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Establishing the complexity of the historical city centre transformation with a special reference to Yaowarat

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ABSTRACT

Modern planning for historical city centres often encounters with a number of obstacles. The most notably one is the conflict between urban conservation and urban regeneration -- heritage legacy vs economic potentiality. Due to the urban complexity, conventional understanding of the historical city centres often misses some key spatial importance which should be transferred to planning. For example, the two strands of Space Syntax research which can help explain the spatial phenomena: spatial preferences for commercial/retail distribution (Hillier 1999, Kasemsook 2017 and 2019) and spatial segregation of the social marginalisation (Vaughan and Arbaci 2011).

Yaowarat, a historic Chinese settlement of Bangkok, has been the national retail and wholesale centre for varieties of products and lately an international tourist attraction. It is widely accepted that Yaowarat have steadily declined in the past 20 years. Numerous conservation plans, urban renewal designs and new developments have been proposed to transform yet conserve Yaowarat. All seem to miss the concrete understanding of Yaowarat's complexity. Space Syntax theories and methodology were proposed to study the spatial structure of Yaowarat, through spatial configuration analysis, building-use survey and heritage building evaluation. By far, it is successful to establish: first, the relationships between spatial configuration and the existence of live centre through building-use distributions, gentrification and heritage building distribution; second, the association between spatial segregation and abandoned buildings; and third, the selected social marginalisation. Hence, Yaowarat's complexity and diversity can be presented. This leads to an insightful knowledge for amending on or proposing for the on-going and future conservation planning and urban renewal design of the historical city centre. Simultaneously, it critically questions the common urban-conservation planning practice.

KEYWORDS

Historical city centre, Yaowarat, Bangkok, Space configuration, Diversity

1 INTRODUCTION

One of the biggest challenges facing the planning of historical city centre is to balance the proportions of heritage conservation and urban regeneration. The extent to which heritage conservation should be defined, classified and included, for example, artistic, social and cultural valuable building and building uses, environment, etc., and the purposes of urban regeneration such as economic, safety, liveliness and so on, have to be clarified (Amirtahmasebi et al 2016). Then, to what degrees they should be applied to the comprehensive plan of the historical city centre, through its urban planning content and implementation process, has to be clearly indicated.

Often, modern planning of the historical city centre fails to reflect the balance and the processes mentioned. One reason for this failure might be the lack of spatial comprehensibility on the complexity of the historical city centre transformation, particularly its urban structure. Space Syntax theories and methodology, therefore, can be very helpful in this case. This research proposes to establish the complexity of the historical city centre transformation through its urban structure, using the diversity definition as proposed by Penn et al (2009) and spatial segregation of the social marginalisation suggested by Vaughan and Arbaci (2011). Yaowarat is a subject of this research. The aim is to gain an insightful knowledge in order to amend on or propose for the on-going or the future conservation planning and urban renewal design of the historical city centre.

Yaowarat is a historical district of Bangkok, the capital of Thailand. It has been the Chinatown of Thailand, the national retail and wholesale centre for varieties of products, and lately one of the national and international tourist attractions. Yaowarat locates to the south-east of the former political centre of Bangkok, the Grand Palace, and next to the Chao-Phraya River, the city' main river. The district has always been included in the conservation plan of the historical city area of Bangkok, but not to be strictly conserved as the Grand Palace area (Figure 1).

Initially, Yaowarat had been established next to the Chao Phraya River around Song Wat Road. Through evolution, the core area of Yaowarat has moved northward to Vanich 1 Road, Yaowarat Road and Charern Krung Road, successively in terms of distances from Song Wat Road. Although the whole neighbourhood area of Yaowarat is considered to covered these four east-west main streets, the studied area covers only three east-west main streets, one of which is pedestrianised. They are: Charern Krung Road (the first paved road of Thailand), Yaowarat Road and Vanich 1 Road (Soi Vanich 1) -- the last street is the pedestrianised one. Song Wat Road was excluded. The studied area also covers four main north-south streets: Warachak Road,

Ratchawong Road, Itsaranuphap Road (a pedestrianised road) and Mittraphan Road. Figure 1 shows the studied area of Yaowarat, which is bounded to the east and the west by two ring canals of the historical area of Bangkok, the middle and outer ring canals, to the north by Chaokamrop Road and to the south by Vanich 1 Road. In addition, Bangkok former main railway station locates just to the immediate east of Yaowarat. The studied area covers approximately 0.77 square kilometres.

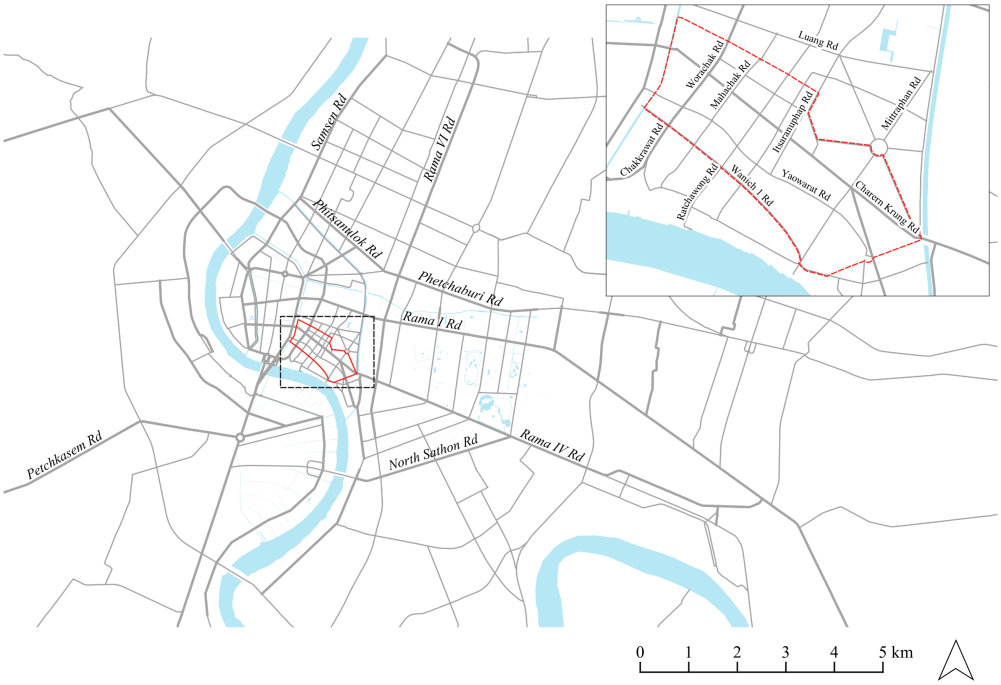

Figure 1: Location of Yaowarat

Yaowarat has been mainly perceived as a Chinese settlement which had originally been resettled from the Grand Palace area to the current location more than 250 years ago. The Chinese were not only the labour, but have always been the principal merchants and financiers of the Thai economy. Yaowarat was their stronghold; and, they made it a prosperous centre. Many historical records widely mention on several types of Chinese- and commercial-related buildings and building uses in Yawarat, in addition to residences and religion places, for example, retail, wholesale, fresh market, workshop, financial place, news outlet, factory, entertainment and gambling venue, warehouse, hotel, etc. The highest building of Bangkok once located in the area. However, there have been some evidence of the other religion and ethnic groups within the area, for example, Hindu, Sikh, Muslim, Vietnamese and Thai, as seen from their religion places or commercial premises. In summary, Yaowarat was a district of various uses and people.

