Testing an Integrated Methodology for Urban Typo-morphological Analysis on Famagusta and Ludlow

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ABSTRACT

Urban morphology is a system containing many disciplines within in it and it falls within the interest of different professions such as architecture, geography, philosophy, archeology, anthropology, history and ethnography. In the scope of the thesis only architectural and geographical dimension of urban morphology will be discussed.The main aim of this study is to analyze and compare the urban morphological character of the medieval originated towns at different geographies and different cultures throughout the history up to present. In addition to this, it aims to understand why morphology of towns changed throughout the years and how it is shaped and changed within this process. Thus, origin of urban morphology based on *geography* at planning level and *architecture* at typological level will be explored. It aimed to analyse the Conzenian and Caniggian methods, which form the basis of morphological studies on medieval originated towns. It synthesized Conzen and Caniggia concepts and it intends to clarify the research design of cases. The method of analysing the cases –comparative longitudinal case study- is resulted from the theoretical bases of the thesis. In this study, comparative longitudinal case studies methodology is used for testing whether the morphological analysis approaches is applicable in different geographies. At the end it intends to present the synthesized Conzenian's and Caniggian's concepts on Famagusta and Ludlow in order to test whether this method would provide an opportunity to apply the integtated methodology for morphological analysis in different regions.

Keywords: Urban Morphology, MRG Conzen, G.Caniggia, Morphological Analysis

ÖZ

Kent morfolojisi, birçok disiplini içinde barındıran; mimarlık, coğrafya, felsefe, arkeoloji, antropoloji, tarih ve etnografya gibi mesleklerle kesişen bir sistemdir. Bu tezin kapsamında kent morfolojisi sadece mimari ve coğrafi boyutuyla tartışılacaktır. Bu çalışmanın ana amacı, farklı coğrafya ve kültürlerde, ortaçağ kökenli kentlerin morfolojik karakterlerini tarih içerisinde günümüze kadar karşılaştırarak analiz etmektir. Buna ek olarak, kent morfolojisinin yıllar içinde niye değiştiğini anlamak ve bu süreçte nasıl şekillendiğini ortaya koymak da çalışmanın kapsamında yer almaktadır. Böylelikle, planlama aşamasında coğrafyaya, tipoloji aşamasında da mimarlığa bağlı olarak kökeni oluşan kent morfolojisi ortaya çıkarılmaktadır. Günümüze kadar varlığını sürdüren ortaçağ kentlerinin morfolojik çalışmalarında esas olarak kullanılan Conzen ve Caniggia metodları aracılığıyla, mimari ve coğrafi açıdan farklı bölgelerin analiz edilmesi amaçlanmaktadır. Conzen ve Caniggia kavramlarını sentezlemekte ve farklı tasarım örneklerinin araştırması aydınlatılmaktadır. Bu çalışmada, karşılaştırmalı boylamsal örneklem metodolojisi, morfolojik analiz yaklaşımlarının farklı coğrafyalara uygulanabilirliğini test etmek amacıyla kullanılmaktadır. Sonunda, Conzen ve Caniggia kavramlarının sentezlenmesi sonucunda önerilmekte olan bütünleşik analiz methodu Mağusa ve Ludlow'da uygulanarak, farklı bölgelerde morfolojik analiz uygulama fırsatı verip vermediği test edilmektedir.

Anahtar Kelimeler: Kent Morfolojisi, MRG.Conzen, G.Caniggia, Morfolojik Analiz

This thesis has been dedicated to children with Autism

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Chapter 1

INTRODUCTION

Urban morphology is a system comprising many disciplines, and it falls within the interests of different professions such as architecture, geography, philosophy, archeology, anthropology, history and ethnography. In the scope of this thesis, only architectural and geographical dimensions of urban morphology will be discussed. Whereas certain architectural and geographical dimensions of urban morphology address physical issues, others focus on social and cultural issues. Additionally, it is not possible to review all approaches from different disciplines within the scope of this thesis. This thesis will focus on the geographical and architectural dimensions of urban morphology in Europe, United States, China and Japan because a review of the literature reveals that most urban morphological research has been conducted in these countries.

However, investigating the uniqueness and richness of places, as opposed to an abstract and constrained approach, makes it possible for urban morphological research to connect with people's daily experience and to incorporate such experience in plans and designs. By analyzing the context of urban environments, researchers and designers are responsible for ordering and processing this information using their skills and general knowledge. McLoughlin (1969, p. 45) defined the study of urban morphology as a way of introducing the element of form in planning processes by removing that element from the realm of arbitrariness. The methodological approach links to methodical approaches in planning without disregarding the non-rational aspects of form. This approach makes it possible to

discuss the form of towns based on morphological methods. In addition, morphological analysis plays an important role in the development of conservation plans.

Various definitions of urban morphology have been suggested by researchers in different disciplines. For example, Moudon (1997, p. 3) describes urban morphology as "the study of the city as human habitat". Levis Strauss (1954, pp. 137-138), who is a sociologist, describes the city as "the most complex of human inventions, … at the confluence of nature and artifact." There are many definitions of urban morphology, but there is one that several authors, including Clark (1985), Small & Witherick (1986), and Goodall (1987), agree on. Thus, the common definition of urban morphology is that it consists of the study of the form, shape, plan, structure and functions of the built fabric of cities or towns and is concerned with the historical development of this fabric over time.

According to Vance (1990), urban morphology or city form tends to change in response to the context of city development over time. Thus, the study of urban morphology involves examining not only existing the physical elements of a city but also their evolution over the course of history.

Using more primary resources, Gordon (1984, p.3) and Onal et al. (2003, p.428) concur that a city's morphology involves plots, buildings, use, streets, plans, and townscapes. There is agreement that the city or town can be read and analyzed through the medium of its physical form. The study of morphology focuses on the history of variation in form (first used in 1885) by Goethe (Wilkinson & Willoughby, 1962). It is important to the use of morphology as a tool for analysis that it is not only about form. In serious urban design, form may never be viewed without

considering its context: the meaning attached to it, its relationship to use, the process of transformations that characterize it, and its relationship to the urban process.

In 1996, morphologists from different disciplines such as geography, architecture, sociology, history and planning established the International Seminar on Urban Form (ISUF), an organization that acknowledges the expansion of urban morphology as an emerging interdisciplinary field. ISUF aims to provide a platform for the exchange ideas, theories and information about projects among a wide range of readers (http://www.urbanform.org).

Pioneers of morphological studies G. Caniggia and MRG Conzen have provided guidelines and established a method for morphological analysis in a systematized way. Caniggia analyzes the urban form in an inductive way, whereas Conzen takes a deductive approach. Both methods have certain shortcomings. Caniggias' approach is to begin with the smallest component of the building, followed by a method that associates the building with the city as a whole. This method has certain problems with generalized application because the smallest components and elements of a building may not be classified in the same way in different geographical regions. A building's elements and components are changed according to local characteristics, which can be unique to a region. In contrast, Conzen's approach is to begin with the whole city on a geographical level and then move down to the building scale. Again, some elements of analysis are not easily applied everywhere because of the strong influence of borders, regions, hierarchies and locations. Conzen's analysis does not address building elements and components in as much detail as Caniggia's approach.

1.1 Aim, Objectives and Question of the Research

In different geographies associated with different cultures or civilizations, unplanned developments in historical and contemporary areas can result in incompatible morphological forms, especially in medieval towns. Typo-morphological analysis helps in understanding the urban form and presents an opportunity for a wide range of design or planning strategy. This type of analysis also helps to determine the conservation plans or strategies of towns that reveal clues to their own history. Such analysis methods are a process that reviews the evolution and evaluation of towns throughout history. MRG Conzen and G. Caniggia performed urban morphological studies of European cities, providing an opportunity to compare the results of both authors' approaches on the European continent. However, it is unknown whether either method can be used outside of Europe. Moreover, there is no town in which the two methods have been applied simultaneously. Accordingly, *the research question* becomes: "How would it be possible to suggest a synthesized method through integrating the Conzenian and Caniggian methods for typo-morphological studies"?

The main aim of this study is to develop an integrated method based on Conzenian and Caniggian theoretical frameworks. The study is a theoretical attempt to formulate a synthesized methodology for typo-morphological analysis. In this paper, this methodology is applied to two cases comparatively to verify the effectiveness of the method.

A literature survey of Conzen's and Caniggia's methods for morphological analysis reveals that these methods have not been used in all geographical regions because the elements and components of the methods are applicable only to Europe, the United States and China. Thus, the major objective is to conduct research on the

two methods to establish a base for an integrated urban morphological method that will be applicable to different sites throughout the world. This approach provides an opportunity to understand the urban form more clearly.

It is hoped that the proposed method of analysis of urban form according to a morphological approach will help designers, planners, cultural geographers, urban morphologists, typologists, and historians find better solutions while they are designing, analyzing, planning or conserving cities, urban areas or districts worldwide.

1.2 Research Methodology

The method of the study is based on two parts: a documentary survey and a case study. The first part of the study is derived from a documentary survey. The study attempts to define the problem by exploring why typo-morphological studies are necessary to measure the structure of cities. Why do we need this analysis? How should we approach analysis and design in the urban context? Next, the research will bring detailed reviews and surveys in response to the question put forward and will investigate the aims and objectives of the study. After a review of the issues and relevant sources, the study aims to establish the basis of the theory of the thesis.

The literature survey has been conducted based on the *key terms* "urban morphology," "urban typology," "urban form," "typo-morphology," "MRG Conzen," and "G. Caniggia". The literature survey contains reviews on the M.R.G. Conzen and G. Caniggia methods derived mainly from primary and secondary sources. In this thesis, the main sources for MRG Conzen are *Alnwick, Northumberland: a study in town-plan analysis*", Institute of British Geographers, London,book Conzen M.R.G, 1988, and *Morphogenesis, morphological regions and secular human agency in the historic townscape as exemplified by Ludlow*, in

Denecke, D. and Shaw, G.(eds) urban historical geography, Cambridge Uni. Press, Cambridge, pp. 255-261 titled article and Conzen M. R. G, (1969). In addition, there are some reviews of Conzen's notes from his private collection at Birmingham University.

G. Caniggia's works have been reviewed in the book 'Caniggia G, Maffei G., 2001*, Interpreting Basic building Architectural composition and building typology* Alinea editrice, Firenze, Italy'. Few primary sources in English are available for Caniggia's work, and most are in Italian.

Another issue is a review of the discussions from the perspectives of different disciplines. These reviews are found in issues of the International Seminar on Urban Form (ISUF) and the Journal of Urban Morphology, established in 1996. Finally, the cultural, political and economic backgrounds of the selected cases from historical sources are examined. One of the cases is Famagusta, for which the historical sources are reviewed from both primary and secondary sources. Primary sources from the national archive in North and South Cyprus and secondary sources from several books and articles are reviewed. The other case is Ludlow, for which historical sources are reviewed from primary and secondary sources as in the Famagusta case. Primary sources from the Ludlow library and secondary sources from books and periodicals related to Ludlow are reviewed. All of these surveys help to establish the theory of the thesis.

After the documentary survey, this thesis aims to develop an integrated method of both the Conzenian and Caniggian approaches to compare and synthesize them.

The second part of the study is the case study. This part is composed of two sections: a literature survey to understand the historical backgrounds of towns and a

site survey for measuring the data of the cases. The literature to be surveyed for the case study related to the historical backgrounds of the towns is selected from primary and secondary sources from archives, books, journals and articles. Data collection on sources has been reviewed from primary sources collected from the national archives. In addition, maps and drawings for Ludlow were collected from the MRG. Conzen collection at Birmingham University, and ordinance survey maps were also collected from the Ludlow City Council. Maps and drawings from Famagusta were collected from the North Cyprus City Planning Department and Land Register Office and Mağusa Municipality.

Site surveys based on the theory enable testing of the method with data collecting through morphological studies. The comparative longitudinal case study method was selected for analyzing and comparing the selected cases. One of the aims in choosing this method was to determine whether the integrated method can be applied to the selected cases. The comparative case study method was chosen, according to the urban morphological point of view and approaches, especially those of MRG Conzen and G. Caniggia, that emerge from a careful consideration of data that those particular cases provide: Ludlow in the U.K. and Famagusta in North Cyprus. These cases were intentionally chosen from different countries to provide a rich discussion of urban morphology and its methods to test whether the integrated method could be applied in different geographies with different cultures. Examples were selected according to their equivalent time spans, functional similarities, similar fringe belts and natural characteristics in different geographies.

The necessary photographs and digital drawings are the author's own. Illustrations used in this thesis were gathered from various books and from the collections.

Some of the data for the cases were collected from primary and secondary sources and reviewed as desk work, and some of the data were taken from the site surveys during the site survey, especially in the case of physical analysis.

1.3 Limitation of the Study

This study has some limitations. In this study, the physical dimensions of urban morphology have been considered. Because each dimension could be a research topic in itself, natural, social, economic, and ideological determinants of urban morphology are excluded in this thesis. Another issue is the selection of cases. In this thesis, only Conzen's work, and not Caniggia's, is selected as a case for comparison. Thus, when cases are selected, the towns in Italy that were Caniggia's focus are excluded. One reason for this selection process is the language of the documents; Caniggia's work is primarily written in Italian or Old Latin. Therefore, cases from Italy are omitted in the scope of this thesis. In addition, typo-morphological approaches throughout the world are not reviewed in this thesis; only European approaches are reviewed because the selected cases are located in Europe.

1.4 Structure of Thesis

The thesis is composed of 6 main chapters. If no attribution is provided for a drawing or illustration, it is the author's own. This first chapter is an introduction to the research and explains the aims, objectives and research questions of the study, lists the sections included in this chapter, establishes the framework of the thesis methodology and discusses the limitations of the research.

The second chapter discusses the concepts of French, Italian and British schools and the approaches to urban morphology of different geographical and architectural origin from different perspectives.

In the third chapter, the Conzenian and Caniggian approaches are analyzed. Conzen's approach to urban morphology is discussed in the first part, and Caniggia's approach is discussed in the second part. Then, the two approaches and perspectives are compared.

The fourth chapter presents a theoretical and methodological framework for analyzing the cases. This chapter also justifies the reasons for the selection of cases.

The fifth chapter focuses on the analysis of cases according to the theoretical framework and explores and discusses the results of the cases.

Finally, the sixth chapter summarizes the results of the cases and suggests a new approach for conducting a morphological analysis.

Chapter 2

FRAMEWORK FOR MORPHOLOGICAL STUDIES

The study of urban morphology is associated with different views and perspectives. This interdisciplinary characteristic leads to a deeper observation of the origins of urban morphology. Because geography and architecture are two major disciplines under which urban morphology has emerged, the following text will focus separately on the geographical and architectural origins of urban morphology. Thus, the notion of the origin of urban morphology as based on *geography* at the planning level and *architecture* at the typological level will be explored.

Within this context, three schools began to work on urban morphological studies: the English school, the Italian school and the French school. In the scope of the English School, MRG Conzen is a pioneer of morphological studies in urban design. Conzen is a German geographer who migrated from Germany to England before the Second World War (Moudon, 1997, p.3). He is one of the founders of urban morphological studies on the geographical level at the University of Birmingham, a school that aims to introduce such studies worldwide. Basically, the approach is related to thinking in terms of ground use and functions and to spatial planning. Conzen works on parcels and ground plans rather than on buildings, as in usual in other schools. Consequently, his drawings are two dimensional, and properties of the environment are considered as a type of data that could also be subjected to calculations. Later, the urban and historical geographer J.W.R Whitehand (1981) tested Conzen's findings, adding the economic dimension to urban

morphology and investigating the relationships among the city, life styles and the dynamics of the building industry. Subsequently, T.R. Slater studied 20th-century sub-urban expansions and transformations. Additionally, the first PhD graduates from the schools investigating urban morphology such as Peter Larkham, Karl Kropf, and Keith Lilley helped influence the groups' studies and work throughout the world. American schools have been influenced in this fashion, and a significant study on this subject is that of MP Conzen, who is the son of MRG Conzen. He specializes in the morphology of American cities according to the English school. Recent works include those of F. Chen (2012), Z. Xu, (2012), I. Samuel, (2011), K.D. Lilley, (2011), E. Koster (2009), M. Maretto (2009), K. Gu (2008), T. Tian (2008), T. Hall (2008), and I. Kukina (2006), who are influenced by the Conzenian approach and who attempted to test those methods in various towns or countries.

Three successive generations of theorists and researchers can be distinguished in the Italian school: Saveria Muratori (1959), Carlo Aymonino and Aldo Rosi (1960-1980), Gianfranco Caniggia (1975-1990), and Bernardo Sechii (1985-2010). Urban morphological studies began with Saverio Muratori in 1959 (Cataldi et al, 1997, p.49). The Italian school generally focuses on the typo-morphological studies of urban morphology at the architectural level. Muratori generally focuses on the procedural typological studies distinguishing among four scales: building, district, city and territory. According to Muratori, "lack of coherence in modern urban design and planning is caused by the devaluation of inner, intuitive forms that are used to shape environment." (Muratori, 1959, p.21). In the view of Muratori, typology is not only about buildings but also about walls, streets, gardens, the construction of a city and everything that determines the form of a city in a certain period.

Aymonino and Rossi (1966) examine the importance of urban facts such as aspects of the urban form (buildings, spaces, monuments) that are of particular value for the identity of a city. These authors attempt to relate certain building types to the form of the city. Like Muratori, their most important subject is typology. The work of the first generation is primarily aimed at the study of streets and squares. According to these researchers, the larger scale cannot be described in terms of typologies because the material structure of a city is a continuous process and not a completed form.

Caniggia continues to develop Muratori's theory and focuses on typo-morphological studies. He emphasizes the relationship between building type and city form. In his work, he looks for what he calls a basic type that precedes all later types and attempts to construct lines along which later types are developed. Today, B. Sechii (2011), Nicolaz Marzot (2012, 2011), Giancarlo Cataldi (2010), Gian Luigi Mafeii (2010), Maria Grazia Corsini (2010), Paolo Marletto (2009) and Gissupe Strappa (2008) continue the tradition of architectural typo-morphological studies.

After the Italian and English schools, the French school tradition of urban morphology was established in the early 1960s by the sociologist Levi Strauss. Notable pioneers in this group are architects Phillipe Paneria and Jean Castex and sociologist Jean-Charles De Paule, who founded a school of architecture that succeeded the school of the Beaux Arts (1972). These researchers generally focus on cultural morphological issues in combination with architectural typo-morphology. Castex and Paneria developed a method for typological research with the analysis of growth, typology, urban landscape, social practice, and urban structures (Castex, 1972). The French researchers speak of an idealized model that forms the foundation of the concrete type and of a base type that evolved into several types. Typological

analysis can be performed on several levels, each with its own extent of detail and influence. Again, this approach builds on the ideas of Italian morphology; the French, in contrast, do not choose a specific number of levels, nor do they postulate explicitly that urban morphology is built up from the smallest components. According to Peneria and Castex (1972), typological research is based on the definition of corpus and temporary classification, elaborating the types and the typology itself. Their analysis concerns the parts, the buildings, parcels, groups of parcels and the global level of the cities. Subsequently, the sociologist Henry Lefebvre and architectural historians François Boudon and Andre Chastel combined the morphological methodology, theory and practice and applied the approach to many cities in France.

However, urban morphological studies not only consider architectural, geographical and sociological issues but also incorporate the philosophical bases developed by M. Foucault (1977, p.48) and H. Lefebvre (1991, p.27) and by Cassier (1970, p.74), who provided invaluable philosophical commentary on urban morphology.

All three of these scholars created a philosophy based on urban form and morphology. In general, all three focused on the influence of cultural values on urban form. However, Cassirer and Lefebvre considered more the influence of symbols and codes on urban form. In contrast, Foucault was interested in the relationship between the physical and social aspects of places. All of these significant elements created a basis for morphological studies.

In conclusion, the reviews of the approaches of the different schools on urban morphological studies were summarized above. This summary contributed to the general knowledge about the approaches of the different schools. Within this context,

this thesis has two primary goals. One is to establish a consistent basis for the Conzenian and Caniggian approaches to the study of the built form for the purpose of urban morphological analysis. The other goal is to examine the possibility of applying the proposed morphological analysis methods to historically based cities in different countries.

2.1 Geographical Origin of Urban Morphology

In this section, geographical origin of urban morphology will be discussed according to its origin. Geographical research on the urban morphology starts in German speaking countries. It may be traced back at least to the early work of Schlüter, notably two papers published in 1899, one on the ground plan of towns and the other on the aspects of settlement geography, and a monograph on the settlements of north-eastern Germany is published. There are also two later methodological publications, which are discourse on the aims of human geography and an essay on the place of human geography in geographical science. Under the scope of this thesis, Schlüter (1899, p.67) who put the roots of geography and geographical philosophy, Hassinger (1916, p.15) who developed land utilization and building utilization on settlement densities, Geisler and Martinity (1929, p.7) who are examined the town plans and building types on monographic classifications, Bobek (1966, p.13) who examined the towns according to functional change through time will be discussed. Then MRG Conzen's (1958, p.50) urban morphological approaches on urban geography will be discussed in detail. It will be discussed in detail because his ideas can be considered as a turning point of the urban geographical approaches on urban morphology. Finally Whitehand (1981) who develops and suggests new concepts on urban morphology will be discussed.

The European origin of urban morphology especially at geographical level has emerged with Schluter (1899) in Germany who hypothesized morphology of the *cultural landscape* as the object of research in *cultural geography*. Besides he draws attentions to settlement, land utilization and lines of communications. These three conception consist of the cultural landscape which is subdivided into three categories: human geography (settlement geography), economic geography, and transport geography (Whitehand, 1981, p.2). Within urban geography, he takes notice of the physical forms and appearance of the town, and the urban landscape is the main object of the morphological research (Whitehand, 1987, p.3).

H.Hassinger (1916, p.25) broadened the geographical perspective by giving greater attention to land and building utilization and residential density in order to solve the problems of preservation of cities. He is the originally concerned the problems of preservation in the old towns of Austria and thus to a large extent with the distribution of architectural monuments, he mapped the historic architectural styles there, and extending this to include the whole of the city in his art-historical atlas of cities. Interesting and valuable for their purpose as these magnificent efforts were in showing the wealth of architectural monuments of a famous city and the danger to which they were exposed under modern metropolitan conditions.

During the First World War the other influence on urban morphology came from Geisler and Martiniy (1929, p.7) who examined aspects of urban form in much greater detail than had been done before. They are examined comprehensive classification of the sites, town plans and building types in a *morphographic classification* which is relying on the depiction of settlement plans on topographical maps, without uncovering the origins and development of plans (Whitehand, 1987, p.4). In the middle of war years Meier and Roring (1986) worked on urban history

and Klaiber and Siedler (1912, p.39) were concerned with the history of town planning. Other development of urban morphology is the concentration on forms in the urban landscape at the expense of the forces creating them. They focused on form to function,which is one of the important evolution, as well as to understand the relationship with relating forms to their socio-economic context and historical development (Whitehand,1987, p.5).

In 1941 German geographer Scharlau analyzed the *genesis* of town plans, and used cadastral plans showing streets, plots and block plans of buildings. Bobek (1966, p.13) identified the irrationality of concentrating attention on the forms in the urban landscape at the expense of the dynamic source that created these forms, which he spotted in "the role of the town as a living economic organ within the economic system of region". He redefined Geisler's (1929, p.7) morphological expression as "a larger settlement representing the universal economic, political and cultural communication centre of an indistinctly bonded area and having a physical built characteristic features of which tend to intensify towards centre". He also notifies about the necessary trinity of fundamentals characteristics attaching to the geographical nature of towns, which can be defined as function, form, and change through time (Whitehand, 1981, p.7).

The major change in urban morphology was seen during and at the end of the World War II that involved the relegation of urban morphology to a comparatively minor role. Urban morphological research went beyond the long-term influences, revitalizing an attempt to implement a framework for the organization of planning science and much later revealing itself in attempts to construct a theory of townscape management (Whitehand, 1987, p.5).

Until 1960s, the basic significance of urban geographers was the internal structure of the city focused on morphology, which represent the ages and types of buildings and identified different historical components of town plans and uses (Dennis&Prince, 1988, p.48). After that time, MRG Conzen makes valuable contribution to urban morphology and he suggests his own methodology on urban morphology. In line with the main aim of this thesis, his approaches will be explained in more detailed than others. The quotations below explained urban morphological approach of MRG Conzen

> "Conzens' morphological period, namely a phase of social and cultural history creating distinctive material forms in the cultural landscape. He improved *evolutionary approach* to tracing existing forms back to the underlying formative processes and interpreting them accordingly, would seem to provide the rational method of analysis of urban morphology. Conzen's urban morphological study focuses on the town plan, which represents a town in two dimensions including all important characteristics of urban form his study of Newcastle upon Tyne, England, he described the complete method, called an evolutionary method of plan analysis, which is the town-plan study of sequential time periods. In his *town-plan analysis* approach, he identifies three fundamental elements of the town plan that can be analyzed over time in an evolutionary fashion: the streets and their street system, the plots and their plot pattern, and the building arrangement within these patterns (Conzen, 1968). The evolutionary method of plan analysis provides an understanding of the physical development of urban structural elements, resulting from the city's cultural and historical development (factors that strongly influenced its morphological development), which is an objective of the morphological approach. In the study of Burgage cycle in Newcastle, Conzen also uses an evolutionary town plan analysis as a means to understand its physical development over time The *retrogressive* method of working back from present-day forms is rejected quite simply because a proper understanding of processes cannot be attained from the analysis of relics, even in the case of the town plan, which produces a more complete collection of residual features than the building fabric or the land-use pattern: those parts of the townscape that have been removed are as important to a theory of townscape development as those that have survived." (Conzen, 1981, p.13)

Conzen's main contributions are mainly to urban morphogenetics rather than to town planning and he considered map of settlements types over the whole of region, showing symbolically the complete range of urban and rural settlements

forms (Conzen, 1981). He emphasised that town plan is a combination of three distinct but integral plan elements which are the (a) streets and their street system, (b) the plots and their plot pattern and(c) the building arrangement within these patterns. He tried to explain the present structure of a town plan by examining its historical development (Conzen, 1986, p.25).

In 1960s, with the rise of interest in functional classification and the economic bases of urban system, urban morphology was severely criticised as being mainly descriptive, lacking in good measurement techniques and failing to develop a general theory (Herbert&Thomas). In addition to this Whitehand (1988, 1992), Slater, 1990, Whitehand & Larkham 1992a claims that for a more realistic perspective of morphology, it is necessary to lie individual choice makers into a wider structure of morphogentics, economics, land estates interests and artistic consideration.

On the other hand, the social geography of the nineteenth century cities is studied on the basis of the ecological theory of the Chicago school and social area analysis. The spatial structure of a city is reconstructed and compared with a few standard types: *Sjoberg's* (1960) pre-industrial city, *Burgess's* (1924) concentrically zoned city, and *Hoyt's* (1933) sectors. In the 1970s, when the studies were still principally descriptive, only the most general process such as modernization accounted for the observed changes. However over time, the concept of modernity has become less linear and more historical through observation of modern attitudes, perceptions, political, functional, social and economic that laid behind such urban expansion (Denecke, 1988). As Madanipour (1996, p.55) agrees, the detailed studies have focused on urban fragments, they are morphogenetic and functional change, especially during the nineteenth and twentieth century.

In addition to this, JWR Whiteheand focused on the Conzenians' principles with actual developments such as post war period. He tries to integrate the analysis of changes to the building fabric with the study of the individuals and organizations involved in the various aspects of property development, users, planners and architect.(Whitheand,1981,146). Although Karl Kropf (2009), Jeremy Whitehand (2012, p.68-71) Maretto (2012, pp.21-32), Kim (2012, p.51-67), Larkham &Morton (2011, p78-97), Conzen (2009), Gu (2008), Whitehand & Gu (2007) , Larkham (2006) and other morphologist continuing their research on the area, they uses the terminology and Conzenian approache on the same way with some differentiations. Thus, the later suggestions of different scholars do not bring significant impact and change the theory on urban morphology under geographical perspective. Table 1 shows the evolution of urban morphology from geographers' point of view until 1967.

Table 1: Evolution of urban morphology from geographers' point of view

GEOGRAPHER'S NAME	YEAR	COUNTRY	VIEW
SCHUTLER	1899	Germany	• Morphology of cultural landscape as the object of research in cultural morphology • Making relationship amongst settlement, land utilization, line communications • Form function and development through time
HASSINGER	1912	Austria	• Draw attention to land and building utilisation and residential densities to solve the problems of the preservation of cities
GEISLER/MARTINITY	1918	Germany	• Examine town plans and building types in a morphographic classification • Describing the urban towns with topographical and geographical perspective
BOBEK	1927	Germany	• Examine the fundamental characteristics of towns according to form and function change together through time
SCHARLAU	1941	Germany	• Analyze the genesis of towns plans by using cadastral plans together
MRG CONZEN	1949	Germany And UK	• Tracing existing forms back to the underlying formative process and interpreting • Examine the present structure of a townscape by examining its historical development
WHITEHAND	1967	UK	• Integrate the analysis of changes to the building fabric with the study of the individuals and organizations developers and architects. • Allied work in the field of town plan analysis basically in sympathy with the main principles of Conzenian approach after post war year

2.2 Architectural Origin of Urban Morphology

Urban morphology in architectural studies began with Vitruvian triad: *venustas* is defined with healthfulness, the most pragmatic component, its vocabulary

is scarcely mentioned. *Firmitas* that implied the technology and science of construction, is included the manual on one hand, *Utilitas* is recognised for its principle of economy and convenience on the other. This is the first conception of urban morphology emergence (Gwilt, 1860, pp.12-18).

The European origin of urban morphology especially at **architectural** level was emerged with Saverio Muratori(1910-1973) in Italy on the one hand, basically the origin of typology seen in France on the other (Cataldi, 2002, p.3). Typological studies were born in the eighteenth-century French enlightenment to counter the break in the historical continuity and the separation of the building process between the designer and client. One of the famous architects who are pioneers of the teaching of typology was Durand (Sergio, 1990, p.10) who is teaching the components of the architectural elements, the assembly of these elements into systems and the adaptation of a formal scheme to a designated use. Durand (Sergio, 1990, p.38) is interested in the classic forms which were used only in a conformist attitude and for convenience. The design of the city and its interpretation also become an extension in scale of this systematic generative system. He also was interested in the contemporary experiments like shape grammars which revisit the principle of infinitely combining shapes with no functional, static, or formal restrictions (Petrociolli, 1998, p.10).

Nevertheless, Typological approach has been improved in Italy at the beginning of the 19^{h} century with Saverio Muratori (Moudon, 1997, p.4). According to him, typo-morphology is a dialectic relationship between complementary and reversible moments in historic typological research and stages of design developments (Cataldi, 1998, p.35). Also Muratori worked on the analytical built environment concepts on various scales: reading of building constituents,

determining the shape, structure and various uses of buildings, just as readings that can be taken on the scale of clusters, towns, and territory enable to understand the conforming rules at the root of the structuring of building fabrics, urban organism and territorial ranges. (Caniggia G, Maffei G L., 2001, p.10).

After Muratori, *Caniggia* G. developed the dynamics of urban form in its historical development throught its component types and through the evolution of these types. He called these dynamics a typological process. His basic concern is with the historical formation and transformation of the types and of the urban fabrics that resulted (Levy, 1997, p.52). He was interested how the typological process links to more general mechanisms of cultural transmission from generation to generation. Caniggia's work focuses on the conceptual and political basis of architectural design- or architectural composition (CaniggiaG., MaffeiG.L., 2001, p.18). Caniggia carefully constructs the ways buildings come together as cities. He conceptualised his theories into four levels, these are;

- *Buildings* emerge from nature as buildings' materials are mined and modified more or less by humans to produce shelter;
- *Building fabrics* become buildings; buildings then make up the pieces of the urban fabric;
- *settlements* all fit together to make the city and settlements;
- *cities* themselves belong to a regional network of paths, all negotiating the constraints an opportunities of the larger landscape and the earth's surface. (CaniggiaG.,MaffeiG.L., 2001, p.21)

Caniggia(2001, p.56) clarifies how buildings transform first from rural to urban types, then from simple to complex urban types. These compact accumulation are whole, yet made of organic components with each piece, and they are evolving

through time which, as a part of a continuous process of modification to internal and external change.

G.Argan (1962, p.2) provided the theoretical support for the idea of formal typology or morphological memory present in Boullee's (1976, p.37) work by elaborating how type is worked out as a posterior. According to him the birth of type is conditioned by the fact that a series of buildings share an obvious functional and formal analogy among themselves. In the process of comparing or selectively superimposing individual forms for the determination of the type, the identifying characteristic of specific buildings eliminated and only the common elements remain which then appear in the whole series. In the 20th century, typological research has oscillated between the functional and the formal approach until in the 1950s (Petrociolli, 1998, p.11).

On the other hand *Aldo Rossi* and *Rob Krier* are the two of the most important urban morphologist. Although Rossi suggests his ideas in Italy and Krier introduces his ideas in USA, both of them has come up with almost same ideas parallel to each other. Their ideas are based on nostalgic view of immutable past. They are interested in how typological process of building affected form of the urban fabric. (Marzot, 2002, p.66). Also Rosi employs the "hypothesis of the city as manufactured, as a work of architecture engineering which has grown with time" which he emphasizes the invention of the city through time (Menghini, 2002, p.83). Krier (1979) and Rossi (1984) improve Caniggia's typological process concept. They focus on the form development throughout the typological process.

The other development in mid 20th century started with *Hillier* , who is called his method as a space syntax. He states that ,

> "space syntax is a research programme within the morphological paradigm of built environment research. …its aim is to develop theoretical understanding

> of how space works, and its strategy is to combine computer driven formal descriptions of space patterns with empirical observation of how they are used making the link between the two with simple statistics." (Hiller B, Hanson J., 1998, p.108)

He studies on how spaces are linked with each other and he focuses on the axial analysis which is one of the key elements of syntactic studies of urban space and urban pattern. In the axial analysis a line is only drawn where there are built forms to reach. This concept is another view on urban morphology but it is not in the scope of this thesis.

Nevertheless, Moudon (1998, p.1) carry on the morphological research in American cities. Her assumption on urban morphology is based on form, resolution and time which are three fundamental components of urban morphological research. In addition to this, she focused on variation of forms which transformed over the time from city to city with ideologically, culturally and economically. Although Cataldi (2009), Barke (2011) Darain (2011), Marzot (2010), Cataldi (2009,) and other morphologist continue their research on the area, they use the terminology and Conzenian approach on the same way with some differentiations. The table 2 below summarizes all of these approaches in a comparative way until 1980's.

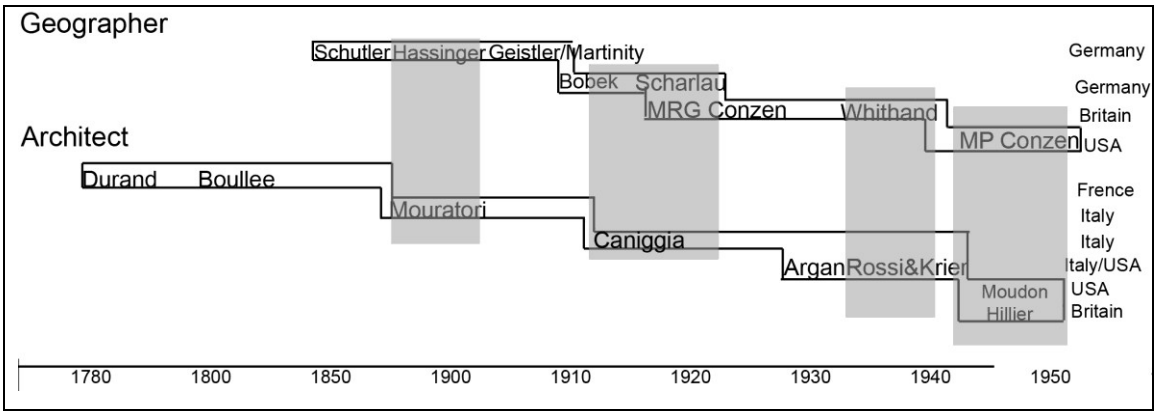
Table 2: Evolution of urban morphology from architects point of view

DURAND	1780	France	Components of architectural elements with no functional, static or formal restriction City scale on systematic generative systems
BOULLEE	1828	France	Conveying meanings and symbols through accurate manipulations of the classic forms and types
MURATORI	1910	Italy	Analytical build environment concepts on various scales Worked on typomorphology.
CANIGGIA	1933	Italy	Developed the dynamics of urban form in its historical thorough its components types and through evolution of them which called typological process
ARGAN	1960	Italy	Identifying characteristic of specific buildings eliminated on the common elements which appear in whole series
ROSSI&KRIER	1970	Italy/America	How typological process of building affected form of the urban fabric
MOUDON	1980	America	Variation of forms transformed over the time to city to city with ideologically, culturally and economically
HILLIER	1980	Britain	How space link with each other into axial analysis method in order to urban pattern and space relation

Based on the discussion above, as seen on table 3, first intersection of geographer and architect in urban morphology starts with Hassinger and Mouratori in the years of 1910. While Hassinger (1916) is focusing on land and building utilisation Muratori (1910) focused on analytical build environment concepts. After that cross paths MRG Conzen and Caniggia works came around during the same period. During this time Conzen improved Scharlaus' genesis town plans on cadastral plans. Conzen (1960) examines towns according to structure of a townscape in historical development whereas Caniggia examines the urban form in its historical development through it components and types in typological process.

Around 1970s Whitehand improved Conzens ideas and he workes in much detail on town plan analysis especially on building fabric. Isochronally Rossi and Krier are improving Caniggia's concepts and they basically are focusing on typomorphology and they try to find out how typological process of buildings affected the form of urban fabric. In recent years MP Conzen works on MRG Conzen works and he improved them in detailed. On the other hand Moudon (1994) applied Caniggia's works on American city and she adds another typological process which is verifying the form transformation over the time to city. Table 3 summarizes all of that process.

Table 3: Chronological order of urban morphology from geographers and architects point of view.



Within the scope of this thesis, the next chapter will focus on the Conzens' and Cannigias' approaches to urban morphology, study their ideas in more detailed.

Chapter 3

CONZENIAN AND CANNIGIAN APPROACHES TO URBAN MORPHOLOGY

In this chapter Conzenian approaches whose origin comes from geography and Caniggia's approaches which origin come from architecture will be reviewed. Though they belong to different disciplines and worked in different countries, they were both pioneers in urban morphology. The aim of the research introduced in this part is to explore the Conzenian's concepts of the morphological region, morphological period, fringe belt and townscape, and to see whether they can be combined, both theoretically and in application, with the typological process, materials, structures, tissues, and urban organisms defined by Caniggia.

The overall intention of this chapter is to establish a basis for a consistent, coherent and comprehensive theoretical subdivision of urban morphology. Throughout the literature survey for Conzen's approach "thinking about urban form" is the primary sources to understanding his approaches. "Interpreting the basic buildings" is the primary sources for the revision to understanding Caniggia approaches. Those books are the fundamental books which shows the main conceptions and techinques of Conzens and Caniggias works.

Conzen's and Caniggia's approaches will be reviewed briefly in first part. In addition to this their general concepts, subdivisions and all related parts will be summarized as well. Detailed information on their approaches and terminology will be given in Appendix 2. However, some of the ideas of Gianfranco Caniggia and

M.R.G. Conzen will not be reviewed in this thesis as they are not related to the scope of this thesis.

In the first part of this chapter, critical review of their theory/approaches and in the second part their similarities and differences will be presented .In addition to this, their approaches will be synthesized which will enlightened to figure out the methodology for case studies in chapter III.

3.1 Conzenian Approach

This section will be concerned with the geographical and urbanistic attitude of MRG Conzen approach on urban morphology under three headings which are (i) *town plan, (ii) fringe belt concept, and (iii)townscape* is a combination of *land utilization*, *building type* and *plan unit*.

3.1.1 Town Plan

A town plan can be defined as the arrangement of an urban –built up area in all its manmade features (Conzen, 1969, p.4). The topographical or geographical arrangement of man-made features, the pertinent characteristic of the general definition of town plan is the spatial relation of the street systems, plot pattern and built arrangement. These features that the town plan consist of four element complexes which are site, street system, plot pattern and building arrangement as well as their division into plan-unit types, sub-types and plan-division (Conzen,1981, p.60).

In addition to these, the *site* is an aspect at different *levels* in different *text*. It is included in the distinction of the implied general feature with function, socio-economic context and development with the form complexes and with the element complexes (Conzen, 1969, p.5; 1981, pp.60-79). *Town plan element complexes* are element complexes, which are composed of three elements: (a) *street* and their

arrangement in a *street-system;* (b) *plots* and their aggregation in *street blocks*; (c) *buildings* or more precisely their *block-plans* (Conzen, 1969, p.5).

3.1.1.1 Street-System

The *street* make reference to the open space bounded by street lines and reserved for the use of surface traffic of whatever kind (Conzen, 1969, p.5). That means the arrangement of contiguous intercommunicating streets viewed as a separate element. Fig 1 shows the street systems approach on element complex of the town plan.. In this statement street defines a *space.* A *space* in this manner can be defined more specifically as an area or volume between particular boundaries. A relation between boundaries constitutes a space. For further determination of the nature of the street, the nature of the boundary must be specified, which in the definition is a *street-line* . This is defined as "the boundary separating a street space from its adjoining *streets-blocks*" (Conzen, 1969, p.130).

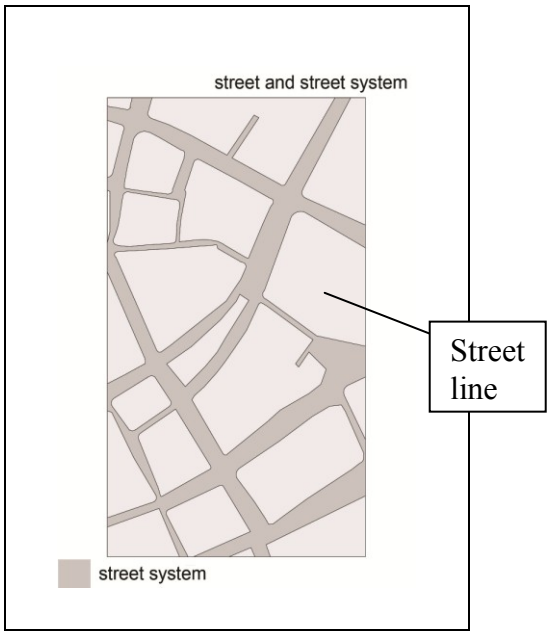


Figure 1: An example of Street system

3.1.1.2 Plot Pattern

The plot pattern is "the arrangement of contiguous plots in a built-up area are viewed as a separate complex of the town plan and divided into street-blocks" (Conzen, 1969, p.128). Additionally, in the system of plot pattern, in Conzens words:

> each parcel is a group of contiguous land parcels or else a single land parcels. Each parcel is essentially a unit of land use; it is physically defined by boundaries on or above ground and may be called *a plot* whatever its size. The arrangement of contiguous plots is evident from the plot boundaries and, when considered separately from other elements of the town plan may be called the *plot pattern* (Conzen, 1969, p.5).

In addition to these, according to Conzen there are two other entities, are the *street block* and the *plot series* (Conzen, 1969, p.5).

Street block is a plot or group of contiguous plots bonded partly or wholly by street-lines and forming a discrete part of plot pattern of the town (Conzen, 1969, p.130). The *plot series* is a row of plots each with its own frontage placed contiguously along the same street line (Conzen, 1969, p.128). In figure 2 both street-blocks and a lot series are aggregates or arrangements of plots and are thus defined by the spatial relation between the constant plots are shown. Given that the street –blocks, and by its similarity, the plot series, is considered as a discrete part of the plot pattern (Conzen, 1969, p.5). There are two different types of elements composing the plot pattern which are *the plot* and the *street block and plot series. T*he presence of two types of elements gives rise to a contradiction in the definition of plot pattern; also points the pattern which is divided into street-blocks.

