Enclave Sub/Urbanism:
A Historical and Configurational Assessment of Metro Manila's Centres of Exclusion and their Surrounding Spatial Fabric

by

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Abstract

The global privatisation of the built environment is seen as a contemporary theme leading to today's range of socio-spatial disparities. This study investigates the historical roots of Metro Manila's enclave urbanism using the spatially applied graph theory centralities of spatial network analysis, as part of the combined analytical methodology of space syntax theory. This uncovers repeating patterns of social exclusion and enclave configuration as Manila expands from its core. This study presents the effects of Daniel Burnham's City Beautiful Plan, which tries to create a unified civic core, but instead leads to Manila's decentralisation and suburbanisation. The parcellation of land following the Spanish colonial rule's *encomienda* system becomes the basis for privatisation of the urban fabric. It also becomes the imprint of car-centric Metro Manila's circumferential spine road, C4/Epifanio Delos Santos Avenue, and its string of private mixed-use enclaves, central business districts and exclusive gated villages. This study uncovers Metro Manila's *unnatural movement economy* within these enclaves, as consumption (retail/services, catering/F&B) points-of-interest locations deviate from space syntax's movement economies, and is instead internalised within large, air-conditioned building footprints (shopping malls and deep floorplate office blocks) with large car parking capacities. This study then (following current local policy arguing for it) uses spatial network analysis to model the effects of opening Metro Manila's exclusive gated villages to the flow of vehicles to help improve access to Metro Manila's commercial mixed-use enclaves/CBDs. The study illustrates that doing so would instead, probabilistically induce road demand and create more vehicular traffic and congestion. Using the same methods, this study instead offers a counterproposal, by identifying key gated villages for selective "opening" of gates and lifting of village restrictions to pedestrianise and induce a (hopefully – more palatable to the village residents) bottom-up *"yellow-field"* redevelopment. This study concludes by placing Metro Manila within space syntax discourse and reflects on how space syntax as a body of knowledge could be expanded, practiced and applied in the Philippine context.

Key Words: Space Syntax, Metro Manila, Enclaves, Unnatural Movement, Induced Demand, Yellow-field, *Encomienda, Hacienda, Reducciones,* City Beautiful, Daniel Burnham, Circumferential Roads, Epifanio Delos Santos Avenue (EDSA), Edge Cities, Suburban Retrofit, Gated Communities, Neoliberalism, Privatisation

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To Metro Manila, may its elite learn to lower their fences, and instead build bigger tables for others to share in their bounty; ***At para sa Inang Bayang – Pilipinas, nawa'y tayo'y makaalpas sa mga tanikala ng kasaysayan na patuloy gumagapos sa ating kaisipan.***

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Chapter 1. Introduction

1.1 The Global Context

The 2014 Revision of the UN's report on World Urbanization Prospects projects the world to grow toward a 66 percent urban population majority by 2050 (UN, 2015, p. 7). This trend points to increasing pressures on urban centres, with the demand for more space to absorb the populations drawn by the lure of cities.

Worldwide, cities densify and sprawl out, overrunning agricultural land and creating new suburbs (Torrey, 2004). Whilst definitions of what constitutes a suburb are as varied as their differences in character (Vaughan et al, 2009; Forsyth, 2012), there is consensus that suburbs have become the globally dominant form of the built environment, covering more land area than what would be considered traditional urban cores and downtowns.

The globalisation (Sassen, 1990) of supply chains, investment, migration, and socio-cultural values has made the world's economies more codependent. As private individuals and actors are able to access the global flows of capital, knowledge, and opportunity, this creates a widening gap between them and those unable to do so. Disparities in wealth and lifestyles, transform the virtual economic and socio-cultural barriers between the global and the marginalised, into the physical barriers bringing about private enclaves in and around the world's cities (Smith, 2002).

Rising with suburbanisation and globalisation is the growth of neoliberalist dogma (Theodore et al, 2011). The distrust of government participation in markets has seen the rise of the private domain, and recession of the public commons. This manifests in waves of privatisation of government assets, services and infrastructure, leading to the tenuous bounds between public-and-private interest.

1.2 Manila's Context

These contemporary global themes find deep local and historical groundings in the Philippines. Manila, the capital of Spanish and American colonial Philippines, is a setting for their control of global commerce across the Pacific Ocean. With limited numbers of colonist administrators, Spain divided the surrounding territories outside Manila and the towns throughout the archipelago to govern its territory.

This proto-privatisation of lands is the *encomienda* system[1] (Murphy and Hogan, 2012) that granted favoured colonists and local chiefs territory for administration, taxation and effective mobilisation of the native workforce. The *encomiendas* muddle the public and private interest, characterising the "enclavisation" of the Philippines, and Metro Manila's urban realm. This is the arc that runs through the historical narratives discussed by this study.

By predating modern neo-liberalist thought, Manila's development, could be argued to be the apotheosis of privatised, neo-liberalist urban form. Depending on where they stand (ideologically and within the city), Metro Manila is both a utopia for those who distrust the state and advocate private initiative, or a cautionary dystopia for the loss of the commons and collapse of urban institutions.

[1] An *encomienda* is a grant of control over the labour within a certain area of land. This is the basis for the land parcellation creating the *haciendas* owned by powerful Spanish-Filipino *mestizo* families. (Doeppers, 1972, p.772)

1.3 Statement of the Problem

Metro Manila's built environment is best described as one of interspersion (Garrido, 2019, p. 59-83) by both formal private enclaves (commercial central business districts/CBDs and residential villages), and informal settlements. Both are cheek-by-jowl, with each delineated by the other (See Figs. 1.1a-b).

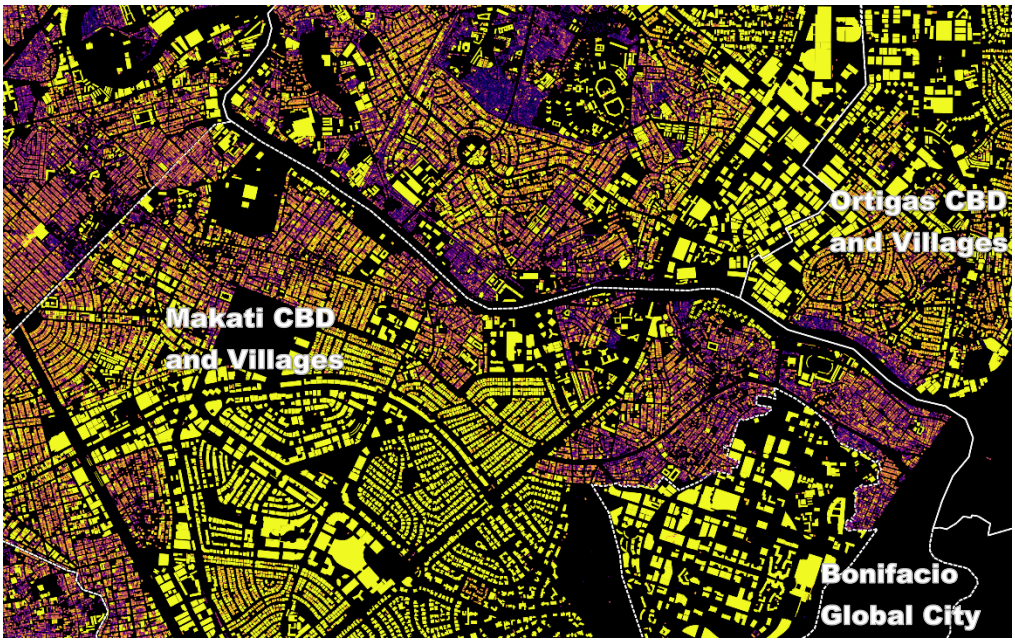


Figure 1.1a: Makati, Bonifacio and Ortigas CBDs (clusters of large building footprints in yellow) and their interspersed built fabric of informal settlements and depressed areas (in purple) from: OpenStreetMap overlaid on Google Earth Satellite Photo. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Figure 1.1b: Manila's riverside informal settlements with the Makati Central Business District in the background. By Noel Celis/AFP/Getty Images. *from: Irish Times. accessed 20 August 2019 Source:* < https://www.irishtimes.com/news/world/asia-pacific/residents-of-manila-s-happyland-slum-put-faith-in-duterte-1.2707230>

These CBDs and their surrounding fabric of gated residential communities are the most evident form of Metro Manila's enclave urbanism today, and while they are its modern service economy's engines, they also exclude and marginalise the larger sum of working-class people who have chosen to live in the interspersed informal settlements for access to jobs and services. The low-density, gated residential communities (see Fig. 1.2) around these commercial enclaves prevent these centres from housing higher densities of middle and working-class populations in multi-family housing typologies. Apart from condominium towers, the only choice is to live outside the core within similarly gated subdivisions as well (Ortega, 2016).

Figure 1.2: Aerial view of Makati CBD with the foreground of Dasmarinas and San Lorenzo Villages. presenting the sharp transition in density and intensification between commercial and residential enclaves. by Anton Zelenov, from Wikimedia Commons. accessed *12 August 2019, source:* < https://commons.wikimedia.org/wiki/File:Manila_Aerial.jpg>

Because of the attraction of these CBDs and similar commercial enclaves around Metro Manila, its aggregate night-time population of 12.87 million residents (PSA, 2016), swells with commuters from surrounding suburban and exurban fringes, bringing its daytime total to 15 million people.

Metro Manila's few rail lines (See Fig. 1.3) are heavily saturated (See Fig. 1.4, next page) and do not extend outside its limits, thereby necessitating the use of private vehicles (as soon as one could afford it) to get from Metro Manila's edges into the urban core.

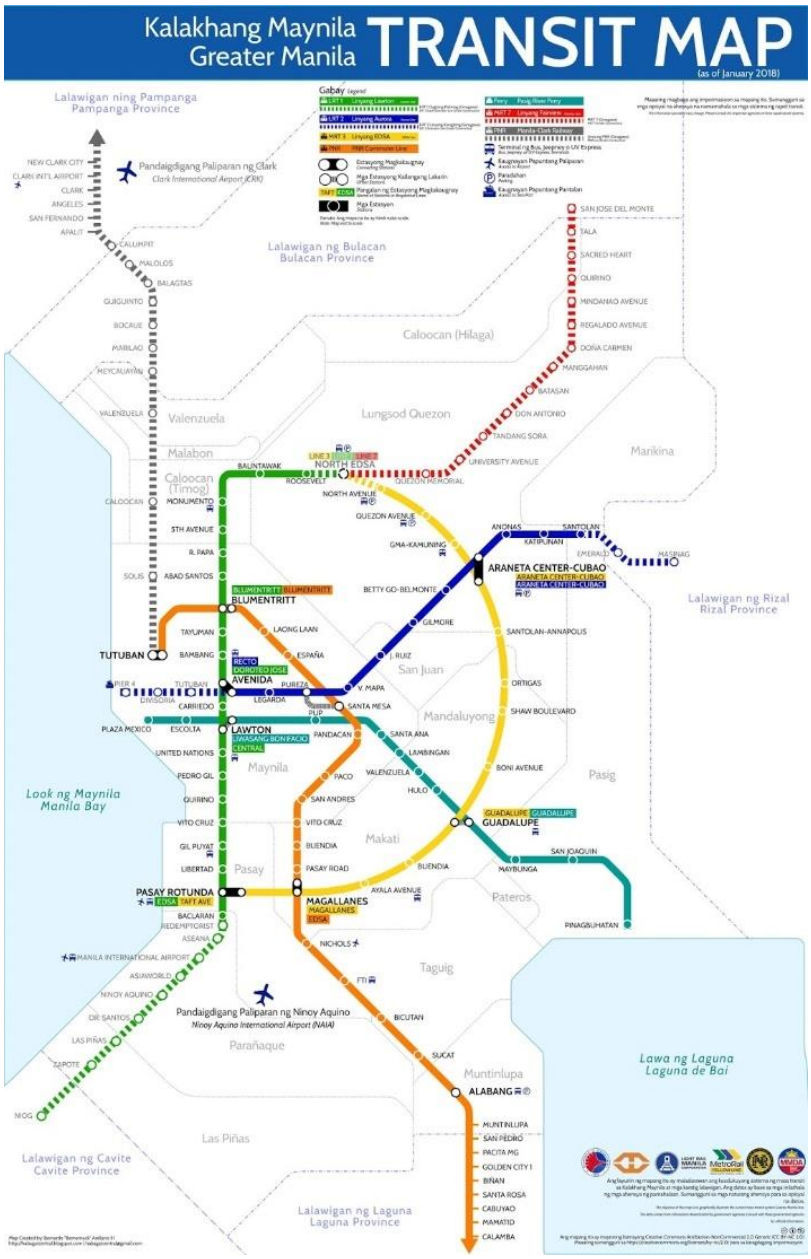


Figure 1.3: Consolidated Rail Transit Map of Metro Manila showing proposed line extensions. By Bernardo Arellano III. *from: Habagat Central. accessed 12 August 2019 Source:* <https://habagatcentral.blogspot.com/2017/12/greater-manila-transit-map-story-of.html>

Figure 1.4: Typical rush-hour queue for MRT-3 line along C4/EDSA. By Michael Varcas/Philippine Star. *from: Philippine Star. accessed 12 August 2019 Source: <* https://www.philstar.com/headlines/2018/03/07/1794450/palace-part-mrt-maintenance-money-went-political-machinery>

Majority of this influx of vehicular traffic is channelled through the Circumferential Road 4 / Epifanio Delos Santos Avenue (C4/EDSA) corridor (See Fig 1.5), which also connects the various enclaves around the core of Manila. C4/EDSA has reached peak volume capacity ratio (VCR) levels and is expected to get worse (See Fig. 1.6-1.7, next page) without intervention.

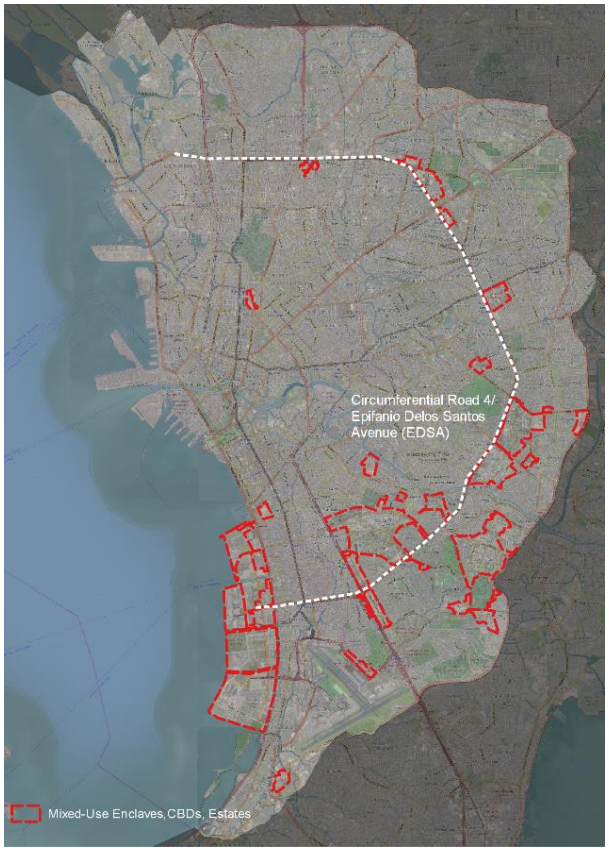


Figure 1.5: Mixed-Use Enclaves, CBDs and Estates (in red outline) connected by the C4/EDSA corridor drawn by author using QGIS, overlaid on OpenStreetMap and Google Earth Satellite Photo. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Figure 1.6: Typical Night Rush-Hour Traffic on C4/Epifanio Delos Santos Avenue (EDSA) *accessed 2 February 2019* Source: https://www.carguide.ph/2013/02/edsa-rehab-project-gets-green-light.html

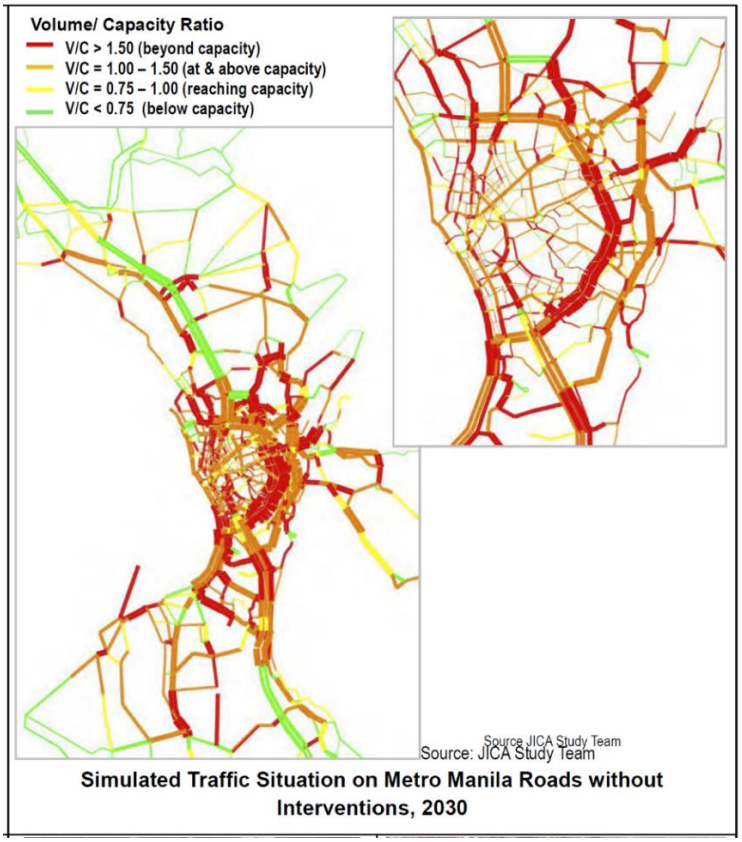


Figure 1.7: 'Simulated Traffic Situation on Metro Manila Roads without Interventions, 2030'. By Japan International Cooperation Agency (JICA) Study Team. **Showing capacity saturation along C4/EDSA**. *from: Roadmap for Transport Infrastructure Development for Metro Manila and its Surrounding Areas (Region III and Region IV-A) Final Report Summary March 2014, by Almec Corporation. accessed 2 February 2019 Source:* <http://www.neda.gov.ph/roadmap-transport-infrastructure-development-metro-manila-surrounding-areas-region-iii-region-iv/>

This state of urban dysfunction has created a sense of resignation at the challenge of fixing Metro Manila. Philippine President Rodrigo Duterte, declaring it a dead city in 25 years (Ranada 2017), is pushing for decentralisation of development away from the capital (Flores, 2018), his administration is proceeding with a new government centre in Clark, Pampanga, a vast former US airbase in the Central Luzon Region to the North of Manila (Schnabel, 2018).

This desire for *tabula rasa* has fostered a tone of historical romanticism in local discourse. Alcazaren (2003) talks about the virtues of Daniel Burnham's City Beautiful Plan and its mis-implementation. Palafox (Macas, 2014) and Soliven (2018) insist that for Manila to recover its lost prestige, it should rediscover and implement the wisdom of Burnham's original plan.

To decongest Metro Manila's streets, Palafox (Mayuga, 2016) wants to open the gates of Makati's exclusive villages to allow traffic to flow into the Makati CBD. Echoing this in his recent 2019 State of the Nation Address, Duterte ordered Metro Manila's local governments to reclaim public roads used for private purposes – including those within gated villages surrounding Metro Manila's business districts (Esguerra, 2019; Talabong, 2019; Adel, 2019). To date, there has been no published study on the possible effects of opening these gates to the public.

1.4 Research Intentions

As Murphy and Hogan (2012) point out, Metro Manila's current dysfunctions have historical roots. While narrated in historical literature, these have not been documented and analysed using space syntax methods. This study intends to provide a configurational analysis of these historical narratives, to show how Metro Manila's spatial network and society reflexively influence each other throughout history– creating the city-region that *Manileños* contend with on a daily basis.

This becomes the pretext for analysis of Metro Manila's existing exclusive enclaves. Opening the residential enclaves sounds like an intuitive traffic

management solution, but by examining existing and historical conditions first, this study aims to interrogate the premises of this measure, and in the process, offer alternate possibilities for moving forward.

This study aims to add Metro Manila as evidence of the rise of enclave sub/urbanism as the morphological pattern of neoliberal privatisation throughout the world, and secondly, to posit Metro Manila as a frontier in the realm of space syntax research and discourse.

1.5 Research Questions

1.5.1 What are the underlying historic patterns of spatial configuration and social exclusion that reflexively lead to Metro Manila's current forms of spatial exclusion and socio-economic configuration?

1.5.2 What impact did the Burnham Plan have on the historical and present-day centralities of Manila's spatial network?

1.5.3 How does Metro Manila's current form of commercial and residential enclave sub/urbanism affect its spatial configuration?

1.5.4 What are the effects of opening the gates of selected residential enclaves on the spatial accessibility of Metro Manila's key commercial enclaves?

1.6 Research Hypotheses

This study's first hypothesis is that there are strong underlying spatial patterns beneath Metro Manila's historical narratives. In the Philippine context, space syntax is a new lens to spatially examine socio-economic issues, and Metro Manila is an important test case for replicating what has been done previously for other cities using space syntax.

The second hypothesis is that Burnham's unimplemented City Beautiful Plan for Manila, while romanticised by current local discourse as the lost ideal, has itself

contributed to the suburbanisation and decentralisation away from Manila's historic core.

The third hypothesis is that Metro Manila's commercial centres and their surrounding residential enclaves are planned for cars, and by virtue of their being private realms, are anomalies to space syntax's natural movement economies and centralities.

The fourth hypothesis is that within Manila's exclusive residential villages, there are embedded potential centralities which could be tapped by strategically opening the villages to movement.

1.7 Dissertation Structure

The second chapter of this study distills the key global and local socio-spatial factors from Metro Manila's historical discourse. These factors have acted on Metro Manila's development and are then discussed with relevant literature. This shall provide the qualitative parameters from which to analyse the historic spatial configuration of Metro Manila.

The third chapter defines the study's proposed methodological frameworks, then outlines the coverage and limitations of this study, delineating the extent of its resources and capacity of its enquiry.

The fourth chapter presents the analytical findings in response to the first and second research questions and tests the first and second hypotheses. This chapter focuses on the historic spatial configuration of Metro Manila, overlaid with the qualitative factors identified in the second chapter to show how common themes emerge along with Metro Manila's patterns of enclave formation. This chapter then discusses the Burnham Plan's attempt to change these patterns, and how it inadvertently lays the blueprint for Manila's decentralisation and suburbanisation after the war.

The fifth chapter presents the analytical findings in response to the third and fourth research questions and tests the corresponding hypotheses. This chapter focuses on the analysis of the spatial configuration of Metro Manila's present-day mixed-use enclaves/CBDs and their surrounding fabric of gated residential communities. It then uses space syntax to model the configurational effects of opening these gated villages up to the public – then offers a counter proposal based on the findings from the historical and present-day analysis.

The sixth chapter recaps and summarises the findings in response to the research questions and tested hypotheses. It then points to prospective avenues for further enquiry. It reflects on the legacy of exclusion and privatisation in the Philippines and how space syntax could be practiced in an increasingly privatising world enclosing on itself.

Chapter 2. Literature Review

This review will summarise current historical discourse on Metro Manila. From these, the chapter aims to distill and highlight the key themes that run throughout Metro Manila's socio-spatial history: enclave urbanism and social correspondence, social reproduction, suburbanisation, globalisation, and privatisation. These themes become the factors used in analysing Metro Manila's historical development. This chapter then concludes by synthesising these using space syntax's foundational concepts: order vs. structure, natural movement, movement economies, centralities and the dual network of cities.

The discourse on Metro Manila's urban development begins with the establishment of the Spanish Walled City of Intramuros and its surrounding suburbs from 1571 to 1898 (Armengol, 1958; Doeppers, 1972; Quirino, 1971; Shioda et al, 2012; Goma, 2012; and Jimenez Verdejo et al, 2015). This is followed by the American take-over and development of Manila as a new colonial capital using Daniel Burnham's City Beautiful Plan from 1899 to 1935 (Duque, 2009; Morley, 2014; Vernon, 2014; Kirsch, 2017; and Morley, 2018); then the Commonwealth period through World War 2 (1936-1945), followed by post-war suburbanisation from 1946 onwards – with the relocation of the country's capital away from Manila towards Quezon City (Pante, 2017; Pante, 2018), and the parallel development of Ayala's Makati *hacienda* into private, exclusive villages and commercial subdivisions (Connel, 1999; and Garrido, 2013).

These are summarized by Ocampo (1992), who ties the narrative of the Spanish and American colonial periods with accounts closer to the time of the American occupation. Murphy and Hogan (2012), span across these periods. They illustrate the effects of the fracturing of territory and sharing of power during Spanish colonisation under the *encomienda* tribute system, as an inherent embedded cause to Metro Manila's current spatial dysfunctions.

These dysfunctions are covered in current discourse. Contemporary research includes: the rise of informality, enclavisation and issues of spatial justice (Shatkin, 2004; Recio, 2013, Garrido, 2013; Garrido, 2019); gentrification, and the displacement of informal populations in the face of private sector investment (Shatkin, 2007; Michel, 2010; Roderos, 2013; Kleibert, 2014; Kleibert and Kippers, 2016; Ortega, 2016; Ortega, 2018; and Kleibert, 2018).

2.1 Enclaves and Social Correspondence

Luymes (1997, p. 187-203) discusses the rise of enclave communities throughout North American suburbia. He examines the socio-economic incentives to developers to provide walls and gates to developments, then presents his typologies of contemporary suburban residential enclaves. Luymes (1997, p.198) identifies the typologies of thresholds, then discusses the gradients of access control from the virtual (camera surveillance) to the physical (fences, guardhouses, etc.). He concludes with the effects of these enclaves on communities, and their land values.

Gated communities have also recently proliferated in Southeast Asia. These are examined through ethnographic surveys by Mohammed (et al., 2015, p. 567-574) to document the sentiments of non-residents around selected gated communities in Malaysia; and by Hapsariniaty (et al., 2013, p. 394-403) to analyse the factors that drive homebuyers to live within selected gated communities in Bandung, Indonesia. Both studies point to the need for deeper investigation into the effects of gated communities on social cohesion and the already strained race relations with local Malay-Muslims, as wealthy ethnic Chinese choose to live within gated villages, self-selecting through price, thereby creating a mechanical solidarity (Durkheim, 1893) from the spatially correspondent (Hillier and Hanson, 1984) community within their gates.

2.2 Social Reproduction

Hillier (2001) discusses “Cities of Reproduction” as means to re/produce society. In the case of Teotihuacan (See Fig. 2.1), instead of configuring around the daily socio-economic life of its occupants as an organically formed city did, its grand axis forms a “monumental core.” This imposed a synchronic space-time order through ceremonies and practices that emphasised the societal hierarchy and power of its leaders.

Figure 2.1: Teotihuacan's Grand Axes: Panoramic view from the Pyramid of the Moon with the Pyramid of the Sun on the Left, showing the monument core / ceremonial axis of Teotihuacan.
photo by: Rene Trohs, 20 October 2016accessed: 7 May 2019. source:
https://en.wikipedia.org/wiki/Teotihuacan#/media/File:Panoramic_view_of_Teotihuacan.jpg

Figure 2.2: Aerial view of National Mall, Washington DC 2007.
photo by: Carol M. Highsmith, Library of Congress Prints and Photographs division accessed: 20 April 2019.
source: <https://en.wikipedia.org/wiki/National_Mall#/media/File:Washington,_D.C._-_2007_aerial_view.jpg>

Oramas-Dorta's (2012) study of Planned Political Capitals includes Washington DC (from which, Burnham draws considerable inspiration) as its earliest historical example (See Fig. 2.2, previous page), amongst the new modern capitals of Brasilia, Abuja, and Astana. It points out that their respective "monumental cores" are not activated as part of the daily socio-economic functioning of their respective urban fabrics — and instead belong to the background network of socially conservative spaces that preserve culture through ceremonial events. Conversely, this study points at how spatial networks, perhaps as a sign of "self-correcting" and filling a market demand, develop organic centralities (Hillier, 1999), even in neighbourhoods not intended to be vibrant districts.

2.3 Suburbanisation

Bourne (1996, p. 163-184) interrogates suburbs as they are traditionally defined, by discussing the different socio-economic lenses suburbs are understood. By doing so, he proposes that suburbs are not monolithic, sterile, nor beneath the urban. Similarly, Forsyth (2012, p. 270-281) defines suburbs using various gradients of ethnic and socio-economic diversity and argues that the term suburb should either be dropped entirely or used with more nuance. Vaughan (et al, 2009, 127 p. 1-13) expounds on Bourne and Forsyth's critique and recasting of traditional definitions of suburbia, using space syntax methods to highlight the presence of embedded organic active centres that serve as hubs of activity and diversity of uses and "urbanity" within London's "suburban" envelope.

2.3.1 Edge Cities

The cases identified by Vaughan (et al, 2009) formed organically over time and are markedly different from the suburban Edge Cities discussed and classified by Garreau (1992). Edge Cities are suburban metropolitan areas that have risen to rival traditional American downtowns. Edge Cities are primarily accessed through major highways and planned with the car in mind (1992, p. 7) – with wide roads and multiple parking lots. Garreau's Edge Cities are privately developed and managed, separate from local political jurisdictions. Sultana (2011, p. 1071-1088) speculates on the future of Edge Cities, questioning their sustainability because

of their dependence on cars and fossil fuels. Sultana argues that traffic congestion, lack of transit infrastructure and suburban demographic shifts could turn people off from Edge Cities. Sultana (2011, p. 1084) points out that "Revitalization of edge cities may in fact be the major urban renewal project of the 21st century."

2.3.2 Gruen's Distilled Urbanity in a Box

Contrasting further from the active streets that Vaughan (et al, 2009) analysed, shopping malls became the heart of America's largely suburban towns and edge cities (Gruen and Smith, 1960). Developed after World War 2, the typology was patterned after Victor Gruen's Southdale Mall in Edina, Minnesota (See Fig. 2.3).

Figure 2.3: Southdale Mall Exterior, 1956, by Victor Gruen & Associates. Photo by Star Tribune Archives, accessed: 1 August 2019. source: <http://www.startribune.com/minnesota-moment-southdale-our-first-nation-s-biggest-mall/495209541/>

His vision distills European civic squares and streetscapes, into a self-contained interior (See Fig. 2.4, next page) that is protected from harsh exterior environments (Gruen, 1964). The car-centric suburban shopping mall complex saw its heyday during the 1960s. This typology was copied throughout the world. Whilst, in decline in the US since the 90s, they continue to be built – especially in tropical countries like the Philippines, because they offer airconditioned comfort

to shoppers, and symbolise the “good” life of abundance, that for most developing economies remains an aspiration for their respective working masses.

Figure 2.4: Southdale Mall Garden Court, 1965, by Victor Gruen & Associates.
Photo by Minnesota Historical Society, accessed: 1 August 2019. source: https://www.theatlantic.com/technology/archive/2018/02/when-malls-saved-cities-from-capitalism/553610/

2.3.3 Induced Demand

WSP’s (2018) evidence review on induced travel demand defines it as “the increment in new vehicle traffic that would not have occurred without the improvement of the network capacity.” This study reviews 25 papers from OECD and European countries and indicates that the range of methodologies used in modelling and measuring induced demand are different and not readily comparable.

What it confirms is that Induced Demand occurs in varying degrees and across different modalities and transport markets. Further, it indicates that “Induced demand is likely to be higher for capacity improvements for local urban areas or on highly congested routes” (WSP, 2018, p. 10). This points to how induced demand occurs as a result of capacity increases in existing urban destinations, which not only generate through traffic, but “to” traffic as well.

The difficulty in accounting for Induced Demand is that even if traffic models are seeded with accurate baseline data, these do not predict the corresponding change in primacy of land along both new and existing road capacity (WSP, 2018, p. 10). New roads have the potential to increase demand for land and buildings and conversely, decrease vibrancy in existing centres.

The report clarifies that not all induced demand is necessarily detrimental. In greenfield or underdeveloped contexts, induced demand brought about by new capacity brings socio-economic benefits (WSP, 2018, p. 10), but only insofar as capacity growth outpaces economic demand growth. What also becomes difficult to manage is the modality and markets for induced demand –longer-ranges necessitate car use, but transport modalities like busses, cycles, or other high-occupancy vehicles can blunt induced demand.

2.4 Globalisation and Privatisation

Sassen (1990) describes the ripple effects of low economic development in the global south and points to corresponding emigration from these countries toward developed economies on a permanent or contract work basis. Urry (2016) points out that the mass movement of people has its own kind of agency, generating its own set of outcomes in society. Similarly, extranational infrastructures (Easterling, 2014) create a commercialised world network of systems linking developed and underdeveloped economies.

This creates an interdependence across regions, activating embedded network agencies and effects that lead to the concentration of power and capital to those able to tap and use these infrastructures. This has gentrified cities into hubs of global finance and trade, triggering a transformation similar to, and in some ways leapfrogging, the tactical greyfield suburban retrofit strategies discussed by Dunham-Jones and Willamson (2008), and crystallising the redevelopment of edge cities mentioned by Sultana (2011). This spurs developers to fill the demand for new office spaces, hotels for expats and travelers, and condominiums for these new global citizens.

This happens in parallel to the neoliberal shift described by Theodore (et al, 2011) wherein governments (to fund debt servicing and push investment) privatise national assets and services. In some cases, blurring the lines between public and private initiatives through partnerships and investment agreements that are skewed toward the private investor.

Post-crisis global austerity has heightens this further as governments partner with private developers to build not just new cities, but the infrastructure connecting and serving them as well. This has remade the metropolitan landscape, implanting islands of global urbanism and consumption, which bypass the surrounding urban fabric (Corpus, 2000; Smith, 2002).

The above forces discussed by contemporary discourse, describe the socio-economic relationships of this age, but to colonial cities in the global south, globalisation and remission of government control have been historically omnipresent and have continuously impacted the built environment.

2.5 Space Syntax / Synthesis:

2.5.1 Order vs. Structure

Hanson's (1989) Order and Structure in urban space analyses the historical morphological layering of London's core, up to the Great Fire of London that devastated it. The study reviews the different proposed planning competition entries. Then highlights how, despite the best efforts to overlay a plan of geometric "order" to reorganise the city, its original organic "structure" eventually rose up from the ashes and surmounts the partially implemented new order (See Fig. 2.5, next page).

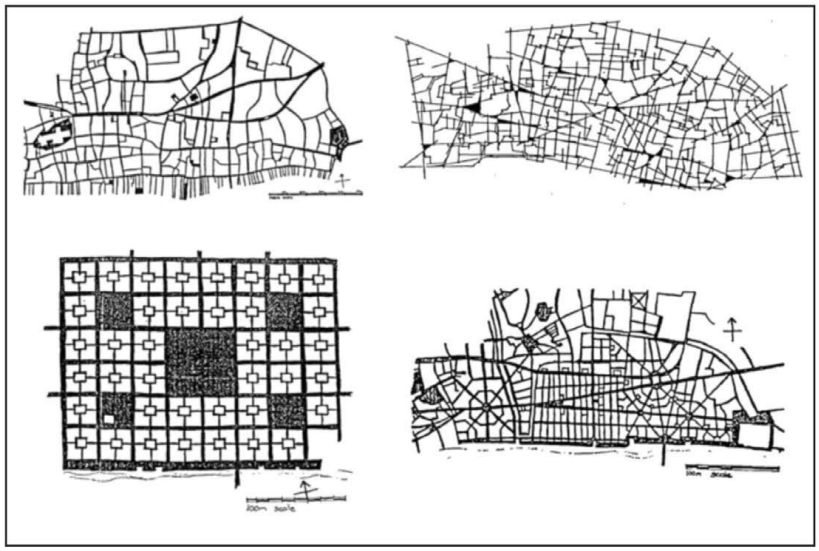


Figure 2.5: "Illustrations from Hanson's work: the map of the City of London before the Great Fire of 1666 (top left). Two of the competition entries for the rebuilding of the City after the Great Fire (bottom row) reflect the differences in using geometrical order to reshape the structure of the City." from: Karimi, K. (2012). A reflection on 'Order and Structure in Urban Design'. The Journal of Space Syntax, 3(1), p. 42.

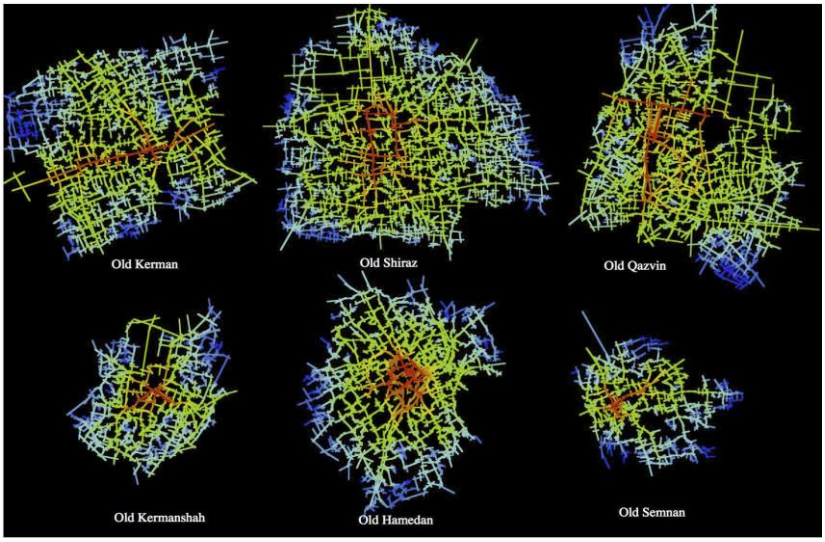


Figure 2.6: "Axial analysis of six historic cities in Iran (c. 1800). The measure of global integration creates a very revealing picture of an urban grid which has no trace of geometric order." - but of an underlying structure from: Karimi, K. (2012). A reflection on'Order and Structure in Urban Design'. The Journal of Space Syntax, 3(1), p. 43.

Karimi's (2012) Reflection on 'Order and Structure' in urban design follows Hanson's reasoning and points out that there is a need to distinguish Order from Structure. Order may be seen more apparently in the physical realm through conformity and harmonisation, whilst structure is not immediately obvious but defines the inherent embedded legibility, wayfinding, and configuration of parts to the whole. Whilst Hanson distinguished this by analysing the City of London's fabric — Karimi illustrates this by revealing the underlying structure in the seemingly "orderless" fabric of ancient, organic cities in Iran (See Fig. 2.6).

2.5.2 Movement Economies, Centralities, and the Dual Network

Foundational to space syntax is the concept of natural movement (Hillier et al, 1993)— in which all things being equal, how space is configured influences its probability to generate pedestrian and vehicular movement. The potential for movement in cities is categorised according to two kinds of applied graph theory centralities (See Fig. 2.7). The closeness centrality, also known as integration, measures the probable capacity of the spatial network to foster movement towards specific close or integrated locations. The second is the betweenness centrality, also known as choice, which measures the probable capacity of the spatial network to generate through movement between any 2 points (Hillier et al, 1993).

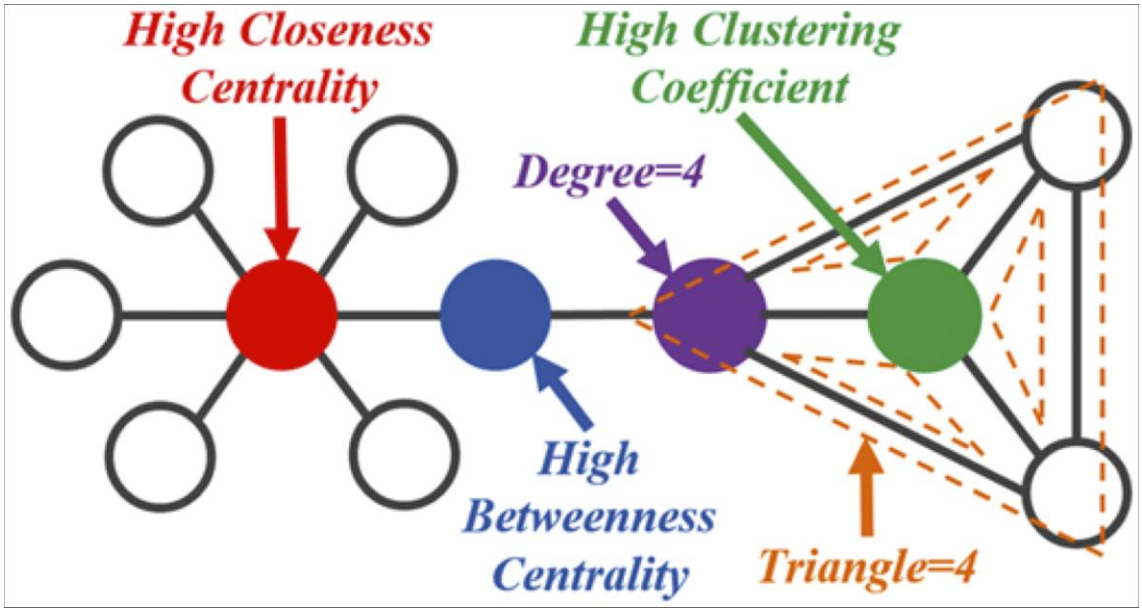


Figure 2.7: Applied Graph/Network Theory Centralities. From: Jure Leskovec, Stanford CS224W: Social and Information Network Analysis, accessed 11 August 2019. Source: <http://cs224w.stanford.edu https://web.stanford.edu/class/cs224w/handouts/15-centrality.pdf>

These concepts are then used to describe cities as movement economies (Hiller, 1996), wherein cities also probabilistically create parts vs. whole relations, by virtue of the variances of activity in (closeness/integration), and movement through (choice/betweeness) certain places which spatial configuration encourages or discourages.

This describes the formation of a generic dual-network (Hillier and Vaughan, 2007) composed of the foreground network on which generative micro-economic activity fosters exchange and interaction, and the background network, which is conservative in how it maintains social and cultural relations within residential communities. This adds nuance to Hillier's (1999) discussion of centrality as a process, wherein he not only relates the relationship between land use and other factors to the idea of configurational centrality in cities, but also highlights that centralities grow, migrate, shift or diffuse over time as the foreground and background networks grow and develop.

The above discussed socio-cultural and economic factors will be layered upon the quantitative analysis of space syntax to add depth to the various narratives discussed in Metro Manila's historical discourse. These shall likewise become the base for analysis of Metro Manila's current conditions.

Chapter 3. Methodology

3.1 Cases for Study

3.1.1 *Macro: Metro Manila's Core*

Metro Manila, the National Capital Region of The Philippines, is located on the archipelago's largest island of Luzon (See Appendix A, p. 171). It sits on an isthmus of land between the Laguna de Bai to the East, connected by the meandering Pasig River system's network of canals and streams to Manila Bay to the West (See Fig. 3.1). Metro Manila is composed of sixteen separate cities and one municipality. Each its own bureaucracy and body politic (See Fig. 3.2). These entities are "coordinated" by the Metro Manila Development Authority (MMDA), which is tasked to handle traffic management, disaster risk reduction, and services that span across local jurisdictions.

Figure 3.1(left): The Isthmus of Metro Manila and the Pasig River. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

Figure 3.2(right): Metro Manila's political divisions. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

From the overall spatial analysis of Metro Manila (See Fig. 3.3), one could see a core formed within the edge of Circumferential Road 5. This is the macro focus (See Fig. 3.4) for this study's analysis, this core area is the setting for Manila's historical development up to today's enclave urbanism.

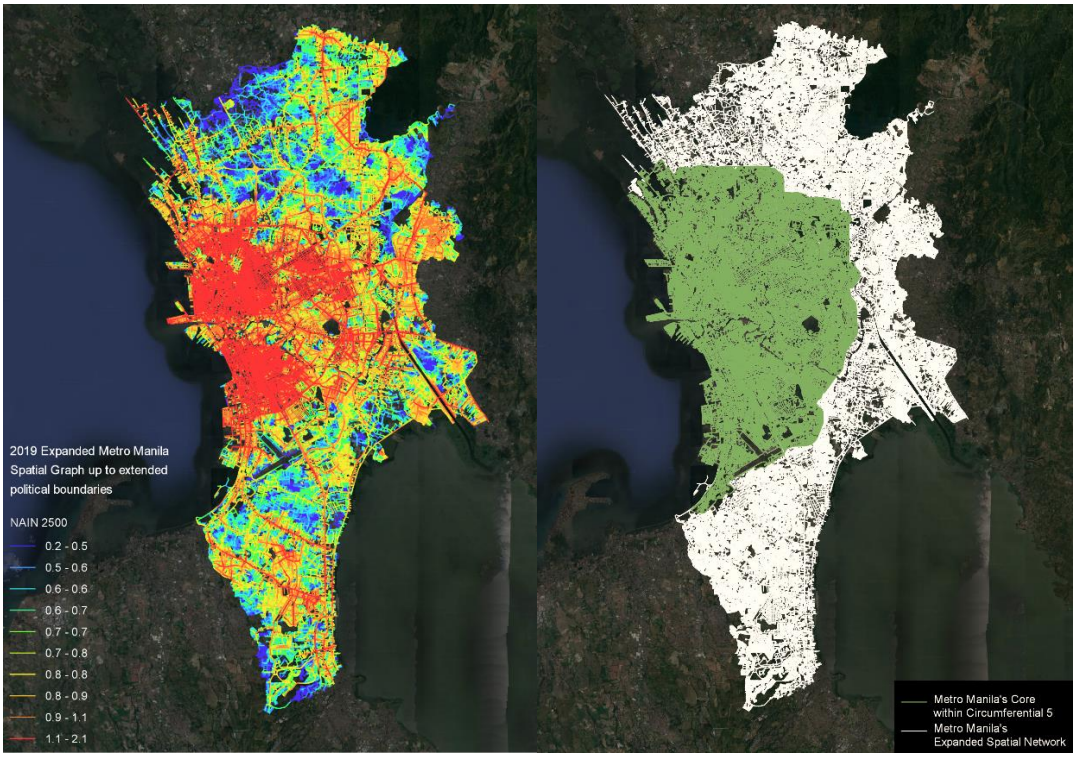


Figure 3.3 (left): 2019 Spatial Graph of Metro Manila: NAIN 2500, showing extent of spatial network up to Metro Manila's present-day political boundaries. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Figure 3.4 (right): Metro Manila's urban core, within Circumferential Road 5.
Drawn by author using QGIS, from: OpenStreetMap overlaid on Google Earth Satellite Photo. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

3.1.2 *Local Cases: Metro Manila's Exclusive Enclaves*

Metro Manila is characterised by its clusters of commercial and residential enclaves defined by the C4/EDSA corridor (See Fig. 3.5, next page). These enclave estates are privately planned and managed. Key commercial enclaves of Makati, Bonifacio Global City, Ortigas, and Greenhills are flanked by gated residential villages or condominium communities and have access to restricted amenities/open spaces such as golf courses and country clubs.

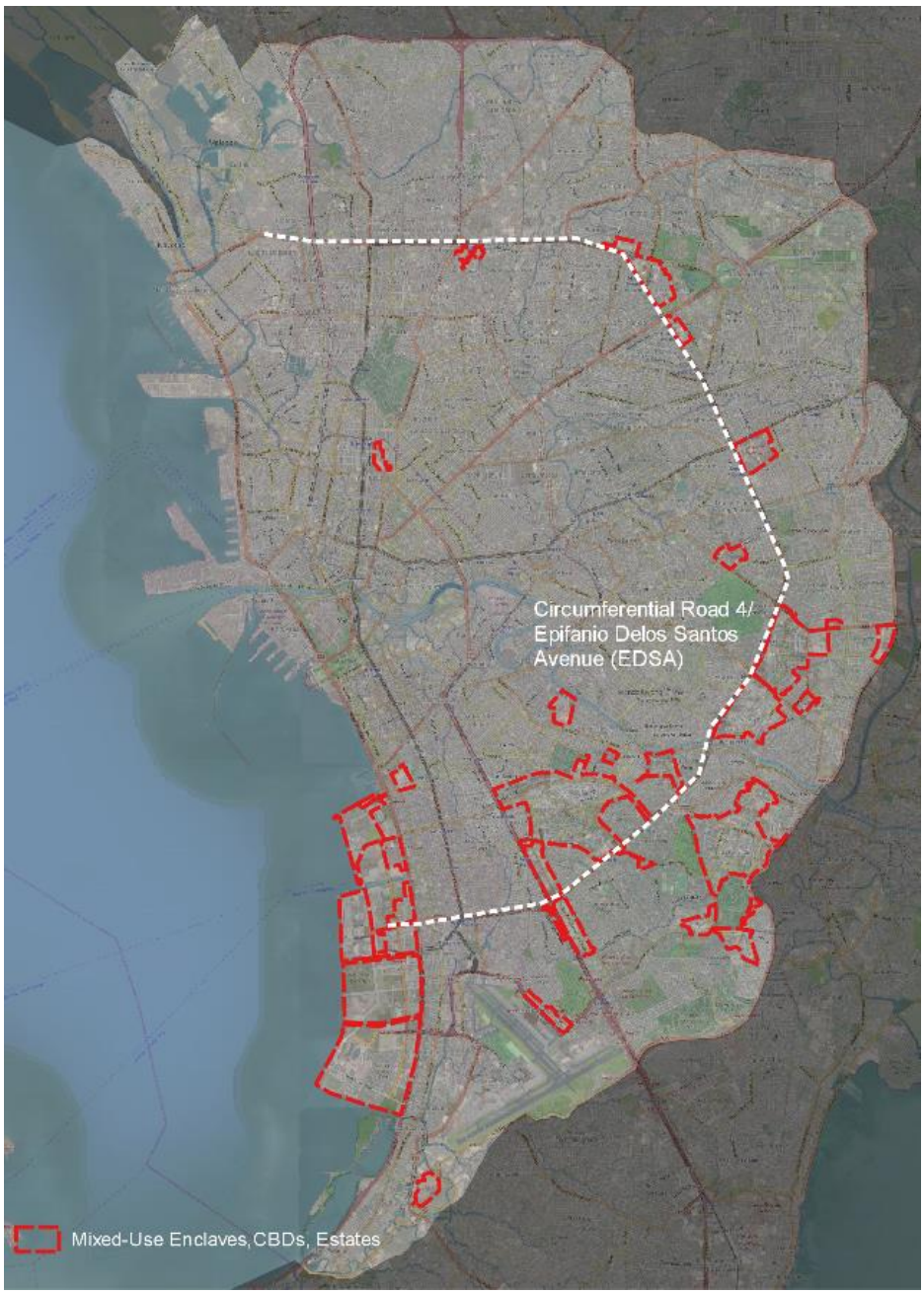


Figure 3.5: Mixed-Use Enclaves, CBDs and Estates (in red outline) connected by the C4/EDSA corridor drawn by author using QGIS, overlaid on OpenStreetMap and Google Earth Satellite Photo. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

These enclaves are shown by Google Streetview's map of surveyed roads as holes in the public-access spatial network of Metro Manila (See Fig. 3.6, next page). This study shall be focusing on these key clusters of mixed-use enclaves/CBDs and their respective surrounding residential fabric (See Fig. 3.7, next page):

3.1.2.1 Ortigas-Greenhills-Pioneer-Cluster

3.1.2.2 Makati-Bonifacio Global City Cluster

Figure 3.6: Makati and Ortigas Residential Enclaves as holes on the Google Earth Street View Map
from: *Google Earth Pro 7.3 (2019) Metro Manila*, viewed
8 August 2019.<http://www.google.com/earth/index.html>.

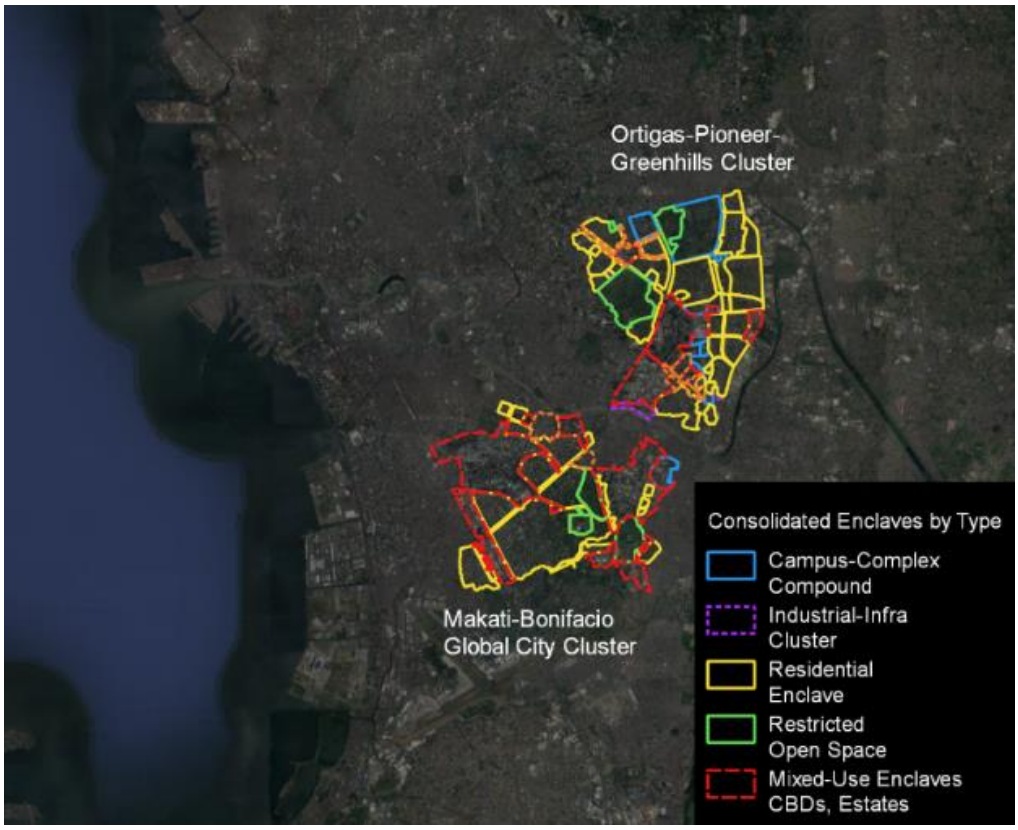


Figure 3.7: Makati and Ortigas CBD Enclave Clusters
Drawn by author using QGIS, from: OpenStreetMap overlaid on Google Earth Satellite Photo. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

3.2 Methodological Framework

3.2.1 *Historical Analytical Framework*

This study traces segment graphs from Manila's historic maps. Using (See Fig. 3.8) space syntax's method of angular segment analysis (Turner, 2000; Turner, 2001; Turner, 2005; Dalton, 2001; Turner, 2007; Charalambous, N. and Mavridou, M., 2012), measures of Normalised Angular Integration (NAIN/closeness centrality) and Normalised Angular Choice (NACH/betweenness centrality) (Hillier et. al, 2012) are produced. The values derived from the spatial analysis of these timeframes are to be compared against points-of-interest (Yang, 2015) and enclaves found in the historical maps, and the socio-spatial narratives from reviewed historical literature. These are analysed using descriptive statistics and are related with the distilled factors identified in this study's literature review to highlight the cyclic patterns of enclave urbanism in Metro Manila's history. This methodology is used to address the first two research questions and test the first two hypotheses – specifically, Manila's spatial history and the effects of Burnham's City Beautiful plan on the growth of Manila.

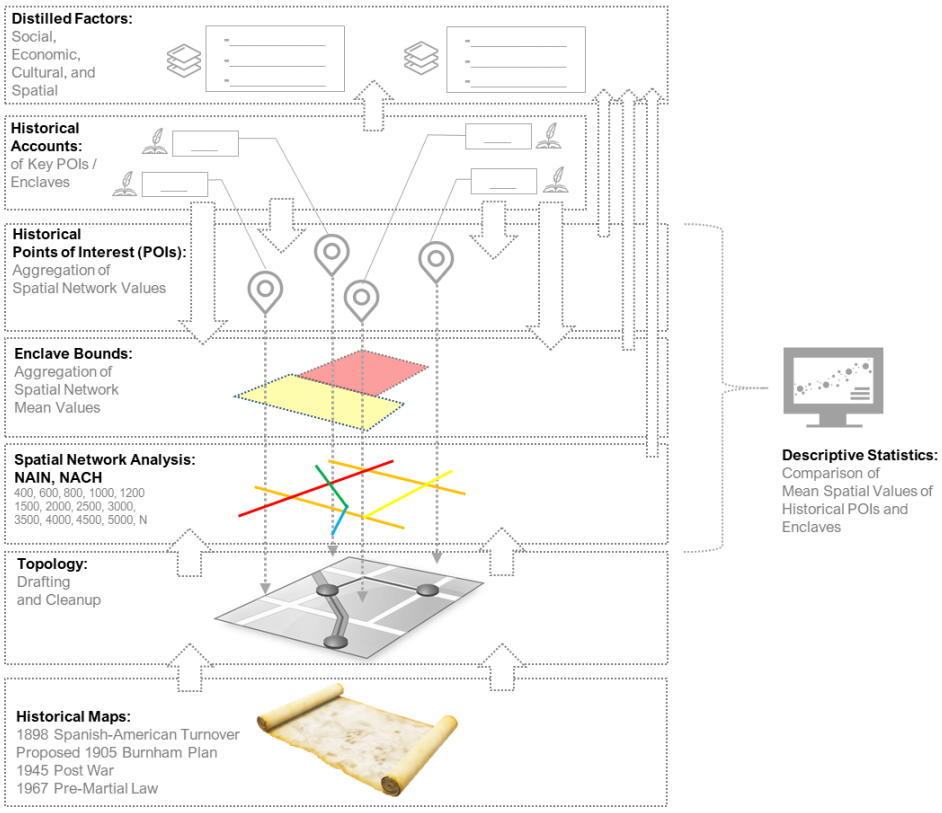


***Figure 3.8: Framework for Assessing Manila's Historic Configuration**, showing historical maps and historical accounts as sources for data for aggregation and descriptive statistical analysis.*

3.2.2 *Present-day Analytical Framework*

For Metro Manila's present-day spatial configuration (responding to the third research question and hypothesis), this study uses a methodology of spatial network analysis overlaid with different types of aggregating data (See Fig. 3.9). The base is composed of segment graphs (traced from basemaps from Open Street Map and Philippine Geoportal), with angular segment analysis producing Normalised Angular Integration (NAIN) and Normalised Angular Choice (NACH) values (Charalambous, N. and Mavridou, M., 2012; Hillier et. al, 2012) with local/pedestrian to macro/vehicular scales. The intent is to capture as much configurational valuation for the spatial network.

