URBAN PANDEMIC RESILIENT HOUSING UNITS (GIRNE NORTHERN CYPRUS)

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BY
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Patience Aji Francis NATHAN: URBAN PANDEMIC RESILIENT HOUSING UNITS (GIRNE NORTHERN CYPRUS)

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DECLARATION

I declare that the work of this dissertation entitled “A CASE OF LAPTA: URBAN PANDEMIC RESILIENT HOUSING UNITS, GIRNE NORTHERN CYPRUS” has been carried out by me in the Department of Architecture. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously for another degree or diploma at this or any other Institution.

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DEDICATION

To my late mother…

ABSTRACT

This dissertation which is entitled: A Case of Lapta: Urban Pandemic Resilience Housing Unit, Girne Northern Cyprus, aimed at creating a sustainable urban environment that will be healthy and conducive for social interaction without compromising pandemic rules. The project location is a connector between land and sea as a natural means of context continuity creation. And the site location's isolation from the city is an added advantage for pandemic development. The facilities provided for this resilient community cut-across health, recreation, civic, dwelling, and other social infrastructures at the general scale. However, this project focuses on dwelling that is limited to three housing typologies-Semi-detached single units (18 units), apartment units (16 units), and detached units (3 units). The design approaches that were harnessed included biophilic approach, sustainable design approach, universal design approach. As part of the methods, a field work was carried out which included note-taking, taking photographs, in order to create a proper site analysis of the location and literature review. The project process included a complete conceptual design scheme which is a solution to the problem identified. When completed, it will be a home away from the city busy life and would be inclusive to all social classes.

Keywords: Pandemic housing; biophilic design; urban housing; urban resilience; urban health

Özet

Kentsel Pandemik dayanıklı konut yerleşkesi, Lapta örneği; Girne Kuzey Kıbrıs, başlıklı bu tez, pandemi kurallarından ödün vermeden sağlıklı ve sosyal etkileşim için elverişli olacak sürdürülebilir bir kentsel çevre yaratmayı amaçlamaktadır. Proje konumu, bağlam sürekliliği yaratmanın doğal bir yolu olarak kara ve deniz arasında bir bağlayıcıdır, ayrıca site konumunun şehirden izole olması, pandemik koşullar için bir avantajdır. Bu alanda kentsel tasarım ölçeğinde, sağlık, rekreasyon, sosyal merkezler konut ve diğer sosyal alanlar tasarlanmış, bu tasarım özelinde de konut birimlerine odaklanılmıştır. Alanda üç farklı tip konut tipolojisi bulunmaktadır: Yarı müstakil tek üniteler (18 ünite), apartman birimleri (16 ünite) ve müstakil üniteler (3 ünite). Kullanılan tasarım yaklaşımları arasında biyofilik yaklaşım, sürdürülebilir tasarım yaklaşımı, evrensel tasarım yaklaşımı yer almaktadır. Tasarımın başlangıcında, saha analizi, fotoğraf ile belgeleme ve literatür taraması yapmak için not alma gibi yöntemler uygulanmış, kavamsal tasarım çalışması yapılmıştır. Alan için geliştirilen kavramlar, konut ünitelerinin konumları, birimlerin birbiriyle, sosyal alanlarla, doğa ile ilişkisi bakımından tasarım kriterlerinin belirleyicisi olmuştur. Öneri, şehrin yoğun yaşamından uzakta bir yuva olacak ve tüm sosyal sınıfları kapsayacaktır.

Anahtar Kelimeler: Pandemik konut; biyofilik tasarım; kentsel konut; kentsel dayanıklılık; şehir sağlığı

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LIST OF ABBREVIATIONS

Architecture 502:	Architectural Studio Design I
Architecture 511:	Architectural Studio Design II
COVID-19:	Corona Virus Disease referred to as 2019 Novel Corona Virus
NATO:	North Atlantic Treaty Organization
NCDs:	Non-communicable Diseases
TRNC:	Turkish Republic of North Cyprus
WHO:	World Health Organization
WWII:	World War Two

CHAPTER ONE
INTRODUCTION

1.1. Background of Dissertation

The proposed design of Urban Pandemic Resilient Community Lapta with focus on Housing Units is timely with the recent/present displacement and uncertainty caused by the COVID-19 Pandemic globally. It is also getting clearer that the new normal may mean territories will have to live with the situation to prevent the enormous problems of total lockdown attempted trials. The concept of the design is to create a pandemic resistant urban environment while taking into consideration the wellbeing of the inhabitants of the community. With regards to the way viruses are mainly transmitted which is by physical contact. We envisioned a scenario whereby people can live in a community which encourages minimal physical contact and yet not compromising social interaction among the residents of the neighborhood. The approach will thereby reduce the impact of loneliness among the dwellers with accessibility and proximity to health facilities and supporting infrastructure. To achieve our goal, an eco-friendly site was chosen which is located at Lapta (Nicosia 5^0 10'N 33^0 22'E), Figure 1. This is a province at the heart of the Turkish Republic of Northern Cyprus (TRNC). Lapta has an area of 18.22km^2 and a population of about 8,000 inhabitants (TRNC State Planning Organization, 2011). The site which measures 10 hectares in area, has an undulating nature with different levels and it is bounded to the Mediterranean Sea. The Google Earth of the site location and outstanding features are shown Figure 2.

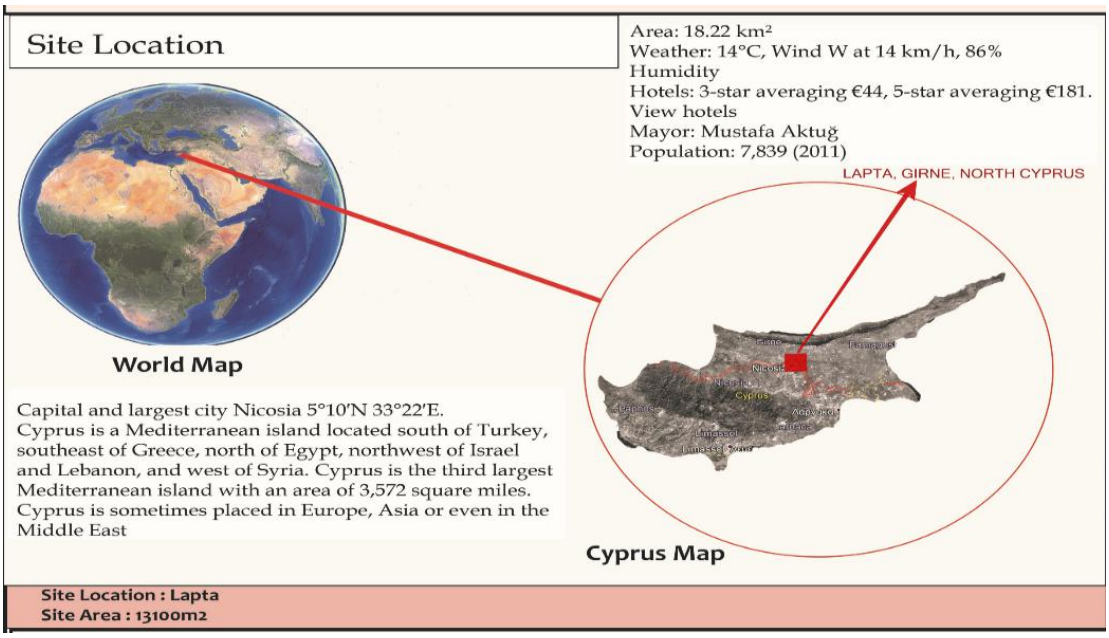

Figure 1: Study Area- Cyprus (Author, 2020)

Figure 2: Pandemic Solution to site (Author, 2020)

The noise levels ranges from 80 – 40 decibels with the highest source coming from earth-moving machineries while the lowest emanates from the sea waves. The atmospheric weather condition of the site has its peak at 37°c and the lowest being 8^0 c with stronger

winds coming from the Northwest and South east direction of the site. At day time, cool air moves from the sea to the land, warm air from the land rises up and take the place of cool air at high temperature thereby pushing cool air towards the sea. At night time, cool air moves from the land to the sea while warm air from the sea rises up from the sea, taking the place of cool air at high temperature hence cool air is pushed down toward the land. Topographically the site is a sloppy terrain thus will lead to meticulous design of the area and provision should be put in place for change of ground surface water and use plant materials to prevent possible soil erosion like natural angle for soil repose should not be exceeded. For the soil texture presence of loamy and clay soil are present which recommend slab on grade foundation are good source for the soil well designed slab to withstand pressure of the soil contracting and expanding allowing the structures support to remain stable, also loamy soil which good for outdoor vegetation like gardens and quality landscaping . Figure 3 shows the analysis of the site.

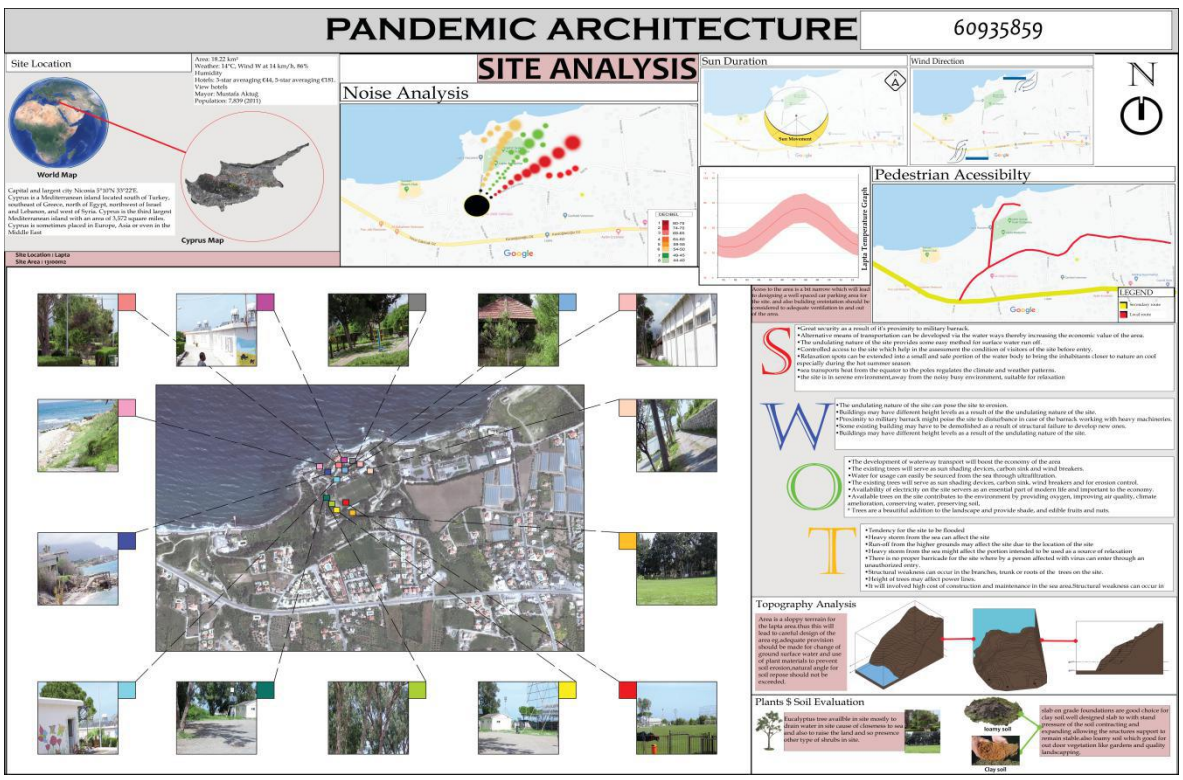

Figure 3: Site Analysis (Author, 2020)

A well designed site with basic amenities was developed to make life easier in the pandemic by mixing a blend of health, recreation and social wellbeing. Different ideas

were put into play with an introduction of a Nursing Home which is necessary to monitor the health of patients that are convalescing from the ailment, a 2500m^2 Health care center that is provided for basic health treatments which is partitioned so as to provide a means of control between the pandemic unit and the other general hospital functions. The health care center was a bit zoned from the busy part of the neighborhood to protect the inhabitants of the community as well as making the hospital more accessible from the entrance of the site and the harbor provided by the sea shore.

