

Regeneration Through Design: A Place-Based Approach for the
Urban Fabric of Owen Sound, Ontario

by

Lauren Carr

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APPROVED/APPROUVÉ

Thesis Examiners/Examineurs de thèse:

Emilie Pinard
(Thesis Advisor / Directeur(trice) de thèse)

Geneviève Vachon
Bill Crumplin
(Thesis Second Reader / Deuxième lecteur(trice) de thèse)

Janna Levitt
(External Examiner / Examineur(trice) externe)

Approved for the Office of Graduate Studies
Approuvé pour le Bureau des études supérieures
Tammy Eger, PhD
Vice-President, Research (Office of Graduate Studies)
Vice-rectrice à la recherche (Bureau des études supérieures)

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Abstract and Key Words

Regenerative Urbanism | Eco-Village | Ecology | Social Regeneration | Inclusive Community

This thesis explores how the integration of regenerative design practices at the scale of a neighbourhood could be a solution towards regenerating Owen Sound's existing urban fabric. Beginning with place is essential to the approach of the thesis, along with careful consideration and input from local individuals. A thorough analysis of the area's demographics and present-day challenges reveals a lack of affordable housing within the urban core. Residents have expressed an interest in eco-village development presenting an opportunity to address these challenges, while simultaneously regenerating industrial land in the downtown. The historical significance of the land further confirms the need for a regenerative design approach to environmental and social challenges. The framework supporting this type of regeneration includes the pillars Living Local, Environmental Resiliency, and Inclusive Neighbourhood. As the post-industrial landscape fades from cities, architectural development must respond to the past while adapting to the community's present and future needs.

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Preface

My interest in eco-villages began long before my thesis year had begun, in a class I had taken for my Environmental Studies Minor. When I learned that a group planned to build an eco-village in my hometown of Owen Sound, the opportunity to join their effort presented itself. As their work progressed, the deeper my curiosity for this way of living went. The idea that I could contribute to change addressing the challenges I saw growing up in my city, motivated me to pursue this curiosity further.

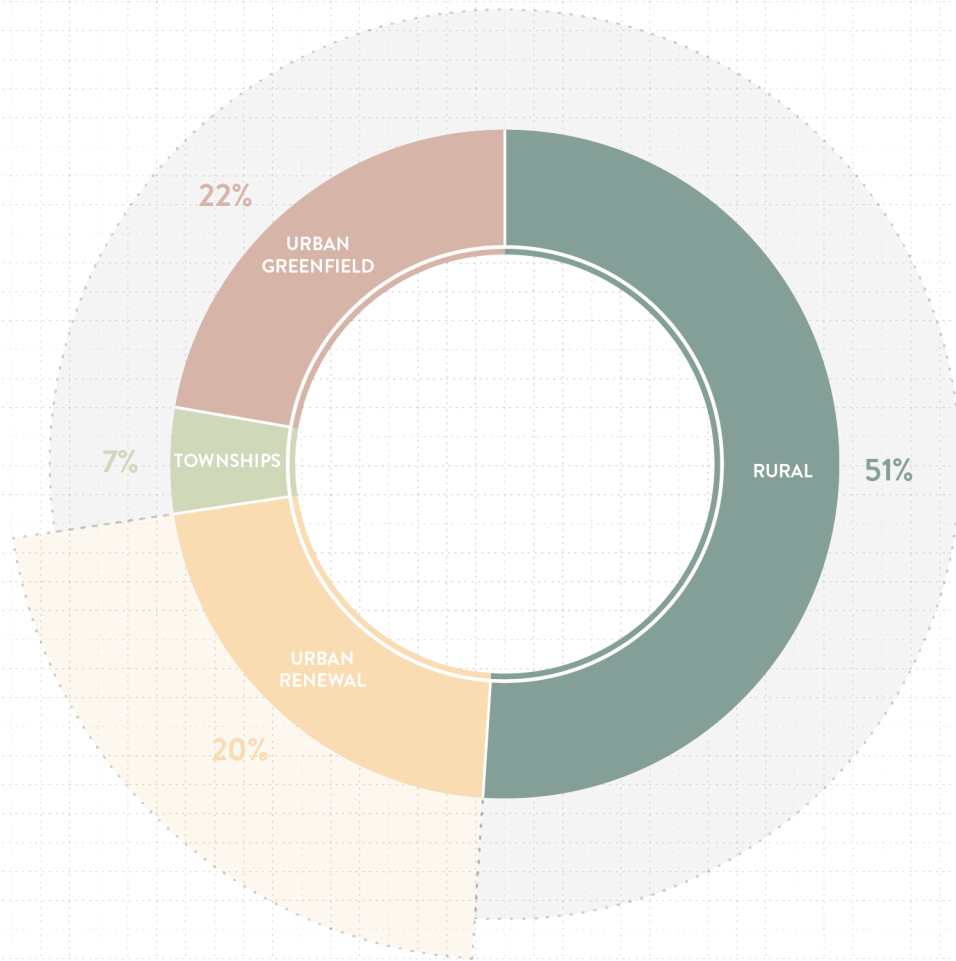


Figure 1: Eco-Village Development Types

In response to current climate and ecologically related challenges, the number of eco-villages continue to grow globally. Current literature reveals that there is a general agreement for eco-villages' broad principles and purpose, but where it varies is how you take these principles and apply them in the built environment. This variation becomes apparent in the wide range of development types from rural to urban renewal and eco-neighbourhood. Organisations such as the Global Ecovillage Network (GEN) recognise that eco-villages vary drastically depending on the vision, context, culture, and interests.¹ As such, they have recognised the fluidity of this term, allowing it to remain without an arbitrary standardization.² For this reason they define an eco-village as it relates to three core practices; rooted in participatory processes, integrating social, cultural, economic, and ecological dimensions, and actively restoring and regenerating their social and natural environments.³ This open definition allows eco-village residents to contribute a larger impact, as it is not restricted or bound by its implementation into the built environment. While there are many different interpretations of the term 'eco-village', it has thus evolved over time to encompass a broad range of communities that value a more regenerative lifestyle.

According to Barton, eco-village development globally is 51% rural, 22% urban greenfield, 20% urban renewal, and 7% township (Figure 1).⁴ In this study, urban renewal refers to sites that have been chosen for the purpose of regeneration in an urban context. As we can see, almost 80% of these communities are developed on rural and peri-urban sites, with limited infrastructure and often a higher proportion of green spaces, further contributing to urban sprawl.⁵ These statistics show that while there is a recognised need to integrate these communities into the heart of urban centres, there is often a missed opportunity to simultaneously regenerate urban sites. Not only is this a missed opportunity to revitalize neglected sites existing within the urban fabric, but also to bring housing to an area where services are already existing. With the climate crisis becoming increasingly urgent, it is no longer enough to simply have limited or zero impact, we must actively be contributing to the regeneration of our built and natural environments.

Owen Sound is a perfect example of this dynamic with Glassworks Cooperative Inc., an urban greenfield eco-village development in the early planning phases. Community members have recognised a need for sustainable housing development, but due to financial or municipal restraint they have started a development on the margins of the city. Despite the benefits and great intentions of the group, they will be restricted in terms of transportation and accessibility for a diversity of residents. At the same time, Owen Sound has been transitioning away from its former identity as a transportation gateway, heavily focussed on industry, to the heart of Grey-Bruce's art scene, largely desired for its scenery. Located on

1 "What Is an Ecovillage - Discover Innovative Eco Communities," Global Ecovillage Network, May 19, 2020. <https://ecovillage.org/projects/what-is-an-ecovillage/>.

2 Hugh Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods* (London: Earthscan, 2009), xii.

3 "What Is an Ecovillage - Discover Innovative Eco Communities."

4 Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*, 69.

5 *Ibid.*, 74.



*Figure 2: Vacant
BCK Site*

the Niagara Escarpment, the area is becoming well known for its natural landscape including unique rock formations, waterfalls, and forest trails. Reflecting this shift in identity, the urban landscape has become populated with vacant brownfield sites as fewer industries rely on the harbourfront or railway for transportation.

With the closing of the BCK Foundry in 1997, a large property located in the downtown was left vacant (Figure 2 and 3).⁶ Initially the city foresaw many opportunities for this site and presented stipulations within the early 2000s master plan proposal consisting of these 6 considerations.⁷

1. Any hotel, retail, or entertainment uses should be concentrated as close to the downtown as possible.
2. Any housing components should integrate into the adjacent neighbourhood.
3. Any market components should be oriented to artistic type of products. Other farmer market activities should be located with the City Market in the City Hall precinct to reinforce the existing pattern of use and activity.
4. Any residential components of the project should take advantage of the views of the harbour.
5. All buildings should address the street edge.
6. Parking should be created as internal areas with connections to the streets.

In 2004, Toronto-based developers bought the land, only submitting a site plan application as of May 2021.⁸ When Owen Sound surveyed the public through its website, 36% of respondents identified affordable housing as one of their top concerns.⁹ While the property was approved to be rezoned as Residential, it is up to the owners to decide if any units will be affordable with the current proposal consisting strictly of 2-bedroom apartments within six four-storey residential buildings (Figure 4).¹⁰ Not only does this proposal exclude much of the demographic currently residing in Owen Sound, but it does not effectively address the stipulations presented by the city. With the city desperately in need of housing and the lot a long-standing eyesore in the downtown, many residents have blindly accepted any development as good development. With 25 years of vacancy, we have yet to see if the project will come to fruition, remaining fenced off to this day. For these reasons the former BCK industrial site provides the ideal location to explore the implementation of ecological-living practices that would actively regenerate the land in an area where services are most

6 R.L. Kennedy, "Canadian Pacific Railway Bruce Division Branches," Old time trains, accessed October 19, 2022, http://www.trainweb.org/oldtimetrains/CPR_Bruce/BRANCHES_1.htm.

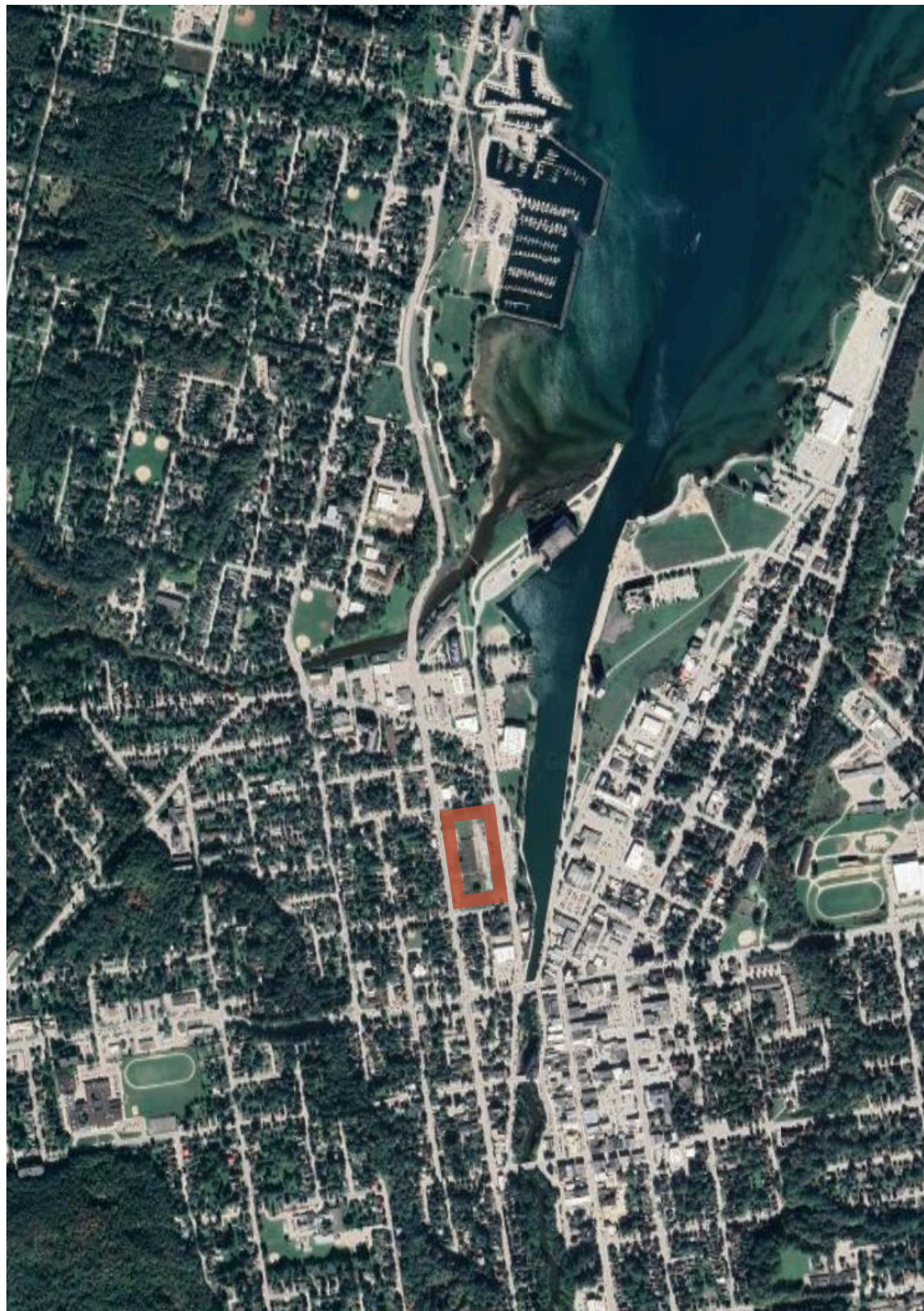
7 "Downtown River Precinct Plan," Owen Sound. Accessed December 22, 2022. <https://www.owensound.ca/en/city-hall/downtown-river-precinct-plan.aspx>.

8 Denis Langlois, "Owner of Former BCK Site Plans to Build Six Apartments on Property," 2022, <https://www.owensoundsuntimes.com/news/local-news/owner-of-former-bck-site-plans-to-build-six-apartments-on-property>.

9 "Attainable Housing Solutions." Glassworks. Accessed October 17, 2022. <https://www.glassworkscoop.com/background>.

10 Scott Dunn, "Owen Sound's BCK Site Conditionally Approved for Apartment Complex," 2022, <https://www.owensoundsuntimes.com/news/local-news/owen-sounds-bck-site-conditionally-approved-for-apartment-complex>.

Figure 3: BCK Site



accessible. This trajectory can be summarized in a question; **How can the development of an eco-village in downtown Owen Sound help to regenerate a brownfield site, building on the social and environmental identity of the city's urban fabric?**

To explore this question, Chapter 1 will present an in-depth analysis of site-based findings, which is the foundation from which the project is built on. Chapter 2 will look at the theory behind living an Ecological Lifestyle, in keeping with the findings from the first chapter. Chapter 3 will present the findings from eco-villages in practice, including the early stages of Glassworks Cooperative Inc. Lastly, Chapter 4 proposes the architectural development for the land, grounded in the research from the previous chapters. With Owen Sound's shift in identity from a transportation gateway and an increasing need for affordable housing, the social, cultural, economic, and ecological dimensions that encompass eco-village design have the potential to regenerate this newfound identity for the downtown. With Glasswork in their early stages of co-design, Owen Sound provides a good context to explore different implementation strategies for eco-living, integrating the community's needs.

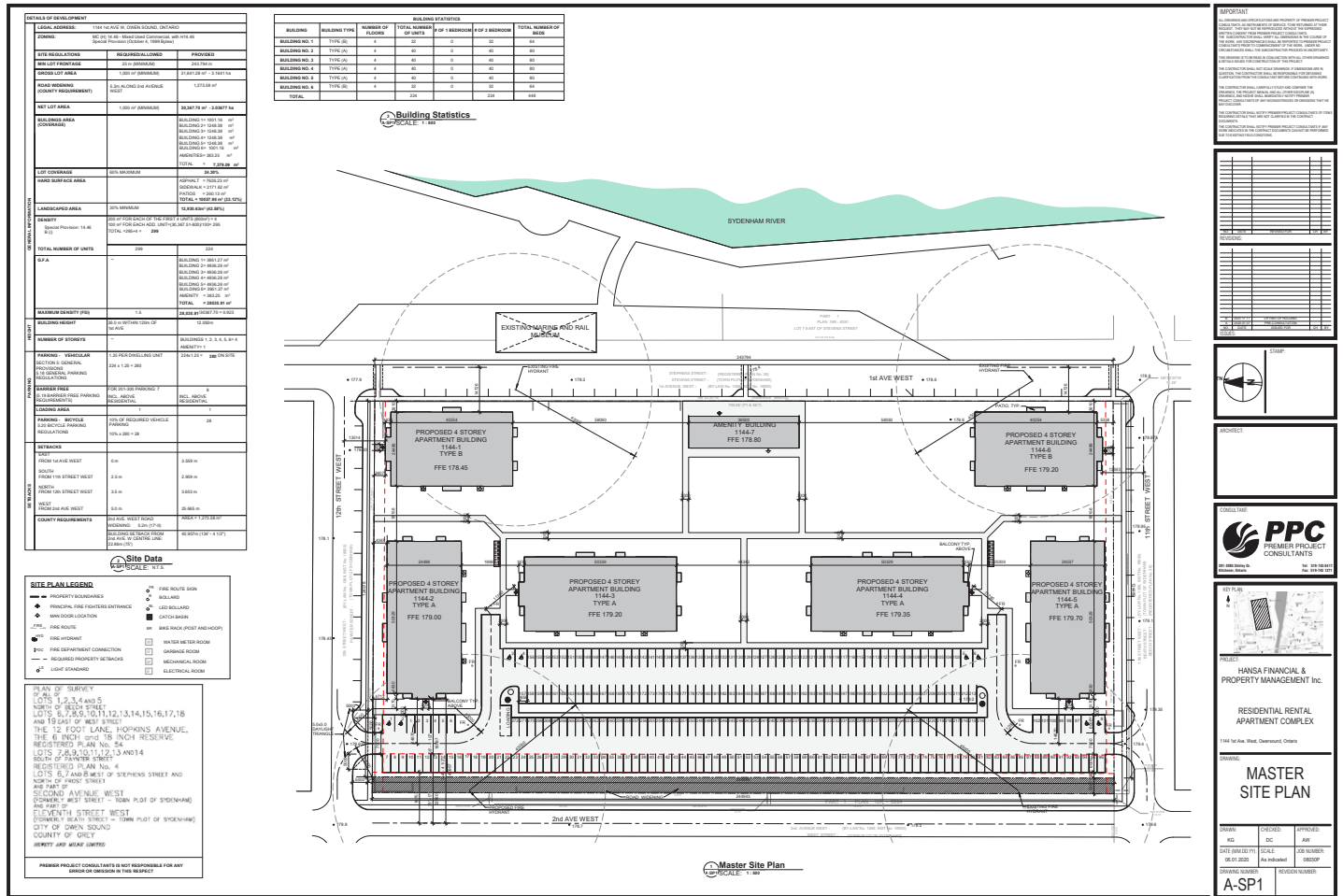


Figure 4: Proposal for BCK Site

1.0

Mapping the Site within its Context

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Figure 5: 1950 Archival
Map Adaptation



Figure 6: Selected Brownfield site materials

An eco-village is born from the minds of community members who have shared beliefs and thus should reflect the people and place from which the community grew. A thoughtful connection to place would consider environmental impacts that extend to the localities of resources and suitable vegetation for the site.¹¹ In addition to the environmental impacts, one must not neglect to consider the social dimension of such development as it could be a catalyst for regeneration.¹² As such, it is essential to begin any development involving themes of regeneration, community, and ecology with a sensitive consideration for the site as well as the surrounding context.¹³ To truly understand the urban past of a city, one must first discover the history of the land and the social networks that it resulted in. To achieve this, the first chapter will provide an in-depth analysis of Owen Sound and the selected brownfield site (Figure 6), as well as context into how the industrial past has influenced the area today. As the chapter unfolds, a framework tailored to this specific context will form, informing an ecologically centred housing development. The information gathered and analysed has been subdivided into sections titled Place, Ecology, and Community. These categories have been devised to encompass all levels of site analysis and will consider multiple scales and time periods, effectively revealing the area's present-day needs. Beginning with place has been fundamental to this thesis, as the city's history and current issues are the reason this proposal is needed and has the potential to contribute a greater environmental impact.

11 Hugh Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*, London: Earthscan, 2009, 58.

12 Kevin Thwaites, Alice Mathers, and Ian Simkins. *Socially Restorative Urbanism: The Theory, Process and Practice of Experiemics*. Routledge, 2013, 53.

13 *Ibid.*, 24.

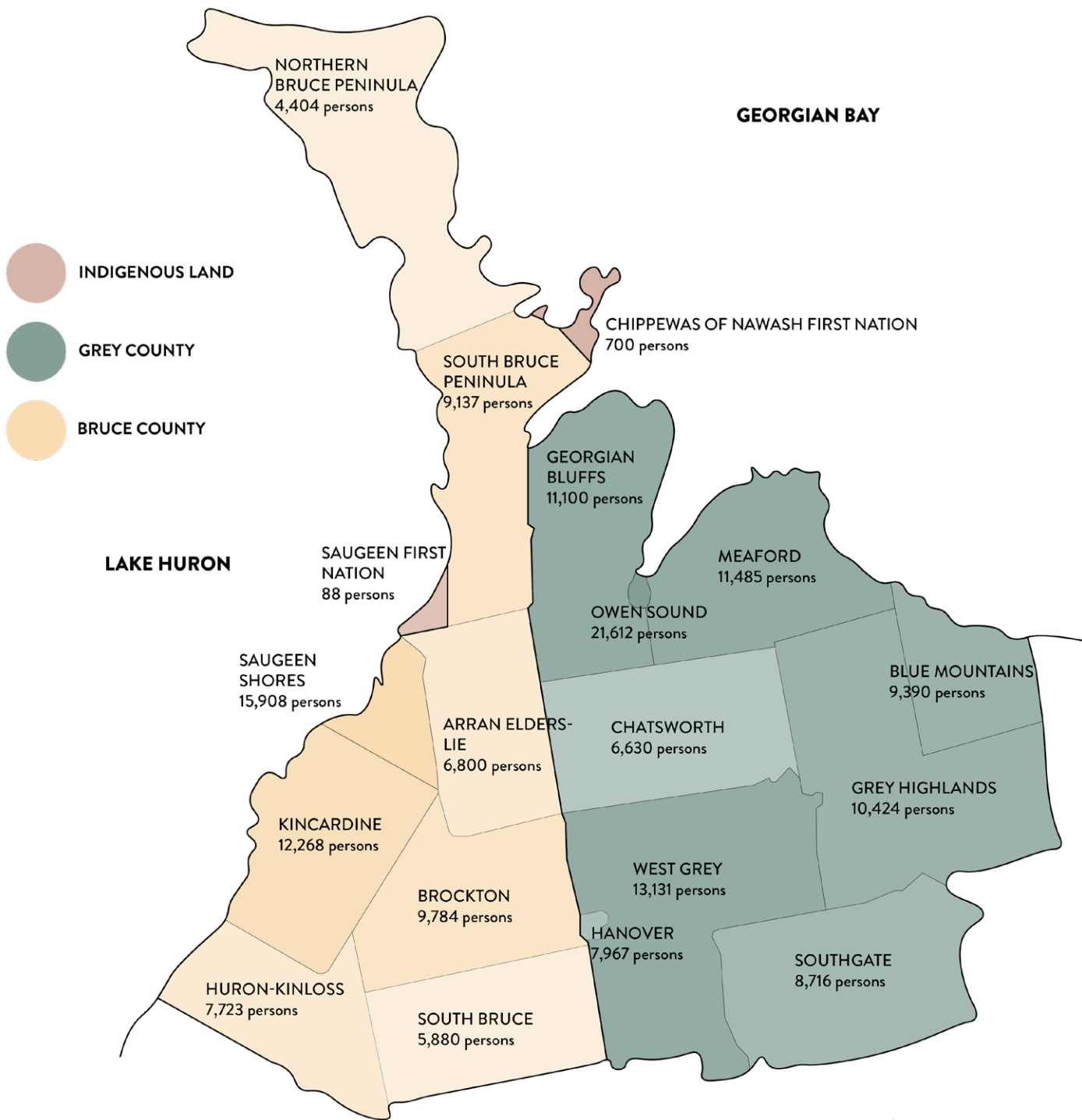


Figure 7: Geographical Location of Owen Sound



1.1 Place

Owen Sound is located in Southwestern Ontario on an inlet of Georgian Bay. It is the largest centre in Grey Bruce County with a population of 21,612¹⁴ and is in close proximity to the Chippewa of Nawash First Nation and Saugeen First Nation territory, both identified on in Figure 7. What is known as Owen Sound today forms part of the traditional territory of the Saugeen Ojibway Nation, whose settlement was on the banks of the Pottawatomi River.¹⁵ Present day, this area is nearby Kelso Beach Park, which is now home to a playground, trail system, and amphitheatre. Between 1830 and 1865, the area was known as the last “terminal” of the Underground Railroad, a secret route that let to freedom for escaped slaves crossing the Canada-U.S. border.¹⁶ During this time the area was first settled in 1841 by surveyor Charles Rankin, and what was once known as Sydenham became Owen Sound in 1851.¹⁷

14 “2021 Census Data Shows Population Growth for Owen Sound,” Owen Sound, accessed September 25, 2022, <https://www.owensound.ca/Modules/News/index.aspx?newsId=3ad4d377-e641-4897-bb71-a4d327c30494>.