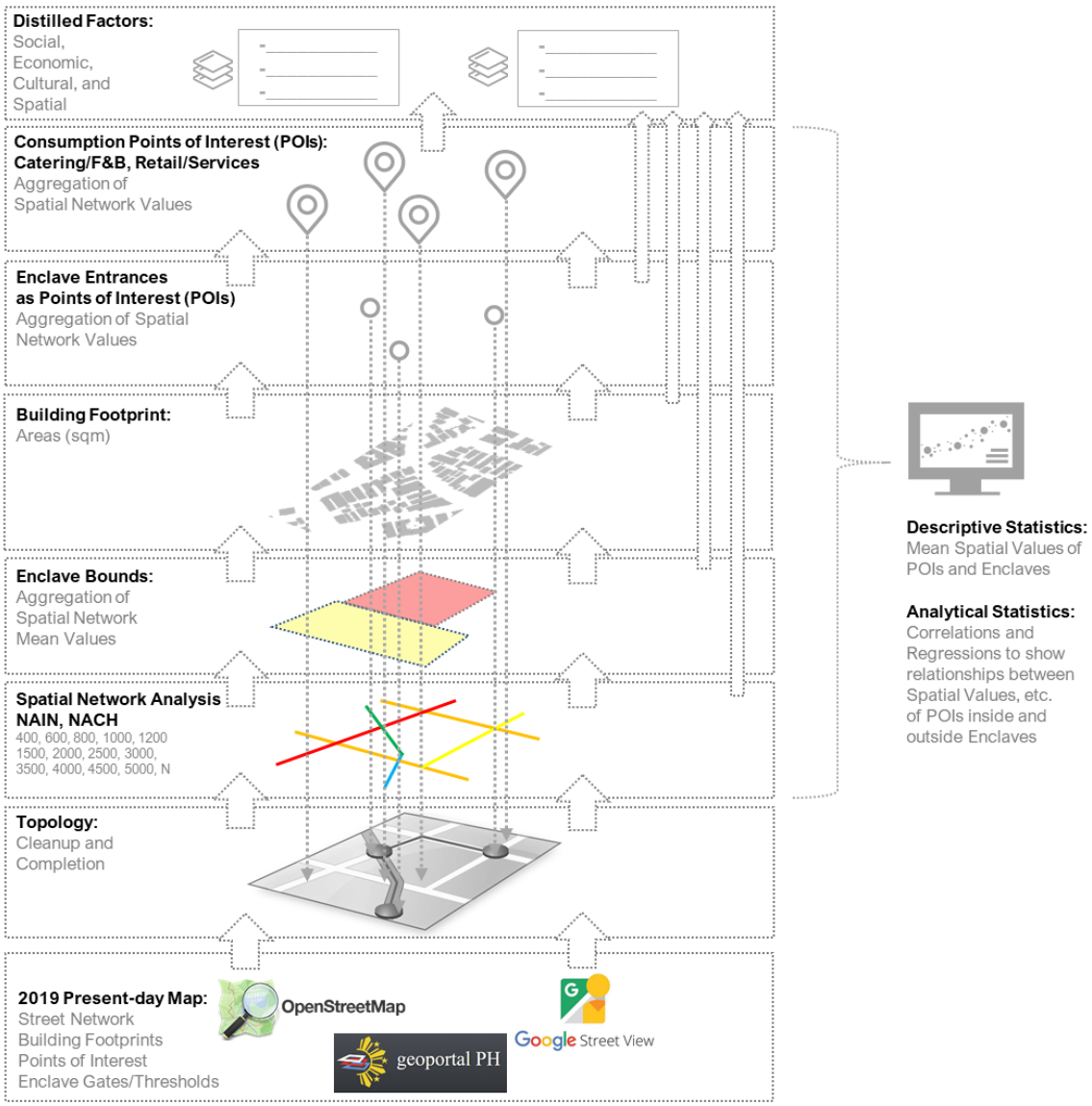


Figure 3.9: Framework for Assessing Metro Manila's Present-day Spatial Configurational Framework*, showing sources for data, types of aggregation of measures, and methods of statistical analysis.*

This is then aggregated with Consumption Activity (Retail/Service and Catering/F&B) Points-of-Interest (POIs) (Yang, 2015) sourced from Open Street Map; Enclave entrance thresholds mapped through a combination of actual and Google Street View survey of the streets around the identified enclaves; and the boundary areas of each commercial and residential enclave. This is statistically analysed using descriptive and analytical statistics (correlations and regressions) to highlight how the spatial network and POIs relate to being within or outside the identified enclaves. Other analytical statistical comparisons are done for Consumption Activity POI data using building footprint areas (sourced also from Open Street Map) to expose patterns of distribution of these Consumption POIs within the commercial enclaves.

3.2.3 *Experimental Framework*

In response to the fourth research question and testing the fourth hypothesis concerning the effects of opening Metro Manila's exclusive gated villages to traffic, this study uses a three-step experimental methodology (See Fig. 3.10, next page). The first step measures and aggregates configurational values (NAIN and NACH) within and outside the identified enclaves, assuming a status-quo, closed condition, with only the identified public gates open for access. Key scales for analysis are local (using 1200m radius for pedestrian circulation) and global (using radius N for vehicular circulation).

The second step measures and aggregates the same measures and scales of analysis, but simulating an all-open condition, opening all public, resident, restricted, and potential pass-through access gates/thresholds to public traffic. These new values are analysed using descriptive and analytical statistics to uncover trends in configurational measures within and outside the enclaves.

The third step measures and aggregates the delta or difference in configurational values between the gated and open conditions. The difference in values is aggregated using the same entrance/threshold POIs, and the enclave boundaries for average difference in values within the enclaves. This is to quantify how the spatial network reacts to open gates, and how it could potentially induce demand for movement to and through these roads.

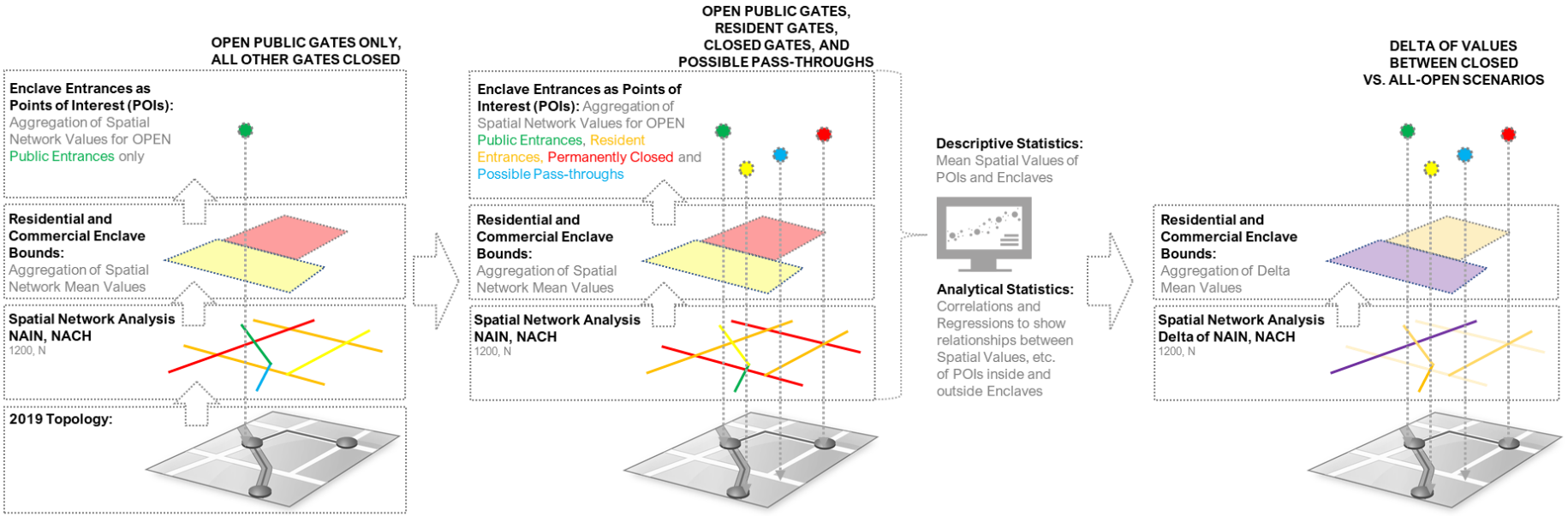


***Figure 3.10: Three-Step Experimental Framework**, for simulating the opening of Exclusive Gated Villages around identified Mixed-Use Commercial Enclaves/CBDs*

3.3 Limitations

All spatial accessibility analysis is undertaken using a combination of QGIS and Depthmap X software (depthmap X development team, 2017), with statistical analysis using IBM SPSS software. Majority of this study will be undertaken offsite in the United Kingdom (based in London), for a period of approximately five months. It will rely on available historical maps from archival sources online and from the British Library; remotely-collected data sourced from: Open Street Map, Google Earth, and the Philippine Geoportal for the present-day spatial network; and Google Street View for verification of gates and access thresholds into the identified enclaves. On-ground verification during the 2-week research and fieldwork trip to the Philippines was very limited due to strict security restrictions and prohibitions on photography of various private estates and villages identified for this study.

Regarding spatial network analysis, it is a probabilistic method based on applying graph centralities to analyse the spatial configuration of cities. This study does not weigh these graphs for land use, density, road right-of-way width, and actual vehicular or foot traffic counts. This study instead uses parallel data as proxies for socio-economic behaviour and human interaction (Consumption Points-of-Interest, Entrance/Thresholds, Enclave Boundaries, Building Footprint Areas) to form a broader methodology in line with Space Syntax theory. It is by comparing these data with configurational values using descriptive and analytical statistics that this study is able to show how Metro Manila's embedded spatial properties correspond with its underlying historical narratives and spatial cultures.

While it tries to address it by proposing alternatives to completely opening villages to public traffic, this study does not factor in the expected resistance and pro status-quo forces within the gated villages being analysed. Detailed modeling of movement requires traffic counts and on-ground collaboration with local authorities and experts, which beyond the time-and-resource scope of this dissertation.

Chapter 4. Metro Manila's Historic Spatial Configuration

4.1 Enclave Sub/Urbanism version 1: *1898 Intramuros*

The Spanish Walled City of *Intramuros* (literally, within the walls), was designed to defend against competing regional mercantilist powers such as the Portuguese, Dutch and the British; and to keep Chinese pirates and subversives out (See Fig. 4.1-4.2) (Doeppers, 1972, p. 769-792; Murphy and Hogan, 2012, p. 7-9).

Figure 4.1: Walled Manila/Intramuros. Oil painting on the inside of a wooden chest, circa 1640-50. Art Museum Jose Luis Bello, Puebla. Mexico., accessed: 1 August 2019. source: <https://commons.wikimedia.org/wiki/File:City_of_Manila_old_painting.jpg>

Figure 4.2: Intramuros 1851. Diccionario Geografico-Estadistico-Historico De Las Islas Filipinas. Madrid 1851. *accessed: 1 August 2019. source: <https://legacy.lib.utexas.edu/maps/historical/manila_1851.jpg>*

It was planned following King Phillip II's Laws of the Indies (Doeppers, 1972, p. 769-792), creating a grid of narrow streets with a hierarchy of plazas that anchored church and government buildings. This was a social reproduction of the European town and socio-spatial correspondence wherein colonial administrators, military officers, and laity kept within a contained urban footprint (see Fig. 4.3 and Table 4.1).

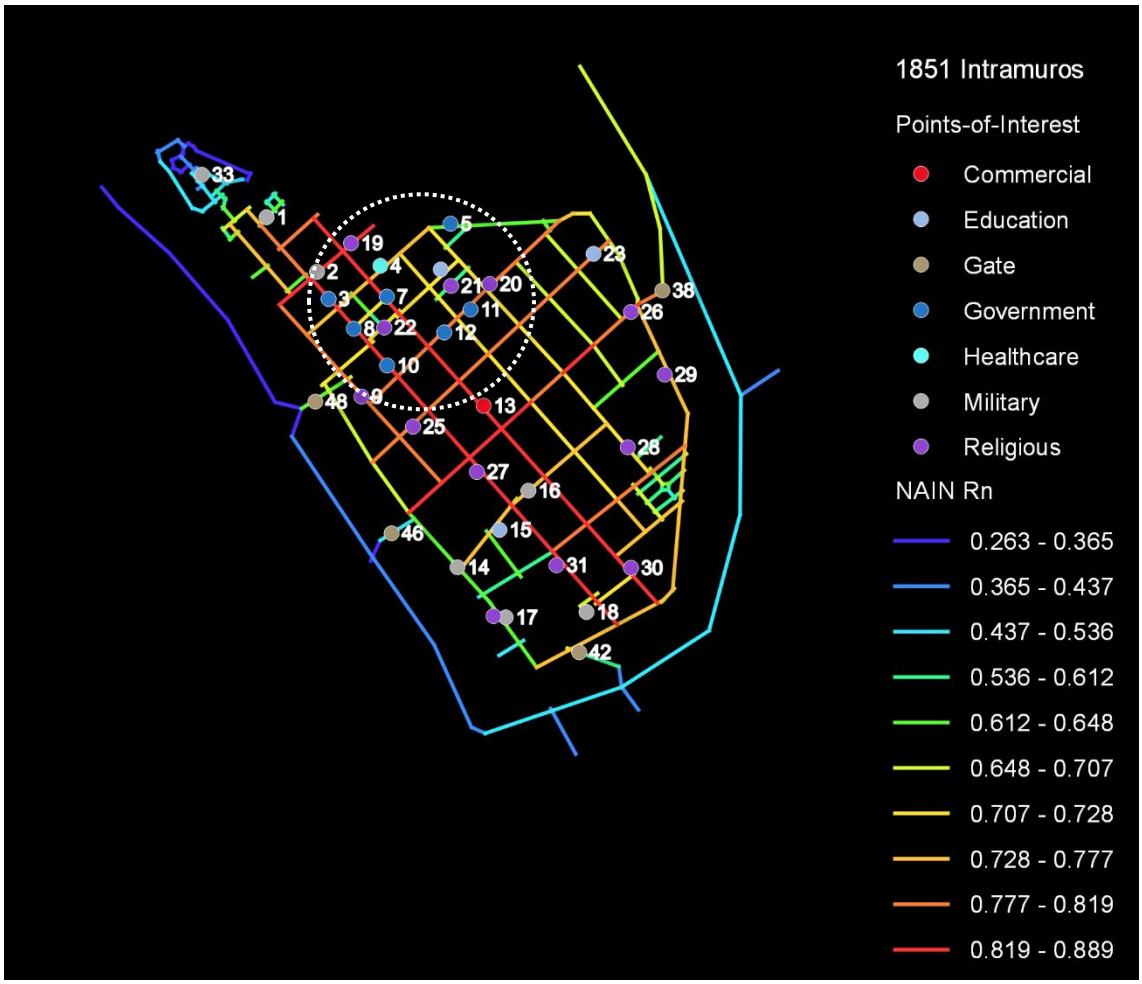


Figure 4.3: 1851 Manila, NAIN radius N - showing Intramuros' Points of Interest. With Major Government Buildings located on globally integrated segments of the 1851 Intramuros Enclave Network. See Table 4.1 (page after) for POI Legend and Values
Analysed using Depthmap X by depthmap X development team, UCL. Drawn by author using QGIS from: *Intramuros 1851.* Diccionario Geografico-Estadistico-Historico De Las Islas Filipinas. Madrid 1851. Source Perry Castaneda Library Map Collection. *accessed: 1 August 2019. source:* <*https://legacy.lib.utexas.edu/maps/historical/manila_1851.jpg*>

Tag	1851 POIs	Type	NAIN Rn	NACH Rn
1	Maestranza de Artelleria	Military	0.63898	1.17631
2	Sala de Armas	Military	0.85201	1.46889
3	Real Audencia	Government	0.88667	1.29259
4	Hospital Militar	Healthcare	0.7401	1.03334
5	Aduana	Government	0.62345	0.21254
6	Universidad de Sto Tomas	Education	0.7252	1.03006
7	Cabildo	Government	0.88712	1.47711
8	Palacio Cortada y Tesoreria	Government	0.72294	0.83623
9	Palacio Arzobizpal	Religious	0.79635	1.04314
10	Contaduria mayor	Government	0.88717	1.32119
11	Interdencia	Government	0.77817	1.16001
12	Consulado	Government	0.77836	1.17934
13	Panaderia	Commercial	0.8875	1.44794
14	Cuartel de Artilleria	Military	0.6133	0.9571
15	Colegio de Sta Potenciana	Education	0.76572	1.2254
16	Maestranza de Fortificacion	Military	0.75801	1.09985
17	Cuartel de Ligeros	Military	0.61261	0
18	Cuartel de Asia	Military	0.69165	0
19	Monjas de Sta Clara	Religious	0.84775	0
20	Sto Domingo	Religious	0.71948	1.10075
21	Beato de Sta Rosa	Religious	0.61016	0.88205
22	Catedral	Religious	0.61176	0.86957
23	San Juan de Letran	Education	0.77863	0.95263
25	Sta Isabel	Religious	0.78008	0.96919
26	San Juan De Dios	Religious	0.73772	1.17989
27	San Agustin	Religious	0.88886	1.34622
28	Orden Tercera	Religious	0.72039	1.01729
29	San Francisco	Religious	0.73674	1.18727
30	Recoletos	Religious	0.88759	1.17801
31	San Ignacio	Religious	0.88561	1.21884
32	Beato dela Compania	Religious	0.61261	0
33	Real Fuerza de Santiago	Military	0.45348	1.20249
38	Puerta de Parian	Gate	0.6978	1.30846
42	Puerta Real	Gate	0.65681	0
46	Puerta de Sta Lucia	Gate	0.52608	0
48	Puerta del Postigo	Gate	0.64796	0
50	Parian 1	Commercial	0.60612	0.87899
	Mean Rn 1851 Intramuros		**0.731106**	**0.8987214**
	Mean Rn Government		0.823405	1.2110783
	Mean Rn Religious		0.756546	0.9224785
	Mean Rn Military		0.660006	0.84352
	Mean Rn Gate		0.632163	0.327115
	Mean Rn Commercial		0.74681	1.163465
	Mean Rn Education		0.756517	1.0693633

Table 4.1: 1851 Manila, NAIN radius N - showing Intramuros' Points of Interest. With Major Government Buildings located on globally integrated segments of the 1851 Intramuros Enclave Network. See Figure 4.3 (page before) for Line Graph and Legend
Analysed using Depthmap X by depthmap X development team, UCL.

Outside *Intramuros* (*Extra-muros*), the *Sangleys* (Chinese traders), flourished as trade with the Spanish grew (Kueh, 2013 and 2014)**.** The Spaniards moved the *Sangleys* (due to fears of revolt, risk of fire and disease) to what was to be successively relocated *parian* (or missionary) districts, until finally settling on the site of Binondo (the world's oldest established Chinatown) in 1594 (Armengol, 1958, p. 127; see Fig. 4.4).

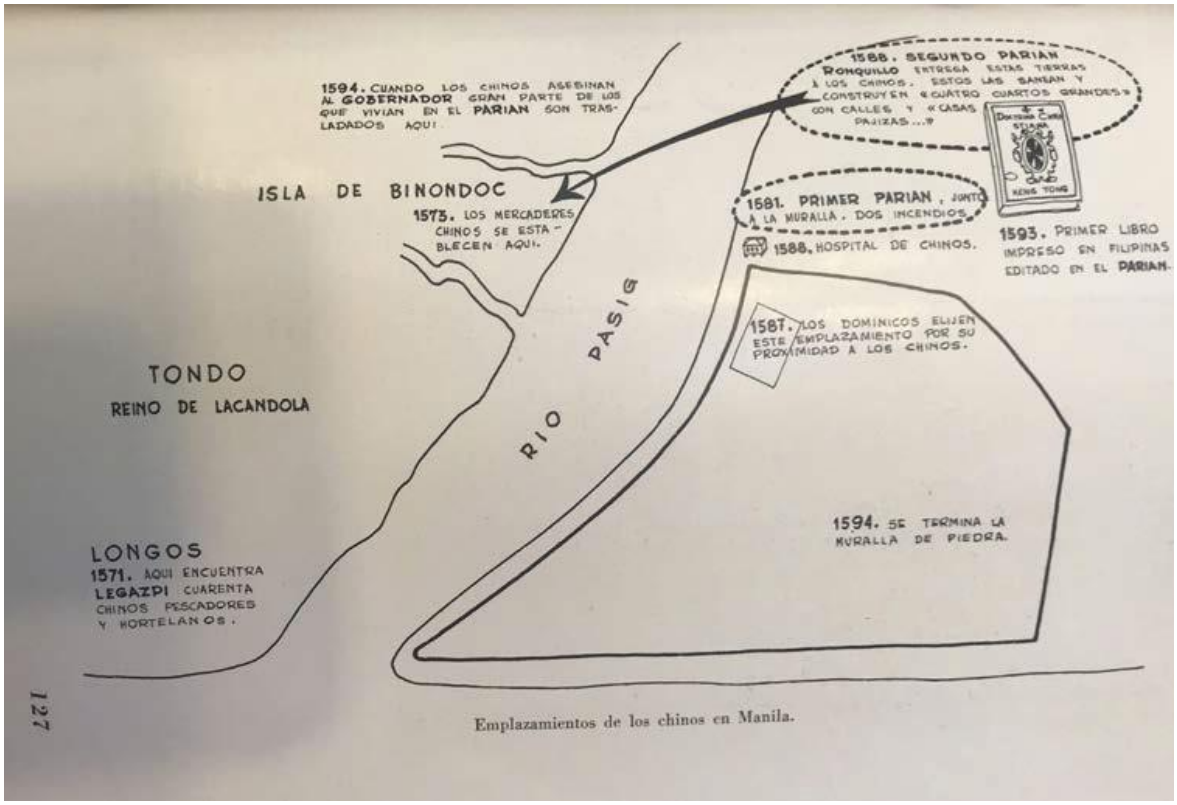


Figure 4.4 Chronological locations of Manila's Chinatown until 1594. Relocations done by the Spanish for security/health concerns from p. 127, Armengol, P.O., 1958. Intramuros de Manila: de 1571 hasta su destruccion en 1945. Ediciones de cultura hispanica.

Similar settlements around *Intramuros' arrabales* (suburbs) (see Fig. 4.5, page after) became mission areas for church-building, effectively placing most of the populace under *bajo de la campana* or "voice" of the bells. This policy was known throughout the Spanish Empire as *Reducciones* (see Fig. 4.6, p. 59), and it was imposed throughout the archipelago as well. Spanish missionaries forcibly relocated indigenous populations into church-centred towns. These formed a network of missions to replicate the parochial society of Christian Europe through the synchrony of church bells and rites throughout the liturgical calendar (Doeppers, 1972, p. 774-779). (see Fig. 4.7a-b, p. 59).

Figure 4.5: 1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898 (showing reducciones mission areas outside Intramuros)
from: Perry Castaneda Library Map Collection. accessed 20 February 2019
Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

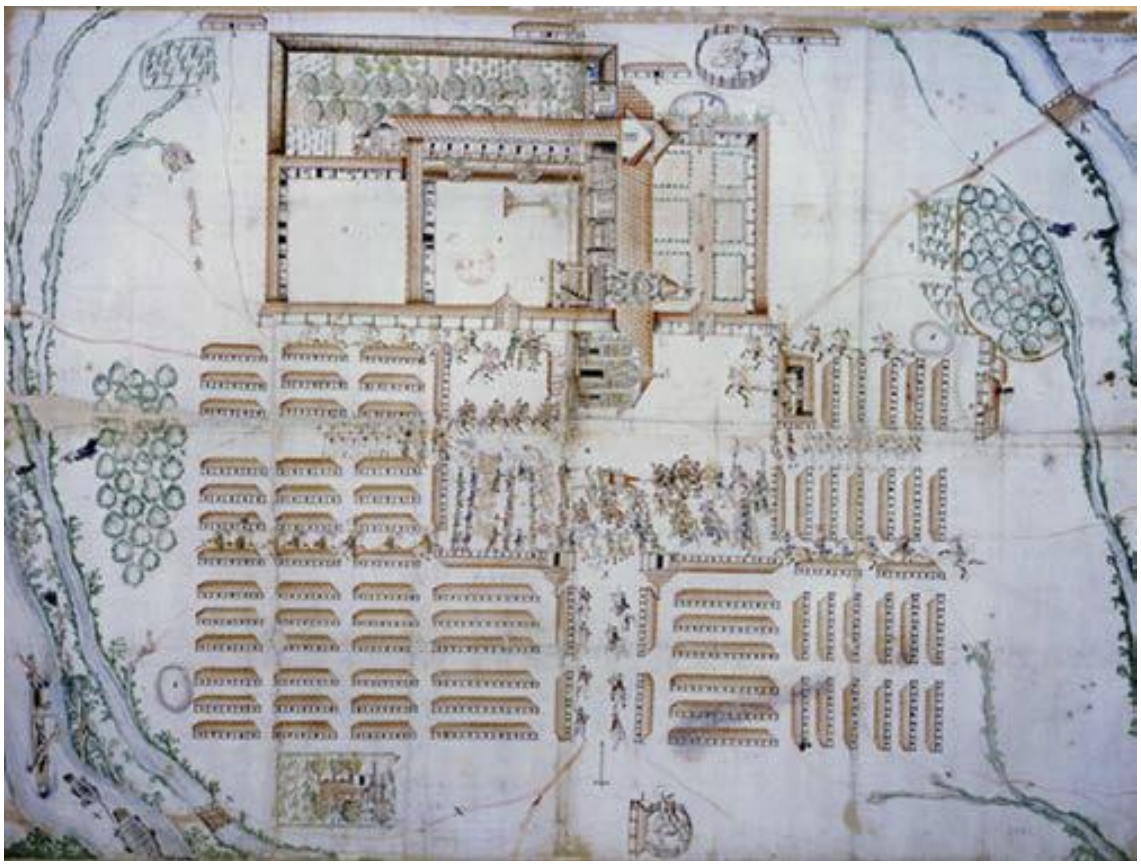


Figure 4.6: Plan of the Reduction of San Juan Bautista, circa 1756. from: Collection of the National Library in Paris, Plans and Maps section. Image courtesy of Artur H.F. Barcelos. accessed 7 May 2019. Source: <https://revista.drclas.harvard.edu/book/jesuit-reflections-their-overseas-missions>

Figure 4.7a (left): Quiapo Church/Plaza, one of the original Reducciones sites during the Spanish period. Showing the feast day of the Black Nazarene every 9th of January from: Getty Images. Accessed 7 May 2019. Source: <https://www.independent.co.uk/travel/ asia/philippines-from-coconuts-to-christianity-let-the-celebrations-begin-8919077.htmljohntewell/5281876897>

Figure 4.7b (right): Entrance gate toward Seville Cathedral, during the Feast of Corpus Christi, every 30th of May. Accessed 7 May 2019. Source: <https://notjustatourist.com/the-ultimate-guide-corpus-christi-seville/?c=063a94a77840>

These missions were administered through the farm-labour rights system called the *encomienda*, wherein missionary friar orders, grantee colonists, local *sangleys*, or *mestizo* (Spanish-Filipino) elite were assigned farmland for labour and production by the populace of each church (Doeppers, 1972, p. 772; Murphy and Hogan, 2012, p. 10). This effectively privatised control of land (Murphy and Hogan, 2012, p. 7-9). This was implemented outside Manila in what was later to become the Tuason *Hacienda* to the north-east, the Ortigas *Hacienda* to the east (Pante, 2017), and the Zobel de Ayala *Hacienda* in Makati to the southeast (Garrido, 2013; see Fig. 4.8).

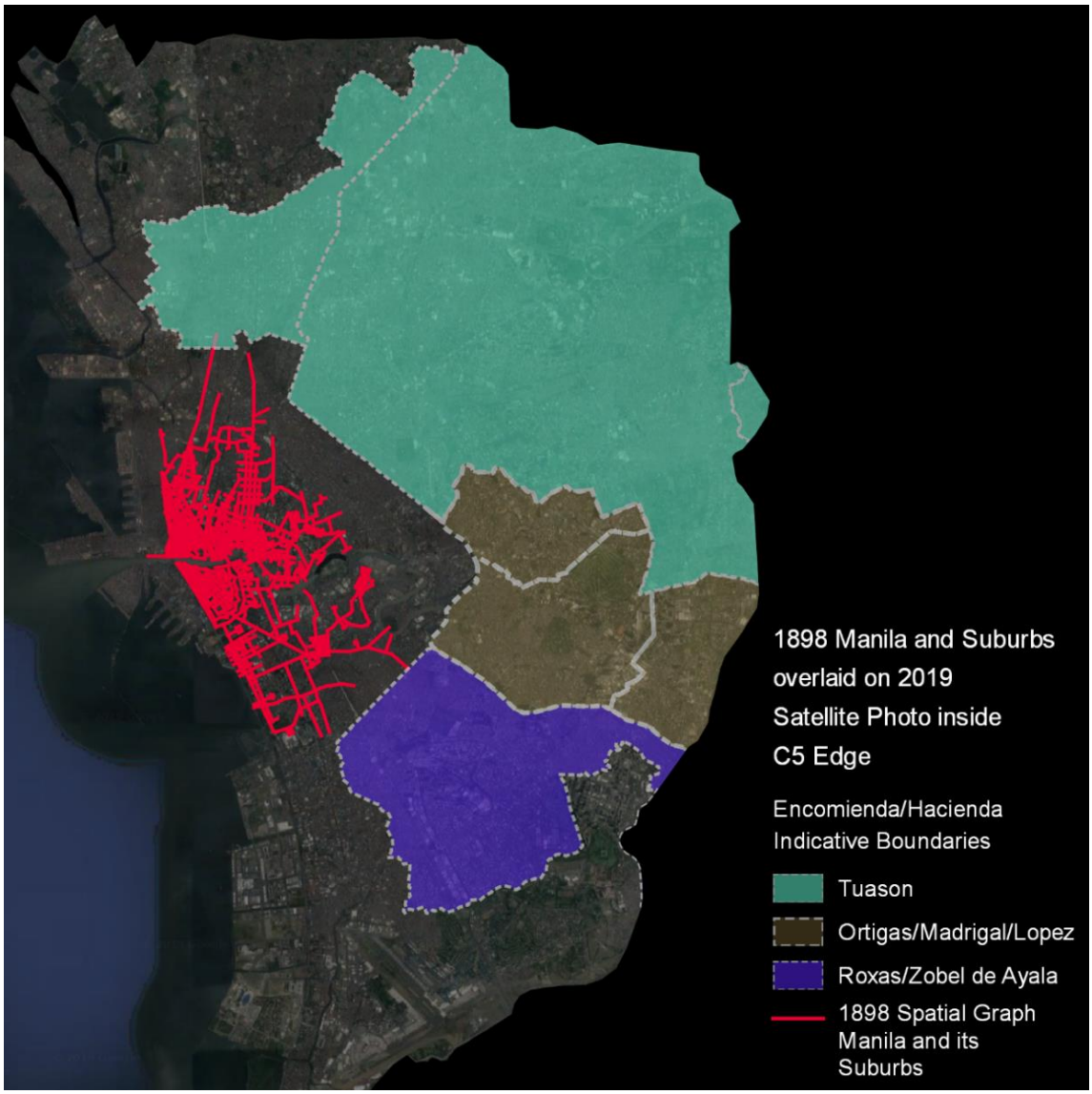


Figure 4.8: 1898 Manila and Suburbs – overlaid on 2019 Satellite Photo inside C5 edge. Showing indicative Encomienda/Hacienda boundaries based on present-day government unit boundaries.
Drawn by author *using QGIS* from: *1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898. Overlaid on Google Earth Satellite Photo*. *From Perry Castaneda Library Map Collection.* accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

The spatial graph produced from the 1898 map of Manila and its suburbs presents three centuries of *reducciones* policy during the Spanish period. Outside of Intramuros, local pedestrian centres emerge. These are the church mission areas that have higher average local integration when compared to Intramuros' churches (see Fig. 4.9 and Table 4.2, page after).

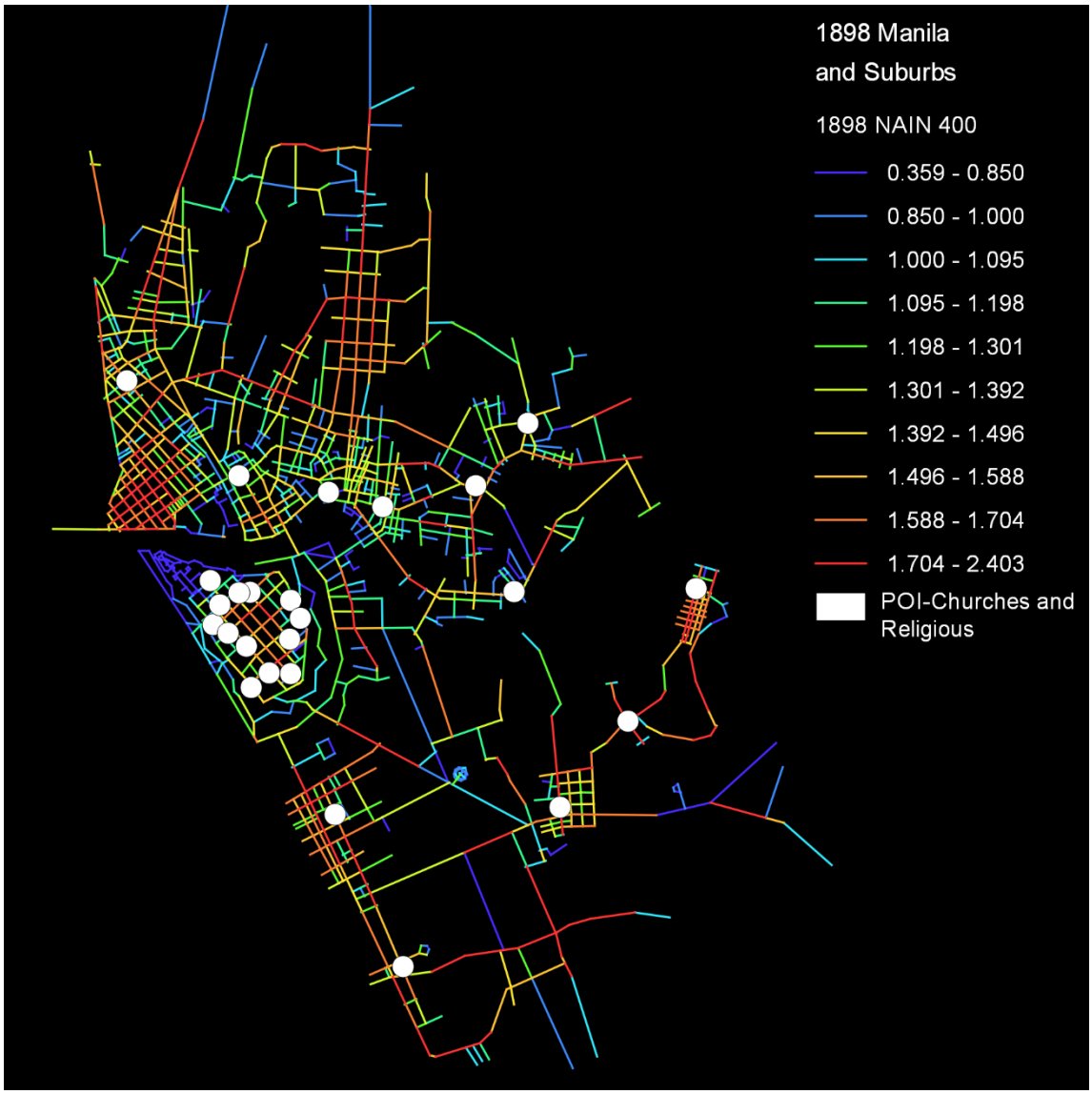


Figure 4.9: 1898 Manila, NAIN radius 400 - showing 1898 Spanish Manila's Churches / Religious Points of Interest. With Mission Churches located on locally/pedestrian integrated segments of the 1898 Network. See Table 4.2 (next page) for Church/Religious POI Values

Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: 1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898 (showing reducciones mission areas outside Intramuros) from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

id	1898 POIs	Type	IntraExtra	NAIN_0400
26	San Juan De Dios	Religious	Intramuros	1.34042
29	San Francisco	Religious	Intramuros	0.9787
28	Orden Tercera	Religious	Intramuros	1.27419
20	Sto Domingo	Religious	Intramuros	1.53103
21	Beato de Sta Rosa	Religious	Intramuros	1.12637
19	Monjas de Sta Clara	Religious	Intramuros	0.95903
9	Palacio Arzobizpal	Religious	Intramuros	1.36901
22	Catedral	Religious	Intramuros	0.94637
25	Sta Isabel	Religious	Intramuros	1.20604
27	San Agustin	Religious	Intramuros	1.46049
30	Recoletos	Religious	Intramuros	1.32122
31	San Ignacio	Religious	Intramuros	1.59183
32	Beato dela Compania	Religious	Intramuros	1.45652
51	Iglesia de Paco	Religious	Extramuros	1.728
52	Iglesia Malate	Religious	Extramuros	1.42863
53	Iglesia Ermita	Religious	Extramuros	1.67066
57	Iglesia Pandacan	Religious	Extramuros	1.57252
58	Iglesia Penafancia	Religious	Extramuros	1.82628
68	Iglesia Sta. Cruz	Religious	Extramuros	1.03888
69	Iglesia Ongpin Binondo	Religious	Extramuros	1.15038
73	Iglesia Tondo	Religious	Extramuros	1.40591
75	Iglesia Sampaloc	Religious	Extramuros	1.32684
77	Iglesia San Miguel	Religious	Extramuros	1.41099
79	Iglesia San Sebastian	Religious	Extramuros	1.23211
102	Iglesia Quiapo	Religious	Extramuros	1.33779
Average	**System Ave**	**Average**		**1.267238025**
Average	**Intramuros**	**Average**	**Intramuros**	**1.217285**
Average	**Extramuros**	**Average**	**Extramuros**	**1.307200444**
Average	**Religious**	**Average**		**1.3476084**
Average	**Rel. Intra**	**Average**	**Intramuros**	**1.27394**
Average	**Rel. Extra**	**Average**	**Extramuros**	**1.427415833**

Table 4.2: 1898 Manila, NAIN radius 400 – 1898 Spanish Manila's Churches / Religious Points of Interest. With Mission Churches located on locally/pedestrian integrated segments of the 1898 Network, having consistently higher values over classified/system averages. See Figure 4.9 (page before) for Church/Religious POI Graph and Legend Analysed using Depthmap X by *depthmap X development team*, UCL.

To the Spanish colonist - Intramuros was the centre of the network around it, outside, they placed defensive positions to guard against the populace. But their imposed order focusing on the walled city, was subsumed by the spatial structure of the suburbs around it. Binondo emerges as the crossroads of the 1898 spatial network (See Fig. 4.10, next page and Table 4.3, p. 64), as it takes advantage of being across the *Puente Espana*/Bridge from Intramuros, becoming the primary route connecting both north and south banks of the Pasig River.

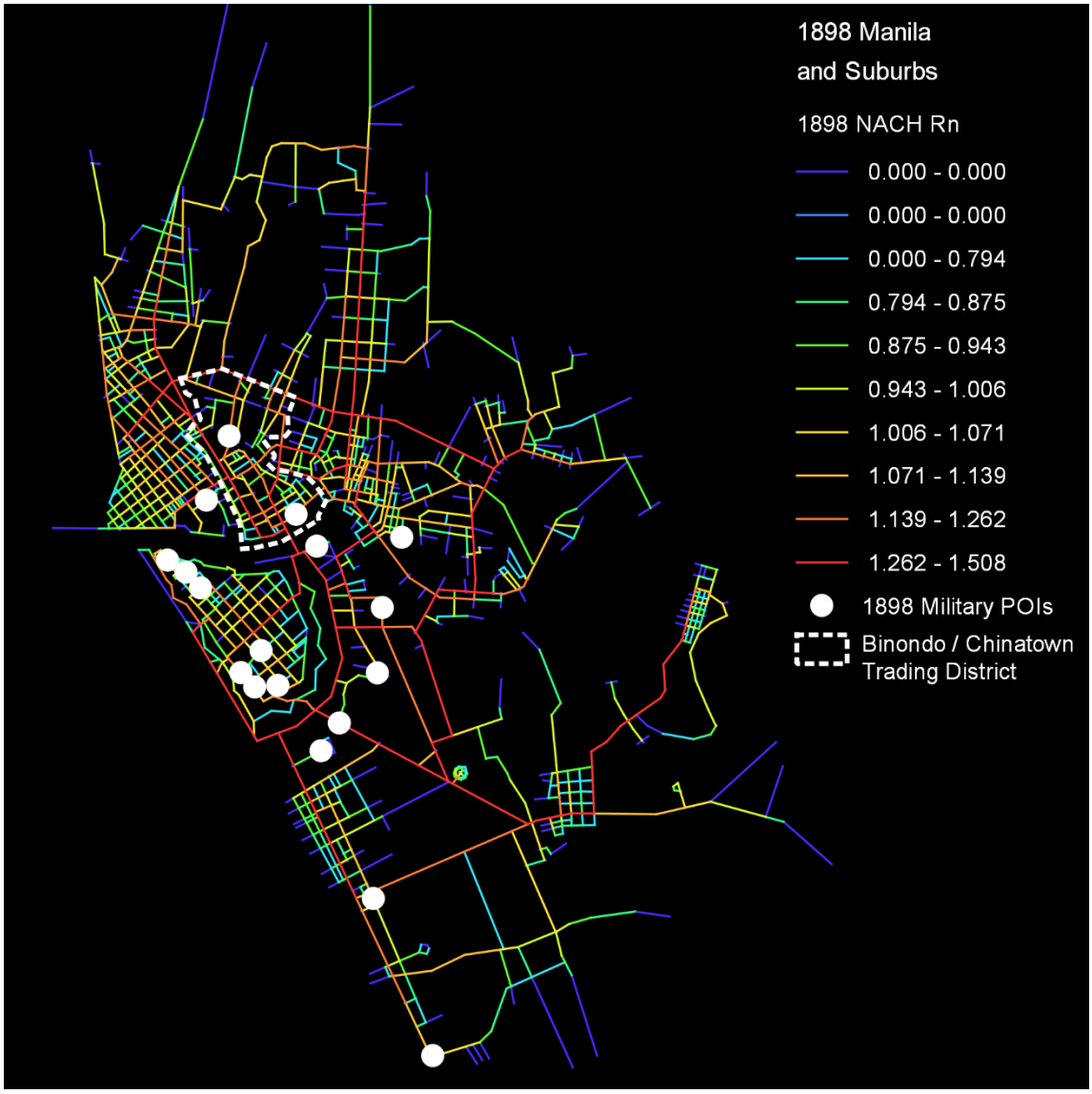


Figure 4.10: 1898 Manila, NACH radius N - showing 1898 Spanish Manila's Military Camps. These are located on major global routes of the 1898 Network. Binondo/Chinatown Trading District emerges as a crossroads for 1898 Manila's spatial network. See Table 4.3 for Military POI Values
Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: 1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898 (showing military camps) from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

id	1898 POIs	Type	IntraExtra	NACH_Rn
1	Maestranza de Artiller	Military	Intramuros	0.79028
33	Real Fuerza de Santia	Military	Intramuros	0.49424
18	Cuartel de Asia	Military	Intramuros	0.75672
17	Cuartel de Ligeros	Military	Intramuros	1.09716
2	Sala de Armas	Military	Intramuros	1.07588
14	Cuartel de Artilleria	Military	Intramuros	1.08078
16	Maestranza de Fortific	Military	Intramuros	0.84444
55	Polvorin de san Abab	Military	Extramuros	1.07325
60	Cuartel de Luneta	Military	Extramuros	0.91318
61	Ruinas de Hospital de	Military	Extramuros	0.84359
63	Baluarte de Carlos IV	Military	Extramuros	0.64481
64	Cuartel de Fortin	Military	Extramuros	0.85544
65	Cuartel de Soda, Esco	Military	Extramuros	0.78557
72	Cuartel de Felipe II	Military	Extramuros	1.16116
85	Campo Concepcion	Military	Extramuros	1.24018
89	Cuartel Malate	Military	Extramuros	1.01062
100	Cuartel De Urbiztondo	Military	Extramuros	1.05162
101	Cuartel de San Miguel	Military	Extramuros	0.5809
Average	**System Ave**	**Average**		**0.8934396**
Average	**Intramuros**	**Average**	**Intramuros**	**0.9351589**
Average	**Extramuros**	**Average**	**Extramuros**	**0.8600642**
Average	**Military**	**Average**		**0.9055456**
Average	**Mil. Intra**	**Average**	**Intramuros**	**0.8770714**
Average	**Mil. Extra**	**Average**	**Extramuros**	**0.9236655**

Table 4.3: 1898 Manila, NACH radius N - showing 1898 Spanish Manila's Military Camps. Military Camps outside of Intramuros have higher average NACH values than system average. See Figure 4.11 for Military POIs Analysed using Depthmap X by *depthmap X development team*, UCL.

Although key market sites on the north bank have low accessibility on the street network (See Fig. 4.11, next page and Table 4.4, p. 66), these become highly accessible (See Fig. 4.12, p. 66 and Table 4.4 p. 66) when the network of canals and access to/from the Pasig River are included in the analysis (Psarra, 2018, p. 42). During this period, the Pasig River was the key global link. For the Spanish, via the Manila-Acapulco trade calling at *Puerto Magallanes*, and for the *Sangleys*, from the Chinese Silk Market of *Alcaceira* (see Fig. 4.13) connecting Manila to Fujian, China (Quirino, 1971).

Figure 4.11: 1898 Manila, NAIN radius N - showing 1898 Spanish Manila's Markets without accounting for access from the River. See Table 4.4 for NAIN Rn Market POI Values.

Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: 1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898 (showing military camps and market sites) from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

Figure 4.12 above: 1898 Manila, NAIN radius N - showing 1898 Spanish Manila's Markets with access from the Pasig River. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: 1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898 (showing military camps and market sites) from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: https://legacy.lib.utexas.edu/maps/philippines.html

Table 4.4 below: 1898 Manila, NAIN radius N - showing 1898 Spanish Manila's Markets with access from the Pasig River. NAIN Rn values rise substantially when factoring in water transport and access along the Pasig River. Analysed using Depthmap X by *depthmap X development team*, UCL.

id	1898 POIs	Type	IntraExtra	NAIN_Rn	w/River NAIN_Rn
13	Panaderia/Baker	Commercial	Intramuros	0.63359	0.66477
66	Mercado Echague (Market	Commercial	Extramuros	0.79091	0.91897
67	Mercado Oscaris (Market)	Commercial	Extramuros	0.77621	0.91874
71	Alcaicera Silk Market	Commercial	Extramuros	0.58548	1.01252
81	Mercado Paz	Commercial	Extramuros	0.88152	0.87068
86	Mercado Arroceros	Commercial	Extramuros	0.62594	1.04249
104	Puerto Magallanes	Commercial	Extramuros	0.87726	0.93758
103	Escolta	Commercial	Extramuros	0.76087	0.88337
Average	System Ave	Average		0.64837	0.73206
Average	Intramuros	Average	Intramuros	0.58839	0.64581
Average	Extramuros	Average	Extramuros	0.69636	0.80106
Average	**Market/Commercial**	**Average**		**0.74147**	**0.90614**
Average	**Market/Comm Intra**	**Average**	**Intramuros**	**0.63359**	**0.66477**
Average	**Market/Comm Extra**	**Average**	**Extramuros**	**0.75688**	**0.94062**

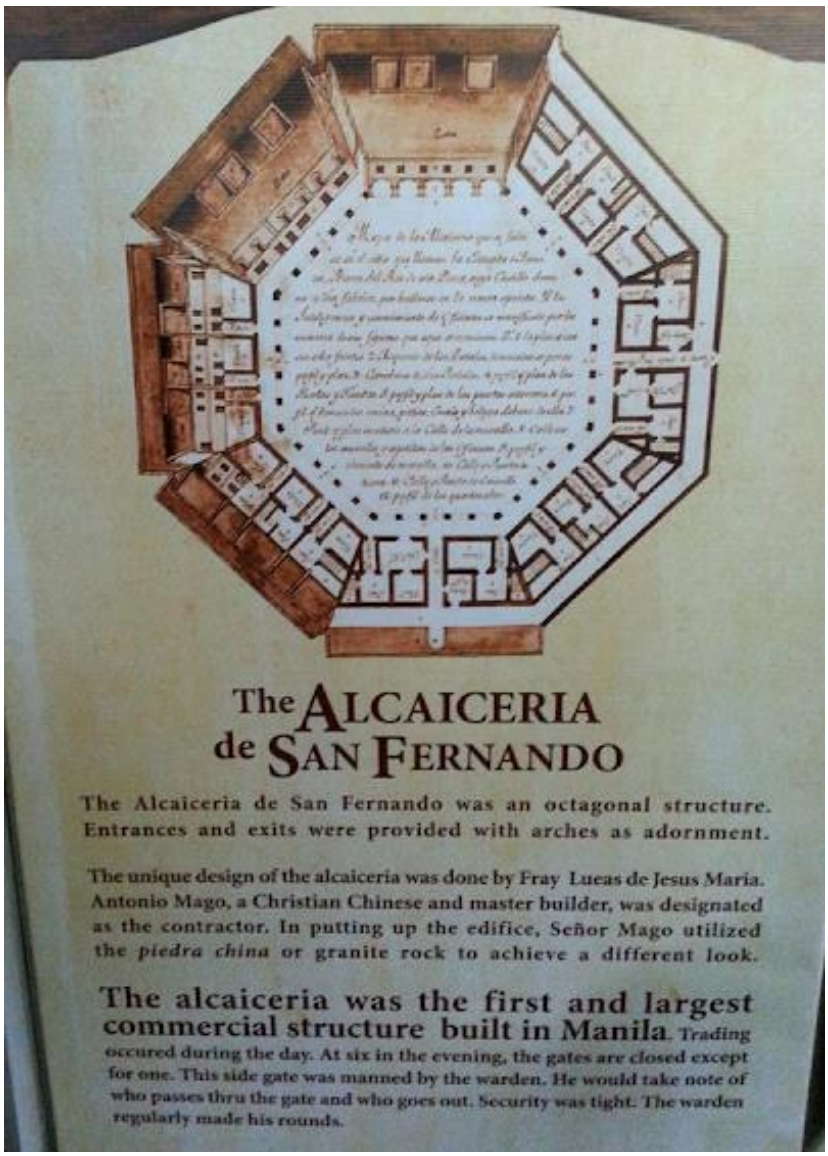


Figure 4.13: Historical Marker of The Alcaiceria de San Fernando / Chinese Silk Market, Manila
from: Department of Education, Manila. Accessed 12 August 2019. Source: <http://depedmanila.blogspot.com/2012/10/pedro-guevara-elementary-school-opens.html>

One could say that – to the colonist's eyes, Binondo was the first edge city – a place of commerce and trade outside Intramuros, with Calle Escolta (See Fig. 4.14, next page) becoming the high-street for the colonial elite. The street's name draws from the presence of the Royal Escorts headquartered on Callejon Soda along Escolta (Armengol, 1958; Quirino, 1971). Their presence provided security for the elite venturing outside Intramuros as they shopped and transacted with the locals. Gonzaga (2014) similarly points out that given the circumstances, Escolta could be considered Manila's first secured shopping mall.

Figure 4.14: Calle de Escolta, Binondo, Manila. 4 July 1899 (Manila's premiere shopping address, a year after Spanish-American turnover) Accessed 3 February 2019. Source: <https://i.pinimg.com/originals/25/a3/bc/25a3bcddcc800a4f2293912e0b45cef1.jpg>

The Spanish legacy of planning in the Philippines is summarised by Arguilla (1950, 14) as: "First for the purpose of defense and second for grandeur… The badly-housed were not the concern of the municipality." Ocampo (1992, 312) concludes: The colony took care only of its own." "While the church brought its converts 'under the bells,' Manila largely walled out the natives and other foreigners."

4.2 Benevolent Assimilation: *The 1905 City Beautiful Burnham Plan*

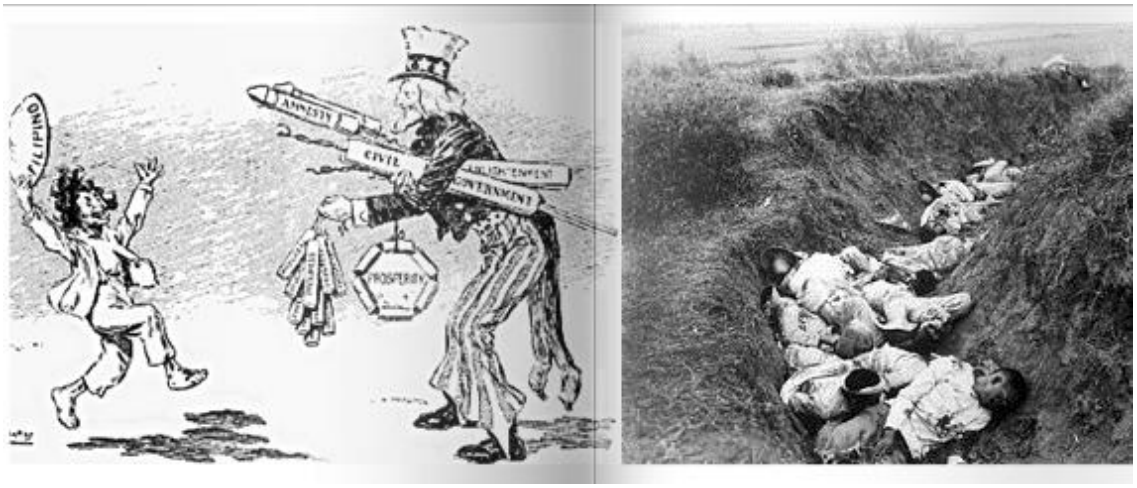


Figure 4.15: America's Benevolent Assimilation, vs. its slaughter of Filipinos during the Fil-American War from 1899-1902 Accessed 3 February 2019. Source: <http://dartmouth.edu/~hist32/History/19th%20Century.htm>

After the Spanish-American war ended in 1898, America consolidated its hold on its new Philippine territory through President McKinley's proclamation of "benevolent assimilation" (see Fig. 4.15), which sought to bring social, civic and practical reforms— like sanitation and infrastructure to the "backward" Philippines (Miller, 1982).

Figure 4.16: World-renowned, American Architect-Planner Daniel H. Burnham, on the terrace of his Evanston, IL home. early 1900s from: Graf, John, Chicago's Parks Arcadia Publishing, 2000. Accessed 3 February 2019. Source:<https://en.wikipedia.org/wiki/Daniel_Burnham#/media/File:Daniel_Burnham.jpg>

Ocampo (1992) discusses how Daniel H. Burnham (see Fig. 4.16), and his associate, Pierce Anderson were invited to the Philippines in 1905 by the new colonial administration, to prepare the Masterplan for Manila. Their intent was to unify the capital with a government centre in a new civic core (See Fig. 4.17, next page; See Fig. 4.18, p.71), preserve the city's heritage in Intramuros, and prepare for Manila's rapid population growth and dispersal with the development of industry, agriculture and transportation.

