

Retrofitting Tarmac Wastelands

Designing for Social and Ecological Permeability

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

This thesis investigates urban strategies to restore ecological and social permeability in underutilized tarmac surfaces of commercial and industrial areas built on ecologically sensitive sites. The city of Toronto has seen urban development where the natural flow of many creeks and ravines had been dramatically altered and re-engineered to flow through concrete culverts buried beneath the vast fields of impervious asphalt surfaces (parking lots), commercial complexes, industrial or residential development. One such site is the Leaside Industrial and Business area that sits on the path of the buried Walmsley brook, a part of the Don River watershed. This site is surrounded by the Don Valley on three sides has been facing major ecological challenges like flooding due to the presence of vast areas of impervious surfaces. The area also faces social challenges, like a disconnect between the Leaside and Thorncliffe Park Neighborhoods and the gradual loss of affordable housing. The site has a significant industrial past and, over the years, saw retail encroachment with the arrival of SmartCenters and other big boxes. With the Eglinton LRT coming up and the development pressure, many industrial companies are migrating to suburbs, giving rise to underutilized industrial and commercial spaces. The site is ripe for transformation and has the potential to explore alternate ways for redevelopment.

The design strategies that would be used to arrive at an urban retrofit proposal would address the aspects of permeability at different scales— from surface permeability, designing for flood resilience, reviving parts of the buried hydrology, and parallelly strengthening the social aspects. This would also provide an opportunity to incorporate sites for local food production in community agriculture and local cafes to increase food security and catalyze social permeability between the two neighborhoods. The design proposal would put forward an alternate way of redeveloping post-industrial sites on buried creeks in Toronto. The key impact of this research would be to question the present redevelopment practices and explore a more ecologically and socially sensitive approach, while examining the transformative potential of these vast under-utilized surfaces.

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My family has been highly supportive throughout this thesis and my career. Thank you, Mom, Dad, Harsh, and Amrita, for the constant motivation.

Dedication

To my Family

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Chapter 01: Introduction

- 1.1 Context
- 1.2 Case Study 1
- 1.3 Case Study 2
- 1.4 Reflection on Case Studies

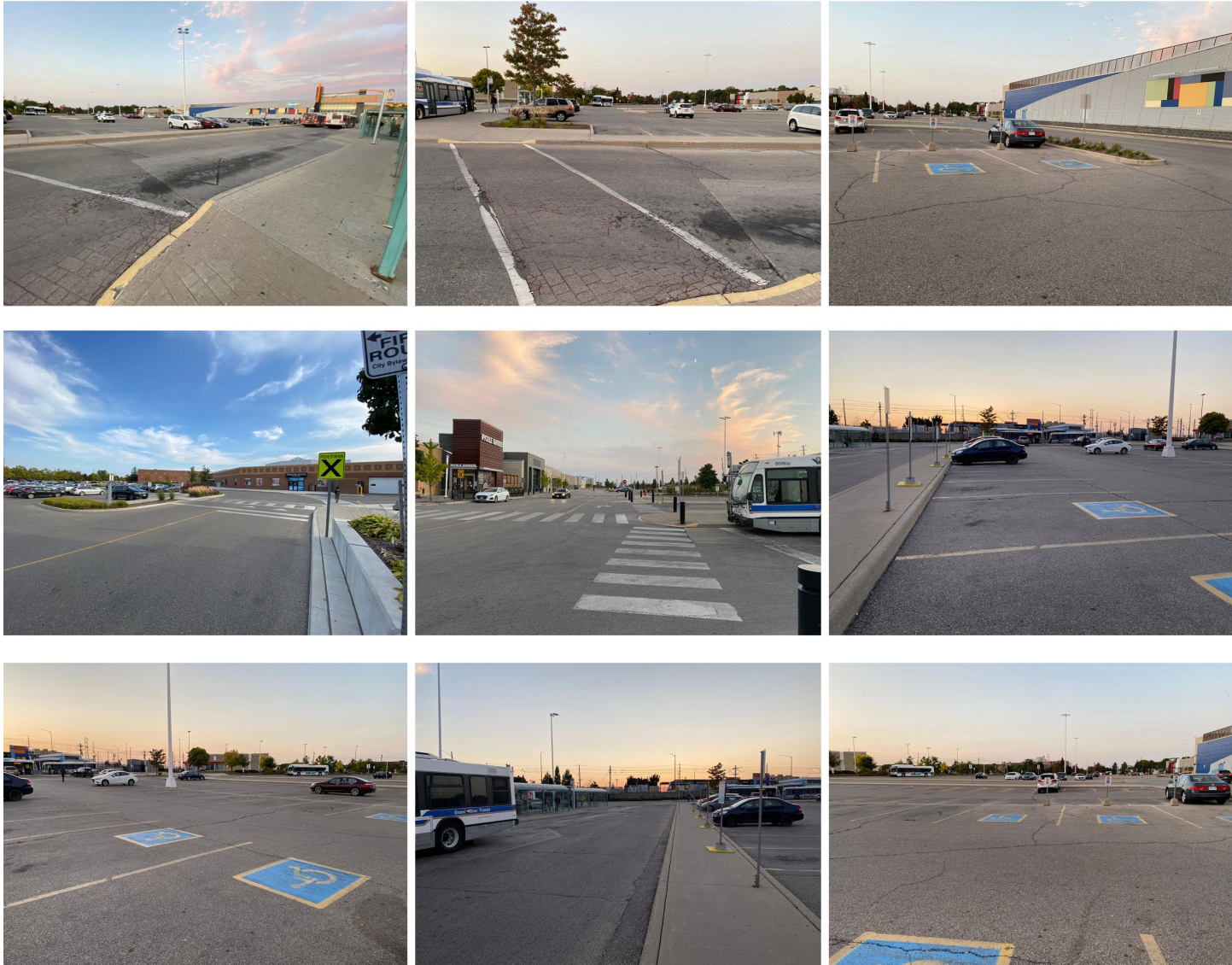


Fig. 1.1 Underutilized parking lots of Conestoga mall, Waterloo

1.1 Context

Looking at the ariel view of many cities in the North American region, we see huge ‘tarmac wastelands’ composed of surface parking lots of commercial or industrial spaces. These urban conditions have evolved from the typology of big-box shopping malls in vast fields of parking lots and industrial spaces that are either abandoned or underutilized. This leads to many ecologically and socially impermeable spaces that weaken the urban environment. They produce a different scale of problems when they are constructed on sites of infilled wetlands or creeks. Many malls and commercial complexes have been constructed on lands that have been developed on buried creeks. In their book *Retrofitting Suburbia*, Professor Ellen Dunham Jones and June Williamson say that “When regional shopping malls were first developed in already existing communities, they were often sited on wetlands, creek beds, or other areas of land that had been deemed unsuitable for residential subdivision and were therefore vacant and available.”¹

In many cities, burying rivers, creeks, or wetlands for urban development was common. The natural flow of many creeks and rivers had been dramatically altered and re-engineered to

1 Dunham-Jones, Ellen, and June Williamson. 2011. “From Regional Malls to New Downtowns Through Mixed-Use and Public Space.” In *Retrofitting Suburbia: Urban Design Solutions for Redesigning Suburbs*, by June Williamson Ellen Dunham-Jones, 114. Hoboken, N.J.: Wiley.



Fig. 1.2 Aerial photograph of Frisco, Texas, showing how dull and monotonous surface parking lots have become an integral part of our everyday lives.



Fig. 1.3 Southdale Centre, Edina, Minnesota is the first modern shopping Centre. 1956.

flow through concrete culverts buried beneath the vast fields of impervious asphalt surfaces of commercial and industrial development. The overlaps between urban development and watersheds have posed significant challenges; this is rooted in the intentions of the developers and city planners to control and shape the watercourses that border on the planned development areas.² The film *Lost Rivers* by Caroline Bacle examines the hidden rivers of many cities worldwide that were buried underground and merged with the sewer systems to counter disease and pollution and also provide large parcels of land for urban development. This burial resulted in severe environmental effects like frequent flooding and sewer overflows. The film also presents successful examples of daylighted rivers like the Cheonggyecheon River in Seoul, which were brought back to the surface after 40 years of burial and integrated into public life.³ In the wake of climate change, the film encourages us to re-examine the relationship between the built environment and the city's natural resources and understand the importance of reintegrating the buried ecology into our cities.

The strategies of reviving the buried hydrology from underneath the under-utilized impermeable surfaces are studied through two case studies: Restoration of the Phalen Wetland from an abandoned shopping center and daylighting of Thornton Creek from a parking

2 Rinne, Katherine, Jason King, Nicholas Power, and Joan and Mills, Helen O'Reilly. 2017. *Hidden Hydrology*. July 11. Accessed August 8, 2021. www.hiddenhydrology.org.

3 2012. *Lost Rivers*. Directed by Caroline Bacle.



Fig. 1.4 The abandoned ruins of Landover Mall in Maryland which was taken down in 2006.

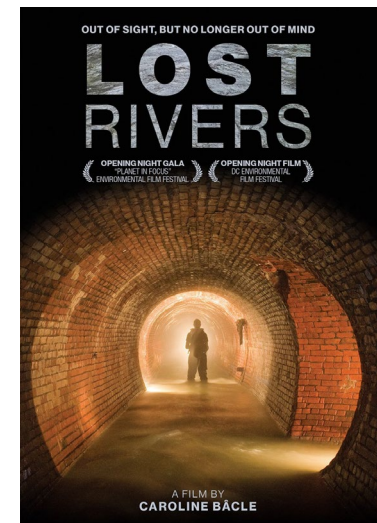


Fig. 1.5 Cover of the film *Lost Rivers* by Caroline Bacle

lot. These case studies show how retrofitting existing conditions can provide us an opportunity to restore the previously destroyed wetlands, creeks, or other ecologically sensitive landscapes that are often casualties of large-scale development. The Lost Rivers Foundation in Toronto has been mapping the disappearing watershed of Toronto and working towards raising awareness. The city of Toronto used to have a strong relationship with its ecology, especially the rivers. However, recent years have seen major industrial and commercial development happening on the banks as well as on infilled creeks. The impact of these major reshaping of the natural landscapes is seen in flooding patterns on the areas developed on these buried creeks. Helen Mills, a Toronto resident and the founder of Lost Rivers, who is actively engaged in the community awareness projects for the buried watershed, says that “It’s a constant struggle to balance development and the protection of the rivers and protection against flooding.”⁴ With the magnitude and frequency of occurrence of these landscapes, it becomes essential to look at these as sites ripe for transformation and question the potential of the design of these impermeable spaces to integrate urban development with its buried ecology.

This thesis would follow the structure of first understanding the social and ecological problems of under-utilized tarmac surfaces built on ecologically sensitive sites through detailed case studies and reflections. The case studies would help identify the analysis factors and understand the forces involved in retrofitting ecologically sensitive sites. The second chapter would look at these problems in Toronto’s context through the selected site of Leaside Industrial and Business Park built on the buried Walmsley brook. The site would be studied for aspects of ecological and social impermeability issues through maps, historical images, and photographs of present conditions. Five potential design strategies would be identified based on the site analysis and the case studies. These design strategies would help arrive at an urban redevelopment plan for the area of Leaside Industrial and Business Park with an approach that is more ecologically and socially sensitive. This alternate design proposal would serve as an example of the potential of impermeable spaces in Toronto to restore the city’s relationship with its ecology.

