

Suburban Subsistence Agriculture:
An Investigation of a Suburban Agriculture on the
Peripheral Edge in the Greater Toronto Area

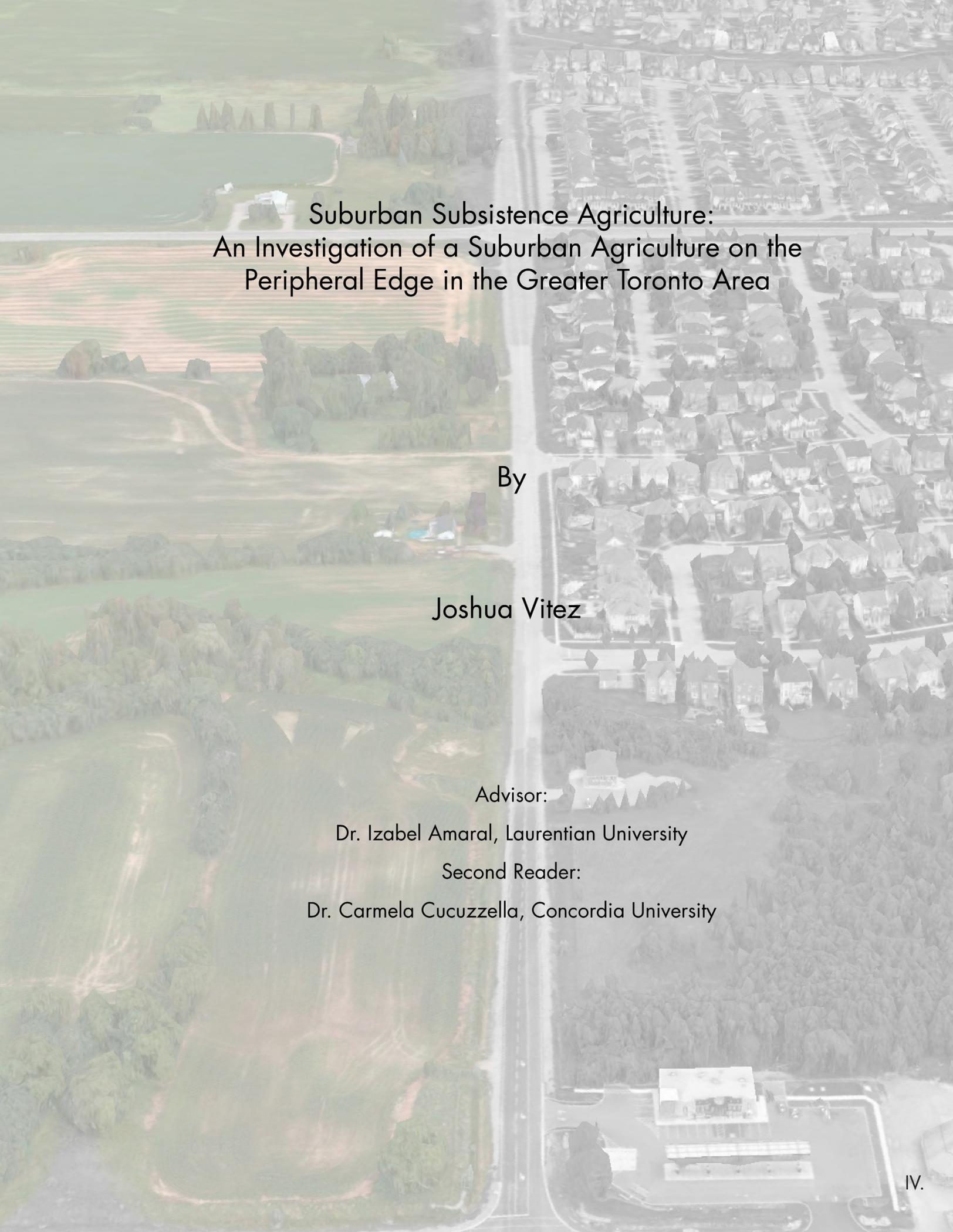
By

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Abstract

The geographical expansion of large populated urban centres raises many environmental preoccupations, among which, the fact that it severely affects the way cities can rely on locally produced food. Suburban development makes cities grow outward from city centres, creating an expanding edge condition. Considered as a global phenomenon, the process of urban sprawl and expropriation generally take over prime agricultural land, thus making it difficult to implement environmentally sustainable conditions for large cities, particularly in regard to food production. Conceiving that agriculture and suburban areas can coexist with one another, this thesis investigates how architecture can contribute to the creation of subsistence agricultural conditions for food production within a suburban context. The suburban edge condition of Toronto, Ontario, offers a great terrain of investigation, and more specifically the town of Brooklin, where a suburban wall seems to move through the land, engulfing productive farms. If we learn how to design for this edge condition, we will, in consequence, develop solutions to the problem of urban growth and the loss of agricultural land. As the increasing demand for land impacts on the natural landscapes, farmland, and its people, a sustainable form of urban development should be considered. First, awareness needs to be raised about the unsustainable rates that agricultural lands are being consumed due to the expansion of cities. When cities take over the lands that fuel and feed them, the consequences are deeply problematic, both to city centres and suburban areas. For this reason, it is urgent to investigate how architecture can contribute to the introduction of subsistence agriculture for food production within larger suburban centres. In order to tackle this complex issue, different scales were addressed, ranging from the region to the scale of an object, trying to develop for each scale a strategy to connect experimental practices of agriculture to the site, its infrastructure and buildings. To create autonomous conditions, suburban farming and permaculture can be part of the urban infrastructure, which will have the potential to stimulate local food production at the domestic, neighbourhood, and city scales. The design of a new suburban edge will introduce a hub dedicated to food production, while relevant forms of housing were investigated as essential components for the suburban development model. Through the connection of these scales, this project probes how the edges of the Greater Toronto Area can become a model for a sustainable suburban subsistence agricultural community.

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Introduction

The growth of cities and their adjacent suburban development has been rapidly impeding outwards from city centres. As in the case of the GTA, metropolitan areas expand in its residential development as the metropolitan area expands its peripheral edge further into its surrounding natural and agricultural landscapes. In the terms of this thesis, it will be addressing the matter of suburban agriculture through an overview of all impacted scales ranging from the region to the city, from buildings and infrastructure to small-scale interventions. Through addressing the continuum of scales, and an edge condition, we will examine the possibility of designing a perfect gradient ranging from urban to agricultural land. The importance of addressing suburban housing models becomes a necessary step to control urban sprawl and create a sustainable edge condition that promotes a transition between urban and rural areas. Introducing the Agricultural Village Hub will create the link between the community and the goal of redefining the suburban model of living based upon suburban subsistence agriculture. Through the connection of these components, this project will examine the potential of how the peripheral edges of the Greater Toronto Area can become a model for suburban subsistence agricultural communities that are sustainable through its own suburban food and agricultural production.

Resilience

Resilience is referred to as having the capacity to adapt to changing conditions with the ability to maintain or regain functionality and vitality in the face of stress or disturbance¹. With many uncertainties in today's global environment, designing our communities and

the infrastructure to support society through the unknown, the notion of resilience begins to play a large role. Resilience is not seen as a new concept, even in the past it formed the basis of so many building traditions to ensure the survival of mankind prior to modern amenities. Resilience is the reinsurance that we as societal communities have the capability to adapt to changing conditions and to maintain or regain functionality and vitality in the face of stress or disturbance. Now seen as an important attribute, resilience needs to become integrated into the planning stages of building, cities and rural areas. As resilience is not a common social process, it entails a thoughtful planning that is normally associated with emergency preparedness, climate change adaptation, and support systems provided by institutions and public services.

Prior to the 20th century, when agro-business and mass transportation networks became the norm, food was traditionally grown locally and was preserved to last until the next growing season. Households functioned self-sufficiently in terms of life's necessities, and communities were close-knit because social safety nets and vital public services such as healthcare had not yet been invented at the time². Once the industrial model of production became fully established, traditional communities built surrounding principles of resilience shifted into a model heavily dependent of modern public services.

In order to reconcile urban communities and food production, within our communities, modern-day resilience is investigated in association with urban infrastructure, and public services, that become a model of food production. By introducing resilience through agricultural production within a suburban

1. University of Toronto, "Resilience Planning Guide," November 2017, https://www.daniels.utoronto.ca/faculty/kesik_t/PBS/Kesik-Resources/Resilience-Planning-Guide-v1.0-2017-11-19.pdf.

2. "White Paper," Fab Cities Challenge, n.d., <https://fab.city/uploads/whitepaper.pdf>.

development in the Greater Toronto Area, this thesis investigates how to complement food production at an intermediate scale between domestic and industrial production. By creating resilience through food production, suburban communities can experience a closed-loop system, as goods are produced in a more diverse way.

In conjunction with the tail end of this thesis research, the world began to undergo the global pandemic of COVID-19. Throughout the beginning of the unknown, panic occurred within our global society leaving individuals unprepared, as the public service sector struggled to deal with the large-scale confinement of people. This event highlights the importance for communities to embrace resilience strategies within their own networks. Resilience is a crucial element to humankind being able to survive for the unknown, whether locally produced face masks are required to stop the spread of a virus or a need to increase agricultural food production to feed the community at large. As a society we cannot rely on the industrial model of production if we as a community (being a town to the scale of the country) need to be able to support ourselves through built-up resilience. COVID-19 has had no bearing in the design or the process of this thesis, however, it has shown us how fragile our global community is and this thesis touches upon a missing link through the network of our own built up resilience in regard to food production.

I. Principles of Agriculture and Suburban Theories for Experimentation on Subsistence

Agriculture is referred to as the science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products. Sub-urbanism is the examination of how the inhabitants of suburban areas such as towns and hamlets interact with the built environment, as well as looking at architecture and its integral role within the societal realm. Together Agriculture, Sub-urbanism, and Architecture are the core aspects as each of them holds a role in achieving Suburban Subsistence³ Agriculture which is the process in which farmers produce food crops to meet the demands for themselves and their families. The overall goal with subsistence agriculture isn't to produce a large surplus but to have the farm output is targeted to survival and is mostly to serve the local requirements.

Agriculture:

The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products.

Sub-urbanism:

Is the study of how inhabitants of suburban areas such as towns and hamlets interact with the built environment.

Subsistence Agriculture:

Is the process in which farmers produce food crops to meet the demands for themselves and their families. The overall goal with subsistence agriculture isn't to produce a large surplus but to have the farm output is targeted to the survival and is mostly to serve the local requirements.

The key elements of agriculture, sub-urbanism, and architecture share the common component of their usage of the land, infrastructure, and the edge condition. Each heavily relies on these with agricultural growth utilizing the land for the benefit of the public consumers meaning the production of food and livestock are being harvested from the land as infrastructure is put in place through the form of irrigation, greenhouses, and barns to support the agriculture industry, with the risk of losing these vital agriculture lands that surround the peripheral edge of the suburban core. Sub-urbanism and architecture, in the same manner, intertwine with one another as they utilize the land for development of these suburban hubs as architecture begins to infill the landscape with infrastructure put in place to support the community and architectural developments throughout the sprawl that spans the edge of the suburban region.

A successful model of Suburban Subsistence Agriculture requires interventions at the scale of the community by integrating agricultural designated corridors throughout the community as well to establish an Agritectural Infrastructure that will become an architectural node within the community as this will be based on a series of systems from food, water, climate, ecology, dwelling, production. Through experimentation working towards successful Subsistence Agriculture by scaling up from experimental practice to large-scale Agritecture Suburban Infrastructure. Local production of foods at domestic and neighbourhood scales will create a closed-loop system for food production and harvesting. That will be

"Dictionary by Merriam-Webster: America's Most-Trusted Online Dictionary." Merriam-Webster. Merriam-Webster. Accessed Jan 3, 2020.

examined from different scales moving from the regional, town neighbourhood, block to a plot towards the scale of an individual chicken coop with the goal of being Subsistence Agriculture within a peripheral edge suburban community.

to food centred hubs will increase the local distribution of food. As a whole to begin taking a step towards the fight against food insecurity.

I.1 Guiding Principles

To move forward into the design portion of this thesis will be driven from a series of guiding principles *Villes Nourrières Mettre l'alimentation au cœur des collectivités* meaning Nourishing Cities Putting food at the heart of communities. This text breaks it down into three main categories A Productive Territory, Successful, and Responsible Businesses, and Improved Access to Healthy Food each also consists of their own subcategories⁴.

A Productive Territory – Consists of the Protection of the productive territory as a set of rules to govern the region. The development of the productive territory, as in how the future of the site will be slated for its specific land use. As well as the optimization of the model of urban development, as in how this urban development functions in a greater manner than just living.

Successful and Responsible Businesses – Looks at the support to farmers with growth development occurring and how they can maintain their livelihoods within the agricultural realm. Responsible production and processing are a key element in serving the community in the case of agricultural goods; a shift away from the industrial model to a more localized one will benefit the community at large.

Improved Access to Healthy Food – Location and design of food infrastructure within the Suburban context will be established through the Suburban Agriculture Intervention. Improving the food supply throughout the community by growing food directly within the community. Optimizing transport to food infrastructure as suburban development increases the introduction of transportation

4. Ibid.

II. Expropriation and Suburban Dissect

The analysis of the legal process of suburban sprawl through the act of expropriation shows how suburbs take over farmland and replace productive lands for a stereotype of green space: the lawn.

II – I. Expropriation

Expropriation is the action by the state or the authority of taking property from its owner for public use or benefit. This developmental impeachment is not a new concept to myself or my family. With family history growing up on a fully functioning farm located on the peripheral edge of the Greater Toronto Area in the Northward of Pickering Ontario. To us,

farming was our lifestyle and for most farming is seen as a unique mode of life and work, but when expropriation comes into play it can turn the lives of individuals upside down. To situate myself into this context our family farms were expropriated by government officials with the intent of developing The Pickering International Airport. The farmland was lost due to the expanding geographical nature that the urban (suburban) model has grown to become, although our lands were lost with the intent of an international airport, we were pushed out due to the growing demographic population of the region. The land over landing group was formed to persuade Ottawa to preserve the Pickering Federal Lands, long earmarked as the site of a future airport, as a secure source of food



Figure 1. End the War on Farmland

and freshwater for Canada's largest urban centre⁵. Being located in what is considered the white belt zone surrounding the largest growing urban region in Canada leads towards the fight to preserve these lands as the realization that food is a growing concern for urban regions. Expropriation is not the only method in which agricultural lands are taken over for development. The Municipal Property Assessment Corporation (MPAC) is responsible for assessing the values for all properties within Ontario. As MPAC assesses properties at higher values, this has left agricultural lands that surround the expanding edge of the suburban regions to become unrealistic through the costs to maintain the owned property leaving farm operators and owners no choice but to sell to developers

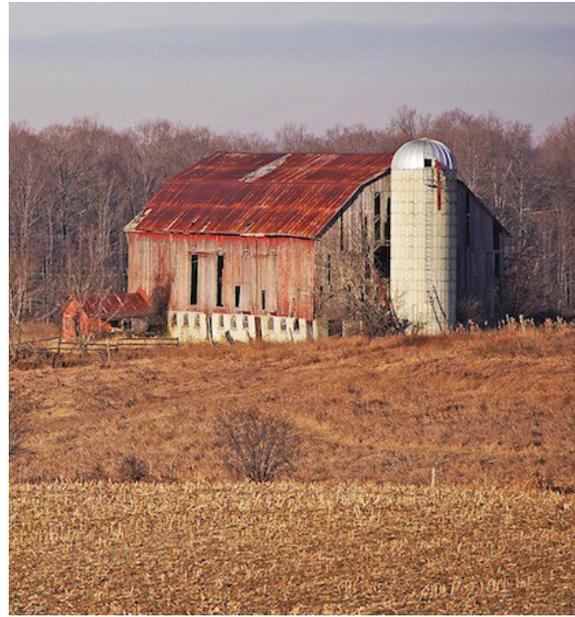


Figure 2. Prepping of tearing down the Barn



Figure 3. Protesting Airport Development Pickering Ontario

5. "Land over Landings - Because Food Is a Growing Concern.," n.d., <https://landoverlandings.com>.

