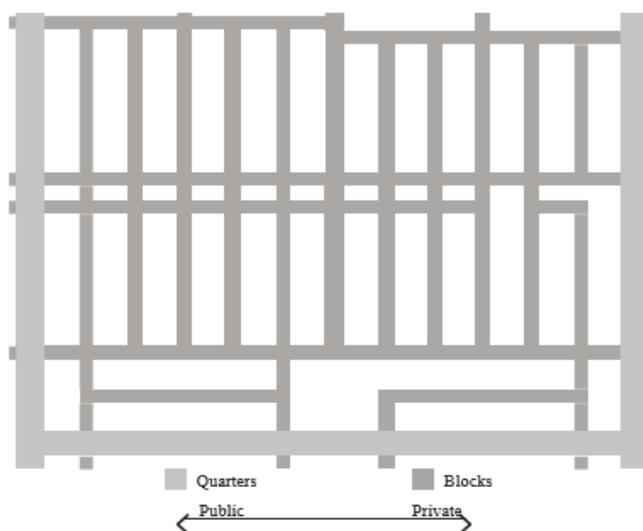


Fig 7.114: Types of streets in the Al-Rakah South.



Fig 7.115: Most sidewalks in modern neighbourhoods are free of pedestrians.

Madan observed the impact of cars on Gulf cities after returning from a visit to Cairo:⁶³

I did not notice before that the modern Gulf city lacks the concept of *Al-shari*,⁶⁴ the Street, regarding dense social activity, as I have experienced it in Cairo. It is true that our streets are wide, well

⁶¹ Andrew B Clarke, Stephen Luke et al. *The Context for Public Transport Development in the Gulf States: Unique Challenges and Perspectives*, Association for European Transport and contributors. 2007.

⁶³ Madan, Hassan. "Al-Shari (the Street)", *Al-Khaleej*, Sharja, UAE. (1991): 34.

⁶⁴ Al-shari is an Arabic word that means "the street."

organised, comfortable for drivers, as they can accommodate fast-flowing car traffic through their multiple ring roads and flying intersections. They remain streets for cars only. The sidewalks paralleling these roads cannot be compared to their vitality pulse, gregariousness and personal details with its counterpart in the world's great cities.

There are only two types of streets within the residential settlement: arterial streets and local streets (Fig. 7.114). Modern neighbourhoods were limited to these two categories of streets, because of the gridiron design, which was applied to urban planning within neighbourhoods at that time. All streets between groups of residential blocks were of the same width as arterial streets between houses; although the general road surrounding the neighbourhood differed.

7.5.2.4 Streets' Specification in Contemporary Neighbourhoods

In the contemporary neighbourhood of Tilal Al-Doha, the main streets have been widened to maintain easy and fast connectivity between different areas of the neighbourhood (Fig.8.116). These also feature long arterial streets that are not accessible to pedestrians; residents have reported difficulty moving between parts of the neighbourhood (Fig. 7.108), for instance, to get to the supermarket in the commercial area. This is due to fragmented parallel planning.⁶⁵

The developers of this neighbourhood had aimed to achieve sustainability by encouraging walking and cycling. Thus, they established a continuous, long, double-sided walkway in the middle of the neighbourhood. However, to achieve sustainability, a neighbourhood is expected to have paths for pedestrians to allow safe movement between houses, to encourage social relationships, and to satisfy residents' daily needs. This vision did not work as planned because of the hot weather, and due to the lack of traffic lights allowing pedestrian crossing.

There are three types of streets in the Tilal al-Doha: arterial, collector, and local.⁶⁶ The residents leave their cars just outside of their houses, rather than in the parking area inside the plot; this is because they use their vehicles several times each day, as most daily activities can only be accessed using a car. Therefore, the street was surrounded by cars on all sides, and empty of pedestrians (Fig. 7.108 & 7.115).

⁶⁵ This phrase is explained in case study four in chapter seven.

⁶⁶ Primary street: Arterial, Secondary: Collector Street, Tertiary: Local Street, and Private Street: cul-de-sac.

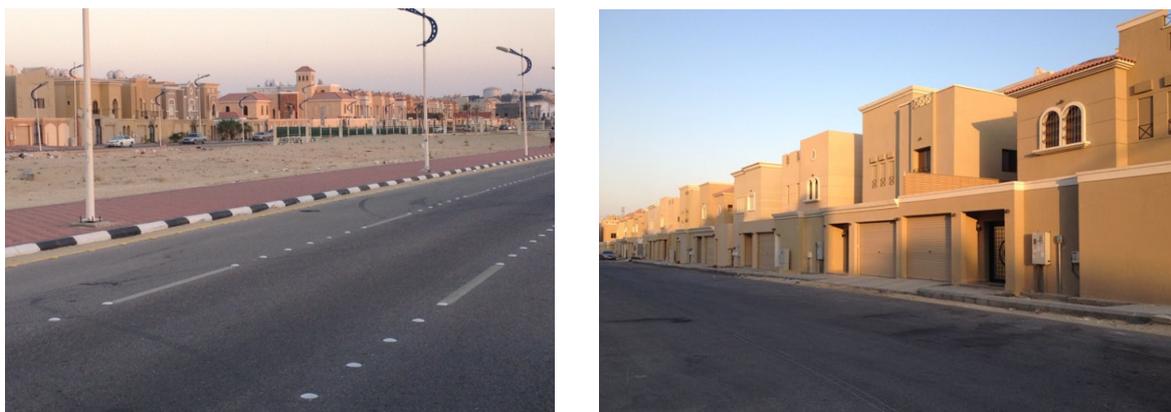


Fig 7.116: The design of the streets and sidewalks in Tilal Al-Doha.

In the 12-metre connector streets with two lanes, residents park their cars outside the house, parallel to the street beside the pavement walkway, on both sides. Typically, each household will have a minimum of two vehicles. The streets are narrow, about 3 metres wide, and the pavement does not allow sufficient access to pedestrians, either due to the presence of trees, basins, or inadequate paving. Thus, the sidewalks are void of pedestrians due to safety concerns (Fig. 7.116).

The neighbourhood has four long footpaths, which create cul-de-sacs and have become a huge parking area, causing congestion, particularly when cars are trying to exit. Thus, complicated traffic problems arise in this neighbourhood.

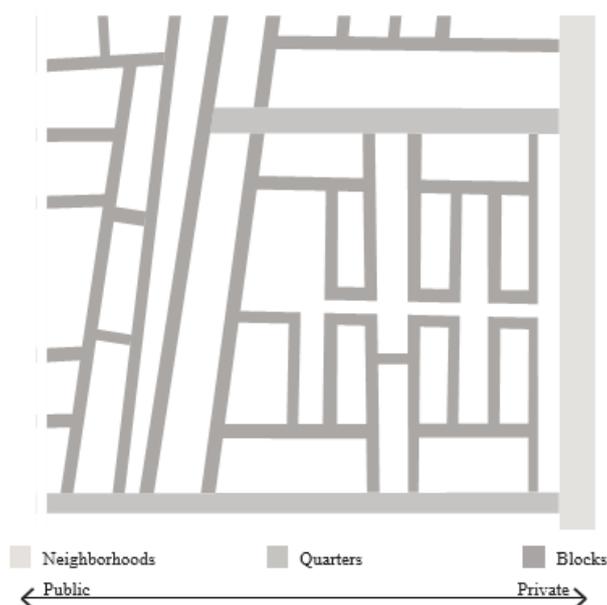


Fig 7.117: Types of streets in Tilal Al-Doha.

In summary, types of streets have changed during the periods evaluated, which has had an impact on privacy and security as well as the hierarchy of the built environment. Streets in the traditional neighbourhood were formed according to climatic and social-cultural constraints. There were three types of streets; the private (cul-de-sac) was safe and secure, and located between groups of houses, the semi-private (*Sekkah*) was a

protected area among house clusters, and the public road between neighbourhoods was completely unsafe and to be avoided by females.

A typical new subdivision for transitional and modern neighbourhoods showed several shifts from traditional forms. There was a rectangular grid system for streets. No longer did the streets benefit from the passive shading produced by groups of buildings. Moreover, the private and semi-private streets in traditional neighbourhoods no longer existed, being replaced with a grid-street pattern and outward-oriented. The streets became only public and semi-public, with semi-public types distributed equally between residential blocks.

In the Contemporary Period, a trend occurred towards the failure of the Western-Planning system and design of previous neighbourhoods. Many native architects and urban designers were challenged to combine traditional approaches with western technology and practices. This has resulted in a hybrid street system with more types and different width measurements. Unfortunately, the cul-de-sac was not included in the new planning system, although on this type of street women and children can feel safe and secure while on the street.

7.5.3 The Analysis of Infrastructure and Public Services

‘Infrastructure’ is the term given to the organisational structures needed to operate facilities.⁶⁷ It refers to the technical structures that support a society, including its public services and the basic supplies needed by a community. This includes 1) transport systems, such as roads, bridges, airports, and railways, 2) telecommunications facilities, such as the phone network, mobile phone service, internet, postal and telegraph services, and 3) utilities, such as a sewage system, electrical grids and the water supply. Infrastructure can also be defined as the set of interconnected structural elements that provide a framework supporting an entire structure of development.⁶⁸

The notion of ‘public services’ refers to a set of services rendered by a government for people living in settlements. Public services tend to be those that are considered essential to modern contemporary life; for instance, education, fire services, healthcare, social services, public transportation and waste management.

7.5.3.1 Infrastructure and Public Services in Traditional Neighbourhoods

Typically, the availability of water or good agricultural land was the most significant environmental factor when determining the location of traditional cities. These two factors formed the infrastructure of any traditional neighbourhood.

⁶⁷ Infrastructure: the meaning from the online Compact Oxford English Dictionary.

⁶⁸ Michael Paul. Development of the Infrastructure to implement the Wismut Rehabilitation Project, Chemnitz, ENVIRONET workshop, Wismut. 2012.

Al-Amamra is a traditional neighbourhood, which was created with residents' personal involvement in the construction process. Residents themselves built streets and services; no infrastructure works were present. The supply of safe drinking water and sanitation, both of which were primitive, was also provided by the local people (Figs. 7.118 & 7.119).

Shallow channels were located next to the exterior wall of the houses, and extended to other houses; these channels discharged used water or rainwater. The Al-Amamra neighbourhood is situated in a problematic area, where there is a flood risk from natural tides, due to the coast being nearby.

Today, the Al-Amamra neighbourhood remains populated, and the municipality has installed a water supply, electricity and sanitation. The service networks are weak and inefficient (Figs. 7.120 & 7.121) as a result of the neighbourhood planning; the neighbourhood has narrow streets and alleys and irregularly placed homes. The pictures clearly show some houses have exposed pipes and wires, and even water tanks in their external elevation. It is not possible to hide them within the walls or inside the buildings because the interior spaces and openings are too small for such large equipment to pass through them. Furthermore, walls are built from mud and limestone, and any openings leave them vulnerable to destruction.



Fig 7.118: Methods of delivering water to homes in a traditional neighbourhood.



Fig 7.119: A neighbourhood after heavy rains or natural tides, due to lack of drainage.



Fig 7.120: A water tank placed outside the house.



Fig 7.121: The condition of the Al-Amamra neighbourhood today.

7.5.3.2 Infrastructure and Public Services in Transitional Neighbourhoods

In search of a new identity that had no link with the past, the municipality and Aramco discarded old traditional schemes and began to build new neighbourhoods. In Labour City (Madinat Al-Ummal), Aramco planned the area, allocating plots to its employees that were ready for construction work to take place following the completion of infrastructure and the provision of public services. Aramco's employees and their families lived in houses that had been there for a long time without the need for modification or renovation.

The infrastructure and public services installed in the transitional neighbourhoods were very simple. All the services were integrated without using technology. In the late 1970s, the original residents left the neighbourhoods in search of more modernised areas;⁶⁹ the Labour City then became inhabited by expatriate workers and their families looking for cheap rent (Fig. 7.122). The need for water, electricity and sanitation subsequently increased, as the owners of the houses split them into multiple residential units to collect the highest possible rent, resulting in a significant increase in the number of residents present in the neighbourhood. The increase in inhabitants created heightened pressure on water, sewage and electricity networks, which had been serving a smaller number of homes at the time of their installation (Figs. 7.123 & 7.124).



Fig 7.122: Foreigner workers are renting houses in the transitional neighbourhood.

Aramco provided certain facilities to the residents of the neighbourhood; including schools, mosques and green areas. They also shared essential public spaces according to their vision of what residents needed from their neighbourhood at that time.

⁶⁹ Aramco employees.

7.5.3.3 Infrastructure and Public Services in Modern Neighbourhoods

In the modern period, the municipality moved on from the schemes trialled during the Transitional Period and began to build new neighbourhoods. The planning of these neighbourhoods and the provision of appropriate infrastructure and public services were among the responsibilities of the municipality. At this time, the government enabled the spread of the population through the creation of residential neighbourhoods in the suburbs of Dammam and Al-Khobar; Al-Raka-South was one such neighbourhood. The residents received plots following a purchasing process after the land was auctioned. Initially, the neighbourhood completely lacked basic infrastructure.



Fig 7.123: The public water tank in Dammam served Labour City. The tank was demolished in October 2012.

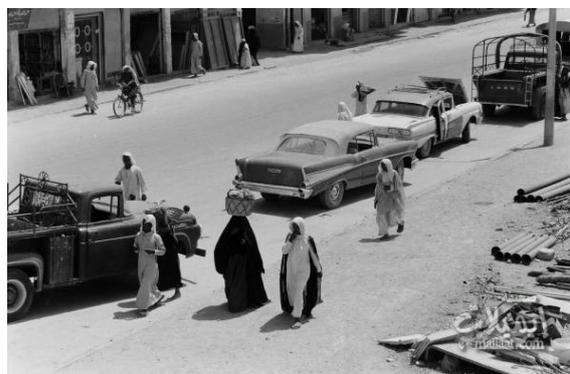


Fig 7.124: The simple pipes welded with liquefied lead for sewage work in Labour City.



Fig 7.125: The residents of the Al-Rakah suffering from sewage overflow.

As the population pressed to expand outside the overcrowded cities, they began living in the new neighbourhood, hoping services would arrive soon and that the municipality would provide them with the necessary infrastructure. Until then, the residents lived in the neighbourhood without sewerage works, paved roads, water, or telecommunications facilities (Fig. 7.125).

After twenty years had elapsed, service provision was finally completed. As a result of the presence of inhabitants in the neighbourhood, the municipality faced many difficulties completing the maintenance and construction of infrastructure. The installation of the urban infrastructure faced many problems, which required more than engineering solutions.

Some land owned by the municipality was scattered throughout the neighbourhood; the residents continued to demand the provision of schools and a health centre, as the nearest school to the neighbourhood was about twenty kilometres away. The neighbourhood was subsequently provided with girls' and boys' schools and one health centre, which was adapted from rented houses (Fig. 7.126).



Fig 7.126: Al-Rakah, the first middle school for girls in a rented house.

Today, the municipality has been given the power to provide lacking services to the Al-Rakah neighbourhood,⁷⁰ for instance by asphaltting the streets, creating parks, establishing schools for both sexes, building social centres, a commercial high street and a community centre. Nevertheless, the neighbourhood is still missing traffic lights and pedestrian signs, particularly around schools, and the sidewalks require significant improvement (Figs. 7.127 & 7.128).



Fig 7.127: The Al-Rakah residential complex is only one kilometre from the southern district of the Al-Rakah neighbourhood.



Fig 7.128: The situation of the streets in the Al-Rakah residential complex, only a few kilometres from the southern district of Al-Rakah.

⁷⁰ Municipal Council of the Secretariat of the Eastern Region, Dammam Metropolitan Area.

7.5.3.4 Infrastructure and Public Services in Contemporary Neighbourhoods

The growing affluence in Saudi Arabia has led to an increase in the use of cars and other vehicles, as well as the need for more residential settlements, the introduction of new technologies, and the importation of architects, engineers, labourers and professionals. Consequently, interest in improving the infrastructure to build contemporary neighbourhoods in the Dammam Metropolitan area has correspondingly increased. At present, the municipality is looking to develop urban infrastructure in line with the requirements set out in the contemporary period, and this has allowed developers to participate in the planning and expansion of new neighbourhoods.

The Tilal Al-Doha was planned and promoted by a developer; the aim is to deliver a neighbourhood to a higher standard than in the previous period, to create an ideal environment for contemporary society. To this end, planners sought to build a high-quality road system, which would be appropriate to reflect the traffic conditions in the surrounding area, and to establish suitable zones for public buildings and facilities, such as schools, mosques and kindergartens.



Fig 7.129: A lake is in the middle of the neighbourhood for collecting rainwater.

However, there are some negative aspects of this neighbourhood; it has no parks, playgrounds, or sports playing fields. The community area is located in the farthest corner of the neighbourhood. Boys' and girls' schools are on Main Street, causing traffic congestion in dismissal time at school, and there is a lake to collect rainwater in the centre of the neighbourhood (Fig. 7.129).

Through negligence and lack of maintenance, a conflict of responsibility arose between the municipality and the developer. Two main issues that arose were the absence of security patrols and a lack of maintained lampposts. These two things were expected to negatively affect the security and safety of the neighbourhood.

In summary, this case study addressed the fact that modern subdivision and building codes have a direct impact on neighbourhoods' infrastructure. The creation of a hierarchical form of infrastructure system guaranteed growth without interruption and the possibility of reform without needing to damage other

systems. The physical character of this infrastructure must be acknowledged as appropriate for intended activities. The need for a dual set of relationships between urban planning and infrastructure was created to serve the housing sector.

7.5.4 The House Patterns

Analysis of house form is essential to the progression of this study to get a comprehensive view. The analysis will begin with a study of urban design and conclude with an analytical study of the house, through an observational study of infrastructure and a street study

7.5.4.1 The Traditional House Form

The houses located in the Al-Amamra neighbourhood opened inwards into courtyards. The function of each house in the neighbourhood as a unit is not only to provide the necessary shelter to fulfil the spatial needs of its occupant, but also serves as an important component of the entire settlement, helping to shape communal spaces.⁷¹

In the traditional house type, lots were typically laid out in the form of a square, although some were irregular. The relationship between space and function was complicated; it was common to describe the various tasks that usually took place within a space, and there was often no single specific role for one space. On this point, Habraken states, “the identity of such typological spaces is not derived from the activities that take place in them, but the position they take in the system; the place they have in the transition between public and private and, most of all, by their particular architectural quality and shape”⁷².

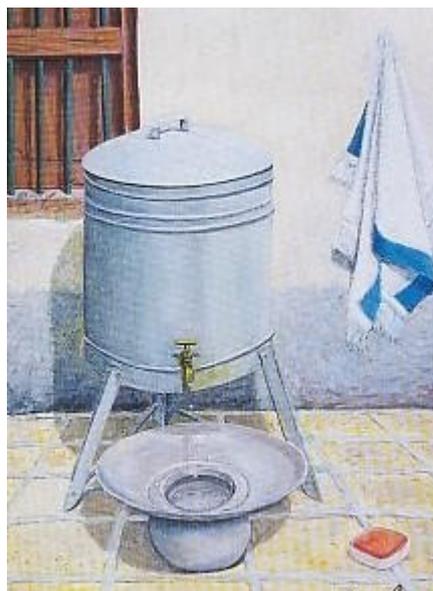


Fig 7.130: A portable basin can be placed in any room of the house.

⁷¹ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

⁷² Habraken N. J. *Type as Social Agreement*, a paper presented at the Asian Congress of Architects, Seoul. (1988):11.

The house had some rooms with a definite, specific architectural value. The men's sitting area is a good example of this. This area could be positioned on the inside or outside, with its function as a semi-public territory. Its function (hospitality and receiving guests) typically derived its importance and meaning for residents from the space it occupied, such as a space for making coffee (*Wijagh*). Some private or semi-private places like the entryway (*Liwan*) were multi-purpose and could change their form according to the season or time (Fig. 7.130). Moreover, the wall of the house emerged as a salient component throughout the traditional urban fabric, not only serving to define the space but also to configure the hierarchy of privacy that determined the traditional way of living in a traditional settlement.

The house was designed around a courtyard, and took the shape of the basic module used for housing and public buildings at that time. The ratio of the construction area to its plot was typically 1:2, with the court taking up approximately 24 percent of the ground coverage.⁷³ The house had two floors: the ground floor and the roof level.

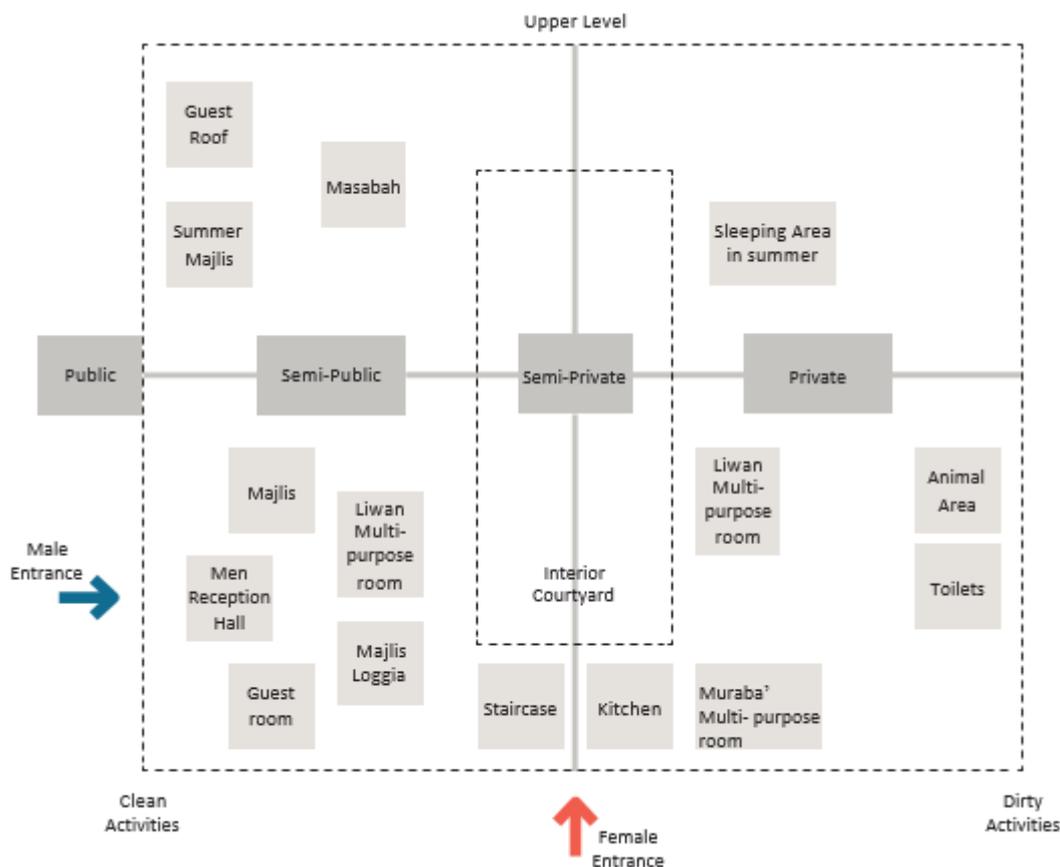


Fig 7.131: The spatial arrangement of a traditional house in the Dammam Metropolitan Area.

This particular house was a single unit within a group of houses; the urban courtyard house found in the Dammam Metropolitan Area exhibits an asymmetrical, rectilinear grouping of small houses, extending from the main house, around the courtyards.

⁷³ The percentage is the ratio of the volume of voids to the volume of solids.

The house had two separate sections. There was a public section, located at the front of the house reserved for male guests; this section contained the male entrance, a reception area, the (*Majies*) sitting area and the dining area (*Moqalat*) for male guests. The semi-public space could be divided into two parts; the front part was for female guests. The second section was semi-private and located in the middle zone for family members; it could also be used to receive female neighbours. The private section was for unclean spaces, like the kitchen, toilets, and (*Samada*), which should not be seen by guests (Fig. 7.131).

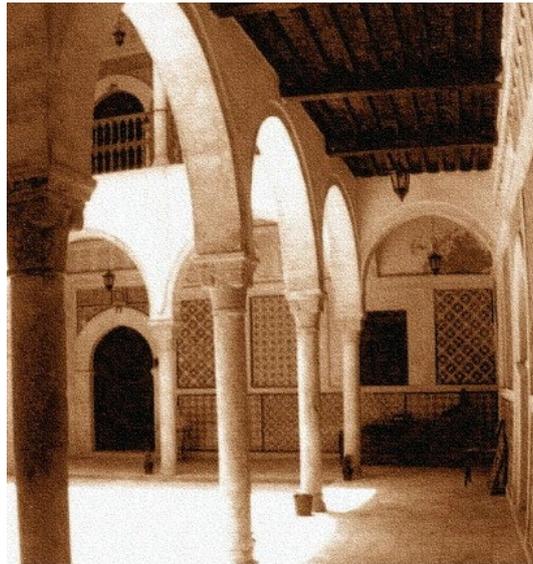


Fig 7.132: The courtyard and loggia inside the case study house in the traditional neighbourhood.

The houses were well protected and isolated from the street, and had very few outward-facing openings. Windows overlooking other houses were not allowed, and were prohibited even if they could have been a source of light and air for the house.⁷⁴ Thus, as it can be seen, there are only four windows in the public zone of the house, one level being higher than eye level for pedestrians on the street side.⁷⁵ All the rooms of the house opened towards the courtyard (Fig. 7.132), to allow in enough air and light. The location of the windows on the ground level was above eye level, and covered with wooden shutters⁷⁶ (Fig. 7.133). The house was characterised by a heavy, massive appearance, and overlooked narrow shaded streets.

The kitchens were mostly located next to the staircase, to serve those who stayed on the roof. The staircase was located in between the semi-public and semi-private zones, to facilitate receiving male guests on the roof when the weather was scorching in the summer. The kitchen was always located in a semi-private area, to serve family members using the courtyard and the other rooms around it. Service spaces were minimised by placing toilets next to one another, and were located in the most isolated part of the house alongside storage and animal areas. In this small house, the lower part of the plan shows the courtyard was relatively small in

⁷⁴ This rule is according to the Qur'anic verses and Prophetic Hadiths, which condemn spying on somebody's house.

⁷⁵ Because of asphaltting and paving the street in recent times, the street became higher than before, which had an impact on the location of windows, as they were then at the level of pedestrians outside.

⁷⁶ Al- Hathloul explains the Umar's ruling on window placement.

- Al-Hathloul, S. Tradition, Continuity and Change in the Physical environment: the Arab-Muslim city. Unpublished doctoral dissertation, Department of Architecture, Massachusetts Institute of Technology, Cambridge, Massachusetts. 1981.

comparison to that in other houses. The house consists of a further four rooms in the semi-private and private zones. Upstairs on the terrace (*Satieh*), there was space for sleeping, and a storage space for mattresses.

...

In the transitional period, traditional neighbourhoods were changed to feature detached dwellings, and clusters were broken into segregated dwellings with separate households. However, the residents continued to live in traditional dwellings, which remained until 1975 (the end of the Transitional Period and the start of the Modern Period). The Transitional Period began when the government chose to fund private housing, establishing the Real Estate Development Fund to provide interest-free loans to build new private houses to Aramco employees and their families, who were living in houses under HOP. At that time, people were ready to move into the new suburbs (neighbourhoods) (Fig. 7.134).

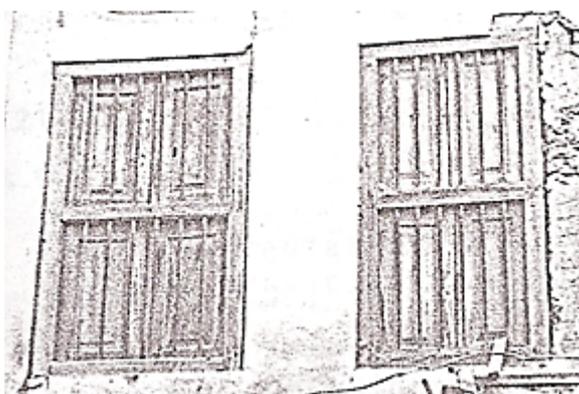


Fig 7.133: Wooden screened windows on the ground floor of a traditional house.



Fig 7.134: An employee of the Department HOP explains one of the house models to another employee, who wishes to own a house under the Aramco HOP.

The move from the traditional to the new house form began in the 1960s, and continued until the 1970s. The detached houses, known as villas, were a common style at this time. They were a symbol of wealth and modernity, with the use of new construction materials making them superior to earlier mud and limestone buildings.

In the transitional period, a function was allocated for each space in the house, which was now designed for single families. However, the inhabitants still retained their traditional customs and norms, aiming to live as an extended family, receive guests in the same way, and maintain their traditional daily routine.

A major shift occurred in the traditional private home, with the replacing of the interior courtyard with external two-metre setbacks. The courtyard was transformed into a covered hall called a ‘*Sala*’, which was used as a living room for informal family gatherings and as a foyer for transitional circulation of air between spaces, particularly once air conditioners became common household appliances. This major change is described in a study by Al-Elawy,⁸⁰ in specific reference to the houses of Al-Hasa⁸¹: “The traditional courtyard has now become a central hall, separated from outside. Rooms are arranged in an orderly manner around this central hall, while windows open to the outside world for fresh air and light, but keep out intruding eyes by being above the height of the average tall man.”

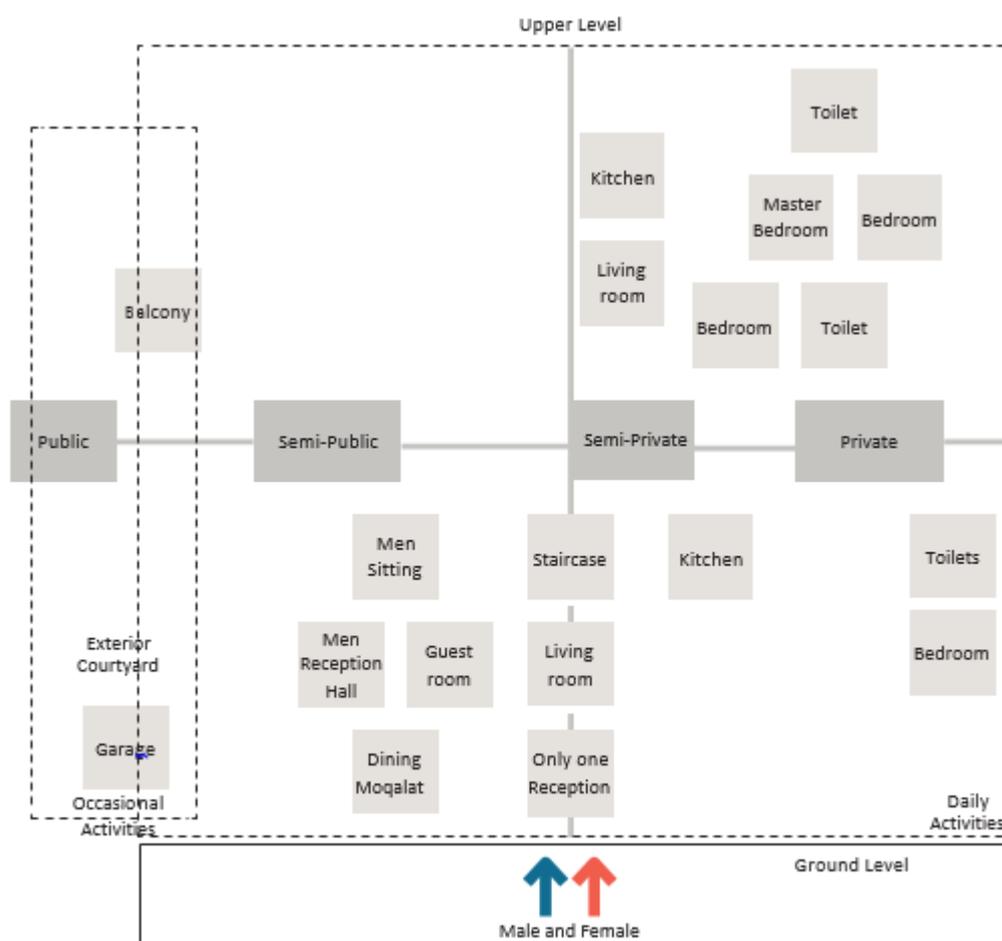


Fig 7.135: The spatial arrangement of the transitional houses in the Dammam Metropolitan Area.

