

#4

THE OUTDOOR SPACES OF THE CONTEMPORARY GREEK CYPRIOT DETACHED HOUSE

CHRISTAKIS CHATZICHRISTOU

University of Cyprus
 hadjichristos@ucy.ac.cy

ELLEN VAFEADOU

University of Cyprus
 ellenv@vafeades.com

ELIAS KRANOS

University of Cyprus
 kranoselias@gmail.com

ABSTRACT

A planning law passed during the British colonial rule of Cyprus still has a strong impact on the character of towns and villages alike. This law requires that 'no part of the main building or alteration or addition to any existing main building shall be less than 10 feet from any boundary of the plot on which it stands'. The impact was enormous, with the continuous street front of the vernacular villages and the older city centers abruptly replaced by rows of detached buildings. The paper focuses on the change the law brought upon the Greek-Cypriot house and more specifically, regarding the role the resulting outdoor spaces now play in the spatial configuration of the house and their visual relationship with the interior of the house and the public space of the front street. Through the study, a discussion is undertaken regarding the significance the regulations have on the kind of community and domestic architecture it promotes through clauses regarding the height of the boundary walls, the heights and use of auxiliary buildings and the parking, all located within the required 3m setback.

KEYWORDS

detached house, courtyard house, spatial characteristics, building regulations

1. INTRODUCTION

"No part of the main building or alteration or addition to any existing main building shall be less than 10 feet from any boundary of the plot on which it stands, except that in cases where the building is used for trade or industry the appropriate authority may sanction such lesser or greater distances as it may in each case consider necessary or appropriate."

(published in THE CYPRUS GAZETTE, 30th MAY, 1946.)

The above planning law, passed during the British colonial rule of Cyprus, played an important role in the transition from the traditional Cypriot house to the contemporary detached Greek-Cypriot house. And while the reasons behind this Law are not to protect thatched roofs from gunpowder sparks, as it was the case in Lagos, the impact was similarly strong. The loss of the

large amount of consolidated outdoor space outdoor space forming the courtyard (see Figure 1) and the breaking up of the continuous street fronts, contributed greatly in the formation of new character for neighborhoods in villages and towns in Cyprus.

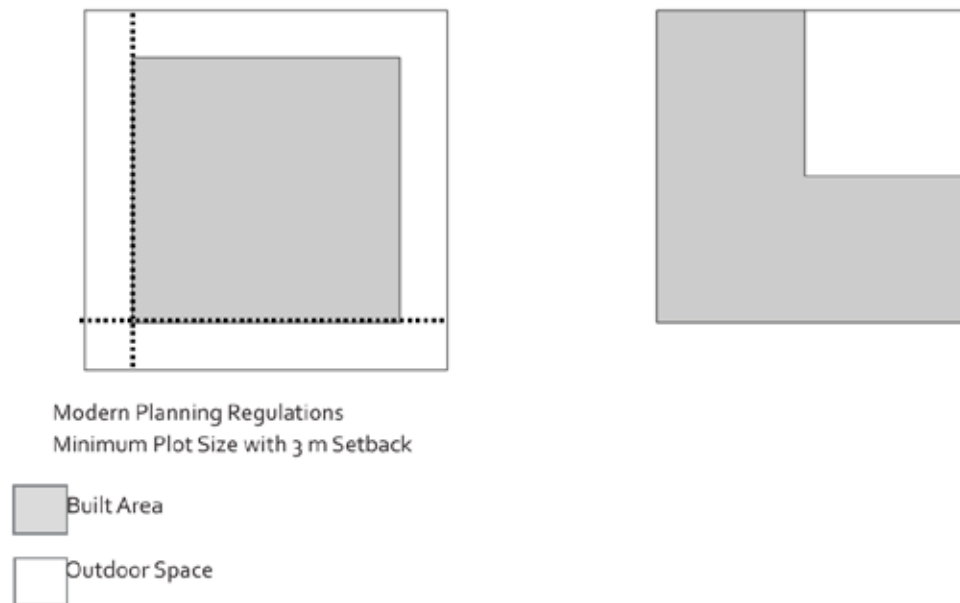


Figure 1. A diagram showing the comparison of outdoor space for the modern detached house and the traditional unit. By Author, 2017.

The contemporary neighborhood, as a result of the above planning rule, is composed of rows of independent detached houses that no longer generate space but rather, occupy it. As houses contract and move away from one another to satisfy this new law, there is an increase in privately owned, leftover space between them. The social role of this resulting free space around the building is of particular interest, since it raises

questions regarding the relationship between the exterior and the interior, the public and the private, the domestic life of the family and how it relates to its spatial and social context.

The first sections that follow, present brief descriptions of both the vernacular Cypriot house and the contemporary detached house, a result of the building regulations. The main part of the paper focuses on the comparison between a sample of four award winning contemporary Greek Cypriot houses and a sample of four typical vernacular courtyard houses.

Admittedly, the Cypriot family and its relationship with its domestic environment have undergone great changes, many of which are not directly linked to the building regulations under investigation. Still, the proposed comparison can highlight the changes that ensued from the vernacular to the contemporary, in terms of the relationship the outdoor spaces have with the interior of the house and the adjacent spaces, be it other neighbouring private houses or the street.

