



The
University
Of
Sheffield.

Urban Form and Regulations: A Morphological Analysis of Erbil City

By
Chwas Abdulhadi Sabr

A thesis submitted in partial fulfilment of the requirements for the
degree of Doctor of Philosophy (PhD) in the Faculty of Social
Sciences at the University of Sheffield

The contents of the chapters presented herein are identical to those in the printed version. This electronic version of the thesis has been edited solely to ensure conformance with copyright legislation and all excisions are noted in the text. The final, awarded and examined version is available for consultation via the University Library.

2016

Urban Form and Regulations: A Morphological Analysis of Erbil City

By
Chwas Abdulhadi Sabr

A thesis submitted in partial fulfilment of the requirements for the
degree of Doctor of Philosophy (PhD) in the Faculty of Social
Sciences at the University of Sheffield

School of Architecture

October 2016

Abstract

The focus of this research is the morphology of the urban form of Erbil city. The research is conducted through three essential stages in six chapters. In the first stage, the factors that could influence the formation and the transformation of urban form are outlined and put together. These include the main focus, the legal factors (in the form of building and planning regulations), and other determinants which include political, social, cultural, economic, and environmental. In other words, the research looks at the formation and transformation of urban form through the frame of building and planning legislation which is supposed to meet inhabitants' needs in an urban settlement in different periods. This establishes the theoretical frame encompassing the influence and the correlation between the sets of factors on the one hand and the urban form as a variable object on the other. Meanwhile, the many aspects and various understandings of urban form as an accumulative product in cities are outlined. The literature surrounding all these issues is covered in the first and the second chapters.

In the second stage, which is covered in the third, the fourth, and the fifth chapters, the established theoretical frame will be examined through the case of the study Erbil city, because this approach to the study of Erbil has not been undertaken previously and is consequently poorly understood. Although Erbil city is thousands of years old and passed through many different eras, the study's focus will be on the period starting in 1920 (when the Iraqi State was established) until the present day, because in this period, the city has witnessed its largest growth and expansion and different building and planning legislation has been issued and amended. Different samples from nine different periods of the growth of the city from different quarters (neighbourhoods) will be selected and analysed. A descriptive and interpretative method will be adopted to deal with the data collected on these samples. Maps, photographs, and legislative texts are the main source of the data. The elements of the analysis include street, block plot, and building. Mapping by the use of AutoCAD and ArcGIS software is the essential tool and method adopted. In the fifth chapter the analysed samples will be compared to explore the nature of the change and the transformation of the urban form of the city over time through which those samples could represent the overall image.

The findings and the implications of the research are outlined in the last stage and the last chapter. The research provides significant documentation on the urban form of Erbil, the important area and subject which has been paid little attention. Therefore, the outcomes could inform responsible authorities, designers, and planners working in Kurdistan. In turn, it would have a significant influence on regulations shaping the city's future urban form. Selecting Erbil city as the case study has a considerable rationale that is incorporated within the research implications. Erbil city provides a typical case for other similar cities in the region. Therefore, there would be a possibility of generalising the methods and the outcomes of this research on many other cases.

Preface

Objectivity and subjectivity are always matters of concern to researchers. There are always questions of how to produce an objective academic piece of writing, or whether objectivity is the characteristic needed for achieving academic writing, or whether there should be a balance between these and subjective issues. This was always a struggle. Our background, our past experience, our social and cultural structure and attitudes, our beliefs, and our religion determine our position, our understanding of how we see the world, how we interpret issues around us, and also determine what are the priorities.

I would like to start from this argument to position my work. To have a better understanding of this thesis, which I done in the last four years but which emerged from earlier thinking, my background is an important issue I have to demonstrate. After my graduation as architect engineer from the department of architecture which belonged to engineering faculty, my first employment was in January 2003 in the Ministry of Municipalities of Kurdistan Region. I then took different positions and responsibilities in different administrative offices of this ministry in Erbil. Erbil, with its ancient citadel, is about eight thousand years old. It has been claimed that it is the oldest continuously inhabited settlement in the world. In its modern era, specifically since 1920, Erbil expanded and grew massively. Before being employed, many questions around issues of the formation of Erbil, the city where I lived in, its growth, its urban form, and its development were circulating in my mind. I was ambitious to practice what I learned from my early studies in the real context of the city. However, in my first practice, which involved developing an existing neighbourhood (Mustawfi Quarter), I realised that there was a missing and an important issue in which I lacked knowledge and which the undergraduate courses did not cover. Whether this has been realised or not by others, this would be an obstacle on the career path of the majority of architect graduates working in Kurdistan cities, including Erbil.

With an architectural background, my later work as the chief of the master planning department of Erbil city, first as a member and then as the head of building permits, as the manager of Urban Planning Directorate of Erbil, as well as sometimes undertaking design practice in the housing sector, all added to my knowledge. This was an experience of learning from practice. The experience of living in an environment and being a part of it is completely different from understanding the environment indirectly from reading. I realised that the process of building a city and its architecture works in a

very interrelated and complex network. An inherited institutional system and culture of architecture and planning which has a root from building and planning regulations being applied, which then became a custom and an imitated tradition, always repeats and generates an urban form that belongs that resistant culture which cannot be easily changed. There was no way other than adapting myself to the stream and letting myself go along with it, or I thinking differently. Any attempt towards a change to this tradition was difficult. Meanwhile, I noticed that out of that system and tradition, actions towards introducing new and imported international and western forms, at the first stages, are attractive and accepted by the public. Understanding issues comes before dealing with and developing them.

My Master's thesis, which I completed in 2009, concerned an evaluation of the planning and building regulations applied on Erbil. However, the area needed much more to be introduced and understood. Understanding the history and the story of an object helps to reveal and to understand its current situation, or even to some extent to predict its future. This PhD study was the opportunity to continue on the same current, but this time the aim was to understand the city of Erbil from a morphological and legislative perspective. I started with a cluster of simple questions, such as to what extent legislation or planning and building regulations determined the current urban form of Erbil; why the form of an area of the city is similar or different from that of another area; and why the change and the transformation of the urban form of the city takes certain direction. Of course, one may find quick and simple answers which lack validity. My aim was to import these issues into an academic thesis.

After I received a scholarship in the HCDP (High Capacity Development Program) of Kurdistan government and received a study offer from the University of Sheffield, I started my PhD study at the School of Architecture at that University in October 2012 with a short proposal of work. The journey started here under the supervision of Dr. Florian Kossak and Dr. Stephen Walker. Through reading the worldwide literature surrounding the area of urban form and urban morphology I realised that there are too many issues of urban morphology which need to be done on Erbil.

Erbil, with its long history, with its interesting urban fabric, and with its fascinating and unique growth during the last hundred years, has an urban morphology that needs to be academically and globally recognized. Urban morphological thinking in western contexts has been developed for about a century to a degree that has resulted in the emergence of different and distinguished schools. Moreover, the organization of

ISUF (International Seminar of Urban Form) has contributed to the development of this field of study from different backgrounds and disciplines. In addition, the journal of Urban Morphology helped to expand the worldwide knowledge of the field, especially with the publications of the studies of urban form on different place contexts such as Britain, France, Italy, Portugal, USA, China, Korea, ...etc.

As I tried to narrow down the focus of the research, it got wider because in fact, I am opening up the field which I see important. As it has been said that a journey of a thousand miles begins with a single step, I had to start from somewhere to open the field of urban form and urban morphology on the context of Erbil city with its wide range of possibilities and choices. This work delivers my detailed practical knowledge and experience of urban planning and building process of Erbil. It is an attempt to establish the studies of urban form on Erbil and other Kurdistan cities. One of the challenging issues I realised during my research was how the Western and international knowledge of urban form and urban morphology would inform my work, which is on an entirely different place and cultural context. I then asked whether the tools of urban morphology and methodologies developed in and used on western contexts could be applied on and used in this different context. The answer depended on understanding and realising the literature of urban form and morphology. Then, introducing a methodology and tools which would suit the context of Erbil, with its limitation and the available data and literature, became a priority.

The process of data collection through the various ways was the most challenging issue as no previous studies in this subject have been done on Erbil. This was the struggle of the work, although arguably this also has become its strength and originality. The process of data collection included collecting any archival piece of maps, images, and aerial photos scattered here and there, collecting the different related legislative texts, collecting information from enquiries and visiting different offices (Erbil Governorate, The General Directorate of Urban Planning, Urban Planning Directorate of Erbil, the different directorates of municipalities of Erbil, GIS Centre office of Erbil, Real Estate Registry offices of Erbil, and some private companies of building housing projects). In this regard I appreciate the cooperation and the support of all those institutions and the colleagues working there who have played a significant role in the production of this thesis. The process did not end there: it extended to field visits and taking about 10,000 photographs from almost all the quarters (Neighbourhoods) of Erbil in two stages over four different visits to Erbil at four different times (January 2014, April to May 2014, January 2015, and April to May 2015). In one of those visits (April

2014) Dr. Kossak also joined and visited Erbil for a week. His visit contributed to the work and brought and added issues.

There have inevitably been some limitations. Almost all the legislative documents are either in Arabic or Kurdish. The translation of these texts into English has mainly been undertaken by me, and there were difficulties in translating some terms. In addition, it is reasonable to mention the time and the environment limitations encountered while I was working on this research. In the last two visits, working became harder as the economic and political conditions in Kurdistan and in Iraq more broadly, deteriorated due to some factors including the attack of the terrorists of ISIS. This also affected the other students of the HCDP scholarship program. These rapid events also resulted in the regression of investment and the rapid growth which continued since 2003 in Kurdistan generally and Erbil specifically. These events were one of the determinants that could have affected the outcome of my research. However, due to the limitation of time I preferred to exclude these event and their influences on the urban form. I limited the time period for the research to cover from 1920 to 2014. After the collection of this massive amount of data, the next challenge was how to effectively manage and use them. The PhD supervisory feedback played a great role in the progress and the development of the research over the last three years.

Finally, although the focus of the research is on the cause and the effect or the correlation between regulations (Building and planning legislation) and the urban form of Erbil city, other determinants are also included where these are deemed sufficiently important to register on urban morphology. Any of those determinants could be an introduction for another research project. This thesis is a contribution to the knowledge in a field or context that lacks regular and systematic documentation. It concerns the modern history of Erbil and its urban form, exploring the role of building and planning legislation on the formation and the transformation of Erbil, from the time when it had an unplanned and organic urban pattern prior to the establishment of the state of Iraq It is hoped that this work will inform those responsible authorities involved in the planning and design in Kurdistan and Erbil.

Dedication

*I would like to dedicate this thesis to my newborn son
'Havas' and my wife.*

*To my parents, my sisters and brothers who have
supported me over the years of my study.*

Acknowledgements

I would like to thank Kurdistan Regional Government (KRG) who offered the scholarship program (High Capacity Development Program). The data collection process was the crucial stage of this research work. In this regard, I owe my deepest gratitude to the staffs of each the governmental offices of Erbil Governorate, The General Directorate of Urban Planning, Urban Planning Directorate of Erbil, the different directorates of municipalities of Erbil, GIS Centre office of Erbil, and Real Estate Registry offices of Erbil.

I am particularly grateful for the assistance given by the manager of the Urban Planning Directorate of Erbil, Mr. Bakhtyar Sadraddin Shareef. I also would like to offer my special thanks to Mr. Sherzad Ahmed for the coordination he made in the data collection process.

Finally, the supervision role cannot be disregarded. Without the comments and persistent feedback of the supervisors Dr. Florian Kossak and Dr. Stephen Walker, this thesis would not have been possible. I take this opportunity to appreciate their effort.

Contents

Abstract	I
Preface	III
Dedication	VII
Acknowledgements	IX
Contents	XI
List of Tables	XIV
List of Figures and Sources	XVI
Chapter 1	1
1. Introduction	1
1.1. Background	1
1.2. Research questions	5
1.3. Research context	10
Place context:	10
Time frame:	13
1.4. Methodology and methods	15
1.5. The aim and the importance of the research	18
1.6. The structure of the thesis	19
Chapter 2	21
2. Urban form understandings and the concepts of change	21
2.1. Urban morphology and urban form definitions and its elements	21
2.2. The emergence and origins of urban morphology and urban form	22
2.3. The three schools of urban morphology in Europe, their focus, and their approach of analysis:	25
2.3.1 <i>The English (the Conzenian) school</i>	26
2.3.2 <i>The Italian school</i>	30
2.3.3 <i>The French (Versailles) school</i>	35
2.4. A mixed approach of urban morphology	39
2.5. Type and typology	40
2.6. Urban planning and building legislation and urban form	41
2.7. The conclusion of Chapter 2	43
Chapter 3	45
3. Erbil city as the context of the research	45
3.1. Key chronological moments and their influences on the urban form and building types in Erbil	45

3.1.1	1920-1932:.....	46
3.1.2	1932-1958:.....	50
3.1.3	1958-1991:.....	55
3.1.4	1991-2003:.....	64
3.1.5	2003-2013:.....	67
3.2.	Different categories of legislation influencing urban form of Erbil	71
3.2.1	<i>Legislation concerning land rights and ownership</i>	71
3.2.2	<i>Legislation concerning heritage and antiquities</i>	77
3.2.3	<i>Legislation concerning planning and building</i>	78
3.3	Housing policies being used which largely influenced the produced urban form:	82
3.3.1	<i>Housing policy 1 (1920-2013):</i>	84
3.3.2	<i>Housing policy 2 (1960-2013):</i>	87
3.3.3	<i>Housing policy 3 (1991-2003):</i>	88
3.3.4	<i>Housing policy 4 (2003-2013):</i>	88
3.3.5	<i>Housing policy 5 (2000-2013):</i>	89
3.4	The conclusion of Chapter 3.....	89
Chapter 4	91
4.	Sampling and Analysis	91
4.1.	Analysis of the urban form of Erbil city	91
4.2.	Fieldwork and data collection.....	92
4.3	The city scale procedure of analysis as a key method to sampling.	99
4.4	Sampling through the selection of tissues from the quarters	104
4.5	Block, street, and individual plot level of analysis	104
4.6	The preparation of the maps	105
4.7	The analysis of the samples	106
4.7.1	<i>Sample 1 (Arab & Taajeel Quarters)</i>	109
4.7.2	<i>Sample 2 (Mustawfi Quarter)</i>	147
4.7.3	<i>Sample 3 (Minara Quarter)</i>	189
4.7.4	<i>Sample 4_1 (Azady_2 Quarter)</i>	217
4.7.5	<i>Sample 4_2 (Iskan Quarter)</i>	247
4.7.6	<i>Sample 5 (Bahar Quarter)</i>	271
4.7.7	<i>Sample 6 (Nawroz Quarter)</i>	297
4.7.8	<i>Sample 7 (Salaheddin Quarter)</i>	325
4.7.9	<i>Sample 8 (Havalan & Zanayan Quarters)</i>	353
4.7.10	<i>Sample 9_1 (Sarbastiy Quarter)</i>	375

4.7.11	<i>Sample 9_2 (Sharawany Quarter)</i>	395
4.7.12	<i>Sample 9_3 (Midya Quarter-Italian City)</i>	411
4.7.13	<i>Sample 9_4 (Shary Lawan Complex)</i>	427
4.8	The conclusion of Chapter 4	443
Chapter 5	447
5.	The comparison of the samples	449
5.1	Comparison process	449
5.2	Conclusion of building types and characteristics.....	464
5.3	The conclusion of Chapter 5	468
Chapter 6	469
6.	Conclusions, implications, and future studies	469
6.1	The methodology and research questions	469
6.2	Urban morphology, legislation and other determinants	471
6.2.1	<i>Urban form at different scale levels</i>	471
6.2.2	<i>Urban form and the periodic growth of the city</i>	472
6.2.3	<i>Urban form between new development and conservation, between modernity and tradition</i> 474	
6.2.4	<i>Urban form, land rights and ownership</i>	476
6.2.5	<i>Urban form and the different housing policies</i>	477
6.2.6	<i>Urban form and the concentric pattern of the city</i>	478
6.2.7	<i>Urban form and the different quarters of the city</i>	479
6.2.8	<i>Urban form and building control, formality and informality</i>	480
6.2.9	<i>Urban form and house building type</i>	481
6.2.10	<i>Urban form between past and future</i>	484
6.3	The implications of the research	485
6.3.1	<i>Academic contribution</i>	485
6.3.2	<i>Contribution to the field of practice</i>	486
6.4	Future studies	487
	Bibliography	491
	Appendix 1 (A letter from Erbil Governorate for facilitating the data collection process) ...	500
	Appendix 2 (The projections of the location of the photographs taken in the process of photographing by basing on their coordination)	501
	Appendix 3 (A published paper by the researcher on Erbil' Urban Form).....	502

List of Tables

Table 3-1: Minimum allowed area of plots according to ‘Amended System of Roads and Buildings No.44 of 1935’ (Source: Prepared by the researcher).....	50
Table 3-2: Minimum setback distances (from all plot sides) according to ‘Amended System of Roads and Buildings No.44 of 1935’. (Source: Prepared by the researcher)..	53
Table 3-3: Minimum allowed area of plots according to ‘Amended System of Roads and Buildings No.44 of 1935’ (Source: Prepared by the researcher).....	56
Table 3-4: Minimum front setback distances according to ‘Amended System of Roads and Buildings No.44 of 1935’ (Source: Prepared by the researcher).....	57
Table 3-5: Plot coverage percentage according to ‘Amended System of Roads and Buildings No. 44 of 1935’ (Source: Prepared by the researcher).....	57
Table 3-6: Minimum front setback distances according to ‘Instructions No. 851 of 1980’ (Source: Prepared by the researcher).....	61
Table 3-7: The percentages of the areas of Erbil city built under the different policies of housing. (Source: Researcher)	83
Table 4-1: Some calculations that help to shortlist the samples. (Source: Researcher).	94
Table 4-2: The first template of table (Source: Researcher)	108
Table 4-3: The second template of table (Source: Researcher)	108
Table 4-4: Sample 1, the transformation determinants (Source: Researcher)	112
Table 4-5: The successive regulations that has influenced Sample 1 Since 1920 (Source: Researcher based on different paragraphs of different legislation).....	117
Table 4-6: The completed list of the successive regulations that has influenced Sample 1 since 1920. (Source: Researcher based on different paragraphs of different legislation)	118
Table 4-7: Setback distance regulations for buildings on commercial streets.....	119
Table 4-8: Sample 2, the formation and transformation determinants (Source: Researcher).....	150
Table 4-9: The successive regulations that have influenced ‘Sample 2’ from 1925 to 1990. (Source: Researcher based on different paragraphs of different legislation).....	151
Table 4-10: The successive regulations that have influenced ‘Sample 2’ from 1991 to 2013. (Source: Researcher based on different paragraphs of different legislation).....	152
Table 4-11: Setback distance regulations for buildings on commercial streets.....	153
Table 4-12: Sample 3, the formation and transformation determinants. (Source: Researcher).....	192
Table 4-13: The successive regulations that have influenced Sample 3. (Source: Researcher based on different paragraphs of different legislation)	193
Table 4-14: Setback distance regulations for buildings on commercial streets.....	194
Table 4-15: Sample 4_1, the formation and transformation determinants. (Source: Researcher).....	220
Table 4-16: The successive regulations that have influenced ‘Sample 4_1’ until 2013. (Source: Researcher based on different paragraphs of different legislation).....	221

Table 4-17: Setback distance regulations for buildings on commercial streets	222
Table 4-18: Sample 4_2, the formation and transformation determinants. (Source: Researcher).....	250
Table 4-19: The successive regulations that have influenced ‘Sample 4_2’ until 2013. (Source: Researcher based on different paragraphs of different legislation).....	251
Table 4-20: The successive regulations that have influenced ‘Sample 4_2’ until 2013. (Source: Researcher based on different paragraphs of different legislation).....	252
Table 4-21: Setback distance regulations for buildings on commercial streets	253
Table 4-22: Sample 5, the formation and transformation determinants. (Source: Researcher).....	274
Table 4-23: The successive regulations that have influenced ‘Sample 5’ until 2013. (Source: Researcher based on different paragraphs of different legislation).....	275
Table 4-24: Setback distance regulations for buildings on commercial streets	276
Table 4-25: Sample 6, the formation and transformation determinants. (Source: Researcher).....	300
Table 4-26: The successive regulations that have influenced ‘Sample 6’ until 2013. (Source: Researcher based on different paragraphs of different legislation).....	301
Table 4-27: Setback distance regulations for buildings on commercial streets	302
Table 4-28: Sample 7, the formation and transformation determinants. (Source: Researcher).....	328
Table 4-29: The successive regulations that have influenced ‘Sample 7’. (Source: Researcher based on different paragraphs of different legislation)	329
Table 4-30: Setback distance regulations for buildings on commercial streets	330
Table 4-31: Sample 8, the formation determinants. (Source: Researcher)	356
Table 4-32: The regulations that have influenced ‘Sample 8’. (Source: Researcher based on different paragraphs of different legislation)	357
Table 4-33: Setback distance regulations for buildings on commercial streets	358
Table 4-34: Sample 9_1, the formation determinants. (Source: Researcher)	378
Table 4-35: The regulations that have influenced ‘Sample 9_1’ until 2013. (Source: Researcher based on different paragraphs of different legislation)	379
Table 4-36: Setback distance regulations for buildings on commercial streets	380
Table 4-37: Sample 9_2, the formation determinants. (Source: Researcher)	398
Table 4-38: The regulations that have influenced ‘Sample 9_2’. (Source: Researcher based on different paragraphs of different legislation)	399
Table 4-39: Setback distance regulations for buildings on commercial streets	400
Table 4-40: Sample 9_3, the formation determinants. (Source: Researcher)	413
Table 4-41: Sample 9_4, the formation determinants. (Source: Researcher)	429

List of Figures and Sources

Figure 1.1: The principles of morphological analysis and the position of this research within the overall scope. (Source: Researcher based on the previous discussion).	3
Figure 1.2: The construction of the research hypotheses and questions by linking the change in the urban form of Erbil city since 1920 to building and planning legislation and some other influencing factors. (Source: Researcher).	7
Figure 1.3: The ancient citadel at the centre of Erbil city. (Source: By Patrick Hayes, October 2007)	11
Figure 1.4: Erbil province location within Iraq. (Source: Geology and Earth Science News and Information).	12
Figure 1.5: Erbil city in three different points of time (1232, 1916, and 1950) which shows its growth from the citadel as the centre of it. (Source: Ministry of Municipalities, General Directorate of Planning and Engineering, Baghdad).....	14
Figure 1.6: Erbil city in 1975 the concentric pattern here has been almost defined. (Source: Ministry of Municipalities, General Directorate of Planning and Engineering, Baghdad)	15
Figure 1.7: Erbil city, the concentric pattern (a mix of ring and radial roads), and its expansion from the centre. (Source: Drawing by the researcher on a satellite image of Erbil in 2006)	17
Figure 1.8: The growth of Erbil city: The first development of different parts of the city in different periods. (Source: Drawing by the researcher on a satellite image of Erbil in 2010 basing on data from Ministry of Municipalities and Tourism, Erbil Urban Planning Directorate)	18
Figure 2.1: Research traditions within urban morphology, with selected authors. (Source: A Glossary of Urban Form by Peter Larkham and Andrew Jones, 1991, developed from Whitehand, 1987a, Figure 9.1 with additional information from Slater, 1990b).	23
Figure 2.2: Genealogy of study in urban morphology by Sima and Zhang. (Source: Comparative Precedents on the Study of Urban Morphology, P 103:2)	25
Figure 2.3: Threefold division of urban landscape by M. R. G. Conzen. (Source: Drawing by the researcher based on the previous discussion).....	28
Figure 2.4: Scale levels of the Italian School of urban morphology (Typo-morphology), (Muratorian typological method). (Source: Drawing by the researcher based on the previous discussion).....	32
Figure 2.5: Scale levels of the Italian school of urban morphology (Typo-morphology) (Caniggia and Maffei’s typological method). (Source: Drawing by the researcher based on the previous discussion)	35
Figure 3.1: The Ottoman Empire area. (Source: The Islam Project)	47
Figure 3.2: The three provinces which now compose Iraq state belonged to the Ottoman Empire before 1918.....	47
Figure 3.3: The organic pattern of Erbil city citadel and its surrounding area in 1930s. (Source: A) Drawing by the researcher basing on a cadastral map from The Presidency	

of the Municipality of Erbil. B) Naval Intelligence Division, <i>Iraq and Persian Gulf</i> , 1944)	48
Figure 3.4: One of the inner courtyard houses of Erbil citadel (Source: Photograph by the researcher)	49
Figure 3.5: New and widened streets on the citadel and in the surrounding area. (Source: Drawing by the researcher basing on a cadastral map from The Presidency of the Municipality of Erbil).....	51
Figure 3.6: The urban pattern of the citadel before and after opening up the axial street that links the northern and the southern gates. (Source: A) Morris, A.E.J., <i>History of Urban Form, Before the Industrial Revolutions</i> , 1994 B) Drawing by the researcher on an aerial Photograph by Georg Gensler (1973)/ Photo Researchers, Inc.)	52
Figure 3.7: Setback distances, building and plot types in different areas according to the amendment which made in 1936 on ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’. (Source: Drawing by the researcher).....	54
Figure 3.8: Setback distances, building and plot types in different areas according to the serial amendments on the ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’ from 1935 to 1964. (Source: Drawing by the researcher)	58
Figure 3.9: Plots number 72/ District number 44 Warish’ in Erbil city show the re-division of some plots into two plots after the issuance of the ‘ <i>Decision No. 850 of 1979</i> ’	61
Figure 3.10: Plot areas and setback distances according to the ‘ <i>Decision No. 850 of 1979</i> ’ and the ‘ <i>Instructions No. 851 of 1980</i> ’	63
Figure 3.11: Single-family houses adjacent to multi-storey buildings.	64
Figure 3.12: An illegal quarter in Erbil city, known as ‘Badawa illegal quarter’.....	66
Figure 3.13: Erbil city master plan which was approved in 2009.....	67
Figure 3.14: Erbil city centre master plan which then was cancelled and replaced by Erbil citadel buffer zone guidelines. (Source: Ministry of Municipalities, Dar al_Handasah, <i>Erbil City Center: Final Master Plan Report, 2007</i>)	68
Figure 3.15: Residential complexes in the west of Erbil city. (Source: Falcon Group Company).....	68
Figure 3.16: Two symmetric houses, each has 100 m ² with 5 m width on one 200 m ² plot. (Source: A) Photograph by the researcher B) The presidency of the Municipality of Erbil)	69
Figure 3.17: Attached houses with two and three floors in one block. (Source: Researcher).....	70
Figure 3.18: Different districts and subdivisions of land of Erbil. It is the key to the cadastral map of the different parts of Erbil. (Source: Drawing by the researcher based on different cadastral maps from Real Estate Registry offices of Erbil)	76
Figure 3.19: The six municipalities of Erbil city. (Source: Drawing by the researcher based on data from The Presidency of Municipality of Erbil).....	81
Figure 3.20: The different quarters of Erbil. (Source: Erbil Governorate, GIS Department, drawing edited by the researcher)	81
Figure 3.21: Different housing policies applied in Erbil since 1920. (Source: Researcher).....	83

Figure 3.22: The percentages of the areas of the different housing policies applied in Erbil. (Source: Researcher)	83
Figure 3.23: The process of the projection of the plan and building according to ‘Housing Policy 1’ in one of the quarters of Erbil (Hawlery Nwe Quarter). (Source: A) Photograph by the researcher B) Photograph by the researcher C) Urban Planning Directorate of Erbil)	86
Figure 3.24: An aerial photo of a part of a quarter (Sarwaran Quarter) built under policy 3, showing blocks of houses with typical design. (Source: Urban Planning Directorate of Erbil)	88
Figure 4.1: Different colours of the segments of the rings show their construction in different stages and periods of time. (Source: Drawing by the researcher)	98
Figure 4.2: Using closed loop processing between the city level and the neighbourhood level for grouping and then sampling process. (Source: Researcher)	99
Figure 4.3: The periodic growth of the city of Erbil included in the study area boundary. (Source: Drawing by the researcher on a satellite image of Erbil of 2010 based on data from Ministry of Municipalities and Tourism, Urban Planning Directorate of Erbil)	101
Figure 4.4: The selected samples cover different areas of the city that are grouped and divided under different topics. (Source: Drawings by the researcher based on different sources)	102
Figure 4.5: The selection of samples from different parts of the city and from different time periods. The first number refers to the sequence of the period from which the sample is selected and the second number, if any in the case of selecting more than one case from a period, and it refers to the sequence of the samples taken from the period. More than one case has been selected from ‘Period 4’ and ‘Period 9’. (Source: Researcher)	103
Figure 4.6: The possibility of having layers of changes on each sample started to form from nine different periods. (Source: Researcher)	107
Figure 4.7: The typical structure for analysing the samples and the units (measurements, elements, and materials) that are covered. (Source: Researcher)	108
Figure 4.8: The location of ‘Sample 1’ (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	113
Figure 4.9: The location of Sample 1 area, the historical Minaret, and the first three ring roads. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)	113
Figure 4.10: The integrated organic pattern of the routes of the citadel and the down part of the city in 1950s. The organic pattern extended from the citadel to the down part areas. (Source: A) Drawing by the researcher basing on a cadastral map from the archives of the Presidency of the Municipality of Erbil. B) Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)	114
Figure 4.11: A Cadastral map of Erbil city includes the quarters of Saray, Topkhana, Takiyah (the three quarters of the Citadel), Arab, Taajeel, and Khanaqa. The map drawn in the late of 1930s but some modifications and changes have been drawn in the later periods. (Source: A map from The Presidency of the Municipality of Erbil but edited by the researcher)	115

Figure 4.12: Direct municipality regulations enacted at different levels that have influenced ‘Sample 1’. (Source: Researcher).....	119
Figure 4.13: An aerial photo of Erbil city in 1928 from southeast. (Source: British Academy Library, photographed by Royal Air Force, 1928)	120
Figure 4.14: Aerial photos of Erbil city in 1938. (Source: British Academy Library. They were taken from the archaeological survey conducted by Sir Marc Aurel Stein and captured in 1938 by or with the assistance of the Royal Air Force)	120
Figure 4.15: The citadel and the southern down part before and after introducing and opening up new streets. (Source: Drawing by the researcher basing on a cadastral map from The Presidency of the Municipality of Erbil. See [Figure 3.3] and [Figure 3.5])	121
Figure 4.16: ‘Bata shop’ in an opened up street (Ashty Street) which was publicly known by the name of this shop. (Source: Erbil Governorate).....	122
Figure 4.17: The change of the use of some parts of the sample area from residential to commercial strips along with the new opened up streets in the area in 1950s. (Source: Drawing by the researcher based on data from Urban Planning Directorate of Erbil) .	122
Figure 4.18: A new opened up and introduced commercial strip (Ashty or Bata Street) with a new building type (multistorey building) in 1960s. ‘Ashty Street’ now which was known as ‘Bata Street’ before. (Source: A) Drawing by the researcher based on a cadastral map from The Presidency of the Municipality of Erbil, See [Figure 3.5]. B) Erbil Governorate)	123
Figure 4.19: Single houses in the area of ‘Sample 1’ (Arab and Taajeel quarters) in a deteriorated condition and they fell down or they are liable to fall down. (Source: Researcher).....	124
Figure 4.20: Some proposed uses in the new city centre master plan which has a trend of development of the area by introducing new commercial and business centres open spaces. (Source: Ministry of Municipalities, Dar al_Handasah, <i>Erbil City Center: Final Master Plan Report, 2007</i>).....	125
Figure 4.21: Land use map-The final master plan of the city centre of Erbil by Dar Al_Handasah Company. (Source: Drawing by the researcher on a map from KRG/ The Ministry of Municipalities, Dar al_Handasah, <i>Erbil City Center: Final Master Plan Report, 2007</i>)	126
Figure 4.22: New Zoning regulations proposed in the new master plan for the city centre, by Dar Al-Handasah Company. (Source: Drawing by the researcher on a map from KRG/ The Ministry of Municipalities, Dar al_Handasah, <i>Erbil City Center: Zoning Regulations & Building Design Guidelines Report, 2007</i>).....	126
Figure 4.23: Changes on the area from 2007 to 2011 which were mainly a result of the proposed routes and open spaces by the new city centre master plan approved in 2007. (Source: A) Drawing by the researcher on a satellite image of Erbil of 2004 adapted from Google Earth B) Drawing by the researcher on a satellite image of Erbil of 2010 adapted from ArcGIS and taken by DigitalGlobe)	127
Figure 4.24: ‘Shar Park Square’ which was built in 2010 by the removal of some buildings. (Source: Drawings by the researcher on photographs from Erbil Governorate)	128
Figure 4.25: A refined street in Taajeel quarter on Erbil valley according to the new city centre master plan. (Source: Researcher).....	129

Figure 4.26: Buffer zone of the citadel. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, <i>Urban Design Guidelines for the Buffer Zone of Erbil Citadel</i> , 2011, p6)	130
Figure 4.27: ‘Sample 1’ area (a part of Arab and a part of Taajeel quarters) includes different planning areas proposed by the guidelines for the buffer zone of the citadel. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, <i>Urban Design Guidelines for the Buffer Zone of Erbil Citadel</i> , 2011, p16).....	131
Figure 4.28: The influence of the proposed urban design guidelines for the ‘buffer zone A’ of the citadel. A new building in the area built adjacent to a traditional building according to the regulations that achieve harmonizing the facades. (Source: Researcher)	132
Figure 4.29: Modern commercial buildings and single houses in ‘Sample 1’ area been built in 1950s and 1960s. They are now considered as a part of the history of the area. (Source: Researcher)	133
Figure 4.30: Vernacular and heritage single courtyard houses with historical, architectural, and aesthetic values in the area of ‘Sample 1’, and narrow and closed end alleys. The houses have two floors in average. (Source: Researcher)	134
Figure 4.31: Vernacular and heritage single courtyard houses with historical, architectural, and aesthetic values in the area of ‘Sample 1’, and narrow and closed end alleys. The houses have two floors in average. (Source: Researcher)	135
Figure 4.32: New and existing buildings that have façade treatment with brick as a local and vernacular building material. (Source: Researcher)	136
Figure 4.33: A decorated screening brick wall has been built to hide the heterogeneous facades of the existing buildings rounding the old Bazaar. But on the opposite side of ‘Ashty Street’ the facades of the buildings have been covered by brick cladding. (Source: A) Erbil Governorate B) Photographs by the researcher)	137
Figure 4.34: ‘Sample 1’ area: A mix of organic and irregular urban pattern with regular pattern of plot and route elements. (Source: Drawing by the researcher based on data from the General Directorate of Urban Planning)	138
Figure 4.35: ‘Sample 1’ area from south west: A mix of organic and irregular urban pattern with interventions of regular pattern of plot and route elements. The introduced opened up streets (Ashty and Shekhy Choly streets) have separated the area into few clusters of urban fabric. (Source: Drawing by the researcher based on data from the General Directorate of Urban Planning)	138
Figure 4.36: Direct regulations enacted at different levels that have influenced Sample 2. (Source: Researcher).....	153
Figure 4.37: The location of ‘Sample 2’ and ‘Mustawfi’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	154
Figure 4.38: The boundary of ‘Mustawfi’ quarter, the Ring Roads, and ‘Shaikh Qazi’ valley. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)	154
Figure 4.39: A high oblique aerial photo of Erbil citadel and the city before 1935 from southwest. The north area of the citadel has not been built yet. (Source: Naval Intelligence Division, <i>Iraq and Persian Gulf</i> , 1944, photographed by Royal Air Force in 1933)	155
Figure 4.40: A serial of aerial photos of Erbil from 1919 to the end of the first half of the last century show ‘Sample 2’ area (Mustawfi quarter). The first formation of the	

area appears in the photo of 1938. As the building process of single houses has been done individually and gradually (not at a time), the formation process of the quarter happened slowly. (Source: Drawings by the researcher on photographs from different sources: A) Royal Geographical Society, photographed by Royal Air Force B) British Academy Library, photographed by Royal Air Force C) Naval Intelligence Division, *Iraq and Persian Gulf*, 1944 D) Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)..... 156

Figure 4.41: The different parts of ‘Sample 2’ area which were planned and registered in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)..... 157

Figure 4.42: The original land features (old roads, land boundaries, and streams of valleys) have significant influence on the ground plan of the sample area. The different parts have different registration numbers. Plot areas of the different parts range from 80m² to 300m². However, there are exceptions. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)..... 157

Figure 4.43: ‘I –section steel joists’ used for windows and doors lintels and roofing in an early single-family house in the area of ‘Sample 2’. It superseded the use of timber which was in use prior to 1920. (Source: Researcher)..... 158

Figure 4.44: The common characteristics of the early houses built in the period (1926-1940) of the first formation of the area of ‘Sample 2’. (Source: Researcher) 159

Figure 4.45: The influence of the original old land features (old roads, agricultural land boundaries, and a valley streams) on the formation of sample 2 area which is reflected in the pattern and the layout of streets and blocks of ‘Sample 2’ area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning) 160

Figure 4.46: A high oblique aerial photo of Erbil citadel and the city before 1935 from southwest. Original roads appear in the area. These roads have later reflected in the ground plan of the quarter. (Source: Naval Intelligence Division, *Iraq and Persian Gulf*, 1944, photographed by Royal Air Force in 1933) 161

Figure 4.47: Erbil map, ‘Plan of Erbil’ by ‘Great Britain. Naval Intelligence Division in 1944. It conforms to the aerial photo taken in 1919 by The Royal Air Force, [Figure 4.40]. (Source: Naval Intelligence Division, *Iraq and Persian Gulf*, 1944)..... 162

Figure 4.48: The opening up of the north part of the second ring road (Ayubi Street) appears in a vertical aerial photo of Erbil in 1951. The Second Ring Road (Ayoubi Street) passes through the quarter. Both, the second and the third ring roads opened up after the first formation of the quarter and required a removal of some existing buildings and changes in the ground plan of the area. Some buildings (single family houses) in ‘Mustawfi’ quarter are on the path of the road. These houses were later removed. (Source: Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)..... 167

Figure 4.49: Mustawfi quarter border in 1970s. The area of the quarter included both Mustawfi and Tairawa now. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department) 167

Figure 4.50: The three commercial streets (Tairawa, Aaras, and Alti Barmagh streets) passing through the area from the north to the south and connecting the second ring road to the third ring road. The multistorey commercial buildings on these streets were built along with these streets from 1950s continuously. The commercial activities have

influenced the inner areas and resulted in the change and the transformation of the physical forms of buildings in the area. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)..... 168

Figure 4.51: ‘Tairawa Street’ from north towards south. Commercial buildings built in 1980s. The average height of the buildings is two storeys. (Source: Researcher)..... 168

Figure 4.52: Modern commercial buildings on ‘Tairawa Street’ built in the period (1956-1975). They have two floors. The ground floor is shops and the first floor is residential apartments. The buildings have no setback distance from the streets and 1.25m distance offset distance towards the street to make a cantilever. (Source: Researcher)..... 169

Figure 4.53: The continuous and the accumulated process of change and transformation over the area. The process of building new buildings and demolishing old buildings has resulted in the variety of the urban form of buildings that convey the characteristics of the forms over the successive periods from 1925 to 2013. (Source: Researcher) 170

Figure 4.54: The old traditional courtyard houses are demolished and replaced by new modern houses but most of them are replaced by multistorey commercial buildings. However, they are all still attached. (Source: Researcher) 171

Figure 4.55: A new development plan of a part of ‘Mustawfi’ quarter was approved in 2004. The main notion of this development plan was to create a commercial centre and attracting more commercial activities into the area by widening the majority of the existing roads which generally causes a partly removal of buildings. This plan was applied on any new individual building granted a permit of demolishing the old existing building and building a new one on a request by the owner. This policy was applied on the area from 2004 until 2010. (Source: Drawing by the researcher on a map from The Presidency of the Municipality of Erbil)..... 171

Figure 4.56: Tairawa Street towards south. The plan of 2004 for the western part of ‘Tairawa Street’ resulted in the change of the panoramic scene of the attached buildings along the streets. The plan was applied on any new building in the area and proposed building setback from the street while the old existing buildings have no setback distance. As a result the straight building line was broken by those new buildings. (Source: Researcher) 172

Figure 4.57: The area of ‘Sample 2’ was included in the ‘Buffer Zone B’ of the citadel in 2011. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p6). 172

Figure 4.58: ‘Sample 2’ area is included in the ‘Buffer Zone B’ of the citadel. The urban design guidelines applied on this area defined four different zones in which different policies and interventions employed. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p 16) 173

Figure 4.59: The height guidelines for the buffer zone of the citadel. The maximum height in ‘Mustawfi’ quarter (Sample 2) is 15m or four storeys in the areas defined as ‘Urban Corridors’ (the second ring road, the third ring road, and the axial road (Aras Street). However, the maximum height of 8m or two storeys is in the ‘New Courtyard Houses’. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p 27) 173

Figure 4.60: New buildings in the area built according to the ‘Citadel Buffer Zone Guidelines of 2011’. The maximum height allowed is 4 floors. Setback distance from

the streets is applied on some zones in the area basing on their previous regulations. The facades are flat with decorated brick cladding and windows with flat and pointed arches to reflect the heritage and vernacular elements. However, the attached type has been maintained. (Source: Researcher) 174

Figure 4.61: Blocks samples selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011) 174

Figure 4.62: A block (block 1) sample selected from the western part (Part 1) of ‘Sample 2’ area. The block has been built as the first urban area category of the ‘*System of Roads and Buildings No. 44 of 1935*’. The areas of the plots vary but all are less than 200m². No noticeable change happened to the plots areas since the first formation. The building type is courtyard but some old houses have been demolished and replaced by modern types with the disappearance of the courtyard. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 175

Figure 4.63: Blocks (block 2 and 3) samples from the eastern part (Part 4) of ‘Sample 2’ area. They have been built as the second urban area category of the ‘*Amended System of Roads and Buildings No. 44 of 1935*’. The original areas of the plots were ranged from 200m² to 300m² with exceptions. The later regulations of ‘*Decision No. 850 of 1979*’ and ‘*The Instructions of the Decision No. 851 of 1980*’ have influenced these two blocks. The houses are attached type. Despite that the regulations did not impose setback distance, but front setback is noticed in almost all the houses. The open area formed from the setback distance is used for spacious front garden. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 176

Figure 4.64: The selected blocks (block 2 and 3) from the eastern part of ‘Sample 2’ area. The transformation (pooling and subdivision) on some plots under the successive regulations issued after the first formation of the area. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 177

Figure 4.65: The possible form of buildings, plots, block and street of the first urban area category which can be produced by ‘*Amended System of Roads and Buildings No. 44 of 1935*’ and the real produced form by the same system in the west part of ‘Sample 2’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 178

Figure 4.66: The possible form of buildings, plots, block and street of the second urban area category which can be produced by ‘*Amended System of Roads and Buildings No. 44 of 1935*’ and the real produced form by the same system in the east part of ‘Sample 2’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 179

Figure 4.67: The possible transformation of the form of buildings, plots, block and street of the second urban area category which can be resulted by ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 in 1980*’ and the real resulted form by the same regulations in the east part of ‘Sample 2’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 180

Figure 4.68: The common form characteristics of the houses built in the period (1950-2014) in the area of ‘Sample 2’. (Source: Researcher) 181

Figure 4.69: Direct regulations enacted at different levels that have influenced Sample 3. (Source: Researcher)	194
Figure 4.70: The location of ‘Sample 3’ and ‘Minara’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	195
Figure 4.71: The boundary of ‘Minara’ quarter, the Ring Roads, and the two valleys. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)	195
Figure 4.72: The different parts of ‘Sample 3’ area which were planned and registered in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)	196
Figure 4.73: The original land features (old roads and land boundaries) have significant influence on the ground plan of the sample area. The average area of the original plots is 300 m ² . However, the areas of the plots vary from 220m ² to 500m ² . In later periods, due to subdivision actions in later periods, some plots were subdivided into two. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	196
Figure 4.74: An aerial photo taken in 1951. Few single family houses appear in the north east of Minara quarter, the part which is very close to the citadel from the east. (Source: Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)	197
Figure 4.75: Early courtyard houses in the northeast part of the ‘Minara’ quarter built in the late of the second period (1937-1940). (Source: Researcher)	197
Figure 4.76: The common characteristics of the early houses built in the period (1941-1955) of the first formation of the area of ‘Sample 3’. (Source: Researcher)	198
Figure 4.77: The influence of the original old land features and the concentric pattern of the city on the formation of ‘Sample 3’ area which is reflected in the pattern and the layout of the streets and the blocks. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	199
Figure 4.78: The continuous process of replacing the old houses by new residential (single family houses) or multistorey commercial buildings. The process is still in progress. (Source: Researcher)	203
Figure 4.79: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	204
Figure 4.80: Photographs show the two selected blocks of buildings in ‘Sample 3’ area and the historical minaret (Choly Minaret). (Source: A) Drawing by the researcher on a photo from The Governorate of Erbil B) Photograph by the researcher)	204
Figure 4.81: Two block (block 1 and block 2) samples from ‘Sample 3’ area showing the existing condition. The typical area of the original plots is 300m ² . The widths and the depths of the plots in the first block vary but the depth of the plots of the second block is 20m. In later periods some plots were subjected to subdivision actions. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	205
Figure 4.82: The buildings of ‘Block1’ are a mixture of single family houses, multistorey commercial buildings, and a mosque. (Source: Researcher)	205

Figure 4.83: The two blocks include a mixture of original houses of detached and semi-detached types formed under the ‘ <i>Amended System of Roads and Buildings No. 44 of 1935</i> ’ and transformed and new buildings (replaced the old houses) of attached type formed under the influence of the later amendments and new regulations of later periods. Different setback regulations are applied on the buildings. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	206
Figure 4.84: The buildings of ‘Block 2’ are a mixture of original old single family houses and new replaced houses. (Source: Researcher)	206
Figure 4.85: The selected blocks (block 1 and block 2) from ‘Sample 3’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. Due to that the minimum subdivision area according to ‘ <i>Decision No. 850 of 1979</i> ’ is 120m ² , the original plots have been formally and informally subdivided into two each with an average area of 150m ² for two single family houses. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	207
Figure 4.86: The possible form of buildings and plots which can be produced by the amendment of 1936 of the ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’ and the real produced form by the same regulations in ‘Block 2’ of ‘Sample 3’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	208
Figure 4.87: The possible form of buildings and plots which can be produced by the amendment of 1964 of the ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’ and the real produced form by the same regulations in ‘Block 2’ of ‘Sample 3’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	209
Figure 4.88: The possible form of buildings and plots which can be produced by the successive amendments of the ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’, ‘ <i>Decision No. 850 of 1979</i> ’, ‘ <i>Instructions of the Decision No. 851 of 1980</i> ’, and ‘ <i>Decision No. 940 of 1987</i> ’, and the real produced form by the same set of regulations in ‘Block 2’ of ‘Sample 3’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	210
Figure 4.89: The common characteristics of the transformed houses built in the area of ‘Sample 3’ in later periods (1956-2013). (Source: Researcher)	211
Figure 4.90: Direct regulations enacted at different levels that have influenced Sample 4_1. (Source: Researcher)	222
Figure 4.91: The location of ‘Sample 4_1’ and ‘Azady_2’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	223
Figure 4.92: Azady_2 quarter boundary. (Source: Drawing by the researcher on a satellite image of Erbil of 2010).....	223
Figure 4.93: The different parts of the ‘Sample 4_1’ area which were formed in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil).....	224
Figure 4.94: The original land feature conform the four different parts which compose the ‘Sample 4_1’ area. The size of the plots differs from one part to another, especially part 2 which has an average plot area of 500m ² and part 2 with an average plot area of 300m ² . (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	224

Figure 4.95: The common form characteristics of the houses built in the period (1956-1975) of the first formation of the area of ‘Sample 4_1’. (Source: Researcher)	225
Figure 4.96: The height of the fence and the front setback distance of the house building from the street create a visual barrier that, wholly or partly, prevents seeing the house from outside (the street). The fence works as a strong screen which defines the separation line between the public spaces (streets) and the private spaces (the buildings of the houses). This gives privacy to the house and the front garden which is used by the households. The social, cultural, and religious attitudes of the people have the role in this characteristic. Due to that the older parts of the city which have courtyard type, the private open space is located in the middle of the plot and it is separated from the public space (the street) by some parts and spaces of the building of the house (rooms, storages, and sometimes baths and toilets). This separation also gave privacy to the open court in the house. (Source: Researcher)	226
Figure 4.97: The influence of the original old land features (old roads and agricultural land boundaries on the formation of the area which is reflected in the pattern and the layout of streets and blocks of ‘Sample 4_1’ area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	227
Figure 4.98: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	232
Figure 4.99: Two blocks (block 1 and block 2) samples selected from the first part of ‘Sample 4_1’ area showing the existing condition. The blocks have been built as the third urban area category of the ‘ <i>Amended System of Roads and Buildings No. 44 of 1935</i> ’. The areas of the plots vary. All the original plots (the plots which have not transformed) have areas range from 300m ² to 600m ² (20m X 25m). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	233
Figure 4.100: Two blocks (block 1 and block 2) samples selected from the first part of the ‘Sample 4_1’ area showing the existing condition. The existing building types are a mixture of detached, semi-detached, and attached houses. Due to the changes in the regulations over time, the setback distances vary. There are cases (the buildings which have not applied front setback and the minimum limit of plot coverage) that do not match the regulations. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	234
Figure 4.101: A block (block 3) sample from the second part of the area. The early building process of houses on the block is dated back to after 1964. They were built as the third urban area category of the amendments of ‘ <i>The System of Roads and Buildings No. 44 of 1935</i> ’ made by 1965. The average area of the original plots is 300m ² (15m X 20m). However, some cases have areas more than 300m ² , especially the plots at the corners which usually have areas more than the typical. The type of the houses is attached with front setbacks which are regulated by both, the amendment of 1964 of ‘ <i>The System of Roads and Buildings No.44 of 1935</i> ’ and ‘ <i>The Instructions of the Decision No. 850 of 1979</i> ’. The houses of the block have been built in the successive periods since 1964 and the process of the removal of the old houses replaced by new is still in progress. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	235

Figure 4.102: The selected blocks (block 1 and 2) from the first part of “Sample 4_1” area. The transformation (pooling and subdivision) on some plots under the successive regulations issued after the first formation of the area. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	236
Figure 4.103: A block (block 3) sample from the second part of the area. The average area of the original plots is 300m ² (15m X 20m). There is one case of informal subdivision into two plots for two individual houses. This type of subdivision now became a common trend in the area. In this process the old house is removed and replaced by two houses each share an area of 150m ² (7.5m X 20m) or (15m X 10m) in the case of the corner plots. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	237
Figure 4.104: The possible form of buildings and plots of the third urban area category which can be produced by the successive and the accumulated amendments of ‘ <i>The System of Roads and Buildings No. 44 of 1935</i> ’ by 1965, and the real produced form by the same system in the first part of ‘Sample 4_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	238
Figure 4.105: The possible form of buildings, plots, and block and street of the third urban area category which can be produced by successive and accumulated amendments of ‘ <i>The System of Roads and Buildings No. 44 of 1935</i> ’, ‘ <i>The Decision No. 850 of 1979</i> ’, ‘ <i>The prescriptive No. 851 in 1980</i> ’ and the ‘ <i>Decision No. 940 of 1987</i> ’ on one hand, and the real produced form by the same set of regulations in the first part of ‘Sample 4_1’ on the other hand. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	239
Figure 4.106: The possible form of buildings, plots, and block and street of the third urban area category which can be produced by ‘ <i>The Amended System of Roads and Buildings No. 44 of 1935</i> ’ and the real produced form by the same system in the second part of ‘Sample 4_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	240
Figure 4.107: The common form characteristics of the houses built in the period (1975-2013) in the area of ‘Sample 4_1’ (Azady_2 Quarter). (Source: Researcher).....	241
Figure 4.108: Direct regulations enacted at different levels that have influenced ‘Sample 4_2’. (Source: Researcher)	253
Figure 4.109: The location of ‘Sample 4_2’ and ‘Iskan’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	254
Figure 4.110: The boundary of ‘Iskan’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010).....	254
Figure 4.111: The different parts of the ‘Sample 4_2’ area which were planned and registered in different time periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)	255
Figure 4.112: Each part has a different registration number. ‘Part 1’ is the focus of the analysis of the sample. The original land features and the radial road (Runaky Road) have determined the layout of the area but with extent of difference of influence on the different parts of the area. (Source: Drawing by the researcher based on data from The	

Figure 4.113: ‘Part1’ was built in two stages. The typical plot areas of the first stage are 108m² and 135m². The second stage was built later and the typical plot areas of this stage are 150m² and 200m². ‘Part2’ and ‘Part 3’ have been planned in later periods. They have different registration numbers. The typical plot area of ‘Part 2’ is 600m². However, due to subdivision actions in later periods, some of the plots of ‘Part 2’ have been subdivided into smaller areas, mostly 300m². The typical plot area of ‘Part 3’ is 200m². (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning) 256

Figure 4.114: A survey of the area done in 1973 shows the first stage of ‘Part 1’ but the second stage of this part and both ‘Part 2’ and ‘Part 3’ have not been built yet. (Source: Humanitarian Information Center for Iraq (HIC), Map HIC Reference 333) 256

Figure 4.115: The common characteristics of the early houses built in the period (1976-1985) of the first formation of the area of ‘Sample 4_2’. (Source: Researcher) 257

Figure 4.116: The ground plan pattern of the different parts of ‘Sample 4_1’ has variably influenced by the concentric pattern of the city and the original land features (land boundaries and old roads). It seems that the layout has not originally designed for this location but it has been fitted to adapt this context. (Source: Drawing by the researcher based on data from The Real Estate Registry offices of Erbil and The General Directorate of Urban Planning) 258

Figure 4.117: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011) 263

Figure 4.118: Three blocks samples from the first part of ‘Sample 4_2’ area showing the existing condition. Both (Block 1 and Block 2) are from the first stage of ‘Part 1’. The average plot area of the plots of ‘Block 1’ is 108m² (9m X 12m). Addition and replacement actions to the houses resulted in not keeping a constant front setback distance and building line. This is also the case in ‘Block 2’. However, the average area of the plots of eastern row of this block is 135m² due to that the depth of the plot is 15m. In the case of ‘Block 3’ which is from the second stage of ‘Part 1’, apart from the plots of the two ends of the block, a constant font setback of an average distance of around 5m is kept. The blocks include a mixture of old original, modified, and new houses. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 264

Figure 4.119: Demolition the old houses located on the radial road (Runaky Road) and replacing them by multistorey commercial buildings. (Source: Researcher) 265

Figure 4.120: The common characteristics of the houses built in the later periods (1996-2013) in the area of ‘Sample 4_2’. (Source: Researcher) 266

Figure 4.121: Direct regulations enacted at different levels that have influenced ‘Sample 2’. (Source: Researcher) 276

Figure 4.122: The location of ‘Sample 5’ and ‘Bahar’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department) 277

Figure 4.123: The current boundary of ‘Bahar Quarter’. (Source: Drawing by the researcher on a satellite image of Erbil of 2010) 277

Figure 4.124: The previous boundary of “Bahar” and “Krekaran” quarters. (Source: Drawing by the researcher on a satellite image of Erbil of 2010) 278

Figure 4.125: The different parts of the ‘Sample 5’ area which were formed in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)	279
Figure 4.126: The original land features have little influence. However, an agricultural land boundary separates part 1 and part 2 from part 3. The size of the plots differs from one part to another. The average plot area of part 2 is 100 m ² and the average plot area of part 3 is 150 m ² . (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	279
Figure 4.127: The common characteristics of some early houses built in the periods (1966-1985) of the first formation of the area of ‘Sample 5’. (Source: Researcher)	280
Figure 4.128: The influence of the original old land features (old roads and agricultural land boundaries on the formation of the area which influenced the pattern and the layout of the streets and blocks of ‘Sample 5’ area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	281
Figure 4.129: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	285
Figure 4.130: A block (block 1) sample selected from the second part of the ‘Sample 5’ area showing the existing condition. The block has been built informally. The areas of the plots were prepared in 200 m ² each, but two houses have been built on the majority of the plots. The block includes a variety of attached types of buildings. The setback distances and the plot coverage are not regulated by a certain regulations but are submitted to the decisions of the owners. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	286
Figure 4.131: The selected block (block 1) from the second part of ‘Sample 5’ area. The transformation (pooling and subdivision) on the majority of the plots resulted under the pressure and the increasing demand on houses. This process was made informally. However, their existing condition was legalized by the authority basing on ‘ <i>Decision No. 5 of 2002</i> ’ made by the Kurdistan Parliament on informal buildings. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	287
Figure 4.132: A block (block 2) sample from the third part of the area. The early building process of houses on the block is dated back to after 1964. They were built as the first urban area category of the amendments of ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’ made by 1965. The typical area of the original plots is 150m ² (7.5m X 20m). The common type of the houses is attached with front setbacks which are regulated by the amendment of 1964 of ‘ <i>System of Roads and Buildings No.44 of 1935</i> ’, ‘ <i>Decision No. 850 of 1979</i> ’ and ‘ <i>Instructions No. 851 in 1980</i> ’. The process of the removal of the old houses replaced by new is still in progress. There is one case of plot which is in this process and is vacant. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	288
Figure 4.133: The possible form of buildings and plots of the first urban area category which can be produced by the successive and the accumulated amendments of ‘ <i>System of Roads and Buildings No. 44 of 1935</i> ’ by 1965, ‘ <i>Decision No. 850 of 1979</i> ’, and ‘ <i>Instructions No. 851 in 1980</i> ’ and the real produced form by the same set of regulations	

in the third part of ‘Sample 5’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	289
Figure 4.134: The common characteristics of the houses built in the later periods (1996-2013) in the area of ‘Sample 5’. (Source: Researcher)	290
Figure 4.135: The transformation of the area in 2005 due to the implementation of the remaining segment of Sixth Ring Road (Peshawa Qazi Muhammad Street) and the widening of a part of ‘Alban Street’. This project required the removal of some informal houses which were directly or indirectly on the paths of those streets. (Source: Drawings by the researcher on the satellite images of 2004 and 2011)	291
Figure 4.136: Direct regulations enacted at different levels that have influenced ‘Sample 6’. (Source: Researcher)	302
Figure 4.137: The location of ‘Sample 6’ and ‘Nawroz’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	303
Figure 4.138: The boundary of ‘Nawroz’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010).....	303
Figure 4.139: The different parts of the ‘Sample 6’ area which were planned and registered in the same period. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)	304
Figure 4.140: Apart from the line which separates ‘Part 1’ and ‘Part 2’, the original land features have no significant influence on the ground plan of the sample area. The area has two categories of plot area in each part (200 m ² and 300 m ²). However, due to subdivision actions in later periods, plots of areas less than 200m ² have emerged. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	304
Figure 4.141: The area has two categories of plot area in each part (200 m ² and 300 m ²). However, due to subdivision actions in later periods, plots of areas less than 200m ² have emerged. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	305
Figure 4.142: The common characteristics of the early houses built in the period (1976-1985) of the first formation of the area of ‘Sample 6’. (Source: Researcher)	306
Figure 4.143: The original land features have no significant influence on the pattern of the formed ground plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	307
Figure 4.144: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	311
Figure 4.145: A block (block 1) sample from the first part of the ‘Sample 6’ area showing the existing condition. The early houses of the block have been built according to ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’. The area of the original plots is 320 m ² (16 m X 20 m). Some of the old houses have been replaced by two houses (160 m ² each) or three houses (100 m ² - 120 m ²). The block includes a variety of attached typologies of buildings. The setback distances and the plot coverage are not regulated by a certain regulations but are submitted to the decisions of the owners. The common type of the houses is attached with front setbacks which are regulated by the ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’.	

(Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 312

Figure 4.146: A block (block 2) sample from the first part of the area. The early houses of the block have been built according to ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 of 1980*’. The average area of the original plots is 200m² (10m X 20m). However, some cases have different dimensions and areas more than 200m², especially the plots at the corners of the block which usually have areas more than the typical. No significant changes and modifications happened to the plots and streets. The common type of the houses is attached with front setbacks which are regulated by the ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 of 1980*’. The houses of the block have been built in the successive periods since 1981 and the process of the removal of the old houses replaced by new is still in progress. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 313

Figure 4.147: A block (block 3) sample from the second part of the area. They early houses of the block were built according to ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 in 1980*’. The average area of the original plots is 300m² (15m X 20m). However, some cases have different dimensions and areas more than 150m², especially the plots at the corners of the block which usually have areas more than the typical. No significant changes and modifications happened to the plots and streets. The common type of the houses is attached with front setbacks which are regulated by the amendment of 1964 of ‘*The System of Roads and Buildings No.44 of 1935*’, ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 of 1980*’. The houses of the block have been built in the successive periods since 1979 and the process of the removal of the old houses replaced by new is still in progress. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 314

Figure 4.148: The selected block (block 1) from the first part of ‘Sample 6’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. The original plots subdivided into two or three plots. Until 1987 the minimum allowed area of subdivision was 120 m². However, the subdivision type of the plots in of this block is by sharing which means that the original plot can be shared by two or three owners with no official separation lines. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 315

Figure 4.149: The selected block (block 2) from the first part of ‘Sample 6’ area. The transformation (subdivision) on four plots is evident. The original plots which have 200 m² area subdivided into two plots. After 1979, there are no regulations that allow official subdivision of areas less than 120 m².The subdivision type of the plots in of the block is by sharing which means that the area of original plot can be shared by two or three owners with no official separation lines. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil) 315

Figure 4.150: The selected block (block 3) from the second part of ‘Sample 6’ area. The transformation (subdivision) on most of the plots can be observed. The original plots which have 300 m² area subdivided into two or three plots. After 1979, there are no regulations that allow official subdivision of areas less than 120 m².The subdivision type of the plots in of the block is by sharing which means that the area of original plot can be shared by two or three owners with no official separation lines. (Source:

Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	316
Figure 4.151: The possible form of buildings and plots which can be produced by the by 1965, ‘ <i>Decision No. 850 of 1979</i> ’, and ‘ <i>Instructions No. 851 of 1980</i> ’ and the real produced form by the same set of regulations in ‘Block 1’ in the first part of ‘Sample 6’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	317
Figure 4.152: The possible form of buildings and plots which can be produced by the by 1965, ‘ <i>Decision No. 850 of 1979</i> ’, and ‘ <i>Instructions No. 851 of 1980</i> ’ and the real produced form by the same set of regulations in ‘Block 2’ in the first part of ‘Sample 6’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	318
Figure 4.153: The possible form of buildings and plots which can be produced by the by 1965, ‘ <i>Decision No. 850 of 1979</i> ’, and ‘ <i>Instructions No. 851 of 1980</i> ’ and the real produced form by the same set of regulations in ‘Block 3’ in the second part of ‘Sample 6’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	319
Figure 4.154: The common characteristics of the houses built in the later periods (1996-2013) in the area of ‘Sample 6’. (Source: Researcher)	320
Figure 4.155: Direct regulations enacted at different levels that have influenced ‘Sample 7’. (Source: Researcher)	330
Figure 4.156: The location of ‘Sample 7’ and ‘Salaheddin’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	331
Figure 4.157: The boundary of ‘Salaheddin’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)	331
Figure 4.158: The different parts of the ‘Sample 7’ area which were planned and registered in the same period. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)	332
Figure 4.159: The original land features (Old boundaries) have no significant influence on the ground plan of the sample area. The two parts have two different registration numbers. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	332
Figure 4.160: The sample has four categories of plot area (200m ² , 250 m ² , 400m ² , and 600 m ²). However, due to subdivision actions in later periods, plots of areas less than 200m ² have emerged. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	333
Figure 4.161: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 7’ area which is a part from ‘Salaheddin’ quarter. (Source: See page 105).....	334
Figure 4.162: The common form characteristics of the houses built in the period (1986-2003) in the area of ‘Sample 7’. (Source: Researcher)	335
Figure 4.163: The original land features have no significant influence on the pattern of the formed ground plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	336

Figure 4.164: Samples of blocks selected from ‘Sample 7’ for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	340
Figure 4.165: A block (block 1) sample from ‘Sample 7’ area showing the existing condition and the building process which is still in progress. Out of 23 plots 4 plots have not been built by 2011. The typical area of the original plots is 250m ² (10 m X 25 m). The block includes attached type of houses which have been built in the period (2003-2011) and regulated by the ‘Instructions No. 851 in 1980’. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	341
Figure 4.166: A block (block 2) sample from ‘Sample 7’ area. The typical area of the original plots is 400 m ² (16 m X 25 m). However, the majority of the plots have been subdivided and used for two (8m X 25m) or more single family houses. The block includes attached with front setback type of houses which have been built in the period (2003-2011) and regulated by the ‘Instructions No. 851 in 1980’. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	342
Figure 4.167: A block (block 3) sample from ‘Sample 7’ area. The average area of the original plots is 600m ² (20m X 30m). However, the plots at the corners of the block have different dimensions and areas more than 600m ² . Except four plots which were unbuilt by 2011, all the other plots have been subdivided into two (10m X 30m) or more. The block includes attached with front setback type of houses which have been built in the period (2003-2011) and regulated by the ‘Instructions No. 851 in 1980’. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	343
Figure 4.168: The selected blocks (block 1 and block 2) from ‘Sample 7’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. Due to that the minimum subdivision area according to ‘Decision No. 940 of 1987’ is 200m ² , the original plots of ‘Block 1’ informally subdivided into two. Out of 23 plots 9 have been informally subdivided. However, almost all the plots of ‘Block 2’ have been subdivided into two, each with 200m ² (8m X 25m) or more (one case at one of the corners) with areas less than 200m ² . (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	344
Figure 4.169: The selected blocks (block 3) from ‘Sample 7’ area. The average area of the original plots of the block is 600m ² (20m X 30m). Apart from four unbuilt cases of the original plots, all the plots have been subdivided into two each with 200m ² (10m X 30m) or more (2 cases). As the minimum subdivision area according to ‘Decision No. 940 of 1987’ is 200m ² , the original plots of this block can be formally subdivided into two or three according to the dimensions of the plot. However, one informal case is subdivided into 6 plots each with an average area of 100m ² and used for 6 single family houses. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	345
Figure 4.170: The possible form of buildings and plots which can be produced by the ‘Decision No. 940 of 1987’ and the ‘Instructions No. 851 of 1980’ and the real produced form by the same set of regulations in ‘Block 1’ of ‘Sample 7’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	346

Figure 4.171: The possible form of buildings and plots which can be produced by the ‘Decision No. 940 of 1987’ and the ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in ‘Block 2’ of ‘Sample 7’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	347
Figure 4.172: The possible form of buildings and plots which can be produced by the ‘Decision No. 940 of 1987’ and the ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in ‘Block 3’ of ‘Sample 7’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	348
Figure 4.173: The common form characteristics of the houses built in the period (2004-2014) in the area of ‘Sample 7’. (Source: Researcher)	349
Figure 4.174: Direct regulations enacted at different levels that have influenced ‘Sample 8’. (Source: Researcher)	358
Figure 4.175: The location of ‘Sample 8’ and ‘Havalan’ and ‘Zanayan’ quarters. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	359
Figure 4.176: The boundary of ‘Havalan’ and ‘Zanayan’ quarters. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)	359
Figure 4.177: The different parts of the ‘Sample 8’ area which were almost registered in the same period. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil).....	360
Figure 4.178: ‘Sample 8’ composes of parts from both ‘Havalan’ and ‘Sarwaran’ quarters but they are registered in the same year under the same registration number (7, District 93 Hasarok). (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	360
Figure 4.179: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 8’ area which is a part from both ‘Havalan’ and ‘Zanayan’ quarters. (Source: See page 105)	361
Figure 4.180: The common form characteristics of the houses built in the period (1996-2003) of the first formation of the area of ‘Sample 8’. (Source: Researcher)	362
Figure 4.181: The common form characteristics of the houses built in the period (2004-2014) in the area of ‘Sample 8’. (Source: Researcher).....	363
Figure 4.182: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011).....	364
Figure 4.183: A block (block 1) sample from ‘Sample 8’ area showing the existing condition and the building process is still in progress. Out of 24 plots 5 plots have not been built by 2011. The typical area of the original plots is 200 m ² (10 m X 20 m). The block includes attached type of houses which have been built in the period (1996-2011) and regulated according to ‘Instructions No. 851 in 1980’. However, one case of not complying the regulations is noticed which include two houses each on 100m ² (5m X 20m) land area on one 200m ² (10m X 20m) plot. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	365
Figure 4.184: A block (block 2) sample from ‘Sample 8’ area. The typical area of the original plots is 200 m ² (10 m X 20 m). The block includes attached with front setback	

type of houses which have been built in the period (1996-2011) and regulated according to ‘ <i>Instructions No. 851 in 1980</i> ’. However, more than half of the original 200m ² plots have been used for two single family houses each on 100m ² (5m X 20m) land areas. Those are considered as the contrary to what the regulations proposed. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	366
Figure 4.185: The selected blocks (block 1 and block 2) from ‘Sample 8’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. Due to that the minimum subdivision area according to ‘ <i>Decision No. 940 of 1987</i> ’ is 200m ² , the original plots informally subdivided into two. This means that the original plot is shared by two owners with no official separation line. In the first block one case of informal subdivision and one pooling case can be observed. However, with 18 cases of plots out of 32, more than half of the plots of the block have informally been subdivided into two. Each 200m ² single plot was used for two 100m ² single-family houses. The majority of the houses with 100m ² on the informal subdivided plots have been built in the period (2004-2014). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	367
Figure 4.186: The possible form of buildings and plots which can be produced by ‘ <i>Decision No. 940 of 1987</i> ’ and ‘ <i>Instructions No. 851 of 1980</i> ’, and the real produced form by the same set of regulations in ‘Block 1’ in ‘Sample 8’ (Havalan quarter). (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	368
Figure 4.187: The possible form of buildings and plots which can be produced by ‘ <i>Decision No. 940 of 1987</i> ’ and ‘ <i>Instructions No. 851 of 1980</i> ’, and the real produced form by the same set of regulations in ‘Block 2’ in ‘Sample 8’ (Havalan quarter). (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	369
Figure 4.188: The original land features have no significant influence on the pattern of the formed plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	370
Figure 4.189: Direct regulations enacted at different levels that have influenced ‘Sample 9_1’. (Source: Researcher)	380
Figure 4.190: The location of ‘Sample 9_1’ and ‘Sarbasty’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	381
Figure 4.191: The boundary of ‘Sarbasty’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010).....	381
Figure 4.192: The two parts of ‘Sarbasty’ quarter which have two different typical plot areas (200m ² and 250m ²). (Source: Drawing by the researcher on a satellite image of Erbil in 2010, based on data from the Real Estate Registry Offices of Erbil)	382
Figure 4.193: The different parts of ‘Sarbasty’ quarter proposed by ‘ <i>Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007</i> ’. In each part a common colour is applied on the facades of houses. (Source: Drawing by the researcher on a map from the Presidency of the Municipality of Erbil)	382

Figure 4.194: The form characteristics of single family houses regulated by the new regulations in ‘Sample 9_1’. (Source: Researcher)	383
Figure 4.195: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 9_1’ area which is a part from ‘Sarbasty’ quarter. (Source: See page 105)	384
Figure 4.196: Unbuilt residential plots beside and between completed houses in the area. (Source: Researcher)	384
Figure 4.197: Incomplete houses beside completed houses. (Source: Researcher).....	385
Figure 4.198: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	385
Figure 4.199: A block (block 1) sample from ‘Sample 9_1’ area showing the existing condition and the building process is still in progress. Out of 27 plots 16 houses have been built by 2011. The typical area of the original plots is 200 m ² (10 m X 20 m). The block includes attached type of houses which have been built according to ‘ <i>Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007</i> ’. The setback distances and the plot coverage are regulated by this regulations which, comparing to the previous regulations it reduced the level of flexibility in the interpretation. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	386
Figure 4.200: A block (block 2) sample from ‘Sample 9_1’ area showing the existing condition and the building process is still in progress. Out of 20 plots, 9 houses have been built by 2011. The typical area of the original plots is 200 m ² (10 m X 20 m). The block includes attached type of houses which have been built according to ‘ <i>Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007</i> ’. The setback distances and the plot coverage are regulated by this regulations which, comparing to the previous regulations it reduced the level of flexibility in the interpretation. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	387
Figure 4.201: The possible form of buildings and plots which can be produced by ‘ <i>Decision No. 940 of 1987</i> ’ and ‘ <i>Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007</i> ’ and the real produced form by the same set of regulations in ‘Block 1’ in ‘Sample 9_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	388
Figure 4.202: The possible form of buildings and plots which can be produced by ‘ <i>Decision No. 940 of 1987</i> ’ and ‘ <i>Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007</i> ’ and the real produced form by the same set of regulations in ‘Block 2’ in ‘Sample 9_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	389
Figure 4.203: The original land features have no significant influence on the pattern of the formed ground plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	390

Figure 4.204: Direct regulations enacted at different levels that have influenced ‘Sample 9_2’. (Source: Researcher)	400
Figure 4.205: The location of ‘Sample 9_2’ and ‘Sharawany’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	401
Figure 4.206: The boundary of ‘Sharawany’ quarters. (Source: Drawing by the researcher on a satellite image of Erbil in 2010).....	401
Figure 4.207: ‘Sample 9_2’ focuses on ‘Sharawany’ quarter with a registration number 26. District 94 Badawa. The average area of the plots is 250m ² . However, there is a small part of the sample from ‘Hamrin’ quarter which has a different registration number and the average area of the plots of this part is 200m ² . (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	402
Figure 4.208: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 9_2’ area which is a part from ‘Sharawany’ quarter. (Source: See page 105)	402
Figure 4.209: The common form characteristics of the houses built in the period (2004-2013) of the first formation of the area of ‘Sample 9_2’. (Source: Researcher)	403
Figure 4.210: A block sample selected from ‘Sample 9_2’ for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	404
Figure 4.211: A block case selected from ‘Sample 9_2’ area. The plots have been transformed through informal subdivision actions on the majority of them. Due to that the minimum subdivision area according to ‘Decision No. 940 of 1987’ is 200m ² , the original plots informally subdivided into two. This means that the original plot is shared by two owners with no official separation line. About 75% of the built up plots have been subdivided. Two types of subdivisions can be noticed: equal subdivision, each has 125m ² (6.75m X 20m) and unequal subdivision, one has 150m ² (7.5m X 20m) and the other has 100m ² (5m X 20m). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	404
Figure 4.212: A block sample from ‘Sample 9_2’ area showing the existing condition and the building process which is still in progress. Out of 20 plots 4 plots have not been built by 2011. The typical area of the original plots is 250 m ² (12.5 m X 20 m). The block includes attached type of houses which have been built in the period (2004-2011). Apart from the informal subdivision of the plots, the building process of the houses is regulated by ‘Instructions No. 851 in 1980’. There are four houses that have been built on the original area of the plot with no subdivision. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil).....	405
Figure 4.213: The possible form of buildings and plots which can be produced by ‘Decision No. 940 of 1987’ and ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in the selected block from ‘Sample 9_2’ (Sharawany quarter). (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	406
Figure 4.214: The influence of the original land features on the pattern of the formed plan. The location of the area within the city and the concentric pattern of the city are routinely influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	407

Figure 4.215: The location of ‘Sample 9_4’ and ‘Midya’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	414
Figure 4.216: The boundary of “Midya” quarter. (Source: Drawing by the researcher on a satellite image of Erbil in 2010)	414
Figure 4.217: The complex includes five types of houses and the area included in “Sample 9_3” includes four types. The average plot area of each type is different. However, the plot area of a certain type is not constant and it may vary from a house to another. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning)	415
Figure 4.218: The average plot area of each type of the houses is different: for type 1 is 140m ² ; type 2 is 200m ² ; type 3 is 240m ² ; type 4 is 320m ² ; and type 4 is 600m ² . (Source: Researcher)	415
Figure 4.219: Different satellite images taken from four different years show ‘Sample 9_3’ area. Unlike the individual process of policy 1, all the houses of the complex were built together in the same time and the complete scene aimed was achieved. From 2010 to 2014 no difference can be noticed in the residential buildings (single-family houses). (Source: See page 105)	416
Figure 4.220: 3D views showing the parts of the complex were prepared before being constructed. (Source: Hemn Group Companies, <i>Italian City Project, Erbil</i>)	416
Figure 4.221: The common form characteristics of the houses of ‘Sample 9_3’ (Italian City) which have been built in the period (2004-2013). (Source: Researcher)	417
Figure 4.222: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	418
Figure 4.223: A block (block 1) sample from ‘Sample 9_3’ area. The typical plot area of house type 1 is 140m ² (7m X 20m). Front and rear setback is applied. The produced type of the block is side attached and back detached houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	419
Figure 4.224: Block samples (block 2 and 3) from ‘Sample 9_3’ area. The typical plot area of house type 2 is 200m ² (10m X 20m). Front and one side setback is applied. The produced type of the block is semi-detached (side detached and back attached) houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	420
Figure 4.225: Block samples (block 4 and 5) from ‘Sample 9_3’ area. The typical plot area of house type 3 is 240m ² (12m X 20m). 4.2m front and 0.6m rear setback is applied. The produced type of the block is attached houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	421
Figure 4.226: Block samples (block 6 and 7) from ‘Sample 9_3’ area. The typical plot area of house type 4 is 320m ² (16m X 20m). 4.2m front setback, 1.1m one side setback, and 0.6m rear setback is applied. The produced type of the block is semi-detached houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	422

Figure 4.227: The location of the area within the city and the concentric pattern of the city are influential. In addition, the design intentions also determined the form of the layout. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)	423
Figure 4.228: Direct regulations enacted at different levels that have influenced ‘Sample 9_4’. (Source: Researcher)	430
Figure 4.229: Shary Lawan housing complex. (Source: Happy Land Company)	431
Figure 4.230: The location of ‘Sample 9_4’ and ‘Shary Lawan’ housing complex. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)	432
Figure 4.231: The boundary of ‘Shary Lawan’ housing complex. (Source: Drawing by the researcher on a satellite image of Erbil in 2010).....	432
Figure 4.232: ‘Sample 9_4’ which is a part of ‘Shary Lawan’ housing complex includes 3 types of houses. Few blocks included a mixture of two types. The common house type is type 1. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning).....	433
Figure 4.233: The four different types of houses in ‘Shary Lawan’ housing complex. Both type 1 and type 2 seem similar from the front view and they can be arranged in a block in two different ways: either by replicating a double mirrored houses (symmetric replication), or by replicating the house without mirroring (identical array). Type 3 is not implemented in the complex and the number of the houses of type 4 is very limited, with about 70 houses, this type does not exceed 7% of the total houses of the complex. (Source: Happy Land Company)	433
Figure 4.234: The common form characteristics of the houses of ‘Sample 9_4’ (Shary Lawan housing complex) which have been built in the period (2004-2013). (Source: Researcher).....	434
Figure 4.235: Different satellite images taken from four different years show ‘Sample 9_4’ area and building three blocks of house type 2 after 2010. (Source: See page 105)	435
Figure 4.236: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)	435
Figure 4.237: A block (block 1) sample from ‘Sample 9_4’ area. The typical average area of the plots of the block is 200m ² (10m X 20m). A typical and identical design of type 1 is adopted for the houses of this block. The type is side attached and rear detached with front setback. This type can be replicated in two ways: whether by mirroring (layout type 1) which is the case in this block, or by identical arraying (layout type 2). (Source: A) Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil B) Happy Land Company).....	436
Figure 4.238: A block (block 2) sample from “Sample 9_4” area. The typical average area of the plots of the block is 200m ² (10m X 20m). A typical and identical design of type 1 is adopted for the houses of this block. The type is side attached and rear detached with front setback. The type in this block has been replicated by identical arraying (layout type 2). (Source: A) Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil B) Happy Land Company)	437

Figure 4.239: A block (block 3) sample from ‘Sample 9_4’ area. The typical average area of the plots of the block is 200m ² (10m X 20m). A typical and identical design of type 1 and 2 is adopted for the houses of this block. House type 2 is side attached and rear detached with front setback. Both house types 1 and 2 in this block have been replicated by mirroring (layout type 1). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)	438
Figure 4.240: A block (block 4) sample from ‘Sample 9_4’ area. The typical average area of the plots of the block is 200m ² (10m X 20m). Typical and identical design of both type 1 and 2 are adopted for the houses of this block. House type 4 is side attached and rear detached with front setback. Both house types 1 and 4 in this block have been replicated by mirroring (layout type 1). (Source: A) Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil B) Happy Land Company)	439
Figure 4.241: The original land features have no significant influence on the pattern of the formed plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry offices of Erbil and The General Directorate of Urban Planning)	440
Figure 5.1: A visual comparison of the tissue layouts of the samples. (Source: Researcher).....	452
Figure 5.2: A visual comparison of the street layouts of the samples. (Source: Researcher).....	455
Figure 5.3: A visual comparison of the block layouts of the samples. (Source: Researcher).....	458
Figure 5.4: A visual comparison of the pattern of building-plot-block of the samples. (Source: Researcher)	462
Figure 5.5: The relationship between the concentric pattern and the layout of the samples. (Source: Researcher)	463
Figure 5.6: A summary of the possibilities of the house types of ‘Period 1’ to ‘Period 5’. (Source: Researcher).....	466
Figure 5.7: A summary of the possibilities of the house types of ‘Period 6’ to ‘Period 9’. (Source: Researcher).....	467
Figure 6.1: An aerial photo of Erbil in 1938 from north towards south. (Source: British Academy Library. It was taken from the archaeological survey conducted by Sir Marc Aurel Stein captured in 1938 by or with the assistance of the Royal Air Force).....	473
Figure 6.2: A high oblique aerial photo of Erbil and its citadel from north towards south, 2009. (Source: The Presidency of the Municipality of Erbil)	473
Figure 6.3: Urban form between new development and conservation, between modernity and tradition. (Source: A) Naval Intelligence Division, <i>Iraq and Persian Gulf</i> , 1944. See [Figure 1.3]. B) By Patrick Hayes, October 2007. See [Figure 3.3]. C) Drawing by the researcher. See [Figure 4.10]. D) Drawing by the researcher. See [Figure 4.143]. E) Photograph by the researcher, 2014. See [Figure 4.19]. F) Photograph by the researcher, 2014. See [Figure 4.218]. G) Photograph by the researcher, 2014. See [Figure 4.30]. H) Photograph by the researcher, 2014. See [Figure 4.181].).....	475

Chapter 1

1. Introduction

1.1. *Background*

This research investigates the process of urban form and its change in Erbil city since the establishment of the Iraq State in 1920. To give a better understanding of what the research exactly encompasses, the terms and concepts that studies of the urban form of cities involve are introduced here and their definitions given. The discussion begins with what the city means, from the perspective of the notion of change.

Cities are an accumulation of a series of studied, unstudied, conscious, unconscious, planned, and unplanned actions over time. Cities are ‘Places made up of buildings and people’.¹ This confirms the definition of city as a ‘man-made object built over time’.² Cities, in their nature of patterns are classified into two main categories: Planned and unplanned. However, there are cities that are a mixture of these two. Some have defined unplanned patterns as ‘Organic’. Non-ordered alleys and irregular open spaces are apparent characteristics of unplanned or organic patterns, which evolve and develop without a prior plan.³ However, sometimes, this type of pattern can be regulated and reshaped by planned interventions according to the needs in different periods of time. Therefore, the result would be a mixed pattern.

The urban form of cities is always questionable. From the point of view of urban designers ‘urban form’ has two different and integrated meanings. It means street pattern and areas when it is interpreted as a two dimensional object while three dimensionally, it refers to heights and shapes.⁴ Albert Levy identified four main elements (plot, street, constructed space, and open space) that define the physical urban form of cities⁵. However, Emily Talen has outlined three main elements that significantly affect the urban form of cities. Those are street widths, heights of buildings, and building lines and setback.⁶ This is an insight to understanding urban

¹ S. Kostof, *The City Shaped, Urban Patterns and Meanings Through History* (London: Thames and Hudson Ltd, 1991), p. 40.

² Aldo Rossi, *The Architecture of the City*, First (Cambridge: The MIT Press, 1982), p. 128.

³ Kostof.

⁴ M Lowndes and K Murray, ‘Monuments Dilemmas and the Development of the Rules of Thumb for Urban Designer’, *The Planner*, 74.3 (1988), 20–23.

⁵ Albert Levy, ‘Urban Morphology and the Problem of Modern Urban Fabric: Some Questions for Research’, *Urban Morphology*, Urban Morphology, 3.2 (1999), 79–85.

⁶ E. Talen, *City Rules, How Regulations Affect Urban Form* (Washington: Island Press, 2012).

form by analysing its compositional elements which can be measured either quantitatively or qualitatively.

Moreover, even within a certain city, the urban form is not a static object. It could experience dramatic changes. 'Urban form' and 'urban morphology' are always linked to each other. In the studies of form, sometimes the term 'morphogenesis' is used 'to define the process leading to the formation and transformation of the built environment'. 'Urban morphology equals the study of urban form'.⁷ 'Urban morphology is the study of the city as human habitat'.⁸ Although the term 'urban morphology' has various understandings and uses, it mainly means investigation on the physical form.⁹ It also refers to the process of the change and the morphology of the physical forms of human settlements over time. Geographers have been involved in studying urban morphology. However, in 1996 this understanding has been shifted when ISUF (International Seminar of Urban Form) introduced urban morphology as an interdisciplinary field which involves architecture, geography, history and planning.

Morphological analysis is a method of understanding urban form through three main principles: The first is through the three physical elements, buildings and open spaces, plots, and streets. The second is through the four different scales starting from the micro scale (such as singular building and plot) to the higher scale or the regional scale. The last is historically through replacement and transformation of its elements.¹⁰ The focus of this research within the overall scope of dealing with urban form as a physical entity can be defined in two phases. The general focus includes the three physical elements of urban form with the influencing determinants of transformation at up to the city scale. However, the research is positioned with a detailed focus on legislative factors and their influence on the formation and transformation of the elements of plot and building-open space. See [Figure 1.1].

⁷ Anne Vernez Moudon, 'A Catholic Approach to Organizing What Urban Designers Should Know', *Journal of Planning Literature*, 6.4 (1992), 331–49 (p. 342).

⁸ Anne Vernez Moudon, 'Urban Morphology as an Emerging Interdisciplinary Field', *Urban Morphology*, 1.1 (1997), 3–10 (p. 3).

⁹ J. W. R. Whitehand, 'British Urban Morphology: The Conzenian Tradition', *Urban Morphology*, 5.2 (2001), 103–9.

¹⁰ Moudon, 'Urban Morphology as an Emerging Interdisciplinary Field'.

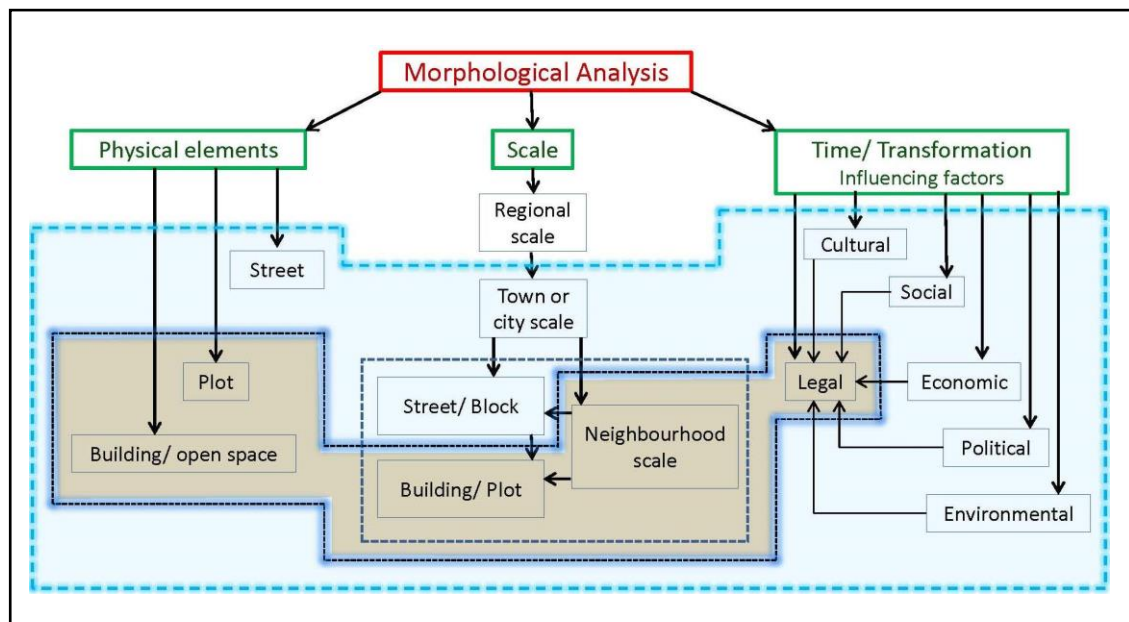


Figure 1.1: The principles of morphological analysis and the position of this research within the overall scope. (Source: Researcher based on the previous discussion).

The pattern of the change of urban form could be gradual and continuous when the new resulted forms have links to the existing and some characteristics and qualities are passed from the old to the new form. In other words, the new production inherits aspects from the existing. This process does not occur independently but it is governed by some rules and traditions which could be either intended or unintended. However, sometimes, in some cases and periods, the change could be discontinuous and interrupted, such as when the newly produced forms are partially or wholly independent from their ancestors with no apparent connection. Levy pointed out that the modern urban forms are shifts in the process of urban form changes.¹¹ Whichever the pattern of the change is, there are factors such as social, cultural, environmental, economic, and political, all combined together, that influence the process.

The main aspect of the existence of urban settlements, generally, is to control developments, growth, and organise patterns of relationships between individuals and communities living in the settlement. This is one of the points that the process of urbanization aims at. Responsible authorities for urban planning and design, emerging from defined objectives, try to predict and manipulate the process of the development and change. Decisions and policies which can be represented in different forms and hierarchies such as laws, codes, regulations, and discrete separate orders are used as an

¹¹ Levy.

implementation tool, minimizing the occurrence of deviation to the least as much as possible, to manage the process and direct it towards the goals.

Consequently, the resultant urban form cannot be separated from the influence of urban planning and design decisions. They lead to the development of types and even also the appearance of new types. Anne Moudon has classified studies related to urban form into typology-morphology, which is more common in Europe rather than in North America, and space-morphology.¹² As people in different ways affect the process of the urban form change, the physical form of the city also affects the city users. Bill Hillier identified three types of laws¹³ that underlie urban form: laws of the object itself which interpret how buildings are combined to form urban areas; the laws from society to urban form that means how the society uses the first sets of laws to interpret the social relation in a spatial form; and finally the laws from urban form to society, which addresses the other way in which the urban form influences the society.¹⁴ There is a mutual influence between urban form and its users (people). People produce forms and forms affect their life and behaviour. Then, the generation of urban forms by people and the influence of these urban forms on people who again produce new and modified urban form work and circulate in a closed loop process.

From this notion, the three schools of urban form studies in Europe are distinguished. The first is the Italian School, the second is the Versailles School in France, and the last is the English or Conzenian School which is originated from early studies in Germany by M. R. G. Conzen and some other scholars such as Schluter and Geisler who worked before Conzen.¹⁵ Each of these schools has its own focus and methods which differentiates it from the others. For example, the first aims harmonizing the new urban form with the old and they should be integrated in the context. This approach was a result of the challenge of fitting modern architecture into the existing context of Italian cities. The Versailles's concern is on developing and evolving social critiques through typo-morphological methods. However, the latter which has resulted in the establishment of the Urban Morphology Research Group in England, adopts analysing urban form and interpreting it by giving explanation.¹⁶

¹² Levy.

¹³ In this context the word 'law' does not mean legislation but it is used as a rule of phenomena.

¹⁴ B. Hillier, 'The Architecture of the Urban Object', *Ekistics*, 334 (1989), 5–21.

¹⁵ Whitehand, 'British Urban Morphology: The Conzenian Tradition'.

¹⁶ *The Urban Design Reader (Routledge Urban Reader Series)*, ed. by Michael Larice and Elizabeth Macdonald, 1st edn (London: Routledge, 2006).

‘A type is an “abstract object built through analysis” that reproduces the properties that are deemed essential by the analyst of a family of real object’.¹⁷ Using type as a means to interpret the change in urban places and their structure is a theory of typo-morphology which involves the physical structure of cities based on classifying the type of urban form (buildings and open spaces).¹⁸ The typo-morphology, which as a combined term, was first used by Aymonino in 1966: it studies socioeconomic forces that result in a physical form production. Saverio Muratori described typo-morphology as an ‘operational history of urban form’.¹⁹ However, space-morphology focuses on geometrical characteristics of the urban form. Hence, spatial elements (i.e. rooms and transportation channels) and their relationships justify the urban form.²⁰

1.2. Research questions

Based on a subjective thinking, I as an architect and a planner who worked in Erbil had questions about its urban form and its process of change over time. Hence, the issue begins from a specific context of place which is Erbil. The research questions are constructed upon the hypothesis that there is a mutual relationship between the urban form of Erbil on one hand and a group of influencing factors on the other. Legislation is the first determining factor. However, the other factors which can be summarised as social, cultural, environmental, economic, and political also have affected the urban form of the city. The latter group of factors all combined together are supposed to be represented in policies in a form of legal factor or legislation. This research tests the hypothesis of the formation and the transformation of the Erbil’s urban form as a physical entity influenced by legislation and other factors. Regarding this issue, the question of ‘How’ is raised. This type of question investigates the nature and extent of the influence and the relationship.

The lack of studies concerning these issues on Erbil was the primary motivation of the initiation of this kind of questions. Consequently, answers to these questions would generate an original contribution to the knowledge of urban form and urban morphology. For having a more precise understanding of the issue, the research and its questions is specified to the time period from 1920 to the present day in which the

¹⁷ Anne Vernez Moudon, “Getting to Know the Built Landscape: Typomorphology” From Ordering Space: Types in Architecture and Design (1994), in *The Urban Design Reader*, ed. by Michael Larice and Elizabeth Macdonald (London: Routledge, 2006), p. 271.

¹⁸ Moudon, “Getting to Know the Built Landscape: Typomorphology” From Ordering Space: Types in Architecture and Design (1994), p. 257.

¹⁹ Moudon, “Getting to Know the Built Landscape: Typomorphology” From Ordering Space: Types in Architecture and Design (1994), p. 257.

²⁰ Moudon, ‘A Catholic Approach to Organizing What Urban Designers Should Know’.

massive change and urban growth happened in Erbil. In this regard, three research questions which have an open nature and starts by ‘How’ are made.

The first is **‘How, and to what extent has Erbil’s urban form been influenced by building and planning legislation (regulations) in different periods?’** In other words, it is questioning the relationship between the urban form and its morphology on the one hand and the legislative factors which are supposed to reflect and represent the social, cultural, environmental, political, and economic factors on the other. However, in reality, the urban form is not always shaped by legislation, but sometimes, when legislation is absent or has some degree of flexibility, the urban form is influenced directly or indirectly by other factors such as the social, cultural, environmental, economic, and political, all combined together. Hence, the second question is addressed: **‘How has Erbil’s urban form been influenced by different factors (social, cultural, environmental, economic, and political) in different periods?’** This question is constructed upon the assumption that apart from legislation, urban form is influenced by other factors. Again, this question investigates the nature, the extent, and the directions of their influence. These two questions investigate the relationship between the urban form and the influencing factors. To ease the investigations and the comparison, the period from 1920 until the present is subdivided into particular periods according to determined shifts or changes, explained in more detail below.

Answers to these questions would lead towards the third and the last question **‘How has Erbil’s urban form changed?’** Through the process of analysis of the urban form and the factors of its shaping over the past period, the research would conclude the answer of the third and the last ‘How’ question which investigates the nature and the extent of the formation and the transformation of the urban form as a physical entity over the time period. See [Figure 1.2].

These questions can be reinforced by the morphological studies and its literature. The research questions are supported by the assumptions that the studies of urban form encompass and investigate. Regarding the studies on urban form, Jeremy Whitehand grouped three strands of research which emerged from Conzen’s foundation (the English School).²¹ The first strand is ‘Micro morphology’. It does not just analyse at the scale of the individual plot which is neither new to architects nor to geographers, but what was new was the detailed analysis of the spatial relationships between the physical changes to 20th century’s residential houses.

²¹ Further detail on the approaches of this school will be provided in the next chapter.

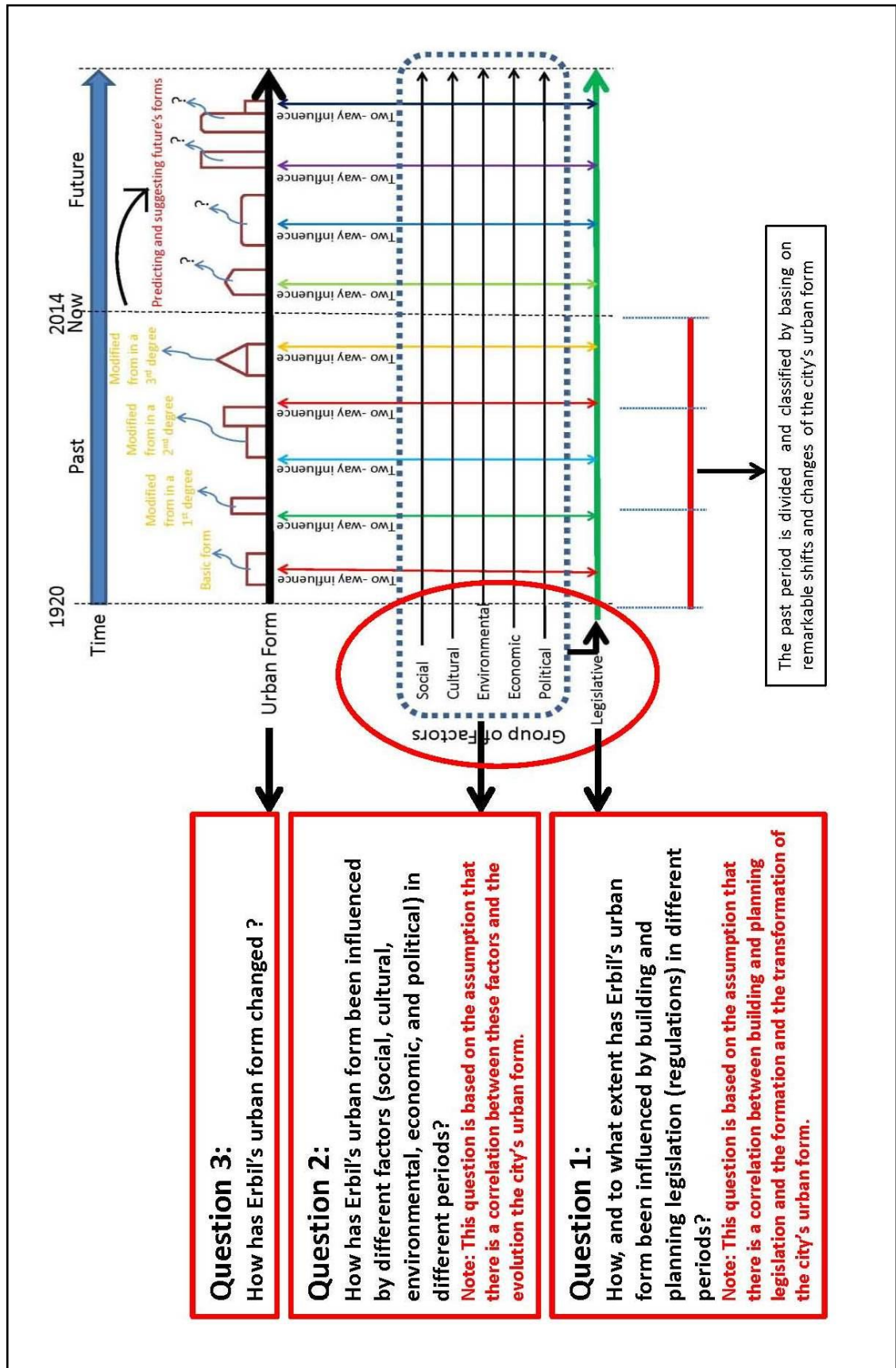


Figure 1.2: The construction of the research hypotheses and questions by linking the change in the urban form of Erbil city since 1920 to building and planning legislation and some other influencing factors. (Source: Researcher).

The second strand involves studies on the morphological periods. Morphological period studies deal with how the characteristics of the form of a certain period is changed and replaced by those of the next period. The third strand is the relationship between the decision-taking and the urban form. In other words, this means how different and separate decisions are combined to create regularities on the ground. Unlike Conzen, his followers paid more attention to the role of decision-takers in shaping the urban form.²² Peter Larkham stated that the most important trends of studies are those which focus on how the urban landscape change in historical contexts over long time period and investigate features of the form that have been produced by the previous generations.²³

Starting from the position that urban form changes over time and is influenced by factors based on what scholars stated, the research questions guiding this thesis were established. Alexander Cuthbert linked urban form to social aspects and has pointed out that ‘In most regions of the world, urban form had to pay some respect to nature, both in the organization of social space and in domestic architecture’.²⁴ Jerold Kayden acknowledged the considerable influence of legislation on the urban form. He cited that ‘For better and worse, law makes a powerful imprint on the design of the built environment’.²⁵ A. Morris has defined factors that affect the formation of the urban form as ‘determinants’ and classified them into two categories according to their origins. The first one which he called ‘natural-world’ mainly consists of climate, topography and available construction materials. This category has significantly affected shaping historic urban form (organic and planned). The second includes a number of actions and interventions by humans and Morris has categorised them under ‘man-made’ determinants, some of the groups under this category justify the urban form of both organic and planned towns as well.²⁶

This concept of linking between the physical environment and urban form on the one hand, and people’s characteristics on the other, has previously been addressed by Amos Rapoport. Rapoport claimed that there is a two way influence between people’s characteristics as individuals and groups on the one hand and the physical built

²² Whitehand, ‘British Urban Morphology: The Conzenian Tradition’.

²³ Peter J. Larkham, ‘The Study of Urban Form in Great Britain’, *Urban Morphology*, 10.2 (2006), 117–41.

²⁴ A. Cuthbert, *The Form of Cities: Political Economy and Urban Design* (Oxford: Wiley-Blackwell, 2006), p. 1.

²⁵ J. Kayden, ‘The Law of Urban Design’, in *Companion to Urban Design*, ed. by T. Banerjee and A. Loukaitou-Sideris (New York: Routledge, 2011), p. 176.

²⁶ A.E.J. Morris, *History of Urban Form, Before the Industrial Revolutions*, 3rd ed (Essex: Longman Group UK Ltd, 1994).

environment on the other.²⁷ In other words, people within certain social groups and individuals who have certain characteristics, culture, and social status influence the shaping of urban form of the built environment in a certain way. Conversely, a certain urban form of the built environment affects people as well, and any change in one of those two would lead to a change in the other. This is a circulating pattern of cause and effect. However, as much in geography, it can be argued that the significant effect on people is made by social and economic environment, not by the built environment. Rapoport's concern is about identifying human characteristics and many others beyond these like economic, socio-cultural, psychological and technological. Regardless of the aims of Rapoport's claims, it can be derived that social, cultural, and economical factors are crucial because they have considerable influence on shaping the built environments and its form.

Despite its objectives, what it aims at, and its level, legal factor in the form of rules and regulations or laws has a considerable effect on cities' urban form. Some of them are used as a tool of controlling developments, while others are adopted to achieve the minimum requirements to create a comfortable and safe living environment. However, some have cultural norms and aesthetic values and priorities. Adding to these previous, legislation could be a reflection of political, social, and economic issues. Nevertheless, the result is that they lead to shaping a certain urban form.

Historically, the Codes of Hammurabi 2100 B.C in Old Babylon which was used as a tool of achieving justice is considered as the dawn of building regulations,²⁸ followed by Greeks' regulations about the building of dwellings, and then Romans' regulations on limiting buildings' height. Then, in the Middle Ages some regulations were adopted to restrict fire hazards. An increase in number and scope of adopting regulations in the beginning of nineteenth century had been noticed. They were adopted as a tool of protecting public health and safety.

Zoning codes or ordinances²⁹ has been introduced to divide cities into different parts (districts) which have different pre potential or wanted characteristics distinguishing from each other. This is achieved through organizing uses of lands,

²⁷ A. Rapoport, *Human Aspects of Urban Form, Towards a Man-Environment Approach to Urban Form and Design* (Oxford: Pergamon Press Ltd, 1997).

²⁸ A. B. Gallion and S. Eisner, *The Urban Pattern, City Planning and Design*, 3rd ed (London: D. Van Nostrand Company, 1975), p. 6.

²⁹ Different countries use different terms for legislative texts and most legislation have a chapter or a section in which the used terms in the body are defined. However, sometimes the term refers to the hierarchical level of the legislation.

densities, height and bulk, and off-street parking.³⁰ In the twentieth century regulations affecting forms has changed from conscious to unconscious action and shifted from form-direct to form-indirect rules. There are three categories of rules that have an impact on shaping urban forms: the first are rules that deal with street width which has a considerable impact on urban form. The next is building height regulation. The last category is rules that deal with building lines and setback distances.³¹ Michael Guggenheim explained that changes in building types (familiar to the locality and unfamiliar one) can be traced through analysing debates about zoning laws.³² He also stated that ‘Zoning laws are the legal instruments used to define building types as ‘not belonging’, and therefore foreign’.³³

1.3. Research context

‘Nothing exists or ever has without being fixed in **space** and **time**’.³⁴ In this section, the place context and the time frame of the case that this research studies are defined. According to the statement by Morris ‘**Characteristically the form of an urban settlement at any given period is the result of a number of locally effective determinants**’³⁵, understanding the urban form of Erbil can be achieved through understanding the time period in which the form is emerged or changed. The factors that influenced the urban form are strongly attached to the time period in which they existed. As previously mentioned, the characteristic of originality of this research work emerges from that its questions will be focused on a particular context that lacks previous studies in this concern.

Place context:

The research uses Erbil city³⁶, the capital of Kurdistan (the northern region of Iraq), as its case study. Erbil as it is perhaps the oldest present-day city in the world is a clear example of organic growth of cities by having a tell (a man-made settlement mound) at its centre, and possessing a cellular urban grain at its early stages, specifically in Sumerian period when it was named ‘Arbela’.³⁷

³⁰ Gallion and Eisner.

³¹ Talen.

³² M. Guggenheim and O. Soderstron, *Reshaping Cities, How Global Mobility Transforms Architecture and Urban Form* (Abingdon: Routledge, 2010).

³³ Guggenheim and Soderstron, p. 45.

³⁴ Gianfranco Caniggia and Gian Luigi Maffei, *Architectural Composition and Building Typology: Interpreting Basic Building*, trans. by Susan Jane Fraser (Firenze: Alinea, 2001), p. 56.

³⁵ Morris, p. 10.

³⁶ ‘Erbil’, ‘Arbil’, or ‘Irbil’ is called ‘Hewlêr’ in Kurdish.

³⁷ Morris.

As Arthur B. Gallion and Simon Eisner state, ‘there are reasons why cities are located where they are; they were important reasons in the history of the city and they bear upon its future’.³⁸ Erbil lies on a plain and fertile land. The ancient citadel is the core from which the city has grown. This ancient citadel was continuously inhabited for 6000-8000 years.³⁹ See [Figure 1.3].



Figure 1.3: The ancient citadel at the centre of Erbil city. (Source: By Patrick Hayes, October 2007)

Erbil witnessed its largest growth since ‘World War I’. It expanded over a relatively plain land called ‘Erbil plain’ which is about 390m above sea level.⁴⁰ In 1920, Iraq state was established which consisted of the three provinces which were a part of the Ottomans Empire. The establishment of Iraq under the mandate of the British was a part of a larger plan of dividing the area made according to a secret agreement called Sykes-Picot between the United Kingdom and France in 1916 before the end of the war and then was revealed in 1917. This agreement allocated the control of both the United Kingdom and France over the area of the Ottomans.⁴¹ Erbil at that time belonged Mosul province. In 1919 Erbil consisted of approximately 2400 dwellings with an average household size of six persons. At the time it had 14.500 inhabitants distributed on nine neighbourhoods (quarters) three of which were

³⁸ Gallion and Eisner, p. 125.

³⁹ Morris.

⁴⁰ Erbil Governorate, ‘Erbil Geography’, *Erbil Governorate* <<http://www.hawlergov.org/ar/page.php?id=1329120973>> [accessed 15 December 2015].

⁴¹ David Fromkin, *A Peace to End All Peace: The Fall of the Ottoman Empire and the Creation of the Modern Middle East*, First (New York: Henry Holt and Company, 1989), p. 286.

that of the citadel.⁴² The city grew steadily over the next decades leading to more than one million inhabitants in 2006.⁴³ Erbil now is the fourth biggest cities in Iraq after Baghdad, Basra, and Mosul. It lies about 350 km in the north of Baghdad [Figure 1.4].



Figure 1.4: Erbil province location within Iraq.
(Source: Geology and Earth Science News and Information).

Although there are no figures about the area and the population density of Erbil in 1919 like the estimation of population size, the area and the density can be calculated by basing on historical aerial photos. These show that the area of the city in 1919 was estimated to be about 0.6 Km² and this included the citadel. By then, it was a small town. Therefore, the density might be around ‘24000 people/km²’. This high figure of density confirms that the city was compact due to the relatively small areas of the houses, the narrow alleys and circulation networks, and the absence of public squares. According to survey done in 2006 for the preparation of a new master plan for the city, the area of the city (the area bounded by the Seventh Ring Road) was by then about ‘84.32 km²’ and about 28.5% of which was residential in 72 quarters.⁴⁴ About a half of the city’s area included in that study was vacant which includes planned but not built areas.⁴⁵

⁴² Erbil Governorate, ‘Erbil Population’, *Erbil Governorate* <<http://www.hawlergov.org/ar/page.php?id=1329152161>> [accessed 15 December 2015].

⁴³ Dar al_Handasah and Ministry of Municipalities, *Erbil City Master Plan: Stage 2 Report, Analysis of Existing Situation and Major Development Issues* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2006), p. ES-6.

⁴⁴ Dar al_Handasah and Ministry of Municipalities, *Erbil City Master Plan: Stage 1 Report, Data Collection and Field Surveys* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2006), pp. 3–16.

⁴⁵ Dar al_Handasah and Ministry of Municipalities, *Erbil City Master Plan: Stage 1 Report, Data Collection and Field Surveys*, pp. 3–16.

In 1974 Erbil was nominated as the administrative centre of the autonomous region of Iraqi Kurdistan.⁴⁶ This was based on the agreement of 11th March between the Kurdish and the Iraqi government.⁴⁷ And according to the new constitution of Federal Iraq of 2005, Erbil was nominated as the capital of Kurdistan region however this had been decided since the first establishment of the parliament of Iraqi Kurdistan in 1992. It is located in the north of Iraq. After 2003, Erbil witnessed development in many sectors among which is tourism. It was named as ‘Arab Tourism Capital’ by the ‘Arab Council of Tourism’ for the year 2014.⁴⁸

Time frame:

This research studies the urban form of Erbil during the period from the establishment of Iraq state in 1920 until the present day. This period is subdivided into sub-periods according to political and economic events and changes which in turn, as the research assumes, resulted in changes in the urban form of different parts of the city that have been built in different periods.

The study covers the period from 1920 due to two main reasons. The first is that since the establishment of the state of Iraq, different laws and policies of organizing cities and different planning and building regulations have been issued in different periods of governance system such as royal, republic and federal. The second is that it can be noticed that over 90% of the city’s expansion has taken place after 1920. See [Figure 1.5] and [Figure 1.6]. The first building and planning legislation issued after 1920 was ‘*System of Roads and Buildings No. 44 of 1935*’. After 1958 when the country’s system of governance shifted to a republican system, serial amendments have been made to this regulation as a reflection of the new system of governance. However, notable changes have been made in different aspects of people’s life and planning rules like education system, ownership rights and subdivision and amalgamation codes.

⁴⁶ The Revolutionary Command Council, *Law of Iraqi Kurdistan Autonomy No. 33 of 1974*, In *Iraqi Gazette No. 2327*, 1974, pp. 3–7 (para. 1).

⁴⁷ Erbil Governorate, ‘Erbil Population’.

⁴⁸ ‘Erbil Tourism 2014’, *Erbil Tourism 2014* <<http://www.erbiltourism2014.com/en/erbil/erbil-2014>> [accessed 15 December 2015].

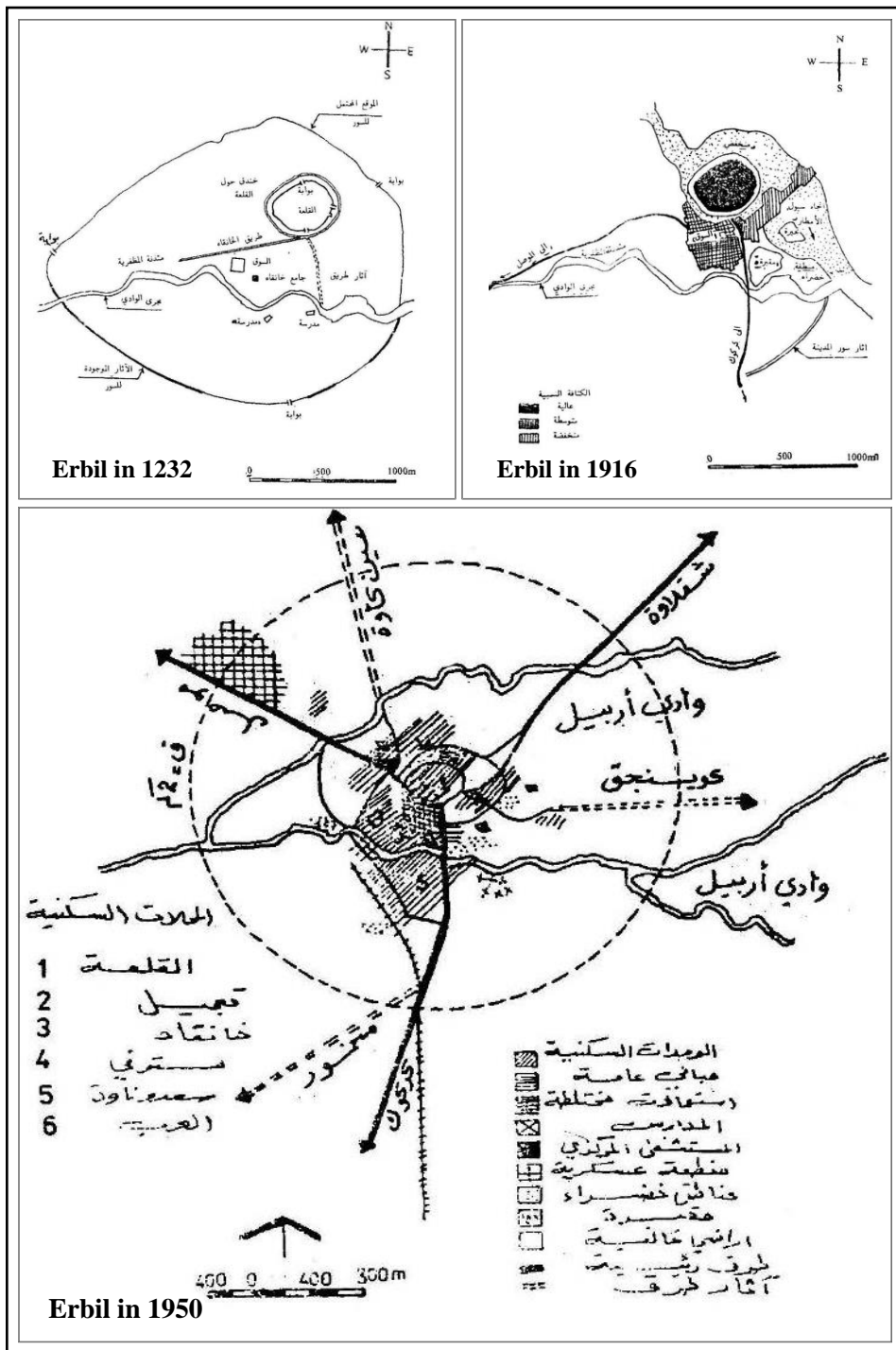


Figure 1.5: Erbil city in three different points of time (1232, 1916, and 1950) which shows its growth from the citadel as the centre of it. (Source: Ministry of Municipalities, General Directorate of Planning and Engineering, Baghdad)

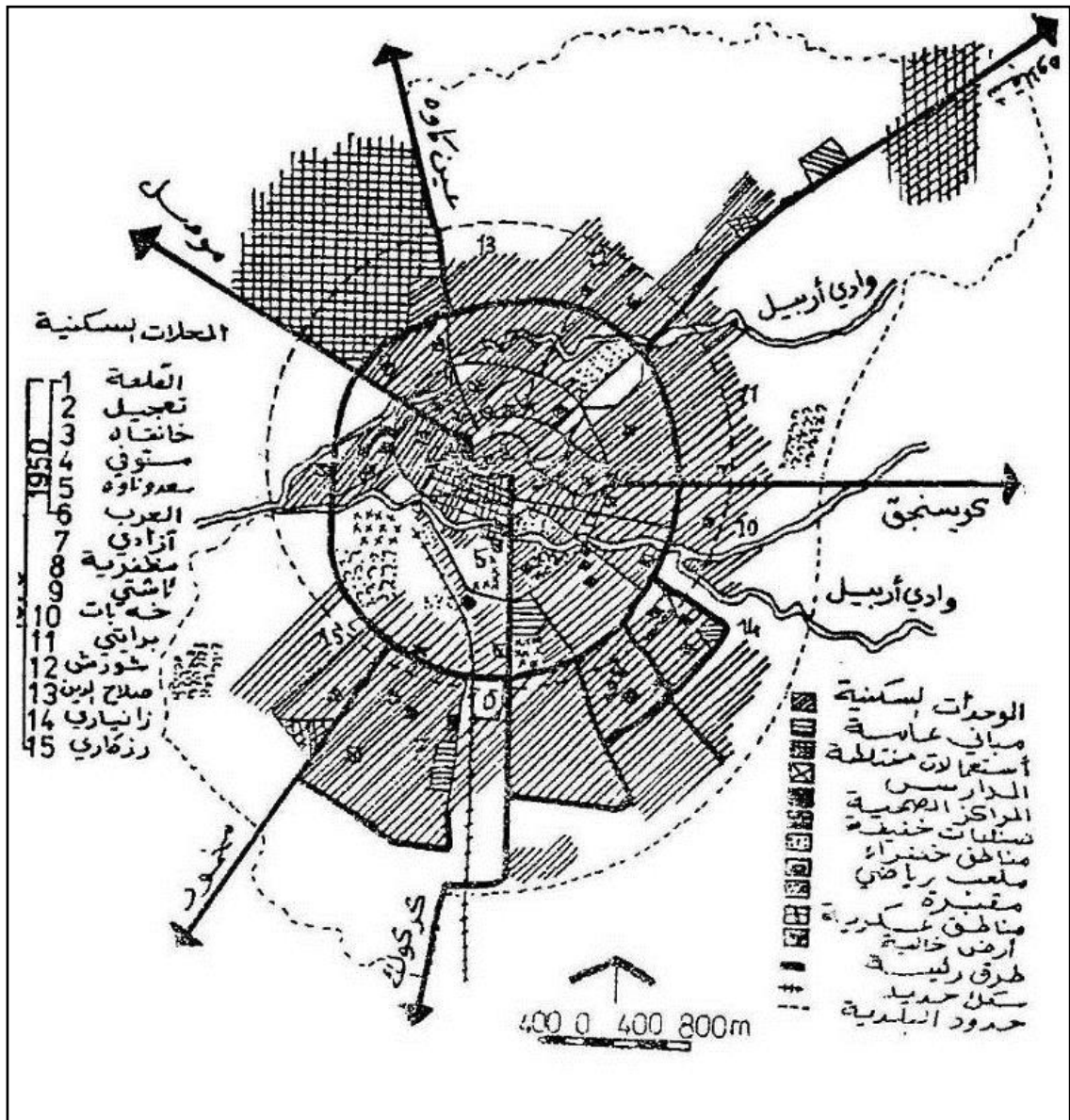


Figure 1.6: Erbil city in 1975 the concentric pattern here has been almost defined. (Source: Ministry of Municipalities, General Directorate of Planning and Engineering, Baghdad)

1.4. Methodology and methods⁴⁹

Based on the combined approach of the understanding the city as a spatial structure and as a functional system which have been addressed by Aldo Rossi⁵⁰, this research addresses issues to understand the formation and the transformation of the city and links these to the influencing factors. The research deals with three sets of variables that change over time. The first set is urban form and its change. This research covers the residential areas of the city as they constitute a larger proportion of the city and its urban form. In order to obtain an overall view of the city's form, the study will deal

⁴⁹ A detailed description of the methodology and the methods will be provided in Chapter 4.

⁵⁰ Rossi.

with the whole city and its different parts and compares them. This includes examining the patterns of the components of the different parts of the city and their formation and transformation by spatially analysing the physical form (street patterns, plot patterns, and building patterns). The change in the urban form is a result of or accompanied by other nonphysical changes which is classified as the second set of variables (social, cultural, and economic). The last group of variables is the legislative factors (legislation). The latter, as it is supposed, should represent, reflect, and embody the second set of variables [Figure 1.2]. However, sometimes this would not be the case.

The research uses various sources of data. These include legislative texts and visual tools such as maps, photographs, aerial and satellite images. Informed by Conzen's morphogenetic approach, 'morphological region' maps are prepared. According to these kinds of maps the urban areas which have a unity of forms distinguished from the surrounding areas are grouped. Therefore, the urban areas in the city can be divided into many morphological regions with different levels of strength to the boundaries which separate these regions. These maps are generally produced by relying on different possible aspects of urban form, such as plan type, building type, and land utilization.⁵¹ However, in the case of Erbil a different approach will be adopted to prepare different maps. The hypothesis behind this approach is constructing assumptions that each the grouping and the separation of areas in each of those maps could relate in some way to the nature, the formation and the transformation of the physical form of Erbil. Erbil's city plan is a mixture of rings and radial axes extended from the city centre where the ancient citadel is located (the oldest part in the city).

The city has expanded and grown from this centre stage by stage in different periods of time. Generally, the further from the centre, the more recent a part is. Hence, the distance from the centre would measure the order of the different stages of the city's growth [Figure 1.5], [Figure 1.6], [Figure 1.7], and [Figure 1.8]. Samples from areas in the different periods of growth are selected. The next step is gaining a general idea about these samples and comparing them according to their physical form features by which the elements of form (street pattern, plot pattern, and building pattern) of these samples will be classified and described. At the same time the research relies on collecting and analysing legislative texts (building and planning regulations) in order to explore the correlation between the change in the urban form and these texts of

⁵¹ M. R. G. Conzen, 'Morphogenesis, Morphological Regions and Secular Human Agency in the Historic Townscape, as Exemplified by Ludlow', in *Urban Historical Geography Recent Progress in Britain and Germany*, ed. by D. Denecke and G Shaw, Cambridge Studies in Historical Geography, 10 (Cambridge: Cambridge University Press, 1988), pp. 72–253.

regulations. These data have both a quantitative and qualitative nature. Some aspects of qualities cannot be measured quantitatively but they will be described and interpreted in an attempt to deal with them. GIS and CAD software are used to support these mapping and cartographic techniques. The expected challenges that might be faced in the whole process are the shortage in the archives and documents that would support the analysis and interpretations. The data have by necessity been obtained from different sources such as the different directorates of municipalities of Erbil, Urban Planning Directorate of Erbil, General Urban Planning Directorate of Kurdistan, Land Registry Directorates of Erbil, Governorate of Erbil, and GIS office of Erbil. In some cases, informal enquiries have been adopted to trace the sources of the data.

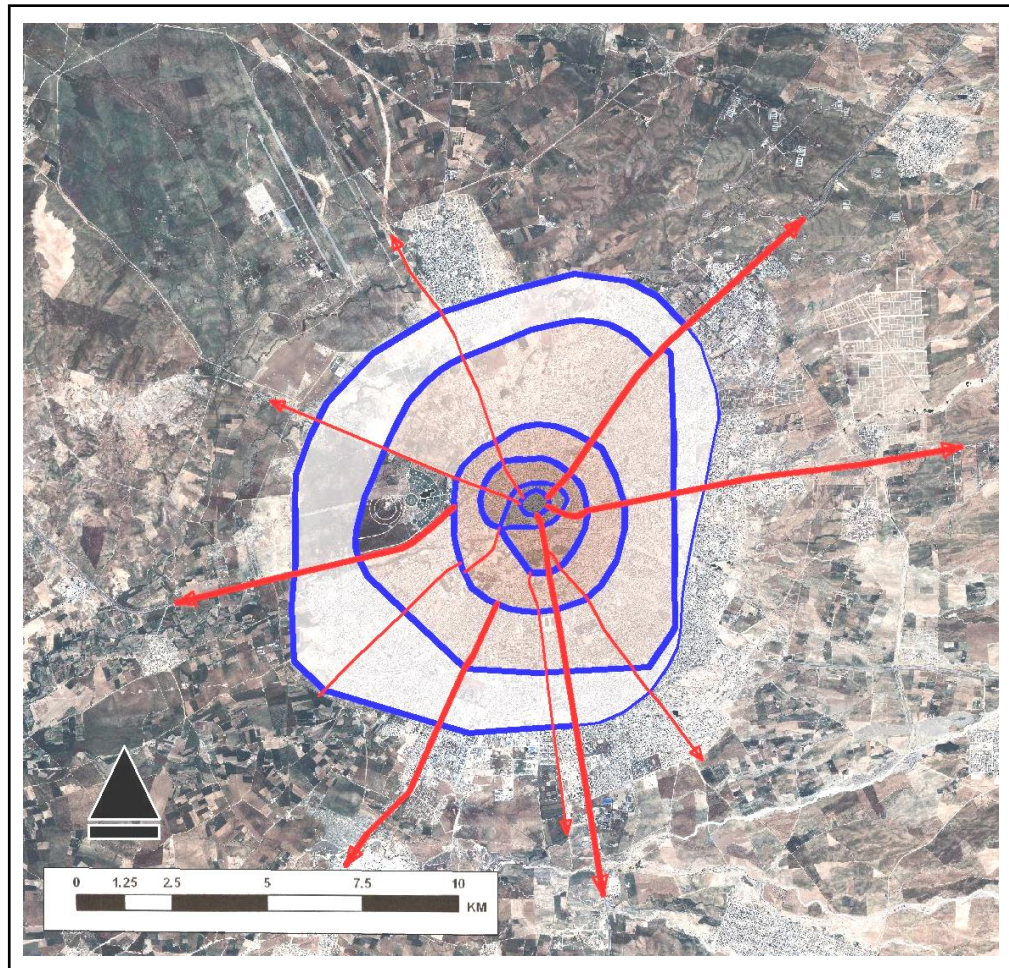


Figure 1.7: Erbil city, the concentric pattern (a mix of ring and radial roads), and its expansion from the centre. (Source: Drawing by the researcher on a satellite image of Erbil in 2006)

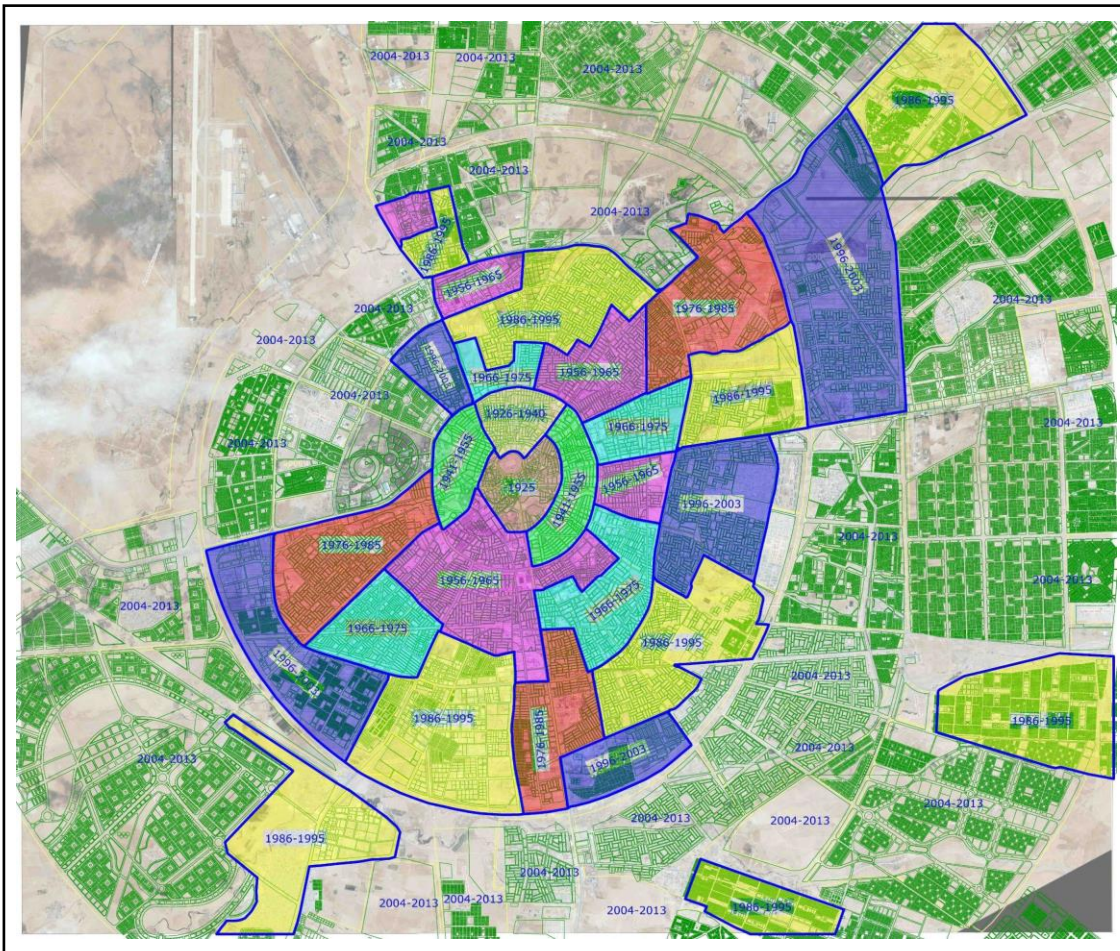


Figure 1.8: The growth of Erbil city: The first development of different parts of the city in different periods. (Source: Drawing by the researcher on a satellite image of Erbil in 2010 basing on data from Ministry of Municipalities and Tourism, Erbil Urban Planning Directorate)

1.5. *The aim and the importance of the research*

A.C. Hall introduced the concept of urban morphology and its parameters within the local built environment as a useful tool to tackle the problems in existing settlements as accumulative processes of redevelopment. He demonstrated how urban morphology as a concept can work through design control process and incremental change interventions to achieve design objectives which emerge from local needs. He addressed the need for a proactive system rather than being reactive.⁵²

This research is concerned with the study of Erbil as its case study, and tries to interpret how its urban form has been affected by the design and planning regulations which have been adopted and decided upon by the concerned authorities in parallel with some other factors chronologically. The focus will be on the legal factors. ‘*System of Roads and Buildings of 1935*’ is considered as the first key piece of legislation that has

⁵² A. C. Hall, ‘Dealing with Incremental Change: An Application of Urban Morphology to Design Control’, *Urban Design*, 2.3 (1997), 221–39.

had an impact on cities since 1920. Some of these urban design and planning decisions are general and comprehensive, applied to all Iraqi cities without exceptions, while others are concerned and specified in the local environment (Erbil city).

The importance of the research will mainly be reinforced by interpreting the process of the change in the urban form as a product. This aspect of research on Erbil has not been covered by any previous study. A gap and an ambiguity can be noticed in this concern. In addition to that, the city is now passing through a critical and rapid stage of growth and development due to the current economic growth of the region and national as well as international investment in various sectors, especially in building construction and the built environment.

The research would establish a better understanding of Erbil's urban form and justify it to help the concerned authorities (municipalities and urban design and planning authorities) to make appropriate policies and decisions regarding the urban form of the city. Therefore, the results of this study could be a valuable and effective reference for the development of the city's future urban form. Moreover, the outcomes of this research could be a significant contribution to knowledge in general and a useful model to the cases which have some similar common aspects.

1.6. The structure of the thesis

This thesis consists of six chapters which map onto three related but distinct stages of the research process. These stages are: The first is an introductory stage; the second is a processing and analytical stage concerned in Erbil which is the case of the study; and the third can be named as ending and finishing stage. As it has been presented, this chapter outlines introductory issues of the research. The elaboration of the research questions involved in the context of Erbil was made. The designed methodology and the tools adopted to answer the questions and to achieve the aims of the research were outlined. However, a deeper description of the methodology and the analytical approach will be covered in Chapter 4. Chapter 1 is a part of the first stage of the research. Yet, it provides a broad overview of the research work. The first stage continues and will be completed by Chapter 2.

Chapter 2 is not specific to Erbil. It covers a world-wide literature on aspects of urban morphology and its different approaches emerged from the different European schools (the English, the Italian, and the French). A mixed approach is used as an adaptation to the limitation and the nature of the context of Erbil on which the research is conducted. The theoretical framework also encompasses issues of types and typology

as they are important aspects of urban form. Legislation concerning building and planning process as tools to generate urban form is also covered in Chapter 2.

The second stage starts by Chapter 3 which is concerned in Erbil as the context of the study. This chapter can be considered as a transitional step from the theoretical framework of Chapter 2 to identify the place and time context of the study. The main role of Chapter 3 is to identify all the aspects concerning the urban form of Erbil since 1920. These aspects include the key historical events, the different types of legislation which have directly and indirectly influenced the formation and the transformation of Erbil, and the different housing policies which have immensely determined the nature of the urban form of Erbil.

Chapter 4 is the extension and the core of the second stage (processing and analysis). The process of data collection, sampling, and analysing the selected samples are what this chapter covers. A detailed description of the methodology and the methods adopted are clearly provided. Thirteen samples from nine different periods since 1920, from different parts of Erbil are analysed. Chapter 5 deals with the samples differently to what has been done in Chapter 4. A comparison of the analysed samples is made in Chapter 5 which is the last step of the second stage. It sums up the change process and concludes the key form characteristics and differences between the samples and the periods. The comparison is conducted by focusing on certain elements of urban form.

The thesis ends up by Chapter 6 which is the last stage of the research process. It is concerned in the research conclusion and its implications. It concludes the methodological approach used to answer the research questions. The link between the formation and the transformation of the urban form of Erbil on one hand and the different issues which have been examined in the different chapters on the other is summarised in ten headings in Chapter 6. This summary provides an overall understanding of the way in which the research is conducted to answer its questions and the outlined issues. The contribution of the research to the knowledge of the field of the urban form studies of Erbil is also covered.

Chapter 2

2. Urban form understandings and the concepts of change

This chapter is the complementary part of the first stage of the research work. The aim of this chapter is to position the research within the existing literature of urban form and urban morphology. An overall review of the existing literature is made. The three main schools of urban morphology in Europe and their approaches are reviewed. Through this, the common terms used in the field are defined. However the research does not adopt a particular approach of any of the three schools as it is, yet this review helps to identify the possibilities of the adoption of ideas from the existing approaches and the application of them on the context of Erbil. In the end, a mixed approach is proposed, responsive to the local characteristics and limitations of Erbil. This chapter contributes to inform the methodology and methods used to answer the research questions.

2.1. *Urban morphology and urban form definitions and its elements*

Through presenting the different definitions of urban form, the research is positioned by what urban form means to this research. Urban form is defined from different points of view such as what has been defined by scholars in geography, architecture, urban design, and urban planning. Different terms have been used to describe the physical aspect and geometry of a built-environment. However, there is not a clear difference between what urban pattern and urban form means, yet they sometimes are used in different contexts to describe different aspects of the built-environment. Urban pattern is described and determined by three elements: the layout and width of streets, land parcelation, and the spatial arrangements of zoning ordinances.⁵³ In other words, the matters of orientation, location, and size or scale would define urban pattern. Yet, one of the common definitions of urban form is a description of the physical characteristic which would be identified by the variables of setback, plot coverage, street width, building type, and building height.⁵⁴ Urban form can be studied in three different hierarchical scales starting from the top or the regional scale down to the bottom, city scale and neighbourhood scale each with different levels

⁵³ Talen, p. 37.

⁵⁴ Talen, p. 127.

of details of design elements.⁵⁵ The elements that exist at those different scales and levels are interrelated and interdependent in a particular structure.⁵⁶

Moudon describes the city as an accumulation of individual and group actions that reflect social and economic forces over time. The outcomes of these forces and actions will be reflected in the physical form of the settlement. Deriving from this, the urban morphology can be defined by three main looped steps: socioeconomic forces come firstly, human actions to meet the current needs secondly, and then the result of these two previous steps is the physical form. These three steps are repeated throughout and they will not end at a point. Therefore, time is a crucial dimension of urban form studies.⁵⁷ The different approaches of the three schools of urban morphology are based on understanding and defining urban form from different perspectives in which the scale and the level of the details vary. In this research, urban form is seen as a physical and tangible object and is treated at its various interrelated levels from the higher and down to the more detailed level or the level of blocks of plots and buildings. The essential elements defined by Talen are dealt with.

2.2. *The emergence and origins of urban morphology and urban form*

In this section urban morphology would be the centre of the argument. It aims at theoretical and epistemological issues that outline the different interpretations which emerge from different perspectives and understandings of urban form and urban morphology as a multidisciplinary field of study. As a result, there would be a need to deal with urban morphology as a practice tool to understand the formation and the transformation of towns. Considering all these mentioned, the three schools of urban morphology that emerged in Europe (English, Italian, and French) should be mentioned and presented as they are the key answer to the most of the issues that encompass urban morphology.

Studies of ‘urban morphology’ are dated back to the end of nineteenth century as it is presented in Jeremy Whitehand’s chronological description. Although the term ‘urban morphology’ has various understandings and uses, it mainly means investigations on the physical form.⁵⁸ Morphological analysis not only involves forms, but also involves the context, meanings attached to them, their relation to urban

⁵⁵ Urban Design Advisory Services, *Urban Form, An Urban Design Approach for Understanding the Urban Form of Regional Centres* (Sydney: Department of Urban Affairs and Planning, 1998).

⁵⁶ Karl S. Kropf, ‘The Handling Characteristics of Urban Form’, *Urban Design Group*, Winter.93 (2005), 17–18 (p. 17).

⁵⁷ Moudon, ‘Urban Morphology as an Emerging Interdisciplinary Field’.

⁵⁸ Whitehand, ‘British Urban Morphology: The Conzenian Tradition’.

processes such as social and political, and the process of their transformation. Although it has started from studies by geographers, urban morphology is considered as a multidisciplinary field of study as architects and urban designers, and planners also have contributed to the studies of urban form or urban morphology. This has been clearly evidenced in a graph by Whitehand in 1987 which then developed by Peter J. Larkham and Andrew N. Jones in 1991 [Figure 2.1].⁵⁹

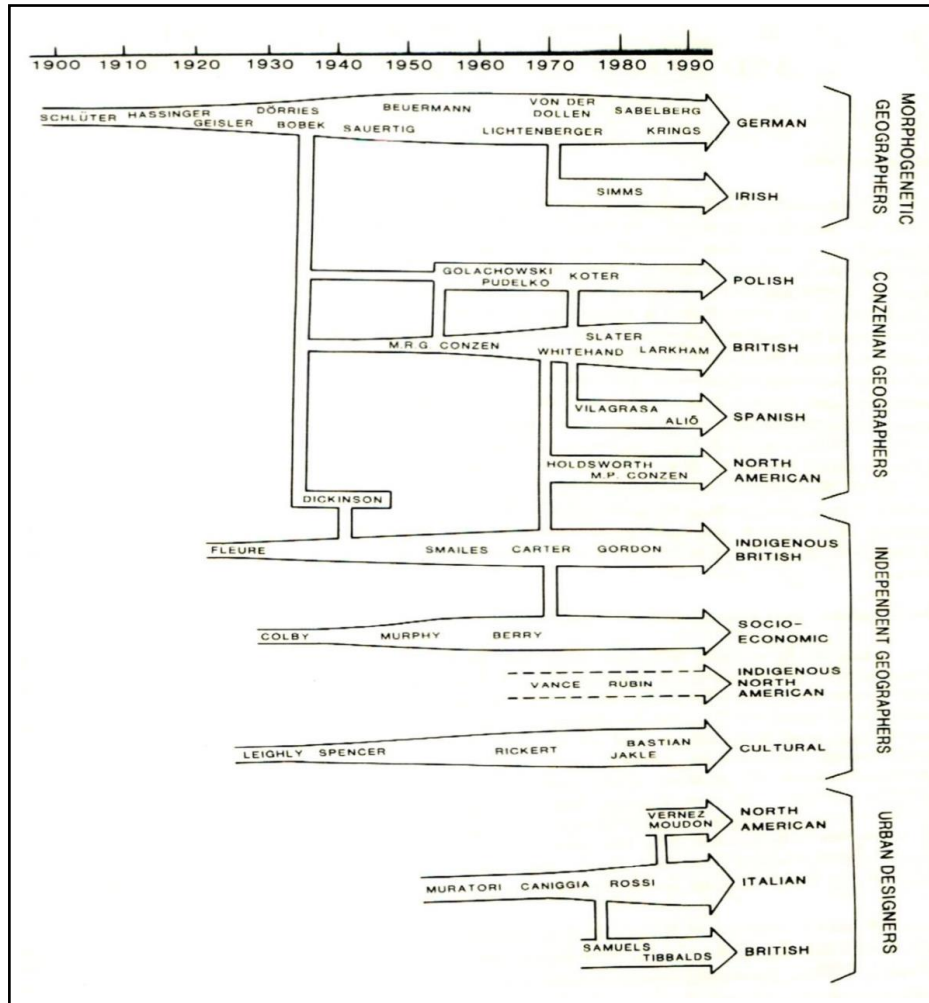


Figure 2.1: Research traditions within urban morphology, with selected authors. (Source: A Glossary of Urban Form by Peter Larkham and Andrew Jones, 1991, developed from Whitehand, 1987a, Figure 9.1 with additional information from Slater, 1990b).

According to the contextual requirements and characteristics, works on urban morphology have developed and been distinguished in Europe, resulting in the appearance of the three schools of urban morphology. Whitehand claims that as a result of that there is a lack of integration, connection, and co-operation between those who work on urban morphology from different disciplines such as typo-morphologists in the

⁵⁹ A Glossary of Urban Form, ed. by Peter J. Larkham and Andrew N. Jones, Historical Geography Research, 26 (Birmingham: Urban morphology research group, 1991), p. 2.

architecture field, those who uses space syntax, geographers, and the scholars of spatial analysis, the different schools of thoughts have emerged.⁶⁰

Moreover, internationally, the role of the organization ‘International Seminar of Urban Form’ cannot be disregarded. Since its establishment in 1996 by a group of urban morphologists⁶¹ from England, France, Germany, Ireland, Switzerland, Japan, Australia, and the USA in the disciplines of architecture, geography, history, and planning, it pushed the studies of urban form forward significantly.⁶² This was achieved by bringing researchers and practitioners concerned with the build environment together by organizing international annual conferences and many publications in its journal ‘Urban Morphology’.⁶³ This was due to the awareness of recognising urban morphology as a multidisciplinary field.

Going back further, the establishment of ‘Urban Morphology Research Group’ by Whitehand at the University of Birmingham in 1974 is considered as a shift point in research in urban geography as now it is a strong research centre.⁶⁴ The studies of urban form have been distinguished between the approaches that characterise the researchers who deal with the different contexts of different backgrounds of history and culture.

A categorization of urban morphology basing on the main discipline that the scholar originates from has come to be evident. Yina Sima and Dian Zhang grouped four main categories or field of studies. These groups were mainly represented by the prominent scholars. These fields are: geography lead by Conzen (the English school of urban morphology), architecture which can be represented by the works of Gianfranco Caniggia (the Italian school), Science which appeared in the late of twentieth century in the works of Bill Hillier’s of ‘Space syntax’ that took a quantitative approach and a mathematical tool to a social analysis of a space, and lastly the philosophy reflected in Henri Lefebvre who claims that the space is a social existence [Figure 2.2].⁶⁵

In a research paper, the multidisciplinary methods and measurements of urban form have been discussed. The paper presents five different methods looking at urban form at different levels and from different points of view. Each level has a different concern and a different nature of data. These perspectives include: landscape ecology,

⁶⁰ Whitehand, ‘British Urban Morphology: The Conzenian Tradition’.

⁶¹ The first meeting of ISUF was in 1994.

⁶² Moudon, ‘Urban Morphology as an Emerging Interdisciplinary Field’, p. 4.

⁶³ ‘ISUF- International Seminar on Urban Form’, (*ISUF*) *International Seminar on Urban Form*, 2015 <<http://www.urbanform.org/>> [accessed 5 September 2015].

⁶⁴ Moudon, ‘Urban Morphology as an Emerging Interdisciplinary Field’, p. 4.

⁶⁵ Yina Sima and Diang Zhang, ‘Comparative Precedents on the Study of Urban Morphology’, in *7th International Space Syntax Symposium*, ed. by Daniel Koch, Lars Marcus, and Jesper Steen (Stockholm: Proceedings, 6th International Space Syntax Symposium, 2009), p. 103:1-103:8 (p. 103:1-103:2).

economic structure, transportation planning, community design, and urban design. The paper defined urban form study as a core of urbanism studies. Urbanism can be relatively defined comparing to non-urban areas by relative terms such as types, patterns, and intensity of development.⁶⁶ The approach that this research adopts is rooted in some principles and tools of Conzenian and Italian schools. In other words, it combines architecture with geography.

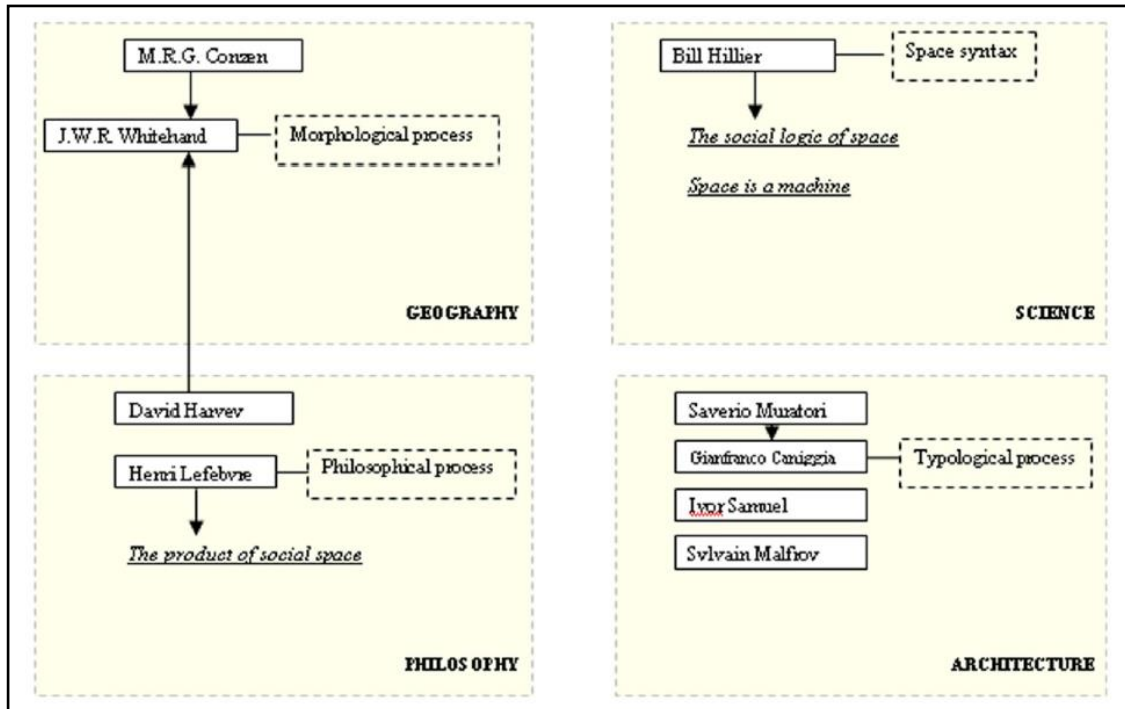


Figure 2.2: Genealogy of study in urban morphology by Sima and Zhang. (Source: Comparative Precedents on the Study of Urban Morphology, P 103:2)

2.3 The three schools of urban morphology in Europe, their focus, and their approach of analysis:

Three schools of urban morphology have been distinguished in Europe. In this section, those three schools, their approaches, the vocabularies and the terms they use, and their origins are reviewed. The locations of their origin are particularly important as their emergence was a response to issues existing in their contexts.

⁶⁶ K. Cliftona and others, 'Quantitative Analysis of Urban Form: A Multidisciplinary Review', Journal of Urbanism: International Research on Placemaking and Urban Sustainability, 1.1 (2001), 17–45.

2.3.1 *The English (the Conzenian) school*

This school is known by its geographic approach. A number of strands of British urban morphology outside the geographic approach of M. R. G. Conzen can be identified.⁶⁷ Whitehand has described the key characteristics of the English school which what has been known as Conzenian.⁶⁸ Broadly, the English school is characterised by M.R.G. Conzen who was a student in the Geographical Institute in the University of Berlin during the years, from 1926 until he migrated to Britain in 1933. There he worked as a town planner, followed by a period of interest in the link between geography and planning, and then again worked in geography in the late of 1950s.⁶⁹ He is influenced by ancestors in the discipline such as Schlutter, see [Figure 2.1]. The two prominent papers by Schlutter in 1899 which were about a pragmatic statement on settlement geography and urban landscape, and the ground plan of towns were the early examples of tracing the historical development of urban form (urban morphology in later periods).⁷⁰

The school which has a German origin dated back to the end of nineteenth century is characterised by its geographical approach of morphology and known as a German morphogenetic tradition, the approach of ‘tracing the evolution of urban forms in terms of their underlying its formative process’.⁷¹ More specifically, Conzen’s works of urban morphology were characterised by themes summarised under headings of morphogenetic and evolutionary approach, considering the individual plot as a base unit of analysis, townscape developments conceptualisation, the use of technical terms precisely, and cartographic analysis from field survey and the use of documents as evidence.⁷² The role and the importance of ‘plots’, in the internal space organizations of medieval towns, had been recognised in earlier German works.⁷³

⁶⁷ Larkham, p. 117.

⁶⁸ Whitehand, ‘British Urban Morphology: The Conzenian Tradition’.

⁶⁹ J. W. R. Whitehand, *The Changing Face of Cities: A Study of Development Cycles and Urban Form*, The Institute of British Geographers/ Special Publications Series (New York: Basil Blackwell, 1987), p. 5.

⁷⁰ J. W. R. Whitehand, ‘CONZENIAN URBAN MORPHOLOGY AND URBAN LANDSCAPES’, in *6th International Space Syntax Symposium* (Istanbul: Proceedings, 6th International Space Syntax Symposium, 2007).

⁷¹ J. W. R. Whitehand, ‘Background to the Urban Morphogenetic Tradition’, in *The Urban Landscape : Historical Development and Management : Papers by M. R. G. Conzen*, ed. by J. W. R. Whitehand, Institute of British Geographers Special Publication ; no.13 (London: Academic Press, 1981), pp. 1–24 (p. 1).

⁷² Whitehand, ‘Background to the Urban Morphogenetic Tradition’, p. 12.

⁷³ Whitehand, ‘Background to the Urban Morphogenetic Tradition’, p. 13.

These themes were clearly reflected in his work '*Alnwick Northumberland: A Study in Town Plan Analysis*'.⁷⁴ Conzen's works contributed to the establishment of the international seminar of urban form (ISUF).⁷⁵ The school focuses on spatial planning and the use and the function of the ground. Then, from the planning point of view which can only be represented in two dimensional drawings, this school approaches morphological analysis. This trend can obviously be noticed in the Conzen's town plan analysis of Alnwick in which he presented issues of the layout of the town.⁷⁶ These were issues about firstly the formation of the layout or how it is primarily built, its changes over time, and the way in which the different components of it are related and fixed. These issues have been discussed through understanding the formation and the transformation of the town of Alnwick in a structure of five successive morphological periods.⁷⁷

In this regard, it is distinguished from the other two schools (Italian and French). However, it has similarities to the Italian school, especially when it considers that the smallest units are the basic elements of constructing the larger objects. Yet more specifically, in the English school the 'parcel' is considered as the constitutional basic unit of city structure and, contrary to the Italian which pays more attention to 'buildings' and their uses. It undertakes the analysis on three hierarchical but interrelated levels on which, like in that of the Italian school, the details vary. These levels are city form, urban tissue or building and space, and the detailed level of the use of ground. Cartographic, two-dimensional drawings are used to represent the form. However, this is not the case all the time. In his work of the market town of Ludlow, Conzen introduced the term '**Form complexes**'.⁷⁸ In this work he mapped three form complexes: the first is plan type areas; the second is building type areas in which the focus was on the three dimensional physical forms; and the last is land and building utilization areas. Three compositional elements of urban form (streets, parcels, and buildings) are defined in the Conzenian approach.

Conzen has developed as well as introduced some new technical terms to represent ideas that he has identified. This was what distinguished Conzen from

⁷⁴ Whitehand, 'Background to the Urban Morphogenetic Tradition'.

⁷⁵ Whitehand, 'CONZENIAN URBAN MORPHOLOGY AND URBAN LANDSCAPES'.

⁷⁶ M. R. G. Conzen, *Alnwick, Northumberland : A Study in Town-Plan Analysis*, 2nd edn (London: Institute of British Geographers, 1969).

⁷⁷ Conzen, *Alnwick, Northumberland : A Study in Town-Plan Analysis*.

⁷⁸ M. R. G. Conzen, 'Geography and Townscape Conservation', in *Anglo-German Symposium in Applied Geography*, ed. by H. Uhlig, and C. Lienau (Giessen- Würzburg-München: Lenz, Giessen, 1975), pp. 95–102.

those who worked before him. He, in the study of Alnwick, was the first who introduced the threefold division of townscape⁷⁹ into: ‘Town plan or Ground plan (streets, plots, and block plans of buildings)’; ‘Building fabric’ or building form; and ‘Land and Building utilization’ [Figure 2.3].⁸⁰

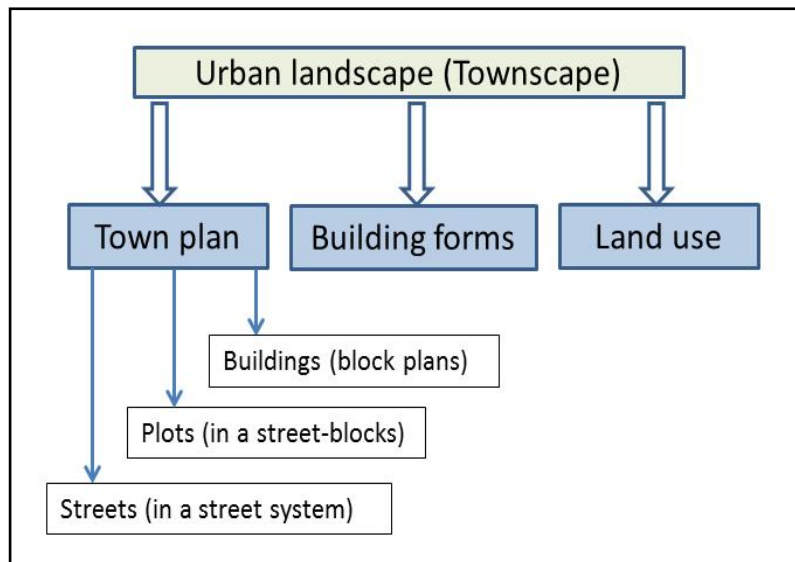


Figure 2.3: Threefold division of urban landscape by M. R. G. Conzen. (Source: Drawing by the researcher based on the previous discussion)

Some of the terms that Conzen introduced to describe and develop his ideas are mentioned. **‘Morphological frame’**: means that rural areas in a long-term process, over time, are converted to urban areas and streets as plot boundaries play a considerable effect. He, by the term **‘Morphological region’** meant the urban area which has a unity of forms that distinguishes it from the surrounding areas. Therefore, the urban areas in a city can be divided into many morphological regions but with different levels of strength of boundaries which separate these regions. For example, in the morphological region map of English market town of Ludlow, Conzen divided the area by five levels of boundaries. The morphological region map was applied on different aspects of urban form, such as plan type, building type, and land utilization. These have led to producing different morphological region maps on the same area. These maps focused on the historical development of an urban area and therefore they would provide us with object lessons for the future, Conzen believed.

He also developed the concepts of the process of town development. He identified ideas related to plot or micro-scale level which focused on the relationship

⁷⁹ The term ‘Townscape’ is used as a synonym for ‘Urban Landscape’.

⁸⁰ Whitehand, ‘British Urban Morphology: The Conzenian Tradition’, p. 104.

between plots and the block plans of buildings. He introduced '**Burgage cycle**' which means the repeated cycle of over time gradual transformation by building up, and then clearing and building again. This cycle can be repeated many times in the city especially in the old parts of it.

Conzen studied the boundaries and dimensions of plots which later on were developed more by Slater. Slater, through analysing the plots' width measurements, concluded the intentions of medieval surveyors, what the original plans were like, and how, then later on in different periods, they were subdivided.

'**Fringe belts**' is another term used by Conzen to refer to the dynamic areas of the city which are in a transitional stage. These areas are indications of the morphological change of the city structure. They could have a certain clear structure in a certain period but later on, they have obtained another structure. The fringe belts, like some parts of cities, are characterised by the irregularity in plots sizes and shapes. Conzen's works in English market town of Alnwick and major English city of Newcastle were based on what Louis in 1936 did on fringe belts within Berlin. Fringe belts are resulted due to the drop in house building when land values were low. However, the high prices of lands caused high density housing. This frequent variation led to an interrupted outward growth of the built up area which then shaped an urban area that includes fringe belts. Fringe belts characterised by some physical aspects:

- 1) Large, contiguous vegetated areas often interspersed with large institutional or 'landmark' buildings.
- 2) The virtual absence of housing.
- 3) Sparse road network.
- 4) Low incidence of radial roads which consequently led to the relatively low penetration by vehicles.

Fringe belts separated historical areas and morphologically distinct housing areas.

'**Compositeness**' (the structure or the totality) which is another term is used to mean the collection of patterns and the variations of uses and forms. The totality can be represented by '**Figure-ground plan**'. Regarding the terms that Conzen introduced, '**Morphological units**' or '**Plan units**' which is also interpreted as urban tissue, refer to the parts of the city with the same morphological properties, the characteristic properties of the urban form elements (streets, buildings, and parcels) which reflects the social and economic forces of their periods. This is defined as

'morphological periods' and an example of this was shown by Conzen in his work of maps of the English port city 'Whitby'.⁸¹ These units contribute to building up the totality of the city form. Finally, '**Stratification**' is used to mean layering all what contributes to the formation of the form over time in the urban landscape. These could be additions, transformations, and disappearance of elements. The successors of Conzen applied his ideas not only on the old towns but also on new and modern ones. For instance, Moudon studied the typology of buildings, parcels, and streets of American suburbs.

2.3.2 *The Italian school*

Urban form studies with architectural backgrounds and concerns of typology became apparent in Italy in the mid of twentieth century when issues of how the contemporary cities should be developed.⁸² However, attempts became clearer in 1940s as a response to the challenges of harmonising the modern architecture and fitting in it with the existing traditional context of Italian cities.⁸³ Therefore, the different interpretations of urban form resulted from different methods of analysis was the matter. However all architects, urbanists, and urban designers' focus with their different stand points was on the concept of 'type' and the connections between urban morphology and building typology.⁸⁴

A number of researchers and their followers with different perspectives and approaches contributed to the studies of urban form and urbanism in Italy which outlined the Italian approach of typology. Among the list of the names of the researchers and contributors to the Italian approaches, six prominent names who summarise the four successive generations of the school and their approaches of dealing with the subject are mentioned and distinguished:

1) Saverio Muratori (1910-1973)

Muratori's ideas developed in a period before and after the World War II and in the period of the appearance of modernity. He developed the typological process that Pagano, within geographical traditions, had addressed first. His

⁸¹ M. R. G. Conzen, 'The Growth and Character of Whitby', in *A Survey of Whitby and the Surrounding Area*, ed. by G. H. J Daysh and J. E. Hemingway (Eton: Shakespeare Head Press, 1958), pp. 49–89.

⁸² Works of Gustavo Giovannoni on historical centres and Giuseppe Pagano on developments of the rural settlements in the beginning of twentieth century are considered as first attempts in typological studies as a classical architecture.

⁸³ Moudon, "'Getting to Know the Built Landscape: Typomorphology" From Ordering Space: Types in Architecture and Design (1994)', p. 256.

⁸⁴ Nicola Marzot, 'The Study of Urban Form in Italy', *Urban Morphology*, Urban Morphology, 6.2 (2002), 59–73.

essays from 1944 to 1946 and those in 1950s for the first time, addressed the ideas of ‘operative history’, considering towns as living organisms, type and fabric, and addressed the issue of integrating new buildings within the place and its cultural context of building. This was a response to the misconnection between the plans of the already existing quarters and the new modern movements of architecture.⁸⁵ His ideas were examined in his works on Italian towns such as Venice in ‘*studi per una operante storia urbana di Venezia*’ in 1959-1960, Rome in ‘*studi per una operante storia urbana di Roma*’ in 1963, and some architectural design of new public buildings and a systematic survey of historic buildings of a town.⁸⁶ In Muratori’s approach (the typological method) the forms are grouped into types. He argued that the cultural behaviour leads to the formation and transformation of cities.⁸⁷ Therefore, according to him, ‘type’ is a construction of norms and conventions produced by experience in a particular culture of a region or a town over time. In this concern, ‘type’ is distinguished from ‘standard’. ‘Type’ is fully charged with cultural meanings. ‘Standard’ has poor cultural meanings but technical norms form it.

Three issues in Muratori’s approach are considered. The first is that the spatial structures are concrete material forms, the second is an autonomous system of rules govern the transformation of those forms and this system can be studied separately, and the third is this system, in addition to the physical dimensions and the functions of the forms, carries meanings, ideas, and experiences of the local culture. Therefore, there is always a culture beyond forms.

Muratori in his typological method focuses on coherence and criticises the modern urban design and planning as they lack coherence when they are producing an environment caused by devaluation of inner and intuitive forms. He, by attaching the local culture and meaning, and adopting a systematic and scientific approach tries to sort out the lack of coherence in the modernism. Therefore, his approach takes the form in deep in contrast to the modernism which deals with form abstractly and shallowly. ‘Operative history’ (*storia operante*) method of analysis, as Muratori states is a useful tool and could be a base for the design process in architecture and urban design. Muratori established a theory that involves all aspects of human environment with all the components that binds all

⁸⁵ Giancarlo Cataldi, Gian Luigi Maffei and Paolo Vaccaro, ‘Saverio Muratori and The Italian School of Planning Typology’, *Urban Morphology*, 6.1 (2002), 3–14.

⁸⁶ Marzot, p. 63.