15 “Owen Sound 160 Years,” Owen Sound, Accessed December 20, 2022. <https://www.owensound.ca/en/exploring/owen-sound-160-years.aspx>.

16 “Black History,” Owen Sound, Accessed December 10, 2022. <https://www.owensoundtourism.ca/en/arts-and-culture/Black-History.aspx>

17 “Owen Sound 160 Years.”



Figure 8: Elevators seen from Kelso Park

Due to the city's ideal location on Georgian Bay and the protection that the cliffs of the Niagara Escarpment provide, Owen Sound has historically identified as a port city.¹⁸ Archival maps reveal the development of the city over time, indicating the location of major industries and the resulting growth. By placing these historic maps alongside other significant historical events we can see that much of the city's growth is due to the Canadian Pacific Railway (CPR) connection in 1870 that enabled major industries to grow in the city's urban core.¹⁹ In 1884 the CPR built a grain elevator on the west side of the harbour with a capacity of

18 "Transportation Act Review - Port of Owen Sound - Tc.canada.ca." Accessed December 22, 2022. https://tc.canada.ca/sites/default/files/migrated/city_20of_20owen_20sound.pdf.

19 Owen Sound CPR Link, Accessed December 22, 2022, <https://www.history-articles.com/owen-sound-cpr-link.html>.

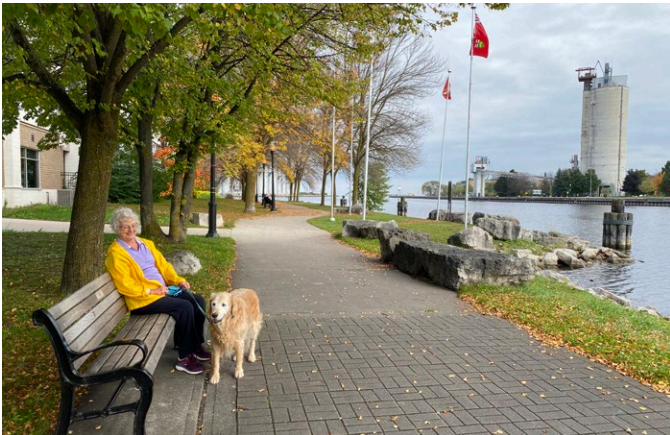


Figure 9: Elevators in Owen Sound's Harbour

4,000,000 bushels, or about 100,000 tonnes.²⁰ This grain elevator was burnt down by fire in 1911, but by 1925 new elevators were built along with another dredging of the inner harbour.²¹ Today the elevators are still in use, with a capacity of 93,000 tonnes and mostly used for shipments of grain and salt with cement silos being constructed in 1990 (Figure 8 and 9).²²

The port industries became even more significant with following WWI and WWII. Located on the East side of the harbour, Russell Brothers built ships for the Royal Canadian Navy, and on the West side, William Kennedy & Sons Owen Sound Iron Works (later Black Clawson Kennedy, BCK) built the propellers for these ships.²³ These two industries were the city's main employers, remaining in operation until well after the wars had ended, but eventually closing in 1974 and 1997 respectively.²⁴ With the removal of these industries and the Canadian Pacific Railway (CPR) in 1995, what once had been the transportation gateway to Western Canada, began redefining its image.²⁵ Today, the city no longer heavily relies on these industries for employment, leaving many sites such as BCK vacant as a reminder of this past. Despite the removal of industries from the downtown, its history remains well known by residents.

20 "Transportation Act Review - Port of Owen Sound - Tc.canada.ca."

21 Ibid.

22 Ibid.

23 Ibid.

24 "Russel Brothers Ltd," Great Lakes Tugs & Workboats, December 9, 2014. <https://gltugs.wordpress.com/russel-brothers-ltd/>.

Becky Azzano, "Factory Whistle Strikes Note of Interest," The Hub of Owen Sound, Accessed December 22, 2022. <https://owensoundhub.org/life/2591-factory-whistle-strikes-note-of-interest.html>.

25 R.L. Kennedy, "Canadian Pacific Railway Bruce Division Branches," Old time trains, accessed October 19, 2022, http://www.trainweb.org/oldtimetrains/CPR_Bruce/BRANCHES_1.htm.

Dr. Steve Briggs, "The Kennedy Whistle," Russel Brothers Ltd.. Steelcraft Winch Boat and warping tug builders from Owen Sound, Ontario., accessed October 19, 2022, <http://russelbrothers.com/tugfest/whistleblow.html>.

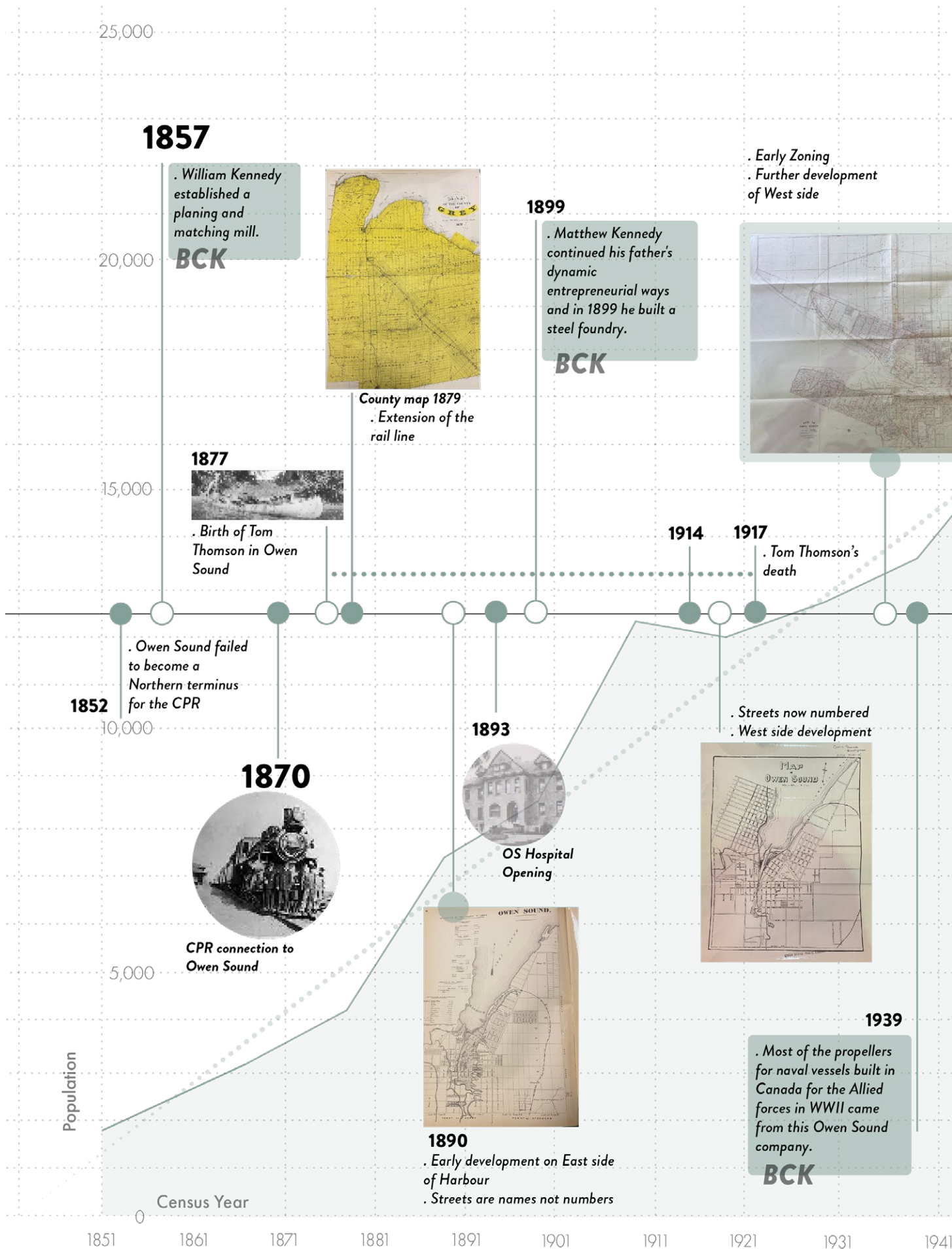
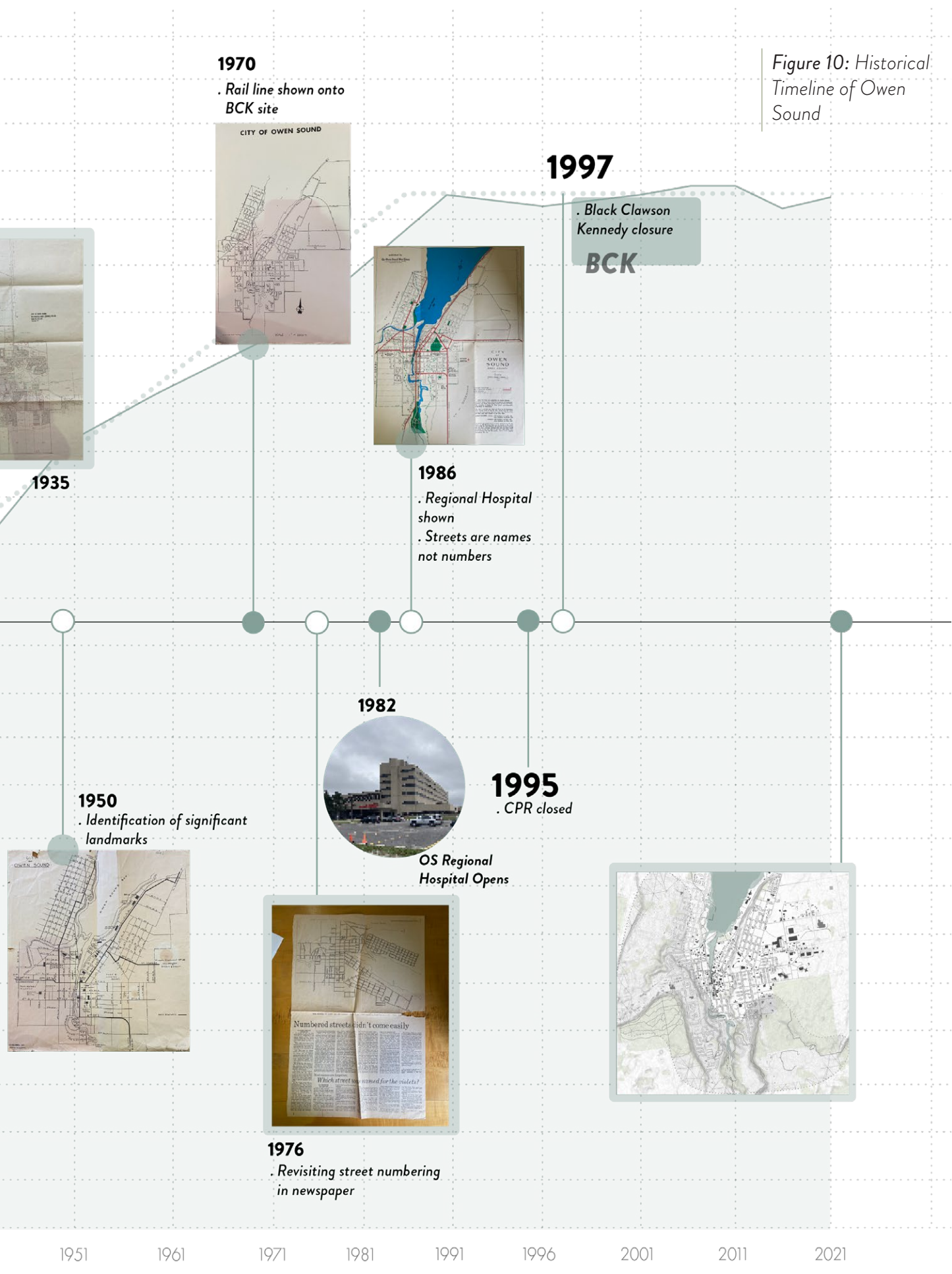


Figure 10: Historical Timeline of Owen Sound



1951

1961

1971

1981

1991

1996

2001

2011

2021

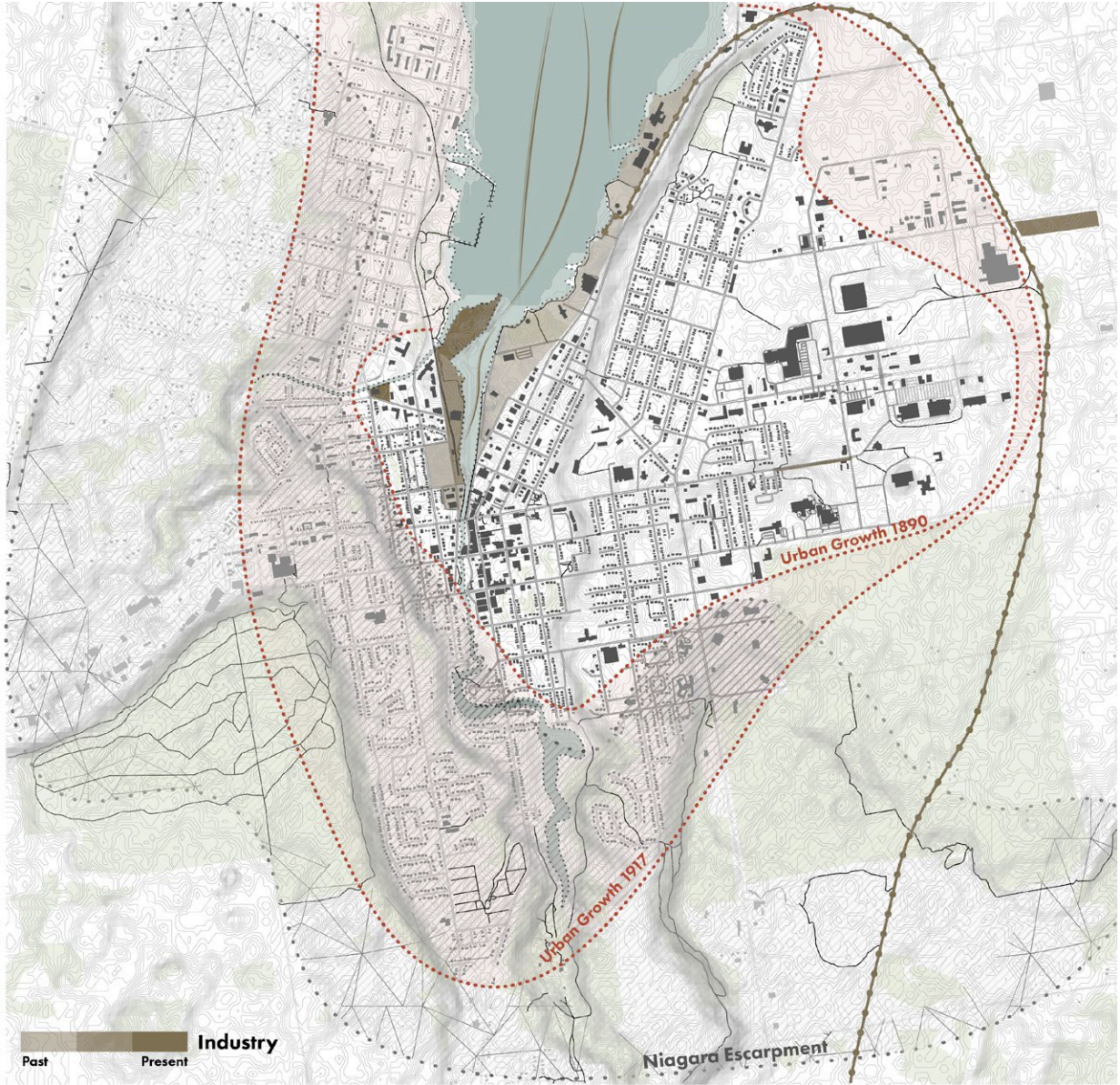


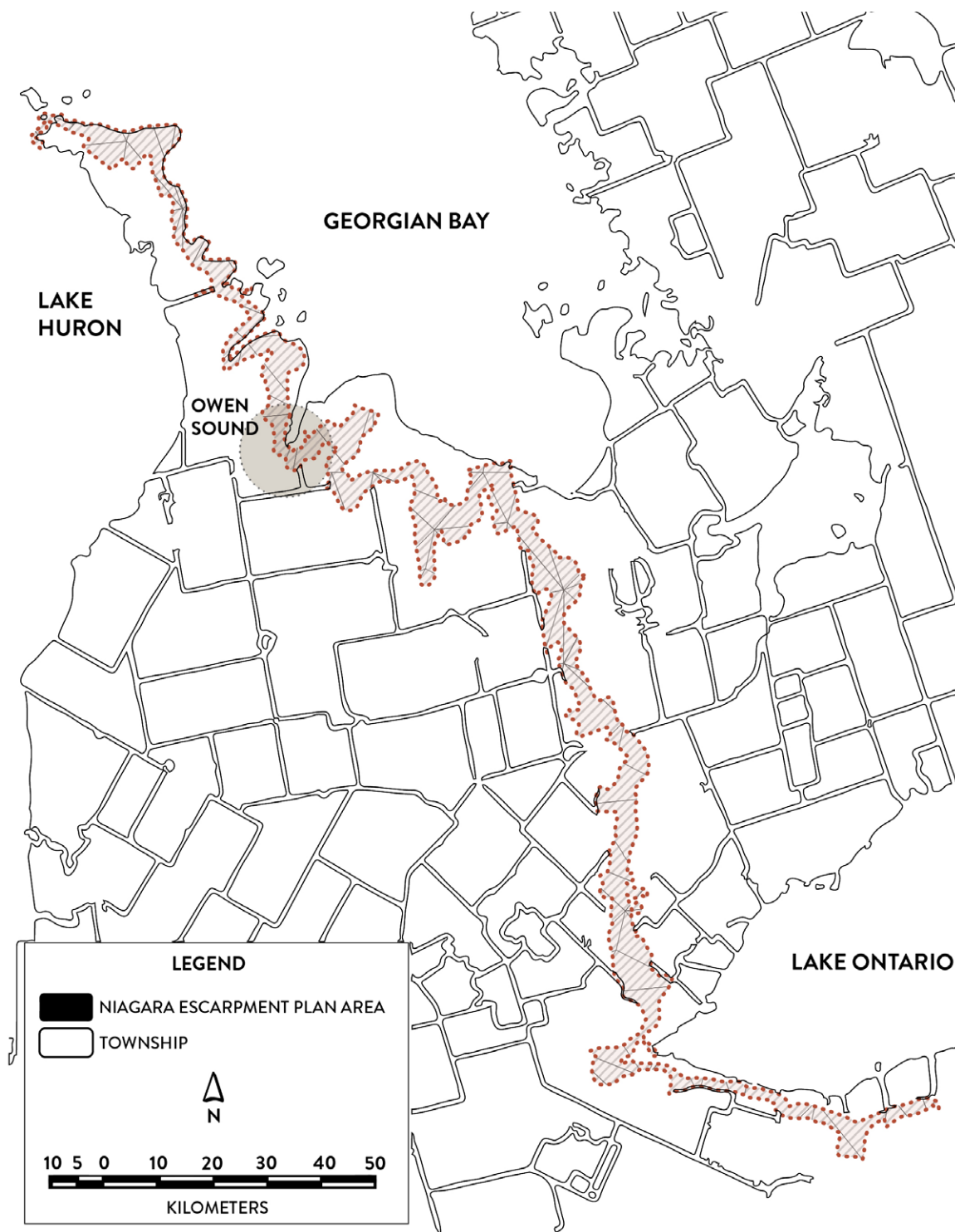
Figure 11: Historical Development in Owen Sound

Although the port served effective for these major industries, many of the boats in the harbour historically carried passengers. With Owen Sound as the main transfer point for passengers traveling to and from the western provinces, transportation became part of the city's economic development.²⁶ As industries such as ship building, cement companies, and furniture makers developed over time, this mobilized a gradual increase in population growth until approximately 1990 (Figure 10). By mapping this growth in plan, we are able to see the industries at the core of the city, with its development sprawling over time (Figure 11). This mapping also reveals that while the waterfront dictated much of the city's early industrial development, growth became increasingly affected by the Niagara Escarpment, which will be further unpacked in the following subsection.

Beginning with a better understanding of Owen Sound's social and cultural history, the city's development reveals complex layers of changing needs. As the city has evolved, the residents needed to adapt to the declining demand for industries that had once been their main source of economic gain. Part of this adaptation has been the emergence of new industries and an increase in tourism due to the beautiful landscape. The following section will look at the ecologies present in Owen Sound today, from a city-wide perspective to the zoomed in detail of the selected site, revealing how its industrial history has influenced the land.

26 "Transportation Act Review - Port of Owen Sound - Tc.canada.ca."

Figure 12: Map of the Niagara Escarpment



1.2 Ecology

The Niagara Escarpment, which formed as a result of geological processes beginning 400 million years ago, offered an environmentally desirable condition for port industries in the city's early years of settlement (Figure 12).²⁷ While some industries still operate out of the harbour, the escarpment is better known today for the beautiful scenery it offers. Stunning waterfalls and rocky cliffs are the result of this natural landscape feature, a unique attraction that can be accessed from many local trailheads. The scenery not only attracts hikers, but there has been an influx of tourism for people looking to cottage or fish close to fresh bodies of water. Some of these hiking trails connect to the downtown's harbour front through Kelso Beach Park which hosts many outdoor events such as the Salmon Spectacular and Summerfolk. A few of these signature landscape features are photographed and can be seen in Figure 13.

Not only is the escarpment an attraction for many, but as briefly mentioned in the previous subsection, it has greatly influenced urban growth. The access points on the East and West sides of town have become major points of traffic, forming the main vehicular access points within the city (Figure 14). The location of the main streets is a direct result of the bridges which cross the Sydenham River in the centre of the downtown. Due to the restricted access

²⁷ "About the Escarpment: Niagara Escarpment Foundation," Niagara Escarpment Foundation |, February 5, 2021, <https://nefoundation.ca/about-the-escarpment/>.

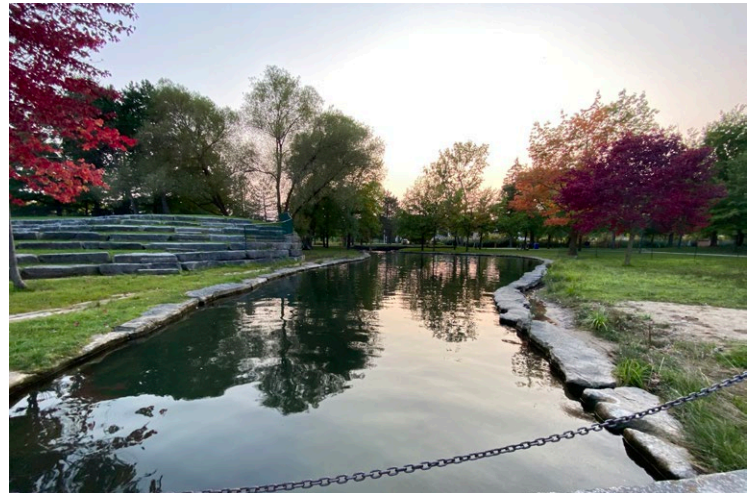
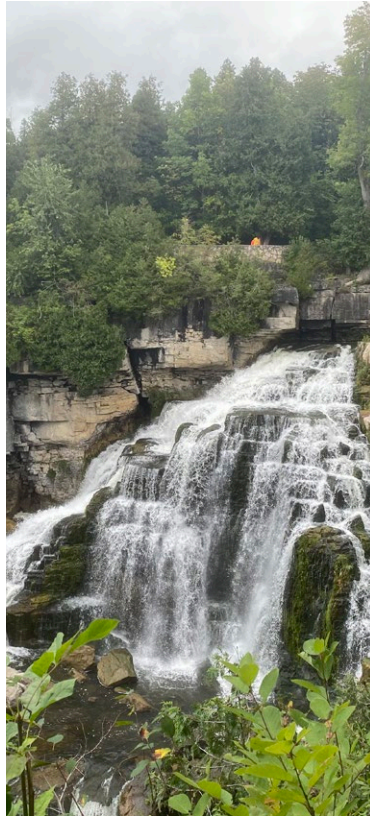


Figure 13: Photographs of Owen Sound today

above the escarpment, much of the city's growth has occurred in close proximity to these main arteries, while continuing to sprawl along the waterfront, avoiding the escarpment. This means that while Owen Sound has been affected by urban sprawl, much like many cities, it has not had uniform growth due to these ecological dimensions that have been present for millions of years.²⁸

By mapping the city in section, it is easy to see the transition between local ecologies on a large scale (Figure 15 and 16). Examining the environmental qualities of the BCK site and surrounding context has also helped identify what local plant and animal species are present in the area. An integral part of regeneration is introducing local plants as part of outdoor

28 "What We Do," Bruce Trail Conservancy, February 15, 2023, <https://brucetrail.org/what-we-do/>.