2. THE TRADITIONAL COURTYARD HOUSE

The long Ottoman Rule of Cyprus (1571-1877), deterred industrialization and restricted urban modernization resulting in a rather similar development in urban and rural areas, until the early decades of the British colonial period (1878 - 1960). Historically, traditional housing in Cyprus, found in rural and urban areas, adopted a courtyard typology within a dense building fabric and a continuous facade. These houses had no space between them. The tightly knit nature of living within such a neighborhood, meant that the families were interdependent upon one another and through this co-operation, the community's "system of social control" was also

strengthened. (Markides, 1978, p.81) Additionally, the lack of physical space between each home resulted in a greater consolidation of outdoor space in each house. This compact massing provided shading to the traditional narrow streets, from one and two storey buildings on either side rendering this space, together with the absence of vehicular traffic, a public living-room.

In its elemental form, each home was characterized by a *makrinari*, a central room opening to an internal courtyard or facing a street. This central room developed into the *dichoron* by adding a second *makrinari* and further additional rooms were created due to growing families and social influences. Through these spatial ramifications, the traditional house began to evolve into more complex spatial configurations. These walls were composed of stones at their base and then supplemented using *plinthari*, mud mixed with straw, otherwise known as abode construction. The walls shared between two households reduced heat losses and gains as they were protected from the natural environment. There are two primary forms of traditional housing, one type facing the street with a yard at the back and the other with the yard facing the street and the house behind it. The form of the house adapted, depended on its orientation, with the *makrinari* facing north and the courtyard always facing south. (Papacharalampous, 2001)

The courtyard is an architectural feature which was established in prehistoric and historic architecture in Cyprus. The closed and semi-open rooms were arranged around the courtyard, with a consideration of their orientations, inter-relations and communications. This arrangement was vital as it formed the dwelling's layout. The courtyard developed a comfortable microclimate for the house using cross and stack ventilation to cool the dwelling. (Philokyprou, 2011)

Semi-open spaces such as the *iliakoi* (entrances), porches and galleries were located on the south side of the courtyards, (Papacharalampous, 2001) in order to prevent direct sun rays from entering the house.

Traditional dwellings in Cyprus, developed over time, through the evolution of society, respond to their environment and context and acknowledge the necessities of the locals. (Heal, Paradise, & Forster, 2006) As emphasized by Rapoport, the traditional house is constructed through traditional construction methods using local materials while its spaces are defined by several social and cultural notions. Thus, both its construction as well as its spatial configuration is in response to its physical and social environment.

3. THE MODERN DETACHED HOUSE

In the 20th Century, administrative stability under the British Rule, brought a "modern" planning system to the island, covering construction, road network and sanitation. The new planning regulations abolished the formal spatial arrangement of the traditional Cypriot dwelling and its most important feature, the courtyard. This was the birth of the modern detached house.

The modern house in Cyprus eventually left behind fundamentally all of the characteristics of its predecessor. The mass of the building moved to the center while the outdoor space, from a unified central courtyard became a perimetrical 3 meter wide space around the house. The *salotrapezaria* (the formal living/ dining room) replaced the *dichoron* as a central element of the household and served the purpose of hosting the *xenos* (the honored guest). The modern house introduced the aspect of further separate rooms, especially bedrooms. (Markides, 1978) There is also an increase in permanent separations leading to a loss of multifunctional spaces which was a characteristic of the traditional house.

Furthermore, the spatial form of the modern house, with its interior and exterior spaces having various orientations, does not allow potential passive energy to cool and heat the house. Moreover, the lack of homogeneity, regarding the heights of adjacent dwellings, result in reduced privacy. Without being solely responsible for the changes taking place, the new proximity regulations established by the British Rule, have greatly contributed in the disintegration of the traditional neighborhood.

Modern architecture called for clarity, light and the investigation of the relationship between the interior and the exterior. (Jaschke, 2009) In the early twentieth century, German Jewish

philosopher, Walter Benjamin, with his description of the over-furnished and over-crowded “bourgeois interior,” set a negative reference to which the concept of modern living was generated against. (Benjamin & Demetz, 1986) Modern architects began to design new residential interiors open to the exterior world. Yet, these new architectures, Ebenezer Howard’s Garden City, Le Corbusier’s Ville Contemporaine and Frank Lloyd Wright’s Prairie Houses were open to nature, rather than the city. Subsequently, modern architects and planners avoided undertaking the matter of contention; the individual dwelling’s relation with public space, offering potential for “*encounter, exchange and spectacle.*” Modern architecture’s failure to relate the “domestic” with the urban has been linked to the strict and rather professional division between urban and architectural planning. In the 1950s, a young group of architects calling themselves Team 10, arose from the international platform for modern architects CIAM, and began to question the division of architecture and urbanism. They also re-evaluated the relationship between interior and exterior space. They focused in identifying the counterpart of “private, domestic interior” as the urban realm, not nature. Furthermore, they re-examined the manner in which the connection between interior and exterior should be made, not only through spatial and visual continuity but “through meaningful, psychologically effective transitions.” (Jaschke, 2009, p.175) The Dutch architect Aldo van Eyck, a member of Team 10, expressed this issue as an urban question with existentialist and psychological overtones:

“We are not only breathing in, nor are we exclusively breathing out. This is why it would be so beneficial if the relation of interior space and exterior space, between individual and common space inside and outside, between open and closed (directed towards the inside and outside) could be the built mirror of human nature, so that a man can identify with it. These are formal realities because they are mental realities. Moreover they are not polar but ambivalent realities. The dwelling and its extension into the exterior, the city and its extension into the interior, that’s what we have to achieve” (van Eyck, 1956)

Perhaps the rationale supporting the regulations imposed by the British in Cyprus did not have the above aims in mind. Still, in this case as well, the main idea was to improve the living conditions of the inhabitants. The regulations in effect today, which are in a sense an evolvement of those initial regulations related to the massing of the house and its relationship with the plot boundaries are:

- the distance between the main house and any boundary of the plot is a minimum of 3 meters.
- within the 3m setback, buildings supporting the main building may be built as long as they meet the height and size requirements. Any auxiliary building area must be less than 25% of the main building and less than 10% of the building plot. Furthermore, it must be located a minimum of 1.5m away from the main building with a maximum height of 3.5m. If it is a mechanical room it could be in contact with the main building but in such a case it must be 1.8m away from the plot boundary.
- a covered parking space touching the main building as well as the plot boundary is allowed as long as the parking space is open on two sides. A small auxiliary building can also be part of this arrangement.
- the auxiliary building’s contact along the outer plot boundary can be maximum 35% of the boundary dimension It can be increased to 40% when the auxiliary buildings of the neighboring house meets with the common border as well. Auxiliary buildings are not allowed in contact with the road boundary or a public green space which may be adjacent to the plot.
- the maximum height of the boundary walls is 2.1m when it is a boundary between two plots. When the boundary meets the road, the boundary wall must be less than 1.2m. (Ministry of Interior, Department of Building and Housing, 2011)

Yet, most architects and users alike, seem to doubt the effectiveness of these regulations and especially regarding the creation of a peripheral zone of outdoor space on each plot. While admittedly the planning regulations enforced by the British were not solely responsible, the

rather abrupt and forced shift from the traditional house to the modern detached house in Cyprus has clearly generated a noticeable reduction in the social interaction between the families living in a neighborhood. The resulting, privately owned leftover space around the house, rather than offering opportunities for social activity, is often neglected and underused and in many cases it becomes the cause of problems between neighbors. Popular ways of deviating from the law reveal the degree of discrepancy between the desired and the permitted. In perhaps most of the cases, auxiliary buildings which are shown as a storage space or a laundry room are used as proper living space for the house-help or an older parent, the height of the front and side wall is increased by thick bushes or a 'non-permanent' wooden or metal construction, while the garage which can touch both the main house as well as the plot boundary only if it is open on two of its sides is often sealed by a construction that can be considered by the planning authorities as 'impermanent'.

These observations reflect the gap between the lifestyle proposed or assumed by the residential design which is influenced greatly by the regulations enforced by town planners, and the actual lifestyle of the users. The section that follows takes a closer look at four award winning houses, analyzing their spatial characteristics and listening to what the architects as well as the homeowners themselves have to say about the designs. The comparison of these houses with four typical vernacular courtyard houses allows for an evaluation of the shifting role played by the outdoor spaces then and now.

5. A COMPARISON BETWEEN THE CONTEMPORARY AWARD WINNING DETACHED GREEK-CYPRIOT HOUSE AND ITS VERNACULAR ANCESTOR

Four award-winning detached houses are compared to four vernacular courtyard houses in an attempt to see how the specific regulations have influenced the design of the house and sequentially, the manner in which the house relates to its outdoor spaces and its urban context. The fact that the award winning houses have been distinguished by the evaluation committee as exemplary pieces of domestic architecture could be taken as representative of the views of the local architectural culture in general. Before examining the houses themselves, brief accounts of the remarks or comments by the architects in their statements accompanying their entry to the competition, and the homeowners expressed in semi-structured interviews conducted for the sake of the present research, are presented.

5.1 COMMENTS BY THE ARCHITECTS AND THE USERS REGARDING ASPECTS OF THE DESIGNS INFLUENCED BY THE PLANNING REGULATIONS

5.1.1 COMMENTS BY THE ARCHITECTS

The architects, in the report submitted along the other materials requested for the evaluation, give some form of explaining regarding the way they went about designing the exterior space: 'The form of the house was strongly influenced by the shape of the plot, its orientation and the surrounding space. The open plan interior wraps around the courtyard which is related to the surrounding nature' (architect of House 1); 'The clients' request was for an introverted house with a central private outdoor space' (architect for House 2); 'the design investigates the relationship between the private domestic space and the public space of the neighbourhood street through the creation of degrees of privatization which, with the use of in-between spaces and controlled visual connections with the street and the public walkway, protects the interior of the house. What is sought after is an organic connection between the interior and the exterior spaces. The large areas for planting allow for low and high vegetation which will contribute in the creation of a favourable living environment' (architect for House 3); 'the public and semi-public spaces, (kitchen/dining room and living room), are arranged around the patio facing south with views into the private garden and to the Troodos mountains at the back' (architect for House 4)

It is clear that the stated intentions of the architects are greatly related to desired relationship between the main outdoor space and the interior of the house. And while three of the houses

aim at creating a private outdoor space, only the fourth house (House 3) tries to create degrees of privatization between the public street and the private interior.

5.1.2 COMMENTS BY THE HOMEOWNERS

The homeowners of house 1 are the parents of the architect. They find that the sheltered courtyard creates the right spatial connection between the interior and the exterior. Similarly, the homeowner of house 2 is quite satisfied with the rather introverted design which presents high walls to the exterior.

The homeowner of house 3 explained that he has a very close relationship with his architect and that through their friendship the architect knew well the family's desire to have large and varied outdoor spaces. The homeowner says that they practically use all the outdoor areas designed by the architect, depending on the season and the time of day. When the climate is cool they sit in an area where there is no wind and when it is hot they sit in a space where there is a cool breeze. There are also spaces which are more private for intimate social gatherings and spaces where they can watch the children play. He is happy with the variety of spaces but he believes that he would be just as content with half the spaces provided. When asked about privacy, the homeowner explained that privacy is not one of his priorities but it is for his wife. If he could alter the height of the front boundary wall he would make it higher to increase the privacy of the outdoor areas.

