ABSTRACT

Title of Thesis: A TRANSFORMATIVE OLYMPIC VILLAGE: THE WASHINGTON 2024 POST-GAMES LEGACY

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This thesis explores the Modern Olympic Games to strategically design an Olympic Village for Washington D.C. that plans not just to house athletes, but to provide a vision for the post-Games city. Through discovery of the spirit and meaning behind one of the world’s biggest events and analysis of various post-Games Villages, the proposed Olympic Village will innovate the future of Washington D.C.’s Southeast region. Study of existing mixed-use architecture, urban planning, and adaptation will help formulate an Olympic Village design. It is the intention that the Olympic Village, much like its athletes, will emulate the Olympic motto “Citius, Altius, Fortius,” meaning “Faster, Higher, Stronger.” The objective is to establish a village that allows for a faster turnaround in post-Olympic design, utilizes higher standards, and uses stronger applications to building a more sustainable city.
A TRANSFORMATIVE OLYMPIC VILLAGE: THE WASHINGTON 2024 POST-GAMES LEGACY

by

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Preface

A Modern Summer Olympic Games entails an abundant array of program requirements to fully operate. Many venues and locations are needed to successfully facilitate an Olympics, however the “heart of the Games” is where the athletes spend most of their time, in the Olympic Village. The scope of this thesis is focused strictly on the Olympic Village itself, and while it ensures that the Olympic Village requirements needed for a Summer Games can be met on the site, this thesis is primarily about what will happen to a Village post-Games.
Dedication

I dedicate this thesis to the Olympian in everyone.
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List of Abbreviations

D.C.: District of Columbia

IOC: International Olympic Committee

NOC: National Olympic Committee

OCOG: The Organizing Committees of the Olympic Games

OV: Olympic Village

OVP: Olympic Village Plaza

RZ: Residential Zone

OZ: Operational Zone

AMI: Average Median Income
Chapter 1: Introduction

The Olympic Games is an international event that has entertained the world from its birth in Ancient Greece to its revitalization into the Modern Olympic Games by Pierre de Coubertin in the 1800s. The Games offer unprecedented opportunities not just to the athletes that compete, but to the cities that host them and the millions of people affected by each Olympiad’s legacy. While the Modern Olympics have managed to adapt and grow over time, it still maintains the themes of its ancestor’s festivities; it is these themes of unity, opportunity, and legacy that continue to inspire athletes and nations alike.

Though every Olympiad ends with the extinguishing of the Olympic torch, each Games leaves an everlasting impact on its host city economically, culturally, socially, and architecturally. Some Olympic Games have historically left their host city in upheaval while others left their city with vigor and prospect. The fate of each host city comes down to not just their appearance and organization during the Olympic Games, but their plans after they are out of the limelight. Strategic urban planning and design is necessary in the formation on an Olympic Venue as it completely transforms a city for an international event that lasts a mere three to six weeks; however while the Games come to a finite end, the infrastructure and architecture needed to encompass the event is left to try and fit itself into the host city’s existing urban fabric.
The Olympic Village is considered the “heart of the Games,” as it is home to the athletes and officials during an Olympic Games. Furthermore, the Olympic Village requires the most amount of design and creation due to the high building footprint required. The Olympic Village entails a wide array of program elements to allow for it to function separately from the city during the Games, though the turnaround from Games to typical city lifestyle has challenged past hosts for decades.

This thesis will focus on the Olympic Village and explore what is required for a city to host international athletes while also planning for what is needed to guarantee a successful addition to an existing city’s urban fabric. This thesis will propose that Washington D.C. host the 2024 Olympic Games and design the XXXIII Olympiad’s Olympic Village in the city’s Southeast region. Through precedent analysis, the IOC’s Olympic Village Technical Manual, and urban planning, the District’s Village will be established. The majority and theoretical aspect to this thesis will be based on what can happen to the Olympic Village post-Games from an architectural and urban standpoint.

The challenge will be designing an Olympic Village that will plan for the future, allowing for flexibility and adaptability to help institute a new built area into Washington D.C. that will benefit the city on a social and economic scale. The proposed Olympic Village will incorporate phasing and malleable yet sustainable design concepts that will offer Southeast D.C. new opportunities, the residences a unified community, and the overall city of Washington D.C. a legacy.
Chapter 2: History of the Olympics Games

THE ANCIENT GAMES

The Origin

The very essence of the Ancient Greek Games resonates in today’s Modern Olympics. Many rituals, traditions, competitions, and allure to the contemporary Games can be recounted to the very first Games in 776 B.C. The Games were exceptionally popular, becoming the greatest recurring event in antiquity. The Ancient Games were held without fail every four years, until the Christian Emperor Theodosius I banned all pagan festivals in AD 394. With longevity of nearly twelve hundred years, the Games continued a boisterous but sacred event for Greece.

The pagan Olympic Games were first and foremost a religious occasion intended to honor the Greek Gods, specifically the ruler of all Olympian Gods, Zeus; “It takes a serious leap of our modern imaginations to remember that the pagan Olympic Games were devoted first to religion and only second to athletics: every sporting contest was dedicated to Zeus, and sacred rituals took up as much time as sports.” The five-day festival was regarded as the ultimate event, towering well over any other annual occasion. This event, transpiring every four years, coincided with the second full moon after the summer solstice, an Olympiad dedicated to Zeus and


celebrating the best mortals on earth, “they attracted the best of the best, and the most celebrated of the celebrated.”

Though arguably the most entertaining event of the Olympics, sports were only one part of the festivities. The Games were the perfect pagan entertainment experience both in and out of the stadium; the festival was chockfull of visual wonder, joyous occurrence, and spirited relations, “Each Olympiad was an expression of Hellenic unity, an all-consuming pageant, the meeting place of heaven and earth, as spiritually profound for pagans as a pilgrimage to Varanasi for Hindus or the Muslim hajj.” For athletes, an opportunity to get closer with the Greek Gods like never before, and for those attending a chance to witness something extraordinary. Furthermore, the Games were strictly an all-male event, and performed in the complete nude. Some believed the absence of clothes was to benefit performance without discomfort or hindrance with a predominant strategy to diminish any suggestion of social class. Additionally, the nude predilection is additional indication of the Greek’s worship of physical characteristics and strength. The Games presented the athletes, showcasing them as beauty, strength, and perfection. While the Olympics demonstrated vigor and manifestation, many believed the determination of the audience was vital to the Games as well; Athenian philosopher Epictetus argued that the Ancient Games were a mere symbol for human existence, emphasizing that the harsh realities of scorching summer heat, the difficulties of travel and crowds, as

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well as the extremely lack of sanitation pushed everyone to their limits but showcased their determination for some of the most unforgettable spectacles.  

For five chaotic days, every four years, Olympia was undeniably the capital of the world, having athletes and visitors travel great lengths to compete for honor and Zeus, himself. Winning in the pagan Games was considered everything, an athlete with first place victory garnered more than the materiality of an olive wreath and prize money. The champion of each competition was rewarded with honors unimaginable to the measly mortals now surrounding him, as he was from then on considered a demigod. These athletes were the closest things to Gods walking amongst the Greeks, gaining surmounted worship and praise. A life of nobility, luxury, and privilege awaited each athlete in their home city, while their legacy was to be acknowledged until the end of time.

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5 Perrottet, *The Naked Olympics*, 11.
Figure 1: Ancient Greek Boxers, Marie-Lan Nguyen, 2011

To the Greeks, winning and partaking in the olive wreath ceremony was the most quintessential accolade a human could achieve, “this was as close to deification as any mortal could come—and the glory could compound over generations.”

The Site of Olympia

Olympia had its hindrances as a venue for mass congregation. The site while seemingly ideal with its stadium and temples of worship was too remote for its own good. The rural area lacked almost all proper accommodations, failing to offer basic sanitation and even the most rudimentary facilities. While the five-day festival offered vendors entertainment, and lavish feasts, it severely lacked essential

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8 Perrottet, *The Naked Olympics*, 43.
necessities, such as for many places to sleep or rest. Tens of miles off beaten roads, the venue was not maintained until the Games surfaced every four years, and the need for water and hygiene was a continuous dilemma. It was not uncommon for audience members to pass out or perish due to heat exhaustion or illness during the festival.

Figure 2: An artist’s impression of ancient Olympia, Pierers Universal-Lexikon, 1891

In preparation for the Olympics, athletes were required to travel to the city of Elis, here they had to register and train for thirty days before the festival began. Here, trainers adamantly pushed their athletes to the edge, while judges observed and analyzed each and every candidate. Rather than the sanctuary of Olympia, Elis was essentially the host city, which became the original Olympic Village, “[Elis] where an invasion of hopefuls were forced to train together in isolation throughout the
midsummer.” The Games were well organized, with specific deadlines and preparation, starting months in advance.

*The Modern Games Comparison*

While the ancient Greeks established the foundations of Western geometry, philosophy, science, art, and drama, they too initiated today’s passion for modern sports. The Greek’s pride and admiration for competitive athletics is not only infused in the Modern Olympic Games, but also safely embedded in international culture as a whole. Worldwide, sporting events draw massive attention and excitement, sparking loyal fans and invested audience. Every World Cup, World Series, national competition, and Super Bowl resonates back to the events held on the dirt laid stadium at Olympia.

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9 Perrottet, *The Naked Olympics*, 47.
The spectacle and energy that encompasses modern sporting events echo the vigor and joie de vivre established in the Ancient Games. The human fascination with triumph and physical perseverance is what forms a coherent connection between Ancient Greeks and the rest of the world.

Though the Modern Summer Olympic Games consist of 41 sport disciplines for competition, the Ancient Games held 18 core events. While the Modern Games explore vast sporting events each pushing athletes to the ultimate limit, the Ancient Games were a testament to Zeus, “Some time around 1000 B.C. an agrarian festival at Olympia was combined with casual foot races dedicated to Zeus in a village.
Alongside running, many Greek events still remain in the Modern Games, such as wrestling, boxing, javelin, and discus.

The program of many Greek Cities has influenced the modern day Games as well as athletics as a whole. In Greek society, the gymnasium was considered the ultimate social center, encouraging not just training and exercise, but relaxation, communication, and even homoerotic sexual occurrences. In every Greek city and sanctuary, there was an “iatreia,” a healing place. While Olympia was scarce with buildings, it had an iatreia to benefit athletes, “Archaeologists cannot confirm its [the iatreia] location at Olympia, but the edifice referred to today as ‘Greek Building,’ between the Stadium and Hippodrome, would have been the logical choice.”

Olympia was home to an administrative center of the Games, the Prytaneion, which held the champion feast, the Game’s eternal flame, and a wing that archived past Olympiads, offering display of relics and memorabilia from famous events and heroes. The Modern Games, though much more programmed and organized, are comprised of Greek DNA. Stadiums, and gymnasiums are placed in the spotlight, while amenities for both athletes and visitors offer experiences that emulate the past.

While the Modern Games continue to draw in record-breaking numbers on broadcast television, and fans from all over the country flock to whatever host city to get a taste of the action throughout the 16 day affair, the Ancient Games consisted of nothing less than pure devotion. Greeks from all over travelled, some by carriage, by

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13 Perrottet, *The Naked Olympics*, 175.
horse, or even foot for days if not weeks, just to immerse themselves into the five-day action, “In terms of audience satisfaction, our own revived Olympic Games can hardly compare—unless they were to be combined with Carnival in Rio, Easter Mass at the Vatican, and a tour of Universal Studios.” The Olympic fanfare while officially lasting less than a week during the pagan Games, had rippling effects. Winning athletes were worshipped and admired back in their home city, while losing athletes were ridiculed, shunned, and some pushed to their breaking point, developing depression and mental illness or even committing suicide. Cities who housed a winning Olympian could gain an influx of visitors, commerce, and notoriety. There was an everlasting shadow left after each Olympiad, whether they were good or bad depended completely on the athlete.

While the remote rural location of the Greek Olympic Games was an everlasting problem, running the Games in one permanent location can be seen as a much stronger convenience in relation to the Modern Games. Today’s backdrop for the Olympics traverses the world, as cities continue to bid and compete to host the Games in their backyard. The Modern Games voyage into territories never showcased before in the Game’s history, which can offer lively new tourists, unprecedented income, and a chance to innovate city landscapes into prestige urban locations; however, with every hopeful promise and opportunity can come unparalleled logistical problems, debt, and worldwide shame if not handled properly.

