Analysis on Urban Morphology Transformation of Historic Urban Centre in Spanish-American Colonial City: Case Study on City of Granada, Nicaragua

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Analysis on Urban Morphology Transformation of Historic Urban Centre in Spanish-American Colonial City
—Case Study on City of Granada, Nicaragua—

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In Spanish-American cities the centre has followed a particular pattern that gives it an important recognition in the shaping of the urban structure. The origins can be traced back to the Law of the Indies, where the Spanish prescribed the structure around a square. Therefore, this study focuses on the physical form of the city, which means characteristics and typologies of block and lot sub-division as well as the traditional colonial Spanish housing type through the case study of City of Granada, Nicaragua. First, it explores the original block typology based on the Law of the Ladies in order to point out the shape, dimension and proportional attributes. Then, it clarifies the present conditions and how it evolved through the urban process, showing as a result the present block and lot typology. The results are useful for identifying the existent physical conditions of the HUC of Granada, and in addition, it clarifies the major transformation of the urban environment.

Keywords: Historic Urban Centre, Block, Sub-division, Spanish Colonial Housing, Conservation

1. INTRODUCTION

1.1 Background

Today, most of Latin American cities keep the original Spanish style in the Historic Urban Centres (HUC) which present the past with buildings, monuments, streets, and plazas. Nevertheless, these centers that used to be the attractive main core of the urban development now show different conditions, because these cities today must accommodate an increasing numbers of cars, a higher density of buildings, and ever more services.

The economic and social situation of most of the Latin American countries has transformed these HUCs to become the poles attracting immigration and deriving in high density low-income housing, disordered mixed land use, low urban fabric in contrast with high rise buildings, congested traffic and large number of street vendors. Such changes inevitably have resulted in a change in character, demolition of historic buildings, and the compromise of open spaces.

Since the HUCs are associated with architectural merit, a consistency of building materials, and tangible evidence of past lifestyles (International Seminar on Urban Form: 2006), and due to the fact that many of them are considered as historical heritage by the UNESCO World Heritage Convention, there is a need to improve and conserve in order to make them more attractive and lively areas. The present situation of HUCs shows an increasing impact of contemporary architecture and infrastructure increasingly indifferent to the historic context, as well as insufficient criteria to manage the impacts on the historic urban landscape. These impacts can be recognized with the incompatibility in volume and scale with the historic urban patterns, the destruction of traditional typologies, the breaking of the continuity and in some cases, with the high-rise constructions.

This study, therefore, focuses on the transformation of the urban morphology in historic urban areas through the survey and analysis in the case study on City of Granada, Nicaragua located in Central America, which is an example of a Spanish-American colonial city. The city illustrates the distinctive contribution in the Spanish colonial architecture and urban structure remained almost intact. It has been selected as a case study because the HUC of Granada represents an active and lively centre that still functioning as CBD with the main economic activities and urban facilities since its foundation. And also, it has been developed as an historical city by the government of

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Nicaragua, and its protection and preservation has been promoted as well.

First, the study explores the typology of block and lot subdivisions as the basis for the construction of building types. Consequently, it focuses on the traditional colonial housing as a representative building typology of the historic urban environment.

1.2 Objectives

This study mainly aims to clarify the present condition and transformation patterns and typologies of block and lot subdivision as well as the present condition of traditional colonial housing uses. Therefore, this study pursues the following objectives:

1. To identify the existent typologies of block and lot subdivision in the target area of City of Granada in order to clarify the transformations, current uses and their relation with the characteristics of the traditional Spanish colonial housing building type.
2. To identify and clarify the evolutionary process and types of transformation of the traditional Spanish colonial housing building types.

1.3 Research Method

The research method of this study consists of the field survey and analysis for categorization. The urban morphology elements such as block, lots sub-division and building type were all surveyed in December 2005. The analysis was made by starting with the morphology of blocks and lots. The blocks were analyzed on the basis of two different original forms; the first analysis consists on the geometrical shape of blocks based on the Law of the Indies, and secondary is based on the presence of urban design elements such as squares, public open spaces, streams and urban heritages that represents landmarks of the city.