4 Rinne, Katherine, Jason King, Nicholas Power, and Joan and Mills, Helen O’Reilly. 2017. *Hidden Hydrology*. July 11. Accessed August 8, 2021. www.hiddenhydrology.org.

1.2 Case Study 1

Re-greening of Phalen Shopping Centre, St.Paul, Minnesota

Site History/Context

Phalen Shopping Centre was constructed on a wetland in 1959 in the suburban area of St.Paul, Minnesota. Ames Lake, the wetland site on which this mall was built, was a part of an elaborate water system that formed the water flow from Lake Phalen to the Mississippi River. Lake Ames and other chain lakes were host to fish, wildlife habitats and were a major flyway for migratory songbirds and waterfowl.⁵ “Marian Seabold recalled the day in the early 1960s when she awoke to heavy smoke in the air. The peat in the wetland was on fire, and the smoke hung in the air for weeks. Soon dump trucks filled in the wetland to prepare for the building of Phalen Shopping Center with the expectation that a major highway would be routed nearby. But that road was never built. Eventually, Phalen Center’s shelf life would come to an end.”⁶

5 Dunham-Jones, Ellen, and June Williamson. 2011. “Retrofitting Social Life Along Commercial Strips.” In *Retrofitting Suburbia : Urban Design Solutions for Redesigning Suburbs*, by Ellen Dunham-Jones and June Williamson, 74. Hoboken, N.J.: Wiley.

6 Passi, Sage. 2020. *Ramsey-Washington Metro Watershed District*. May 7. Accessed August 8, 2021. www.rwmwd.org.



Fig. 1.6 The failing shopping centre and surface parking lots in 1997.



Fig. 1.7 The abandoned and deteriorating condition of Phalen Shopping mid-1990s.

In the mid-1990s, the condition of the shopping center and its parking lot had deteriorated beyond repair. The large vacant lot and the dying mall had a major negative effect on the communities' identity. Additionally, the parking lot had started bucking in many places, with cattails growing in the pavement cracks and the ends of the lot occasionally filled up with water given its ancestral wetland grounds (mallards and Canadian geese were often found paddling here since it was their stopping ground along their migratory path).⁷

Redevelopment Plan and Design Strategies

The strategy for retrofitting this project was adopting the re-greening approach-- restoring the wetland and using it as a catalyst for future economic development. Densification was not a feasible option since this was a region of a low or negative economy. Also, given the site's geographical location, design strategies to restore the wetland were considered the most viable immediate retrofit approach. Professor Joan Nassauer of the Department of Landscape Architecture at the University of Minnesota proposed a conceptual design for rebuilding the lake and its wetland. The excavation that started in 1998 revealed the original wetland soil beneath the sand infill of the mall and parking lot. After excavation, the groundwater started seeping in, and the site was left dormant for a year to allow the local aquatic vegetation to return to the area naturally. The proposed 'Ecological Neighbourhood' played many vital roles: restoring the wetlands and

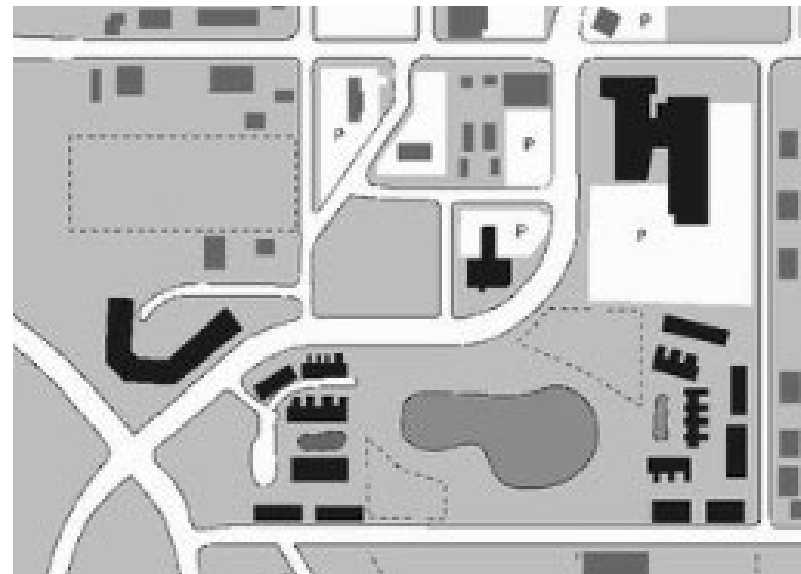


Fig. 1.8 Plan after the restoration of Ames lake and the wetlands with new road layout and surrounding developments in 2005.



Fig. 1.9 The restored Phalen Lake and Wetlands

7 Passi, Sage. 2020. *Ramsey-Washington Metro Watershed District*. May 7. Accessed August 8, 2021. www.rwmwd.org.

the lake system with migratory birds' habitat, filtering and retaining storm-water, supporting an affordable development, and working as a catalyst for further economic growth.⁸

Community Engagement

Revival of the wetland involved the participation of local school students, who helped plant seedlings, monitoring the water quality and its ecological transformation. They interacted with the community, residents, and leaders to organize events and awareness programs. The neighborhood has embraced this return of the lake. To this day, they use it for nature walks, bird-watching, and fishing. They bring their lunches over to sit on the benches during their breaks.⁹

Ecological and Economic benefits

With the restoration of wetland, there was demonstrated increased local biodiversity. Even though the proposed transit center (in the original development plan) was eventually not built, this project catalyzed the construction of new market-rate housing on the lake's periphery. "A 2007 report estimated the market value of the project had increased over \$26 million since 2000."¹⁰

8 Passi, Sage. 2020. *Ramsey-Washington Metro Watershed District*. May 7. Accessed August 8, 2021. www.rwmwd.org.

9 Ibid.

10 Dunham-Jones, Ellen, and June Williamson. 2011. "Retrofitting Social Life Along Commercial Strips." In *Retrofitting Suburbia : Urban Design Solutions for Redesigning Suburbs*, by Ellen Dunham-Jones and June Williamson, 74. Hoboken, N.J.: Wiley.



Fig. 1.10 Students planting seedlings along the revived edge of Lake Ames



Fig. 1.11 High School students accessing the water quality and documenting the ecological transformation.

1.3 Case Study 2: Redevelopment of Thornton Creek from an under-utilized parking lot in Seattle, Washington

Site History/Context

Similar to the previous case, the Northgate neighborhood in Seattle had an underutilized 9-acre parking lot, south of the Northgate Mall, where vast asphalt surfaces were built on the headwaters of Thornton Creek.¹¹ Given its ancestral land, this parking lot of Northgate was naturally prone to flooding. A drainage pipe (60 inches) buried under the surface parking lot was the only medium that carried the flow of the creek and storm-water runoff from the surrounding commercial developments, streets, and the interstate highway. Additionally, the Thornton Creek water ecosystem had faced continuous degradation due to runoff from the impervious surfaces of surrounding commercial development. Rapid urbanization and removal of natural vegetation from around the creek also contributed to the high composition of toxins in the runoff, affecting biodiversity and local water quality. Local environmentalists suggested restoring the creek, while the city developers and planners were interested in

11 Giraldo, Greg, and Sarah and Davies, Melanie Preisler. 2010. "Thornton Creek Water Quality Channel: From Parking Lot to Channel Headwaters." In *Low Impact Development 2010*, by Greg Giraldo and Sarah and Davies, Melanie Preisler, 1712. Seattle

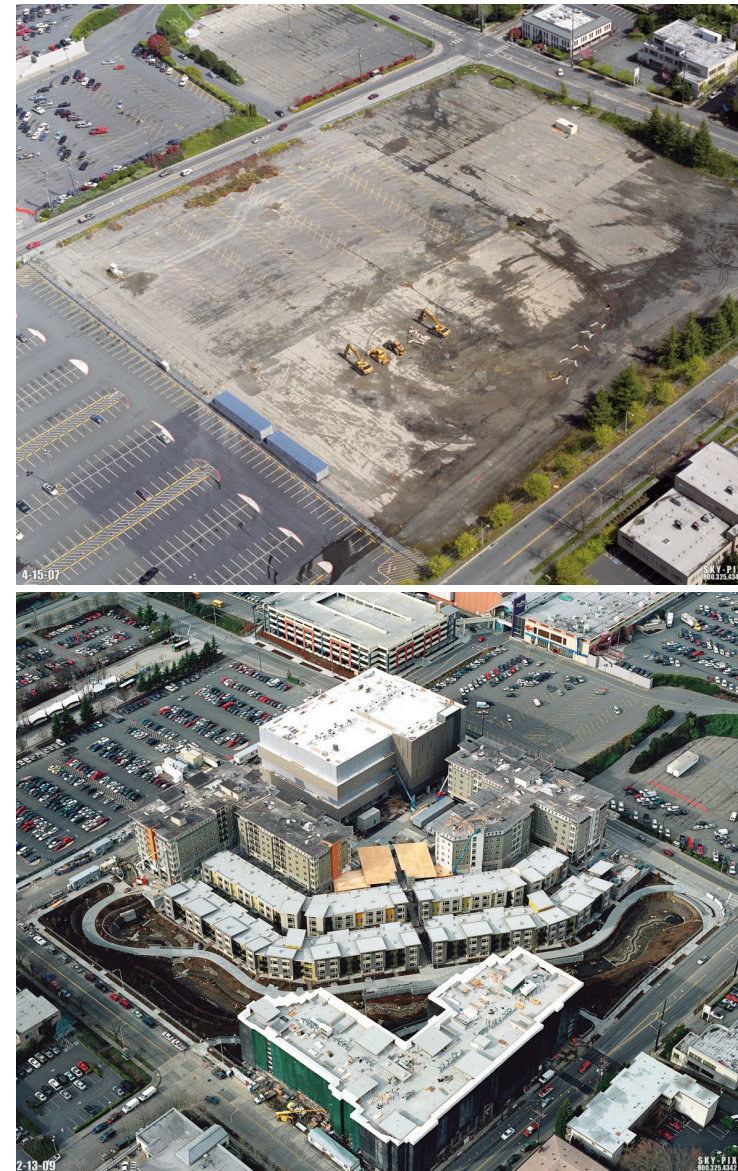


Fig. 1.12 Before and Construction-in-progress pictures

densifying the area since a terminus of the light rail line was proposed adjacent to the site. Therefore the redevelopment proposal was to incorporate mix-use development and pedestrian orientation in the design of Thornton Creek Water Channel, which is a ‘soft’ landscape designed as storm-water infrastructure.¹²

Redevelopment Plan and Design Strategies

The design strategies for the redevelopment of Thornton Creek incorporated ecological, economic, and community benefit factors. The Landscape Architecture Foundation defines this project as follows: “Carved out of an abandoned parking lot, the Thornton Creek Water Quality Channel treats urban storm-water runoff from 680 acres within a necklace of channels, pools, and terraces designed to mimic the performance of a natural creek. Its lush plantings overlooking and paths have added 2.7 acres of public open space to the Northgate Urban Center and catalyzed surrounding redevelopment. The facility is a model for how multi-functional landscapes can be integrated into the dense urban fabric.”¹³

12 Giraldo, Greg, and Sarah and Davies, Melanie Preisler. 2010. “Thornton Creek Water Quality Channel: From Parking Lot to Channel Headwaters.” In *Low Impact Development 2010*, by Greg Giraldo and Sarah and Davies, Melanie Preisler, 1709-1720. Seattle

