Extended Urbanization in Tandem with Sustainability: Exploring the Nordhavn Suburb in Copenhagen, Denmark and its Green Initiatives

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Extended Urbanization in Tandem with Sustainability: Exploring the Nordhavn Suburb in Copenhagen, Denmark and its Green Initiatives

A Senior Thesis in Urban Studies
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Abstract

In Europe or North America, suburbs are often considered the desired area in which to live and are expected to be the new form of a “city”.¹ With this being so, cities are expanding their footprints at a fast rate. My stereotypical suburb is a formerly rural area with houses and great spaces separating them from one another. Along with this stereotype, the only transportation system readily available is a private automobile. However, after travelling to Copenhagen, I found that in Denmark, suburbs are where people strive to live. They are less congested than the city center and have the same great amenities that one would find in Copenhagen’s city proper. Transportation is one of the first things that is thought of when building out of the center of Copenhagen. Public transportation is ultimately what ties the city together with its suburbs. Given their transportation infrastructure needs, are all aspects of suburbs in Copenhagen sustainable?

While Copenhagen wants to maintain its sustainable backbone, it also wants to urbanize and broaden its footprint. Can a city have extended urbanization and sustainability at the same time? This question targets Copenhagen initially, but is also important to understand when studying suburbs all over the world. Sustainability is a concept that is easily overlooked by certain cities, especially when focusing on suburbs. As the environment is becoming more important globally, we have to understand the way people are living and what sustainable choices can be made individually and city-wide in order to improve the quality of life for a greater number of people in metropolitan areas.

Acknowledgements

The Center for Urban and Global Studies at Trinity has shaped my education over the past four years. I have been so fortunate to take classes that are interesting and incorporate hands-on learning to really engage with the community. Along with Trinity, the Danish Institute for Study Abroad program in Copenhagen, Denmark contributed to my college experience and my thesis in particular. My teacher Regitze Hess is the reason that I focused my research on the Nordhavn suburb due to our engaging field trip to the neighborhood. She made sure that our class understood the city as a whole which included the trip to the suburb. In addition to this, she shed light onto the fact that suburbs should not all be thought of as having a negative impact to the environment. This statement has served as the backbone of this thesis.

Professor Garth Myers has guided my thesis-writing journey by providing advice and resources to make this thesis one that I can be proud of. He has helped tailor my topic so it is approachable and not overwhelming. As my advisor, he has made my experience at Trinity so enjoyable and is the one to thank as my final year comes to an end. Without his encouragement or support, I would not be handing in a thesis. Thank you Garth, my family, and fellow classmates that have cheered me on every step of the way!
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Introduction

The question driving the research behind this thesis is: Can a city suburbanize while simultaneously making the area environmentally conscious? More specifically, can Copenhagen have extended urbanization and green sustainability? If there is any city that can expand their footprint while also keeping the environment in mind, it is Copenhagen. Nordhavn is a new development that is currently being built on the outskirts of Copenhagen city proper. The city is attempting to attract residents to live in this suburb because it will still have easy access into the main city center.

In this thesis, I researched Copenhagen and its sustainability initiatives. Further, I sought to understand the new development outside of the Copenhagen city proper known as Nordhavn (The North Harbor). With this new neighborhood, I have attempted to comprehend what type of development it is, who it is for, along with what type of architecture is apparent and how it influences sustainability. Along with this, the new Metro development is an important aspect of the city’s desire to use renewable energy as much as possible. The business side of the Metro and how it was being constructed was also something that was imperative to research closely because it reflected the government of Copenhagen. Copenhagen’s government, and Denmark's government overall which allows for it, are main reasons as to why the city has a strong local autonomy. Without the structure and capacities of their government, the city might not be as successful when focusing on the sustainability of the city. The local authorities have a major impact, rather than the national Danish government having all of the power. I also researched the recent C40 World Mayors Summit that Copenhagen hosted in October of 2019. The C40

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summit consisted of mayors from major cities around the world discussing climate change and how they can collaborate and offer ideas as to how they can improve the environment. During this summit, Copenhagen announced its grand ambitions in terms of sustainability, in that it is seeking to be climate neutral by 2025. This plan is referred to as CPH 2025. I also compared Copenhagen to other European cities to see if this new, sustainable form of development is occurring elsewhere. The comparisons consisted of suburbs in Norway, Sweden, and Switzerland. Through these areas, I searched for similarities and differences that future sustainable suburbs could learn from before developing the area.

This thesis relates to the larger field of urban studies through architecture, development, suburbanization, urban geography, urban politics, and sustainability studies. While most of these fields are important to explore, it has been beneficial to limit the amount I have included, and to focus on those that answer my questions surrounding sustainable suburbanization in Copenhagen. I explore the architecture in the Nordhavn development along with the development itself and how CPH City & Port is attempting to complete it in an environmentally safe way. CPH City & Port set up the competition in 2008 for the plans of Nordhavn. The subject of suburbanization has been one of the most important fields to touch upon because it is increasing globally, as I learned in my class, “Global Cities”, taught by Garth Myers. The politics and culture of Copenhagen are two things that cannot be disregarded when understanding Copenhagen as a whole. The culture and its government go hand in hand, and one cannot survive without the other. Copenhagen is making these green adjustments to their city, while

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6 Nordhavn, 2019.
7 Harrison and Hoyler, 169.
also attempting to increase their economic growth.\(^9\) Can these both be done simultaneously, or does something have to be sacrificed?

**Background**

Copenhagen is the capital of Denmark, directly across from Malmo, Sweden, in Northern Europe. The metropolitan region of Copenhagen has about 1.8 million residents and also has many of the major industries and centers for the Denmark government and Parliament.\(^{10}\) Copenhagen is the largest city in Denmark by a drastically large amount compared to the second largest city, Aarhus, which is home to only 300,000 citizens. Originally, Copenhagen was known as being a port city where most of Denmark’s wealth was generated.\(^{11}\) Christian IV was one of the most influential kings for Denmark due to the major buildings he appointed to be built along with his drive for international trade and use of the harbor to his economic advantage.\(^{12}\) He ruled for 59 years from 1588-1648. As a result of the amount of trade and ideas coming in and out of Copenhagen, architectural styles from other areas in Europe were brought to Copenhagen and mixed together into what was later known as the Gothic Renaissance. This is one of the major styles that is seen throughout the late-Medieval section of the city and can be accredited to Christian IV.\(^{13}\) Shortly after Christian IV’s rule, in 1660, Copenhagen was ruled by an absolute monarchy, wherein the king was essentially a figure of God on land, and he was divinely chosen to be in power.\(^{14}\) Much of this information was solidified by my teacher Anders

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\(^{13}\) Heiberg, 4.