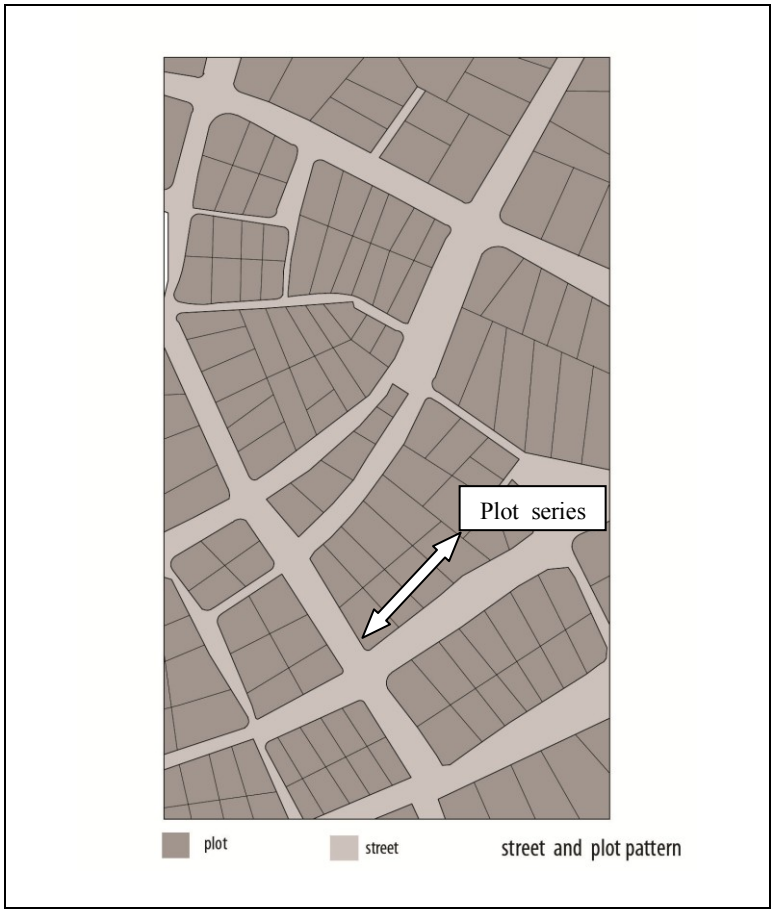


Figure 2: An example of Plot Pattern

In addition to this street line is clarified as the boundary between streets and street-blocks according to the formation of the outer edge of plots in a block. It might be considered as the outline of the street-blocks. Street lines may bind street-blocks wholly or in part. The street block is identified as an aggregate of plots and the street line as an aggregate of specific parts of plots taken together but not necessarily forming a complete closed figure, the street line could not seem to form a component or determine position of the street-block (Conzen, 1969, p. 12).

3.1.1.3 Building Pattern

It is the arrangement of existing buildings, i.e. their block-plans in a built-up area viewed as a separate element complex of the town plan (Conzen, 1969, p.123). As the combination of buildings, the appropriate feature clarifying the *building*

pattern is the spatial relation between elements. The fundamental element is, the block-plan, which is formed as closed figure and consists of the ground surface within the boundaries. *The boundaries* are the lines of the building are containing walls. As in the case of street-lines, this undertakes the relations virtual to orthographic projection, the lines being two-dimensional conflict of the physical material of the external walls of the building as seen at figure 3. The relevant characteristic defining block-plan is the spatial relation of boundary lines which refer to specific material objects by convention (Conzen, 1969, p.123).

Figure 3: An example of Building pattern

3.1.2 Townscape

Townscape is "the physiognomy of the urban landscape" (Conzen, 1969, p.131) The characteristics of town can be identified as comprising its physical configuration or the order of man-made features in the town. In addition to these, historical development points to an addition of historical forms into the townscape.

This produces, fancy, uniform picture, but a composite and usually complex one with complementary elements, because each form-production period has its own form style, thus appropriate recognizable as a distinctive morphological period. The phenomenon is a familiar one in terms of the building fabric, with its typical architectural street spaces and squares, its street systems, and its plot patterns. The occurrance of different morphological periods, then imparts to the townscape is known figuratively as historical layering and point out the historical time depth involved in the making of the townscape (Conzen, 1969, p.3). Townscape is a combination of; (a) *land utilisation* (b) *building type*, and (c) plan unit As seen on figure 4 all of them overlays to each other to form the townscape. Each terms will be explained in its turn under section 3.1.2.1, 3.1.2.2 and, 3.1.2.3.

Another term is used by Conzen in townscape analysis is morphological regions which defines the border or regions of the terms mentioned above and it put them in hierarchical order.

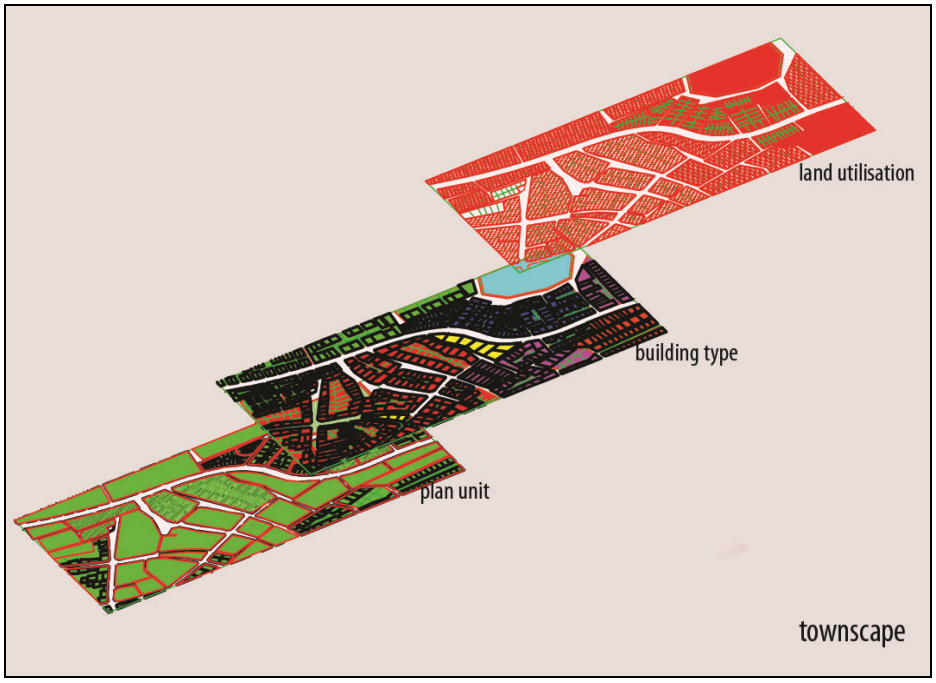


Figure 4: An example of Townscape

Morphological Region is an area that has a unity in respect of its form that distinguishes it from surrounding areas. However, the boundaries between regions vary in strength (Conzen, 1988, p.257).

Conzen describes morphological regions, or townscape units, as areas of homogeneous urban form in terms of land use, building type and plan type (Conzen, 1975). They are formed by a combination of units for all three of these form complexes and are characterized by a hierarchical system.

As seen on figure 5, 6, 7, the components of urban morphological regions are urban land utilisation building type and plan type and has been divided into 4 rank of hierarchy. In first rank which called morphotopes shows the basic historical elements and development and second rank is refers a first settlement areas and old development, third rank is a combination of old and new development areas and last rank shows the new development areas according to their aims. First rank generally drawn in thicker line which is indicate the importance of the rank of hierarch. In Figure 8 shows that all of these components come on top of each other and morphological regions have been defined according to their hierarchical order. All of these create a basis for townscape.

Figure 5: Building type region

Figure 6: Plan unit region Figure

7: Land utilisation region

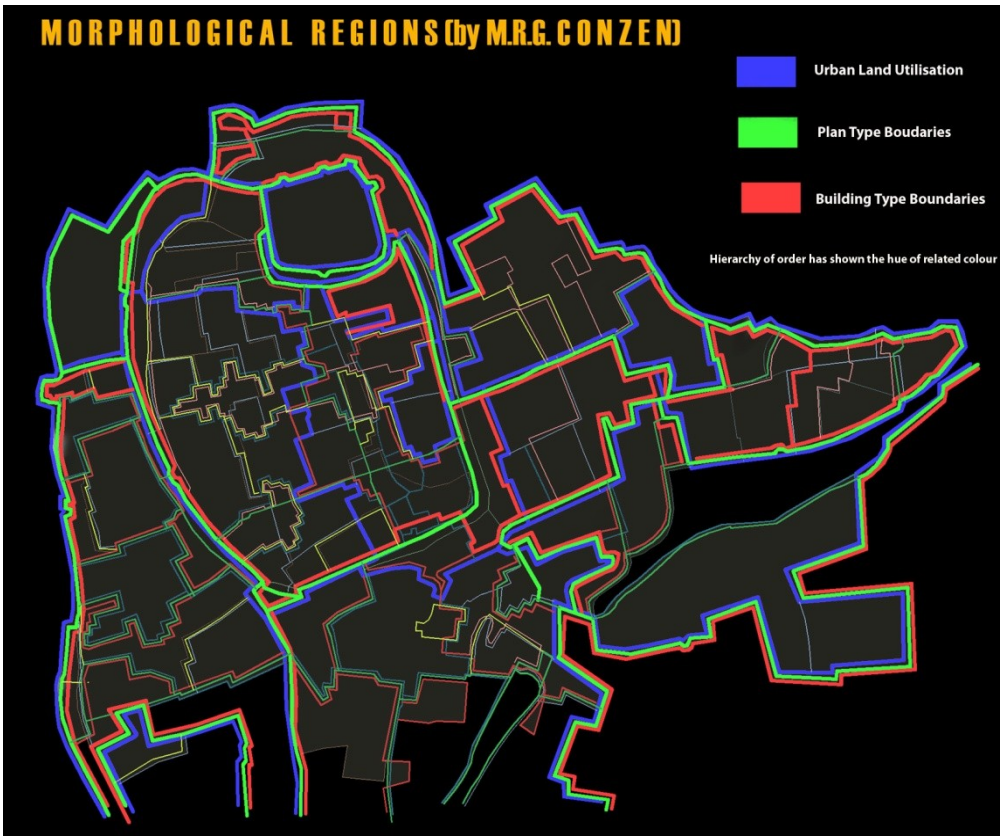


Figure 8: An Example of Ludlow Morphologic

3.1.2.1 Land Utilisation Pattern

The land use pattern is the order or spatial development of land use. Conzen (1981, p.79) identified that "the elements of the pattern are the individual units of *land utilization* occupying discrete plots. Classification of uses is based on the single criterion of purpose". *Elements* and *patterns* shows some differences within the land utilization pattern as seen on figure 9

Thus the element complexes refer to basic functional categories by Conzen (1988, p.258) which are residential, commercial, industrial, community service functions and their subdivisions produces the detailed classification of actual land-use types. For instance in the figure the division of the land utilization pattern presents six groups. These are residential premises, shopping business professional

premises, open spaces, public and community premises, and industrial premises. He adds that shopping and community premises take its place at the centre of town. Residential premises can be in centre of town with shopping and community premises but basically it is its around of centre. Rest of activities takes place around residential premises.

Figure 9: An example for land utilization

3.1.2.2 Building Type / Building Fabric

The building fabric (1981, p.79) is defined as "the elements of the urban land utilization pattern, that is the individual units of land utilization occupying desecrate plots". As seen in figure 10 the building fabric of towns can be readily divided according to original function into those buildings that house the dominant part of the land use occupying their plots and as well as period of construction which is significant to define the building fabric pattern. The first are the plot dominants and the end are the plot accessories. In townscape in Europe with a medieval plan, the majority on the plot dominants are traditionally sited at the street frontage of their burgage plots.

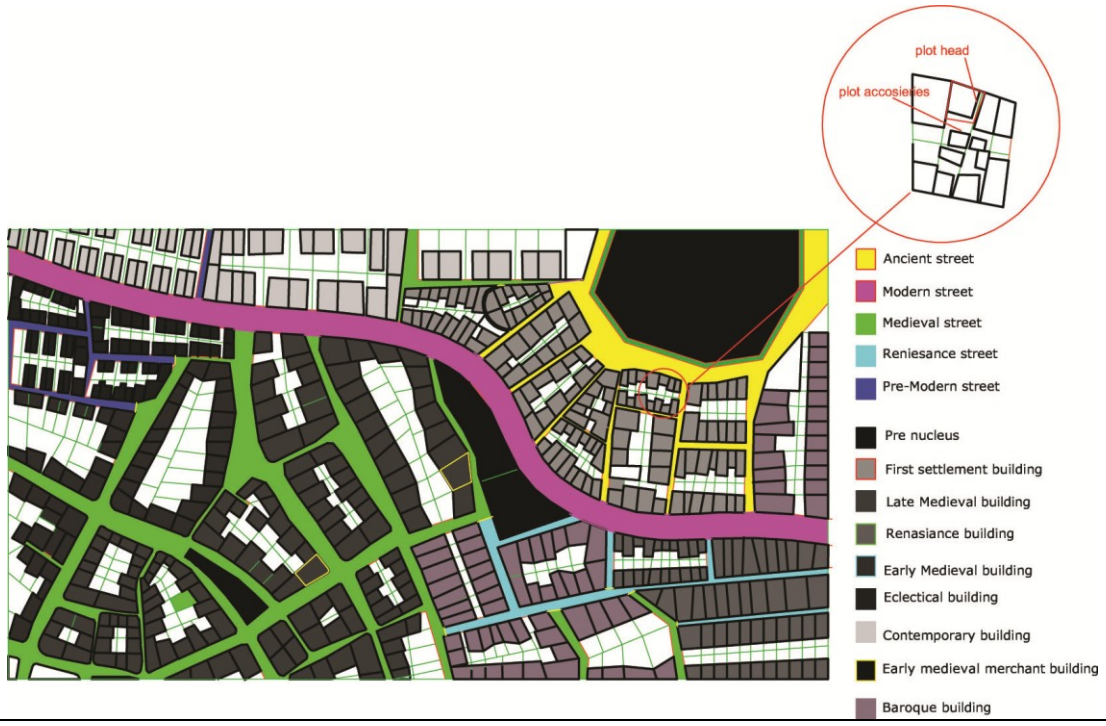


Figure 10: An example of building and street type zoning with plot dominant and accessories

The elements are defined as individual buildings without any more specific definition. One must therefore assume the conventional definition of building. Conzen does, however, distinguish different types of building bssed on several different criteria. Most general is the distinction of plot dominant and plot accessory which is seen in figure 10. The distinction is based on the use of the building and the position of the building within the plot relative to the street. As seen in figure 10 a plot dominant is the site of greater use and is located on the frontage, the plot accessory is the site of lesser use and not on the frontage, the pertinent criteria for this distinction are thus the property of relative levels of human activity and the spatial relation of the building with the street. He also distinguishes types based on period of origin and original purpose as well as specific internal and external form.

Each type is a class, more general classes encompassing the more specific as subset, all the classes begin subsets of the fundamental class posited by building (Conzen, 1969, p.87).

Figure 11: An example showing building fabric pattern

As with land utilization, there are also groupings or element complexes within the building pattern. The relevant characteristics defining the groups are, similar to the class of the element and its position relative to others. Figure 11 shows building types and groupings based on *seven* different statements which are: the position relative to a street, the intensity of use, the use type, the period of origin and the internal and external form assuming a conventional definition of building.

2.1.2.3 Plan Unit (Unit type)

Plot pattern is the arrangement of contiguous plot in a built up area, viewed as a separate element complex of the town plan and divided into street blocks. Conzen defines the plan unit "…. identified in any part of the town plan that is morphologically different from its surroundings - in terms of its streets, plots and buildings. This may be undertaken at differing scales from layouts to individual morphotopes and applies to any area that exhibits internal homogeneity and morphological disunity with neighboring plots" (Conzen, 1960, p.5) In addition to this, As it is seen in Figure 12 a town plan representing individualized combination of streets, plots and buildings distinct from its neighbors, in terms of unity and/or homogeneity. Plan-units represent essentially morphogenetic plan types and vary in

character so as to produce a morphogenetic typology in which the simple element combinations represent sub-types, their integrations to more complex units forming types. As seen in the figure urban nucleus creating the morphogenetic units in the town and rest of the units combination get in relation according to these units. When defining the units, the main consideration is the plot type and then the building pattern. Combination of these two gives the plan unit type. Again in the figure when plot type shows differences than other types that means it is another unit type.

Figure 12: An example for plan unit type

3.1.3 Fringe Belt

The fringe-belt concept is "a belt-like zone originating from the temporarily stationary or very slow advancing fringe of a town and composed of a characteristic mixture of land-use units initially seeking peripheral location." In the words of Conzen (1969, p.127)

> "As such it is a distinct type of integument and a major plan division in its own right. Significant changes in the whole civilizational context of a town's development such as fluctuations in population and economic development or repeated intensification in the introduction of all kinds

of innovations causes intermittent deceleration or standstill in the outward growth of a town as well as marked changes in the admixture new and-use types at the town fringe."

Based on the above discussions, everything which shown above reveals that *fringe belt*s became a means of putting order into the complexity of urban development by rebuilding the past development of the urban spaces. The *urban fringe* did not extend the outward regularly but underwent periods of acceleration, deceleration, and cessation.

There is three zoning system at fringe belt concept which are inner fringe belt, middle fringe belt and outer fringe belt.

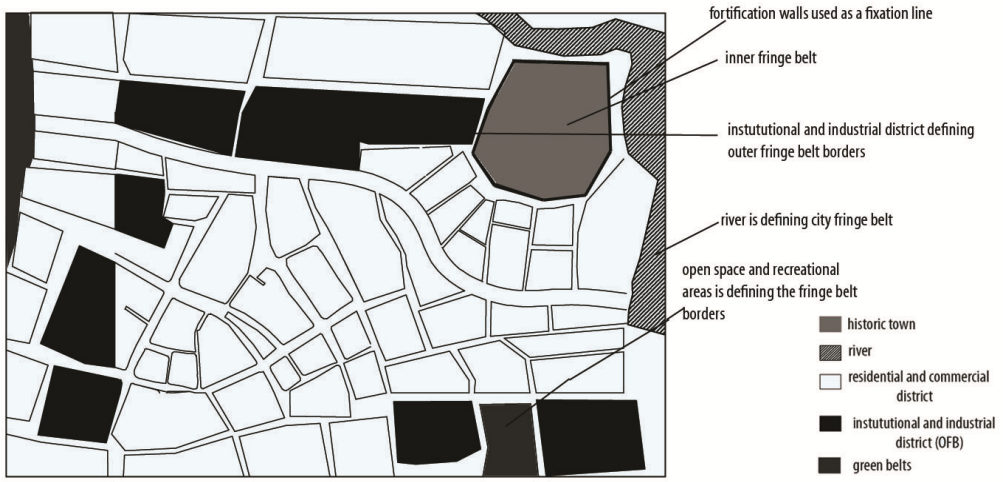


Figure 13: An example drawing for urban fringe belt development

As seen on figure 13 areal condition conducive of fringe belt formation include obstacles to the normal outward growth of the residential area. In addition to this, the river is another fixation line which is defining the fringe belt as well. Continuous inner fringe belts have been particularly associated with fortification zones, which acted as powerful fixation lines during its period. Less common, but often comparable influences have been placed in outside of inner fringe belt and

green. Over the centuries corporate decision making has probably been less important in delineating new fringe belts than it was in the era of town fortifications.

Fringe-belt development can be separated into two fundamental phases. The *First phase* is that when land at the fringe of the built up area is taken up for the first time by quasi-urban land uses. It processes until land under these uses no longer adjoins on to rural land. Additional development of fringe belt, which is the addition of new plots at the actual fringe of the built-up area, is thereafter prevented. *The second phase*, that of most transformations are comparable with changes of location that result from the enveloping of the fringe belt by outward growth of the built up area.

3.2 Canniggian Approach

This section will be concerned with the architectural and urbanistic attitude of Gianfranco Caniggia on urban morphology. Caniggia's enquiry aims to understand the built form by examining the historical process of its formation. A distinction is made between the spatial correlation of built objects (copresence) and temporal correlation (derivation). The inquiry of spatial correlation of built objects is based on a set of subdivisions that forms a hierarchy. The components are: elements, structures of elements, systems of structures, and organisms of systems (Caniggia, 2001). Caniggia applies this to both individual buildings and to towns.

First of all individual buildings, in which building materials such as bricks, timber, stone etc. are considered as elements. The structures of elements are then the associations of building materials into such things as walls, floors, roofs etc. After that, systems of structures are arrangements of the latter into rooms, corridors, stairs, etc., the organism being the building. When considering the town, the same scheme is also applied, taking buildings as elements. The structure of elements is an

association of buildings or an aggregate which referred to as a *tissue*. The system of structures is then a combination of tissues forming districts and neighborhoods. When these taken together, they formed the *settlement* of towns. Then all of these get unified and formed as the *organism/nucleus* of the town and cities. The built form is modified according to changing social and economic conditions, forming the typological process

3.2.1 Building

According to Caniggia (2001, p.75), "buildings are those in which we live or in which we carry out another function in a building." He focused on building as he believed that building type is a kind of formation which gives information about its relevant time. He argues that,

> "…..the knowledge of type results from our observance and interpretation of existing building, therefore from our critical consciousness as an analytical recognition of the existence of types, their progressively changing system and the typological process. Aggregations or structures are recognizable as relatively autonomous: rooms, stairs etc. come together to form the organism of systems, specifically, the entire building" (Caniggia, 2001, p.75).

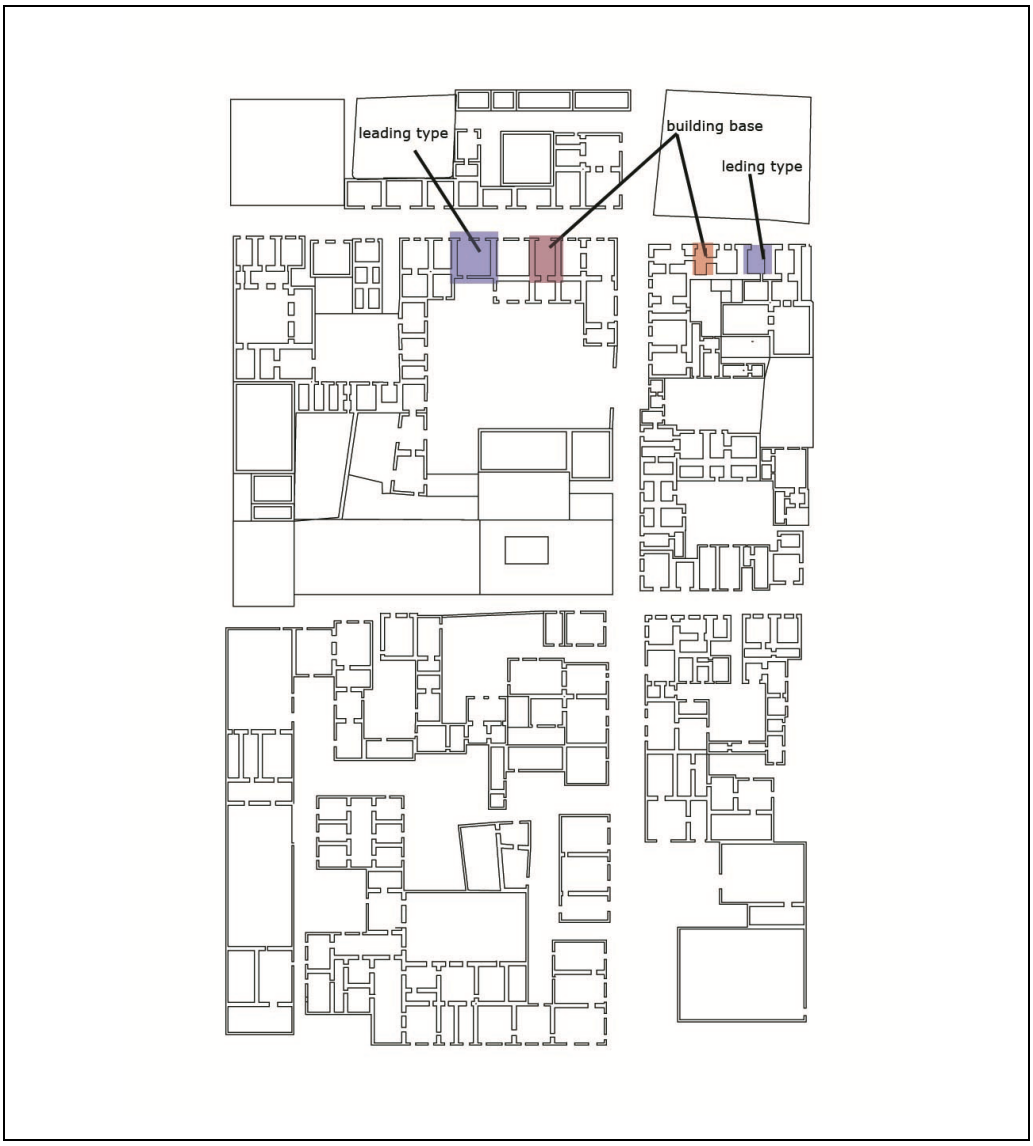


Figure 14: Como, Buildings location with their types

As seen above, (Figure 14) general building type class is subdivided into specific types (e.g. room number, some opening on buildings etc). The distinction is based on both physical form and use. In addition to this, basic building has been divided into more specific types which are called (a) base type; (b) leading type; (c) synchronic variants of position, (d) transformation and substitution.

3.2.1.1 Materials

According to Caniggia, the specific subdivision in the hierarchy of components is based on the elements which are bricks, tiles, timbers etc. (Cannigia,

2001, p.39). If it would be generalized, it could be stated that *elements are building materials*.

According to Caniggia (2001, p.37) material is a synthesis between the matter of which it is made and the specific culture which the people of a region congers in using it in order to build. The relevant aspects in description of material are the component substance and the relation of use for the determination of building between the subject and humans. Nevertheless this is an obstructed definition which is reduces to: the basic elements of buildings are the smallest elements used in buildings as seen in figure 15. In this figure walls are made from stone and structure material is wood and roof material is brick. In his approach, Caniggia defines all of the materials for each building.

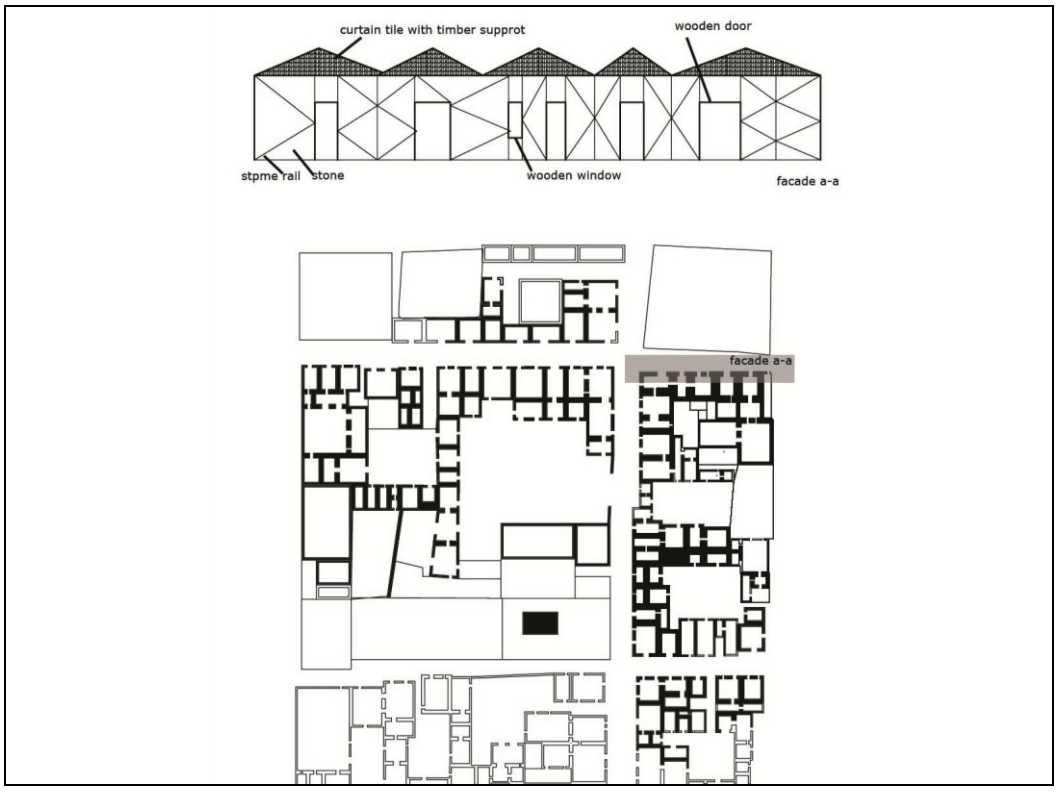


Figure 15: An example for wall material in English vernacular construction

3.2.1.2 Structures

Caniggia (2001, p.62) states that the "building structures is understanding and making use of the logical tools and structures of the built environment characterizing

a cityscape" Hence, it helps to the understanding of the components of a man-made complexes. In addition to this, a unique relationship of several elements is equal to objects with a relation of whole-to-part entities of the scale immediately smaller, the smaller scale being materials or elements. Structures deal with the general class which is identified by the characteristics of relation of the whole to the part with elements or materials.

As shown in the illustrations of structures on figure 3.16 different types of wall structures are distinguished by different arrangements of different types of walls such as load bearing walls. Roof's structure is truss which is a combination of wood and brick. The wood which is the part supported part of roof is called truss system and it is covered with brick. On the other hand windows structure system is load bearing system and its material is wood.

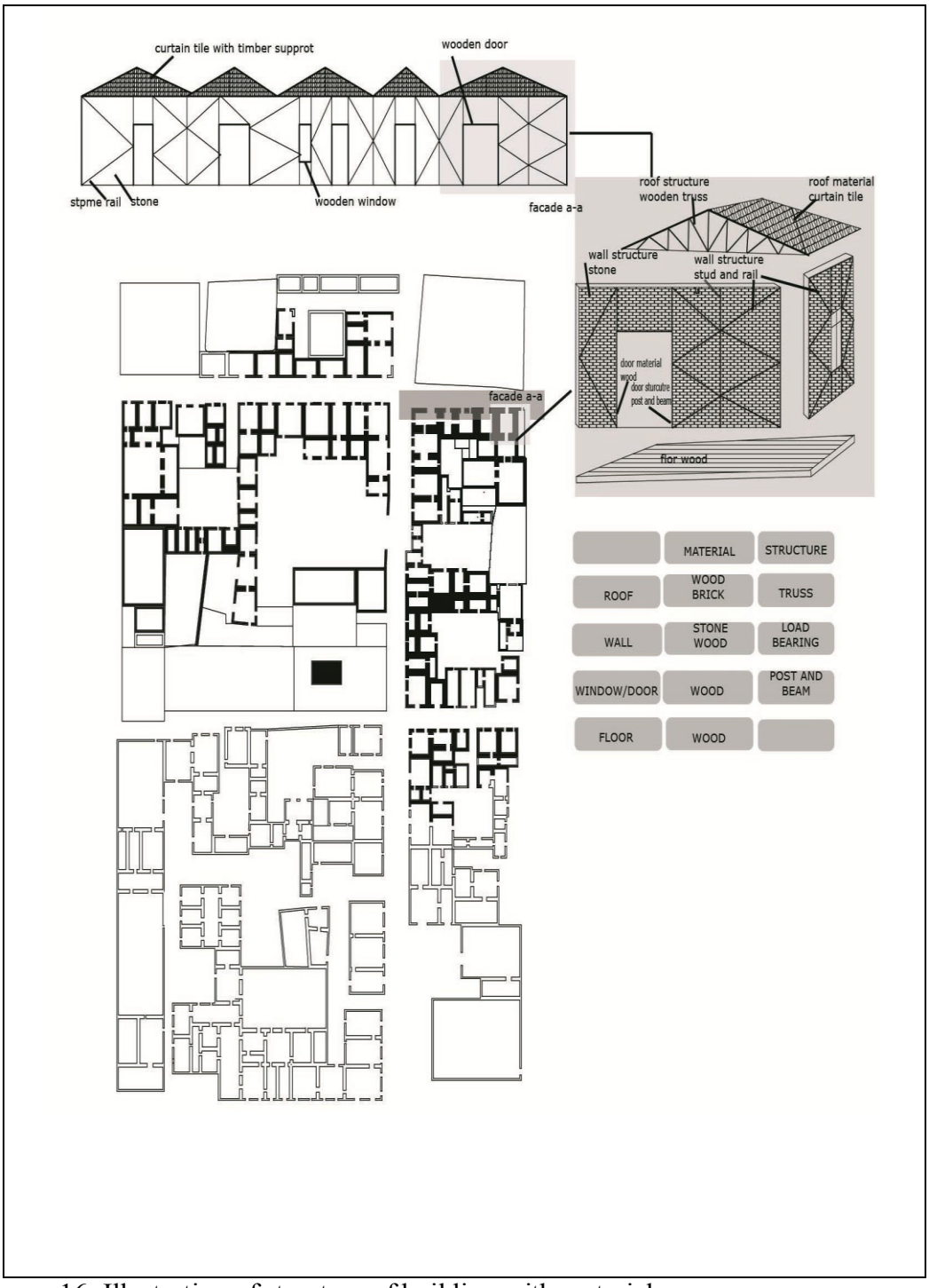


Figure 16: Illustration of structure of building with material

The ***use and the definition of form*** is the other pertinent characteristic of the structure form which increases the distinction between use and form. According to Caniggia (1993, p.89) "use is tangible, however, identification of a form by use must ultimately refer back to physical description of parts and arrangements". This is combined especially visible when subsequently the identical parts and organization

can be used for different aims over time. In conclusion, defining the entities by choosing the pertinent characteristics of form is a matter of consistency. The determination between human and form is consistent and systematic in order to maintain the definition of form, intention, use or purpose.

Cannigia states that, another component in the general class of structure is the ***aperture***: "Constitutes a structure within a structure and forms part of the whole vertical structure… maintain insulation, protection and the ability to support itself, in brief, all the characteristics of vertical structure excepting that of carrying the floor." (Caniggia, 1984, p.152)

In the hierarchy of scales at the structures, Caniggia's definition which is "structure within structure" includes important characteristics of the two general classes. *Apertures* are still a part of the vertical structure within itself, which is composed of materials. Besides, it deals with only the structure placed within the opening such as windows and its frame both including horizontal and vertical pertinent elements.

As seen in figure 17 a window in a stone face brick wall shows the various components. Looking closely at this example, it can apparently be seen that the window is more complex than described in the text. There are ties to reinforce by up to right, which gives support to both the wall and window. In addition to these linkages on walls is done by wooden ties. Window frame is made by timber and it provides a supporting element which is linked by ties. Mono directional timber framework defines the border of window. Thus such a detailed information indicates the various components of the window.

On the other hand Caniggia make distinction between ***elastic and plastic*** structures whereas same distinction has been seen on the *elements* of the building.

The physical properties and behavior has been determinant on elastic and plastic elements of a structure when placed under a load. Caniggia states three identified characteristic in comparing the two: *weight*, which is a property*; lateral dimension* or *thickness* which is also a property, describe in terms of a comparison to a *fixed unit* of measure; and relative *seriality or organicity*, which is a distinction between two types of in general arrangement or structural relation of parts (Caniggia, 2001, p.71). In addition to this Cannigia (1993, p.91) states that

> " each of these characteristics determines a range between two poles. A given structure is more or less light or heavy, thin or thick and serial or organic. Specifically, a rough timber wall, is an elastic structure relative to a rough stone wall which is plastic. The former is lighter, thinner and has parts arranged in an more serial order, the latter is heavier, thicker and has parts arranged in a more organic order. Equally, simple ridge beam and rafter roof is more elastic relative to a double frame truss roof, the latter being thicker, heavier and more organic. Thus, in general, a structure made of elastic material tends to be heavy, thick and organic."

Elastic refers to light, thin, serial on one hand and plastic refers heavy, thick, and organic on the other hand. The distinction between elastic and plastic both in element and structure helps to explain the different forms and their formation on one hand, but they do not definitely define classes of form of sufficient detail or specificity on the other hand. This distinction helps to understand the relative order between identified forms within the general class of elements.

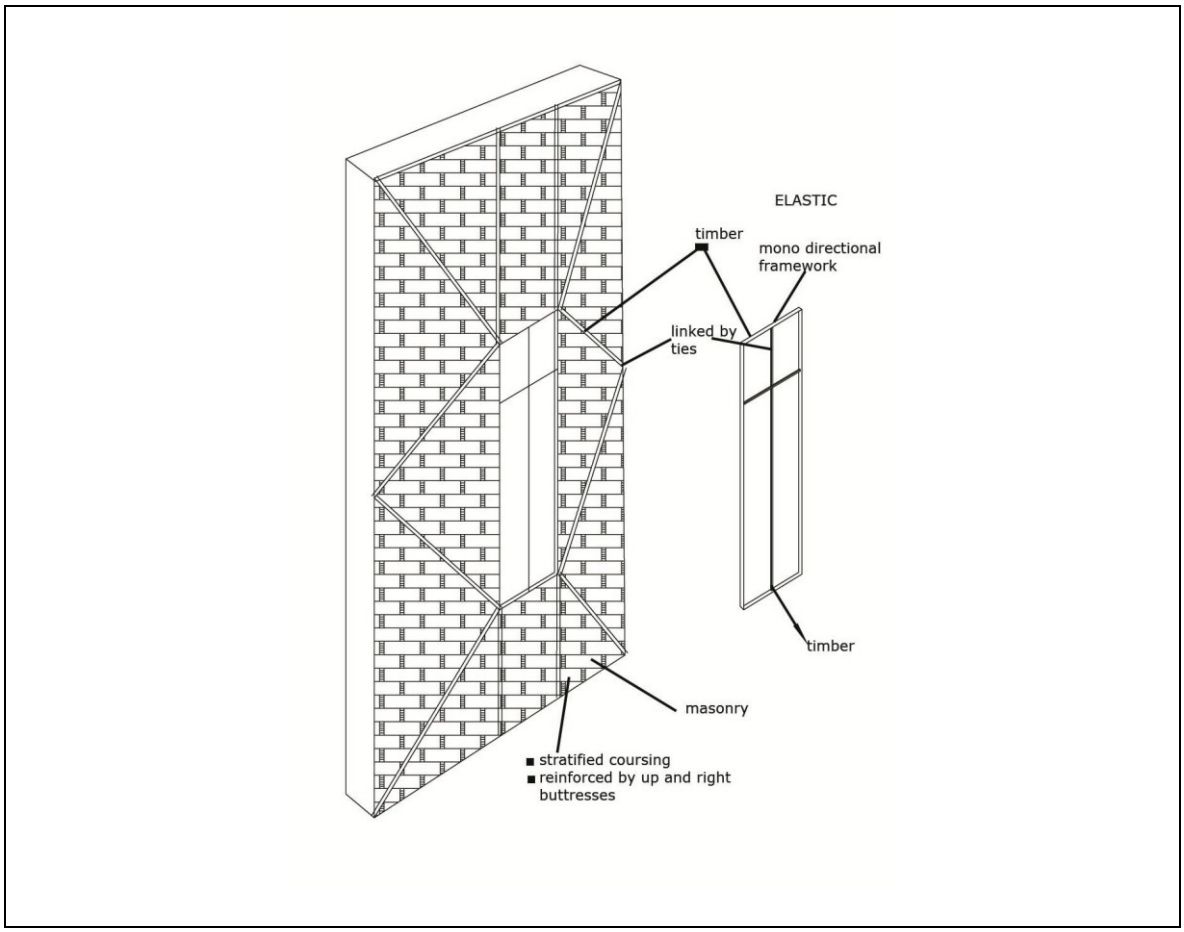


Figure 17: Example for the elastic and plastic structures

As seen in figure 17 Caniggia's diagrammatic representation of the development of elastic/timber and plastic/masonry structures. A: Elastic/Timber 1) first characterized by a mono directional framework; 2) linked by ties; 3) producing a lattice structure. B: plastic/masonry 1) first characterized by stratified coursing; 2) reinforced by upright buttresses; 3) producing a wall articulated for strength.

3.2.1.3 Rooms or cells (Base Type/ Elementary Cells)

Although Caniggia divided the conventional terms rooms and stairs, his own terms that he used are the *base type/ rooms* and the *elementary cell*. In evolution and typological process he defined the base type and elementary cell as component parts, arrangement of components, position, which is relative to other entities and use or purpose.

As shown on illustration on figure 18 the ***base type*** is defined as " a single room house made of one space enclosed by a floor, surrounded by load bearing walls and a roof with one of the four walls pierced by a door for access, light and air, this space being about five or six meters square" (Caniggia, 2001, p.106).

The elementary cell is the same space entered into the formation of a derivative type of greater size (Caniggia, 2001, p.97). However, the base type has in turn a developmental history that produced by *elementary cell*, such as a room of the same size that has come to form part of a derived more developed type which is shown on illustration in figure 18

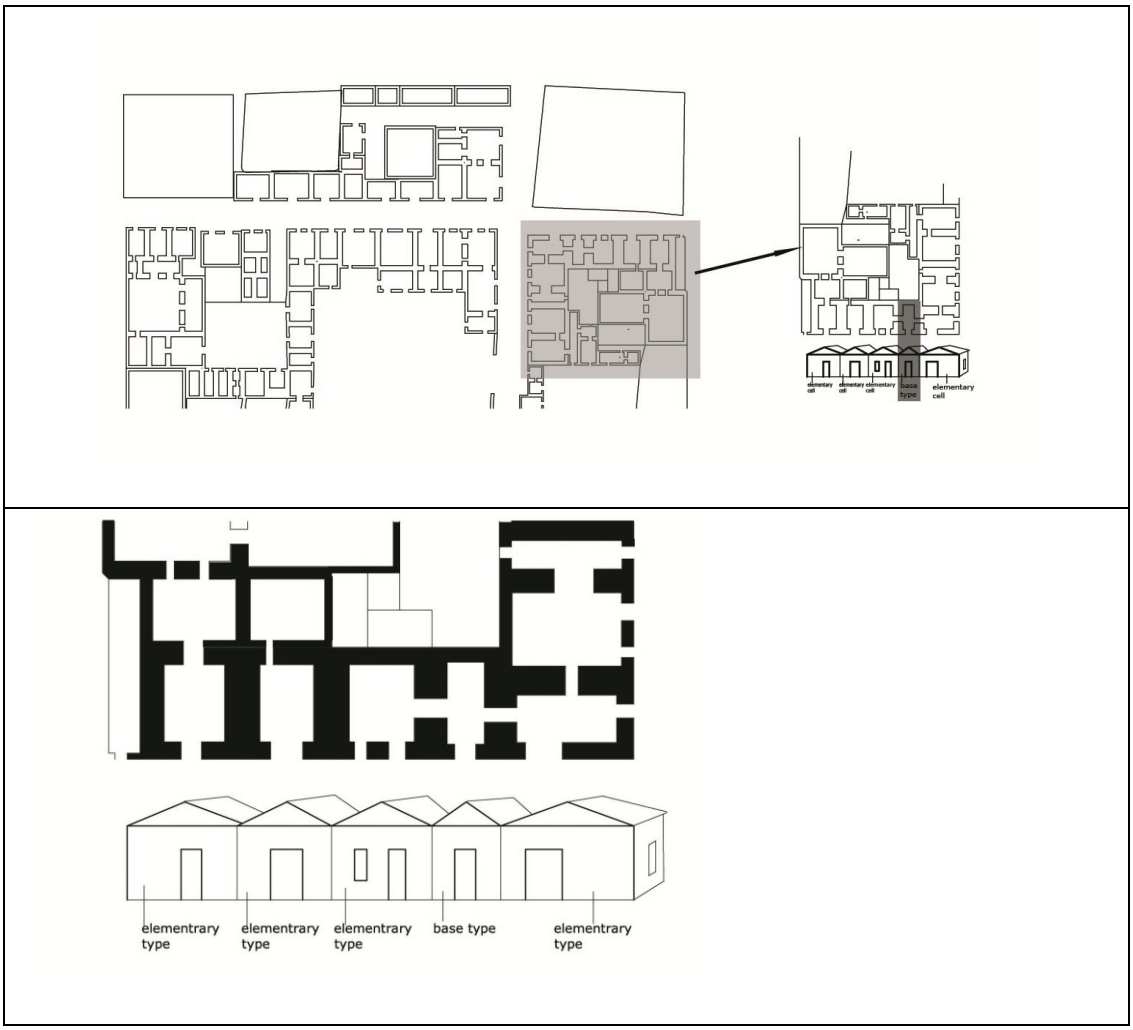


Figure 18: Example drawings for base and elementary types

3.2.1.4 Building Types

In this part of the thesis, the building types and their relation between the elements, structure and cells will be analyzed. Types are analyzed into three headings which are base type, leading type, synchronic variants of position, transformation and substitution. According to Caniggia (2001, p.50) building type refers to usage in the past and still today which indicate any group of buildings with some characteristics or a series of characteristics in common. In addition to this he believed that building type is a product of past and present spontaneous consciousness. Additionally, he (2001, p.104) defined that "building type is a plan that is neither designed nor written but conceived as a system of integrated notions in builders minds." Figure 19 shows the diagrammatic representation of building type based on ground floor plan arrangement. Here, base type refers to the basic simple unit of the structure. The pertinent characteristics used to distinguish different types of the arrangement of base type and arrangement of rooms, including the windows and roof position and the position of the entrance gives the clue about the leading type.