Being also the architect, the inhabitant and owner of house 4 explains how the 3m setback on the east and west sides of his plot were incorporated in the garden while the south (garden) and north (garage) sides are spaces which are wider than 3m. He argues that the front and back spaces are not wasted as they are indeed used by the family. He finds that the 3m setback rule should be revised or replaced and finds that it is perhaps more important to have substantial distances between the windows in adjacent properties.

Here too, as with the comments by the architects, it is clear that privacy in the use of the outdoor spaces of the house is valued by the users.

5.2 QUANTITATIVE ANALYSES

A more quantitative attitude is adopted in this part of the paper, with the first section looking at the relationship the outdoor spaces in the two sub-groups have with the interior as well as with the public domain (the street), and the second section looking at the syntactic characteristics of the designs using tools offered by the space syntax methodology.

5.2.1 THE OUTDOOR SPACES, THE INTERIOR AND THE PUBLIC DOMAIN (THE STREET)

The analysis in this section is based on a space break-up of the outdoor spaces around the house, and looks at the use allocated to these spaces, and at the visual relationships between the interior, the outdoor spaces and the street. (see Figures 2-5)

Concentrating on the outdoor space itself, a number of comparisons and observations can be made based on the information presented in tabular form regarding the allocation of use in the outdoor space and the visual connections created by the design. One first observation is that Detached House 3 tends to be an exception regarding all the aspects examined in the Detached Houses.

HOUSES	TOTAL OUTSIDE AREA (hadjivassiliou)	SOCIAL						AMENITIES						TRANSITION						NOT FOR SPECIFIC USE					
		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
House 1	355.05	44.39						74.14						100.32						66.69					
Area	100.00%	12.50%						20.88%						28.26%						18.78%					
Percentage		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		0	43.14	1.25	0	68.8	0.00	5.34	0	45.35	8.15	14.5	32.32	30.92	15.44	3.95	16.38	1574	14.87	0.00	389.0	1574	14.87	0.00	389.0
Total Area Sub-C Percentage		0.00%	12.15%	0.35%	0.00%	19.38%	0.00%	1.50%	0.00%	12.77%	2.30%	4.08%	9.10%	8.71%	4.35%	1.11%	4.61%	4.43%	4.19%	0.00%	10.96%	4.43%	4.19%	0.00%	10.96%
House 2	(fercos)	400.62						13379						41.75						1207.45					
Area	1922.00	20.84%						6.96%						2.17%						62.82%					
Percentage	100.00%	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		0	383.69	0	16.93	92.62	5.21	21.5	14.46	41.75	0.00	0	0	92.5	656.42	81.47	377.06	2376	16.47	0	98.16	2376	16.47	0	98.16
Total Area Sub-C Percentage		0.00%	19.96%	0.00%	0.88%	4.82%	0.27%	1.12%	0.75%	2.17%	0.00%	0.00%	0.00%	4.81%	34.15%	4.24%	19.65%	1.24%	0.86%	0.00%	5.11%	1.24%	0.86%	0.00%	5.11%
House 3	(phocaides)	233.12						53.92						100.33						34.56					
Area	459.20	50.77%						11.74%						21.85%						7.53%					
Percentage	100.00%	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		92.04	47.30	53.15	40.63	49.1	0.00	4.82	0	39.07	7.83	29.44	23.99	23.43	7.64	0	3.49	29.32	0.00	7.95	0.00	29.32	0.00	7.95	0.00
Total Area Sub-C Percentage		20.04%	10.30%	11.57%	8.85%	10.69%	0.00%	1.05%	0.00%	8.51%	1.71%	6.41%	5.22%	5.10%	1.66%	0.00%	0.76%	6.39%	0.00%	1.73%	0.00%	6.39%	0.00%	1.73%	0.00%
House 4	(patsalosavris)	31.75						96.43						68.25						126.90					
Area	32.333	9.82%						29.82%						21.11%						39.25%					
Percentage	100.00%	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		0	31.75	0	0	11.05	5.87	55.71	23.8	34.77	0.00	23.08	10.4	51.91	0.00	56.63	18.36	0	0.00	0	0.00	0	0.00	0	0.00
Total Area Sub-C Percentage		0.00%	9.82%	0.00%	0.00%	3.42%	1.82%	17.23%	7.36%	10.75%	0.00%	7.14%	3.22%	16.05%	0.00%	17.55%	5.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

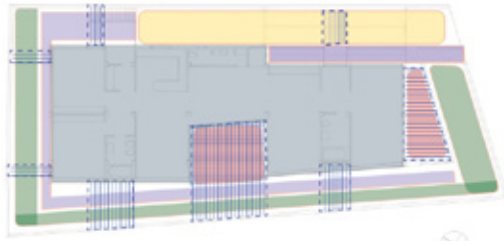
VS=Visible from Street

VI=Visible from Interior

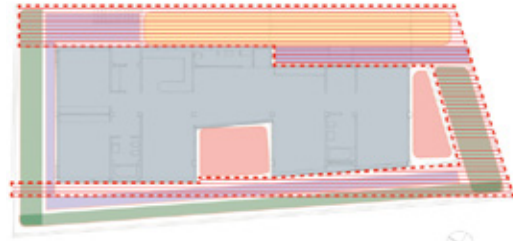
VS&VI=Visible from Interior & Street

NV=Not visible from either Interior or Street

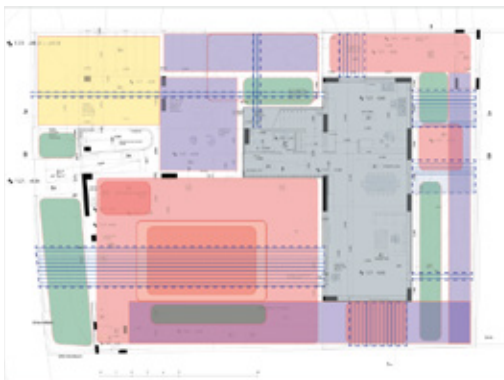
Figure 2 - Table presenting data for outside area in four award winning detached Houses in Cyprus. By Author, 2017