THE MODERN OLYMPIC GAMES

The Revival

The first modern Olympic Games opened in 1896, and from then on became an international tradition. It was four years earlier that French baron Pierre de Coubertin proposed the revival of the Greek Olympic Games to an awestruck lecture hall on the occasion of the fiftieth anniversary of the Athletic Sports Union. Pierre de Coubertin established a concept to not merely replicate Greek history but to spread a comprehension of antiquity. He stressed to modernize the Ancient Games, to flesh out the true meaning and spirit found only at the ground of Olympia and start to adapt them to a progressive society, “The image of Olympia adopted by moderns, however, rather than causing them to embrace the complex reality of the ancient events that took place at Olympia, made them inclined to establish some privileged fragmentary elements of them, such as physical effort, fair competition on a wide scale, and sacred truce.”

Pierre de Coubertin seized a unique opportunity for France, allowing for the country to reestablish an event that was only just being understood through Germany’s excavation of Olympia and proposing a much needed international

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bond. The ultimate challenge for de Coubertin, was to establish a Games with just as much meaning and spirit as the Games played in 776 B.C. It was vital for Pierre de Coubertin to dissect the pagan Olympics, and intricately piece together a more progressive Games, one that instituted contemporary beliefs and themes, himself stating “The new Olympic Games will be modern, very modern.”

De Coubertin sought a Neo-Olympism, an event based off general education and values strictly adapted to the needs and desires of human life in the contemporary era. Sequestering the ultimate opportunity, Pierre de Coubertin was on a mission to formulate a worldwide event that spoke to generations both past and imminent, “Historical context and the work of one man together contributed to taking up this heritage, identifying its content, and attempting to bring it to reality by means of effective and durable achievements.”

The Meaning and Spirit

Pierre de Coubertin’s “Olympism” was devised on the notion of community and the idea of coming together. It was de Coubertin’s goal to create a unique unity in the premise of national individuality and internationalism. To bring nations together and compete not just for honor of their country but to bond in a cultural experience completely unprecedented was the Modern Games’ core. Even the contemporary logo of the Olympic Games demonstrates this notion of unity, displaying five rings each

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representing a major area of the world interconnected to one another. Furthermore, the five colors were strategically chosen as at least one of the logo’s colors can be found in each nation’s flag.

Figure 4: Olympic Rings, Pierre de Coubertin, 2013

It was Pierre de Coubertin’s hope that future generations grew up in a world that exonerated a need for utopian ideals but rather embellished a periodic occasion for relation and respect across the nations.²²

Pierre de Coubertin believed the Modern Games would form a global unity that emulated some of the great rituals and traditions established by the Greek’s Olympics. Freely adapting from the ancient precedent, the new Games were to still maintain the essence, celebration, and earnestness found in the DNA of the pagan

Olympics: constructing an opening and closing ceremony, utilizing an official
Olympic anthem as well as national anthems, forming an athletic parade, awarding
winners in medal ceremonies, acknowledging an Olympic oath, and maintaining the
four year fanfare.\textsuperscript{23} The Ancient and Modern Games while rudimentary, are
distinctive in their own right; each containing the vital ingredients to produce
momentous and monumental occasions. The transition from Ancient to Modern
Olympic movements are not so black and white, but Pierre de Coubertin was sure
their foundations remain true:

The ancient athlete honoured the gods. Similarly the modern athlete glorifies
his country, his race, and his flag. I believe therefore, that I was right to
revive, from the outset, a religious feeling that would envelop the new
Olympism, and that would be transformed and magnified by the
internationalism and democracy which are the marks of modern times—the
same feeling, none the less, as led young Greeks eager for muscular triumph
to the foot of the altar of Zeus.\textsuperscript{24}

\textit{New Fundamentals}

While the new festival needed to maintain particular elements and concepts
found at the grounds of Olympia, they too needed to be distinguished by harmony.\textsuperscript{25}
To further push the Olympics into the modern era, Pierre de Coubertin believed that
the Olympics needed to produce its own sense of culture. According to de Coubertin,
sport was to be regarded as a producer of art as well as an occasion for art, “[Sport]
produces beauty in that it produces the athlete, who is a living sculpture. It is an

occasion for beauty thanks to the buildings that are dedicated to it, the shows and festivals it engenders.” Pierre de Coubertin wanted to create the opulence of the Olympics through the synchronization of art and literature, even establishing five additional Olympic competitions dealing with sculpture, architecture, literature, music, and painting. While the ideas were innovative, the overall combination was not sustainable for a successful modern format.

*The Flaws of Neo-Olympism*

While the Modern Games continue to fascinate audiences from all over the world, they come with setbacks. Pierre de Coubertin’s Games over time have concealed their original intent and the respect of their revival. Much of the spectacle of today’s Olympics appeal to the festivities more so than the significance of their origin, “It would be hard to find in the Games of our own time the educational, spiritual, and philosophical dimension claimed for them by Pierre de Coubertin.” Each Games comes with its own challenges and faults, most prominent being the Berlin Games in 1936. The opportunity and power that comes to a host city with each Olympics can tarnish the festival if not heeded properly. The Berlin Games, held during the Nazi regime displayed just how brittle the Games could be, “The 1936 Games, in their seductiveness and their perverseness, unquestionably offer an exemplary illustration of the potential for beauty and grandeur, but also of the

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fragility of the modern Olympics.” Furthermore, it can be hard to justify de Coubertin’s intent of “coming together” with the foremost agenda being competition between nations. A strong contradiction has inherently been set up within the contemporary Games, as unity and rivalry continuously remain cohesively eminent.

The Success of Neo-Olympism

The Modern Olympic Games managed to come into fruition due to great historic timing and one man’s imperative initiative to not just revive an ancient tradition, but establish an event that blended with the progressive era and allowed for a unified international message. Pierre de Coubertin constructed the modern Olympic Games relying on education, values, and unity, “For Olympism to come into its own, this sporting instinct must be clothed in aesthetic and moral concerns as well.” What makes the Olympic Games today so lucrative, are many of the factors de Coubertin dealt with at their rebirth: the appeal of imagination on cultural, political, and athletic levels, the concept of renewal and revival of the Games in relation to general education, and the notion of diffused historic knowledge. The Olympics, Ancient or Modern, create opportunity; opportunity that can drive the human spirit to unimaginable places.

Chapter 3: The Theory and Sense of Community

OVERVIEW

The creation of a community entails an unprecedented kit of parts in order to not just function but allow for organic growth. The nature of communities has been studied and tested for centuries. Sociologists, psychologists, architects, and urban planners have analyzed and hypothesized what formulates a successful community. The relationship between the human and both the natural and built environment are essential to the creation of a “sense of community.”

The engineering of community development is continually tested and challenged. Various concepts of urban design are constructed as technology and the economy change; industrialization caused people to migrate to cities increasing convenience and production, but in turn, losing the human connection to the environment and municipality. The era of sustainability has started to question the ideas of sprawl, suburbia, and city-dwelling with the notion of “green,” mixed-use, and LEED practices.

The analysis of how communities operate and allow for growth will establish a backbone to the Olympic Village. Proper technique and procedures can benefit athletes during the Games yet be flexible and strategic enough to formulate a community for Washington D.C. It is vital to not only establish a new neighborhood

for the Southeast quadrant, but create a community that can flourish and blend into the region’s existing ties.

SENSE OF COMMUNITY

The concept of community has a lot of layers, but in its simplest form is about the desire of acceptance and the need for interaction, “the sense of community is essentially a feeling of belonging and the shared interests among members of a community.”33 In comparison to community is the concept of social life of a place, which refers to the configurations of socializing behaviors that are expressed between residents.34 A neighborhood environment typically consists of a residential area and a non-residential area, one consists of a sense of community, while the latter is a place for socializing behaviors.

Throughout history, public spaces and a neighborhood’s environment are a cohesive unit.35 While the industrial revolution deeply uprooted urban planning concepts of the 1900’s, the invention of media and virtual networks have begun to affect the way in which people interact and create communities,

Cities have been regarded as the fulcrum of human communication and social life; however, the emergence of virtual societies and electronic

33 Leila Mahmoudi Farahani and Mirjana Lozanovska. "Sense of Community and Social Life." 223.
34 Leila Mahmoudi Farahani and Mirjana Lozanovska. "Sense of Community and Social Life." 223.
Advancement in technology and the human dependence on media has placed a new challenge on the already complex theory of community. Through innovative thinking and design, the built environment in neighborhoods could begin to enhance the chance of interaction through the preferment of walkability and the use of stationary activities.37

There are four distinct elements of the sense of community according to the McMillan and Chavis theory which states:

1. Membership- the feeling that who belongs to the community and who does not;
2. Influence- ability to express and influence the group which works both ways, some influence by the group on its members is needed for group cohesion;
3. Integration and fulfilment of needs- the feeling that members are awarded and some needs are satisfied by being a member of the community;
4. Shared emotional connections- the common history of members in a community, which includes the extent and quality of interaction between members.38

The McMillan and Chavis theory on the sense of community has played a large role in the fields of architecture and urban planning. Scholars have debated for decades the idea of whether the physical characteristics of the built environment can actually encourage a sense of community. Studies have found a positive correlation between

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feeling a sense of community and physical built environment characteristics.\textsuperscript{39}

Further studies have even offered the use of social policies and physical design strategies in order to strengthen or preserve a neighborhood’s sense of community.\textsuperscript{40}

The proven increased chances of social interaction due to the built environment, is vital to a community and neighborhood as a whole. Even weak ties in relationships formed through interaction can offer growth for the future.

Developing pedestrian-friendly environments and walkability are key factors to the sense of community, as well as being the starting point for social residential connection. While populated places like a town’s main street are proven areas of interaction, it is necessary to not solely rely on city centers and commercial streets to breathe opportunities for communal relationships to bloom.

Social life plays a vital role in the creation of sense of community, and sociability is a main role in public places within cities and neighborhoods.\textsuperscript{41} Public life, anything from sitting, standing, running, walking, and playing that occurs within a public space help define social interaction and human connection. Architecture can be a tool that can be utilized to form public spaces through manipulation and strategic design to encourage social habits,

Being alive for architecture is about being complex: forming, transforming and maintaining a structural organization that consists of multiple constituents

\textsuperscript{39} Leila Mahmoudi Farahani and Mirjana Lozanovska. "Sense of Community and Social Life." 226.
\textsuperscript{40} Leila Mahmoudi Farahani and Mirjana Lozanovska. "Sense of Community and Social Life." 226
\textsuperscript{41} Leila Mahmoudi Farahani and Mirjana Lozanovska. "Sense of Community and Social Life." 228.
arranged in specific patterns. Similarly, being socially alive refers to the complex socializing patterns in a specific context.  

Jane Jacobs’ revolutionary book, *The Death and Life of American Cities*, proposes strategies to enhance city living and performance. Jacobs stresses the importance of high-density neighborhoods that encourage mixed land use and public places in order to create vitality. The use of sidewalks, parks, greenery, activity generators such as food, and areas for community gatherings can create the character of a space as well as enforce what type of actions should take place there. Jacobs’ findings reveal that the physical structure of cities as well as urban layouts can lead to human experiences of cohesive community and lifestyles. Furthermore, with a sense of community, comes increased feelings of safety and security. More social interactions and relationships between neighbors, correlate to safer environments as people begin to look out for one another.

THE NEIGHBORHOOD UNIT

Clarence Perry presented the Neighborhood Unit in the 1920s, a concept focusing on residential development in metropolitan areas. Perry’s conception utilizes pedestrian-friendly design, enticing walkability and compassing a layout

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42 Leila Mahmoudi Farahani and Mirjana Lozanovska. "Sense of Community and Social Life." 228.
offering mixed-use and a commons at the center; showcasing an elementary school and a few other institutions, placed in the middle of the neighborhood’s urban fabric. Perry accommodated traffic but as a sense of boundaries for the neighborhoods. The neighborhoods size and layout was very specific, and was to not stray in size or definition. Perry’s Neighborhood Unit was the groundwork for modern-day planning movements, specifically New Urbanism.