Furthermore, an administrative and social center of about 2000m^2 was designed carefully with regards to pandemic safety measures to cater for the management of administrative functions for the urban pandemic community. General residential dwelling units were provided across the different level of the site. These residential units can be accessed by walkways and circulation mediums for a variety of users that are strategically placed and designed around the site to ease access and encourage safety by the choice of materials such as permeable walking space which helps tackles flooding issues and allows soil to receive nutrient and paying attention to physical and social distancing. To encourage safe communal activities in the area, various activity areas, semi open spaces, therapeutic gardens, fitness areas, edible gardens and herb gardens were considered while planning the pandemic community and were carefully placed around the site. To cater for the security needs of this neighborhood, a perimeter fencing was provided and the introduction of surveillance points/towers, with one around the harbor and another by the main entrance to the site by land helps in restricting and overlooking the visitors coming to the neighborhood and testing the incomers before granting them access to the pandemic neighborhood.

1.2. Dissertation Problem

The Pandemic produced a connected amount of complications which includes death and illness, a stress in the healthcare system, traveling ban and restrictions, home-confinement and quarantine necessities, confusion and fright, stress; both physical and mental, not excluding the great loss of revenue due to people and commerce which impends the development of the economy at the local, national and global levels respectively.. In this era of pandemic situation, how can housing units that are resilient and will at the same time

meet human needs for social interaction be achieved? Recent happenings due to the covid-19 pandemic created uncertain economic difficulties for different social class and even the entire society. Appraisals of current architectural and urban discourses also ponder how many years of research and development had concentrated only on the wellbeing, safety precautions and ergonomic of users of buildings while neglecting the architecture of preventive medicine/virology in housing developments.

1.3. The Aim and Objectives of the Dissertation

This dissertation will be organized to create urban housing design that will be resilient in a pandemic situation within a proposed comprehensive gated community with other social infrastructures without compromising the precautions for virus spread. Based on this main aim, the dissertation will consist the following objectives:

1. How can urban housing units accommodate people in a pandemic situation without hindering social interaction?
2. What type of design approaches can provide social interaction for users without compromising pandemic safety and preventive measures?
3. How can the design scheme be structured to accommodate different social class of the community?
4. How can the design environmentally interact with the selected contextual environmental features and incorporate biophilic and sustainable principles?
5. What local, modern materials and specific design elements can be explored on the proposed housing units to create a sense of continuity of the context while maintaining aesthetics?

1.4. The Importance of the Dissertation

The rationale for this dissertation is directed towards providing a model design that remedy the problem already identified, which is the development of urban resilient housing units in a pandemic situation that obeys pandemic set rules without hindering social interaction. Furthermore, having selected a previous site that was used for the first phase of the pandemic development in Lapta Community, the site possesses distinctive features that is appraised at studio reviews and shown potentials to support this project, other vital issues

relating the importance of the dissertation will include the provision of approaches that will be transferable to similar design projects and researches in other contexts. It will contribute to the ongoing discourse on the COVID-19 pandemic as it affect architecture and urban design in the world. It will also provide therapeutic space and calm environments where people can feel safe and secure. In addition, the development will facelift the community image and build place belonging courage of the locals.

1.5. Research Methodology

The research methodology of this dissertation is qualitative research. It will be based on literature survey, documents and case studies, forming the first phase. While under documents the materials retrieved will include: The spatial and visual materials that were used in the previous Design Studio 1 (ARC 502) is harnessed since the proposed design is a subset in the site location for the Urban Resilient Pandemic Community, Lapta. Retrieval of design minimum standards and other background data from design reference books, location map downloaded from Google Earth, and previous completed dissertations related to the topic.

The second phase will involve the development of a conceptual design model through the synthesis of all the possible data sourced as a demonstration and solution for the problem identified. Based on this premise, a complete set of architectural drawings will be reproduce with other visualization. This framework is envisaged to answer the major question of the dissertation: How can housing units that are resilient and will satisfy social interaction be created without compromising pandemic norms?

1.6. Limitation of the Study

This project is structured for the design of Urban Pandemic Resilient Community for Lapta in Girne, North Cyprus. The project is site sensitive and all analysis carried out will respond only to the specificity of the location. The site layout is design to handle housing units and relaxation facilities. The verticality of the buildings will not exceed 4 storeys which is compatible with the existing modern urban morphology of Northern Cyprus. From the site analysis done, the site show different datum (levels) of which the design will be organized to match with the existing topography even though there will be cut-and-fill at some points, and site stabilization. Since the project programming is comprehensive in

nature, the design will come in phases, the first phase is handled through Studio I-ARC502 in Spring Semester 2019/2020. There will be provision on site to accommodate future developments for Studio II-ARC511 in Fall Semester 2020/2021.

1.7. Overview of the Dissertation

The project location is a connector between land and sea as a natural means of context continuity creation and the site location's isolation from the city is an added advantage for pandemic development. The facilities provided for this resilient community cut-across health, recreation, civic, dwelling, and other social infrastructures. The design approaches that were harnessed included biophilic approach, sustainable design approach, universal design approach. This dissertation will comprise six (5) chapters. In chapter one, the introductory aspects of the Pandemic Architecture will be laid. A search for related research about the topic will be provided in chapter two, followed by the review of literature in chapter three. The methodology used will be expanded in chapter four, while chapter five discusses the specific design consideration. The summary, conclusion, and recommendation made in chapter five.

CHAPTER TWO

URBAN RESILIENCE AND HOUSING DEVELOPMENT TRENDS

2.1. Urban Pandemic, Resilience and Housing

Precision is whole and positions immobile and still stands don't varies or progress and is inevitably lifeless. The whole thing in the world varies, progression suggests that the construction is not whole therefore the option of developing (Osho, 1985).

As culture and budget are continually altering, the wishes and demands of individuals fluctuates all the while. Countries like Netherlands and China, experienced a flourishing growth in the number of housing need after the WWII. They are currently faced with the values of these thriving expansions. The housing source does not contest any longer the altered wish. The calculable demand is replied with a qualitative source like the real estate, which transmits the volume to acclimate to these continually altering demands.

This building evolution should be planned to learning hence existence able to familiarize to varying situations, mixed growth with development and change to last like creatures do in a settled ecology (Biomimicry Life's principles circle, 2010). That way, focus will no longer be on the expansion (most maintainable real estate at liberation) but rather on optimization (elasticity offers the volume to adjust to vicissitudes thus becoming more user-environmental fixated in the long run). This study is not attentive on Biomimicry but will spread on the ideas linking to maintainable plans (Benyus, 2002). The central knowledge is that most of the challenges encountered in life like the transportation, nature has already solved many of the problems we are dealing with: energy, food production, adaptability, climate control, benign chemistry, transportation, and more.

If we look at current urban housing, it is clear that they do not have the adaptive possessions of natural multipart organizations. So why don't we generate housing in the way nature makes complex systems? Developers use the term "flexibility" to define a system's capability to absorb shockwaves, that is environmental or social changes, sudden economic. Many communities have aims to rise their elasticity (100 Resilient Cities). Flexibility being the 'capability of any urban organization to preserve endurance through all stresses and shocks while definitely familiarizing and altering towards sustainability'(https://unhabitat.org/resilience).This epidemic shaped an interconnected set

of difficulties that contains disease and losses, system stress of health care, portable limitations, stay-at-home and separation necessities, confusion and fear, physical and mental stresses, plus lost profits to persons and trades which threaten local, nationwide and international financial growth (Litman, 2020).

Although there is widespread works on community resilience planning and emergency management, most present journals emphasis threats on environmental such as wildfires hurricanes, and earthquakes; epidemics obtain little deliberation. Plagues vary from most other tragedies because they loom people but not organization, have long periods and enormous economic influences. So, their justification is mainly focused on with caring people and providing economic safety, with little requirement for substructure repair and shield (Litman, 2020).

2.2. Housing and Biophilic Design

There is growing attention on the part of planners, designers and urban planners in biophilic design and much innovative literature and writing looking in the last numerous centuries. Biophilic design grasps that good project, at the structure, city and regional, scale site, must comprise nature and usual elements.

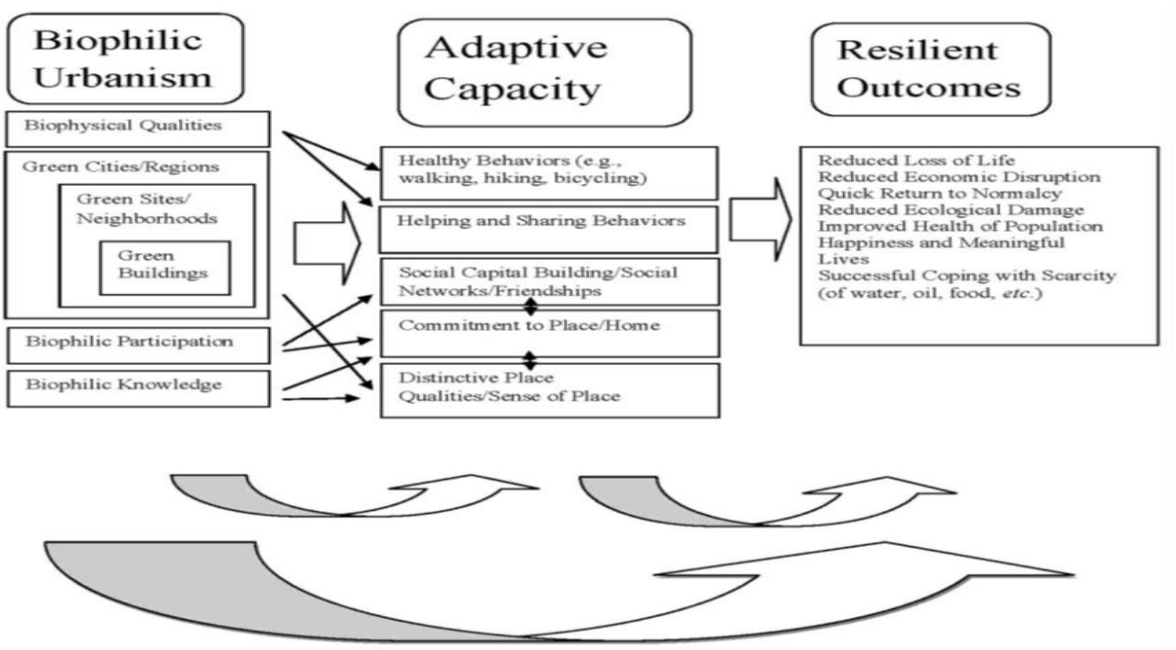

Figure 4: Biophilic pathways to urban resilience (Beatley & Newman, 2013).

2.3. Urban Resilience and Housing for Social Interaction

The forthcoming is random so clever development makes for thinkable unforeseen variations, what economic expert call tremors, we must “optimize for the best but prepare for the foulest.” This would be casual if we confronted just one thinkable tremor, but there is a huge variety of likely coercions that personalities and societies may face. Below are overall values for community flexibility conferring to Litman (2020).

2.3.1. *Prepared and Responsive*

Equipped and receptive resources that societies have dependable guidance, management programs effective emergency, and good communiqué that allows communal administrators to connect with inhabitants and people to interconnect with communal officials.

2.3.2. Robust, Secure, Redundant and Flexible

Critical substructure must be robust, flexible and superfluous in order to endure possible failures and strains, and should avoid higher-risk sites. For example, tremors cause much less injury and wounded in areas with strong structure codes, and extreme climate is less likely to source power disappointments where efficacy lines are subversive. Likewise, for safety sake, households and groups should dodge defenseless valleys, beaches and woods vulnerable to wildfires, risks that are growing with climate change.