Nonetheless, Yaowarat is widely accepted to have steadily declined for the past 20 years. The evidence of this declining can be seen from economic, social and architectural aspects. Modern trade and financial centres have relocated to the other areas, due to the unavailability of land parcels in Yaowarat that cannot support their needs for modern buildings, leading to lower reinvestment. Many of the wealthy Chinese merchants have migrated to the suburban areas to live in the detached houses larger than their cramped commercial shop-houses. The sub-urban

migration has leaved the commercial centre to be operated by a mix of labours, who are from the north-eastern region of Thailand, Myanmar, Cambodia and Laos, and stay in the rented rooms on some of the ground floor or the upper floors of the shop-houses. Many buildings are underused, particular on the upper floors, available for lease, unmaintained, or abandoned, making Yaowarat, in some parts, a dilapidated area.

Due to its heritage legacy and economic potentiality, numerous conservation plans, urban renewal design proposals and new developments have been proposed to transform yet conserve Yaowarat. For example, the introduction of Bangkok's underground mass transit with two stations in Yaowarat has already influenced two whole block developments. Currently, Yaowarat is regulated by a number of regulations issued by different government authorities. Each focuses on different aspect; and, few of them are interrelated. They do not address the complexity of Yaowarat's transformation and diversity, and subsequently create confusion for application for both the conservation and the regeneration. This research proposes that the established relationships between social, cultural and economic aspects to spatial structure based on diversity can shed light on the complexity of Yaowarat's transformation. It will also help subside this confusion, should the gaining knowledge be considered when the regulations are planned.

2 THEORETICAL FRAMEWORK

Two strands of Space Syntax research shape this research's theoretical framework. One is the spatial preferences for commercial/retail distribution for urban centres of both the city and the suburban (Hillier 1999, Kasemsook 2017 and 2019, Vaughan et al 2015, Törma et al 2017). Another is the spatial segregation of the social marginalisation (Vaughan and Arbaci 2011). Linking these two strands are the concept of diversity as proposed by Penn et al (2009). The main theories forming the basis of those theories are Hillier's spatial configuration theories: 'Centrality as a process' (Hillier 1999) and 'Spatial sustainability in cities' (Hillier 2009).

2.1 Spatial configuration

Hillier's theory of 'Centrality as a process' (Hillier 1999) propose that city centre is a result of a spatial process. The process works through the influence that spatial configuration has on the formation and location of city centres and the development and sustains their vitality. First, spatial configuration impacts movement and subsequently influence on land use choices and development of the city centre, or live centre – the retail and entertainment centre. Keys to this process are the local grid conditions – the layout and the global and local integration within the city system. With city transformation, the location of the centre can shift; and, the blocks making up the grid are more likely to be subdivided – creating the local grid intensification as described by Siksna (1997). The local integration generates movement and land use choices within the local grid, while the global integration brings movement into the city centre. Both levels of integrations work to make the city centre an attractor within the whole spatial system.

Theory of 'Spatial sustainability in cities' (Hillier 2009) was further developed from the theory of 'Centrality as a process'. It suggests that the city has underlining spatial structures, which consist of foreground and background networks. The foreground network links centres at all scales and the background network is made up by grids of residential spaces. The two networks are the reflection of the relations between environment, economic and socio-cultural forces. Spatially, sustainability is created through the operation of these two networks' configurations to generate movement types, to and through movements, and influence land use choices, in order to minimise trip length.

2.2 Diversity

The concept of diversity as suggested by Penn et al (2009) is developed further based on the impact of spatial configuration on the development of urban areas. Penn argues that '*the definition of diversity must not only include both the physical and spatial properties of urban form, but also the socio-economic and cultural properties of the communities that inhabit and use the city as their behaviours affect our sensory perception in urban space*' (Penn et al 2009, p.219). Diversity is not equivalent to 'mixed use or mixing'. There are some degrees of structure underlining diversity which work through time. To understand diversity, one needs to have both spatial and cognitive dimensions of intelligibility, created by spatial structure, land use distribution, trip efficiency and visual information in relation to physical, social and cultural aspects of urban areas (Penn et al 2009, p.233-234). Diversity in urban terms has three distinctive forms: diverse spatial structure with multiple local centres which can be local intelligible but globally unintelligible; diverse social, cultural and economic uses and behaviours, each occupying different locations within spatial network; and, diverse information being capable to be perceived and retrieved when experiencing environment, and meaningful for autonomous action (Penn et al 2009, p.233-237).

2.3 Spatial segregation of the social marginalisation

Vaughan proposes that the concept of segregation is far more complex, spatially and socially (Vaughan and Arbaci 2011). Spatially, segregation can be found in the city centre or the suburban areas. Its location can shift in relation to urban transformation and introduction of new urban elements, for example, railway line and station (Törma et al 2017), a similar pattern to live centre. A locally integrated area within a globally segregated network is different from a locally segregated area within a globally integrated network. The local and global levels of segregation generate different types of spatial encounter and co-presence between different types of social groups. Socially, the focuses of segregation vary from location to location: social and ethnic differences, classes, immigrants, religions or races. These minority groups have their owns ways to utilise spatial network for socialising and gaining economic opportunity (Vaughan and Arbaci 2011).

The research proposes that Yaowarat as a historical city centre is a diverse urban area. The complexity of its diversity can be unfolded through the relationships between spatial structure and socio-economic properties distributed within its spatial network. The primacy is the distribution of buildings and building-use types in relation to spatial configuration. As confirmed by many Space Syntax researches, live-centre related buildings should occupy the integrated public spaces, i.e., street segments, due to their spatial preferences for economic activity. The integration should influence the aggregation and clusters of different building-use types as presented by Hillier and Penn (1992). Building-use types which are more related to social and cultural aspects should occupy the less integrated segments, a representation of the social marginalisation to some degrees. The distribution of heritage buildings, as cultural evidence of diversity, and building renovation or new construction, as gentrification sign of urban transformation, may follow the distribution of live-centre related buildings. Economic potentiality is very powerful to induce investment in constructing valuable or new buildings.