13 Benfield, Kaid. 2011. “How to Turn a Parking Lot Into an Ideal Green Community.” *The Atlantic*, November 22.

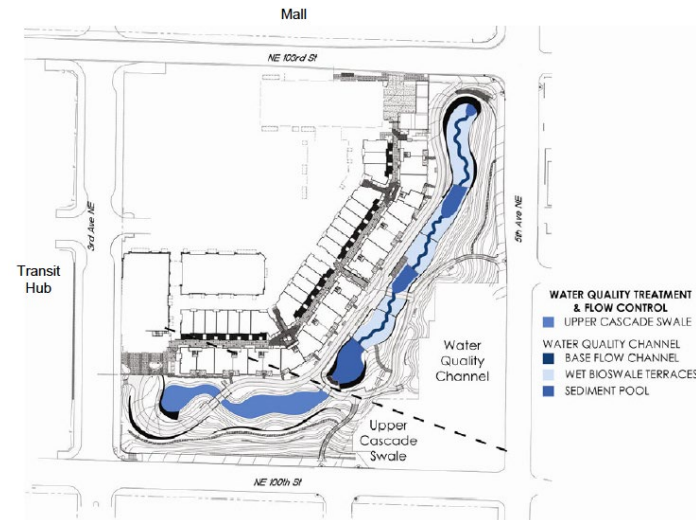


Fig. 1.13 Elements regulating flow and water quality treatment



Fig. 1.14 Mixed-Use Design elements and open spaces for community engagement

Ecological strategies:

The Thornton Creek Channel was designed to improve storm-water quality by incorporating a diverse vegetation palette to increase biodiversity and filter pollutants from storm-water. This vegetation palette increased wildlife habitat, which was reflected in the number of species after redevelopment. There was also a significant decrease in impervious surfaces (approximately 78%).¹⁴

Economic strategies:

The new development plan of Thornton Place comprised 109 condos, 278 apartments, retail, and an open public plaza. This transit-oriented development with mixed-use and pedestrian connection to the surroundings was a catalyst for economic development.¹⁵

Community Strategies:

The design of the pedestrian streetscape connected the open public spaces, creek, pathways, bridges, and residential neighborhoods strengthen the social life of the communities and neighborhoods.¹⁶

14 Benfield, Kaid. 2011. "How to Turn a Parking Lot Into an Ideal Green Community." *The Atlantic*, November 22

15 Ibid.

16 Ibid.

1.4 Reflections on Case Studies

Retrofitting can allow us to restore the ecology that was initially destroyed by the development patterns in suburbs or urban centers, especially the sites developed on wetlands, creeks, or other ecologically sensitive landscapes. Parallel to this, there is an opportunity to integrate the neighborhood's social fabric and build connections that strengthen the community's social life and possibly catalyze economic development. This approach of restoring the ecology and social life can be seen in both the case studies of Phalen and Seattle, although in different contexts.

Re-greening of the Phalen project was situated in negative economic growth, and the primary objective of the project was to restore the wetlands and encourage its natural proliferation with minimal built intervention. On the other hand, although the redevelopment of Thornton Creek focused on restoring the natural creek watershed, there was also a significant focus on designing the mixed-use development and pedestrian paths connecting to neighboring communities. Both of these projects helps me understand the forces at play in the retrofitting of ecologically sensitive sites (wetlands and creeks), which would help with the site selection in the context of Toronto and understand the factors in its analysis.

Chapter 02: Site

Leaside Industrial and Business Park

- 2.1 The Hidden Hydrology of Toronto
- 2.2 The Story of the buried Walmsley Brook
- 2.3 Ecological History of Leaside Lands
- 2.4 The First Settlement
- 2.5 Evolution of Leaside as an Industrial Business Park
- 2.6 Encroachment of Retail in the Industrial Lands
- 2.7 Ecological Impermeability: Tarmac Coverage and Flooding Issues
- 2.8 Social Impermeability: Disconnect between Neighborhoods
- 2.9 Development Pressure due to Eglinton LRT
- 2.10 Challenges

2.1 The Hidden Hydrology of Toronto

The city of Toronto has many creeks and ravines, which are a part of six major watersheds: Etobicoke Creek, Mimico Creek, Humber River, Don River, Highland Creek, and Rogue River. This city, too has buried many smaller ravines and tributaries over the years for urban development—starting from 1800 where Toronto had many rivers flowing into Lake Ontario. Over the last 200 years, they had been buried and piped in culverts to provide uniform land surfaces for the cities’ development. The correlation between areas of heavy urban development and the infilling of Toronto’s rivers can be seen in these maps.

Many organizations and groups like Lost Rivers, Toronto Green Community, Toronto Field Naturalists, and The Vanishing Point are working towards mapping and photographing the present conditions of the buried watershed and raising awareness among the residents by organizing Nature Walks and other programs.¹ Pieces of evidence of these buried watersheds can be seen in the city as small disturbances in the otherwise typical city layout, like small curves and slopes on the streets, sudden dead ends. Helen Mills, a Toronto resident and founder of Lost Rivers, says that “these little perturbations of the grid are actually deeply meaningful symptoms

1 Rinne, Katherine, Jason King, Nicholas Power, and Joan and Mills, Helen O’Reilly. 2017. *Toronto lost Rivers*. July 11. Accessed August 19, 2021. www.hiddenhydrology.org



Fig. 2.1 The lost Parsons Creek of North York redirected in a corrugated metal storm sewer.



Fig. 2.2 The Spadina Storm Trunk Sewer built to redirect the Castle Frank Brook in Toronto.

Fig. 2.3. The Buried Watershed of Toronto

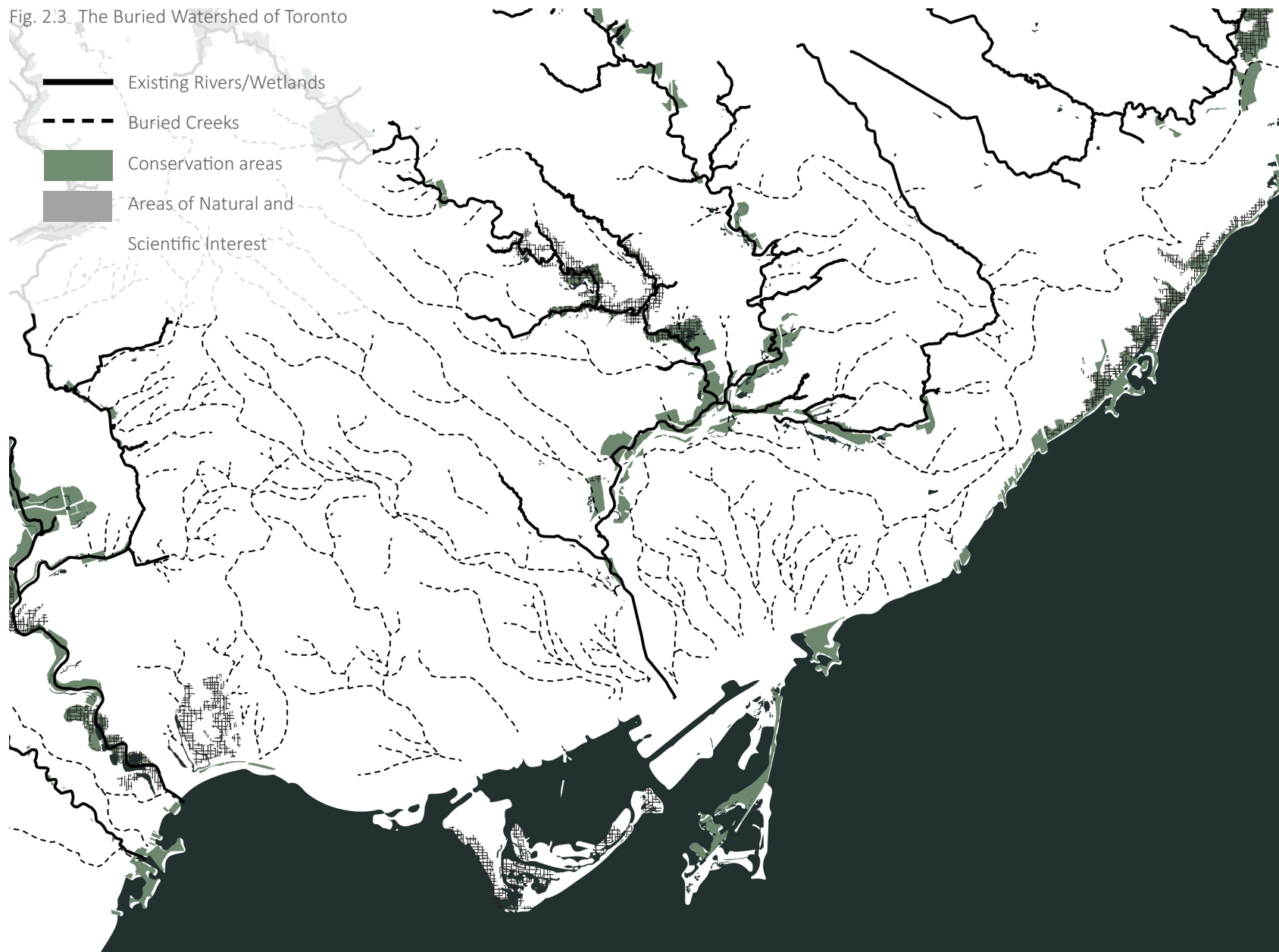
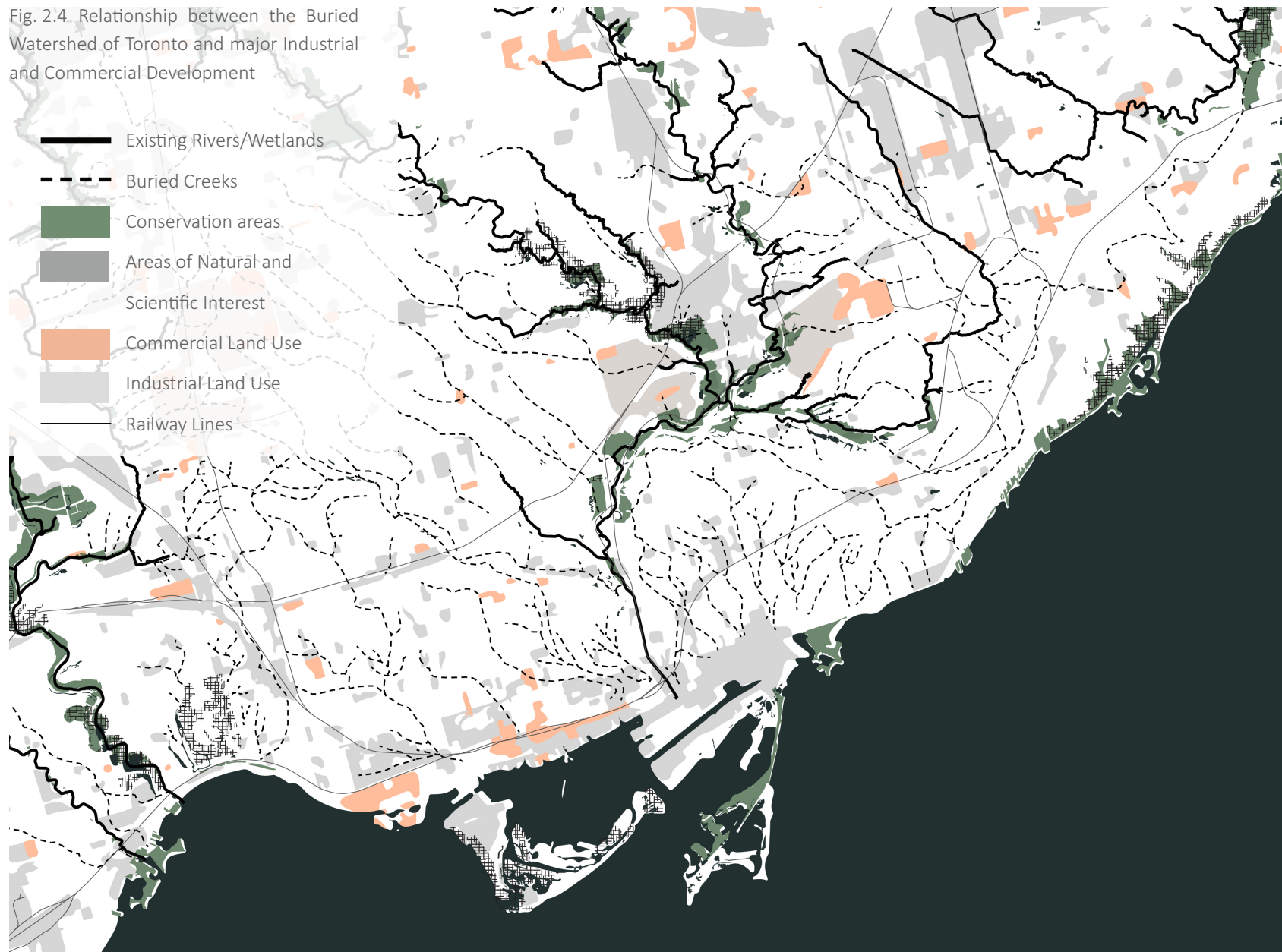