2.3.3. *Diversity*

A various structure is well able to reply to unforeseen variations. For instance, people who usually travel by vehicle should worth partaking substitutes, such as bicycling, good walking and community transportation in their public, for conceivable forthcoming circumstances in which they cannot or should not energy, because of an automobile disappointment, medicinal problematic or misplaced profits, or as a tragedy makes infrastructures impenetrable or fuel inaccessible. Drivers also profit from non-auto styles that decrease their chauffeuring burdens. Similarly, homes advantage from having varied home heating system and food options, food materials, and engagement chances.

2.3.4. *Affordable and Resource-efficient*

Transport and housing are most home's two main expenditures, reasonable housing and conveyance are chiefly significant for flexibility preparation. These values can be practical to many kinds of development choices. For example, this proposes that to rise pliability, homes should select households, and cultures should plan districts that are in lower-risk sites, with effective and superfluous public substructure, and shape multi-modal transport organizations that offer suitable admission to significant facilities and events deprived of necessitating a vehicle. These values also propose that societies should guarantee reasonable housing and transport choices are accessible. Homes with low profits, no physical damages or other special requirements in a walkable neighborhood can find reasonable patronage. Other factors of consideration are the risk level of the locality, the effective and functioning communal infrastructure, and the presence of multi-modal system of transportation that offers an appropriate access to vital activities and amenities without the use of cars. These principles also advocates that the community ensures that the available transport and housing system are affordable, so somewhat ménage, even low income earners, individuals with physical disabilities, requiring distinctive attention and need can find appropriate inexpensive houses in a walkable locality.

These values increases the locality's resilience to numerous threats like diseases, pandemics and other catastrophes, and single homes' bounciness to surprises such as bodily incapacity and loss of income. Even though during pandemics, damages does not affect physical infrastructure like in the case of natural calamities, but stresses the infrastructure of households, constraining traveling activities, which in turn forces many households to require more affordable transportation means and houses as a result of the impact on their finances.

Houses with reserved doorway which connects directly to driveways and sidewalks lessens the risk of contagion, this kind of houses are referred to as houses with ground-floor access. And areas with many-family buildings with external stairs and walkways has lower risks. While homes with common entryways, internal lobbies and lifts are probable to present further risks, though these risks can be abridged through regular sanitization and cleaning, as well as encouraging residents' and employees' hygiene. To decrease the risk in housing environment, homes are constructed outside wildfire, flood boundary and to tolerate indigenous risks like extreme heat and cold, earthquakes, hurricanes.

To lessen the stress resulting from isolation, homes require adequate quiet space, sufficient ventilation and lighting, provision of reserved outdoor areas like terrace or deck with seats mainly for kids, a roof-top garden or yard (Bereitschaft & Scheller, 2020). Home office is desired, especially when a member of the house works or studies at home. Individual privacy is imperative, like a household office or noiseless workstation, mainly for working from home. Windows are positioned towards the street, an anterior portico or small verandah, allowing occupants to talk and wave at their neighbours while keeping a safe distance (sociable distance).

A recent article by planner Michael Mehaffy, *Why We Need 'Sociable Distancing'*, demonstrates how pedestrian-oriented growth, moderate-density makes the most of dwellers' capacity to observe social interaction amongst homes, pedestrians and shops which upsurges happiness, safety and health. The National Association of City Transportation Officials (NACTO) created the *Rapid Response: Tools for Cities* and Streets for Pandemic Response and Recovery that describes ways the local government can enhance transportation well-being in this pandemic. These measures includes highlighting vital above non-vital travels, the protection of workers in the front-line, and altering streets management and design to deliver additional care and space for cyclist and pedestrians. This study shows that, even though well-to-do car owners maybe pleased and healthy in areas that are dependent on automobiles, such areas imposes a substantial constraints and costs: it therefore requires all adults to have a personal vehicle. This in turn offers a limited movement preferences for occupants who prefers not driving, should not, or cannot drive. In such cases, digital and physical right to use of vital amenities and events is restricted and costly. For utmost houses, the benign, most resilience and healthiest homes are sited on walkable metropolitan neighbourhood where public amenities and activities are not difficult to access by foot or bicycles.

2.4. Types of Urban Housing

Housing as a concept shares an akin definition as a "house" which Melnikas (1998) describes as a relatively limited and definite, biologically, physically, socially closed place where persons can live their biosocial life, by acquiring services, perform household tasks and other biosocial activities. The author states that in present days, additional

thoughtfulness is centered on the cost and benefits of housing, i.e. the comfort, convenience and appropriateness of the house, energy-efficiency; the purchase costs, construction and servicing should be proportional to the benefits that can be gotten from this housing. The different housing types and their sub-divisions is presented in Table 2.2.

Table 1: Housing Typologies (Henilane, 2016)

Type of housing	Characteristics
By housing type	Room in the apartment
	Apartments in multi-apartment residential building or non-residential
	Muilti-Apartment residential building family house
	Other
By housing size	One room
	One- room Apartment
	Two-room Apartment
	Three-room Apartment, and more family house
	Other
By housing amenities	Housing with all amenities
	Housing with part of amenities
	Housing without amenities
By housing location	Housing in a city
	Housing in rural territory
By group of population	Any resident
Living in the housing	Persons with low-income or social group at risk
By type of housing	State-owned housing
Ownership right	Municipality-owned housing
	Natural person's owned housing
	Legal person's owned housing
	Other
By construction period of the housing	Housing build before world war II
	Housing built from 1945 to 1990
	Housing built from 1990 until now
By energy efficiency indicators	Minimum regulatory energy performance level allowed for new
Of housing	building
	Minimum regulatory energy performance level allowed reconstructed or renovated buildings
	Almost zero energy consumption housing
	Other
By construction materials	Brick wall
Used in the exterior wall of the	Wood
housing	Brick/panel
	Reinforced concrete
	Wood/masonry
	Other

2.5. Urban Housing and Health

Public health and planning has corresponding skill sets. In the same light, health conditions connected to housing like poor access to water, poor quality of enclosed environment, and disclosure to unsafe substance, menaces, or communicable maladies, presents a vital health liability. Generally, pandemics and its cruelty has incentivized a unified methodology to public health, urban planning and engineering.

To comprehend the recommendations for urban design of infrastructure and buildings-mobility, water, and so on, it is prerequisite to grasps the variables of a pandemic. What are the challenges these cities experience in keep up with access to essential needs? What are the key compounding elements for these? Here according to Smolders (2020) is a description of the structural, environmental and social challenges.

2.5.1. Urban Planning and Density

The demographic as well as its dispersal are indeed the center of urban growth, both in terms of the geographic boundaries of the city and its compact urban fabric of great density. Having over half of the global population anticipated to urbanize, creating a town livable is the biggest challenge for anyone to be inclusive, particularly when a large part of that population lives in urban slums.

In this pandemic, metropolitan zones has had the largest increase in cases, this is magnified. This serves as a wake-up call in policies for design and zoning's need to concentrate on enhancing living conditions and implementing sustainable models to minimize traveling times and create optimum capacity for communal spaces.

2.5.2. Urban Green Spaces

All public open spaces are urban green spaces which consist primarily of leisure spaces such as parks, event fields, squares, urban development spaces, greenbelts, buffers on the outskirts of the city, and natural and urban parks such as urban woods, botanical gardens, and zoos. Their function in a city's health and livability and the well-being of its people is critical and is often underfunded in relation to the other development priorities of the city. During a pandemic, existing green spaces are of enhanced significance and should be

reconsidered as critical social and public health infrastructure in pandemic resilience design.

Although there have been predominantly pre-pandemic use of municipal green spaces for leisure events, these spaces can be rapidly converted to house critical facilities that could see elevated level of use in public health emergencies. Municipal emergency response strategies extending to the pandemic crisis include urban green spaces. Urban green space use will change from encouraging linear leisure to embodying diverse, community-driven health and environmental results by devising a pandemic strategy for urban green space to mitigate spatial pressures faced by essential services and by adapting these spaces for resilience in a post-pandemic community. Urban green spaces are important to the habitability, health and well-being of a community. However, during difficult financial times in cities, support for local parks and recreation departments is frequently reduced first, and even with complete funding, urban green spaces are insufficient in scale and unequal in distribution. Because urban green spaces are rooted in nature, however, they give communities built-in health benefits through proximity (e.g. improved air quality) and are designed to be recreational. Thus, these spaces has being modified to preserve tragedy management initiatives in a pandemic scenario. By enhancing their amount and value in a coherent campaign contrary to climatic changes, social inequality and health inequalities, to allow a health-resilient future, population and cities.

2.5.3. Health and Well-being

Urban green spaces as spaces that offer health benefits are backed by solid evidence, in particular when tackling health challenges linked to energy conditions (water and air contamination, WASH influences, etc.) and – anti risk of disease (NCDs, such as obesity, diabetes, mental health etc.). Antioxidant defense systems, enhanced nutrition, decreased urban heat island effect reduction of obesity, and better sleep, among many other advantages, are important positive health links associated with these pathways..

In pandemic situations, where physical isolating initiatives are proposed, unlimited access to all public spaces should be limited to wider areas, such as public parks. In order to facilitate critical services, track user capacity, identify safe distances, permit demographics, and set standards for restricting kinds of activities, spaces allowing public access during a pandemic should be evaluated. In several countries in Europe, such as Germany and the

Netherlands, these are seen. While access to public parks is limited, vulnerable groups such as the elderly and children (including preschoolers) are now allowed to use community parks and parks with a maximum capacity of ten persons in Singapore.

2.6. Design Scheme For Social Classes During Pandemic

During pandemics, the form has often follow the concern of transmission, even more than the function (Ellin, 1999). Diseases form our built environment, from the interior to urban growth. Earlier, to reduce the risk of infectious diseases, people revamped interiors, architecture, cities, and infrastructure. There are many developments in architecture and urban history, taking into account past events in the last 200 years.

2.6.1. Sanitary Reform

The health care revolution during the industrial period was influenced by typhoid and cholera. These epidemics have resulted in the growth of water and sanitation systems to deal with diseases, leading increasingly to sanitation innovation and requiring straighter, safer and more broad-based construction of underground pipe systems on the streets. Furthermore, in 1855, the third pandemic changed the essence of all things from drainage pipes to doorway limits and building foundations (Budds, 2020; Klaus, 2020; Wainwright, 2020).

2.6.2. Building and Housing Reform

The wiping style of expressionism may partially be traced to TB. Modern architectural structures were inspired by a time of simple form, stringent geometries, new materials and the rejection of ornamentation. Modern architects have built these curative environments clean from disease and pollution (physically and symbolically). These characteristics expressed modernist concerns over and above the esthetic charm of the therapeutic influence of light, air and nature. These buildings had large windows, balconies, flat texture that did not retain pollutants and white colour, which showed a sense of neatness (Budds, 2020; Chang, 2020). Against this context, our built environment should be

established in the current health crisis to increase the protection coats that helps avert contagions and ailments from spreading.

2.6.3. Potential Transmission Dynamics of Pandemic

Because many people devote their everyday lives inside the built environs, the probable transmission dynamics of infection must be understood. The pandemic could be transmitted through air and by unswerving and incidental communication as individuals travel through the urban environment. Owing to likely and automated pattern of airflow and other causes of turmoil in the enclosed environment, viral particles may be directly deposited on surface or up in the air (Cirrincione et al., 2020; Dietz et al., 2020; Horve et al., 2020). To mitigate the risk of infection, WHO has recommended that an interpersonal reserve of 1.5 or 2 m (about 6 feet) be preserved. New issued research, however, supports the premise of virus spread from an infected individual over 2 m (Bourouiba, 2020; Setti et al., 2020). In addition, scholars from Oklahoma State University imitated different environments and movement settings to tell whether the social distance guiding principle of six feet is suitable. Results submits that this rule is suitable when the environmental airflow is immobile (Oklahoma State University, 2020). The transmission mechanisms of infection are influenced by other variables and the wearing of protective clothing. However, based on the latest knowledge and research conducted by experts, WHO is continuously modifying and bring up-to-date all the listed distances.