3 DATASETS AND METHODS

The methodology covers three types of data sets: spatial network, surveys of building uses, and evaluation of valuable buildings. Details are as followed:

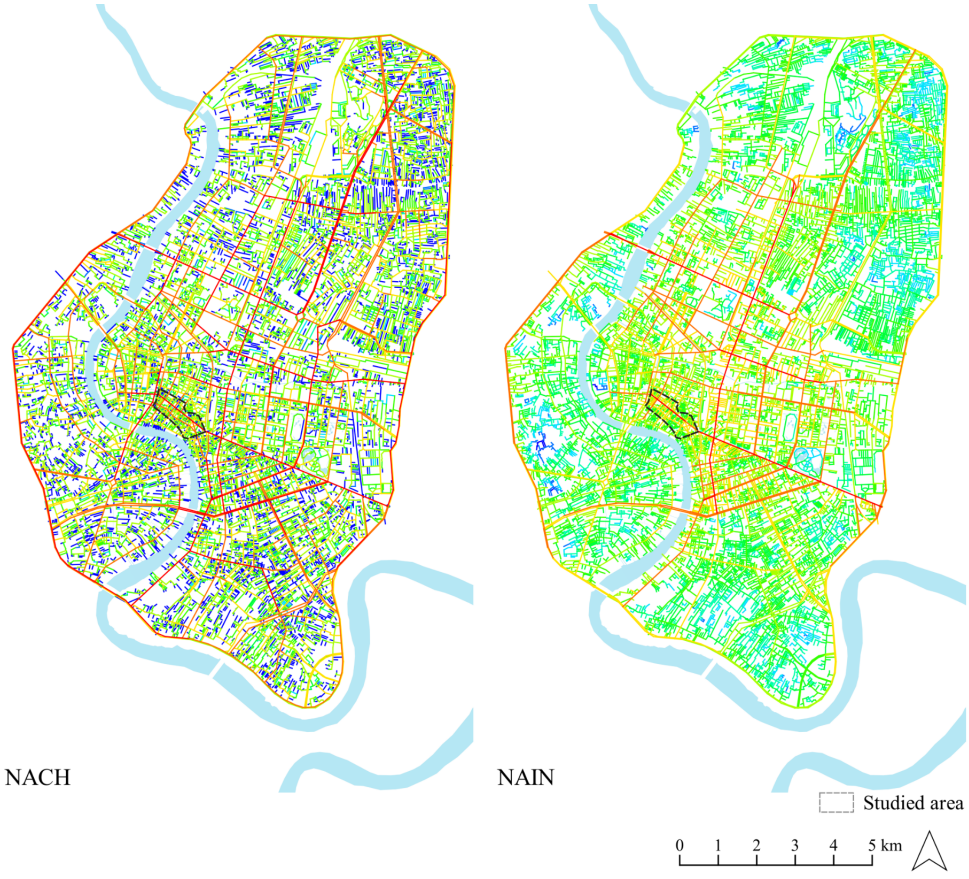

Figure 2: Segment analysed maps of Bangkok within the central circular roads showing NACH and NAIN

Three scales of spatial network model were made to analyse Yawarat's spatial configuration. They are: spatial network of the city of Bangkok, spatial network of Bangkok's within the central circular roads and spatial network of the studied area of Yaowarat. A comparative segment analysis of the three models for spatial configuration points out that the spatial network of Bangkok's within the central circular roads (33,792 segments) should be the studied model of the research. The model of the whole city Bangkok (262,368 segments) is too large, with Yaowarat (811 segments) being a very small area although being globally accessible. The studied area's model was too limit in terms of the contextual influence but is useful for rechecking with the building and building-use distribution. Figure 2 displays the segment analysed maps of Bangkok within the central circular road showing NACH and NAIN. Figure 3 shows the enlarged NACH and NAIN maps of Yaowarat area within the Bangkok maps.

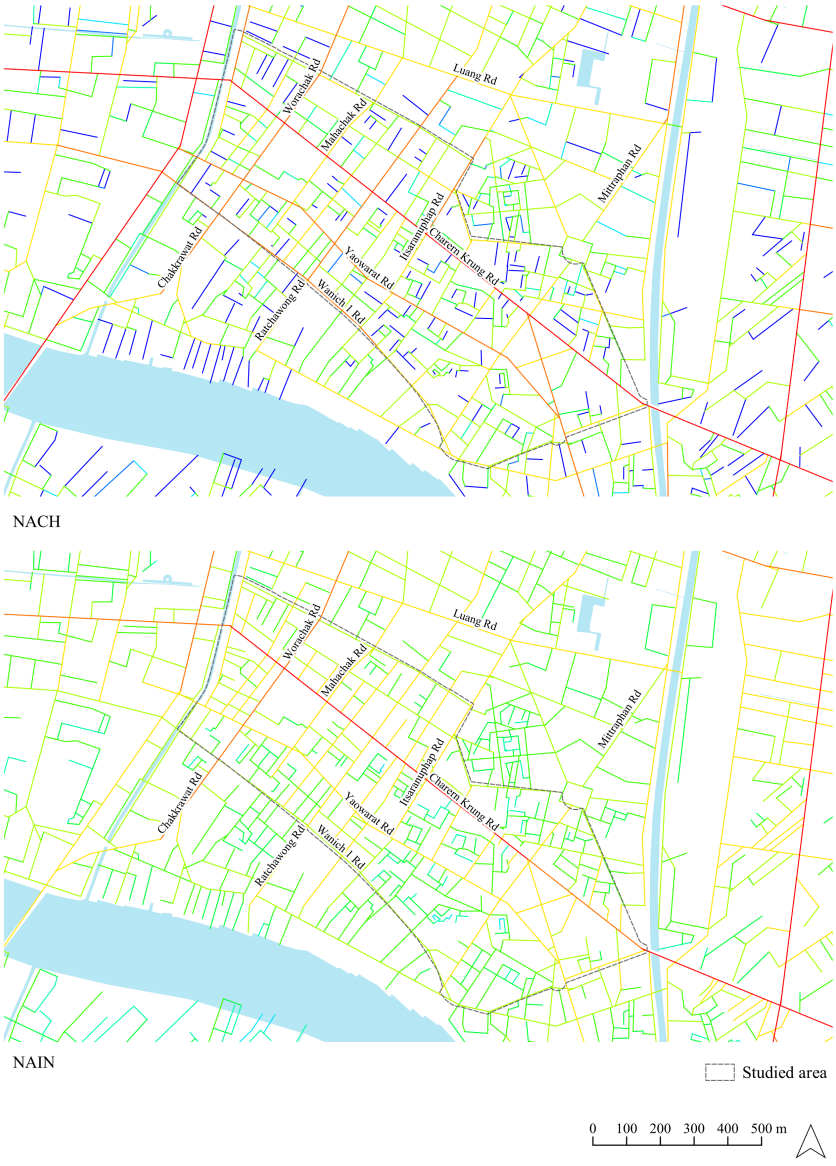

Figure 3: Enlarged maps of Yaowarat within the Bangkok segment maps showing NACH and NAIN

Two types of surveys ware carried out in September-November 2020. One was to record building characteristics and types of use. Another was to evaluate heritage values of buildings. Within an area of 0.77 square kilometres, there were 6,526 buildings recorded. Building uses on the ground floor to the fifth floors and buildings characteristics, for example, style, height, construction material, construction time and so on were recorded. For this paper, only building uses of the ground floor were analysed and presented. This is because of the view that the ground floor uses have more of the direct impact from the spatial configuration, socially and economically, and from land price/rent competitiveness than uses of the upper floors.