⁸⁷ Marzot, p. 63.

the interrelated steps from the single building to the totality of the territory. These issues were later on developed by his followers.⁸⁸

In Muratorian (the Italian) School the building is always treated within its environment, the city cannot be understood when its parts are disregarded, and the history of the city plays a significant role in understanding it as it is produced by a set of successive processes and actions of growth over time. As a result, the place and time context are essential. Every component that forms the city is taken into account as the city is not just about buildings. The ‘archetype’ is the first and the basic type which later transforms and results in the appearance of different types. [Figure 2.4].

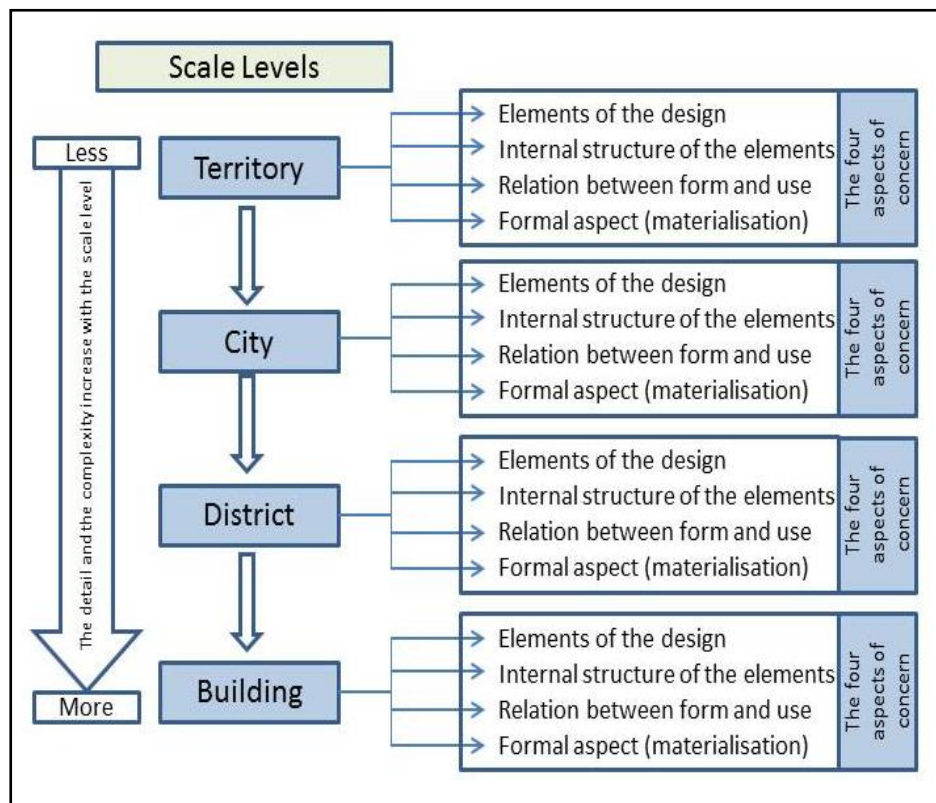


Figure 2.4: Scale levels of the Italian School of urban morphology (Typomorphology), (Muratorian typological method). (Source: Drawing by the researcher based on the previous discussion)

2) 1960 – 1980: Carlo Aymonino and Aldo Rossi

Their contribution started to be distinguished in the second half of twentieth century.⁸⁹ Rossi’s focus was also on ‘typology’. In his book ‘*The Architecture of the City*’ (*L’architettura della città*), Rossi, like Muratori, criticised the modern

⁸⁸ Marzot, p. 63.

⁸⁹ Marzot.

movement. He pointed out that the city can be understood by its architecture and its parts. He did not mean by architecture the visible image or a singular entity but the architecture as a construction of the city over time.⁹⁰ This was based on ‘the hypothesis of the city as a man-made object, as a work of architecture or engineering that grows over time’.⁹¹ In other words, and more specifically, he believed that the evolution of the concept of ‘house’ over time and space cannot give an overall and reliable interpretation of the form and its changes due to its rapid and temporal value. On the contrary, to obtain a better understanding of the form, his focus was on the residential area as it evolves a wider time span and more consistent value.⁹² Therefore, he links the past to present in addition to addressing the ultimate and definitive aspects of the life collectively. People create architecture in a try to intentionally create a better environment. Then, it cannot be separated from the life of the society. From his point of view, city is a whole synthesised from its different parts.⁹³ He defines city as a construction that originates from the relationship between particular and universal, individual and collective, the building and the sphere of public and private, the rational design of architecture and the value of places. The parts of the city are going through a dynamic process of changes over time. Meanwhile, the monuments remain constant points and stay in the collective will.⁹⁴

He acknowledges the importance of history as a tool to inform the future of design process.⁹⁵ He adopts historical methods to describe urban artefacts and the local factors (for example the political problems) that shape them.⁹⁶ While studying the city, two major systems should be recognised: the first is the functional system which considers the city as a production generated from a system of architecture and urban space formed by social, political, and economic factors. Hence, the city is understood through studies and analyses of those factors and from the point of views of those disciplines; and the second is that the city is seen as a spatial structure system from the point of view of architecture and geography. Rossi positioned himself on the second one with particular attention to

⁹⁰ Rossi, p. 128.

⁹¹ Rossi, p. 34.

⁹² Marzot, p. 68.

⁹³ Rossi, p. 100.

⁹⁴ Rossi, p. 21.

⁹⁵ Rossi, p. 128.

⁹⁶ Rossi, p. 162.

the issues in the first system as it raises issues and questions need to be addressed.⁹⁷

He systematically treated with building typology and urban morphology. From his point of view, the form of the city is a summary of its architecture. Then, the city is considered as a man-made product meanwhile there are artefacts created themselves and history elaborated and characterised them.⁹⁸

‘Urban artefacts’ are material constructions something different to materials, a work of arts linking the city to its qualities. Examples of urban artefacts are buildings, streets, districts which are a work of art their forms characterise their individuality and dominate their functions. They represent the social and religious life. The city is a combination of natural and artificial elements as it is an object of nature but subject to culture. Rossi agrees with Levy on that point of view and he overweighs the importance of the whole over the parts. More precisely, the city is readable through its total architecture but in terms of its parts. Typology is attached to history and the type generates form. Rossi believes that the function is not constant that produces type. One specific type can have different functions in different successive periods. Then he rejects the functionalism. Rossi supports the permanence theory or ‘the law of planimetric persistence’ by Poete and Lavedan (1926) when he sees the city as a man-made object produced and processed over time.⁹⁹

3) 1975 – 1990: Gianfranco Caniggia and Gian Luigi Maffei

They continued to develop Muratori’s theory. For instance, Caniggia worked on urban tissues and his attempts were to focus on theoretical aspects of the already established concepts but with issues of certain complexities.¹⁰⁰ He developed concepts of the terms of ‘type’, ‘building fabric’, and ‘basic building’.¹⁰¹ Maffei who was Caniggia’s colleague contributed to his works and after Caniggia’s death he also collected and published some of his unfinished works [Figure 2.5].¹⁰² The concept of the hierarchy of the components star (the levels of the scale) is adopted in the analysis of urban form.¹⁰³ The last name is

⁹⁷ Rossi, pp. 46–49.

⁹⁸ Rossi, p. 29.

⁹⁹ Rossi, p. 57.

¹⁰⁰ Marzot, p. 63.

¹⁰¹ Cataldi, Maffei and Vaccaro, p. 8.

¹⁰² Cataldi, Maffei and Vaccaro, p. 8.

¹⁰³ Karl S. Kropf, ‘Urban Tissue and the Character of Towns’, *Urban Design International*, 1.3 (1996), 247–63 (p. 251).

that of the fourth generation (1985-2010), Bernardo Secchi and his trend was the extension of the works of the previous scholars in Italian school.

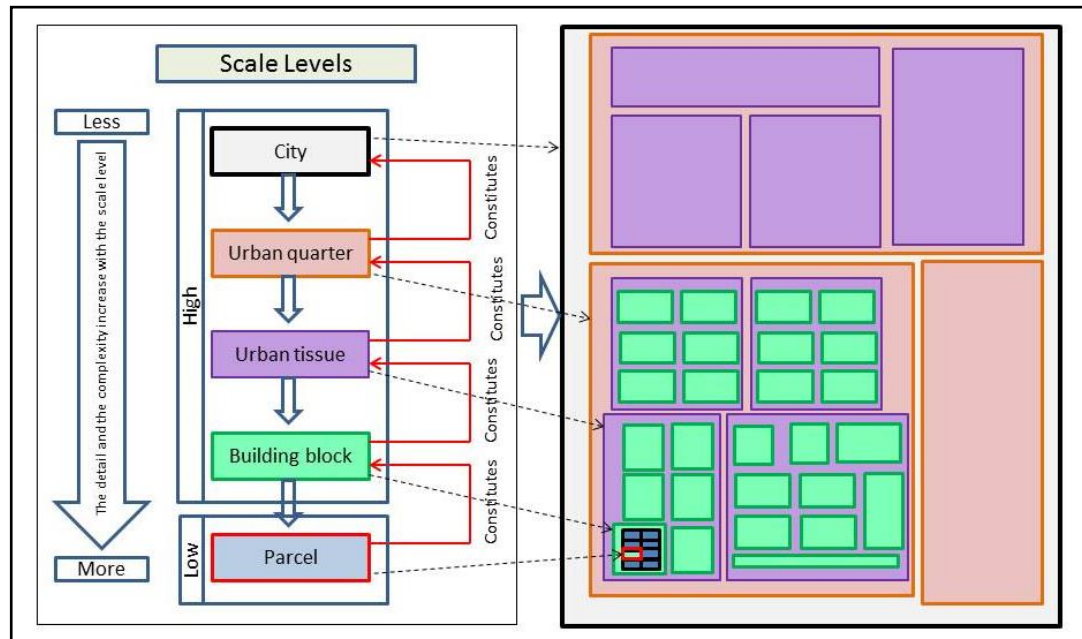


Figure 2.5: Scale levels of the Italian school of urban morphology (Typo-morphology) (Caniggia and Maffei’s typological method). (Source: Drawing by the researcher based on the previous discussion)

2.3.3 *The French (Versailles) school*

A summary of the historical review on the emergence of the French schools and its approach is made. After the Second World War the morphological studies in France were involved in reconstruction. Two strands emerged. The first was by geographers and sociologists who worked in governmental policy making but their role was not described. The other approach was architectural after 1960. During this time modern architects thought that the city is an ultimate object of architecture while the institute of the Ecole de Beaux -Arts who had a conservative concept of architecture was criticised until it was closed in 1969.¹⁰⁴

Architects believed that architecture should be taught at universities however the government did not adopt this belief. As an alternative 23 independent schools of architecture were established. A unit of ‘Bureau de la Recherche Architecturale’ in the ministry of what is called now The Ministry of Culture who is in charge of architects was established. It was responsible for encouraging research in the schools of architecture.¹⁰⁵

¹⁰⁴ Michael Darin, ‘The Study of Urban Form in France’, *Urban Morphology*, 2.2 (1998), 63–76 (p. 65).

¹⁰⁵ Darin, p. 65.

Two groups involved in urban research were in the top, the first was the Ecole d'Architecture de Paris-Belleville and the other was the Ecole d'Architecture de Versailles. **In the Ecole d'Architecture de Paris-Belleville**, Bernard Huet who was interested in the modern cities led a number of studies on some French cities. In all of these studies a typo-morphological approach was adopted which it was rooted in a branch of Aymonino-Rossi of the Italian school of Muratori, the branch that involved in the dialectical relationship between the physical evolution of a town and its building types or housing types. However, it distinguished from the Italian school by having a focus on the sociological aspects of urban and architectural forms.¹⁰⁶

In the Ecole d'Architecture de Versailles (The school of architecture of Versailles), which is known as the French school of urban morphology, some names such as Phillippe Panerai, Jean Castex, and Jean-Charles Depaule are prominent.¹⁰⁷ The focus of their approach was that **the form is a result of the social and economic forces.**¹⁰⁸ They are keen to the notion of **bottom to up in urban design** and they are against the idea of top down planning. Here, the **individual has his voice** in the process of design and planning the city. According to their approach urban form is not independent from the daily life of people and it perceives and experiences the environment differently to that of the Italian does. It focuses on three dimensional drawings and photographs rather than only using plans and abstract sections. The analytical approach of this school assumes that **the traces in the environment are indications** that help uncovering its logic, non-apparent and hidden issues and city is much more than an abstract array of data.

The city as a form of organization should be interpreted by understanding its urban structure. There should be care in the process of analysis and judging the situation basing on pre-assumptions. Every result is possible and the real situation decides that. Rejections should not be generally made and questions of what type, how, and where are raised as simple solutions are a result of inaccurate analysis which they could have negative outcomes rather than positives. According to the approach of this school the design process in itself is a part of analysis.

Time is an important dimension when analysis is made. There should always joy, interest, pleasure, and motivation exist. Urban analysis receives its importance when it provides the designer the order and the force of the structure that support the

¹⁰⁶ Darin, pp. 65–66.

¹⁰⁷ Moudon, 'Urban Morphology as an Emerging Interdisciplinary Field', p. 5.

¹⁰⁸ Darin, p. 66.

design work. The social context of urban design is not simple and it is complicated. Therefore, the result of the design is non-applicable and is useless when it does not meet and realise the needs of the society. As a result of this, the design will not receive the support from the society.

Past successful solutions are informative for establishing a good theoretical framework for design process and projects. The French approach **analyses the space by analysing its structure, the growth of the context, its typology, urban landscape which has a basis on Lynch, Cullen, and Unwin's ideas.** In addition the analysis **considers the social practices** in the urban space.

Methodological prepositions: **'letting the environment speak to you'**. According to this school typology should base on the existing environment. Making assumptions of typology by basing on the ideal situations is avoided as it does not represent the real typology of the environment. According to the locality of each environment methods of analysis should be developed depending on the way of thinking. However, existing knowledge plays a significant role as it can be adapted and modified in a way that suits the local environment. Then, **the existing local characteristics of the environment are crucial and decisive and general criteria are not sensible.**

In the French approach, different sort of types and their relations can be ordered in different ways. Differences between and variations within types is treated as typology. Types are classified and ordered in families. In each family of type the most repeated or the best representing example is undertaken in the analysis. This is called a 'typical example'.

Similarly to the Italian school, depending on historic bases, the French school concludes types, but uses different terms. For example 'basic type' or 'undisputable type' is as an opponent to 'archetype' in the Italian school which can result in producing other different types. Studying the urban form of building blocks and parcel properties can derive the archetype. It operates typological analyses on different relating levels with different level of detail that the layer owns without explicitly nominating the gradual and the hierarchical level, from smallest parts to the whole, like the Italian does.

The typological analysis is done through four successive phases: the first is the matter of definition; the second is temporary classification; then elaborating the types; and finally the typology. The research parameter should be defined. This can be determined through the matter of the level that the study deals with.

There are several choices of levels on which the study can focus:

The first is the level of **parts of buildings**. In urban analysis this level can be exemplified in gables, courtyards, entrances, etc. the higher level is the level of **buildings** which in some urban tissues are considered as the basic unit. **The combination of parcels with buildings is the other level**. The importance of the typological analysis at this level comes from that it shows the relation between buildings and spaces. Dealing with parcels as a set or a group is another level. **Group of parcels** or building blocks are important as it clearly shows: the division of the space; and the relationship between the individual and the collective. At this level, the morphologists could focus the analysis on streets, squares, canals, and gardens as a starting point. And the last is **the global level**. The good typological analysis should take all levels into account, even if it focuses on one certain level.

After defining the level, the next is the research area should be precisely outlined. When taking a research area for typological analysis, issues of the scope, aims, the detail, the type of questions, available time for the analysis, and the already available material on the topic should be considered.

Induction process basing on fieldwork, survey, expanding the materials and the evidence, doing the process again and again is an iteration process by which the theory is developed and refined. Visual typology can depend on inducing main characteristics from complex visual information. Once the research parameters are defined, the phase is the temporary classification. This phase starts with a survey (inventarisation) on the objects and their characteristics.

After doing a survey on an acceptable number of objects and receiving the first idea of the criteria for a typology, the first classification of clear cases of objects into types is done, by grouping the described or the recorded photographs and drawings into families. This step is not a typology but it is a primary attempt of induction of types as a type is not a concrete example but it is constructed and designed. Then, these primary types are refined through doing observations on more cases and repeating the proses (iteration).

Elaboration of types is the third phase of the typology process. In this phase, to obtain a precise conclusion of types, all the properties should be considered. The common properties of the families of objects found previously define the type and the non-common properties are considered as variations of types.

The typology process then becomes closer to its final phase. In the last phase of the process the types are systematically ordered. The origin of certain types is

investigated to know whether the type has come or resulted from other types through a process of development, change, and modification. In studying the variations of types, the extent of the differences between types show whether these differences lead to having different types or they can be categorised under the same type. This is called as the bandwidth of the variations. The social consensus defines the common characteristics that compose a type. This consensus is subject to changes within time as it is a dynamic character.

2.4 A mixed approach of urban morphology

It is possible to deal with urban morphology by a mixed approach which combines approaches of two or the three established schools of urban form. This is a case in this research. Issues from the approaches of the English and the Italian Schools are adopted. In other words, the research tries to deal with the urban form of Erbil by some of the tools invented by those two schools which combine geographic and architectural issues. However, there are some areas of overlapping between these two schools. They only sometimes use different terms to refer to similar aspects. Investigation of this overlapping area and a comparison between these two schools through the works of Conzen and Caniggia has been addressed by Kropf¹⁰⁹ and Levy.¹¹⁰

The adoption of the mixed approach emerges from the understanding that urban form can comprehensively understood when it is linked to place and its importance. Architecture of any particular context of place is not free from its geography. Understanding urban form from architectural point of view should include geographical aspects such as demographic, topographic, and land concerns which determine the architecture itself. It can be justified that having this perspective is partly contributed to the researcher background of practice. The combination of these two points of view (geographic and architectural) is reinforced by adaptations that are based on issues that emerge from the determinants of the place and time context. This mixed and grafted approach generates the methodology and the methods of the analysis carried out. There will be refers to the approach adopted in each step of the analysis in ‘Chapter 4’.

¹⁰⁹ Hall, p. 231.

¹¹⁰ Levy, p. 80.

2.5 Type and typology

Some issues of type and typology have been mentioned in the previous sections of the different schools of urban morphology, especially in the Italian school. Yet, this section, more specifically concerns the terms ‘type’ and ‘typology’. ‘Type’ in its simple definition describes the abstract form of an object. ‘It is a norm, an abstraction, not an actual building.’¹¹¹ Typology is the study of types. Muratori described ‘type’ as an internal structure by which the different elements of an object linked to each other to construct the whole. The nature of this structure justifies the way in which an element relate to other. He attaches ‘type’ to both contexts of time and place and he is aware of the importance of this link.¹¹² In the urban context, typology could concern in spaces which consists of squares and streets such as that is studied by Krier¹¹³ or could concern in buildings such as the approach Muratori called ‘procedural typology’.¹¹⁴ In this sense, Caniggia and Maffei defined ‘building type’ as a term has been used ‘to indicate any group of buildings with some characteristics, or a series of characteristics, in common.’¹¹⁵ Typology is a tool to describe the urban form and the formation process of cities.¹¹⁶ However, type and typology are treated and studied in more sophisticated ways. Studies of type (typology) can be combined with studies of urban form (urban morphology) in typomorphological studies. Moudon described ‘typomorphology’ as a tool to ‘reveal the physical and spatial structure of cities’.¹¹⁷

Typology can be used in different ways to achieve different aims. Muratori approached typology to understand city by combining building, urban fabric, and plan.¹¹⁸ Typology can, as a useful tool, be used in contemporary conditions as it describes patterns derived from historical examples.¹¹⁹ In other words, typology would be used as a tool for design that offers different possibilities based on historical cases of the context. Thus, in this context, typology achieves the continuity of the urban characteristics over time. Yet, at the same time, it can achieve choices of contemporary solutions. A particular type carries characteristics which can be interpreted differently

¹¹¹ Douglas Kelbaugh, ‘Typology: An Architecture of Limits’, in *Urban Design Reader*, ed. by Carmona Matthew and Steve Tiesdell, First (Oxford: Architectural Press, 2007), pp. 83–97 (p. 87).

¹¹² Anna B. Menghini, ‘The City as Form and Structure: The Urban Project in Italy from the 1920s to the 1980s’, *Urban Morphology*, Urban Morphology, 6.2 (2002), 75–86 (p. 81).

¹¹³ Rob Krier, *Urban Space*, Forewarded by Colin Rowe (New York: Rizzoli, 1979).

¹¹⁴ Moudon, ‘Urban Morphology as an Emerging Interdisciplinary Field’, p. 4.

¹¹⁵ Caniggia and Maffei, p. 50.

¹¹⁶ Moudon, ‘A Catholic Approach to Organizing What Urban Designers Should Know’, p. 342.

¹¹⁷ Moudon, “‘Getting to Know the Built Landscape: Typomorphology’” From *Ordering Space: Types in Architecture and Design* (1994), p. 257.

¹¹⁸ Menghini, p. 81.

¹¹⁹ D. Walters and L. Luise Brown, *Design First: Design –based Planning for Communities* (Oxford: Architectural Press, 2004), p. 82.

and translated into different design possibilities depending on the view point of the designer.¹²⁰

In conclusion, typology is adopted in two approaches, either as a tool to understand and interpret the urban form of the city in the past periods or as an approach of design based on types derived from the former approach. This research uses type to describe the general characteristic of buildings and streets pattern emerged and transformed in different periods of time. A summarisation of the types in each period is used to understand the nature of the process of change whether it is a continuous process of evolution or it is shifts and interruptions. In other words, at this stage, type and typology is conducted to understand the urban form but not as a tool for designing.

2.6 Urban planning and building legislation and urban form

One of the most important forces that govern the process of producing urban form and its changes and transformation in urban settlements is building and planning legislation. According to their level of power, hierarchy, context of their use, and their concern, different terms are used. Terms such as law, by-law, ordinance, codes, standards, orders, instructions and regulations are used in different contexts to mean different issues and cover different aspects. Whatever their concern is, they all share the aim of achieving control.

Building control as an established legislation has been defined as a collection of laws (primary and secondary) which are at the national or regional level and regulations which are those at the local level.¹²¹ It would achieve aims that for which it is established and implemented. Health and safety are the common aims. However, priorities differ from a country to another and from a city to another as well. Thinking of the issue as a system, three essential components can be identified. These components are also configured in three successive stages. In the first stage, the will of the public is elaborated and defined in a process such as the process of legislating laws and constitutions by Parliament establishment. In other words, the laws should reflect the general aims and the broad line needs of the public. The aims and wills that are enacted in a form of laws in this stage are less liable to short term periodic updates and changes. Those laws also identify the authorities and their responsibilities in dealing with and implementing the control process. In the second stage, the second component

¹²⁰ Walters and Luise Brown, p. 85.

¹²¹ J. H. Garnham Wright, 'Building Control By Legislation: The UK Experience', in *The Theory and Practice of Building Control*, First (Chichester: John Wiley & Sons, 1983), p. x.

is identified. The general aims are interpreted and expressed in technical terms in a form of regulations which identify the rules, standards, and criteria that should the buildings must comply with. Frequent changes and updates in short terms would occur at this stage as it relies on issues such as standards and technologies that are not static and continuously develop. To achieve a higher efficiency, the regulations must be kept up to date. The last component which comes in the third stage is the enforcement of the regulations by which checks and follow-ups are carried out to ensure that the building conform to the regulations which in turn, achieve the aims identified. This is also an important issue which guarantees effective implementation when it is done efficiently. Depending on the system of the country, the enforcement policy could vary from only checking the drawings and the specifications, to inspections of the production or the built product itself.¹²²

In any place context and at any time, legislation reflects the social and technical condition of the context in which it is used. Legislation could reflect policies and embodies other external factors and then works as rule which governs a certain phenomenon such as in urban morphology. Building and planning regulations are tools of a controlled development. However, sometimes in the absence of control due to whatever reasons, informal building process emerges which may result in slums. The link between design control and urban form was revealed and enlightened by Hall.¹²³ He introduced this link in the terms of the process of change. Design control process is dynamic in nature and consequently influence the process of change of urban form. This can be exemplified in the changes of plots (pooling and subdivision), extensions to the existing building, and changes in use.

In terms of the urban context, whether concerning issues of planning or design, 'zoning' is widely used. Ideas on 'zoning' have been mentioned in the introduction of 'Chapter 1'. It is a tool by which the urban settlement is spatially divided into different districts according to the variables of density, use, and in turn, building regulations. In other words, it is place-based building regulations.¹²⁴ It creates heterogeneity between the different parts of city but homogeneity within a particular part. In Iraq, '*System of Roads and Buildings No. 44 of 1935*' was implicitly a type of zoning ordinance. It divided the city into different zones according to the factor of building density which as a foregone conclusion, resulted in determining population density.

¹²² Garnham Wright, pp. 32–35.

¹²³ Hall.

¹²⁴ Talen, p. 21.

2.7 The conclusion of Chapter 2

This chapter is the last step of the first stage of the research work. It made a review of the literature of urban form and urban morphology, with a focus on the three different schools of urban form in Europe (the English, the Italian, and the French). Their emergence, their different approaches, tools, and priorities were mentioned. The English school has a geographic approach, while the Italian has an architectural perspective. As the research approaches urban form from a perspective of a combination of the fields of geography and architecture, more focus has been on the English (Conzenian) and the Italian schools.

Due to the fact that this research is on Erbil which is a different context and is a context with a different geographic, social, cultural, and institutional background, it was impossible to import the Western approaches as they are and apply them to Erbil. For this reason, there was a need to design a methodology inspired by some ideas from the English and the Italian schools with modifications to adapt the context of Erbil. A detailed description of the designed and adopted methodology will be made in Chapter 4, after defining and explaining all the aspects concerning Erbil and its urban form in Chapter 3 which is the second stage of the research. The role of Chapter 2 in the research process becomes evident here as an early essential step within the overall process. As the research is questioning the link between urban form and regulations represented in planning and building legislation, this chapter also defined the legislation and their role as a tool of control which translates plans and policies into reality.

Chapter 3

3. Erbil city as the context of the research

While the previous chapter was concerned in the theoretical frame work and the world-wide literature of urban morphology, their different approaches, and regulations, this chapter is allocated to Erbil which is treated as the single case of this research. Therefore, Erbil is defined and introduced in this chapter, which covers all the aspects related to the urban form of Erbil, including the legislative factor which is the main concern of the research. Moreover, other issues that would relate to the urban morphology of Erbil are mentioned. A chronological review is the common feature by which all the sections of this chapter are structured.

Erbil started and grew from a citadel which is now located at the centre of the city. ‘The Citadel of Erbil is a rich historical repository holding evidence of many millennia of habitation; more than 8000 years old, it is the longest continuously inhabited site in the world’.¹²⁵ This claim has been supported by evidence obtained from excavations.¹²⁶ Erbil, in its early stages was distinguished by its organic growth from the citadel with a cellular urban grain. In the Sumerian period it was named ‘Arbela’.¹²⁷ The massive growth of the city has been since 1920. Therefore, this chapter covers all the events that have occurred, the legislation that has been enacted, and the policies that have been used from 1920 to the present day.

*3.1. Key chronological moments and their influences on the urban form and building types in Erbil*¹²⁸

This section focuses on the time context of the research. According to Conzen the individual plot is the basic unit for the urban form of the town plan units which is a composition of a different street, building, and plots’ types.¹²⁹ A chronological overview of the key historical events happened in the state of Iraq since its establishment in 1920

¹²⁵ UNESCO OFFICE FOR IRAQ, ‘Revitalization Project of Erbil Citadel’

<<http://www.unesco.org/new/en/iraq-office/culture/erbil-citadel/>> [accessed 9 November 2015].

¹²⁶ Andrew Lawler, ‘Erbil Revealed: How the First Excavations in an Ancient City Are Supporting Its Claim as the Oldest Continuously Inhabited Place in the World’, *Archaeology*, 2014

<http://www.archaeology.org/issues/145-1409/features#art_page1> [accessed 16 February 2015].

¹²⁷ Morris.

¹²⁸ See [Appendix 3] which is a paper by the researcher about issues of this section.

¹²⁹ Moudon, “‘Getting to Know the Built Landscape: Typomorphology’ From Ordering Space: Types in Architecture and Design (1994)’, p. 264.

is made.¹³⁰ In this overview there will be a focus on the urban form through its compositional elements, plot and building within the plot as the essence of the urban form of the city. However, sometimes street pattern is included in the discussion as it has been introduced by Conzen as a compositional component of plan unit. Meanwhile, the key events of the period are introduced, along with their relevant historical background.

3.1.1 1920-1932:

In 1900, the area within the border which is now called Iraq state belonged to the Ottoman Empire which had ruled the area since the mid-15th century [Figure 3.1]. The Empire had religious roots that emerged from Islam. Four pillars that have religious meanings consisted of the government. The first was the ‘Grand Vazir’ (Sultan) or the cabinet head. The second was the chancellors, and the other two were the judges and the additional pillars (accountants and treasurers).¹³¹

The term ‘Iraq’ was used by Arab geographers since the 8th century. It means ‘the shore of a great river along its length, as well as the grazing land surrounding it’.¹³² This area historically had been known as ‘Mesopotamia’. Its location between the two rivers (the Tigris and the Euphrates) characterised it by a fertile land for a various agricultural yields¹³³. The highest post in the government was occupied by the ‘Sultan’: a ruler in Istanbul. Sub-rulers in the regions which belonged to the empire were lower than sultan in the governmental hierarchy. The sub-ruler post was called ‘Vali’ who governs the ‘Vilayat’ or the province. The area which is now called Iraq had been divided into three provinces: Basra, Baghdad, and Mosul which included Erbil city [Figure 3.2].¹³⁴

Michael Bonine identified some common planning and design characteristics of Middle Eastern cities, but Erbil was identified as a notable example that had a distinct morphology. The original pattern was a round city with a large wall to protect the city. In the centre of the city there were temples and public buildings. Then, later on, these temples were changed and developed into a great stepped

¹³⁰ BBC, ‘Country Profiles: Middle East: Iraq Profile- Timeline’, *BBC*, 2016

<<http://www.bbc.co.uk/news/world-middle-east-14546763>> [accessed 15 July 2016].

¹³¹ Constance Johnson, *IRAQ: LEGAL HISTORY AND TRADITIONS* (Washington,: The Law Library of Congress, 2004).

¹³² CHARLES TRIPP, *A HISTORY OF IRAQ*, 3rd edn (Cambridge: University Press, 2007), p. 8.

¹³³ Johnson.

¹³⁴ Andrew C. McLaughlin III, ‘Thoughts on the Formation of the State of Iraq’ (presented at the Chit Chat Club, San Francisco, California, 2008).

Ziggurat in some of Mesopotamian cities.¹³⁵ The urban form of Erbil city prior to 1920 was characterised, as it can explicitly noticed in the ancient citadel, by a distinct organic pattern, narrow alleys [Figure 3.3] , inner courtyard houses no more than two storeys height, and sometimes with a basement floor [Figure 3.4].

These distinct characteristics were generally due to environmental and social pattern associated to religious beliefs in the whole region as Bonine stated that there is a difficulty in defining the boundary of Middle Eastern region, yet the common and distinguishing characteristic that binds this region (Middle East and North Africa) now is the religion of Islam which has had an impact on all the cultural aspects of this region. However, many cities of this region have cultural and religious varieties which have a historical background older than the age of Islam.¹³⁶



Figure 3.1: The Ottoman Empire area. (Source: The Islam Project)

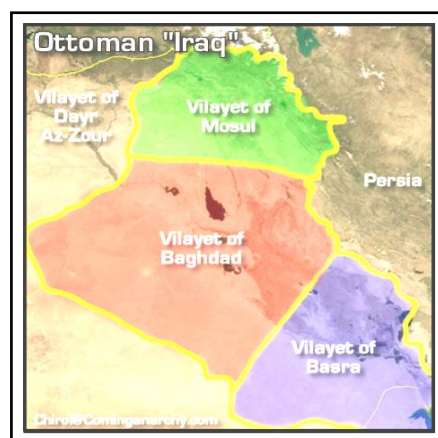


Figure 3.2: The three provinces which now compose Iraq state belonged to the Ottoman Empire before 1918.

¹³⁵ Michael E Bonine, 'Cities of the Middle East and North Africa', in *Cities of the World: World Regional Urban Development*, ed. by Jack F. Williams and Stanley D. Brunn, 2nd edn (New York: Harper and Collins College Publishers, 1993).

¹³⁶ Bonine.

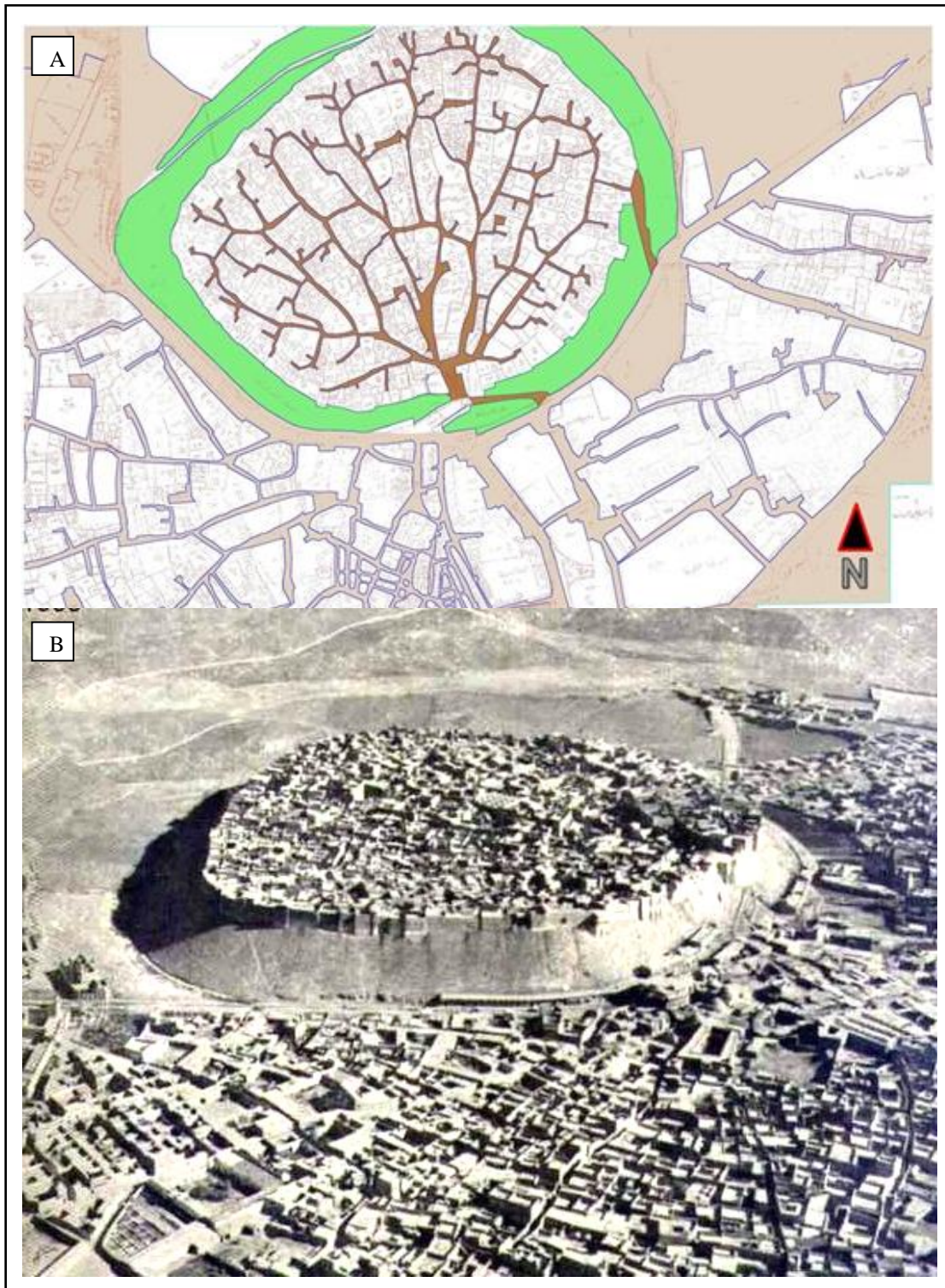


Figure 3.3: The organic pattern of Erbil city citadel and its surrounding area in 1930s. (Source: **A**) Drawing by the researcher basing on a cadastral map from The Presidency of the Municipality of Erbil. **B**) Naval Intelligence Division, *Iraq and Persian Gulf*, 1944)

Adding to these, despite the fact that Islam was the dominant religion in the entire area of the Ottoman Empire, there were many cultural, ethnic, environmental, and geographical disparities between the different provinces and even within one province. After the First World War in 1918, according to the ‘Sykes-Picot Agreement’ which was made secretly between Britain and France, the area came under British control.¹³⁷ In 1920 the state of Iraq, which included the three provinces, was established and was under the British mandate until 1932. In 1923 Erbil became an independent ‘Liwa’ (administrative unit) when it was a ‘sub-Liwa’ of Kirkuk in 1921. In 1922 according to amended Turkish regulation Mayors and Councils, who received an established municipal service by British Army, were selected by an election while they were previously nominated.¹³⁸

However the early period of the mandate was politically unstable, and many conflicts between British and different Kurdish groups who aimed for an independent Kurdistan took place. By contrast, the later period, especially after 1925, was more peaceful and stable. Depending on aerial photographs, accurate cadastral town plans were prepared for many towns and villages accompanied with better established property rights.¹³⁹ As a result, generally, there were some changes on the Iraq cities’ urban form and the urban life showed a modern and different form from the prior era.¹⁴⁰



Figure 3.4: One of the inner courtyard houses of Erbil citadel (Source: Photograph by the researcher)

¹³⁷ Johnson.

¹³⁸ Stephen Hemsley Longrigg, *IRAQ, 1900 TO 1950 A POLITICAL, SOCIAL, AND ECONOMIC HISTORY*, Second edition (Oxford: University Press, 1956).

¹³⁹ Longrigg.

¹⁴⁰ Longrigg.

3.1.2 1932-1958:

In 1932 Iraq became independent from the British mandate and became a monarchical state. This period was also unstable and witnessed many conflicts between the government and minorities such as Kurdish and Assyrians on the one hand and the breaking out of World War II in 1939 on the other, all of which caused economic difficulties. The Land Settlement Law (Law of Lazmah), which outlined a certain form of land ownership, was issued in 1932. However this law was just a continuity of the previous Ottomans' reforms 'Tanzimat' which had a trend of land privatization.¹⁴¹ Based on the amendments of the law of municipalities' administration number 84 and 24 in 1931 and 1934 respectively, in 1935 the 'System of Roads and Buildings No. 44' was issued.¹⁴²

This legislation was applied to all Iraq cities without exception. Accordingly, in addition to some other factors including transportation such as the advent of vehicles, the city witnessed notable changes. This system was a kind of zoning ordinance which was a common legislative tool of dealing with urban settlements around the world. This legislative tool was one of the significant factors that justify the city's urban form. The notion of this regulation was to divide the settlement (town) into six different urban districts or areas. Each has different minimum allowed plot area, minimum width of streets, maximum ratio of building coverage, building materials, open spaces ratio, and different types of building orientation in accordance with the plot dimensions. For example, in the urban area of the first classification, the minimum allowed area of plots to be subdivided was 100 m². This limit of allowance is gradually increased in the second, the third, and until the distinct urban area category [Table 3-1].¹⁴³

Urban area category	Minimum plot area (m ²)	Minimum plot front width
The first	100 m ²	-
The second	200 m ²	10 m
The third	300 m ²	-
The fourth	600 m ²	-
The distinct	1200 m ²	-

¹⁴¹ Johnson, p. 16.

¹⁴² The Royal Iraq, 'Set of Laws and Systems', *Iraqi Gazette No. 1465* (Baghdad, 1935), p. 195.

¹⁴³ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No. 1542*, 1936.

¹⁴⁴ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*, sec. 47 and 52.

The first category, as it is stated in this regulation, includes the already old existing fabric (organic pattern) of the city in which the technical services are difficult to apply due to its obsolescence.¹⁴⁵ This regulation also allowed the opening up of new streets such as the street that links the north and the south gate of the citadel, and widening the existing ones if required for purposes of public needs and services [Figure 3.5] and [Figure 3.6]. These regulations influenced not only the new areas and developments of the city but also the existing ones.

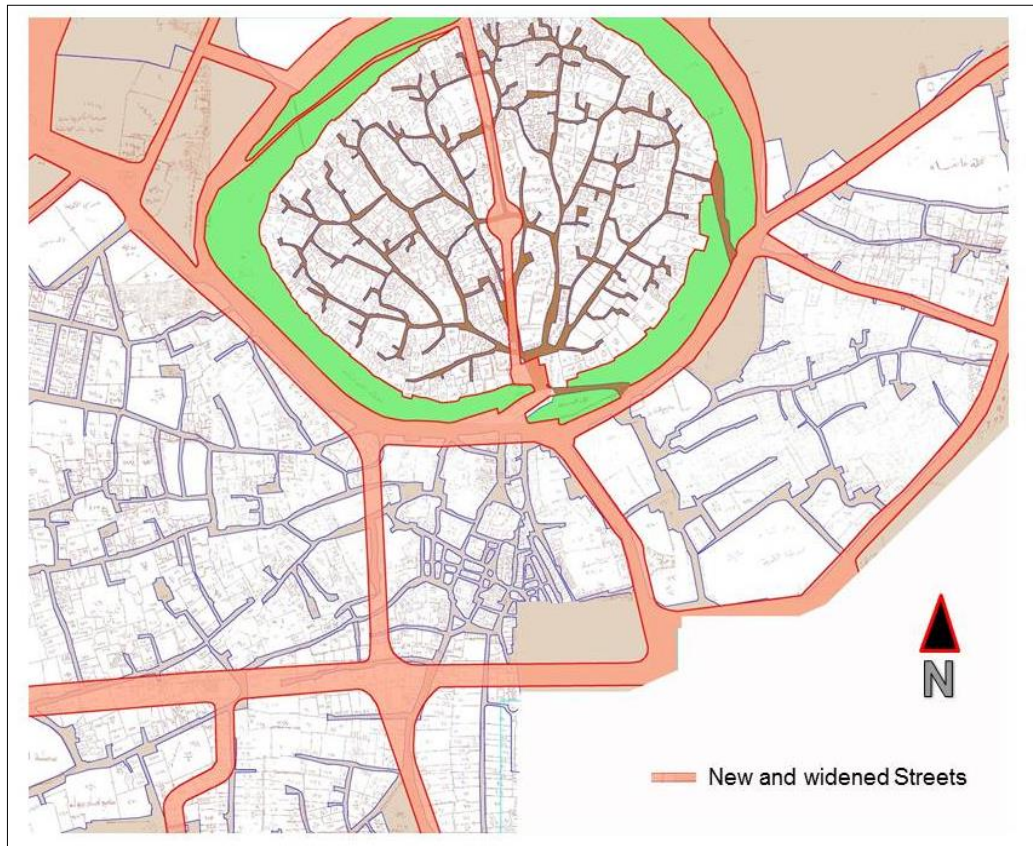


Figure 3.5: New and widened streets on the citadel and in the surrounding area. (Source: Drawing by the researcher basing on a cadastral map from The Presidency of the Municipality of Erbil)

¹⁴⁵ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*, para. 3.

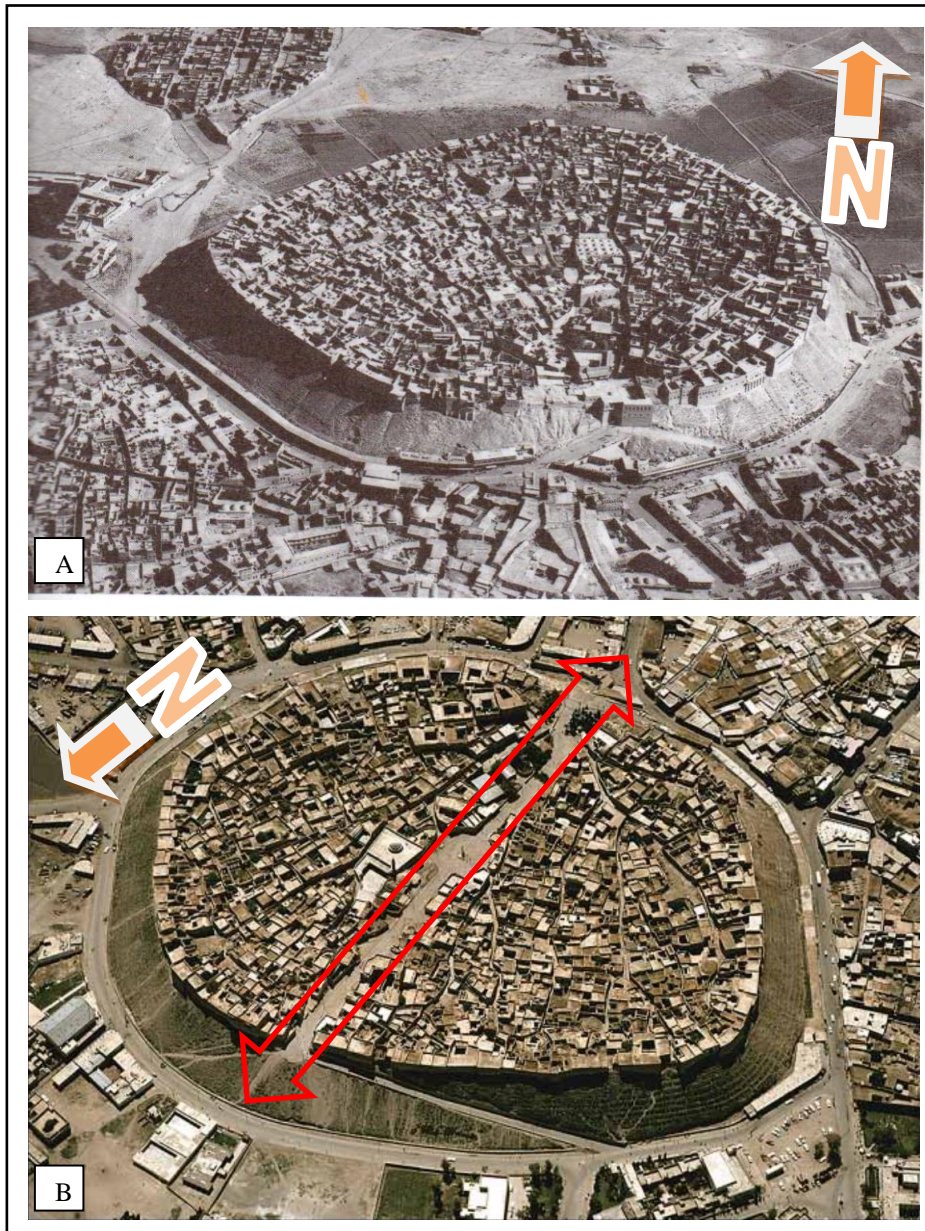


Figure 3.6: The urban pattern of the citadel before and after opening up the axial street that links the northern and the southern gates. (Source: **A**) Morris, A.E.J., *History of Urban Form, Before the Industrial Revolutions*, 1994 **B**) Drawing by the researcher on an aerial Photograph by Georg Gensler (1973)/ Photo Researchers, Inc.)

The setback distance limitation which introduces the relationship between the plot and the building and the street as well in the amended system in 1936 resulted in producing different building types within the blocks in different categories of urban areas. See [Table 3-2] and [Figure 3.7]. However the serial amendments on the system in the subsequent periods (1936, 1937, 1938, 1939, 1940, 1942, 1953, 1955, and 1956) caused an accumulation and different layers of urban form changes on the already existing areas.

Table 3-2: Minimum setback distances (from all plot sides) according to 'Amended System of Roads and Buildings No.44 of 1935' ¹⁴⁶ . (Source: Prepared by the researcher).	
Urban area category	Minimum Setback distance from the street (m)
The first	0.0
The second	0.0
The third	2.5 m
The fourth	4.0 m
The distinct	6.0 m

This legislation had socio-economic influences among the city's residents, as it divided the city into different hierarchies of quarters. The lower income people tended to reside in the first urban area category, while the rich families chose to inhabit the distinct or special category areas which were characterised by the lower density, larger plot sizes and open spaces. This division and the separation of the city's areas resulted in the separation and social segregation. The boundaries and borders of these different areas were obvious through the urban form elements that outline the differences in the densities between these different categories of urban areas.

¹⁴⁶ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*, para. 53.


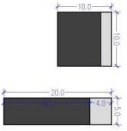
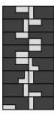


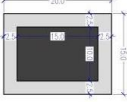

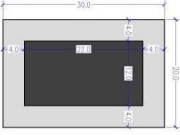

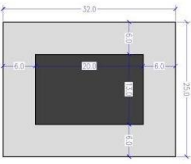
Block pattern		Building and plot pattern	
	The resulted pattern is attached houses		1st Urban area 100m ²
	The resulted pattern is attached houses		2nd Urban area 200m ²
	The resulted pattern is detached houses		3rd Urban area 300m ²
	The resulted pattern is detached houses		4th Urban area 600m ²
	The resulted pattern is detached houses		Distinct Urban area 1200m ²

Figure 3.7: Setback distances, building and plot types in different areas according to the amendment which made in 1936 on ‘*System of Roads and Buildings No. 44 of 1935*’. (Source: Drawing by the researcher)

3.1.3 1958-1991:

Although Iraq became a sovereign state according to the League of Nations in October 1932, the British still had a strong influence. In 1932, the first king of the Iraq kingdom King Faisal was appointed by the British.¹⁴⁷ A revolution in 14th July 1958 led to the change in the country's governance from Royal to Republican system. By then, the '*System of Roads and Buildings No. 44*' had had a notable influence on shaping the city's urban form. It was applied to all cities in Iraq regardless the local characteristics of cities and differences between them. Cultural, social, geographical, and topographic differences are apparent between some northern (Kurdistan), middle, and southern cities. However the system gave some power to the local authorities, yet the essential broad line of it was more influential.

Some events and the issuance of legislation had influenced the citizens and rural and urban areas as well. '*Law No. 80 of 1958*' on land and agricultural reforms allowed the small groups and peasants to have the right of holding lands as small plots by redistributing them. In cities low-cost housing projects targeted families and individuals working in different governmental sectors. One of the main housing projects was the procedure of land subdivision, which offered building plots to people who were in need for it, and also provided low interest loans to allow people build their own houses.¹⁴⁸

In 1964 the '*Law of Municipalities' Administration No. 84 of 1931*' was replaced by the '*Law of Municipalities' Administration No. 165*' in a response to the new system of the governance. The old law classified towns according to the town's revenue. However the new law did this on the base of the population size into five classifications: Distinct municipalities' classes first classed, second classes, third classes and the last which was the smallest was the fourth. Baghdad, which was the capital of Iraq, was an exception from this classification.¹⁴⁹ According to this law, Erbil was classified as the first class municipality with a population size higher than 75000 people. Consequently, according to the '*Amended System of Roads and Buildings No. 44 of 1935*', Erbil was divided into four urban area categories which meant that the distinct and special urban area categories did not exist.¹⁵⁰

¹⁴⁷ Johnson.

¹⁴⁸ Johnson.

¹⁴⁹ The President of the Republic, *Law of Municipalities' Administration No. 165 of 1964*, In *Iraqi Gazette No. 1033*, 1964, CLXV, para. 11.

¹⁵⁰ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*, para. 3.

The main characteristic of the republican system was that it had a trend of socialism in which the government took the stronger power. The trend of a radical socialism became more apparent since 1969 in 7th Ba‘th Party Regional Congress. In this Congress there were ‘much focus on workers’ and peasants’ rights, and talk of further land reform and the collectivisation of agriculture.’¹⁵¹ Individuals obtain their value when they are positioned within groups and communities. Not only was not this system in favour of the preparation of an atmosphere that allows private sectors to grow but also the public and state companies, in all sectors, dominated the market. The government also started to build some residential complexes in cities for governmental employees. According to the amended system of buildings and roads these complexes were exceptions from the classification of urban areas. The building type of these complexes’ houses was typical.

The emergence of signs that attempted to reduce the density differences between different urban areas, increasing the built up ratio on plots for residential purposes, and the growth of families that the extended families tended to reside in a larger house with a larger number of rooms, all combined together in 1964 resulted in an abolition of the section number 53 which was about building setback distances and it was replaced by a new section that only impose front setback when it was previously also applied to the other three sides of the plot which are mostly adjacent to the next plots [Table 3-3] and [Table 3-4].¹⁵² Plot coverage was also determined by this legislation and it was specified as percentages related to the area of the plot [Table 3-5].

Table 3-3: Minimum allowed area of plots according to ‘Amended System of Roads and Buildings No.44 of 1935’ ¹⁵³ (Source: Prepared by the researcher).		
Urban area category	Minimum plot area (m ²)	Minimum plot front width
The first	100 m ²	-
The second	200 m ²	-
The third	300 m ²	15.0m
The fourth	600 m ²	20.0m
The distinct	800 m ²	25.0m
The special	2000 m ²	25.0m

¹⁵¹ TRIPP, p. 190.

¹⁵² The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No.993*, 1964, pp. 98–99.

¹⁵³ The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, para. 47 and 52.

Table 3-4: Minimum front setback distances according to ‘ <i>Amended System of Roads and Buildings No.44 of 1935</i> ’ ¹⁵⁴ (Source: Prepared by the researcher).	
Urban area category	Minimum Setback distance from the street (m)
The first	0.0
The second	0.0
The third	2.5 m
The fourth	4.0 m
The distinct and special	5.0 m

Table 3-5: Plot coverage percentage according to ‘ <i>Amended System of Roads and Buildings No. 44 of 1935</i> ’ ¹⁵⁵ (Source: Prepared by the researcher).	
Urban area category	Plot coverage (%)
The first	80%
The second	80%
The third	65%
The fourth	55%
The distinct	50%
The special	30%

This changed the types of houses from detached to attached in the urban areas number 3, 4, the distinct, and even the special urban areas which had been added by an amendment on the system in 1944 [Figure 3.8].¹⁵⁶ Accordingly, this increased the ratio of plot coverage and consequently reduced the percentage of open spaces.

¹⁵⁴ The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, para. 53.

¹⁵⁵ The Monarch of the Kingdom, *Amended System of Roads and Buildings No.44 of 1935*, In *Iraqi Gazette No. 1465*, 1935, para. 50 and 53.

¹⁵⁶ The Monarch of the Kingdom, *Eighth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No. 2211*, 1944, pp. 102–4 (para. 5).


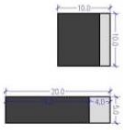


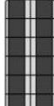
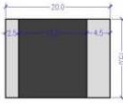

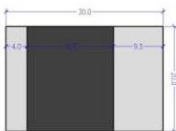
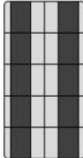
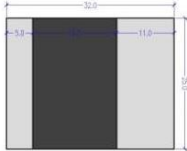
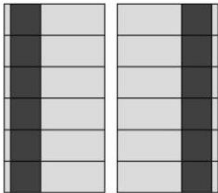
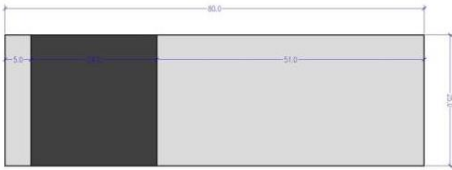
Possible block pattern	Possible building and plot pattern	
		1st Urban area 100m ²
		2nd Urban area 200m ²
		3rd Urban area 300m ²
		4th Urban area 600m ²
		Distinct Urban area 800m ²
		Special Urban area 2000m ²

Figure 3.8: Setback distances, building and plot types in different areas according to the serial amendments on the ‘*System of Roads and Buildings No. 44 of 1935*’ from 1935 to 1964. (Source: Drawing by the researcher)

In 1960s, Kurdistan witnessed conflicts between the Kurdistan Democratic Party (K.D.P.) who demanded autonomy and the Iraqi forces.¹⁵⁷ At the beginning of the 1970s the government started to nationalise the petrol companies working in Iraq, and in 1972 the Iraqi government nationalised IPC (Iraq Petroleum Company) which was the most important development in Iraq since 1958.¹⁵⁸ However legal actions targeting this issue had been previously started from 1961 when the Public Law No. 80 was issued.¹⁵⁹ In addition, the years from 1970 to 1974 Kurdistan witnessed some political stability due to the agreement of 11th March of 1970 between the Kurdish and the Iraqi government which then resulted in the issuance of law No. 33 about the autonomy of Kurdistan by which Erbil was nominated as the capital of the autonomous Kurdistan.¹⁶⁰ The economic growth of 1970s led to an improvement in many sectors although there were political problems especially since the accord of Algiers of 1975 between Iraq and Iran to defeat the Kurdish forces and the operations of relocating Kurdish communities from the areas close to Turkish and Iranian borders to cities and new settlements in Kurdistan and also to the southern cities of Iraq.¹⁶¹ This was the start of the displacement from the rural areas to urban settlements. The increasing demand on housing, the continuity of the government policy to reduce the differences between the neighbourhoods, and to limit the extravagance and the waste in using lands areas for housing purposes as it was justified by the government, it issued the '*Decision No. 850*' in 1979.

According to this decision the minimum allowed area of the plot subdivision was 120 m² in the centre of provinces (cities) regardless the urban area category and 100 m² in towns and suburbs. Section 7 of this decision aborted any text in the '*System of Roads and Buildings No. 44*' which contradicts the decision. This meant that the density differences in urban area categories in cities were going to be vanishing and the whole city was treated as one urban area. The decision also prevented the building of a single house on a plot whose area exceeds 800m² in all existing urban area categories and also in new developed urban areas.¹⁶² This

¹⁵⁷ Majid Khadduri, *REPUBLICAN IRAQ: A Study in 'Iraqi Politics Since the Revolution of 1958* (London: Oxford University Press, 1969), p. 178.

¹⁵⁸ Michael E. Brown, 'The Nationalization of the Iraqi Petroleum Company', *International Journal of Middle East Studies*, 10 (1979), 107–24.

¹⁵⁹ Johnson.

¹⁶⁰ The Revolutionary Command Council, *Law of Iraqi Kurdistan Autonomy No. 33 of 1974*.

¹⁶¹ TRIPP, pp. 204–6.

¹⁶² The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*, *In Iraqi Gazette No. 2722*, 1979, p. 8.

decision caused a shift in changing the urban form and building types of houses in all Iraqi cities generally including Erbil city.

Moreover, this legislation allowed building more than one house on one plot if each house area is not less than 120m² regardless of the dimension of the plot.¹⁶³ This meant that it is highly possible that unbuilt or vacant plots which have an area equal to or more than 240 m² in already existing urban areas can be subdivided into two or more plots. As a result of this, two or more houses can be built on such a type of plots. Nevertheless, the majority of new developments or new areas were subdivided according to this order. The possible impact of this decision on the urban form in existing areas was a shift from homogeneous houses in area to heterogeneous fabric with a various ranges of houses' areas. To exemplify this, rather than building one house on a plot with 300m² in the third urban area category, the owners tended to build two houses. Although this case was more typical, it cannot be generalised because there were numerous examples to the contrary.

A year after, the '*Instructions No. 851*' concerning building houses and instructions about the implementation of the '*Decision No. 850 of 1979*' was issued. The section number 4 of this instruction detailed the setback distances for single-family house buildings [Table 3-6] and [Figure 3.10]. It also limited 6m as a minimum width of houses and stated that the plots where more than one house is built can be subdivided into as many as the number of the existing houses, but the minimum width of each should not be less than 6m.¹⁶⁴ See [Figure 3.9]. A single amendment on the '*System of Roads and Buildings No. 44*' concerning the building license and the construction process duration was made in 1984 and this was the last amendment on the system.

¹⁶³ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

¹⁶⁴ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses, In Iraqi Gazette No. 2756, 1980, pp. 237–38.*



Figure 3.9: Plots number 72/ District number 44 Warish' in Erbil city show the re-division of some plots into two plots after the issuance of the 'Decision No. 850 of 1979'.

(Source: Drawing by the researcher basing on a cadastral map from The Presidency of the Municipality of Erbil)

Table 3-6: Minimum front setback distances according to 'Instructions No. 851 of 1980' ¹⁶⁵	
(Source: Prepared by the researcher)	
Urban area category or the plot area (m ²)	Minimum Setback distance from the street (m)
The first	0.0
The second	0.0
100 ≥ Plot area ¹⁶⁶ ≥ 200	1.5
200 > Plot area > 600	2.5
600 ≥ plot area	4.0

¹⁶⁵ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*, sec. 4.

¹⁶⁶ For plots that are subdivided according to the decision no. 850 in 1979

Due to the war between Iraq and Iran from 1980 until 1988, the economic and political instability, and the migration from rural to urban areas due to the government destruction of Kurdish villages and the forced movement of people from them, the government's focus on dealing with housing crisis was firstly through the extension of the policy that aims minimizing the houses areas in cities and towns and secondly through building residential camps for the migrated and displaced people from their villages. These camps were called 'coercive camps' and they were generally located nearby cities where they could be easily controlled by authorities. However, the government continued the policy of providing lands for people to build their own houses and this was reinforced by offering mortgages.

Due to the war conditions, the government offered war dead and soldier families lands for free or low prices for housing purposes. The municipalities in cities and towns were obliged to prepare new developments or new neighbourhoods for these families for this issue. These new neighbourhoods (quarters) were named martyrs', militaries', and officers' neighbourhoods. The area of plots in these neighbourhoods ranged between 200 m² to 600m². A common and typical characteristic can be noticed in houses were built in this period although people were free to have their own touch on the design of their houses and they were affected by the building regulations that were in use at these times in addition to the available building technologies.

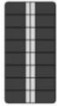

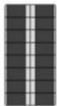


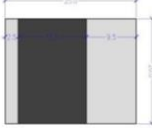

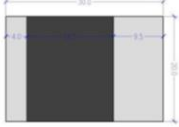
Possible block pattern	Possible building and plot pattern	
		1st and 2nd Urban area 100 m ² - 200 m ²
		100 m ² ≥ Plot area ≥ 200 m ²
		200 m ² > Plot area > 600 m ²
		600 m ² ≥ Plot area

Figure 3.10: Plot areas and setback distances according to the ‘*Decision No. 850 of 1979*’ and the ‘*Instructions No. 851 of 1980*’.
(Source: Drawing by the researcher)

In 1987 an amendment on the ‘*Decision No. 850*’ was made by the ‘*Decision No. 940*’. This amendment changed the minimum area of the plot and increased it from 120m² to 200m² in cities, 250m² in towns (Qaza), and 300m² in suburbs (Nahiya).¹⁶⁷ This decision confirmed the idea of treating with the whole city as one unit and aborted the notion of the variety and differences between different parts.

Some regulations on land use have significantly affected the urban form of the city. According to the municipalities’ administration law No. 165 in 1964, the

¹⁶⁷ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*, In *Iraqi Gazette No. 3183*, 1988, p. 6.

municipality's council is in charge of the preparation of master and detailed plan for the city and its districts and make changes on them as well.¹⁶⁸ Accordingly, the use of some residential plots on certain streets in some areas were changed to mixed or commercial uses although on some of these plots single-family houses had already built on while the rest were still unbuilt. This encouraged the owner of the unbuilt plots to build commercial and multi-storey buildings rather than single-family houses. The multi-storey and commercial buildings were built according to an issued regulation in 1989 from Baghdad.¹⁶⁹

These decisions resulted in changing the panoramic view of some streets when single-family house buildings and multi-storey buildings were built adjacent to each other on the same street. However the owners of plots were free to build either single-family house or mixed or commercial multi-storey building, yet the higher economic income of multi-storey buildings encouraged the owners to build multi-storey buildings. This decision resulted in social, economic, and even aesthetic consequences as well. See [Figure 3.11].



Figure 3.11: Single-family houses adjacent to multi-storey buildings.
(Source: Photographs by the researcher, 2011)

3.1.4 1991-2003:

After the end of the war between Iraq and Iran in 1980, Iraq faced some economic problems and in 1990 occupied Kuwait. This action brought serious consequences to the country and resulted in putting Iraq under economic siege, which in turn led to the uprising in the southern cities and Kurdistan cities in the north as well. Kurds finally could liberate their lands and establish their autonomous

¹⁶⁸ The President of the Republic, CLXV, sec. 43.

¹⁶⁹ Ministry of Local Governance, General Directorate of Urban Planning, *Building Regulations in Commercial Areas No. 4131, Official Letter No. 4131 on 16/9/1989*, 1989.

region.¹⁷⁰ In 1992, the election resulted in the establishment of first parliament of Kurdistan and the first cabinet. Some new laws in different sectors were issued by the parliament. The municipalities' administration law No. 6 in 1993 was issued. This law was mainly borrowed its principles from the Iraqi law number 165 in 1964 but there were some changes on it to adapt the new situation of Kurdistan region and its new system.

This period witnessed the stagnancy in building process due to the economic crises that faced the country generally and Kurdistan region especially. However, some new developments and new neighbourhoods were built. Some of these were built by the people who received money from outside sources especially from their relatives who were living outside the country especially in Europe. Also the UN organizations especially HABILITAT built few residential complexes however their contributions were very limited. These complexes were characterised by typical and single-storey houses.

Due to the unstable political and economic conditions of the country and the city as well when the authority was incapable to provide fundamental services and the inability to control the urbanization and building process, some illegal and slum quarters appeared. These quarters were characterised by its irregular streets and blocks patterns [Figure 3.12]

Some official studies have been done on Erbil city. The first master plan for the city was approved in 1977 and the next in 1994. However, these two plans, which were named 'master plan', were just graphic drawings as they were not supported by a comprehensive study and analysis. Yet, the crucial period that the city has witnessed is after 2003, after the fall of the regime, when Kurdistan region was legally recognised as a federal region within the state of new federal Iraq.¹⁷¹

¹⁷⁰ TRIPP, pp. 248–50.

¹⁷¹ TRIPP.

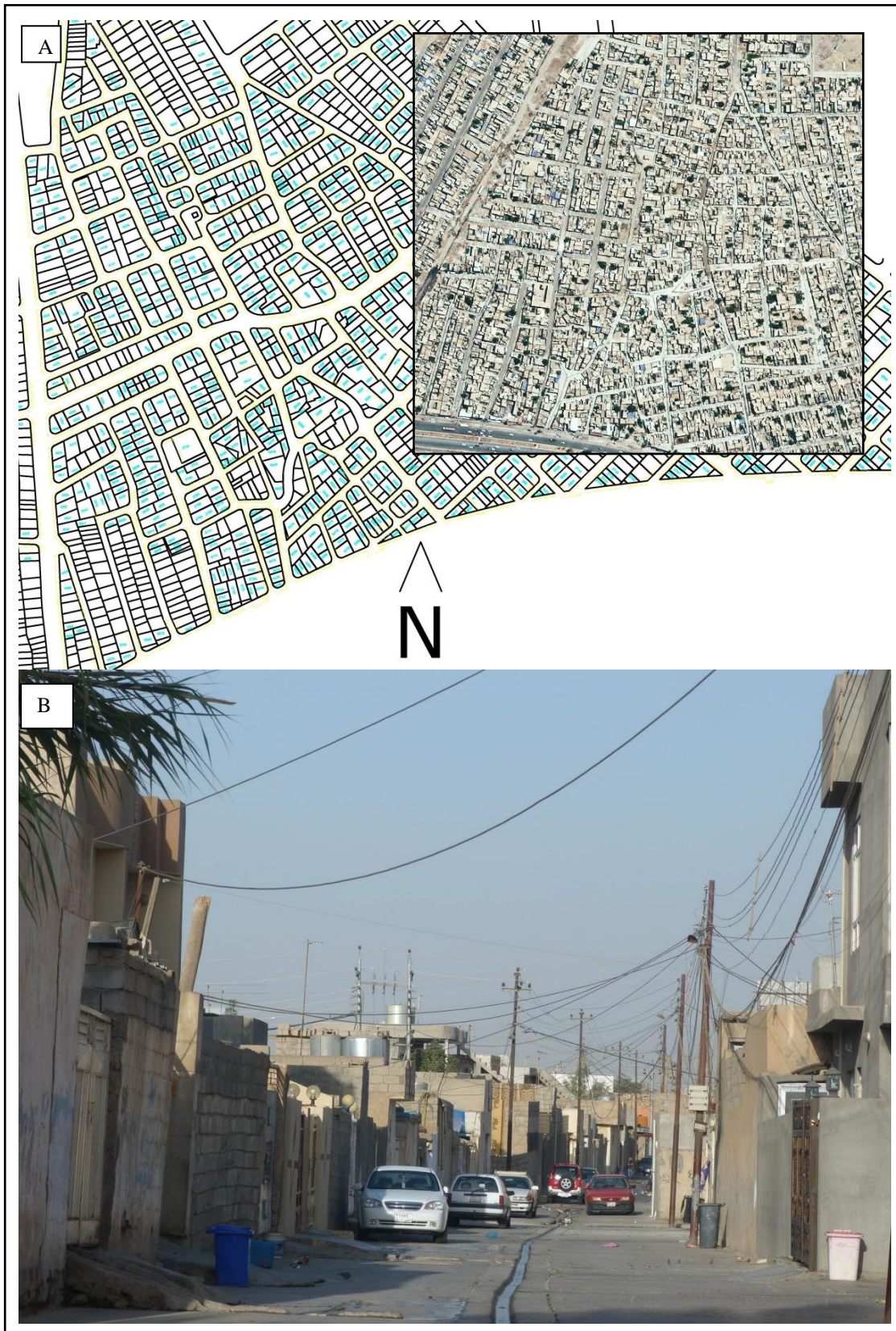


Figure 3.12: An illegal quarter in Erbil city, known as ‘Badawa illegal quarter’.
(Source: **A**) the Presidency of the Municipality of Erbil. **B**) Photograph by the researcher, 2013)

3.1.5 2003-2013:

The region and Erbil city as its capital witnessed considerable growth and development after 2003. The first master plan based on a comprehensive study for the city was prepared from 2006-2009 [Figure 3.13]. This was followed by the preparation of the city centre master plan [Figure 3.14], preparing guidelines for the buffer zone around the citadel, the master plan for the first green belt ring, issuing the investment law of Kurdistan number 4 in 2006 from the Kurdistan parliament which resulted in the building of many residential complexes in Erbil city [Figure 3.15], and some amendments on the building regulations which have led to a considerable change in the urban form of the city.

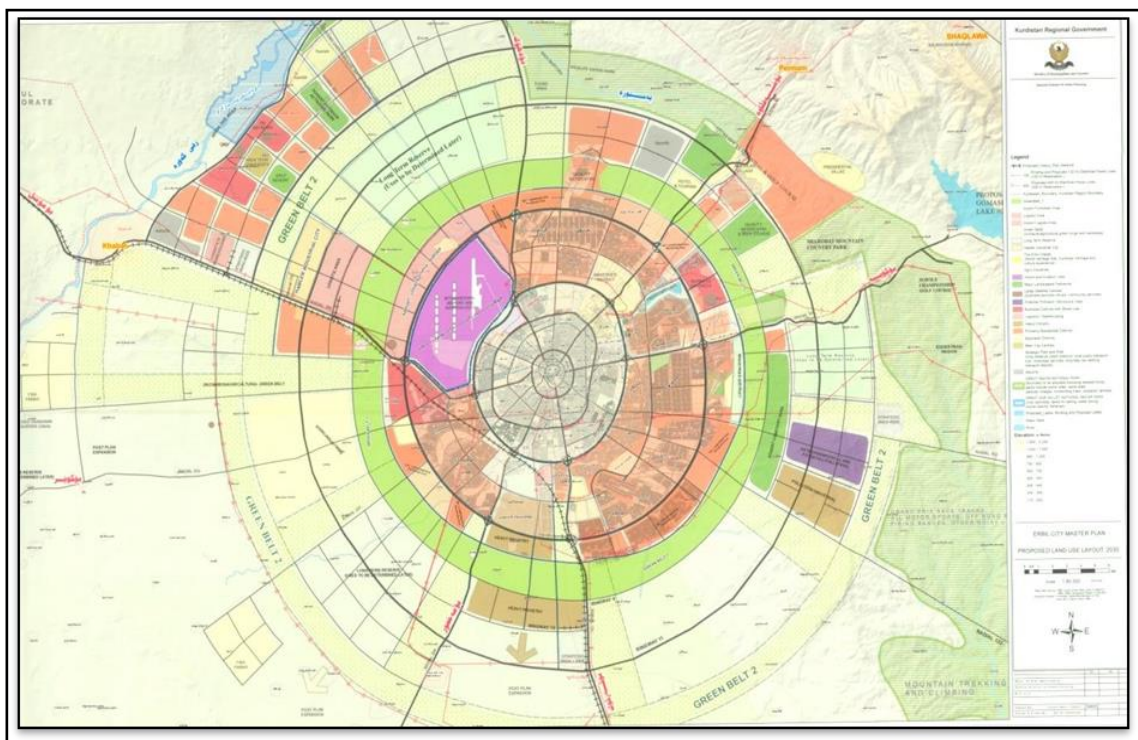


Figure 3.13: Erbil city master plan which was approved in 2009.
(Source: Erbil Urban Planning Directorate)

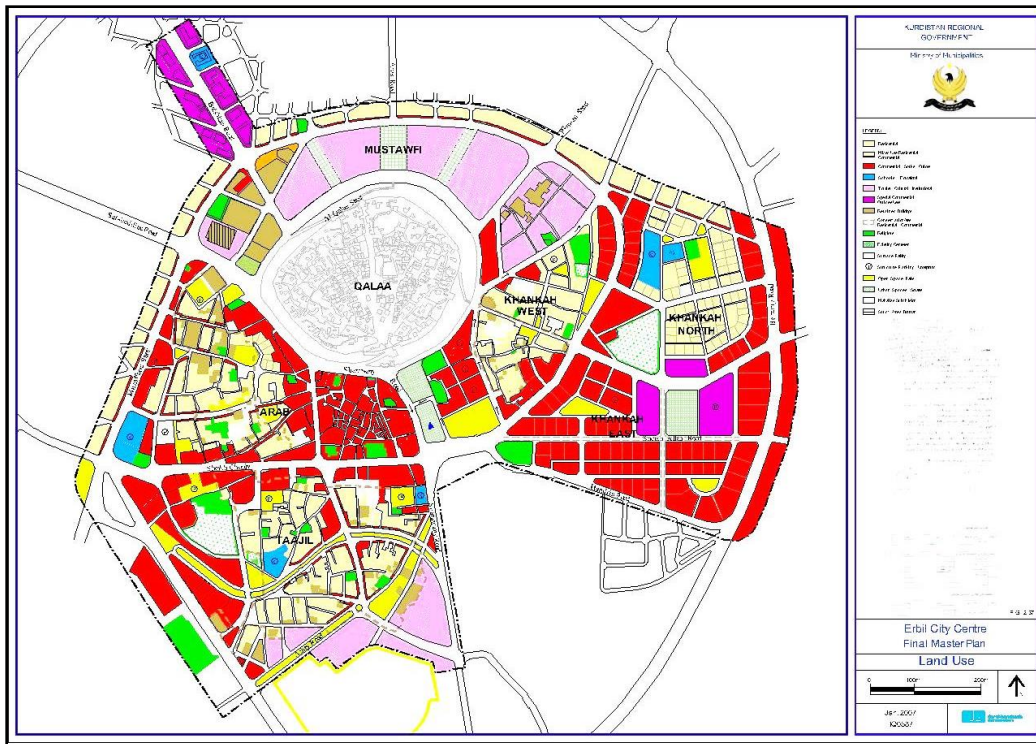


Figure 3.14: Erbil city centre master plan which then was cancelled and replaced by Erbil citadel buffer zone guidelines. (Source: Ministry of Municipalities, Dar al_Handasah, *Erbil City Center: Final Master Plan Report, 2007*)



Figure 3.15: Residential complexes in the west of Erbil city. (Source: Falcon Group Company)

However the imprint of all the previous regulations were powerful on the process of building and the urban form of the city even in the new developments, yet some attempts were made by the responsible authorities to make amendments and changes in policies and regulations in a response to the new incomes of the new stage which was characterised by a fast growth in all sectors especially the urbanisation and building construction sector. The increasing demand on housing, due to firstly the increase in the number of new families requiring independent houses, and secondly to the inward migration to Kurdistan cities (especially Erbil) from the unsafe conditions experienced in other Iraqi cities in the middle and the south of the

country, thirdly due to the return of citizens of Erbil who have previously migrated (Kurdish families from Iran and other countries who had been forced to leave Kurdistan over the period between 1960s and 2003), and fourthly the increasing number of the regional and international companies in the region which also needed places for their offices, resulted in the appearance of some new phenomena in building types. These can be summarised in firstly building two houses on 200m² plots when the share of each house was 100m² with 5m width, and secondly building attached single-family houses with three floors which sometimes resulted in the creation of social problems between neighbours. However, previously the height of houses did not exceed two storeys not due to the limits of the legislation but simply through common tradition [Figure 3.16] and [Figure 3.17].



Figure 3.16: Two symmetric houses, each has 100 m² with 5 m width on one 200 m² plot. (Source: A) Photograph by the researcher B) The presidency of the Municipality of Erbil)



Figure 3.17: Attached houses with two and three floors in one block. (Source: Researcher)

These phenomena became very common, so much so that the responsible authorities could not limit them but instead, they made some attempts to regulate them through proposing the height limitations for two and three storey houses. They implemented this proposal firstly on a few neighbourhoods, and then gradually it was applied to almost all the other neighbourhoods which had faced the same issue.

3.2. Different categories of legislation influencing urban form of Erbil¹⁷²

Many pieces of legislation have influenced the formation and the transformation of the urban form of Erbil city since 1920. In this section an overview of this legislation is given. A classification of the legislation is made according to the general topic that the legislation covers and deals with. Some of these legislations have had a direct influence on the urban form at a certain level while others have indirectly influenced the urban form. Moreover, some were only valid for a period of time but they have left their trace on the urban form, where clues of their effect can be noticed on the existing condition of the urban form. The contrary is also true. Due to the accumulative changes of the urban form overtime, the influence of some of the legislations which were in force for a period of time in the past, their influence cannot be seen on the existing condition of the urban form. Yet, archival documents provide useful evidence to show the previous condition of the urban form. Some of this legislation has had a direct influence, while others have had indirect influence. Three categories of the legislations are made:

3.2.1 Legislation concerning land rights and ownership

Land is perhaps the most important elements that influence cities' developments. Aldo Rossi referred to what Hans Bernoulli addressed and emphasised on land rights and private ownership and the consequences of the division of it even when the process extended into defining the form of cities.¹⁷³ The conflicts over land, concerns between state and private ownership, and the value of it always matter. In this section, legislation enacted at the state level concerning land rights and ownership is covered. This category of legislation is dealt with as an indirect influence set of legislation in this research. As was mentioned in the previous chapters, the city is an accumulative product formed over time: therefore there are a number of pieces of legislation that have influenced the formation and the transformation of this product over time. Some of them were valid for a period of time, but their influence on some current and existing urban form of the city can be observed. As the time period that the research covers starts from 1920, all the legislation mentioned in this section have been issued since that date.

¹⁷² All the legislation mentioned in this section has been enacted on a national level (State level) and applied on almost all the Iraqi cities including Erbil.

¹⁷³ Rossi, pp. 152–53.

Land rights and land ownership is one of the important topics that could directly or indirectly influence urban form. A set of legislation has concerned this issue since the establishment of the state of Iraq in 1920. As mentioned, Iraq, before 1920 was three provinces (Mosul, Baghdad, and Basra) belonging to the Ottoman Empire. Therefore, all the cities including Erbil were under the influence of the legislation of the Ottomans. According to a census made in 1867, about only a quarter of the population of Iraq were settling in urban centres. A considerable proportion from the rest was nomadic.¹⁷⁴ Therefore, those people were not strongly tied to land which had no significant value to them. However, this attitude changed in the coming decades, especially after World War II.

In 1858 the law of land of Ottomans was enacted. However, this law was not applied on the cities of the three provinces ('Wilayats') of Iraq.¹⁷⁵ In 1870 the law of 'Tapu' was introduced in Baghdad which was governed by 'Midhat Pasha'.¹⁷⁶ Despite what the main aims of this law were, it to some extent tried to settle the tribes and effectively bind people to agricultural lands. It was a first step of land registration and ownership, by which a Land Registry for documents was introduced. Later on, this law was also applied to 'Mosul'¹⁷⁷ province. Apart from the lands inside the boundary of the urban settlements, little agricultural land was formally registered and they lacked accurate surveys and cadastral maps.

This situation continued even for a period after the end of the World War I and the dissolution of the Ottoman Empire and the establishment of the Iraqi state as the new government of this new state continued on applying the inherited laws of Ottomans. In 1929 the Iraqi government issued a translated version of the Turkish Ottoman law of land to Arabic¹⁷⁸ to be adopted and applied.¹⁷⁹ However, again this process of registration was not based on cadastral surveys by which the location, area, and the boundary of the lands can be exactly determined.¹⁸⁰ The social and the

¹⁷⁴ Maria Hasan Al-Tamimi, 'Kaifa arafa al-Iraqiun nidham al-tapo liawal marra? (How did Iraqis Know the System of Tapu for the First Time?)', *Al-Mada for Media, Culture, and Arts*, 2013 <<http://almadasupplements.com/news.php?action=view&id=6659>> [accessed 16 June 2016].

¹⁷⁵ Hamdi Fuad Al-Ani, 'Nushu mulkiyat al-arz al-ziraiya fi al-Iraq wa marahil tatawiriha (The Emergence of Agricultural Land Ownership in Iraq and its Stages of Development)', *Iraqi Communist Party* <<http://www.iraqicp.com/index.php/sections/objekt/11506-2014-02-28-13-17-57>> [accessed 16 June 2016].

¹⁷⁶ Al-Tamimi.

¹⁷⁷ Erbil belonged "Mosul Wilayat" (province).

¹⁷⁸ The Monarch of the Kingdom, *The Ottoman Law of Land, In the Annex of Iraqi Gazette No. 727*, 1929.

¹⁷⁹ RTI (Research Triangle Institute) International, *Land Registration and Property Rights in Iraq* (Baghdad: USAID Iraq Local Governance Program, 2005), p. 3.

¹⁸⁰ Great Britain. Naval Intelligence Division, *Iraq and Persian Gulf* (London: Routledge, 2014), p. 442.

institutional consequences that this law caused at that time are not the subject here. Yet, it has an indirect influence on the cities' future urban form as some of those agricultural lands have been included in the boundaries of the cities and towns.

During the period of the British mandate (1918-1932), Iraq had four forms of land ownership. The first is 'Mulk' the lands which are in full property owned by private entities (persons or institutions). This type of land constituted the lowest percentage among all other categories. The vast majority of the 'Mulk' lands included the sites of the buildings of the towns and villages. The second was 'Miri', the land owned by the state. All the agricultural lands were 'Miri' but according to the right of use there were in three forms of tenure: 'Tapu tenure' (commissioned as fief with all the rights of the property), 'Luzma' or 'Lazmah' (Permanent leasehold and a combination of tenancy and possession), and 'Simple Miri' (all the agricultural and non-agricultural lands excluding 'Tapu' and 'Luzma').¹⁸¹ The third form of ownership was 'Matrukhi'. It included all the lands used for public utilities whether in rural or urban areas. Examples of 'Matrukhi' are 'communications, waterways, irrigation works, communal threshing grounds, cemeteries, parks, sites of hospitals, schools, historical monuments, and other government buildings'. The fourth and the last form of ownership was 'Waqf' all the lands used for charity purposes and either directly managed by the institutions of 'Waqf' or leased to privates. This form of lands formed about 1.4% of the lands of Iraq in 1944.¹⁸²

In 1932, under the Mandatory ruling, based on the proposals of Sir E. Dowson to make a reform, to improve and restore land tenure and registry basing on cadastral surveys, two laws were introduced¹⁸³: *Law of the Assessment of Land Rights*¹⁸⁴ and *Law of Luzma*¹⁸⁵. A new version of the *Law of the Assessment of Land Rights* was enacted in 1938¹⁸⁶. Then, this followed by a series of amendments in 1941¹⁸⁷,

¹⁸¹ This form of land constituted 55% of the lands in 1944.

¹⁸² Great Britain. Naval Intelligence Division, *Iraq and Persian Gulf*, pp. 443–44.

¹⁸³ Great Britain. Naval Intelligence Division, *Iraq and Persian Gulf*, p. 443.

¹⁸⁴ The Monarch of the Kingdom, *Law of the Assessment of Land Rights No. 50 of 1932, In Iraqi Gazette No. 1137, 1932*, pp. 205–23.

¹⁸⁵ The Monarch of the Kingdom, *Law of Luzma No. 51 of 1932, In Iraqi Gazette No. 1137, 1932*, pp. 224–27.

¹⁸⁶ The Monarch of the Kingdom, *Law of the Assessment of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1625, 1938*, pp. 170–95.

¹⁸⁷ The Monarch of the Kingdom, *Law No. 26 on the Amendment of Law of Assessments of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1895, 1941*, pp. 93–97.

1959¹⁸⁸, 1961¹⁸⁹, 1965¹⁹⁰, 1968¹⁹¹, and 1969¹⁹². An amendment was made in 1938 on the *Law of Luzma*¹⁹³.

In 1943 a new legislation of ‘Tapu’¹⁹⁴ was enacted which replaced the old inherited ‘Tapu System’ from the Ottoman ruling period. After the revolution of 1958 a new version¹⁹⁵ of ‘Tapu System’ replaced the one enacted in 1943 and then it was amended in 1960¹⁹⁶ and in 1965¹⁹⁷. All those versions and amendments of ‘Tapu System’ were based on ‘*Law of the Essentials of the Registry of Non-Movable Possessions in Tapu No. 55 in 1935*’. In 1971 a new legislation was enacted and it replaced both ‘*Law of the Essentials of the Registry of Non-Movable Possessions in Tapu No. 55 in 193*’ and the amended ‘Tapu System’ with all the instructions issued under them. This was the ‘*Law of Real Estate Registration No. 43 in 1971*’¹⁹⁸. One of the aims of this legislation was to introduce a new system of land registration and omit the term ‘Tapu’ which came from Ottomans legacy. This legislation was one of the outcomes of the era after the revolution of 1958. According to this legislation a new ‘Title Deed’ document as an only proof of ownership was introduced. This document includes three essential pieces of information¹⁹⁹: the full name of the ownership, the category of the property²⁰⁰, and the type of the property²⁰¹. In addition, it carries information about the area, the location of the land or the plot in regard to other plots and lands, and the date of the registration.

¹⁸⁸ The Council of the State, *Law No. 20 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 129*, 1959, pp. 95–96.

¹⁸⁹ The Council of the State, *Law No. 61 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 579*, 1961, pp. 289–93.

¹⁹⁰ The Presidency of the Republic, *Law No. 16 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 1075*, 1965, pp. 54–59.

¹⁹¹ The Presidency of the Republic, *Law No. 25 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 1547*, 1968, pp. 54–59.

¹⁹² The Revolutionary Command Council, *Law No. 67 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 1729*, 1969.

¹⁹³ The Monarch of the Kingdom, *Law No. 33 on Amendment of Law of Luzma No. 51 of 1932*, In *Iraqi Gazette No. 1626*, 1938, pp. 204–5.

¹⁹⁴ The Monarch of the Kingdom, *System of Tapu No. 26 of 1943*, In *Iraqi Gazette No. 2100*, 1943, pp. 108–319.

¹⁹⁵ The Council of the State, *System of Tapu No. 64 of 1959*, In *Iraqi Gazette No.296*, 1960, pp. 342–82.

¹⁹⁶ The Council of the State, *The Amendment System of 1960 of the System of Tapu No. 64 of 1959*, In *Iraqi Gazette No.312*, 1960.

¹⁹⁷ The Council of the State, *The Amendment System of 1965 of the System of Tapu No. 64 of 1959*, In *Iraqi Gazette No.1115*, 1965.

¹⁹⁸ The Revolutionary Command Council, *Law of Real Estate Registration No. 43 of 1971*, In *Iraqi Gazette No. 1995*, 1971, pp. 379–453.

¹⁹⁹ RTI (Research Triangle Institute) International, p. 5.

²⁰⁰ The different categories of the property are a plot of land, residential, arable, commercial, or industrial

²⁰¹ There are three types of the estate: private real estates (fully owned by and registered in the Title Deed document to individuals), public estates (owned by the state and its organizations), and endowment which is registered in the endowment department.

Other laws concerning land enacted after the revolution of 1958 were the ‘Laws of the Agrarian Reform’ in 1958²⁰² and in 1970²⁰³. The latter cancelled and replaced a group of legislation concerning land rights including ‘*Law of the Assessment of Land Right No29 in 1938*’ and all its amendments as it claimed that the previous laws were in favour of a minority group of people and the royal families who served the advantages of the colonialism.²⁰⁴ The agrarian reform was a redistribution of land and its rights by limiting a maximum area of land that one can own or have the right to use. Any area more than the maximum limit, will be expropriated by the government who has the right to redistribute and grant it to other farmers. This was an action of the revolution towards socialist system in which the state took more power over most of the sectors.

Both the ‘*Law of real Estate Registration No. 43 in 1971*’ and ‘*Law of Agrarian Reform No. 117 in 1970*’ are still valid. However, a number of amendments have been made to them. These mentioned set of legislations are the important ones which influenced the existing forms of land ownership. The influence of this set of legislation also becomes apparent even when the land is incorporated in the city’s boundary for urban uses and at this stage (the stage of the transformation of the land from agricultural use to urban uses such as residential), other regulations bring an indirect influence. These laws regulate the process of the incorporation of land into the municipalities’ boundaries for urban uses and also regulate the way and the amount of the compensation to be made to the owners and to those who have the right over that land previously (before the transformation process).

Series of successive laws were enacted to regulate the relationship of the land rights between the user and the owner, such as the ‘*Law of Real Estate Usufruct Rights*’²⁰⁵, ‘*Law of Turning-off the Right of Real Estate Usufruct*’ of 1960²⁰⁶ and that of 1967²⁰⁷, and ‘*Law of the Assessment of Real Estate Usufruct Right*’²⁰⁸. However, more concerned set of laws are the laws of land acquisition ‘*Law of Acquisition No.*

²⁰² The Council of the State, *Law of the Agrarian Reform No. 30 of 1958*, In *Iraqi Gazette No. 44*, 1958, pp. 92–109.

²⁰³ The Presidency of the Republic, *Law of the Agrarian Reform No. 117 of 1970*, In *Iraqi Gazette No. 1884*, 1970, pp. 505–46.

²⁰⁴ The Presidency of the Republic, *Law of the Agrarian Reform No. 117 of 1970*, p. 539.

²⁰⁵ The Monarch of the Kingdom, *Law of Real Estate Usufruct Rights No. 55 of 1932*, In *Iraqi Gazette No. 1142*, 1932, pp. 246–49.

²⁰⁶ The Council of the State, *Law of Turning-off the Right of Real Estate Usufruct No. 8 of 1960*, In *Iraqi Gazette No. 289*, 1960, pp. 27–29.

²⁰⁷ The Council of the State, *Law of Turning-off the Right of Real Estate Usufruct No. 150 of 1967*, In *Iraqi Gazette No. 1490*, 1967, pp. 716–20.

²⁰⁸ The Revolutionary Command Council, *Law of the Assessment of Real Estate Usufruct Right No. 17 of 1980*, In *Iraqi Gazette No. 2755*, 1980, pp. 164–65.

54 in 1970²⁰⁹ and ‘Law of Acquisition No. 12 in 1981’²¹⁰ and its amendments of 1994²¹¹ and of 1998²¹². In addition, a law concerning the process of dealing with the rights of lands incorporated in the cities’ boundaries was enacted for Kurdistan region by its legislative institutions²¹³. An amendment on this law was made in 2007²¹⁴. This latter law has significantly influenced the new development plans of the extension of the cities for different urban uses, especially for residential uses and it defined the limits of the compensations to the people who have a certain right for the land before being included in the city boundary. The existing land boundaries according to their registry are different from the boundaries that define the quarters [Figure 3.18]. Some of the quarters are publicly called and known by their registry name or number such as ‘Badawa’, ‘5 Hasarok’, and ‘32 Park’.

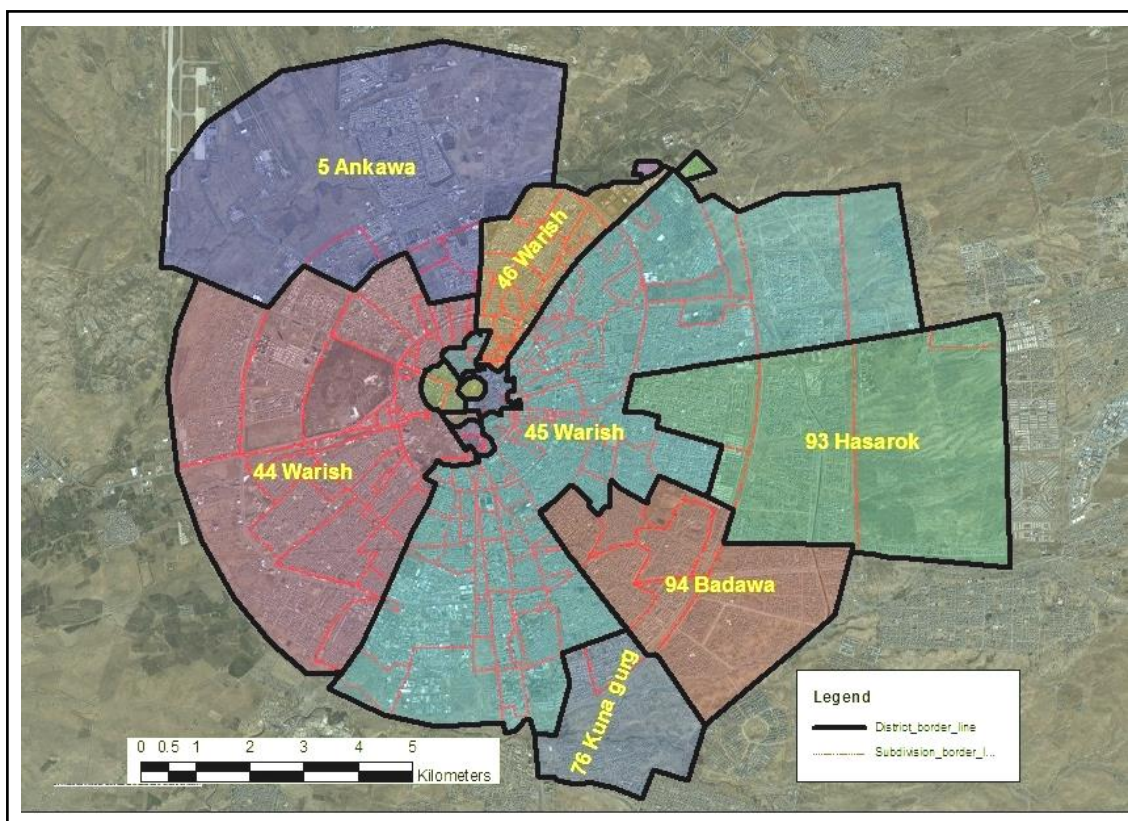


Figure 3.18: Different districts and subdivisions of land of Erbil. It is the key to the cadastral map of the different parts of Erbil. (Source: Drawing by the researcher based on different cadastral maps from Real Estate Registry offices of Erbil)

²⁰⁹ The Revolutionary Command Council, *Law of Acquisition No. 12 of 1981*, In *Iraqi Gazette No. 2817*, 1981, pp. 167–75.

²¹¹ The Revolutionary Command Council, *Law No. 20 on the Amendment of the Law of Acquisition No. 12 of 1981*, 1994.

²¹² The Revolutionary Command Council, *Law No. 6 on the Amendment of Law of Acquisition No. 12 of 1981*, 1998.

²¹³ The Parliament of Iraqi Kurdistan, *Law 3 of 1998 on Turning-off and Subdividing Land located Inside the Municipalities’ Boundaries*, In *The Set of Laws and Systems No. 3*, 1998, pp. 40–41.

²¹⁴ The Presidency of Kurdistan Region, *Law No. 5 on the Amendment on Law No. 3 of 1998 on Turning-off and Subdividing Land located Inside the Municipalities’ Boundaries*, In *Kurdistan Gazette No. 67*, 2007, pp. 19–20.

3.2.2 Legislation concerning heritage and antiquities

Depending on the case and the location of the area, this category of legislation could have either direct or indirect influence on the formation and the transformation of the urban form. As Erbil is a historical city that has an ancient citadel at its centre, the areas surrounding this citadel are very much restricted by the laws and regulations of heritage and antiquities represented in conservation policies and design guidelines. The quarters of Arab, Taajeel, Khanaqah, and Mustawfi are those locations that always were in some form influenced by this category of legislation.²¹⁵

After the establishment of the state of Iraq, many attempts were made to protect antiquities. However, the prominent attempt was that of Gertrude Lowthian Bell.²¹⁶ Her attempt ended up by the introduction of the first Iraqi law of antiquities in 1924.²¹⁷ The collection of her letters evidenced her effort and actions for this law to be enacted.²¹⁸ This was followed by another law in 1936²¹⁹ which aborted the earlier one. According to this law, the buildings which were constructed prior to 1700 are considered as the first type of antiquities.²²⁰ However the amendment of this law in 1974 changed the definition of antiquities to all man-made materials that have an age of 200 years old and older, or they should have historical, national, religious, and artistic values if they are younger than 200 years old.²²¹ This definition remained as the same in the new law of antiquity enacted in 2002²²², as it has been stated in article 7 and article 8.

The aims of this category of law is to define the locations of antiquities, to excavate, protect, preserve, and maintain them. In addition, they aimed to establish museums, preparing models of the antiquities, and preparing studies and research on them. What relates here to building constructions and urban sites is defining those

²¹⁵ A review of some of this category of legislation is made in the next chapter (See sections 4.7.1 and 4.7.2).

²¹⁶ Sabah Al-Nasiri, 'Bidayat ihtimam al iraqiun bi atharihim alqadima wa kaifa sadara qanun al-athar fi al-ishrinat (The Beginning of the Iraqis Care to their Antiquities and How was the Law of Antiquities Enacted in 1920s?)', *Al-Mada for Media, Culture, and Arts*, 2015

<<http://www.almadasupplements.com/news.php?action=view&id=13926>> [accessed 21 June 2016].

²¹⁷ The Monarch of the Kingdom, *Law of Old Antiquities of 1924*, 1924, pp. 84–97.

²¹⁸ Gertrude Lowthian Bell, *The Letters of Gertrude Bell*, ed. by D.B.E. Lady Bell (London: Ernest Benn, 1927), II, p. 645.

²¹⁹ The Monarch of the Kingdom, *Law of Old Antiquities No. 59 of 1936, In Iraqi Gazette No. 1507*, 1936, pp. 368–91.

²²⁰ Paragraph 1 of this law defined the word "antiquity" as any man made material and artefact which was made prior to the year 1700 AD and Article 2 classified antiquities into two categories: movable and non-movable which included buildings.

²²¹ The Revolutionary Command Council, *Decision No. 975 on The Amendment of Law of Antiquities No. 59 of 1936, In Iraqi Gazette No. 2396*, 1974, pp. 373–79 (p. 374).

²²² The Presidency of the Republic, *Law of Antiquities and Heritage No. 55 of 2002, In Iraqi Gazette No. 3957*, 2002, pp. 566–72 (p. 566).

which are considered as antiquity or as heritage and need protecting, conserving, and maintaining them. The nature of the influence of this category of legislation on the urban form of some parts of Erbil city is presented in more detail in the next chapter.

3.2.3 *Legislation concerning planning and building*

This category of legislation is classified as those that have a direct influence on the urban form and its morphology. The different regulations of this category of legislation deal with the city at different scales, starting from the highest (macro) scale down to district unit, neighbourhood (quarter) unit, and then ‘Mahalla’ which is the lowest scale according to Iraq planning standards.²²³ This section covers issues related to the process of planning, design, and the procedure of their preparation and approval within the system. Moreover, the regulations concerning building permits and their process are also presented. However, most of the legislation having a direct influence has been mentioned in Section 3.1 of this Chapter and will be discussed in more detail in the analysis of each individual sample in the next Chapter.

Generally, this set of legislation defined the institutional structure and the role of authorities responsible for building, planning, designing, and developing urban settlements. It also defined the procedure of control and granting building permit.

At the national level, there are various groups of legislation. The earliest of these is the law of municipalities’ administration of 1931.²²⁴ Serial versions (amended and new) of this law have been enacted. According to this law, municipalities are defined as the responsible authority for these issues mentioned. Another influential legislation issued is the ‘*System of Roads and Buildings No. 44 of 1935*’²²⁵. A series of amendments on this legislation were made until 1984. This legislation combined determining the variables of planning and building with enforcement issues. It was a type of zoning ordinance based on building density. It divided the city into different hierarchical zones called ‘urban area category’ from category 1 the denser to special the least density. The legislation concerning plot subdivision and building single-family houses enacted in 1979, 1980, and 1987 has also played a role in determining the urban form of the cities of Iraq. In 1989 legislation was enacted regarding building in commercial areas. However this

²²³ According to Iraq Planning Standards, District has 5000-7000 residential units, Neighbourhood 2400-3400 units, and then Mahalla with 600-800 units

²²⁴ The Monarch of the Kingdom, *Law of Municipalities’ Administration No. 84 of 1931*, In *Iraqi Gazette No. 995*, 1931, pp. 771–94.

²²⁵ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*, In *Iraqi Gazette No. 1465*, 1935, pp. 195–214.

legislation has influenced some areas and their transformation, although commercial buildings are excluded in this study.

On the regional level, Kurdistan has enacted its own legislation after the establishment of its own parliament and its own government in 1992. In 1993 the Kurdistan's municipalities' administration law was enacted.²²⁶ This law was similar to the Iraqi's version of '*Municipalities' Administration Law No.165 of 1964*', but with some adaptations to the new era of the region. A number of amendments on this law have been made.

There are various decisions made on the level of the city by the local authorities of Erbil. However, the most concerning are those decisions made by the municipality council of Erbil, the ministry of municipalities of Kurdistan, and Erbil governorate. By law²²⁷, any design and planning decision before being implemented should be approved by a decision from the municipality council of the city.²²⁸ This decision should be signed by the minister. Examples of these kind of decisions are: extending the municipal boundary of the city, subdividing plots, changing land use, approval of master and detailed plans, proposing new and changing existing plans and building regulations on the level of the city, allocation of land for different projects such as housing, widening existing streets, opening up new ones, and with coordination with the concerned institutions defining, numbering, and naming houses, streets, and quarters.

One of the powers that this set of laws gave to the municipality is the granting of building permit. The authorisation of this power was mentioned in the '*System of Roads and Buildings No. 44 of 1935*'²²⁹, in the '*Law of Municipalities' Administration No. 165 of 1964*'²³⁰, and in the '*Law of Municipalities Administration No. 6 of 1993*'²³¹. Erbil as the capital of Kurdistan region, currently has six municipality's directorates belonged to the Presidency of the Municipality of Erbil. Each of those directorates is responsible for a part of the city and each has its own department responsible for granting building permit for single-family houses [Figure

²²⁶ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*, In *Parliament Gazette No. 9*, 1993.

²²⁷ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*, chap. 4.

²²⁸ The members of the municipality council are elected by the residents for duration of four years and the number of the members varies according to the municipality grade or size but it should not be more than 21 members in the case of special municipalities. The municipality of Erbil has been defined as "special" since 1993 and it has 17 council members.

²²⁹ The Monarch of the Kingdom, *Amended System of Roads and Buildings No.44 of 1935*, chap. 8.

²³⁰ The Presidency of the Republic, *Law of Municipalities' Administration No. 165 of 1964*, In *Iraqi Gazette No. 1033*, 1964, pp. 904–42 (para. 63).

²³¹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*, para. 41.

3.19]. Some areas of the city are exceptional. As the buffer zone of the ancient citadel which includes the quarters of Arab, Taajeel, Khanaqah, and Mustawfi has different design guidelines, building control is managed differently. A specialised committee is in charge of building control here.

These municipalities' directorates manage about 87 quarters [Figure 3.20]. Building permits for other types of buildings, other than single-family houses, is the responsibility of specialised committees. Prior to 2005, the process was centrally managed. There was only the Presidency of Municipality responsible for managing the whole city. Building permits for single-family houses were granted centrally by Master Plan Department from this presidency, and granting building permits for other types of buildings was the responsibility of one committee.

The requirements and documents needed for the application of building permit for a single-family house are:

- a) A proof of the plot ownership (Title Deed);
- b) A cadastral map of the layout of the plot and its dimensions;
- c) Architectural drawing set of the house design prepared by a licenced engineer registered in the syndicate of Kurdistan engineers;
- d) And building license form.

The first two documents are obtained by Land Registry Directorates. After the submission of these documents to the concerned municipality, the location of the plot is checked and might be visited by surveyors from the municipality to ensure that the existing ground situation of the plot conforms to the submitted documents. Then, the permission of building the first stage of the house is granted²³².

²³² Building permit of houses is given in stages to limit and minimise the incompatibility and ensure that the construction is done according the submitted design and the regulations.

3.3 Housing policies being used which largely influenced the produced urban form:

‘The city has always been characterised largely by the individual dwelling’.²³³

One of the significant determinants that largely influenced the production of the urban form of the whole city of Erbil, and all other cities of the region and Iraq, is the set of policies concerning housing. However, it is not explicitly classified and named, the different policies adopted throughout the modern history of Erbil (since 1920) which strongly determined the urban form are grouped under different classification and, in terms of the nature of the form that they could produce, the main characters of each policy are identified. The classification and the naming of those different policies are based on the experience I as a practitioner and a specialist who directly dealt with the issues of urban planning and architecture of Erbil. From the establishment of the state of Iraq until now five different policies can be categorised and they are numbered and ordered by the researcher as follows: See [Table 3-7], [Figure 3.21], and [Figure 3.22].

²³³ Rossi, p. 70.

Table 3-7: The percentages of the areas of Erbil city built under the different policies of housing. (Source: Researcher)

The policy	Policy 1	Policy 2	Policy 3	Policy 4	Policy 5
%	77.64%	2.25%	0.56%	17.83%	1.72%

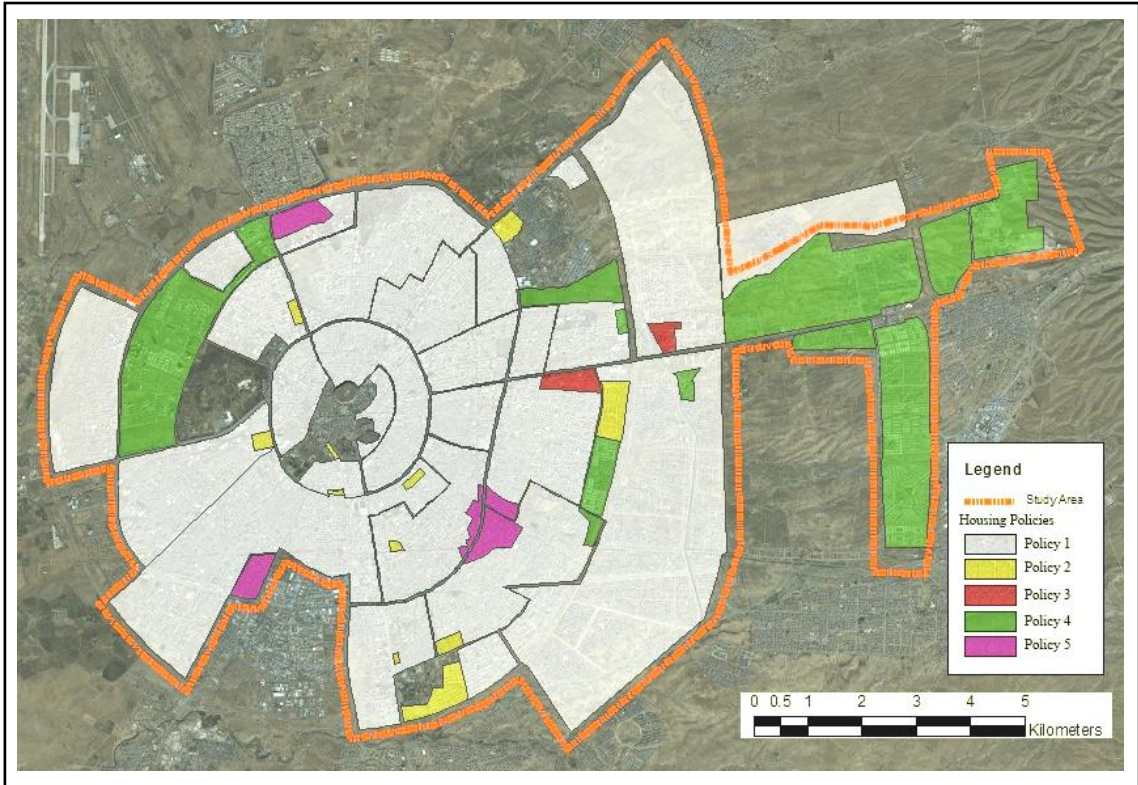


Figure 3.21: Different housing policies applied in Erbil since 1920. (Source: Researcher)

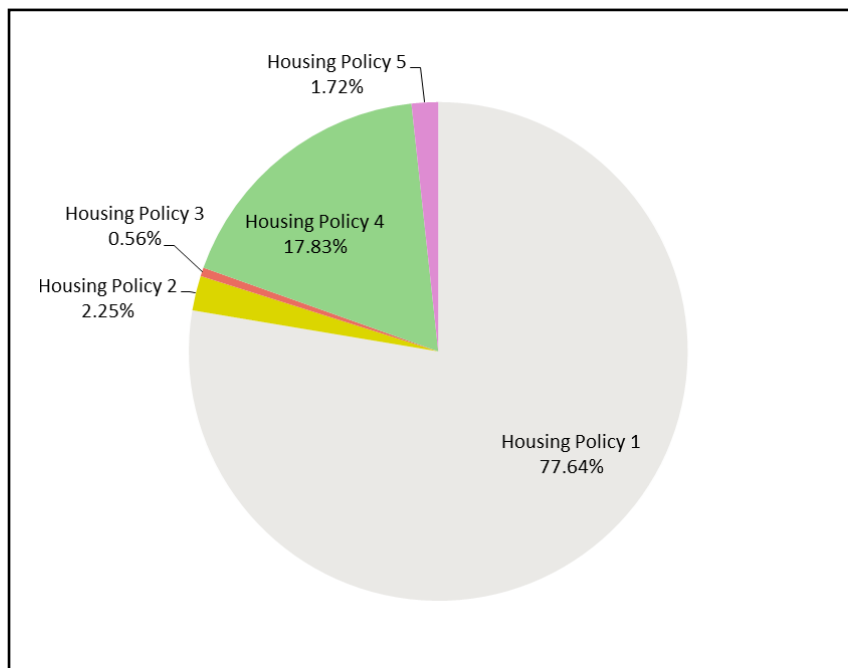


Figure 3.22: The percentages of the areas of the different housing policies applied in Erbil. (Source: Researcher)

3.3.1 Housing policy 1 (1920-2013):

The process of building under this policy started in 1935 with the issuance of the ‘*System of Roads and Buildings No. 44*’. The main feature of this policy is individuality. In other words, individual building process of single-family houses defines this housing policy. This individual process can be followed in two different ways. The first way is the process starts by an application made by the landowner to subdivide his own land into plots for housing and urban purposes. According to chapter 5 of the ‘*System of Roads and Buildings No. 44 of 1935*’²³⁴ this process is organised as follows: the owner submits a request to the municipality. This request should be attached with the documents required including the proposal of the design of the subdivision. After the approval of the request through the designated procedure, the owner can sell the plots individually to others. The new owners, after gaining a building permit from the municipality, are able to individually build a single-family house on the plots of the new development plan.

The second way is that residential single plots are distributed on and granted to people and they build their own houses on these plots by themselves individually, according to building permit regulations adopted by the municipalities in the successive periods. In some periods, this program was supported by offering mortgages from the state banks. This subsidy was organised by ‘*Law of Real Estate Bank No. 73 of 1955*’²³⁵ which was amended in 1956²³⁶, 1958²³⁷, 1959²³⁸, 1960²³⁹,

²³⁴ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*, p. 202 Chapter 5.

²³⁵ The Monarch of the Kingdom, *Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 3635*, 1955, pp. 535–42.

²³⁶ The Monarch of the Kingdom, *Law No. 80 in 1956 of the First Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 3825*, 1956.

²³⁷ The Council of the State, *Law No. 25 in 1958 of the Second Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 28*, 1959, p. 69.

²³⁸ The Council of the State, *Law No. 148 in 1959 of the Third Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 237*, 1959, pp. 733–34.

²³⁹ The Council of the State, *Law No. 48 in 1960 of the Fourth Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No.*, 1960.

1963²⁴⁰, 1964²⁴¹, 1970²⁴², 1972²⁴³, and 1975²⁴⁴. Then in 1976 another law of real estate bank was enacted and cancelled the old one.²⁴⁵

The process of housing under this policy starts from the stage when the government decides on allocating land to a group of people. Then a list of the name of the group is prepared. People who meet the requirements stated in ‘Law of Housing No. 54 of 1962’ can benefit from this program.²⁴⁶ The weighting and the priority base on some points mentioned in the law.²⁴⁷ The more points that the person has, the more chance of benefiting from the program has. Accordingly, the ministry of municipalities and the concerned municipality office in the city have to prepare an area within the master plan of the city which is designed as a housing area including the services that are required such as educational and social services. Next, the area is subdivided according to the plan and the design. Later on, the housing plots are distributed on the people whose names are listed. According to this policy which has had the influence on shaping the major part of the city the individual owners are required to provide some documents to pass through a process of obtaining a permit of building by which they are allowed to build the house. The documents that are required to submit by the owner of the plot include the set of drawings about the design of the house which must match the municipality’s regulations on the design limits and some other managerial regulations.

In both ways, the streets and the blocks of the new design of the developed area should be projected on the ground [Figure 3.23] and then the plots are numbered and registered by the registry directorate (‘Tapu’ office previously). This office has the responsibility of the management and the record of the registration process and transactions made on the lands.

²⁴⁰ The Council of the State, *Law No. 119 in 1963 of the Fifth Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 862*, 1963, pp. 486–88.

²⁴¹ The Revolutionary Command Council, *Law No. 28 in 1964 of the Sixth Amendment of Law of Real Estate Bank No. 73 of 1955*, 1964.

²⁴² The Revolutionary Command Council, *Law No. 79 in 1970 of the Seventh Amendment of Law of Real Estate Bank No. 73 of 1955*, 1970.

²⁴³ The Revolutionary Command Council, *Law No. 114 in 1972 of the Eighth Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 2193*, 1972, pp. 621–22.

²⁴⁴ The Revolutionary Command Council, *Law No. 104 in 1975 of the Ninth Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 2480*, 1975, p. 2.

²⁴⁵ The Revolutionary Command Council, *Law of Real Estate Bank No. 161 of 1976*, In *Iraqi Gazette No. 2566*, 1977, pp. 22–25.

²⁴⁶ The Council of the State, *Law of Housing No. 54 of 1962*, In *Iraqi Gazette No. 730*, 1962, pp. 356–60 (para. 3).

²⁴⁷ The Council of the State, *Law of Housing No. 54 of 1962*, para. 4.

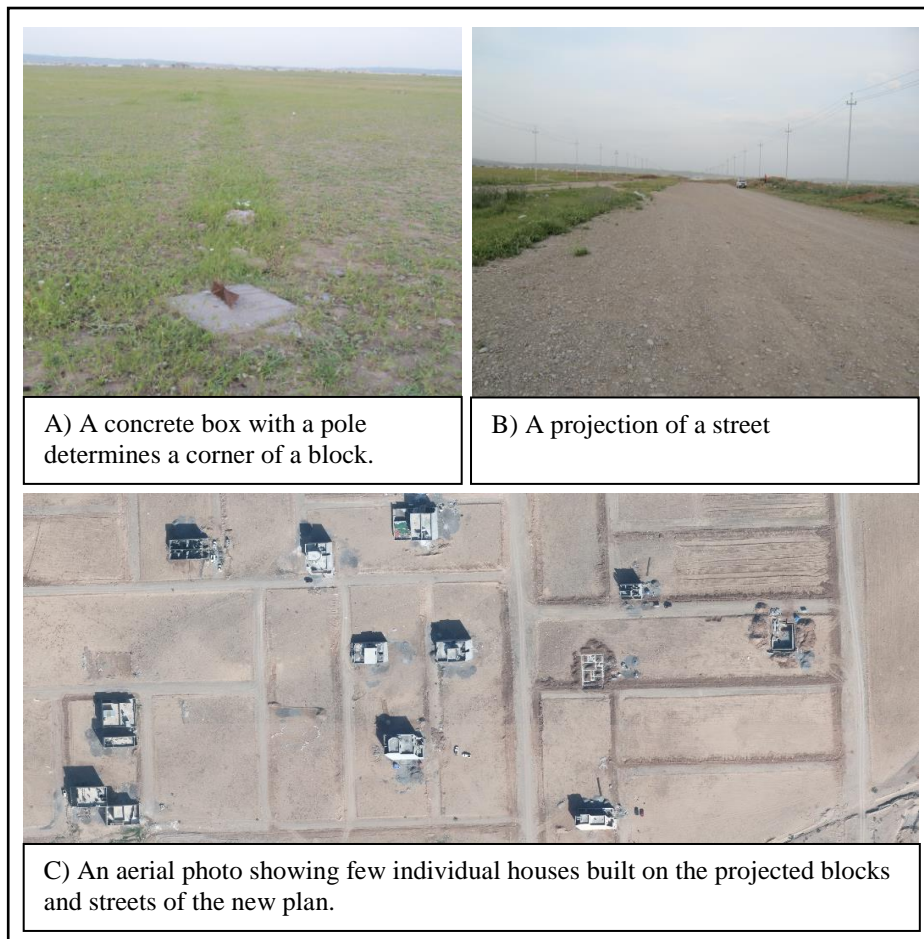


Figure 3.23: The process of the projection of the plan and building according to ‘Housing Policy 1’ in one of the quarters of Erbil (Hawlery Nwe Quarter). (Source: **A**) Photograph by the researcher **B**) Photograph by the researcher **C**) Urban Planning Directorate of Erbil)

It is assumed that three important points may characterise the areas built under this policy. The first is the heterogeneity which is caused by many reasons, such as the time when each owner requests a permit and then starts the building, because each owner is free about when he wishes to build. This leads to the extension of the period when the whole area is fully built. As a result, this extension of time results in the variety of the form, sometimes in an extreme way due to amendments and changes on the regulations, the change in economic, social, and political aspects. The second is the tendency of the people towards this policy as they have relative freedom about deciding on the design of their house that meets their needs and reflects their characters. The last is the difficulties that face the concerned authorities of control and follow-up process. Instead of dealing with one developer or a company, they have to deal with a large number of individual owners who might start the construction of their house at the same time. This would sometimes lead to a

lack of control and the omission of some design limits. Consequently, the forms produced under this policy could range and vary excessively.

3.3.2 *Housing policy 2 (1960-2013):*

After the revolution of 1958 and the shift from royal to republican system of governance, new attempts of housing started by the government. Some new laws were introduced such as the ‘*Law of Cooperative Associations No. 73 of 1959*’²⁴⁸, ‘*Law of Housing No. 54 of 1962*’²⁴⁹ which was amended in 1963²⁵⁰ and 1965²⁵¹. The latter (Law of housing and its amendments) aimed to offer houses which were built by state companies on residential plots for people with a long term mortgages. The installments were subject to monthly payments and distributed over 25 years starting either from the moving in date or from the date of making the contract. If the person is a government employee, the installments will be monthly deducted from his or her salary. If not, direct monthly payment to the concerned ministry should be arranged. The priority for benefiting from the housing program organised by this law was according to points-basis. The more points that the person has, the more chance has of benefiting from the program.

The main feature of this policy is that the typical house or flat designs is applied on all the plots of the neighbourhood prepared. Residential complexes built by the government and its public sectors were by law exempted from some municipalities’ regulations. These complexes are allocated to a very limited group of people who are working in the public sectors and army. However, in the last 12 years some low-income people benefited from this policy. The housing of this policy can be either in the form of a complex of single-family house units or in the form of flats in multi-storey buildings. The houses in a certain complex have identical and typical designs. In contrast to the first policy, this one is characterised by a high level of homogeneity within one complex. However, they do not have a significant effect on the overall image of the urban form of the city as a whole as they constitute a very limited proportion of the city area.

²⁴⁸ The Council of the State, *Law of Cooperative Associations No. 73 of 1959*, In *Iraqi Gazette No.164 Part 1*, 1959, pp. 374–98.

²⁴⁹ The Council of the State, *Law of Housing No. 54 of 1962*.

²⁵⁰ The Council of the State, *Law No. 96 in 1963 of the First Amendment of Law of Housing No. 54 of 1962*, In *Iraqi Gazette No. 858*, 1963, pp. 422–24.

²⁵¹ The Council of the State, *Law No. 2 in 1965 of the Second Amendment of Law of Housing No. 54 of 1962*, In *Iraqi Gazette No. 1069*, 1965, pp. 5–6.

3.3.3 Housing policy 3 (1991-2003):

The emergence of a certain policy in a certain time is highly related to political, social and economic variables attached to the time period. After the uprising of Kurdistan in 1991 and the establishment of Kurdistan region government, the economic crisis of Kurdistan due to the economic siege on Iraq resulted in the humanitarian interventions by international organisations including UN (United Nations) organisations. Few residential complexes built by organisations such as HABITAT (They are exempted from the municipalities' regulations). In terms of the urban form that this policy can produce is to some extent similar to the form produced under the policy 2. See [Figure 3.24].



Figure 3.24: An aerial photo of a part of a quarter (Sarwaran Quarter) built under policy 3, showing blocks of houses with typical design. (Source: Urban Planning Directorate of Erbil)

3.3.4 Housing policy 4 (2003-2013):

After 2003, when Kurdistan was formally recognised as a federal region in the new federal Iraq, Erbil witnessed its largest ever growth and expansion. This was accompanied by the introduction of new approaches of housing. The common feature which characterises the housing projects of this policy is that they all are built by private companies and developers. Under this policy the residential complexes are built by private companies. The project could be either a single-family house complexes or flats in multi-storey buildings. They are exempted from the municipalities' regulations and some of them have been built according to the 'Law

of Investment No. 4 in 2006 in Kurdistan region²⁵² and administrated by the board of investment. It has similar aspects to the ‘policy 2’ however it relatively occupies a larger area and is actively still in use.

3.3.5 Housing policy 5 (2000-2013):

This policy of housing can be defined as the actions that the government and the responsible authorities take to make the informal quarters formal. Some illegal quarters were built in certain periods when there was a demand on housing, yet there was no required supplement of housing; meanwhile there was a lack of control due to political, economic, and institutional circumstances. Later on, these informal settlements needed to be dealt with and treated, whether by removing them or by developing them and providing the required services. In 2002, legislation was introduced by the Kurdistan Parliament to deal with those quarters.²⁵³

This law stated that any informal house built before the introduction of this law, and which does not contradict with the master and the detailed plan of the city and the quarter, can be registered to the occupant and the house will be formally recognised. Afterwards, the municipalities’ directorates, as a responsible authority to implement this law, did surveys for all those quarters and evaluated the situation of them. A development plan was prepared for those just needed development. The development actions included widening and elaborating the streets, opening up new streets, providing public open spaces such as gardens and playground yards, and providing essential services such as schools, health centres ... etc. These interventions are mainly made by the government and sometimes in cooperation with certain organisations such as the case in ‘Badawa Quarter’.

3.4 The conclusion of Chapter 3

This chapter bridges the theoretical literature covered in Chapter 2 to the analysis work of Chapter 4. It is specified to Erbil and various aspects concerning urban form of Erbil. It expanded the introduction of the place and the time context (1920-2014) of the research. All the events influencing Erbil and its development and growth were chronologically addressed and explained. The time span covered by this research was split into major political events including the governance system: the mandate period (1920-1932); the independence and royal system (1932-1958); the republican system

²⁵² The President of Kurdistan Region of Iraq, *Law of the Investment in Kurdistan No. 4 of 2006*, In *Kurdistan Gazette No. 62*, 2006, pp. 22–31.

²⁵³ Kurdistan Parliament-Iraq, *Decision No. 5 on the Treatment of Informal Buildings*, 2002.

(1958-2003) which was subdivided into two periods by the uprising of Kurdistan of 1991; and the federal republican system (post 2003). The political events addressed are considered as a key factor to other institutional, social, and economic changes that could influence the formation and the transformation of Erbil's urban form. The different legislation enacted since 1920, and the way in which they could influence the process of the generation of form, were chronologically identified. The possibilities of the form produced by those regulations were illustrated by visual drawings.

To expand the understanding of the context of Erbil, the legislation influencing the urban form of Erbil has been categorised into certain groups: those concerning land rights and ownership; those concerning heritages and antiquities; and those concerning urban planning and building which are considered as regulations that directly influence the urban form. The latter is the set of legislation that directly involves the municipalities, and they are concerned in the process of planning, building, and control. All these legislative pieces are the influencing factor that this research focuses on its first question and relates it to the urban form of Erbil and its change.

In addition, one more significant issue which massively determined the urban form of Erbil and all other cities of Kurdistan and Iraq are the housing policies. In this regard, this chapter identified five different policies. These policies determined the form in different ways. The more effective one among them is 'Policy 1' which has been in use throughout the timespan covered in this research and formed more than three quarters of the city's area. The prominent characteristic of this policy is the individuality which means that each single house is subject to the individual will and the decision of the house owner. All the aspects mentioned in this chapter will contribute to the establishment of the analysis framework and structure of the samples in the next chapter (Chapter 4) which is the core step of the second stage of this research work.

Chapter 4

4. Sampling and Analysis

This chapter is the core of the second stage of the research work. The theoretical framework and the potential issues concerning the urban form and the influencing factors of Erbil covered in the previous chapters (Chapter 3 and Chapter 4) contribute to the elaboration of this chapter. In detail, this chapter experiments with the methodological approaches, methods, and tools, used in the fieldwork, sampling and then individually analysing the samples. Through this chapter the answers of the research questions are elaborated. The main sources used in this chapter are maps, satellite images, photographs, and legislative texts. In addition, in some situations, formal and informal enquiries are adopted to data collection.

This chapter consists of eight sections which cover the process from data collection to analysis: the first justifies the analytical approach and methodology adopted for the context of Erbil and its potentials and limitations; the second describes the process of fieldwork and data collection; the third defines the analysis process at the city level which is a key to the sampling; the fourth illustrates the process of the selection of tissues from different quarters as samples; the fifth identifies the process of narrowing down the analysis to a level of block, street, and individual plot; the sixth identifies the process of the preparation of the maps based on different sources; in the seventh section, thirteen samples from different quarters and different time periods are analysed; and the last section concludes the chapter. [See the fold out page at the end of the thesis].

4.1. Analysis of the urban form of Erbil city

A refer back (page10) is made to the Morris's statement 'Characteristically the form of an urban settlement at any given period is the result of a number of locally effective determinants.'²⁵⁴ Erbil has its own determinants which might be national, regional, or local. However each context has its own different circumstances, yet the main principles of morphological analysis of urban form and its elements are used. The analytical units identified by both the British and the Italian schools of urban form, with some modifications are adopted. However, the methodology used is designed to fully fit the local context and the structure of the city of Erbil. This would be the distinct

²⁵⁴ Morris, p. 10.

characteristic which would grant originality to the work. To approach the selection of samples from different parts of the city, the analysis starts at the city scale.

The adopted methods and techniques of surveying, sampling, and mapping are important issues which need more attention. The analysis is designed in a way that considers the limitations of the work on the local context of Erbil. These limitations includes the availability and the nature of the data which can be approached and obtained; the existing and the available literature and knowledge on Erbil; the available tools and techniques for the fieldwork; the limitation of time; the nature of the institutional structure of urban planning and design approaches followed in Erbil, Kurdistan, and Iraq as well; and limitations surrounding issues of the local culture and the social nature of the inhabitants of Erbil. In other words, all the local determinants that could inform the work, sampling, and the analysis process are taken under consideration.

4.2. Fieldwork and data collection

The data is the core of the research. The process of the data collection, the methods adopted in the process, and the nature of this data is a part of the methodological approach. This required having a rigorous plan for the process to achieve the aims targeted. Fieldwork as an approach to data collection started in December 2013. This was made according to a plan.

The plan of the fieldwork:

The fieldwork is the approach to data collection. The data have been gathered from different sources including the different directorates of municipalities of Erbil, the Presidency of the Municipality of Erbil, Urban Planning Directorate of Erbil, General Directorate Urban Planning, Land Registry Directorates of Erbil, Governorate Office of Erbil, and site visits. Before commencing the process, a support letter from the Governorate Office of Erbil was obtained to utilise the process of data collection [Appendix 1]. This letter was directed to all the concerned parties and institutions to help in providing data and necessary information required for the research. The work was done in two main stages. The first stage was done in two visits. The first visit was in December 2013 and January 2014 and the second was in April 2014. In this stage different activities were undertaken, including:-

- a) Collecting detailed maps for different parts of the city and assessing their importance for the analysis process is assessed.

- b) Collecting samples of building and planning permit documents from municipalities' archives. These documents were from different parts of the city and from different periods. These documents show the building type and the regulations that the plans of those buildings have been prepared according to.
- c) Cross-checking those documents by field visits and then taking photographs for different buildings from different parts around the city. These photographs were sorted, classified, and projected on the map of Erbil, based on their coordination to ease their review in later stages when needed.
- d) Revising and updating the work. The field visits also brought new ideas, challenges, and opportunities into mind. In this regard, the first stage of data collection can also be considered as a pilot test.

The second stage started after the evaluation of the data collected from the first stage. The second stage was also done in two visits, the first in January 2015 and the second in March and April 2015. After deciding on some areas of the city to be selected as the samples, further data and information were collected and sorted. These included collecting the detailed maps of these areas, taking more photographs of those selected areas, and collecting the documents of the history of the plans of those areas and their registration. Overall, the work done in these two integrated stages mainly consisted of two methods:

The first: Taking photographs and collecting maps.

The aim of this method was firstly to document and record the buildings and streets forms. The photos taken covered around 80% of the city and 79 neighbourhoods (quarters). More than 10,000 photographs were taken in the two stages of data collection. The photographs have been taken from the lens at a height range of 140cm to 170cm which is the range of the height of an adult eye in a standing position. This is to achieve views similar to that of a walking person in a street context can have when looking at different scenes around. Two cameras have been used for the process and the main one was supported by a coordination and location feature. The focus of the photos is on buildings and streets. People as much as possible have not been included in the shots for two reasons. The first is related to the ontological issue of the research as it tries to understand the urban form through the physical parameters of the elements of the form as a geometric entity. The second is related to issues of privacy and security. See [Appendix 2].

The second: Organising and listing these collected data in a table

The aim of this method is to group, categorise, and shortlist the surveyed quarters into samples through a visual comparison between these quarters and presenting some facts on them with some calculations [Table 4-1] which also aided the sampling.

		Number of quarters	Total area (km ²)	%
1	The quarters of the city being covered	80	105.06	100%
2	Quarters built after 2003	33	63.20	60% of the whole city area
3	Neighbourhoods built by private companies after 2003	20	11.77	11.2% of the whole city area
				18% of the areas built after 2003

Samples selection methods: This research covers the whole area of the city (the area that are administratively belonged to Erbil municipality or planned to). However, it is unrealistic to analyse every part at the detail of blocks, single plots and buildings. Therefore, samples are chosen. Those samples should significantly represent the areas and parts of the city. To achieve this, three methods of sample selection will be adopted. Each achieves certain objectives and has its own limitation:-

1) Sampling by basing on the pattern and the structure of the city plan (the concentric pattern which is a combination of ring and radial routes).

As it is apparent from the periodic growth of Erbil [Figure 1.8], the city has almost expanded and grown step by step and stage by stage from the citadel at the centre of the city. The closer a ring is to the citadel, the older is. The potential of choosing samples according to the ring and radial routes addresses two issues: The first is that the samples (blocks, plots, and buildings) would explain the relationship, the layout, and the orientation within the ring and radial roads. The second is that the samples which are on the same ring but on different radial routes and are in a different direction of the city can be compared and analysed to find their differences.

This method has three limitations: The first is that there are some parts of the city that have a further distance from the centre but have been built earlier than

²⁵⁵ Ankawa quarter is excluded from the calculations. By the time when this survey was done some quarters had not been fully built and there were limited number of completed houses in them.

some closer parts. This means that the sequence of the rings cannot fully refer to the chronological sequence of the city's growth stages. The second is that this method would achieve the aim of how the ring and radial streets have influenced the urban form in different parts that have been built in different or the same period of time as well. The use of the lands on these streets is mostly public and commercial which means that single-family houses are not included when this method is adopted. Furthermore, it would not consider the areas that are further from those streets. This limits having the variety of building types of the selected samples. The third is that some rings have not been built in one process but some segments of them have been built in different periods and stages. See [Figure 4.1]. Moreover, some areas were built but then those ring and radial routes were built later and this required removing some already existing built up areas in order to construct those new streets. This led to producing different and exceptional forms that cannot be generalised and would not effectively work as samples which could represent general cases.

2) Sampling according to the legislation 'System of Roads and Buildings No.44 of 1935' and its successive amendments.

According to this legislation Erbil had been divided into four urban area categories (first, second, third, and fourth) that have different, minimum street widths, minimum plot area, maximum percentage plot coverage, and minimum required setback distance by which building line is defined. The potential of this method is that it indicates the influence of this legislation on the urban form of the city.

However, the method has its own shortfalls. Firstly, when this legislation was introduced some areas of the city around the centre had already been built, but were then affected by it. This legislation determined the way in which this area transformed. Secondly, areas which were planned and built after 1979 did not consider plot size limitation according to this legislation but other legislations including 'Decision No. 850 of 1979', 'Decision 851 of 1980', and 'Decision No. 940 of 1987' were applied. The first one defined 120m² as minimum allowed plot area for housing purposes (single-family houses) in any new introduced and developed areas in the city. This indirectly aborted the four classifications of the city in the new developments. That of 1987 was an amendment to the previous legislation of 1979. This amendment proposed 200 m² as the minimum allowed

plot area and no smaller area than this limit is allowed to be subdivided in all new developments and the already existing parts of the city as well. This potentially aborted the classification of the city into the four different categories. Lastly and consequently, adopting the method of choosing samples by basing on the urban area category is not valid, because more than 70% of the city's neighbourhoods have been built after 1979 on the one hand and on the other, even the existing areas built up by 1979 have been affected and witnessed transformation in later periods.

In addition, the expected difficulty is that due to the fact that classifying the city into different urban area categories was not in use after 1979, the map that shows this classification and the boundaries of each urban area category is not available in the archives of the responsible authorities but can be redrawn according to evidence from documents and field observation. The value of this map is that it helps to justify some extent of transformation on the urban form of the areas which had been built before 1979 and the changes of the plans of the areas developed after 1979. This map also would explain the link between the legislation and the physical form.

3) Sampling according to the chronological sequence of the development of the different neighbourhoods of the city since 1920 until now and dividing this period into 10 years intervals. See [Figure 1.8].

The positive aspect of this method is that it takes the time dimension as an indication of excusing the change of urban form as the time is the essential element of morphological analysis. Another benefit of this method is that the samples represent periods of time. This means that the samples from the same period could have similar aspects as they have been built in the same social, political, and economic environment. Therefore, those samples could better correlate the change on urban form and types to those factors.

The limitation of this method can be summarised by two points: The first is that there are two elements of time that should be considered when the city is divided according to the chronological sequence of its different neighbourhoods. The first is the time when the plan of the neighbourhood has been prepared, and the second when this plan has been implemented and the whole area constructed. Sometimes the latter required more than 10 years for the neighbourhood to be wholly built, and during this period many changes happened. This was due to that

according to the system the governments offered plots to families and it was the choice and the decision of the owner (the family) when to apply for building permission and to build their house. The second is that some neighbourhoods have been built in two or more phases in different periods and some neighbourhoods are named and divided according to other factors rather than their plan or their physical aspects. Sometimes changes to their names and modifications of their boundaries have happened in subsequent periods.

4) Sampling by using a combined method.

This method combines the three previous methods and their potential. However, some challenges might be faced when all the previous methods are adopted. Overall observation made in the data collection process and the field visits helped to define some early assumptions which could help the sampling process:

- 1) On the ground, there is no area that can purely represent a certain period. This is due to the transformation and the change process made on them in the successive periods.
- 2) In the periods until 1995 the process of change in the urban form was relatively constant. There was not an extreme or a rapid change. This might be contributed to many factors such as economic, social, and technological (building technology, building material, limited number of professionals working in design, building, and construction).
- 3) The changes after 2003 led to a variety in the form characteristics not in the new developed areas but also on the already existed areas. This as a result produced areas with no certain identity of forms. The rapid growth caused the process not to be rigorously planned and controlled.
- 4) Homogeneity was a characteristic of the form in the periods before 1995 compared with that of the later periods.
- 5) The unstudied changes on the legislation in the different periods have led to the appearance of unexpected forms and changes in the existing areas. In other words, the amendments on the regulations have been made reactively not proactively.
- 6) Some of the changes of the urban form resulted from individual illegal actions: then these actions were repeated and became common customs. As a result, instead of dealing with these phenomena to reduce its negatives, the responsible

authorities legalised them by stating them in the regulations. This encouraged these actions to be spread widely.

- 7) The academia, represented in the schools of architecture and engineering in the city and the region does not effectively respond to the actual needs of the local market which contributes to the process of the formation and the transformation of the urban form of the city. For example, there are no modules in those schools about the building and planning regulations adopted in the country and the city as well.
- 8) The diversity of the residents, with different cultural backgrounds, has been reflected in the urban form and building types, as some of the regulations have a degree of flexibility that allows increasing the choices which consequently produces a variety of forms.
- 9) Social aspects such as imitation and the changes in the lifestyle and social relationships in all periods have influenced the process of the change in the urban form. When the oldest part of the city is compared with the most recent one, it can be noticed that the city has transformed from a human scale neighbourhood to a scale that consider the means of transportation (vehicles) over the human.

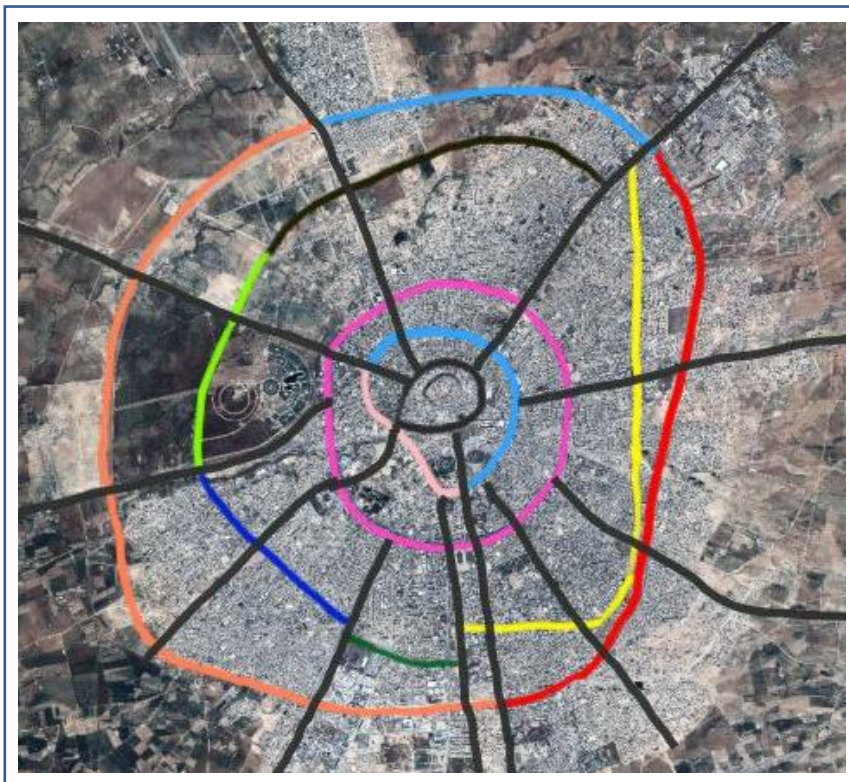


Figure 4.1: Different colours of the segments of the rings show their construction in different stages and periods of time. (Source: Drawing by the researcher)

4.3 The city scale procedure of analysis as a key method to sampling.

By relying on the mentioned three principles of understanding urban form:²⁵⁶ the physical elements, the different scale levels, and the transformation and the replacement of the elements, the analysis is approached. As the whole city is covered in the study, there is a need for a method to focus the analysis on the selection of samples that represent the case and provide an overall understanding to the morphology of the urban form of the city. This process depends on a systematic and objective method which relies on the data and the documents collected. In other words, the sampling, which is a decisive part of the analysis process in itself, depends on the inductive method when the grouping is made through depending on the givens that emerge from the case of Erbil and this is what needed as an adaptation of the theoretical frame. This provides a more valid insight into the case of Erbil as it is different to other cases in the region and the world. However, the method adopts the strategy by which the selection of the samples are held from grouping that starts from general or a wider scale of the city to a more specific or smaller and detailed scale, yet sometimes, simultaneously looking at the case at a detailed scale as a key to grouping at the wider scale is required [Figure 4.2].

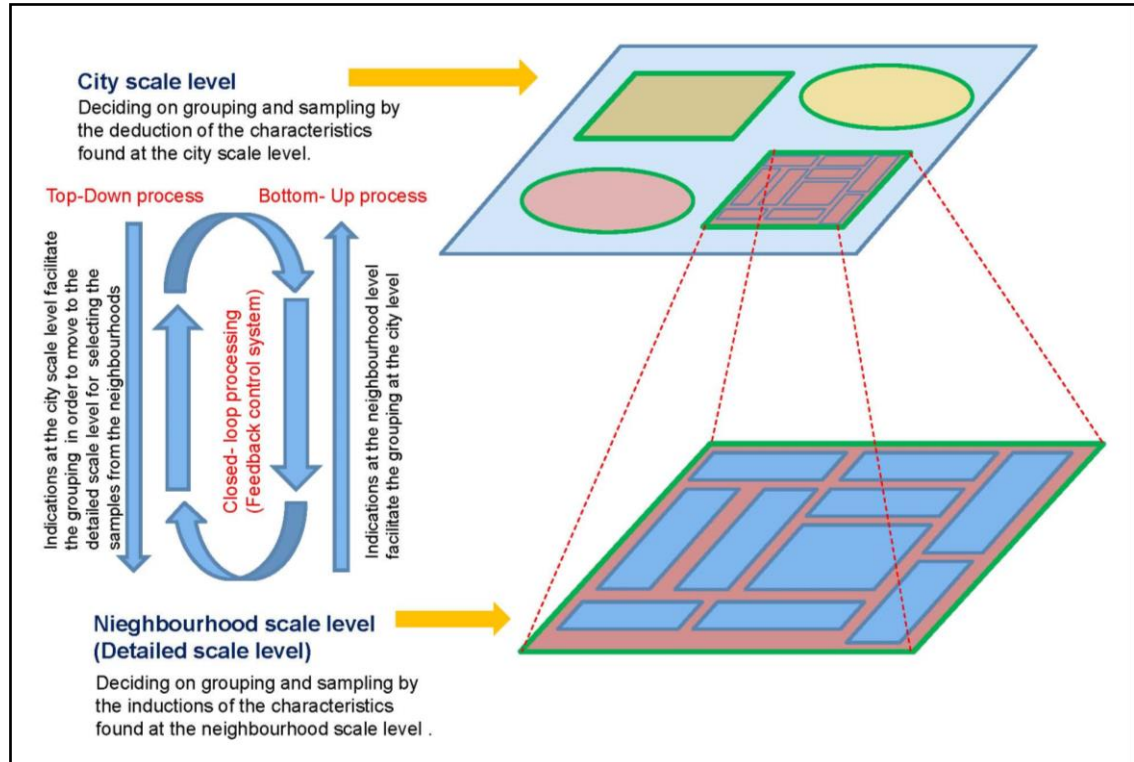


Figure 4.2: Using closed loop processing between the city level and the neighbourhood level for grouping and then sampling process. (Source: Researcher)

²⁵⁶ Moudon, 'Urban Morphology as an Emerging Interdisciplinary Field'.

The hierarchical level of morphological analysis is addressed by Kropf. Two issues exist when moving from a scale level to another. These are the level of complexity and the level of resolution. As moving from the higher scale level (the city level) to the micro scale level (plot and building level) the level complexity reduced but the level of resolution increases. This structure of the analysis of the elements of urban form according to the hierarchical level has been also adopted by Vitor Oliveria.²⁵⁷

A mixed approach of sampling is adopted. In this section the city is divided into different parts in different ways. Some of the ways of those classification and subdivision process of the city are based on the notions of sampling according to the different topics mentioned in the previous section. The first is the division of the city according to the first development of each part, in other words, according to the chronological order of their appearance [Figure 4.3]. Accordingly, the city has been divided into nine different historical periods. The second is by basing on the urban area classification according to ‘*System of Roads and Buildings No. 44 of 1935*’ and there is no map that illustrates this topic. The third is by basing on the different housing policies mentioned in the previous chapter [Figure 3.21]. In addition, the process of data collection, the two stages of field visits, and photographing also supported the process of sampling.

By combining the different maps of the city, sampling is made. Each of those maps could be a layer of a particular topic of grouping and dividing the city. The first map is the one of the periodic growth of the city [Figure 4.3]. The second is that of the different directorates of municipalities [Figure 3.19]. The third is the one of the quarters of the city [Figure 3.20]. The fourth is the map of the five housing policies [Figure 3.21]. The fifth is the map of the districts and subdivisions of land of Erbil according to their registry. The sixth and the last is the ring and radial roads map of the city. See [Figure 4.4]. ‘13’ samples as cases have been selected. They cover the area of the city which has been bounded by a study area boundary drawn by the researcher [Figure 4.5].

The analysis process of each individual sample and the level of the detail and the outcomes may substantially vary. This is due to that those selected samples have different history, they have been emerged and built under different policies and factors, and as a result they could also have passed through different morphological constraints and different extents and layers of transformation.

²⁵⁷ *Urban Morphology: An Introduction to the Study of the Physical Form of Cities*, ed. by Vitor Oliveira, The Urban Book Series, First (Switzerland: Springer Nature, 2016), p. 7.

The analysis of individual samples focuses on issues that combine the approaches adopted by the schools of urban morphology (The English and the Italian) in Europe with some modifications and additions based on issues that emerge from the contextual characteristics of Erbil. These in turn are based on issues of history, socio-economic, environmental, and cultural factors.

The Conzenian approach based on the threefold division of urban landscape: ground plan (streets, plots, and block plans of buildings), building form, and land use is used. When it comes to the comparison between the samples, the typological approach of the Italian School is adopted in an aim to conclude the typo-morphology of the transformation process through the development and the growth of the city over time. The samples in the comparison process have the same size, scale, orientation, and the same aspects of focuses and presentations. In these analyses, visual cartographic representations with textual descriptions and interpretations are adopted. This is because of that the data and the sources used have the both visual and textual nature. The tissue of each sample is analysed in terms of two main issues: the first is the formation of the plan (the original plan), and the second is the transformation. These two are dealt with in terms of streets, blocks, plots patterns, and building forms.

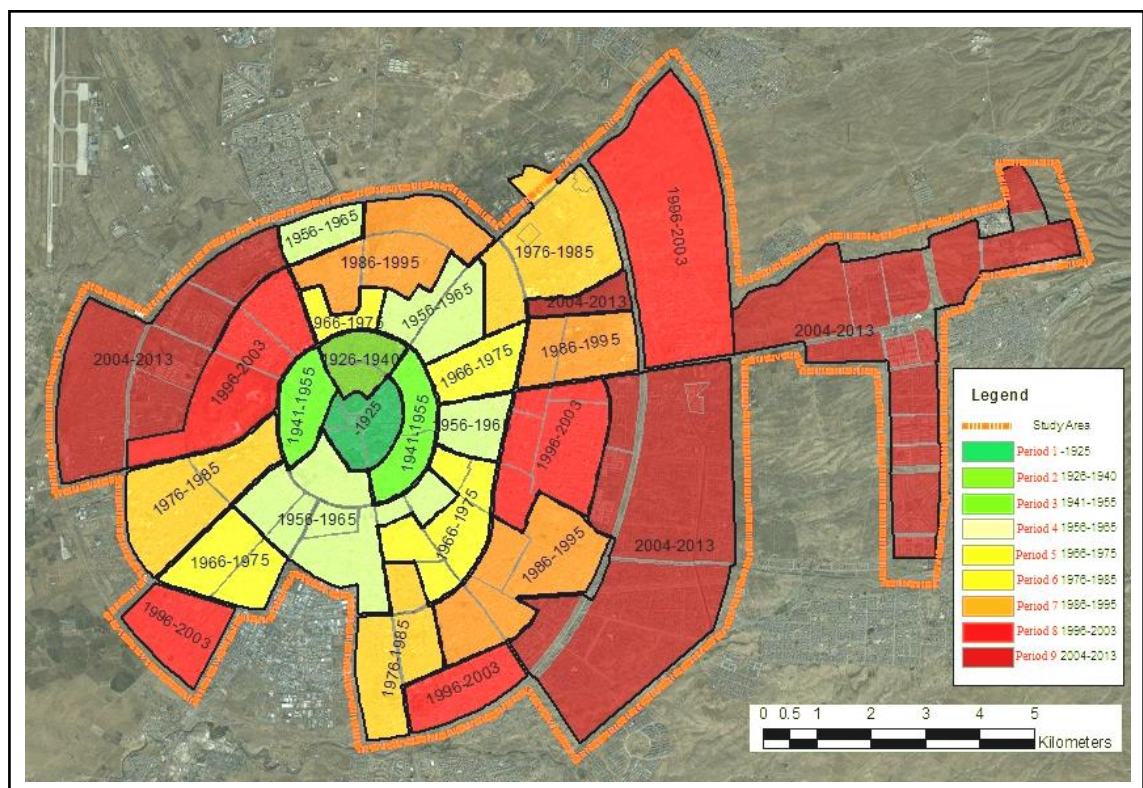


Figure 4.3: The periodic growth of the city of Erbil included in the study area boundary. (Source: Drawing by the researcher on a satellite image of Erbil of 2010 based on data from Ministry of Municipalities and Tourism, Urban Planning Directorate of Erbil)

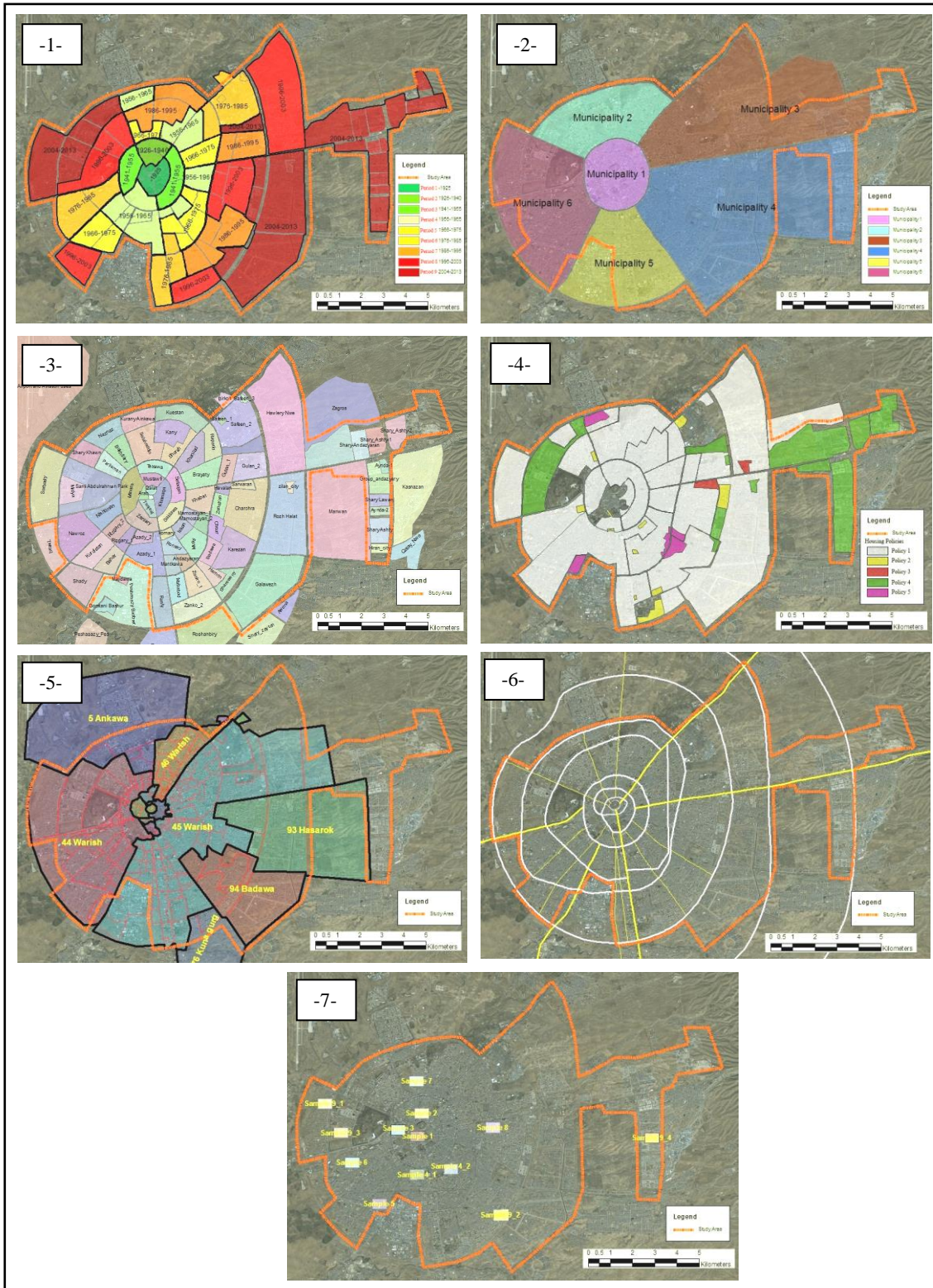


Figure 4.4: The selected samples cover different areas of the city that are grouped and divided under different topics. (Source: Drawings by the researcher based on different sources)

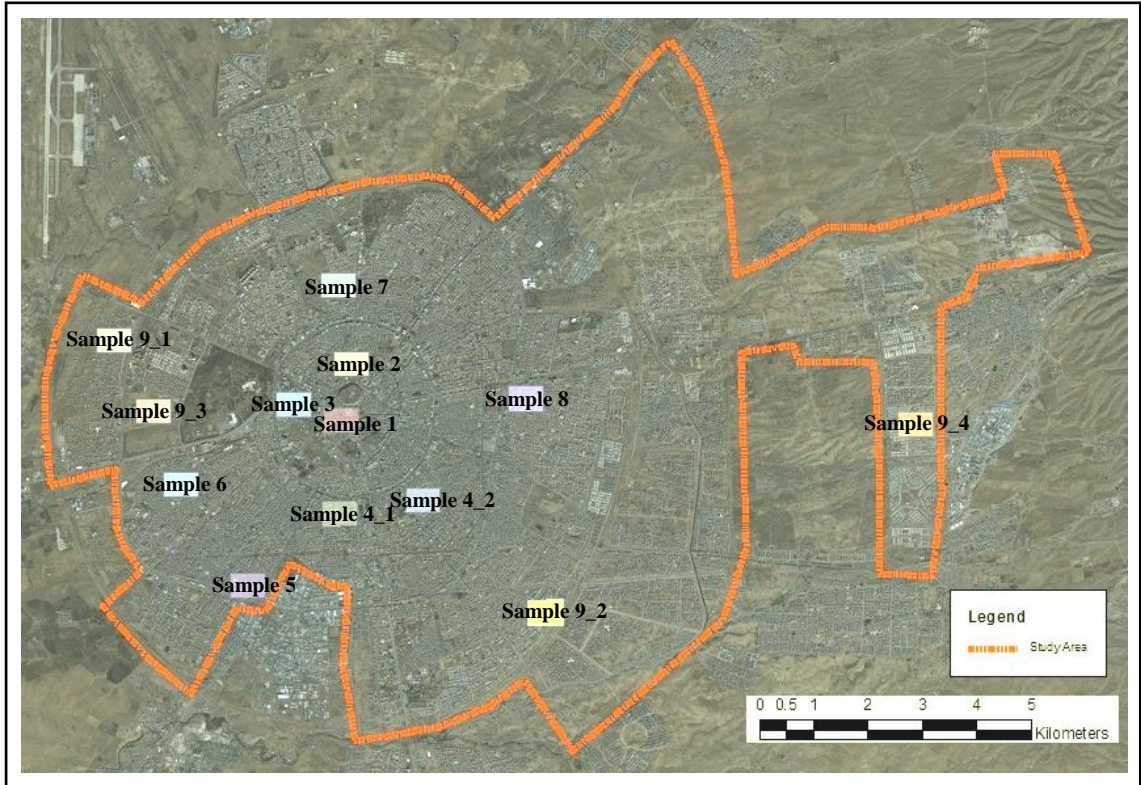


Figure 4.5: The selection of samples from different parts of the city and from different time periods. The first number refers to the sequence of the period from which the sample is selected and the second number, if any in the case of selecting more than one case from a period, and it refers to the sequence of the samples taken from the period. More than one case has been selected from ‘Period 4’ and ‘Period 9’. (Source: Researcher)

4.4 Sampling through the selection of tissues from the quarters²⁵⁸

Urban tissue notions have been used as a tool for understanding the urban change dynamics and as a tool for design.²⁵⁹ After deciding on the selection of the samples from particular areas, the size and the boundary of the sample will be decided. The samples selected represent ‘urban tissues’ of the quarters. A uniform size is selected in order to present the samples in a uniform scale and area which eases the comparison between them. The size of the tissue is included in a rectangular frame which covers about 0.3Km² (640m X 460m). The selection of the tissue is made in a way that would as much as possible represent the general case and an overall image of the quarter. At the same time this size of tissue includes a level of resolution that could cover the essential elements of form (plot and building, block, and street). This complies with the general definition of ‘urban tissue’ made by Kropf. He, from the view point of hierarchy defined the term ‘urban tissue’ as ‘a synthesis of all the components’ and ‘an organic whole that can be seen at distinct levels of resolution’.²⁶⁰ The higher scale means the lower level of detail and the lower scale means the higher level of detail which could include the details of the elements of plot and buildings.

4.5 Block, street, and individual plot level of analysis

An attempt to move down to a more detailed level at which the elements of the form and types can be analysed is made. As the previous level, there should be an approach for the selection. Based on the objectives of the research, at this level, the samples are selected subjectively with in addition to relying on some criteria which ensure an overall understanding of the tissue which in turn represents the quarter (neighbourhood). Samples of blocks are selected from each tissue case. The elements of individual plots and buildings, and their relationship to streets and blocks when they are aggregated, are analysed. This level of detail closely shows the variables of the form elements that have directly been influenced by regulations.

Information gathered from the different city maps presented in Section 4.3, with a vertical aerial photo, and the photographs taken from the field visits, are used as a guide to sampling (the selection of blocks) at this level. The indications concluded at this level again generated the process of grouping and sampling at the previous level

²⁵⁸ The term “Urban Tissue” is used by the Italian school of urban form. See Section 2.3.2 of Chapter 2.

²⁵⁹ Kropf, ‘Urban Tissue and the Character of Towns’, p. 252.

²⁶⁰ Kropf, ‘Urban Tissue and the Character of Towns’, p. 252.

[Figure 4.2]. The analysis at this level is done on the elements of form: street, plot, and building and their patterns.

4.6 *The preparation of the maps*

Mapping is the essential process of the analysis of the samples. All the maps are oriented north-up unless noted differently. The information used for the cartographic drawings depended on a variety of sources:

- 1) Archival maps: these have been obtained from the different concerned directorates of Erbil and book sources. These archival maps are at different scale levels, including those at city scale, at district, and neighbourhood level. The cadastral maps are one of those maps.
- 2) Digitised maps in 'dwg' (Autodesk) and 'mxd' (ArcGIS) formats. The data from these maps were used and represented in a way that suits the purposes aimed of the research.
- 3) Aerial photos and satellite images from different points of time. Some of those have been obtained from archives, books, and museums such as *'Iraq and the Persian Gulf'* and 'Pitt Rivers Museum' which displays the collections of Oxford University (vertical aerial photo of Erbil in 1951). Others have been obtained from Google Earth (a satellite image of 2004) which has a very limited services on Erbil, DigitalGlobe in ArcGIS (a satellite image of 7/5/2010), Ministry of Municipalities of Kurdistan (a satellite image of 2006 prepared for the new city master plan of Erbil and the city centre master plan, and a vertical aerial photo of Erbil in 2011 prepared for sewerage plan purposes), Websites and social media (www.bing.com). Photographs from archives taken by other photographers, and photos taken by the researcher between 2013 and 2015.

The maps prepared by the researcher cover different levels of detail:

- 1) Maps of the city (some of these have been already presented in 'Section 4.3'.
- 2) Maps of the tissues (street, block, and plot) from the different quarters: those are presented in the individual analysis of each sample in 'Section 4.7'.
- 3) Maps of individual cases of blocks, plots, and buildings: these maps are presented in the individual analysis of each sample in 'Section 4.7'

4.7 The analysis of the samples

The individual analysis of the samples one by one is done in this section [See the fold out page at the end of the thesis]. Thirteen cases of samples are analysed. At least one case is taken from each period. The process starts from the older sample from the First Period (-1925) to the most recent ones from the Ninth Period (2004-2013). The older, the more liable to actions and layers of change and transformation in the successive periods is [Figure 4.6]. A typical structure is adopted for the analysis and applied to all of the samples [Figure 4.7]. By adopting the approach of analysing cities described by Moudon, the analysis of the individual samples is structured.²⁶¹ Through this structure the focus of the analysis will be on the aspects of the formation and the transformation of the area. Understanding the process of the formation of a building or a town helps to understand its transformation at different stages of the process.²⁶² In each stage of the analysis, the formation and the transformation, four headings are focused. These include the time period, the housing policy, the regulations, and other influencing determinants. Geographic issues such as the topography of land and land features, and demographic issues are covered as other determinants. By focusing on plans, urban patterns, and building types in the analysis process the urban form of the city is understood. This has been noticed in Muratori's approach when he implicitly recognised the mutual determination of these three issues.²⁶³

However, the nature of the area of the selected sample and its age determine whether this structure can literally be applied or not. For example, in the case of the first sample (the centre of the city and the oldest part) which has a different nature and was formed before 1920, a different structure is used. The presentation of this part of the city is crucial for the research, as it is the only case among the samples that was formed before the start date of the time context that the research deals with. However, the more and the largest actions of change and transformation have been made on the urban form of this sample after 1920.