2.6.4. *Refocusing on Green Spaces.*

The human body requires contact with live plants to ensure our mentally health and grow what we eat to minimize danger, particularly through self-isolation (Constable, 2020; Makhno, 2020). The plantation of our parks, terraces and the establishments of green roof systems have a lot of environmental advantages, which would address many of the concerns of quarantine (Hui, 2011; Specht et al., 2014; Thomaier et al., 2015). The duty of the rooftop is to consider them as the fifth facade of the houses, where green roofs are found. However, the design phase can require additional analyses and specification when green roofs built for food production. (Abd-Elhafeez, ELmokadem, Megahed, & El-Gheznawy, 2016; EL-Gheznawy, 2016).

2.7. Environmental Interaction – Biophilic Design

The intrinsic propensity of humans to relate with natural world remains essential for human physical, mental and well-being, particularly in contemporary life (Wilson 1986; Kellert and Wilson 1993; Kellert, 2012).The concept of biophilia derives from our knowledge of human history, where for some more than 99 percent of the species' life we have formed naturally to respond to forces of nature that are not man-made or artificial.. Much of what is considered to be natural today is relatively recent food-raising on a wide scale only in the last 12,000 years; the town's invention, 6000 years old; the mass production of products and services, starting 400 years ago; and computer technology, starting only in the 19th century. In a bio-centric world not humanly engineered or created, the human body, mind, and senses have evolved (Killert and Calabrese, 2015).
Notwithstanding this likelihood, a growing body of scientific research is increasingly showing that much of our innate nature-affiliation tendencies continue to have major effects on the physical and mental health, performance, and well-being of people (Killert and Calabrese, 2015). A wide range of studies have documented exposure to nature, for example, in the healthcare sector, can reduce stress, lower blood pressure, provide pain relief, enhance disease recovery, accelerate healing, improve staff morale and efficiency, and contribute to less patient-staff disputes (Annerstedt and Währborg 2011; Cama 2009; Frumkin 2001; Kuo 2010; Louv 2012; Marcus and Sachs 2014).

Repeated experience also relies on the advantages of interaction with nature. People may have an innate desire to be associated with nature, but this biological propensity needs to be nurtured and formed to become functional, like most of what makes us human (Wilson, 1986; Kellert, 2012). In the case of biophilia, our inborn desires to be part of nature or to separate and empower our relationships in the natural world may be included. It is most problematic to detach from the natural surroundings, often seen simply as a resource that needs to be used or as a fun but not essential leisure facilities. This rising separation from nature is reflected by modern agriculture, development, schooling, medical services, urban growth and architecture.

The dominant model of design and creation of the new built environment is one great important obstructions to the encouraging understanding of natural surroundings nowadays. This is particularly troublesome, since while people could have developed in the normal

world, contemporary people's "natural habitat" has increasingly turn out to be the internal put up environs where we spend 90% of our time today. The need for valuable interaction with natural surroundings continues to be vital to the healthiness and aptness of people, but it is a satisfactory incidence that has become extremely challenging in today's constructed environment. Nature is largely viewed both as a hitch to overwhelm or a minor and meaningless attention by the prevailing approach to modern building and landscape design. The consequence has been an accumulative disconnect amongst persons and natural surroundings in the built environment expressed in insufficient interaction with natural lighting, air circulation, materials, plants, views, natural shapes and forms, and in overall valuable contact with the natural biosphere. Most of today's built-up surroundings is consequently sensory lacking, it is often reminiscent of the old-fashioned zoo's sterile cages, now ironically forbidden as "inhumane" (Heerwagen in Kellert and Finnegan, 2011).

2.7.1. Biophilic Design Application

By providing a new model aimed at rewarding understanding of nature in the built environment, biophilic architecture tackles the limitations of contemporary building and landscape practice (Kellert et al 2008; Kellert 2005; Kellert and Finnegan 2011). Biophilic architecture aims to create a good habitat for people in the modern built environment as a biological organism that promotes the wellbeing and aptness of individuals (Killert and Calabrese, 2015). The effective application of biophilic scheme takes in some key concepts to be consistently adhered to. The rudimentary necessities for the efficacious practice of biophilic design are these principles. See Figures 2.2-2.4.

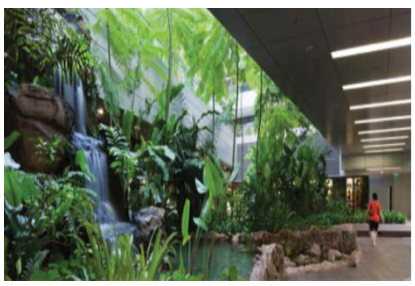

Figure 5

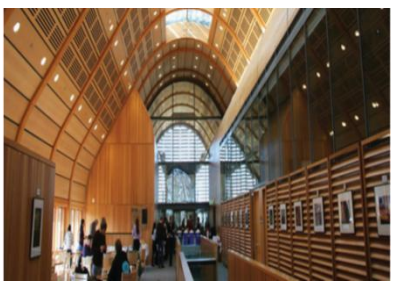

Figure 6

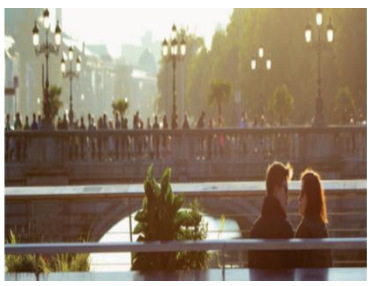

Figure 7

Figure 5: Biophilic design requires repeated and sustained engagement with nature (Kellert & Calabrese, 2015).

Figure 6: Biophilic design advanced people's health, fitness and wellbeing (Kellert & Calabrese, 2015b)

Figure 7: Biophilic design promotes positive interactions between people and nature (Kellert & Calabrese, 2015c)

The fundamental categories of our biophilic design system reflect three kinds of knowledge of nature. These involve nature's straight involvement, nature's incidental involvement, and the knowledge of space and place. The straight involvement of nature denotes to definite interaction with environmental characteristics that will be represented in the constructed environment, including natural lighting, air, plant life, wild life, water, sceneries, and others. Nature's incidental involvement denotes to interaction with nature's depiction or image, the transformation of nature from its original state, or disclosure to unique arrangements and procedures characteristic of the natural biosphere. These includes images and artworks, natural resources such as wooden furnishings and fabrics of wool, embellishment motivated by forms that occur in nature, or environmental progressions such as getting old and time passage, wealth of information, natural geometries, and others that have been vital in man’s progression. Finally, the perception of space and location applies to spatial characteristics that have advanced human health and well-being that are typical of the natural world. Examples includes prospect and shelter, formal difficulty, seeking versatility and route, and more.

2.7.2. *Benefits of Biophilic Design*

Sustainable design has become apparent over the years, forcing new demands on architects and designers to extend their skills to include environmental architecture, sustainable building practices, effective infrastructure and unique urban development projects (SAR, 2010). It has also become apparent that features such as how the spatial hierarchy of a building is arranged, or daylighting, or design impacts on indoor environment and energy efficiency are all significant architectural considerations. The construction process, materials and construction technologies predetermine the building's carbon footprint and its lifespan.

Furthermore, biophilic architecture seeks to maintain over time the efficiency, functioning and durability of natural systems. Applying biophilic scheme can change the environmental settings of a building or landscape in the short term, but would foster an environmentally resilient and healthy natural ecosystem over the long term. A broad range

of physical, mental and behavioral benefits can also result from the effective implementation of biophilic design. Better physical fitness, reduced blood pressure, increased comfort and happiness, less signs of disease, and improved health are physical effects. Mental advantages vary from increased happiness and motivation, to better problem solving and imagination, to less tension and anxiety.

2.8. Summary of Chapter two

The contemporary built environs that progresses the well-being, aptness of people, biophilic architecture aims to create a good habitat for people as a biological organism. The fundamental categories of our biophilic design system reflect three kinds of knowledge of nature. These involve nature's direct experience, nature's implicit experience, and the knowledge of space and place.

CHAPTER THREE

DETAILING METHODOLOGY AND CASE STUDIES FOR THE DISSERTATION

3.1. Methods for the Dissertation

This qualitative research adopted a case study approach. The methods included firstly a review of text related to the sub-themes of the title. That literature survey, the followed:

I. Urban Pandemic, Resilience and Housing

II. Housing and Biophilic Design

III. Urban Resilience and Housing for Social interaction

IV. Types of Urban Housing

V. Urban Housing and Health

VI. Design Scheme for Social Classes during Pandemic

VI. Environmental Interaction- Biophilic Design

From the technical data extracted from design reference books-Architects' Data and design approaches like biophilic, sustainability, ecological and universal were harnessed for effective results. Obtaining documents from TRNC State Planning Office, the location map of Lapta, Girne with contours-see Figure 2, and online visual materials of similar projects from architectural discourse platforms, and design magazines as 2 case studies analyzed at sub-theme 3.3.

Secondly, the field work included a physical survey of the location to capture the site specifics and personality, climatic/weather features and social amenities that informed the site analysis. Thirdly, Conceptual analysis were done to provide a concise direction of the project, complemented with several studio reviews by the design instructors and colleagues. The sum of all the analysis which incorporated statistical tools and critic culminated into the final development of a design model which contained a complete set of architectural drawings that was presented in a jury to fulfill the requirements of the Studio-ARC511.

3.2. Study Area – Lapta Community, Girne, Cyprus.

To achieve the goal, an eco-friendly site was chosen which is located at Lapta, Nicosia (50 10'N 330 22'E), this is a province at the heart of the Turkish Republic of Northern Cyprus (TRNC). Lapta has an area of 18.22km2 and a population of about 8,000 inhabitants (TRNC State Planning Organization, 2011). The site which measures 10 hectares in area, has an undulating nature with different levels and it is bounded to the Mediterranean Sea. The noise levels ranges from 80 – 40 decibels with the highest source coming from earth-moving machineries while the lowest emanates from the sea waves. The atmospheric weather condition of the site has its peak at 37oC and the lowest being 80C with stronger winds coming from the Northwest and Southeast direction of the site. At day time, cool air moves from the sea to the land, warm air from the land rises up and take the place of cool air at high temperature thereby pushing cool air towards the sea. At night time, cool air moves from the land to the sea while warm air from the sea rises up from the sea, taking the place of cool air at high temperature hence cool air is pushed down toward the land.

Topographically, the site is a sloppy terrain thus will lead to meticulous design of the area and provision should be put in place for change of ground surface water and use plant materials to prevent possible soil erosion like natural angle for soil repose should not be exceeded. For the soil texture, presence of loamy and clay soil are present which recommend slab on grade foundation are good source for the soil well designed slab to withstand pressure of the soil contracting and expanding allowing the structures support to remain stable, also loamy soil which is good for outdoor vegetation like gardens and quality landscaping . We created a site with basic amenities to make life easier in the pandemic by mixing a blend of health, recreation and social well-being. The health care center was a bit zoned from the busy part of the neighborhood to protect the inhabitants of the community as well as making the hospital more accessible from the entrance of the site and the harbor provided by the sea shore.

Furthermore, an administrative and social center of about 2000m2 was designed carefully with regards to pandemic safety measures to cater for the management of administrative functions for the urban pandemic community. General residential dwelling units were provided across the different level of the site. These residential units can be accessed by

walkways and circulation mediums for a variety of users that are strategically placed and designed around the site to ease access and encourage safety by the choice of materials such as permeable walking space which helps tackles flooding issues and allows soil to receive nutrient and paying attention to physical and social distancing. To encourage safety and ergonomic communal activities in the area. Other activity areas, semi open spaces, therapeutic gardens, fitness areas, edible gardens and herb gardens were considered as biophilic elements to the entire layout (Litman, 2020).

To cater for the security needs of this neighborhood, a perimeter fencing was provided with the introduction of two surveillance points/towers, with one around the harbor and another by the main entrance to the site. This points will help control movement of visitors and handle testing of the incomers before granting them access to the pandemic neighborhood (Samuelsson et al., 2020).