Larsen who taught the class “History of Copenhagen: Structure, Plan, and Design” at the Danish Institute for Study Abroad in Copenhagen in the Fall of 2018.

Danes are known for being very trusting of their community and pride themselves on the safety of the city. One example of this is that a native Copenhagener is notorious for leaving their young, even newborn child in a stroller outside of a store, even in the cold. However, startling at first, this is an extremely common thing to find once living there for a few months. Along with this, the Copenhagen Metro consists of a ticketing system that requires an “honor code” from the citizens. Rather than having a turnstile so the rider is required to buy a ticket, the Metro has a check station that one willingly has to go up to and scan one’s own pass to get on the Metro. Although one may think that residents would abuse this method, the citizens generally all scan their tickets before getting on the Metro because that is the way they were raised. On the other hand, there are some debates that have occurred within studies of Copenhagen that revolve around the culture of Denmark. The society is infamous for being very homogenous and exclusive toward immigrants.\textsuperscript{15} There are claims that residents aim for almost a perfect society that remains untouched by outsiders. Along with this, Denmark operates with a social welfare system that is unique and differentiates Copenhagen from many other cities.\textsuperscript{16} The power that the municipal government holds is one of the reasons why the city is able to make a positive impact on the environment.\textsuperscript{17} Health care for Danes is ultimately paid for by the government, allowing for many citizens to have free health care while others can choose to see a private physician. With all of this being so, the local freedom of the Copenhagen residents can

\textsuperscript{15} Michael Booth, \textit{The Almost Nearly Perfect People: Behind the Myth of the Scandinavian Utopia}, (London: Jonathan Cape, 2014) 5.
\textsuperscript{16} “Welfare.” Denmark: The Official Website of Denmark, \url{http://denmark.dk/en/society/welfare/}.
\textsuperscript{17} Katz and Noring, 2016.
be seen through the involvement of the citizens in urban planning within the city. This will be exemplified when discussing the construction of the Metro.

While Copenhagen has a strong local autonomy that contributes to the city’s success, another factor that has to be acknowledged is the government’s involvement with private companies: “The focus on strong local capacity is also reinforced by the city government’s ability to establish publicly owned corporations with specialized areas of responsibilities and authority.”

Copenhagen is able to involve their local population in city planning due to the fact that they have publicly owned but privately run businesses such as CPH Port & Development that are devoted to improving the livability of the local citizens. While Copenhagen is regarded as a sustainable city through a variety of their initiatives, such as converting streets to pedestrian-only that were previously infiltrated by cars, there is room for debate and controversies. The government makes it a livable city. However, is it a livable city for all people? Or just Copenhagers? Can the city’s sustainability be replicated elsewhere, or is it the culture that keeps it alive? There are so many aspects of the culture in Copenhagen that have been deeply rooted in society for longer than anyone currently living would know. Given this, could another city adopt any of the city’s ways of life, or is it too particular to Copenhagen?

Urbanists have studied Copenhagen. However, there is not as much research that has been done on the North Harbor due to the fact that it has not been fully completed. A lot of studies have been done on Copenhagen, especially when analyzing transportation. The bike culture is something that has been studied in depth because the system is so successful and

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18 Katz and Noring, 2016.
well done and other cities have attempted to replicate aspects of it. It is interesting to note that while Copenhageners care about the environment and clearly want to make positive changes to their city, 41% of the population commutes by bike because it is the fastest way, not necessarily because of their desire to maintain a clean environment. The historical background sets up the foundation for the way the city is seen today. Urbanists have chosen to study Copenhagen due to its almost utopian feel. However, this ideal society is constantly debated globally due to the claimed closed-mindedness of the society. Along with this, it is currently being debated as to whether Copenhagen is putting its economic goals ahead of its environmental goals.

**Defining Suburbanization, Urbanization and Sustainability**

It is important to understand what ‘urbanization’ really means: conventionally, it is taken to be “the process by which large numbers of people become permanently concentrated in relatively small areas, forming cities.” It is also, then, the process of an urban area sprawling beyond its original urban fabric. Along with this, the population of the urban area increases. The traditional definition of urbanization is changing as explained by urban scholars Neil Brenner and Christian Schmid:

“First, the geographies of urbanization, which have long been understood with reference to the densely concentrated populations and built environments of cities, are assuming new, increasingly large-scale morphologies that perforate, crosscut, and ultimately explode the erstwhile urban/rural divide.”

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22 Jones, 179.
Suburbanization can be understood as an aspect of urbanization for a city. However, it is focused on the growth away from the city center, and suburbs are typically understood as less dense areas outside of the official boundary of the city. A suburb is an extended part of an urban agglomeration. Sustainable development is defined by the United Nations as: “...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (Sustainability) is a term used when a city consciously attempts to monitor its carbon emissions and when civilians make lifestyle choices to make their home and the world a healthier environment. Suburbs, arguably, are eventually going to turn into cities themselves. A sustainable suburb is not something that is researched in depth, nor are many cities focusing on the environment when the economic factor is more important in the short term. As more and more people are moving to suburbs, cities are going to have to make sensible, environmental decisions that focus on the long term impacts a suburb could have on a city and the world as a whole. In Hamel and Keil’s book, Suburban Governance: A Global View, they state how there are a variety of suburbs that one could be familiar with. However, they are all important, and, to Hamel and Keil, suburbs now define urban expansion. Suburbs are starting to be explored more intensely due to the fact that they are the preferred way of life of many in the middle and upper classes in this day and age.

Methodology / Literature Review

I’m placing my research and my final work in the two major scholarly fields of (urban) sustainability studies and (urban) development studies. These two fields are becoming more important in society today as more communities and cities focus on improving the environment.

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26 Roger Keil, Suburban Planet: Making the World Urban from the Outside In, 2018, 8.
while also increasing the residential areas for the growing populations of cities. These two fields are impacted by the environment along with the economy of Copenhagen which is an interesting mix when understanding what the city truly wants. Many scholars have provided powerful pieces of work focusing on sustainability and development. However, the two have not been researched together in enough depth, particularly in relation to suburbanization. This is what led me to explore this area of the field that is growing in importance, but requires the integration of research from both of these realms of scholarship, along with a few others.