Order	Categories	Class	Types	Micro-types
1	**Residential**	Residential	Detached house	Detached house
			Terrace/ Town/ Shop house	Terrace/ Town/ Shop house
			Apartment	Apartment
2	**Co-residential**	Co-residential	Shop house	Shop house
3	**Commercial**	Food & Beverage related	Eatery	Restaurant /
				Quick service
				Chinese restaurant
				Cafe
				Pub & Bar
			Sweet & snack	Sweet & snack
				Traditional Chinese sweet and snack
			Ingredient	Food ingredient
				Tea shop
				Herb shop
			Kitchenware	Tableware
				Kitchen utensil
		Market	Fresh market	Fresh market
			Supermarket	Supermarket
		Shopping centre	Shopping centre	Shopping centre
		Convenient	Convenient store	Convenient store
		Consumer product	Consumer product	Consumer product
		Miscellaneous shop	Miscellaneous shop	Miscellaneous shop
		Gold & Jewellery	Gold	Gold
			Jewellery	Jewellery
		Fashion & Accessories	Apparel	Apparel
			Shoe	Shoe
			Fabric	Fabric
			Accessories	Accessories
			Gift shop	Gift shop
		Toy	Toy	Toy
		Home decoration	Home decoration	Home decoration
			Traditional Chinese home decoration	Traditional Chinese home decoration
		Building appliance	Electronic	Electronic
			Sound & Audio	Sound & Audio
			Lighting	Lighting
		Part & Equipment	Automobile-related	Automobile-related
			Agriculture -related	Agriculture -related
			Camera & Equipment	Camera & equipment
			Gun & Equipment	Gun & Equipment
			Mobile phone equipment	Mobile phone equipment
		Chemical supplier	Chemical supplier	Chemical supplier
		Material supplier	Material supplier	Steel tubes, rods & plates
				Glass
				Timber
				Acrylic & Plexiglass
				Rubber & resin
				Cloth
		Box & Container	Box & Container	Box & Container
		Chinese cultural-related	Charms & holy items	Charms & holy items
			Offering	Offering
			Coffin	Coffin
		Stationary	Stationary	Stationary
		Book store	Book store	Book store

Order	Categories	Class	Types	Micro-types
3	**Commercial**	Entertainment	Film theatre	Film theatre
			Sport club	Sport club
			Snooker club	Snooker club
			Film theatre	Film theatre
		Accommodations	Hotel	Hotel
			Hostel	Hostel
4	**Services**	Healthcare	Surgery/Clinic	Surgery/Clinic
				Dental surgery
			Traditional treatment clinic	Tradition Thai/Chinese medicine
				Acupuncture
				Traditional massage
			Other healthcare service	Other healthcare service
			Pharmacy	Pharmacy
			Medical supplier	Medical supplier
			Eyeglasses	Eyeglasses
		General service	Travel service	Travel service
			Baber and Salon	Barber
				Salon
			General repair shop	General repair shop
			Service centre	Service centre
			Telecommunication service center	Telecommunication service center
			Picture & Signage	Photograph studio
				Signage/billboard making
			Lottery	Lottery
		Financial service	Bank	Bank
			Pawnshop	Pawnshop
5	**Office**	Office	Government office	Government office
			Business office	Business office
			Publisher	Publisher
6	**Education**	Education	School	School
			Tutorial school	Tutorial school
7	**Hospital**	Hospital	Hospital	Hospital
8	**Social & Cultural**	Temple & Shrine	Buddhist temple	Thai
				Chinese
				Vietnamese
			Sikh temple	Sikh temple
			Mosque	Mosque
			Chinese shrine	Chinese shrine
		Cultural & Learning centre	Art gallery	Art gallery
			Museum	Museum
			Community learning centre	Community learning centre
		Association	Public charity association	Public charity association
			Ethnic group association	Ethnic group association
9	**Storage & Warehouse**	Storage & Warehouse	Storage & Warehouse	Storage
				Warehouse
10	**Industrial**	Industrial	Industrial	Industrial
11	**Public utility**	Public utility	Public utility	Public utility
12	**Park and recreational place**	Park and recreational place	Park and recreational place	Park and recreational place
13	**Construction site**	Construction site	Construction site	Construction site
14	**Abandoned building**	Abandoned building	Abandoned building	Abandoned building
15	**Building available for lease**	Building available for lease	Building available for lease	Building available for lease
16	**Unspecified**	Unspecified	Unspecified	Unspecified

Table 1: Classification of ground floor building uses in Yaowarat

Ground floor building uses were classified into category, class, type and micro-type. The classification takes note from Christaller's theory and subsequent researches based on 'central place theory' (Christaller 1966) that the hierarchy of city centres serve different variety of products: the higher the hierarchical centre is, the larger the serving area would be and the greater the product varieties would be provided. Table 1 is the classification of all the categories, classes,

types and micro-types of the ground floor building uses found in Yaowarat. There are 16 categories, 39 classes, 84 types and 105 micro-types. The analysis focused on the distribution of categories and classes of building uses on the ground floor in relation to spatial configuration.

In addition, buildings under renovation, construction and abandonment were also classified for the building-use categories. They represent changes, gentrification and transformation of the city centre. Due to the Covid-19 pandemic during the time of data collection, commercial stalls were excluded from the survey and the analysis. This is because a number of commercial stalls stopped operating, particularly those evening-operating street food stalls, which have made Yaowarat internationally well-known for street food scene, because of the government curfew.

Socio-cultural value of Yaowarat can also be represented by the heritage buildings. Criteria to evaluate building's heritage value were compiled from Burra Charter (Australia ICOMOS 2013); Outstanding Universal Value by UNESCO; Heritage Act by Department of Art, Thailand's Ministry of Culture; and, Criteria for heritage buildings by Association of Siamese Architects under Royal Patronage. Each is often used as a reference for Thailand conservation planning, but hardly crossed check or integrated. The criteria comprise of four different sets of socio-cultural significations, which are: artistic signification, historical signification, technological and learning signification, and social signification. Each of them was subdivided further. In total, there were 10 subdivisions of heritage signification. Every building was evaluated in relation to these 10 subdivisions from minimum to maximum score: 0, 1, 2 and 3. The scores then were summed for the total scores. They were reassigned to all buildings. The buildings were then ranged into five groups according to the total scores: 0, 1-7, 8-13, 14-20 and 21-28 scores.

When analysing the distributions of ground floor building uses and heritage buildings with spatial configuration, they were analysed with a range of segment radii: R200m, R400m, R800m, R1000m, R1500m, R2000m, R2500m, R3000m, R4000m, R5000m, R7000m, R8000m, R10000m and RN. Of these radii, four display positive association. The research will focus on these four radii, which are R400m, R800m, R2000m and RN, and particularly on R2000m.