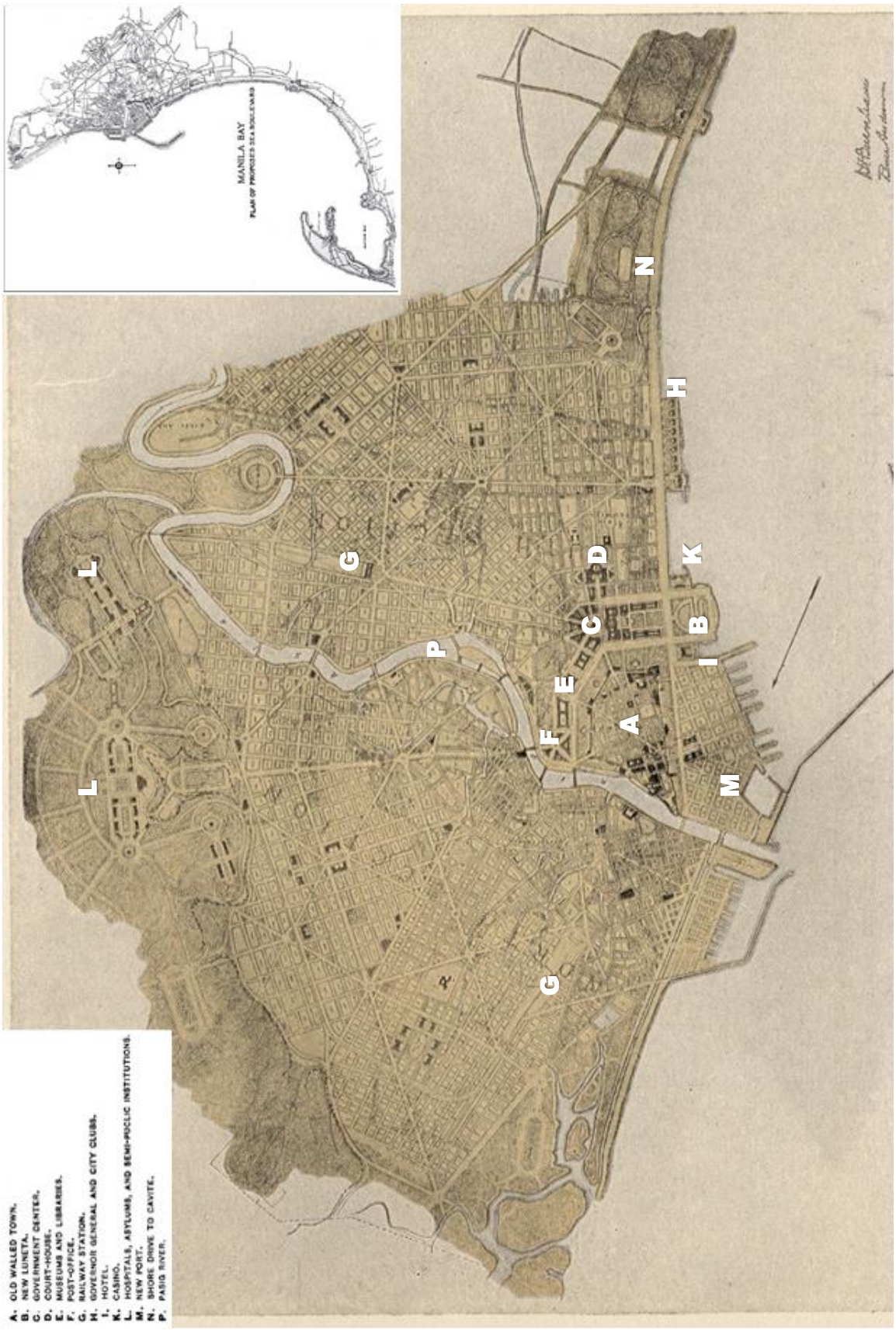


Figure 4.17 (including insets): Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.The essential elements of this plan are the government centre and system of proposed arteries radiating from it, the railway station, and the shore road.
from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 3 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg> <http://fac.arch.hku.hk/asian-cities-research/an-overview-of-the-manila-plan/>

Burnham's intention was for the plan to be revised to meet existing conditions and demand for real estate. Parsons (1915) writes:

> *"An integrated spatial pattern* (see Fig. 4.17, page before) *was prescribed by Burnham for the city, with classic long, straight lines and rectangular units and, on top of a basic grid, a circulation system radiating from a government building site near Intramuros* (see Fig. 4.18). *Circumferential and diagonal arteries and parkways would link this and another building group to the northeast with parks and different sections of the city."*

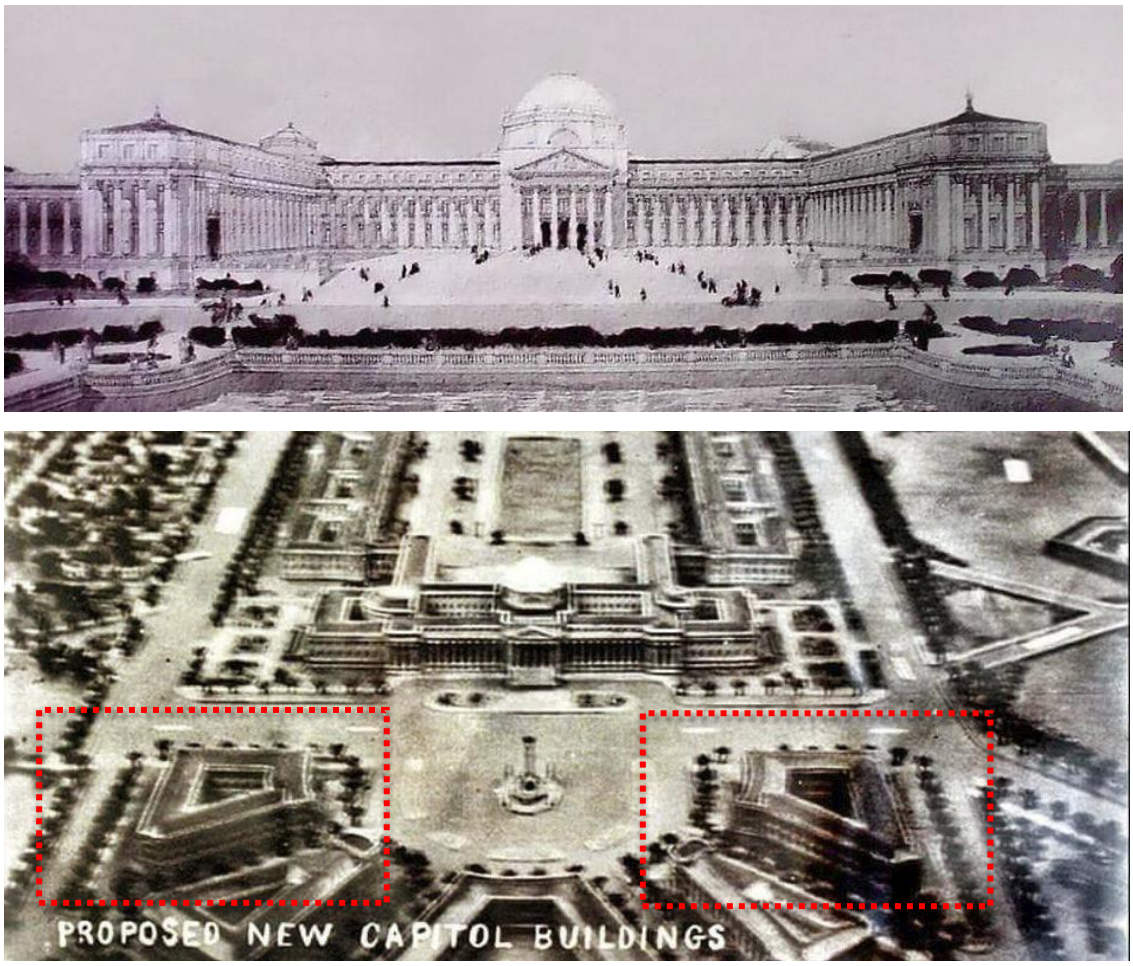


Figure 4.18: The Proposed Capitol Buildings and National Mall to be located beside Intramuros, on what was known as Luneta. Only 2 of the Proposed Buildings were constructed: The Department of Agriculture and Department of Finance Buildings bordered above, which now house The Philippines' National Museum's Natural History and Art Branches. Accessed 3 February 2019. from https://burnhampi.wordpress.com/2010/06/06/the-plan-manila

Burnham's proposed plan sets out to integrate and (one may say) "assimilate" the different *reducciones* mission areas with a city-wide radial concentric grid of streets and bridge crossings that join the north and south banks of the Pasig River (See Fig. 4.19). This was to connect the disparate mission areas as part of a broader urban framework that combines Intramuros and its suburbs into what could be considered the modern city of Manila.

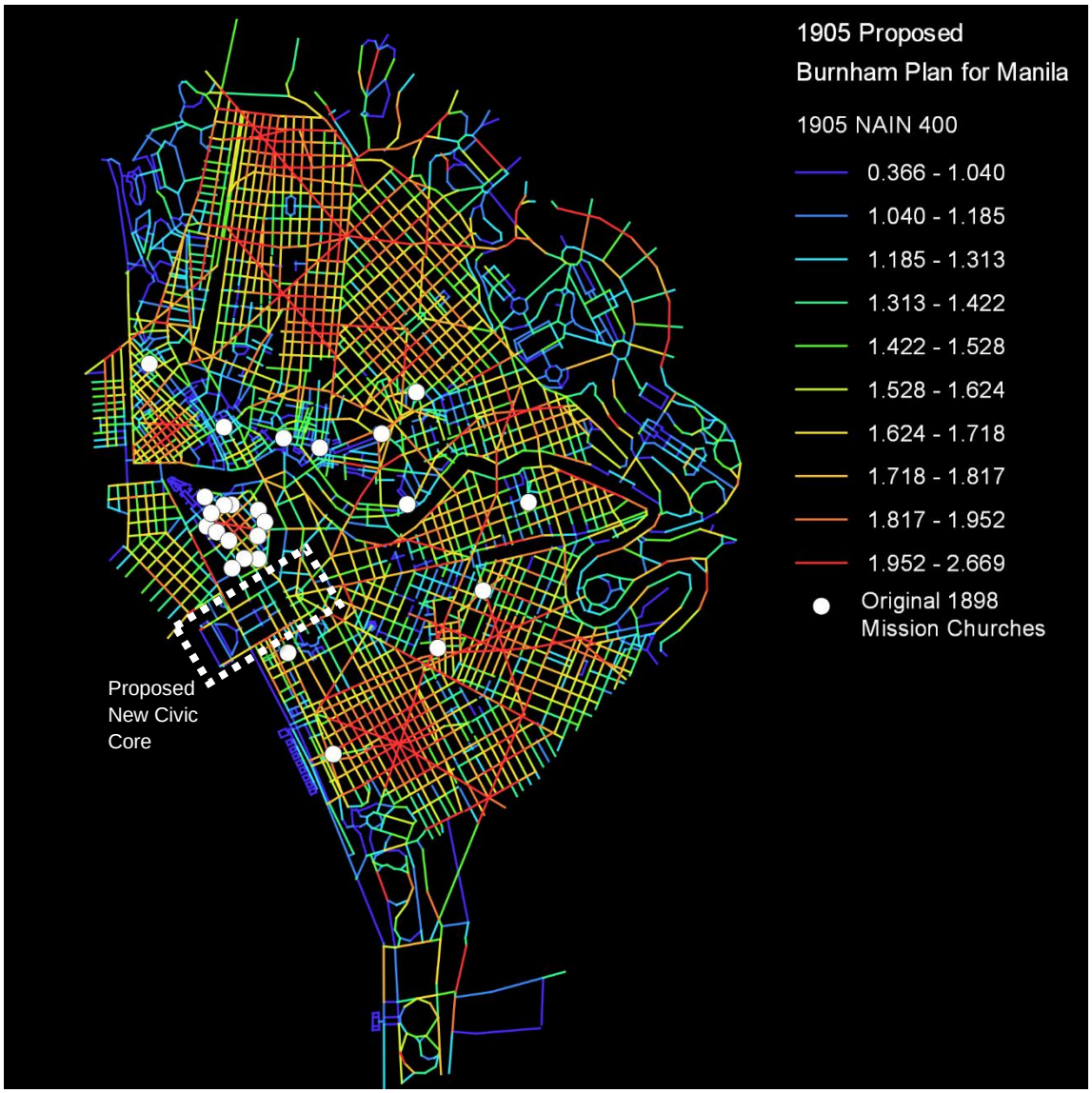


Figure 4.19: 1905 Proposed Burnham Plan for Manila, NAIN radius 400 - showing 1898 Spanish Manila's original mission churches, integrated into Burnham's proposed broader spatial network
Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

This proposed street network was to radiate from what was to be Burnham's suggested site for the Government Centre / National Mall, planned on the crescent-shaped open defensive buffer beside Spanish Intramuros. The key feature of the Mall was an axis left empty as a civic venue for political campaigns, inaugurations, and rallies, effectively reproducing the spatial practice of Washington DC's National Mall (See Fig. 4.20.a and Fig. 4.20.b), from which Burnham drew inspiration (Scott, 1969; Ocampo, 1992; Morley, 2014, p. 7-8). Replicating Oramas-Dorta's (2012) findings, Burnham's National Mall does not create a unifying civic core of activity, and instead shifts the integration core of the city into 2 separate areas to the north and south of Pasig River (See Fig. 4.21, next page).

Figure 4.20a (left): Washington DC, National Mall, looking toward the Lincoln Memorial, during Martin Luther King's "I have a dream" speech 28 August 1963. Accessed 3 February 2019. from: <https://en.wikipedia.org/wiki/March_on_Washington_for_Jobs_and_Freedom#/media/File:I-haveadreamMarines.jpg>

Figure 4.20b (right) – Rizal Park from Quirino Grandstand, during the inauguration of President Corazon C. Aquino, elected to replace dictator Ferdinand Marcos. Accessed 3 February 2019. from: <http://philippinecommentary.blogspot.com/2009/07/let-us-pray-for-cory.html>

(See Appendix B: Case Studies, p. 172)

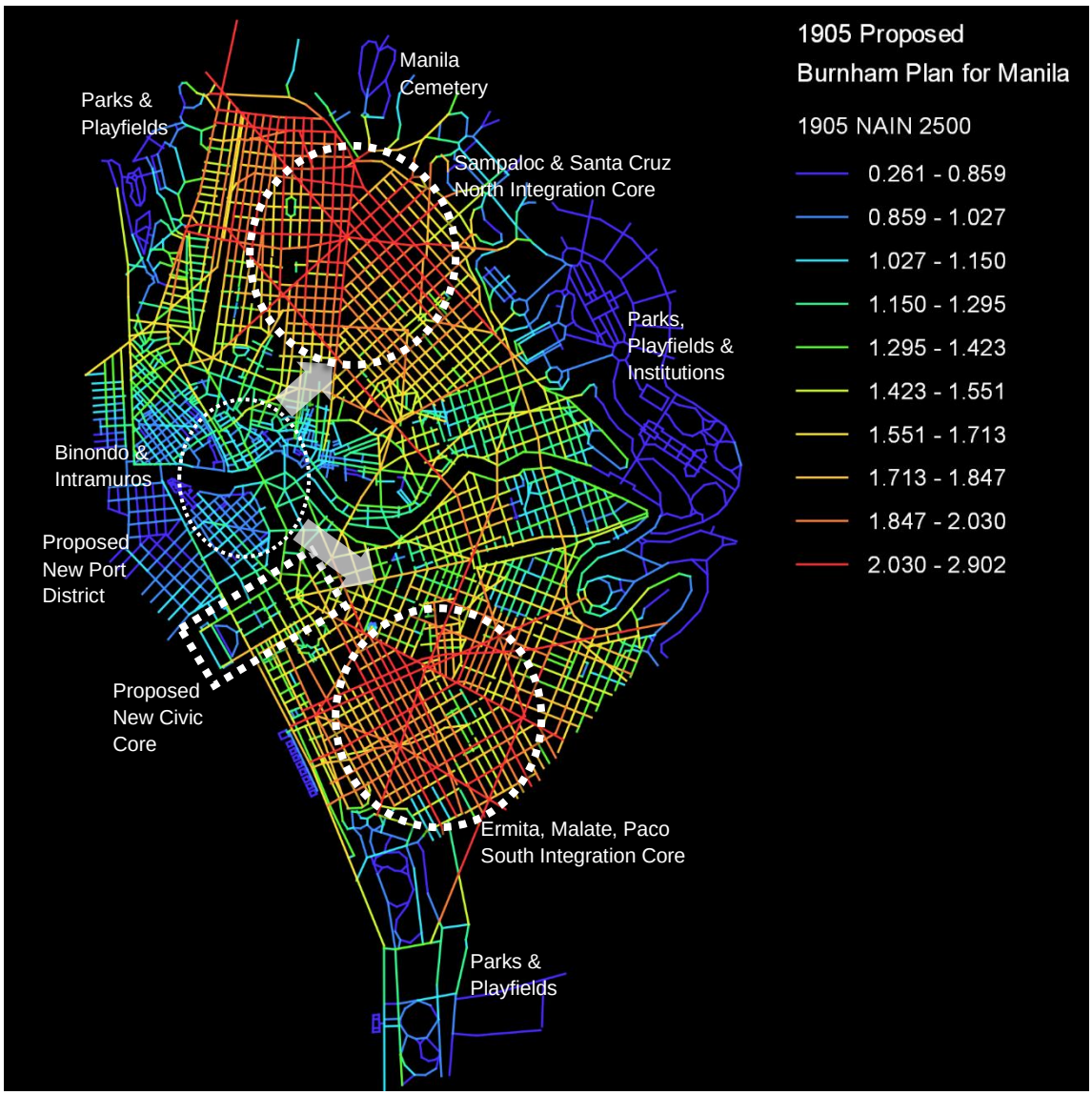


Figure 4.21: 1905 Proposed Burnham Plan for Manila, NAIN radius 2500 - showing shift of integration core away from Binondo toward 2 fragmented integration areas north and south of the Pasig River. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

While Burnham pre-dated the concept of a modern central business district, Shepard (1937) notes that, "He sought to preserve Binondo's position as the business centre by extending wharfage north of the Pasig and improving warehouse, harbor, and other port facilities." Burnham fails in doing so as Binondo's integration levels drop, when compared to the new Integration cores north and south of the Pasig River (See Fig. 4.22a-b, Table 4.5).

Figure 4.22a: Chart Legend: 1905 Proposed Burnham Plan for Manila, highlighting the old core of Binondo, Intramuros, San Nicolas and Burnham's Proposed National Mall of Ermita, versus the actual new integration cores formed by the plan. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

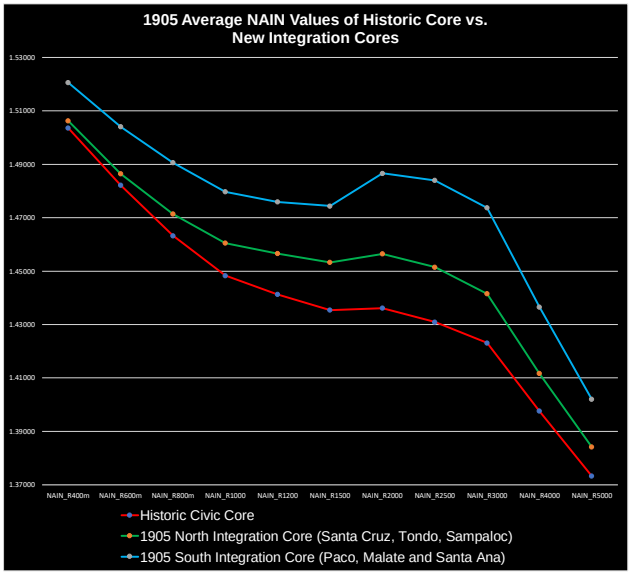


Figure 4.22b: Chart Comparison: 1905 Proposed Burnham Plan for Manila, NAIN Values for the old core versus the actual new integration cores. Analysed using Depthmap X by *depthmap X development team,* UCL.

Districts	NAIN_R400m	NAIN_R600m	NAIN_R800m	NAIN_R1000	NAIN_R1200	NAIN_R1500	NAIN_R2000	NAIN_R2500	NAIN_R3000	NAIN_R4000	NAIN_R5000	NAIN_Rn
Historic Civic Core	1.50356	1.48213	1.46325	1.44830	1.44128	1.43542	1.43615	1.43093	1.42313	1.39758	1.37327	1.40139
1905 North Integration Core (Santa Cruz, Tondo, Sampaloc)	1.50626	1.48640	1.47137	1.46052	1.45654	1.45327	1.45650	1.45151	1.44152	1.41170	1.38412	1.40971
1905 South Integration Core (Paco, Malate and Santa Ana)	1.52057	1.50407	1.49061	1.47970	1.47589	1.47439	1.48661	1.48397	1.47372	1.43657	1.40201	1.43338

Table 4.5: 1905 Proposed Burnham Plan for Manila, NAIN Values for the old core versus the actual new integration cores. Analysed using Depthmap X by *depthmap X development team,* UCL.

Ocampo (1992) recounts Burnham's comparisons: "He thought that some of the esteros should be widened for commercial transport." Burnham (1905) concluded his plan proposal by remarking about Manila: "possessing the bay of Naples, the winding river of Paris and the canals of Venice. The comparison to Paris and Venice may have been apt, but by proposing the centralised port beside Intramuros and San Nicolas, one may say that Burnham inadvertently caused Manila to turn its back on the Pasig River, refocusing water-transport to the new port, and turning the riverside into a rear edge as the network became more road-based. Similarly, by placing the port beside developed areas, Burnham was not able to provide the port adjacency required for manufacturing and warehousing activities.

Burnham, however, succeeds in creating a city-wide foreground network that connects and links the city, at pedestrian (See Fig. 4.23) and global scale (See Fig. 4.24, next page). The radiating diagonals connect the city comprehensively.

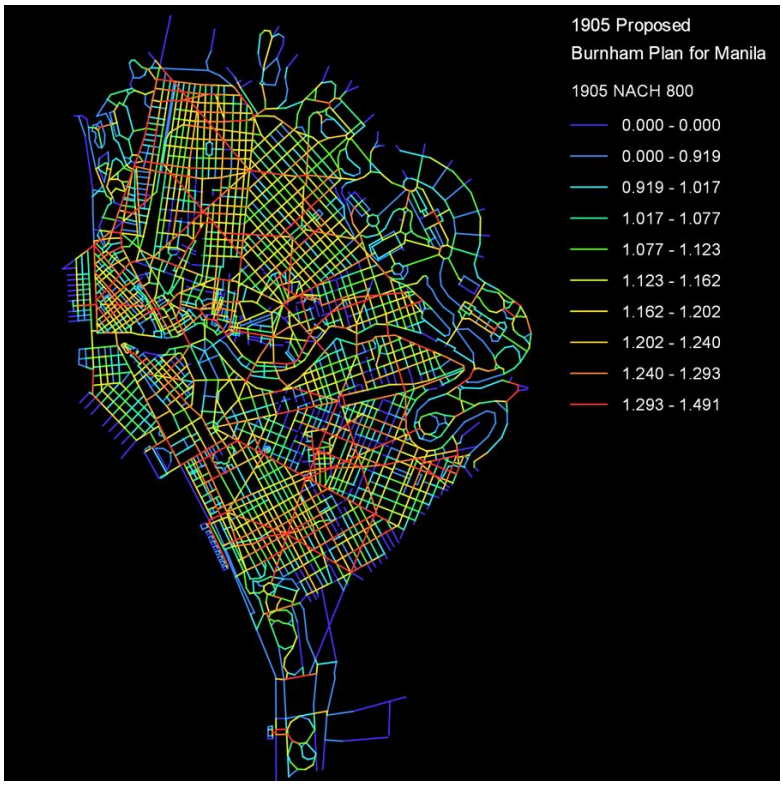


Figure 4.23: 1905 Proposed Burnham Plan for Manila, NACH 800 – showing pedestrian interconnectivity of the Proposed Radial Road Network. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

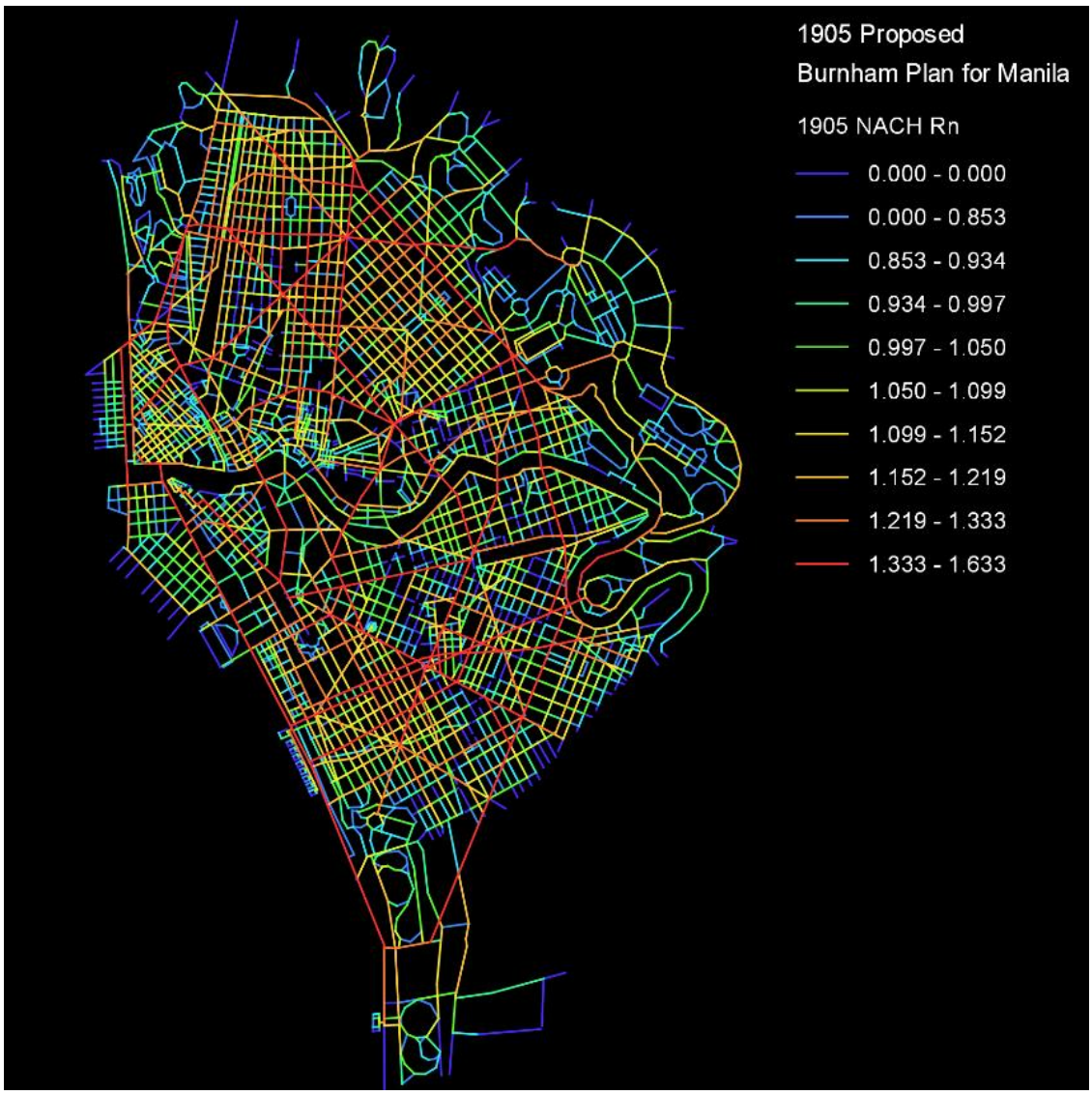


Figure 4.24: 1905 Proposed Burnham Plan for Manila, NACH Rn – showing global/vehicular interconnectivity of the Proposed Radial Road Network. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

This turns the Spanish core and Binondo into a conduit for global traffic, connecting the new integration cores to the north and south of Pasig River. The core districts in red have an aggregate mean global angular route choice (NACH Rn) value that is higher than the rest of the proposed spatial network (See Fig. 4.25a-b, Table 4.6, next page). This may be because of the prevalence of bridge crossings and routes through the area. If Burnham sought to maintain Binondo as Manila's hub for trade, one may ask, does through traffic translate to micro-economic activity? or does it channel it to the new integration cores instead?

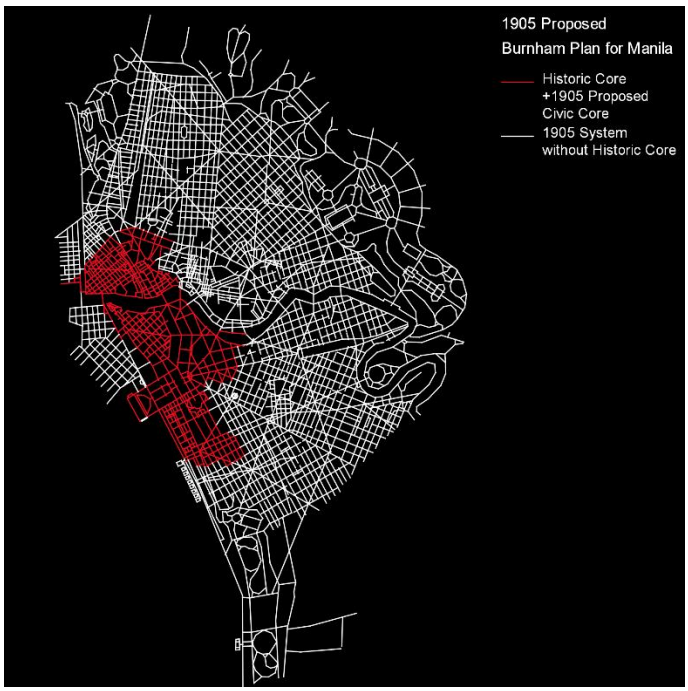


Figure 4.25a (top): Chart Legend: 1905 Proposed Burnham Plan for Manila, highlighting the old core of Binondo, Intramuros, San Nicolas and Burnham's Proposed National Mall of Ermita, versus the rest of the 1905 proposed spatial network. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

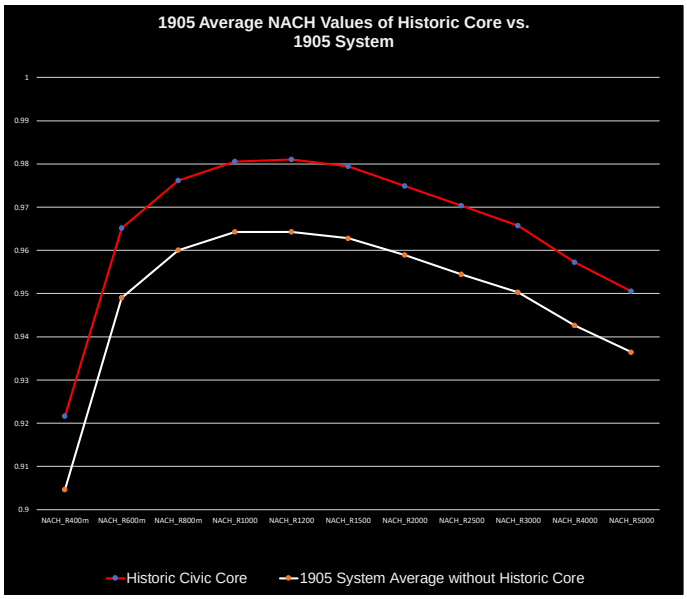


Figure 4.25b (middle): Chart Comparison: 1905 Proposed Burnham Plan for Manila, NACH Values for the old core versus the actual new integration cores, illustrating how the old core becomes a conduit for through traffic with higher NACH values. Analysed using Depthmap X *by depthmap X development team,* UCL.

District NACH comparison	NACH_R400m	NACH_R600m	NACH_R800m	NACH_R1000	NACH_R1200	NACH_R1500	NACH_R2000	NACH_R2500	NACH_R3000	NACH_R4000	NACH_R5000	NACH_Rn
Historic Civic Core	0.92159	0.96513	0.97618	0.98053	0.98103	0.97942	0.97487	0.97030	0.96571	0.95723	0.95054	0.93770
1905 System Average without Historic Core	0.90465	0.94901	0.96000	0.96424	0.96426	0.96279	0.95893	0.95443	0.95026	0.94259	0.93642	0.92440

Table 4.6 (bottom): 1905 Proposed Burnham Plan for Manila, NACH Values for the old core versus the rest of the 1905 proposed spatial network. Analysed using Depthmap X *by depthmap X development team,* UCL

The transfer of power from the Philippines to the United States saw the first deliberate effort to undertake land reform and undermine the system of the *encomiendas/hacienda* estates. The US initiated the purchase of these lands, for partitioning and redistribution into smaller cuts for Filipinos to own, but the policy saw most of the *encomiendas* sold to the original rights grantees, thereby formalising their hold on the estates (Seekins, 1993; Iyer, 2009, p. 10-12).

On Manila's edges, Burnham proposes to locate various green spaces as parks and playfields for recreation. While one can point to similar green belts around British cities, Burnham's open spaces were adjoining and overlapping the private *hacienda* estates outside of Manila's city limits – and its administrative control. Burnham's successors are left largely inutile to the interests of the landowners of these private estates (See Fig. 4.26).

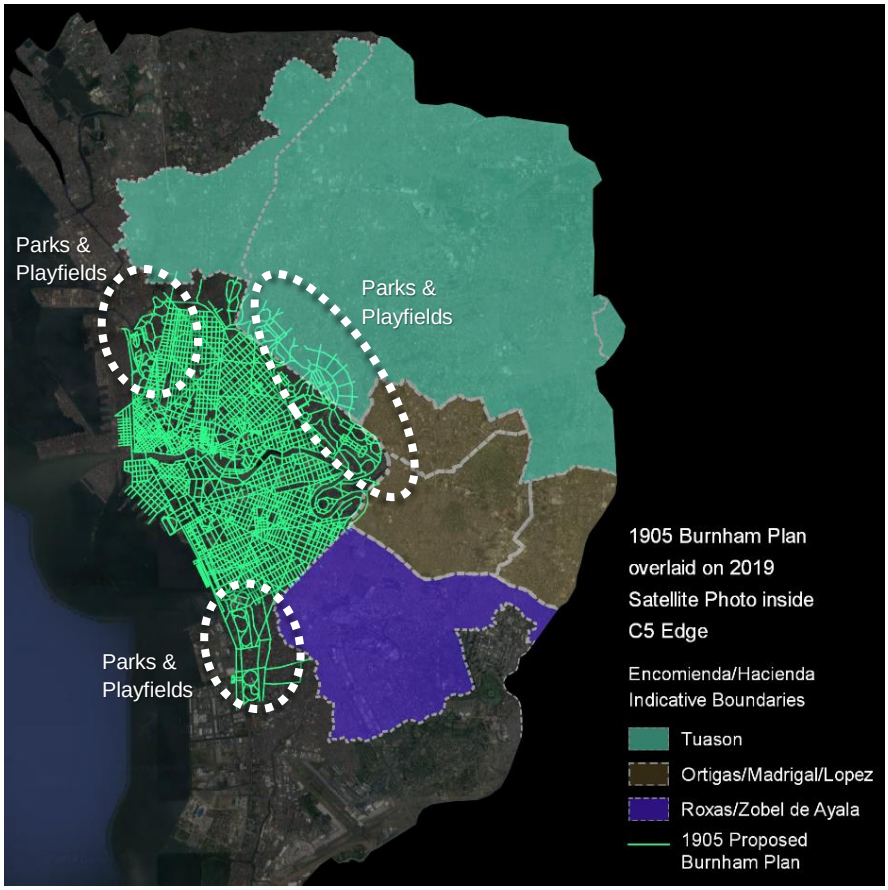


Figure 4.26: 1905 Manila and Suburbs – overlaid on 2019 Satellite Photo inside C5 edge. Showing the Burnham Plan's parks and playfields and indicative Encomienda/Hacienda boundaries based on present-day government unit boundaries Drawn by author *using QGIS* from: *1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898. Overlaid on Google Earth Satellite Photo. From Perry Castaneda Library Map Collection.* accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

4.3 Enclave Sub/Urbanism version 2: *1945 Manila*

Figure 4.27: William E. Parsons, consulting architect to the Insular Government,November 1905 - February 1914 Accessed 3 February 2019.from:<http://www.lougopal.com/manila/?p=3330>

William E. Parsons (see Fig. 4.27), was appointed as Consulting Architect to the Insular Government in November 1905 (Ocampo, 1992). He was tasked to oversee and implement the Burnham plan. He defined the arterial framework for construction, along with the plots for the various civic buildings (See Fig. 4.28). Then to meet demand for industrial land for production, re-zoned the southern banks of the Pasig River from residential into industrial uses (Arellano, 1919 and Mapua, 1920). Parsons and his successors oversaw the growth of Manila (See Appendix C, p. 176), until the Japanese invasion of World War 2, and Manila's eventual destruction in 1945 (See Fig. 4.29), as it became a battleground for liberation forces as they cleared the Japanese from the city through block-by-block shelling and street fighting.

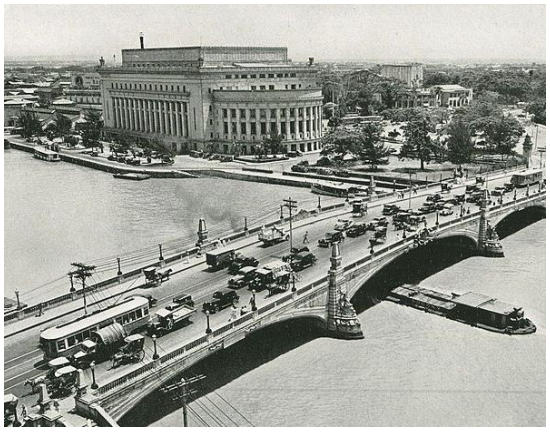


Figure 4.28 (left): Jones Bridge and Manila's Central Post Office are 2 Major Burnham Plan Projects completed during the American Colonial Period. accessed 5 February 2019. from https://www.flickr.com/photos/johntewell/5281876897

Figure 4.29 (right): Intramuros leveled by the US during recapture from Japan at the end of World War 2. accessed 5 February 2019. from https://history.amedd.army.mil/booksdocs/wwii/actvssurgconvol2/chapter13figure341.jpg

The deviations to the Burnham Plan are collectively summarised in the 1945 spatial network of Manila (See Fig. 4.30, next page), which captures the growth and evolution of the city's spatial network after 46 years of American rule.

Figure 4.30: Manila 1945 - composited from North and South artillery and air ordnance maps of US Army / US Army Air Force from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

The 1945 Spatial Network maintains the global integration core of Binondo (See Fig. 4.31). However, the non-completion of Burnham's planned riverside road networks and interconnecting north-south bridges, along with Parson's rezoning of the Pasig riverbanks into large Industrial parcels (see Fig 4.32, see next page), signal the fragmentation of the network into two separate north and south cores.

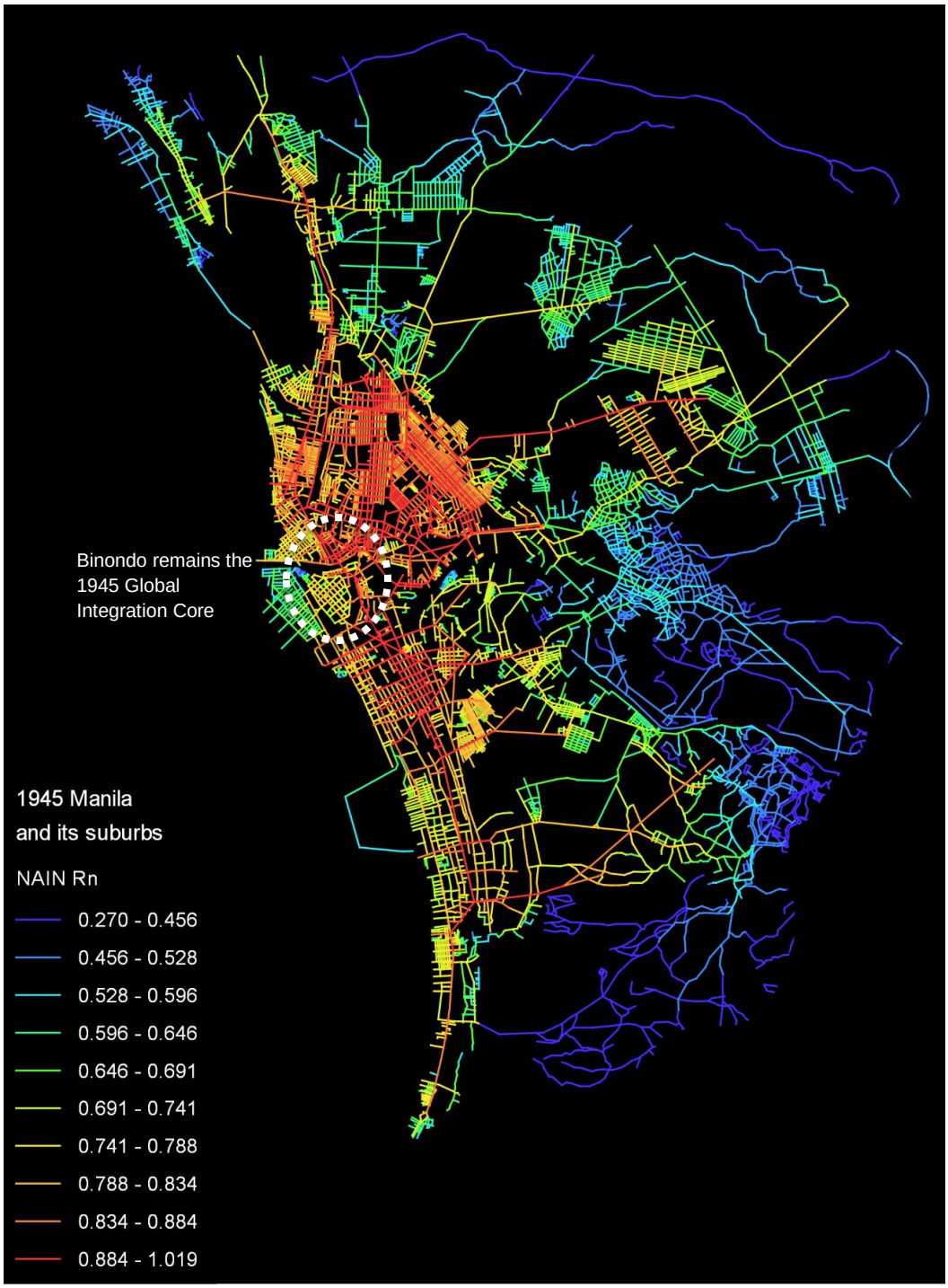


Figure 4.31: 1945 Spatial Graph of Manila, NAIN Rn - showing 1945 Manila's global integration core remaining within Binondo. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

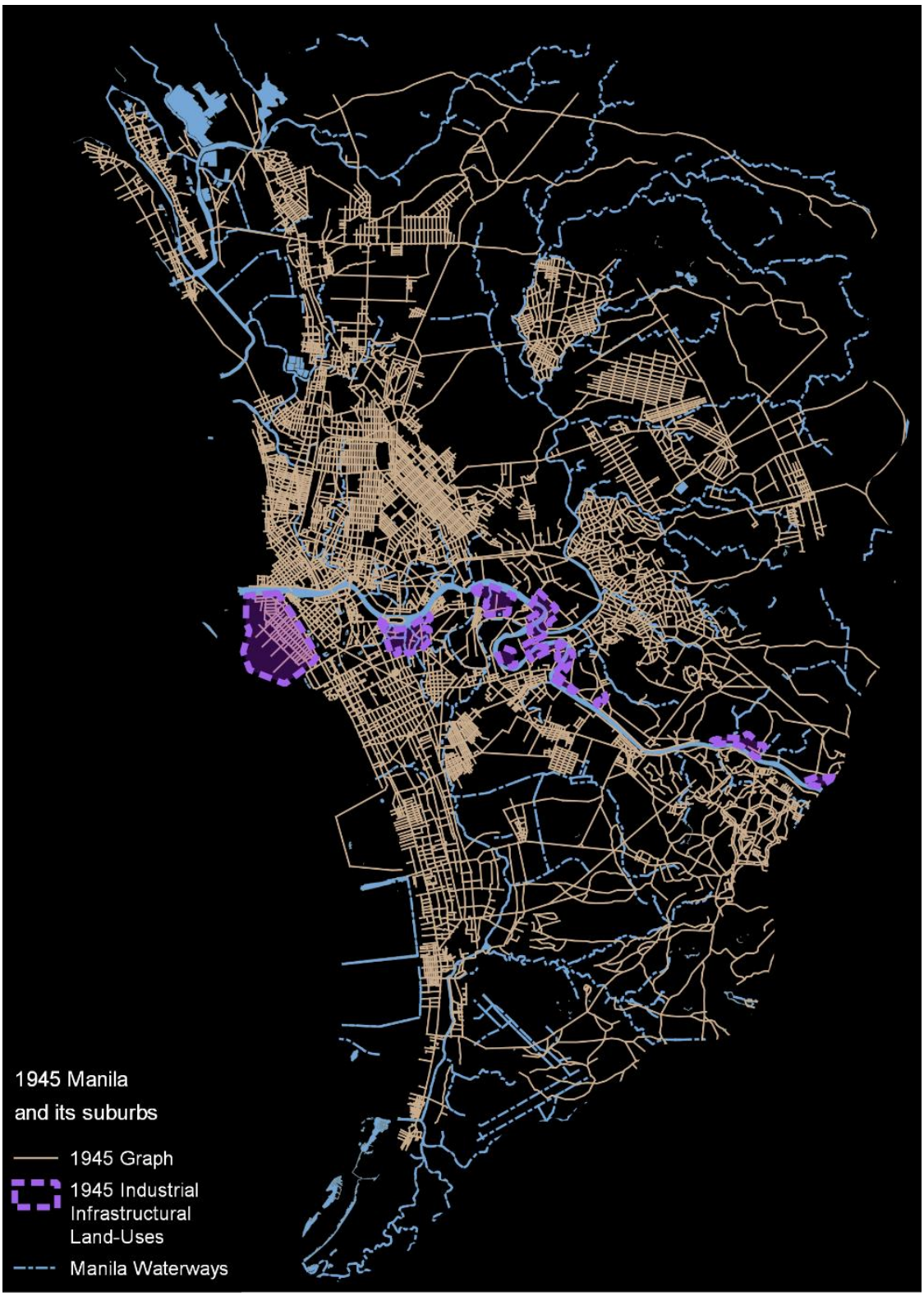


Figure 4.32: 1945 Spatial Graph of Manila - showing Industrial & Infrastructural Land Uses along the Pasig River. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: https://legacy.lib.utexas.edu/maps/philippines.html

This appears at the angular integration measure (NAIN) of 2500m (See Fig. 4.33). This shows how the Burnham Plan could have initiated the hollowing-out of Manila's downtown and the migration of centralities out to the city's new suburbs.

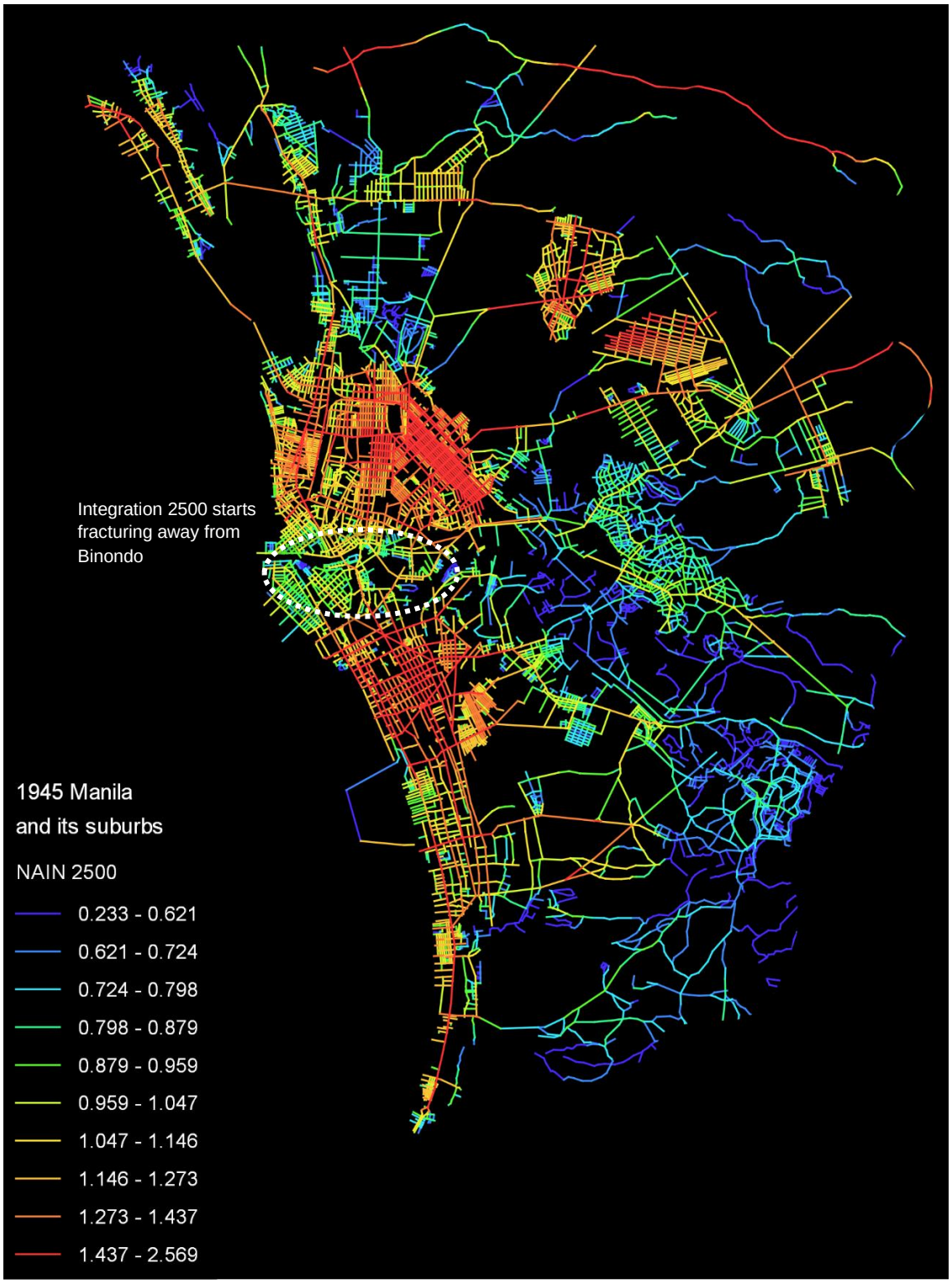


Figure 4.33: 1945 Spatial Graph of Manila, NAIN 2500 - showing 1945 Manila's integration core beginning to fragment into separate halves. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: https://legacy.lib.utexas.edu/maps/philippines.html

Focusing on the angular integration (NAIN) values of the north and south cores of Manila, one can see that the Historic Core has lower average angular integration (NAIN) values than the new north and south Integration Cores. This indicates the decline of the historic core of Binondo (See Fig. 4.34a below; Fig. 4.34-b and Table 4.7, next page). Integration then shifts outward to the tighter grid of working-class neighbourhoods to the North of the Pasig River, and then to the southern neighbourhoods facing Manila Bay: Burnham's National Mall, Ermita, and neighbouring Paco and Malate.

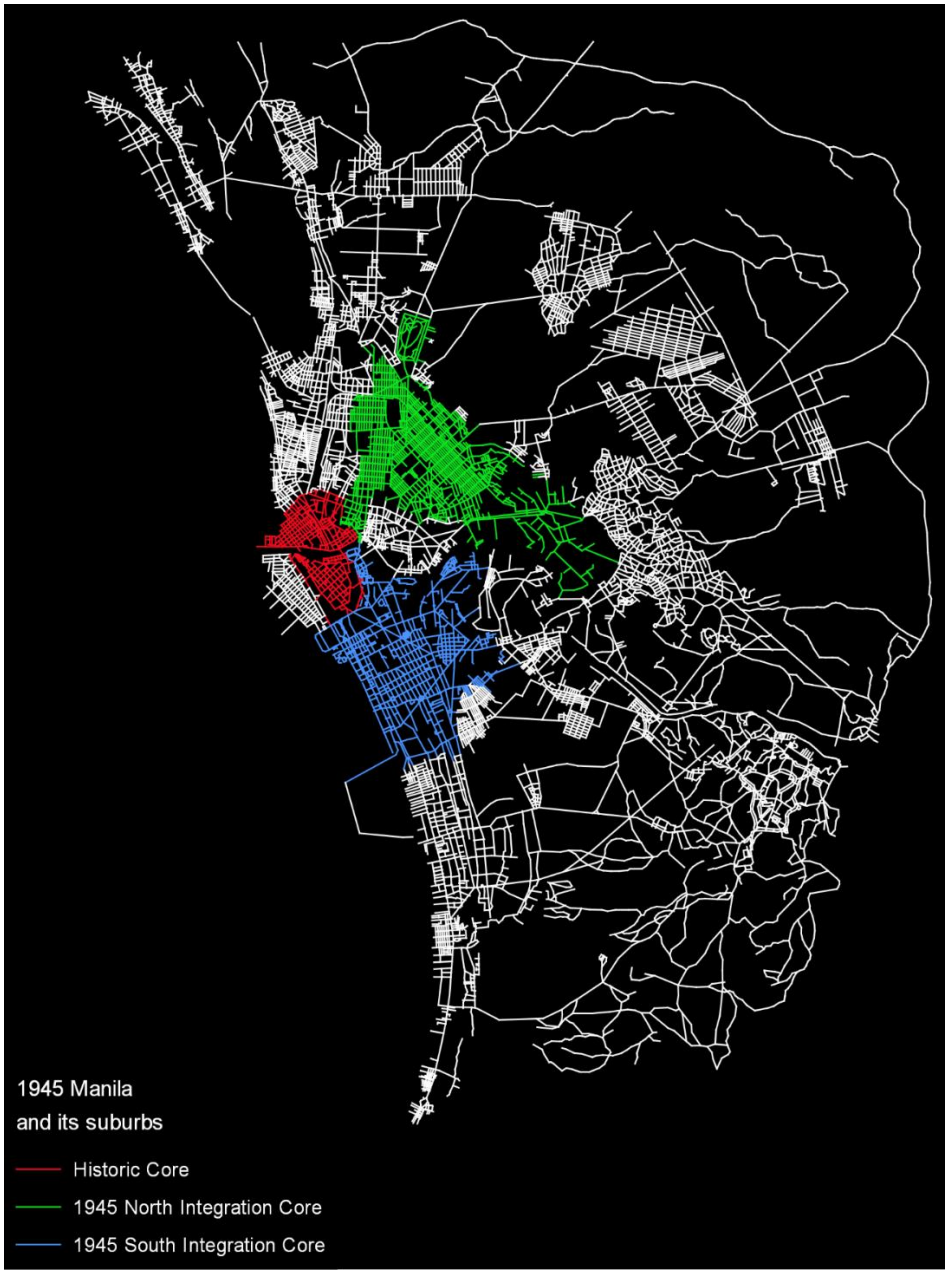


Figure 4.34a: Chart Legend: 1945 Spatial Graph of Manila highlighting the old core of Binondo, Intramuros and San Nicolas vs. the new 1945 North and South Integration Cores. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: https://legacy.lib.utexas.edu/maps/philippines.html

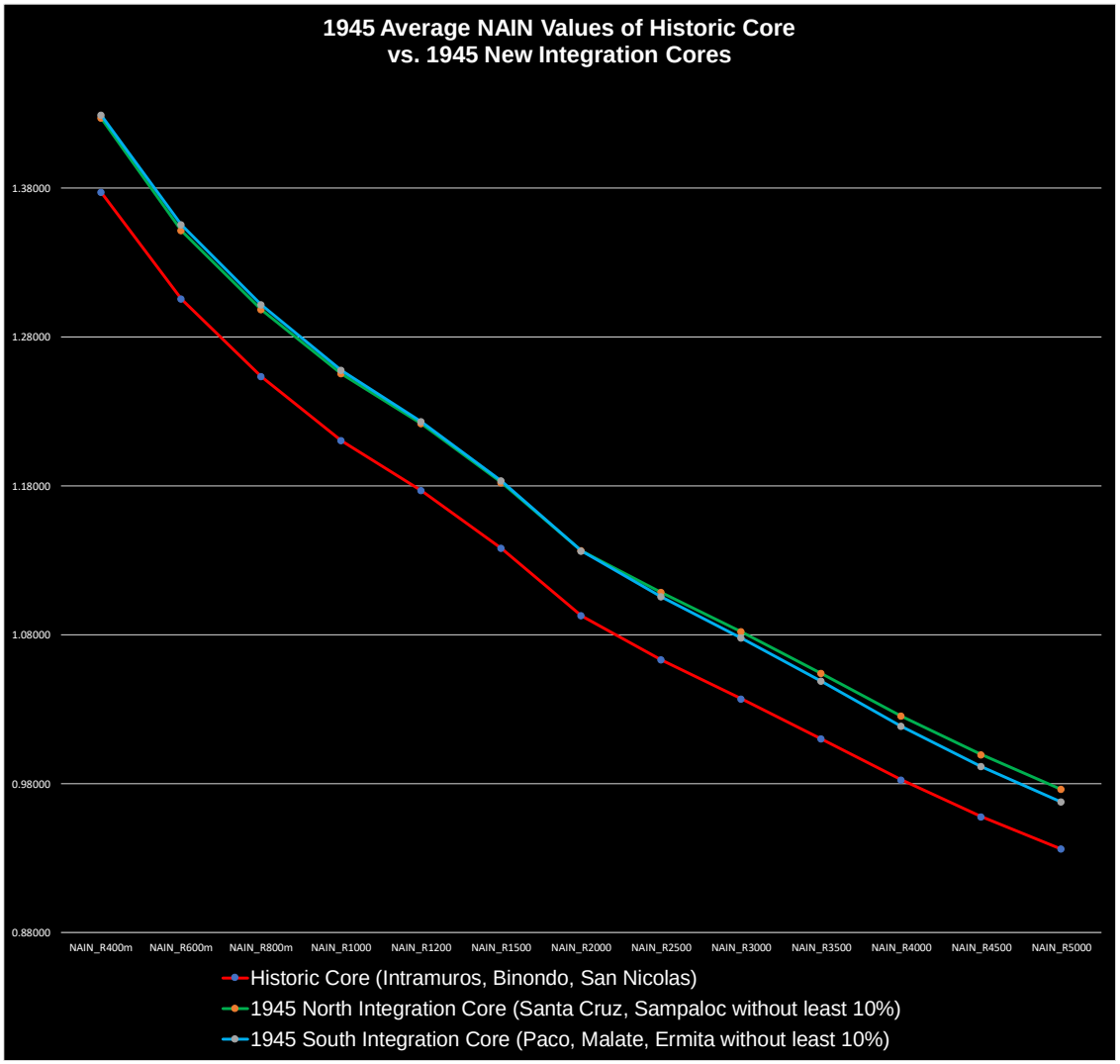


Figure 4.34b (top): Chart Comparison: 1945 Spatial Graph of Manila, NAIN Values for the old core versus the actual new integration cores, illustrating how the old core has been surpassed by the areas to the north and south of the Pasig River. Analysed using Depthmap X *by depthmap X development team,* UCL.

1945 Districts	NAIN_R400m	NAIN_R600m	NAIN_R800m	NAIN_R1000	NAIN_R1200	NAIN_R1500	NAIN_R2000	NAIN_R2500	NAIN_R3000	NAIN_R3500	NAIN_R4000	NAIN_R4500	NAIN_R5000	NAIN_Rn
Historic Core (Intramuros, Binondo, San Nicolas)	1.37701	1.30553	1.25323	1.21034	1.17682	1.13815	1.09283	1.06319	1.03692	1.01011	0.98254	0.95779	0.93627	0.79730
1945 North Integration Core (Santa Cruz, Sampaloc without least 10%)	1.42688	1.35125	1.29831	1.25520	1.22172	1.18217	1.13653	1.10838	1.08196	1.05391	1.02533	0.99949	0.97631	0.83192
1945 South Integration Core (Paco, Malate, Ermita without least 10%)	1.42889	1.35529	1.30150	1.25768	1.22308	1.18321	1.13625	1.10539	1.07778	1.04875	1.01849	0.99138	0.96763	0.82207

Table 4.7 (bottom): 1945 Spatial Graph of Manila, NAIN Values for the old core versus the rest of the 1945 North and South Integration Cores. Analysed using Depthmap X *by depthmap X development team,* UCL

This north-south fragmentation gives rise to a different kind of enclave. The southern integration core fronting Manila Bay (then known as the premiere address during the American colonial period) forms and corresponds with American colonial settlements and institutions (See Fig. 4.35a below; See Fig. 4.35b and Table 4.8, next page).