NEW URBANISM

New Urbanism is an urban design movement, which came into fruition in the 1980s with primary goals of walkable neighborhoods and the promotion of community. The concept encourages the social life of neighborhoods rather than the sense of community among neighbors, as its advancement in pedestrian-friendly environments, mixed-use design, and public spaces all enable successful social living. The planning movement is widely considered as one of the most important of this century, as it strives to create a better future for the generations to come. New Urbanism focuses not just on planning ahead, but about raising the quality of life and the standards of living through the creation of better places to live. The principles of New Urbanism can be utilized in an array of projects both small and large:

1. Walkability: most things within a 10-minute walk of home and work; pedestrian friendly street design.
2. Connectivity: Interconnected street grid network disperses traffic and eases walking; hierarchy of narrow streets, boulevards, and alleys; high quality pedestrian network and public realm.
3. Mixed-Use and Diversity: A mix of shops, offices, apartments, and homes on site; mixed-use within neighborhoods, within blocks, and within buildings; diversity of people (ages, income levels, cultures, and races).
4. Mixed Housing: A range of types, sizes, and prices in closer proximity.
6. Traditional Neighborhood Structure: Discernable center and edge; public space at center; transect planning.
7. Increased Density: More buildings, residences, shops, and services closer together for ease of walking.
8. Smart Transportation: Public transportation and pedestrian-friendly design to encourage bicycle use.
10. Quality of life: Taken together these add up to a life well worth living and create places that enrich, uplift, and inspire the human spirit.⁴⁹

New Urbanism offers a lot of potential, especially in the creation of a neighborhood or city. Utilizing the principles of the movement can greatly benefit residents, businesses, developers, and municipalities.⁵⁰ Since the planning movement works on various scales, many different factors can play a role in the formation of community.

⁴⁹ New Urbanism. Web.
Chapter 4: Post-Olympic Village Precedent Analysis

OVERVIEW

After beginning in 1896, there have been 27 Modern Summer Olympic Games, held in a total of 22 different cities. Furthermore, the International Olympic Committee (IOC) has already established the host cities of future Olympic Games as far as Winter 2022. There is a plethora of not just past examples for Olympic design, but also prime examples of how cities are looking at future technologies and concepts for their Olympic blueprints.

Olympic Villages are considered the heart of Modern Olympic Games, not just to athletes, but to the cities that host them. It is essential for any Olympic Candidate City to critically analyze past Games’ Olympic planning as well as explore each city’s post-Games life (legacy). Through the exploration of different Olympic Village precedents, can come crucial knowledge that can be used in the design for future Villages. Over 120 years, there have been Olympic Villages that failed to achieve their main goals and even exacerbated their city’s economy, while there have been other Villages that have completely renovated host cities for the better.

Through a thorough analysis of past and future Olympic Villages involving capacity, context, Olympic City themes, adaptation after the Games, sustainable investigation, and the overall legacy left within each host city, one can inform the design of the 2024 Olympic Village in Washington D.C.
POST-OLYMPIC VILLAGES OF THE PAST

_Berlin_

The abandoned Olympic Village from the Berlin Games in Germany has a gloomy and haunting story to tell. The 1936 Olympics has been noted as the “Nazi Games,” where strict order and dull architecture reigned supreme. While the Olympic Village emulated recreational activity, the bas-relief of marking German soldiers that lined building walls were all too powerful to offer longevity to the Village. The Berlin Village became home to military training and eventually the Soviet Army, both of which tainted the few good memories created at the international sporting event.\(^{51}\) The Olympic Village, along with the rest of the 1936 Games, were too rooted in Nazi Germany’s identity that any chance of future development was all but forgotten.

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The 1972 Olympic Games in Munich, Germany have been severely criticized and completely changed the way Olympic Villages are designed forever. Germany received the opportunity of hosting a post-WWII Olympic Games, in hopes to alleviate tension and any wrongdoing displayed during the 1936 Berlin Games. The
Munich Games were designed in opposition to the Berlin Games, establishing a theme of apolitical optimism and launching a multi-cultural community spirit. Formulated through these principles, the Olympic Village was supposed to have a positive atmosphere displaying full transparency and friendly openness. One critical example of Germany’s lenient mantra was in its Game’s laidback security.

The 1972 Olympic Games was home to the Munich Massacre, a Black September terrorist attack against the Israeli athletic team. This event completely tarnished the Munich Games especially showcasing the city’s poor decision for a negligent security system. Today, security expenses make up a sizeable portion of the Olympic budget.

There was initial promise in Munich’s Olympic Village design that if considered separately from the tragic events in ’72, can be utilized in future proposals. The Village was intended to serve as a residential complex post-Olympics, as well as, become a showcase for modern forms of urban planning and residential construction. The Olympic Village was located not far from the city center, which allowed for the buildings to be completely surrounded by greenery. Additionally, the Village offered a completely pedestrian-friendly community as it was divided from

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the subterranean vehicle roads constructed below. Designed for 10,000 residences during the Games, the Munich Village offered over 3,100 residential units laid out in three “residential arms” extending towards the southwest and meeting at the Village center.

The 1972 Olympic Village still offers housing today, as it was sold post-Games for affordable housing mostly to students and small families. The Village’s comprehensive facilities, universal design that is ADA compliant, and sustainable elements can offer insight to future Village design, though the Game’s history remains stained on the community.

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56 Heinle, Wischer and Partner, Olympic Village, Munich.
57 Heinle, Wischer and Partner, Olympic Village, Munich.
Barcelona, Spain

The 1992 Olympic Games in Barcelona, Spain have been widely regarded as the most successful and influential of the Modern Games. The '92 Games not only offered up a memorable national competition, but it significantly reinvented the city’s waterfront. Barcelona had an extremely clear-cut approach for their Olympic plan, it was to be unwavering in its projects and to strive to benefit the city as a whole first, and then ensure the well-being of Olympic participants.  

The Olympic Village, which rested right on a new port district, was designed to house 15,000 residents and currently consists of 2,048 apartments with a present population of around 5,783 inhabitants. The revitalized waterfront of Barcelona was not created all at once. The Olympic Village was gradually converted and occupied after the '92 Games hand-in-hand with the steady establishment of local facilities and services. It was vital for the growth of Barcelona to not be faster than its economy, and the measured phasing of the Olympic Village into the city’s post-Games DNA was the very core. Many key features to the Olympic Village’s program were built with strategic conversions in mind, for example using the Games’ polyclinic as a new primary care center and creating a public library out of a large storage area.  

Barcelona’s Olympic Village was truly ahead of its time, as further exploration showcases concepts that continue to be emulated in modern design.

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59 Jordi Carbonell. "The Olympic Village, Ten Years on." 3.
60 Jordi Carbonell. "The Olympic Village, Ten Years on." 3.
61 Jordi Carbonell. "The Olympic Village, Ten Years on." 6.
Residential areas were designed in a mixed-use manner offering commercial, service, and leisure centers all adjacent to one another. The Village’s layout not only planned on benefiting those at the local scale, but also planned to benefit the city on a larger metropolitan scale. The Barcelona Olympic Village offered not only public amenities and an ideal proximity to transit and the waterfront, but it created an ideal balance of uses and opportunity for the city.

Figure 8: Olympic Village Barcelona, BarcelonaOlimpica

Atlanta, USA

Atlanta’s win for the centennial Olympic Games in 1996 was a large achievement for the United States, but predominantly for the state of Georgia. The state’s capital knew that the Games had to be something special, as it won the bid for

the 100-year anniversary of the Modern Games over Athens Greece, the home of the original Ancient Games themselves.

Atlanta Georgia decided to utilize the Olympics as a way to promote the city’s new image, not only as a well-established United States metropolis but also as an international city ready to play a dynamic role in global commerce. The 1996 Games allowed Atlanta to construct new housing and convert existing buildings in preparation for the event. The Olympic Village was designed for 16,000 residences and located strategically within the city near two universities. The Village location allowed for the universities to convert Village housing into dormitories post-Olympic Games. Currently, the Village apartments house 2,000 students, studying at the Georgia Institute of Technology, in three-to-four bedroom units.

The legacy left behind in Atlanta Georgia is commendable, as it revitalized a run-down area of the city with sustainable improvements. Today, Centennial Park remains a great draw for the city, and Atlanta’s serious consideration to sustainable re-use of new Olympic construction is a key concept to be acknowledged.


The 2004 Summer Games were supposed to be a tribute event, commemorating the Ancient Games by taking place in the homeland of Greece. Seven years after the Athens Olympics, and its Olympic Village is a symbol of national shame. The Village was created 12 miles from the city’s capital and was the largest single property development at the time. The Games promised so much more for the Village but with economic downturn and poor planning and phasing, the

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Athens Olympic Village is all but stable. Today, the Village is mostly abandoned, as many promising features failed to be completed, while its location is too secluded to offer any reasonable substance. The nation’s struggle in economy and political will has left the Village in peril still to this day. Furthermore, the Athens Village’s monotonous tones created a stale environment that failed to ignite any sense of identity.

Figure 10: Athens Olympic Village, Telegraph

London, England

The most recent Olympic Games took place in London England, summer of 2012. The Games were widely praised in their efficiency and the city’s decision to utilize temporary structures to alleviate any unnecessary building footprints in regard to its legacy design. The London Olympic Village was implemented in East Village,
Stratford; the city’s proposal in Stratford was a decision to regenerate an area many felt had been forgotten. The newly planned Village was to encourage the capital’s shift east as well as promote a future for Stratford that would emulate high standards of quality and design.67

London’s Olympic Village was designed for over 16,000 residents and currently offers 2,818 apartments for a present population of 6,000 inhabitants.68 The city’s objective was to not only establish a strong residential foundation but to create a self-sustaining community that would thrive on its own.69

The Village apartments spread across eleven developments and consist mostly in sets of eight-to-twelve story blocks, each built around a courtyard.70 Post-Games, the complex offers a mix of housing, but is intended predominantly for affordable housing. The Village design offers a variety of mixed-use concepts such as bars, restaurants, and around 30 shops positioned in East Village. With 27 acres of public spaces, new transportation access, and strategic planning in regards to temporary Olympic structures, the London Village has become a fundamental precedent to future Village planning.71

POST-OLYMPIC VILLAGES OF THE FUTURE

Rio de Janeiro, Brazil

All eyes are on Rio de Janeiro, the host city of the 2016 Olympic Games. The city has ambitious plans to establish a sustainable waterfront in Barra de Tijuca. Being the first South American city to host an Olympic Games, Brazil’s design is set to celebrate the country’s emergence as a world power.72

Brazil has been exploring innovative design concepts for their Games, involving “nomadic architecture,” a term describing the notion of re-using Olympic structures for the further development on the city, such as using a stadium’s parts to

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construct four different public schools. Furthermore, Brazil plans on removing much of the parking infrastructure needed for the Games to establish future residential developments.\textsuperscript{73} It is through these notions of re-use and construction that the country seeks to create a new legacy district with novel houses, jobs, leisure activities, and sustainable growth.\textsuperscript{74}

The Rio Games are proposing 206,000 square meters of built area for the Olympic Village, and offering 31 residential buildings, each 17 stories high.\textsuperscript{75} The Village is set to have universal design and is to work with the compact urban environment that the overall Games are trying to convey. Rio de Janeiro is working rigorously to create an Olympic Games that proposes a diverse mix of living, working, and recreational use, as well as, a flexible framework that can offer an urban phasing project to reconnect the city with its port.\textsuperscript{76}


Tokyo, Japan

After winning the bid for the 2020 Olympic Games, Tokyo, Japan has well already begun the exploration of their Games’ design. Receiving the privilege to host the Olympic Games over five years in advance offers the city the potential to investigate new and innovative ways of architectural design and urban planning.

Proposed to be placed at the waterfront site of Harumi Pier, Tokyo’s Olympic Village has goals to not just be the heart of the Olympic Games for athletes, but the heart of the city’s overall concept. With promise to surpass all the essential criteria

needed for Olympic Village design, Tokyo has ensured a convenient, secure, and comfortable area produced entirely with high standards of service.78

The Olympic Village proposes capacity of 17,000 beds, and plans to incorporate a multitude of facilities in collaboration with the public sector.79 Tokyo’s legacy concept encompasses the conversion to an international exchange plaza, which would offer a place for people from all over the world to gather, learn, interact, and communicate.80 Furthermore, Tokyo’s efforts hope to showcase the country’s advances in sustainability and technology, “The Olympic Village will become an urban residential ‘smart city pioneer model,’ where Japanese sustainability technologies are assembled.”81

While there is another Summer Olympic Games before Japan takes hosting responsibilities, the city’s initial designs and concepts of a compact and ecological Olympic Village, that is set to offer international exchange like never before, is necessary to the analysis of post-Olympic Village lifecycles.

80 “Section Ten: Olympic Village.” Tokyo2020_Candidiate, no. 10, 104.