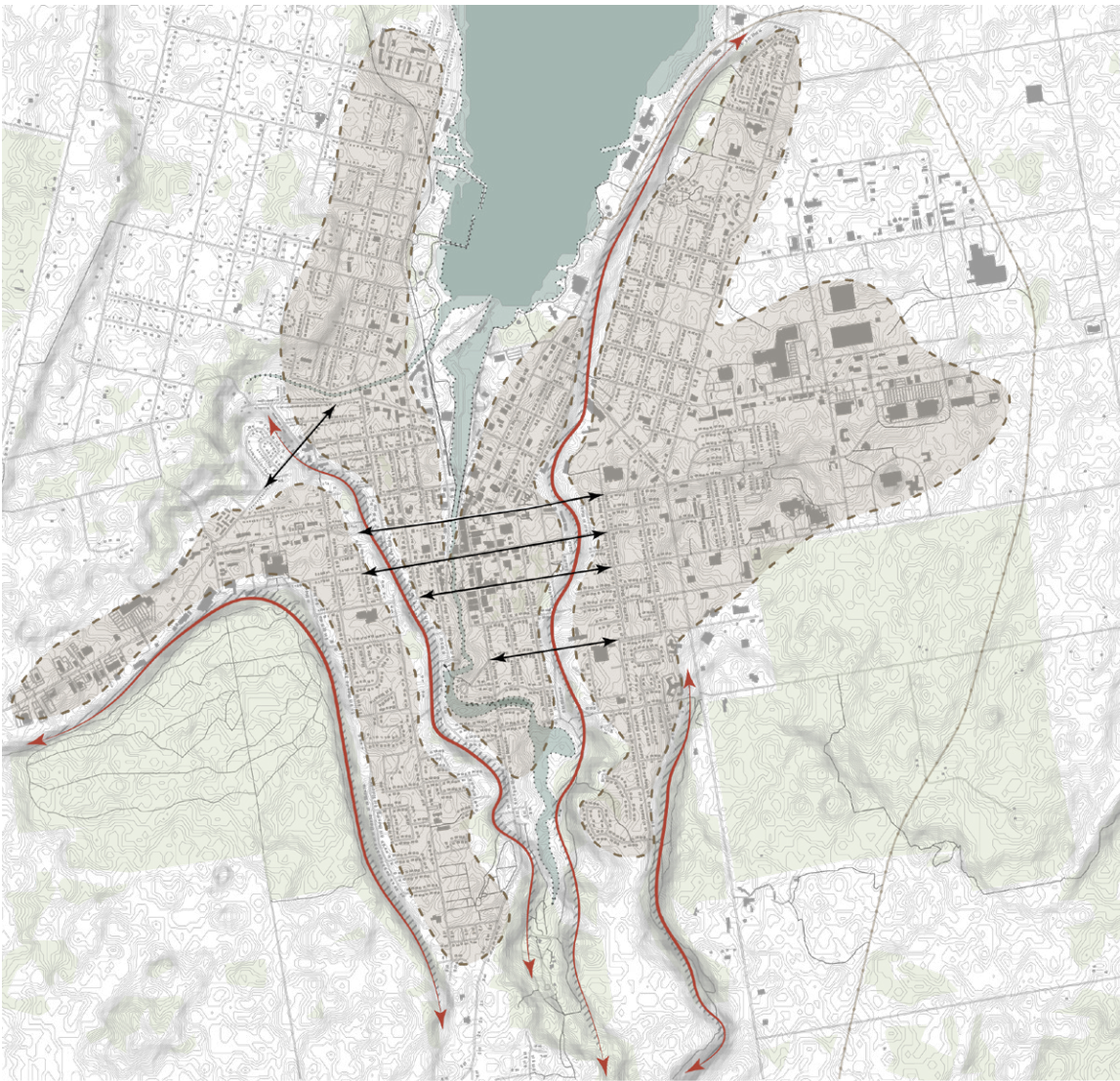
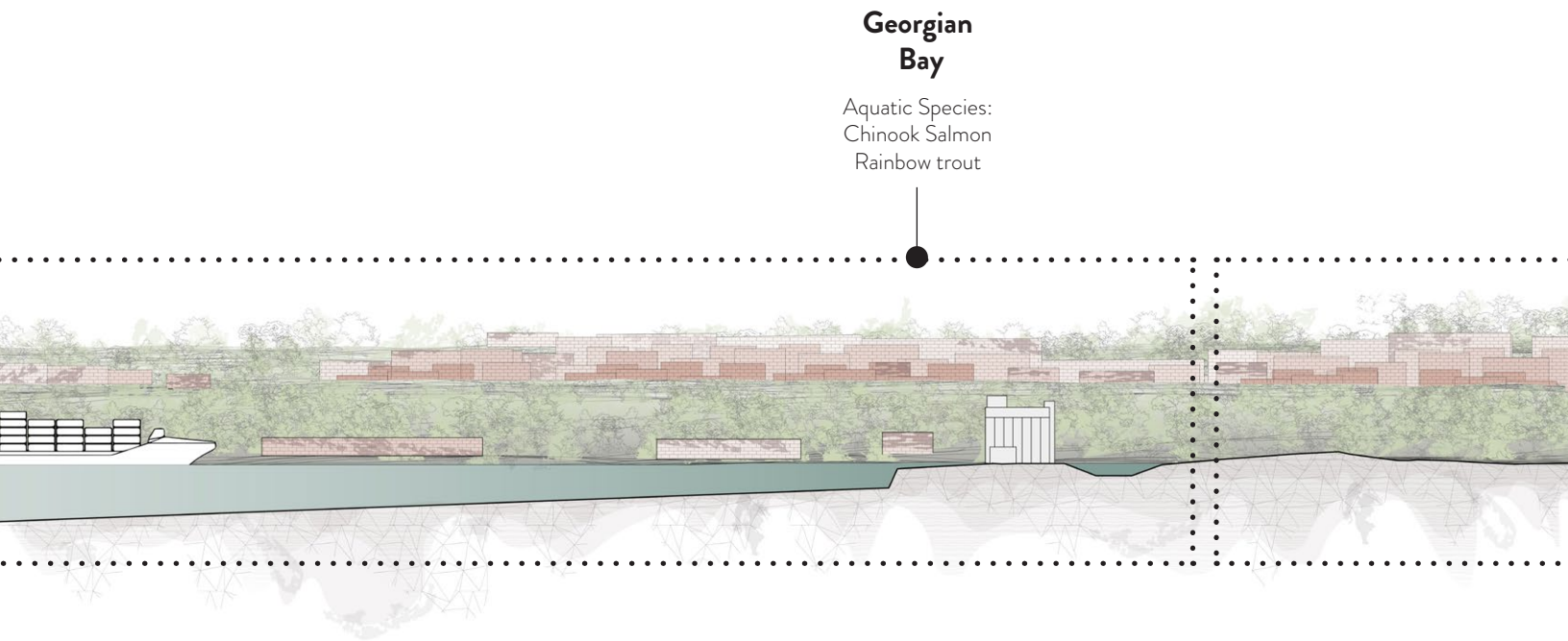
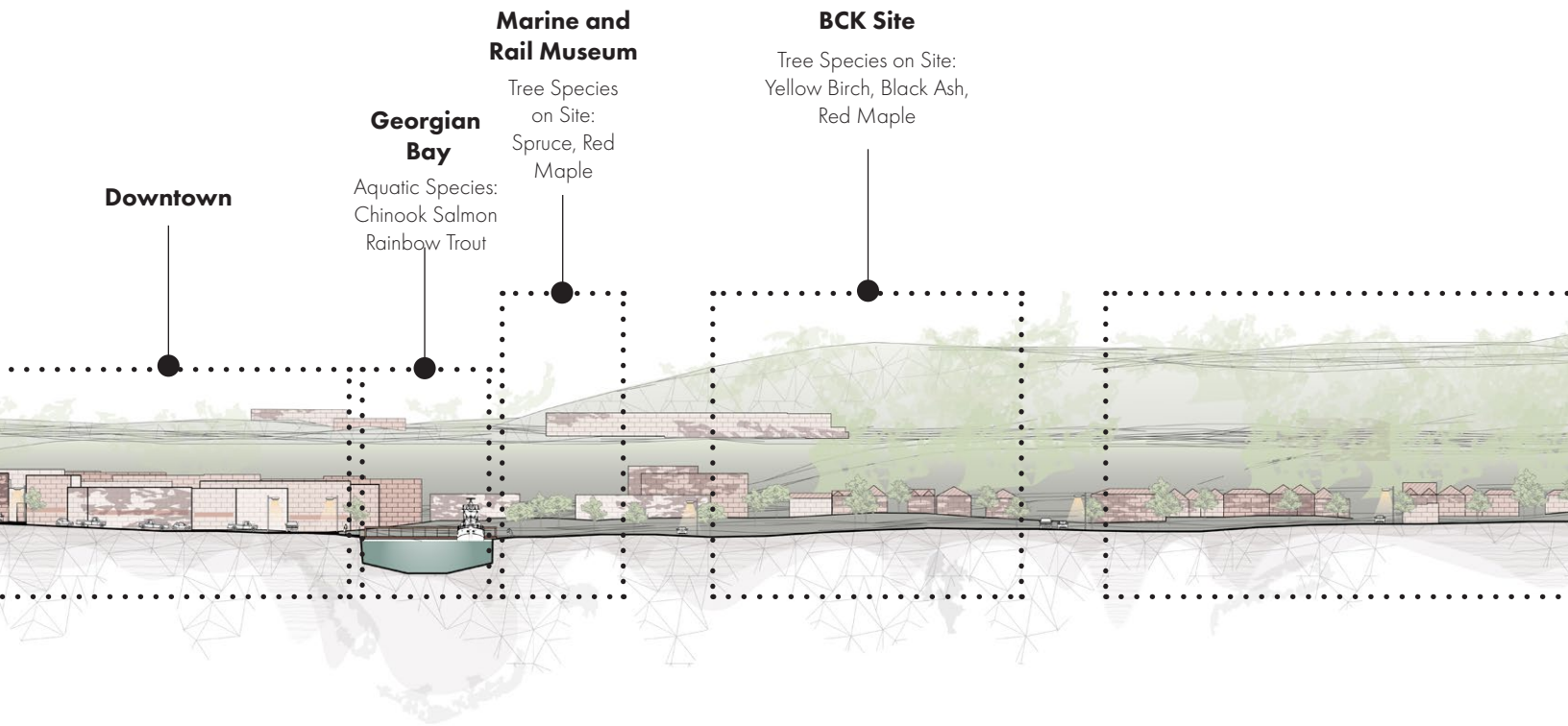


Figure 14: Diagram of city growth

community spaces. Without knowing the native species to the land, it is difficult to know what plants will grow best and have local knowledge associated with them. In Figure 15 we can see the transition between the downtown to a more residential neighbourhood, extending all the way up the Niagara Escarpment. The ecologies of these zones vary with the aquatic life in the harbour hosting fish such as the Chinook Salmon and Rainbow trout, to the Niagara Escarpment which is home to over 300 bird species, 53 mammals, and 36 different species of reptiles.²⁹ In Figure 16 we can see the transition from Georgian Bay to an industrial zone, extending towards the downtown. These two drawings contextualize the site and reveal the ecological layers of the city in section.

29 “Value for Money Audit: Conserving the Niagara Escarpment,” Office of the Auditor General of Ontario, November 2022. https://www.auditor.on.ca/en/content/annualreports/arreports/en22/ENV_NiagaraEsc_en22.pdf



Niagara Escarpment

Home to over 300 bird species, 53 mammals and 36 different species of reptiles.

Species of mammals:

Squirrels, skunks, and raccoons, white-tailed deer, red foxes, weasels, rabbits, and muskrats

Tree Species:

Coniferous species such as Eastern White Cedar and Boreal species such as Balsam Fir and White Spruce.

Residential Neighbourhood

Tree Species on Site:
Spruce, Yellow Birch, Black Ash, Red Maple

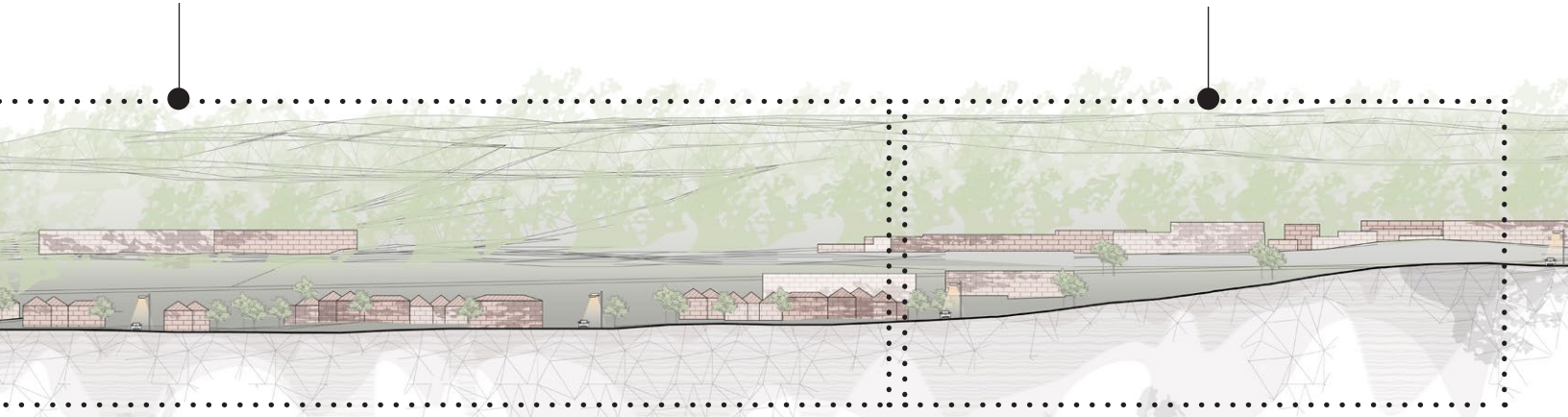


Figure 15: East-West Section of Owen Sound

Industrial Land

BCK Site

Tree Species on Site:
Yellow Birch, Black Ash, Red Maple

Downtown

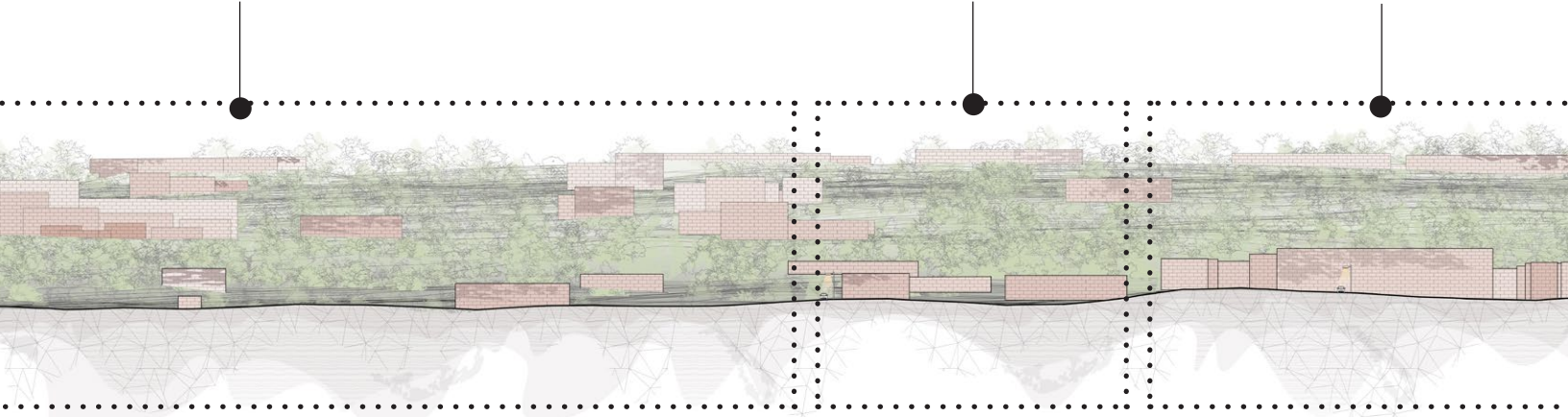


Figure 16: North-South Section of Owen Sound



Figure 17: Seasonal Site Photographs

Zooming in further, some of the ecologies present on site today are tree species such as Yellow Birch, Black Ash, and Red Maple. Much of the growth has occurred following the closure of the factory, aside from a row of mature maple trees along the northern lot line. Seasonal changes bring varying conditions on site including an increase in shadow over the winter months and a narrowing of streets/sidewalks due to snow accumulation, both of which are illustrated in Figure 17 and 18. Due to the protection that the harbour offers, strong winds do not come off the waterfront but rather from the Western direction.

Demolition of the buildings on site followed shortly after its closure, and all that remains of the BCK factory today is portions of the building's concrete foundations. As the developers of the land intended to transform the site into residential units, they were required to complete a Record of Site Condition (RSC) along with other studies to confirm the viability of the land. With these documents from 2005 made public, a deeper dive into the soil conditions revealed that while the land was approved to be developed as residential at the time, it would no longer be up to today's standards (Figure 19). Despite this, the city has approved it for residential development based on these outdated studies.³⁰ Not only is it unsafe to live on this land, but plants grown from this soil would not be edible due to the levels of contaminants. These factors are likely consistent on many brownfield sites and must be addressed adequately for any new development to take place. As such, these concerns have been thoroughly evaluated and will be reflected in the design proposal.

A proposal intending to combat climate change must not neglect to consider the environment and ecologies present on site before development to ensure that it does not impose on the existing. For these reasons, it was essential for this project to consider each of these factors relating to Ecology. The following section will focus on Community, looking at how social and economic factors have influenced this site, and how such development might improve the pre-existing networks.

30 "City Hall," Owen Sound, Accessed October 5, 2022, <https://www.owensound.ca/en/city-hall/resources/Documents/Planning/BCK-Site-/1144-1st-Ave-W---Record-of-Site-Condition---2009.03.16.pdf>

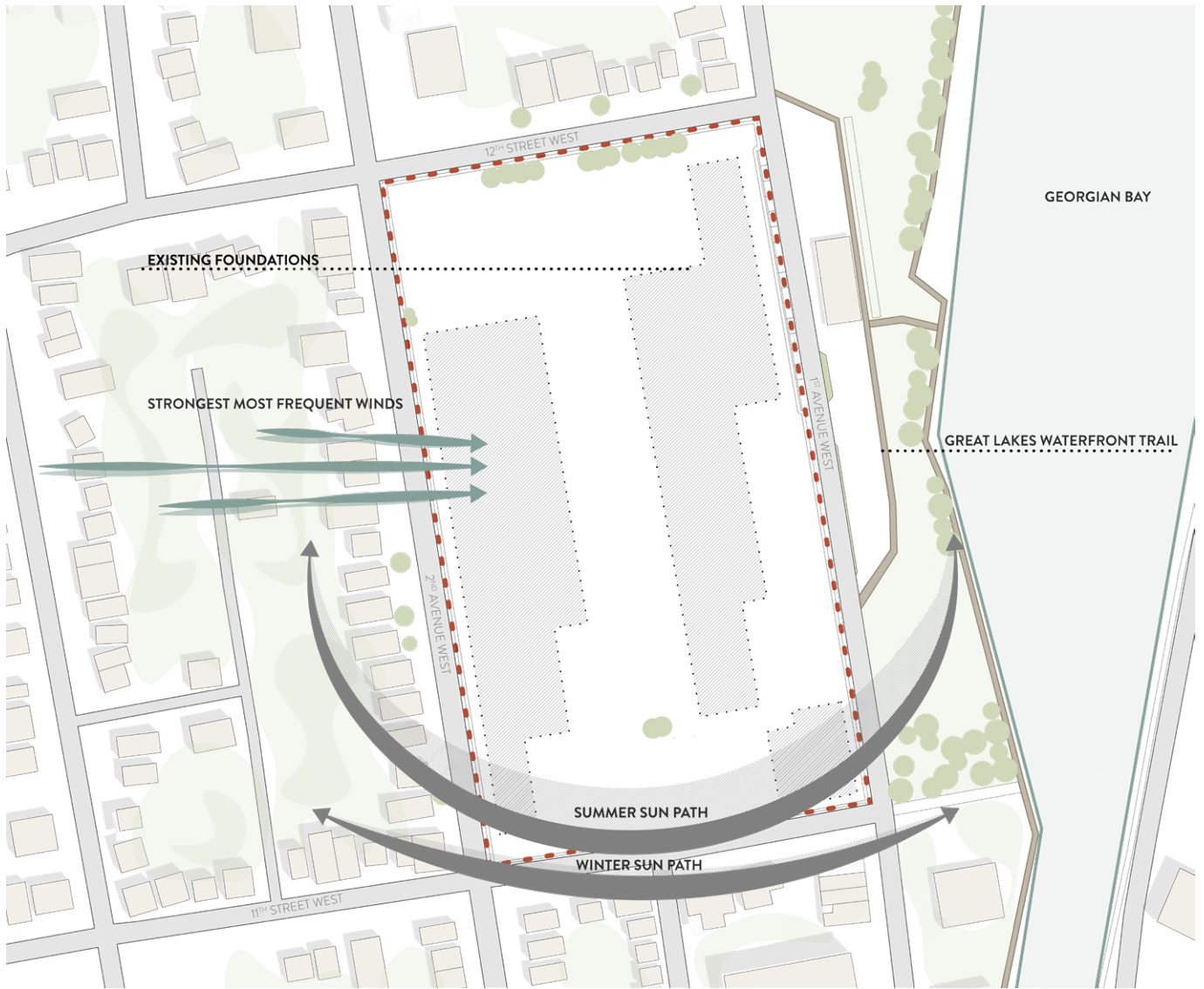


Figure 18: Site Analysis

Contaminant Name	Maximum Concentration (µg/g)	2005 Standard (µg/g)	Non-Potable Residential (µg/g)	Potable Agricultural (µg/g)	type of contaminate
			2023 Standard	2023 Standard	
ACENAPHTHENE	0.09	1000	7.9	7.9	
ACENAPHTHYLENE	0.06	100	0.15	0.15	
ANTHRACENE	0.24	28	0.67	0.67	
ANTIMONY	< 1.6	13	7.5	7.5	
ARSENIC	9.1	20	18	11	
BARIUM	239	750	390	390	
BENZO(A)ANTHRACENE	0.77	40	0.5	0.5	polycyclic aromatic hydrocarbon
BENZO(A)PYRENE	0.63	1.2	0.3	0.078	polycyclic aromatic hydrocarbon
BENZO(B)FLUORANTHENE	1.05	12	0.78	0.78	aromatic hydrocarbon
BENZO(G,H,I)PERYLENE	0.8	40	6.6	6.6	
BENZO(K)FLUORANTHENE	0.73	12	0.78	0.78	
BERYLLIUM	1.1	1.2	4	4	
CADMIUM	0.9	12	1.2	1	
CHROMIUM (TOTAL)	98.1	750	160	160	
CHRYSENE	0.87	12	7	7	
COBALT	7.2	40	22	22	
COPPER	223	225	140	140	Heavy metal - Cu*
DIBENZO(A,H)ANTHRACENE	0.16	1.2	0.1	0.1	carcinogenic aromatic hydrocarbon
FLUORANTHENE	1.73	40	0.69	0.69	polycyclic aromatic hydrocarbon
FLUORENE	0.13	350	62	62	
INDENO(1,2,3-CD)PYRENE	0.66	12	0.38	0.38	polycyclic aromatic hydrocarbon
LEAD	187	200	120	45	Heavy metal - Pb*
MERCURY	0.27	10	0.27	0.25	Heavy metal - Hg*
MOLYBDENUM	9.5	40	6.9	6.9	Heavy metal - Mo
NAPHTHALENE	0.07	40	6.9	0.6	
NICKEL	80.7	150	100	100	
PETROLEUM HYDROCARBONS F1 (C6 -C10)	< 0.2	30	55	55	
PETROLEUM HYDROCARBONS F2 (>C10 - C16)	100	150	98	98	hydrocarbon
PETROLEUM HYDROCARBONS F3 (>C16 - C34)	100	400	300	300	
PETROLEUM HYDROCARBONS F4 (>C34)	470	2800	2800	2800	
PHENANTHRENE	1.32	40	6.2	6.2	
POLYCHLORINATED BIPHENYLS	< 0.05	5	0.35	0.35	
PYRENE	1.46	250	78	78	
SELENIUM	1.5	10	2.4	2.4	
SILVER	0.4	20	20	20	
THALLIUM	0.5	4.1	1	1	
VANADIUM	26	200	86	86	
ZINC	598	600	340	340	Heavy metal - Zn*

Figure 19: Record of Site Condition Analysis



Figure 20: Chi Cheemaun in Owen Sound Harbour

1.3 Community

As the heart of the Grey Bruce Arts scene, Owen Sound has many galleries displaying work of local artists including the work of Tom Thomson from the Group of Seven who was born and raised just outside of the city.³¹ One of the major attractions for local artisans is the unique natural landscape and the beauty that it offers for photographers, painters, and film makers. Although a major identity of the city today is centered around its arts culture, there remains an industrial identity that has persisted after the inception of the city in 1851.³² Present day, the Owen Sound harbour serves a mixture of commercial and industrial uses, moving grain, powder cement and road salt as well as housing ships in the winter including the Chi Cheemaun ferry.³³ The Chi Cheemaun is a large passenger vehicle ferry which travels between Tobermory and Manitoulin Island and during the winter months finds its home in the west side of the harbour (Figure 20). Other than the industrial uses that the harbour serves, the city also relies heavily on the surrounding agricultural, and health care industries.³⁴ Agriculturally, Owen Sound is bordered by farms which focus primarily on livestock for cattle, dairy, poultry and egg, and hog.³⁵ The area's rich history in industry, agriculture, and arts has created a broad range of social networks over the years that has made its way into the city center.