My thesis also differs from what has already been researched about sustainability and development for Copenhagen because the Nordhavn suburb has not been fully developed. This allows for constant new research of the area and a lot of room to interpret it and compare with other research before someone else does so in great depth. Copenhagen’s new push for an entirely sustainable city has been heavily promoted recently, especially through the large scale C40 World Mayors Summit that took place in Copenhagen in the October of 2019. These two main areas of research are relatively new and constantly producing current sources, which has allowed me to interpret them to make my thesis as original as possible. Along with this, my research interrogates the influence architecture and urban design has had on sustainable development. Not only in Copenhagen, but in other cities, the importance of creating buildings that attract residents and tourists has grown, and pushes for people to enjoy the place in which they are living.

There is a hypothetical dimension to my research, due to the fact that the Nordhavn development is not completely finished. The plans of Nordhavn were designed in the

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competition run by CPH City & Port, with various stages of the development being built over the course of 40 years.\(^{30}\) Not only are the plans focused on residences, they are also meant to bring some businesses out to the North Harbour rather than having everything in the center of the city (as will be explained in Chapter One, Section One). There is significant discussion about what other neighborhoods will look like in the Nordhavn development. However, they are not physically finished.\(^{31}\) This allowed for interpretation and discussion concerning sustainable developments in Copenhagen, along with other areas. The city mentioned how they wanted to be carbon neutral while also making an economic profit.\(^{32}\) This counters their ideal culture and the social safety net that the country is built upon. There are debates around sustainability, which is one of the main schools of thought within this thesis. An issue that arises when tackling sustainability within a city is what transpires when a city has a simultaneous focus on economic prosperity. It seems a bit contradictory for Copenhagen to strive for a green urban fabric while also incorporating economic growth and doing so by real estate/satellite town expansion.\(^{33}\) Copenhagen has worked so hard on making the city an attractive place for people to live and do business.\(^{34}\) Has Copenhagen been able to make such drastic sustainable changes because it can afford to with the wealthy class living in the city and wanting to do business there? Copenhagen has been very bold in setting a carbon neutral goal by 2025. This makes people question whether it is even a tangible goal or just a goal put in place for Copenhagen to draw in investors. Copenhagen is making a name for itself and putting itself on the map, which is a strategic move, and it is trying to serve as an international guide for sustainability. However, it is important to understand its underlying goals and whether the city actually wants to make these

\(^{31}\) Urban, 1.  
\(^{32}\) C40 World Mayors Summit, 2019.  
\(^{33}\) Jones, 179.  
\(^{34}\) Jones, 180.
changes or if they are doing so to prosper economically as well. Can one be done without the other? Can both be done at once?

The literature review backing this thesis is focused on three books that explore the idea of suburbanization and urbanization in general. This allowed for a better understanding of what theories analyze the expansion of cities before focusing on just Copenhagen. The books, *Suburban Planet: Making the World Urban from the Outside In* by Roger Keil (2018), *The Suburban Land Question: A Global Survey* by Richard Harris and Ute Lehrer (2018), and *Suburban Governance: A Global View* by Pierre Hamel and Roger Keil (2015), have supplied my background knowledge in suburbanization and urbanization. Suburbanization is a process that is starting to get more recognition in research due to the expansion of suburbs and urban sprawl over the world. A lot of the world is currently urbanized, and some scholars seem to expect the entire world to be urbanized.\(^{35}\) It is also thought that many suburbs are going to become their own cities.\(^{36}\) This is an important concept to understand because Nordhavn is a suburb that is not a gated community and the residents are mixed with each other, creating a sense of community rather than each house being far apart and mainly privatized. Keil (2018: 13) explains how his suburban research is different from what has previously been done, in viewing suburbs in a positive light rather as socially and environmentally destructive: “In doing so, the book takes a stance much different from most of the existing literature that sees suburbs as derivative (of the ‘city’); as problematic and lacking (as in social life and environmental sustainability) and as uniform (as in built form).”\(^{37}\) Another interesting aspect about suburbs is the area in between the city and the suburb and whether it is actually defined, or can be defined.

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\(^{35}\) Keil, 7.
\(^{36}\) Keil, 8.
\(^{37}\) Keil, 13.
Richard Harris (2018) has a different viewpoint on suburbs and their sustainability, seeing them as areas that are exclusive. His idea of the typical suburb is one that revolves around private vehicles as the main form of transportation: “In many places and times there may have been good grounds for those perceptions. In those places, and many others besides, suburban living normally mandates the use of privatized modes of transportation: public transit is less viable, meaning that it is less frequent, less convenient, or simply absent”\(^{38}\) (Harris, 2018, 9). This is why people get the wrong idea about suburbs, especially in the United States, assuming that suburbs are not environmentally sound places to live in. However, all forms of urbanization and suburbanization are imperative to study when understanding urbanization as a whole: “Whether we consider the ‘classic’ model of single-family-home tract housing; the high-rise-dominated ‘modernist’ suburbs of Europe or Canada… they are all examples of suburban growth”\(^{39}\) (Hamel and Keil, 2018, 3). There is no one set suburb for cities to build, but it is interesting to compare the difference between suburbs and cities and how they impact the environment.

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\(^{39}\) Hamel and Keil, 3.
Chapter One

Suburban Developments

Types of Suburbs

It is easiest to understand this specific suburb in Copenhagen when looking more broadly at suburbs as a whole. Hamel and Keil (2015: 3) define the various suburbs one might encounter around the world:

*Whether we consider the ‘classic’ model of single-family-home tract housing; the high-rise-dominated ‘modernist’ suburbs of Europe or Canada; the squatter settlements of Asia and Africa; the gated communities of California, Brazil, or South Africa; or the explosive extension in mega-urban India and China, they are all examples of suburban growth. In addition, the post-suburban environment of existing - even shrinking - metropolitan regions are home to many if not most of the ‘urban century’s’ population. Few of us live ‘downtown’; most live, work, and play across the urban region in formerly or currently suburban neighbourhoods, sectors, or quartiers.*

Nordhavn does not fit the exact mold of the suburbs that Hamel and Keil (2015) listed; however, it is closest to the “high-rise-dominated ‘modernist’ suburbs in Europe or Canada.”

There are some highrises in the suburb, but they are not the only type of residences in the neighborhood. When walking through the area, there are small houses lined up next to one another, breaking up the highrises, and diversifying the housing selection. Nordhavn is meant to be a satellite city of Copenhagen that does not rely on the inner city for necessary resources. Eventually, the Nordhavn development wants businesses and companies to move to the suburb so it is not just a place where people live and commute into the city. This would allow for the area to be mixed use.