Another exemption to the typical structure of the analysis occurs in the cases selected from the later periods (eighth period and later). Due to that the actions of changes on those samples are limited, therefore only the factors influencing the formation of them are presented. Some other adaptations are made according to each

²⁶¹ Moudon, 'Urban Morphology as an Emerging Interdisciplinary Field', p. 3.

²⁶² Karl S. Kropf, 'Conceptions of Change in the Built Environment', *Urban Morphology*, Urban Morphology, 5.1 (2001), 29–42 (p. 31).

²⁶³ Menghini, p. 81.

individual case. These adaptations are based on the limitations and the possibilities exist in each individual case.

Three standard templates of the tables are prepared and presented in each sample, but mostly with different contents that relate to the case of the sample. The first template is about the formation and the transformation determinants of the sample [Table 4-2]. The second is about the successive regulations that have influenced the sample for a certain period of time [Table 4-3].

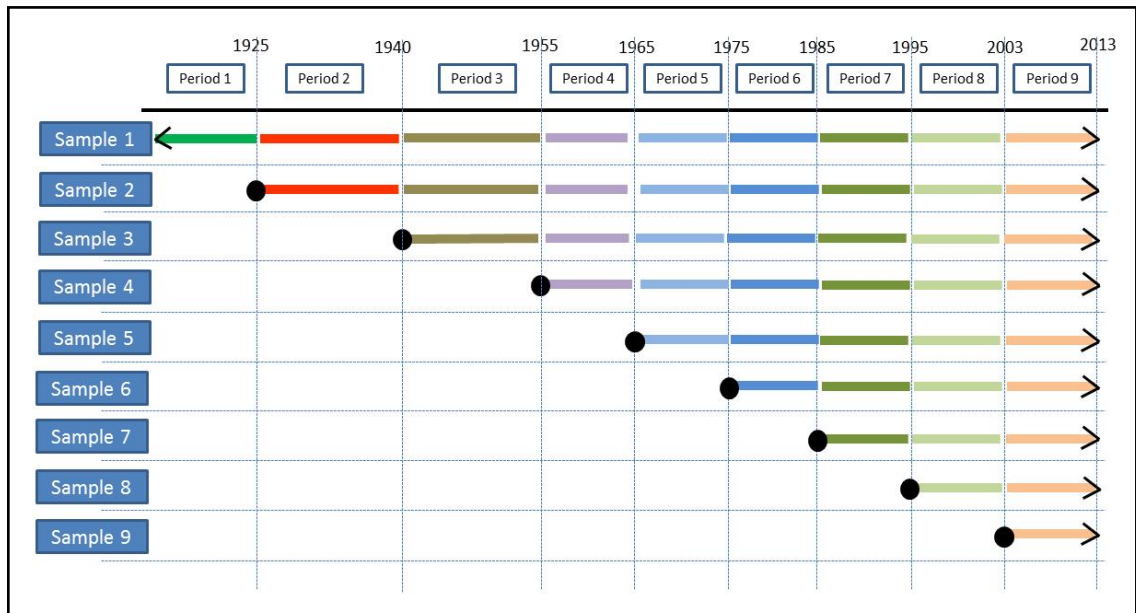


Figure 4.6: The possibility of having layers of changes on each sample started to form from nine different periods. (Source: Researcher)

The third template is on building regulations in commercial areas which has the same content in all the samples. The information included in the second template of the tables is concluded from the different articles of the legislations that could specifically relate to the sample. This required detailed reading through all those legislations as in the original versions of the legislation, the information not being summarised and presented in a form of tables.

Some issues of reading the second template need close attention. For example, the abbreviation ‘N/A’ could refer to that either the heading listed has not been covered by the legislation, or a certain variable of the elements of the form has not been specified by the legislation. Some of the rows of this template of table are shaded light brown. This signifies that this legislation has not directly specified the headings of the columns (the variables of the urban form), yet it influenced the samples in managerial and administrative issues.

Table 4-2: The first template of table (Source: Researcher)						
Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants

Table 4-3: The second template of table (Source: Researcher)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	

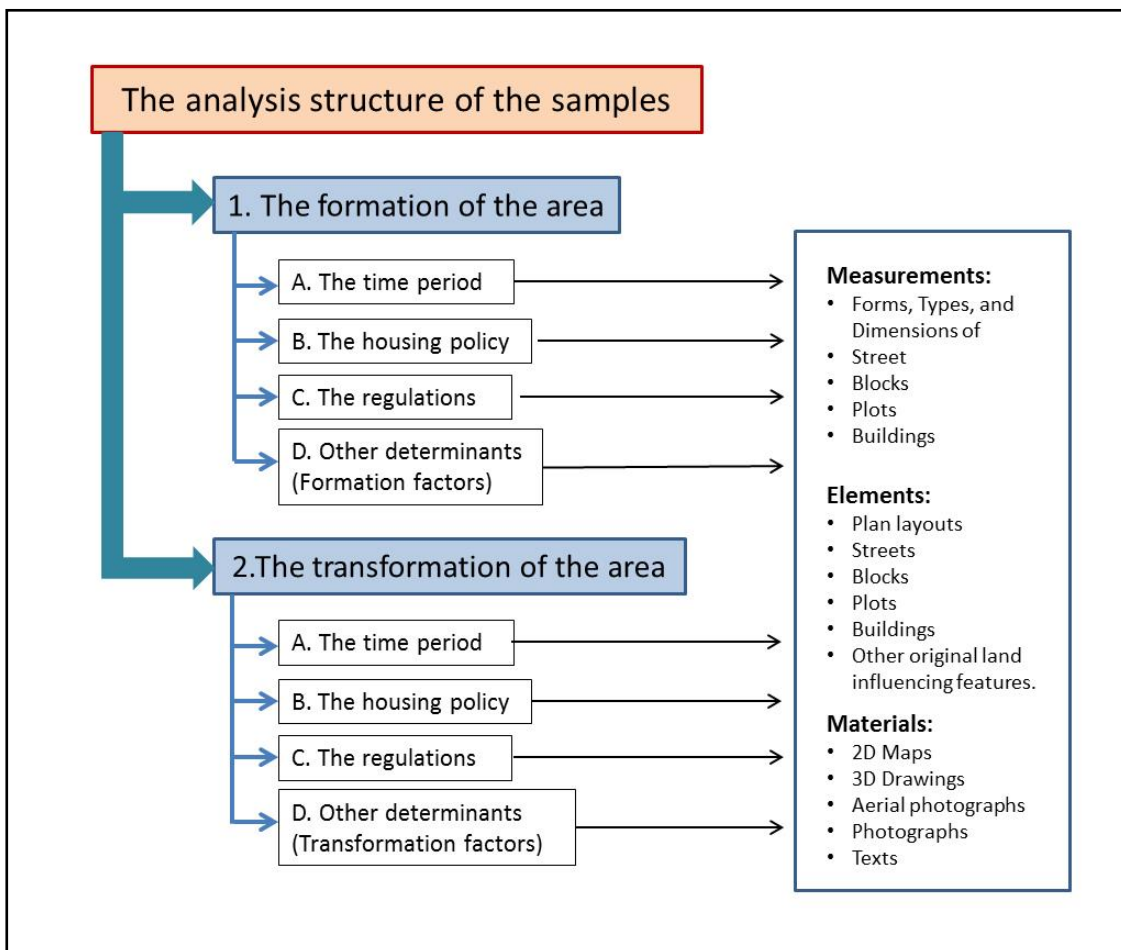


Figure 4.7: The typical structure for analysing the samples and the units (measurements, elements, and materials) that are covered. (Source: Researcher)

Period 1 Sample 1 Taajeel and Arab Quarters



Sample 1 (Taajeel and Arab Quarters)

‘Sample1’ area includes parts of Tajeel and Arab quarters which immediately lie in the south of the citadel (Qalat). The quarters of Arab, Taajeel, and Khanaqa are the oldest parts of Erbil city down from the citadel [Figure 4.8]. They existed before 1920 (the date of the establishment of the state of Iraq). For this reason, the analysis of the first formation of them is excluded.

A massive transformation happened to this area since 1935. Different actions of interventions have been made to the area, including opening up new streets and widening some existing ones as a response to the introduction of car at that time. This required the removal of some buildings. Examples of these are ‘Qalat Street’ (a segment of the First Ring Road) which bounds the citadel separates this area from it and ‘Shekhy Choly Street’ (a segment of the Second Ring Road which penetrates the area of this sample [Figure 4.9]. Afterwards, new type of buildings influenced by the modern movements of architecture appeared along with those streets. Commercial activities and uses gradually occupied the area especially on the introduced and widened streets. A replacement of the residents occurred to the area due to that the original inhabitants of the area started to move out to the new developed quarters which are further from this centre.

Due to the conflict between the policies of renewal on one hand and those of conservation on the other hand, and the conflict between the uses of commercial and residential, the interventions on the area resulted in a mixture of urban form. Different building types exist in the area. A mixture of traditional courtyard houses, modern houses with front setbacks, and multistorey commercial buildings with shops in the ground floors portray the overall urban form of the area. This mixture of urban form extends to include the pattern of the streets. Organic, unplanned, and narrow alleys have been interrupted and broken by planned, regular, and wide streets. Currently, the area composes the city centre of Erbil and includes the old Bazaar and ‘Shar Park’ which was introduced in 2010. This park in the front of the citadel has currently become a focal square of Erbil. It has been defined as the buffer zone of the citadel. Accordingly, new urban design guidelines were proposed.

Table 4-4: Sample 1, the transformation determinants (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
1	Taajeel and Arab	1 st period	Before 1925-Now	N/A	<ul style="list-style-type: none"> • Organic and non-planned area • The System of Roads and Buildings No. 44 of 1935 and the successive regulations • The Law of Antiquities No. 59 in 1936 and its amendment in 1974 • Building regulations in commercial areas No. 4131 in 1989 • The City Centre Master Plan 2006 • The Citadel Buffer Zone Guidelines 2011 	<ul style="list-style-type: none"> • The location and the historical background. • The strong relation to the citadel

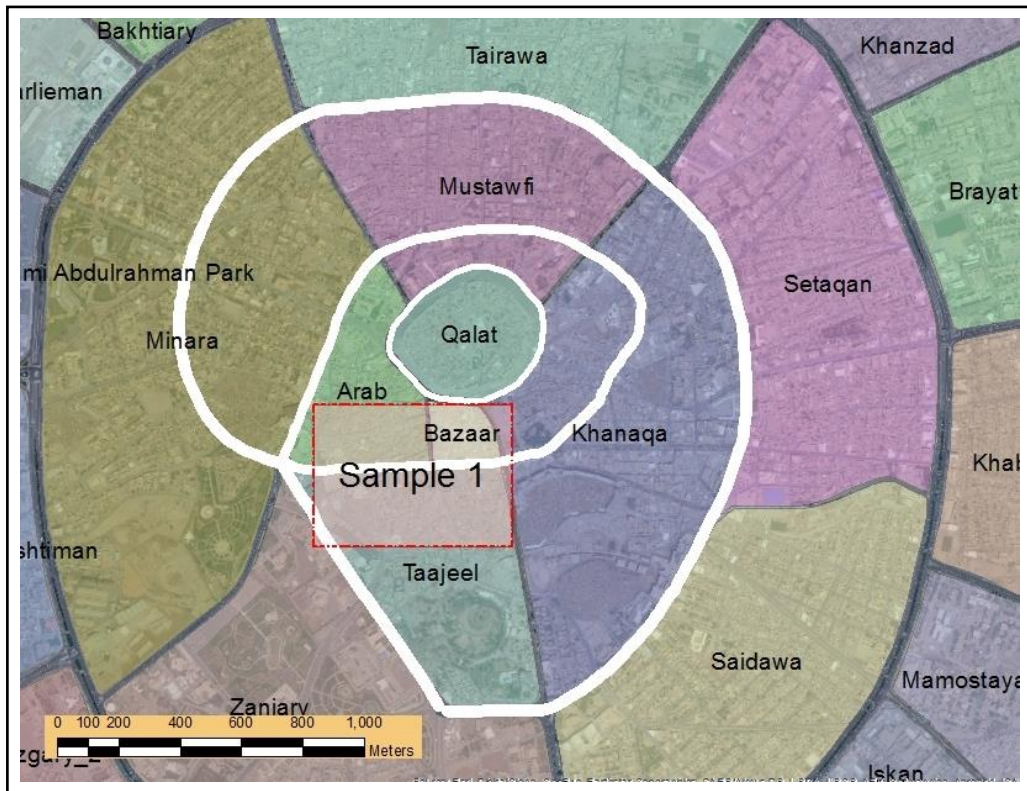


Figure 4.8: The location of ‘Sample 1’ (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

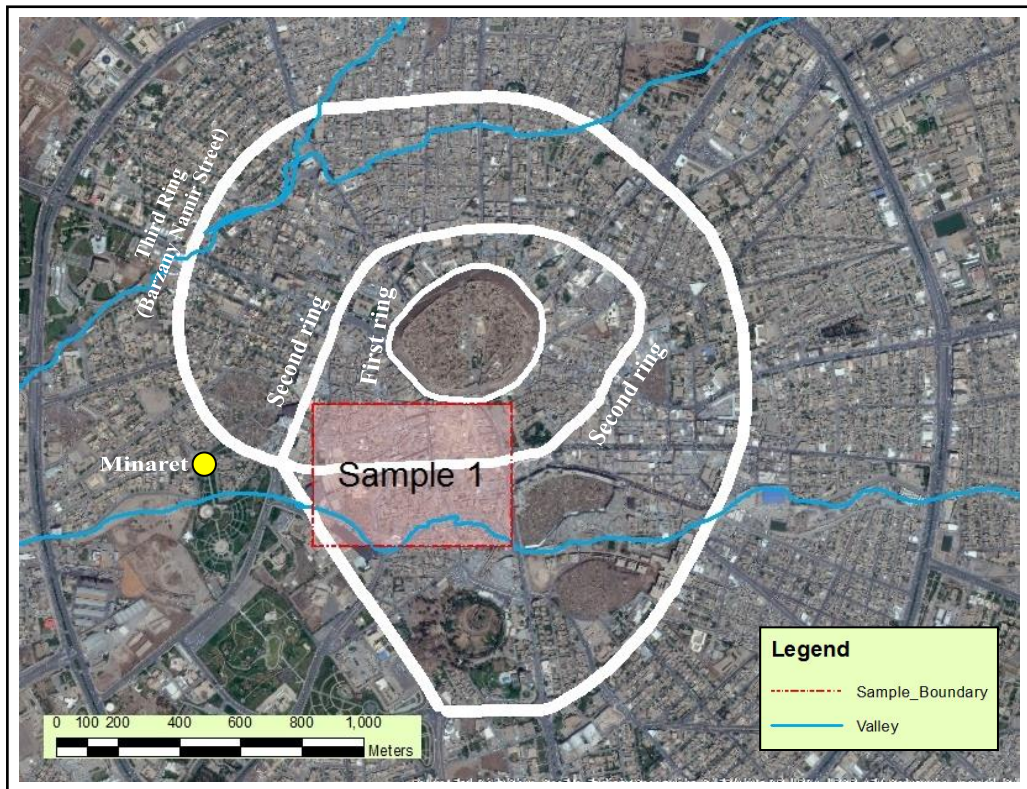


Figure 4.9: The location of Sample 1 area, the historical Minaret, and the first three ring roads. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

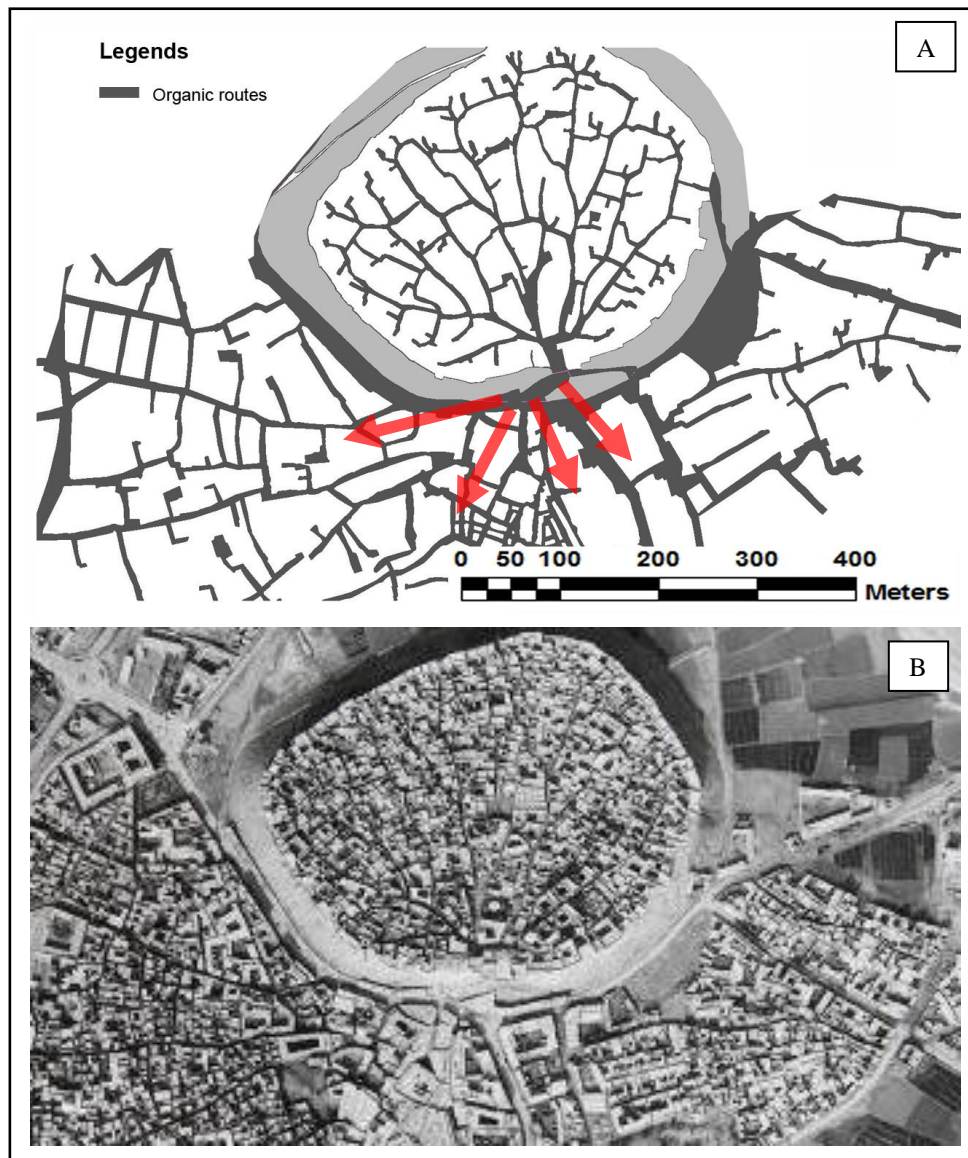


Figure 4.10: The integrated organic pattern of the routes of the citadel and the down part of the city in 1950s. The organic pattern extended from the citadel to the down part areas. (Source: **A**) Drawing by the researcher basing on a cadastral map from the archives of the Presidency of the Municipality of Erbil. **B**) Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)



Figure 4.11: A Cadastral map of Erbil city includes the quarters of Saray, Topkhana, Takiah (the three quarters of the Citadel), Arab, Taajeel, and Khanaqa. The map drawn in the late of 1930s but some modifications and changes have been drawn in the later periods. (Source: A map from The Presidency of the Municipality of Erbil but edited by the researcher)

1. The formation of the area: The citadel is considered as the first start and the oldest part of the city of Erbil as it has been identified as ‘the longest continuously inhabited site in the world’ and ‘more than 8000 years old’ by The United Nations Educational, Scientific and Cultural Organisation (UNESCO).²⁶⁴ The city grew from this core by firstly building down in the southern area of this citadel. This building included uses and activities such as commercial (The old bazaar) integrated with the citadel and then an expansion of residential buildings (single-family houses). This physical integration and visual relationship between the citadel and this area can evidently be traced through the allies and routes which are connected to the main southern gate of the citadel [Figure 4.10].

The quarters of Taajeel, Saadwnawa, Arab, and Khanaqah were firstly built. In the late of 1930s based on an aerial photo, a new Cadastral map for the area was drawn [Figure 4.11]. However, according to excavations, at some points of history, there have been built up areas even further from beyond these quarters which currently are considered as the historical part of the city centre.²⁶⁵ The old Minaret with about 800 years of age which lies about 950 meters far from the southern gate of the Citadel, is evidence which proves that claim [Figure 4.9].

Due to that the research deals with the time span from 1920 (the formation of Iraq state when the area of sample 1 had already existed) to 2013, the formation of this area is excluded. But most of the analysis focuses on the transformation of the area within this time period. Therefore, policies, regulations, and other historical underlying factors of the formation of the area are not covered here in the formation section.

²⁶⁴ UNESCO OFFICE FOR IRAQ.

²⁶⁵ See [Figure 1.6]. ‘Map 1’ shows the city wall (boundary) of Erbil in 1232AD. The city had three gates (eastern, western, and southern gates).

Table 4-5: The successive regulations that has influenced Sample 1 Since 1920 ²⁶⁶ (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the main	From other sides	
1931 ²⁶⁷		2						
1935 ²⁶⁸	1 out of 2	2	$P \geq 100$	3	N/A	N/A	N/A	4/5 for any new residential building
1936 ²⁶⁹	Antiquities law (Preservation impact)							
1936 ²⁷⁰	1 out of 5	2	$P \geq 100$	4 Public roads 3 Private roads	N/A	N/A	N/A	4/5 for any new residential building
1964 ²⁷¹		1						
1974 ²⁷²	Antiquities law (Preservation impact)							
1979 ^{273, 274}	N/A	Distinct	$800 > P \geq 120$	10	6	2.5 Or 1.5	0	N/A
1987 ²⁷⁵	N/A	Distinct	N/A					

²⁶⁶ Before 1920 the latest amendments of ‘The Law of Municipalities of the Ayalats of Ottomans’ in 1294 H. (1877 AC.), ‘The Law of Buildings of Ottomans’ in 1299 H (1882 AC.), and all other regulations issued from the Ottomans had been in force.

²⁶⁷ The Monarch of the Kingdom, *Law of Municipalities’ Administration No. 84 of 1931*.

²⁶⁸ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*.

²⁶⁹ The Monarch of the Kingdom, *Law of Old Antiquities No. 59 of 1936*.

²⁷⁰ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 1542, 1936, pp. 197–206*.

²⁷¹ The Presidency of the Republic, *Law of Municipalities’ Administration No. 165 of 1964*.

²⁷² The Revolutionary Command Council, *Decision No. 975 on The Amendment of Law of Antiquities No. 59 of 1936*.

²⁷³ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

²⁷⁴ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

²⁷⁵ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the main	From other sides	
1989 ²⁷⁶	Commercial streets	Distinct	N/A	$S > 8$ ²⁷⁷	N/A	Vary	Vary ²⁷⁸	%75
1993 ²⁷⁹		Special						
2007 ²⁸⁰	N/A ²⁸¹	Special	Vary	Vary	Vary	Vary	Vary	Vary
2011 ²⁸²	N/A ²⁸³	Special						

²⁷⁶ Ministry of Local Governance, General Directorate of Urban Planning.

²⁷⁷ The setback is applied on buildings on commercial streets that have a width more than 8 meters. See Table 4-7

²⁷⁸ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street.

²⁷⁹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

²⁸⁰ Dar al_Handasah and Ministry of Municipalities, *Erbil City Center: Final Master Plan Report* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2007).

²⁸¹ The area was divided into many zones and treated according to a new 'Zoning Regulations of the new Master Plan for the City Centre'.

²⁸² UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, *URBAN DESIGN GUIDELINES FOR THE BUFFER ZONE OF ERBIL CITADEL* (Erbil: UNESCO Iraq and HCECR and the Governorate of Erbil, 2011).

²⁸³ The area was categorized as the Buffer Zone 'A' of the citadel in which the area follows different rules and stricter regulations of conservation than that of the Zone 'B'

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

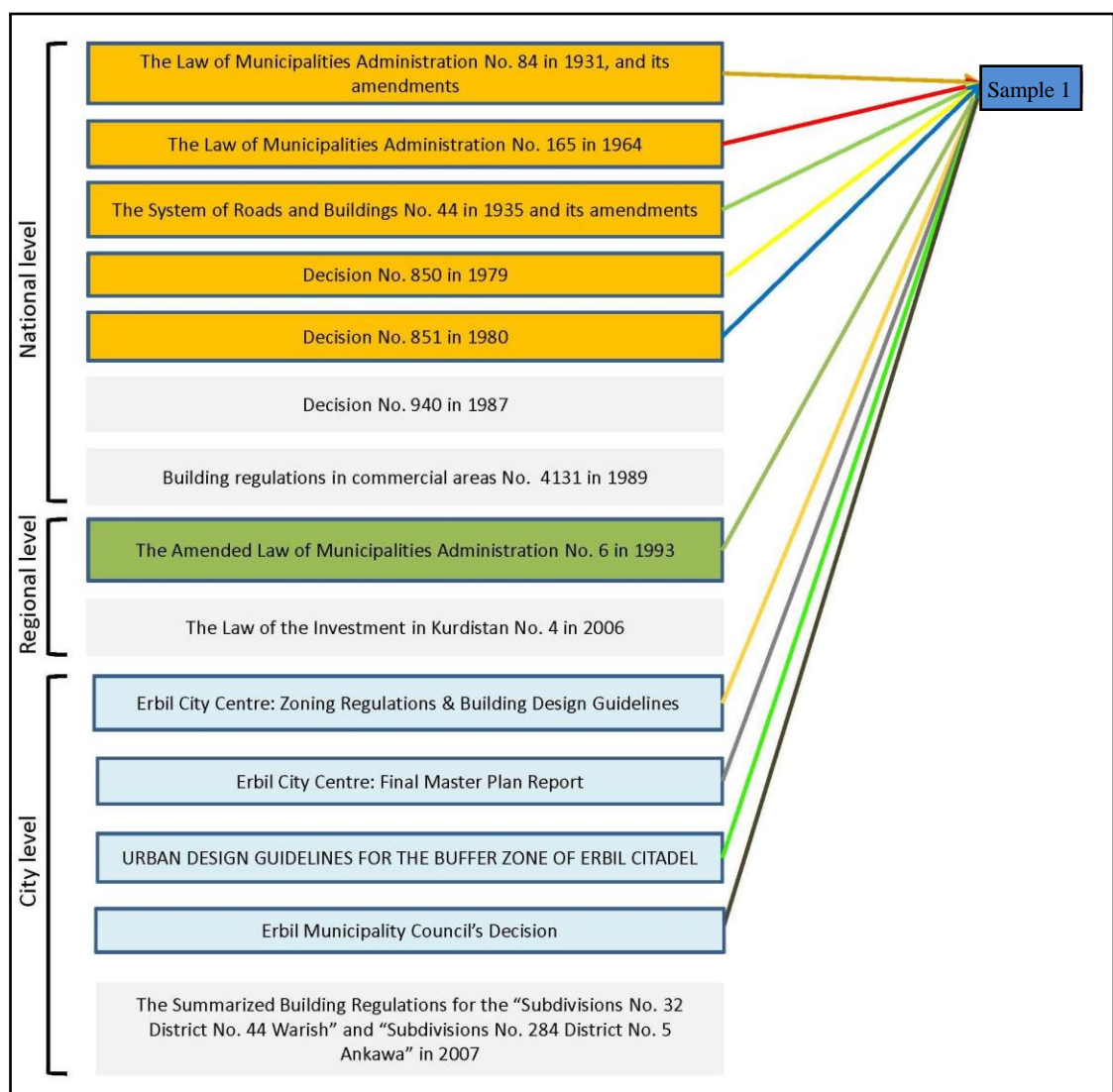


Figure 4.12: Direct municipality regulations enacted at different levels that have influenced 'Sample 1'. (Source: Researcher)

²⁸⁴ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Transformation: Erbil in 1920s and 1930s

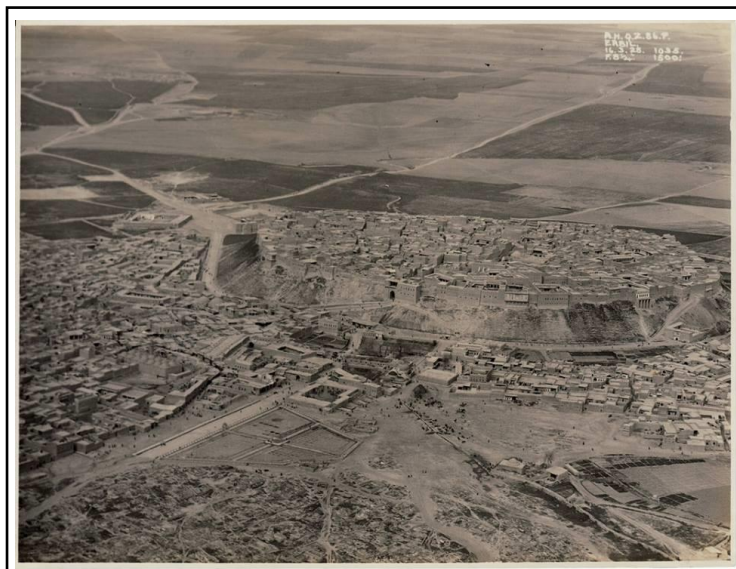


Figure 4.13: An aerial photo of Erbil city in 1928 from southeast. (Source: British Academy Library, photographed by Royal Air Force,

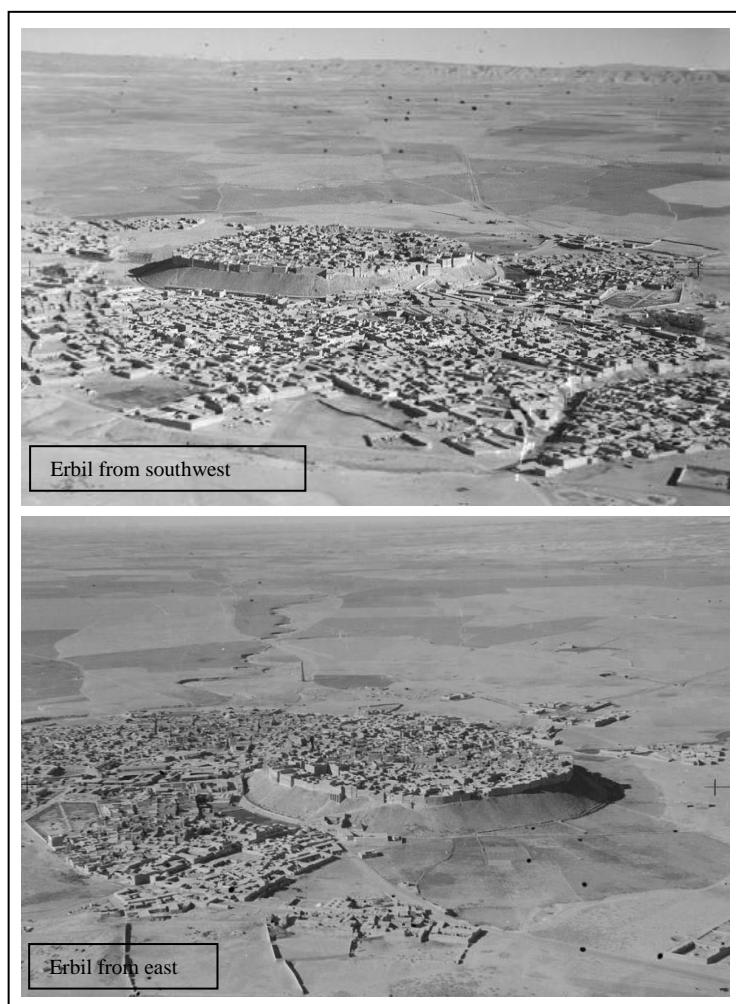


Figure 4.14: Aerial photos of Erbil city in 1938. (Source: British Academy Library. They were taken from the archaeological survey conducted by Sir Marc Aurel Stein and captured in 1938 by or with the assistance of the Royal Air Force)

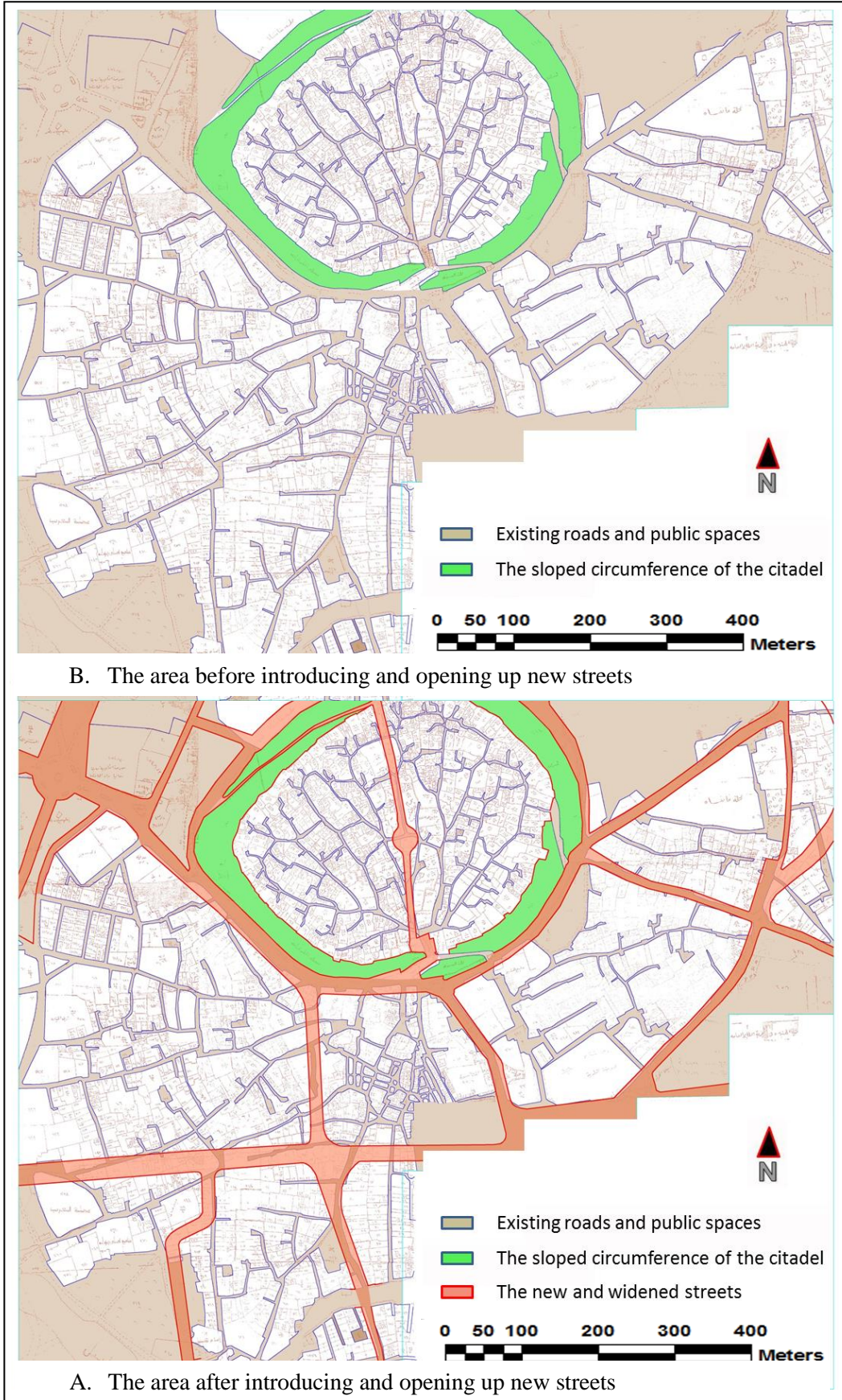


Figure 4.15: The citadel and the southern down part before and after introducing and opening up new streets. (Source: Drawing by the researcher basing on a cadastral map from The Presidency of the Municipality of Erbil. See [Figure 3.3] and [Figure 3.5])

The Transformation: New streets and land use

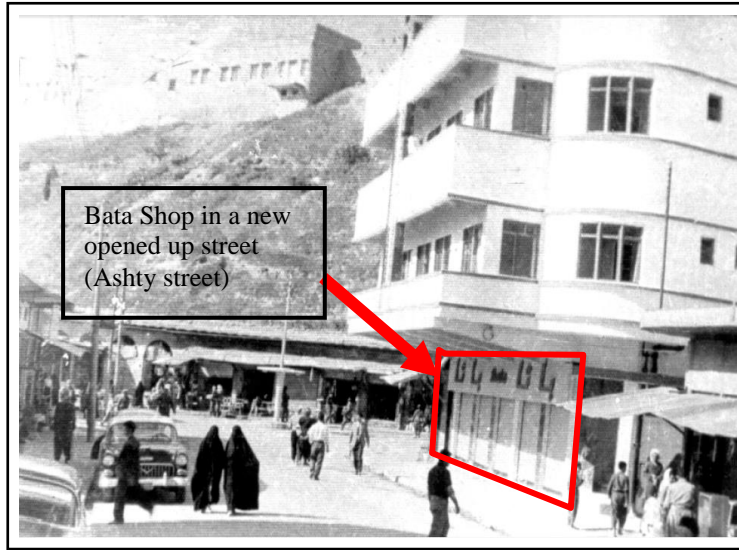


Figure 4.16: ‘Bata shop’ in an opened up street (Ashty Street) which was publicly known by the name of this shop. (Source: Erbil Governorate)

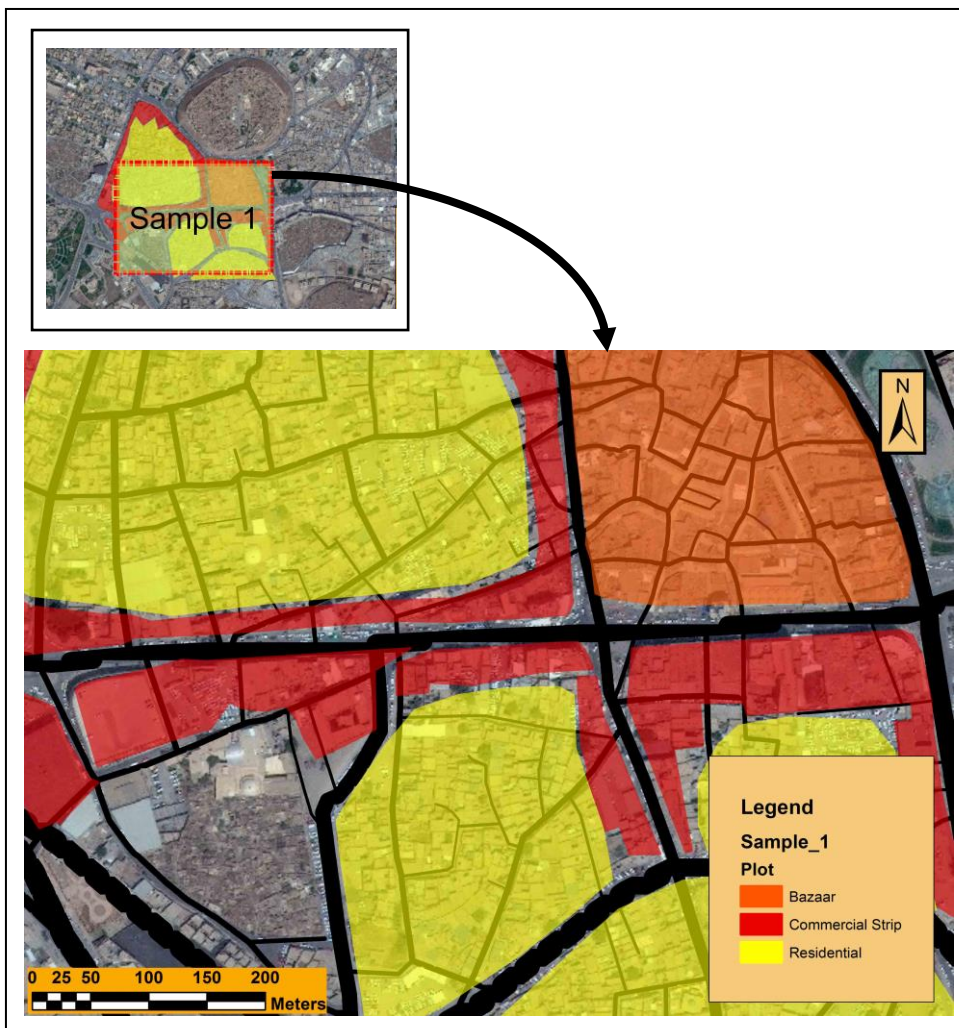


Figure 4.17: The change of the use of some parts of the sample area from residential to commercial strips along with the new opened up streets in the area in 1950s. (Source: Drawing by the researcher based on data from Urban Planning Directorate of Erbil)

The Transformation: New streets and land use

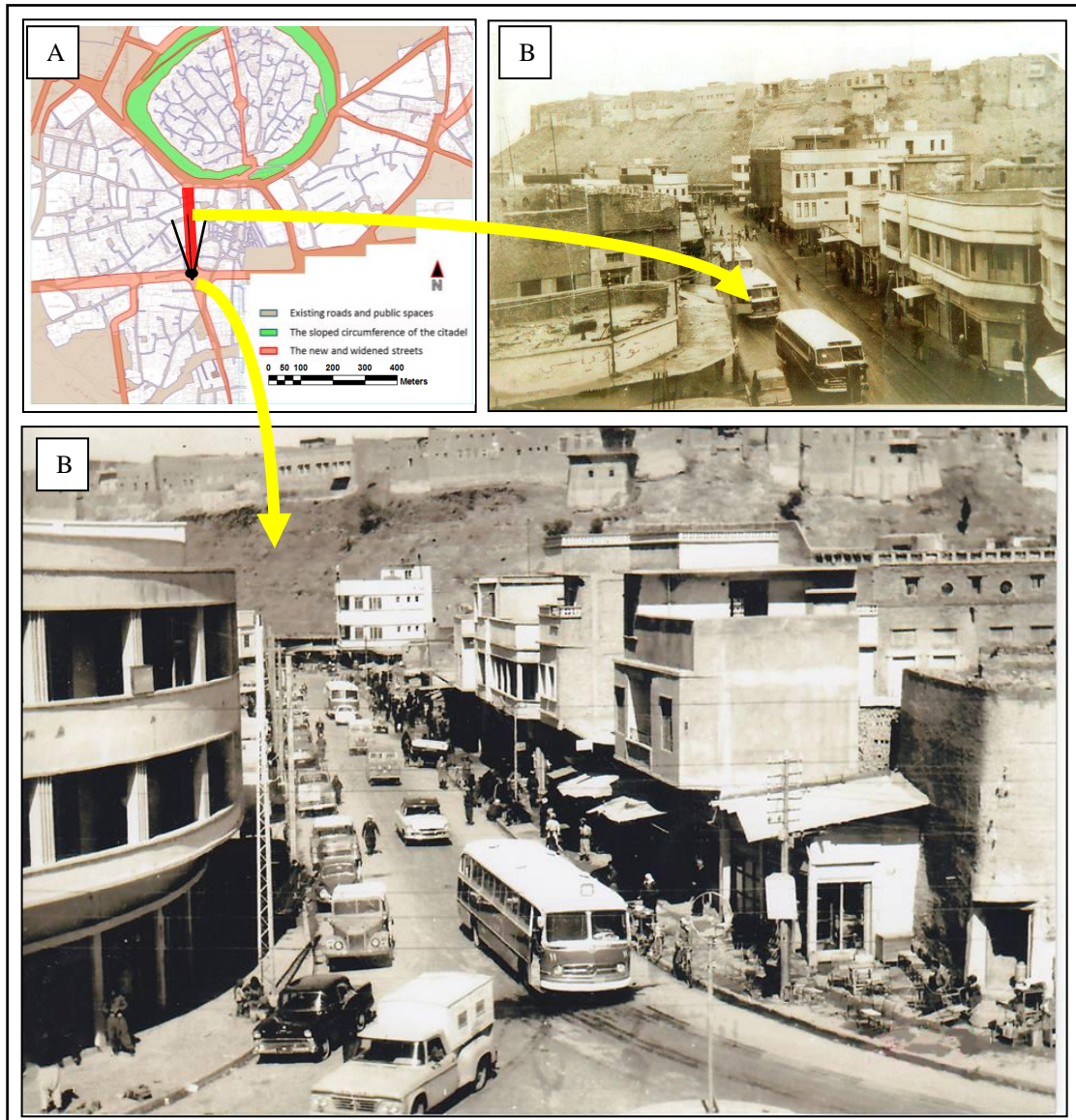


Figure 4.18: A new opened up and introduced commercial strip (Ashty or Bata Street) with a new building type (multistorey building) in 1960s and 1970s. 'Ashty Street' now which was known as 'Bata Street' before. (Source: A) Drawing by the researcher based on a cadastral map from The Presidency of the Municipality of Erbil, See [Figure 3.5]. B) Erbil Governorate)

The Transformation: The absence of conservation policies



Figure 4.19: Single houses in the area of ‘Sample 1’ (Arab and Taajeel quarters) in a deteriorated condition and they fell down or they are liable to fall down. (Source: Researcher)

The Transformation: New master plan and redevelopment



Figure 4.20: Some proposed uses in the new city centre master plan which has a trend of development of the area by introducing new commercial and business centres open spaces. (Source: Ministry of Municipalities, Dar al_Handasah, *Erbil City Center: Final Master Plan Report, 2007*)

The Transformation: New master plan and redevelopment

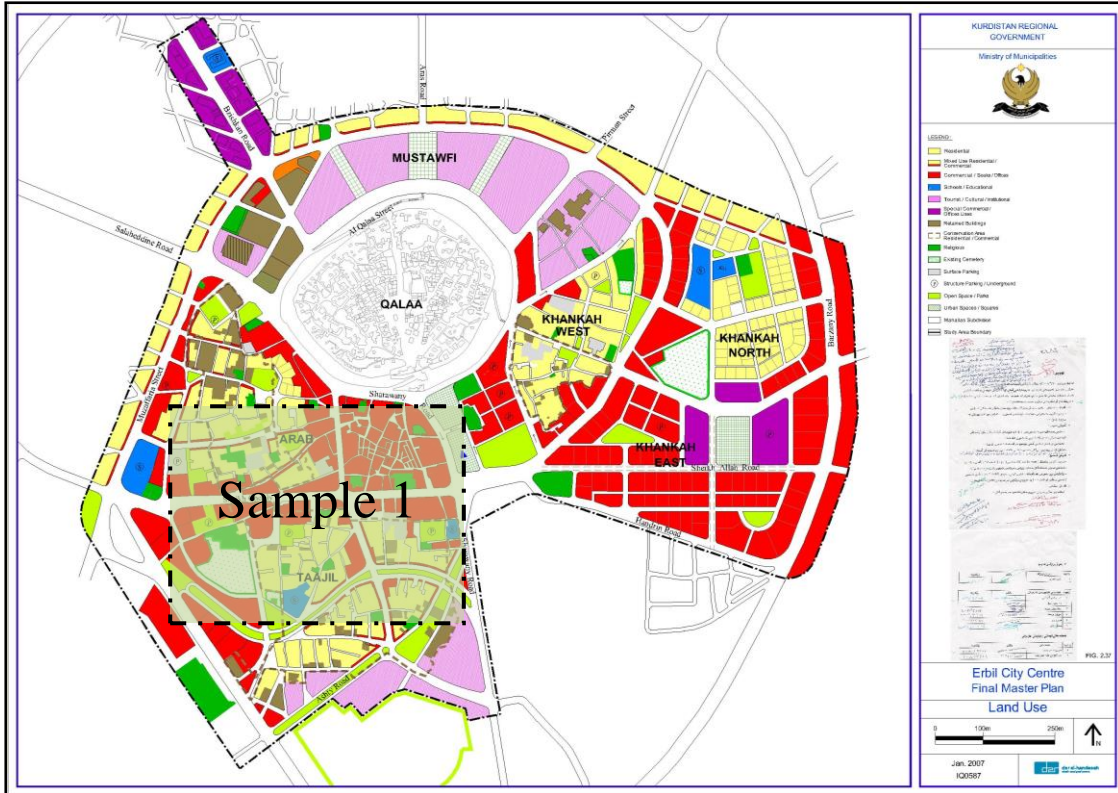


Figure 4.21: Land use map-The final master plan of the city centre of Erbil by Dar Al_Handasah Company. (Source: Drawing by the researcher on a map from KRG/ The Ministry of Municipalities, Dar al_Handasah, *Erbil City Center: Final Master Plan Report*, 2007)

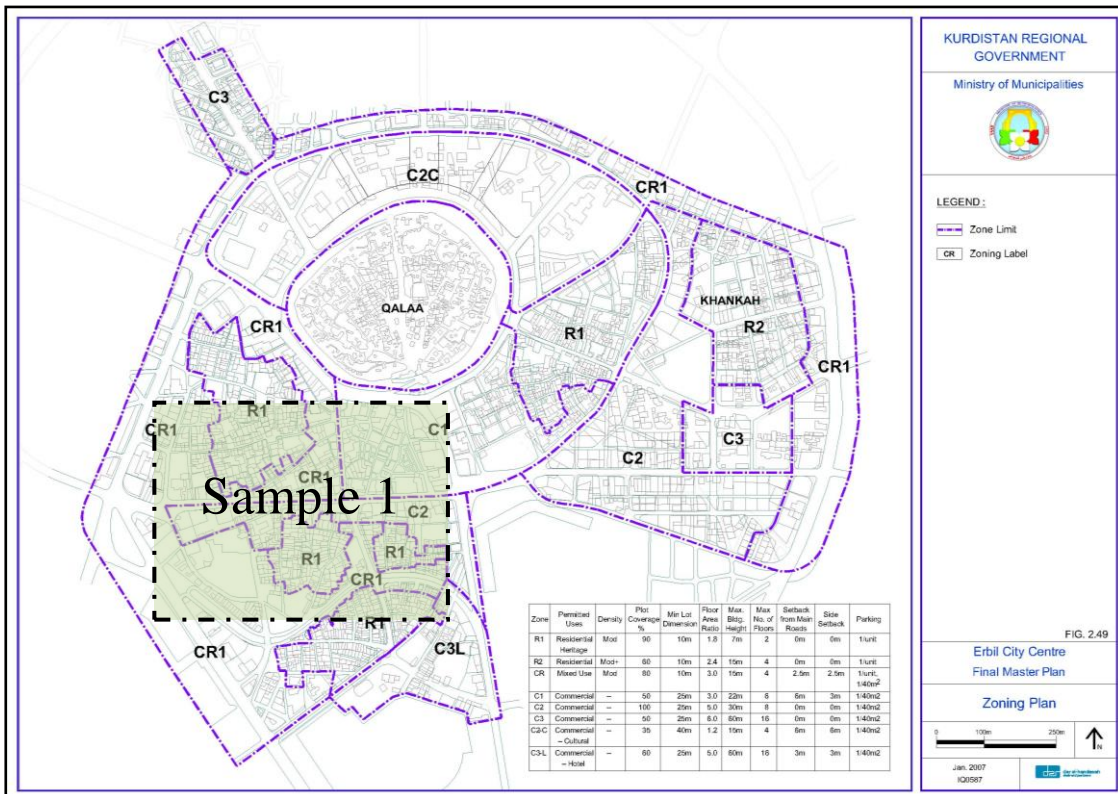


Figure 4.22: New Zoning regulations proposed in the new master plan for the city centre, by Dar Al-Handasah Company. (Source: Drawing by the researcher on a map from KRG/ The Ministry of Municipalities, Dar al_Handasah, *Erbil City Center: Zoning Regulations & Building Design Guidelines Report*, 2007)

The Transformation: New master plan and redevelopment

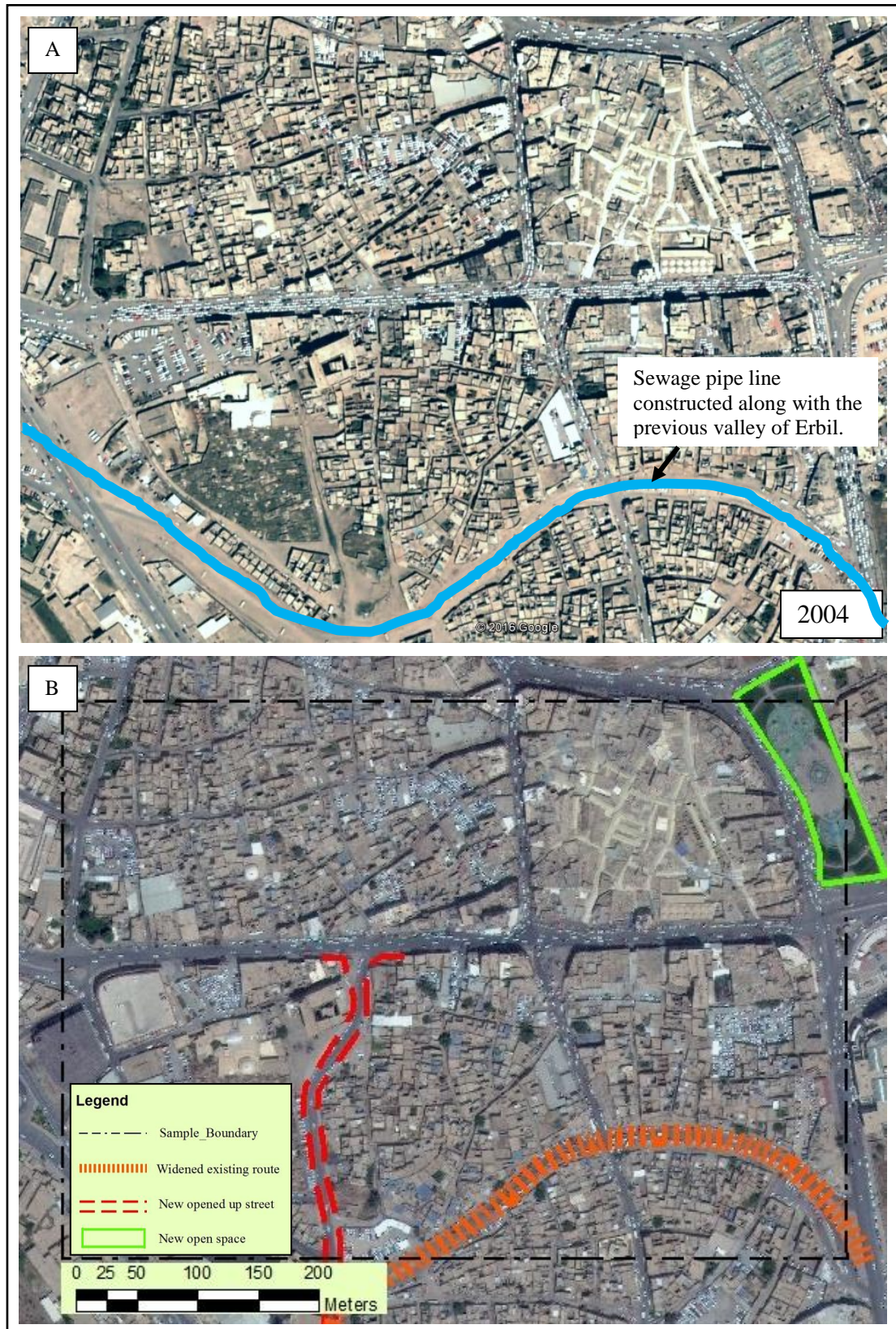


Figure 4.23: Changes on the area from 2007 to 2011 which were mainly a result of the proposed routes and open spaces by the new city centre master plan approved in 2007. (Source: **A**) Drawing by the researcher on a satellite image of Erbil of 2004 adapted from Google Earth **B**) Drawing by the researcher on a satellite image of Erbil of 2010 adapted from ArcGIS and taken by DigitalGlobe)

The Transformation: New master plan and redevelopment

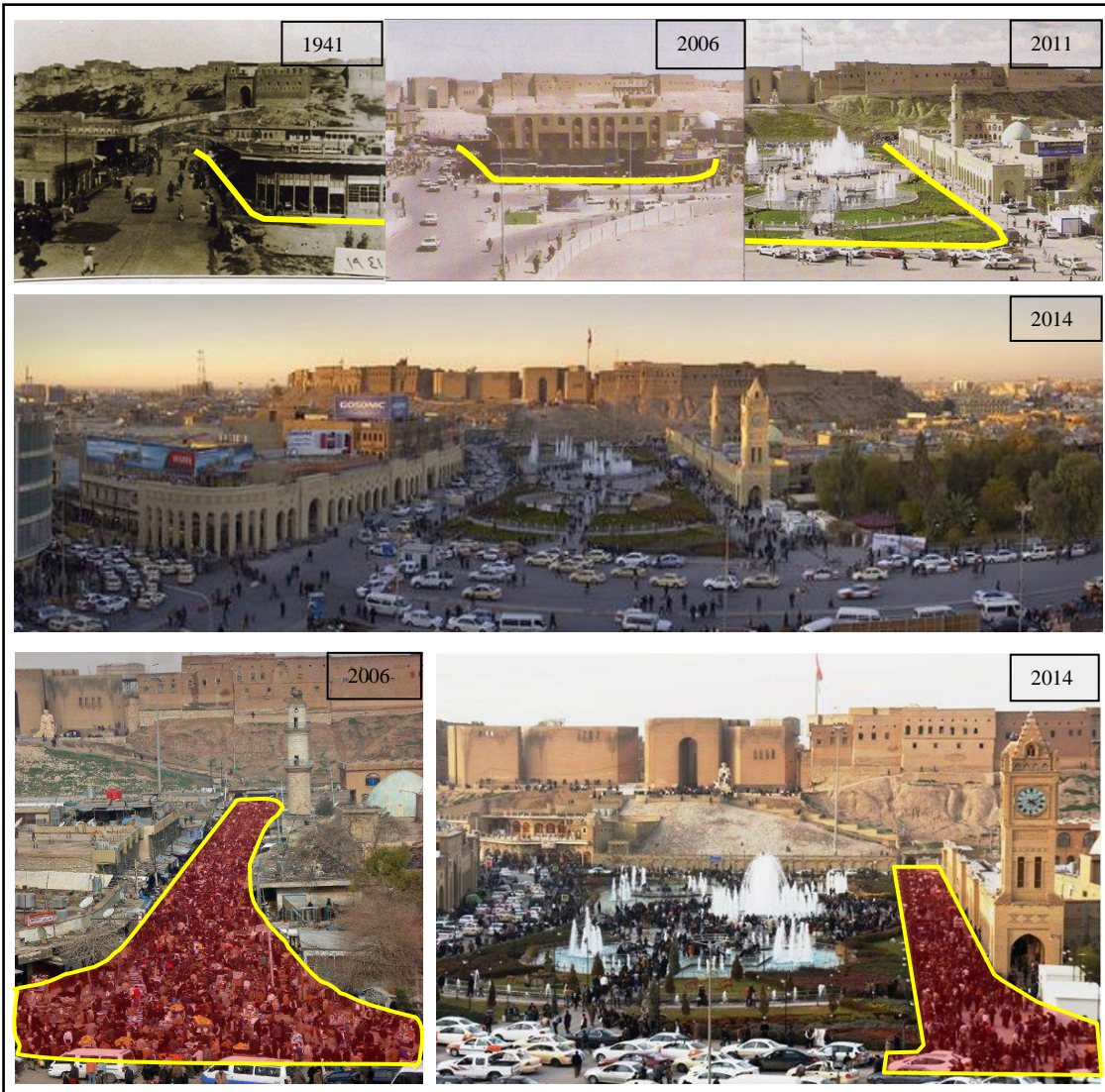


Figure 4.24: 'Shar Park Square' which was built in 2010 by the removal of some buildings.
(Source: Drawings by the researcher on photographs from Erbil Governorate)

The Transformation: New master plan and redevelopment



Figure 4.25: A refined street in Taajeel quarter on Erbil valley according to the new city centre master plan. (Source: Researcher)

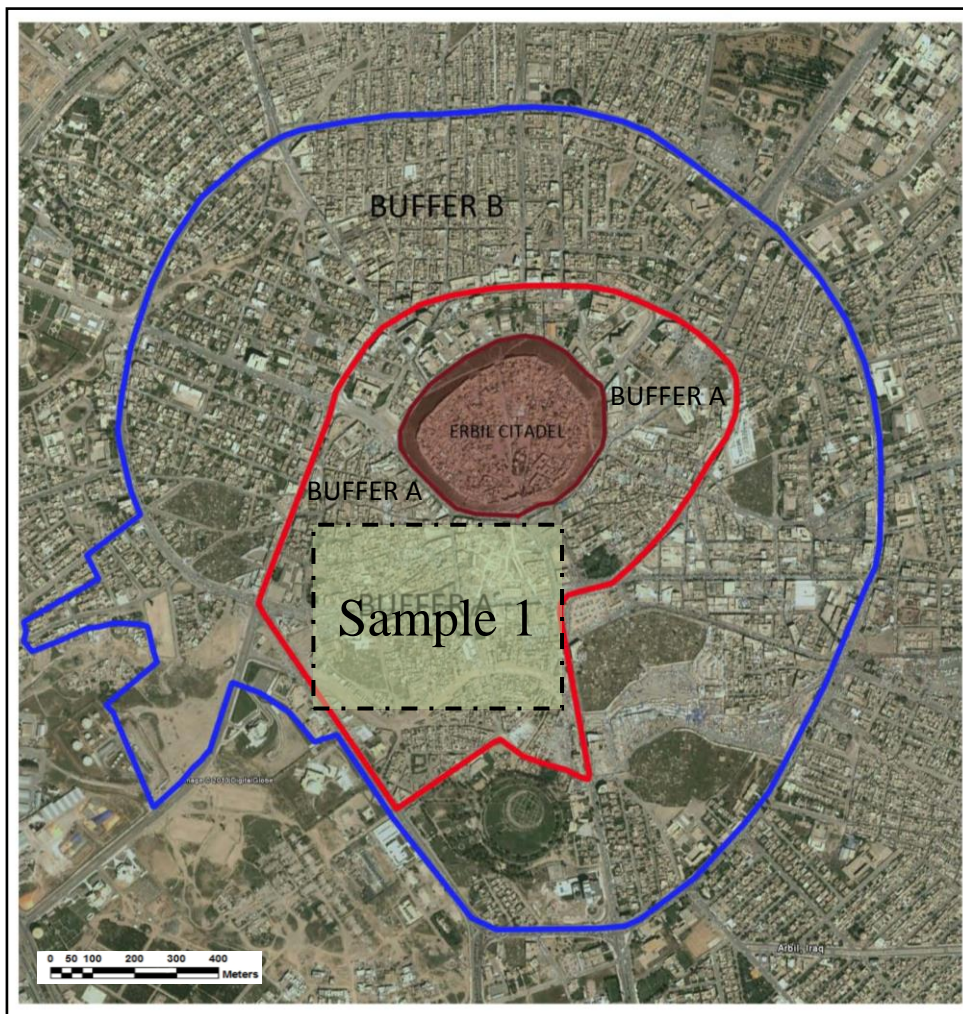


Figure 4.26: Buffer zone of the citadel. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p6)

The Transformation: Conservation as a buffer zone of the citadel

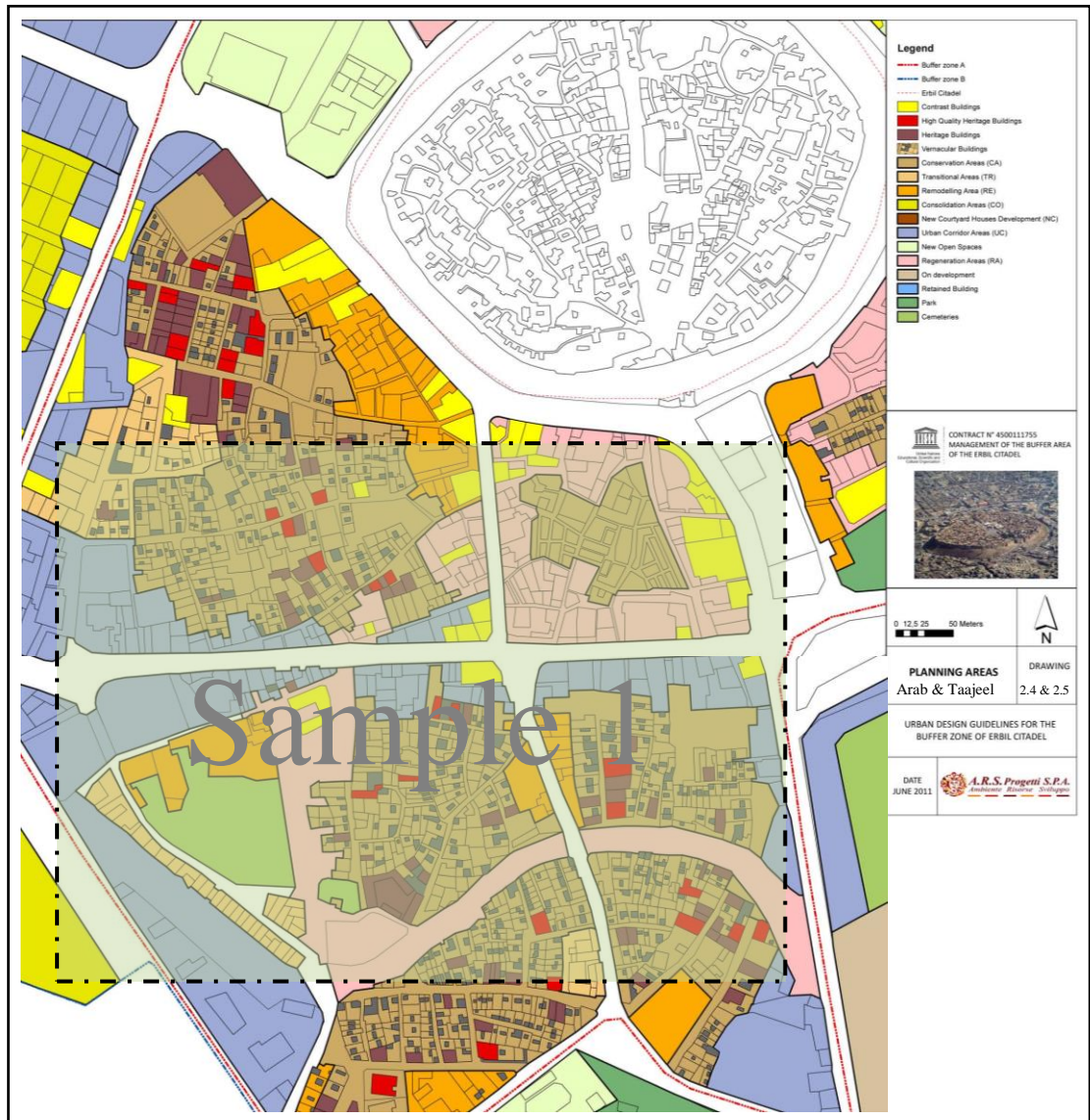


Figure 4.27: ‘Sample 1’ area (a part of Arab and a part of Taaheel quarters) includes different planning areas proposed by the guidelines for the buffer zone of the citadel. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p16)

The Transformation: Conservation as a buffer zone of the citadel



Figure 4.28: The influence of the proposed urban design guidelines for the ‘buffer zone A’ of the citadel. A new building in the area built adjacent to a traditional building according to the regulations that achieve harmonizing the facades. (Source: Researcher)

The Transformation: Conservation as a buffer zone of the citadel



Figure 4.29: Modern commercial buildings and single houses in ‘Sample 1’ area been built in 1950s and 1960s. They are now considered as a part of the history of the area.
(Source: Researcher)

The Transformation: Conservation as a buffer zone of the citadel



Figure 4.30: Vernacular and heritage single courtyard houses with historical, architectural, and aesthetic values in the area of ‘Sample 1’, and narrow and closed end alleys. The houses have two floors in average. (Source: Researcher)

The Transformation: Conservation as a buffer zone of the citadel



Figure 4.31: Vernacular and heritage single courtyard houses with historical, architectural, and aesthetic values in the area of ‘Sample 1’, and narrow and closed end alleys. The houses have two floors in average. (Source: Researcher)

The Transformation: Conservation as a buffer zone of the citadel



Figure 4.32: New and existing buildings that have façade treatment with brick as a local and vernacular building material. (Source: Researcher)

The Transformation: Conservation as a buffer zone of the citadel

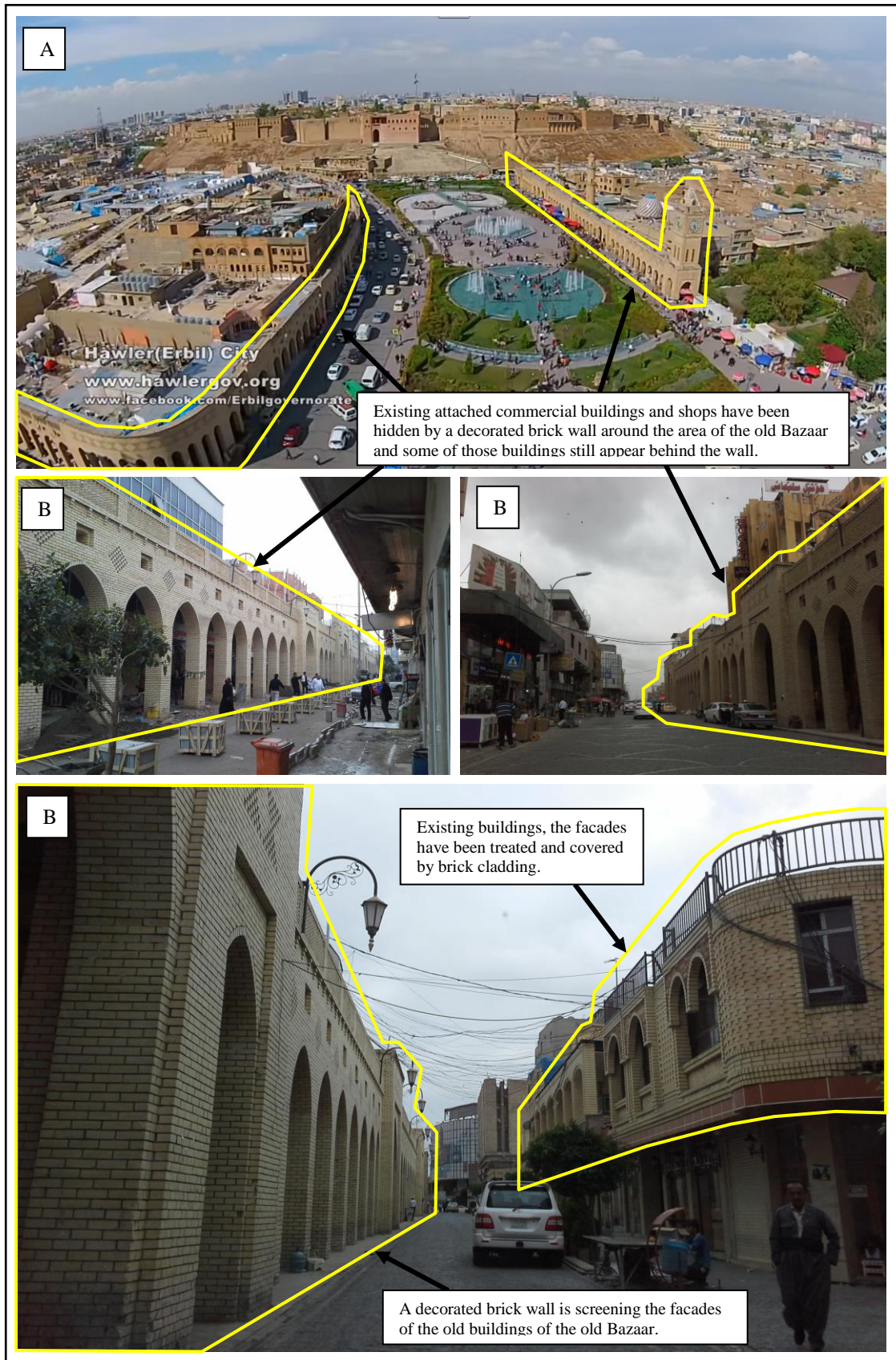


Figure 4.33: A decorated screening brick wall has been built to hide the heterogeneous facades of the existing buildings rounding the old Bazaar. But on the opposite side of ‘Ashty Street’ the facades of the buildings have been covered by brick cladding. (Source: **A**) Erbil Governorate **B**) Photographs by the researcher)

The Transformation: Multistorey commercial buildings



Figure 4.34: ‘Sample 1’ area: A mix of organic and irregular urban pattern with regular pattern of plot and route elements. (Source: Drawing by the researcher based on data from the General Directorate of Urban Planning)

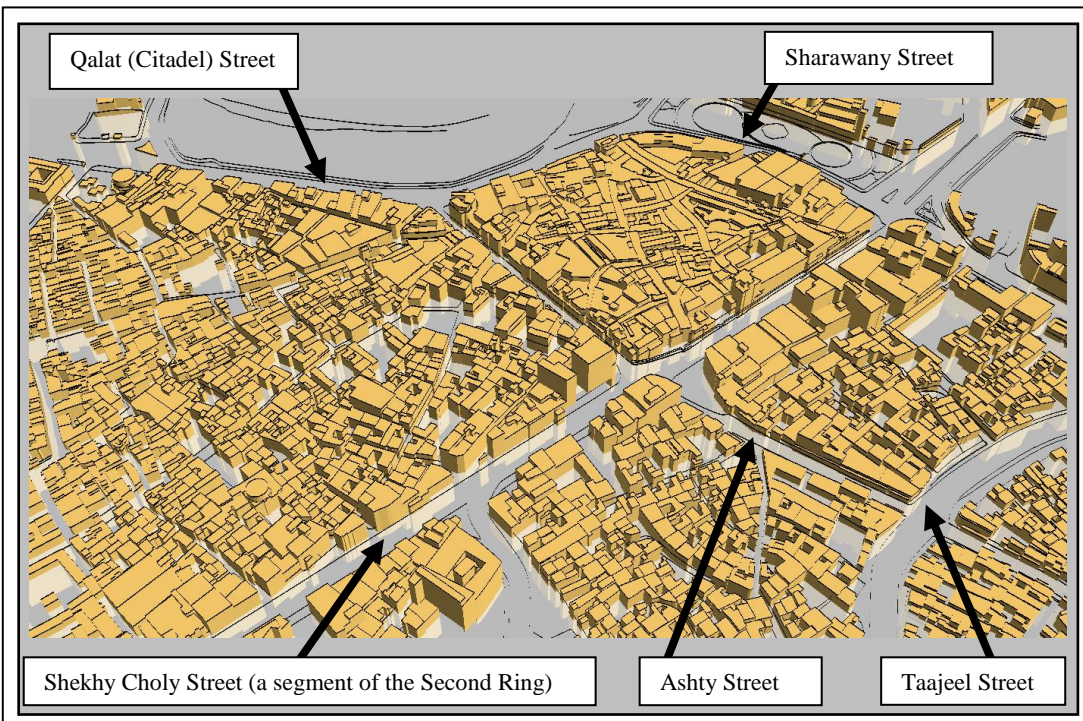


Figure 4.35: ‘Sample 1’ area from south west: A mix of organic and irregular urban pattern with interventions of regular pattern of plot and route elements. The introduced opened up streets (Ashty and Shekhy Choly streets) have separated the area into few clusters of urban fabric. (Source: Drawing by the researcher based on data from the General Directorate of Urban Planning)

2. The transformation of the area: Since the establishment of Iraq state in 1920 changes on the already existed buildings and areas have happened in different periods. These changes have been mainly due to the issuance of new laws and regulations which in turn reflect the policies and requirements of the new coming era at that time. See [Table 4-4] for the transformation determinants.

A. The time period: The key historical events influencing the city as a whole generally but particularly this part of the city which then became a part of the city centre can be summarised in four main political events. The first was the establishment of the state of Iraq in 1920; the second was the shift from royal system of governance into republican system after the revolution of 1958; the third was in 1991 when the uprising of Kurdistan led to the establishment of Kurdistan parliament and Kurdistan government which took Erbil city as its capital; the last was in 2003, the fall of Saddam's regime which led to the Kurdistan's federal region officially being admitted as a region within the new federal Iraq. This event led to a rapid and significant economic growth. These events have resulted in changes in many aspects such as economic and social.

Layers of transformations on the area of 'Sample 1' have happened in the successive periods since 1920. The importance of the area has changed over time from an only residential area with a separate area of a bazaar (known as Qaisary) down from the citadel in 1920s to become a historical, residential but with poorer quality of services, and a commercial city centre especially after 1960s. These changes accompanied by demographic changes. The original residents gradually moved out from the area to new and outer areas of the city where better services of housing that meets the needs of the era were provided. However, there were other social issues affecting this movement such as the growth and the extension of families and the increase of the population which naturally influence the growth and the development of any city.

B. The housing policy: While the area was not a new development in the city after 1920 as it already existed, the trend of transformation has no relation to any housing policies adopted in the rest of the city and the

country as well, but it can be excused by mainly the new laws and regulations, especially those concerning this area.

C. The regulations: The different and successive laws and regulations have significantly influenced the way in which the area of ‘Sample 1’ has transformed [Table 4-5] and [Table 4-6]. These successive regulations have produced street patterns and building types that convey the characteristics of the successive periods from 1930 to 2013. The first legislative tool after 1920 affecting the sample area was the ‘*System of Roads and Buildings No.44 of 1935*’ which was issued according to the ‘*Law of Municipalities’ Administration No.84 in 1931*’. According to this legislation, this area was defined as the ‘First Urban Area Category’ in where there were difficulties in providing services due to its narrow alleys and deteriorated condition. By then, the ring roads surrounding the citadel did not exist. [Figure 4.13] and [Figure 4.14].

This legislation gave authority to the council of the municipality to prepare new designs for those areas and to open up new streets and widen the existing ones which can mostly be achieved by the removal of some existing buildings. This council has also the power to change the use of lands.²⁸⁵ The power for many other types of interventions was given to the local authorities (municipality council). Yet here, a reference to this certain power (the power of making changes on the existing streets) is made due to its immense influence in the transformation on the characteristic of this area (Sample 1). On the contrary, legislation was enacted in 1936 which has a conservative approach but with an extent of flexibility. This was the law about the protection of antiquities that include artefacts as well as historical buildings or any building that has a historical, an architectural, and an artistic or aesthetic value.²⁸⁶ Between these two opposite legislation the emphasis was more towards the ‘*System of Roads and Buildings No. 44*’ due to many issues related to the legislation their selves and the social and cultural environment, the introduction of vehicles, and undermining or not realizing the importance of heritage urban contexts at that time. As a result, in 1950s new streets on the citadel and the down area (including ‘Sample 1’ area) were

²⁸⁵ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*, sec. 5.

²⁸⁶ The Monarch of the Kingdom, *Law of Old Antiquities No. 59 of 1936*.

introduced [Figure 4.15].²⁸⁷ This was a turning point between the history of this historical area and its future. It was also a major change which immensely influenced the life in the area. With no doubts, the urban form has had been significantly influenced by moving from narrow alleys to wide streets, vernacular single inner courtyard houses to modern multistorey commercial buildings (up to three stories) built according to the new legislation [Figure 4.16]. Along the new introduced streets in the area, strips of commercial uses with new building type on both sides of each new street were identified [Figure 4.17].

For the first time the area started to struggle between residential and commercial activities but with a kind of separation and not integration. Just behind these strips which were multistorey commercial buildings and busy streets during daytimes and empty over nights, single houses existed in separated groups by the new introduced axes (streets). Therefore, the organic urban fabric as a whole was affected, some existing traditional buildings were disappeared and removed, new types of building were introduced and built, and new activities, regardless their positive or negative influences, were emerged [Figure 4.18]. The separation between the new introduced commercial strips and the rest of the existing fabric sometimes was just by the existing traditional narrow alleys in the original fabric.

As a continual process, the municipality identified some houses in the area as historical that need to be preserved in different mechanisms ranging from acquiring some of them to be managed by the directorate of antiquities and renting them to governmental employees in low rents to obliging the owners to limited interventions that can be made on each house by the owner (the landlord) in order to at least keep them in their condition. However, these actions and these scattered individual conservation policies were not enough as the authorities did not have a clear vision to manage and invest those selected houses. As a result, those houses deteriorated over time and came under the threat of falling down while some of them wholly or partly fell down [Figure 4.19].

²⁸⁷ The introduced streets in 'Sample 1' area are 'Ashty street' which is publicly known as 'Bata street' due to that there had been a famous shoes shop of Bata brand, and 'Shekhy Choly street' which is now a segment of the 'Second Ring Road' [Figure 4.35].

In all the successive amendments of ‘*System of Roads and Buildings No. 44*’, ‘Sample 1’ area (Arab and Taajeel quarters) stayed as the ‘Urban area category 1’ with no significant changes in the values of the planning and building elements. Both ‘*Decision No. 850 of 1979*’²⁸⁸ and ‘*Decision No. 940 of 1987*’²⁸⁹ did not have a remarkable influence on this area as it was different to the rest of the city’s quarters. Therefore, this part of the city (‘Sample 1’ area) has been treated differently. However, its situation became more complicated and deteriorated over time.

Due to the economic growth after 2003 when Kurdistan region was officially admitted as a federal region, the city witnessed its unprecedented urban development and growth. Concerned authorities started to think about the development of the deteriorated city centre. In 2006 the ministry of municipalities of Kurdistan Region decided to prepare a master plan for the city centre which includes the quarters of Arab, Taajeel, Khanaqah, and Mustawfi. ‘Sample 1’ area is included in this city centre boundary. ‘Dar al-Handasah’ company was assigned to work on this project. The work on the project finished in 2007 and the new prepared master plan for the city centre was approved with some comments on it by the Municipality’s Council of the city. As it has been mentioned in the report of the final master plan ‘The City Centre will be a place where people can prosper, can benefit from the development of the new vision, and can raise their families steeped in the heritage of a new, proud Kurdish culture of the 21st Century.’²⁹⁰ and also ‘The Planning Determinants better prepare the City Centre for the technological and social practices of the present and future, allowing the City Centre to provide venues for the world traveller, business-person or tourist, while celebrating the unique historical and environmental characteristics of the place.’²⁹¹, it is evident that this plan was aimed at

²⁸⁸ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

²⁸⁹ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

²⁹⁰ Dar al_Handasah and Ministry of Municipalities, *Erbil City Center: Final Master Plan Report*, pp. 1–1.

²⁹¹ Dar al_Handasah and Ministry of Municipalities, *Erbil City Center: Final Master Plan Report*, pp. 1–1.

the development of the centre through making this part as a business centre by creating more commercial activities or uses and offices (mostly in Khanaqah and Mustawfi quarters or the north and south east of the citadel), partially opening up new streets and widening some existing ones, and with less attention to conservation. See [Figure 4.20] and [Figure 4.21]. The plan was accompanied by new zoning regulations [Figure 4.22].²⁹²

One proposed opening up street, one proposed widening street, one proposed relatively big and remarkable open space, and very few buildings were built according to this new master plan in a time span of 4 years, from 2007 to 2011. All these were implemented by the removal of some existing buildings [Figure 4.23]. However, some of the ideas of these interventions such as the urban space (Shar Park Square) [Figure 4.24] and the street on the valley of Erbil in Taajeel quarter [Figure 4.25] existed even before the preparation of this master plan but they were incorporated into this plan.

This master plan could not be completely implemented due to that it had some conjunctions with the project of the revitalization and the rehabilitation of the citadel which started in 2007 when a memorandum of understanding between Kurdistan Regional Government (KRG) and UNESCO was signed.²⁹³ As a requirement for an effective protection of the 'historical citadel' of Erbil and its inclusion into the list of 'World Heritage Sites',²⁹⁴ the regulations concerning planning and building in the area of the city centre (which includes 'Sample 1' area) was decided to be reviewed. Those regulations were those legislated by the City Centre Master Plan approved in 2007. The aim of this action was that the citadel has a relation to its surrounding context. Therefore, building and planning in this surrounding area should take the consideration of the norms and the citadel as a historical area as it is an integrated object within its location.

As a result, the surrounding area of the citadel was defined as a buffer zone of the citadel and classified into two degrees of design and

²⁹² Dar al_Handasah and Ministry of Municipalities, *Erbil City Center: Zoning Regulations & Building Design Guidelines* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2007).

²⁹³ UNESCO OFFICE FOR IRAQ.

²⁹⁴ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, p. 6.

planning guidelines regarding the consideration of conservation and preservation norms [Figure 4.26]. ‘Sample 1’ area is a part of the ‘Buffer zone A’ which has more conservation trend. The urban design guideline proposed for the area as the buffer zone of the citadel led to the cancellation of any item in the City Centre Master Plan that contradict with this new guidelines.²⁹⁵ The guidelines proposed seven categories of planning areas: ‘conservation areas, transitional areas, remodelling areas, urban corridors, consolidation areas, new courtyard houses development areas, and regeneration areas’.²⁹⁶ Each of these planning areas have different types of actions regarding land use, land fragmentation and pooling requirements, maximum plot coverage, other parameters (setback and building line, building height, and building type) which all related to building form, other interventions and maintenance works, and guidelines concerning building materials and construction techniques.

According to these guidelines, ‘Sample 1’ area includes different planning categories [Figure 4.27].²⁹⁷ This regulations aims at the conservation of the traditional routes pattern and some heritage buildings in the area which take the issues of form elements of the citadel into account. New buildings are allowed but with respecting the citadel, the public realm, and the panoramic scene of the area. These were achieved by controlling the heights of buildings, the adoption of the traditional and local architectural elements, and building materials [Figure 4.28].

As a complimentary action, the facades of the existing buildings in some commercial streets in the area were covered by materials (traditional brick) that achieve harmony with the traditional context. The area includes different types of buildings with the characteristics of different periods. In 1950s and 1960s when the new commercial streets were opened up, multistorey buildings of modern style were built. The urban design guidelines for the buffer zone suggested the conservation of these buildings as they are now a part of the history of this area in particular and the whole city in general. Therefore, they should be

²⁹⁵ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company.

²⁹⁶ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, p. 11.

²⁹⁷ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, p. 17 and 19.

preserved; especially those are in a good structural condition [Figure 4.29].

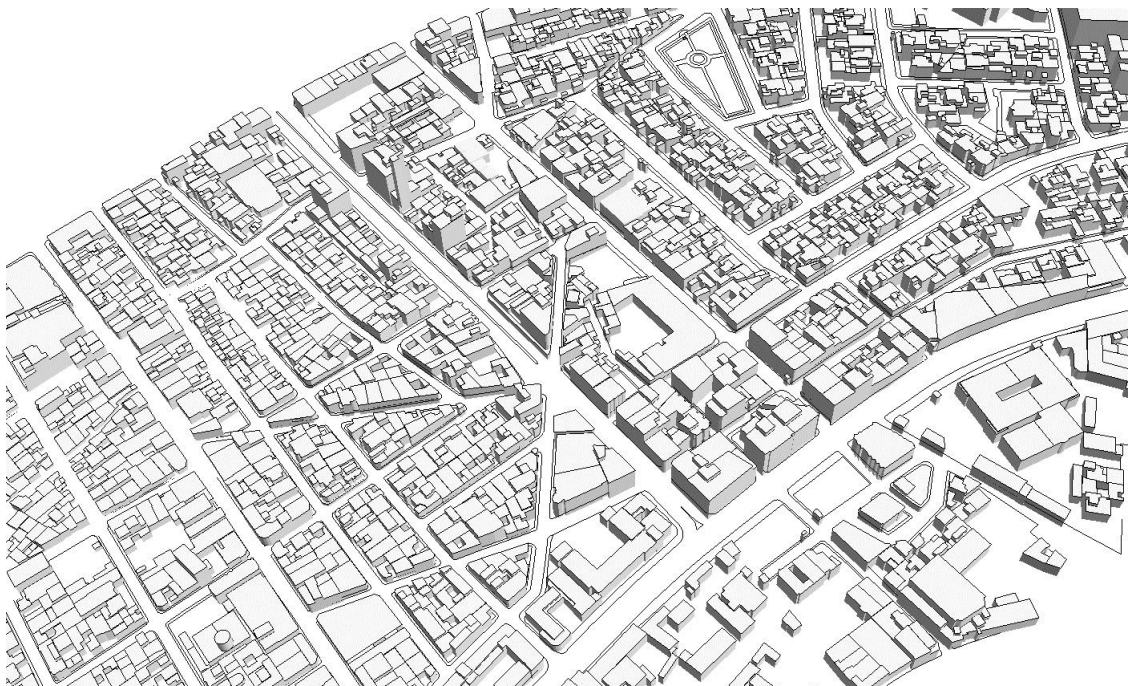
However, there are other types of buildings (single-family houses) that are considered as vernacular heritage buildings which have architectural and aesthetic values and they are integrated with their original context. Those are as well needed to be conserved and maintained [Figure 4.30] and [Figure 4.31]. As a way of intervention in the area to provide a type of harmony to the panoramic scene of building facades, the façade treatments of the existing buildings, especially the buildings on the commercial strips along the commercial streets in the area, has been achieved into two different methods. In both methods, brick as a local building material is used. In the first method, the building façade was decorated by brick cladding. This type of façade treatment is also applied onto any new building in the area [Figure 4.32]. Wherever the possibility of achieving panoramic facades of buildings is difficult, the second method is adopted. A decorated wall by brick as a vernacular building material was built along the building lines to screen and hide the façade of individual buildings. The architectural elements and decorations were borrowed from the already existing heritage and vernacular buildings and houses in the area and the citadel [Figure 4.33].

As a result of all the interventions made on the area of ‘Sample 1’ which in turn has resulted in an accumulative and series of transformations over time and since 1920 under the influence of the different and successive building and planning legislation, the current built environment and form situation of the area reflects different types and forms of routes from narrow irregular and organic footpaths to linear wide streets, and different types and forms of buildings and houses from vernacular court yard house type with a heights ranging from one to two floors to modern multistorey buildings up to four floors [Figure 4.34] and [Figure 4.35]. This variation reflects the different successive periods that have different determinants and building and planning regulations.

D. Other determinants: The history of this part of Erbil and its location in relation to the ancient citadel have had major roles in determining the way in which the urban form of the area is transformed. The area was in

a continuous struggle between policies of redevelopments and conservations.

Period 2 Sample 2 Mustawfi Quarter



Sample 2 (Mustawfi Quarter)

‘Sample 2’ area is a part of ‘Mustawfi’ quarter which has an area of about 1.3Km² and immediately lies in the north of the citadel (Qalat) [Figure 4.37]. The quarter is bounded by the First Ring Road (Qalat Street) from the south and the Third Ring Road (Barzany Namr) from north, and two radial roads (Awni Yousif Street) from east and (Pzishkan Street) from west [Figure 4.38]. It is the first quarter built in the north of the citadel in the second period (1926-1940) after the establishment of Iraq state and then the formation and the transformation of it continued in the later periods.

It was built under ‘Housing Policy 1’ and ‘Housing Policy 5’ and defined as first and second urban area categories of ‘*System of Roads and Buildings No. 44 of 1935*’ and its later amendments. **The common building type of the area are single-family courtyard houses (traditional), attached houses with front setbacks and gardens, and commercial and mixed multistorey buildings which consist of shops in the ground floor and flats in the upper floors. The urban form of this quarter can be considered as a turning point and an edge line of the shift from the tradition of the period before 1925 to the emergence of modernity after 1925.**

The analysis of this sample is done in two main parts, the formation, and the change and the transformation. Like other samples, all the figures (maps, photos, and drawings) and the tables of the analysis will be presented first according to their sequence and mention in the text, and then followed by the main body text of the discussion of the analysis.

Table 4-8: Sample 2, the formation and transformation determinants (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
2	Mustawfi	2 nd and later periods	1926-1940, and later.	1 and 5	<ul style="list-style-type: none"> • The Law of Municipalities Administration No. 84 of 1931 and its amendment. • The System of Roads and Buildings No. 44 of 1935 and the successive amendments. • Decision No. 850 of 1979 on setting plot areas limits for housing purposes. • Instructions of the Decision No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979 • The Citadel Buffer Zone Guidelines, 2011 	<ul style="list-style-type: none"> • Geographic factor (The location, the historical background, and the strong relation to the citadel) • The growth of the population.

Table 4-9: The successive regulations that have influenced ‘Sample 2’ from 1925 to 1990. (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1931 ²⁹⁸		2						
1935 ²⁹⁹	1 out of 2	2	$P \geq 100$	3	N/A	N/A	N/A	4/5 for any new residential building
1936 ³⁰⁰	1 out of 5	2	$P \geq 100$	4 Public roads 3 Private roads	N/A	N/A	N/A	4/5 for any new residential building
1964 ³⁰¹	1 out of 6 and 2 out of 6	1	$P \geq 100$ and $300 > P \geq 200$	4 8	N/A 10	N/A N/A	N/A N/A	4/5 4/5
1964 ³⁰²		1						
1979 ^{303, 304}	N/A	Distinct	$800 > P \geq 120$	10 ³⁰⁵	6	2.5 Or 1.5	0	N/A
1987 ³⁰⁶	N/A	Distinct				N/A		

²⁹⁸ The Monarch of the Kingdom, *Law of Municipalities’ Administration No. 84 of 1931*.

²⁹⁹ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*.

³⁰⁰ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*.

³⁰¹ The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*.

³⁰² The Presidency of the Republic, *Law of Municipalities’ Administration No. 165 of 1964*.

³⁰³ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

³⁰⁴ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

³⁰⁵ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

³⁰⁶ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1993 ³⁰⁷	N/A	Special	N/A					
2004 ³⁰⁸	N/A	Special	N/A	8	N/A	2.5 ³⁰⁹	N/A	Vary
2011 ³¹⁰	Proposed new zoning division	Special	Vary	Vary	Vary	Vary	N/A	80%

³⁰⁷ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

³⁰⁸ A development plan by "The General Directorate of Urban Planning" which dealt with a part of "Mustawfi" quarter as mixed area and proposed widening some streets with applying setbacks from street sides according to the width and the length of the street. See [Figure 4.55]

³⁰⁹ The 2.5m setback distance is applied on all the new buildings on the streets with a length of more than 100m and the streets with a length of 100m and less but have a width of 10m and above. Any path with a width less than 10m is considered as a pedestrian.

³¹⁰ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

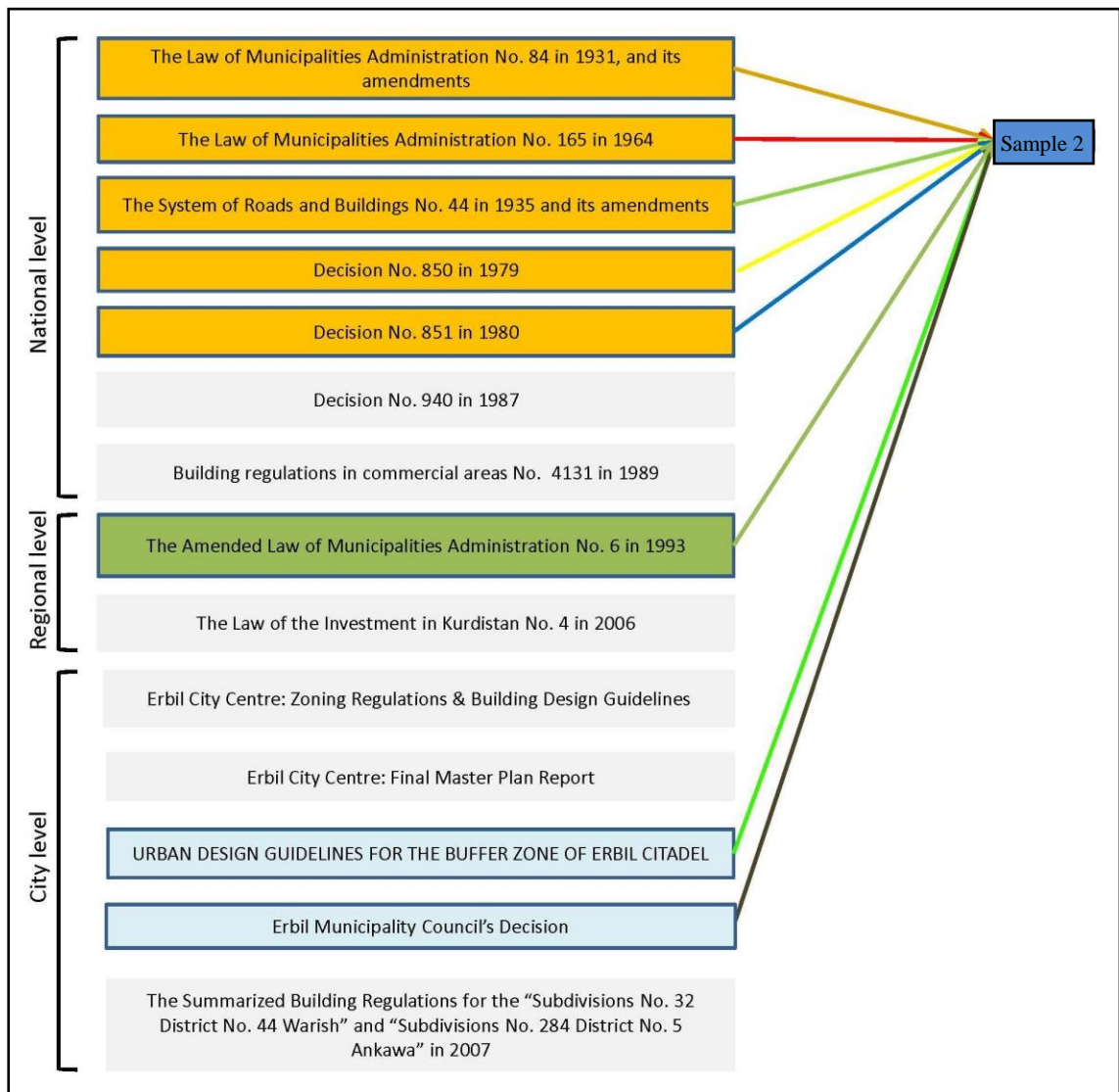


Figure 4.36: Direct regulations enacted at different levels that have influenced Sample 2. (Source: Researcher)

³¹¹ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

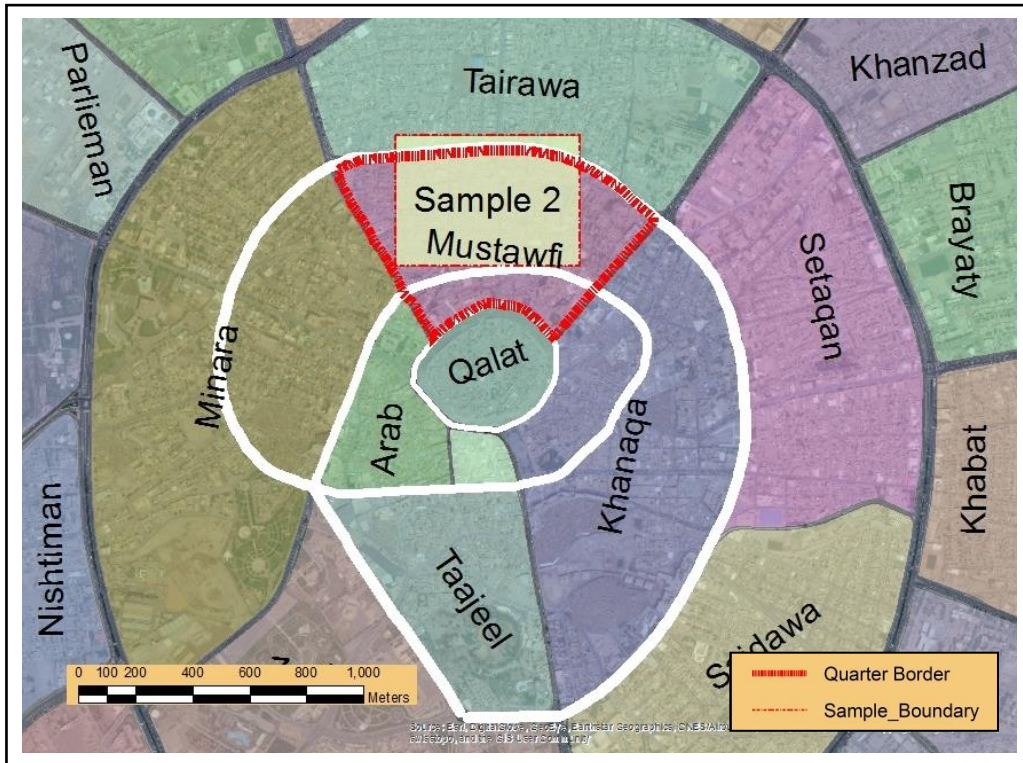


Figure 4.37: The location of ‘Sample 2’ and ‘Mustawfi’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

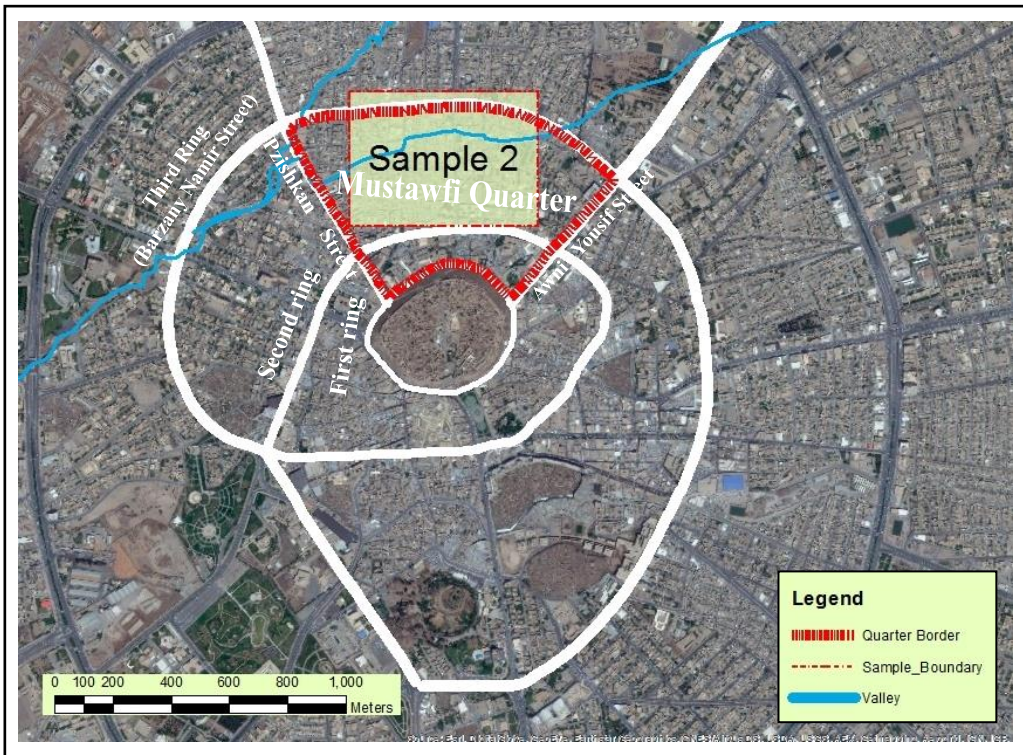


Figure 4.38: The boundary of ‘Mustawfi’ quarter, the Ring Roads, and ‘Shaikh Qazi’ valley. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

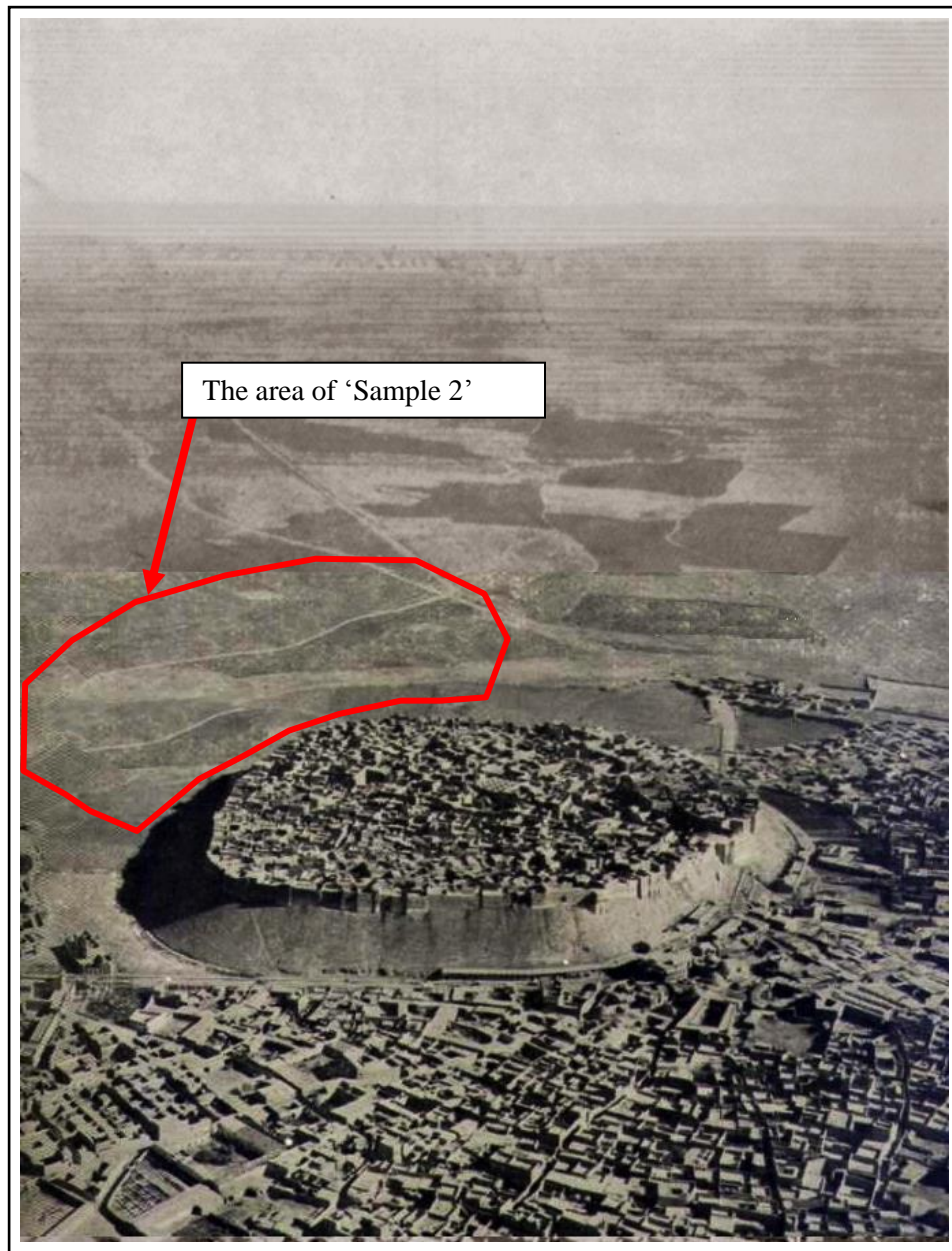


Figure 4.39: A high oblique aerial photo of Erbil citadel and the city before 1935 from southwest. The north area of the citadel has not been built yet. (Source: Naval Intelligence Division, *Iraq and Persian Gulf*, 1944, photographed by Royal Air Force in 1933)

The Formation:

The first emergence of the quarter

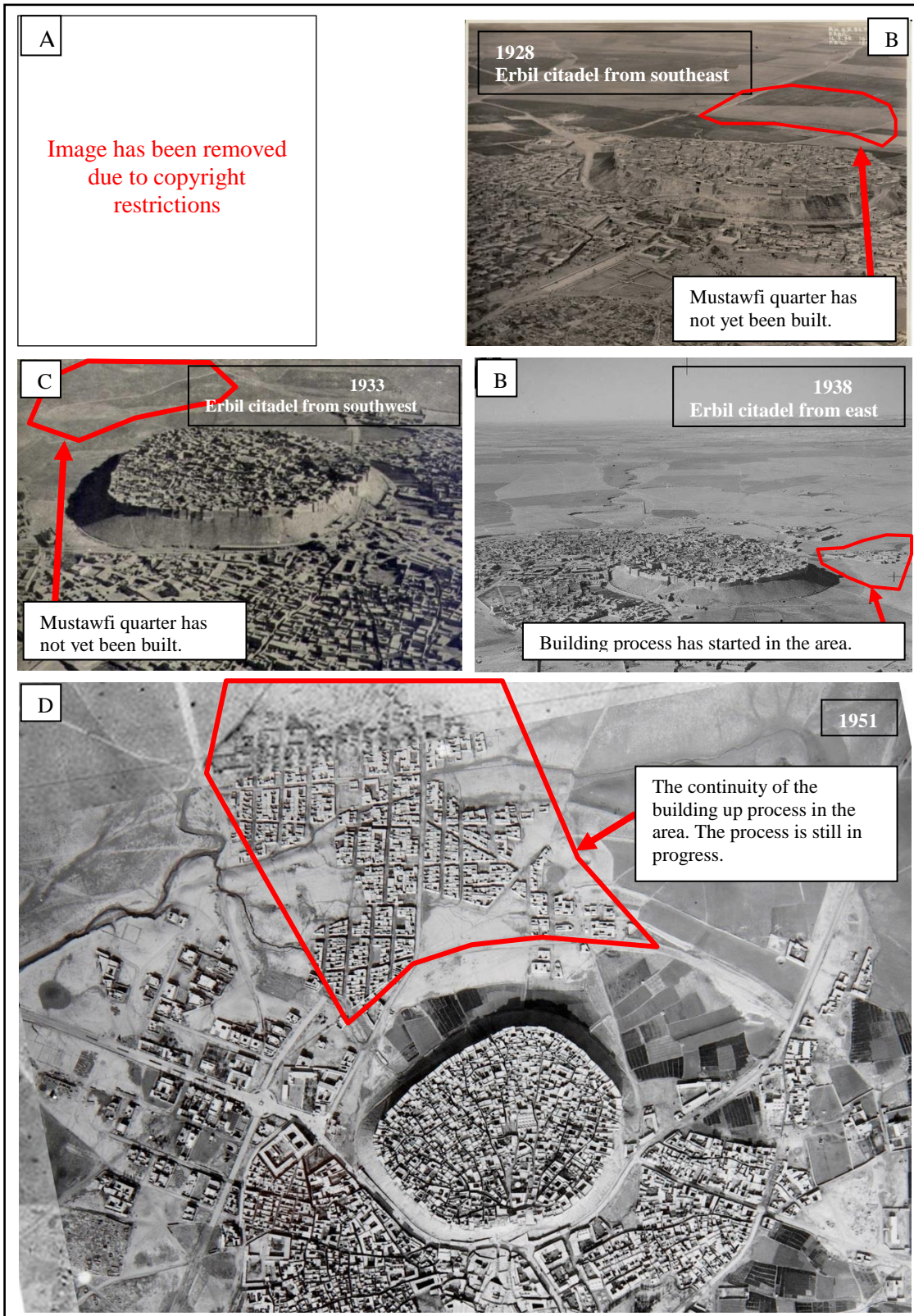


Figure 4.40: A serial of aerial photos of Erbil from 1919 to the end of the first half of the last century show ‘Sample 2’ area (Mustawfi quarter). The first formation of the area appears in the photo of 1938. As the building process of single houses has been done individually and gradually (not at a time), the formation process of the quarter happened slowly. (Source: Drawings by the researcher on photographs from different sources: **A**) Royal Geographical Society, photographed by Royal Air Force **B**) British Academy Library, photographed by Royal Air Force **C**) Naval Intelligence Division, *Iraq and Persian Gulf*, 1944 **D**) Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)

The Formation:

The different parts of the area

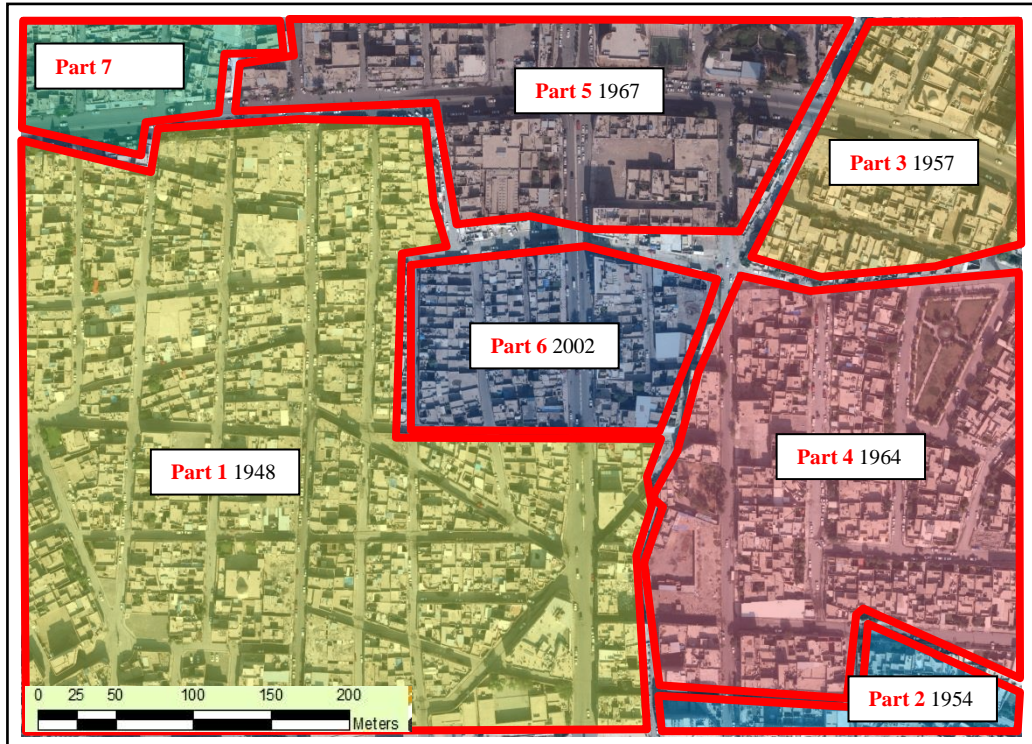


Figure 4.41: The different parts of ‘Sample 2’ area which were planned and registered in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

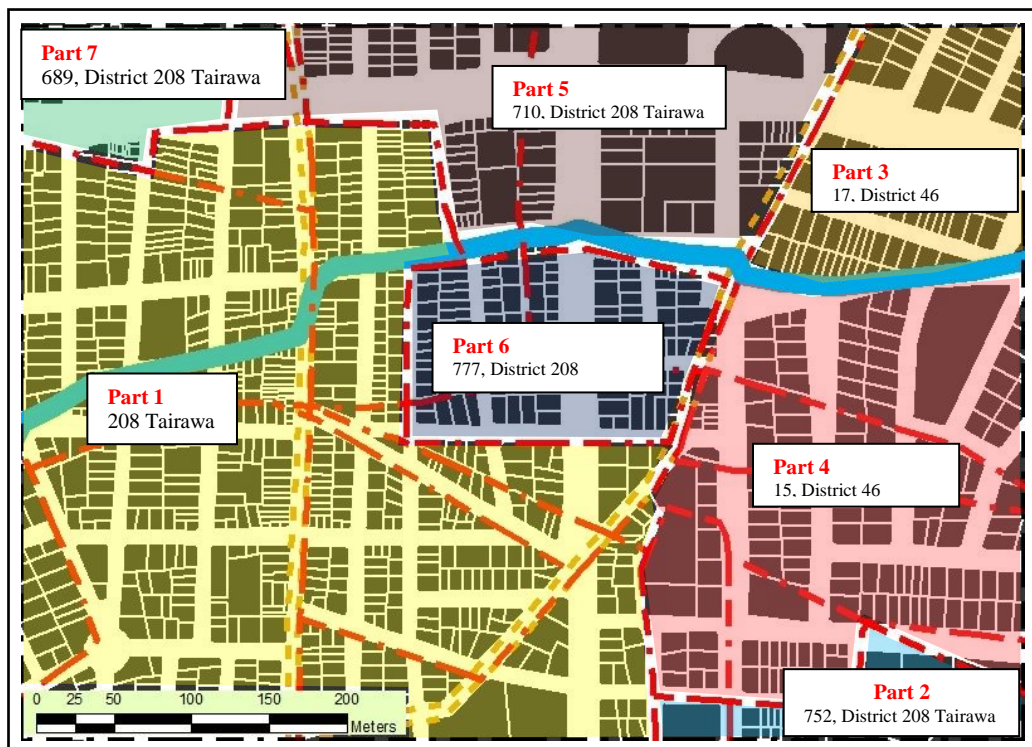


Figure 4.42: The original land features (old roads, land boundaries, and streams of valleys) have significant influence on the ground plan of the sample area. The different parts have different registration numbers. Plot areas of the different parts range from 80m² to 300m². However, there are exceptions. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation: The building form characteristics of the houses



Figure 4.43: ‘I–section steel joists’ used for windows and doors lintels and roofing in an early single-family house in the area of ‘Sample 2’. It superseded the use of timber which was in use prior to 1920. (Source: Researcher)

The Formation: The building form characteristics of the houses

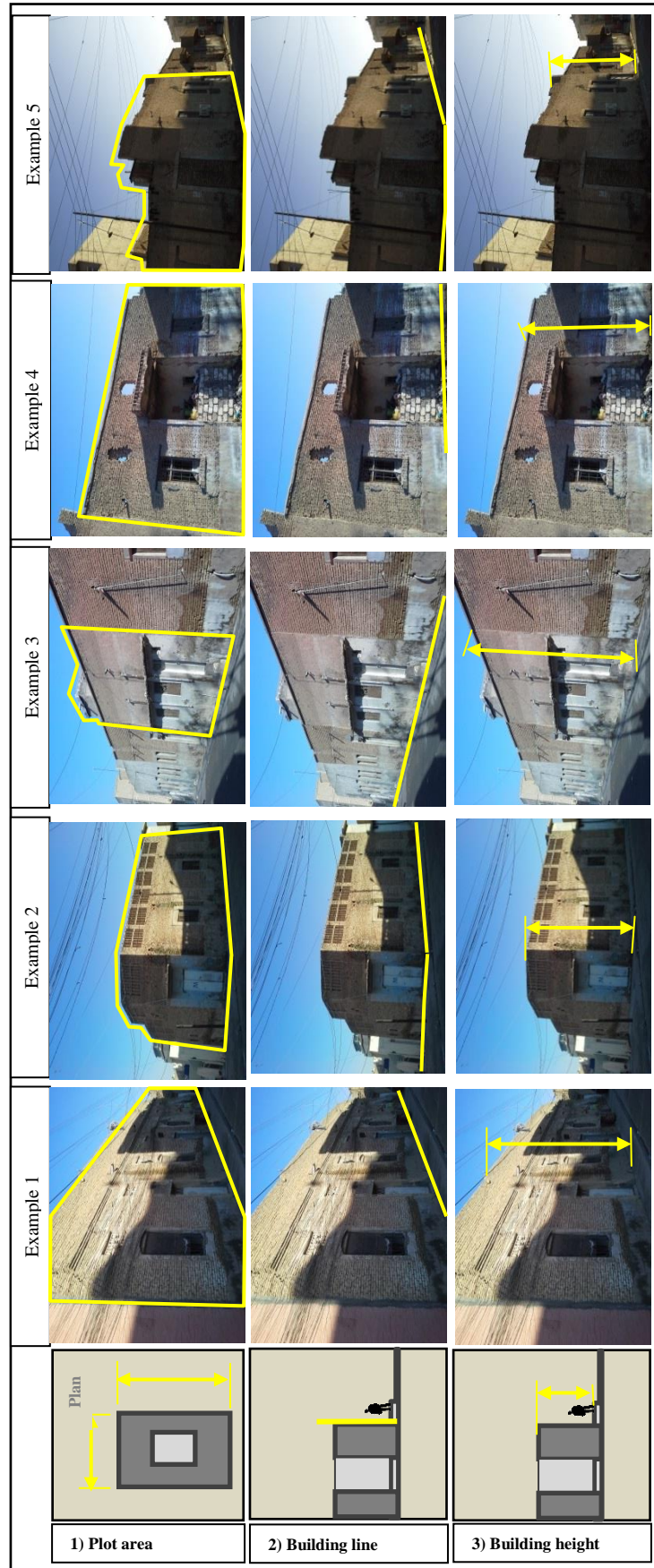


Figure 4.44: The common characteristics of the early houses built in the period (1926-1940) of the first formation of the area of 'Sample 2'.
(Source: Researcher)

The Formation: The plan and the original land features

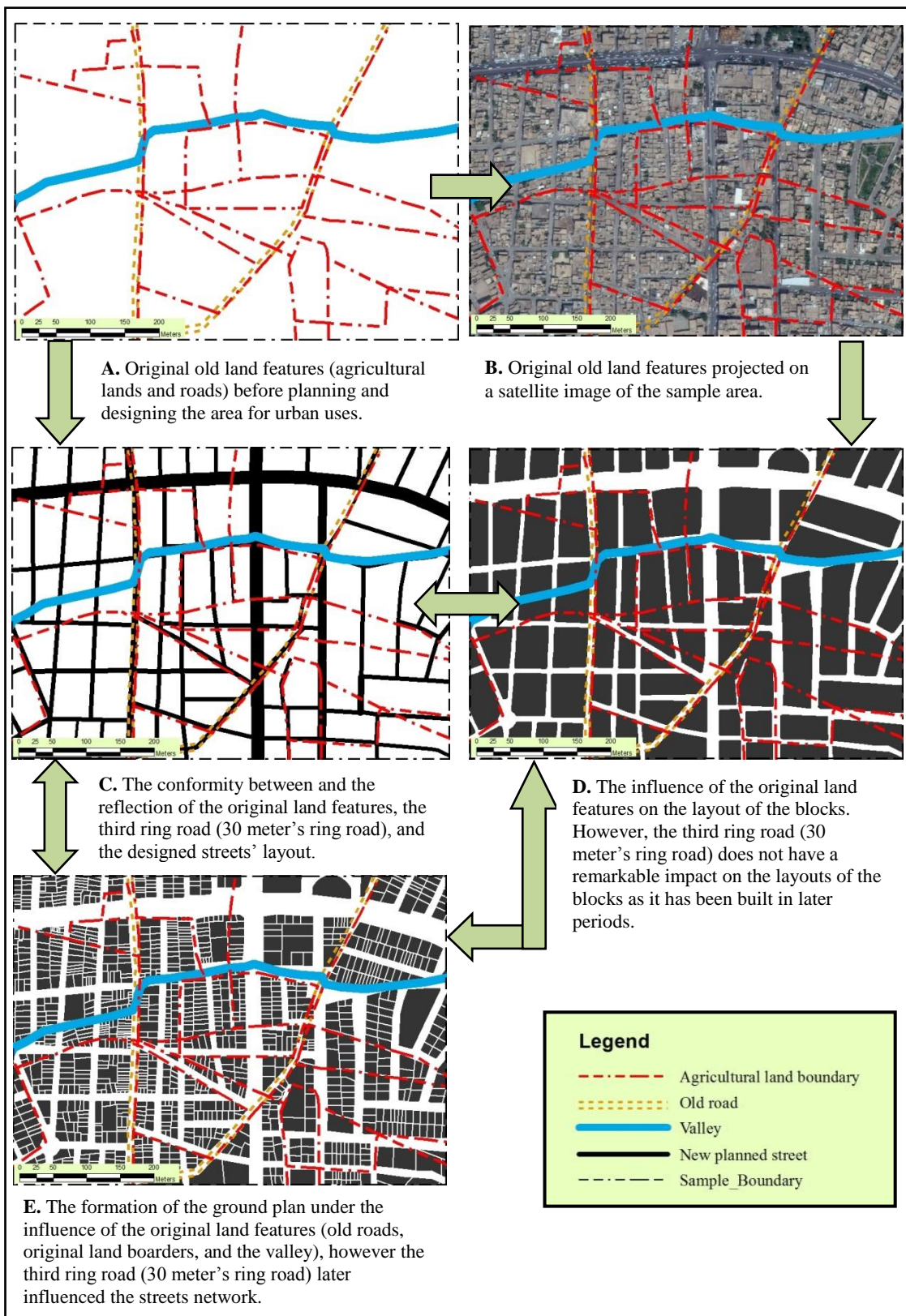


Figure 4.45: The influence of the original old land features (old roads, agricultural land boundaries, and a valley streams) on the formation of sample 2 area, which is reflected in the pattern and the layout of streets and blocks of 'Sample 2' area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation: The plan and the original land features

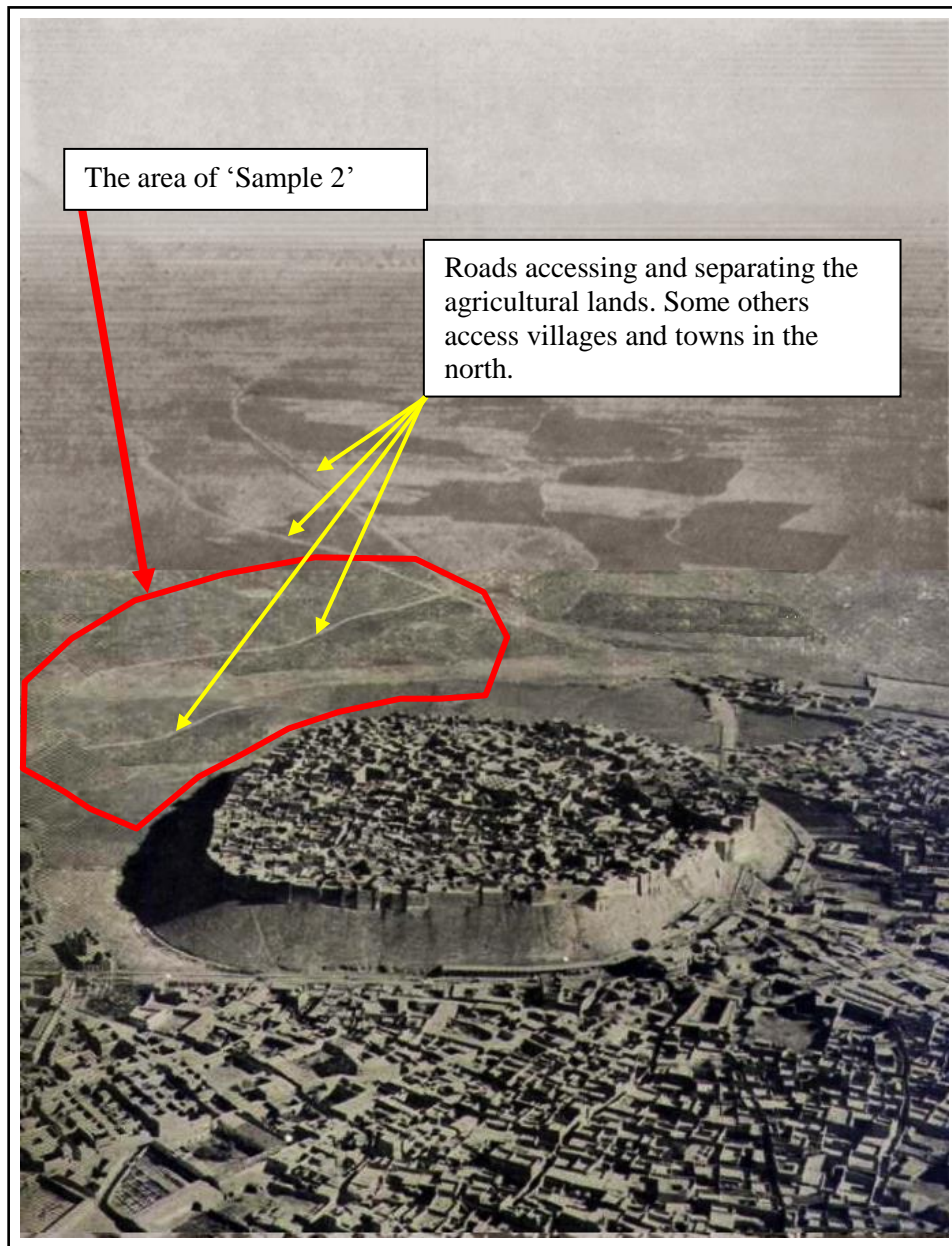


Figure 4.46: A high oblique aerial photo of Erbil citadel and the city before 1935 from southwest. Original roads appear in the area. These roads have later reflected in the ground plan of the quarter. (Source: Naval Intelligence Division, *Iraq and Persian Gulf*, 1944, photographed by Royal Air Force in 1933)

The Formation: The plan and the original land features

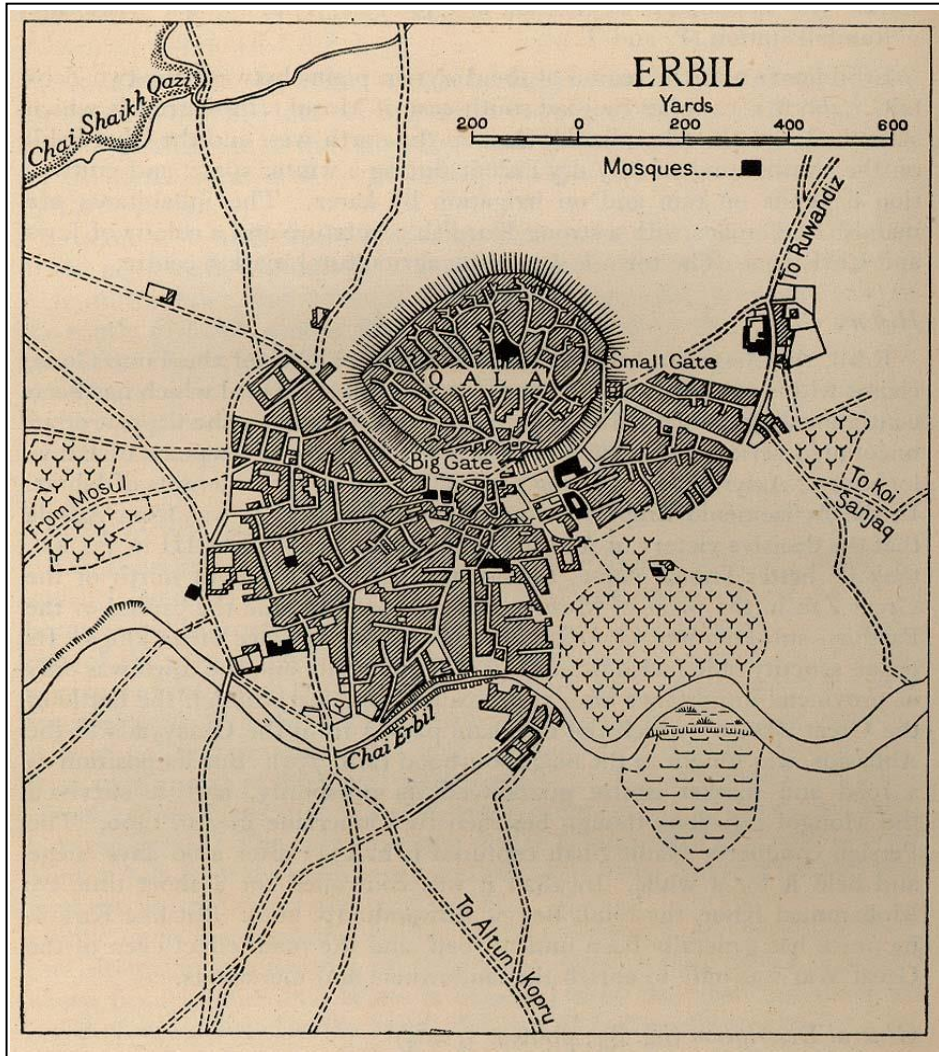


Figure 4.47: Erbil map, 'Plan of Erbil' by 'Great Britain. Naval Intelligence Division in 1944. It conforms to the aerial photo taken in 1919 by The Royal Air Force, [Figure 4.40]. (Source: Naval Intelligence Division, *Iraq and Persian Gulf*, 1944)

1. The formation of the area: The formation of this area is dated back to after the establishment of the state of Iraq in 1920 and after 1925, the date which the research takes as the start of its time context. Therefore, the analysis of this sample focuses on the first formation of it and unlike ‘Sample 1’ it follows the same structure which will be adopted for all other next samples.

A. The time period: According to the classification of the periodic growth of the city, the first emergence of the area of ‘Sample 2’ (Mustawfi quarter) is dated back to the second period (1926-1940) by the formation of the western and the southern part of it. However, it has been built late in this period, specifically after 1935. It is the first residential quarter built after the establishment of the state of Iraq and the first quarter built in the north of the citadel [Figure 4.39]. The period of the emergence of this area is evident from the aerial photos of Erbil in 1919, 1938, and 1951 which clearly shows the appearance and the formation of a significant part of ‘Sample 2’ area (the southern and the western part of Mustawfi quarter) [Figure 4.40]. The sample area consists of different parts formed and registered in different periods [Figure 4.41]. The formation and building process of those parts preceded the registration process, especially in the parts 1, 2, and 6. The eastern part (part 3 and part 4) of ‘Sample 2’ has been built in the later periods (1955 and upward). The original land features have determined the boundaries of those different parts. Those parts have different registration numbers as they originally were different lands owned by different owners [Figure 4.42]. The urban form of this part carries the characteristics of the periods of the fourth and the later periods.

B. The housing policy: The ‘Housing Policy 1’ and ‘Housing Policy 5’ were adopted in this area. Usually, after planning, the approval of the plan, and projecting the layout of the streets and the blocks of the plan of the area by the authority, the owners have built their houses individually. However, in some early built parts of this sample from this quarter, the institutional actions and the registration process followed the construction of the area. The process was the other way round. Some parts, especially ‘Part 6’ was registered very late despite that it had been built decades ago. This part is known as the illegal houses of ‘Tairawa’.

Then, this part can be categorised under ‘Housing Policy 5’. As a result of the individual actions of building and planning under those two mentioned policies, the building up process of the area took a long time span to clearly be formed on the ground. Therefore, the gradual and accumulative built up process are the common characteristic of this quarter. This is the case in all the quarters built according to the ‘Housing Policy 1’, and even ‘Housing Policy 5’ where the extended time span could produce the variety of forms and types due to the continual changes in the determining factors of the different successive periods.

In the first emergence of the area (Mustawfi quarter), all the single-family houses were courtyard type. The building type of this sample, specifically in ‘Part 1’ was the continuity of the same type of the houses prevalent in the earlier periods and the older parts of the city (the citadel quarters, and the quarters of Arab, Taajeel, and Khanaqah). Traditional courtyard type houses of local building technologies, local building materials (mainly brick), and local traditional design of houses were used, but with some notable changes and the appearance of some non-local elements reflecting the social, the cultural, and the technological advances.

For example, the local brick masonry and decoration were used but the arches of the doors and the windows were omitted by flat lintels, and new roofing techniques was introduced which used (I –section joists), [Figure 4.43], made of steel for jack-arching in bricks and ‘juss’ mortar and large external windows with imported glass from abroad were used for the first time in this area and in the new houses in the older parts of the city and the citadel³¹². However, the distinction was that the parcelation, and blocks and streets’ design and layout were different in the way that the organic pattern, as a whole, disappeared.

C. The regulations: The layout of the area was planned and projected according to the amendment of 1934 of ‘*The Law of Municipalities Administration No. 84 of 1931*’ and Chapter 5 of ‘*System of Roads and Buildings No. 44 of 1935*’³¹³. The minimum requirements of street width,

³¹² High Commission for Erbil Citadel Revitalization (HCECR), ‘History’, *Erbil Citadel* <<http://www.erbilcitadel.org/ErbilCitadel/history.php?page=6>> [accessed 18 December 2015].

³¹³ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*, pt. 1 Chapter 5.

plot area, and building orientation within the plot were, to some extent the reflection of the ‘*System of Roads and Buildings No. 44 of 1935*’. Section 31 of Chapter 7 of this legislation prevented using timber as a structural building material in any new building, including new houses in the city³¹⁴. This, to an extent, influenced the produced urban form of buildings, especially the single-family houses. Then, the successive amendments on this system and the successive regulations have put their influence on the continual process of building and transformation of the area. See [Table 4-8], [Table 4-9], and [Table 4-10]. The area consists of many parts registered in different years. The registration of the older parts, especially ‘Part 1’ followed the construction and the formation. This was due to institutional issues. The original owners of the original agricultural lands of the parts 1, 2, 3, and 4 developed the land by planning the area and sold the individual plots to people.

The urban form characteristics of the houses of the early formation of the period 1926-1040 can be summarised in three points [Figure 4.44]. The first is the average area of the plots of the houses varies from 80m² to 200m². However, there are exception cases of less and more than this range. The second is that the front building line aligns the front plot line (boundary). This means that no front setback is applied. The common building type is courtyard house in which the inner courtyard provides privacy. The last is the height of the house. The early houses characterised by having one floor of an average height of 4m including the roof parapet.

D. Other determinants: In addition to the introduction of new planning and building legislation, there were other influencing factors of the formation of the area and its urban form which cannot be disregarded. These can be summarised in two main key factors:
First: The increase of the population³¹⁵ which was either due to the result of a natural growth, or a migration from rural areas to the city, and the relative political stability of the state during the interwar period had an influence on the appearance of this quarter.

³¹⁴ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*, p. 206.

³¹⁵ According to a census in Iraq done in 1947, with 4037 people the population size of Mustawfi quarter was almost as many as that of the citadel.

Second: The geographical factor which can mainly be represented in the location of the area itself, its characteristics, and its original land features [Figure 4.45]. It was the closest area to the citadel. It is separated from the citadel by the First Ring Road which bounds the citadel. The topography of the original land used for the development of this quarter characterised by some streams of valleys composing the ‘Shaikh Qazi’ valley which passed through the area and Erbil. The land used for this quarter was agricultural. There were roads accessing these lands and connecting them to the older parts of the city and the citadel, and roads and boundaries separating these lands. Some other roads were passing through this area connecting the city to the villages and the towns in the north [Figure 4.46]. These original land features clearly appear in an old map of Erbil³¹⁶ [Figure 4.47], and in the aerial photos of 1919, 1925, 1933, and even the one of 1951 [Figure 4.40].

These original land features later became determinants that influenced the ground plan of the area. Their influence has reflected in the blocks and streets layout of the ground plan of the quarter and ‘sample 2’ area. The first and the second ring roads were built after the first formation of the area. Therefore, they are not features influencing the urban form of the first formation of the area. They have had the role in the transformation of ‘Sample 2’ area.

³¹⁶ Great Britain. Naval Intelligence Division, ‘Erbil, Iraq.’, Iraq and the Persian Gulf 1944 (Oxford, from The University of Texas Libraries, Perry-Castañeda Library Map Collection.) <http://www.lib.utexas.edu/maps/historical/erbil_1944.jpg> [accessed 9 December 2015].

The Transformation: Street network and land use

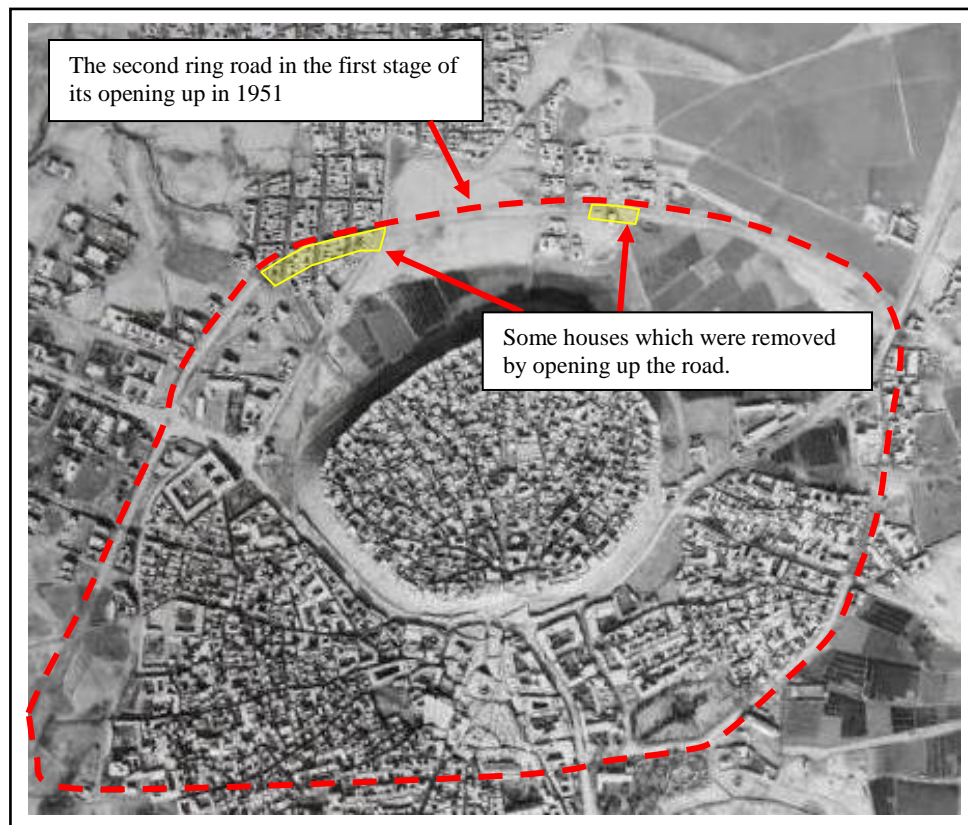


Figure 4.48: The opening up of the north part of the second ring road (Ayubi Street) appears in a vertical aerial photo of Erbil in 1951. The Second Ring Road (Ayoubi Street) passes through the quarter. Both, the second and the third ring roads opened up after the first formation of the quarter and required a removal of some existing buildings and changes in the ground plan of the area. Some buildings (single family houses) in ‘Mustawfi’ quarter are on the path of the road. These houses were later removed. (Source: Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)

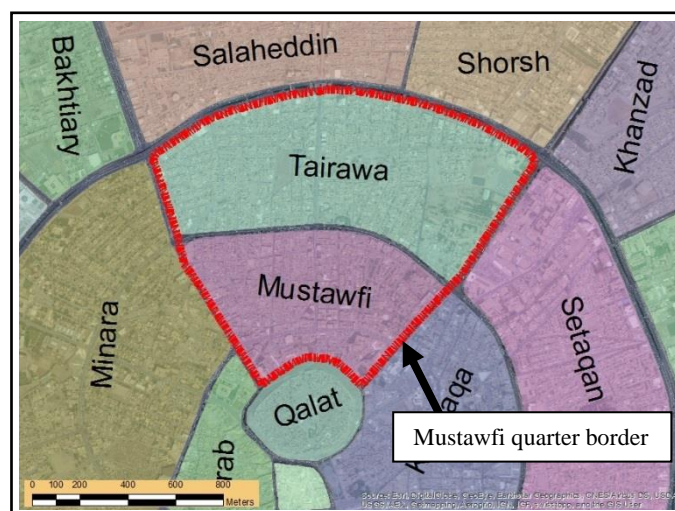


Figure 4.49: Mustawfi quarter border in 1970s. The area of the quarter included both Mustawfi and Tairawa now. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

The Transformation: Street network and land use

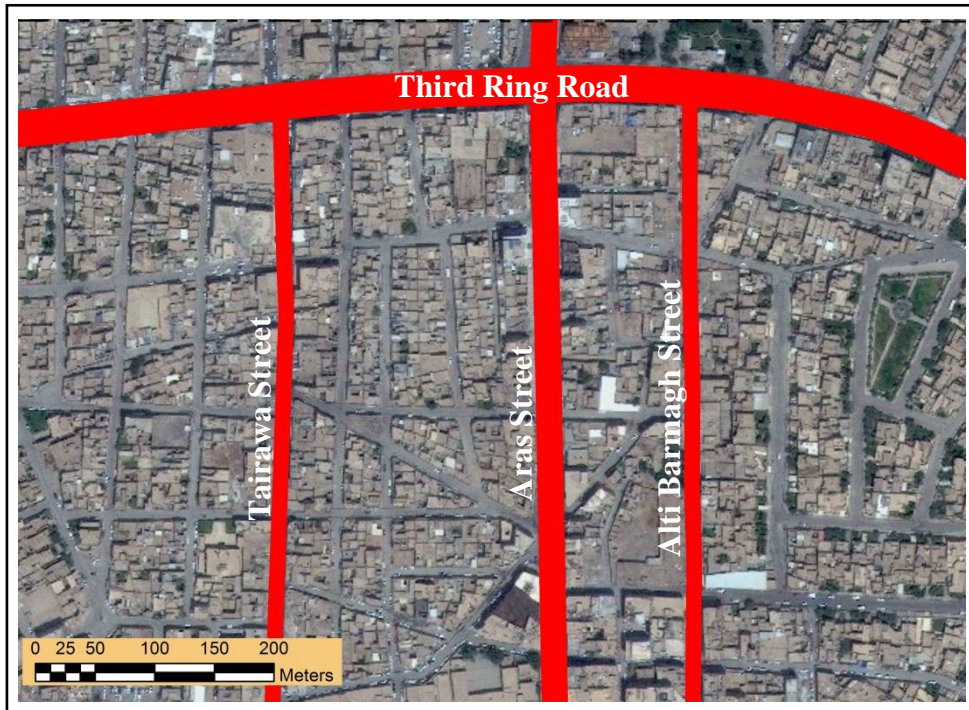


Figure 4.50: The three commercial streets (Tairawa, Aras, and Alti Barmagh streets) passing through the area from the north to the south and connecting the second ring road to the third ring road. The multistorey commercial buildings on these streets were built along with these streets from 1950s continuously. The commercial activities have influenced the inner areas and resulted in the change and the transformation of the physical forms of buildings in the area. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)



Figure 4.51: 'Tairawa Street' from north towards south. Commercial buildings built in 1980s. The average height of the buildings is two storeys. (Source: Researcher)

The Transformation: Multistorey commercial buildings

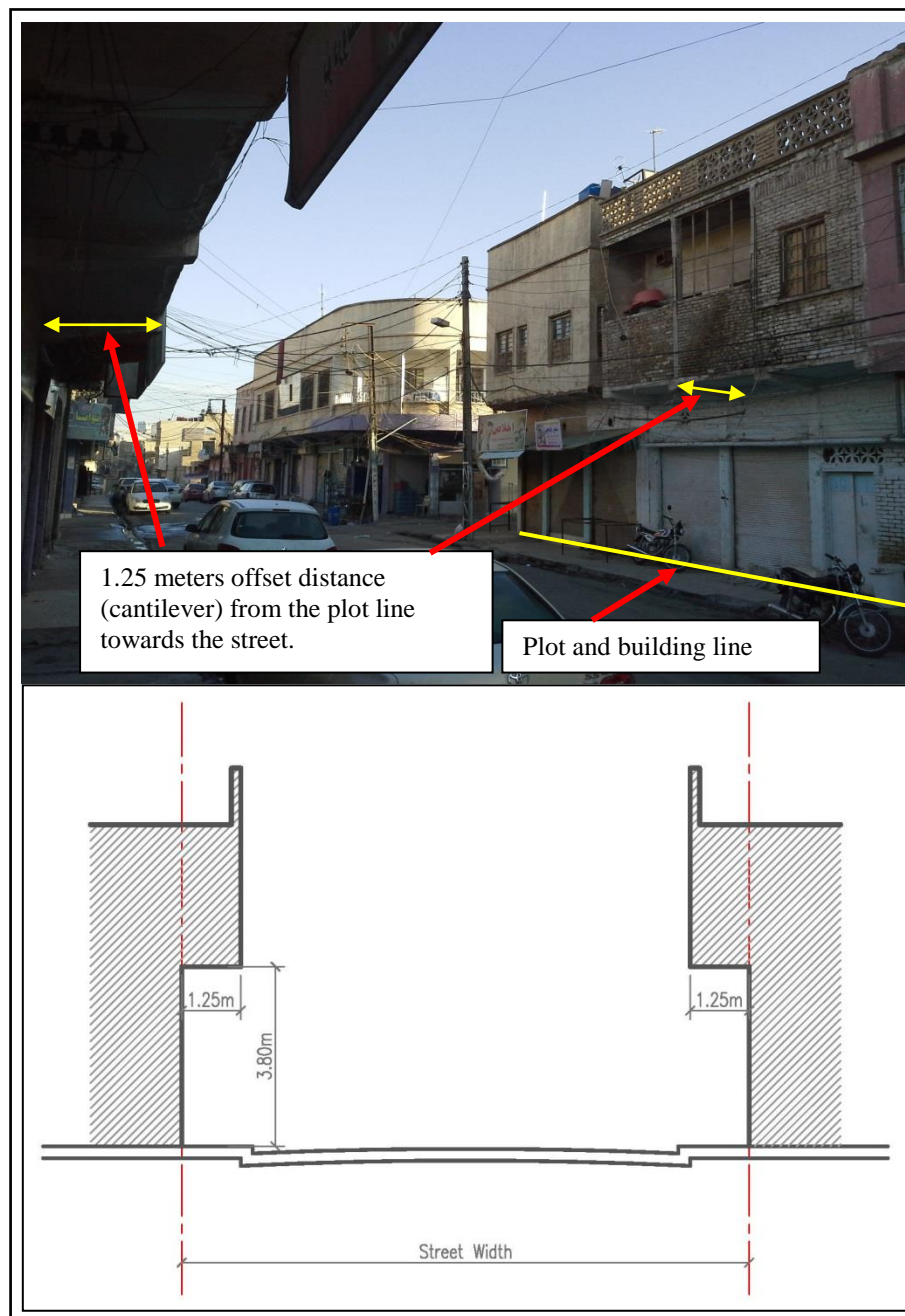


Figure 4.52: Modern commercial buildings on ‘Tairawa Street’ built in the period (1956-1975). They have two floors. The ground floor is shops and the first floor is residential apartments. The buildings have no setback distance from the streets and 1.25m distance offset distance towards the street to make a cantilever. (Source: Researcher)

The Transformation: Different types of buildings



A panoramic photo from a road junction point inside the area. To the right is a traditional courtyard house from the periods prior to 1955 (The 2nd and the 3rd periods). To the left is a modern house with a front garden, from the 1980s (the 6th and the 7th periods).



A panoramic photo from a road junction inside the area. To the right and the left are single storey traditional courtyard house from the 2nd period (1925-1940). The middle is a mixture of two storeys traditional courtyard, modern houses with front setback, and two storeys commercial buildings, all from the 6th, 7th, and 8th periods (1975-2003).



A panoramic photo from a road junction inside the area. To the right is a trace of a demolished old house from the 2nd period. The plot now is used for car parking. To the left is a commercial building from the 9th period (2004-2013).