31 "Tom Thomson." The Canadian Encyclopedia. Accessed December 22, 2022. <https://www.thecanadianencyclopedia.ca/en/article/tom-thomson>.

32 "Owen Sound 160 Years."

33 "Transportation Act Review - Port of Owen Sound - Tc.canada.ca."

34 "Key Industries." Made In Grey. Accessed December 22, 2022. <https://madeingrey.ca/key-industries>.

35 "Grey Bruce Farms for Sale." Ontario Farms and Land Group - Farm Real Estate, April 28, 2022. <https://ontariofarmsandland.com/grey-bruce-farms-for-sale>.



Figure 21: Mapping of the Localities around Site

- | | | |
|---|---|--|
| ● Residential | ● Open Space/Rural | + Elementary School |
| ● Commercial/Institutional | ● Public Green space | ○ Grocery |
| ● Industrial | * Daycare | x Point of Interest |

Due to the city's industrial past, the old Black Clawson Kennedy Foundry site is a 5-minute walk to the downtown. The now vacant site presents an ideal location for a regenerative housing development with its proximity to services and need for land restoration. Requiring close access to the train track, the Foundry was located just across the street from the station, which now operates as a museum commemorating this history. Mapped in Figure 21 is the localities of services within walking distance to the old BCK site. Not only does the proximity of services allow residents to be more flexible in terms of accessible transportation but cutting down on travel time is a large contributor of sustainable practice.³⁶ Notably on this map is the proximity of the site to groups like OSHaRE and the farmers market which present opportunities to give back to the community. As both organizations are within a 10-minute walking distance, it becomes clear why the city of Owen Sound would request any farmers market related activities to operate out of the existing market.

Taking a closer look at the site and its immediate context in section tells a more intricate story of the community that the proposed design would become part of. By zooming in on the East-West section, the sites relation to the harbourfront becomes obvious (Figure 22). With the knowledge of this historically significant site, a sensitive consideration is required when designing the neighbourhood's relationship to the waterfront acknowledging that during the winter the Chi Cheemaun sits directly across from the site. The South elevation of the site can also be seen from this section, illustrating the progressive height with which buildings are becoming as they arrive closer into the downtown. Cutting the section in the opposite direction reveals the adjacent single-family dwellings which line the Western edge of the site (Figure 23). These homes will directly face the proposed site, which has been taken into consideration for the duration of construction and for the final design. These homes have the potential to take on certain aspects of a regenerative lifestyle assuming that the neighbourhood's practices expand beyond the confines of the site boundaries. Considering this, the typology of these homes has been integrated into the design furthering the connection to the existing residential neighbourhood.

The selected site offers an optimal location to connect affordable housing in an area where services are most accessible, maintaining inclusionary zoning.³⁷ Currently 24.7% of Owen Sound's population is 65 years and over in contrast to the 16.7% of Ontario's (Figure 24).³⁸ This data demonstrates that the health care industry, while already one of our top employers, may continue to rise as the demand for services targeting the elderly increases. Not only will the demand for health services grow, this statistic shows that there is an opportunity to house the existing aging population as well as provide a draw for young new residents within a

36 Hugh Barton. *Sustainable Communities the Potential for Eco-Neighbourhoods*. London: Earthscan, 2009, 61.

37 Jeff Speck, *Walkable City: How Downtown Can Save America, One Step at a Time*, 2022, 110.

38 Government of Canada, Statistics Canada, "Census Profile, 2016 Census Owen Sound [Population Centre], Ontario," October 27, 2021. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=POPC&Code1=0619&Geo2=PR&Code2=35&SearchText=Owen+Sound&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=0619&TABID=1&type=0>.

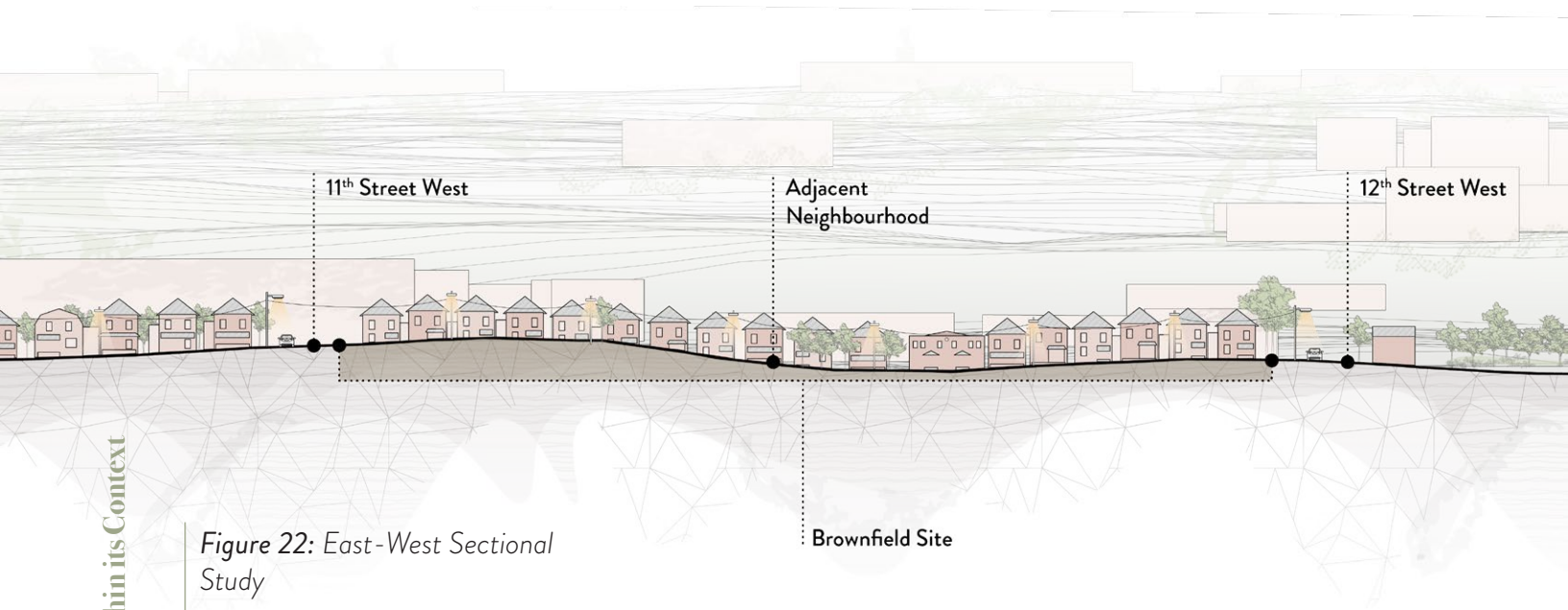
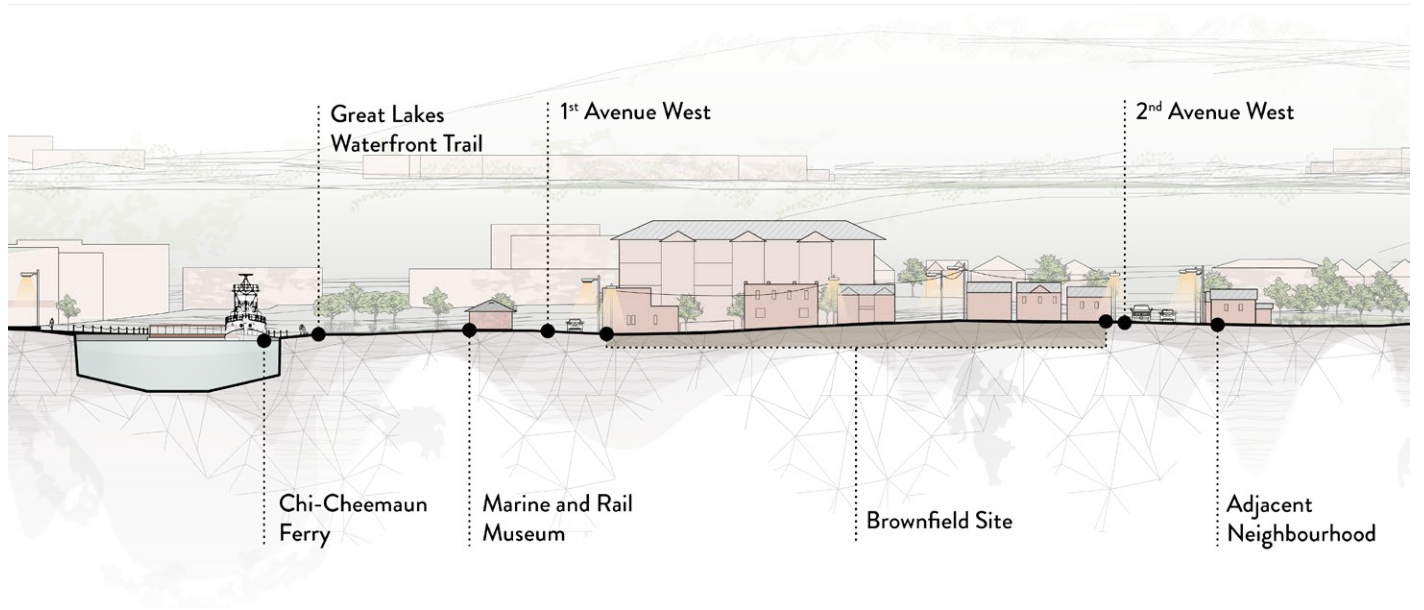


Figure 22: East-West Sectional Study

Figure 23: North-South Sectional Study

co-operative housing model.³⁹ This would mean that the users of the proposed village would range in age from children to the elderly population, considering the fact that there is not a stage in life that is fully self-sufficient.⁴⁰ They would be brought together by a shared desire to have a positive contribution towards the sustainability crisis. With many jobs transitioning to remote work, this would allow many working-class individuals to live and work within the village bringing another level of accessibility.⁴¹ Although remote work would broaden the occupations of residents, there is an opportunity for studios to be located on-site as the Grey Bruce area is popular in the artisan community. These spaces could become rentable and serve as sources of revenue for the neighbourhood. To further understand the demographic in Owen Sound, the following graphs reveal that the city is primarily car-centric with just over a third of the population renting (Figure 25 and 26). The high renting population is likely due to residents being unable to afford property that suits their needs. In terms of housing, the data suggests that there is a lack of affordable housing suiting all ages while also supporting a sustainable mode of transportation within the city.

Understanding Owen Sound’s past and present has helped contextualize this research and ground the proposal within pre-existing social and economic structures. With the city transitioning through many industrial identities, it has left gaps in the urban fabric on properties located close to the harbour front and urban core. Although some of the harbourfront is still utilized for industrial purposes, there are sites which remain abandoned as developers fear the expense associated with polluted land. As a previously brownfield site, the BCK property presents an opportunity to revitalize what was once an industrial icon into what the residents of Owen Sound see their city as today. These key findings have contributed to a framework for Regenerative Design and will be further discussed in the following chapter. Rooted deeply in the place, the framework addresses the economic, ecological and social dimensions required for such development.

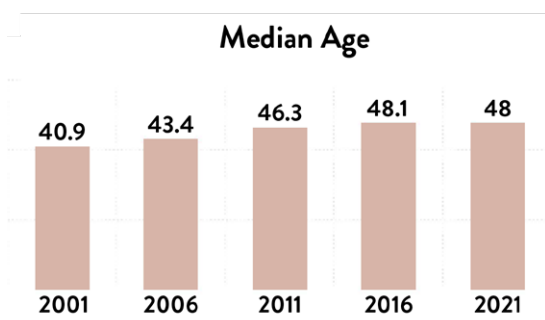


Figure 24: Median Age in Owen Sound

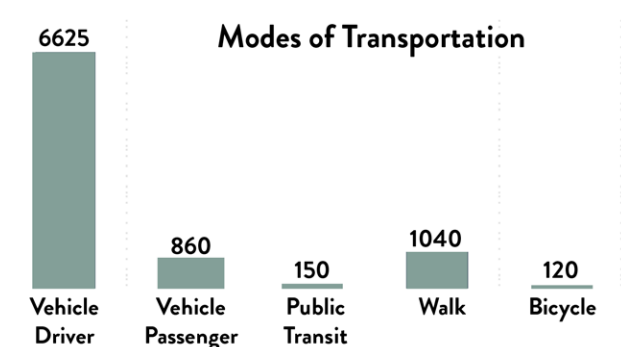


Figure 25: Modes of Transportation in Owen Sound

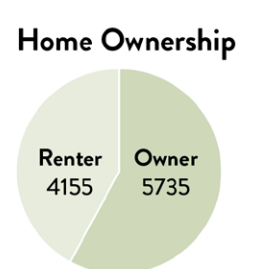


Figure 26: Home Ownership in Owen Sound

39 Caroline Dove, *Radical Housing: Designing Multi-Generational + Co-Living Housing for All*. London: RIBA Publishing, 2020, xiii.

40 Christopher Alexander, *A Pattern Language*. Fachhochsch., Fachbereich Architektur, 1990, 189.

41 David Sim, *Soft City: Building Density for Everyday Life*. Washington: Island, 2019, 12.

2.0

Regenerative Design

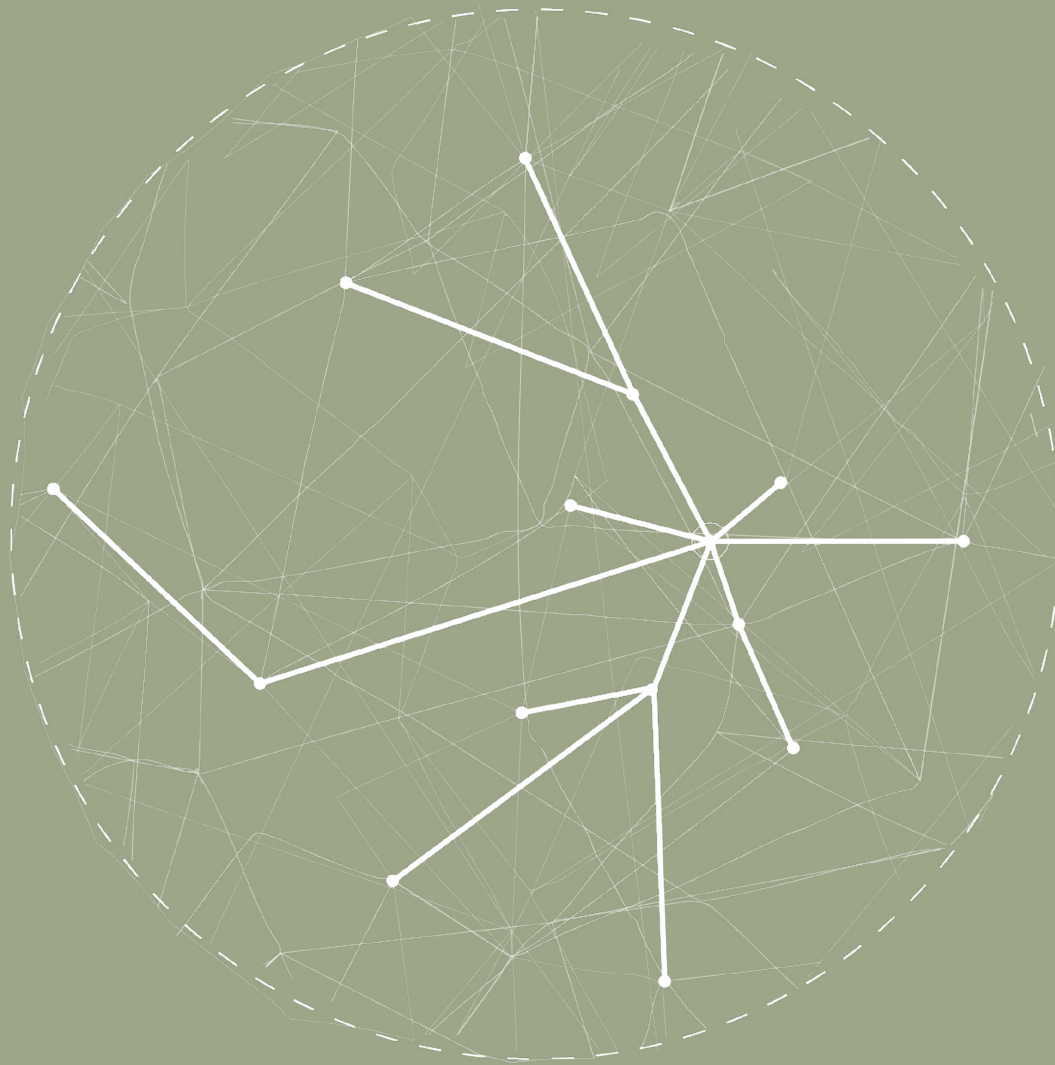


Figure 27: Conceptual
Regenerative Design
Framework

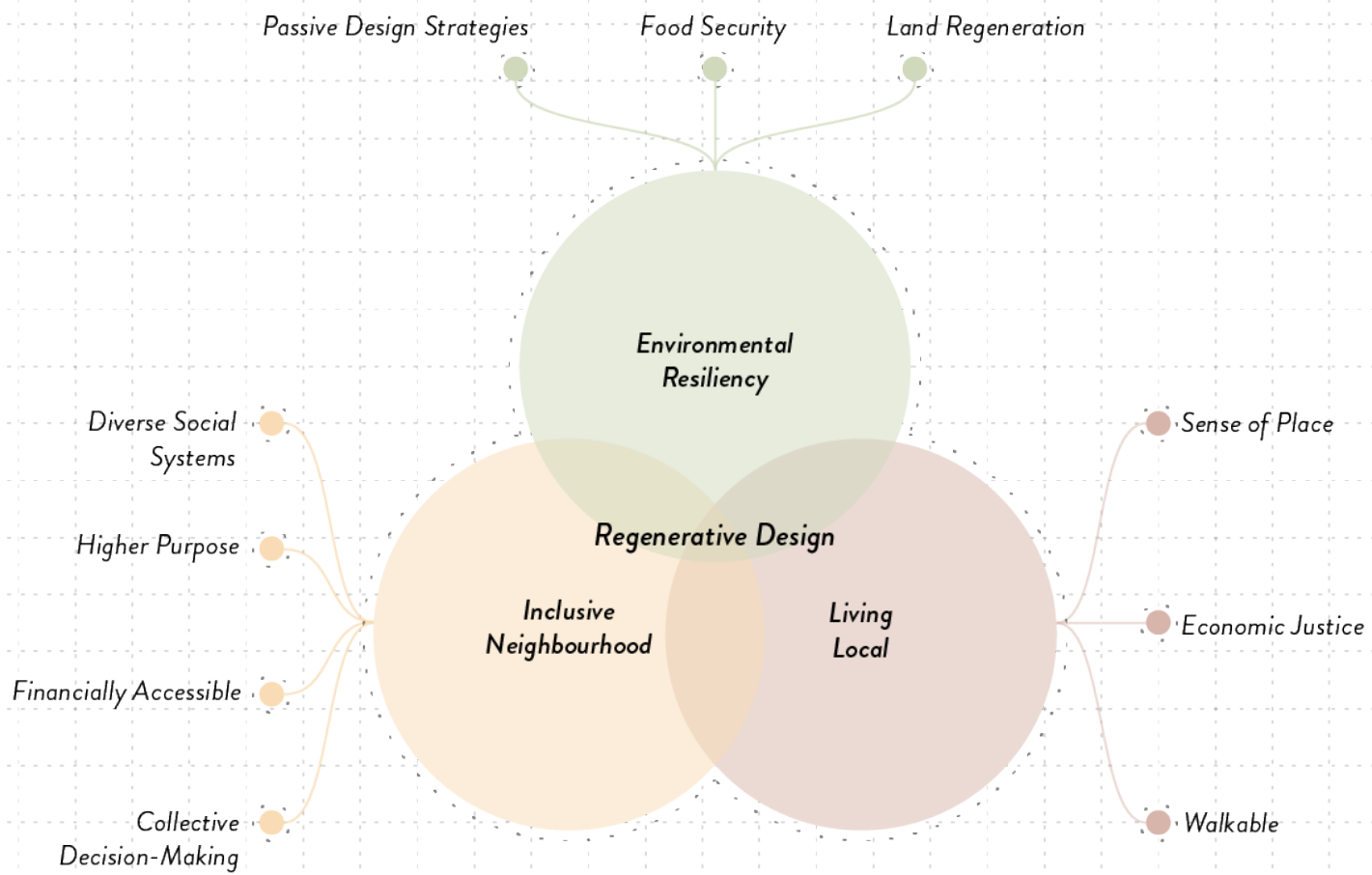


Figure 28: A Framework for Regenerative Design.

During the Industrial Revolution, very few individuals were able to recognise the looming impact of industrialization as it seemed to have unlimited potential.⁴² Increasing impacts could no longer be ignored, thus forming a wave of environmental thinking referred to as the period of innocence, with an unattainable faith in science and technology and/or ignorance toward the ecological crisis. With the broader public becoming increasingly aware of environmental issues, another wave of thinking emerged as the Environmental Movement. Around the mid 1960s, groups of people who refused to accept the consumerist culture that they had been brought up with, began to come together to express their concerns. One of the results of this movement is intentional communities, resisting the ideals of their previous lives and adopting a holistic approach to ecological living. Although the term appeared early in the 1970s, the Eco-Village Movement did not gain wide recognition until 1979, despite some groups already practicing similar methods within other intentional communities.⁴³ In more general terms, an eco-village is a utopian model for sustainability, functioning to demonstrate livable, sustainable approaches to economic and social life, which dually defines regeneration.⁴⁴

With many socioeconomic factors contributing to the success of eco-villages, there are many key considerations which must be accounted for in the design process. Action in similar neighbourhoods can be seen through the practice of carpooling, sharing electrical devices, self-sufficiency in food production, and attempts to create an independent energy supply through renewable methods.⁴⁵ While these are all effective methods for sustainable practice, the research in this chapter has been categorized into a framework for Regenerative Design which consists of three overlapping layers (Figure 28). These layers are a direct result of the research conducted for Place, and thus were developed specifically with the selected site and its broader context in mind. Due to the uniqueness of community's and their landscape, it is essential to the success of an eco-village proposal to draw from their existing networks. Acknowledging that actions promoting sustainability work better together, these topics intentionally intersect one another despite their categorization. The layers are: Living Local, Environmental Resiliency, and Inclusive Neighbourhood.

42 Judit Farkas, "Very Little Heroes' History and Roots of the Eco-Village Movement," *Acta Ethnographica Hungarica* 62, no. 1 (2017): 69–87. <https://doi.org/10.1556/022.2017.62.1.4>.

43 Ibid.

44 Katherine Casey, Maria Lichrou, and Lisa O'Malley. "Prefiguring Sustainable Living: An Ecovillage Story." *Journal of marketing management* 36, no. 17-18 (2020): 1658–1679.

45 Geseko von Lüpke, "Ecovillages: Islands of the Future?" *RCC Perspectives*, no. 8 (2012), 76.

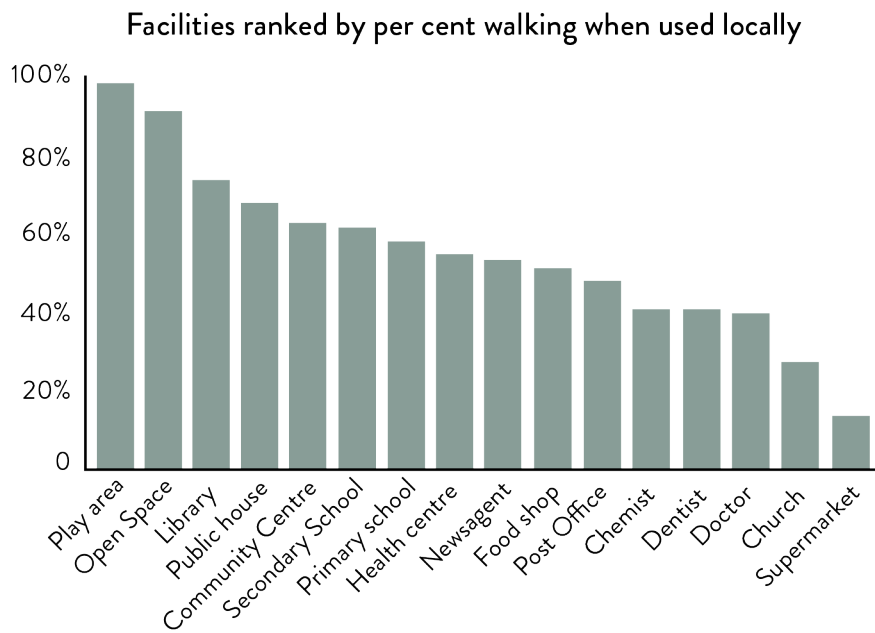


Figure 29: Proportion of Walking Trips for Access to Local Facilities

2.1 Living Local

A major contributor to an eco-village's low environmental impact is through the practice of Living Local, which encompasses the many ways in which an individual interacts with their environment. This includes the practice of buying, selling, eating, and working as local as possible. There are many positive implications from these practices, which can be best viewed from an environmental and social perspective. The environmental significance of Living Local can be seen through the reduction of carbon emissions in walkable communities, as well as creating a stronger connection to food grown on site. Additionally, establishing a better sense of place through a walkable and accessible neighbourhood appeals to the social dimension of such practice. The environmental and social effects of our actions are the main reason eco-village residents prioritize local living.