⁸⁰ Al-Elawy, I. S. The Influence of Oil upon Settlements in Al-Hasa Oasis, Saudi Arabia, Unpublished PhD, Dhahran, The University of Dhahran, (1976): 364.

⁸¹ Al-Hasa is a city located in Eastern Province to the south of Dammam Metropolitan Area.

Service areas, such as the kitchen and toilet, were located in the semi-private and private zones of the ground floor, to serve the family and guests' areas, while an additional bathroom was located between the two bedrooms.

There were two kinds of outside spaces located in the public zone: a garage and a balcony, the use of which was restricted to men only. Many houses have enclosed their balconies and added them to interior spaces. In the transitional house design, the balcony and exterior courtyard took the place of the interior courtyard in traditional houses, and defined how the ground and upper floors accessed sufficient lighting and ventilation.

The two floors have the same spatial arrangement; the upper floor is designed to represent a private zone, including the master bedroom and other bedrooms, while the guest bedroom is on the ground floor, in the semi-public area (Fig. 7.135). The reception area for male guests is located in the semi-public zone, which is further into the house than it had been previously. It is also integrated with the remainder of the rooms in the semi-private zone. The family living room was transformed into a female guest area, as no particular area is allocated to family members. The living room is also more private than had been the case in the previous arrangement.

7.5.4.3 The Modern House Form

The typical modern house sat among a group of houses of the same design⁸² (Fig. 7.136), which were distributed by Saudi Arabian Airlines Company to its employees as part of a housing programme. These houses were identical in terms of the lot size, components and spatial arrangements.

The house selected has been subject to much change over the years. The present design consists of two floors in addition to the ground floor. The house had one main entrance, through which to receive both male and female guests, and family members, leading on to the front courtyard. However, there were two entrances to the houses; one leading to the male guest area, and the other intended for family members and female guests.

The ground floor contained the formal sitting area for male guests, and was attached to the dining room, and a toilet also serves them. Some of the spaces in the house featured greater privacy than available in the Transitional Period. For instance, the living room changed its location so it would be between the semi-private and the entire private zone, and the female sitting area was moved from the front zone of the semi-public spaces to the semi-private zone. The kitchen and bedrooms remained in the back zone as private spaces.

On the first floor, a terrace was constructed and attached to the house. It provided two rooms, one bedroom and a dressing room. As the allocation of a function for each space of the house was more sophisticated in this period, more spaces were needed to meet the needs of the house's inhabitants. The roof remained unused for some time, until the family decided to hire a servant; it then became an annexe including a bedroom, bathroom, storeroom and laundry and ironing room.

⁸²The houses have similar space organization as the case study three.

In the modern period, the living room was typically positioned in the central part of the house, and functioned as a reception and dining area when the family received female guests. The staircase was located in front of the living area, which had previously been isolated and used only as vertical circulation space.

Setbacks were not distributed evenly in all directions; the front yard was the largest lot area, up to 4-6 metres in width, the left setback rebounded from the house and was more than three metres in width, while the rest of the setbacks were two metres each. The house had only one garage opening, but this could accommodate more than a car; the garage changed from a public to a semi-public area after the wall that separated it from the outside front yard was removed.

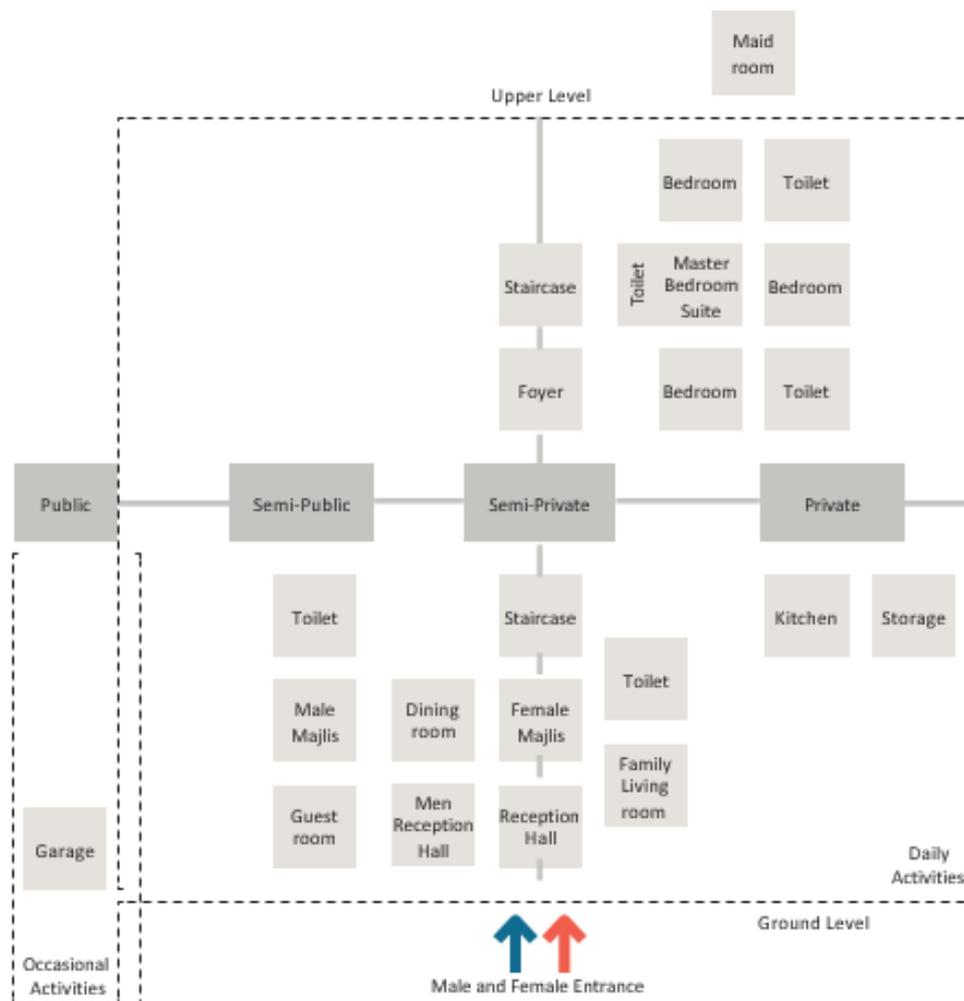


Fig 7.136: The spatial arrangement of modern houses in the Dammam Metropolitan Area.

7.5.4.4 The Contemporary House Form

In general, contemporary houses are designed by trained professionals, Saudi Architects who observe national and international architectural trends. Considerations of style and aesthetics are as important as function, with the goal being the balance of all elements.⁸³ An emphasis on style and fashion is evident.

The selected house from the Contemporary Period is a detached house built on an interior lot, within a group of houses constructed by a real estate contract to be sold for investment purposes. The house is representative of contemporary houses across the region. The types of houses made available to medium-income families are limited to two kinds: small oblong detached houses and semi-detached houses (duplexes).⁸⁴

The house is built on a long rectangular lot, due to the nature of the division of residential blocks in the neighbourhood. The house comprises two floors with an annexe added on the roof. In this period, the lot area became smaller; however, increased functions required more spaces allocated to them, such as activities practised in the living room. Consequently, one of two things happened: either the room became smaller, or several functions were allocated to the same space.

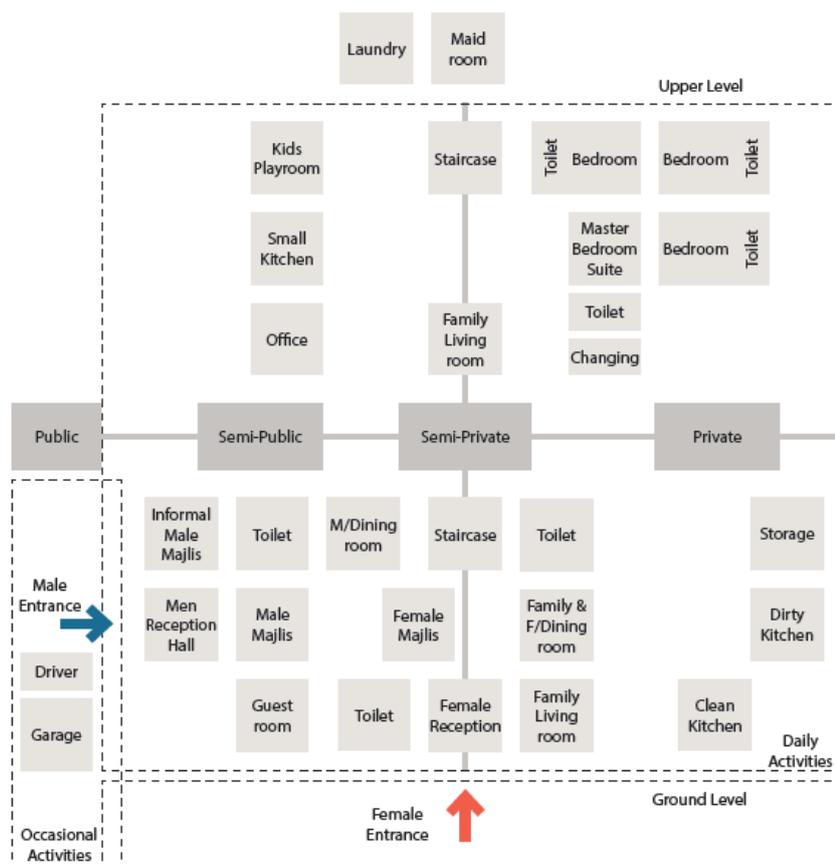


Fig 7.137: The spatial arrangement of the contemporary house built on an interior lot in the Dammam Metropolitan Area.

⁸³ Fadden, Y. M. "The Development of Contemporary Housing in Saudi Arabia (1950-1983)." PhD diss., MIT Cambridge, 1983.

⁸⁴ The term circulates among the general public and refers to attached houses.

In the selected house, the constructed area is divided into the following: a front zone devoted to semi-public spaces, including a male reception hall, formal and informal sitting area and the dining room for men, with a toilet to serve the area; and the middle zone, which has a semi-private function and features of the family zone, with a family and female entrance, reception hall, and female sitting area. The staircase, living room and a clean kitchen oscillate between the semi-private and private zones. Bedrooms, the dirty kitchen and storage are located in the private zone as the family prefer to conceal these spaces for additional privacy (Fig. 7.137).

The segregation of the sexes inside the house is less significant than in earlier periods: the segregation found in the men's reception area included the location of the driver's room and the maids' area. The driver, as a foreign male⁸⁶, was expected to live away from the family zone, while the female maid is located on the house roof to ensure her protection from strangers and give privacy to family members. There are a notable two main entrances, one for males and the other for family and female guests. The separation between the sexes is also apparent in the retention of the front zone for male guests only; this helps to control their movement inside the house, while female guests are allowed to move inside the house within the semi-private area. Balconies were introduced to the first floor of the house, the goal being to create a breathing space outside of the house that gives a feeling of more space.

7.6 Summary

This chapter presented an analytical and descriptive study of the four case studies, which were selected to represent some of the most prominent housing examples in place from the Traditional, Transitional, Modern until the Contemporary Periods. The case studies illustrate the spatial arrangements of houses, and urban planning in the Dammam Metropolitan Area. The purpose of studying the case studies was to highlight a variety of housing units in different periods, as a way to understand the functional interaction between spaces within the house and between the house and the urban planning. These case studies were studied in-depth by investigating each periods' models and shedding light on household experiences when dealing with home spaces and the surrounding environment, which in turn offer an overview of approaches to understanding the housing issues in the region.

The case studies are based on information collected from an observation area, secondary research, and most importantly, an in-depth study of houses' spatial arrangements. This makes it possible to more fully understand how these houses developed and implemented new concepts to integrate with urban planning as a way to serve the built environment. The observation process provided a lot of information concerning the responses of inhabitants towards the designs that were introduced. It measured how individuals interact with a physical and spatial context. The study also observed how those who share activities utilise internal domestic space and act as members of the external community.

⁸⁶ According to the religious, customary and traditional beliefs in Saudi society.

The case studies cover key visual features concentrated into three main categories: (1) the basic urban planning elements of the selected neighbourhoods; (2) aspects of home exteriors; and (3) interior spaces of homes. These types were subjected to physical and environmental observations, and the impact of climate and privacy on the shape of the house and its relationship to the spatial arrangement.

The houses in traditional and transitional neighbourhoods were clearly similar in their types of spaces, spatial arrangements, the size of the house, the construction materials, the house façade, and the number of entrances. This is because the population retention of cultural and religious heritage took place without external interference. The houses in Modern and Contemporary Periods also showed many similarities and some differences in house styles, and house finishing materials. The houses shared similar features due to the adoption of building regulations that had emerged during the Modern Period, in addition to the cultural and religious needs. However, differences appeared because of the imposition of western ideas in the housing sector.

This chapter studied and analysed the constituent elements of the built environment, ranging from the large public scope (Urban Settlements) to the small private scope (House Form and its elements) and occurring gradually through urban design elements (street and infrastructure system). Subsequently, the focus was on the effect of urban design on the house form, affecting both the internal and external zones and features.

This chapter has addressed the compilation of the data as a framework to facilitate the link between the research questions raised in the first chapter and the data provided via the projection method. This process paved the way for the comparison analytical study at the end of this chapter. The analytical framework will permit the data to construct spatiotemporal perspectives in the home environment.



Chapter VIII

Changes and Resistance

8. Changes and Resistance

8.1 Introduction

The built environment is the physical and visible expression of a culture's spatial organisation.¹ During the last several decades, designers, planners and anthropologists have increasingly joined together, wishing to examine built environments, in particular settlements and dwellings carefully.² They have examined differences in building forms and modifications over time, as well as highlighting the social and cultural factors responsible for these variations.

As a consequence of the multiple economic booms that have taken place in the Dammam Metropolitan Area, settlements and housing have undergone constant evolution. This chapter seeks to investigate the changes in patterns that have occurred in the built environment on both the large scale (neighbourhoods) and small scale (houses) during the study period. Furthermore, this chapter attempts to bring an understanding of the impact of urban design components that evolved throughout the years on outdoor and indoor house components. The study observes the relationships among home spaces and examines the meaning behind the changes and developments.

The spatial organisation appears to be closely related to human behaviour and lifestyle,³ but is also affected by additional factors. This chapter will investigate these factors, such as social and technological development, by analysing important relationships, and examining their impact on case studies. Typological figures can be described according to their particular shape and architecture, spatial organisation (both internal and external), and their role in defining the public and private realms of the house.⁴

This chapter seeks to answer the following questions: what are the changes and resistance to change in the home environment of the Dammam Metropolitan Area over time? Why did changes occur in the spatial organisation of the home environment and its' elements throughout different periods? To what degree are space relationship and external features affected by urban design elements? How have residents managed to adapt the spatial organisation of their home environment to suit their needs?

¹ Rapoport, A. 'Spatial Organization and the Built Environment' *Companion Encyclopedia of Anthropology: Humanity, Culture and Social Life*, Routledge World Reference, London, UK. Ch. 17. (2002): 461.

² Jeffrey Hou. *Insurgent Public Space Guerrilla urbanism and the remaking of contemporary cities*. Canada: Routledge, 2010.

- Jill Grant & Lindsey Mittelsteadt. Types of Gated Communities, *Environment and Planning B: Planning and Design*, 31, (2004): 913-930.

- Jill Grant. *Planning the Good Community New Urbanism in Theory and Practice*. London: Routledge. 2006.

³ Al-Kurdi, Feryal. *Lifestyle and House Form: The Case of Aramco Houses under Home Ownership in Dhahran*. Unpublished Master's dissertation, King Faisal University, Dammam, Saudi Arabia. 2004.

⁴ Habraken N. J. *Type as Social Agreement*, a paper presented at the Asian Congress of Architects, Seoul. 1988.

8.2 Change and Resistance in the Home Environment of the Case Studies

This research identifies certain incentives, or drivers, of in-house development form, both external and internal. The external drivers include technology and the impact of urban planning on house form, while internal drivers include aspects related to the residents and their influence on house form, reflecting their behaviour and lifestyle.

Urban planning has a significant impact on residents' lifestyles, which is apparent in the house form.⁵ However, socio-cultural factors must not be underestimated in their power to create segregated communities, as evidenced in the case of the Aramco Camp.⁶ The incorporation of Saudis in the residential neighbourhoods populated by Americans and foreigners led to a difficult coexistence for Saudis. The neighbourhoods were planned in a Western way, and the houses designed to be convenient for a Western lifestyle. The Saudis suffered from a lack of privacy, which is considered a critical requirement to preserve their lifestyle. Additionally, neighbourhoods lacked mosques, and security was very high in neighbourhoods, limiting Saudis proximity and contact with their relatives who lived outside the community.

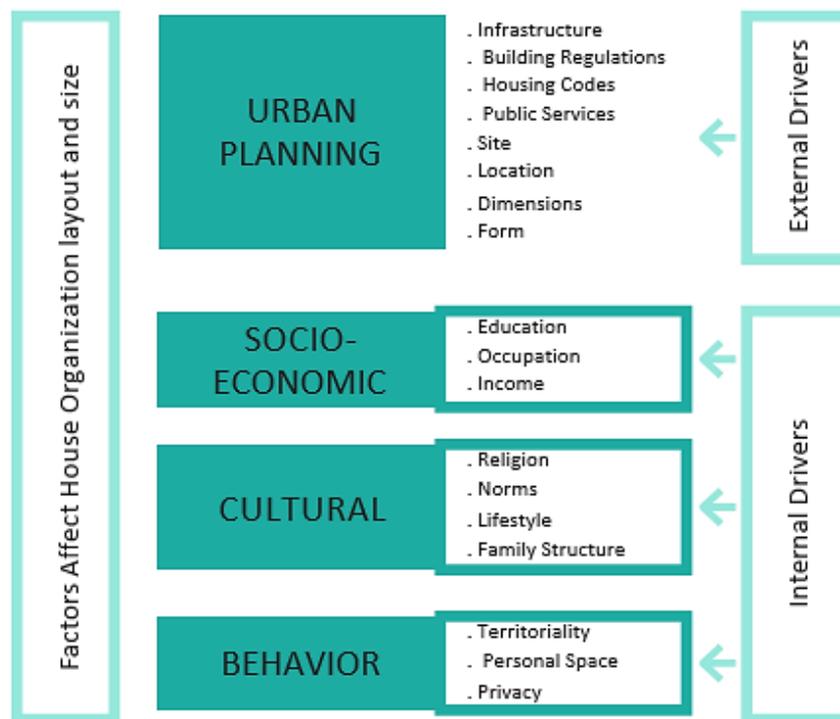


Fig. 8.1: Factors influencing house form.

The factors affecting housing form fluctuate and evolve over time (Fig. 8.1), particularly physical factors. In the past, people were more concerned with house orientation; they were highly responsive to the site,

⁵ Al-Kurdi, Feryal. Lifestyle and House Form: The Case of Aramco Houses under Home Ownership in Dhahran. Unpublished Master's dissertation, King Faisal University, Dammam, Saudi Arabia. 2004.

⁶ Al-Kurdi, Feryal. The Labor City in Dammam: An Analysis of its House Forms, Advanced workshop ARAR 602. King Faisal University. 2002.

For more details about the Aramco Camp, please refer to Appendix C.

specifically the local climate, topography and issues of physical comfort within the house.⁷ Over successive decades, houses have lost their mythological and cosmological connotations.

Today, advanced technology can overcome several of these factors, meeting residents' needs and desires. The choices available abound, which has given rise to new factors affecting house form that has gradually come to dominate and inform cultural values. The physical setting has the potential to provide ample options that fit with local customs, and traditions, but actual choices are often severely limited by the modern cultural matrix.⁸

8.3 Influential Factors on Spatial Organisation of Houses

Some important factors affecting the design of homes in Saudi Arabia include: the social dimension, cultural factors, religious values, and environmental factors. All of these have a direct effect on the final form of Saudi housing and implications for the built environment within each region in Saudi Arabia. In addition, the perspectives of the owner, the designer, and the contractor all have an impact on the final shape of the housing unit or residential neighbourhood.

The most important factor affecting the form of residential units and the built environment in Saudi Arabia is privacy, which is tied to religious values and social customs. Climate also has an impact on building design.

8.3.1 Privacy and its' Role in Spatial Organisation

Privacy, in the context of the built environment, is defined by the relationship between a person and the spaces in his/her built environment. According to Abu Gazala, privacy has three main functions:⁹ the limiting of social interaction, the establishment of plans and strategies for managing interaction, and the maintenance and the development of self-identity.

Altman, in his early comparative study, argued that privacy is a culturally universal process, necessary for human survival.¹⁰ Cultures vary considerably in the degree and manner in which they express privacy. In an advanced definition of privacy, Altman emphasises the individual boundary to maintain behaviours. Privacy patterns must result in cumulatively from individual needs and behaviours if they are to be culturally distinct. Altman found that privacy is expressed through verbal and nonverbal behaviours, as much as it is expressed through the manipulation of the physical environment. As an analytical construct, however, privacy has recently been questioned by Howell and Tentokali, who argue that researchers may give privacy and other individualistic behaviours too much importance when structuring spatial relations in some cultures in which

⁷ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished PhD thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

⁸ Rapoport, A. House Form and Culture, Englewood Cliffs, N.J.: Prentice-Hall. Geoforum, 3, no 4, (1972): 47.

⁹ Abu-Gazzeah, Tawfiq. "Privacy as the Basis of Architectural Planning in the Islamic Cultures of Saudi Arabia." In Faith and the Built Environment: Architecture and Behavior in Islamic Cultures. Süha Özkan, ed. Lausanne: Comportments. (1996): 93-111.

¹⁰ Altman, I. *Environment and Social Behavior*, California, Brook/ Cole Publishing Company. 1977.

the obligations for sociability are strong. In their analysis,¹¹ Altman and Gauvain focused on how houses are used expressively for ideational purposes and efficiently to control clear behaviours, especially pertaining to privacy.¹² People have intentionally introduced physical and intangible boundaries to indicate how spaces are separated and linked together.

The meaning given to privacy in other cultures might differ from that in Saudi culture, where it is associated with a different symbolic value system, because it is strongly related to religious values. It is important to consider the cultural and social customs and conventions in Saudi Arabian society, especially in the Eastern region, when assessing the impact of privacy on the houses of the Dammam Metropolitan Area. Islam is an important spatial organisation tool in society. The differentiation of genders and the segregation of spaces can be expected to have a direct effect on spatial organisation. Privacy, with its architectural,¹³ social and psychological dimensions, is fundamental to the daily lives of the people of Saudi Arabia.

According to the case studies, the interpretation of privacy and its impact on the design and use of boundaries in the traditionally built environment in the Dammam Metropolitan Area explains spatial organisation in houses within the built environment of the neighbourhood. Abu-Gazzeh states, “the physical and conceptual separation of males and females is a constant reminder of the gender differences present in the culture of Saudi Arabia, as manifested by a rigid division of labour and strict role differentiation. Thus, visible and invisible boundaries serve to remind individuals of behaviour that is required within this culture.” Building codes and regulations in traditional houses were drawn from cumulative experiences governed by religion, customs and traditions. The house was designed to maximise privacy to residents by dividing zones according to required exposure to the public, minimising the number and size of openings and segregating genders.

In transitional, modern and contemporary periods, both Saudis and expatriates settled into recently built urban neighbourhoods comprising a mixture of cultures; this mixture had an impact on the concept of privacy that added to the housing regulations that emerged at the end of the transitional period. Despite the building regulations that hindered the attainment of the desired level of privacy, it is noted that Saudi houses have high boundary walls, extended by lightweight metal sheets, to prevent visual and physical intrusion¹⁴ (Fig. 8.3). These boundary walls provide a clear dividing line between the public and private space and ensure privacy in outdoor spaces.

It is also noted that in all housing units, from traditional till contemporary periods, each dwelling has two entrances; one for family members and women guests, and the other for men guests. Saudi families place partitions or large artificial trees in front of their homes’ family entrance, to obstruct the view of other residents or guests; they also seal windows and balconies (Fig. 8.2). They use curtains, sunscreens or panels made out of lightweight materials.

¹¹ Howell, S. C., & Tentokali, V. Domestic privacy: Gender, Culture, and Development Issues. In S. M. Low & E. Chambers (Eds.), *Housing, culture, and design: A comparative perspective*. Philadelphia, PA: University of Pennsylvania Press. (1989): 281-297.

¹² Altman, I. & Gaurain M. A Cross-Cultural and Dialectic Analysis of Homes, in Liben. L. et al. (Eds.) *Spatial Representation and Behavior across the Life Span: Theory and Application*, New York, Academic Press. (1981): 283-320.

¹³ More privacy is required for women than for men.

¹⁴ An extension made of metal, aluminium, or wood extending above the regulated three meters of the exterior wall.



Fig 8.2: Windows and balconies are closed with curtains, metal shades, or wooden boards to obstruct outsider views into the house.

The protection of privacy is an expression of personal territory. Saudi families like to personalise privacy through their psychological identification with place, as symbolised by the arrangement of the physical components of the house and the attitude towards acquisitions. Over time, it was observed that there was a decrease in the privacy dominance of spatial organisation in the houses of middle-income people.

8.3.2 Climatic Factor in Building and Urban Designs



Fig 8.3: The boundary walls are extended with metal or wooden sheets to become high enough to ensure privacy in outdoor private spaces.

The extreme temperatures of Saudi Arabia have led to the development of coastal cities due to its proximity to sources of water, as is evident in the Eastern Province. These cities experience high humidity - sometimes reaching more than 90% - so the climate is a factor that shaped specific types of housing units in the Traditional Period. Traditional houses have been characterised by interior courtyards and wind towers (*badgeer*) which are considered notable features in this period.

In traditional urban forms of housing, the internal organisation of space reflected climatic concerns, as in, for instance, the interior courtyard and the use of wind towers for cooling. The emphasis was on clustered and attached residential units of non-regular lots. The neighbourhood, formed by winding, narrow, and shaded street networks (Fig. 8.4), contributed to the creation of a mild microclimate during the humid and scorching summer of the Eastern Province.¹⁶ In contrast to the microclimate approach, the modern individual villa model relies on modern technology, such as air-conditioning, to improve the internal atmosphere of the houses, leaving vast areas of the city vulnerable to adverse weather conditions.



Fig 8.4: Traditional architectural solutions to manage the climate of the Eastern Province.

The climatic situation in the Eastern Province of Saudi Arabia, which encompasses the Dammam Metropolitan Area, must be taken into account when the municipality seeks to develop new neighbourhoods. The gridiron planning, which was adopted from Western urban designs, does not consider environmental factors. The transitional and modern houses built by non-Saudi architects failed to take the country's climatic features into account.¹⁷ In the Transitional and Modern Periods, houses were constructed as cubical mass units with huge openings in reinforced concrete. This model was not suited to the Eastern Province's climate, where heat enters the house through windows and finds no way out. Furthermore, the reinforced concrete material preserves heat, unlike clay, from which traditional houses were built. The interior courtyard and the

¹⁶ The compact neighbourhood systems in traditional neighbourhoods create a difference in atmospheric pressure that allows the airflow according to Osmosis features.

¹⁷ In 1950, the apartment building that belonged to Mr. Ahmed Al-K'aki had an architectural style that was more suited to the Mediterranean region than to the hot and humid climate of the Eastern Province.

wind tower resulted from the accumulated experience of the population in how to deal with the climate. The architects in the Contemporary Period aimed to address negative factors that appeared in modern homes. They minimised use of balconies, some windows, and the size of openings. They sought to use central AC for air conditioning all domestic spaces and incorporated thermal insulation into the exterior walls to reduce the effect of the heat absorption. There are some new cases of implementing the interior courtyard as an aesthetic aspect, but not as a climactic solution.

8.3.3 The Influence of the Second Oil Boom on Housing in Saudi Arabia

With the improvement of the national economy after the second oil boom,¹⁸ residents began to experiment with new designs and building materials. New construction methods and materials, such as reinforced concrete, cement blocks, bricks, and many other materials were introduced at an increased rate. Residents required the construction of detached houses, residential compounds, semi-attached houses, and apartments in new styles. (Fig. 8.5) “The relative lack of professional expertise within the kingdom resulted in the development of a catalogue of standardised designs for single-family houses, largely by foreign architects.”¹⁹



Fig 8.5: Left: Typical detached houses, Middle: modern apartments, Right: semi-attached houses.

The construction boom of the 1970s was made possible by an increase in world demand for oil. A study in 1978 came to an alarming conclusion regarding the situation of housing in Saudi Arabia. It found that only 2% of all income earners in the Riyadh area (the capital) were able to buy a new detached house.²⁰ This small and modest number reflected the gap between demand and supply following the first few years of increasing oil prices worldwide. In the Modern Period, real estate bank loans were approved by the government, and introduced to help citizens own their own homes. Later, detached houses appeared, once the demand for homeownership increased.

In major Saudi cities, such as the triplet cities of the Dammam Metropolitan Area, the average cost of land accounted for one-third to one-half the price of new dwellings. Moreover, rapid urbanisation and improved economic conditions, both on a national and an individual level, resulted in a pattern whereby urban development characterised many Saudi cities' contemporary urban forms. The lack of master plans, as well

¹⁸ After 1974.

¹⁹ Drakakis-Smith, David. *Urbanisation, Housing and the Development Process*, New York: New York St. Martin Press. (1980): 313.

²⁰ Speerplan Regional-Und Stadtplaner, 1978. Riyadh Diplomatic Quarter: Master Plan Draft Report.

as a lack of urban growth boundaries, contributed to this high-cost growth pattern, which Saudi cities would continue to suffer from for decades to come.²¹

Massive allocations in the built environment during the current decade encouraged locals and foreigners to invest in the booming construction industry. A study attributes the 122% increase in the population in Saudi Arabia to the rapid growth in households set up by young people leaving their parental home younger, and the arrival of rural migrants and foreign immigrants.²²

Consequently, the private housing sector has proven unable to meet the rising demand for new housing units. Several factors might be contributing to the slow response of the real estate market in this regard. In Faisal Mubarak's words, "Islamic teachings upheld by the conservative government and the majority of the population discouraged the development of a bona fide private housing sector using financing practices employed in the West, such as the interest-based mortgage system. Artificial restrictions, such as skyrocketing land prices due to the frenzied speculative real estate market, thwarted the production of new housing."²³

Later, prior to the third oil boom, The Sixth National Five Years Development Plan (1995-2000) called for an active role on the part of the private sector to bridge the gap between supply and demand, due to projected cuts in government subsidies for housing. Central government regulations, which limit housing loans to seven years, were not changed to accommodate announcements of the plan. To date, banks are still not allowed to extend the allocated time span of seven years.

The phases in the evolution of the housing sector outlined above have influenced house type and form in the Contemporary Period. Typical houses for medium-income people have become smaller in size and more compact. New types of small-scale houses have emerged, such as the semi-detached houses, the vertical apartment, and the cottage within the private residential compound.

8.4 Analytical Reading of Housing Policy and Building Regulations in Saudi Arabia

In the traditional and early transitional periods,²⁴ the Kingdom adopted a centralised power system.²⁵ Centralised power, "has also led to policy failures when central decision makers impose standardised programs without regard to local conditions and sensitivity to the differential impacts of the programs in different local settings".²⁶

²¹ This sporadic pattern of development was initiated following the inception of the Kingdom in the 1930s, was exacerbated in the 1950s and the 1960s, and gathered momentum in the booming decades of the 1970s and 1980s. This was encountered in 1989 when the Council of Ministers adopted the Urban Growth Domain (UGD).

²² Mubarak, Faisal A. *Urban Growth Boundary Policy and Residential Suburbanization: Riyadh, Saudi Arabia*, Habitat International 28, (2004): 567–591.

- During the modern period

²³ Ibid.

²⁴ From 1924 to 1953. Source: King Khaled bin Abdul Aziz Database.

²⁵ Centralised power was adopted to hold off political, centrifugal forces, resulting from the different loyalties of the newly unified country's regions, and to encourage development and modernization.