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Figure 13: Olympic Village Tokyo Rendering, Japantrends
**Table 1: Post-Olympic Village Precedent Matrix, Image by Author, 2015**

<table>
<thead>
<tr>
<th>HOST CITY AND YEAR</th>
<th>CAPACITY</th>
<th>CONTEXT</th>
<th>THEMES</th>
<th>ADAPTATION</th>
<th>LEGACY</th>
<th>SUSTAINABILITY</th>
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<td>Friedenspark</td>
<td>Friedenspark</td>
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<td>Olympic Park</td>
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<td>Olympic Park</td>
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</tr>
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<td>Olympic Park</td>
<td>Olympic Park</td>
<td>Olympic Park</td>
<td>Olympic Park</td>
</tr>
<tr>
<td>Rio de Janeiro, Brazil</td>
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<td>Rio de Janeiro</td>
<td>Olympic Park</td>
<td>Olympic Park</td>
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<tr>
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<td>Olympic Park</td>
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</tbody>
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Chapter 5: Site

THE DISTRICT OF COLUMBIA

As Pierre de Coubertin paved the way for the Modern Olympic Games, Pierre Charles L’Enfant paved the way for the layout of Washington D.C. The District of Columbia was established in 1790 after Congress authorized a federal district along the Potomac River. L’Enfant imagined inspirational architecture, public spaces, and grand gestures to help build the city, “L’Enfant designed the city from scratch, envisioning a grand capital of wide avenues, public squares and inspiring building in what was then a district of hills, forests, marshes, and plantations.”

Pierre Charles L’Enfant surveyed the land and utilized European models as precedent to create a city that would suggest an idea that every citizen was equally important. Furthermore, L’Enfant stressed the importance of a great “public walk” to be the city’s centerpiece, and thus the concept of Washington D.C.’s National Mall was formulated. L’Enfant established the city’s infamous diagonal avenues, each named after a state, which cuts through the District’s grid street system to emphasize Capitol Hill and the government that sits on top of it.

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84 Kenneth Fletcher. "A Brief History of Pierre L’Enfant and Washington, D.C."
It was not until 1901, after much debate and controversy with L’Enfant’s proposal, and an update to L’Enfant’s framework did the city’s planning get complete. The McMillan Commission, a team of architects and planners, planned a widespread park system and array of monuments to solidify the Nation’s Capital. From the Commission onwards, Pierre L’Enfant’s urban plan for Washington D.C. has remained the primary precedent for any future work in the District, further noted by the chairman of the National Capital Planning Commission, John Cogbill, “We take L’Enfant’s plan into account for virtually everything we do.”

L’Enfant’s plan led the way in the District of Columbia’s formation, however, Andrew Ellicott’s alterations to the plan displays a provocative feature in the

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Southeast region. The surveyor pursued L’Enfant’s D.C. plan, tweaking it, by changing the alignment of Massachusetts Avenue and adding additional elements. Elllicott’s plan of Washington D.C. terminates Massachusetts Avenue, in the Southeast region, with a park space, an abundant bookend to an area of cross streets. The public space is vastly different from L’Enfant’s open but widely empty space in his iteration. This site, which rests alongside the Potomac River is home to the Washington 2024 Olympic Village.

Figure 15: Plan of the City of Washington, Andrew Ellicott

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Figure 16: USGS DC Satellite Image, 2002

SOUTHEAST WASHINGTON D.C.

Washington D.C. is split up into four quadrants: Northwest, Northeast, Southwest, and Southeast. The Southeast quadrant is highly residential as well as extremely underdeveloped in relation to the other three quadrants. Within the Southeast region rests Reservation 13 and Hill East, two sites whom overlap in plan, as well as share significant city structures, “As East Capitol Street intersects with 19th Street in the Hill East neighborhood, the residential portion of the neighborhood gives
way to a large site that’s home to RFK Stadium, the D.C. Armory and, a little further south, a 67-acre parcel of land known as Reservation 13.”

Reservation 13 is predominantly the federal reservation in Hill East, which is stark in relation to the rest of D.C.’s urban plan. The Advisory Neighborhood Commissioner in Hill East once said, “It was never part of the L’Enfant Plan, which everybody knows in terms of the city, this area was always kind of set aside,” this statement is no more apparent than when someone travels east away from the U.S. Capitol and through the city’s traditional architecture and urban design only to experience a sudden contrast in the barren Reservation 13 area.

Reservation 13 has been home to few but largely institutional buildings, the Washington Asylum in earlier years, while still housing the D.C. Jail, D.C. Department of Health facilities, and the D.C. General Hospital. One of the most notable and controversial features of Reservation 13 is the D.C. General Hospital, that has been closed since 2001 but currently serves as an on and off emergency homeless family shelter. With 67 mostly vacant acres, a majority of abandoned or fallowed buildings, and the often ghost parking lots to the rundown Robert F. Kennedy Memorial Stadium, the site has been depressed and tarnished in the sight of local residents as well as the city for over a decade.

90 Martin Austermuhle. "Remaking Reservation 13” Web.
Figure 17: D.C. Jail, Image by Author, 2015

Figure 18: Previously known as D.C. General, Image by Author, 2015
The District of Columbia has formulated multiple design proposals for Reservation 13, as it is one of the biggest remaining parcels of undeveloped land in the city.\(^\text{92}\)

Plans to build new neighborhoods, parks, and retail all created promise to the Southeast waterfront, but timing and lack of initiative never pushed a master plan any further, “Mayors have come and gone, the great recession dried up cash for development, and attention shifted elsewhere.”\(^\text{93}\)

The Hill East neighborhood of Southeast D.C. has a strong character of its own and has begun to grow in opposition to Reservation 13 over the past couple of years. The region, though close to Capitol Hill, consists mainly of affordable housing and severe lack of amenity. The Hill East neighborhood is sprinkled with historic row houses and a strong sense of community, as many of the residents have lived there for generations.\(^\text{94}\) While the cost of living is cheaper in relation to residents in Northwest D.C., the lighter costs come with a price, “the affordability comes with a trade-off: crime is higher than on the Hill (the neighborhood experienced roughly 40 percent more violent crimes than Capitol Hill in 2010) and there are far fewer businesses nearby catering to residents.”\(^\text{95}\) The neighborhood has strong potential for improvement, it remains in an area largely undeveloped and most notably it is served by two Metro Stations: Potomac Avenue and Stadium/Armory.

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\(^{92}\) Martin Austermuhle. "Remaking Reservation 13" Web.

\(^{93}\) Martin Austermuhle. "Remaking Reservation 13" Web.


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Reservation 13 is a dumping ground of sorts, as it remains unplanned and does not offer permanent solutions. The emergency homeless shelter operating out of the old D.C. hospital as well as the dated D.C. jail both still operating for necessity rather than for proper functionality or as a unified piece to Washington D.C.’s infrastructure. The site lacks any real character and is nestled within two prominent elements of the city, north of the site rests RFK Stadium and south sits the highly underappreciated Congressional Cemetery. The site of Reservation 13 can be alleviated of its makeshift homeless shelter and rundown prison if a proposal comes along that offers a rejuvenation of the Anacostia River waterfront in relation to the stadium and cemetery while justifying the relocation of these two provisions.
Figure 19: Congressional Cemetery, Image by Author, 2015

Figure 20: Relationship between Jail and Cemetery, Image by Author, 2015
Gensler Proposal

Working with the Gensler firm’s Washington 2024 Olympic bid proposal, the designed Olympic Village will bring the Games to fruition. The firm’s Washington 2024 master plan created for hosting the Games centered on one of the core themes being utilized in the design of the Olympic Village, “unity.”96 The proposed Olympic Village design will settle in with Gensler’s overarching Olympic Venue. The firm’s bid offered revitalization of the Anacostia waterfront, idealistic views to the city’s monuments, and defined areas to host the assembly of games, “Concentrating event venues in areas that would take advantage of the city’s unique character and icons, the plan also focuses on stimulation development for the Anacostia waterfront.”97

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Gensler’s Olympic master plan was developed with legacy plans to help envision what would happen to Olympic facilities after the torch, during the 2024 Games, was extinguished. However, the Washington 2024 bid lost out to Boston’s bid (the city later stepped out of the running and Los Angeles took its place). While the master plan helped identify locations for prominent venue structures, the loss of bid never pushed those concepts any further. The Olympic Village designed throughout this research and analysis will be in conjunction to Gensler’s proposal of the Games, getting into unprecedented detail of the Village’s legacy after the 2024 Games in Washington D.C.
Site Analysis

The initial site visit brought up tantalizing ideas for potential, as well as showcased just how large and underused the Reservation 13 area is. The site rests on the edge of the Anacostia River and offers potential to be the city’s eastern gateway.

Illustration 2: Washington D.C. Axial Relationship in Reference to Site, Image by Author, 2015
This location offers potential connections not only to the revamped RFK Stadium of the 2024 Olympics but it also can establish a more utilized pedestrian-network to the cemetery.

Illustration 3: RFK and Congressional Cemetery in Relation to Site, Image by Author, 2015

The site rests at an abrupt end to Massachusetts Avenue. The prominent street runs throughout the city of D.C. through a sequence of public green spaces. The site has the opportunity to create a proper terminus for Massachusetts Avenue, allowing for a final public space alongside the Anacostia River.
The Olympic Village site is burrowed in-between RFK Stadium and Congressional Cemetery, a historic site. The Village will require relocation and then demolition of all existing buildings current on the Reservation 13 property.
It is immediately apparent that the site abruptly ends the L’Enfant urban plan and lacks connection to the Anacostia River. Two initial concepts to consider in design is to connect the diagonal streets back to the river and/or further continue the grid layout of the city.
Illustration 6: Diagram of Cross-Axis Connection to Anacostia, Image by Author, 2015
The site grants some unique opportunities to consider during design. The soft edge along the river is rustic and an existing pedestrian path is actively used. Anacostia Park, a public park, sits directly across the river, filled with trails and communal activities. Potential connection or reflection across the river is possible.
Figure 23: Edge of site on the Anacostia Waterfront, Image by Author, 2015
Figure 24: View from across the river on a Pedestrian Path Looking towards RFK, Image by Author, 2015
Illustration 8: Existing Site Map in Relation to 2010 Floodplain data of 100 and 500 year floods, Image by Author, 2015

Figure 25: Existing Land Use Diagram, DC Atlas, 2015
The Existing Land Use Diagram showcases the large amount of low-density housing in the area, prominent green space along the waterfront, as well as the lack of commercial or mixed-use spaces.

Figure 26: Census Tracking Median Income in 2000; Showing Contrast between Capitol Hill and Hill East, DC Atlas, 2015
The Zoning Diagram displays the various different zoning regulations that take place around the site. A large area, including the Anacostia waterfront, and RFK stadium are considered unzoned. Important zoning districts, formulated by the D.C. Office of Zoning, which discuss FAR, lot occupancy, density, restrictions and regulations are as followed:

- **HE-1**: Hill East Subdistrict 1 (19th Street) includes squares with frontage onto 19th Street, between Independence Avenue and Massachusetts Avenue. Allows a maximum lot occupancy of 80%, minimum and maximum building heights of 26 and 50 feet respectively, a maximum of 4 stories, and a maximum floor area ratio (FAR) of 3.0. New buildings, or additions to existing buildings must be reviewed by the Zoning Commission for consistency with established design guidelines.

- **HE-2**: Hill East Subdistrict 2 (20th Street) includes squares with frontage on 20th Street. The maximum lot occupancy is 75%, the minimum and maximum building heights are 40 and 80 feet respectively. The maximum
number of stories is 7, and the maximum floor area ratio is 4.8. New buildings, or additions to existing buildings must be reviewed by the Zoning Commission for consistency with established design guidelines.

- **HE-3**: Hill East Subdistrict 3 (Water Street) includes squares with frontage on Water Street. Allows a maximum lot occupancy of 80%, minimum and maximum building heights of 80 and 110 feet respectively, a maximum of 10 stories, and a maximum floor area ratio (FAR) of 7.2. New buildings, or additions to existing buildings must be reviewed by the Zoning Commission for consistency with established design guidelines.

- **HE-4**: Hill East Subdistrict 4 (Corrections) includes squares N and O. The maximum lot occupancy is 75%, the maximum building height is 90 feet. The maximum number of stories is 8, and the maximum floor area ratio is 6.0. New buildings, or additions to existing buildings must be reviewed by the Zoning Commission for consistency with established design guidelines.

- **R-4**: Permits matter-of-right development of single-family residential uses (including detached, semi-detached, row dwellings, and flats), churches and public schools with a minimum lot width of 18 feet, a minimum lot area of 1,800 square feet and a maximum lot occupancy of 60% for row dwellings, churches and flats, a minimum lot width of 30 feet and a minimum lot area of 3,000 square feet for semi-detached structures, a minimum lot width of 40 feet and a minimum lot area of 4,000 square feet and 40% lot occupancy for all other structures (20% lot occupancy for public recreation and community centers); and a maximum height of three (3) stories/fifty (40) feet for new construction of three (3) or more immediately adjoining residential row dwellings built concurrently on separate lots and three (3) stories/thirty-five (35) feet for all other structures (60 feet for churches and schools and 45 feet for public recreation and community centers).