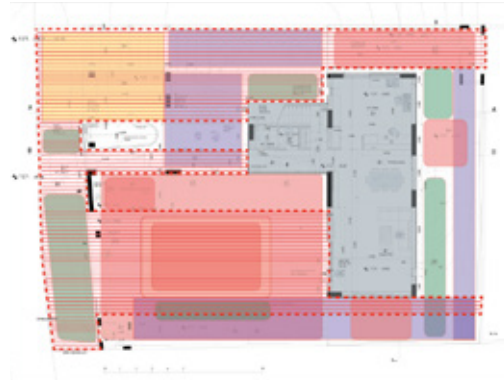
Detached House 1



Detached House 2



Detached House 3



Detached House 4



Figure 3 - Outside area in four award winning detached Houses in Cyprus. By Author, 2017

HOUSES	TOTAL OUTSIDE AREA	SOCIAL						AMENITIES						TRANSITION						NOT FOR SPECIFIC USE					
		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Courtyard House 1	148.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area	100.00%	-	-	-	-	-	-	2.95	1.98%	18.12	11.755	79.09%	117.95	79.09%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00%
Percentage		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		-	-	-	-	0.00	0.37	0.00	2.58	0.00	4.16	12.50	11.46	11.20	42.52	3.86	59.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area Sub-C Percentage		-	-	-	-	0.00%	0.25%	0.00%	1.74%	0.00%	2.80%	8.41%	7.71%	7.54%	28.61%	2.60%	40.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Courtyard House 2	131.71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area	100.00%	-	-	-	-	-	-	23.70	17.99%	14.66	11.13%	85.95	65.26%	172.56	14.48	5.62%	7.40	5.62%	7.40	5.62%	7.40	5.62%	7.40	5.62%	7.40
Percentage		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		-	-	-	-	0	6.51	0	17.19	5.99	1.63	7.04	3.1	52.34	1.73	28.78	0.04	2.15	0.32	4.89	0.04	2.15	0.32	4.89	0.04
Total Area Sub-C Percentage		-	-	-	-	0.00%	4.94%	0.00%	13.05%	4.55%	1.24%	0.00%	5.35%	2.35%	39.74%	1.37%	21.85%	0.03%	1.63%	0.24%	3.71%	0.03%	1.63%	0.24%	3.71%
Courtyard House 3	211.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area	100.00%	-	-	-	-	-	-	10.69	5.05%	13.89	6.56%	81.54%	38.84%	172.56	14.48	6.84%	7.40	5.62%	7.40	5.62%	7.40	5.62%	7.40	5.62%	7.40
Percentage		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		-	-	-	-	0.16	0.00	0	10.53	3.74	3.49	0	6.66	9.2	65.60	2.73	95.03	6.13	1.46	0.38	6.51	6.13	1.46	0.38	6.51
Total Area Sub-C Percentage		-	-	-	-	0.08%	0.00%	0.00%	4.98%	1.77%	1.65%	0.00%	3.15%	4.35%	31.00%	1.29%	44.91%	2.90%	0.69%	0.18%	3.08%	2.90%	0.69%	0.18%	3.08%
Courtyard House 4	124.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Area	100.00%	-	-	-	-	-	-	6.90	5.53%	5.55	4.44%	84.96%	68.44%	106.08	6.33	5.07%	7.40	5.62%	7.40	5.62%	7.40	5.62%	7.40	5.62%	7.40
Percentage		VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV	VS	VI	VS&VI	NV
Total Area Sub-Category		-	-	-	-	0	0.91	0	5.99	2.27	0.00	0	3.28	11.66	25.61	1.67	67.44	0	0.62	0	5.71	0	0.62	0	5.71
Total Area Sub-C Percentage		-	-	-	-	0.00%	0.73%	0.00%	4.80%	1.82%	0.00%	2.63%	9.34%	20.51%	1.34%	53.77%	0.00%	0.50%	0.00%	0.00%	0.00%	0.50%	0.00%	0.00%	4.57%

VS=Visible from Street
 VI=Visible from Interior
 VS&VI=Visible from Interior & Street

Figure 4 - Table presenting data for outside area for the four courtyard Houses in Cyprus. By Author, 2017



Figure 5 - Outside area for the four courtyard Houses in Cyprus. By Author, 2017

5.2.1.1 OUTDOOR SPACE AND ALLOCATION OF USE

Presumably due to the larger plot sizes, the total amount of outdoor area for the courtyard houses is less than that of the detached houses. Still, in the case of courtyard houses, the space is central whereas the outdoor spaces of the detached houses is broken up and found mainly on the perimeter of the house.

As Figure 2 shows, the largest percentage of outdoor space in the contemporary detached houses is not allocated to a specific use in all the houses except house 3. Furthermore, with the exception of house 3 and house 2, social uses tend to be allocated to the smallest percentage of outdoor space.

In the case of the Courtyard vernacular houses (Figure 4) the greatest percentage of outdoor space is not allocated a specific use but it is known that this space was used for social events as well as for activities related to farming and animal rearing.