II – II. Suburban Dissect

The suburbs are referred to as a mixed-use or residential area, existing either as part of a city or urban area or as a separate residential community within commuting distance of a city⁶. The suburban model has followed the trend to be developed on the peripheral edge of the city and to encompass an abundance of adjacent agricultural land. The suburbs began to form as more of a post-war community focused housing typology it became an ideal place to live and escape the city core to raise a family were commuting into the downtown for work was seen as a standard. The suburb model is seen as a vehicle-oriented mode of living. Each house has a driveway in which multiple vehicles can occupy, grocery and retail establishments are surrounded by vastly large asphalt parking lots and the

6. Richard Florida, "How Should We Define the Suburbs?," article, City Lab, June 12, 2019, <https://www.citylab.com/life/2019/06/suburbs-definition-census-data-way-of-life/591343/>.

network of interstate-like roads guiding people to and from. The perception of non-urban environment is largely associated with the concept of lawn, which spread from the British culture of the landscape to North America's parks. Designer of Central Park (New York) and Mont Royal Park (Montréal), Frederick Law Olmsted is one of the key figures to understand the diffusion of the North American Lawn. Throughout North American suburbs, residents seem to all share a deep-seated psychological attachment to the lawn, which suggests that the creation and maintenance of lawns stem from the human desire to dominate and impose an order of nature⁷ through the repetitive actions of feeding, weeding, and cutting. Although "suburbs weren't built as a model to thrive forever"⁸, with their cookie-cutter house one after another, the suburb model has not yet changed since its creation.



Figure 4. Suburbs from above Markham Ontario

7. Sarah B. Schindler, *Banning Lawns* (Maine: University of Maine School of Law, 2014).

8. Ellen Dunham-Jones, *Villes Nourricières Mettre l'alimentation Au Cœur Des Collectivités*, n.d., <https://vivreenville.org/notre-travail/videos/reportages/nouvel-urbanisme-et-requalification-des-banlieues-%5Bvoa-st-fr%5D.aspx>.

III. Continuum Scales for the Design of Suburban Subsistence Agriculture

This chapter evaluates the subject of suburban agriculture considering ten different scales, ranging from a regional scale, where both the city and the region are investigated, to the small scale of an object that addresses the problem of agriculture and urban conditions.

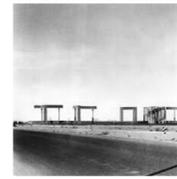
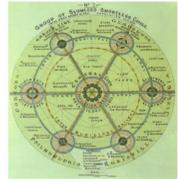
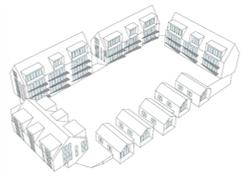
Considering the regional scale, we observe the phenomenon of the loss in agricultural farmlands throughout the southern Ontario region. On a regional scale, we can observe the potential zones for agricultural production as the region can be classified into four zones, agroforestry, rural, peri-urban, and urban agricultural zone. In the context of this thesis, it focuses on the condition of the edge between the Peri-Urban and Rural zones with the focus directed at establishing a design plan based on architecture and the integration of agriculture. The examination of the Greater Toronto area indicates projections for the future that the metropolitan area in regard to the expansion of the population, housing, and land space requirements. By examining how these predictions can be integrated to the design of an edge condition for the city, we investigate transformations through residential, public, and community spaces as well as agricultural lands. American-born architect Steven Holl examines the edge conditions of several cities alongside their urban and rural fabric introducing unique solutions of integrated residential, public space, green space, and transit to collectively define the edge conditions of a city. Although Holl's proposals remain highly utopian, it draws attention to the fact that city edges are not only understudied, but spatially and visually undefined.

Suburban sprawl has become a well-known factor surrounding urban centres as they accumulate vast amounts of highly sought-after land on the peripheral of the urban centre. To redefine the peri-urban edge condition through the integration of public green spaces throughout the community should act as a key component. This model of community is seen within the Garden City movement, which was intended to create self-contained and functioning communities surrounded greenbelts. Based on the Garden Cities concentric model, the peri-urban scale is examined with a focus on the integration of agricultural spaces into the community fabric.

Dissecting the suburban region unveils its ignored and undeveloped core consisting of vast parking lots and empty strip malls centred around the use of the automobile. With its core lacking density and identity, the town of Brooklin Ontario is a prime example of a suburban community seen throughout the peri-urban region of the Greater Toronto Area. In order to bring the suburban core to its full potential, design should address strategies to an increase density and develop a strong network of systems geared towards minimizing the use of the automobile within these communities.

The existing suburbs developed over the past 50 years show a persistent design and occupation model that request an urgent update in order to be more environmentally sustainable and better serve its community. Even if suburbs were highly criticized in urban theory, only recently they were studied for the potential quality they can offer⁹.

⁹. Markus Moos and Robert Walter-Joseph, Still Detached and Subdivided? Suburban Ways of Living in 21st-Century North America (Jovis,

CONTINUUM (SCALES)	REGIONAL	GREATER TORONTO AREA	PERIURBAN	SUBURBAN CORE	SUBURBAN EDGE	HOUSING BLOCKS/UNITS	PUBLIC SPACE	GREEN/AGRICULTURAL SPACE	BUILDINGS	THE COOP
PROBLEM STATEMENT	loss of agricultural farm lands throughout the region.	expansion of population requiring more housing and land space.	suburban sprawl accumulating vast amounts of highly sought after land on the peripheral of the urban centre.	ignored and underdeveloped component to the suburban fabric, consisting of vast parking lots and empty strip mall shops.	unconventionally developed suburban model, as the way suburbs have been built has not changed although the actual demographics of whom occupies these regions has.	sprawling large suburban homes do not meet the actual demand of the suburbs.	limited under-utilized public spaces are few and far between within the suburban car orientated model of living.	greenspace and agricultural lands are highly under threat of development.	large sprawling development of industrial designed strip malls, and oversized suburban homes.	under-utilized opportunity to have small scale farming occurring within the suburban communities.
DESIGN PRINCIPLES	Take in to consideration the strengths and weakness of the region, as not all agriculture can be done everywhere given the landscape and surrounding environments.	Examining the conditions of a city in which it grows to be able to determine an edge to the city and the conditions that will exist there.	based around the garden city movement, were intended to be planned, self-contained communities surrounded by greenbelts	with a lacking density in the core of suburban communities the design goal is to increase the overall density of suburban living into a more practical form of living within the core.	development has to address social-demographic demand that is reflecting in who lives within suburban regions through a new model of residential living within suburban communities.	redesign the residential living within the suburbs to better reflect the change of how individuals live and occupy spaces within the suburban community.	have public greenspace instead of the existing suburban model of the private lawn	rotation of crops re-introduction of small animals	greenhouses integrated into the peri-urban fabric	integrate a small scale coop model into the community. provide the possibility to have the coop mobile to allow for easy relocation.
CASE STUDIES		 Steven Holl	 Garden Cities Concentric Model	 Brooklin ON	 Brooklin ON	 housing typology concept	 Hendrick Farm	 Worgl Austria	 Greenhouse/the Farm	 The Coop
DESIGN URBAN PLAN/ ARCHITECTURE	To focus in on a specific zone and design plan, and create architecture within the zone that reflects the nature of the agriculture potential that surrounds this regional zone.	To be achieved through a series of residential complexes and public community spaces to make up the edge conditions of a city.	Integrated public greenspaces throughout the community linking to one another.	the core of the suburban identity is centred around a car base mode of living, the goal of increasing the density is to establish a larger network of systems to minimize this mode of living within the suburban communities.	be able to establish a new model of what living along the suburban edge is through the integration of community, and agricultural components driving the suburban edge to a new level of living.	housing is to be reflected through a new model of living within the suburban realm through a mode of communal mixed unit complexes alongside agricultural corridors.	public space throughout the community will be consisting of plaza space, courtyards, an integrated trail system linking the new suburban model to the existing community.	integrate of agricultural corridors that will serve the community through the process of growing crops and small scale livestock production.	village hubs will establish agricultural community centres, integration of barns, greenhouses, and communal seedbanks.	a small scale coop designated for small scale livestock farming throughout the community, to be managed by the stakeholders of the suburban agricultural community.

Examining how new development is to occur along the edge condition of Brooklin Ontario unveils a problematic phenomenon, since proposed developments reproduce traditional suburban design, regardless of the changing demographics of the region. By addressing the social-demographic demand as a design priority, through a focus on “who” lives within suburban regions, we propose a whole new model of suburban development¹⁰. As it is inevitable that the suburbs continue to grow, strategies to avoid urban sprawl need to be developed, as a connected and densified model for the suburbs is essential. Housing models should be based on actual demographics, rather than stereotypes of the large suburban homes. The redesign of residential spaces within the suburbs will stimulate how individuals live and occupy spaces in a way to encourage a strong sense of community.

Public spaces within standard suburban communities are often limited and underutilized, as they seem sparkled within the car orientated suburban fabric. As a prime model for the integration of public space, Hendrick Farm is a suburban Québec community that has successfully integrated the human scale into its urban design. Rather than prioritizing the automobile, open public spaces are integrated throughout the entire urban fabric. Facility of access and integration to green spaces are considered important characteristics of suburbia, however, green space is mostly associated with the suburban lawn, but it also includes public parks and conservation areas.

Under the threat of the recent increased development throughout the GTA region, green space and agricultural lands are rapidly consumed as communities expand outwards. Nonetheless, urban growth and the preservation of green spaces, including agricultural lands, do not have to be irreconcilable. The town of Worgl (Austria) is a remarkable example, as throughout its history it has woven green spaces and

n.d.).

10. Amanda Kolson Hurley, *Radical Suburbs* (Belt Publishing, n.d.).

agricultural industry into its urban fabric¹¹. Barns, farmyards, grazing, croplands, and livestock spring up throughout the town’s central core. The thesis takes the concept of integration of agriculture lands throughout a corridor system within the community through the process of growing crops and small-scale livestock.

The introduction of a community building will stimulate how the community functions in its entirety, since large sprawling development of industrial designed strip malls cannot be considered a synonym of appropriate community spaces. Bringing a central village hub into the community will allow the creation of an agriculture community centre which will be done through the integration of barns, greenhouses and communal seed banks. In addition, bringing small-scale livestock production into the community will transform existing underutilized spaces into productive spaces. Integrating the idea of the small-scale coop into the urban and architectural designs empowers community members with the control of their food production. The integration of small-scale livestock can be done throughout designated agricultural corridors linking the community.

11. A field trip to Austria on December 2019 provided the opportunity to see in situ how agriculture and food production can be a regular part of urban daily life. The town of Worgl had a unique way of its daily life and how the people used and occupied the space. Residents indicated how agriculture and urban life can truly coexist with one another to serve a fully functional residential community through its farming and development growth.

III – I. Regional

Canada holds seven physiographic regions and the province of Ontario has a unique geographical landscape that includes three of these regions: the Hudson Bay Lowlands, The Canadian Shield, and the St. Lawrence Lowlands.¹² The majority of the agricultural lands and the population is situated within the southern portion of Ontario. For the basis of this thesis, the examination specifically looked into the smallest geographical zone, the St. Lawrence Lowlands which “is a plain located along the St. Lawrence River between Québec City in the east and Brockville, Ontario in the west”.¹³ Although being the smallest physiographic region, it holds a large role in the agricultural industry of Canada as these lands are some of the country’s the most fertile lands. The soil throughout the St. Lawrence Lowlands allows

for a wide variety of agricultural foods to be produced: “Deciduous and coniferous trees can be grown including walnut, maple, hemlock, and oak trees. Tobacco plants, peaches, cherries, grapes, apples, hay, carrots, and beans can also be grown”.¹⁴ Southern Ontario can be subdivided in four main regional zones, consisting of Urban, Peri-Urban, Rural and the Boreal zones of southern Ontario. Agriculture is a unique feature to southern Ontario with the majority of industry occurring throughout its rural zones. However, this increases the demand force of the agriculture industry to revisit its existing farming model, and transform small-scale rural areas into industrial farms. As large cities grow, it is imperative that agricultural practices be woven into existing built environments at multiple levels: as urban agriculture, peri-urban agriculture, rural agriculture, and agroforestry within the Boreal zone. The Greenbelt, Ontario, is located in

12. Norman Hillmer and Robert Bothwell, “Ontario,” Canadian Encyclopedia, n.d., [https:// www.thecanadianencyclopedia.ca/en/article/ontario](https://www.thecanadianencyclopedia.ca/en/article/ontario).

13. “St. Lawrence Lowlands,” n.d., <https://www.arcgis.com/apps/MapJournal/index.html?appid=70c98db6230b494f98ee0add0001fb91>.