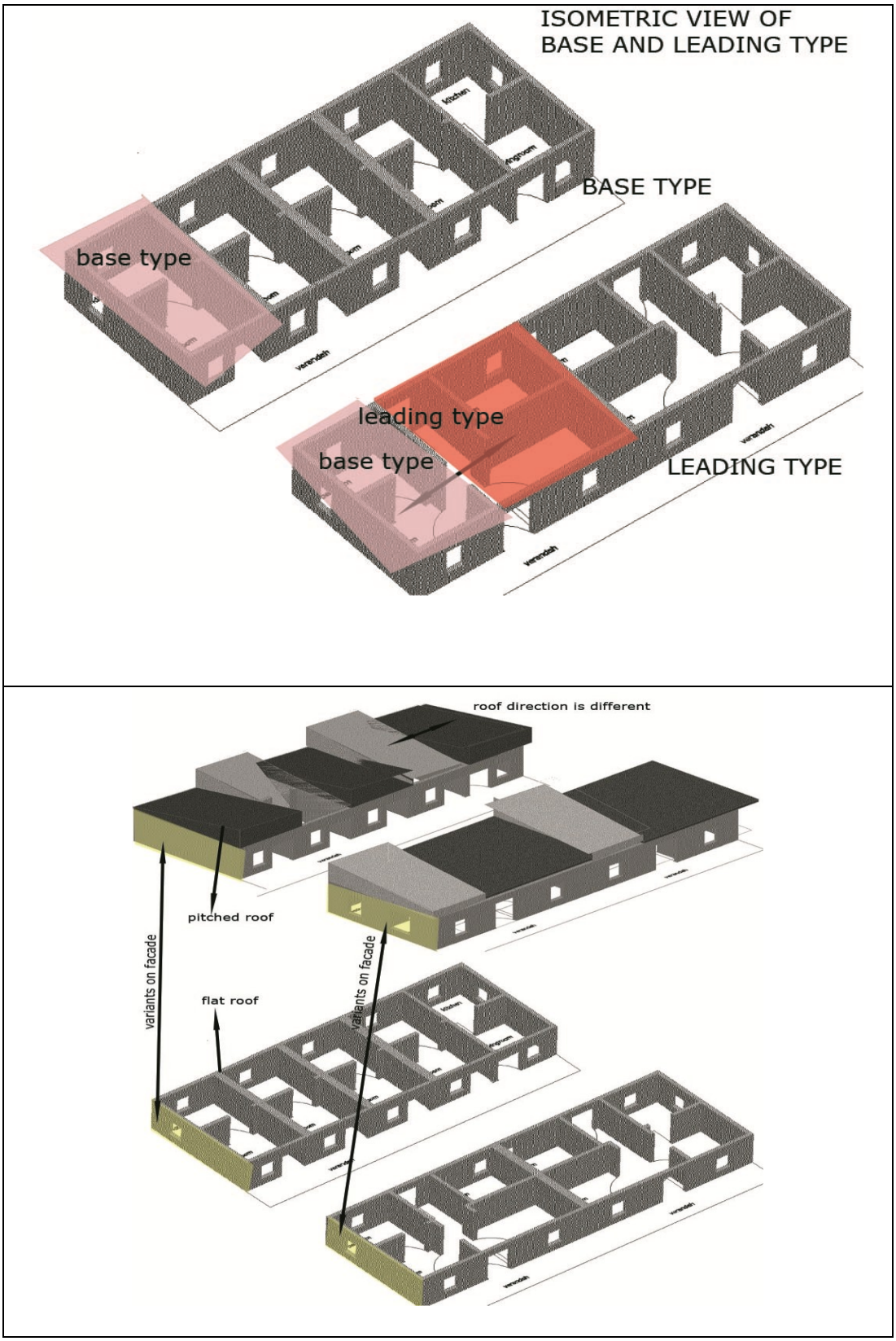


Figure 19: An example of a typical English building type with isometric drawings

3.2.2 Urban Tissue

Urban tissue is the concept of the coexistence of several buildings existing in the minds of builders before the act of building. It also refers to the level of spontaneous consciousness, as civil result of the experience of putting together several buildings and summing up all interesting aspects, including aggregation (Caniggia, 2001, p.119). He uses another term which is most generic term possible indicates a collection of buildings that he called *aggregates.* The distinction between aggregates and tissue is that tissue deal with the objects as types and covers the pertinent characteristic of a connection to other objects in a typological process. According to Caniggia (2001) A tissue is analyzed under six headings which are *lot, pertinent strip, route, blocks, and infill tissue and, nodes and poles.*

3.2.2.1 Lot

Lot, defined by Caniggia (2001, p.124) is the area built upon together with street and route. It deals with the relations of the structure on it and neighbors' which provides a connection to the area. Neighbors can be named as the nearest plots, route and street. Their relations with its surrounding are defined by the border of the lot both in two dimensional relations and three dimensional relations to each other. In addition to this, lot division during the time is another important issue that gives a formation of lot during the time. It also affects the routes and streets typology as well.

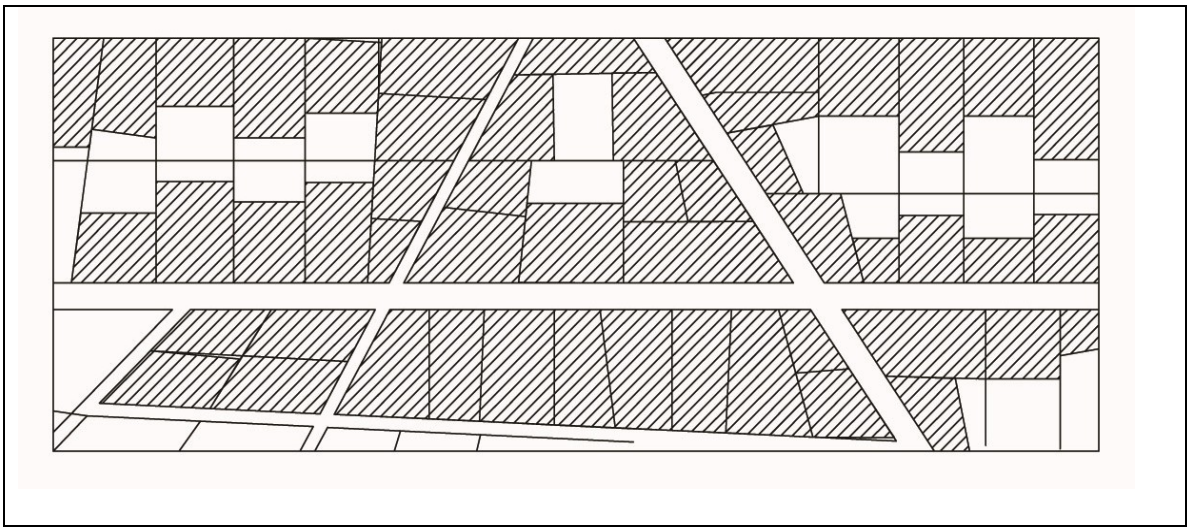


Figure 20: An example of Lot division

3.2.2.2 The Pertinent Strip

The pertinent strip, as Caniggia (2001, p.125) defines, that **is** an area built upon together with street and route. It deals with the relations of the structure on it and neighbours from surround. Neighbours can be defined with the relations of the nearest lots' structure, route and street. All that relations give an overview of the pertinent strip definition in plan level. On facade level, the relations of the window and doors, entrances and garden walls' position present the character of the pertinent strip. As seen in figure 3.21, the first pertinent street character is differentiated by the position and proportion of the plots according to the primary street. The buildings are occupy the total length of the plot which is faces to the main street. Generally, building forms along this street are L shape (Caniggia, 2001, p.25)

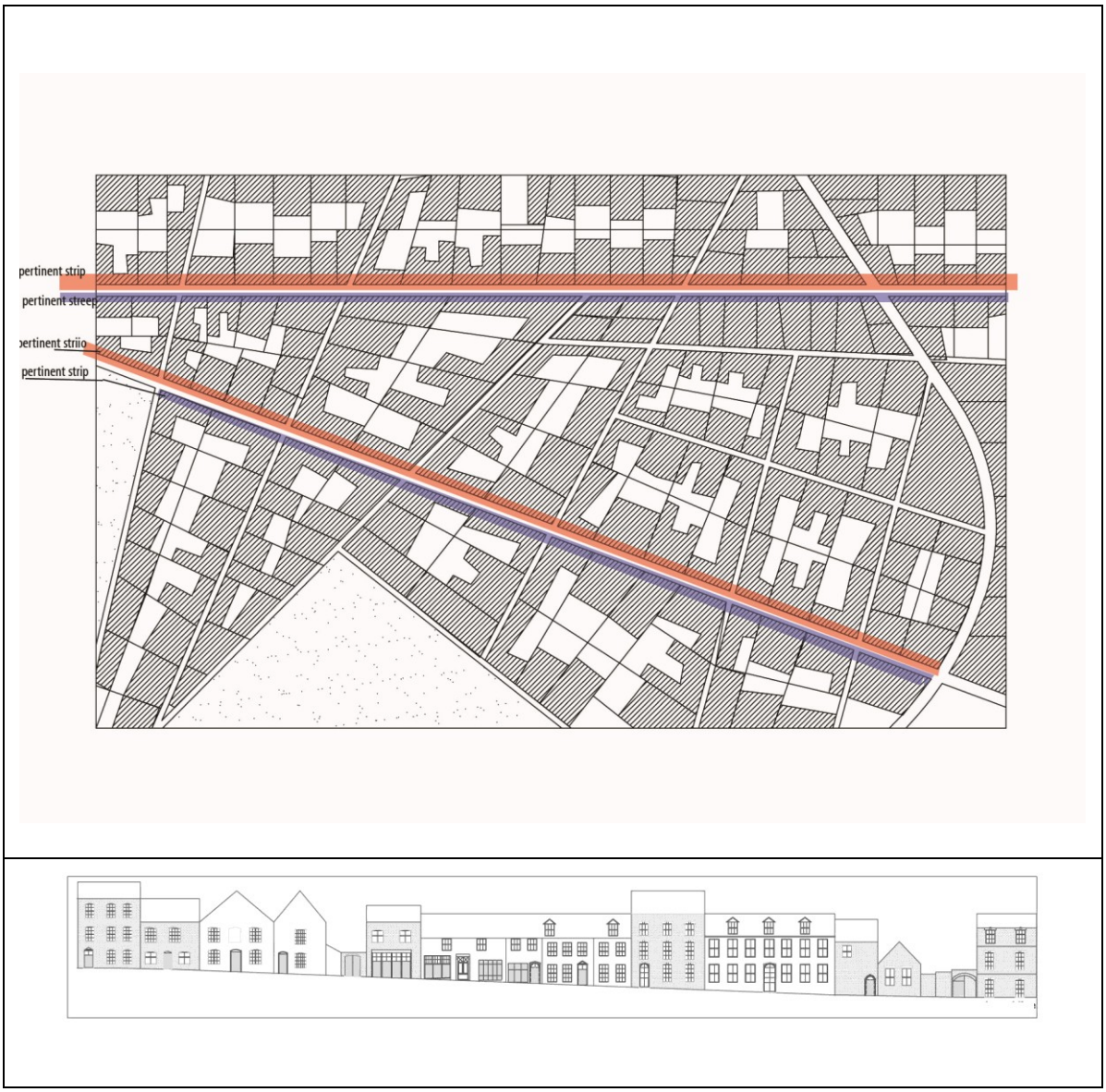


Figure 21: An example of Pertinent strip

3.2.2.3 Route

Caniggia (2001, p.124) states that "the route is, by definition, a structure apt to providing access to a place, starting from another. The knowledge of route closely involves basic and specialized building typologies in the sense that route or pathway describes not only the connecting structure between various rooms for a specific use but also the structure contained each room permitting its internal use as well as entrance."

Caniggia (2001, p.124) asserts that

> "we will use the categories route and pertinent strip in order to characterise the structure of tissue and given that the definition of the general classes specifies that an object of a scale is all objects with a relation of whole to part to objects of the scale immediately smaller, it would follow that the route should be placed in the scale of building or organism"

On the other hand, built route is a term referring to a more general class of a lower level of specificity within the scale occupied by tissues. They can be subdivided into specific classification such as *matrix route, planned building route, connecting route, and restructuring route.*

According to Caniggia (2001, p. 131) *Matrix building route s* are the routes which take its own direction despite of buildings lining it. As seen on figure 22 blue color shows the matrix route which could be either rectilinear or curvilinear to shorten its route which is overcoming any obstacles to its linearity.

At the same figure *planned building route* in red color in brackets can be defined as building continuum along a matrix route which show some differentiation with the formation of different kind of routes form gaps. It can be obtained as breaks through the front or demolishing houses (Caniggia, 2001, p.131).

Connecting route, shown in green in the figure is a kind of row building which has lined the two planned building routes. It is a back-route which have a couple of houses been to built of the two opposite fronts. It would be demolished thus giving rise to a route in order to have its sides lined by the previous building (Caniggi, 2001, p.132).

Restructuring route which is shown as with yellow, is a type of route which overlays a pre-existing building tissue when it is necessary to consider a direct connection between two pre-existing poles not already connected by an existing matrix route by cutting through the aggregate (Caniggia, 2001, p. 132)

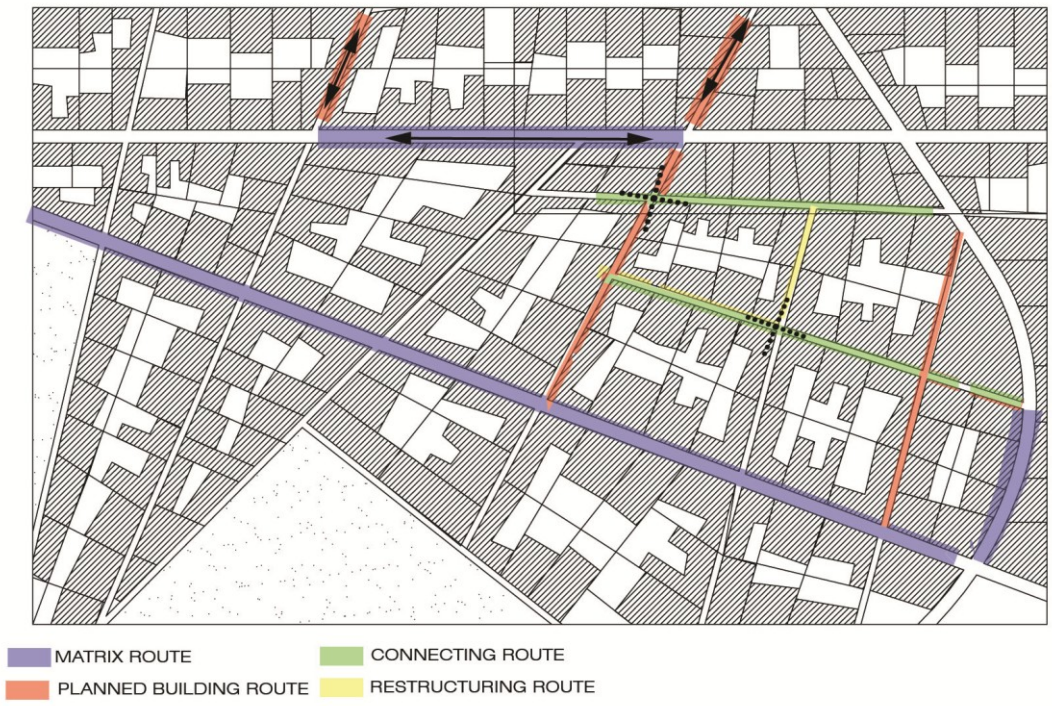


Figure 22: An example drawing for route

3.2.2.4 Block

Although there are many different definition of block by different authors Cannigia (2001, p.133) defines it as the "combination of a matrix route, two parallel planned building routes which is perpendicular to the matrix route and a connecting route parallel to the matrix route" as seen on Figure 23 He adds that *blocks* are constantly set by the coordination between several pertinent strips of each route.

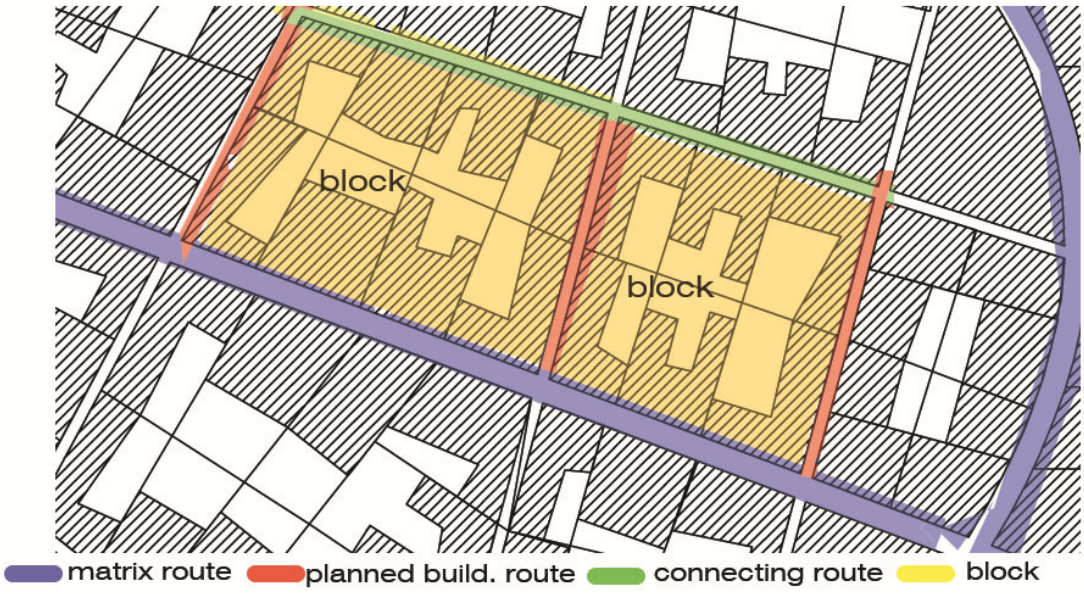


Figure 23: An example drawing of a block

3.2.2.5 Base and infill tissues

As a point of Caniggia view (2001, p.138), ***base tissue*** refers to the matrix route, described as an arrangement of particular parts and like base type also refers to a position in the typological process.

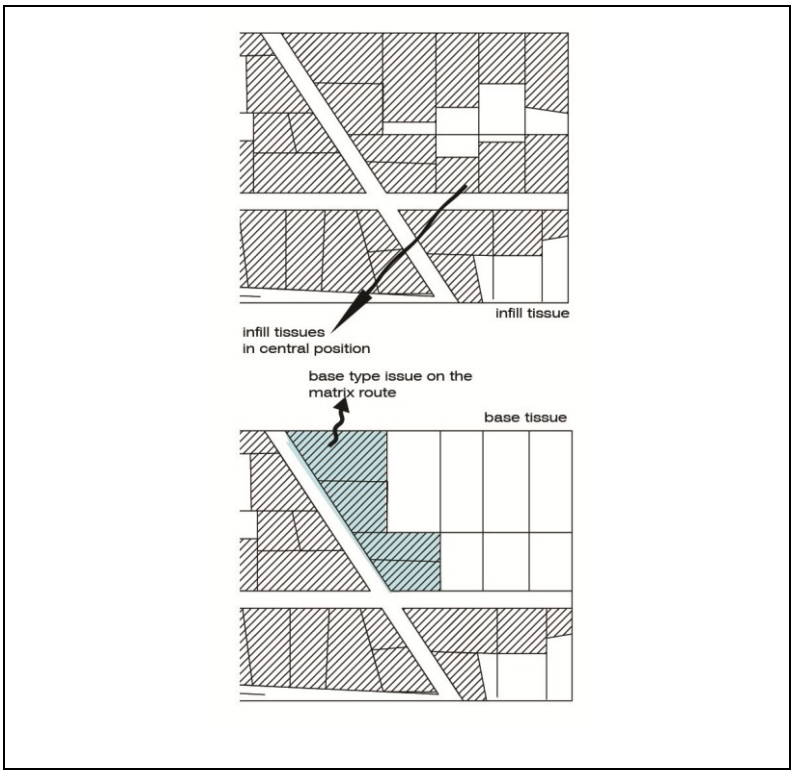


Figure 24: An example of base and infill tissue

It is starting point from which a tissue evolves. As seen in figure 24 it is lined with base type buildings and whose longitudinal development is limited by the need to start interpolating planned building routes (Caniggia, 2001, p.135). On the other hand ***"infill tissue"*** is a serial tissue which planned around a matrix route and intersected by a planned building route.

3.2.2.4 Nodes and Poles

According to Caniggia (2001, p.168) node, nodality and pole, polarity is based on similar position of objects and the axis of a route. These terms refer to the fluid positions to be in use along a route. A *node* is any crossing of routes in the matrix of tissues on one hand and, a pole is any ending point in the matrix of tissues on the other hand.

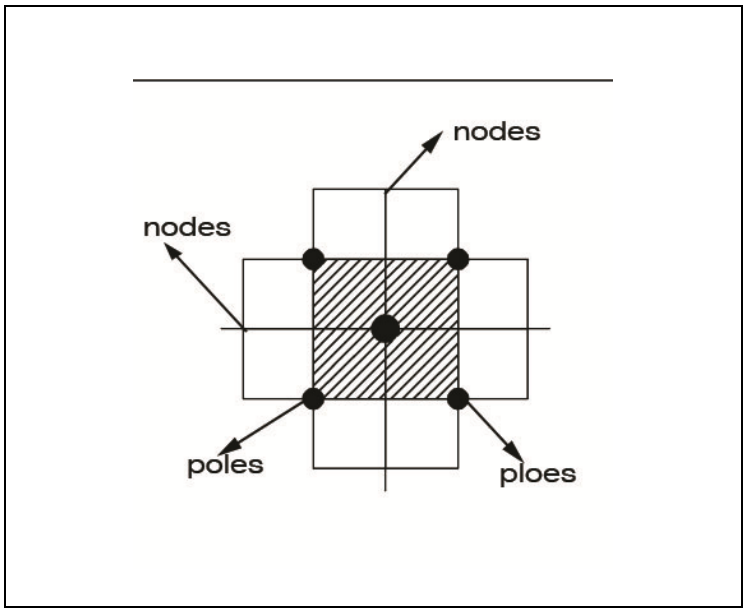


Figure 25: Nodes and poles

3.2.3 Settlement organism and Urban Organism

Caniggia (2001, p.165) defines the settlement as a complex of residential buildings directly related to a whole productive territory. Accordingly, he (2001, p.165) defined the *settlements* is a "dwelling complex, which can be directly related to a production of a neighborhood". On the other hand he identifies (2001, p.161) the *proto urban nucleus* is a complex of dwellings engaged for secondary or service activities which can be connected to a radius of power consisting not just the territory but also that of a series of surrounding settlement. He adds that *urban nucleus* is a complex with a more augmented radius of power containing the areas of influence of many proto urban nucleuses and relevant areas of several settlements (Caniggia, 2001, p.165).

These definitions consist of recommendation to parts to buildings; to use: residential buildings, producing territory and uses, referring also to the lower positive extent of influence. On the other hand Caniggia (2001, p.166) defines:

> "the *organisms* are in contrast is a hierarchy of complementary and reciprocally inner-functional attributions identifying each part. The distinction between *settlement and urban* which has been used individually in exploring the territory, seems to be aggregate at first sight.

> It is determined that a group of houses that only serves as a dwelling, whereas it has been never determined that a town consisting only of residential houses. A small group of houses featuring other facilities-just think of a service core of rebuild land, or small hamlet bordering on a store or in which casually originate at some crossroads at the service of a small group of houses which is certainly not a settlement (Caniggia, 2001, p.166)."

With these ideas **Territory** meaning has been changed depending on development process, which has been given at the foundation of the settlement, convey and also it changed into a village, town or metropolis context throughout the history.

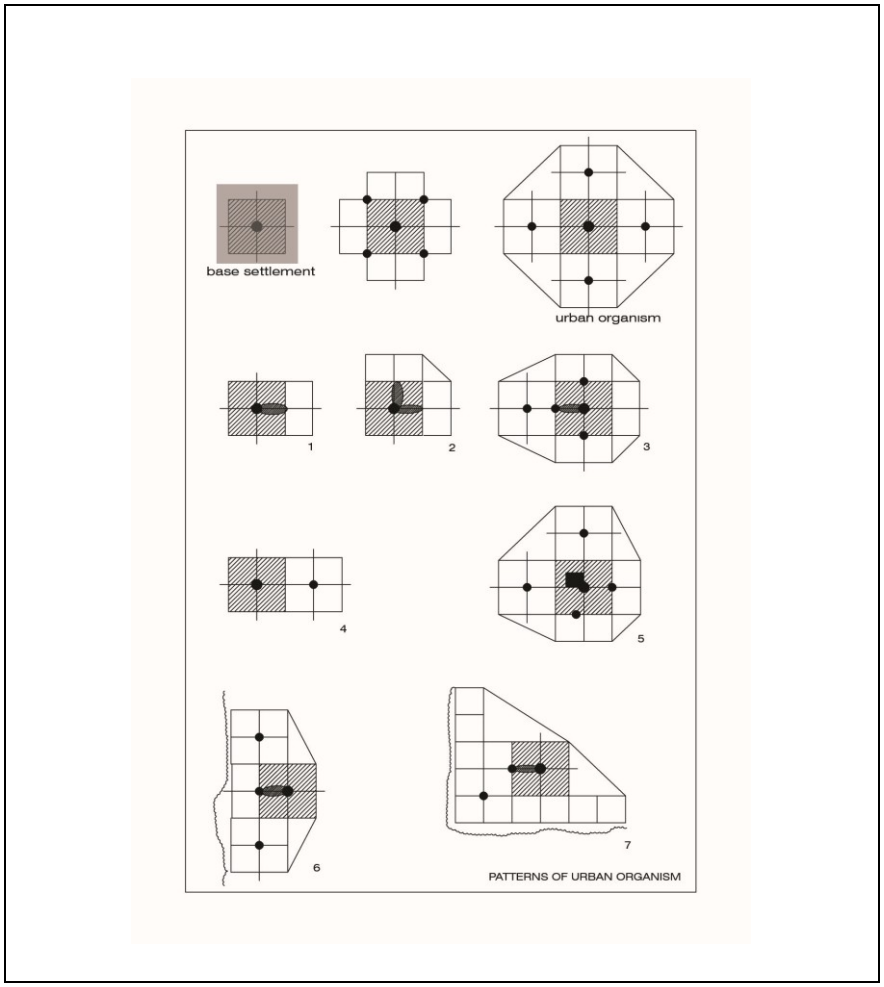


Figure 26: An example of Urban Organisms

As seen in Figure 26 modular doubling patterns of an urban organism with initial dimension 1 can give rise to barycentric duplication 2 through half module additions on each side or 3 through whole module additions, in 3 relatively

autonomous sun-centers has been seen. 4,5,6,7 represent prevalently mono-directional growth and 8 is bi directional non symmetric growth and linear nodalities such as sea, lakes etc.

3.3 A Critical Review Of Conzen's and Caniggia's Concepts on Urban Morphology

Within the scope of this thesis, it has been attempted to analyze urban morphology with all dimension. Before all these analysis have been done, different point of views of various morphologist are discussed who are the pioneers in the morphological studies. Within this context, interdisciplinary importance and sphere of interest of the morphology is argued in the second chapter. At the end of those arguments, urban morphology is analyzed by the view of geographers and architects. The evolution of geographical and architectural dimension of urban morphology is discussed in chronological order. Later, it is focused on the MRG Conzen and G.Caniggia who are the pioneers on urban morphological studies. Recently it is ascertained that the terminology and approaches which are used by MRG Conzen in Geographical area and by Caniggia in Architectural area are still in use today. Consequently the approaches of these two people have been analyzed this chapter .

Conzen focused on the area of Geography. In this way he analyzed urban morphology from macro scale to micro scale. In his analysis, Conzen starts with the detail and goes to the overall: Thus the three main headings of his urban morphological approach are : (a) town plan, (b) fringe belt and (c) townscape. Town plan is composed of streets, buildings and plots. The fringe belt helps to understand the development of towns according to time. Last one which is townscape is a combination of plan unit, land utilization and building pattern. It is an output of these three concepts which overlies with each other.

Caniggia however, studied urban morphology from an architectural perspective. Like Conzen, Caniggia also analyzed urban morphology in three parts: Building, urban tissue and settlement organism & urban organism. Caniggia put emphasis on four components when he firstly analyzes building. These are materials, structures, the buildings, room/cell and the types of buildings. Morphology of the building comes into existence when all of these are analyzed.

Secondly, urban tissue has been analyzed under six main headings. These are the plots which are including the buildings, pertinent strips which exhibit the relationship between lots and buildings and the pertinent areas which ar located behind the buildings.

As the third part he analyzed the routes which constitute building and road together. The fourth heading focuses on the blocks composed of many parcels and explaining the relations between parcels and the roads surrounding them.

In the fifth part, base and infill tissues through analysis of the occupancy and spacing rates were discussed. Consequently, the node and pole terms are discussed, through which focal points and axes in continuance were analyzed. All these then constitute urban tissues. Finally the urban organism which is including all urban settlements and urban centers and also two main headings above is analyzed.

MRG Conzen and Gianfranco Caniggia worked in different disciplines and in different countries. Both worked, however, in the larger overall context of Europe within a similar period. Both have applied considerable attention to their object of study. These considerations go some way in accounting for the differences and similarities which emerge in comparing their work, Conzen, the geographer, and Caniggia, the architect, both use the vocabulary and concepts of their respective disciplines. In Conzen's work, there is an emphasis on the town plan and in

Caniggia's on the building. Conzen uses the terms and concepts of geography and geomorphology and Caniggia those of architecture, also adopting biological terms and concepts.

Caniggia seeks to understand the built environment by examining the historical process of its formation. He begins first with the general distinction between spatial and temporal relations, which he refers to respectively, as copresence and derivation. The examination of copresence proceeds with an abstract set of component subdivisions. The subdivision forms a hierarchy in which the components are: elements, structures of elements, systems of structures and organisms of system.

This is first applied to individual buildings, in which building material such as bricks, timbers, tiles etc. are taken as the elements. The structures of elements are then the associations of building materials into such things as walls, interior floors, roofs etc. System of structures are arrangements of the latter into rooms, stairs, corridors, etc; the organism being the building, looking at the town, the same scheme is applied taking buildings as elements. The structure of elements is an association of buildings or an aggregate, in general referred to as a tissue. The system of structure is then a combination of tissues forming regions or districts, which is taken together to form the organism of the town, the forms are identified with the context of the successive changes constituting a town's development. The entire period of development is divided into phases distinguished by difference in the characteristic forms produced over a period of time.

On the other hand Conzen seeks to explain geographical structure of towns and begins by distinguishing the general aspects of function, social, and economic context, the site, and the morphological aspects: town plan, land utilization pattern and building fabric. Conzen intended to treat all three aspects in equal detail but at

the end concentrated on town plan. The town plan is itself subdivided into three complexes of plan elements: street-system, plot pattern and building pattern. The constituent element of the street-system is the block-plan of the building; further, particular unique combinations of streets, plots, and block plans represent plan-units. Simple combinations of these are sub-types and related sub-types together from types.

To account for the larger scale divisions of the town plan, Conzen identifies plan-divisions, which are combinations of plan units. Several orders of plan division are identified, each order begin a combination of division of the next lower order. A further distinction is made which is the identification of morphogenetic regions which are combinations of town plan, building fabric, land utilization pattern and the site. The development of the town, which leads to the variety and complexity of arrangement of plan-units, plan-division and morphogenetic regions, is divided into morphological periods, these corresponings to the periods of social and economic development which gave rise to specific changes in the town. Types of change are also distinguished such as burgage plot repletion and metamorphosis, redevelopment and fringe-belt development.

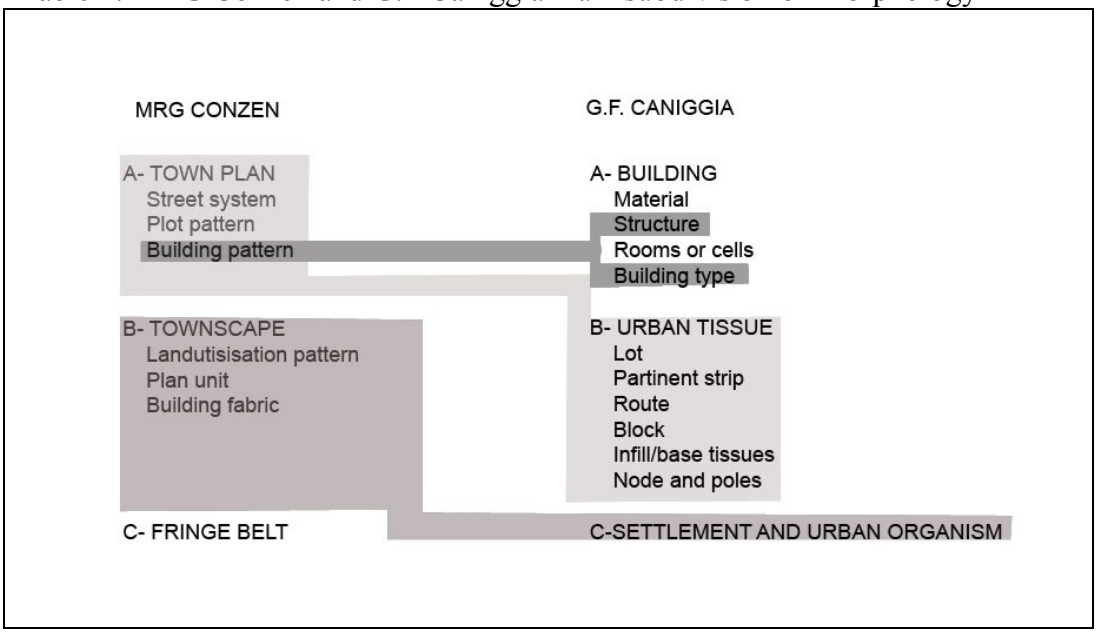
Equally, for both Conzen and Caniggia, the study of the built environment is a means of regaining something of what has been lost or at least preserving the admire the traditional town and seek to understand how it came to be.

The two methods have been used to explain and understand the towns: similar objects can be explained by same method. Therefore from all the preceding, it follows that the two methods together can be used to give a comprehensive descriptive analysis of other towns from a morphological perspective.

As seen in Table 1 in Conzen's works, he categorized the analysis and concepts under three groups which are *(a) town plan, (b) fringe belt and (c) townscape*. All of them explained and discussed in detail in this chapter. On the other hand Caniggia categorized the analysis and concepts under three headings like Conzen. These are (a) building, (b) urban tissues and (c) settlement organism/urban organism. Table 4 shows the similar terms and different terms of their conceptions. The table indicates that, Conzens' town plan and Caniggias' urban tissues sub division generally overlap with each other. In addition to this, Conzen's townscape and Caniggia's settlement/urban organism show similarities in general. All of these similarities and differences are explained in this chapter.

On the other hand, Conzen's fringe belt and Caniggia's building division does not have any common point. Only Conzen's building pattern under town plan headings have some common points with Caniggia's structure and building type under Building headings. The questions which must be answered then: How similar are these methods? How exactly can they be linked together? How is greater detail shown? How does greater detail improve explanations? Can the method be applied to different examples?

Table 4: MRG Conzen and G.F Caniggia main subdivision on morphology



For effective comparisons, it is necessary to establish a consistent method of analysis using the same set of terms for all examples. The purpose of this thesis is suggested that such a method can be established through the synthesis of existing methods however, to a method for the identification and description of form. This should be seen not as a method for determining a fixed set of objects but as a method of exposing, by comparison, differences that demand explanation. A consistent view of form then provides the basis of comparison of towns.

3.3.1 Conzen's and Caniggia Methodology

Examination of the studies of Conzen and Caniggia reveals that their methodologies show some similarities and differences in their studies. Conzen (1969, p.6) mostly considered town plan analysis with an evolutionary method. One of the major contributions of his method is the systematic inclusion of plots as a primary element for analysis.

Conzen's (1969, pp.6-7) work established a framework of concepts, terminology and procedures for analyzing the town plan in the effort to explain the

physical form of the town itself. The approach is historical and evolutionary, which considers the form of the town as the result of the sequence of events in its formation. Those events are in turn seen as part of the social and economic development of the local regional and national context in which the town lies.

On the other hand Caniggia (2001, p.14) use the typomorphological approach on architecture and urban design. He worked on the proper basis for design through knowledge of buildings. His concern was the processes of the formation and transformation of the built environment and the immediate needs it accommodates, rather than an abstract social or political program.

Table 5: Similarities and differences of Conzen and Caniggia on Methodology

Similarities	Differences	
	Conzen	Cannigia
Both use similar structure and elements	Evolutionary method	Typomorphological method
	Mostly emphasis on historical evolution on town plan with concepts and terminology	Mostly focus on building process, formation and transformation in build environment

3.3.2 Medieval Towns

Conzen takes as his primary object of analysis the English town of medieval origin where as Caniggia focuses on Italian towns, studying those which grew and were substantially transformed in the medieval period but which were in many cases of Roman origin. Both of them examine medieval towns of Europe, which presents a greater degree of similarity more likely again, as much as European medieval towns are similar. The medieval period was seen by them as an ideal instance of community, when the needs of that community were expressed directly in the building of the town, by people of the community. It was seen at the time when craft

predominated and the production of the built environment was not mediated either by labor or mechanization. For Conzen (1969) and Caniggia (2001) this period, or more generally, the period from the middle Ages to the end of the eighteenth century, is seen as one tradition, a tradition now lost to modern society.

However both Conzen and Caniggia, modern society is in a state of crisis (Conzen, 1981, p. 55; Caniggia, 1979, p.15) as a result of the loss of traditions and the negative effects of mechanization and industrialization. For both, the built environment as produced in the medieval or traditional period is seen as superior against those that are produced in our time. More practically, for both generally, Conzen specifically, this period is of central importance because the majority of the towns of Western Europe were created or substantially transformed in that time. Both admire the traditional town and seek to understand how it came to be. This does not exclude examination of modern forms, indeed, to understand the traditional town it is necessary to start with the town as it is known today, rather within the town as we know it today are the races of what went before.

In addition to this, for Conzen, as a geographer, examination of towns lead to an explanation of the present form of the town as well as suggestions for conservation or preservation policies. Caniggia goes beyond explanation and policies and attempts to use the lessons embodied in the town as a basis for design proposals. In this sense Caniggia goes further in pursuing the ideal of the traditional town, he seeks to repair the damage done to historic towns by modern development through rebuilding following the principles gathered from the study of traditional building.

Table 6: Similarities and differences of Conzen and Caniggia on Medieval Towns

Similarities	Differences	
	Conzen	Caniggia
Towns are in Europe	Focusing on English town	Focusing on Italian towns
Towns are Roman origin	Suggestion of preservation and conservation policies	Suggesting a design proposal
Traditional town		

3.3.3 Town Plan

In the conception of town plan, Conzen and Caniggia share a fundamental assumption. For both, the key to understand the town as it is today is the town as it has been its history. For Conzen, "Towns have a life history. Their development together with the cultural history of the region in which they lie, is written deeply into the outline and fabric of their built-up areas" (1969, p.6) "An evolutionary approach, tracing existing forms back to the underlying formative process and interpreting them accordingly would seem to provide the rational method of analysis "(1969, p.7)

For Caniggia; there is a

> "Substantial correspondence between structure and history, a characteristic proper to all things which derive from a process of formation….. Further, to read building structure is to understand the structure of the built environment as a spatial realm using logical tools, it is to understand the components as put together, structured, by man….. be achieved by reconstructing the process of formation of the later type starting room its elementary or original form"(1979, pp. 59-60)

From these quotations it is evident that the similarity in their views is not found only in the idea of history as the key to understanding the structure of towns. Both Conzen and Caniggia see the town as the result of a formative process. History is that process. Equally, both see the process of formation as one of gradual change or evolution (Conzen, 1969, pp.4-9; Caniggia, 1979, p.52). While Caniggia posit a general overall mechanism for the evolutionary process, and Conzen does not, both identify similar components or properties in the process, both identify differential

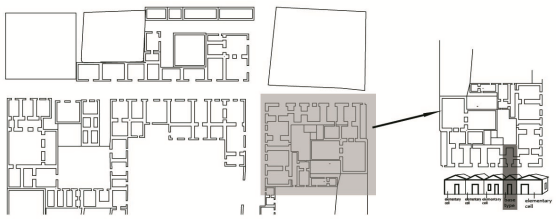
rates of change between smaller elements such as individual buildings and larger elements such as patterns of streets and blocks (Conzen, 1969, pp.4-7; Caniggia, 1976, pp.63-102).

Both recognize that people's needs change over time, demanding new forms of buildings, the result being the transformation of the existing buildings, central areas of a town and the addition of new forms on the periphery. This implies that there is a direct correlation between forms and the purpose and activities the forms accommodate as well as social and economic conditions under which they were formed, an implication made explicit by both Conzen and Caniggia. Both also identify periods or phases in the process of the development and transformation of the built environment. In addition to these both desire to understand the physical form of towns, with that common object and purpose and given the similarities in their overall view already mentioned.

On the other hand, Conzen is focusing on buildings and its structure, plots and its components and street pattern. He overlies all of them together and find out the town plan structure whereas Caniggia get in deep research on buildings that he focused on building, building components (door, windows, rooms), building material (wood, stone, brick) and aggregates (concrete, sand, etc). He gives importance to building scale and then focusing on town plan and urban issues. He considers that buildings are the important elements on town plan and for this reason buildings should be analyzed deeply.

In addition to this, while Conzen concentrated on buildings, plots, and streets equally, Caniggia gave importance to building and then block and route. As seen in Figure 27 Conzens town plan is analyzed in larger scale and all of the elements are examined equally. In Caniggia's town plan, buildings are examined according to

aggregates, materials and elements whereas routes and blocks are not classified and analyzed intensely.



Conzen	Caniggia

Figure 27: Conzen and Caniggia Town plan

Table 7: Similarities and differences of Conzen and Caniggia on Town Plan

Similarities	**Differences**	
	Conzen	Caniggia
Towns have its history **Helps to understand structure of towns** **Result of formative process** **Transformation of existing buildings in central areas to additional new buildings.**	Focusing on building, plot, street pattern	Focusing on building components, material and aggregates

3.3.4 Plot

Conzen's plot and Caniggia's lot, which refers to the same thing is perhaps most directly if vaguely examples of tissues, of which the lot is the module, demonstrates the similarity. The graphic similarity while encouraging, is too vague as a basis of comparison. Conzen identifies two main types of entities, the plot, on the one hand and the block and plot series. He further identifies entities of plot head and plot tail which are subdivision of the plot. In defining tissue, Caniggia identifies three main entities: the lot, made up of the built area and the pertinent area; the

pertinent strip, made up of lots; and the built route, made up of the route and the pertinent strip. The block is mentioned but is considered by Caniggia s equivocal.

Figure 28 Conzen's plot series is an aggregate of plots and Caniggia's pertinent strip an aggregate of lots. Though both recognize the block as an aggregate of plots or lots, they differ in their definition and interpretations of the block's place within the structure of forms.

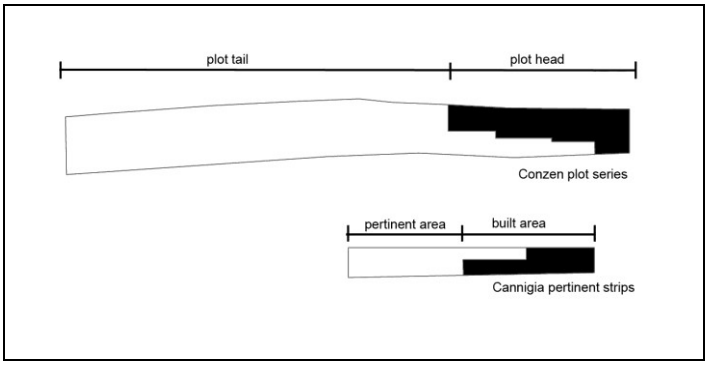


Figure 28: Plot series and pertinent strip

In addition to these against the Conzen's (1969, p.27) 'definition of plot reduced to a parcel of land defined by boundaries on the ground', Cannigia's (2001, p.45) definition remains unchanged with '*the area built upon together with the pertinent area'*. In both case, the plot is considered as an area. As it's most basic, this is to see the ground or surface of the earth as divisible, any one continuous division begin an area in opposition to other continuous division. In other word, an area is the part of the earth's surface, seen as a two dimensional surface, defined as within a closed geometric figure made up of points and the lines between them. The lines are the boundaries of the area. The pertinent characteristics defining the area are thus the spatial relation on a two dimensional surface of boundary lines. It is in these terms that Conzen's plot and Caniggias's lot can be considered to refer to the same thing. Examination of statements about the plot or lot in specific application shows similarities between Conzen's and Caniggia's conception of plot and lot respectively. Caniggia notes that there is

> "On each route the basic characteristic of modularly disposed building fronts. This is symptomatic, in reality, of an overall modularity in the conformation of aggregates. That modularity arises from the fact that an aggregate is built an more or less the same time using analogous building types. Analogous types imply a similar measure of area under each building, which constitutes the buildable lot. This is comprised of the area built upon together with the pertinent area. Therefore, the module of the aggregate is the lot, constantly tending toward a rectangular form and disposition of one short side fronting on the street and the long side perpendicular to the street (Caniggia, 1979, p.129).