5.2.1.2 VISUAL ACCESSIBILITY OF OUTDOOR SPACES

A general observation regarding the Detached Houses is that, with the exception of the introverted house 2, a large percentage of the outdoor space is visible from the street and a much smaller percentage is rendered visible from the interior. Under a different lens, looking only at the percentage of the outdoor space which is allocated to social use, a different reading can be made. Here, the largest part of the social spaces is mainly visible from the interior, except in the case of House 3 since most of the social outdoor spaces are visible more from the street than from the interior.

In the case of the Courtyard vernacular houses, with the exception of the courtyard house 2, a large percentage of the outdoor space is not visible from either the street or the interior. In the case of courtyard house 2, the amount of outdoor space visible from the interior is equal to the amount of outdoor space not visible from either street or interior. All the courtyard houses are generally more visible from the interior rather than the street. With courtyard houses outdoor space is mostly not visible, therefore creating a visual link from the interior or exterior is not dominant in this design.

Interestingly enough, flowerbeds and planters in the detached houses are mostly visible from the street (public) rather than the interior.

5.2.2 SPACE SYNTAX ANALYSIS

The spatial properties of the two groups of houses are investigated using space syntax analysis. The goal is to determine the degree and the manner in which outdoor space is integrated within the house's layout. For the analysis, all indoor and outdoor spaces are accounted for and DepthmapX is used to calculate the syntactic measures. Furthermore, using the convex map as a base, Justified Accessibility Graphs (J-Graphs) are created to examine how the spaces are related to each other

5.2.2.1 INTEGRATION AND MEAN DEPTH VALUES (DEPTHMAPX)

According to the overall results, the average integration value of all convex spaces per detached house is lower than that of the courtyard houses. Quite telling are the rankings of the main spaces according to the integration values:

- Detached House 1 MV > EH > IL > FD = ID > FL > B > K
- Detached House 2 EH > IL > FL > MV > FD > ID > K > B
- Detached House 3 EH > FD > L > K /ID > MV > B
- Detached House 4 B > K > D > L > MV

- Courtyard House 1 MC = P > MR = D > K = ASH
- Courtyard House 2 MC > MR > D > P > ER = K
- Courtyard House 3 MC > P = MR > ASH > K = ER > D
- Courtyard House 4 P > MR > MCER > D > ASH

In two detached houses, the most integrated space is the entrance hall and the staircase connecting the two floors, while in the other two cases the most integrated space is an outer transition space, which is located within the 3m setback and has no direct connection to the interior. The values for the main veranda show no clear trend, apart from the fact that this space tends to be segregated rather than integrated.

In contrast, the rankings for the courtyard houses show the most integrated space, in three of the four cases, to be the main courtyard and in one case, the *iliakos*, another primarily outdoor space. However, in terms of the depth values of their main outdoor spaces, the two types of dwellings are analogous. These spaces tend to be shallow spaces rather than deep, despite the fact that all the detached houses exhibit larger mean depth values in comparison to the courtyard houses.

5.2.2.2 JUSTIFIED GRAPHS

Each space in the justified graph can be classified according to the way it connects to its neighbours and beyond. Four types thus emerge: Type A is a terminal space; Type B is a transition space which is not part of a ring sequence; Type C is a space that is part of a ring sequence; Type D is a space which is part of two or more ring sequences, (Hanson, 1998, p.173).

All the detached houses, with the exception of one, have a very low percentage of TYPE A and TYPE B convex spaces (spaces that do not create rings). In fact, they exhibit a large proportion of TYPE C and TYPE D convex spaces. This results in large rings between the perimeter outdoor spaces of the houses and a large number of rings between the exterior and interior spaces.

The courtyard houses have predominantly TYPE A and TYPE B rather than TYPE C and TYPE D convex spaces implying the presence of significantly fewer rings. In two cases, there is a ring between the enclosed areas and the *iliakos*, whereas in one courtyard house there is a ring involving some of the outdoor areas and the main courtyard, and in the other courtyard house there is a ring between the interior and the main courtyard.