14. Ibid.

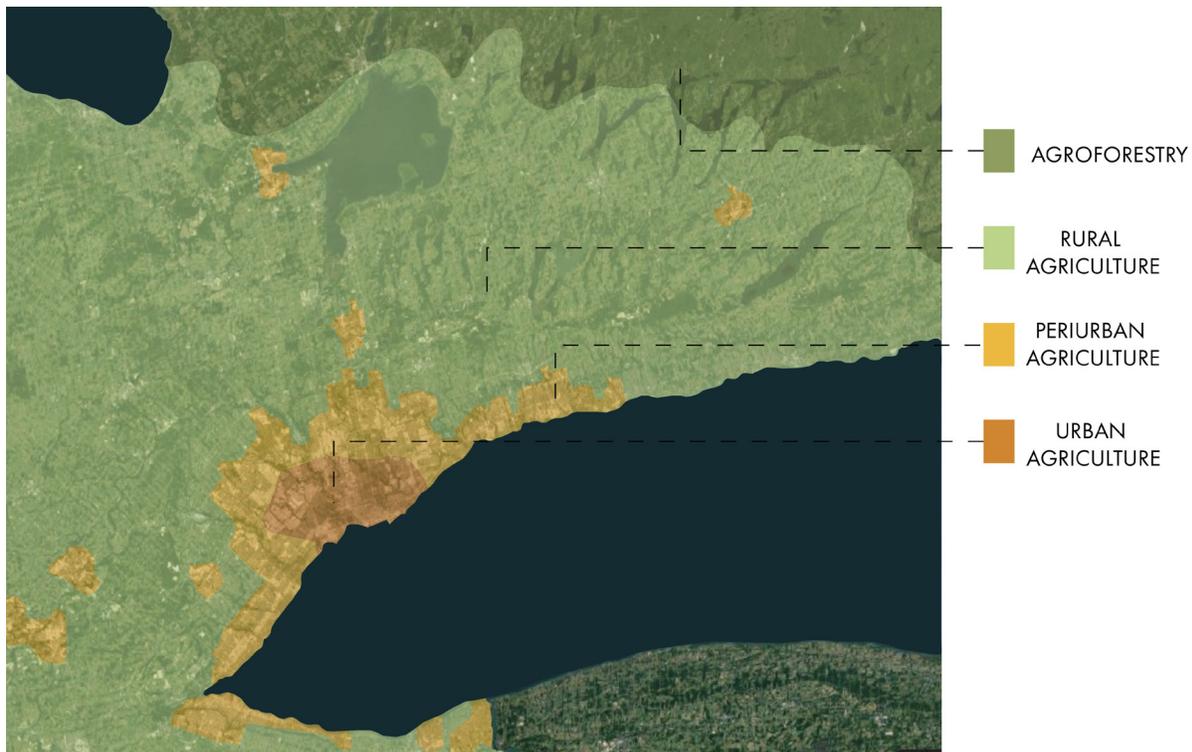


Figure 6. Regional Scales Mapping Southern Ontario

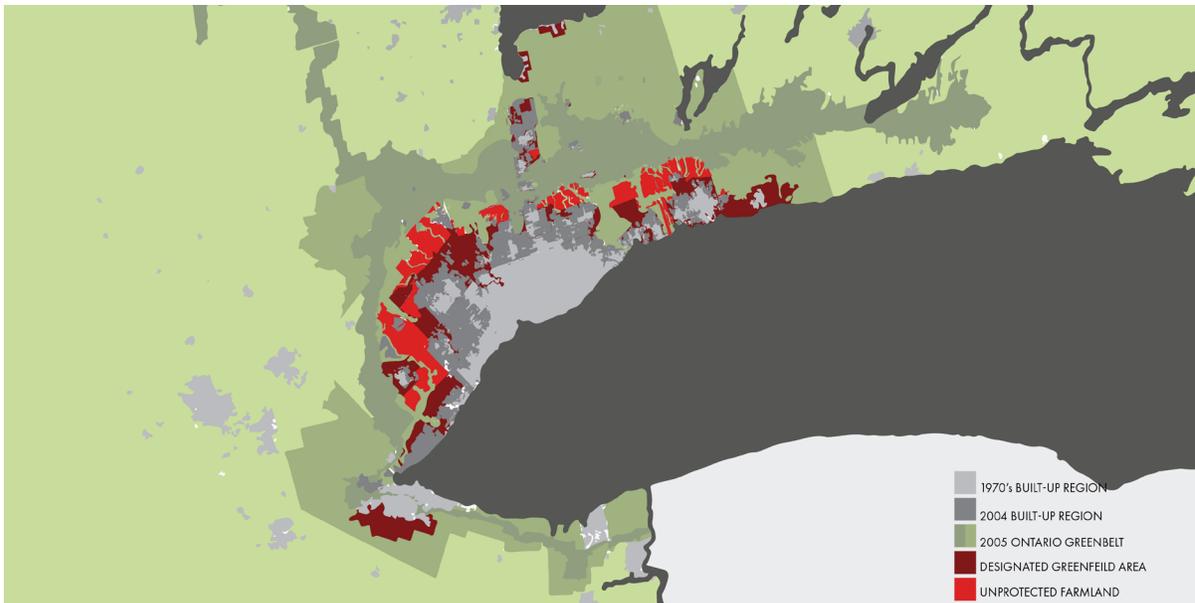


Figure 7. The Greenbelt Ontario

the heart of the Greater Golden Horseshoe (GGH) and is home to the largest urban centre within Canada, Toronto. It consists of the Niagara Escarpments, the Oak Ridges Moraine as well the farmlands that surround these geographic forms. This region has been drastically expanded over the past decade, to the point where suburban development impedes rapidly into much of southern Ontario's prime agricultural farmland. In 2005 under the Dalton McGuinty Liberal Party the approval of the Greenbelt Act made possible for Canada to have the largest protected Greenbelt in the world. Consisting of roughly 2 million acres of protected land extending as far north as Tobermory, and stretches 325 kilometres from Rice Lake in Northumberland County to the Niagara River. Diverse in its ecosystems, the Greenbelt encompasses roughly 721,000 acres of land with lakes, wetlands, river valleys, and forests. With approximately 4782 farms operating, the greenbelt produces food for the surrounding regions. As "on average, food travels 2500 km before it reaches our plates the greenbelt-grown food travels less than 250 km¹⁵", the greenbelt stays mostly in southern Ontario.

15. "The Greenbelt," Greenbelt, n.d., https://www.greenbelt.ca/about_the_greenbelt.

With the intention to protect more lands, on May 2017 the "Greenbelt grew to include 21 urban river valleys and 7 coastal wetlands, connecting critical water resources in the rural lands of the Greenbelt to Lake Ontario¹⁶." These urban river valleys serve as a connecting branch between the suburban and rural lands as they span from the core of the Greenbelt to the shores of Lake Ontario "and provide our communities with green space to explore, they clean and filter our water and air, reduce our flood risks, and provide a home to wildlife".¹⁷ The implementation of the Greenbelt was defended by more than 100 community-based groups who continue to advocate for the protection of vital drinking water supplies and lands that have not yet been incorporated into the Greenbelt.

Oak Ridges Moraine:

Referred to as the "Ontario rain barrel",¹⁸ the Oak Ridges is a geographic landform that was created throughout the ice age. The retreating of the glacial ice forms led to a vast deposit of silt, clay, gravel, and sand, that compose the current ridges. Hydrology features define

16. Ibid.

17. Ibid.

18. Burkhard Mausberg, *The Greenbelt: Protecting and Cultivation a Great Ontario Treasure* (Toronto: Barlow Book Publishing, 2017).

the moraine and essentially acts “like a sponge to the rainwater, the Oak Ridges Moraine forms an important watershed that distributes water, flowing to the south to Lake Ontario and to Lake Simcoe in the north¹⁹.” The area consists of a large number of farms that directly rely on the water resources that the Oak Ridges Moraine provides to the region. Besides being some of southern Ontario’s most productive farmland, the region also boasts an abundance of habitats for wildlife to flourish. The first proposal of the Oak Ridges Moraine Conservation Act came into effect in 2001. Government authorities indicate the importance of development for the area: “The goal was to protect the region and decide where development should be discouraged in the region so as to secure all the sensitive natural places of the Oak Ridges Moraine”.²⁰

The Niagara Escarpment:

The build-up to the Greenbelt Act of 2005 was the result of a series of events beginning with the initial protection plans for the Niagara Escarpment dating back to 1973, when actions towards the preservation of natural elements became part of planning strategies for cities and regional planners²¹. Also, “The Act is to be a guarantor of the cultural identity of the Métis and First Nations who are bound to this land²².” The Niagara escarpment was recognized as a World Biosphere Reserve by the UNESCO (the United Nations Educational, Scientific, and Cultural Organization) in 1990. In accordance with principles of the Greenbelt act, the Niagara Escarpment plan deploys several key components, such as the protection of natural habitats with guiding principles overall hydrology resources.

19. “Oak Ridges Trail Association, Oak Ridges Moraine, Accessed August 23, 2019, <https://Oakridgestrail.Org/Moraine/>,” n.d.

20. “Ministry of Municipal Affairs, Oak Ridges Moraine Conservation Plan (Ottawa: Queen’s Printer for Ontario,2017) 1–2,” n.d.

21. This was officialised with the Niagara Escarpment Planning and Development Act of 1973. Mausberg, *The Greenbelt: Protecting and Cultivation a Great Ontario Treasure*.

22. Niagara Escarpment Commission & Ontario Ministry of Natural Resources, *Niagara Escarpment Plan* (Ottawa: Queen’s Printer for Ontario, 2017) 1 ,7., n.d.

Alongside environmental protection, tourism was encouraged as part of the region’s economy. While the Niagara Escarpment plan preserves the natural landscape and historic character of the escarpment; it uppermost provides tools to control the development of cities or communities that immediately surround the escarpment. Working closely to protect the current accomplishments, stakeholder municipalities share a concern on the implementation of an overseeing body for the Greenbelt.

III – II. Greater Toronto Area: The expansion: introduce pop growth data/mapping of growth

The Greater Toronto Area (GTA) is Canada’s largest metropolitan region that has become home to some of the fastest urban and suburban growth within the province of Ontario. The Greenbelt, Ontario, faces a debated future with “90% of Ontarians that believe the Greenbelt is vital to the survival of Ontario for future generations to come but, alas, with its location and geographical composition the future of the Greenbelt does not appear to have a secure future²³”. The Greater Toronto region is one of the fastest-growing demographics in North America with a projected population to increase by 13.5 million inhabitants by 2041. Even if the “Greenbelt protects environmentally sensitive areas and productive farmlands from urban development and sprawl²⁴”, it also encloses a zone around the Greater Toronto Area (GTA), referred to as the inner ring. This inner ring consists of the city of Toronto, Peel, Durham, Hamilton, Halton, and York’s regions with the projection of a growth rate of almost 50% of its current inhabitants by 2041. Growth is not just expected to occur on the inner ring as projections also indicate growth

23. Salim El Filali, “Grey to Green” (Salim El Filali, Waterloo, Ontario, 2019).

24. “What Is the Greenbelt.”

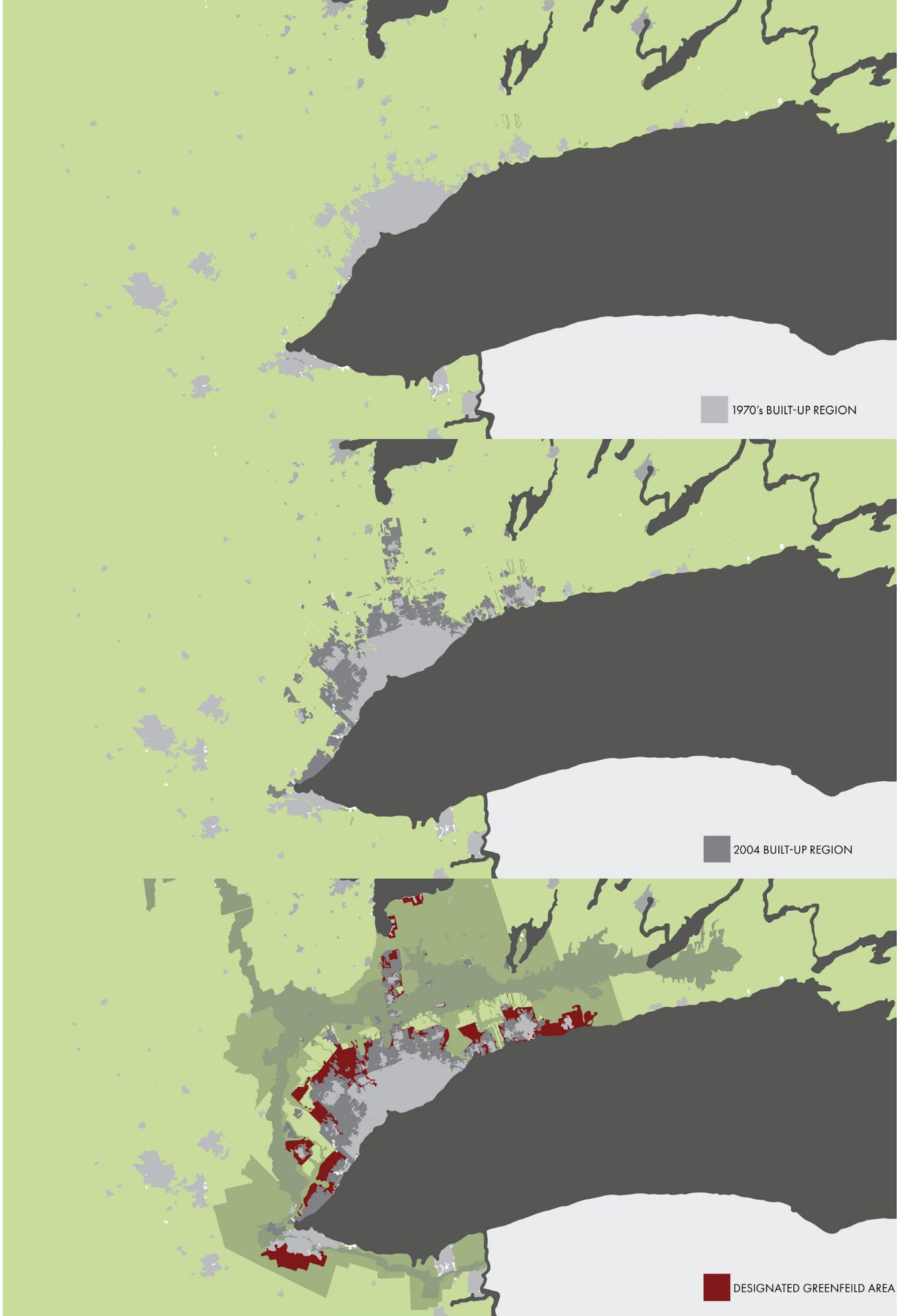


Figure 8-10. Greater Toronto Area Growth Mapping

for the outer ring will, which consists of the Waterloo, Niagara, Simcoe, Barrie, Guelph, Peterborough and Northumberland regions. In 2001 this outer edge surpassed 1.9 million residents and by 2031 it is expected to pass 2.8million, with an increasing growth rate by 2041 with roughly 3.3 million residents living within the outer ring. Consequently, it triggers "the urgent question of how the Greenbelt's legitimate boundaries" can be realized as there is no visible barricade border but only the limited remaining amount of free lands. These are referred as the "White Belt",

reducing the idea of Greenbelt to a "buffer zone, with only a few kilometres or at times only a few metres to stand between the urban sprawl and the most protected greenbelt in the world".²⁵

The future of this region faces two driving issues, the first and main being the fact that "75% of the overall projected population growth is expected to occur within the inner ring and will not be evenly distributed across the outer ring (outside the Greenbelt)"²⁶.

25. El Filali, "Grey to Green."

26. "A Note About The White Belt," Neptis, n.d., <https://www.neptis.com>.