Another interesting view explained in *Suburban Planet* (Keil 2018: 23) is the tendency to think of suburbs following a set of guidelines:

*Robert Lewis points to the bias in suburban studies that has contributed greatly to a particular view of what suburbanization is all about: the privileging of middle-class...*
residential environments, close to nature, or in nature, usually on tree-lined street systems with an internal orientation for private consumption and external links to higher-level transportation that connects to labour markets, cultural and educational facilities downtown as well as commercial establishments in nodal sub centres along the extended mobility grid.

Nordhavn fits some of these typical expectations; however, it aims to break the stereotype of a suburb being exclusively residential. Along with this, it will have exceptional public transportation. Yet, it will include the same expectations as anyone living in downtown Copenhagen. I see the goal of the neighborhood to be a seamless addition to the city and serve as a place for the influx of the overall Copenhagen population that is expected to grow exponentially.

**CPH 2025 / CPH Suburbs**

While there are many different facets that contribute to the City of Copenhagen becoming completely carbon neutral by 2025, focusing on the new suburban developments that are expanding the Copenhagen footprint is something that is necessary to study extensively. Suburbs can be some of the most unsustainable areas within the overall view of a city. However, Copenhagen’s design of a suburb is not the same as how other areas of the world plan suburbs. Nordhavn is not a gated community that relies on private transportation which is what is stereotypically thought of in the U.S. when talking about planned suburbs.

CPH City & Port Development is responsible for many of the revitalization plans that have been implemented in Copenhagen. The city was not always as robust and successful as many people see it today. One of the main reasons for such a positive improvement can be accredited to the CPH City & Port Development. This company is publicly owned, but privately
run. This type of organization allowed for the company to turn inactive public land into areas that the citizens would make use of. Along with this, the company structured it so any profits that were gained from the improved area would go towards bettering transportation sectors of the city. This has allowed for the city to improve in more ways than one and has impacted many residents in all areas rather than just one neighborhood that enjoys the benefits. This company is also responsible for the development of the neighborhood Orestad, which is located right on the path down to the CPH Airport. While this neighborhood is nicely developed and directly attached to the Metro line, it personally was not as inviting as the Nordhavn neighborhood. We took a day trip to Orestad, and it is known amongst the city residents that it is very windy in the area because the buildings are not spaced in a way to block any potential wind. The area also has a large mall and other grand buildings that take away from the outdoor public space that Nordhavn is attempting to create with the harbour. However, Orestad is an example of the successful implementation of the Metro line and how the correct transportation can draw people out to a suburb. CPH City & Port Development is essentially behind all aspects of recent revitalization projects in Copenhagen which all connect to one another. Without one project, the company would not have been able to improve all of the necessary areas of the city. Without the Metro expansion, Nordhavn would not be the desirable place it is expected to be due to the accessible transportation.

*Plans of Nordhavn*

In 2008, CPH City & Port Development ran a competition for urban planners and architects to design a plan for Nordhavn, and the winner(s) would ultimately be the ones

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43 Katz and Norwalk, 2018.
implementing their plans for the Nordhavn development. Refer to Figure 1 to picture Nordhavn in 2008 before any additions were implemented and then compare it to Figure 2 that shows what Nordhavn will look like once all of the additions are completed - which is expected to be in 2025 and designed by COBE, Sleth, Polyform, and Ramboll.\textsuperscript{44} The Inner Nordhavn is the first of the plans to be built and was the development that I visited first-hand. This is the first phase of a much longer process of the entire Nordhavn development that is expected to be completed in about 40 years.\textsuperscript{45} There were already 2,500 residents as of 2019 in the neighborhood and I expect that number to increase even more once public transportation is finished connecting the area to the center of the city. The goal is for the Nordhavn neighborhood to reach a similar amount of residents as the other neighborhoods that make up the city of Copenhagen, as seen in Figure 3 where the numbers represent the approximated number of residents in the neighborhood. One set of plans labeled as “The Intelligent Grid” (seen in Figure 4) displays how Nordhavn expects the layout of the area to be of mixed use. This allows for variation of the area and does not separate the function of each building to a specific area. This eliminates the possibility of the neighborhood becoming completely residential or commercial. Nordhavn is expected to be a home to 40,000 residents along with a workspace for an additional 40,000.\textsuperscript{46}

When initially looking at the plans, the small islands and canals separating the spaces from one another did not seem to suggest that suburban development would be the most efficient way of taking advantage of the space. However, this would allow for smaller, more intimate areas, along with the fact that more residents will be able to have views of the water.\textsuperscript{47} Analyzing the plans of Nordhavn allows for anyone to experience the development, not just the

\textsuperscript{45} Cobe - Nordhavn.
\textsuperscript{46} Ibid.
\textsuperscript{47} Ibid.
designers or residents. While there are plans for the future developments past the Inner Harbour, there is no set design yet. This encourages the future residents and workers to help with the development of the space and how it will be for the people that are actually going to be utilizing the space daily.\textsuperscript{48}

\textit{Transportation}

\textit{Biking}

The bicycle infrastructure in Copenhagen is constantly praised for how safe and efficient the system is. The bike lanes in the city are elevated and separated from moving traffic. A typical bike lane is sandwiched between a lane dedicated to parked cars that is inches below the bike path on the left and then on the right there is the sidewalk for walking pedestrians that is a few inches above the bike lane, as seen in Figure 5. If one rides a bike at a constant speed of 20 km/hr and is greeted by the green signal from the smaller traffic bike light, then the biker will continue to hit every green light.\textsuperscript{49} This is known as the “Green Wave” and is in place on the main streets of Copenhagen along with the popular commuter routes. The bike lanes are much more time efficient for residents especially when commuting into the city and citizens bike because it is truly the fastest way to get around and can get you as close to your destination as possible. Slower bikers remain on the right side of the lane while the left side is used for passing. This transportation method was intimidating at first. However, everyone rides at their own pace, and if you use your hand signals correctly, no one will be inclined to ring their bell.

In the Nordhavn development, they have created a bike lane known as the green loop that connects the neighborhoods within Nordhavn along with a path straight to the center of the

\textsuperscript{48} Cobe - Nordhavn.
city of Copenhagen.\(^{50}\) Having accessible bike lanes for the citizens of the development is just as important as the addition of public transportation. Those living in a suburb might be concerned about the easy accessibility into the city, especially if their preferred method of transportation is biking. This green loop has attracted citizens that have been previously living in the city because this suburb offers a slower lifestyle while simultaneously having an easy connection into the center of the city.