These quotations indicate a greater degree of similarity between Conzen's and Caniggia's conception of the plot as used for the analysis of an English town of medieval origin and Italian towns of medieval origin. There is a similarity in outline, that is, the configuration of the boundary on the ground plane, and a similarity in the division and location of component parts-the built area and inbuilt area. There is the further similarity of orientation to the street or route. The quotations both also imply that a building is located within the plot in a similar relative position. Given the above similarities, Conzen' plot and Caniggia's lot refer to a similar set of characteristics and so may refer to the same or similar class of object, at least with the restricted areas specified.

Another similar terminology under the plot/lot heading is **Plot series and pertinent strip.** Both Conzen and Caniggia identify a simple arrangement of plots which Conzen terms plot series and Caniggia terms pertinent strip as seen on figure 29 and this figure indicates that, for Caniggia, the pertinent strip is a constituent of a built route, the latter begin a type of tissue. Equally, for Conzen the plot series is a component of plan-unit. Tentatively, then, it may be suggested that the simple arrangement of plots corresponding to the plot series and pertinent strip is an identifiable form occupying a primary level above that plot and below the plan unit or tissue.

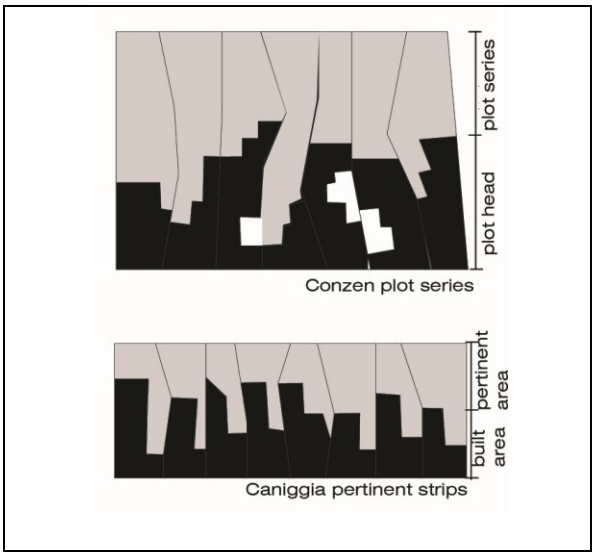


Figure 29: An example of configuration of pertinent and plot

Table 8: Similarities and differences of Conzen and Caniggia on Plot/Lot

Similarities	**Differences**	
	Conzen	Caniggia
Both refers the same definition Definition is; plot considered as an 2D area in urban spaces or planned areas	Subdivision of plot Plot head Plot tail	Subdivision of lot Built area Pertinent area
Both agree that arrangement of plots corresponding to the plot series or pertinent strips	Plot series is component of plan unit	Pertinent strips is type of tissues

3.3.5 The Building

Having confirmed the distinction of plot and building or more strictly the distinction of two levels of form in the hierarch occupied by buildings respectively, the comparison of the level corresponding to the building can be addressed. The comparison is complicated by Conzen's distinction of town plan and building fabric. As a plan element in the town plan, building or block plan refers to the two dimensional trace of a three-dimensional object. Though Conzen does not strictly define building, the plan, section, elevation and axonometric or isometric drawings are generically similar to those used by Caniggia to illustrate building types. Given the lack of a specific detailed definition on the part of Conzen, the definition of the plot as containing the building along with the graphic similarity are the primary bases

for positing a correspondence between Conzen's building-building fabric, and Caniggia's, building type. On the other hand, Caniggia's building type is deeply analyzed according to its material characteristics, structure, openings and its types whereas Conzens only give specification of structure and material.

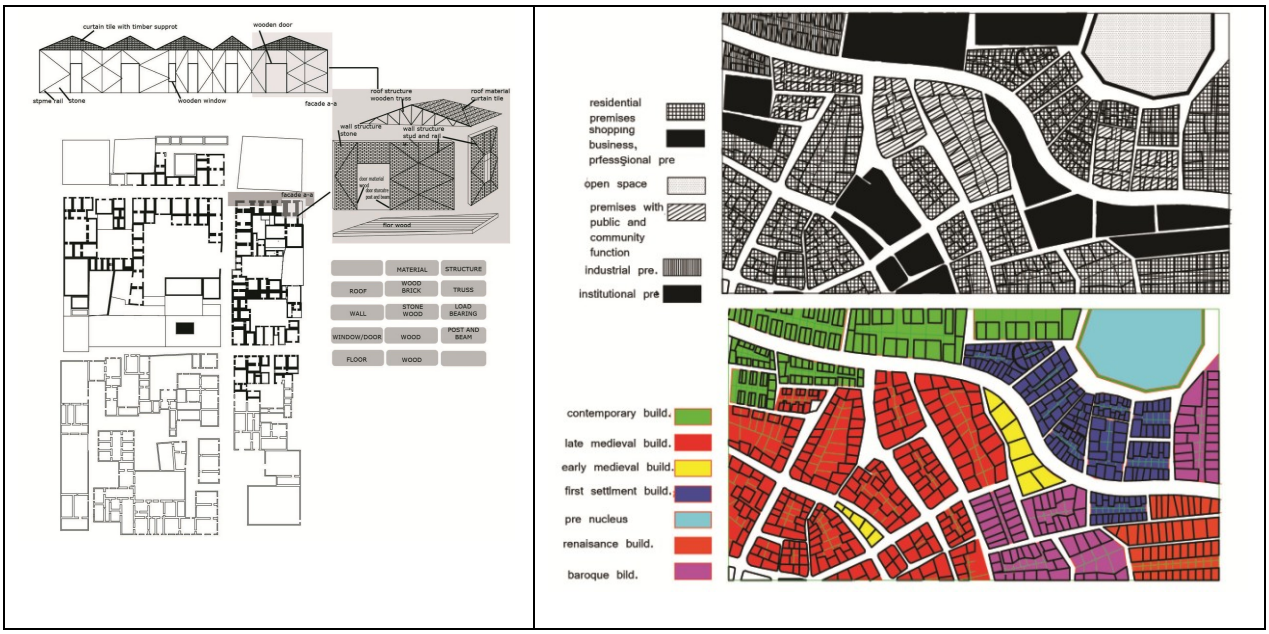


Figure 30: Building definition

In figure 16 and 17 the different emphases of Conzen's and Caniggia's work become fully apparent. Caniggia goes on to define the parts of buildings, identifying three levels of form under that of the building, namely rooms, structures and materials. Conzen only defines the building structure, building types (what are they using for?) and building period (which period are they built up?). Although both consider building as an important town element, their priority on building components is different than each other.

Table 9: Similarities and differences of Conzen and Caniggia on Building

Similarities	**Differences**	
	Conzen	Caniggia
Both consider the building as a main element of towns.	Only consider the building as a main element	Detailed analysis on material, structures, rooms and aggregates.

3.3.6 Definition of Form (Plan Element)

Regarding the first issue, Conzen's geographical perspective sees the town, or more specifically the form complexes and elements complexes, in terms of discrete elements and their distribution pattern. Conzen thus identifies elements and element complexes. That is, having identified distinct types of form, the building, plot and street, he conceives the combination of any one type of element as the pattern of that one type over the entire town. Within each pattern he then distinguishes different specific types of each element.

In contrast, Caniggia sees the combination of a given element as another distinct type of object of which there may be many different types over the area of town. For Caniggia, combination of plots is not the plot pattern of the entire town but a single tissue which is another type of element. A combination of tissues may then be a town or part of a town. For Caniggia, the pattern of any one element over the whole town is not an entity but an analytical tool. In the attempt to conceive of the town as it was built, the pattern over the whole town of a given element plays no direct part. The pattern is useful in attempting to determine how the town was conceived, after the fact in analysis. This is not to say that Caniggia's division is more realistic than what Conzen would consider the element complexes as anything but analytical tools. Indeed, the difference reduces to one of emphasis and the status conferred on the patterns by Conzen in calling the patterns element complexes. Ultimately Conzen and Caniggia both use the pattern of single elements over the whole town for the purpose of distinguishing types.

For Conzen, it is not the pattern as a whole which contributes to the explanation of the town, but types distinguished within the patterns and their inclusion in plan-units. The types form each complex in themselves and together in

plan-units are the entities which are used in explanation. The difference between Conzen and Caniggia in this respect is thus more the specific procedure rather than the content.

Furthermore, Conzen does conceive the form in a way similar to that of Caniggia in the definition for plan-units and plan divisions, a plan unit is a combination of buildings, plots and streets in the same way that a tissue is a combination of buildings, lots and pattern of a single element over the whole towns, which is used for the analytical purpose of distinguishing types, and the types themselves, and the combination or arrangement of types to form objects of the next higher level of complexity.

In terms of the general conception of form, this puts the emphasis, as Caniggia does, on the specific types of form as constituents of a given town or urban area. The pattern of the forms of a single level is seen as a particular view of the town to be used for the purposes of analysis.

Assuming this conception, Conzen's building fabric, block and building pattern, plot and plot pattern and Caniggia's materials, structures, rooms, buildings and lot have been accounted for within the five levels adopted so far. It remains to determine elements above the level of plot.

In addition of all above, both Conzen and Caniggia focus on town form in different approach. Both try to figure out town form which of Conzen more interested in plot, street, building and then he overlay them and tries to figure out the relations of their functional patterns and form patterns. At the end he is focusing on town development form in detail. On the other hand, Caniggia is focusing on building form. Then he figure out building form according to material, organization of rooms, aggregates and structure. Then he figures out the general typologies of

building in each town. Then figure out the urban tissues according to block and route form. Then he combines all of them together to find out the town form as a whole.

Table 10: Similarities and differences of Conzen and Caniggia on definition of form

Similarities	**Differences**	
	Conzen	Caniggia
Both consider the building as a main element of towns.	Only consider the building as a main element	Detailed analysis on material, structures, rooms and aggregates.

3.3.7 The Block

The block, however, is also a combination of plots and is a form identified by both Conzen and Caniggia. The distinctive feature of the block relative to the plot series is that it is surrounded entirely by streets. Caniggia argues that the block is a combination of pertinent strips, begin the result of the fusion of serial built routes. This conception, while valid in many cases, shows the limits imposed by Caniggia's concentration on a particular region and period. One of the fundamental premises of Caniggia's method is that the attempt to reconstruct the town is done according to the conception by which it was built.

Conzen defined the block like Cannigia but he said that block is a combination of plot, street system and buildings. Both argue that without buildings they are two dimensional areas. When buildings are built up on block they start to transformed three dimensional areas.

Table 11: Similarities and differences of Conzen and Caniggia on Block

Similarities	**Differences**	
	Conzen	Caniggia
It is a plot series surrounded by streets.	Combination of building, plot and street system	Combination of plot series

3.3.8 Street / Route

Caniggia's definition of tissue includes the street as a constituent part as do most of the plan units identified by Conzen. Caniggia defines route as the structure

which allows a place to be reached (1979, p.128). This definition gives no indication of the physical nature of the street unless arrangement of materials. This interpretation would seem to accommodate most examples. Within the suggested framework of elements, it would then occupy primary position between that of materials and that of rooms. By extension it could then be considered to occupy successively the levels corresponding to buildings, plots and tissue or plan units. This degree of extension should not be considered an anomaly. As Caniggia notes a building cannot exist without a route (1979, p.127). The route is perhaps one of the most fundamental and necessary structures created by man. It has been possible to precede this far without discussing the route because it is not internal to the forms which have been examined. In many cases, however, knowledge of points of access to and from routes is essential in the explanation of forms. Access and movement to and through forms in the built environment are fundamental aspects in the way in which the forms accommodate human intentions and uses.

Returning to Conzen's view of the street, he does in a sense include both the street and block in his definition of the street system. He explicitly names the street as the element but the object actually determined by the definition is in effect the block. He does not refer to the street as a material object which can be outlined but as a space between blocks. It is possible, however, to define the street as a distinct object, as suggested by Caniggia. As a structure it is a composition of materials oriented horizontally and usually levels with the ground, of parallel sides of such and such a width and such a length.

Caniggia states that routes are giving the characteristics to urban tissues and each route carries its own characteristics with buildings and its surround. As well as Conzens agree this statement but he add that street defines a space and space is a

volume or area between particular boundaries. As a result of the discussions above, Conzen's and Caniggia's definition of the terms is generally same but in detail they show some differences.

Table 12: Similarities and differences of Conzen and Caniggia on Street/Route

Similarities	**Differences**	
	Conzen	Caniggia
It is a linking element to connect places to each other	Street as a space between block	Route as the structure which allows a place to be reach

3.3.9 Townscape / Tissue

Conzen's townscape and Caniggia's urban tissues show some similarities to each other. But in detail they show some differences. According to Cannigia, tissue deals with the objects as types and covers the pertinent characteristic of a connection to other objects in a typological process. It is a town or part of town process which carries dynamic values of components of tissues. On the other hand Conzen seeks to determine the townscape with plan unit through analyzing the building type and plot relation and make connection with street line, as well as building activity and building history. As seen on figure 27 he considers that all these elements overlay with each other and each town has unique identity which he named as townscape.

Both Cozen and Cannigia consider the towns patterns in general. They agree that two dimensional elements and three dimensional elements come together and formed the urban tissue or townscape. But in detail some of their components differ from each other. Tissue is mostly considered to be composed of building and its components, route types, blocks types, pertinent characteristics and such things, where building function and unit characteristics are not important. Whereas Conzen gives importance to land utilization pattern and plan unit pattern. The main difference between them is function of towns and buildings. However Conzen and Caniggia both identify similar types of entity.

In addition to these, several issues arise when examining how these units come together or form larger entities, or conversely, when attempting to identify townscape or tissues within a specific town.

Table 13: Similarities and differences of Conzen and Caniggia on Townscape/ Tissue

Similarities	**Differences**	
	Conzen	Caniggia
Both consider the town pattern Buildings, plots and streets and their combinations are the main components to figure out town plan	Consider physical space with functions Plot and building pattern	Consider the physical elements rather than functions such as route, block and building relation

3.3.10 Organism / Morphological Regions

Caniggia's urban organism and Conzen's morphological regions are at the higher level of town development analysis. Both of their analysis on town is macro level. Caniggia describe urban organisms; as an analysis of the town, where the building is the element, a structure of elements is the urban tissue, their arrangements forms regions or districts, which together form the organism of the entire town. The examination of the derivation / correlation is an attempt to find the basis for the built form created in a specific era. Every era produces a different type of dwelling. The organism is modified according to changing social and economic conditions, forming the typological process.

On the other hand Conzen defines the town plan as the topographical arrangement of an urban built-up area in all its man-made features. The town plan is itself subdivided into three constituent parts or elements: streets and their arrangement in a street system, plots and their aggregation in street blocks, and the block-plans of buildings (Conzen, 1960, p.5): Combinations of town plan, building fabric, land utilization pattern and the site, form morphological regions (Conzen, 1975). A morphological region represents a phase in the development of the town, which creates distinctive material forms in the cultural landscape to

suit the particular socio-economic needs of its society. As seen above Caniggia's urban organism and Conzen's morphological regions shows some similarities to each other in their context but within themselves the way of analyzing towns show differences.

Caniggia's urban organisms are related to arrangements or combinations of tissues. Such combinations are the plan divisions of urban organisms. An urban organism is a general class according to the typological process.

As mention above, urban organism and morphological regions show similarities in general and for that reason both of them can be put in the same classification. The only difference is their components. For instance, in urban organism; town is the combination of buildings, tissues, regions and districts with in economical and social changes. Whereas a morphological region is a combination of land utilization, plan unit pattern and building pattern within cultural context. So both of them consider social and cultural context but their physical way of analysis shows difference from each other.

Table 14: Similarities and differences of Conzen and Caniggia on urban organism / morphological regions

Similarities	**Differences**	
	Conzen	Caniggia
Both of them in macro level concepts They considered the overall view Both give importance to development process of towns.	Morphological regions represents a phase in the development of the town, which creates distinctive material forms in the cultural landscape to suit the particular socio-economic needs of its society	Organism is modified according to changing social and economic conditions which forming typological process

3.3.11 Conclusion

At the end of the discussion, table 15 gives the summary of the similarities and differences both Conzen's and Caniggia's terms in briefly. Next chapter take

these comparison and conception in to consideration and they provide a basis of methodology for analyzing the cases.

Table 15: Summary of Conzen and Caniggias concepts similarities and differences

	DIFFERENCES		SIMILARITIES
	CONZEN	CANIGGIA	
METHODOLOGY	*Evolutionary method	*Typomorhology	*Both use similar structures and elements
MEDIEVAL PLAN	*British medieval origin towns	*Italian medieval origin towns	*Both are medieval originated towns
TOWN PLAN	*Focus on building, plot, street pattern	*Focusing on building components, material and aggregates.	*Town has been its history of the region *Resulted of formative process *Helps to understand structure of towns *Result of formative process *Identifying similar components *Transformation of existing buildings
PLOT/LOT	*Plot series is an aggregate of plots *It reduce to a parcel of land defined by boundaries on the ground	*Pertinent strips on aggregate of lots *The area built upon together with the pertinent area	*Both explain in different way but refers same meaning which is plot considered as a 2D area *Identifying differential rates of charge between smaller elements to larger elements Correlation between forms, activities and economic condition
PLOT SERIES/PARTINENT STRIPS	*It is a component of plan unit	*It is a constituent of a built route	*Only terminology different but in context they show similarity.
DEFINITION OF FORM	*Elements as the pattern of that one type over the entire town	*Elements be many different types over the area of town *Combination of tissues may be a town or part of town	*Use the pattern of single elements over the whole town for the purpose of distinguishing types

Table 16: Summary of Conzen and Caniggias concepts similarities and differences (cont.)

	DIFFERENCES		SIMILARITIES
	CONZEN	CANIGGIA	
BLOCK			Both use exact same explanation is comnination of plots
STREET/ROUTE	*It is an elements but the object actually determined by definition as in effect the block	*It is the structures with allows place to reach	*Both consider route/street as an element to connect place to another place
PLAN UNIT/TISSUE	*Street as a space between blocks	*Route as the structure which allows a place to be reach	*Both definition based on the complex of the object which the plot series or block is a part the street begin another consistent element *Distinguishing only streets, plot series, block in outline, it is possible to identify several basic types of plan units/tissues
URBAN ORGANISM / MORPHOLOGICAL REGION	*Combination of town plan, building fabric, land utilization pattern and site form morphological regions	*As an analysis the town , the building is the elements, a structure of elements is the urban tissue, their arrangements which together formed organism of the entire time	*Higher level of town development analysis

Chapter 4

INTEGRATED METHODOLOGY –M.R.G. CONZEN AND G. CANIGGIA- ON URBAN MORPHOLOGY

This chapter aims to put forward a theoretical framework for the analysis of the cases, which synthesized/integrated Conzen and Caniggia concepts as mentioned in the previous chapters and it intends to clarify the research design of cases. This chapter is divided into 4 main sections: (a) Methodology of analyzing comparative longitudinal case studies, (b) Methodology of analyzing cases, (c) Framework of case study analysis, (d) Selection of cases

4.1 Methodology of Analysing Cases

In this study, qualitative research will be conducted for collecting the data for cases in which data are gathered directly from sites/towns and social or community groups in their natural environment for the purpose of the study of interactions of the characteristics of towns.

There are five basic methods for research design: case study, longitudinal study, comparison study, comparative longitudinal study and experimental study. The case study method was selected for analyzing and surveying the towns of Famagusta and Ludlow under the three periods of medieval, pre-modern and modern, and findings from those periods will be presented. This research is an exploratory study that takes a broad look at the towns in the study.

In addition, the case study method was followed for selected cases using a *longitudinal study* method, which is an observational-descriptive type of research

that usually continues over a period of time and is frequently called a developmental study. In this study, there are two cases from the southern and northern parts of Europe, both of which are put in the same classification and studied for a period of time and their results recorded.

The method of *comparative study* tolerates a comparison of two or more variables at or nearly at the same time. The longitudinal comparative research method is not sufficient to use alone. There is also a need for case study research. The aim in this approach is to answer two questions: what is going on, and is there a relationship between the towns of Famagusta and Ludlow the case studies? While conducting the research on Famagusta and Ludlow, the first question is, Are there are any similarities between Famagusta and Ludlow? The second question is, What is the difference between the two towns, and does this difference persists through time? Therefore, both case study and longitudinal study methods are necessary to determine the similarities and differences between the two towns. When two cases with the same dependent and independent variables are compared, there is a need for a longitudinal comparative case study research design. Thus, to present a framework for the analysis of the towns of Famagusta and Ludlow, the comparative longitudinal case study method was selected. This method describes the aspects of the methodology that provide consistency between case studies and longitudinal studies, thereby allowing easy comparative analysis. The general approach was to use inductive analysis to discover common elements in the case and longitudinal studies and then, using those elements, to design a format for analyzing the issues consistently.

In research design, there are factors and variables that are followed in the study. A variable is a concept that varies in terms of type. In other words, variables

are any characteristics that can take more than one form or value. Thus, elements and components of morphology are determined as variables. Although they are classified as variables in many studies, in this study, culture, socio-economic aspects and the political system, which are considered the historical background of the town, are determined to be factors. Factors are analyzed by examining records and conducting content analysis, which is based on gathering data to examine records and documents, and variables (elements and components of morphology) are analyzed by site survey analysis.

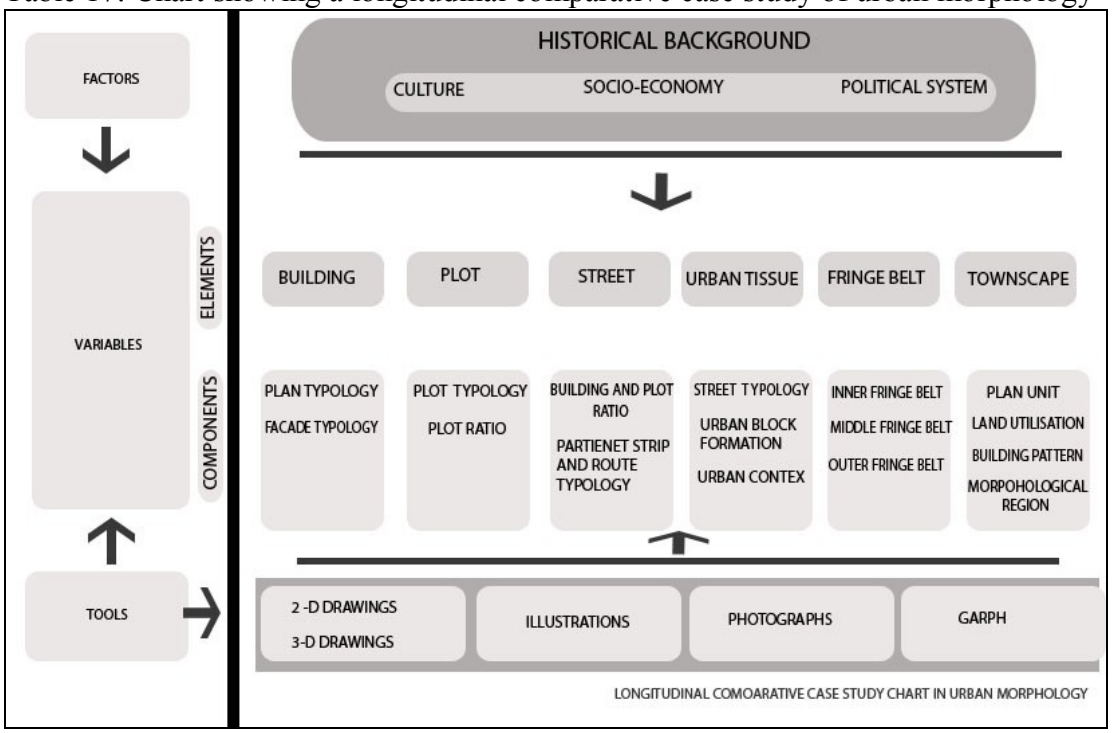
4.2 Methodology of Analyzing Comparative Longitudinal Case Studies

As mentioned, the method of analyzing the cases – comparative longitudinal case study – resulted from the theoretical bases of the thesis. In this study, a comparative longitudinal case studies methodology is used to test whether the morphological analysis approach is also applicable in Cypriot cities. This study aims to analyze European towns in different geographies, cultures and locations. The advantage of the comparative longitudinal case study approach is to test whether the method can be used for different cases, especially in different countries on the same continent or in different geographies over time.

For testing the proposed method and research questions, factors and variables are determined as mentioned. The factors are the historical backgrounds of the towns, which will be discussed below. The variables are tested through desk work and literature review. The variables, which will be measured through field work and site survey, are the tools and elements of the research. The elements are building, plot, street, urban tissue, fringe belt and townscape. The components are plan and façade typology, plot typology and ratio, building ratio, pertinent strip and route

typology, urban block formation, urban context, plan unit, building pattern and morphological region.

Table 17: Chart showing a longitudinal comparative case study of urban morphology



In this study, independent factors gradually changed through time, in a long process that slightly affects the morphology of towns. Because each factor could be a research topic in itself, the historical backgrounds of urban morphology are kept constant. Thus, the duration of this study was insufficient to conduct extensive research on historical backgrounds along with the physical analysis. However, the elements and components are dynamic variables because they show and emphasize the physical changes through time. Although cultural values change slowly, the physical environment changes relatively rapidly. People's life styles, economic dimensions, and demographic changes directly affect the physical environment. Furthermore, in this study, these elements are not analyzed deeply because they are not within the scope of this thesis. However, tools are neutral elements that only help to measure factors and variables, and using these tools helps to measure the site survey research.

The explanation below details how the factors and variables are analyzed. As shown in table 17 above, the factors are explored under three headings: culture, socioeconomic and political system. The elements and components are analyzed under six headings: buildings, plots, streets, urban tissue, fringe belt and townscape. This table also presents details about the tools of this research.

4.3.1 Factors of the Study

Factors of this study have been analyzed in terms of historical backgrounds of towns, according to social, cultural and economic issues. The aim of analyzing the historical background is to understand the evolution of towns over time. This approach also seeks to determine the diversity of the civilization of towns to the current time. In the scope of this thesis, these factors are not analyzed or discussed deeply, but they are constant and have changed only slightly over time.

If these factors were considered to be changeable, another analysis and methodology would be needed, which it is not possible to include in this research because it would mean the development of another thesis. The research methodology for this part of the thesis was documentary research and literature survey.

4.3.2 Variables of the Study; Elements and Components

The elements and components of the study are the variables in this research because they can change rapidly during a specific period of time. On this basis, these variables may change according to people's needs as well as environmental factors.

All of the elements and components are related to Conzen's and Caniggia's method/approach, as discussed in chapter 3. In addition, section 3.3, discusses the similarities and differences of Conzen's and Caniggia's concepts. The end of the chapter synthesizes the two methods, which conveys the determination of the

longitudinal comparative case study methodology and also helps to analyze the cases through comparative study.

Elements contribute to understanding the physical formation of towns and are used to describe the typology of towns in 2D and 3D. Through the utilization of the elements of morphology, the aim is to determine whether this method would be applicable in different countries. In this context, morphological elements have been searched under six headings: buildings, plots, street, urban tissues, fringe belt, and townscape. All of these elements have the components as explained below.

Buildings: In the analysis of the buildings, the typological plans of buildings were studied, and generalization of the plan of building typology was attempted according to the components of the building: room arrangement, building material and structure technique. While studying the components of the building, first, the room arrangement and, second, the arrangement of windows and doors of buildings were analyzed. Moreover, the façade ratios and typologies have also been considered through the analysis of mass and void relationships, materials of elements, and elements of structure.

Plots: The aim was to analyze the plot size, its form and its relationship to the buildings on the plot. The ratio of plot to buildings and the relationship between them is found. The plot form is studied according to dimensions, which contributes to the understanding of the plot typology in general. Examination of the plot details also helps with understanding the historical process. In addition, the relationship helps with understanding changes in the plot typology within the town morphology, as well as the development of towns. Finally, the typology of the plots on the blocks is determined.

Street: The relationship of the building and plot series along the street has been analyzed to determine the street typology according to street width, building and street relationship, and pertinent strip characteristics. When analyzing the relationship between the street and the buildings, the first consideration is the relationship between the street line and the building location, for example, whether the buildings are detached or attached along the street line, and whether they are continuous along the street or create a niche. Another issue is to determine the street typologies according to building, pedestrian paths and plantings. This helps to determine the character of the pertinent strips of the street and understand them according to the route typology.

Urban Tissue: This analysis aimed to examine the urban block according to its character. Components investigated include plot characteristics, pertinent strip character, route types, and block types in terms of the typological process with the elements' aggregates. In addition, this analysis investigates the building position within the urban context and the building typology in terms of the tissue typological process. Within this context, the analysis contributes to the understanding of the impact of all of the components of the tissues of selected cases in the urban context.

Fringe Belt: This analysis seeks to evaluate the development of towns throughout the historical process. To analyze the fringe belt, it is divided into the inner fringe belt (IFB), the outer fringe belt (OFB), and the middle fringe belt (MFB). In analyzing the IFB, static elements such as wall, river, sea and green belt are considered. An MFB residential area is explored considering the institutional areas where the MFB border will be drawn. The OFB is analyzed according to static elements, green belts or areas, institutional areas and industrial areas.

Townscape: The analysis of the townscape aimed to evaluate the town development through history. The townscape was analyzed according to three components: plan unit type, land utilization and building pattern. The combination of the three components gives the townscape formation. According to plan unit type, the aim is to determine the development of the plot and building relationship through history until the current day. However, plan unit types also determine the evolution of the town block development. Urban land utilization is another component that would contribute to the understanding of the urban core development through time according to its functional distribution. This analysis aimed to distinguish how the form of development changed in terms of typological process. The building pattern is the third component of the townscape and explores 3D forms and 2D plan typologies through time as well. The combination of these three components determines the townscape development of the cases. In addition, the evaluation of plan unit type, land utilization and building pattern obtains the rank in the hierarchy of morphological regions that provide an understanding of the development form of the town.

4.3.3 Tools

Drawings, illustration, photograph and graph helps to support the analysis visually. It helps to explore the building façade in scale, plan and 3D drawings or illustrations. Graphs show the densities of related analysis. In addition to this it helps to shows the development of towns and summary of analysis. For drawings *Auto Cad* program is used to draw maps, town plan, building elevation and facades. In addition to Auto Cad drawing, *Trace Line* program helps to transfer images to drawing program. This provides a basis for a deeply analyzing the building façade, street silhouette and town plan in scale. In addition to this *3D Max* provide to draw 3D

illustrations and modeling town plans and other necessary drawings with materials. At the end, tools helps to figure out the components and elements characteristics as well as it facilitate visual research on research design. This part of the thesis aimed to built up the research design of the cases and it narrate how the cases are analyzed in systematic way. Table 18 shows the longitudinal comparative case study research design outline in this study.

Table 18: Research Method

METHOD	CONSTANT DETERMINANTS	METHOD OF MEASURMENTS
DESK WORK LITERATURE SURVEY	CULTURE	Examine on recorded documents and data from primary and secondary resources
	SOCIO-ECONOMIC	
	POLITICAL SYSTEM	
METHOD	VARIABLES	METHOD OF MEASURMENTS
SITE SURVEY FIELD SURVEY DESK WORK	BUILDING	Site survey ,map survey, physical analysis and documentary search
	PLOT	Site survey ,map survey, physical analysis and documentary search
	STREET	Site survey ,map survey, physical analysis
	URBAN TISSUES	Site survey ,field work, map survey, physical analysis
	FRINGE BELT	Field survey, map survey
	TOWNSCAPE	Field survey, map survey, documentary search

Chapter 5

TESTING AND APPLYING THE INTEGRATED METHODOLOGY ON SELECTED CASES: FAMAGUSTA AND LUDLOW

This chapter aims to present the application of the synthesized/integrated Conzenian's and Caniggian's concepts on Famagusta and Ludlow. In addition to this, it discusses the selection of cases. It intends to argue the effects of factors and variables of morphology on Famagusta and Ludlow. Firstly, it starts with analyses and discussion of the factors which are political, cultural, and socio-economic background of the two towns. Then it explores and compares the variables, which are buildings typology, plots, urban tissues, fringe belt and townscape.

5.1 Selection of Case

This part of the research addresses detailed information on similarities and differences of the selected cases. To this end, two different criteria have been established for the selection of the cases. The first criterion was focusing on two different cultures or civilizations in Europe, and the second criterion is concerned with how these cultures/civilization affect urban form in different parts of Europe. In this study, two cases were selected from the United Kingdom and Cyprus. The justification for selecting cases from these two countries is that the U.K. is located in the northern part of Europe whereas Cyprus is in the southeastern part of Europe, providing two opposite poles to provide an opportunity to understand the difference, if any, in terms of urban morphological characteristics of settlements a distance

apart. Another reason for selection of those cases was to find how different civilizations affect the urban form. One motivation to select the case from the U.K. is that Conzen studied that country on the geographical level and tested his work on Ludlow in approximately 1978. In his article (1988) 'Morphogenesis, morphological regions and secular human agency in the historic townscape as exemplified by Ludlow', Conzen discusses his works on Ludlow in the 1970s. Thus, Ludlow has been considered as a relevant case for future analysis for purposes of comparison. The old town in Famagusta is a good examples because of the heterogeneity of its civilization. Four civilizations have passed through the island: Latins, Arabs, Ottomans, and the British. This feature provides an opportunity to test whether this method could be applied on a case with a heterogeneous character. Thus, in the U.K. in Ludlow and in Cyprus in Famagusta, the walled city is selected for analysis. One significant reason to select Old Town Famagusta in Cyprus is its physical location and origin. It is a significant medieval walled city in north Cyprus, and it is one part of the town that borders the water. Additionally, it has fortifications. In the U.K., Ludlow exhibits the same physical characteristics as Famagusta, where which Caniggian methods were applied only in the CBD and Conzenian methods were applied in the whole town. The aim of this analysis was to systematize the findings and start to move toward the macro scale; in other words, to establish a principally inductive approach. Generally, 2D surveys have been applied to the whole town in detail, and 3D searches have been applied to the town center in detail. One reason to analyze the towns in two stages is their size. Ludlow is half the size of Famagusta. In addition, the character of the residential units of both towns as well as the middle fringe belt is not a significant element for performing typo-morphological analyses.

However, to measure the developmental process, the whole town should be analyzed to facilitate further research.

5.1.1 Similarities of Cases

To understand the similarities of the selected cases, the towns have been evaluated according to location and cultural, functional, periodical, and physical characteristics. *Physically*, both of the towns have fortifications surrounding them, which have survived until today. Additionally, the fringe belts have the same characteristic features in both towns.

The first concern is the water element. In Ludlow, the Teme River delineates one edge of the town, and it can be called one of the outer fringe belts of the city. In Famagusta, the Mediterranean Sea meets the edge of the city and could be considered as one of the outer fringe belts of the old town as well. The fringe belt development of the two cities shows the same characteristics, especially when considering features of the inner fringe belt and the outer fringe belt. Moreover, castles and their walls define the inner fringe belt in both towns, and fortifications define the outer fringe belts of the towns. In addition, the castles are located at the edge of the water features.

Periodically, both towns' origins are based on the medieval era. The characteristics of medieval towns were explained briefly in chapter 2. *Functionally,* at the beginning of the medieval era, the function of Ludlow and Famagusta was based on trade activity, and thee cities were important trade centers in their regions (Uluca,2006,p.22; Faraday,1991,p.43). Ludlow continues with the same function today, but Famagusta does not. Additionally, for a specific period in history, Famagusta became a military base rather than a trade center. Although they were

important trade towns in their histories, they have lost their popularity in recent times, although some trade activity continues.

When comparing building density, although the sizes of the towns are different, the towns have generally similar densities. Consequently, CBD size and density show the same characteristics, both with areas of approximately 1 km.sq. From the perspective of land utilization characteristics, the cities both have commercial activities in the core zones and religious enterprises that are located at the edge of the core zone. Residential functions surround the core. In addition, shopping and retail activities begin at the edge of the market square and continue in a linear organization along the street around the square. This organization is further discussed below.

5.1.2 Differences in the Cases

Differences in the towns have been determined according to cultural, physical, functional, and locational characteristics. *Culturally,* Famagusta shows a heterogeneous character, whereas in Ludlow, a cultural homogeneity through the ages can be observed. Thus, it can be stated that Ludlow presents a monocultural structure because the people share the same Anglo-Saxon cultural background. However, Famagusta's cultural background through the ages has changed, namely, as Italian, French, Ottoman, British, and Cypriot.

Physically, Famagusta is larger than Ludlow. Although density is the same, the size of Ludlow is one half the size of Famagusta. The Famagusta town plan is organic, whereas Ludlow has grid-like plan organization. However, some theoreticians have claimed that Ludlow has an organic plan (Slater, 1991; Larkham, 1991).

Functionally, the economic growth of the towns is an important factor related to town development. Ludlow's economy is based on trade, and it has had a strong economy throughout ages. Old Town Famagusta was occupied by many civilizations, consisting of are Venetian, Lusignan, Ottoman and British. After the British period, short after the foundation of the Republic of Cyprus, there was ethnic conflict between the Turkish and Greek Cypriots until 1974, and until that time, the economy was well, but after the war in 1974, the economy weakened over time. *Geographically,* the cities are located on two opposite poles of Europe: Ludlow is in northern Europe, whereas Famagusta is in southeastern Europe.

The findings and discussions reveal that analysis of town development and morphology in different parts of Europe provides the opportunity to test whether Conzen's and Caniggia's methods are valid throughout Europe. Table 19 presents a brief summary of the similarities and differences of the selected towns.

Table 19: Similarities and Differences of Famagusta and Ludlow town characteristics

	Similarities	Difference	
		Ludlow	Famagusta
Physical	Towns have got fortifications They have water features	Half time smaller than Famagusta Grid organization	Two times larger than Ludlow Organic pattern
Functional	They are based on trade activity	High economy	Low economy
Geographical	They are on the same continent	North Europe	South-east Europe
Periodical	Medieval origin		
Cultural/civilization		Homogenous structure Monoculture structure	Heterogeneous structure Cultural diversity

5.1.3 General Location of Famagusta Old Town and Ludlow

As has been stated above, the two examples were chosen mainly because both of the towns have fortifications and they are both of medieval origin. In addition, these choices have provided the opportunity to analyze two settlements at opposite

poles of Europe, as seen in figure 31, showing Famagusta to the east and Ludlow to the west.

Figure 31: Locations of Famagusta and Ludlow in the context of Europe

Within this context, **Famagusta** is the third largest city in Cyprus and is located on the east coast of the island in close proximity to the Karpas Peninsula with a view of Famagusta bay. The town is known for its harbor and old quarter, Varosha, which has been abandoned for more than thirty years now since the division of the island in 1974. However, Famagusta's beginning is clearly related to the castle as its pre-urban nucleus, which in its original smaller form most likely dates back to 1192. The Walled city's population today is approximately 2,500 (DPO 2012). Although the foundation of the town of Famagusta followed and was delineated by the building of the castle and the fortifications overlooking the Mediterranean Sea, the town is likely to be known for its fortifications, palaces and churches (Faraday, 1991, p.1). This town is important for marketing and trade activity and thus can be considered as a market town, especially during the medieval era.

Figure 32: Location of FamagustaFigure 33: Location of old town Famagusta

Ludlow is a small market town in the south of Shropshire, a few miles east of the Welsh border (figure 34.). However Ludlow's beginning is clearly related to the castle as its pre-urban nucleus, which in its original smaller form most likely dates from 1086 to 1094 (Conzen, 1988, p.263). The town's population today is approximately 7,700, but until the late 18th century, it rarely had more than 2,000 habitants (Loyd, 1984, p.5). Although the foundation of the town of Ludlow followed and was determined by the building of the castle on the ridge overlooking the River Teme, it is likely to be known by its place names, the layout of its roads, the fact that there were two or three earlier settlements (Faraday, 1991, p.1). This town is important for its marketing activity and thus can be considered as a market town, especially during the medieval era.

Figure 34: Location of the town of Ludlow Figure 35: Location of medieval Ludlow

5.2 Historical Background of Famagusta and Ludlow

Cyprus is an island, and throughout the ages, there has always been cultural interaction with other countries that have a shore on the Mediterranean Sea. Cyprus is located on the crossroads between Western and Eastern civilizations that serve as the hosts of many cultures. Therefore, old town Famagusta has a variable and mixed culture in its history. Until 1191, many civilizations had passed through the island, including Egyptian, Byzantine, and Arab. Old town Famagusta was sited to show the generative structure both culturally and socially from 1191 onward (Mango, 1984, p.8).

The history of the walled city dates back to the first century AD, and its development is structured on successive periods: the early period (648-1192 AD), when the foundations of the city were laid; the Latin period (1192-1571); the Ottoman period (1571-1878); the British period (1878-1960); the period of the Republic of Cyprus (1960-1974); and after the war (1974-). However, because of the lack of documentation of the previous periods, this study focuses on the 12th century (1464) aftermath called the medieval period.

In contrast, Ludlow's history dates back to the 11th century with the establishment of the castle at the edge of the River Teme. Its development is based on successive periods in the 12th century, as Conzen (1988, p.263) states: "Continent outside the area of Roman-Medieval settlement continuity, such pre or proto-urban settlements have been known to historians for a long time by various medieval Latin terms The 13th to 16th centuries are known as the Tudor Elizabethan and Jacobian periods; the 16th to 19th centuries are known as the Georgian and Regency periods; and the 19th to 20th centuries are known as the Late Victorian and Edwardian periods."Based on the above, old town Famagusta shows heterogeneous cultures, whereas Ludlow has shown a homogeneous cultural background. Although there have been different historical periods with different emperors, all of their backgrounds are rooted in British culture.

Table 20: Cultural Background of Ludlow and Famagusta according to time span

	Cultural Diversity	12th -16th century	16th -19th century	19th -20th century	20th -21st century
FAMAGUSTA	Heterogeneous	Latin period • Lusignan • Geneon • Venetian	Ottoman period	British period	Republic of Cyprus and Divided Cyprus
LUDLOW	Homogenous	Tudor Elizabeth period	Georgian and Regency Period	Late Victorian and Edwardian period	United Kingdom

Famagusta Old Town history begins with the Latin period with Lusignan, Genoese, and Venetian occupations. The **Lusignans** occupation of Famagusta was insignificant. With the exception of a tower, a bishop, and a place of pilgrimage, there is no other feature to be mentioned (Enlart, 1987, p.210). In the town, urbanization began with the Lusignans in Famagusta Old Town. According to Oldenburg, who visited the town during that period, Famagusta was known for its proximity to the coast with a good harbor and as a lightly fortified city (Cobam,

1969, p.96). The last crusader, whose territories in Syria and Palestinian were conquered by Mamluks, turned Cyprus, especially Famagusta, into one of the most important trade centers in the Mediterranean region (Mairer, 1968, p.88). With this development, Famagusta became an important site for Western merchants who migrated from the war (Enlart, 1987, p.210) and a node between east and west. In addition, the half circular form of Famagusta bay provides an opportunity for ships to anchor at the harbor in safety, which was an important quality during that period. Another reason for the increased importance of Famagusta was the rigid ban dictated by Western Pope on trade with Mamluks (Makarias, 1932, p.80). However, Cypriots could sell and exchange their products with all nationality. Because of the increase in trade activities, Famagusta became one of the most important and prosperous trade centers in the region. Thus, the glorious life style has reflected the prosperity of the town (Makarias, 1932, 92-95)

Population growth has been another important issue in the development of the town. Migration to Famagusta brought cultural diversity to the town, and overcrowding created a need for more land. The efficiency of the feudal system increased during those times (Edbury, 1995a, p: 357), and with these developments, the city was in need of stronger defense against exterior forces (Edbury, 1991, p.120). It should be noted, however, that during this period the Black Death was responsible for a population decrease in the labor force of the town as well as a decay of the buildings.