The design considers ease of movement and accessibility to various units while at the same time focusing on the needs, comfort, and health of collective residents of the neighborhood without compromising sustainability, ecology, and well-being (Banai, 2020). Provisions were also made for cycling, more paths and small roads to offer complementary ways for pedestrian walking. Spaces which are permeable are incorporated to tackle flooding and allow soil to receive nutrients. Through the introduction of water body on the site leading to the development of external wetlands in order to reduce humidity and act as filtration on the site. The site layout of the ARC502 project is added as Figure 8.

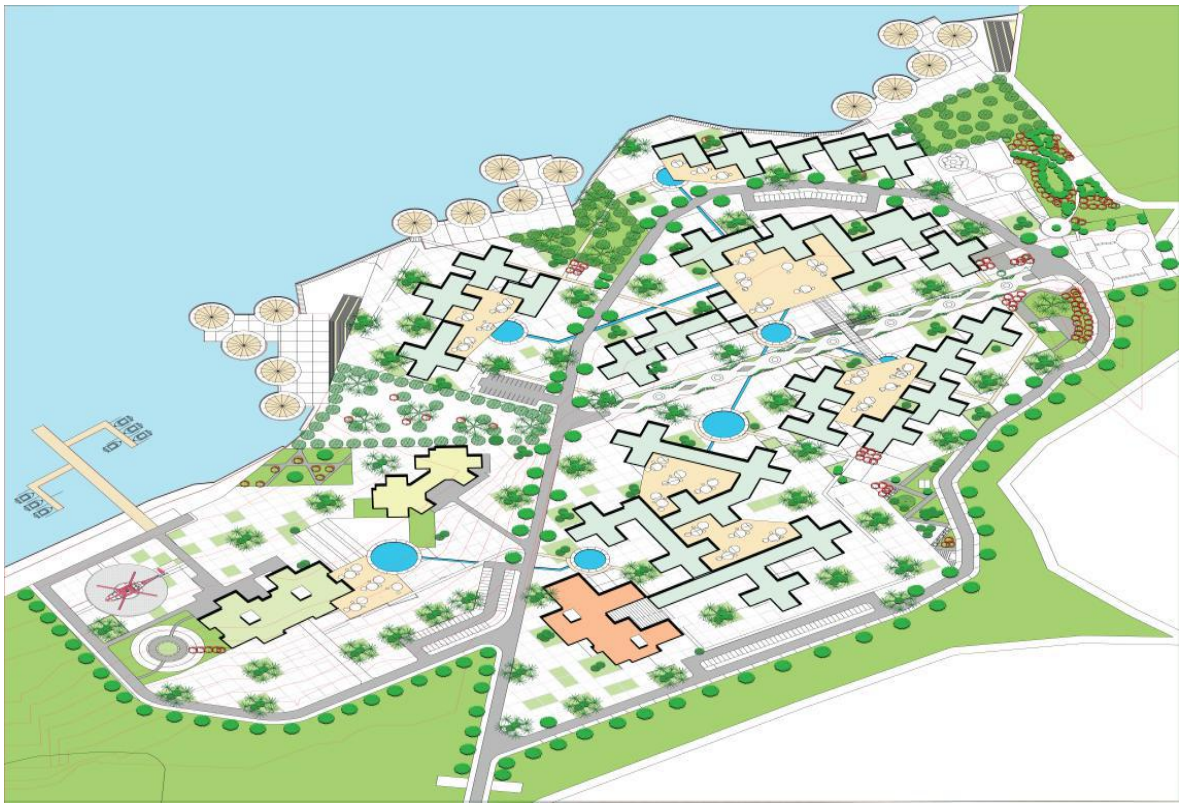

Figure 8: Site Layout for ARC502 Project, Lapta community, Girne, Cyprus. (Author, 2020).

3.3. Analysis Of Case Studies

This study has analyzed two examples of completed projects that relate this work from Archdaily that is online cases. The cases are 35th Street Apartments, Istanbul, Turkey and Whitesands Housing, Hong Kong, China. Sequel to these indicators, the analysis of the case studies begins with appreciation of the visual data which are arranged cordially. The primary qualities are identified using Architectural organization-interior space, materials selection, site layout, style, and relationship with the local environment. The arrangement of data adopted the preliminary cases description format used by (Onur et al., 2020).

3.3.1. 35th Street Apartments, Istanbul, Turkey.

Located in the northern part of Izmir, 35th Street Apartments, Istanbul, Turkey. The topography of its background shapes it. The site has a steep slope with a height difference of 60 meters. A continuous underground driveway between parking lots on both sides, a pedestrian street above, and townhouses attached to it, is an archetypal portion of the

project. This method facilitates optimized distances between car parks and homes, which also helps to achieve green areas by incorporating underground parking lots. Figure 3.2-3.6 shows all selected visual materials.

Table 2: Project information of 35th street apartments

ARCHITECT	TEGET
Aim	To allow unique views overlooking green fields along the corridor, opens up range of different sequences along the spine and optimized distances between car-parks and the houses, which also helps gaining green areas by embedding parking lots underground.
Location	Ulukent 35th Street Apartments Istanbul, Turkey.
Spatiality	Istanbul
Style	Modern
Funder	Turkish government
Built year	2011

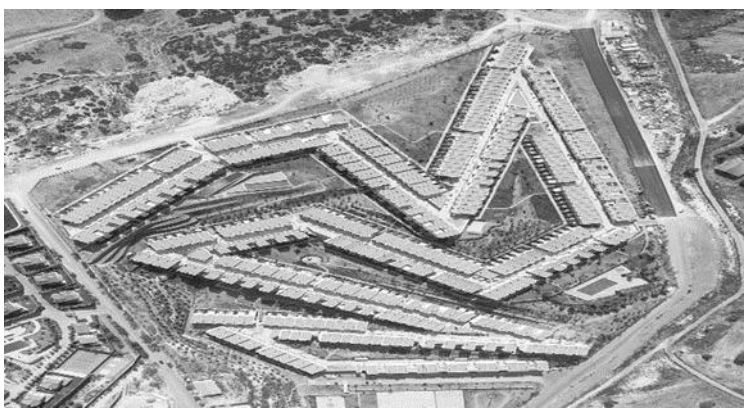

Figure 9: Site Plan of Ulukent 35th Street Apartments, Istanbul, (Cemal Emden, 2011)

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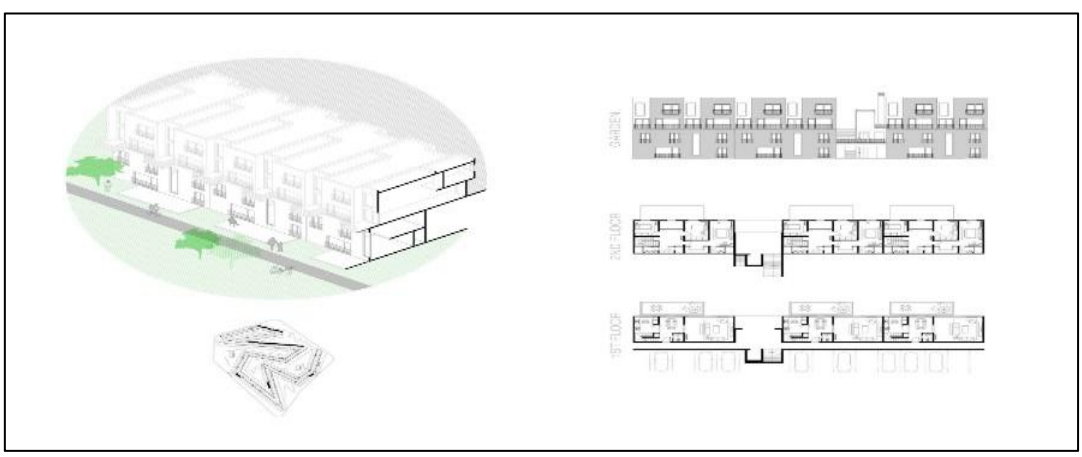


Figure 10: Isometric View and Floor Plans of Ulukent 35th Street Apartments, Istanbul, (Cemal Emden, 2011)

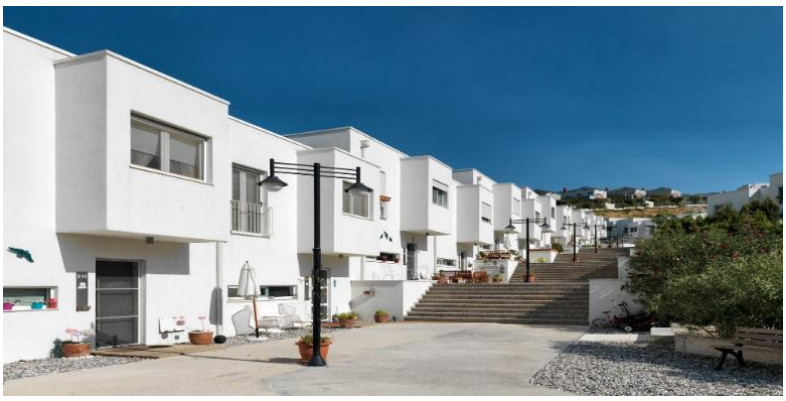


Figure 11: Internal street view 35th Street Apartments, (Cemal Emden, 2011)

Figure 12**:** 3D-Sectional Drawing of 35th Street Apartments, (Cemal Emden, 2011).

Figure 13: Internal green view of 35th Street Apartments, (Cemal Emden, 2011).

3.3.2. Whitesands Housing, Hong Kong

Whitesands is a 28 single family home housing property located between the beach of Pui O and Cheung Sha on South Lantau, Table 3 of Hong Kong. With each house focused to capture spectacular views of the South China Sea and the surrounding scenery, the development draws on the beauty of its natural environment. The brief called for a new innovation that facilitates a comfortable, coastal environment. In the early design stage, an accessible, communal living model was implemented, emphasizing this concept and

affecting how they addressed the architecture of the buildings. An image of the construction from the earliest stage was constructed by the community perception; one where the spaces between buildings are as important as the spaces inside and as a group, the houses form a picturesque neighborhood. The clubhouse will be a discrete but integral part of the society, a simplistic terrace. Figure 3.7-3.10 provides the visual materials.

Table 3: Project information of whitesands housing

ARCHITECT	**PDP London Architects (Hong Kong Studio)**
Aim	To create positive alliances and outcomes for clients, their buildings and sites, our community and the wider environment
Location	Hong Kong
Spatiality	China
Style	Modern
Funder	Chinese government
Built year	2011

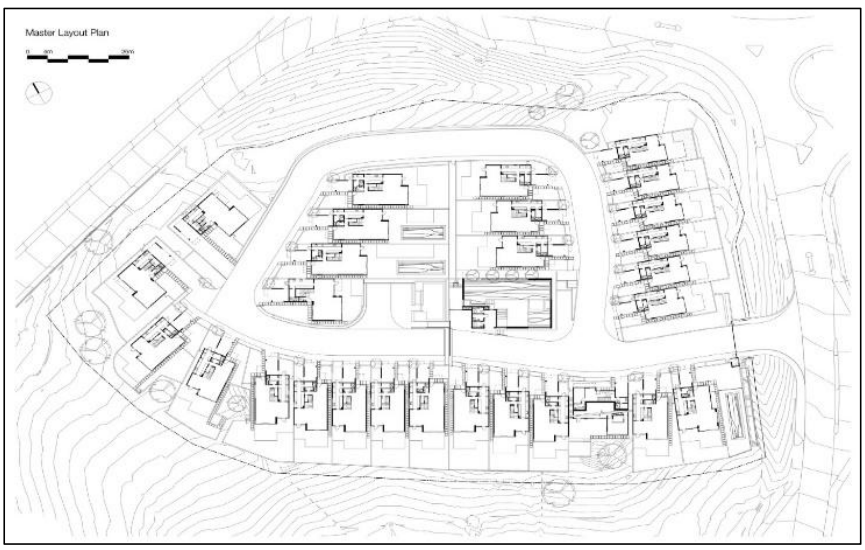


Figure 14: Site plan of whitesands housing (SAR, 2011)