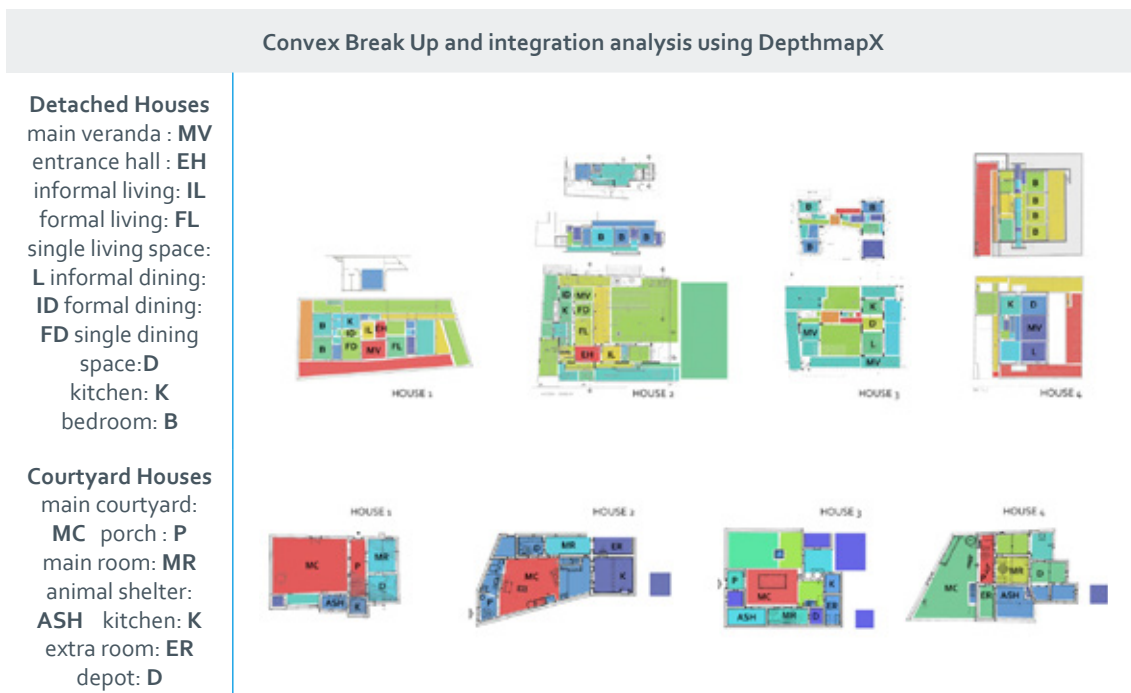


Figure 6 - Table showing Convex Break Up and integration analysis using DepthmapX. By Author, 2017

Syntactic resulted data using DepthmapX							
		Integration (HH)			Mean Depth		
		Minimum	Average	Maximum	Minimum	Average	Maximum
Detached Houses	House 1	0.591825	1.00902	1.50148	2.74194	3.73185	5.41935
	House 2	0.408273	0.824118	1.42323	3.22917	5.17092	8.77083
	House 3	0.482579	0.674999	1.03965	3.72973	5.41821	7.94595
	House 4	0.482587	0.708888	0.944191	4.2093	5.4408	7.27907
Courtyard Houses	House 1	0.492552	0.9642378	1.72393	1.57143	2.21429	3.00
	House 2	0.746129	1.58739	5.2229	1.27273	2.12121	2.90909
	House 3	0.6098	1.03293	2.25157	1.8125	2.99265	4.00
	House 4	0.472966	0.855004	1.48647	2.07692	3.08791	4.38462

Figure 7 - Table showing syntactic resulted data using DepthmapX. By Author, 2017.

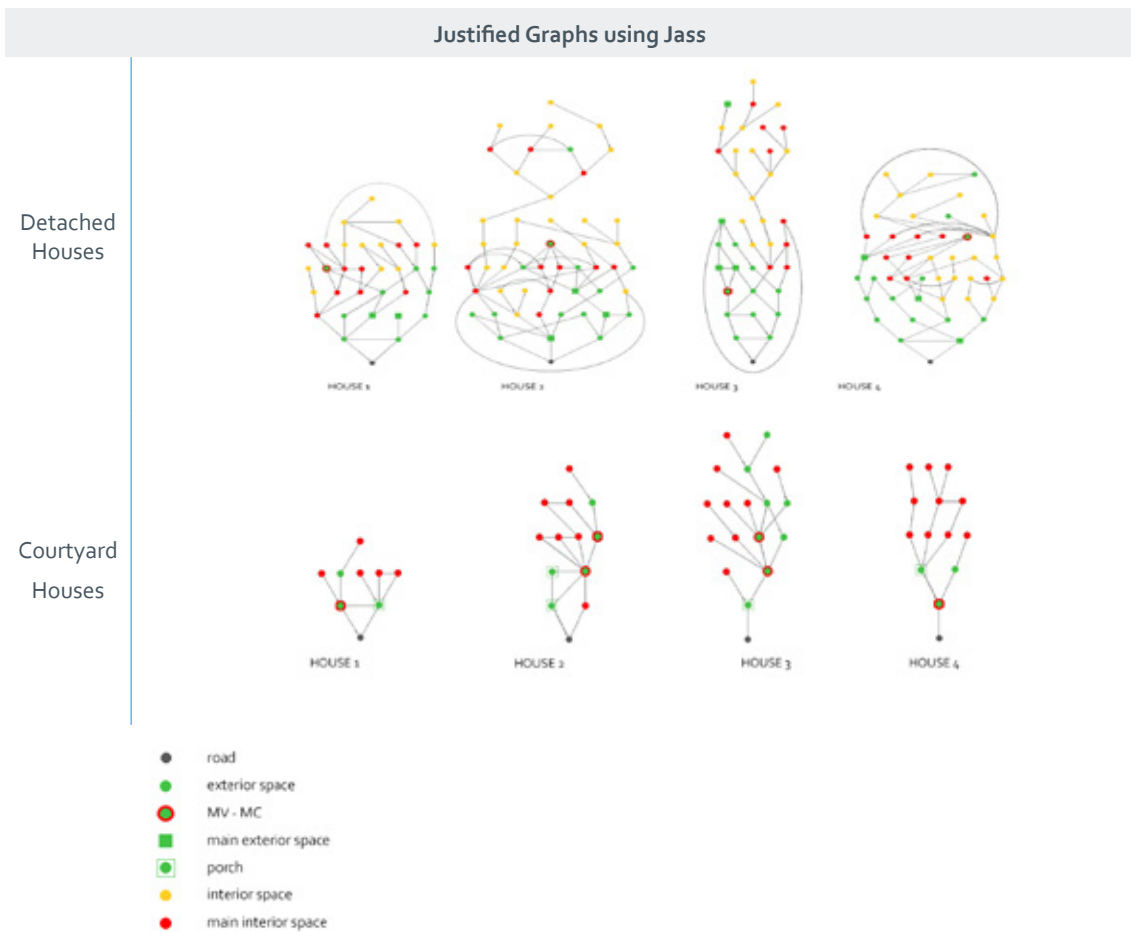


Figure 8 - Table showing Justified Graphs using Jass. By Author, 2017.