Chapter 6: Program

IOC OLYMPIC VILLAGE TECHNICAL MANUAL

The International Olympic Committee requires the Olympic host city to follow a set of manuals in the design and creation of that city’s Olympiad. The manuals are tested and adapted guidelines for the city to follow as they embark on the journey of hosting the world’s biggest competition. Following is a summarized and condensed version of the Olympic Village: Technical Manual that will be used in the design and planning of the Washington 2024 Olympic Village.99

Part I: Overview

Following the Olympic Charter, and Host City Contract, are the Technical Manuals. The Technical Manuals are in integral part and contain detailed technical obligations, planning information, procedures and processes, and proven practices, “thus they provide the technical requirements and information for the implementation of the key functions by the OCOG’s and their partners” (14). It is the International Olympic Committee’s goal to establish beneficial legacies throughout the world, especially through the notion of “teamwork” and the idea of striving for the same goal, “as a responsible organization, the IOC wants to ensure that host cities and residents are left with the best possible legacy in terms of venues, infrastructure, environment, expertise and experience” (18).

“The Host City Contract and the Olympic Charter Rule 39 stipulates that an Olympic Village must be provided to house all eligible athletes and officials for the duration of the Olympic Games.


65
Olympic Village Layout

Figure 27: Olympic Village Diagram, Olympic Village Technical Manual, 2005
### Table 2: Olympic Village Measurement Requirements, Image by Author, 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Two Bedroom</td>
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<tr>
<td>Dining Area (including staff, back of house, McDonalds, bag check)</td>
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<td><strong>Casual Dining</strong></td>
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<td>Polyclinic</td>
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<td><strong>NOC Services Center</strong></td>
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<td>Chef de Mission Hall</td>
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<td>Resident Center</td>
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<td><strong>Security Command Center</strong></td>
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<td><strong>Standard Space Requirements</strong></td>
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<td>Bank</td>
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<td>Dry Cleaning</td>
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<td>Olympic Museum</td>
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<td>WADA</td>
<td>529</td>
</tr>
<tr>
<td><strong>Operational Zone</strong></td>
<td></td>
</tr>
</tbody>
</table>
The Residential Zone

The Residential Zone (RZ) is a vital area of the Olympic Village. The RZ is the ‘private’ area of the Village and contains not only accommodation but dining and recreational activities.

The RZ contains the following facilities:
- Accommodation;
- NOC offices;
- NOC medical spaces;
- NOC workshop / storage areas;
- Dining Halls;
- Polyclinic;
- NOC Services Center;
- Resident Centers / front desks;
- NOC meeting rooms;
- Athlete lounges;
- Chef de Mission Meeting Hall;
- Security Command Center (SCC);
- Recreational Sports Facilities;
- Recreational areas;
- Religious Center;
- Facility Services Center (co-located in Operational Zones). (65)

The Olympic Village Plaza

The Olympic Village Plaza (OVP) is the recreational, retail, and commercial area of the Olympic Village. This area is for the benefit not only of the Athletes and Officials but also the Guests to the Village.

The OVP contains the following facilities:
- Team Welcome Ceremonies;
- Retail services;
- Recreation services;
- Meeting rooms;
- Village Management Offices (optional). (66)

The Operational Zone

The Operational Zone (OZ) contains the back of house areas of the Olympic Village including all the services for the Olympic Village to function efficiently and effectively. The OZ is strategically located on the perimeter of the Olympic Village to better facilitate movement in and out of the Village without compromising security operations.

The OZ hosts the following operations:
- Main Entry;
- Access Control Points (ACPs);
- Vehicle Control Points (VCPs);
- Guest Pass Center;
- Welcome Center;
- Village Media Center;
- Transport Mall (adjacent to the Residential Zone);
- NOC Dedicated Car Parking;
- Drivers Lounge;
- Vehicle Motor Pool;
- Staff Center;
- Staff Parking;
- Facility Services Center (FSC);
- Material Transfer Area (MTA);
- Rifle Storage Center (RSC). (67)
Planning Phases

Design Planning
“The OCOG needs to determine the type of housing used in the Olympic Village (e.g. dormitory, apartment, multiple family housing, etc.). The Olympic Village is a main signature facility of the Olympic Games and therefore should incorporate local architectural designs, features and local materials where possible” (71).

“The infrastructure requirements, such as roads, waste, hot water, power and technology must be compatible with Olympic Village standards and post-Games use… Additionally, the location of nearby buildings, roads, and waterways will also affect the Olympic Village design” (71).

“When selecting a site it is important to match Olympic Games needs and the post-Games needs and utilize permanent buildings for both where possible” (72).

“Previous Games experiences should be considered when determining water, power, waste, and other utility usage for the Village site. An Olympic Village requires substantially more utility resources than a normal residential building complex” (73).

“Temporary design and construction is driven by the operational needs for the Olympic Games that are not met by the permanent elements” (74).

Operational Planning
Operational planning provides the foundation for the Games time operations of the Olympic Village. It consists of four phases that help lead to development and further logistical operations. The phases are as followed while detailing can be found in the Appendix:
- Strategic planning;
- Concept planning;
- Operational planning;
- Operational readiness (75).

Part II: Space Planning- Village Zone Locations

Residential Buildings
“The OCOG must provide NOCs with office, medical and storage space in or adjacent to each NOC’s accommodation.
Athletes of different countries must not be required to share an apartment and/or room. Provisions must be made so that men and women can be accommodated separately” (88).

An example of an 8-person apartment would be:
- 4 bedrooms (or more if some are single rooms);
- Bathroom facilities (2 wash basins, 2 lavatories and 2 showers or baths);
- 1 living area equipped with sockets for television, telephone and Internet;
- Curtains / blinds;
- Bed linen, pillows and blankets;
- Storage areas for personal belongings;
- Must be lockable;
- Must include tables and chairs (88).

**Bedrooms**: single bedrooms must have a minimum size of 97sqft including closets. Rooms housing 2 persons must have a minimum size of 129sqft including closets (89).

**General requirements**:
- No more than 2 beds per room to guarantee undisturbed conditions;
- All Chefs de Mission must be allocated a single room;
- The ratio of 4 Athletes per 1 bathroom (4:1) must be respected (89).

**Living space**: To be considered is the necessity of a cheerful atmosphere, which can be created by using children’s drawings and/or posters as wall decorations.

**NOC Office Space**

Each NOC must have its own office for administration purposes and to support their Athletes and Officials.

The number of rooms to be provided depends on the size of the team.

**Dining Hall (Athletes and Officials)**

“The dining experience for Athletes and Officials is one of the key indicators for the Olympic Village success.
Capacity: The minimum capacity of the Main Dining is 5,000 seats and no more than 700 seats at Casual Dining for an Olympic Games. Approximately 35,000 meals are produced for an Olympic Games” (96).

“The Main Dining Hall is a key element of the Olympic Village in its location and functional importance. The facility should be located within a short walking distance of the Transport Mall and near the residential buildings. The number and location of the dining facilities will depend on the layout of the Olympic Village. A Casual Dining option is required in areas of the Olympic Village where the Main Dining Hall is situated some distance from the residences” (96).

Operational Specifications:
- Entry Control Point;
- A Dining Area;
- A Staff Dining Area: entrance, serving and seating must be separate from the Athletes and Official dining areas (1,000 seats);
- Serving Area;
- Water collection / dish drop;
- Bathrooms in or located adjacent to the dining facility
- IOC Athlete Commission Voting: composed of 12 Athletes elected for 8 years by their peers and up to 7 members nominated by the IOC President in order to ensure a balance between regions, sexes, and sports (98).

“McDonald’s: McDonald’s will have a designated area in the dining facility for a fully functional restaurant. The look and promotion of McDonald’s must not go beyond the area attributed to the IOC Marketing Partners” (101).
Figure 28: Dining Hall Diagram, Olympic Village Technical Manual, 2005

**Polyclinic**

The Olympic Village Polyclinic provides medical services to all Residents and OCOG staff that are in the Olympic Village. It is to be seen as the primary health care center for NOC’s.

A full range of services by medical and surgical specialists should be organized by the OCOG for use by the Athletes and Officials residing in the Olympic Village.
The Polyclinic must provide:
- Reception and patient waiting areas;
- Outpatient care;
- Emergency care;
- Suitable rehabilitation exercise facilities and equipment;
- Pharmacy;
- Doping Control Station;
- Radiological services;
- Laboratory services;
- Ophthalmologic and optometric services;
- Dental care services;
- Podology (109).

NOC Services Center

The NOC Services Center is established to centralize communication and services between the various OCOG divisions and each NOC’s Chef de Mission or designee.

Olympic Village Resident Centers / Front Desk

“Olympic Village Resident Centers have become one of the most critical components of the Residential Zone operations. Resident Centers act like a ‘concierge’ and are the first point of contact for Resident issues with the OCOG. A Resident Center should support between 500-1,000 Residents

Resident Centers provide:
- Information on Olympic Village facilities and operations;
- Relaxation lounge and meeting place;
- Assistance with problems or opportunity to address an issue.

Resident Centers should include:
- Front Desk;
- Housekeeping Office;
- Television / lounge area;
- Laundry facilities;
- General storage;
- Public accessible toilets;
- Public payphones;
- Beverage station;
- Ice machines.

Resident Centers will be interspersed throughout the RZ. They must be located in close proximity to the in-Village transport route and residential buildings.
Super Resident Centers can be created to provide a more structured service for a larger area of the Olympic Village. To include:
- Laundry services;
- Business Center;
- Cybercafe location;
- Wifi hotspots;
- Games room;
- Bookable meeting rooms” (127).

Security Command Center (SCC)

“The Security Command Center will serve as the headquarters of the Olympic Village security operation located within the Village perimeter. The SCC should be located within the Olympic Village fence line an in close proximity to the Logistics compound and Logistics sale port to facilitate easy ingress / egress of emergency vehicles and personnel. The SCC can be in temporary, modular or permanent type facility. Lastly, the SCC requires a large parking compound for up to 20 security vehicles Resident within the Village” (133-135).

Religious Center

The Religious Center will provide a location and suitable facilities for religious services, prayer, quiet, meditation, and counseling for Residents of the Olympic Village.

The for Olympic Games, the OCOG should provide Religious Services for:
- Christianity;
- Judaism;
- Islam;
- Buddhism;
- Hinduism (141)

Recreational Activities

An important part of the Village life for residents is appropriate relaxation and social time. Residents need time and space to escape the pressures and stress of sports competition with distraction of media, fans or even team pressures.

The basic components of an Olympic Village recreation program includes but are not limited to the following:
- A place to watch movies (seats between 20-50 people at one time);
- Television lounges (usually located in Resident Centers);
Games rooms (very popular, usually located throughout the RZ and the OVP);
Dance Club or café type facility;
Internet facilities;
Special concerts / live entertainment;
Relaxation massage. (143)

Dance Club / Cafe

“The Dance Club or Café will provide a fun atmosphere for Olympic Village Residents to dance, listen to music, see live performances and participate in activities. The Dance Club or café must consider its proximity to Athlete accommodation and noise generation that could affect other Residents in the Olympic Village. The Dance Club must be located within the RZ. The Dance Club should accommodate up to 400 people in Olympic Games. A café style club can be considered providing comfortable lounge space and or rooms that promote social interaction between the Village residents” (145).

Olympic Village Plaza (OVP)

The Olympic Village Plaza (OVP) is the heart of the Olympic Village where Athletes, Officials, Guests and Media can interact. The OVP is frequently visited and highly used area by the Residents, Broadcasters, Media, VIPs, and Village Guests.

The principle activities in the OVP are:
- A meeting place for residents and their NOC Guests;
- A suitable commercial arcade for Residents and Guests to purchase essential items and souvenirs in a secure environment;
- NOC Team Welcome Ceremonies;
- A suitable media interview area. (151)

Zone Control Points (ZCP)

“Zone Control Points allow access between the RZ and the OVP. ZCPs are located on a fence line separating the OVP from the RZ. This fence line is within the secure outer fence line of the Olympic Village” (154).

Village Amphitheater

“All NOCs must officially be welcomes to the Host City and the Olympic Village by the Mayor of the Village. The Team Welcome Ceremonies are held at the Village Amphitheater in the OVP. There will be approximately 202 ceremonies for the Olympic Games. The Village Amphitheater should double as an entertainment site, ceremony site or act as a Media backdrop within the Olympic Village.
The Flag Mall consists of all the national flags of the NOCs participating at the Olympic Games. In addition, the IOC flag, United Nations, the country and regional flag of the Host City must be present” (158).