Then, based on the original sub-division and historical plans and the urbanization process through the review of the documents of the previous study, the process of transformation and subdivision of blocks is clarified, and then the present typology of lots is derived.

Categorization of block, lot and building types is constructed in order to point out the relationship that the original grid pattern layout of blocks and streets which have influenced the building shape and the urban environment. Through the case study of City of Granada, it can be expected that, such categorization of different typologies will contribute for improvement of specific elements from the historical urban environment, which will form the database useful and helpful for creating a new guideline for urban design and conservation.

2. PRESENT CONDITION

2.1 Outline of Nicaragua

Nicaragua is located in Central America Isthmus (Fig.1). It is the largest country with 129,494 km² in Central America, and is more geographically varied than any country in the area.

Nicaragua is divided in three major geographic regions: Pacific area, Caribbean lowlands, and the Central highlands located between both of the regions and most extensive in north. Since colonial times, settlers have pushed slowly eastward into the central highlands. Nicaragua is a nation of farmers like its neighbor countries in Central America. Since early colonial times, the densely populated Pacific area has been Nicaragua’s main centre of subsistence and commercial agriculture. The first Spanish cities of Nicaragua were City of Granada and City of Leon, and both of the cities were founded in 1524 on the banks of lakes.

2.2 Outline of City of Granada

According to the Central American history, the City of Granada was one of the first colonial cities founded by the Spanish in the region of Central America, which means that the city is an example of an old colonial town founded by the Spanish during the 16th century that still is in tact with its original urban structure until now. As many other Latin American cities, it was founded as a strategic harbor city to connect the commercial routes and the slave traffics from Latin American territory to Spain.

The City of Granada has been developed as an important historical city by the government of Nicaragua, and its protection and preservation has been promoted due to its cultural and historical value. Nowadays, since the colonial city of Granada represents the significant places that illustrate the distinctive contribution in the Spanish colonial architectures and urban structures that have remained almost intact, it has become an important tourism city to visit. It is well maintained with Spanish colonial urban

Fig. 1: Location Maps of Nicaragua and Granada
patterns and architectures, among which the patio housing is the most representative type that in many cases keeps its original structures and construction materials.

2.3 Present Condition of the HUC

The City of Granada has an urban structure based on one main center and three sub-centers, and all of them are located inside the boundaries of the HUC (Fig. 2).

Main Centre: It represents the original structure of the foundation period composed by the Main Plaza and surroundings. It is the main public urban space for diurnal nocturnal activities, and also called “Parque Colon”.

Sub-Centre “Xalteva”: It was the indigenous town established before the Spanish conquest and colonization period. It is the oldest urban place in the age when the city was controlled and dominated by the Spanish after they colonized Nicaraguan territory.

Sub-Centre “Parque Sandino”: Located on the surrounding area of the old railway station. It represents an historic important node to revitalize due to its location, its relation with the city and other historical areas.

Sub-Centre “Convent San Francisco”: Located on the surrounding area of the Convent “San Francisco”.

3. ANALYSIS ON BLOCK AND LOT SUB-DIVISION TYPOLOGY

3.1 Original Block Proportion

The original block proportions were square shapes with 84m x 84m. This allowed not only for the construction of fairly large housings and gardens, but also provided some land for gardens and stables. The blocks were initially divided into four plots trying to keep proportional dimensions with the major plaza (KINSBRUNER: 2005). The plots were however, soon divided into narrower plots. As buildings were built to the boundary of the plots, the urban result for these colonial towns was a continuous façade along the street, with a tendency for a continuous height of construction. The shape and dimensions of the major plaza determined the location of the streets and consequently the shape and dimensions of the blocks that conforms the grid pattern layout.