Lastly, interviews were carried out for residents, i.e., people who live or work in the area, and visitors. Questions were related to heritage buildings, social spaces and recognition of Yaowarat spatial identity. Similar to the exclusion of commercial stalls, the Covid-19 pandemic had a huge impact on the interviewing process and made the interviews inconclusive. The research, therefore, used the interviews' results as a reference rather than evidence for analysis.

4 RESULTS

THE CONTINUING LIVE CENTRE

Although Bangkok has enlarged and developed with many other economically more powerful centres, which are served with strongly linked roads, Yaowarat has always been well-connected

within the city network. The spatial network of Yaowarat consists of three main east-west streets (Charern Krung Road, Yaowarat Road and Vanich 1 Road) and four main north-south streets (Warachak Road, Ratchawong Road, Itsaranuphap Road and Mittraphan Road), with two being pedestrianised, Vanich 1 Road and Itsaranuphap Road, in each direction. These eight streets form the area's orthogonal grid pattern and large blocks. The large blocks were further subdivided with the grid intensification characteristics mentioned by Siksna (1997). However, not all the grids of the smaller blocks have the continuous orthogonal grid pattern. Few have the discontinuous grid pattern.

Because of these grid characteristics, Yaowarat is a well-integrated area, globally and locally. All segments of Charern Krung Road, which is one of the three main east-west roads, are a part of the foreground network of Bangkok's spatial network within the central circular roads (Figures 2 and 3). NACH values of these segments are in the top 5% of all the city's segments. Most segments of the other main roads in both directions in Yaowarat have NACH values in the top 20%. As for the background network, very few local grids in Yaowarat area are segregated, though there are some. They tend to be just less integrated. In the other words, the local grid configurations forming the background network of the area are indifferent.

The configuration suggested that Yaowarat has a spatial network that is well linked with the city network and within itself. According to Hillier's theory (Hillier et al 2012), this spatial configuration characteristics of Yaowarat can well generate both to- and through movement types, one to bring the movement into the area, the foreground network, and another to distribute the movement within the area, the background network. Accordingly, the spatial configuration characteristics should be one of the reasons why Yaowarat has always maintained to be one of the importance live centres of Bangkok: having great accessibility at all scales.

THE SHOPPING DISTRICT WITH A STRUCTURE

Table 1 is the strong evidence of Yaowarat being the national retail and wholesale centre, having wide varieties of products. From the survey of ground floor building uses, the uses can be classified into 16 categories, 39 classes, 84 types and 105 micro-types. Of the 16 categories, commercial category has the greatest number of classes compared to the other categories. The commercial category has 20 classes of the total 39 classes, about 50%. This pattern also repeats for types and micro-types. There are 42 commercial types from the total 84 types and 55 commercial micro-types from the total 105 micro-types. Second to the commercial category is the service category, with three classes, 15 types and 20 micro-types. However, the social and cultural related category is well represented within Yaowarat. There are three classes, nine types and 11 micro-types.

In terms of the number of buildings (Table 2), the commercial category has the highest number of buildings, 2,219 from 6,256 buildings, 35% of the total number of buildings being surveyed.

Interestingly, it is the residential category which has the second highest number of buildings, 1,770 buildings which is 28% of the total number of surveyed buildings. This is followed by the category of construction site, with 471buildings (7.5%), and then the service category, with 415 buildings (6.6%). It should be noted that the combined numbers of commercial and service buildings approximately accounts for 42% of all the number of surveyed buildings, the two categories of use with frequent visits, commonly. There are a marked number of buildings relating to community, social and cultural provision, 252 buildings (4%). They are: seven educational premises, four hospitals, 239 social and cultural related buildings, and nine public utility buildings. In addition, there are also a noticeable number of buildings which cannot be specified for building uses of the ground floor, 412 buildings (6.5%). A significant number of buildings are inactive, 777 buildings (12%). They are: 471 construction sites, 199 abandoned buildings and 107 buildings available for lease.

Order	Categories	Number of buildings
1	Commercial	2223
2	Residential	1770
3	Construction Site	471
4	Unspecified	409
5	Services	391
6	Social & Cultural	239
7	Storage & Warehouse	211
8	Abandoned building	199
9	Office	147
10	Building available for lease	107
11	Public utility	28
12	Industrial	28
13	Co-residential	21
14	Education	7
15	Hospital	4
16	Park and Recreational place	1
	Grand Total	6256

Table 2: Number of Yaowarat's ground floor building uses in terms of categories

Order	Class	Number of buildings	Order	Class	Number of buildings
1	Residential	1770	21	Financial service	48
2	Fashion & Accessories	569	22	Toy	34
3	Food & Beverage related	509	23	Consumer product	33
4	Construction Site	471	24	Home decoration	31
5	Unspecified	409	25	Public utility	28
6	Materials supplier	235	26	Industrial	28
7	Temple & Shrine	223	27	Shopping centre	27
8	Storage & Warehouse	211	28	Stationary	24
9	Gold & Jewellery	201	29	Accommodations	24
10	Abandoned building	199	30	Co-residential	21
11	General service	172	31	Association	13
12	Healthcare	171	32	Entertainment	9
13	Office	147	33	Chemical supplier	7
14	Building appliance	115	34	Education	7
15	Part & Equipment	115	35	Hospital	4
16	Building available for lease	107	36	Book store	4
17	Chinese cultural-related	89	37	Market	4
18	Miscellaneous shop	76	38	Cultural & Learning centre	3
19	Box & Container	59	39	Park and Recreational place	1
20	Convenient	58		**Grand Total**	**6256**

Table 3: Number of Yaowarat's ground floor building uses in terms classes

Of the 2,223 commercial buildings (Table 3), the top six classes with the greatest number of buildings are: fashion and accessories (569 buildings), food and beverage related (509 buildings),

material supplier (235 buildings), gold and jewellery (201 buildings), building appliance (115 buildings) and part and equipment (115 buildings). The combined number of their buildings are at 1,744 buildings, which is 78% of the total commercial buildings. This suggests that the principal commercial products, being provided in Yaowarat, are of these six commercial classes. However, as a historic Chinese settlement, there are 89 buildings selling commercial products relating to the Chinese culture, 4%. If the commercial types and micro-types are considered, more Chinese cultural related building uses could be further specified, for example, Chinese restaurant, traditional Chinese sweet and snack, traditional Chinese home decoration, or traditional Chinese cultural and belief related accessories.

Clearly, Yaowarat is a strong commercial centre which provides wide varieties of products and services, and is a highly distinguished centre for six product types. The presence of the other commercial products might be to supplement these six or to take the advantage of the six and the area's configuration to maximise more purchasing products for each trip, i.e., purchasing trip efficiency. The classification confirms the signification of the centre according to Chirstaller's theory (Chirstaller 1966). However, there is a clear evidence of the socio-cultural presence in Yaowarat through the ground floor building uses. Yaowarat, therefore, still maintains to be the Chinese social and cultural centre. It is the hub for both the commercial and the Chinese centre.