**Metro**

The Metro is arguably the most reliable form of public transportation within Copenhagen. The system is driverless and runs 24/7.\(^{51}\) The first line of the Metro opened in 2002. This is considerably later than other European Metro transportation systems such as the Metro in Paris, where the first line was opened in 1900. While it was a longer waiting time for this form of public transportation for Copenhagen, this allowed for the construction of the Metro to be done in the most efficient way possible. Along with this, residents were asked to provide input of what they wanted to see within the Metro and the newly constructed stations. In the older Paris Metro stations, one might experience the dimly lit, narrow corridors one has to travel through in order to get onto the Metro. While the Paris Metro system essentially connects the entire city together, Copenhagen residents expressed their safety concerns with Metro stations, allowing for the construction to be completed correctly the first time, rather than having to modify them due to the lack of residents using the metro at certain times of the night. I took the class, “Getting There: Transportation in Urban Europe” while abroad in Copenhagen. We took a field study to one of the Metro stations that was currently under construction. We met with one of the architects and builders of the station where they explained to us their methods for construction

\(^{50}\) Cobe - Nordhavn.

\(^{51}\) About the Metro - The Copenhagen Metro, [https://intl.m.dk/about-the-metro/](https://intl.m.dk/about-the-metro/), Accessed 10 Mar. 2020.
of the stations. The stations had been previously mapped out in terms of where they would be; however, the Metro construction company set up a small tent by the expected station where residents could express their desires for the new station. Some of the ideas that were expressed from this set-up were implemented into the actual construction of the stations. Some residents said that they would prefer an open station with light that comes in above. Along with this, the outside of the station would have green, public areas for people to enjoy rather than just passing through the station to the next destination. The interiors of the station also replicate the transportation that corresponds with it - such as the S-Train is red, so the tiles leading from the metro to the S-Train are red.

The Copenhagen Metro is an efficient way of travelling around the city. However, when I was studying there in 2018, the Metro did not reach the neighborhood in which I was living. Along with this area, the Metro missed almost half of the city. This led to the expansion of the project known as the Cityringen, which is a circle line going all around the city, as shown in Figure 6. The M1 and M2 lines were already in place at the time, which allowed travelers to transport from the airport directly into the center of the city, but not to the neighborhoods outside of the center. With this new circle line, a traveler will be able to get around the city in 24 minutes.⁵²

While Nordhavn has been accessible to the city center by the S-Train line, the Metro is much faster and gets travelers in and out of the city in a more efficient manner. The Metro line expanding to Nordhavn was fully functioning on the expected date of March 28th of 2020. Despite the Coronavirus pandemic posing as a threat to the opening of the line, the only thing that was altered was the anticipated celebration at the site of the station.⁵³ This would allow for

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someone to live in the Nordhavn suburb but also commute into the city much faster than waiting for the S-Train (that is not as fast and does not have as many stations around the city). Some suburbs, such as those in the United States, do not have sufficient public transportation like the Copenhagen Metro. This makes the Nordhavn suburb attractive to residents, especially those that do not want to own or rely on a car as their primary form of transportation. With this option of the Metro line that directly connects the suburb to the inner city, it allows for Nordhavn to be a sustainable suburb. Copenhagen is thinking of transportation first when designing the suburban neighborhood. It is easier to initially include extensive transportation in an area, rather than it being an afterthought like the Cityringen (the construction of which has disrupted the city and the daily life of some residents).

**Bus System**

The bus system in Copenhagen is another great public transportation option for citizens. The neighborhood that I lived in did not have a Metro station within walking distance, so the fastest route from my dorm to school was either to bike or to take the bus. The bus was pleasant to ride and allowed me to become accustomed to the city by experiencing the travel above ground. The Metro is below ground so it did not allow for the same experience. I often took the bus because I was not as comfortable riding my bike when the weather was not permitting. While the bus is not as sustainable as the Metro or biking, the bus requires passengers to press the “Stop” button so the driver is notified that someone is exiting at the next stop. If no one is waiting at the bus stop in addition to no one pressing the “Stop” button, then the driver will continue on the route.

The area of Nordhavn is constructing the new Metro line to reach the neighborhood to the city in addition to the green bike loop. Along with this, they are experimenting with
self-driving mini-buses that will loop around within the Nordhavn development. This self-driving bus project is known as the AVENUE-project. Not only is sustainability a main focus of the suburb, but also innovation. This would not be a main form of transportation for residents into the city, but would connect the transportation hubs to other areas of the neighborhood. The AVENUE-project is also conducting surveys to get a better understanding of how residents travel.

Coming from a suburb where we have had to rely on cars as our primary form of transportation has driven my interest in studying cities where people are able to walk to get somewhere or travel a short distance on public transportation that is readily accessible. A main focus on suburbs that are expanding now lies with the public transportation that will be implemented so residents can still access the city center easily and, more importantly, without expanding their carbon footprint.

Architecture / Urban Design / Public Space in Nordhavn

One of the many ways the Nordhavn construction project is attempting to be as environmentally friendly as possible is through architecture. Rather than completely clearing out the Nordhavn site to construct all new buildings, the development decided to keep some of the already standing buildings. Two of the major buildings that the development has refurbished were previously grain silos. This has allowed for the neighborhood to maintain its historical industrial feel, while also saving materials and unnecessary emissions that are required for constructing buildings from scratch. The Nordhavn Silo is an example of a successful addition upon a previously existing building. The photo of the Nordhavn Silo before construction is seen

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in Figure 7 and then the current picture of the Nordhavn Silo is seen in Figure 8. It is mainly a residential apartment building with other public amenities throughout the space.

Another important aspect of the Nordhavn neighborhood is the utilization of the tops of the buildings. Figure 9 shows a simplified diagram of the Nordhavn Silo's layers along with the important addition of the public space on the roof of the building. There is a public restaurant and viewing deck. The building does not consist solely of private residences, but also public spaces to create a sense of community. This allows for various uses of the building and it does not only serve one subset of people. The red parking garage next door has a playground on the roof, as seen in Figure 10. The people in the picture are students from my class as we explored Nordhavn and all of the amenities it offers to the public. Many of the buildings have green or public spaces on top of the buildings to make use of all of the building. In addition to this, there are certain areas within the harbour that are roped off for public use. These are known as harbour baths and serve as public swimming pools in the canals. In 2002, across the bridge from the center of Copenhagen, one of these harbour baths was built to attract people to this space. While the baths have served as a tool to engage citizens within a neighborhood that might need some growth, it is also a tool used more broadly for the entire city. “Moreover, the harbour baths are exploited extensively in the international marketing of Copenhagen as a modern green capital of Europe.”