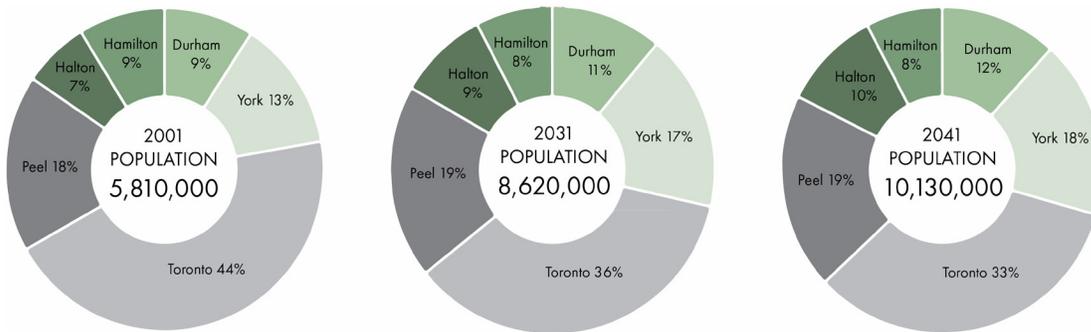


Figure 11. GTA Population Growth Inner Ring

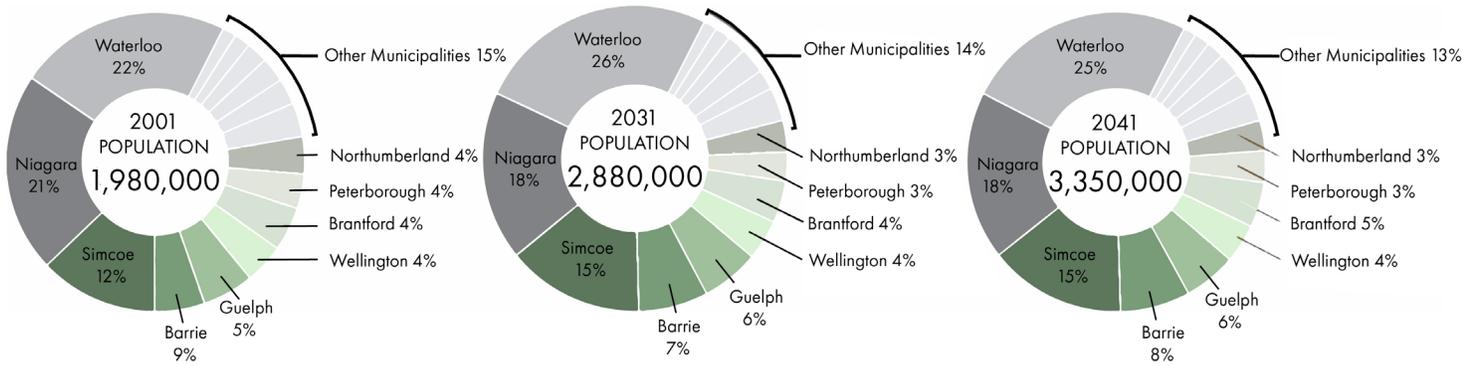


Figure 12. GTA Population Growth Outer Ring

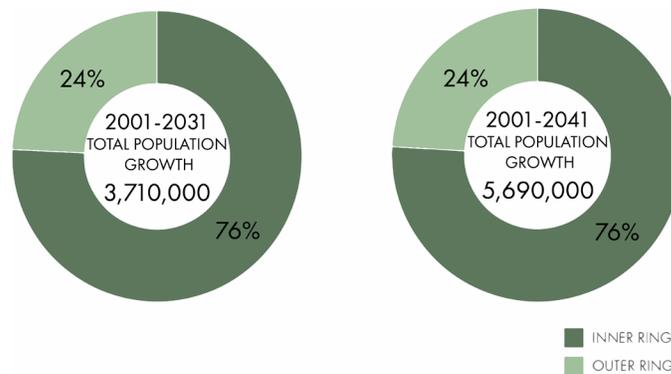


Figure 13. Total GTA Population Growth Inner vs Outer Ring

The following issue refers to the Greenbelt completely encompassing the inner ring urban regions, forcing the projected growth to impede on the Greenbelt to be “only a small amount of free lands, designated as greenfield area, separate the Greenbelt from the sprawl (Grey Belt)²⁷”. One risky option is to leave the unprotected (under the Greenbelt act) lands become the White belt, after these are designated for development, however, this vital land is all that stand between the Greenbelt and the suburban edge. Deplorably, the condition of the suburban edge is drastically changing as many regions envisage a vast amount of development. Even more lamentable is the controversy around Bill 66:

We will open up the Greenbelt; not all of it. We are gonna open a big chunk of it up, and we're gonna start building. And making it more affordable! And putting more houses out there! - Doug Ford²⁸

During its election period (March 2018), the Progressive Conservative Party of Ontario proposed in its election campaign, and continued to push after being elected, the need to open up the lands within the Greenbelt for development, through Bill 66. Premier Doug Ford heavily put the blame on the Greenbelt for causing the high unaffordable housing within the Greater Toronto Region. The Conservative Party of Ontario pushed through several attempts to get Bill 66 approved but confronted the mobilization and push back from Ontarians as they “did not want the Greenbelt to be fragmented by development”.

org/publications/story-so-far/chapters/note-about-whitebelt.

27. El Filali, “Grey to Green.

28. “Bill Kelly, ‘Bill Kelly: Doug Ford Backtracks on Greenbelt Promise,’ Global News, Video File, August 24, [### III – III. Peri-Urban](https://Globalnews.ca/News/4749633/Doug-Ford-Greenbelt/Beta/?Utm_expid=.KzOUD-5JkQOC06y_MqxGqECg.1&utm_Referrer=https%3A%2F%2Fwww.Google.Com%2F,” n.d.</p></div><div data-bbox=)

The peri-urban scale is examined here, considering that strategies to control urban sprawl, and integrate agricultural spaces, can be inspired by the Garden City movement. The city of Whitby, Ontario, is introduced to discuss the potential of a satellite city to become a catalyst for the Greater Toronto Area as a whole.

The Garden City Movement

Starting in the United Kingdom, the Garden City movement is a model of urban planning that was introduced by Sir Ebenezer Howard in 1898. The Garden Cities were “intended to be planned, self-contained communities surrounded by greenbelts²⁹, with a balance between residential, industrial, and agricultural components. In this model design for community living, the greenbelts separate the housing from industry, combining the best aspects of the city and the countryside: “Human society and the beauty of nature are meant to be enjoyed together.³⁰”

The Garden City movement was seen as a “radical campaign for co-operative development³¹, or as an alternative to the overcrowding and densification cities have experienced during the 19th century.³² In order to establish a Garden City, Howard had to finance and purchase land. This led towards the founding of the Garden Cities Association, later to be referred to as the Town and Country Planning Association (TCPA), resulting in the foundation of the first garden city of Letchworth. Designed under a low-density planning, and scattered with well-

29. F.Lee Ackerman, “The Garden City Movement,” n.d., <https://www.geni.com/projects/The-Garden-City-Movement/15255>.

30. Oliver Wainwright, “The Garden City Movement: For Ebenezer to Ebbsfleet,” March 17, 2014, <https://www.theguardian.com/artand-design/architecture-design-blog/2014/mar/17/ebbsfleet-garden-city-george-osborne>.

31. Ibid.

32. “Howard’s garden city concept combined the town and country in order to provide the working class an alternative to working on farms or ‘crowded, unhealthy cities’”. F.Lee Ackerman, “The Garden City Movement.”

crafted dwellings, these communities have left a highly desired outcome:

Planned on a concentric model, these garden cities would set the primary civic functions in a central park, ringed by a great glass shopping arcade, beyond which would lie halos of housing and schools, encircled by a peripheral necklace of factories and services³³.

With the intention of encouraging the community to embrace the values of the plan, every occupant would become a shareholder through the adoption of “principles of collective land ownership, long-term stewardship and land value capture for the benefit of the community couldn’t be more relevant now.”³⁴ In short, the urban design included spatial principles as well as a strategy for a non-profit property ownership model.

33. Wainwright, “The Garden City Movement: For Ebenezer to Ebbfleet.”

34. F. Lee Ackerman, “The Garden City Movement.”

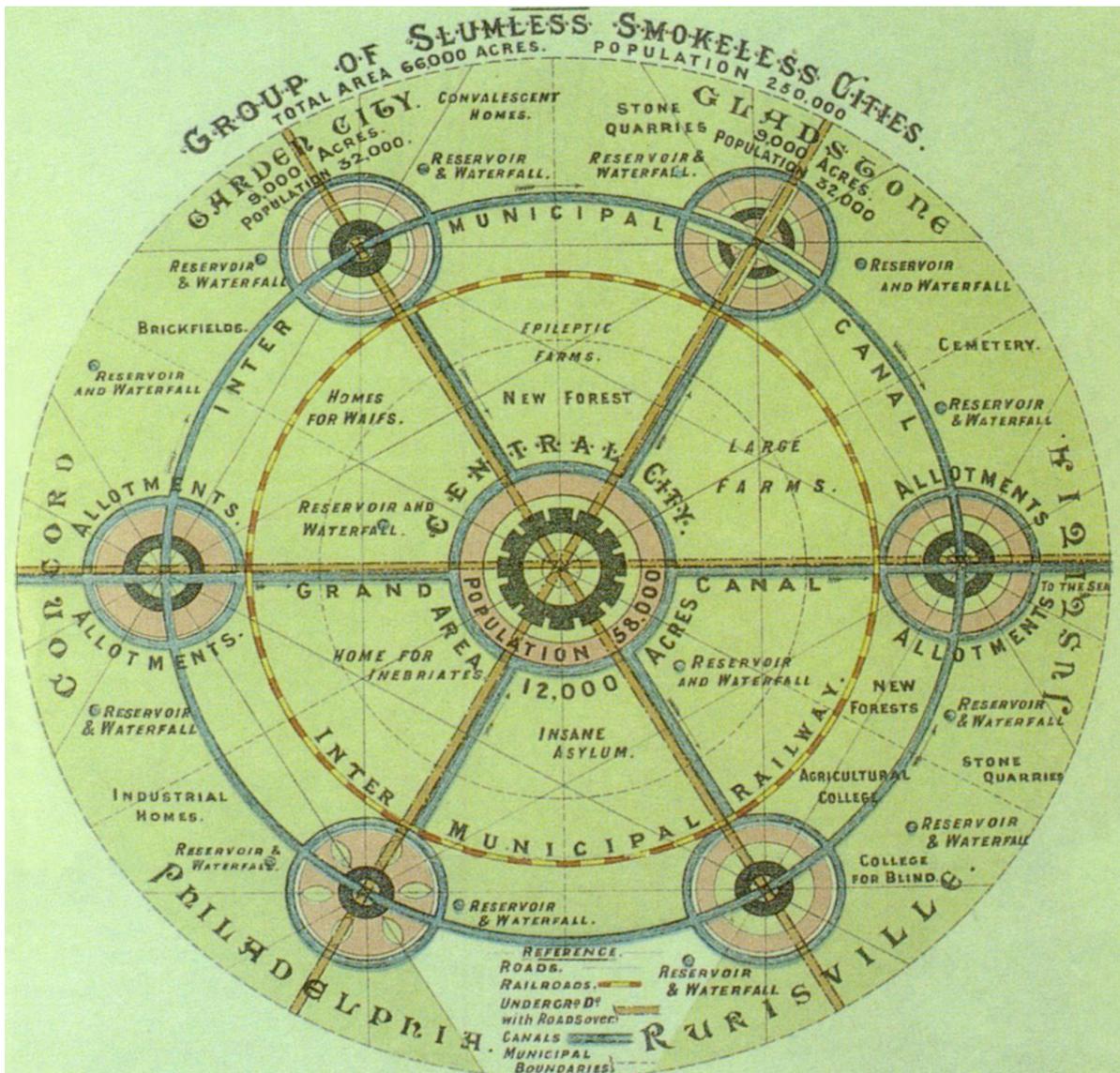


Figure 14. The Garden City Movement

Whitby / Brooklin (Ontario)

The peripheral edge condition of the greater Toronto area was studied and a segment within this region was to be selected to establish a community model focused on suburban subsistence. The selection process included the outlining of specific nodes throughout the peripheral edge of the Greater Toronto Area, where the Town of Whitby seemed to gather all elements for the design of an Agricultural Infrastructure to be developed. Whitby is a typical bedroom community, as the city and its surrounding region has no physical local industry to support its residents. Whitby inhabitants commute to and from the Toronto area. The region of Whitby has been undergoing an expansive amount of growth over the course of past years and a large projected growth is envisioned.

Looking at Whitby, more specifically the Northward Hamlet of Brooklin, allowed us to experiment how an expanding location can become an urban edge between the agricultural lands and the existing urban community. The experiment promotes a new relationship between urban and rural areas through the concept of Suburban Subsistence Agriculture. This led to a new model of suburban living that integrates urban development, ideas from the Garden City movement, and methods of Subsistence Agriculture.

Founded in 1820, the town of Brooklin became an epicentre for flour production by 1840, with the establishment of mills and railroad lines leading throughout southern



Figure 15-18. Town of Brooklin Imagery

Ontario. By 1950, the General Motors industrial plant began to stimulate suburban development that spread throughout the region. From the early 1990s to the present day, Brooklin shows steady growth reaching currently a population of roughly 25,000 people. Future development for the next ten to twenty years anticipates needs for 56,000 new residents. Much of land surrounding the edge of the town is already in control of developers, with plans for some sites to break

ground in the upcoming year. The image figure 19 depicts the density surrounding the Greater Toronto Area indicating the peripheral edge nodes of density. Highlighted in the red outline is the town of Whitby Ontario, with the Northward of Brooklin Ontario.