The OCOG must provide:
- Flag poles for the IOC and the national flags of the NOCs at the ceremony;
- Stage with appropriate look of the Games;
- Shelter from the weather;
- Seating for the Olympic Games of up to 500 seats;
- The Flag Mall should be situated in close proximity to the Village Amphitheater.

**Village General Store**

“The OCOG will be responsible for the detailed design and fit-out of the Village General Store. The Store is a convenience shop for Residents and Guests at the Olympic Village. The Village General Store will provide a limited variety of products including. The range of exclusive Olympic Village merchandise is always a popular seller for Residents and Guests at the Olympic Village. Special attention should be given to these souvenir items in the Village General Store.

Note: The Village General Store must be adjacent to a service road to facilitate deliveries of goods and waste removal” (160).

**Bank**

Due to security implications, temporary fabricated tents are not appropriate for bank operations.

**Cyber Café**

Several Cyber Cafes can be provided throughout the Olympic Village. In addition to the Residential Zone Cyber Cafes, it is likely a Sponsors will want to provide such a facility in the OVP. The Cyber Café is a very popular area for Athletes and Officials.

**Hair Salon**

The Hair Salon is one of the most popular shops within the OVP.

**Café**
The Café will serve as a primary gathering place to relax in a comfortable atmosphere. The Café is often used for informal meetings by Guests and Volunteers. The Café provides a good location for live entertainment to small audiences. The OCOG should provide outdoor seatings as a part of the café as well as a good location for live entertainment to small audiences. The OCOG usually defines design and completely fit-out taking into consideration, local cultures, trends, and use of the look of the Games.

**Olympic Museum**

The location of the Olympic Museum must be prominent in the OVP. There must be an office and display area, both of which must be clearly divided. There must be storage for gift items for those Athletes that donate items to the Olympic Museum.

**WADA’s Athlete Outreach Program**

It is one of the most effective vehicles for educating Athletes and their support personnel about the dangers and consequences of doping.

**Operational Zone**

The Operational Zone consists of all the functions that are required in order that the Olympic Village can operate effectively.

**Main Entry**

“The Main Entry of the Olympic Village includes buildings and access points designed to facilitate entry into the Olympic Village by properly accredited Village Residents, NOC Guests, and accredited Media.

The Main Entry must be located immediately adjacent to the OVP. The Main Entry is usually the first impression visitors have of the Olympic Village and therefore must be appropriate in its design and have suitable look of the Games elements.

The Flag Mall can be located adjacent to Main Entry if no suitable location near the Village Amphitheater can be found (196-197).”

The Main Entry can consist of permanent or temporary structures.

**Welcome Center**

The Welcome Center should be located adjacent to the Olympic Village.
Facility Services Centre (FSC)

The FSC must be strategically located on the Olympic Village perimeter and in close proximity to major public roads allowing large vehicle movements to facilitate deliveries.

Village Operations

The Olympic Games workforce is approximately 11,000 people in all.

Entertainment or Recreational Activities

“The OCOG must provide certain retail and recreational services in the Olympic Village for the comfort and enjoyment of the Athletes and Officials. The OCOG must provide a suitable commercial area for the Residents” (259).

Security

“The Olympic Village must be fenced and patrolled to avoid intruders. The Olympic Village is one of the most critical locations of the overall security arrangements for the Olympic Games, but security operations must be implemented without creating an oppressive atmosphere for the Residents” (261).
Figure 29: Security Diagram, Olympic Village Technical Manual, 2005

Olympic Village Housing Allocation
“The Olympic Village Housing Allocation or more commonly known as NOC Allotment Process is the assignment of housing, administrative, and medical spaces to participating NOCs. This is a complex activity that must take into account 202 NOCs for the Olympic Games.

The framework for individualized NOC space assignments consists of numerous resident buildings of varying capacities, floor plans, and differing proximities to resident services. In many cases, temporary structures are needed to supplement the permanent buildings in order to meet the required amount of office, medical, and storage spaces for the NOCs.

The OCOG will assign blocks of rooms to each NOC bases on the NOC delegation size and indicated preferences of the respective NOCs” (283-284).

The OCOG must follow the following assumptions for NOC Housing Allocations:

- No more than 2 persons to a bedroom;
- A single room for the Chef de Mission of the NOC;
- No more than 4 persons per bathroom;
- Males and females must be assigned separate bedrooms;
- Different NOCs should not share housing units (e.g. apartments) except where NOCs explicitly request it;
- An NOC’s total number of beds for the Olympic Village shall not exceed the number of qualified Athletes and Officials for the Olympic Games.

Calculating NOC Delegations Sizes is not easy and often fluctuates.

NOC Offices should be locations adjacent or in close proximity to the NOC accommodation. Medical spaces should be also located in the same proximity of the NOC offices and accommodation.

“Due to the technical and physical requirements of certain sports (e.g. sailing, rowing, shooting and soccer) they are often located at some distance from the Host City” (295).

For additional information on the program and technical requirements of an Official Olympic Village, see the Appendix.
Illustration 10: "London Trial 1" Consider central hub within the Village, Image by Author, 2015
Illustration 11: "London Trial 2" Consider grid and building barriers before apartments, Image by Author, 2015
POST-GAMES OLYMPIC VILLAGE PROGRAM

OVERVIEW

The Olympic Village is intended to be as efficient and as accommodating to athletes and officials as possible. *The Olympic Village: Technical Manual* emphasizes the necessary program and urban layout required for a city to properly host international residents for an Olympiad. Each new host city has followed the guidelines while pursuing new and innovative ways to accommodate Olympic guests while also planning for the Village’s post-Games life. This thesis will challenge the manual’s requirements with the intent to better establish a legacy community without hindering the efficiency and comfort needed for an Olympic Village.
CONVERSION STRATEGIES

Building Adaptability and Flexibility

The proposed Olympic Village for Washington 2024 will require building adaptation once the Games end. The physical changes to the Olympic Village for its transition into a unified community in the District should not require drastic transformations but mere improvements and additions to the preexisting structures. The buildings may require the demolition of walls, the addition of walls, or a simple fit-out due to change in program. Many precedent post-Games Villages have embraced certain Manual requirements, such as planning for the polyclinic to acclimate into the community’s primary care facility.

Temporary Structures

Recent host cities, such as London, have begun to revolutionize the process between Olympic Village design and post-Games design. The 2012 Games successfully used temporary structures within its Olympic Village to satisfy the Manual’s Village requirements without having to create any unnecessary structures not needed once the Games were finished. This is most evidently showcased in London’s dining hall, one of the biggest and most important pieces to the Olympic Village but one not essential to a typical community. Temporary structures can be designed as predominantly full-functioning buildings, and can offer potential land for future permanent structures after they are dismantled.
Blocking and Phasing

The design for a legacy community should be incorporated within the initial design of the Olympic Village. The Village is to be a precursor of what is to come to the site when the Games are over. The Olympic Village requires a lot of land and typically a large building footprint; therefore, it is vital to strategically plan the community’s layout in a blocking and phasing manner. The Village can be created, from a design standpoint, showing different blocks of program. Some residential structures can be used for student housing in one area while another block of residential becomes mixed-use family housing. The idea of blocking will begin to create a unique atmosphere in the post-Games community.

Furthermore, the concept of phasing is imperative to how the community will continue to operate and function within the city ten, twenty, even fifty years down the road. The area of Southeast, Washington D.C. is in need for development and revitalization; however, it is extremely important to not establish a community with more housing, commercial use, and public amenities than the city’s economy can handle at a time. The growth and staggered development of Barcelona’s waterfront after the 1992 Games is a vibrant precedent to emulate, as the area was gradually converted and occupied in order to not compete with the city’s economy.

Public Land

The amount of land needed to accommodate an Olympic Village is demanding, with most of it becoming public land, an Olympic Village can offer great opportunity. The District of Columbia has set a goal in public land development,
initiating the need to set aside 20 to 30 percent of total housing units on the site for moderate to extremely low income households.\textsuperscript{100} The goal is ambitious as public land redevelopment is likely to offer some of the only opportunities to provide housing affordable to households below 60 percent Average Median Income (AMI).\textsuperscript{101}

Affordable housing provides the diversity of housing a city like Washington D.C. needs. It is through effective public-private development that a city can provide promising and beneficial public and communal facilities such as libraries, and recreation centers. Accommodating a variety of family incomes can help build a more sustainable and economically integrated city.\textsuperscript{102} Furthermore, public land can be a great location for affordable small business and non-profit commercial space, public art, parks, and innovative environmental design:

The public process to create a site-specific plan must start early and allow the sharing of information and needs, helping the community and city stakeholders create a vision for the mix of public benefits and complementary private uses that fit the site’s potential and context. This public engagement process must balance responsiveness to local needs and desires with the responsibility of using public land for critical citywide goals such as affordable housing.\textsuperscript{103}

The former Anacostia Waterfront Corporation established the Hill East region to set aside a total of 30 percent affordable housing, half at 30 percent AMI and the other half at 60 percent AMI. While funding deeply affordable housing is no easy

task, the city’s publicly owned land offers opportunity to create the necessary units by removing the cost of land as a prominent factor from the development’s equation.\textsuperscript{104}

The redevelopment of the Hill East area of Southeast D.C. will promise a lot of public amenities, and these facilities must be planned for in advance of the 2024 Olympics. Successful public land deals requires the collaboration of D.C. government agencies, community, civic, and private development. The cooperation of various organizations and supporters will ensure a cohesive vision within the post-Games Olympic Village. Transparent actions within public and private benefits in the design of the post-Games Village will help establish a stronger foundation both within the community and within D.C.’s economy.

PROGRAM TYPES

\textit{Mixed-Use}

Mixed-Use is a concept that enables a variety of building uses to be incorporated together. Apartment buildings and office buildings with retail and commercial uses on the ground level enable more social and economic advantages. The strategic design of mixed-use communities can greatly enhance the atmosphere of the area, encouraging visitors to come to the site rather than just the residents. This is an application that will be studied further in order to create an ecological and growing D.C. legacy. The post-Games Village will accommodate many public amenities, offer business opportunities, provide entertainment, and encourage communal activity.

Sustainability

Sustainability is a vital concept to architecture and planning in the 21st century. Sustainability entails the planning for growth and ecological betterment for future generations. The concept will go hand-in-hand in the design of the post-Olympic Village, as both seek to accommodate future use. Walkability, green-building practices, smart growth, LEED, and the Living Building Challenge all offer opportunity for a community to live and prosper in relation to the environment and the people who live there.

*Sustainable Olympic Design and Urban Development*, by Adrian Pitts and Hanwen Liao, explores the tactics and implications that can be made for a city to successfully develop a more sustainable design approach in the creation of a Modern Olympic Games. The book studies past Olympic venues and the impacts each Games left on their city’s economy. Pitts and Liao establish a scope for Olympic design, “Direct-Olympic-related” development, which needs to be examined at both the individual project level and the urban level for their environmental consequences. By comparison, the “indirect-Olympic-related” development has much to do with the larger scale impact on the host city’s overall built environment; this should be assessed at the strategic planning level for its interactions with the city’s long-term plan.105 Through investigation of multiple Modern Olympic Villages, the

development of Villages should be in line with the host city’s urbanization strategy.\textsuperscript{106}

The formation of an Olympic Village plays a vital role in the concept of fostering cultural interaction and the promotion of Olympism. The settings and spatial arrangements of the Village play a crucial role in the character and success of the area during the Olympics, “Tactical means of separating functional zones and separating transport helps enable athletes to pursue choices (e.g. to prepare for the competition, to train, to be at leisure, to rest or sleep, or to enjoy social activities) without jeopardizing other’s well-being; important considerations, as are safety and security.”\textsuperscript{107} Villages are encouraged to entail more compact designs, meeting medium density requirements that offer prominent communal and green areas. The most crucial implementation to Olympic Village design is for its construct to be a demonstration of environmentally sustainable development both for the local community and for the world as they gaze upon it during the Games.\textsuperscript{108}


Chapter 7: Design Application

HISTORY AND PROGRAM

Themes

The Modern Olympics offer a country the opportunity for income, innovation, and unprecedented notoriety or if not established strategically, unparalleled logistical problems, debt, and worldwide shame. Through the in-depth precedent analysis matrix studying host city and Games’ year, capacity, initial themes, adaptation, legacy, and sustainability, three universal design themes were generated (see Table 1). Unity, fashioned through universal design, mixed-use buildings, and communal green spaces allows for a more uniform and cohesive Village design. Opportunity, offers areas such as waterfront districts to be revitalized as well as the notion to plan for the future user, considers the forthcoming life of the Village. Lastly, legacy promotes the concepts of phasing, and the consideration of a city’s economy post-Games.