²⁶ Adams, Carolyn T. "The Decentralization of Housing." In *Government and Housing: Developments in Seven Countries*. Vol. 36. Urban Affairs Annual Reviews. New York, Sage Publications, (1990): 25.

The dynamics of the housing market in Saudi Arabia, and the Eastern Province, in particular, cannot be adequately assessed in the absence of sufficient data. Likewise, there are existing building regulations, such as the need for two-metre setbacks, and the requirement for a window on each façade, which mean the land use and the relationship with adjacent streets and the zoning ordinances need to be revised to allow for the possibility of smaller houses in the future. This is supported by Drakakis-Smith's observation that, "the existing standards and regulations are both out of date and out of context, relating more to Western countries from which they [were] originally adopted...".²⁷ Previous plans included some disadvantages and drawbacks, some of which are discussed below.

The provisions of the Real Estate Development Fund (REDF) failed to account for household income; this had a negative effect on the final output of the Saudi housing organisation and quality. The REDF recipients were responsible for the design and construction of their units, which in many instances resulted in poorly designed and low-quality structures due to funding. Additionally, a large number of housing units were built for profit to achieve better social status.²⁸ "...the REDF has been a component of the overall development plan to improve the standard of living and providing for greater equality in the distribution of primarily oil wealth"²⁹.

Due to the REDF's lenient rules about construction in Saudi's urban areas, loans were not tied to any building regulations or guidelines. The only requirement was proof of ownership of the land, which then meant there was no relationship between building regulations and REDF regulations, explaining the imbalance between the two. REDF and other government agencies involved in the production of housing units, were expected to coordinate with the city's municipality to guarantee efficient use of the undeveloped land currently accounting for half of the approved subdivided land in the city.

REDF sponsored units are single-family houses, duplexes, townhouses and even apartments allocated for rent; in the suburbs, rural areas, and traditional settlements, residential units are arranged around courtyards. The slowdown in the allocation of generous government subsidies over the last two decades has given rise to more affordable multi-family dwellings, such as semi-detached houses (duplexes), apartments and exurban residential developments, which include secondary homes,³⁰ recreation properties, and walled gardens are known locally as *istirahat*.³¹ The result is the emergence of an urban field on the outskirts of the Dammam Metropolitan Area in which urban residential activities are complete with technical services, commercial developments, and agricultural land.

²⁷ Drakakis-Smith, David. *Urbanization, Housing and the Development Process*, New York: New York St. Martin Press. 1980.

²⁸ Especially in rural and smaller towns, where the cost of the loan was more than enough to build relatively modest structures and considerably cheaper than those in main cities, the extra money could be used to enhance the house form and quality of the recipient's life.

²⁹ Al Ankari, Khlid M. and El-S. El-Bushra, Eds. *Urban and Rural Profiles in Saudi Arabia*. Berlin, Gebrudern Borntraeger. 1989.

³⁰ Exurban residential development: Urban Residential Developments in the Countryside, or it can be defined as a semi-rural region beyond the cities.

³¹ *Istirahat*: the term is used for walled land that contains residential units at the corners, leaving the rest of the land for agricultural purposes or recreational activities.

No formal building regulations existed before the implementation of the building plan for the Al-Khobar area in the 1940s. Building regulations in Saudi Arabia developed during the second half of the twentieth century. Setback requirements in Saudi Arabia were established in the late 1960s. These required a setback of one-fifth the width of the street to the front, and a minimum of 2 metres at the sides and to the rear. Therefore, the detached dwelling became the only type of dwelling for people in the Kingdom, not only out of preference, but also according to the law. In Al- Hathloul's words, "As a result of borrowing physical conventions [setback] from other contexts and applying them in the Arab-Muslim city a duality has developed in the system as a whole and more specifically in the regulatory mechanism resulting in confusion and contradictions."³²

The method of land subdivision favours individual, free-standing units free, and the building regulations for residential development reinforce this. The municipality regulates the construction of new houses by enforcing the building legislation. Existing regulations relating to housing policy and urban planning encourage construction of attached houses and condensed housing. This is where regulations have impacted on-street capacity, infrastructure, facilities, and services. The subdivisions of small residential blocks and narrow streets, the construction of semi-detached houses, and apartments have created parking problems.



Fig 8.6: Setbacks around the residential buildings in the Dammam Metropolitan Area past and present.

There are some procedures to complete before embarking on the construction of any house in a residential neighbourhood. Any contractor choosing to undertake construction work must first obtain approval and a copy of the building regulations from the municipality. After attaining construction approval, other licenses must be collected from the Ministry of Water and Electricity and Saudi Telecom. A sketch of the building site, executed by a professional architectural office, is required to obtain a license from the municipality. Finally, a building inspector is required to inspect the building after it is finished, at the pre-final finishing stage, to ensure that it complies with the municipality's rules and regulations. This procedure encourages residents to change their designs after receiving their licenses from the municipality, resulting in fraud and infringement of building codes.³³

³² Al-Hathloul, S. Tradition, Continuity and Change in the Physical environment: the Arab-Muslim city. Unpublished doctoral dissertation, Department of Architecture, Massachusetts Institute of Technology, Cambridge, Massachusetts. 1981.

³³ Residents have the chance to modify their homes against regulated codes in the period between obtaining the license and the finishing stage.

The government should identify and implement policies that effectively meet the housing needs of each region in Saudi Arabia. Institutions to govern and regulate the national housing system should be established. There is a need to meet the demand for housing, and to identify the best housing product to meet the demand. The public sector is expected to cooperate with the private sector and supply land, services, and financing for construction, while the private sector enhances the quality of housing stock by implementing building regulations and policies. Building codes and zoning regulations must address the cultural, climatic and functional aspects of residential development and socioeconomic change. The zoning and land use maps of the city should be reconsidered to determine potential building areas as a method to increase residential densities.

8.5 The Impact of Urban Planning on External Features of Houses in Different Periods

8.5.1 The Impact of Urban Planning on External Features of the Traditional House

The only open space in traditional houses was the central courtyard. This had a distinct and definite square shape, most likely to control air movement.³⁴ The courtyard was used as a room where many activities took place, as it lay at the heart of the traditional house. The irregular streets of organic urban planning affected the exterior walls of houses, creating a solid barrier with a limited number of small windows. The windows that existed were covered with wooden shutters, to prevent anyone outside from looking directly into the house. One can easily deduce the nature of the space behind the windows from their height above street level. High windows, approximately two and a half metres high, indicate a need to ventilate a private area behind them, such as the female guests' sitting area. The windows of the male sitting area, in contrast, were placed at a normal height, to allow the occupants to observe what was happening in the street (Figs. 8.7 & 8.8).

In most cases, the traditional house had two doors. If the house was constructed on an interior lot, both doors were positioned at the same elevation, to the far right and left sides of the main elevation, leaving maximum space between them; corner houses featured a door on each elevation. Attention was paid to leaving an adequate distance between the external doors to give women the freedom to visit one another with the utmost privacy (Fig. 8.7).

³⁴ Abdulac, Samir. "Traditional Housing Design in the Arab Countries in Urban Housing| Arch net." 1982. Accessed March 09, 2016. <http://archnet.org/publications/4254>.

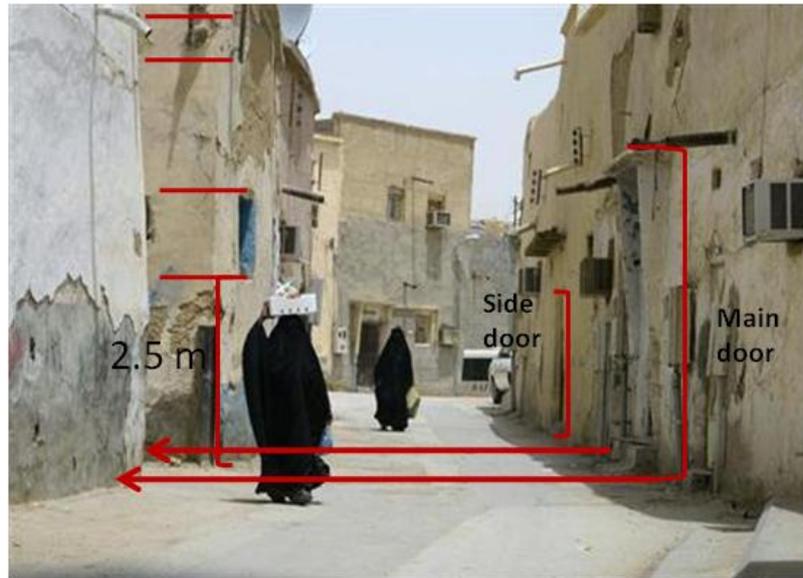


Fig 8.7: The location of windows and doors in a traditional neighbourhood.

Due to the intimate urban planning of the neighbourhood, the doors in traditional houses were considered a light barrier between the public zone (street) and the semi-public zone (house). The doors were made of wood or iron, which depended on the economic situation experienced by the inhabitants, leading to a small opening above to ventilate the '*dehreez*' and to hear visitors. The homeowner would place a wooden bench outside the house, usually near the outer door, ensuring that it did not obstruct their neighbour or the '*dehreez*' space; the outer door was only completely closed after evening fell.



Fig 8.8: The typical shape of windows and doors in a Traditional House.

8.5.2 The Impact of Urban Planning on External Features of the Transitional House

Due to the gridiron planning and the new building regulations implemented during the Transitional Period, the courtyard changed its outlook from inwards to outwards. The new arrangement had no positive value as the land surrounding the house extended approximately two metres from the house. The windows of neighbours' houses overlooked the setbacks, so women were unable to sit in what they considered the exterior courtyard. This empty strip around the house was useless unless the residents chose to use it to further extend the internal space (Figs. 8.9 & 8.10).

The inclusion of a balcony was characteristic to homes in the Transitional Period. However, these were not used for their intended purpose since the balconies overlooked neighbouring houses and opened onto the local streets. After a time, inhabitants resorted to closing the balconies with glass or aluminium segments, transforming them into a storage area or an extension to the house.



Fig 8.9: A house with windows on all sides in the Madinat Al-Ummal in 1965. Children still want to play and gather with others outside the house.

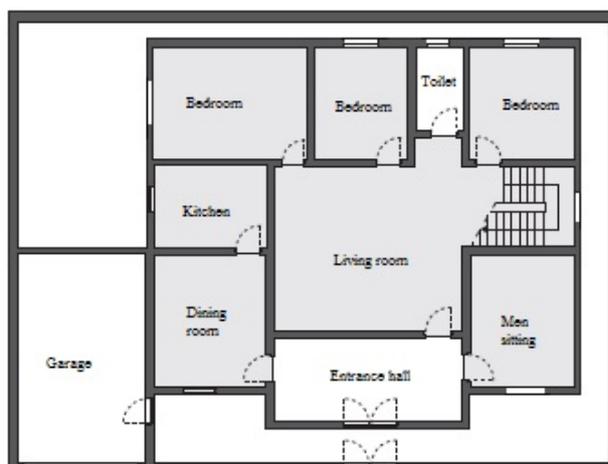


Fig 8.10: A plan of a house in the transitional period shows the setbacks around the house.

In the Transitional Period, the home became one solid mass, so designers incorporated many windows to allow the passage of light and air into the interior. Neighbours overlooked each other, which gave rise to embarrassing situations; some residents resorted to raising the height of the fence, closing certain windows, or hanging heavy curtains.

The presence of an outer fence was an inevitable result of the new building regulations.³⁵ The owners had to build the fence according to the rules,³⁶ but after a short period, occupants increased their height to extend beyond the upper boundaries of their neighbours' windows. Fences were built using either wooden shingles or perforated brick (Fig. 8.11).

³⁵ Mubarak, Faisal A. *Urban Growth Boundary Policy and Residential Suburbanization: Riyadh, Saudi Arabia*, Habitat International 28, (2004): 567–591.

³⁶ According to government regulations and Aramco HOP rules.

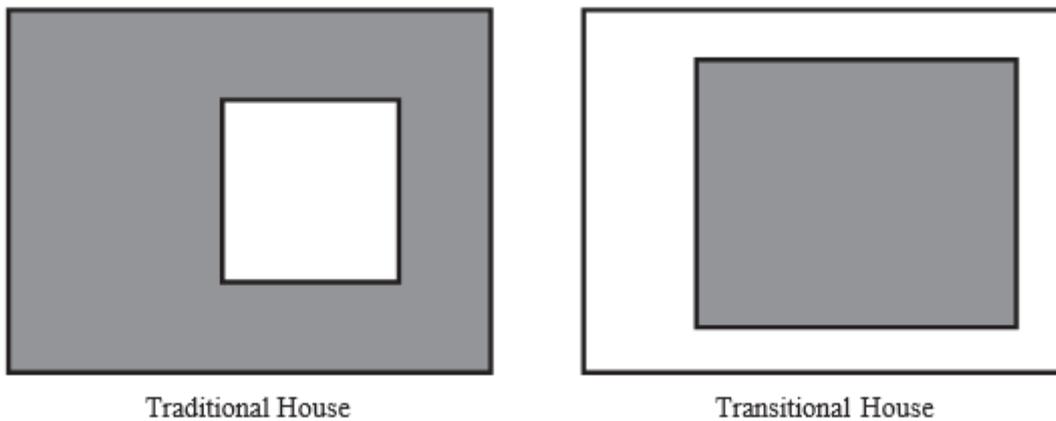


Fig 8.11: The layout of traditional and transitional houses shows the change of the opening yard from inward to outward. (White: void, Gray: Solid)

The first transitional houses in Labour City in Dammam had one main entrance, accessed through the outer fence. The designers saw no benefit in providing two main entrances, particularly in homes that were located on an interior lot. Instead, the main door was made bigger and wider with a canopy (Fig. 8.12). However, it was later observed that many homeowners had added another door located to the side of the fence, or changed the garage entrance into a second door to serve as access for female guests and family members (Fig. 8.13).

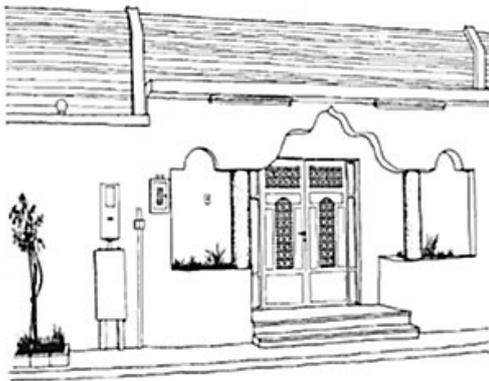


Fig 8.12: A transitional house that has extended its fence with wooden shingles.



Fig 8.13: A transitional house that has added another side entrance.

8.5.3 The Impact of Urban Planning on External Features of the Modern House

A scarcity of balconies characterised houses in modern neighbourhoods. Residents realised the futility of building balconies, as there were few opportunities to use them for their intended purpose. They also standardised the window size and shape, so that they would be one metre by one and a half metres, except for windows in toilets and over staircases, which varied in shape and size.



Fig 8.14: A typical home in the Modern Period.

The modern house had one main entrance. The garage door, which was made of iron, consisted of fragmented oblong pieces, and later became a roll-up type. In this period, it was rare for family members to use the garage for their cars. This was because of the urban nature of the neighbourhood, which was devoid of community centres or shopping areas, and had no sidewalks to provide a safe place to walkabout. Occupants used their cars for all journeys, even short distances (Fig. 8.14).

The formation of open spaces changed significantly as a result of the introduction of setbacks. A notable result was that the unity among physical volumes was weakened or lost. The effect of the setbacks in this stage created a fragmented urban fabric; the resultant pattern was a block or cluster of segregated dwellings and households, each with a setback space on all sides, which was not beneficial. Children living in the house could play in these setbacks, but alone, not with neighbours, and they could not play out in the street due to the risks posed by automobiles. The separation of dwellings made it harder for residents to form relationships with their neighbours, and consequently led to a fragmented community.

The outer fence remained simple and robust, although there were attempts to incorporate geometric designs or use different types of materials along the top of the walls. However, the main exterior elevation of modern houses was either painted, coated with marble, or decorated with tiles (Fig. 8.15).

Modern neighbourhoods did not foster the development of social relationships as a result of their urban planning. Typically, a social environment will develop among residents whenever people live close enough to encounter one another frequently within a shared physical-spatial environment. The character of the social interaction taking place in a living environment is influenced by specific architectural characteristics; e.g. the presence of facilities such as schools, shops, bus stops and playgrounds, and by the actions and motivations of stakeholders, like housing associations, local government, and municipal service providers.



Fig 8.15: A house from the Modern Period, about thirty years old. The house was built in a neighbourhood void of basic urban planning features, such as sidewalks and streetlights.

The external features of the house in (Fig. 8.15) reveal from which period it belongs. The house owes its final shape to the impact of urban planning on the residential neighbourhood; as explained in the description of the modern neighbourhood, residents also tried to avoid the mistakes made when building homes previously.

8.5.4 The Impact of Urban Planning on External Features of the Contemporary House

The external character of this period differs completely from the past. There is a clear competition between residents, who seek to distinguish their homes from one another, with the result that the patterns, designs and materials used are diverse. Advanced technology is used in the construction of raw materials has affected the diversity of façades, and engineering drawing programmes have had a significant impact on the innovation of contemporary elevations. There have been attempts to lend character to contemporary urban planning in the residential neighbourhoods of the Dammam Metropolitan Area, which spread first to the façades of houses and then to the interiors. Streets have become wider, allowing homeowners to express their identity, beliefs, and material wealth to passers-by.

The façades of the houses are now a hybrid of East and West. Architectural features belong to buildings originating in Western countries, such as France, Greece, Spain, Italy, and more. In other words, many of the homeowners in the area are increasingly choosing the façades of their homes to match Western architectural styles, ignoring the Arabic style and heritage of the region (Fig. 8.16).

Mohammed Al-Abdullah mentioned that those in charge of installations (permits established) are unable to document the vocabulary of the urban character of the area.³⁷ Therefore they are attempting to overlap each other and become hybrids with no true identity. In his opinion, the solution is to involve persons with

³⁷ Al-Abdullah Mohammed Masoud. Relevance of the Local People's Socio-Cultural Values in the Landscape Development of Recreational Sea Fronts of Saudi Arabia: The Case of Dammam, Thesis submitted in fulfilment of the degree of Doctor of Philosophy in Landscape Architecture, University of Newcastle Upon Tyne, UK. 1998.

expertise, such as specialists, academically qualified individuals, and those skilled in culture and art, to develop a full impression of what the urban features of each region should be, as well as to establish the involvement of faculty members from architectural colleges. Together, they need to agree on the features that can be utilised by the municipalities, the secretariats, and engineering offices.



Fig 8.16: A contemporary house with different finishing materials and facade elements.

There is no limit to the diversity of house façades in the Dammam Metropolitan Area, which has come to include all kinds and forms of windows and fences, based on the latest designs and new finishing materials and technologies available in the global market. The use of balconies re-emerged, after their disappearance in the Modern Period (Fig. 8.17).

Two main entrances characterise houses of this period; one for men, and another for women and family members. A further door, differing in size from the others, is for the driver's room, which is often located beside the garage door. The setbacks are narrower than those during the Modern Period; largely due to the comparatively small size of the territory, resulting from contemporary urban planning. It is also noteworthy that there is a rectangular structure located in the front yard, in which to receive informal male guests; this space has a similar function to the sitting area located in front of the main entrance of traditional houses. This arose due to a lack of attention being paid to social aspects when planning neighbourhoods, from the Transitional Period through to the Modern and Contemporary Periods.



Fig 8.17: Contemporary houses represented by attached units that contain balconies, pitched roof, and different types of windows and finishing materials for their façades.

8.6 Conclusion Analysis (The Impact of Urban Planning on House Form)

To make conclusions from the findings of the previous analysis, and to move beyond description to detailed analysis and interpretation of observation, there is a need to summarise the data by observing case study findings to achieve the main objective of the study.

The house should be seen as part of a total social organisation and not an isolated structure. Houses are only one element of large settlements of urban planning. The urban planning and how residents use the settlements also affect the house form. As is evident in the previous chapters, each settlement had specific traditions, ideas, customs and different social relations between men and women. The differences that arose are reflected in the spatial organisation of the house, how spaces were used within houses, and the form of the house itself. On a smaller scale, the house is an integral part of any residential neighbourhood; common living patterns always relate to one another and extend from the neighbourhood to the house, and vice versa. It is, therefore, necessary to treat houses as part of an integrated social system, as the relationship between residents and their built environment helps reveal the relationship between houses and the settlement, such that how settlements are used affects the house form.

It is apparent that relationships develop when residents engage with and utilise facilities and services within residential settlements, such as by entering public spaces, utilising services, worshipping and using ceremonial buildings, interacting in spaces for members of each gender, and using educational spaces. These relationships help to form the settlement and affect its surrounding content by involving residents in decision-making in the built environment. It is important to see the house within the surrounding residential settlements, non-domestic areas, social meeting places and shopping areas, and to observe how these settlements and other urban spaces are used. One should also consider the movement from the house to the street, through various transitions, and measure the distance to other areas of the settlement.

As highlighted in the four case studies, each settlement specifies customs, traditions, beliefs and social relations between residents as a whole, and between men and women. The differences between settlements can be seen in their houses, in term of spatial organisation, style, form, the development of new spaces within the house and methods of coping with the surrounding environment.

It is apparent that several factors associated with settlement composition can affect the house form; first, the type of street in the neighbourhood. Second, the availability of facilities and services. Third, the impact of the distribution of public buildings such as schools, mosques, ceremony halls and community centres within residential neighbourhoods, and the interaction of each factor with individuals of each gender and age.

It is also important to see the house as a part of the total settlement; that is, the house should be understood in its relation to the neighbourhood, the public spaces, non-domestic spaces, social meeting places and the town on a larger scale. One should also consider the movement to the house through transitional areas, from

streets and to other parts of the settlement, and also study the relationship between the private levels of the house and different parts of the street.

Every house in various settlements of the Dammam Metropolitan Area evolved in form according to the needs and comfort level of the neighbourhood, which varied over time. Spatial formations can be seen as symbolising the character of societies.³⁸ Built environments that reflect separation, and those that reflect centrality in the settlement pattern communicate different stories about the way of life within each community, and cities that are formed with buildings directly adjacent to the streets, and those that are formed with buildings that share courtyards. In both cases, spatial formations serve as symbols of a particular culture.

8.6.1 The Impact of Urban Planning on the Traditional House Form

During the traditional period, the neighbourhood design decisions of the occupants affected the form of most houses. This impact and interdependence between houses were reinforced once religious law came to dominate.³⁹ The outcome of house-to-house interdependence, neighbours' relationships, the configuration of exterior components and associated privacy concerns all affected settlement formation.

The formation of traditional settlements arose out of the sale of land, which attracted people to settle and build houses. They then built the complementary facilities that they needed, such as mosques and markets simultaneously (Fig. 8.18). Therefore, urban planners and architects consider the traditional residential settlement one of the most successful residential settlements. It resulted from an accumulation of experiences; as facilities and services were within walking distance of the houses. The hierarchy of streets in the traditional neighbourhood, specifically main streets, local routes, and cul-de-sacs, helped every space in the house to be located in a proper place, commensurate with their relationship to the adjacent street. Also, there was the flexibility to change the function of the space to suit the requirements of the family.

Traditional settlements and houses in the Dammam Metropolitan Area were not challenged by the physical constraints imposed by nature; notably, they were influenced by climate and topography, and were in harmony with their surroundings; in this way, they were environmentally friendly settlements, and "each house in a traditional settlement, adapted itself to achieve all natural and cultural requirements through the cumulative construction of houses. In this way, the pleasing effects of urban planning of traditional settlements were applied to the house form".⁴⁰ The rationale behind including the interior courtyard was to allow ventilation and light, avoiding the need for windows that would open from exterior walls overlooking neighbours. The introverted courtyard provided a breathing space away from the settlement. The interior courtyard was reserved for family members, particularly women, who could enjoy an open-air area in privacy, while the outside of the house was a space for social interactions between men (Fig. 8.19).

³⁸ Hillier, B. and Hanson, J. *The Social Logic of Space*, Cambridge: Cambridge University Press, 1984.

- Hanson, J. *Decoding Homes and Houses*. UK: Cambridge University Press, 1998.

³⁹ *Fikh AlMuamalat* is an Arabic term; *Fikh* means the science of law based on religion, and is concerned with all aspects of public and private life and business, while *Mu'amalat* addresses concerns and conflicts arising from the interactions and relationships among people (e.g. Family law, criminal law, laws of inheritance, property, contracts, conflicts due to building activity and/or decisions etc.)

⁴⁰ Eyüce, A. *Learning from the Vernacular: Sustainable Planning and Design*. Open House International, 2005, s. 9-22. 32.



Fig 8.18: This illustration shows the development phases in the traditional settlements.

The spatial hierarchies of traditional settlements, from the most public to the most private, were designed to satisfy the privacy demands of Islamic law. The fundamental structure of the settlement pattern was so strong that even the indoor spatial organisation of the house proved to be a constant element overall.

In traditional neighbourhood networks, cul-de-sacs influence the movement between houses, particularly among female neighbours; thus, female entrances and their sections in the houses were typically located here. Cul-de-sacs also provided a safe area for children to play while under their mothers' supervision.

As a result of the social fabric of the residential neighbourhood, houses were designed by interactions with neighbours, without any breach of privacy. The main entrances to the houses were oriented according to street layout, and set so as to avoid locating the male entrance close to the female one. Often, the main door remained open throughout the day, and was locked in the evening, reflecting the nature of Arab hospitality. If the main door was closed, the semi-public and semi-private areas became private (Fig. 8.20).

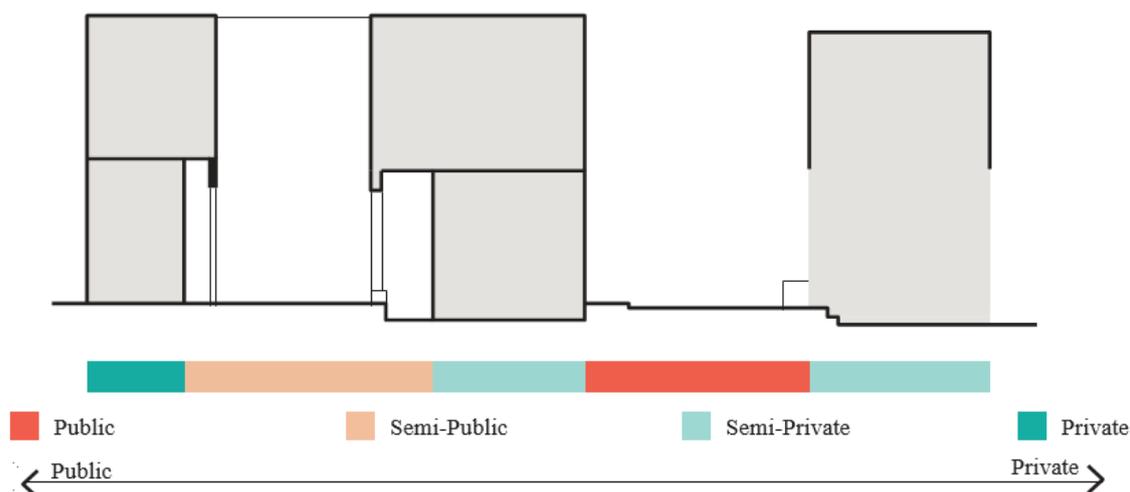


Fig 8.19: The privacy hierarchy in a traditional settlement.

8.6.2 The Impact of Urban Planning on Transitional House Form

In the Transitional Period, as represented by the Aramco neighbourhoods, the sequence of the settlement formation process was such that urban planning preceded the construction of houses (Fig.8.21), and thus residents were not involved in the process of designing and building their homes. This process differed

significantly from that of the previous period, and thus many changes were evident in the homes of this period.

The urban design of the city in the Transitional Period represented a radical shift from the traditional approach. The use of vehicles played a major role in this change, as driving was confined to men, while women and children walked in the road. Therefore, in the design of Labour City, a walkway was provided between the two rows of houses within the residential block. This helped pedestrians to move around safely, away from cars. The establishment of a rear walkway was intended to bring an element of interest to the cul-de-sac, particularly reflecting the abundance of land at that time (Fig.8.23).

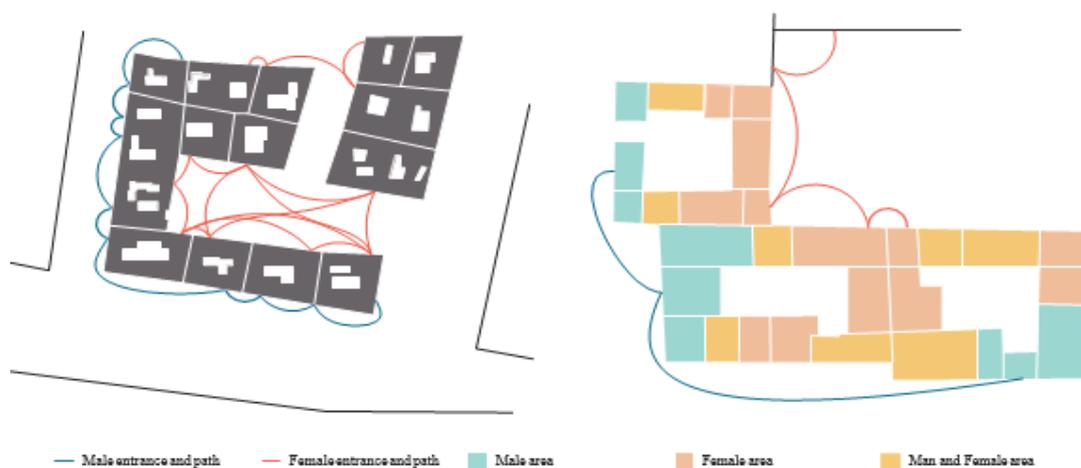


Fig 8.20: The effect of urban planning on the house form. This illustration shows male and female circulation between houses in the Traditional neighbourhood.

The building regulations and new urban design, together, determined the final form of the residential neighbourhoods and homes in the Transitional Period. There were several changes in the hierarchy of privacy after the courtyard was moved from the centre to the outside of the house. The streets and balconies represented the public domain, while the front courtyard was a semi-public male sitting area, and the dining area was located inside the house as setbacks were semi-private. The private area was the area designated for family members, allowing the reception of female guests in the semi-private zone; whereas, the private area was assigned to family members only (Fig.8.22).

Transitional Sequence (Aramco)



Fig 8.21: This illustration shows the development phases of establishing the transitional settlements.

From irregular urban planning to methodical planning, with the typically segmented lots of transitional urban planning, many changes occurred affecting the lives of residents in the Dammam Metropolitan Area. These changes were reflected in the urban design of the city, house form, and everyday life, whether for an individual or family. “The planning and design process can change the habits and behaviour of the occupants or users and their use of this house or building”.⁴¹ This occurred in transitional houses when the central courtyard was covered and replaced with either a foyer or a family living room. In the morning, women had habitually gathered in the interior courtyard to chat or prepare lunch, and this practice had disappeared.

The private area was intended for use by family members only; it was always located on the first floor, or to the rear of the house. The private area of the transitional houses contained the master bedroom, an ensuite toilet, a children’s bedroom, a small living room to serve as a play or study room for children, and a small kitchenette.

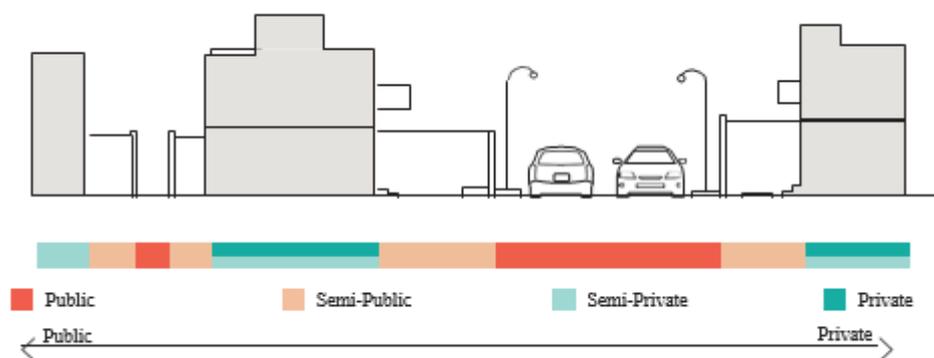


Fig 8.22: The privacy hierarchy in a transitional settlement.