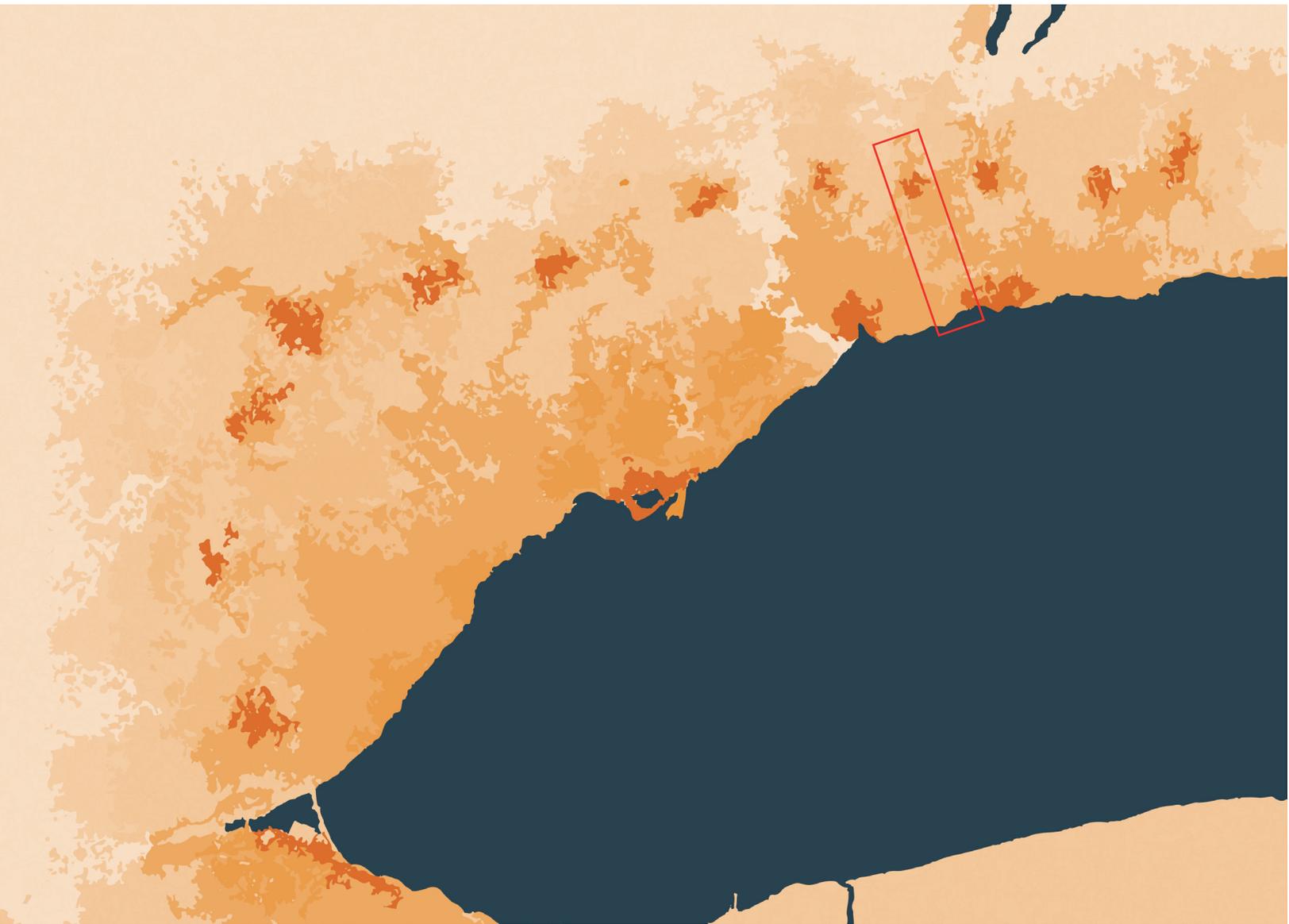


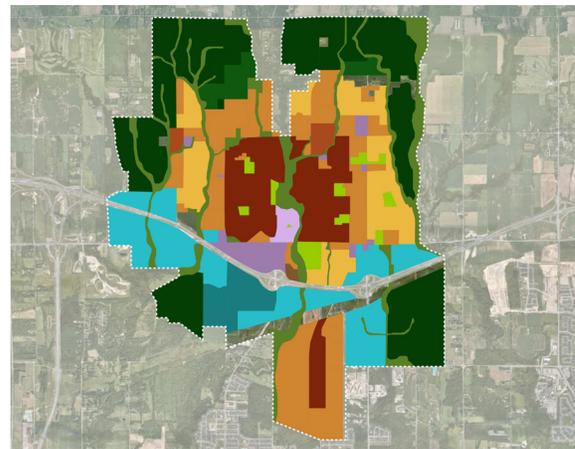
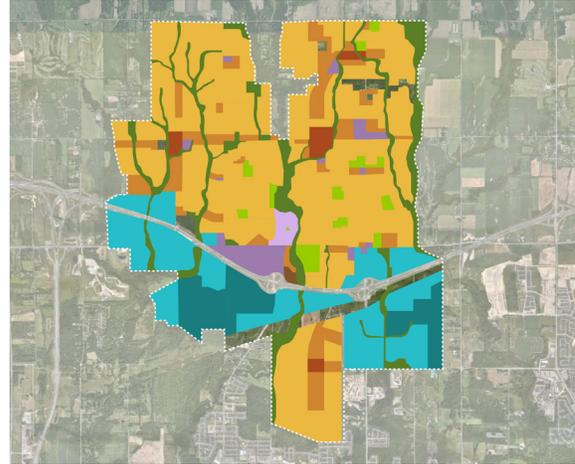
Figure 19. Mapping of Density: Greater Toronto Area. Red Rectangle Indicates Area of Study.

III – IV. Suburban Core

Suburbia is a dizzyingly broad category. The term refers to semi-rural areas where strip malls nibble at farmland and those where tall towers loom over the city line. It encompasses McMansions, mobile homes, airports, and light-industrial estates, landfills, and parkland.³⁵

Frequently overlooked, suburbs are a unique model of residential living that remained practically unchanged over the last fifty years. Being characterized by mixed-use or residential areas, suburbs are seen to be either part of a larger urban area, or a distinct residential town that is within commuting distance of the city centre. Traditionally, suburbs tend to proliferate around cities that have an abundance of adjacent flat land, which is the case for the Greater Toronto Area. Despite being on the outer edges of the larger urban centres, these regions tend to function much differently than the urban core, firstly because they are designed for the automobile. As a commuter zone that allows people to move to and from the city centre, suburban developments include multiple car driveways, fenced-in yards, and grocery stores with large parking lots. With its sprawling lawns, and low density of inhabitants, suburbs have developed with such characteristic that has attracted people as an alternative to living in city centers. The suburban core itself is constantly ignored as a component to the suburban environment, first because it is actually difficult to clearly identify a central core whose, as its location and visible boundaries are unclear. Suburbs are structured as low-density fabric where automobile circulation is privileged to public transit. Given its relation to a larger city centre, commercial, public and community buildings are often situated towards the outer edge of a suburb, rather in its geographic centre.

³⁵. Kolson Hurley, *Radical Suburbs*.



Top Figure 20. Town of Whitby Purposed Expansion for Brooklin

Bottom Figure 21. Thesis Analysis Proposal for Densification

The traditional town's four corners, or vastly large parking lot surrounded by box stores are the equivalent to suburban cores, which raises the question how these cores can be densified and better designed. The town of Brooklin has an old town square bordered by small shops and homes, which is surrounded by a vast suburban development that spreads to an outer ring of box stores on the edge of town. As other suburban cities, the core of Brooklin does not contain itself to a single location. It spreads across the land, forming an impractical situation for pedestrian traffic, which forces users to take the automobile. Instead of trying to design a single central core, suburban communities need to build up on existing environment, which leads to the design of a series of connected hubs.

III – V. Suburban Edge

The suburban edge is a distinctive stark line between the suburban residential development and open lands. In the case of the Greater Toronto Area, the town of Brooklin represents a common situation as development occurring through the town overtakes agricultural lands. As a moving suburban wall, the development is rhythmmed by the original farm grid, starting and stopping at the edge of each rectangular plot of land. This expansion of a suburb unfortunately happens without consideration for repurposing or densifying the existing

urban fabric that remains underdeveloped, and even worse, seem to ignore the changes on the sociodemographic demand. Notably, the stereotype of a North American nuclear family continues to inform this type of development, although this no longer corresponds to the profile of contemporary suburban communities. Looking at a total number of 138,960 residential dwellings, the Census Metropolitan Area (CMA) of statistics Canada was completed in 2016 for the Oshawa CMA, which included the

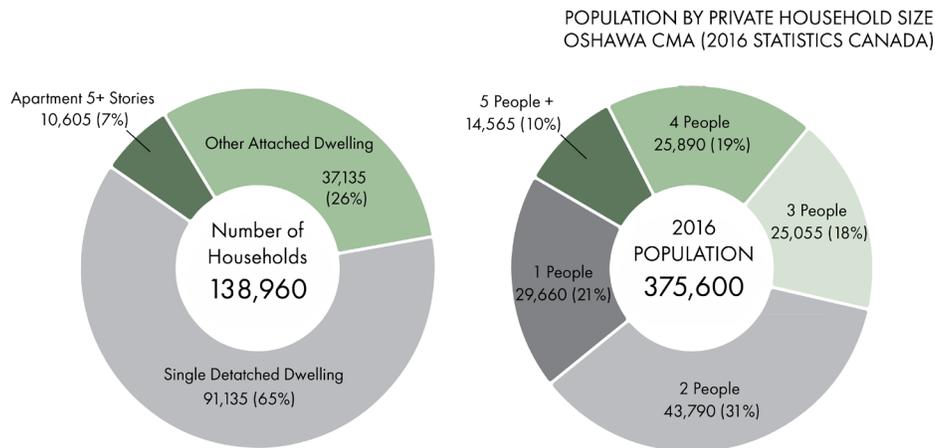
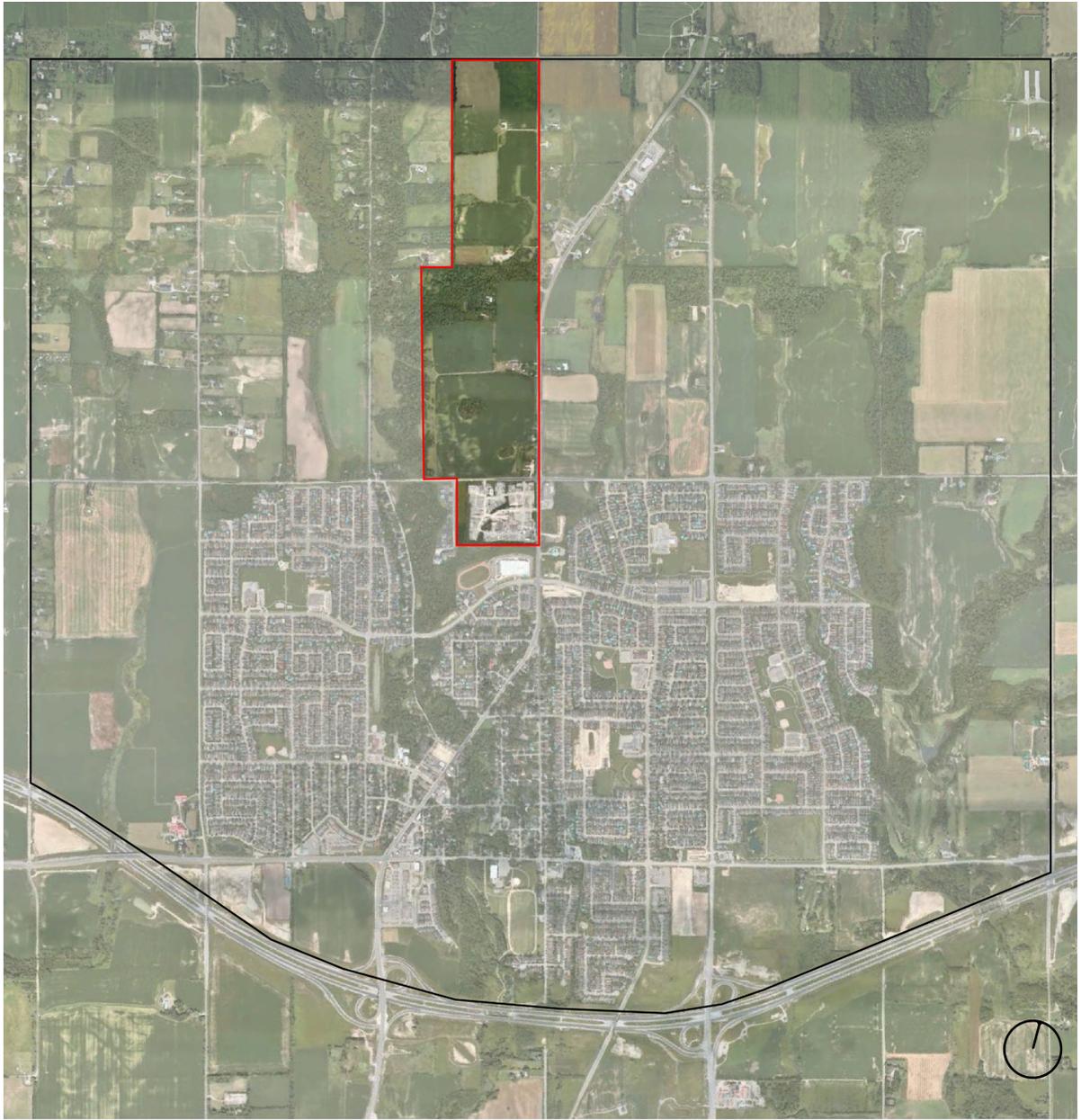


Figure 22.

municipalities of Oshawa, Clarington, and Whitby.³⁶ The CMA examines the different levels of dwellings, population and other statistics of the region. The dwellings are analyzed according to three main categories, being a single dwelling, detached housing types and dwellings of five stories or more. From this total, the results show that 65% are single dwelling homes, 26% are detached housing types and only 7% are 5+ stories. The statistics for the area highlight who truly occupies the suburbs, which is different from the stereotype nuclear family. At the regional scale, the 2016 CMA looks at a population of 375,600 residents. Out of the total population number, identifies those who live within a set household: 52% of the