> "Island concurred by **Genoan** in 1373. 'In the 14th century the Lusignans had to face the growing influence of Genoa and in 1372 the Genoese took the city by surprise and it then remained in Genoese hands until 1464 despite numerous attempts for its recapture by the kings of Cyprus. Nicholas Martoni describe the Famagusta during his trip in those years; "the city of Famagusta is as large, I reckon, as Caupa and has fine squares and houses very much like those in Capua, but a great part, almost a third, is uninhabited, and the houses are destroyed, and this has

> been done since the date of Genoese lordship.' The gradual involvement of Venice, in support of the Lusignans, resulted in the liberation of Famagusta. The Venetians provided King James II of Kusignans with a Venetian queen, Caterina Cornaro. On his death Caterina assigned all important posts to the Venetians and in 1489 she handed over the island to the Venetian Republic (Doratlı, 2011, p.65)."

In her presentation at the XIII Annual Meeting of The Europa Nostra Scientific Council, Belgrade-Serbia, Doratlı argued that the fortifications had been barely started by the Genoans.

> "Considering the city before Venetian period from fortification point of view, based on the argument of Bishop of Oldenburg, G. Jeffery stated in his book 'Historic Monuments of Cyprus' that in 1211, the small town has been slightly fortified (Jeffery,1918, p.101). According to G. Perbellini, Henry II of the Lusignan dynesty founded the castle in 1310, but did not complete it (Perbellini, 1988, p.21). Until and during the Genoese occupation of the town (1372- 1464), there has been some improvements in the defense system of the town. During this period, the city is said to have finer walls, high with broad alleys round them, and many and high towers all round" (Jeffery, 1918, p. 102).

According to the travelers in the city at that time, the city was in ruins, and most of the buildings were in decay. With an exception of one or two merchants, the rest of the inhabitants were associated with agriculture (Arbel, 1984, p.188). In later periods, Venetians made some improvements in the streets and kept them clean. People who came from abroad stayed in quarantine for a period and were then allowed to enter the city. The main square was famous in the region for its marketing activity (Jennings, 1993, p.236), which took place between the sea gate and the land gate (figure 35).

Figure 35: Drawing of Famagusta Walled City

Enlart (1987, p.462) describes the square as a marketing area that brought all of the town's inhabitants together with the traders. St. Nicholas Cathedral was at the edge of the square, and the palace was located opposite the church. These two important buildings delineate the borders of the square. The trade activity continues on Abdullah Pasha Street and Namık Kemal Street, which provides the main link to the land gate. A Gibbelino engraving shows that Ali Pasha Street was another important route for trade activity in those years (Uluca, 2006, p.91).

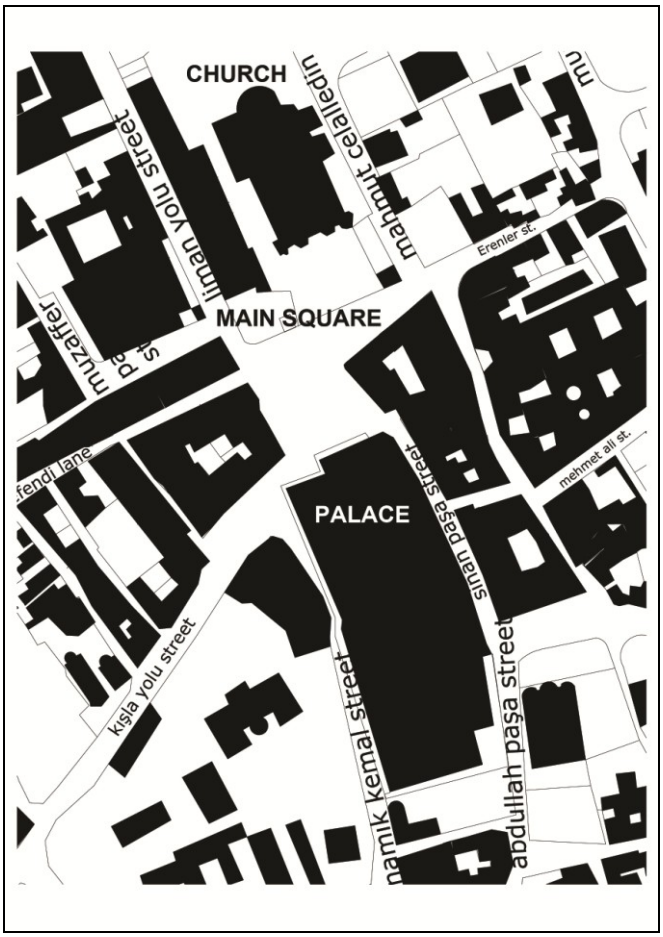


Figure: 35a Illustrative drawing of town centre

In addition to those streets, Liman Yolu Street and Erenler Street are the most lively trade streets because of the proximity of the sea gate and the main square. Venetians tried to improve the deteriorating conditions remaining from the Genoian occupation. First, the Venetians turned Famagusta into a fortified city as a military base. 'The Walled City dating back to the 15th century, is a superb example of a fortified Medieval city with its bastions, citadel (Castella), moat (cut out of solid rock), Sea Gate (Porte del Mare) and Land Gate (Ravelin)', according to Önal et al. (1999, p.335). Increasing threats pushed the Venetians to make the defense stronger than before. A city council, composed of people of various professions, was established to protect the well being and affluence of the people of the city. Because of this inflection point, the city needed to defend itself from outsiders. Most of the

militaristic buildings and fortifications were built during this period. The construction of those buildings brought another population to Famagusta (Arbel, 1984, p.200), although trade and militaristic activity continued. This period is also known for the Black Death, which caused a major decrease in the city's population. To overcome this diminishing population, Venetians brought additional people from its colonies to Famagusta. In addition, Syrians, Jewish and Cypriot villagers migrated to Famagusta, and the population began to show more heterogeneity than before, which led to an economic stability in the area around the old town, where there had been swamp areas that facilitated the spread of the Black Death.

Venetians improved the public facilities of the town and rehabilitated the old town. With those improvements, the city became more livable and wealthier than before. But Famagusta needed new social and economic activity. Therefore, Venetians created attractive opportunities for living in Famagusta, attracting immigrants from Syria and other Venetian colonies to the city. With these changes, many Venetian ships began passing through Cyprus, which brought improvement to social and economic relationships (Arbel, 1984, p.184). The port of Famagusta became one of the most important trade areas on the island during this period, and Famagusta attracted many traders. This improvement caused an increase in social interaction as well.

When the **Ottomans** occupied the island, there were two major issues. First, Christians were forced to move out of the town. Second, the harbor at Larnaca became more important than the harbor at Famagusta. As a result, the prominence of Famagusta, as well as its population, began to decrease (Maritti, 1971, p.67& Hill, 1952, p.248). During that period, the Christians only visited the town during the day. According to Turner (1815), there were only three Christian families who were living

in town. Christians, who were banished, moved 3 km away from the town, and they settled in an area called Varosha. This area was known for its fertile soils and healthy conditions, especially its wetlands. This movement of the population directly decreased the economic liveliness of the Famagusta. New families were brought to the town from Anatolia, but were not enough to fill the empty buildings. The people who came to Famagusta from other countries did not stay long in the town because of the deteriorating health conditions and low population (Erdoğru, 1994, p.215-218). The privileges for foreigners in the Ottoman Empire at the port of Larnaca exerted a pull on all trading activities to this area (Jennings, 1995, p.265). With this development, the use of the harbor at Famagusta decreased. Frequently recurring Black Death and earthquakes also had a negative effect on the city. Additionally, the marshes at the mouth of the Pedios River contributed to the spread of malaria, and during the Ottoman period, this issue was ignored as it was during the Venetian period, and the disease became an increasingly serious problem (Dixon, 1879, p.279). In 1573, the placement of Muslims together with soldiers changed the identity of the city as a military base. In later years, security in Famagusta intensified, and the city became a place of exile and an open prison. Most of the buildings and urban open spaces were used for this purpose (Dixon, 1879, p.215). As a result, economic activities declined to the point that they were insufficient to sustain Famagusta, which was transformed into a small village rather than a city (Stewart, 1908, p.62). Varosha became more crowded than Famagusta, and the region became more popular for production during this period. One important improvement during that time was a change in the backbone of the street system, and Istiklal Street become the main street of the city. The streets that were near the port started to lose their efficiency.

In 1878, the Ottomans acquired the island, and the island became a true colony of the British Empire in 1910. From a cultural point of view, this has been a turning point (Zia, 1953, p.137). As a result of the rehabilitation of the island in general, the population of the island has increased from 185,630 to 578,000 (Angelides, 1996, p.224). During the British era, Famagusta started to regain importance in terms of economic and physical development, which led to an increase in population as well (Horn, 1960, 103). In addition, re-development of the harbor and the city began in 1878. Within the following months, Famagusta law came into force. With this development, streets, open spaces, and the improvement of buildings, new construction or reconstruction, hygiene and clean, properly conducted work were provided. This law made available streets, open spaces, clean and dirty water channels, regulation of the port, clean and more advanced navigation services, and a new railway terminal (Hafızoğlu, 2000, p.55). During this period, the railway both supported the port activities and provided easy access to other cities in the region. The marshes were dried and rehabilitated, telegraph and telephone facilities were brought to the town and public facilities such as schools and hospitals were also provided.

Two important issues directly affected the town's development. First, the underutilized port of Famagusta regained its importance on the island, which brought economic improvement and a population increase in the town. A few new gates have been opened in the fortifications, which have provided improved access to the town.

Second, British regulation of the streets brought significantly changes to the street pattern in the town. Some cul-de-sacs were connected to other streets, and some new streets were open parallel to one another. Schools, a library, a covered

market, a police station, and warehouses were built during this period. Most of the agricultural areas were divided into plots for public use (Uluca, 2006, p.205).

With the establishment of the Republic of Cyprus in 1960, Famagusta Municipality was divided into Turkish and Greek Cypriot administrations. Famagusta Walled Town was under the rule of Turkish Cypriots, and all other parts of the town were ruled by Greek Cypriots. In 1963, the governance of Famagusta began to experience problems between Greeks and Turks both socially and administratively, which resulted in conflicts between two communities. In the following year, civil war began. The Turks migrated from their villages to the old town, and this continued until 1974. After 1963, a decrease in the efficiency of the Turkish representatives in administration issues led to an economically unbalanced situation between the two communities. Because the Walled Town was congested at that time, some Turks moved out of the Walled Town to nearby areas such as Sakarya, Baykal and Karakol districts (Keshishian, 1985, p107).

With the war in **1974**, the island was divided into two parts: the southern province, where the Greeks lived, and the northern part, where the Turks were settled. Two years later, the *Turkish Cypriot Federal State* was established. After the war, Greek Cypriots who were living in Varosha left the area, which has been uninhabited since then (Doratlı, 2000, p.201). During the adaptation process to the new situation, Famagusta old town suffered from impacts of the war. The activities of the port have decreased as a result of the war, and the overcrowded population of the Walled Town began to move outside the walls, which caused a decrease in the population.

After the establishment of the Turkish Republic of Northern Cyprus in 1983, the northern part of Cyprus was faced with political embargos, and this has affected

Famagusta old town as well. During those times, there were no significant changes in the city because the structure and form of the city was completed. In recent years, a few urban regeneration projects have been implemented in the historical core of the town.

Ludlow was built as a purpose of military campaigns in the **Tudor Elizabeth Period** during 12th and 13th century with Wales (Faraday, 1991 p.17). During, **Tudor - Elizabeth period (11th -12th C.) ,** political system has affected the Ludlow formation. In the mean time significant transformation in their political capital since the days of Henry II had affected English towns in the general overflow of economic development to become understood as important origin of income by monarchy and other feudal system.

In those time, military governance was more powerful than the Feudal system. Both church and government ruled the burgage around the Ludlow and took high taxes from citizens as well as landlords within Feudal system (Faraday,1991;33).

In **Ludlow** as seen in table 20 cultural factors had shown similar characteristics to each other. One of the reasons is that all cultures that passed through Ludlow were based on the same origin. Before 11th century there was no direct evidence that shown some clue about the establishment of nucleus settlement (Hal Dalwood). In 11th century Lacy family settled on the land of Ludlow and started to build up a castle. In 12th century, Toudor Elizabethan and Jacobean period has been started. This name has been taken from the period in which kingdom had conquered the town. The castle had been enhanced, and other families were moved to the town from middle part of UK. (Taylor, 1978). **In Ludlow,** Castle and its surround were built around 11th century. Town walls had been completed at the end

of 11th century and beginning of 12th century. During this period, although it was built for a militaristic purpose, mercantile activities had been continuing within the walls (Faraday, 1991:1). During, those times two families lived here who were of Anglo-Saxon origin. Out part of the castle was called Dinham which was the rural part of Ludlow in that era. Its economy was based on wool and cloth (Conzen,1988, p.268). In addition to that, Ludlow's booming economy and increasing concentration of personal wealth in the thirteenth century created a lively property market in the town centre. The massive and protracted works fortunately coincided with a period of economic prosperity and religious piety, expressed in corporate and personal liberality towards the church. The ordinary income of the church would never have been enough. The church has reminded as the formal centre of civic life in that time. Although there were other centres of activity like guilds, the market and house- none of these had the universal or emotional appeal of the church (Faraday, 1991, p.55). Marketing activity was expanded around the town centre like Mill Street which was functioning with silk industry and shops (Lloyd,1984, p.25).

On the other hand, all burgage holders paid a standard burgage rent to the manorial lord, which in Ludlow was twelve pence for a full burgage, with larger or smaller plots. Until 1461 this burgage rent was paid to the Lord of the Castle, but when in that year the whole manor except the castle was transferred to the newly incorporated borough, these rents became payable to the Corporation (Lloyd,1979, p.2). In addition to this, Guild was founded in the mid-thirteenth century, partly as a mutual benefit society, and partly to provide chaplains to perform masses for the souls of departed members and to pray for those still living. The guild was initially financed by rent charges on properties, latter known as sock rents, which were generally granted in perpetuity (Faraday,1991, p.85).

Socio-economic development, in the same period began to gather giving and augmenting perceptible view of the developing urban community and its principal oligarchy of rich wool and cloth merchants (Lloyd,1984, p.15). By the early thirteenth century Ludlow's filling factory was recorded and by 1273-8 the town was to export wool (Weyman, 1972, p.27). Wide experience and foreign resources had accessed to specific information on urban affairs like the plan technicality of Narrow Lane, while connection in the corporate self-government of Ludlow and in their own land capitals gave them a risk in the economic ability of the townscape. In this advanced, socio-economic background of the thirteenth century town has stated in the characteristic townscape habitués of the new streets called Broad Street and Mill Street layout (Faraday, 1991, p.108).

During the **Late Medieval period (16-19 century)** that is named asbGeorgian and Regency period, military significance of the castle was reduced (Faraday, 1991, p.96). According to Faraday (1991, p.96), the battle of Ludford was fought between Yorkist and Lancastrian forces in 16th century and this was followed by the sack of the town. After that, town had a corporate borough system in the mid of 16th century.

During the ***Georgian and Regency era,*** political system has started to be more flexible as the church and the government tolerated a free burgage for lords and high class families in order to provide more development areas in Ludlow walled city (Faraday, 1991, p.19). In addition to these, castle became an important power base for barons political activities (Loyd, 1984, p.20). At the beginning of 13 century the development of chapels and chantries in the church, each with its endowed chaplains,, became politically important in terms of the religious impact of the town (Faraday ,1991, p.55).

In this period, the structure of society has been changed. Medieval association *society type* individual as a rule acted not so much independently but rather as a member and under the effective protection and control of some corporate body or bodies or persons to which belonged (Faraday,1991, p.137). But they carried the extension of previous society's cultural background.

In those times the close commercial ties between Bordeaux and Bristol. Ludlow is the main commercial route by which Gascon wine reached Bristol. All the towns within the drainage basins of the Severn and its tributaries; similarly, hides, wool and cloth from the central Welsh Border could reach Gascony (Conzen,1988, p.267). The idea of the bilateral back lane could have travelled to Ludlow by the same route which made it important in this period. With this changes, military-based culture began to replace the commercial culture but their cultural origin was still the same which is Anglo-Saxon.

In Late ***Vicotrian and Edwardian period (19th-20th C.)*** political transformation, individual initiative would play a greater part in the development of the townscape of the Old Town. In addition to this church efficiency became lesser than before and it starts to give its place to lords or barons of the town and also they were controlled by the Guild (Faraday, 1991, p.55). With this change liberalization in the ownership of land started to give opportunities for users for independent land management (Weyman, 1972, p.34).

The period between 19th – 20th Century (Late Victorian and Edwardian) carried the same cultural background as Georgian regency. In those times the organic products was important in the UK and also Ludlow which was one of the important organic product centers. So within the cultural exchange Ludlow lived the trade culture peak times in 20th century.

Although militaristic cultures left its place to trade culture general cultural background of town is British originated.

In that era the development is situated on the unimportant Welsh border railway line in a productive agricultural region without any important industrial resources. Ludlow has been by-passed by Victorian industrialisation and has shared in its changes and growth symptoms only in terms of a modest, but socio-economically secure country town and central place for the small region around it. During this period working class population was housed partly in the Old town, some of them lived out of town walls on the large burgesses backyards or plot tails (Conzen,1988, p.271).

In this period shops started to be distributed not only on the specific streets such as Mill Street and Broad Street but also they were started to locate themselves all around the town and two or more shops being next door to each other which is not seen before (Lloyd,1984, p.97).

During the ***United Kingdom period (20th -21st C.)*** , political system started to change slightly, at the beginning in the century, Mayors started to govern the town but this does not means that the church and landlord system totally changed however it lost its efficiency (Wright ,1972 p.208). Socially and culturally form of the town has not changed. In that period some of the housing areas spread out of the old town because of the need for of land. With this development, the bulk of new residential accommodation however has been provided outside the traditional town and thus there is little replacement of houses with in the Old Town. The business centre, although on its medieval site, likewise has had few replacements of commercial or administrative buildings during the last 150 years. Lifestyle of the town shows some changes because of the requirements and changes of the mode of production. Today

Ludlow is known by its organic handmade products whereas in history it is known by its wool cloth production. Like Famagusta, Ludlow Old Town is completes its development in the beginning of 20th century.

5.3 Urban Morphology of Famagusta and Ludlow

This part of the study aimed to analyze the physical data of Famagusta and Ludlow through utilizing the integrated methodology, which has been presented in chapter 4.3, under six main headings which are (a) Building, (b) Plots, (c) Streets, (d) Urban Tissues, (e) Fringe Belt and (f) Morphological Region.

5.3.1 Building Typology of Famagusta and Ludlow

According to Caniggia building typology can be analyzed from the basic genetic units of building through the complex units of it. Within this context plan typology and façade typology become important components that help to understand the typological process of buildings. In order to understand the plan typology, spatial organization has been taken into consideration on the main proto type of each period. While analyzing the plan typology only the residential buildings had been analyzed. Although there were some other public and religious buildings which survived until today, they are only few in numbers to give any opportunity to compare their typology within themselves. House plan typology has been searched on 5% of houses. The selection of the samples is done randomly. While this selection is done, condition, originality and location of the houses, is the main cconsideration. There are some difficulties to get into the houses because of privacy.

On the other hand, façade analysis has been done in the historic commercial core which is preserved until today. Simply because : (i) both town cores' genetic

plan unit are of medieval origin, (ii) in both cases cores were first established and they are preserved until today.

5.3.1.1 Plan Typology

In ***Famagusta***, plan typology can be analyzed under 4 periods which are early medieval, late medieval, pre-modern and modern. Early medieval period was starting with Lusignan and end with Venetians which is named as Latin period in Cyprus. While considering plan type in early medieval time it has been determined that only 3 houses survived until today. Othello castle was the main urban nuclei in that period.

Plan types in ***early medieval*** time (Latin); base type mainly, is composed of two rooms adjacent to each other and service spaces are located out of the building.

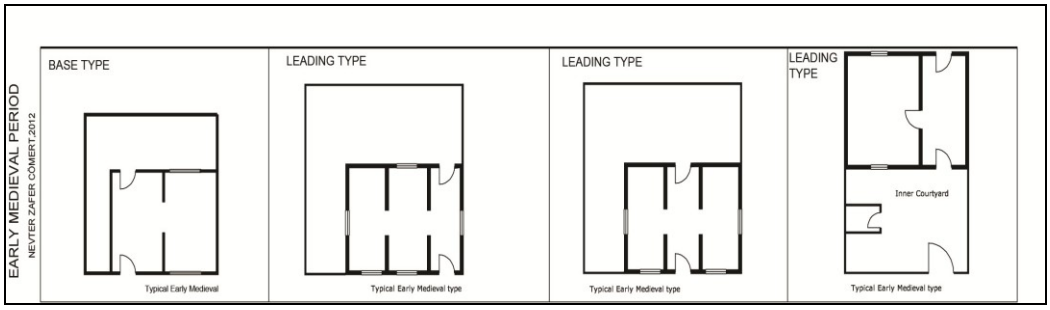


Figure 36: Latin medieval plan typology

In that time most of the buildings were surrounded by walls, which defined the fringe of plots (Dağlı,1998). But they do not exist anymore. The later developments of those housing types are based on that typology. As seen in figure 36 leading types have emerged from the base type. The entrance of a building is locate at the middle of arrangement and two rooms take place on the right and the left. In the other types, entrances are located either on the left or on the right corner of the building and rooms come together side by side.

In the late medieval time, which is the *Ottoman period;* mainly, service space and main building are located in the courtyard. Service space and main space are separated from each other in the courtyard.

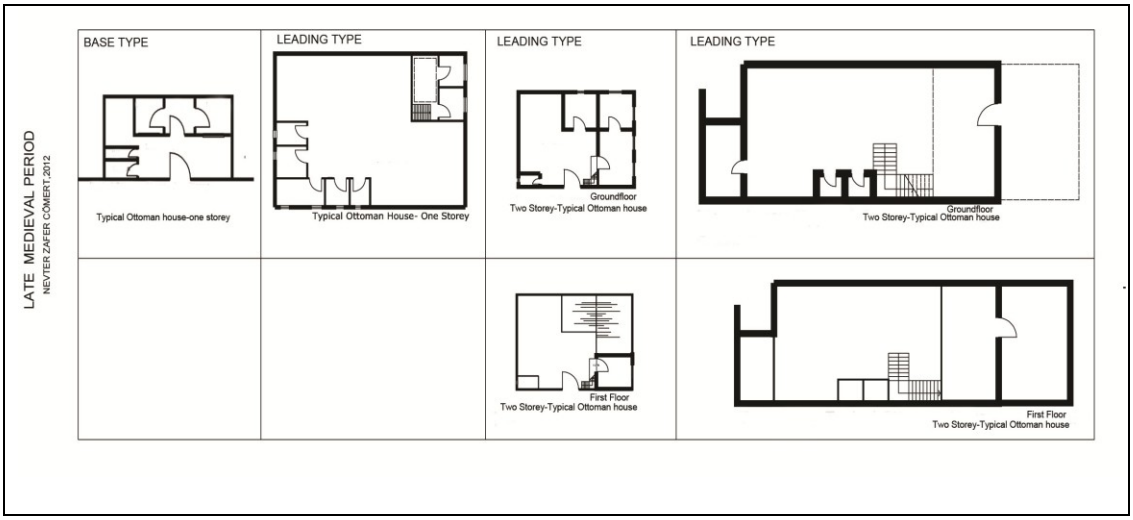


Figure 37: Famagusta Late Medieval Ottoman plan typology

Figure 37 shows the basic types of the houses and rooms arrangement. In the base type, there is no direct entrance to the building from the road. High walls create a border to the building or the courtyard. Buildings are located in-between the walls and all room arrangements surrounds the courtyard. In that time two story buildings started to be built. Two storey buildings emerged from base type. Again they were locating in the courtyard. Their main entrance was named as the sofa and two rooms were located on the ground floor. Two rooms with a sofa were located also on the first floor. The circulation between two floors has been provided form courtyard. Similar to the Latin period, their service space is not connected to the main functions.

Pre-modern time is named as the *British period*. It can be separated into two parts which are early British Period (1878-1930) and Late British Period (1930-1960).

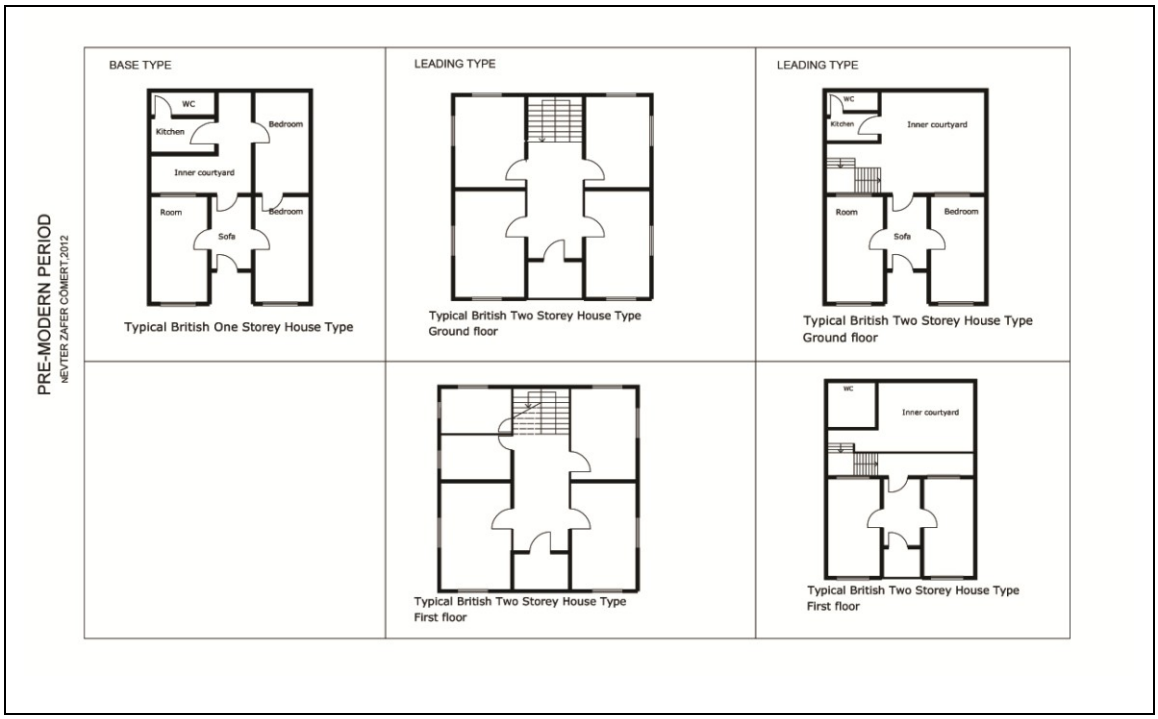


Figure 38: Famagusta Pre-modern British plan typology

In the early British Period, base type shows similarity with the Latin base type. British ones are more complex or have more additional rooms and bigger scale than Latin. Still their service functions have been located on the courtyard like Latin and Ottoman. Two storey buildings' stairs take place in the courtyard at the earlier times but on the second period, they were placed in the building and courtyard concept becomes a backyard (figure 38). All services and circulation areas have been designed in buildings especially in the second British era. Base plan type of first and second British period is very similar to each other except the service space and vertical circulation. Room arrangements were similar with the early British period with their upper stair room. Generally their entrances are in the mid of the building and two rooms are located on both sides. Kitchen, wc, stairs and other room are located on the back side of building. If it has upper floor, sofa, two or four rooms are located on the upper floor.

Modern Time starts with the independence of island. This period has been divided into two periods based on two important events. The first one was the independence of island and the second one was the war in 1974.

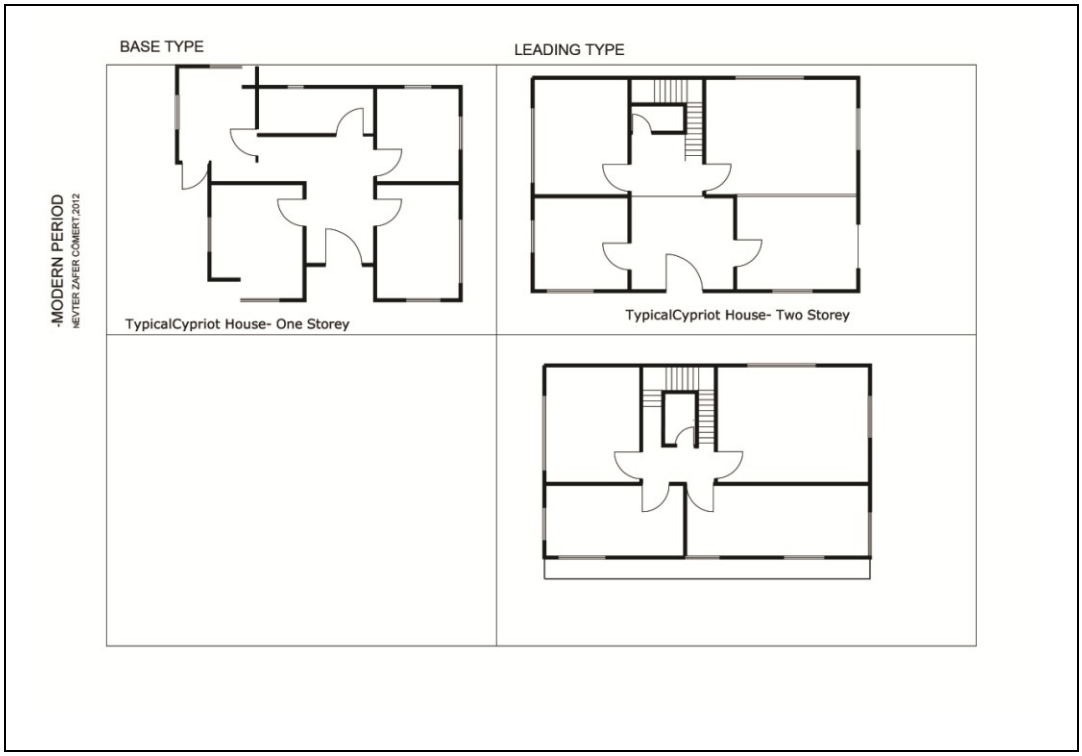


Figure 39: Famagusta Modern Cypriot plan typology

Önal et.al (1999, p.341) stated that "the intervention is one of the important turning points for the city of Famagusta, after the war in 1974, until the 80s, the thresholds and constraints were dramatically changed, and urban form was also affected negatively". This caused to fulfillment of the empty lands without considering the traditional background of the buildings. Numan et.al. (2000, p.342) states that one of the significant changes in that period is the building typologies which reject the traditional impacts. Generally buildings do not show similar form character. Several different architectural elements which come from history is used on buildings. Their base type is similar to Latins' but without any wall. Their service spaces are in the houses like the British. Most of them are attached to each other.

Basically they were leading type of the British but service area has another access to its pertinent area. Their size is bigger than others as well.

As seen on figure 39, the plan typology of this period has been influenced from the early medieval time base type plans. But at the late medieval it turned into another formation which can be named as courtyard houses. Their typology is different than early medieval period. One of the reasons of this is the cultural background. Accordingly, all of the facilities held in private sapace and service areas is separated from the main building. In pre modern time, plan units are directly influenced by the early medieval period. As seen in figure 39, entrance has been located in the middle of the building and two rooms aligned surrounded the entrance. Kitchen and one more room and toilets took their place at the back side of the building. In modern time same style has been continued with small changes but basically it carries the same typology of British. In summary except late medieval, all plan types are influenced by the early medieval period until today.

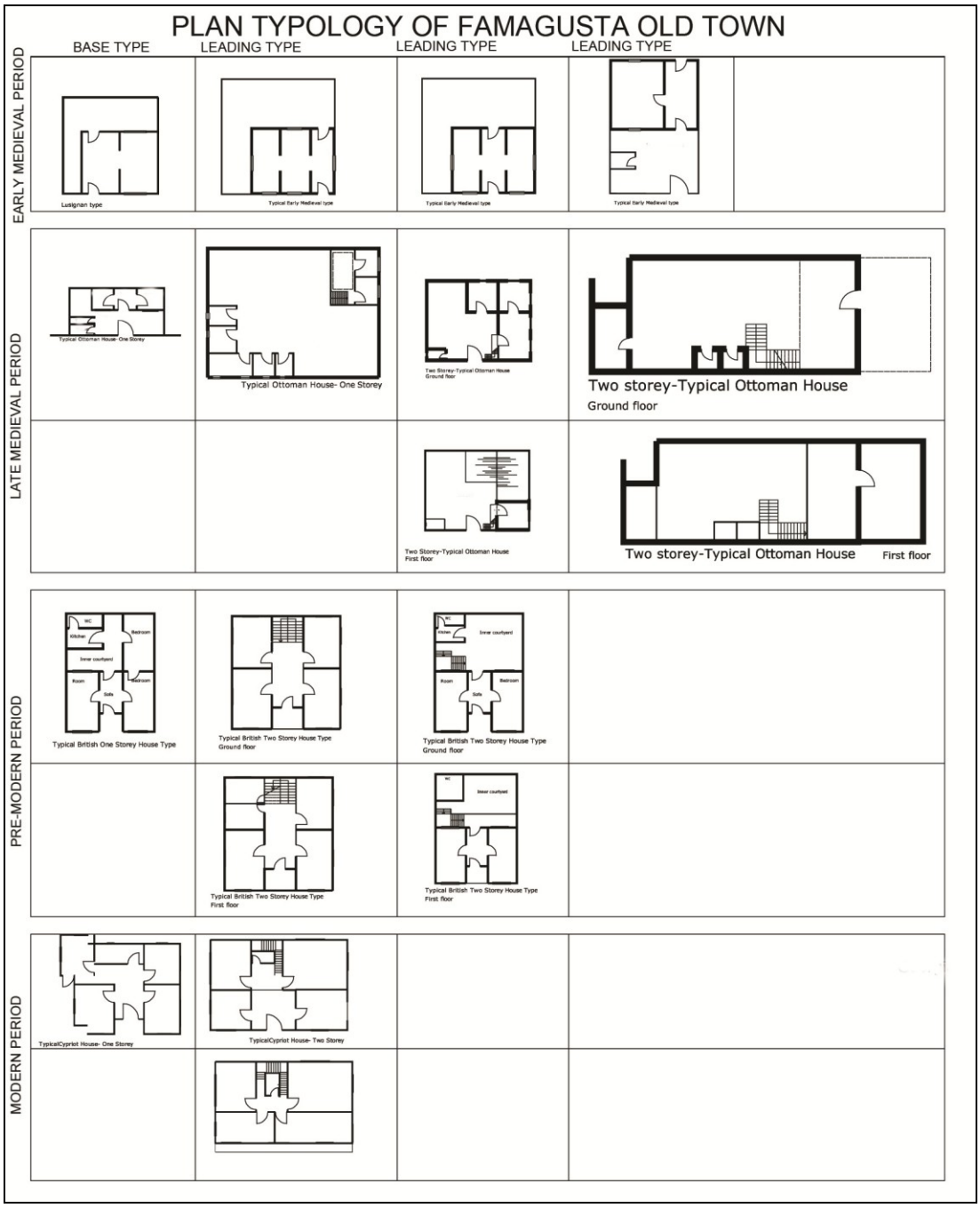


Figure 40: Famagusta housing typology

In ***Ludlow***, plan typology can be analyzed under 4 periods like Famagusta which are early medieval, late medieval, pre-modern and modern. Early medieval period started with Anglo-Saxon British. While considering plan type of the early medieval time, there were few houses, which survived until today. Ludlow was the main urban nuclei in that period. Additionally, there were a church, a hospital, a town hall and schools (Faraday, 1991, p. 89-93).

Plan types in ***early medieval*** time in Ludlow, base type mainly, composed of two rooms parallel to each other.

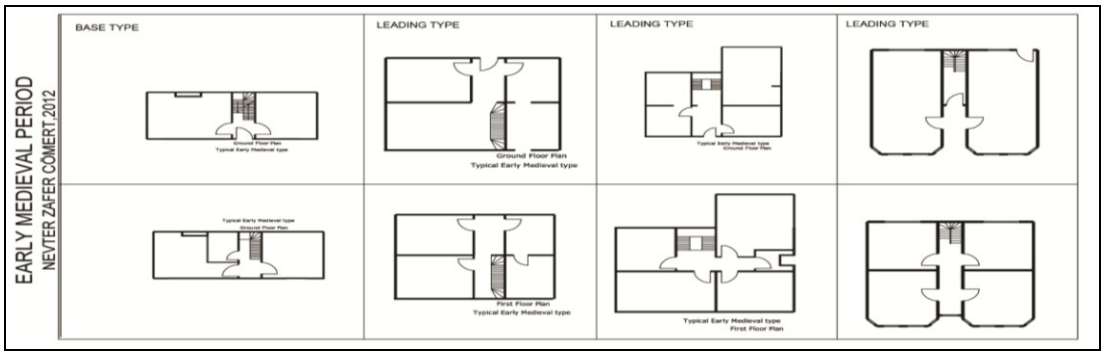


Figure 41: Ludlow Early medieval plan typology

Entrance to the end of a long narrow corridor, a hallway, and the stairs can be reached at the end of this corridor. Service spaces like a kitchen or storage has been located at the basement. Usually first floors were similar to the ground floors. The later development of those housing types based on this typology. As seen in figure 41 leading types emerged from the base type. The entrance of a building is located in the middle of arrangement and two rooms or four rooms or integrated rooms take its place either on right or left side of entrance. Sometimes half hexagon extensions on the front façade have been followed. One of the important characteristics of the early medieval houses is the integration of the shops with the buildings. Usually, shops are located on the ground whereas kitchen, living room and study room takes its place on the first floor. Cellar and storage were located on the basement floor. Second floor consist of bedrooms and bathroom. Those types of houses has surrounded the market square in medieval era.

In late medieval time, (*Tudor-Elizabeth Period);* the most dominant characteristics of building elements different than previous period is fireplaces and chimneys which were more common, and staircases featured more prominently.

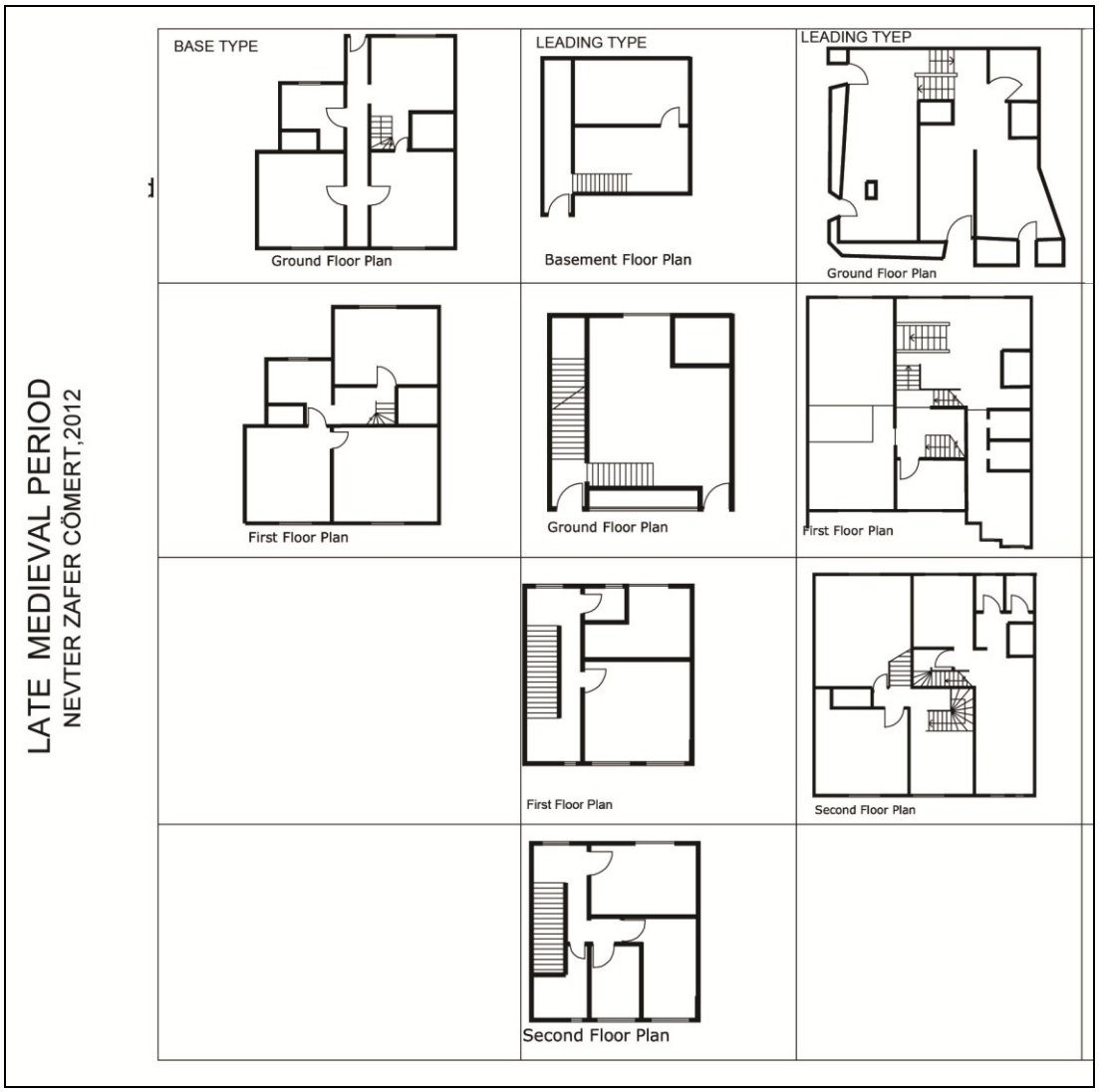


Figure 42: Ludlow Late medieval Tudor-Elizabeth plan typology

Figure 42 shows the base type of the houses and rooms arrangement. In base type, Entrance to the end of a long narrow corridor, a hallway, on either side of the hall were the living area, the kitchen, dining room and stair case. Upper floor rooms were arranged around the hallways. Rests of the types in that period emerged from the base type.

On the other hand, some of the buildings, which accomodate multi use as housing and shopping, have created another base type. In this type, basement floor was used as a cellar, kitchen and storage, where all rooms are located side by side. On the ground floor plan there is a direct entrances to shops. Vertical circulation that

reached the upper floor took its place at the rear part of the building or at the end of the corridor or passage way. All of the functions are arranged along the main bone that can be named as passage way or corridor on the ground floor. Leading types have emerged from this type with the addition of rooms along the axis. Again the upper floor is arranged around the corridor as well.

Pre-modern time, (*Georgian and Regency period)*, It can be stated that it takes its plan typology from the early medieval period, and similarly the entrance to the end of a long narrow corridor, a hallway, the stairs can be reached at the end of the corridor. Leading type plans are influenced from the base types. Like medieval plans, some of the parlour has got the half hexagon bay.

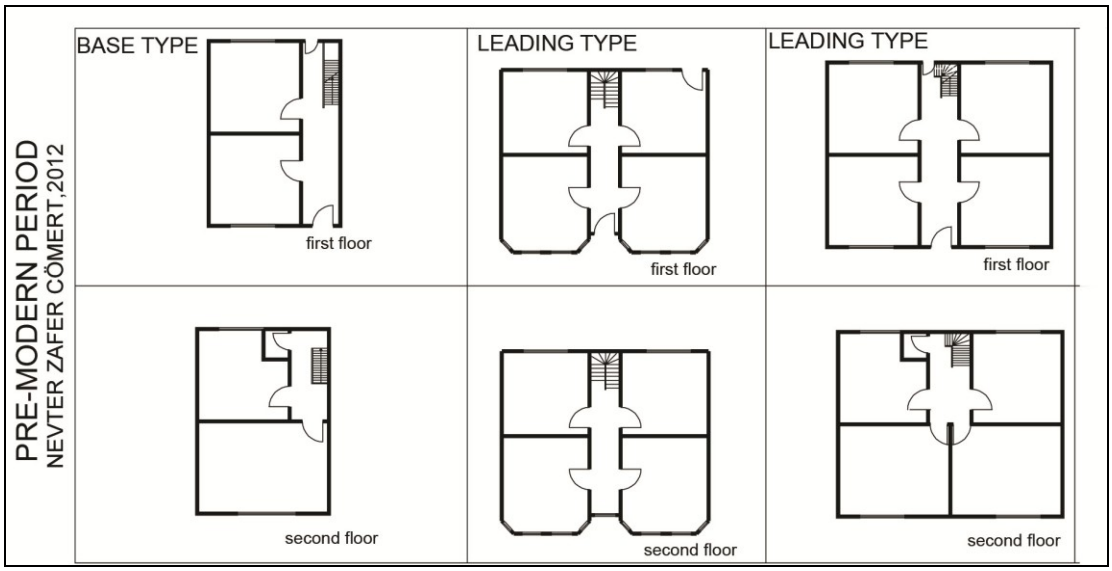


Figure: 42 Ludlow Pre-Modern Georgian-and Regency plan typology

The first floor typology based on the ground floor base type with narrow long corridor and two rooms on the left side and two rooms on the right side as well as bathroom and auxiliary functions takes its place on the corridor. Generally other types of plans are generated from the base type. Sometimes rooms' arrangement takes place around the hall where the vertical circulation is also located.