The streets near the house threatened the safety of the children, resulting in the back walkways becoming an area for gathering and playing. Women also used the back walkway to move around the neighbourhood, either to visit neighbours, or to take their children to school, which was located in the neighbourhood. However, the houses did not have a back door opening onto the rear walkway, for security reasons. By contrast, male visitors used the front walkway to move around the neighbourhood; travelling by car, and parking in front of the houses, although they sometimes used side and back walkways to access the mosque located in their quarter.

Transitional urban planning emerged in an earlier development period, as an abundance of vacant land areas allowed segmentation of the neighbourhood into large, square-shaped lots. These residential blocks were approximately 100 by 50 metres, and most lots were identical, only the corner ones differed and were typically 25 by 20 metres, with some variations in width. The majority of the houses in transitional neighbourhoods were designed as several spaces distributed along the sides of an outer wall, leaving a central space to serve as the foyer. There was also a strip around each house comprising the total area of the house, which had no function.

⁴¹ Taiash, Khalid bin Abdulaziz. *The Meanings and Values of Symbolism in Traditional and Contemporary Architecture*, Riyadh. 2008. [Arabic reference]

The houses in this period were subject to many changes over time, indicating a lack of readiness to accommodate the lives of their inhabitants. Changes occurred in the outsides of the houses, the façades, and also the interior spaces and floors (Fig. 8.24).

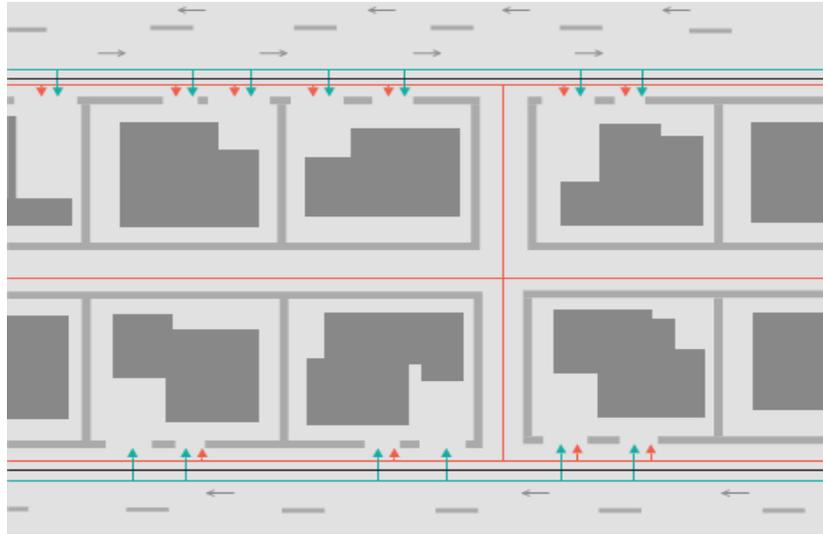
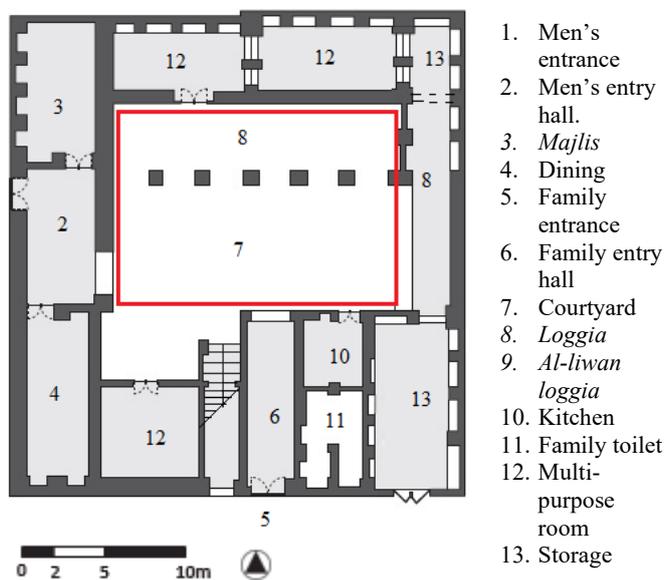
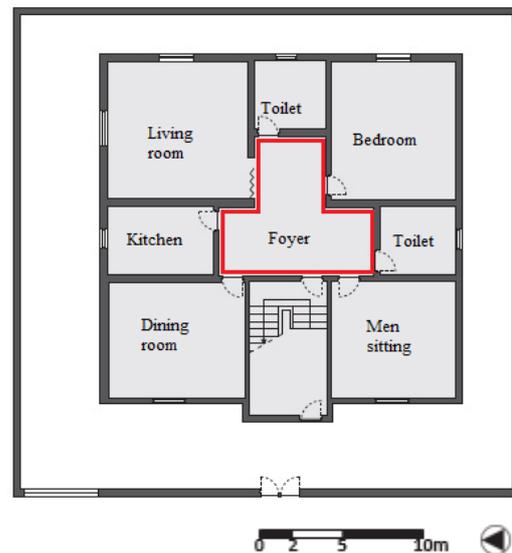


Fig 8.23: This illustration shows male and female circulation between houses in a transitional neighbourhood. (Red: Female, Green: Male.)



A traditional house in Dammam shows the central courtyard inside the red rectangle.



A house from the transitional period in Labour City in Dammam, showing the central part in red. This takes the place of the internal courtyard in the traditional houses, while an external courtyard with 2 metre setbacks surround the house from outside.

Fig 8.24: These two houses demonstrate the radical transformation of the house form between the Traditional and the Transitional Period.

8.6.3 The Impact of Urban Planning on the Modern House Form

In modern settlements, services and facilities were not put in place when residents moved into the neighbourhood. Thus, residents built grocery stores and other kinds of shops to serve the neighbourhood, due to the lack of community centres, commercial quarters, or a high street. Shops were established in the corners of front yards or garages, and appeared throughout the neighbourhood. This was irritating for neighbours, especially when shops faced a family entrance. These shops were different from those in the Traditional Period; they were completely open to the central commercial street, so people would feel free to stop and sit outside. They served as a social meeting point.

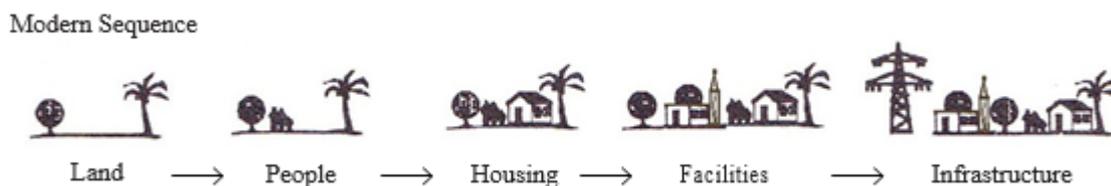


Fig 8.25: This figure shows the development phases of establishing the modern settlements.

The neighbourhood lacked the most basic services, such as pavements, sewage systems, and desalinated water; however, people lived in the neighbourhood despite the shortage of services. Modest urban planning directly impacted the house form and relationships between residents; neighbourhoods were free from pedestrians, and there was little or no social life outside the house (Fig. 8.26 & 8.27). Social engineering can be either positive or negative,⁴² intended or unintended; it is an expected consequence of architecture. For example, the housing subdivisions failed to include sidewalks, discouraging walking and interactions in public spaces. Neighbourhoods that combined residential and commercial elements in their design were able to distribute facilities to relieve the pressure on neighbourhood centres and reduce reliance on cars (Fig. 8.25).

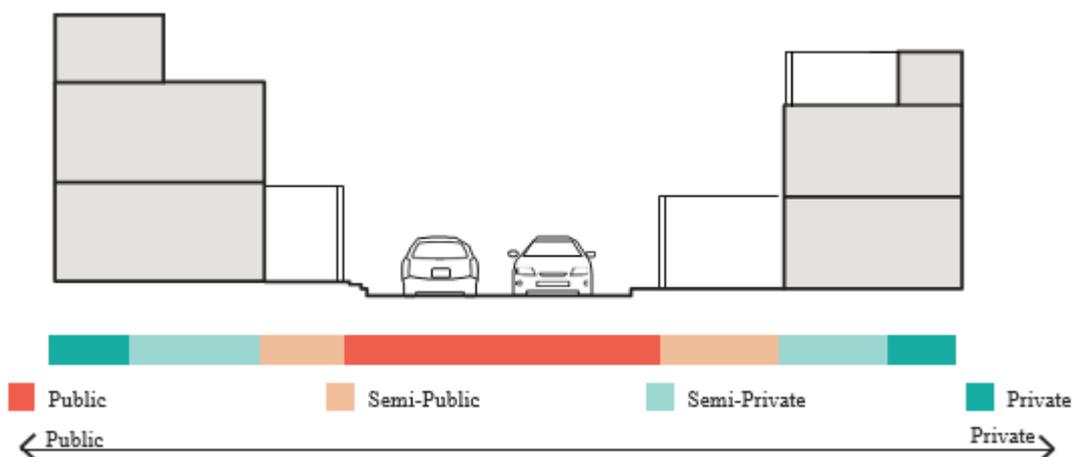


Fig 8.26: The privacy hierarchy in a modern settlement.

⁴² Villano, David. "Embracing New Urbanism." Miami Magazine. Accessed June 13, 2015. <http://www6.miami.edu/miami-magazine/fall98/urbanism.html>.

This period witnessed an increase in the number of spaces allocated to housing, due to the development and growth of urban city planning. The lot area increased from what it had been in the Transitional Period, reaching approximately 600 square metres. The changes were associated with a larger living room and changes in spatial quality, with a grand entrance hall and central open staircase. The symbolic role of the living room was further emphasised by its double-height and the staircase.⁴³

The distances between neighbourhoods in modern city plans made hosting less common. This created a need to allocate an area dedicated to hosting female guests, while in the Transitional Period, hosting took place in the family living room. This new area was located in the semi-private domain. The male sitting area, '*Majlis*', became more isolated in the front zone of the house, and its entrance hall continued to be situated in the semi-public zone.

There were also changes to the size and position of the kitchen, which was sometimes located in the semi-private domain. Storage was added to the kitchen to store more food. Storage space took up approximately half the kitchen area, and the neighbourhood had no supermarkets or shopping malls.

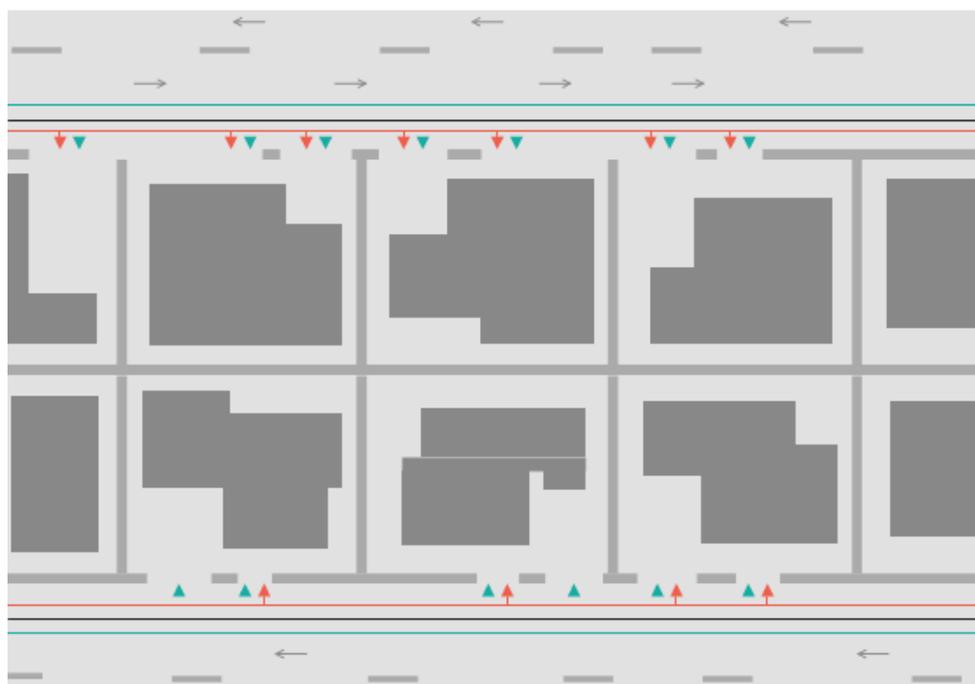


Fig 8.27: This illustration shows male and female circulation between houses in the modern neighbourhood. (Red: Female, Green: Male.)

As a result of the new, larger-sized houses, there was a need for a maid or housekeeper, which in turn required additional space to accommodate them. The only proper space for this was at roof level, providing safety and privacy, both for the maid and family members. The majority of families built an annexe containing a maid's room, a toilet and sometimes a laundry room.⁴⁴

⁴³ The symbolic role of the living room is the family gathering.

⁴⁴ Al-Awad Nada. The impact of the domestic labour on economic terms in the Saudi family, research from Housing and home management dept. King Abdul-Aziz University, Jeddah, KSA. 2006.

Some houses added a basement level, which greatly increased the size of the house, and some enlarged the front yard or provided additional room for their children to play, as the neighbourhood had no parks, playgrounds, or community centres. Additional bedrooms and toilets were also common to this period. All houses had water tanks, which were located at the top of the roof. There was also a room to collect wastewater underground, as a result of delays in establishing the required infrastructure.

8.6.4 The Impact of Urban Planning on the Contemporary House Form

The current layout of contemporary neighbourhoods, which is characterised by a short depth of residential blocks, encouraged developers to build residential housing projects, offering duplexes, either complete or unfinished. These projects were a dominant feature of this period.

In previous decades, much of the urban infrastructure was established without much concern for its impact on a city's appearance, cultural scene, or environmental situation. However, recently, awareness of the aesthetics of engineering has begun to influence infrastructure design more generally;⁴⁵ for instance, integrating infrastructure needs with a desire for green spaces. In the contemporary neighbourhood, developers have become interested in establishing an infrastructure before putting land up for auction (Fig. 8.28).

Contemporary Sequence

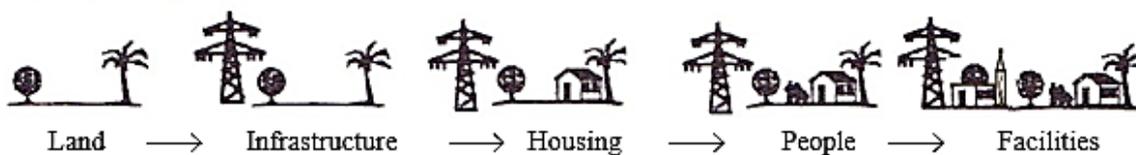


Fig 8.28: This figure shows the development phases of the establishing contemporary settlements.

Developers in the Contemporary Period have sought to apply what they have learned from their previous experiences. They ensure that the neighbourhood will meet all the needs of the population, through service provision, facilities, and infrastructure, to make it an attractive area for realtors and those looking for housing in a contemporary residential neighbourhood with good service provision. The municipality made it a requirement that before it became inhabited a neighbourhood must offer the following facilities: infrastructure, paved roads and walkways, parks and playground, and allocated spaces for schools, mosques, a clinic, and a commercial area. Any failure or deficiency in establishing these within a residential settlement would negatively affect the house form and its built environment (Fig. 8.28).

⁴⁵ Ekerete Usak, "Sustaining Infrastructure development for a Quality Lifestyle in Nigeria". Review. MNSE; MNIMEchE. Accessed February 4, 2016. http://eketnse.org/sites/default/files/library/Engineering_Week_2014/Technical%20Paper%20Mechanical%20Division%202014.pdf.

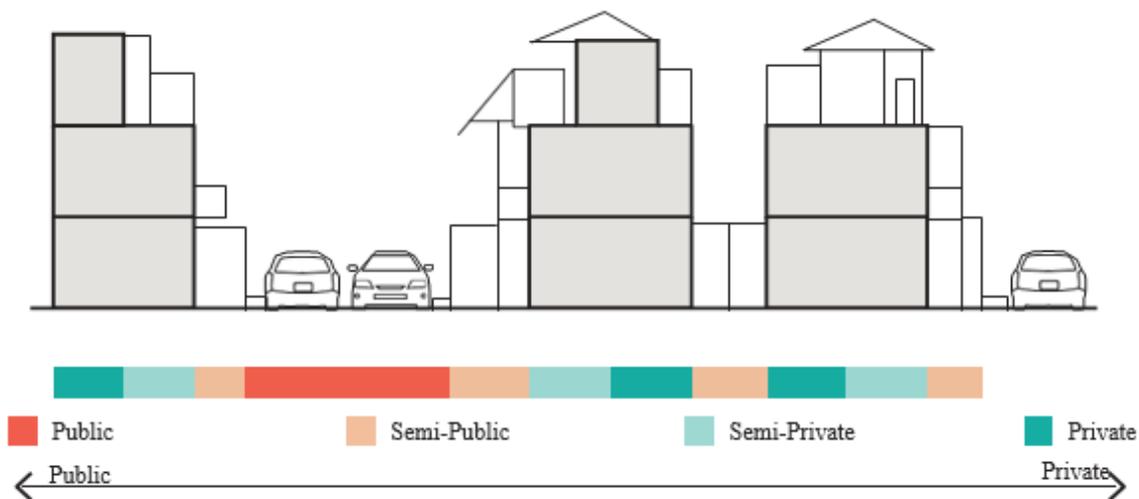


Fig 8.29: The privacy hierarchy in a contemporary settlement.

In the contemporary neighbourhood, residential blocks have become small and narrower than in previous periods, as neighbourhoods are smaller. There is also a greater need to provide a larger number of lots. The outcome of segmented gridiron planning and narrow streets is longitudinal plots; the kinds of houses that emerged are mostly semi-detached in this period. Such houses have small rooms, narrow yards and setbacks and serve only basic functions. People in recent times prefer these houses, either for financial reasons, in light of the rising prices for residential land, or because families are smaller than in the past.

Consequently, how life is conducted in open spaces among children and older adults has changed. Children previously had direct access to open space, but were later confined by the walls of each dwelling. Today, they remain inside housing units, without access to much social activity. Moreover, the smaller size of the interior built environment means contemporary neighbourhoods need to provide more facilities to overcome these barriers (Fig. 8.29).

Darweesh examined contemporary private housing in the Eastern Province of Saudi Arabia.⁴⁶ She highlighted notable factors relating to life in Saudi Arabia that are significant, but have been neglected by housing designers. These factors included visual and sound privacy, outdoor spaces for children's activities or entertainment, and flexibility in the design of internal and external spaces to accommodate additional family members, change of use, or multiple uses. The observations presented are intended to suggest adaptations to properties to improve the local lifestyle in the Dammam Metropolitan Area.

The lack of fully developed facilities and services in residential neighbourhoods has caused residents to look for other residences that can meet the specifications lacking in the environment surrounding their existing house. Robert Opoku and Abdul-Mumin categorise the various factors affecting Saudi housing in the

⁴⁶ Darweesh, Lena. Dweller-Initiated Changes and Transformations in Built environment: The Impact of Building Regulations. Unpublished MSC thesis. King Faisal University, Dammam, Saudi Arabia. 2003.

Contemporary Period by measuring the importance of particular factors to consumers.⁴⁷ They found that the presence and size of the front courtyard are the most important factor to residents planning to buy a home; second most important is a location close to family and local streets, then the size of the kitchen and the type of air conditioning, followed by the rest of the factors.

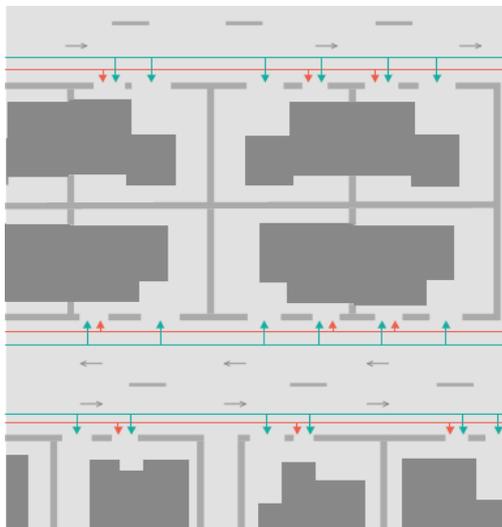


Fig 8.30: This illustration shows male and female circulation between houses in the contemporary neighbourhood. (Red: Female, Green: Male.)

In recent times, most of the dwellings in the Dammam Metropolitan Area have lost their previous simplicity and clarity, in both their internal and external organisation. The houses have become very stylish (Fig. 8.31, 32), and every space in the house has a particular function. Therefore, any desire to extend the built area of the houses can be achieved by building extra rooms in the free space in the exterior yard, or the roof. Most residents turn the rear setback into another kitchen called the dirty kitchen, and a room with a toilet in the front yard to be an informal male sitting area '*Diwaniah*', and construct extra rooms on the roof to use as a study room, playroom for children, or a multi-activity hall.



Fig 8.31: Contrast between styles depending on the inhabitants' preferences.

⁴⁷ Robert, Opoku A., and Abdul-Mumin G., Alhassan. "Housing Preferences and Attribute Importance among Low-income Consumers in Saudi Arabia." *Habitat International* 34, no. 2 (April 2010): 219-27.

The government intended the setbacks between houses to serve as effective insulation against noise and to prevent the spread of fire. However, Today, the space surrounding the suburban house is merely unused space. Thus, mandatory setbacks no longer function as fire preventers; rather, safety can be ensured through the use of more appropriate fire prevention methods and fire-resistant building materials. Moreover, these small setbacks constitute a nuisance, as well as being wasted.

Interior walls inside detached houses have reduced in number, particularly in between semi-private and private areas, due to the limited lot size. Separate rooms have been replaced by a flowing and generous space (Fig. 8.32), as previously occurred in relation to the female sitting area and living room, and between the kitchen, dining, and living rooms.



Fig 8.32: The open area in a house in the Dammam Metropolitan Area, without walls and doors.

8.7 The Experience of Changes in the Saudi Home Environment

The home environment in Saudi Arabia has changed over time. People may have resisted these changes, as is their nature, even if they lead to a better life.⁴⁸ Mashary Al-Naim states, “...Every society faces a real challenge to maintain its identity for any length of time, especially under conditions of rapid economic and technological change.”⁴⁹

Change is a dynamic phenomenon, expressing identity. Many factors have played a role in the experience of change in the Saudi home environment: the culture, the oil boom, modern technology, globalisation and the

⁴⁸ Al-Kurdi, Feryal. *Lifestyle and House Form: The Case of Aramco Houses under Home Ownership in Dhahran*. Unpublished Master's dissertation, King Faisal University, Dammam, Saudi Arabia. 2004.

⁴⁹ Al-Naim, Mashary A. "Identity in Transitional Context: Open-Ended Local Architecture in Saudi Arabia," in *Arch Net-IJAR: International Journal of Architectural Research*, 2, no. 2. (2008.):125-146.

desire for self-expression. This research attempts to understand residents' physical reactions towards urban planning and the home environment, and to investigate how these responses have shaped houses over time.

8.7.1 Changes in the Traditional Home Environment

Arab houses reflect the history, growth and family structure of the generations that have inhabited them. The traditional houses in the Eastern Province were courtyard houses, compact and arranged in various clusters, determining the neighbourhood layout. Neighbourhoods were sometimes closed urban units, called courts '*barah*'.⁵⁰ Each court was established by a group of buildings surrounding urban space. Every court was a model for urban and public life, and was mainly reliant on the Islamic principles of the neighbourhood.⁵¹ Each house represented one part of a social system connecting neighbours together.

In traditional courtyard houses, one or two rooms were built at ground level to accommodate the nuclear family; these rooms were purposely constructed in a way that would support any future rooms above. Notably, the internal courtyard border defines the possible areas for a future extended family home.

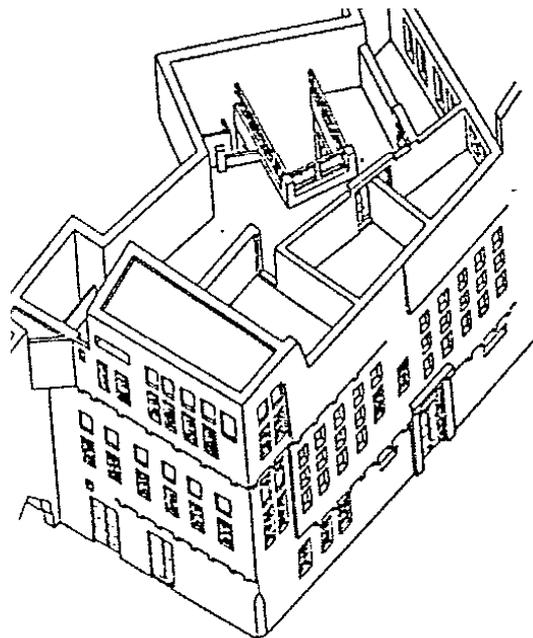


Fig 8.33: Traditional clustered house shows the cumulative process of building a house according to urban change.

House growth was determined by the head of the family, who divided the plot into different areas to fulfil particular functions, always cognisant of future expansion⁵² (Fig. 8.33). In courtyard houses, an adjacent house could be taken over as a family extension; in which case, an internal passage would be constructed to

⁵⁰ Such urban form and patterning were unique, as it was the origin where it was created and lastly buried. The urban space between houses was a multi-functional space, where social coherence and neighbourhoods activities occurred.

⁵¹ Neyazi, Y. A. De-Fragmentation of Space in Dwellings, Neighborhoods, and City of Al-Madinah: Using Urban Information Systems. GURU. Newcastle upon Tyne, Newcastle, University: 90. 2007.

⁵² Akbar, Jamel. Elements of the Traditional Built Environment, in Crisis in the Built Environment: The Case of the Muslim City. Singapore: Concept Media Pte Ltd., 1988. J. Akbar states that, religiously speaking, nobody owns the land. Everyone needs a piece of the land, and can claim it anywhere by building a wall around it, but this ownership should not harm the others in any way.

join the houses (nuclear houses) into a single integrated unit. Al-Naim states, “This principle maintained the homogeneity of the use and meaning of the traditional settlements”⁵³ over a long period, maintaining a consistent identity, despite changes in life circumstances.

The indigenous people, who remained in their traditional houses until the late 1960s, made few changes to imitate the aesthetic of the Transitional Period. These changes were limited to the exterior appearance, such as changing front doors and restoring exterior façades and outer edges with cement plaster. Other indigenous people left their homes to foreign labourers, and moved to new neighbourhoods (Fig. 8.34). As a result, many changes appeared very clearly on the front façades. Each home was also turned into a residential complex, meaning that every room then accommodated some workers. All services, including electricity, sewage and air conditioning, which had been installed earlier, were incorporated. Workers made changes to the housing in line with their needs, and continued to modify the form of the houses as required.



Fig 8.34: Traditional houses show the changes after the indigenous people abandoned them to foreign labourers.

8.7.2 Changes in the Transitional Home Environment

Every period left a strong imprint on the style of houses in architectural terms, with styles growing in popularity, evolving and fading over time. Throughout this process, a new concept of space and new home aesthetic was introduced in the Dammam Metropolitan Area. This change could be seen as the first step towards new house forms emerging in the contemporary Saudi home environment. A significant impact of this shift was seen in the conflict between the traditional and the new house forms. The variations in house form were limited at the beginning of the Transitional Period.

In the transitional neighbourhoods of Dammam, those people who used the residential units were given an opportunity to choose their house style from several choices available at the HOP office.⁵⁴ There were a lot of modern architectural elements included in plans that did not fit the needs of the local population,

⁵³ Al-Naim, M. Continuity and Change of Identity in the Home Environment Development of Private House in Hofuf in Saudi Arabia, Unpublished Ph.D. thesis of the University of Newcastle upon Tyne, United Kingdom. 1998.

⁵⁴ Aramco employees.

specifically their customs and traditions. Consequently, most people made key changes, either inside or outside the home, to make them more commensurate with their physical and social needs.⁵⁵

The new house form that appeared in the Transitional Period resulted in some harmful consequences, which made the living situation inadequate and uncomfortable for residents, and forced them to carry out costly alterations. Some of these alterations included: changing the configuration of internal spaces to accommodate multiple uses, or changes in use, upgrading partitions to provide required visual and sound privacy between spaces, dividing or combining spaces, modifying the front and rear yards to accommodate family members and guest entertainment activities, and changing spatial arrangements.



Fig 8.35: Many of houses in Labour City (Madinat Al-Ummal) were transformed into residential investment buildings.



Fig 8.36: This picture shows one of the houses in Labour City that was rented to single workers.

Residents tried to negotiate the transitional home environment, prioritising aesthetics at the expense of function. Previously, external elements, such as balconies and front and side setbacks, were empty spaces unused by residents; thus, they constructed extra rooms to revitalise inactive areas.

Further changes were made to houses in the Transitional Period. For example, residents who still wished to live in extended families separated their houses into two different floors upon the marriage of the eldest son, if he wanted to live with his parents. Many of the houses in this period were transformed into residential investment buildings, while others were inhabited by foreign workers (Figs. 8.35 and 8.36).

8.7.3 Changes in the Modern Home Environment

The process of modernising the home environment in the Dammam Metropolitan Area continued to progress after the Transitional Period, resulting in many more changes to housing form to reflect urban design, impacting people's composite mental image. This situation can be attributed to factors such as variations in

⁵⁵ People other than Aramco employees built their new houses in a way that conveyed both local traditional and western imported imagery. The imported housing elements were a result of the familiarity of Western architecture among residents.

the economic, educational, and communication systems in Saudi Arabia, and the corresponding impact on Saudi families.⁵⁶ These changes took on different forms and influenced all aspects of life. The most obvious aspect was architecture, and the changes that occurred were particularly apparent in the home environment.

The Saudi building regulations marked the true beginning of changes to the home environment in the Modern Period. The system progressed through several stages before the government finally established the Ministry of Municipal and Rural Affairs and the Real Estate Development Fund (REDF) in 1975. The strict application of these regulations led to the emergence of a detached house, or villa, as the primary type of house in the whole of Saudi Arabia. Another important factor was the homestyle imposed by the Aramco programme in the 1950s, which continued to be of influence until the 1970s.

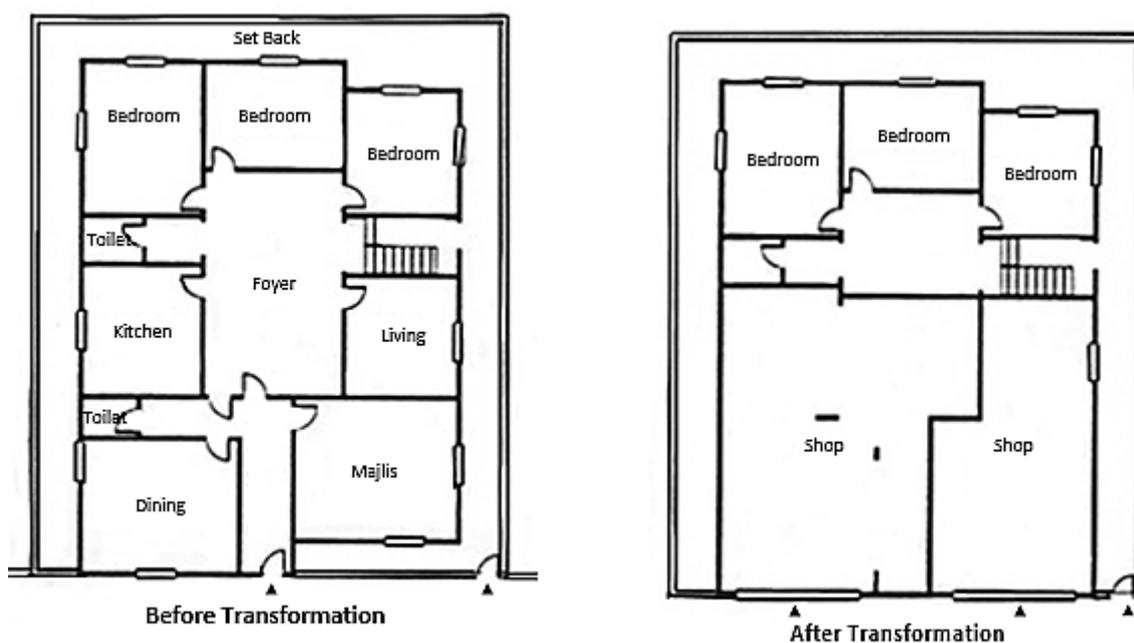


Fig 8.37: The same house after transformation, the ground floor has been turned into shops, rooms for workers and storage areas.