When discussing the various positive contributors of living local, it is essential to discuss the difficulties many communities face with the rise of globalization. As the accessibility to global goods and services continue to increase, the more challenging it is to support your local community. While many people may only shop or work close to home, this does not mean that their actions are only seen at a local scale. Although one may buy their groceries at a supermarket nearby, much of these items have been transported from global sources, removing one's ability to see directly where it is coming from.⁴⁶ The sustainability aspect of an

46 Hugh Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*. London: Earthscan, 2009, 25.

eco-village is largely based on the locality of people's activities, but this alone is not enough to combat climate change. To surpass these constraints, one must think globally and act locally.⁴⁷ Acknowledging that external factors prevent many individuals from living off local sources, it is essential that any eco-village development understand the existing constraints and work to improve them.

Transportation outside of an eco-village is often unnecessary as most needs are locally available to residents, effectively decreasing the need for a vehicle. While this may be the result of proximity to existing facilities and services, another factor is additional programming within the village. An example could be a makerspace or shop that provides residents access to tools that could fix household items. Alternatively, it could take the form of a rentable commercial space that becomes a source of income to finance community expenses.

The 20-minute neighbourhood has recently gained popularity, defined by the time it takes to walk to your destination and back.⁴⁸ This concept, while initially referring to dense urban city settings, is also true for an eco-neighbourhood. All of these aspects contribute to a reduction in emissions caused by travel. Data suggests that the majority of people, when provided the choice, prefer their local facilities when it comes to supermarkets, secondary schools and newsagents.⁴⁹ Approximately half of people will choose to use their local post office, health centre, and food stores. While just less than half will use local primary schools, play areas, community centres, and pubs. Statistically, only a small number of users will choose to use nearby churches, libraries, dentists, and leisure facilities. The main reason for this would be where services become more specialized, users become more willing to travel. This data emphasizes the value of local facilities for the public, but does this statistically correlate to a reduction in trip length and car dependence? According to studies done by ECOTEC and Winter and Farthing, local use does lead to shorter trips and less overall travel. Despite the data revealing an increase in car dependence over the past 40 years, 93% of people still choose to travel on foot for trips under 800m. Best seen in Figure 29, walking is the primary mode of transportation for local open spaces, play areas, local schools, pubs, and community centres.⁵⁰ While maybe not a surprising statistic, this data confirms the value of these facilities accessible within walking distance. Improving the walkability of communities reduces carbon emissions and creates a stronger sense of belonging.⁵¹ Reducing the need to travel outside of your walkable radius additionally contributes to the local economic justice, which effectively keeps the flow of money within the community. These factors are essential when designing an eco-neighbourhood as one must consider the localities of such facilities before determining what would be best suited as an addition to the neighbourhood. Environmentally, the impacts of promoting a walkable community must not be overlooked.

47 Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*, 26.

48 May East, "A Guide to 20-Minute Neighbourhoods," May East, August 18, 2021. <https://www.mayeast.co.uk/blog/20-minute-neighbourhood>.

49 Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*, London: Earthscan, 2009, 61.

50 Ibid., 63.

51 Jeff Speck, *Walkable City: How Downtown Can Save America, One Step at a Time*, 243.

The motivation behind spreading suburbia was proximity to the city and nature, this was ironically the shared impulse of the eco-city.⁵² Richard Register suggests that our environment, society, and climate are showing signs of severe dislocation and that eco-villages could be part of the solution.⁵³ As previously established, removing eco-villages from existing communities reduces the accessibility to local facilities, which affects the sustainability aspect of such development. Additionally, social implications of this isolation, as seen with the Covid-19 pandemic, increase the rates of stress, depression, and mental illness. Designing places that promote regular social interactions has proven to reduce these side effects, enabling people to build local social networks, develop social capital, participate in community life, and feel that they belong. Although redesigning the entire city at once is an unrealistic utopian ideal, regenerating existing systems becomes a realistic sustainable solution. This social regeneration can be seen through the implementation of restorative urbanism, meaning that curated environments within the city act as recovery space from mental fatigue.⁵⁴ These design interventions often incorporate a natural approach to landscaping, which creates a sense of removal from everyday demands. Integrating hubs for recovery from mental fatigue is often unintentionally designed into eco-villages along with their allocation for agricultural development. These spaces could serve dual purposes within communities when designed intentionally, additionally serving the adjacent neighbourhood. Not only could an eco-village development foster a better sense of belonging for residents, but it could become a hub for recovery within the existing city.

By placing the development within range of essential services and integrating appropriate programming with social recovery into the design, the eco-village naturally fosters feelings of belonging. The practice of Living Local benefits the sustainable aspect of living in a village, establishing a better sense of place while also bringing economic justice to the community.⁵⁵

52 Richard Register, and Brady Peeks, "Village Wisdom, Future Cities: The Third International Ecocity and Ecovillage Conference Held in Yoff, Senegal, January 8-12, 1996", Oakland, Calif: Ecocity Builders, 1997, 27.

53 Ibid., 27.

54 Jenny Roe, and Layla McCay. *Restorative Cities: Urban Design for Mental Health and Wellbeing*, London: Bloomsbury Visual Arts, 2022, 2.

55 Ibid., 202.

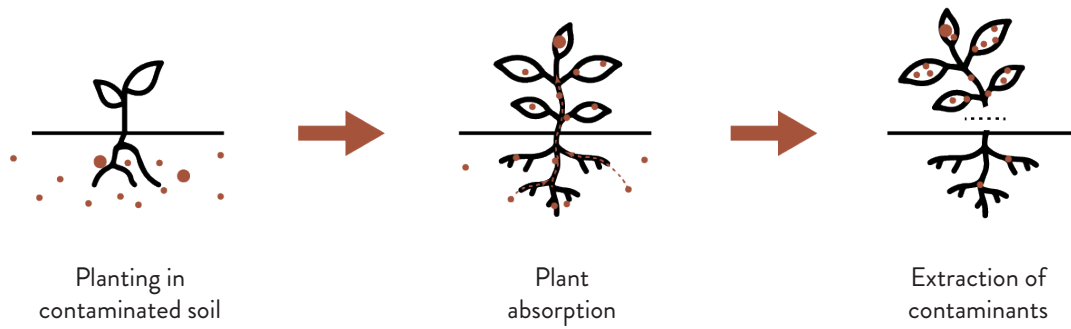


Figure 30:
Phytoextraction
Diagram

2.2 Environmental Resiliency

As the definition of an eco-village suggests, the community's consideration for the site's ecologies and natural environment are what separate it from other development. For this reason, it is essential to consider the regeneration of the land from which the village operates. This would take into account the past and present ecosystems specific to the site, including indigenous perspectives.⁵⁶ Food security, while one of the major benefits to an eco-village, will look different depending on the context of the site and should reflect such uniqueness.⁵⁷ As part of designing for environmental resiliency, the integration of passive and active strategies is a crucial component of what encompasses this layer of regenerative design.

Referring to Barton's study presented in the Introduction, urban renewal has been an underutilized category in eco-village development which presents an opportunity for these communities to have a greater impact on land regeneration.⁵⁸ Further, the strategies to achieve land regeneration are influenced by the pre-existing land use. Remediation strategies on brownfield sites are the most challenging to regenerate, but the resulting outcome is more

56 Liz Walker, *Choosing a Sustainable Future: Ideas and Inspiration from Ithaca, NY*. Philadelphia, PA: New Society, 2010, 24.

57 Brenda Platt, and Jenn Davis, *Growing Local Fertility: A Guide to Community Composting*, Institute for Local Self-Resilience, 2014, 84.

58 Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*, 69.

impactful. While there are many ways in which contaminant removal can occur, the strategy that stands out for its natural, less invasive nature is Phytoremediation, more specifically Phytoextraction. This process involves the planting of vegetation that is able to withstand these conditions and accumulate contaminants into their aboveground biomass, which is then cut back for removal from site (Figure 30). Efficiency of this process relies on a few factors such as plant selection, plant performance, heavy metal bioavailability, soil, and rhizosphere properties. Generally, hyperaccumulators are the ideal selection for this process as they are plant species capable of accumulating very high levels of heavy metals (HM) in their aboveground parts without phytotoxicity symptoms. These plants range in sizes from trees to flowers and would be gradually removed from site as the contaminants leave the soil. In 2016, a study investigated the real-scale clean-up of a former industrial area polluted with a mixed contamination of HMs, hydrocarbons and polychlorinated biphenyls. The process employed the use of *Populus* sp., empress tree (*Paulownia tomentosa*), the perennial shrub Scotch broom (*Cytisus scoparius*), in combination with naturally growing vegetation and the addition of organic matter (horse manure).⁵⁹

“Within 2 years, vegetation with any of the three species resulted in the reduction of both organic and HM contamination (average reduction of about 35, 40, and 70% in the soil content of HMs, hydrocarbons and PCBs, respectively); moreover, soil functionality was also recovered during the remediation.”⁶⁰

Employing this technique on brownfield sites would restore current ecosystems in a reasonable time frame without extensive invasive measures, additionally improving the appearance of the extraction process for neighbours.

Although the practice of Phytoextraction would bring the land to the required contaminant levels for development, the process of land regeneration would not stop there. Once the development is in full operation, residents participate in the process of land regeneration, which often begins with a community compost. Community composts actively raise awareness by exposing community members and educating the public about the environmental benefits of compost. It actively reduces waste, enhances soil fertility, improves plant growth, and thus carbon sequestration.⁶¹

While these factors contribute to developing a sustainable neighbourhood, it also facilitates a healthy culture around food production. Food becomes another layer of regeneration in eco-villages with consideration for the climate in terms of efficiency in growing season and preservation. Food not only contributes to sustainable living within the village but is also

59 Yan, An, Yamin Wang, Swee Ngim Tan, Mohamed Lokman Mohd Yusof, Subhadip Ghosh, and Zhong Chen. “Phytoremediation: A Promising Approach for Revegetation of Heavy Metal-Polluted Land.” *Frontiers in Plant Science* 11 (2020). <https://doi.org/10.3389/fpls.2020.00359>.

60 Suman, Jachym, Ondrej Uhlík, Jitka Viktorova, and Tomas Macek. “Phytoextraction of Heavy Metals: A Promising Tool for Clean-up of Polluted Environment?” *Frontiers in Plant Science* 9 (2018). <https://doi.org/10.3389/fpls.2018.01476>.

61 Ibid.

used as an element of social life. It is a lens which can be viewed socially and environmentally with attention to place as well as its relation across scales. When looking at place-based characteristics one must consider physical material elements, such as localized plants and seasonal production.⁶² In contrast, social relations can be viewed in terms of local economies and knowledge as well as self-reliance. Globalization of the food industry, loss of biodiversity, global warming, and food poverty are all ways in which food has had an impact on our social and environmental systems.⁶³ Often the impacts of our choices are not seen and thus the perception that these impacts do not exist. Allowing food production processes to be seen and influenced by the people living there, effectively facilitates a conversation around our eating habits.

In a Canadian climate, having four seasons requires an efficient system of growth and preservation of food during the warmer months to account for the long winter. Factors such as these would influence methods of food production within the village and may result in alternate growing strategies such as the use of a greenhouse. Additionally, there may be traditional methods used by the local people which would allow for integration into the existing network, further benefitting the local people. For these reasons, an in-depth site analysis, presented in Chapter 1, is essential for all aspects in designing an eco-village. The following case studies further confirm this claim with a variation in food practices which vary depending on the demand and the context. Twin Oaks located in Virginia, USA is a rural eco-village of 100 residents who process food through fermentation, canning, and dehydrating. Los Angeles Ecovillage is located in a dense urban neighbourhood with 40 residents and is an established food-sharing hub for residents as well as non-residents. Finney Farm located in Washington State is a rural eco-village of 8 people practicing seed sharing and additionally contributing to food justice education programs.⁶⁴ Each of these practices is a reflection on the community's knowledge and needs demonstrating the ways in which eco-villages have adapted their model for food.

Another aspect of the ecological framework is the integration of green building technologies to further contribute to the regeneration of the social and environmental systems within the neighbourhood. Buildings use half of the world's energy, adding transportation to and from these buildings, this accounts for 75% of global energy use.⁶⁵ Therefore, everything we design must reflect that this responsibility has not been taken lightly using methods such as circular architecture (Figure 31). Effective methods can be put into practice through simple, small-scale, low-tech, low-cost, human-centered, and gentle solutions.⁶⁶ The sun is most notable when considering these strategies as it offers a direct source of energy and drives the Earth's climate creating opportunities to draw energy from wind, waves, tides, as well as

62 Platt, and Davis. *Growing Local Fertility: A Guide to Community Composting*, 74-85.

63 Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods*, 199.

64 Ulug, Ciska, Elen-Maarja Trell, and Ina Horlings, "Ecovillage Foodscapes: Zooming in and Out of Sustainable Food Practices," *Agriculture and human values* 38, no. 4 (2021): 1041-1059.

65 Huw Heywood, *101 Rules of Thumb for Low Energy Architecture*, Newcastle upon Tyne: RIBA Publishing, 2021, 10.

66 David Sim, *Soft City: Building Density for Everyday Life*, Washington: Island, 2019, 4.

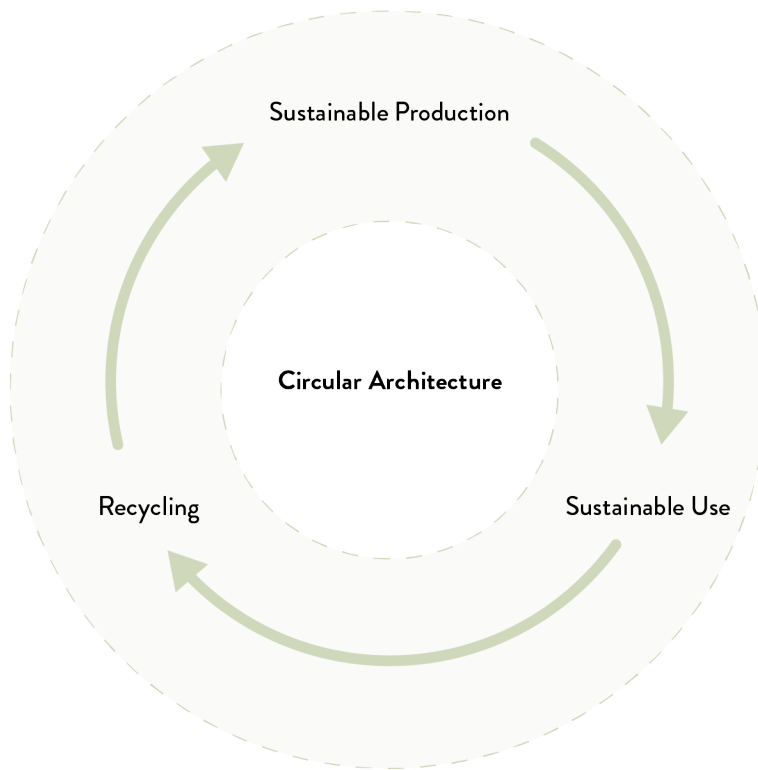


Figure 31: Circular Architecture Diagram

many other biological sources.⁶⁷ Additional passive design strategies can include the use of ground source heat pump, compost toilets, rainwater collection, and biochar all contributing to the neighbourhood's long-term sustainability and affordability. The key to implementing all these strategies into the context of an eco-village would be centering them around the neighborhood as it relates to people, place, and planet.⁶⁸

Environmental Resiliency consists of a systems approach towards regeneration, with each layer influencing the next. Beginning with the land is an effective first step to ensure that the existing ecologies have been well integrated into the design merging cohesively within the context. Acknowledging that food is a major factor in the social and environmental aspect of an eco-village, the consideration for place based ecological knowledge is crucial. As part of what encompasses a resilient neighbourhood, long term sustainability within the built forms must effectively utilize what is naturally existing on site. Individually these layers would not be enough to sustain an eco-village, but together they create a framework for Environmental Resiliency.

67 Peter F. Smith, *Architecture in a Climate of Change: A Guide to Sustainable Design*, Amsterdam: Elsevier/Architectural Press, 2008, 42.

68 Sim, *Soft City: Building Density for Everyday Life*, 6.



Figure 32: Inclusive Neighbourhood Diagram

2.3 Inclusive Neighbourhood

The Inclusive Neighbourhood works to attain a shared higher purpose among community members, which will ultimately unify the group.⁶⁹ An agreed upon vision for the neighbourhood also drives the decision-making process for the duration of design, construction and living phases. A key dimension of the inclusive neighbourhood is the diversity of social systems that are supported by this development within the existing context. Another part of facilitating an inclusive environment is involving local community members throughout project development to ensure a bottom-up approach.⁷⁰ Achieving the desired diversity among residents also involves a range of appropriate programming and a financing model that appeals to many (Figure 32).

Maintaining a collective goal between residents mitigates disagreements in the long-term. Although a decision might not satisfy everyone, it is what is best for the community. In terms of a decision-making model, most eco-villages prefer to operate by consensus. This does not mean that everyone agrees on everything, but rather people are sufficiently satisfied not to block decisions. In order to block a decision, it must be based on principle rather than preference, which relates back to the established vision for the group.⁷¹ While this may seem

69 John M. Meyer, Jens Kersten, and Karen Litfin, "Ontologies of Sustainability in Ecovillage Culture: Integrating Ecology, Economics, Community, and Consciousness." Chapter. In *The Greening of Everyday Life: Challenging Practices, Imagining Possibilities*, 250–264. New York, NY: Oxford University Press, 2016, 13.

70 Register, Peeks, "Village Wisdom, Future Cities: The Third International Ecocity and Ecovillage Conference Held in Yoff, Senegal, January 8-12, 1996", 174.

71 Karen T. Litfin, *Eco-Villages: Lessons for Sustainable Community*, Cambridge, UK, 2014, 116-117

like a challenging method, 69% of eco-villages are voluntarily initiated outside of the public or private sector; further confirming that these communities are a result of individuals within the community identifying and addressing the issues that they care about.⁷² Due to a pre-established connection through which members have already connected, the vision would be a clarification and discussion around its definition. In order for ecological transformation to be accepted by the community, it must be a process led by the people.⁷³

“Ecological goals are important, but the real gift an eco-village offers is to show the world how people can live together.” – Jeff Gilmore⁷⁴

Although the members of a community must agree upon their goals, their surrounding neighbours remain an essential step in the process. Building on the claim that this development must be led by the people, this includes those who will be affected by such change regardless of if they choose to become members. Their input is invaluable as residents of the area carrying knowledge that may otherwise be undetected and alerting the community to concerns affecting those close by. Not only does this enrich the design process, but in facilitating communication with the public, a diversity of opinions and perspectives are revealed.

The Covid-19 global pandemic has not only brought to light weaknesses in the way we design our cities, but it has allowed people to see the need for change. To prevent the spread of the virus many adopted the practice of social distancing. While effective in preventing transmission, the negative impact on people’s mental health and wellbeing has been drastic. The result being a newfound motivation to appreciate the things that we had once taken for granted about life in our urban environments. With wellness and quality of life now at the forefront of design there is an opportunity to effect change through the addition of eco-villages into our urban centres.⁷⁵ As part of the solution, principles for diverse communities that applied before the pandemic hold true today.

One principle for a diverse community requires the neighbourhood to serve more than one function, and to appeal to a broad demographic. These people should ideally go outdoors on different schedules but can share many common facilities with one another.⁷⁶ The interactions that occur as a result foster a sense of belonging within the community contributing to positive mental health and wellbeing. Diversity would also be achieved through accessibility of goods and services enabling those without access to a vehicle. The strength of the neighbourhood is further determined by the age diversity of residents, as

72 Barton, Sustainable Communities the Potential for Eco-Neighbourhoods, 69.

73 Register, Peeks. “Village Wisdom, Future Cities: The Third International Ecocity and Ecovillage Conference Held in Yoff, Senegal, January 8-12, 1996”, 59.

74 Litfin, Eco-Villages: Lessons for Sustainable community, 111-112.

75 Roe, and McCay. Restorative Cities: Urban Design for Mental Health and Wellbeing, 12-16.

76 Jane Jacobs, Death and Life of Great American Cities. London: The Bodley Head, 2020, 150.

there is not a stage in the life cycle that is fully self-sufficient.⁷⁷ Jeff Speck suggests that millennials are the start of the walking generation and have been altering the desire to cycle or ride the bus within the city. Similarly, statistics have shown that the number of nineteen-year-olds who have opted out of getting their drivers licence has almost tripled since the late seventies, from 8% to 23%. By creating desirable environments for walkability, street life and a pedestrian culture, young people are encouraged to make use of alternate modes of transportation inspiring other age demographics to do the same.⁷⁸ Not only should there be diversity in age, but the level of publicness should vary as there will inherently be a preference among residents.⁷⁹ To achieve this level of inclusivity within the neighbourhood there must be a diversity of multi-generational housing typologies, which will also result in an active street life.⁸⁰ Many eco-villages have adopted a cohousing model which includes shared agricultural and cooking responsibilities contributing to the affordability of this typology.⁸¹

While sharing facilities is part of what accounts for affordability within the neighbourhood, there must be consideration for the affordability of the land and units from which people will live.⁸² The land in similar Canadian communities is either donated or purchased by the cooperative and would then be given to the local Community Land trust association to hold in perpetuity (Figure 33).⁸³ The development would then be a collaborative effort with approximately 50% of funding coming from government assistance, 15-20% from donors or cooperative members, and 30-35% as part of a mortgage (Figure 34).⁸⁴ Short-term affordability will largely be achieved by working with stakeholders to develop affordable rental prices that would be set in advance while long-term affordability would be in the resale value cap which would be established in advance of development.⁸⁵ Considering that development would take place as funding became available, the decision to develop the neighbourhood in stages would become integral in the design process. To ensure the neighbourhood's success, there must be a variation in age and condition of the buildings which additionally supports gradual development phases as the neighbourhood evolves.⁸⁶ Staggered aging of buildings ensures long-term affordability in terms of maintenance, but also allows changes to be made to the design along with the progression of the community's needs. For these reasons, an inclusive neighbourhood should be executed at intervals to ensure affordability at all stages of life.

77 Christopher Alexander, *A Pattern Language*, Fachhochsch., Fachbereich Architektur, 1990, 188.

78 Speck, *Walkable City: How Downtown Can Save America*, 19.

79 Alexander, Christopher. *A Pattern Language*. Fachhochsch., Fachbereich Architektur, 1990, 195.

80 Speck, *Walkable City: How Downtown Can Save America*, 106.

81 Casey, Lichrou, and O'Malley, "Prefiguring Sustainable Living: An Ecovillage Story," 1664.

82 Emily Talen, and Sungduck Lee, *Design for Social Diversity*, New York, NY: Routledge, 2018, 101.

83 "Community Land Trust - Co-Op and Non-Profit Housing." CHF BC, February 11, 2023. <https://www.chf.bc.ca/community-land-trust/>.

84 "Index-Linked Mortgage (ILM) Program," Agency for Cooperative Housing, Accessed March 16, 2023, <https://www.agency.coop/about-co-ops/funding-programs/index-linked-mortgage-ilm-program>.

85 "Perpetual Affordability and Community Control of the Land: Community Land Trusts in Canada," Canadian Housing & Renewal Association, Accessed March 16, 2023, <https://chra-achru.ca/perpetual-affordability-and-community-control-of-the-land-community-land-trusts-in-canada/>.

86 Jacobs, *Death and Life of Great American Cities*, 151.

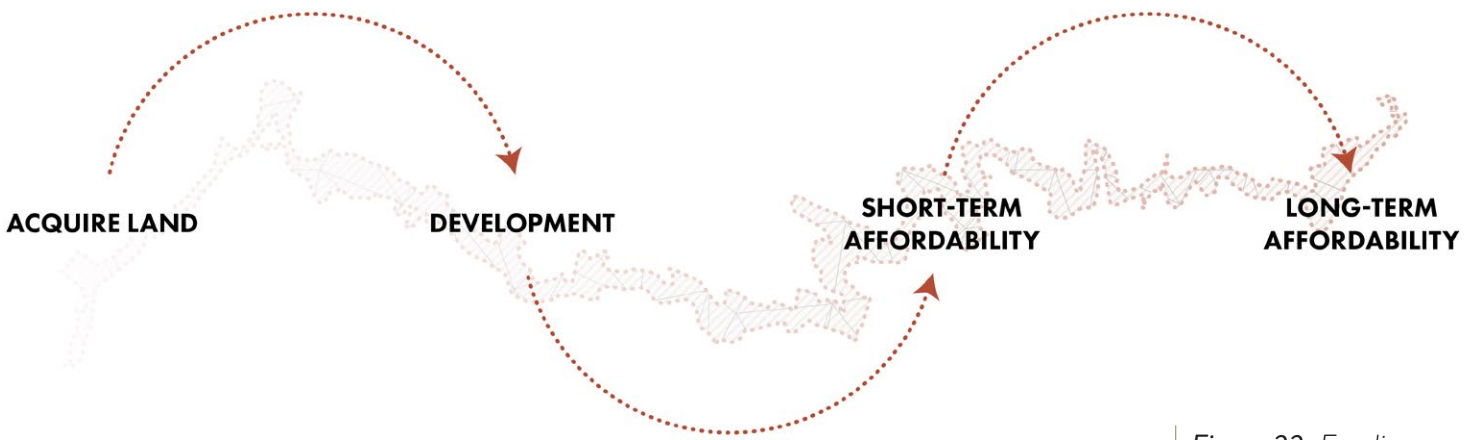


Figure 33: Funding
Timeline

The many layers encompassing the inclusive neighbourhood are part of what contributes to a framework for regenerative design. This includes the unity of eco-village residents, which is effectively established through a shared vision assisting in consensus decision-making. A diversity of social systems is established when designing with a bottom-up approach, maintaining affordability and accessibility for many demographics. To achieve these goals, programming on site, including housing typologies, must reflect the targeted community.