The themes of unity, opportunity, and legacy offer themselves to an active Washington 2024 Games and its post-Games lifespan. Unity promotes nations to come together in one place, while on a human scale, lends itself to the creation of a sense of community in the Village after the Olympics. Opportunity encourages athletes and countries to pursue human perseverance and national growth, while it will also lend itself to new prospect for the Southeast region of the Games. Furthermore, just as legacy endorses record-breaking and the notion to be immortal
during the Summer Games, it also will establish a long-term inheritance in the District of Columbia as a whole.

_Zones and Tactics_

By adopting and strategically dissecting a typical Olympic Village Program, four distinct zones were formulated and calculated for the Washington 2024 Olympic Village. The four zones: Residential, Operational, Recreational, and Transportation were tabulated and scaled to ensure proper security measures. To decrease the demanding building footprint of the Olympic Village, the D.C. Armory and St. Coletta of Greater Washington Public Charter School would be used to house programmatic elements. The D.C. Armory’s robust size and flexibility lends itself as the temporary housing structure of the much required Village Dining Hall. A permanent dining structure would provide itself well for the short lifecycle of the 2024 Games, but would be an underutilized nuisance for the Southeast region in the long run. Furthermore, with the 2024 Games taking place in the summer months, the public charter school lends itself well to Operational Zone requirements, such as much needed storage and even security measures. Both existing buildings on the Hill East site will be of great use during the Olympic Games, this strategy diminishes some of the extensive program required in an Olympic Village as well as further implements an approach to benefit D.C. post-Games.
Table 3: Post-Olympic Village Program Analysis, Image by Author, 2016

POST-OLYMPIC VILLAGE PROGRAM ANALYSIS

After the necessary tabulations and organization of the Games’ program, it is vital to consider what elements of each zone would and would not benefit the future of the site. Through the concept of conversion tactics, each zone can start to plan for...
what pieces of the program could be permanent or temporary in order to plan for new potential building uses.

**CONVERSION TACTIC**

*Illustration 13: Conversion Tactic, Image by Author, 2016*

**CONTEXT**

It is essential that the Olympic Village is properly scaled in relation to the existing building in the Hill East region. Through various studies of apartment flooring sizes, each exploring how many units per floor would be needed to
accommodate all 17,000 athletes and officials on the site, the base of four potential building typologies were established. The schematic study displays that smaller building footprints require more buildings on the site, while larger footprints do not lend themselves to the site’s existing context.

Illustration 14: Schematic Scaling Diagram, Image by Author, 2016

The architectural elements required for such a massive project would be very significant to the overall character of the site. A flaw of Olympic Villages in the past is their monotonous and bleak homogeneity. Taking an approach similarly created for the London 2012 Games, the Washington 2024 Games would offer “Design Guidelines,” for the creation of residential buildings. The guidelines would be a comprehensive toolkit offered up to a variety of local D.C. architecture firms to encourage façade explorations of the residential buildings to promote a unique but uniform Olympic Village. The guidelines would offer the Village more character but maintain a necessary cohesive identity. Furthermore, the guidelines express the
requirements of parking, zoning, sustainability, formatting, and overall aesthetic of
the Village:
Table 4: Residential Architecture “Design Guidelines” for Local Architecture Firms, Image by Author, 2016

**RESIDENTIAL “DESIGN GUIDELINES”**

**LOCAL ARCHITECTURE FIRMS**

### TYPOLGY
- **TOWNHOUSE/Apartment Complex**
- **Apartment Building Type A**
- **Apartment Building Type B**
- **Apartment Building Type C**

### MATERIALS
- Concrete
- Brick
- Black Cladding
- Aluminum Cladding
- Glass
- White Cladding

### ZONING
- **Townhouse Apartments**
  - Floors: 1-3
  - Individual “Walk-Up” Townhouses
  - Variations: 3 Individual Townhouses per Complex (4-6 Stories, 80-120 Feet)
- **Apartment Type A**
  - Ground Floor: Offices, Communal Spaces / Commercial & Retail
  - Floors: 2-3
  - 8 Units per Floor
  - Variations: 6-8 Stories (80-110 Feet)
- **Apartment Type B**
  - Ground Floor: Offices, Communal Spaces / Commercial & Retail
  - Floors: 2-3
  - 16 Units per Floor
  - Variations: 8-9 Stories (100-190 Feet)
- **Apartment Type C**
  - Ground Floor: Offices, Communal Spaces
  - Floors: 1-3
  - 12 Units per Floor
  - Variations: 13 Stories (110-170 Feet)

### SUSTAINABILITY
- Residential buildings will be designed commensurate with the living building challenge.
- Potential features: green roofs, renewable energy, stormwater management, reusable & local materials.

### PUBLIC TRANSIT
- The site will benefit from the proximity to public transportation.

### PARKING ACCOMMODATIONS
- Public and private car parks, both on-site and off-site, are to be planned at the north and south entrances to the area.
- Additional parking will be implemented throughout the site.

### REGULATIONS
- **Formatting**
  - Apartments will be formatted and planned for day-to-day living.
  - Apartment blocks will each have a community courtyard, crossing pavions, fountains, and statues.
- **Aesthetic**
  - Residential buildings are to have a baseline of 20 feet.
  - Each apartment type will maintain a specific glazing to solid ratio.
  - Residential buildings on main street are to have 60-70% of the ground floor for public retail activities.

### NOTE
- Buildings will be predominantly concrete for efficiency and cost.
- Firms will use a preselected list of facade material options to allow variety within a uniform aesthetic.
- With an undefined waterfront and public amenities, the hill east area, residential building heights will be between 60-110 feet. Keeping the hill east area.
- There will be a gradual increase in height from west to east.
- Parking lots will be used for storage during the Olympic Games, i.e., partitioned for ancillary facilities.
- The site and buildings will consist of universal design and be pedestrian-friendly.
NOTE:
*Design guidelines and regulations allow for the Olympic Village to have a uniform but varied sense of community.

PUBLIC LAND FOR PUBLIC GOOD
- Maximize the site’s potential: high-density mixed-use
- Meet community needs: daycare, healthcare, entertainment, workforce development training, public library, food and clothes pantry.
- Affordable housing a top priority
- Provide transparent valuation of public and private benefits

AFFORDABLE HOUSING
- Plan for 10% of residential units on the site to be set aside for affordable housing (income targeting split of 15% at 30% AMI, 15% at 60% AMI).
- Successful public land deals require that D.C. government agencies, civic, community, and private development interests all work collaboratively.

NOTE:
*With over 2,175 residential units being constructed, over 600 units will be offered up as affordable housing.
URBAN FABRIC

In order to form an urban plan for the Washington 2024 Olympic Village, it is vital to understand the existing context of both the D.C. city grid and the immediate site’s existing infrastructure. A city like Washington D.C. has distinct geometric features, a grid layout with diagonal roads running through it. Massachusetts Avenue and Potomac Avenue offer various potential connection points while the street grid starts to scale the overall site. A series of urban moves help to establish the formation of the Olympia Riverfront urban design scheme.

Illustration 15: Site Geometry, Image by Author, 2016

Illustration 18: Maintaining City Grid, Image by Author, 2016

Illustration 19: Massachusetts Ave Terminus, Image by Author, 2016
Illustration 20: Soft Edge and Floodplains, Image by Author, 2016

Illustration 21: Olympia Riverfront Scheme, Image by Author, 2016
Through the analysis and planning of the 2024 Olympic Village, much of the required program started to emulate that of an Ancient Greek city. Key elements like an agora, gymnasium, acropolis, and theater began to relate the modern day Village to that of its ancestor villages.

Illustration 22: Relation to Ancient Greek City, Image by Author, 2016

The Olympic Village has an extensive program and strict security measures, all of which is organized in the four Olympic zones established from the *Technical Manual*. While the zones will not be necessary post-Games, they are essential in the overall formation of the Olympic Village. The Residential Zone is the core of the Village, offering athletes and officials easy access to all points of the site. The Recreational Zone wraps around the Residential Zone, and offers great potential for interaction both on and around the Anacostia River. The Operational Zone remains in
the west of the site, establishing an entry to the Village off Massachusetts Avenue. Lastly, the Transportation Zone remains near the dining hall (D.C. Armory), offering a great location for athletes during the Olympics, while benefiting RFK Stadium post-Games.

![Illustration 23: Established Olympic Zones, Image by Author, 2016](image)

Further character is given to the Village when urban blocks are accompanied with buildings and the architecture begins to create hierarchy within the site. In continuation, the landscape then is able to weave the Village together, helping to form an interconnected urban design. Five paths designed in the Riverfront Park grow out from the Truce Monument, at a point of three and a point of two, reflecting the significance of the Olympic rings: unity. By reverse-engineering the master plan of the Washington 2024 Olympic Village, the post-Games master plan easily intertwines
with the city’s existing context. The boundary roads of the Olympic Village would allow for proper operation during the 2024 Games, while the remaining planned roads would be pedestrian pathways until the Games ended and roads could be implemented.

Illustration 24: 2024 Games Master Plan, Image by Author, 2016
While the site demands a lot of strategic planning, the architecture and programmatic design of each urban block takes tactical consideration as well. Four residential building typologies were created to encourage easier and faster construction methods. A curved building type will rest along the eastern portion of the site for maximized waterfront views. A townhouse/apartment hybrid typology will encourage a more activated street front while also paying homage to D.C.’s historic townhome aesthetic. Two different “L” shaped residential building typologies will exploit urban blocks and encourage mixed-use ground floors at every street front.
Illustration 26: Maximized Waterfront Views with Curved Typology, Image by Author, 2016

Illustration 28: Communal Green Spaces Diagram, Image by Author, 2016

Illustration 29: Hierarchy of Streets | Main Street North to South Connection, Image by Author, 2016

TRANSFORMATION

The Olympic Village Plaza is a vital piece not just to the Games, but also to the site post-Olympics. The Plaza will be the gateway of Olympia Riverfront. The Village Plaza is home to many accommodations and centers for the Games, while becoming an entertainment hub that encourages visitors to explore the area and Riverfront Park when the Olympics are over. The Plaza’s most unique feature is a portable practice running track that is gazed upon by terraced buildings reminiscent of stadium seating. The overall space embodies the physical perseverance of the athletes that will inhabit the site. The site will donate all but the tracks interior lane to a local public school post-Games allowing for the Washington 2024 legacy to live on. The
Village Plaza will gain a more structured program after the Olympics leave the city, accommodating prominent city features like pathways and roadways.

Illustration 32: Olympic Village Plaza Perspective (During Games), Image by Author, 2016
The transformation of the Olympic Village is displayed at an array of scales. Courtyard spaces will resemble the transformation of the Plaza, as what is to be a more flexible space during the Games will start to establish an identity and program post-Olympics. Courtyards will offer people an opportunity for recreation and leisure, suggesting vegetable gardens, grilling, or smaller community gatherings.
Every Olympic Village has a Truce Wall, this structure is signed by athletes and officials to promise a fair and peaceful Olympic Games. In the city where monuments have shaped its identity, the 2024 Truce Wall will become a new
resurrected monument in the Southeast region. The acrylic structures will commemorate the history of the Washington Games long after the Olympics as the immense structure will rest of podiums and glow vibrantly around a bed of D.C.’s flower, the American Beauty Rose.

Illustration 36: Olympic Truce Monument Perspective (During the Games), Image by Author, 2016
Along with the transformation of the Olympic Village for its post-Games use, is the phasing of both its building uses and economy. The Olympic Village allows for four-bedroom units to each house eight athletes during the Games, and while this is beneficial to the Olympics, it would never work in a city’s diverse apartment development. Planning for the future of the Village, the residential building typologies would allow for an easy transformation into a variety of unit types. Drywall between select bedrooms could be taken down to change the larger and repetitious four-bedroom units to allow for studios, two-bedroom, and three-bedroom units. The variation of unit sizes in the post-Games Village will offer more apartment units for rent or purchase, as well as match the ever-growing diversity of Washington.
D.C. The ground floor of many Main Street located apartment buildings will gradually phase over from the Olympic program to a more business and retail oriented program, while still offering some key features such as lounge and conference spaces.
It is vital to Washington D.C.’s economy that all programmatic elements to the post-Games Village do not open within the market immediately after the closing ceremony. The influx of businesses, operations, and development created by the Olympics will need to gradually get released into the city’s economy in order to ensure commercial gain rather than loss. Using the Village Plaza as an entertainment hub, essentially the core of the Village, businesses and development will open their doors to the newly urbanized Southeast region over a minor timespan. The reverse-engineering of the Village will encourage program type to remain mostly constant while offering diversity in building use. The post-Games turnaround of the Village will set the pieces into regular motion, the D.C. Armory and Public Charter School back to their intended uses, mixed use buildings along the Village Plaza will offer more entertainment amenities, while Main Street will begin to operate as a business center.