Due to the spread of the commercial buildings throughout Yaowarat, the association between spatial configuration and commercial building distributions is less clear, for both the categories and classes of the commercial uses. The regression analysis shows that r-squared values between spatial variables (NACHR400m, NACH R800m, NACH R2000m and NACH RN) and the number of commercial buildings and commercial building density per segment, from the commercial category and some selected commercial classes, are very low. A similar pattern is also found with the residential uses, having very low r-squared values between spatial variables (NACH R400m, NACH R800m, NACH R2000m and NACH RN) and the number of residential buildings and residential building density per segment. However, some forms of structure can be clearly identified from the distribution maps of building-use categories and building-use classes (Figure 4 and Figure 5).

Figure 4 and Figure 5 display the distributions of building uses in terms of categories and classes superimposed on NACH R2000m. Figure 4 shows that commercial buildings are everywhere in Yaowarat, on the main and the sub-streets. A few residential and socio-cultural buildings also found to locate along the main streets. Majority of residential buildings locate inside the blocks. Some of them are even surrounded by the commercial buildings on all block sides, making the residential buildings the innermost accessible buildings. For the social and cultural buildings, if they are temples or big Chinese shrines, they tend to locate along the main streets of both directions. The small Chinese shrines are more likely to locate on the sub-streets.

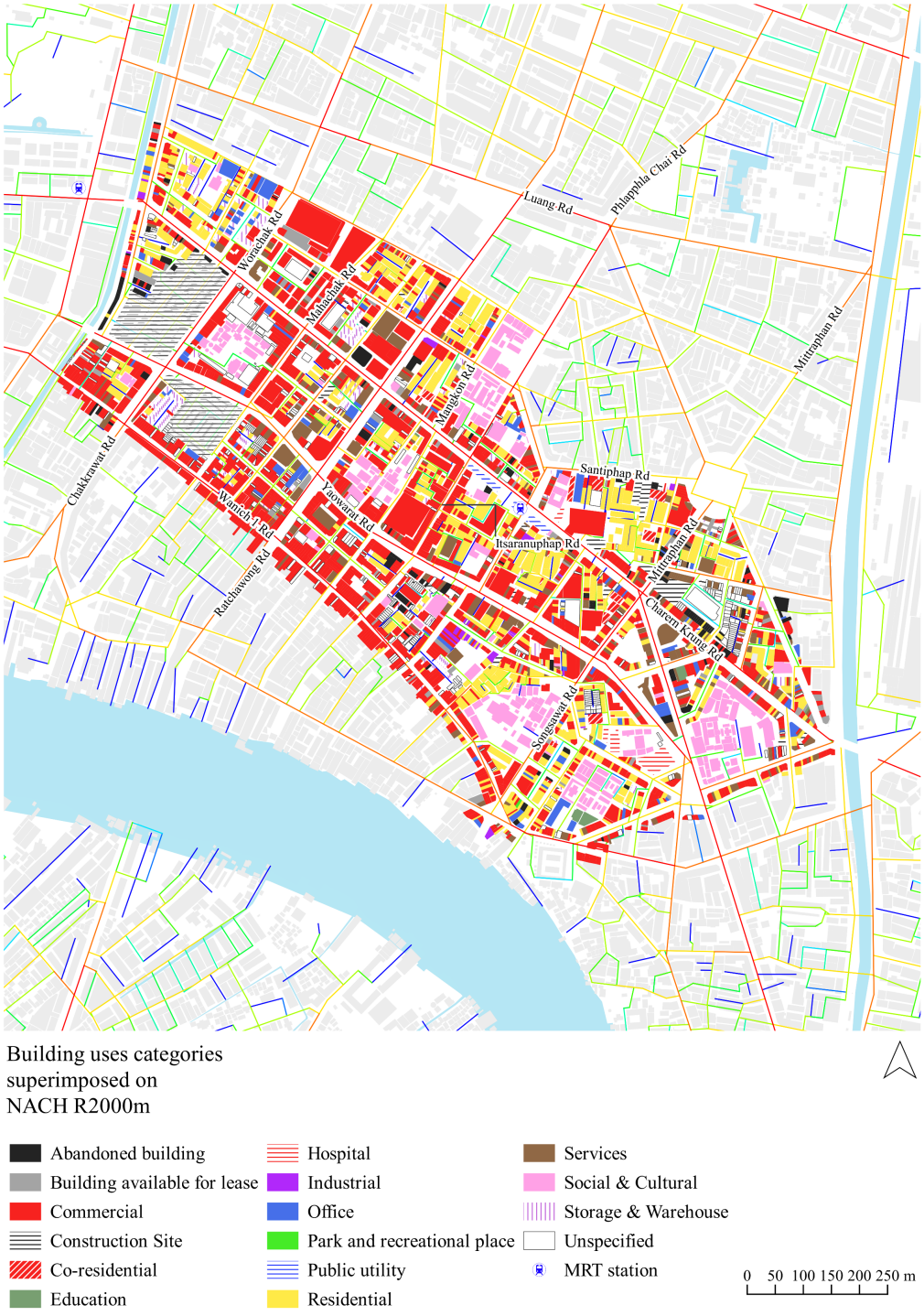

Figure 4: Distribution of ground floor building-use categories of Yaowarat superimposed on NACH R2000m map