Modern Time is starting with 20th century (Late Victorian and Edwardian period). In that period similar to others, base type of the buildings were same.

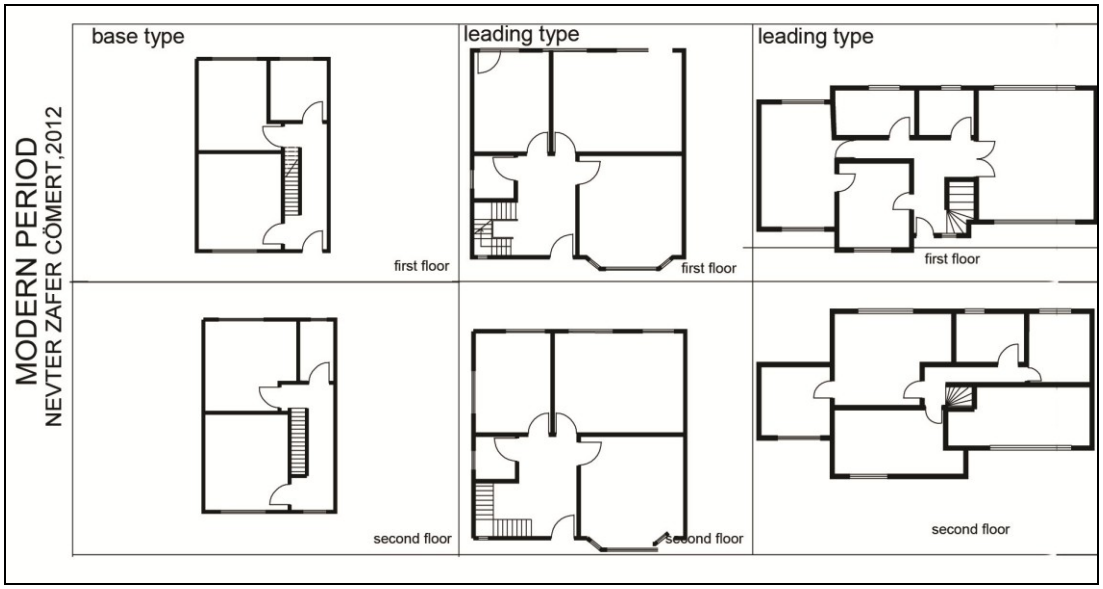


Figure 43: Ludlow Modern Late Victorian-Edwardian plan typology

There is an entrance patio facing the corridor and all rooms take place along this corridor. Stairs are located near the entrance. There is no relation with the ground floor spaces. At the first floor, all rooms are located around the corridor ways. The leading type of the ground floors or upper floors is the extension of this base type.

As seen on Figure 43, the plan typology has been influenced by the early medieval time base type plans. But at the late medieval, it turned into another formation, which would have been a result of the Civil War. The building typologies became larger than the previous ones and families started to live with their relative together. During this period, importance of trade activity has increased. Usually all of the ground floors were used as shops and upper floors were used as living spaces. In pre modern time, plan units were directly influenced by the early medieval period. As seen in Figure 43, the entrance faced the long and narrow corridor and at the end of the corridor stair ways took place. Generally, room arrangement shows similarities

with the medieval period base and leading type. In modern time, same style has been continued with small changes, but basically it carries the same typology of previous periods except the dominance of the half hexagon parlour types. In summary except late medieval, all plan types influenced by the early medieval period until today.

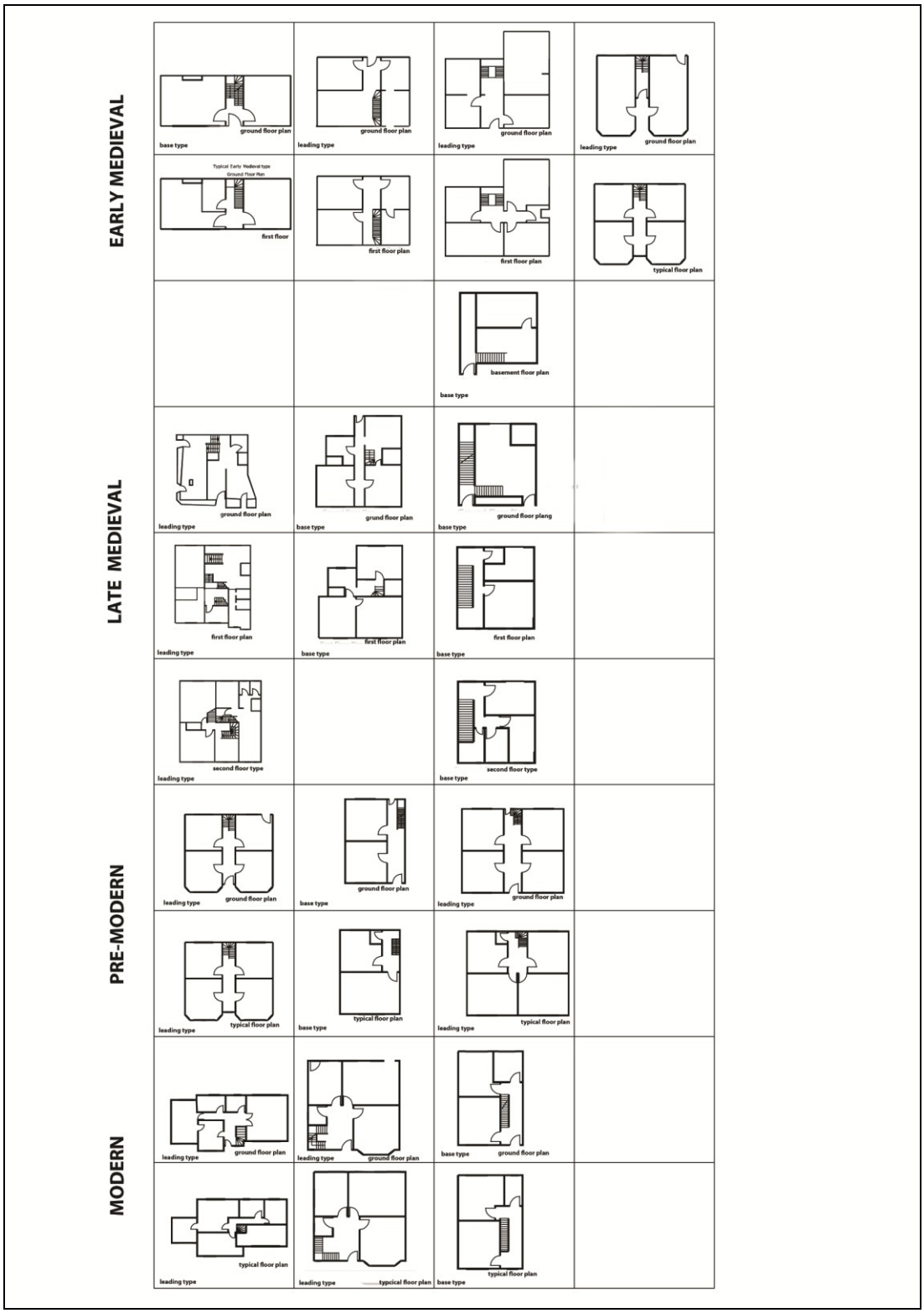


Figure 44: Ludlow General Plan typology

As a final remark on housing plan typology process; As seen on plan typology, in Famagusta, except Late Medieval time it shows similarity on base type. Or it can be claimed that all types, except Ottomans, were influenced from the early

medieval plan typology. In pre modern and modern time there were some changes according to needs and changing way of life style. However, the general layout of the house plan typology has come from the medieval time until today.

Ludlow has followed a similar process about the evolution of the housing plan typology but not as clear as with the Ottomans. In late medieval time base type is still similar to medieval, but on the ground floor, if there is a shop, its plan typology shows some changes.

When comparing both towns according to plan typology, both of them shows same process with conserving the first typological base type. In modern times, because of the needs and new materials, spaces become more complex than in previous periods but still keep the historical principles on the plan.

5.3.1.2 Façade Typology (Front Façade)

Façade typological analysis will only be made at the first hierarchical rank of the town center. One of the main reason is that there is an opportunity to follow the different typological process which presents various cultural impacts on the periods. When facades were analyzed firstly all the items below has been considered;

- mass and voids relations
- material
- structure

At the end of this analysis it is aimed to understand and read the façade evolution and to suggest comments on the façade typology and how they were shaped in their relevant periods.

In Famagusta, usually buildings are two storey however, sometimes either three or one storey buildings also exist, but common assumption is two storey. ***Mass and voids*** relations show differences in different periods. In early medieval time,

when the facades are reviewed, it can be seen that the windows are rectangle and their ratio is 1:1,5 where such building typological ratios has been seen in ***Lusignan period*** . The examples of those buildings are Churches which survived until today. As seen on figure 45 one of the significant elements on the façade is pointed arch on windows and doors. Ornamentation with roses and animals on the doors and windows at public buildings signify the period characteristics.

Material in that period is mud brick and sand stone which is light yellow in color and fine in texture. In addition to those, ***structure*** of the buildings is load bearing system.

In **Venetian period** again the significance of the mass and void relations on the façade is 1:1 or 1:1.25 ratio. Other important thing is key stone on the window and doors. As seen in Appendix A F2 street façade key stone is smaller and trapezoid in shape. In addition to this it can be said that in Venetian period, ornamentation around the doors and sometimes windows has been used to extension of the main stones from the wall surface and it defined the border of the voids with its relief view. In addition to this, shops are single storey. Their entrances are emphasized with a pointed arch. Narrow door and rectangular shape shop frontage make it unique in those times.

Material is yellow sand stone like before and ***structure*** is load bearing system with yellow stone sometimes if mud-brick is used, horizontal beam are embedded in a stone wall to strengthen it. As seen on Fig 5.15 some of the facades on the figure signify the Venetian period shops on the elevation. The window and door material is wood and there is iron window rail protecting the building from the exterior threats.

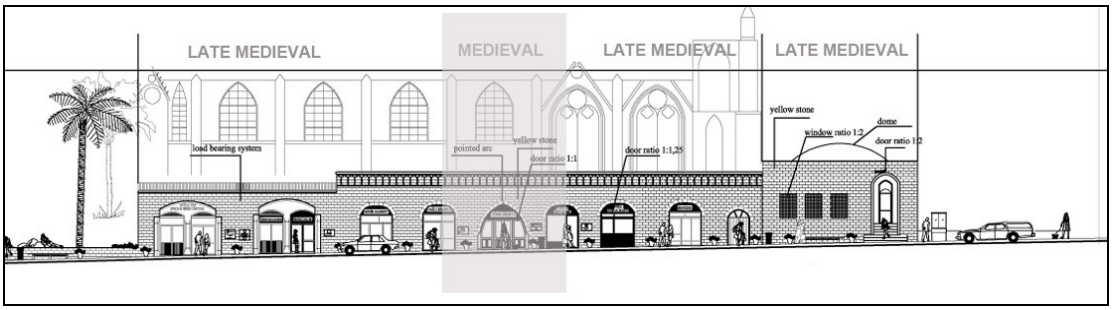


Figure 45: Drawing of Famagusta Old Town Medieval Period Façade

In **Late Medieval** time, building ***mass and void*** ratio shows some differences on the scale of the windows which became larger and the ratio is 1:2. As seen in Appendix F2 street façade, all ***Ottoman*** house types are differentiated from previous periods with its ratio and the shape of the doors and windows . If there is an arch on the façade, its shapes was rounded rather than pointed and the key stone is smaller than before. As seen in figure 45 M***ass and void*** relation on the surfaces has shown some differences than the late medieval time. The location of the windows on the façade is a little bit higher than before and usually windows' headings is semi arch with small key stone. Sometimes houses were hidden behind the walls and the façade were solid surfaces. In addition to those façade typologies, there is verandas (balcony) or cumba on the second floor(bay) during this period.

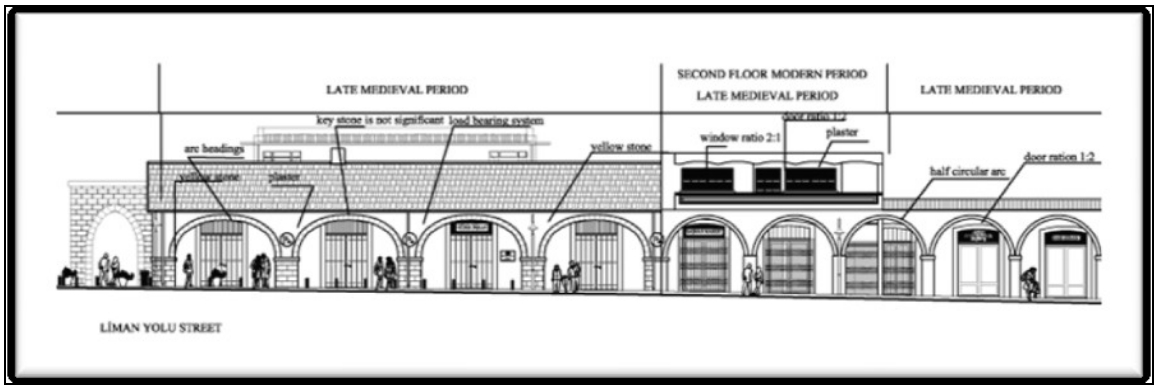


Figure 46: Drawing of Famagusta Old Town Late Medieval Period Façade

On the other hand, there is an arcaded space in front of the shop entrances, and they defined by semi rounded arch. Shop entrances are in the middle and they are twice larger than before. There is no shop frontage in that time. Although they use the same ***material*** for construction, the dimension of the stone is smaller than before. Window and door materials are wood and iron window rail has protected from outer threats like in early medieval time. The ***structure*** system is more or less the same as before which is load bearing system.

Pre modern façades followed the late medieval façade typology with 1:2 but key stone shows slightly some differences. During Pre modern times (**British period),** the same principles like late medieval are followed. Their façade ratios are same but as seen in the Appendix F2 and figure 46 the ornamentation surrounding the doors and windows are different than before. On the façade, yellow stone is used for decoration along the windows and the doors. The arrangement of the headings are arc or linear. Sand stone gave way to yellow stone.

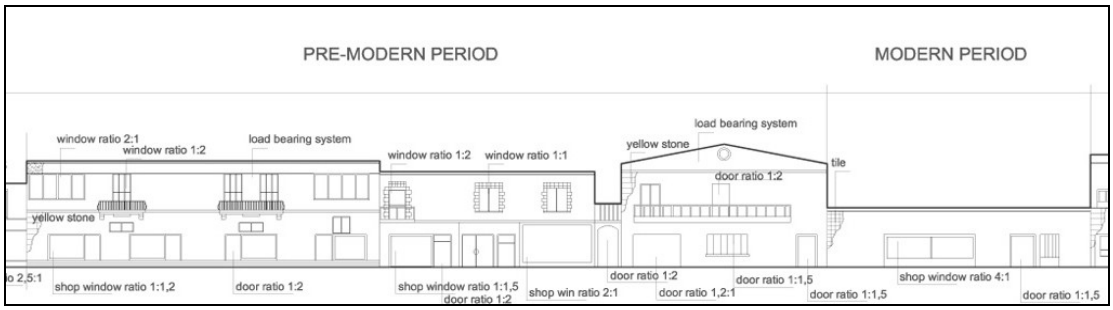


Figure 47: Drawing of Famagusta Old Town Pre-modern Period Façade

Most significant characteristics on the façade is window bay and balcony on the second floor. If there are window bays, they are half hexagonal types. Sometimes small balconies lay on the second floor. When shop frontages are analyzed, like in Ottoman period half arches on the entrances has been observed and additionally, there is round window on the top. The doors are twice bigger than in Ottoman period.

Their roof type is different than before. Until this time, roof is flat, but in British time roofs are pitch roof. The ***material*** for construction is yellow stone with mud brick. Window and doors are wooden and there is large door rail to protect the shops frontage. The ***structure*** method is more or less same as before which is load bearing system.

In **modern times**, the ***mass and void*** relations show some differences than before. Some of the windows and doors ratios look like similar to the previous periods but some of them were completely different. Most of the window ratio is 2:1 which is becoming wider in contrast to the previous era. In addition to this, doors become wider than before. In modern times there is a balcony on the second floor and they look like British style. On the shop frontage there is one small door which gives access to the shops and there are rectangular type's window frontages, which is located sometimes on the left sometimes on the right. Sometimes there is a variation of the base type. If there is upper floor another door takes place on the façade but it is not as effective as shop entrance. If it was possible to get access from the other part of the street, housing entrance has been located on the back side of the building.

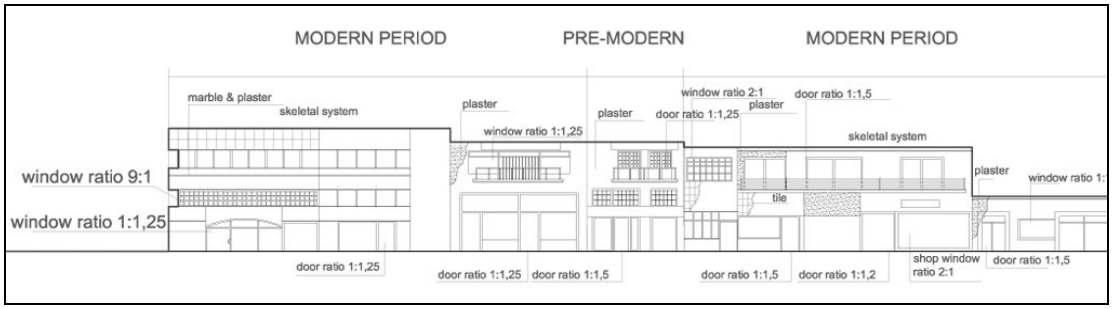


Figure 48: Drawing of Famagusta Old Town Modern Façade

Usually show cases are rectangular and sometimes two rectangular form come together and create a linear organization. With this development most of the facades are covered by openings, which resulted in unbalanced solid and void

relations. On the upper floors, it carries British extensions and within time ratios get verified. With the globalization of the ***materials*** aluminum, iron, chrome and such a new materials has been seen as a window and door material. The facades are covered sometimes with plaster, sometimes with artificial stones, or yellow stones. The ***structure*** techniques are changed as well, like a skeletal system which caused extension of the façade and minimization of the arches.

In **Ludlow** buildings are usually two or three storey. If they are at the town center, shops frontage has been on the ground floor and upper floor used as a house, offices etc. In early medieval period, (**Tudor-Elizabeth period),** building facades' ***material***s are composed of wood and gypsum.. When mass and void relations are considered, openings' ratio is approximately 1:1, 1:1.5 and 1:2 seen on Appendix A, L2 and figure 49, solid surface covers much span than the voids on the facades. Black and white balance is one of the significant characteristics of the building. Most ordinary homes in Tudor times were half timbered - they had wooden frames and the spaces between were filled with small sticks and wet clay called wattle and daub. Usually there are two windows on the surfaces at each floor. If there are shops on the ground floor, shops' and houses' entrances are on different sides.

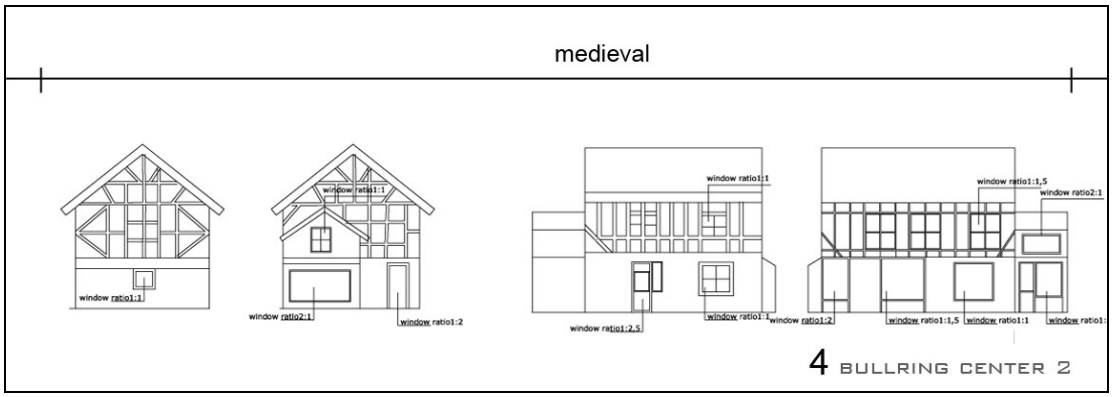


Figure 49: Drawing of Ludlow Old Town Medieval Façade

Usually shops entrances takes place close to the shop frontage and entrances are located on the corner of the buildings. Wooden linear dark color structure systems add variety to the façade surface. Surfaces covered with wooden supports and gypsum. In addition to these, windows' frames and dividers are wood and they create unity on the façade. Usually doors are fully wooden as well as on the shop entrance door way are the same. Shop frontage frame is wood. One of the reasons of this may be limitation of the ***material*** in this era. ***Structure*** techniques are wooden load bearing system and stone load bearing system.

In ***late medieval*** period (***Georgian and Regency period*****),** the ***mass and void*** relations is different than early medieval period. The windows form is turned into rectangular shape instead of square shape. In addition to this, *sash*[1] window style is one of the significant style of the windows. In addition to this, there is ornamentation on the top of the window with a row of trapezoid stones which is behaving like a lintel. The window sill appears for the first time on the façade in that time as well. The window is divided into small square or rectangle pieces as seen in Appendix A L2 and figure 50. Sometimes half circular windows or doors top/headings have been observed on the façade which is called Venetian window. The quoins[2]defined the edge of the facades as well. Another significant element on the façade is pediments which surrounded the door with stone blocks. This is the element that has been for first time observed on the façade and it put emphasis on the period characteristics.

[1] Sash window: An important part of traditional windows, the window sash is the moving section of the window. They are composing of a simple frame that is build to allow easy insertion into window casements. They are the windows where the glazed panels are opened by sliding vertically or horizontally in a style.)

[2] Quoins: Are the stone which are either structural or decorative elements to give the impression of strength and firmness to the outline of a building.)

Their ratio is 1:2 and windows are top of each other. Their size become larger and they become more dominant element on the façade according to mass and void relations.

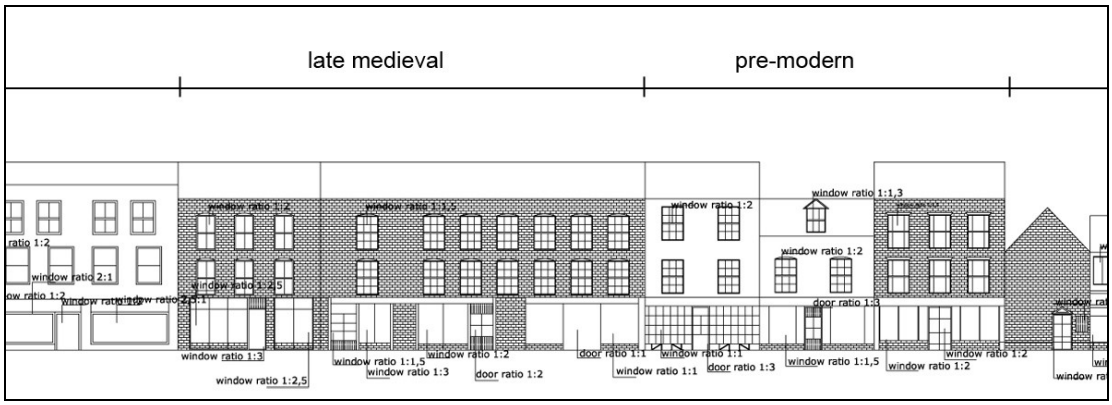


Figure 50: Drawing of Ludlow Old Town Late Medieval Façade

Other significant changes on the façade are hexagonal bays. However, they are not efficiently used in those times. Additionally, shops windows' division is like a house window and their shape is rectangular. Doors' shape has changed during this time which is composing of half wooden , half glass surface. **Material** that have been used on the façade is stone ornamentations, wooden window and door frame and casement, stone decorations and structural systems' and brick wall surface. The ***structure system*** of the buildings still is stone load bearing system like a previous period.

In **Pre- modern times** (***Victorian and Edwardian period***) ***mass and void*** relations are more or less like a Georgian and Regency period. Although the ratios of the windows are the same, their ornamentation is different. However, façade balance is same as before. In this period sash windows are simpler and their division number is lesser then before. Top of the window ornamentation is half arc which is one of the important significant changes that is different than the previous periods. Other significant changes on the façade typologies are frequent uses of hexagonal bays.

One of the advantages of the hexagonal shop window is to take the view from many ways. In addition to this, the façade ornamentation become more plain than before.

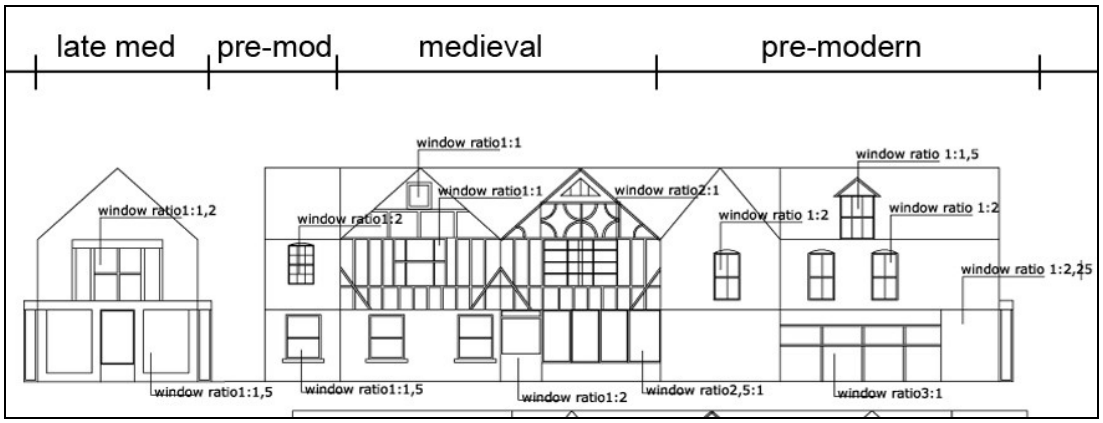


Figure 51: Drawing of Ludlow Old Town Pre-modern Façade

The ***material*** that have been used in this period is stone arch shape window headings, wooden window frames and casements, wooden door for residential uses and half wood half glass material for shop frontage and doors, red brick and white plaster on the surface cover. Generally the structural system is like previous period which is stone load bearing system but with the globalization of the materials, reinforce concrete reach this town as well and some skeletal system has been observed on the buildings.

In **modern times**, building ***mass and void*** relations is more or less like in previous period. Moreover because of the construction technique and structural system windows' ratios have changed. Column and beam system gives an opportunity for larger voids on the surface for that reason sometimes the facades are full of window (figure 51). Sometimes although the windows ratio is 1:2, they are larger than before. Sometimes they cover the half surfaces of facades.

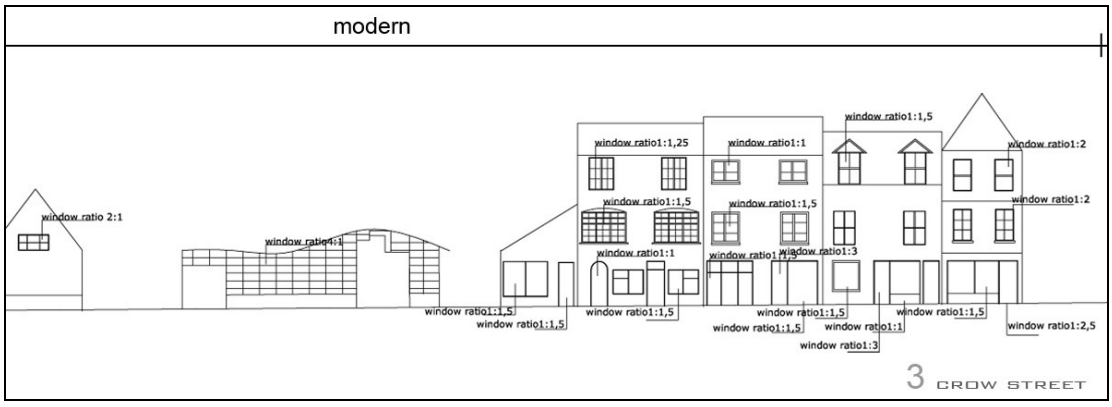


Figure 52: Drawing of Ludlow Old Town Modern Façade

Same points have been reflected on the shop frontage as well. In addition to these the ***materials*** have changed. Some of the window and door frames are wooden some of them are aluminum and some of them are composite materials. The surface material is either red brick cover or plaster. This material change is one of the significant characteristics of that period. When structural system is considered, generally they are skeletal system and some of the buildings still constructed as a stone load bearing system.

As a final remarks on façade typology; In Famagusta it can be said that the significant characteristics of the period on the façade has been easily followed with the mass and void relations and also structural system and the materials that have been used during the period. The beginning of the early medieval period window ratio was 1:1 or 1:1.5 whereas at the late medieval period this ratio has been followed. However later on this has been changed into 1:2 ratio. In later periods, although the ratios have been kept, the dimension of the windows has changed. In current times the globalization and standardization of the material caused changes of the mass and void ratios. In addition to this, the structure system is load bearing system until the modern times. When the façade of the streets has been evaluated, it can be said that the periods can easily be read on the façades until the modern times. In modern period with the imitation of the previous typologies and incompatible uses

of ornamentations on the facades and shops frontages caused to the typological chaos in some cases (Appendix A F2).

The construction technique helps to understanding the buildings' construction period. Materials of the façade typologies help to understand the local material of those periods. In Ludlow, like in Famagusta, building typologies as well as construction techniques and materials and show differences according to the periods.

When the street typologies are considered in both towns, their evaluation has followed almost the same path. According to parallel period characteristics, both town facade ratios have been more or the less same but their façade size and building types are different than each other. Although their material is stone in Cyprus yellow/sand and in Ludlow red brick has been used. When their shop frontage typologies have been evaluated, shop frontages in Ludlow has been followed the same ratios and similar shapes. But in Famagusta shop frontage typologies has shows differences amongst them. Especially during the modern times, facades do not have any certain typological process as seen in Appendix A F2 and L2 Façade typology sheet.

5.3.2. Plots

In this study, plots have been analyzed under two components: (a) plot typology that gives an idea about the evolution of the plot, and plot form. (b) The ratio of the plot (according to depth and width).

5.3.2.1 Plot Typology and Ratio

In Famagusta, the findings show that, when comparing the street character all of the plots show differences. They are usually rectangular or L-shape. Although they have a narrow and linear character, their areas and ratios are different than each

other. But general morphological process on those plots is similar. It can be said that their form is small rectangular or square and L-shape with regular character but ratio is changing according to the width and length of the plots. Their ratio is generally 1:1 or 2:1. The plots on the west part are larger than south-east part. They are larger than the others and their shape is wide and rectangular. Although their ratio is 1:1 and 1:2 their areas is bigger than others. On north-west part most of the plots are in irregular shape which is not classified. One of the reason is the history of plot. Some of them came from the medieval time with the public function and it preserves its public function until today. Other plots characteristics and forms in this area shows some similarities like those in south west area which are small rectangular plots with 1:1 or 1:2 or 1:3 ratios. The plots on the north part are irregular shape and they are widest plots in the area. In appendix A F3, shows that the position of the plot typology according to streets. It may be seen on that the general plot typologies and their distribution. As seen in Appendix A F3a, usually on the street plots types separated approximately under 7 types. General layout of the plot typology in Famagusta can be classified under seven category; those are

- Rectangular shape – square shape-large, ratio ≤ 2:1 / 1:1
- Rectangular shape and L-shape- wide and large formation- ratio ≥1:2/1:1
- Rectangular shape and L-shape-wide and small formation ratio ≥1:2/1:1
- L-shape and irregular shape -equal formation- ratio 1:2/ 1:3
- L shape- large and wide formation- ratio 1:2 or 2:1
- Irregular shape
- Rectangular shape-narrow and deep formation-ratio ≥ 1:2

All of those types show differences according to the position on the street. The form of the plot and ratios are depending on the street character and morphology.

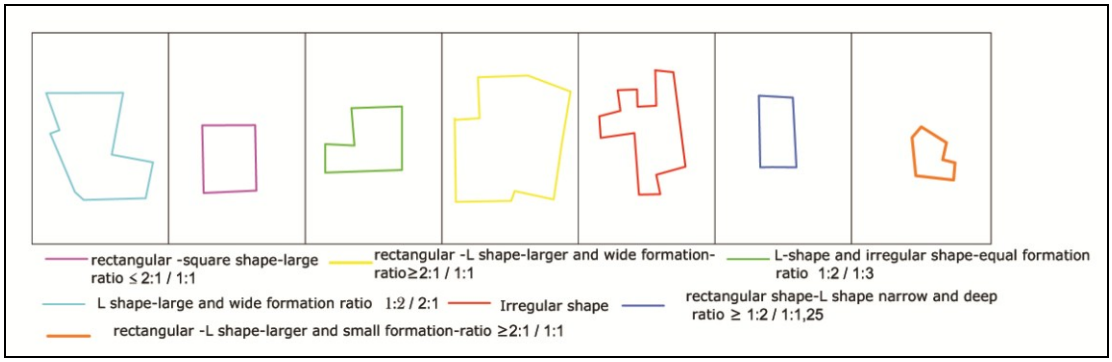


Figure 53: Plot typology of Famagusta

In Ludlow plan typology analysis has been done according to street characteristics. While analyzing, each street typological process has been analyzed within themselves. The typological and morphological separation has been done according to the area of the plots and form of the plot. Another issue which has been considered is the ratio of plots. The drawings in Appendix A L3 and L3a, shows the plot morphology according to the formation of the plot area, plot form and ratio.

In Ludlow**,** streets are analyzed according to their establishment and rank of road hierarchy. The findings show that, Mill Street and Broad Street plot character shows similarities. Although they have a narrow and linear character, their size and ratios are different. But general morphological process on those plots is similar. Although Raven lane is parallel to Mill Street and Broad Street its plot form is not as narrow as the others, where the ratio is approximately 1:3 or 1:2.

Old Street is parallel to that street; some of plot formation shows differences like wide and large rectangular form. Although its ratio is 1:2 the size of the area is larger than plots on Broad Street. When Dinham plots have been evaluated, the beginning part of the Dinham has irregular plot form which cannot be classified in a

group. But later development of those units shows differences like Mill Street and Old Street form, which is narrow and long. Bell lane and Brand lane plot form shows some differences than others. Some of the plot form like wide, large and rectangular form is like others but some of them are L shape forms, which have not seen before. Especially in Bell lane, plot form is wider and larger than others in terms of plot ratio, area and size.

On the Castle Street and in Market Square, 9 types of plot form has been observed. The first types are much like of those on Mill Street and Broad Street, narrow and deep. Other type is like a square form which ratio nearly 1:1. Other type is L shape form like Bell Lane but its area is three times bigger than Bell Lane plot form. In addition to this, the plots which is in the Market Square, are carrying the same form, square or small rectangular form. However their area shows small differences than each other. On the other hand, other plot formation has been seen next to the castle which is irregular form like Dinham unit.

Another typology is large and rectangular types, which size is larger than others and its ratio is around 1:2. Crow street plots are large and wide which ratio is 1:2 on one hand. The other typology is deep and narrow and its size is twice larger than the other narrow and deep plots. The King Street plot typology is starts to smaller rectangular plot to larger and rectangular plot that shows the gradual growth throughout the crow street plot typology. General layout of the plot typology in Ludlow can be classified under five categories:

- Rectangular shape - narrow and deep formation – ratio $\geq$ 1:5
- Rectangular shape- wide and large formation- ratio $\leq$1:4
- Square shape-equal formation- ratio 1:2/ 1:1
- L shape- large and wide formation- ratio 4:2

- Irregular form

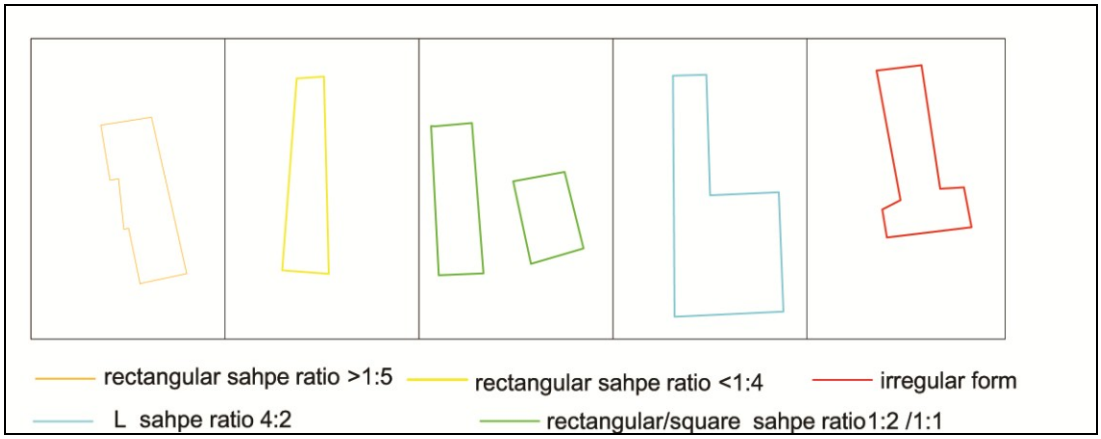


Figure54: Plot typology of Ludlow

All of those types show the differences according to the position on the street. Additionally, street formation plays important role in terms of formation of the plots, character and morphology.

As a final remarks of the plot typology, although both of the towns show differences, it can be said that, their evaluation within itself shows same growth like repetition of the plots with different dimension or division of plots. In Ludlow, narrow rectangular and wide rectangular plots can easily be followed with different dimensions and in Famagusta L-shape rectangular or square plot formation can easily be followed by consequences. In Ludlow plots are divided into segments according to needs since medieval, also Famagusta followed the similar division like Ludlow. In medieval time large the plots which are owned by the landlords who lived on the large plots and let workers live on that plot tail. In Famagusta plots usually owned by the church or government and resident lived with the permission of those authorities (Uluca, 2006, p.124). Both cities show almost the same plot typology formation and division. In the nearest past, larger medieval plots are divided into pieces according

to demand of people in line with the building regulations and articles of the countries.

5.3.3. Streets

As mentioned in the previous chapter, streets have been analysed according to buildings lines and buildings, street form and plot relations. According to Caniggia (2001) and Conzen (1969) each street has its unique character, form and structure.

In Famagusta, there are ten type of categorization of the streets, which are grouped according to their form characteristics, plot and building relations on street line, and form of the streets. Streets are analyzed, according to their position with each other for instance, if they are parallel to each other or if they intersect each other. The selection of groups of streets is done randomly.

First group of street type is the back bones of the city which are *İstiklal Street and Abdullah Pasha Street.* Istiklal Street is one of the important streets which provide a link between sea gate and land gate. When considering the typology of the street according to building plot and street relationship; all buildings are parallel to the street and there is a direct link from the street to building. Street is long and narrow with its buildings. There is no road, street or lane parallel to this street. It is one of the important backbones of the city structure.

Second Group streets- *İskender Pasha Street* and Lala Mustafa Pasha Street, *Abdullah Pasha Street* and *Namık Kemal Street,* typology is different than other with their street length and pertinent strip character. As Uluca (2006:98) stated, those streets are old streets, which are carrying medieval characteristics with their organic structures and the buildings which are located there. Although these streets are narrow and irregular, some of the buildings and plot morphology is different than each other. In Iskender Pasha is a large building located on augmented plots and it

has two entrances from different streets. Lala Mustafa Pasha Street is another street that shows different pertinent characteristics although some of the buildings have direct link with streets some of them is elevated with 3 or 4 steps. Also it is narrower than the others and its organic character makes this street unique.

Abdullah Pasha street's pertinent strip shows some differences with building characteristics and plot typology. Upper part (west part) of the street typology is narrow and buildings have direct link with the street. Lower part of the street which is close to the main square has different pertinent street character. Although the buildings are parallel to the street, their entrances are on the side streets. Usually plots and buildings are larger than others. On that street there is two types of pertinent strip, which can be named as a building entrances with direct link to streets and buildings which have indirect entrances to the street.

Third group streets –*Afrodit, Sabri Kazmaoğlu* and *Nedim Effendi,* and *Piyale Pasha*, *Lutfi Berberoğlu*, *Mehmet Pasha*, and *Gündüz Street* are narrow and shorter and the buildings along these streets are like a wall and they are usually two storey buildings which have a direct link to the street. Some of the contemporary buildings have direct link to the street whereas some have not. With polar morphological characteristics it is not easy to group them into one pertinent strip character. Division into three pertinent strip characters is possible, where there are buildings with direct relations to the street; mega structures with multiple relations to street and buildings with indirect relations with streets.

Fourth group streets are *Kızıl hamam*, *Suphi Ezel*, *Kuru Çeşme*, *Akkule* and *Liman Reis, Necip Tözün* and *Beşparmak Streets* which is approximately parallel the İstiklal Street towards the west create a different characteristics with its organic street development and different pertinent strip character. The typology of street shows two

distinctive features: Firstly, walls create a pertinent strip to the streets and houses located behind the wall in a hidden manner. There is a space between walls and houses. Secondly, if the houses face the street their windows is above the eye level, which provide a wall effect as well but its pertinent street is different than the first type.

Although they present medieval characters the buildings that are located on the street shows some differences. Upper part of the streets carries the medieval street characteristics with its residential buildings and public buildings' location and relations to the street is not same as residential ones. It is placed in the plot and its entrances does not get a direct acess to the pertinent strip

Fifth group streets-, *Muzaffer Ersu, Mahmut Celalledin, Liman youlu, Muzaffer, Pasha,and Barutçu Street* is parallel to each other but their morphological character show differences to each other. Although street widths and lengths are almost the same, their building character and the relation to the street is different than each other. While Mahmut Celalledin and Muzaffer Ersu street show similar characteristics according to eclecticical buidligns relations and private buildings relations.

Liman Yolu Street shows unique character with its various buildings types and various relations on street. The buildings which belongs different to periods are observed. Some of them has the veranda or gardens on the front part of the plot. This result in differentiation of the pertinent strip on the same line.

Sixth group streets- *Naim Efendi, Kışla Yolu, Hükümet Street Street, named Tabakhane Street, Yeni Yol Street, Ahmet Ratip Street* is perpendicular to Şerif Arzık, Barutçu, Cumhuriyet, Kertikli,Muzzafer Pasha and Necip Tözü streets, and they carries the same characteristics with different building types but all of them has a

direct link to the street except the medieval buildings. If the buildings are medieval, the border which defined the pertinent strip is yellow stone walls.

The public buildings take place in the middle of the relevant plots and their pertinent strip are only defined by the land border. The residential buildings have direct relations to the street. Only, Hükümet Street shows different medieval characteristic with its heterogeneous buildings in terms of their periods and relations. Here public buildings have direct relation to the street whereas medieval residential building are hidden behind high walls. Modern buildings along the street do not have direct linkage to the street.

Although the street forms, width and length is different, their characteristics are similar to each other.

Seventh group streets- *Ethem Aga, Kertikli , Cumhuriyet, Şerif Arzık,* and upper part of *Barutçu Street* parallel to each other and they are perpendicular to Ahmet Ratip. They have a similar length and width, they show differences with the position of buildings on the plots. On Barutçu Street there is no building on the plot. Only the plot border defined the street pertinent character. In Şerif Arzık, Cumhuriyet and Ethem Aga Street and Kertikli Street their character and the street-building relationship shows similar character. They are approximately 3 m away from its pertinent strip. Such a position creates another morphological character on the streets typology.