Figure 4.53: The continuous and the accumulated process of change and transformation over the area. The process of building new buildings and demolishing old buildings has resulted in the variety of the urban form of buildings that convey the characteristics of the forms over the successive periods from 1925 to 2013. (Source: Researcher)

The Transformation: New regulations and building types



Figure 4.54: The old traditional courtyard houses are demolished and replaced by new modern houses but most of them are replaced by multistorey commercial buildings. However, they are all still attached. (Source: Researcher)

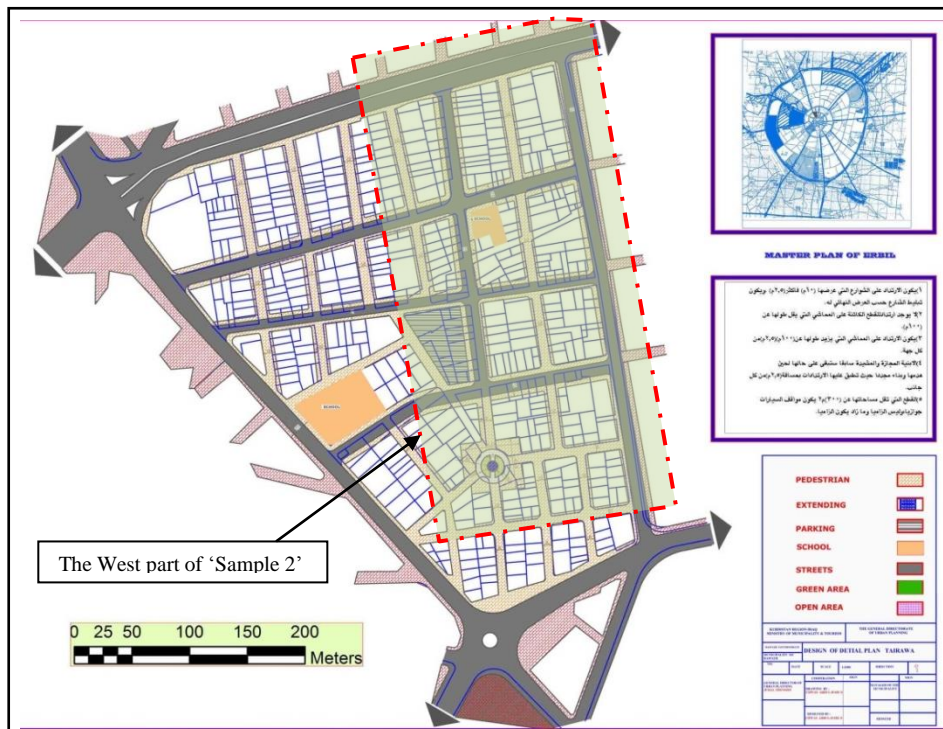


Figure 4.55: A new development plan of a part of ‘Mustawfi’ quarter was approved in 2004. The main notion of this development plan was to create a commercial centre and attracting more commercial activities into the area by widening the majority of the existing roads which generally causes a partly removal of buildings. This plan was applied on any new individual building granted a permit of demolishing the old existing building and building a new one on a request by the owner. This policy was applied on the area from 2004 until 2010. (Source: Drawing by the researcher on a map from The Presidency of the Municipality of Erbil)

The Transformation: New regulations and building types



Figure 4.56: Tairawa Street towards south. The plan of 2004 for the western part of 'Tairawa Street' resulted in the change of the panoramic scene of the attached buildings along the streets. The plan was applied on any new building in the area and proposed building setback from the street while the old existing buildings have no setback distance. As a result the straight building line was broken by those new buildings. (Source: Researcher)

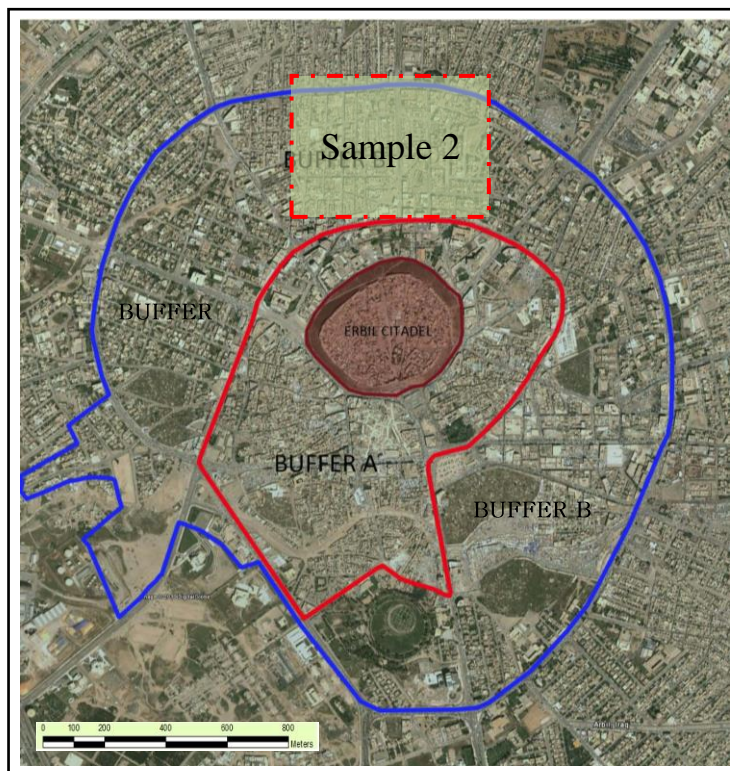


Figure 4.57: The area of 'Sample 2' was included in the 'Buffer Zone B' of the citadel in 2011. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p6)

The Transformation: Citadel's buffer zone and urban design guidelines

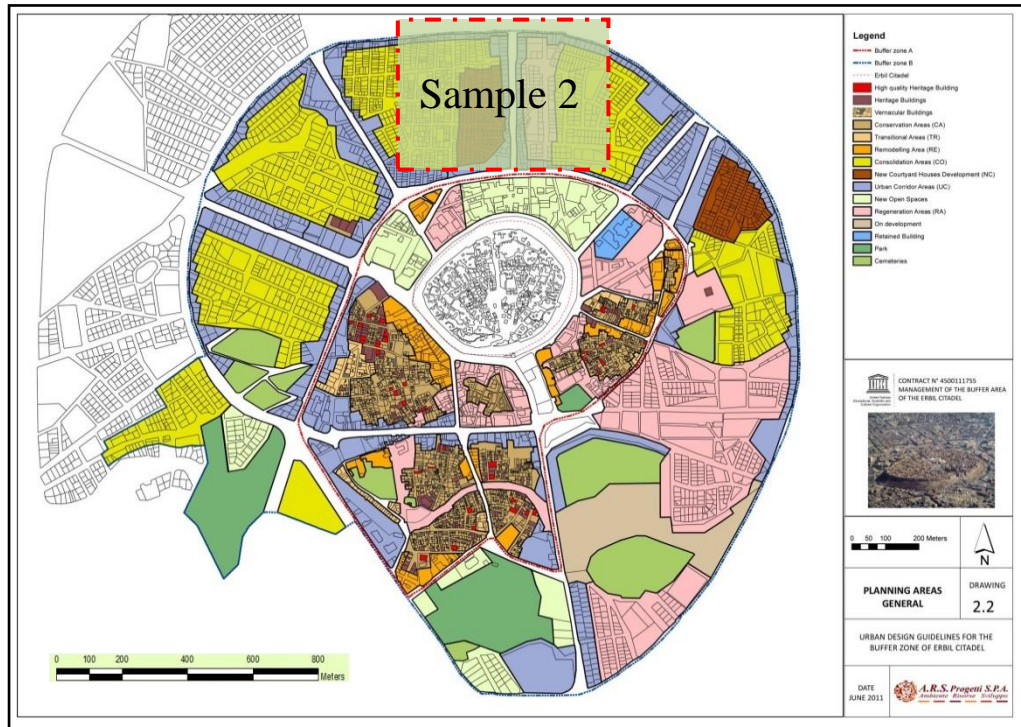


Figure 4.58: ‘Sample 2’ area is included in the ‘Buffer Zone B’ of the citadel. The urban design guidelines applied on this area defined four different zones in which different policies and interventions employed. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p 16)

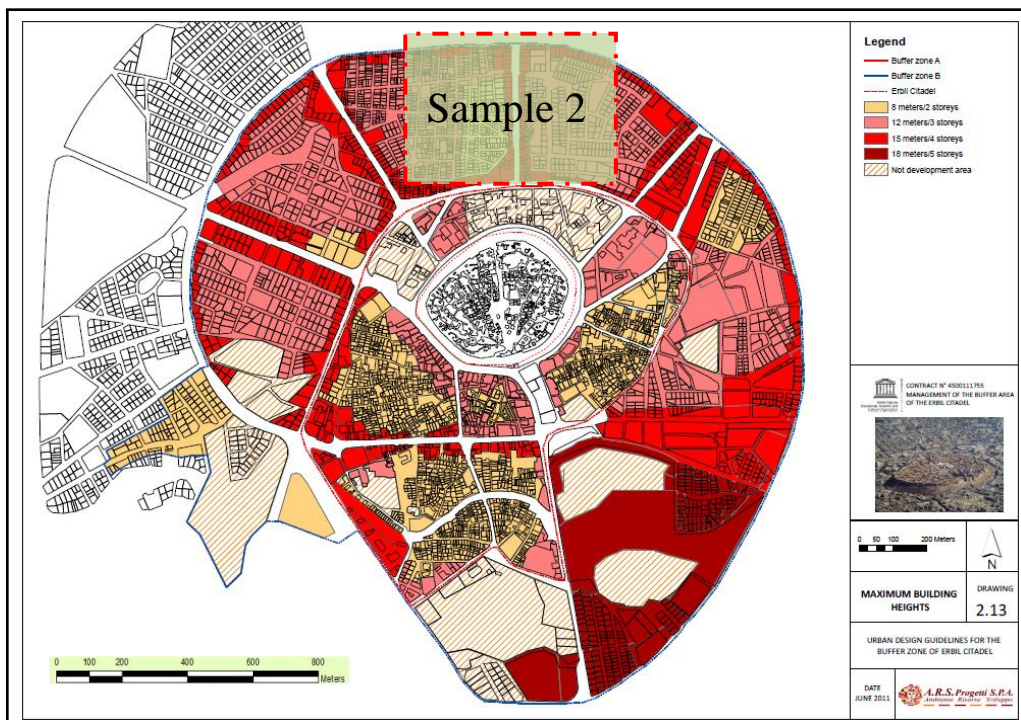


Figure 4.59: The height guidelines for the buffer zone of the citadel. The maximum height in ‘Mustawfi’ quarter (Sample 2) is 15m or four storeys in the areas defined as ‘Urban Corridors’ (the second ring road, the third ring road, and the axial road (Aras Street)). However, the maximum height of 8m or two storeys is in the ‘New Courtyard Houses’. (Source: Drawing by the researcher on a map from ARS Progetti SPA Company, *Urban Design Guidelines for the Buffer Zone of Erbil Citadel*, 2011, p 27)

The Transformation: Citadel's buffer zone and urban design guidelines



Figure 4.60: New buildings in the area built according to the 'Citadel Buffer Zone Guidelines of 2011'. The maximum height allowed is 4 floors. Setback distance from the streets is applied on some zones in the area basing on their previous regulations. The facades are flat with decorated brick cladding and windows with flat and pointed arches to reflect the heritage and vernacular elements. However, the attached type has been maintained. (Source: Researcher)

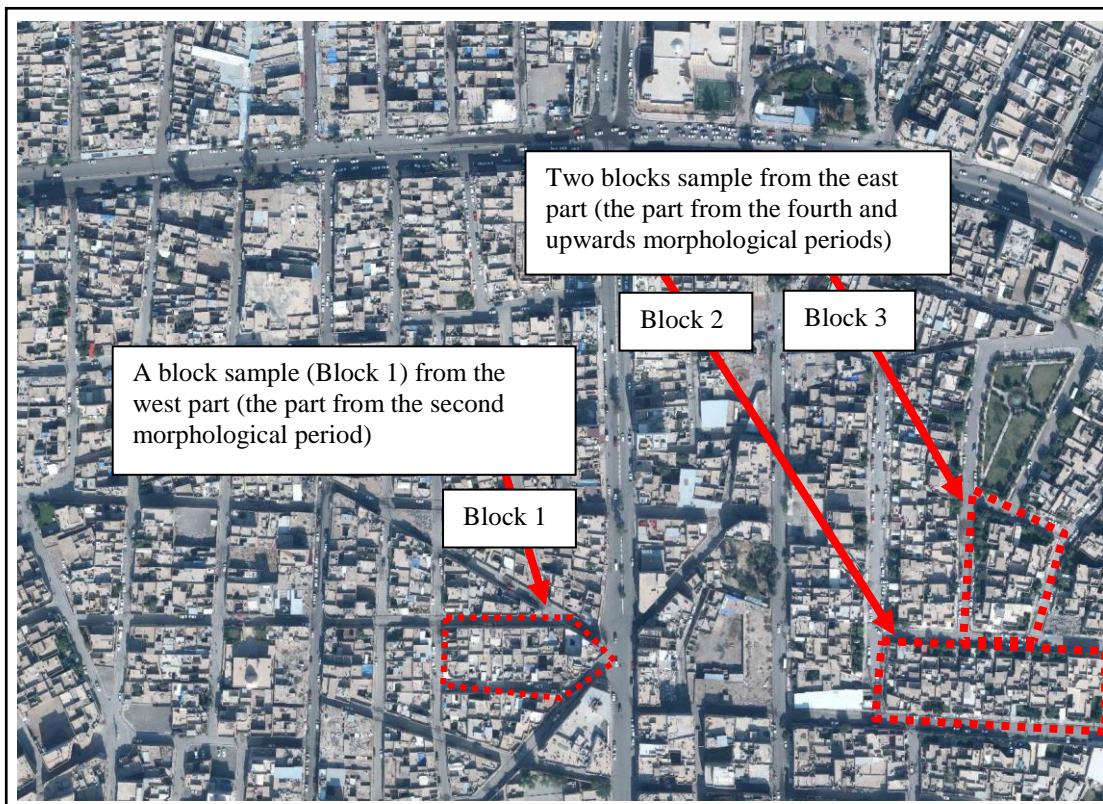


Figure 4.61: Blocks samples selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Transformation: Building- Plot parameters

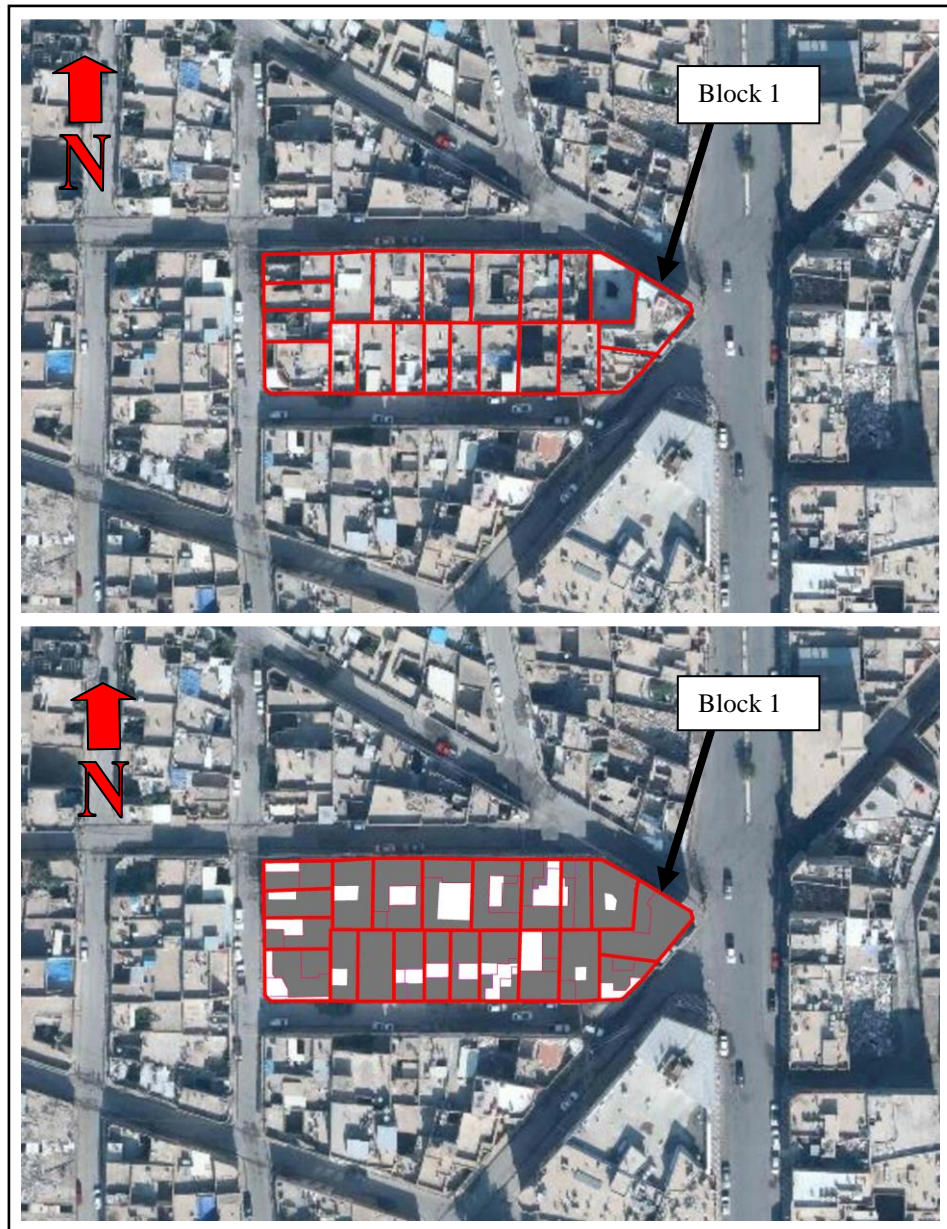


Figure 4.62: A block (block 1) sample selected from the western part (Part 1) of ‘Sample 2’ area. The block has been built as the first urban area category of the ‘*System of Roads and Buildings No. 44 of 1935*’. The areas of the plots vary but all are less than 200m². No noticeable change happened to the plots areas since the first formation. The building type is courtyard but some old houses have been demolished and replaced by modern types with the disappearance of the courtyard. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: Building- Plot parameters

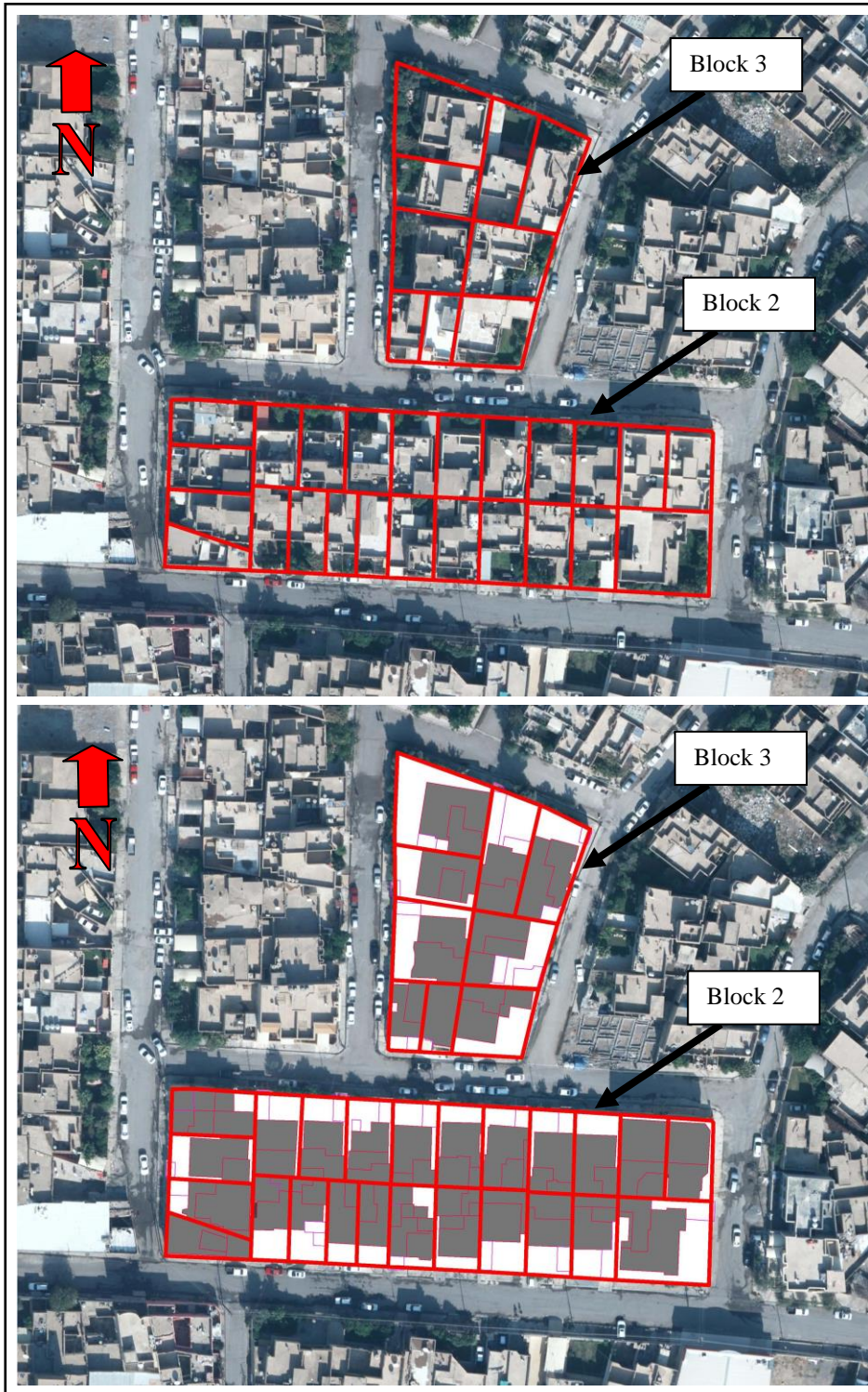


Figure 4.63: Blocks (block 2 and 3) samples from the eastern part (Part 4) of ‘Sample 2’ area. They have been built as the second urban area category of the ‘Amended System of Roads and Buildings No. 44 of 1935’. The original areas of the plots were ranged from 200m² to 300m² with exceptions. The later regulations of ‘Decision No. 850 of 1979’ and ‘The Instructions of the Decision No. 851 of 1980’ have influenced these two blocks. The houses are attached type. Despite that the regulations did not impose setback distance, but front setback is noticed in almost all the houses. The open area formed from the setback distance is used for spacious front garden. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The transformation of plots

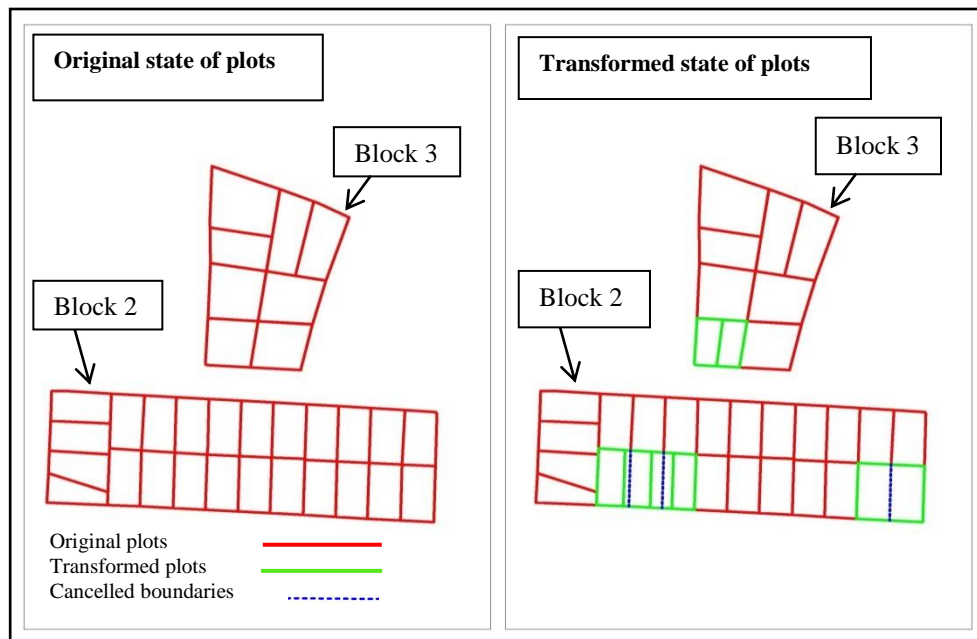


Figure 4.64: The selected blocks (block 2 and 3) from the eastern part of ‘Sample 2’ area. The transformation (pooling and subdivision) on some plots under the successive regulations issued after the first formation of the area. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The regulations and the form

Urban area category -1-						
"The System of Roads and Buildings No.44 in 1935", In Iraqi Gazette No. 1465, 1935. And the successive amendments until 1979						
Building and plot pattern. Plot coverage=80%			Block pattern			
Possible Form	Front and rear setback type		Courtyard type	Front and rear setback typology		
	Plot area = 200m ²					
	500m ² > Plot area >= 100m ²		Front and rear setback type		Courtyard type	
	Plot area = 100m ²					
Produced Form			The resulted pattern is attached houses			
			Plot area = 200m ²			
			Plot area = 100m ²			
			Block 1 			

Figure 4.65: The possible form of buildings, plots, block and street of the first urban area category which can be produced by ‘Amended System of Roads and Buildings No. 44 of 1935’ and the real produced form by the same system in the west part of ‘Sample 2’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The regulations and the form

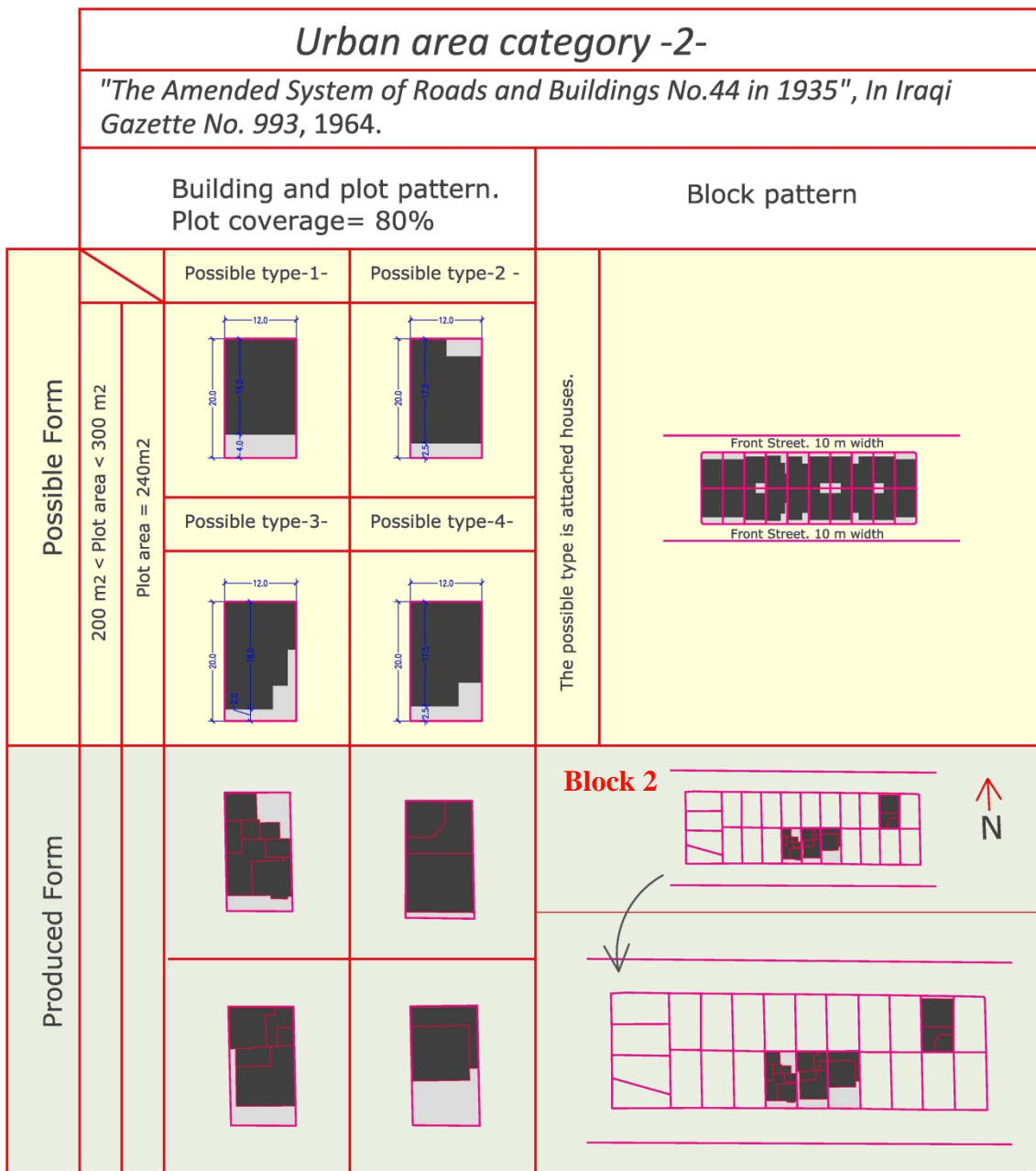


Figure 4.66: The possible form of buildings, plots, block and street of the second urban area category which can be produced by ‘Amended System of Roads and Buildings No. 44 of 1935’ and the real produced form by the same system in the east part of ‘Sample 2’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The regulations and the form

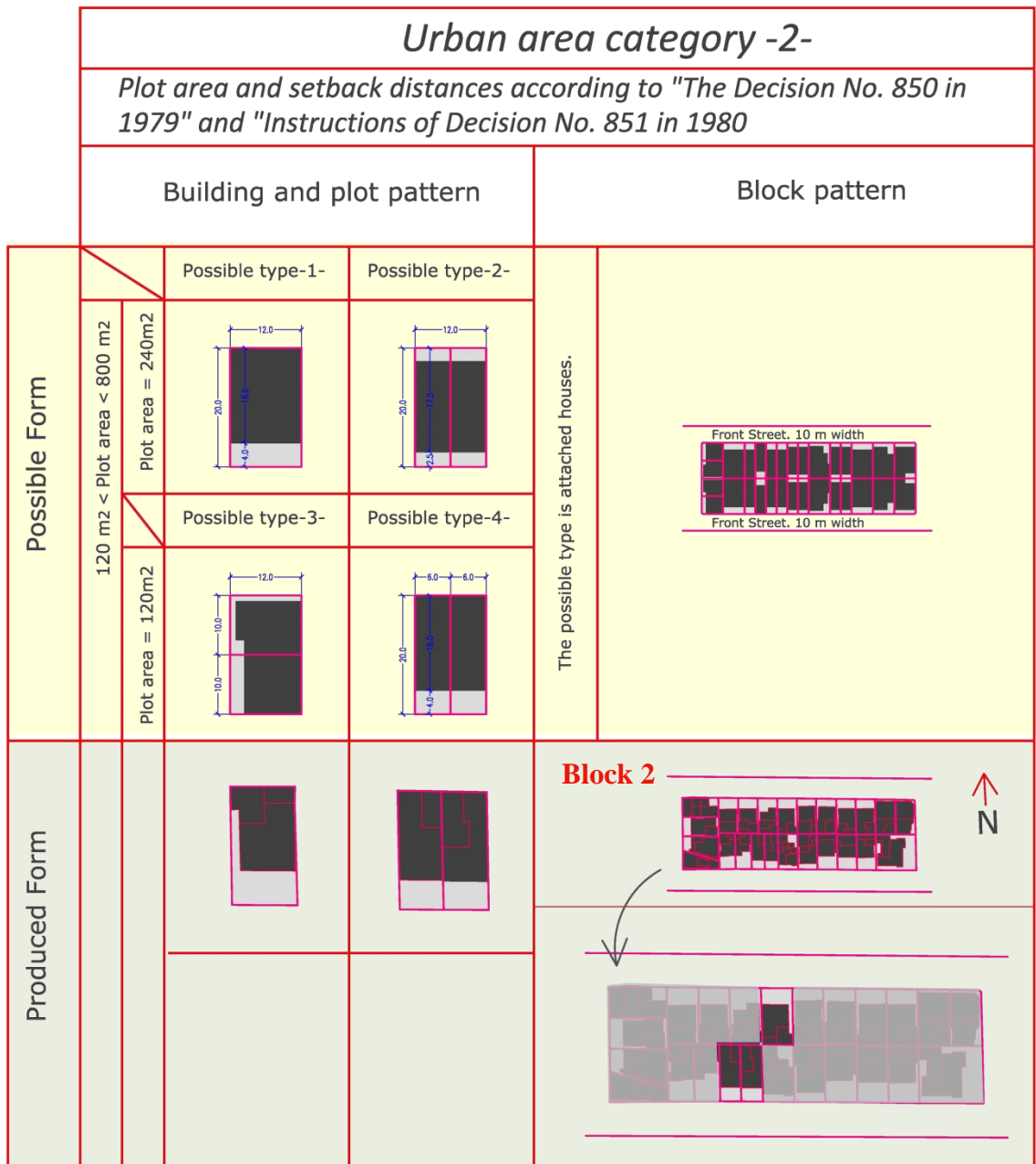


Figure 4.67: The possible transformation of the form of buildings, plots, block and street of the second urban area category which can be resulted by ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’ and the real resulted form by the same regulations in the east part of ‘Sample 2’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The building form characteristics of the houses

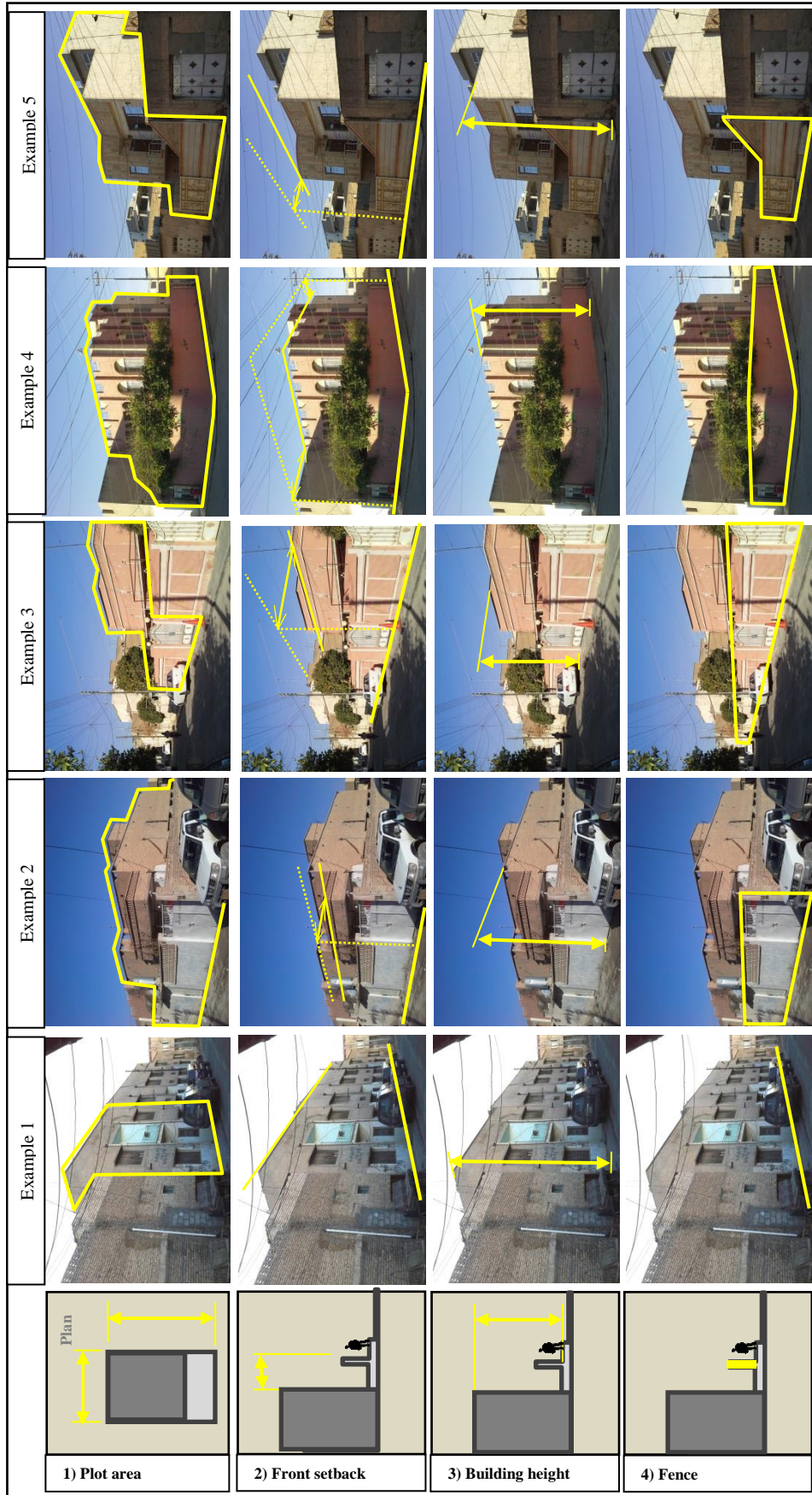


Figure 4.68: The common form characteristics of the houses built in the period (1950-2014) in the area of ‘Sample 2’. (Source: Researcher)

2. The transformation of the area: Subsequent events have had a significant influence on the urban form of the area of 'Sample 2' and its transformation since its formation in 1930s. To understand the change and the transformation of the urban form of 'Sample 2' area, the same typical structure of analysis which is used in all other samples, will be followed.

A. The time period: After its first emergence, 'Mustawfi' quarter witnessed layers of changes and transformations in the later periods, especially after 1950. The first remarkable change of the area was between the late 1940s and the early of 1950s when the second and the third ring road were opened up [Figure 4.48]. Other significant changes occurred under the influence of a number of events. These events are: the revolution of 1958 by which the governance system changed from Royal to Republican, followed by the introduction of the '*Law of Municipalities Administration Number 165 in 1964*', and then the Kurdish revolution of 'Aylul' (September) which resulted in the migration from villages to the city. The factor of population growth in the transformation of the urban form of 'Mustawfi' quarter is very crucial as it affected the population size of the city since its formation. During this period the population size of the quarter considerably increased. From 1947 to 1957 the population of the quarter of Mustawfi has almost doubled and from 1957 to 1965 the population growth of the city was about 10%. This means that more single-family houses have been built and the area of the quarter has enlarged to become the biggest quarter of the city in population and in area at that time.

The same trend of growth of the quarter continued. By 1977 the population of the quarter reached to 30378 people. This means that compared to the population size in 1947, it was almost 7 times and still occupied the first place in size and density as well.³¹⁷ However, the boundary of the quarter was not the same as it is now. It extended to include the part beyond the Third Ring Road (30 Meters Ring Road or Barzany Namr Street now), the quarter which is now 'Tairawa'³¹⁸. In other words, 'Mustawfi' which was the official name of the quarter included both 'Mustawfi' and 'Tairawa' quarters now [Figure 4.49]. This

³¹⁷ Erbil Governorate, 'Erbil Population'.

³¹⁸ "Tairawa" has been the publicly known name of "Mustawfi".

is an index of that the quarter and its urban form have witnessed an immense change and transformation over the successive periods since its establishment.

- B. The housing policy:** As mentioned, both ‘Housing Policy 1’ and ‘Housing Policy 5’ have been adopted in building up the quarter and its growth over all the successive periods from 1930s. This resulted in the gradual and the dramatic transformation which happened differently and heterogeneously over the area, especially the changes on the level of plots and buildings due to that they are owned by different individual owners. As a result, the buildings and the plots were submitted to singular and individual actions of management and transformation. In other words, the matter of the change and the transformation on the plot or the building was up to the owner. The owner decides when and how to make changes on his or her plot or building, but with the accordance to the other determinants, especially the regulations.
- C. The regulations:** Building regulations are the significant factor that has influenced the way in which the area has changed and transformed. The successive legislations of building and planning [Table 4-9], [Table 4-10], and [Table 4-11] in Iraq, in Kurdistan especially after 1991, and in Erbil dramatically have resulted in layers of transformations reflected in street patterns and building forms. Some planning decisions on the level of the city have remarkably influenced this area as well.

The Second Ring Road which was opened up in the early of 1950s [Figure 4.48], the north part of it passes through this quarter and separates it into two parts, north and south. The majority of the southern part is public and multistorey buildings but includes a very limited number of single houses. This part of the quarter is excluded in the area of ‘Sample 2’. In the period (1955-1975) some modern houses and multistorey buildings were built in the area especially on the new opened up ring roads and on ‘Tairawa Street’ which passes the area from north to south [Figure 4.50] and [Figure 4.52]. The process of building along with this street continued in 1980s [Figure 4.51]. The same trend is true for another two streets: ‘Aras Street’ and ‘Alti Barmagh Street’ cutting the area from the north or from the Third Ring to the south or the Second

Ring. In the later periods (1980s- 1979) the legislations that regulated urban and building issues influencing the urban form were the '*Law of Municipalities' Administration No. 165 in 19964*' and the '*Amended System of Roads and Buildings No. 44 of 1935 935*'.

The continual and the accumulative process of change and transformation on the existing buildings, building new houses on the vacant and unfilled plots, and demolishing the old buildings to build new ones are evident in the existing condition of the urban form of the area [Figure 4.53]. The form of the buildings over the area of 'Sample 2' conveys the characteristics of the forms from the successive periods and reflects, to a certain extent, the successive issued and amended building legislations over those periods. Some blocks faced extreme changes, not only those are on the commercial streets, but also those in the inner areas as the use of some parts (the south western part, for example) of the area have transformed from residential to commercial and mixed uses. As a result of this change, new building forms have been produced. Different building types with different forms appeared in one block. For example, multistorey commercial buildings became adjacent to single-family houses with two storeys [Figure 4.54]. Consequently, single-family houses are on the way of vanishing in some parts of the area, except a certain part that by the guidelines of the buffer area of the citadel in 2011, has been defined to be preserved.

The transformed streets from residential to mixed and commercial uses produced a mix of multistorey buildings and houses. Until 1989 the front setback distances of buildings were regulated by '*Amended System of Roads and Buildings No. 44 of 1935*'. According to this legislation, the setback distance has no direct relationship to the width of the front street, but the urban area category in which the building is located determines the setback limit. However, by the issuance of the regulations of buildings in commercial areas in 1989, the front setback distance was determined by the width of the street on which the building is located [Table 4-11]. This regulation, established a relationship between the width of the street and the setback distance of the building which is located on the street. This is applied to all multistorey commercial buildings in any new introduced commercial

areas or streets. This regulation stated that any introduced commercial areas before the date of the issuance of this regulation, will remain regulated by the legislation which had been in use previously. Therefore, this regulation did not leave a significant influence which could result in a transformation of the forms of the area of ‘Sample 2’

In 2003, a development plan was prepared for the western part of ‘Tairawa Street’ to encourage commercial activities. The plan was approved in 2004 [Figure 4.55]. The plan widened most of the existing roads and applied 2.5 setback distances in most of the area, except the plots that are located on paths less than 10 meters width after widening and less than 100m length [Figure 4.56]. Accordingly, the setback limit would have a relationship to the width of the street and its length as well. This plan was applied on every new and future building. In other words, the already existing buildings remain in their condition until when they are demolished by a request from their owners. This means that the process of change towards the aim of this plan is a long term process. However in 2010 the area was included in the ‘Buffer Zone B’ of the citadel [Figure 4.57].

The urban design guidelines for the buffer zone of the citadel divided ‘Mustawfi’ quarter into four types of areas to which different intervention policies are applied: New Courtyard Houses Development (NC), Consolidation Areas (CN), Regeneration Areas (RA), and (Urban Corridor Areas (UC)³¹⁹, [Figure 4.58]. The common guidelines that would have an influence on the produced urban form can be summarised into four main categories that either directly or indirectly could influence the produced urban form: land use, land fragmentation or plot size, building guidelines such as the height of buildings or the number of floors³²⁰, [Figure 4.59], building type, plot coverage, building setback, and building materials of facades³²¹. The values of all these mentioned elements of the guidelines vary from a zone to another. See [Figure 4.60].

³¹⁹ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, p. 16.

³²⁰ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, p. 27.

³²¹ UNESCO office for Iraq and HCECR and ARS Progetti SPA Company, pp. 66–67.

The area of 'Sample 2' as it was originally a composition of two parts originated from two different periods (the second and the fourth) and formed as two different urban area categories (the first and the second) of the '*System of Roads and Buildings No. 44 of 1935*' and its later amendments, the transformation forces have differently influenced the change of the urban form of it. Some determinants of the successive legislations have little influence. For example, the minimum allowed area of the subdivision of plots in 1979 and 1987 has had a minimum touch on the transformation of the plots sizes. As the original plots sizes were almost in the range from 100m² to 300m² with a majority of plots of less than 200m² and they are owned by different owners, the subdivision was not a common trend in the area. However pooling was not restricted much, but due to the same reason of that the plots are owned by different people, uniting the plots was not common as well. The '*Amended System of Roads and Buildings No. 44 of 1935*' did not apply setback regulations on the areas that were classified under the second urban area category.

The eastern part of 'Sample 2' area is an example of this. However, the majority of the produced forms of the buildings of the single-family houses have front setback distances which were used as gardens and car parking. In both parts of 'Sample 2' the flexibility of the regulations regarding building orientation within the plot allowed producing a variety of possibilities. If there was homogeneity, it was mainly due to the prevalent social and cultural issues of the period in which the area or the buildings were built.

Three blocks samples are selected for a closer and more detailed analysis on plots and buildings form [Figure 4.61]. The first block has been selected from the west part (the older part which is from the second period) of 'Sample 2' area or Mustawfi quarter. The building type of this block is courtyard house but with no regular or uniform in the size or in the orientation of the open yard [Figure 4.62]. The other two blocks have been selected from the eastern part (Part 4) of 'Sample 2' which is from the periods of the fourth and afterwards [Figure 4.63]. They have been built as the second urban area category of the '*Amended System of Roads and Buildings No. 44 of 1935*'. The original areas of the plots ranged

from 200m² to 300m². However, there are exceptions in 'Block3' which include plots of areas more than 300m². The existing situation of some plots are less than 200m² and more than 120m² as they are a result of pooling and subdividing the original plots which had areas more than 200m². The subdivision has been made according to the '*Decision No. 850 of 1979*' and '*The Instructions of the Decision No. 851 of 1980*' which allow subdividing plots into areas of not less than 120m² [Figure 4.64]. The regulations applied to this part have not imposed setback distance but limited a maximum of 80% of plot coverage which means 20% open. However, the majority of the houses from these two blocks have front setback distances to create an open area in front of the house which are used as gardens and car parks.

These samples of blocks have been compared against the default forms and types that the regulations being applied on the area could produce. In the case of 'Block 1', however the early regulations only specified 80% plot coverage and did not impose courtyard type but the resulted type of the majority of the houses of this block are courtyard type. This is due to that those houses followed the fashion of that period. However, there are some new houses built after demolishing old ones in later periods and these cases of houses did not follow the trend of courtyard type but they have attached type with front setback [Figure 4.65]. 'Block 2' has been formed and transformed under the influence of the '*Amended System of Roads and Buildings No. 44 of 1935*', and '*Decision No. 850 of 1979*' and its instructions enacted in 1980 successively [Figure 4.66]. The latter legislation mainly resulted in the changes and transformations in the area of the plots by pooling and subdivision [Figure 4.67].

The existing condition of 'sample 2' area includes a mixture of house types which would be considered as the result of the layers of changes in the different determinants including regulations. To summarise the common form characteristics of the houses built after 1955 five examples are selected [Figure 4.68]. Some courtyard houses (Example 1) built in later periods in this quarter have two storeys height while the early houses of the period 1926-1940 have only one storey.

Both the houses of 'Example 2' and 'Example 3' which have been built in 1960s and 1970s have spacious front gardens and front fences to define the house boundary and separate it from the street. The same trend extended to 1980s (Example 4) and up to now. This trend also continued and represented in the house of 'Example 4' which has been built after 2003 after demolishing an old house.

D. Other determinants: Most of the determinants other than regulations were mentioned. The transformation of the area has happened by some determinants which, in a complex network of relationships connected to the key historical events in the state and in the city in different periods. The continual increase of the population size of the city has resulted in the increase of the density. Some houses were transformed in the way to inhabit two or more families as the size of the families increased and some others were extended. Subdividing some unbuilt plots into two or more perhaps was a response to accommodate this trend of increase.

Period 3

Sample 3

Minara Quarter



Sample 3 (Minara Quarter) (New Arab and Mudhafarriya before)

‘Sample 3’ area is a part of ‘Minara’ quarter which has an area of about 1.5 Km². The distance between the citadel (Qalat) and the nearest point of the quarter is only 200m [Figure 4.70]. The quarter is named by the historical minaret of Erbil which is known as ‘Choly Minaret’ or ‘Mudhafarriya Minaret’. The minaret has an age of about eight centuries old dated back to the era when ‘Muzaffar al-Din Abu Sa’eed al-Kawkaboori’ governed Erbil. The quarter is bounded by the Second Ring Road (Sultan Muthafar Street) from east, the Fourth Ring Road (Kurdistan Street) from the west, the radial road (Pzishkan Street) from north east, and ‘Halabja Street’ from the south east to the south. The Third Ring Road (Barzany Namir Street) passes through the quarter. **The first formation of ‘Minara Quarter’ was in the Third Period (1941-1955), yet its further formation continued in the later periods. It was built under ‘Housing Policy 1’ [Figure 4.71]. However, very few scattered houses in the quarter have been built according to ‘Housing Policy 2’. These houses were owned by the state to accomodate its employees. Many of those houses were demolished and replaced by newer buildings. Those houses do not have significance on the whole area due to the limited and small number of them.**

The Sample area is composed of different parts of different areas with different registration numbers. The ‘first part’ was planned and registered in 1940 and the latest registration was in 1980s (Part 8 and Part 9). All the parts registered before 1980 have been planned according to the *‘Amended System of Roads and Buildings No. 44 of 1935’*. **The areas of the original plots in this quarter range from 220m² to 500m². However, there are some cases of plots with areas less and more than this range. As a result of formal and informal subdivision actions in later periods, plots with areas less than 200 m² can be noticed. The area contains a mixture of attached and semi-detached types of houses with front setback. A limited number of very early built houses which have a courtyard type still exist in the area.** The street and block type of ‘Sample 3’ area is very influenced by the original land features. The analysis follows the structure of the formation and the transformation of the area [Table 4-12].

Table 4-12: Sample 3, the formation and transformation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
3	Minara	3 rd and later periods	1941 and later	1	<ul style="list-style-type: none"> • The System of Roads and Buildings No. 44 of 1935. • Decision No. 850 of 1979 on setting plot areas limits for housing purposes. • Instructions No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations of Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • The location • Geographic factor (The location, and the original land features).

Table 4-13: The successive regulations that have influenced Sample 3. (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the streets	From other sides	
1931 ³²²	N/A	2	N/A					
1935 ³²³	2 out of 2	2	$P \geq 500$	10	10	3	1.5	2/3
1936 ³²⁴	3 out of 5	2	$600 > P \geq 300$	10	10	2.5	2.5	2/3
1938 ³²⁵	3 out of 5	2	$600 > P \geq 300$	10	15	2.5	2.5	2/3
1964 ³²⁶	3 out of 6	1	$600 > P \geq 300$	10	15	2.5	0	65%
1964 ³²⁷	N/A	1	N/A					
1979 ^{328, 329}	N/A	Distinct	$800 > P \geq 120$	10	6	2.5 Or 1.5	0	N/A
1987 ³³⁰	N/A	Distinct	$P \geq 200$	10	10	2.5 Or 1.5	0	N/A
1989 ³³¹	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ³³²	N/A	75%
1993 ³³³	N/A	Special	N/A					

³²² The Monarch of the Kingdom, *Law of Municipalities' Administration No. 84 of 1931*.

³²³ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*.

³²⁴ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*.

³²⁵ The Monarch of the Kingdom, *Third Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 1633, 1938, pp. 70–72*.

³²⁶ The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*.

³²⁷ The Presidency of the Republic, *Law of Municipalities' Administration No. 165 of 1964*.

³²⁸ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

³²⁹ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

³³⁰ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

³³¹ Ministry of Local Governance, General Directorate of Urban Planning.

³³² The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street [Table 4-14].

³³³ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

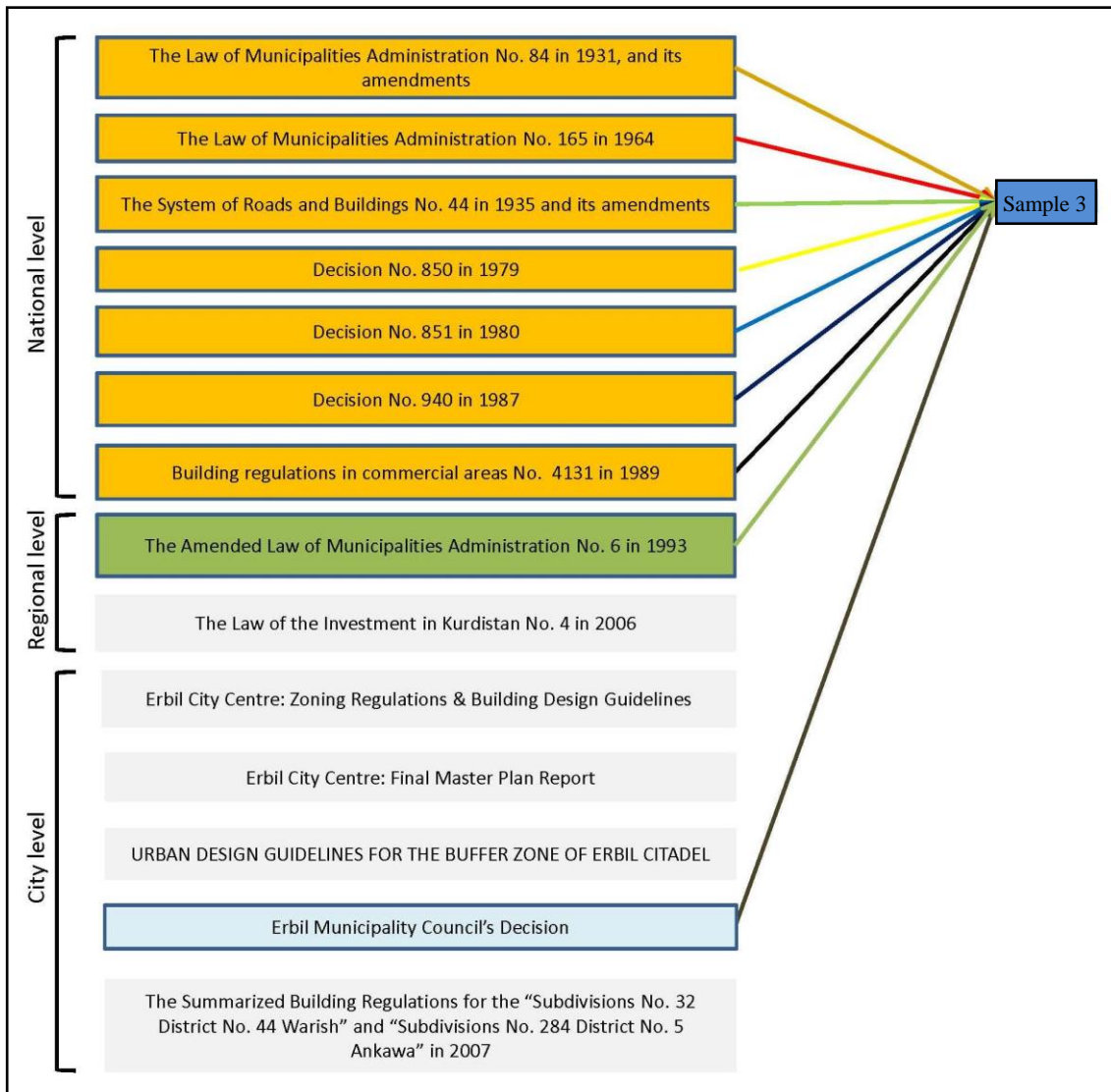


Figure 4.69: Direct regulations enacted at different levels that have influenced Sample 3. (Source: Researcher)

³³⁴ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

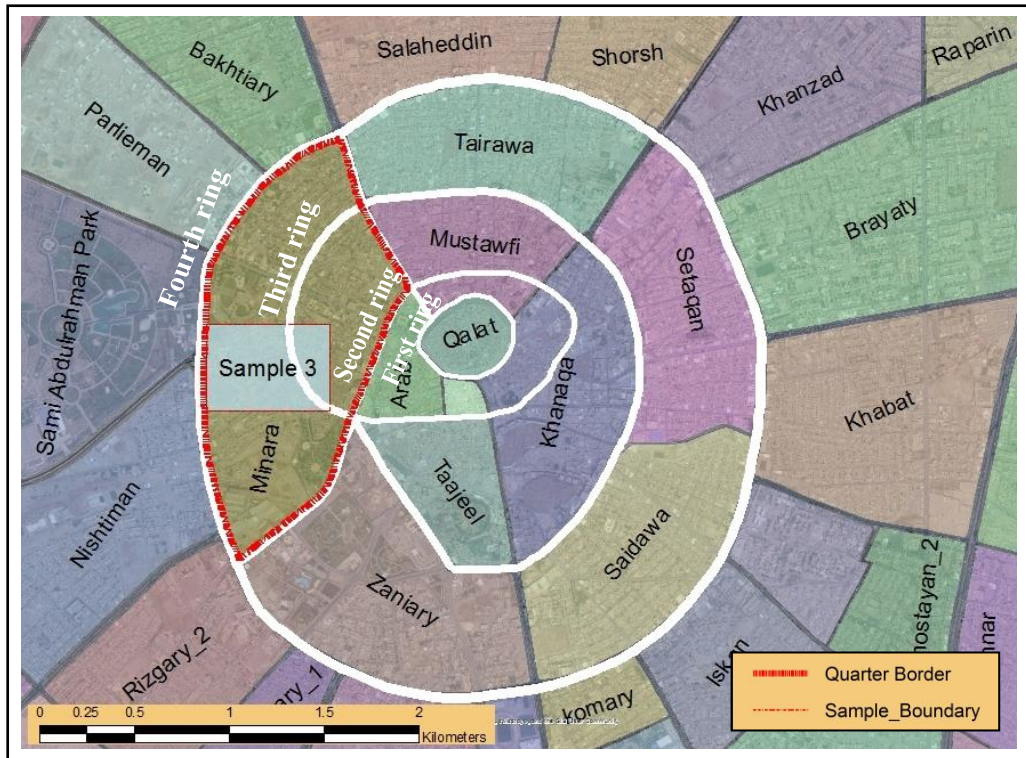


Figure 4.70: The location of ‘Sample 3’ and ‘Minara’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

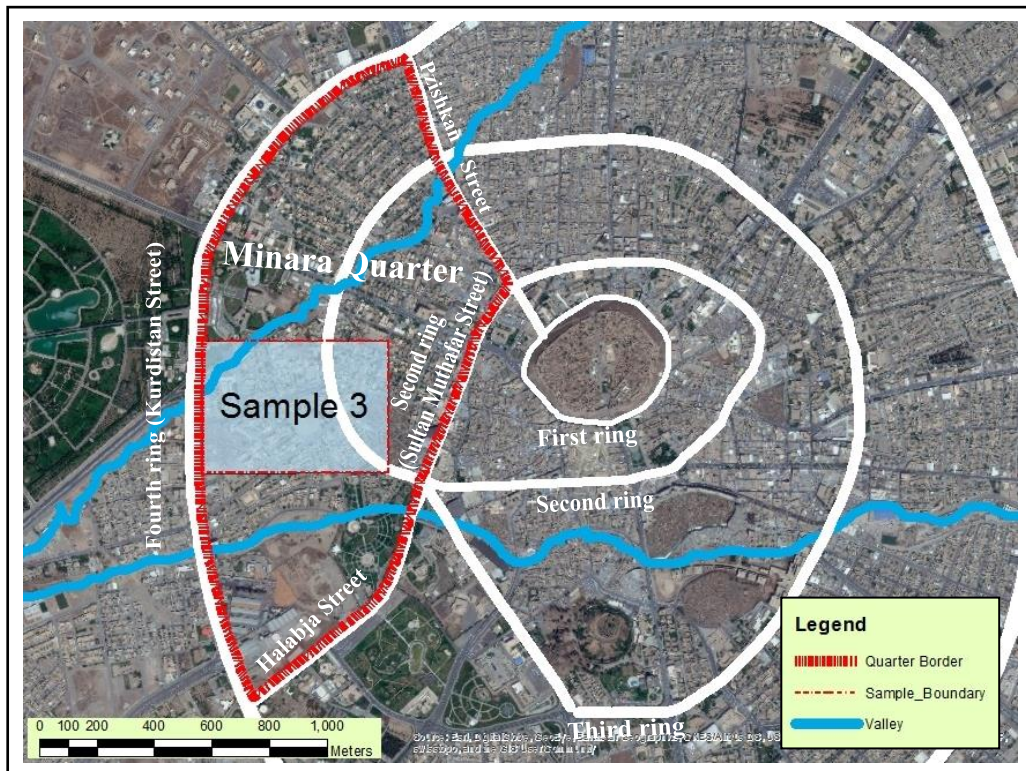


Figure 4.71: The boundary of ‘Minara’ quarter, the Ring Roads, and the two valleys. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

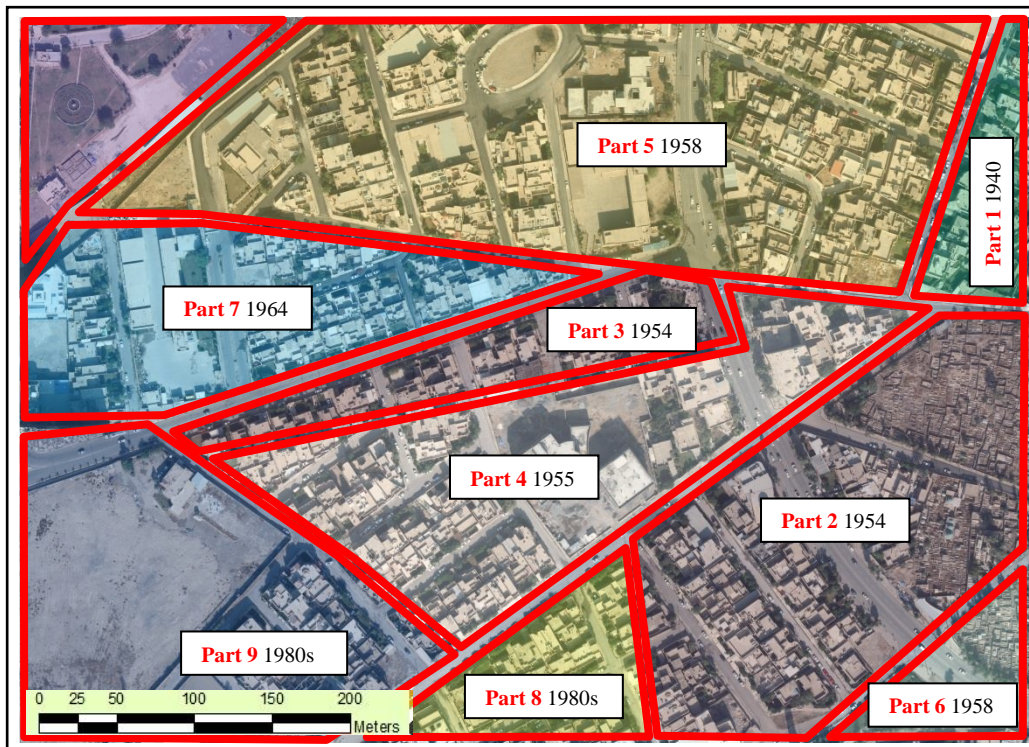


Figure 4.72: The different parts of ‘Sample 3’ area which were planned and registered in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

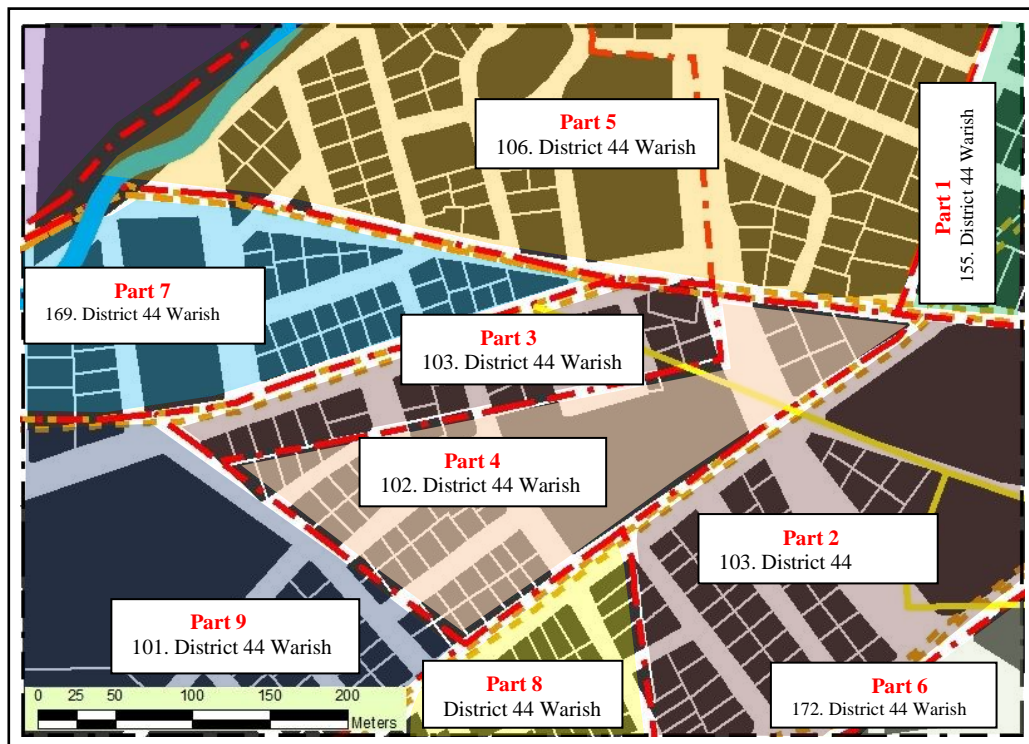


Figure 4.73: The original land features (old roads and land boundaries) have significant influence on the ground plan of the sample area. The average area of the original plots is 300 m². However, the areas of the plots vary from 220m² to 500m². In later periods, due to subdivision actions in later periods, some plots were subdivided into two. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation:

Early building process in ‘Minara’ quarter

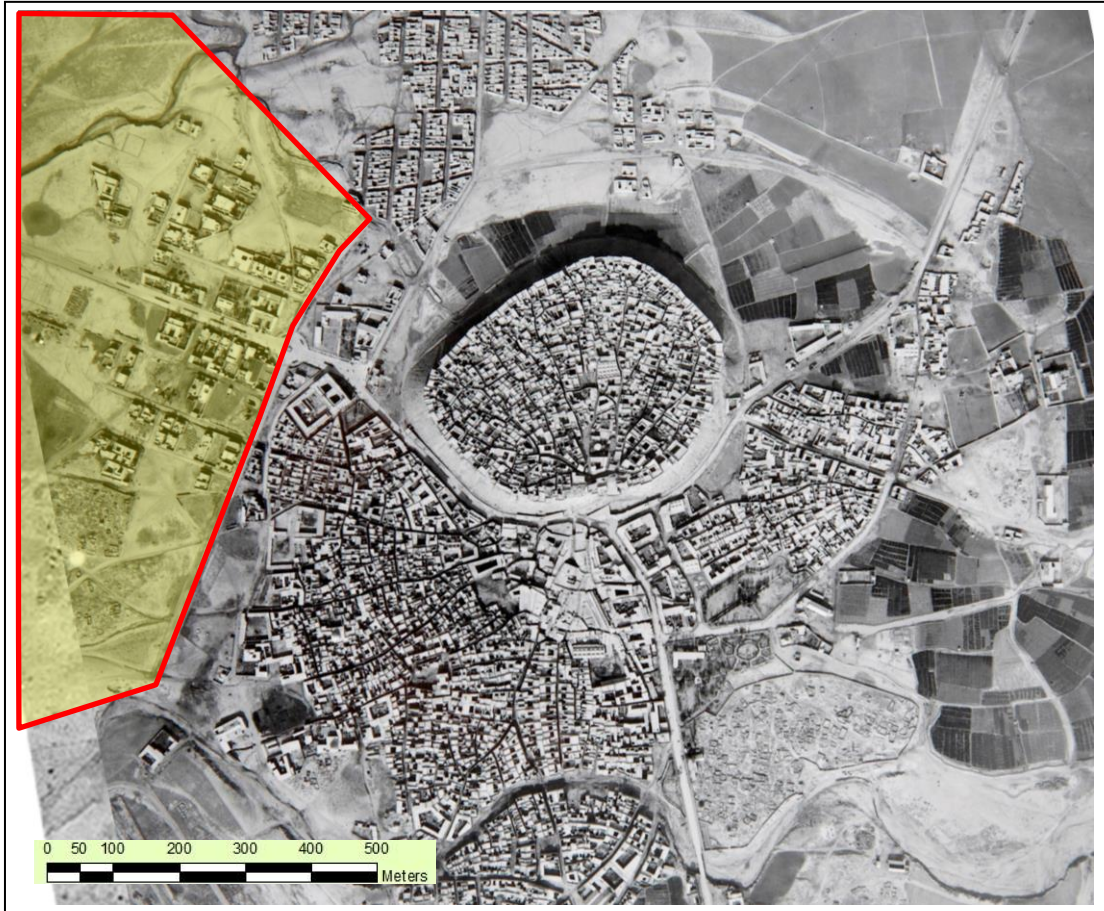


Figure 4.74: An aerial photo taken in 1951. Few single family houses appear in the north east of Minara quarter, the part which is very close to the citadel from the east. (Source: Pitt Rivers Museum, Photograph Collections/ The University of Oxford, photographed by Aerofilms Ltd.)



Figure 4.75: Early courtyard houses in the northeast part of the ‘Minara’ quarter built in the late of the second period (1937-1940). (Source: Researcher)

The Formation: The building form characteristics of the houses

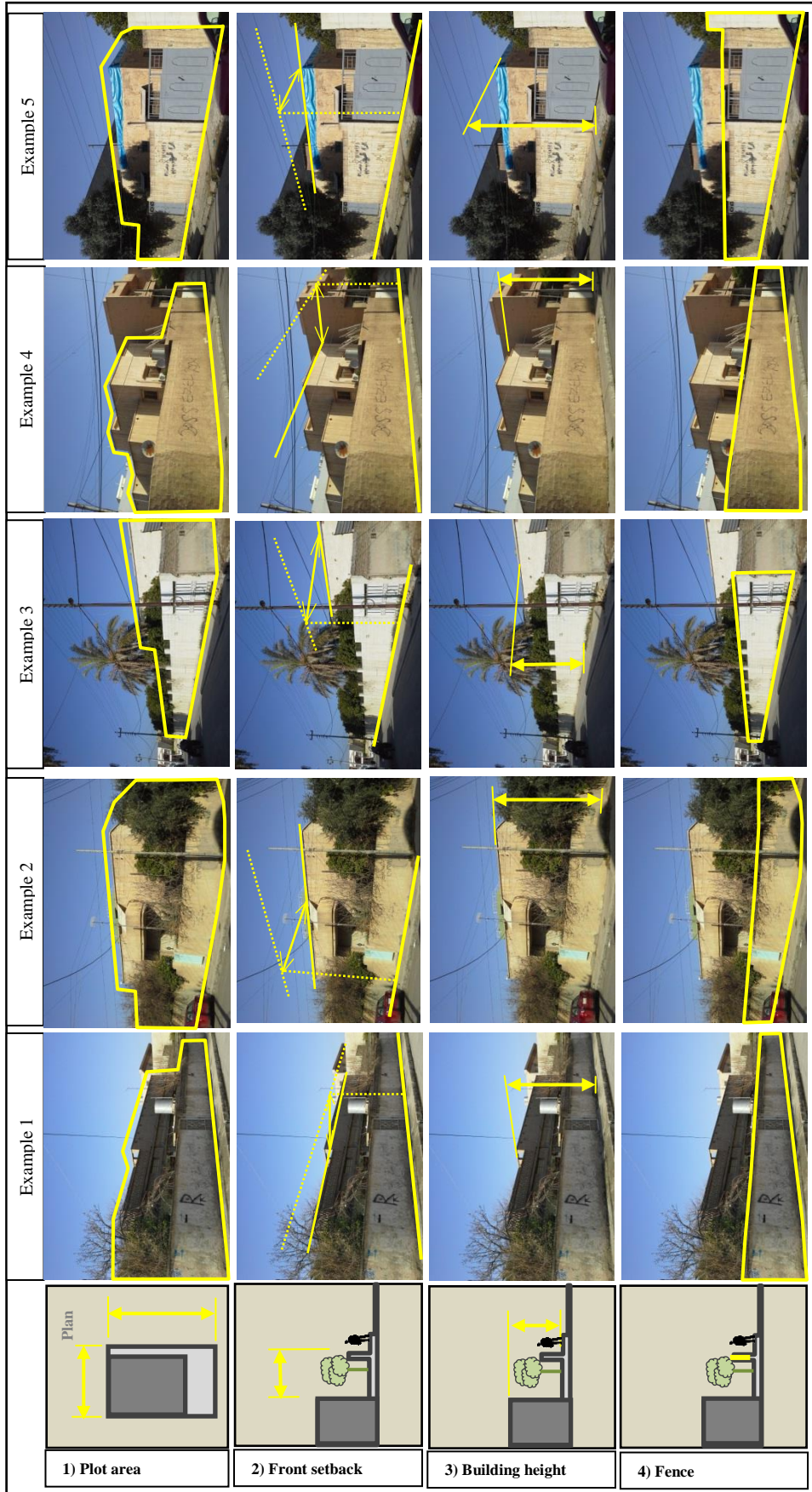


Figure 4.76: The common characteristics of the early houses built in the period (1941-1955) of the first formation of the area of ‘Sample 3’. (Source: Researcher)

The Formation:

The plan and the original land features

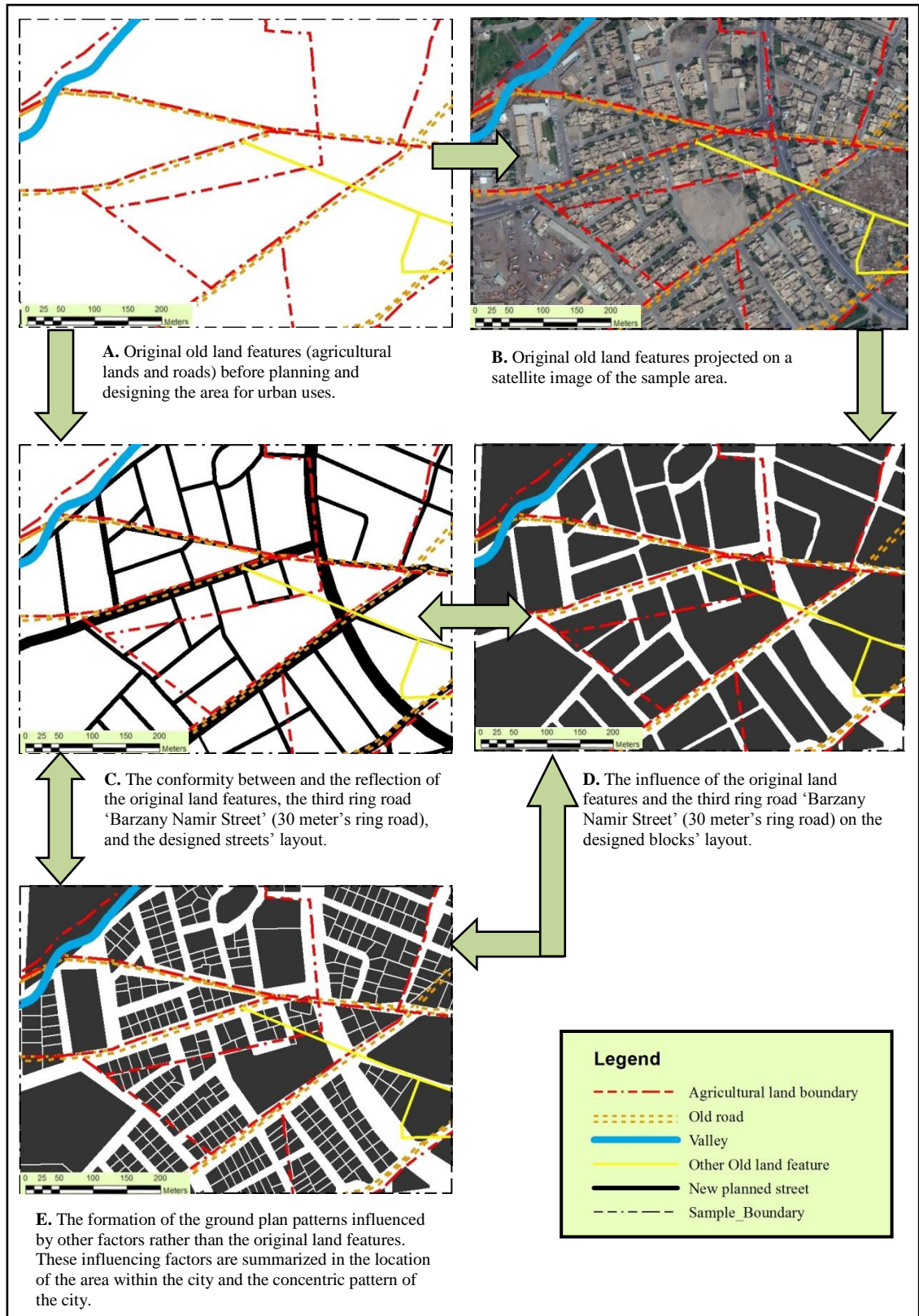


Figure 4.77: The influence of the original old land features and the concentric pattern of the city on the formation of 'Sample 3' area which is reflected in the pattern and the layout of the streets and the blocks. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

1. The formation of the area: Through four main headings the analysis of the formation of the sample area will be undertaken: the time period, the housing policy, the regulations, and other determinants.

A. The time period: The first design and plan of this quarter is dated back to the period between 1940 and 1955 especially the part which is closer to the citadel (Qalat). This means that the early formation of the quarter was in the royal system period. Planning of and building in this quarter with its current border was not in one stage. Some parts of it including the north-east part were planned first. The area of the sample consists of nine parts planned and registered in different years [Figure 4.72]. Those parts have different registration numbers [Figure 4.73].

B. The housing policy: Except some small scattered groups of houses that have been built over the area according to the policy 2, the majority of the area of this quarter has been built and formed under 'Housing Policy 1'. According to this policy the planning and design authorities are responsible for planning new neighbourhoods which include residential uses with their services but building the individual houses in the area is the responsibility of the plot owner after obtaining a building permission from the municipality office according to certain regulations. After the projection of the plan prepared by the authorities on the ground, according to a certain procedure, if land was owned by the state, the government grants residential plots to families for housing purposes. However, building up and the formation of the area does not happen in one time, but happens gradually as each owner has the right of when to decide to build his house. The aerial photo of Erbil taken in 1951 shows the north east part of the quarter and is considered as an evidence of the individual gradual process of the building up and the formation of the area [Figure 4.74]. An early building of houses started in the north east part, the part which is closer to the citadel. Few of those houses were built from 1937 to 1940 [Figure 4.75].

C. The regulations: The present physical characteristics of the buildings and the houses of this area convey the characteristics of the successive periods from 1940 to now. The existing condition of the area is formed under the influence of successive regulations since 1940 [Table 4-13]. In

1935 '*The System of Roads and Buildings No. 44*' was issued for the first time³³⁵. The area was firstly planned (to be in the city's municipal boundary for urban uses) according to the first amendment made in 1936 on the '*System of Roads and Buildings No. 44*'³³⁶. The area was planned as the urban area category 3.

After one year of the issuance of the '*System of Roads and Buildings No. 44*', an essential amendment was made on it when it had not left an evident trace on the ground. This amendment included issues of defining 'Urban Area Category' and all the variables related to the elements of plot, building, and street in the area. According to the legislation of that time, the minimum plot area of this urban area category was 300m². This legislation imposed building setback from the sides of the plot in this sample area. This was a new type of houses that Erbil witness and it was a shift from courtyard houses which has no setback to houses with setback. However, in the few early houses despite that that the setback distances are applied, the houses kept its courtyard type as well [Figure 4.75]. Gradually, the courtyard type disappeared.

The form of the early houses of the area was characterised by four main points. The first is having a plot area of 300m² and more of which building coverage does not exceed 65%. The second is the setback distance. However according to the regulations the minimum front setback distance is 2.5m, but the majority of the houses have front setback more than the minimum requirement. This allowed having a spacious front garden. As a result of setback and plot coverage requirements, the resulted building type is detached or semi-detached houses. The third characteristic is the height of the houses. One floor height is a common feature of the early houses. The average total height of the house is 4m including the roof parapet height. The last point is the fence of the houses which defined the plot and the boundary and separated neighbour houses and the private spaces of the house from public spaces (streets). The front fence included either a single gate with

³³⁵ The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*.

³³⁶ The Monarch of the Kingdom, *First Amendment System of the System of Roads and Buildings No. 44 of 1935*.

a width of about 2.6m, or two gates while the second has an average width of 1.2m [Figure 4.76].

D. Other factors: There are other factors than those mentioned. These influencing factors emerge from local characteristics of the area itself and its location within the city and the citadel. They are linked to the characteristics of the area before been planned. The valleys of ‘Erbil’ and ‘Shaikh Qazy’ pass through this quarter (with its current border) from the north east and the east to the west of the quarter [Figure 4.77]. The land and the topographic features have had a great influence on the streets and blocks layouts of the design of the quarter.

Before planning the area for urban uses within the municipality’s boundary of the city, the land was used for agricultural uses as it was a fertile land. The boundaries of the agricultural plots, the roads accessing them and those passing through them to other destinations, and the irrigation channels were the original land features that have left traces on that new development plan of the area. Due to some reasons such as the ownership of these lands which were private, the institutional issues of converting the use of those lands from rural and agricultural to urban and to become an area included in the city’s boundary, and the demand for the city’s expansion, the area has not been designed in one stage and has been included in different cadastral maps [Figure 4.73] and [Figure 4.77].

The location and the distance of the area from the citadel and the older parts of the city cannot be disregarded. The roads accessing those lands were extended from the citadel and the old parts of the city surrounding the citadel especially the southern and the western parts. This means that those roads were generally extended from east to west. In addition the concentric pattern of the city which can be visually represented in the ring and radial roads is also significant. The third ring road which was known as the ‘crescent road’ (Hilaly Road) and now is known as the ‘Barzany Namir Street’ passes through this quarter and the sample area [Figure 4.71]. Those factors have had a great influence on the layout of the area (the quarter area and the sample selected from this quarter). This influence can clearly be noticed in the streets and blocks’ layout and pattern of the first plan.

The Transformation: Demolishing old and building new



Figure 4.78: The continuous process of replacing the old houses by new residential (single family houses) or multistorey commercial buildings. The process is still in progress.
(Source: Researcher)

The Transformation: The selection of blocks samples

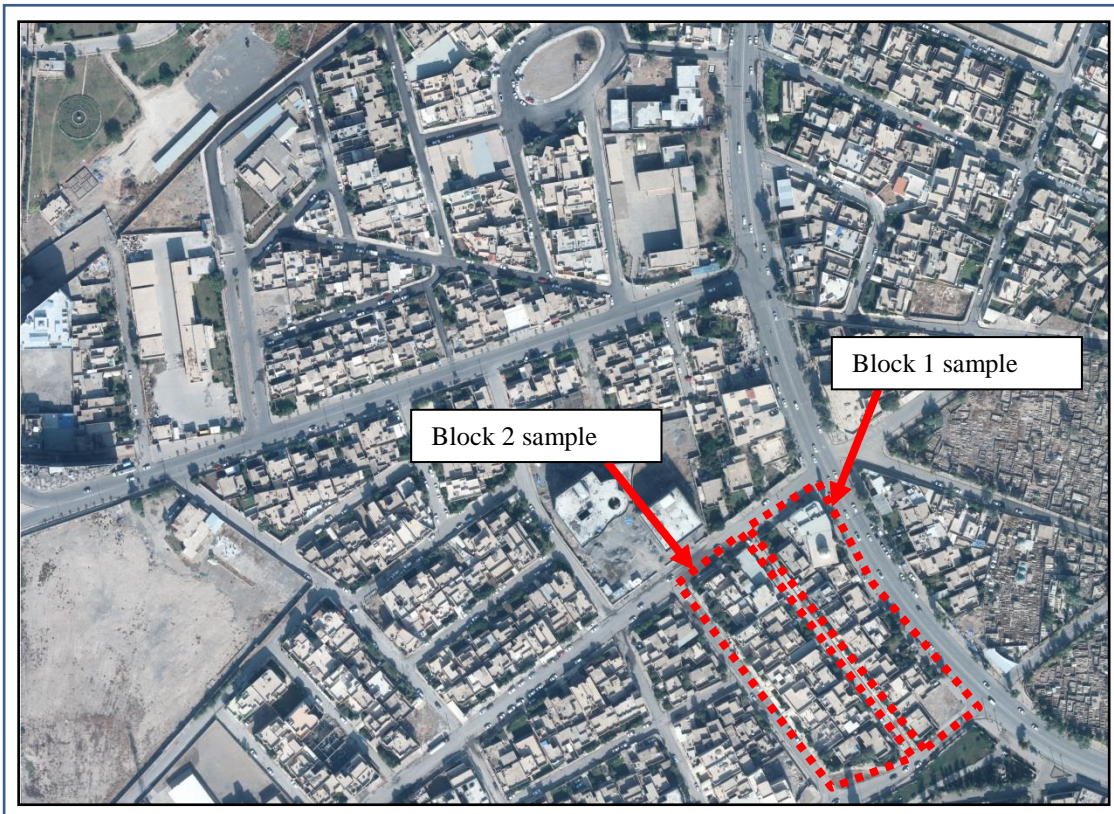


Figure 4.79: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

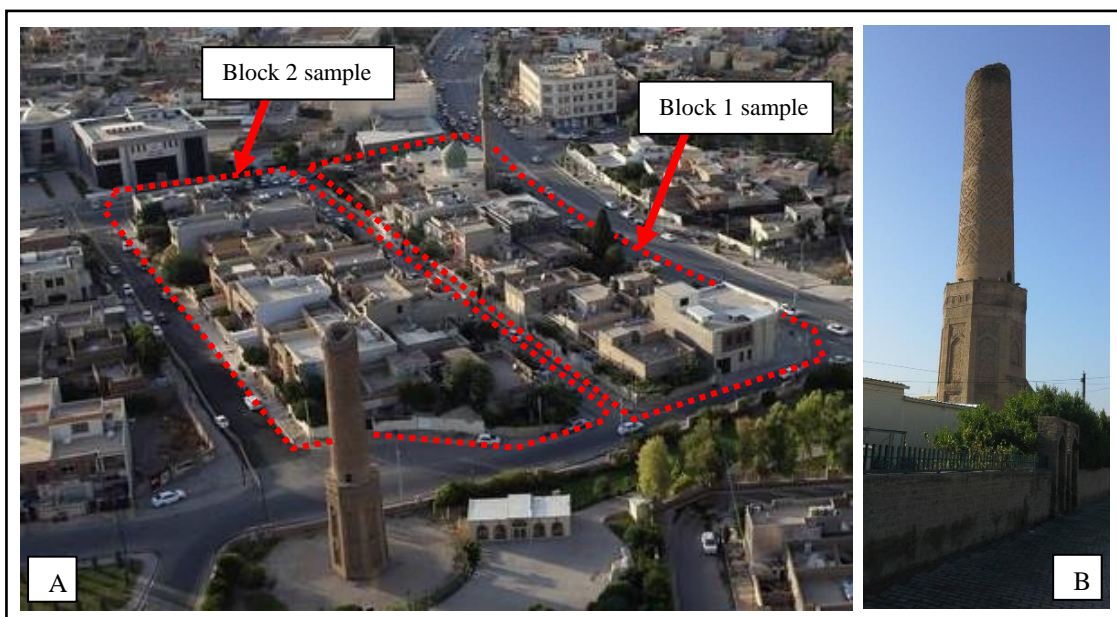


Figure 4.80: Photographs show the two selected blocks of buildings in ‘Sample 3’ area and the historical minaret (Choly Minaret). (Source: **A**) Drawing by the researcher on a photo from The Governorate of Erbil **B**) Photograph by the researcher)



Figure 4.81: Two block (block 1 and block 2) samples from ‘Sample 3’ area showing the existing condition. The typical area of the original plots is 300m². The widths and the depths of the plots in the first block vary but the depth of the plots of the second block is 20m. In later periods some plots were subjected to subdivision actions. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)



Figure 4.82: The buildings of ‘Block1’ are a mixture of single family houses, multistorey commercial buildings, and a mosque. (Source: Researcher)

The Transformation: Building- Plot parameters



Figure 4.83: The two blocks include a mixture of original houses of detached and semi-detached types formed under the ‘*Amended System of Roads and Buildings No. 44 of 1935*’ and transformed and new buildings (replaced the old houses) of attached type formed under the influence of the later amendments and new regulations of later periods. Different setback regulations are applied on the buildings. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)



Figure 4.84: The buildings of ‘Block 2’ are a mixture of original old single family houses and new replaced houses. (Source: Researcher)

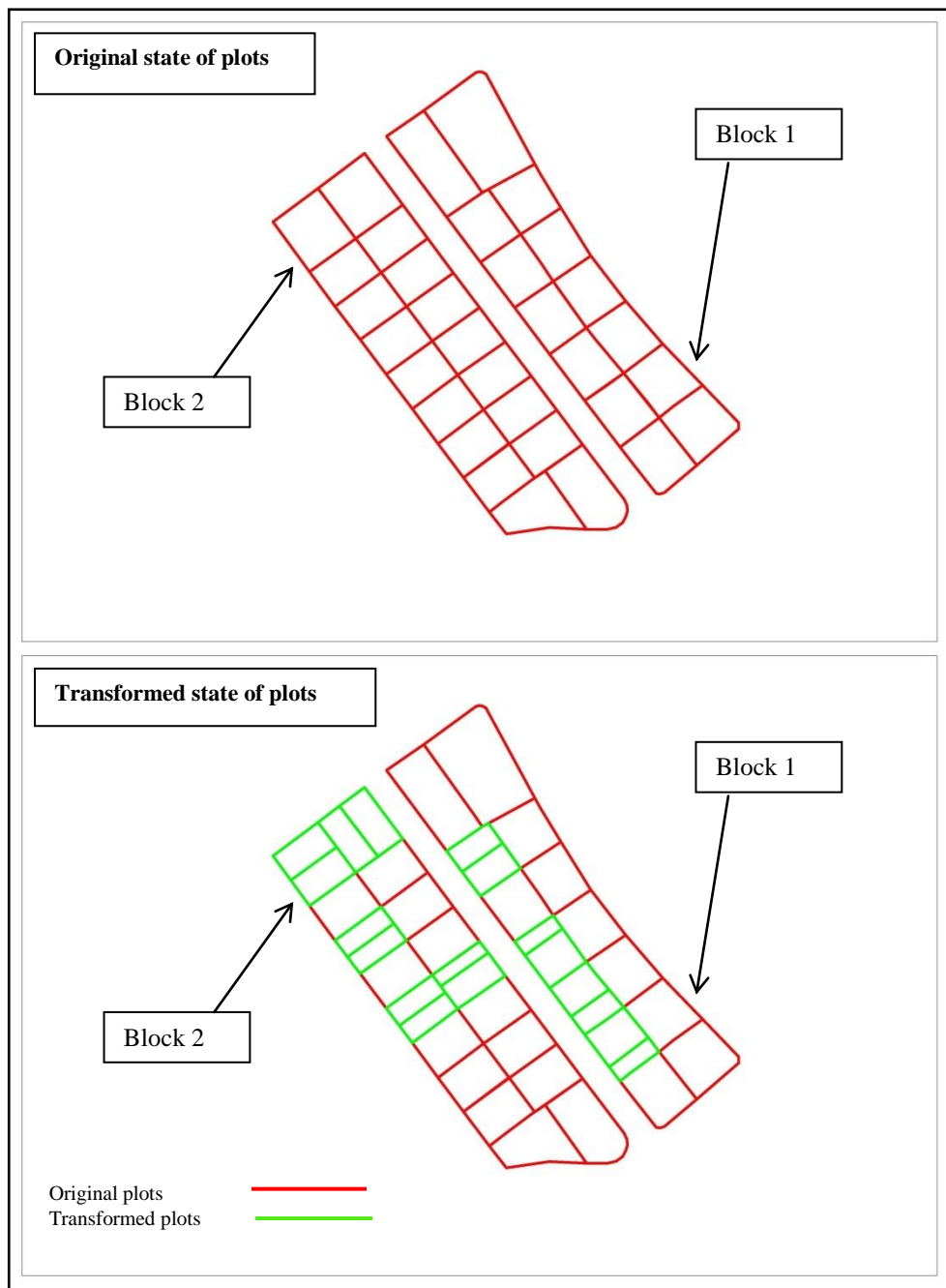


Figure 4.85: The selected blocks (block 1 and block 2) from ‘Sample 3’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. Due to that the minimum subdivision area according to ‘Decision No. 850 of 1979’ is 120m², the original plots have been formally and informally subdivided into two each with an average area of 150m² for two single family houses. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

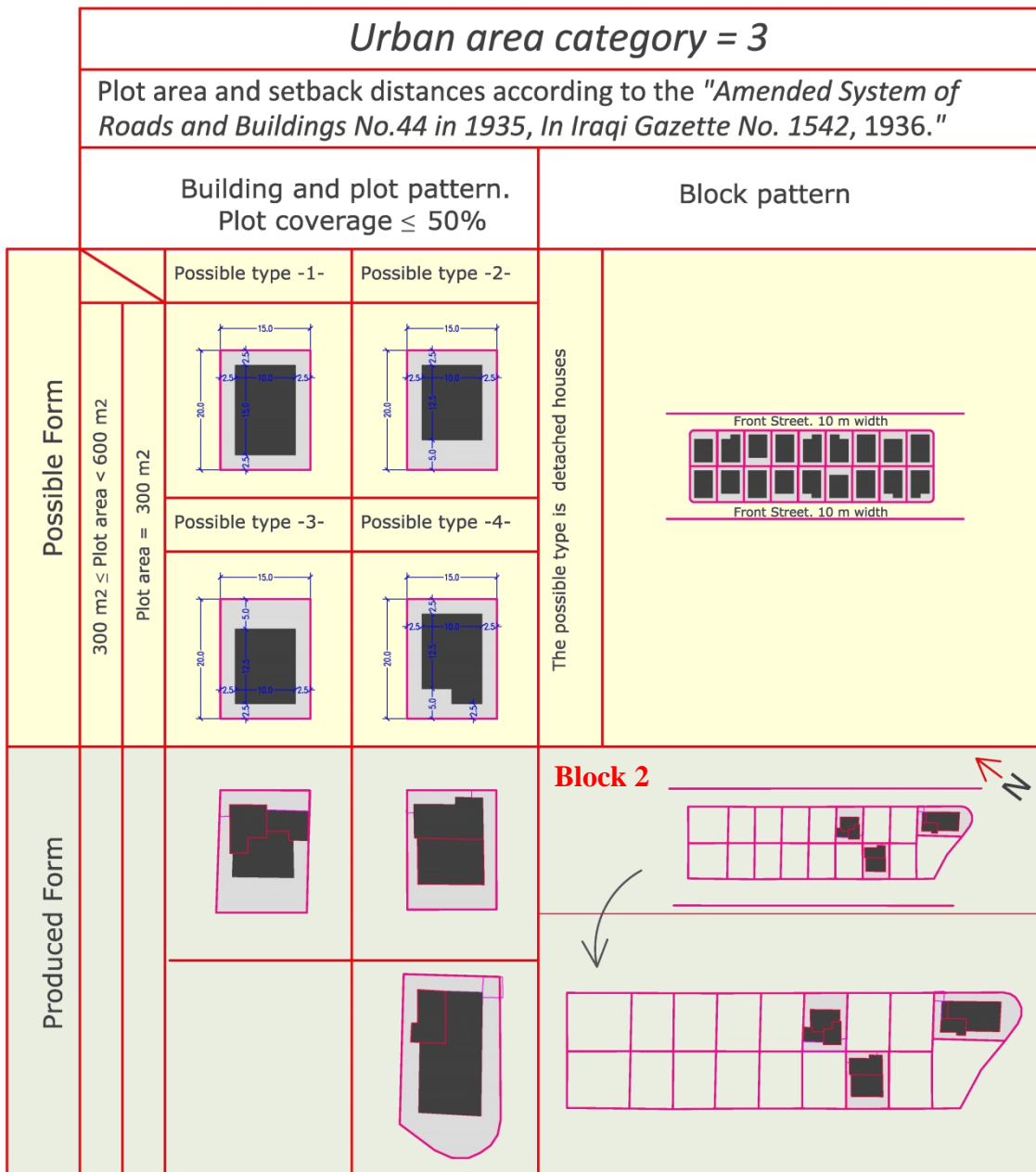


Figure 4.86: The possible form of buildings and plots which can be produced by the amendment of 1936 of the ‘System of Roads and Buildings No. 44 of 1935’ and the real produced form by the same regulations in ‘Block 2’ of ‘Sample 3’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

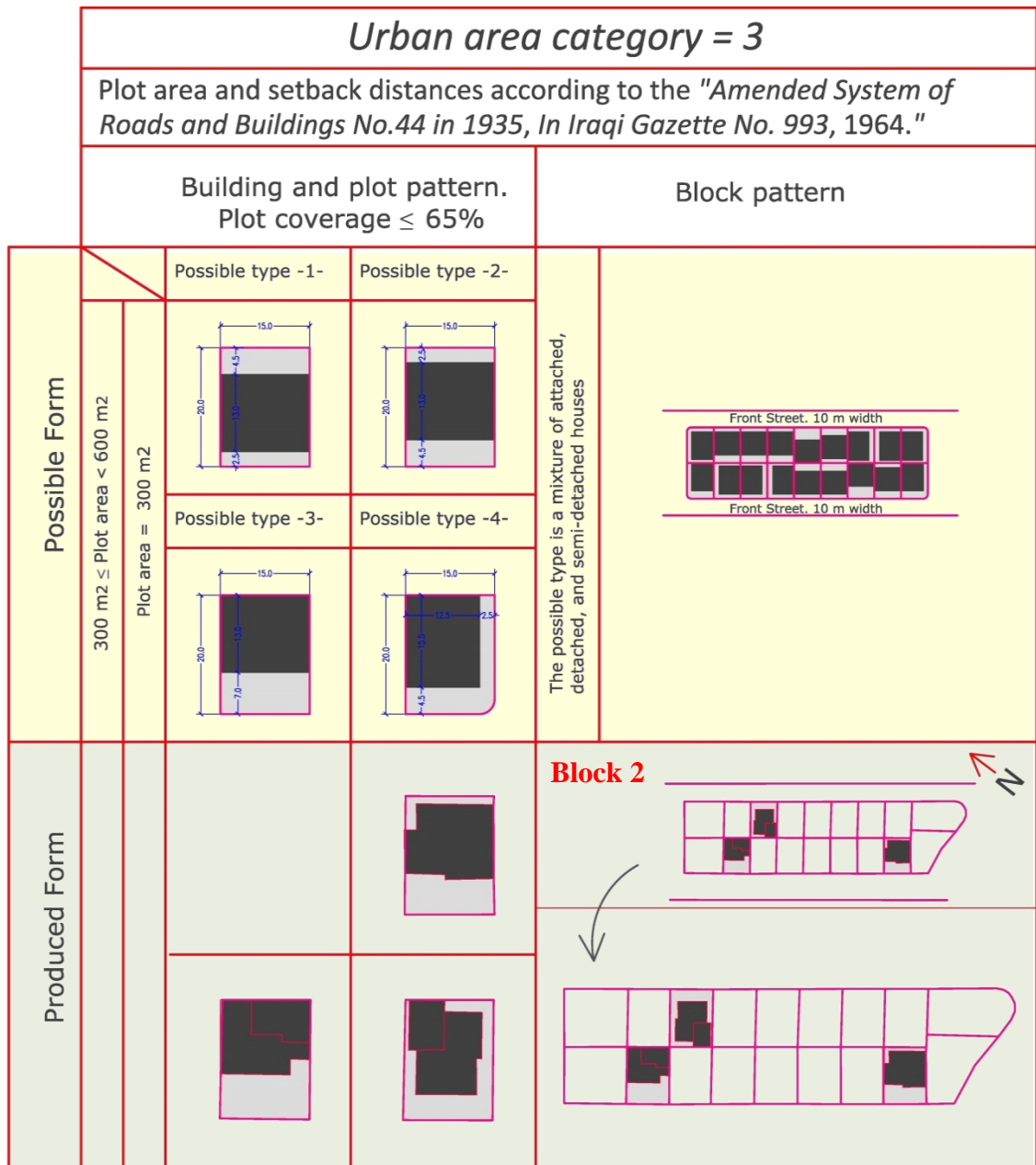


Figure 4.87: The possible form of buildings and plots which can be produced by the amendment of 1964 of the ‘System of Roads and Buildings No. 44 of 1935’ and the real produced form by the same regulations in ‘Block 2’ of ‘Sample 3’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

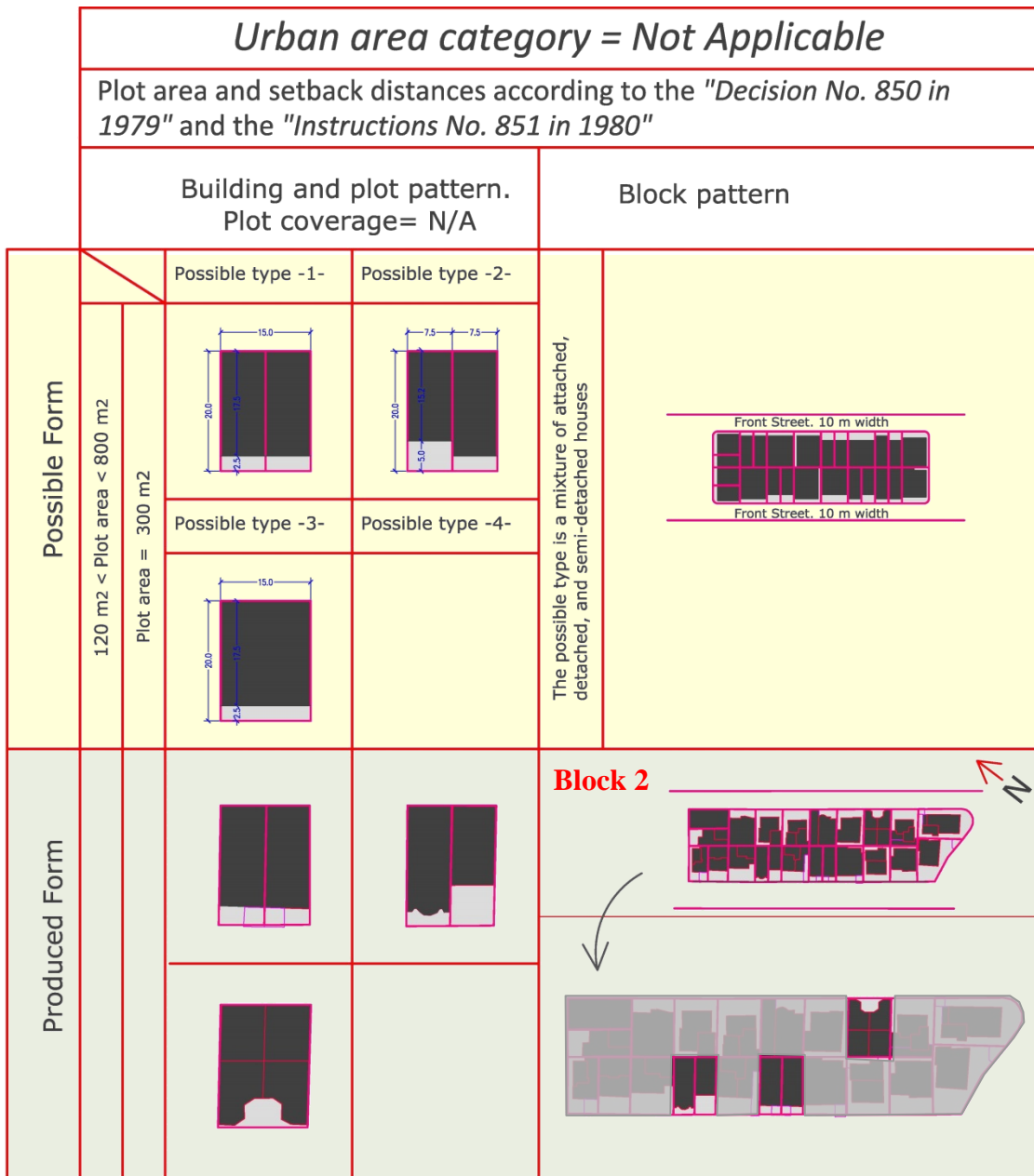


Figure 4.88: The possible form of buildings and plots which can be produced by the successive amendments of the ‘System of Roads and Buildings No. 44 of 1935’, ‘Decision No. 850 of 1979’, ‘Instructions of the Decision No. 851 of 1980’, and ‘Decision No. 940 of 1987’, and the real produced form by the same set of regulations in ‘Block 2’ of ‘Sample 3’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The building form characteristics of the houses

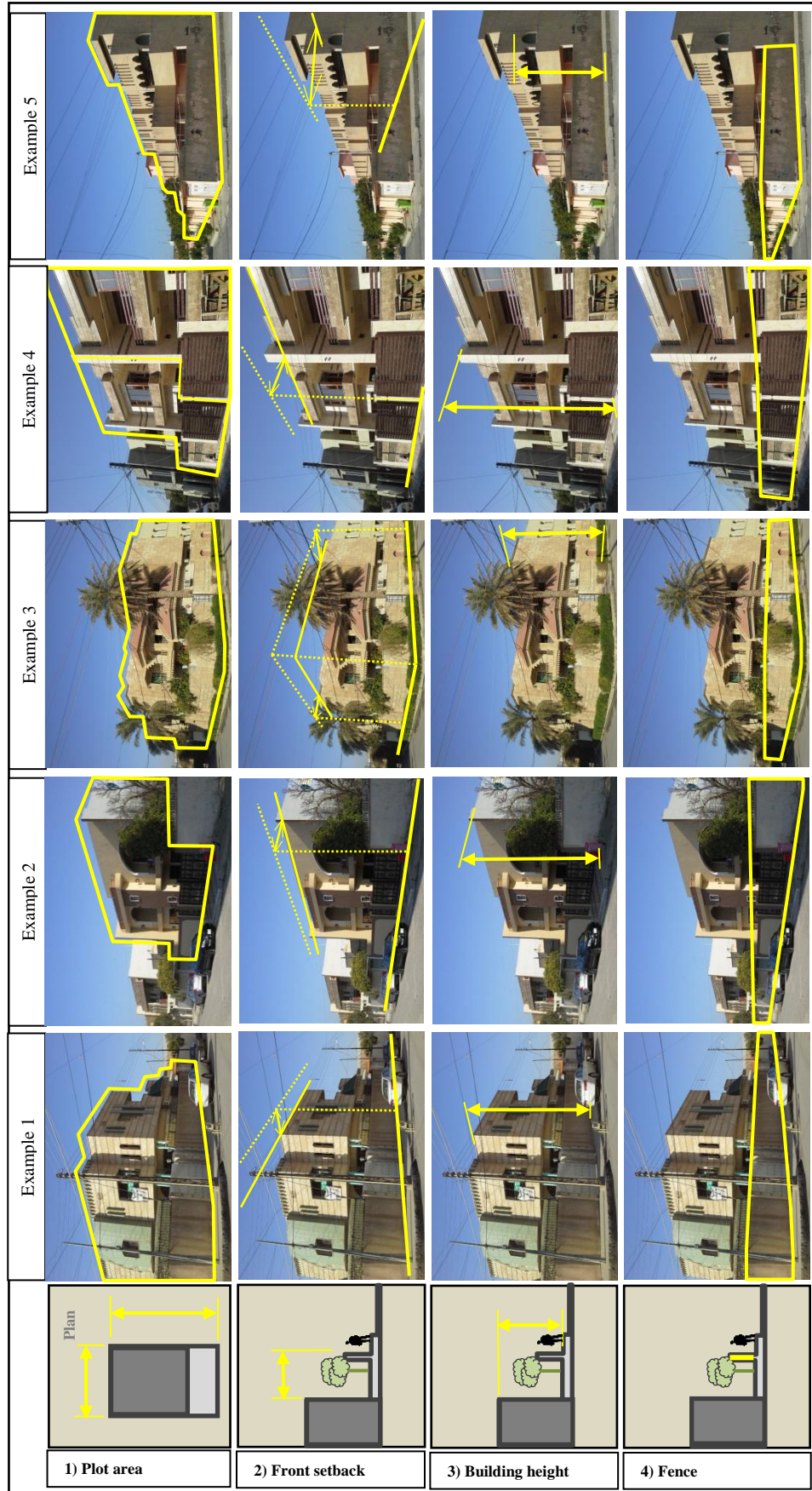


Figure 4.89: The common characteristics of the transformed houses built in the area of ‘Sample 3’ in later periods (1956-2013). (Source: Researcher)

2. The transformation of the area: Through the same structure that was used in the analysis of the formation of ‘Sample 3’ area, the transformation analysis will be done.

- A. The time period:** The other six following periods have involved in the subsequent continual changes on this area. Some key historical events in the country have had an influence on the transformation of the area of ‘Sample 3’ either in a direct way or through the changes in the planning and building regulations. A number of events on the state and regional level can be listed. The first event was the revolution of 1958 by which the governance system of Iraq state was changed from royal to republic. This change in turn led to significant and essential changes in laws and regulations in many sectors of which those related to land management, planning and building in cities. The second was the Kurdish revolution in 1961 known as ‘Aylul Revolution’ which then resulted in the autonomy of Kurdistan in 1970 and then followed by other revolutions such as ‘Gulan’ in 1976 and a ‘New Revolution’ of Kurdistan. The third was the nationalization of oil industry which started from 1968 and in 1972 was complete. This resulted in the economic boom in 1970s. The fourth was the Iraq-Iran war from 1980 to 1988. The fifth was the first gulf war in 1991 which was followed by an economic siege on Iraq. The sixth was the uprising of Kurdistan cities resulting in the independence of the region in 1991 and the first election in Kurdistan in 1992 and establishing the first parliament and the first cabinet of Kurdistan region, then civil war between the two Kurdish parties until 1997. The seventh and the last was the fall of Saddam’s regime in 2003 leading in the national and international admission of Kurdistan region as a federal region within the new Iraq. All these events have influenced in different ways (positively and negatively) on the economic and political state of Erbil which in turn influenced the urban growth and the form of the city.
- B. The policy:** As mentioned before, almost all the area was formed under ‘Housing Policy 1’. As a result, the new developments, the transformations, and the changes of the area were generated under the influence of the same policy. A major and an apparent characteristic of the changes and transformations under this policy is the individuality.

Individual continuous process of building new houses, additions to the existing houses, and replacing the old houses by new ones (demolishing the old and building new) have determined the way in which the urban form of the area has transformed and changed [Figure 4.78].

C. The regulations: A serial amendments and changes on the '*System of Roads and Buildings No. 44*' were made [Table 4-13]. In addition, an introduction of some new regulations regarding plots subdivision, building individual houses, and land use changes as well resulted in the changes in building form. These changes included all the variables related to the form elements (plots and buildings but not streets). Then, it is expected that this area to witness no changes on the streets' pattern. In fact, comparing to buildings and plots, the street element is more resistant to changes. If changes happen on streets, is very slight.

For a closer analysis of the elements of plots and buildings and to understand how the amendments and the changes in regulations have influenced the urban form of the 'Sample 3' area, two blocks samples are selected [Figure 4.79]. These two blocks are located in the part registered in 1954 under the registration number '103. District 44 Warish'. They are far from the historical minaret of Erbil 'Choly Minaret' by about 50m [Figure 4.80]. The first block lies on the commercial street (Third Ring Road) 'Barzany Namir Street'.

The continuous individual process of changes on the plots and the buildings of the houses of these two blocks resulted in producing a mixture of building types and different plot areas. In the case of the first block, the row of the plots located on the 'Third Ring Road' is commercial and should be used for multistorey commercial buildings. Therefore, all the existing houses on that side of the block are liable to be demolished and replaced by multistorey commercial buildings [Figure 4.82]. However, the second block includes a mixture of old and new which is a replacement of the old houses from the successive periods [Figure 4.84]. Due to the successive regulations influencing the sample area over time, consequent and accumulative layers of changes have happened on the plots and buildings of those two blocks. The existing condition of them is a mixture of detached, semi-detached, and attached

house types [Figure 4.81] and [Figure 4.83]. Moreover, the building line along the blocks is not clear as the setback distance from the front street has changed over time by the successive regulations.

The houses from older periods are very likely to be demolished and replaced by newer houses which will be built according to the current regulations. This continual process of replacement and change is repeated in a cycle leading to not having a unity or homogeneity in the form at a certain point of time even if no changes made on the current regulations as they allow producing a wide range of the difference in forms. As a result, the form of the houses in those two blocks does not purely characterise and represent a certain period. Yet, they convey the characteristics of the successive periods until now.

The current valid regulations are those issued in 1979³³⁷, 1980³³⁸, and 1987³³⁹. The average area of the original plots in 'Sample 3' is 300 m². The mentioned regulations allow building two single houses on one plot of the mentioned area as each house area should not be less than 120 m². And they also allow subdividing the plots into two. The cases of building two houses on one plot or subdivided plots in these two blocks started from the sixth period and later (1979-now) as the houses are those from those periods [Figure 4.85].

In order to understand how the successive regulations produced the variety of house types, a detailed analysis is done. The early regulations, the amendment of 1936 of the '*System of Roads and Buildings No. 44 of 1935*' produced detached house type [Figure 4.86]. Then, the amendment of 1964 of the same legislation produced semi-detached and attached house types [Figure 4.87]. Later on, '*Decision No. 850 of 1979*' and '*Instructions of the Decision No. 851 of 1980*' allowed building two houses on one original plot which has 300m² area. This has been produced whether in a formal plot subdivision when each subdivided plot gain its own registration number, or informally [Figure 4.88]. Apart from the change in the use of the row of the plots located on

³³⁷ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

³³⁸ Revolutionary Command Council, *Prescriptive No. 851 in 1980 on building houses, in Iraqi Gazette No. 2756, 1980, pp. 237–38*.

³³⁹ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

the 'Third Ring Road' from mixed use to commercial use, no changes have happened on the streets pattern.

The form of the houses of later periods of this quarter (sample area) can be summarised as follows [Figure 4.89]: The first is plot area. As a part of the gradual and continuous process of change, some of the original plots submitted to changes mainly represented in subdivision actions. In this case, the original plots which have areas of 300m² or even more are either equally or unequally subdivided into two plots for two single-family houses. See example 4 of [Figure 4.89]. This is not a character applied on all the cases. However, some new houses of the later periods were built on the original plot area. Hence, the houses of the area are characterised by having a mixture of original plots and subdivided plots. The second is setback variable. The early regulations imposed building setback from all the sides of the plot. Then, it changed to only impose front setback. Yet, the houses of later periods especially those of 2004-2013 have smaller front gardens. The third is the height of the building. As it is noticed the majority of the early houses have one floor height. However, the new trend of the later houses is having two floor height of an average of 7.5m including the height of the roof parapet. The fence of the house is an obvious element that can be noticed by the users of the public spaces (streets). This is clearly seen in the photographs. The front fence functions as a physical separation boundary between private and public, it defines the boundary of the house and the plot, and it provides security and privacy to the house by opaqueness and having a reasonable height. The houses of the later periods of the area kept this characteristic. However the height of the fence varies from a house to another depending on the owner, but the difference is negligible.

D. Other determinants: As mentioned, legislation is not the only factor that has determined the way of the change and the transformation of the urban form of this sample area. About a half century of time is long enough for happening changes in the political state of the country, the region, and the city, changes of economy, and changes in many aspects

of people's life. All these influenced the whole city including this sample area as well.

Period 4

Sample 4_1

Azady_2 Quarter



Sample 4_1 (Azady_2 Quarter)

‘Sample 4_1’ is a part of ‘Azady_2’ quarter which has an area of 0.45 Km² and lies around 1.7 Km in the south of the citadel (Qalat), immediately after the Forth Ring Road (Kurdistan Street) which is known as ‘The 60 Meters Ring Road’ [Figure 4.91]. The first formation of the quarter was in the Fourth Period (1956-1965) and then the formation and the transformation of it continued in the later periods. It was built under the ‘Policy 1’ of housing. This area of the quarter, at some point of the past, was known as ‘Zanyary’. The quarter is bounded by the Fourth Ring Road (Kurdistan Street) from north, a straight street (Kany Street) from south, the radial road (Makhmur Road) from west, and ‘Azady_1 Street’ from east [Figure 4.92].

It was built as the third urban area category of *‘The Amended System of Roads and Buildings No. 44 of 1935’*³⁴⁰. **The average plot area in this quarter ranges between 300m² and 600m². The area of some plots exceeds 600m². The common type of the houses is attached, with some cases of detached and semi-detached, but not regular. The houses have front setbacks and spacious gardens. There are some cases which have rear garden as well. The street and block type of the eastern part of the area is dead end street (Cul-de-sac). This part includes four dead-end streets and an opened loop one (U shape). In this quarter modern house types substituted the traditional courtyard type. Therefore, this quarter is completely free from courtyard house type which was used in the previous periods.**

The analysis is done in the same structure of the formation and the transformation in which all the determinants influencing the urban form will be presented [Table 4-15]. All the figures (maps, photos, and drawings) and the tables of the analysis related to the formation will be presented first according to their sequence and their first mention in the text of the first formation of the area, followed by the text of the analysis of the formation. The same will be repeated in the transformation analysis part.

³⁴⁰ All the successive and the accumulated amendments of “*The System of Roads and Buildings No. 44 in 1935*” which had been issued by 1960.

Table 4-15: Sample 4_1, the formation and transformation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
4_1	Azady_2	4 th and later periods	1956-1965, and later	1	<ul style="list-style-type: none"> • The Amended System of Roads and Buildings No. 44 of 1935. • Decision No. 850 of 1979 on setting plot areas limits for housing purposes. • Instructions No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (The location, and the original land features. • The socio-economic status of the residents.

Table 4-16: The successive regulations that have influenced ‘Sample 4_1’ until 2013. (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1931 ³⁴¹	N/A	2				N/A		
1960 ³⁴²	3 out of 5	2	$600 \geq P^{343} \geq 300$	10	15	2.5	2.5	2/3
1964 ³⁴⁴	3 out of 6	1	$600 > P \geq 300$	10	15	2.5	0	65%
1964 ³⁴⁵	N/A	1				N/A		
1979 ^{346, 347}	N/A	Distinct	$800 > P \geq 120$	10^{348}	6	2.5 or 4 ³⁴⁹	0	N/A
1987 ³⁵⁰	N/A	Distinct	$800 > P \geq 200$	10	10	2.5 or 4 ³⁵¹		N/A
1989 ³⁵²	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ³⁵³	N/A	75%
1993 ³⁵⁴	N/A	Special				N/A		

³⁴¹ The Monarch of the Kingdom, *Law of Municipalities’ Administration No. 84 of 1931*.

³⁴² All the successive amendments of “*The System of Roads and Buildings No. 44 of 1935*” which had been made by 1960.

³⁴³ P= Plot area

³⁴⁴ The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*.

³⁴⁵ The Presidency of the Republic, *Law of Municipalities’ Administration No. 165 of 1964*.

³⁴⁶ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

³⁴⁷ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

³⁴⁸ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

³⁴⁹ If the plot area exceeded 600m², a minimum setback distance of 4 m from the street is applied.

³⁵⁰ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

³⁵¹ If the plot area exceeded 60 m², a minimum setback distance of 4 m from the street is applied.

³⁵² Ministry of Local Governace, General Directorate of Urban Planning.

³⁵³ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street. See [Table 4-17].

³⁵⁴ The Parliament of Iraqi Kurdistan, *Law of Municipalities’ Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

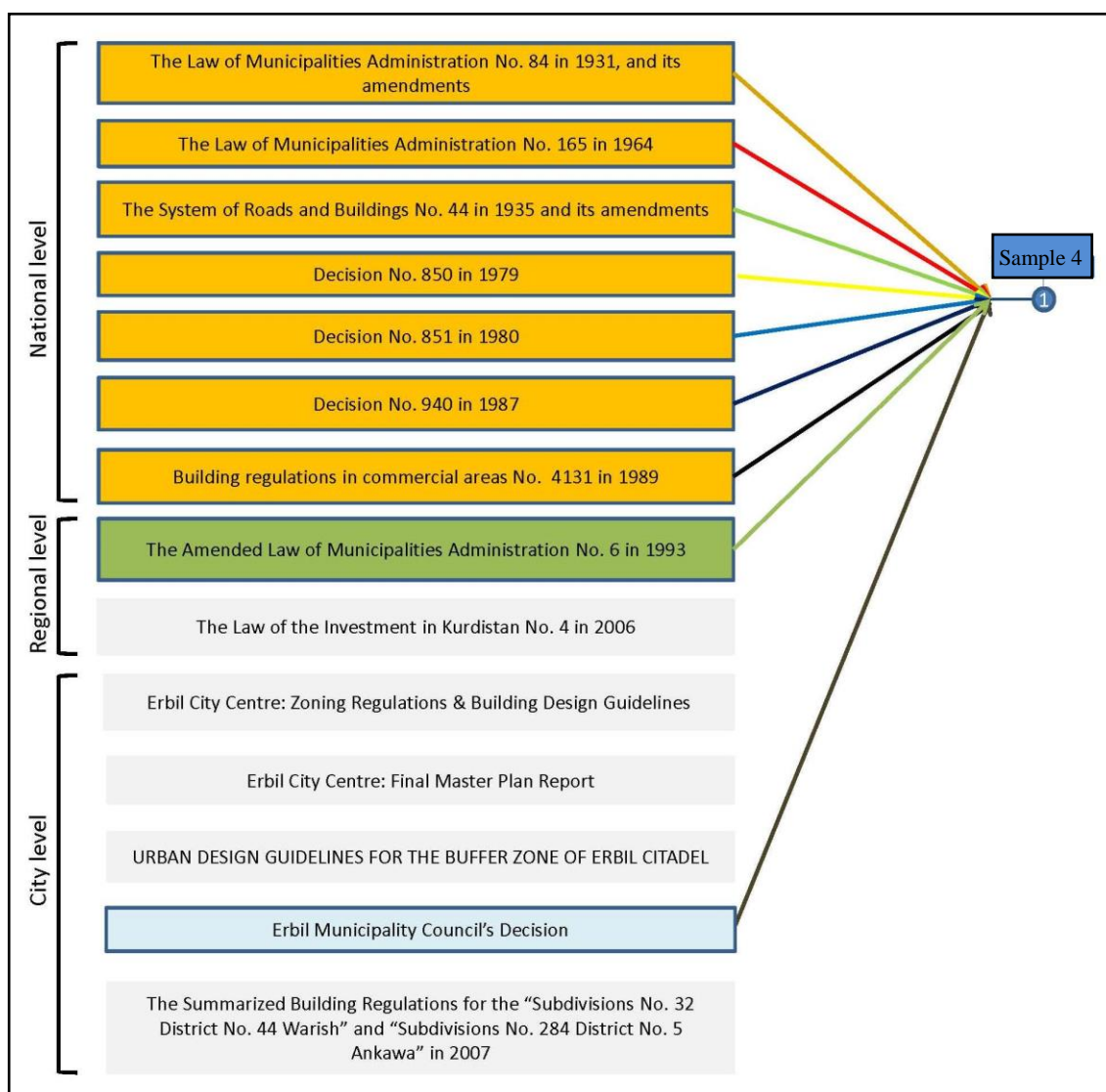


Figure 4.90: Direct regulations enacted at different levels that have influenced Sample 4_1. (Source: Researcher)

³⁵⁵ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

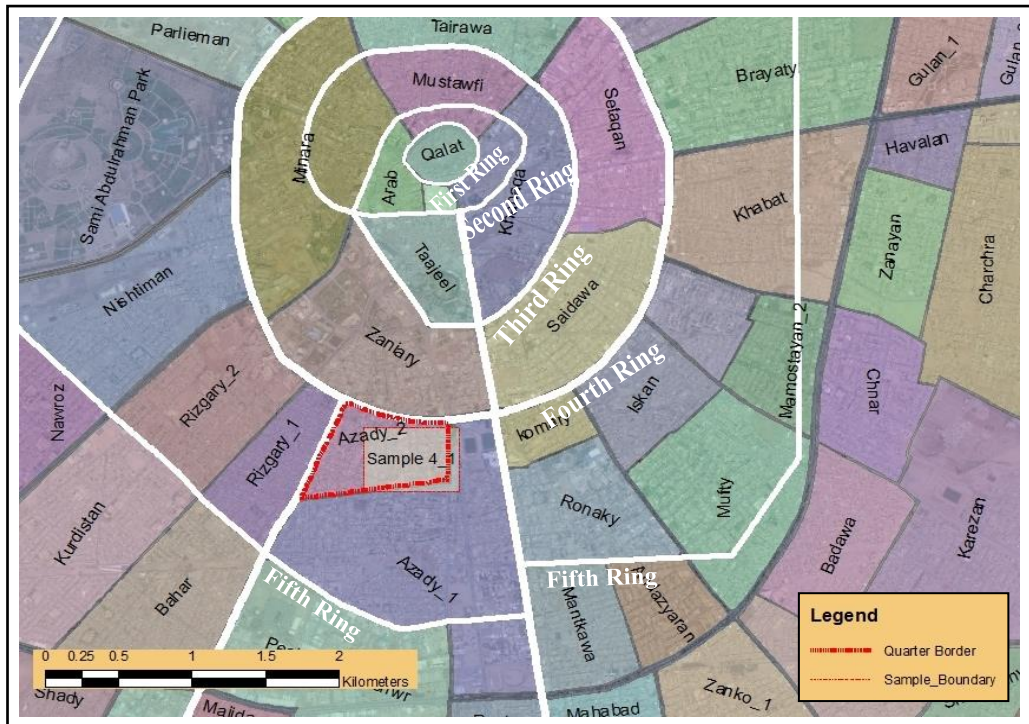


Figure 4.91: The location of ‘Sample 4_1’ and ‘Azady_2’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

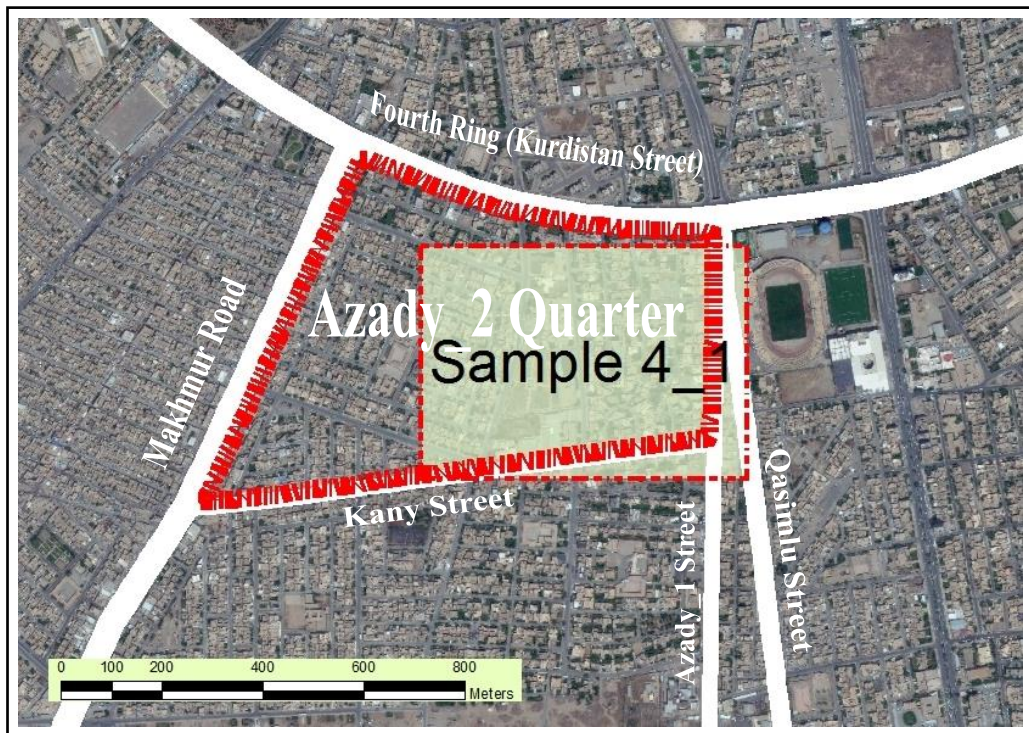


Figure 4.92: Azady_2 quarter boundary. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

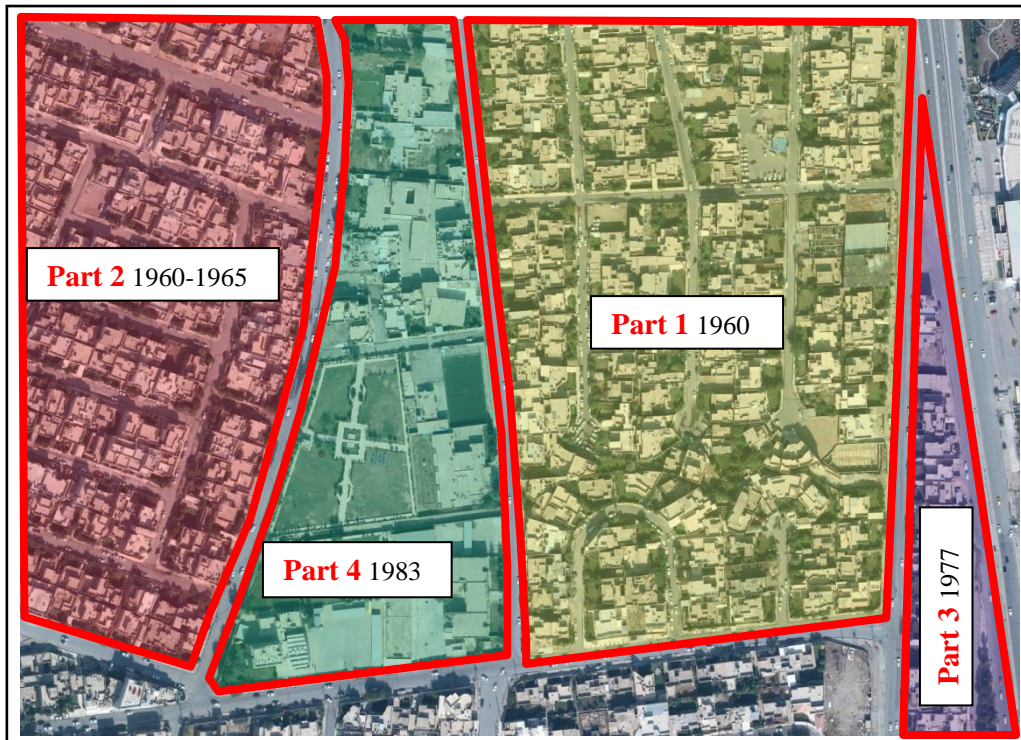


Figure 4.93: The different parts of the ‘Sample 4_1’ area which were formed in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

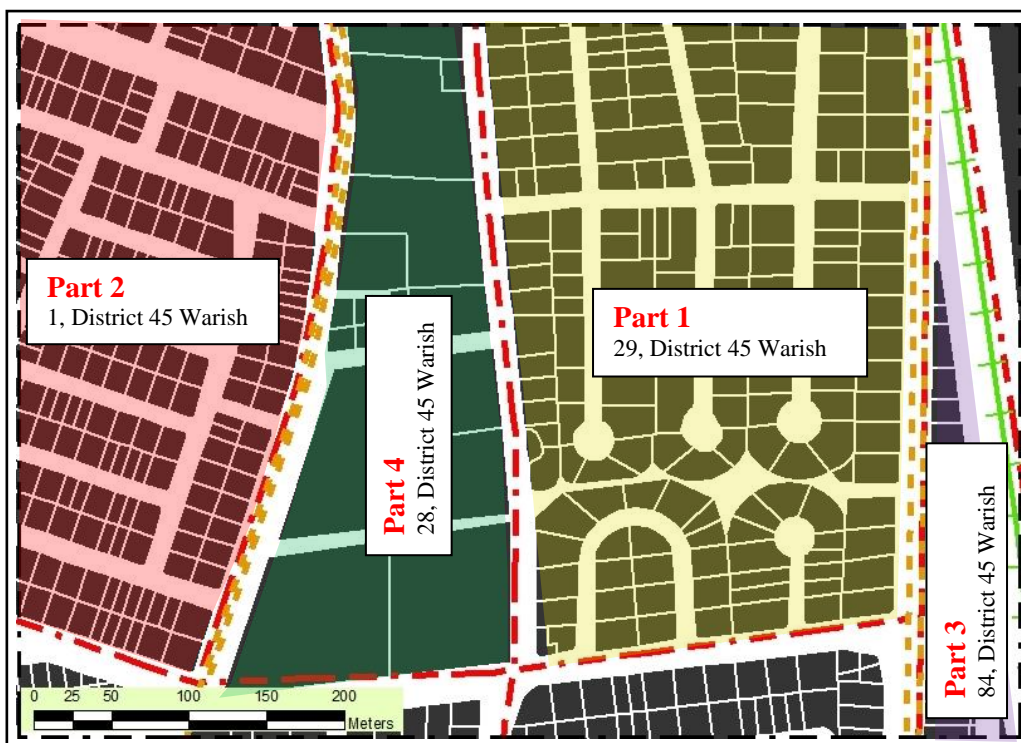


Figure 4.94: The original land feature conform the four different parts which compose the ‘Sample 4_1’ area. The size of the plots differs from one part to another, especially part 2 which has an average plot area of 500m² and part 2 with an average plot area of 300m². (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation: The building form characteristics of the houses

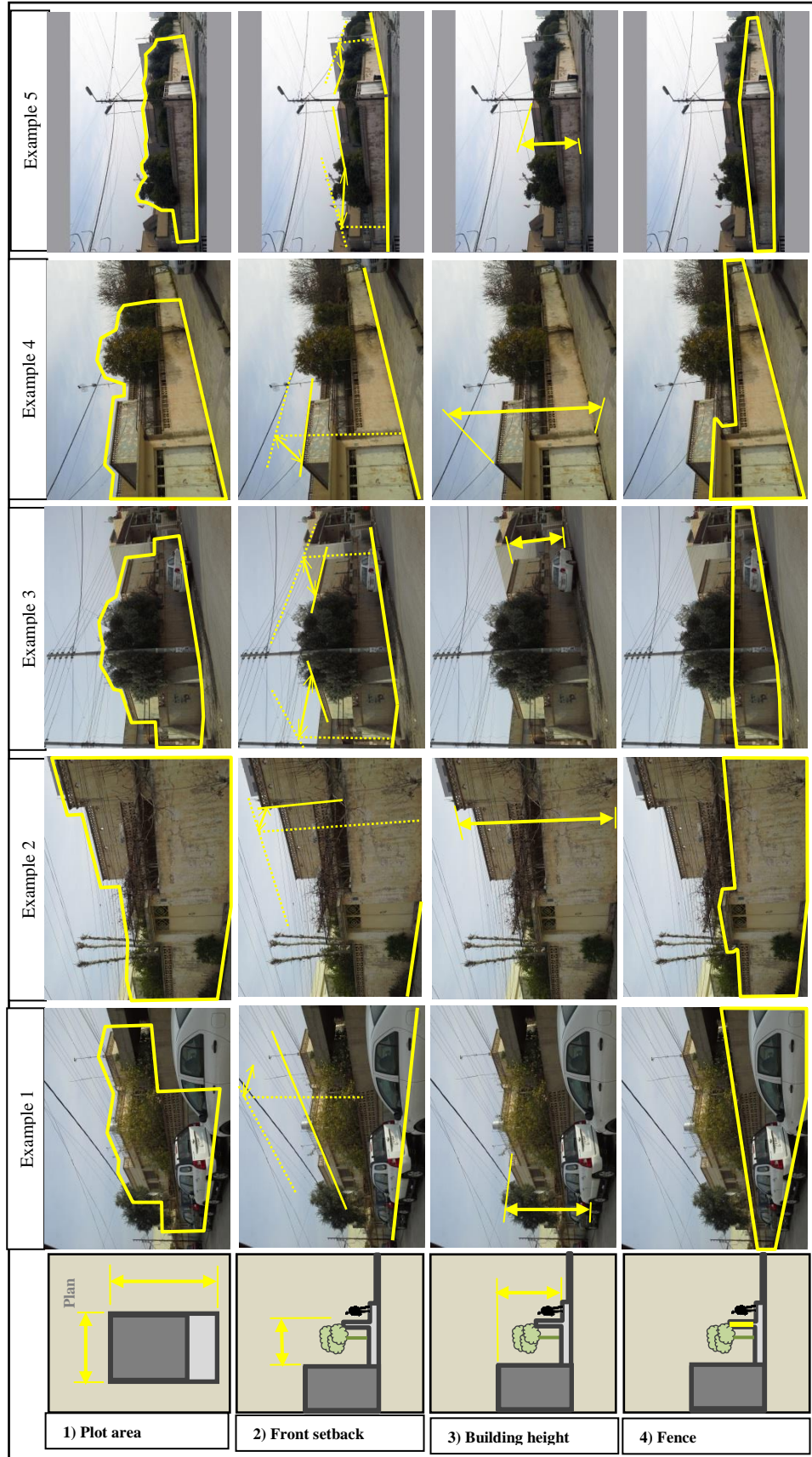


Figure 4.95: The common form characteristics of the houses built in the period (1956-1975) of the first formation of the area of ‘Sample 4_1’. (Source: Researcher)

The Formation: The separation of the houses from the public spaces (streets)

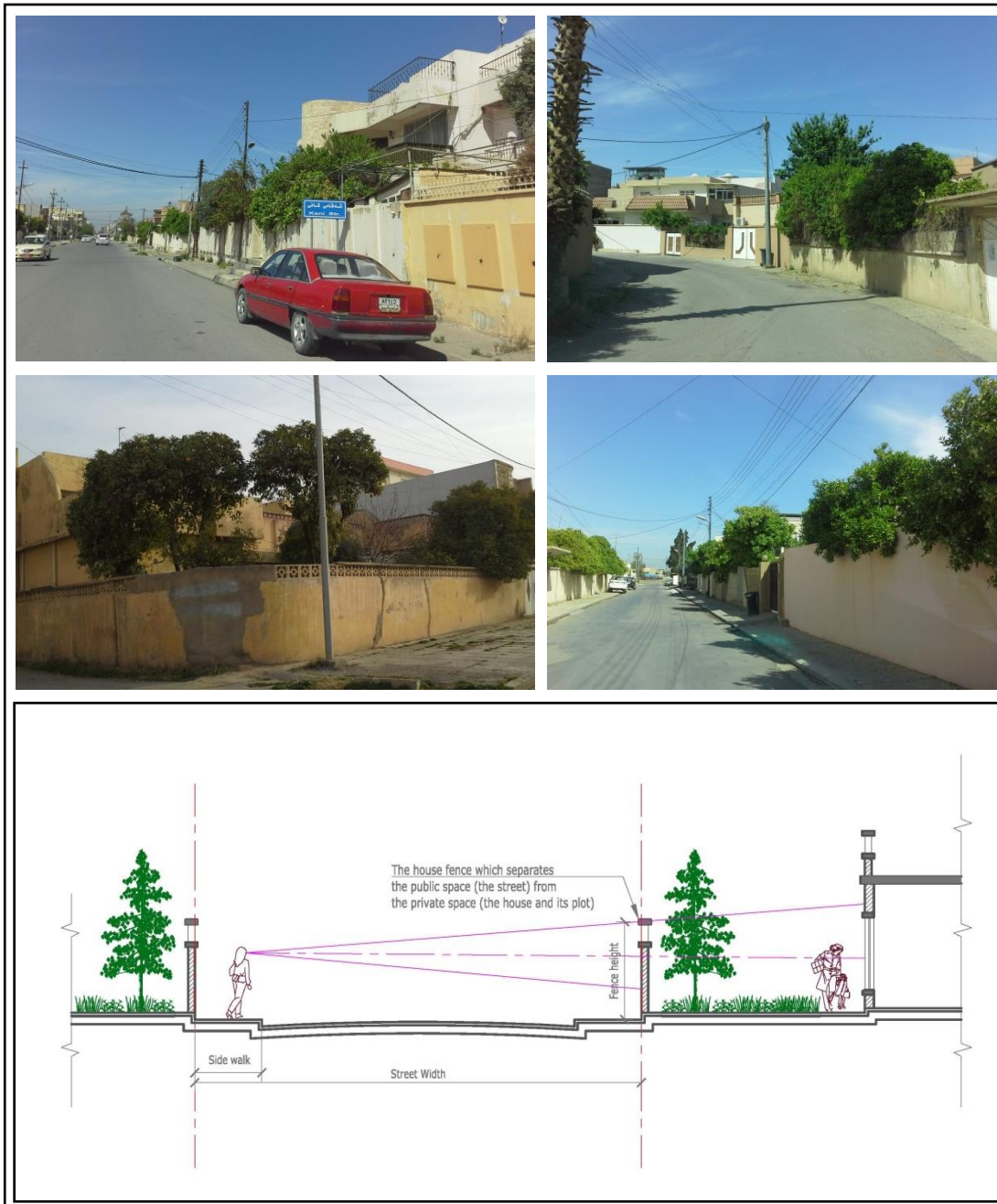


Figure 4.96: The height of the fence and the front setback distance of the house building from the street create a visual barrier that, wholly or partly, prevents seeing the house from outside (the street). The fence works as a strong screen which defines the separation line between the public spaces (streets) and the private spaces (the buildings of the houses). This gives privacy to the house and the front garden which is used by the households. The social, cultural, and religious attitudes of the people have the role in this characteristic. Due to that the older parts of the city which have courtyard type, the private open space is located in the middle of the plot and it is separated from the public space (the street) by some parts and spaces of the building of the house (rooms, storages, and sometimes baths and toilets). This separation also gave privacy to the open court in the house. (Source: Researcher)

The Formation: The plan and the original land features

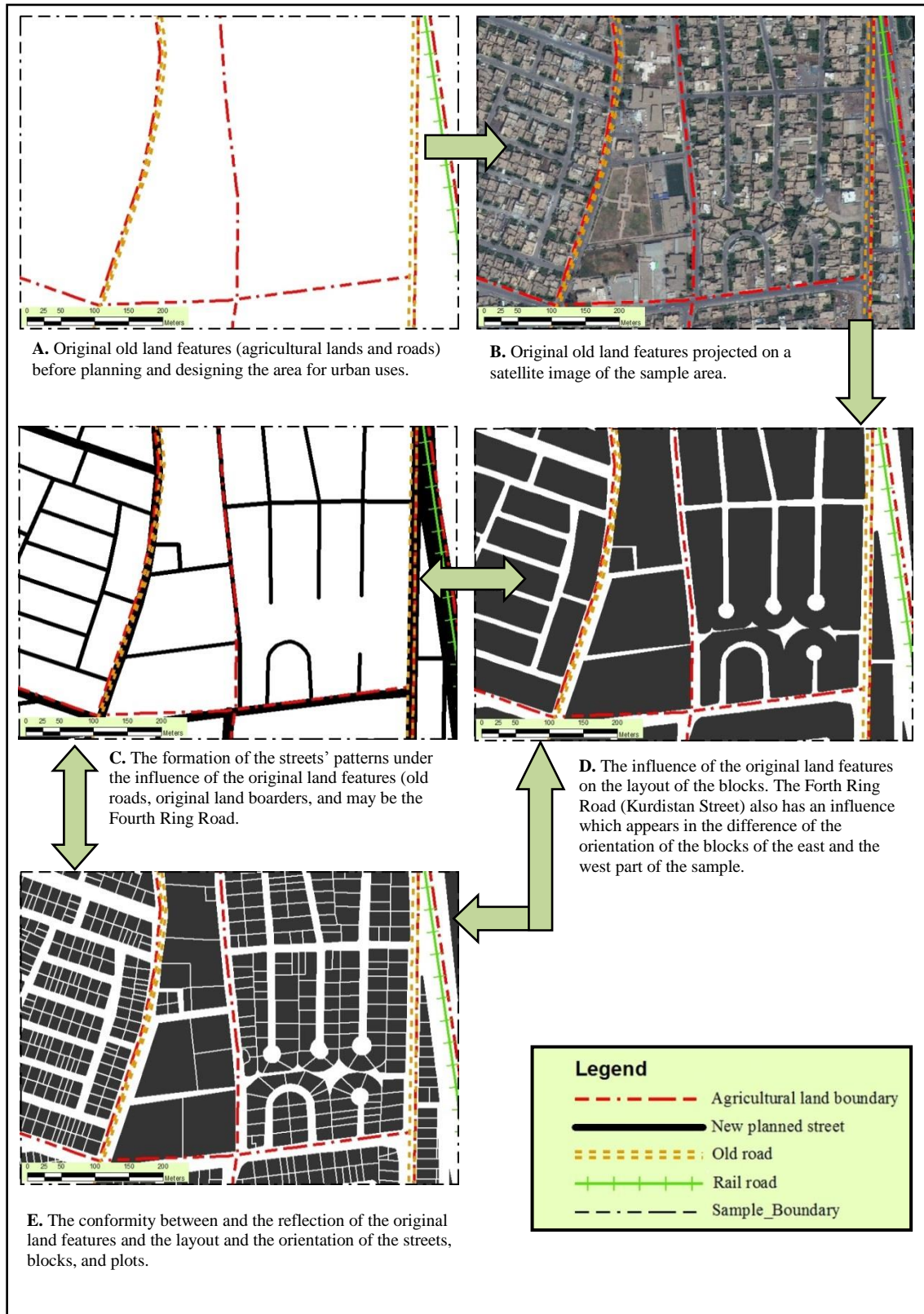


Figure 4.97: The influence of the original old land features (old roads and agricultural land boundaries) on the formation of the area which is reflected in the pattern and the layout of streets and blocks of 'Sample 4_1' area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

1. The formation of the area: The Sample area has been formed as four parts in different periods. The first plan or the first formation was in 1960. Many factors, to different extents, influenced the formation of the area in different periods at different levels.

A. The time period: The four parts included in the sample boundary have been planned and registered in different time periods [Figure 4.93]. According to the classification of the periodic growth of the city, the first emergence of the first part³⁵⁶ (the eastern part) of the area of ‘Sample 4_1’ (Azady_2 Quarter)³⁵⁷ is dated back to the fourth period (1956-1965), more specifically in March 1960 or immediately after the revolution of 1958 which resulted in the change of the governance system from royal to republic. The second part³⁵⁸ (The western part) has been formed in the same time period of that of the first part. The third part³⁵⁹ has been formed in April 1977 or the Sixth Period (1976-1985).

The last part (part 4)³⁶⁰ which is located between the first two parts mentioned, in the first plan of the quarter was labelled as services use. This part now includes services such as hospital, school, kindergarten, garden, and playground³⁶¹. Yet in 1983 few plots in this part were introduced and subdivided for single-family house purposes. Due to that the formation of the area was in a modern period, all the single-family houses of the area reflect the trend towards the modernity. The vernacular courtyard type is completely disappeared in this area.

B. The housing policy: ‘Housing Policy 1’ was adopted in this area. The individual ownership is prevalent in the area. Each owner has the right when to submit the documents for gaining building permission to start building his or her house. Accordingly, the building process of the area continued over a long time span. Like most of the quarters built under the ‘policy 1’ of housing, the gradual and the accumulative process of the formation and the transformation exist in this area. As a result, it is possible to have different forms and types of houses which have been

³⁵⁶ The registration number of the first part is “29, District 45 Warish”

³⁵⁷ A small part of the “Sample 4_1” area is from “Azady_1” quarter which has a registration number “2, District 45 Warish”.

³⁵⁸ The registration number of the second part is “1, District 45 Warish”

³⁵⁹ The registration number of the third part is “84, District 45 Warish”

³⁶⁰ The registration number of the fourth part is “28, District 45 Warish”

³⁶¹ This type of buildings is not included in the study.

built in different periods. The owners of the houses consist of a demographic mixture. Some of the original residents of the city who resided in the older parts of the city (the citadel and the surrounding area of the citadel), themselves or their family extensions moved out to reside in the newer quarters such as 'Azady_2' where they have the opportunity to live in larger houses with spacious gardens and modern neighbourhood services. Another component of the residents of 'Azady_2 quarter' was the people who came from other towns of the province of Erbil and even other cities of the region.

C. The regulations: The ground plan of the area was planned and projected according to the amendment of 1934 of 'The Law of Municipalities Administration No. 84 of 1931' and '*The Amended System of Roads and Buildings No. 44 of 1935*'³⁶². The minimum requirements of street width, plot area, and building orientation within the plot were the reflection of this legislation. Then, the last two amendments of 1964 and 1984 of this legislation, and the successive regulations have put their touch on the continual process of building and transformation of the area. See [Table 4-16], and [Table 4-17].

The characteristic which distinguishes this quarter is that, with having four dead end streets in the first part of the 'Sample4_1' area, is the only planned Cul-de-sac type in the city [Figure 4.94]. However, from the ground plan of this plan unit (the 'Cul-de-sac' group of blocks and streets) it appears that they have not integrated well within the context. This would confirm the claim of importing this plan unit as it was from another context into this area of context, without any modification to adapt to its new place context. Consequently, some transformation in the later periods was made to treat the spaces. The characteristics of the form of the early single-family houses in the area is, to a considerable extent, the result of the requirements of the form elements of building regulated by '*The Amended System of Roads and Buildings No.44 of 1935*' [Figure 4.95].

The areas of the houses ranges from 300m² to 600m² and few plots have areas more than 600m², especially those are in the eastern part

³⁶² The Monarch of the Kingdom, *System of Roads and Buildings No.44 of 1935*, pt. 1 Chapter 5.

(Part 1). The average area of the plots of the east part is 500m². Most of the plots in this part have areas fall in the range (450m² -600m²). However, the western part (Part 2) and the few plots in the middle part (Part 4) have plots with an average area of 300m². There are also some exceptions of areas more than 300m². Most of the houses have one storey height (3m- 4m) with staircase and a stairwell (penthouse) which leads to the roof of the house. There are also some cases of two storeys. The front setback distances of 2.5m² and up which allow having enough area for a spacious front garden and a car park area. The house is separated from the street by a fence with height (1.4m -2.2m). The height of the fence is proportioned with the height of the house, the width of the street, the front setback distance, and the vegetated front garden in a way that create a barrier which visually separates the house from the street (the public space) [Figure 4.96]. The fences reflect the social characteristic of the residents of the city at that time and it still exist.

The houses which have been built before 1964 were submitted to the amendment of 1939 of '*The System of Roads and Buildings No. 44*'. Accordingly, 2.5m as a minimum setback distance from all the sides of the plot in the third urban area category was applied. However, the amendment of 1964 of the system changed and restricted the compulsory setback of building to be only from the street side. The continual process of building resulted in producing different forms of houses which represent the different time periods.

D. Other determinants: Other influencing factors that have determined the resulted form of the ground plan and its layout can be summarised into two: the demographic nature of the first owners and the residents, and the geographic determinant which is represented in the location and the original features of the land used for the quarter. The original features include the old roads, old rail road³⁶³, and original agricultural land boundaries. There is conformity between the original land features and the produced ground plan. The old roads including the railroad and the agricultural land boundaries left traces on the new plan [Figure 4.97].

³⁶³ The railway link between Erbil and Kirkuk was opened in 1949. Yet it was abandoned in 1970s by the Iraqi government. Consequently the rail was removed but it left an influence on the plan and the formation of some areas of the city, including "Azady_2" quarter.

The fourth ring road (Kurdistan Street) has also an imprint on the quarter as it bounds the quarter from the north [Figure 4.92].

The social composition, in the early formation of the area, was an admixture of the families or the extensions of the families who lived in the older parts of the city and the citadel. This group consists of people who mostly were government employees. The other group of the residents was families came from other towns of the province and other towns and cities of the region. Again, most of those people were also worked in government institutions. Most of those two groups were in a good economic status which reflected in the urban form of the quarter and the building of the relatively large houses.

The geographic determinants (the original land features) also influenced the form of the layout of the first plan of the area. However, this was also submitted to actions regulated by a set of legislations³⁶⁴ other than those mentioned which directly related to building and planning. This set of legislations consists of different laws and systems which gradually and over time, defined and treated all the issues regarding land ownership, titling and real estate transactions in Iraq since its establishment in 1920.

³⁶⁴ A set of regulations regarding land tenure and land ownership indirectly influenced the urban form of the city. Examples are “*The Law of the Assesment of Land Rights No. 50 in 1932*”, “*The Law of Luzma No. 51 in 1932*” and its amendment in 1938, “*The Law of the Assesment of Land Rights No. 29 in 1938*” in its successive amendments until 1969, “*The System of Tapu No.26 in 1943*”, “*The System of Tapu No.64 in 1959*” and its successive amendments until 1961, “*The Law of Real Estate Registration No. 43 in 1971*”, “*The Law of Agriculture Reform No. 30 in 1958*” and its successive amendments, “*The Law of Agriculture Reform No. 30 in 1958*”, “*The Law of Agriculture Reform No.117 in 1970*” and its amendments, and the laws of expropriation and titling.

The Transformation: The selection of blocks samples

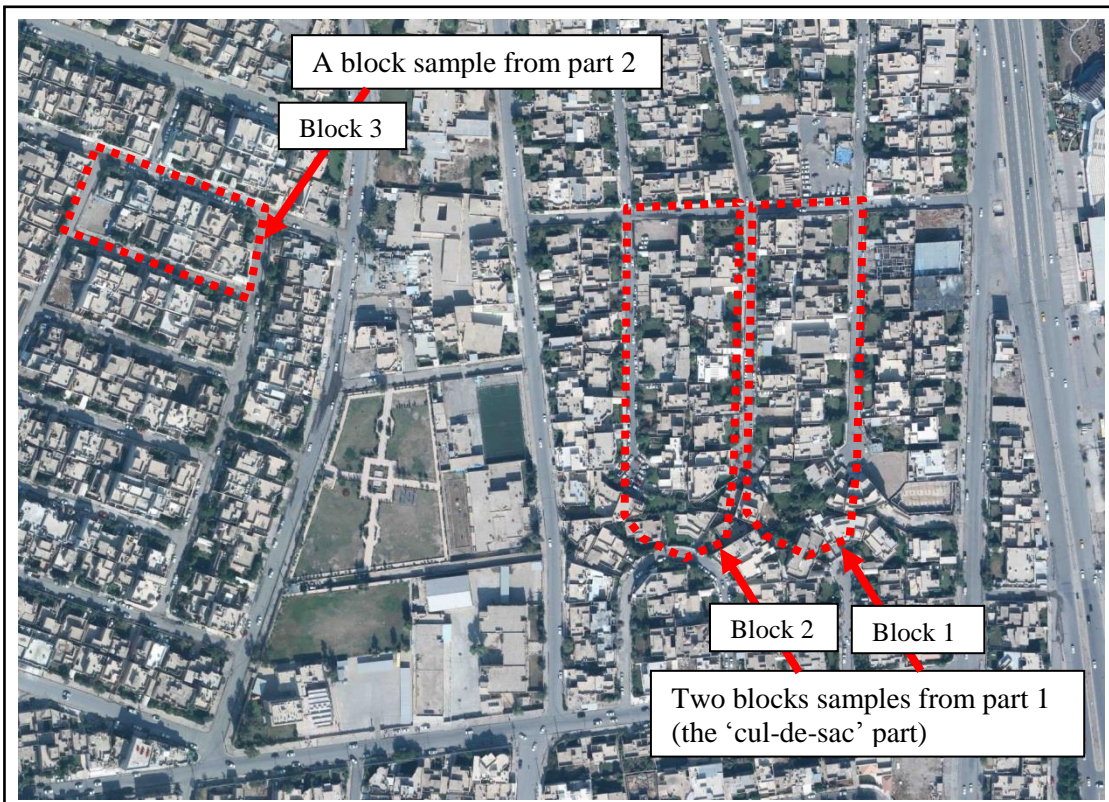


Figure 4.98: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

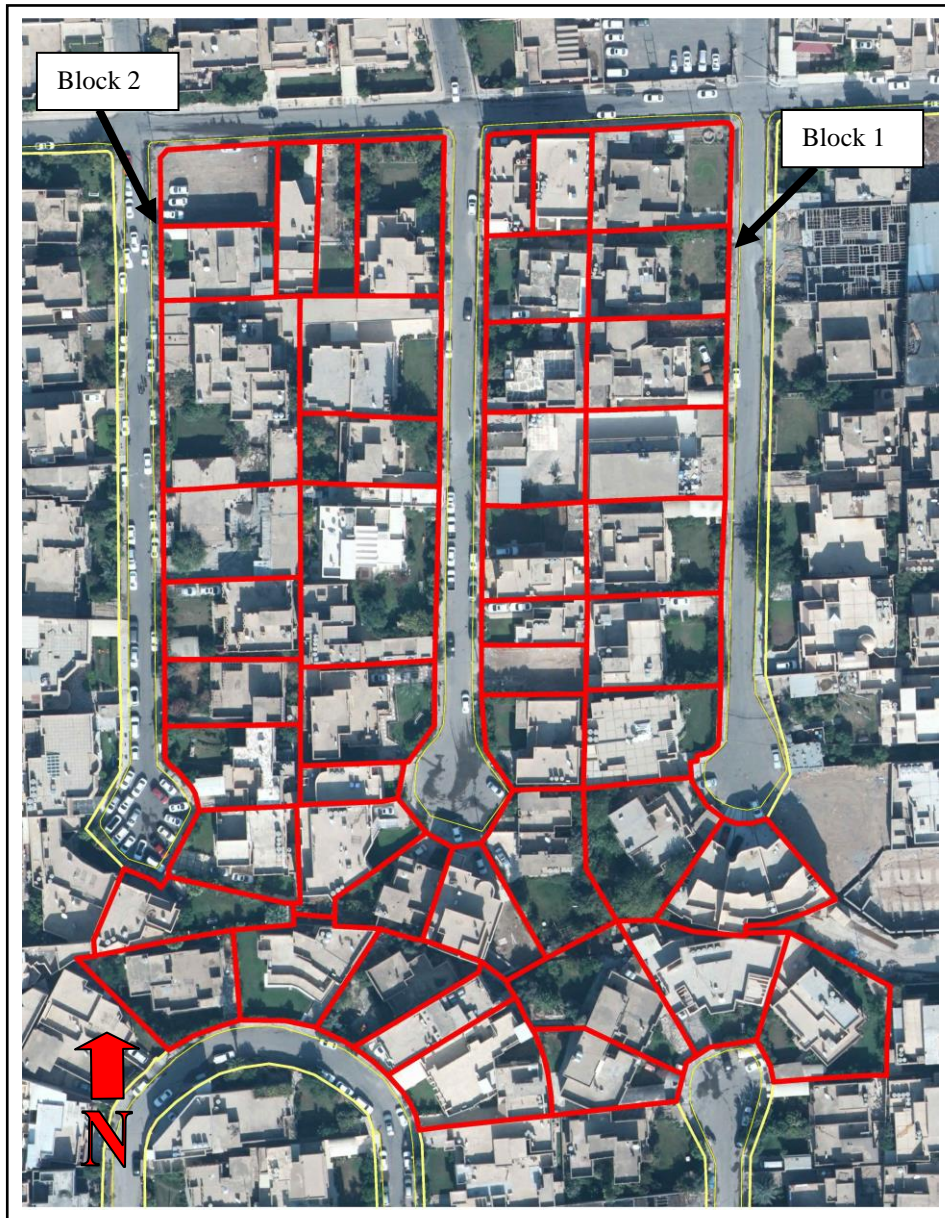


Figure 4.99: Two blocks (block 1 and block 2) samples selected from the first part of 'Sample 4_1' area showing the existing condition. The blocks have been built as the third urban area category of the 'Amended System of Roads and Buildings No. 44 of 1935'. The areas of the plots vary. All the original plots (the plots which have not transformed) have areas range from 300m² to 600m² (20m X 25m). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: Building- Plot parameters

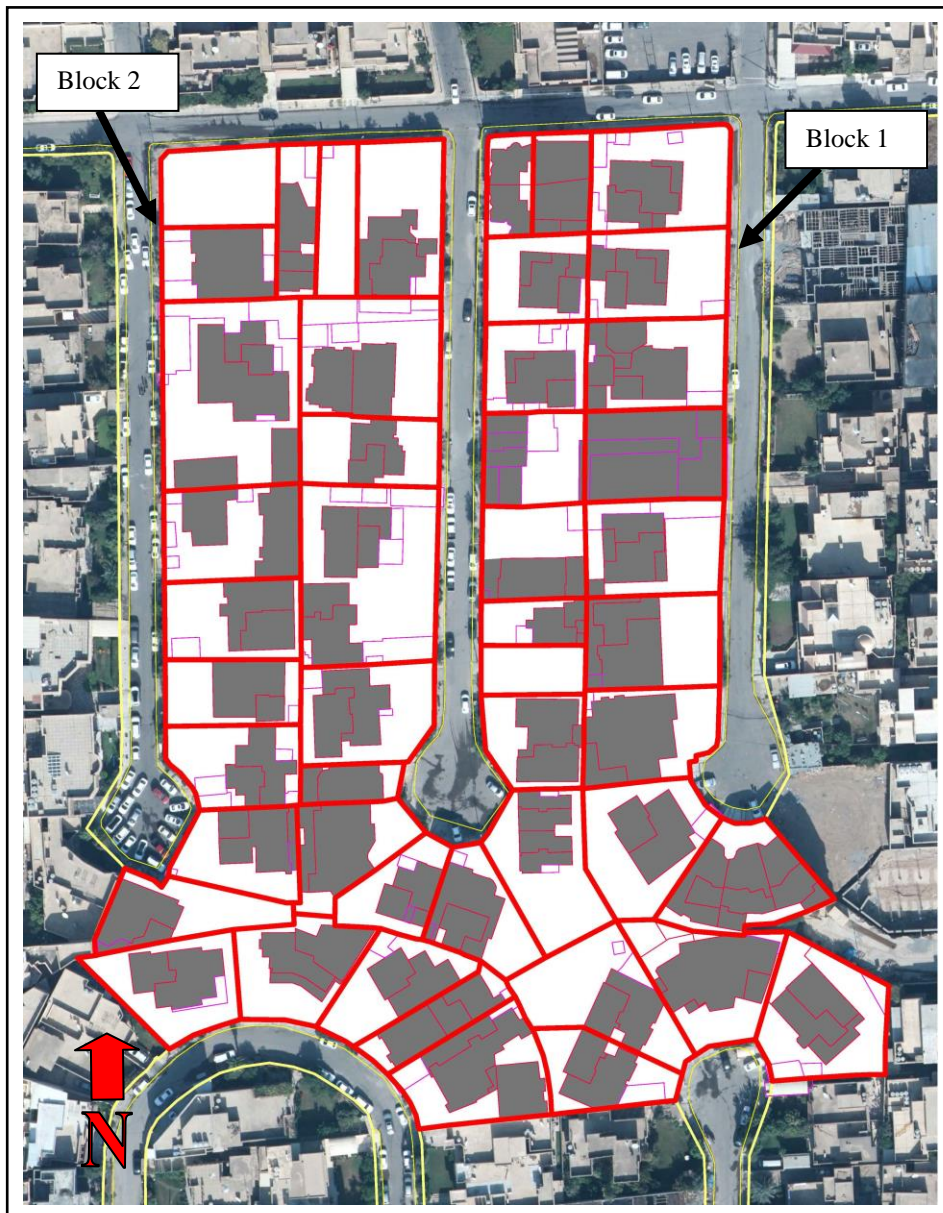


Figure 4.100: Two blocks (block 1 and block 2) samples selected from the first part of the ‘Sample 4_1’ area showing the existing condition. The existing building types are a mixture of detached, semi-detached, and attached houses. Due to the changes in the regulations over time, the setback distances vary. There are cases (the buildings which have not applied front setback and the minimum limit of plot coverage) that do not match the regulations. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

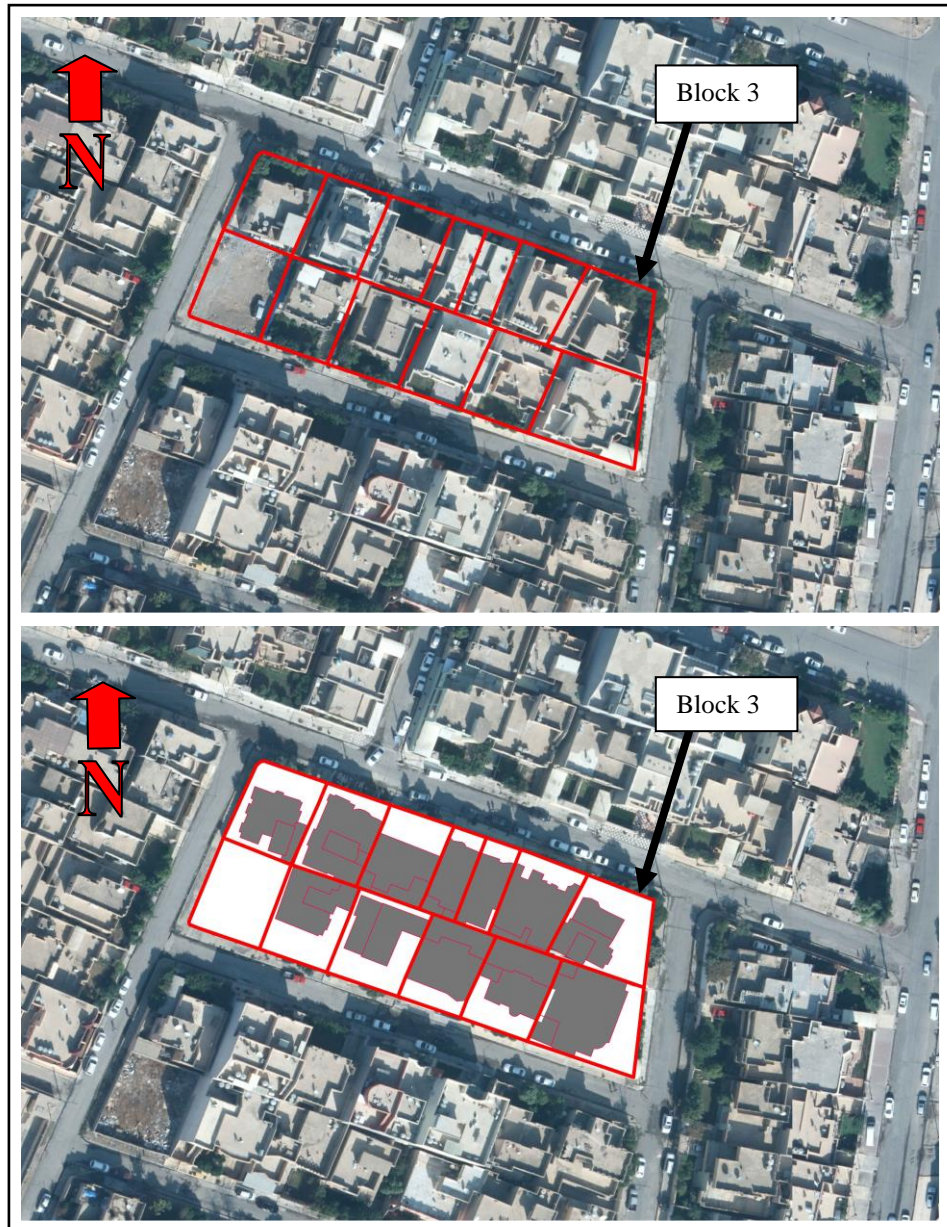


Figure 4.101: A block (block 3) sample from the second part of the area. The early building process of houses on the block is dated back to after 1964. They were built as the third urban area category of the amendments of ‘*The System of Roads and Buildings No. 44 of 1935*’ made by 1965. The average area of the original plots is 300m² (15m X 20m). However, some cases have areas more than 300m², especially the plots at the corners which usually have areas more than the typical. The type of the houses is attached with front setbacks which are regulated by both, the amendment of 1964 of ‘*The System of Roads and Buildings No.44 of 1935*’ and ‘*The Instructions of the Decision No. 850 of 1979*’. The houses of the block have been built in the successive periods since 1964 and the process of the removal of the old houses replaced by new is still in progress. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

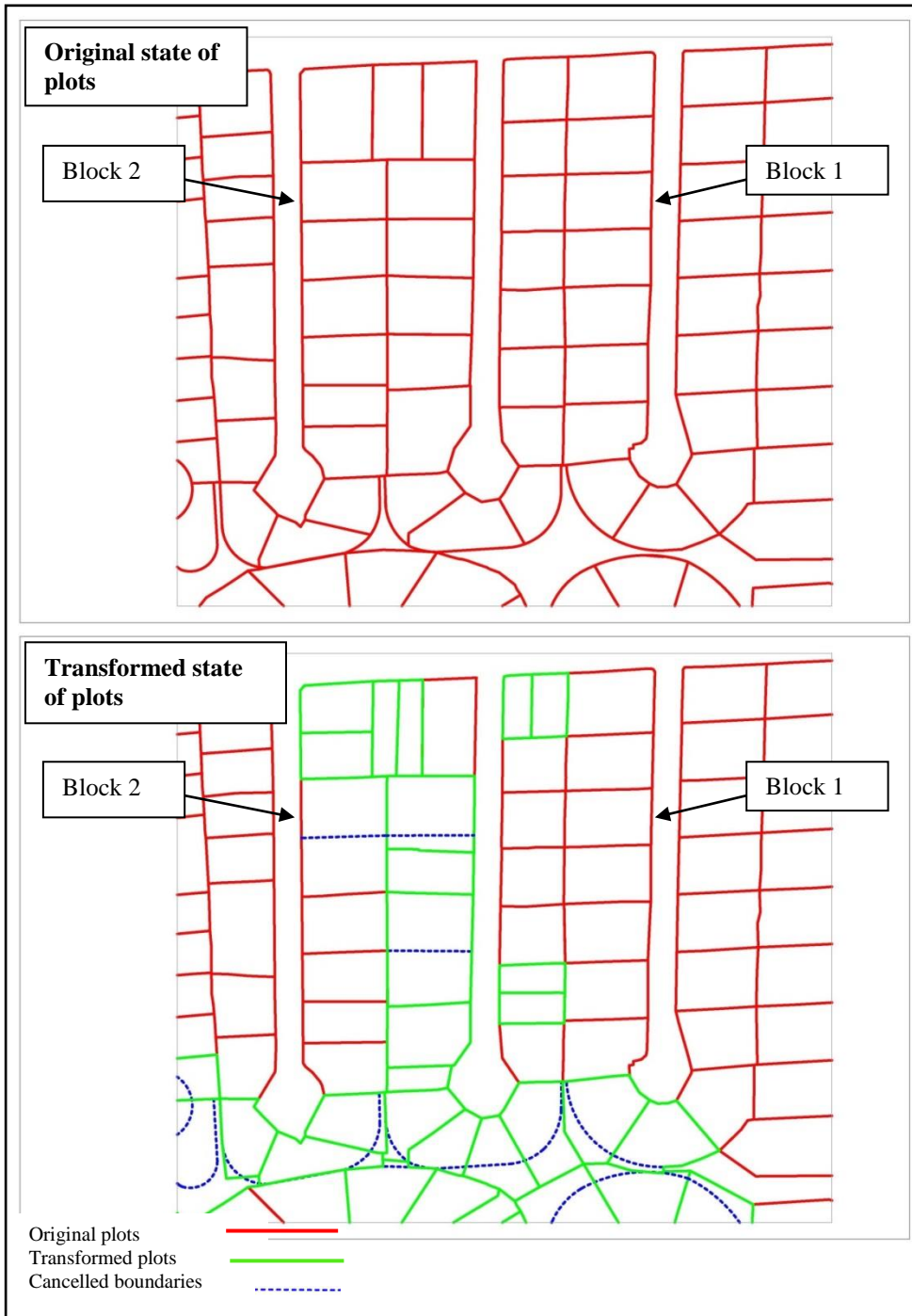


Figure 4.102: The selected blocks (block 1 and 2) from the first part of “Sample 4_1” area. The transformation (pooling and subdivision) on some plots under the successive regulations issued after the first formation of the area. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

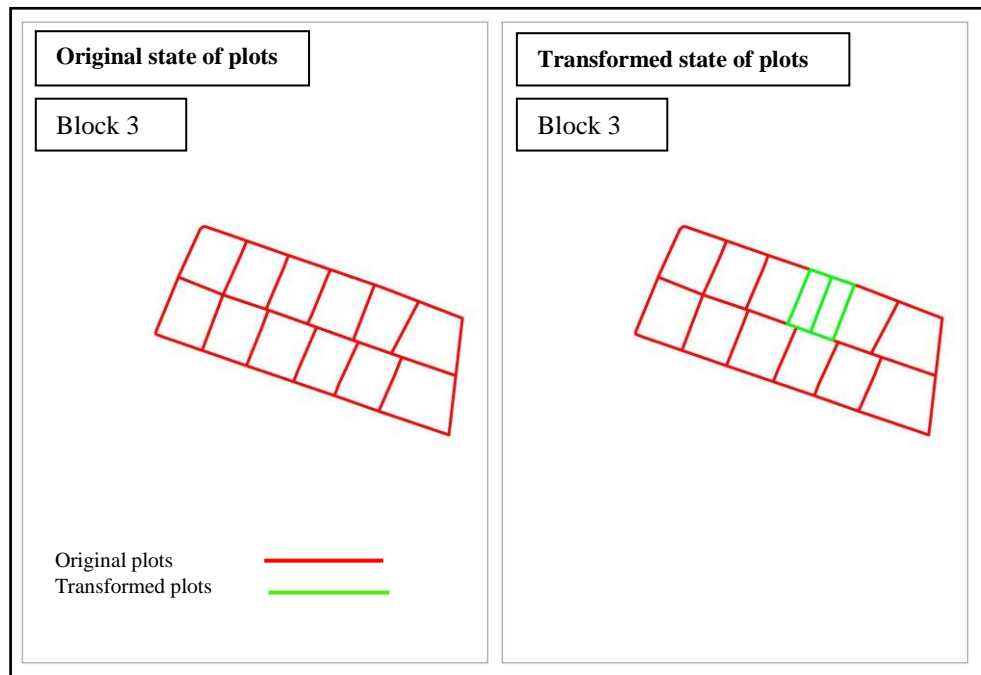


Figure 4.103: A block (block 3) sample from the second part of the area. The average area of the original plots is 300m² (15m X 20m). There is one case of informal subdivision into two plots for two individual houses. This type of subdivision now became a common trend in the area. In this process the old house is removed and replaced by two houses each share an area of 150m² (7.5m X 20m) or (15m X 10m) in the case of the corner plots. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

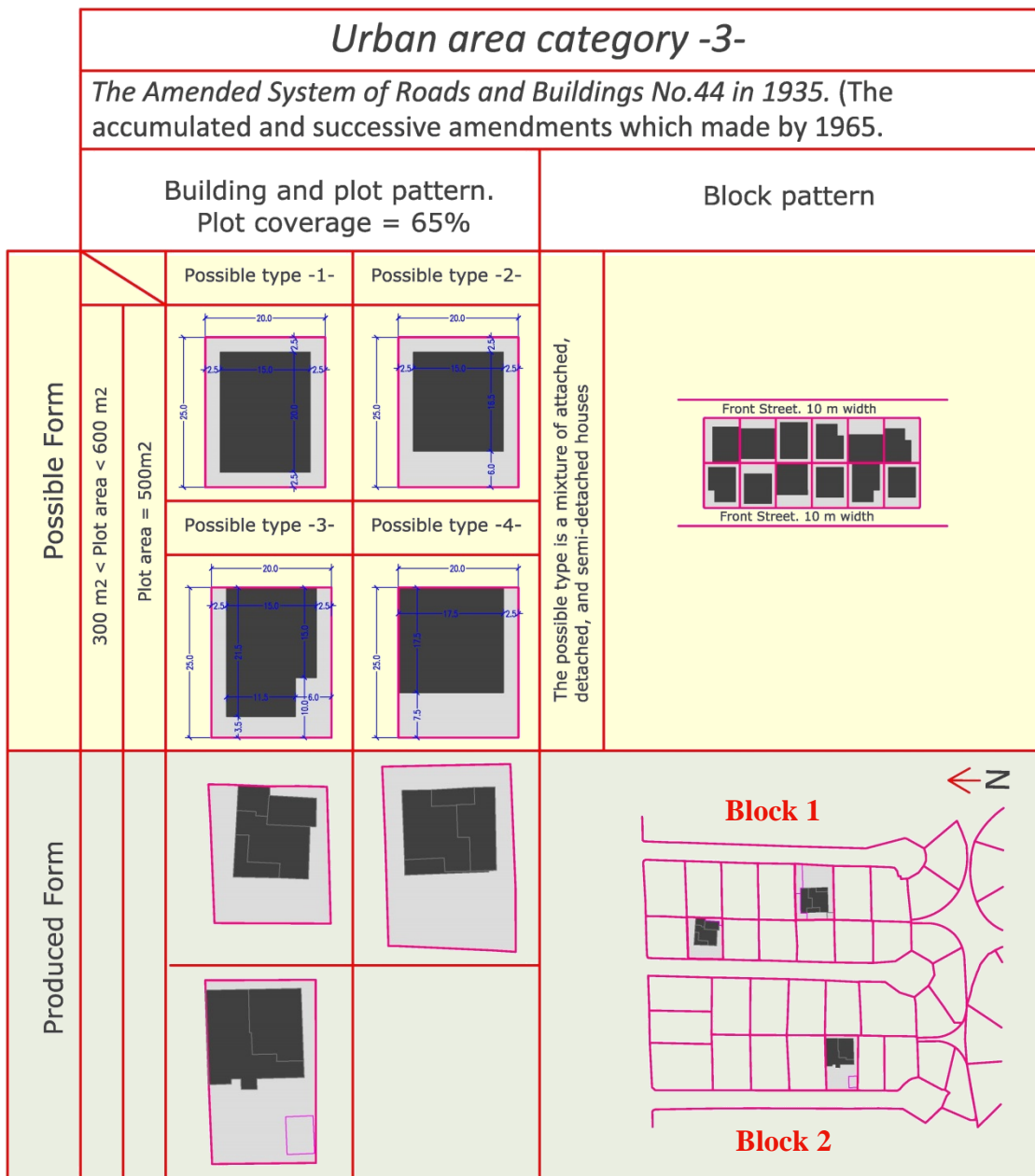


Figure 4.104: The possible form of buildings and plots of the third urban area category which can be produced by the successive and the accumulated amendments of ‘*The System of Roads and Buildings No. 44 of 1935*’ by 1965, and the real produced form by the same system in the first part of ‘Sample 4_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)



Figure 4.105: The possible form of buildings, plots, and block and street of the third urban area category which can be produced by successive and accumulated amendments of ‘*The System of Roads and Buildings No. 44 of 1935*’, ‘*The Decision No. 850 of 1979*’, ‘*The prescriptive No. 851 of 1980*’ and the ‘*Decision No. 940 of 1987*’ on one hand, and the real produced form by the same set of regulations in the first part of ‘*Sample 4_1*’ on the other hand. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

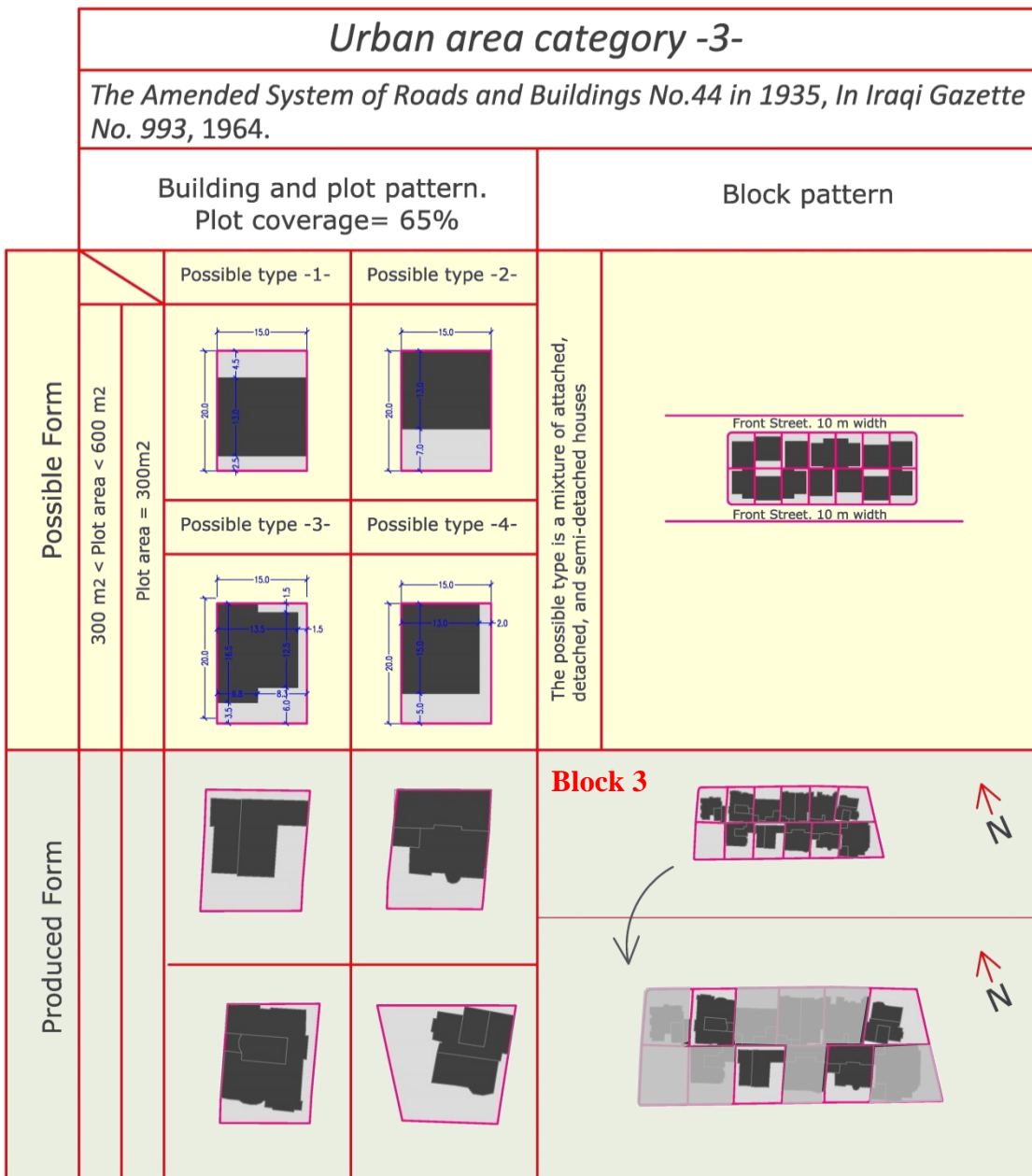


Figure 4.106: The possible form of buildings, plots, and block and street of the third urban area category which can be produced by ‘*The Amended System of Roads and Buildings No. 44 of 1935*’ and the real produced form by the same system in the second part of ‘*Sample 4_1*’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: The building form characteristics of the houses

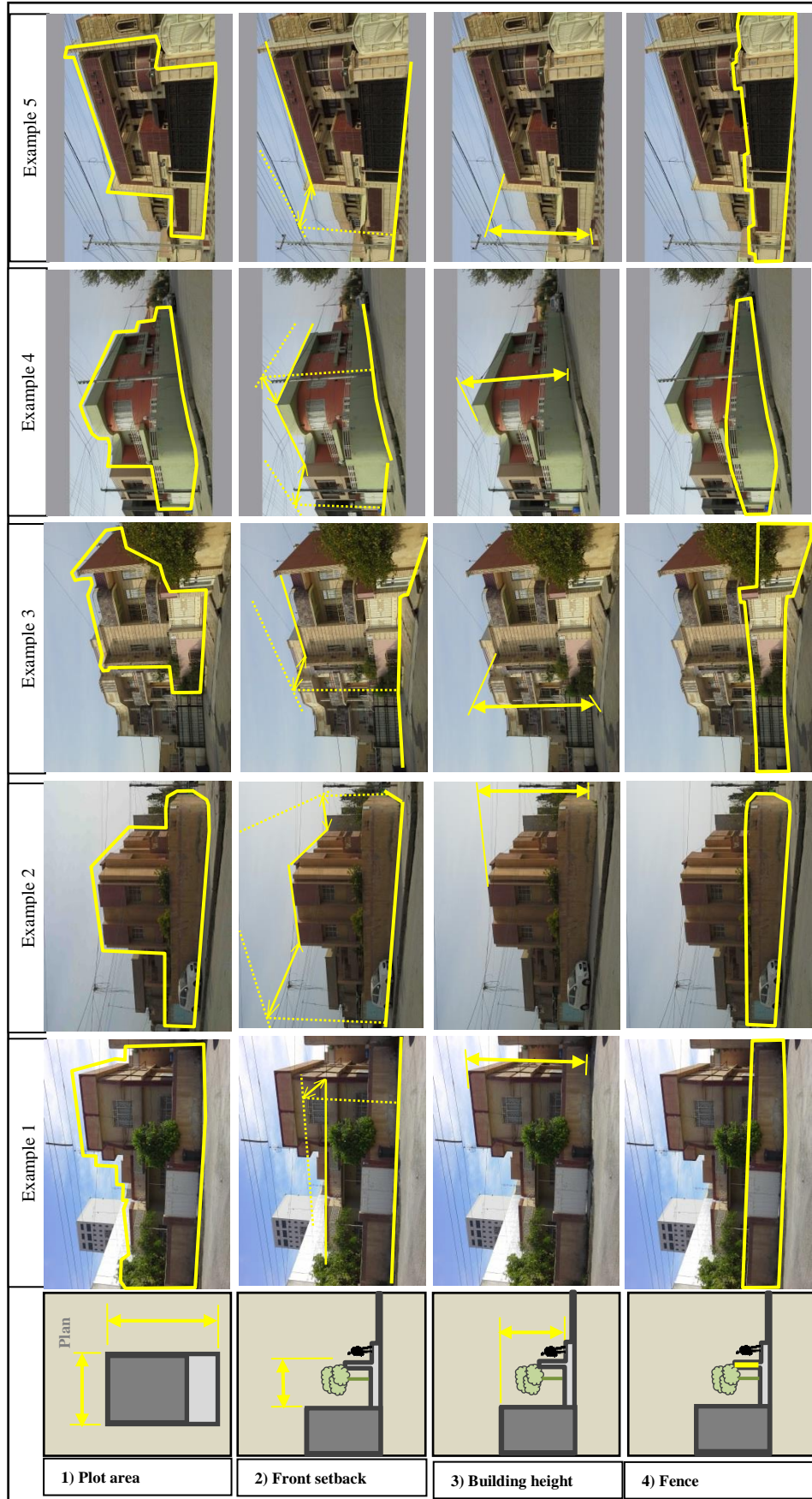


Figure 4.107: The common form characteristics of the houses built in the period (1975-2013) in the area of ‘Sample 4_1’ (Azady_2 Quarter). (Source: Researcher)

2. The transformation of the area: Subsequent events have had a significant influence on the urban form of the area of 'Sample 4_1' and its transformation since its formation in 1960s. To understand the change and the transformation of the urban form, the same structure of the headings presented in the formation will be followed here as well.