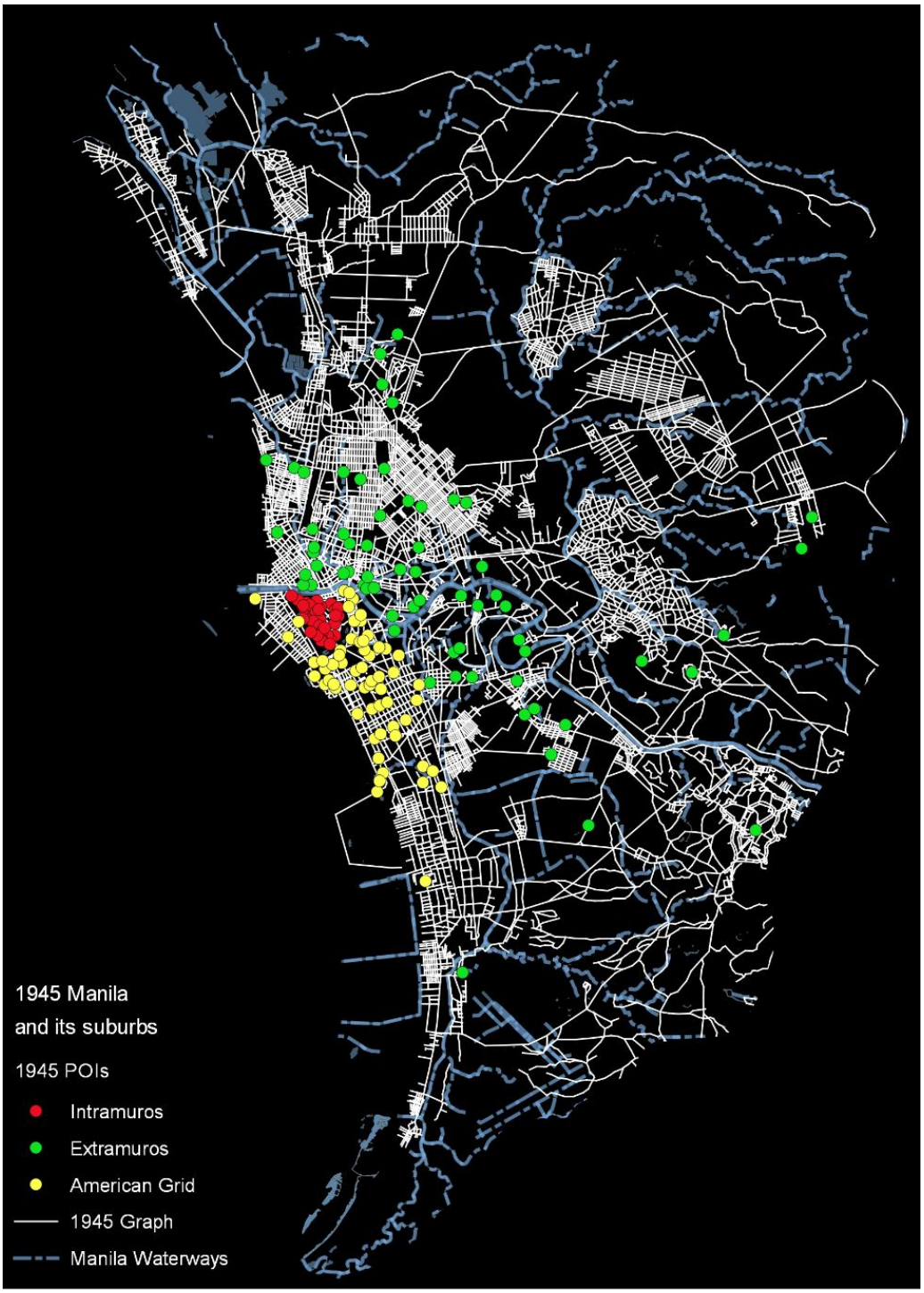


Figure 4.35a: Chart Legend: 1945 Spatial Graph of Manila showing clustering of American Points-of-Interest around Bayfront area compared to Intramuros and Extramuros Points-of-Interest. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

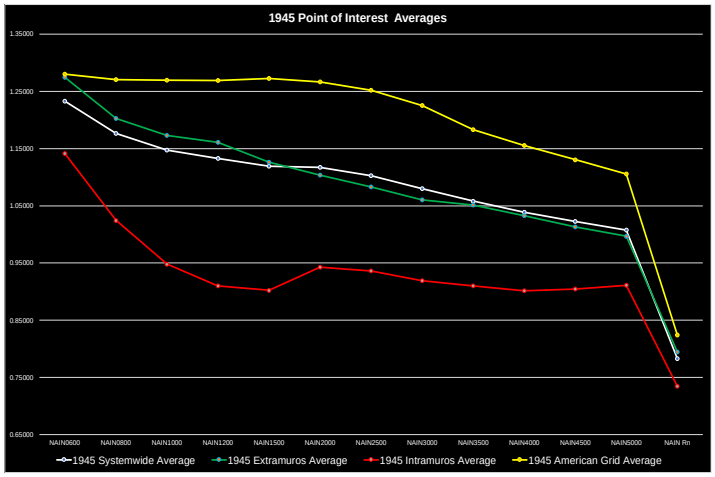


Figure 4.35b (top): Chart Comparison: 1945 Spatial Graph of Manila, average NAIN Values for Points of Interest showing how American POIs have higher NAIN across the range, versus POIs in Intramuros and Extramuros, illustrating how American institutions have taken up prime, accessible positions on the Manila Bayfront. Analysed using Depthmap X *by depthmap X development team,* UCL.

1945 POIs	Type	NAIN0400	NAIN0600	NAIN0800	NAIN1000	NAIN1200	NAIN1500	NAIN2000	NAIN2500	NAIN3000	NAIN3500	NAIN4000	NAIN4500	NAIN5000	NAIN Rn
1945 Systemwide	Average	1.28902	1.23276	1.17655	1.14718	1.13292	1.11913	1.11739	1.10268	1.07989	1.05811	1.03873	1.02244	1.00754	0.78292
1945 Extramuros	Average	1.30831	1.27479	1.20257	1.17310	1.16077	1.12602	1.10349	1.08290	1.06031	1.05127	1.03283	1.01328	0.99679	0.79439
1945 Intramuros	Average	1.24960	1.14153	1.02438	0.94797	0.90995	0.90228	0.94252	0.93637	0.91888	0.91020	0.90143	0.90466	0.91093	0.73469
1945 American Grid	Average	1.32988	1.27989	1.27056	1.26926	1.26892	1.27265	1.26664	1.25207	1.22540	1.18308	1.15548	1.13051	1.10556	0.82393

Table 4.8 (middle): 1945 Spatial Graph of Manila, average NAIN Values for the American Points of Interest vs. Intramuros and Extramuros POIs. Analysed using Depthmap X *by depthmap X development team,* UCL.

This southern integration core hosts a concentration of American-founded institutions, and is itself buffered from the rest of the urban fabric by Burnham's National Mall to the north, the Estero de Paco to the East, and Burnham's Park No. 1 or Harrison Park to the south (See Fig. 4.36a below; See Fig. 4.36b and Table 4.9, next page).

Figure 4.36a: Chart Legend: 1945 Spatial Graph of Manila showing clustering of American Points-of-Interest around Bayfront area and the land-use/natural buffers surrounding the Bayfront. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: https://legacy.lib.utexas.edu/maps/philippines.html

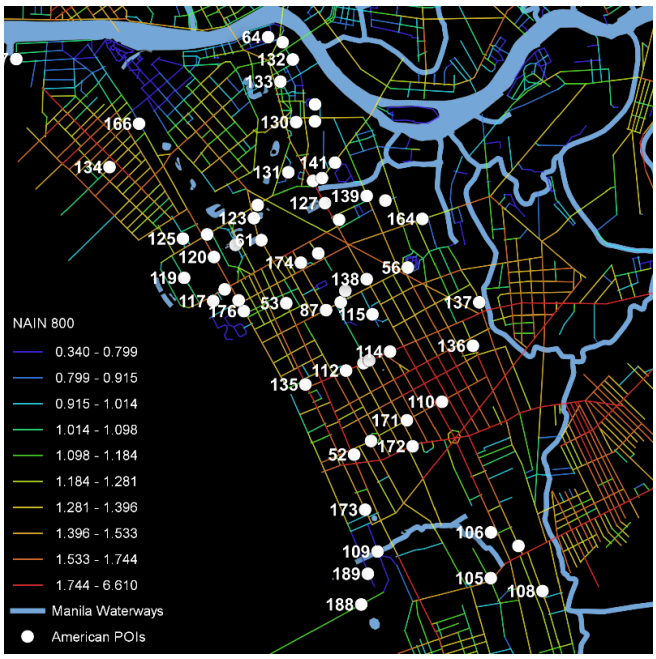


Figure 4.36b: 1945 Spatial Graph of Manila, NAIN 800m with American Points of Interest within the Bayfront Enclave. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

id	1945 POIs	Type	Systemwide	NAIN0800	NAIN1200	NAIN2500	NAIN5000	NAIN Rn
53	Ermita Church	Religious	American Grid	1.47412	1.50918	1.32024	1.18935	0.83982
54	Cemeterio Malate	Cemetery	American Grid	1.37762	1.41032	1.32952	1.11256	0.76549
61	Wallace Field	Recreation	American Grid	1.46023	1.31448	1.31080	1.09721	0.81795
64	Post Office	Government	American Grid	0.75652	0.78592	0.75609	0.86870	0.71727
87	Observatory	Education	American Grid	1.46060	1.43306	1.47843	1.20604	0.87353
88	University of the Philippines	Education	American Grid	1.33410	1.40356	1.42688	1.18032	0.86890
105	Rizal Memorial Stadium	Recreation	American Grid	1.34753	1.41499	1.41874	1.24951	0.83073
106	De La Salle University	Education	American Grid	0.96835	1.01937	1.19305	1.21262	0.86465
107	St. Scholastica's College	Education	American Grid	1.37637	1.42808	1.63916	1.36900	0.86179
109	Fort Abad	Military	American Grid	0.67339	0.73261	0.81779	0.79464	0.64459
110	Oriental Club	Recreation	American Grid	1.66788	1.54230	1.44831	1.24498	0.89182
111	St. Paul's Institution	Education	American Grid	1.87262	1.65216	1.69798	1.29608	0.91397
112	Assumption College	Education	American Grid	1.66837	1.54338	1.57797	1.23958	0.88060
113	UP Medical School	Education	American Grid	1.73793	1.59841	1.56573	1.22834	0.88055
114	Government Laboratory	Government	American Grid	1.70727	1.63726	1.53640	1.20944	0.87461
115	Philippine General Hospital	Healthcare	American Grid	0.88234	1.05447	1.16235	1.05572	0.81867
116	UP Chemical Laboratory	Education	American Grid	0.91258	1.00006	1.06876	0.98045	0.77535
117	Army Navy Club	Recreation	American Grid	1.16714	1.23020	1.20114	1.12894	0.83394
118	Elks Club	Recreation	American Grid	1.56357	1.57882	1.47258	1.29925	0.90975
119	New Luneta	Recreation	American Grid	1.03007	1.05087	1.09001	1.07336	0.80713
120	Burnham Green	Recreation	American Grid	1.60086	1.59572	1.41519	1.17411	0.81917
121	Old Luneta	Recreation	American Grid	1.04313	0.96935	0.96813	0.94041	0.74471
122	Police Station	Government	American Grid	1.27630	1.31865	1.27548	1.18586	0.87074
125	Manila Hotel	Hotel	American Grid	0.88091	0.86891	0.95023	0.94324	0.74915
126	Casa de Espana	Recreation	American Grid	1.17076	1.31176	1.26034	1.17559	0.90845
127	Santa Rita Hall	Education	American Grid	1.75887	1.74282	1.61750	1.40931	1.01846
128	Manila Club	Recreation	American Grid	0.85441	0.93035	0.92063	0.84830	0.71992
129	YMCA Arroceros	Recreation	American Grid	1.07432	0.96650	0.86794	0.95513	0.78139
130	Manila City Hall	Government	American Grid	1.05124	0.97927	0.87944	0.96048	0.78453
131	Legislative Building	Government	American Grid	0.82919	0.88198	0.86321	0.93110	0.76576
132	Estado Mayor (Stadium)	Recreation	American Grid	0.93251	0.94125	0.94324	1.04254	0.82574
133	Mehan Gardens	Recreation	American Grid	1.10866	1.10180	0.97141	1.09226	0.85200
134	Customs House	Government	American Grid	1.46620	1.02953	0.98169	0.73293	0.72315
135	Military Plaza	Government	American Grid	1.53332	1.49709	1.44600	1.13979	0.80485
140	Philippine Normal School	Education	American Grid	1.48609	1.38710	1.45375	1.31325	0.98411
141	Philippine Trade School	Education	American Grid	1.34380	1.32547	1.24965	1.27095	0.96701
142	Girls Dormitory	Education	American Grid	1.27302	1.25118	1.36276	1.25615	0.96702
143	Sternberg Hospital	Healthcare	American Grid	0.72119	0.70460	0.68492	0.77397	0.67507
144	Ice Plant	Commercial	American Grid	1.07676	1.05398	0.99287	1.08327	0.82385
160	Paco Rail Station	Infrastructure	American Grid	1.47078	1.38624	1.39140	1.11637	0.85526
164	Tabacalera Cigar Factory	Industrial	American Grid	1.38798	1.60589	1.56793	1.23661	0.90199
166	Municipal Court	Government	American Grid	0.88482	1.03340	0.99919	0.85120	0.81941
167	Engineer Island	Infrastructure	American Grid	1.03526	0.72647	0.88421	0.66894	0.59306
171	Malate School	Education	American Grid	1.43036	1.50808	1.37368	1.18630	0.85276
172	Malate Market	Commercial	American Grid	1.79856	1.87417	1.63348	1.25818	0.85719
173	American School	Education	American Grid	1.31530	1.30089	1.41310	1.16886	0.80005
174	Baptist Church	Religious	American Grid	1.16406	1.12182	1.08678	1.01071	0.77983
175	Columbia Club	Recreation	American Grid	1.24312	1.22557	1.17538	1.05313	0.81258
176	American High Commissioner	Government	American Grid	1.39501	1.49861	1.35432	1.10976	0.79521
178	Bay View Hotel	Hotel	American Grid	1.49141	1.59617	1.48769	1.24325	0.86552
179	Manila Polo Club	Recreation	American Grid	1.12974	1.18392	1.11499	0.97008	0.70131
188	Seaplane Basin	Infrastructure	American Grid	1.11897	0.73925	0.65472	0.73852	0.61791
189	Yacht Club Basin	Recreation	American Grid	0.77358	0.99187	1.20375	1.06446	0.75249
123	Tennis Club	Recreation	American Grid	1.50561	1.27200	1.30570	1.09273	0.80927
124	Municipal Golf Links	Recreation	American Grid	1.41066	1.35619	1.31768	1.16293	0.84064
	1945 Systemwide	Average		1.17655	1.13292	1.10268	1.00754	0.78292
	1945 Extramuros	Average		1.20257	1.16077	1.08290	0.99679	0.79439
	1945 Intramuros	Average		1.02438	0.90995	0.93637	0.91093	0.73469
	1945 American Grid	Average		1.27056	1.26892	1.25207	1.10556	0.82393

Table 4.9: 1945 Spatial Graph of Manila, NAIN Values for the American Points of Interest within the Bayfront Enclave. Analysed using Depthmap X *by depthmap X development team,* UCL

Burnham's open spaces to the east of Manila could no longer be enforced on the Tuason, Ortigas and Zobel de Ayala *Haciendas*. The development of these *haciendas* as Manila's suburbs was spurred by Pres. Quezon's pre-war plan to transfer the capital of the Philippines to Quezon City, which was to be sited on land purchased from the vast north-east Tuason *Hacienda* (Pante, 2018, p. 15-38). By 1945 the first street grid was laid down for what was to be Quezon City's South Triangle. Effectively, the *hacienda* edges closest to Manila – were developed as suburban expansions (See Fig. 4.37) of the core's population (Pante 2018, p. 15-38; Garrido 2013, p. 171-172).

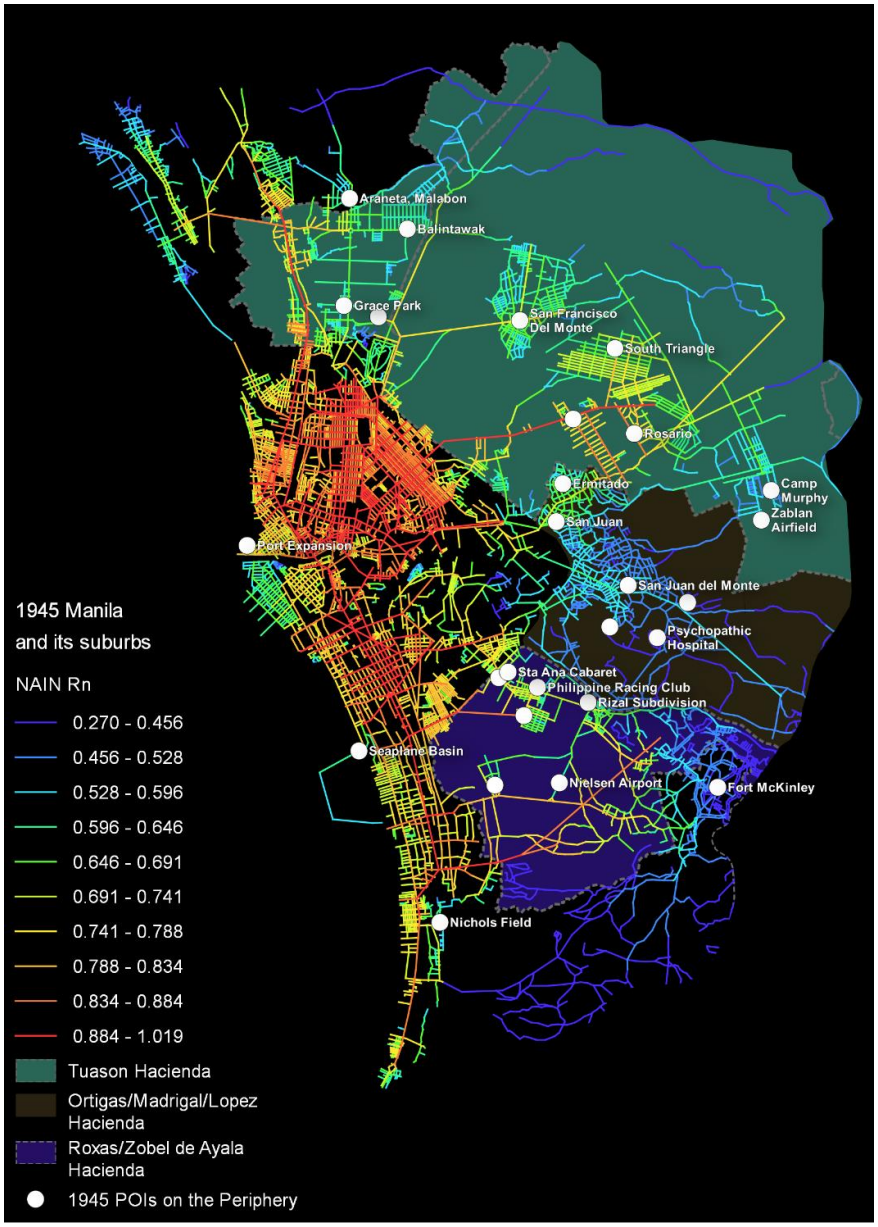


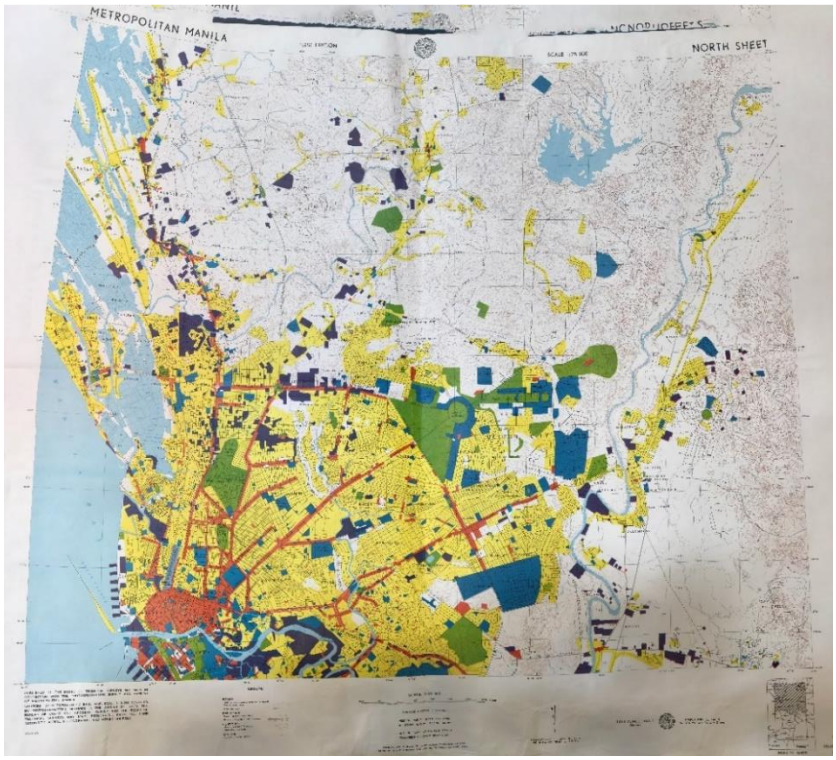
Figure 4.37: 1945 Spatial Graph of Manila, NAIN Rn with Points of Interest outside Manila (within the Haciendas). Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: *Manila 1945 artillery and air ordnance maps of US Army Air Force* from: Perry Castaneda Library Map Collection. accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

Militarisation of Manila's (Duque, 2009) outskirts during the American colonial period manifest in how Camp Murphy in Cubao and Fort McKinley were located on the highest elevations, overlooking Manila Bay against naval invasion. These also provided a perimeter to secure American Manila against rebellion from the native populace.

Globalisation manifests in the expansion of the Port, while Air travel similarly imprints itself on the fabric of Manila with new passenger terminals and military airfields. Reclamation from Manila Bay also scales up, with land earmarked for a new Central National Airport, located by the bay to service the Flying Boats that connected the Philippines to the United States.

4.4 Enclave Sub/Urbanism version 3: *1967 Metro Manila*

1967 saw the dictator Marcos enter his second year in his first elected term as president. It marks the completion of the first consolidated technical survey of Metropolitan Manila (See Fig. 4.38a-b).



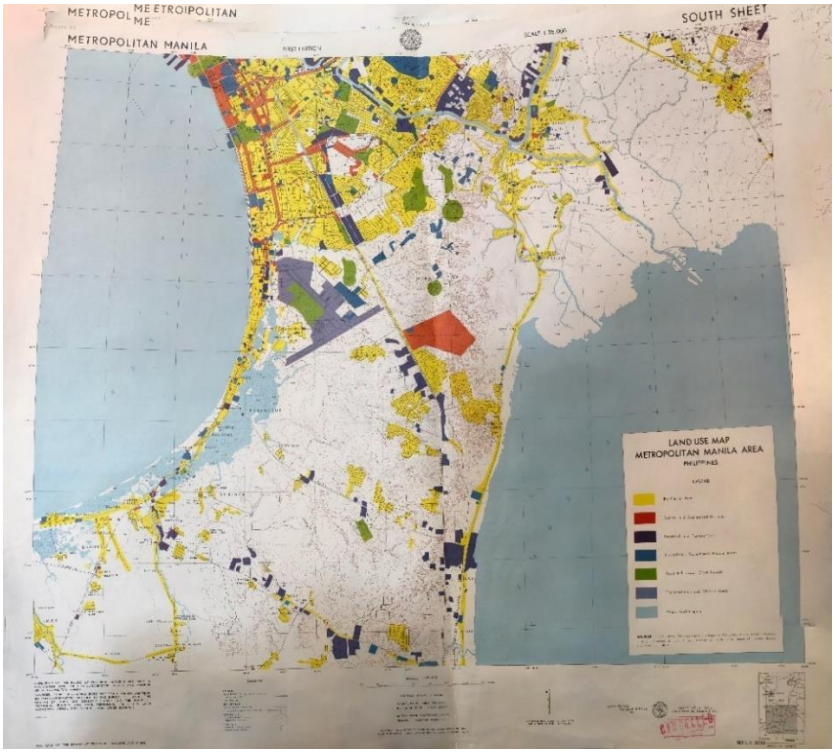


Figure 4.38a-b: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

Metro Manila's suburbanisation has reached the edges of the planned Circumferential Road 4/Epifanio Delos Santos Avenue (C4/EDSA), and continues the Burnham Plan's pattern of fragmentation (See Fig. 4.21, p. 74) into two separate integration cores (See Fig. 4.39).

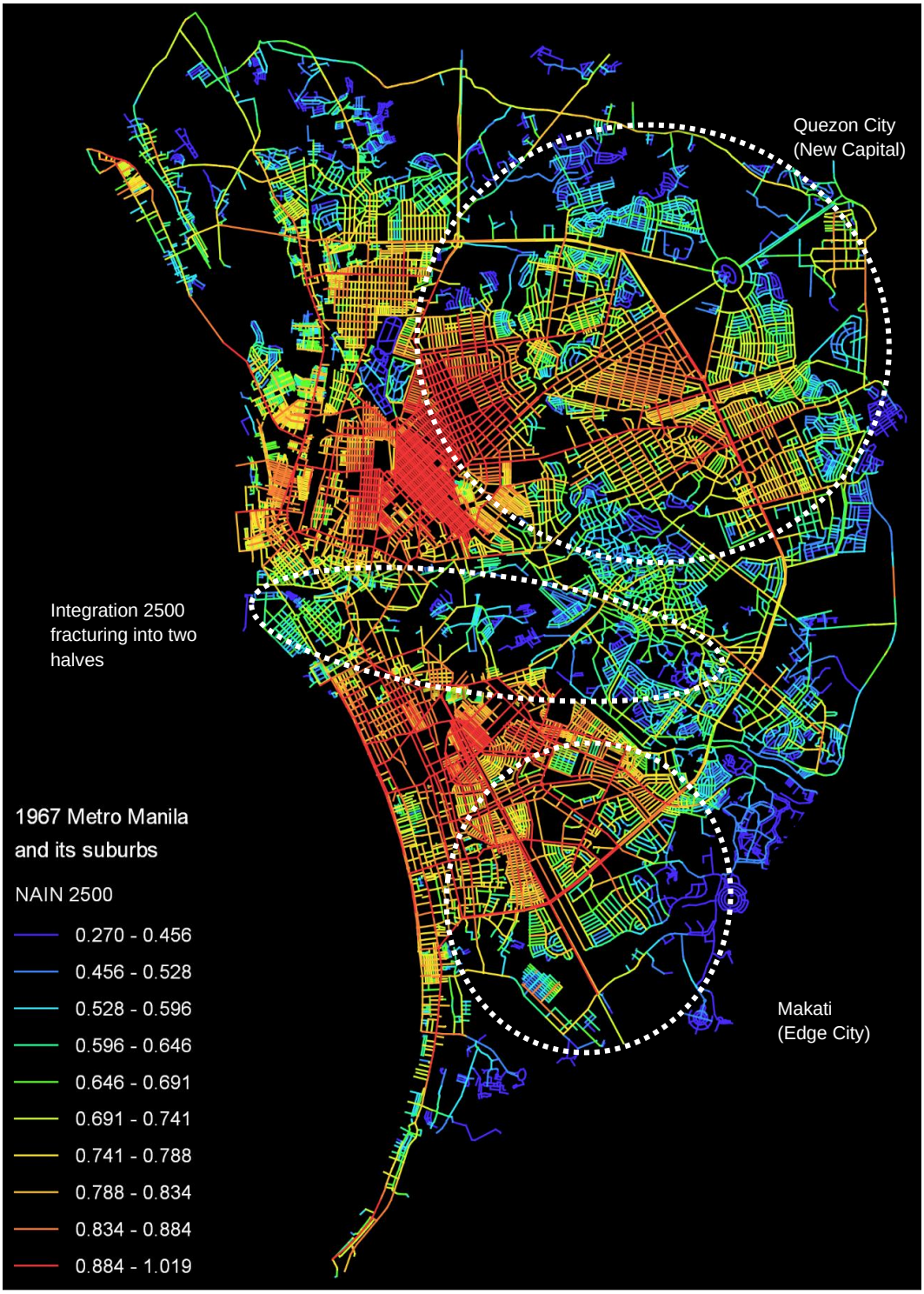


Figure 4.39: 1967 Spatial Graph of Metro Manila, NAIN 2500, showing fragmentation into north and south integration cores. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

The emergence of the C4/EDSA ring road rivals the old business district of Binondo in terms of global angular integration (NAIN Rn; See Fig. 4.40 below) and global angular choice (NACH Rn; See Fig. 4.41 next page) in connecting both north and south halves of Metro Manila.

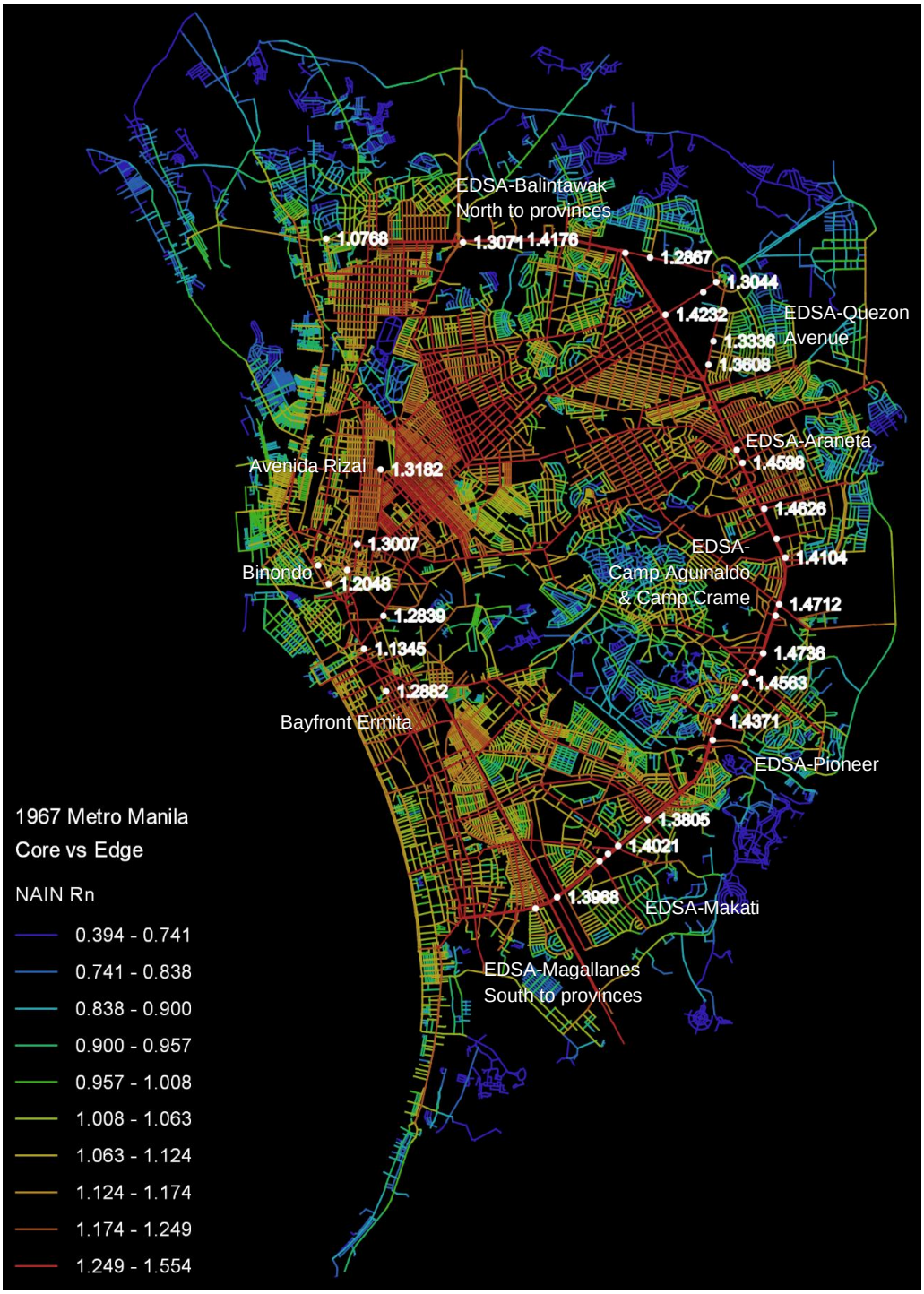


Figure 4.40: 1967 Spatial Graph of Metro Manila, NAIN Rn, showing higher global integration values along Circumferential Road 4/Epifanio Delos Santos Avenue compared to Manila's original business district of Binondo, American Bayfront district – Ermita, and shopping district of Avenida Rizal. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

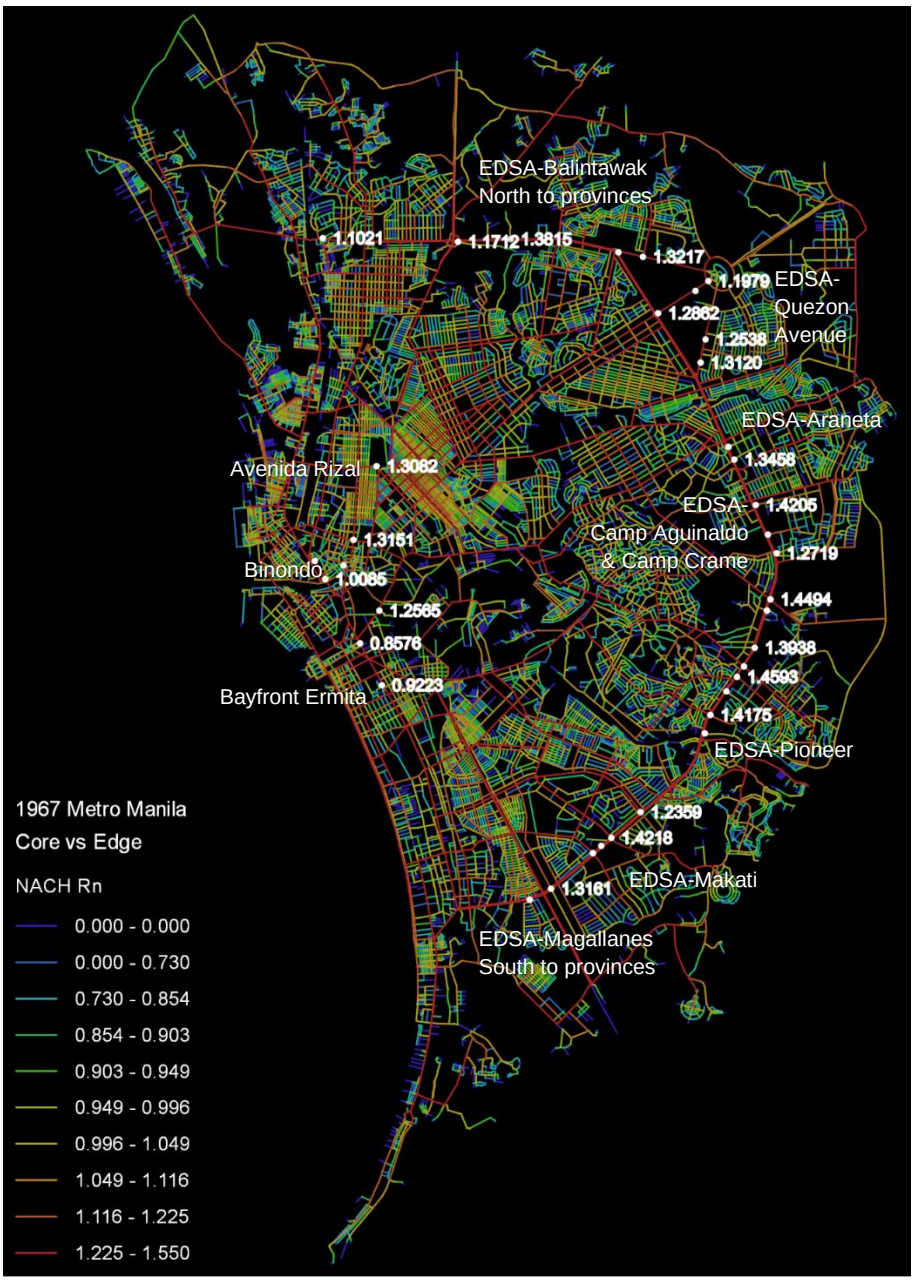


Figure 4.41: 1967 Spatial Graph of Metro Manila, NACH Rn, showing higher global route choice values along Circumferential Road 4/Epifanio Delos Santos Avenue compared to Manila's original business district of Binondo, American Bayfront district – Ermita, and shopping district of Avenida Rizal. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

The fragmentation of Metro Manila points to the emergent dualities of Manila's former surrounding *encomiendas* as they undergo development as suburbs. The new capital to the northeast, became Quezon City with its workers housing projects (Pante, 2017). And Makati to the southeast, was developed as a private estate under the Ayala Corporation. Makati catered to the old-rich and middle-class families seeking to leave Manila's devastated bayfront districts (Garrido, 2013).

Murphy and Hogan (2012, p.26) point out that past catastrophic events leading to the destruction of cities, such as the Great Fire of London (discussed by Hanson, 1989; and expounded on by Karimi, 2012) and the fires that devastated San Francisco and Chicago (both re-planned afterwards by Daniel Burnham) have been impetus for a flowering of civic spirit amongst wealthy private interests to rebuild and improve on their cities – Manila's elite, on the other hand, in an exercise of private interest, sought to move away from the devastated heart of Manila, and leave rebuilding it to the government.

Quezon City was planned with grand avenues, and outsized super-blocks scaled for cars (See Fig 4.42). Officially dedicated in 1948, with initial plans laid out before World War 2. It predates the new postwar capitals of the world (such as Brasilia and Abuja), and attempts to cast aside the colonial elitism of Intramuros and Manila by becoming a city for workers (Pante, 2017). The modern capitals it preceded have similar socialist and modernising intentions and were likewise grandly scaled for vehicles.

Figure 4.42: Proposed Plan for the Capital City (Quezon City) – by Harry Frost et al. accessed 21 July 2019. from: < https://www.rappler.com/newsbreak/iq/71703-revisiting-quezon-city-master-plans>

The Art-Deco Quezon Memorial (See Fig. 4.43), the elliptical park (See Fig. 4.44) and Commonwealth avenue leading to the Proposed New Government Centre was supposed to symbolically mark the city and define a grand civic processional (Buerza, 2014), the same way the Arc du Triomphe does for Paris, but because of the oversized scale, this instead, mimics car-oriented suburbs (Connel, 1999; and Garrido, 2013), reproducing the aspirational affluence and mass consumption of the American Dream.

Figure 4.43: Quezon Memorial Shrine by Federico Illustre. accessed 6 August 2019. from: < http://malacanang.gov.ph/76249-visit-the-quezon-memorial-shrine-and-museum-online/ >

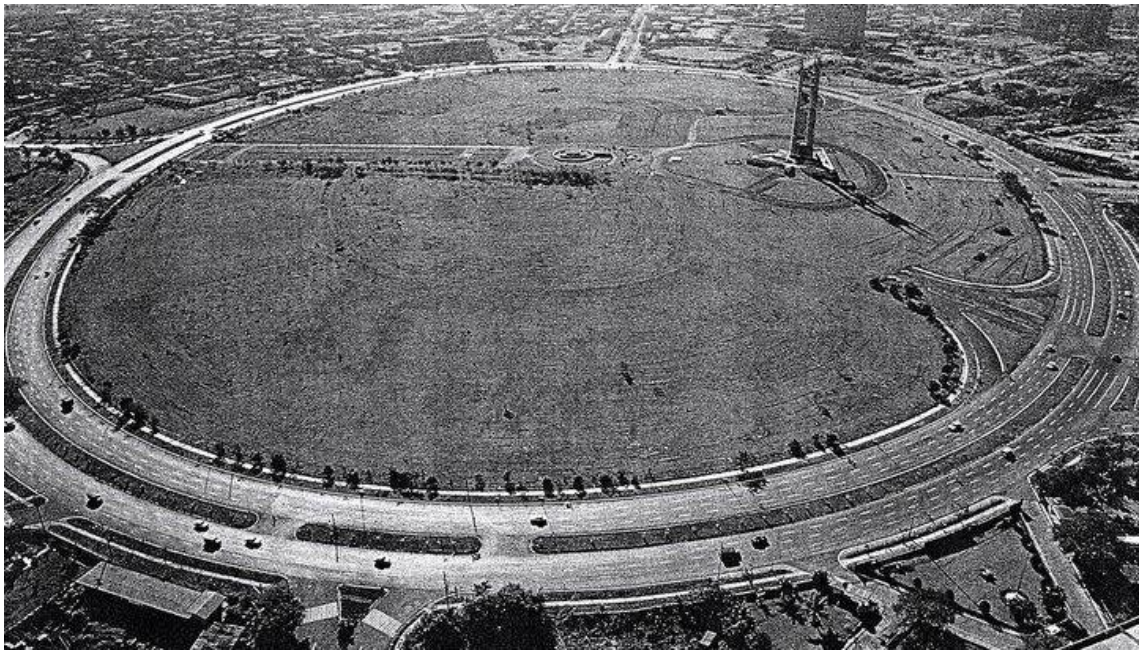


Figure 4.44: Quezon Elliptical Circle, 1960s with 8 lanes of roads surrounding it. The median has since been removed and converted into additional lanes. accessed 6 August 2019. from: < https://retroscope.ph/1000/01/01/quezon-memorial-circle/ >

The large scale of the north and east triangle blocks and the adjacent elliptical blocks were allocated for the proposed government institutions to be sited in Quezon City. Their low levels of angular integration (NAIN) (See Fig4.45a below and Fig. 4.45b next page) echoes the grand civic geometries of social reproduction discussed by Hillier (2001) and Oramas-Dorta (2012).

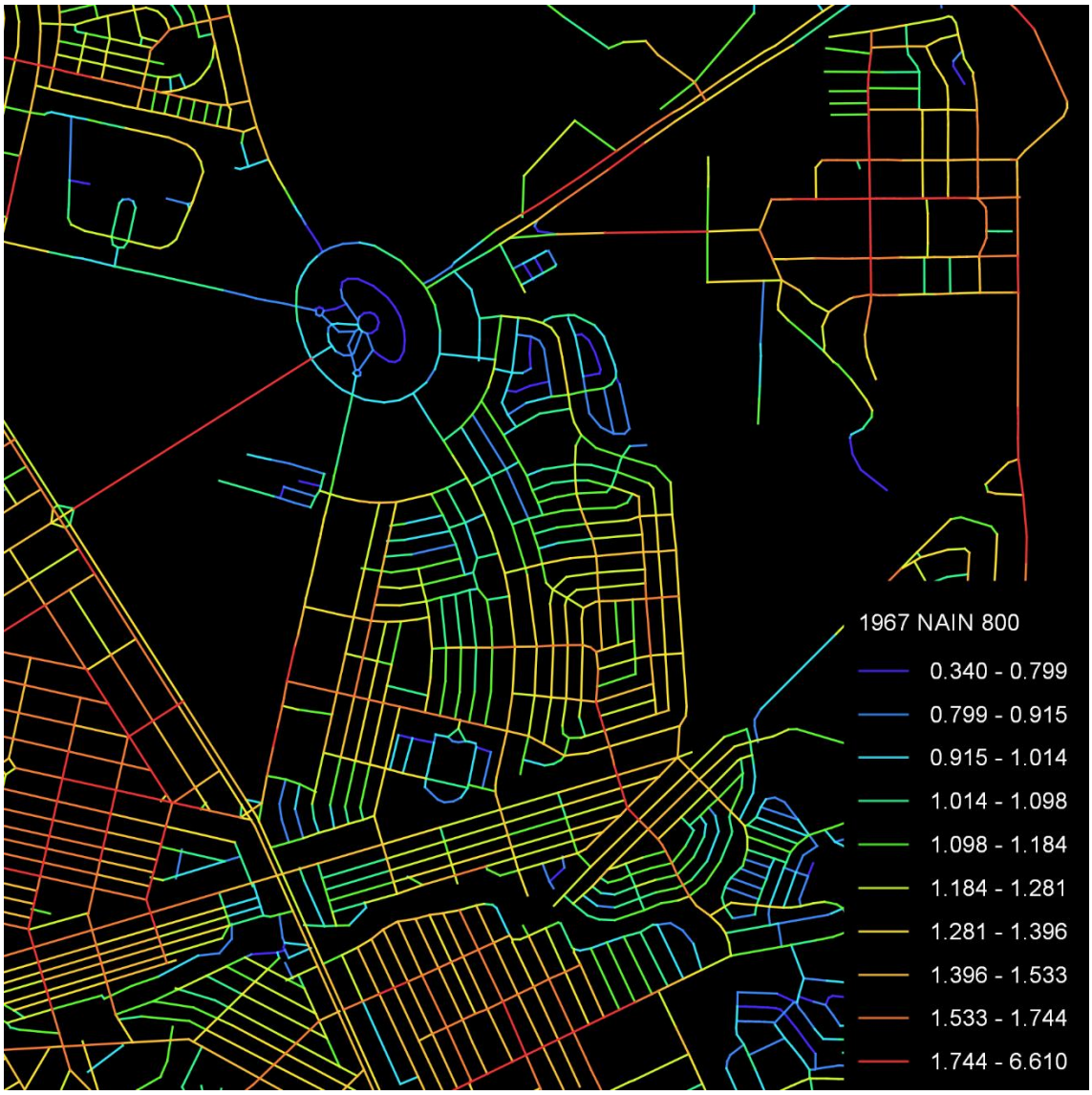


Figure 4.45a: 1967 Spatial Graph of Metro Manila: Quezon City, NAIN 800, showing lack of pedestrian integration in and around the Elliptical/Triangle blocks. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

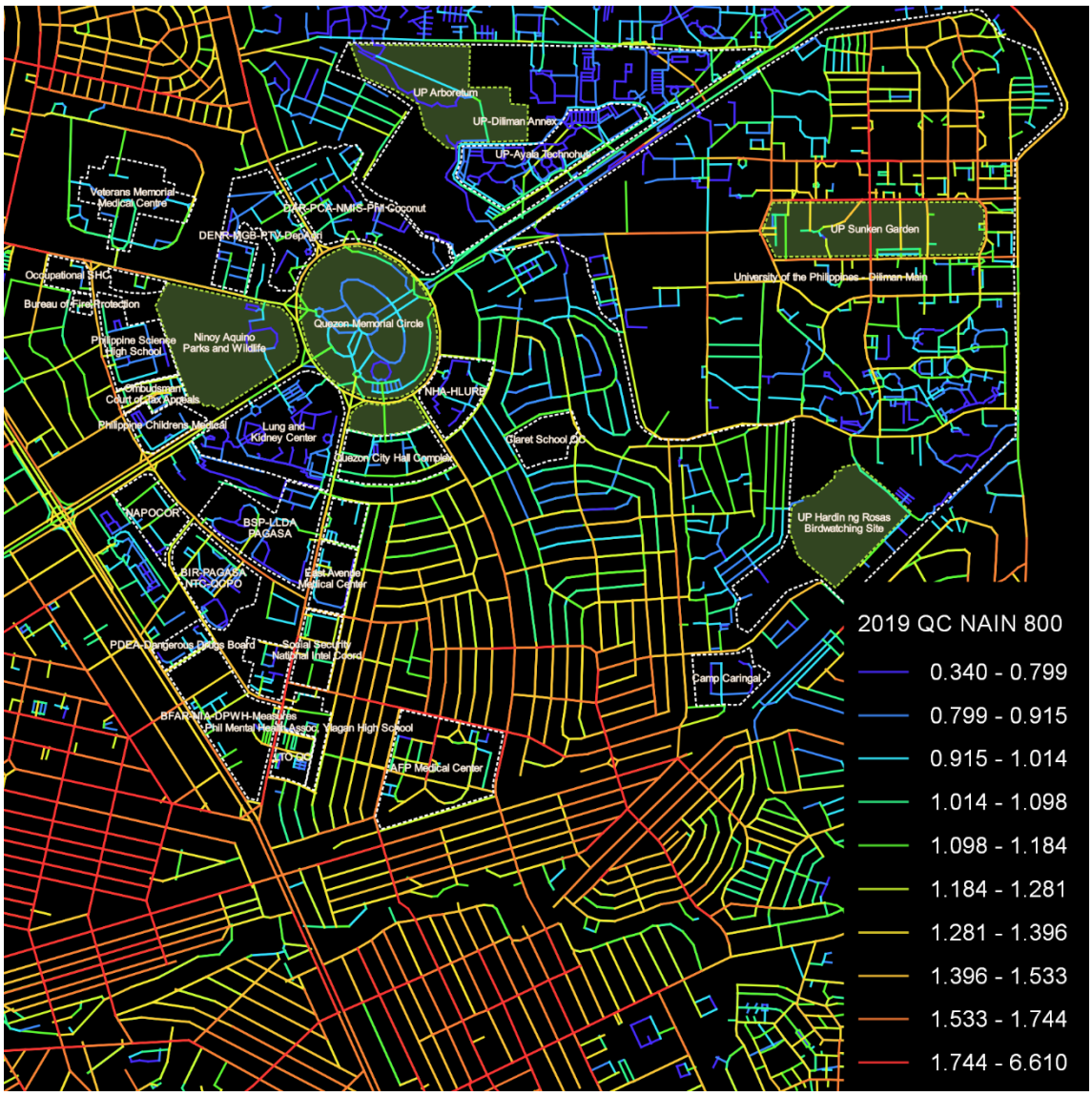


Figure 4.45b: 2019 Spatial Graph of Metro Manila: Quezon City, NAIN 800, showing present-day Government Agencies and their respective enclaves. The Elliptical/Triangle blocks behave like separate enclaves, disconnected from pedestrian circulation. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

Quezon City by 1967 also shows the spatial outcome, of the public housing programme instituted by Philippine postwar administrations. These housing projects were planned along the edges of Quezon City adjoining Manila and neighbouring towns. These formed a perimeter to the formal elliptical and triangular geometry of Quezon City's civic heart.

Although planned as an “open” worker’s city (See Fig. 4.46), it becomes host to the country’s first private gated residential enclave: Philam Life Village completed in 1947 (Pante, 2018, p. 15-38). Perhaps the fences and gates became imperative to sell the private development in the midst of public housing projects?

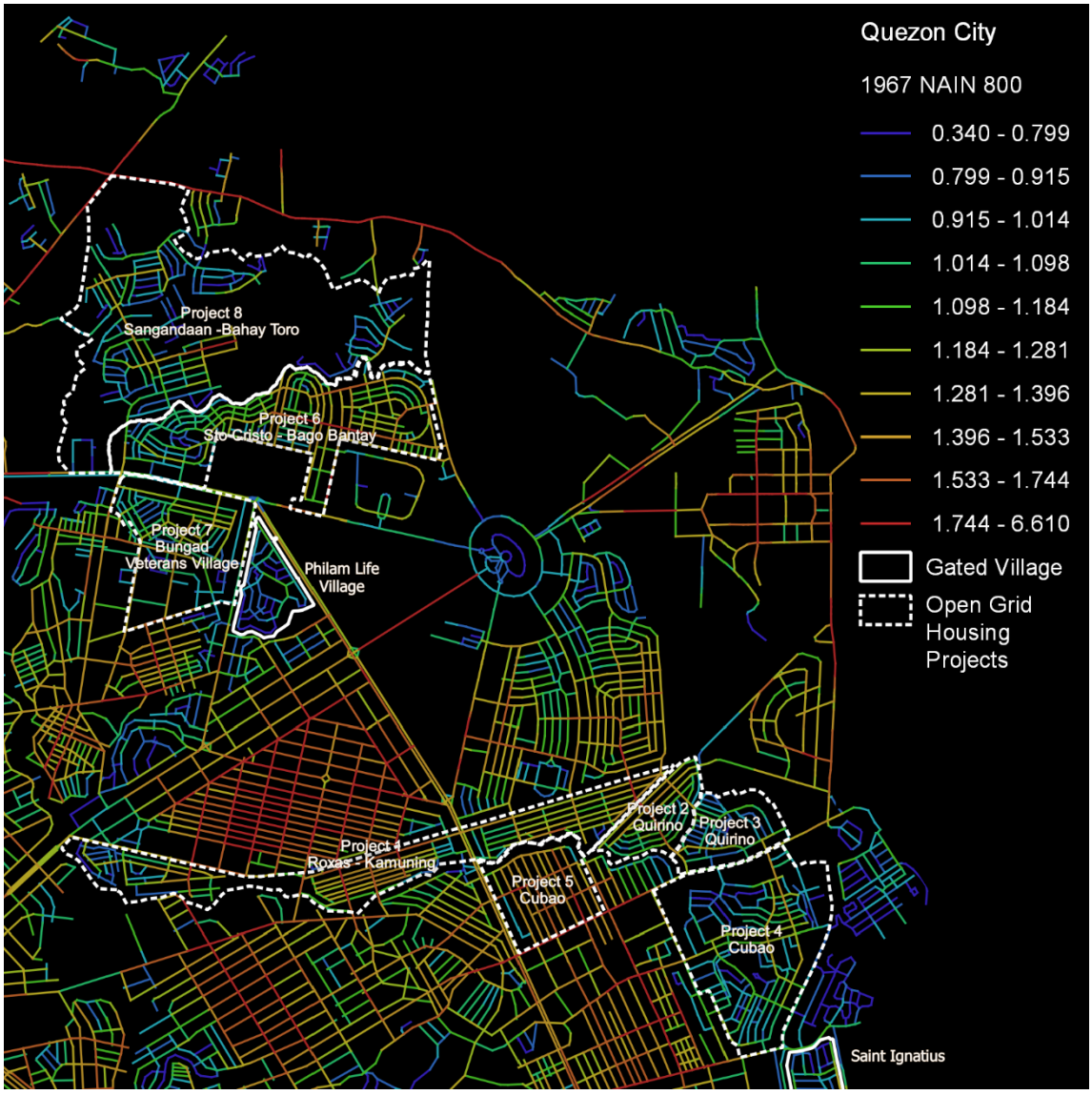


Figure 4.46: 1967 Spatial Graph of Metro Manila: Quezon City, NAIN 800, showing government public housing projects in Quezon City, and Philamlife Village, the 1st planned gated community. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

This signals another form of enclave urbanism, the development of the *encomiendas/haciendas* into gated villages. Philamlife is followed by Makati’s Villages, Greenhills, and the Valle Verde Belt (Murphy and Hogan, 2012, p. 17; Garrido, 2013, p. 171-172).

Initially formed to keep post-war communist guerrillas out, these now keep their residents safe from burglary and kidnapping syndicates. Comparing these villages with the housing projects, one can see how the gated villages are planned for cars, and not for pedestrians (see Fig. 4.47a below; Fig. 4.47b next page; Fig. 4.47c and Table 4.10, p. 103).