The Kertikli street buildings are dfferent than each other. Although it has British street character, the buildings on it does not reflect this character, except the historical ones. Other street and plot relation that has been seen on the north part is the Ethem Aga upper part, which is defined by the social housings units. They are row houses with verndahs. This cause a different types of the street typology in

Famagusta Old Town. The other street typology is the streets which are parallel to the town walls.

Eight group street- *Canbulat road, Cengiz Topel Road, Altun Tabya Street, Ramiz Gökçe Street,* and *Server Somuncu Street* has bulky plots with its dull building and they have a direct relation to the street with their large entrance access. Whereas on Altun Tabya Street buildings are smaller and they do not have direct relations to its pertienent strip. Most of them has 3-5 m distance from the streets. In general both carries the same morphological characteristics. One side of pertinent strips is defined by the town wall, other parts which are defined by the plots and buildings have no direct relations to its relevant pertinent.

Within this context, in **Ludlow** *Mill Street's* and *Broad Streets'* character is similar to each other which are parallel to each other. The buildings' relations with plots are similar as well. The pertinent strip of the two streets carries common characteristics like direct relation between the houses and streets, but the entrance of the houses have been elevated about 50 cm above the streets. The house types along the streets are also similar to each other. It may be claimed that they exhibit linear and wide formation with elevated building with its pertinent area. In addition to this, although Crow Street and Old Street are parallel to Mill and Broad their street morphology is different. There are direct relations between the buildings and street pertinent. There is no stairs or no elevated part. As a result, their pertinent characteristics show differences. The variety of the buildings makes these two streets different than others.

As seen on L4 in Appendix A, Bell Lane and Raven Lane are narrower but longer than the Mill and Broad Street. *Dinham Street* is the first street where the town starts to grow. Its pertinent street characteristics are totally different than others

as its presents an organic and irregular street form. Pertinent strips show different morphological characteristics where the buildings take their place behind the walls and there are gardens directly meeting with the streets. The relation of the building and street is weak and walls create a boarder on the street.

All of the buildings are in gardens and there is no direct relations. On the other hand, lower part of the Castle Street and Raven Street shows similarities with their narrow and short street typology. The buildings along those streets have direct relation on both sides and all plots are occupied fully by the buildings. Two main facades of the buildings faced the roads and they have direct relations between its related pertinent streets.

King Street has got different street characteristics with its building and plots. Similar to Castle Street and Raven Lane, all buildings have fully occupied the plots. The only difference is only that main facades face to the street. They have a direct relationship with the street. Brand Lane and Bell lane shows similar characteristics in terms of the relations of the buildings and street. Some of the buildings walls create a border to the street and some of them have direct relation to the street and their windows' height is on the eye level, which is not seen on the other streets. Width of the street is very narrow and length of the street is shorter than King, and Lower Castle Street. Silk Mill Lane and Champ lane shows the same characteristics with its organic street pattern and town walls.

Town walls create a border of the street where the pertinent strip character is totally different than the others with its high and different textured wall. Buildings take its place along the street but their window is higher from the eye level. As a result, series of buildings are perceived like a wall. Because of this effect, street character looks like a corridor.

In summary, in Ludlow, Street typological and then morphological process has been examined in each street separately with their plot and building relations. Some of the streets carry the same periodical characteristics but some of them show totally different typological and morphological characteristics. In overall framework all of them can be evaluated within themselves with the pertinent street character, building facade relations and plot position, as well as be analysed and evaluated with in this context. Finally, all the streets that have been analysed reflect their period characteristics with street structure and morphology. This is an important issue on the morphological analysis.

As a final remark on Famagusta Old Town, street morphology shows heterogeneous characters with its organic street structure. Each street in the town is unique within itself. Mostly, the form of the street has formed in medieval time. In that time building, street relation and plot ratio is more or the less carries the same characteristic; building's facade on the street pertinent area and all buildings were located on the plot head. In later times especially in late medieval time, street character is the same but instead of buildings plot walls defined the street pertinent and buildings are located in the mid of the plot. But pertinent strip and form of the street have not changed. Only the building typology and street silhouette changed because most of the walls are blank. Sometimes, not entrance but sides of the buildings have defined the pertinent strip of the streets with small window or service window. This morphological modifications cause to change the street pertinent typology.

A significant change on street morphology can be seen during the British Period. Existing buildings have been located on the same position but new buildings either elevated from the street level approximately 70 cm or they are approximately 3 meter

away from the street. With this change the form of the street has been changed. Morphological changes have been followed in Cypriot Republic times, where houses has been attached to each other but their front facade has been approximately 3 m away from the street and pertinent strip of the street defined by the gardens.

When *discussion* based on the both town like a previous headings same can be followed on the streets. Both towns' morphological characteristics are different although both of them have the organic formation. Ludlow formation is more regular than Famagusta old town. However, both town evolution processes shows similarities. For example in medieval time although building and plot morphology different than to each other, evolution of the plot typology shows similar process. The comparison shows that, both town historical evolution started with the medieval originated streets and other parts developed on the basis of those streets. Its original form has been kept from that era. Within this context, it can be said that both towns' evolution show the same structure and they can be compared with each other.

5.3.4 Urban Tissues

Urban Tissues refers to the urban block and its elements with components in the urban block which are buildings, streets, plots and their relationships. The ratio of the plot according to depth and width has been analyzed as well. Within that context, the division of the plot typology and form of the street and building relations which has been mentioned on previous headings in this chapter has been analyzed in the block formation. In Famagusta 50 and in Ludlow 12 tissues has been analyzed.

In Famagusta , urban tissue from T1 to T2 follows the irregular rectangular organization with same plot typologies and form. T3- T 6 are linear, narrow and irregular organization which is parallel to each other with same ratio. T9 has linear, rectangular and irregular organization where as T10 has triangular formation around

the same area. T17, T18, T19 has a nearly to square shape and T16 is half size of them. T15, are the irregular large form with its large plot division.

In addition to those T11, 12, 13, 14 are irregular rectangular form when they compared with the block closer to the town centre. Organic street formation (İstiklal Street, Mahmut Celalledin St, Abdullah Pasha St. and Sinan Pasha st.) cause to irregular and organic block formation. Especially the blocks which include at least one of those streets, have irregular block form. T22,T23,T24,T17,T25 are parallel to each other like a gridal formation but their size and form is different to each other and this indicates that each of them formed in different period or they are divided into pieces in different times. Another block formation as seen in T26 is a linear organizations around the Namık Kemal Square and plots fully occupied by the buildings. T27, T30 have triangular organization but their ratio and size is different to each other.

T42,T41,T40,T39, as a block character they seem to be similar to each other on one hand. Their plot size and building typology is different than each other on the other. T38 block has different formation and shows some differences from others with division and street formation as well. On the other hand T44 is the largest block in the Famagusta Old town with its large and irregular plot formation, ecclesial ruins and other public buildings which are located in the middle of the plots presenting a different pertinent strip on this tissues. In addition to those T35 and T36 carry the same characteristics. They preserved the same block characteristics throughout the history until today. T47 and T48 blocks have linear and irregular form which are fully occupied by buildings.

Urban tissue of ***Famagusta***, shows some differences but when morphology of tissues has been considered, firstly, it could be understood that, small pieces of

blocks took place around the entrance gate of the town through the main square. While some blocks are parallel to each other with a rectangular or linear shape, some of the blocks have triangular shapes (T20,T30,T27).

When comparing both towns according to urban tissue; although both of them are of medieval origin, their form is totally different than each other. But when considering them separately, their growth has followed the same order. In early medieval time block formation was irregular and larger and buildings are not attached to the streets. But later on, with the division of plots and new street openings, blocks became more regular and streets became parallel to each other. A building starts to be attached to the street either by building façade or high garden walls. Within this context, urban tissues can be followed according to the periods. The block evolution starting from the medieval until today result in the unique urban tissues of towns.

As a result of the generalization of the urban tissue of Famagusta, tissues can be categorized under 11 group as seen on F5a in Appendix A. These groups are;

T1: Small rectangular form – small irregular/rectangular plot

T2: Rectangular form- small and narrow plot

T3: Large Rectangular form- medium plot

T4: Large L shape form- large and wide plot

T5: Medium rectangular/irregular form- medium and small plot

T6: Small irregular form- small narrow plot

T7: Medium rectangular form, medium plot

T8: Small irregular form- irregular plot

T:9: Triangular and linear form- medium rectangular plot

T:10: Large irregular form –Large irregular plot

T11: Square form- square plot

In Ludlow, urban tissues from T1 to T4 have unique character which has been formed in medieval time (appendix a L5). Tissues on those plots are organic and irregular. In addition to this, plots are large and irregular like block shape. T5 blocks have gridal organization with long - narrow and rectangular plots character with surrounded roads. The blocks from T6- 8 have irregular organizations. The reason of this might be Old Street have got medieval character whereas the Broad street was formed later than Old Street. In addition to them T9 carries the same characteristic like T5. There is another block formation as seen in T12 which are linear organizations in the castle square and plots fully occupied by the buildings.

Urban Tissues of Ludlow shows some differences according to street formations and plot divisions. Within this context, while earlier medieval character blocks are irregular later developments became more regular and gridal than before. Form of the fortification walls gives the boundaries of the tissues. Town walls are one of the defender to create a boundary of the tissues and this is the major elements on the formation of morphology of town.

As a result of the generalization of issues, as seen in figure 5.21, there are 7 types of tissues has been observed in Ludlow which are;

- T1: Medium rectangular form- medium rectangular plot
- T2: Linear form- small size plot
- T3: Rectangular form- deep and narrow plot
- T4: Linear form- medium size plot
- T5: Large irregular form- irregular plot
- T6: Square form- square plot
- T7: Rectangular for- large plot

5.3.5 Fringe Belt

Fringe belt analysis in this study has been done according to inner fringe belt middle fringe belt and outer fringe belt formation. It is aimed to show the development character of the town.

In Famagusta, Castle area is defined by the walls, which can be named as inner fringe belt, where fixation lines define this border. Inner part of the walls where the space within the castle walls can be defined inner fringe belt. Outer fringe belt defined by the fortification walls as seen on F6 in appendix a which is called by MRG Conzen as fixation lines. Open land is another element that surrounds the housing areas, which are parallel to the fortification wall. The other element that is defined by the fringe belt is moat. It is a linear element, which surrounds the fortifications.

However, both towns' walls show same characteristics and both define the old towns' fringe belt. Both of them have inner fringe belt and outer fringe belt. Both towns' inner fringe belt formation is based on the first settlements where fortifications have created the border of castle with gardens that is called inner fringe belt. In addition to these, other fringe belt is defined by fortifications in both towns but they have some differences. In Ludlow only town walls defined the outer fringe belt. In Famagusta, town walls defined the fringe belt like Ludlow but, the green areas or empty plots are the other elements that defined the fringe belt. Other element is a moat which is not seen on the Ludlow fringe belt formation. It defined the outer fringe belt as well. This shows that both town walls define the inner fringe belt and outer fringe belt development with the same evolution.

In Ludlow, Castel is the first settled area with its fortifications, and it is surrounden by an open land (green area) with outer walls. This is the first genetic

unit of Ludlow. According to fringe belt concept, this area is inner fringe belt of Ludlow. As seen in L6 in appendix a , its border strictly defined by walls that can be named as fixation line, which creates a physical border to the town. Outer Fringe belt is defined with town walls and the area between inner fringe belt and outer fringe belt has the housing units which show homogenous character with their plots. But the buildings from the outer part of the outer fringe belt shows some differences from each other. Buildings pattern will be analysed in next heading.

In summary, Ludlow has got two fringe belt which are inner fringe belt and outer fringe belt. In the inner fringe belt open land and town walls defined the border of fringe and outer fringe belt is defined by town walls. Thus, it can be stated that all fringe belts are defined by fixation lines.

5.3.6 Townscape

Morphological regions have been analyzed through the components under three headings which are plan unit type, land utilization and building pattern. Intersection of three components gives the townscape formation of the historical towns. Plan units have been analyzed according to the relations to the plot formation, street formation and building formation like an urban tissues but basic differences from the urban tissues is the origin of the street. According to MRG Conzen each street shaped its plots and buildings and because of this reason street name and formation is important element in plan unit analysis. Land utilization is analyzed in detail but they are summarized under 5 main groups which are

- residential premises,
- shops, business and professional premises with or without residence
- Open spaces
- Industrial premises with builder yards and warehouses

- Premises with public or community functions

Building types have been analysed according to building construction period with addition or without additions and their construction type with materials.

In this part MRG Conzen's study on the Land Utilisation, Building Types and Plan Unit has been taken as a basis for this the study. Thus, all the analysis on Ludlow has been influenced by his analysis and they are updated on the MRG Conzen's original maps.

5.3.6.1 Land Utilization

Detailed functional analysis has been done as an update to MRG Conzen's analysis. Every function plot by plot has been defined. Later, each of them has been generalized according to Conzens' five categories.

In Famagusta, open spaces surround the fortifications and outer ring of the town. In addition to this, some of the ruined buildings within large plots, which survived until today can also be considered as an open space. Public and community functions have been located on the north-east part of the town. Especially the largest plot area which is close to the north gate has been used as a communal activity. There is another area close to the centre, which has been used with the same function. Shops, business and professional premises with or without residential functions have been located along the main pedestrianized street as seen in F7 in appendix a. It shows axial development and it can be named as a traditional core. Residential premises are used in a wide range in the Famagusta old town.

In Ludlow, as seen on the L7 in appendix a, there is very few open spaces, which surround the Castle and religious spaces. Public and community functions are distributed through the whole town randomly. Similarly, industrial premises which include builders' yards and warehouses have been distributed randomly in the town.

Shops, business and professional premises with or without residence has been located along the Market Square, King Street and High Street. Some of them took place among the houses but they are not dominating the surrounding. Shops, business and professional premises show an axial development at the center of the town. Conzen named this area as a traditional core of town (Conzen,1969;234). Transportation premises have taken its place at the fringe of the town. As seen on L7 in appendix a, dominant function of the town is residential premises.

When comparing both towns according to the land utilization firstly, main characteristics of both towns are shops, business and professional premises with or without residential functions. Both of them have axial organizations and they are located at the traditional core in the centre of the town. Both towns' castle and their plots, religious areas have been used as open spaces. In addition to these, both towns' residential premises spread all around the town and their range is wider than other functions. On the other hand, there is no similarity on the development or range on the industrial premises, public and community functions.

5.3.6.2 Building type

In Famagusta, building pattern has been divided under 5 period which are Medieval-Lusignan Period, Venetian Period, Ottoman Period, British Period, After 1960 Period. From Lusignan period there are a few buildings that survived until today and they are generally located around the market square. Some of the religious buildings are located on the edges of the town as seen on F8 in appendix a . Venetian period buildings have been located around the market square and Liman Yolu Street and others are spread around the centre. The walls which remained until today were built in that period. In Ottoman time, Ottomans only built a few buildings in the old town like an infill. They filled the empty plots around the centre and few houses

close to the centre. They rather preferred to use the existing buildings with some modifications. Most common buildings belongs to the British period. This period building types are spread all around the town as seen on F8 in appendix a. It can be said that they are dominating the old town's character. After 1960 period houses were built especially after the war in 1974, which are eclectical houses. They take their places in the areas that are left over plots. They are a kind of infill but there is no any period characteristic.

In Ludlow, building pattern is divided under 6 periods, which are medieval period, Tudor Elizabeth and Jacobian Period, Georgian and Regency period building type, Late Victorian building type, Modern building type. According to this classification as it can be seen on L8 in appendix a there are very few medieval houses, which survived in Ludlow until today. They were located along the High Street and Bull Ring. Other few houses have been located close to the town walls on the Mill Street and Broad Street. There is some Tudor Elizabeth and Jacobian Period houses, which have been located close to the medieval houses and on the market square with their characteristics structures as mentioned L8 in appendix a. Those types of buildings have been located on the main roads as well.

Additionally, most common buildings belongs to the Georgian and Regency period. They are located along the main roads which are King Street, Market Square, Mill Steet, Old Street, Crowe Street and Broad Street whereas Late Victorian houses were built on the empty plots like an infill. Some of them were built on the outer part of the walls. Modern buildings has been built up on the Bell Lanes and others are built behind the traditional houses in the mid of the blocks, which are not directly seen from the road.

When comparing Famagusta and Ludlow building types according to the period, in both cases medieval building type location shows the same characterisitics, that is which they are at the traditional core around the market square. Both town walls were built in that period. There are a few buildings that are built in the following periods which is called Ottoman in Famagusta and Tudor Elizabeth and Jacobian in Ludlow. British houses in Famagusta and Georgian and Regency houses in Ludlow are dominating the town character in both cases. During the following periods, only infill on the empty or left over spaces without any certain period characteristics can be seen.

5.3.6.3 Genetic Plan unit

Plan unit analysis covers the analysis of plot and building type relations, also street form and their relations and land utilizations.

In Famagusta, the first plan unit appeared with the castle which is called pre-urban nucleus. It is the first genetic plan unit in Famagusta, due to its unique form, the construction year and the material used. After the pre-urban nucleus, medieval borough appears along the Sinan Pasha Street, Namık Kemal Street and Liman Yolu street. It is dominating the Namık Kemal Square with large-rectangular shape with the monumental buildings. Medieval character plan units have been observed on the ecclesial buildings at different part of the town with large irregular forms. An extension of medieval borough is another development with small plot division for marketing facilities on the Liman Yolu Street.

16th Century trade units are also located on the Liman Yolu Street with its large and rectangular plots for marketing activities as seen on F9 in appendix a. In addition to these 16th century expansion with large plot has been observed on the Naim Efendi Street. Also 16th century expansion with full plot with L shape plot

form and rectangular form shows full plot cycle formation on the Kışla Yolu Street. Other formation has been followed on the 28th Çelebi Mehmet Efendi Street with L-shape and irregular plot organization. Their function is residential with significant period characteristics.

On the other hand, Late 17-19th century extension of medieval plot shows narrow buildings, which fully occupied the plot cycle with residential function with or without shops. Late 19th century shops with ware houses with extended plots formation has been seen on the Canbulat Street. The plan unit formation is deep with ware houses or shops. This is another plan unit in the old town which has a large and irregular plan unit formation. Although its period characteristics show that it belongs to the 19th century cycle, the dimension and irregularity of the mono plot, indicates that it may belong to medieval era. But the buildings and public function of the buildings makes this cycle to belong the 19th century period.

In 20th century, plot extension with new single plot as an extension of the medieval period cycles are formed around the western land gate area of the old town. They have a wide irregular plot formation generally fully occupied with buildings with mixed use functions.

The other formation along the İstiklal Street is 20th Century Medium Size Plan unit cycle with different building types and retail function with or without residential premises. 20th century medium plot cycle with medieval borough extension forms have been seen on the Muazzez Ersu and Mahmut Celalledin Street. Building characteristics belonging to modern period and multi functional distribution has been observed in that area. There is another plot formation there which has mid 20th century large plot cycle with the plan unit. They usually emerged as of the large areas with the division of the smaller parts. Large plots tolerates an superstructure

type of buildings which cannot be categorized easily according to building period. Late 20th century plan units with medium plot cycle have been continued on the Ahmet A.Ratip and Naim Efendi Street. This unit has strong architectural characteristics that reflect the period and organization of the roads and residential functions reflects the plan unit characteristics as well. Fortification is the important issue which shaped the old town's border. Open spaces are only classified as left over spaces because they do not have any plan unit characteristics except the place definition with fortifications and organic ring road. Some left over spaces in the town also can be considered in this plan unit.

In Ludlow, 6 types of plan unit formation have been followed. The first plan unit has appeared with the castle, which is called pre urban nucleus. It is the first genetic plan unit in Ludlow, because of the form, the construction year and the material of the castle. The second plan unit which has been followed in this period is the castle extension in late 12th Century as seen on L9 in appendix a. In medieval borough time, Dinham Unit has been followed the previous units on the west part of the castle. Later development has been started from the opposite side of the Dinham Unit, which called Christ Croft development.

Broad Street-Mill Street unit is another plan unit type with deep burgage and market street facilities and as well as late medieval building character. Church units' plan unit in the town shows some different characteristics in that time. Its burgage size is different than previous ones owing to its especial function and the burgage character makes it different than others. The High Street Unit is another significant unit with its marketing functions with deep narrow burgage. It is developed around the market square which Conzen (1968, p.268) identified as ' …. The whole complex, some 300 meters long from west to east and on average about 36 meters

wide, was originally a large, oblong open space forming the market place or High Street of Ludlow and together with the serial burgage series fronting it may be called the High Street Unit.' (Conzen, 1968:264) In addition to these, in the later 12th century, plan unit formation is deep-burgage ribbons with the mixture of different building types and mixture of shopping function. The street which gives an access to this plan unit is mainly Old Street and some parts of the Crow Street.

Until here the streets are organic and not regular but, Mill Street and Broad Street shows regular street organization with its medium size plots and regular housing organization. This plan unit is different than others because there are the occupational lanes which give access to the streets and their width and depth are lesser than the main streets. They are multipurpose streets like Old and Crow Street but their regularity makes them different from the other plan units. Town wall is an important issue, which shaped the old town's border. Because of the fabric production in Ludlow, Bell Lane is unit developed to give access to the production with its wide-burgage cycle.

When considering both towns, first of all it can be said that both towns' urban nucleus are based on the castle formation and later extension through the town. On the other hand, both town evaluation of the plan unit shows some differences. In Ludlow plan units can be discussed according to the street formation and plot types and building type, whereas in Famagusta it is hard to classify them like Ludlow. In Famagusta, one street has embraced more than one plan units. Fundamental reason of this is heterogeneity of the town.

5.4 Findings and Evaluation on Cases

In the discussion *of factors*, research indicates the following:

- The *historical backgrounds* of Ludlow and Famagusta are different. Although a homogeneous cultural character, which can be called British, has been followed in Ludlow, Famagusta Old Town's cultural character has been determined through Lusignan, Venetian, Ottoman, British, Turkish and Greek occupations, resulting in a heterogeneous character. Socio-economic development of both towns is based on trade activities. With those activities, both towns can be considered marketing towns. There are some differences with the marketing formation of the towns; in Famagusta, marketing activities have been conducted with other countries via the port, whereas in Ludlow, fabric marketing is conducted, and the product is distributed to other provinces or boroughs in Britain. The *political systems* of both towns have followed the same order. In the medieval period, a feudal system was observed in both towns, followed later by militaristic bases. A dynasty period has been pursued in both Ludlow and Famagusta. Democratization and liberation were observed in both towns during different times.

Those three fundamental issues make this study comparable because the political systems and socio-economic evolution have more or less followed the same pattern. The cultural background differences also make this study comparable.

Considering the elements and components helps in the analysis of the existing urban form according to morphological criteria. This analysis aimed to determine unique morphological forms according to town character and helps in making a wide range of comparisons, especially in towns of medieval origins that survive today.

- In *building typology,* there are two types of morphological analysis: plan typology and street facade typology. In *plan typology,* both towns showed different plan organization. Culture played an especially critical role in such a

formation. However, when Famagusta and Ludlow are compared with each other, their evolutionary process reveals the same order.

Regarding facade typology, like plan typology, the facade characteristics and ratios are different in the two towns. One explanation for this discrepancy is the cultural differences, and another explanation is the use of local material and techniques. However, the evolution of the towns followed the same processes within themselves. Morphological analysis techniques on building typology can be applied to both towns, and they provide an opportunity to compare their processes with those analyses.

- *Plots* are another element that is important in morphological analysis. The findings indicate that each town's plots have been divided into small parts from the medieval until today. Today, the plots take their final form. Both town plot division ratios and their forms are different. When the two towns are generalized according to ratios, generally the plot ratio is either 1:2 or 2:1 in both towns.

- The morphological analysis of *street* form indicates that each town has a unique character regarding shape, order, length and width. Both of the towns have an organic street character, but the degree of organicity differs. For example, in Famagusta, the main street is more curved, and one street may have several widths, whereas in Ludlow, the streets are organic but not as curved as in Famagusta. Thus, in both towns, the streets present an organic medieval form. In Ludlow, some of the major streets are parallel to each other, but in Famagusta, major streets usually show irregular organization, which constitutes the primary difference between the two towns. Moreover, in general terms, the two towns show the same medieval characteristics and other street formations based on those streets.

- An analysis of urban tissues reveals that all of the buildings or front yard walls in the medieval period until the 17th century have a direct relationship with the street. After the 17th century, each town's urban tissue formation shows certain differences. The urban tissue analysis shows that there could be no open space evaluations. One of the reasons is that in medieval times, all of the plots were fully occupied by buildings. Thus, there were no empty plots without any buildings. The only open space in urban tissues was streets and squares. Regarding this characteristic, the two towns are the same.

- Both Ludlow and Famagusta Old town show the same *fringe belt* formation. Castles defined the inner fringe belt formation with walls that can be called a fixation line. The outer fringe belt is defined by fortifications, which is one of the one significant elements in both towns. It can be said that although the culture and geography are different, medieval originated towns show the same fringe belt formation with defensive walls.

- *Townscape*, composed of land utilization, building type and plan units of towns, is an important element in morphological analysis. The townscape provides an overall image of a town.

  - Land utilization analysis has been classified according to MRG Conzen's classification. Within this context, the two towns' land utilization can be analyzed easily to understand the borders or formation of the center, where the institutional and public functions are located and how the residential units are developed. The locations of the public transport system and the industrial pattern can easily be seen. This makes following the land use pattern of the settlements an advantage.

In Ludlow and Famagusta, town center functions consist of shops, offices, and professionals with or without residences. The towns' open space function has been observed near religious facilities and castles. Other functions are spread throughout the towns. This study provides an opportunity to understand the functional distribution of towns in terms of certain criteria, as discussed above. This approach shows that if those 5 functions are analyzed, it will provide an opportunity to compare the towns' functional distribution.

- Building plan analysis in both towns reveals differences caused by cultural and geographical differences. The analysis shows that most of the medieval buildings that survived until today are located in the centers of the towns, compared with other buildings from later periods, which were built on the plots more randomly. One common characteristic in both towns is their construction techniques and materials. Construction techniques according to periods are similar to each other in both towns and use mud-brick or local stone as a building material. It can be said that both towns can be compared according to their historical construction time, material and techniques.

- The plan units of the towns display differences, with the exception of the town center formation. Both town center plan units are similar. In addition, the pre-urban nuclei and urban nuclei character is the same. Therefore, in Ludlow, classification of the plan units is clearer than in Famagusta because Famagusta's heterogeneous character suggests too many different plan units. Although the two towns' plan unit formation started with a similar evolution, later developments and the heterogeneous character of Famagusta old town show differences, although they are still comparative elements.

- The townscape analysis is based on the overlapping of these three issues. As a result, it shows how the townscape is formed during the time, and whether there is a new development area or new planning strategies, this analysis gives an idea of how this formation would appear.

Consequently, all of the findings indicate that the towns that are of medieval origin have a unique character. A morphological analysis method helps to understand the evolutional form of the town throughout the formative process. Within this context, integrated morphological analysis, including building typologies, plots, streets, urban tissues, fringe belts, and townscape, shows the overall formation of the towns and presents an idea of the future forms of the towns. When this analysis is complete, the discussions suggest that these morphological techniques can be applied to all towns on different continents with different cultures. Although their morphological character would be different from one another, it presents an opportunity to discuss and analyze different towns in different continents compared to one another.

Chapter 6

CONCLUSION

The study of urban morphology is characterized by a number of perspectives and disciplines including geography, architecture, philosophy, archeology, cartography, and sociology. However, in this thesis, only the geographical and architectural perspectives have been considered.

The study of urban morphology began to take shape at the end of the nineteenth century as a field of research concerning the urban form. Its origins were largely within European geography and architecture, in which the pioneers were MRG Conzen and G. Caniggia. Whereas MRG Conzen mainly focused on morphogenetic methods, evolutionary methods, and the conceptualization of historical development, morphological terminology and cartographic representation, G.Caniggia focused on the typological process of the settlements and the evolution of architectural typology and philosophy. The integration of both concepts provides a strong tool for urban morphological analysis, conservation and planning strategies.

There are two main aims of this thesis. First, the aim is to establish a consistent basis for the Conzenian and Caniggian approaches of building form by interpreting both methods. Second, this thesis aims to examine the possibility of applying the proposed integrated morphological analysis method on different geographies with different cultures, especially with towns that are of medieval origin. Finally, this thesis suggests an integrated approach to morphological analysis that could be applied in different parts of the world. This study compares only two

examples on the two opposing poles of the European continent to test whether those morphological analysis methods can be applied in different countries.

6.1 Summary of Findings

This part of the thesis discusses the findings and critical thinking on comparisons of urban morphology conducted by applying an integrated methodology based on the synthesized Conzenian and Caniggian methodologies.

6.1.1 Evaluation of the Integrated Methodology

MRG Conzen's and G Caniggia's methodologies were not applied separately to a wide range of towns throughout the world. They were applied only in European countries, primarily in Britain and Italy. In Europe, town plans are usually stable, and there are not many different civilizations involved, which makes it much easier to apply the methods on the analysis of urban form. In recent years, K. Gu (2008) and Xu (2012) started to apply parts of MRG Conzen's methodology in Chinese cities, but they were faced with difficulties in applying all of the methodological aspects to Chinese towns. As a result, certain parts of the approach that would not be applicable outside of Europe were eliminated. Accordingly, within the scope of this research, an attempt has been made to interlace the two approaches (methodologies) and to test whether an integrated methodology would be applicable regardless of location. Application of the proposed integrated methodology reveals that, although the approach would be viable, there would be certain difficulties in coping with the cases that are heterogeneous in character. Heterogeneity of culture and civilization in an urban environment brings variations in form and makes it difficult to analyze a city in a systematic way.

One of the strengths of the new proposed integrated methodology is the opportunity that it provides to test it on a wide range of the towns throughout the world. The method provides an opportunity to compare many towns in a systematic way. However, if there are variations in the civilizations, the forms of the towns cannot easily be analyzed. Such a situation might indicate the need for certain differences in methodology and adjustment of findings according to that heterogeneity.

6.1.2 Recommendations for Future

The systematic morphological analysis methodology applied in Ludlow and Famagusta indicates that this method can be applied in both towns without problems. However, although it was applied to both towns, in Famagusta, the methodology has certain difficulties as mentioned below:

- Heterogeneity in civilization causes variation in forms such as plot types, building types, tissues, street form, plan units and land utilization. This makes it difficult to classify such cities systematically, which brings complexity to making comparisons with other towns.
- The proposed methodology shows some differentiation in different geographies. This discrepancy is a result of the heterogeneity or variety of different civilizations in different geographies.
- Although the elements in the methodology are the same, the way of analyzing the cases may show some variations.
- Different civilization backgrounds bring variation to the morphological types, which made it difficult to classify them in groups in a systematic way.

Within the scope of this study, the methods identifying the morphological analysis of the two different towns that are of medieval origin, which characterized the features of the urban pattern, were determinant and examined throughout using a longitudinal comparative case study. Analysis indicates that all of the elements and components of urban morphology can be tested on different settlements that have different historical backgrounds. In addition, this method was applied to the industrial town in Lefke, Cyprus, and results indicated that it can be applied in different contexts (Cömert&Hoşkara, 2013). This integrated method provides the opportunity to apply this methodology to towns throughout the world with some differentiation. This integrated analysis provides the ability to understand building plans, facade formation, street typology, plot form, urban tissues, fringe belt formation and townscapes. It is believed that this integrated method for morphological analysis helps to clarify and understand the following:

- The future development of town guidelines
- Long- and short-term planning guidelines
- How to improve historical town conservation planning
- An overall point of view about the morphology of settlement that causes appropriate or compatible uses and forms of the urban environment

Additionally, this morphological analysis is applied not only to historically originated towns, but also it provides a wide range of opportunities to study new or modern settlement development.

As a result, considering the findings of this research summarized above, it can be concluded that an integrated method derived from Caniggia's and Conzen's methods can be applied to different civilizations in different parts and in the different geographies. In addition, analyses contributes to an understanding of the spirit of

cities from medieval ages until today and opens a discussion regarding how the urban organism has been conserved and developed using those morphological methods. This comparative study provides an opportunity to compare towns according to the same criteria, which provides a method of equal comparison for morphological studies.

For further discussion, the morphology of open spaces has not been mentioned in this thesis. Cases were selected from towns of medieval origin, and open spaces are defined according to land use functions such as squares, streets and areas surrounding religious spaces. Within this context, such spaces do not suggest any wide range of opportunity to conduct morphological analysis on open space. If investigation of the streets and their pertinent strips is conducted, urban tissues and townscape do not present any opportunity to discuss the organization of open space. The analysis of two towns indicates that there is not enough building frontage or gardens to provide opportunities to understand the morphology of open spaces.

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APPENDICES

Appendix A: Famagusta and Ludlow Typomorphological Analysis

Appendix B: Glossary

This glossary has been copied from the 'http://www.urbanform.org/glossary.html'
Accretion - *Conzenian terminology*: "A peripheral addition to the built-up area of a town generally consisting of a non-traditional plan- unit and forming a component of either a residential integument or a fringe belt"
Adaptive redevelopment - *Conzenian terminology* : A redevelopment of a plot, or series of plots, within the existing street system without the introduction of new streets
Addition - *fabric change*: SEE: **building adaptation.** The addition of floorspace to an existing building; extension.
Additive processes - *Conzenian terminology*: A sequence of activities whereby new forms are created at the outer edges of an urban area
Aggregate : is a vague series of buildings; settlement and urban organisms are alos series of buildings, the aggregate and its correlated tissue is a contionous built environment, focusing on its serial formation laws, which are intrinsic to the nature of its essential modularity and repetitiveness.
Agricultural residual - *Conzenian terminology* :Areas of agricultural land that have become surrounded by urban development. These often form part of the, usually open, middle and outer fringe belts or the intervening residential integuments
Anglo-Scandinavian - *architectural style* : Style typical of British post-WWII housing, derived from Voysey's smaller housing and contemporary Scandinavian developments. Main characteristic is the use of several textures, contrasting brickwork with weatherboarding, tile-hanging, and rendering; and often the use of pantiles rather than plain tiles
Apartment : A dwelling within a block of similar dwellings. Common in North American use; in Britain, usually referred to as a `flat' within a `block of flats' (which may be high-rise). SEE: **block housing**
Apartment block/house - *building type*
SEE: **block housing**

Arcade - *architectural term - building type* : (1)Series of arches carried by columns, pilasters or similar. May be free-standing; if attached to a wall as a decoration, known as a blind arcade. (2)Covered avenue with shops on one or both sides: this use dating from 1731 (Curl, 1986) and most commonly known with reference to Victorian shopping arcades.
Architectural incongruence - *Conzenian terminology* : "The juxtaposition, commonly within the same street front, of buildings belonging to different morphological periods (Conzen, 1969, p. 123). This is particularly evident in areas that have experienced large-scale redevelopment during one morphological period; or have a mix of revivalist or Modern styles introduced into an otherwise mature streetscape. Tugnutt and Robinson (1987, chapter 5) give good illustrations.
Architectural style : A term used to define the predominant, usually exterior, appearance of a building. Architectural styles or designs usually follow fashions in art and literature and are, at any time, limited by the constructional methods and materials available to society. They usually derive their names from periods in history (for example Classical, Gothic, Regency, Victorian). Buildings may combine

more than one style because they transcend design periods, different phases of construction or alteration are evident, or because the current fashion was for revivalist styles, such as neo-Georgian or neo-Tudor.

Arterial ribbon - *Conzenian terminology*

SEE: **ribbon development**

Augmentative redevelopment - *Conzenian terminology*: A form of redevelopment that adds to the street system within the pre-existing morphological frame.

Back lane/access - *street type*: A minor element in the street system. Originally functioning as occupation roads to gain access to the rear of strip plots, in many towns the back lanes have been widened either for the modern requirements of the motor car, owing to the creation of tail end plots. In the residential townscape, the occurrence or introduction of a back lane has provided access to tandem development in rear gardens of existing houses (Jones et al., 1988). In American usage, alley.

Back-to-back - *building type* :A terraced house with access and windows only on the front faade and with a party wall to a similar building at the rear. House type common in northern British industrial towns, notably Leeds. This house type was banned by most locally-adopted and model bye-laws by the 1880s.

Basic type - *Caniggian terminology* In Caniggia's analysis, dwellings form the basic type of any urban tissue (Samuels, 1982, p. 3). All other building types are special types.

Blind-back - *building type* :A dwelling, usually a terraced house, that lacks rear windows or access. Its rear wall is usually along a plot boundary. It was a characteristic form of burgage repletion in England during the pre- and early-industrial periods and during the C19th was constructed in manufacturing cities, often intermixed with back-to-backs.

Block plan of a building - *Conzenian terminology* :"The area occupied by a building and defined on the ground by the lines of its containing walls. Loosely defined as the `building' in town-plan analysis.

Borough :(1)settlement type A town with a corporation and special privileges granted by a Royal charter; a town that, especially from the C14th onwards, sends representatives to Parliament (idea originating from Fr. bonne ville: Petit-Dutaillis and Lefebvre, 1930, p. 68). Legal independence is another significant criterion (Bateson, 1904). In the early medieval period, there was no general or legal distinction to borough (SEE: **burh** (Petit-Dutaillis and Lefebvre, 1930, Ch. VIII). There is a tacit assumption that borough (or Scottish burgh) can be equated with `town', but little discussion has taken place on this point despite the acknowledged deficiencies of legally-based definitions (Graham, 1988, p. 40; Clarke and Simms, 1985); See the discussion of town status (town, para. 2).

(2)An English administrative district. County Boroughs were designated from 1888 as those urban boroughs with populations over 50,000; or over 75,000 from 1926. Following the London Government Act, 1963, Greater London was divided into 32 London Boroughs (plus the City of London Corporation); and as a result of the Local Government Act, 1972, Metropolitan Boroughs were created within the six new metropolitan counties of England when county boroughs were abolished. Borough corresponds to the Scottish burgh.

Boulevard

(1)Originally the broad, horizontal surface of the rampart of a town wall.

(2)street type A broad, handsome avenue, often for ceremonial use (cf mall). Applied first to the wide thoroughfares that replaced the city walls of Paris: the first such was opened in 1670, extending from Port Saint-Denis to the Bastille.

Break-through street - *Conzenian terminology* - *street type* : A street constructed to link two or more existing streets. These were particularly common in the early-C19th: the era of transport innovations. A break-through street may involve the demolition of building fabric and dissection of a plan-unit.

Building adaptation - *fabric change* :This is a particularly wide-ranging category, much subdivided, covering all changes to the building fabric other than new building/major rebuilding/redevelopment. To denote an addition of floorspace to a building, the term addition is used by Whitehand (1983b, p. 323), Whitehand and Whitehand (1983, p. 490), Freeman (1983, p. 2, 1986a) and Larkham (1986a) to include all extensions and free-standing auxiliary buildings. Pain (1980) uses this term, but does not define it. Extension is used by Pain (1980, p. 44), Luffrum (1979, p. 120) and Sim (1976, p. 65, 1982). Pain (1980) and Cooper (1984) both provide a sizeable list of other changes, not defined, which are more or less those that the original data source (building plans and planning applications respectively) give. As these are undefined they are of little use, particularly such vague groupings as `alterations to form', `conversion' and `structural external alteration and extensions'. Some comparison with other studies may be made if all such categories are amalgamated. Luffrum (1979, p. 120) and Sim (1976, p. 65, 1982) identify changes in plots - amalgamations and subdivisions - that would have some effect upon the interior structure of buildings. Larkham (1986a) identified `interior alterations', and Whitehand's general survey of the field (1983a) mentions these, but they do not necessarily involve plot changes, and are usually ignored since they do not affect the exterior of buildings. Larkham (1986a) also identified refurbishment as a distinct category, although this is a specific type of adaptation recognised for the purpose of studying conservation-related changes. As such, it is unlikely to be found in most other studies of built fabric change.

Building coverage - *Conzenian terminology*: "The amount of plot area covered by buildings, expressed as a percentage of the total plot area" (Conzen, 1969, p. 123). This is also known as the plot ratio by local planning authorities, who use the measure to control density in new developments.

Building cycle: Periodic fluctuation in the rate of building construction dependent upon the changing socio- economic conditions

Building fabric/built fabric: The building material and architectural style in which a structure or group of structures is constructed. Incompatible building fabric combinations may be seen as one element of architectural incongruence and, therefore, the consequences for townscape management of ill-considered fabric combinations are immense.

Building line - *Conzenian terminology* - *planning terminology*:A line, usually roughly parallel to the street-line, which follows the alignment of building front walls. In central areas the building line is often the street line. In most residential areas the building line is set behind front gardens. The Conzenian building line is an "irregular geographical ... line" and is distinct from the line introduced by town planners to control the siting of new buildings . The French equivalent is known as alignement, controlled since an edict of Henri IV in 1607, and codified by Napoleonic legislation in 1807

Building pattern - *Conzenian terminology* :In town-plan analysis, this is "the arrangement of existing buildings, ie their block-plans in a built- up area viewed as a separate element complex of the town plan"
Built fabric : Term used interchangeably with building fabric.
Built-up area - *planning terminology*:An area predominantly occupied by buildings where a system of street lighting is required. Colloquially, broadly synonymous with `urban'.
Burgage: From Lat. burgagium. "The urban strip-plot held by a burgess in a medieval borough and charged with a fixed annual rent as a contribution to the borough farm (firma burgi) or a communal borough tax of the town" (Conzen, 1969, p. 123). "Defined in legal terms as a property unencumbered with manorial services which could be bought, sold or bequeathed freely without reference to any manorial authority" (Bond, 1990).
Burgage analysis - *method of analysis* :In form, burgages are long and narrow. Conzen (1969, pp. 31-33) suggests from empirical evidence a `normal' English burgage width as some 28-32ft. Burgages may be analysed using both geometric and metrological means. Recent metrological analysis suggests that burgages were regularly planned and laid out according to statute measures (rods, poles, perches) (Slater, 1981, 1988, 1990c). Various types of burgage can be distinguished (SEE: **morphometric analysis**.
Burgage plot
Tautology - SEE: **burgage** despite its common usage
Burgage series : Series, usually a row, of similar burgages. A convenient unit for burgage analysis; may be a plan- unit. See the example of Lower Broad Street, Ludlow in Slater (1990c, pp. 71-72).
Burgage tenure - *interest in land* : A form of tenure found in boroughs (legally defined) by which all forms of service were commuted to a fixed money rent. This tenure was probably of French, not Anglo-Saxon, origin. Free burgage tenure paid a fixed annual rent, and rendered no services

Change of use: Luffrum (1979, p. 20) used simple inspection of property type in an attempt to determine whether function had changed from residential to commercial use or vice versa. This proved unreliable. Sim (1976, p. 55, 1982) used the category as defined by Planning Committee minutes; Pain (1980, p. 44) as defined by the building register; and Larkham (1986a) and Cooper (1984, p. 13) used the indication of a planning application for consent to a change of use. These definitions are not compatible. Planning applications note only `material change of use', and Heap (Ed., vol. 2, section 2-815) states that "the application of the formula [to determine change of use] in individual cases contains often a significant element of subjective judgement, and is regarded by the courts as being primarily a matter of fact and degree for the Secretary of State". A geographer probably has an instinct to classify change of use as being change of function, but this is clearly not the same as the planner's view (and, after all, these data sources were designed for planning use): "The precise meaning of `material' ... is not altogether clear ... it appears from some decisions of the Minister [now Secretary of State], and also from the courts, [thay they] have at some times felt that between one use and another of broadly similar character there will be development [ie a change of use] if, and only if, change to the other use will have a substantial effect on the amenities of the neighbourhood ..." (Heap, Ed., vol. 4, section 6-085). There are few guidelines to define `material', thus what is deemed `material' and will therefore appear on the planning register is an

individual decision by each local planning authority's planning officers, guided by the Town and Country Planning (Use Classes) Orders, which themselves change. (See Heap, 1987, pp. 121-135.) Some measure of inconsistency may thus arise. Changes of use per se do not require an application under the building regulations: only those where the new use entails structural changes are found when using building plans as a data source. Both data sources nevertheless provide more reliable and internally consistent data than Luffrum's field survey technique.

Checkerboard/Chequer plan -U.S. term for grid plan.

Closed building development - *Conzenian terminology* : "The arrangement of plot dominants in rows or terraces of more than eight houses" (Conzen, 1969, p. 124).

Cocktail belt :A term used by Whitehand (1967) to describe the belt of middle-class residential areas in the urban-rural fringe of major cities, and specifically London. See Whitehand (1988a).