When I visited the space in 2018, Nordhavn was the home to some of the initial residents and began attracting families to the space with these harbour baths. This allowed for people to explore the area that did not live there along with making Nordhavn a destination, rather than a place one passed through to get to the center of Copenhagen. With all of these public spaces in a neighborhood, it encourages a sense of community and does not

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57 Jensen, 555.
exclude residents from one another. It also allows for people to explore the area rather than just traveling through it to get to their private space.
Chapter 2

Where Else is this Happening?

Copenhagen serves as a great example for sustainability initiatives cities should be making. Along with this, the city has targeted infamous environmental concerns that stem from suburban developments. While Copenhagen is a great resource, it is important to look at other European cities that are building or have already built similar suburbs close to the inner-city. Through Norway, Sweden, and Switzerland, a development will be explored within each major city that compares best with Nordhavn. These examples will show the difference in sustainability actions and what proves to be the most important feature for a city to implement. Some developments make sustainability the headliner for the neighborhood while others do not mention it at all. These three extended urban areas show the varied ways developments are executed and how residents utilize the space.

Tjuvhomen, Norway (Thief Island / Isle of Thieves)

A similar neighborhood and development to Nordhavn is Tjuvhomen in Norway. This waterfront area was famously also known as the Isle of Thieves. This nickname came from the bad reputation of the area due to the fact that thieves previously loitered around in the area. However, this development has transformed into one of the most expensive places to purchase real estate. This is due to the redevelopment of the area and incorporation of high end stores, restaurants, and an upscale hotel. This allows for the area to be a destination and a place for investors to enjoy. Tjuvhomen is a neighborhood of Oslo and has helped continue the sprawl of

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the city. While it is not considered a part of the center of the city, it is a short walk from the Palace Square. The fun architecture draws people out to these small islands from the center of Oslo along with the featuring of local artists. About twenty different architects designed the various buildings giving the area the character it is now known can be seen in Figure 11. The Astrup Fearnley Art Museum designed by Renzo Piano as seen in Figure 12 is another factor that draws people out to the area.

Tjuvhomen serves as a great comparison to Nordhavn due to the location of the developments both being in close proximity to the water and the historical aspect of the developments previously being home to industrial sites. Both of these neighborhoods also try to attract wealthy investors to the area in order to continue to redevelop the neighborhood in addition to expanding the greater city’s footprint. While all of this is true, Tjuvhomen is a much smaller area, making it difficult to include any affordable housing. Along with this, there is not much outdoor space making it a difficult place for young families and children to fully reside.\textsuperscript{60} Nordhavn on the other hand, has many different housing units, some being in apartments while others are smaller houses. This allows for any type of resident to find their desired home along with the fact that there are plenty of public spaces for children to run around and play.

While these two newer developments have similarities in methods revolving around exciting architecture to draw people to the area, Tjuvholmen does not focus on the sustainability of the area nearly as much as Nordhavn does. When reading about the development, it only focuses on the architecture and wealthy residents that it appeals to. Aside from the short distance it is from Palace Square, there are no environmental initiatives that were displayed like they are for Nordhavn. Vulkan is a different neighborhood in Oslo that highlights its sustainable efforts; however, it is not on the water like Tjuvholmen and Nordhavn. This makes Tjuvholmen

\textsuperscript{60} Carponen, 2018.
and Nordhavn interesting to compare because while they are both on the water, they have different motives when studied more in depth. Nordhavn is attempting to appeal to wealthy residents, but that is not the only thing driving the construction of the development. This is apparent through the desire for accessible public transportation by all residents along with public green spaces. While these two developments have aesthetic similarities, their environmental and social intentions remain different.

**Hammarby Sjostad, Stockholm**

Hammarby Sjostad is a neighborhood located within Stockholm, Sweden. It is a development situated on the water, and sustainability was the main focus when constructing the area. This is important to note that environmental concerns were not an afterthought as many suburban developments have been victim to the previous way of just building to expand rather than building for the betterment of the city and the citizens. The Hammarby model is described as having a “sustainable circular metabolism.” In simpler terms, this means that the neighborhood uses the waste or renewable resources to make electricity. This type of circular resourcing is best explained through an example within Hammarby: “For instance, about 1,000 flats in Hammarby Sjostad are equipped with biogas stoves that utilize biogas extracted from waste water generated in the community.” This circular energy model can be seen through Figure 13. Hammarby not only wants to achieve this newer form of living, but it also wants to make the neighborhood a dense area. This is not in the sense of making an entirely separate city, but rather, a different form of suburban life. Another aspect that makes this neighborhood environmentally conscious, is the addition of public transportation: “Most important perhaps is the close proximity to central Stockholm and the installation (from the beginning) of a

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61 Wheeler and Beatley, 409.
62 Ibid.
high-frequency light rail system and an extensive pedestrian and bicycle network.” These various forms of public transportation allow for any resident in Hammarby to live as freely as someone with a private vehicle. This also encourages residents to not even own a private vehicle because it is not necessary with the various forms of accessible transportation. This neighborhood is an effort to extend the city of Stockholm and offer an additional place to live.

Hammarby Sjostad and Nordhavn have many similarities when exploring these newer developments in depth. Both of these neighborhoods are based on the water and are closely linked to the inner city by public transportation. These developments have emphasized the incorporation of public transportation since the beginning of planning. While Hammarby Sjostad has a light rail rather than a metro, it is still an important factor to the development that allows for commuters to live in the area who work closer to the inner city. Public transportation serves as a great sustainable alternative to private vehicles and overall limit to the use of fossil fuels. This is a simple addition to a new, suburban development that can be easily incorporated, no matter the location around the globe. Both of these areas had sustainability in mind while planning and building the development. This makes it much easier to accomplish sustainable goals rather than building the development first and thinking about the environment after and having to make expensive changes to accommodate these needs.

While Nordhavn and Hammarby Sjostad share similarities, they also have some differences that one can learn from the other. Nordhavn makes architecture a great focus in addition to sustainability in order to attract certain people to the development while also making the building methods sustainable as seen through the refurbished silos. Hammarby Sjostad could have incorporated this method of design in addition to its complex sustainability efforts to make the area even more inviting and attract all different kinds of people and families.

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63 Wheeler and Beatley, 410.
64 Ibid.
Nordhavn, on the other hand, can learn from Hammarby Sjostad’s circular resource design. The North Harbour is continuing to expand for the next forty years and has the ability to include this type of planning. It will be interesting to see if the suburb includes more sustainable efforts as it continues to grow. While Hammarby Sjostad has the ability to act as an example for other cities because it has been completed, Nordhavn gets to learn from the successful developments along with the mistakes that it can avoid when building.