Figure 15: Arial view of whitesands housing (SAR, 2011)

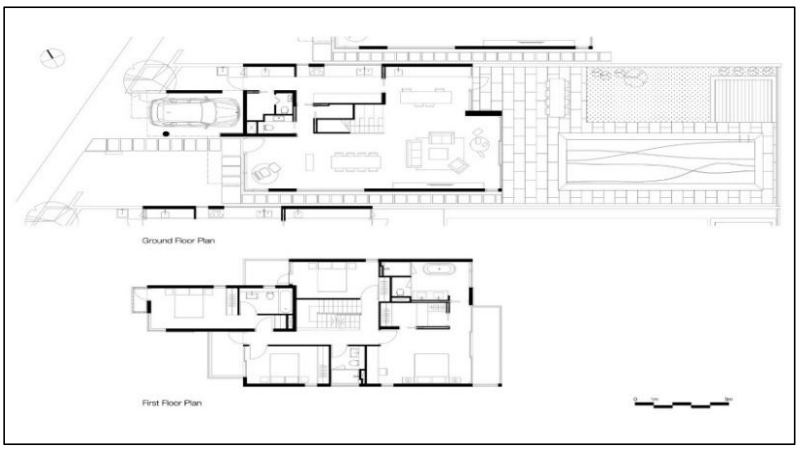


Figure 16: Ground and first floor plans of whitesands housing (SAR, 2011)

Figure 17: Rear elevation of whitesands housing (SAR, 2011)

CHAPTER FOUR

GENERAL/SPECIFIC DESIGN CONSIDERATIONS FOR URBAN PANDEMIC RESILIENT HOUSING UNITS

4.1. General Design Considerations for Urban Pandemic Resilient Housing Units

Under this theme, 9 general design criteria are considered- Accessibility, ramps, landscape, building orientation, roof system, entrance, biophilic elements, building materials, and steps.

4.1.1. Accessibility

These residential units are accessed by walkways and circulation mediums around the site to ease access and encourage safety by the choice of materials such as permeable walking space which helps tackles flooding issues and allows soil to receive nutrient and paying attention to physical and social distancing.

4.1.2. Ramps

Ramps are provided at entrances and where changes of level are observed around the site layout because they are preferable for all ages to use and will not restrict wheelchair users. All ramps should be ≤ 1:12, simplify literally as having gentle slope, use of slip-resistant surface materials, safety rails and good lighting are essential elements of a ramp are also incorporated.

4.1.3. Landscape

Effective landscape elements and design of open spaces will foster the beauty of the community and contribute to the percentage increase of oxygen flow and reduce urban island heat effect. So, biophia elements are planted surrounding all systems to trap carbon release to the atmosphere. Other facilities like street furniture and outdoor facilities are required to aid social life and sight views. Parking areas for residents were provided and

were clearly marked on the area. The number of parking spaces were determined by the need/demand study and the lifestyles of residents.

4.1.4. Building Orientation

In order to boost the power consumption of the buildings, the location of the buildings must be linked to seasonal changes in the direction of the sun as well as prevailing wind patterns. Perhaps, rendering it fun to live in and cheaper to maintain. However, since Cyprus weather is best describe as showing composite character, the buildings placement took the sea as a locus.

4.1.5. Roof System

Green roof, vertical garden, and minimum paving are natural mitigating elements for climate change management and considered in helping to lower urban air temperatures and control urban heat island effect.

4.1.6. Entrance

The building's principal entrance was clearly distinguished from other facades to avoid unnecessary loiter of visitors and defines way-finding clearly.

4.1.7. Biophilic Elements and Building Materials

Features was considered in this design project of the housing unites e.g. flowers, trees etc. Both modern and local materials combination in the building design will constitute balance at both the physical fabric and object experience. It will also contribute to sustainability if the locally available materials are infused in the design example stones and wood. The correct mix of cool and warm colors will psychologically support the visual appeal of users.

4.1.8. *Steps*

Assuming the terrain of the site is not relatively flat as is the case of Cyprus, then steps and ramps and bridges provision would aid walk-ability of all ages. Perhaps the physically disadvantages persons will not be marginalized by the layout.

4.2. Natural Lighting and Ventilation

Lapta is a town in Kyrenia with a high rate of oxygen flow which helps in eliminating rise of air borne diseases. This is due to its proximity to the mountains, the sea and dense vegetation around the area. Contributions from available vegetation in the environment improves the air quality, the climate, conserving water and preserving the soil. With the tendency for site to be flooded due to its closure to the sea and attraction of heavy storms that is prevalent on the island, a sustainable parking lot for recycling of water for the trees in the area and for adequate cleaning of the atmospheric air was considered.

Low wind speed will enhance pollutant accumulation. The low-cost, organic method of circulating air in buildings, principally high-occupancy buildings situated in high-density built-up areas, is natural aeration in urban spaces. In conclusion, WHO insists that natural ventilation can be one of the most successful measures to reduce the risk of infectious propagation in the area. It is a protocol for micro-wind patterns in large and overcrowded urban areas, not like various countries with laws that deal with intense wind conditions.

Breezeways along major wind direction are deemed vital in a dense mega-city to enhance air movement. These air paths in the town are researched and planned to establish and develop detailed guidelines. Among the requirements for street orientation, pattern and expansion, uninterrupted green space, height of the building of 6.0 m, and shape, this design was chosen.

4.3. Social inclusion

Social inclusion is a process of enhancing the circumstances under which persons participate in society, enhances the ability, opportunities and integrity of those who are

marginalized on the basis of their ethnicity. The site itself being isolated from the main city of Lapta makes it a perfect zone for the pandemic project. Relaxation spots are extended into a small and safe portion of the water body to bring the inhabitants closer to nature and cool off especially the summer season. Moreover, the site is in a serene environment away from the noisy zones of the town, making it suitable for relaxation. The site is close to a water body which puts in cognizance some pros and cons like alternative means of transportation through waterways thereby increasing the economic value of the sea. The water usage for the site can be sourced from the sea through the means of ultra-filtration.

4.4. Circulation And Security

The major access to this site is narrow which leads to designing a well-spaced car parking area for the site and gives room for adequate and controlled circulation in and out of the site. The military barrack proximity to the site will help to boost the security but could pose a threat of noise pollution which planting of trees is made to counter it. To cater for the security needs of this neighborhood, a perimeter fencing was provided with the introduction of two surveillance points/towers, with one around the harbor and another by the main entrance to the site. This points will help control movement of visitors and handle testing of the incomers before granting them access to the pandemic neighborhood (Samuelsson et al., 2020).

4.5. Pandemic Procedures And Safety

Lapta creates a sustainable urban environment that is healthy and conducive for social interaction without compromising pandemic rules. The site location's isolation from the city is added advantage for pandemic development. The concept of the design is to create a pandemic resistant urban environment while taking into consideration the wellbeing of the inhabitants of the community (Capolongo, 2014).

As remarked in the methodology, the first phase of this community design articulated different ideas which included an introduction of a Nursing Home which is necessary to monitor the health of patients. Those who are convalescing from the ailment are separated

by a 2500m^2 Health Care Center that is provided for basic health treatments which is partitioned so as to provide a means of control between the pandemic unit and the other general hospital functions. Furthermore, an administrative and social center of about 2000m^2 was designed carefully with regards to pandemic safety measures to cater for the management of administrative functions for the urban pandemic community. The residential dwelling units are zoned to have a strong view of the Sea, taking advantage of the site topography thereby giving room to split-level orientation of the housing blocks. These residential units can be accessed by walkways and circulation mediums for a variety of users that are strategically placed and designed around the site to ease access and encourage safety. The choice of materials such as permeable walking space which helps tackles flooding issues and allows soil to receive nutrient and paying attention to physical and social distancing. Other activity areas added to support safety are, semi open spaces, therapeutic gardens, fitness areas, edible gardens and herb gardens were considered as biophilic elements to the entire layout (Litman, 2020).

4.6. Site Topography, Climate And Environment

Topographically, the site is a sloppy terrain thus leading to meticulous design of the area using change in levels. That context responsible technique favored ground surface water run-off and use plant materials to prevent possible soil erosion. For the soil texture, presence of loamy and clay soil are present which recommend slab on grade foundation are good source for the soil. Often times such slabs withstands pressure of the soil contracting and expanding allowing the structural supports to remain stable. Also loamy soil which is good for outdoor vegetation like gardens and quality landscaping. As part of solving the site levels and maintaining spatial connections, a pedestrian bridge is introduced to link the housing units' zone with the sporting zone.

Lapta is close to the mountains, the sea and dense vegetation around the area. The site itself being isolated from the main city of Lapta makes it a perfect zone for the pandemic project. Contributions from available vegetation in the environment improves the air quality, the climate, conserving water and preserving the soil. The site is close to a water body which naturally modifies it climate through the year and adequately maximized for the spatial organization and orientation of the housing blocks.

4.7. Project Brief

This project is programmed for the design of Urban Pandemic Resilient Housing Community for Lapta in Girne, North Cyprus. The project is site sensitive and all analysis carry out responded only to the specificity of the location. The site layout is structured to handle housing unit and relaxation facilities. The verticality of the buildings followed 2-storey thereby making them compatible with the 4-storey existing modern urban morphology of Northern Cyprus. From the site analysis done, the site showed different datum (+2.0, +6.3, +7.5, +8.7, +10.0) of which the design is organized to match with the existing topography even though there will be cut-and-fill, and site stabilization. Since the project programming is comprehensive in nature, the design came in phases. The first phase was handled through Studio I-ARC502 in Spring Semester 2019/2020 while the second phase is developed for Studio II-ARC511 in Fall Semester 2020/2021 constituting the focus for the drawings/details shown at sub-theme 4.9.

4.8. Architectural Program

The architectural program is logically framed taking into consideration spatial generic organization common to residential development areas at the levels of public, semi-public and private. The minimum space sizes are included as shown in Table 4.1 and 4.2.

Table 4: Generic spatial zoning and sizes (Author, 2020)

PUBLIC AREA	SEMI-PUBLIC AREA	PRIVATE AREA
Living Room. Dining. Visitors' Toilet.	Kitchen Utility space	Bedrooms Bathrooms

Table 5: Space sizes (Author, 2020)

S/N	Unit Layout	Minimum Area (m^2)
1	Living Area	20.35 ㎡
2	Bedroom –single bed	8.0 ㎡
3	Bedroom-double bed	11.5 ㎡
4	Bedroom for Visitors	8.0m^2
5	Kitchen	16.7 ㎡
6	Bathroom	4.1 ㎡
7	Visitors toilet	2 ㎡
8	Dining Area	8.1 ㎡
9	Circulation and Storage	15 ㎡
12	Utility room	4.32m^2

4.9. Architectural Drawings and Details

The architectural program is logically framed taking into consideration spatial generic organization common to residential development areas at the levels of public, semi-public and private. The minimum space sizes are included as shown in Table 4.1 and 4.2.

Table 6: Numerical analysis of pandemic resilience housing units

Housing Type	Number of Blocks	Number of Floors	Number of Family per Floor	Total of Units
Semi-detached single units	3	2	3	18
Apartment units	4	2	4	16
Detached units	3	2	1	3
TOTAL	10			37

From the Table 4.3, the analysis when plotted using statistical diagrams-Bar Chart and Pie Chart shows that Semi-detached units occupied 48.6% making it the highest density of the Urban Resilience Pandemic Housing Units. The second housing type in the scheme is Apartment units (43.2%) forming the medium density while the lowest density is the detached units occupying only 8.1%.