Fig. 2.4. Relationship between the Buried Watershed of Toronto and major Industrial and Commercial Development



of a buried past: a landscape of deep ravines, bubbling brooks and primordial forest that has been obliterated by the building of the city.”² Even though some of Toronto’s watercourses have been filled in and diverted into culverts, we are harshly reminded of their presence in the form of flooded basements, sinking houses, and overflowing storm sewers.

In many cases, the loss of natural flow and stream length leads to damage and flooding in those areas. Now the human impact of these major reshaping of the natural landscape of the cities is being rethought, as its consequences are seen in flooding patterns of the areas developed on these buried creeks. Helen Mills says that “It’s a constant struggle to balance development and the protection of the rivers, and protection against flooding.”³

The map in figure 2.3 shows the present watershed of Toronto, the creeks that have been buried over the years, the Conservation areas (regionally significant lands like valleys or environmentally sensitive areas), and Areas of Natural and Scientific Interest. Figure 2.4 overlays the layers of major commercial and industrial land uses in Toronto over the map of existing and buried natural heritage. This map helps understand the correlation between commercial

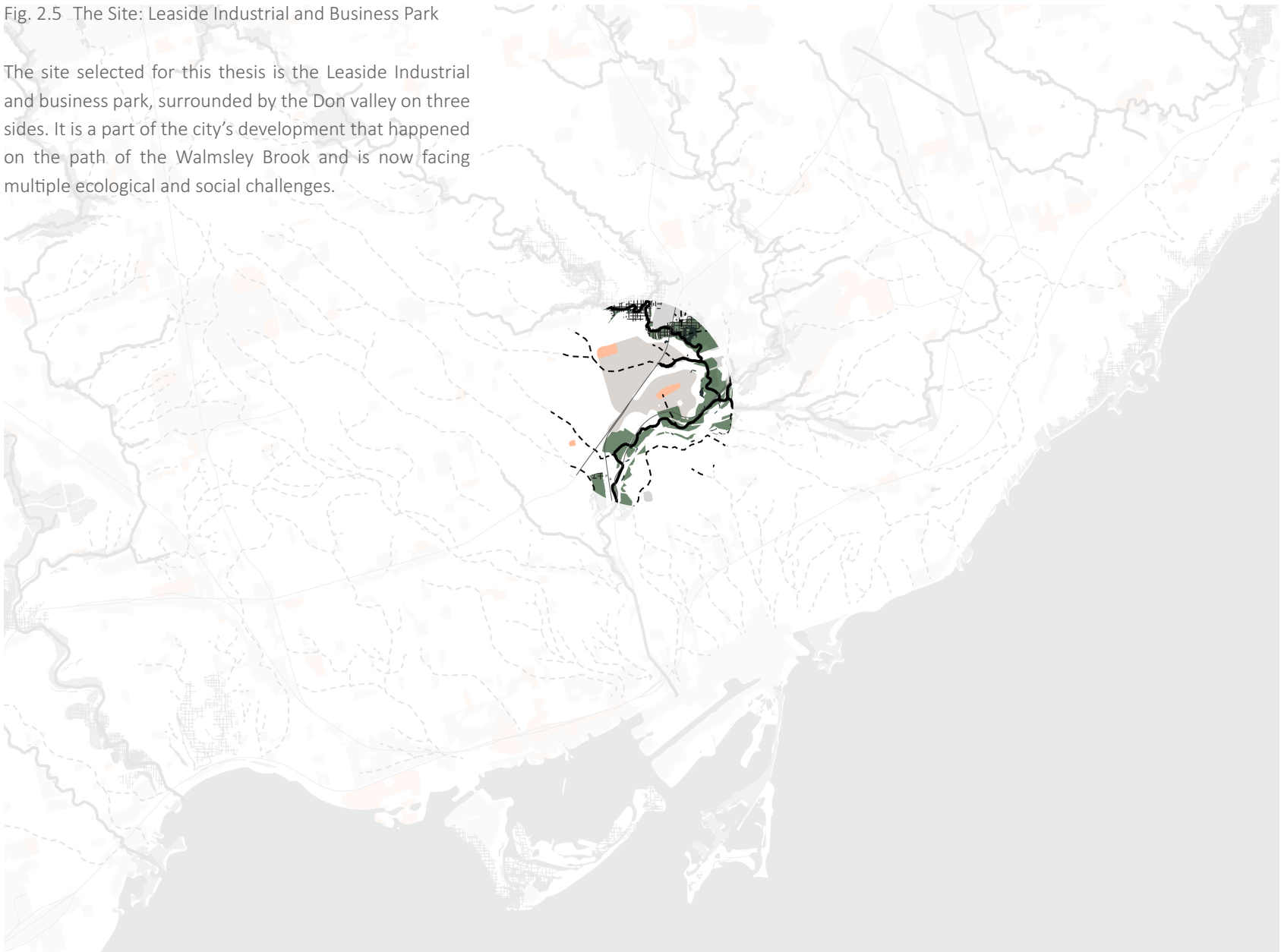
and industrial development and the buried watershed, showing which urban development areas led to the infilling of Toronto’s watershed. The overlay of the natural heritage of Toronto and major development zones helps us identify many areas that were developed on ecologically sensitive sites and have the potential for ecological restoration from their current situation. The site that would be studied in detail for this thesis is the buried Walmsley Brook in the Leaside Industrial and Business Park of East York (figure 2.5). This site is surrounded by the Don River and conservation areas on three sides.

2 Mills, Helen. 1995. *Lost Rivers Introduction*. Accessed August 19, 2021. www.lostrivers.ca.

3 Rinne, Katherine, Jason King, Nicholas Power, and Joan and Mills, Helen O’Reilly. 2017. *Toronto lost Rivers*. July 11. Accessed August 19, 2021. www.hiddenhydrology.org

Fig. 2.5 The Site: Leaside Industrial and Business Park

The site selected for this thesis is the Leaside Industrial and business park, surrounded by the Don valley on three sides. It is a part of the city's development that happened on the path of the Walmsley Brook and is now facing multiple ecological and social challenges.



2.2 The Story of the buried Walmsley Brook

Walmsley Brook, which used to be a part of the Don River watershed, originated as two small streams near Duplex Avenue and Alexandra Boulevard (Northwest of the present Sunnybrook plaza). It flowed southeast past the Bayview and Eglinton junction (site of Sunnybrook Plaza) and Leaside's present commercial and industrial development area (approximately near SmartCentres Leaside) to join the Don river in Ernest Thompson Seton Park. It was around 6km long.⁴ 'Leaside,' a book by Jane Pitfield, mentions that the site of the present Sunnybrook Plaza used to be a marsh, where the locals used to take loam for their gardens. In 1922, this brook was piped, and with the construction of Sunnybrook Plaza in 1952, it was buried beneath it. Further commercial and industrial development affected the brook's flow, and it was lost beneath it.⁵

The site selected for this thesis, the Leaside Industrial and business park, is a part of the city's development that happened on the path of the Walmsley Brook and is now facing multiple ecological and social challenges, which will be discussed in the following sections.

4 Kettel, Geoff. 2020. *The old rivers that still flow below*. October 11. Accessed August 19, 2021. leasidelife.com.

5 Ibid.

2.3 Ecological History of Leaside Lands

The ancient glacial Lake Iroquois partly submerged the area now known as Leaside in c. 12000 BCE, whose shoreline cut across the southeast corner of the Leaside Industrial Business park area. Since the site was submerged under a succession of Lakes for thousands of years, it was shaped by the movement of sedimentary deposits like sand, silt, and rocks. The receding Lake Iroquois flattened the area forming plateau-like Leaside lands, a part of 'Iroquois Plain.' The centuries of runoff from the branches of the Don carved deep valleys around three sides of Leaside lands.⁶

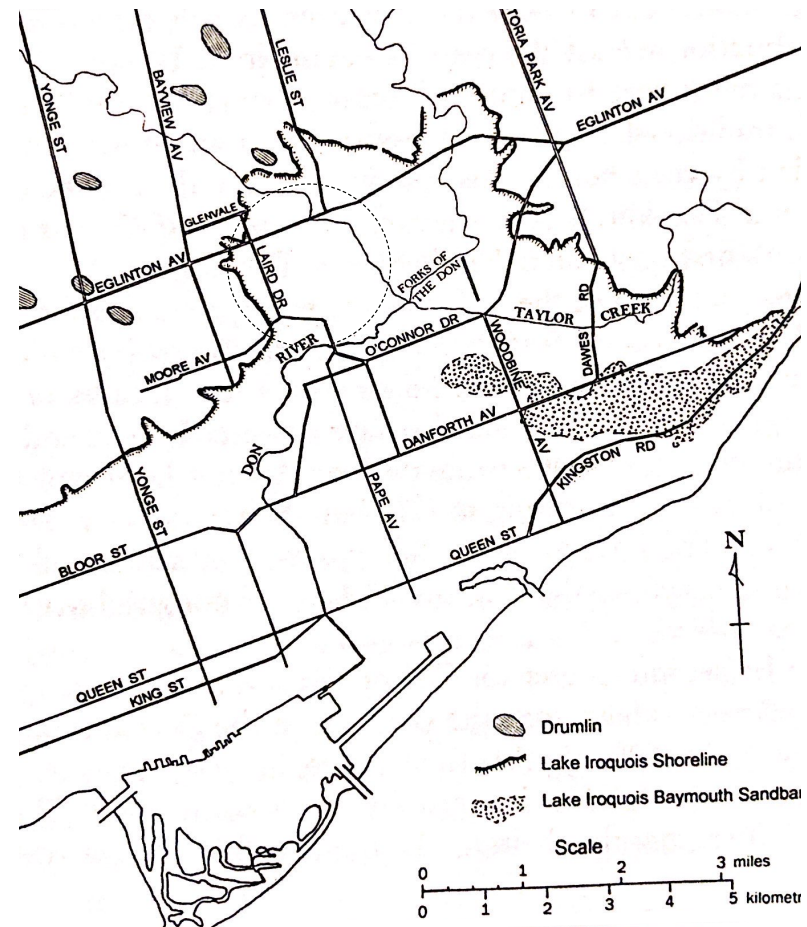


Fig. 2.6 Map showing extent of the waters of Lake Iroquois. Mapwork by Ed Freeman

6 Pitfield, Jane. 2000. "From Pre-Settlement to Settlement." In *Leaside*, by Jane Pitfield, 2. Toronto: Natural Heritage Books.