**Zurich North, Switzerland**

Zurich North is not a distinct neighborhood like Hammarby Sjostad or the Isle of Thieves, but instead an expansive area consisting of multiple municipalities and neighborhoods. This area is sandwiched between the city center of Zurich and the city’s airport making it in between urban and suburban. Zurich North used to be an area that was considered the outskirts of Zurich and was a place traveled through to get to the inner city; however, that image is changing. General Motors was one of the first of other businesses to relocate their headquarters to Zurich North. As these businesses began to move to this area between the inner-city and airport, the construction of a new tramline through the area was implemented. With this form of public transportation known as the “Glattalbahn”, it would allow for residents to move out to Zurich North who could not afford to live in the inner-city where housing is expensive. While this provides a great alternative for the middle class, the lower class is not included in what is considered “affordable housing”. While a tramline can be an expensive project, it is important to understand the long-term goals of the city: “In order to allow movements in space, it is

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65 Cobe - Nordhavn.
67 Nüssli and Schmid, 679.
68 Nüssli and Schmid, 686.
69 Harris and Lehrer, 108.
necessary to produce the required infrastructure, which is, by necessity, fixed in space.\textsuperscript{70} While a tram might take longer to fully construct, it will attract more people to the North space and provide easy access back into the inner city. The architecture of the area is described as ‘urban’ by residents. However, what does that really look like? Some of the terms that were used to contextualize these buildings are: ‘Minimalistic angular forms’, ‘cold’, and ‘could be found anywhere’.\textsuperscript{71} An example of one of these buildings can be seen in Figure 14 which shows Schule Leutschenback.\textsuperscript{72} While this grand architecture might attract people out to the area, residents still find themselves travelling into the inner-city to enjoy public events and spaces.\textsuperscript{73} Zurich North is continuing to expand as more of the space develops in addition to areas increasing in value that are in close proximity to the tramline. This shows how imperative public transportation is in order to transform a suburb.

Zurich North and Nordhavn share some similarities when looking at them side by side. One commonality revolves around the public transportation infrastructure development. While Zurich North has a tram and Nordhavn has a metro, they both proved to be highly influential for the success of the area. It provides a sustainable way of travel along with a socio-economically accessible form of transportation. Both of these neighborhoods and cities at large understand the importance of implementing public transportation in order to develop the area and connect it with the inner-city. With the public transportation already in place, it allows for both cities to surpass its original footprint into areas that were not as populated before.

Nordhavn is a confined neighborhood when compared to the Zurich North area. Those that live in Nordhavn do not have to go into the inner-city for all events and the neighborhood is

\textsuperscript{70} Nüssli and Schmid, 689. 
\textsuperscript{71} Nüssli and Schmid, 693. 
\textsuperscript{73} Nüssli and Schmid, 693.
attempting to bring all necessary public spaces to the area so residents can remain in the harbour rather than having to go to the inner-city to enjoy such amenities. Some residents expressed the lack of public events in Zurich North explaining why they continue to go into the inner-city to enjoy what is not available in the periphery. Another difference between these two suburbs is their aesthetic appeal. Nordhavn was able to create original architecture due to the repurposing of silos rather than just constructing grand buildings that look “urban”. This allows for Nordhavn to have a sense of place rather than Zurich North where the buildings could be anywhere and lack contextuality. Zurich North can learn from Nordhavn’s planning techniques by asking the residents what they want to see in the development rather than just building to make a place feel “urban” and make it more for the people that will be living in it.

Analysis of These Three Suburbs

After exploring Isle of Thieves, Hammarby Sjostad, and Zurich North, one can see the commonality of the three areas through the location of the space being outside of the inner-city, yet closely connected to the center. These emerging suburbs are all trying to attract new residents to the area to fully extend the urban footprint of the city. It is interesting to note the difference in sustainability efforts. Hammarby Sjostad is built around a sustainable lifestyle trying to make it as environmentally friendly as it possibly can be. While on the other hand, the Isle of Thieves rarely mentions, if at all, the sustainable resources that are offered in the neighborhood. While it is beyond the scope of the thesis to research or evidence this, one might speculate that Norway’s status as an oil-producing country and the fuel-intensive means of linking its far-flung urban areas might lead Oslo having less of a culture of sustainability than Copenhagen. However, the Isle of Thieves in addition to Zurich North has focused on architecture in order to bring in investors and residents. While these emerging new suburbs

74 Nüssli and Schmid, 693.
approach their development in different ways, they all have various aspects that can be learned from one another. A new development is much more than building grand architecture; however, there have to be some qualities that draw in investors in order to fulfill sustainability initiatives.
Conclusion

Initially, the term “sustainable suburb” seemed like an oxymoron with my previous exposure to American suburbs. However, after traveling to Copenhagen and exploring the Nordhavn neighborhood, it became clear that this term was referring to something that actually could be achieved. The crux of this study revolves around the contradiction about sustainable suburbs. While some suburbs do not think about sustainability while under construction, there are suburbs that put environmental efforts before anything else. Nordhavn is an example of a suburb that focuses on sustainability. This is due to the typical way of life that Copenhageners live, especially by putting public transportation first. The Nordhavn planners already knew how important it would be for commuters to have the appropriate tools to travel to work in the city center. Other cities are more concerned about just implementing roads for cars and public transportation is more of an afterthought, making it even more difficult to then change a suburb to be sustainable when a private vehicle is the fastest way one can get to their destination within the city. Therefore, Copenhagen has a leg up on other cities when extending their urban footprint because private vehicles are already labeled as unsustainable.

Through all of this research, it has led me to make the conclusion that suburbs should not all be thought of as having a negative impact on the environment. Due to the lack of research on suburbs as a whole, it is unfair to categorize all suburbs into one broad category, when in reality, they are all very different, even those that surround the same city. Here is an example of a generalized statement concerning suburbs: “The role of the suburb is not only as ‘victim’ of climate change but the suburb is also a villain in the climate change debate.”75 This kind of statement is ultimately too simplistic, because what gets called a suburb and what is considered sustainable varies greatly, even when looking at similar wealthy Northern European

countries. This makes it difficult to universally define a suburb. In addition to this, it is also challenging to propose one set solution for making a suburb sustainable.