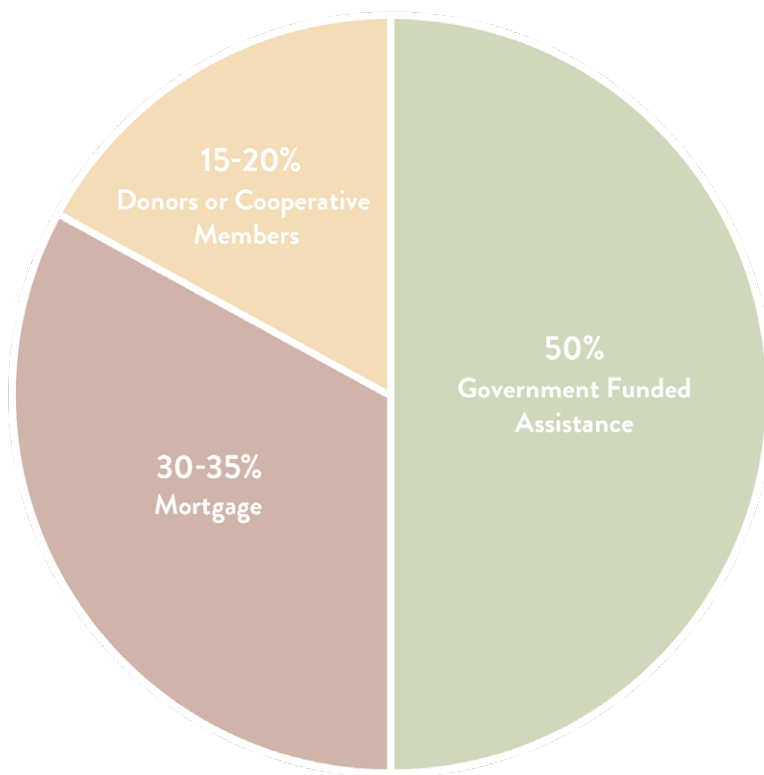


Figure 34: Funding Strategy

3.0

Ecological-Living in Practice



Figure 36: Kitchen sink at Whole Village

Internationally, eco-villages have become an increasingly popular way of living and working within a community, which has resulted in many successful precedents.⁸⁷ In addition to written documentation, there is much to learn from verbal communication with communities that have been practicing these lifestyles or are in the process of community integrated design (Figure 36). For these reasons, this Chapter presents the methodology of this thesis through case study research as well as discussions with members of the Glasswork Co-op in Owen Sound, Ontario.

87 Judit Farkas, “‘Very Little Heroes’ History and Roots of the Eco-Village Movement,” *Acta Ethnographica Hungarica* 62, no. 1 (2017): pp. 69, <https://doi.org/10.1556/022.2017.62.1.4>.



Figure 37: Courtyard and fresh vegetables in the shared kitchen at Whole Village

3.1 International Practice

This section presents case studies from the four different types of eco-village development explained by Hugh Barton: rural, urban greenfield, township, and urban renewal. Research for these categories has been primarily conducted through written source material, but I have had the opportunity to visit a rural eco-village development, called Whole Village, located close to Caledon, Ontario. Although this thesis is focusing on an urban site, it has historically been less common and results in fewer successful case studies. For these reasons, the following case studies will unpack their success, analysing scale, housing type, founding principles, governance, ownership, regenerative design strategies, and integration of food production, which have helped inform this thesis.

Beginning with **rural** development, this category refers to an isolated community disconnected from a major hub, often self-sufficient from the outside world. The case study selected for this category is a carbon negative community named **Whole Village** (Figure 37 and 38). Attending their orientation, I was able to get a tour, speaking to their residents and ask them questions. With one housing typology of cohousing, the plan consists of a central common space with the units surrounding. As a smaller community housed inside a single building, weekly meetings are conducted on Sunday nights to plan for the week ahead.

Figure 38: Whole Village Passive heating



Many of the residents here have bought-in to the cooperative, owning their own unit while a few rent their homes. Renting has become one of the community's requirements before progressing to ownership, allowing long-term residents to socialize with potential residents mitigating future disagreements within their consensus decision-making model. Their agreed upon mission and vision are another part of what prevents major disagreements, ensuring that everyone agrees with the community's long-term goals. These founding principles are posted in their main common space to be viewed at all communal meetings and gatherings.⁸⁸

Location: Caledon, Ontario, Canada

Age: 2002

Size: 17 residents

Housing Type: Cohousing Cooperative (1 neighbourhood)

Founding Principles: Their founding pillars are ecology, community, and education.

Vision: We envision a transformed world in which humanity lives in right relationship within the web of life.

Mission: Whole Village is a cooperative farming ecovillage that aspires to model and support resilient, just, and regenerative systems.

Governance: Consensus decision-making.

Ownership: Cooperative (rental and ownership models, must be part of cooperative)

Regeneration Strategy: Regenerative Agriculture

Food: Cooperative Network

88 Jacob, and Nancy. "Whole Village." Whole Village, March 15, 2019. <https://www.wholevillage.org/>.



Figure 39:
EcoVillage at Ithaca

Urban greenfield development refers to communities that are in close proximity to an existing city, but on a site that have not had any prior development on site. Located on the city limits, the **Ecovillage at Ithaca** is a perfect example of this category (Figure 39). Through a process of phased development, the community has grown to include three cohousing neighbourhoods each accommodating varying resident needs with age diversity. The first neighbourhood began with 30 homes varying in size, the second consisting of 30 homes as duplexes, and the third with 40 homes, 15 of which within a four-storey common house.⁸⁹ These neighbourhoods have developed over 20 years, integrating new technologies as they become available. Community decisions are made through a consensus in each neighborhood, and a Village Association representing all three. Similar to Whole Village, you must be a member of the cooperative in order to buy but here it is also a requirement for those choosing to rent. This process is meant to ensure you are making an informed decision about living there.⁹⁰

Location: Ithaca, New York, United States

Age: 1996

Size: 160 residents

Housing Type: Cohousing Cooperative (3 neighbourhoods)

Founding Principles: Live Learn Grow

Governance: Consensus decision-making.

Ownership: Cooperative (rent and own, must be part of cooperative)

Regeneration Strategy: Land restoration (health of ecosystem that has been degraded from conventional methods of farming)

Food: Larger Farming shared responsibility 10 acres (land trust)

89 "Neighborhoods." Ecovillage at Ithaca. Accessed March 21, 2023. <https://ecovillageithaca.org/live/neighborhoods/>.

90 "Village Life." Ecovillage at Ithaca. Accessed March 21, 2023. <https://ecovillageithaca.org/live/village-life/>.



Figure 40: Photographs of Auroville

Township development refers to an area that is dedicated to a unified vision but consists of multiple settlements within their boundary. **Auroville**, located in Bommayapalayam, India is one of the world's oldest ecovillages and falls under this category (Figure 40).

“Auroville wants to be a universal town where men and women of all countries are able to live in peace and progressive harmony above all creeds, all politics and all nationalities. The purpose of Auroville is to realise human unity.”⁹¹

The founders of the village are Mirra Alfassa, referred to as The Mother, and Sri Aurobindo. Although it was Aurobindo's vision, it was The Mother who executed developing this vision. Decision-making within the community was originally done through the founder but with her passing, governance transitioned to the Auroville Foundation. Due to the township's larger area, the city was planned into zones to accommodate development labeled industrial, international, cultural, peace, and residential enveloped by a greenbelt. These zones were the base from which the settlement has grown but there area locations where this zoning has been broken.

Location: Auroville, Bommayapalayam, Tamil Nadu, India

Age: 1968

Size: 2000 residents

Housing Type: individual dwellings, cohousing, apartments, and youth hostels (over 100 different settlements)

Founding Principles: Embody ideal human unity and diversity “Auroville emerges as a unique, multi-cultural confluence where matter and spirit, the individual and the collective meet in the search for a higher consciousness”⁹²

Governance: through the Auroville Foundation, originally done by the founder of the township.

Ownership: Originally the government transitioned to Auroville foundation in 1991⁹³

Regeneration Strategy: Greenbelt and integration of nature into new development.⁹⁴

Food: 20 farms around Auroville some focus on vegetables, while others on fruits, grains, dairy and processed food.⁹⁵

91 “Auroville in Brief.” Auroville. Accessed March 21, 2023. <https://auroville.org/page/brief>.

92 “The Mother.” Auroville. Accessed March 19, 2023. <https://auroville.org/page/the-mother>.

93 “Organisational History and Involvement of Government of India.” Auroville. Accessed March 19, 2023. <https://auroville.org/page/organisational-history-and-involvement-of-government-of-india>.

94 “Auroville in Brief.”

95 “Auroville Farms.” Auroville. Accessed March 19, 2023. <https://auroville.org/page/auroville-farms>



*Figure 41:
Photographs of
Greenwich Millennium
Village*

Urban renewal refers to sites that have been chosen for the purpose of regeneration in an urban context. While the term village often implies that the community is self-contained, operating separate from the settlements adjacent to them, urban renewal presents an alternative.⁹⁶ In addition to regenerating existing land, there are significant benefits to sharing resources in terms of environmental and economic sustainability. Integrating these communities into the existing urban environment has the potential to advance sustainable living past the borders of the eco-village and presents an opportunity to provide affordable housing and food security to a diversity of residents. This inclusive bottom-up ideology encourages the existing community to contribute toward regenerating their own city's urban fabric, allowing the development to form as a result of needs identified by current residents.⁹⁷ What separates this category of development from others is its potential to contribute a greater impact within our cities.⁹⁸

Approaches for such development can be seen in car-free developments, optimizing energy performance, promoting social equity, and restoring degraded land. Due to the nature of this thesis, the selected case study for this category is **Greenwich Millennium Village** (Figure 41 and 42). Similar to the site in Owen Sound, this project works to regenerate previously industrial land in an area located close to the downtown. Additionally, this development addresses urban sprawl and the social benefits of community centred design. Their method for regeneration was largely a social approach with the existing land remediated through a removal and capping process.⁹⁹ As a joint-venture business model, decision-making and land ownership varies as it strays from the typical cooperative model. In order to achieve a mix of affordability there are options for mortgage subsidiary but are otherwise a standard home purchasing method.

96 Katherine Casey, Maria Lichrou, and Lisa O'Malley, "Prefiguring Sustainable Living: An Ecovillage Story," *Journal of marketing management* 36, no. 17-18 (2020), 1662.

97 Richard Register, Bradly Peeks, "Village Wisdom, Future Cities: The Third International Ecocity and Ecovillage Conference Held in Yoff, Senegal, January 8-12, 1996", Oakland, Calif: Ecocity Builders, 1997, 174.

98 Farkas, "Very Little Heroes' History and Roots of the Eco-Village Movement."

99 "Greenwich Millennium Village Phases 3, 4 and 5." Ramboll Group. Accessed March 19, 2023. <https://ramboll.com/projects/ruk/greenwich%20millennium%20village%20phases%203%20%204%20and%205>.



Figure 42:
Greenwich
Millennium Village

Location: London, England

Age: 2000

Size: 3400

Housing Type: Duplexes and apartments

Founding Principles: The ethos behind the project was to provide a range of high quality and innovative homes that would facilitate a more sustainable lifestyle.¹⁰⁰

Governance: NA

Ownership: Joint venture ownership (mortgage subsidiary offers on homes)

Regeneration Strategy:

Gov held competition for land.¹⁰¹ Greenwich Peninsula was once the site of the largest gasworks in Europe and is now the subject of a phased masterplan for mixed use development. The peninsula was partly remediated in the 1990s and then split into parcels for phased construction. The ground is clay with 6-7m of contamination above it, topped with a 1m cap. Remediation was mainly done through the capping of contaminants after this.¹⁰²

Food: Increase biodiversity but no food production.

Each of these precedents helps illustrate the evolution of eco-villages globally and adds another layer of understanding when placed alongside other communities (Figure 43). Initially, eco-villages were not very open to scientific research or analysis. Working in an isolated manner, they saw themselves as refuges to a violent consumerist lifestyle. Geseko von Lupke writes that eco-villages are perceived as “third-world islands” in the middle of unlimited possibilities as the Western world would see it. Lupke suggests that societies require a fundamental change to the way we think and live and that eco-villages could be part of that solution.¹⁰³ Based on the presented eco-villages, we can see the levels of isolation that Lupke refers to.

100 “This History of Greenwich Millennium Village.” Greenwich Millennium Village. Accessed March 19, 2023. <https://www.greenwichmillenniumvillage.co.uk/masterplan/history>.

101 Ibid.

102 “Greenwich Millennium Village Phases 3, 4 and 5.”

103 Geseko von Lüpke. “Ecovillages: Islands of the Future?” *RCC Perspectives*, no. 8 (2012): 73–78.

North America

South America

Europe

1975

Damanhur Ecovillage (Diedmont, Italy)
 - 450 residents
 - 25 nucleus (large house) with 15-30 people in one
 - known for their Temple of Humanity

1962

Findhorn Ecovillage (Scotland, United Kingdom)
 - 250 people
 - Cohousing unit in an old hotel

1978

Tamera, Portugal
 - 200 residents
 - Peace research Village

1930

Solheimar Ecovillage (Southern Iceland)
 - 120 residents
 - only ecocentre in Iceland
 - for 10 months of the year 98% food sovereignty

Africa

1977

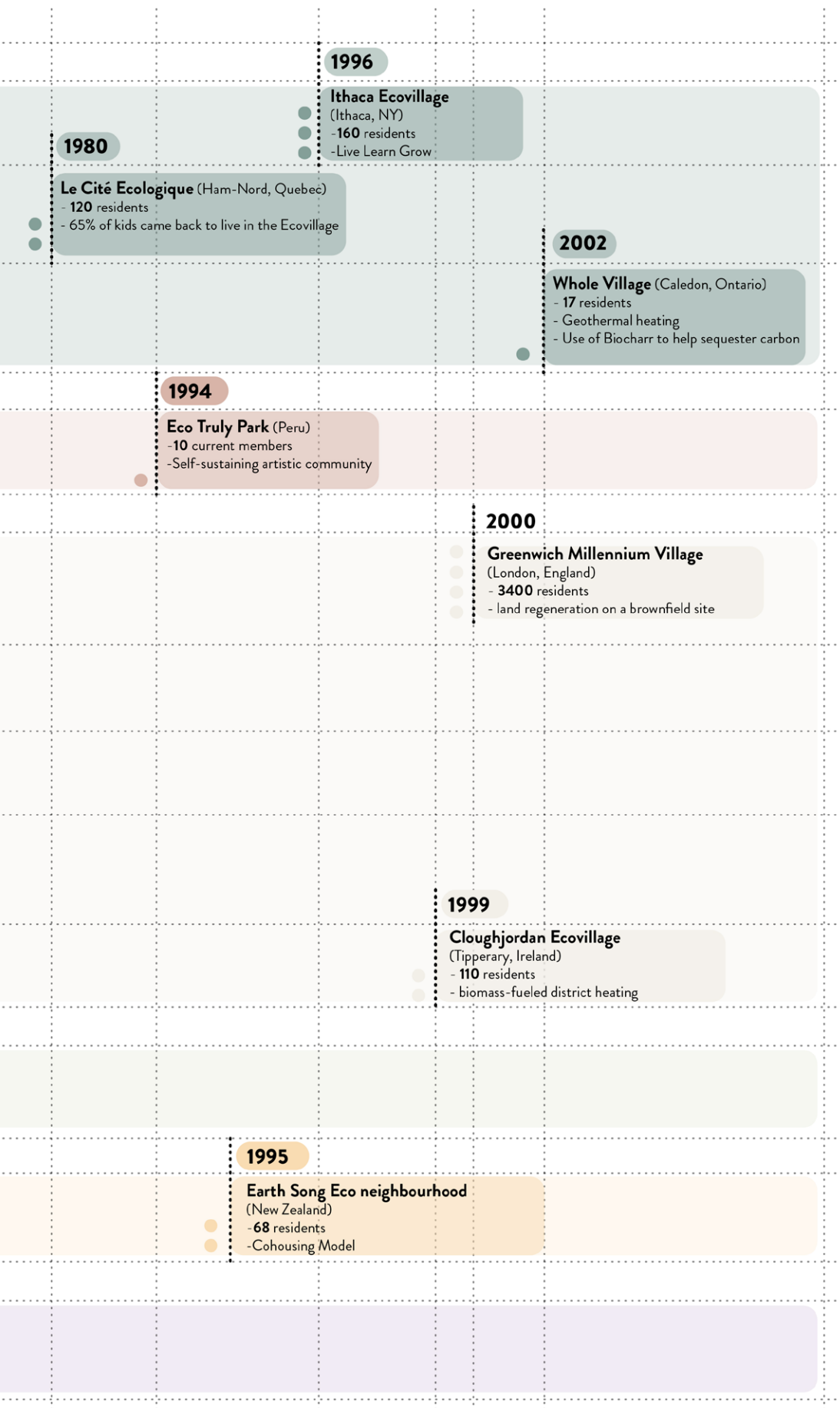
Sekem, Egypt
 - Today employs 2000
 - sustainability for culture, ecology, social and economic

Oceania

Asia

1968

Auroville, India
 - 2000 residents
 - Embody ideal human unity
 - it is its own township. Free education, medical care...



- 500+
- 150-500
- 50-150
- 1-50

Figure 43: Precedent Library

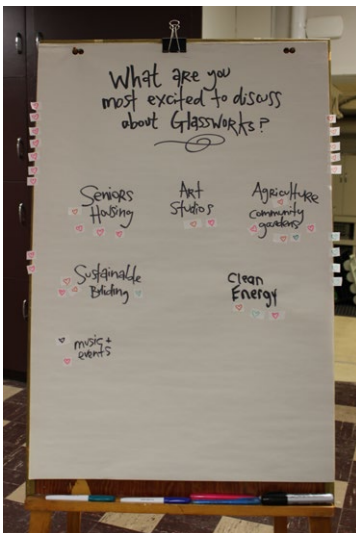
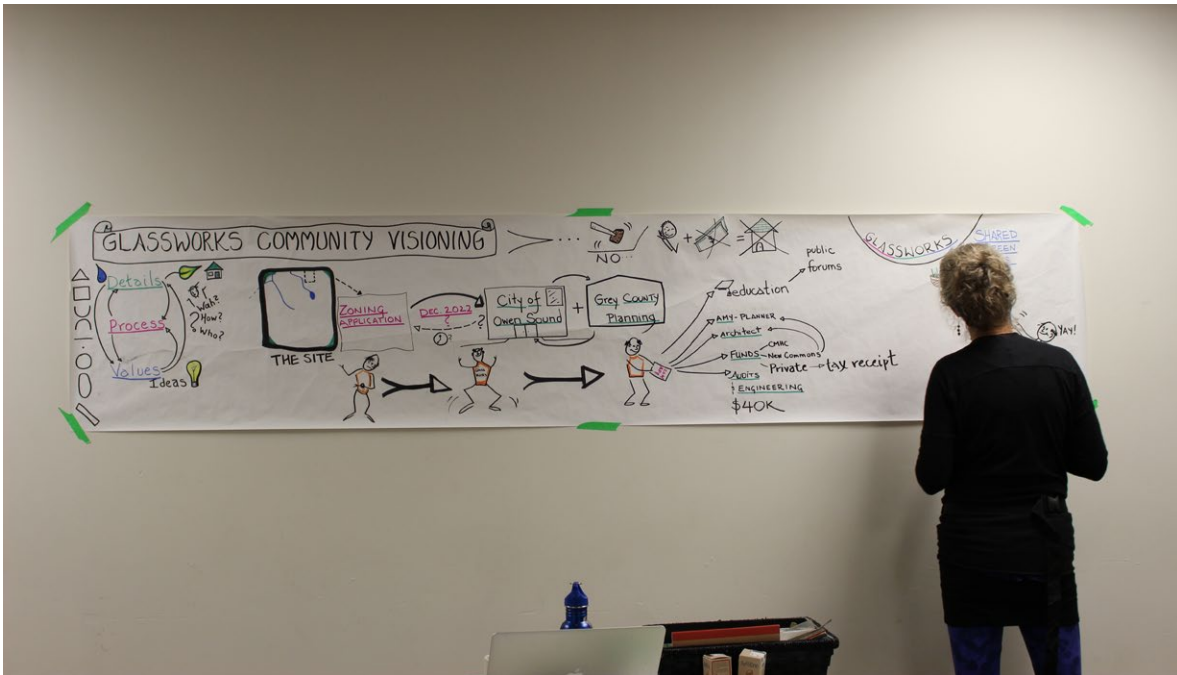


Figure 44: Glassworks Community Visioning Session Photographs

3.2 Participatory Design Observations

Glassworks Cooperative Inc. is a group that formed in Owen Sound as a result of local demand for eco-village development. In 2021, a 46-acre plot of land was purchased for this vision, located on the East side of Town which would be categorized under the term urban greenfield development.¹⁰⁴ While the decision to locate on the periphery of the city may have been the result of economic factors, they too will be unintentionally contributing to urban sprawl despite the benefits and great intentions.

My connection to this group started in early 2021 when it became public that this group had purchased the land and their intentions for it. Since then, their team has made new partnerships, obtaining an architect and non-profit development company. Through conversations with Glassworks Founding Board member Kelsey Carriere, I joined the group's Co-Design planning process, facilitating co-design meetings and photo documenting in-person meetings, helping to structure and participate in co-design sessions within the community I was raised (Figure 44). The contributing members of these co-design sessions, which have taken place in person and virtually, include local indigenous members, interested residents, curious community members, as well as the architect for the project. Their

104 "Glassworks Village, Owen Sound Ontario." Glassworks. Accessed December 22, 2022. <https://www.glassworkscoop.com/>.

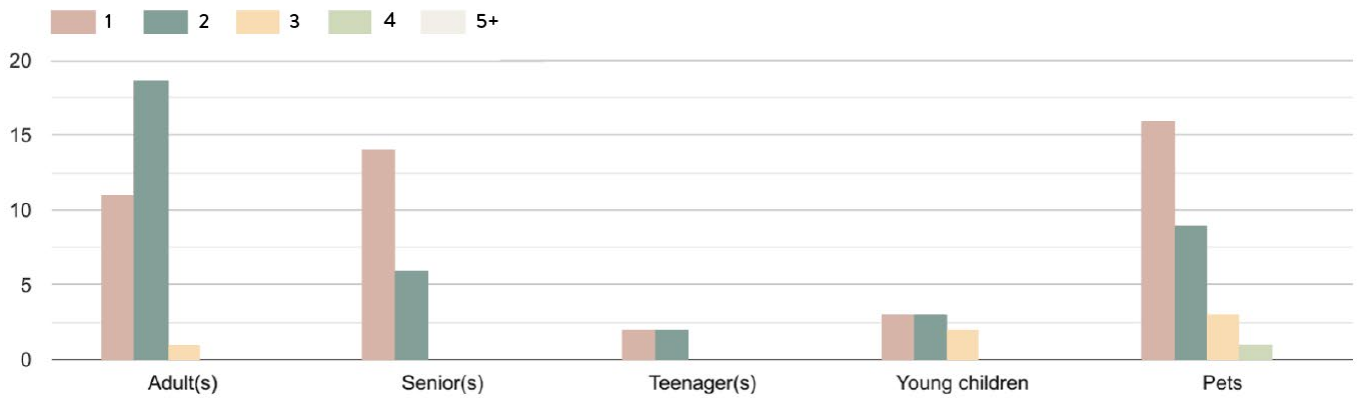


Figure 45: Demographic of Interested Residents (Data collected from 60 individuals)

objective is to help determine the needs of the residents and will allow an open forum for those interested to participate in the process of designing their future community. Through identifying these key desires, I will be able to integrate a bottom-up approach to eco-living practices.

Not only have I been able to hear from potential residents directly at these meetings, which are made public, but statistics gathered by this group have helped inform key programmatic elements as well as determine the demographic of interested residents. These demographics include a diverse age range, from families with young children to the aging population (Figure 45). A poll of Desired Program elements outside of Residential helped to inform a flexible Art/Workshop/Teaching space for residents. With data collected from 60 individuals, the results were the following¹⁰⁵:

- Shared Art Studio | 34 ppl
- Shared Workshop Space | 34 ppl
- Shared Teaching Spaced | 25 ppl
- Sustainable Agriculture | 24 ppl
- Senior Care | 24 ppl
- Food Processing | 22 ppl
- Co-working Space | 22 ppl
- Shared Music Studio | 18 ppl
- Locating my Business | 14 ppl
- Child Care | 13 ppl

From verbal feedback in the co-design meetings, there was positive feedback for intergenerational housing, increasing the overall diversity of the neighbourhood. The input from potential residents is crucial because for ecological transformation to be accepted by the community, it must be a process led by the people.¹⁰⁶ These factors all contribute to the importance of this portion of the methodology and have highly influenced the design proposed in the following Chapter.