3.2 Block Typology

(1) Typology of Blocks by Geometrical Shape

It can be appreciated that, the grid pattern layout of HUC of Granada is composed by irregular blocks with different shapes and dimensions (Fig. 3). Considering the diversity of the block’s shapes, a typology of blocks by shape is proposed as follows:

Type 1: This is the smaller block typology of the grid pattern layout of HUC of Granada. It has almost square shape with similar dimensions on each side. This typology originated from the foundation period with 63m X 63m.

Type 2: This typology is the most common proportion from the colonial Spanish-American cities 84m X 84m and in HUC of Granada as well. However, the proportion is not regular.

Type 3: This typology also has square shape but with larger dimensions, about 126m X 126m. It can be pointed out that this is a variation from the typical block proportion of 84m X 84m.

Type 4: This typology has a rectangular shape with 84m X 168m. It was clarified as a variation from the original proportion of 84m X 63m. Like in the above types, this typology also has an irregular shape and different dimensions.

Type 5: This typology also has a rectangular shape but with smaller dimensions, 42m X 168m. This typology also represents a variation from the original proportion of 84m X 63m.

Type 6: This typology has a triangular shape. It is a particular type compared with the traditional grid pattern layout of colonial Spanish-American cities with regular square shape. Proportion maintains two sides of 84m as the original block type of 84m X 84m.

Type 7: This typology is the combination of the square shape type 84m X 84m and the triangular shape. This typology is also a particular case of HUC of Granada.

Type 8: This typology is also a combination of the rectangu-
lar shape 84m X 168m and the triangular shape. This typology has the largest proportions and not so common.

Type 9: This typology has very irregular proportions. In general, it can be pointed out that the block shape typology of HUC of Granada is irregular. It can be suggested that, based on the historical data reviewed from the process of urban growth, that due to various destructions of the city on different periods of time, the original morphology was altered after being consecutively rebuilt.

(2) Typology of Blocks by Urban Design Elements
This typology was built based on Kevin Lynch’s theory of “Good City Form” (LYNCH: 1984), which means that the cities form a unique subset, they possess a very clear sense of structure often called “legibility of the cityscape”, and their visual experiences strongly depend on the city’s morphology. Given a visualization scenario, users’ visual experiences strongly correlate to how they interact with the environment. Therefore, some elements of the urban structure that create a visual image such as squares, landmarks, city edges and street segments were used for this typology (Fig. 4).

Type A (blocks along streams): This typology was built based on two streams that the city of Granada has. This characteristic naturally shaped these blocks and can be an important aspect to consider for the physical urban environment conservation.

Type B (blocks with returning points): There are some blocks with irregular returning points. Based on the historical review of the urbanization process of the City of Granada, it was found out that the morphology of some blocks was transformed buildings returning points as a defense strategy for military purposes. The purpose was to create labyrinth streets to make the invaders confused and lost for an easy attack.

Type C (blocks with landmarks): This typology was built based on the location of the most representative architectural elements such as churches, convents and museums.

Type D (blocks as landmarks): On this typology, the landmark occupies the total block area.

Type E (blocks with colonial housing heritage): This typology was built based on the municipality urban heritage list of buildings. The municipality of City of Granada has prescribed a group of traditional Spanish colonial housings as urban heritage to be conserved. Therefore, blocks possessing these housings were grouped.

Type F (regular block): This typology of blocks does not have significant element, however, does not mean that, they lack importance. These blocks are also part of HUC of Granada and their value is recognized as a group that defines the historic urban environment of the city and also need to be conserved.

Through this categorization it was clarified that, City of Granada has some urban design elements considered as landmarks that can be useful and taken into consideration as well for the creation of new urban design and specific conservation guidelines for the revitalization of the HUC.

3.3 Block Sub-division Transformations from 1856 to present
Based on historical maps about the urban process of City of Granada from three different periods of time, it was clarified the block sub-division transformation from 1856 to present. Furthermore, it was pointed out that, from 1856 to 1893 the lot area average was between 500m² to 2500m². At this time the front and length dimensions were between 16m and 60m wide average, being the most popular between 31m and 45m wide. These findings demonstrate the theory about the large block sub-divisions prescribed in the Law of the Indies.