The villa represents the transformations of the Modern Period; when space became a device for expressing the new social status, wealth, and modernity of Saudi families.⁵⁷ They lived in different forms and styles of the villa; after families had lived in their houses for some time, interior and exterior alterations were made. These alterations led the way towards a new period, and a new house form during the Contemporary Period.

Most detached houses in Al-Rakah were transformed to satisfy residents' needs and social values. People adapted their houses to express themselves and their socio-cultural beliefs. For example, some people added metal sheets on top of the outer fence, between the house and its neighbours; this meant the three-metre-high outer fence did not offer the required privacy to enable women to use the exterior yard. Another alteration appeared in houses with balconies or large openings; these alterations created an external physical

⁵⁶ Al-Suba'ee, A. *Oil Discovery and its Impact on the Social Life of Eastern Province (1930-1960)*. 1987. [Arabic text].

⁵⁷ Middle-class people were mostly from government and Aramco employees.

contradiction in the house façades of the period,⁵⁸ where the outer form became an explicit symbol of modernity.



Fig 8.38: The ground floor of a dwelling unit turned into shops and storage, while the first floor has been divided to form two apartments for investment purpose.

Some residents built extra rooms to house a maid on the top floor, and some covered the entire area of the roof deck and used it for additional rooms. Sometimes, the ground floor was turned into shops and rooms for workers and storage (Fig. 8.37& 8.38). A dedicated entrance for receiving female guests was built in most houses that did not have two separate entrances. The majority of houses also built an extra-large room in the front yard for informal visits by male guests, for instance, neighbours and relatives. This allowed women more freedom to move around the house, away from foreign males. Al-Hussayen commented on this matter, attributing the alterations that people made to their houses to ignorance of women's role in society on the part of designers and decision-makers.⁵⁹

Residents continued to make various changes and alterations to the interior of their houses, which contrasted with their external appearance, using European, or Mediterranean styles, or even returning to traditional images for external façades. The houses themselves had a modern design, which contradicted their external features. The house, in this case, was not a single entity; rather, the modern hybrid form was considered an architectural style not defined by internal social organisation.

8.7.4 Changes in the Contemporary Home Environment

The Contemporary Period began by trying to draw on past experience, capitalising on advantages and avoiding disadvantages. Developers, implementers and builders, designers and planners now possess the benefit of experience gained from 1949 onwards.⁶⁰

⁵⁸ High fences with extra height by metal sheets were virtually contradicted by the large windows and big balconies in houses of the Modern Period.

⁵⁹ Al-Hussayen, A. S. *Woman and the Built Environment of Najd*, unpublished PhD thesis in Architecture, Department of Architecture, Edinburgh University, UK. 1996.

⁶⁰ In 1949, the Aramco Company started its Home Ownership Program (HOP).

The Contemporary Period has witnessed a desire to recreate traditional images, registering the need to echo values and traditions within the built environment. This return to a more traditional housing style is considered to be a form of nostalgia, or a kind of architectural fashion, and many residents want to express the former identity of the region. Unfortunately, the imitation of traditional houses does not fit with the demands of contemporary urban planning of settlements, or internal social reality.⁶¹ Al-Naim states, "...if we considered that the traditional form reflects our roots, this does not mean that it expresses our identity. Identity in contemporary Saudi architecture should reflect Saudi society's contemporary moral and values."⁶²



Fig 8.39: Some houses like to reproduce the idea of an interior courtyard.

Some contemporary houses have reintroduced the idea of the interior courtyard (Fig. 8.39), which was common to the traditional period (Fig. 8.40). The use of a central courtyard in contemporary detached houses is not widespread. The courtyards are typically enclosed by glass walls, and glass sliding doors, which increases the amount of natural light admitted to the house, and also maximises cooling load and thereby power consumption. Access to this central court is also somewhat restricted by the glass enclosure. Some contemporary houses have a glass dome built over the courtyard opening, eliminating the need to set the courtyard apart from the house. However, both solutions are costly and require greater space.

The contemporary house in the Dammam Metropolitan Area demands more rooms for all family members, naturally increasing the size of the house. The growing number of women working in jobs away from home has led many families to hire maids to help clean the houses during working hours. Moreover, the need for a

⁶¹ Al-Naim, M. Cultural Resistance in Contemporary Saudi Society, Al-Darrah, 26, no.1-2. 1991. [Arabic text]

⁶² Al-Naim, Mashary A. "Identity in Transitional Context: Open-Ended Local Architecture in Saudi Arabia," in Arch Net-IJAR: International Journal of Architectural Research, 2, no. 2. (2008.):125-146.

driver to take the woman of the house to work and the children to school is common; this means a special section of the home is often now dedicated to the maid and the driver.

In the Modern Period, *Diwaniya* expressed the residents' need to provide a place to receive male guests without allowing them to enter the house. In the Contemporary Period, however, the *Diwaniya* became an integral part of the house.



Fig 8.40: These houses show the trend to evoke the traditional style of Gulf houses in contemporary houses in the Dammam Metropolitan Area.

8.8 Effects of Present / Absent Urban Design Elements on the Use of Domestic Spaces

The lack or surplus of services and facilities in the urban design of residential neighbourhoods led to the development of many spaces within houses; the following are some observations suggesting how urban design elements influenced house form:

- Lack of parks, green areas and playgrounds led to exploitation of free land in the neighbourhood for use as a playground, as a temporary solution. A further impact was felt on residential spatial requirements, because children needed an outdoor/ indoor area to play inside the house.
- Lack of socio-cultural complexes that are usually attached to the mosques means that men need to meet and chat, so large informal male sitting areas (i) were created in the front courtyards near to the guest entrance.
- Lack of community facilities in the modern neighbourhoods' led to the creation of a space in the house to supply missing facilities requiring a bigger lot area.
- Distance from homes to commercial centres. More storage with a large space in the house, or some houses turn their garages into grocery stores.
- The scarcity and the high cost of land, alongside the high cost of living leads to small houses being built on small residential lots with fewer interior spaces.
- Muslim people need to attend the mosque and community area frequently. Some local mosques are further away, which requires the use of a car, so residents stopped using garages. Most garages are not used and so are converted into sitting areas, storage, or an extra room. The car is always parked

outside the house on the street. This makes it easy for residents to take the short ride to the mosque. As a result, sunshades for cars are scattered along the local street and occupy a large area above the pavement.

- Women started to work outside the home, and the lack of kindergartens necessitated the hiring of a housemaid or babysitter. So, an extra room was needed for the housemaid.

As discussed, and depicted in Table 8.1, four phases of transformation are evident in the urban cities of the Dammam Metropolitan Area.

Table 8.1: General observations of transformation within the urban cities of the Dammam Metropolitan Area.

Transformation by a slight adjustment	Transformation by addition & division	Transformation by conversion and alteration	Transformation by reconstruction
Reuse the house with a functional change rather than physical change, particularly with regards to the interiors.	Increase the number of rooms to meet residents' needs; some additions made to make services suitable for the modern lifestyle.	Convert physically for a new use, subdivide the house for more rental units or introduce new services into the house.	The location of the house can undergo reconstruction.
Example: most old houses adjusted resemble new houses, using electricity and modern facilities. In the Transitional Period, balconies were covered for maximum privacy	Example: rooftop rooms commonly added to contemporary houses for servants. Additions to maximise privacy where the house is shared by more than one family in the Traditional Period	Example: subdivide for more rental units, as happened in the Transitional Period, when the whole first floor was turned into a separate apartment.	Example: reconstruction; the closer to the main street, the more likely to be transformed and used commercially. Garages are turned into grocery stores.

Source: Fieldwork.

8.9 Summary

The variations mentioned above in reference to the urban planning design, and the target elements of different periods pointed to additional modifications that occurred in the home environment, in both internal and

external domains. The study provides systematic documentation of growth and the development of the built environment in the Dammam Metropolitan Area over the given timescale. It also describes typical patterns and principles of transformation from one phase to another, taking into consideration how other shared values and external influences impacted the home environment and its relationship with surrounding society, such as climate factors and privacy.⁶³

In the detailed study and observation of the development of houses and their districts over time, this chapter studied the urban fabric, street specifications, infrastructure with public services, and house patterns for all the periods that passed through the region, from traditional to contemporary, through transitional and modern. These headings, including the analytical study, answered the questions of what changes occurred affecting housing over the several stages of modernisation. They also contained the answer to why the shifts of houses happened.

This chapter addressed the most common factors that influence the house form as it relates to privacy, which is the most influential component in the spatial organisation of houses. Also, it studied the influence of climate conditions on the design of urban plans for residential neighbourhoods and buildings. It was also necessary to know the impact of the second oil boom, which is considered the most transformational leap that affected the development of the region. The chapter recounted the housing policy and building regulation and their impacts on settlements and houses and how residents dealt with applying them in their houses.

From the analytical study of the impact of urban planning on house form and external features, it is apparent that traditionally built architecture in the Eastern Province was locally rooted and sustainable.⁶⁴ This type of architecture and urban planning was environmentally friendly. They responded well to the challenges set by climate and local culture. They conserved energy and used eco-friendly materials. The traditional architecture also preserved cultural heritage and local identity, sustaining traditions, customs, norms and culture. Traditional architecture is not only 'green', environmentally friendly, and economically viable, but is also social and cultural. The traditional house is authentic because it satisfies aesthetic standards and sensibilities.

The traditional architecture combines the dual benefit of providing an efficient and comfortable living environment with minimal impact on the natural environment. Sustainable architecture, then, is the continuing production of space with artistic, effective, and low cost and low energy use architecture. It is the architecture that responds to function, climate, natural forces, local resources and culture. This is a vital prerequisite for any housing development. It is low-cost and low-tech; which is crucial to homeowners.

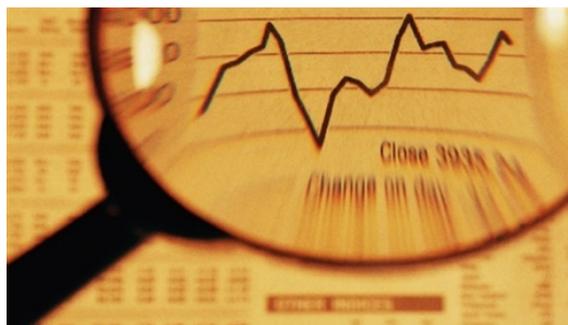
This comprehensive and descriptive analysis of the development phases during the Transitional, Modern, and Contemporary Periods clarifies and then evaluates the effect of the oil booms on urban design and the house

⁶³ This thesis addresses the residents' lifestyle and the building regulations as influential factors on house form in the following chapter.

⁶⁴ El-Borombaly, Hossam, and Luis F. Molina-Prieto. "Adaptation of Vernacular Designs for Contemporary Sustainable Architecture in Middle East and Neotropical Region." *International Journal of Computer Science and Information Technology Research* 3, no. 4 (August 29, 2015): 13-26. December 2015. Accessed December 2016. https://www.researchgate.net/publication/281282008_Adaptation_of_Vernacular_Designs_for_Contemporary_Sustainable_Architecture_in_Middle_East_and_Neotropical_region.

form, relative to the Traditional Period. An analytical reading observes the application of urban policy and building regulations, which coincided in their development with the oil boom, as a means to discover the extent of the impact of these factors on house design.

This chapter concludes that the house is very much integrated with the external environment through its external elements; such as the façade, fence, and exterior yards. A balance was also reached between the house and the neighbourhood. Some home spaces served as substitutes for missing facilities or services, which were then provided within the neighbourhood, such as an external informal sitting area for men, a garage, large storage areas and a children's playground. It is also notable that the house had some living functions within its space, compromising the level of well-being. Adequate areas of functional space in houses are not identified, and the difference between the need and desire for space is also not clarified. Most spaces in the contemporary houses took the character of multi-purpose areas because of the limited land lot and the absence of some internal walls.



Chapter IX

Summary and Conclusion

9. Summary and Conclusion

9.1 Introduction

This chapter presents the summary and findings of this research study and answers the questions raised in the first chapter. It also outlines the limitations of the study and presents some recommendations for future research. Finally, it puts forward a design proposal for a residential district with housing units as an example of a new sustainable design approach.

9.2 Research Summary

The deepening problems in the housing sector in Saudi Arabia and the indication that these problems are likely to be aggravated over time motivated the researcher to study the development of urban design in the Eastern Province of Saudi Arabia and observe what factors can improve the home environment. The researcher studied the layout of the neighbourhoods in the context of urban planning development. The current evolution of the urban scene in the Eastern region of Saudi Arabia is likely to lead to cities with residential neighbourhoods that have a span gap between residents and their built environment. Murat notes that "...the ongoing rapid urbanisation under the pressure of the dynamics of the global economy seems to create immense contrasts regarding human & monumental scale, horizontal & vertical forms, walled & open settlements, luxurious & dilapidated buildings right next to each other in the morphology of Arab cities"¹.

The main aim of this study was to detect the changes occurring in the house form following economic oil booms and observe the interdependent relationships between the development of urban planning of residential settlements and the emergence of the new neighbourhood in parallel to the changes occurring in the environment of homes affected by the economic evolution. Consecutive oil booms in the region prompted several changes inside and outside the houses. They also affected spatial house arrangements and functions over time. The study takes into consideration the physical and social values of urban design and the roles these play in enhancing and consolidating people's lives in their home environments.

This research sought to understand the processes of formation and transformation of the residential neighbourhoods in the Dammam Metropolitan Area over the last eighty years. Four distinct periods were discerned:

¹ Murat, Cetin. Transformation and Perception of Urban Form in Arab City International Journal of Civil & Environmental Engineering IJCEE-IJENS 10 no.04. 2010.

1. The Traditional Period (before 1949) - this period ranges from the beginning of the hut form to the traditional home in the Eastern region. It is characterised by a reliance on the construction experience of the local people and residents.
2. The Transitional Period (1949 -1974) - the period following the first oil boom in the Dammam Metropolitan Area, during which the impact of Aramco's Home Ownership Programme on household patterns was apparent.
3. The Modern Period (1974 - 2003) - the period in which many types and styles of houses emerged, coinciding with the lack of development of the Dammam Metropolitan Area.
4. The Contemporary Period (2003 - present) - the period in which housing regulations and the urban system were developed to accommodate the continuous development of the lifestyle of inhabitants in this oil region.

The study identified the three main elements which had an impact on neighbourhood planning and subsequent interventions: namely

- The introduction of new and changing housing regulations and policies
- The existing and continuing lifestyles and cultural traditions centred on issues of privacy.
- The climatic conditions.

The process of change in the residential neighbourhoods can be understood by analysing the impact of urban design on the home environment, and by taking relevant aspects relating to the social life of individuals and their families and factors that influenced the housing form and design into consideration.

The results of the study were obtained through an analysis of the urban planning design of residential settlements and the observation of the adaptation of house form over time. The study moved from 1) the general to the detailed perspective, 2) from the urban planning of the residential settlements to details of houses, and 3) from the higher-level aspects (the city's planning concept) to middle-level aspects (socio-cultural values) to lower-level aspects (people's lifestyles). The study used the traditional built environment as a framework to understand the changes that emerged in the periods that followed (transitional, modern, and contemporary) in the same area. The study used the historical investigation and detailed case study analysis as the principal mode of study to discover the past, which allows the understanding of the changes in the present.

The study used the method of analysis and extrapolation to analyse the following aspects: settlements' urban planning, neighbourhood designs, street specifications, and the condition of infrastructure and public services. The spatial arrangement of houses was also observed as this is an indication of the role privacy plays inside and outside the house. The climate factor and its impact on the house form and the built environment in the same region were also observed. The analysis of these factors and the way they changed over time indicated that the recurring oil booms in the region drove the development of the built environment. The effects of this boom extended to every aspect of daily life for the individual and the family.

The American company Aramco invested and expanded its distribution in oil regions, especially in the Eastern Province of Saudi Arabia. The company built a new housing district that introduced a new house form - the bungalow - for their foreign employees. This was the first modern house form introduced to the region. The growing demand for oil increased the citizens' income and raised their standard of living. The company initiated a Home Ownership Programme to help local employees buy officially approved and certified houses. This economic evolution had an impact on the house type and form with the changes reflected in the houses' external features.

The study demonstrates that changing building regulations had a direct impact on urban planning in residential settlements which were evident in the house form and features. Each planning period is marked by a distinct house shape and space organisation. The analysis showed that many households were forced to build their homes in a way that met the needs of the residents' everyday lives simply because they were required to follow housing policies and building regulations. The following are the changes that occurred to urban planning and house form during each period:

- The Transitional and Modern Periods. According to the analysis, the main stressful element introduced in this period in new housing schemes in the Dammam Metropolitan Area was the gridiron pattern which resulted in the outer courtyard and setbacks of these houses not being sufficient to provide privacy to the residents. This led to the social isolation of neighbourhoods. The lack of privacy meant that the residents did not feel secure, and they also felt that they had lost their identity. Many interior spaces, such as *Muraba* and *Liwan*, disappeared. The spaces became more personalised and dedicated to one function. The sense of belonging to a place, security, and privacy, important factors that make a house a home, were lacking.

The incongruity between building regulations and the desired domestic environment were evident in the issues of privacy and issues relating to climate control that emerged in this period. As a result, residents had to modify the house form and alter the use of space within their homes. Most modifications to house design were made in the public and semi-public zones located at the front area of the house. Other modifications were commonly made to the back and side setbacks, the only areas that could be altered by adding space without changing or deducting from other areas. Annexes with two to three rooms started to be built on the roofs of houses to add space. These changes were made to adapt the house to the inhabitants' lifestyle and utilise the wasted space surrounding houses (the setbacks), creating more liveable space for families.

- The Contemporary Period. Some changes extend to the semi-private zone (the middle zone), which contains the spaces that belonged to the family members. The limited space within the house constrains spatial arrangements. As a result, spaces are gradually relocated and shifted from the public zone to the semi-public private zone. In this way, the spatial arrangement of the house has evolved. The ladies' guest area moved from the semi-public zone to the semi-private, while the kitchen has become an open space, and moved from the private zone to the semi-private.

- Notably, family members need to live in a comfortable house that meets their needs throughout their lives. Mai and Rahman state, “As universally observed, families require [a] satisfactory dwelling environment throughout their respective life cycles. Housing transformation, whether by moving, improving or a combination of both seeks to obtain satisfactory habitat.” Transformation and changes in the home organisation started at the end of the Transitional Period. Homeowners of the Modern Period practised transformation on a broader scale and at all levels of the home. Transformation also took place due to people’s changing needs, aspirations, and priorities. Family requirements for comfort, life expectancy, tenure type, and security also vary over time. This is particularly apparent in developing countries that see changes in infrastructure, services, density, economy, and society as a whole.

9.3 Conclusions

9.3.1 Accommodating the Building Codes and Housing Regulations

One can observe the continuous process of spatial adjustment over the years, which is evident in individual households. Spatial modifications occurred in response to the residents’ changing social and physical needs in synchronisation with the evolution of the outer world that surrounds their homes. The residents’ attempts to divide their homes started at the design stage.

The evidence gathered by this study shows that the building regulations in the Modern Period did not give residents the freedom to modify and personalise their houses; therefore, residents started to modify their houses after they had obtained the building licences. On the other hand, most houses in the contemporary period had a more elaborate aesthetical design, both inside and outside, as a result of the new building regulations. Because of the building regulations, some detached houses had few interior walls. The cost of land increased. The changes occurred only in the area not covered by building regulations, such as in the relationships between space and style of the exterior façade. As Lawson writes: “legislators can often pose considerable problems for the designer and they may sometimes even conflict with the client. Town planning legislation, for example, exists chiefly to protect the General Public from the possible excesses of individual architectural clients.”² Building regulations are crucial to the way buildings evolve. They need to be able to balance the interests of society as a whole while maintaining the flexibility that house owners need.

The building regulation and housing codes fall under the supervision of the Saudi Arabian Standards Organisation (SASO).³ The housing codes were derived from the American housing codes when Aramco set up its housing project in the Eastern Province. They developed due to the Saudi citizens’ wish to evolve. The housing codes encompass a whole regulation system that also covers a few rules for the maintenance of health and road safety. Performance codes are commonly used in water, electricity, and drainage services. The

² Lawson, Bryan. *How Designers Think: The Role of the Behavioral Science in Environmental Design*. 3rd ed. Oxford: Architectural P, 1997.

³ The Saudi Standards, Metrology and Quality Organization (SASO) was established pursuant to Royal Decree No. M/10 dated 1992-03-03H (17/4/1972 G), as a body of judicial personality and with an independent budget.

earliest regulations and housing codes did not take into account the social factors that played an essential role in the life of the locals, and the policymakers who applied them did not strive to try to find the right balance.

The Aramco Home Ownership Programme had a definite impact on building in the transitional period. The hybrid form of new houses had a significant impact on the phases of development. Unlike house built in the traditional perios, houses built in this period did not take the inhabitant's needs, lifestyle, and cultural background into consideration.. The houses built through the Home Ownership Programme were designed by foreign architects who did not transfer the locals' traditional housing elements into the design, and did not strive to reflect their customs and mores into the style of houses. The changes in the shape of houses built in the transitional period included replacing the inner courtyard (the main characteristic of traditional houses) with exterior setbacks; thus, instead of looking inwards, the houses began to be more outward-looking. The functional zones and subdivisions dramatically changed from the traditional logic to the new exotic design of transitional houses, a change characterised by the move of the kitchen area from the back to the middle zone.

9.3.2 Culture, Lifestyle, Privacy and Climatic Factors

The evidence gathered by this study indicates that the residents preferred to live in a home that they owned and which they could pass on to the following generations. Buildings dating from the traditional, and transitional periods and some buildings of the modern period had extra rooms built-in for their married sons, to allow them to stay with them for a while longer. Homes and neighbourhoods intended to have special specifications enabling homeowners to stay long term, regardless of economic change and the rapidly changing demands of the technological age. The built environment, which comprises homes and neighbourhoods, should grow to meet human and cultural needs while preserving the environment, so that these requirements can be met not only for the present generation but also for generations to come; this is what is referred to as sustainable development.

The Aramco Home Ownership Programme had a significant impact on the transitional period, especially on the cultural development and lifestyle of the inhabitants. The findings of this study indicate that the Aramco Housing Ownership Programme had a strong influence, not only on the development of house form and the planning of neighbourhoods, but also on the inhabitants' lifestyle. The grid-iron form of planning, the arrangement of residential blocks, and the hybrid form of the new houses had a significant impact on the development phases over the years.

Changes to the concept of privacy and the advent of new methods of construction and new technologies all had an impact on the use of space. Visual privacy is the one recurrent theme that appeared in new housing regulations. The issue of privacy was noticeable when inhabitants wanted to own a house with modern or contemporary design. The efficiency of use of space and other elements of the housing unit is evident in designs that allow the multiple uses of specific areas. About 30% of the total area of homes today is outdoor and indoor unused space that includes walkways, entrances, setbacks, interior foyers near main doors, and balconies which do not fit in with the culture, lifestyle and privacy needs of residents of the region.

Balconies in this region are usually either closed off and added to the functional spaces of the house, or just neglected and ignored. Foyers are often merged with living rooms, and setbacks are covered and joined to the interior spaces. Exterior walkways are used as informal sitting rooms and fall between the semi-public and semi-private zones. Owners also adjust aesthetic and climatic solutions to achieve privacy, for example, by covering large windows and balconies that open directly onto the street.

A comparison of the houses of the contemporary period and traditional houses yields specific factors that helped shape the built environment. History shows that societies inevitably evolve and make changes to their living patterns and their housing principles and regulations, taking account of the climate factor. Home owners find functional and aesthetic solutions to achieve a comfortable climate atmosphere inside their homes.

It is evident that traditional houses were built on the basis of experience in construction methods that take into account impacting factors. The result was a built environment that housed inhabitants comfortably for a long time without modification.

The shape of the house and its spatial organisation were changed after the adoption of the Aramco Home Ownership Programme and their strict rules. The houses constructed under this Aramco Housing Programme did not take the climate factors into consideration. The result was that the inhabitants had to make radical changes once they had settled into the house. Changes were made to the house design because of the climate factor. Most balconies were closed with aluminium sheets, the number of windows overlooking the street and their size were minimised, and large areas of the setback were covered to add to the inner area of the house. Changes and modifications of the home were ongoing over the transitional, modern and contemporary periods to obtain the best solution to ensure a climactically comfortable home environment.

In conclusion:

1. The oil booms experienced by the region brought about economic changes in the Eastern regions, especially in the Dammam Metropolitan Area and were indirectly responsible for dramatic shifts from the traditional to the transitional, modern, and contemporary house types. Traditions and social aspects gradually changed with the development of the country because of economic growth. New habits emerged, and other hereditary customs disappeared that led to a change in social interaction between local people, which in turn directly affected the shape of the house and relationships for space distribution and urban planning.
2. Spatial organisation of the houses of the Dammam Metropolitan Area radically changed from the traditional period to the contemporary period. The public, semi-public and semi-private zones changed their location in each period to deal with the issue of **privacy versus modernity**.

- Having two or more entrances is common in both traditional and contemporary houses; they are essential to maintaining privacy, gender segregation, and hospitality.
 - In traditional houses, walls are used to create privacy; open space layouts are not favoured.
 - Transitional spaces in houses of the Contemporary Period, such as entrance halls and foyers, were essential as they made possible a high level of interaction between indoor and outdoor spaces, with other spaces remaining private.
 - Traditional and contemporary houses had many floors and territory levels to increase privacy and underline territoriality. Single floor houses with a low privacy level appeared in the Transitional Period when Aramco floated the Home Ownership Programme.
 - Local people prefer detached houses because they are more private than semi-detached houses. This preference becomes clear when the traditional layout is no longer the most common factor. Detached houses are convenient when planning further infrastructure. However, it is common practice to aim for high-density housing to overcome problems of stretched services. This necessity gave rise to semi-detached houses that required a shared wall and had one entrance but preserved privacy.
 - Introverted plans, where the windows look inward, are evident in traditional houses, while extroverted plans, where the windows are oriented outward towards the street, can be seen in the houses of the transitional period, the modern period and the contemporary period.
 - The Western-style of the spatial organisation of the contemporary house uses corridors to connect rooms, while the traditional house used a central courtyard to separate rooms.
 - Traditional houses used local construction materials, while contemporary houses use imported construction materials and supplies. Current house owners and builders cannot be forced to use traditional local materials with traditional construction methods; in the contemporary period people look toward aesthetic standards, rather than the quality of the work and sustainability, which were core concepts of the traditional way of building houses.
3. The houses of the Traditional Period had an **intangible quality of space** (the spatial relationships and space arrangements), while houses of the Contemporary Period have a tangible quality of space (construction materials, visible interior and exterior features, in addition to spatial relationships and space arrangements), as a result of urban planning and design development.
 4. Following a comparative and descriptive analysis of the development phases of the urban planning of neighbourhoods and the evolution of the house form in Saudi Arabia following the oil booms, this study identified the social factors affecting inhabitants and their relationships with residential spaces that are linked with the urban design and housing regulations. This study has identified some important aspects that have informed the design of residential housing, which are routinely overlooked in haste to plan and design residential neighbourhoods. It is essential to identify the new activities within the current home environment of the Dammam Metropolitan Area by taking cultural changes into account. Emphasis should be placed on the socio-cultural factors categorised according to values and needs, such as the issues of privacy, ability to influence fashionable and social

aspects, the effect of the climate factor on house form, and the impact of housing codes and building regulations.

5. The Authority of Urban Planning in Saudi Arabia ignored environmental and social aspects when planning new settlements after the Traditional Period. This affected the residential environment as residents deliberately found a way around the building regulations by modifying their houses after getting their building licence. During the observation study, it was noted that residents in the traditional built environment played an active role. According to Islamic law, house owners have the right to add to and make changes in their house, and the neighbourhood as a whole, in agreement with neighbours. Residents in the newly built environment from the Transitional to the Contemporary Periods have a passive role; all the designing and planning of the built environment is done by the government, designer, and developer, and users have no say.
6. Following the completion of this study, there is a call by the researcher and other architects in Saudi Arabia to revive traditional urban designs that respect the values of privacy and make allowances for climate factors. Traditional designs also met today's demands for a sustainable / ecologically sound type of urbanisation.

9.4 Recommendations

This research sought to define the framework for the improvement and cultivation of strong neighbourhood identity, with the dramatic changes and slow adaptations occurring in housing spatial organisation, which plays a basic role in improving and consolidating people's lives in their home environments. Residents did not have a significant role to play in developing the rules and regulations of urban planning and housing sectors from the Transitional Period until the Contemporary Period. The gap between urban design politics and the house form in traditional houses was far less than it is now. This gap will diminish when laws and regulations take into consideration social factors and the surrounding environment.

The analysis of housing development and its relationship with urban planning identified a need for an association that gathers together local governments, developers, and neighbourhood committees to promote the individual's participation in housing and neighbourhood activities and, thus, create a unique character for each community unit within new towns. This proposal answers the question of how the quality of life in the home environment can be improved, and how the identity of neighbourhoods can be brought back. Housing must be economically feasible, socially acceptable, technically viable, and environmentally friendly, taking into consideration the physical and social values of the region under study. Housing policies and building regulations should aim to achieve these goals.

The forecasted growth of the Saudi economy and the Saudi population (Fig. 9.1) indicate that there will be a high demand for housing for some time to come. It is anticipated that new housing will be built in urban cities, such as Dammam, Al-Khobar, and Dhahran, and incorporated with new neighbourhoods and towns located on the outskirts of these main cities to make them sustainable and ensure the maximum utilisation of

services and facilities provided to the main cities. It is expected that most new residential developments will be built within mixed-use zones;⁴ this poses a design challenge for planners who must ensure that the needs of residents are met.

For these goals to be met, different stakeholders must fulfil different roles. Key planning principles need to be reflected in development plans and local area plans to guide the groundwork for planning applications for residential development in urban areas. The study also suggests ways of restoring the urban fabric and housing design as a cohesive configuration that links experience in planning and construction with the present concepts and technology. This correlation could help achieve a sustainable home environment. The proposed model would help to create housing that meets the requirements, demands, and possibilities stated above, with flexibility for modification according to the changing needs of the inhabitants.



Fig 9.1: The caricature explains that building a house is the only concern for the head of the family; it also shows the dominant form of homes in Saudi Arabia.

9.4.1 Recommendations for Practitioners

Government, owners, and developers start to believe that they are contributing to the development of urban design in contemporary neighbourhoods when making such changes. They are, in fact, only providing limited essential services; their involvement should be much deeper. They should focus on social aspects, maintain the architectural identity, and observe the residents' needs within their built environment. The following recommendations are offered for professionals in the field of urban planning and housing:

9.4.1.1 Recommendations for the Government and the Housing Authority

In 1975, the Ministry of Municipal and Rural Affairs was set up to overlook the urban planning of major cities in the Kingdom of Saudi Arabia. Responsible for the administration of the municipalities throughout the Kingdom, its primary functions included city and town planning, the development and maintenance of necessary infrastructures, such as roads and their components, and town cleaning.

⁴ Comhshaol, Oidhreacht Agus Rialtas Aitiuil. *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns & Village)*, Government of Ireland. 2009.

The tasks of the Ministry are varied and distributed according to the major regions of the Kingdom. Among these tasks is the development of appropriate strategies for urban planning in the triplet cities of the Dammam Metropolitan Area. The government bears the responsibility for the urban design and planning of the Eastern Province's towns and nearby villages. A well-coordinated and comprehensive housing policy and related building regulations would have to be formulated in the early stages of development to achieve some measure of success. Akbar noted that the housing crisis in Saudi Arabia is characterised not only by the lack of building stock but also by the low quality of the housing⁵ which is available.