A. The time period: The first formation of the area of 'Sample 4_1' was in the fourth period (1956-1965), more specifically in 1960. This means that the area was planned and built after the revolution of 1958 by which the system of the governance changed from royal to republic. The three historical key events in the country and Kurdistan influenced the urbanization process in Erbil. Consequently, this influenced the urban form and the transformation of it. The first two events influenced positively. The political agreement of 11th March of 1970 by which Kurdistan obtained the autonomy³⁶⁵ and the nationalization of IPC (Iraq Petroleum Company) in 1972, resulted in the political stability and the economic growth of the country in 1970s.

In 1970s the country witnessed an acceleration of urbanization which reflected in the housing. This encouraged people to build houses. Building process in the new introduced and planned neighbourhoods in the city continued. The quality of the implementation of the regulations and the follow-up was acceptable. However, the event which negatively affected the process was the denunciation of the agreement in 1974. The continual process building in the later periods, to different extent influenced the transformation of the area.

B. The housing policy: 'Housing Policy 1' has been adopted in building up the quarter and its growth over all the successive periods from 1960s. This resulted in the gradual and the dramatic transformation which happened differently and heterogeneously over the area, especially the changes on the level of plots and buildings due to that they are owned by different owners. As a result, the buildings and the plots were submitted to singular and individual actions of management and transformation. In other words, the matter of the change and the transformation on the plot or the building was up to the owner. The owner decides when and how to

³⁶⁵ The agreement was between the central government of Iraq and the Kurdish of Iraq.

make changes on his or her plot or building, but with the accordance with the other determinants, especially the regulations.

C. The regulations: Building regulations played a significant role in the process of the change and the transformation of the form of the area. The successive legislations of building and planning [Table 4-16] and [Table 4-17] in Iraq, in Kurdistan especially after 1991, and in Erbil have dramatically resulted in layers of transformations strongly reflected on buildings form but less on streets pattern. Three blocks samples are selected for a further analysis on the plot and building level. The first two blocks are from the first part of the area. The third block is from the second part [Figure 4.98].

Three remarkable changes on the regulations have resulted in the transformation of the area. The first was the amendment number 16 in 1964 on '*The system of Roads and Buildings No. 44 of 1935*'³⁶⁶. In this amendment 2.5m² setback distances became only compulsory on the side of the buildings adjacent to streets while it was compulsory on all the sides (sides adjacent to streets and neighbour plots) of the building or the house. By then, very few houses had been built in the area. The second influential change in the regulations was '*The Decision No. 850 of 1979*'³⁶⁷ and '*The Instructions No. 851 of 1980*'³⁶⁸. Those two integrated legislation opened the way, regardless the number of the urban area category, to subdividing the plots that have areas of 240m² or more. They also regulated setback distances in regard with the area of the plots, however it stated that in the parts of cities built before this decision the existing setback distance applied previously will be valid and applied on any new building. These two legislations have no significant influence on the area of 'Sample 4_1'. The third legislation was '*The Decision No. 940 of 1987*'³⁶⁹.

The latter legislation has influenced the plot sizes and the house areas. The minimum allowed area of subdivision became 200m². This

³⁶⁶ The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*.

³⁶⁷ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

³⁶⁸ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

³⁶⁹ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

means any plot with an area not less than 400m² can be subdivided into two. This has influenced the first part of 'Sample 4_1' area which has plots of the average area of 500m² and some cases have areas more than 500m² [Figure 4.99]. The existing condition of plot and building type in 'Block1' and 'Block 2' is a mixture of detached, semi-detached, and attached houses [Figure 4.100]. Supported by the successive regulations, some of the plots in these two blocks were subdivided into two. On the contrary, few cases of pooling plots can be observed as well [Figure 4.102]. In addition, the unsolved and undefined spaces left behind and between the plots located at the closed end of the street were treated as 'left areas' (Fazla) and submitted to a process of split into parts to be merged with the plots.

However, in 'Block 3' of the second part of the area the original typical plot area is 300m² (15m X 20m). The existing condition of the building type of the houses of this block again, is a mixture of detached, semi-detached, and attached. There is not a straight building line as a result of not having a uniform front setback distance [Figure 4.101]. The informal subdivision is a characteristic when the original average plot size was 300m². As a result, there is one case of informal subdivision in this block and this was made after demolishing an old house on this plot and replaced by two houses. The original plot which had 300m² has been used for two houses each shares 150m² plot areas [Figure 4.103].

To measure the extent of the influence of the regulations on the ground, the possible forms that can those regulations generate, are compared against the resulted forms on the ground. In the first part, the two selected blocks are treated with. The earlier regulations (regulations being valid before 1964 in this area) imposed setback distances from all the sides of the plot. Consequently, detached house type was produced [Figure 4.104]. In few cases, this trend continued even after 1964 when the amendments of the regulations identified compulsory setback distance to be only from the sides adjacent to the streets (front setback). In theory, the three different legislations of 1979, 1980, and 1987 would abolish the homogeneity in the areas of the plots, the setback distances, and the plot coverage percentage [Figure 4.105]. This also affected the second part of the area as the result of the process of replacing old houses

by two new houses in an informal subdivision action happened on the plots buildings [Figure 4.106]. Some old houses were removed and replaced by newer ones regulated by the newer legislation. As a result, the forms of houses in a block carry the characteristics of the forms from the successive periods from 1960 to 2013.

The forms of the single-family houses of the area built after 1975 until now convey the characteristics of the forms influenced by the different determinants of the time periods and the successive regulations. The common characteristics can be summarised under four headings [Figure 4.107]. The quarter includes a mixture of houses which have various plot area (original typical areas and transformed areas either by subdivision actions or pooling). Therefore the plot area ranges from 150m² to 1000m². All the houses have front setback but with different distances despite that the minimum limit which is 2.5m has been applied. Some houses have spacious front gardens (Examples 1, 2, and 4) but this is less apparent in the houses built in most recent periods, especially after 2003 (Examples 3 and 5). The majority of the houses have two floors' height. However, there are some cases of one storey or three storeys. The last point is the fence of the houses which determines the boundary of the house. As the height of the house increases and the front setback distance decreases, the form of the houses becomes more apparent from the streets. This is the contrast to the houses built in the first formation of the area (1956-1975).

The pattern of the streets has stayed constant. No notable change and transformation on streets can be mentioned. The only change on the streets was decisions on the change of the use of some streets from residential to commercial. These decisions based on Article 25 of '*The Law of the Municipalities Administration No.6 in 1993*'³⁷⁰. Transformed streets from residential to mixed and commercial uses produced a mix of multistorey buildings and houses.

D. Other determinants: The transformation of the area has happened by some determinants which, in a complex network of relationships connected to the key historical events in the state and in the city, the

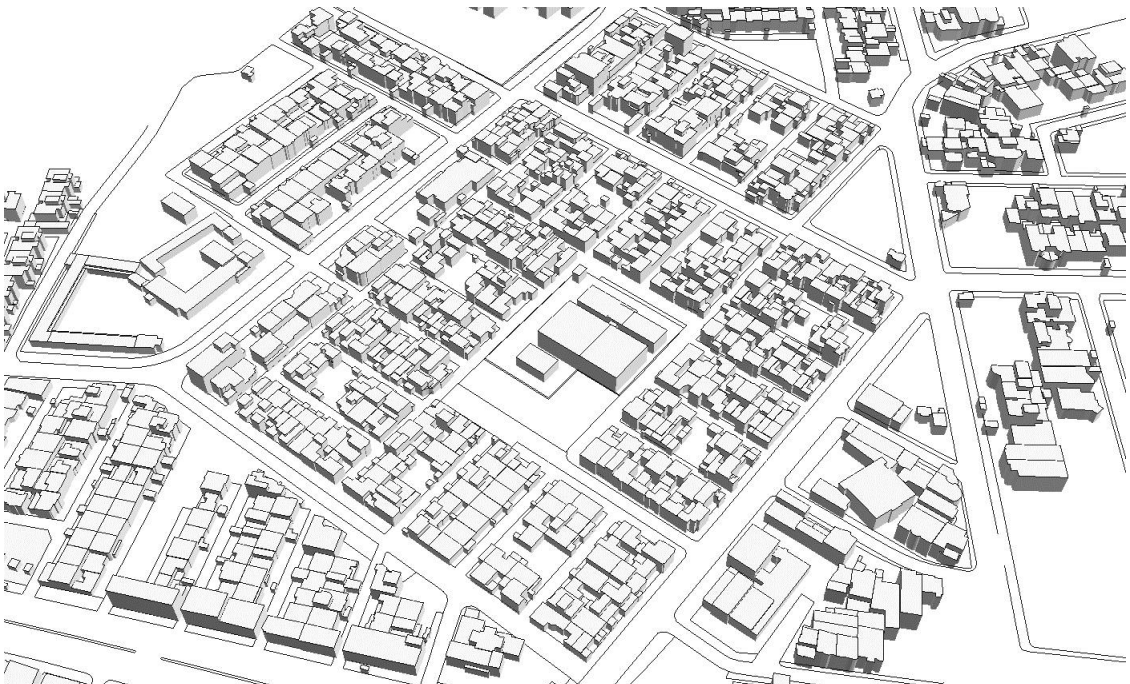
³⁷⁰ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

changes and the amendments of some regulations, and the issuance of new regulations. The continual increase of the population size of the city has resulted in the increase of the density. Some houses were transformed in the way to inhabit two or more families as the size of the families increased and some others extended. Subdividing some unbuilt plots into two or more perhaps was a response to accommodate this trend of increase.

Period 4

Sample 4_2

Iskan Quarter



Sample 4_2 (Iskan Quarter)

‘Sample 4_2’ area is a part of ‘Iskan’ quarter which has an area of 0.53Km² and lies around 1.7 km to the south-east of the citadel (Qalat), between the Fourth Ring Road (Kurdistan Street) which is known as ‘60 Meters Ring Road’ and the Fifth Ring (a segment of the ring known as ‘Jamal Haydary Road’) [Figure 4.109]. The quarter is bounded by the Fourth Ring Road from north west, a street separates it from ‘Mufty Quarter’ from south east, the radial road ‘Mala Effendi Street’ from north east, and the radial road ‘Runaky Road’ from south west [Figure 4.110]. The first formation of ‘Iskan’ quarter was in the Fourth Period (1956-1965), more specifically from 1962 to 1966 under ‘Housing Policy 2’. All the houses which have typical designs were built together in one phase by state companies. Yet, transformation actions of additions to some existing houses and replacement of others by new ones continued in later periods. As a result, the uniform form changed to become diverse.

The introduction of ‘Law of Real Estate Bank No. 73 of 1955’³⁷¹, ‘Law of Housing No. 54 of 1962’³⁷², and ‘Law of Cooperative Associations No. 73 of 1959’³⁷³ had an influence on housing developments in the country since then. Quarters with a name of ‘Iskan’ exist in many Iraqi cities and most of them were built around the same time period. The area characterised by again adopting small plot areas and narrow streets. The average plot area in the old part (part 1) of this quarter ranges from 108m² to 200m². Depending on the projection of the typical design, additions to the existing houses, and replacement of the old houses, the houses of this part are a mixture of attached with a mixture of having front setbacks and not having front setbacks. The minimum width of streets in the area is 6m. The other parts included in this sample area boundary have larger typical plot areas and those are excluded from the analysis as they have been built in later periods and under ‘Housing Policy 1’. See [Table 4-18] for the determinants and the analysis structure of the formation and the transformation of the area.

³⁷¹ The Monarch of the Kingdom, *Law of Real Estate Bank No. 73 of 1955*.

³⁷² The Council of the State, *Law of Housing No. 54 of 1962*.

³⁷³ The Council of the State, *Law of Cooperative Associations No. 73 of 1959*.

Table 4-18: Sample 4_2, the formation and transformation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
4_2	Iskan	4 th and later periods	1956-1965, and later	1 and 2	<ul style="list-style-type: none"> • Amended Law of Housing No. 54 of 1962. • Law of Cooperative Associations No. 73 of 1959 • Amended System of Roads and Buildings No. 44 of 1935. • Decision No. 850 of 1979 on setting plot areas limits for housing purposes. • Instructions No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (The location, and the original land features. • The socio-economic status of the residents.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1934 ³⁷⁴		2						
1956 ³⁷⁵	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A
1959 ^{376,377}	1	2	N/A	N/A	N/A	N/A	N/A	N/A
1960 ^{378,379}	1	1	N/A	N/A	N/A	N/A	N/A	N/A
1962 ³⁸⁰		1						

³⁷⁴ The Monarch of the Kingdom, *Amended Law of Municipalities' Administration No. 84 of 1931*, 1934.

³⁷⁵ The Monarch of the Kingdom, *Twelfth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No. 3918*, 1956, pp. 342–43.

³⁷⁶ The Council of the State, *Thirteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No.237*, 1959, pp. 385–86.

³⁷⁷ The Council of the State, *Law of Cooperative Associations No. 73 of 1959*.

³⁷⁸ The Council of the State, *Fourteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No.296*, 1960, pp. 24–26.

³⁷⁹ The Council of the State, *Fifteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No.361*, 1960, pp. 103–4.

³⁸⁰ The Council of the State, *Law of Housing No. 54 of 1962*.

Table 4-20: The successive regulations that have influenced 'Sample 4_2' until 2013. (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1964 ³⁸¹		1						
1979 ^{382, 383}	N/A	Distinct	$800 > P \geq 120$	10 ³⁸⁴	6	2.5	0	N/A
1987 ³⁸⁵	N/A	Distinct	$800 > P \geq 200$	10	10	2.5 or 4 ³⁸⁶		N/A
1989 ³⁸⁷	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ³⁸⁸	N/A	75%
1993 ³⁸⁹		Special						

³⁸¹ The Presidency of the Republic, *Law of Municipalities' Administration No. 165 of 1964*.

³⁸² The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

³⁸³ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

³⁸⁴ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

³⁸⁵ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

³⁸⁶ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

³⁸⁷ Ministry of Local Governance, General Directorate of Urban Planning.

³⁸⁸ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street. See [Table 4-21].

³⁸⁹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

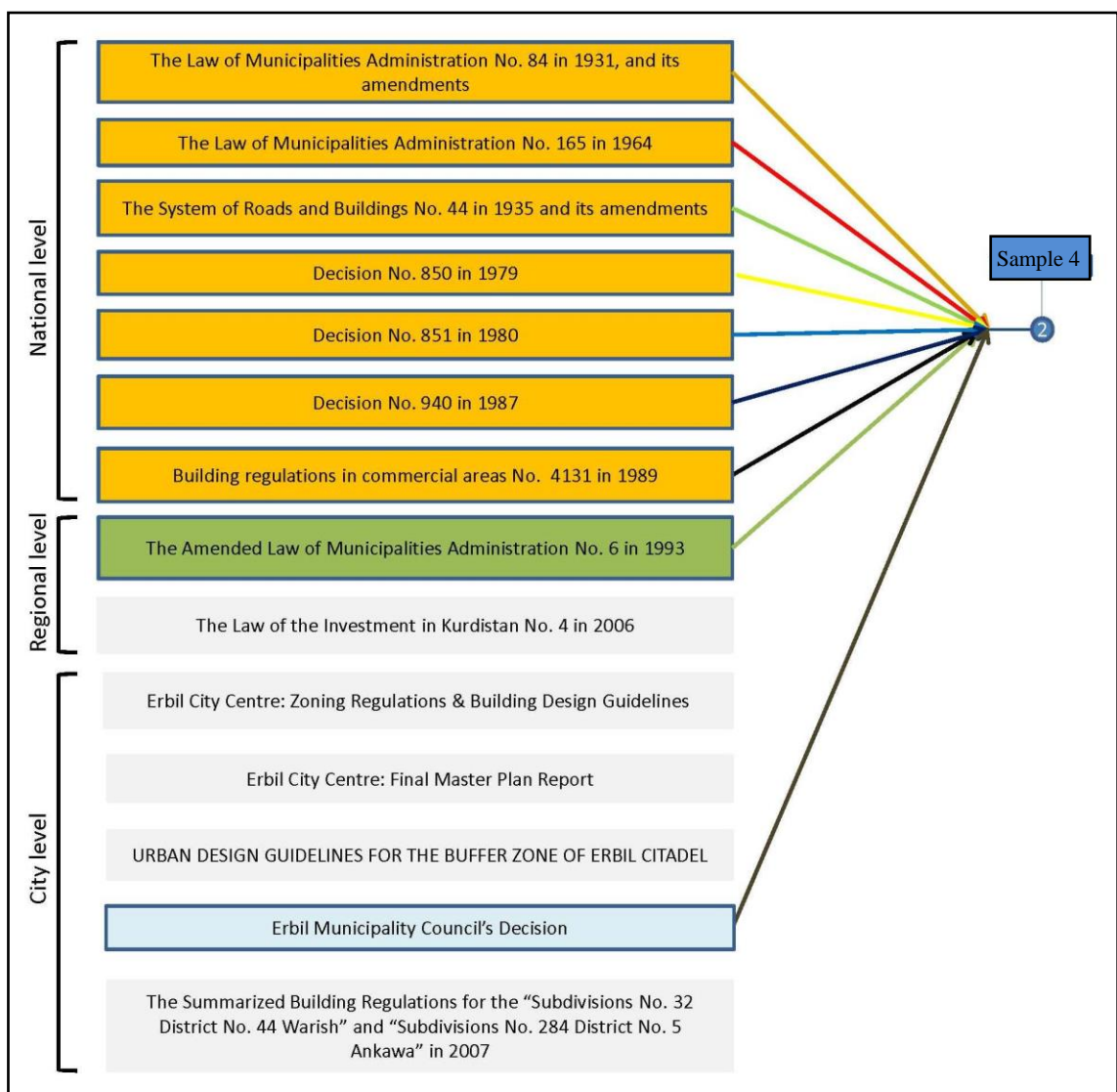


Figure 4.108: Direct regulations enacted at different levels that have influenced 'Sample 4_2'.
(Source: Researcher)

³⁹⁰ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

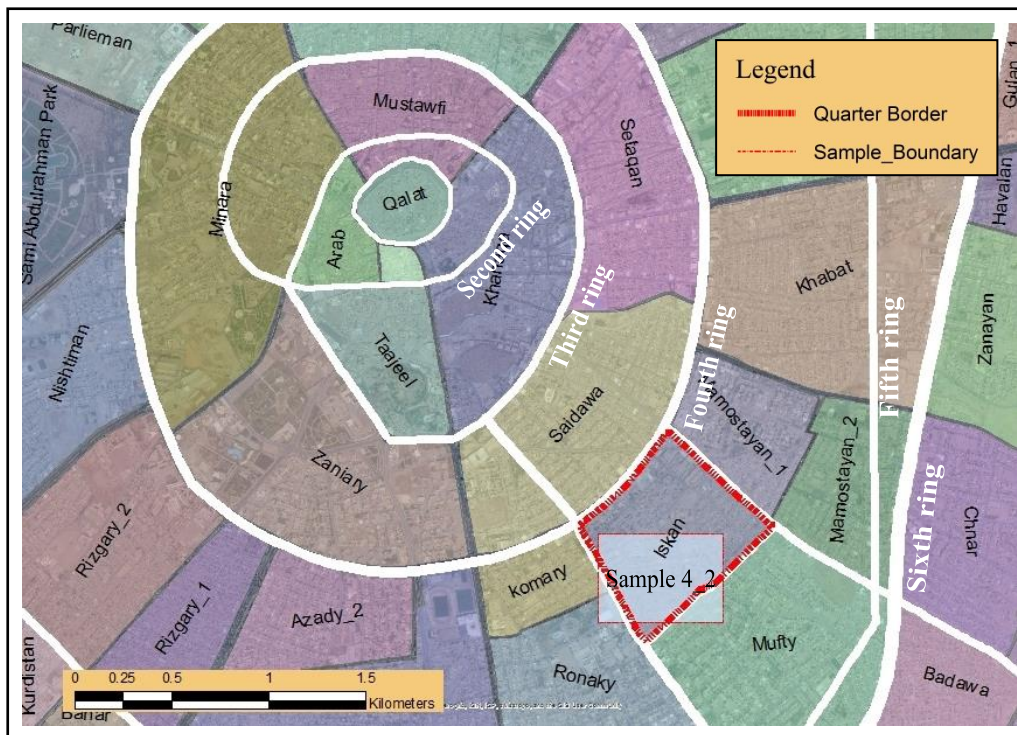


Figure 4.109: The location of ‘Sample 4_2’ and ‘Iskan’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

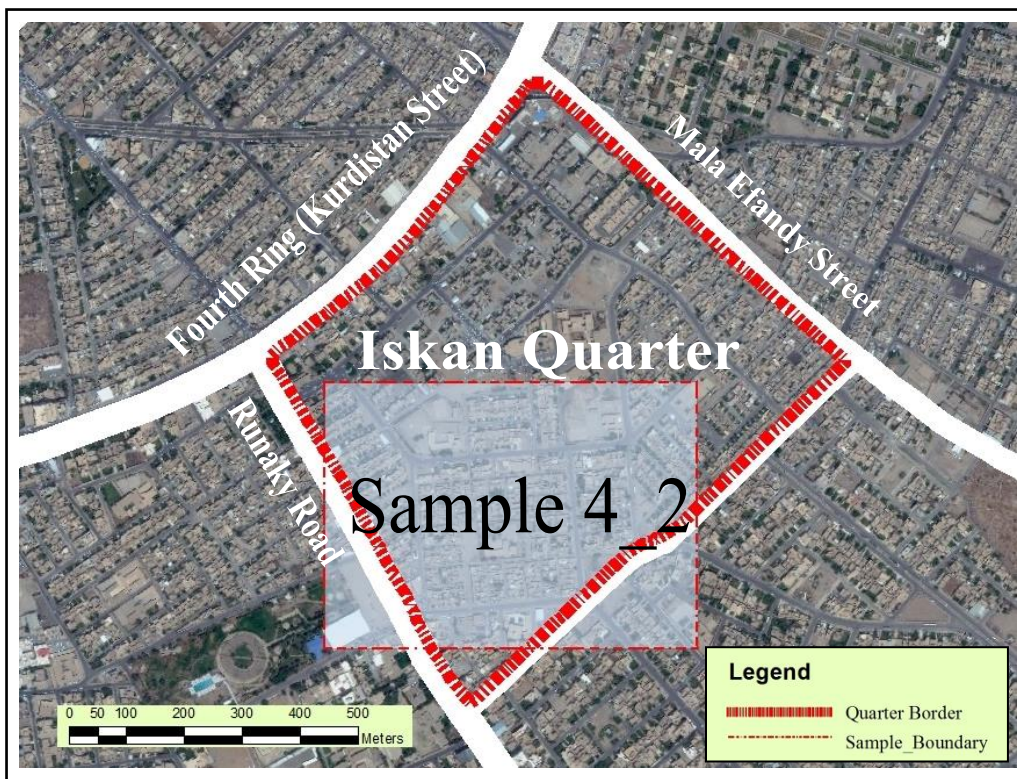


Figure 4.110: The boundary of ‘Iskan’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

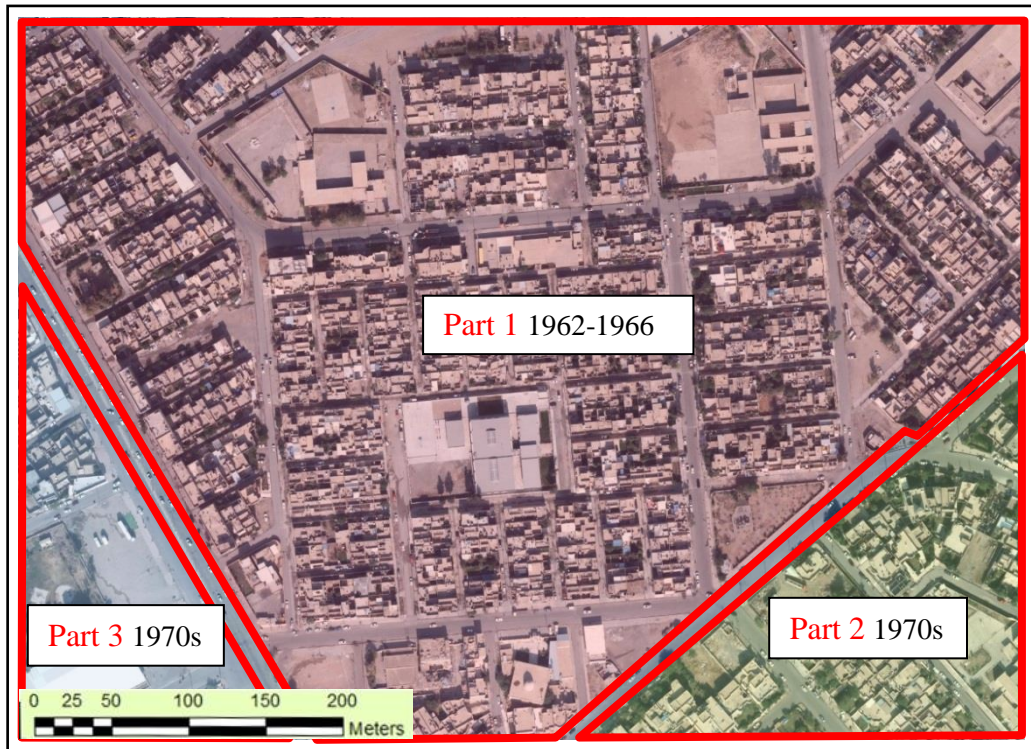


Figure 4.111: The different parts of the ‘Sample 4_2’ area which were planned and registered in different time periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

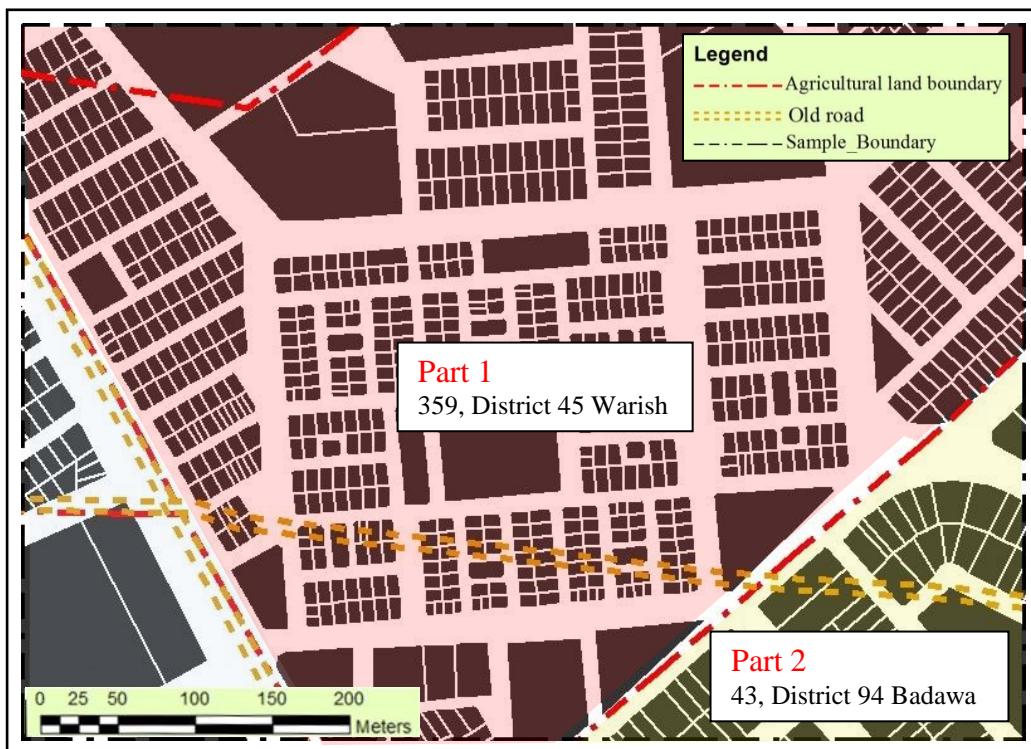


Figure 4.112: Each part has a different registration number. ‘Part 1’ is the focus of the analysis of the sample. The original land features and the radial road (Runaky Road) have determined the layout of the area but with extent of difference of influence on the different parts of the area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation:

The different parts of the area



Figure 4.113: 'Part1' was built in two stages. The typical plot areas of the first stage are 108m² and 135m². The second stage was built later and the typical plot areas of this stage are 150m² and 200m². 'Part2' and 'Part 3' have been planned in later periods. They have different registration numbers. The typical plot area of 'Part 2' is 600m². However, due to subdivision actions in later periods, some of the plots of 'Part 2' have been subdivided into smaller areas, mostly 300m². The typical plot area of 'Part 3' is 200m². (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

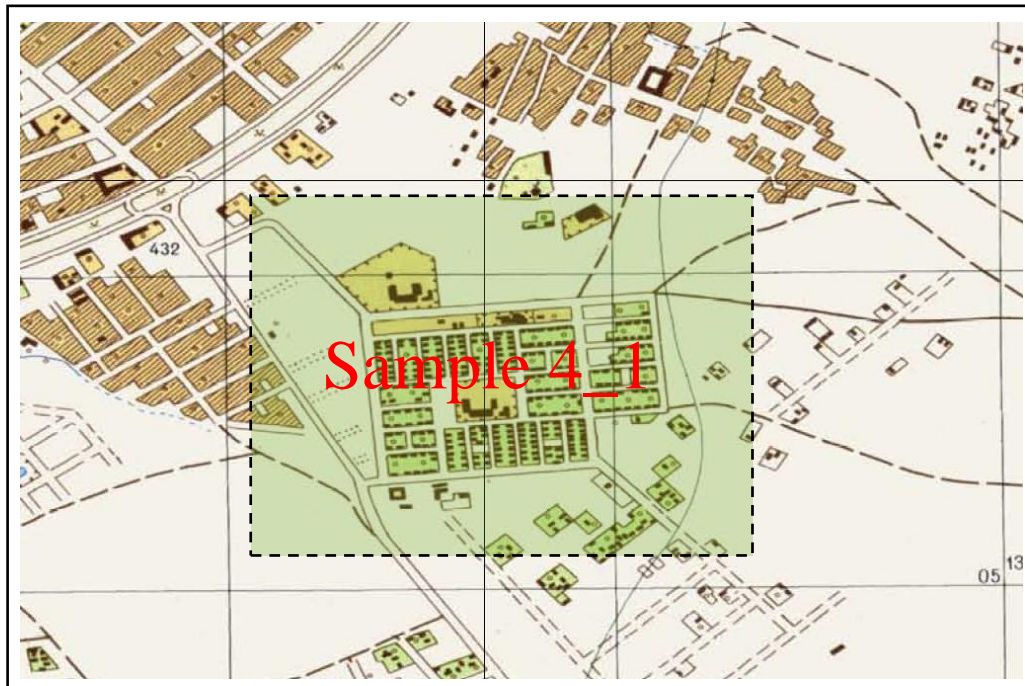


Figure 4.114: A survey of the area done in 1973 shows the first stage of 'Part 1' but the second stage of this part and both 'Part 2' and 'Part 3' have not been built yet. (Source: Humanitarian Information Center for Iraq (HIC), Map HIC Reference 333)

The Formation: The building form characteristics of the houses

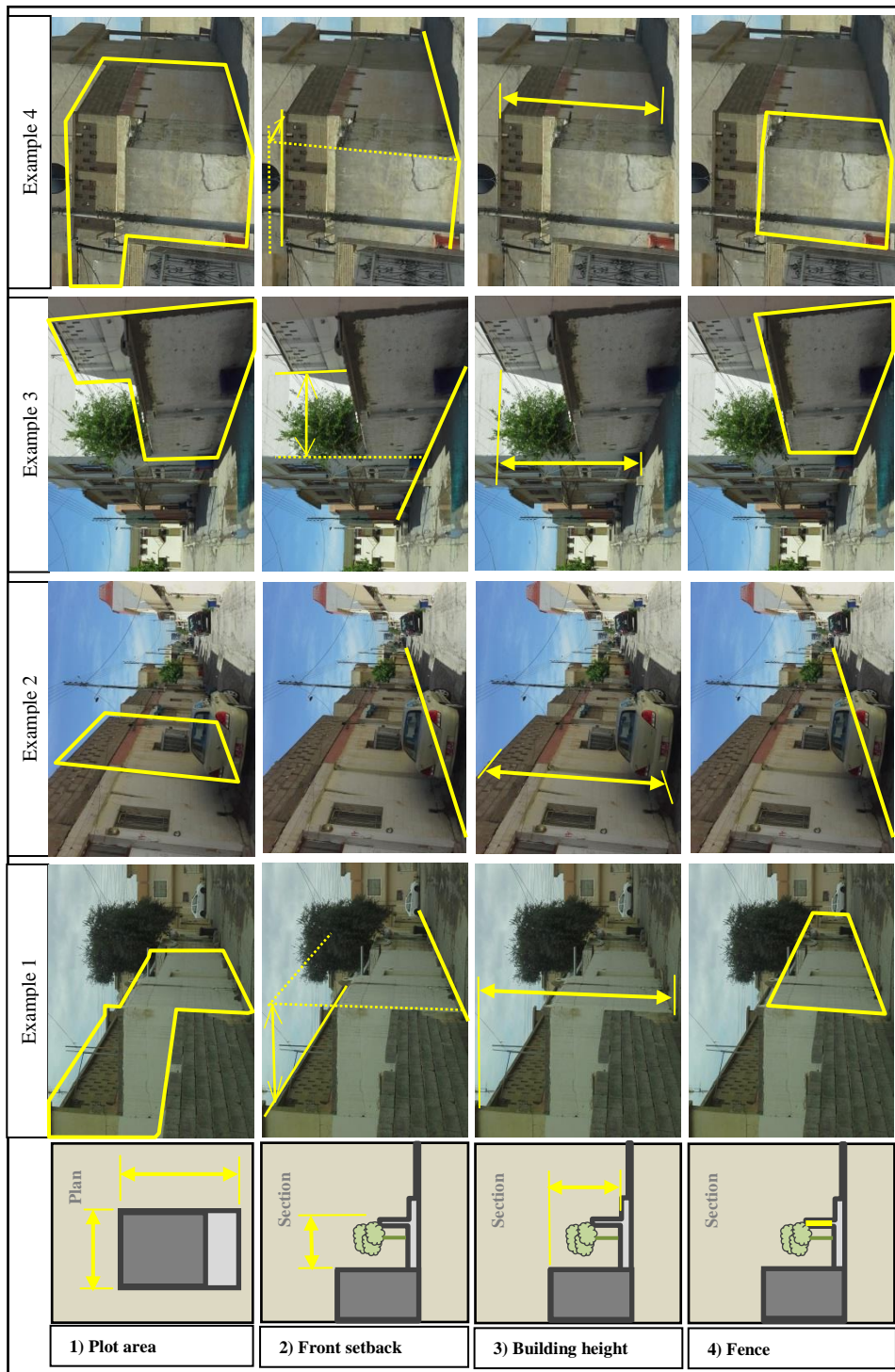


Figure 4.115: The common characteristics of the early houses built in the period (1976-1985) of the first formation of the area of ‘Sample 4_2’. (Source: Researcher)

The Formation: The plan and the original land features

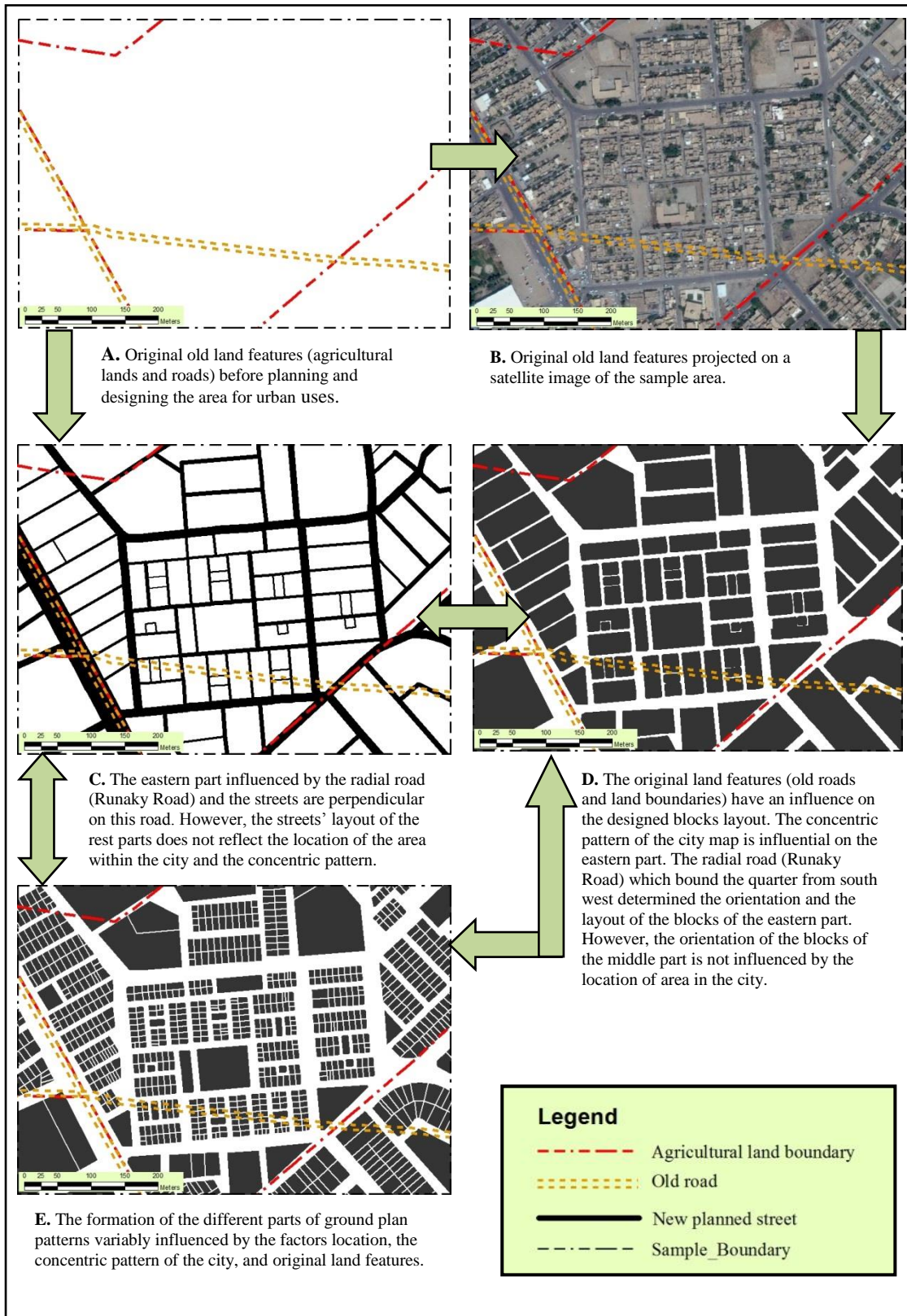


Figure 4.116: The ground plan pattern of the different parts of 'Sample 4_1' has variably influenced by the concentric pattern of the city and the original land features (land boundaries and old roads). It seems that the layout has not originally designed for this location but it has been fitted to adapt this context. (Source: Drawing by the researcher based on data from The Real Estate Registry offices of Erbil and The General Directorate of Urban Planning)

1. The formation of the area: ‘Sample 4_2’ area is a part of ‘Iskan Quarter’. The area of the sample consists of three parts formed in different time periods. However, the focus of the analysis will be on the oldest part (Part1) which has been formed in the Fourth Period (1956-1965). The construction and the registration of the houses of this part were from 1962-1966. Then, the continual process of individual building has resulted in the change and the transformation of the form of the area.

A. The time period: The three parts included in the area of the sample have been formed in different time periods. The first part which was formed in 1962-1966 is the focus of the analysis. The other two parts which compose a small area of the sample emerged in later periods [Figure 4.111]. Each part has a different registration number [Figure 4.112]. This area is one of the quarters formed after the revolution of 1958. Socialism characteristics reflected in many aspects of life and governance. This event resulted in the emergence of new attempts of housing in Iraq cities and towns. Consequently the government took more power over different aspects of the state. The government gave more importance to its employees in different ways. However, some of those attempts started even before the revolution, yet they started to be apparently formulated after the revolution. Quarters under the name of ‘Iskan’ emerged in many Iraqi cities at that time but with different urban form characteristics.

B. The housing policy: ‘Housing Policy 2’ was adopted in the formation of the area. A complex of single-family houses of typical designs was built by the state companies. Those houses were granted to different groups of people with particular social class. In the case of ‘Iskan Quarter’ the typical houses were offered to government employees who are of middle and lower posts. The process was supported by a long term mortgage plan extends over 25 years. The cooperative associations such as ‘Housing associations’ which have been formed at that time introduced new mechanisms to organise housing process. Moreover, the establishments of banks specialised in aspects of real estate and construction also contributed impressively to the whole process.

C. The regulations: The houses of the complex of 'Iskan' was built and then granted to people. A set of legislation together constituted an institutional power that determined and formed new housing policies in the country. The first legislation was '*Law of Real Estate Bank No. 73 of 1955*'³⁹¹ and its successive amendments until 1976 when '*Law of Real Estate Bank No. 161 of 1976*' cancelled and substituted it. The law of real estate bank established a bank that its main duty is to encourage and support the process of housing development in different ways such as offering long term loans to citizens to buy or build their house, allocating land for the cooperative associations for housing purposes and lending them money, making agreements with the cooperative associations that aim to build houses for their members who do not have house.³⁹²

The second legislation was '*Law of Cooperative Associations No.73 of 1959*'³⁹³. This legislation organised the establishment of the cooperative organizations. It defined the cooperative association as 'an economic institution established to promote its members' condition in terms of production, land reform, marketing, housing, providing pensions, or any other economic purpose that the association adopts'.³⁹⁴ Housing was one of the important aspects that were covered by this law and the role of the law in housing sector actively reflected in the reality. The third was '*Law of Housing No. 54 of 1962*' and its successive amendments in 1963 and 1965.

In parallel to the mentioned legislation, the municipalities' legislations are always significant in the urban settlements (cities and towns) such as '*Amended Law of Municipalities Administration No. 84 of 1931*' and '*System of Roads and Building No. 44 of 1935*'. However, in the case of the projects of 'Housing Policy 2' they did not determine the parameters and the elements of the urban form in a direct way at any scale level, neither on the scale of the neighbourhood, nor on the scale of the plot and the house building. Their influence was completely in a different way. According to the amendment made in 1956 on '*System of*

³⁹¹ The Monarch of the Kingdom, *Law of Real Estate Bank No. 73 of 1955*.

³⁹² The Monarch of the Kingdom, *Law No. 80 in 1956 of the First Amendment of Law of Real Estate Bank No. 73 of 1955*, para. 4.

³⁹³ The Council of the State, *Law of Cooperative Associations No. 73 of 1959*.

³⁹⁴ The Council of the State, *Law of Cooperative Associations No. 73 of 1959*, para. 2.

roads and Building No. 44 of 1935 all the housing projects built by the government and its companies were excepted from applying the regulations being applied on the rest of the city concerning setback and building line, plot coverage, plot area, plot front width, and street width.³⁹⁵ This meant that by law those projects are free from the determinants of form variables specified by the system itself. See [Table 4-19]

The area in its first formation had a uniform and a homogenous characteristic. The width of the streets ranges from 6m to 20m and the typical width is 6m. The early houses have typical designs. Although it is currently difficult to find a block of houses in its first condition and they were either submitted to changes and extensions or replacement by new houses, through individual cases the form characteristics of the early houses can be summarised as follows [Figure 4.115]: The first is that there are four typical plot areas in the first part, 108m² (9m X 12m) 138m² (9m X 15m) in the first stage which has been built earlier, and a few number of plots with 150m² (10m X 15m) and 200m² (10m X 20m) in the second stage. The other parts (Part 2 and Part 3) which are excluded from the analysis have plot areas range from 200m² to 600m² [Figure 4.113] and [Figure 4.114]. The second is building line. Front setback which is harnessed for a front garden is applied on the houses of some blocks while no front setback is applied on others. Although the design of the houses was typical, the matter of having setback or not depended on factors of the projection of the design on the plot, the orientation of the plot in accordance with the streets, and the depth dimension of the plot. The third is the height. The early houses were characterised by having one storey height about 3.5m including the parapet. The last is achieving privacy either by a front fence if the house has a front setback or by separating the inner courtyard of the house by spaces of rooms if the house no front setback.

D. Other determinants: The geographic factors summarised in the location determinants such as the land boundaries and the old roads before planning the area for urban developments and housing. When this

³⁹⁵ The Monarch of the Kingdom, *Twelfth Amendment System of the System of Roads and Buildings No. 44 of 1935*, paras 1-4.

housing project was proposed, the first stage was built and the surrounding area had been almost unbuilt [Figure 4.114]. The layout appears as a typical design and (all or a part of it) has been applied and fitted into this context. As a result, the layout and the orientation have no clear connection to the context and the concentric pattern of the city. The layouts of the second stage of 'Part 1' which has been built in 1970s and both 'Part 2' and 'Part 3' which also have been built in 1970s and 1980s integrate with the context and the concentric pattern of the city especially the radial road (Runaky Road) and their streets either parallel to or perpendicular on this radial road. The difference of the layout and the orientation of the first stage of 'Part 1' from the rest parts can clearly be noticed. The latter influenced by the original land features of land boundaries [Figure 4.116].

The Transformation: The selection of blocks samples

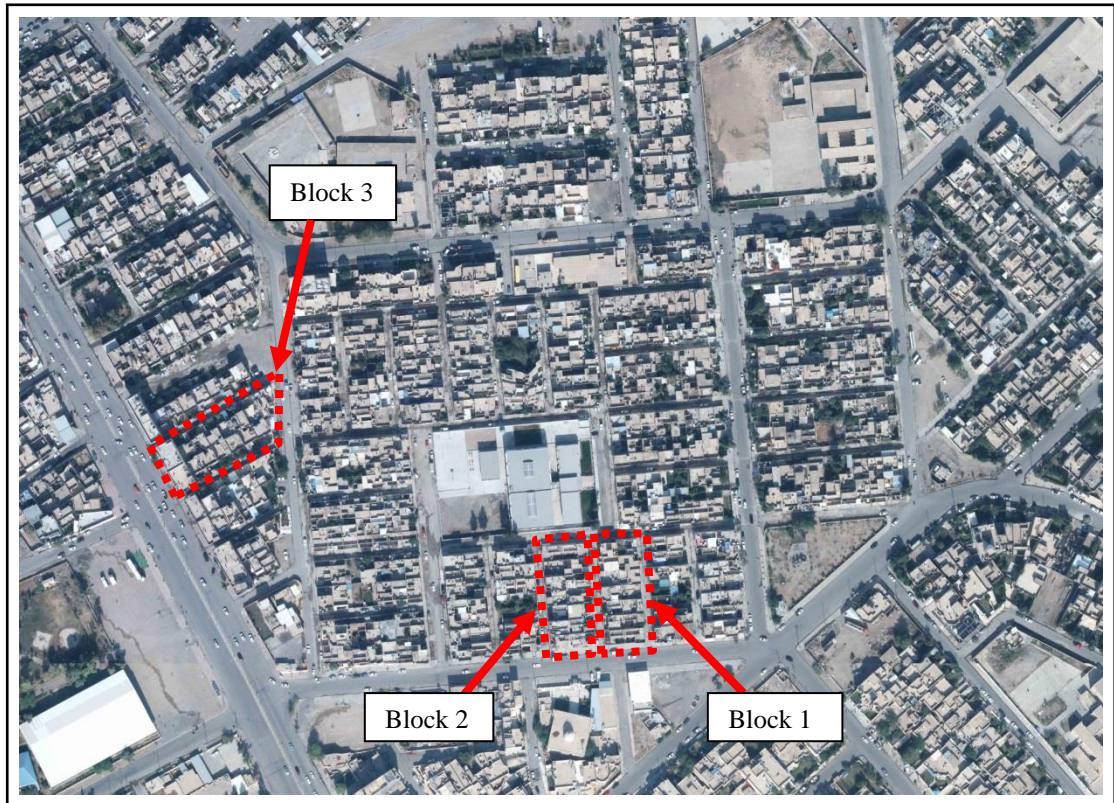


Figure 4.117: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Transformation: Building- Plot parameters

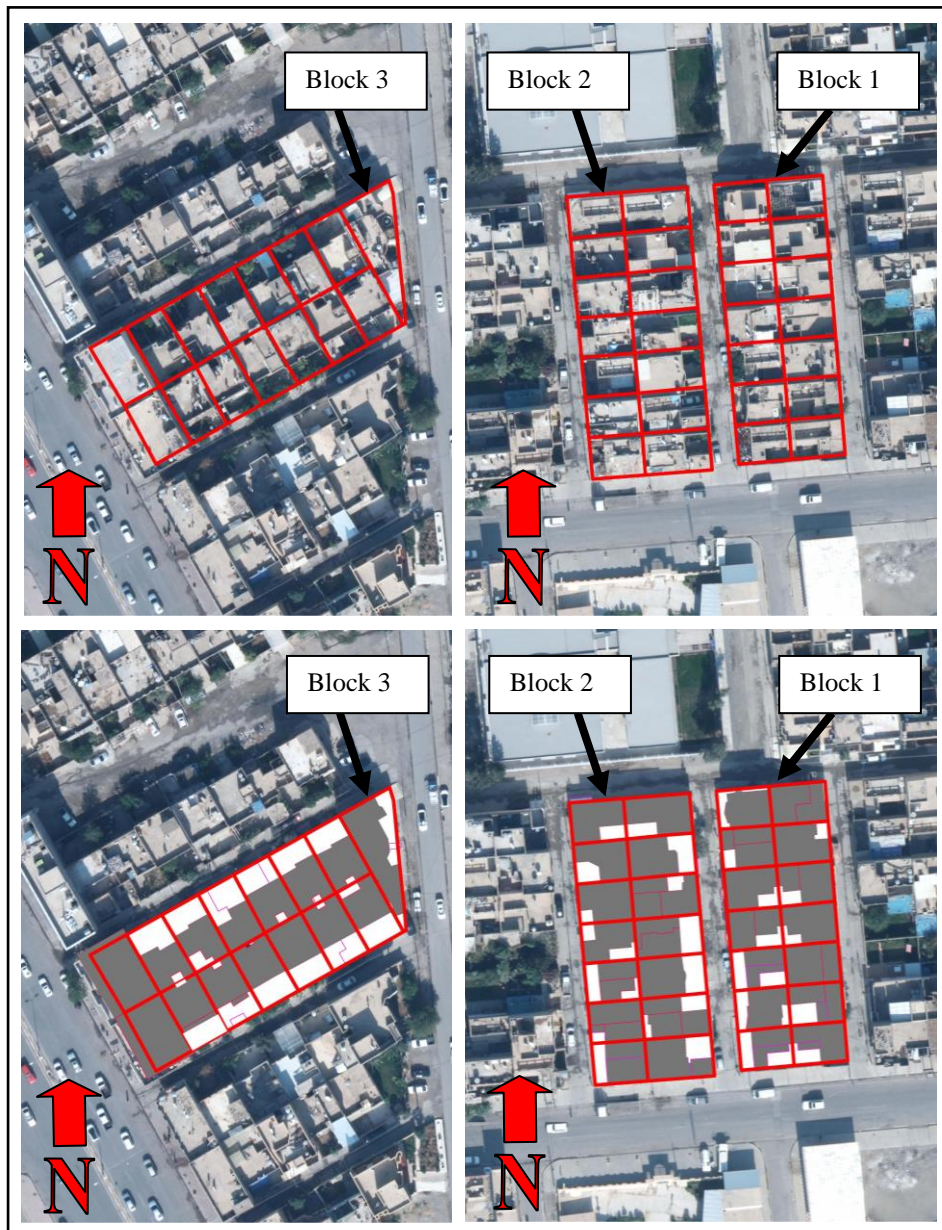


Figure 4.118: Three blocks samples from the first part of ‘Sample 4_2’ area showing the existing condition. Both (Block 1 and Block 2) are from the first stage of ‘Part 1’. The average plot area of the plots of ‘Block 1’ is 108m² (9m X 12m). Addition and replacement actions to the houses resulted in not keeping a constant front setback distance and building line. This is also the case in ‘Block 2’. However, the average area of the plots of eastern row of this block is 135m² due to that the depth of the plot is 15m. In the case of ‘Block 3’ which is from the second stage of ‘Part 1’, apart from the plots of the two ends of the block, a constant front setback of an average distance of around 5m is kept. The blocks include a mixture of old original, modified, and new houses. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: Multistorey commercial buildings



Figure 4.119: Demolition the old houses located on the radial road (Runaky Road) and replacing them by multistorey commercial buildings.
(Source: Researcher)

The Transformation: The building form of the houses of later periods



Figure 4.120: The common characteristics of the houses built in the later periods (1996-2013) in the area of 'Sample 4_2'. (Source: Researcher)

- 2. The transformation of the area:** Since its formation in 1962-1966, the area witnessed a dramatic transformation. Many factors have played roles in this process of change. Almost all the changes happened to the houses and no significant change happened to the streets and their layout.
- A. The time period:** The incomes of the successive periods influenced the sample area in different ways. In each period a certain form and extent of influence determined the way in which the urban form of the area transformed. This area is not free from the influencing factor that affected the rest of the city. The first stage of the first part of the sample area followed by the second stage in 1970s. Then 'Part 2' and 'Part 3' planned and built but with larger plot areas.
- B. The housing policy:** Despite that this part was built according to 'Housing Policy 2', the transformation of the area was very much submitted to individual actions. The successive individual actions of transformation changed the uniformity to disparity. In the beginning, changes to the houses were restricted yet in later periods this control of making changes on the houses did not continue. In terms of changes and replacement of houses on individual bases, the urban form of the area is currently similar to that of the areas built according to 'Housing Policy 2'.
- C. The regulations:** Decisions of defining the area of the plot and the typical design of the house did not take the requirements of the families for which this project of housing was built. It is not certain that this project has been designed for this context of place. Clues show that it was a part or a unit from a larger layout and has been imported and applied to this context. This is applicable even on the typical design of the houses. As the plot areas of the first stage of the 'Part 1' are 108m² and 135m², and the houses were one storey, the built up area was limited. A need for more interior spaces and rooms spaces by the residents required them to make additions and extensions to their houses. Individual actions on individual cases of the houses became a common phenomenon. Offering building permits for these actions authorised by legislations of '*Amended Law of Municipalities' Administration No. 165 of 1964*' and '*Amended System of Roads and Building No. 44 of 1935*'

and the first part was treated as ‘Urban Area Category 1’ as the area of the plots did not exceed 200m² [Table 4-19]. Since 1979, ‘Part 2’ and ‘Part 3’ of the sample were subjected to ‘*Decision No. 850 of 1979*’ and then to ‘*Decision No. 940 of 1987*’ [Table 4-20]. The nature of the changes made to the houses was mostly limited to extensions of covering the front open yard areas for creating new rooms and then adding new storeys for extra extensions. For a detailed analysis three samples of block are selected [Figure 4.117]. The existing condition of the buildings of ‘Block 1’ and ‘Block 2’ consist of a mixture of original, extended, and new houses from the later periods. As a result of this mixture, neither the plot coverage nor the front setback distances are consistent. This is also similar in the case of ‘Block 3’ which is from 1970s or the second stage of ‘Part 1’. Individual actions of transformation on the houses resulted in producing heterogeneity while they have had not only a homogeneous form but also a uniformity due to that they have had been built according to ‘Housing Policy 2’ [Figure 4.118]. Moreover, some of the paths and small gardens which existed in the area (the paths and the gardens which divided a block into two parts), according to requests from the owner of the houses, were incorporated into the houses and the areas of those paths were merged to the plots beside them³⁹⁶.

The changes not only limited to the form of the houses but also extended to changing the uses of the plots located on the commercial streets to commercial uses. Examples of this, is the two plots of ‘Block 3’ located at the end of the block which is on ‘Runaky Road’. The houses of these two plots were demolished and replaced by multistorey commercial buildings [Figure 4.119]. This process was regulated by ‘*Amended Law of Municipalities’ Administration No. 165 of 1964*’, ‘*Amended System of Roads and Buildings No. 44 of 1935*’, ‘*Building Regulations in Commercial Areas No. 4131 in 1989*’³⁹⁷ [Table 4-21], and then by ‘*Amended Law of Municipalities’ Administration No. 6 of 1993*’.

The existing form characteristics of the houses (transformed houses) can be summarised as below [Figure 4.120]: Firstly, the area of the plots remained constant and no actions of subdivisions have been

³⁹⁶ The selected blocks’ samples do not include this case. For such cases see [Figure 4.112].

³⁹⁷ Ministry of Local Governance, General Directorate of Urban Planning.

made as the original areas of the plots were relatively small (108m² and 135m²) which reduced the probability of subdivisions, neither formally nor informally. Secondly, building lines changed due to individual actions of on the houses. This happened in two ways, either by extensions to the existing houses and using the front open area which composed from front setback for building rooms (Examples 1 and 2 of [Figure 4.154]), or by demolishing and replacing the old houses by new ones which mostly have front setbacks (Examples 3, 4, and 5 of [Figure 4.120]). Thirdly, the height of the houses increased to two storeys. This again happened in two ways (Examples 1 and 2 of [Figure 4.120]), either by adding a new storey to the old existing house, or by building new houses instead of the old ones after demolishing them (Examples 3, 4, and 5 of [Figure 4.120]). Lastly, achieving privacy in the cases of the modified houses was by separating the inner courtyard of the houses by building rooms immediately overlooking the streets (Examples 1 and 2 [Figure 4.120]). However, in the case of the new houses, this is achieved by fences (Examples 3, 4, and 5 of [Figure 4.120]).

D. Other determinants: Not only regulations influenced the process of the change of the urban form of the sample area, but also other determinants generated the process and found ways even through legislation to be brought to the reality. Within the growth and the extension of the city, the location of the sample ('Iskan' quarter) received its important as it is relatively not too far from the city centre and all the amenities needed for the neighbourhood. The increasing demand on housing as a result of the natural (increasing the number of the families' members or emerging new families in the extension process) and non-natural (Migration and displacement) increase of the population of the city required extensions and enlarging the spaces of the existing houses mostly through adding storeys as the plot of the area was limited. In later periods, especially since 1980s and intensively after 2003 as a result of the economic growth, the trend towards demolishing the old houses and replacing them by new ones according to the need became a phenomenon in the area and even in the rest of quarters of Erbil.

Period 5 Sample 5 Bahar Quarter



Sample 5 (Bahar Quarter)

‘Sample 5’ area is a part of ‘Bahar’ quarter which has an area of 0.96 Km² and lies around 3.0 km to the south-west of the citadel (Qalat), between the Fifth and the Sixth Ring Roads (Peshawa Qazi Muhammad Street) which is known as ‘The 100 Meters Ring Road’ [Figure 4.122]. The quarter is bounded by the Fifth Ring Road (Zurgazraw Street) from north, the Sixth Ring Road (Peshawa Qazi Muhammad Street) from south, the radial road (Makhmur Road) from east, and ‘Alban Street’ from west [Figure 4.123]. The first formation of ‘Bahar’ quarter, with its current border³⁹⁸ [Figure 4.124] was in the Fifth Period (1966-1975) yet its further formation and transformation continued in later periods. It was built under the ‘Housing Policies 1 and 5’.

It was firstly planned in 1970-1972 as the first urban area category of ‘*Amended System of Roads and Buildings No. 44 of 1935*’³⁹⁹. However, extensions of the quarter were made illegally. Later on, in the successive periods, the responsible authorities took different actions to legally recognise the area. **Therefore, a part of this quarter has been built illegally and known as ‘Informal Houses of Bahar’. The plot area in this quarter ranges between 100m² and 200m². The common type of the houses is attached with a mixture of houses with front setback, no front setback, and inner courtyard. The street and block type of the majority of ‘Sample 5’ area (the eastern part) is a simple ‘Oblong grid’ with typical ‘Cross-junctions’.⁴⁰⁰ In contrast, the west part of the ‘Sample 5’ area is formally planned by the responsible authorities.**

The analysis structure of the formation and the transformation of the area is followed as it is presented in [Table 4-22]. All the figures (maps, photos, and drawings) and the tables of the analysis related to the formation will be presented first according to their sequence and their first mention in the text of the first formation of the area, followed by the text of the analysis of the formation. The same will be repeated in the transformation analysis part.

³⁹⁸ “Bahar” quarter with its current border includes both “Bahar” quarter and “Krekaran” quarter which included the residential campus of the textile factory of Erbil.

³⁹⁹ The accumulative amendments of ‘*System of Roads and Buildings No. 44 of 1935*’ made by 1979.

⁴⁰⁰ This part was built illegally with no prior formal plan.

Table 4-22: Sample 5, the formation and transformation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
5	Bahar	5 th and later periods	1966-1975, and later	1 and 5	<ul style="list-style-type: none"> • The Amended System of Roads and Buildings No. 44 of 1935. • Decision No. 850 of 1979 on setting plot areas limits for housing purposes. • Instruction No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. • Decision No. 5 of 2002 on informal buildings 	<ul style="list-style-type: none"> • Geographic factor (The location, and the original land features. • The socio-economic status of the residents.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1934 ⁴⁰¹	N/A	2	N/A					
1964 ⁴⁰²	1 out of 6	1	200 > P ≥ 100	4	N/A	N/A	N/A	4/5
1964 ⁴⁰³	N/A	1	N/A					
1979 ^{404 405}	N/A	Distinct	800 > P ≥ 120	10 ⁴⁰⁶	6	2.5	0	N/A
1987 ⁴⁰⁷	N/A	Distinct	800 > P ≥ 200	10	10	2.5 or 4 ⁴⁰⁸		N/A
1989 ⁴⁰⁹	Commercial streets	Distinct	N/A	S > 8	N/A	Vary ⁴¹⁰	N/A	75%
1993 ⁴¹¹	N/A	Special	N/A					
2002 ⁴¹²	N/A	Special	N/A					

⁴⁰¹ The Monarch of the Kingdom, *Amended Law of Municipalities’ Administration No. 84 of 1931*.

⁴⁰² The Presidency of the Republic, *Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*.

⁴⁰³ The Presidency of the Republic, *Law of Municipalities’ Administration No. 165 of 1964*.

⁴⁰⁴ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

⁴⁰⁵ Revolutionary Command Council, *Prescriptive No. 851 in 1980 on building houses, In Iraqi Gazette No. 2756, 1980, pp. 237–38*.

⁴⁰⁶ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

⁴⁰⁷ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴⁰⁸ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

⁴⁰⁹ Ministry of Local Governance, General Directorate of Urban Planning.

⁴¹⁰ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street [Table 4-24].

⁴¹¹ The Parliament of Iraqi Kurdistan, *Law of Municipalities’ Administration No. 6 of 1993*.

⁴¹² Decision No. 5 from Kurdistan parliament treated the areas built illegally. After a preparation of a development plan for those areas, the houses that do not contradict with the plan, will be approved and registered as formal.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

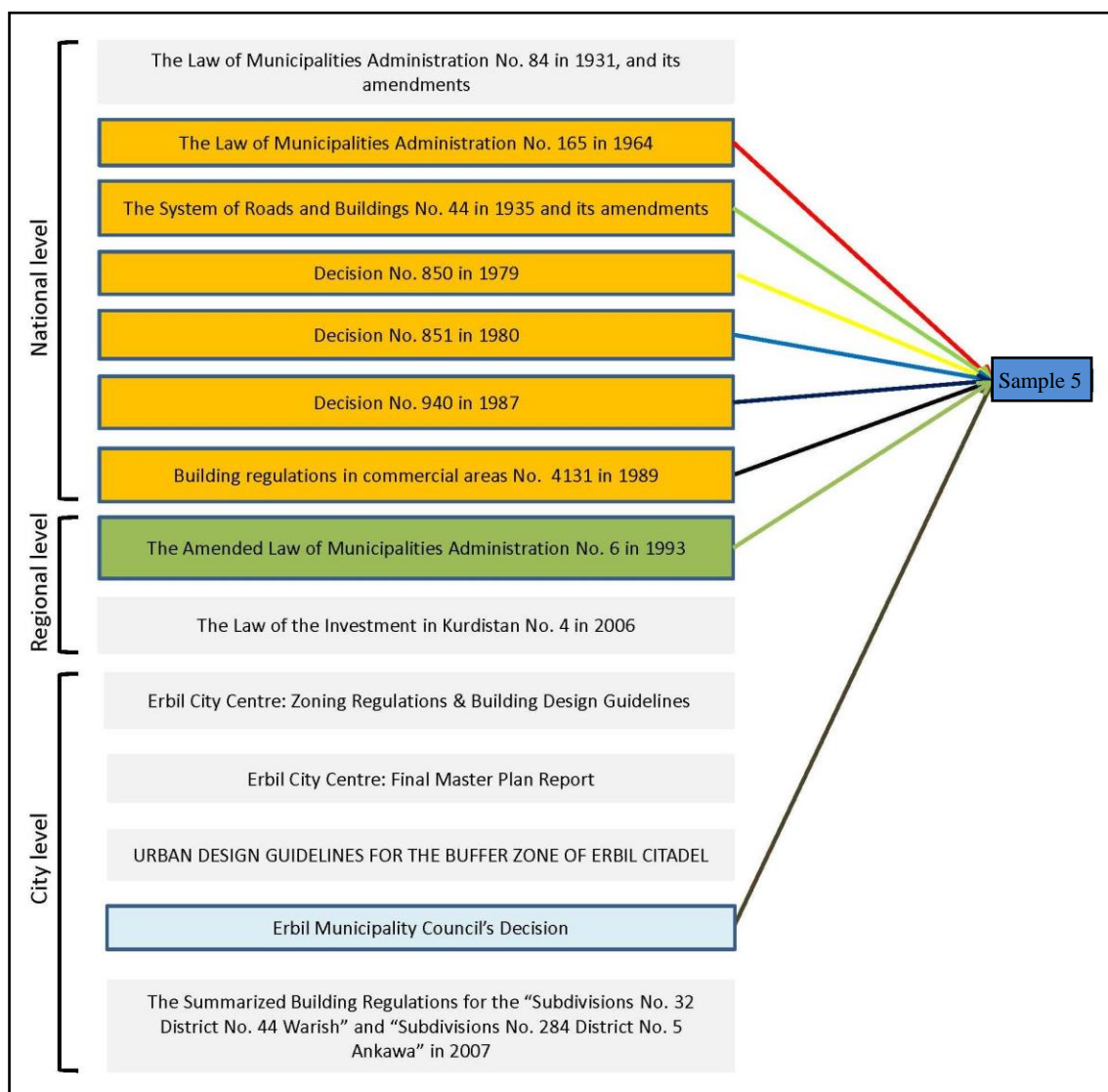


Figure 4.121: Direct regulations enacted at different levels that have influenced ‘Sample 2’.
(Source: Researcher)

⁴¹³ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

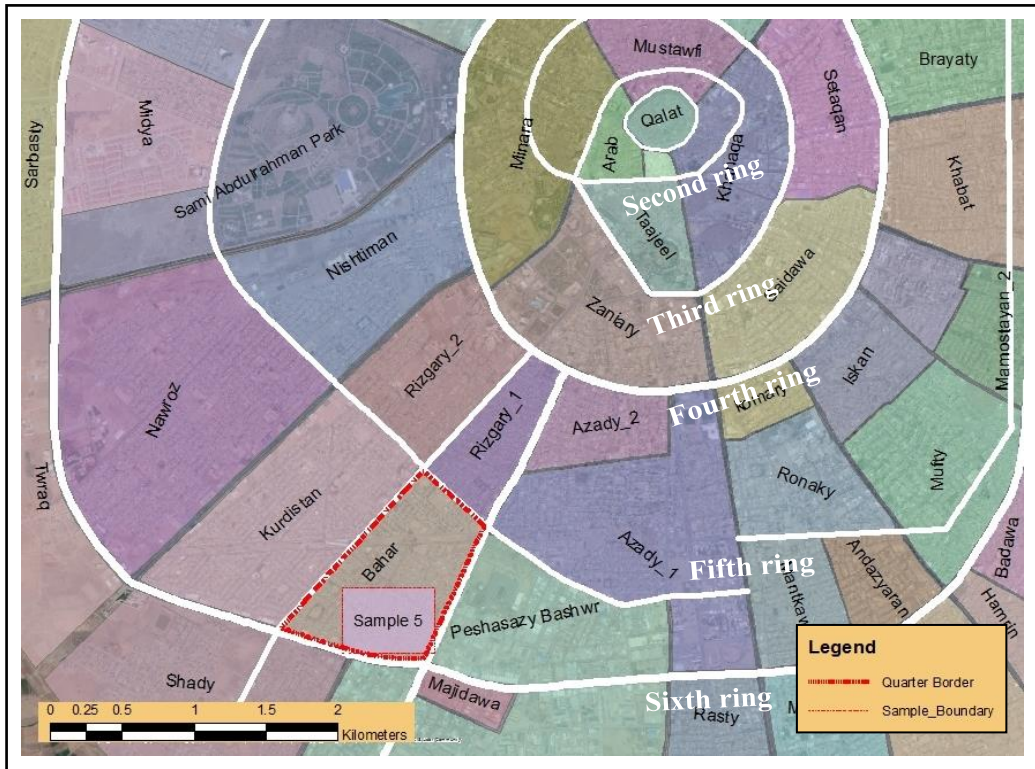


Figure 4.122: The location of ‘Sample 5’ and ‘Bahar’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)



Figure 4.123: The current boundary of ‘Bahar Quarter’. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

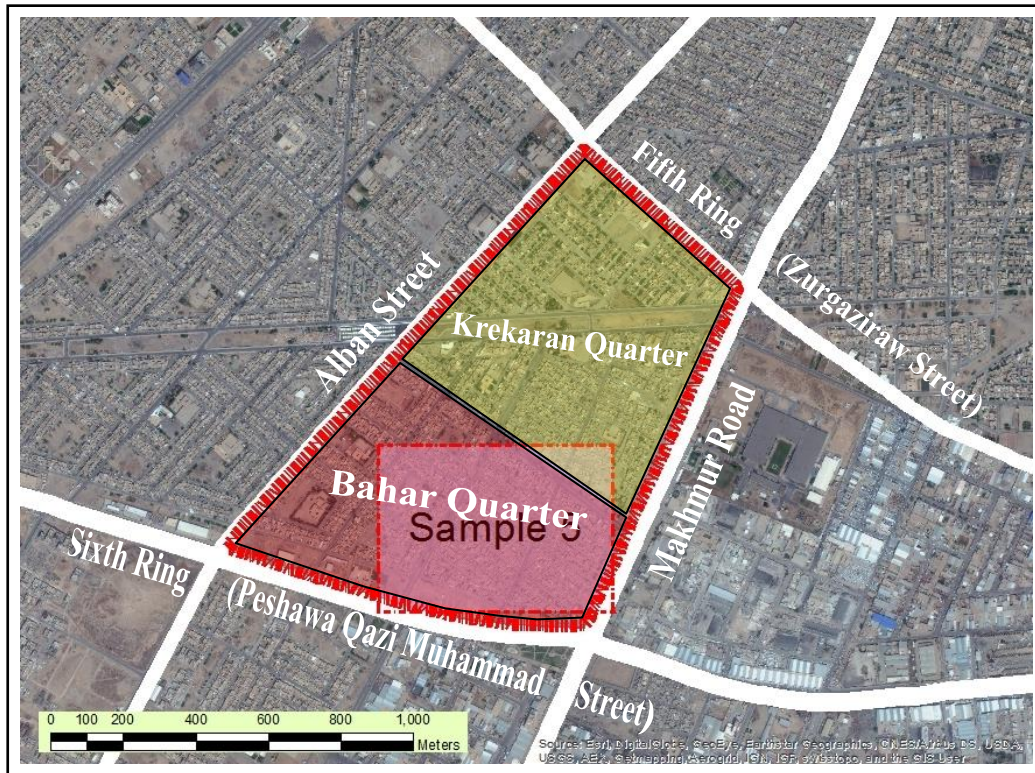


Figure 4.124: The previous boundary of “Bahar” and “Krekaran” quarters. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

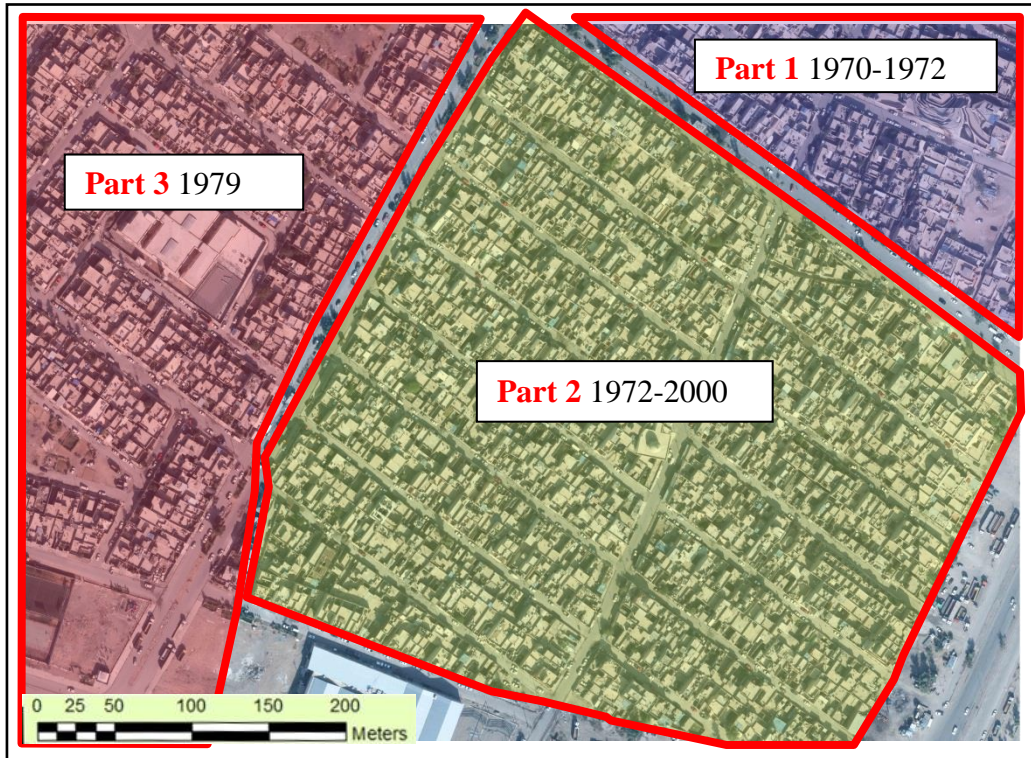


Figure 4.125: The different parts of the ‘Sample 5’ area which were formed in different periods. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

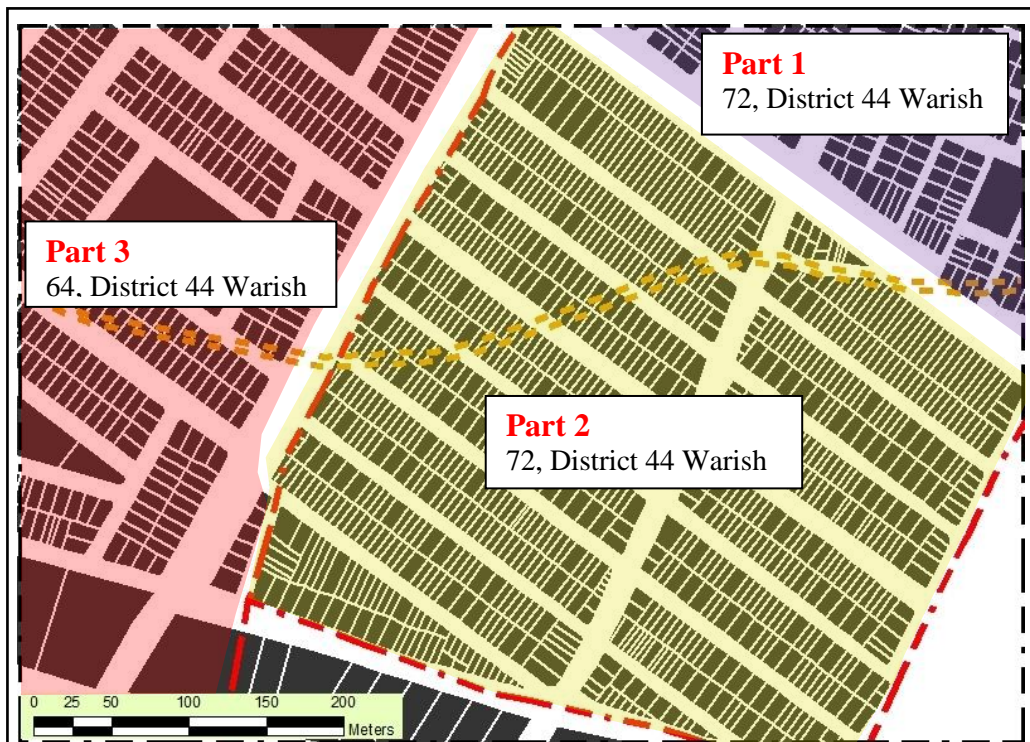


Figure 4.126: The original land features have little influence. However, an agricultural land boundary separates part 1 and part 2 from part 3. The size of the plots differs from one part to another. The average plot area of part 2 is 100 m² and the average plot area of part 3 is 150 m². (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation: The building form characteristics of the houses

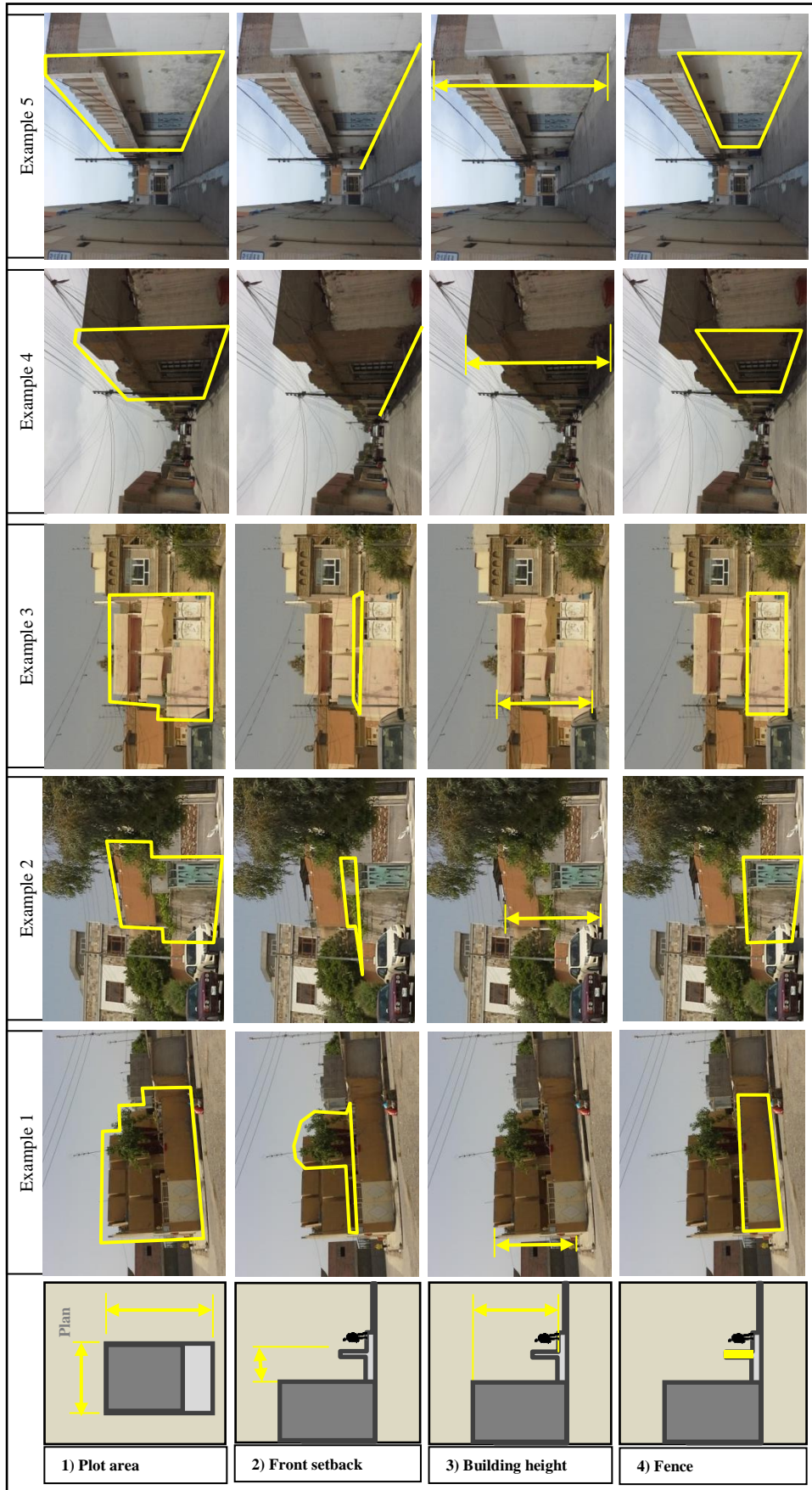


Figure 4.127: The common characteristics of some early houses built in the periods (1966-1985) of the first formation of the area of ‘Sample 5’.
(Source: Researcher)

The Formation: The plan and the original land features

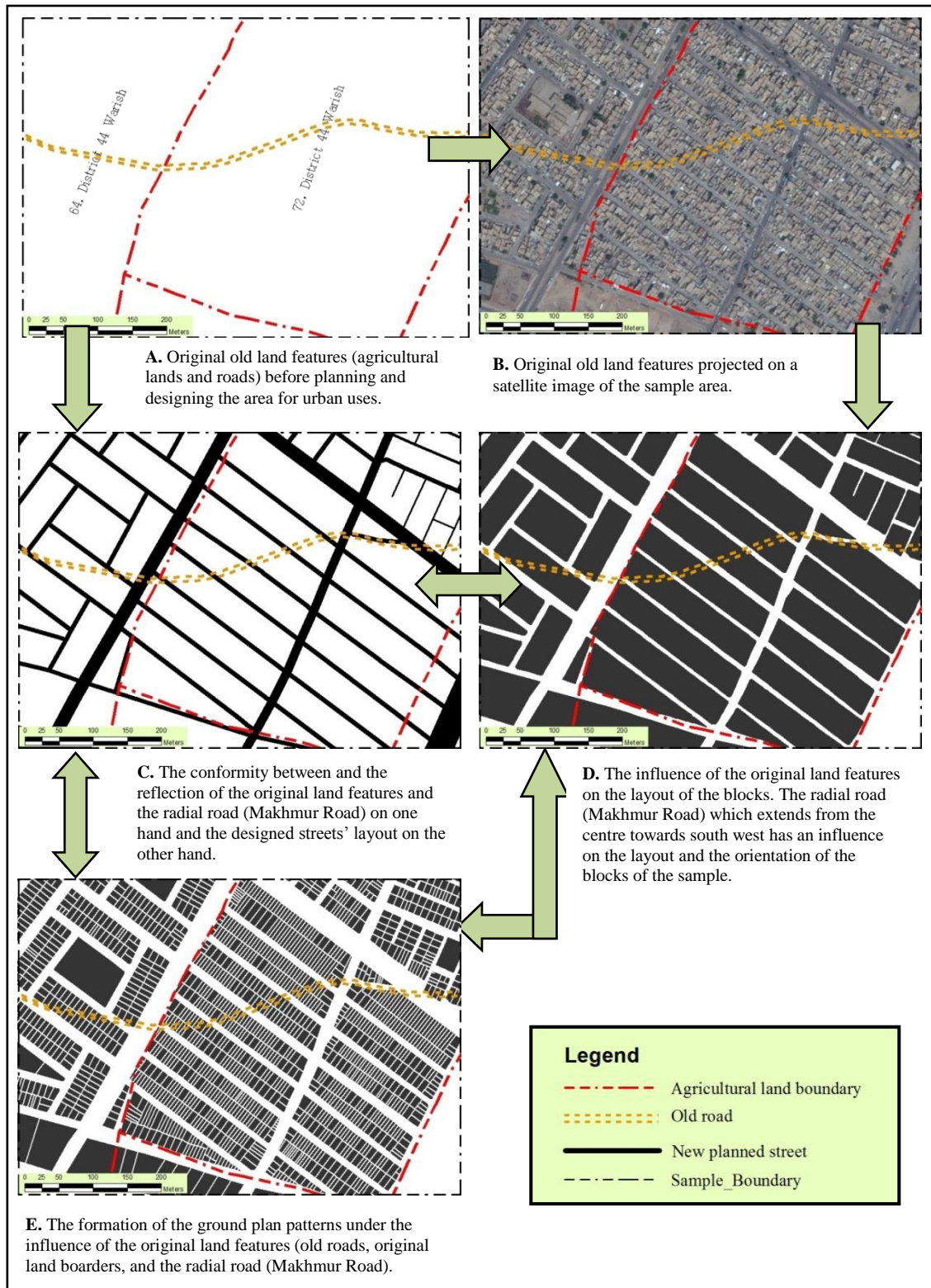


Figure 4.128: The influence of the original old land features (old roads and agricultural land boundaries) on the formation of the area which influenced the pattern and the layout of the streets and blocks of 'Sample 5' area. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

- 1. The formation of the area:** The Sample area consists of three parts formed in different periods. The first plan or the first formation was in 1970-1972 which included about 300 houses. Then, the extensions of the area included both planned (formal) and unplanned actions (informal building).
- A. The time period:** The three parts included in the sample boundary have been created in different time periods [Figure 4.125]. The emergence of the first part⁴¹⁴ (the north eastern part) of ‘Sample 5’ (Bahar quarter) is dated back to the Fifth Period (1966-1975)⁴¹⁵. In this part, about 300 plots were granted to the families of the martyrs of the Kurdish revolution (Aylul revolution). The second part (the eastern part) has been formed illegally in the later periods and was registered⁴¹⁶ after the year 2002 when a redevelopment plan was prepared to introduce some public spaces for social and community services. The third part⁴¹⁷ has been formed from 1979 or the Sixth Period (1976-1985) and later periods. This part has the registration number of the north area of the quarter which was previously known as ‘Krekaran’ quarter. The single-family houses of the area reflect the social class of the residents.
- B. The housing policy:** The ‘Housing Policy 1’ and ‘Housing Policy 5’ formed and transformed this area. The part which was built illegally also became a part of the individual process of building but with a less influence of regulations. Individual ownership is prevalent in the area. Accordingly, the building process of the area has been a long term process. This individual process of building over time has resulted in the variety of building forms which represent the period in which they were built.
- C. The regulations:** The ‘ground plan’ of the first part of the area was planned and projected basing on the amendment of 1934 of ‘The Law of Municipalities Administration No. 84 of 1931’ and ‘*The Amended System of Roads and Buildings No. 44 of 1935*’. It was planned as the first urban area category. The minimum requirements of street width, plot area, and building orientation within the plot are a reflection of this

⁴¹⁴ The registration number of plot subdivisions of the first part “72, District 44 Warish”

⁴¹⁵ In 1972 the plots of this part were registered and numbered.

⁴¹⁶ The registration number of this part is a continuity of the subdivisions of “72, District 44 Warish”

⁴¹⁷ The registration number of plot subdivisions of the third part is “64, District 45 Warish”

legislation. Then, successive regulations, specifically, those in 1979⁴¹⁸, 1980⁴¹⁹, 1987⁴²⁰, and 2002⁴²¹ have influenced the continual process of building and transformation of the area. See [Table 4-23], and [Table 4-24].

What characterises this sample are the houses of relatively small plot area (100 m²- 200 m²), and a mixture of formal and informal buildings in the second part⁴²² [Figure 4.126]. The form characteristics of the early houses of the area can be summarised as follows [Figure 4.127]: The first, the heterogeneity of the type of buildings. All houses are attached type. However, some have front setback distance⁴²³ while others do not. This can be noticed from a street view of the blocks, especially in the second part. The second is the relatively small area of houses (100 m²- 200 m²). The front side of some houses is 5 m, and the plot area would be 5m x 20m. The third is the privacy issue which is a common character of the houses of Erbil. The visual and physical separation of houses from the streets and public areas is achieved by fences in the houses with front setback, while in the houses which do not have front setback the separation is achieved by locating some spaces (rooms, storages, and other services) of the house in front. In most of the houses, the entrance gate is wide enough to allow a car to pass through into inside. The fourth is the height of the buildings. The houses have one to two floors with an average height ranges from 3.5 m to 7 m.

D. Other determinants: Apart from the regulations, there are other factors that determined the formation of the area and the characteristics of its forms. There are two key determinants: The geographic determinant which is represented in the location and the original features of the land used for the quarter; And the absence of building and planning control and the lack of the implementation of the regulations which resulted in individual and group informal actions of building process. The original

⁴¹⁸ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

⁴¹⁹ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴²⁰ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴²¹ Kurdistan Parliament-Iraq.

⁴²² Part 2 of the area has formed illegally. The areas of the plots were originally 200 m². However, the majority of these plots were subdivided into two (each 100 m²).

⁴²³ The setback distance is not regular.

features include the old roads and the agricultural land boundaries before developing the area for urban uses. There is a weak influence of the original land features and the produced ground plan. The old road which passed through the area from east to west has no significant influence on the formed ground plan [Figure 4.128]. The influence of the concentric pattern of the city is evident in the orientation and the layout of the streets and the blocks of the area [Figure 4.124]. The radial road (Makhmur Road), the Fifth, and the Sixth Ring Roads determined the layout of the streets and the blocks of the area.

The informality, due to the lack of implementation of building and planning regulations, played a significant role in the produced form of the area. The 'part 1' and 'part 3' were planned formally. However, 'part 2' is a result of informality. In 1970-1972 about 300 plots with an average area of 150m² each were planned and granted to the martyrs' families of the Kurdish revolution of '11th Aylul'. Therefore, the majority of the original residents of this part were those families. This was the outcome of the autonomy that Kurdistan gained for the first time when some institutions that reflect this political outcome were established in Erbil. After 1975 when again the political struggles emerged between the Kurdish and the central government of Iraq who retreated and repealed the agreement with the Kurdish, a migration from Kurdish villages started to the cities. Those people needed housing. Those who were unable to buy properties or rent houses, started to build their own houses informally in some parts of cities or in the areas close to the cities. This process continued when the political situation worsened and living in some villages became hard. 'Part 2' of the sample area is the result of this process. 'Part 3' of the sample was planned in 1979.

The Transformation: The selection of blocks samples

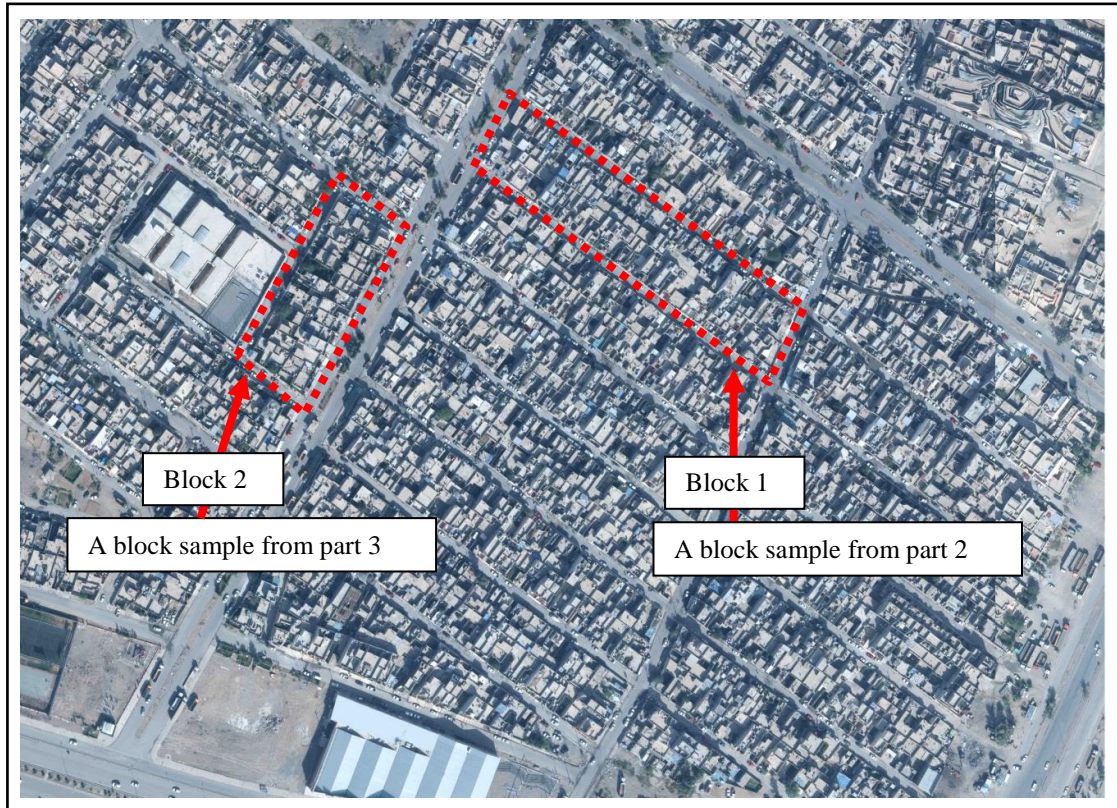


Figure 4.129: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)



Figure 4.130: A block (block 1) sample selected from the second part of the ‘Sample 5’ area showing the existing condition. The block has been built informally. The areas of the plots were prepared in 200 m² each, but two houses have been built on the majority of the plots. The block includes a variety of attached types of buildings. The setback distances and the plot coverage are not regulated by a certain regulations but are submitted to the decisions of the owners. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

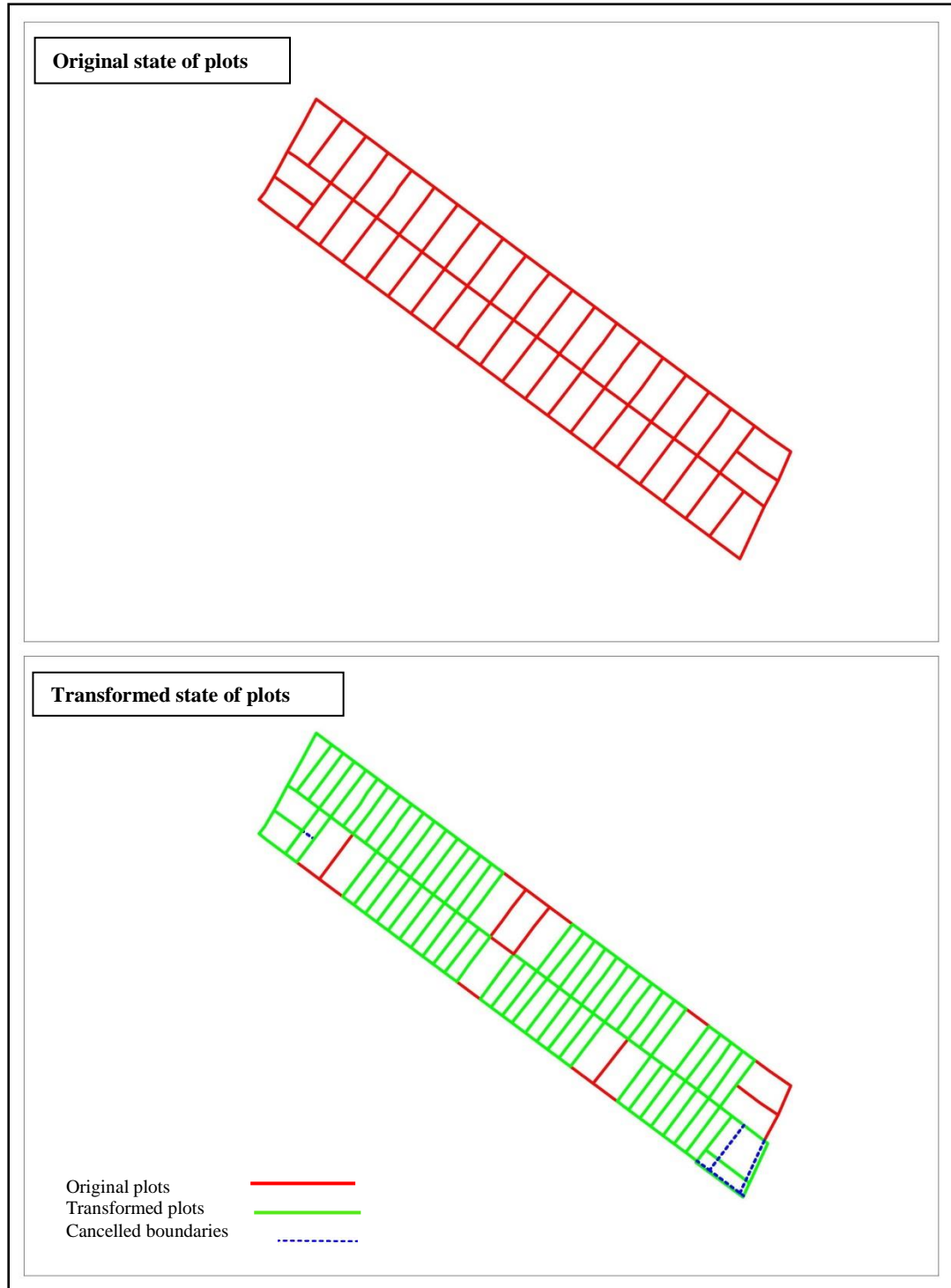


Figure 4.131: The selected block (block 1) from the second part of ‘Sample 5’ area. The transformation (pooling and subdivision) on the majority of the plots resulted under the pressure and the increasing demand on houses. This process was made informally. However, their existing condition was legalized by the authority basing on ‘*Decision No. 5 of 2002*’ made by the Kurdistan Parliament on informal buildings. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

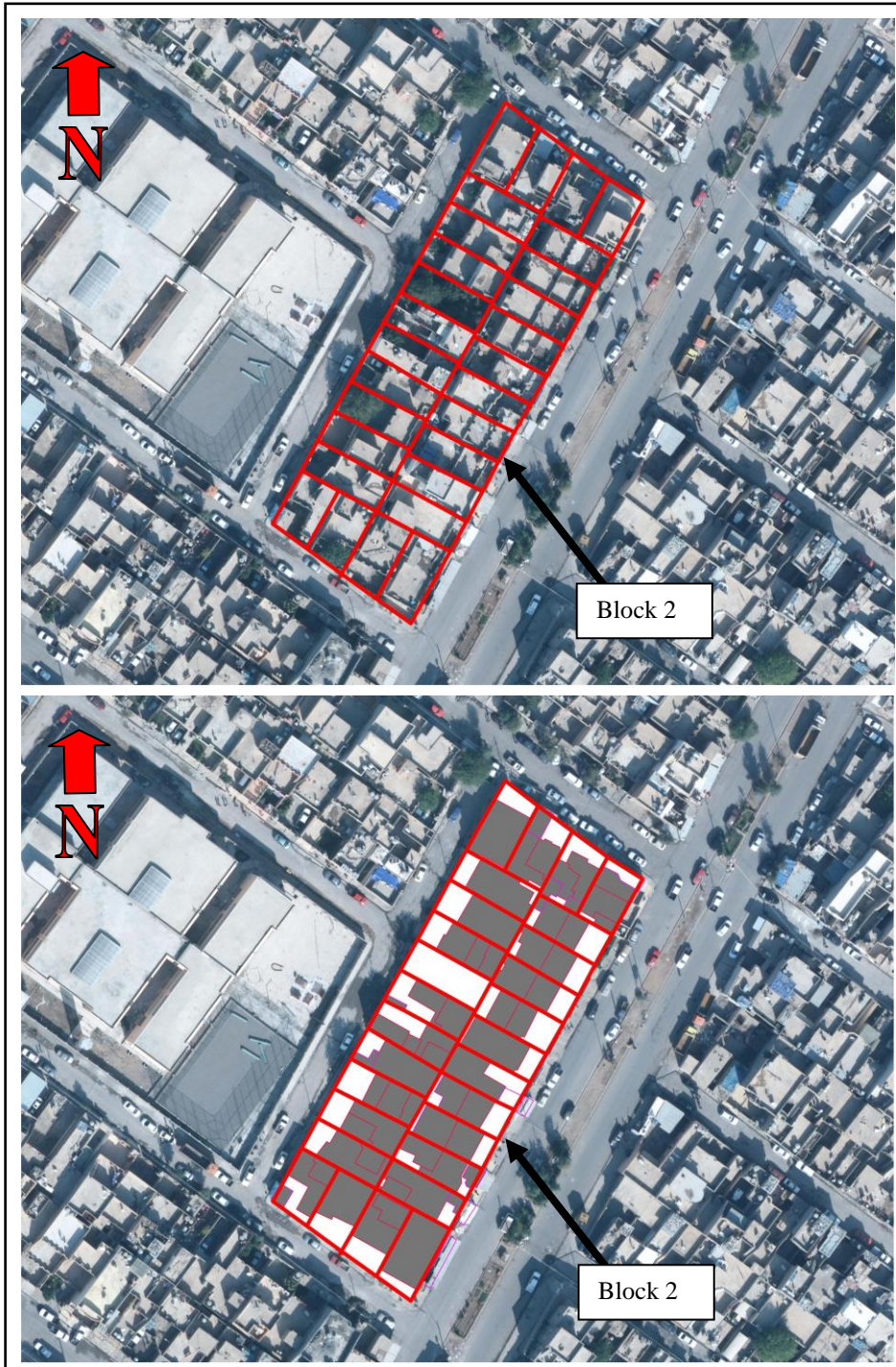


Figure 4.132: A block (block 2) sample from the third part of the area. The early building process of houses on the block is dated back to after 1964. They were built as the first urban area category of the amendments of ‘*System of Roads and Buildings No. 44 of 1935*’ made by 1965. The typical area of the original plots is 150m² (7.5m X 20m). The common type of the houses is attached with front setbacks which are regulated by the amendment of 1964 of ‘*System of Roads and Buildings No.44 of 1935*’, ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 of 1980*’. The process of the removal of the old houses replaced by new is still in progress. There is one case of plot which is in this process and is vacant. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

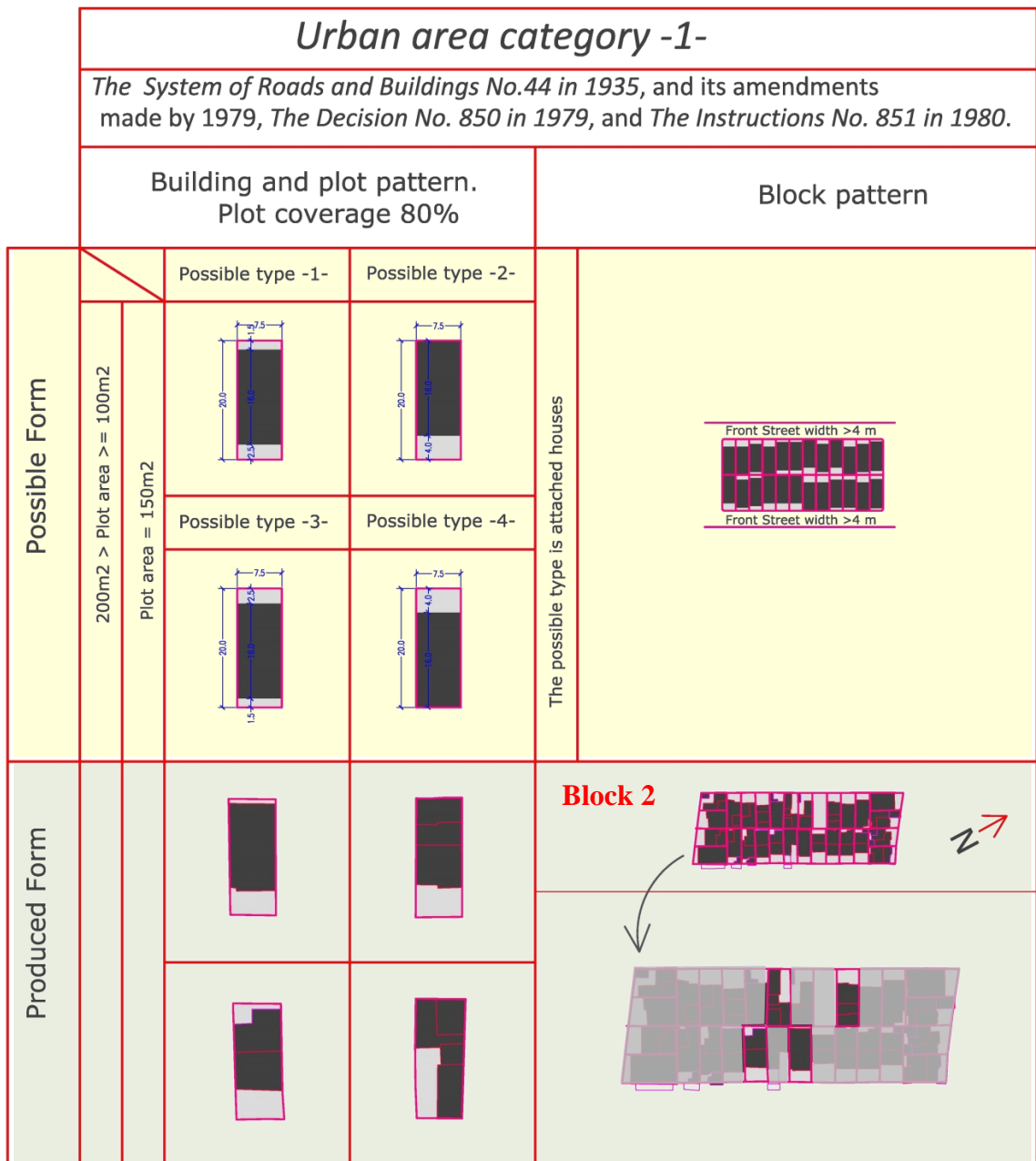


Figure 4.133: The possible form of buildings and plots of the first urban area category which can be produced by the successive and the accumulated amendments of ‘*System of Roads and Buildings No. 44 of 1935*’ by 1965, ‘*Decision No. 850 of 1979*’, and ‘*Instructions No. 851 of 1980*’ and the real produced form by the same set of regulations in the third part of ‘*Sample 5*’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The building form of the houses of later periods

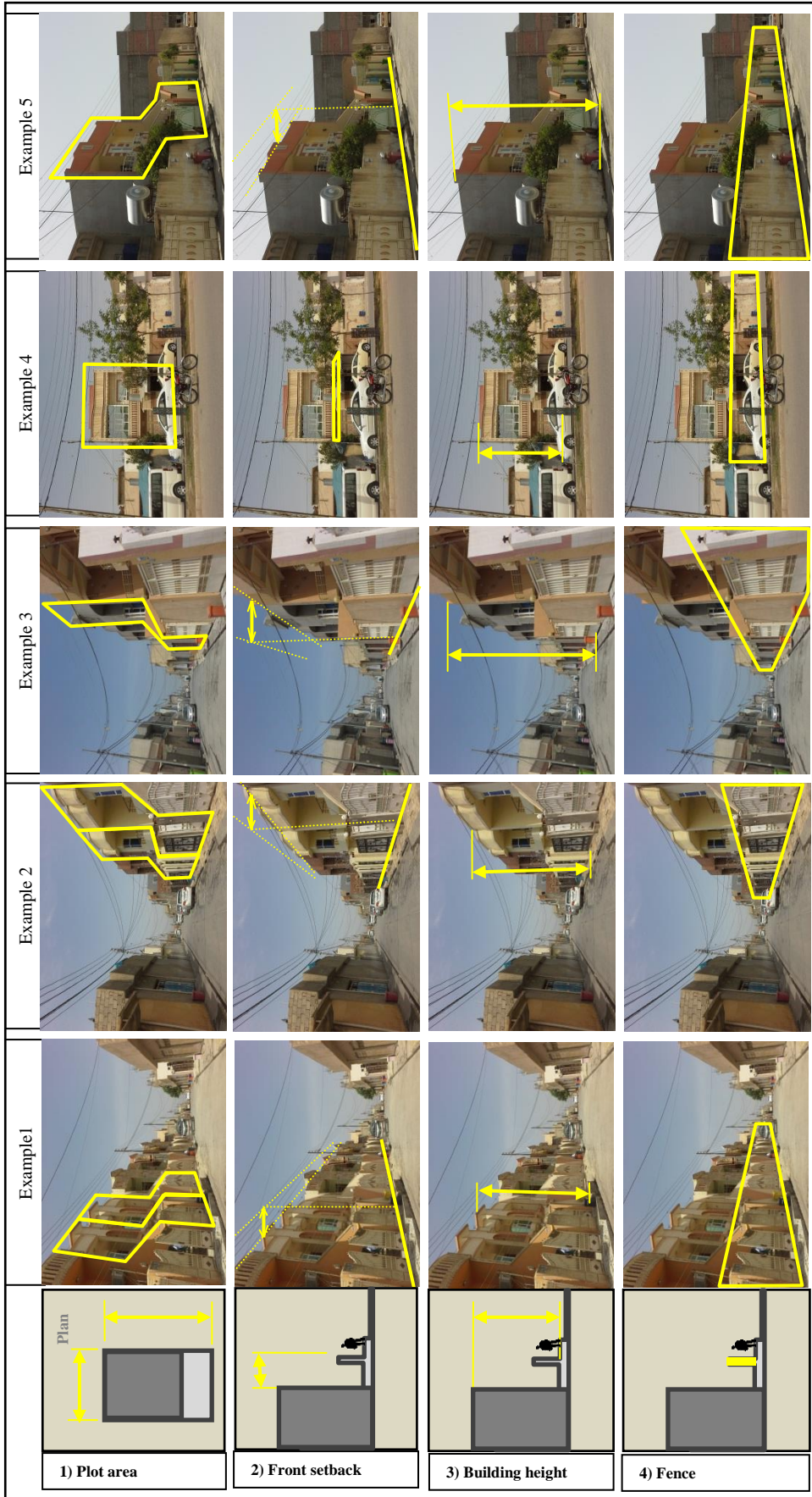


Figure 4.134: The common characteristics of the houses built in the later periods (1996-2013) in the area of ‘Sample 5’. (Source: Researcher)

The Transformation: The opening up of street

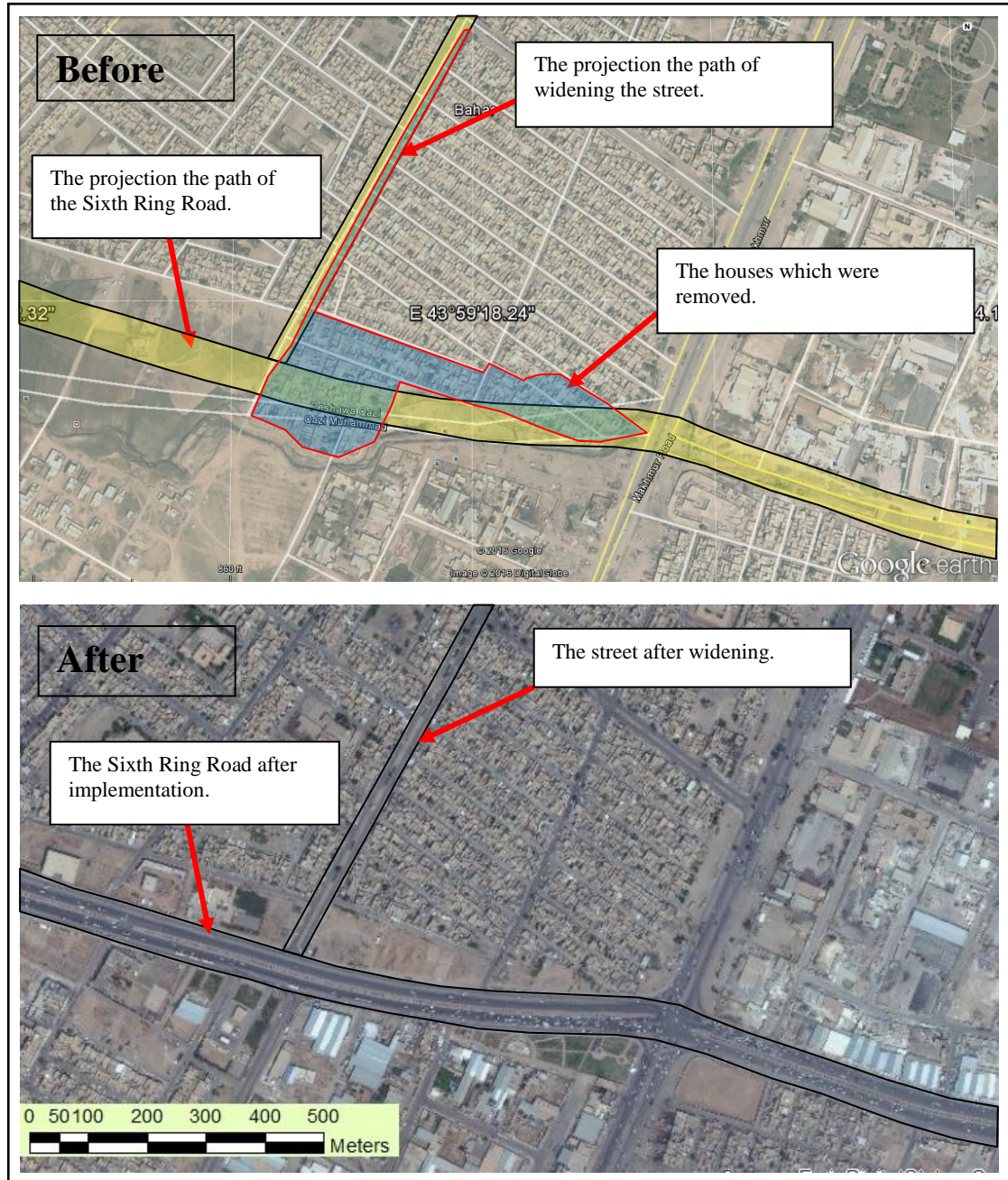


Figure 4.135: The transformation of the area in 2005 due to the implementation of the remaining segment of Sixth Ring Road (Peshawa Qazi Muhammad Street) and the widening of a part of ‘Alban Street’. This project required the removal of some informal houses which were directly or indirectly on the paths of those streets. (Source: Drawings by the researcher on the satellite images of 2004 and 2011)

2. The transformation of the area: Due to the fact that the area has been formed in the periods after 1970 and the average area of the houses is relatively small, the transformations that happened to the area were mainly due to decisions made on the level of the region and the city.

A. The time period: The first formation of the area of ‘Sample 5’ was in the fifth period (1966-1975), more specifically in 1970-1972. The area has enlarged and expanded in the later periods. The political agreement of 11th March of 1970 by which Kurdistan obtained the autonomy⁴²⁴ and the nationalization of IPC (Iraq Petroleum Company) in 1972, resulted in political stability and economic growth of the country in 1970s. The acceleration of urbanization of the country in 1970s was reflected in the housing and the expansion of the city.

The suppression of Kurdish revolution by the central government in 1975 and its repeal about the agreement it had made with Kurds resulted in the migration of Kurdish people from the villages and rural areas to the urban settlements and Erbil which resulted in an uncontrolled urbanization. The second part of the ‘Sample 5’ area is a result of that process. Then, in the later periods this process continued until 2000 when a decision from the Parliament of Kurdistan made about treating the informal quarters in the cities of Kurdistan. The quality of the implementation of the regulations and the follow-up in this area was weak and not on a required level. The continual process of building in the later periods, to different extent influenced the transformation of the area.

B. The housing policy: The ‘Policy 1’ and ‘Policy 5’ of housing have determined the building up of the quarter and its growth. Like other quarters formed by the ‘Policy 1’ the individual building process of houses was dominant which causes a continuous, gradual, and long-term transformation on the singular plots. However, in ‘part 2’ of the sample area the ‘Policy 5’ was dominant. The characteristic of the individual process of building and change was entirely free from regulations unless the area is legally treated by certain decisions. In other words, the matter

⁴²⁴ The agreement was between the central government of Iraq and the Kurdish of Iraq.

of the change and the transformation on the plot or the building was up to the owner without any legal restriction.

C. The regulations: Building regulations have not been a significant determinant in the extension and the transformation of the area as a large part (Part 2) of the sample area has been formed informally. The successive legislations of building and planning [Table 4-23] and [Table 4-24] in Iraq, in Kurdistan especially since 2000, and in Erbil dramatically have resulted in layers of transformations reflected in the area and building forms. Two blocks samples were selected for further analysis on plot and building level. The first block is from the second part of the area and the other block is from the third part [Figure 4.129].

The regulations: ‘*The Decision No. 850 of 1979*’⁴²⁵, ‘*The instructions No. 851 of 1980*’⁴²⁶, ‘*The Decision No. 940 of 1987*’⁴²⁷, and ‘*The decision of Kurdistan Parliament in 2000*’ have put their touch on the transformation of the area. The latter legislation identified the way of dealing with informal buildings and areas to be formalised. This legislation stated that any informal house built prior to 2000, regardless the area of the house, can be registered as formal if it does not contradict with the plan of the quarter⁴²⁸. Many of those houses have areas of 100 m² on an informal subdivision of a plot of 200 m². The selected block (Block 1) sample from this part has been built informally. The areas of its plots were prepared in 200m² each, but two houses have been built on the majority of the plots. Therefore, the area of the majority of the plots of those houses is 100 m². As a result, most of the 200m² were subdivided into two and they were registered as their current condition when a decision made on making them formal. The block includes a variety of attached types of buildings. The setback distances and the plot coverage are not regulated by a certain regulations but are submitted to the decisions of the owners [Figure 4.130]. Consequently, the registration process of making them formal considered the plot area on

⁴²⁵ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

⁴²⁶ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴²⁷ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴²⁸ This plan is a development plan for the informal areas planned, prepared, and approved by the authorities.

which the house is built. Many plots in 'part 2' were subject to this subdivision which resulted in two plots each has 100 m² areas [Figure 4.131]. However, the subdivision is not a phenomenon in the first and the third part of the area as the original average and the typical plot size was 150m² which according to regulations cannot be subdivided. As a result, these two parts have been resistant to any change regarding the size of the plots. The houses of the second block sample (Block 2) were built as the first urban area category of the amendments of '*The System of Roads and Buildings No. 44 of 1935*' made by 1965. The typical area of the original plots is 150m² (7.5m X 20m). However, some cases have different dimensions and areas more than 150m², especially the plots at the corners of the block which usually have areas more than the typical. No significant changes and modifications have happened to the plots and streets. The common type of the houses is attached with front setbacks which are regulated by the amendment of 1964 of '*The System of Roads and Buildings No.44 of 1935*', '*The Decision No. 850 of 1979*' and '*The instructions No. 851 in 1980*'. The houses of the block have been built in the successive periods since 1979 and the process of the removal of the old houses replaced by new is still in progress [Figure 4.132].

In order to measure the extent of the influence of the regulations on the ground, the possible forms that those regulations can generate are compared against the resulted forms on the ground. In the 'third part', the selected block is treated with [Figure 4.133]. The two different legislations of 1979 and 1980 determined the characteristics of the plots, streets, and buildings. But, no significant transformation due to those regulations, on the plots and streets of the first and the third parts of the sample area cannot be noticed and the change was only on the buildings. The forms of the houses in a block carry the characteristics of the forms from the successive periods from 1979 to 2013. Some old houses were removed and replaced by newer ones which are regulated by the same legislation but produced new forms due to other determinants [Figure 4.134]. Overall the characteristics can be summarised as follows: the area of the plots of the houses ranges from 100 m² to 150 m²; front setback distance is applied. The setback distance is 1.5m and more but it is not enough for gardens; the majority of the houses are two or three floors;

and lastly, all the houses have fence with an entrance gate wide enough for a car to pass through. The height of the fence ranges from 1.4m to 2.2m but does not work as a visual barrier to provide privacy to the house, especially to the first and the second floors. The fence only has the function of determining the plot and the house boundary. Due to that the front sides of the plots are 7.5m or less (5 m), and the average width of the entrance gates is 2.5. In the street view arrays of doors of the gates dominant the front side of the houses.

The layout of the streets has stayed constant. No notable change and transformation on streets can be observed. The only change on the streets was decisions on the change of the use of some streets from residential to commercial. These decisions based on Article 25 of '*The Law of the Municipalities Administration No.6 in 1993*'⁴²⁹. Transformed streets from residential to mixed and commercial uses produced a mix of multistorey buildings and single-family houses.

D. Other determinants: The transformation of the area has happened by other determinants. The continual increase of the population size of the city has resulted in the increase of the density. Houses of areas of 150 m² and 100 m² are dominant in the area. This factor is also resulted in producing houses of 2-3 floors, increasing the plot coverage, and the disappearance of the front gardens [Figure 4.134]. In 2005 a decision made by the ministry of municipalities of Kurdistan about a removal of a number of informal houses from 'Part 2' of the sample area due to the opening up and the implementation of the remaining segment of the sixth ring road (Peshawa Qazi Muhammad Street) and widening a part of 'Alban Street' [Figure 4.135]. The residents of these houses were granted plots in neighbour areas. This was the most notable transformation of the area on the various levels from the neighbourhood level to single plot level. The implementation of this project limited the informal expansion of this area towards the south west and identified a strong functional boundary to the area.

⁴²⁹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Period 6 Sample 6 Nawroz Quarter



Sample 6 (Nawroz Quarter)

‘Sample 6’ area is a part of ‘Nawroz’ quarter which has an area of 2.6Km² and lies around 2.8 km to the south-west of the citadel (Qalat), between the Fifth and the Sixth Ring Roads (Peshawa Qazi Muhammad Street) which is known as ‘The 100 Meters Ring Road’ [Figure 4.137]. The quarter is bounded by the Fifth Ring Road (Zurgazraw Street) from the east, the sixth ring road (Peshawa Qazi Muhammad Street) from the west, the radial road (Mosul Road) from the north, and ‘Nawroz Street’ from the south [Figure 4.138]. **The first formation of ‘Nawroz’ quarter was in the Sixth Period (1976-1985) yet its further formation and transformation continued in later periods. It was built under the ‘Housing Policy 1’.**

It was firstly planned in two parts. The ‘first part’ was planned and registered in 1981 for solders and army officers of the state. The ‘second part’ was registered in 1982 and granted to the families of the missing soldiers in the war between Iraq and Iran at that time. Both parts have been planned according to the ‘Decision No. 850 of 1979’ and ‘The Instructions No. 851 of 1980’. The average plot area in this quarter ranges from 200m² to 300m². Each part contains the two categories of plot area (200m² and 300m²). However, there are some cases with areas less than 200m² due to subdivision actions in later periods. The area contains a mixture of attached and semi-detached type of houses with front setback. The street and block type of ‘Sample 6’ area is ‘Oblong’ with ‘T’ junctions. The analysis structure of the formation and the transformation of the area is presented in [Table 4-25].

Table 4-25: Sample 6, the formation and transformation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
6	Nawroz	6 th and later periods	1976-1985, and later	1	<ul style="list-style-type: none"> • Decision No. 850 of 1979 on setting plot areas limits for housing purposes. • Instruction No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (The location, and the original land features. • The socio-economic status of the residents.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1964 ⁴³⁰	N/A	1	N/A					
1979 ^{431, 432}	N/A	Distinct	$800 > P \geq 120$	10 ⁴³³	6	2.5	0	N/A
1987 ⁴³⁴	N/A	Distinct	$800 > P \geq 200$	10	10	2.5 or 4 ⁴³⁵		N/A
1989 ⁴³⁶	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ⁴³⁷	N/A	75%
1993 ⁴³⁸	N/A	Special	N/A					

⁴³⁰ The Presidency of the Republic, *Law of Municipalities' Administration No. 165 of 1964*.

⁴³¹ The Revolutionary Command Council, *Decision No. 850 of 1979 on setting plot areas limits for housing purposes*.

⁴³² The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴³³ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

⁴³⁴ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴³⁵ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

⁴³⁶ Ministry of Local Governance, General Directorate of Urban Planning.

⁴³⁷ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street. See [Table 4-27].

⁴³⁸ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

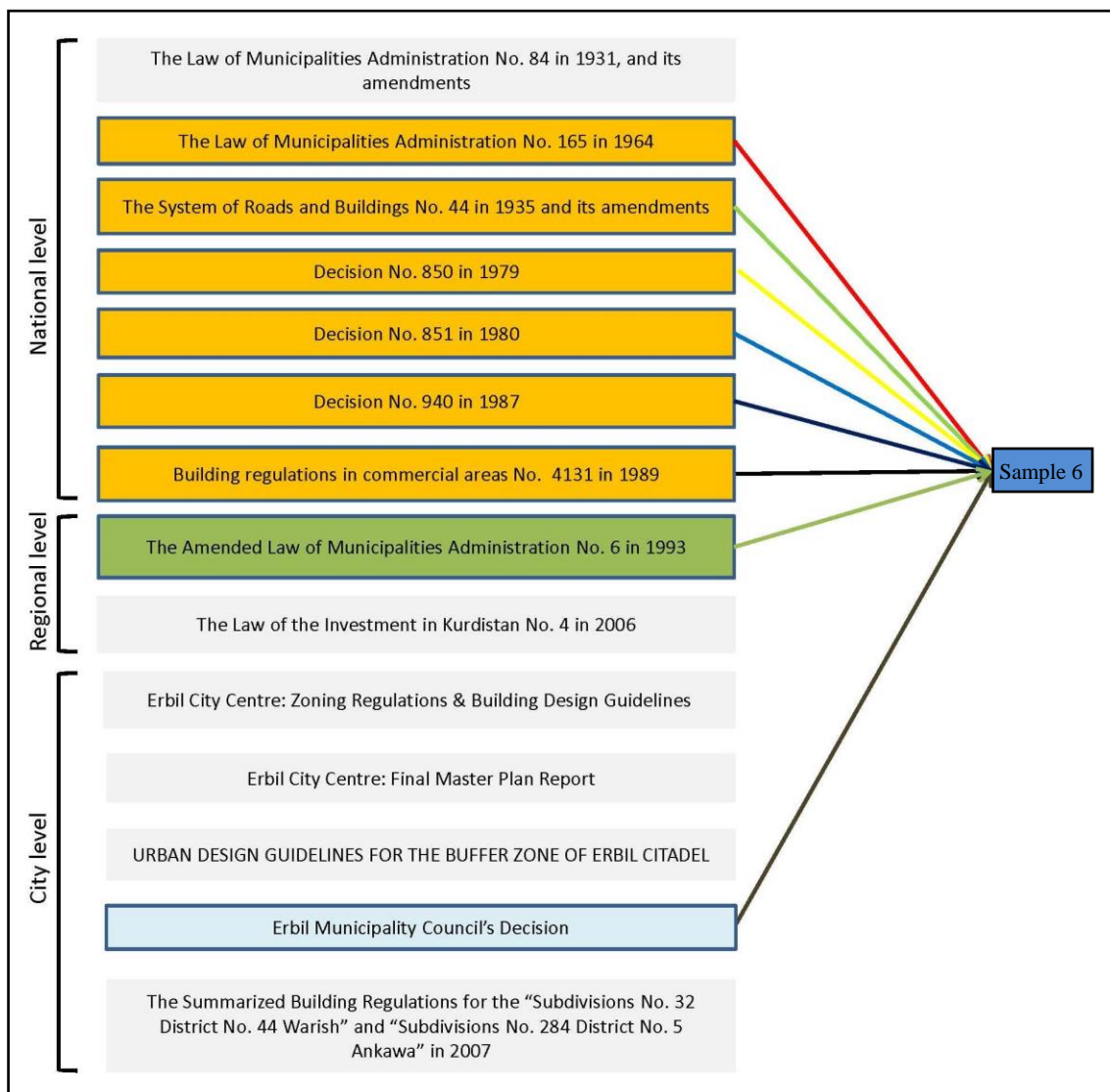


Figure 4.136: Direct regulations enacted at different levels that have influenced 'Sample 6'.
(Source: Researcher)

⁴³⁹ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation: The location and the boundary

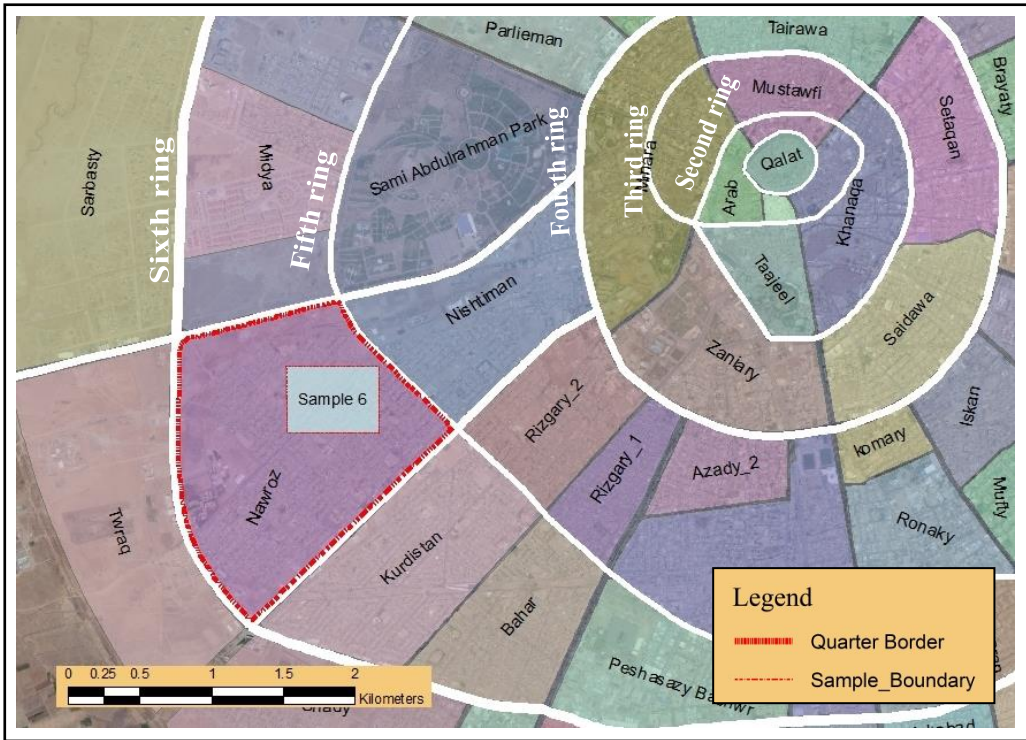


Figure 4.137: The location of ‘Sample 6’ and ‘Nawroz’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

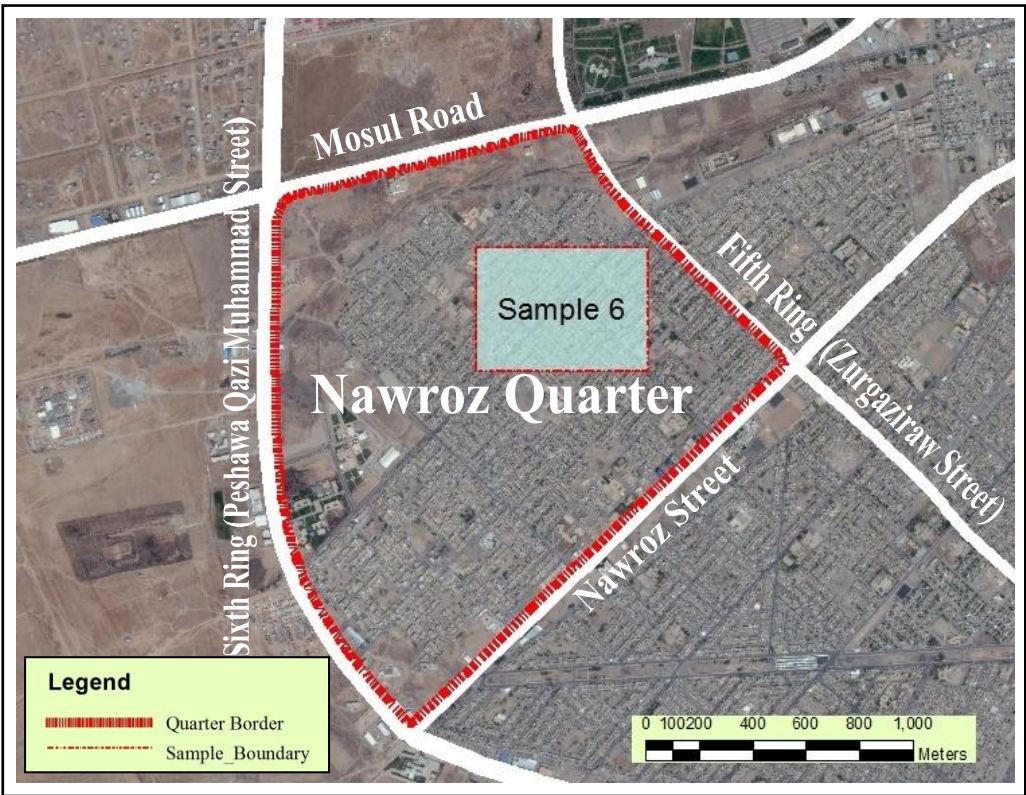


Figure 4.138: The boundary of ‘Nawroz’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

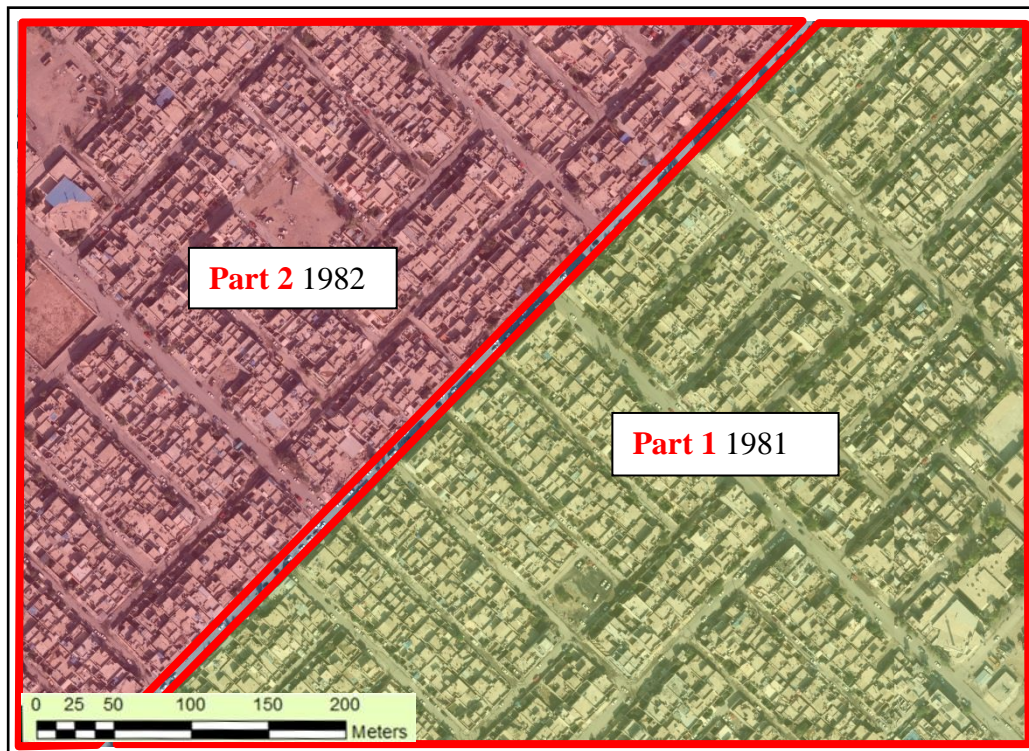


Figure 4.139: The different parts of the ‘Sample 6’ area which were planned and registered in the same period. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

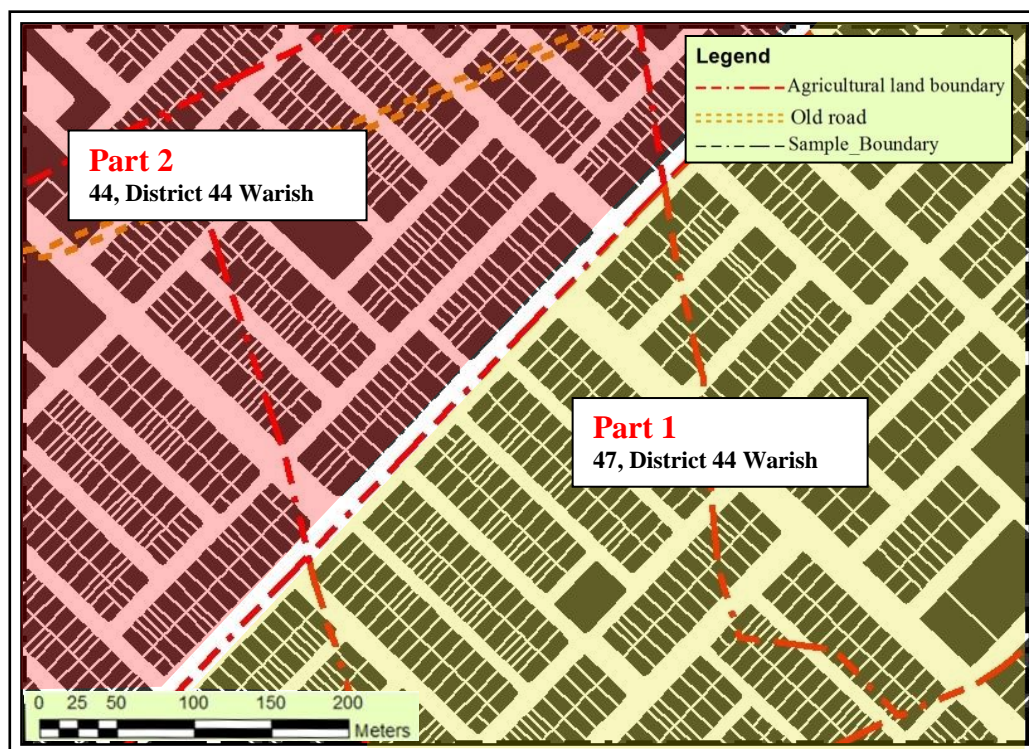


Figure 4.140: Apart from the line which separates ‘Part 1’ and ‘Part 2’, the original land features have no significant influence on the ground plan of the sample area. The area has two categories of plot area in each part (200 m² and 300 m²). However, due to subdivision actions in later periods, plots of areas less than 200m² have emerged. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

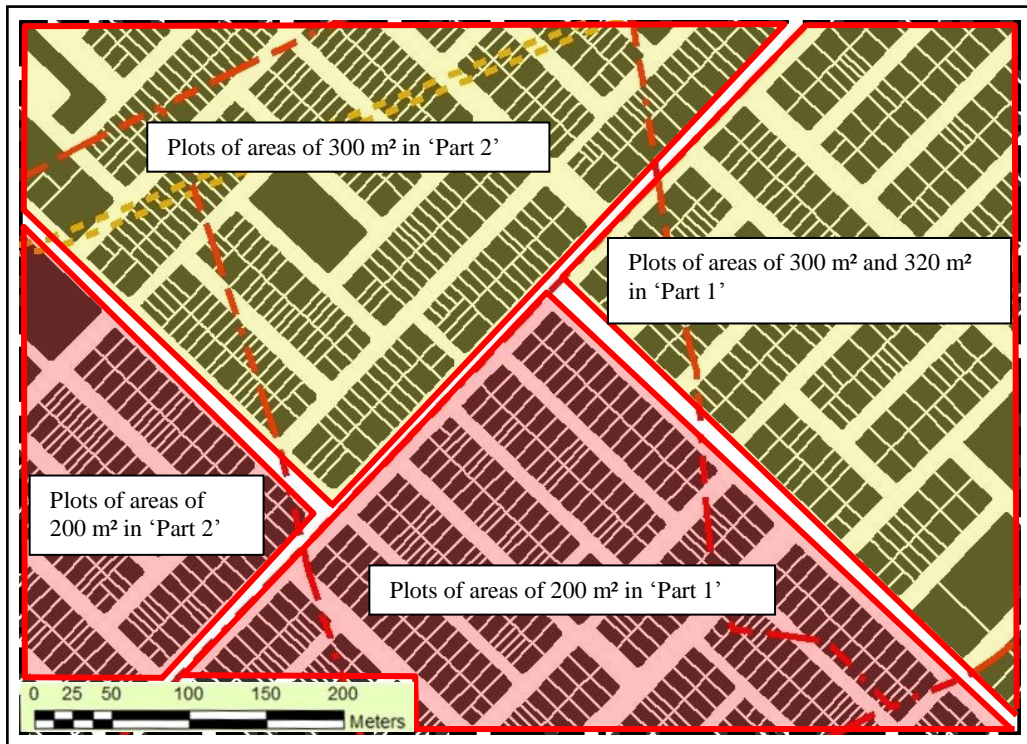


Figure 4.141: The area has two categories of plot area in each part (200 m² and 300 m²). However, due to subdivision actions in later periods, plots of areas less than 200m² have emerged. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation: The building form characteristics of the houses

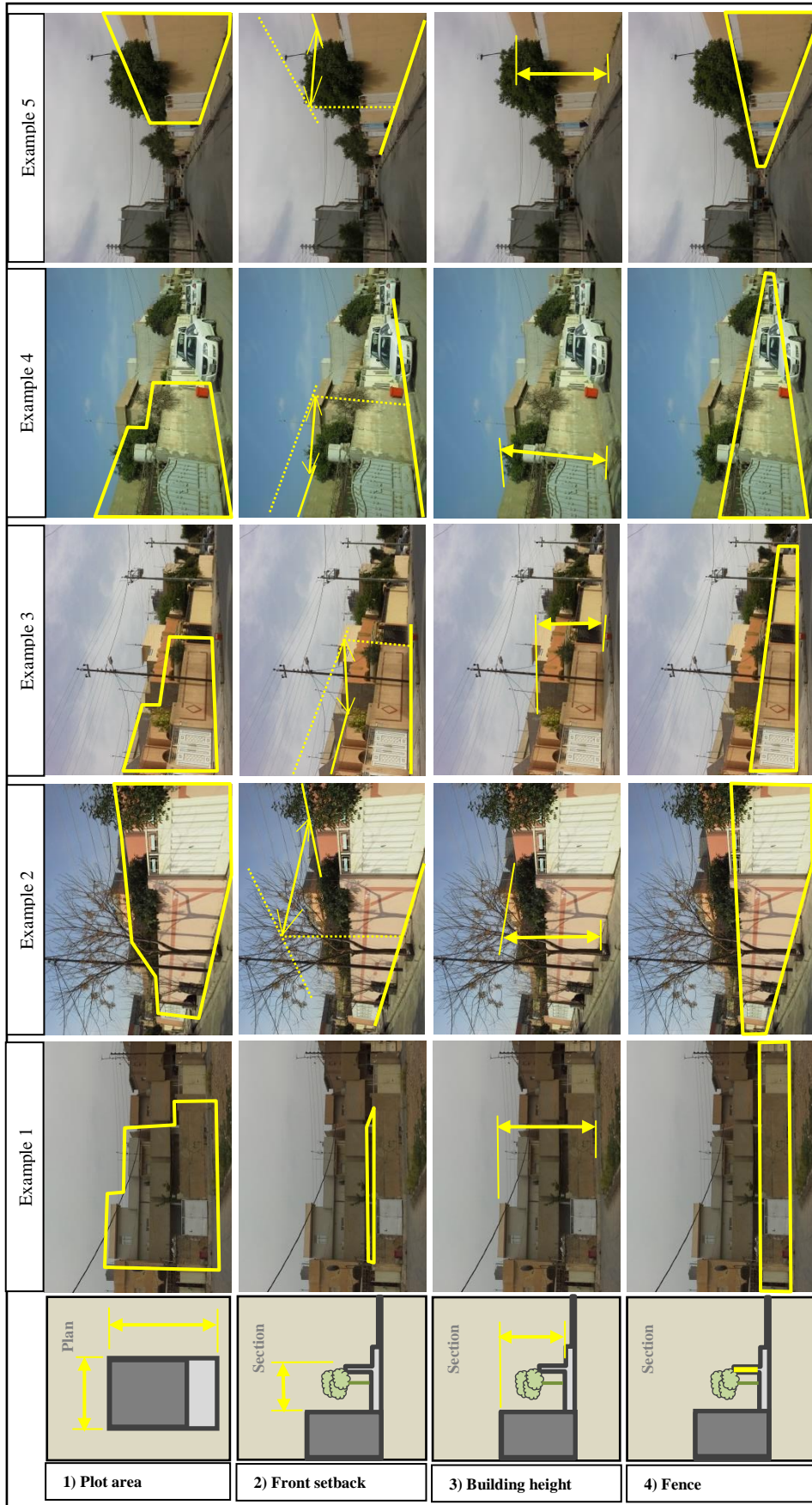


Figure 4.142: The common characteristics of the early houses built in the period (1976-1985) of the first formation of the area of ‘Sample 6’. (Source: Researcher)

The Formation: The plan and the original land features

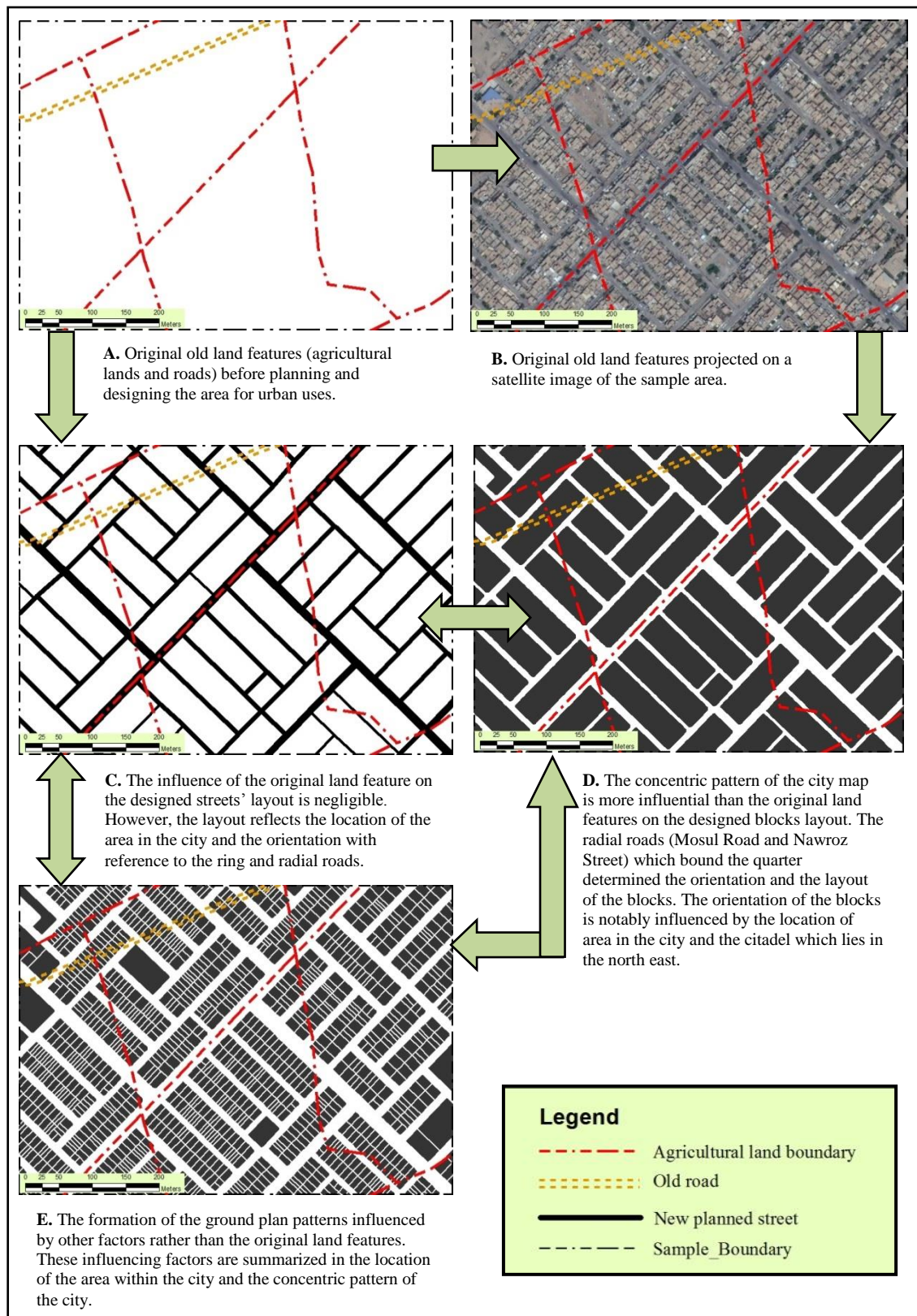


Figure 4.143: The original land features have no significant influence on the pattern of the formed ground plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

1. The formation of the area: The Sample area which is a part of ‘Nawroz Quarter’ consists of two parts formed in the same period (The Sixth period). The preparation of the plan and the registration of the first part were in 1981 and that of the second part was in 1982. Then, the continual process of individual building has resulted in the change and the transformation of the area.

A. The time period: The two parts included in the sample boundary have been created in the same time period [Figure 4.139] and they have two different registration numbers [Figure 4.140]. The emergence of the first part (the south eastern part) of ‘Sample 6’ is dated back to the Sixth Period (1976-1985), more specifically in 1981 and 1982. In 1980 the war between Iraq and Iran started and lasted for eight years. The plots of ‘Part 1’ (the south eastern part) were granted to soldiers and army officers of the state. The plots of ‘Part 2’ (the north western part) were offered to the families of the missing soldiers in the war. Another facility to those people was the offer of mortgages to subsidise building process for housing purposes.

B. The housing policy: ‘Housing Policy 1’ was adopted in the formation of the area. Similarly to all areas built under this policy, the individual and continuous building process has extended over long time span. This form of individual building resulted in an endless and long term process. The diversity of building forms was an apparent characteristic of this process.

C. The regulations: The ‘ground plan’ of the first part of the area was planned and projected basing on the ‘The Law of Municipalities Administration No. 65 of 1964’, ‘*The Decision No. 850 of 1979*’, and ‘*The Instructions No. 851 of 1980*’ which, in new developments in the city, cancelled the notion of planning city parts into different urban area categories based on ‘*The System of Roads and Buildings No. 44 of 1935*’. The minimum requirements of street width, plot area, and building orientation within the plot are a reflection of this group of legislation. Then, successive regulations of 1987⁴⁴⁰ and 1989⁴⁴¹ have influenced the

⁴⁴⁰ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴⁴¹ Ministry of Local Governance, General Directorate of Urban Planning.

continual process of building and transformation of the area. See [Table 4-26], and [Table 4-27].

What characterises this sample is the area of the plots of the early formation of the quarter ranged between 200 m² and 320 m². Few blocks in 'Part 1' have plots of 320 m². See [Figure 4.141]. The form characteristics of the early houses of the area can be summarised as follow [Figure 4.142]: The first is that there are three categories of plot area of the houses, 200 m² (10 m X 20 m), 300 m² (15 m X 20 m), and 350 m² (16 m X 20 m). The front width of the plots ranges from 10 m to 16 m. However, the depth of the plots is constant (20 m) The difference of the areas is mainly contributed to the difference of the width of the plots (10 m, 15 m, and 16 m) successively). The second is all the houses are attached type with a few examples of semi-detached. The houses have front setback distances which in most cases used for gardens and car park spaces.