The analysis of the year 1940 shows that, the lot area average was between 500m² and 2000m². Front and length dimensions were between 16m and 45m. At present, the lot area average is between 250m² and 500m². The front dimensions are between 7m and 15m wide and the length dimension between 16m and 30m wide. Therefore, it can be concluded that throughout the process of urban growth and land speculation, significant transformation on the block sub-division proportions have taken place (Fig. 5, 6 and 7).

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Fig. 4: Typology of Blocks by Urban Design Elements
3.4 Lot Typology

Based on the field survey, lot sub-division typology was built. Seven types of lots were found out based on the shape, area and location within the block (Fig. 8 and 9).

**Type A (Interior Lot Type):** This type is the most common from the lot sub-division typology of HUC of Granada. It has 57.03% from the total of lots.

**Type B (Corner Lot Type):** This type represents the second most common lot sub-division typology. It has 18.14% total of lots.

**Type C (Through Lot Type):** This typology represents the 10.56%. It has two frontages.

**Type D (“L” Lot Type):** This type represents the third group of the lot sub-division typology, it has 11.29%. It is characterized for its large front side but short and irregular back side.

**Type E (Invert “L” Lot Type):** This type is the less common from the lot sub-division typology of HUC of Granada. It has only 0.62%. It has three frontages and usually large area.

**Type G (Block Type):** This type also has large area, it occupies the total area of the block which means that it does not have any sub-division. It has 0.79%.

![Fig. 8: Lot Typology](image)

![Fig. 9: Lot Length Transformation Trend](image)

4. ANALYSIS ON TRADITIONAL SPANISH COLONIAL HOUSING BUILDING TYPE

The architectural type of the traditional colonial housing of Granada can be described as a succession of solids and voids from the street to the back of the building. Without any front or side setbacks from the property lines, a continuous, steady wall defines the perimeter of the housing (RIBERA: 2003). This housing typology still survives in HUC of Granada. Urban space, principally streets and plazas, maintains the same relationship to urban buildings and blocks that courtyards have to the rooms of the housing.

4.1 Interior Lot Type

Based on the number of courtyards and within the interior or corner lot type, the typology of the traditional Spanish colonial housing was built. For those housings located on the interior lot type, four different typologies were found out as follows (Fig. 10):

**Type A (One Courtyard):** This type is the most simple and modest design from the traditional Spanish colonial housing. It has only one courtyard with small area.

**Type B (Two Courtyards):** This type is one of the most common that can be found at the HUC of the city of Granada.

**Type C (Three Courtyards):** This type has three courtyards and a large area. Usually the back courtyard is for domestic animals and the other two are destined for social and decorative functions of the housing. This type was commonly for those families with a high social status.

**Type D (Four Courtyards):** This type has four courtyards and also a large area like the above type. This type of traditional Spanish colonial housing was also for families with a high social status.

4.2 Corner Lot Type

Typology of traditional Spanish colonial housings located on corner lots type was also built. It was categorized by three different typologies:

**Type E (One Courtyard):** This type has only one courtyard and is not a common type from the HUC of the City of Granada.

**Type D (Two Courtyards):** This type is more common from the corner lot type of the HUC of the City of Granada. Usually one courtyard is used for animals or for household chores same

![Fig. 10: Interior and Corner Lot Type of Traditional Housing](image)
as those housings located on interior lot type.

**Type E (Three Courtyards):** This type is also common from the corner lot type of the HUC of the City of Granada.

### 5. Transformations Typology of Traditional Spanish Colonial Housing

Since the foundation of the colonial cities in the Spanish America, the residential types and land use became well defined in the urban structure, and contributed to form a very successful model of city at the scale of the long duration (REYNOLDS: 2002). A general analysis of this model along with the study of the forms of housing during ancient times, reveals a number of ruptures and discontinuities in the 20th century, specifically in the distribution of housings in the urban space, in the architectural typologies, in the urban profile as a whole, and in the life style inside the wealthy and the modest housings.