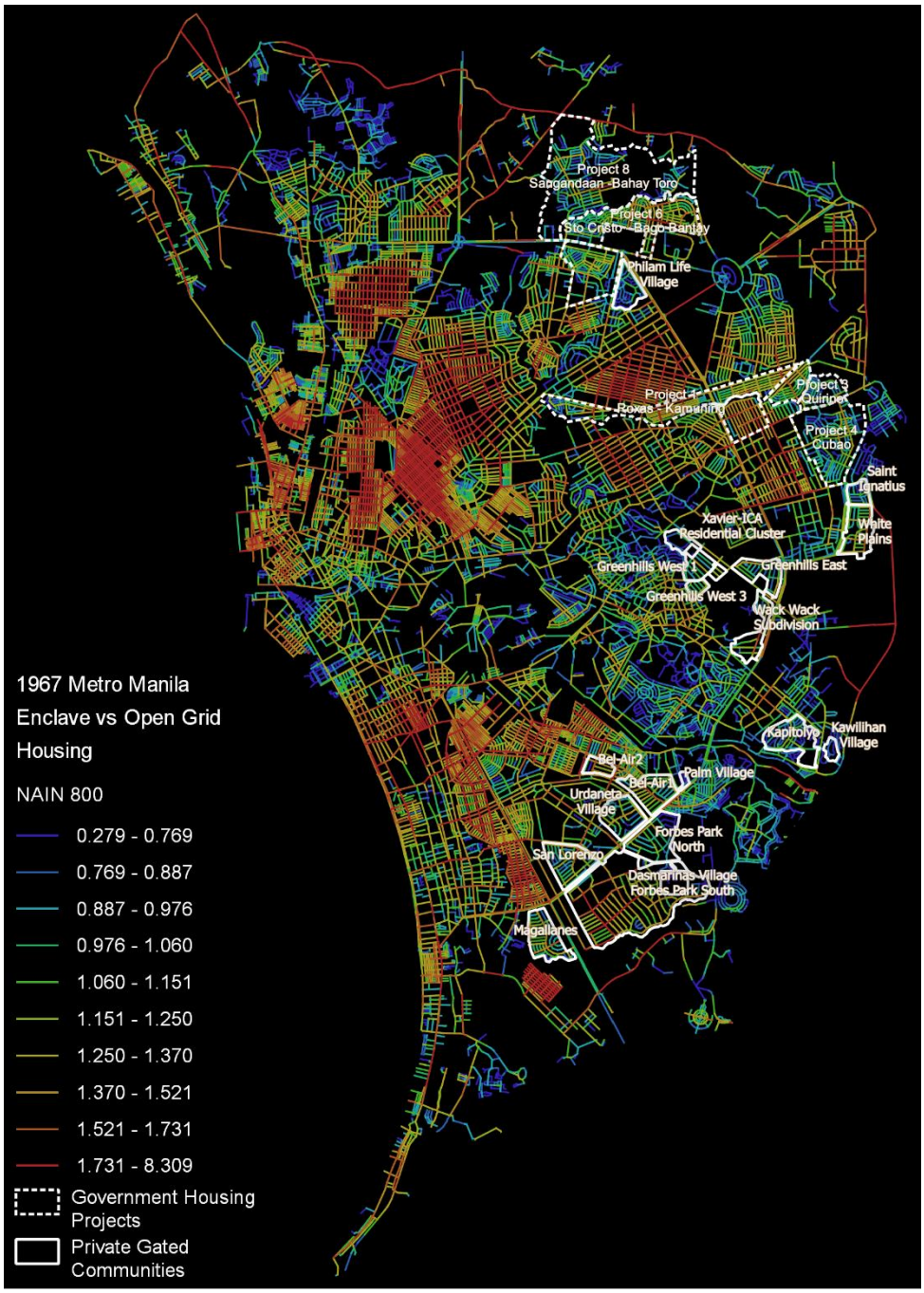


Figure 4.47a: 1967 Spatial Graph of Metro Manila: NAIN 800, showing government public housing projects in Quezon City, vs gated communities within the former haciendas to the south. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

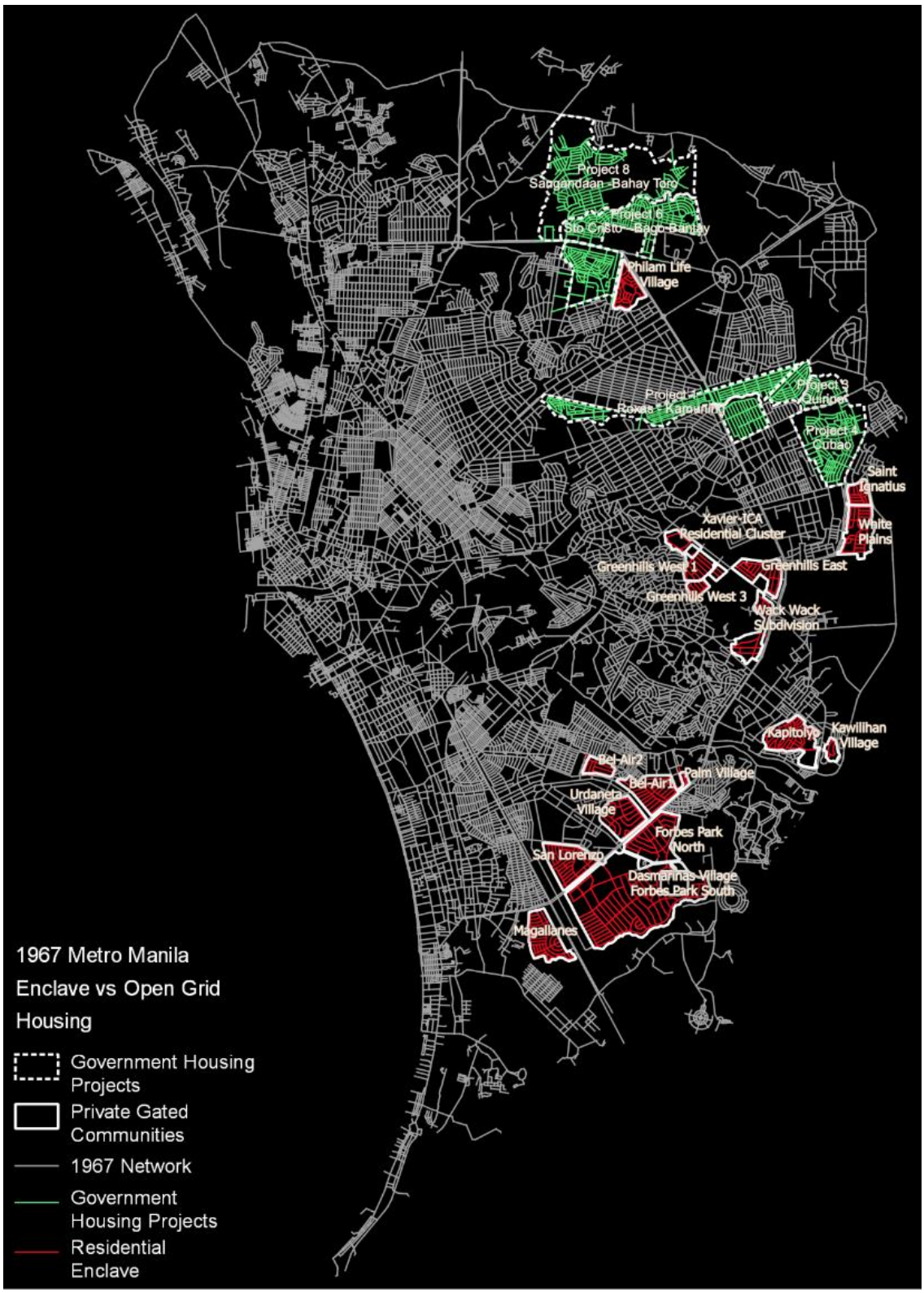


Figure 4.47b: Chart Legend: 1967 Spatial Graph of Metro Manila: showing government housing projects vs residential enclaves. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

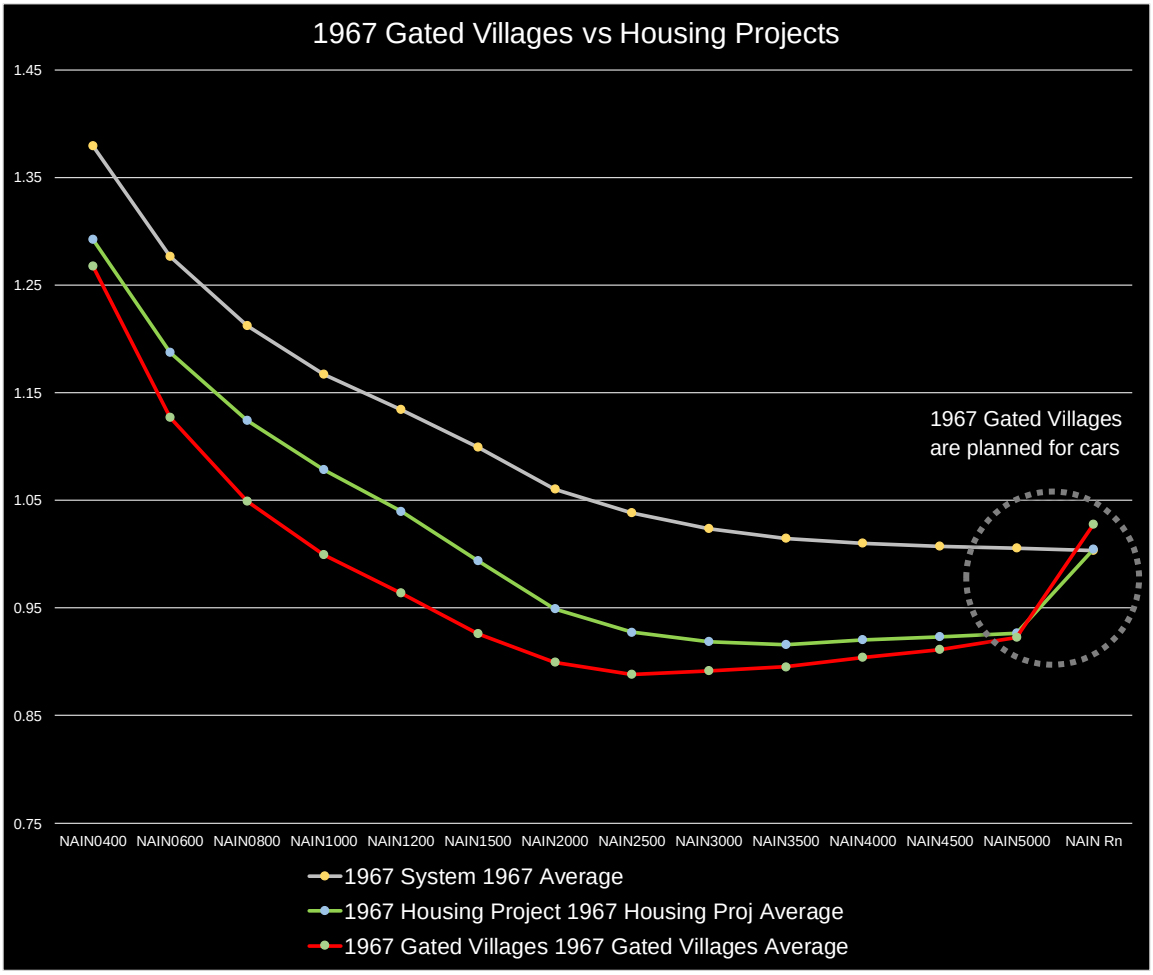


Figure 4.47c: Chart Comparison: 1967 Spatial Graph of Metro Manila, average NAIN Values for Gated Villages vs Housing Projects vs 1967 System. showing how the gated villages all have lower spatial integration values, except for Rn, which indicates reliance on vehicular access. Analysed using Depthmap X *by depthmap X development team,* UCL.

1967 Residential	NAIN0400	NAIN0600	NAIN0800	NAIN1000	NAIN1200	NAIN1500	NAIN2000	NAIN2500	NAIN3000	NAIN3500	NAIN4000	NAIN4500	NAIN5000	NAIN Rn
1967 System	1.37897	1.27655	1.21198	1.16681	1.13436	1.09917	1.06009	1.03837	1.02376	1.01450	1.00999	1.00717	1.00573	1.00325
1967 Housing Project	1.29206	1.18714	1.12419	1.07831	1.03969	0.99379	0.94929	0.92736	0.91868	0.91568	0.92038	0.92316	0.92631	1.00441
1967 Gated Villages	1.26756	1.12692	1.04900	0.99946	0.96379	0.92597	0.89953	0.88844	0.89154	0.89522	0.90405	0.91125	0.92275	1.02768

Table 4.10: 1967 Spatial Graph of Manila, NAIN Values for Gated Villages vs Housing Projects vs 1967 System. showing how the gated villages all have lower spatial integration values, except for Rn, which indicates reliance on vehicular access. Analysed using Depthmap X *by depthmap X development team,* UCL

Symbolically, the former site of America's Camp Murphy, gets renamed as bases for the Philippine Constabulary (Camp Crame) and Armed Forces (Camp Aguinaldo). Projecting power against the provincial communist insurgency. These previous fringe outposts become prime land with C4/EDSA (See Fig. 4.48, next page) becoming more spatially integrated with higher global angular integration values (NAIN Rn).

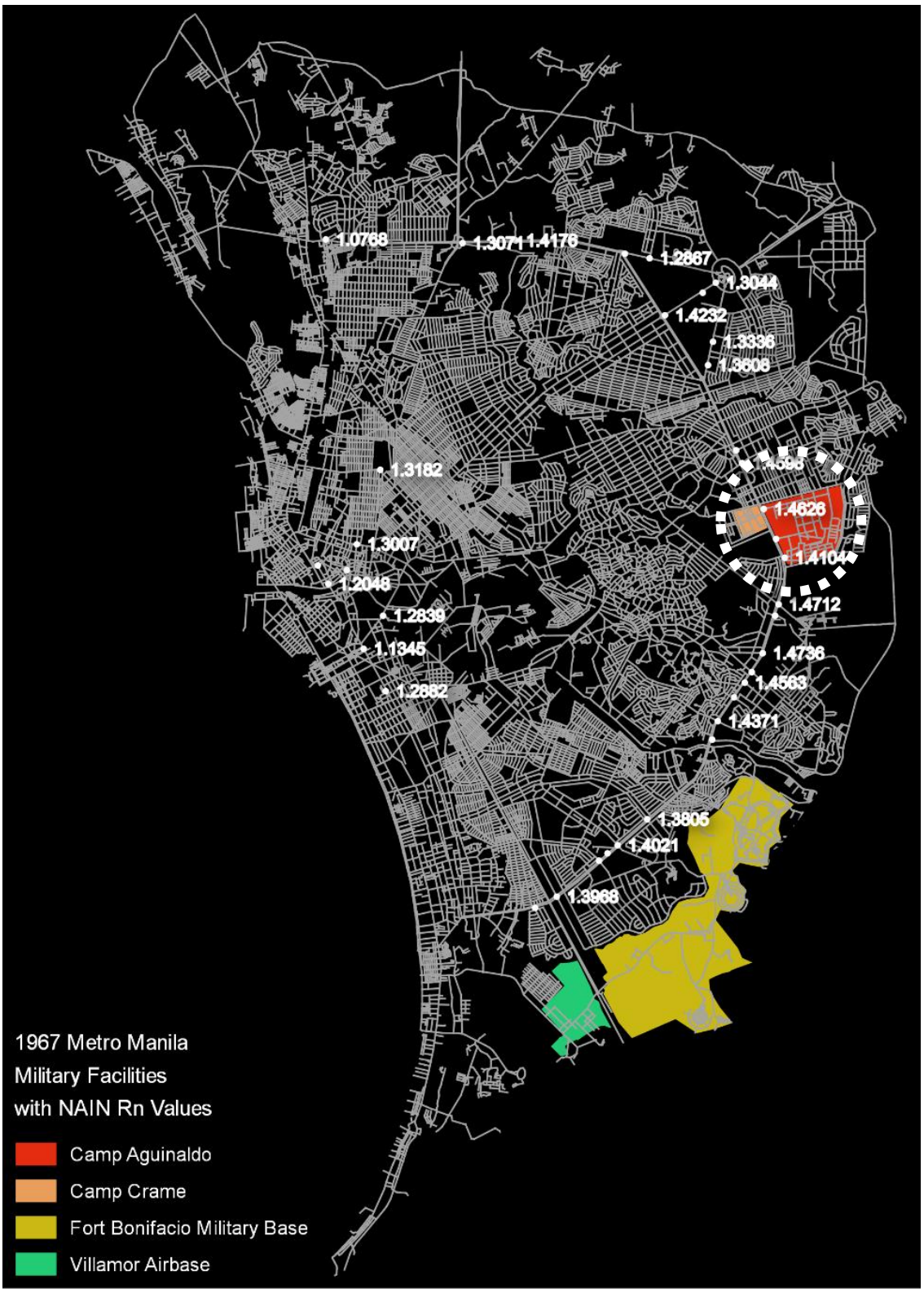


Figure 4.48: 1967 Spatial Graph of Metro Manila with NAIN Rn Values for C4/EDSA vs Old Manila, and underlay of Military Facilities, showing how these facilities have become primely located along the C4/EDSA corridor. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

These were central during Marcos' Martial Law dictatorship. He used the Constabulary and Armed Forces as his means of subduing dissent and projecting power over Manila's populace. During his downfall in the 1986 EDSA People Power Revolution (See Fig. 4.49a-b), C4/EDSA became the stage for protests against Marcos. This presents how the edge has superseded the centre of Manila's National Mall for civic action (Porio, 2009).

Figure 4.49a (left): Protesters assembling in front of Camp Aguinaldo's Main Entrance along C4/EDSA during the EDSA People Power Revolution of 1986 by Joe Galvez, GMA News. accessed 6 August 2019. from: < http://www.positivelyfilipino.com/magazine/30-years-ago-coup-detat>

Figure 4.49b (right): Hundreds of thousands of people during the height of EDSA People Power Revolution, February 1986. by Joe de Vera, in *People Power: The Philippine Revolution of 1986: An eyewitness history.* accessed 6 August 2019. from: <https://en.wikipedia.org/wiki/People_Power_Revolution#/media/File:EDSA_Revolution_pic1.jpg >

Makati to the south becomes the opposite of Quezon's city for workers. Makati's exclusive villages were planned around the Ayala shopping centre and the office business district of Ayala Avenue, Makati Avenue and Paseo de Roxas formerly Nielson Airfield's runways (See Fig. 4.50a-b).

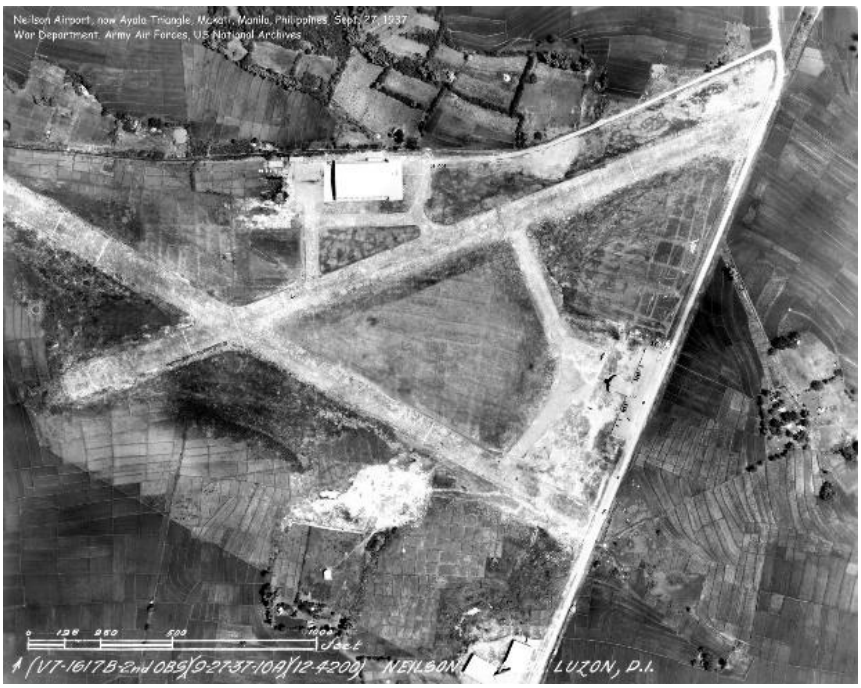


Figure 4.50a (left): Nielson Airport, Makati, Manila, Philippines, 27 Sept. 1937. War Department, Army Air Forces, US National Archives accessed 12 August 2019. from: < https://www.flickr.com/photos/johntewell/42293772602>

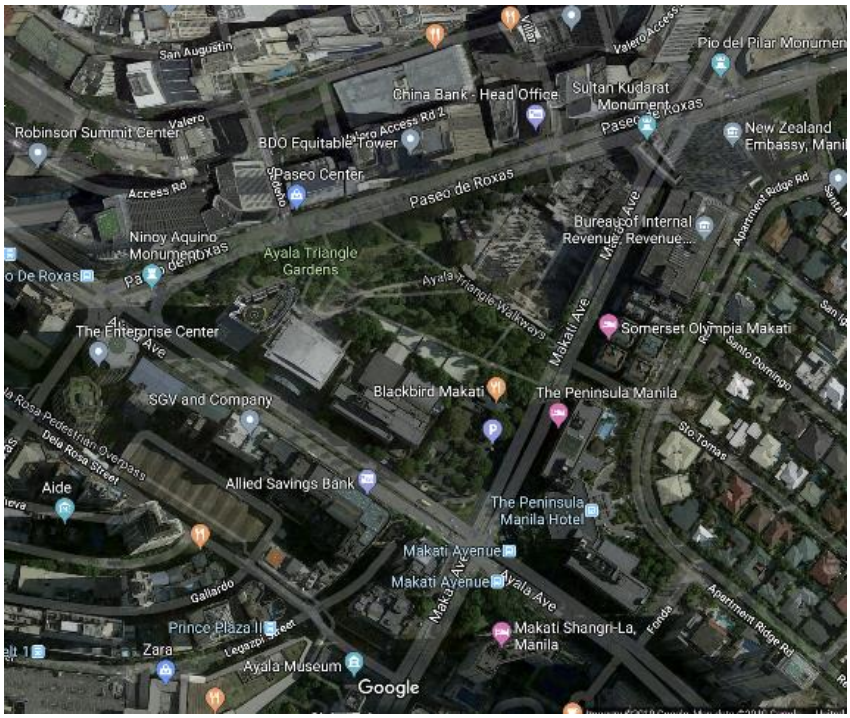


Figure 4.50b (right): Ayala Triangle, 2019. Annotated Satellite Photo by *Google Maps.* accessed 12 August 2019. from: < https://www.google.com/maps/@14.5563576,121.0236428,706m/data=!3m1!1e3>

Makati was the Edge City that came to define Metro Manila's C4/EDSA corridor (See Fig. 4.51), it was followed by similar districts developed by the successor corporations of the family-owned *haciendas*. The Araneta Centre (See Fig. 4.52) in Quezon City; and later on, Greenhills (See Fig. 4.53) and Ortigas Centre (See Fig. 4.54).

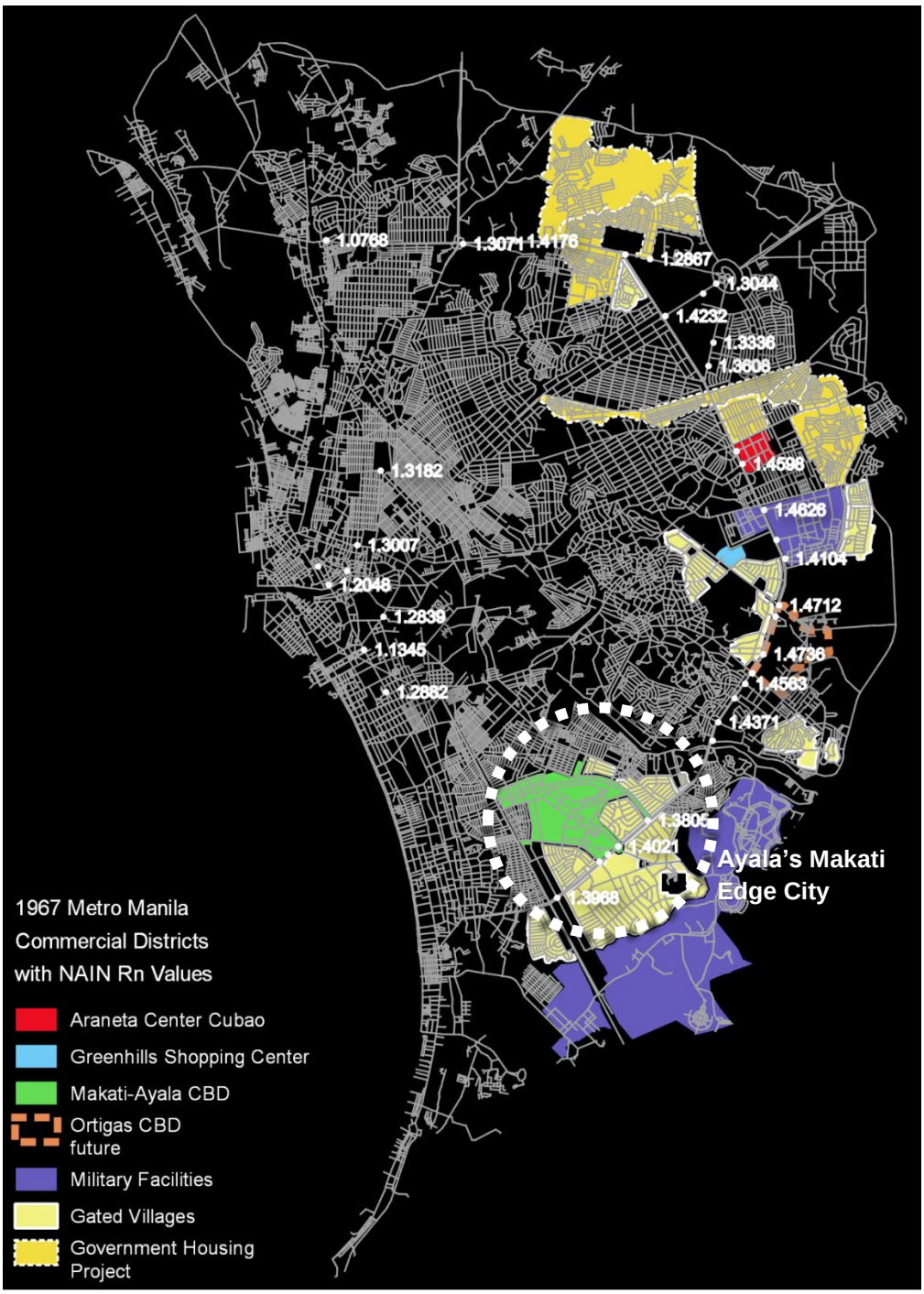


Figure 4.51: 1967 Spatial Graph of Metro Manila with NAIN Rn Values for C4/EDSA vs Old Manila, and underlay of Commercial Districts, Residential Subdivisions and Military Facilities. along the C4/EDSA corridor. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

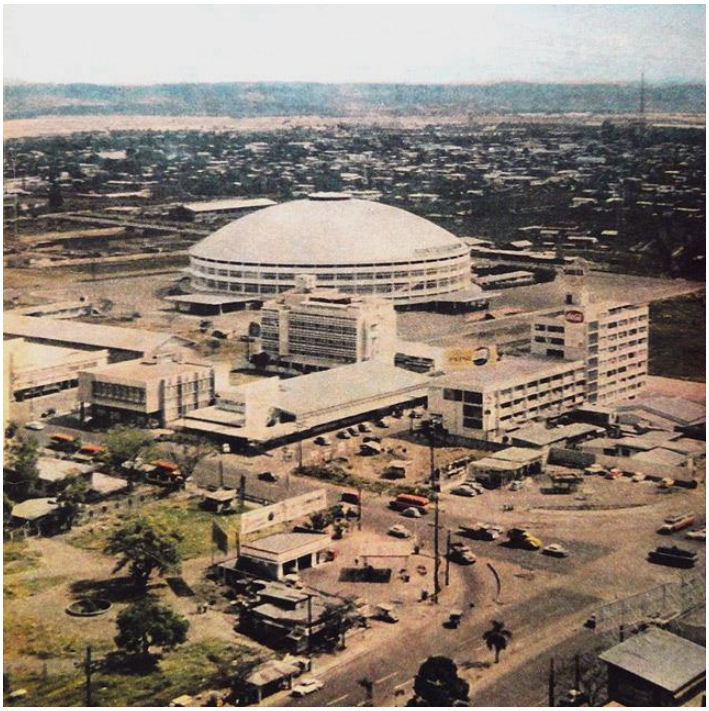


Figure 4.52 (top): Araneta Centre, Cubao, Quezon City, showing the Araneta Coliseum, site of Muhammad Ali vs. Joe Frazier "Thrilla in Manila," 1 October 1975. by Evaristo F. Nievera, *Sunday Times Magazine: "Quezon City Boom Town,"* 29 September 1963. accessed 12 August 2019. from: < https://www.flickr.com/photos/johntewell/42293772602>

Figure 4.53 (middle): Greenhills Shopping Centre, late 1970s. accessed 12 August 2019. from: < https://oldmanila.org/2018/02/12/old-greenhills-memories/>

Figure 4.54 (bottom): Ortigas Centre, Meralco Building, late 1970s. accessed 12 August 2019. from: < https://www.pinterest.co.uk/pin/841469511602519794/?lp=true>

Manila's post-war private suburbs, prioritised social and physical order and conformity in the gated villages and manicured gardens and golf courses within them. Instead of Manila's urban structure resurfacing with clarity from the rubble of destruction, what emerged was the indelible mark of the privatised order imposed on the land in the form of the Spanish colonial *encomienda/hacienda* system (Murphy and Hogan, 2012; See Fig. 4.57).

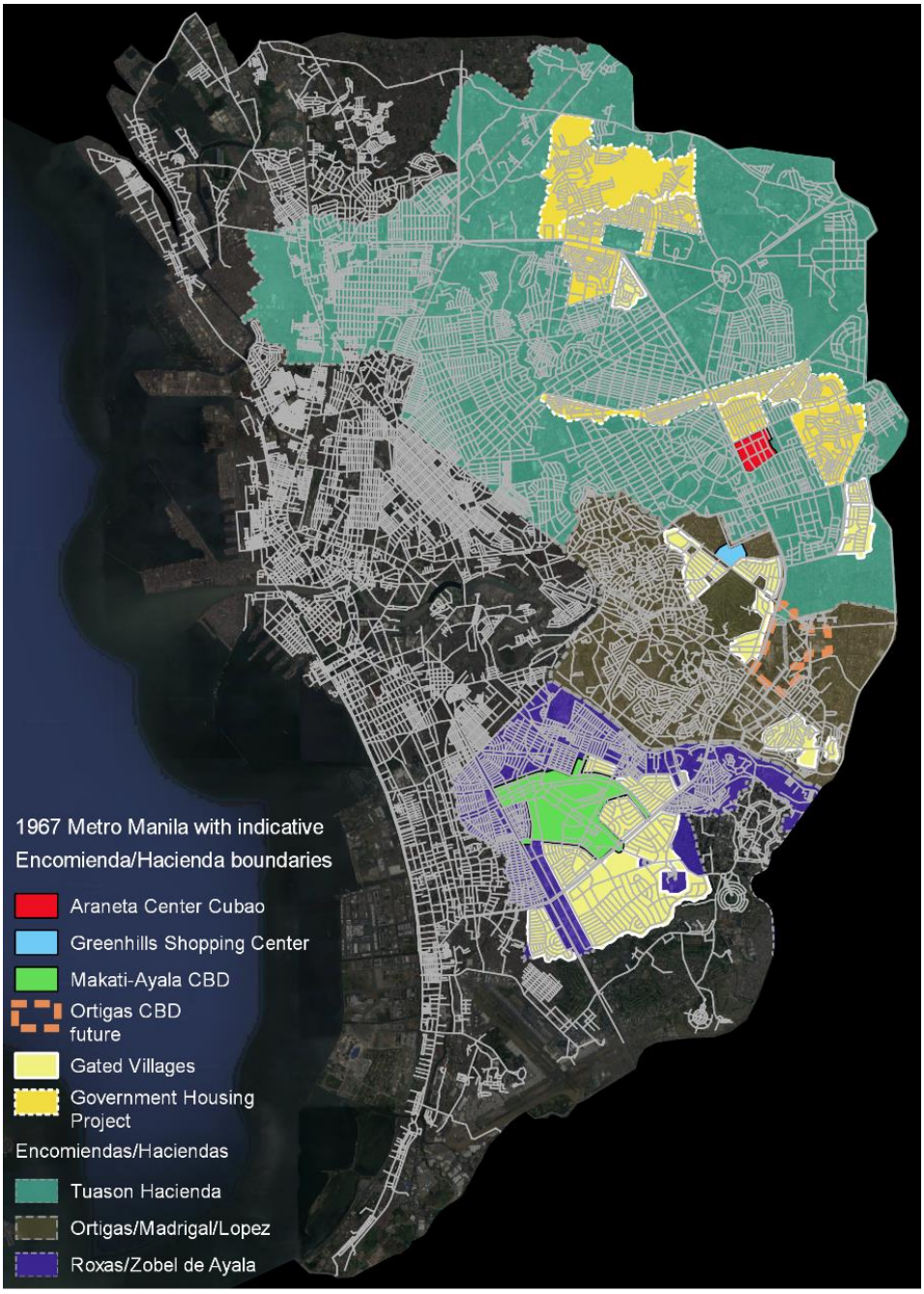


Figure 4.57: 1967 Spatial Graph of Metro Manila with underlay of Commercial Districts, Residential Subdivisions along the C4/EDSA corridor, and indicative boundaries of original encomiendas/haciendas. Drawn by author *using QGIS* from: Metropolitan Manila 1967 – Land-use and Road Networks overlaid on Topography. North and south halves of Metro Manila. Published by: Board of Technical Surveys and Maps, Republic of the Philippines from: British Library Map Room. accessed 23 July 2019.

Chapter 5. 2019 Metro Manila's Enclave Sub/Urbanism and the prospects for change

The fall of the 20-year Marcos dictatorship in 1986 brought economic ruin to the Philippines. As a replacement to foreign investment, Government's formalised policy of labour export has grown the Filipino diaspora (Tyner, 2000, p. 63-64), with millions employed overseas and offshore. They remit foreign currency to their respective families back home to fund their daily expenses, education, and home investment.

Ortega (2018) highlights how this mass-migration has sprawled the suburban and exurban residential fringes of Metro Manila from its core within the C4/EDSA corridor outward and beyond to its neighbouring provinces (See Fig. 5.1), as overseas worker families bought their own plot of the suburban dream.

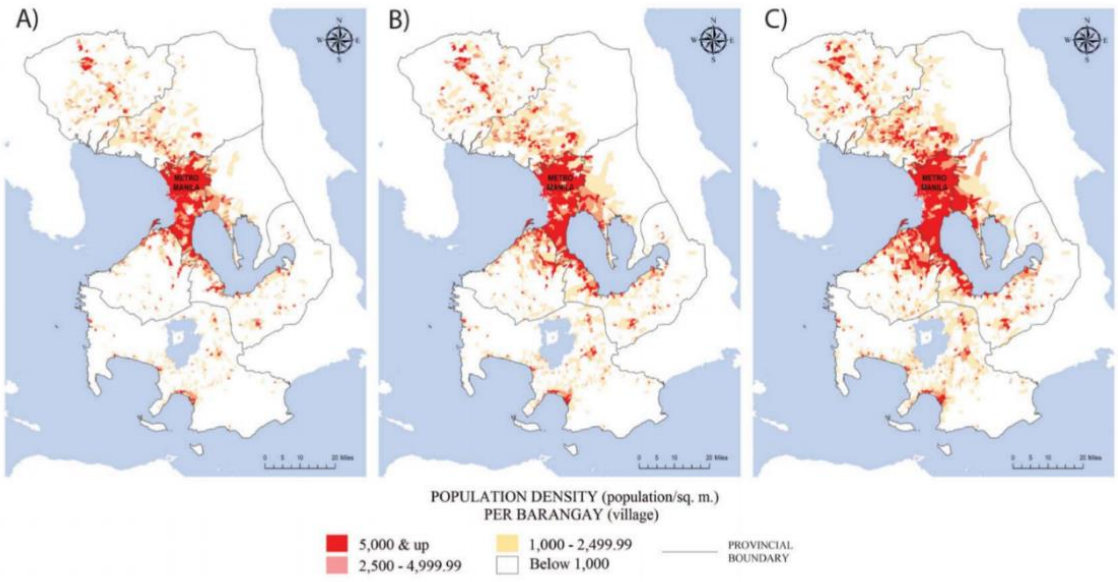


Figure 3. Demographic spillover and suburban growth of Manila: (A) 1990; (B) 2000; (C) 2010. (Color figure available online.)

Figure 5.1: "Demographic spillover and suburban growth of Manila" accessed 12 August 2019. from p. 13 of Ortega, A.A.C. (2018) Transnational Suburbia: Spatialities of Gated Suburbs and Filipino Diaspora in Manila's Periurban Fringe. *Annals of the American Association of Geographers*, *108*(1), pp.106-124. DOI: 10.1080/24694452.2017.1352482

This is supplemented by the growth of the Philippines' Business Process Outsourcing (BPO) sector in the past two decades (Mitra, 2013, p. 6-8). Filipinos readily took to English-speaking voice and support jobs which multinational corporations offshored for cost efficiency.

Because of differing time zones between the Philippines, North America, and Western Europe, previously sleepy after-hours office districts in Makati and Ortigas were remade by their tenants and workers into 24-7 cities tethered by extranational telecom infrastructure (Easterling, 2014) to the different overseas clients they serviced.

These socio-economic currents layer onto the historical pattern of enclave urbanism in Metro Manila's core and manifest themselves onto the new mixed-use enclaves and CBDs along the C4/EDSA corridor. This has compelled the same enclave developers to intensify uses within their estates, implementing greyfield suburban retrofits (Dunham-Jones and Willamson, 2008), upgrading utilities, increasing plot ratio densities, and transforming the edge cities (Sultana, 2011) of Makati, Ortigas, Greenhills and Araneta into full-blown Mixed-Use Central Business Districts and Vertical Enclaves.

This happens in parallel with the neoliberal shift described by Theodore et al (2011), wherein the Philippine government (to fund debt servicing and spur investment) privatises large tracts of state land in and around Metro Manila. This led to a mix of public-private partnerships and privately led mixed-use enclave projects from land re/development (Ortega, 2016; Shatkin, 2004, p. 391-394; Murphy and Hogan, 2012, p. 19; Kleibert, 2018, p. 477-480).

Examples of these include (see Fig. 5.2, next page, and Appendix D and E, p. 179-180) Bonifacio Global City, McKinley Hill and McKinley West in Taguig (from the redeveloped Fort Bonifacio military base), Rockwell Centre (brownfield redevelopment of former powerplant), the SM Mall of Asia Complex and PAGCOR Entertainment City (mixed-use and casino/gaming developments built on land reclaimed from Manila Bay).

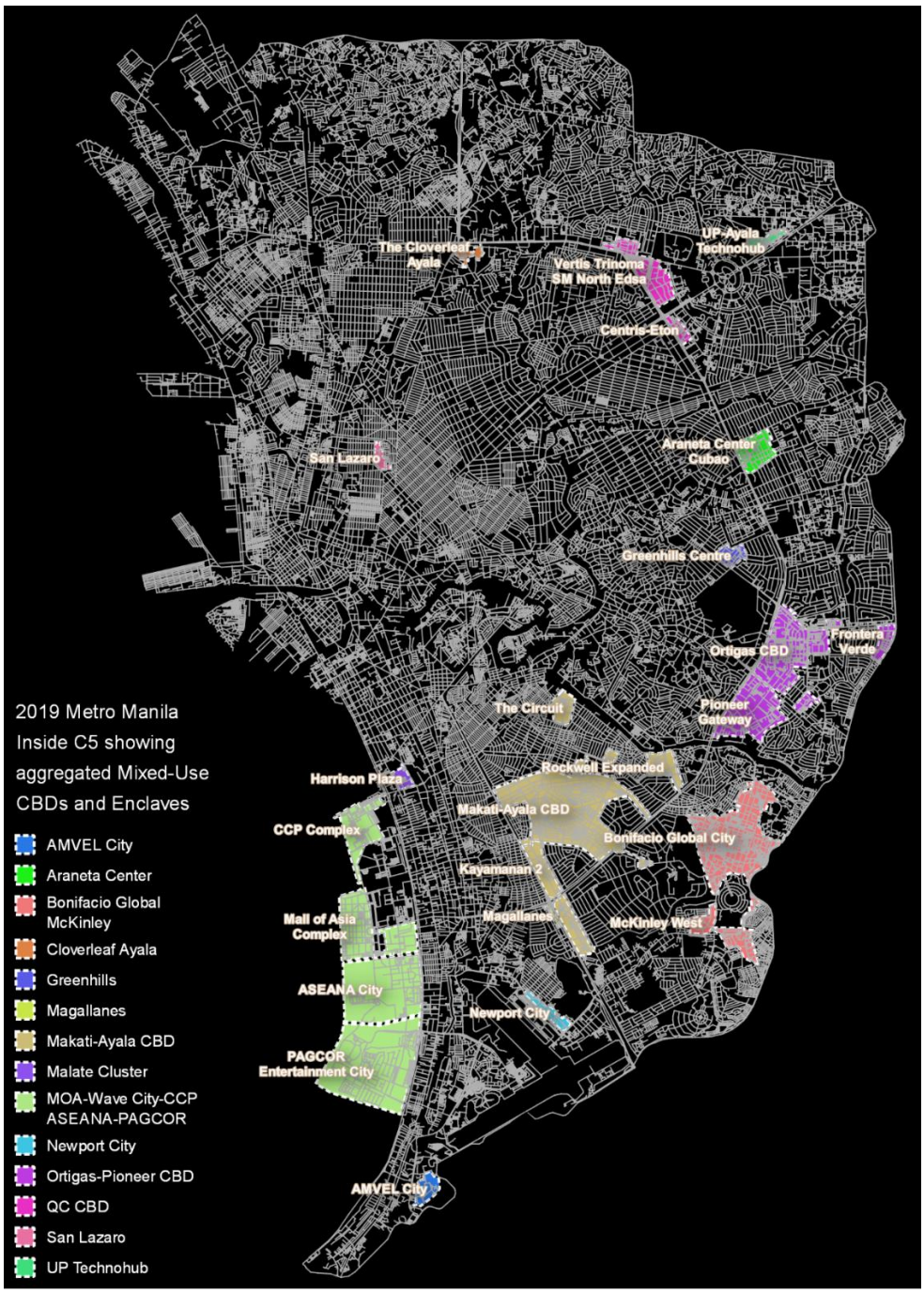


Figure 5.2: 2019 Spatial Graph of Metro Manila within Circumferential 5 Road, showing Mixed-Use Central Business Districts and Enclaves aggregated by location. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Remaking the metropolitan landscape, these enclaves are globally connected with high mean NACH values across all movement ranges (See Fig. 5.3, next page and Table 5.1, p. 114), and high mean NAIN values for vehicular movement (See Fig. 5.4, next page and Table 5.2, p. 114); Yet are locally segregated, with low mean NAIN values for pedestrian movement (See Fig. 5.4, next page and Table 5.2, p. 114). These enclaves are isolated islands of production and consumption (Corpuz, 2000; Smith, 2002).

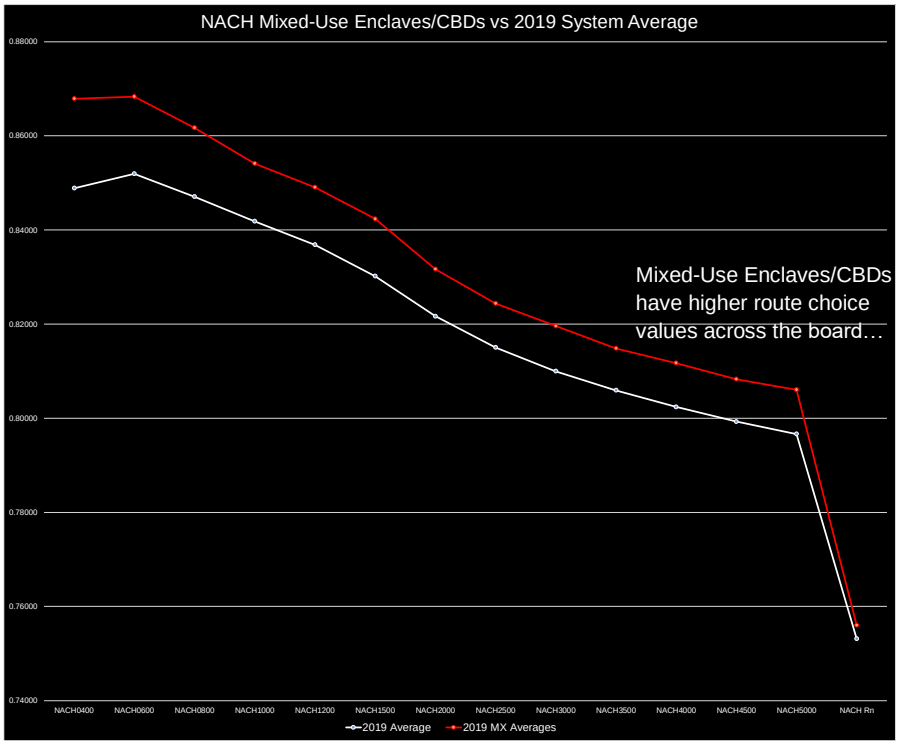


Figure 5.3a: Chart Comparison: 2019 Spatial Graph of Metro Manila, average NACH Values for Mixed Use Commercial Enclaves / CBDs vs 2019 System. showing how the Mixed-use enclaves/CBDs have on-average higher NACH / route choice values compared to the rest of Metro Manila, indicating how they are along/within important routes within Metro Manila's systems. Analysed using Depthmap X *by depthmap X development team,* UCL.

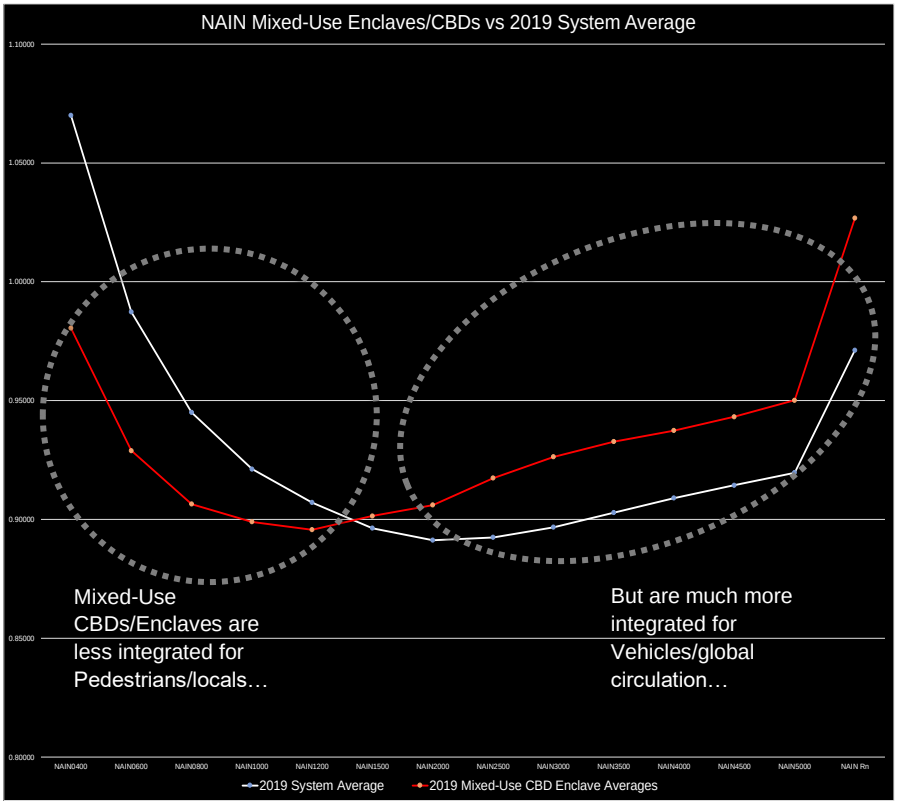


Figure 5.3b: Chart Comparison: 2019 Spatial Graph of Metro Manila, average NAIN Values for Mixed Use Commercial Enclaves / CBDs vs 2019 System. showing how the Mixed-use enclaves/CBDs have on-average lower pedestrian/local integration values (from NAIN 400 – 1200) compared to the rest of Metro Manila, and then conversely, higher vehicular/global integration values – this indicates how these Mixed-Use CBDs and Enclaves are skewed toward attracting vehicular traffic. Analysed using Depthmap X *by depthmap X development team,* UCL.

Mixed-Use Districts/Enclaves	NACH0400	NACH0600	NACH0800	NACH1000	NACH1200	NACH1500	NACH2000	NACH2500	NACH3000	NACH3500	NACH4000	NACH4500	NACH5000	NACH Rn
AMVEL City	0.95254	0.92564	0.90358	0.88826	0.87828	0.86938	0.85181	0.83292	0.81449	0.79997	0.79247	0.78782	0.78896	0.73484
Araneta Center	0.92128	0.91460	0.91273	0.90972	0.90308	0.89245	0.87436	0.86326	0.86101	0.85975	0.85437	0.84726	0.84183	0.79016
Bonifacio Global-McKinley Average	0.89898	0.89152	0.88529	0.87933	0.87201	0.86455	0.86339	0.86143	0.85728	0.85406	0.84975	0.84622	0.84384	0.80284
Cloverleaf Ayala	0.86669	0.86224	0.84352	0.82886	0.82527	0.83189	0.81393	0.80576	0.80961	0.80764	0.80805	0.81305	0.81319	0.76313
Greenhills	0.82272	0.83069	0.83293	0.83399	0.83709	0.82762	0.81556	0.79772	0.78474	0.77752	0.77662	0.77625	0.77592	0.73477
Magallanes	0.59465	0.61919	0.61247	0.60274	0.63867	0.64830	0.63472	0.62942	0.62352	0.62433	0.62460	0.62605	0.62438	0.59775
Makati-Ayala CBD Average	0.77986	0.78740	0.77843	0.77385	0.76899	0.75973	0.75118	0.74574	0.74413	0.74081	0.73891	0.73691	0.73474	0.69210
Malate Cluster	0.74537	0.72939	0.71378	0.71724	0.71018	0.70599	0.69782	0.69446	0.69219	0.68926	0.68621	0.68250	0.68050	0.63617
MOA-Wave City-CCP-Aseana-PAGCOR Average	0.79595	0.79761	0.79503	0.78946	0.78612	0.78123	0.77357	0.76656	0.76177	0.75781	0.75518	0.75101	0.74778	0.69236
Newport City	0.89883	0.90446	0.90458	0.89517	0.88806	0.88293	0.87939	0.85831	0.85139	0.84604	0.84235	0.83532	0.83134	0.79126
Ortigas-Pioneer CBD Average	0.85203	0.83742	0.82689	0.81551	0.81076	0.79935	0.79338	0.78819	0.78437	0.78011	0.78061	0.77906	0.77925	0.73525
QC CBD Average	0.92173	0.93209	0.92574	0.91695	0.90727	0.89677	0.88148	0.87445	0.86870	0.86666	0.85965	0.85309	0.85029	0.80412
San Lazaro	0.95414	0.99714	1.01112	1.00149	0.98403	0.98770	0.95275	0.94223	0.93426	0.92174	0.91304	0.90892	0.90510	0.81908
UP Technohub	0.93340	0.90169	0.88479	0.86853	0.85785	0.84953	0.83820	0.84072	0.83556	0.82389	0.81580	0.80323	0.79761	0.75029
2019 Average	**0.84885**	**0.85195**	**0.84707**	**0.84185**	**0.83684**	**0.83015**	**0.82166**	**0.81502**	**0.80995**	**0.80592**	**0.80239**	**0.79928**	**0.79662**	**0.75310**
2019 Mixed-Use CBD Enclave Averages (NACH)	**0.86787**	**0.86832**	**0.86171**	**0.85409**	**0.84908**	**0.84236**	**0.83164**	**0.82435**	**0.81960**	**0.81483**	**0.81170**	**0.80829**	**0.80604**	**0.75601**

Table 5.1: 2019 Spatial Graph of Manila, NACH Values for Aggregated Mixed-Use Enclaves vs 2019 System. Analysed using Depthmap X *by depthmap X development team,* UCL

Mixed-Use Districts / Sub-Enclaves	NAIN0400	NAIN0600	NAIN0800	NAIN1000	NAIN1200	NAIN1500	NAIN2000	NAIN2500	NAIN3000	NAIN3500	NAIN4000	NAIN4500	NAIN5000	NAIN Rn
AMVEL City	0.85493	0.74523	0.70953	0.68842	0.67403	0.65752	0.65895	0.63484	0.61364	0.59746	0.58866	0.55805	0.56495	0.73873
Araneta Center	1.03530	1.07003	1.08736	1.08258	1.08611	1.08556	1.04636	1.05305	1.07724	1.10389	1.11342	1.10030	1.09139	1.15702
Bonifacio Global-McKinley Average	0.96459	0.87501	0.83596	0.81469	0.78653	0.76223	0.75846	0.75974	0.75430	0.75208	0.74862	0.74553	0.74030	0.78312
Cloverleaf Ayala	0.92374	0.77602	0.66585	0.64338	0.64773	0.66121	0.67651	0.71922	0.75101	0.76358	0.78382	0.82197	0.85508	1.00853
Greenhills	0.93447	0.86210	0.84601	0.83608	0.83228	0.81109	0.79734	0.80753	0.82047	0.83303	0.85042	0.88081	0.90225	1.05949
Magallanes	0.78405	0.64207	0.61599	0.64581	0.67525	0.72047	0.71282	0.70882	0.71239	0.72867	0.75931	0.80485	0.82642	0.99149
Makati-Ayala CBD Average	1.09016	1.05673	1.01650	0.98123	0.95529	0.93688	0.94340	0.95460	0.96736	0.96445	0.96525	0.97296	0.97639	1.05721
Harrison Plaza	0.88149	0.86776	0.84476	0.88276	0.90803	0.97129	1.05790	1.11558	1.15377	1.17718	1.20190	1.20358	1.20704	1.07143
MOA-Wave City-CCP-Aseana-PAGCOR Average	0.96828	0.90438	0.88707	0.87903	0.87298	0.87945	0.88719	0.89021	0.90040	0.91935	0.93414	0.94488	0.95452	0.99173
Newport City	0.97117	0.96788	0.96980	0.94912	0.93945	0.91826	0.85641	0.79198	0.75139	0.73248	0.72137	0.71546	0.71100	0.83860
Ortigas-Pioneer CBD Average	0.86012	0.81857	0.79959	0.79510	0.78981	0.78671	0.80828	0.83024	0.83754	0.84387	0.84557	0.84748	0.85920	1.00601
QC CBD Average	0.93137	0.87590	0.84647	0.83372	0.83838	0.84256	0.85753	0.88266	0.89964	0.91341	0.91254	0.91247	0.92139	1.10540
San Lazaro	0.98519	1.01633	1.08029	1.16030	1.25335	1.40350	1.38861	1.41904	1.42767	1.41589	1.39367	1.39010	1.38851	1.20504
UP Technohub	0.63028	0.59468	0.57871	0.57003	0.53857	0.50789	0.48616	0.50269	0.52364	0.53903	0.55640	0.56618	0.57201	0.66084
2019 System Average	**1.06998**	**0.98723**	**0.94496**	**0.92114**	**0.90707**	**0.89621**	**0.89127**	**0.89238**	**0.89664**	**0.90280**	**0.90894**	**0.91433**	**0.91956**	**0.97116**
2019 Mixed-Use CBD Enclave Averages (NAIN)	**0.98044**	**0.92886**	**0.90641**	**0.89895**	**0.89559**	**0.90141**	**0.90597**	**0.91730**	**0.92630**	**0.93265**	**0.93735**	**0.94314**	**0.95007**	**1.02674**

Table 5.2: 2019 Spatial Graph of Manila, NAIN Values for Aggregated Mixed-Use Enclaves vs 2019 System. Analysed using Depthmap X *by depthmap X development team,* UCL

5.1 **Unnatural Movement**

Metro Manila's patterns of mass consumption show Catering/F&B, Retail/Services, and Hotel/Accommodation Point-of-Interest (POI) data (from Open Streetmap) cluster strongly (See Fig. 5.4a-b) within these enclaves, alongside the historical business districts of Binondo and Ermita.

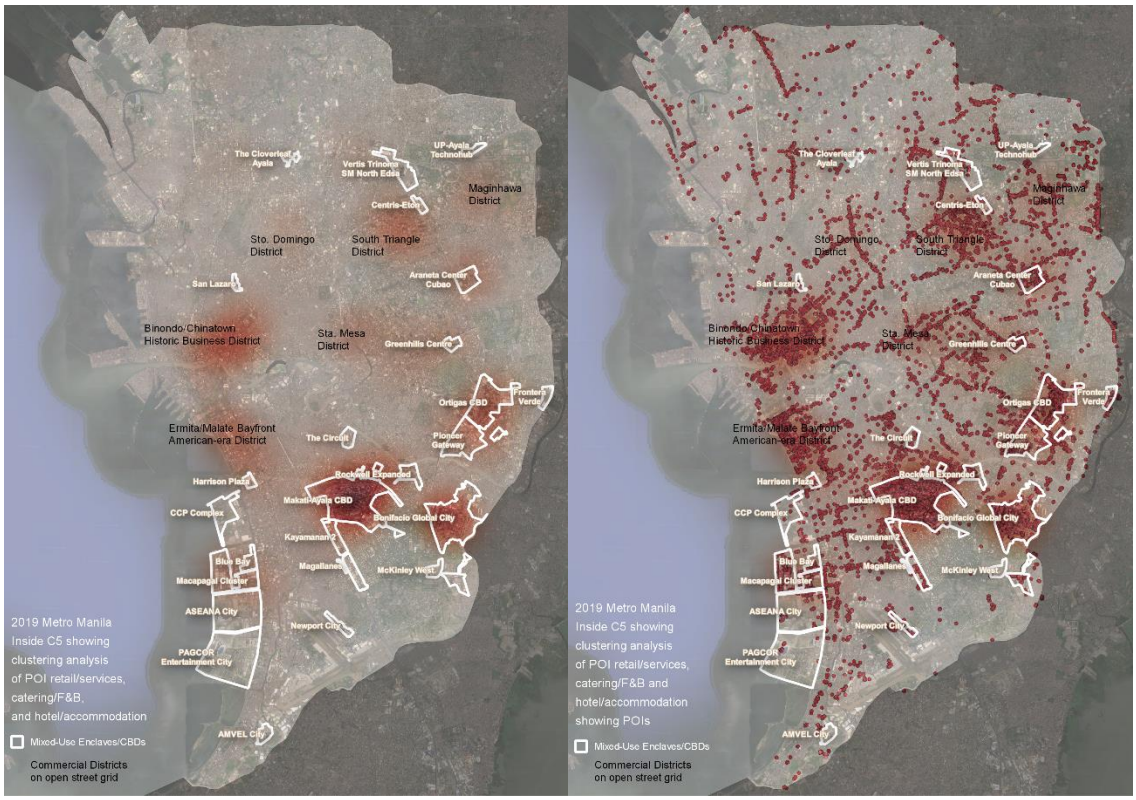


Figure 5.4a (Left): Clustering analysis/heat map of 2019 Metro Manila (inside C5) Retail/Service, Catering/F&B and Hotel/Accommodation POIs. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Figure 5.4b (Right): Catering/F&B and Hotel/Accommodation POIs (overlaid on clustering analysis). *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

However, when comparing these POI locations vs spatial accessibility using angular segment integration (NAIN), it becomes apparent how consumption within these mixed-use enclaves don't adhere to Hillier's (et al, 1993) natural movement or movement economies (Hillier, 1996). The POIs within the enclaves have lower accessibility (NAIN) values when compared to POIs outside the enclaves, whose accessibility (NAIN) values are higher because they are correlated to follow natural movement within and radiating out of Manila (See Fig. 5.5, next page and Table 5.3a-b, p. 117).