6. CONCLUSIONS

A number of comments can now be made regarding the character of the outdoor spaces of the detached contemporary Greek- Cypriot house with the results of the analysis confirming that the impact the building regulations introduced by the British Rule in 1946 goes beyond the quite apparent break-up of the continuous street front of the vernacular neighbourhood.

The strongly integrated courtyard of the vernacular house as the main, and in many cases only, outdoor space is replaced by a main veranda or other outdoor space which, despite its connections with other outdoor spaces which run perimetrically around the building, remains rather segregated. The most integrated space of the unit now tends to be located inside the house. Even in cases when the most integrated space is an outdoor space, it is not the main outdoor space but a transition space somewhere in the perimeter of the building which is not that essential in the life of the family.

The above observation is also linked to the increase in the number of rings in the detached contemporary house but what needs to be pointed out, as mentioned above, is that many of these rings do not play a significant role in the lifestyle of the family since they involve the practically left-over space around the house.

Additionally, although the visual connection between the courtyard and the interior spaces of the vernacular house was much less than that of the main outdoor space and the interior of the contemporary house, the visual exposure of the contemporary house's outdoor space to the street, means less privacy, a setup which does not seem to be desirable by most homeowners. With the wall separating the street from the outdoor spaces having a maximum height of 1.2 m, the imposed spatial relationship does not seem to reflect the way the family relates to the public space. This is also the case, with the 2.1m high wall which can be built where the plot meets a neighbouring plot. Unlike the interior spaces which were found around the courtyard of the vernacular house, these walls may break the visual but not the sound connectivity between adjacent houses.

It should therefore be no surprise that the architect during the design, and the homeowners after the house is completed, try to find ways to eliminate the negative effects these regulations have on the desired lifestyle of the family.

REFERENCES

- Bottomore, T. B. (n.d.). *Sociology: A Guide to Problems and Literature*. nwin University Books; Fourth Impression edition (1965).
- Caramondani, A. (2017, January 25). Questionnaire regarding distances of buildings from the boundaries of their building plots.
- Charalambous, N., & Peristianis, N. (n.d.). "Cypriot Boundaries." *IASTE, University of California*, 159.
- Demi, D. (1997). *The walled city of Nicosia: typology study*. Nicosia: United Nations Development Programme.
- Hadjichristou, Y. (2012). Malleable Courtyards. Presented at the Aec International Conference 2012, The Brazilian British Centre: AEC 2012: 7th International conference on innovation in architecture, engineering and construction.
- Hanson, J. (1998). *Decoding homes and houses*. Cambridge ; New York: Cambridge University Press.
- Heal, A., Paradise, C., & Forster, W. (n.d.). *The Vernacular as a Model for Sustainable Design* (PLEA2006 - The 23rd Conference on Passive and Low Energy Architecture, Geneva, Switzerland, 6-8 September 2006). Welsh School of Architecture, Cardiff, Wales.
- Hillier, B. and Hanson, J., (1984) 'The social logic of space', Cambridge: Press syndicate of the University of Cambridge.
- Jaschke, K. (2009). City is House and House is City. In V. Di Palma, D. Periton, & M. Lathouri (Eds.), *Intimate metropolis: urban subjects in the modern city*. London ; New York: Routledge.
- Kassapis, G. A. (2016, December 30). Questionnaire regarding distances of buildings from the boundaries of their building plots.
- Krentos, D. (2017, January 19). Questionnaire regarding distances of buildings from the boundaries of their building plots.
- Loizos, P. (2004). *The Greek gift: politics in a Cypriot village*. Mannheim [u.a.]: Bibliopolis.
- Markides, K. C. (1978). *Lysi: Social change in a Cypriot village*. Social Research Centre.
- Michaelides, A. (1985). *Chora, old Nicosia*. Nicosia.
- Ministry of Interior, Department of Building and Housing. The Streets and Buildings Regulations (CONSOLIDATED TEXT) up to 2016 (1959).
- Ministry of Interior, Department of Building and Housing. (2011). *GUIDE TO URBAN PLANNING REGULATIONS* (2nd ed.).
- Oliver, P. (Ed.). (1997). *Encyclopedia of vernacular architecture of the world*. Cambridge ; New York, NY, USA: Cambridge University Press.
- Papacharalampous, G. C. (2001). *The Cypriot House*. Nicosia: The Scientific Research Centre.
- Philokyrou, M. (2011). Teaching Vernacular Architecture and Rehabilitation in Relation to Bioclimatic Design Elements. In International PLEA Conference, M. Bodart, & A. Evrard (Eds.), *PLEA 2011: Architecture & sustainable development : conference proceedings of the 27th International Conference on Passive and Low Energy Architecture, Louvain-la-Neuve, Belgium, 13-15 July, 2011*. Louvain-La-Neuve: Presses universitaires de Louvain.
- Rapoport, A. (2006). Vernacular design as a model system. In L. Asquith & M. Vellinga (Eds.), *Vernacular architecture in the twenty-first century: theory, education and practice*. London ; New York: Taylor & Francis.
- Rapoport, A. (2007). The nature of Courtyard House: A conceptual Analysis. *Traditional Dwellings and Settlements Review*, XVIII(II), 52–72.
- Vafeades, G. (2017, January 20). Questionnaire regarding distances of buildings from the boundaries of their building plots.
- Van Eyck, A. (1986). Paris, Capital of the Nineteenth Century. In W. Benjamin & P. Demetz, *Reflections: essays, aphorisms, autobiographical writing* (pp. 146–162). New York: Schocken Books.
- Vrichea, A. (2003). *Living and House*. Athens: Greek Letters.