#### 5.1 Transformations on the Spatial Distribution

Through the field survey, it was found out that, the transformations for the interior lot typology are as follows (Fig. 11):

**Type 1 (Equally Divided):** This typology has only one courtyard. It is the most common transformation. This division allowed both sides to have courtyards, corridors and rooms equally divided. This typology also represents the most common case on the HUC of the city of Granada with 33.96% from the total of housings surveyed.

**Type 2 (Division 1/3):** This type usually has three courtyards and it is sub-divided on two parts from the location of the back courtyard and the middle of the housing. It was found out that 7.62% from the total.

**Type 3 (Division from the Centre on “L” Shape):** On this case, this type usually has four courtyards. The sub-division occurs on “L” shape from the middle of the housing trying to keep as possible courtyards on both divisions (5.31% total).

**Type 4 (Division from the Corridor on “L” Shape):** This type also has four courtyards and is sub-divided on two parts from the middle as well but in this case from the corridor. Thus, both parts are proportionally distributed with almost same area with courtyards and corridors. 8.65% from the total has this typology. In general, the patio housing has experiment a substantial transformation but in some cases the typology lost the central patio due to the new distribution of property in narrower parcels. Through the field survey it was also found out that some transformations on the corner lot type of traditional Spanish colonial housings were as follows:

**Type 5 (Divided Horizontally):** This type refers to the transformation of those housings located on a corner lot type. It was found out that, one of the transformations is related to the sub-division of the housing on two parts horizontally, allowing enough area for one courtyard each. One of the parts became categorized as interior typology and the other remains as a corner type with two frontages. This type is the second most common case (22.72%) following the Type 1 of the interior lot type.

**Type 6 (Divided Vertically):** This type is the third most common case found out during the field survey with 19.35%. The transformation occurs on the sub-division of the housing on two parts as well but in this case is vertically divided.

**Type 7 (Divided on “L” Shape):** This type of transformation occurs with the division of the housing on “L” shape. This typology usually has three courtyards, thus one of the parts remains with two courtyards and the remaining part with one courtyard and one frontage. It can be said that this type is not common at the HUC of the case study because the number of the corner lot types is less comparing with the interior lot types (1.815). However, it can be also pointed out that, due to the location on a corner lot this type allows a more flexible subdivision of the housing on different directions.

**Type 8 (Divided from the Main Corner):** This type is characterized for the sub-division of the traditional Spanish colonial housing on two parts based on the main corner. This shows that one of the smallest part remains as a corner lot type with two frontages and the other part also with two frontages and larger area. It was found out that, 0.58% has this typology.

#### 5.2 Transformations on the Land Use

This chapter approaches the transformations on the urban land use patterns that provide support to the tourist industry. In the case study, it was found out that, significant transformations primarily on the traditional Spanish colonial housing to hotels, museums, restaurants, souvenir shops and some other uses destined for tourist consumption. The original layout of the traditional Spanish colonial housings has to be altered, landowners
need to continuously renovate and improve such facilities in order to take part of the competitive tourism market and obtain the benefits resulting from it. The main transformations are:

**Case A-1, Partially Renewed for Hotel Use:** Transformations are primarily on the spatial distribution of the changing use of the courtyards and corridors. For those housings with more than two courtyards, the main courtyard is usually kept with its original function of an open space, as a decorative or a social space. The remaining courtyards are transformed, and the new elements are added such as pool or fountains. In extreme cases, the area is occupied to build new spaces with different functions. During the field survey, 69 historical buildings were analyzed and the findings show that, 38 buildings were partially renewed, 24 of them for hotel uses (Fig. 12).

**Case A-2, Partially Renewed for Commercial Use:** Also like in the above case, those housings with more than two courtyards only the main one was kept but the remaining were altered for different functions to the original. Other transformations were found on the use of the rooms located on the front of the streets, usually rented for commercial activities. It was found out that, 14 housings with these type of transformations (Fig. 12).