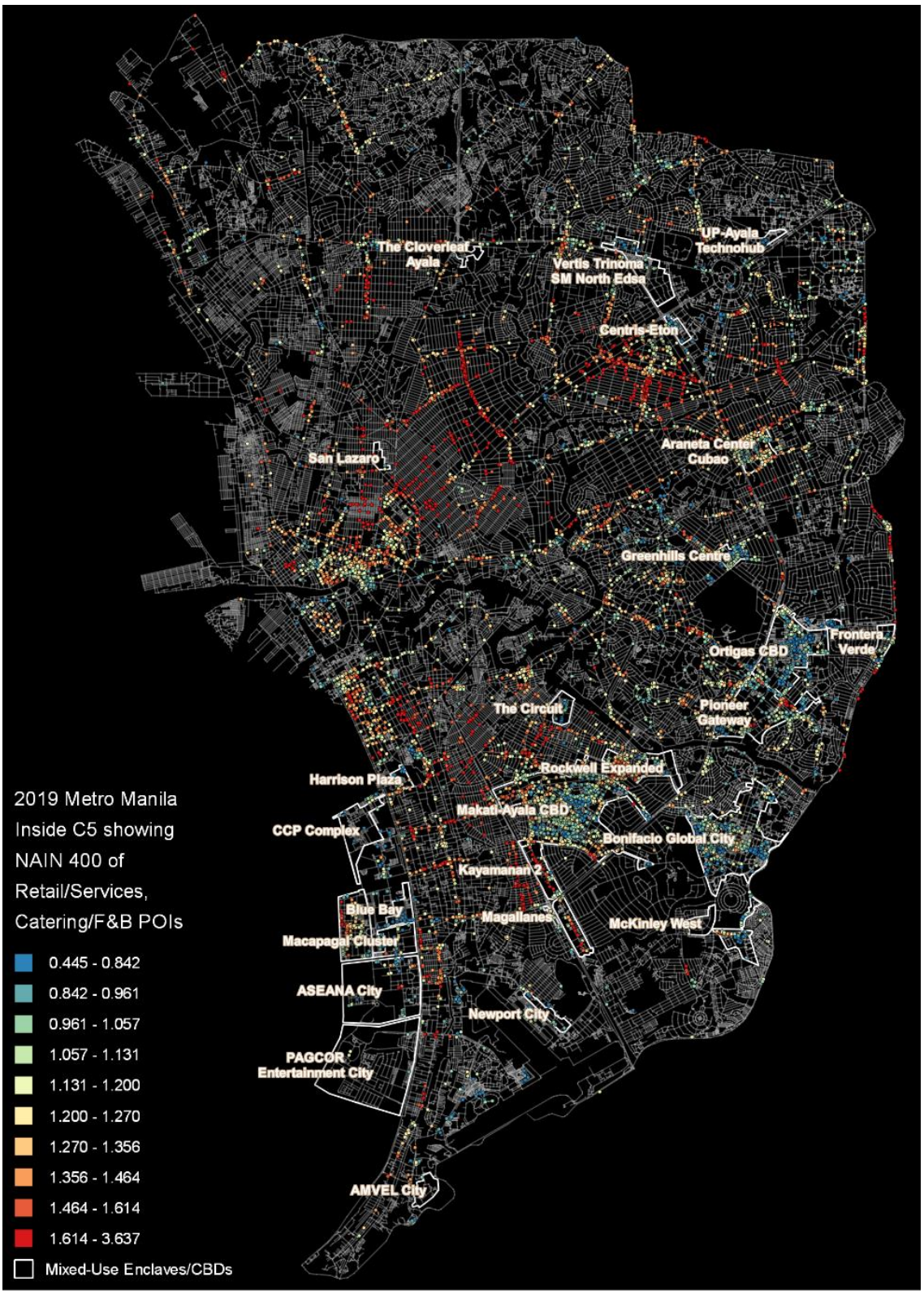


Figure 5.5: 2019 Metro Manila (inside C5) spatial graph, with overlay of Retail/Service, Catering/F&B and Hotel/Accommodation POIs showing their location's NAIN 400 values. This shows high local/pedestrian integration for POIs outside the enclaves, but low local/pedestrian integration for POIs inside the Mixed-Use Enclaves and CBDs. Analysed using Depthmap X, *by depthmap X development team,* UCL. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Correlations

		OutsideIs1	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
OutsideIs1	Pearson Correlation	1	.125**	.198**	.222**	.231**	.241**	.255**	.266**	.276**	.279**	.284**	.289**	.292**	.296**	.283**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 5. 3a: Correlations for Retail/Service and Catering/F&B POIs outside the enclaves with their corresponding location's NACH Values. This shows statistically significant, weak positive correlations with global/vehicular NACH values for these POIs representing urban consumption. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		OutsideIs1	gxIN0400	gxIN0600	gxIN0800	gxIN1000	gxIN1200	gxIN1500	gxIN2000	gxIN2500	gxIN3000	gxIN3500	gxIN4000	gxIN4500	gxIN5000	gxIN Rn
OutsideIs1	Pearson Correlation	1	.427**	.410**	.375**	.346**	.316**	.290**	.273**	.267**	.268**	.284**	.311**	.341**	.370**	.360**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 5.3b: Correlations for Retail/Service and Catering/F&B POIs outside the enclaves with their corresponding location's NAIN Values. This shows statistically significant, weak to moderate positive correlations with both local/pedestrian and global/vehicular NAIN values for these POIs representing urban consumption. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

What could be causing this anomaly within the enclaves? A look at building footprint data presents clues. The building footprints within enclaves are in the largest quantile (See Fig. 5.6). Could the POIs correspond with larger building footprints?

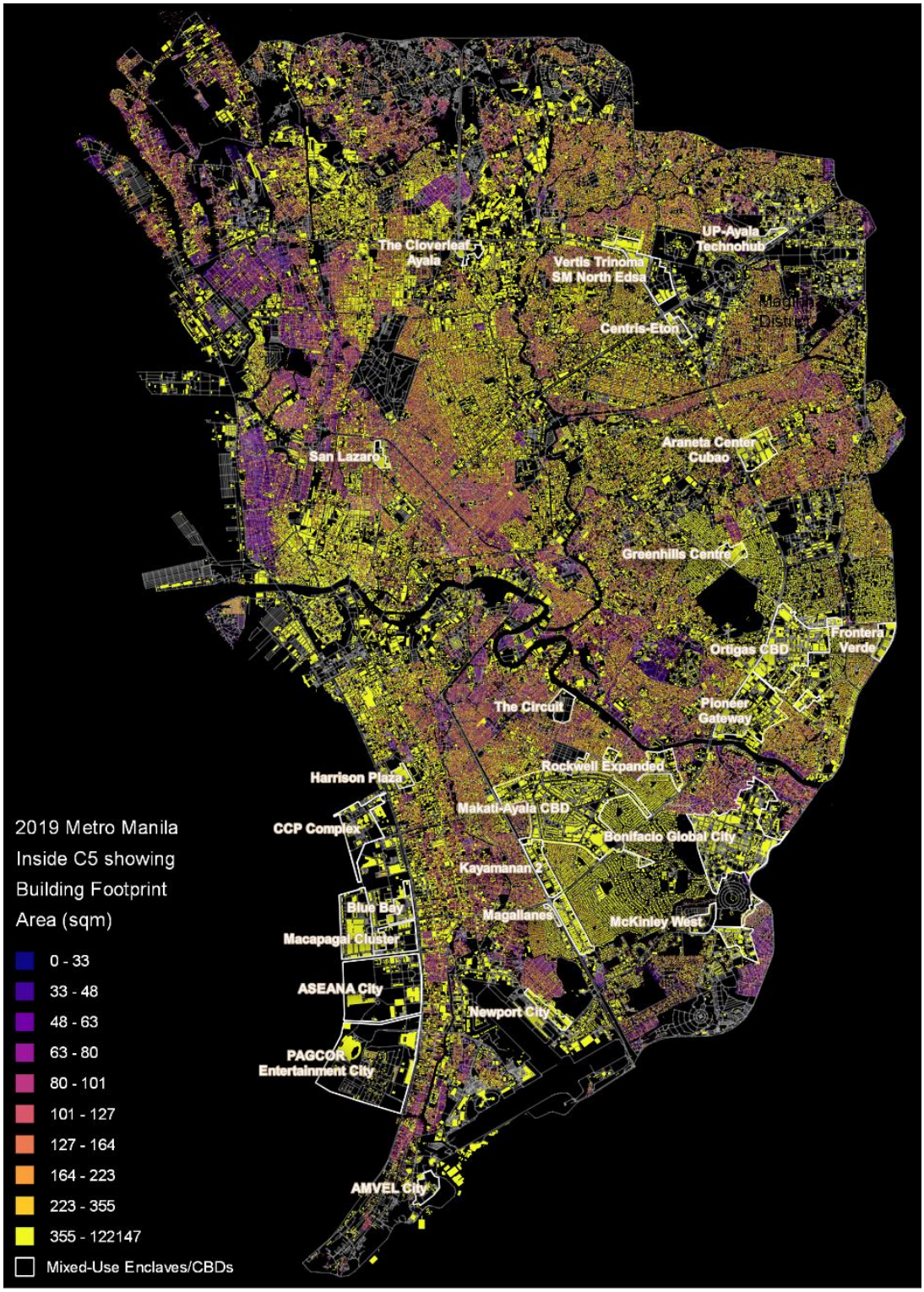


Figure 5.6: 2019 Metro Manila (inside C5) spatial graph, with overlay of Building Footprints, according to their area in square meters (sqm). This shows a coarser grain of building footprints within the Mixed-Use Enclaves and CBDs. Analysed using QGIS. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

This is confirmed by a moderate positive correlation between these POIs and the average size of the building footprint they locate in, similarly a weak to moderate negative correlation with accessibility was found for these POIs (See Fig. 5.7 and Table 5.4a-c. next page).

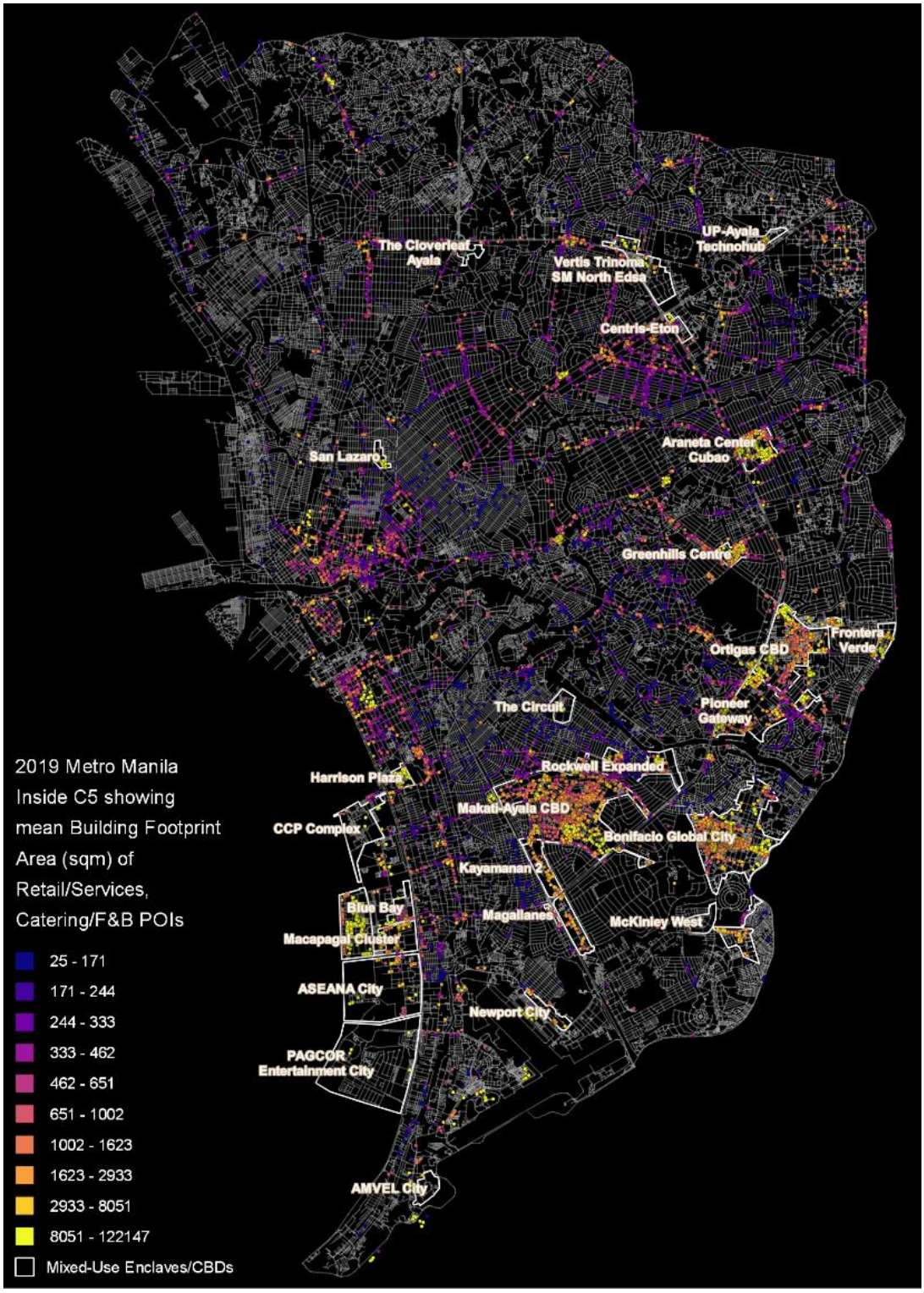


Figure 5.7: 2019 Metro Manila (inside C5) spatial graph, with overlay of Retail/Service and Catering/F&B POI locations with their corresponding Building Footprints, classified according to their area in square meters (sqm). This shows that the POIs within the Mixed-Use Enclaves/CBDs are within larger building footprints. Analysed using QGIS. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Correlations

		Insideis1	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
Insideis1	Pearson Correlation	1	-.125**	-.198**	-.222**	-.231**	-.241**	-.255**	-.266**	-.276**	-.279**	-.284**	-.289**	-.292**	-.296**	-.283**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 5.4a: Correlations for Retail/Service and Catering/F&B POIs inside the enclaves with their corresponding location's NACH Values. This shows statistically significant, weak negative correlations with global/vehicular NACH values for these POIs representing urban consumption. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		Insideis1	gxIN0400	gxIN0600	gxIN0800	gxIN1000	gxIN1200	gxIN1500	gxIN2000	gxIN2500	gxIN3000	gxIN3500	gxIN4000	gxIN4500	gxIN5000	gxIN Rn
Insideis1	Pearson Correlation	1	-.427**	-.410**	-.375**	-.346**	-.316**	-.290**	-.273**	-.267**	-.268**	-.284**	-.311**	-.341**	-.370**	-.360**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	8776	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397	8397

Table 5.4b: Correlations for Retail/Service and Catering/F&B POIs inside the enclaves with their corresponding location's NAIN Values. This shows statistically significant, weak to moderate negative correlations with both local/pedestrian and global/vehicular NAIN values for these POIs representing urban consumption. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		Insideis1	meanbldgar	minbldgare	maxbldgare
Insideis1	Pearson Correlation	1	.374**	.321**	.375**
	Sig. (2-tailed)		.000	.000	.000
	N	8776	8653	8653	8653

Table 5.4c: Correlations for Retail/Service and Catering/F&B POIs inside the enclaves with their corresponding location's Building Footprint area. This shows statistically significant, weak to moderate positive correlations with the size of the Building Footprints containing these POIs representing urban consumption. Building Footprint values analysed using QGIS, and processed using IBM SPSS Statistics 25, *by IBM.*

A linear regression confirms the interrelationships of accessibility and building footprint areas to the presence of these POIs within or outside Metro Manila's mixed-use enclaves/CBDs (See Table 5.5a-c).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.366	.366	.375

a. Predictors: (Constant), maxbldgare, gxlN4500, gxlN0400, gxlN1000, meanbldgar, gxlN0800, gxlN5000

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	674.806	7	96.401	684.834	.000[b]
	Residual	1166.523	8287	.141		
	Total	1841.329	8294			

a. Dependent Variable: Insideis1

b. Predictors: (Constant), maxbldgare, gxlN4500, gxlN0400, gxlN1000, meanbldgar, gxlN0800, gxlN5000

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.299	.022		57.975	.000
	gxlN0400	-.495	.025	-.310	-19.471	.000
	gxlN0800	-.436	.067	-.267	-6.560	.000
	gxlN1000	.560	.067	.335	8.362	.000
	gxlN4500	3.513	.145	1.888	24.265	.000
	gxlN5000	-4.010	.146	-2.089	-27.459	.000
	meanbldgar	1.166E-5	.000	.174	7.042	.000
	maxbldgare	7.456E-6	.000	.132	5.342	.000

a. Dependent Variable: Insideis1

Table 5.5 (a. top, b. middle, c. bottom): Linear regression to predict locations of Retail/Service and Catering/F&B POIs based on spatial accessibility and building footprint area inside and outside the enclaved network. A significant relationship [p<.000], with an R^2 of 0.366 was found for the variables listed and the POI locations. Spatial accessibility values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

One could surmise that the internalisation of consumption activity happens within the airconditioned shopping centres and large footprint buildings of these commercial enclaves (See Fig. 5.8). These are internally less accessible by virtue of their being private enclosed spaces.

Similarly, another possible reason for the internalisation of these POIs could be the preference for offices with deep floor plates optimised for Business Process Outsourcing operations, the ground floors of which are usually tenanted by retail and F&B stores (See Fig. 5.9).

Figure 5.8 (left): SM Megamall in Ortigas after expansion in 2014. It is one of the largest shopping malls in Metro Manila in terms of square footage. By RioHondo. *from: Wikipedia. accessed 12 August 2019.Source:*<https://en.wikipedia.org/wiki/SM_Megamall#/media/File:The_Megamall_at_Ortigas_Center_Manila.jpg>

Figure 5.9 (right): Typical Contact Centre, Business Process Outsourcing Office layout within a deep-floorplate building. By Romeo Gacad/AFP *from: Rappler File Photos. accessed 12 August 2019 Source:* < https://www.rappler.com/nation/231114-senate-third-final-reading-bill-flexitime-alternative-work-arrangements>

Combining these consumption POI findings with the average angular segment integration (NAIN) values of each mixed-use commercial enclave/CBD (see Fig. 5.2, p. 112), one can see that these commercial enclaves are internally segregated from the rest of the spatial fabric of the city. It also shows that the enclaves themselves are not geared to encourage pedestrian/local movement out in their streets, and instead, bring movement into large-footprint buildings.

Looking closer into the mixed-use enclaves/CBDs, their respective “gates” or entrance thresholds and markers/signage (See Fig. 5.10a-f) are at locations (see Fig. 5.11, next page) that correlate with high vehicular-range choice (NACH) and integration (NAIN) (See Table 5.6a-b, p. 125). This is an indication that entrances and thresholds to these mixed-use enclaves/CBDs are planned around vehicular movement.

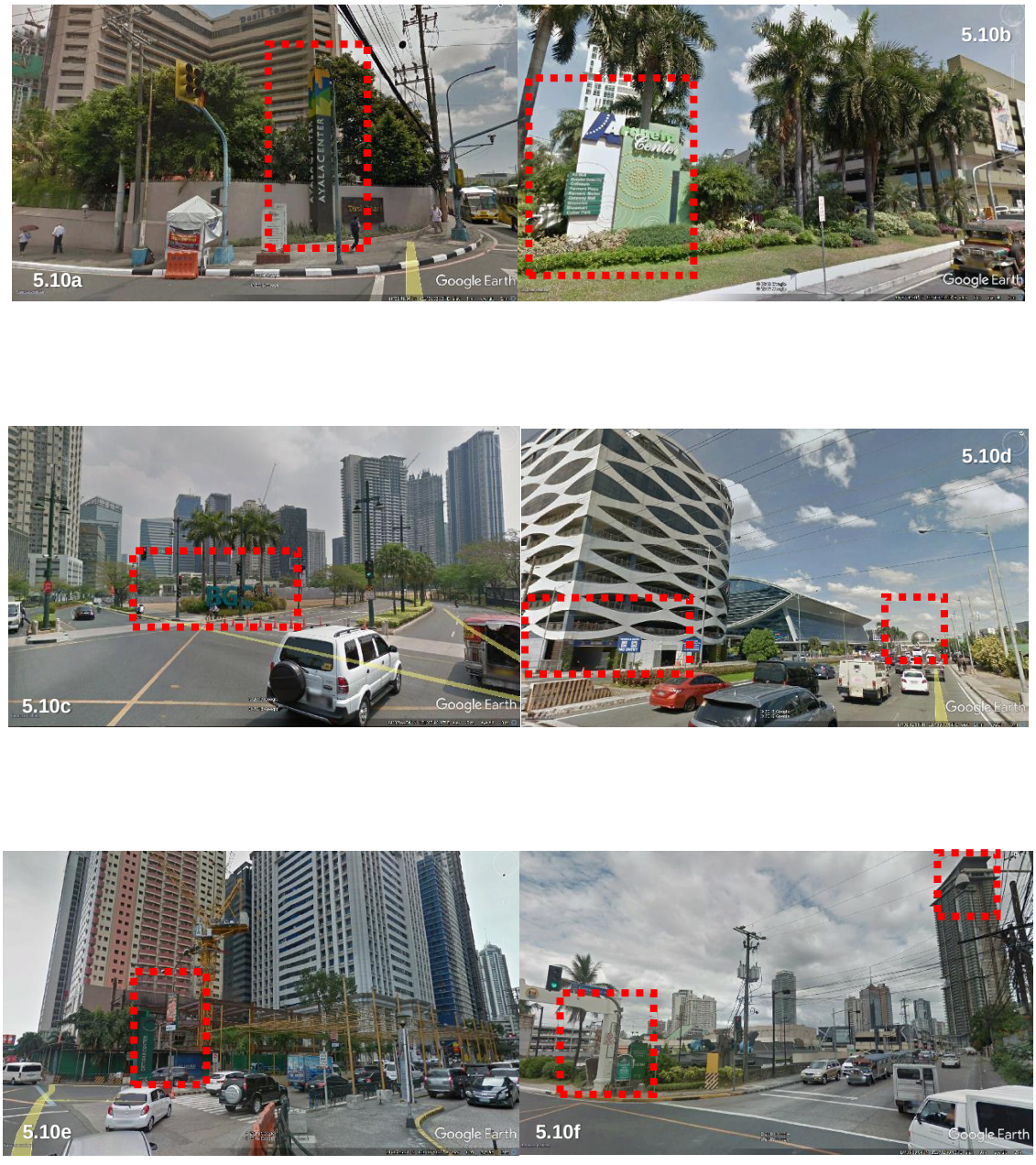


Figure 5.10: Sampling of entrance markers/thresholds/signage for Mixed-Use Enclaves / Estates / CBDs: a) Ayala Center, Makati; b) Araneta Center, Cubao; c) Bonifacio Global City, Taguig; d) SM Mall of Asia district; e) Ortigas Center, Mandaluyong; f) Greenhills, San Juan. accessed *12 August 2019, source: Google Earth Pro*

Figure 5.11: 2019 Metro Manila (inside C5) spatial graph, with overlay of points representing Entrances/Thresholds to Mixed-Use Enclaves/CBDs. Drawn by author from manual street-view survey of Google Earth using QGIS. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Correlations

		EntryPOI	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
EntryPOI	Pearson Correlation	1	.192**	.306**	.344**	.369**	.386**	.394**	.401**	.404**	.405**	.405**	.404**	.403**	.402**	.393**
	Sig. (2-tailed)		.006	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199

Table 5.6a: Correlations for Mixed-Use Enclave/CBD entrance POIs with their corresponding location's NACH Values. This shows statistically significant, moderate positive correlations with global/vehicular NACH values. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		EntryPOI	gxIN0400	gxIN0600	gxIN0800	gxIN1000	gxIN1200	gxIN1500	gxIN2000	gxIN2500	gxIN3000	gxIN3500	gxIN4000	gxIN4500	gxIN5000	gxIN Rn
EntryPOI	Pearson Correlation	1	.129	.188**	.222**	.252**	.272**	.287**	.300**	.296**	.288**	.283**	.278**	.283**	.291**	.362**
	Sig. (2-tailed)		.069	.008	.002	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199

Table 5.6b: Correlations for Mixed-Use Enclave/CBD entrance POIs with their corresponding location's NAIN Values. This shows statistically significant, moderate positive correlation with the NAIN Rn value. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

Given this, another typology leading to the pattern of internalisation of retail/service and catering/F&B activity is the consolidation of built area to accommodate the large parking footprints for the mixed-use enclaves/CBDs. These parking structures are required to contain the private vehicles used by their workers and executives driving in from neighbouring villages and distant suburbs (See Fig. 5.12a-b).

Figure 5.12a (left): Net Lima and Net Park Office Towers, Bonifacio Global City with a combined multi-storey parking podium, and catering/F&B arcaded on grade. By Mark Heinrich Go *from: BluPrint Magazine. accessed 12 August 2019 Source:* <https://bluprint.onemega.com/grading-green-berde/>

Figure 5.12b (right): One Parkade, Bonifacio Global City, standalone multi-storey carpark, with catering/F&B (orange and white structure). By Michael Gabriel Sumastre. *from: Sumastre Photography. accessed 12 August 2019 Source:* < https://www.sumastre.photography/w-fifth-avenue-building-in-bgc-aerial-drone-photography/>

From the above findings, one can see that Metro Manila is a city of two realms – an outdoor, public city of streets and fine-grained activity following space syntax's economies of natural movement; contrasting markedly with the enclavised private realm, dominated by car-centric planning, interiorised within shopping malls and large-footprint buildings.

Metro Manila's "unnatural movement" counters Hillier's theories of natural movement (Hillier et al, 1993) and movement economies (Hiller, 1996). As the built environment is privatised, more inward-looking, locally segregated enclaves develop. These become less "urban" and behave architecturally, with defined envelopes and few controlled entrances/thresholds. This disturbs the patterns of natural movement at the local scale, and in doing so, distort the local-global relationships that make cities intelligible. Each development stands apart, disconnected from the rest of the surrounding fabric; but serve as major attractors for global movement. This contradiction causes the congestion plaguing Metro Manila.

5.2 **Private Realms**

Metro Manila's C4/EDSA corridor is also marked by gated villages (See Fig. 5.13-5.14, next page) planned as part of the developer-driven edge cities that came to be after World War 2.

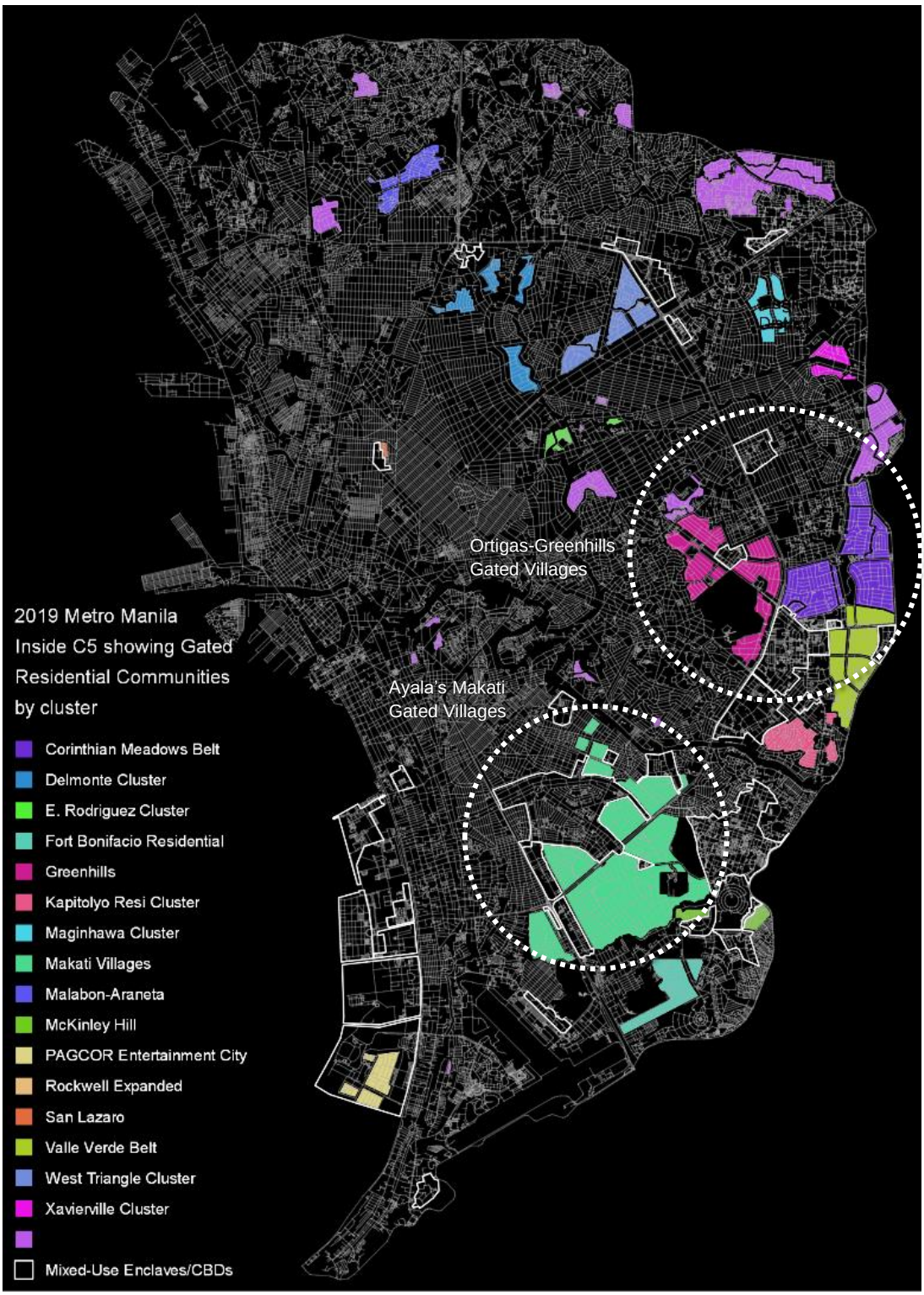


Figure 5.13: 2019 Metro Manila (inside C5) spatial graph, showing Gated Residential Communities, and key clusters around Mixed-Use Enclaves/CBDs. Drawn by author using QGIS. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

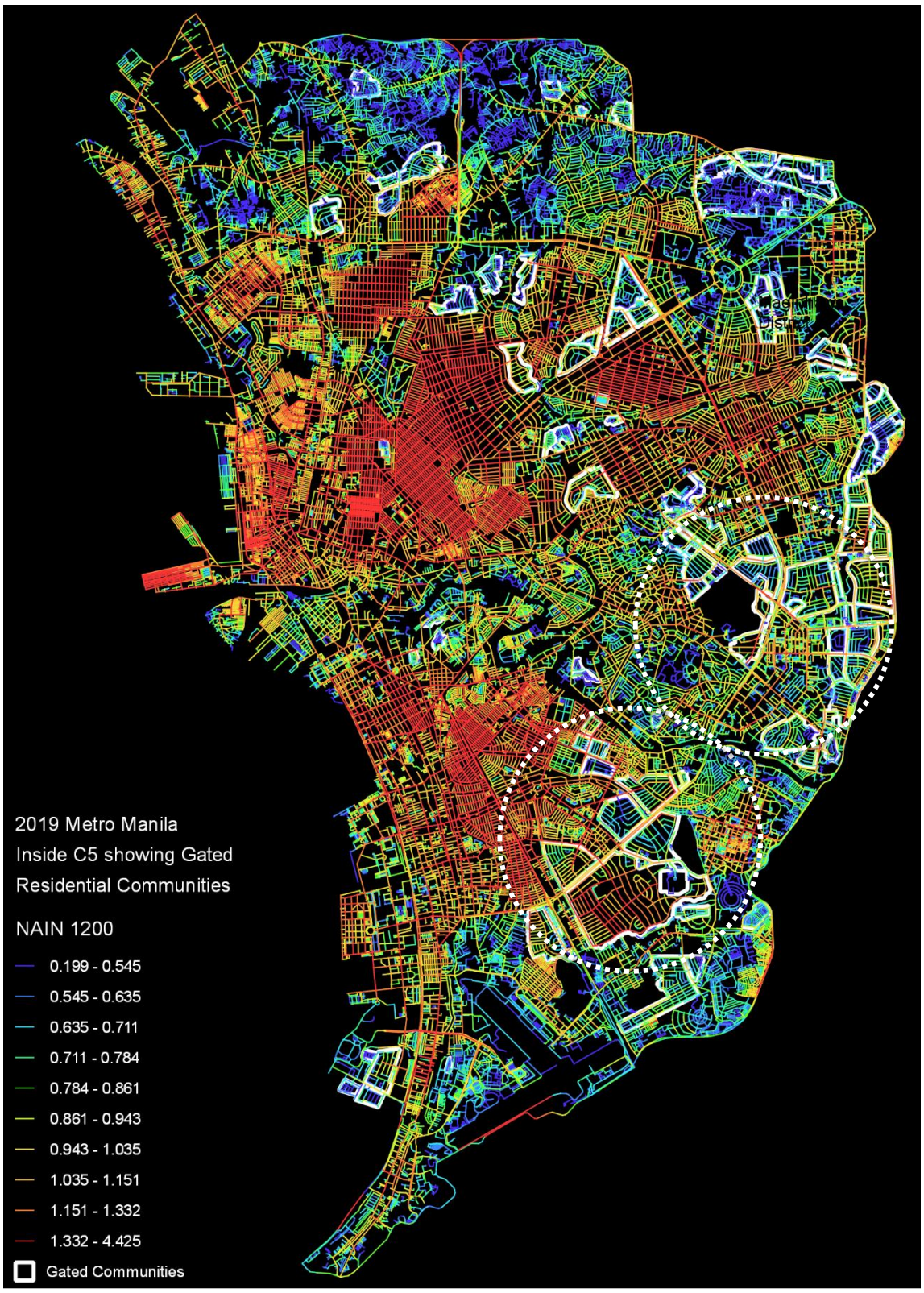


Figure 5.14: 2019 Spatial Graph of Metro Manila within Circumferential 5 Road, NAIN 1200 showing Gated Residential Communities. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Ayala's Makati Villages are paralleled by Ortigas and Co.'s Greenhills. Similar residential subdivisions along the Valle Verde-Corinthian Gardens-Green Meadows Belt (See Fig. 5.15) followed in the 1980s.

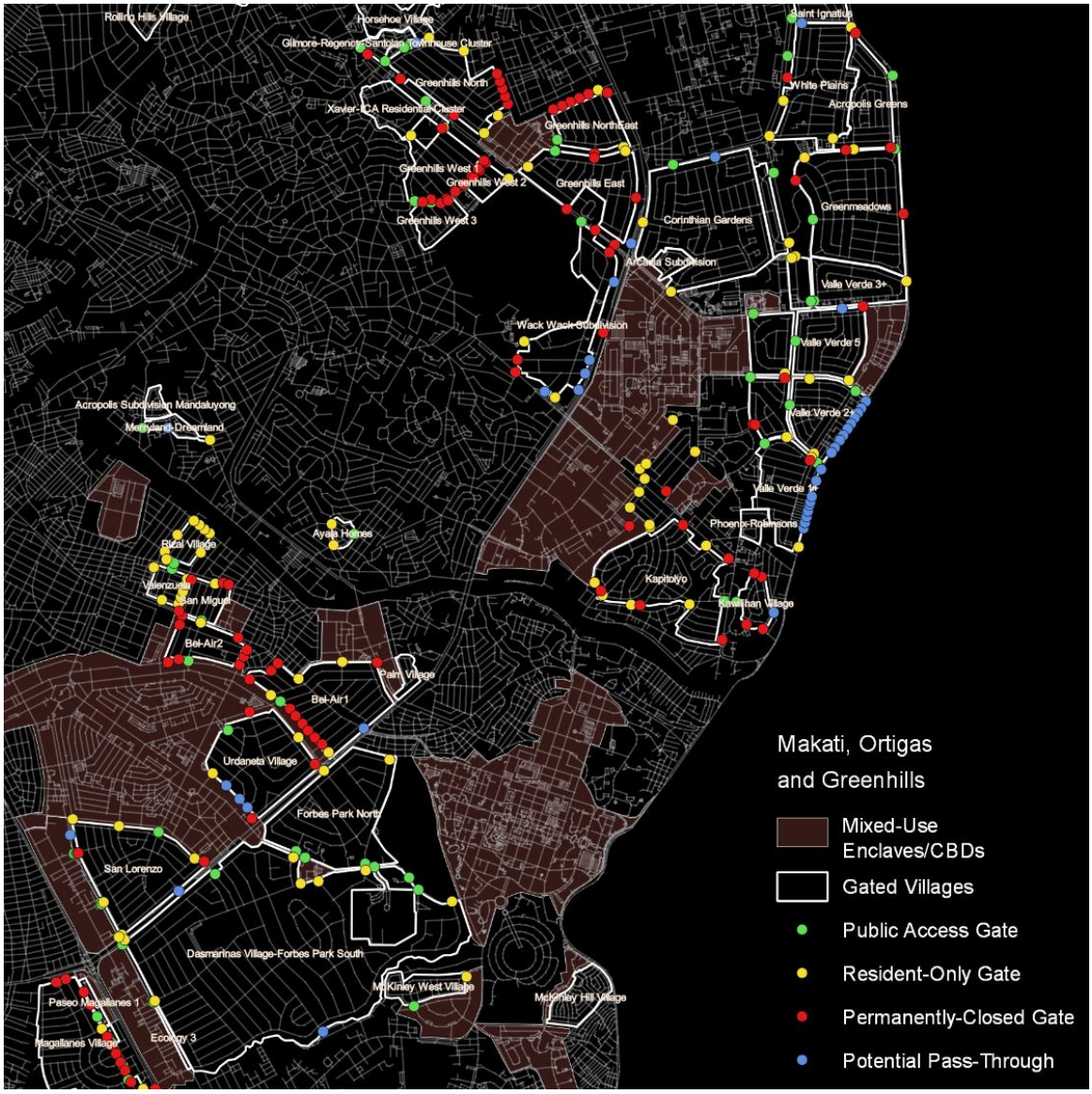


Figure 5.15: 2019 Makati-Ortigas-Greenhills spatial graph, showing exclusive Gated Villages around Mixed-Use Enclaves/CBDs. Gates located by author from manual Google Street View survey, Drawn by author using QGIS. *from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

These exclusive gated villages around the mixed-use enclaves/CBDs internally have average values for integration (NAIN) and choice (NACH) that generally have weak to moderate negative correlations to the local to global range of movement when compared to the rest of the spatial network. (See Table 5.7a-b, next page).

Correlations

		Enclaved	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
Enclaved	Pearson Correlation	1	-.326*	-.330*	-.357**	-.384**	-.403**	-.437**	-.472**	-.492**	-.497**	-.494**	-.493**	-.492**	-.489**	-.458**
	Sig. (2-tailed)		.017	.016	.009	.005	.003	.001	.000	.000	.000	.000	.000	.000	.000	.001
	N	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53

Table 5.7a: Correlations for Average NACH values of Internal Network within Exclusive Gated Villages (access through public gates only). This shows statistically significant, moderate negative correlations vs. systemwide NACH values. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		Enclaved	gxIN0400	gxIN0600	gxIN0800	gxIN1000	gxIN1200	gxIN1500	gxIN2000	gxIN2500	gxIN3000	gxIN3500	gxIN4000	gxIN4500	gxIN5000	gxIN Rn
Enclaved	Pearson Correlation	1	.087	-.059	-.171	-.258	-.306*	-.348*	-.342*	-.296*	-.270	-.248	-.238	-.239	-.237	-.062
	Sig. (2-tailed)		.536	.675	.221	.062	.026	.011	.012	.031	.050	.073	.087	.084	.088	.658
	N	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53

Table 5.7b: Correlations for Average NAIN values of Internal Network within Exclusive Gated Villages (access through public gates only). This shows statistically significant, weak negative correlations vs. systemwide NAIN values. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

Similar to the CBDs they are planned with, the public and resident-only entrance gate locations (See Fig. 5.15, p. 130 and Fig 5.16a-b) for these villages have accessibility values that positively correlate with vehicular movement (NACH 2000+ and NAIN 3500+) (See Table 5.8a-b, next page). This is despite being relatively close to the commercial areas of their respective masterplanned estates. Because of spatial configuration, residents are still more likely to use their cars to get to their neighbouring commercial areas than walk – likely compounded by the heat of Manila and the perceived safety within the air-conditioned bubble of a private vehicle.

Figure 5.16a: Typical Public Access Gate (Dasmarinas Village-Arnaiz Gate) with 2 lanes each way. Outer lane for residents (with boom gate). Inner lane for public visitors to leave their ID) accessed *12 August 2019, source: Google Street View* <https://www.google.com/maps/@14.5458599,121.0273775>

Figure 5.16b: Typical Resident-only Access Gate (Dasmarinas Village-McKinley Gate) with 1 lane each way (with boom gates) accessed *12 August 2019, source: Google Street View* < https://www.google.com/maps/@14.5484727,121.0326157 >

Correlations

		EntryPOI	gxCH0400	gxCH0600	gxCH0800	gxCH1000	gxCH1200	gxCH1500	gxCH2000	gxCH2500	gxCH3000	gxCH3500	gxCH4000	gxCH4500	gxCH5000	gxCH Rn
EntryPOI	Pearson Correlation	1	.340**	.435**	.480**	.499**	.503**	.516**	.522**	.524**	.522**	.519**	.522**	.521**	.520**	.489**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117

Table 5.8a: Correlations for exclusive gated village public entrance and resident-only entrance POIs with their corresponding location's NACH Values. This shows statistically significant, moderate positive correlations with global/vehicular NACH values. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		EntryPOI	gxIN0400	gxIN0600	gxIN0800	gxIN1000	gxIN1200	gxIN1500	gxIN2000	gxIN2500	gxIN3000	gxIN3500	gxIN4000	gxIN4500	gxIN5000	gxIN Rn
EntryPOI	Pearson Correlation	1	.127	.143	.154	.157	.150	.156	.163	.175	.195*	.226*	.236*	.233*	.235*	.243**
	Sig. (2-tailed)		.172	.123	.098	.091	.107	.094	.079	.059	.035	.014	.010	.011	.011	.008
	N	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117

Table 5.8b: Correlations for exclusive gated village public entrance and resident-only entrance POIs with their corresponding location's NAIN Values. This shows statistically significant, weak positive correlations with global/vehicular NAIN values. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

Each village also has permanently closed gates that are only opened for emergencies (See Fig. 5.17a). They also have dead-end roads that were initially planned to connect externally but were walled-off completely to localise traffic (See Fig. 5.17b). All these could be opened-up as alternate routes for access. These gate locations were verified through actual road visual survey and manual Google Street View survey.

Figure 5.17a (left): Typical Permanently-Closed Gate (Bel-Air-Makati Avenue Gate) accessed *12 August 2019, source: Google Street View*
< https://www.google.com/maps/@14.5632603,121.0287424,3a,75y,321.22h,85.68t/ >

Figure 5.17b (under): Typical Walled-Off, Potential Pass-through (Wack Wack Subdivision-Ortigas Avenue) accessed *12 August 2019, source: Google Street View*
< https://www.google.com/maps/@14.5940713,121.0573027,3a,21.3y,220.39h,79.61t/ >

5.3 Finding the “Yellow-Field”

This section models opening (See Fig. 5.19b, next page) these gated (See Fig. 5.19a, next page) villages, to see the effects on the surrounding network. This uncovers embedded, potential re-developable centralities that the village gates hold back from naturally occurring. Yellow is used in this case, referencing the residential zoning colour classification used in the Philippines (See Fig. 5.18 and Appendix F, p. 181), which is adopted from the American Planning Association (APA, 2006).

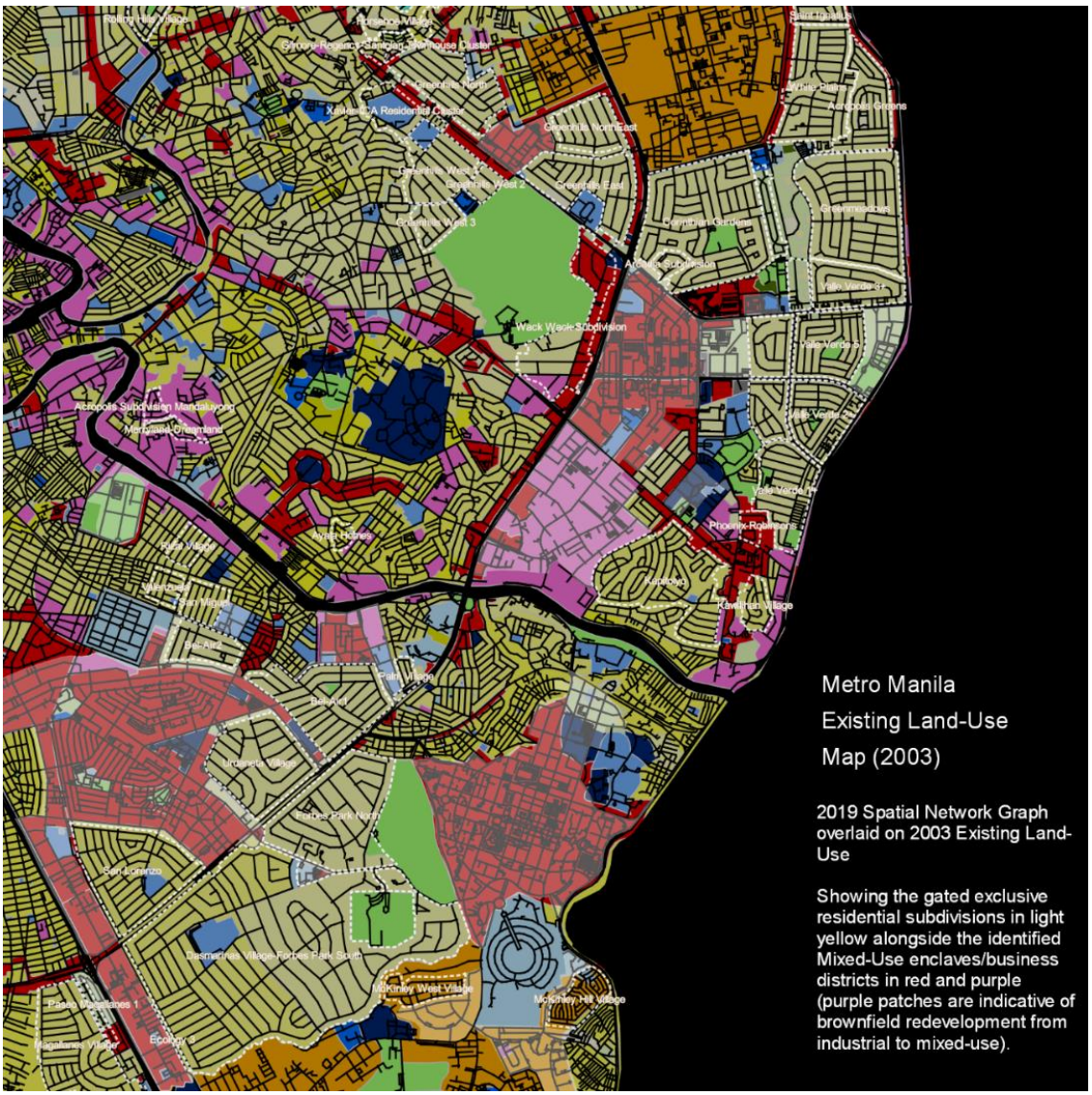


Figure 5.18: ‘Metro Manila Existing Land-Use Map (2003).’Focusing on Makati and Ortigas Area From *Philippine GeoPortal.* accessed 23 March 2019. Source: <http://www.geoportal.gov.ph/> *with overlay of 2019 existing spatial network graph,* drawn by author using QGIS. *from: OpenStreetMap.* accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>

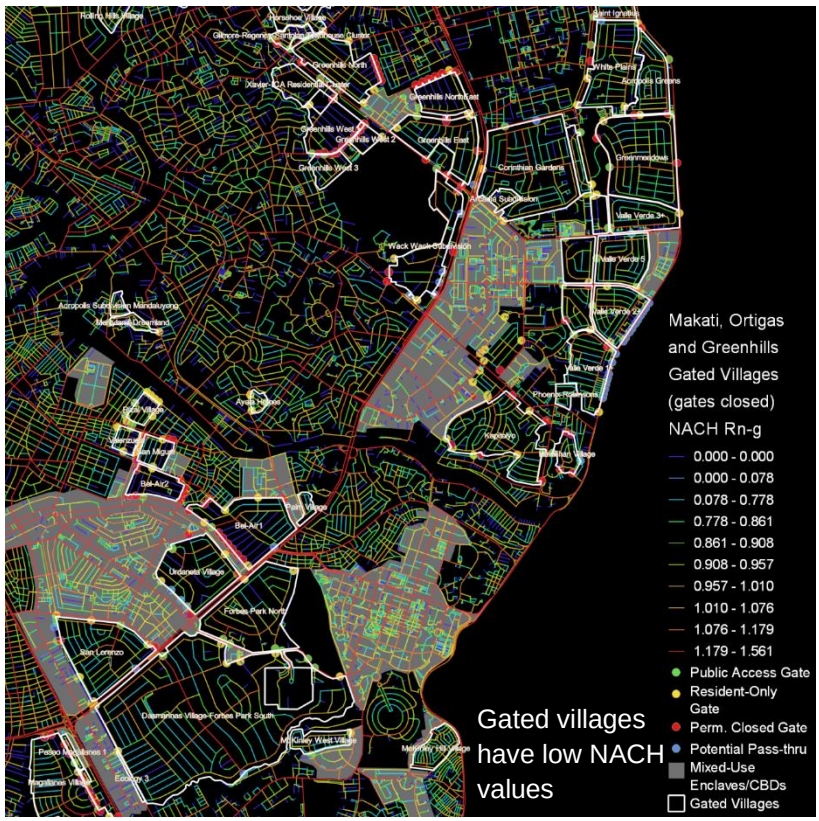


Figure 5.19a: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. NACH Rn showing Gates Closed/Status Quo. This presents the internal structure of the gated villages showing which roads have higher probability of use. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

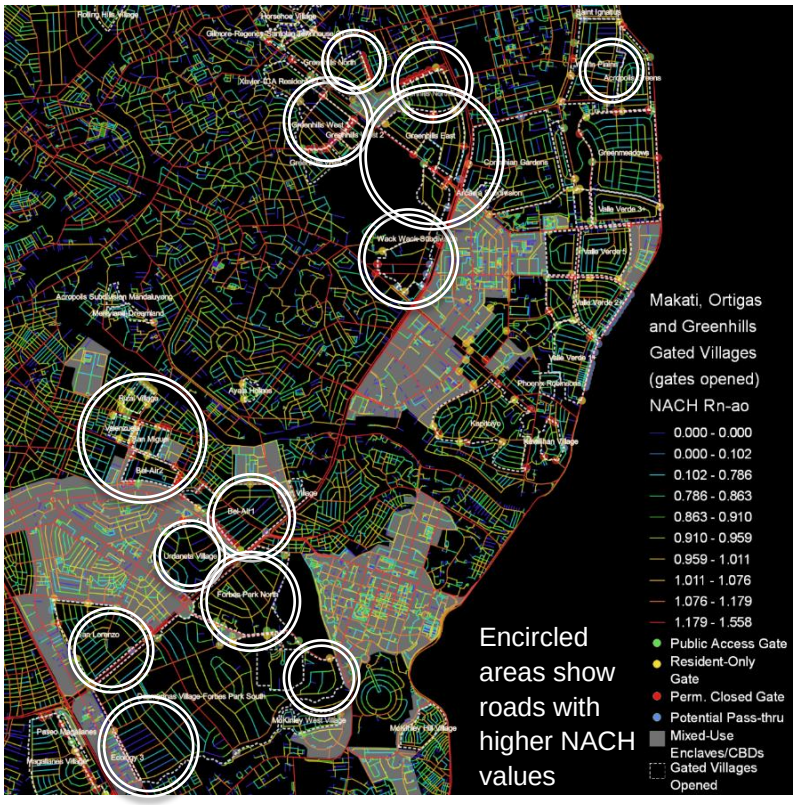


Figure 5.19b: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. NACH Rn showing opened village gates. Activated routes/areas with higher NACH Rn values encircled. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Doing so (with all the expected security problems and protests from respective homeowner's associations), creates new global through routes within these villages (Fig. 5.19c). The differences in gated and open choice values is visually summarised and averaged per village (See Fig 5.19d, next page).

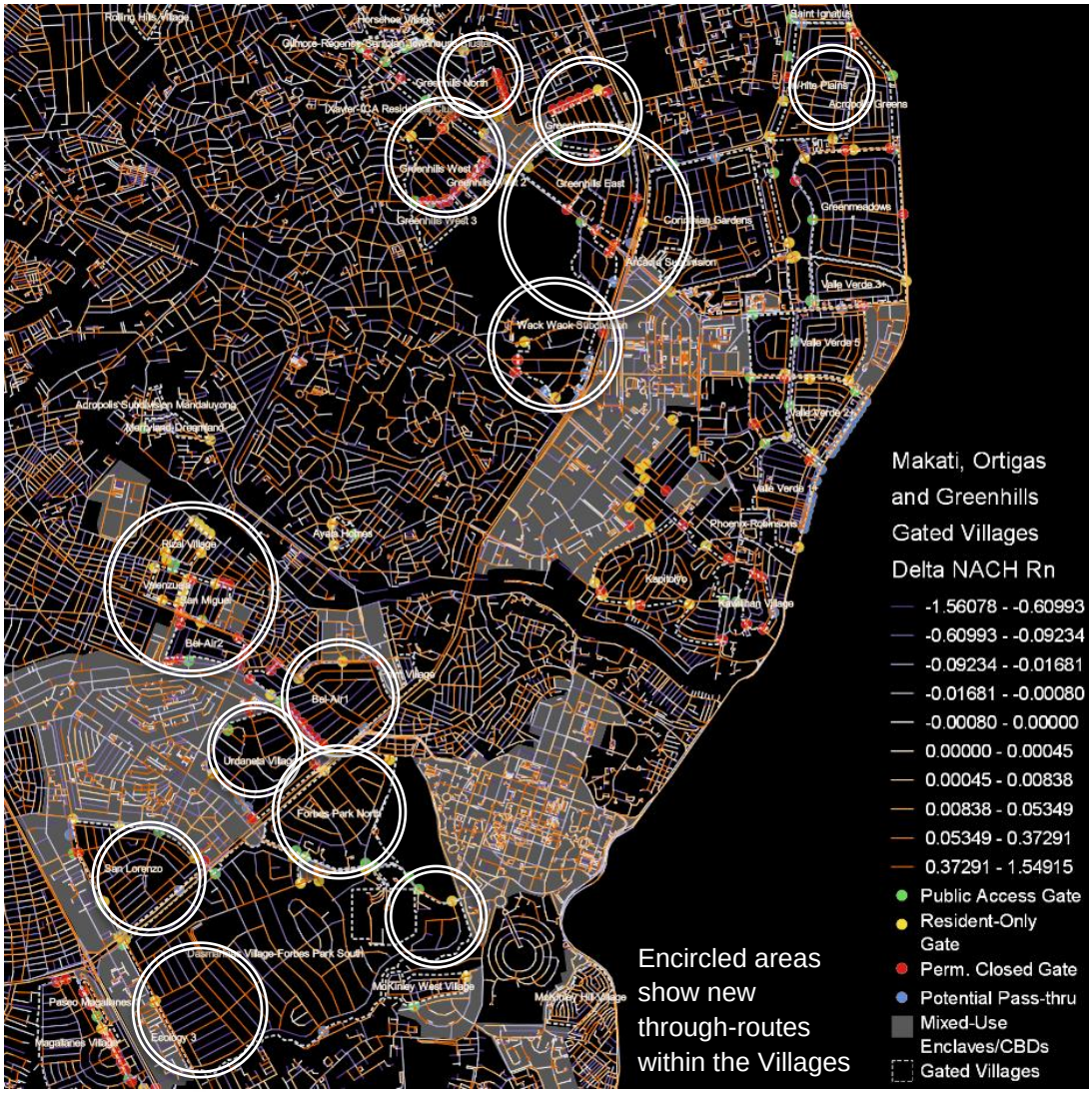


Figure 5.19c: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. Showing difference of NACH Rn between closed and opened village gates. Areas with roads that have a substantial increase in NACH Rn value encircled. This represents probable new through routes within villages. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

This has a high probability of decongesting the streets leading into their adjacent business districts. But since Metro Manila's enclaves have thresholds configured for vehicular circulation, opening the gates to these villages also increases the probability of adding to the vehicular congestion within these business districts, because their road capacity essentially remains the same (Fig 5.19d, next page).

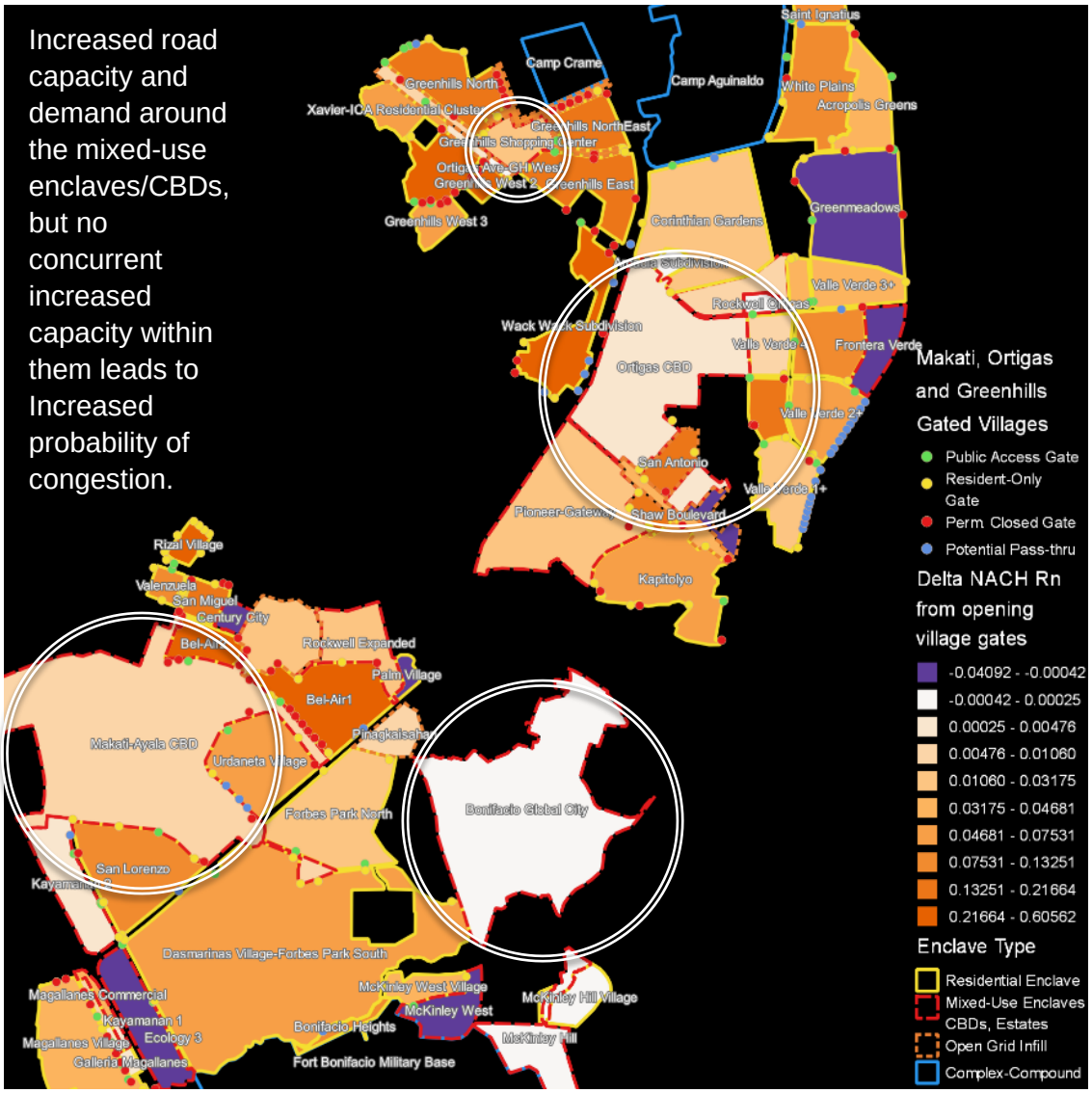


Figure 5.19d: 2019 Enclave Bounds of Makati, Bonifacio, Ortigas, and Greenhills. Showing average difference of NACH Rn value between closed and opened village gates, per enclave. This is used to represent potential to generate more traffic around the encircled CBDs/commercial enclaves through induced demand. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Similarly, gated villages (See Fig. 5.20a, next page) opened to through traffic raise global integration (higher NAIN Rn) values throughout their immediate vicinity (See Fig. 5.20b, next page).