The third is the height of the buildings. The houses have one to two floors with an average height ranges from 3.5 m to 7 m. The last is the privacy issue which is a common characteristic of the houses of Erbil. The visual and physical separation of the houses from the streets and public areas is achieved by fences which have the height ranges from 1.4 m to 2.2 m. In almost all of the houses, the entrance gate is wide enough to allow a car to pass through into inside.

D. Other determinants: Other influencing factors that determined the formation of the area and the characteristics of its forms can be summarised into two: The geographic determinant which is mainly represented in the location of the quarter within the city of Erbil and the influence of concentric pattern of the city on the layout of the streets and blocks [Figure 4.137] and [Figure 4.138]. However, the original features of the land used for the quarter have no significant influence on the layout. This is mainly because of that the agricultural lands and the old roads of the area were submitted to a technical and institutional process as a preparation for the plan intended. This process included the cancellation of the old roads and the change in the areas of the lands through merging and subdividing them. As a result, the area separated

into two parts. [Figure 4.143]. The second factor which is also linked to the period in which the area has been developed. The state at that time was in a war against Iran. As a motivation tool, the government started to reward the people who had joined army and their families. A form of this reward was by offering housing in different ways. Granting and offering residential plots for housing purposes supported by mortgage policies was one of the ways of motivation.

The Transformation: The selection of blocks samples

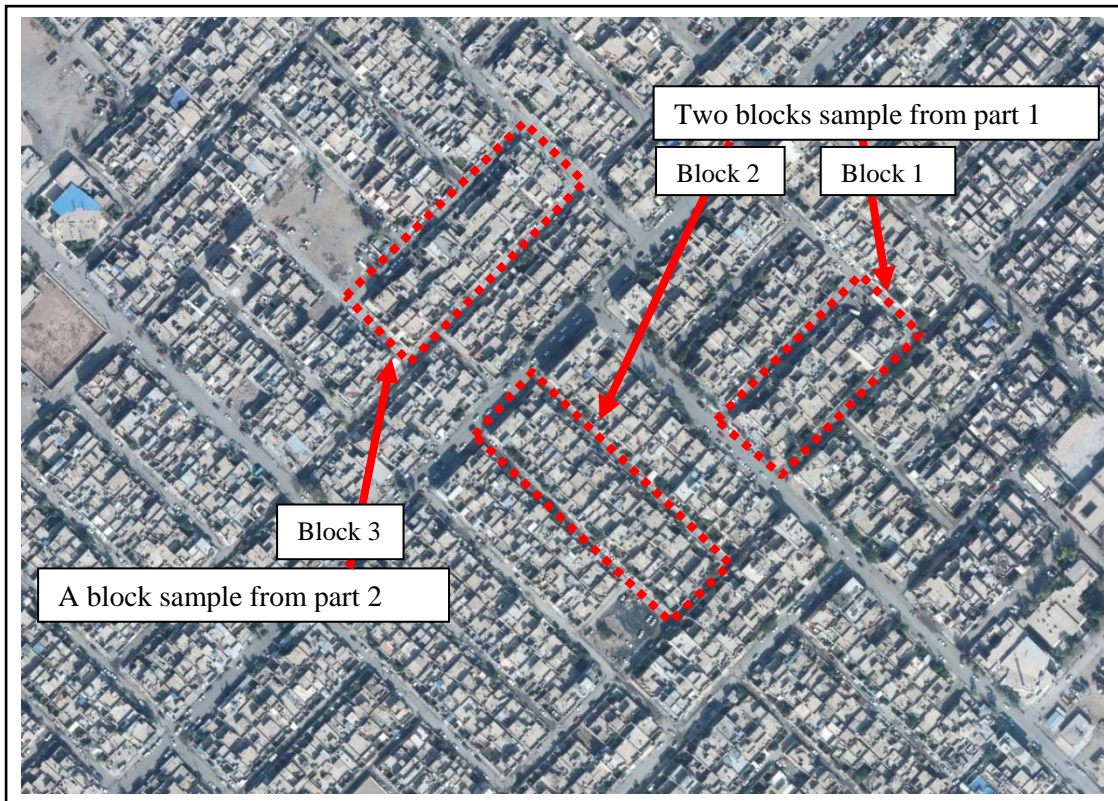


Figure 4.144: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

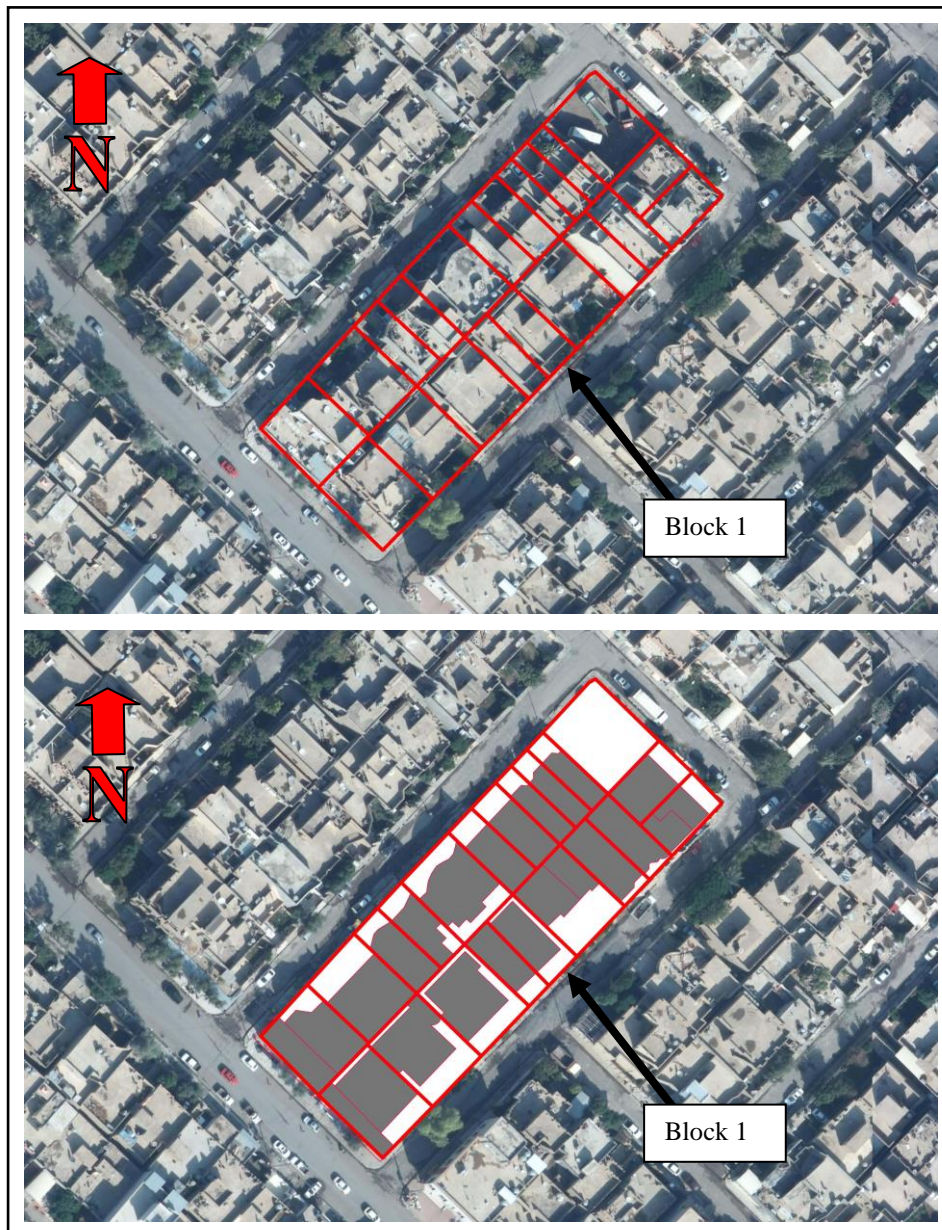


Figure 4.145: A block (block 1) sample from the first part of the ‘Sample 6’ area showing the existing condition. The early houses of the block have been built according to ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’. The area of the original plots is 320 m² (16 m X 20 m). Some of the old houses have been replaced by two houses (160 m² each) or three houses (100 m²- 120 m²). The block includes a variety of attached typologies of buildings. The setback distances and the plot coverage are not regulated by a certain regulations but are submitted to the decisions of the owners. The common type of the houses is attached with front setbacks which are regulated by the ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

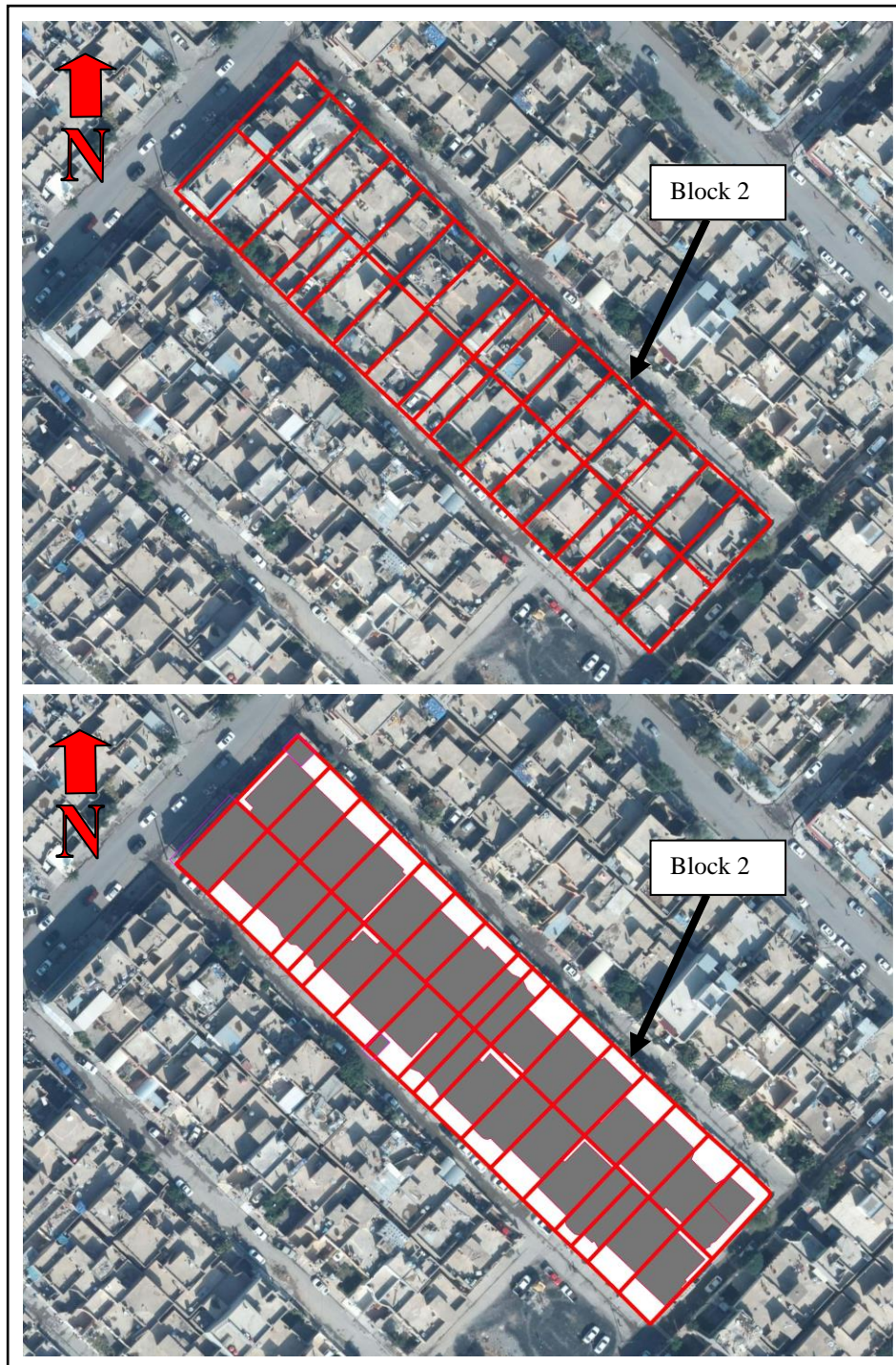


Figure 4.146: A block (block 2) sample from the first part of the area. The early houses of the block have been built according to ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 of 1980*’. The average area of the original plots is 200m² (10m X 20m). However, some cases have different dimensions and areas more than 200m², especially the plots at the corners of the block which usually have areas more than the typical. No significant changes and modifications happened to the plots and streets. The common type of the houses is attached with front setbacks which are regulated by the ‘*Decision No. 850 of 1979*’ and ‘*Instructions No. 851 of 1980*’. The houses of the block have been built in the successive periods since 1981 and the process of the removal of the old houses replaced by new is still in progress. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

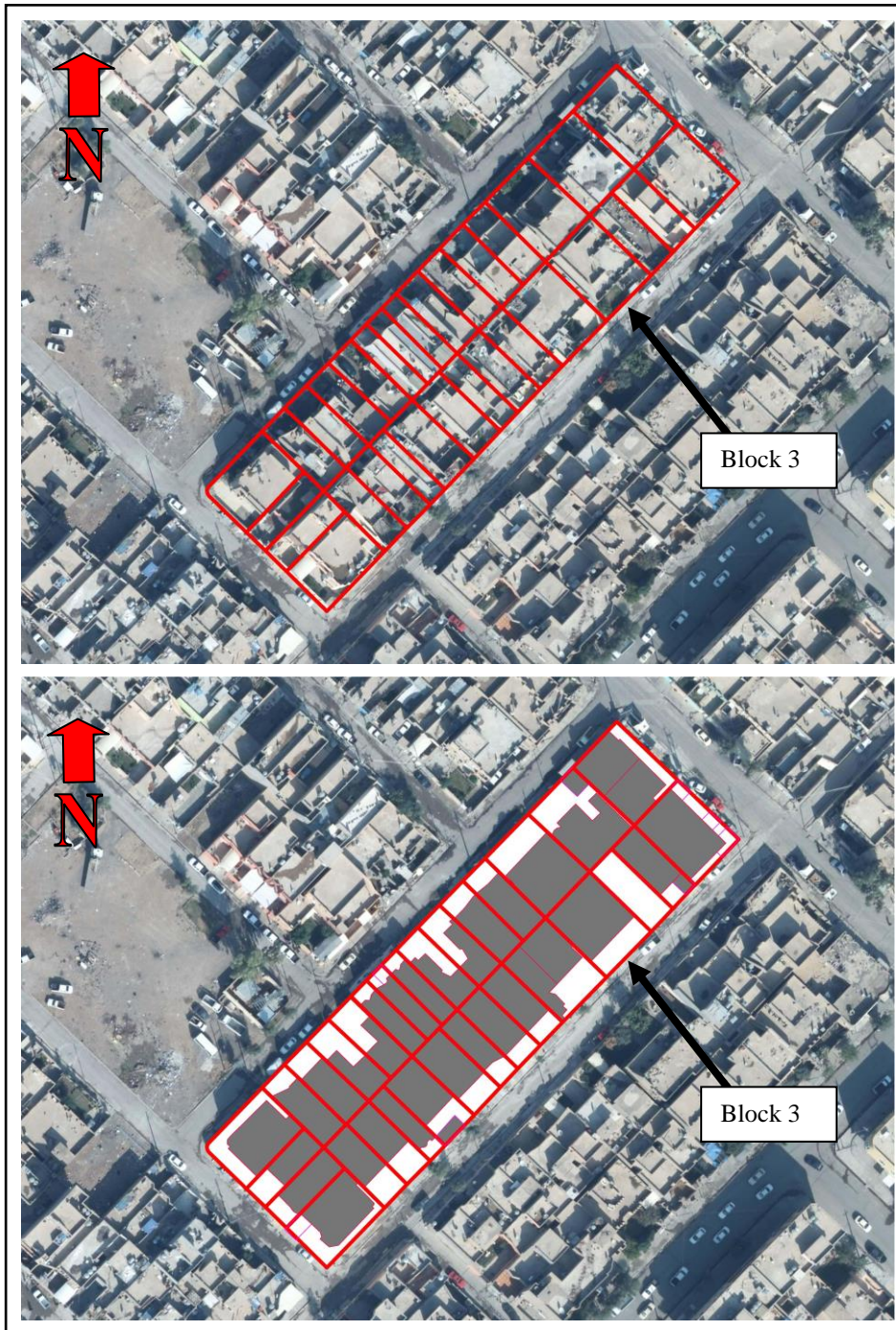


Figure 4.147: A block (block 3) sample from the second part of the area. The early houses of the block were built according to ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’. The average area of the original plots is 300m² (15m X 20m). However, some cases have different dimensions and areas more than 150m², especially the plots at the corners of the block which usually have areas more than the typical. No significant changes and modifications happened to the plots and streets. The common type of the houses is attached with front setbacks which are regulated by the amendment of 1964 of ‘The System of Roads and Buildings No.44 of 1935’, ‘Decision No. 850 of 1979’ and ‘Instructions No. 851 of 1980’. The houses of the block have been built in the successive periods since 1979 and the process of the removal of the old houses replaced by new is still in progress. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The transformation of plots

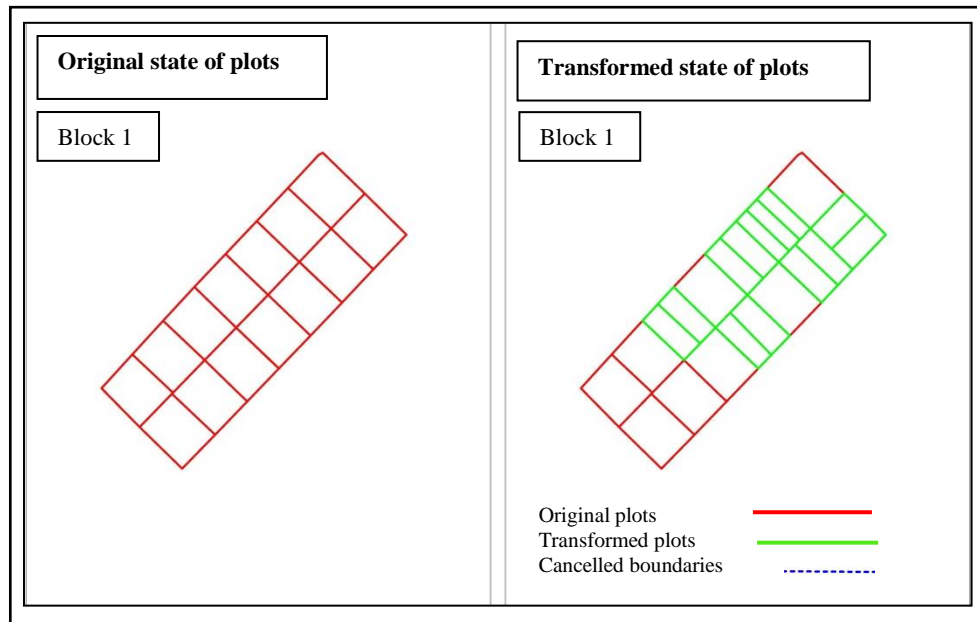


Figure 4.148: The selected block (block 1) from the first part of ‘Sample 6’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. The original plots subdivided into two or three plots. Until 1987 the minimum allowed area of subdivision was 120 m². However, the subdivision type of the plots in of this block is by sharing which means that the original plot can be shared by two or three owners with no official separation lines. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

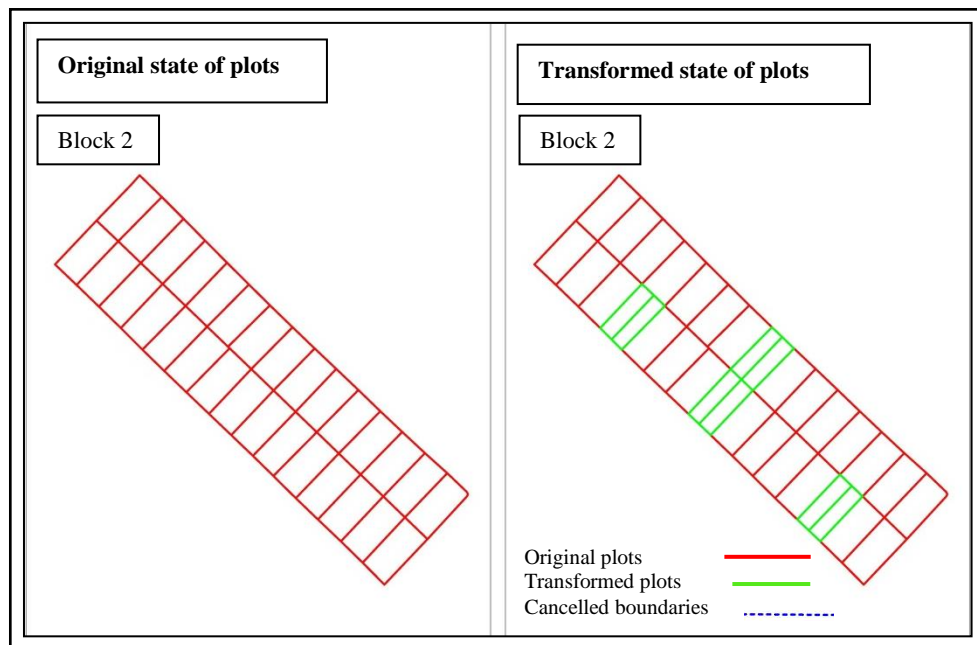


Figure 4.149: The selected block (block 2) from the first part of ‘Sample 6’ area. The transformation (subdivision) on four plots is evident. The original plots which have 200 m² area subdivided into two plots. After 1979, there are no regulations that allow official subdivision of areas less than 120 m². The subdivision type of the plots in of the block is by sharing which means that the area of original plot can be shared by two or three owners with no official separation lines. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

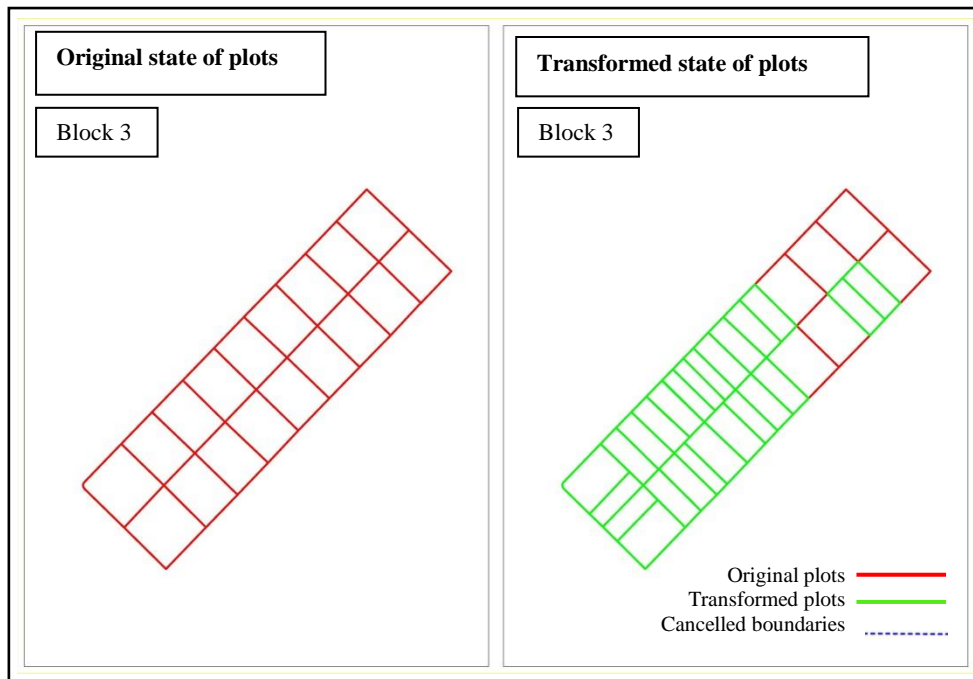


Figure 4.150: The selected block (block 3) from the second part of ‘Sample 6’ area. The transformation (subdivision) on most of the plots can be observed. The original plots which have 300 m² area subdivided into two or three plots. After 1979, there are no regulations that allow official subdivision of areas less than 120 m². The subdivision type of the plots in of the block is by sharing which means that the area of original plot can be shared by two or three owners with no official separation lines. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

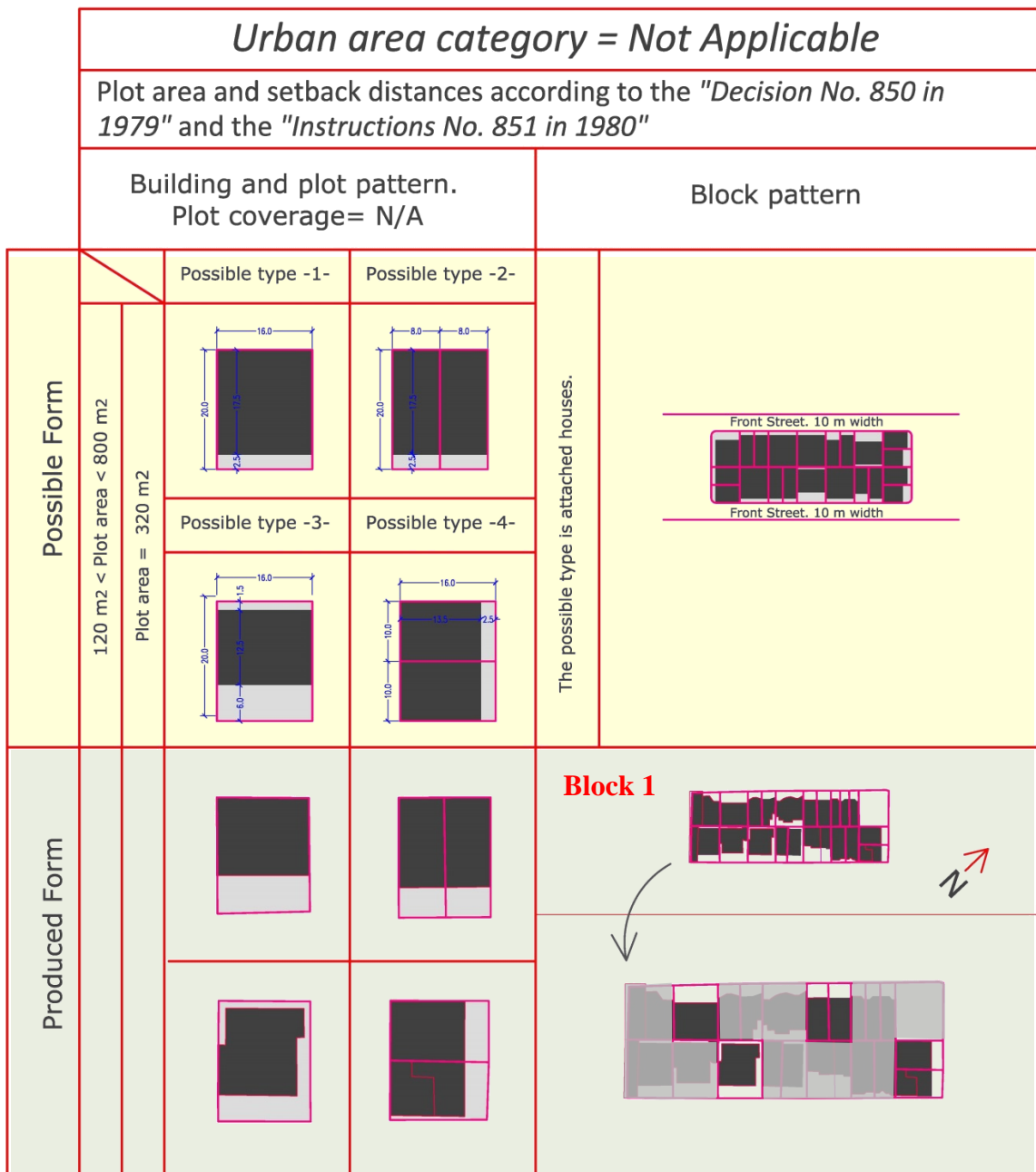


Figure 4.151: The possible form of buildings and plots which can be produced by the by 1965, 'Decision No. 850 of 1979', and 'Instructions No. 851 of 1980' and the real produced form by the same set of regulations in 'Block 1' in the first part of 'Sample 6'. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

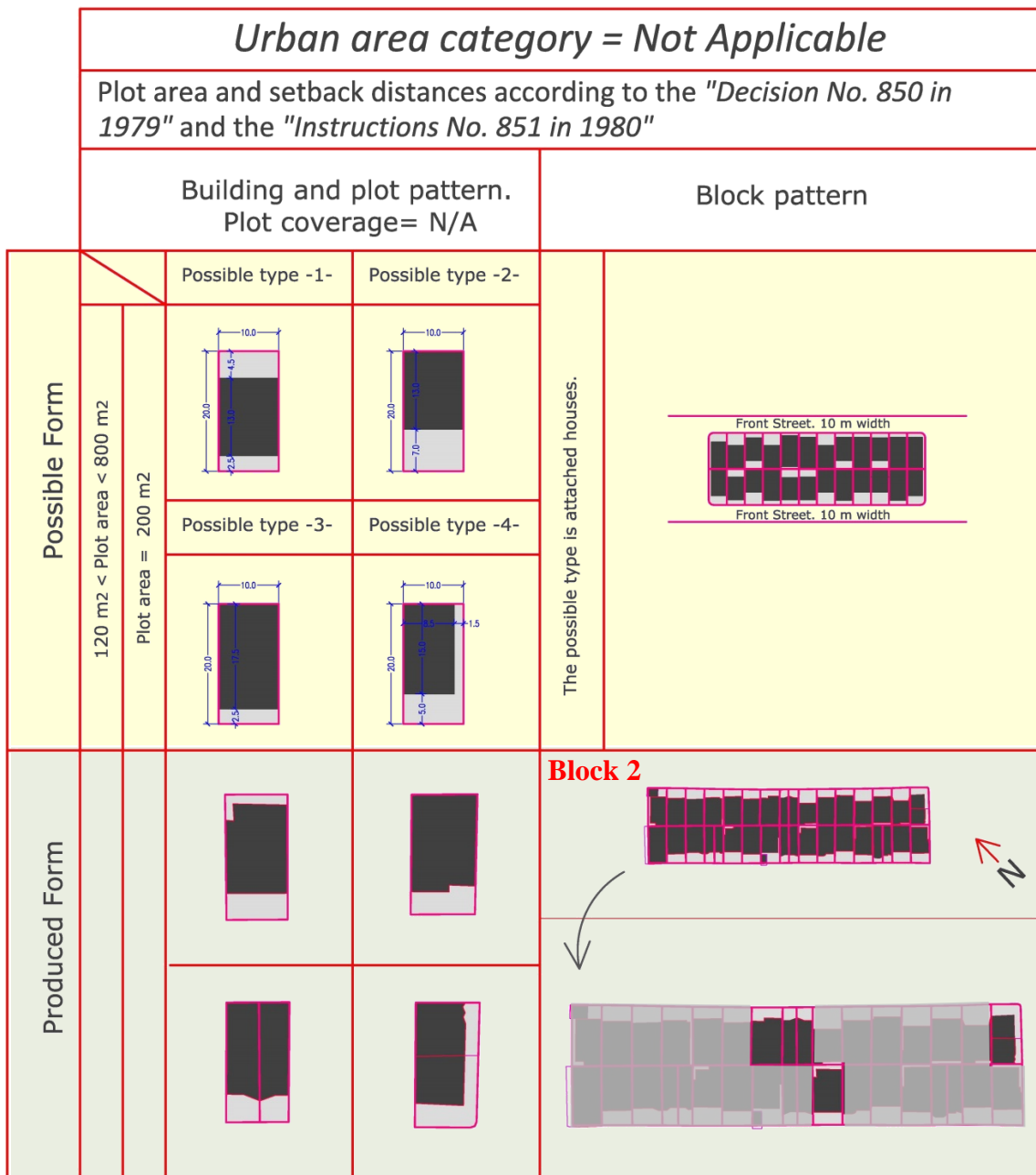


Figure 4.152: The possible form of buildings and plots which can be produced by the by 1965, 'Decision No. 850 of 1979', and 'Instructions No. 851 of 1980' and the real produced form by the same set of regulations in 'Block 2' in the first part of 'Sample 6'. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

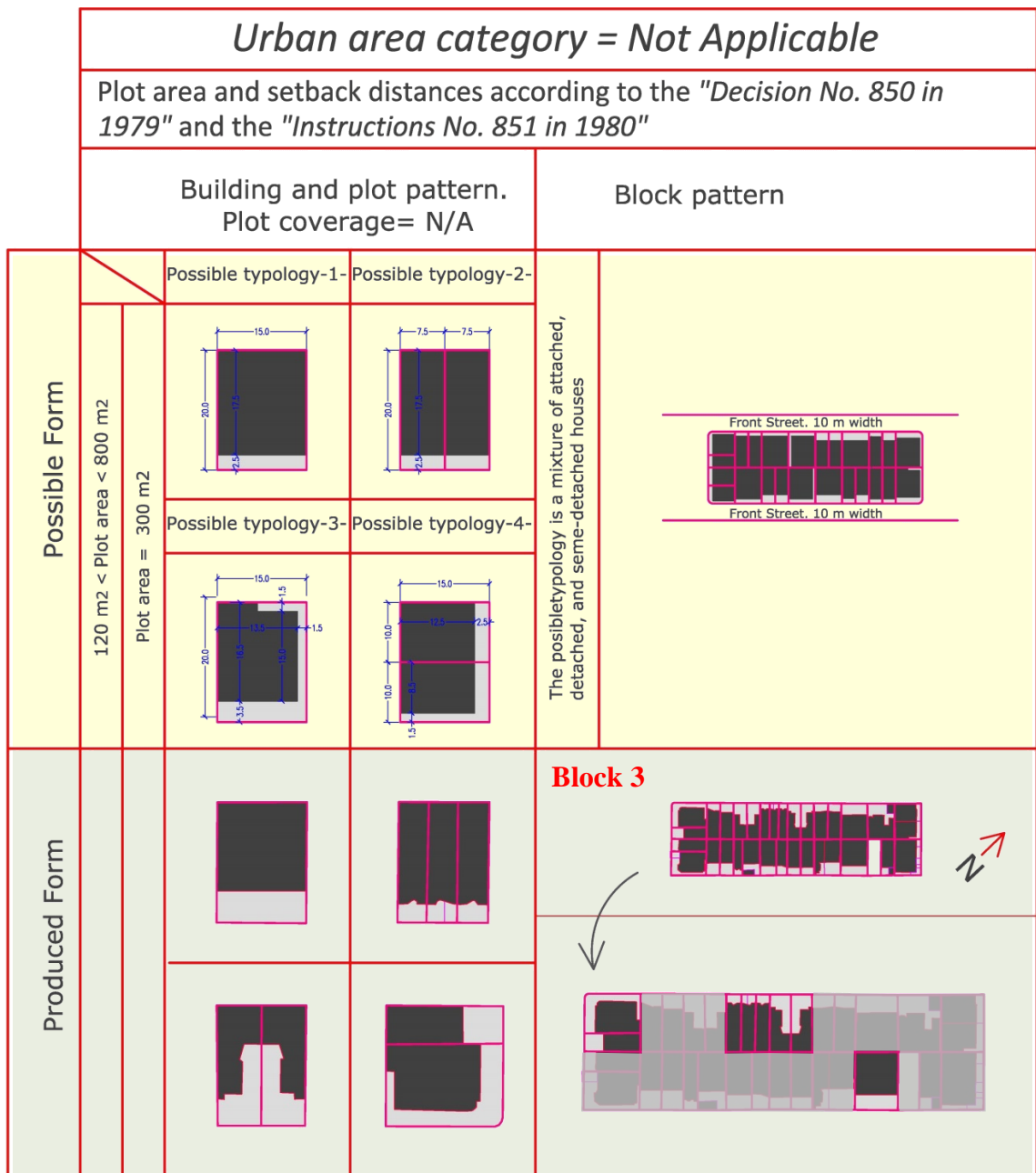


Figure 4.153: The possible form of buildings and plots which can be produced by the by 1965, 'Decision No. 850 of 1979', and 'Instructions No. 851 of 1980' and the real produced form by the same set of regulations in 'Block 3' in the second part of 'Sample 6'. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The building form of the houses of later periods

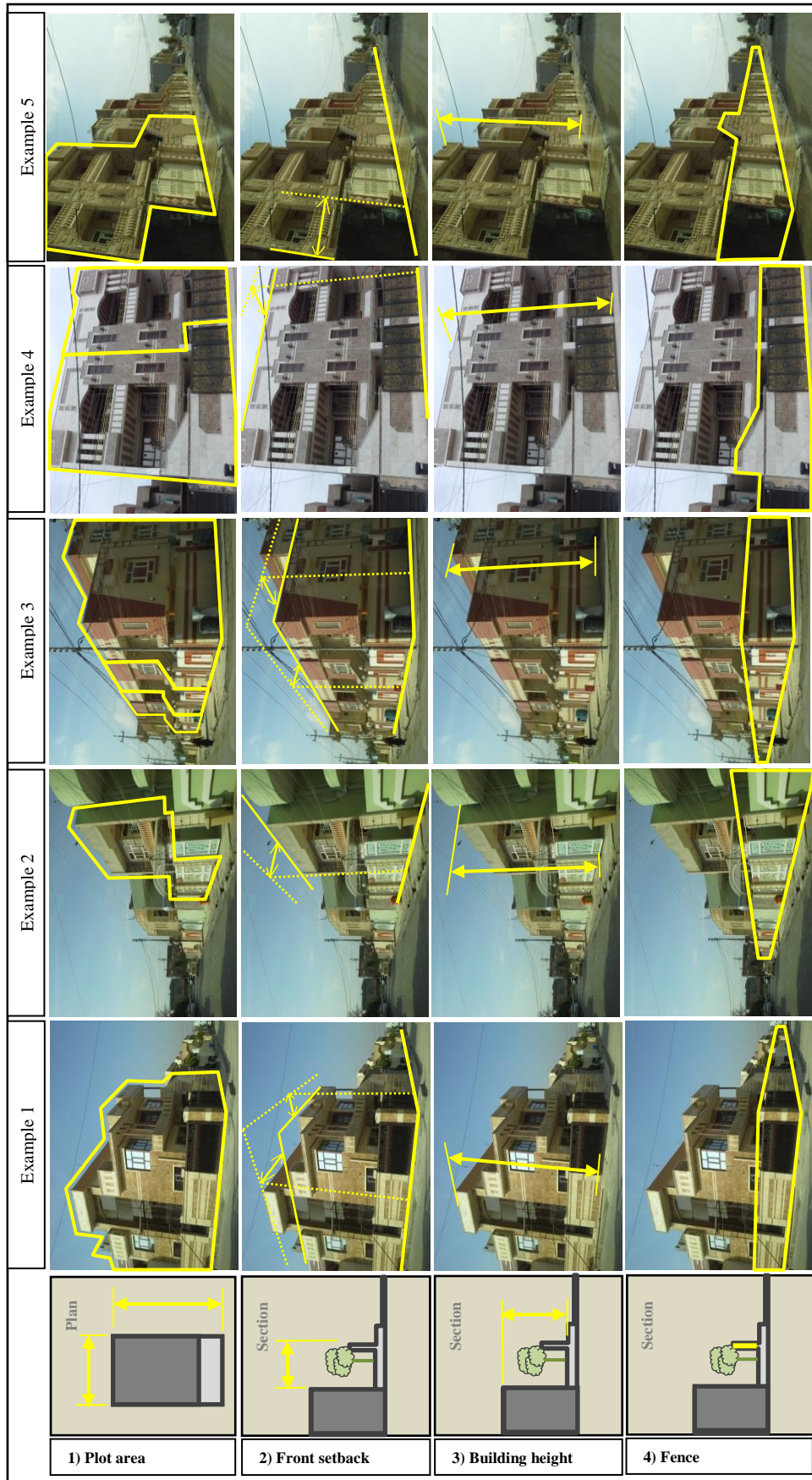


Figure 4.154: The common characteristics of the houses built in the later periods (1996-2013) in the area of 'Sample 6'. (Source: Researcher)

2. The transformation of the area: The area has been formed in the Sixth Period, more specifically in 1980 and 1981 which means that they have been formed under the regulations ‘*The Decision No. 850 of 1979*’ and ‘*The Instructions No. 851 of 1980*’. These two regulations concerned plot subdivision for single-family houses and building determinants. In the later periods, the transformations of the plots and single-family houses were also made under the influence of these regulations.

A. The time period: The building process of the single-family houses of the area continued in the later periods as many of the plots were still unbuilt. In 1988 the between Iraq and Iran ended. In 1990 the country involved in another war. Consequently, this resulted in the economic siege. Then, the uprising of Kurdistan happened. In 2003 the governance system of the country was changed to Federal when Kurdistan was officially admitted as federal region. These political events have influenced the building process of the area to different extents but not mainly through the changes in the regulations concerning building single-family houses.

The rapid growth of the city and the economic improvement after 2003 also influenced the area. Some old houses have been demolished and replaced by new ones. Similarly to other parts and other quarters of the city, subdividing the plots formally and informally into two or more plots for housing purposes is an apparent phenomenon in this area.

B. The housing policy: ‘Housing Policy 1’ has determined the building up of the quarter and its growth in the later periods. This means the area has been submitted to individual decisions made by the owners of the individual properties (plots and houses). This is the reason of the difference and the variance in the form of the houses despite that they are regulated by the same regulations.

C. The regulations: As it has been mentioned, two regulations have influenced the formation of the area; they also have determined the changes and the transformation. ‘*The Decision No. 940 of 1987*’ which was an amendment of the ‘*Decision No. 850 of 1979*’ apart from that it changed the minimum allowance area of subdivision it has not had a significant influence on the sample area. The change in the minimum

allowed area of plot subdivision changed from 120 m² to 200 m² [Table 4-26]. However, on the ground, informal subdivision can be observed. This means that the original plot can be formally shared by two or more persons, informally subdivided into two or more and separated by informal lines. Consequently, the shares of each person are used for a separate single-family house.

The changes of the use of the plots through the change of the use of the street where the plot is located on resulted in the replacement of the old single-family houses by multistorey mixed and commercial buildings which have different type to the single-family houses and are regulated by '*Building Regulations in Commercial Areas No. 4131 in 1989*'⁴⁴² [Table 4-27]. In order to understand the changes and the transformations on the detailed level (the level of the individual plot, building, and block), three blocks were selected from the two parts of 'Sample 6' area [Figure 4.144].

The typical area of the plots of 'Block 1' from 'Part 1' is 320 m² (16 m X 20 m), that of the plots of 'Block 2' from 'Part 1' is 200 m² 200 m² (10 m X 20 m), and that of the plots of 'Block 3' from 'Part 2' is 300 m² (15 m X 20 m. Plot coverage in the sample area is not regulated by certain legislation. The only determinant is setback distance from the streets sides. According to the 'Instructions No. 851 in 1980' the setback distance depends on the typical area of plots of the block. In the case of 'Block 1' and 'Block 3' the minimum setback distance is 2.5 m and in the case of 'Block 2' is 1.5 m. As a result, the setback distance of the buildings in the three selected blocks varies from a house to another as it is subjected to individual wishes and decisions of the owners. The existing condition of the type of the buildings which consists of both original houses from the first formation of the area and transformed and new houses of the later periods is a mixture of attached and semi-detached houses [Figure 4.145], [Figure 4.146], and [Figure 4.147].

Some plots in the three cases of the blocks have been subdivided into smaller areas. In 'Block 1' six plots out of fourteen have been subdivided into two or three plots of areas 160 m² for each in the case of

⁴⁴² Ministry of Local Governance, General Directorate of Urban Planning.

the subdivisions into two plots and areas range from 100 m² to 120 m² for each subdivided plot in the case of the subdivision into three plots [Figure 4.148]. In 'Block 2' four plots out of thirty have been subdivided into two plots of areas of 100 m² each [Figure 4.149]. In the case of 'Block 3', twelve plots out of eighteenth have been subdivided. One case from those twelve has been subdivided into three plots each with an area of 100 m². The rest have been subdivided into two plots of areas range between 120 m² to 180 m². However, the majority of the subdivision cases are plots with an area of 150 m² [Figure 4.150]. Since 1987 the regulations does not allow subdividing plots into areas less 200 m². This means that all the subdivisions of plots of 'Sample 6' area generally and that of the selected samples of the blocks specifically which have areas less than 200 m², either they have been made before 1987 when the minimum allowance of subdivision area was 120 m² or they have been made informally. In both cases the formal subdivision into areas of less than 120 m² has not been allowed.

In a comparison between the possibilities of the forms that can be produced by the regulations have been in force in the sample area and what those regulations produced on the ground through the three samples of the selected blocks, it can be observed that the predictions of the possibilities, to some extents match the real produced forms on the ground [Figure 4.151], [Figure 4.152], and [Figure 4.153]. However, subdividing plots into areas less than 120 m² for housing purposes is a case which has not been predicted and not been allowed by the subdivision regulations since 1979.

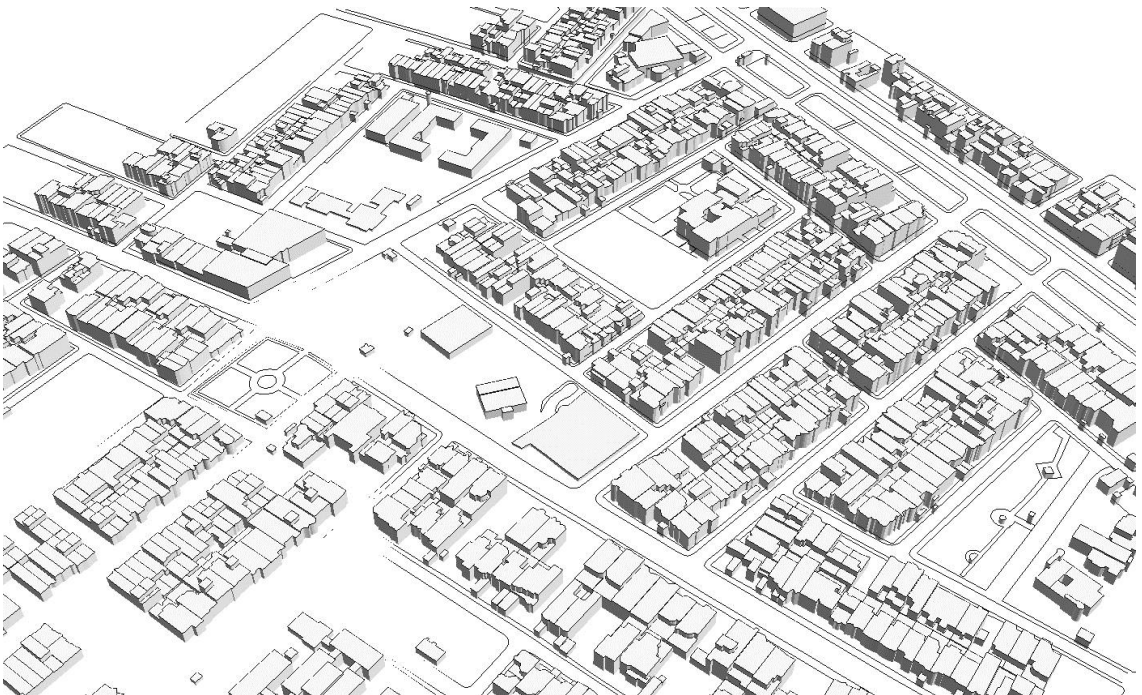
The layout of the streets has stayed constant. No notable change and transformation on streets can be observed. The only change on the streets was decisions on the change of the use of some streets from residential to commercial. These decisions based on Article 25 of '*The Law of the Municipalities Administration No.6 in 1993*'⁴⁴³. Transformed streets from residential to mixed and commercial uses produced a mix of multistorey buildings and single-family houses.

⁴⁴³ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

D. Other determinants: Other determinants that have influenced the process of the change and transformation of the area can be summarised into the economic and social. The increase of the demand on housing as a result of the imbalance between the increase of the population and the provided number of houses on one hand, and the increase in the price of land on the other hand, the subdivision phenomenon of plots into smaller areas became common. This resulted in the increase of the density as a result of the replacement of one house on a single plot by two or more new houses. This factor is also resulted in producing houses of 2-3 floors, increasing the plot coverage, and the disappearance of the front gardens [Figure 4.154].

All the replaced and transformed houses have fences with entrance gate wide enough for a car to pass through. The height of the fence ranges from 1.4 m to 2.2 m but does not work as visual barrier to provide privacy to the whole house, especially the first and the second floors. The fence mainly has the function of determining the plot and the house boundary. The front side of most of the subdivided plots range between 5 m and 10 m when the average width of the entrance gates is 2.5. In the street view of some blocks or a part of some blocks the array of gates dominate the front side of the houses (The fences).

Period 7 Sample 7 Salaheddin Quarter



Sample 7 (Salaheddin Quarter)

‘Sample 7’ area is a part of ‘Salaheddin’ quarter which lies around 1.2 km to the north of the citadel (Qalat), between the Fourth and the Fifth Ring Roads [Figure 4.156]. The quarter is bounded by the Fourth Ring Road (Kurdistan Street) from the south, the Fifth Ring Road (Gulan Street) from the north, the radial roads (Ainkawa Road) from the west, and ‘Bahirka Road’ and ‘Mawlawy Street’ from the east [Figure 4.157]. The first formation of ‘Salaheddin’ quarter was in the Fourth Period (1956-1965) and its further formation and transformation continued in later periods. In 1977, the population of the quarter reached to 2948 people. This growth was in the southern part of the quarter. However, the formation of the sample area selected from this quarter was in the Seventh Period (1986-1996). It was built under ‘Housing Policy 1’.

It was firstly planned in two parts. Both parts were planned and registered in the same period (1994) and the plots were granted to judges, journalists, and Peshmarga martyrs. The area has been planned according to the ‘Decision No. 940 of 1987’ and built according to the ‘Instructions No. 851 of 1980’. The first part of the area includes plots with typical areas of 250m², 400m², and 600m² while the second part have plots with an average area of 200m². However, there are some cases of more than the typical areas, especially those located at the corners of the blocks. In later periods, some of the plots were subjected to formal and informal subdivision actions which resulted in smaller plot areas. The area contains attached type of houses with front setbacks. The street type of ‘Sample 7’ area is a composition of street segments with ‘T- junctions’. The analysis of this sample is structured to cover both, the formation and the transformation of the area [Table 4-28].

Table 4-28: Sample 7, the formation and transformation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
7	Sallaheddin	7 th and later periods	1986-1995, and later	1	<ul style="list-style-type: none"> • Instructions No. 851 of 1980 on building single houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (The location, and the original land features. • The socio-economic status of the residents.

Table 4-29: The successive regulations that have influenced 'Sample 7'. (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1980 ⁴⁴⁴	N/A	Distinct	$800 > P \geq 120$	10	6	2.5	0	N/A
1987 ⁴⁴⁵	N/A	Distinct	$800 > P \geq 200$	10	10	2.5 or 4 ⁴⁴⁶		N/A
1989 ⁴⁴⁷	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ⁴⁴⁸	N/A	75%
1993 ⁴⁴⁹	N/A	Special	N/A					

⁴⁴⁴ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴⁴⁵ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴⁴⁶ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

⁴⁴⁷ Ministry of Local Governance, General Directorate of Urban Planning.

⁴⁴⁸ The setback distance of a building is applied only on the sides adjacent to streets and vary according to the width of the street. See [Table 4-30].

⁴⁴⁹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

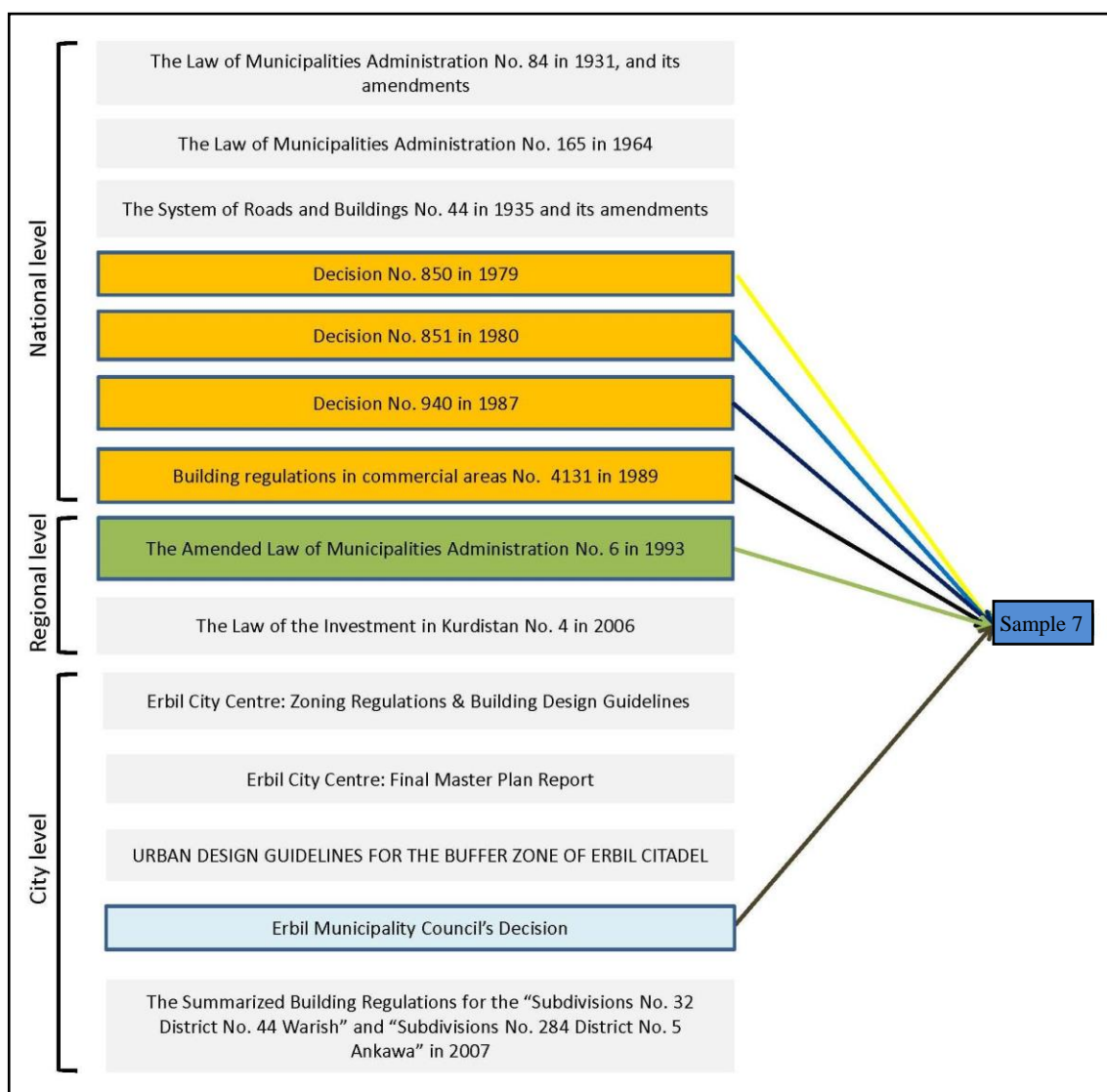


Figure 4.155: Direct regulations enacted at different levels that have influenced 'Sample 7'.
(Source: Researcher)

⁴⁵⁰ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation: The location and the boundary

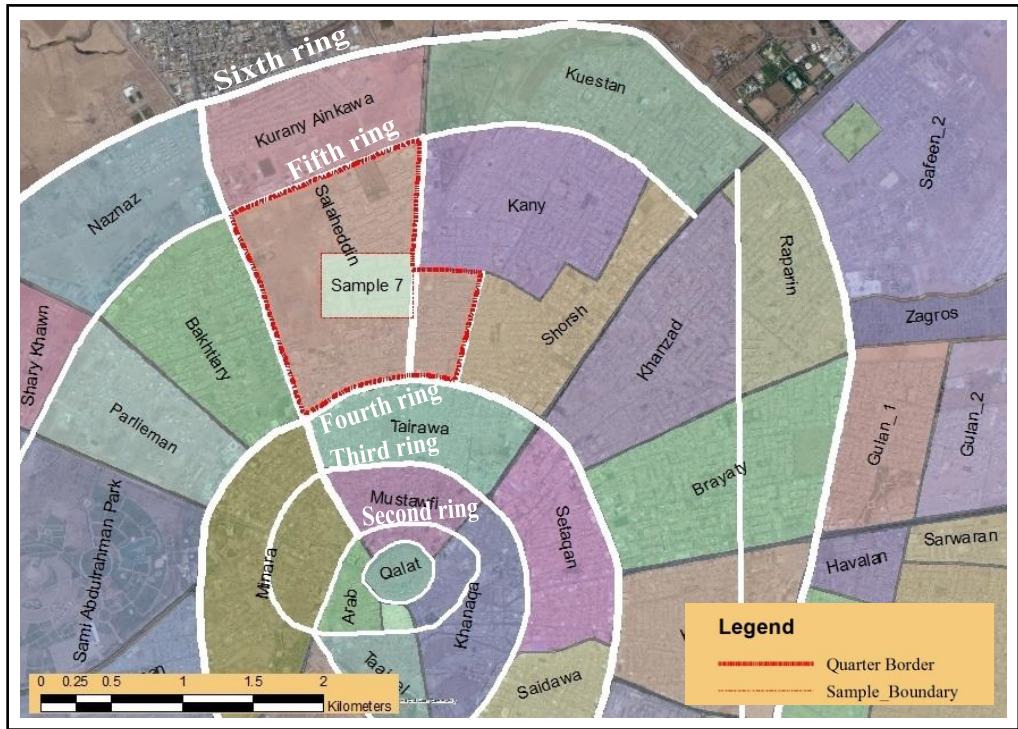


Figure 4.156: The location of ‘Sample 7’ and ‘Salaheddin’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

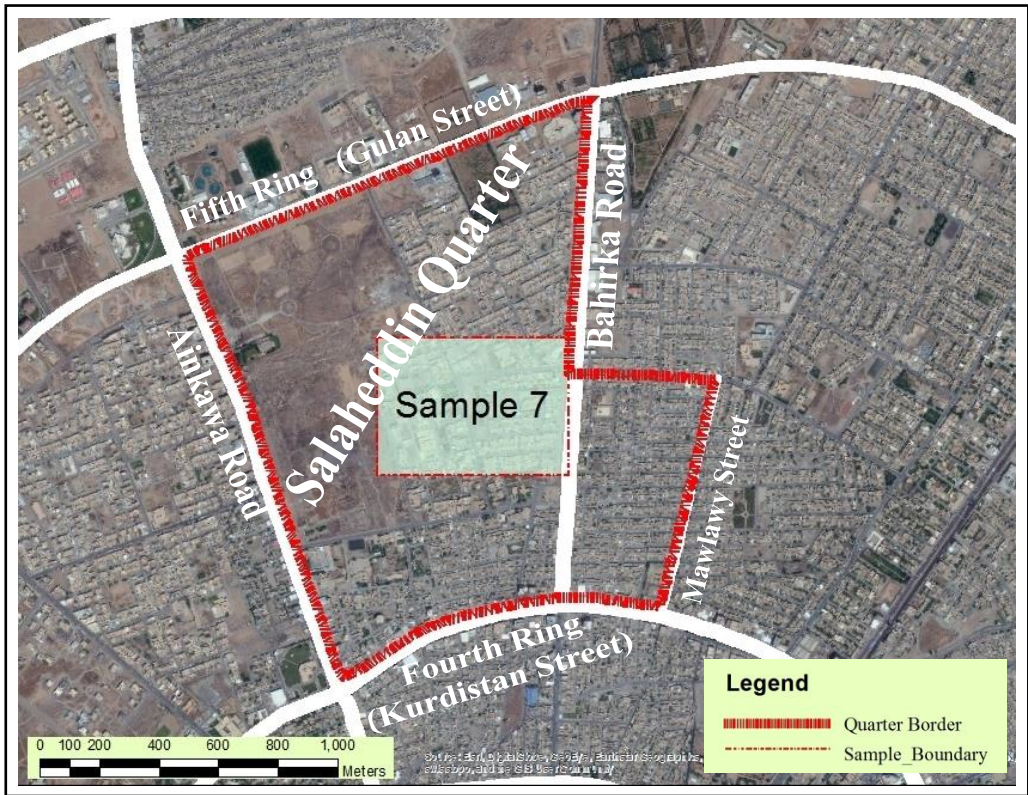


Figure 4.157: The boundary of ‘Salaheddin’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

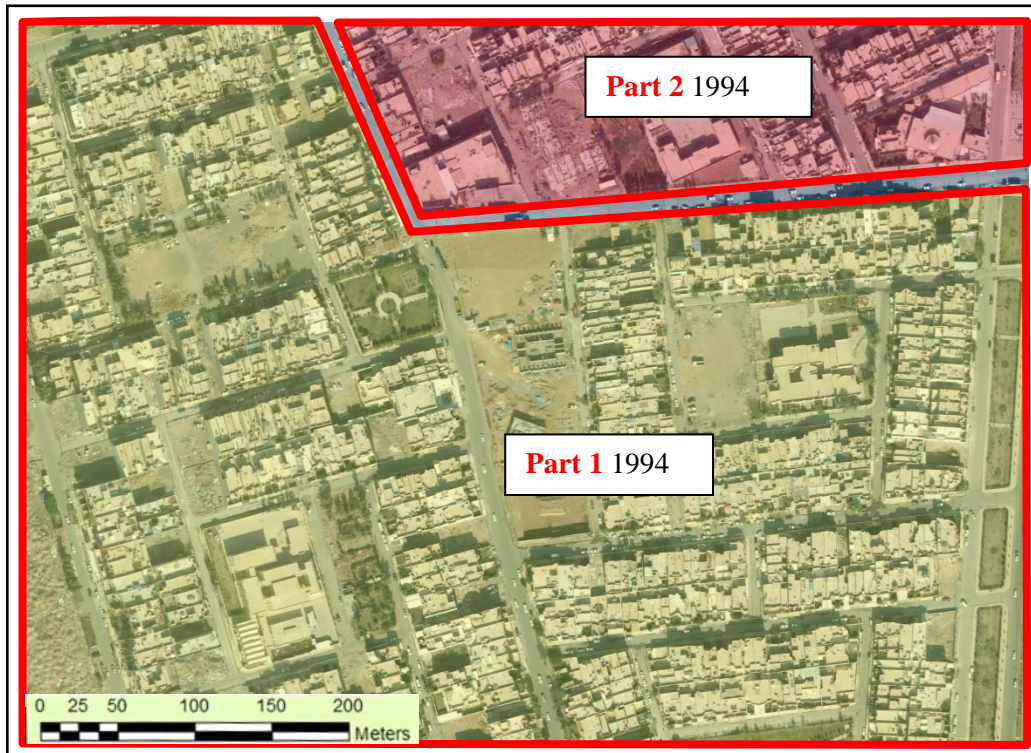


Figure 4.158: The different parts of the ‘Sample 7’ area which were planned and registered in the same period. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

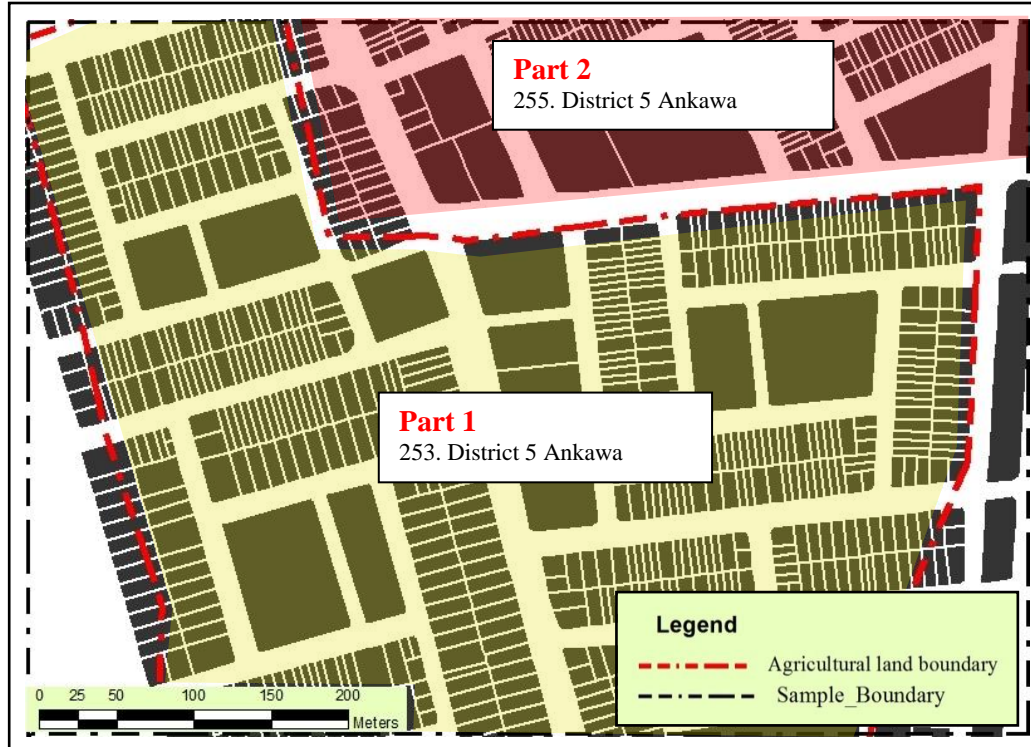


Figure 4.159: The original land features (Old boundaries) have no significant influence on the ground plan of the sample area. The two parts have two different registration numbers. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

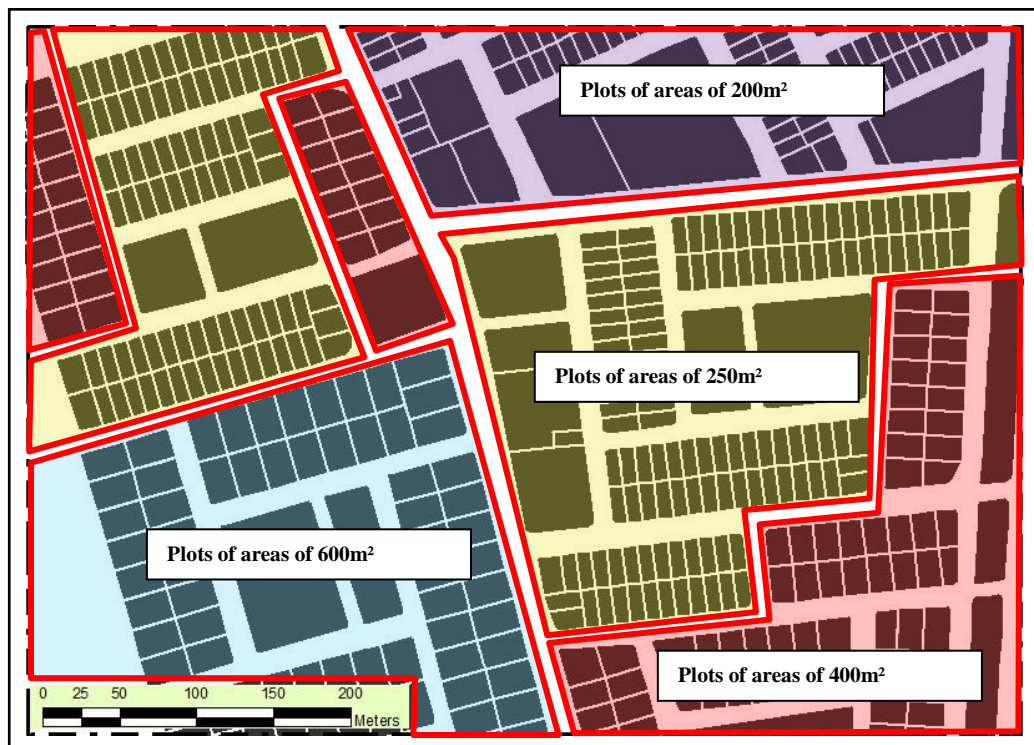


Figure 4.160: The sample has four categories of plot area (200m², 250 m², 400m², and 600 m²). However, due to subdivision actions in later periods, plots of areas less than 200m² have emerged. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

The Formation:

The different parts of the area



Figure 4.161: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 7’ area which is a part from ‘Salaheddin’ quarter. (Source: See page 105)

The Formation: The building form characteristics of the houses

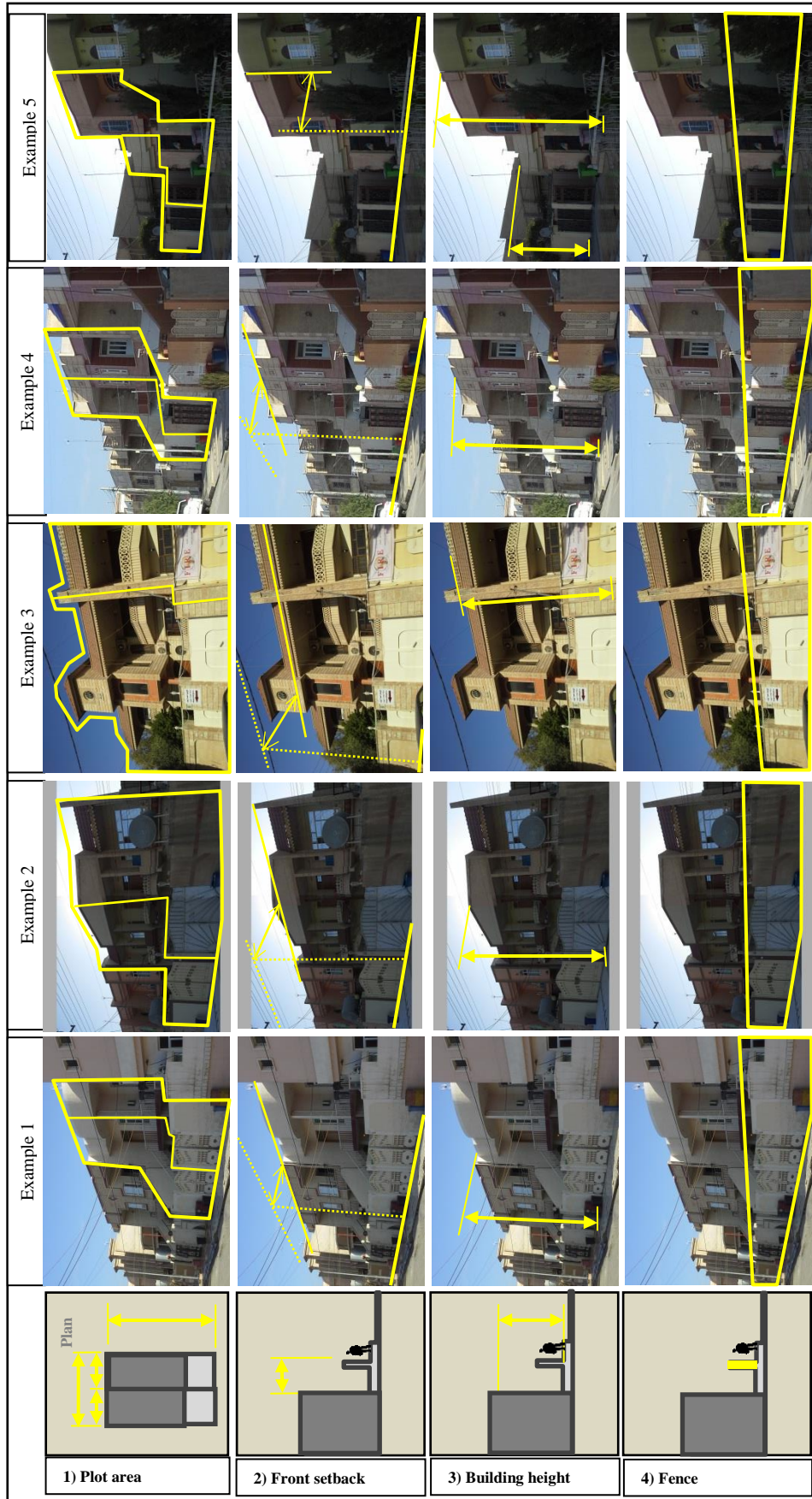


Figure 4.162: The common form characteristics of the houses built in the period (1986-2003) in the area of ‘Sample 7’. (Source: Researcher)

The Formation: The plan and the original land features

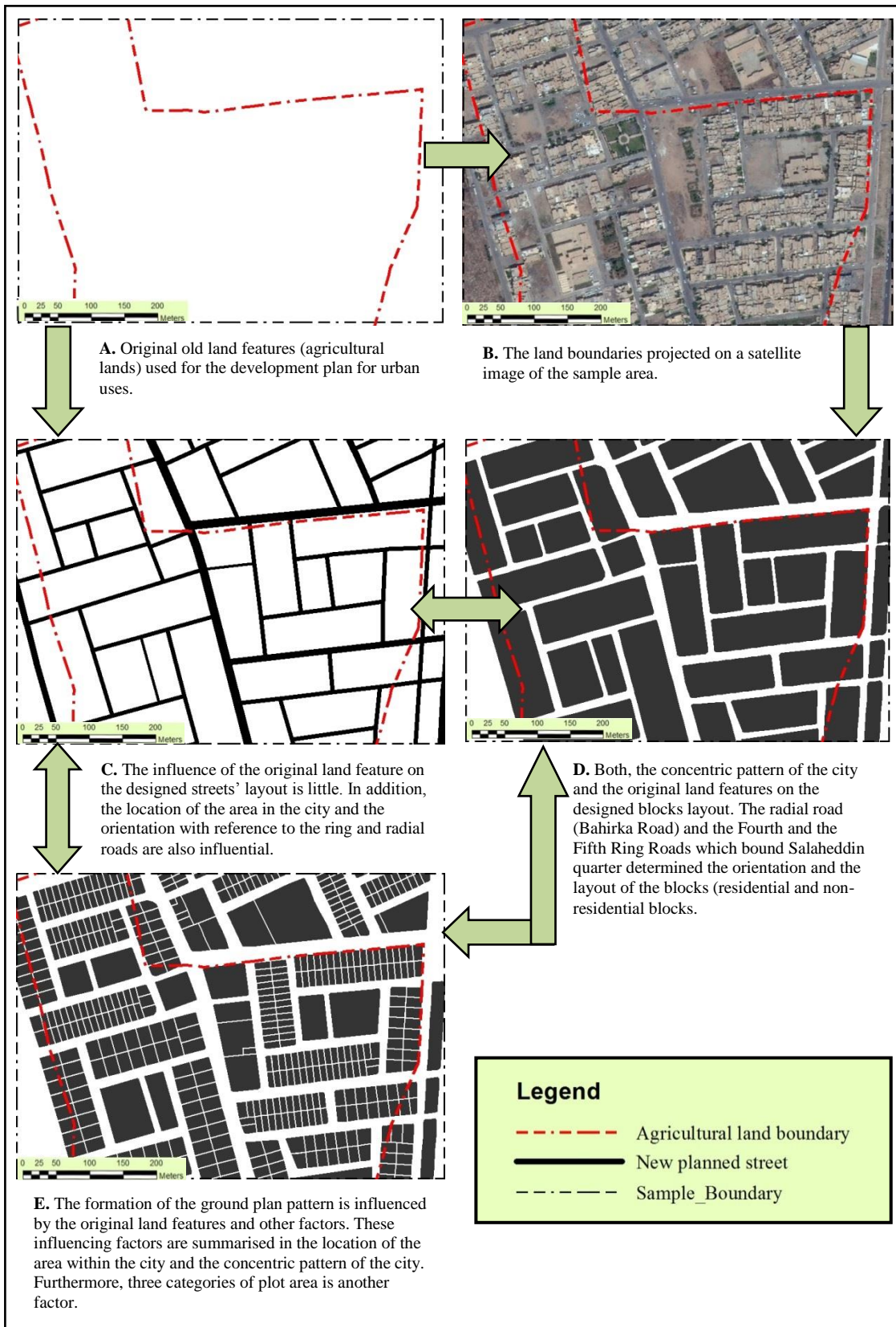


Figure 4.163: The original land features have no significant influence on the pattern of the formed ground plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

1. The formation of the area: The Sample area which is a part of ‘Salaheddin’ quarter consists of two parts formed in the same period the (Seventh Period). The plan and the registration of both parts were in 1994. Then, the continual process of individual building has resulted in the change and the transformation of the area.

A. The time period: Two significant political events happened in this period. In 1988 the war between Iraq and Iran finished. However, this event did not have a positive influence on the country due to the economic crisis resulted from the huge cost of the war. This situation did not continue for long and resulted in the second event. The state was involved in another war when it invaded Kuwait. In 1990 the United Nations Security Council imposed sanctions against Iraq as a penalty of this invasion. Then the Gulf War (Desert Storm) of 1991 resulted in the liberation of Kuwait. The economic sanction was extended by the United Nations Security Council.

The series of the events continued when in 1991 the uprising of Kurdistan and other cities of Iraq happened. This was a major political shift for Kurdistan. In 1992 the first national election of Kurdistan formed the first Parliament and the first governmental cabinet of Kurdistan Region. Erbil was nominated as the capital of the region. However, the economic sanction which was imposed on Iraq included Kurdistan as well. In addition, Kurdistan cities suffered from the economic sieges imposed by the central regime of Iraq. In 1994 the civil war between the two major Kurdish parties created security instabilities. Under these difficult political, economic, and security situations the process of building and urban development suffered. Despite all these difficulties, there were few attempts of planning new quarters in the city of Erbil.

The two parts included in the sample boundary have been created in the same time period [Figure 4.158] and they have two different registration numbers [Figure 4.159]. The emergence of the area of ‘Sample 7’ is dated back to the Seventh Period (1986-1995), more specifically in 1994. The plots of the area were granted to judges and

journalists with different average areas [Figure 4.160]. However, until 2003 the process of building up the area was slow.

- B. The housing policy:** ‘Housing Policy 1’ was adopted in the formation of the area. Due to the economic difficulties of Kurdistan in the period 1991-2003, the individual process of building in the whole region progressed slowly until 2003. Few houses in the area were built in the period 1996-2003 when the area still lacked primary services. The process of building accelerated after 2004 [Figure 4.161].
- C. The regulations:** The sample area was planned and projected basing on the ‘*Law of Municipalities’ Administration No. 6 of 1993*’. The minimum requirement of plot area was regulated by ‘*Decision No. 940 of 1987*’. However, building single-family houses was regulated by ‘*Instructions No. 851 of 1980*’. Then, the regulations of 1989⁴⁵¹ which concern multistorey commercial buildings have influenced the continual process of building and transformation of the area. See [Table 4-29], and [Table 4-30].

In the early formation, the sample area included a mixture of blocks of different average plot areas. It included plots of areas of 200m² (10m X 20m), 250m² (10m X 25m), 400m² (16m X 25m), and 600m² (20m X 30m) [Figure 4.160]. The form characteristics of the early houses of the area which were built in the second half of 1990s can be summarised as follow [Figure 4.162]: The first is that the majority of the original areas of the plots were formally or informally subdivided into two or more according to the area and were used for two or more single-family houses. However the valid regulations did not allow subdividing areas into less than 200m² formally and 120m² informally, yet houses on plots of areas of 100m² can be noticed. Very limited cases of not using the original area of the plot for one single-family house can be observed. The front width of the plots ranged from 10m to 20m and they had depths of 20m, 25m, and 30m. The second is the attached type of houses. The houses have front setback distances which in some cases used for front gardens and mostly for car park spaces.

⁴⁵¹ Ministry of Local Governance, General Directorate of Urban Planning.

The third is the height of the buildings. The majority of the houses have two floors with an average height of 7m. Yet, a limited number of the houses have one floor with an average height of 3.5m. The fourth is the privacy and security issue which are achieved by the fences. The fences have a height ranges from 1.4 m to 2.2 m. In almost all of the houses, the fence have an entrance gate with a width allow a car to pass through into inside.

D. Other determinants: Similarly to the other samples, the geographic determinants (the location of the quarter within the city of Erbil and the influence of the concentric pattern of the city on the layout of the streets and blocks) significantly influenced the area [Figure 4.156] and [Figure 4.157]. However, the original features of the land used for the quarter have limited influence on the layout. The technical and institutional procedures made on the plots have had a role in that. Due to those procedures the sample area ended up with two parts which have two different registration areas [Figure 4.163]. The other factor can be summarised in the forces linked to the period in which the area has been developed. For example, the decision of having different plot areas is attached to the governmental authority basing on the notion that different types of people with different hierarchical levels of qualifications and posts in the intuitional system of the government should be allocated plots with different areas. However, this decision did not take the affordability of those people to build a larger house on a larger plot area while there was not an incentive and subsidy program of housing and building at that time. Consequently, most of the people formally or informally subdivided their plots into two or more and sold one of the subdivided plots. This increased the ability of those owners to build their house when the area of the plot is smaller and there is an additional budget from the sale of the subdivided plot. However, this phenomenon spread and expanded to become a business and marketing in housing sector context when the opportunity of making profits from building and selling smaller houses on smaller plots increases.

The Transformation: The selection of blocks samples

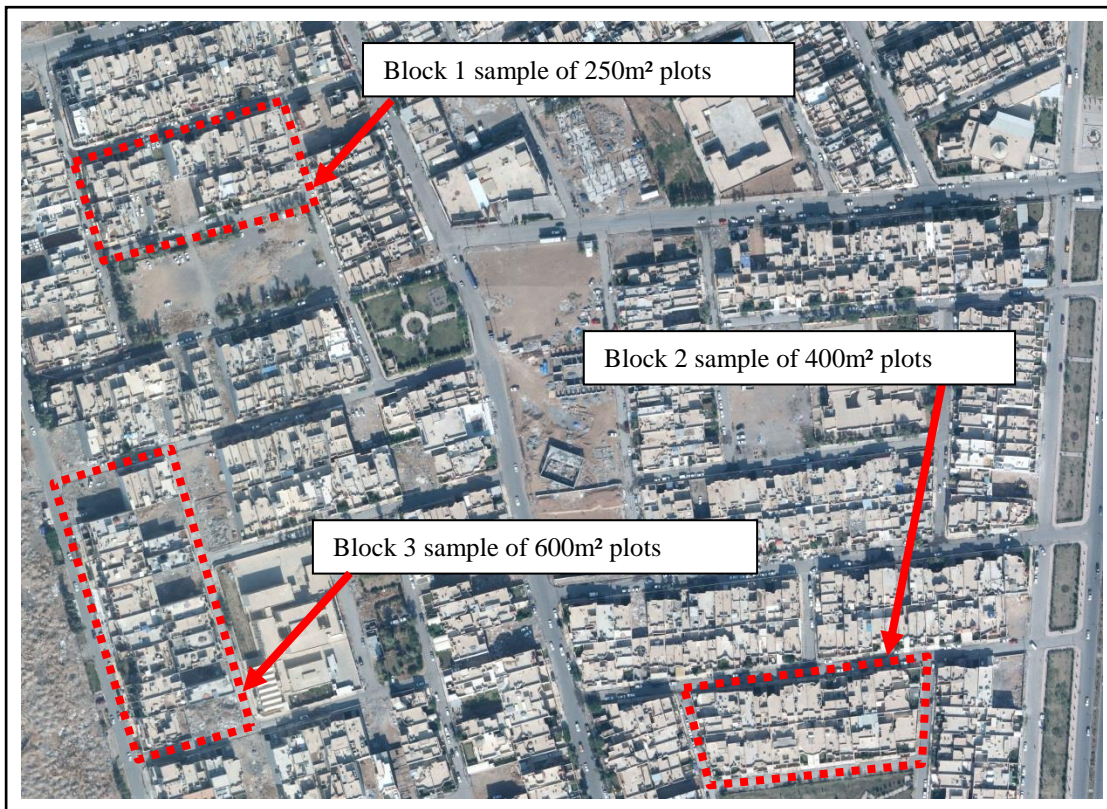


Figure 4.164: Samples of blocks selected from ‘Sample 7’ for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Transformation: Building- Plot parameters

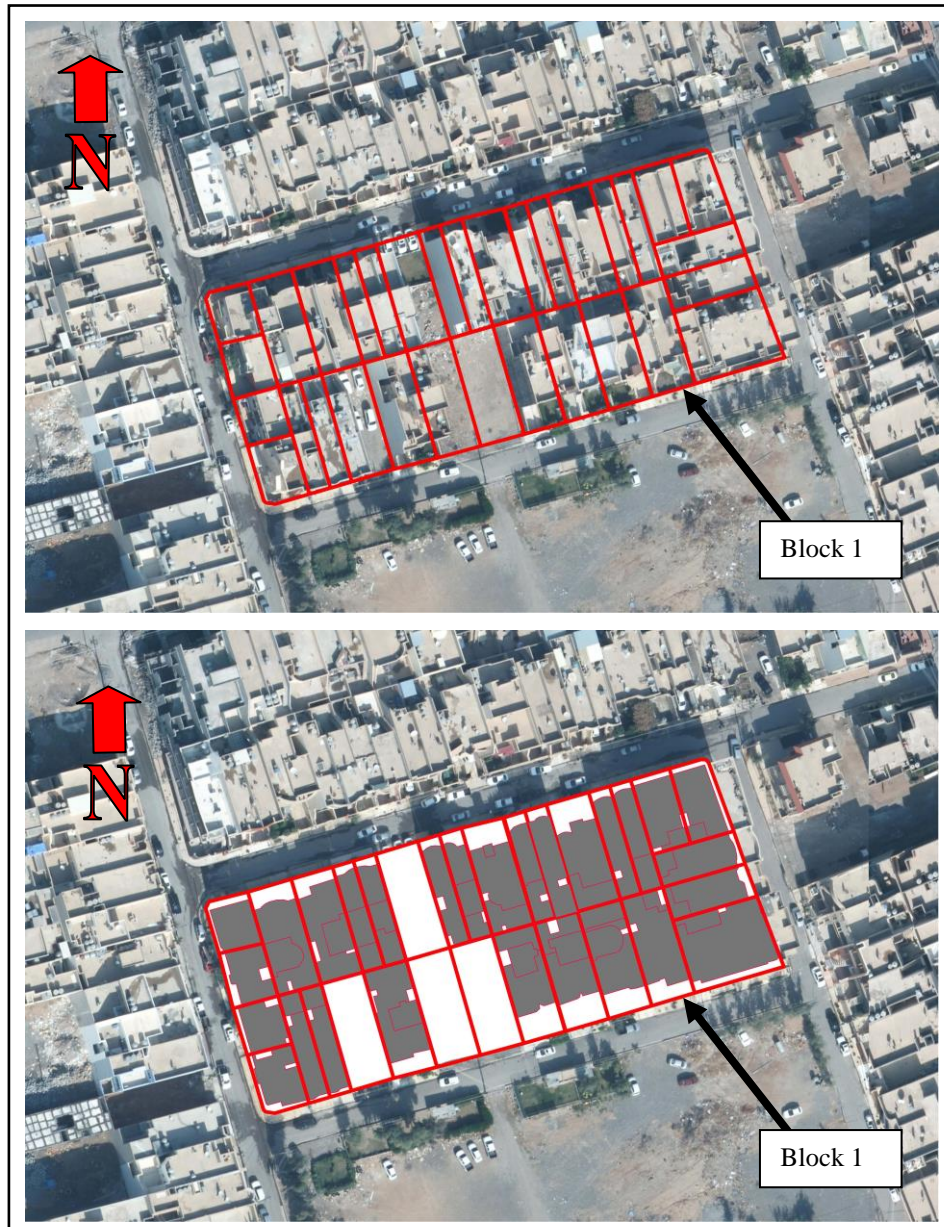


Figure 4.165: A block (block 1) sample from 'Sample 7' area showing the existing condition and the building process which is still in progress. Out of 23 plots 4 plots have not been built by 2011. The typical area of the original plots is 250m² (10 m X 25 m). The block includes attached type of houses which have been built in the period (2003-2011) and regulated by the '*Instructions No. 851 in 1980*'. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

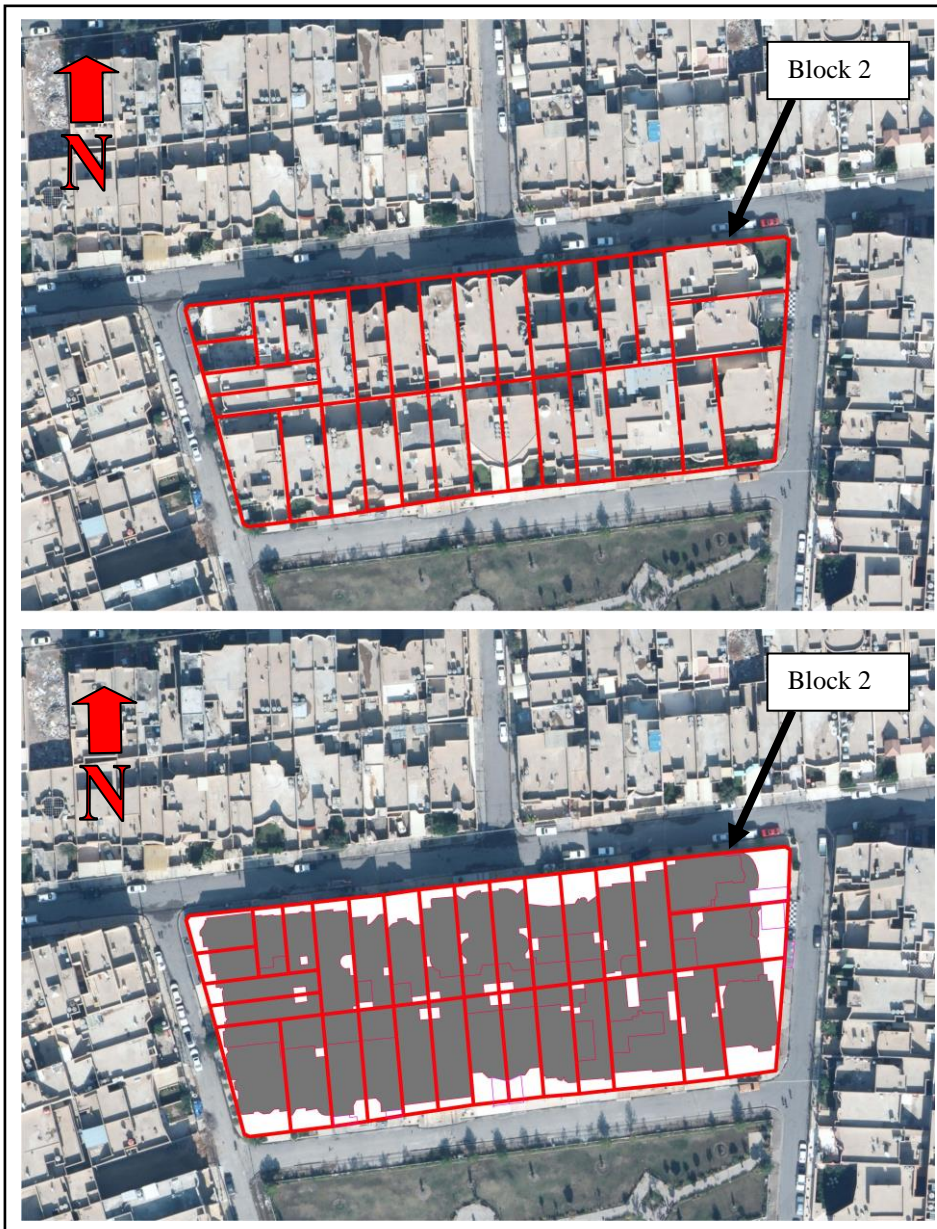


Figure 4.166: A block (block 2) sample from ‘Sample 7’ area. The typical area of the original plots is 400 m² (16 m X 25 m). However, the majority of the plots have been subdivided and used for two (8m X 25m) or more single family houses. The block includes attached with front setback type of houses which have been built in the period (2003-2011) and regulated by the ‘*Instructions No. 851 in 1980*’. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

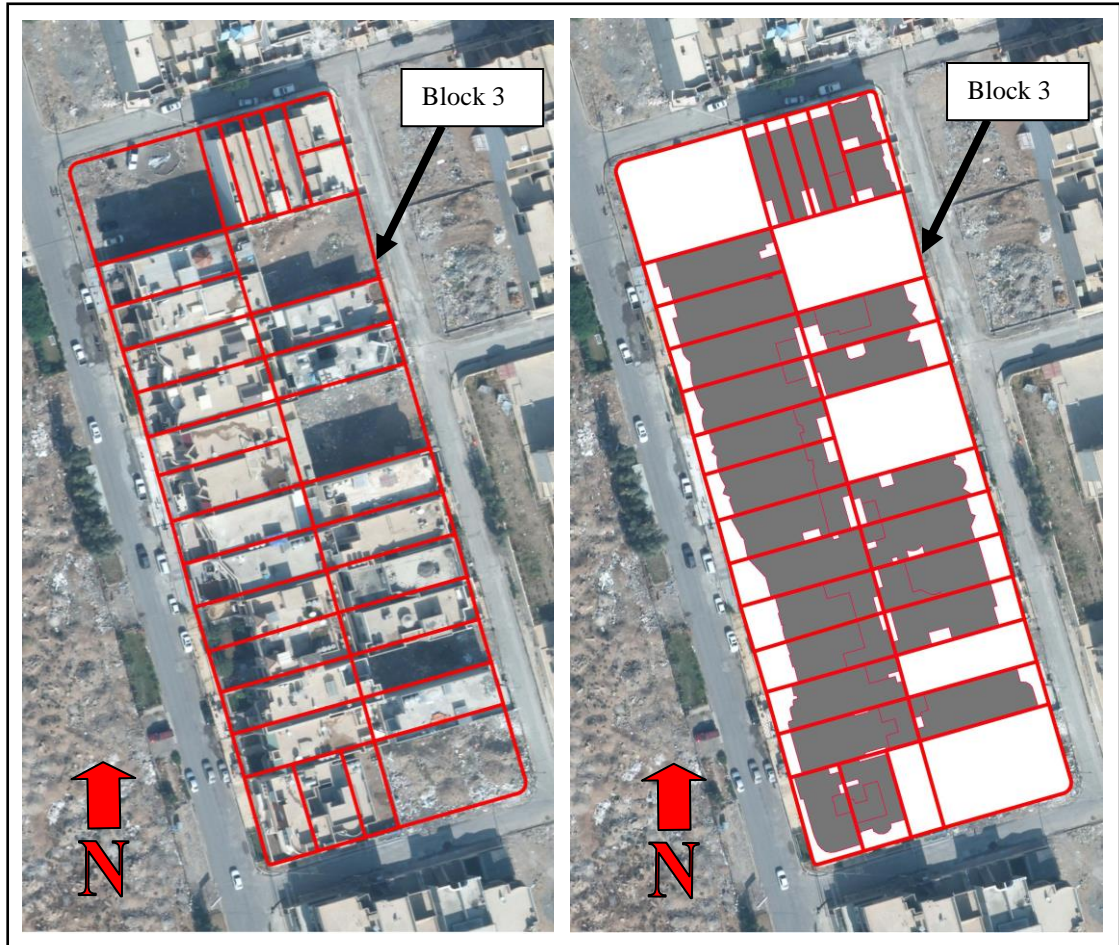


Figure 4.167: A block (block 3) sample from ‘Sample 7’ area. The average area of the original plots is 600m² (20m X 30m). However, the plots at the corners of the block have different dimensions and areas more than 600m². Except four plots which were unbuilt by 2011, all the other plots have been subdivided into two (10m X 30m) or more. The block includes attached with front setback type of houses which have been built in the period (2003-2011) and regulated by the ‘Instructions No. 851 in 1980’. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

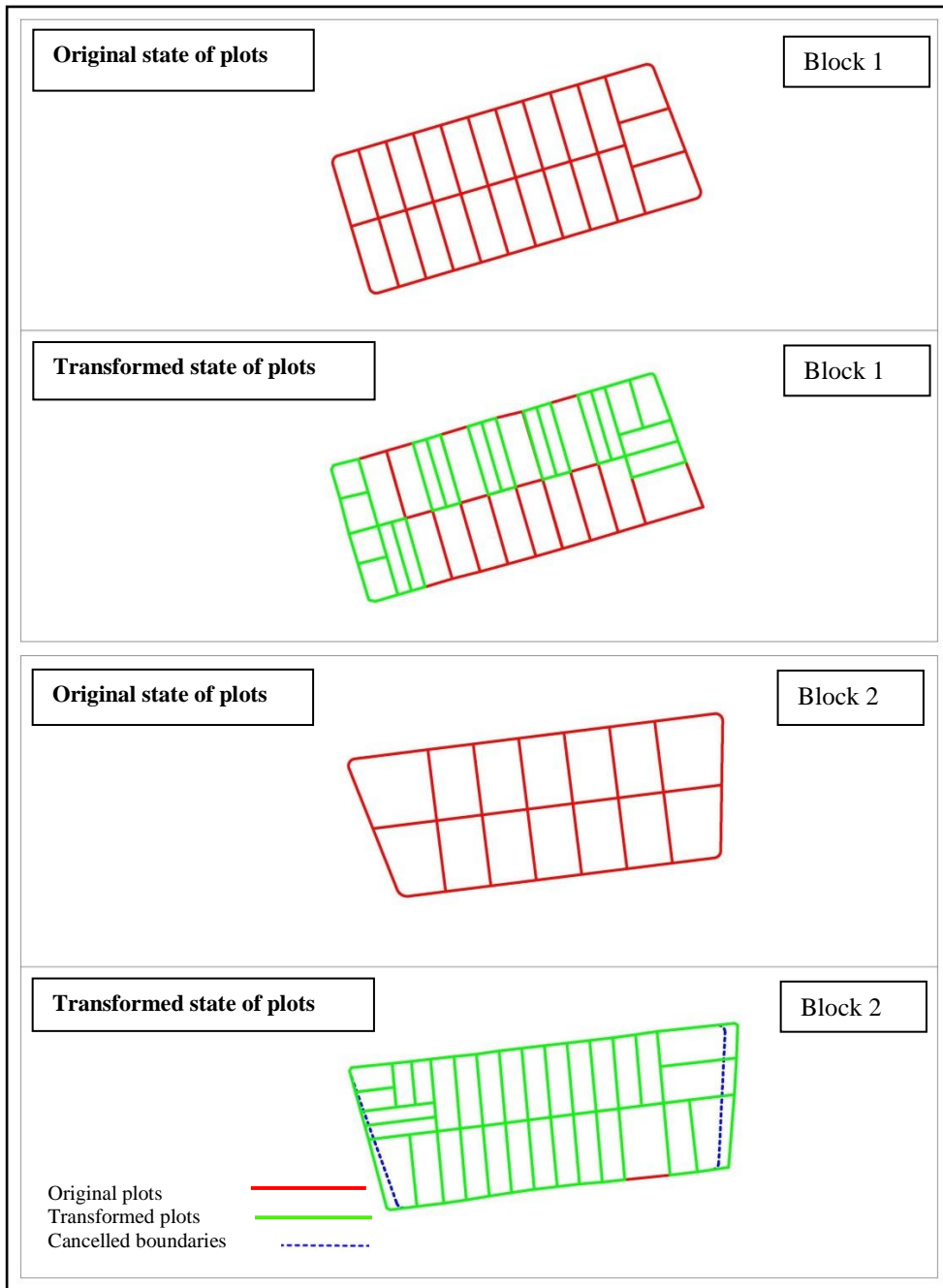


Figure 4.168: The selected blocks (block 1 and block 2) from ‘Sample 7’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. Due to that the minimum subdivision area according to ‘Decision No. 940 of 1987’ is 200m², the original plots of ‘Block 1’ informally subdivided into two. Out of 23 plots 9 have been informally subdivided. However, almost all the plots of ‘Block 2’ have been subdivided into two, each with 200m² (8m X 25m) or more (one case at one of the corners) with areas less than 200m². (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

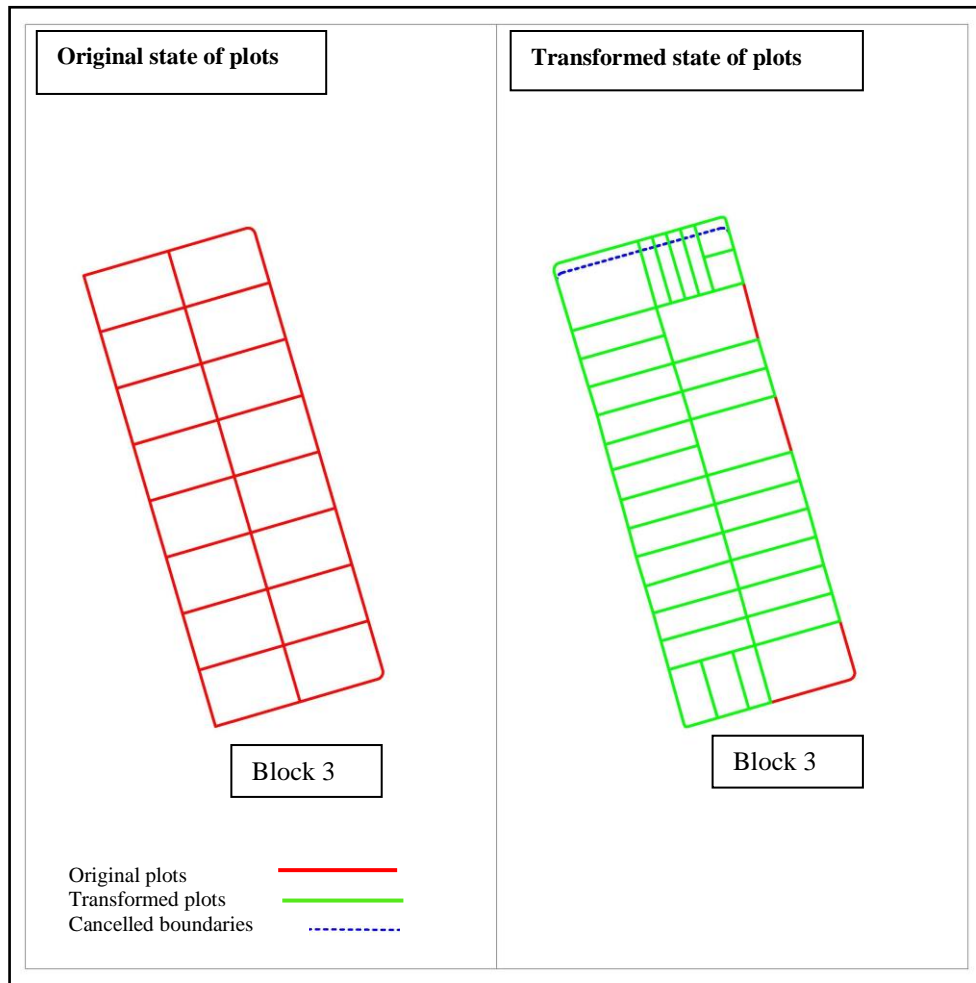


Figure 4.169: The selected blocks (block 3) from ‘Sample 7’ area. The average area of the original plots of the block is 600m² (20m X 30m). Apart from four unbuilt cases of the original plots, all the plots have been subdivided into two each with 200m² (10m X 30m) or more (2 cases). As the minimum subdivision area according to ‘Decision No. 940 of 1987’ is 200m², the original plots of this block can be formally subdivided into two or three according to the dimensions of the plot. However, one informal case is subdivided into 6 plots each with an average area of 100m² and used for 6 single family houses. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

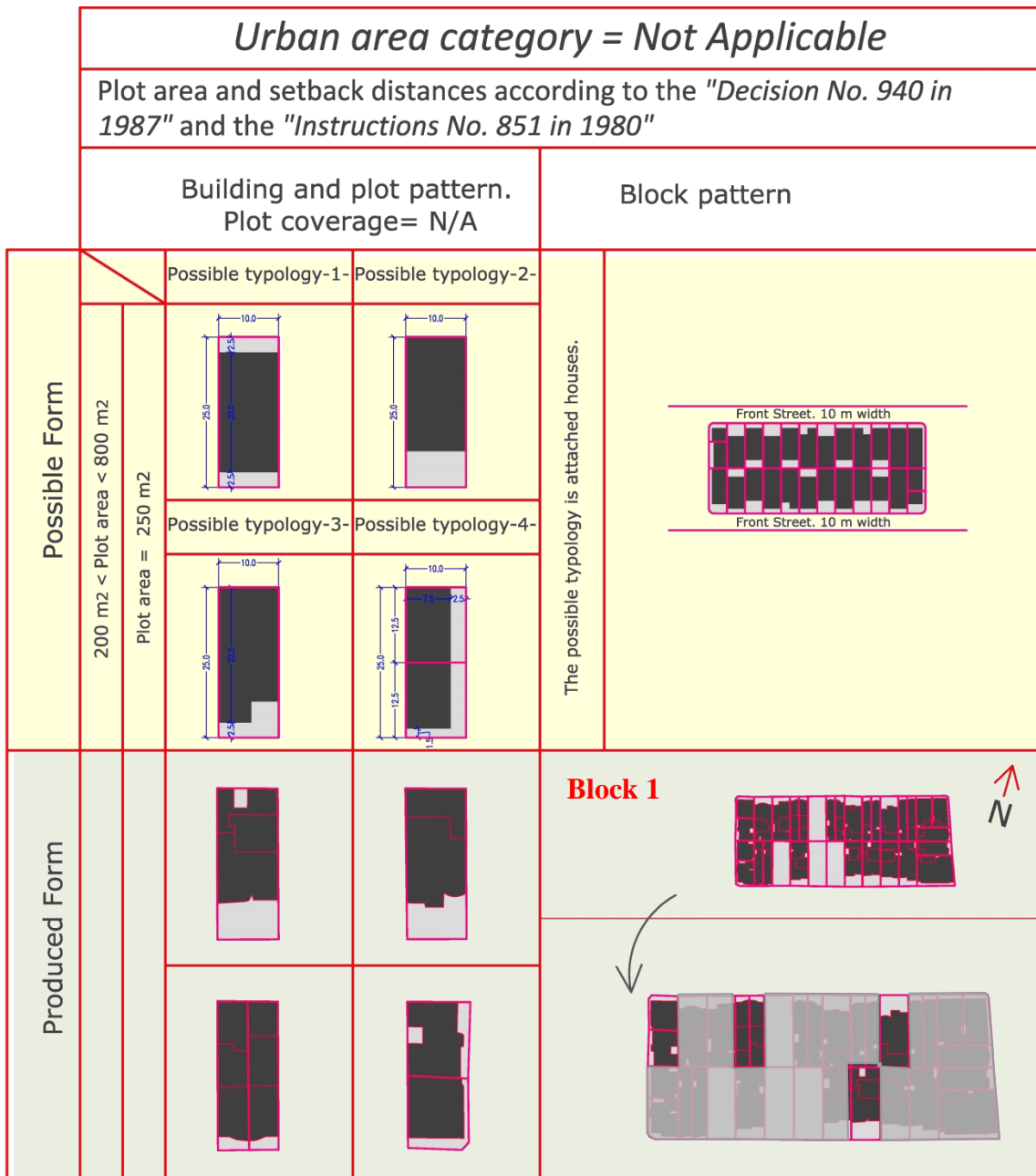


Figure 4.170: The possible form of buildings and plots which can be produced by the ‘Decision No. 940 of 1987’ and the ‘Instructions No. 851 of 1980’ and the real produced form by the same set of regulations in ‘Block 1’ of ‘Sample 7’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

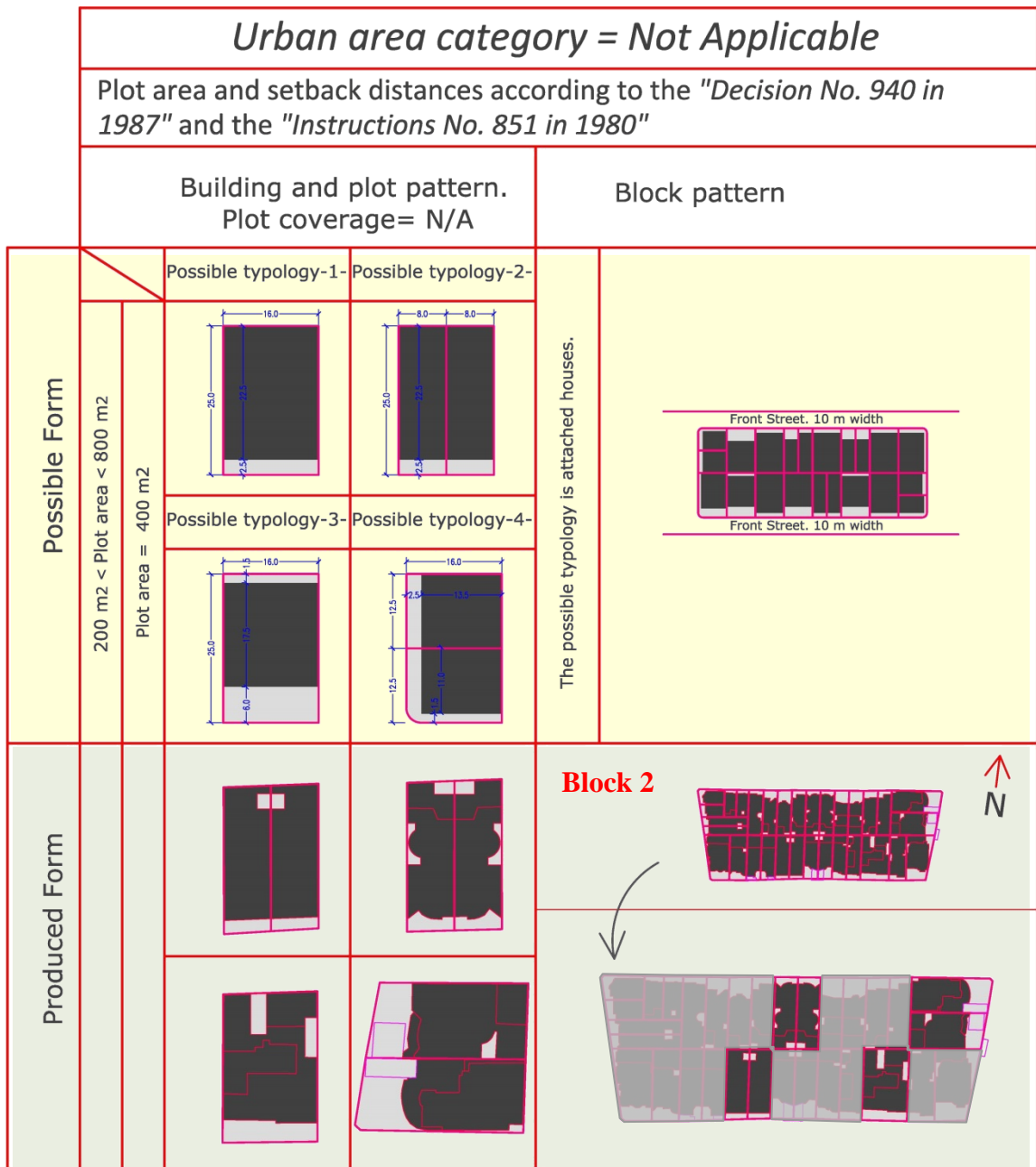


Figure 4.171: The possible form of buildings and plots which can be produced by the ‘Decision No. 940 of 1987’ and the ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in ‘Block 2’ of ‘Sample 7’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

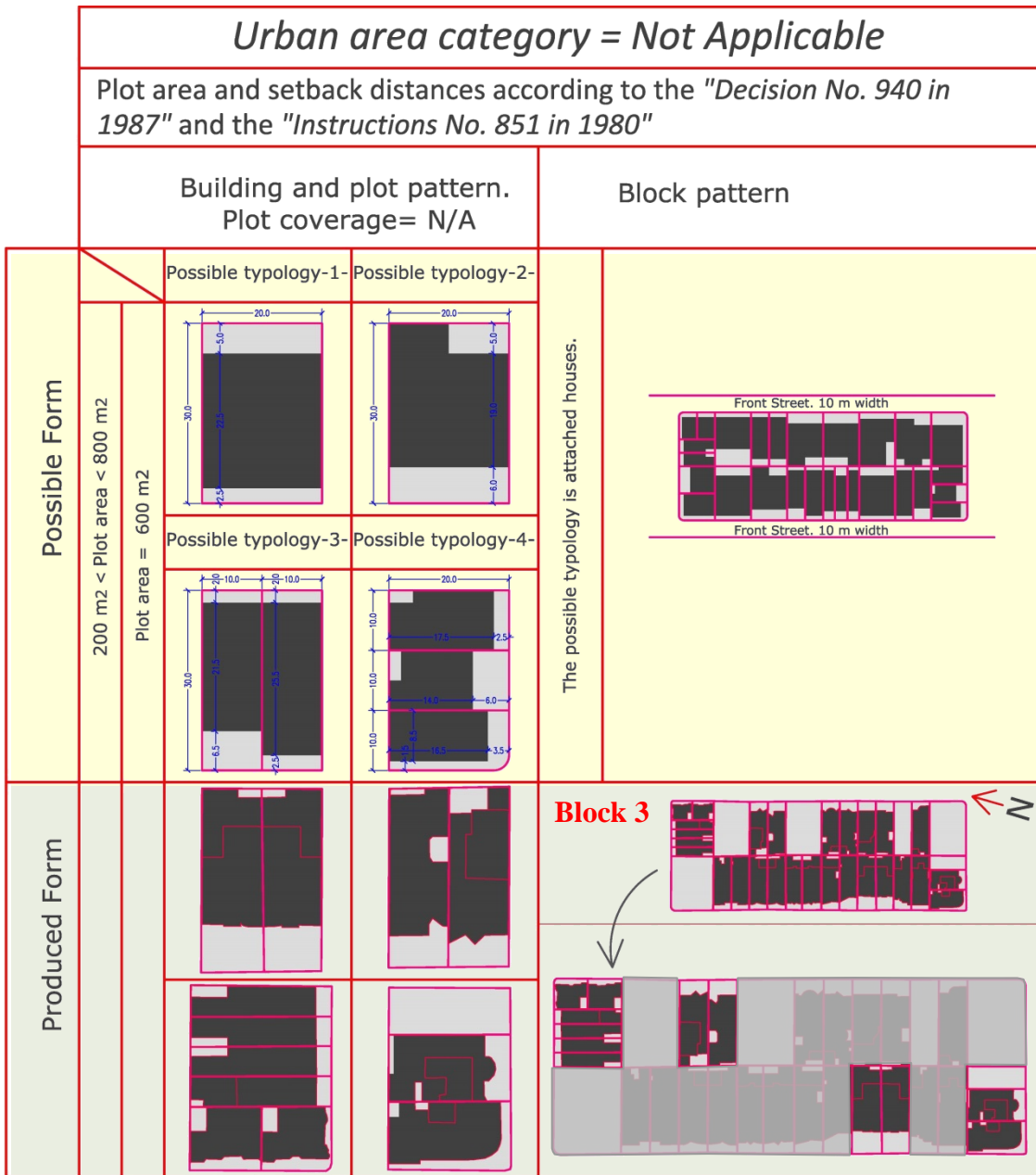


Figure 4.172: The possible form of buildings and plots which can be produced by the ‘Decision No. 940 of 1987’ and the ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in ‘Block 3’ of ‘Sample 7’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Transformation: The building form of the houses of later periods

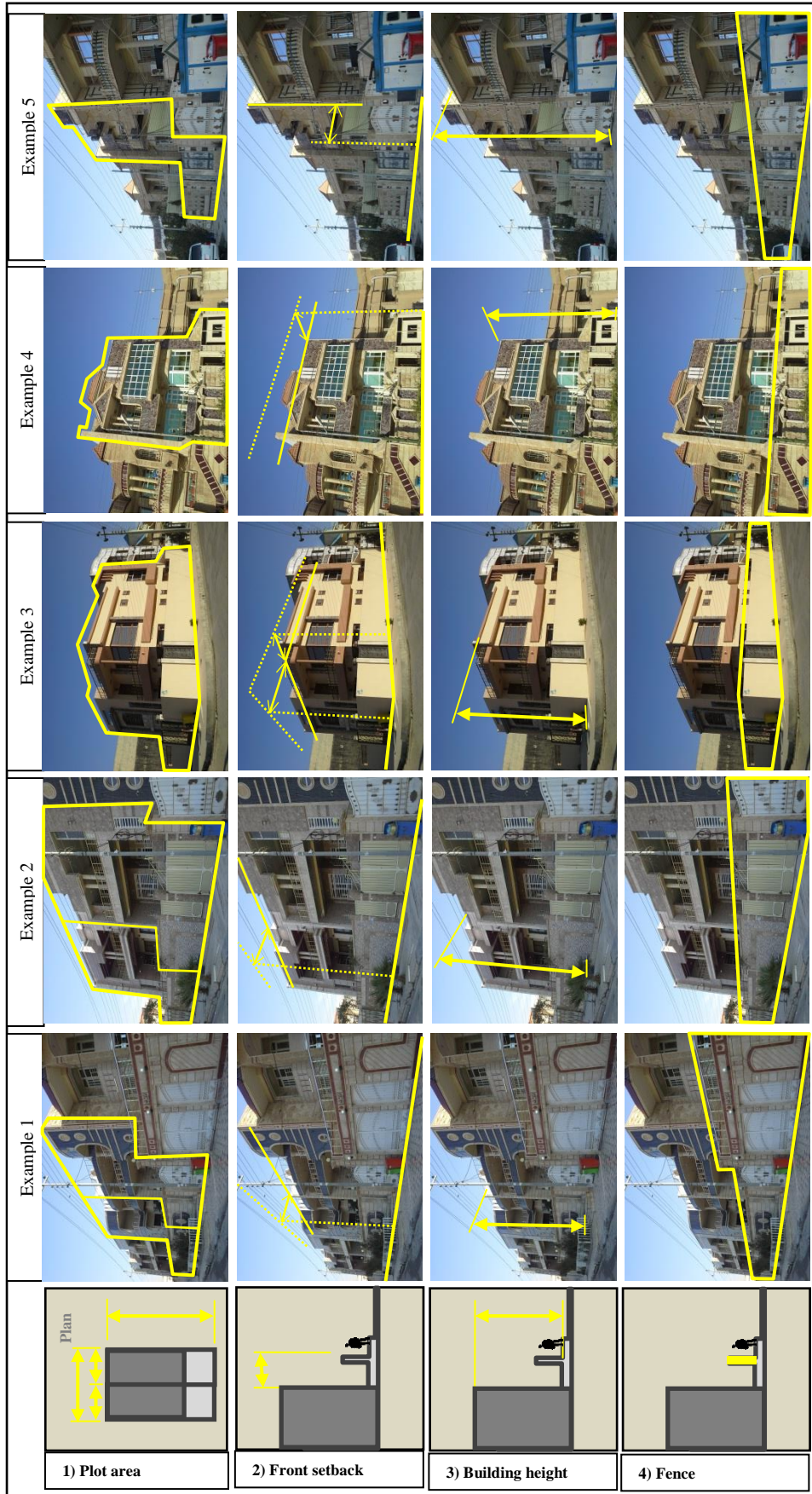


Figure 4.173: The common form characteristics of the houses built in the period (2004-2014) in the area of ‘Sample 7’. (Source: Researcher)

2. The transformation of the area: The area has been formed in the Seventh Period under the regulations the ‘*Decision No. 940 of 1987*’ and the ‘*Instructions No. 851 of 1980*’. These two regulations concerned minimum subdivision area of plots for single-family houses and building determinants, respectively. However, the majority of the houses included in the sample area have been built after 2003. Despite that the building process of single-family houses is regulated by the same set of regulations, the houses built in this period (2004-2013) have some transformed characteristics differentiated from that of the earlier periods.

A. The time period: The building process of the single-family houses of the area continued widely in the later periods, more specifically, after 2003 as many of the plots were still unbuilt. The fall of Saddam’s regime in 2003 resulted in the establishment of a federal system of governance and Kurdistan region was formally admitted as a federal region. The region has developed economically which reflected in the financial states of people. The outcomes of this period can be noticed in the urban growth of Kurdistan cities generally and Erbil as the capital of the region specifically. The trend of plot subdivision for building more than one house became a common phenomenon.

B. The housing policy: ‘Housing Policy 1’ has determined the building up of the whole quarter and its growth in the later periods. Therefore, the individual process which submitted to the individual tool of building control is the essential factor. As a result, with having certain flexibility in the regulations and the implementation of those regulations, the area was liable to have different forms of building.

C. The regulations: The same set of regulations (‘*Decision No. 940 of 1987*’ and ‘*Instructions No. 851 of 1980*’) determined the forms of the single-family houses of the sample area since its first formation in 1994. However, the houses built in the area after 2003 were to some extents different to that of the previous generations. The extent of the difference varied from a block to another depending on several factors including the original area of the plots of the block. Three samples of blocks were selected [Figure 4.164].

The average original plot area of 'Block 1' is 250m² (10m X 25m). However, the existing condition of the satellite image taken in 2011 shows cases of houses on subdivided plots with average areas of 125m² and the process of individual process is still in progress when 4 cases are still unbuilt. All the subdivided cases have been made informally as the regulations set 200m² as the minimum allowance of plot subdivisions for housing purposes. Due to the flexibility in imposing the distance of the front setback, no uniform setback distances were applied on individual cases [Figure 4.165]. In the case of 'Block 2', the average area of the original plots is 400m² which makes the possibility of formal subdivision higher. By 2011, the whole plots of the block were built. Similarly to the first block, the building line is not uniform [Figure 4.166]. The average area of the original plots of 'Block 3' is 600m². The block does not include any case of using the original area of the plot for one single-family house [Figure 4.167]. About a quarter of the plots of the block are still unbuilt by 2011. The setback distance is similar to that of the other two blocks.

Formal and informal subdivision actions are a common phenomenon of the sample area. This can be closely noticed from the samples of the blocks. In the first block 9 plots out of 23 of which 4 cases are unbuilt. This means about 40% of the plots of the block have been used for more than one house. This figure increases to about 93% in 'Block 2' which have plots of an average original area of 400m² [Figure 4.168]. This might be due to that according to regulations a 400m² plot can be formally subdivided into two, each with 200m² and this area is more affordable to build. In the case of 'Block 3', by 2011, 4 plots are still unbuilt and out of 12 of built plots all are subdivided and used for two or more single-family houses which means that 100% of the plots are subdivided [Figure 4.169].

By comparing the possible typologies of the forms that the regulations can produce in the sample area against what have been produced in the selected samples of the blocks, it can be observed that apart from the informal subdivision of the plots with areas less than the minimum formal allowance (200m²), the produced forms are predicted. In the case of the first block, both, the possible and the produced type of

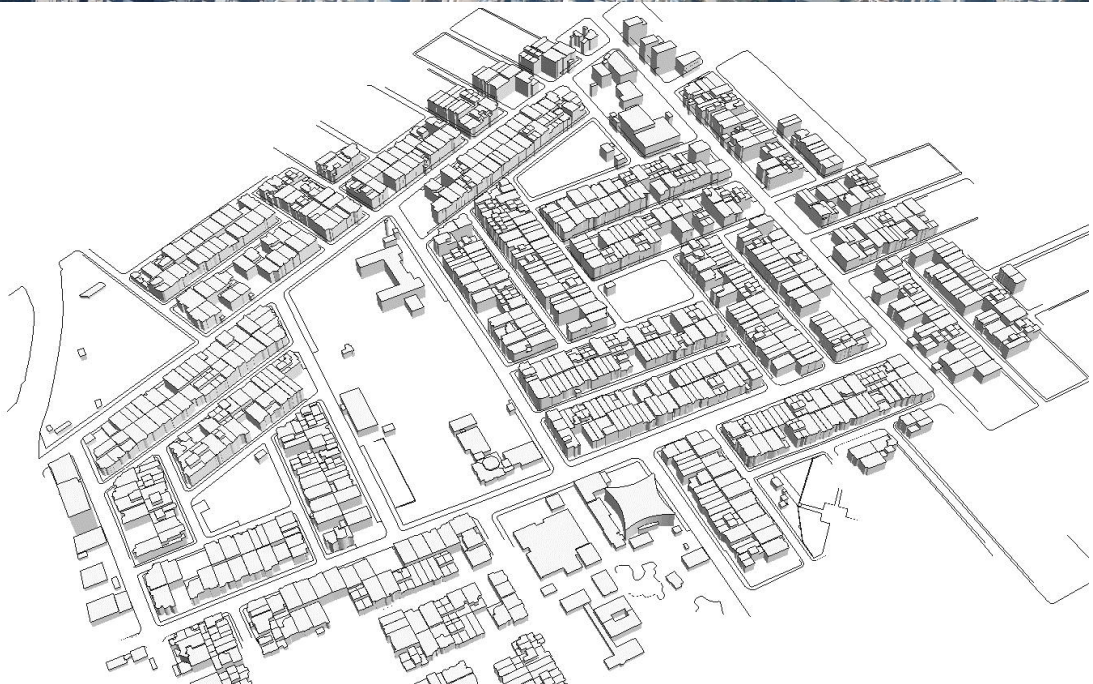
the houses are attached and all the subdivision cases have been made informally [Figure 4.170]. The same is the case in 'Block 2'. Yet, due to that the original area of the plots is 400m², the formal subdivision into two plots for two single-family houses, each with 200m² is allowed. In addition, one of the plots at a corner of the block has been used for 6 single-family houses each with plot areas less than 200m² [Figure 4.171]. With having original plots of an average area of 600m² in 'Block 3', the possibility of plot subdivision increases. The proportion of the plot dimensions (20m X 30m) allows subdivision into two (10m X 30m) when the dimension of 20m is adjacent to the street. Yet, in the case of corner plots, there is a possibility of formal subdivision into three each with 200m² (10m X 20m) [Figure 4.172].

The change of the use of the plots through the change of the use of the street where the plot is located on produced, on one street, both, single-family houses and multistorey mixed and commercial buildings which have different type to the single-family houses and are regulated by '*Building Regulations in Commercial Areas No. 4131 in 1989*',⁴⁵² [Table 4-30].

D. Other determinants: The economic growth after 2003 and the increase in the price of land resulted in the appearance of houses distinguished from their earlier generation by mainly two form characteristics despite having regulated by the same set of regulations imposed in the previous period [Figure 4.173]. Formal and informal subdivision of plots for building two or more single-family houses is one of the common characteristics. This reduced the width of the front side of the houses as the width is subdivided. Furthermore, the height of houses increased to up three floors to reach at about 10m.

⁴⁵² Ministry of Local Governance, General Directorate of Urban Planning.

Period 8 Sample 8 Havalan & Zanayan Quarters



Sample 8 (Havalan & Zanayan Quarters)

‘Sample 8’ area consists of two parts. The northern part is located in ‘Havalan’ quarter and the southern part is located in ‘Zanayan’ quarter. The area lies around 2.7 km to the east of the citadel (Qalat), immediately after the Sixth Ring Road ((Peshawa Qazi Muhammad Street) [Figure 4.175]. ‘Havalan’ quarter is bounded by the Sixth Ring Road from the west, the radial road (Koya Road) from the north, and adjacent to ‘Sarwaran’ and ‘Chwarchra’ quarters from the east and ‘Zanayan’ quarter from the south [Figure 4.176]. The first formation of ‘Havalan’ quarter was in the Eighth Period (1996-2003) and continued in the Ninth Period. It was built under the ‘Housing Policy 1’.

The plots of ‘Havalan’ quarter are a part of the subdivisions of the plot 7, District 93 Hasarok which is belonged to the lands of the village of ‘Hasarok’. The plot number 7, District 93 Hasarok was planned and registered in three stages. **The plots of the first stage were registered in December 1995 and granted to the governmental employees, specifically to engineers and the grant process was administrated and organised by the ‘Engineers Syndicate of Kurdistan’.** A number of the plots of this stage are included in ‘Havalan’ quarter and the rest are included in ‘Zanayan’ quarter. **The second stage includes plots in ‘Sarwaran’ and ‘Chwarchra’ quarters. The third stage includes around 170 plots in ‘Havalan’ quarter which were used as compensation to the original owners of the land used for the development of this area.** They were registered in 1997. The plots of both, the first and the third stage are covered in ‘Sample 8’ area [Figure 4.177].

The area has been planned according to the ‘*Decision No. 940 of 1987*’ and ‘*The Instructions No. 851 of 1980*’. **The average plot area in the quarters of ‘Havalan’ and ‘Zanayan’ is 200m².** However, there are some cases which have areas more than 200m², especially the plots at the end of the blocks and those are located on the commercial axes (‘Sixth Ring Road’ and ‘Koya Road’). **Due to informal subdivision actions, some of the plots were used for two single-family houses each with 100m².** **The common building type of the area is attached type of houses with front setback. The street and block type of ‘Sample 8’ area is ‘Oblong’ with ‘T-junctions’.** There are no building regulations that would lead to certain transformation in the area. The analysis structure focuses on the continuous formation process of the area since 1996 [Table 4-31].

Table 4-31: Sample 8, the formation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
8	Havalan and Zanayan	8 th and later periods	1996-2003, and later	1	<ul style="list-style-type: none"> • Instructions No. 851 of 1980 on building single family houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (the location). • Socio-economic status of the residents in the period.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1980 ⁴⁵³	N/A	Distinct	$800 > P \geq 120$	10 ⁴⁵⁴	6	2.5	0	N/A
1987 ⁴⁵⁵	N/A	Distinct	$800 > P \geq 200$	10	10	2.5 or 4 ⁴⁵⁶		N/A
1989 ⁴⁵⁷	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ⁴⁵⁸	N/A	75%
1993 ⁴⁵⁹	N/A	Special	N/A					

⁴⁵³ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴⁵⁴ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

⁴⁵⁵ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴⁵⁶ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

⁴⁵⁷ Ministry of Local Governance, General Directorate of Urban Planning.

⁴⁵⁸ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street. See [Table 4-33].

⁴⁵⁹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

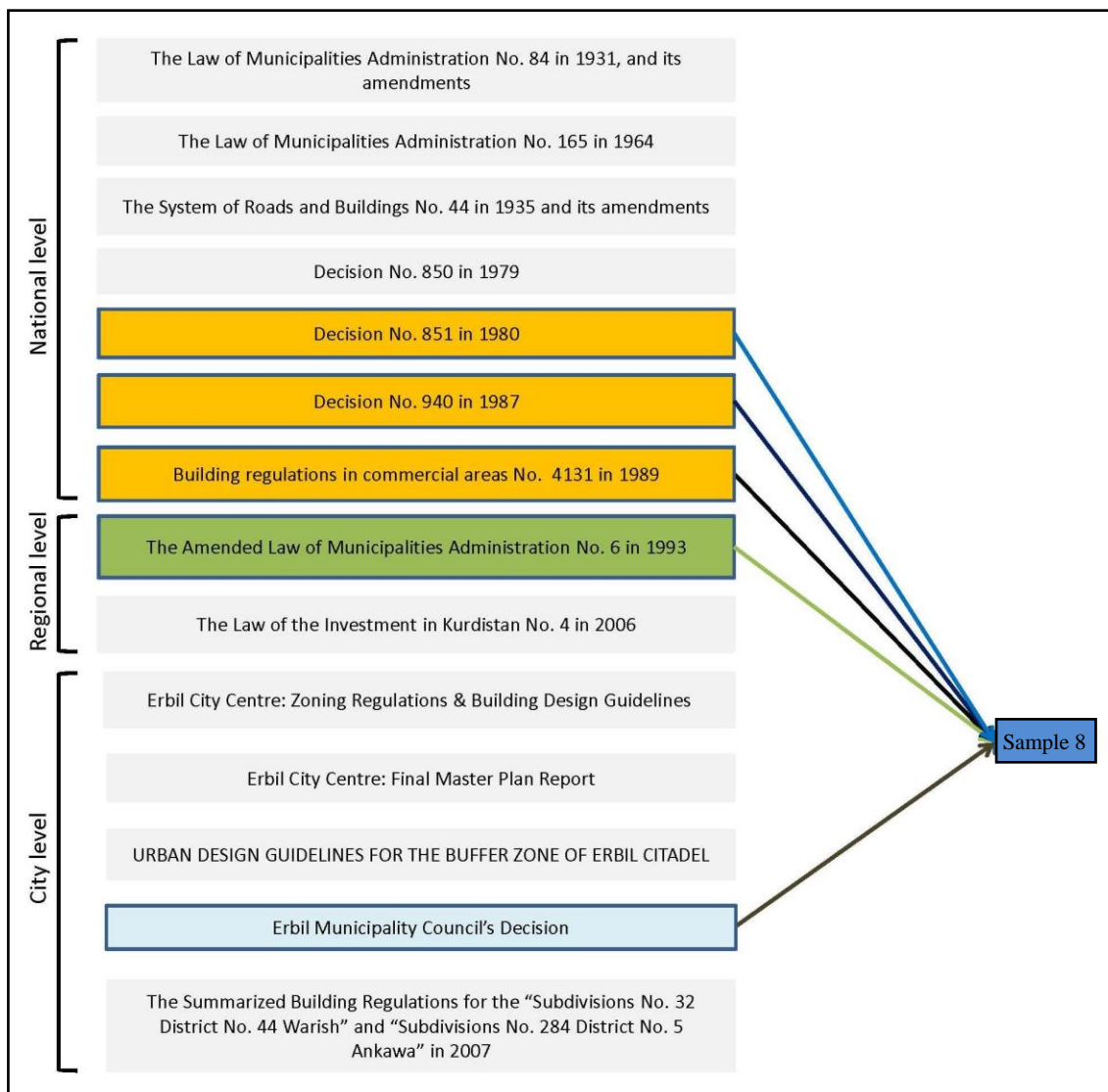


Figure 4.174: Direct regulations enacted at different levels that have influenced 'Sample 8'.
(Source: Researcher)

⁴⁶⁰ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

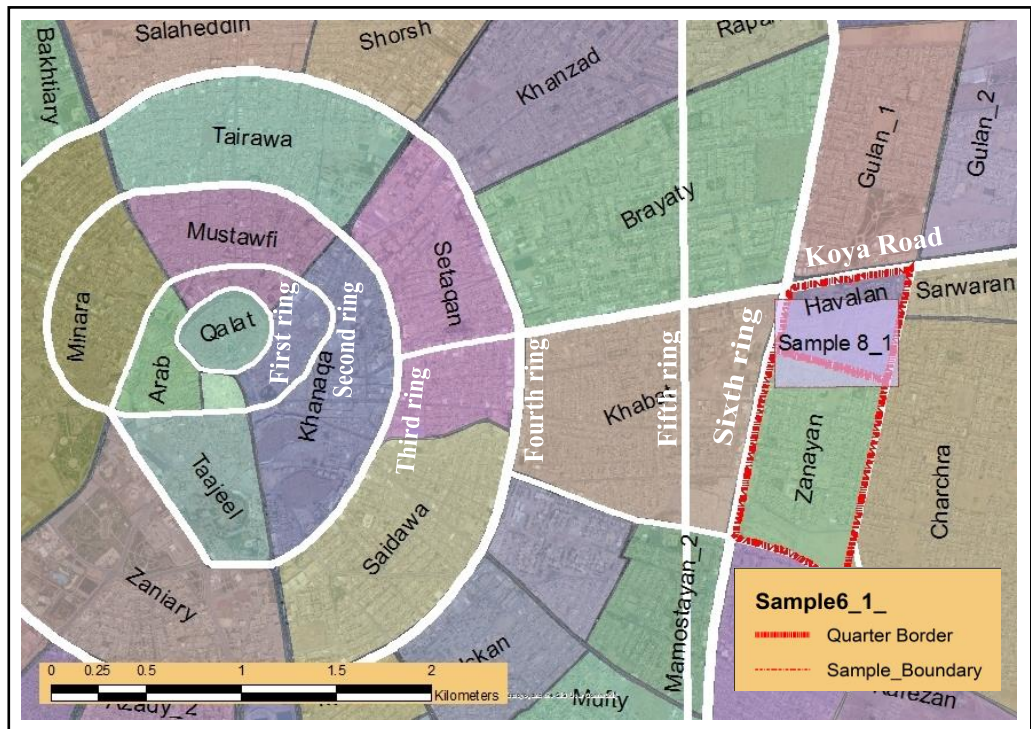


Figure 4.175: The location of ‘Sample 8’ and ‘Havalan’ and ‘Zanayan’ quarters. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

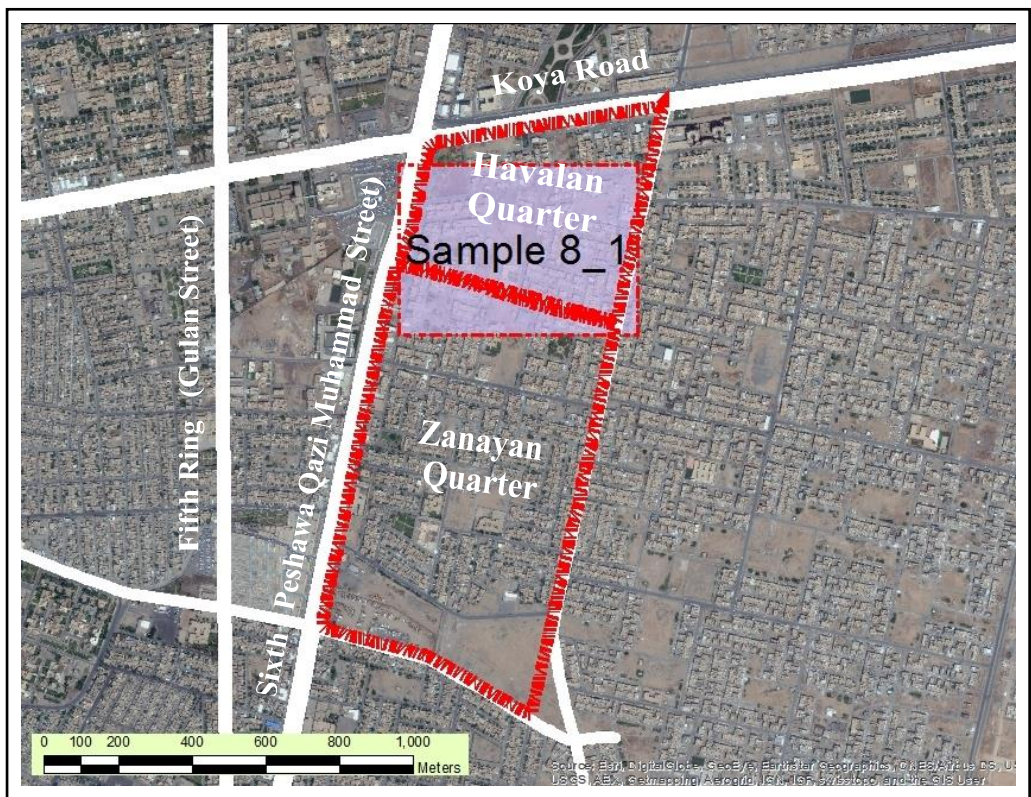


Figure 4.176: The boundary of ‘Havalan’ and ‘Zanayan’ quarters. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

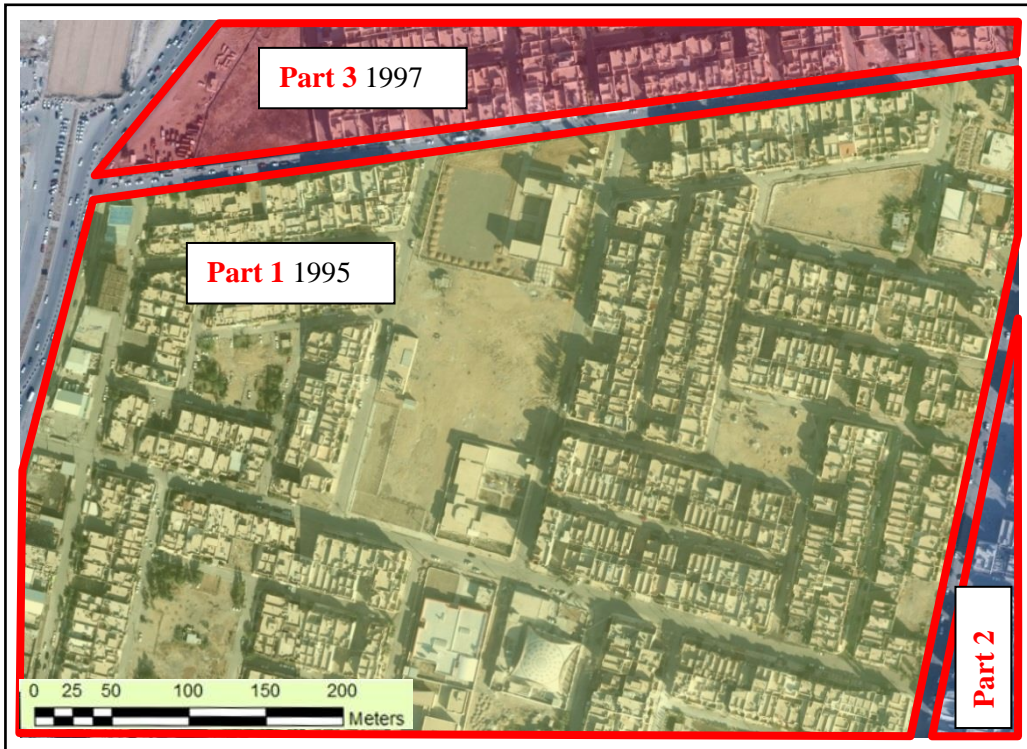


Figure 4.177: The different parts of the ‘Sample 8’ area which were almost registered in the same period. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011, based on data from The Real Estate Registry Offices of Erbil)

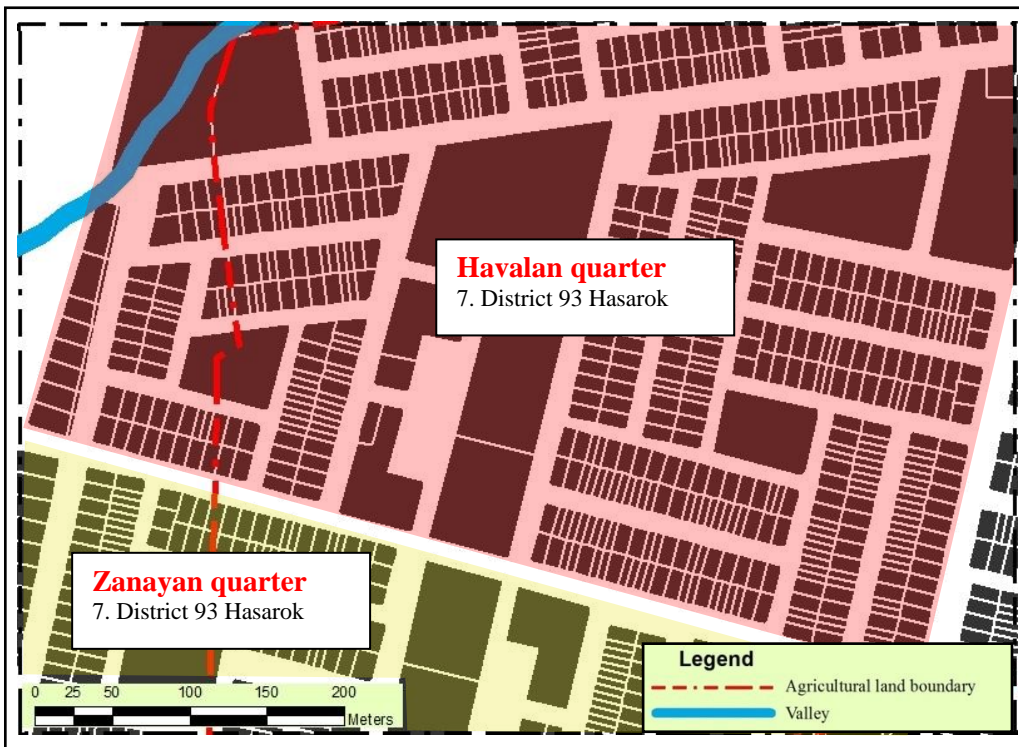


Figure 4.178: ‘Sample 8’ composes of parts from both ‘Havalan’ and ‘Sarwaran’ quarters but they are registered in the same year under the same registration number (7, District 93 Hasarok). (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)



Figure 4.179: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 8’ area which is a part from both ‘Havalan’ and ‘Zanayan’ quarters. (Source: See page 105)

The Formation: The building form characteristics of the houses

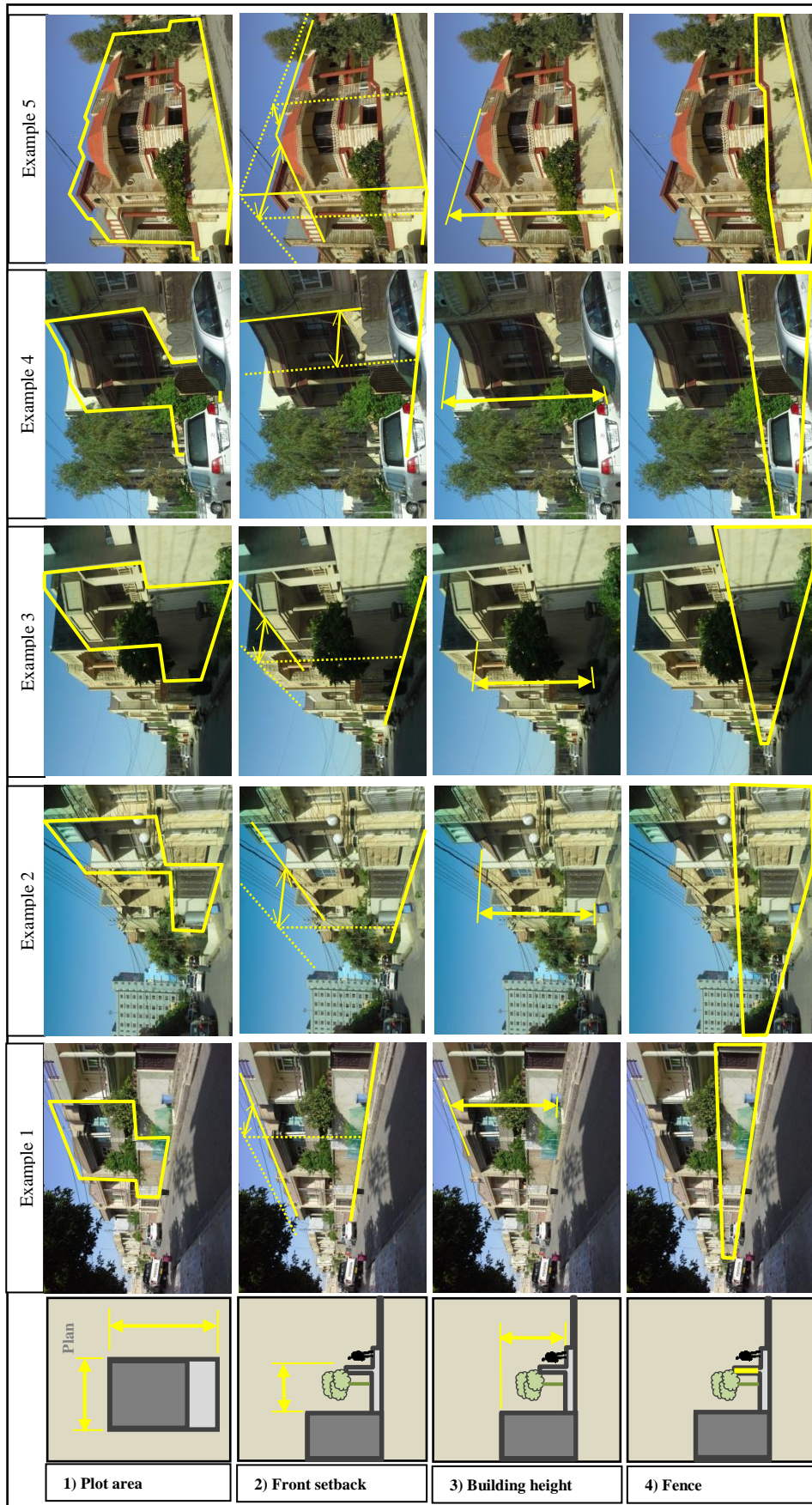


Figure 4.180: The common form characteristics of the houses built in the period (1996-2003) of the first formation of the area of ‘Sample 8’. (Source: Researcher)

The Formation: The building form characteristics of the houses



Figure 4.181: The common form characteristics of the houses built in the period (2004-2014) in the area of ‘Sample 8’. (Source: Researcher)

The Formation: The selection of blocks samples

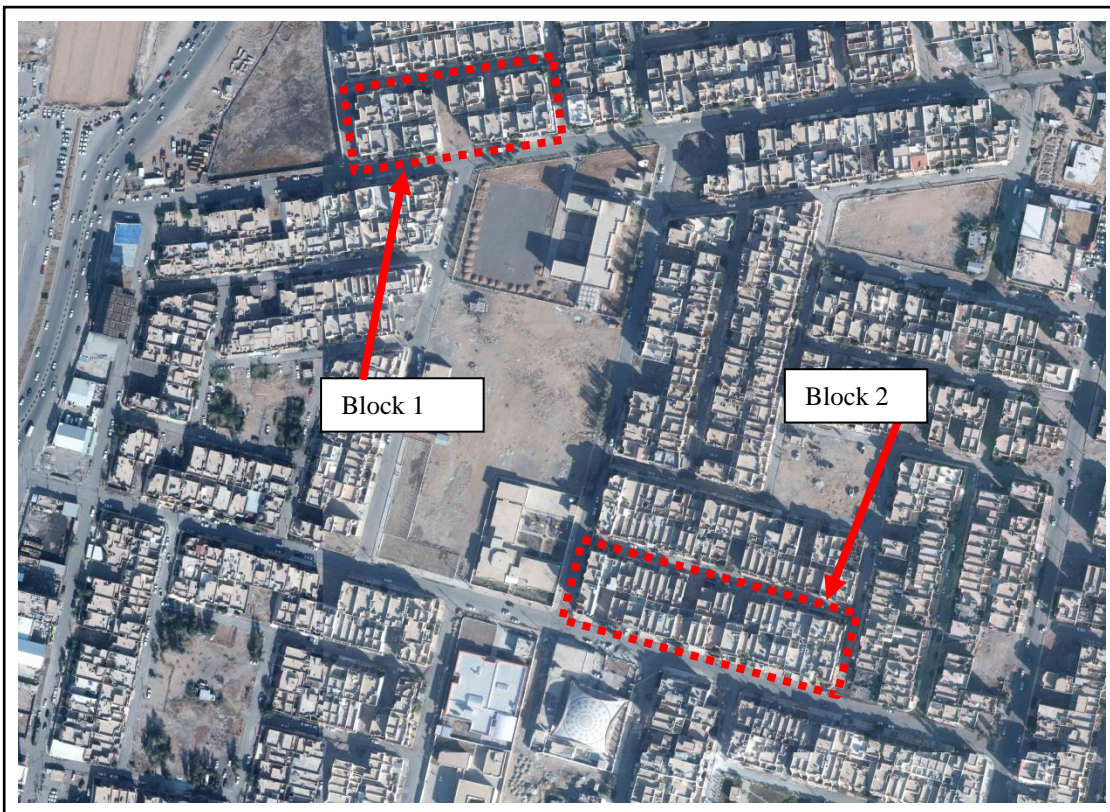


Figure 4.182: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Formation: Building- Plot parameters

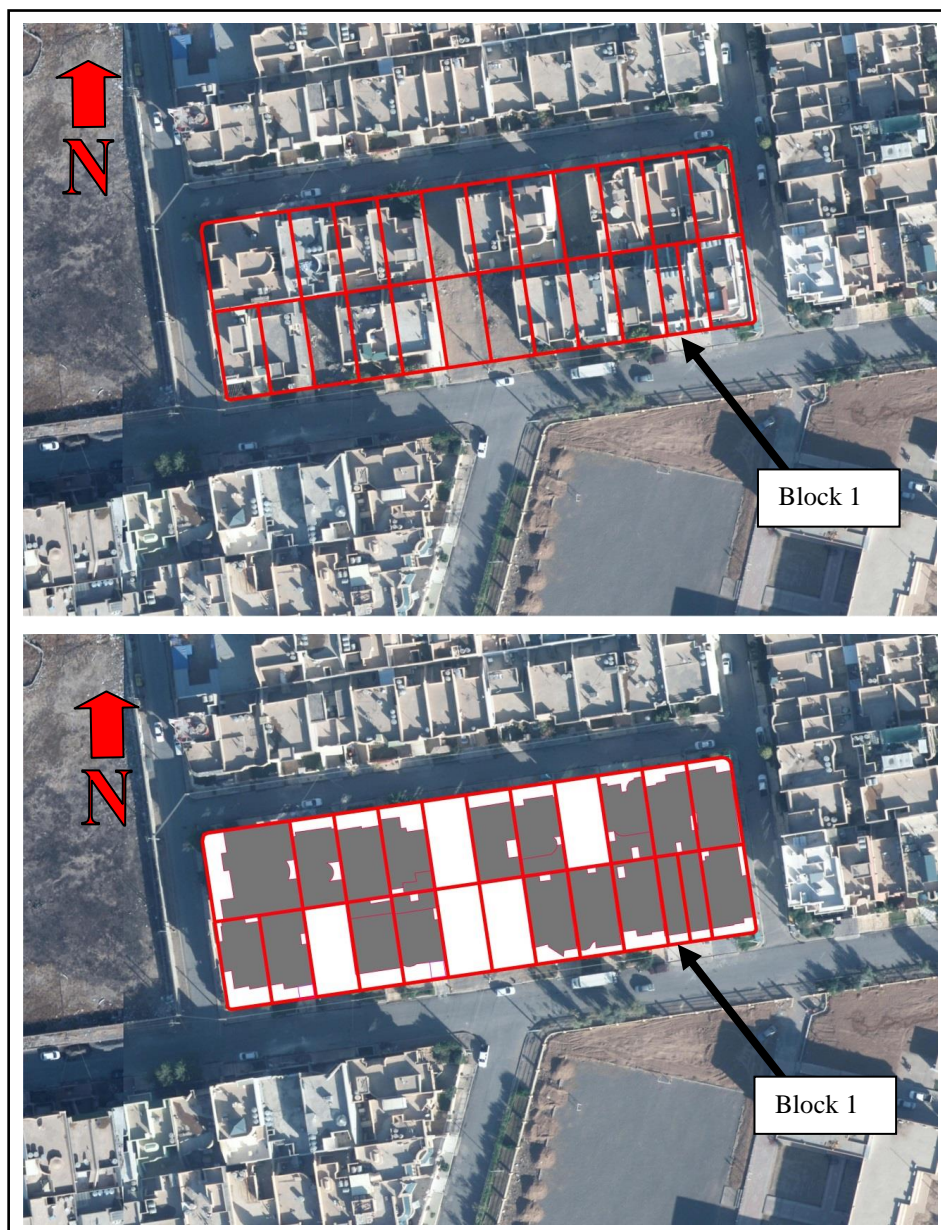


Figure 4.183: A block (block 1) sample from ‘Sample 8’ area showing the existing condition and the building process is still in progress. Out of 24 plots 5 plots have not been built by 2011. The typical area of the original plots is 200 m² (10 m X 20 m). The block includes attached type of houses which have been built in the period (1996-2011) and regulated according to ‘*Instructions No. 851 in 1980*’. However, one case of not complying the regulations is noticed which include two houses each on 100m² (5m X 20m) land area on one 200m² (10m X 20m) plot. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)



Figure 4.184: A block (block 2) sample from ‘Sample 8’ area. The typical area of the original plots is 200 m² (10 m X 20 m). The block includes attached with front setback type of houses which have been built in the period (1996-2011) and regulated according to ‘*Instructions No. 851 in 1980*’. However, more than half of the original 200m² plots have been used for two single family houses each on 100m² (5m X 20m) land areas. Those are considered as the contrary to what the regulations proposed. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

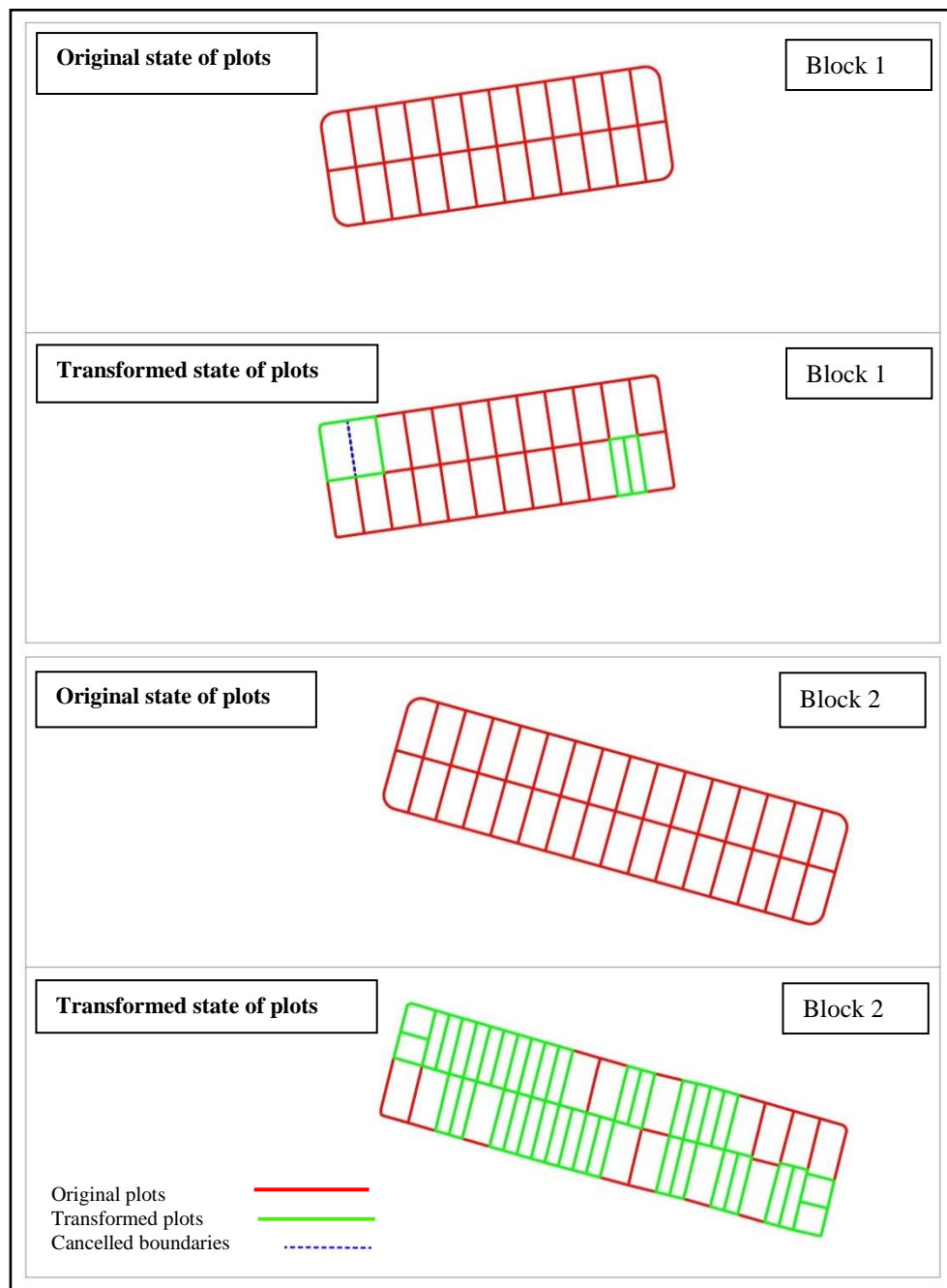


Figure 4.185: The selected blocks (block 1 and block 2) from ‘Sample 8’ area. The transformation (subdivision) on some plots resulted under the pressure and the increasing demand on houses. Due to that the minimum subdivision area according to ‘*Decision No. 940 of 1987*’ is 200m², the original plots informally subdivided into two. This means that the original plot is shared by two owners with no official separation line. In the first block one case of informal subdivision and one pooling case can be observed. However, with 18 cases of plots out of 32, more than half of the plots of the block have informally been subdivided into two. Each 200m² single plot was used for two 100m² single-family houses. The majority of the houses with 100m² on the informal subdivided plots have been built in the period (2004-2014). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

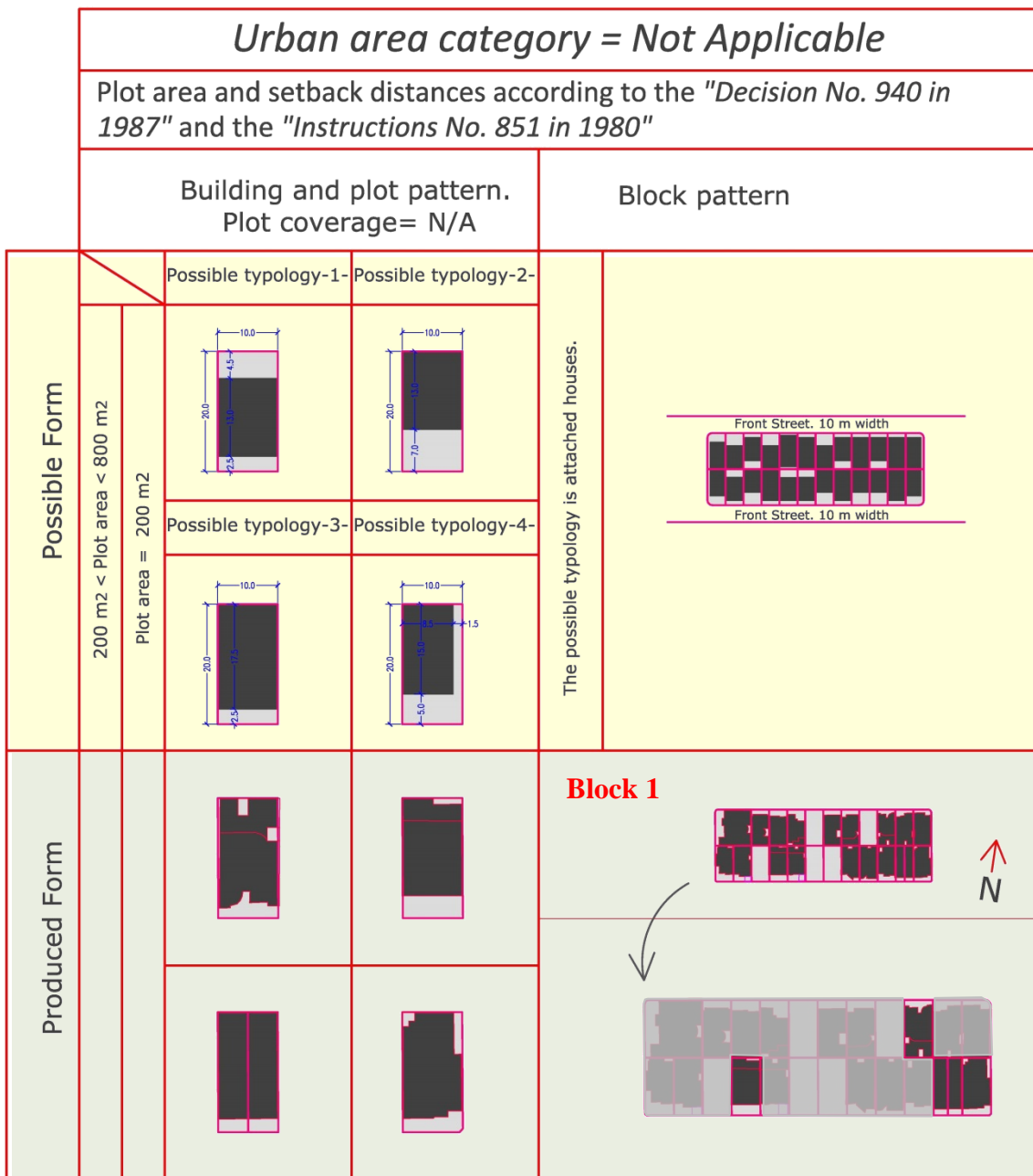


Figure 4.186: The possible form of buildings and plots which can be produced by ‘Decision No. 940 of 1987’ and ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in ‘Block 1’ in ‘Sample 8’ (Havalan quarter). (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

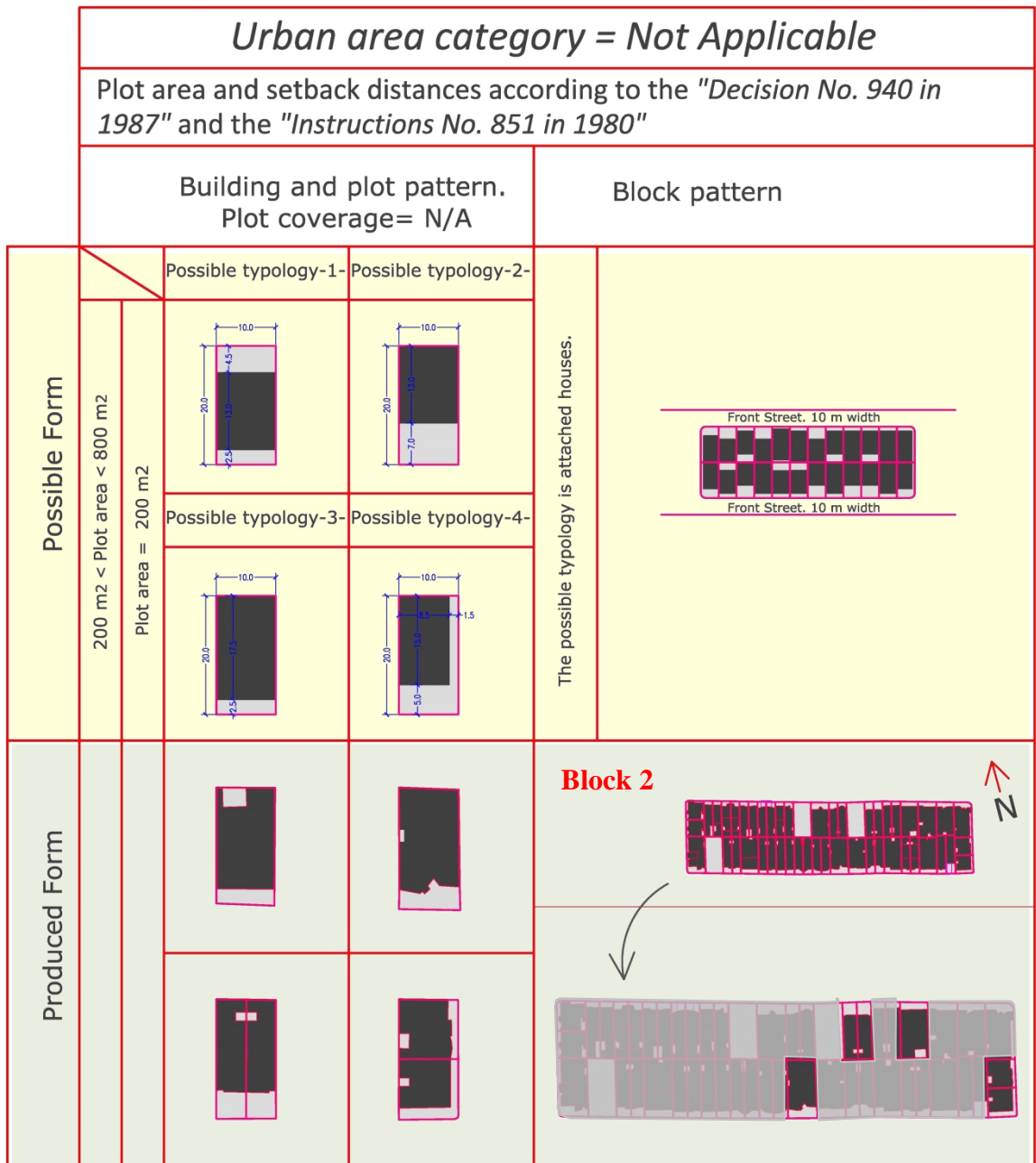


Figure 4.187: The possible form of buildings and plots which can be produced by ‘Decision No. 940 of 1987’ and ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in ‘Block 2’ in ‘Sample 8’ (Havalan quarter). (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: The plan and the original land features

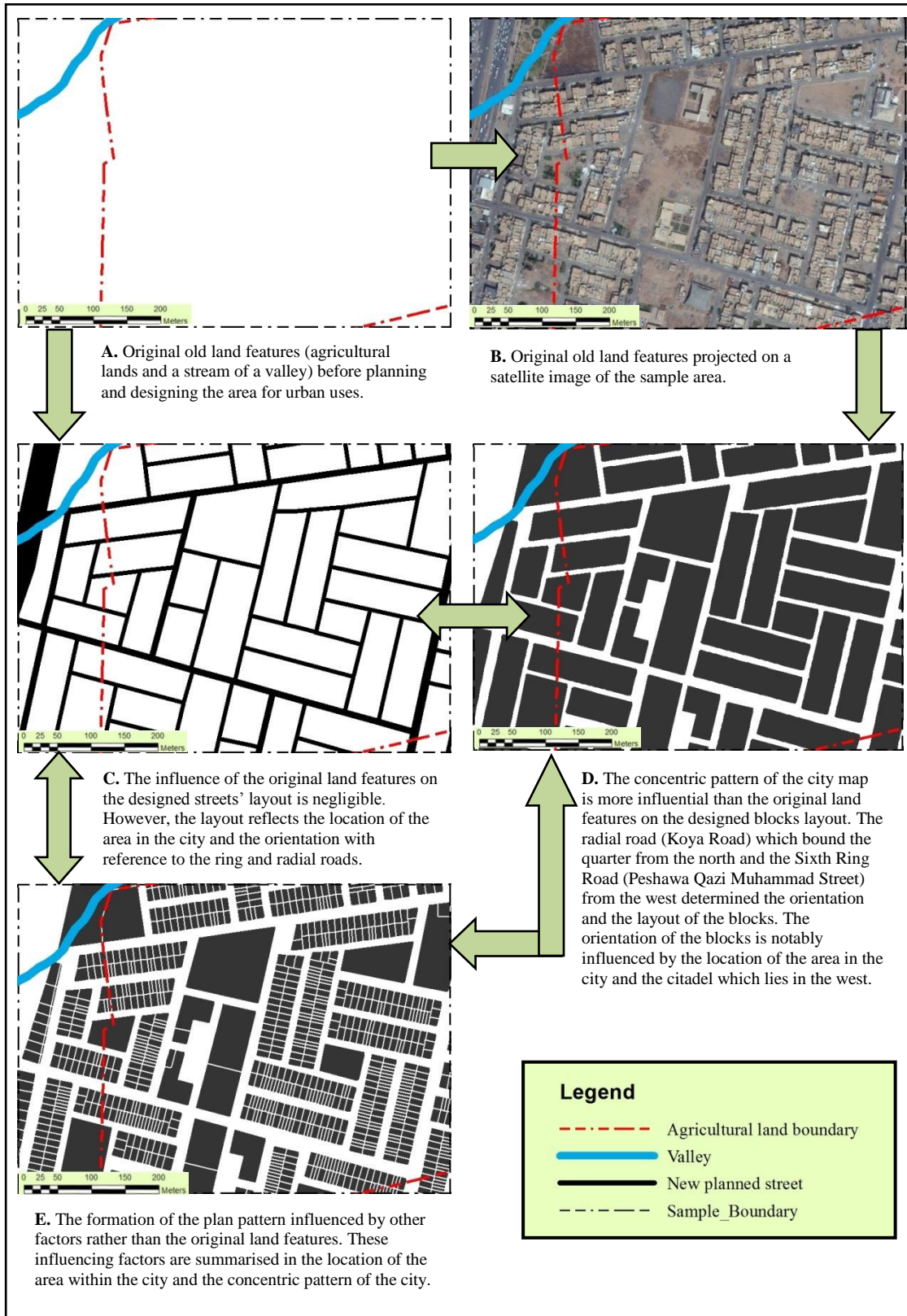


Figure 4.188: The original land features have no significant influence on the pattern of the formed plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

- **The formation of the area:** The sample area which is a part of both ‘Havalan’ and ‘Zanayan’ quarters formed in the same period (The Eighth period) and extended to the Ninth Period [Figure 4.178]. The plan and the registration of the area started from December 1995 to March 1997. However, the continual process of individual building continued and is still in progress.