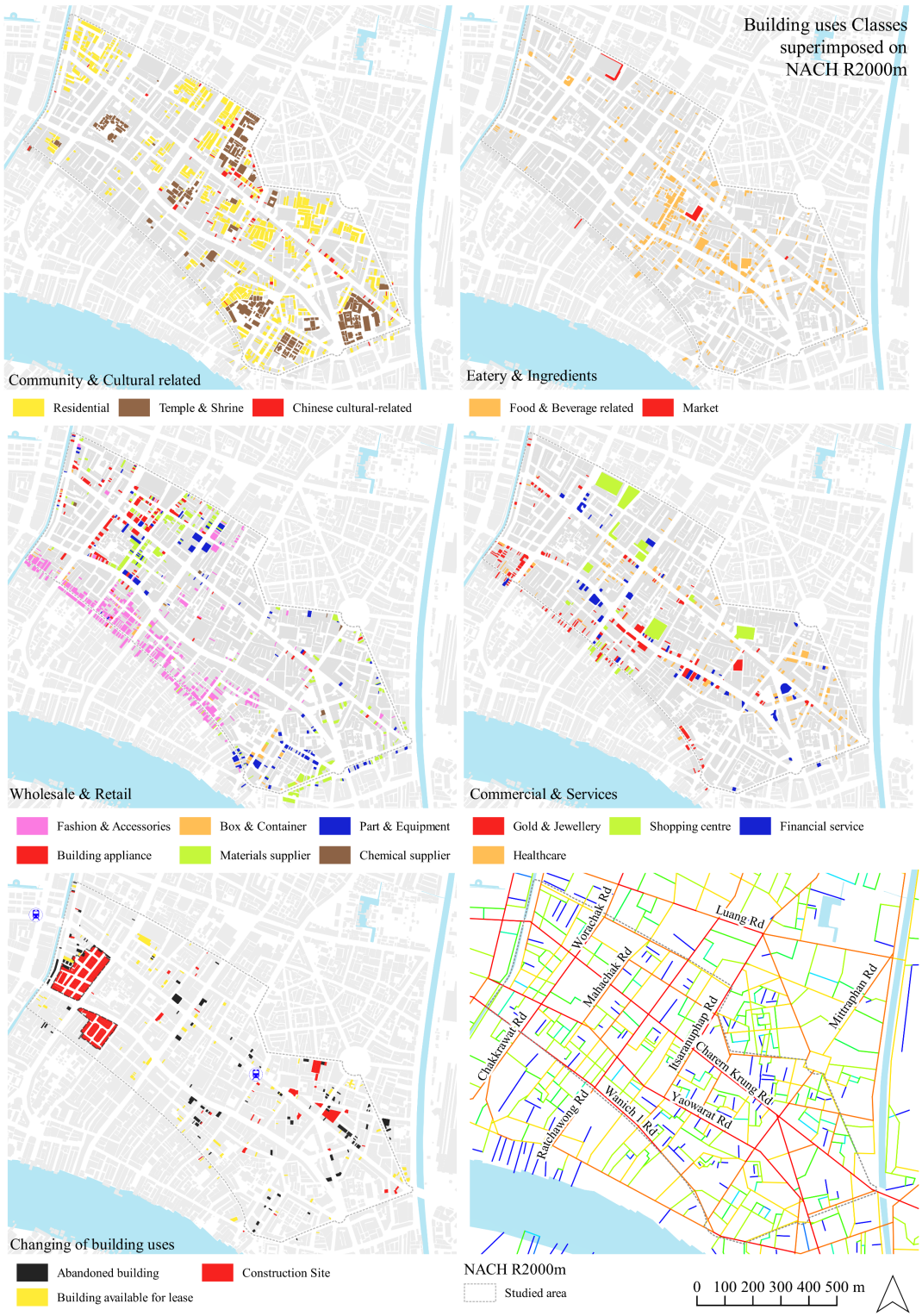

Figure 5: Distribution of selected ground floor building-use classes of Yaowarat superimposed on NACH R2000m map

Considering the distribution of buildings in terms of the building-use classes, some forms of the spatial structure are highly apparent (Figure 5). The three main east-west streets are noticeably occupied by the commercial buildings from four dominant different classes. Most fashion and

accessory shops continuously occupy Vanich 1 Road. Food and beverage related places, particularly the eatery ones, mostly occupy Yaowarat Road. However, a significant number of food ingredient shops continuously occupy Itsaranuphap Road, a north-south main street which geographically locates at the centre of Yaowarat and orthogonally passes through all the three main east-west streets. Gold and jewellery shops aggregate along the three main east-west streets, but more concentrate on Yaowarat Road and Vanich 1 Road. Unlike the other two main east-west streets, Charern Krung Road is occupied by shops with more variety of commercial classes than Vanich 1 Road and Yaowarat Road.

The linear aggregation of buildings with similar classes is also found, to a lesser degree, on the other streets, mostly the north-south streets, some being main streets. Material supplier shops linearly aggregate on two of the north-south streets, one locating in the north-western area of Yaowarat, the other locating in the south-eastern edge. Part and equipment shops aggregates in the same areas as material supplier shops, but on different streets. Building appliance shops aggregate in the north-eastern area and next to the streets with material supplier shops. The ways in which these streets which have the shops with complimentary products from different commercial classes connect to each other create a cluster or a sub-centre, one in the north-western area and another in the south-eastern area (Figure 5).

Residential buildings are more likely to aggregate as a cluster. Some takes the whole block area, the other are part of the blocks. Majority of the residential blocks are in the eastern area of Yaowarat (Figure 5). The residential clusters in the central area tend to locate at the innermost area of the blocks. Their areal sizes are much smaller than those in the eastern areas. Small Chinese shires spread through all areas of Yaowarat, while the large Chinese shrines and Buddhist temples mostly locate in the central and the eastern area. They could occupy the whole or a half of the blocks.

The distribution of the construction sites is very interesting (Figure 5). There are two patterns. One is the whole block development, which concentrates in two large blocks locating in the north-eastern area. Their blocks are bounded by at least two main streets. The two blocks consist of more than 400 buildings of the total 471 buildings. The rest of the construction sites disperse throughout Yaowarat. Of the two under construction blocks, one is privately organised by the resident corporation and attempt to keep the original scale of all the buildings within the block. Another is developed by one of the country's largest developers and will maintain a few original scale buildings, with the large buildings being built in the inner block. In addition, abandoned and buildings available for lease locate on the sub-streets, which are the less integrated segments.

Accordingly, there are five forms of building-use distribution structure found in Yaowarat. The first is the strong linearity of the commercial centre with four dominant different classes along the three main east-west streets and one north-south main street. This is the characteristic Hillier

and Penn mentioned as 'marginal separation by linear integration': *moving along the linear streets, buildings and building characters change slowly, but may change radically when one turns a corner* (Hillier and Penn, 1992). The second is the sub-centres, formed by the lesser commercial-aggregated linearity of some segments of the main streets and their nearby streets. More presence of the sub-centres in the future is supported by the two under construction blocks. The third is the residential clusters -- the whole, the half and the innermost of the block. The fourth is the clusters of the temples and shrines locating further away from the centre of the live centre. The fifth, the last one, is the abandoned buildings and buildings available for lease which are dispersed, but mostly locate on the less integrated sub-streets.

THE HERITAGE IDENTITY

Of the 6,526 buildings, there are 1,127 heritage buildings, 17% of the total number of surveyed buildings. The heritage is defined by four significations: artistic, historical, technological and learning, and social. As mentioned, every building was evaluated for its heritage signification by being given scores for all the four significations. The scores then were summed and assigned to each building. Figure 6 is a distribution map of the heritage buildings in Yaowarat. The buildings were ranged in relation to their total scores. They were crossed checked with the buildings uses and interviews. To some extent, the results of the evaluation and the interviews are similar that the buildings recognised by residents and visitors to be the heritage buildings often have the high scores from the evaluation.

Similar to the regression analysis of the building uses and spatial configuration, r-squared values between spatial variables (NACH R400m, NACH R800m, NACH R2000m and NACH RN) and the number of heritage buildings and heritage building density per segment are very low. The distribution map of the heritage buildings displays a clearer structure (Figure 6). Majority of the heritage buildings locate along the two main east-west (Yaowarat Road and Charern Krung Road) and the four main north-south streets (Warachak Road, Ratchawong Road, Itsaranuphap Road and Mittraphan Road). They tend to have the linear aggregation except those locating in the south-eastern areas.