It is crucial to look back at my initial questions that were posed in the introduction: “Can a city suburbanize while simultaneously making the area environmentally conscious? More specifically, can Copenhagen have extended urbanization and green sustainability?” After all of this research and analysis, these questions can be tentatively answered. Through the Nordhavn neighborhood specifically, Copenhagen seems to have achieved green suburbanization. Although some literature suggests that this could fail, the urban planners of the North Harbour were conscious of this and put public transportation as the most important aspect of the development. By doing this, the suburb is putting the environment first. The completion of the construction of the Metro and neighborhood occurred around the same time, allowing for residents to turn to the most convenient way of transportation for them while it is also the most environmentally conscious. In addition to the Metro, the implementation of bike lanes that lead into the city continues to allow for biking to be the preferred method of travel within the city due to the time efficiency. While the construction of the buildings is a difficult thing to make entirely sustainable, the development was still able to do so through the repurposing of old grain silos into residential apartments. This is something that could have been overlooked when attempting to make the neighborhood have a certain curb appeal; however, these buildings were so successful. The varied architecture throughout the neighborhood allows for residents to see the historical buildings, but in a new light. These major factors have made Nordhavn a successful sustainable suburb.

After achieving such a feat in Copenhagen, it is important to turn to other cities to show the possibility of developing such a suburb and asking the question: Is this type of suburb sustainable?

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76 Cobe - Nordhavn.
possible to recreate in other areas? This question is partially answered within Chapter 2. However, the three neighborhoods discussed are on very different spectrums when thinking about sustainable suburbs. Tjuvholmen primarily focused on the aesthetics of the development while Hammarby Sjostad put sustainable efforts way above any innovative architecture. Zurich North remained in the middle when placed next to these examples due to the focus of public transportation in addition to urban architecture; however, more could be improved on either end. Nordhavn is able to serve as a great resource for other developments because of its balance between sustainability and beauty. However, is it possible for other cities to create a similar development, or was Nordhavn made possible due to the powerful local government and deeply rooted environmental concerns? The city government has made great strides to making the entire city carbon neutral. This type of thinking is not always apparent in other cities, making it much more difficult to dedicate a suburb to sustainability efforts when the residents and government do not see it as being the most important feature. While it might not be as easy, there are still new ways of urban planning and architecture to make a suburb sustainable that might not have attempted to be otherwise. Further on, I have listed a set of a few features that any new development could consider including before constructing in order to make a sensible, sustainable suburb.

Nordhavn clearly puts sustainable efforts in the forefront. However, it also included certain features that would be appealing for wealthy investors such as the architecture. This makes me question: Can a city create a successful sustainable suburb without an economic incentive? This question cannot be answered with a simple yes or no answer, but it is important to keep in mind when understanding the development tactics of a new neighborhood. These new developments can be very expensive to build and might need investors in order to thrive and maintain the success within the area. If investors are drawn to the neighborhood, they might
be able to help the city as a whole. In the case of Copenhagen, the city is attempting to be carbon neutral by 2025 and some of the efforts need sufficient funding so if investors are attracted to the Nordhavn development, they might be inclined to help the city reach the goal. Copenhagen is trying to avoid making the neighborhoods become fully gentrified by including mixed use spaces and affordable housing: "...Copenhagen’s redevelopment yielded a comparatively socially mixed city with appealing public spaces and inventive architecture. This was facilitated by strong public authorities...who upheld welfare state values and only to a small extent gave in to the market-oriented ideologies..."77 This shows that a new development does not have to fully appeal to investors, but rather, can accommodate other social groups in order to make the neighborhood attractive to all residents.

After learning so much about Copenhagen and Nordhavn in particular, it has allowed me to see how every place is different. Through the analysis in Chapter 2, it further shows what the city finds most important to implement within the new suburb. While each example of these emerging suburbs is a little different, there are important takeaways for any new, extended urban development to consider to include. The first is the use of architecture, allowing for a development to attract different kinds of residents. This variety is important, particularly for the potential of sustainable suburbs to succeed in urban areas that are less wealthy and more economically unequal than Copenhagen. I find that innovative architecture that incorporates old buildings or styles native to the area can make the neighborhood distinct and include a sense of place. Nordhavn does this through the old grain silos and it was really well received by the current residents. If that is not an option for a new development, it could be beneficial to refer back to historical buildings within the inner-city and incorporate some similar styles to allow the neighborhood to attract residents that enjoy the architecture of the inner-city. In addition to

77 Urban, 1.
architecture, the addition of an attractive site such as the modern art museum that was built in the Isle of Thieves brings people out to the area and makes the neighborhood a destination rather than a place to pass through when traveling into the city. Any form of public space is necessary no matter where the extended urban development is. This is a great way for a development to differentiate itself from other neighborhoods and does not need to follow a specific plan. Nordhavn included public harbour baths which is an alternative to a traditional park. Another feature that suburbs should be including is a sustainable effort of some sort. The desire to be easily connected to the inner-city can fulfill these two key components for a successful suburb through public transportation. This would also allow for a broader range of residents with socio-economic backgrounds because one would not need a private vehicle in order to live in the suburb. While each suburb is different, these key aspects can be included in any development in various forms. Even though there is no set mold for new developments to fit, this allows for cities to take ideas from one another and learn what works in certain areas.

Overall, this research has exemplified that any form of a suburb has the capability to be sustainable. Even if these terms mean different things, they are targeting areas that are considered extended urbanization. Nordhavn has served as a great resource for other developments outside of the inner-city due to its acknowledgement of sustainability, in addition to other urban planning tactics that allow future residents to express their desires for the area. By including residents in the beginning of planning, it allows for the construction to be done in the way that the people living there deem most fit. It also provides a different set of eyes that are not trained as urban planners or architects to make the area feel more local instead of just building to make the space feel a certain way. While Nordhavn is by no means the perfect new, extended urban neighborhood that other developments should exactly copy, but rather it stands
as a success story to show that a new development has the potential to balance all the different needs and desires of the city, residents, and the environment.
Appendix

Figure 1. “Nordhavn as it looked before the extension began in 2008.”

Figure 2. “Nordhavn as it will look when fully expanded.”

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78 Cobe - Nordhavn.
79 Ibid.
Figure 3. “Nordhavn will match the size of other Copenhagen districts.”

Figure 4. “The intelligent grid.”

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80 Cobe - Nordhavn.
81 Ibid.

Figure 7. Nordhavn Silo Before

Figure 8. Nordhavn Silo After

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84 *Cobe - Nordhavn.*
85 Ibid.
Figure 9. Diagram of the Layers of Nordhavn Silo.  

Figure 10. Playground on top of parking garage. 

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86 Cobe - The Silo.
87 Sydney Pagliocco, September 13, 2018.
Figure 11. “Modern Apartment Building in Tjuvholmen, Oslo”

Figure 12. “Astrup Fearnley Museet.”

Carponen, 2018, Photo taken by Jorg Greuel.

Figure 13. “Integral energy, waste and water system.”

Figure 14. “Schule Leutschenbach.”

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