A. The time period: The area included in the sample boundary has been created in the same time period [Figure 4.177]. The registration of the first part (the southern part) of ‘Sample 8’ was in 1995 and the third part in (the northern part) was in 1997. In 1991 an International economic siege was imposed on Iraq which lasted in 2003. The uprising of Kurdistan in 1991 resulted in the autonomy of Kurdistan region. This led to the first election in Kurdistan which resulted in the establishment of Kurdistan Parliament and Kurdistan Regional Government. Due to the difficult political and economic situation of Iraq and Kurdistan as well, the growth of the cities and housing was very limited. Despite all those difficulties there were some attempts of new developments regulated by the old regulations and the new law number 6 of municipalities’ administration of Kurdistan issued in 1993 and its three amendments until 1999. The plots of the area of ‘Sample 8’ were granted to government employees (engineers).

B. The housing policy: ‘Housing Policy 1’ was adopted in the formation of the area. This period (1996-2003) was characterised by implementing the same policies and strategies of housing adopted in the previous periods. The individual building process expands over many years which would be an endless process. The diversity of building forms was an apparent characteristic of this process. Due to the economic challenges in the period (1996-2003), the ability of the responsible authorities to provide the services such as roads pavement, water, and electricity supply to the new developed and planned areas was limited. Similarly, the ability of people to build their individual house was also limited due to that the individual process of housing was not subsidised by incentive and mortgage policies. These factors resulted in a very limited building

process in the sample area [Figure 4.179]. By 2004, the roads had still been unpaved.

C. The regulations: The ‘ground plan’ of the area was planned and projected basing on ‘*The Law of Municipalities Administration No. 6 in 1993*’, ‘*The Decision No. 940 of 1987*’, and ‘*The Instructions No. 851 of 1980*’ which means that the notion of urban area categories based on ‘*The System of Roads and Buildings No. 44 of 1935*’ is not applied. The minimum requirements of street width, plot area, and building orientation within the plot are reflections of these legislations. See [Table 4-32].

The average area of the plots of the quarter is 200 m² which is regulated by ‘*Decision No. 940 of 1987*’. Few houses were built in the sample area from 1996 to 2003. The form characteristics of those houses can be summarised as follow [Figure 4.180]: The first is that the plot area of the majority of those houses is 200 m² (10 m X 20 m) which means that the average front width of the plots is 10m. The second is all the houses are attached type. The houses have front setback distances which in some cases the front area formed from the setback used for gardens and car park spaces.

The third is the height of the buildings. The houses have two floors with an average height of 7m. The privacy and security issue achieved by the fence is the last characteristic. This is a common characteristic in the houses of Erbil. With having a height ranging from 1.4m to 2.2m, the fences achieve visual and physical separation to the houses. The house has one or two entrance gates one of which used for car entrance.

The formation of the area and the individual building process extended to the Ninth Period (2004-2013). However, the same previous set of regulations was applied. Theoretically, this means that the houses built under the influence of the same legislation would have the same form characteristic. However, the produced houses in the area of ‘Sample 8’ have some transformed form characteristics. These characteristics are a result of the new outcomes of the new period started since 2003 when a new system of governance was established after the fall of the previous

regime. The economic growth, the political stability, and the fast urban growth of the city of Erbil are the features of the new period. The houses built in that period differentiated from the houses built in the previous period by two main points. The first is the informal subdivision by building two single-family houses on one 200m² plot. Each house has a half share (100m²) of the area of the plot and both are authorised under one building permit can be observed. This means that the original plot can be formally shared by two or more persons and the share of each person is used for a separate single-family house. In order to achieve more built-up spaces, the number of floors of houses increased from two to three [Figure 4.181].

Two blocks are selected for a detailed analysis on the level of individual plots and buildings [Figure 4.182]. In the first block, the typical area of the plots of the houses is 200m² (10 m X 20 m). Similarly, this is the case in the second block. Both include houses of attached type [Figure 4.183] and [Figure 4.184]. Plot coverage in the sample area is not regulated by certain legislation. However, according to the valid regulations (*'Instructions No. 851 in 1980'* and *'Decision No. 940 of 1987'*) the minimum area of a plot for one single house is 120m² which means that a plot with 200m² cannot be used for two single-family houses. The minimum front setback which should be applied on the area of 'Sample 8' is 2.5m. In 'Block 1' there is one case of having two houses each on 100m² which is less than the limit specified by the regulations. However, in 'Block 2' 18 plots out of 32 have informally been subdivided into two and used for two houses, each on 100m² plot area [Figure 4.185]. The majority of those cases have been built after 2003.

In a comparison between the possibilities of the forms that can be produced by the valid regulations in the sample area and what those regulations produced on the ground through the two samples of the selected blocks, it can be observed that in contrast to 'Block 2' the produced form cases in 'Block 1' match predicted forms by the regulations [Figure 4.186] and [Figure 4.187].

The layout of the streets has stayed constant and no notable change and transformation on streets can be observed. The only change

on the streets was decisions on the change of the use of some streets from residential to commercial. These decisions based on Article 25 of '*The Law of the Municipalities Administration No.6 in 1993*',⁴⁶¹ [Table 4-33]. Transformed streets from residential to mixed and commercial uses produced a mix of multistorey buildings and single-family houses.

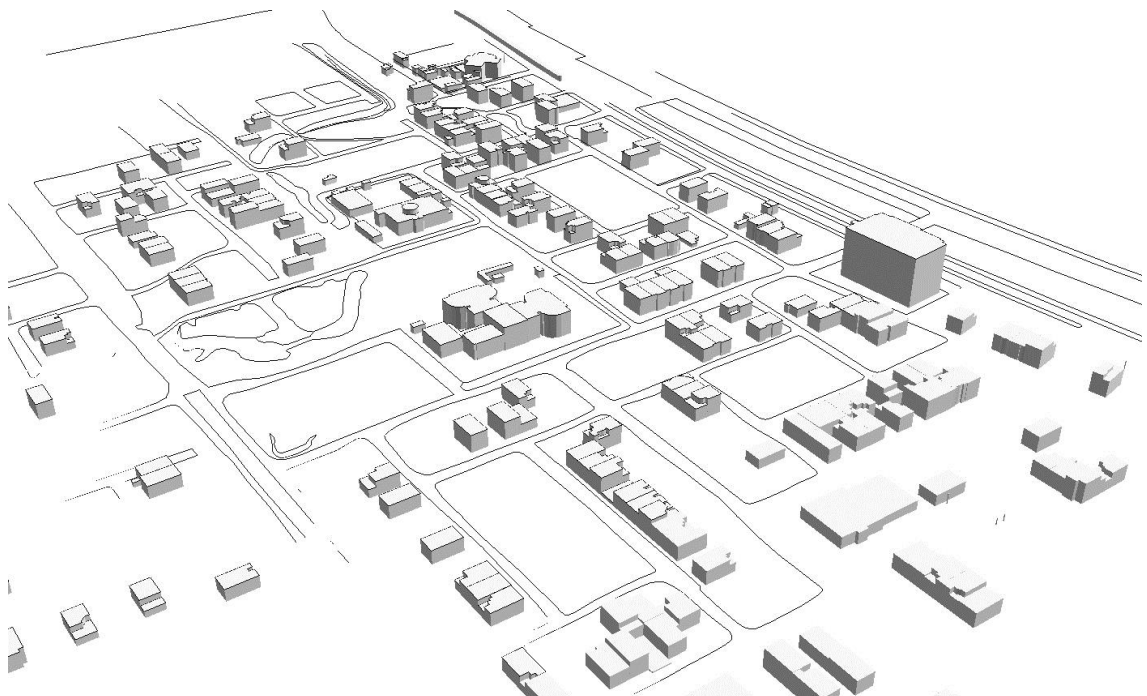
D. Other determinants: Apart from the factors mentioned, there are other influencing factors that determined the formation of the area and the characteristics of its forms. The influence emerged by the location of the quarter within the city of Erbil and the influence of the concentric pattern of the city on the layout of the streets and blocks are evident [Figure 4.175] and [Figure 4.176]. However, the original features of the land used for the quarter have no significant influence on the layout. This is mainly because of that the agricultural lands and the old roads of the area were submitted to a technical and institutional process as a preparation for the plan intended. This process included the cancellation of the old roads and the change in the areas of the lands through merging and subdividing them. As a result, the area separated into two parts. [Figure 4.188]. The second factor is also linked to the period in which the area has been developed. Most of the houses of the area have been built after 2003 and the process is still in progress. The increasing price in the housing market and real estates led to the increase in the population density by building two houses on one plot despite that the process of building has been subsidised by housing mortgages.

⁴⁶¹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Period 9

Sample 9_1

Sarbasty Quarter



Sample 9_1 (Sarbasty Quarter)

‘Sample 9_1’ area is a part of ‘Sarbasty’ quarter which lies around 4.0 km to the west of the citadel (Qalat), between the Sixth (Peshawa Qazi Muhammad Street) and the Seventh Ring Roads which is known as ‘The 120 meters Ring Road’⁴⁶² [Figure 4.190]. The quarter is bounded by the Sixth Ring Road (Peshawa Qazi Muhammad Street) from the east, the Seventh Ring Road from the west, the radial road (Mosul Road) from the South, and ‘Airport Road’ from the north [Figure 4.191]. The first formation of ‘Sarbasty’ quarter was in the Ninth Period (2004-2013) yet it had been planned before 2003. However, due to technical issues such as a change in the detailed plan, a delay in providing neighbourhood services (roads pavement and water and electricity supply), proposing new building regulations for the area, taking considerations of nearby Erbil international Airport, and not issuing building permit until 2006, building process and the formation of the area launched in 2006 by issuing a very few building permits. The quarter was built under the ‘Housing Policy 1’.

The quarter was planned in two parts. The first part includes residential plots with 200 m² and the second part includes plots of 250 m². The plots of both parts were granted to governmental employees such as teachers and employees in other sectors. The quarter was planned according to the ‘Decision No. 940 of 1987’ and ‘Instructions No. 851 of 1980’. However, building process in the area was regulated by ‘Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa’. The area contains attached type of houses with front setback. The street and block type of ‘Sample 9_1’ area is ‘Oblong’ with ‘T-junctions’. The structure of the analysis of this sample focuses on the formation as there is not any significant transformation of the area which can be mentioned [Table 4-34].

⁴⁶² The Seventh Ring Road is a proposed highway street and still under construction.

Table 4-34: Sample 9_1, the formation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
9_1	Sarbasty	9 th period	2003-2013	1	<ul style="list-style-type: none"> • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa Building , 2007 • Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (The location, and the original land features. • The socio-economic status of the residents.

Table 4-35: The regulations that have influenced 'Sample 9_1' until 2013. (Source: Researcher based on different paragraphs of different legislation)								
Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1979 ⁴⁶³	N/A	Distinct	$800 > P \geq 120$	10 ⁴⁶⁴	6	2.5	0	N/A
1987 ⁴⁶⁵	N/A	Distinct	$800 > P \geq 200$ 200	10	10	2.5 or 4 ⁴⁶⁶		N/A
1989 ⁴⁶⁷	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ⁴⁶⁸	N/A	75%
1993 ⁴⁶⁹	N/A	Special	N/A					
2007 ⁴⁷⁰	N/A	Special	Original area ⁴⁷¹		Original	3.5 ⁴⁷³	0	75%

⁴⁶³ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴⁶⁴ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

⁴⁶⁵ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴⁶⁶ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

⁴⁶⁷ Ministry of Local Governance, General Directorate of Urban Planning.

⁴⁶⁸ The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street. See [Table 4-36].

⁴⁶⁹ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

⁴⁷⁰ The Presidency of Erbil Municipality, *Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007*

⁴⁷¹ The area of the original plot cannot be formally and informally subdivided.

⁴⁷² The width of the original plot cannot be reduced by any means of subdivision.

⁴⁷³ In the case of the plots at the corner of the blocks, 3.5m front setback is applied from the main street and 1.25m from the secondary (sub) street.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

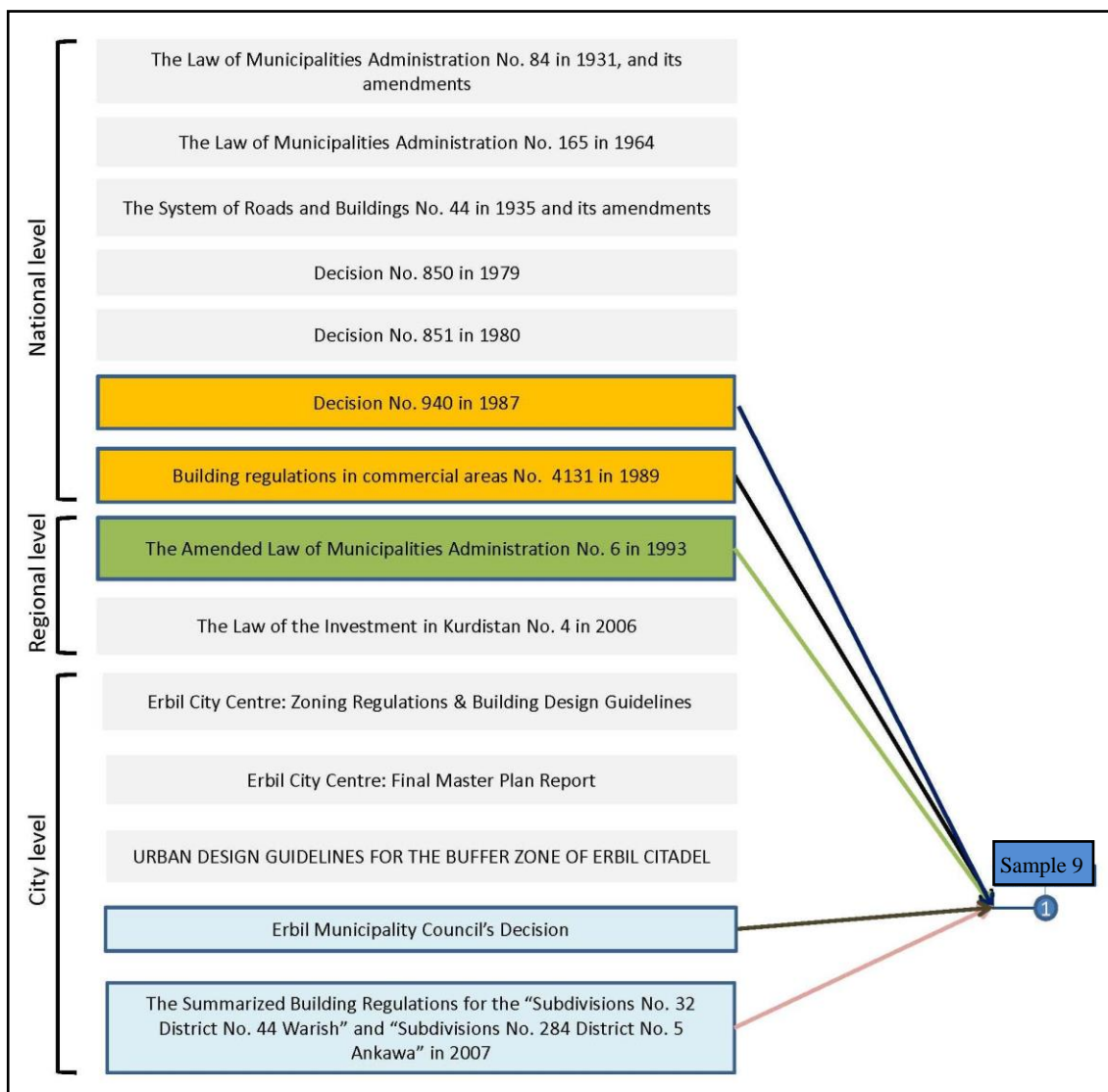


Figure 4.189: Direct regulations enacted at different levels that have influenced 'Sample 9_1'. (Source: Researcher)

⁴⁷⁴ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation: The location and the boundary

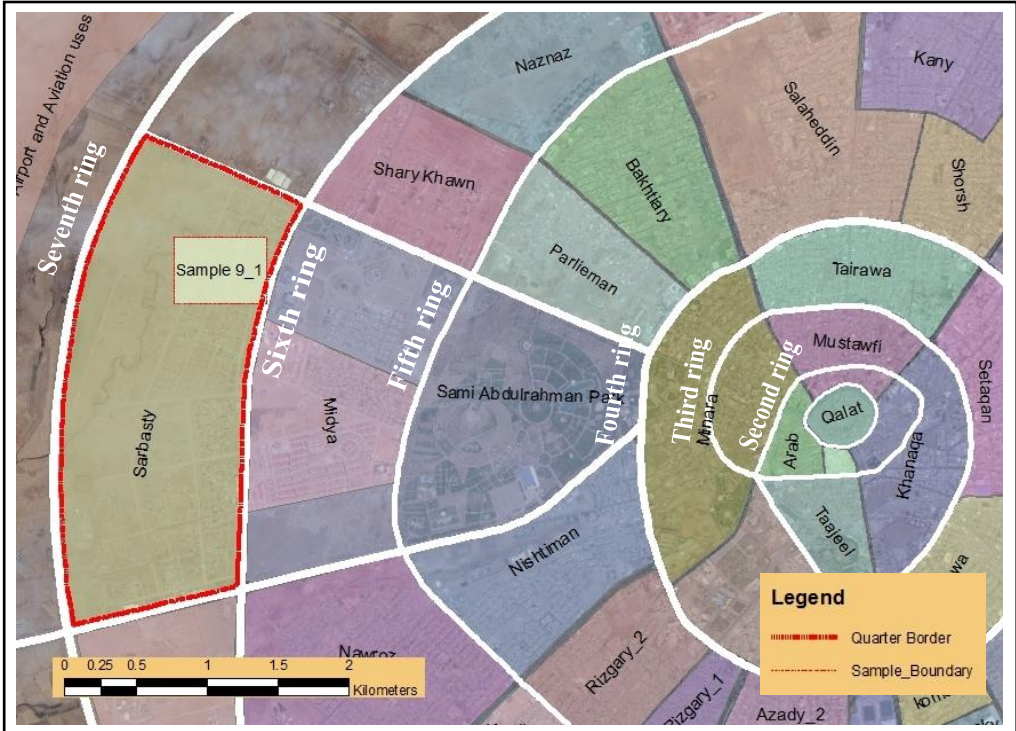


Figure 4.190: The location of ‘Sample 9_1’ and ‘Sarbasty’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)



Figure 4.191: The boundary of ‘Sarbasty’ quarter. (Source: Drawing by the researcher on a satellite image of Erbil of 2010)

The Formation:

The different parts of the area

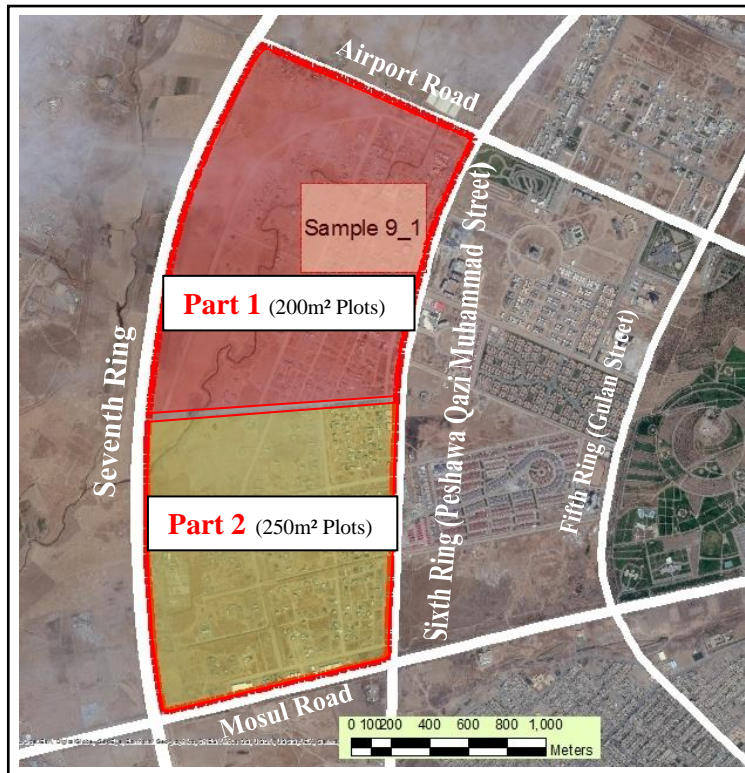


Figure 4.192: The two parts of ‘Sarbasty’ quarter which have two different typical plot areas (200m² and 250m²). (Source: Drawing by the researcher on a satellite image of Erbil in 2010, based on data from the Real Estate Registry Offices of Erbil)

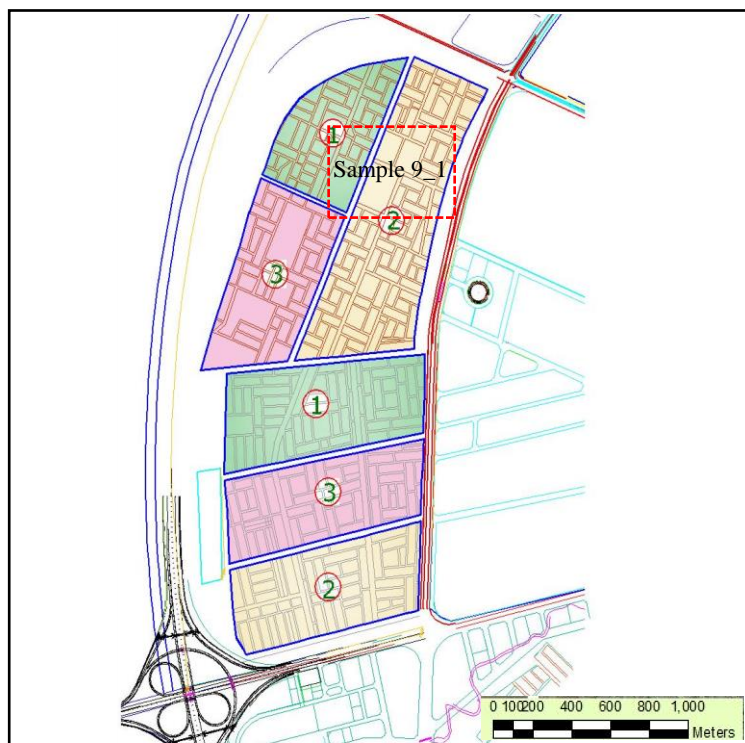


Figure 4.193: The different parts of ‘Sarbasty’ quarter proposed by ‘*Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007*’. In each part a common colour is applied on the facades of houses. (Source: Drawing by the researcher on a map from the Presidency of the Municipality of Erbil)

The Formation: The building form characteristics of the houses

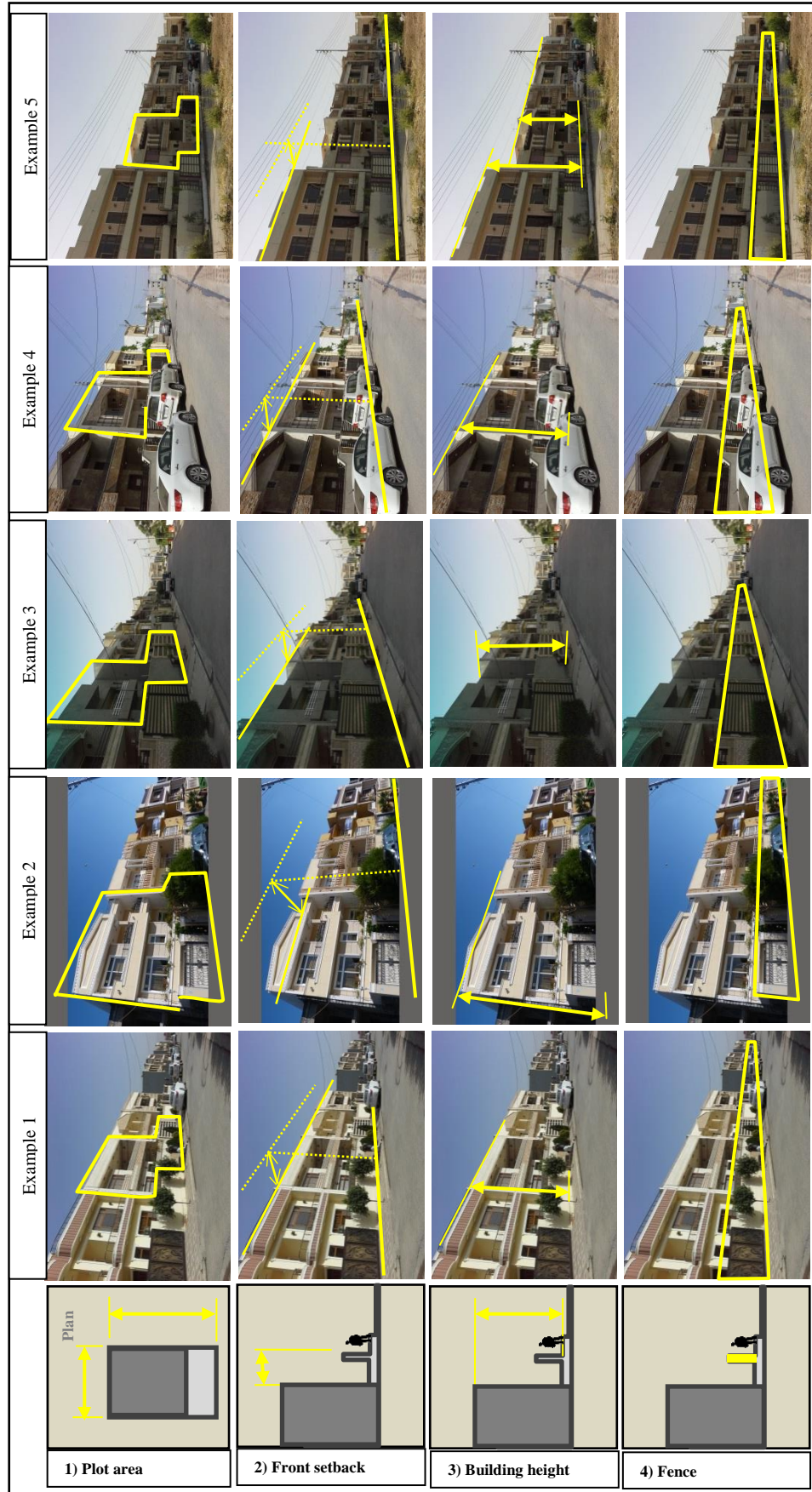


Figure 4.194: The form characteristics of single family houses regulated by the new regulations in ‘Sample 9_1’. (Source: Researcher)

The Formation:

The individual building process

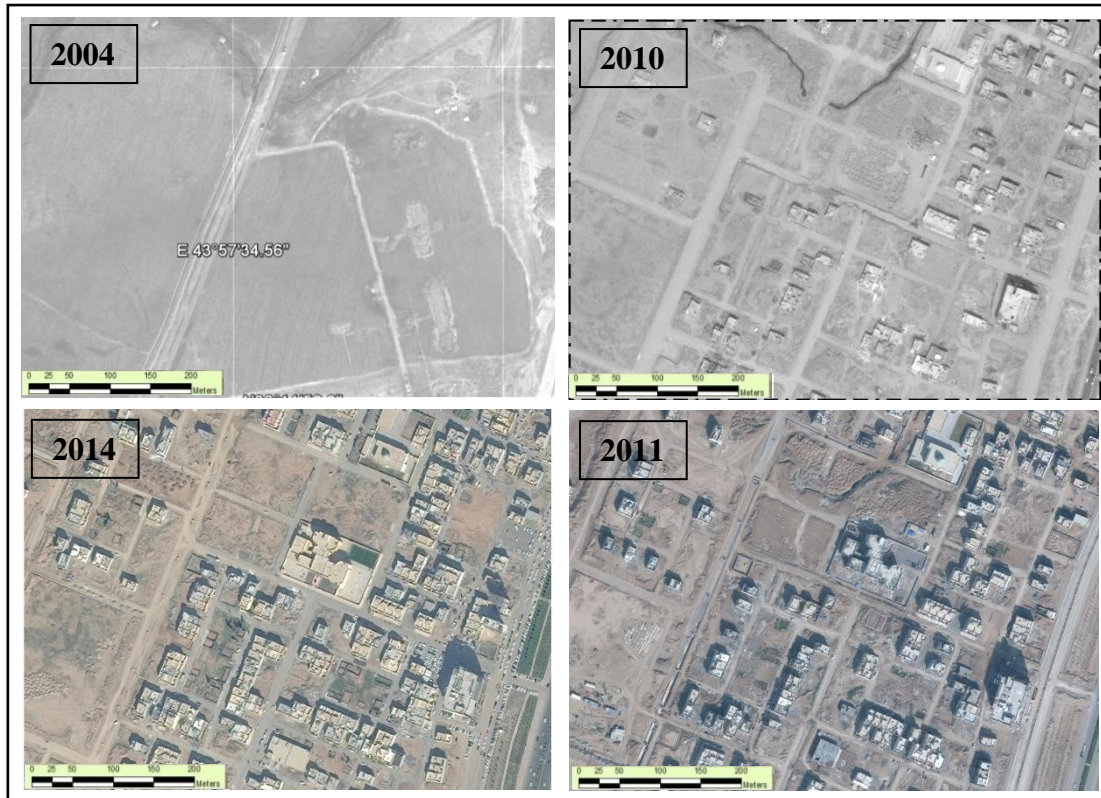


Figure 4.195: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 9_1’ area which is a part from ‘Sarbasty’ quarter. (Source: See page 105)



Figure 4.196: Unbuilt residential plots beside and between completed houses in the area. (Source: Researcher)

The Formation: The individual building process & the selection of blocks



Figure 4.197: Incomplete houses beside completed houses. (Source: Researcher)

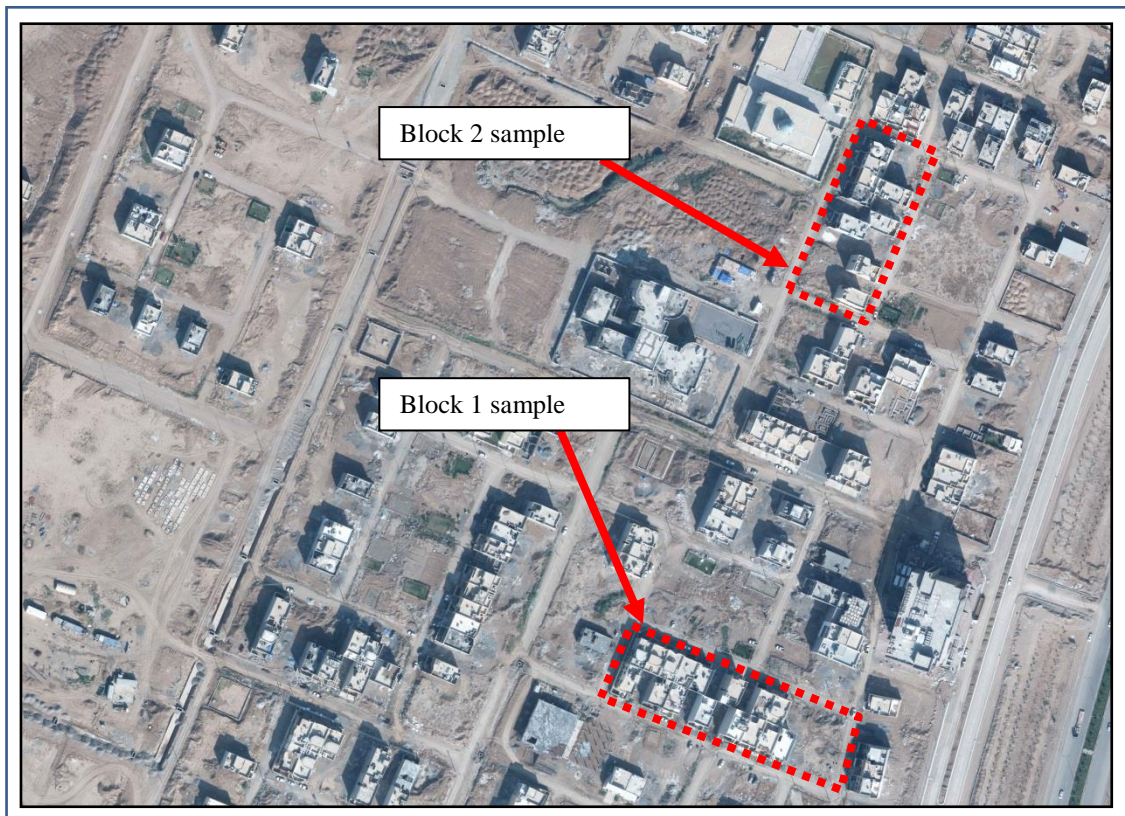


Figure 4.198: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Formation: Building- Plot parameters

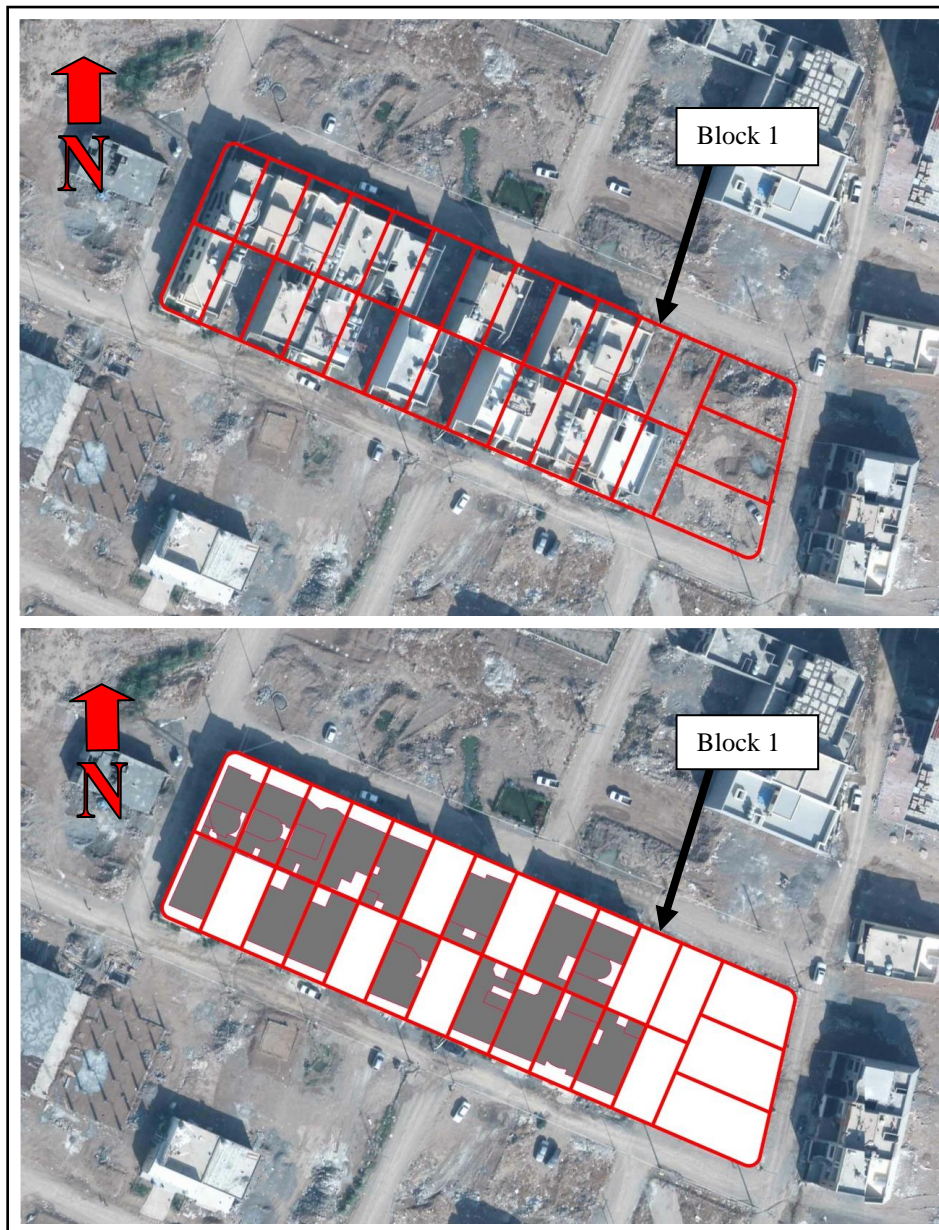


Figure 4.199: A block (block 1) sample from ‘Sample 9_1’ area showing the existing condition and the building process is still in progress. Out of 27 plots 16 houses have been built by 2011. The typical area of the original plots is 200 m² (10 m X 20 m). The block includes attached type of houses which have been built according to ‘*Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007*’. The setback distances and the plot coverage are regulated by this regulations which, comparing to the previous regulations it reduced the level of flexibility in the interpretation. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

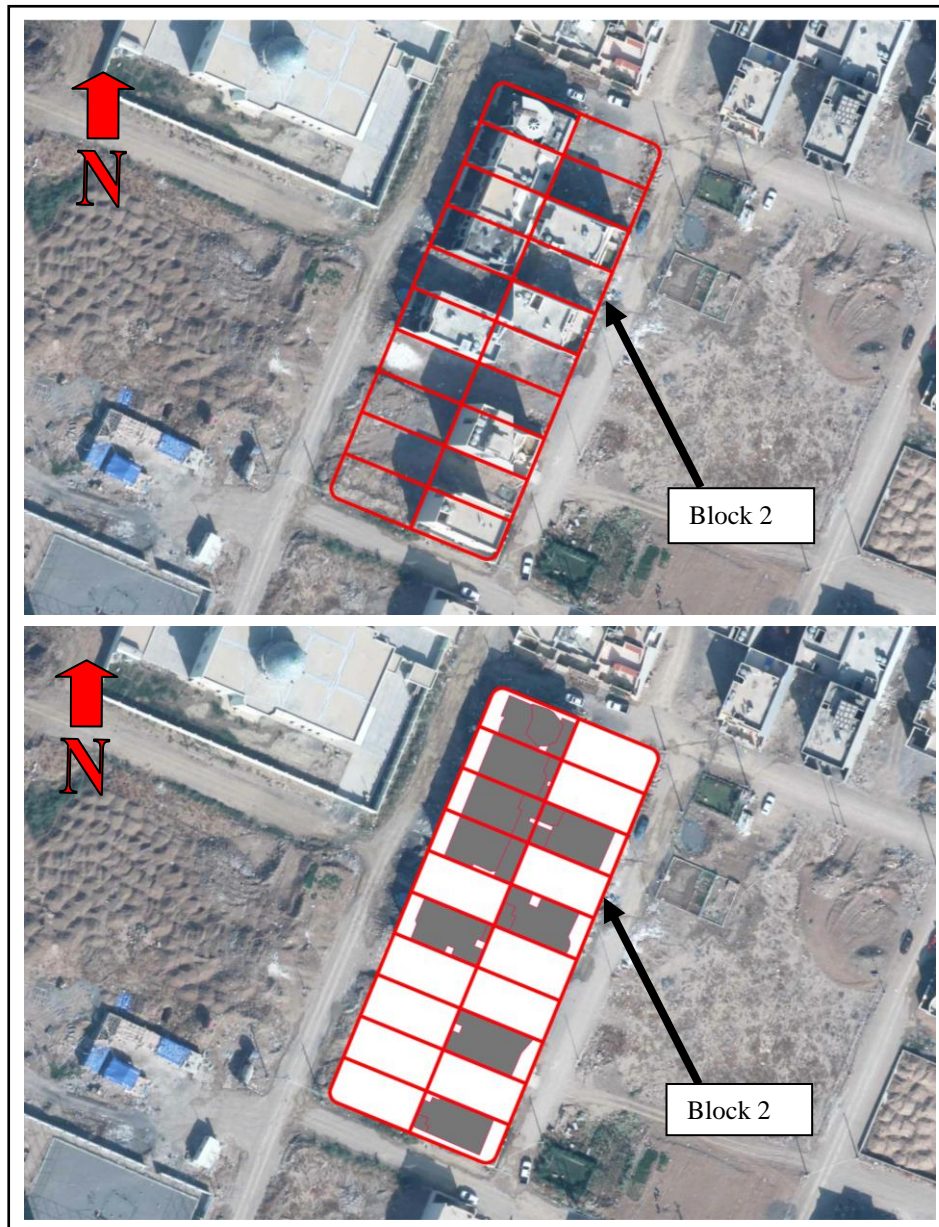


Figure 4.200: A block (block 2) sample from ‘Sample 9_1’ area showing the existing condition and the building process is still in progress. Out of 20 plots, 9 houses have been built by 2011. The typical area of the original plots is 200 m² (10 m X 20 m). The block includes attached type of houses which have been built according to ‘*Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007*’. The setback distances and the plot coverage are regulated by this regulations which, comparing to the previous regulations it reduced the level of flexibility in the interpretation. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

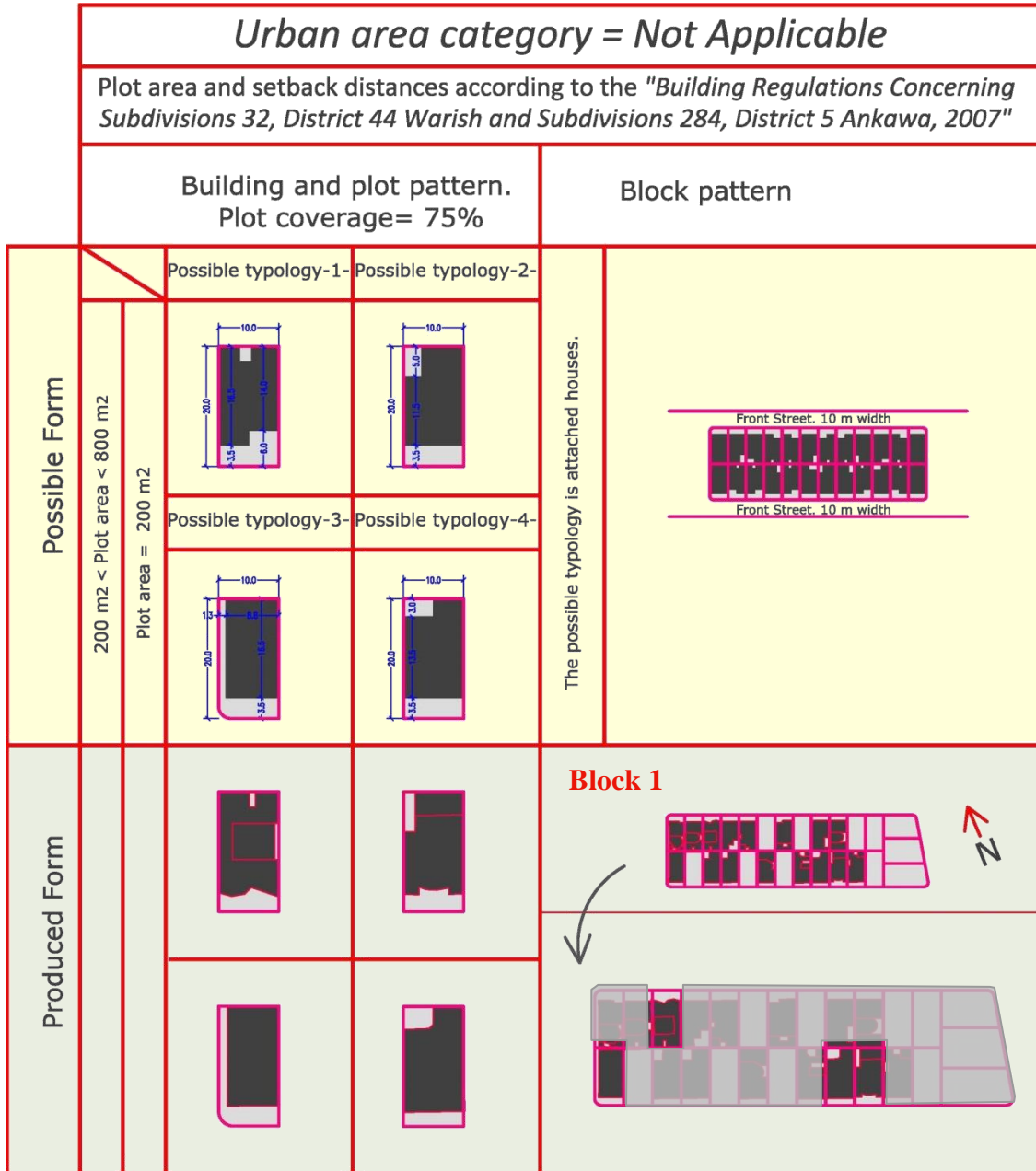


Figure 4.201: The possible form of buildings and plots which can be produced by ‘Decision No. 940 of 1987’ and ‘Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007’ and the real produced form by the same set of regulations in ‘Block 1’ in ‘Sample 9_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

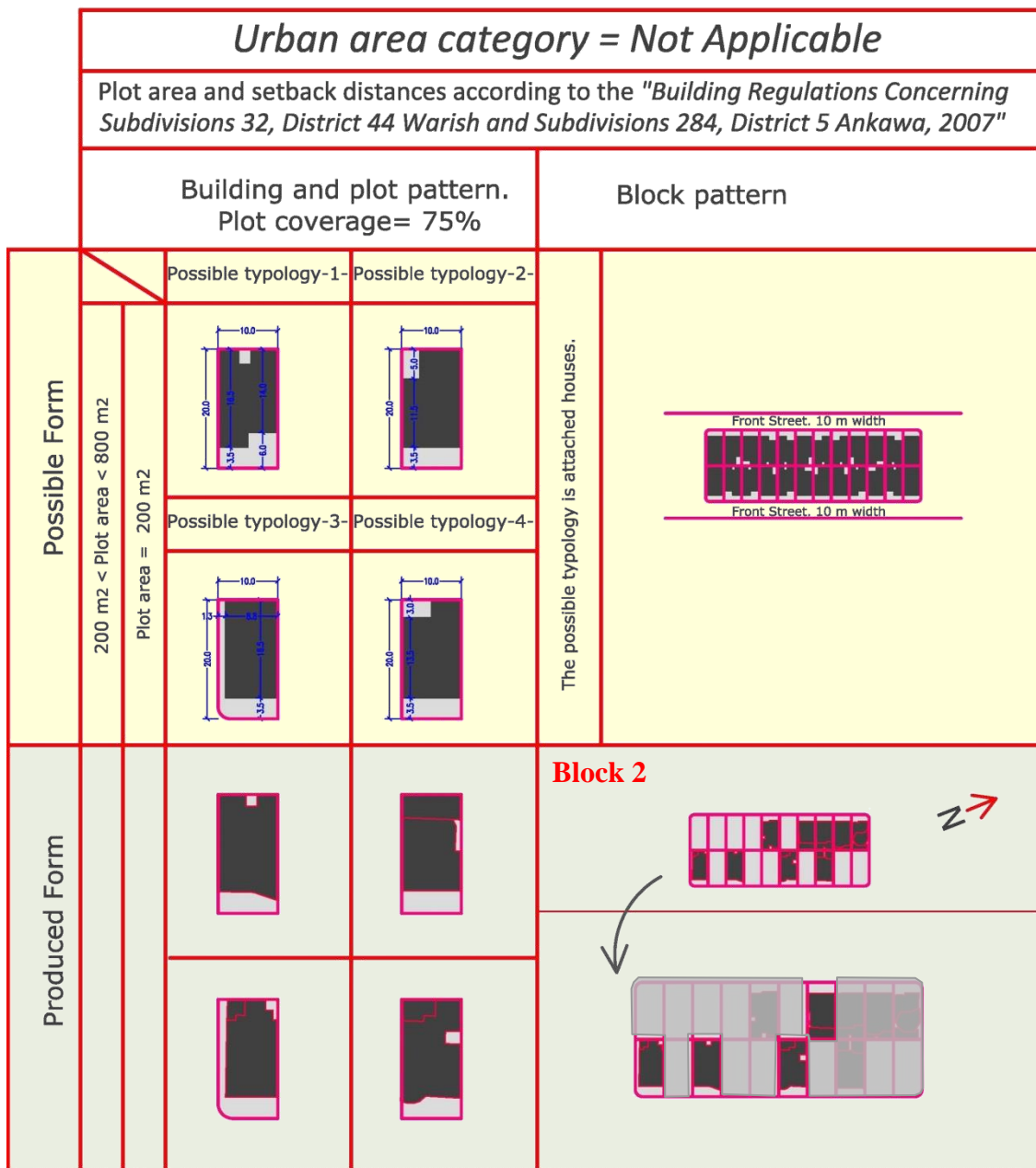


Figure 4.202: The possible form of buildings and plots which can be produced by ‘Decision No. 940 of 1987’ and ‘Building Regulations in Subdivisions Number 32, District 44 Warish, and Subdivisions Number 284, District 5 Ankawa, 2007’ and the real produced form by the same set of regulations in ‘Block 2’ in ‘Sample 9_1’. (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: The plan and the original land features

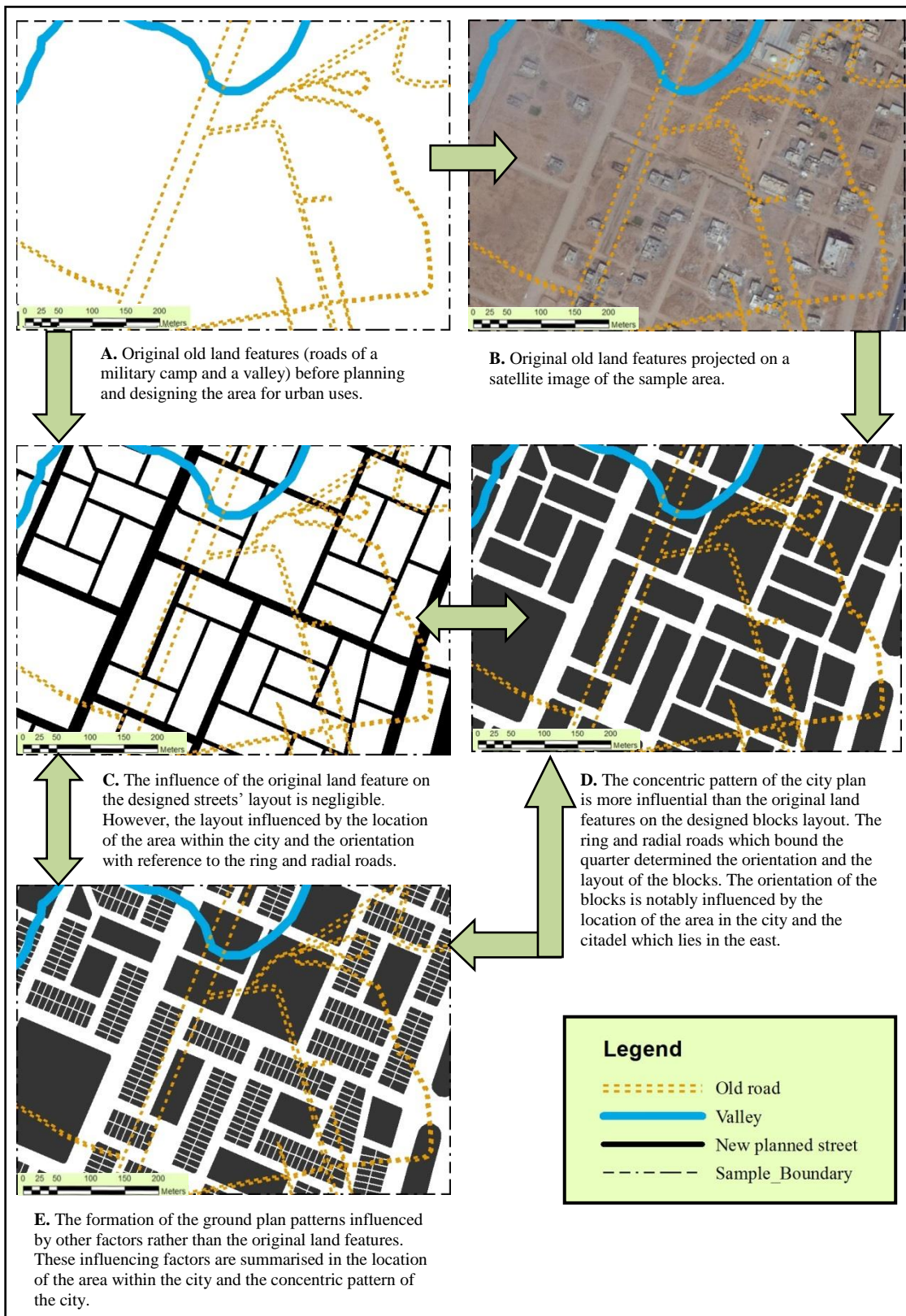


Figure 4.203: The original land features have no significant influence on the pattern of the formed ground plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

- **The formation of the area:** The sample area which is a part of ‘Sarbasty Quarter’ formed in the (Ninth period). The plan and the registration of the quarter were in 1997. However, building process started in 2006. The process of individual building is still in progress.
 - A. The time period:** However, the area was planned before 2004, yet no building was constructed until 2006. The plan of the quarter includes two categories of residential plot areas. 200m² (12m X 20m) and 250m² (12.5m X 20 m) [Figure 4.192]. The plots of both parts were granted to governmental employees. The period after 2003 is considered crucial due to the economic boom Iraq generally and Kurdistan specially witnessed. This economic growth reflected on the urban growth of the city of Erbil. Building process in this quarter corresponded with the improvement of the income and financial status of people. Another facility to those people to build their houses was the housing mortgage provided by the government.
 - B. The housing policy:** ‘Housing Policy 1’ was adopted in the formation of the area. The individual building process is the main characteristic which influences the nature of building form. This process extends the formation of the area over a long time span. The diversity, which sometimes in an uncontrolled way, of building forms is an apparent characteristic of this process. As a way to limit the heterogeneity of the forms of single-family houses, the authority adopted new building regulations. This attempt was to overcome the criticisms which faced the individual building process resulted from ‘Housing policy 1’.
 - C. The regulations:** The plan of the quarter was prepared and projected basing on ‘*The Amended Law of Municipalities Administration No. 6 of 1993*’, ‘*The Instructions No. 851 in 1980*’, and ‘*The Decision No. 940 of 1987*’ which specified 200m² as a minimum area of the plots prepared for residential (single-family house) purposes. Consequently, the quarter was planned in two parts [Figure 4.192]. The first part includes plots with a typical area of 200m² and 250m² in the second part. The minimum width of the streets is 10m. Building process in the quarter started with a very few cases of houses in 2006. However, in 2007 when a new

building regulation was prepared for two quarters in Erbil including ‘Sarbasty’ quarter, the rate of building process was increased.

This new regulation was prepared by a committee formed by the order number 7223 in July 2007 in ‘The Presidency of Erbil Municipality’. The aim was to propose a new building legislation that meets the requirements of individual building process on one hand, and on the other hand to achieve a controlled urban form to reduce the contrasts which can cause a form of irregularity. The committee prepared a detailed report which covered three issues: building regulations, the mechanisms of the implementation of the regulations, and feedback and follow-up process. Due to the importance of the location of the quarter within the city and the building process which had not started yet by then, there was a high chance of success to apply this new regulation⁴⁷⁵.

The flexibility in the previous building regulations which have been applied on other areas of Erbil resulted in increasing the variances between individual building cases which produced a kind of heterogeneity, in some cases described by ‘chaos’. Hence the proposal of the committee included regulating both urban and architectural variables of single-family houses. These variables included the area of the plots, the width of the front side of the plot, plot coverage (open and built-up ratio), setback distance, the elevation of the main entrance of the house and the ground floor, the number and the height of floors, front gardens, car park, the height of the fence, and the height of the stairwell. In addition, the colour and the finishing materials of the facades of houses are also covered by the report. The quarter is subdivided into six parts in which three different colours are applied on the facades of houses [Figure 4.193]. In addition to the building regulations of single-family houses, the building regulations of 1989⁴⁷⁶ on commercial buildings have influenced the urban form of the quarter. See [Table 4-35], and [Table 4-36].

⁴⁷⁵ The Presidency of Erbil Municipality, *The Report of the Committee of Building and Urban Regulations in ‘Subdivisions of 32, District 44 Warish’ and ‘Subdivisions 284, District 5 Ankawa’* (Erbil: Kurdistan Regional Government: Ministry of Municipalities/ The Presidency of Erbil Municipality, 2007).

⁴⁷⁶ Ministry of Local Governance, General Directorate of Urban Planning.

As a result of the implementation of this regulation, the urban form of the houses characterised by some points which distinguish it from that of other quarters. The form characteristics of the houses of the area can be summarised as follow [Figure 4.194]: The first is that there are two categories of plot area of the houses, 200 m² (10 m X 20 m), and 250 m² (12.5 m X 20 m). Therefore, the front width of the plots ranges from are 10 m and 12.5 m. The new regulations prohibited and change on the plot area and its dimensions which may result in smaller area than the original status. This means that no transformation which may results in smaller plot areas is allowed. The second is all the houses are the attached type with front setback distance of 3.5m. The front area of the house which is produced from the front setback should include a garden with at least 5m².

The third is the height of the buildings. The houses have two floors with 7.5 m total height including the roof parapet or three floors with 9.6m total height including the roof parapet. These two possibilities of the height of houses can be found in one block and a row of houses. The last is separation of the houses from the streets and public areas which is achieved by fences. The height of the fences is 1.8m. Each house can have a maximum of two entrances in the fence, one with 2.7m width for car entrance and the other with 1.2m.

Despite the regulations that would grant an extent of unity in the form through some form variable and elements between the individual houses, the complete scene of the form of the area would take years to be achieved [Figure 4.195], [Figure 4.196], and [Figure 4.197]. In addition, over long time periods, political, economic, social and technological changes could happen that would result in the change in the process of building and the continual process of the formation of the area and the city as well. These changes would lead to producing different or modified forms of individual cases of houses on the unfilled plots. Consequently, this could result in producing different form of the whole scene that lacks the unity characteristic which had been aimed.

In order to compare the possibilities of the forms that the new regulations can produce against what have already been produced on the ground according to this new regulations, two block samples have been

selected [Figure 4.198]. In the case of the first block, by 2011 about 60% of the plots of the block have been built and almost half of the plots of the second block have been built [Figure 4.199] and [Figure 4.200]. The new regulations proposed attached type of houses with front setback and 75% as a maximum plot coverage percentage. Due to the proposed mechanisms of the implementation of the regulations through building permit, the completed houses and the existing condition of the two selected block samples reflect the new proposed regulations for the quarter to an accepted degree. By 2011, apart from the architectural variables concerning building materials and colours of the facades, no significant deviation can be noticed in the implementation of the new regulations [Figure 4.201] and [Figure 4.202].

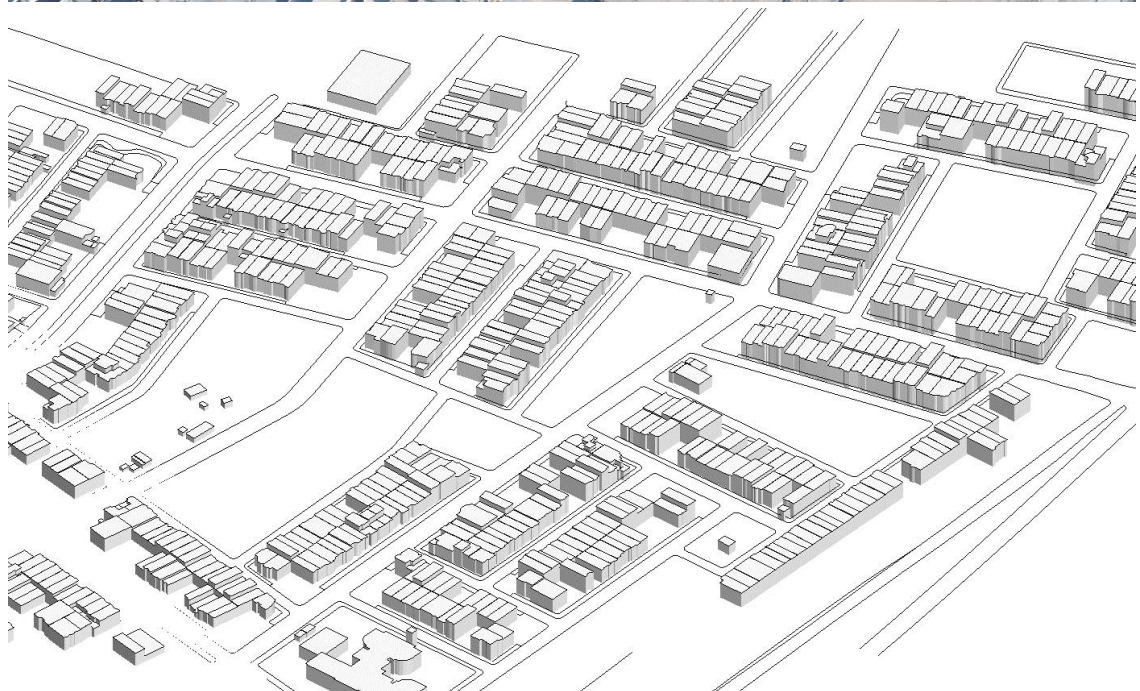
D. Other determinants: Other influencing factors that determined the formation of the area and the characteristics of its forms can be summarised into two: The geographic determinant which is mainly represented in the location of the quarter within the city of Erbil and the influence of the concentric pattern of the city on the layout of the streets and blocks [Figure 4.190] and [Figure 4.191]. The quarter is nearby to some investment projects of housing and close to the ‘International Airport of Erbil’. The area before being planned for urban uses was a military camp included some building constructions and roads. However, those old features did not have a significant influence on the layout of the quarter plan [Figure 4.203].

The second factor which is linked to the period in which the area has been built. The economic development of Iraq generally and Kurdistan region specially has influenced Erbil city as well. The increasing demand on houses and the fast urban growth required the authorities to have stronger control over the individual building process. This was one of the reasons of proposing new building regulations for this area. The building process in this quarter is also supported by mortgage policies as an intensive policy to encourage the owners to build their houses.

Period 9

Sample 9_2

Sharawany Quarter



Sample 9_2 (Sharawany Quarter)

'Sample 9_2' is a part of **'Sharawany'** quarter which lies around 5.0 km to the south east of the citadel (Qalat), between the Sixth Ring Road (Peshawa Qazi Muhammad Street) and the Seventh Ring Road [Figure 4.205]. **'Sharawany'** quarter is bounded by **'Bnaslawwa Road'** from the north, **'Zanko Street'** from the north west, **'Runaky Road'** from the south west, and the Seventh Ring Road from the south east [Figure 4.206]. The area was formed in the Ninth Period (2004-2013) and is still in progress. It was built under **'Housing Policy 1'**.

The quarter was planned and registered in 2004. The plots of the area were granted to the government employees (the employees working in the ministry of municipalities and its departments in Erbil). The area has been planned according to the *'Decision No. 940 of 1987'* and built according to the *'Instructions No. 851 of 1980'*. **The average plot area of the quarter is 250m². However, there are some cases which have areas more than 250m², especially the plots at the end of the blocks. Due to informal subdivision actions, some of the plots were used for two single-family houses, either with equal subdivision (2 X 125m²) or unequal subdivision (100m² and 150m²).** The common building type of the area is attached type of houses with front setback. The block type of **'Sample 9_2'** is rectangular and trapezoid arranged in an **'Oblong'** with **'T-junctions'** type of street. **The minimum width of the planned streets of the area is 12m.** Apart from the regulations concerning commercial buildings, there are not any other building regulations that would lead to certain transformation in the area. The structure of the analysis focuses on the continual process of the formation of the area since 2004[Table 4-37].

Table 4-37: Sample 9_2, the formation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
9_2	Sharawany	9 th period	2004-2013	1	<ul style="list-style-type: none"> • Instructions No. 851 of 1980 on building single family houses. • Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979. • Building Regulations in Commercial Areas No. 4131 of 1989. 	<ul style="list-style-type: none"> • Geographic factor (the location). • Socio-economic status of the residents.

Year	Urban area category	Municipality grade	(P) plot area (m ²)	Minimum width of streets (m)	Minimum plot front width (m)	Setback distance (m)		Maximum Plot coverage
						From the street	From other sides	
1980 ⁴⁷⁷	N/A	Distinct	$800 > P \geq 120$	10 ⁴⁷⁸	6	2.5	0	N/A
1987 ⁴⁷⁹	N/A	Distinct	$800 > P \geq 200$	10	10	2.5 or 4 ⁴⁸⁰		N/A
1989 ⁴⁸¹	Commercial streets	Distinct	N/A	$S > 8$	N/A	Vary ⁴⁸²	N/A	75%
1993 ⁴⁸³	N/A	Special	N/A					

⁴⁷⁷ The Revolutionary Command Council, *Instructions No. 851 of 1980 on building houses*.

⁴⁷⁸ This width was applied on new planned streets built after the issuance of this regulations and the area did not include any new streets.

⁴⁷⁹ The Revolutionary Command Council, *Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979*.

⁴⁸⁰ If the plot area exceeded 600 m², a minimum setback distance of 4 m from the street is applied.

⁴⁸¹ Ministry of Local Governance, General Directorate of Urban Planning.

⁴⁸² The setback distance of a building is applied only on the sides are adjacent to streets and vary according to the width of the street. See [Table 4-39].

⁴⁸³ The Parliament of Iraqi Kurdistan, *Law of Municipalities' Administration No. 6 of 1993*.

Street width (m)	The floor	Front set back distance	Side and rear set back distance overlooking the streets
Less than 30 m	The ground floor and the basement	2.5 m	2.5 m & 1.25 m
	The first floor and the upper floors	0.0 m	0.0 m
30 m and above	The ground floor and the basement	5.0 m	3.0 m
	The first floor and the upper floors	2.5 m	1.5 m

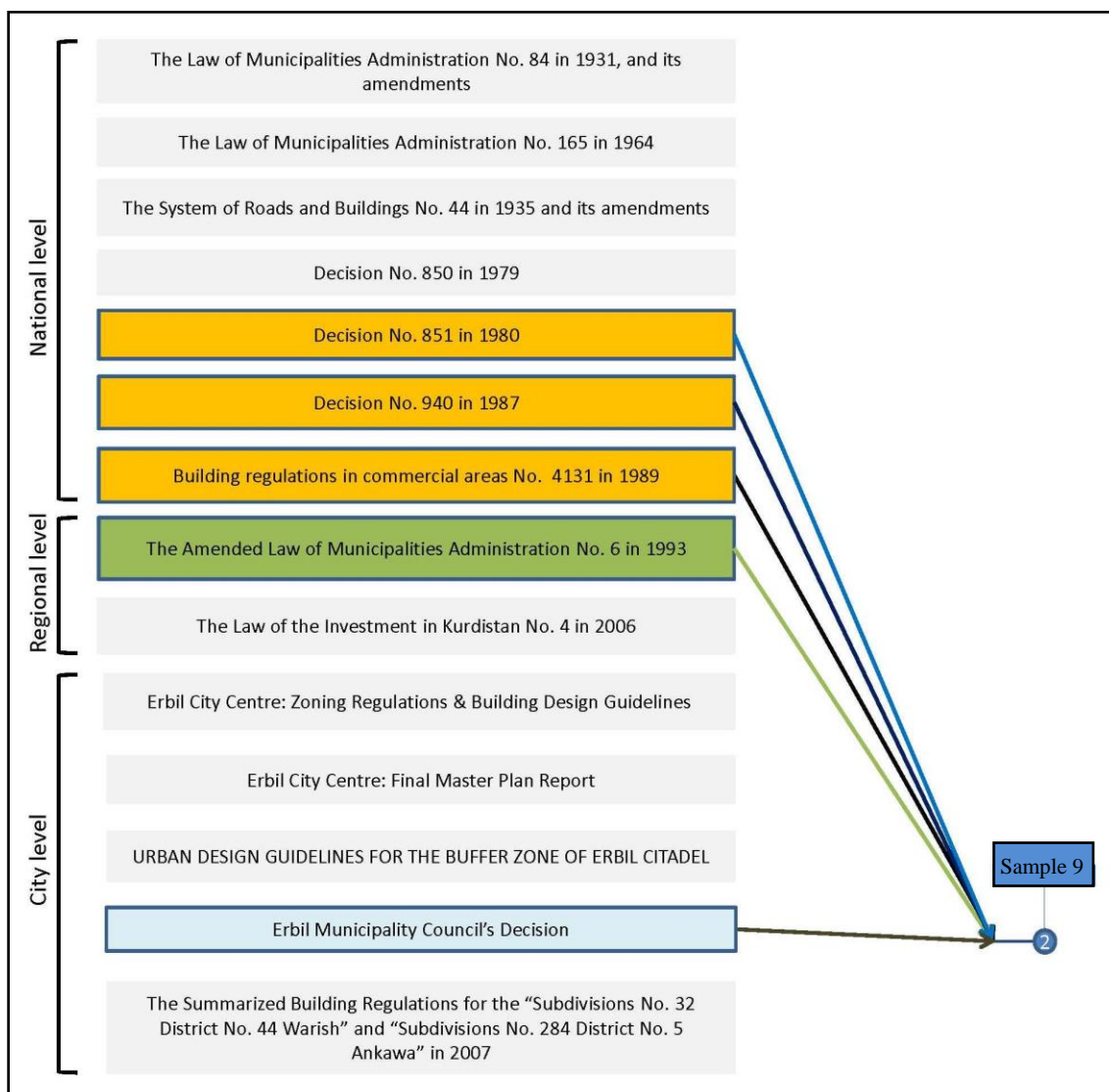


Figure 4.204: Direct regulations enacted at different levels that have influenced ‘Sample 9_2’. (Source: Researcher)

⁴⁸⁴ Ministry of Local Governance, General Directorate of Urban Planning, p. 1.

The Formation:

The location and the boundary

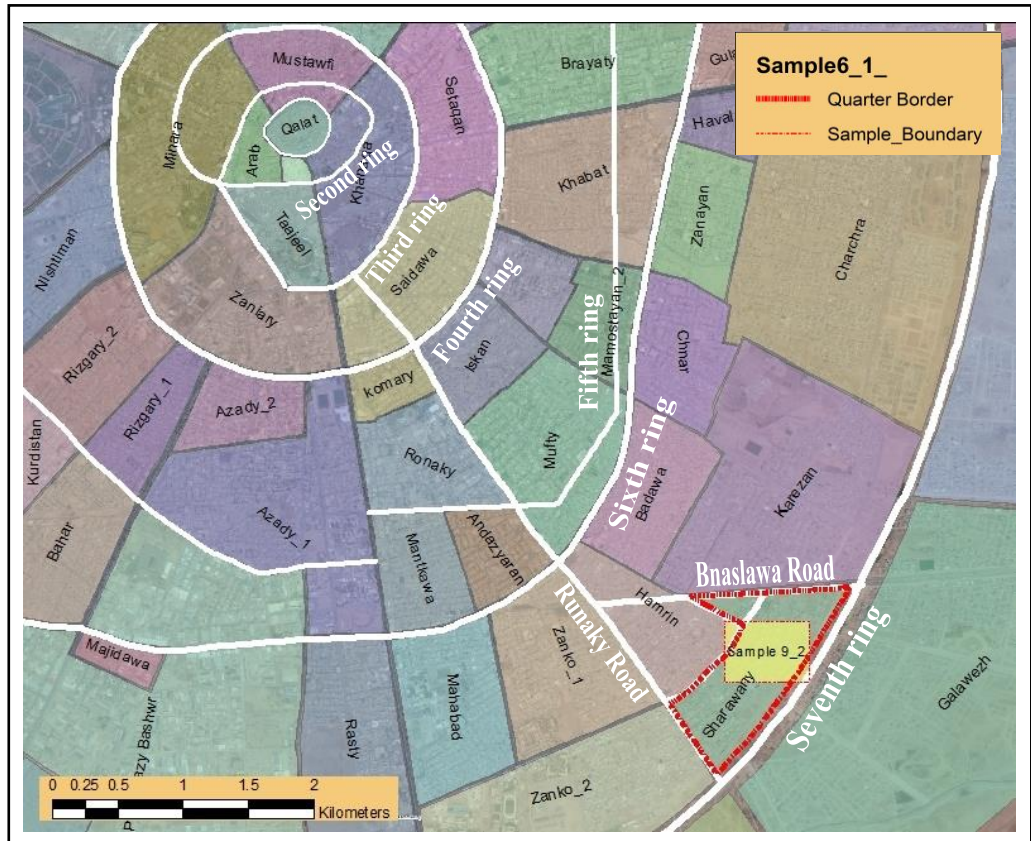


Figure 4.205: The location of ‘Sample 9_2’ and ‘Sharawany’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

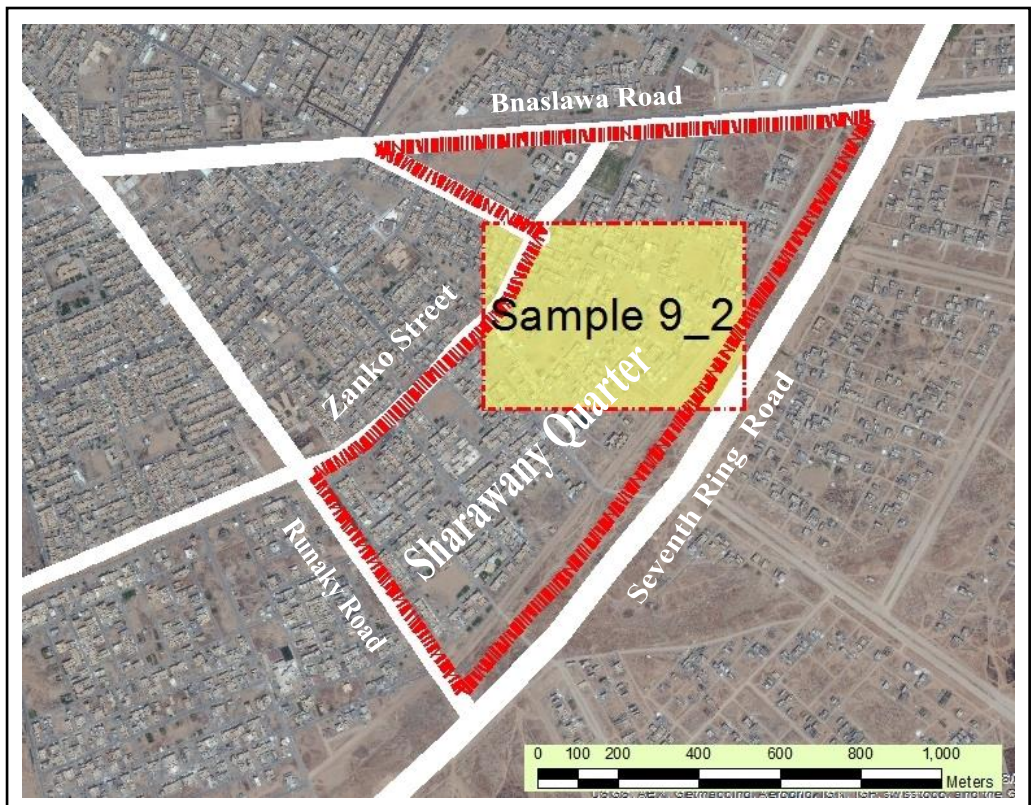


Figure 4.206: The boundary of ‘Sharawany’ quarters. (Source: Drawing by the researcher on a satellite image of Erbil in 2010)

The Formation:

The different parts of the area

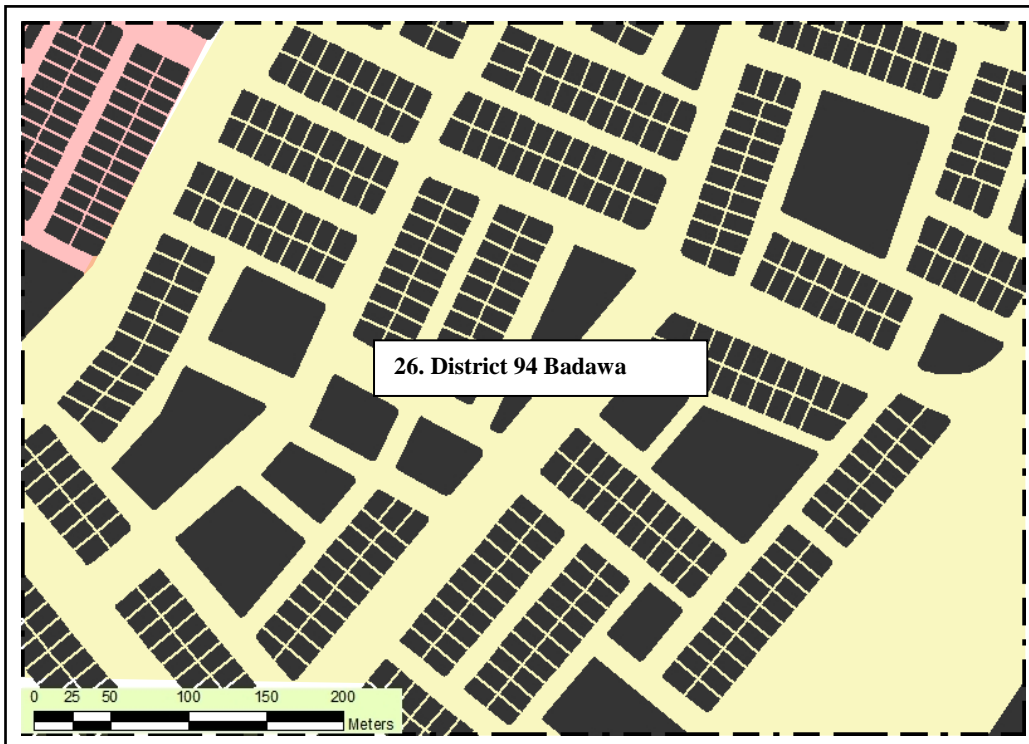


Figure 4.207: ‘Sample 9_2’ focuses on ‘Sharawany’ quarter with a registration number 26. District 94 Badawa. The average area of the plots is 250m². However, there is a small part of the sample from ‘Hamrin’ quarter which has a different registration number and the average area of the plots of this part is 200m². (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

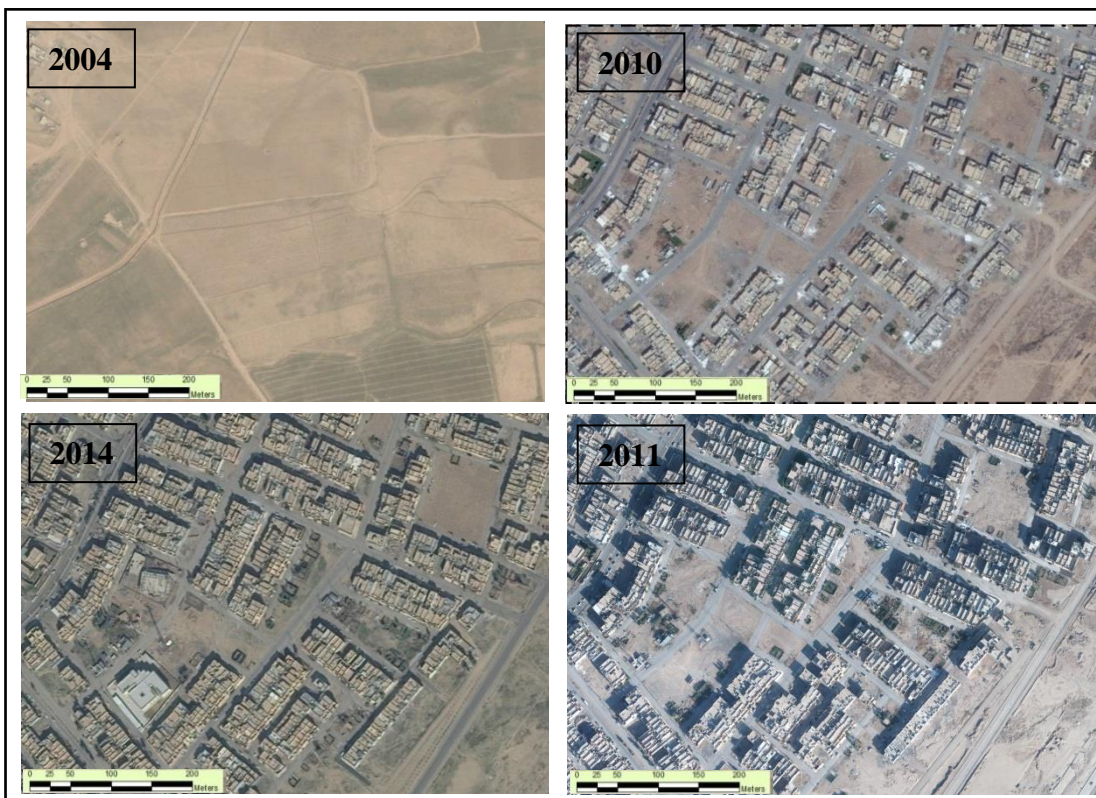


Figure 4.208: Different satellite images taken from four different years show the continual process of individual building from 2004 to 2014 in ‘Sample 9_2’ area which is a part from ‘Sharawany’ quarter. (Source: See page 105)

The Formation: The building form characteristics of the houses

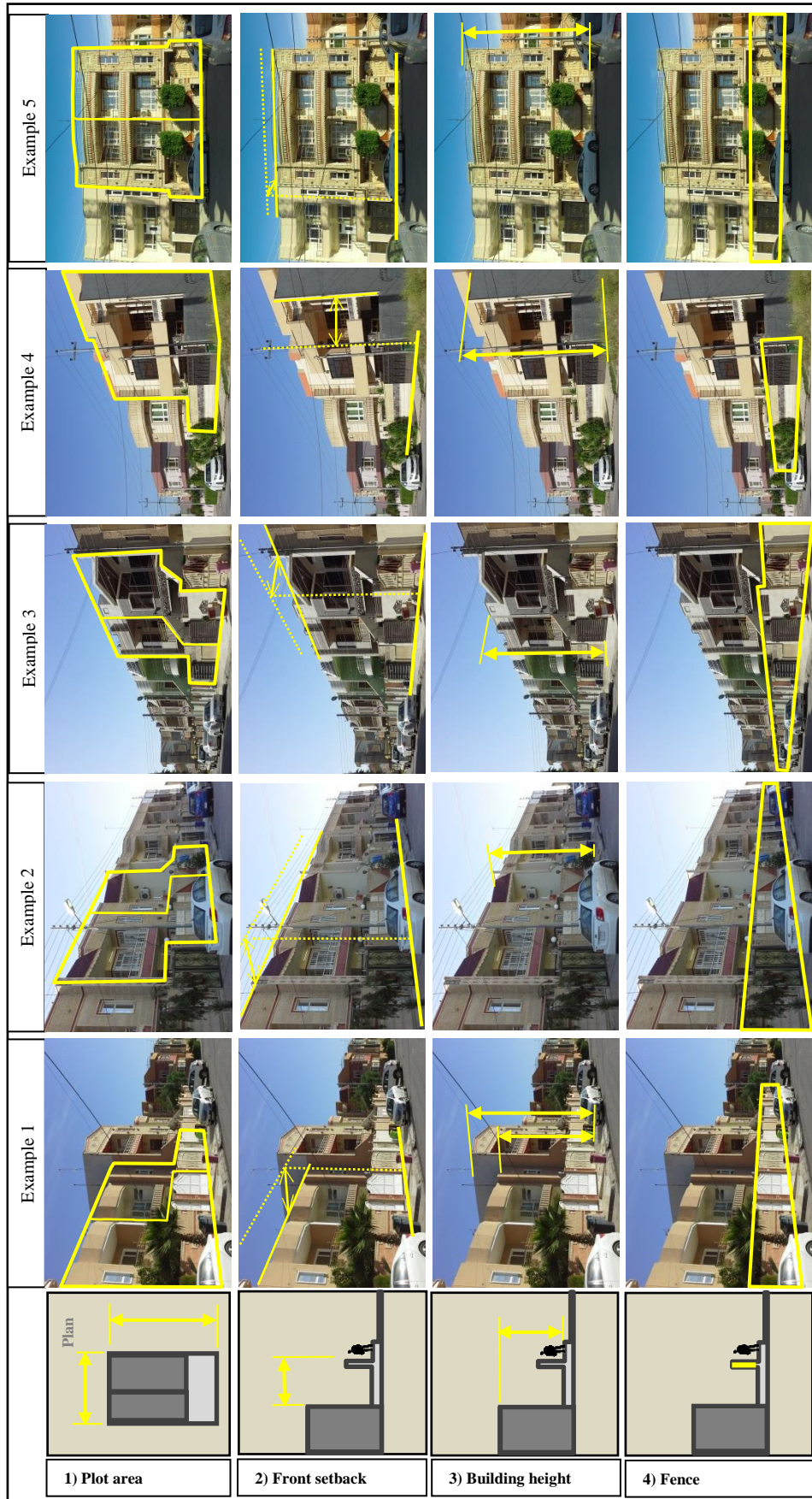


Figure 4.209: The common form characteristics of the houses built in the period (2004-2013) of the first formation of the area of 'Sample 9_2'. (Source: Researcher)

The Formation: The selection of blocks samples

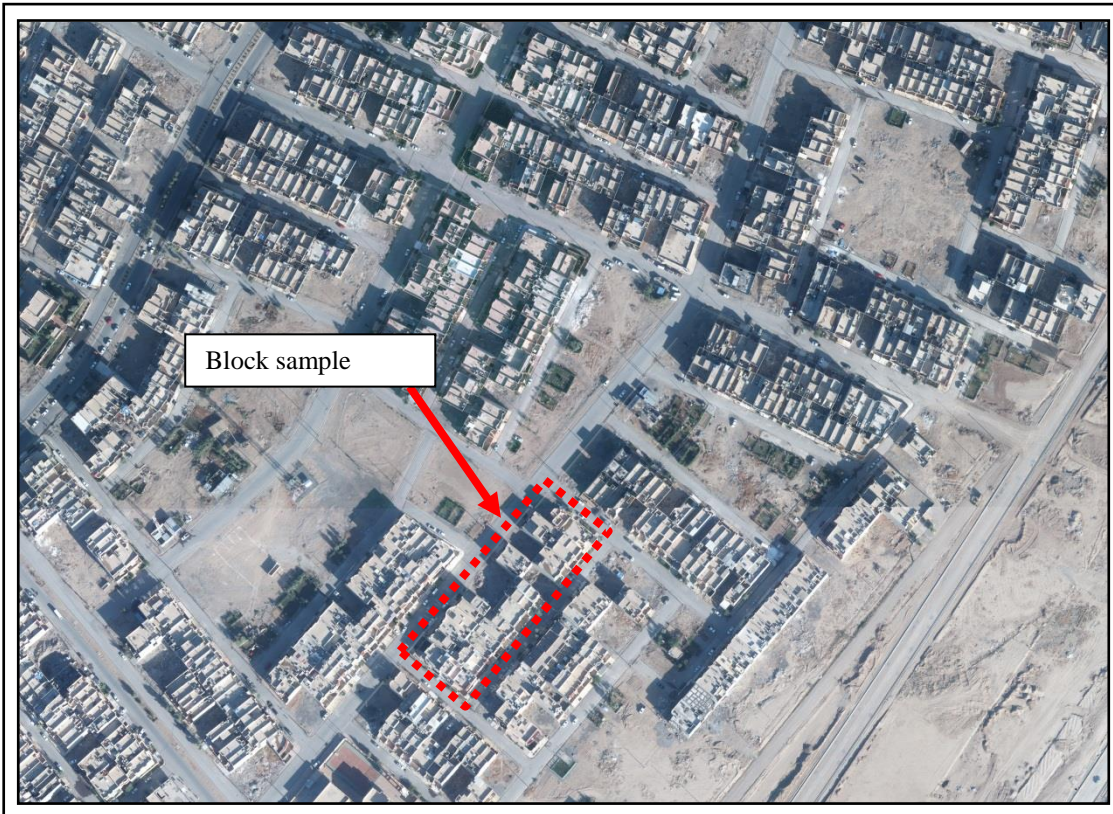


Figure 4.210: A block sample selected from 'Sample 9_2' for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

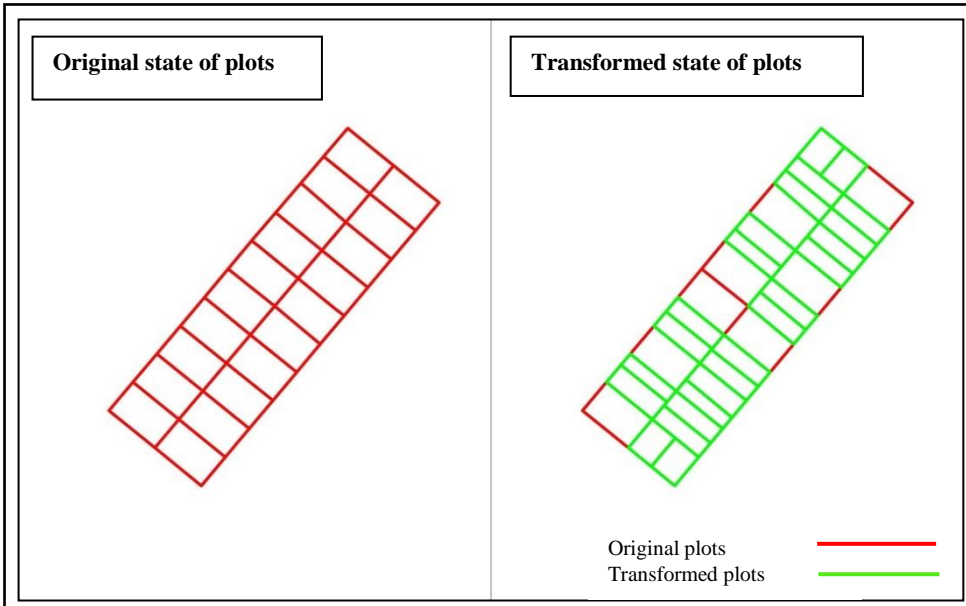


Figure 4.211: A block case selected from 'Sample 9_2' area. The plots have been transformed through informal subdivision actions on the majority of them. Due to that the minimum subdivision area according to 'Decision No. 940 of 1987' is 200m², the original plots informally subdivided into two. This means that the original plot is shared by two owners with no official separation line. About 75% of the built up plots have been subdivided. Two types of subdivisions can be noticed: equal subdivision, each has 125m² (6.75m X 20m) and unequal subdivision, one has 150m² (7.5m X 20m) and the other has 100m² (5m X 20m). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: Building- Plot parameters

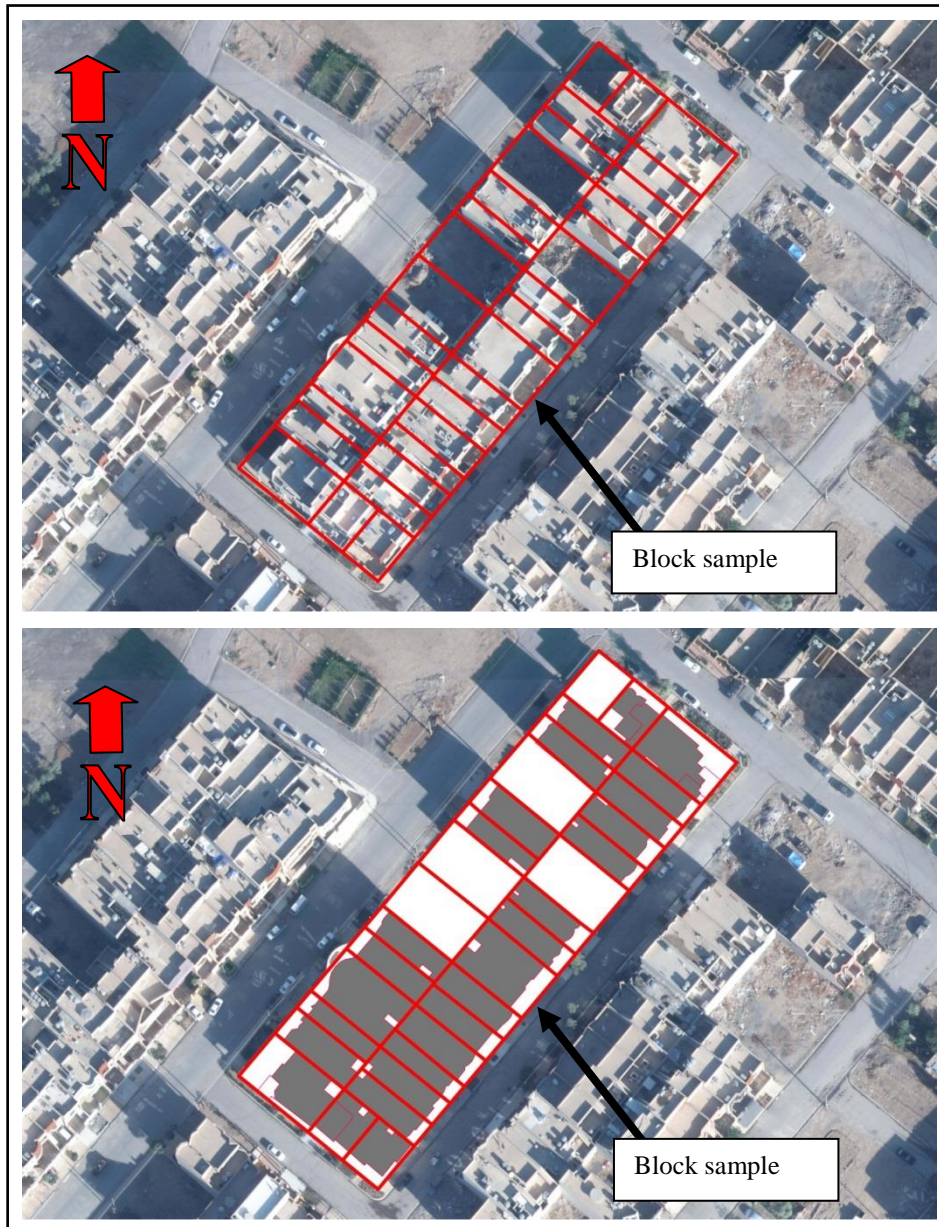


Figure 4.212: A block sample from ‘Sample 9_2’ area showing the existing condition and the building process which is still in progress. Out of 20 plots 4 plots have not been built by 2011. The typical area of the original plots is 250 m² (12.5 m X 20 m). The block includes attached type of houses which have been built in the period (2004-2011). Apart from the informal subdivision of the plots, the building process of the houses is regulated by ‘*Instructions No. 851 in 1980*’. There are four houses that have been built on the original area of the plot with no subdivision. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)





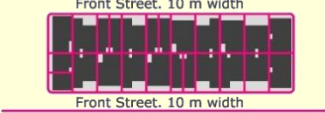




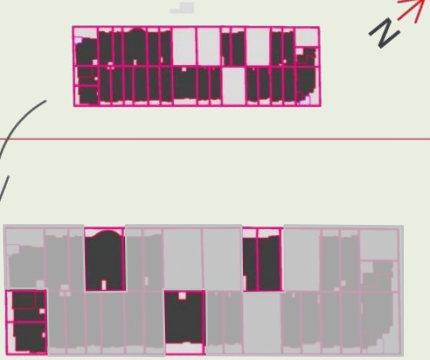
<i>Urban area category = Not Applicable</i>			
Plot area and setback distances according to the "Decision No. 940 in 1987" and the "Instructions No. 851 in 1980"			
		Building and plot pattern. Plot coverage= N/A	Block pattern
Possible Form	200 m ² < Plot area < 800 m ²	Possible typology-1- 	Possible typology-2- 
	Plot area = 250 m ²	Possible typology-3- 	Possible typology-4- 
		The possible typology is attached houses.	
			
Produced Form			
			
		<p style="color: red;">Block sample</p> 	

Figure 4.213: The possible form of buildings and plots which can be produced by ‘Decision No. 940 of 1987’ and ‘Instructions No. 851 of 1980’, and the real produced form by the same set of regulations in the selected block from ‘Sample 9_2’ (Sharawany quarter). (Source: Researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: The plan and the original land features

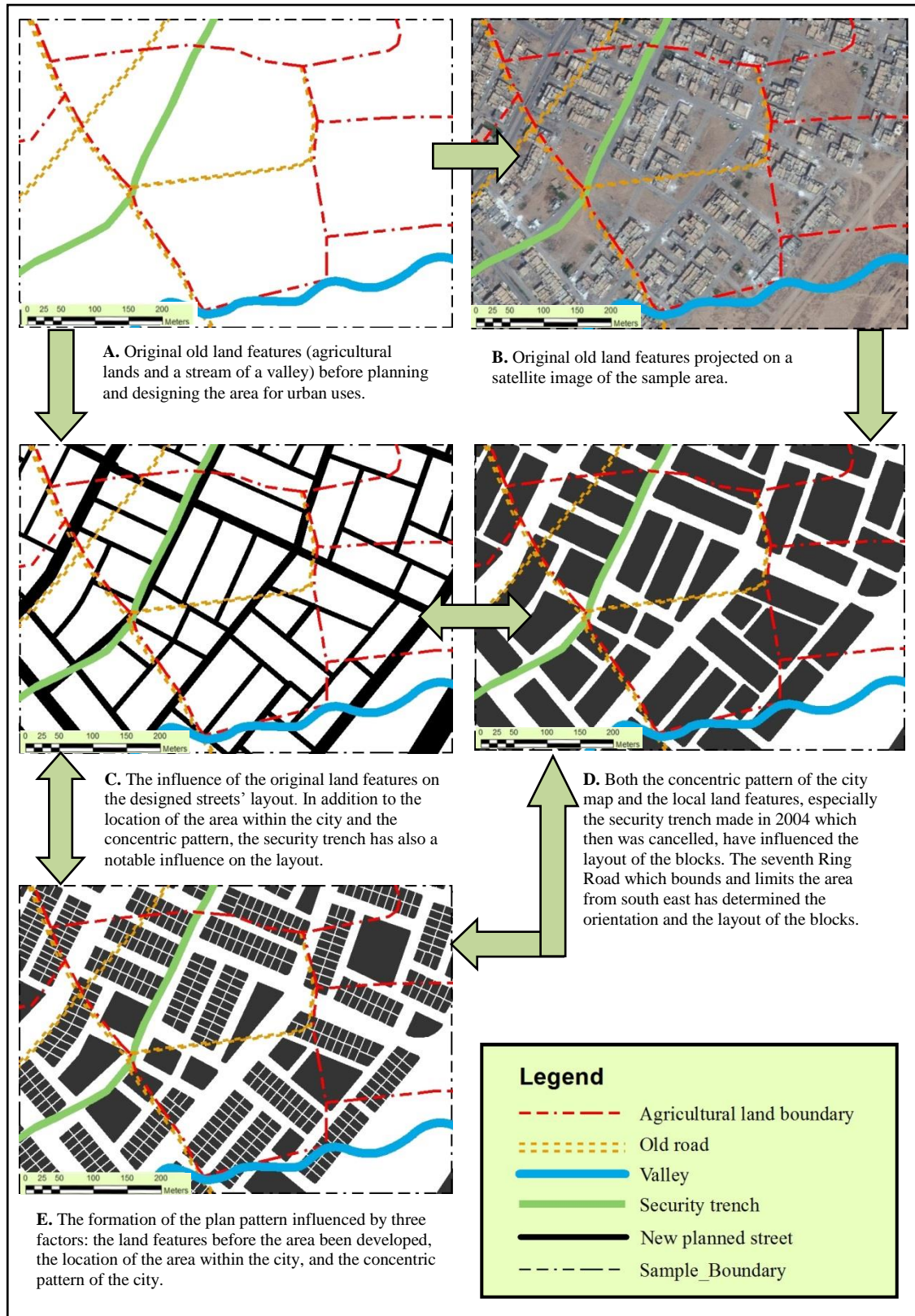


Figure 4.214: The influence of the original land features on the pattern of the formed plan. The location of the area within the city and the concentric pattern of the city are routinely influential. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

- **The formation of the area:** The sample area which is a part of ‘Sharawany’ quarter formed in the Ninth Period, more specifically in 2004. The plots of the sample are subdivided from a land under the registration number ‘26. District 94 Badawa’ [Figure 4.207]. Building process started in 2006 and still in progress.

A. The time period: The area included in the sample boundary has been planned in 2004 and gradually built as an individual building process. All the events attached to the period such as the shift in the governance system to federal after the fall of the previous regime in 2003, the relatively political stability, the economic growth, the urban growth, and consequently the rapid expansion of the cities of Kurdistan, especially Erbil as the capital of the region, have determined the formation of the area. Providing the services of streets pavement, water and electricity supply immediately after the projection of the plan of the area on the ground, and the incentive policy represented in providing housing mortgages have accelerated the individual building process and the formation of the area.

B. The housing policy: Similarly to the previous sample ‘Housing Policy 1’ was adopted in the formation of the area. However, this period (2004-2013) was characterised by in addition to policy 1 different housing policies were employed in the different parts of the city which will be mentioned in the next samples. As the nature of the individual building process, the time span extends and building control by the responsible authorities becomes challenging. However, it offers a kind of flexibility to people on deciding when and how to build their house. This provides a diversity of building forms which may be interpreted in either ways, whether as a positive way or the contrary. The housing policy adopted cannot be separated from the time period. A longer time span of the formation of the area results in an increase in the variance and the difference of individual building forms as the possibility of emerging new factors, incomes, and changes increases. Comparing to the previous sample, the individual formation process of this sample has been faster [Figure 4.208].

C. The regulations: The area was planned and projected basing on ‘*Amended Law of Municipalities Administration No. 6 in 1993*’, ‘*Decision No. 940 of 1987*’, and ‘*The Instructions No. 851 of 1980*’. See [Table 4-38].

Two design decisions were set in the plan of the quarter. The first is the average area of the plots is 250m² and the second is the minimum street width in the area is 12m. Those two decisions comply with and do not contradict the minimum requirements set by ‘*Decision No. 940 of 1987*’. The four form characteristics of the houses of this sample can be summarised as follows: The first is that the average plot area of houses is 250 m² (12.5m X 20m) which means that the average front width of the plots is 12.5m. However, informal subdivisions of the majority of the plots resulted in reducing the plot area of the house to at 100m² (5m X 20m). Therefore, two single-family houses were built on the original plot area (250m²). The two houses could be identical in the design when the share of plot area of each house is 125m² (6.25m X 20m), see example 5 of [Figure 4.209], or they could have different design and form (see examples 1, 2, and 3). The second is the attached type with front setback and in most cases the area formed from the front setback is used for car park spaces and in some cases for a small garden as well.

The third is the height of the buildings. However the houses of this period are characterised by having three storeys height, most of the houses of this sample have two floors with an average height of 7m. The fence of the house which achieves issues of security and privacy is the fourth form characteristic which is a common characteristic of the houses of the whole city. The height of the fences ranges from 1.4m to 2.2m. The area of the entrance gates in the fence increase when the original area of the plot is used for two houses

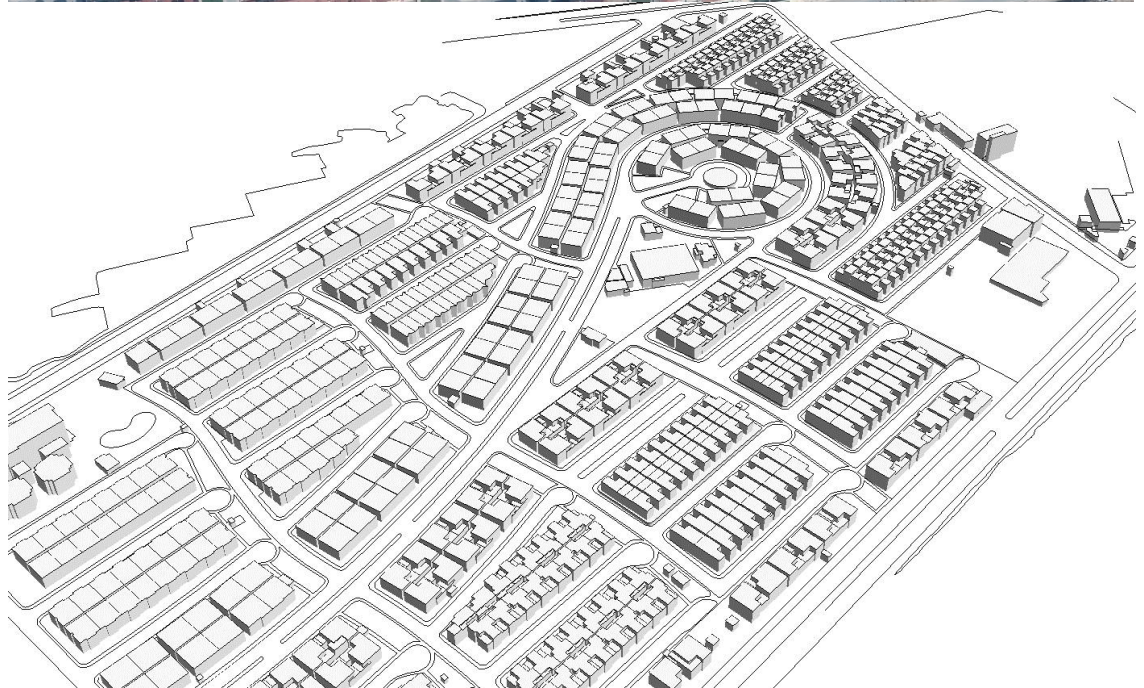
A block is selected for a detailed analysis [Figure 4.210]. The block is formed from the aggregation of 20 plots and the typical original area of the plots was 250m² (12.5m X 20m). However, transformations due to informal actions resulted in the increase of the density. 60% of the total number of the plots of the block and 75% of the built-up plots of the block have been subdivided into two among which three cases are unequal subdivision (5m X 20m and 7.5m X 20m). The subdivision of

the corner plots are made by dividing the length of the plot which is 20m. Then, the result would be two plots each with 125m² (12.5m X 10m) [Figure 4.211].

All the houses of the block are attached type with only front setback begins from 1.25m and goes up [Figure 4.212]. Plot coverage in the sample area is not regulated by certain legislation. However, according to '*Decision No. 940 of 1987*' the minimum area of a plot for one single-family house is 200m² which means that a formal plot subdivision is not allowed in this block. Moreover, according to '*Instructions No. 851 of 1980*' the minimum area of a house is 120m². In this case, an informal and equal area subdivision is possible when the area of a plot of each house is 125m². Apart from unequal subdivision cases, all other possibilities of forms that the valid regulations would produce match what those regulations produced in this block [Figure 4.213].

D. Other determinants: This sample is also influenced by the factors of location, the concentric pattern of the city, and the original land features before planning the area for urban uses. The most influential land feature on the plan of the sample is the security trench which the authority of the city made in 2004 to protect the city from security breaches from outside that would threaten the city at that time. This trench surrounded the city from east and extended to the south and the east. The trace of this trench line became a street in the development plan of the area. Consequently, this influenced the overall layout [Figure 4.214].

Period 9
Sample 9_3
Midya Quarter
(Italian City)



Sample 9_3 (Midya Quarter-Italian City)

‘Sample 9_3’ area includes a part of the housing complex of ‘Italian City’ which is a part of ‘Midya’ quarter. This quarter composes of two private housing projects, ‘Italian City’ and ‘English Village’. The area lies around 3.0 km to the east of the citadel (Qalat), between the Fifth Ring Road (Gulan Street) and the Sixth Ring Road ((Peshawa Qazi Muhammad Street) [Figure 4.215]. ‘Midya’ quarter is bounded by the Fifth Ring Road from east, the Sixth Ring Road from west, a street separates it from ‘Empire complex projects’ from north, and ‘Rotana Road’ which is parallel to Mosul Road from south [Figure 4.216]. This complex is one of the projects built under the ‘Housing Policy 4’ by a private company (Hemn Group). However, works on the project commenced before the issuance of the law of investment (‘Investment Law No. 4 of 2006’⁴⁸⁵). The majority of the housing projects of investment whether built under the law of investment or not, did not submit to the building regulations applied by the municipalities.

This complex was built on a subdivision of the land No. 32, District 44 Warish which was previously proposed for the future extension of ‘Sami Abdul-Rahman Park’.⁴⁸⁶ The houses of the project were privately sold. This housing project includes five types of houses with different areas and neighbourhood amenities and services such as markets. Each house type has a different typical plot area. Sometimes, the plot area of a certain type vary from a house to another depending on the neighbourhood plan and the form and the layout of the block on which the plot is located. However, the built-up area of the type is constant [Figure 4.217] and [Figure 4.218]. Overall, the area includes a mixture of building type of attached and semi-detached with front setback and sometimes with rear and side setback. Cul-de-sac type is adopted in the design of the complex. Many houses of the area have been submitted to a change in the use from residential to commercial and business office. The analysis structure focuses on the form elements.

Table 4-40: Sample 9_3, the formation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
9_3	Midya quarter (Italian city)	9 th period	2004-2013	4	<ul style="list-style-type: none">• No certain building regulation was applied.	<ul style="list-style-type: none">• Geographic factor (the location).• Investment trend.

⁴⁸⁵ The President of Kurdistan Region of Iraq.

⁴⁸⁶ “Sami Abdul-Rahman Park” is a largest park in the west part of Erbil. Works on this park started in 1998.

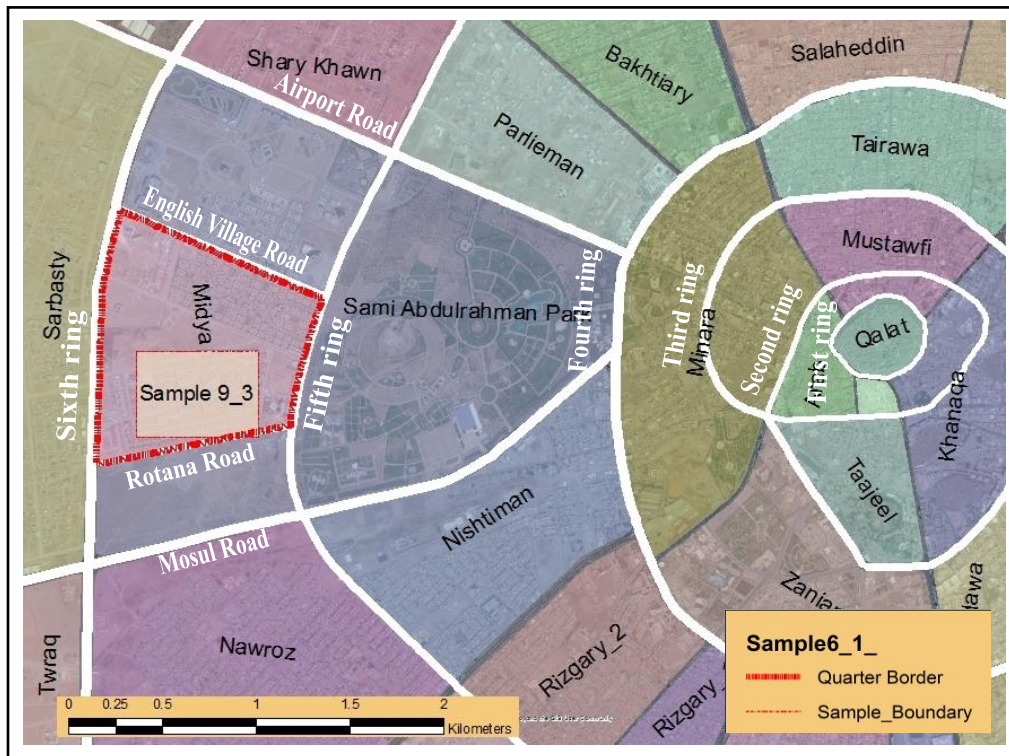


Figure 4.215: The location of ‘Sample 9_4’ and ‘Midya’ quarter. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

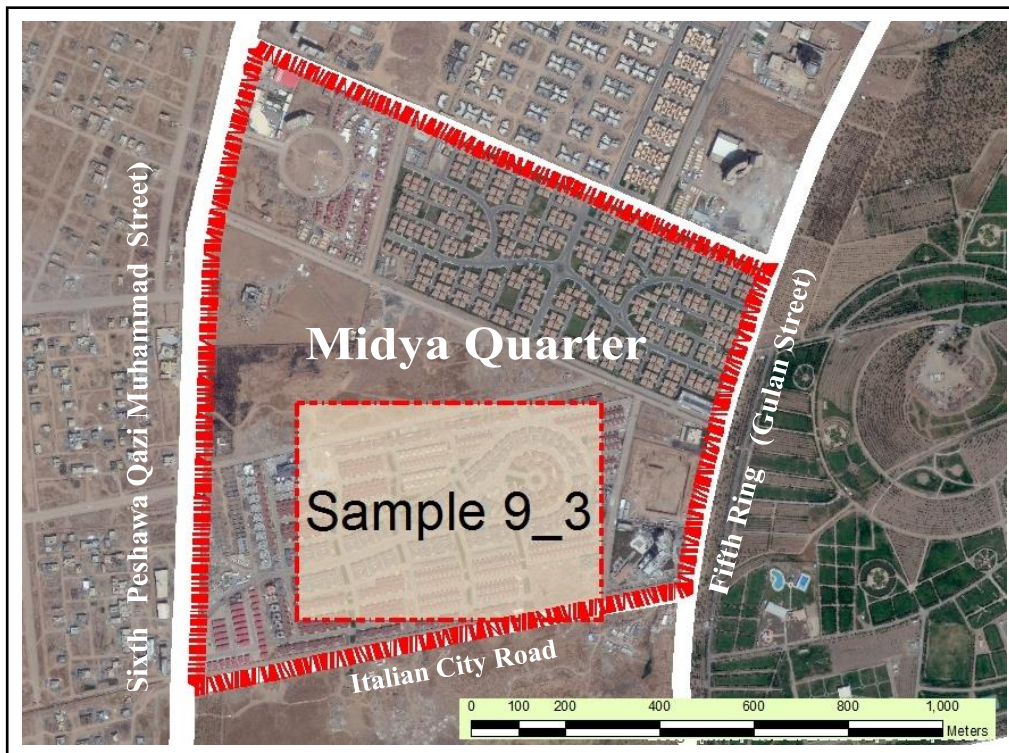


Figure 4.216: The boundary of “Midya” quarter. (Source: Drawing by the researcher on a satellite image of Erbil in 2010)

The Formation:

The different types of houses

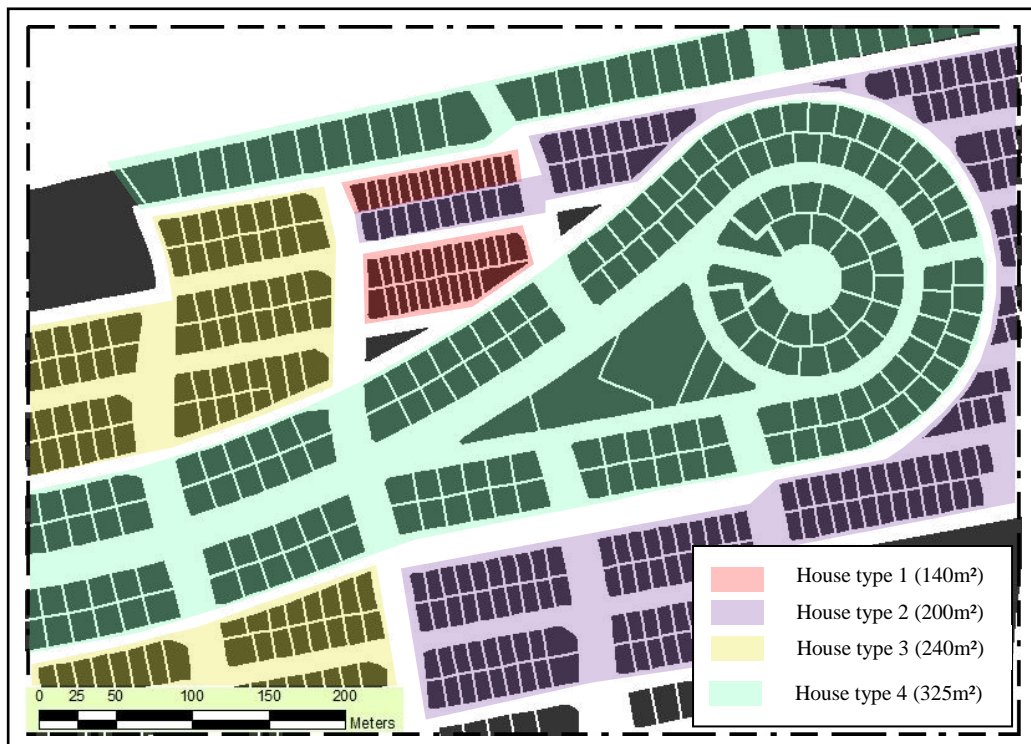


Figure 4.217: The complex includes five types of houses and the area included in “Sample 9_3” includes four types. The average plot area of each type is different. However, the plot area of a certain type is not constant and it may vary from a house to another. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning)



Figure 4.218: The average plot area of each type of the houses is different: for type 1 is 140m²; type 2 is 200m²; type 3 is 240m²; type 4 is 320m²; and type 4 is 600m². (Source: Researcher)

The Formation:

The time period and building process



Figure 4.220: 3D views showing the parts of the complex were prepared before being constructed. (Source: Hemn Group Companies, *Italian City Project, Erbil*)



Figure 4.219: Different satellite images taken from four different years show ‘Sample 9_3’ area. Unlike the individual process of policy 1, all the houses of the complex were built together in the same time and the complete scene aimed was achieved. From 2010 to 2014 no difference can be noticed in the residential buildings (single-family houses). (Source: See page 105)

The Formation: The building form characteristics of the houses



Figure 4.221: The common form characteristics of the houses of ‘Sample 9_3’ (Italian City) which have been built in the period (2004-2013). (Source: Researcher)

The Formation: The selection of blocks samples

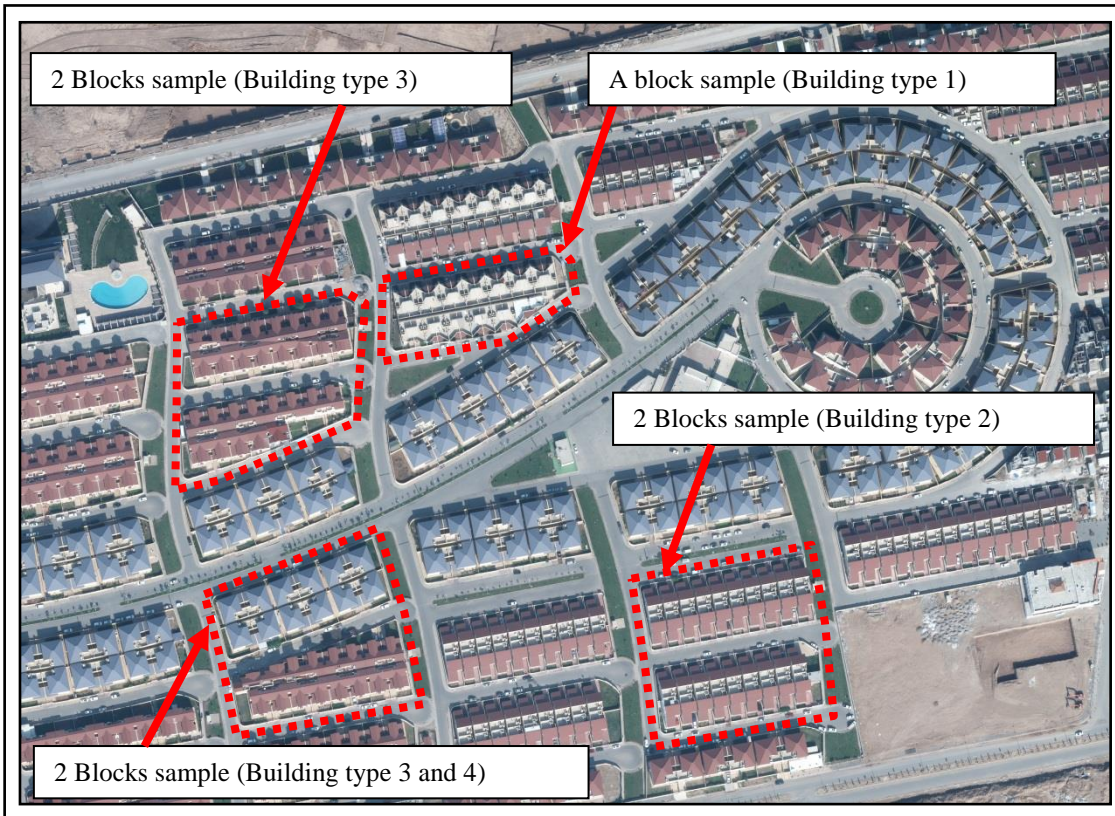


Figure 4.222: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Formation: Building- Plot parameters

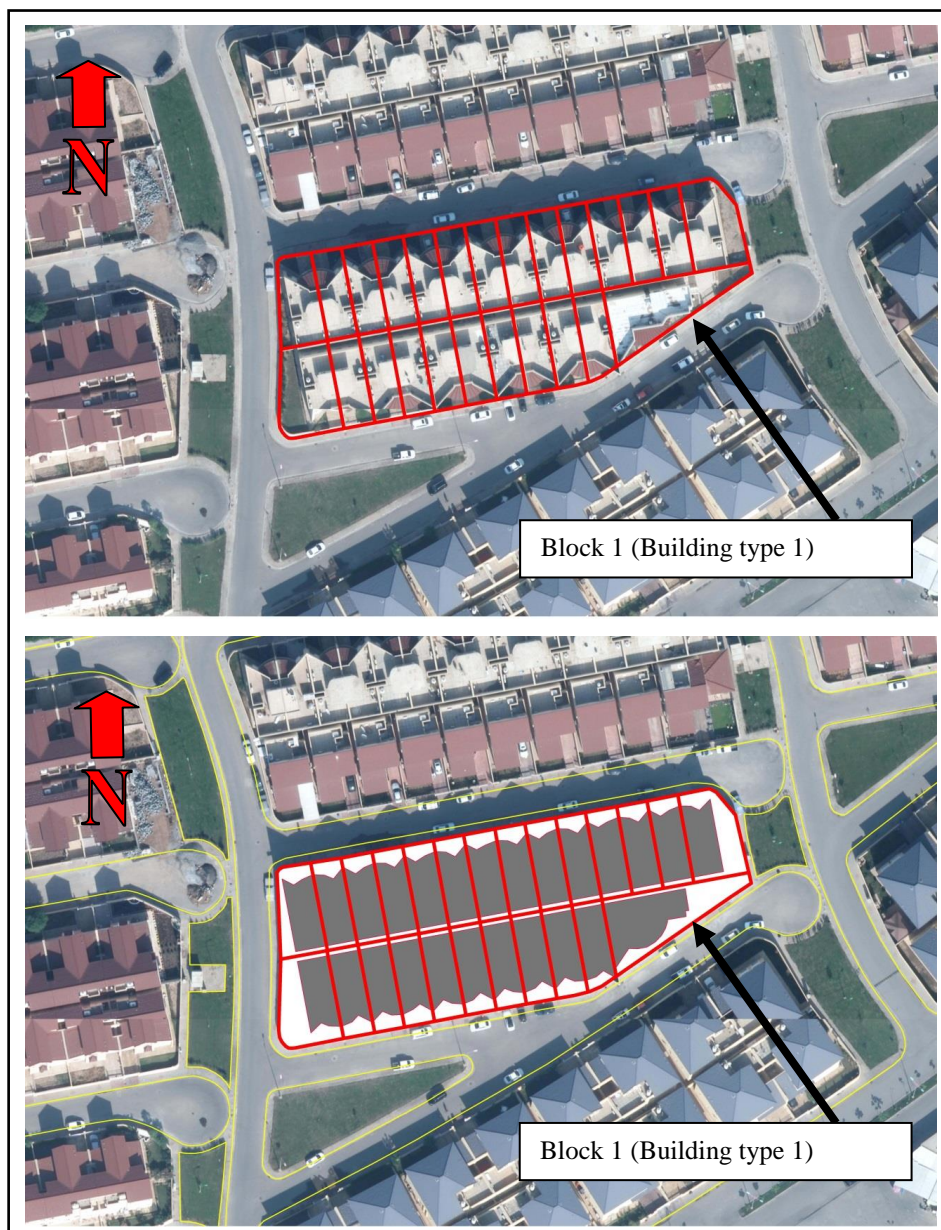


Figure 4.223: A block (block 1) sample from ‘Sample 9_3’ area. The typical plot area of house type 1 is 140m² (7m X 20m). Front and rear setback is applied. The produced type of the block is side attached and back detached houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: Building- Plot parameters

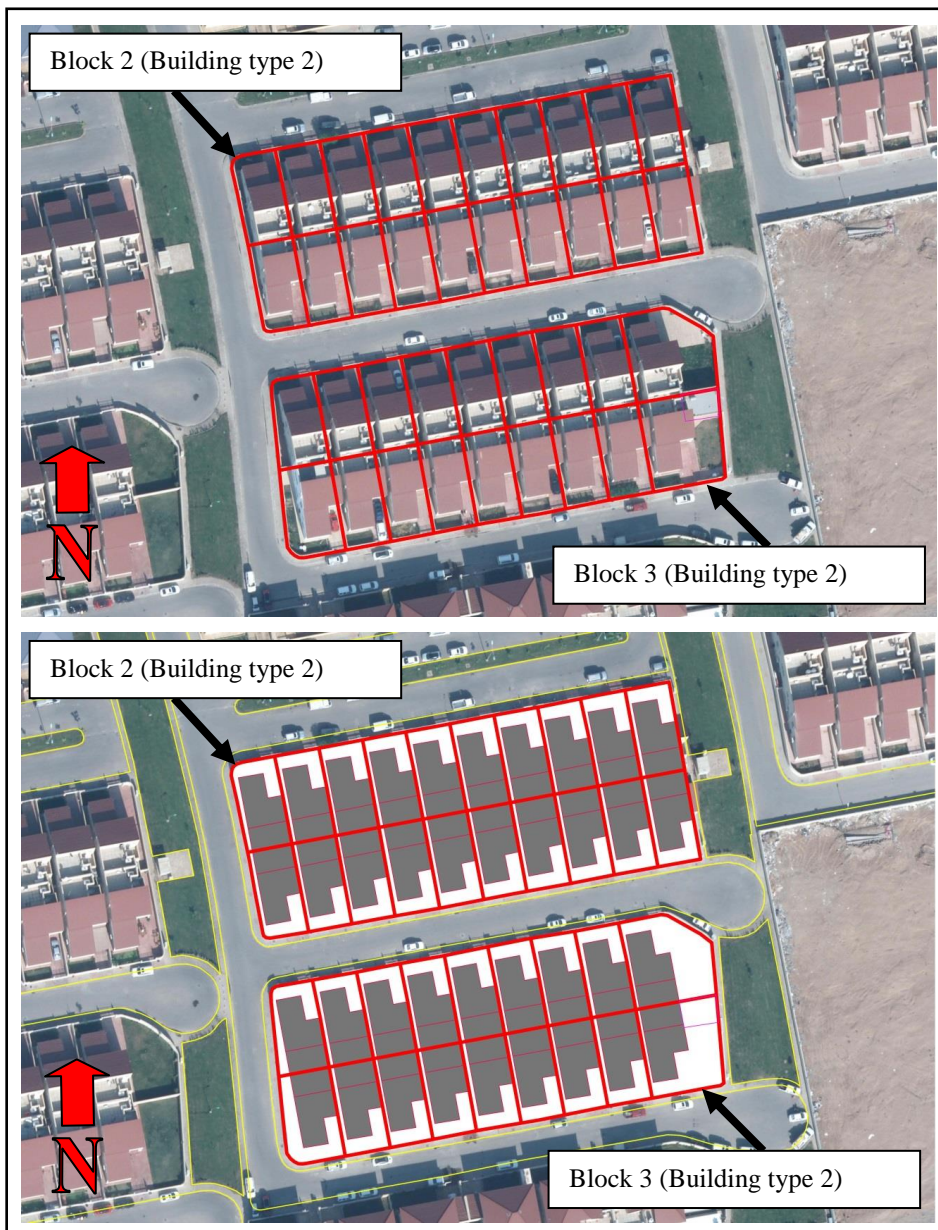


Figure 4.224: Block samples (block 2 and 3) from ‘Sample 9_3’ area. The typical plot area of house type 2 is 200m² (10m X 20m). Front and one side setback is applied. The produced type of the block is semi-detached (side detached and back attached) houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: Building- Plot parameters

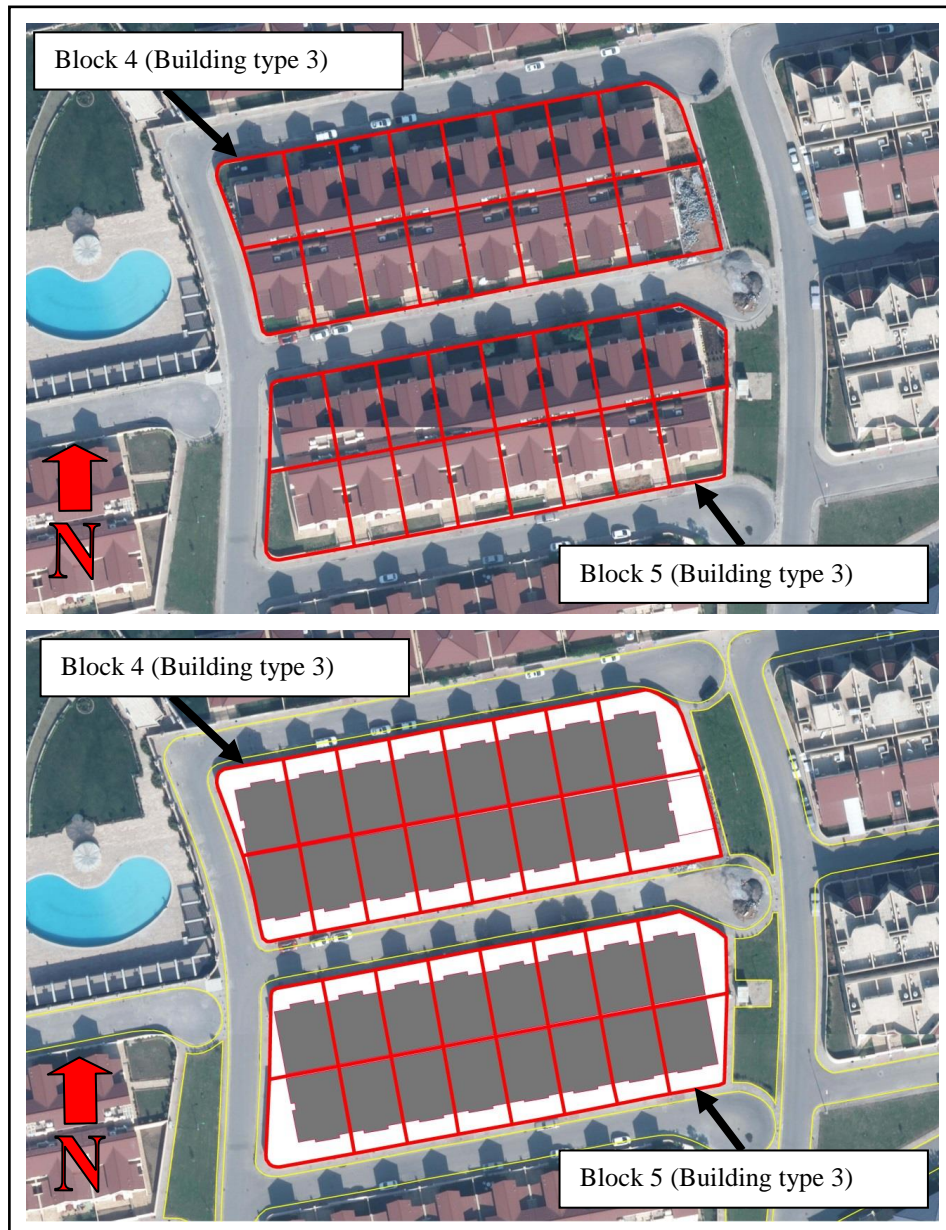


Figure 4.225: Block samples (block 4 and 5) from 'Sample 9_3' area. The typical plot area of house type 3 is 240m² (12m X 20m). 4.2m front and 0.6m rear setback is applied. The produced type of the block is attached houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation: Building- Plot parameters

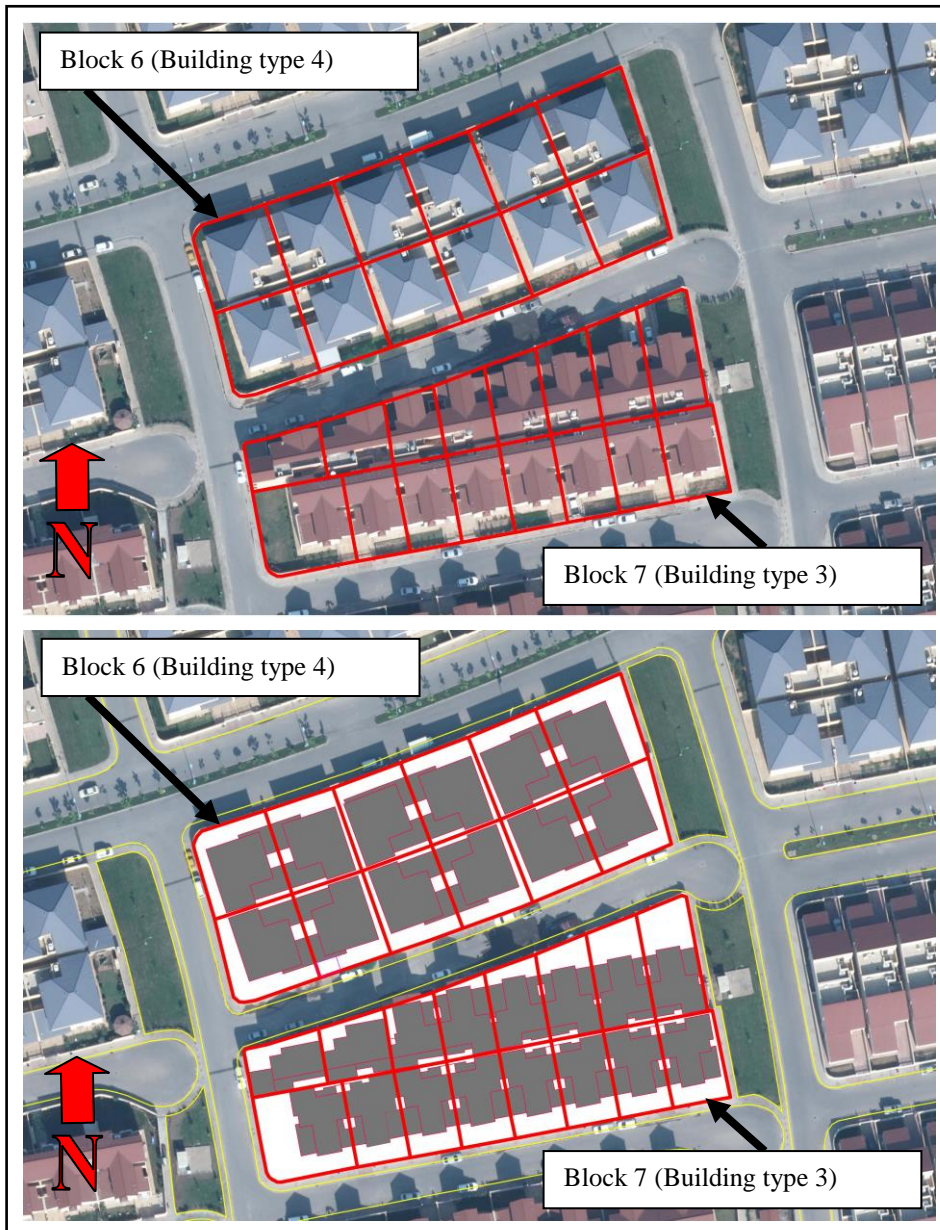


Figure 4.226: Block samples (block 6 and 7) from 'Sample 9_3' area. The typical plot area of house type 4 is 320m² (16m X 20m). 4.2m front setback, 1.1m one side setback, and 0.6m rear setback is applied. The produced type of the block is semi-detached houses. One end of each street is closed, physically but not visually, by a loop. (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

The Formation:

The plan and the original land features

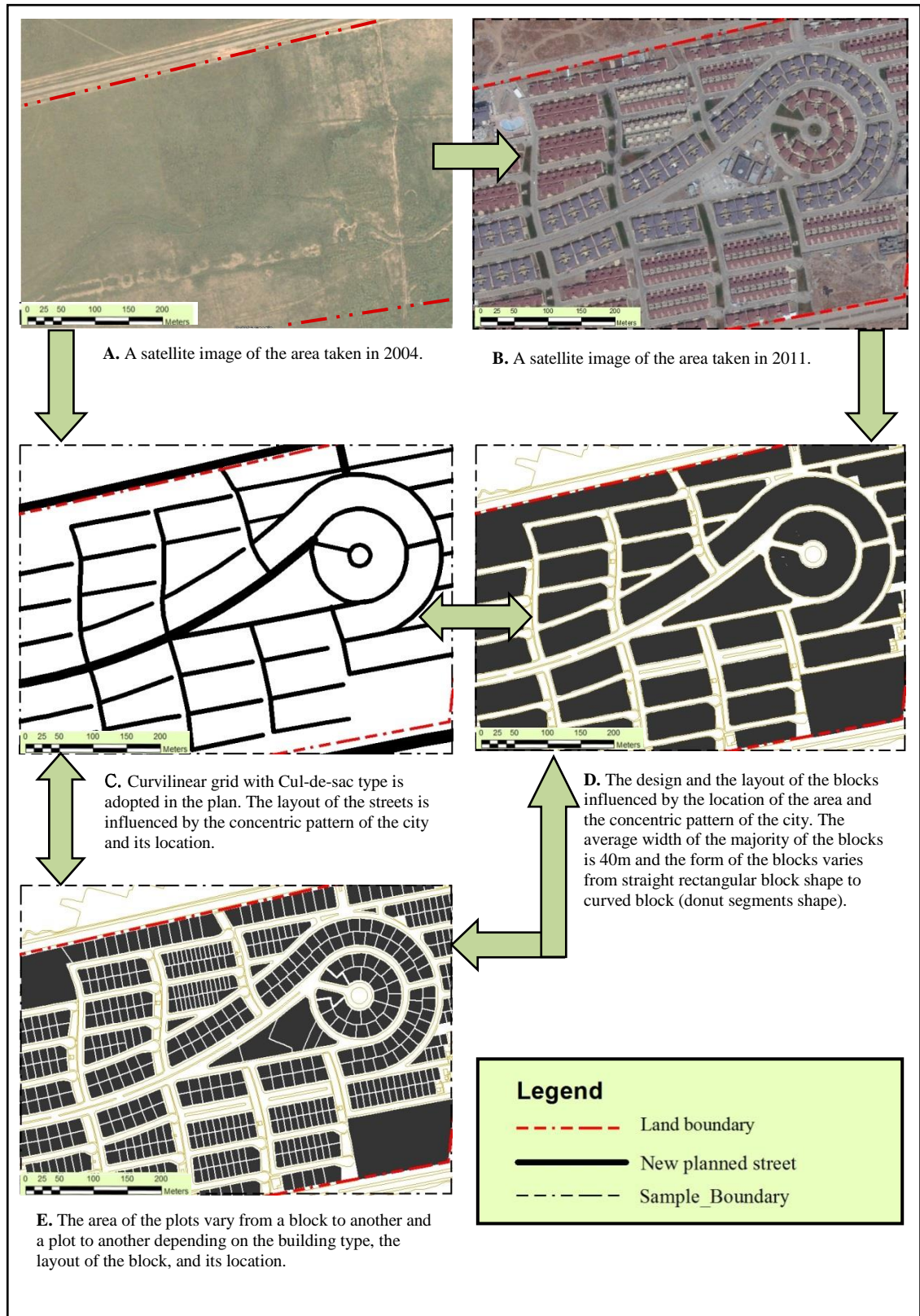


Figure 4.227: The location of the area within the city and the concentric pattern of the city are influential. In addition, the design intentions also determined the form of the layout. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

- **The formation of the area:** The sample area which is a part of ‘Italian City’ and ‘Midya’ quarter formed in the Ninth Period, more specifically in 2005 and 2006. Unlike the areas formed under ‘Housing Policy 1’, this complex which is one of the housing projects of ‘Housing policy 4’ does not adopt individual building process and has been built in one time. Therefore, it is less liable to continuous process of formation and transformation, at least in a short time period.

A. The time period: The area included in the sample boundary has been created in one time and in the same period. The economic development of the region after 2003, led to an urban development and growth of the cities, mainly characterised in housing projects. Some new trends of housing influenced by global and western housing trends and they attempted to embody and symbolise the characteristics of some western housing fashions and architecture and named by their name. Examples of this current are the housing complexes of English village and Italian City [Figure 4.220]. Those housing projects to a certain extent imported the house form of those western housing architecture. However, they did not take the local social and cultural issues. Regardless of whether those projects have succeeded to contribute to solving housing issues, commercially, they achieved success.

B. The housing policy: The ‘Housing Policy 4’ was adopted in the formation of the area of ‘Sample9_3’. Most of the housing projects of this policy in Erbil were built after 2003. This project was not supported by government mortgage policies. As all the projects of ‘Policy 4’ this project also did not adopt the individual process of building. Therefore, the houses of the project built by one company (Hemn Group) and all together. The final and intended form of the complex was achieved. As a result of the absence of the continual and individual process the possibility of the change and transformation of the form is weak. Apart from some multistorey and commercial services and buildings, no notable change and transformation happened in residential and single-family houses of the area [Figure 4.219].

C. The regulations: The project was not restricted by any building regulations valid in Erbil and adopted by the municipality. However, the design of the complex tried to include some features that characterises distinguishes it from other parts of the city built under ‘Housing Policy 1’. The overall form of the complex, street view, and the aerial view from airplanes as it is close to the airport are the general form characteristic of the project⁴⁸⁷. Pitched roof type is not a local character of buildings of cities of Kurdistan and especially Erbil. The majority of private housing projects of ‘Policy 4’, including ‘Italian City’ adopted this feature and became a common form characteristic of those projects.

In order to accommodate various groups of people with different financial status, the design provided five building types of single-family houses with different plot area starting from 140m² to 600m² which is described by ‘Villas’ [Figure 4.221]. With about 41 houses of the complex the ‘house type 1’ which has an average plot area of 140m² (Example 1) composes 6% of the total houses. However, the second type (Example 2) which has 200m² plot area composes about 25%. By having about 194 houses, ‘Type 3’ (Example 3) composes around 30% of the total houses of the project. ‘Type 4’ (example 4) with 236 houses composes 36% which is more than the number of the houses of other types. The ‘Villas’ type or ‘type 5’ (Example 5) of [Figure 4.221] composes just less than 2% with 19 houses. Front setback is applied in all the types and except the ‘Villas’ type the rest types have two stores height. The fences with a height less than 180cm and using railing and transparent materials in the entrance gates, the level of privacy decreased.

For having a closer image on the aggregation of single houses of each type in a block, seven examples of blocks are selected [Figure 4.222]. Starting with the smallest plot area (7m X 20m) which is ‘Type 1’, the house has front and rear setback. The produced type of houses is attached [Figure 4.223]. The next and larger average plot area is that of ‘type 2’ which has an average area of 200m² (10m X 20m). Front and one side setback is applied on this type. Therefore, the resulting type is

⁴⁸⁷ Hemn Group Companies, ‘Italian City 1’, *Italian City Project, Erbil* <<http://www.hemngroup.com/Default1.aspx?page=article&id=565&l=1>> [accessed 17 May 2016].

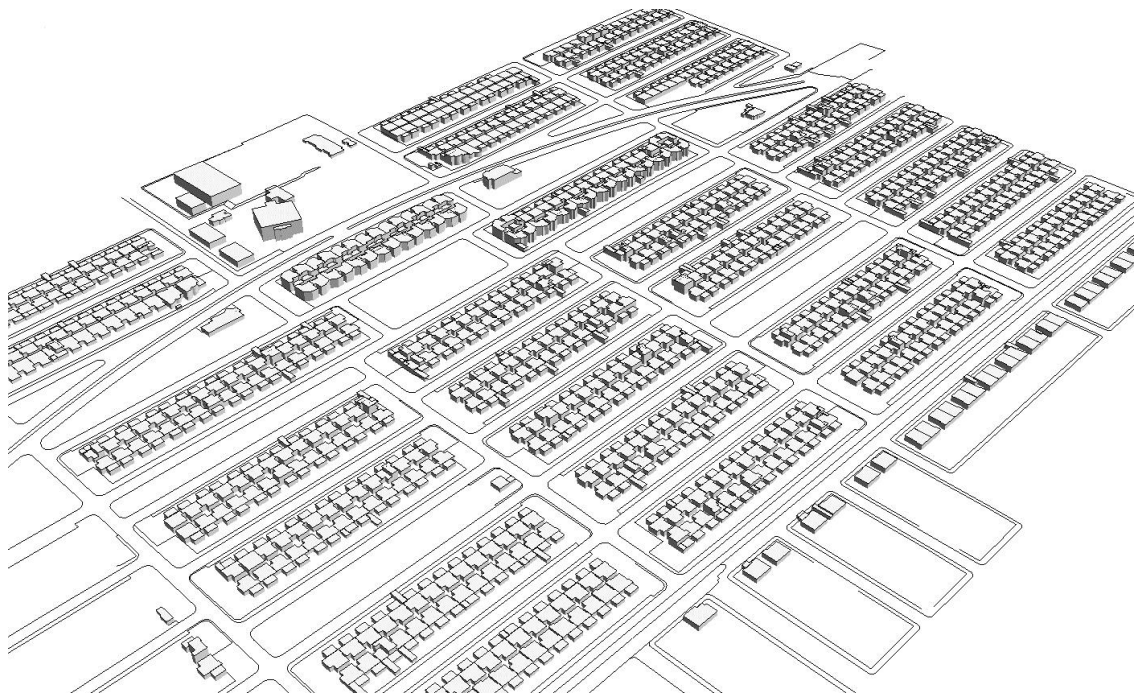
semi-detached houses. However, the back of the houses are still attached [Figure 4.224]. 'Type 3' comes next. The average plot area of this type is 240m² (12m X 20m). As the houses of this type have front and rear setback, the resulted type is attached [Figure 4.225]. The last type included in the sample area is 'type 4' which has an average plot area of 320m² (16m X 20m). The houses of this type are detached from one side and rear [Figure 4.226].

D. Other determinants: In addition to the factors of location, the concentric pattern of the city, the economic growth of the urban growth of the city, and the investment trends [Figure 4.227], global and western architecture is another influencing factor of the production of the urban form of this complex. As the land used for the complex has no significant influencing feature on the resulted plan.

Period 9

Sample 9_4

Shary Lawan Complex



Sample 9_4 (Shary Lawan Complex)

‘Sample 9_4’ area includes a part of the housing complex of ‘Shary Lawan’ [Figure 4.229]. The area lies around 10.0 km to the east of the citadel (Qalat), between the Eighth Ring Road and the Ninth Ring Road⁴⁸⁸ [Figure 4.230]. ‘Shary Lawan’ housing complex is bounded by the Ninth Ring Road from east which separates it from ‘Kasnazan’ town and is neighbouring the investment projects of housing of ‘Group_Andazyary’ from north and ‘Aynda-2’ from south. From east it is neighbouring ‘Mariwan’ quarter. [Figure 4.231]. This housing complex is also one of the projects built under the ‘Housing Policy 4’ by a private company (Happy Land Company) according to ‘Investment Law No. 4 of 2006’⁴⁸⁹. The project was granted permission from the ‘Investment Board’ of Kurdistan by the permit number 56 in 31st October 2007. All the housing projects built under the law of investment did not submit to the building regulations applied by the municipalities. However, they were imposed to obtain building permit for the complex as a whole.

The houses of the project were sold privately and supported by housing fund program by which the government contributes to the project by a part of the cost to reduce the total price of the house. This housing project includes four types of houses with 200m² of plot area. Three types of the houses are one storey and the first type is the common type [Figure 4.232]. Out of about 1150 houses of the complex⁴⁹⁰, about 70 houses in a few blocks is the fourth type which is two storeys. The houses are side attached and rear detached type, one floor with front and rear setback. The open area formed from the front setback is deployed for a garden and a car park space. Oblong pattern with ‘T-junctions’ and ‘cross-junctions’ types are adopted in the plan of the complex and the minimum street width is 12m. Few houses of the area were submitted to a transformation in the height. Some owners added another floor to their house. The analysis structure focuses on the form elements.

Table 4-41: Sample 9_4, the formation determinants. (Source: Researcher)

Sample	Quarter	Time period	Year	Housing policy	Regulations	Other determinants
9_4	Midya quarter (Italian city)	9 th period	2004-2013	4	<ul style="list-style-type: none">• Law of Investment of Kurdistan Region No. 4 of 2006.	<ul style="list-style-type: none">• Geographic factor (the location).• Design decisions.

⁴⁸⁸ Both Eighth and Ninth Ring Roads are not implemented. The Seven Ring Road is under construction.

⁴⁸⁹ The President of Kurdistan Region of Iraq.

⁴⁹⁰ Happy Land Company, ‘Lawan City, Erbil’, *Lawan City, Erbil*

<<http://www.happylandiraq.com/projectDetails.aspx?ID=281>> [accessed 21 May 2016].