105 Ibid.

106 Register, and Peeks. "Village Wisdom, Future Cities: The Third International Ecocity and Ecovillage Conference Held in Yoff, Senegal, January 8-12, 1996", 175.

4.0



Architectural Response

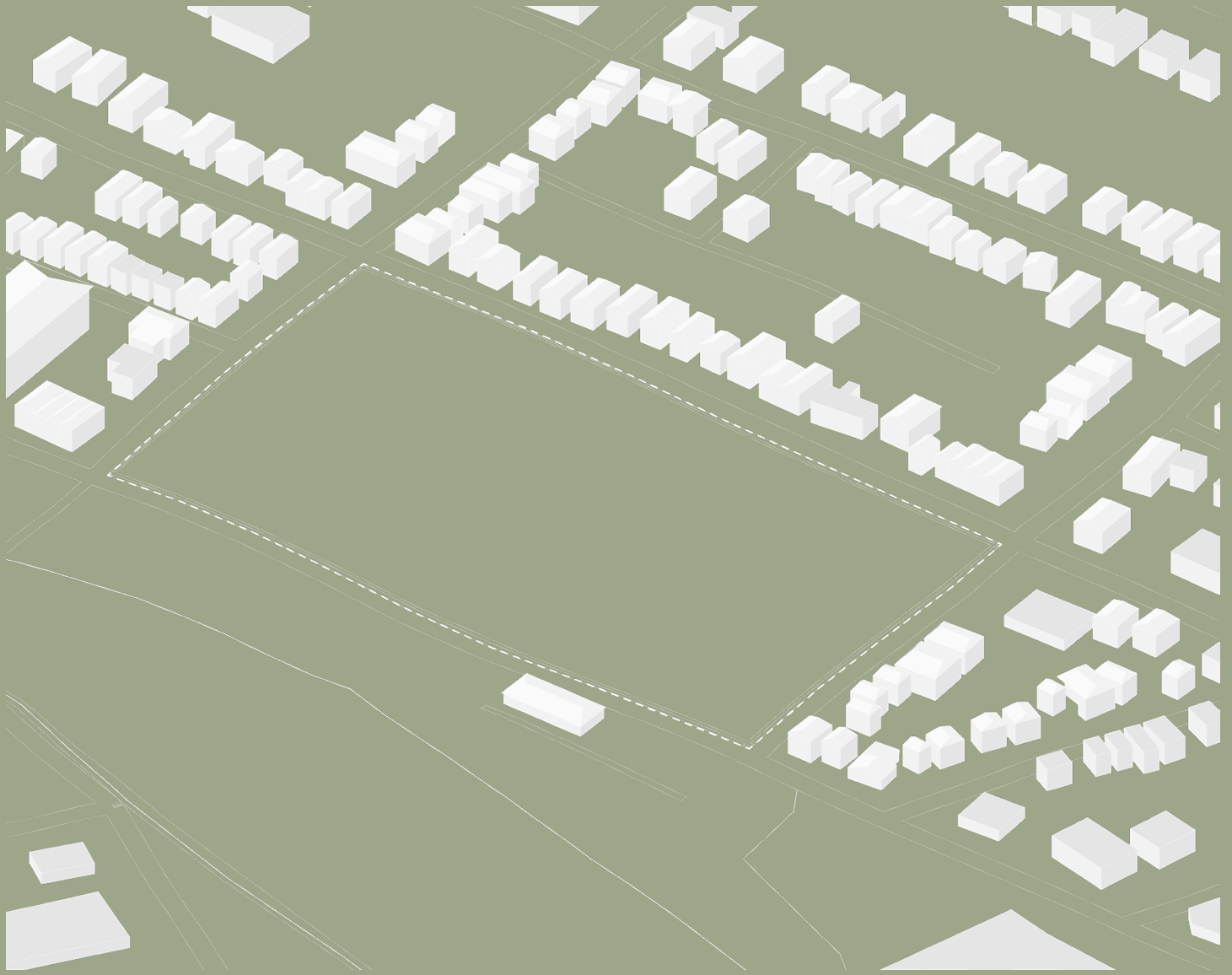


Figure 46: Architectural Response Diagram

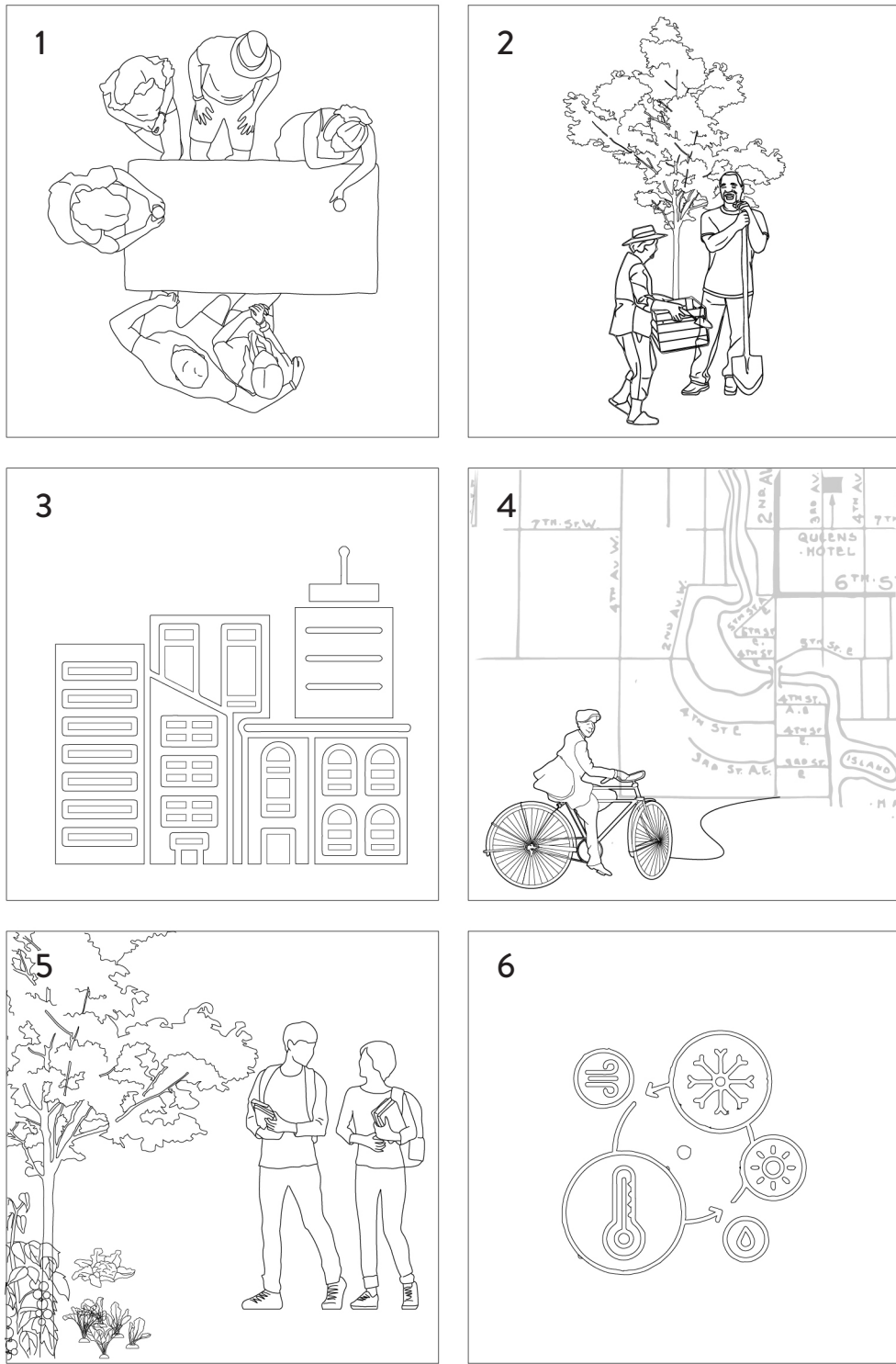


Figure 47: Key Objectives Diagram

Based on the regenerative design framework presented in Chapter 2, the following Chapter will work to unpack each theme, addressing it within the context of the chosen site. As a synthesis of this research, Figure 47 illustrates six key lessons demonstrating the design qualities required for such development.

1. Community integration, referring to input from future members in the design process, as well as designing spaces intended for gathering.
2. Collective and personal outdoor spaces that facilitate knowledge-sharing among neighbours.
3. Applying the appropriate density that responds to the context of the site.
4. Public programming applied at multiple scales to facilitate meaningful interactions between residents and visitors.
5. Phases of development that are determined by the land and the adjacent neighbours.
6. Site-specific response to climatic conditions.

This section will address each of these lessons, beginning with the design at the site scale and ending at the building scale.



Figure 48: Handmade Pottery

4.1 Mission and Vision

During my visit at Whole Village, members explained that every eco-village should have an agreed upon Mission and Vision to centre group decisions. Their Mission and Vision are posted in the main decision-making room as these core values are what ground the group. They are statements which evolve over time and must be constantly updated to reflect the current resident's values. This practice is essential for any community in the early stages of development, as this can be referenced as difficult decisions arise. This proposal's Mission and Vision would be annually revised to ensure that all residents align with the group's trajectory and are as follows.

Vision: Imagining a community that fosters social and ecological regeneration within a framework for ecological living.

Mission: Actively regenerating the ecologies on an urban brown-field site while simultaneously creating an inclusive environment for diverse social systems.

At the heart of this proposed neighbourhood is a shared belief in the importance of community. Conceptually this vision takes the form of a set of ceramic dishes, on which plants from the site have been pressed to create unique patterns (Figure 48). These dishes have been designed for their users and are a direct reflection of the Place, as is the design and research for this thesis.

Program Element	Breakdown	Quantity	Description
Intergenerational Housing	Cohousing	6	144 Beds
	Townhomes	6	132 Beds
	Apartments	3	136 Beds
Community Building		2	
	Larger Makers Space	2	Rentable / Adaptable
	Smaller Makers Spaces	4	Rentable / Adaptable
Urban Farming	Greenhouse	2	
	Personal Garden	412	For each resident
	Shared Gardens	45	Accessible to all residents
	Small Shed	3	To store gardening supplies
Cafe			Rentable
Parking		50	Car sharing

Figure 49: Program Matrix

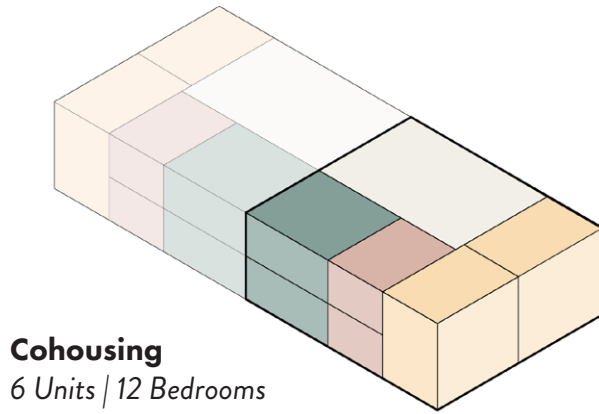
4.2 Program and Overall Phasing Strategy

Responding to the research presented in Chapter 2, this proposal will be conducted in phases to account for finances, neighbours, land regeneration and variation in housing typology. Phases also ensure a staggered aging process for the buildings over time.¹⁰⁷ As the research suggests, the financing model for this proposal will be similar to that of other cohousing communities in Ontario and largely depends on the phases being carried out at intervals. Beginning with the land, it would be either donated or purchased and would then be given to the local Community Land trust association to hold in perpetuity. The buildings on site would be a collaborative effort with 50% being funded from government assistance, 15-20% by Donors or co-op members, and 30-35% as part of a mortgage.¹⁰⁸ Short term affordability will largely be achieved by working with stakeholders to develop affordable prices that would be set in advance. Long term affordability would be in the resale value cap which would be established in advance of development.

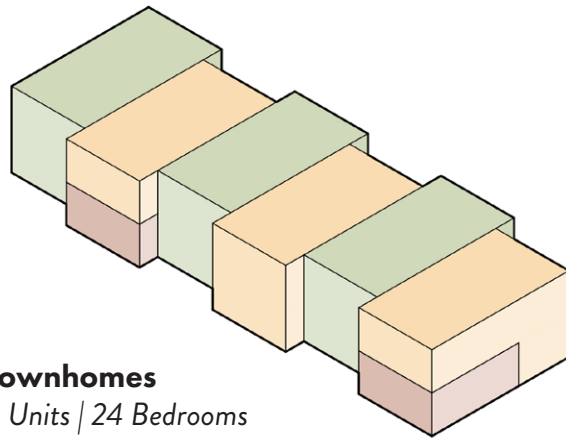
The program of this proposal responds to site specific demographic findings and feedback from work with Glassworks (Figure 49). Consequently, the three housing typologies appeal to a broad range of residents, conscious of age and desired level of community involvement.

107 Jacobs, Jane. *Death and Life of Great American Cities*. London: The Bodley Head, 2020, 150.

108 “Index-Linked Mortgage (ILM) Program,” Agency for Cooperative Housing, Accessed March 16, 2023, <https://www.agency.coop/about-co-opsfunding-programs/index-linked-mortgage-ilm-program>.

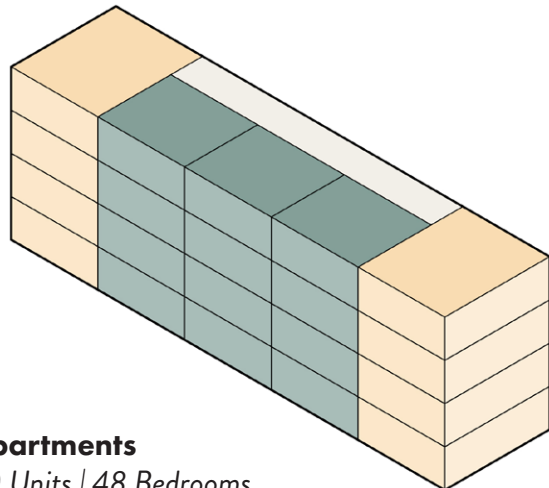


Cohousing
6 Units | 12 Bedrooms



Townhomes
9 Units | 24 Bedrooms

- 1 Bedroom
- 2 Bedroom
- 3 Bedroom
- 4 Bedroom
- Common Space



Apartments
20 Units | 48 Bedrooms

Figure 50: Housing
Typology Massing

Each unit will have access to their own personal outdoor gardening space in addition to larger gardens and greenhouses which will be shared among the community. These communal gardening spaces will be supported by nearby sheds to store residents' equipment and supplies. On site compost is another element that would be woven into urban farming and would grow as the phases progress. Communal indoor spaces, including a café and makerspace, will also grow with the addition of phases to account for the increased demand. These community buildings are adaptable, shared spaces that can become flexible art, workshop, and teaching spaces for residents, with the option to rent to the community. This option would provide a source of income that could be used for upkeep on site.

The three main housing typologies proposed for the site are intergenerational cohousing, townhomes and apartments (Figure 50). Cohousing is the typology designed for residents who are most open to the idea of shared amenities and living spaces. This housing typology would be the first on site as these will be the individuals most willing to put in the time and resources required to live collectively. As the most unique housing typology, this is the building that has been developed in the most detail and will be presented in Chapter 4.4. Figure 50 illustrates one variation of the unit massing which is modular and shows variation throughout the design. Each cohousing building contains two sections of 12 bedrooms. Based on the research, this is the ideal number of people to live collectively, considering decision making processes and facility sharing.¹⁰⁹ Each cohousing contains a variation of one-, two-, and three-bedroom units. The Townhome typology is designed to merge seamlessly within the existing neighbourhood as these will be the buildings that will face the existing homes along the perimeter of the site. They include units for one, three, or four bedrooms. As the tallest of the three typologies, the apartments will be at the centre of the site and include two- and three-bedroom units.

The total number of beds that were approved by the city for construction on this site was 448. This design proposal includes 412 beds, in addition to indoor and outdoor community centred programming. Not only does the density of this project align with the current proposal, but the design also responds more effectively to the six stipulations presented in the early 2000s master plan proposal (please refer to the Introduction). The following section will present the design in phases integrating each of these programmatic elements.

109 Karen T. Litfin, *Eco-Villages: Lessons for Sustainable Community*, Cambridge, UK, 2014.

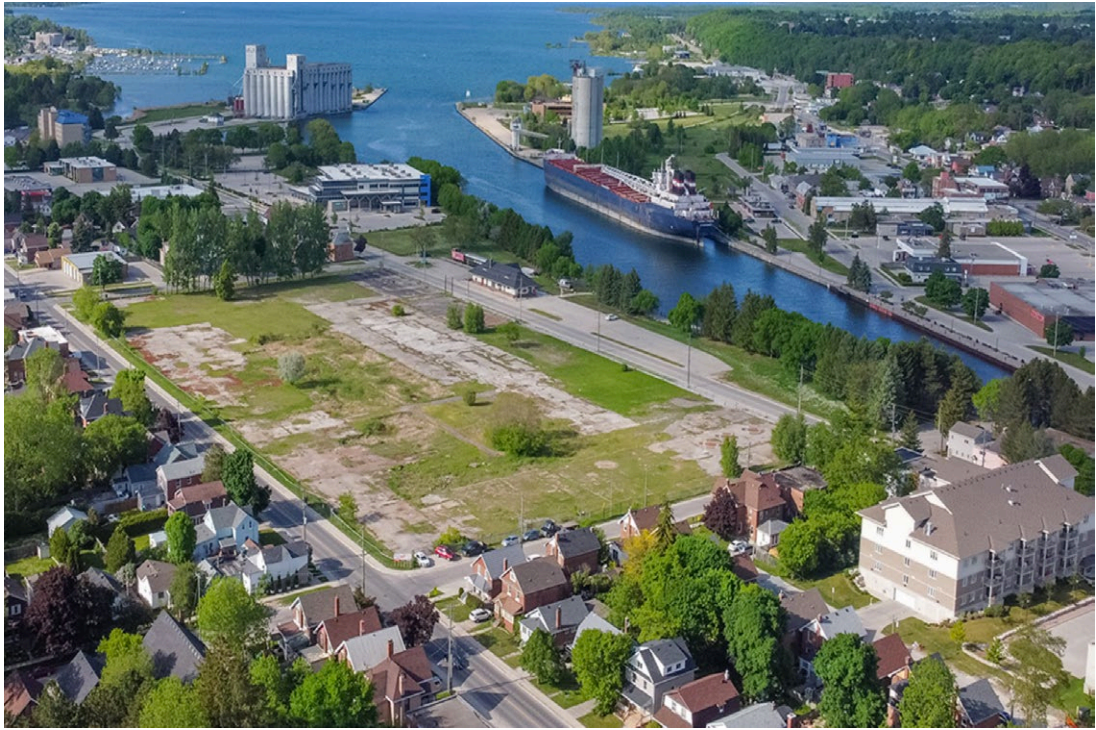


Figure 51: Historic site comparison (1960s-2020)

4.3 At the Site Scale

The proposed five phases will be presented at the site scale to best understand the integration of housing typologies and programming into the existing networks. Each phase works to address the six key design lessons as a reflection of the research. Phase one begins with the removal of existing foundations on site (Figure 51). Once the concrete remains have been removed, the phytoextraction process can begin. This form of remediation proved as least invasive while also providing neighbours with a pleasant public amenity, views and walking paths. The lower lying plants that have been selected are a Perennial shrub *Cytisus Scoparius*, and *Helianthus Annuus*, *Sedum Alfredii*, and *Trifolium Alexandrinum*. The trees that have been selected for this process are *Populus Sp.*, and Black Willow. Each of these plants have been selected for their efficiency in the Phytoextraction process, along with climate consideration, and is curated for the sake of residents who will be close by (Figure 52). This phase also integrates site walkways into the existing network, including installations and gathering spaces which would be reacting to the installations that exist on the trail further north (Figure 53).

Phase two begins after 2-3 years of phytoextraction, when the soil contaminants have been removed to an acceptable level (Figure 54). At this point, the multi-generational cohousing, community building, greenhouses, and gardens may begin development. The location of each building and pathway is the result of shadow studies, consideration for the adjacent residences, museum, downtown, and waterfront trail. Central to the site, in front of the museum, a stretch of greenspace is intended to create a productive public space for the



*Figure 52: Existing
Neighbourhood condition*

city, and that adds permeability to the site. The community buildings will collectively house a café, a large gathering/makerspace, and small studio/makerspaces. The makerspaces are intended for residents to fix and build items on site as an alternative to outsourcing tools or expertise. This would be a place where residents could come to fix household items or be creative in their craft. This design also ensures each resident has access to a small portion of land for independent experimentation with agriculture, as suggested by Karen Litfin.¹¹⁰ This has been provided just outside each door in addition to the shared garden space which has been selectively located based on shadow studies. While some space has been allocated for gardening, specific portions of land will remain untouched following the phytoextraction process, as a reminder of this past. These portions are illustrated in a curvilinear shape, located beside the larger gardens. While limited, there is a small portion of space allocated for parking that would house a car sharing system. As part of this phase, the cohousing buildings have been designed in further detail and will be presented in the following subsection.

Phase three would begin with the addition of multi-generational townhomes, gardens, and a community building (Figure 55). Similar to phase two, the additional parking is intended for car sharing and the community building includes smaller makerspaces. The townhome exterior facades will be constructed with brick, responding to the primary material in the existing neighbourhood. This typology primarily faces the existing residential community, as it is alike in density and height. Each townhome will have direct access to the outdoors and will be allocated space within the shared gardens.

Phase four would include the addition of apartments and garden extension, with smaller makerspaces and gardens occupying the roof of each building (Figure 56). As this is the tallest typology it will be located at the core of the development providing a smooth transition in height. The buildings are oriented to achieve limited shadow on adjacent outdoor areas, avoiding larger garden spaces. Units in this typology primarily face the waterfront with circulation on the West side of the building.

Illustrated in section is the relationship between the public and private realm within each housing typology and outdoor community space (Figure 57 and 58). These same relationships can be seen at a larger scale, including the relationship between existing infrastructure in Figure 59 and 60. Relating back to the theoretical framework, each aspect of this design has been built on the three pillars: Living Local, Environmental Resiliency and Inclusive neighbourhood. Figure 61 summarizes some of these larger scale strategies in axonometric view. In red is the integration of urban farming into the proposal. Illustrated in yellow are design strategies influenced by the sun including solar panels and roof orientation. Blue shows where the roof pitch allows for water collection to occur, a system intended for use within the urban farming system. Lastly in green are locations intended for community gathering.