Colonial town - *settlement type* :A town established by colonial powers to act as a focus for the transfer of colonial wealth back to the homeland, to consolidate the conquest of the country, and to impose a culture or religion upon the colony. Usually used of European colonisation of Africa and the Americas (Reps, 1965), but there are other examples of colonial town plantation, such as those of the Normans in medieval England and Ireland (Marshall, 1968; Graham, 1988) and by the Germans in many parts of medieval Europe (Clarke and Simms [Eds], 1985, Section III). Characteristically, they are strongly defended settlements and are linked by a good transportation network, or are coastal settlements. They are carefully planned, often with a grid-plan layout, often centred upon an administrative functional area, with ceremonial features such as malls. They have little in common with the form of native settlements. See King (1976).

Company suburb/town - *settlement type*:Mining, industrial or manufacturing suburbs or entire towns developed by a company to house workers adjacent to their workplace. Allen (1966) discusses 191 U.S. company towns. The employer had greater control over the workers and their families - in the workplace (as employer), in the town (as shopowner, educator and administrator) and in the home (as landlord). For example, control was often exercised by payment in Company credit or token rather than cash. A number of these settlements were run on idealistic lines, such as New Lanark, the idealist there being Robert Owen, who attempted to create a socialist settlement. As cities grew in the mid-C19th to early C20th, many companies moved to the peripheries of existing settlements and established company suburbs: eg in Berlin, the Siemens company developed Siemensstadt (Ribbe, 1985), and in/L ?d_, a small number of paternalistic industrialists developed the `hydro-industrial' area with factories, shops, houses and a fire station (Koter, 1969). The employer frequently provided cheaper and a higher standard of housing and community facilities than were available in the rest of the city, with the aim of attracting the best workers to their factory. It was common for there to be a religious basis to the philanthropy of these industrialists: Titus Salt, an evangelist Christian, established Saltaire (Bradford) in 1850 with the aim of improving housing conditions for wool mill workers; and the Cadbury family developed Bournville (Birmingham), a suburb to be run on Quaker principles, in 1879.

Complementary building development - *Conzenian terminology*: "Retarded building development taking place on parcels of unbuilt land within an otherwise built- up area and completing the plan-unit of that area. It often results in architectural incongruence" (Conzen, 1969, p. 124). These parcels of unbuilt land may include agricultural residuals, plots that have been previously unattractive for

development, or open spaces within the urban fabric. This is a sub-set of new building.

Composite town-plans: A town plan consisting of a number of discrete plan-units that reflect the particular circumstance of their creative phase. It is becoming apparent that the majority of English towns are composite in character (Slater, 1990c): compare the analysis of Lichfield by Bassett (1982) with that by Slater (1986b).

Cul-de-sac - *street type*: A street closed at one end. Also known as `close', `blind alley' or `dead end'. Widely used in residential planning from the mid-C20th, especially in attempts to segregate pedestrians and local traffic from through traffic.

Derivative plot - *Conzenian terminology*: "A secondary plot carved from a parent plot by partition" (Conzen, 1969, p. 124). This division may be by truncation, medial division or other form of partition: Examples of derived plots in the modern residential townscape are given by Jones et al. (1988, pp. 13-17).

Detached house - *building type*:A dwelling not physically attached to any other, and most often set in its own grounds. These characteristics ensure that this is a housing type for upper socio-economic groups; however, a vogue for detached housing in Britain during the 1970s and 1980s has seen a more general application of this type. `Cottage' or `villa' in North American usage (cf Holdsworth, 1986).

Developmental method - *method of analysis*: A research procedure in which development (here = urban growth) is investigated in a chronological sequence (Whitehand [Ed.], 1981, p. 13).

Edwardian - *architectural style*:Architectural style characteristic of the reign of Edward VII (1901-1910). In practice, the period lasts from the end of the C19th to the end of WWI (Whitehand, 1984). The influences of the Edwardian period were the experimental work of the Arts and Crafts architects, the Art Nouveau movement in Europe, and the separate revival of English Baroque, which came to prominence as British Gothic architects were nearing the end of their careers enabling such practitioners as Voysey, Blomfield and Lethaby to exert influence (Service, 1977).

Element complex - *Conzenian terminology*: "The totality of plan elements of one particular kind in a town plan viewed separately from others. There are three element complexes, ie the street system, the plot pattern and the building pattern" (Conzen, 1969, p. 125). These three elements are central to the Conzenian analysis and the delineation of regions for the purposes of townscape management (Conzen, 1975, p. 95 et seq., 1988).

Extension - *fabric changes*:See paragraph 1 of building adaptation. The term addition is generally preferred.

Extra-mural: Outside the town walls: hence extra-mural suburb; extra-mural street. Such development may occur because pressure on land within the walls is too great, or because further development is not permitted there. Contrast with intra-mural.

Facade changes - *fabric changes*: Many studies of C20th urban form have been of commercial districts, where building faade changes are sufficiently frequent and distinct to form a separately identifiable group, usually shopfront changes (eg Blacker, 1987). Faade changes do not always form an identifiable grouping in residential areas. Luffrum (1979, p. 120) points out that these changes are actually a sub-set of building adaptations. Earlier studies used field inspection to determine changes, Whitehand (1979, p. 563) seeking the oldest identifiable external ground floor feature and its relation to building age, and Luffrum (1979, pp. 121-122; 1980; 1981, p. 164) using a subjective impression as Whitehand's method "can on occasions be unrepresentative of the shopfront as a whole" (idem, 1979, p. 121).

Later studies (Whitehand and Whitehand, 1983, p. 490; Freeman, 1983, p. 2, 1986a; Whitehand, 1983a; Larkham, 1986a; Jones, 1987; Sim, 1976, p. 44, 1982) have identified faade changes from planning and building records. Cooper (1984, p. 13), Bastian (1978), Mattson (1983), Pain (1980, p. 44) and Blacker (1987) refer specifically to shopfronts, excluding - not specifically, but by implication - all other faades. Pain also makes a distinction between new and altered shopfronts, a distinction of scales that others (eg Sim, 1976, p. 44) do not use, partly owing to the difficulty of stating when an alteration becomes a whole new front. Pain (1980) does not resolve this problem. Larkham (1986a), working with both commercial and residential areas, includes some residential faade changes, particularly window replacements. Other changes such as extensions, which may also affect the faade, are not included; this is an inconsistency. A distinction is also made between faade alterations and those applications dealing solely with the placement of signs, whether they be nameboards or projecting signs on a shop faade, or others such as free-standing pub signs. This is owing to the number of applications for specific consent to display advertisements (Town and Country Planning [Control of Advertising] Regulations; latest edition 1984; see Heap, 1987, chapter 12). These would otherwise distort an all-encompassing faade category.

Fascia - *architectural term*: (1)A broad band, sometimes projecting, used in Classical architecture, eg in architraves. (2)The name-board above a shop-front; being derived from Classical prototypes employing fasciae.

First-cycle development : Initial development on green-field sites most frequently on the urban-rural fringe (Pompa, 1988). Later intensification of development or redevelopment on these sites is termed second-cycle development.

Fixation line - *Conzenian terminology*:The site of a linear feature that has, at some time, provided a barrier to development. Fortifications, such as a town wall, mark the traditional stationary fringe of an ancient town. During subsequent growth of the settlement it forms a line between the intra-mural and proximal extra-mural inner fringe belt. Fixation lines may also take the form of physical features such as rivers; man-made features such as railways; or even intangible features, eg local authority planning area boundaries, parish boundaries or the pattern of land ownership. As economic, social, demographic and political pressures for urban development exceed the barrier of resistance formed by a fixation line, the town will expand beyond its confines. It is usual that this urban fringe is of a lower density and of more open form than that part of the town inside the fixation line. Even when the physical structure of resistance is removed, forms on the ground tend to reflect the line of the barrier (for example, annular streets follow the line of walls).

Flatted terrace - ***building type*****:** A terrace of houses comprising one flat on each floor. Access is obtained through separate front doors, either along the street or from a courtyard. A characteristic form of Tyneside and London (Muthesius, 1982, pp. 130-137).

Form complex - ***Conzenian terminology*** **:** SEE: **element complex**

Fringe belt - ***Conzenian terminology:*** Fringe belts, or Stadtrandzone, were first identified by Louis (1936) in a study of Berlin. The city walls, and latterly the line of the city walls, formed a barrier to the physical growth of urban areas (SEE: **fixation line**. The concept was refined by Conzen (1960) in his study of Alnwick, and by Whitehand (1967a, 1974, 1988b). Conzen describes the fringe belt as "a belt-like zone originating from the temporary stationary or very slowly advancing fringe of a town and composed of a characteristic mixture of land-use units initially seeking

peripheral location. ... In towns with a long history this geographical result emerging gradually from these dynamics is often a system of successive, broadly concentric fringe belts more or less separated by other, usually residential integuments" (Conzen, 1969, p. 125) (SEE: **residential accretion**) A typical pattern would be: a first or inner fringe-belt (Conzen, 1960, pp. 58 et seq.) surrounding the kernel of a town, about an antecedent fixation line; one or more intermediate or middle fringe-belts (Ibid., pp. 80 et seq.) which are not usually closed and are separated from the inner belt by other, generally residential, integuments; and the most recent or outer fringe-belt (Ibid., pp. 105 et seq.) along the current urban-rural fringe. Fringe belts constitute a major element in the internal structure of cities (Whitehand, 1988b, pp. 54-55) especially where a fixation line has had a powerful constraining influence. The implications for townscape management are considerable. A regulated scheme of management is difficult to formulate in these areas of irregular form and low-density land use. Changes in fringe belts are discussed by Conzen (1962) and later by Whitehand (1974, 1988b) and Barke (1976, 1990). "The absorbtion of a fringe-belt component by a functionally different, usually residential, integument" (Conzen, 1969, p. 125) is referred to as fringe-belt alienation. Fringe-belt reduction is "the loss of component plots on part of a fringe belt either by fringe-belt translation or by alienation" (Ibid., p. 125), where translation is the transfer of a land-use unit, or plot, from an older fringe belt to a more recent one (Ibid., p. 126). There are problems with the definition of fringe belts (von der Dollen, 1990, p. 321). "..[T]he urban fringe-belt is characterised by spontaneity, not planning, and is typified by the singular relocation of individual functions from the centre to the periphery". Von der Dollen argues that where cities have expanded by administrative act, a fringe belt is not created, since "decisions on users, reasons for removal, and space requirements are here made at the lowest, individual, level, whereas city expansion requires a legal act". He thus defines fringe belt as both form and process. There is also a problem of scale and quantity. "Disparate residential development along arterial routes remains a characteristic of the urban fringe-belt until it is systematically integrated into the urban entity - a process which only results from a substantial growth spurt brought about by, and steered by, planned decision-making" (Ibid.).

Frontage - *Conzenian terminology*:The interface between main access street or waterway with the boundary of a plot. It is measured as the length of street line taken up by it (Conzen, 1960, p. 31). In the U.S., `front-feet' are sometimes used an a measure for apportioning assessments. A metrological analysis of burgage frontages in medieval towns (Slater, 1981) demonstrates that this division of plots reveals much about town development and the stability of plot frontage widths within planned extensions.

Genetic urban quarter : Those parts of a town that were planned as a unit at any time from the medieval period to the present day. Genetic urban quarters usually have particular functional, administrative or social characteristics represented within a plan-unit or layout. Examples may include planned medieval extensions; occupational quarters of early modern towns; factory suburbs; garden suburbs; villa districts; or building society estates. The term is found in the Germanic literature; this working definition was used during the Third Anglo-German Conference on Urban Historical Geography, 1988. The relationship between genetic urban quarters and morphological regions is, as yet, unresolved.

Genius loci - *Conzenian usage* :"The genius or guardian spirit of a place", used by Conzen (eg 1975, p. 82) to indicate the character of a location. Apparently

synonymous with the more popular term `spirit of place' (eg Ford, 1974). Occasionally used by planners and architects (Esher, 1988).

Geometrical analysis - *method of analysis*: Analysis of plots, particularly medieval burgages, with especial reference to relative proportions of width and length (Slater, 1988, 1990c, pp. 74-77).

Georgian - *architectural style*: Blanket name given to styles popular in the reigns of George I - IV. Mose of these were developments of the classical style, using regular symmetrical fenestration, using columns, pilasters, pediments, cornices hiding shallow-pitched roofs, and so on. Red brick and stone were predominant building materials; the former sometimes covered by stucco. Plan elements characteristic of this morphological period include squares, crescents and circuses (Summerson, 1962). Regency is a later development of this style (early C19th).

Green belt - *planning usage* : An area of predominantly open agricultural land surrounding major settlements where further urban expansion is strictly limited by legislation. Green Belts were initially envisaged by the Garden City Movement to set urban areas against a background of open country and containing only extensive land uses and agriculture (Howard, 1902); but it was not until 1938 that Britain's first formal green belt, around London, was legalised (Thomas, 1970). In a Circular of 1955 the Government encouraged local planning authorities to include green belts in local development plans. This conflicted with the need, in the largest conurbations, for new housing at the urban-rural fringe to replace dwellings lost in slum-clearance schemes. Belts around most large urban areas were proposed as a result of the 1955 Circular but not approved until the 1970s (Hall, 1982). Growing pressure for development within a settlement may `leap-frog' the constraints of the green belt to more distant, less strictly-controlled, areas (Hall et al., 1973; Munton, 1983) which are easily accessible by trunk roads and motorways, Land uses, except agricultural and some mineral extraction, are prohibited unless they encourage leisure and recreation. However, central government policy in the 1980s has weakened many of the green belt controls allowing selective - usually large-scale - residential developments in a `green setting'. With these changes to official policy, the future of the green belt concept is uncertain. A number of academics and planners favour a green wedge, rather than belt (G.E. Cherry, pers. comm.), allowing a greater proportion of quasi-rural land closer to city centres. However, local and county authorities are struggling to sustain the quality of their hard-fought-for approved green belt (Elson, 1986).

High street - *street type* : Main street of a (usually) smaller town; sometimes widened to form a street market; street name sometimes persists in larger towns and cities, but the function may have changed.

High-street layout - *Conzenian terminology* : "A medieval plan-unit showing traditional, long strip plots or deep burgages arranged in series on either side of a major traffic street widened to provide a street market (Ger. `strassenmarkt')" (Conzen, 1969, p. 126).

Historic district - *U.S. planning terminology* : U.S. equivalent to U.K. conservation area.

Historicity - *Conzenian terminology:* Historical expressiveness, usually in relation to the townscape. Frequently used to denote the embodiment in the townscape of the creations of past societies.

Infill: A general term used to categorise the increase of densities in a townscape as repletion occurs. OED notes first use in this context in 1971 - P. Gresswell,

Environment, "it is possible to `infill' between two distant houses...". See Whitehand (1989); Whitehand and Larkham (1990).
Integument - *Conzenian terminology*: Additions and extensions to the town beyond the limits of the traditional kernel plan-units (Conzen, 1960, pp. 82, 103, 116-118). In U.S. terms, an `annexation'. Integuments may be residential extensions of a single morphological period, such as Victorian villa suburbs (Slater, 1978) or fringe belts.
Land use : The functional application within a unit of land. This has been controlled in towns from the medieval period, where undesirable land users, such as tanners, were relegated to the urban periphery (eg Keene, 1985; Czok, 1979, p. 12). Development around such land-uses may form extra-mural suburbs. Since the Town and Country Planning Act, 1947, local planning authorities have been able to exert control over urban land uses through development plan procedures and, at a micro-scale, by the refusal of planning applications. In the U.S., land use is controlled by a process of `zoning'.
Land-use unit - *Conzenian terminology*: SEE: **plot**
Leading type - *Caniggian terminology* : SEE: **tipo portante**
Lot : North American usage for plot.

Main street - *street type*
North American usage - SEE: **high street**
Major rebuilding - *fabric change*: Defined as the rebuilding of the majority of a site to give a new form, but where some of the old structure remains. Ross (1979) suggests that if over 20% remains, the change should be called a rebuild (he uses the term `building replacement'); however, without measurement of walls, floor area etc., it is difficult to be quite so precise about this. Ross (1979), Pain (1980), Whitehand and Whitehand (1983) and Freeman (1983, 1986a) extend the category of new building to include major rebuilding. Larkham (1986a) counts it separately. It is impossible (unless there is access to the raw data) to disaggregate a study that has amalgamated these two categories.
Major traffic street - *Conzenian terminology - street type*: "A street carrying regional traffic into and through the built-up area of a town" (Conzen, 1969, p. 126) (Ger. `Verkehrsstrasse', hist. Fr. `carrire'). Many such streets, having been thoroughfares since the medieval period, have been by-passed by new roads skirting the kernel as modern traffic flows become excessive.
Market: A gathering of people for the sale and purchase of provisions, livestock etc. In the medieval period, the acquisition of the right to hold markets, although not a guarantee of success, was vital to the growth of towns, particularly planned/planted towns. The creation or, more frequently, confirmation of market privileges by the monarch was often the first step towards borough status, was part of the general urbanising process, and reached its peak under Henry II and Edward I (Platt, 1976a, p. 31; See Beresford, 1967). For a central European example of the influence of the market in early urbanisation, see Schlesinger (1985).
Market church: Church in a market place; usually having no graveyard, and often originating as a daughter chapel of a mother church that retained burial (and other) rights.
Market colonisation:Process whereby market places were occupied by buildings. This usually took the form of temporary market stalls acquiring a permanent status and being replaced by permanent buildings; characterised by not having plots other than the land actually occupied by the building itself. SEE: **concretion; encroachment** A further stage of colonisation is the development of a market hall as

market functions expand. Other features of colonisation are the market church and market cross.

Market place:Ger. der Markt; Polish targ. A public place, or space, for the purpose of buying and selling; most often at the centre of a town - although during the British civic replanning in the post-war period, many such market-places were removed to the edge of the town centre. Morphologically, the market place is a plan unit most often as an open area populated by itinerant market stalls on market days. As the market becomes more established, the stalls become permanent (SEE: **market colonisation**. Market places take a variety of forms, that may reflect the period or nature of settlement foundation or planning (Golachowski, 1956). The oldest derive from village greens, common open spaces and the triangular junctions of roads. Triangular market places (eg Alnwick [Conzen, 1960] and Taunton [Aston and Bond, 1976]) are typical of this latter derivation and of markets at the gateways of abbeys, mostly founded in the C11th and C12th. Widened street markets (eg Henley in Arden [Aston and Bond, 1976]) are typical of market towns with no focal junction, a single street town plan. This plan type seems to be typical of the post- c. 1100 period (Ibid., p. 89). The last major market type is trapezoid, commonly known as market squares. These may be regular squares or rectangles in a regular grid-plan layout, or more irregular trapezoids where the ideal regular grid cannot be achieved in practice (eg Lichfield [Slater, 1986b, 1987]).

Market town - *settlement type* :Ger. Markstadt. Town with a major marketing function for a surrounding hinterland; has morphologically characteristic market features.

Medial plot - *Conzenian terminology* :A derivative plot developing in the middle of a strip plot between the plot head and plot tail. Medial plots will only develop where there is a longitudinal line of communication, since they have no access to the frontage street or the back lane (Conzen, 1960, p. 65).

Metamorphic plot pattern - *Conzenian terminology*:"A plot pattern showing secondary changes caused by amalgamation, division and truncation of plots" (Conzen, 1969, p. 127). These changes occur within individual street blocks and involve no change to the street system.

Monastic urban elements:Urban elements deriving from monastic influences are important in many European medieval towns. Such influences range from the large plots and extensive ranges of buildings for monastic use, often found on developing fringe belts to individual monastic town houses or Klosterhfe. Monastic elements may also act as pre-urban nuclei.

Morphogenesis : The creation of physical forms viewed as a developmental or evolutionary process (Whitehand [Ed.], 1981, pp. 1-24).

Morphography - *method of analysis*:The description of forms without reference to their origins and mode of development (Whitehand [Ed.], 1981, p. 13).

Morphological conformity - *Conzenian terminology*:The manner in which a plan unit corresponds with the existing plan outline, or morphological frame.

Morphological frame - *Conzenian terminology*:"An antecedent plan feature, topographical outline, or set of outlines exerting a morphological influence on subsequent more or less conformable plan development, and often passing its features on as inherited outlines" (Conzen, 1969, p. 127). The pattern of development forming the kernel of a town often provides a constraint to the form of future development in the area. The pattern of plots and streets therefore has a morphological influence upon later development. The presence of a rapid change in gradient, or the course of a river, forms topographical outlines around which the

development of the town is, initially at least, constrained. See Slater (1989a) for the use of the morphological frame in the analysis of Doncaster. The morphological frame is also an important element in the redevelopment of residential areas (Jones et al., 1988) within the scope of Conzenian townscape precepts.

Morphological period - *Conzenian terminology*:Any cultural period that exerts a distinctive morphological influence upon the whole or any part of a town. The forms resulting will represent the socio-economic needs of that society and will survive to a varying degree as residual features depending upon the needs of successive societies (see Conzen, 1988). The products of cumulative historic morphological periods make up the morphological frame. There are few sharp boundaries to morphological periods (Whitehand, 1984).

Morphological processes :The set of process shaping urban form. These include adaptive, additive, repletive and transformative processes.

Morphological region - *Conzenian terminology* **:**An area of homogenous urban form in terms of plan type, building type and land use (Conzen, 1975). Conzen suggests, but inadequately defines, a hierarchical order of morphological regions, the smallest of which is the morphotope (Conzen, 1988).

Morphology (urban):The study of form. OED, the history of variation in form (first use 1885); term used by Goethe (Wilkinson and Willoughby, 1962). Thus, urban morphology refers to "the study of the physical (or built) fabric of urban form, and the people and processes shaping it" (working definition advanced by Glossary editors). Use in English in this context dates at least to Leighly (1931). In urban design, the term is proncipally used for "... a method of analysis which is basic to find[ing] out principles or rules of urban design" (Gebauer and Samuels, 1981); although they also note that the term can be understood as the study of the physical and spatial characteristics of the whole urban structure: this is closer to the geographer's usage.

Morphometric analysis - *method of analysis*:Analysis of the form of urban plots (SEE: **metrological**and SEE: **geometrical** analysis). Used principally of burgages. Conzen (1988, note 25) provisionally suggests 3 types of burgage, based on morphometric analysis of the length:width ratio (E). E = 4 or less= shallow burgage E = >4 - 7= medium burgage E = >7= deep burgage.

Morphotope - *Conzenian terminology*:"The smallest urban localities obtaining distinctive character among their neighbours from their particular combination of constituent morphological elements" (Conzen, 1988, p. 259). These elements consist of the characteristics of plan type, building type and land use (Conzen, 1975). A morphotope is essentially the smallest type of morphological region. .

New building - *fabric changes*:The construction of a wholly new building on a cleared or new site. This category and that of major rebuilding have unfortunately suffered from a multiplicity of names, from `major rebuild' (Whitehand and Whitehand, 1983, p. 487), `new building' (Larkham, 1986a, 1988a; Cooper, 1984, p. 13) and `building replacement' (Ross, 1979, p. 13; Whitehand, 1979, 1983; Luffrum, 1979, 1980, 1981) to `redevelopment' (Whitehand, 1978, 1984; Freeman, 1983; Sim, 1976, p. 73; 1982). Callis (1986, p. 6) uses `total rebuild', `rebuild' and `redevelop' interchangeably. Whitehand and Whitehand (1983) and Freeman (1983, 1986a) amalgamate this category with that of major rebuilding, a potential source of confusion. A number of different strands need to be disentangled. Redevelopment appears to be an unsatisfactory term, as it has strong association with planning usages such as `comprehensive redevelopment'; indeed Heap (Ed.) recognises no

other legal meaning for the term. Nevertheless, it has been used as a blanket term for new building by Whitehand (1979) and Bateman (1971). It seems to imply larger units than the single plots most often considered in these studies. Where larger units are involved, eg in the construction of a shopping centre, then use of redevelopment may be valid: but at what level is the line drawn - how many plots are required to become a redevelopment? If the term is used, it should follow Conzen's (1969) definition. Building replacement likewise has connotations, but with single plots: for if many plots are involved, then development becomes more than replacement and becomes redevelopment, as above. New building may entail construction on a new plot, a cleared site (which may already be vacant, or be cleared especially for this development) or may be on a subdivision of an existing plot. The former is rare in town centres; the latter is common in mature residential areas having extensive original plots (Jones et al., 1988). Complementary building development occurs on plots left vacant during the first cycle of development. Ross (1979, p. 13) states that "in reality, a continuum exists between building replacement and building adaptation rather than a sharp break. Therefore, although the definition of a replacement was accepted as the demolition of an existing form and the building of a new one in its place, there was a need to be flexible ... it was decided to apply the criterion that at least 80% of an old building had to be demolished to constitute a replacement".

Objectivate - *M.R.G. Conzen's usage* :"To render objective" (OED: first use in the Contemporary Review vol. XXI, 1873). Used by Conzen (1966, 1975). Not `objectificate', OED "the action of objectifying, or condition of being objectified". To make concrete, to make obvious.

Old Town :SEE: **altstadt, kernel**

Orthomorphic plot patterm - *Conzenian terminology* :A plot pattern, of whatever age, that has experienced no change to its form through subdivision, amalgamation or augmentation or in any other way. Conzen (1960, pp. 69-70) uses the term with regard to burgage series, but it may equally be applied to residential integuments and other plot patterns.

Ostsiedlung: The colonising settlement movement of German-speaking peoples east of the Elbe into Slav lands as farmers, traders and merchants.

Parallel street plan:A street layout in which the principal streets are approximately equidistant. Various types of parallel-street system were employed in planned towns created during the German colonisation of east- central Europe (the Ostsiedlung), especially during the later medieval period (Siedler, 1914).

Parent plot - *Conzenian terminology*:"An original or primary plot from which secondary or derivative plots have been carved by partition" (Conzen, 1969, p. 128). Parent plots are the product of an original layout or design. They exist, unaltered, in an orthomorphic plot pattern but over time become divided and/or amalgamated. Conzen (1960, p. 56) illustrates this by describing a burgage series, but it may equally be applied to any `original' plot in any layout (see, eg, Jones et al., 1988, pp. 13-17).

Plan:SEE: **town plan** (1)A drawing made by projection on a horizontal surface especially showing relative parts of (one floor of) a building. A large-scale map of a district (OED). A plan is usually of such a large scale as to differentiate between elements of the town plan. The most common plans used for studies or urban form in Britain are the Ordnance Survey 1:500, 1:1,250 and 1:2,500 series. (2)planning terminology Colloquial term for planning document: in England, Structure Plan,

Local Plan, Unitary Development Plan (Heap, 1987); in the U.S., a Master Plan or Comprehensive Plan may legally be mandated and development may legally be required to be `in accordance' with it.

Plan division - *Conzenian terminology*:"A geographical group of morphogenetic plan-units, a morphogenetic plan `region' within the town. Urban plan divisions are arrenged in a hierarchy of two or more orders depending upon the size and complexity of the town. The kernel or Old Town, with or without its inner fringe belt depending upon the character of that belt, forms a plan division of the first order as does the totality of integuments outside. Individual integuments are plan divisons of the second order" (Conzen, 1969, p. 128). Individual planned layouts will also form plan divisions of the first order; plot series or street blocks of similar character would constitute second-order divisions, and plots or collections of plots containing similar urban forms may form a third-order plan division. The identification of plan-divisions has many implications for townscape management. If plan divisions, or townscape regions (Conzen, 1988), are areas within a town that are morphologically similar, then second-cycle treatment of these areas may be more sympathetically undertaken as areas of similar form require similar policies for change.

Plan element - *Conzenian terminology*:The town plan may be divided into three consituent parts or elements: streets, and their arrangement into a street system; plots and their aggregation in street blocks; and buildings within those plots (Conzen, 1960, p. 5). Each combination of these plan elements derives a uniqueness from the characteristics of site and the established morphological frame.

Plan analysis - *method of analysis*:Often used as shorthand for town-plan analysis.

Plan unit - *Conzenian terminology*:A plan unit may be identified in any part of the town plan that is morphologically different from its surroundings - in terms of its streets, plots and buildings. This may be undertaken at differing scales from layouts to individual morphotopes and applies to any area that exhibits internal homogeneity and morphological disunity with neighbouring plots (Conzen, 1960, p. 5, 108 et seq.).

Plot :(1)colloquial Piece, usually small, of ground (OED). (2)Conzenian terminology "A parcel of land representing a land-use unit defined by boundaries on the ground" (Conzen, 1969, p. 128). It is a plan element.

Plot accessory - *Conzenian terminology* : A building associated with the land use of the plot but not the primary or plot dominant building on that plot. Plot accessories are usually in the `garth' or garden at the tail of the plot. In the medieval town, accessories would have originally been subsidiary buildings to the mercantile function of the plot (Conzen, 1960, pp. 31-32). In residential integuments, accessories may include greenhouses, sheds and garages or, in areas of mixed land use, workshops (for examples see Burnett, 1978, chap. 3).

Plot amalgamation - *Conzenian terminology*: A process typical of the burgage and redevelopment cycles. Occurs when the requirements of a society become different from those existing when the areas were originally laid out.

Plot boundary: A division between plots, often also separating land ownership units. Primary plot boundaries (Slater, 1981) exist as relict features of the orthomorphic plot pattern. Characteristically, they are straighter and longer than subsequent boundaries that have been added to the morphological frame.

Plot cycle:The burgage cycle is the best-known plot cycle; but similar developmental cycles have been shown to operate for plots in residential areas (Jones, 1990) and town centres (Koter, 1990).

Plot dominant - *Conzenian terminology* :"The main building associated with the land use of the plot" (Conzen, 1969, p. 128). In medieval towns the plot dominant most frequently occupied much of the street line at the plot head. The remainder of the strip plot (whether burgage or toft) would contain subsidiary buildings or plot accessories. In residential areas the plot dominants follow a building line set back from the street line allowing room for a front garden. Areas of lower residential density tend to have a less formal arrangement of plot dominants.
Plot head - *Conzenian terminology* :"The smaller but usually more important front part of a strip plot [or other plot] including the frontage and any other land under, and close to, a plot dominant placed on or near the street line" (Conzen, 1969, p. 128).
Plot pattern - *Conzenian terminology*: The arrangement of plots - considered deparately from the other plan elements - up to the level of street blocks. Areas of homogenous plot pattern may result from a laid-out plot series or formal layout, the constraints of the morphological frame or planning controls.
Plot ratio - *planning terminology*: SEE: **building coverage**
Plot series - *Conzenian terminology*: A row of adjacent plots that share similar building line and development characteristics.
Plot tail - *Conzenian terminology*: "The larger but usually less important rear part of a strip plot, rarely occupied by a plot dominant" (Conzen, 1969, p. 128). This area, which typically has poor access, is developed to a much lower density than the plot head, and contains plot accessories and the garden (whether for recreation or quasi-productive uses).
Pre-urban nucleus - *Conzenian terminology* :A plan-unit that pre-dates the development of a town. It usually comprises a church and often buildings of an ecclesiastical order (SEE: **monastic urban elements** (Slater, 1987, pp. 191-203), or a fortification (Conzen, 1960, p. 21), which gives rise to the settlement adjacent to it. Note, however, that some castles were imposed on existing settlements during periods of colonisation. The pre-urban nucleus is most often the first plan unit (providing the stimulus for further development) (SEE: **urbs** and is followed by an early suburban integument, which together form the kernel of the Old Town. See Clarke and Simms (Eds), 1985, pp. 30, 108, 499, 672, 678, 696.

Primary plot boundary:SEE: **plot boundary** :
Proto-urban/proto-town - *settlement type*:In English usage there is a difference in emphasis between proto- and pre-urban, but there appears to be no consistency of usage (Clarke and Simms, 1985, p. 672). Proto-towns "were not towns, but they possessed some of the attributes of genuine towns. The concept corrsponds to the recognised anthropological feature of many societies - that it is common for settlements to be in a state of transition from village, camp or sanctuary to town. This is not to say that all medieval towns in non-Roman Europe necessarily went through such a phase before emerging as fully developed towns" (Ibid., p. 673). It has also been stated that "it is not possible to sustain proto-urbanism: a site is either urban or it is not" (Hodges, 1982, p. 23). This statement appears to ignore often lengthy phases of slow growth and accretion of functions, tending towards the outmoded view of town creation by legislative fiat (SEE: **town** para. 2).
Pseudo-street sysyem - *Conzenian terminology*: A pattern of streets that develop within a plan unit as a result of building repletion. The streets are commonly narrow and unsuitable for traffic, but do serve to connect antecedent streets at either end and provide much-needed access to the plot tails of strip plots (Conzen, 1960, p. 66).

Redevelopment - *Conzenian terminology*:Defined by Conzen (1969, p. 129) as the "development of previously cleared central urban land in response to socio-economic revaluation of the area. May take the form of new building layout or other design for a new land use, replacing the whole or part of an obsolete plan unit ...". Conzen's subdivisions of redevelopment into augmentative and adaptive are also useful, as is his identification of the redevelopment cycle. The term applies to all land having undergone first-cycle development; it is not restricted to central urban areas.
Redevelopment cycle - *Conzenian terminology*: The process of redevelopment in response to changing socio-economic revaluation of capital investment. In British towns the first redevelopment cycle is usually towards the end of the C18th, when many medieval plots were first cleared, then lay as urban fallow, were amalgamated and redeveloped with broadly constant building coverage towards a climax phase. Then follows a period of piecemeal replacement or a return to a period of urban fallow (Conzen, 1960, p. 91, 94). The burgage cycle is a specialised form of redevelopment cycle; SEE: **plot cycle**
Replacement - *Conzenian terminology*: The rebuilding or redevelopment of individual buildings, usually the plot dominants. replacement does not include change that involves the amalgamation or subdivision of plots, but only the substitution of the block plan of one building for another (Conzen, 1960, p. 69). SEE: **building replacement**

Repletion - *Conzenian terminology* :The gradual intensification of building density in an existing plot pattern. These secondary buildings can be additional plot dominants on derivative plots (alongside the existing back lane). Alternatively, repletion takes the form of new plot accessories which develop with the socio-economic requirements of the occupiers through time. Repletion occurs in all types of plan unit as the redevelopment cycle progresses. Conzen (1960, pp. 59, 66 et seq.) illustrates this for the medieval town, and Koter (1990) the modern town centre. SEE: **building cycle, burgage cycle, plot cycle**and SEE: **redevelopment cycle** residential repletion is "the colonisation of a large residential plot by dwelling-houses on derivative plots either in the form of a conforming repletive layout or by piecemeal individual repletion. Retention of the antecedent plot dominant on its residual parent plot usually produces architectural incongruence" (Conzen, 1969, p. 130). Residential repletion is one form ofsecond-cycle development and is particularly common in the post-WWII period as the socio-economic requirements of society changed, lessening the need for large houses with large gardens. The effects of piecemeal repletion and redevelopment have been particularly marked in south-east England (Whitehand, 1988, 1990; Jones, 199), but are a nationwide phenomenon (Booth, 1989; Jones et al., 1988; Pompa, 1988; Whitehand and Larkham, 1990). Consequences for the character of the townscape owing to architectural incongruence and increasing residential densities can be severe (Whitehand, 1990).
Residential accretion - *Conzenian terminology*:The addition of dwelling houses to the edge of the built-up area. According to the fringe-belt concept, outward urban growth consists of alternating residential accretions and fringe belts. SEE: **accretion**
Residential development unit - *Conzenian terminology*:An accretionary plan unit, otherwise termed a residential integument, that is formed by the release of land for development. Both residential layouts and arterial ribbons are such units (Conzen, 1960, pp. 71-72, 85 et seq., 97 et seq.).
Residential gross density - *Conzenian terminology - planning terminology*: `Density' is in common use to express these concepts. "The number of houses per

unit of land including the plots and all streets providing sirect access to them. The term applies to an individual plot as well as to a plan unit. In the latter case it is an average value" (Conzen, 1969, pp. 129-130). It is expressed by local planning authorities as a number of houses, or number of habitable rooms, per unit area. The definition of a `habitable room' is not consistently applied, and usage varied from one authority to another. In most cases, a habitable room includes bedrooms, reception rooms, dining/breakfast rooms and studies, but not hallways, kitchens, bathrooms or storage spaces (City of Birmingham, 1987, p. 6). Density is used extensively by local planning authorities as a measure to ensure good standards of design and layout. Lower than average densities are favoured in situations where the site contains natural features, such as trees; the existing residential density is low such that new development should be of a similar character; access to the site is a problem; or where public amenity space is required. Conversely, higher desnities would be required where the site is close to a town centre; in an area where the scale of development justifies higher densities for reasons of civic design; in areas where dwellings for small households are acceptable; or in areas where mixed housing types are preferred. Areas of special townscape value, such as conservation areas, frequently have density controls included in any formalised scheme of management. These values will be stated in the local plan or other policy documents (eg City of Birmingham, 1987, pp. 4-6; London Borough of Hillingdon, 1981a, pp. 10-11, 1981b, pp. 2-8).

Residential ribbon - *Conzenian terminology*:SEE: **arterial ribbon; ribbon development**

Residential street - *Conzenian terminology* - *planning terminology* - *street type*:A street accommodating traffic to and from adjoining residential plots only (Conzen, 1969, p. 130) (Ger. Wohnstrasse). In planning usage, this term has a meaning allied to residential land use rather than to the traffic flow pattern.

Ribbon development: The extension of urban development along an existing arterial road. This is a particular characteristic of urban growth in Britain from the mid-C19th to the inter-war period. Pressure from planners and rural conservationists against this sprawl led to the Ribbon Development Act, 1935, which prevented any worsening of the effects of rural degredation, decentralisation of homes and traffic congestion. Solutions to the problem were not offered until the reorganisation of local planning in 1947 (Conzen, 1960, pp. 44, 69-70; Hall, 1983, pp. 30-41). SEE: **arterial ribbon**

Row - *Conzenian terminology*:A line of plot dominants occupying the full street frontage but of diverse architectural design. This form of closed building development is typical of the kernels of historic towns (Conzen, 1960, p. 32). Contrast with row houses.

Row houses : (1)Applied in medieval contexts: a rare survival is modified form is the Rows in Chester (Chester Archaeological Society, 1984). (2)North American term for terraced housing. .

Second-cycle development: Repletion of development within an area that has undergone virtually complete first-cycle development. In the residential townscape, this usually takes the form of single or multiple plot redevelopment, and the addition, or infill, of new dwellings by plot truncation or mediation (Pompa, 1988, pp. 79-80; Jones, 1990).

Semi-detached house - ***building type***:One of two houses attached by a party wall but separated from other buildings. These became popular during the Victorian period when the suburban villa residence became a feature of lower-middle class housing

and gave the impression of a large detached dwelling (Slater, 1978). Popularity peaked in the inter-war period when the expansion of British cities, both by local authorities and speculative developers, predominantly used universal plan semi-detached designs (Edwards, 1981, chap. 3; Bournville Village Trust, 1941, p. 38). These are typified by the Metroland developments of north-west London (Jackson, 1973).

Set-back - *U.S. planning terminology*:U.S. zoning regulations controlling permitted amounts of floorspace, whereby the upper floors of tall buildings are set back behind the building line of the ground floor. This admits more daylight to street level, and avoids canyon-like streets (Moseley, 1986).

Special type - *Caniggian terminology*:In Caniggian analysis, all building types other than dwellings are special types of any urban tissue (Samuels, 1982, p. 3).

Street - *Conzenian terminology - street type*:A town or village road that has more or less closed building development along its length. It is a space (street-space), is bounded by street lines and is provided either for through traffic - a major traffic street - or for access to parts of a plot - an occupation street - or a solely residential street. It is a plan- element.

Street block - *Conzenian terminology*: A group of plots bounded by street lines (Conzen, 1960, p. 5).

Street density - *Conzenian terminology*: "The average street length per unit of urban land" (Conzen, 1969, p. 130).

Street line - *Conzenian terminology*:The line dividing street-space from adjoining street blocks (Conzen, 1960, p. 5).

Street market : Street used, and often widened, to accommodate market functions: SEE: **market place**

Street system - *Conzenian terminology:*The arrangement of streets within the town plan, of which it is an element complex (Conzen, 1960, p. 5).

Strip-plot - *Conzenian terminology:* An elongated plot with one of its shorter boundaries forming the frontage with the street. An occupation road or back lane often provides access to the plot tail. The layout of burgages is a typical form of strip plot. Subdivision (mediation) of plots heightens this characteristic, as the high rental value of street frontages is maximised (Conzen, 1960, p. 28).

Subdivision - *fabric change* :Plots may be divided horizontally or vertically: SEE: **plot cycle** See Shiramizu and Matsumoto (1986).

Tail-end plot - *Conzenian terminology*:A derivative plot occupying the tail of a parent plot, being the result of plot truncation (Conzen, 1969, p. 56).

Timber-framed building - *building type*:Building with a main structure of timber, making up a series of frames (cross, wall, roof and floor), jointed together. Early urban examples rarely survive; examples from the C15th onwards are more common. Small urban plots (commonly subdivided burgages) and high land values led to modifications of rural timber-framed house plans, giving taller buildings commonly with oversailing upper stories (known as `jetties'). Buildings using this type of construction usually appear as `half-timbered' (also known as `black- and-white' from their usual, albeit probably Victorian, appearance). They are commonly referred to as Tudor, although by no means all examples date from this period. C20th `black-and-white' buildings are rarely structurally timber-framed; the timber and infilling is solely decorative: these buildings may erroneously be termed half-timbered, but are better known by the style name neo-Tudor.

Tipo portante - *Caniggian terminology* :Italian, `leading type'. Concept developed by Caniggia, where there is optimum relationship between the building type and the urban fabric at a given period and location, as both are constructed simultaneously. This occurs only in extensions to settlements developed during periods of urban expansion. At any given period, the leading type is thus found on the expanding fringes, while earlier buildings will have been modified to incproprate features of the new leading type. See Samuels (1982, 1990).

Town - *settlement type:*Smaller urban area; but `town' is undefined as to exact size or function. In the U.S. `city' is usually preferred for most settlements above c. 5,000 population: `towns' are rare. Note that there is considerable debate over what constitutes a medieval `town' (not unrelated to the debate on boroughs). The C19th emphasis on market law or municipal law as the essence of a medieval town has largely been abandoned in favour of a functionalist approach (Clarke and Simms, 1985, pp. 674-676; Schledermann, 1971).

Townscape cell - *Conzenian terminology*:The smallest of a hierarchy of unitary areas within a town, often a plot or a small group of plots (SEE: **morphotope**.

Townscape region :SEE: **morphological region**

Transformative processes - *Conzenian terminology*:A sequence of activities whereby change in brought about to existing urban forms (contrast with additive processes).

Tunnel-back dwellings - *building type*:Terraced houses, most often of the late-Victorian or Edwardian periods, in which external access to the rear of the dwellings is obtained through passageways located at intervals on the street frontage. Also a variant of the earlier court housing where the courts were completely enclosed by houses and were accessible only through narrow passageways, called tunnels (Muthesius, 1982, p. 108; See Brunskill, 1978, pp. 112-113).

Tudor - *architectural style*: Common term for architecture popular in the Tudor period, refers almost exclusively to timber- framed buildings, although there are good examples of Tudor brickwork.

Urban fallow - *Conzenian terminology* :Land, within the urban fabric, that is temporarily disused owing to socio-economic devaluation. This concept was developed by Conzen from the Sozialbrache (social fallow) of Hartke (1953). It forms part of the burgage, plot and redevelopment cycles, when land has been cleared but no new development, initiated by socio-economic revaluation, has begun (Conzen, 1960, p. 94).

Urban fortifications:The walls, towers, bastions, ditches, moats and glacis of the fortified town (see Barley, 1976); includes urban castles, although in many cases the primary function of the castle was not the protection of the town itself. Such fortifications usually ringed the kernel of the town, forming a barrier to development; a fixation line; but, when cleared (often in the C18th-C19th in Europe) afforded an opportunity for certain types of development, including ringstrasse.

Urban fringe belt - *Conzenian terminology*:SEE: **fringe belt**

Organisms: Is in contrast a hierarch of complementary and reciprocally inter-functional attributions identifying each part. The distinction between settlement and urban which can be use particular in examining territory, appears to be quantitative at first sight.

Urban landscape : Term more usually used in scholarly writing (eg Whitehand [Ed.], 1981; Whitehand, 1988a). Virtually synonymous with townscape.

Urban tissue - *Caniggian terminology:*In Caniggian analysis, the urban tissue is the ensemble of aggregated buildings, spaces and access routes (Samuels, 1982, p. 3).

Victorian - *architectural style*:Styles of the reign of Victoria (1937-1901), sometimes extended into the Edwardian period. Usually divided into three periods: early Victorian (1837 - c. 1855), characterised by Classical styles, mid- or High-Victorian (c. 1855 - c. 1875), characterised by neo-Gothic, and late Victorian (c. 1875 to the turn of the century), characterised by an increasing eclecticism in the use of historicist stylistic elements (Dixon and Muthesius, 1978, pp. 17-28).