**Case B-1, Completely Renewed for Hotel Use:** This case consists of completely renewed traditional Spanish colonial housings for hotel use. This means that the internal distribution is totally changed but keeping the original facade design. This case was commonly found for hotel uses, thus the original layout of the housings has to be altered and built as much as rooms as possible as well as other facilities that hotels required (Fig. 13).

**Case B-2, Completely Renewed for Commerce Use:** This case also consists of completely renovation for commercial uses. Renovations consist of the use of the rooms for rented shops but the courtyard is kept as a central circulation space (Fig. 13).

Cases B-1 and B-2 are less common comparing to the Cases A-1 and A-2, because the landowners try in a way somewhat to maintain some original characteristics of the traditional Spanish colonial housing due to its historic value and attraction, but in some cases as those B-1 and B-2, it is difficult to maintain, and they keep only the original facade design.

### 5.3 Transformations on the Courtyard

During the field survey on the traditional Spanish colonial housing, it was found out that, there were different transformations on the courtyard. These transformations were clarified as follows:

**Type A, Addition of Decorative Elements:** This type of transformation is the most common; it consists on the decoration of the courtyard with different elements as fountains, pot plants and some other. This typology can be pointed out as improvement of courtyard. The layout is not altered but instead of this decorative elements are added.

**Type B, Addition of Pool:** This transformation type is very common on those traditional Spanish colonial housings, which transformed their land use from a housing to a hotel for example. Thus, in most of the cases the courtyard is substituted by the construction of a pool.

**Type C, Fill in an Arcade:** This type maintains the courtyard proportion and layout, but the surrounding arcades are closed. Therefore, the main function of the courtyard, which consists on providing close contact with it and natural ventilation is interrupted, creating a different atmosphere.

**Type D, Division of Courtyard:** On this type, the courtyard is divided by a wall on two. This type of transformation is also very common to find on the traditional Spanish colonial hous-
ing when they become sub-divided.

**Type E, Encroach on the Courtyard’s Open Space:** On this typology, part of the courtyard area is substituted by the construction of another space. Thus, the courtyard area is reduced.

**Type F, Addition of another Floor:** This type is also very common transformation on the traditional Spanish colonial housing. Primarily on those housings that transformed to hotel uses. The addition of another floor is frequently implemented in other to make a better use of the available space for the construction of rooms.

It can be pointed out that the internal layout of the traditional Spanish colonial housings allowed different transformation on its spatial distribution, and that the courtyard was a key element of these transformations (Fig. 14).

6. CONCLUSION

Based on the results of the analysis on the transformation of block, lot and the traditional Spanish colonial housing, it can be concluded that the Spanish-American colonial city, City of Granada has been reshaped in the process of urbanization on different levels from the block sub-division level through the building level. The transformation is demonstrated first on the analysis on block shape and transformation of the traditional Spanish colonial housings, which presents geometric design and symmetrical spatial distribution as well as the large construction area which easily allowed internal sub-divisions. In summary, the transformation can be characterized as follows:

1. In general, it can be pointed out that, the block shape typology of the HUC of Granada is irregular. It can be suggested that, based on the historical data reviewed from the process of urban growth that due to various destructions of the city on different periods of time, the original morphology was altered after being rebuild consecutively.
2. The categorization of blocks by geometrical shape can be also useful considering the relation and influence that the shape of the block has in the shape of lot and consequently in the shape of the building type.
3. The categorization of the traditional Spanish colonial housing was also clarified from its original layout as well as its various transformations on the internal spatial distribution and the most common cases of the changing of land uses. This categorization can be provided as a basis for future conservation guidelines for specific uses or functions that at present times the traditional Spanish colonial housing of Granada has.
4. Through the categorization of block and lot typologies, it was clarified that, the city of Granada has some urban design elements considered as landmarks that can be useful and taken into consideration as well for the creation of new urban design and specific conservation guidelines for the revitalization of the HUC.

Furthermore, it can be concluded that in spite of these transformation figured out through the analysis, it is clear that the HUC of City of Granada demonstrates the continuity and persistence of the original form, which is considered as a meaningful cultural and historical value at the present time for revitalization and conservation.

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