110 Litfin, *Eco-Villages: Lessons for Sustainable Community*



Figure 53: Phase One





Figure 54: Phase Two

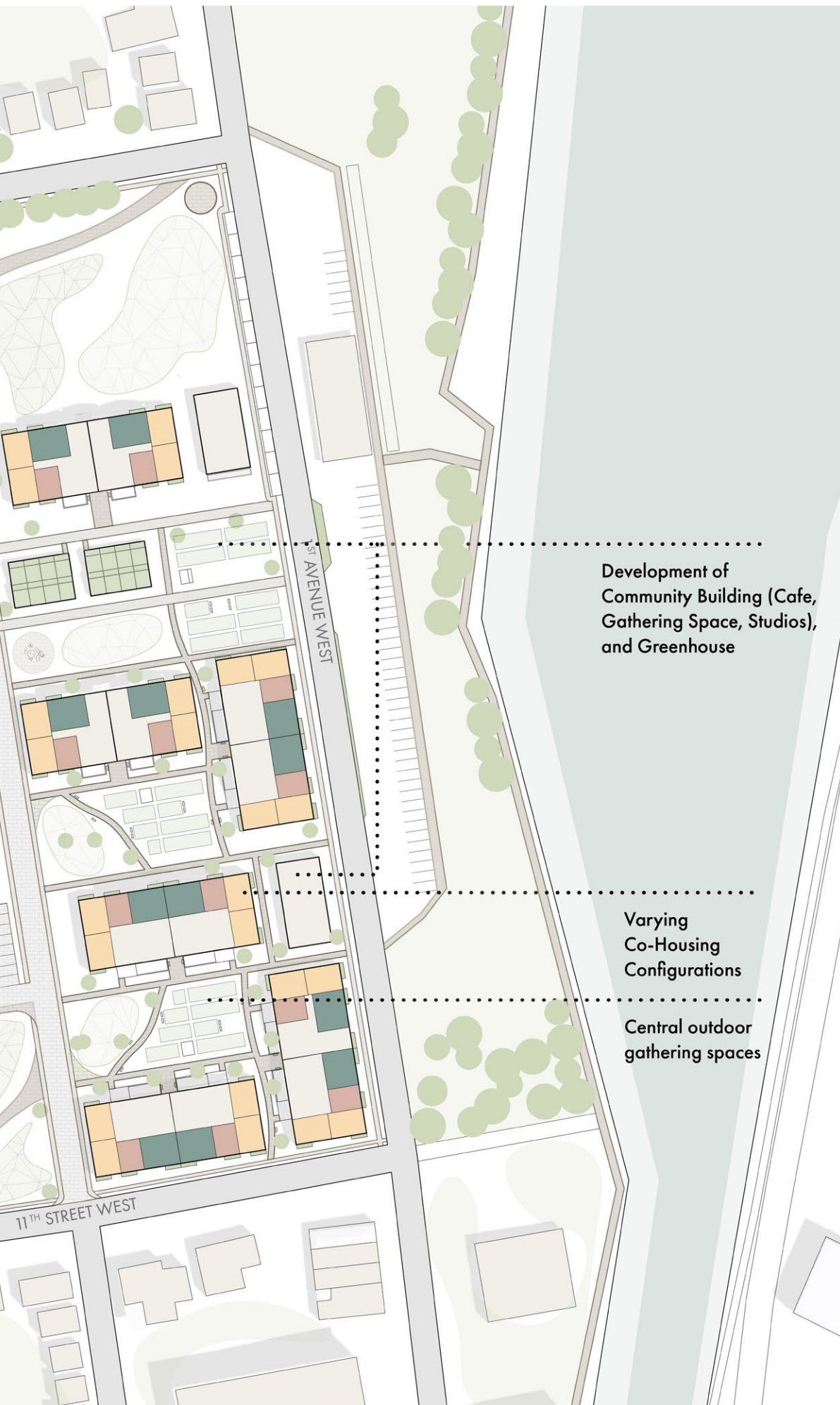




Figure 55: Phase Three





Figure 56: Phase Four



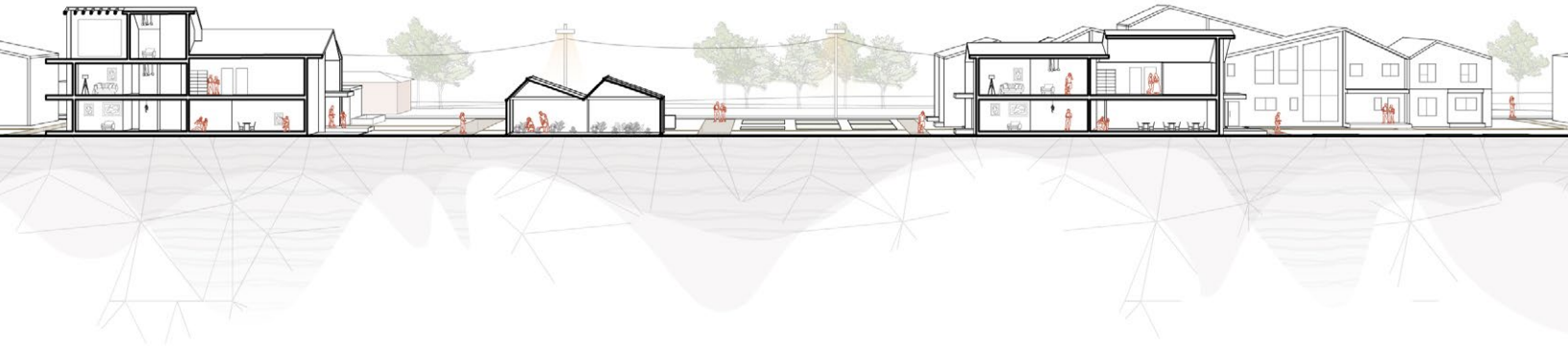


Figure 57: North-South Site Section

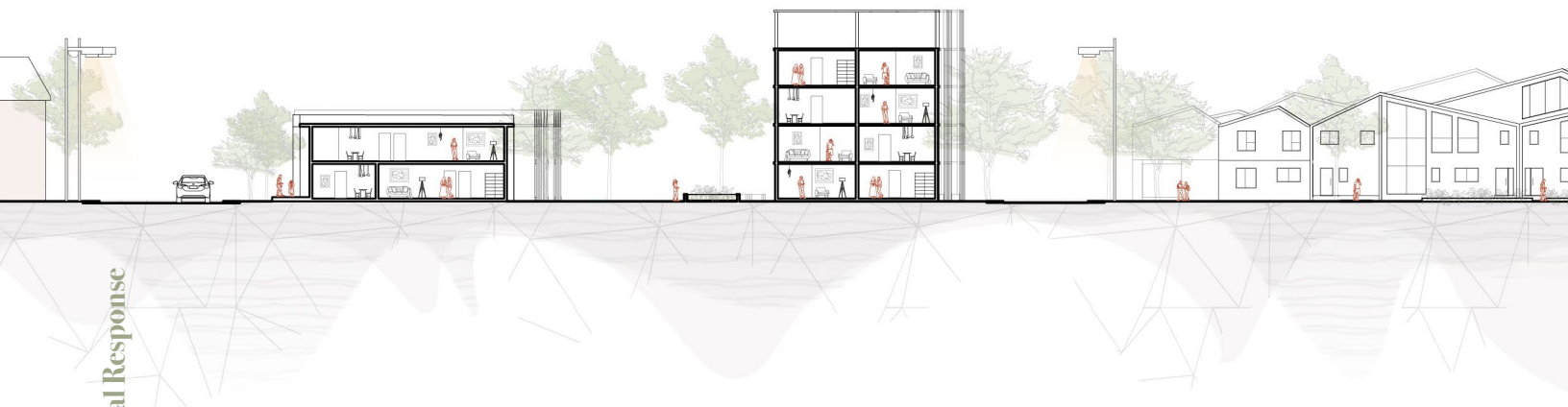
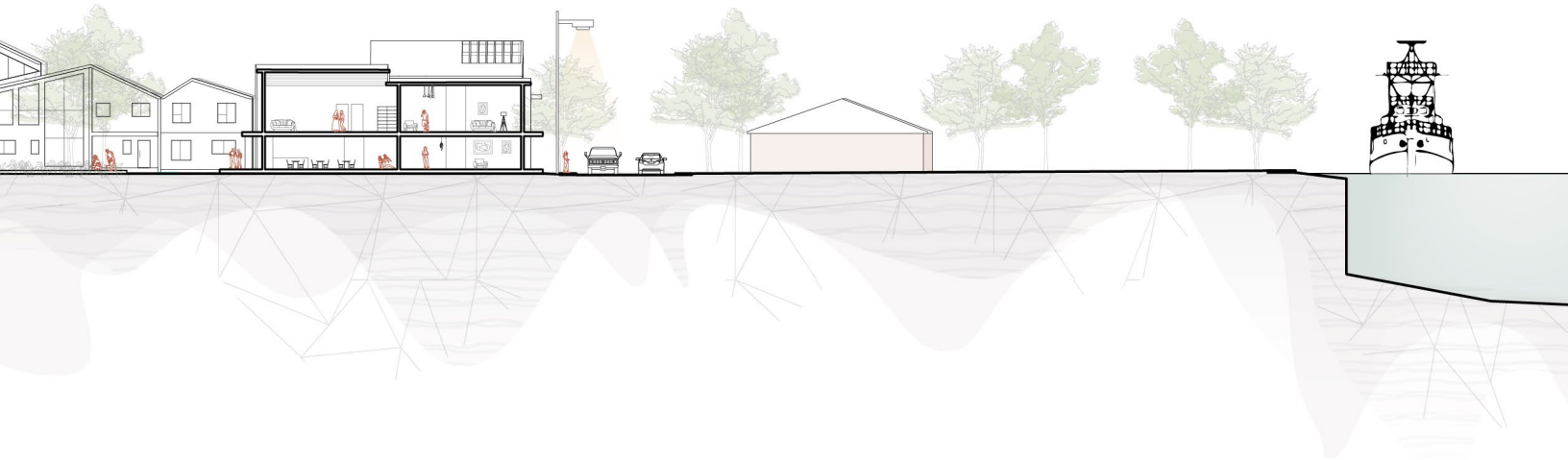


Figure 58: East-West Site Section



Figure 59: Shadow Study Diagram





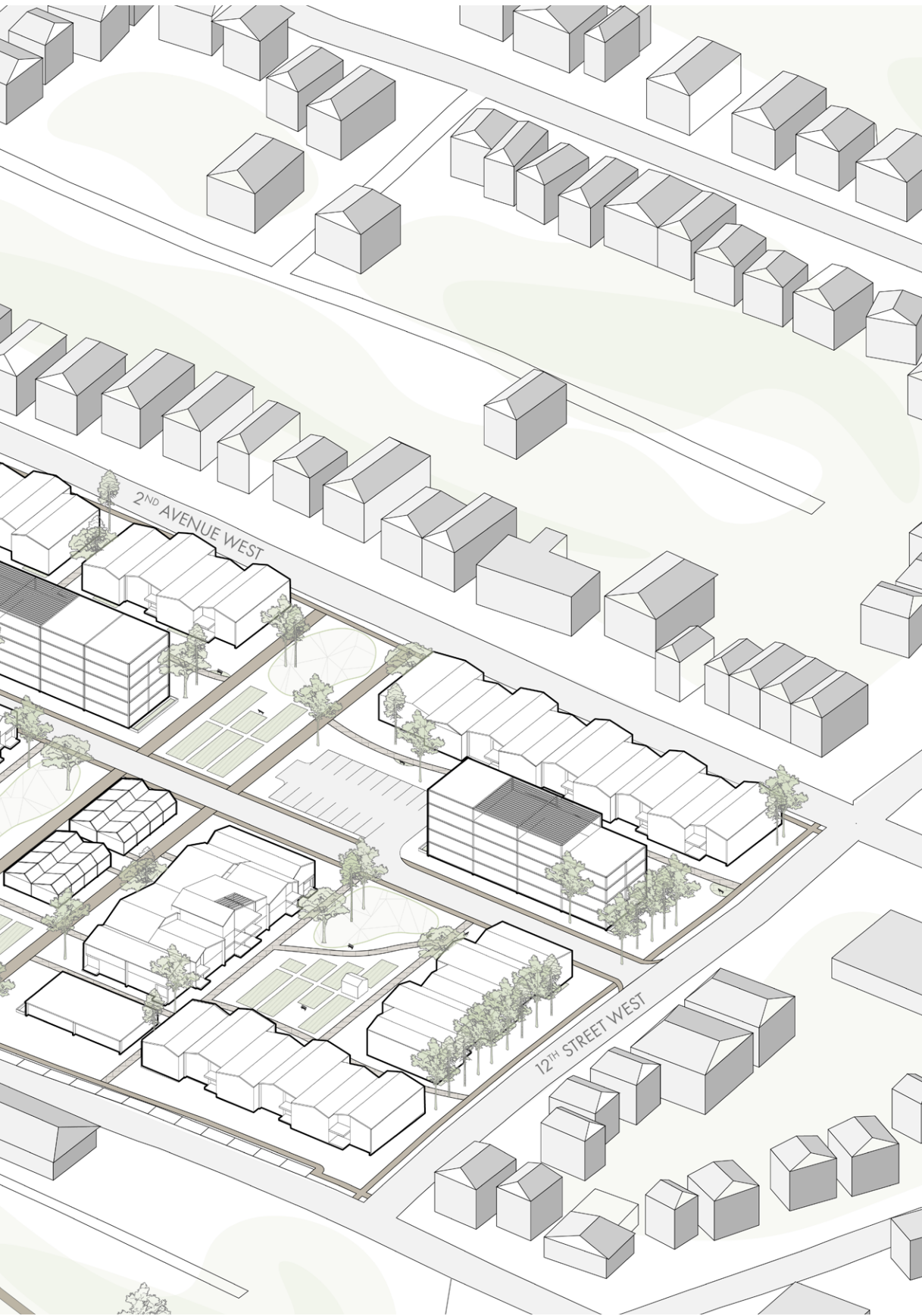


Figure 60: Site
Axonometric View



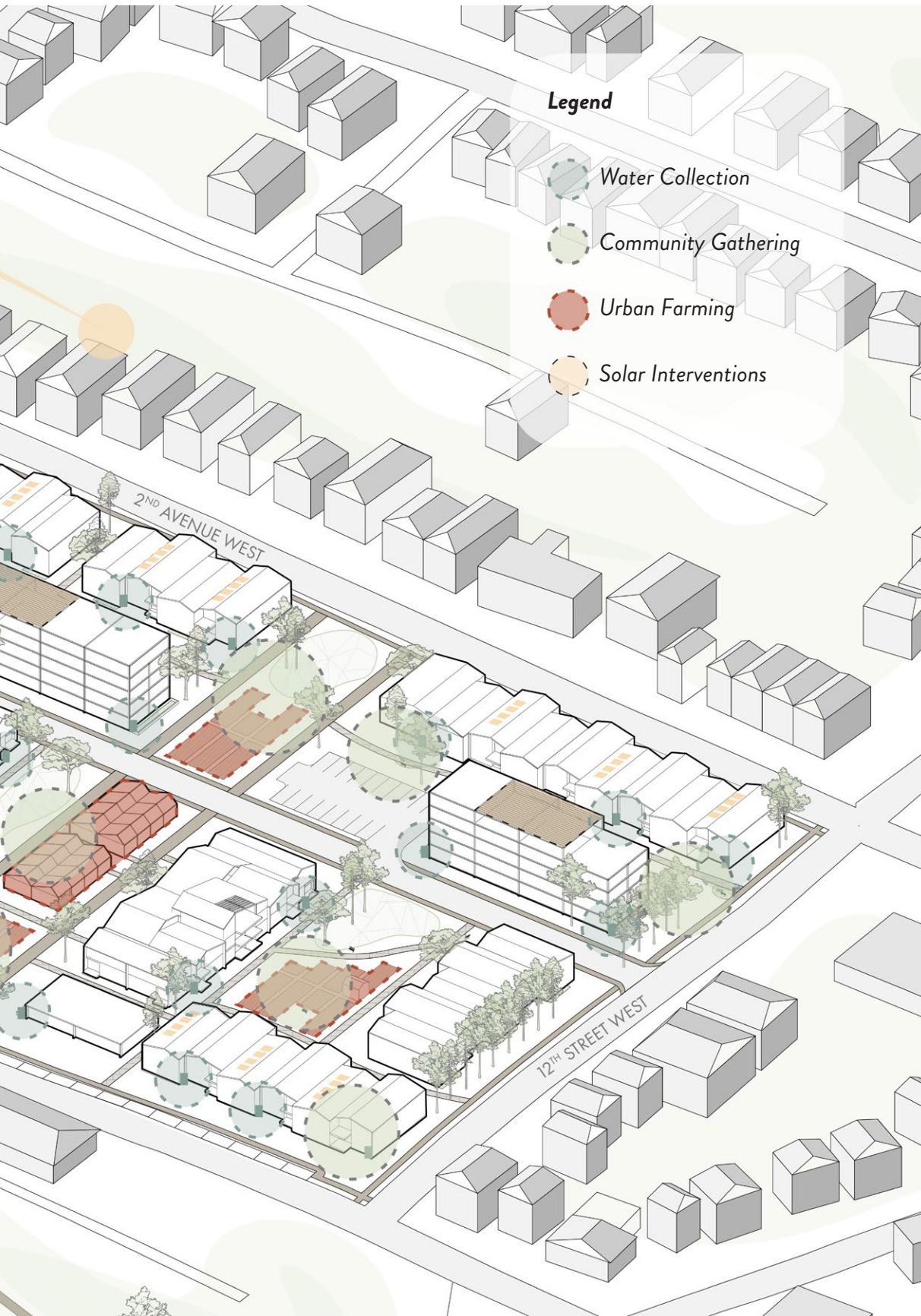


Figure 61: Site Axonometric View of Larger Scale Design Strategies



Figure 62: Courtyard and Interior Perspectives

4.4 At the Building Scale

Returning to the cohousing typology from phase two, the following perspectives depict two views of the proposed buildings (Figure 62). At the top we see an exterior view from the courtyard, which is occupied primarily by urban farming intersected with circulation paths. The larger windows on the façade indicate a higher level of transparency due to the public nature of the interior space. Similarly, in the private dwelling the percentage of glazing decreases to allow for appropriate privacy. Below is an interior view illustrating the main common space shared by residents from 6-unit dwellings. This large common space is open to above allowing lines of sight from the kitchen, dining area, children play area, library, craft space and living room. In section, the levels of privacy from common space to individual dwelling becomes clearer, illustrated with potential ways residents may appropriate the space (Figure 63).

The modular nature of the design allows for flexibility based on site conditions, which has resulted in two main floor plan variations. Beginning with the first variation, the building can be entered from the public garden space where you arrive at a mudroom equipped with an area for coats and boots (Figure 64). Slightly ahead of this are 6 large cubbies, one for each unit, which allows each household to store their outdoor things in the entrance area. This was one thing that appeared essential in my visit at Whole Village, as their entry was quite



Figure 63: Cohousing
Section

small and lacked sufficient storage space. To the left of the entry is the main kitchen and dining room, which has a direct line of sight to the children's play area and looks into the courtyard, programmed with urban farming. Surrounding this communal space are individual units, each including a smaller kitchen layout to account for the larger common kitchen. The larger kitchen is where many meals will be shared, scheduled 2-4 times a week depending on the group's needs. The private units do not include laundry machines as this would also be a shared amenity, further contributing to affordable practices. At the either ends of the building are two three-bedroom units, which extends up to the second floor. The one- and two-bedroom units remain on one level. As mentioned, at the site scale, each unit has direct access to the outdoors with a privacy buffer of vegetation and a change in elevation height to better separate the private from the public realm.

Arriving at the second floor, the slightly smaller common space includes a shared laundry room, small library, lounging space, and craft table (Figure 65). There is also a guest room which is located to the right of the stairs. Continuing up to the third floor, which has a significantly smaller footprint, we arrive at a semi-private and private office space (Figure 66). These rooms are intended to be used for residents who may work from home, but have been designed to be appropriated by their users as a smaller makerspace that complement the one in the main shared building. This level also houses a mechanical room and small outdoor terrace shared by neighbours.

The second cohousing variation providing a more central common space (Figure 67). The intention of this shift is to allow each resident's common space a visual connection to their respective courtyard. This change additionally alters the flow of pedestrian traffic, allowing for smoother circulation on site. The same amenities occupying each floor in variation one remains the same in this variation. Similarly, the three-bedroom units remain at the corners, with the one-bedroom unit beside the kitchen and the two-bedroom unit beside the main entrance (Figure 68).

In elevation, the materiality of the façade becomes clearer. With reference to the site's first industrial life as a planing and matching mill in 1857, the façade mostly consists of wood. In Figure 70, we can see the elevation which faces the courtyard. Figure 71 is street facing and shows the residents balconies, which have been pushed into the facade for protection and privacy. We can also see the third-floor outdoor space which has partial shade protection from a pergola-like structure.



Figure 64: Cohousing
Variation 1, First Floor



Figure 65: Cohousing
Variation 1, Second Floor
Figure 66: Cohousing
Variation 1, Third Floor



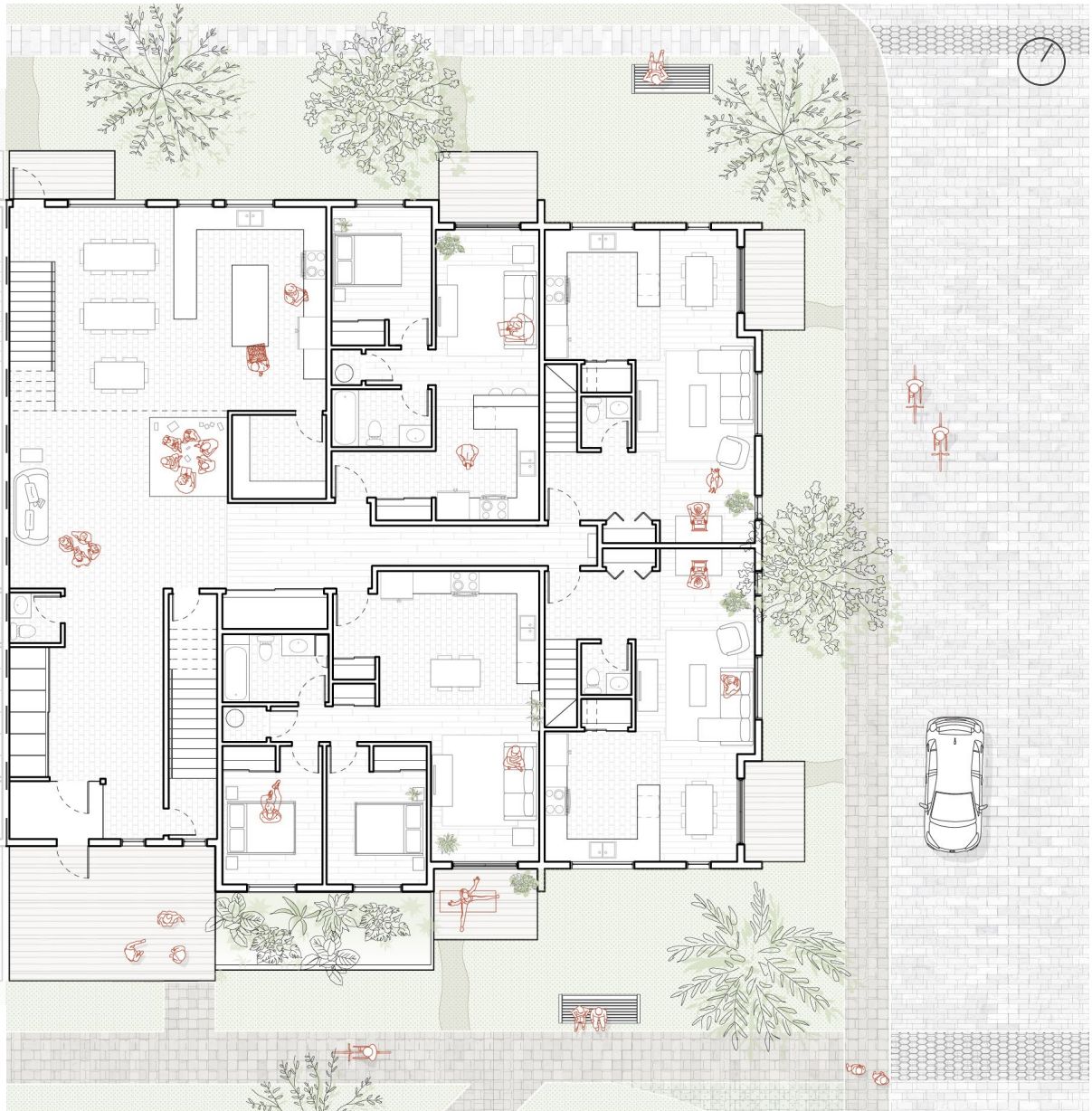


Figure 67: Cohousing
Variation 2, First Floor



Figure 68: Cohousing
Variation 2, Second Floor
Figure 69: Cohousing
Variation 2, Third Floor





Figure 70: Cohousing
Coutyard Elevation



Figure 71: Cohousing Street
Elevation





Figure 72: BCK Site Visit
Photograph

As our cities develop, the responsibility to design for climate resilience within the existing urban fabric becomes increasingly important. Rather than resorting to urban sprawl to accommodate for an ever-increasing population that requires housing and resources, the answer may be in the core of our communities. Internationally eco-villages are leading examples of how low impact living can be implemented in a wide variety of contexts, pushing the boundaries of how our neighborhoods and communities are designed.¹¹¹ This thesis highlights that “urban renewal” is an underutilised category of eco-village development, presenting an opportunity to redesign our current cities with the intent to regenerate existing social and natural environments.¹¹²

111 Register, Peeks, “Village Wisdom, Future Cities: The Third International Ecocity and Ecovillage Conference Held in Yoff, Senegal, January 8-12, 1996”, 63.

112 Hugh Barton, *Sustainable Communities the Potential for Eco-Neighbourhoods* (London: Earthscan, 2009), 69.

Owen Sound is a great case for this research. With the need already identified by the community members and a diversity of housing typologies in demand, there is a potential to push the boundaries of regenerative design. This thesis opposes the current proposal at the old Black Clawson Kennedy site with a variation of housing typologies at a range of scales (Figure 72). It introduces additional community programming with a café, makerspace, and urban farm facilitating a walkable, socially diverse system for residents. Careful consideration for the existing neighbourhood ensures that the proposal responds appropriately to the current density. Placing quality of life as a priority in design for residents and neighbours has guided this proposal.

Although this thesis is driven by the place, the framework for regenerative design may be applicable to various communities. While the principles could relate to many urban brownfield sites, the methodology of participatory design observation is one that can and should be used again. This bottom-up approach ensures that a design proposal comes from the people who will be affected by it. In addition to the positive implications of diverse perspectives, this practice will encourage those included to become involved in the community. With input and feedback from local residents, the design is more likely to succeed.

With a limit on time and acknowledging that the proposal is one of a multifaceted nature, the scope of research was intentionally narrowed down in its core principles. While this was a necessary decision for the purposes of this thesis, I hope to continue exploring these avenues further. The particular areas of research being, the integration of technical systems, building envelope design, and a more in-depth application of passive design strategies. These are all aspects of a sustainable community and would have become the next stage in the design process. The intention behind working at two scales was to capture the essence of life in this eco-village. These unexplored avenues would have expanded these scales to include a medium and detailed level of design.

Imagining that this proposal was to reach phase four, my hope would be that the practices extend beyond the boundaries of the site, resulting in a fifth phase of design (Figure 73). As those living in the community bring their knowledge to friends and family, these methods of living have the potential to grow in other homes, connecting likeminded individuals. In addition to existing relationships, individuals from the adjacent neighbourhood may become part of this larger network through the available public programming. The aspirations for this thesis go beyond what has been presented and I acknowledge the complex nature of such multifaceted development. There is an eco-responsibility placed on designers as the effects of climate change become increasingly urgent. The answer may be at the heart of our cities, reimagining urban sites into social and environmental hubs for regeneration that affect change.



Figure 73: Phase Five



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