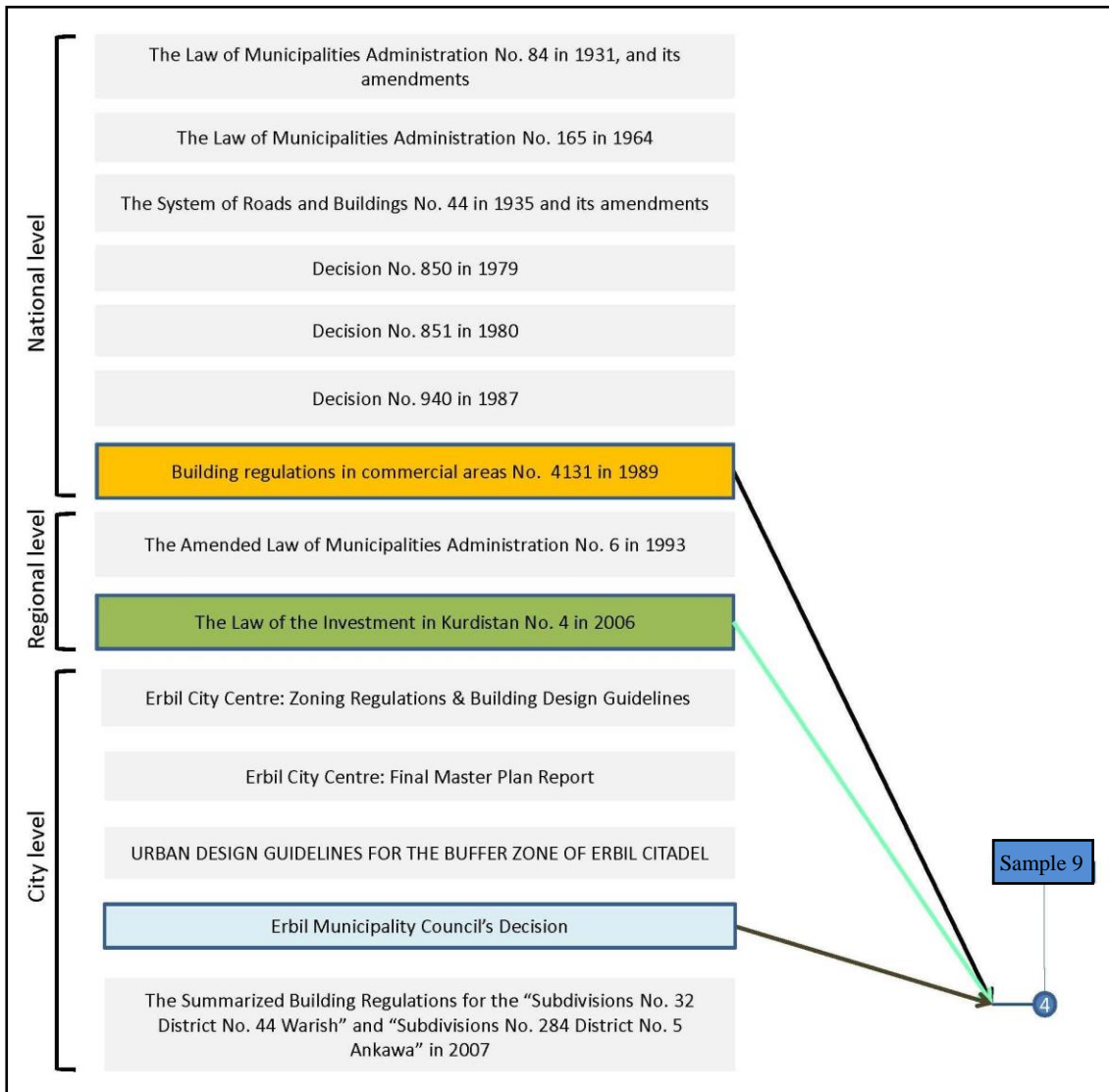


Figure 4.228: Direct regulations enacted at different levels that have influenced ‘Sample 9_4’.
(Source: Researcher)

The Formation:

The view of the complex

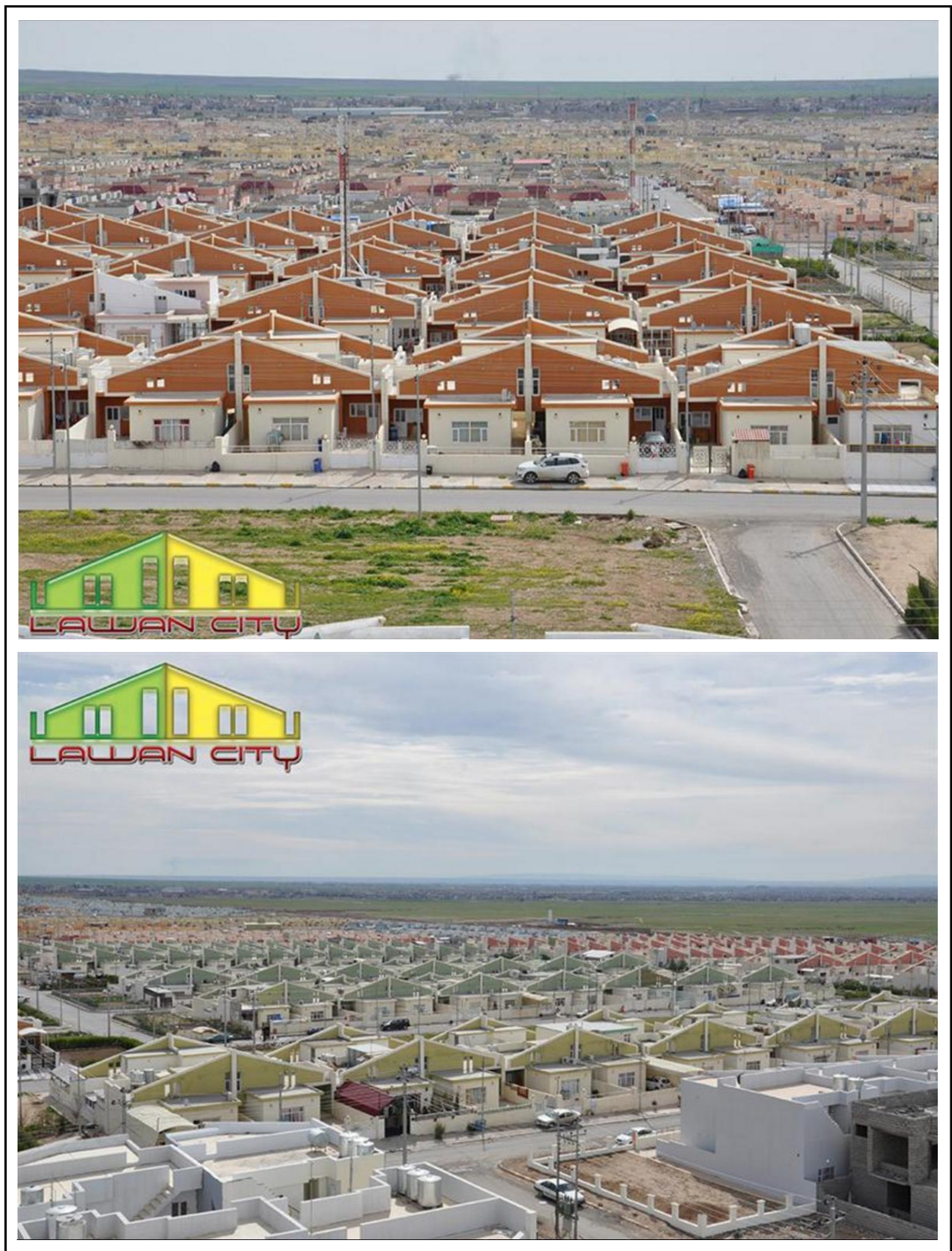


Figure 4.229: Shary Lawan housing complex. (Source: Happy Land Company)

The Formation:

The location and the boundary

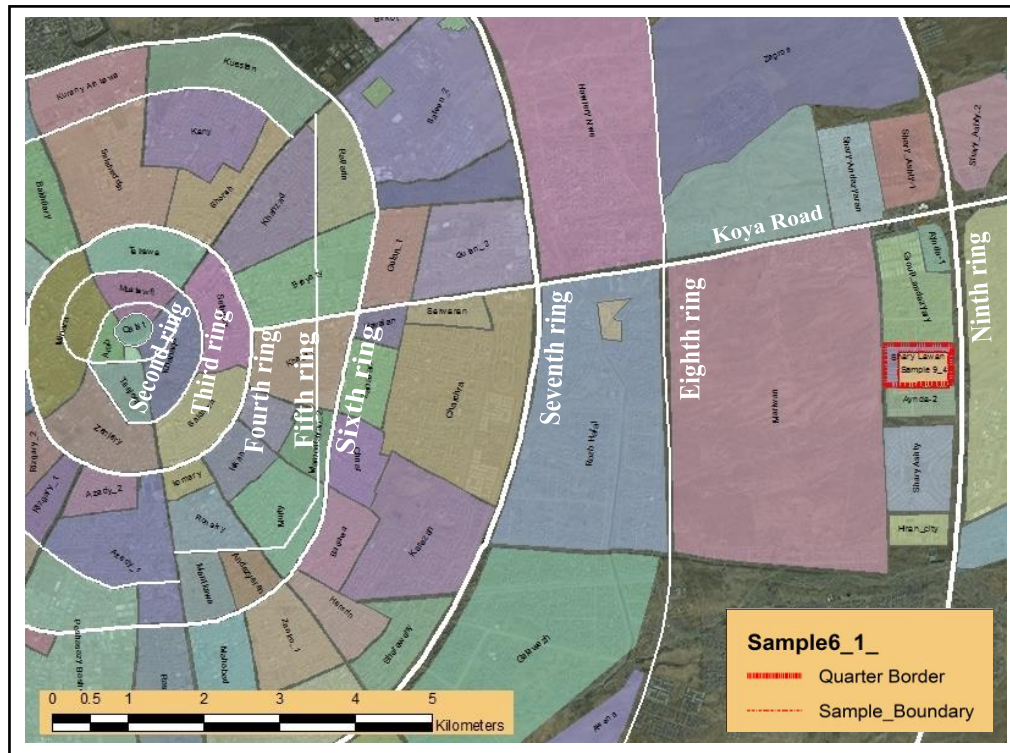


Figure 4.230: The location of ‘Sample 9_4’ and ‘Shary Lawan’ housing complex. (Source: Drawing by the researcher on a map from Erbil Governorate, GIS Department)

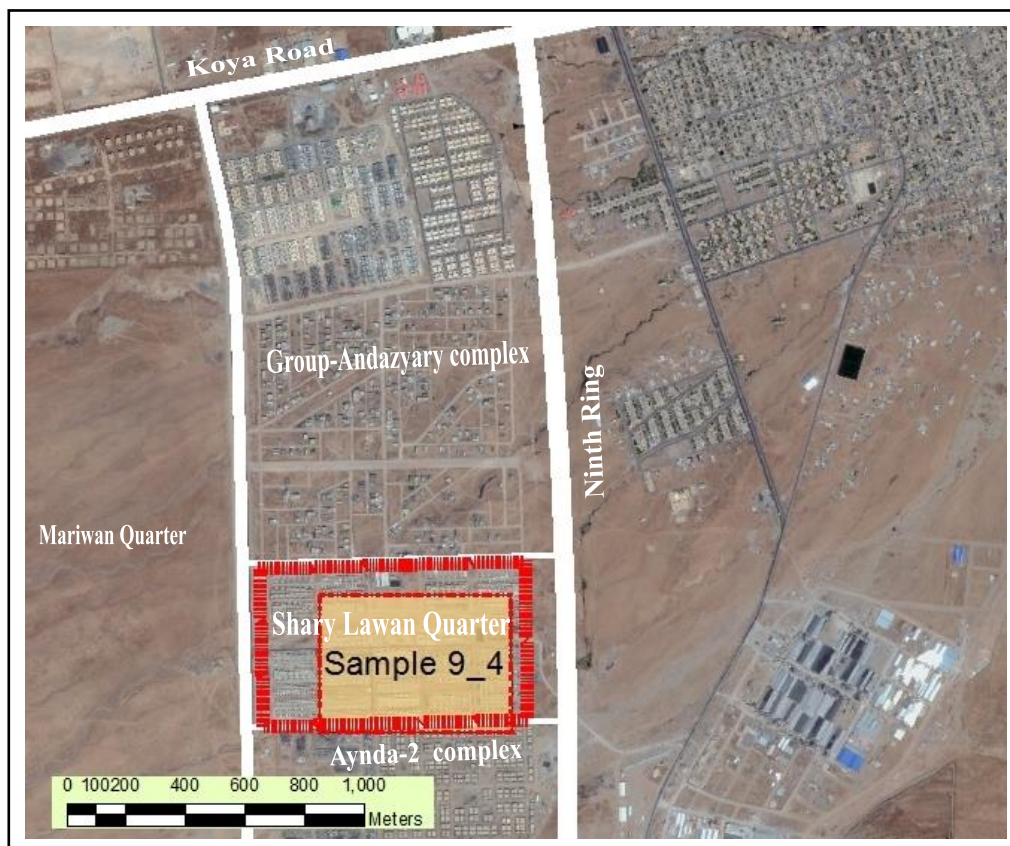


Figure 4.231: The boundary of ‘Shary Lawan’ housing complex. (Source: Drawing by the researcher on a satellite image of Erbil in 2010)

The Formation:

The different types of houses

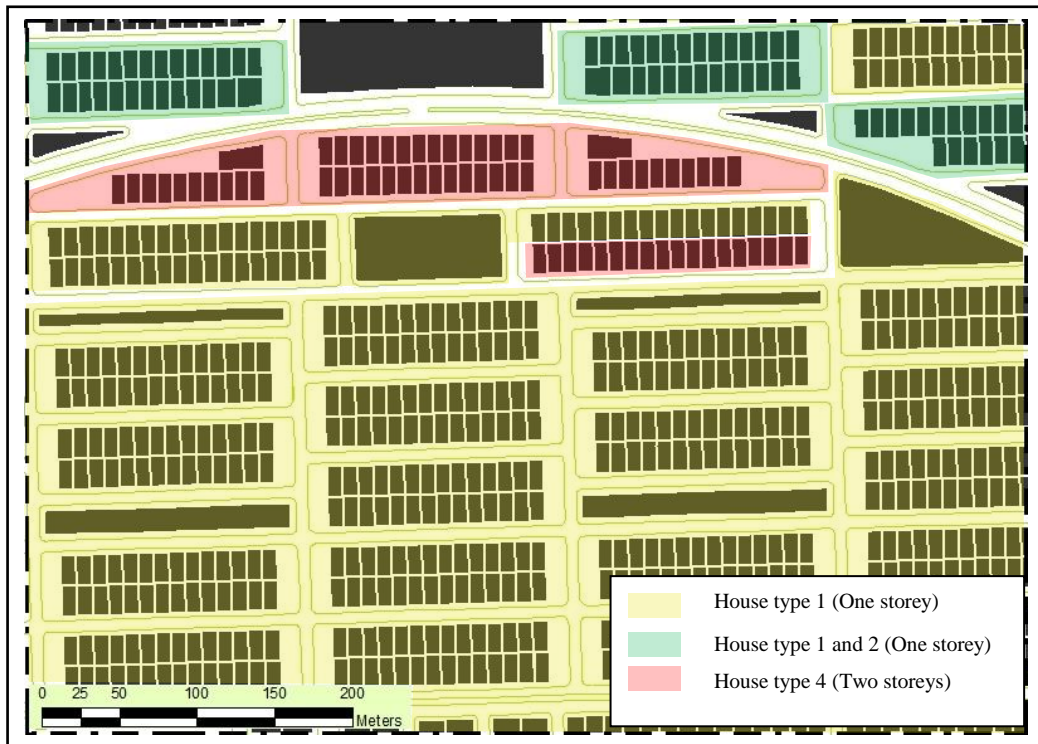


Figure 4.232: ‘Sample 9_4’ which is a part of ‘Shary Lawan’ housing complex includes 3 types of houses. Few blocks included a mixture of two types. The common house type is type 1. (Source: Drawing by the researcher based on data from The Real Estate Registry Offices of Erbil and The General Directorate of Urban Planning)

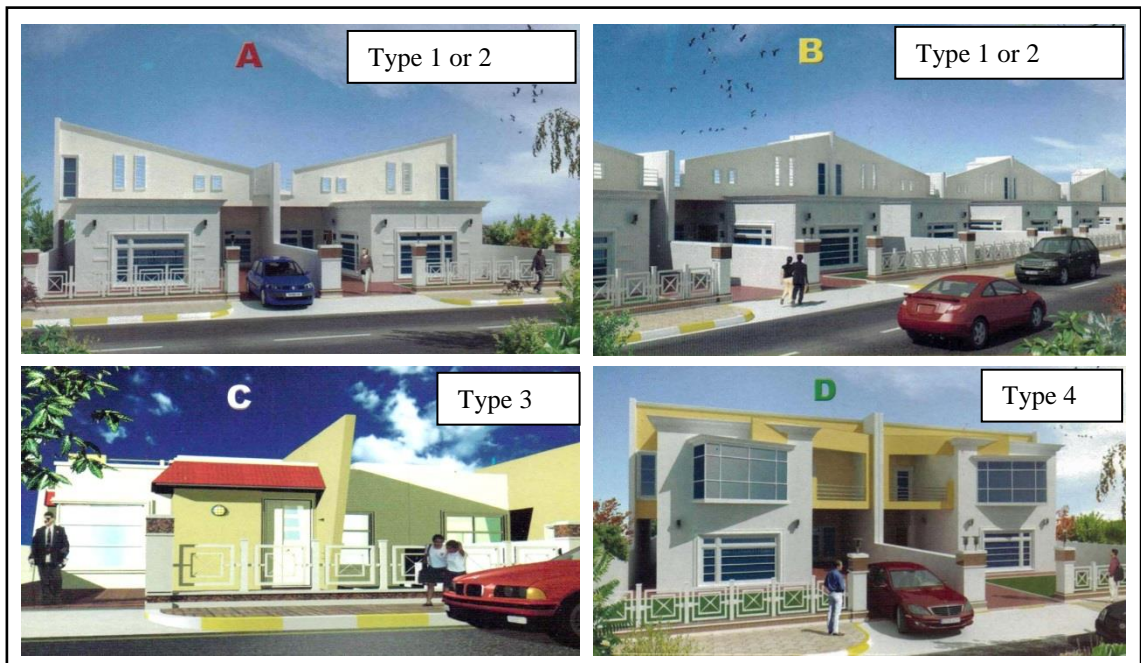


Figure 4.233: The four different types of houses in ‘Shary Lawan’ housing complex. Both type 1 and type 2 seem similar from the front view and they can be arranged in a block in two different ways: either by replicating a double mirrored houses (symmetric replication), or by replicating the house without mirroring (identical array). Type 3 is not implemented in the complex and the number of the houses of type 4 is very limited, with about 70 houses, this type does not exceed 7% of the total houses of the complex. (Source: Happy Land Company)

The Formation: The building form characteristics of the houses

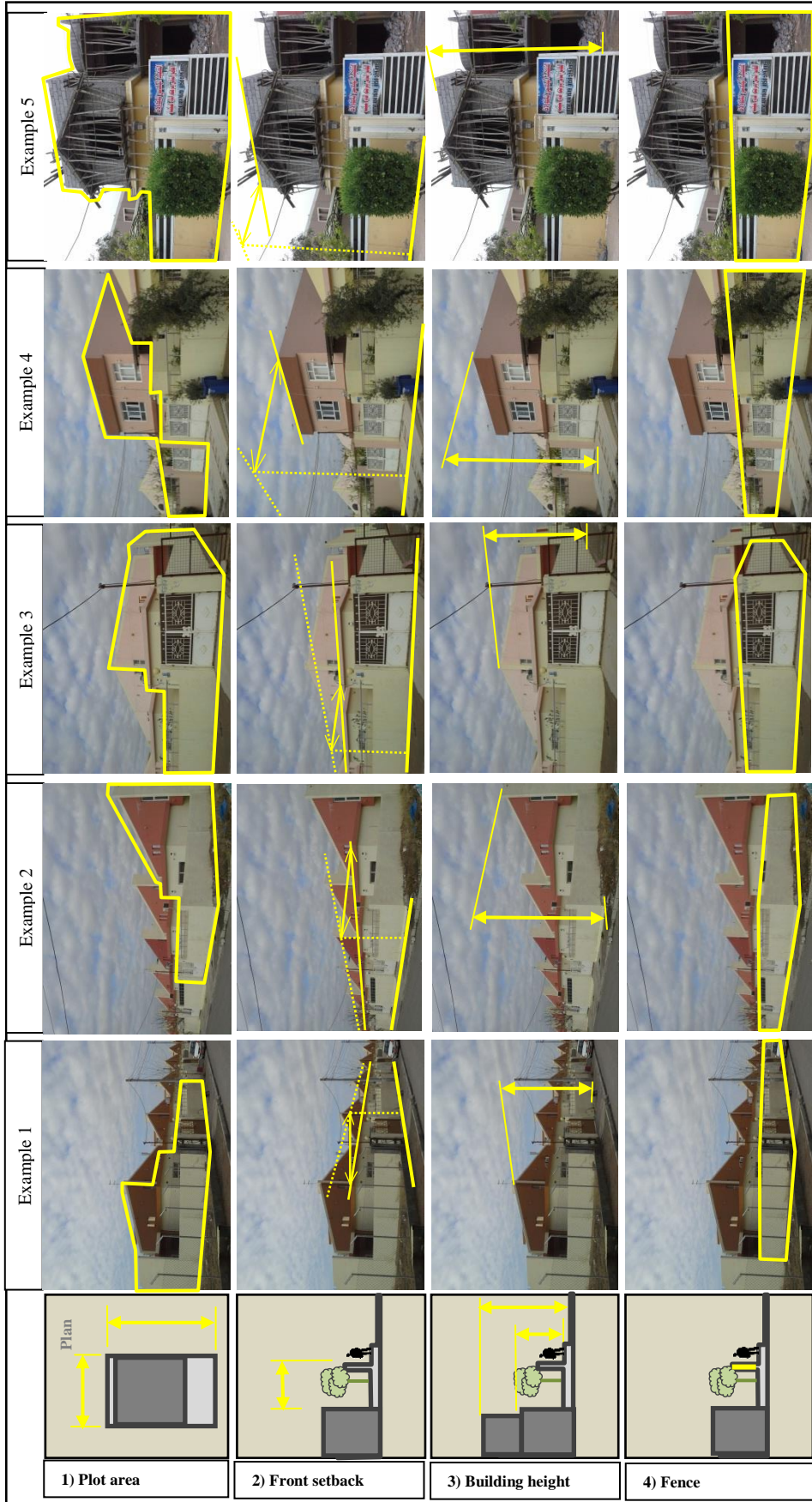


Figure 4.234: The common form characteristics of the houses of ‘Sample 9_4’ (Shary Lawan housing complex) which have been built in the period (2004-2013). (Source: Researcher)

The Formation: The selection of blocks samples

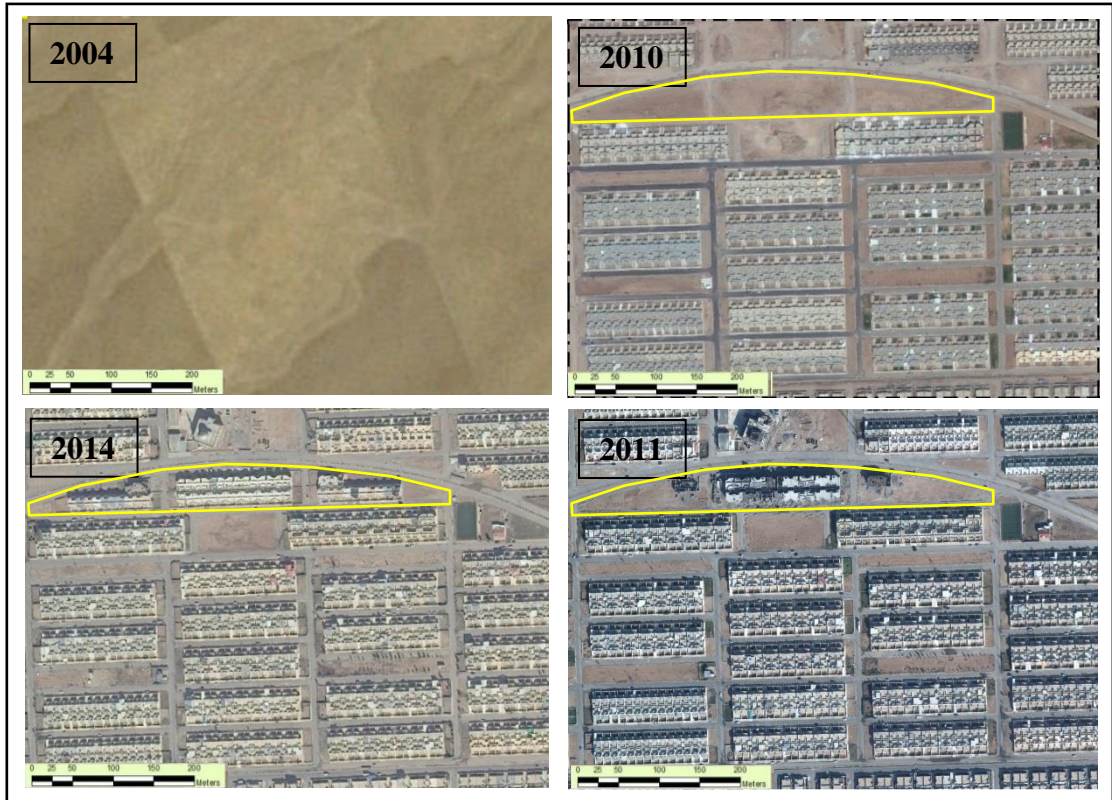


Figure 4.235: Different satellite images taken from four different years show ‘Sample 9_4’ area and building three blocks of house type 2 after 2010. (Source: See page 105)

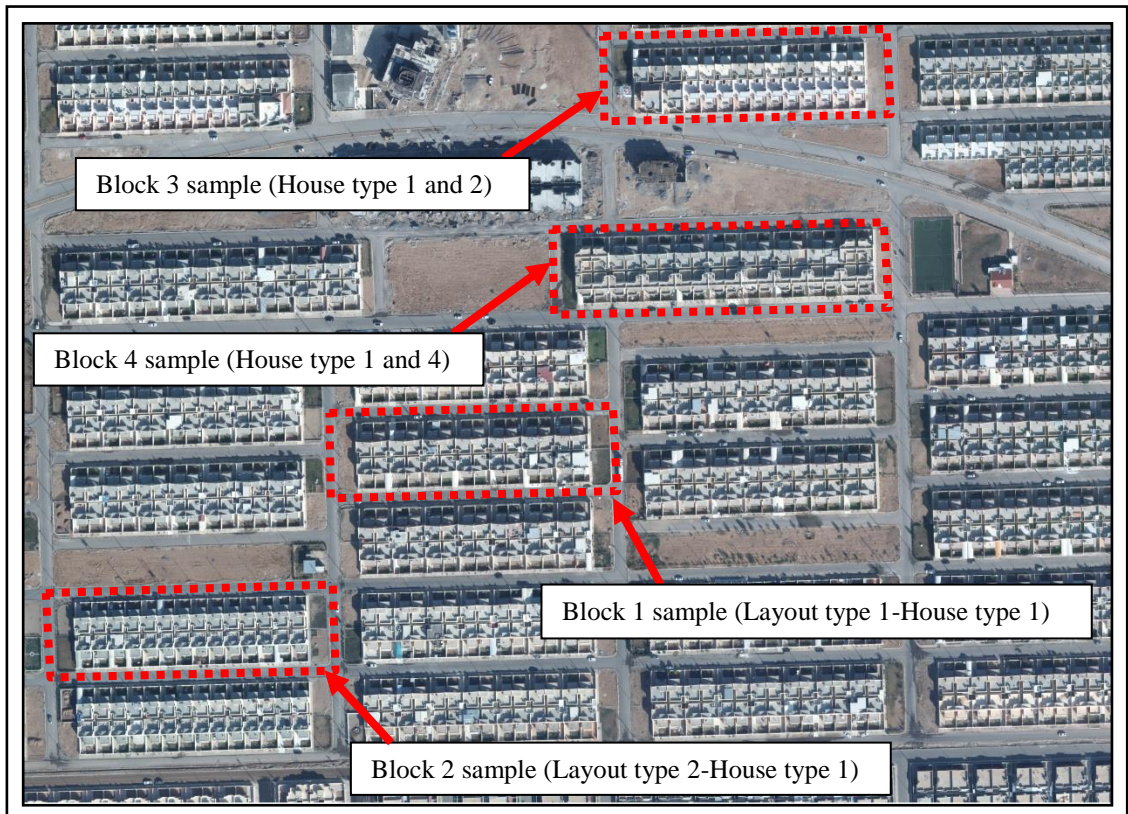


Figure 4.236: Samples of blocks selected from the area for a detailed analysis on the level of plot and building. (Source: Drawing by the researcher on an aerial photo of Erbil of 2011)

The Formation: Building- Plot parameters

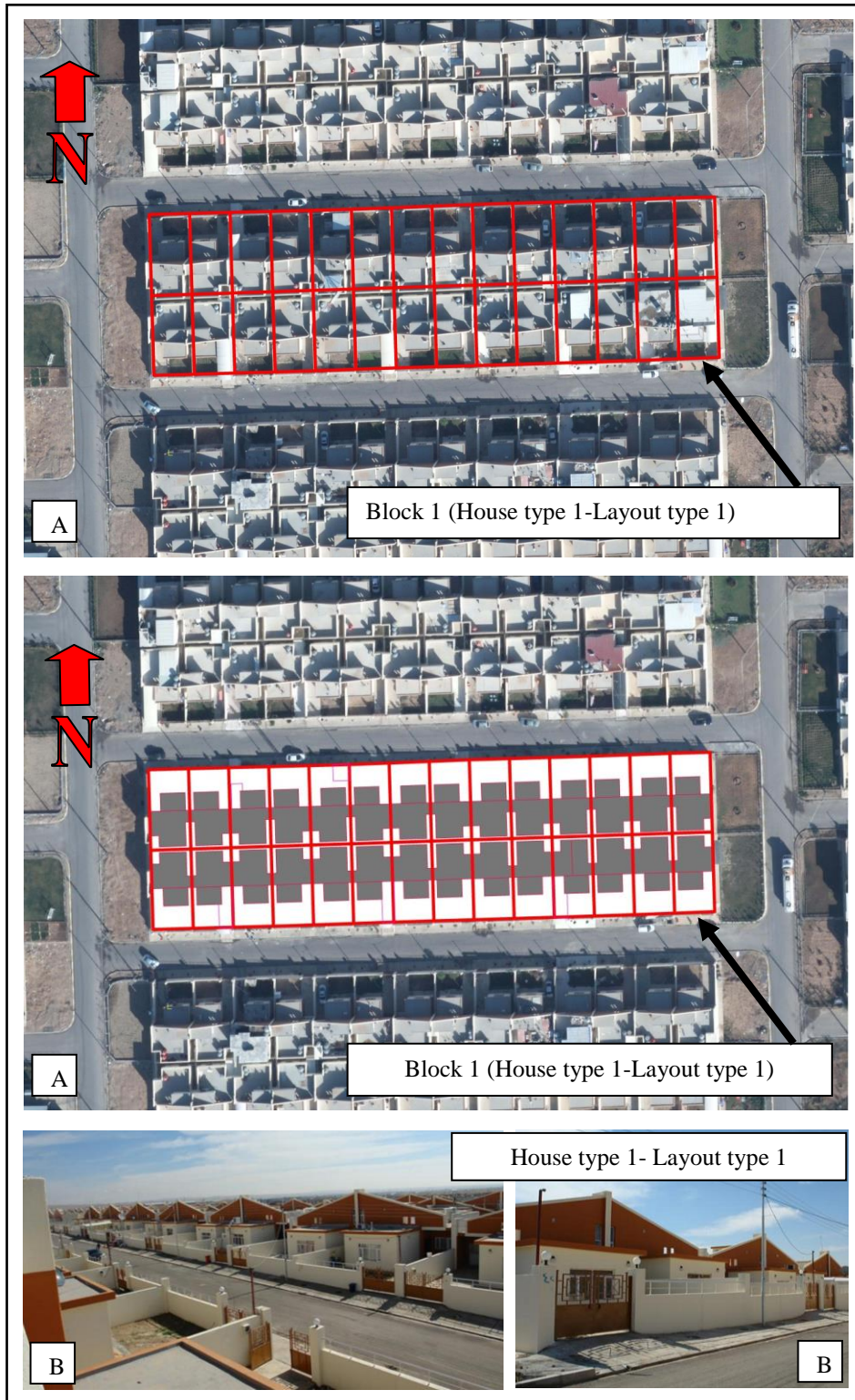


Figure 4.237: A block (block 1) sample from ‘Sample 9_4’ area. The typical average area of the plots of the block is 200m² (10m X 20m). A typical and identical design of type 1 is adopted for the houses of this block. The type is side attached and rear detached with front setback. This type can be replicated in two ways: whether by mirroring (layout type 1) which is the case in this block, or by identical arraying (layout type 2). (Source: **A**) Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil **B**) Happy Land Company)

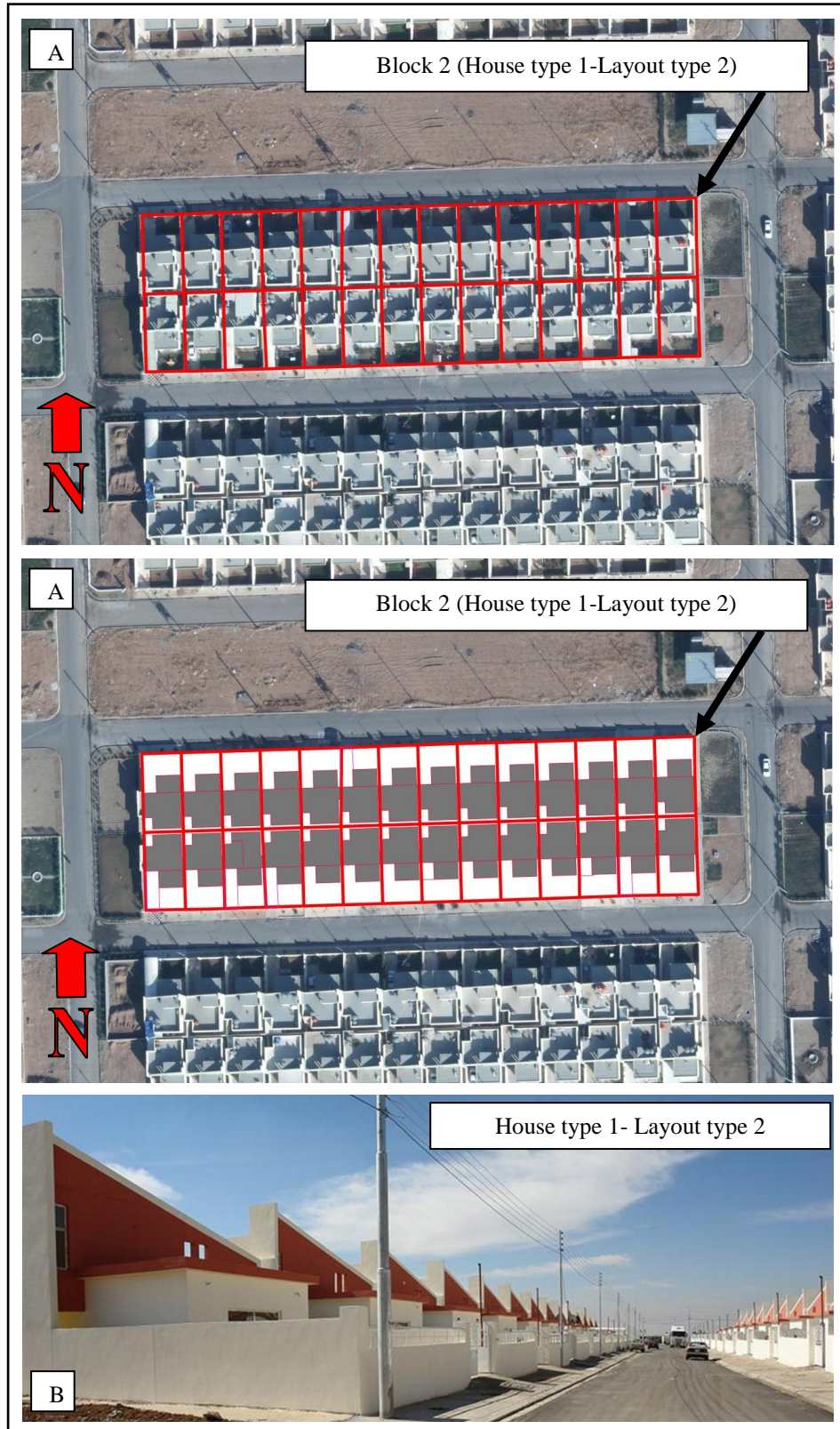


Figure 4.238: A block (block 2) sample from “Sample 9_4” area. The typical average area of the plots of the block is 200m² (10m X 20m). A typical and identical design of type 1 is adopted for the houses of this block. The type is side attached and rear detached with front setback. The type in this block has been replicated by identical arraying (layout type 2). (Source: A) Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil B) Happy Land Company)

The Formation: Building- Plot parameters

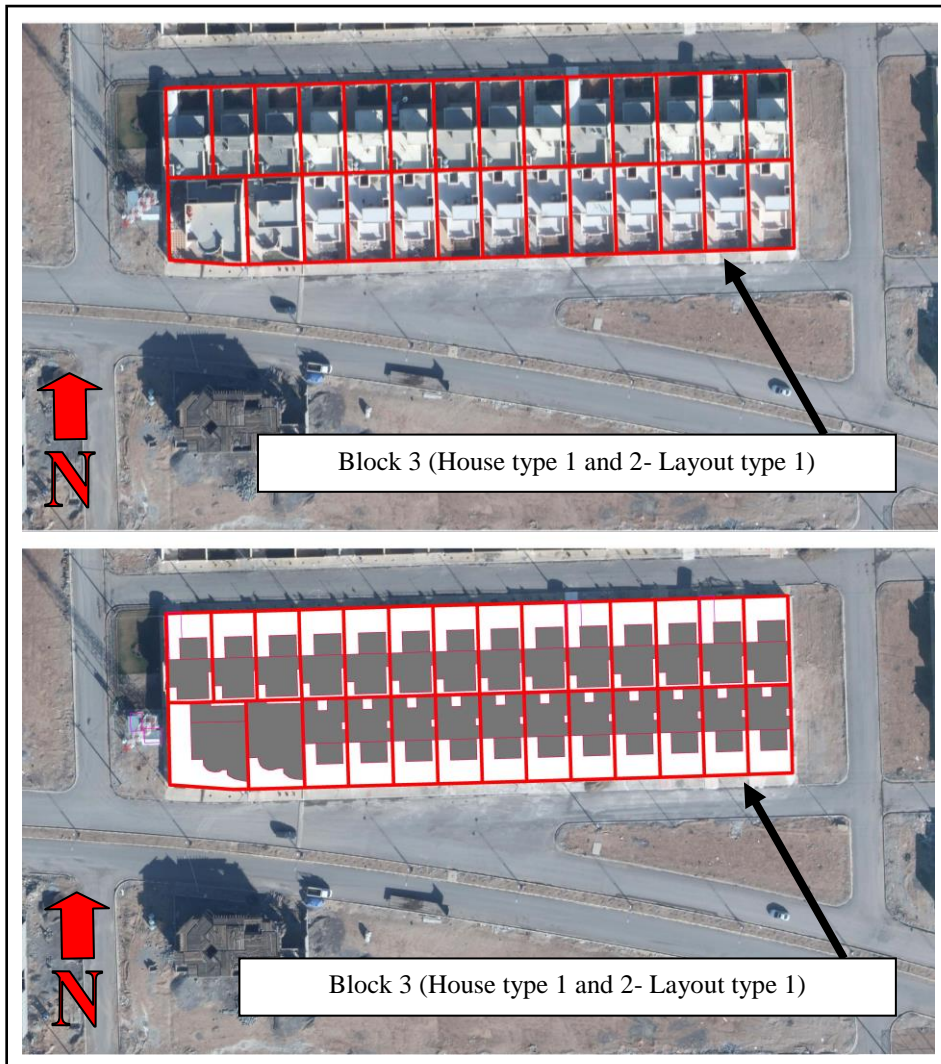


Figure 4.239: A block (block 3) sample from ‘Sample 9_4’ area. The typical average area of the plots of the block is 200m² (10m X 20m). A typical and identical design of type 1 and 2 is adopted for the houses of this block. House type 2 is side attached and rear detached with front setback. Both house types 1 and 2 in this block have been replicated by mirroring (layout type 1). (Source: Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil)

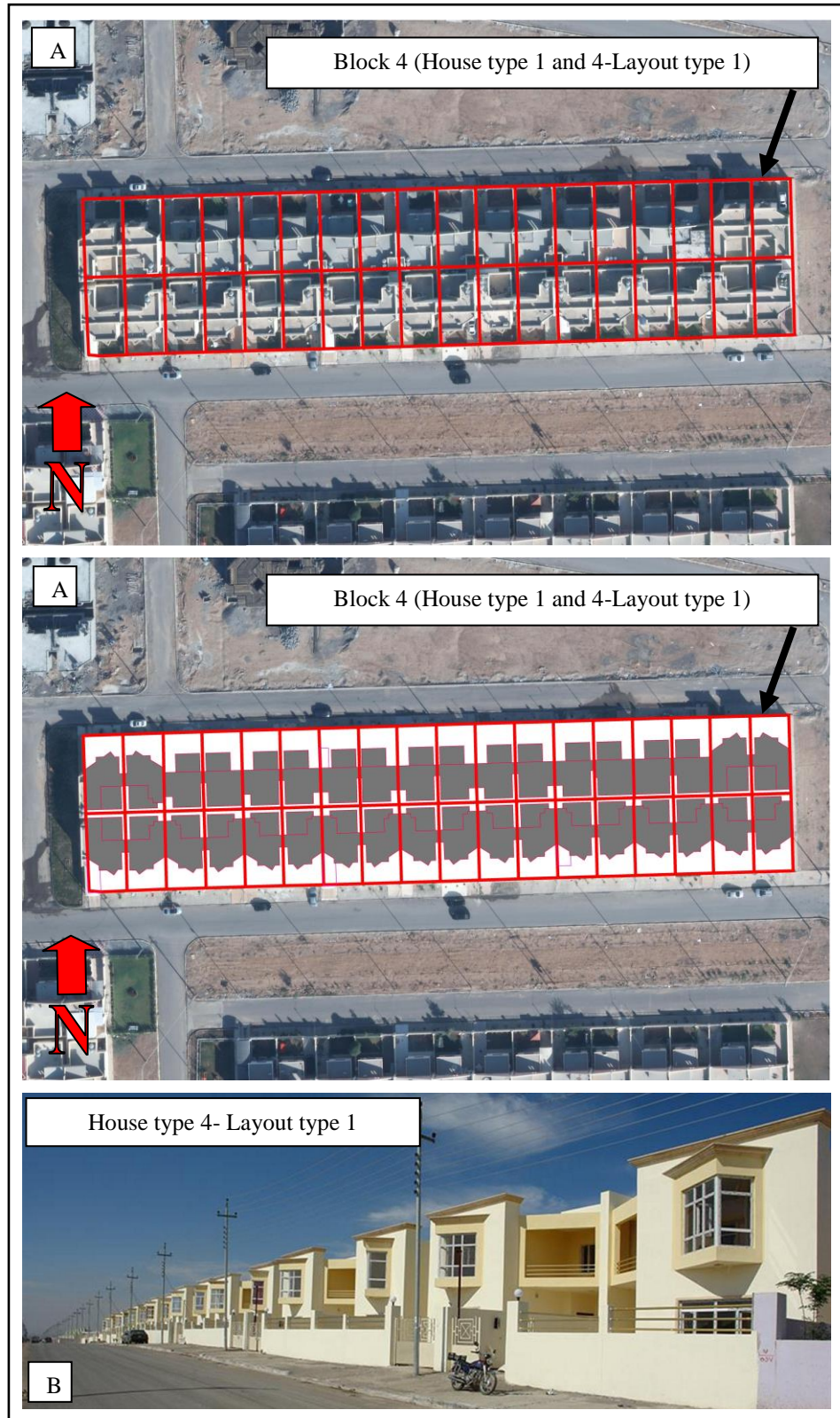


Figure 4.240: A block (block 4) sample from ‘Sample 9_4’ area. The typical average area of the plots of the block is 200m² (10m X 20m). Typical and identical design of both type 1 and 2 are adopted for the houses of this block. House type 4 is side attached and rear detached with front setback. Both house types 1 and 4 in this block have been replicated by mirroring (layout type 1). (Source: **A**) Drawing by the researcher based on data from The General Directorate of Urban Planning and The Real Estate Registry Offices of Erbil **B**) Happy Land Company)

The Formation: The plan and the original land features

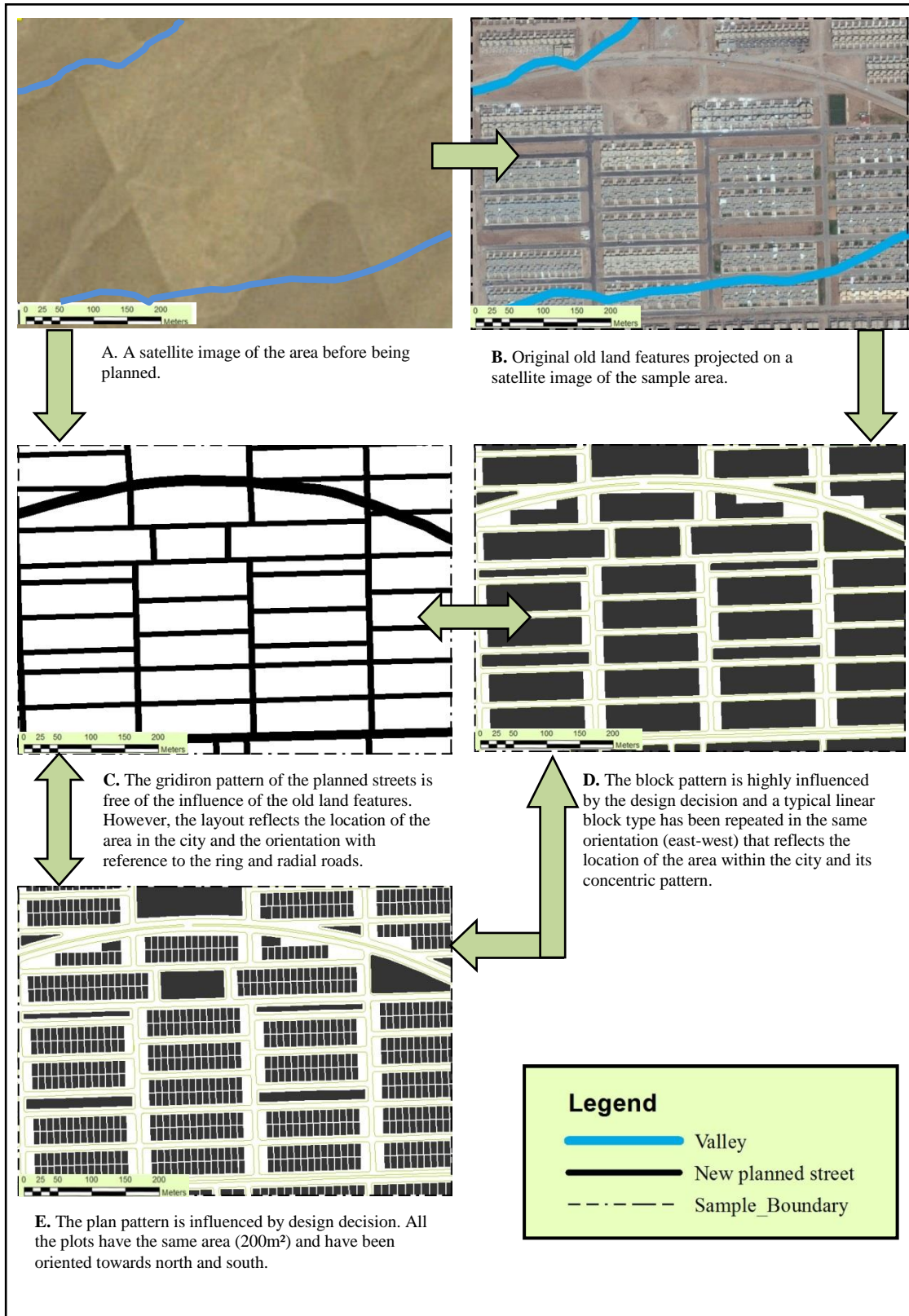


Figure 4.241: The original land features have no significant influence on the pattern of the formed plan. The location of the area within the city and the concentric pattern of the city are more influential. (Source: Drawing by the researcher based on data from The Real Estate Registry offices of Erbil and The General Directorate of Urban Planning)

- **The formation of the area:** The sample area which is a part of ‘Shary Lawan’ housing complex formed in October 2007. Hence, it belongs to the (Ninth period). The project includes around 1050 single-family houses with some neighbourhood services.
 - A. The time period:** The period ‘2004-2013’ included different attempts in different ways to tackle the problems of housing and meet the population growth rate of Erbil. This housing project was granted the investment permit from the Board of Investment under the acceptance number 56 in 31 October 2007. The same factors attached to the time period mentioned in the previous sample (Sample 9_3) are valid in this case as well. However, one of the incentives for investment housing projects to tackle housing problems was ‘Housing Fund Program’ according which the government would take the responsibility of a part of the cost of the project to reduce the cost of the individual houses to people.
 - B. The housing policy:** Similarly to other housing projects built after 2003 and according to ‘Housing Policy 4’, this project also did not follow the individual process of building. Hence, it is expected to achieve the final and complete pattern proposed in the plan of the area in a short time period as all the houses of the project are built together. The project was built by ‘Happy Land Company’.
 - C. The regulations:** The housing projects of investment to certain extent had a freedom in design limitations as they were not restricted by any valid building regulations adopted by the municipality. However, the plan, the average area of the plots, setback distances, and height of the houses do not contradict with the regulations of ‘*Decision No. 940 of 1987*’ and ‘*Instructions No. 851 of 1980*’ which are adopted by the municipality for ‘Policy 1’ of housing. The plan of the project used to include four house types, yet three of them were implemented (House type 1, type 2, and type 4) [Figure 4.232] and [Figure 4.233].

The four characteristic of the form of the houses which have been mentioned in the previous samples will be demonstrated here as well. The typical plot area of all the 1150 house units is 200m² (10m X 20m). The front setback of 5.9m has been applied on all the types, and 1.2m rear setback has been applied on typ1 and type 4. The front area formed

from the front setback is used for a front garden and a car park space. Apart from house type 4 which have two storeys, the rest of the house types have only one storey with a penthouse, and the average height is 7.5m. Few house cases in the area have been submitted to changes of adding a new storey. However, this did not affect the total height of the house as this new storey is on the penthouse height. See example 4 and example 5 of [Figure 4.234]. The fence in the first design was mainly by railing, yet an opaque fence has been implemented and sometimes a railing part is added to the opaque wall [Figure 4.234]. On the plan level of the area, apart from building houses of type 2 in three blocks no significant change can be noticed [Figure 4.235].

Four block samples were selected which show the arrangement of the types of houses in a block [Figure 4.236]. In the first block [Figure 4.237] type 1 has been applied. The type of the house has been replicated by mirroring (layout 1). The houses are side attached and rear detached. However, in the case of 'Block 2' the same type of house has been replicated and arranged by arraying the 'layout 2' [Figure 4.238]. The third block includes both type 1 and type 2 of houses, each on one side of the block. The arrangement of the types in this block is similar to the first block [Figure 4.239]. The last block sample selected includes both house type 1, and houses type 4 which have been arranged by mirroring the type [Figure 4.240]. A clear and straight building line has been achieved by a uniform (5.9m) front setback in both type 1 and type 2 of houses and 4.5m front setback in type 4.

D. Other determinants: Despite the distance of 10.0km of the sample area from the centre of the city and the citadel, the factors of location and the concentric pattern of the city have influenced the urban pattern of this sample as well. But no local land features has played a role in the formation of the pattern of the complex [Figure 4.241]. In addition, other factors have also played a role such as the economic growth, the urban growth of the city, the investment trends, and the decisions emerged from design specification of the types proposed.

4.8 The conclusion of Chapter 4

This chapter is the core of the second stage of the research work. The analysis of the samples was conducted in this chapter [See the fold out page at the end of the thesis]. The analysis process was preceded by successive steps of fieldwork, data collection, and sampling. All these steps were described in this chapter. They were covered in the sections of this chapter which provide a detailed description of the methodology, the tools and methods. The main sources of data used were archival maps, photographs (aerial photos and photos taken by the researcher), and legislative texts.

Sampling is the first step of the analysis. The approach used to sampling started from the city scale level. This was based on grouping the different parts (quarters) of the city according to the date of the emergence of each part, or the periodic growth of the city. This approach helped to understand the geographic feature represented in the location of the sample. Nine groups of quarters which emerged in nine different periods were made: First Period (prior to 1925); Second Period (1926-1940); Third Period (1941-1955); Fourth Period (1956-1965); Fifth Period (1966-1975); Sixth Period (1976-1985) ; Seventh Period (1986-1995); Eighth Period (1996-2003); and Ninth Period (2004-2013). This grouping was made on two assumptions: the first is that each quarter, as it has emerged in a certain period, has common characteristics including the characteristics of form; the second is that the urban form of each part (quarter) of the city reflects the determinants (influencing factors) existed in the period when the quarter was planned and built up. From each period at least one sample of a tissue was selected. However, the selection of the tissues was preceded by the field visits and photographing. This was to consider issues that could exist at the detailed level (micro level) of buildings in the sampling and this determined the decision of selecting more than one sample from certain periods, more specifically Fourth Period and Ninth Period.

Thirteen samples were taken. The analysis through different samples representing different time periods from 1920 to 2013 and linking this process to regulations and other factors (political, social-cultural, economic, and environmental) helped to understand the formation and the transformation of the city's urban form over this period. The potential influence of the chronological events (legislative, political, economic, and social) mentioned in Chapter 3 were closely examined in this chapter through the analysis of the individual samples which have emerged in different periods. This approach of analysis helped to answer the three research questions: **'How, and to what extent has Erbil's urban form been influenced by building and planning**

legislation (regulations) in different periods?’ ‘How has Erbil’s urban form been influenced by different factors (social, cultural, environmental, economic, and political) in different periods?’ and ‘How has Erbil’s urban form changed?’

The urban form of Erbil has been influenced by regulations but the nature and the extent of this influence was different in different periods, and even different in different samples from the same period (Period Nine for example). Different categories of legislation influenced the urban form of Erbil at different stages of the formation and the transformation process. For example, legislation concerning land rights and ownership influenced the early plan of the area of the sample and the nature of this influence changed from a period to another. This influence has been covered in the section of ‘the other determinants’ in the analysis process and it has been represented in the original land features (original land boundaries and roads) prior to the urban development of the area. The layouts of the tissues, the streets, and the blocks have been influenced by this set of legislation, but the influence was stronger in the early periods (Period 2 and Period 3).

However, the influence of the legislation concerning urban planning and building starts from the early stages of the urban development. This set of legislation has been also subjected to changes (amendments to the existing legislation, issuance of new legislation, and cancellation of the old legislation). These changes were responds to the new outcomes that the new events, which happened in each period, have brought. An apparent change that this set of legislation made are: a change from organic and non-planned pattern to planned and ordered pattern; a change from dividing the city into different categories of urban area on which different planning and design parameters are applied and this had been regulated by the ‘*System of Roads and Buildings No. 44 of 1935*’, to treating the city as one urban area on which the same group of planning and design parameters are applied and this was regulated by the ‘*Decision No. 850 of 1979*’, ‘*Instructions No. 851 of 1980*’, and then by ‘*Decision No. 940 of 1987*’; and a change from residential uses represented in the single-family houses to commercial uses represented the multistorey commercial buildings and this process was regulated by the different successive laws of municipalities’ administration and the legislation of ‘*Building Regulations in Commercial Areas No. 4131 of 1989*’. The other set of legislation was concerned in heritage and antiquities or conservation policies (the successive laws of antiquities from 1924 to 2002, the regulations of city centre master plan of Erbil of 2007, and ‘*Urban Design Guidelines for the Buffer Zone of Erbil Citadel of 2011*’). The influence of this set appeared in ‘Sample 1’ and a part of

‘Sample 2’. In addition, the different housing policies informed by different legislation have immensely influenced the urban form of Erbil. ‘Housing Policy 1’ has determined more than 75% of the city’s urban form since 1920. This policy has been regulated by the planning and design set of legislation. However, the other policies were exempt from this set of legislation. In the period after 2003, many private housing complexes appeared. The enactment of the ‘*Law of the Investment in Kurdistan No. 4 of 2006*’ encouraged the building of these complexes. These complexes are characterised by having typical or uniform building types (house types).

The methodology that the research approached, and the analysis conducted in this chapter considered and examined different issues that are connected to the urban form of Erbil. These can be summarised in ten topics: the different scale levels (city level, neighbourhood level, individual plot and building level) and the interrelation between these levels; the periodic growth of the city as key to the formation and transformation; the contradictions between tradition and modernity, the two extremities that are evidently represented in the first (prior to 1925) and the ninth (2004-2013) periods; issues of land rights and ownership and the institutional changes of them over time; the different housing policies; the concentric pattern of the city which is represented in the combination of ring and radial roads; the potential of the selection of tissue samples from the quarters which are also subjected to changes; building control issues and the flux of formality and informality; the building type of the single-family houses and its change; and hints about the expectation of the future forms. Although the analysis of this chapter examined some of these issues, they will be clearly concluded in the next chapter which is about the comparison of the samples.



Comparison



of Samples



Chapter 5

5. The comparison of the samples

In the previous chapter, the formation and transformation of the urban form of the different parts of the city which have been influenced by different regulations and other different forces in different periods of the growth and the evolution of the city have been analysed. This process was conducted through a number of samples and followed a rigorous structure. The analysis process through this structure provided a detailed understanding of the individual cases isolated from the determinants and the constraints that would relate to the relationships and links between those samples.

In this chapter which is the last step of the second stage of the research work, a comparison between those samples is made and the urban morphology of the city is traced through the differences and similarities between the samples. A vertical structure of comparison is adopted in which a certain element is taken from each sample to be compared, and then another element is taken to be compared. In the same way, the comparison continues for the rest of the elements one by one. In the comparison structure, the focus is on the elements.

5.1 Comparison process







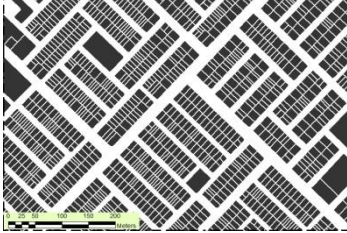
The change and transformation process within each individual sample was identified in the previous chapter. In this chapter, the transformation of the city is traced through the changes of the urban form between the samples over the successive periods. The samples will be compared firstly through the **form elements** including the urban tissue (the layout of streets, blocks, plots, and buildings) and the form characteristics of single-family houses; and secondly through the influencing **determinants** of the formation and the transformation process. This process of comparison establishes a comprehensive understanding of the morphological process of the city since 1920. Presenting the changes between the samples concludes the panoramic scene of the evolution process of the city through the periodic scenarios.

The process of the comparison is presented in matrixes each presenting an element. The first matrix examines the sample tissue and the form elements as a whole but with a focus on plots as entities aggregated to form the whole [Figure 5.1]. The comparison concludes the cases that have similarities and the cases which are different. Despite the fact that Sample 6, Sample 7, Sample 8, Sample 9_1, and Sample 9_2 are situated in different locations in the city, they have similar pattern and can be grouped

together. They are influenced by the local land features but with a reduced strength compared to the earlier samples.

Sample 1 is a unique case and different to the rest as it represents the organic pattern integrated with the pattern of the ancient citadel although there have been regular and planned actions to modify it. The Samples which have emerged after 1925 are mostly based on the regulations enacted from 1935 and the organic characteristic has completely disappeared in them. A fluctuation between formal and informal actions has been remarkable throughout the samples. The tissue layouts of each of Sample 2, Sample 3, Sample 4_1, Sample4_2, and Sample 5 are different. These differences emerge from a number of factors which can be summarised in the characteristic determinants of the time period in which they are built and their location within the city. More specifically, the determining factors are the regulations, the housing policies, the design and plan intentions, the relation to the other parts of the city, the influence of the concentric pattern of the city, the original features of the land, and the common and prevalent housing types of the period. Of course, these were not independent from the political, social, and economic influences which existed in the periods.

For example, Sample 2 is a mixture of formal and informal actions, a mixture of 'Housing Policy 1' and 'Housing Policy 5', a mixture of traditional courtyard housing types in the older parts and modern with front setback housing types in the eastern parts which have been built after the western part, strongly influenced by the original and topographic features of the land such as the valleys, the agricultural land boundaries, and immediately located in the north of the citadel and the elements of streets and blocks are oriented accordingly. However, Sample 4_2 is a mixture of 'Housing Policy 1' and 'Housing Policy 2', influenced by the regulations of housing associations, the orientation of the older part is free from the factors of the location within the city, and has a different design approach to Sample 2. Sample 4_1 has a Cul-de-sac and looped pattern which distinguishes it from the rest of the samples. Sample 5 is also a mixture of formal and informal actions but its layout is different due to its location within the city and influenced by the regulations of formalising it. Both Sample 9_3 and Sample 9_4 are different to the rest of the earlier samples. Their difference can be visually noticed in their tissue layout. Their difference is mainly due to that they are built according to 'Housing Policy 4'. They are housing complexes that have been planned, designed, and built by developers and investors and not or little influenced by the local regulations adopted in the other parts of the city. They did not follow the same planning and building approaches and institutional paths and procedures.

1) Tissue layout		The characteristics
Sample 1 / period 1		Organic, unplanned, and irregular pattern interrupted by regular routes resulted from planned actions. The area of the plots of the houses vary between 70m ² to 300m ² .
Sample 2 / Period 2		It consists of different parts that have emerged from different periods [Figure 4.41, p157]. The pattern of the oldest part resulted from a mixture of formal and informal actions, plans, and buildings over time. There is no average plot area of the houses. The different parts have different typical plot areas. The areas range from 90m ² to 300m ² .
Sample 3 / Period 3		It consists of different parts that have emerged from different periods [Figure 4.72, p196]. The different parts have different typical plot areas. The areas range from 200m ² to 300m ² .
Sample 4_1 / Period 4		It consists of different parts [Figure 4.93, p224]. However, compared to the two previous cases (Sample 2 and Sample 3), the parts are larger. The different parts have different typical plot areas. The original average areas range from 300m ² to 650m ² . The plots have been subjected to subdivision actions since 1979.
Sample 4_2 / Period 4		It consists of different parts [Figure 4.111, p255]. The different parts have different typical plot areas. The areas range from 108 m ² to 200m ² . The plots did not face actions of subdivisions. However, the buildings of the houses have been subjected to both extensions of the existing and replacement of the existing.
Sample 5 / Period 5		It has been formed by informal plans and individual actions of buildings. It has been elaborated and legalised by formal and planned interventions. The elements are oriented along two axial directions (Northeast-Southwest and Northwest- Southeast). Plot areas range from 100 m ² to 200m ² .
Sample 6 / Period 6		It consists of different parts planned in one period [Figure 4.139, p304]. The elements are arranged in perpendicular axes (Northeast-Southwest and Northwest-Southeast) oriented. The different parts have different typical plot areas, range from 200 m ² to 320m ² . The plots have been subjected to subdivision actions.

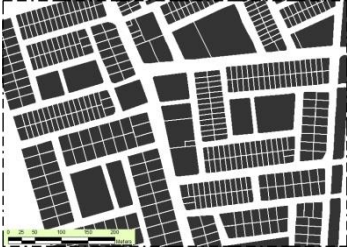

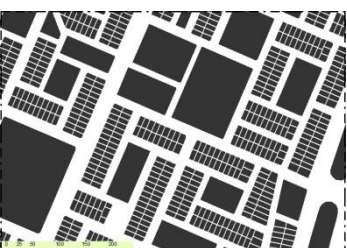
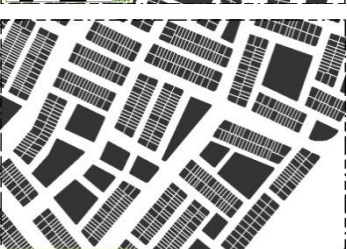
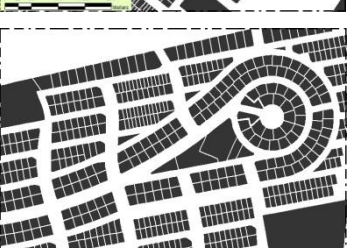



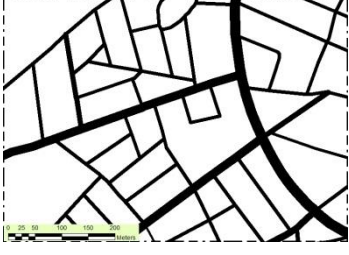



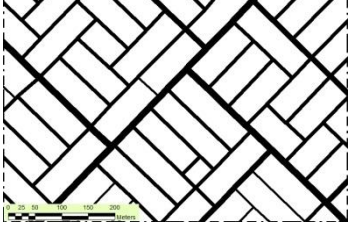
	1) Tissue layout	The characteristics
Sample 7 / period 7		It consists of different parts planned in the same time period [Figure 4.158, p332]. The different parts have different typical plot areas. The areas range from 200m ² to 600m ² . The larger plot areas have been subjected to both formal and informal subdivisions. The elements arranged in almost a perpendicular axes.
Sample 8 / Period 8		It consists of different parts planned in the same period [Figure 4.177, p360]. The different parts have similar typical plot area. The average area is 200m ² .
Sample 9_1/Period 9		The quarter has two different parts [Figure 4.192, p382]. The plots of the part covered in the sample boundary have areas of 200m ² . However, the typical plot area of the other part is 250m ² . Subdivision of plots is not allowed. Apart from the influence by factors of location within the city, the layout type is similar to the last samples.
Sample 9_2/ Period 9		The quarter and the area is one part. The typical area of the plots is 250m ² . Subdivision of plots into two equal and non-equal areas is common. Similarly to the last three samples (Sample7, Sample8, and Sample9_1) the layout of this sample is influenced by its location within the city in which the orientation differentiated.
Sample 9_3/ Period 9		The area covered in the sample area has four different house types. The typical areas of the plots of the different types of the houses are 140m ² , 200m ² , 240m ² , and 325m ² . Yet, the house could have a plot of a larger area than the typical. Apart from a circular part, the elements are one axis oriented and East-West directed.
Sample 9_4/ Period 9		The area is one housing complex. The typical area of the plots is 200m ² . The elements are one axis oriented and East-West directed.

Figure 5.1: A visual comparison of the tissue layouts of the samples. (Source: Researcher)

In the second matrix the street layout is examined [Figure 5.2]. Similarly to the layouts presented in the first matrix, the street layouts are also very much dependant on factors mentioned. Due to a visual similarity, the street layouts of Sample 6, Sample 7, Sample 8, Sample 9_1, and Sample 9_2 can be grouped together although they have been built in different periods from 1980 to 2014. Their street layout almost have influenced by a similar set of regulations, '*Decision No. 850 of 1979*', '*Instructions No. 851 of 1980*', and '*Decision No. 40 of 1987*'. The same pattern of street hierarchy is adopted in them. 'T-junctions' and a minimum width of 10m are the characteristic features of the street layouts of this group of samples. The differences of the layout can be visually concluded in each of Sample 1, Sample 2, Sample 3, Sample 4_1, Sample 4_2, Sample 5, Sample 9_3, and Sample 9_4.

Sample 1 is characterised by the organic pattern intervined by planned, wide, and straight streets. The street layout of Sample 2 is characterised by the dominance of North-South orientation and have alleys of narrow widths compared to the later samples (except Sample 4_2). It is influenced by the original land features. The street layout of Sample 3 is very much influenced by the concentric pattern of the city, its location, and the original land features. The same reasons exist in the layout of Sample 4_1 but they are translated and resulted in a different layout except that Cul-de-sac and looped streets characterise the layout. Again the street layout of Sample 4_2 is unique due to the same reasons mentioned in the tissue layout of the sample. The street layouts of each of Sample 9_3, and sample 9_4 are different as they are not restricted by the same set of the regulations used in the earlier samples. The difference between the street layout of Sample 9_3 and Sample 9_4 is due to that they are built by different developers who are not restricted by certain planning and design guidelines.

2) Street layout		The characteristics
Sample 1 / period 1		Organic, narrow, unplanned, irregular, and closed end routes pattern interrupted by regular, planned, straight, and wide streets. Minimum width of streets is 3m. The organic pattern is a continuity of that of the earlier period originated from the citadel. Yet, the new interventions represent regulations directed actions.
Sample 2 / Period 2		Oblong irregular grid pattern with a dominance of North-South oriented routes. However, some roads of a different orientation exist. The routes are straight and perpendicular, and much influenced by the original land features and the concentric pattern of the city. Minimum width of streets is 3m. Dead end routes started to disappear in this period.
Sample 3 / Period 3		The layout is influenced by the original land features and the concentric pattern (ring and radial roads) and integrated with it. It includes segments of Third Ring Road and radial roads extended from the city centre. The minimum width of streets is 10m.
Sample 4_1 / Period 4		The pattern consists of routes perpendicular to each other. The layout is influenced by the original land features and the concentric pattern, few closed end examples and one looped exist. The minimum width of street is 10m.
Sample 4_2 / Period 4		A combination of cellular and a hierarchical oblong grid layout with an orientation free from the influence of the factors of location within the city (the concentric pattern), but then integrated within the larger context. The influence of the original land features and the concentric pattern appear in the outer part. The minimum width of street is 6m.
Sample 5 / Period 5		Simple 'Oblong grid' pattern with 'Cross-junctions' in the eastern part and 'T junctions' in the western part. The layout is influenced by the concentric pattern of the city. The original land features have little influence. This justifies the uniform orientation. The minimum width of street is 10m.
Sample 6 / Period 6		'Oblong' pattern with 'T-junctions' and least 'Cross-junctions'. The concentric pattern of the city is apparent in the orientation of the routs. The original land features have little influence. This justifies the uniform orientation of the streets. The minimum width of streets is 10m.

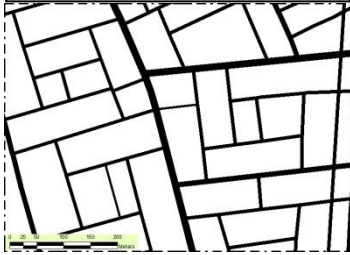
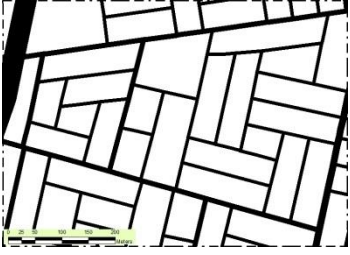
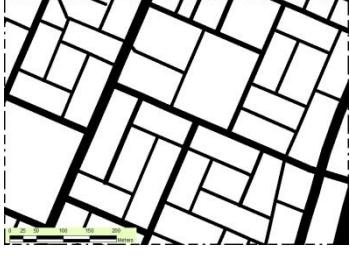
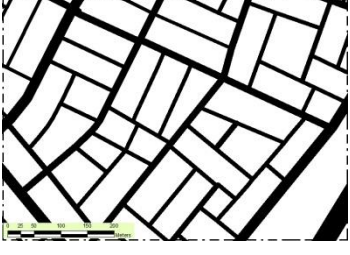
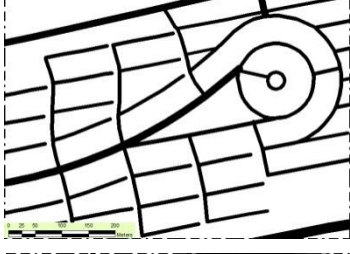



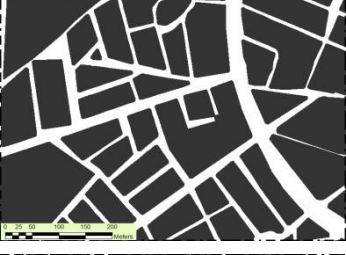


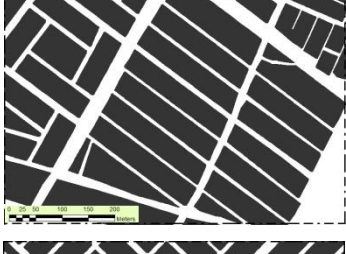
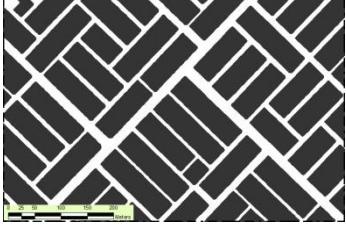
2) Street layout		The characteristics
Sample 7/period 7		'Oblong' pattern with 'T- junctions' and least 'Cross-junctions'. The orientation of the concentric pattern of the city is apparent in the orientation of the routes. The original land features have little influence. The minimum width of street is 10m.
Sample 8/ Period 8		'Oblong' pattern with 'T- junctions' and least 'Cross-junctions'. The orientation of the concentric pattern of the city is apparent in the orientation of the routes. The original land features have little influence. The minimum width of street is 10m.
Sample 9_1/Period 9		'Oblong' pattern with 'T- junctions' and least 'Cross-junctions'. The orientation of the concentric pattern of the city is apparent in the orientation of the routes. The original land features have little influence. A uniform orientation is dominant. This justifies the link to the concentric pattern. The minimum width of street is 10m.
Sample 9_2/ Period 9		'Oblong' pattern with 'T- junctions' and least 'Cross-junctions'. The orientation of the concentric pattern of the city is apparent in the orientation of the routes. The original land features have little influence. The minimum width of street is 12m.
Sample 9_3/ Period 9		Curvilinear with Cul-de-sac pattern. The orientation of the concentric pattern of the city is apparent in the orientation of the routes. The minimum width of street is 10.5m.
Sample 9_4/ Period 9		Oblong grid pattern with both 'Cross-junctions' and 'T- junctions'. The orientation of the concentric pattern of the city is apparent in the orientation of the routes. The original land features have little influence. The minimum width of street is 12m.

Figure 5.2: A visual comparison of the street layouts of the samples. (Source: Researcher)

In the third matrix the focus is on the block of plots that are separated by streets and other public spaces [Figure 5.3]. The blocks are interrelated with plots and streets. The layouts of the streets determined the layouts of the blocks. The same kind of grouping which was made in the street layouts is valid here in the block layouts. The same influencing factors exist. However, the similarities and differences emerge from the shape of the blocks and the size of the blocks represented in the width and length which in turn is influenced by the size of the plots and the number of the plots in the block.

In Sample 1 irregular and organic street pattern and plot shape and size resulted in irregular pattern of blocks. The interventions of regular and straight streets also resulted in the modification of the blocks. Rectangular or similar such as trapezium shapes of blocks with two back attached rows of plots are characteristic in almost all the samples. However, other shapes such as triangular exist in some areas of some of the samples. These are a result of the original land features such as the old roads, the land boundaries, and the topographic nature of the land. 40m width of blocks is dominant in all the samples excluding Sample 1, and Sample 2. This width allows having a plot of 20m depth which is a typical depth in Erbil. However, some of the samples also included blocks of a different width such as 30m in Sample 4_2 and Sample 5, 45m in Sample 3, 50m in Sample 5 and Sample 7, 60m in Sample 4_1 and Sample 7.

3) Block layout		The characteristics
Sample 1 / period 1		Organic, unplanned, no typical shape, and irregular pattern. Planned actions of opening up new streets broke down some blocks and elaborated the edges of them. The shapes are determined by natural land features such as valleys.
Sample 2 / Period 2		The majority of the blocks have trapezium shape oriented North-South is dominant. Few triangular, parallelogram, and trapezium blocks exist. No typical and no uniform size exists. As the streets, the layout of the blocks is influenced by the natural land features such as valleys and old roads.
Sample 3 / Period 3		Trapezium block shape is dominant, but parallelogram, trapezium, and triangular shapes exist. The original land boundaries and roads determined the layout pattern, the shape, the size, and the orientation of the blocks. Rectangular shape is dominant. The typical width of the blocks ranges from 40m to 45m.
Sample 4_1 / Period 4		The eastern part is dominated by 'U' shape blocks and oriented 'North-South'. The western part consists of rectangular and trapezoid blocks. The difference of the orientation between the eastern and the western parts (the slight rotation in the orientation) is due to the concentric pattern of the city. The typical width of the blocks is 40m, and 60m.
Sample 4_2 / Period 4		Rectangular shape of blocks is dominant. The orientation of the blocks of the oldest part (the cellular central part) is free from the influence of the concentric pattern of the city. The typical width of the blocks is 30m, and 40m.
Sample 5 / Period 5		The eastern part which has been formed informally consists of trapezoid blocks (uniformly oriented influenced by the concentric pattern of the city). The western part which is formed formally, includes rectangular blocks but shorter. The typical width of the blocks is 40m, 30m, and 50m.
Sample 6 / Period 6		Rectangular and typical block pattern is dominant. The blocks are oriented in two perpendicular directions. Their orientation is influenced by the concentric pattern of the city. The typical width of the blocks is 40m.

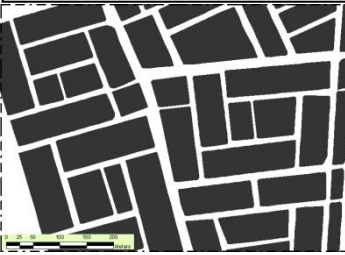
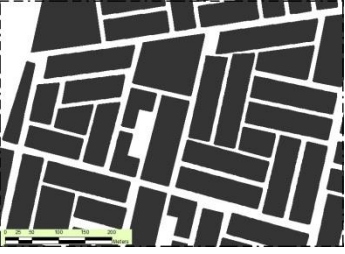
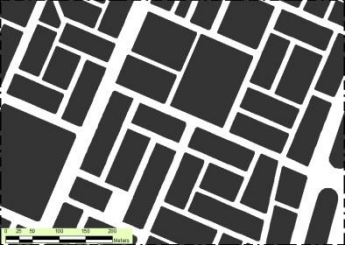


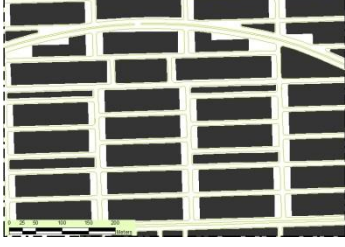

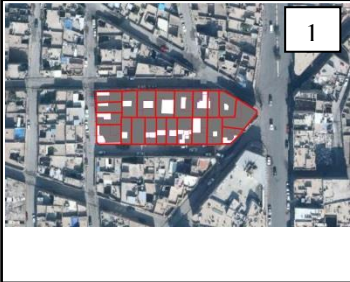
















3) Block layout		The characteristics
Sample 7 / period 7		Rectangular and trapezoid shapes of blocks are dominant. The orientation of the blocks is determined by the concentric pattern of the city. The typical width of the blocks is 40m, 50m, and 60m.
Sample 8 / Period 8		Rectangular and trapezoid blocks are dominant. But it includes some irregular rectangular (parallelogram and trapezium) blocks. The orientation of the blocks is determined by the concentric pattern of the city. The typical width of the blocks is 40m.
Sample 9_1 / Period 9		Rectangular shape of blocks is dominant. The orientation of the blocks is influenced by the concentric pattern of the city. The typical width of the blocks is 40m.
Sample 9_2 / Period 9		Rectangular and trapezoid shape of blocks is dominant. The orientation of the blocks is influenced by the concentric pattern of the city and the land features (security trench). The typical width of the blocks is 40m.
Sample 9_3 / Period 9		Typical rectangular blocks is dominant. Donut segments' shape exists. The orientation of the blocks is influenced by the concentric pattern of the city. They are uniformly oriented. The typical depth of the blocks is 40m.
Sample 9_4 / Period 5		Uniform rectangular blocks is the prevalent shape. The orientation of the blocks is influenced by the concentric pattern of the city. They are uniformly oriented in a grid and East-West directed. The typical width of the blocks is 40m.

Figure 5.3: A visual comparison of the block layouts of the samples. (Source: Researcher)

The last matrix is concerned with buildings (houses) in a relation to plots and blocks with a focus on the variables that measure this relationship, including plot coverage, building setback, and building line [Figure 5.4]. The housing policies and the regulations have played a significant role in determining the housing types and the building orientation of the house within the plot. The layout and the orientation of the houses of a particular sample can vary although they are determined by the variables of setback and plot coverage specified by the same set of regulations. This is the case in the quarters that are built according to 'Housing Policy 1' which is characterised by the individual process of building. As the regulations specified the minimum allowance of front setback, the building lines in the blocks are mostly liable to become discontinuous by some buildings which have a front setback distance more than the minimum allowance. This is not the case in each of Sample 9_1 to which different regulations and control tool are applied, Sample 9_3, and Sample 9_4 which are followed 'Housing Policy 4'.

The traditional courtyard houses exist in the old part (eastern part) of Sample 2. This type disappeared in the samples of the later periods. The '*System of Roads and Buildings No. 44 of 1935*' introduced new types of buildings which did not exist in the city. In the areas which had been categorised as 'Third Urban Area Category' and upward, setback from all the sides of the plot was compulsory which resulted in a detached type. Few examples of this type can be observed in the blocks of Sample 3 and Sample 4_1. The plot size was the element which was most exposed to modifications and less resistant to changes. The regulations of 1979, 1980, and 1987 reduced the minimum allowance plot area of the houses to 120m² and then to 200m². This change exposed all the existing plots which have a larger size to subdivision actions. Subdivided plot is phenomenal in all the samples except Sample 9_1 in which subdivision actions is prohibited by regulations, and Sample 9_3, Sample 9_4 which are built by developers according to 'Housing Policy 4' and exempt from the individual process of building.

4) Block-Plot-Building		The characteristics
Sample 1 /period 1		
Sample 2 / Period 2	 	<p>The houses have been individually built.</p> <p>1-Attached courtyard houses in the first block. No setback.</p> <p>2-Attached and irregular semi-detached houses in the blocks of the eastern part. Setback applied.</p>
Sample 3 /Period 3		<p>The houses have been individually built.</p> <p>Detached, irregular semi-detached, and attached houses. Different front setback distances resulted in the discontinuity of building lines.</p>
Sample 4_1 / Period 4	 	<p>The houses have been individually built.</p> <p>1-Detached, irregular semi-detached, and attached houses. Different front setback distances resulted in discontinuity of building lines.</p> <p>2-Attached and irregular semi-detached houses. Different front setback distances resulted in discontinuity of building lines.</p>
Sample 4_2/ Period 4	 	<p>The houses have been individually transformed</p> <p>1-Attached houses. A mixture of having and not having front setback.</p> <p>2-Attached houses. Apart from the buildings at the corners, has relatively clear building lines.</p>

4) Block-Plot-Building		The characteristics
Sample 5 / period 5	 	<p>The houses of the area have been individually built.</p> <p>1-Informal houses. A mixture of types.</p> <p>2-Formal attached houses. Different front setback distances resulted in discontinuity of building lines.</p>
Sample 6 / Period 6	  	<p>The houses of the area have been individually built.</p> <p>1-Attached type is common. One of the sides has clear building line.</p> <p>2-Attached houses with relatively consistent front setback and clear building line.</p> <p>3-Attached houses. Different front setback distances resulted in discontinuity of building lines.</p>
Sample 7 / Period 7	  	<p>The houses of the area have been individually built.</p> <p>1-Building is still in progress. Attached houses. front setback is applied. One of the sides of the block has a relatively clear building line.</p> <p>2-Attached houses. Different front setback distances resulted in discontinuity of building lines.</p> <p>3-Building is still in progress. Front setback is applied. A relatively clear building line exist but due to the differences in setback distances the building line is not straight</p>
Sample 8 / Period 8	 	<p>The houses have been individually built. Building is still in progress in both blocks.</p> <p>1-Attached type. Building line is discontinuous.</p> <p>2- A consistent setback resulted in clear building lines.</p>

Block-Plot-Building		The characteristics
Sample 9_1/period 9		<p>The houses have been built individually. Building is still in progress in both blocks.</p> <p>1-Attached houses with consistent setback. 2-Attached houses with consistent setback.</p>
Sample 9_2/Period 9		<p>The houses have been built individually. Building is still in progress. Attached houses with consistent front setback distances.</p>
Sample 9_3 / Period 9		<p>The houses have been built in one time by a developer. Building is complete in all the blocks. Typical designs and front setback distance applied. Consequently, this resulted in forming clear building lines.</p> <p>1-Side attached and back detached houses. 2-Side detached and back attached houses. 3-Attached houses. 4-Semi-detached houses.</p>
Sample 9_4 / Period 9		<p>The houses have been built in one time by a developer. Building is complete in all the blocks. Typical designs and front setback distance applied. Consequently, this resulted in forming clear building lines.</p> <p>1-Side attached and rear detached. 2- Side attached and rear detached. 3- Side attached and rear detached. 4- Side attached and rear detached.</p>

Figure 5.4: A visual comparison of the pattern of building-plot-block of the samples. (Source: Researcher)

A summary of the influence of the concentric pattern

From the previous comparison it can be noticed that the layouts of the samples have been influenced by the concentric pattern of the city. Their locations in relation to the city centre and the citadel, and their distances from that centre, have determined their orientation. The streets are oriented in a way they integrate into the concentric network of the streets of the city. As a result, the layouts of the blocks also reflect that influence. Consequently, this will be also true for the individual plots and buildings. The distances from the centre determined the nature of the influence. The closer to the centre, the more liability to the variances of orientation between the streets, blocks, and plots of the sample is. This can clearly be observed between ‘Sample 3’ and ‘Sample 9_4’. See [Figure 5.5].

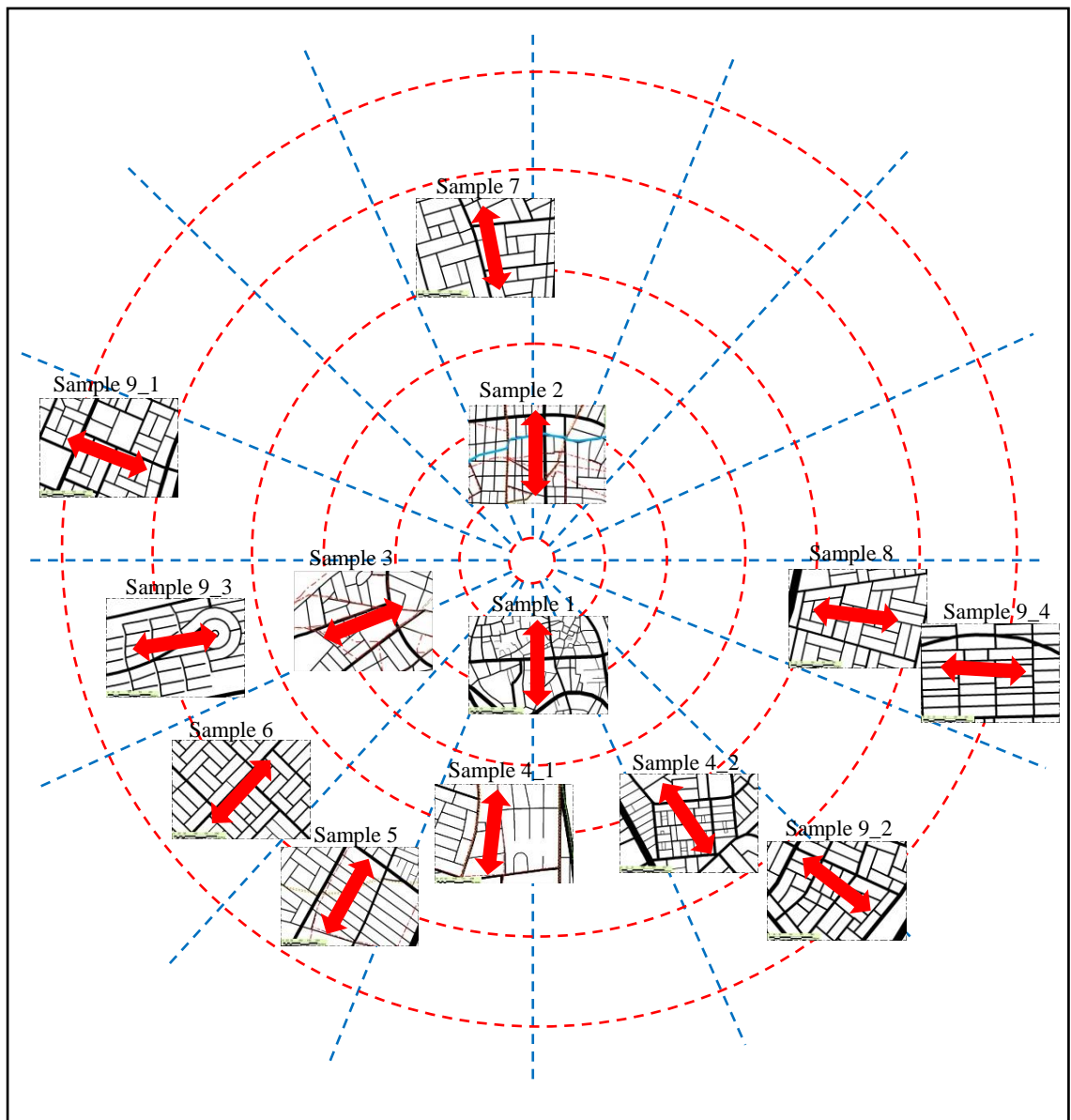


Figure 5.5: The relationship between the concentric pattern and the layout of the samples.
(Source: Researcher)

5.2 Conclusion of building types and characteristics

The building types concluded in each period are presented in [Figure 5.6] and [Figure 5.7]. Some key issues of interpretation of the types concluded needed to be clarified. For example, the houses of the same layout but with different heights or different number of storeys are represented in different types; the houses built on the subdivided plots have not been presented alone as a type but they are shown with their twin in the original plot; the types that refer to the subdivided plots disregard that the subdivision is equal or unequal; the types that show courtyards or air shafts represent the idea in general disregarding the location and the orientation of the courtyards and the air shafts; and the types of different sizes refer to the difference in the plot areas.

Period 1 (-1925) [Figure 5.6]

Here, the courtyard type is prevalent. However, depending on the orientation of the courtyard, different choices exist and they can be grouped under five categories of type: the courtyard is surrounded from three sides (a-Period 1); the courtyard is surrounded from two opposite sides (from back and the front of the house, b-Period 1); the same previous orientation but with the variance in the heights (c-Period 1); the courtyard is surrounded from all the sides by a single storey building (d-Period 1); and the courtyard is surrounded by all the sides by two storey buildings (e-Period 1).

Period 2 (1926-1940) [Figure 5.6]

The same types mentioned in period 1 continued to appear in this period with no significant change.

Period 3 (1941-1955) [Figure 5.6]

This period witnessed a shift and a discontinuity of the courtyard types typical of former periods. However, the courtyard type did not wholly disappear, yet it was subject to modifications. Overall, the types that emerged in this period can be grouped into four main categories: modified courtyard type which combines the characteristic of the courtyard and the front setback of the modern types (a-Period 3); fully detached two storey house type (setback from all the sides of the plot) on plots of areas of 500m² and more (b-Period 3); fully detached one storey house type (setback from all the sides of the plot) on plots of areas range from 300m² to 500m² (c-Period 3); and the same as the previous but with two storeys height (d-Period 3).

Period 4 (1956-1965) [Figure 5.6]

The courtyard type has completely disappeared, replaced by the types of the houses informed by the new modern regulations. The difference of this period from 'Period 3' is that semi-detached and attached choices of types emerged and the tendency was towards the attachment of the sides as the width of the plots restrict setback from the sides. Examples of modifying the existing detached houses to semi-detached by extensions to the house emerged. The choice can be grouped into four main types.

Period 5 (1966-1975) [Figure 5.6]

Courtyard type on small area plots started to informally appear. Some of the possibilities of the previous period were forwarded to this period. However, the attached house types of both one storey and two storeys height on 200m² plot area emerged. All the types mentioned, from this period and the earlier periods, that have the front setback distance allowed having spacious front gardens and a car park area. This is the case in all the types with front setback mentioned in the earlier periods.

Period 6 (1976-1985) [Figure 5.7]

Fully detached house types started to disappear in this period. Choices of semi-detached and attached houses on plots of areas ranging from 200m² to 500m², with front setback for front garden and car park became common. The interesting point in this period is that a formal subdivision of plots for building more than one house emerged as the new regulations issued in 1979 allowed the subdivision of plots into areas not less than 120m². The subdivision could be into equal or unequal areas. The possibility of the houses on the subdivided plots could be identical or different.

Period 7 (1986-1995) [Figure 5.7]

No significant change in the type of the houses can be noticed in this period and no notable difference can be observed between this period and the previous one. All the possibilities existed in the previous period passed to this period.

Period 8 (1996-2003) [Figure 5.7]

The same possibilities of types were forwarded from 'Period 6' and 'Period 7' to this period. However, the minimum area allowance of plot subdivision increased to 200m². This means that all the plots which have areas of 400m² or more were liable to be subdivided and be used for two houses.

Period 9 (2004-2013) [Figure 5.7]

Major changes can be observed in this period. In addition to the choices forwarded from the previous period, many new choices of types emerged, which branched from three different characteristics. These included firstly subdivision; secondly using the front area created from the front setback for a car park or reducing the distance of the front setback and creating a space for a car in the ground floor immediately under the built up areas of the first floor; and thirdly the differences in the number of the storeys of the house. Two significant points can be summarised in this period. The first is the emergence of the informal subdivision which appeared towards the end of the previous period (Period 8) has become characteristic in this period. The common informal subdivision area is 100m² (5m front width X 20m depth). The second is that the private housing projects imported the types of pitched roof for the first time while the local roof type was flat with having parapet as the roof has functions (they were used for some activities in summers).

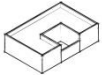

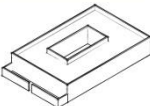
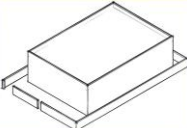
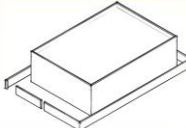
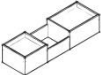

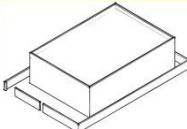
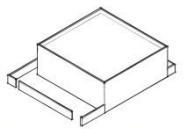
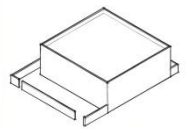



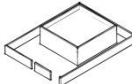
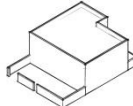


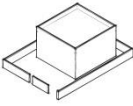
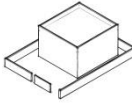



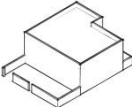
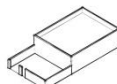
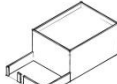
	Period 1	Period 2	Period 3	Period 4	Period 5
a					
b					
c					
d					
e					
f					

Figure 5.6: A summary of the possibilities of the house types of ‘Period 1’ to ‘Period 5’.
(Source: Researcher)

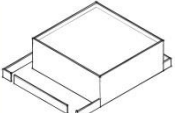
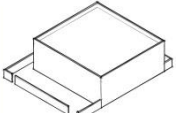
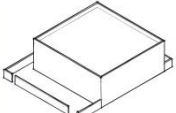
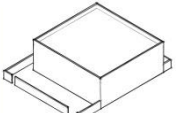
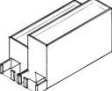
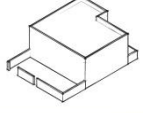
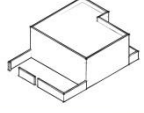
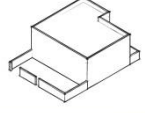
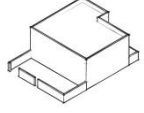
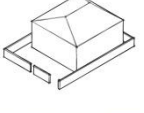
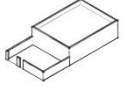
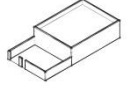

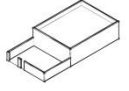
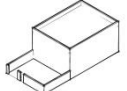
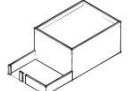
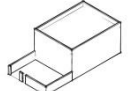
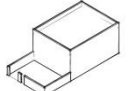
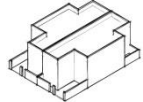
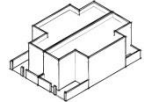
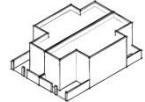
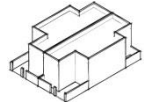
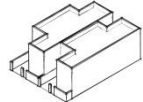
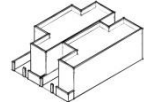
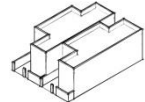
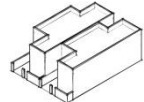
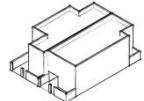
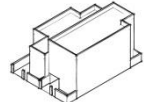
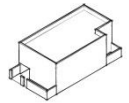
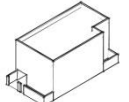
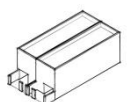
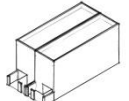
	Period 6	Period 7	Period 8	Period 9	
a					
b					
c					
d					
e					
f					
g					
h					
i					
j					
k					
l					

Figure 5.7: A summary of the possibilities of the house types of ‘Period 6’ to ‘Period 9’.
(Source: Researcher)

5.3 The conclusion of Chapter 5

This chapter is the last step of the second stage of the research work. It is analysis through a comparison process between the analysed samples in Chapter 4. It took a different perspective to approach understanding the formation and the transformation of the urban form of Erbil. In this chapter, the focus has been on the elements of form by which the differences between the samples have been concluded. It concluded some form characteristics of the elements of form of the samples. Through matrixes, the tissue layout, the street layout, the block layout, and the relation of block-plot-building were covered in the comparison. This approach visually showed the changes from a period to another in a simple way. It also concluded the link between the layout of the streets and the blocks of the samples, and the concentric pattern of the city.

However, the chapter not only dealt with form two-dimensionally, but also three-dimensionally. It concluded the abstract form (building type) of the houses of each period through three-dimensional drawings. The traditional courtyard type of houses, which does not have front setback, was prevalent in the first and the second periods (-1940) and gradually started to disappear from the third period (1941-1955). However, the traditional courtyard type appeared in some of the following periods, especially in the informal areas (Sample 5 for example). The types of houses also varied and alternated between attached, semi-detached, and detached over the successive periods. Meanwhile, the setback and plot coverage variables changed from an area to another according to the '*System of Roads and Buildings No. 44 of 1935*' which divided the city into different urban area categories on which different planning and design parameters are applied. This continued until 'Period 6' when '*Decision No. 850 of 1979*', '*Instructions of Decision No. 851 of 1980*', and then '*Decision No. 940 of 1987*' were enacted which treated the whole city as one area when they applied almost the same set of planning and design parameters. This increased the possibility of similarities between the different urban area categories of the city. Houses of smaller plot areas (120m² - 200m²) became common. Informal and formal subdivision of plots into two or more for building more than one house became a phenomenon as a result of the latter legislation. In 'Period 9' (2004-2013), the options of house types increased, especially the houses on a subdivided plots into two. In addition, the front setback distances of the built up houses decreased to the minimum limit (2.5m, and 1.5m) that the legislation defined.

Chapter 6

6. Conclusions, implications, and future studies

This chapter sums up the process of the formation and the transformation of Erbil's urban form and the issues that have determined this process. It covers the summary of the main aspects of the methodology used and its potential to answer the research questions, and the relationship between the urban form of Erbil as the focus of the research on one hand and the legislative factors and other influencing factors (social, cultural, economic, and political) on the other. It relates the findings back to the research questions. The importance and the contribution that the research could offer to existing knowledge and its implications are demonstrated. The issues are organised in a different structure by which the main subject of the research, which is urban form and regulations in the context of Erbil, is highlighted.

6.1 The methodology and research questions

A summary of the designed methodology to answer the research questions addressed is made. All the issues studied and mentioned in the previous chapters that relate in different ways to the research questions provide the essential structure of the designed methodology. The methodology adopted took aspects from the approaches of the English and the Italian Schools of urban morphology. Both the English and the Italian Schools overlap in some aspects. They both consider the plot as a constitutional unit of urban form. The 'form complexes' of the threefold divisions of the urban landscape: ground plan, building form, and land use are adopted in the methodological approach. Aspects and determinants of urban morphology at the city scale level deal with geographic issues that have roots in the English School. The elements of urban form such as street, plot, and building are not independent from the influences of the geographic factor represented in the location and the orientation. The location and the orientation of the samples within the city and the natural land features are issues grounded on the English approach.

The adaptations to the methodology used have been made to fit the nature of the specific context of Erbil. As a considerable percentage of Erbil's city area consists of single-family houses (due to the horizontal expansion of the city), this study focused on the residential sector, more specifically on the single-family housing areas. The focus on the residential areas to understand the form of the city was due to that the residential

areas represented in the single-family housing constitutes a higher proportion of Erbil's area and its urban form, and this also took its root from the Italian approach of Aldo Rossi. Land and building of other uses have been excluded. This means that the third division of the urban landscape identified by Conzen is excluded. The exception is made when it relates the changes and replacement of the urban form as a result of the change from residential use (single-family houses) to commercial use (multistorey commercial buildings), which is a common phenomenon in the context of Erbil.

Understanding urban form through its hierarchical levels, which is referred to by Kropf, is another approach used in the analysis. Moving on to the architectural, the detailed level and the scale of buildings, two types of change can be observed: additions and extensions to the existing houses, and their demolition and replacement with new houses. This is a common phenomenon in Erbil that has been observed through the analyses of the samples. This phenomenon has been defined by Conzen as 'burgage cycle'. Some ideas from the Italian approach have also been used: Rossi's definition of architecture as a construction of a city over time rather than as a singular entity requires understanding a building through its contexts of time and place, and through the history of the city as it is a product of a set of actions of growth over time. A combination of the functional and the spatial structure systems shaping the production of cities by Rossi has also been adopted. In the first system, the underlying political, social, and economic factors have been studied, while in the latter system the city is seen as a spatial structure. A belief of understanding the city's total architecture through the city's different parts promoted the idea of breaking down the city into different parts and then selecting samples from them through understanding their formation and transformation: thus the urban morphology of the city is understood. The three research questions, 'How, and to what extent has **Erbil's urban form** been influenced by building and planning **legislation** (regulations) in different periods?' 'How has **Erbil's urban form** been influenced by **different factors** (social, cultural, environmental, economic, and political) in different periods?' and 'How has **Erbil's urban form** changed?' focus on Erbil's urban form. In the first question, the urban form is related to legislation factors as determinant influences on its formation and transformation over time. The second question based on the assumption that the process is not independent from the other determinants such as social, political, and economic forces which are in a complex relationship, directly influencing the urban form and sometimes indirectly again through regulations.

6.2 Urban morphology, legislation and other determinants

As the main focus of the research questions is urban form, the structure of the conclusion made in this section is constructed upon and around urban form as well. Legislation has not influenced the urban form in a simple formula. It is embodied in many subjects that either directly or indirectly have, in a complex system, influenced the process of the formation and the transformation of the urban form of the city. Legislation concerning any of those subjects cannot be studied separately as an only influencing determinant of the urban form, as it works in an integrated system. As a result, urban form is determined by a package of legislation which includes regulations covering various aspects. In the end they operate all together to generate certain forms. Legislation is also not independent from the overall atmosphere in which it has been introduced. Political, social, economic, and environmental factors at every time period elaborated the policies that produced the legislation.

The analysis process of Chapter 4 dealt with many aspects concerning urban form and its formation and transformation over time. A summary of the process and its findings are concluded to provide a better understanding of how the analysis has elaborated the answers of the three research questions. The urban form of Erbil city as the core of the research and its questions is linked to ten topics that have been covered and studied throughout the research. These are discussed in turn below:

6.2.1 Urban form at different scale levels

The research recognised that urban form should be studied at its different interrelated scale levels as the analysis of the physical elements and their changes can be understood through their interrelated levels.⁴⁹¹ Any of those levels embody indications of the form at the other (upper or lower) level [Figure 4.2]. For example, decisions at the city scale level such the linking of two different areas by a new street, dividing the city according to different municipality areas, and land use decisions, all influenced the urban form at the level of individual plots and buildings as well. The level of complexity and the elements of form increases when moving to the higher scale level. However, the level of resolution increases when moving down to the micro scale level (the level of plots and buildings). This has been addressed in the morphological hierarchy of Kropf.⁴⁹² On the city level, the elements determining

⁴⁹¹ Moudon, 'Urban Morphology as an Emerging Interdisciplinary Field'.

⁴⁹² Hall, p. 234.

the urban form include major roads, valleys or rivers, natural topographic features, and other man-made features such the citadel in the case of Erbil.

Understanding urban form can be achieved through understanding the link between the different interrelated scale levels and through a comprehensive analysis that deals with the city as parts in a whole and as a whole that consists of different parts.⁴⁹³ The aim of adopting an analytical approach that deals with the different compositional elements of urban form at the different hierarchical levels has been to achieve a comprehensive understanding of the urban form and to understand the nature of the relationship between these levels.

Assumptions about this issue established the methodological approach of the analysis at the different scale levels. In the individual analysis of the samples, the samples were defined within the whole through identifying their location and their history. A single plot or a single building in a certain sample is not independent from the overall atmosphere and structure. This confirms the idea of the ‘totality’ introduced by the English and the Italian Schools.

6.2.2 *Urban form and the periodic growth of the city*

‘The urban form of the city is always the form of a particular time of the city; but there are many times in the formation of the city’.⁴⁹⁴ Erbil has immensely grown since 1920 [Figure 6.1] and [Figure 6.2]. Many historical key events have had a role in determining the growth of the city and its urban form. As in every historic city, time is the essential dimension of the process of the evolution of the urban form of Erbil. Political, social, and economic instabilities over the period since 1920 due to a number of events such as issues of ruling and governance system, wars, revolutions, petroleum companies nationalisation, uprisings, sanctions and economic embargo, civil wars, fall of regimes (and the events of 2014 and 2015 which are excluded in this research), all influenced many aspects of Erbil’s life including its urban growth, the urban developments, and the urban form of the city as has been analysed in Chapter 4 through the selected samples [See the fold out page at the end of the thesis].

Those events led to the enactment of successive pieces of legislation that represent the policies aims adopted in the different eras. The interesting issue is that those events mostly led to the reversals of plans and policies due to the fact that they

⁴⁹³ Oliveira, p. 7.

⁴⁹⁴ Rossi, p. 61.

resulted in instabilities. These instabilities and inconsistencies have not given enough time to the plans to be completed or to be implemented. Meanwhile, since 1920 the city has expanded at a fast (and increasing) pace as more than 90% of the city has been built after 1920 [Figure 1.8, p18], [Figure 6.1, p473] and [Figure 6.2, p473]. The major and rapid growth has been after 2003 [Table 4-1, p94]. Over this period the level of building control has been unstable. At some points, the weakness of control authority resulted in the appearance of informal actions at both individual and collective levels [Section 3.1, p45].



Figure 6.1: An aerial photo of Erbil in 1938 from north towards south. (Source: British Academy Library. It was taken from the archaeological survey conducted by Sir Marc Aurel Stein captured in 1938 by or with the assistance of the Royal Air Force)



Figure 6.2: A high oblique aerial photo of Erbil and its citadel from north towards south, 2009. (Source: The Presidency of the Municipality of Erbil)

6.2.3 Urban form between new development and conservation, between modernity and tradition

The different pieces of legislation enacted since 1920 have influenced the urban form of the city in different ways. These can also be classified into those concerned with new developments and those concerned with protecting the old. These two trends have sometimes been in contradiction. The urban form of the city, at a certain period of time (1940-1955) witnessed a shift from the traditional — represented in the organic and unplanned pattern, narrow alleys, and courtyard houses— to a modern and planned city pattern and the replacement of the traditional courtyard houses by the houses with front and rear setbacks. This shift can be observed between the first three samples. ‘Sample 1’ (Arab and Taajeel quarters) represents the traditional model. ‘Sample 2’ (Mustawfi quarter), can be considered as a transitional area where small individual attempts of planned areas appeared. Linear streets emerged but they are still relatively narrow and the existence of the traditional courtyard house is type extended in this sample area although some modifications appeared. ‘Sample 3’ represents the early stage of the disappearance of the traditional forms and the appearance of the modern and regulations informed urban form. This scenario presents the overall image of the process of change to the urban form between the different parts of the city that emerged in the periodic growth. However, there have been also changes even within the areas. For example, the area of ‘Sample 1’ does not purely represent the organic pattern and the traditional form. Many actions of transformation and change have influenced it through which new developments at different levels emerged. Interventions of opening up new streets and widening some existing ones, the emergence of new building types are examples of the change within. Over the past periods, a struggle between conserving the old and replacing the old by new has been a concern in the city. However, in all the cases, the favour on the ground was towards the removal of the old. In recent years, more serious attempts at the protection and conservation of the legacy of the traditional urban form, defined as heritage, have gained priority. Yet, this process requires a longer time span to be interpreted and translated into reality. See [Figure 6.3].

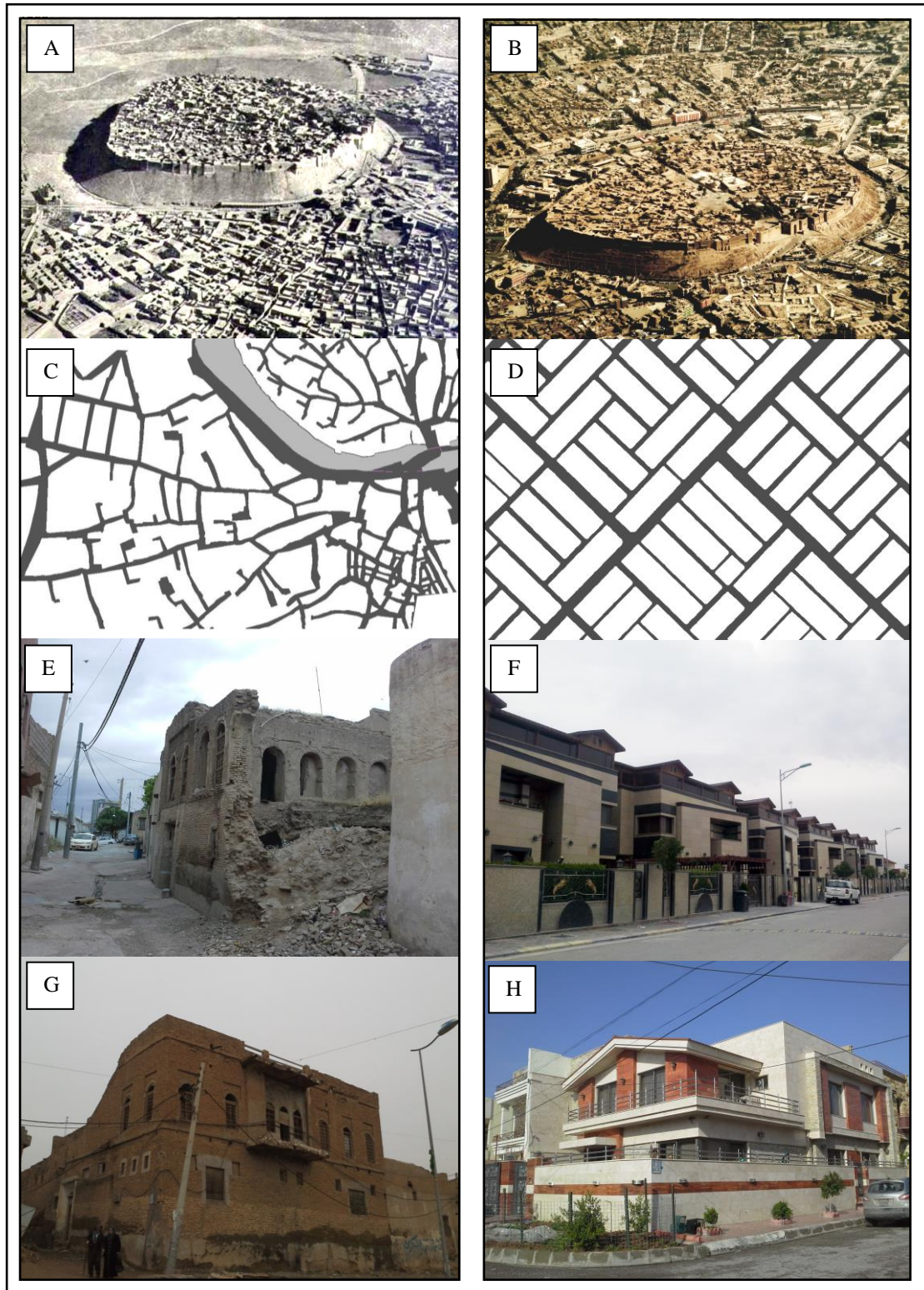


Figure 6.3: Urban form between new development and conservation, between modernity and tradition. (Source: **A**) Naval Intelligence Division, *Iraq and Persian Gulf*, 1944. See [Figure 1.3]. **B**) By Patrick Hayes, October 2007. See [Figure 3.3]. **C**) Drawing by the researcher. See [Figure 4.10]. **D**) Drawing by the researcher. See [Figure 4.143]. **E**) Photograph by the researcher, 2014. See [Figure 4.19]. **F**) Photograph by the researcher, 2014. See [Figure 4.218]. **G**) Photograph by the researcher, 2014. See [Figure 4.30]. **H**) Photograph by the researcher, 2014. See [Figure 4.181].)

6.2.4 Urban form, land rights and ownership

Urban form cannot be separated from the essential element, which is land. Issues of land right and ownership, disregarding the form of the land, have influenced the urban form of Erbil through different legislations enacted at different times [Section 3.2.1, p71]. The nature of this influence can be summarised into three stages. The first stage is before using the land for urban uses and before being incorporated in the city's boundary (municipality's boundary). As Erbil is on a fertile plain, the majority of the land around the citadel was agricultural. Successive sets of laws have been enacted since 1932 when the state was under the British mandate. The different legislations concerned in a redistribution of land to improve agriculture in different ways, especially those concerning issues of ownership and rights of use.

This issue was treated in different approaches in the royal and the republican periods. The original boundaries of the agricultural lands and their areas have been submitted to transformation actions. However, in some cases of the samples of the earlier periods, those original boundaries left their traces in the development of the area for urban uses. Their influence can be traced in different ways. They are represented in the overall layout of the area, in the layout and the orientation of the new streets, in the layout of the blocks, and they are appeared as lines separating a block into two parts. Clear examples of this are 'Sample 2' (Mustawfi quarter) and 'Sample 3' (Minara quarter). This issue, in some early cases, restricted the design and the plan of the area. Their influence appeared strongly and limited the design choices. This case has been repeated in many later developed areas but with reduced impact. The second stage commenced when those agricultural lands were incorporated in the city's boundary for urbanisation purposes. This stage was also governed by a set of laws that organised the management of this process and the nature of the rights of the owners of the land after being incorporated in the municipality's boundary for urban developments. The third stage began when the land became streets and plots for different uses such as residential, commercial, mixed, creational...etc. However, in this stage, the influential set of regulations were those that concerned plot subdivision, merging (pooling), and changing the use, all of which were subjected to plan and design decisions. These three stages together influenced the resulting urban form.

6.2.5 Urban form and the different housing policies

The most decisive issue of determining the urban form that influenced the whole city are the housing policies, although again these are not independent from the overall sphere surrounding the period in which the policy has emerged. 'Housing policy 1' is the prevalent policy that has determined the urban form of over three quarters of the city's area [Figure 3.22, p83]. The dominant characteristic of this policy is individuality. Individual building process with relatively flexible building legislation which can be interpreted by and translated into a number of ways increased the variances of the urban form. In its extreme cases, this created an extent of heterogeneity and in some cases it might be expressed as irregularity. This individuality not only affected the building form of the house, but also extended to influence the plots, the other element of form. With having flexible regulations concerning plot subdivision, especially after 1979, subdivisions occurred as a notable phenomenon.

The repetition of this phenomenon of individuality created a tradition which has become a part of the culture. This culture, which is rooted in 'Housing Policy 1', affected the other housing policies as well. This can be observed in 'Sample 9_4' (Shary Lawan) as after a short period from the completion of the project some individual cases of the houses were submitted to individual changes of extensions and additions such as adding a storey. It can also be observed in the informal quarters after they have adapted as formal. In the same trend, each house would be liable to individual actions of changes.

Moreover, this individuality increased the load of the control process as, for the municipality dealing with a larger number of people building their houses is harder than dealing with a few and limited number of developers. The regulations concerning the preparation of plots, granting them to people for housing purposes, the freedom of the decision of the owner about when to build the house or sell the plot, sometimes resulted in dealing with land as a commodity subjected to commercial transactions and speculations rather than a resource for solving housing issues. When this issue is linked to urban form, the overall scene of the form of a block in a street view, a number of unbuilt plots interrupt the continuity of the panoramic elevation of a row of the houses. Examples of unbuilt plots can be observed in 'Sample 7' (Salaheddin quarter), 'Sample 8' (Havalan & Zanayan quarters), 'Sample 9_1' (Sarbasty quarter), and 'Sample 9_2' (Sharawany quarter).

The gradually extended individual building process over longer time spans resulted in an incompleteness of the overall plan form as intended. In longer time spans, the possibilities of changes to other aspects that influence urban form can increase. In addition, the common style of building is prone to changes over long time spans. This also resulted in the individual actions of replacement of old houses by new. This cycle of gradual building and replacement is defined by Conzen as 'burgage cycle'. All these could lead to the increase of debates on homogeneity and heterogeneity issues which are a serious concern of the urban form of the city.

6.2.6 Urban form and the concentric pattern of the city

One of the determinants that have affected the urban form of Erbil at the city scale level and at the neighbourhood level is the unique concentric pattern, a mixture of ring and radial roads of the city relating to the citadel core. This was one of the issues that the research examined through the analysis of the individual samples. The citadel has had an impact on the decisions of the future concentric growth pattern of the city.

This concentric pattern started to configure since 1950s when new streets were opened up in the earlier areas of the city. Decisions of the proposed master plans in later periods (the master plan of 2009) confirmed the idea of the concentric pattern. Two important factors facilitated this idea. The first is the relatively flat land on which the city is built up. The second is the city's central location within the region. The access to the other cities and towns in the north, south, east, and west has been through roads which then were developed to the radial roads of the concentric pattern. The city grew from the citadel outwards stage by stage. The older parts of the city are the closer to the citadel, and vice versa.

On the neighbourhood level, the influence of the concentric pattern on the layout of the blocks and the streets of the neighbourhood gradually decreases when moving outwards from the centre. In other words, the relationship between the concentric pattern through the rings and radials weakens when moving away from the city centre away from the citadel. However, a relationship and influence still exists to some extent. This issue can be observed from all the samples that were analysed. In 'Sample 3' (Minara quarter), which is located between 'Second Ring Road' (Sultan Muthafar Street) and 'Fourth Ring Road' (Kurdistan Street), and 'Third Ring Road' (Barzany Namir Street) passes through it, the layout is highly

influenced by those rings and the roads linking it to the centre. See [Section 4.7.3, p189].

This is similar in the case of ‘Sample 9_4’ (Shary Lawan Complex) which is the furthest area from the city centre. Yet due to the long distance from the centre, the influence is different. As the curvature of the rings decreases when moving away from the centre, the variation in the orientation of the streets and the blocks of the area decreases and they are all directed north-south and east-west. The influence of the concentric pattern changed in that aspect. The exceptional case to this rule is ‘Sample 4_2’ (Iskan quarter) [Section 4.7.5, p247]. The layout of ‘Part 1’ of the sample area, which is the earliest part, has no significant relationship to the concentric pattern. However, the other parts of the sample tried to integrate it into the context and the concentric pattern of the city. See [Figure 5.5, p463].

6.2.7 Urban form and the different quarters of the city

The boundary, the area, and the name of the quarters have also been subjected to changes. Many names were changed after 1991 or after the uprising of Kurdistan. Most of the names before 1991 were in Arabic but they were then changed to Kurdish. Some cases were directly translated such as ‘Krekaran’ which means ‘Labourers’, ‘Zanayan’ which means ‘Scientists’, ‘Andazyaran’ which means ‘Engineers’, and ‘Komary’ which means ‘Republic’. However, others were named differently such as ‘Nawroz’⁴⁹⁵ and ‘Nishtiman’⁴⁹⁶. The research depended on the latest map of the quarters of the city. The quarters cannot be relied as a significant indication of the urban form. The analyses of the samples showed that the quarters have been formed in different stages in different periods and sometimes also under different building regulations. This means that a certain quarter could consist of different urban developments which may vary in their urban form. Examples are ‘Sample 2’ [Section 4.7.2, p147], ‘Sample 3’ [Section 4.7.3, p189], ‘Sample4_1’ [Section 4.7.4, p217], ‘Sample 4_2’ [Section 4.7.5, p247], ‘Sample 5’ [Section 4.7.6, p271], and ‘Sample 7’ [Section 4.7.8, p325]. However, this is not always the case, especially in the more recent and newer quarters such as ‘Sample 8’ [Section 4.7.9, p353], ‘Sample 9_1’ [Section 4.7.10, p375], and ‘Sample 9_2’ [Section 4.7.11, p395]. The quarters from which those samples are selected have been formed in one

⁴⁹⁵ ‘Nawroz’ quarter was previously called ‘Askary’, the Arabic word which means ‘Military’.

⁴⁹⁶ ‘Nishtiman’ quarter was previously called ‘Jadish al-Shabby’, the Arabic word which means ‘Militia’.

stage as a one unit and hitherto, they have not been subjected to changes, neither in areas nor in boundaries or shapes.

6.2.8 *Urban form and building control, formality and informality*

A legal tool of controlling the urban development through the building control process is building permits and the legislation that regulates their implementation. However, this also depends on other factors such as the power of the authorities responsible for this issue and the implementation procedure, as well as political and economic stabilities. The legislation that regulated the building permits process and its management are ‘*System of Roads and Buildings No. 44 of 1935*’ and the successive laws of municipalities’ administration (‘*Law of Municipalities’ Administration No. 84 of 1931*’, ‘*Law of Municipalities’ Administration No. 65 of 1964*’, and ‘*Law of Municipalities’ Administration No. 6 of 1993*’). According to the analysis of the samples, informalities and irregularities are at two different scale levels: individual cases of informal houses and group of informal houses.

The individual cases of informal houses within the formal and planned neighbourhoods exist. This is when the whole or a part (extensions) of house is built without a building permit, or the execution of the building does not comply with the criteria specified by the building permit document. The criteria include plot coverage, setback distances, subdivision and the number of the houses that can be built on a single plot, the minimum allowed plot area, and building within the formal dimension of the plot. Control over these details of individual irregularities is not easy, as it demands both skill and power by the responsible authorities. This would become more complicated when the regulations have a high level of flexibility, which makes it difficult to distinguish between formal and informal cases. All the types of individual irregularities such as issues of plot coverage, setback distances, and informal subdivisions can be observed in the analysed samples.

On another level of informality, or concerning groups of informal buildings, some informal quarters emerged at certain periods. An example is ‘Sample 5’ (Bahar quarter) [Section 4.7.6, p271]. These informal settlements constitute a part of the city and its urban form. These informal parts have been treated under ‘Housing Policy 5’ by which they are elaborated, recognised, and formally incorporated into the city. As a result, the common irregularities of the individual cases from a group became a trend and a phenomenon which was difficult to overcome. They influenced the generation of the form of the city.

6.2.9 *Urban form and house building type*

In the 100 years or so since 1920, the building types in Erbil have changed in various ways. However, the research focused on the building type of single-family house as it composes the largest portion of the city's area and consequently the urban form of the city is evaluated through the urban form of its residential areas, more specifically the single-family houses. The change of the house types is mainly affected by the building legislations and other determinants emerged in the different periods. The different variables which specify the type and the important points concerning the building type of single-family houses can be summarised as follows:

- 1) **Traditional courtyard type and modern (solid) type:** the different traditional courtyard types have gradually disappeared since 1920, replaced by modern solid types with various possibilities. This disappearance became evident from the Third Period and onwards (1950-2014).
- 2) **The height of the house:** the number of storeys or the overall height of the houses has varied since 1920. The average height of the one storey house is 4m including the parapet. The height of the two storey houses ranged between 6.7m to 7m depending on the design of the house, whether the ground floor is designed to accommodate the car under the first floor, a type which emerged towards the end of the Eighth Period (2000-2014) or is designed to accommodate the car in the front space created from the setback distance which first emerged in the Third Period (1940-1955). The average height of the three storey houses is 9m (2m ground floor + 3m first floor + 3m Second floor + 1m parapet). The three storey houses apparently emerged from the Ninth Period (since 2003).⁴⁹⁷
- 3) **Plot area and plot shape:** the type of the house is very much related to the plot area, its shape, and its dimensions. The type of the plots changed from irregular small areas (80m² -150m²) in the First and Second Periods to regular and larger areas (200m² and up) from the Third Period. From the Second Period to the mid of the Sixth Period (1920-1979), the area of the plot depended on the category of the urban area in which the plot is located. This had been regulated by '*System of Roads and Buildings No 44 of 1935*'. See [Table 3-1, p50] and [Table 3-3, p56]. From 1979 to 1987, the area of the plots of single-family houses depended on

⁴⁹⁷ Three storeys is a maximum height of single family houses.

'Decision No. 850 of 1979' which specified 120m² as a minimum area in all parts of all cities over the whole country and disregarded zoning or the difference of the urban area category which had previously been regulated by the *'System of Roads and Buildings No. 44 of 1935'*. As a result, some of the plots which have areas of 240m² or more have subjected to formal or informal subdivisions. In the Seventh Period (1987), the minimum allowed area of the plot was changed to 200m² in cities. This also encouraged the phenomenon of the subdivision of the plots which have areas of 400m² and up into two or three when the share of each resulted plot after the subdivision is not less than 200m². These two significant changes resulted in the emergence and the accumulation of the variety plot areas.

- 4) **Setback distances and building lines:** From 1935 to 1980 this was specified by the *'System of Roads and Building No. 44 of 1935'*. Different urban area categories had the different setback specifications. See [Table 3-2, p53] and [Table 3-4, p57]. Since 1980, the setback distance has been regulated by the *'Instructions No. 851 of 1980'* and only setbacks from the sides adjacent to streets have been compulsory. The distance of the setback depended again on the plot area. See [Table 3-6, p61].
- 5) **Plot coverage:** Before 1935, plot coverage was not specified by regulations. However, the courtyard type granted enough percentage of open space to the house. From 1935 to 1980, this variable depended on the zone or the urban area category in which the plot was located, and was regulated by the *'System of Roads and Building No. 44 of 1935'* [Table 3-5, p57]. After 1980 the specifications of plot coverage was not explicitly cancelled. However, its application was ambiguous and not clearly stated in the new legislation of 1980. Although defining and naming the types of the house has not been stated in any of the successive regulations, both setback and plot coverage regulated the orientation and the projection of the building in relation to the plot. They implicitly defined the type. In other words, they specified whether the resulted type of a house in a building series is attached, detached, or semi-detached. The traditional courtyard houses were attached to each other. However, the modern solid types of the later periods since 1955 varied between the three types (attached, semi-detached, and attached).

The type which became common after 1980 is attached which now constitutes the majority of the city. There is also a common trend towards this type. This is mainly due to the fact that there has been a continuous trend towards the decrease of the plot front width by the successive regulations, more specifically since 1979 as a result of formal and informal subdivisions of the plots. The plot coverage varied according to the plot area and the front setback distance which ranged from 1.5m in the plots of areas of 100m² and up to 200m² to 2.5m in the plots of areas of 200m² and up to 600m², and 4m in the plots of areas of 600m² and more. As a result, the plot coverage could vary from 7.5% as a minimum possible percentage. Some recent developments of housing projects which have been built according to 'Housing Policy 4' (Private housing complexes) are exceptions. They include a mixture of types but are clustered in groups or blocks. See 'Sample 9_3' [Section 4.7.12, p411].

- 6) The privacy of the house:** This issue is covered by the research as it is one of the aspects that not only defined the form characteristic of the individual house, but also defined the form characteristic of a block and physically defined the street spaces. As a reflection of the social and cultural aspects of Erbil as many other cities in the region, privacy issues of the house, defining the private spaces and separating it from the public spaces is an important issue. This objective in the single-family houses has been achieved through different ways over time. The traditional courtyard type achieved the acceptable level of privacy as the house is closed towards the internal courtyard. The rooms overlooked the private internal courtyard.

This was changed in the later periods as the courtyard type started to disappear and was replaced by modern types of houses. Fences in a form of walls with enough height that it works as a physical and visual barrier offered a level of privacy, although this issue has not been covered in the regulations. In other words, the building of the fences of the houses has not been stated by the successive regulations. At the same time the fences strongly defined the border between private (house) and public spaces (streets and squares). It also defined the boundary of the plot. However, the level of privacy achieved through fences depended on some variables such as the height of the fence, the number of the storeys of the house, the front setback distance of the house, and the width of the street on which the house is located. More importantly, over the time period

from 1920 to 2014 and over some successive generations of people and the residents, the cultural and social attitudes have also changed. People's understanding and needs to attain a satisfactory level of privacy have changed. The privacy characteristic is understood as a relatively issue which could carry different meaning from a context to another and from time to another. Due to the wishes of some individual owners to personalise their dwellings, there have been few exceptions to the common trend in achieving privacy by the nature of the fences.

6.2.10 Urban form between past and future

All the issues covered in this research are those that have contributed to the formation and the transformation of the urban form of the city from 1920 to 2014. Questions of how this process has happened and what has influenced it have been covered and studied. By going back to the primary issue of benefiting from the lessons learned from studying history for enhancing the future, the research provides hints that could be studied further in the future.

Cities are defined as accumulative products shaped over time. A city is a dynamic entity which is always in the process of transformation. Therefore, 'time' is an important factor. Any plans and actions towards achieving better forms require time to be translated into reality. This also requires a relative political and economic stability. Understanding the system of the formation and the transformation of the urban form through morphological studies provides a clearer vision of how this system has worked in a particular context. It provides awareness about what are the players that determined the important characteristics of the process. Once the objectives of what the future form should achieve are addressed, the mechanisms can be established and introduced. However, this requires extensive knowledge, assessment, and understanding of the past experiences.

The urban form of Erbil has changed immensely since 1920, from unplanned and organic patterns to planned, formal, informal, regular and irregular, and from traditional courtyard houses to modern type houses. The nature of the transformation can be summarised into shifts and gradual changes. All these have happened and influenced by a complex network of determinants including legislative, political, social, and economic factors.

This research started by questioning the nature and the extent of link between Erbil's urban form and legislation. However, the repetition of the implementation of

the regulations over time has created a tradition or a culture which in turn has generated a form that does not completely comply with the original regulations. Later on, this tradition became more influential than the original regulations, and resistant to any changes or amendments to the regulations.

6.3 The implications of the research

As it is driven by many factors, the design process at the urban level requires a long time period for an urban design project to be produced and implemented in full.⁴⁹⁸ In Erbil the residential areas built according to 'Housing Policy 1' require longer time to be completed and can extend up to decades. Referring back to the definition of cities as accumulated product or a man-made object constructed over time, it is impossible to change this product towards a better situation by only academic research. There should be a realistic and a pragmatic vision. What this research has done is a first step for a long journey. What impact this academic piece could have emerges from what distinguishes it from others and makes it different. The implications of this research can be summarised into two essential aspects: its academic contribution, and its contribution to the field of practice:

6.3.1 Academic contribution

This research work can contribute to academia in different aspects. It derives originality from the place and the time context that it covers. The research focuses Erbil, a city which lacks previous academic research concerning regulations and urban form, a historic city which has not been given enough space in academia. By covering the time period from 1920 to 2013 and splitting this period into nine periods, this research provides an understanding of how the formation and the transformation of the urban form of Erbil have worked in those different periods over a century of time.

One of the most significant academic contributions of this research is the methodological approaches and methods that it used. As the social, cultural, economic, political, and geographic contexts of Erbil are different to those of the Western cities, there was a need to design a methodology that fulfils Erbil. From harnessing the existing constructed worldwide (European) approaches and tools in the field, this research established a methodology that suits the context of Erbil and

⁴⁹⁸ Robert Adam, *The Globalisation of Modern Architecture : The Impact of Politics, Economics and Social Change on Architecture and Urban Design since 1900* (Newcastle: Cambridge Scholars, 2012).

its limitations. It combined ideas from the English (geographic approach) and the Italian (architectural approach) Schools of urban morphology. Consequently, the methodology and methods of this work could be applied on other cases that have common similarities in the region and the world. The designed methodology also informs other scholars and researchers who aim to develop studies of urban form and urban morphology of Erbil and other similar Middle Eastern cases.

The fieldwork and data collection process was the challenge of this research work, but it is also the strength. The amount of the data including the maps, documents, and photographs is a contribution as well. The considerable number of maps and drawings prepared in this research work will enrich the archives involved in the urban form of Erbil and its history. The considerable number (more than 10000) of photographs covering the different quarters of Erbil from 2013 to 2015 by the researcher document the city's urban form at a particular point of time of the city's history. These can be useful documents for other studies concerning urban form and architecture by the researcher or other researchers. Finally, as this research is a widening up of the field of the urban form of Erbil, it identified many issues and a wide range of possibilities which can be investigated and extended further for future academic studies.

6.3.2 Contribution to the field of practice

Any development intended in the fields of architecture, urban planning, and urban design of the city should rely on assessments made on the past and the existing condition. This is what the research has done. It analysed the urban form of the city influenced by regulations and other factors (social, cultural, economic, political, and environmental). It documented the evolution of the urban form of Erbil over the period of the modern era since 1920. It evidenced the way in which building and planning legislation that has been enacted on the different levels and how this has influenced the formation and the transformation of the urban form of Erbil. Therefore, based on those mentioned, it informs the responsible authorities to develop the legislation concerning this field of practice.

Through the documentation of the different pieces of legislation and an analysis of their effects, this research provides access to all these regulations and helps practitioners within the authorities responsible for building control and building permits on the one hand, and the developers, designers and architects on the other hand. More importantly, some aspects of housing and single-family houses

have been covered in this research. These aspects would inform people working in the housing sector in Erbil and the region as well. The research presented the different policies of housing and demonstrated the way in which those policies influence the urban form of the different parts of Erbil. It identified the link between housing and urban form which the plans of the future developments in the housing sector should consider. Despite the fact that the individual process of building houses of 'Policy 1' offers a wide range of possibilities of urban form which can be judged either positively or negatively, it put an immense pressure on the control system which requires control over each individual building which are built by different owners. As a result, the implementation of the regulations to achieve the intended forms becomes more challenging. This could result in mis-implementation. Developments of this policy and alternatives to overcome this issue are required. This could motivate the responsible authorities to rethink of this issue.

6.4 Future studies

One of the potentials of this research work is the high possibility to achieve continuity. As it was mentioned, this research opened a way for a wide range of possible issues that can be studied and researched further. Some of these issues have been already addressed in this research. Yet, due to the fact that the research did not deal with those issues in more depth as they were not the main concern, the need for developing these issues further in future research works becomes a priority.

The first issue is that this research only covered the residential areas and apart from some areas of 'Sample 1' and 'Sample 2', the research did not cover the commercial areas and commercial streets. To some degree, the urban form of Erbil can be partially explained by the urban form of the commercial buildings in the commercial parts of the city and along with the radial and ring roads. The change of the land use from residential to commercial has recently become a phenomenon. As it has been addressed in this research, this type of change has resulted in the change of the urban form (building type). The appearance of multistorey commercial buildings along with these streets instead of single-family types of houses is a result of this kind of change. This process of change can happen in two different ways: either by the replacement and the removal of the building of the house, or by building the multistorey commercial building on the vacant plot before being used for housing. The relationship between the urban form and its process of formation and transformation and the phenomenon of change can be studied further in the future. This topic has also paid less attention.

The second is the changes of plot shape and size. Two types of modifications are observed: subdivision of plots which results in smaller plot areas, and pooling (amalgamation) which results in producing larger plot area. In the residential parts of the city, the trend is more towards subdivision which allows building more than one house and increases the number of the houses on the original plot area. This has been thoroughly covered by this research and this phenomenon was noticed in most of the analysed samples. However, the other trend (amalgamation) is more common in commercial areas. The reason for this is economic as the commercial land values more than residential. The larger plots of commercial uses are more expensive than the smaller. In many cases the amalgamation is between a commercial land and a residential land and the use of the land resulted from this process will be commercial. This adds more economic value to the land. Consequently, the commercial buildings constructed on this type of land could have different forms to those of constructed on the original land. This topic can be understood more and extended further by future studies.

The third is that the housing complexes built by the developers under the law of investment have diverse forms. These complexes are exempt from the municipalities building regulations. The developers are free to introduce and import any types of form as the restrictions are less. However, the houses of many of those complexes are used for other uses than residential. There might be cultural, social, economic reasons behind this issue. Apparently, it seems that the urban form of these complexes receives acceptance. However, this needs more investigation to be understood through academic studies.

The fourth is that this research approached understanding the urban form of Erbil and its changes over time from a multidisciplinary point of view with a more focus on planning and building legislation (regulations) as this had been addressed in the first research question. Apart from legislative factors, in the second question it addressed other underlying factors such as social, cultural, economic, and political that influence the urban form of Erbil. However, it did not deal with the economic and political factors in a depth that would be from the economist and politician points of view. This can be achieved by a multidisciplinary research that brings the specialists from these fields together. As this research has already addressed these issues, it has the potential to involve the researchers from other disciplines for further studies in the future.

The fifth and final is that this research work, its stages, its analysis, and its conclusion can be delivered to the practitioners in the fields of architecture, urban design, and urban planning in Erbil. This can be achieved through organising different

and serial events of seminars and workshops for the concerned authorities in the ministry of municipalities. These events help to develop the capacity and the performance of these people by involving them in the issues mentioned of which they may be less aware.

Finally, this research provides a better understanding of how the regulations have worked and translated to a physical form over the period from 1920 to 2014. It also considered the influence and the potentials of different factors when they are linked together. A better understanding of these issues could potentially lead to a better urban environment.

Bibliography

- Adam, Robert, *The Globalisation of Modern Architecture : The Impact of Politics, Economics and Social Change on Architecture and Urban Design since 1900* (Newcastle: Cambridge Scholars, 2012)
- Al-Ani, Hamdi Fuad, 'Nushu mulkiyat al-arz al-ziraiya fi al-Iraq wa marahil tatawiriha (The Emergence of Agricultural Land Ownership in Iraq and its Stages of Development)', Iraqi Communist Party
<<http://www.iraqicp.com/index.php/sections/objekt/11506-2014-02-28-13-17-57>> [accessed 16 June 2016]
- Al-Nasiri, Sabah, 'Bidayat ihtimam al iraqiun bi atharhim alqadima wa kaifa sadara qanun al-athar fi al-ishrinat (The Beginning of the Iraqis Care to their Antiquities and How was the Law of Antiquities Enacted in 1920s?)', *Al-Mada for Media, Culture, and Arts*, 2015
<<http://www.almadasupplements.com/news.php?action=view&id=13926>> [accessed 21 June 2016]
- Al-Tamimi, Maria Hasan, 'Kaifa arafa al-Iraqiun nidham al-tapu liawal marra? (How did Iraqis Know the System of Tapu for the First Time?)', *Al-Mada for Media, Culture, and Arts*, 2013
<<http://almadasupplements.com/news.php?action=view&id=6659>> [accessed 16 June 2016]
- BBC, 'Country Profiles: Middle East: Iraq Profile- Timeline', BBC, 2016
<<http://www.bbc.co.uk/news/world-middle-east-14546763>> [accessed 15 July 2016]
- Bell, Gertrude Lowthian, *The Letters of Gertrude Bell*, ed. by D.B.E. Lady Bell (London: Ernest Benn, 1927), II
- Bonine, Michael E, 'Cities of the Middle East and North Africa', in *Cities of the World: World Regional Urban Development*, ed. by Jack F. Williams and Stanley D. Brunn, 2nd edn (New York: Harper and Collins College Publishers, 1993)
- Brown, Michael E., 'The Nationalization of the Iraqi Petroleum Company', *International Journal of Middle East Studies*, 10 (1979), 107–24
- Caniggia, Gianfranco, and Gian Luigi Maffei, *Architectural Composition and Building Typology: Interpreting Basic Building*, trans. by Susan Jane Fraser (Firenze: Alinea, 2001)
- Cataldi, Giancarlo, Gian Luigi Maffei, and Paolo Vaccaro, 'Saverio Muratori and The Italian School of Planning Typology', *Urban Morphology*, 6 (2002), 3–14
- Cliftona, K., Q. Ewinga, J. Knaapa, and Y. Songb, 'Quantitative Analysis of Urban Form: A Multidisciplinary Review', *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 1 (2001), 17–45
- Conzen, M. R. G., *Alnwick, Northumberland : A Study in Town-Plan Analysis*, 2nd edn (London: Institute of British Geographers, 1969)

- , ‘Geography and Townscape Conservation’, in *Anglo-German Symposium in Applied Geography*, ed. by H. Uhlig, and C. Lienau (Giessen- Würzburg-München: Lenz, Giessen, 1975), pp. 95–102
- , ‘Morphogenesis, Morphological Regions and Secular Human Agency in the Historic Townscape, as Exemplified by Ludlow’, in *Urban Historical Geography Recent Progress in Britain and Germany*, ed. by D. Denecke and G Shaw, *Cambridge Studies in Historical Geography*, 10 (Cambridge: Cambridge University Press, 1988), pp. 72–253
- , ‘The Growth and Character of Whitby’, in *A Survey of Whitby and the Surrounding Area*, ed. by G. H. J Daysh and J. E. Hemingway (Eton: Shakespeare Head Press, 1958)
- Cuthbert, A., *The Form of Cities: Political Economy and Urban Design* (Oxford: Wiley-Blackwell, 2006)
- Dar al_Handasah, and Ministry of Municipalities, *Erbil City Center: Final Master Plan Report* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2007)
- , *Erbil City Center: Zoning Regulations & Building Design Guidelines* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2007)
- , *Erbil City Master Plan: Stage 1 Report, Data Collection and Field Surveys* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2006)
- , *Erbil City Master Plan: Stage 2 Report, Analysis of Existing Situation and Major Development Issues* (Erbil: Kurdistan Regional Government: Ministry of Municipalities, 2006)
- Darin, Michael, ‘The Study of Urban Form in France’, *Urban Morphology*, 2 (1998), 63–76
- Erbil Governorate, ‘Erbil Geography’, Erbil Governorate
<<http://www.hawlergov.org/ar/page.php?id=1329120973>> [accessed 15 December 2015]
- , ‘Erbil Population’, Erbil Governorate
<<http://www.hawlergov.org/ar/page.php?id=1329152161>> [accessed 15 December 2015]
- ‘Erbil Tourism 2014’, Erbil Tourism 2014
<<http://www.erbiltourism2014.com/en/erbil/erbil-2014>> [accessed 15 December 2015]
- Fromkin, David, *A Peace to End All Peace: The Fall of the Ottoman Empire and the Creation of the Modern Middle East, First* (New York: Henry Holt and Company, 1989)
- Gallion, A. B., and S. Eisner, *The Urban Pattern, City Planning and Design*, 3rd ed (London: D. Van Nostrand Company, 1975)

- Garnham Wright, J. H., 'Building Control By Legislation: The UK Experience', in *The Theory and Practice of Building Control*, First (Chichester: John Wiley & Sons, 1983)
- Great Britain. Naval Intelligence Division, 'Erbil, Iraq.', *Iraq and the Persian Gulf 1944* (Oxford, from The University of Texas Libraries, Perry-Castañeda Library Map Collection,) <http://www.lib.utexas.edu/maps/historical/erbil_1944.jpg> [accessed 9 December 2015]
- , *Iraq and Persian Gulf* (London: Routledge, 2014)
- Guggenheim, M., and O. Soderstrom, *Reshaping Cities, How Global Mobility Transforms Architecture and Urban Form* (Abingdon: Routledge, 2010)
- Hall, A. C., 'Dealing with Incremental Change: An Application of Urban Morphology to Design Control', *Urban Design*, 2 (1997), 221–39
- Happy Land Company, 'Lawan City, Erbil', *Lawan City, Erbil* <<http://www.happylandiraq.com/projectDetails.aspx?ID=281>> [accessed 21 May 2016]
- Hemn Group Companies, 'Italian City 1', *Italian City Project, Erbil* <<http://www.hemngroup.com/Default1.aspx?page=article&id=565&l=1>> [accessed 17 May 2016]
- High Commission for Erbil Citadel Revitalization (HCECR), 'History', *Erbil Citadel* <<http://www.erbilcitadel.org/ErbilCitadel/history.php?page=6>> [accessed 18 December 2015]
- Hillier, B., 'The Architecture of the Urban Object', *Ekistics*, 334 (1989), 5–21
- 'ISUF- International Seminar on Urban Form', (ISUF) *International Seminar on Urban Form, 2015* <<http://www.urbanform.org/>> [accessed 5 September 2015]
- Johnson, Constance, *IRAQ: LEGAL HISTORY AND TRADITIONS* (Washington,: The Law Library of Congress, 2004)
- Kayden, J., 'The Law of Urban Design', in *Companion to Urban Design*, ed. by T. Banerjee and A. Loukaitou-Sideris (New York: Routledge, 2011)
- Kelbaugh, Douglas, 'Typology: An Architecture of Limits', in *Urban Design Reader*, ed. by Carmona Matthew and Steve Tiesdell, First (Oxford: Architectural Press, 2007), pp. 83–97
- Khadduri, Majid, *REPUBLICAN 'IRAQ: A Study in 'Iraqi Politics Since the Revolution of 1958* (London: Oxford University Press, 1969)
- Kostof, S., *The City Shaped, Urban Patterns and Meanings Through History* (London: Thames and Hudson Ltd, 1991)
- Krier, Rob, *Urban Space*, Forwarded by Colin Rowe (New York: Rizzoli, 1979)
- Kropf, Karl S., 'Conceptions of Change in the Built Environment', *Urban Morphology*, 5 (2001), 29–42

- , 'The Handling Characteristics of Urban Form', Urban Design Group, Winter (2005), 17–18
- , 'Urban Tissue and the Character of Towns', Urban Design International, 1 (1996), 247–63
- Kurdistan Parliament-Iraq, Decision No. 5 on the Treatment of Informal Buildings, 2002
- Larice, Michael, and Elizabeth Macdonald, eds., *The Urban Design Reader* (Routledge Urban Reader Series), 1st edn (London: Routledge, 2006)
- Larkham, Peter J., 'The Study of Urban Form in Great Britain', *Urban Morphology*, 10 (2006), 117–41
- Larkham, Peter J., and Andrew N. Jones, eds., *A Glossary of Urban Form*, *Historical Geography Research*, 26 (Birmingham: Urban morphology research group, 1991)
- Lawler, Andrew, 'Erbil Revealed: How the First Excavations in an Ancient City Are Supporting Its Claim as the Oldest Continuously Inhabited Place in the World', *Archaeology*, 2014 <http://www.archaeology.org/issues/145-1409/features#art_page1> [accessed 16 February 2015]
- Levy, Albert, 'Urban Morphology and the Problem of Modern Urban Fabric: Some Questions for Research', *Urban Morphology*, *Urban Morphology*, 3 (1999), 79–85
- Longrigg, Stephen Hemsley, 'IRAQ, 1900 TO 1950 A POLITICAL, SOCIAL, AND ECONOMIC HISTORY', Second edition (Oxford: University Press, 1956)
- Lowndes, M, and K Murray, 'Monuments Dilemmas and the Development of the Rules of Thumb for Urban Designer', *The Planner*, 74 (1988), 20–23
- Marzot, Nicola, 'The Study of Urban Form in Italy', *Urban Morphology*, *Urban Morphology*, 6 (2002), 59–73
- Mclaughlin III, Andrew C., 'Thoughts on the Formation of the State of Iraq' (presented at the Chit Chat Club, San Francisco, California, 2008)
- Menghini, Anna B., 'The City as Form and Structure: The Urban Project in Italy from the 1920s to the 1980s', *Urban Morphology*, *Urban Morphology*, 6 (2002), 75–86
- Ministry of Local Governance, General Directorate of Urban Planning, Building Regulations in Commercial Areas No. 4131, Official Letter No. 4131 on 16/9/1989, 1989
- Morris, A.E.J., *History of Urban Form, Before the Industrial Revolutions*, 3rd ed (Essex: Longman Group UK Ltd, 1994)
- Moudon, Anne Vernez, 'A Catholic Approach to Organizing What Urban Designers Should Know', *Journal of Planning Literature*, 6 (1992), 331–49

- , “‘Getting to Know the Built Landscape: Typomorphology” From Ordering Space: Types in Architecture and Design (1994)’, in *The Urban Design Reader*, ed. by Michael Larice and Elizabeth Macdonald (London: Routledge, 2006)
- , ‘Urban Morphology as an Emerging Interdisciplinary Field’, *Urban Morphology*, 1 (1997), 3–10
- Oliveira, Vitor, ed., *Urban Morphology: An Introduction to the Study of the Physical Form of Cities*, The Urban Book Series, First (Switzerland: Springer Nature, 2016)
- Rapoport, A., *Human Aspects of Urban Form, Towards a Man-Environment Approach to Urban Form and Design* (Oxford: Pergamon Press Ltd, 1997)
- Rossi, Aldo, *The Architecture of the City*, First (Cambridge: The MIT Press, 1982)
- RTI (Research Triangle Institute) International, *Land Registration and Property Rights in Iraq* (Baghdad: USAID Iraq Local Governance Program, 2005)
- Sima, Yina, and Diang Zhang, ‘Comparative Precedents on the Study of Urban Morphology’, in *7th International Space Syntax Symposium*, ed. by Daniel Koch, Lars Marcus, and Jesper Steen (Stockholm: Proceedings, 6th International Space Syntax Symposium, 2009), p. 103:1-103:8
- Talen, E., *City Rules, How Regulations Affect Urban Form* (Washington: Island Press, 2012)
- The Council of the State, *Fifteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No.361*, 1960, pp. 103–4
- , *Fourteenth Amendment System of the System of Roads and Buildings No. 44 of 1935*, In *Iraqi Gazette No.296*, 1960, pp. 24–26
- , *Law No. 2 in 1965 of the Second Amendment of Law of Housing No. 54 of 1962*, In *Iraqi Gazette No. 1069*, 1965, pp. 5–6
- , *Law No. 20 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 129*, 1959, pp. 95–96
- , *Law No. 25 in 1958 of the Second Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 28*, 1959, p. 69
- , *Law No. 48 in 1960 of the Fourth Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No.*, 1960
- , *Law No. 61 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938*, In *Iraqi Gazette No. 579*, 1961, pp. 289–93
- , *Law No. 96 in 1963 of the First Amendment of Law of Housing No. 54 of 1962*, In *Iraqi Gazette No. 858*, 1963, pp. 422–24
- , *Law No. 119 in 1963 of the Fifth Amendment of Law of Real Estate Bank No. 73 of 1955*, In *Iraqi Gazette No. 862*, 1963, pp. 486–88

- , Law No. 148 in 1959 of the Third Amendment of Law of Real Estate Bank No. 73 of 1955, In Iraqi Gazette No. 237, 1959, pp. 733–34
- , Law of Cooperative Associations No. 73 of 1959, In Iraqi Gazette No.164 Part 1, 1959, pp. 374–98
- , Law of Housing No. 54 of 1962, In Iraqi Gazette No. 730, 1962, pp. 356–60
- , Law of the Agrarian Reform No. 30 of 1958, In Iraqi Gazette No. 44, 1958, pp. 92–109
- , Law of Turning-off the Right of Real Estate Usufruct No. 150 of 1967, In Iraqi Gazette No. 1490, 1967, pp. 716–20
- , Law of Turning-off the Right of Real Estate Usufruct No. 8 of 1960, In Iraqi Gazette No. 289, 1960, pp. 27–29
- , System of Tapu No. 64 of 1959, In Iraqi Gazette No.296, 1960, pp. 342–82
- , The Amendment System of 1960 of the System of Tapu No. 64 of 1959, In Iraqi Gazette No.312, 1960
- , The Amendment System of 1965 of the System of Tapu No. 64 of 1959, In Iraqi Gazette No.1115, 1965
- , Thirteenth Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No.237, 1959, pp. 385–86
- The Monarch of the Kingdom, Amended Law of Municipalities' Administration No. 84 of 1931, 1934
- , Amended System of Roads and Buildings No.44 of 1935, In Iraqi Gazette No. 1465, 1935
- , Eighth Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 2211, 1944, pp. 102–4
- , First Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 1542, 1936, pp. 197–206
- , First Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 1542, 1936
- , Law No. 26 on the Amendment of Law of Assessments of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1895, 1941, pp. 93–97
- , Law No. 33 on Amendment of Law of Luzma No. 51 of 1932, In Iraqi Gazette No. 1626, 1938, pp. 204–5
- , Law No. 80 in 1956 of the First Amendment of Law of Real Estate Bank No. 73 of 1955, In Iraqi Gazette No. 3825, 1956
- , Law of Luzma No. 51 of 1932, In Iraqi Gazette No. 1137, 1932, pp. 224–27

- , Law of Municipalities' Administration No. 84 of 1931, In Iraqi Gazette No. 995, 1931, pp. 771–94
- , Law of Old Antiquities No. 59 of 1936, In Iraqi Gazette No. 1507, 1936, pp. 368–91
- , Law of Old Antiquities of 1924, 1924, pp. 84–97
- , Law of Real Estate Bank No. 73 of 1955, In Iraqi Gazette No. 3635, 1955, pp. 535–42
- , Law of Real Estate Usufruct Rights No. 55 of 1932, In Iraqi Gazette No. 1142, 1932, pp. 246–49
- , Law of the Assessment of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1625, 1938, pp. 170–95
- , Law of the Assessment of Land Rights No. 50 of 1932, In Iraqi Gazette No. 1137, 1932, pp. 205–23
- , System of Roads and Buildings No.44 of 1935, In Iraqi Gazette No. 1465, 1935, pp. 195–214
- , System of Tapu No. 26 of 1943, In Iraqi Gazette No. 2100, 1943, pp. 108–319
- , The Ottoman Law of Land, In the Annex of Iraqi Gazette No. 727, 1929
- , Third Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 1633, 1938, pp. 70–72
- , Twelfth Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No. 3918, 1956, pp. 342–43
- The Parliament of Iraqi Kurdistan, Law 3 of 1998 on Turning-off and Subdividing Land located Inside the Municipalities' Boundaries, In The Set of Laws and Systems No. 3, 1998, pp. 40–41
- , Law of Municipalities' Administration No. 6 of 1993, In Parliament Gazette No. 9, 1993
- The Presidency of Erbil Municipality, The Report of the Committee of Building and Urban Regulations in 'Subdivisions of 32, District 44 Warish' and 'Subdivisions 284, District 5 Ankawa' (Erbil: Kurdistan Regional Government: Ministry of Municipalities/ The Presidency of Erbil Municipality, 2007)
- The Presidency of Kurdistan Region, Law No. 5 on the Amendment on Law No. 3 of 1998 on Turning-off and Subdividing Land located Inside the Municipalities' Boundaries, In Kurdistan Gazette No. 67, 2007, pp. 19–20
- The Presidency of the Republic, Law No. 16 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1075, 1965, pp. 54–59
- , Law No. 25 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1547, 1968, pp. 54–59

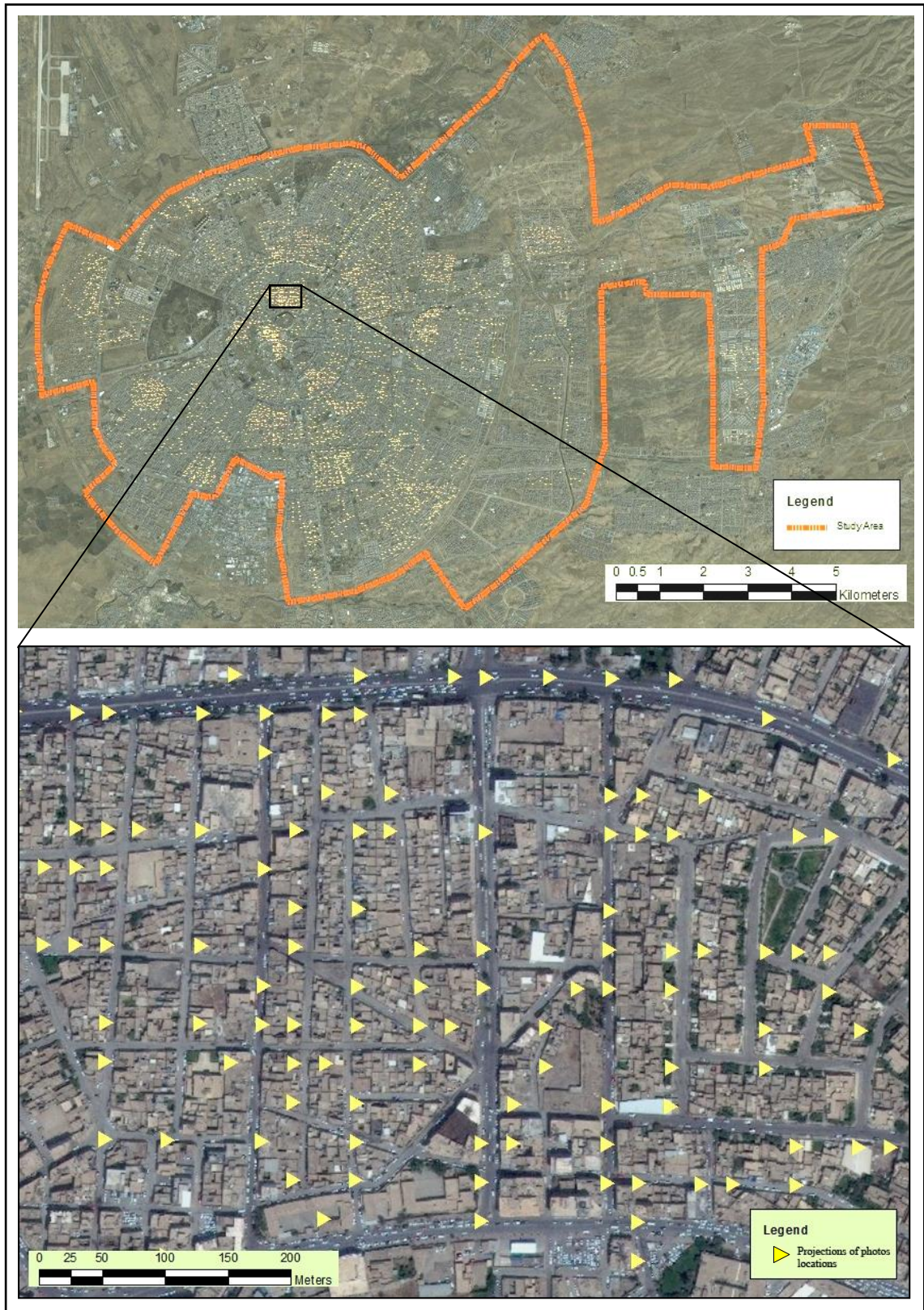
- , Law of Acquisition No. 54 of 1970, In Iraqi Gazette No. 1855, 1970, pp. 227–34
- , Law of Antiquities and Heritage No. 55 of 2002, In Iraqi Gazette No. 3957, 2002, pp. 566–72
- , Law of Municipalities’ Administration No. 165 of 1964, In Iraqi Gazette No. 1033, 1964, pp. 904–42
- , Law of the Agrarian Reform No. 117 of 1970, In Iraqi Gazette No. 1884, 1970, pp. 505–46
- , Sixteenth Amendment System of the System of Roads and Buildings No. 44 of 1935, In Iraqi Gazette No.993, 1964, pp. 98–99
- The President of Kurdistan Region of Iraq, Law of the Investment in Kurdistan No. 4 of 2006, In Kurdistan Gazette No. 62, 2006, pp. 22–31
- The President of the Republic, Law of Municipalities’ Administration No. 165 of 1964, In Iraqi Gazette No. 1033, 1964, CLXV
- The Revolutionary Command Council, Decision No. 850 of 1979 on setting plot areas limits for housing purposes, In Iraqi Gazette No. 2722, 1979, p. 8
- , Decision No. 940 of 1987 about the Amendment on the Decision No. 850 of 1979, In Iraqi Gazette No. 3183, 1988, p. 6
- , Decision No. 975 on The Amendment of Law of Antiquities No. 59 of 1936, In Iraqi Gazette No. 2396, 1974, pp. 373–79
- , Instructions No. 851 of 1980 on building houses, In Iraqi Gazette No. 2756, 1980, pp. 237–38
- , Law No. 6 on the Amendment of Law of Acquisition No. 12 of 1981, 1998
- , Law No. 20 on the Amendment of the Law of Acquisition No. 12 of 1981, 1994
- , Law No. 28 in 1964 of the Sixth Amendment of Law of Real Estate Bank No. 73 of 1955, 1964
- , Law No. 67 on the Amendment of Law of Assessment of Land Rights No. 29 of 1938, In Iraqi Gazette No. 1729, 1969
- , Law No. 79 in 1970 of the Seventh Amendment of Law of Real Estate Bank No. 73 of 1955, 1970
- , Law No. 104 in 1975 of the Ninth Amendment of Law of Real Estate Bank No. 73 of 1955, In Iraqi Gazette No. 2480, 1975, p. 2
- , Law No. 114 in 1972 of the Eighth Amendment of Law of Real Estate Bank No. 73 of 1955, In Iraqi Gazette No. 2193, 1972, pp. 621–22

- , Law of Acquisition No. 12 of 1981, In Iraqi Gazette No. 2817, 1981, pp. 167–75
- , Law of Iraqi Kurdistan Autonomy No. 33 of 1974, In Iraqi Gazette No. 2327, 1974, pp. 3–7
- , Law of Real Estate Bank No. 161 of 1976, In Iraqi Gazette No. 2566, 1977, pp. 22–25
- , Law of Real Estate Registration No. 43 of 1971, In Iraqi Gazette No. 1995, 1971, pp. 379–453
- , Law of the Assessment of Real Estate Usufruct Right No. 17 of 1980, In Iraqi Gazette No. 2755, 1980, pp. 164–65
- The Royal Iraq, ‘Set of Laws and Systems’, Iraqi Gazette No. 1465 (Baghdad, 1935), p. 195
- TRIPP, CHARLES, A HISTORY OF IRAQ, 3rd edn (Cambridge: University Press, 2007)
- UNESCO OFFICE FOR IRAQ, ‘Revitalization Project of Erbil Citadel’
<<http://www.unesco.org/new/en/iraq-office/culture/erbil-citadel/>> [accessed 9 November 2015]
- UNESCO office for Iraq and HCECR, and ARS Progetti SPA Company, URBAN DESIGN GUIDELINES FOR THE BUFFER ZONE OF ERBIL CITADEL (Erbil: UNESCO Iraq and HCECR and the Governorate of Erbil, 2011)
- Urban Design Advisory Services, Urban Form, An Urban Design Approach for Understanding the Urban Form of Regional Centres (Sydney: Department of Urban Affairs and Planning, 1998)
- Walters, D., and L. Luise Brown, Design First: Design –based Planning for Communities (Oxford: Architectural Press, 2004)
- Whitehand, J. W. R., ‘Background to the Urban Morphogenetic Tradition’, in The Urban Landscape : Historical Development and Management : Papers by M. R. G. Conzen, ed. by J. W. R. Whitehand, Institute of British Geographers Special Publication ; no.13 (London: Academic Press, 1981), pp. 1–24
- , ‘British Urban Morphology: The Conzenian Tradition’, Urban Morphology, 5 (2001), 103–9
- , ‘CONZENIAN URBAN MORPHOLOGY AND URBAN LANDSCAPES’, in 6th International Space Syntax Symposium (Istanbul: Proceedings, 6th International Space Syntax Symposium, 2007)
- , The Changing Face of Cities: A Study of Development Cycles and Urban Form, The Institute of British Geographers/ Special Publications Series (New York: Basil Blackwell, 1987)

Appendix 1 (A letter from Erbil Governorate for facilitating the data collection process)

<p>حكومة اقليم كوردستان وزارة الداخلية محافظة اربيل الادارة المحلية مديرية الادارة و الذاتية</p>	 <p>KURDISTAN REGIONAL GOVERNMENT – IRAQ MINISTRY OF INTERIOR / ERBIL GOVERNORATE LOCAL ADMINISTRATION / DIRECTORATE OF ADMINISTRATION AND PERSONAL AFFAIRS</p>	<p>حكومة تى ههريمى كوردستان وهزاره تى ناوخو پاريزگای ههولير كارگيرى خوچى يه تى بهريوه بهرايه تى كارگيرى و خويه تى</p>
<p>ژماره/ ۱/ ۲۲ / ۱۲۹۰ رێکەوت/ ۱۲ / ۲۰۱۴ زاینی بهرامبه‌ر/ ✓ / رێبه‌ندان / ۲۷۱۳ ی کوردی</p>		
<p>بۆ/ لایه‌نی په‌یوه‌ندان ب/ توژینه‌وه</p> <p>به‌ریز (جواس عبدهادی صابر) قوتایی دکتورایه قوناعی یه‌گه‌می پرۆژه‌ی تواناسازی قهرمانبه‌رانی هه‌ریه‌م و بواری دکتوراکه‌ی (شیوازی بیناسازی شاری هه‌ولیر و گۆرانکاریه‌کان) یه‌تی ، پێویستی به‌ زانیارییه‌ له به‌ریوه‌به‌رایه‌تی و قهرمانگه‌ په‌یوه‌ندانره‌کان و وه‌رگرتنی چهند وینه‌یه‌کی گه‌ره‌ک و شه‌قامه‌کانی هه‌ولیر . تکایه‌ هاوکازی و ئاسانکاری پێویستی بۆ بکری و سوپاس .</p>		
<p> ئه‌ندازێدار ظاهر عبدالله عثمان یاریده‌ده‌ری پارێزگاری ۲۰۱۴/۱ /</p>		
<p>وینه‌یه‌ک بۆ :-</p> <ul style="list-style-type: none"> ❖ وه‌زاره‌تی شاره‌وانی و گه‌شت و گوزار له‌گه‌ل رێژدا. ❖ به‌ریوه‌به‌رایه‌تی په‌ره‌پێدانی توانای مرۆی/نوسراوی ژماره / ۵۴۷ له ۲۰۱۴/۱/۱۴ له‌گه‌ل رێژدا ❖ ناویراو ❖ خولار 		
<p>مصدرا ۱/۱۲ -</p>		

Appendix 2 (The projections of the location of the photographs taken in the process of photographing by basing on their coordination)



Appendix 3 (A published paper by the researcher on Erbil's Urban Form)

Humanities and Social Sciences Review, CD-ROM. ISSN: 2165-6258 :: 03(03):325–340 (2014)

A Study on the Urban Form of Erbil City (The Capital of Kurdistan Region) As an Example of Historical and Fast Growing City

Chwas A. Sabr
The University of Sheffield, UK

ABSTRACT

Erbil as a historical city has faced a notable growth in different periods after the establishment of Iraq state in 1920, especially after 2003 when it has witnessed its largest expansion rate. This, in turn has influenced the rate of the change of the urban form. This paper addresses the issue of the urban morphology of Erbil city in different periods since 1920. It presents the change of the urban form of the city through the frame of legislation which is supposed to reflect policies that meet a number of factors such as political, economic, social, cultural, environmental-climate, and technological. A descriptive and interpretative approach is adopted as an aim to provide an understanding of how and why this process of change has happened. The sources of data such as maps, photographs and legislative texts are used.

Keywords: Regulations (Legislation), Urban form, Morphology, Erbil city.

Access to the full text at:

<http://www.universitypublications.net/hssr/0303/pdf/V4NA346.pdf>