Fig. 2.7 Aerial view of the Leaside Industrial and Commercial Area

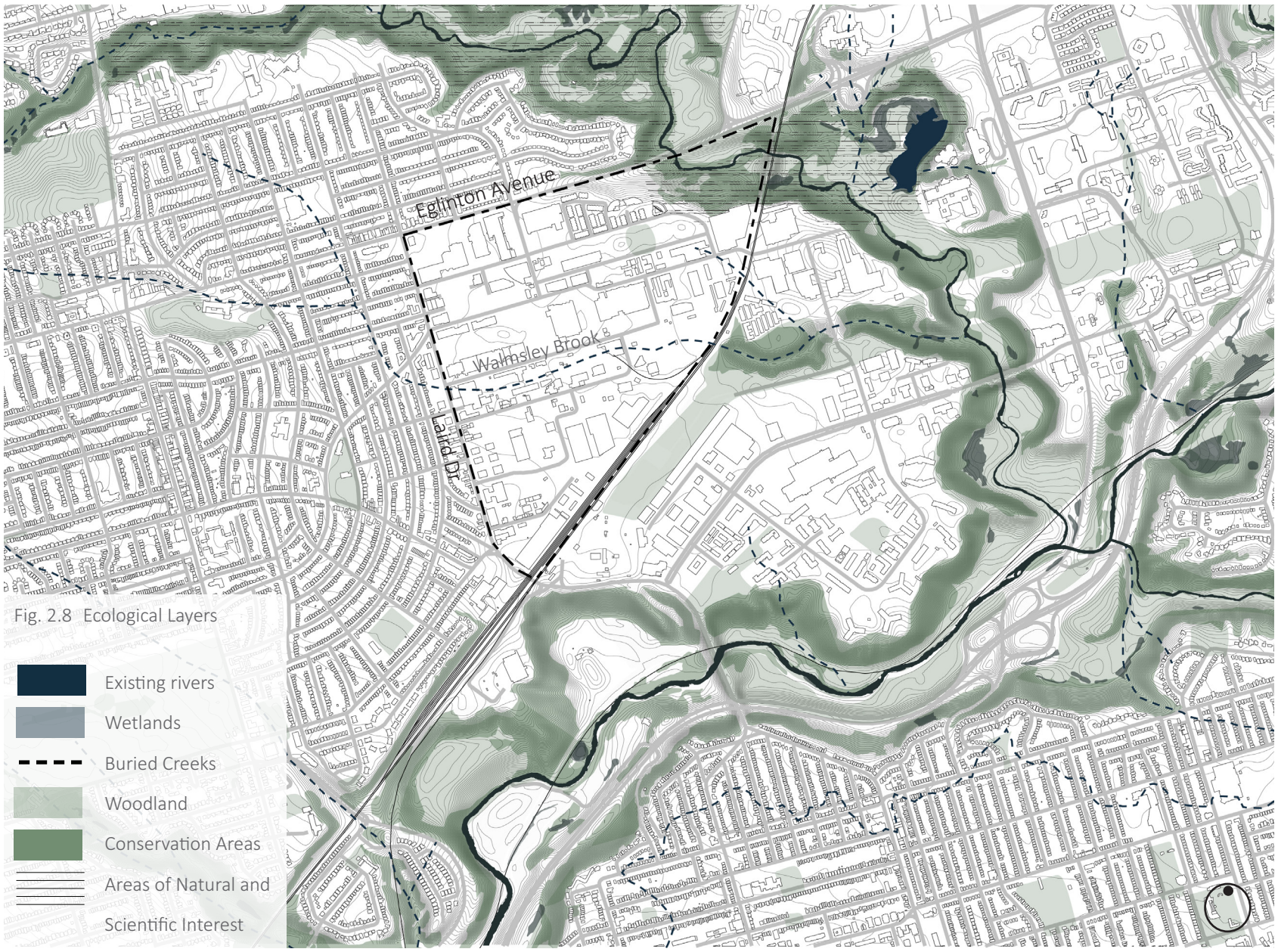


Fig. 2.8 Ecological Layers







-  Existing rivers
-  Wetlands
-  Buried Creeks
-  Woodland
-  Conservation Areas
-  Areas of Natural and Scientific Interest



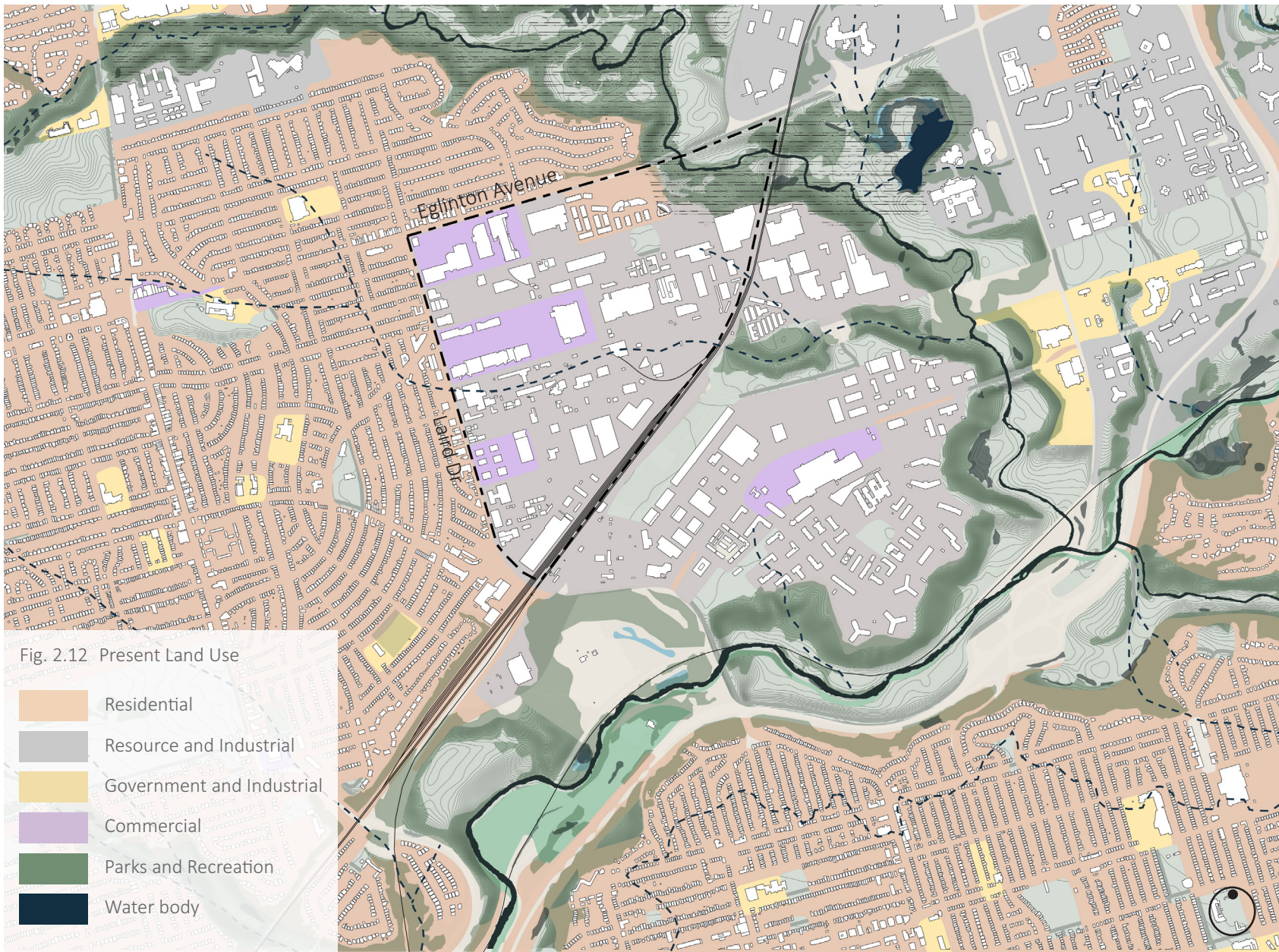
Fig. 2.9 West Don Trail at ET Seton Park, parallel to the Don River and looking towards the Overlea Blvd bridge



Fig. 2.10 The Don River below Overlea Blvd



Fig. 2.11 The Don River Valley



2.4 The First Settlement

The plateau-like topography of Leaside that consisted of rich quality soil ideal for agriculture, surrounded by the Don River on three sides, attracted the aboriginal peoples. Nine thousand years ago, the area of Leaside saw the arrival of the first human settlement of Paleo-Indians who farmed corn, beans, and squash around the area bounded between Bathurst, Eglinton, Duplex, and Strathallen streets. The village of York was established in 1793 with the pressure of the American Revolution and the arrival of Lieutenant-Governor John Graves Simcoe.⁷

2.5 Evolution of Leaside as an Industrial Business Park

The Leaside Area of the early nineteenth century saw the settlement of a Euro Canadian family of John and Mary Lea (after whom the area was named), who purchased the 200-acre land in 1820 and used it for agriculture, given the nature of the fertile lands overlooking the Don River.⁸ The industrial history of Leaside started during the

7 Pitfield, Jane. 2000. "From Pre-Settlement to Settlement." In *Leaside*, by Jane Pitfield, 2. Toronto: Natural Heritage Books.

8 Pitfield, Jane. 2000. "The Lea Family." In *Leaside*, by Jane Pitfield, 5-6. Toronto: Natural Heritage Books.

1870s, with the purchase of the southeast corner of the Leaside land by the Ontario and Quebec Railway (OQR) for the construction of a railway line from Toronto to Peterborough. This line was later leased by Canadian Pacific Railway (CPR) to build railway maintenance shops, rail sidings, and a Leaside Junction railway station. With the northward urbanization of Toronto, the land parcels surrounding the railway were bought by Canadian Northern Railway, with a vision to plan a residential community parallel to the railway zone. Landscape Architect Fredrick Todd designed the residential area following the Garden city principles with curvilinear streets and separated residential from commercial and industrial land uses.⁹ On the other hand, the neighboring Thorncliffe Park neighborhood was developed on a former racetrack overlooking the Don. Both these neighborhoods were divided by the CPR railway tracks, which continue to be a form of the physical and social divide between the two neighborhoods even today.

9 Watson, Andrew. 2014. *An Unpredictable Path to the Suburbs: A History of Toronto's Leaside Neighbourhood*. May 15. Accessed August 19, 2021. niche-canada.org.