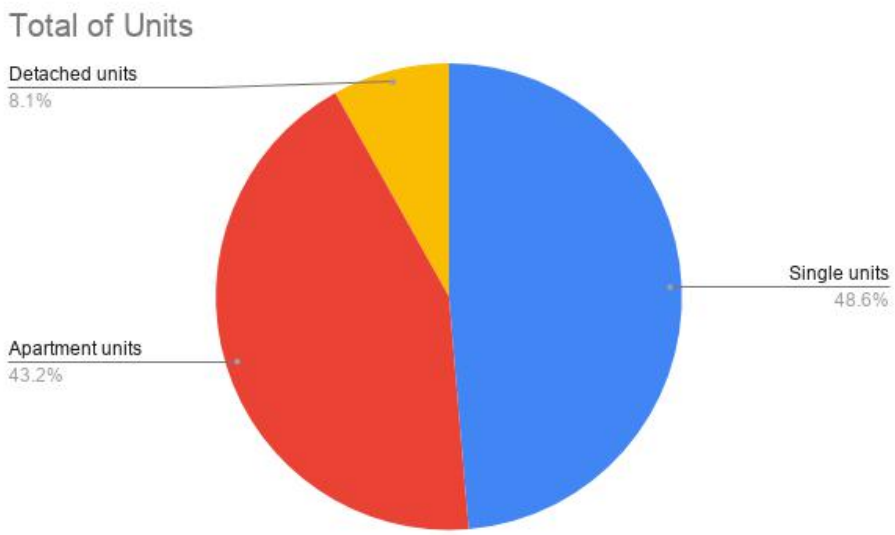


Figure 18: Percentage analysis of pandemic resilience housing units

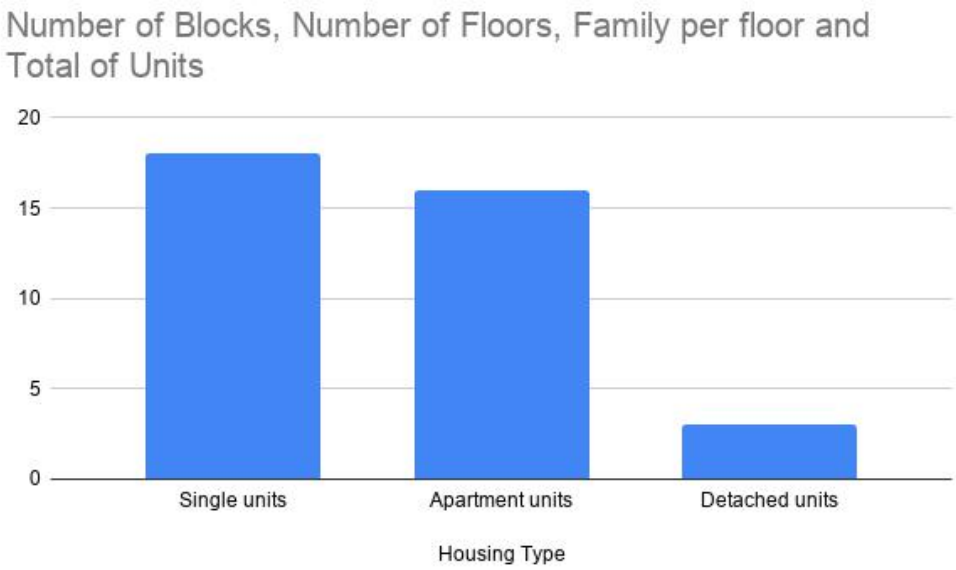


Figure 19: Ranking analysis of pandemic resilience housing units

Apart from the site layout/site plan that are arranged firstly, other parts of the drawings are arranged to follow the order of the housing type shown in Table 5 above.

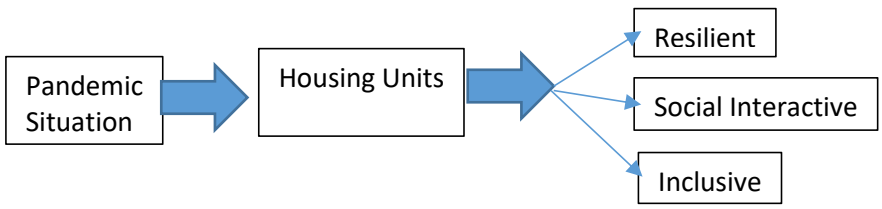
CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This dissertation aimed at creating an urban pandemic resilient housing units environment that is healthy and conducive for social interaction without compromising pandemic rules. The project location is a connector between land and sea as a natural means of context continuity creation. The project is an integral part of a community neighborhood development with other facilities like health, recreation, civic, and infrastructures urban systems. The design approaches that were harnessed included biophilic approach, sustainable design approach, and universal design approach. A fieldwork was carried out which included note-taking, taking photographs, in order to create a proper site analysis of the location. The project includes a complete conceptual design scheme which is a solution to the problem identified. When completed will be a home away from the city busy life and will be inclusive to all social classes.

Moreover, to cope with the goal of this dissertation as illustrated in the diagram below



In order to satisfy the above relationship of designing housing units in a pandemic situation that would be resilient, socially interactive and inclusive. The design scheme incorporated context-based approach that responded to the terrain of the location and connecting the natural elements of the setting to enhance both the physical and psychological health of the users. Furthermore, the use of stones and wood for eco-friendliness and glass for feel of enclosure but connecting. As evidence with the two case studies analyzed, the design provided large green areas, green roofs, balconies, transparent glazing in all public compartments and pedestrianization to support the community's overall health and wellbeing.

5.2. Recommendations

The research makes the following recommendations:

1. A future design should tailor towards smart community as a measure for tackling pandemic architecture.
2. As part of sustainability, our design should be used to design detail energy efficiency framework for the housing units and the entire community.
3. An in-depth physical and structural analysis study of the existing buildings located close to the sea should be carry-out to improve the character of the context.
4. A spatio temporal design should be provided to handle air pollution around the surrounding settlements.
5. The need to create a similar community in future in other districts of North Cyprus will be necessary to handle future demographical increase.

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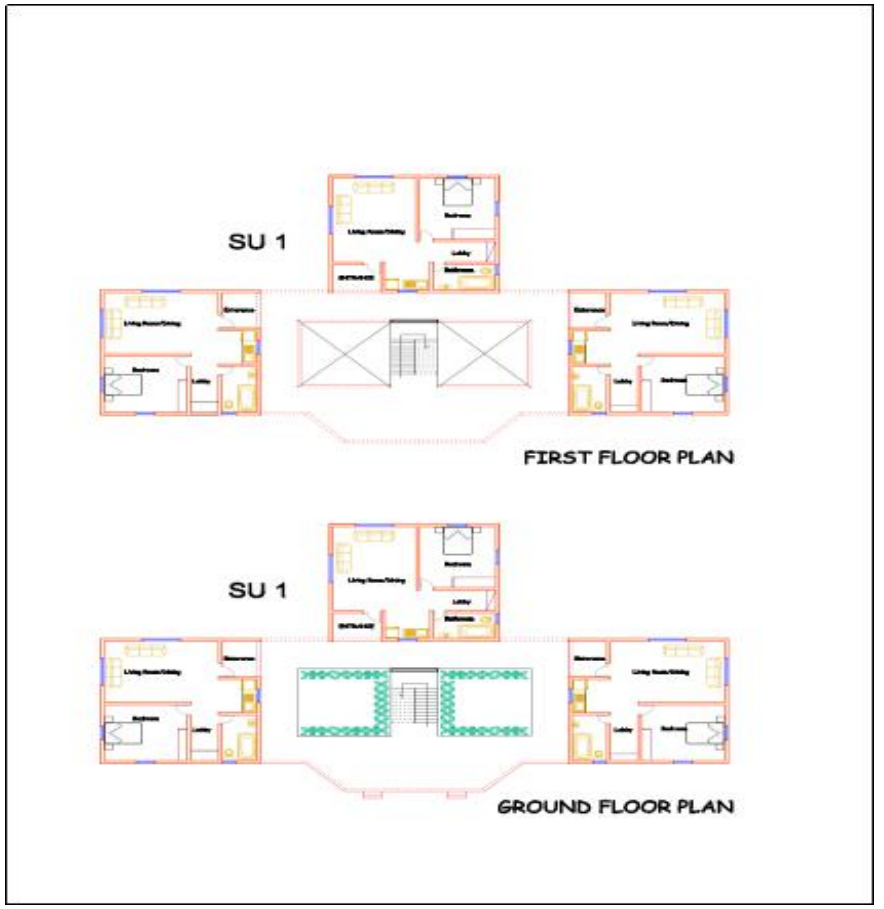
APPENDICES

Appendix 1: Site layout of Pandemic Resilient Housing Units

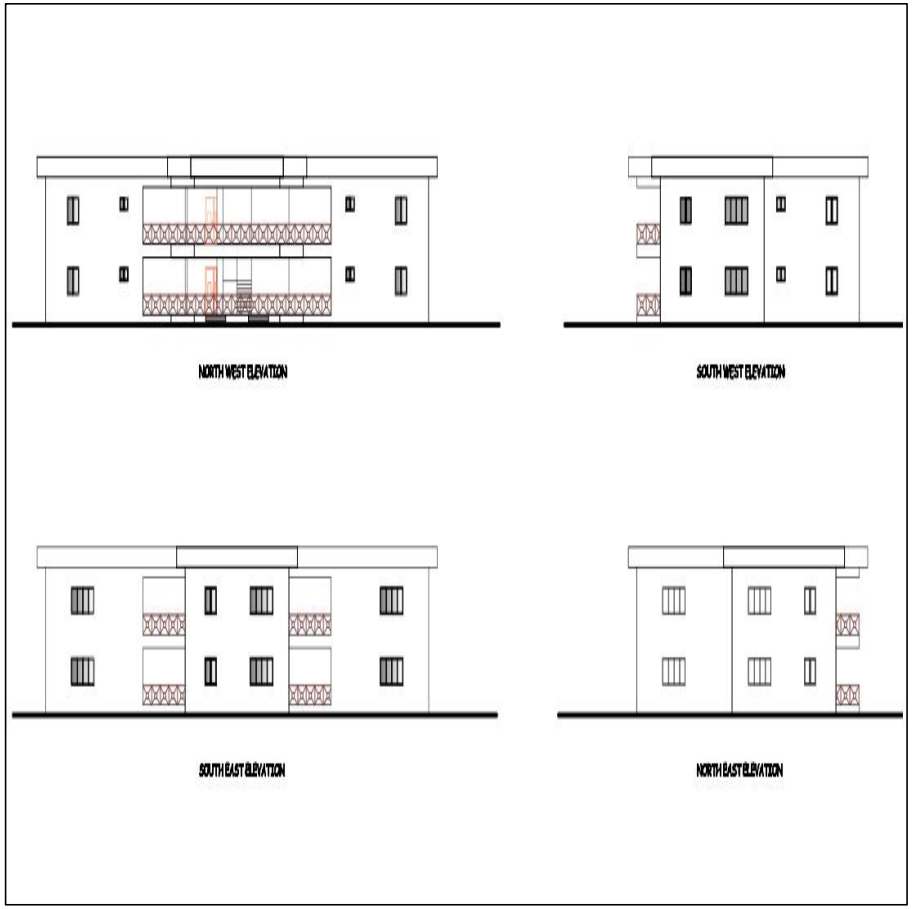
Appendix 2: Site plan of Pandemic Resilient Housing Units.

Appendix 3: Ground Floor Plans of Pandemic Resilient Housing Units.