The heritage buildings cover various building uses. However, they are more likely to be the commercial buildings and the social and cultural buildings (Figure 6). The most significant heritage buildings by number are gold and jewellery shops, temples and shrines, restaurants and food ingredient shops, banks, community association buildings and hospitals. There are a marked number of heritage residential buildings, clustering to the far north-eastern and the far south-western area. By and large, the heritage building distribution seems to have a similar structure to the building-use distribution.

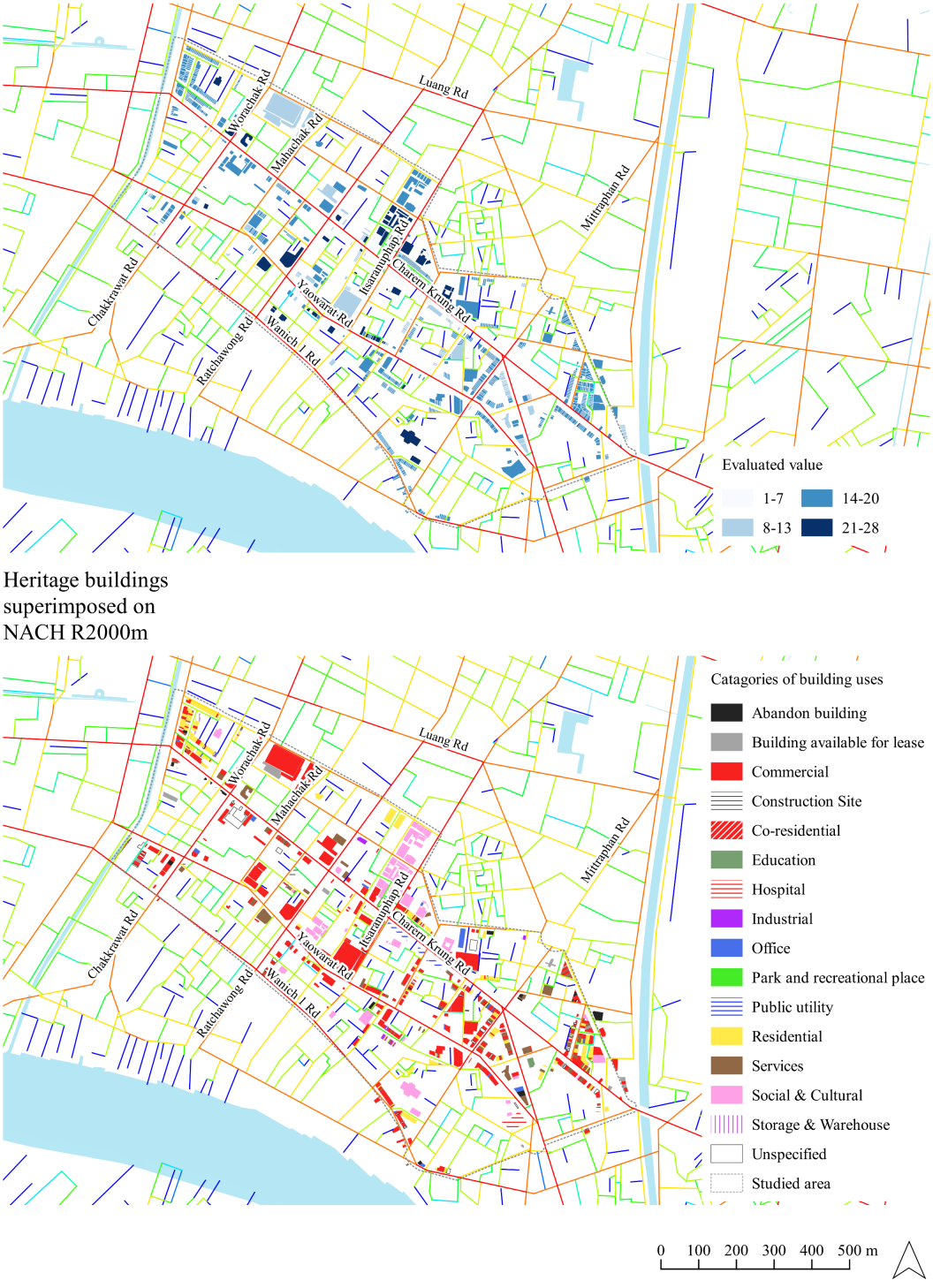

Figure 6: Distribution of the heritage buildings of Yaowarat superimposed on NACH R2000m map

5 CONCLUSIONS

THE COMPLEXITY OF YAOWARAT'S TRANSFORMATION

The complexity of Yaowarat can be unfolded as followed. Through evolution, Yaowarat has developed the foreground and the background network which can maintain the area's connection and accessibility with the city and within the area itself. On the one hand, the global and local

integration help sustain the area's being the live centre, through spatial scales and time. On the other hand, the integration creates the evenness of the area's streets, to some degrees positively. This should be the key reason why the r-squared values are low in all regression analyses.

Yowarat definitely is a diverse historical city centre. The area strongly has some forms of structure. First, Yowarat has a diverse spatial structure, the main structure formed by the seven main streets and the multiple local structures within the blocks. The main and local structures are both globally and locally intelligible. Second, the area has diverse social, cultural and economic uses which occupy different locations within the spatial network. Their aggregation can be identified with five spatial structures of the building-use and the heritage building distribution: the linearity of the commercial centre, the clusters of the commercial sub-centre, the selective clusters of the residence and the socio-cultural buildings at the edge area, and the structure of the heritage buildings following the building-use distribution. Third, Yaowarat has diverse information which can be constructed though the perception of the aggregation of building uses and heritage buildings when one moves in the area and could experience the environment with meaningful for autonomous action.

REFLECTION ON THE HISTORICAL CITY CENTRE PLANNING

It seems clear that the planning process of the historical city centre should begin by studying and establishing the complexity and the diversity of the historical city centre itself. It should challenge the conventional assumption of the planning process and the definition of the planning elements. Examples can be learnt from Yaowarat in terms of street network, land/building uses and heritage conservation:

First, with the spatial network that is globally and locally integrated, introducing new roads that could interrupt the integration has to be very delicate. For example, to introduce a missing link in the segregated inner block of the residential area may interrupt the residents' privacy which is very precious in the busy live centre such as Yaowarat, i.e., eliminating the selected social marginalisation. This can also affect the aggregation of building uses.

Second, it is important to specify and diversify land use types in the historical city centre. The planning practice to assign a single dominant use to the whole area of the historical city centre which is a live centre should be terminated. The conservation or the comprehensive plan should maintain and reflect the distribution of diverse building uses on the ground floor, while allow the building uses of the upper floors to alter. It is important to carefully plan the use types along the streets and sub-areas, to continue the identity of the whole area. It should also be aware of the conflict of uses in the approximated area and location.

Third, the comprehensive plan should regulate the wholesale block development with big-scale building that will affect the commonly humanised building scale within the historical city centre.

The conservation plan should not regulate the building characteristics throughout the whole area of the historical city centre, but should be selective. It should regulate buildings on the streets where the heritage buildings aggregate to maintain the identity of the area, while allow new developments in the other streets, providing that the building scale is maintained.

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