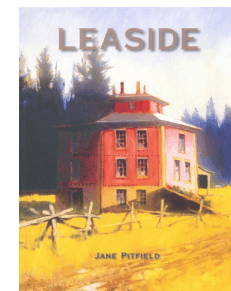


Fig. 2.13 The book 'Leaside' by Jane Pitfield

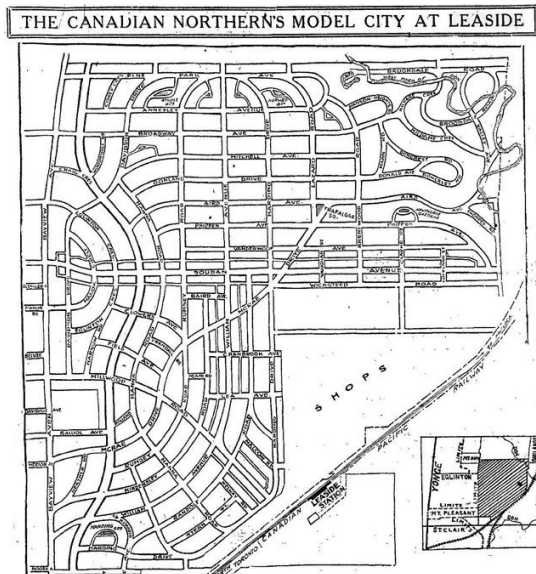


Fig. 2.14 The town of Leaside was designed by Fredrick Todd Frederick Todd as a development for a community to be built around a maintenance yard for their railway.



Fig. 2.16 Thorncliffe Park was a bold 1950s plan by the Town of Leaside to redevelop a former racetrack overlooking the Don River.



Fig. 2.15 The Leaside CPR Railway station in 1899.



Fig. 2.17 The CPR railway tracks acting as a physical divide between Leaside and Thorncliffe Park.

The vision of this Leaside suburban development was affected by the outbreak of World War I and the onset of the Great Depression. In her book 'Leaside,' Jane Pitfield talks about the evolution of Leaside as an industrial town. The industrial development area of Leaside played an essential role in keeping Leaside alive during World War I till the late 1930s. Identifying the potential proximity to the railways, Canada Wire and Cable Company was established in 1912 on the industrial part of Leaside. During World War I, the company opened a munitions factory and an airfield to train the Canadian Air Force.¹⁰ Figures 2.18 and 2.19 shows images of the Hangers at Leaside Aerodrome and buildings of Canada Wire and Cable company. From the 1930s, the Leaside industrial area started burgeoning as many industrial companies started setting up their establishments. This industrial growth supported employment and therefore helped increase the residential development in the area.¹¹

The historical map of Leaside in 1913-34, drawn up by John Naulles, a local historian and a cartographer, shows the industrial beginnings of Leaside, which was also called the railway town then. In 1913, Leaside expected heavy industrial growth, where farmlands were sold to industries and real estate companies. "To me, that is the most interesting 20-year period in its 100-year history because it includes

10 Pitfield, Jane. 2000. "Factories Come to Leaside." In *Leaside*, by Jane Pitfield, 39-50. Toronto: Natural Heritage Books.

11 Watson, Andrew. 2014. *An Unpredictable Path to the Suburbs: A History of Toronto's Leaside Neighbourhood*. May 15. Accessed August 19, 2021. niche-canada.org.

1916- During World Wars

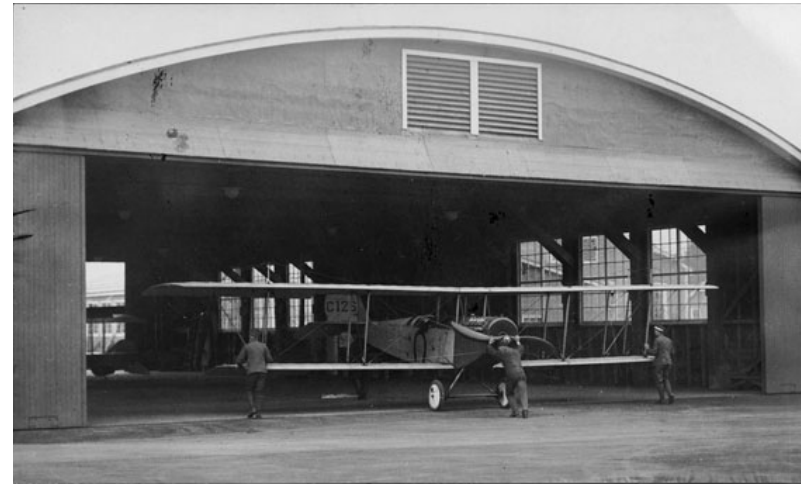


Fig. 2.18 Image of one of the Hangers at Leaside Aerodrome

1922- Factories coming to Leaside

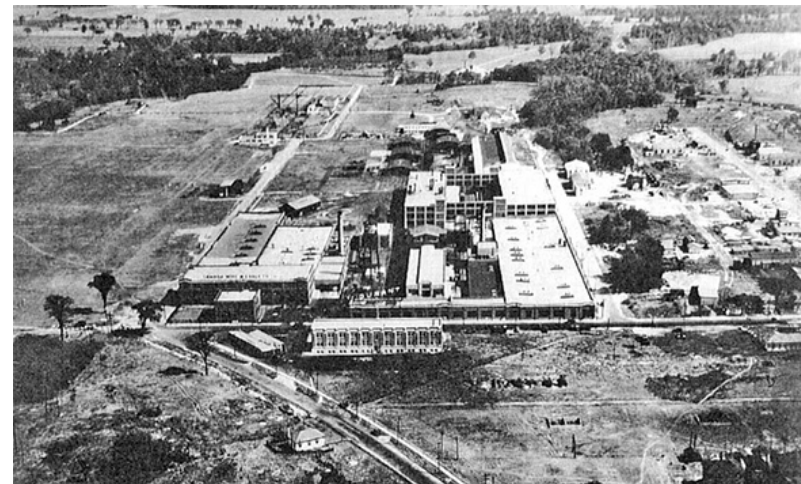


Fig. 2.19 Canada Wire & Cable and Durant Motors buildings with Leaside Aerodromes fields to the North.

Leaside's industrial beginnings, as a railway town, heavy industry, and airfield, through to the closing of the airfield in 1931, and the rail yards in 1933, signaling a change." — John Naulls.¹² The historical map of Leaside in figure 2.20 also shows the path of Walmsley brook running across the Industrial lands of Leaside. With the arrival of industrial buildings like Canada Wire and Cable, Durant Motors, and the Aerodrome, the brook was subsequently filled in and piped near Laird Drive.¹³ Further development saw the construction of Leaside viaduct over the Don Valley, which improved the access from the southeast parts of the Leaside and Thorncliffe Park communities to the then township of East York. It drastically increased the residential development in Leaside.¹⁴

12 Kettel, Geoff. 2020. The old rivers that still flow below. October 11. Accessed August 19, 2021. leasidelife.com.

13 Muir, Robert. 2015. Lost River Walks Toronto - Yesterday's Rivers Are Tomorrow's Flooded Basements. July 30. Accessed August 19, 2021. www.cityfloodmap.com.

14 Watson, Andrew. 2014. An Unpredictable Path to the Suburbs: A History of Toronto's Leaside Neighbourhood. May 15. Accessed August 19, 2021. niche-canada.org.

1927- Construction of Leaside Viaduct



Fig. 2.21 Leaside Viaduct built over the Don Valley drastically improved access from the south and east to the community and stimulated a building boom in the 1930s.

1951- Site of the first Shopping Centre



Fig. 2.22 The dip in the road (the site of the buried Walmsley brook), being 'filled in' for the construction of the new Sunnybrook Shopping Centre

2.6 Encroachment of Retail in the Industrial Lands

The end of World War I saw the slow encroachment of retail in the industrial site of Leaside. The photograph in figure 2.22 shows a dip in the road, which was the site of the former Walmsley brook being filled in to construct Sunnybrook plaza at the junction of Eglinton Avenue East and Bayview Avenue. Sunnybrook Shopping Centre was one of the first strip malls in Toronto, hosting various businesses like banks, supermarkets, drugstores, and hair salons.¹⁵ According to Jane Pitfield, the site of this strip mall used to be a marshland where people took loam soil for their gardens, indicating the presence of the former Walmsley brook path dissecting this site. Further retail growth in the area can be seen in the present land use map of the site.

RioCan's Leaside Centre

The area south of the junction of Eglinton Avenue East and Laird Drive has RioCan's Leaside Centre hosting stores like PetSmart and Canadian Tire. East of this site towards Brentcliff Road has Mercedes Benz dealership, Marshalls, Homesense, Staples, and other small retailers.

15 Pitfield, Jane. 2000. "Merchants of Bayview, McRae, Millwood and Sunnybrook." In *Leaside*, by Jane Pitfield, 89-95. Toronto: Natural Heritage Books.



Fig. 2.23 RioCan's Leaside Centre

Leaside Lake

The site south of RioCan's Leaside Centre, between Vanderhoof Avenue and Wicksteed Avenue, used to be a Corn processing and research facility of J.R. Short Mills, which was demolished to construct a large format retail center. The excavation had started in 2015, but the construction site has been abandoned for five years. Therefore the site gets flooded every spring since the excavation, with water from runoff and melting snow. It is jokingly referred to as 'Lake Leaside' by the locals and has become an established feature in the neighborhood that acts as a resting stop for ducks and geese across Toronto.¹⁶ The site was also described as a graveyard of big-box retail dreams by Bayview News. Concerns from some of the residents regarding the safety issues of an empty lake site with rickety fences led to the decision to drain the lake. This took some time as the sewer systems were unable to bear the water flow from this site.¹⁷ The photograph in figure 2.24, taken in Winter 2020, show the reappeared and frozen Lake Leaside.



Fig. 2.24 The frozen waters of 'Lake Leaside' in January 2021.



Fig. 2.25 Water drained from the site of 'Lake Leaside' in May 2021 for a new retail proposal.

16 Burnside, Rodger. 2020. *Back for its fourth year, Lake Leaside offering a rest stop for the birds*. April 30. Accessed August 19, 2021. streeter.ca.

17 Ibid.

SmartCentres Leaside

The site south of Lake Leaside is of SmartCentres Leaside, a large format commercial center built in 2006, is hosting Sobeys, BestBuy, LCBO, and other retail and food stores. The adjacent land occupied by Home Depot functions in coordination with the SmartCentres. The photographs in figure 2.26 show the island of impermeable tarmac surface at the center with the commercial blocks around it and piles of snow stored in winter. Developers tend to prioritize convenience. This leads to forlorn-looking parking lots that remain underutilized for the major part of the year.¹⁸ Although the interior facing facades of these malls have an arcade for pedestrian movement, the exterior facades are composed of blank walls and service areas, and therefore lack the response to the streets.

Leaside Industrial Park and Cement Plant

South of the SmartCentres site is the Leaside Industrial park, accommodating a range of industrial buildings between Industrial and Commercial street. It hosts car dealerships, storage areas, concrete contractors, small retailers, manufacturing units, recycling centers, concrete suppliers, building materials, and aggregate stores. However, with the development pressure due to the Eglinton LRT construction, the land value is increasing. This has forced many industrial companies to give way to mixed-use and commercial redevelopment schemes, and they have started moving out.

18 Ben-Joseph, Eran. 2012. "A Lot in Common." In *Rethinking a Lot: the Design and Culture of Parking*, by Eran Ben-Joseph, 16. Cambridge, Mass: MIT Press.