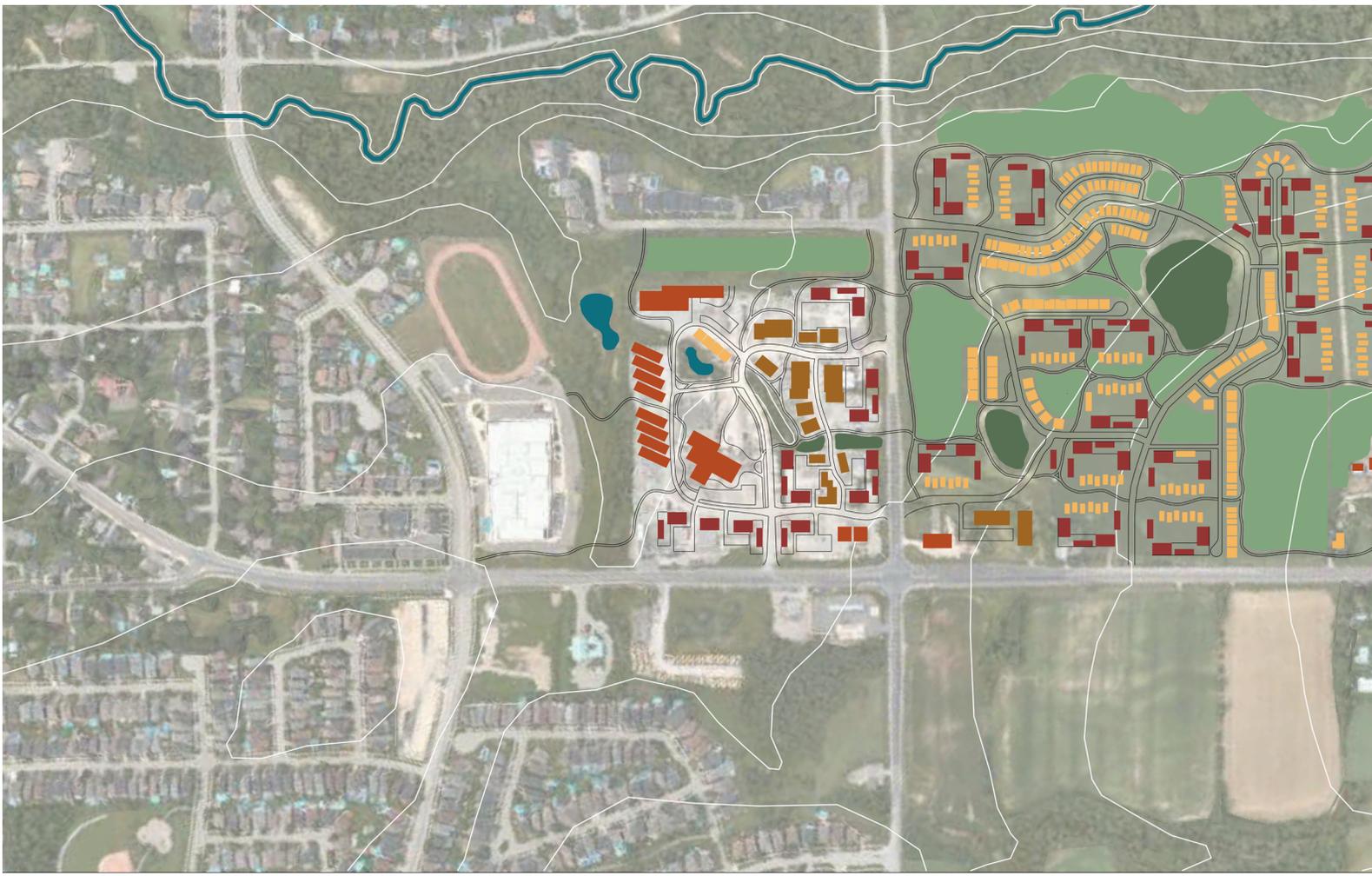
population is primarily between single and double individual living situations, while 37% is between three and four people within a household, and only 11% are homes with five or more individuals. The reality shows that the majority of the people living within this region are between one and two people occupying a dwelling, not with standing the fact that the majority of homes have large building footprints. If the suburban edge has to keep moving into agricultural lands, at a very minimum, the model of land occupation needs to suit the demographic profile of whom truly occupies the area. It is imperative to introduce a new model of living at the suburban edge that integrates community and agricultural components, and above all, that limits the loss of agricultural land.

36. "Statistics Canada," n.d., <https://www12.statcan.gc.ca/census-recensement/2016>



Top Figure 23. Town of Brooklin and Site Location

Bottom Figure 24. Site Exercise: Using existing grid of suburban homes. Totalling 1320 Residential Dwellings



COMMUNITY
 MIXED-USE
 HIGH DENSITY RESIDENTIAL
 LOW DENSITY RESIDENTIAL



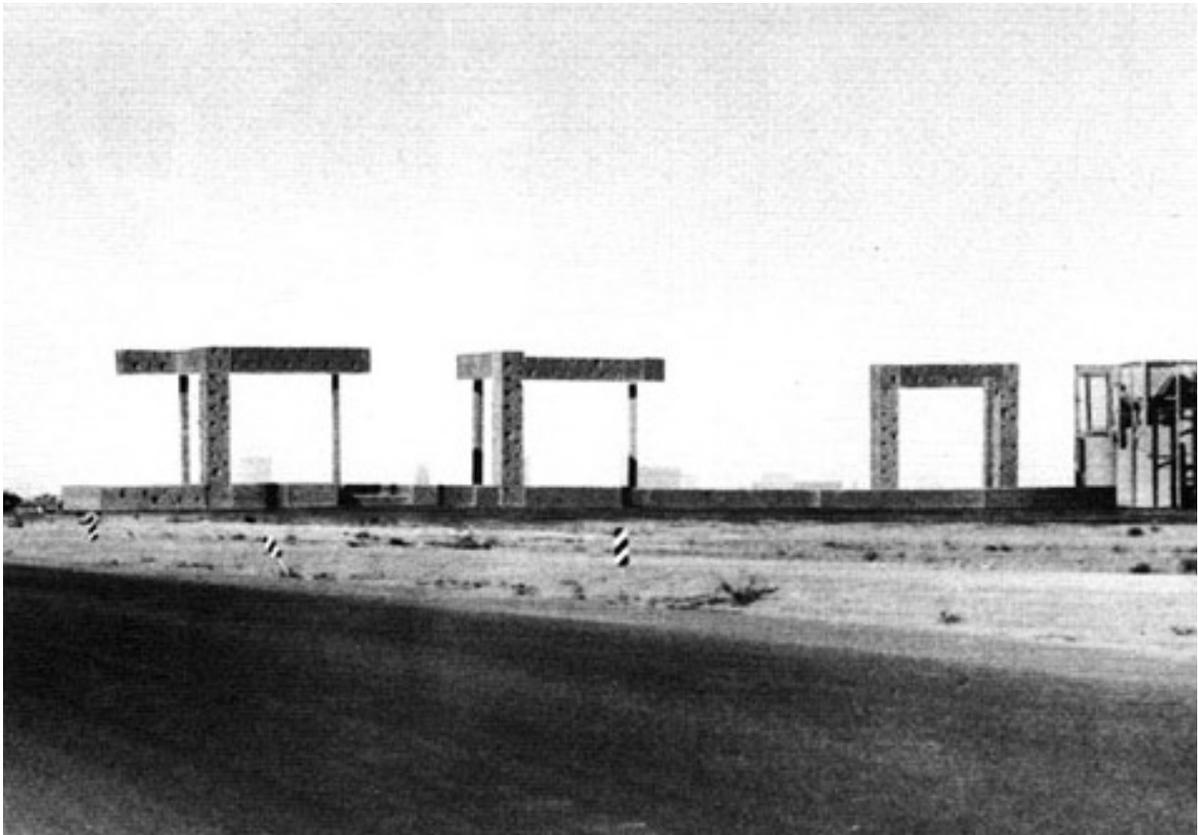
36 Figure 26-31. Brooklin Edge Site Condition



Figure 25. Site Plan Community Proposal



Figure 30. Brooklin Edge Site Condition



Top Figure 32. Steven Holl Cleveland Ohio

Bottom Figure 33. Steven Holl Phoenix Arizona

Figure 25 shows the Community Plan for the town of Brooklin for 4400 residential units. The project introduces a series of housing typologies: Mid-rise, Row houses, and single unit dwellings, which correspond to suburb's demographic data.

Steven Holl's Edge of a City

A series of explorations were done by American-born architect Steven Holl on *Edge of a City* 1977. Holl's work examines the edge conditions of American several cities alongside their urban and rural fabric, and observes that "The expanded boundary of the contemporary city calls for the synthesis of new spatial compositions".³⁷ Holl's proposals look at the edge of the city and incorporate living, working, recreational components that become "new pedestrian sectors that might act as social condensers for new communities".³⁸ Cleveland, Ohio, is located along the shores of Lake Erie and its central city core is surrounded by an outer suburban region, which is boarded by agricultural lands. Holl identifies different zones in Cleveland, mainly being residential and agricultural. He designs a theoretical expansion plan in which a new urban pattern is created by five X-like crossings that define specific residential and agricultural zones. This plan allows designated agricultural zones to be preserved, and residential areas to expand. Toronto, Ontario, is comparable to Cleveland for its urban morphology and natural landscape.

Holl looked at Phoenix, Arizona, where he explores a series of Spatial Retaining bars that infer the edge to the city, and the beginning to the desert. With that, he emphasizes the importance of protecting the fragile desert ecosystem. Each retaining bar structure "inscribes a 180sqft space while it rises to frame views of the distant mountains and the desert. Loft-like living areas hang in silent isolation, forming a new horizon for the city."³⁹

37. https://www.daniels.utoronto.ca/faculty/kesik_t/PBS/Kesik-Resources/Resilience-Planning-Guide-v1.0-2017-11-19.pdf

38. Holl, Steven. *The Edge of a City*. 1977

39. Ibid.

III – VI. Housing/Blocks

The design of the suburban edge is largely driven by a desire to tackle the inadequacy of the existing suburban model, where sprawling homes do not address the actual demand. The model of residential living within the suburbs should reflect how individuals live and occupy spaces within their community. Thus, design will propose a mode of communal mixed-unit complexes that are located throughout agricultural corridors. The buildings are designed considering a variety of types that correspond to realistic individuals living conditions.

Mid-rise, detached, semi-detached, row housing, and a mixed-use housing units will be the basis for residential living throughout the community. Mid-rise buildings are defined as being the 'in-between' scale for a building, as these dwellings are larger than houses but remain smaller than towers. These dwellings embrace a positive connection to their environment as they provide lots of usable space and allow for "a comfortable pedestrian environment and animate the street by lining the sidewalk with doors and windows with active uses including stores, restaurants, services, grade-related apartments, and community uses"⁴⁰. Detached housing is a free-standing residential building. It is sometimes referred to as a single-family home, as opposed to a multi-family residential dwelling. In comparison, a semi-detached house is still a single-family dwelling but actually shares one common wall with the next house. Row houses line a street in a row, whereas townhouses may be situated or grouped in different layouts within a development. Row houses are two or more identical or nearly identical units that share a common wall on one or both sides of the unit⁴¹. Mixed-use development is a term that is used for two related concepts: in the sense

of mixed-use zoning or mixed-use planning, it is a type of urban development, urban planning, or a zoning type that blends these two forms with one another cohesively.

The form of the residential dwellings and blocks are based on simple forms, which create a play with the simplicity of traditional suburban areas. The integration of parking/driveway into the structure indicates the importance of limiting the automobile. All dwellings link themselves onto the agricultural corridors and trail system throughout the community. Mid-rise style of residential living is elevated to allow for underground parking for residents, while the raised central courtyard space serves as public and agricultural space where residents can grow crops and small-scale livestock. The new model of suburban development will serve the demands for the need of residential living within this region and creates a successful balance for the Suburban Subsistence Agriculture to occur.

40. "Mid Rise Buildings," n.d., <https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/design-guidelines/mid-rise-buildings>

41. "Webster Dictionary," n.d., <https://www.merriam-webster.com/dictionary/row%20house>.



Figure 34. Residential Medium to High Density: Overlooking Agricultural Courtyard.

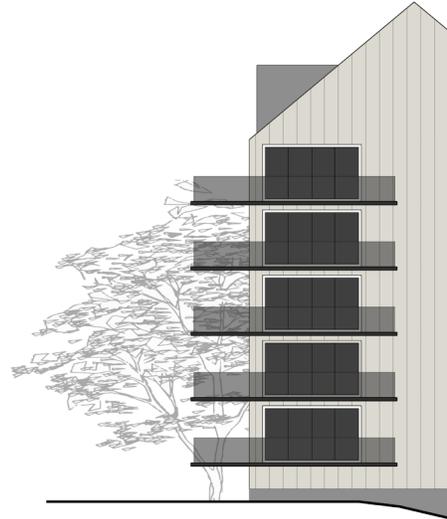


Figure 35. Residential Low Density: Overlooking Agricultural Corridor



Mid Rise Housing

Front Elevation

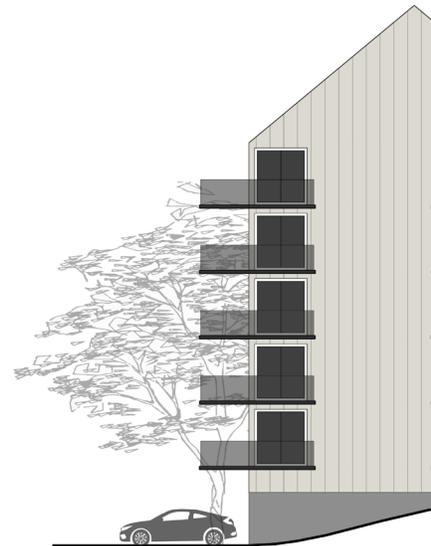


Mid Rise Housing



Mid Rise Housing

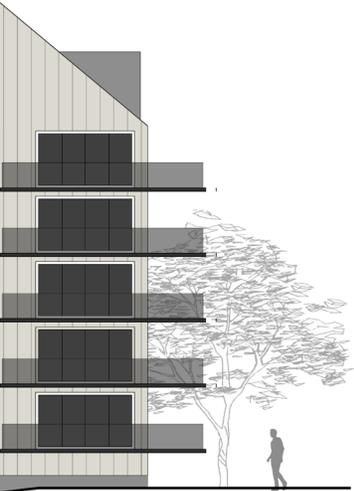
Back Elevation



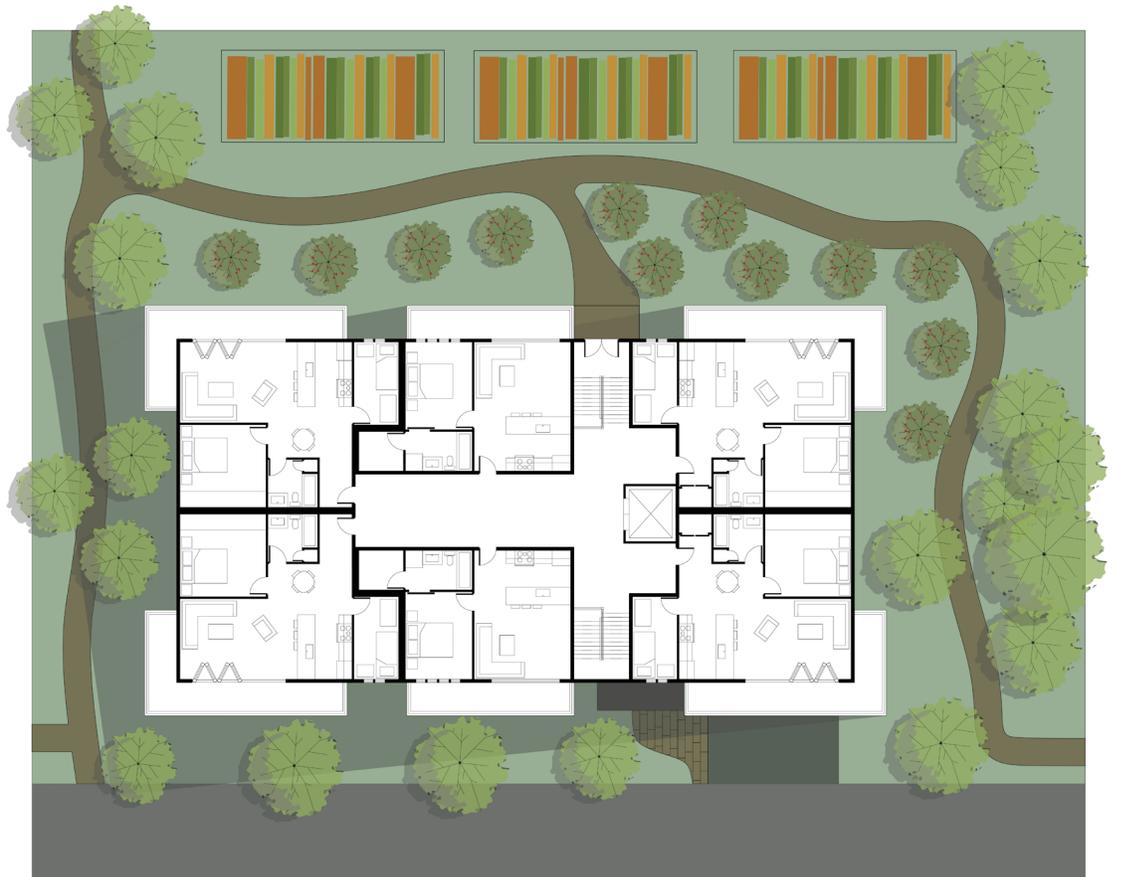
Mid Rise Housing



Side Elevation



Side Elevation



Mid Rise Housing

Floor Plan (levels 1 - 6)