Saudi families desire to live in mixed residential neighbourhoods that combine detached houses, semi-detached houses, and apartments with high standards and quality. These kinds of neighbourhoods could house extended families from one clan, just as they did in the traditional period. A unique home, according to John Blackburn "... should be designed to accommodate change and evolve with time. Children grow up; adults grow old, and their needs change. A great home will adapt gracefully to life's changes".⁶ "Home is an expression of personality and family and their unique patterns of life. Consequently, the essence of home is closer to life itself than to artefact."⁷ Efficient residential architecture must reflect the individual's lifestyle, have an aesthetic form and the essential elements of a home, and must be built according to the demands of the site plan.

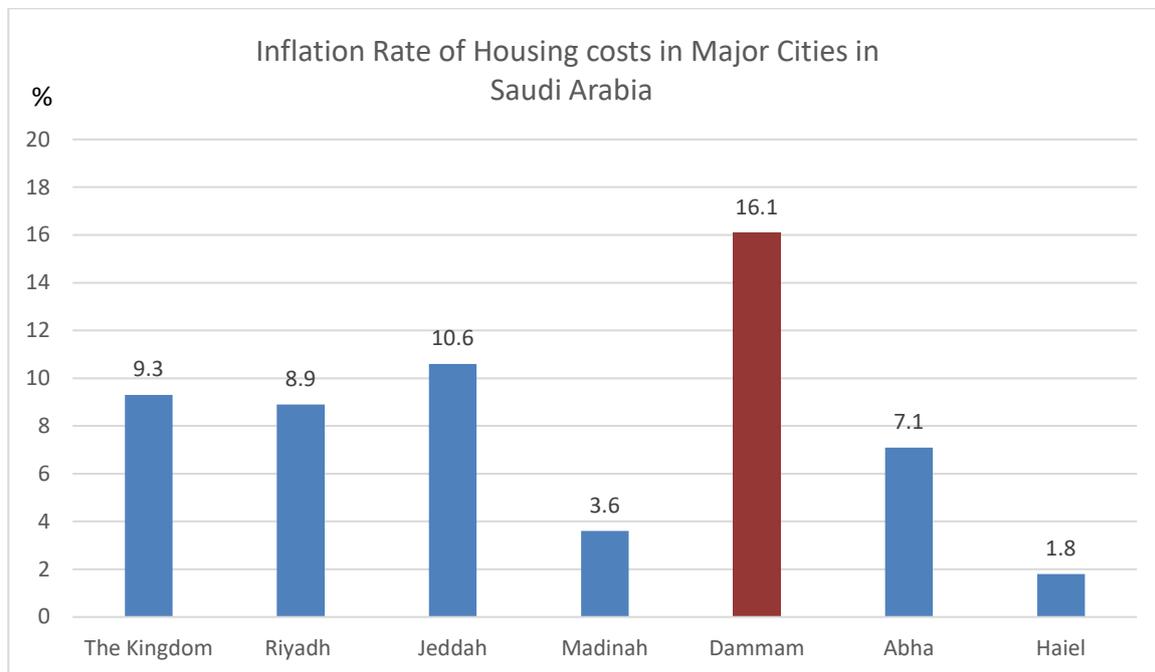


Fig 9.2: Inflation of housing by major cities in Saudi Arabia in 2012.

⁵ Akbar, Samir. "Al-Hakemeiah for the Development of Real Estate Investing 150 Million Riyals for Residential Projects in the Eastern Province (Dr. Samir Akbar: The Market Turned in Part from a Crisis of Housing to the Modest Quality in Construction." *Al Riyadh Newspaper* (Riyadh), July 1, 2008, 14617th ed.

⁶ John Blackburn As principal of Blackburn Architects, P.C. <http://blackburnarch.com/about/staff-profiles/>

⁷ Juhani Pallasmaa, Identity, Intimacy and Domicile - notes on the phenomenology of home. In book: *The Home: Words, Interpretations, Meanings, and Environments*, Avebury, (2003):131-147.

It is critical that local government be a partner in the development, implementation and continuous evaluation of any future national urban policy. Local government plans and community goals should, therefore, be a platform on which broader programmes are built. Local government plays a major role in land use planning and development approval systems in all kingdoms. Local government must continue to play a role in urban policy. Councils should be established in every neighbourhood. Councils play a serious role in representing the needs and wishes of local communities, and they can play an essential role in both protecting and developing the cities. Any national policy based on ecologically sustainable and universal principles will recognise that, in the majority of cases, local solutions will be the best method for delivering agreed national goals.

It is recommended that the government establish a legal body or organisation under the auspices of the Ministry of Housing to carry out housing and urban planning studies. The organisation should seek to implement social planning principles, promote affordable housing and land, fund infrastructural projects, and address the mitigation and adaptation challenges of increasing density, climate change, and rapid growth. Establishing and developing such an organisation would help develop the housing sector within the region and the Kingdom as a whole.

The Kingdom of Saudi Arabia allocated lands close to main cities and encouraged developers to plan these cities according to the Saudi standards. These new neighbourhoods or suburbs should be distributed to investors for a nominal amount, on condition that the investors develop the land according to the new and revised government regulations. The developer and the designer could learn from the experiences of other countries and share in the success of the development process of a residential environment. The primary aim would be to improve the residents' quality of life by providing an ideal and sustainable residential environment within and outside the homes, which can be called a general housing development.

A new housing system should be provided by the government which must be adopted by municipalities, agencies, developers, implementers and individuals. The system applies sustainability criteria in all aspects related to the built environment: the design, regulation and building codes. This system can benefit from traditional wisdom in architecture and planning in which there was a close interrelationship between the factors that influenced the urban design of residential neighbourhoods; these factors include privacy and climate factors, the local culture, the residents and the surrounding environment.

Finally, the development process starts with the choice of the right location to create an integrated society and a suitable living environment for individuals and families, through to the development of raw land divided in a deliberate manner, taking into account all the technical and environmental aspects of comprehensive engineering design. The land includes all the necessary services starting from the infrastructure, with the potential of providing public facilities such as schools, mosques, parks, commercial centres and health centres, so that the residents do not need to travel long distances unless necessary.

9.4.1.2 Recommendations for Architects and Planners

Architects and planners are advised to adopt the design of the traditional city as an archetype for contemporary urban life. Moreover, they are urged to introduce a new way of linking the old concept of urban centrality and concentric hierarchies, in which the centre symbolises power and gradient of privacy, with the new, which makes room for multiple centralities and the development of the concept of privacy from city level to house level (Fig:9.4). Architects must be innovative in finding solutions for privacy issues that emerged with the adoption of the new design of urban planning or house form.

The urban structure and forms of cities are being reshaped in a way that reflects the economic, political and social changes. Global investments are gradually dominating local real-estate markets, so traditional cities are being transformed to make room for new places of world consumption. Traditional city centres are being combined with a network of centres to keep the city from disintegrating and, often, the job of architects and planners is limited to dealing with decision-makers.

Architects and planners have to contribute to the preservation of urban balance⁸ to ensure the sustainable and harmonious development of space and society. When designing a house or planning a neighbourhood, they should first ensure that they are well versed in the values and traditions of the area and seek to share these values with the residents as well as the professionals. The architects must deal with specific problems; they must try to synthesise the old theories with a contemporary form, to get what is called a new hybrid. These thoughts enable people to share their collective socio-cultural values, thus achieving an original architecture of the community.

When seeking to revive the traditional type of housing, architects should carefully consider what to retain and what to discard, because the characteristics of traditional housing reflect the shared values of the people. The choice of what to keep cannot be a personal one, but must reflect the shared values of society. Architects should seek to integrate space for practical needs with traditional spaces to enrich them. The challenge is not to refuse the past, but to connect to it and transform it into a continuous and sophisticated process to suit today's culture.

Yasser Elsheshatawy notes that Arab architects and planners need to take advantage of this unique 'global moment' and begin to adopt a view that unshackles them from the heavy burden of the past to embrace modernity.⁹ The following concepts combine Elsheshatawy's notes with the author's recommendations; these ideas could be used to link traditional with contemporary housing architecture and urban design:

⁸ Urban balance means "The territorial development plan determines the objectives of results in short, medium and long term. It specifies the guidelines for development and the human and material resources necessary to achieve the target results. The civil society, public and private actors, must partner for its development and its assessment." Rurality-Environment-Development, 2012.

- Rural-urban: balanced interrelations to achieve Europe 2020 strategy and territorial cohesion, ComRED-2012-1-E.

- Rural Development in the European Union –Statistical and economic information –DG Agri –December 2009.

⁹ Elsheshatawy, Yasser. *The Evolving Arab City: Tradition, Modernity and Urban Development*. London: Routledge, 2008.

- 1- Use the concepts of the spatial arrangement of the traditional houses to attain more privacy – the primary requirement for any Saudi family- and apply them to the newly designed houses.
- 2- Do more research on ‘design for climate’ and new materials that simulate the traditional construction materials and their suitability to climate factors’ or new techniques and systems of climate control inside homes .
- 3- Take into consideration the space design in traditional houses (shape, orientation and function) and adjust them into the contemporary house design.
- 4- Emphasise the socio-cultural factors that affect the elements of the built environment in a traditional house and measure their impact on city planning and house form. Then, investigate to what extent these factors have an impact on the contemporary built environment each decade.
- 5- Control the climate inside contemporary houses by reusing traditional energy-saving and passive design strategies with contemporary techniques, such as smaller courtyards, ventilation openings, rowshan (perforated screened), shading devices, badjeer (wind tower), as was prevalent in the Eastern Province.

السلطنة العربية السعودية
وزارة الشؤون البلدية والتربية
الجمهورية

استمارة طلب رخصة بناء

رقم الاستمارة: / / ١٤٠٥
تاريخ الاستمارة: / / ١٤٠٥

بيانات صاحب الرخصة:
الاسم: العنوان: رقم الهاتف:
المدن المدني: البلدية: تاريخها: / / مصدرها:

بيانات الملك وحقه الأرض:
رقم قطعة الأرض: رقم المخطط: تاريخه: / / الحي:
رقم الصك: تاريخه: / / مصدره:
أرغب في الحصول على رفع مساحي عن طريق:
 مساح البلدية مكتب محاسبي التوقيع:

مسؤول الرخص والأراضي:
المكتب الهندسي:

• قطعة الأرض المطلوب الترخيص بالبناء عليها تقع في: منطقة غير مخططة منطقة مخططة
تم الاطلاع على سجل القطعة رقم بالمخطط رقم وتاريخه: / / ١٤٠٥ والصك المقدم ووجد
 مطابق ، وعليه تم ملء بيانات الصك بالكروكي التنظيمي رقم:
 غير مطابق ، وعليه تم حفظ على إصدار الرخصة:

اسم مسؤول الأراضي: التوقيع: التاريخ: / / ١٤٠٥

• تم مدينة موقع الأرض على الطبيعة وإجراء الفرق المساحي لقطعة الأرض وتكوين ذلك بالكروكي التنظيمي .
اسم المساح/المراقب: التوقيع: التاريخ: / / ١٤٠٥

• تم تكوين الشرائط ومتطلبات التنظيم ، وكثافة بيانات أبعاد الأرض وحدودها طبقاً للكروكي التنظيمي
اسم مهندس الرخص: التوقيع: التاريخ: / / ١٤٠٥

مراجعة التصميمات	اسم وموقع مهندس الرخص	التاريخ
استلام التصميم النهائي		
إصدار الملاحظات على التصميم النهائي		
استلام التصميم النهائي		
إعداد التصميم النهائي		

الرسوم المستحقة: رقم الإصدار: تاريخه: / / ١٤٠٥
تم تدليل الكروكي التنظيمي لطلب الرخصة
كاتب الرخصة: التوقيع:
توقيع طالب الرخصة: التاريخ: / / ١٤٠٥

Fig 9.3: Building permits application form.
Ministry of Municipal and Rural Affairs shows that there is an option to build on unplanned area
(The words surrounded by red lines).

9.4.1.3 Recommendations for the Developers

The developers are recommended to provide a checklist to be used in neighbourhood design and street layout. The list which follows is derived from global urban planning programmes applied to cities in developing countries.¹⁰ These are some of the points that developers must keep in mind when establishing new neighbourhoods:

1. Ensure a comprehensive and integrated development of services to the suburbs of cities to make each neighbourhood independent.
2. In new developments, provide safe and high-quality neighbourhoods with a safe environment.
3. In existing developments, consider adjustments for car parking, adding specified spaces for at least one car for each house so that the inhabitant could use the maximum space of his/her house.
4. Ensure the integration of more green parks and kids' playgrounds in new settlements to improve the quality of the inhabitants' life.
5. Ensure adequate facilities and services by applying high-quality standards that meet today's requirements.
6. Plan infrastructure services to reduce the burden of providing services within the home.
7. Adopt the developments in passive design in homes that need active developers to understand how the home works with daily and seasonal climates and apply sustainable thoughts in their designs.

The list above highlights the most critical points to be followed by developers and planners of residential neighbourhoods in the contemporary period. These key points give leeway to developers to express their creativity and innovation in the field of planning. Real-estate developers should adopt projects that will leave a profit margin, but still meet aesthetic and functional requirements so as not to abandon the cultural values of the country.

9.4.1.4 Recommendations for the Residents

The residents' vision of what their houses should look like has changed. Houses express the identity of their occupants. Nowadays, the majority of residents are employed. They have visited countries overseas or been on scholarships abroad. On their return, they either want to go back to the type of house that they remember from childhood or apply what they have observed in the countries they visited. They design their homes in a contemporary manner. They want to express their modern views through their houses. Akbar states that the aspirations of Saudi families rise after they travel abroad and see large-scale projects and residential homes that meet their expectations.¹¹

¹⁰ UN-Habitat. Sustainable Housing for Sustainable Cities: A Policy Framework for Developing Countries, UNON, Publishing Service Section, Nairobi. 2012.

¹¹ Akbar, Samir. "Al-Hakemeiah for the Development of Real Estate Investing 150 Million Riyals for Residential Projects in the Eastern Province (Dr. Samir Akbar: The Market Turned in Part from a Crisis of Housing to the Modest Quality in Construction." *Al Riyadh Newspaper* (Riyadh), July 1, 2008, 14617th ed.

Changes in economic conditions and social requirements and increased awareness among the population require a mechanism and channel of communication that transpires through their needs and desires in their homes. Public decisions are now increasingly based on general public opinion. Residents are more committed to contributing actively to solving problems in their urban area, instead of waiting for government intervention. This could be the first recommendation for residents made by this study: inhabitants should participate in enhancing their home environment. This participation could be implemented by allocating a number of seats and votes in the municipal council to inhabitants.

9.4.2 Recommendations for Improving the Housing Sector in Saudi Arabia

The urban planning strategy for the future expansion of a city should have some key planning policies. Their implementation depends on the responsiveness of administrators in the Kingdom, government departments and organisations committed to the task of developing and applying construction tools.

Several points falling under the urban planning strategy of residential neighbourhoods affect house form. The first point concerns the organisation of land subdivision and building regulation. The second aspect is related to housing development methodology. Land subdivision issues and building regulations relate to the organisational side of planning residential neighbourhoods - they are concerned with balancing population density and the size of the land area according to the development of building regulations.

The issue of the rising density of contemporary residential neighbourhoods can be managed through constantly increasing green areas and street width and ensuring essential services and facilities to serve the contemporary built area. There is a positive side to reducing the built area, using design applications and proper planning techniques, which is a reduction in the cost of infrastructure to serve the neighbourhood. Reducing residential land use does not necessarily mean sacrificing family housing needs; appropriate functional spaces can still be provided in small residential lots. Decreasing the area of residential plots helps to make housing more affordable.¹²

The building regulations in place today have been used to shape urban development in the city of Dammam and its suburbs for decades. However, these regulations do not provide sufficient flexibility to accommodate the needs of future housing. The setback regulation restricts the design process and future development. Ultimately, these regulations lead to a lower residential density and an increase in the cost of land (with the cost reflecting the higher cost of utilities and infrastructure).

This study found that controlling the dimensions of residential plots and blocks mainly impacts streets lengths; the shorter the streets in small neighbourhoods, the lower the costs of infrastructure and the less need for private cars to be used to move between neighbourhoods. Residential lots should be rectangular and follow the annular design principle with an orthogonal plan for residential blocks to reduce the lengths of streets.

¹² Through savings in the price of lot area per unit, this is usually one-third of the total cost of housing.

Common services such as children's playgrounds,¹³ parks and community centres should be developed in a central area of the neighbourhood (Fig. 9.3). This would be a key factor in developing the housing sector and the house form itself.

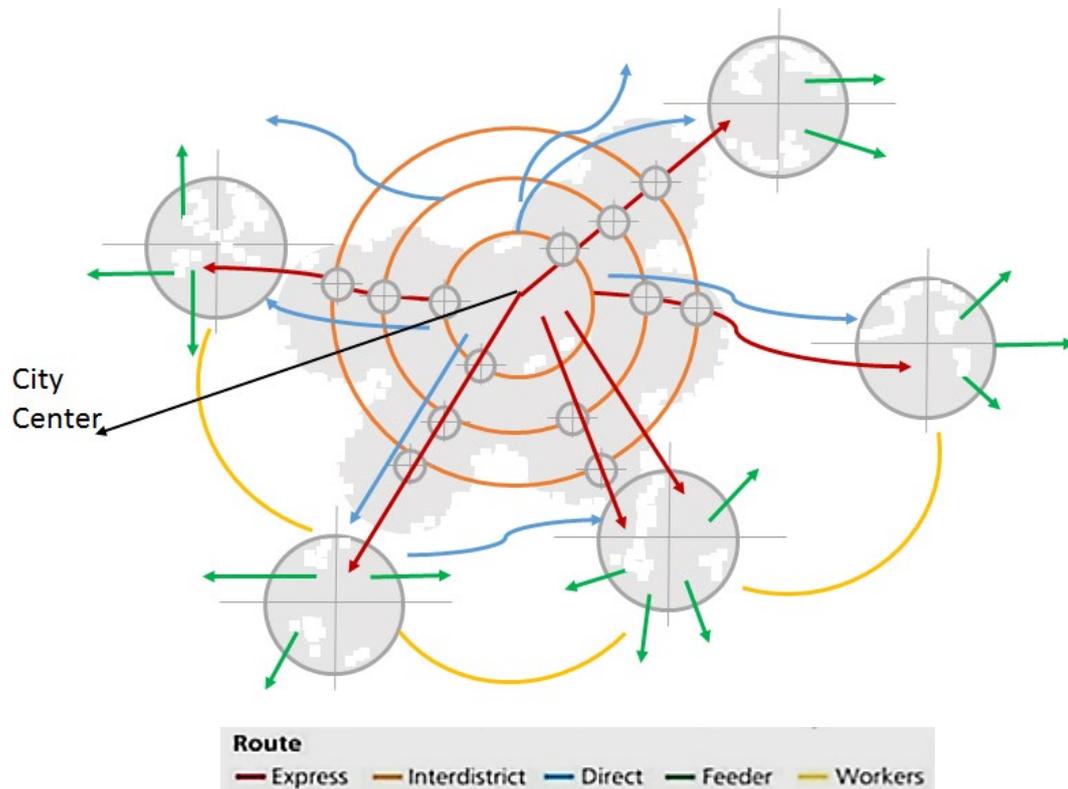


Fig 9.4: This illustration shows an example of urban planning of a sustainable city.

According to Al-Wehaibi, the houses should be constructed on a plot area that ranges from 200 to 300 metres square¹⁴ for seven people, the average number of members of a Saudi family. They should exploit the space available to the maximum. The house design should accommodate the spatial requirements of a family within a small area; this is done by abandoning the setbacks and building to the edge of the lot, thus optimally using the available space and leaving in the courtyard in style traditionally used in the region. Homes should be designed by an architect using best practices in sustainable and energy-efficient design, considering important factors such as climate, privacy, and inhabitants' lifestyle.

¹³ As we are aware that the city is the result of interaction between earthly systems and human systems, neighbourhoods must include the following in order to reduce the impact of the lack of services on the residential environment: 1) adequate educational services, such as elementary school, kindergarten and nursery according to residents' ratio and placed in a safe area, 2) a health centre which serves the residents according to population density (at least one health centre inside each neighbourhood), 3) a variety of entertainment facilities to suit all ages and genders (kids and youth playground, public parks, recreation centre for men and women, coffee shops, Internet cafe, and public library), 4) a central commercial complex or local market for the basic needs of the population, 5) a Friday mosque in the centre of the neighbourhood and smaller mosques distributed throughout the neighbourhood's quarters to help residents to pray the five daily prayers and 6) a gas station near the high way to fulfill the needs of the population to fill their cars before leaving the neighbourhood 7) services for waste collection, with temporary collection centres for waste, each serving residential block or more, 8) adequate communication services, 9) security services, 10) civil defense, and 11) a distribution of green areas among housing units as breathing areas for children and families.

¹⁴ Al-Wehaibi, Sulaiman. "A Study: lack of diversity of residential land tracts in accordance by the needs of the population reinforces an imbalance in supply and demand." Alriyadh (Riyadh), June 6, 2011, 15687th ed. Accessed February 11, 2017. <http://www.alriyadh.com>.

Also, the neighbourhood must have adequate car parking space for housing units and at service centres. There should not be direct traffic passing through the core of the neighbourhood. Housing should be designed around cul-de-sacs, and paved pedestrian paths should link all parts of the district to facilitate service provision without the need of a car.

The guidelines provided above represent the basic components of the neighbourhood in the Dammam Metropolitan area and other cities within the Kingdom. Developers and individuals should work together with the municipality to establish new neighbourhoods based on these guidelines that also integrate socio-cultural needs.

9.4.3 Recommendations for a New Sustainable Design Approach

As a preliminary solution, implemented by many other countries and cities, including Hofuf in Saudi Arabia, that have had a similar experience,¹⁵ the smallest sub-neighbourhood unit could be planned to ensure a social identity. Attention to the details of planning neighbourhood quarters facilitates the task of planning the whole neighbourhood. The author proposed a design model that combines the recommendations suggested by this study. Site design and layout is one of the most important aspects when implementing the concept of the traditional neighbourhood to achieve sustainability. When housing projects start on a free site plan, the developer should seek to preserve the natural envelope that surrounds the site and incorporate it into the residential buildings.

When getting closer to the neighbourhood's smaller elements, the circulating roads or cul-de-sacs facilitate entry and exit into the neighbourhood and can ensure the safety of the residents (Fig. 9.5). The houses should be built in either the traditional style (the central courtyard house) or the Western-style (with surrounding setbacks), with an optional front and backyard. A group of houses in one residential block should face a central public garden and playgrounds – a green area designed only for the use of that clustered set of units – and access to it may be possible only from the homes or from side entrances. This central courtyard provides a safe place for children to play and could also be used as a meeting place for women. Men and youths can gather at either the front yard or the central public community centre that would contain a multi-purpose hall, sports courts and a central park near the mosque. This vision is derived from the traditional neighbourhood set up, simulating the idea of grouping houses with enclosed plazas and having a dominant central community service with the central mosque. In this proposed design approach, the researcher combines the housing regulations of Saudi Arabia with the traditional design of the Dammam Area and applies it to the whole built environment.

Also, it is recommended that the community centre establish itself adjacent to the mosque. This centre should become a centre of cultural activities and should focus on social interaction. A complex of clustered units designed to embrace the community centre would be placed in the heart of the neighbourhood. The

¹⁵ Shihabuddin, Mahmud, and M. Al-Naim. *Identity Crisis Due to the Transformation of the Neighborhoods and Changing Characteristics in Our Traditional Dwellings: A Case for Two Muslim Cities Dhaka and Hofuf*. Proceedings of Housing Symposium 3. Riyadh: High Commission for the Development of Arriyadh. (2007): 37-56.

neighbourhood quarters are linked to the community centre by pedestrian pathways, that are also linked to the main and local roads of the street network.



Fig 9.5: This illustration shows the proposed planning of a cluster set of units; each cluster has a central common space.



Fig 9.6: Realising the concept of sustainability and the role of architects and planners.

Nowadays, the planning of neighbourhoods in the Dammam Metropolitan Area focuses on infrastructure; efforts should be made to ensure that the areas maintain their relatively sound economic base and have community services. Employment opportunities are essential to the new neighbourhood's economic and social setting. Such a neighbourhood would succeed due to its significance and uniqueness and would not simply be a repetition of many other programmes that have been introduced in the central city.¹⁶ The new neighbourhood should be self-contained to have an economic base for its daily needs and employment

¹⁶ E.g., the model city or urban renewal.

opportunities primarily for its residents to provide health, education and social services. It would be impossible to find places of employment for all close to their residences. However, the town's development corporation, the industries and the businesses admitted to the community could work together to provide housing for their employees, or even provide housing as part of the benefits of the employment package, as Aramco did with their employees (Fig. 9.6).

The Ministry of Housing must give priority to homeownership for the resident who has relatives in the same neighbourhood because this would benefit the city as a whole from both the social and the economic perspective. It should provide small, defined, urban neighbourhoods, comprising a compatible mix of uses and housing types. This site design leads to savings in the use of the land area and infrastructural costs and ongoing maintenance. A well-coordinated and comprehensive policy would have to be formulated in the early stages of development to achieve any measure of success.



Fig 9.7: The House Type (A) is constructed on small plot measuring 220 m². This illustration shows three floors: the ground floor, the first floor and the annex.

The following is a simplified picture of some of the specifications that must be met in a sustainable neighbourhood within the Dammam Metropolitan Area:

1. A network of connected streets with covered pavements and trees for convenient and safe movement throughout neighbourhoods. Connected street patterns generate a more efficient transportation system than one with main roads and only a few connector streets¹⁷.
2. Focus on the pedestrian over the automobile. The focus should be on narrower streets with on-street parking. Narrower streets improve walking; it makes it easier to cross the street. On-street parking provides a safety barrier for parked cars to protect pedestrians from moving traffic.
3. The placement of important public buildings on the main sites places importance on public buildings and creates landmarks and a strong sense of place.

The achievement of sustainability in the neighbourhoods and cities of the Dammam Metropolitan Area improves housing conditions and cultivates a strong community atmosphere. This can be achieved through innovative design and conveniently located services of the highest standard, so the physical aspects of living can be improved. Local governance, developers and the neighbourhood committee should promote individual participation in the neighbourhood and activities and thus create the unique character of each community unit within the new towns.

Any scheme which seeks to promote sustainability in the housing sector in Saudi Arabia will face significant challenges, including 1) the challenge posed by the climate; 2) the rapid population growth and 3) the privacy issue. This study concentrates on these three main issues, it evaluates the influence of urban planning on housing, taking these factors (climate, privacy and population growth) into account.

The challenge caused by the climate in Saudi Arabia is twofold: high temperatures and scarcity of water. Undoubtedly, the climate is an important factor in planning the neighbourhood as well as the house form and its spatial organisation. As for the rapid population growth; there is a need to ensure that there are sufficient services to meet the increasing requirements of the rising urban population. Population growth affects the size of the house, the number of houses, the proportion of the plot area, as well as the size of the neighbourhood. Ensuring privacy is the third challenge to be met by housing in Saudi Arabia. Residents are increasingly living in high-rise buildings which are constructed too close to low-rise private homes. This is the consequence of building codes which do not take into account the issue of privacy and its importance in Saudi society. When neighbourhoods are unsustainable, people leave in search of better housing; this causes the juxtaposition of residences housing single foreign labourers and areas populated by families.¹⁸

The design concept of this proposed housing unit considers the three elements studied in this thesis: privacy, the climate and planning and building regulation in addition to the need for sustainability in the housing sector within the Dammam Metropolitan Area from Traditional Period until the present time. The proposed housing

¹⁷ Greater connectivity enables traffic to disperse rather than be concentrated, enables the greater choice of routes, increases response times for emergency services, and makes public transportation much more viable.

¹⁸ Combining families and single foreign labours violate the privacy desired in the issue of sustainable Saudi neighbourhoods.

unit is designed to be sustainable through the use of local, durable construction material and interior finishing materials. The design relies on the existence of the interior courtyard, the main feature of traditional houses that help manage the local climate as well as being an aesthetic element inside the house. The design tried to simulate the idea of having the sun louvre system in traditional houses to obtain a higher degree of privacy. The louvres are made from different materials, have a different shape and are fabricated in a contemporary way.

There are three house forms (Type A, B and C) within the proposed neighbourhood design. The aim is to meet the needs of a growing population. The type of house varies according to the size of the plot area, the number of rooms and spatial arrangement. Type B and C are similar, but Type C is smaller in size and lot area.

The different categories of houses are designed to fit Saudi families' lifestyle and their requirements. There is also space to expand horizontally in the direction of the central green area between the houses within the residential block and vertically on the roof area.

The idea of sustainable housing is still new and unfamiliar to the general public in Saudi Arabia. Most Saudis understand sustainable housing in terms of Edwards and Turrent's definition, that is: ¹⁹ housing would be viable if everyone had access to a home that is decent; such housing promotes social cohesion, well-being and independence. There has been considerable interest in recent years in the concept of sustainable architecture in Saudi Arabia. Salama stated that "sustainability or sustainable design is simply a rephrasing of some of the forgotten values of traditional architecture and urbanism."²⁰ The main concerns that are brought up in discussions of the sustainability of residential buildings in Saudi Arabia remain energy management and water consumption.

The quality of life is one of the leading drivers promoting sustainability in architecture, especially in the housing sector. In Saudi Arabia, because of rapid population growth and increased urbanisation, houses are not being constructed in sustainable ways, and the high cost of sustainable houses is inconsistent with the growth in the cost of living,²¹ which discourages people from implementing new concepts in housing.

Unfortunately, Saudi Arabia lacks expertise in building environmentally friendly housing. It is hard to verify whether a home meets the sustainability criteria if it has been standing for a long time, for many reasons: change in the number of family members over time; its changing value on the market and the emergence of new technologies and their impact on the construction sector. Houses which integrate sustainability measures

¹⁹ Edwards, B., & Turrent, D. *Sustainable Housing: Principles and Practice*, London: E&FN Spon. 2000.

²⁰ Salama, A. *Environmental Knowledge and Paradigm Shifts: Sustainable and Architectural Pedagogy in Africa and the Middle East*. In *Architectural education today: cross-cultural perspectives*, eds. A. Salama, W. O'Reilly and K. Noschis, (2007): 51-59. Lausanne: Compartment and Authors.

²¹ The public perception of this 'new concept' is that it is expensive, and some of the public are still not aware of this 'new concept'.
- Susilawati, Connie, and Muhammed Al Surf. *Challenges Facing Sustainable Housing in Saudi Arabia: A Current Study Showing the Level of Public Awareness*. Proceedings of the 17th Pacific Rim Real Estate Society Conference, Bond University, Gold Coast. 2011.

into their design are likely to last for a long time. Sustainability measures help cut down on wasted energy and fulfil the economic and social goals of the state and individuals.



Fig 9.8: The House Type (C) is constructed on a small plot of 170 m². This illustration shows three floors: the ground floor, the first floor and the annex.

9.4.4 Recommendations for Future Research

There has been a lack of consistency in the design and construction methods of residential buildings in Saudi Arabia. The results of this study specify an urgent need for more researchers to undertake comprehensive studies on the technical and legal aspects of the design and construction of residential buildings in the Kingdom and to identify the factors that have the most impact on residential housing design given the rapid development of urban areas in Saudi Arabia. The Kingdom should establish committees to study the key

factors to include in a tool to measure sustainability. Such a tool should include sustainability criteria that relate to the environment, society, economics, site/land use, communication and transportation. Designers and planners must consider privacy in the design, and this should be encoded in various forms of physical development and space organisation.

This thesis helps to set a checklist encompassing the essential elements of housing in Saudi culture for those involved in establishing new neighbourhoods. Also, a reformulation of housing codes and building regulations is recommended in light of the ever-changing requirements of contemporary Saudi life. The degree of satisfaction of the population about the size and shape of the current home could also be a topic for future research. Future programmes must be designed in cooperation with the key players involved in the housing and construction fields and in line with several broad, guiding principles, including adaptability, resilience, equity, innovation, integration and efficiency. A study can be done on the implications of the involvement of the residents in the restructuring of housing regulations. Also, a study can be done to evaluate the built environment of isolated villages and hamlets in multiple geographical environments to measure the strength of relations between the house and the surrounding environment and the degree of satisfaction with their houses reported by the residents. The findings of this study can be applied to other cities of Saudi Arabia to help the designers and planners to propose the best solutions and circulate them around the Kingdom.