Fig. 2.26 Paved parking lots of SmartCentres Leaside

NEWS

EDITION: LEASIDE

Back for its fourth year, Lake Leaside offering a rest stop for the birds

Flooded excavation site has become an annual spring tradition

April 30, 2020 Rodger Burnside geese, Laird Drive, Lake Leaside, Vanderhoof Avenue



Fig. 2.27 Lake Leaside which makes an appearance every spring due to runoff from surroundings.



Fig. 2.29 The Votorantim Cement Plant and Aggregates Store



Fig. 2.28 The abandoned industrial building shells on sites between Commercial Rd and Industrial Rd

2.7 Ecological Impermeability: Tarmac Coverage and Flooding Issues

To study the ecological impermeability, the first step was to map out all the impermeable surfaces on the site literally. Here the term ecological impermeability refers to when a surface or a design element hinders the percolation or flow of water on the site. The map in figure 2.31 shows all the asphalt surfaces of roads, parking lots, sidewalks, and buildings. We see that these surfaces are concentrated in Leaside's industrial and commercial zones, especially along the approximate path of the buried Walmsley brook. The photographs in figure 2.26 are of the SmartCentres parking lots showing the expanse of the impermeable and underutilized surfaces. Apart from its effect on soil and vegetation, vast and continuous paved surfaces create stormwater runoff problems that can cause flooding. Both the events, the burial of Walmsley brook in pipes, and the increase in impervious surfaces in its flow path, can lead to damage and flooding in the area. This aligns with the observation of the City Flood Map, which says that, even though Walmsley Brook has been buried and enclosed in pipes, the residual flow path remains the same. They predict that with extreme rainfall, there could be overland flooding along the original path of the brook, as the storm sewer capacity could be exceeded.¹⁹ Evidence of this could also be seen in Leaside

19 Muir, Robert. 2015. *Lost River Walks Toronto - Yesterday's Rivers Are Tomorrow's Flooded Basements*. July 30. Accessed August 19, 2021. www.cityfloodmap.com.

lake, an abandoned construction site that gets flooded every year with runoff from neighboring paved surfaces and melted snow. According to the Basement Flooding Study Report generated by the City of Toronto, the area of Leaside has historically faced basement and surface flooding, where during extreme storms, the stormwater exceeds the sewer capacity and results in overland water flow along the roads and other low-lying areas. After filling the low-lying areas, the water backs up into basements of residential units.²⁰ This map in figure 2.33 shows the cases of basement flood reports in the residential areas of Leaside. The report also suggests methods of reducing the risk of flooding, including increasing permeability by introducing bioswales, increasing grassed surfaces, permeable pavement, and proposing wet ponds and bio-retention units.

20 City of Toronto. 2014. *Basement Flooding Study Area 2*. www.toronto.ca, Toronto: City of Toronto.

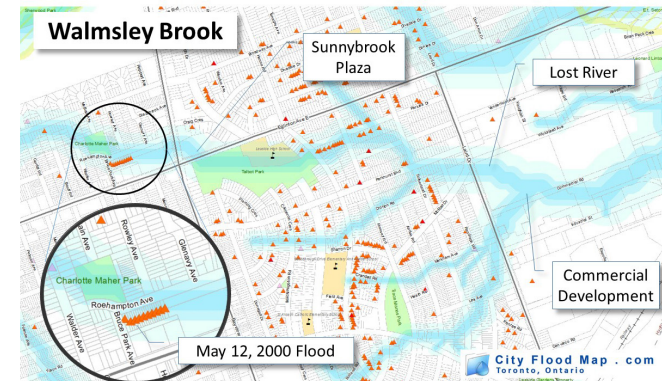
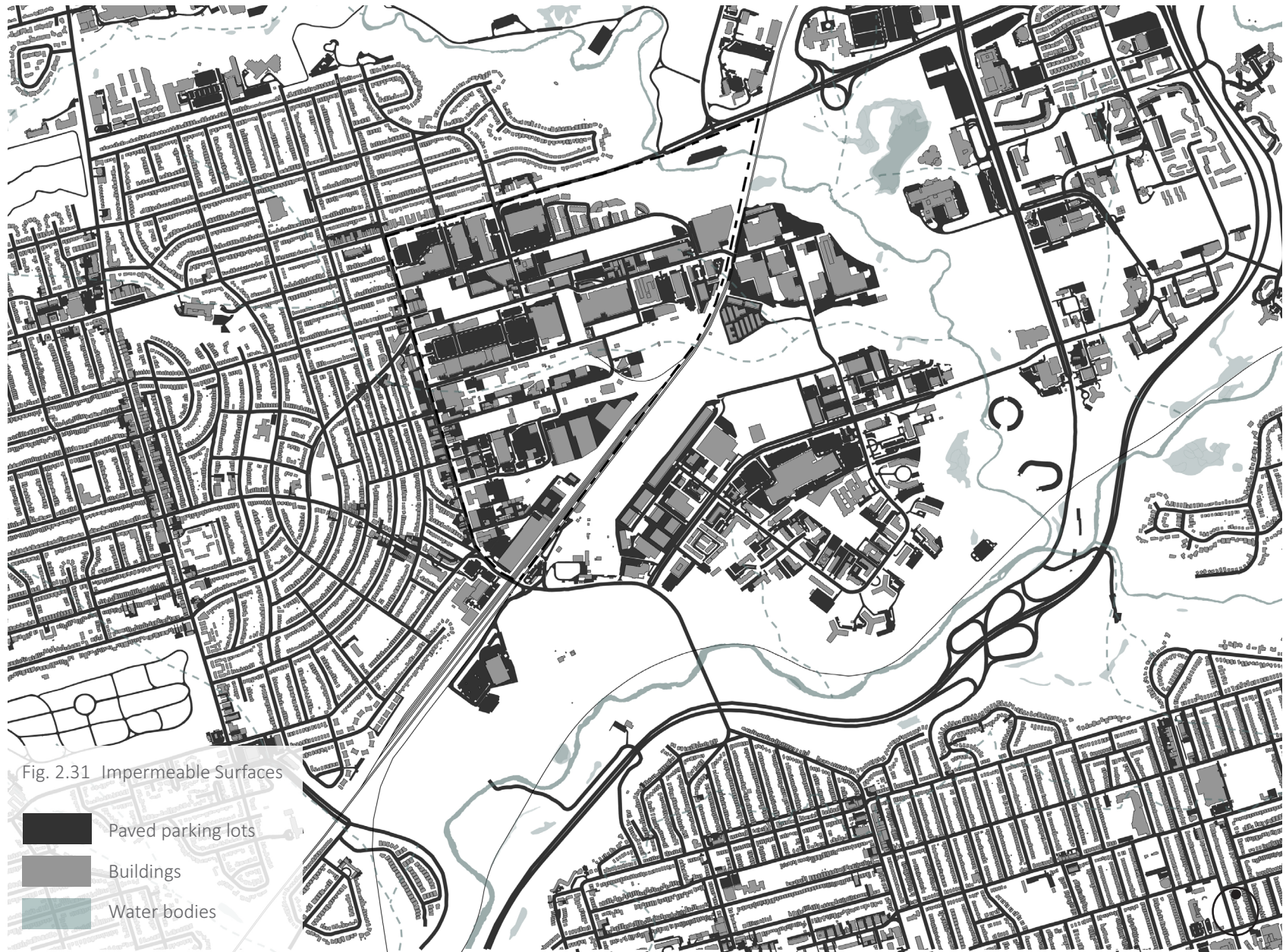


Fig. 2.30 City Flood Map predicting the overland path flow during flooding. It coincides with the path of the former Walmsley brook.



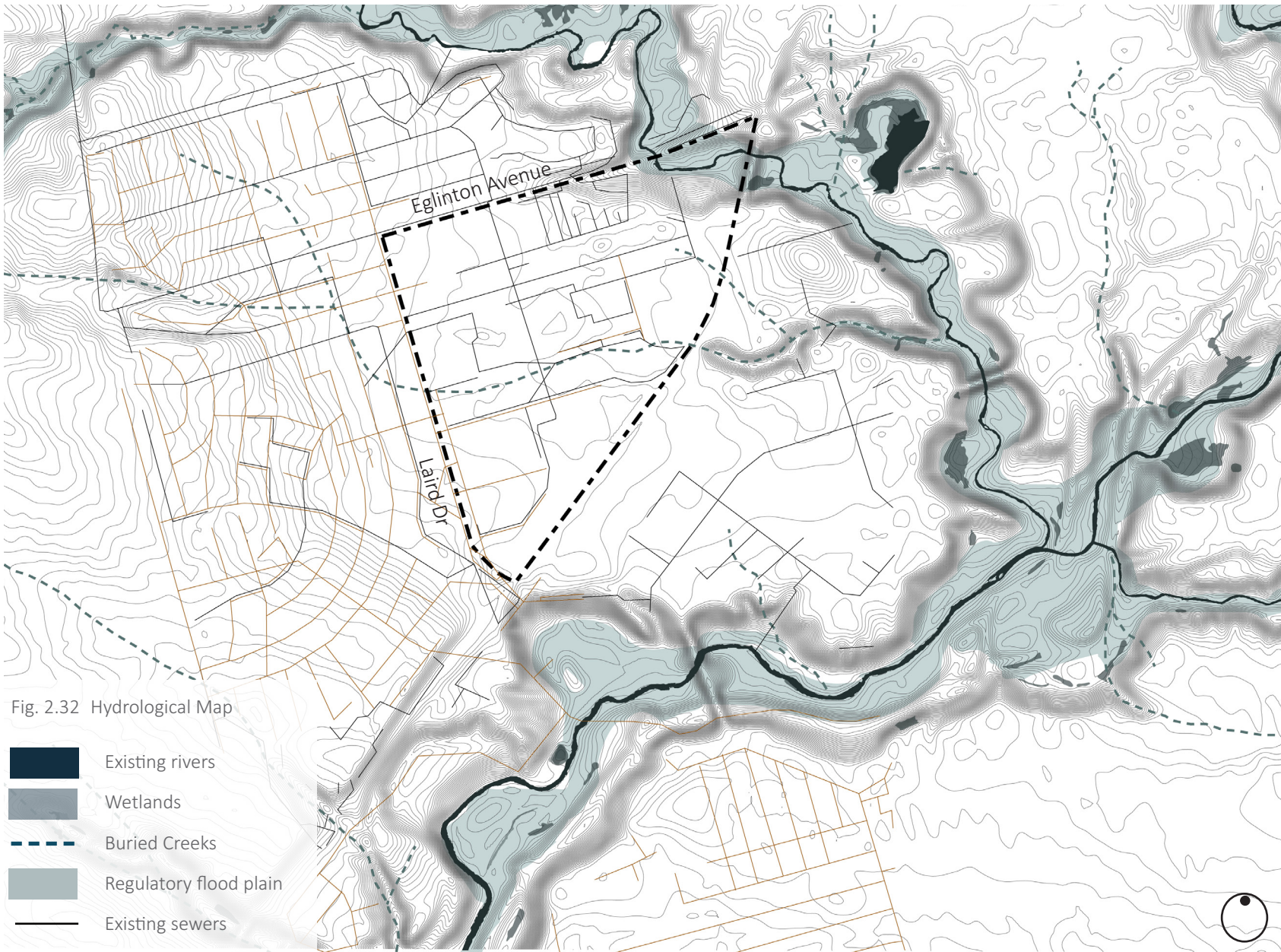







Fig. 2.32 Hydrological Map

-  Existing rivers
-  Wetlands
-  Buried Creeks
-  Regulatory flood plain
-  Existing sewers