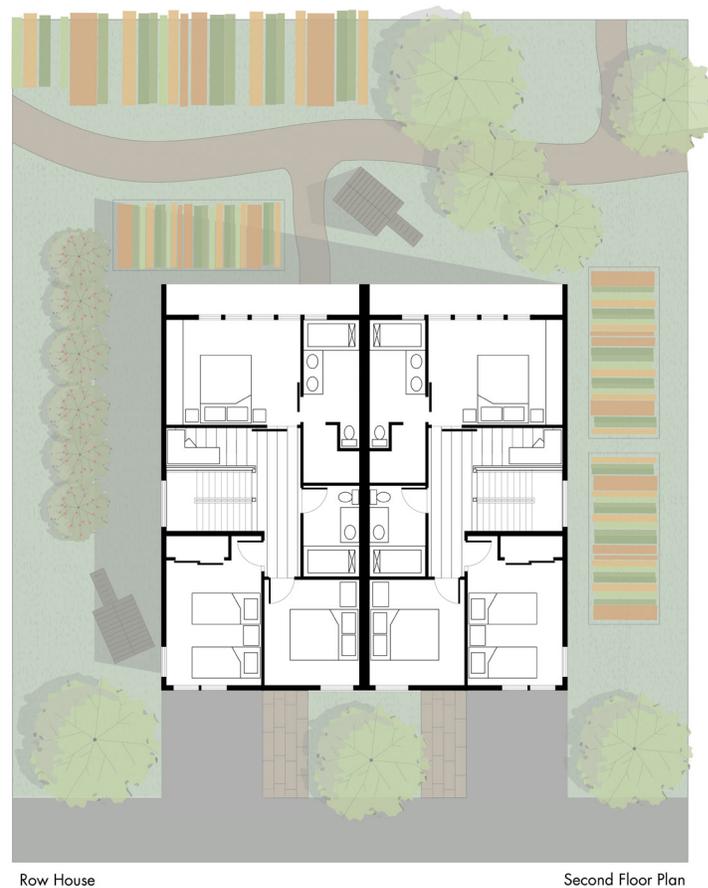
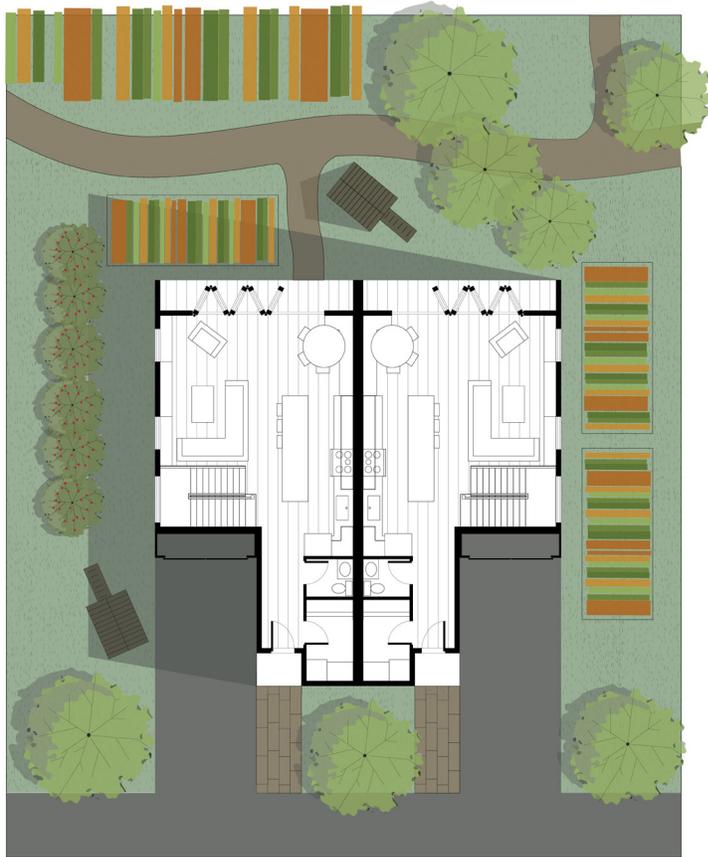
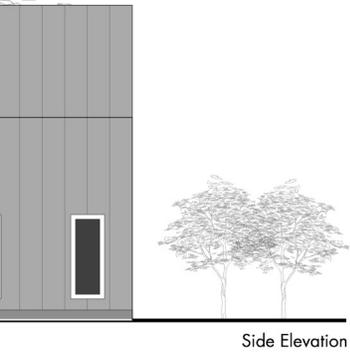


Figure 38. Row House Residential Plans



Single Dwelling

Front Elevation



Single Dwelling

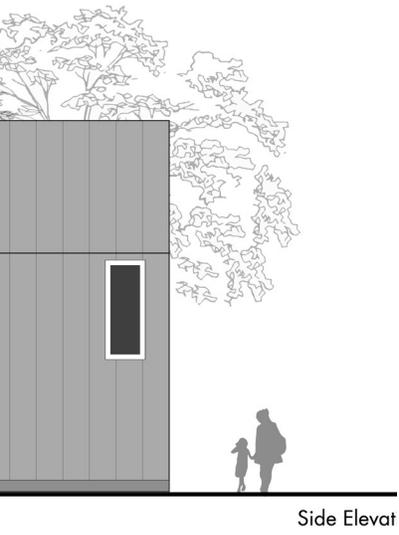


Single Dwelling

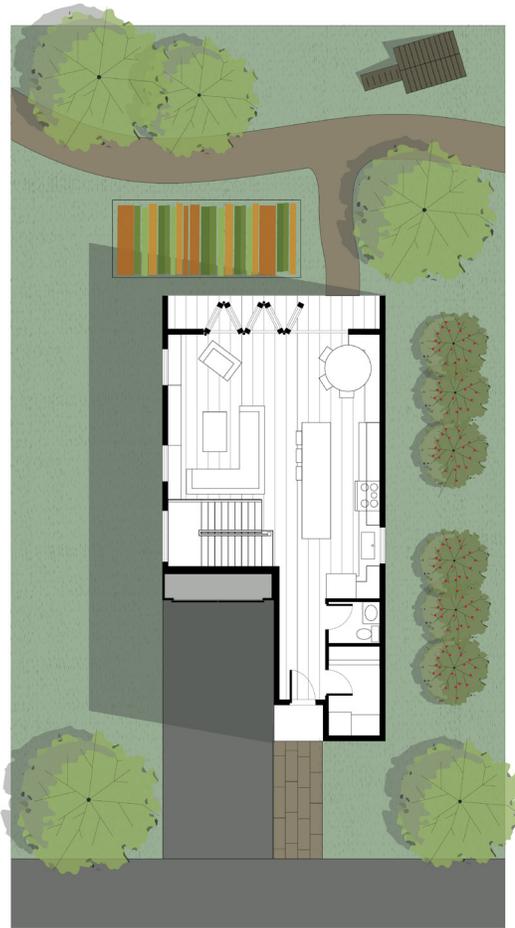
Back Elevation



Single Dwelling

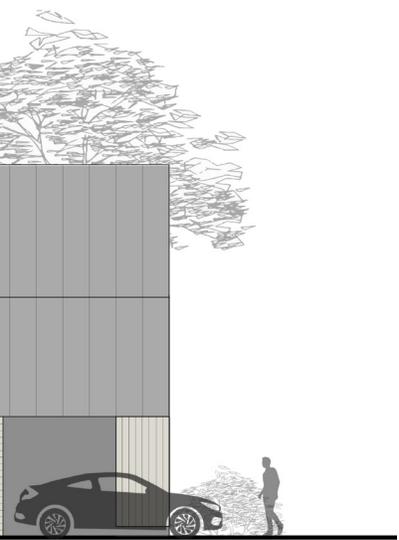


Side Elevati

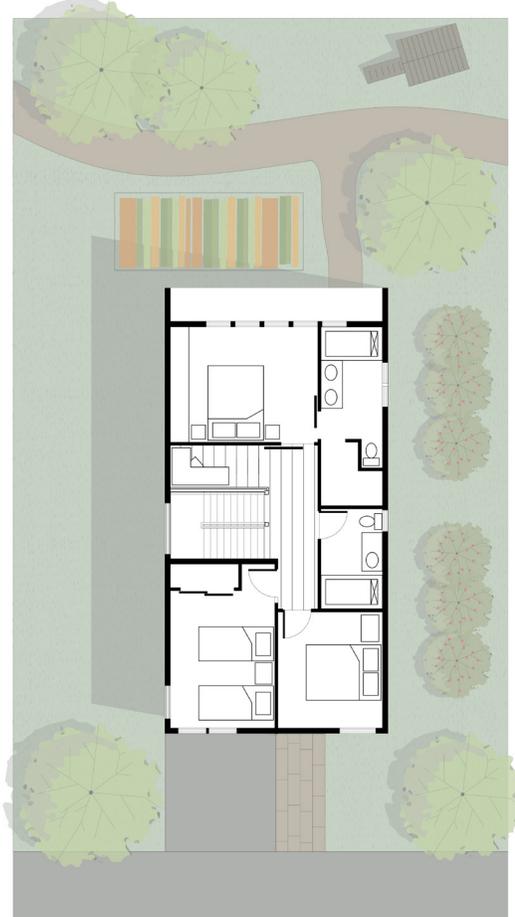


Single Dwelling

First Floor Plan



Side Elevati



Single Dwelling

Second Floor Plan



Figure 41. Community Courtyard within Residential Compound



Figure 42. Community Agricultural Corridor

III - VII Public Space

Public space is an important component to a community and is clearly missing within traditional suburban developments, as existing public spaces are underutilized and have limited pedestrian access. Good public spaces are open and accessible to all peoples, and allow for public gathering spaces such as plazas, squares, and parks. Connecting spaces, such as sidewalks and streets, are also public spaces.⁴² Throughout the new

model of the suburban edge, public space in the community model will include plaza space, courtyards, and an integrated trail system that acts as an agricultural corridor. This corridor reinforces the functioning of subsistence agriculture, linking dwellings to a village hub, and the rural fields, and connecting the new suburban model to the existing community. Finally, public green space is introduced to the model, as an alternative to the private lawn.

42 "Inclusion Through Access to Public Space," n.d., <http://www.unesco.org/new/en/social-and-human-sciences/themes/urban-development/migrants-inclusion-in-cities/good-practices/inclusion-through-access-to-public-space/>.



Figure 43 - 46. Hendrick Farm

Hendrick Farm

Situated in Chelsea (Québec), Hendrick Farm is "an adaptive development that rejects today's automobile-dependent, cookie-cutter suburbs, and reclaims traditional village design, embodying the best aspects of some of the world's most sought-after

neighbourhoods"⁴³. The farms' development encourages walking, play, recreation, social, healthy lifestyles, and inspires a sense of community. Hendrick farm makes more than fifty percent of its land available for public use. This was achieved by introducing a variety of interconnected parks, trails, and 43. "Hendrick Farm," n.d., <https://www.hendrickfarm.ca>.

walking paths which provide opportunities for social interaction, recreation, and connections between different segments of the neighbourhood, a surrounding park, and the Hendrick farm village.⁴⁴ The Hendrick Farm neighbourhood has been carefully designed to ensure maximum walkability and access to outdoor spaces.⁴⁵ Hendrick Farm is an inspiring reference that shows how design can be informed by the scale of the person rather than the automobile, integrating pathways and trails throughout the community to link the individual dwellings, agricultural production, and town hubs throughout the suburban fabric. Village Hub Agricultural-Farm Centre Hendrick farm serves as a prime model for farming in the suburban community as it becomes an integrated business model to work, farm and serve the suburban community through its agricultural practices. The Agricultural-Farm Centre works in connection to a series of hubs throughout the peripheral suburban edge. As a whole, the hubs will form a network for subsistence agriculture, as one hub can support another through the diversity of the livestock and crops produced within the community. By creating employment opportunities for individuals to work within the agro-industry of the community, the model of agriculture farming through the Village Hub Agricultural-Farm Centre holds a large potential for serving the community through its methods of operations.

Worgl Austria

Worgl is located in the valleys of the Austrian Alps in the state of Tyrol, in the Kufstein District. The town serves as major railroad junction Innsbruck, Austria, to Munich Germany, and the inner-Austrian rail line to Salzburg. Worgl is a mixed-use town serving as the main retail and shopping district in the region with a population of twelve thousand residents that offers a unique diversity for its occupants. Traditionally within the Austrian alp valleys, these towns functioned as farming communities to later be developed and densified with mixed-use residential and commercial, mid-rise, and single dwelling residences offering a diversity of living for the demographics of the region. The town of Worgl over time developed in a way North American towns do not, and that is embracing the original industry of the region; its agriculture. Woven throughout the urban fabric of Worgl in the agricultural industry with barns, orchards, cows, horses, chickens, and community gardens. The integration of agriculture has developed with the growth of the town seamlessly merging the residential and commercial sectors with farming. A series of public pathways and corridors link the community to the agricultural lands as they vary from a series of barnyards, dairy barns, and large livestock grazing and crop fields. The town embodies its agricultural routes and celebrates it by maintaining its function throughout the town even as it grows the original routes to the town remain as an anchor within the community.