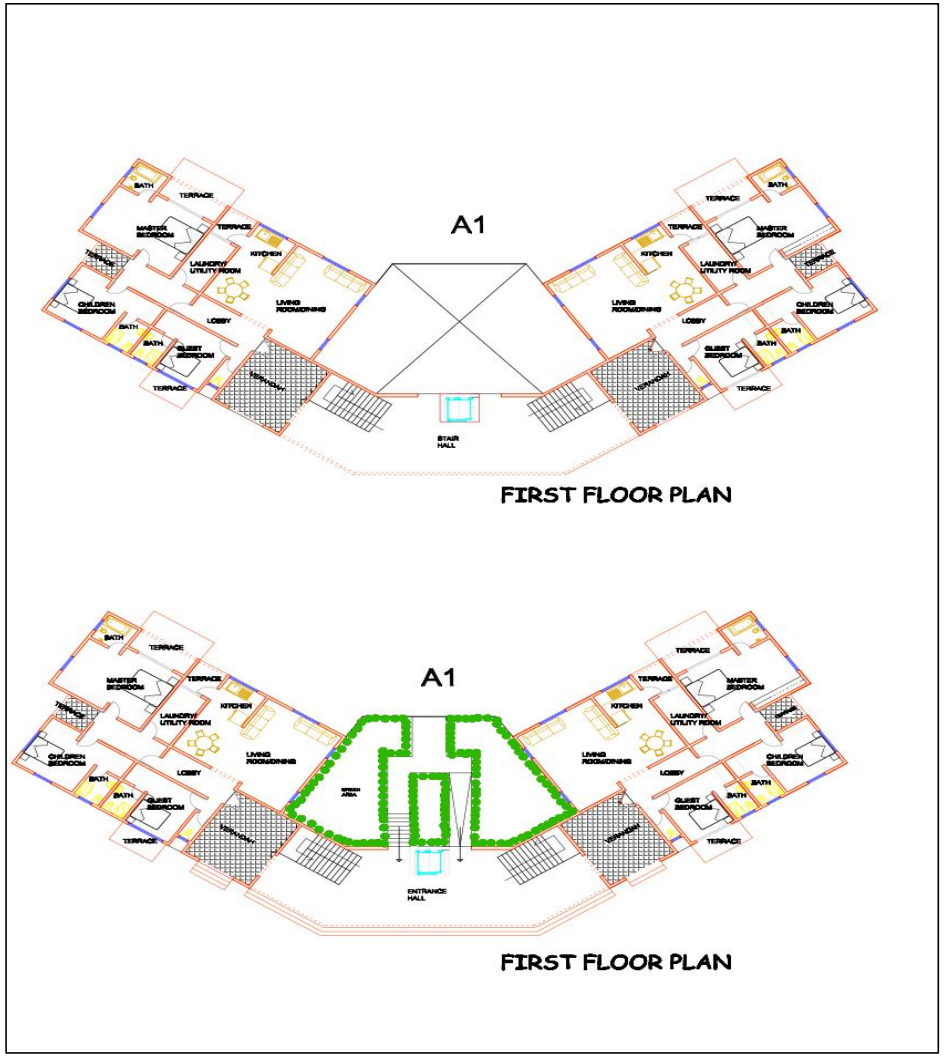
Appendix 4: First Floor Plans of Pandemic Resilient Housing Unit



Appendix 5: Floor plans of single semi-detached units

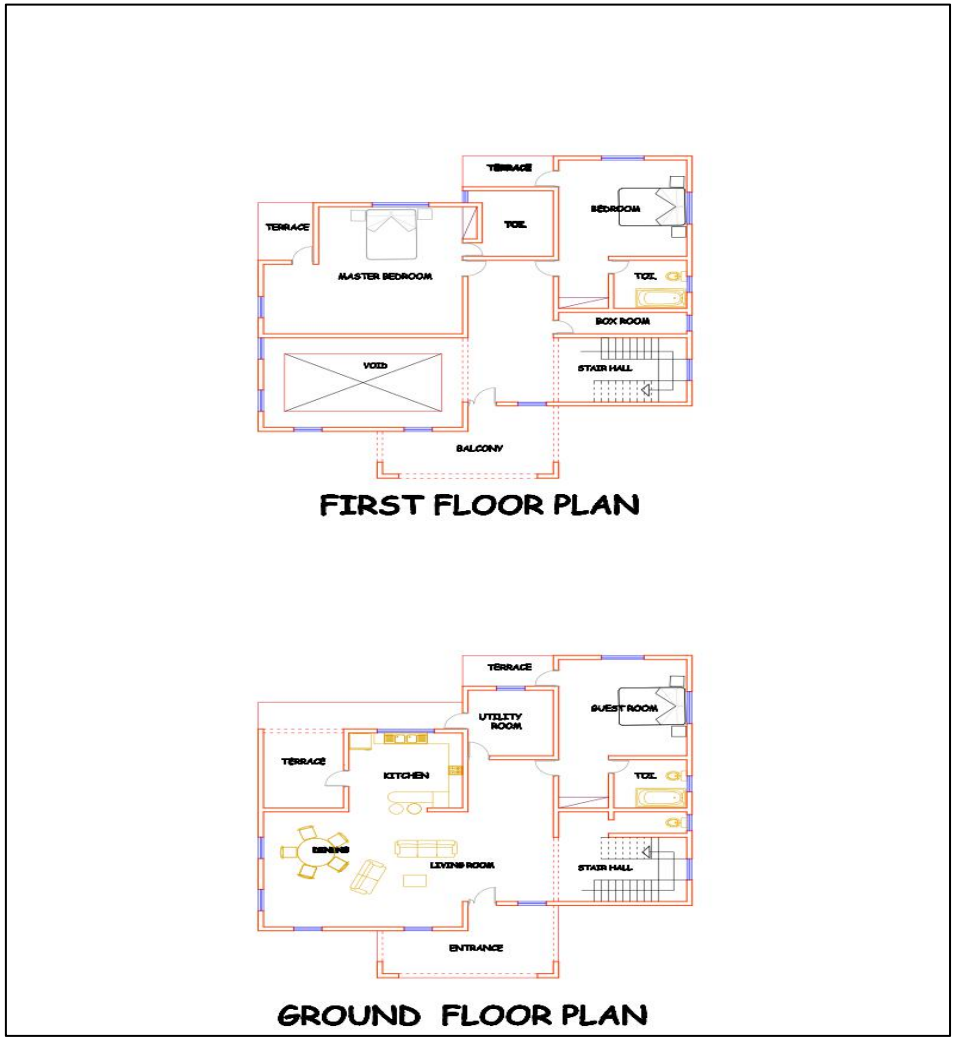


Appendix 6: Elevations of Semi-detached Single Units



Appendix 7: Floor plans of Apartment Units

Appendix 8: Elevations of Apartments units



Appendix 9: Floor Plan of 3 Bedroom Detached Units

Appendix 10: Elevations of 3 Bedroom Detached Units

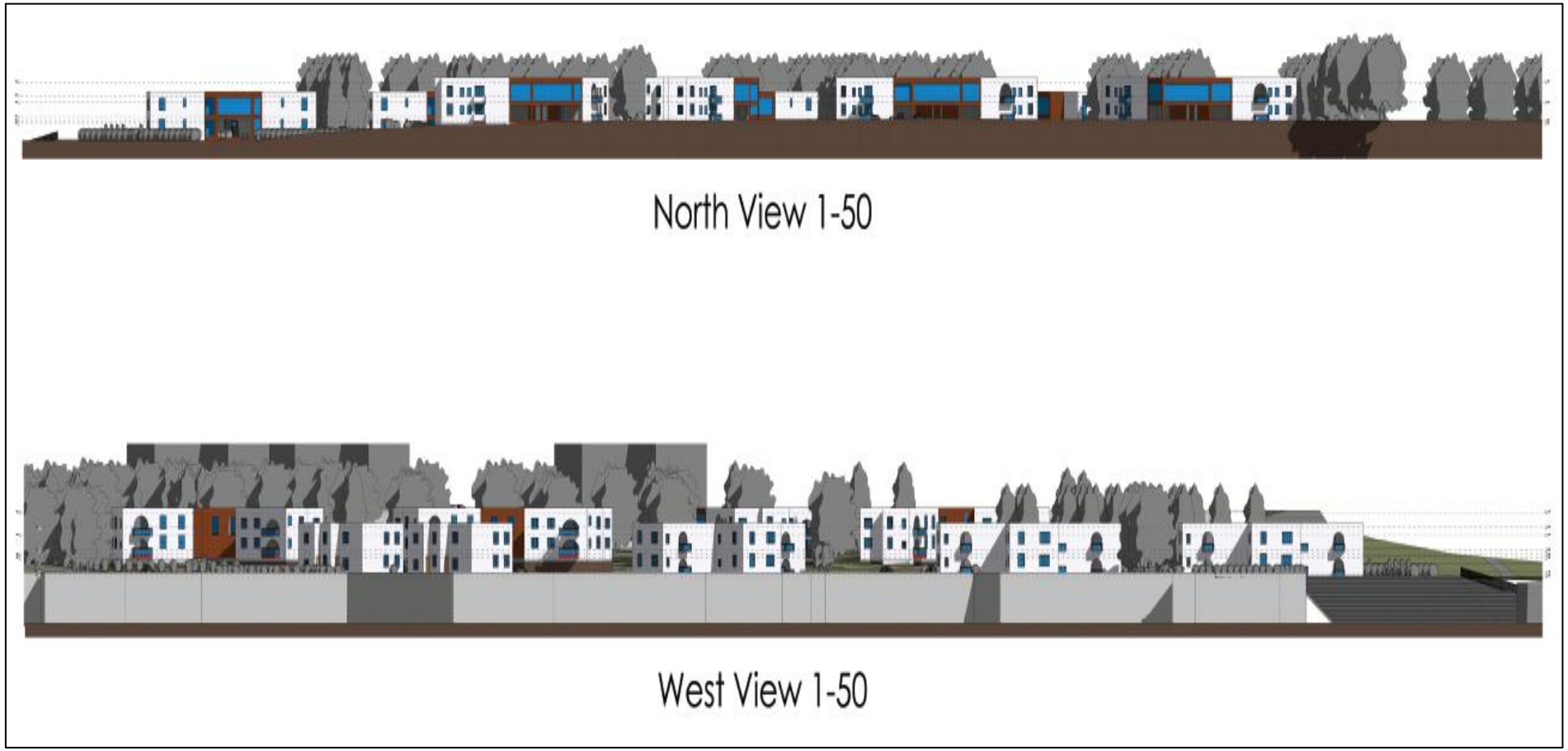
North View 1-50

West View 1-50

East View 1-50

South View 1-50

Appendix 11: All Units Elevations of Pandemic Resilient Housing Units.



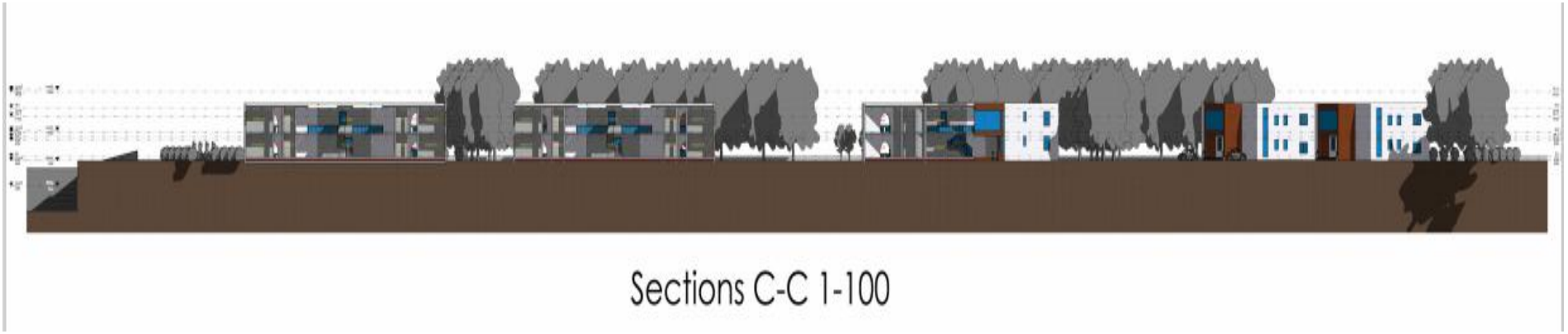
Appendix 12: Enlarge North/West Elevations of Pandemic Resilient Housing Units.

Appendix 13: Enlarge East/South Elevations of Pandemic Resilient Housing Units.

Appendix 14: Sections of Pandemic Resilient Housing Units.

Appendix 15: Enlarge Section A-A

Appendix 16: Enlarge Section B-B



Appendix 17: Enlarge Section C-C

Appendix 18: 3D- Views of Urban Resilient Housing Units