Appendices

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Appendix A

Vocabulary and Terms of Building Design Elements in Arabic Language and their Meanings

These words which written below can be used as a reference for old-style terms used in the different periods in Arabic words.

Adab: Good manners, civility, politeness.

Al-Bait: House

Al-Maskan: Home.

Al-Faroush: Like cement mortar.

Al-Fina' aldakhely: Space is adjoining a property and used by its residents.

Al-Shamal: North wind.

Arish: Covered area in front of a storage or bedroom on the roof.

Asr: Late afternoon.

Badgeer: Air vents in walls and roof parapets, air tower.

Baiet: House.

Baraha/ Barahas (plural): open space.

Barasti or Eshaa: Date palm hut with a pitched roof. It is Persian term means housing.

Dalla: coffee pot.

Dehlees or Dehreez: Entry halls beyond the guest and family entrances.

Dhuhr: Afternoon.

Diwaniyah: Formal reception room for male guests.

Esha Prayer: Evening Prayer.

Fajr: Early morning.

Faroush: Coral slab 5 to 15 cm. thick and approximately one-meter square length.

Fereej: Neighbourhood.

Fikh AlMuamalat: is an Arabic term; Fikh means the science of law based on religion and is concerned with all aspects of public and private life and business, while Mu'amalat which addresses concerns and conflicts arising from the interactions and relationships among people.

Fina: Outdoor courtyard.

Gahwa: Coffee

Hamam: Bathroom.

Hasa Bahri: Coral stone, see rocks medium-sized lumpy quarried from the sea by divers.

Hay: A Neighbourhood.

Hijar: (Plural) remote villages.

Housh: Outdoor courtyard.

Ithil: Tamarisk.

Jame': larger than an ordinary mosque which Friday prayer can hold in it.

Juss: Gypsum made from sea lime.

Kandal or Chandel: tree trunks imported from India with 4 meters maximum length.

Kindiyah: a Sleeping area without windows, used during the hottest period of the year.

Kottab: Its plural is katateeb, means a small group of children gathered in the mosque to learn Quran and the teachings of the Islamic religion.

Liwan: Covered area between two rooms usually open towards the courtyard.

Maghrib: Sunset Prayer.

Madrassa: School.

Mahmasa: a shallow, long-handled iron pan which holds just above the flames.

Majlis: Formal sitting area.

Makhzan: Storage room.

Manwar: Opening in the ceiling above the (Mogahwa), where the coffee is prepared for guests.

Mashbah: Covered loggia-like areas on upper floors of a house, usually open to the north and east side when located on the roof.

Masjid: Neighborhood mosque.

Masjid Al-Juma': Friday mosque.

Minah: are the Arabic term denoting land gifts authorised by the King.

Moqalat: Formal dining room.

Muraba: A multi-purpose room in the form of square

Nura: powdered limestone.

Qaisariyah: Section of the general market which is well protected by a high enclosure, roof and heavy doors for the storage and sale of high-priced merchandise.

Qasr: Residence of the Prince.

Roosana: Alcove in the interior facade of the walls of rooms.

Roshien: Openings above doors, windows and interior alcoves, sometimes they are highly decorated with transparent plaster screen.

Rewag or Riwaq: A Covered loggia on ground floors, usually surrounding the courtyard.

Sabat: Part of a street bridged by building.

Sala: Living room.

Samada: The animal section.

Satieh: Roof terrace.

Shari'ah: Prophet Mohammed Law and religious principals and regulation.

Sikka: Street.

Souq: Marketplace located to the Friday mosque, divided according to trades and crafts.

Tarma: Openings surrounded by wooden screens above the main door.

Umrah: is a pilgrimage to Mecca performed by Muslims that can be undertaken at any time of the year.

Urf: Recurring practices which are acceptable to people of sound nature. Verbal Urf consists of agreement of people on the meaning of words. As a result, the customary meaning becomes dominant meaning, and literal meaning is reduced to the status of an exception. Actual Urf consists of commonly recurrent practices which are accepted by the people.

Wijagh: Coffee preparing place.

Yad al mahmasa: a kind of spoon.

Appendix B

The Structure of Saudi Family

The Structure of Saudi Family

Since 1972, the family in Saudi Arabia has been experiencing changes in structure, functions, roles and status. This change might be attributed to factors such as urbanisation, industrialisation, education, telecommunication and mass media. The family becomes nuclear in the major cities although most relatives leave near each other in the same neighbourhood. This phenomenon explains the significant horizontal expansion of the major cities in Saudi partially.¹

“The traditional Saudi extended family structure could be described as tribal and matrilineal² regarding lineal descent, in which kin of both sexes was related through the men only. It can also be described as patriarchal in that the father or the grandfather had the legal power and social norms, which supported his authority.”³ The particular type of family in Saudi the big cities is going towards nuclear, while relatives lean towards to live near each other even in the major cities that are extending horizontally more than vertically.⁴ Therefore, interaction among relatives can be achieved more easily. The extended family usually includes three generations, grandparents, sons/fathers, daughters/mothers, and a child, in which grandfather was the head of the household regarding authority structure.⁵

In the traditional family, decisions to marry were made mainly by both families. Fathers are believed to play a major role in decision-making regarding this issue, while mothers, in reality, play a greater role, more hidden but more influential, in this decision.⁶ Married women in Saudi Arabia as the case in all Muslim countries preserve the names of fathers' families and tribes as a part of their identity, according to Islamic teachings.⁷

Endogamy and Exogamy Marriage

In the traditional family, endogamy marriage is very familiar; it was controlled to potential spouses from the same tribe. However, some of these limits vary in different regions of the country. In the central part of the country, for example, these limitations are more observed while they are less seen in the western region.⁸ “Regarding exogamy, the dominant marriage pattern is among first cousins, primarily to the sons and daughters of the uncle/father’s brothers. Marriage with the sons and daughters of mother’s

¹ El-Haddad, Yahya, ‘Major Trends Affecting Families in the Gulf Countries’. *Major Trends Affecting Families*, United Nations, New York, 2003, p. 225.

² A kinship system based on matrilineal clans was the source of Cherokee identity and the sinew of society

³ Achoui, Mustafa M. "The Saudi Society: Tradition and Change." In *Families Across Cultures A 30-Nation Psychological Study*, 435-41. Ch.32. 2006: Cambridge University Press.

⁴ Ibid.

⁵ Georgas, J. Family: Variations and changes across cultures. In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture (Unit 13, Chapter 3)*, Center for Cross-Cultural Research, Western Washington University, Bellingham, Washington USA. 2003.

⁶ Ibid.

⁷ Achoui, Mustafa M. "The Saudi Society: Tradition and Change." In *Families Across Cultures A 30-Nation Psychological Study*, 435-41. Ch.32. 2006: Cambridge University Press.

⁸ Ibid.

sisters and brothers used to be in the second rank.”⁹ Now, it is the opposite. The main reason for this new trend is the increasing influence of the mothers in the selection of their son’s wives.¹⁰ However, young and educated people tend to select their wives from different tribes, groups and clans. The groom or his family should present a dowry of the marriage, which usually consisted of money, jewellery or any valuable thing, to the bride. This is a mandatory duty to the groom or his family towards the bride according to Islamic teachings. No marriage would be considered legal without this dowry, regardless of its value. The husband, according to Islamic teachings, is in charge of his family and must be the one who is responsible of the family financial burdens even if his wife is working or rich unless she makes concessions.¹¹

Divorce

The Divorce rate in Saudi Arabia is increasing. The total number of registered divorce cases in the Kingdom was 28,867 cases in 2009.¹² This number represents 20% of the total marriages in the country in the same year. The main causes of divorce according to Al-Saif are due to women working, polygamy, family pressures, family interference, and sexual maladjustment.¹³

Polygamy

Polygamy is another phenomenon that is dramatically changing and decreasing because of urbanisation, education, development, and cost of living. Educated and employed women gain more independence and consequently reject polygamy. Some parents and young females put monogamy as a condition before marriage. Putting such conditions are acceptable to the Islamic teachings. Gharaib¹⁴ found that 86.8% of husbands in the Gulf (Qatar, Kuwait, United Arab Emirates, Oman, Bahrain and Saudi Arabia) have only one wife, 9.6% have two wives, 1.1% has three wives and 0.33% only has four wives; 74.7% had married their relatives; and 25.5% live with their extended families. Al-Saif noticed that in Saudi Arabia, only 4.8% of parents approves of their daughters marrying a husband who has another wife.¹⁵ This rate is much lower than the previous rate of 14.5%.

Residence after Marriage in Traditional Families

After the son is married, he resides in or near the fathers' residence. The married daughter is traditionally supposed to live in or near the house of the father-in-law. The mother-in-law has authorization over the

⁹ Georgas, J. Family: Variations and changes across cultures. In W. J. Lonner, D. L. Dimmel, S. A. Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture (Unit 13, Chapter 3)*, Center for Cross-Cultural Research, Western Washington University, Bellingham, Washington USA. (2003): 438.

¹⁰ Al-Saif, M. I. Introduction to the study of Saudi society. Riyadh: Al-Khariji. [Arabic Text] 1997.

¹¹ "Islamic Marital Jurisprudence." Wikipedia. Accessed May 15, 2015. https://en.wikipedia.org/wiki/Islamic_marital_jurisprudence.

¹² Hameedawy, Husain. "A Wellknown Saudi Cleric Launched Initiative Called for "difficulty in Divorce."" *ALArabiya*. May 12, 2010. Accessed September 23, 2013. <http://www.alarabiya.net/articles/2010/05/12/108428.html>.

¹³ Al-Saif, M. I. Introduction to the study of Saudi society. Riyadh: Al-Khariji. [Arabic Text] 1997.

¹⁴ Ghraib, S. A. Characteristics of Agricultural Societies in the Arab Gulf States. Publication. Riyadh: Arabic Center for Security Studies and Training, 1991. [Arabic Text].

¹⁵ Al-Saif, M. I. Introduction to the study of Saudi society. Riyadh: Al-Khariji. 1997. [Arabic Text]

daughter-in-law. Even in the major cities, one might notice that married children are supposed to live near to their parents if not in the same house. The trend among educated, married spouses is to be independent of the parents even if they are supposed to live near to them as a social commitment.¹⁶

Family Roles and Functions

The father in the traditional Saudi family is the main source of income, and the mother is the home keeper. Women are not supposed to work outside the house in traditional families. The grandparents are highly respected and play a great role in deciding about many family issues. Consequently, the rate of Saudi women in labour force is still minimal (about 6%).¹⁷ However, the traditional Saudi families have influenced by rapid economic change occurred in Saudi Arabia. At the beginning of 1970's, the percentage of non-married girls is increasing, and almost all young females go to school. On the other hand, Al-Saif stressed that "a new trend is developing. Saudi families, in general, do support women working outside the family, on condition of respect for Islamic traditions and not mixing with men. He reported that 52% of Saudi women are inclined to work outside the family for financial reasons, and 50% are motivated to work to achieve self-actualization and gain a social role and status."¹⁸ Al-Saif¹⁹ also mentioned that the social and economic changes in Saudi Arabia since 1970 (Second Oil Boom) created changes in some roles and social status of many individuals and functions in the society. The role of women in Saudi society is changing confidently, but their status is still fixed. In the case of family disagreements or conflicts, parents and grandparents play a vital role in solving conflicts. Female children are supposed to help their mothers while male children are expected to help their fathers. However, maids in Saudi wealthy and middle-class families are taking over most of the mothers' functions such as housekeeping, cooking, and cleaning.

Changes in the Family Demographics

The Government "Chart" states in article 9 that: "The family is the nucleus of the Saudi society." Some sociologists such as Al-Saif think that this new organisation of society is positive because it stresses the importance of the family rather than the tribe or the individual. The marriage age is, for example, an indicator of the impact of urbanisation on the Saudi family. Females used to marry at a very early age: between 13-16 years old. This tradition is changing. The age of marriage among women is now between 20 and 25 years of age. Males used to marry between 15 and 18.²⁰

¹⁶ Georgas, J. Family: Variations and changes across cultures. In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture* (Unit 13, Chapter 3), Center for Cross-Cultural Research, Western Washington University, Bellingham, Washington USA. 2003.

¹⁷ Achoui, Mustafa M. "The Saudi Society: Tradition and Change." In *Families Across Cultures A 30-Nation Psychological Study*, 435-41. Ch.32. 2006: Cambridge University Press.

¹⁸ Al-Saif, M. I. *Introduction to the study of Saudi society*. Riyadh: Al-Khariji. 1997. [Arabic Text].

¹⁹ *Ibid.*

²⁰ Georgas, J. Family: Variations and changes across cultures. In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture* (Unit 13, Chapter 3), Center for Cross-Cultural Research, Western Washington University, Bellingham, Washington USA. 2003.

At present, the majority of young men prefer to delay their marriage. About 60% of Saudi youth do not prefer to get married early because of the expenses of the wedding²¹. The Late marriage of both males and females might be attributed to several factors; such as growing years of schooling for both sexes, high expenses of marriage especially the cost of the dowry (bride price), desire to live independently, and the desire to select the spouse freely,²² The birth rate in Saudi Arabia, however, is one of the highest rates in the world (3.5%).²³

Family values and principles

The majority of the citizens live in traditional neighbourhoods with people with whom they share mainly the same values, traditions and family relationship. However, the social relationships in the large Saudi cities are changing. The social bonds are becoming weaker in kind and number.²⁴

There are no available studies about changes values during the period of this study. Despite, sociological studies regarding values, social relationships, social change, and marriage, as indicated above. Family values are changing especially in the major cities such as Dammam, Riyadh, and Jeddah because of the development of urbanisation, industrialisation, and education. Nevertheless, the practices of veiling and gender separation and the values related to these practices have not changed.

The social relationships among relatives and people who belong to the same tribe are still great. Family members' meetings annually when religious holidays and special events such as marriage are clearly seen. Modern communication technology makes it easier to get in touch with relatives regardless of their location. Also, the opinions and values that are related to female education and women career away from home are becoming more active and supportive.

²¹ Al-Saif, M. I. (1997). Introduction to the study of Saudi society [Arabic Text]. Riyadh: Al-Khariji.

²² Al-Badran, K., & Rashed, F., 1989. An Empirical Study for Marriage Contract in the Eastern Region of the Saudi Arabia Kingdom. Studies and issues from the Arab Gulf society, Social and Labour Studies Series, N14, The Executive Bureau of the Ministry counsel of Labour and Social Affairs of the Arab Gulf States Cooperation Counsel. Bahrain: Al-Manama. [Arabic Text].

²³ A Historical Outline of Saudi Arabia, http://faculty.kfupm.edu.sa/MGM/mustafai/dr._mustapha_achoui/files%5CResearch_Sa (accessed February 01, 2017).

²⁴ Al-Masa'ad, 1995 in Al-Saif, 1997.

Appendix C

Aramco's Main Camp

Aramco's Main Camp

As the world demand for oil increased in the 1970s, Aramco expanded its operations. Consequently, its company towns witnessed major growth. A population of Dammam was 418,500 in 1987, while Al-Khobar's population were 132,600 in the early 1980's. Aramco contracted the American planning house of Caudill Rowlett Scott(CRS) to prepare master plans for its towns²⁵, CRS made master plans for Dhahran and other cities. Aramco believed that a comprehensive plan was needed to facilitate future orderly growth.



American camp, this picture has been taken in 70's

The CRS handbook stated that Aramco is committed to creating living conditions equal to those at home for American and other non-Saudi employees. Therefore, the communities and their housing, recreational and community support components will be planned roughly equivalent to those of a middle-income California community.

During the 1970s, the Saudi government became increasingly involved in the day to day operation of Oil Company. As a result, more Saudis were housed in Dhahran senior camp, so the ethnic character of the previously American compound was gradually hazy.

In the early 1970s, the increasing demand and production of oil created new pressures. Three new features of urban design appeared. These were: wide boulevards and avenues like King Abdu Aziz Boulevard and Dhahran Avenue.

In Dhahran Aramco camp, the residential units were single- family, one-story dwelling built of wood and stucco with sloping roofs. Each home surrounded by a lawn and yard and enclosed by a hedge. All units were air conditioned and adequately furnished. The senior staff housing units varied in style and size. The higher officials in the upper echelon of Aramco's bureaucracy occupied larger elaborate and better houses. Lower-rank American employees lived in more modest ones. The higher-income single employees were accommodated in a multi-roomed modern building with communal space for cooking and entertaining. Other bachelors were confined to barrack-type dormitories which contained many conveniences.

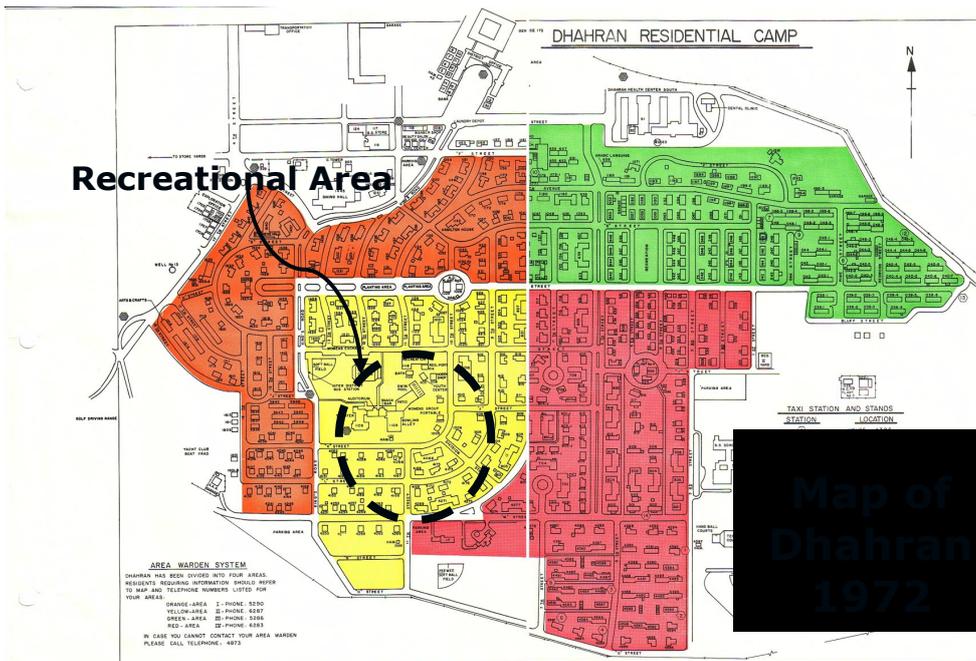
²⁵ Lebkicher, R., Renz, G. and Steineke, M. (1952)



Arial views of American camp of Aramco Company in Dhahran.



Recent Picture of the Saudi Aramco camp.



A plan of Aramco Residential camp in Dhahran 1972



A view of the Webster living room at 1423 Kings Road, Dhahran, late 1950s. Decorations included an extensive collection of brass Arab coffeepots (above the window), matched Kerman rugs bought in Beirut, Mildred's prized carved screen from Bombay and her collection of Oriental ivory figurines displayed on the wall near the sofa. (Photo by Mildred Webster.)

Source:

<http://www.aramcoexpats.com/Articles/Pipeline/In-Search-Of-Oil/Dear-Folks/3065.aspx>



A view of a room belong to Saudi Aramco employee



Front of the Webster house at 1423 King's Road, circa 1949.
Photo courtesy Judy Webster Bauer.



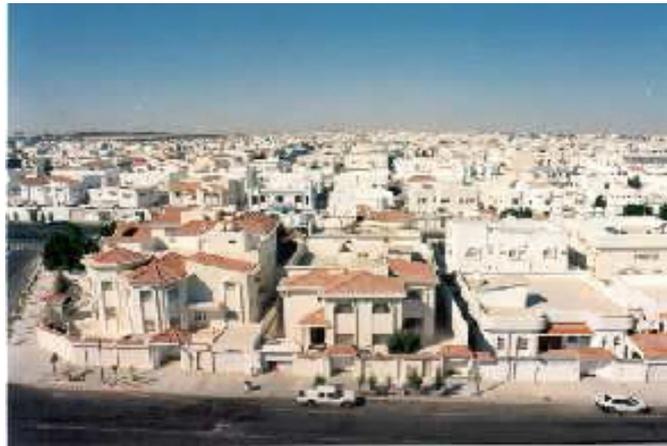


Pictures are taken from inside the American Camp of Aramco showing the type of houses.

Appendix D

The Saudi Aramco Home Ownership
Program

Saudi Aramco Home Ownership Program²⁶



Saudi Aramco Home ownership Area (Dhahran)

Source: http://hr.aramco.com.sa/home/Site_map/outreach/Home_Ownership/home_ownership.html

The Home Ownership Program is one of the most significant benefits that the Company provides to its Saudi male employees. The Program started in the middle of last century in 1951, when about 15,000 free housing lots have been distributed to employees. Several improvements have been incorporated into it since then. More than 47,000 home loans have been approved to employees so far in several regions around the Kingdom of Saudi Arabia such as Eastern Region (Dammam, Doha,...etc.), Middle Region (in Riyadh), and the Western Region (in Jeddah). The number of houses under Saudi Aramco Home Ownership Program in the first quarter of 1999 in Eastern Province is 41876 houses,²⁷ of which 4024 houses in Dhahran, 2383 in Doha, 1592 in Dana and 49 in Rabia. The Program is administered by the Home Ownership and Community Development Division (HO&CDD), as part of the Employee Relations Services Department.

As the name implies, the division not only distributes lots and provides housing loans, it also participates with local municipalities in the development of whole new communities with complete paved roads, sidewalks, streetlights, underground utilities, and landscaping. The latest example of this is the Al-Danah Project.

The loan program is open to employees who are male Saudi nationals between the ages of 20 and 58 by the Gregorian calendar. The employee must be married or the head of the household and should have four years of continuous service with Saudi Aramco Company with satisfactory job performance records.

An eligible employee may take a loan to build a new house, buy a ready-built house, or complete a partially built house that he already owns. The house may be constructed on one of the Company's free housing lots, or on a lot purchased by the employee. The employee is responsible for his house design and quality of construction. The only restriction applied to the company's home loan is that it must be for a single-family house not built for commercial purposes.

²⁶ This study, carried out by the researcher earlier. It is one of the Master research requirements

²⁷ Al-Shabat, A., 1999.

Loan amounts range from SR280,000 to SR950,000, depending on the employee's monthly base salary. The loans are repaid through a payroll deduction of 20 percent from the employee's monthly salary over a period of 10 to 15 years. "This is a very comfortable repayment system," Al-Jama said. "The employee hardly misses the money." To initiate the loan process, an employee should complete a home loan application form, available at any Home Ownership office, and provides the latest original family booklet. Employees who seek free lots need to complete a separate form.

Objectives of the Home Ownership Program

- It is a program to develop exemplary communities near Company's operational areas upon the availability of funds, land and in the case of high demand.
- Develop lands to provide free lots for eligible Saudi male employees to construct charming homes under the Home Ownership Program.
- Offer attractive incentives for Saudi employees so that they remain committed to the Company.
- Participate in the development of local communities.
- Convenience for employees to commute from work to their residence locations and vice versa.
- The desire of the majority of employees to live close to their work location.

Typical Program

The Program started in 1951, and several improvements have been incorporated into it since then. In 1976 Plan B was introduced with higher loan amounts and other attractive features. More than 47,000 home loans have been granted to employees so far. The employee should build on the lot according to home loan lot type as follow:

Home Ownership Program's Requirements

Saudi Aramco Company imposed some requirements to their employees to commit when they start to build their homes under Home Ownership Program. The requirements stated as:

Geographical Location Limitation

- Loan Agreements will be executed only for the acquisition of homes located Kingdom-wide in established communities, and their dependencies provided the home location be 150 kilometres from the employee's work location.
- For remote area employees building or purchasing a home outside the Eastern Province under the Home Ownership Program, the home must be located in a Company-approved location that is usually not more than 150 kilometres from the employee's work location or family/days off residence.

- The family/days-off residence will be as reflected in the Company's record and must fall within approved home ownership areas. (Examples of such employees are: East/West Pipeline, Hawtah, Shaybah, Offshore, etc.)

Lot /House Requirements

- The house/lot deed is not mortgaged.
- The house/lot is located on the street 8 meters wide or more.
- The minimum area of the lot is 325 square meters.
- The lot/house is located in a field that has an approved master plan.
- There are no site violations.
- The house is less than ten years old.
- The house is intended to provide single-family dwellings.
- A copy of the building permit is available.
- Copies of the house drawings are available.

House Dimensions Limitations

Drawings shall include the following:

- Scale
- Clearances (Set Backs)
- Maximum heights²⁸
- Maximum Areas
 - Buffet: 2 meters x 3 meters.
 - Laundry: 3 meters x 3 meters.
 - Dirty Kitchen: 3 meters x 3 meters, and attached to the regular kitchen.
 - Basement, Annex, Driver's room and Diwaniyah: subject to the Local Municipality's limitations and approval.
 - Parents' studio: a room + a bathroom + a 2 meters x 3 meters kitchenette.

Building Restrictions

Loan funds shall be used only for the construction or purchase of a single-family dwelling.

- A building containing divisions that make it impossible to reach all habitable rooms from one entrance or in which minor alterations would have the same effect shall not be considered as a single-family dwelling.

²⁸ All the above-mentioned limitations must comply with the current existing rules and regulations of the local municipalities.

- A building containing similar facilities in different stories with the apparent intent to house more than one family shall not be considered as a single-family dwelling.
- If loaner's marital status requires more than one single dwelling, he will be permitted to construct a building containing divisions and containing similar facilities in different stories upon producing evidence that he is married to more than one (1) wife

Safety Suggestions

- For Ground Floor, there must be a fire exit for the kitchen.
- For First Floor kitchen door, to be opened to/next to the stair room and made of a fireproof material (e.g. aluminium).
- Check for fire exits availability and make sure there is no "fire trap" in the case of fire.
- Use nonskid floor tiles for all bathrooms, kitchen(s) and walkways.
- Check for tripping hazards that might be visible in the design.
- All electric systems to be grounded and electric fixtures to be unreachable by toddlers.

Home Loan Lot Type

Once the employee has met the eligibility requirements, he may select a home loan with one of the following lot types:

- Free Lot
- Lot Allowance
- Private Lot

Free Lot: Free lots are developed by the Company and can be acquired as they become available in some urban regions.

Lot Development Cost: Does the company incur the cost of developing the free lot. This cost may become part of the employee's loan debt if he leaves the Company before settling his debt, depending on the termination reason.

Lot Categories: When available, free lots will have three sizes for assignment to eligible employees based upon the following loan limits:

Home Loan Limit (SR)	Lot Category
Up to 345,599	Small (300 sq.m.)
345,999-477,599	Medium (400 sq.m.)
477600 and above	Large (500 sq.m.)

Table: This table shows the lot categories with its prices under Aramco Home Ownership

Lot Allowance

The Company will assist an employee who chooses to purchase a lot to construct his home loan house. An employee who chooses to buy a ready built house partially completed house is eligible to get lot allowance. The amount of plot allowance is determined by the price of the lot as recorded in the title deed, or as determined by the company. However, the amount cannot exceed SR 150,000.

Private Lot

The employee may also provide a suitable lot that he owns and requests a home loan to construct a house on it. When the lot is approved, he will be qualified for the lot allowance.

Home Loan Options

An eligible employee under Home Ownership program has three options:

- Construction of a house on a free, private or purchased lot
- Procurement of a ready-built house or self-owned house
- Completion of partially built house

Eligibility Requirements

To be eligible, the employee must fulfil all the following requirements:

- A Saudi male national
- Age between 20-58 years old (Gregorian)
- Married or bona fide head of household
- Satisfactory job performance
- Four continuous years of service with Saudi Aramco

Programs Undertaken

A total of around 15000 free lots has granted to eligible Saudi Aramco²⁹ employees to build their houses through the Home Ownership Program so far.

²⁹ The Kingdom had gradually purchased Aramco's assets, gaining full ownership of the company in 1980. In 1988, by Royal Decree, King Fahd ibn 'Abd al-'Aziz officially established the Saudi Arabian Oil Company, or Saudi Aramco, to replace Aramco and assume its responsibilities.



Dammar Labor City
Source: <http://ersd.aramco.com.sa/htm>



Al-Danah Home Ownership Program.
Source: <http://ersd.aramco.com.sa/htm>

The major home ownership areas are:

- Doha & Danah in Dhahran
- South Dammam
- West Al-Khobar & Aqrabiyah)
- Rahimah Home Ownership area
- Safwa Home Ownership area
- Abqaiq Home Ownership area
- Mahassin in Al-Hassa
- Al-Rabiyah in Dhahran
- Yanbu Home Ownership are



Fig.: Aramco Home Ownership in Dammam, Alkhobar, and Dhahran triangle. 1. South Dammam, 2. West AlKhobar, 3. AlAqrabiyah, 4. Doha and Dana
Source: <http://www.easternemara.gov.sa/map-sharg8.htm>

Appendix E

High Rise Apartments and Affordable
Housing in the Dammam Metropolitan Area

Mass and Affordable Housing Projects

In an endeavour to adapt to a new way of living, the Saudi government introduced mass and affordable housing projects, as did many other countries around the world. This was, especially important, as the national average income decreased after years of steady increase. Over the last four decades, Saudi cities experienced a significant change to residential projects. As a result, the government's multipurpose projects appeared for the development of housing.³⁰ These type of housing has a great impact on housing sector in the contemporary period when local citizens are accustomed to this kind of housing for the Modern time.³¹



Fig.: Mass Housing Project in Dammam and Al-Khobar cities.

Jeddah Economic Forum discussed the Turner's notion of "Housing by people"³². The book expressed the belief that networks of people can hold their surrounding and order them logically without experts to decide what they need. He described the type of housing that has been forced upon people by their governments and sets it against what individual communities can attain when allowed to help determine the housing they will have. Another important concept that related to the same subject was Supports: An Alternative to Mass Housing developed by Habraken in 1961.³³ He wrote about the damage mass housing causes to the balance

³⁰ In 1970, significant progress was made in the development of institutions to tackle the problems of housing. A General Housing Department was established in 1971 under the Ministry of Finance and National Economy; thereafter it developed to become the Ministry of Housing and Public Works. This department implemented public housing programs, while the Ministry undertook the program of: designing and constructing low-income households, selecting recipients of houses, collecting of payments of interest-free loan repayable over a 25-year period and maintenance of public spaces and services of the projects.

³¹ Citizens refused to live in residential apartment buildings when it established in the transitional period. Apartment buildings violated the convictions of the population in the provision of the necessary privacy.

³² - Jeddah Economic Forum. 2013, Housing the Growing Population of the Kingdom of Saudi Arabia.

- 2nd Affordable Housing Development Summit in 2014.

- Salama. A.M. A Lifestyle Theories Approach for Affordable Housing Research in Saudi Arabia, College of Environmental Design. Emirates Journal for Engineering Research, 11 (1), (2006): 67-76

- Turner, John F.C. Housing by People: Towards Autonomy in Building Environments, London: Marion Boyars. 1976.

³³ Habraken, N. John. Quality and Quantity: The Industrialization of Housing. Forum XVIII. no.2. 1964.

of the built environment. Habraken proposed ways in which this balance can be restored.³⁴ In particular, emphasising a need for architects to consider people's lifestyles when designing buildings.³⁵

High-rise Mass Housing

Of course, Mass and Affordable Housing in the region is governed by certain rules and regulations that might interfere with adaptability and well-being. Government or nongovernment Mass Housing follows typical floor plan layouts. Most floor plans are designed in a practical way with fixed spacing and defined functions, usually ignoring individuals' desires to make future modifications.



Fig: Identifiable board of the mass housing project.

³⁴ This research refers to the reprinted edition of the first English edition that has been published in 1972. Habraken proposed concepts in which this balance can be restored. In order to restore the natural relationship between the buildings and their environment, the levels of professional participation must be disseminated. People must also be enabled to participate in the design process. In order to do this technically, a support building is divided into two levels, the support level and the infill level, where the support level includes the structural elements and common partition wall, which are decided by the professionals, while the infill level includes all the remaining elements to be decided upon by the users. Supports idea started to circulate worldwide. After long research, discussion and experiments on the technical implementation of these concepts, a tartan band grid was introduced, which has later become a building standard in Europe. The full implementation of the support theories faced many challenges such as the economic aftershock as a result of the oil shortage and technical implementation.