44. "What Is Small Scale Farming?," January 16, 2019, <https://farmityourself.com/what-is-small-scale-farming/>

45. Ibid.



Figure 47- 52. Worgl, Austria: Intergrated Suburban Agricultural Model



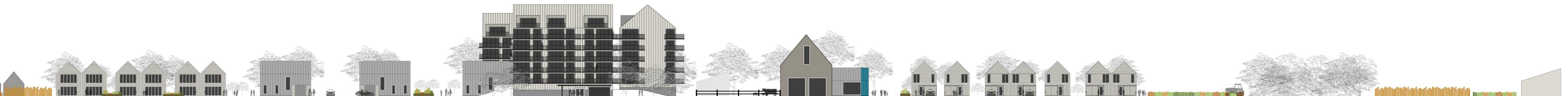
DISTRIBUTION: AGRICULTURAL VILLAGE CENTRE

RESIDENTIAL: MEDIUM TO HIGH DENSITY

CONSUMPTION: MIXED USE
RESIDENTIAL LIVING, RESTAURANTS, SHOPS

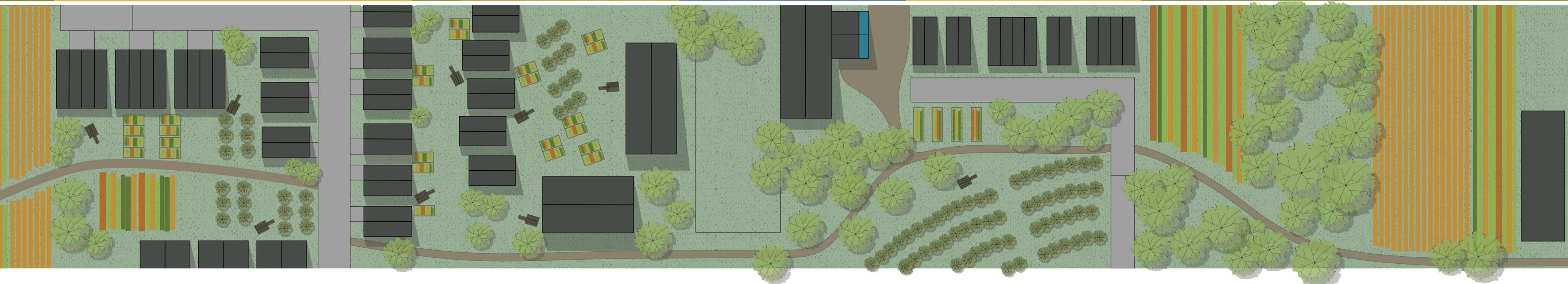
RESIDENTIAL: MEDIUM TO HIGH DENSITY





RESIDENTIAL: LOW DENSITY

PRODUCTION: SUBURBAN SUBSISTENCE FARMING



III - VIII Green Agricultural Space

The large growth expected on the peripheral edge of the Greater Toronto Area is a substantial threat to existing agricultural lands that risk being replaced by suburban development. The suburban model proposed in this thesis integrates a high amount of Greenspace and agriculture into the suburban fabric. As a way to prevent that agricultural lands from being consumed for other purposes, design strategies focus on an integration of agriculture into the suburban fabric stretching across the edge of peri-urban and rural sectors. To integrate agriculture production into a successful Suburban Subsistence Agriculture model, designated agricultural production spaces are placed on open lands, and agricultural corridors link different areas of the site. The framework for Suburban Subsistence Agriculture requires that small-scale farming be incorporated into the community's daily activities. Small-scale farm production is traditionally a more sustainable way of farming land in comparison to today's large-scale industrial farms, given that it requires very little land (usually between one to ten acres) and little to no expensive technologies. Closely tied with other sustainable agricultural methods such as organic, biodynamic, permaculture farms, or leisure farming, small-scale farming is efficient and will typically yield a higher production per land unit when compared to industrial farming methods. The farming of animals at this scale include livestock such as chickens, rabbits, and pigs rather than larger animals. The integration of agricultural corridors will support the community through the process of growing crops and small-scale livestock production. An example of small-scale farming is well depicted on the film *The Biggest Little Farm*.⁴⁶ The proposed design can work with similar farming conditions. Traditionally farming communities served one another as a linked support system, as families yielded a diverse number of crops

and livestock depending on location and type of land. The Suburban Subsistence Agriculture model can be operated as family farm, or as a gathering of family farms, allowing families to be in control of the farmland in proximity to their residential community. Local community gardens are another feature to the realization of the suburban subsistence agriculture model. This farming model physically involves local community members in the farming operations. In return, individuals will be able to have their own crops and livestock and serve their individual households with agricultural goods. The benefits of integrating agriculture and suburban development refer to communities being supplied with healthy fresh food by their local farm, thus reconnecting residents and food producers.

46. John Chester, *The Biggest Little Farm* (Netflix, 2019).

III – IX. Buildings

Centred within our suburban model, the Village Hub acts as a link between the existing suburban fabric, the new residential area. It brings agricultural production to the community as it is a place for of cultivating, processing, and distributing food in or around urban areas.⁴⁷ The farming of “street edges and verges, vacant land, parks, backyards are ways to encourage an appreciation of locally grown food and increase consumption of fresh produce”.⁴⁸ This can be based on the concept of the “New Food Movement,” which is centred around putting the production model back into the hands of the consumers as this model will be adapted to the unique needs and setbacks of each built environment that establishes its basis. The simplicity of this practice can be highlighted: “Innovation is essential to getting the best yields out of the concrete jungle, but it can sometimes seem deceptively simple”.⁴⁹

This hub becomes a space that draws upon the different elements to the community creating a communal approach to growing, raising, foraging, or sourcing food within the suburban limits through experimentation working towards food autonomy by scaling up from exploratory practice to large-scale Suburban Subsistence Agriculture through new infrastructure. The hub becomes a space for serving the community in a way that chain and big box stores cannot serve the community in a new way as the Village Hub coherent combination of suburban living and a country community by introducing local businesses to serve the community with the agricultural products produced within the suburban edge condition. The Hub will also function with a cafe and bakery to function as a destination within the community. An integrated greenhouse onto the building allows for year-round production of locally produced goods.

47. “Urban Agriculture Isn’t Anything New.,” *The Urban Farmer*, n.d., <http://www.theurbanfarmer.ca/urban-agriculture>.

48. Jennifer Cockrill-King, *Food and The City - Urban Agriculture and The New Food Revolution* (Amherst, N.Y. : Prometheus Books, 2012)

49. *Ibid.*

The site will provide education on agriculture for the community, through direct interaction with food products within the hub. The site includes several strategies for production: crop fields, orchards, and a retaining pond to serve as irrigation for the croplands. A planting of maple trees will allow for the yearly harvests of maple syrup to be made in the on-site sugar shack. The Village Hub will act as an anchor for the suburban community as it completes the link for the community to function at the scale for Suburban Subsistence Agriculture. It serves the community with the local production of foods at domestic and neighbourhood scales on a closed-loop system for food production and harvesting.⁵⁰ A series of Agricultural Village Hubs along the peripheral suburban edge will function as a network between suburban communities.

The building’s form is derived from the traditional Monitor Barn, also referred to as a Raised Centre Aisle or “RCA”, because of its a raised central section. This barn style offers a higher roofline than a gable-style barn, bringing natural light and ventilation, which allows at the same time the creation of a large loft or even finished living quarters.⁵¹ When functioning as a barn, the building’s outer wings lend themselves naturally to horse stalls. The construction methods include a timber-frame structure following the traditional historical methods of barn construction. The framing of the building would allow vast open space for the market, cafe, bakery as well as the integration of a greenhouse structure to link into the monitor structural frame. The sugar shack follows the same form of the building through a modified monitor barn to allow maple syrup to be produced. The overall built form establishes a visual connection with the agriculture industry, which is also present throughout the project.

50. “White Paper.”

51. “DC Builders,” n.d., <https://www.dcbuilding.com/barns/monitor/>.





South Elevation



West Elevation



Figure 58. Village Agricultural Centre

Village Hub - Agricultural Farm Centre - Site

- 1. Agriculture Crop Lands, Rotational Crops
- 2. Irrigation Pond, serves cropland / greenhouse
- 3. Orchard
- 4. Exterior Market Pavilion
- 5. Loading Bay
- 6. Linking Trail System
- 7. Maple Tree Grove, Sugar Bush
- 8. Parking Lot



Figure 59. Village Agricultural Centre

Village Hub - Agricultural Farm Centre - Plan

- 1. Main Entrance
- 2. Market Space
- 3. Greenspace
- 4. Cafe/Bakery
- 5. Kitchen
- 6. Walk-in Fridge
- 7. Universal Public Washroom
- 8. Universal Staff Washroom
- 9. Sugar Shack, (Maple Syrup)
- 10. Loading Bay
- 11. Storage, Rolling Shelving System





Figure 62. Mapping of Density Nodes: Greater Toronto Area

The image figure 62 depicts the density surrounding the Greater Toronto Area indicating the peripheral edge and the network of density nodes.

III - X. The Coop

The chicken coop came to mind when I was asked to think of an object to be constructed in relation to the development of this thesis. The reason for selecting a chicken coop has to do with the study of small-scale farming within suburban areas. If agriculture can be easily associated to growing food and livestock, urban agriculture, on its turn, seems to be restricted to the growth and production of food. Suburban agriculture, however, differs from urban agriculture, given that it provides more space and opportunities to utilize the land. Thus, the integration of small-scale livestock into the suburban landscape seems both feasible and appealing.

The coop is a way for people to practise small-scale farming through raising livestock such as chickens and rabbits with the intent to supply their households. Public agricultural corridors provide a space for residents to raise small animals, thus using the land to benefit themselves and the community. The coop will also serve as an educational aid, allowing children to learn and have fun while helping to raise livestock.

Whether it is children helping their parents out with the chores, or an individual wanting their daily dose of fresh eggs brought to their plate, the coop serves the community in many ways as it becomes a key component to suburban agriculture identity. The built form reflects the trivial nature of a traditional suburban development illustrated through the overall form of a traditional barn.

The coop itself can vary in scale but in the case of this 1:1 built object, it will hold between two and four chickens comfortably as a manageable size for those interested in small-scale farming. With a large rear hatch door and removable trays for cleaning, it's set up in a way to make the overall care an easier process. The Coop was then shifted onto a wheeled-raised platform for mobility throughout the agricultural corridors, giving

the chickens the opportunity to raise and fertilize different parts to the corridors. The Coop would be sold to the community in kit forms or built form available at the local village agricultural hub. The object shapes how the suburb occupants can utilize the land in ways that the suburbs have not been used before. The coop brings an added layer of opportunities to farm in a new model of suburban agriculture.



Figure 63 - 65. The Coop

Conclusion

The edge condition of suburban regions is a crucial component to urban fabrics, but it is drastically changing in unsustainable and ineffective ways, as shown in the study of the Greater Toronto Area. A model for Suburban Subsistence Agriculture investigated how experimental practices of suburban farming and small-scale farming can become part of the suburban infrastructure, which will have the potential to stimulate food production at a domestic, neighbourhood and city scale. To address the matter of suburban agriculture, this thesis overviews a continuum of scales ranging from the region to the city, from buildings and infrastructure to the small scale of an object.

When addressing the continuum of scales, we realized that it is not possible to design a perfect gradient ranging from urban to agricultural land. When looking at the scale of the edge condition, the gradient is closer to a patchwork of different programs and densities, as it needs to adapt to specifics of a site, which was the city of Brooklin, Ontario.

Through the connection of these scales, this project has probed how the edges of the Greater Toronto Area can become a model for suburban subsistence agricultural communities that is sustainable through its suburban food and agricultural production. When examining the scale of the building, the design of a new suburban edge introduces a hub dedicated to suburban food production, and acting at the same time to create a network of food infrastructure to the larger area.

Suburban subsistence agriculture can integrate a system of nodes to serve and densify the edge conditions of our suburban regions, integrating of agriculture within the community, and one community to each other. This thesis shows the importance of addressing suburban housing models as a necessary step to control urban sprawl and

to create a sustainable edge condition that can become a productive transition zone between urban and rural areas.



Figure 66. Perception Edge Condition Gradient Graphic.



Figure 67. Factual Edge Condition Gradient Graphic.

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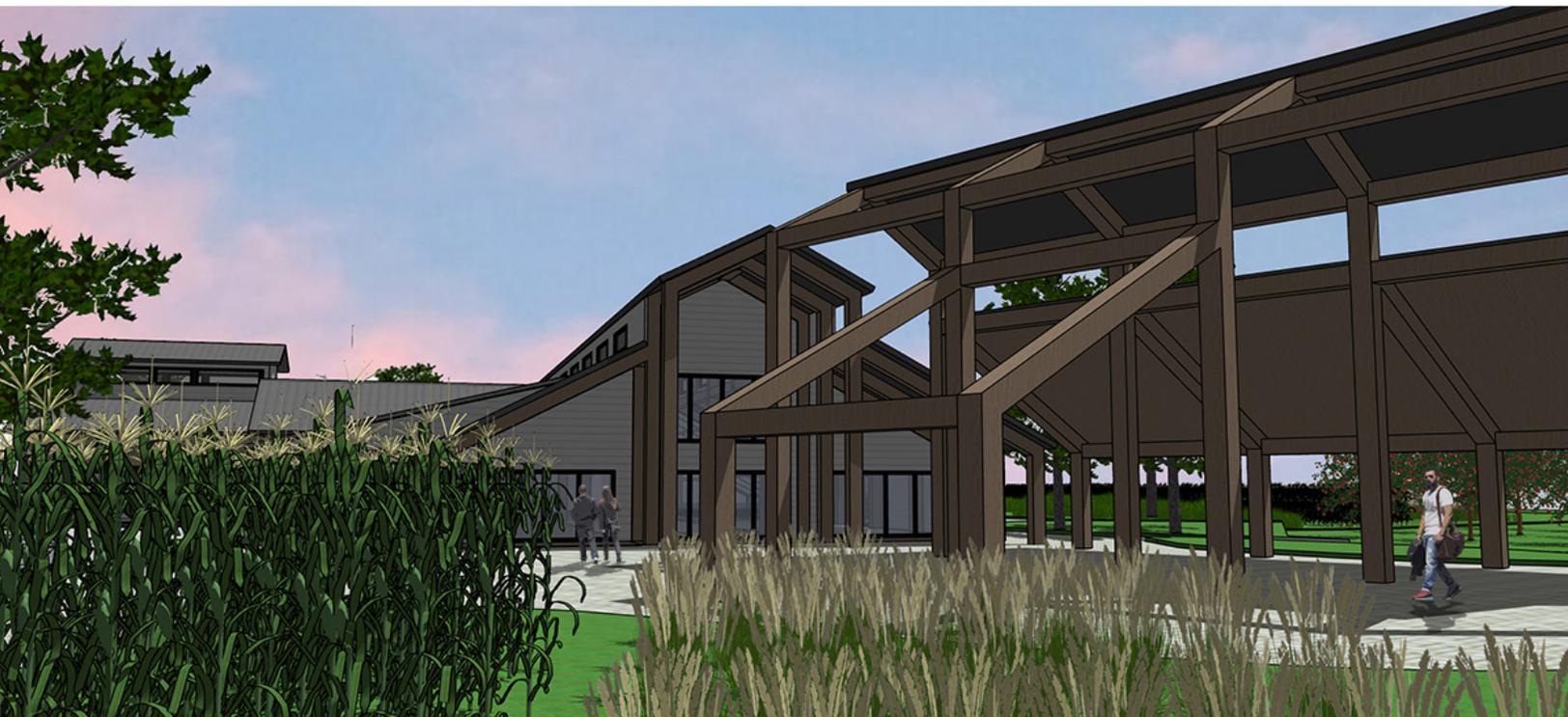
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Appendix A







72 Figure 72. Medium to High Density Residential - Courtyard

Figure 73. Village Agricultural Farm Centre



Figure 74 - 75. Village Agricultural Farm Centre