Illustration 40: 2024 Games Building Use Diagram, Image by Author, 2016
The 2024 Games’ Olympic Village will form the fundamental element that Ellicott’s plan for Washington D.C. intended. The Village will revitalize the Anacostia Riverfront as well as become a boundary to the quintessential D.C. grid. The formation of the Village offers a better connection with the city’s existing urban fabric, further helping it prosper when the Olympics are complete.
Chapter 8: Finish line

CONCLUSION

An Olympic Village requires a large amount of program, infrastructure, design layout, and commitment in order to achieve a fruitful setting for an Olympic Games. The “heart of the Games” must put the needs of its athletes and officials first in order to properly function for an Olympics lifespan; however, a successful Olympic Village needs to benefit not just the athletes of the Games, but the city it will long reside in post-Olympics. It is through innovative architecture, urban planning, landscape design, and adaptation that we are able to design an Olympic Village that can effectively house athletes in a memorable Games.

The themes of unity, opportunity, and legacy can encourage a notable Olympic Games, but can also institute a Village in Washington D.C. that will better weave into the city’s existing urban fabric. Unity will continue to grow in the D.C. Village post-Games as communal green-spaces, and mixed-use development hearten the neighborhood. Opportunity lends itself to Washington D.C.’s much neglected Southeast region through the creation of a new commercial area that offers new housing and job prospect. Lastly, legacy will reign superior in the post-Games Olympic Village, as the area will continue to honor the 2024 Games. The spirit of triumph and human perseverance is reflected in the Village Plaza and its interior running track and recreation spaces, the peace established by the Truce Monument and Olympic Rings Statue, the memories created in “The Eagle” amphitheater venue
space, and the newly activated waterfront. However, it is the universal design, sustainable efforts, an influx of business, commercial, and retail growth, and the commitment for 30% affordable housing that allows this Village to have a true legacy.

RETROSPECTIVE

My thesis defense presentation was a memorable and quite successful experience. There was great conversation about the design decisions made as well as discussion about specific details in the presentation. Some critics suggested a denser Village, one with less green spaces in order to relate with D.C.’s city context. Critics posed questions about continuing Massachusetts and Potomac Avenue through the site, as well as offering firms to design more than just four building typologies. The urban blocks were critiqued and the conversation was had that a closer look at façade studies would give a better understanding of the Village’s intent for diversity. The presentation both verbal and visual was commended, with the notion that such a large scaled project was easily made understandable at various scales.

This thesis has allowed me to pursue a passion that has offered me great opportunity and knowledge along the way. The thesis itself was challenging to grapple, and had far more additional elements to it than originally anticipated, which continued to widen its scope along the way. The range of this thesis was too large to push a singular building through design phases from start to finish, however it demonstrates the many trades needed in the field of architecture today. The
Washington post-Games Olympic Village offered me a chance to work collaboratively with architecture, urban planning, landscape architecture, and adaptation. The critics gave some great advice such as offering more space to accommodate future development in the area, but also some advice that would not be beneficial to the Village’s original purpose of housing athletes, such as having more unique residential typologies and bridging Massachusetts Avenue. Olympic Village design is a very intricate and ever-growing dilemma in Olympic development. This thesis has offered some key points in the design of Olympic Villages that could begin to plan for their permanent futures post-Games. The legacy plan of Olympic Villages should be the forefront for host cities, the interconnection of Villages and their city’s existing urban fabric are an integral part to making a post-Games Olympic Village prosper.
Appendices

Continuation of program details required in the *Olympic Village: Technical Manual*:

**Village Philosophy**

Objectives:

The Olympic Village must:

- Operate 24 hours a day;
- Be secure from general public and media;
- Provide the required services for Athletes and Officials

The objectives of the Technical Manual on Olympic Villages are to:

- Provide Applicant and Candidate Cities with information in order to devise their plans for an Olympic Village;
- Provide OCOG’s with the structural information in order to plan and construct the Olympic Village;
- Provide information on planning requirements and operations of the Paralympic Village;

Provide guidance to an OCOG to design, plan, construct, and operate an Olympic Village for the Olympic Games, Olympic Winter Games, and Paralympic Games.

Limits:

Olympic Village requirements will need to be adjusted to suit the Host City and the site in question” (19).

“High-Level Obligations:

- Accommodate all participating Athletes and primary Team Officials providing them with the necessary services and facilities to prepare for the Olympic Games;
- Design the Residential Zone and the Olympic Village Plaza;
- Operate the Olympic Village using relevant facilities;
- Provide same service levels in the additional Athlete accommodations as in the Olympic Village.

Olympic Village- Village Zone Locations:
Accommodation must be no more than 2 people per room;
No more than 4 people to each bathroom;
All NOCs must have adequate accommodation, office space, medical space, and storage space;
The OCOG must complete block planning with each function in the Olympic Village;
The Olympic Village officially opens 14 days before the Opening Ceremony for Olympic Games;
The Olympic Village closes 3 days after the Closing Ceremony for the Olympic Games
The OCOG must provide a Religious Centre;
The OCOG must provide recreational activities in the Olympic Village” (25-26).

The Olympic Village is generally the largest project for the Olympic Games as it is a core piece to the Olympic Games as a whole. The Village is vital to the Olympic Games and must be not only safe and secure, but a comfortable environment for participating Athletes and Officials from all over the world to live and work effectively, “The Olympic Village caters to the Athletes needs by creating a comfortable environment to facilitate the mental and physical preparation for participation in the Olympic Games free from disturbance from the outside world” (31).

The Village Mission Statement:

The mission of the Olympic Village is to provide the necessary accommodation, services, and recreational activities for the convenient use and enjoyment of all participating Athletes and Officials in a secure, comfortable, and attractive environment. The Olympic Village should be unique in that all Athletes from around the world can live together in solidarity and friendship. It is a unique living experience. (34)

There is an “Athletes first” mantra to the Olympic Village, ensuring that close collaboration between the NOC Services, Security, Sports, and the IOC is continuous. OCOG’s are advised to develop its own philosophy, Village Mission Statement, and theme such as, tradition, culture, social, food, sport, security, excellence, or operational. Furthermore, the OCOG should consider in advance, the use of traditional construction methods, trends and utilization of cultural activities, and local materials to enhance the Athletes experience in the Olympic Village. The Village’s aesthetic, general environment, and atmosphere all play an important role to the overall Olympic Games. Environmental considerations are crucial to the future of the site as well, and need to be planned for. In most cases, the Olympic Village site will
also be the Paralympic Village short after the Games, which though smaller in size, needs particular design and fit outs (34-35).

Stakeholders Obligations

With a large variety of stakeholder living, working, and visiting the Olympic Village, there are numerous obligations that must be implemented.

Village Capacity:

The exact number of Athletes is determined through the Olympic Games Qualification Systems. The number of Officials accompanying the Athletes is calculated on the number of eligible Athletes and based on Rule 39 of the Olympic Charter.

The Olympic Village capacity for Residents is as follows:

- The Olympic Village must accommodate at least 16,000 people at the Olympic Games.

A certain contingency of beds needs to be added to the above number in case of unexpected high numbers of Athletes, latent rooms and emergencies.

Obligation:

- The OCOG must provide accommodation for all participating Athletes and eligible Team Officials in twin bedded rooms within the Olympic Village;
- One Olympic Village should be provided for all Athletes and Officials in close proximity to the competition venues and the Olympic Stadium. Where Olympic venues are more than 50 Km or one hour drive (under normal road and traffic conditions) from the Olympic Village, a second Olympic Village must be provided. (38)

All Olympic Villages must provide the same type and quality of services to the Residents:

The OCOG must provide the following requirements for each NOC:

- A Chef de Mission room;
- Bedrooms and bathrooms for Athletes and Officials;
- NOC team offices;
- NOC meeting rooms;
- NOC medical rooms;
- NOC workspace / storage space.
The major operational areas affecting Residents of the Olympic Village are:

- Transport Mall;
- Dining Hall;
- Polyclinic;
- Welcome Center;
- NOC Services Center;
- Resident Centers;
- Social and entertainment areas;
- Security perimeter (particularly the Residential Zone)

The OCOG must provide certain operational services free of charge to enable the Athletes and Officials of the MOCs to operate in an efficient manner such as:

- Food and beverages;
- Housekeeping;
- Laundry;
- Logistics;
- Security;
- Recreational activities. (38-39)

Organizational Structure

The organizational structure of the Olympic Village function needs to have a logical decision making structure and include all Function of the OCOG that will be involved in the Olympic Village operations (43).

“The Olympic Village is a high profile and highly complex project of the Olympic Games” (45)

“Olympic Village Management must constantly evaluate the Village and its services in relation to the proposed Village site use after the Olympic Games” (47).

The Olympic Village Site use will consist of:

- Permanent construction;
- Temporary construction and installation;
- Fit-out;
- Functions and systems testing;
- NOC check-in;
- Games period;
- NOC check-out;
- Transition to Paralympics;
- Check-in for Paralympics;
- Paralympics;
- Check-out for Paralympics;
- Site clean-up, tear down and hand-over to owners

The OCOG must determine the length of time they require the land for the exclusive use for the Olympic Games. (52-53)

**Construction**

The Olympic Village is generally the largest construction project of the Olympic Games and usually involves a considerable amount of investment (77).

**Permanent Construction**

Funding for permanent construction is generally from Government sources but can also be provided by:
- Private investors;
- Public companies;
- The future owners of the building site;
- The construction company itself

“Where possible design should incorporate local architecture, culture, and trends. Utilization of local and / or environmentally friendly materials is encouraged” (78).

After the Olympic Games, the OCOG must proceed to:
- Reclaim site assets;
- Tear down temporary installations;
- Repair / repaint buildings if needed (79).

**Temporary Design and Construction**

It is essential to the Olympic Village’s overall design and operation for permanent structures to be utilized as much as possible, “Olympic Village services that can adequately placed within and can effectively function in permanent structures will be financially more effective than temporary construction for the OCOG” (81). Temporary design and construction will be determined by the permanent construction design and the layout of existing buildings on site.

The OCOG should define:
- Temporary structures driven by operational needs for each area;
- Procurement policy and needs;
· Design of temporary structure;
· Land, type, and size;
· Construction and installation methods;
· Technology requirements and installation;
· Temporary modular buildings;
· Structural tents (81).

**Concept Planning**

The Olympic Village Management needs to complete block planning for all areas of the Olympic Village.

The OCOG must:
- Define perimeter of site;
- Secure before construction;
- Define in more detail the actual site perimeters for the Olympic Village including security needs and access points (82).

It is important to identify the large spaces and services within the Olympic Village and locate the major and most essential services first so that the Olympic Village can function effectively. Less vital operations can be secured later.

Define pedestrian, material, and vehicle flows in the Olympic Village according to the following:
- Pedestrian flows should not cross vehicle flows where possible;
- Material flows, restocking should be back of house and separate from Resident transport flows where possible;
- To achieve the minimum amount of transport movements possible within the Olympic Village (82).

Potential environmentally friendly projects for the Olympic Village can include:
- Recycling of materials;
- Reusable sources of energy;
- Solar power;
- Recycling of Olympic Village water; Protection or integration of wildlife and vegetation on site (84).

**Paralympic Village**
The Paralympic Village operates under the same basic principles as the Olympic Games.

*Capacity*

“For the Paralympic Games, the Village should accommodate a minimum of 7,000 Residents. 4,000 Athletes and 2,200 Team Officials need to be accommodated of which there will be approximately 1,700 wheelchair users in the Paralympic Village” (302).

*Periods of Operations*

“The transition period between the Olympic Games and the Paralympic Games is usually only 3 or 4 days.

Temporary installation and construction changes must be minimal in order that the Paraolympic Village is operational on the arrival of Paraolympic Athletes and Officials” (303).

*NPC Residential Buildings*

“The NPC residential buildings are usually the same rooms used for the Olympic Games. Specific requirements will need to be added to cater for the Paralympic Athletes and Officials” (313).

- One accessible bathroom should be provided for every 3 wheelchair users;
- One shower in each apartment needs to be made accessible;
- The residential units shall be a combination of single and double rooms, with an appropriate number of wheelchair accessible rooms.  

For further detail and images on the requirements and foundations needed to establish an Olympic Village, refer to the *Olympic Village: Technical Manual*.
Bibliography