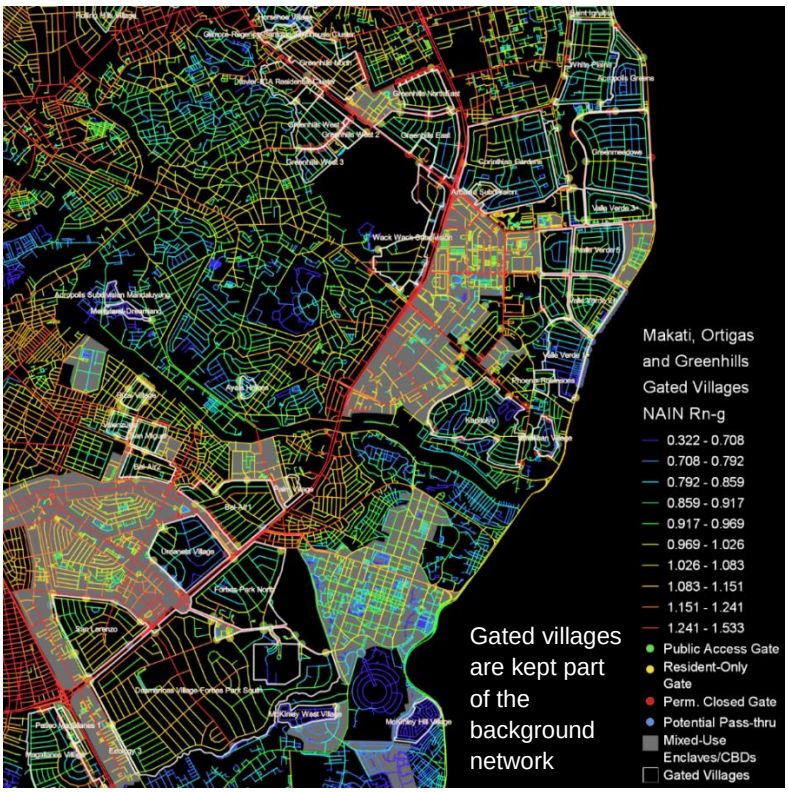


Figure 5.20a: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. NAIN Rn showing Gates Closed/Status Quo. This represents how access gates supress the generative capacity of the spatial network within the villages. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

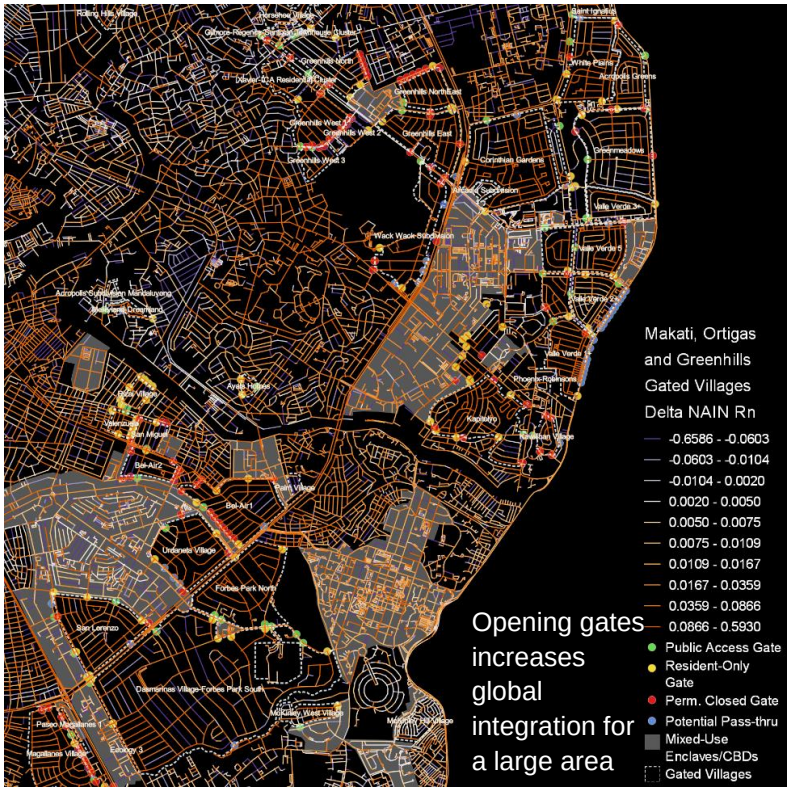


Figure 5.20b: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. Showing difference of NAIN Rn between closed and opened village gates. This presents how opening gates could spread out an increase in NAIN Rn values almost uniformly across the enclaved areas. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

This effectively transitions parts of these villages from the suburban conservative/passive background network (See Fig. 5.20c), into the urban generative/active foreground network. The increases the probability for the opened streets to become destinations themselves, becoming the impetus for redevelopment into commercial land-uses (WSP, 2018, p.4), thereby inducing more traffic demand into the opened villages (See Fig. 5.20d).

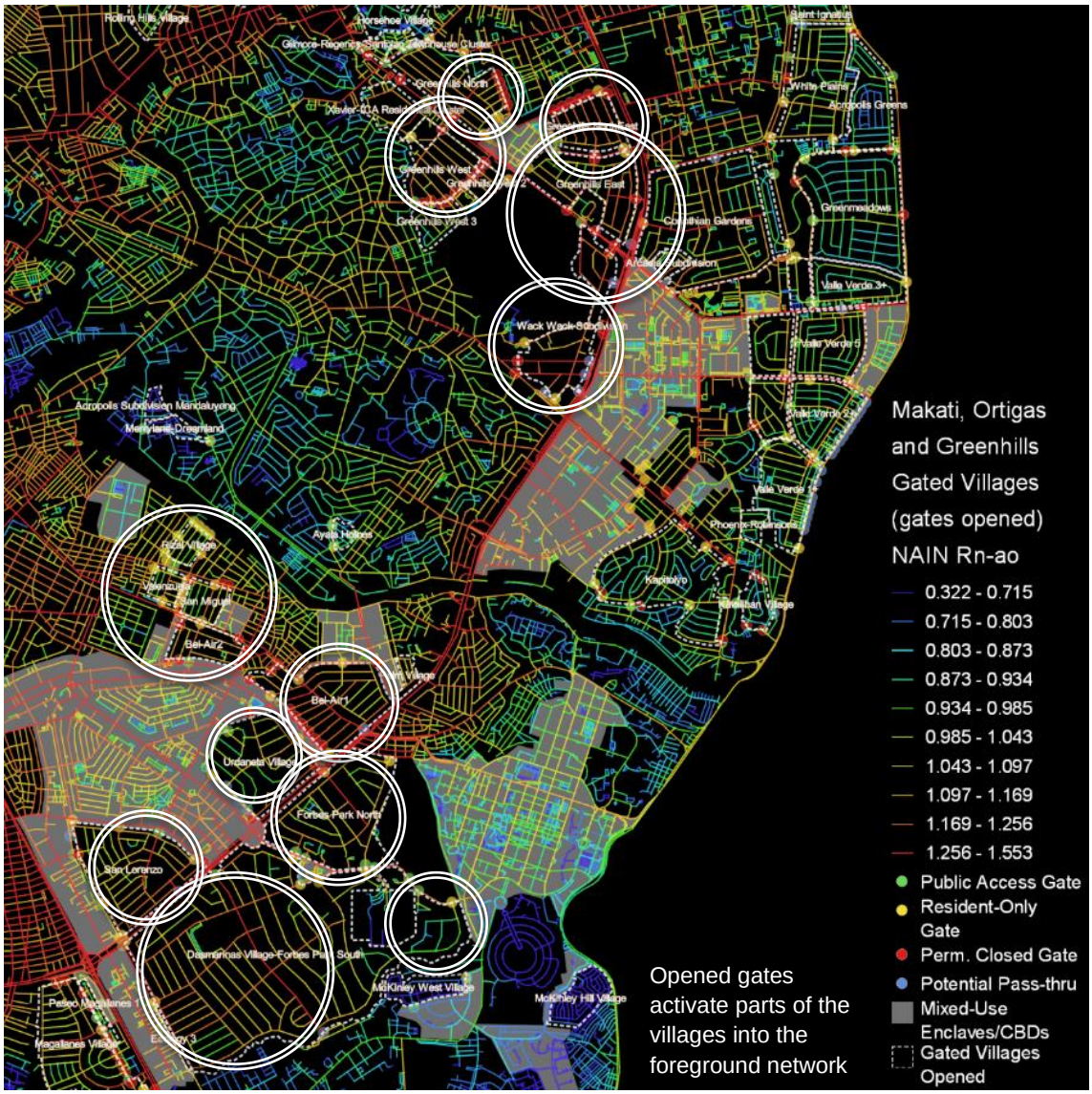


Figure 5.20c: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. NAIN Rn showing opened village gates. Activated areas with higher NAIN Rn values encircled. These represent embedded organic centralities within these gated villages, activated by opening their gates. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

The differences in gated and open integration values is visually summarised and averaged per village. Opening the gates to these villages increases congestion because this induces new road demand in and around the business districts with the increase in integration values; whilst the road capacity within the business districts themselves essentially remains the same (See Fig. 5.20d).

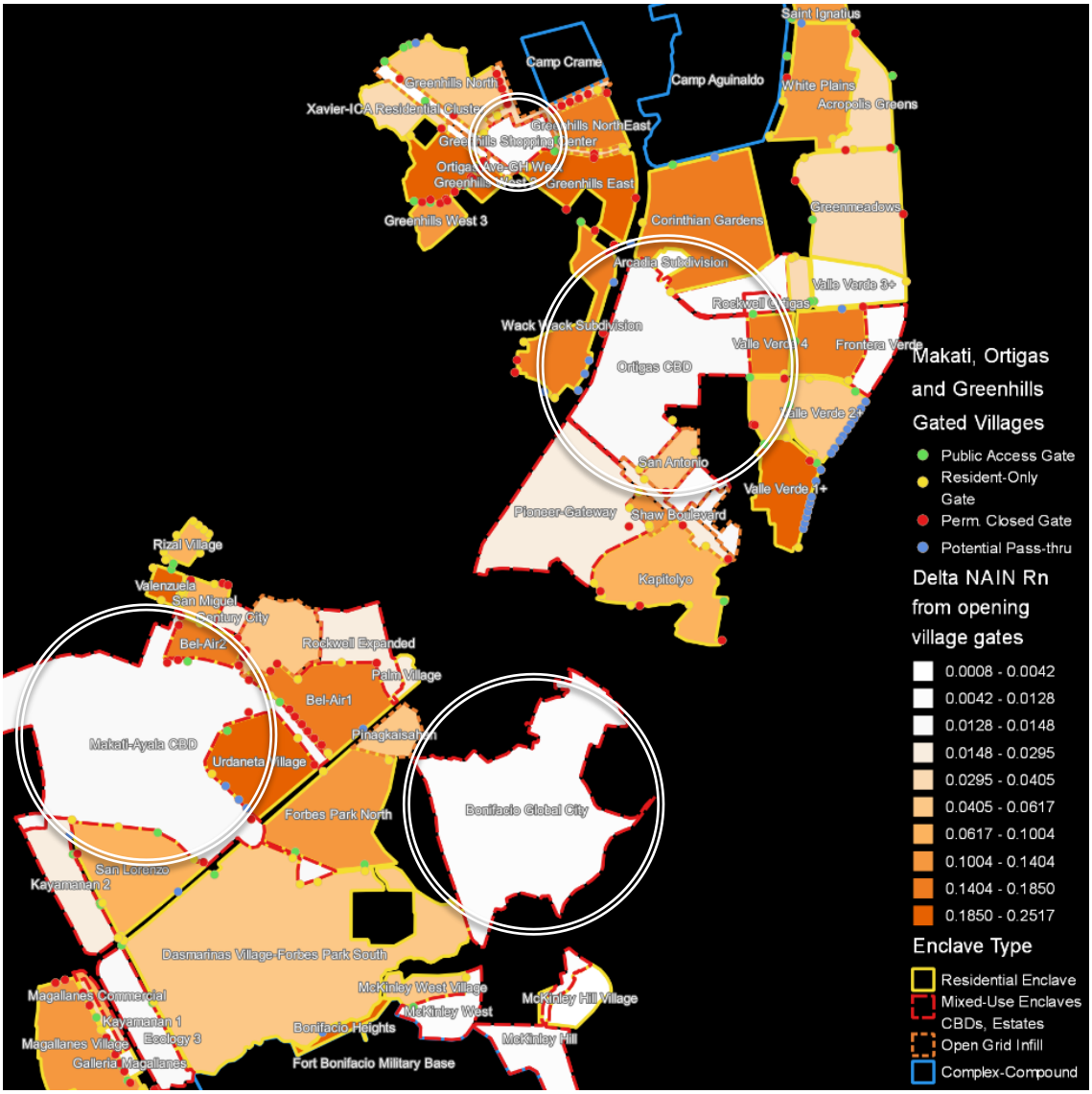


Figure 5.20d: 2019 Enclave Bounds of Makati, Bonifacio, Ortigas, and Greenhills. Showing average difference of NAIN Rn value between closed and opened village gates, per enclave. This is used to represent potential to generate more movement/activity into the formerly gated villages around the encircled CBDs/commercial enclaves through induced demand. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

The increased probability of vehicular configuration is correlated for entrances/thresholds to the business districts and villages (See Table 5.9a-b and Table 5.10a-b next page, red borders showing vehicular range movement, and Appendix G).

Correlations

		EntryPOI	aoxCH0400	aoxCH0600	aoxCH0800	aoxCH1000	aoxCH1200	aoxCH1500	aoxCH2000	aoxCH2500	aoxCH3000	aoxCH3500	aoxCH4000	aoxCH4500	aoxCH5000	aoxCH Rn
EntryPOI	Pearson Correlation	1	.337**	.520**	.614**	.678**	.710**	.734**	.743**	.744**	.745**	.746**	.746**	.744**	.746**	.736**
	Sig. (2-tailed)		.002	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	87	85	85	85	85	85	85	85	85	85	85	85	85	85	85

Table 5.9a: Correlations for Mixed-Use Enclave/CBD Entrance POIs with their corresponding location's NACH Values for all-open gates. This shows statistically significant, strong positive correlations for these locations across local to global ranges of movement. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		EntryPOI	aoxIN0400	aoxIN0600	aoxIN0800	aoxIN1000	aoxIN1200	aoxIN1500	aoxIN2000	aoxIN2500	aoxIN3000	aoxIN3500	aoxIN4000	aoxIN4500	aoxIN5000	aoxIN Rn
EntryPOI	Pearson Correlation	1	.251*	.328**	.401**	.453**	.486**	.514**	.531**	.533**	.534**	.521**	.506**	.509**	.545**	.721**
	Sig. (2-tailed)		.020	.002	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	87	85	85	85	85	85	85	85	85	85	85	85	85	85	85

Table 5.9b (under 5.9a): Correlations for Mixed-Use Enclave/CBD Entrance POIs with their corresponding location's NAIN Values for all-open gates. This shows statistically significant, moderate to strong positive correlations for these locations across local to global ranges of movement. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

Correlations

		EntryPOI	aoxCH0400	aoxCH0600	aoxCH0800	aoxCH1000	aoxCH1200	aoxCH1500	aoxCH2000	aoxCH2500	aoxCH3000	aoxCH3500	aoxCH4000	aoxCH4500	aoxCH5000	aoxCH Rn
EntryPOI	Pearson Correlation	1	.281**	.370**	.409**	.430**	.430**	.438**	.438**	.440**	.438**	.437**	.439**	.438**	.438**	.412**
	Sig. (2-tailed)		.002	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	117	115	115	115	115	115	115	115	115	115	115	115	115	115	115

Table 5.10a: Correlations for Exclusive Village Entrance POIs with their corresponding location's NACH Values for all-open gates. This shows statistically significant, moderate positive correlations for these locations across local to global ranges of movement. NACH values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

		EntryPOI	aoxIN0400	aoxIN0600	aoxIN0800	aoxIN1000	aoxIN1200	aoxIN1500	aoxIN2000	aoxIN2500	aoxIN3000	aoxIN3500	aoxIN4000	aoxIN4500	aoxIN5000	aoxIN Rn
EntryPOI	Pearson Correlation	1	.156	.171	.182	.175	.167	.160	.153	.156	.173	.207*	.217*	.216*	.219*	.215*
	Sig. (2-tailed)		.096	.068	.052	.062	.075	.088	.101	.095	.064	.027	.020	.021	.019	.021
	N	117	115	115	115	115	115	115	115	115	115	115	115	115	115	115

Table 5.10b (under 5.11a): Correlations for Exclusive Village Entrance POIs with their corresponding location's NAIN Values for all-open gates. This shows statistically significant, weak positive correlations for these locations with global ranges of movement. NAIN values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*

The correlations indicate a possibility that if streets are opened to pedestrians and cyclists only – using lower-range measures from 400-1500m (see Table 5.9a-b, p. 142 and 5.10a, p. 142, blue-bordered values), connectivity could be improved in a less disruptive manner.

Analysing the gated villages using the local scale of 1200m (See Fig. 5.21a), one can see how the gates suppress their integration values, keeping them part of the background network. There are exceptional areas of high local integration within villages (the largest of which is Dasmarinas Village), which light up with high local integration, even with the gates closed.

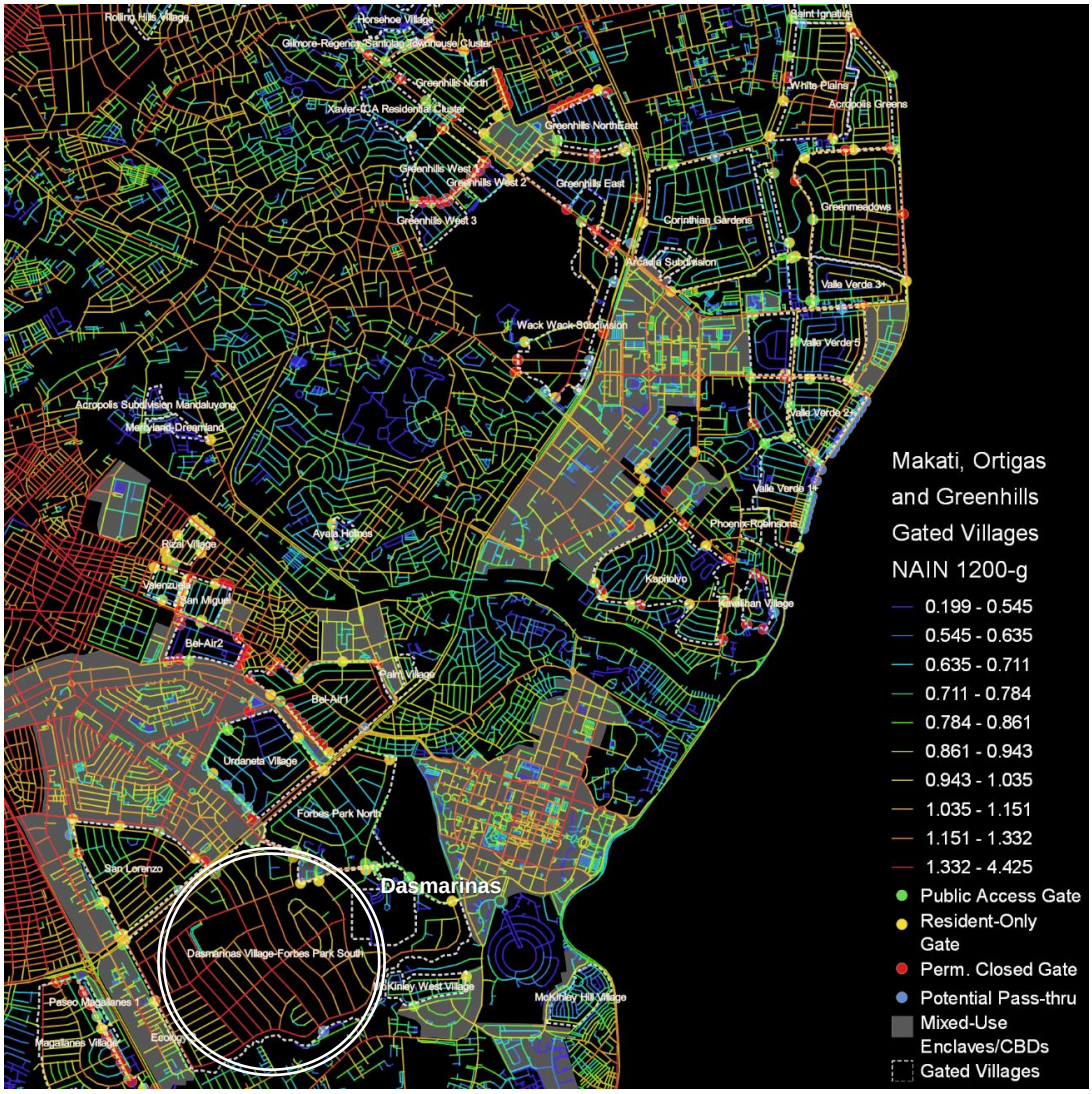


Figure 5.21a: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. NAIN 1200 showing Gates Closed/Status Quo. This represents how access gates supress the generative capacity of the spatial network within the villages. Despite closed gates, Dasmarinas Village maintains high local integration values. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source:* <*http://download.geofabrik.de/asia/philippines.html#*>

When opened to pedestrian/local movement (See Fig. 5.21b). The enclaves' embedded local centralities light up with higher integration values. This shows that enclaves have more potential to be pedestrianised if they are more compact and shallower from their thresholds. Dasmarinas Village remains an exception for its size but remains highly integrated with opened gates.

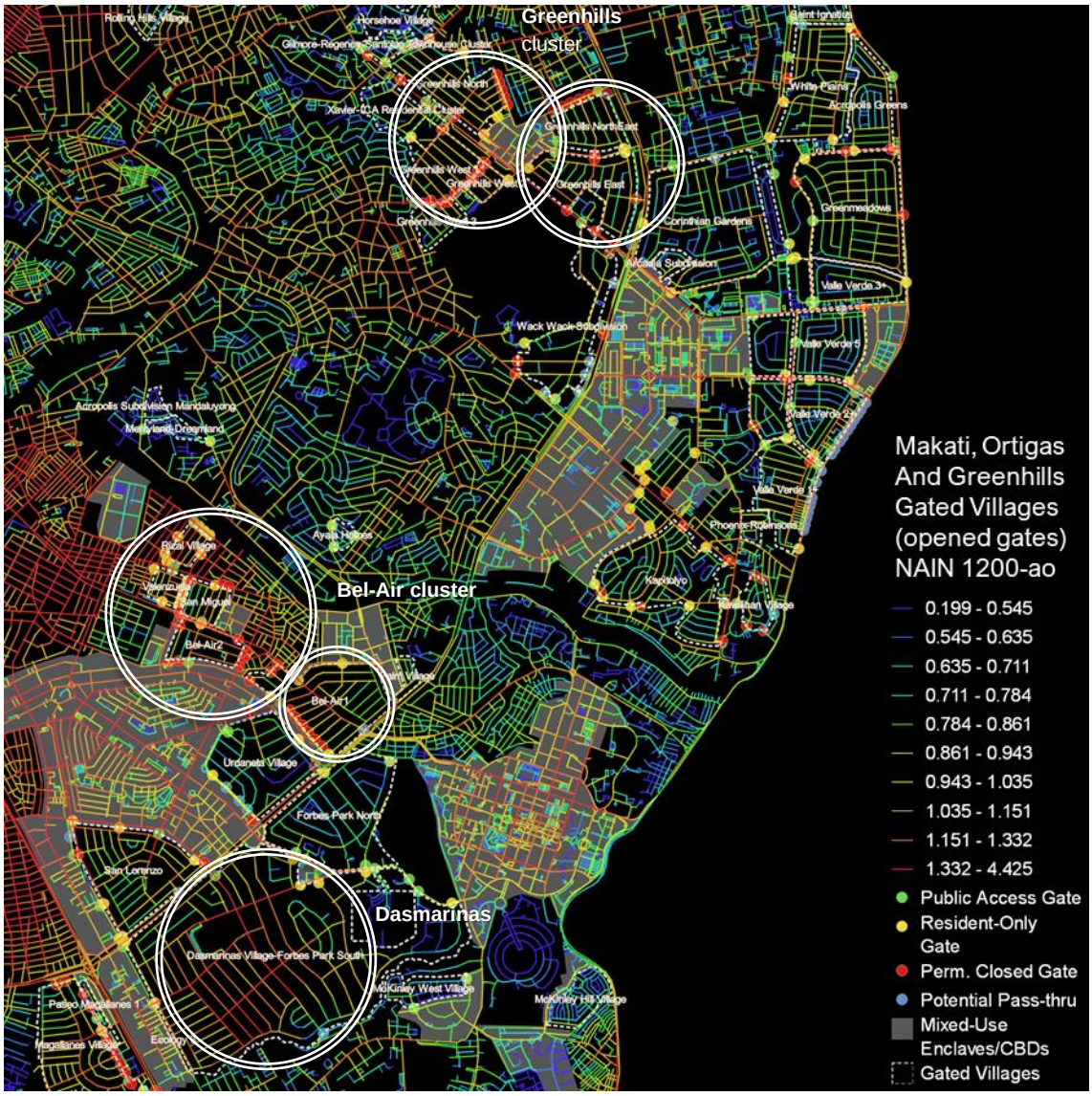


Figure 5.21b: 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. NAIN 1200 showing opened village gates showing integrative potentials for opening up gated streets to pedestrians. Presents how localised integration values favour smaller, more compact – and thereby shallower configurations closer to their thresholds. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Opening-up the villages to pedestrian/local movement presents a less disruptive increase in integration values in the surrounding spatial network (See Fig. 5.21c). This shows the localised effect of pedestrianisation on the system, thus minimising the probability of induced vehicular demand disrupting these opened areas.

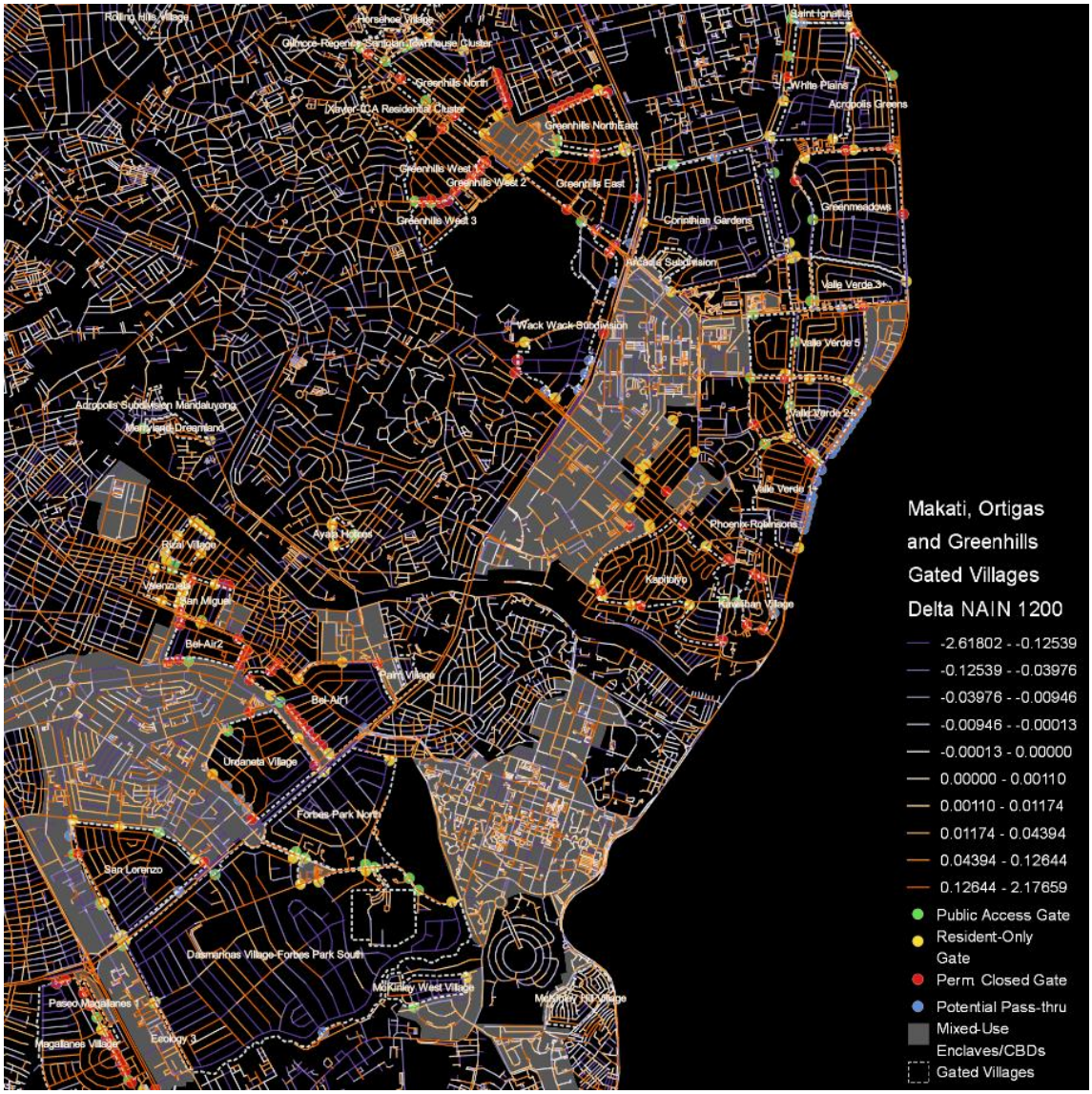


Figure 5.21c (top): 2019 Spatial Graph of Makati, Ortigas, and Greenhills Enclaves. Showing difference of NAIN 1200 graphs between closed and opened village gates. Presents how less disruptive it is to open these villages to pedestrian movement. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

The differences in gated and open pedestrian/local integration values is visually summarised and averaged per village, the following are revealed to have significant increases in pedestrian/local integration values (See Fig. 5.21d) relative to the system: the Bel-Air-Poblacion cluster (See Fig. 5.22, p.147) in Makati, and the Greenhills cluster (See Fig. 5.23, p.148) in San Juan, and the Valle Verde cluster in Ortigas (See Fig. 5.24, p.149). Each presents a possible case for "yellow-field" redevelopment to be discussed further.

Interestingly, villages which had internal local integration cores while gated (See Fig. 5.21a, p. 143), experience a net decrease in average integration when their gates are opened. Dasmarinas Village is the largest example. These villages are more introverted and self-contained, and present alternate possibilities to redevelopment (See Fig. 5.25, p.150).

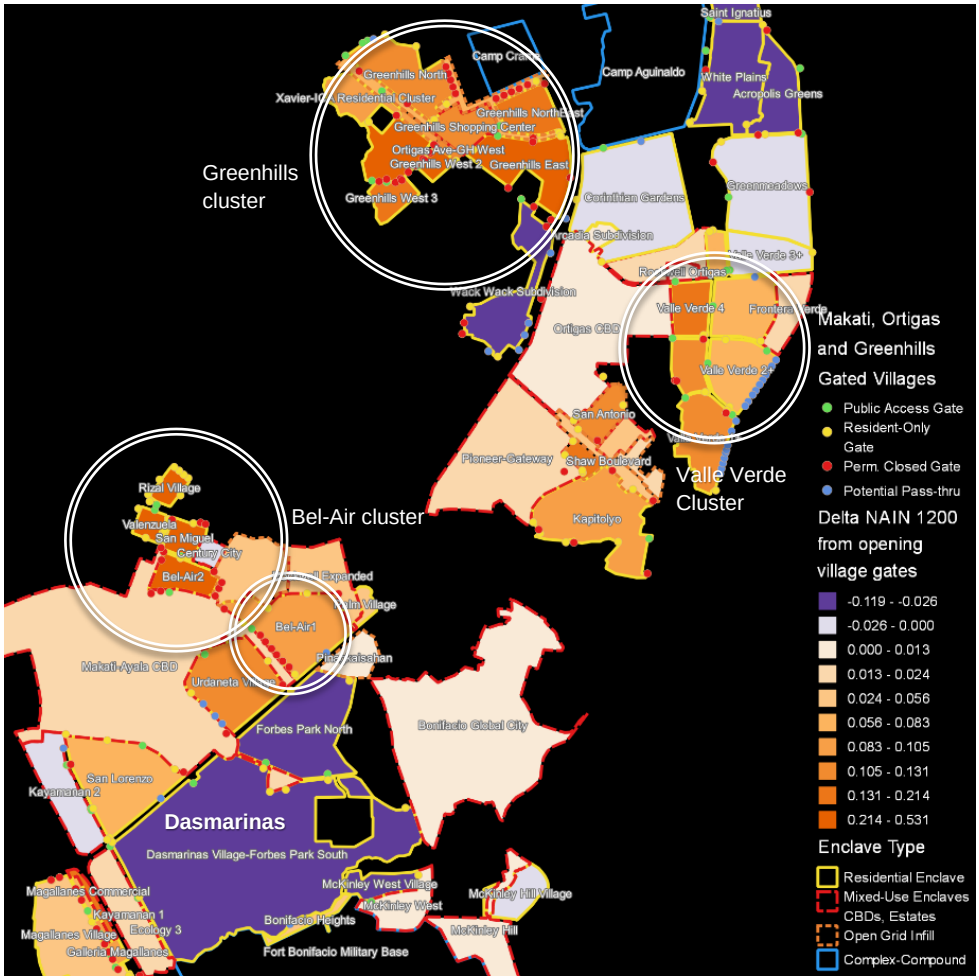


Figure 5.21d: 2019 Enclave Bounds of Makati, Bonifacio, Ortigas, and Greenhills. Showing average difference of NAIN 1200 value between closed and opened village gates, per enclave. Presents how localised integration values favour smaller, more compact – and thereby shallower configurations closer to their thresholds. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source:* <*http://download.geofabrik.de/asia/philippines.html#*>

5.3.1 "Yellow-field" Districts: Bel-Air and Greenhills Clusters

The separate clusters formed around Greenhills in San Juan (See Fig. 5.22) and Bel-Air Village in Makati (See Fig. 5.23), could be opened-up to pedestrians and bicycles using a combination of measures: bollarded streets, sidewalk improvements, protected bike lanes, easing of ground floor use restrictions for community retail, escalating to the change of village design guidelines allowing increased densities and multi-family mid-rise typologies.

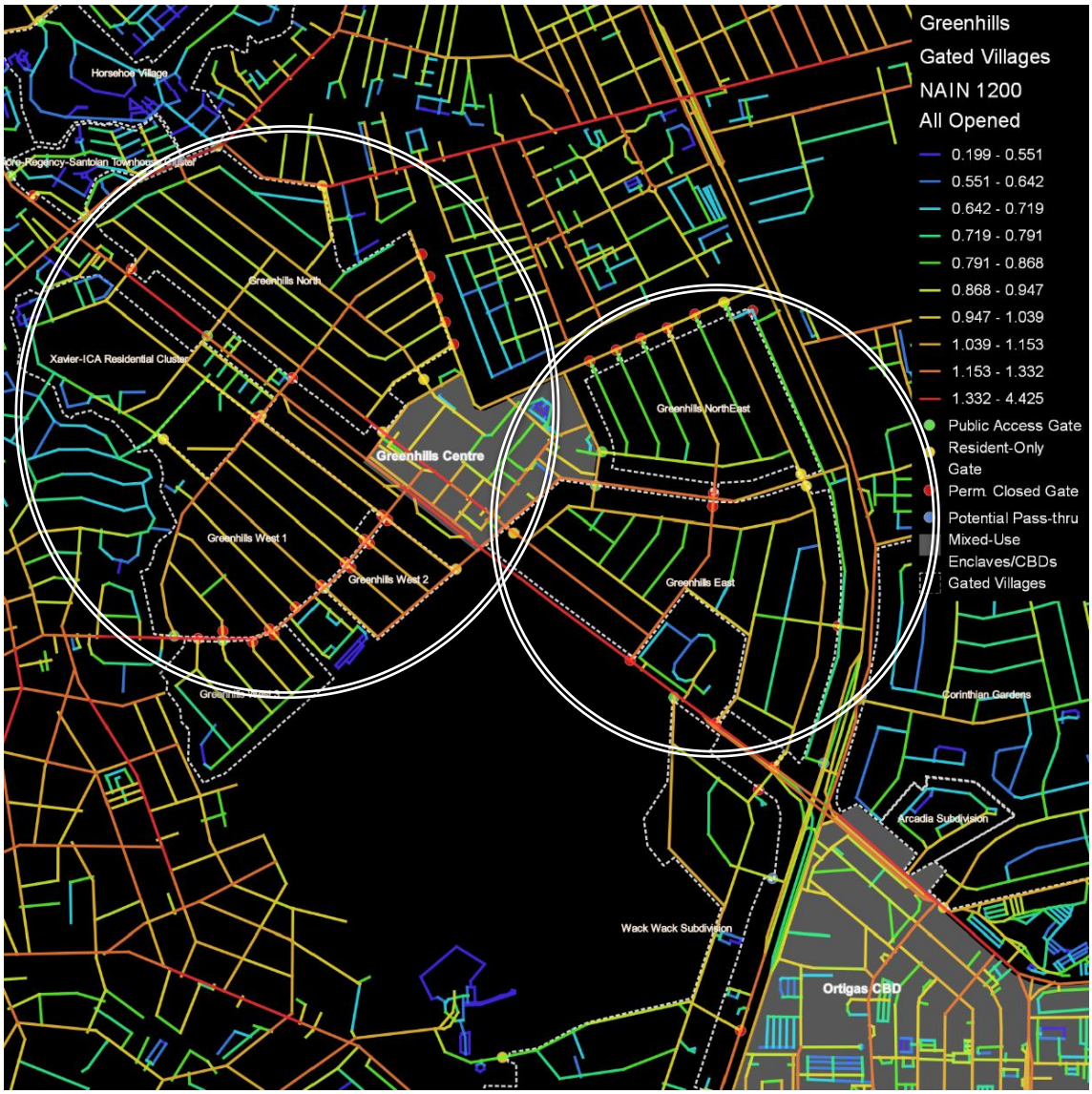


Figure 5.22: 2019 Spatial Graph of Greenhills Cluster. NAIN 1200 showing opened village gates. This presents local pedestrian potential centralities held back by the village gates. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

These could gradually unthaw the frozen centralities in these villages. With increasing land values, wealthy landowners in these villages may consider these gradual moves, rather than the drastic and top-down measure to open their gates to traffic. These gated subdivisions, when opened-up to pedestrians and cyclists could lead to a new form of fine-grained, bottom-up "yellow-field" redevelopment, allowing organic processes, not unlike those discussed by Vaughan et al (2009), to take hold and urbanise the suburban.

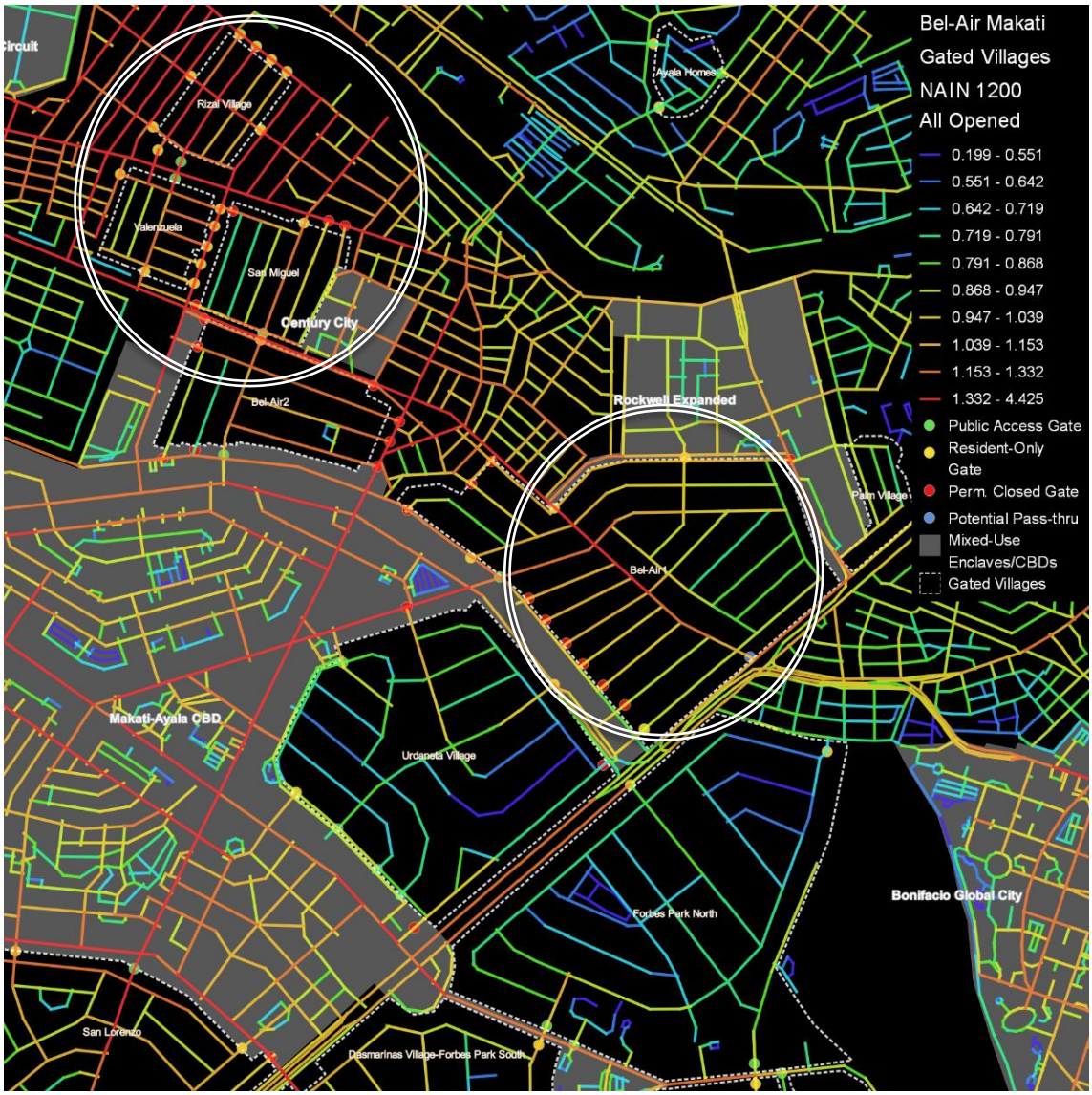


Figure 5.23: 2019 Spatial Graph of Bel-Air Cluster. NAIN 1200 showing opened village gates. This presents local pedestrian potential centralities held back by the village gates. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

5.3.2 "Yellow-strips": Valle Verde, Corinthian and Greenmeadows

On the other hand, introverted road networks having few entrances, tree-like branching roads and cul-de-sacs, and grid patterns that go against the grain of traffic create configurations with lower integration (NAIN) levels. Metro Manila's Valle Verde-Corinthian and Greenmeadows cluster have this introverted configuration (See Fig. 5.24). But even within these introverted communities, there are opportunities to create localised strips of activity (good for a local convenience store, bakery, daycare or nursery, etc). When managed well, these strips could cater to their respective internal pedestrian markets.

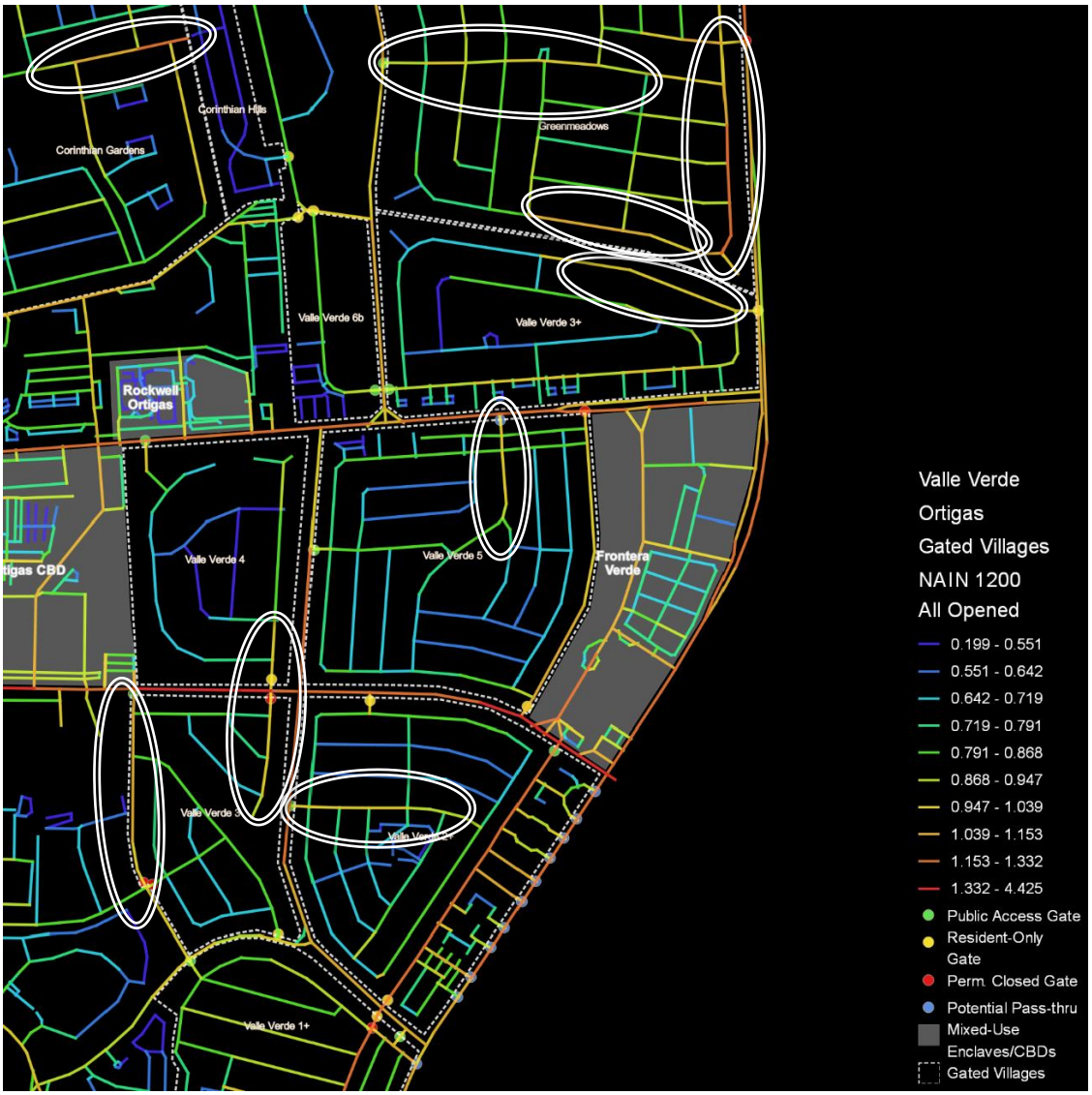


Figure 5.24: 2019 Spatial Graph of Valle Verde cluster. NAIN 1200 showing opened village gates. This presents locally integrated streets/strips or segments which could be activated with localised retail/activity. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

5.3.3 Densified Enclaves: Dasmarinas Village

Curiously, even with closed gates, Dasmarinas Village (See Fig. 5.21a) in Makati has high levels of pedestrian/local integration (NAIN 1200) (See Fig. 5.25). With open gates and connections, it becomes a global pass-through (with high NACH Rn values for certain routes) connecting Makati CBD to the Bonifacio CBD (See Fig. 5.19b, p. 136; Fig. 5.19c, p. 137). These routes could be used as protected cycling paths instead of letting vehicular traffic into Dasmarinas Village.

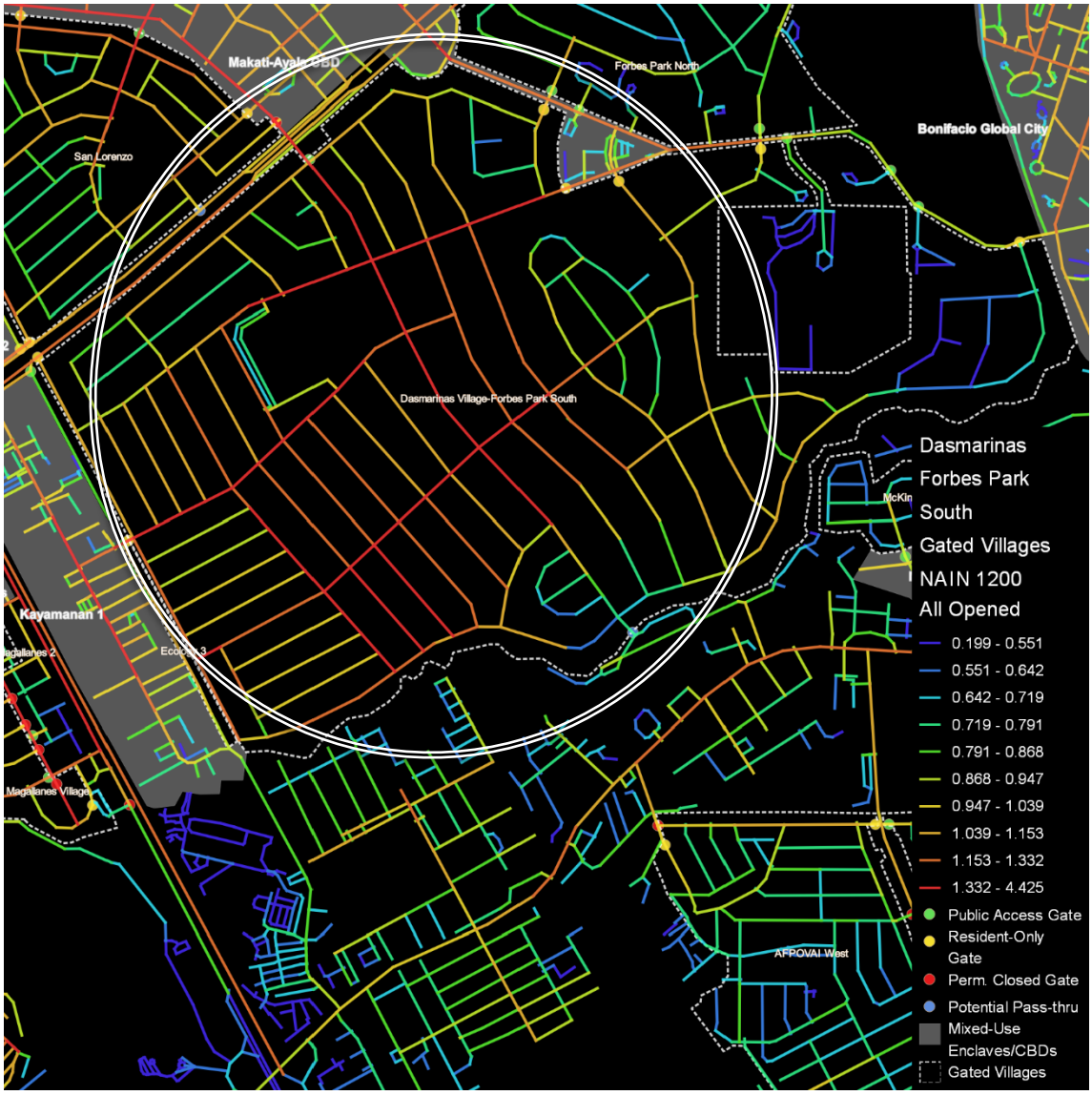


Figure 5.25: 2019 Spatial Graph of Dasmarinas Village. NAIN 1200 showing opened village gates. This presents local pedestrian potential centralities within Dasmarinas Village. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Perhaps the most intriguing and contentious prospect for Dasmarinas Village is based on the previously revealed strong positive correlation between consumption activity within mixed-use enclaves and large building footprints (See Fig. 5.29), Dasmarinas Village's coarse street grid could lead to consolidation of individual lots that could produce larger building footprints. This opens the doors to densification into mixed-use, mid-rise buildings instead of the single-use, single-family villas presently onsite. Could this area (maintaining its affluence) become a denser, more pedestrianised, yet still upscale, neighbourhood similar to the Upper East Side or Chelsea in Manhattan?

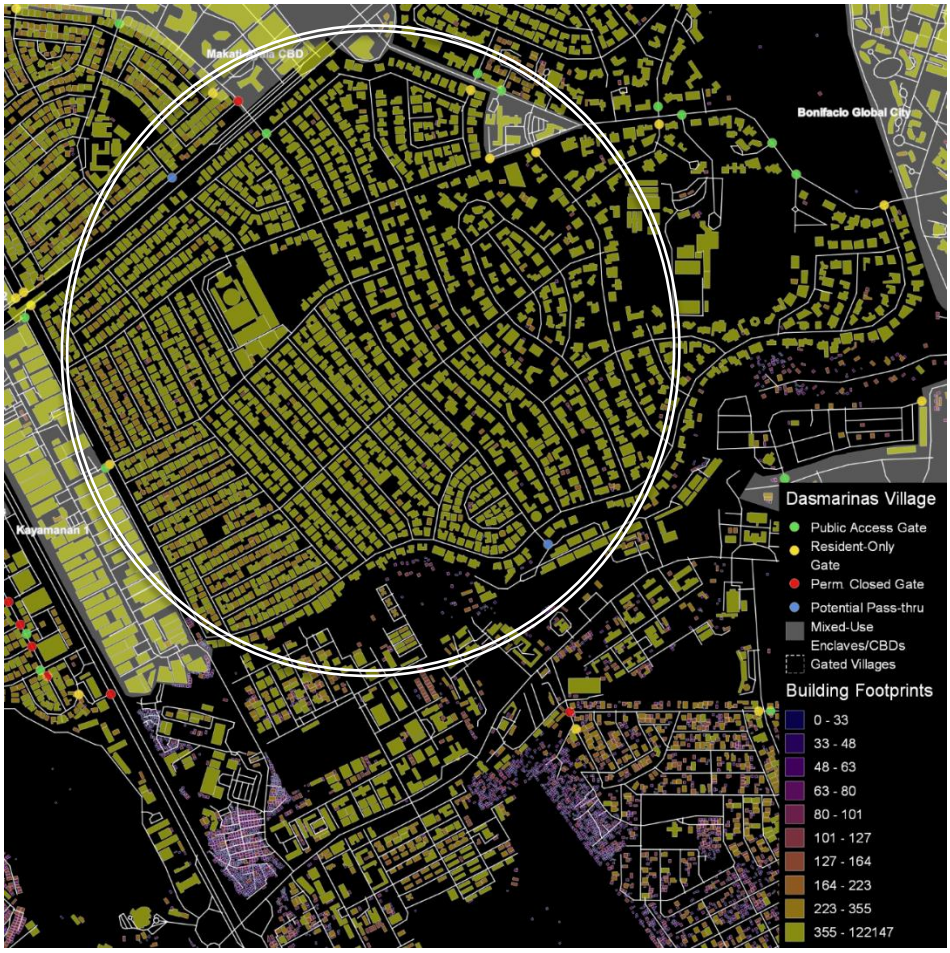


Figure 5.26: 2019 Building Footprints of Dasmarinas Village, overlaid on its Spatial Graph. This shows how its building footprints are relatively coarser-grained and larger than the surrounding context. This presents an intriguing – yet disruptive potential for consolidation into larger footprints for bigger building densities with mixed-uses. Spatial graph drawn by author using QGIS with Building Footprint data from*: OpenStreetMap. accessed 20 February 2019 Source:* <*http://download.geofabrik.de/asia/philippines.html#*>

The findings for Dasmarinas and the other villages discussed, points to the need for further study, applying planning/design strategies, and perhaps moving forward with community engagement.

Chapter 6. Discussion and Conclusion

6.1 Research Outcomes

In response to the first research question, this study highlights how Metro Manila's spatial configuration unfolds like a fractal, creating recognisable patterns in social exclusion and spatial configuration across time and spatial scales. This study categorises the narratives and events (See Table 6.1) in Manila's history according to their respective socio-spatial factors.