³⁵ Kendall, Stephen. Residential Open Building. Uk: E&Fn Spon, (2000): 172-175.

Suggestions for improvement have always solely focused on structure, availability of infrastructure and the provision of health, education, and shopping facilities in housing, whereas they have in reality a multidimensional nature and evoke a range of different images, concepts and vision.³⁶

Mass housing and low-income government housing (affordable housing) was built in three main centres in Saudi Arabia: Riyadh, Dammam and Jeddah. The Saudi government began mass housing, and OGEM built towers of housing in both Dammam and Al-Khobar cities in the early 1980s.³⁷ The housing apartments opened for Saudis in the mid-90s. The government began housing families who had been displaced from Kuwait during the Gulf War II. After the liberation and the return of the people, the government started to offer the apartments for sale under REDF, and they have been inhabited ever since.³⁸



Fig: Site plan in one of the mass housing projects in Saudi Arabia.

The mass housing project has been a target of much recent criticism. Architects, landscape architects and urban planners have argued for some time that quality housing is essential to the well-being of individuals and society. These types of housing have proven unsuccessful in many regards; some have even been abandoned, fallen into decay and have been demolished.³⁹ The mass housing projects have been seen as a

³⁶ Lawrence, R.J. "Housing and Home: Agenda for Future Research". In M. Bulos and N. Teymur (eds) *Housing Design, Research, Education*, Avebury, Aldershot UK, (1993): 29-41.

³⁷ The name of the contractor.

³⁸ Real Estate Development Fund.

³⁹ Othman, S. Mahmood. *Towards a Methodology to Direct the Governmental Subsidy in the Housing Sector: A Comparative Study*. Proceeding of the 2nd Housing Symposium titled 'Affordable Dwelling' Organized by the High Commission for the development of Arriyadh. Riyadh. Saudi Arabia. (2004): 1-16.

remarkable failure, attributable to their inability to engage users in the design and building process. Thus, the buildings were unresponsive to their users' needs and the surrounding contexts, as well as suffering from economic-based problems.⁴⁰

Mass housing has, however, been observed to have some advantages. In particular, it served as a shelter for millions of expatriates and refugees. It has the potential to solve the increasing demands for housing in various parts of the world. The tradition of building houses began to diminish with the wave of mass housing.⁴¹ Such housing distanced users from the construction process, and widened the gap between occupants and the urban environment around them, as advancing technologies, increased services and developing infrastructure widened the gap between traditional and modern further.

The Deputy Ministry of Housing executed 13 housing projects in nine of the Kingdom's cities. The projects consist of apartments in multi-storey buildings. Each building had 4 to 6 flats on each floor, over 13 floors. The total area of each apartment was about 208 square metres in Dammam towers while in Al-Khobar Towers it was 197 square metres. Each apartment has three bedrooms, living room, and dining room, men sitting area with separate entrance, tow balconies, kitchen and three toilets.

Apartments

At the beginning of the emergence of apartments in Saudi Arabia, apartment buildings were produced by foreign contractors and manufacturers.⁴² These projects were delayed for the same reason as those which caused delays to the mass housing projects. Gradually, apartments have attained popularity in the Kingdom. According to the most recent data, apartments form 32 percent of all housing in the Kingdom.⁴³ Small families, expatriates, and newly-married Saudis (without children) usually choose this housing type. Both Saudis and expatriates rent most apartments.

In the next two decades, the demand for apartments is expected to rise throughout the Kingdom, as younger Saudis enter the job market, and income sensitivity will lead this segment of the population to select more affordable housing. As a result of changes in the height of apartment buildings, according to new governmental building regulations, incentives to build multi-storey apartment buildings in the Dammam Metropolitan Area will increase.

In the modern period, mid-size apartment buildings were commonplace in Dammam Metropolitan Area.⁴⁴ As the tempo of urbanisation is increased, demand for housing was met with the introduction of the apartment. Urbanisation allowed for the alteration of the family structure, as individuals left the traditional extended family to seek their fortune in the city. Smaller, more mobile units required smaller housing units for their

⁴⁰ Al-Saati, Maha. Open Duplex House, An Open Building Application to Duplex Houses in Saudi Arabia, Unpublished Master Thesis, King Faisal University, Dammam, Saudi Arabia. 2006.1

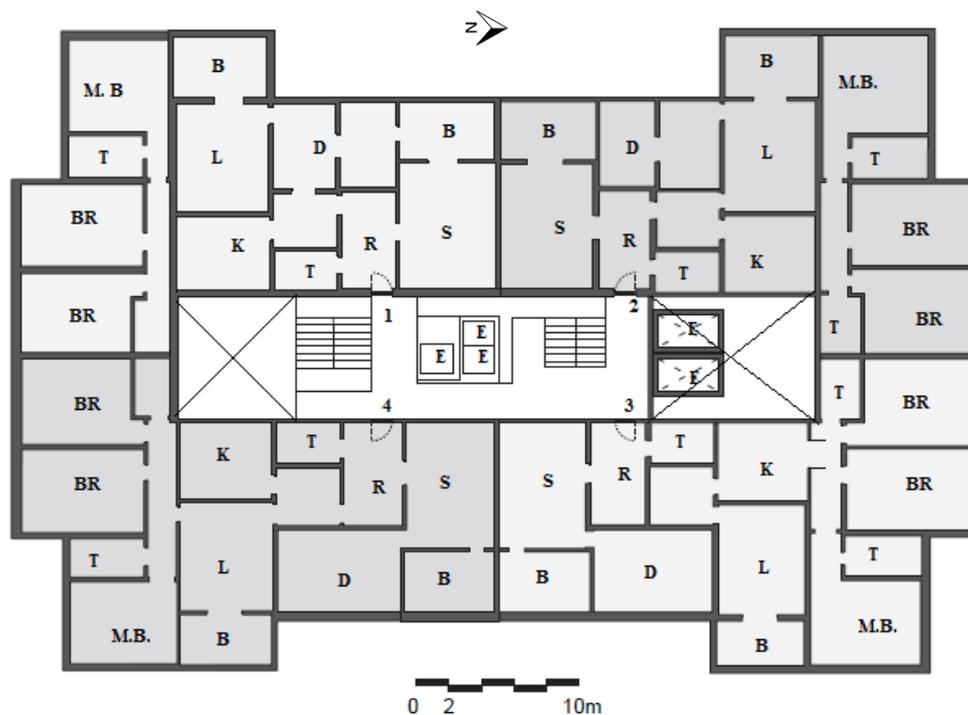
⁴¹ Kendall, Stephen. Residential Open Building. UK :E&Fn Spon, (2000): 29-31

⁴² Sarja, Asko. Open and Industrialized building. E&FN Spon, UK. 1998. 80.

⁴³ Sfakianakis, John. The Real Estate Sector in Saudi Arabia, Office of the Chief Economist. Samba, 2006.on Books. 1976.

⁴⁴ Two to four floors.

nuclear families and single occupant households in Dammam Metropolitan Area were mainly for rent rather than for sale; however, the trend now is towards the ownership of units.⁴⁵



1, 2, 3, 4: are the numbers of the apartments, B: Balcony, BR: Bedroom, T: Toilet, K: Kitchen, L: Living room, D: Dining room, M.B.: Master Bedroom, E: Elevator, S: Sitting room, R: Reception.

Fig: A plan of an apartment building showing the interior divisions.

Apartments are built either by the government as affordable housing or by real estate developers,⁴⁶ who are funded by the government or private sector speculators. The development of modern apartment buildings in the central region of the country began in the late 1950s. The pattern of living in an apartment established itself, especially in Riyadh, for two reasons; the first one is that migrants at that time from surrounding countries preferred an apartment building to a traditional house;⁴⁷ the second factor was that the three apartment buildings included in Al-Malaz project were rented to government employees⁴⁸.

⁴⁵ In the past, only in limited circumstances, government regulations allowed the partitioning of ownership of units sharing one land parcel.

⁴⁶ Has been discussed in the previous heading.

⁴⁷ It is for security and cultural reasons.

⁴⁸ When the government of Saudi Arabia decided to move government offices from Makah and Jeddah to Riyadh and to build offices for the ministries, the government felt the immediate need to provide housing for all the government employees transferred to Riyadh in 1957. The site chosen for their housing was al-Malaz. The housing project was initiated by the Ministry of Finance and National Economy in cooperation with Riyadh Municipality. Al-Malaz housing project consisted of 754 dwelling units and 180 apartment units in three apartment buildings. The apartments were rented on a permanent basis.

In the early years, the development of apartment buildings concerned the emergence of zoning regulations and the introduction of the high-rise buildings. In the 1950s and 1960s, it concluded that certain rules should be applied uniformly throughout the entire country.

Apartment buildings are of two types: walk-ups and high-rise apartment blocks. They are freestanding buildings on two or more land plots and conform to the same setback requirements. Walk-ups' are two to five storeys high with central stairs with two to four units on each floor. These have not been separately zoned from the private to the residential. Usually, the owners of apartment buildings reside on one of the floors and rent out the remainder of the apartments. In some cases, close family members share flats. Apartments here can be characterised as small houses without courtyards and gardens. The majority of apartment buildings are located in commercial streets and boulevards, with the ground floor reserved for commercial uses such as stores, offices and shops.

The results of research done by Al-Hariqi revealed that 47.9 percent of housing types in Eastern Province of Saudi Arabia were apartments.⁴⁹ Apartment buildings are common in Dammam and Al-Khobar because these cities are places where foreigners took it as an area of living and working, while Dhahran was free of apartment buildings until the beginning of the contemporary period.



Fig: Apartment buildings appear in Al-khobar district, most of them built after 1970.

Apartments are grouped according to the type of residents. For example, singles live together in a district far away from families. Meanwhile, families live in apartment buildings confident that they will not be disturbed from single people interfering in their privacy. The number of inhabitants who want to live in apartments reduces the number of family members' increases and monthly income decreases.

⁴⁹ Al-Harigi F., J. Salagour, A. Al-Shieha. Estimate Number, Size and Type of Housing in Saudi Arabia for the Next Twenty Years. King Abdul-Aziz City for Science and Technology, Jeddah. 2007.

This apartment type does not allow inhabitants to enjoy the satisfaction and pride of ownership, which is a traditional cultural trait. High-rise apartment towers have negative associations in addition to the vertical circulation that is inevitably created by elevators, which is another obstacle to privacy in the view of the community.



Fig: One can observe that apartment buildings in Dammam Metropolitan Area increased the number of floors to meet the demands for more apartments.

Appendix F

A Summary of Built Environment in Different Periods



NEIGHBORHOOD

Services

- Mosques
- Local markets
- Plaza in front of mosques as a community center
- Ladies shops inside their homes

- Springs, fresh water for watering people
- Farms around the village for entertainment and a source of food supply
- Folk coffee shop



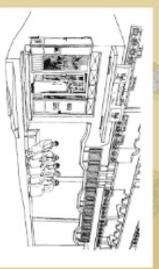
1935

Services

- Mosques distributed in every residential blocks
- Primary, middle and high schools for boys and girls



Planning with basic infrastructure





There were no community and shopping centers, so A lot the fathers had their cars in the garages of their homes instead of the garage

Two parks on both sides of the neighborhood. Parks site in front, deliberate

1949

Services

- Lack of basic services



Planning without infrastructure



Paving roads, then after that the basic infrastructure installed, after a period of construction the neighborhood, the conflicting of the two process frustrated success



Frequent interruption of water

1955

Services



Planning with full infrastructure



Well located parks with fences too safety



Community center held the operations of Eid and other important occasions

Utilities: Electricity, telephone, water supply, sewer line, surface water

1973

202

Children play in the squares in front of their homes

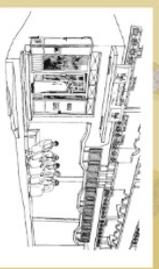
Folk coffee shop



Two parks on both sides of the neighborhood. Parks site in front, deliberate



There were no community and shopping centers, so A lot the fathers had their cars in the garages of their homes instead of the garage



Mosques distributed in every residential blocks



Lack of basic services



Paving roads, then after that the basic infrastructure installed, after a period of construction the neighborhood, the conflicting of the two process frustrated success



Frequent interruption of water



Services



Well located parks with fences too safety



Community center held the operations of Eid and other important occasions

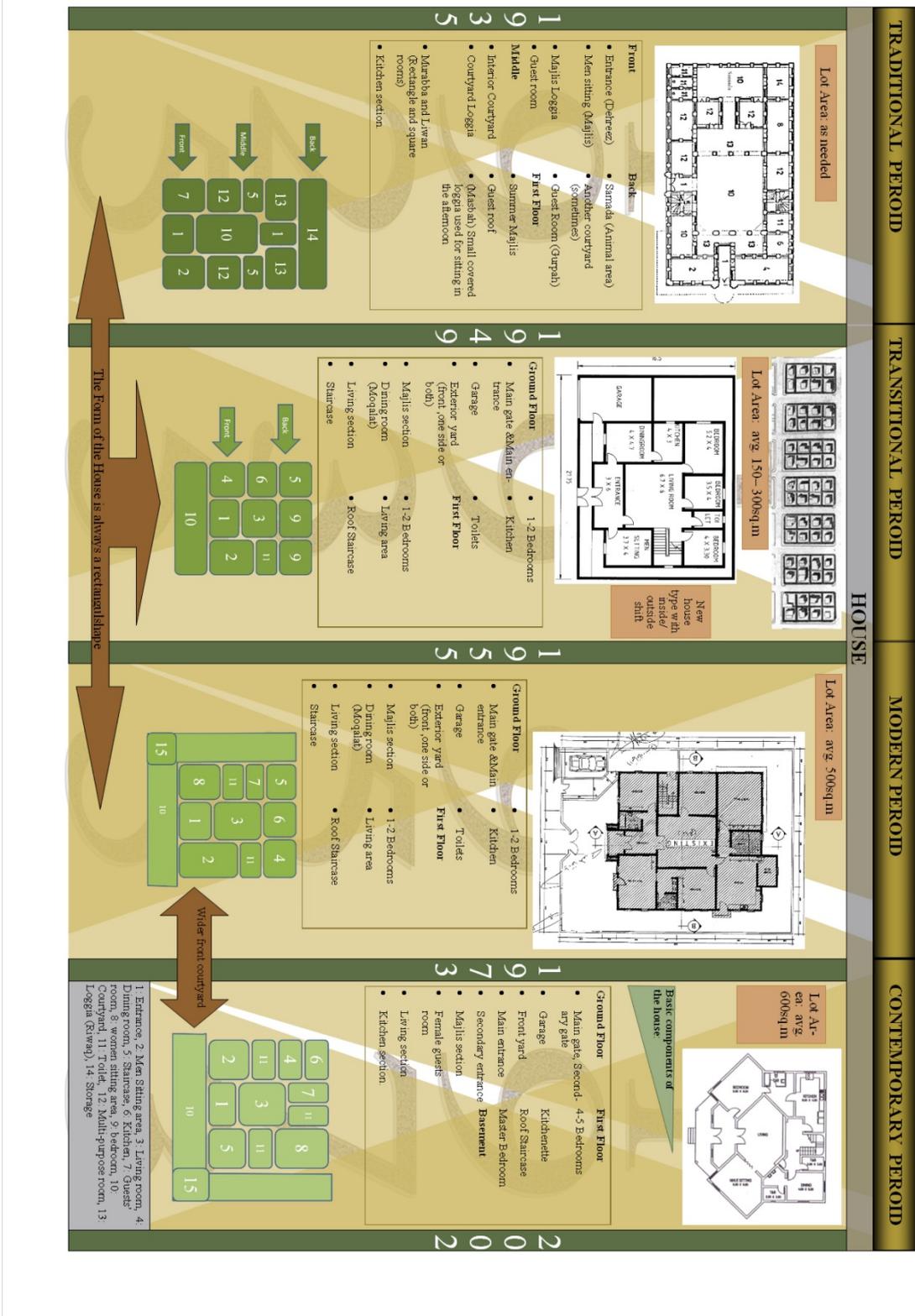
Utilities: Electricity, telephone, water supply, sewer line, surface water

Measures of success

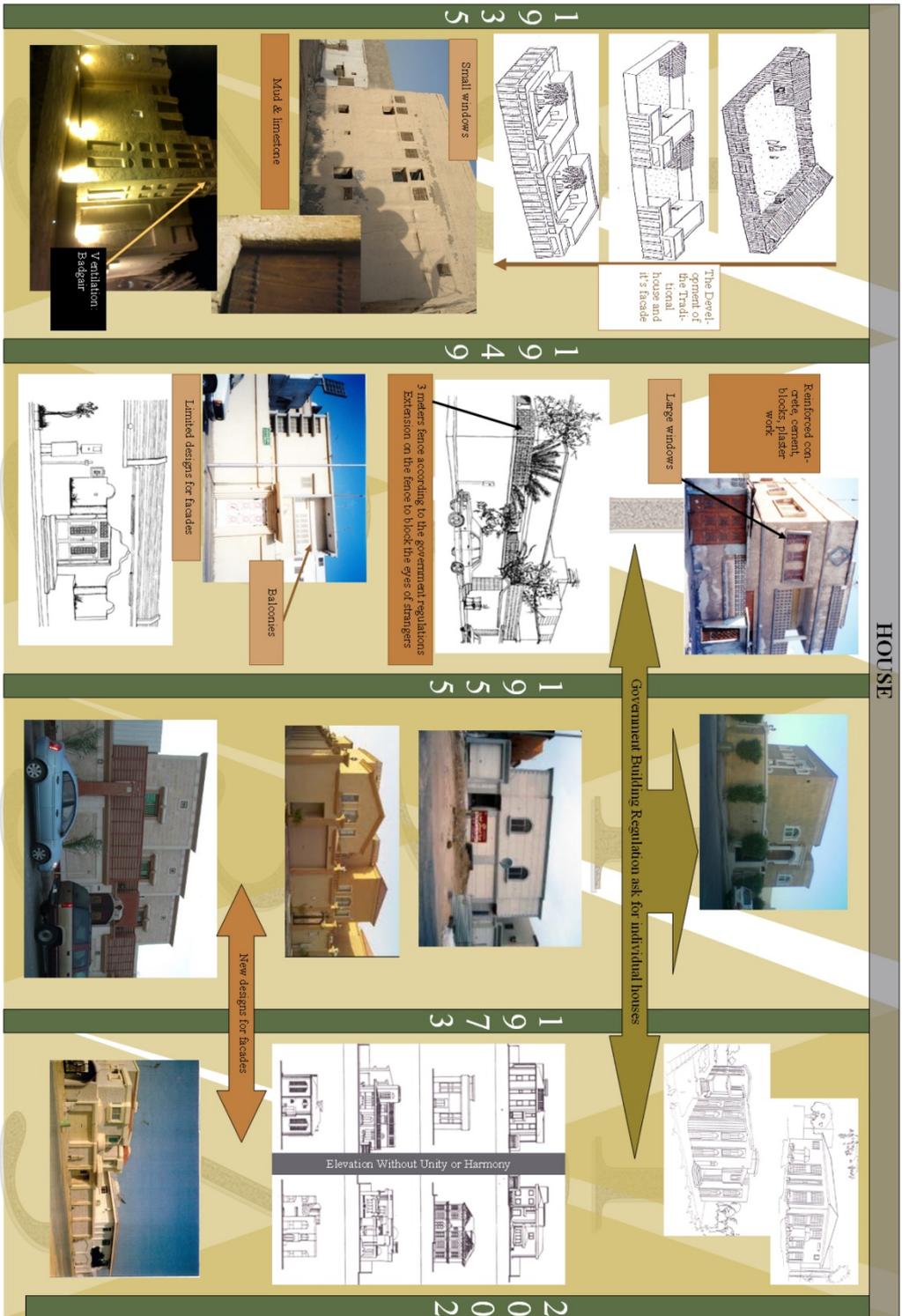
Measures of success		Al-Dwarsii	Labot City	AH-Rakab	Al-Dunah
Physical	Density	E	VG	G	VG
	Network Efficiency	E	E	G	E
	Space/ Person	E	F	G	VG
	Parking	F	E	F	E
Climatic Response	Flexibility of Technology	U	F	F	VG
	Site Layout	E	F	F	F
	Unit Layout	E	U	U	U
	Use of Passive System	E	U	U	U
Economy/ Fin.	Affordability	U	G	F	VG
	Energy Costs	E	U	U	F
	Maintenance	VG	G	U	VG
	Infrastructure costs	U	F	U	F
Social/ Cultural	Community Identity	E	F	F	F
	Opportunity for grouping (Family or Relatives)	E	F	F	F
	Cultural Considerations in Neighbourhood's Layout	E	U	U	U
	Cultural Considerations in House's Units	E	F	F	U
	Opportunities for Socialization of Male	E	F	F	F
	Opportunities for Socialization of Females	E	F	F	F
	Opportunities for Socialization of Children	E	U	U	G
Avg. Score		4.2 = VG	2.3 = F	1.8 = F	2.7 = G



E: Excellent =5
 VG: Very Good =4
 G: Good =3
 F: Fair =2
 U: Unsatisfactory =1



HOUSE



HOUSE

1 9 3 5

Houses For Extended family



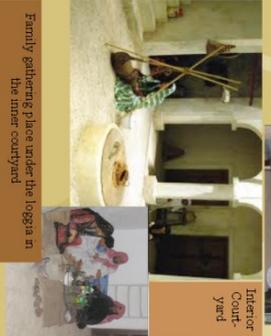
Men Maalis (Sitting area)



Simple Kitchen



Interior Court-yard



Family gathering place under the loggia in the inner courtyard

1 9 4 9

Houses still For Extended family



Furniture was not significantly different. (Okdeqalah)



Simple family used the ground floor, while they reserve the first floor for the eldest son when he marry

The family Meet in the enclosed area called the living room in the middle of the house, They still like sitting on the floor

Sofas could be used in the men sitting area (Qadajis)



Furniture is very simple



1 9 5 5

Houses For Single family

formal dining room has been introduced into house plans




Many corridors

Modern Features in kitchen and toilets need more space




1 9 7 3

Houses For Single family

Men sitting area



Women sitting area



Very sophisticated

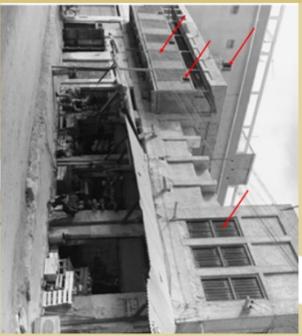


External room on the courtyard as a shape of tent for men gathering and communicate

2 0 2

HOUSE (Adaptability and Flexibility)

Maximum expression of the privacy with the freedom in the traditional houses



1
9
3
5



High sense of privacy for residents and their guests
Because of the lack of corresponding doors



Narrow alleys, closed-ended streets (Gul-de-sas) and Barha allocated to a small group of houses are good examples to achieve privacy on traditional houses.



Start allocating some blocks to be commercial areas in each district.

Women still go out to get their groceries without the intervention of men



1
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4
9



The entrances of guests and family has become one main entrance beside the garage door which has not been used for its function



Apartments buildings' sign to emerge in this part.

The use of bikes still more popular than cars in this stage



1
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5
5

Resorting to the construction of umbrellas on the pavement sidewalks instead of the shadows that were found by traditional houses



The street became unsafe environment for children to play



Any external open space covered or transformed to a closed room so the shape of the houses be-

1
9
7
3



The frequent use of vehicles has to dispense with the garage



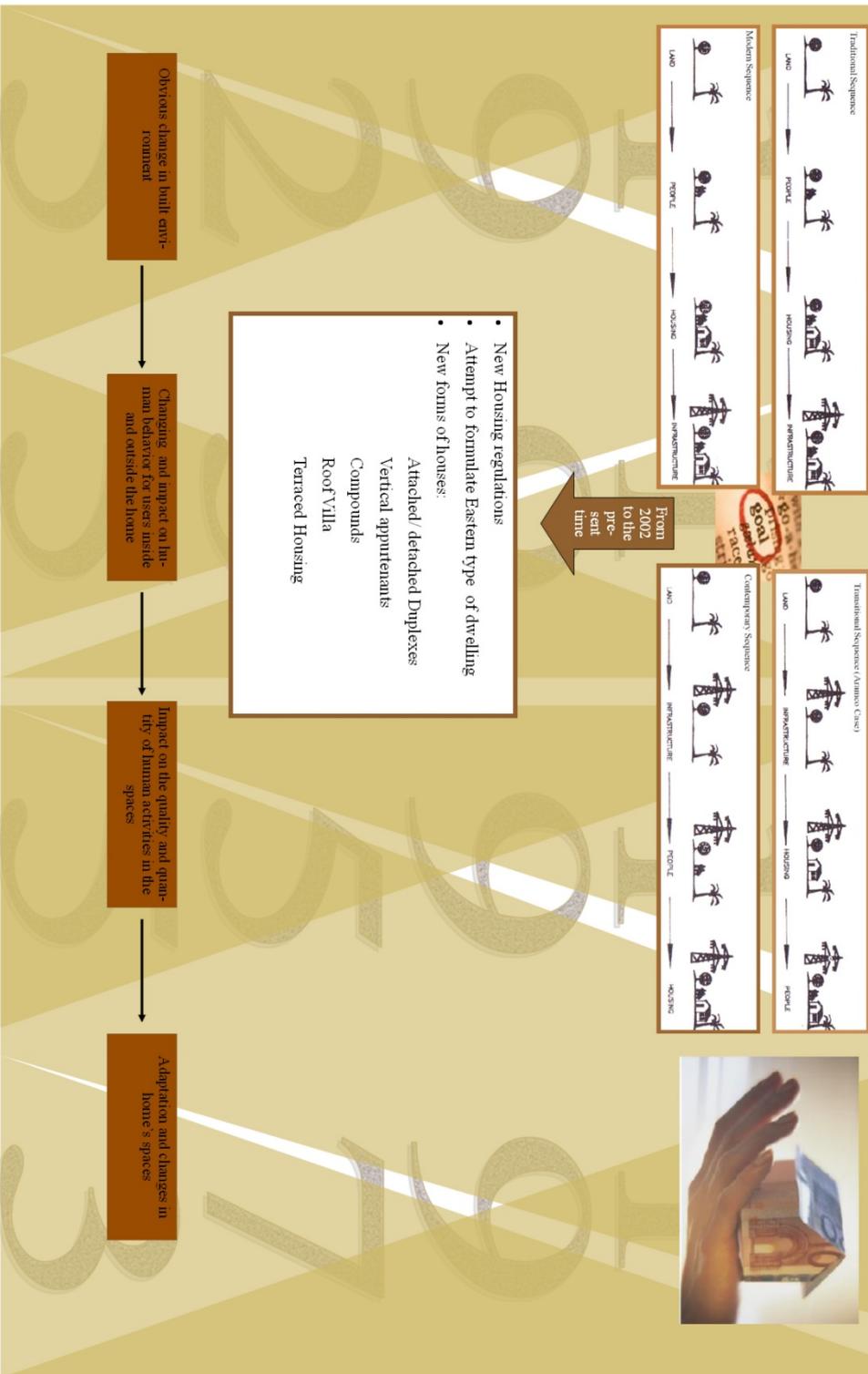
There are Parks, but??



Residential complex spread in this stage to control the built environment a way from government building regulations

2
0
2

The Relationship between the Urban Land, People, Housing and Infrastructure



Appendix G

The Source of the Thesis's Figures

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Fig 2.1	Nomadic Bedouins settled in groups, residing in tents.	http://www.albreah.com/vb/t4252.html
Fig 2.2	The old city of Jeddah in 1938.	http://wikimapia.org/12073261/Historic-Jeddah-AL-Balad
Fig 2.3	The old cities were walled also had date palm gardens with wells among neighborhoods.	http://www.qatifoasis.com/?act=gal&action=view&sid=40
Fig. 2.4	The transitional period was a phase of contrast between old and new in Tarut city in the Eastern Province of Saudi Arabia.	http://www.qatifoasis.com/?act=gal&action=view&sid=82
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Fig 2.11	Boon J.J. comparison of area and perimeter for varying housing forms (houses under governmental regulation, traditional houses, and Aramco houses)	Boon J.J. (1982)
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Fig 3.2	Map of traditional settlements in the Eastern Province shore of Saudi Arabia.	Ahmet Vefik Alp, 1990.
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Fig. 3.4	Old city of Tunis.	Hisham Mortada (2003).
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Fig.3.31	Courtyard houses in the 1940s.	Fieldwork.
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Fig. 3.44	Diagrammatic explanation for the climatic behavior at night, noon, and in the afternoon.	Shahim Abdurahiman M.
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Fig.3.50	The façades of traditional houses in Dammam city.	Fieldwork.
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Fig. 3.61	Burnt limestone and cement plaster were used in construction.	http://eshtrut.blogspot.com/2011_04_24_archive.html
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Fig. 3.63	Traditional building materials with their construction methods.	Fieldwork.
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Fig. 4.4	The aerial views show initial buildings at Aramco Camp with a grid-iron plan in Dhahran city.	http://www.aramcoexpats.com/articles/page/616/?new
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Fig.4.7	Bulldozers dug out streets in preparation for the grid planning in Dammam Metropolitan Area.	http://3waied.net/?p=79
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Fig.4.10	A view of the Dhahran headquarters office building, 1952.	http://www.the-saudi.net/dia/old-dhahran/index.html
Fig.4.11	Aerial view of a residential section of American Camp in Dhahran, 1950s.	www.aramcoexpats.com .
Fig.4.12	Side view of Aramco houses showing the grid-iron planning.	http://www.hawamer.com
Fig. 4.13	Bedouin watchman leaning on a gypsum building block made in Arabia; April 1946.	https://yallafeed.com/fy-aydhalwtny-al-87-swr-tstardh-ttw-r-alsawdyh-mnth-tasysha-whata-alywm-4987

Fig. 4.14	Number of Saudi workers in the 1950s. In the middle, the Minister of Petroleum and Mineral Resources, Ali Al-Naimy.	https://qafilah.com/ar/
Fig.4.15	Views of residential Area of Saudi camp.	http://www.the-saudi.net/dia/old-dhahran/index.html
Fig.4.16	Houses of Saudi workers destroyed in the mid-1960s.	http://www.the-saudi.net/dia/old-dhahran/index.html
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Fig. 4.18	A petrol station opened in the Eastern Province in 1946.	http://www.saudiaramco.com/en/home/our-company/our-history0
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Fig.4.20	American style housing at Aramco's Main Camp in Dhahran. View of Aramco warehouses, Dhahran, late 1940s.	http://www.aramcoexpats.com/articles/2007/06/22dear-folks22-the-webster-letters-from-arabia-1944-1959-11/
Fig.4.21	Saudi Camp in Dhahran between the 1930s and 1940s.	http://www.aramcoexpats.com/articles/2007/06/22dear-folks22-the-webster-letters-from-arabia-1944-1959-11/
Fig.4.22	Aramco planned the Main Camp and constructed the employees' housing units in the 1940s.	http://www.aramcoexpats.com/articles/2007/06/22dear-folks22-the-webster-letters-from-arabia-1944-1959-11/
Fig.4.23	This picture shows clear change in the form of a wider street, which allowed intrusion on the privacy maintained by traditional houses.	http://www.aramcoexpats.com/photos/saudi-arabia.aspx?page=24
Fig.4.24	This picture shows vehicle access to new traditional neighbourhoods was no longer controlled by the population.	http://www.aramcoexpats.com/photos/saudi-arabia.aspx?page=24
Fig.4.25	The transitional period shown in Al-Khobar Street plans from 1936-1947.	CHM Hill, report no, 13b.
Fig.4.26	The narrow and irregular streets no longer fit the vehicles.	http://www.alriyadh.com/2012/11/22/article786295.html
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Fig 4.28	Aramco Cars in the 1950s.	http://www.saudiaramco.com/ar_sa/home/our-company/our-history0.html?timeline=social
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Fig.4.38	A detached house (villa type) developed in the 1950s when the Aramco Home Ownership Program began.	Al-Naim, M., 1991
Fig.4.39	A common detached house in Dammam and Al Khobar cities (Labour City in the 1950s).	'Aramco Home Ownership Program' < http://ersd.aramco.com.sa/htm > (1st Nov. 2002) and fieldwork.
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