Socio-Spatial Factors in Manila's Develpment	1898 (Spanish Turnover)	1905 (Burnham Plan)	1945 (Post-War/ Indepenence)	1967 (Marcos/ Martial Law)	2019 (Present-day)
Enclave Urbanism & Social Correspondence	Intramuros and Spanish Colonists	Attempts to connect Intramuros with the broader fabric outside it	Ermita, Malate and Pasay Bayfront District as the American enclave	Quezon City becomes a city of government compounds; Gated communities keep middle class within	Mixed-use urban vertical enclaves for the educated elite, marginalization of informal settlers/ working classes
Social Reproduction	*Reducciones* Mission Churches and Plazas	Civic Public Spaces, Luneta as Washington Mall	The American Downtown in Ermita/ Malate and Street-car suburb in Pasay	Quezon City as a worker's city vs Makati's American elite suburbia	Global "lifestyles"
Control & Security	Cuartels and Fortifications on major routes	Takeover and conversion of Spanish Forts into American camps	Camp Murphy in the outskirts (C4/EDSA)	Camp Aguinaldo and Camp Crame on C4/EDSA. Private Guards	Private Guards, Gates/ Thresholds and CCTV surveillance
Suburban Development	*Reducciones* districts	Assimilation of *Reducciones* districts as part of the radial grid of Manila	Quezon City's development; start of subdivision of Manila's adjacent haciendas	C4/EDSA corridor becomes a car-centric belt of edge-city development	Sprawl of single-family homes to the exurban fringes of Metro Manila.
Centrality and Structure vs.	Binondo as the crossroads	Unintentional fragmentation of the city into 2 halves	Binondo remains the integration core, but fragmentation into 2 halves ongoing	C4/EDSA overtakes Binondo as the new integration spine of Metro Manila / primary North to South route	C4/EDSA becomes the choked Integration core and Route for Metro Manila,
Imposed Order	Intramuros as the fortified centre	The National Mall or Civic Core as the heart of the city	Devastation of World War 2	Quezon City's grand axes	CBDs and Mixed-Use Enclaves as attractors
Globalisation and Trade	Galleon trade with Acapulco, Mexico; Sangley trade with Fujian, China. Both rely on the Pasig River	New Port district beside Binondo/San Nicolas, reorientation from River to the Bay	Port Expansion and new Airfields established. Industrial uses zoned beside Pasig River	Nielson Airfield becomes the heart of Makati Central Business District. Manila International Airport. Overseas Filipino Workers.	Overseas Filipinos drive suburban sprawl; Business Process Outsourcing gentrifies urban districts for 24/7 operations
Privatisation & Neoliberalism	*Encomienda* System	Attempt to secularise Encomiendas fails, land holdings bought by *Encomienda* grantees	Adjacent haciendas are subdivided, without control/ oversight by planning authority/ government	Development of haciendas proceeds with almost full private control by family developers	New wave of "hacienderos" spearhead brownfield redevelopment of industrial land into new centres
Commercial Activity	Riverside markets for the locals, Escolta for the "escorted" colonists	Attempts to keep Binondo as the centre for trade, but shifts Integration Centrality to 2 separate areas	Escolta becomes a business district, and high street for elite,	Metro Manila sees the first wave of Air-conditioned shopping malls	Shopping centres and outdoor "Lifestyle" centres, interiorise retail and consumption.

Table 6.1: Consolidation of major themes identified in Literature Review vs Metro Manila's pattern of development.

While not spatially deterministic, this study shows that these events in Metro Manila's historical development interact reflexively with Manila's patterns of spatial configuration, providing evidence that Manila's enclavism has an underlying socio-spatial logic.

Responding to the second research question, the Burnham Plan shifts the integration core away from Binondo, toward 2 separate northern and southern integration cores. This provides the evidence proving the second hypothesis and lays the groundwork for the decentralisation and migration of centralities in Metro Manila's future development (See Fig. 6.1). However, this study also shows that the Burnham Plan's radial-concentric road network is an ideal of spatial accessibility, with its spatial values highest across all ranges, and across the different time frames in Metro Manila's development (See Fig. 6.2a-h, next page and Fig. 6.3a and 6.3b, p. 155).

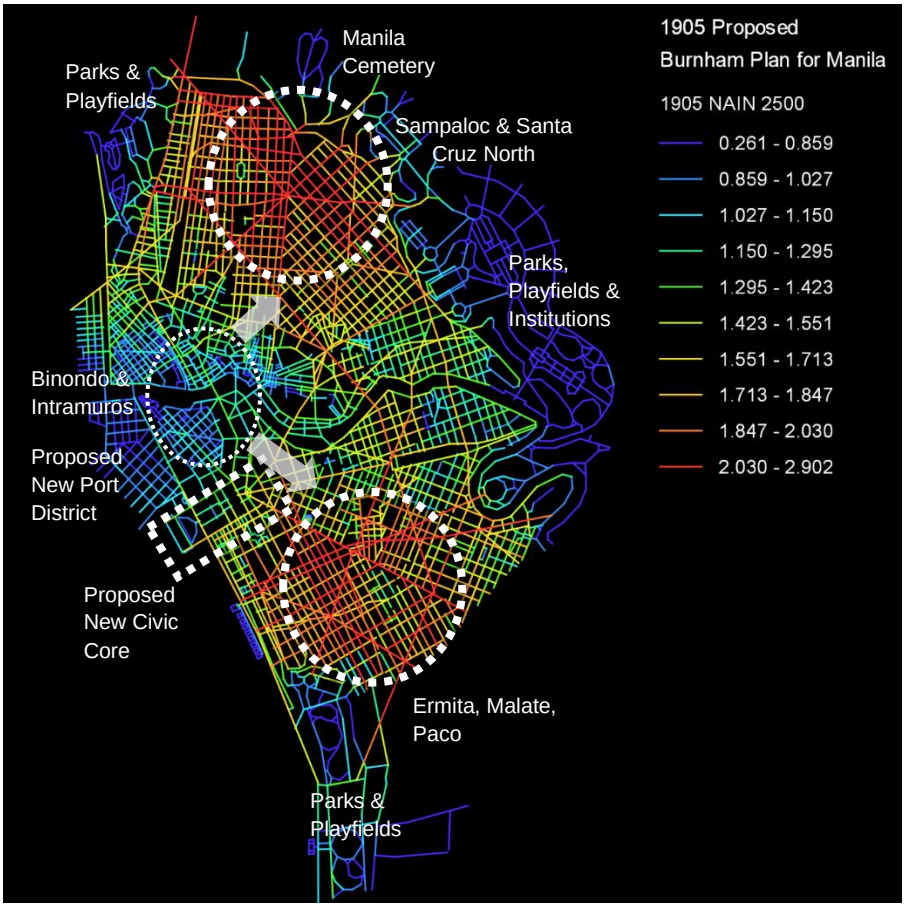


Figure 6.1: 1905 Proposed Burnham Plan for Manila, NAIN radius 2500 - showing shift of integration core away from Binondo toward 2 fragmented integration areas north and south of the Pasig River. Analysed using Depthmap X by *depthmap X development team*, UCL. Drawn by author *using QGIS* from: *Plans for the Development of Manila, Submitted to the Philippine Commission by D.H. Burnham, 1905.* from: Burnham, D. H. (1905). Report on Improvement of Manila. The Author. Accessed 5 February 2019. Source: <http://fac.arch.hku.hk/asian-cities-research/wp-content/uploads/Manila-Plan.jpg>

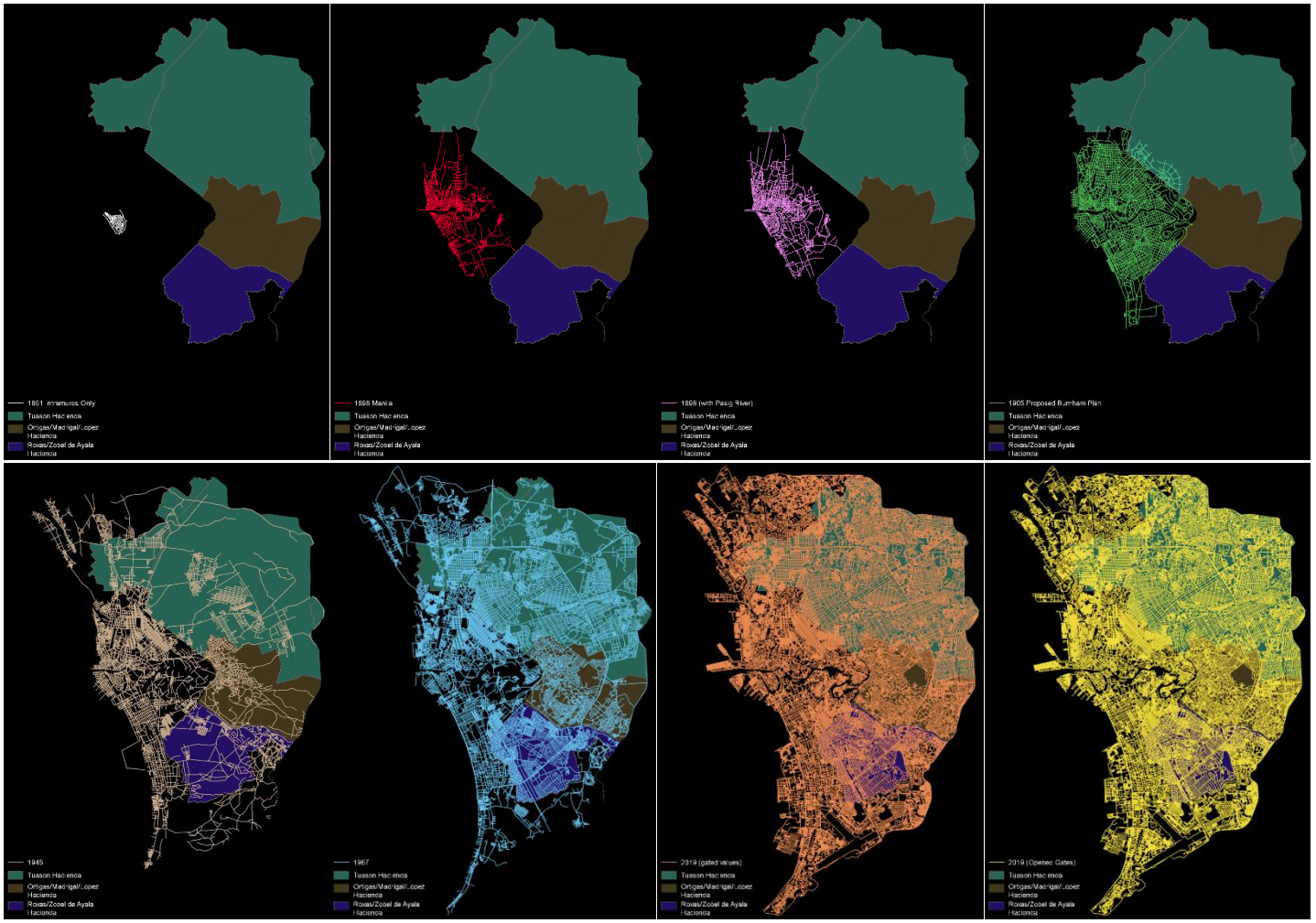


Figure 6.2. Key Map for Graph Comparison vs original indicative boundaries of encomiendas/haciendas around Manila (Left to Right, Top): a.1851 Intramuros Only, b. 1898 Intramuros and Arrabales, c. Intramuros and Arrabales with Pasig River, d. 1905 Proposed Burnham Plan for Manila. (Left to Right, Bottom Row): e. 1945 Manila and suburbs, f. 1967 Metro Manila, g. 2019 Metro Manila (gated), h. 2019 Metro Manila, all gates open. See next page for graph comparisons. Drawn by author *using QGIS from various sources cited earlier. Please refer to earlier captions for annotations.*

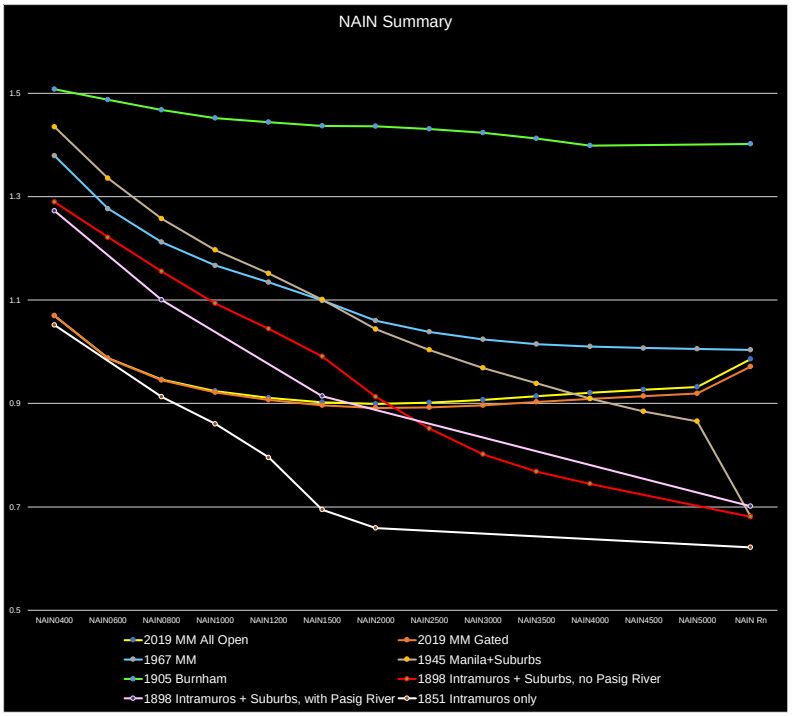


Figure 6.3a. Graph comparison of NAIN / Integration / Closeness centrality values of Metro Manila during different time periods. The theoretical 1905 Burnham Plan (in green), with its radial connected framework of streets has the highest integration levels across the board, but initiates fragmentation of the city into 2 halves, and does not account for the surrounding encomiendas/haciendas owned by private interests. The upward trend of both 2019 graphs (yellow and orange) show how vehicle-centric Metro Manila is, as global integration values are higher than local/pedestrian values. Analysed using Depthmap X *by depthmap X development team,* UCL.

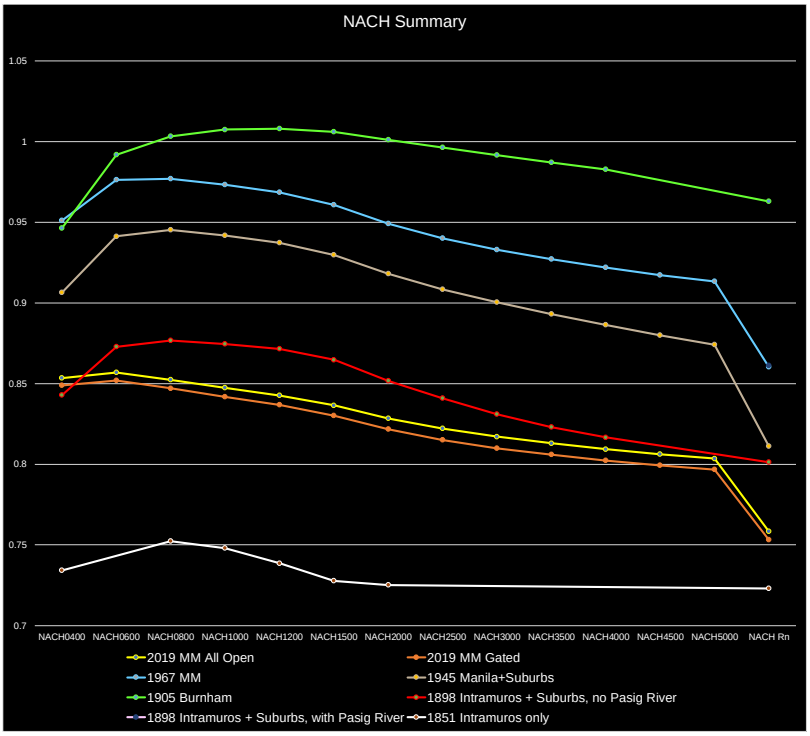


Figure 6.3b. Graph comparison of NACH / Choice / Betweeness centrality values of Metro Manila during different time periods. The theoretical 1905 Burnham Plan (in green), with its radial connected framework of streets has the highest route choice levels across the board, the lower choice values for 2019 (yellow and orange) show how enclavisation has reduced through routes in Metro Manila. Analysed using Depthmap X *by depthmap X development team,* UCL.

Because it was an unimplemented proposal, the Burnham Plan kindles a symbolic significance as the lost City Beautiful that Manila was supposed to be. But its dimensions were ultimately bounded by its brief within Manila's city limits (See Fig. 6.4). It does not address how to manage and control development of Manila's bordering *haciendas/encomiendas*. Ultimately Metro Manila's enclavism is not just a planning/design problem, but one of socio-political control over the privatised land holdings that became its present-day enclaves.

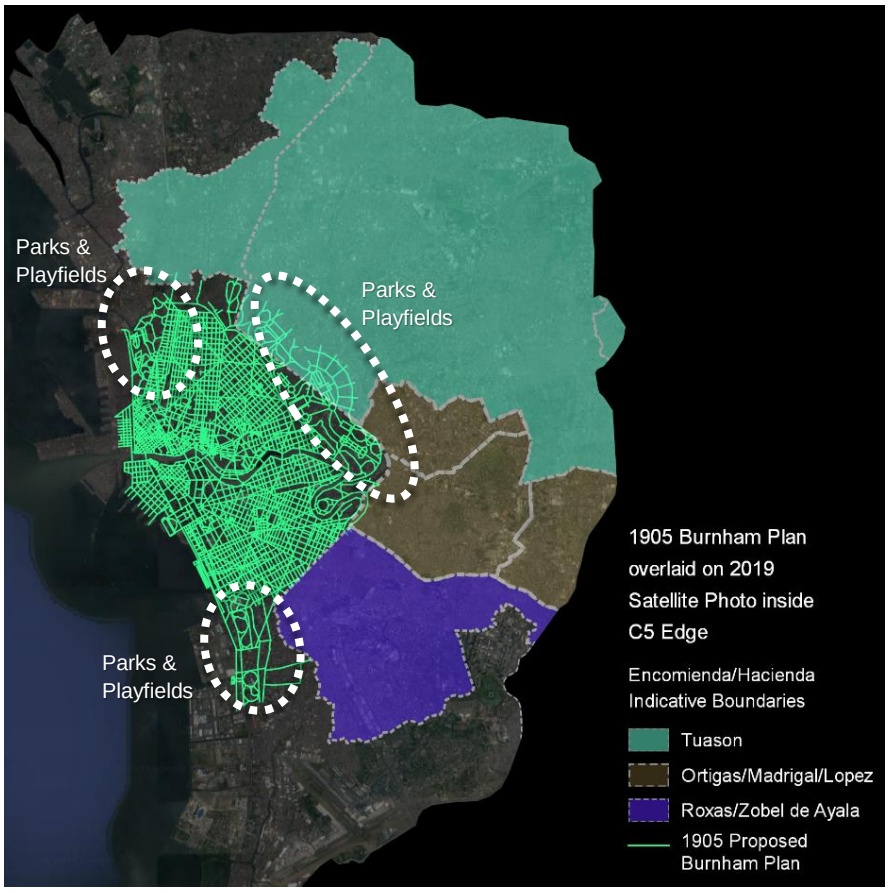


Figure 6.4: 1905 Manila and Suburbs – overlaid on 2019 Satellite Photo inside C5 edge. Showing the Burnham Plan's parks and playfields and indicative Encomienda/Hacienda boundaries based on present-day government unit boundaries Drawn by author *using QGIS* from: *1898 Manila and its surrounding suburbs / Plano de Manila y sus Arrabales 1898. Overlaid on Google Earth Satellite Photo*. *From Perry Castaneda Library Map Collection.* accessed 20 February 2019. Source: <https://legacy.lib.utexas.edu/maps/philippines.html>

In response to the third research question, Metro Manila's commercial enclaves attract (car-oriented) global movement toward their concentration of jobs and services. The enclave thresholds/entrances are largely accessible only along major vehicular routes. Once inside the enclaves, the spatial network has relatively low pedestrian integration within, and relatively low pedestrian accessibility to the areas outside the enclaves. Consumption activities within the mixed-use enclaves are internalised within large building footprints which are not integrated with their exterior spatial network. This contrasts sharply with how consumption activities adhere to the natural movement created by the configuration of the spatial network outside the mixed-use enclaves.

Similarly, the gated residential communities surrounding these commercial enclaves have their main entrances along routes that are used for vehicular circulation. Their internal street layouts are also less integrated with the exterior network and apart from rare instances, are internally less integrated for pedestrian movement. This is evidence proving the third hypothesis, showing how Metro Manila's current car-oriented enclavism is internally anomalous to space syntax's natural movement economies and centralities.

In response to the fourth research question, opening the gates of the exclusive villages surrounding Metro Manila's mixed-use enclaves/CBDs generates new vehicular routes into the CBDs passing through these villages. While temporarily alleviating traffic congestion by providing more road capacity, the increase in global integration values within the villages could induce demand by creating traffic to these villages, and not just passing through them. This could further congest the roads around these commercial and residential enclaves.

To test the fourth hypothesis, this study highlights embedded pedestrian centralities within these residential enclaves. These could be tapped by opening roads for pedestrians and cyclists only. Whilst residents will undoubtedly argue for the status-quo, the clamor for opening these gates places the imperative on them to consider this measure, on their terms, rather than as an imposed or top-down directive from the National Government, over which they have no control

of. One can also see the potential of how this could improve the quality of life for residents by reducing local car-use, and when paired with closer analysis and study with community engagement in planning and design, improving amenities through specific permitted commercial activities. These could lead to mobilising the high land values within the enclaves by allowing for higher densities on streets with higher integration levels. These could be strong incentives for their respective communities to consider these tactical changes as an alternative to opening their gates fully to public traffic.

6.2 Conclusions, Future Research and Reflections

The legacy of the conversion of *encomiendas* in the Philippines echoes around the world in more contemporary cases of large-scale privatised development. Enclaves are not necessarily a bad thing, nor are the thresholds and fences that secure them. The lack of peace and order, and the high rates of violent crime in Manila are an omnipresent danger not just to the residents of these gated villages, but to everyone as well.

What is needed is a reassessment of the scale and accessibility of these enclaved developments. Planned for the scale of cars and vehicles, these need to be localised for walking (with other modes of public transport and better infrastructure) to address the many socio-spatial dysfunctions (large carbon footprints, poor health, lost productivity and quality of life due to traffic and congestion, etc.) that spring from this vehicle-first orientation.

Deeper studies are needed to understand “unnatural movement” into these commercial enclaves, by measuring their significance as attractors of activity. The dual realm of interiorised “urban” spaces within Metro Manila’s shopping malls, and outside them also needs to be understood. How well do they connect with their surrounding fabric, and what are their implications on local and global movement?

The concept of yellow-field redevelopment also needs to be explored further. What spatial findings in gated communities could lead to actionable redevelopment? How can these be codified as a planning toolkit for bottom-up densification, pedestrianisation, and activation of the typical sterile gated residential suburb into a vibrant urban village?

The concept of walking distance also needs to be contextualised locally. Stifling heat (amongst other environmental and cultural factors) makes Filipinos lazy to walk outdoors in Metro Manila.

This study delves into Metro Manila's planned and formalised territories, but a large percentage of Metro Manila's population lives within informal settlements. What are the spatial dysfunctions of these settlements?

Also, as transport engineering and economics has difficulty in modelling and evaluating induced demand, could a relationship be found between induced demand with the differences in spatial integration values of the spatial network and their land uses?

Lastly, whilst taught as a non-normative methodology for analysis, this study points to what space syntax could be in localised Philippine practice. By surfacing the configurational properties of spatial networks, it could be used to inform regulation and oversight, focus investment, and become a fair dealer that will help mediate amongst uneven power balances and interests. Hopefully, space syntax could be a tool to cultivate the ground and help grow and reinforce open markets, and with them, the common good.

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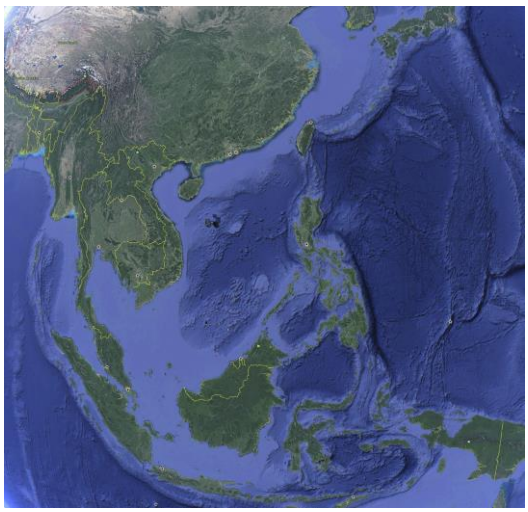
Appendix A: Geophysical and Social Contexts and their implications on the Philippines and Metro Manila

1. Archipelagic Monsoon Trading Region

The Philippines is on the eastern edge of what Widodo (2004) describes as the historical Southeast Asian Mediterranean of the South China Sea (See Fig. A.1). An archipelagic nation composed of 7,641 islands (NAMRIA, 2017), the Philippines has 3 major Island Groups: Luzon in the North, the Visayas Islands of the Central Philippines and Mindanao to the South (See Fig. A.2).

Even before the advent of European colonisation, Gipoloux (2011) concludes that regional trade followed the regular shifting of monsoon seasons and the annual tropical cyclones (typhoons). The country sees up to 20 Typhoons annually entering its area of responsibility (PAGASA, 2018). Usually originating from the Pacific Ocean, typhoons take a path through Luzon and Visayas Island groups, leaving Mindanao largely untouched for year-round agriculture (See Fig. A.3, next page).



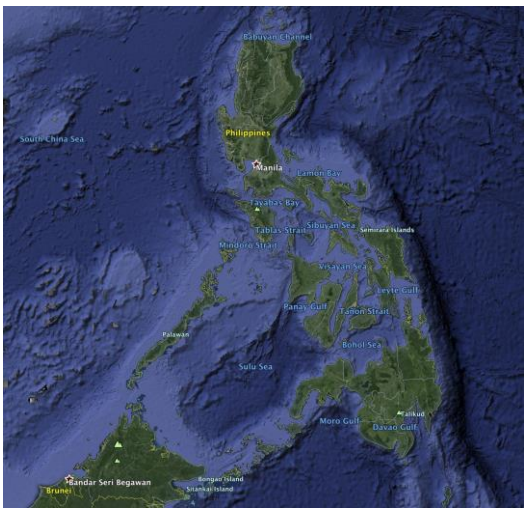


Figure A.1 (left): Philippines within the Southeast Asian context. from: Google Earth Pro Satellite Photo Composite. Accessed 3 December 2018. Source: Various Satellite Photos taken from orbit

Figure A.2 (right): Metro Manila is on the Northern Island of Luzon. from: Google Earth Pro Satellite Photo Composite. Accessed 3 December 2018. Source: Various Satellite Photos taken from orbit

The country has a population of 100.9 million people (PSA, 2015), with 19 distinct "mother tongue" dialect geographic regions (GMA News, 2013). These dialects form the basis of fractious local identities (See Fig. A.5). Kramer (1998) points out that it is these same parochial identities that the United States (and the Spanish before them) have exploited to control the populace.

2. Seismic and Volcanic Risk

Archipelagic Southeast Asia lies on the tectonically active Pacific Ring of Fire (See Fig. A.4). The Philippines has 5 major earthquake fault groups (PHILVOLCS, 2018). Greater Manila's 100.00 kilometre-long West Valley Fault System is a constant threat to the capital's inhabitants, having the capacity to produce a destructive earthquake with a magnitude of up to 7.6. (Nelson, A., Personius, S., Rimando, R. and Punongbayan, et al., 2000) There are also 25 currently active volcanoes in the Philippines (PHILVOLCS, 2018), 2 of which (Taal and Banahaw, with most recent eruptions in 1977 and 1909 respectively), have the potential to directly affect the southern portions of Metro Manila:

Figure A.3 (left): *Fifty Years of Cyclone Paths thru the Philippine Islands.* Source: NOAA, PHILGIS. by: David Garcia, 2016. Accessed 09 December 2018. From: < https://www.mapmakerdavid.com/>

Figure A.4 (middle): *A Hundred Years of Earthquakes inside the Philippine Islands.* Source: USGS, PHILGIS
by: Davida Garcia, 2016. Accessed 09 December 2018. From: < https://www.mapmakerdavid.com/>

Figure A.5 (right): *Philippine Ethnolinguistic Regions.* Accessed 06 December 2018
Source: <https://commons.wikimedia.org/wiki/File:Phillanguages.jpg>

Appendix B: Case Studies

1. Paris as Burnham's Beaux-Artes and Haussmanesque Ideal

Burnham's Parisian aspirations are quite obvious in how he sought to use similar radial roads and grand vistas/civic axes to weave together the North and South banks of the Pasig River, and to connect the historic core of Intramuros with the rest of expanded Manila. What immediately becomes recognisable is how Paris is able to distribute integration and accessibility to both north and south banks of the Seine River (See Fig. B.1).

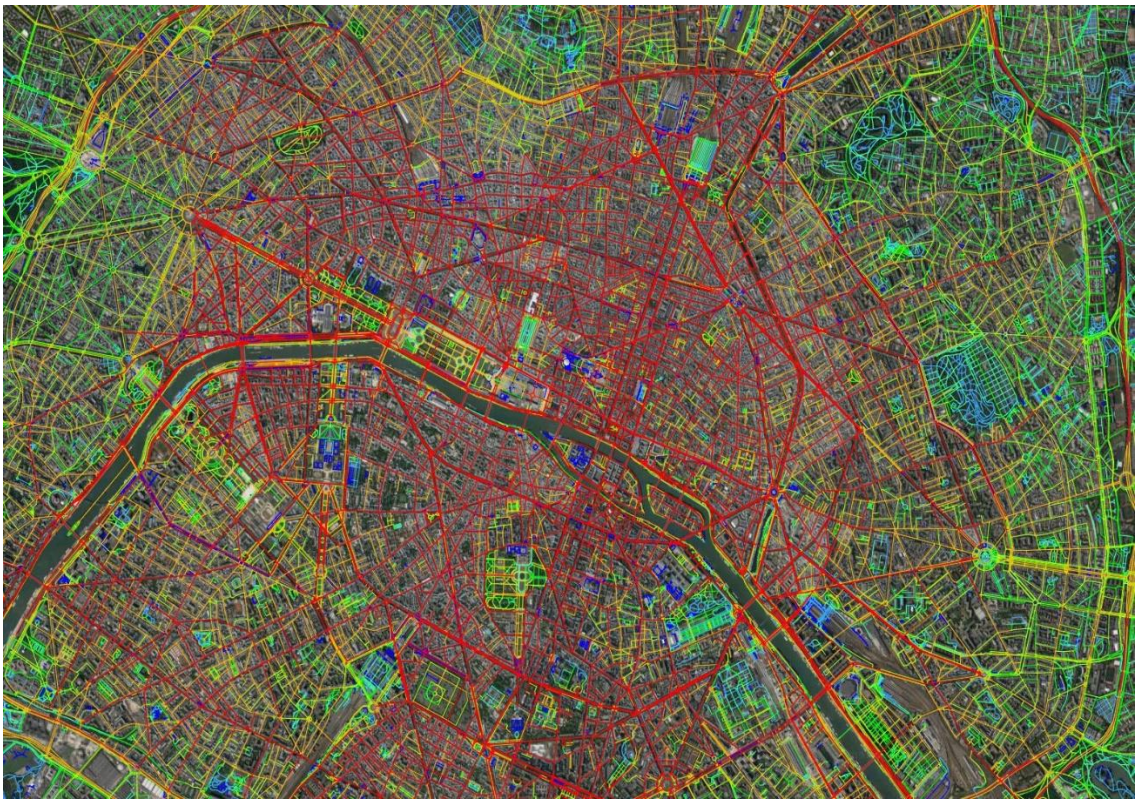


Figure B.1: 2019 Paris Integration analysis radius 8 angular turns - Central Paris' good connectivity between North and South banks despite separation by the River Seine. Riverside roads and numerous bridge crossings are instrumental in providing access to both sides of the River. Grand civic axes (usually in Jardins) do not necessarily become Integrated areas. Analysed using Depthmap X by depthmap X development team, UCL. source: Open Streetmap Road Centreline. accessed 25 February 2019. From: <http://www.geofabrik.edu>

Paris, despite being bisected by the Seine, appears to be able to hold centrality within its original historic core, and does not favour one specific side of the river. One could point at the number of river crossings that tie both banks together. With 25+ bridges within Paris' main ring road, one can see that it took that much infrastructure to integrate the city. Since Paris is not a port or marine-facing city, it is not inherently lop-sided and is able to distribute large-parcel industries further along the Seine, away from the city centre, thereby maintaining permeability and accessibility to the river.

Burnham's 1905 Plan, and today's current separated centralities could be a product of the lack of bridge infrastructure between the North and South banks of the Pasig River.

2. Washington DC and Paris' Grand Axes recount Hillier's "Strange Cities"

The grand civic axes found in Washington DC's National Mall and in Paris different Jardins, while central to schema of both cities, are not necessarily integrated with respect to their respective surrounding spatial network.

These parts of Washington DC and Paris could be seen as examples of Hillier's (1996: 215-238) "strange cities" which refer to Teotihuacan and Brasilia's axiality, which while dominant in diagram, are less so when assessed in comparison with the actual daily use of each city's residents.

This is so well illustrated in Paris where the Champs Elysees transitions from an urban boulevard into a "strange" civic axis into the plazas/jardins along its path, and one can see that the integration and probabilistic capacity of the boulevard to generate activity shifts out to the edges of the civic spaces. This occurs in Washington DC's National Mall as well with vibrancy and activity generated elsewhere in the spatial network along the long diagonal routes that cut through the city grid (See Fig. B.2, next page).

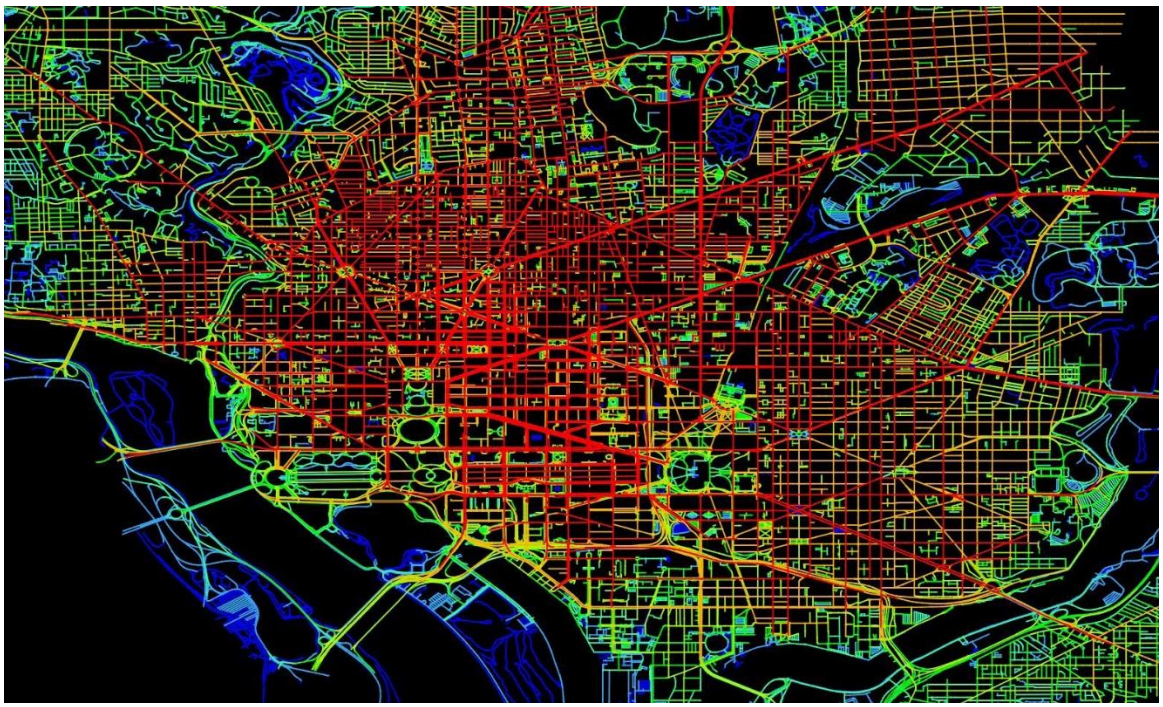


Figure B.2: 2019 Washington DC Integration analysis radius 8 angular turns - showing how the National Mall is not necessarily automatically activated throughout just by virtue of being configured on grand axes. Analysed using Depthmap X by depthmap X development team, UCL. source: Open Streetmap Road Centreline. accessed 25 February 2019. From: <http://www.geofabrik.edu>

Appendix C: Manila's Historical Maps during the American Period

1. 1915 Manila

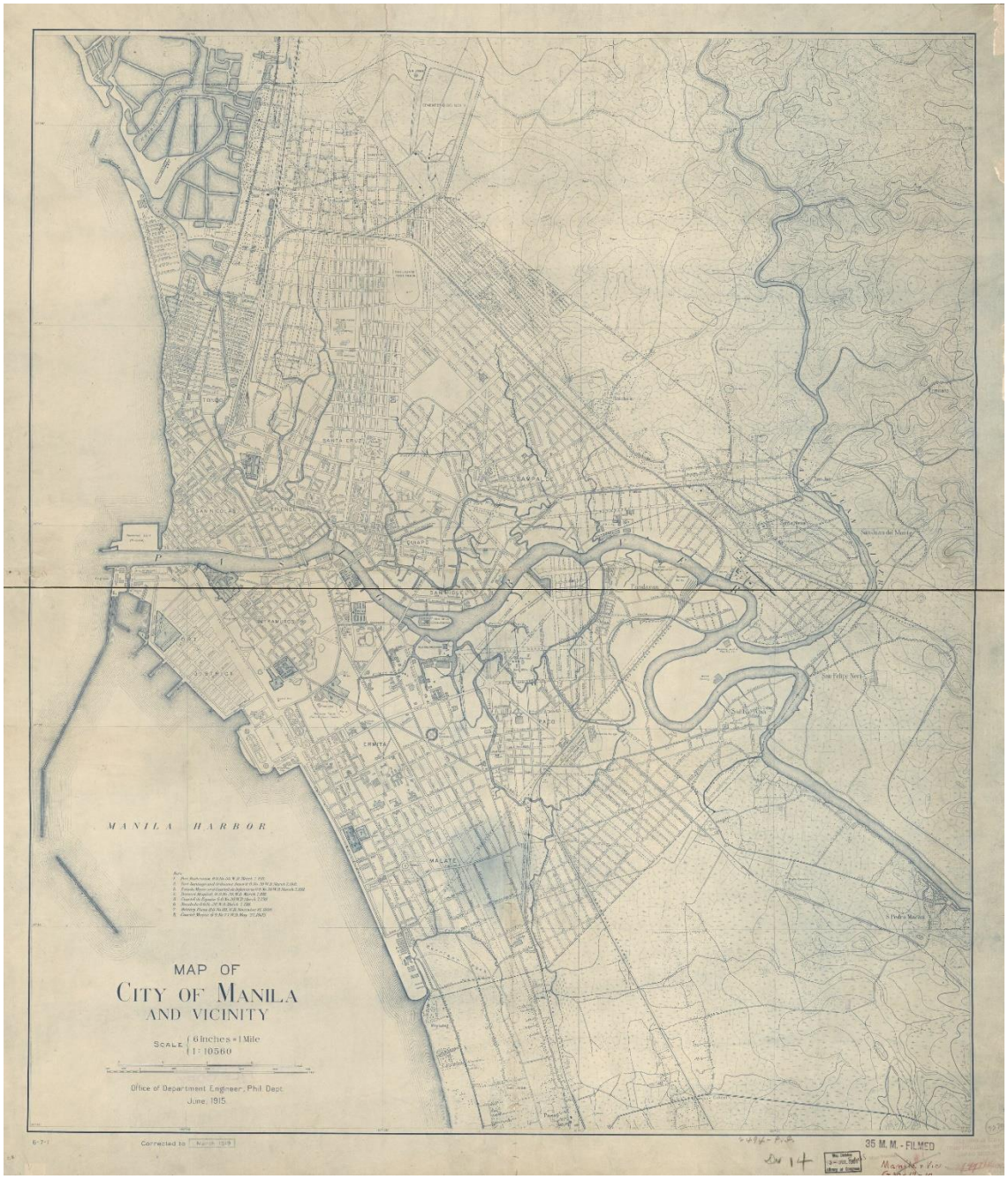


Figure C.1: Manila 1915 - showing city grid 1 year after William Parsons' resignation from his post as consulting architect. accessed 5 February 2019. from: <https://www.loc.gov/item/2012586259>

2. 1920 Manila

Figure C.2: Manila 1920 - showing how road network complied with Parsons' revised grid. accessed 5 February 2019. from: https://www.loc.gov/item/2012586259

3. 1930 Manila

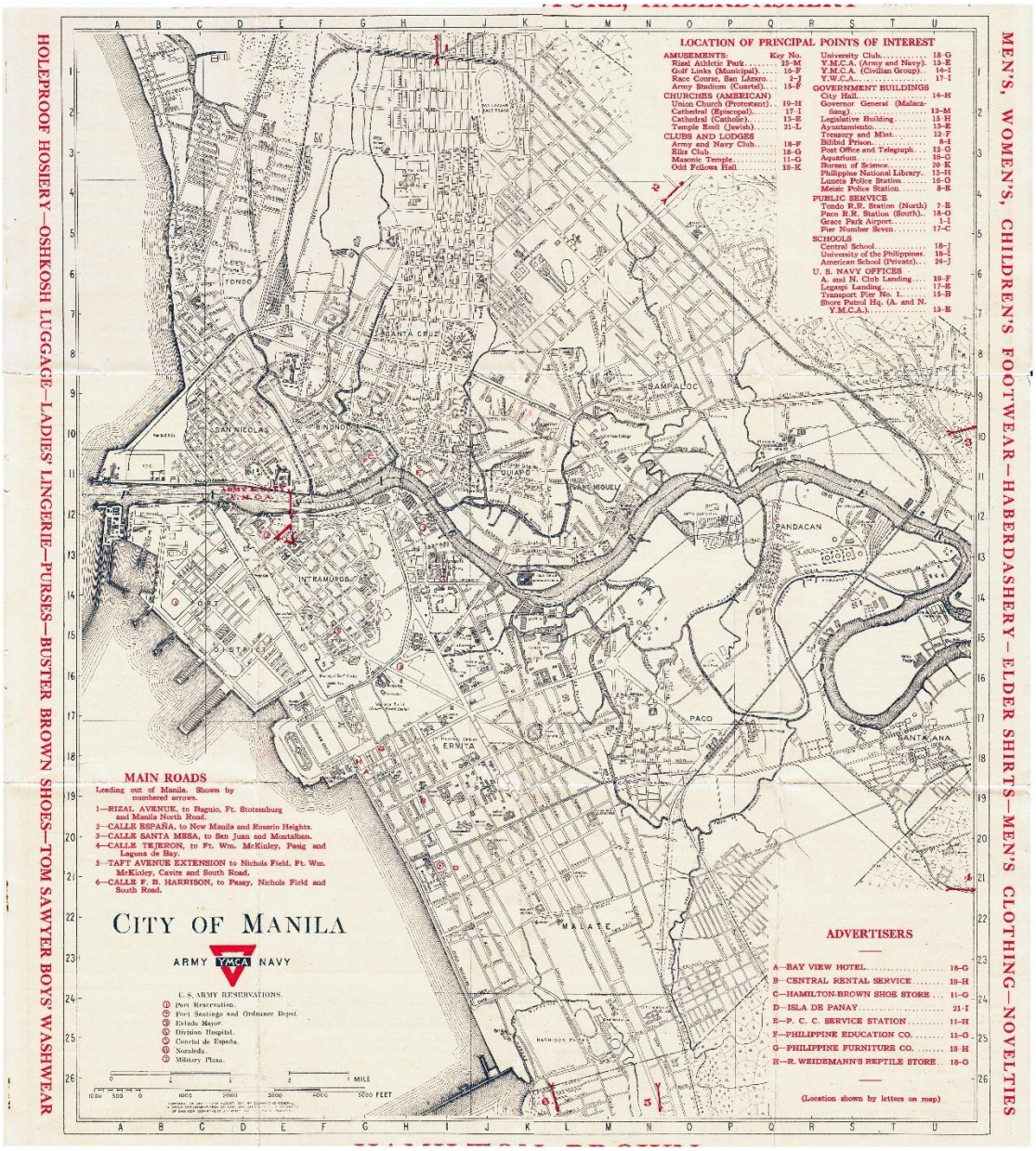


Figure C.3: Manila 1930 - showing expansion / intensification of use and Americanisation of Manila. Accessed 5 February 2019. from: https://www.flickr.com/photos/johntewell/ sets/72157623628506511

Appendix D: 2019 Metro Manila Inside C5 showing Mixed-Use CBDs and Enclaves, NAIN 2500, gated condition. Showing continuation of fragmentation between North and South Halves of Metro Manila.

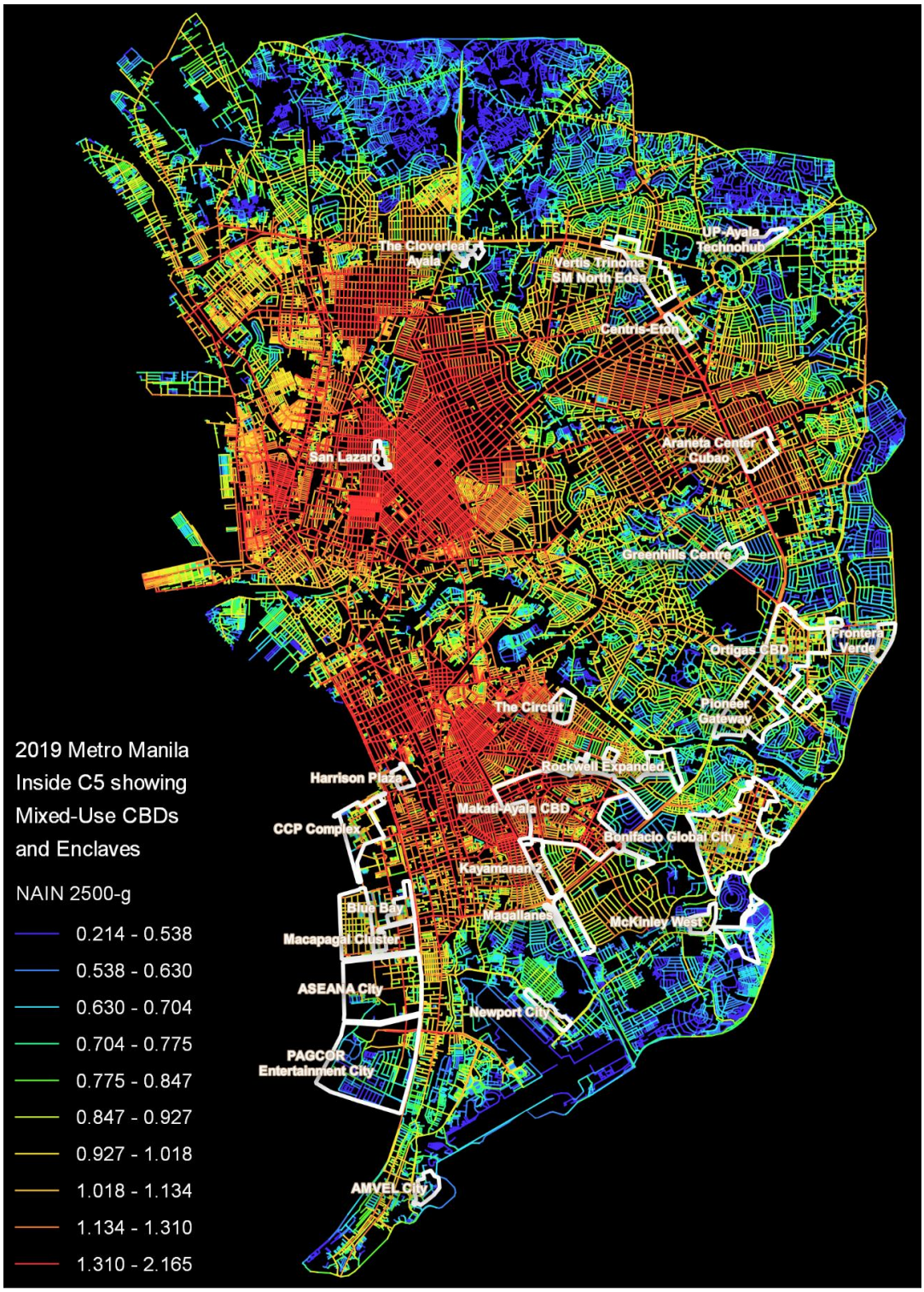


Figure D.1: 2019 Spatial Graph of Metro Manila within Circumferential 5 Road, NAIN 2500 showing Mixed-Use Central Business Districts and Enclaves. Analysed using Depthmap X *by depthmap X development team,* UCL. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Appendix E: 2019 Metro Manila inside C5 showing Consolidated Enclaves by Type

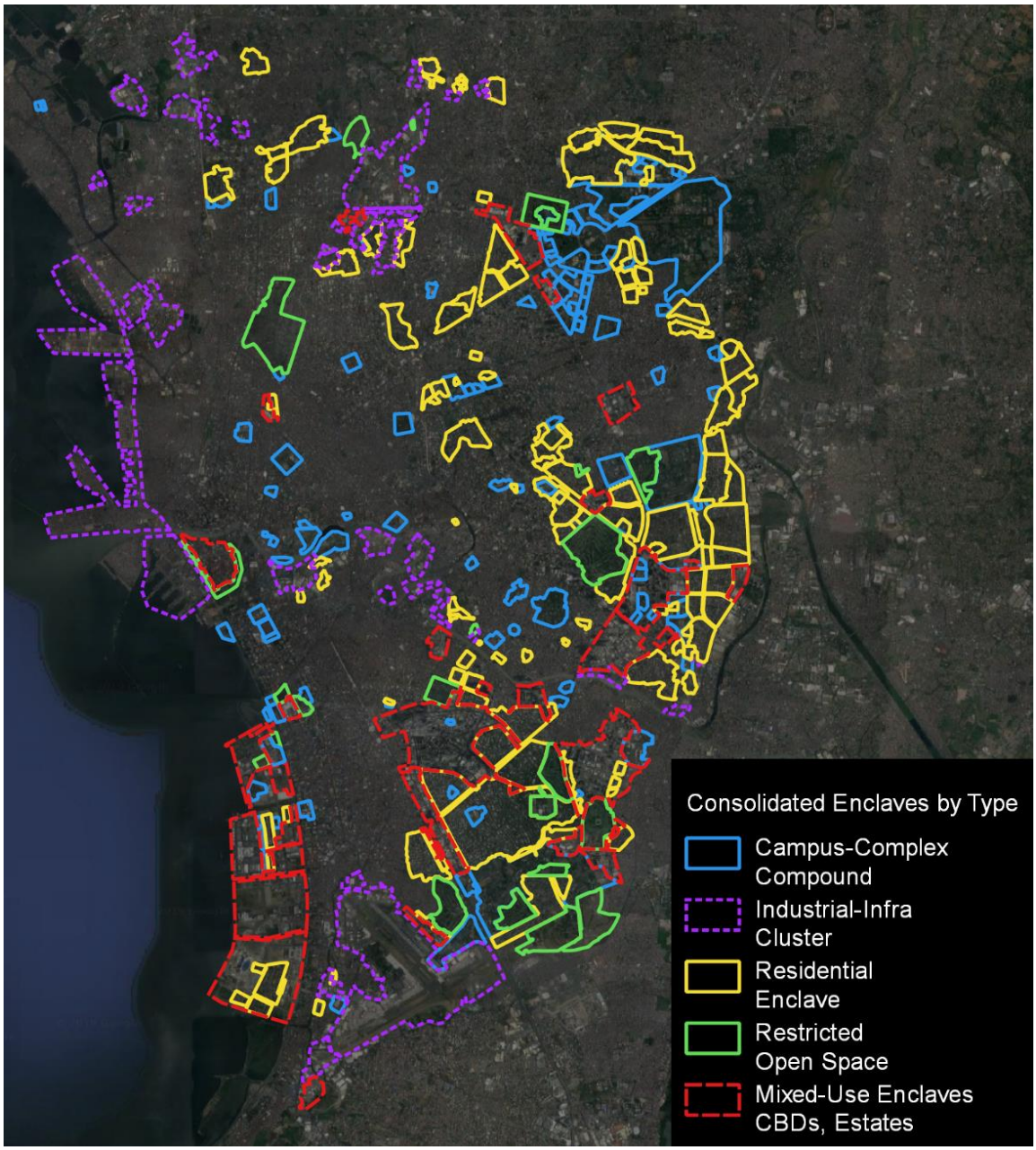


Figure E.1: 2019 Spatial Graph of Metro Manila within Circumferential 5 Road, showing Consolidated Enclaves by Type. Drawn by author *using QGIS from: OpenStreetMap. accessed 20 February 2019 Source: <http://download.geofabrik.de/asia/philippines.html#>*

Appendix F: Metro Manila Land Use Map 2004

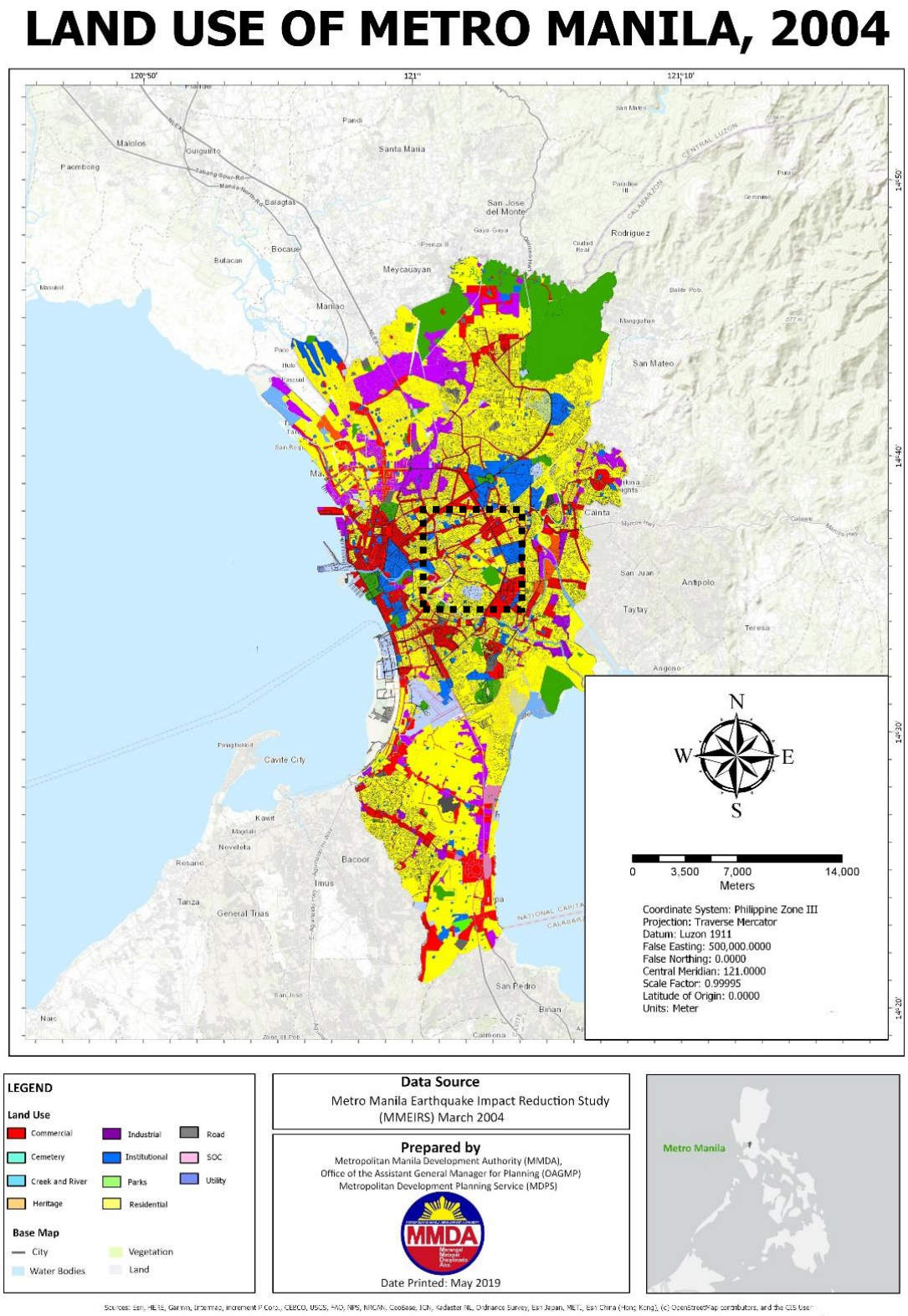


Figure F.1: 'Land Use of Metro Manila, 2004'. By MMDA-OAGMP-MMDPS, March 2004. *from: Metro Manila Earthquake Impact Reduction Study (MMEIRS).* Source: Metro Manila Development Authority, Office of the Assistant General Manager for Planning

Appendix G: Linear Regression modelling the locations of Mixed-Use Enclave/CBD Entrances based on the improved spatial accessibility brought about by opening the gates of surrounding exclusive villages.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.874[a]	.763	.752	.180

a. Predictors: (Constant), aoxIN Rn, aoxCH5000, aoxIN5000, aoxCH Rn

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.406	4	2.102	64.531	.000[b]
	Residual	2.605	80	.033		
	Total	11.012	84			

a. Dependent Variable: EntryPOI

b. Predictors: (Constant), aoxIN Rn, aoxCH5000, aoxIN5000, aoxCH Rn

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1.833	.186		-9.873	.000
	aoxCH5000	2.483	.370	1.351	6.708	.000
	aoxCH Rn	-1.547	.389	-.907	-3.979	.000
	aoxIN5000	-.765	.172	-.431	-4.459	.000
	aoxIN Rn	2.000	.245	.912	8.177	.000

a. Dependent Variable: EntryPOI

Table G.1 (a. top, b. middle, c. bottom): Linear regression to predict locations of Mixed-Use Enclave/CBD Entrance POIs based on the improved spatial accessibility brought about by opening the gates of surrounding exclusive villages. A significant relationship [p<.000], with an R^2 of 0.763 was found for the variables listed and the POI locations. The range values of the variables found by this regression are all for high-range vehicular/global movement. Spatial accessibility values analysed using Depthmap X *by depthmap X development team,* UCL, and processed using IBM SPSS Statistics 25, *by IBM.*