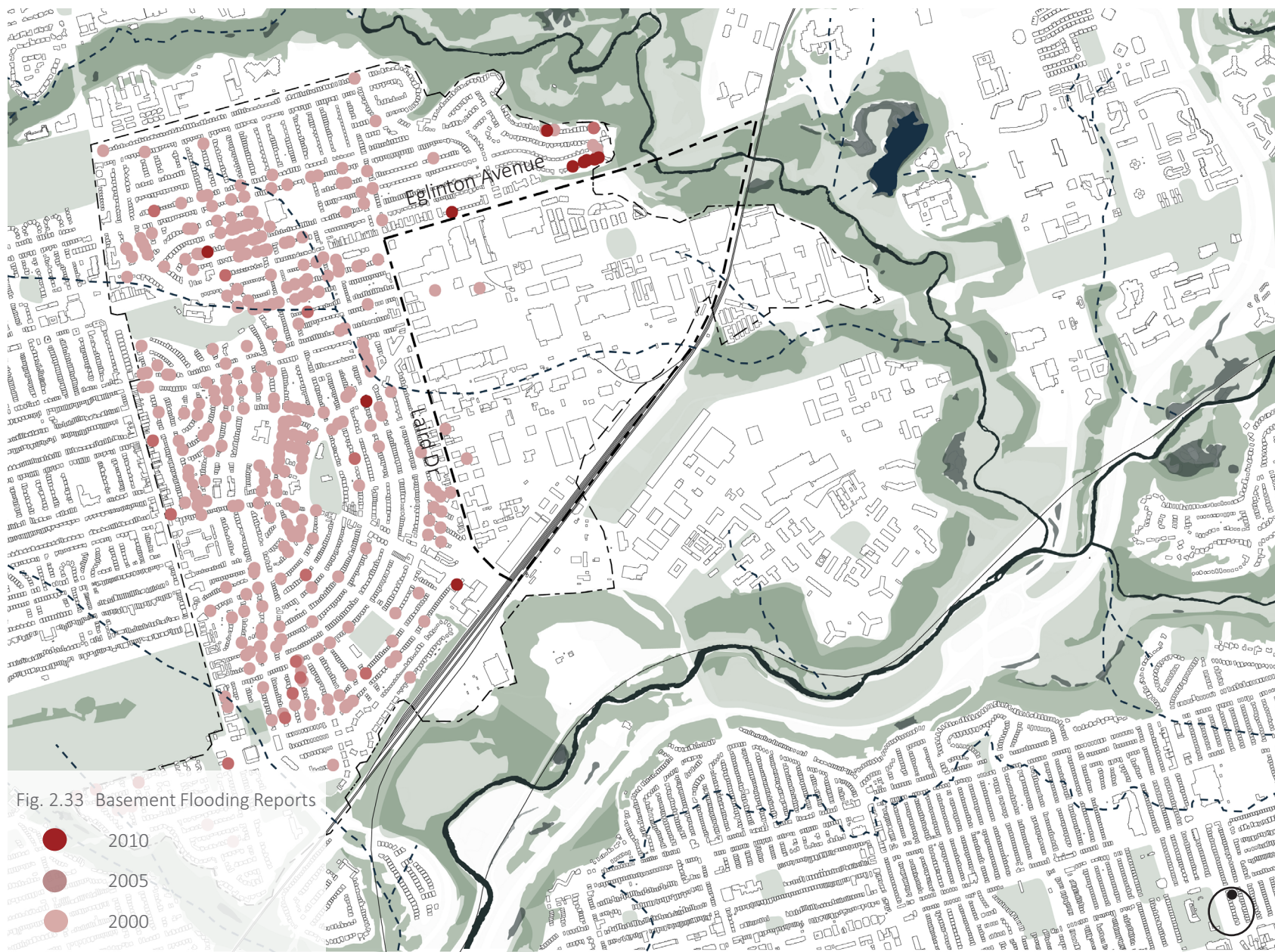


Fig. 2.33 Basement Flooding Reports

- 2010
- 2005
- 2000

2.8 Social Impermeability: Disconnect between Neighbourhoods

The social context of the Leaside site is studied by understanding the network of existing public spaces and their accessibility, presence of underutilized spaces, areas of social disconnects, the present food security, and potential for introducing local food production as a catalyst for bridging social disconnects. The map in figure 2.37 shows the location of emergency food programs, community food services, local food retail, food markets, children’s meal programs, community gardens, and urban agriculture.²¹ We see that many of these initiatives, like community gardens, are happening more in the Thorncliffe Park neighborhood. At the same time, Leaside only has a community food service and a children’s meal program. Addressing social impermeability parallel to food security can provide potential solutions responding to both.

This map in figure 2.36 shows the elements of social layers like the trails, important parks, recreational spaces, and industrial heritage buildings in the Leaside neighborhood. The wooded areas of the Don River Valley host parks and green spaces with many recreational and hiking trails, some of which are easily accessible from the Throncliff Park neighborhood. However, access to these spaces from Leaside is poorly defined. A small part of the Walmsley brook still

flows north of the Thorncliffe Park neighborhood and disappears as it approaches the CPR tracks towards the Leaside area. In a conversation with Sabina Ali, the Executive Director of Thorncliffe Park Women’s Committee, she says that the pandemic has made us realize the importance of public spaces and their ease of access for the residents. RV Burgess Park used to be the only accessible green space that used to be fenced off. With time, many such spaces were realized; however, access to the ravine still remains the biggest challenge, with Seton Park being the only access point.²²

The conversation with Sabina Ali helped me understand social impermeability further. She said that there is a strong need to bridge the social gap between Leaside, an affluent higher-income neighborhood, and Thorncliffe Park, a densely populated multi-cultural neighborhood.²³ She has organized many programs like Park Cafe, bazaars, and school art programs, as an effort to revitalize the park, strengthen the connection to the ravine and increase public participation. The Park Café Project, which involved a refurbished shipping container in RV Burgess Park selling different dishes from the locals every day, was organic and robust. However, increasing the involvement of the residents of Leaside in this program was a bit challenging. Therefore, addressing the disconnect between the two neighborhoods could help improve social permeability.

21 Toronto Food Policy Council. 2018. *Food by Ward*. Accessed August 19, 2021. tfpc.to.

22 Sabina Ali, phone conversation with author, March 11, 2021.

23 Ibid.



Fig. 2.34 The Park Cafe initiative by Sabina Ali



Fig. 2.35 Summer markets and Sunday bazaars in R.V Burgess Park.

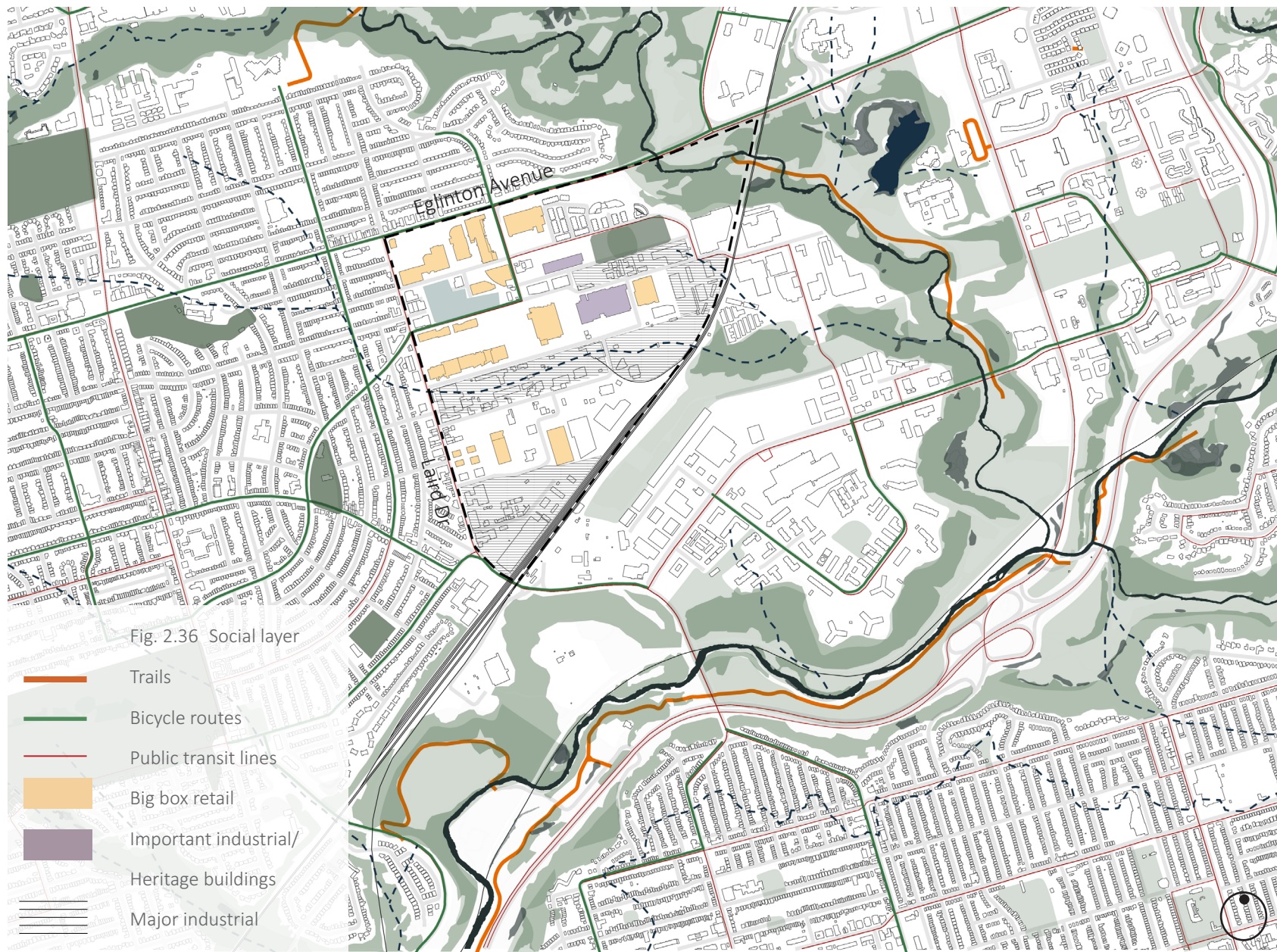









Fig. 2.36 Social layer

-  Trails
-  Bicycle routes
-  Public transit lines
-  Big box retail
-  Important industrial/
-  Heritage buildings
-  Major industrial



2.9 Development Pressure Due to Eglinton LRT

The LRT construction at Eglinton Ave, which is expected to be complete by 2022, would dramatically impact the growth of Leaside. In a conversation with Geoff Kettel, the Co-President of Leaside Residents Association, he said that the land values have gone up dramatically with the Eglinton LRT coming up. This has led to many industrial companies migrating to suburbs, leaving abandoned industrial building shells on the interior sites of major industrial zones in Leaside.²⁴ On the other hand, the perimeter of this neighborhood has zones facing significant development pressure. Eglinton Ave has two major proposals: a high-rise mixed-use development at 815 Eglinton Ave and the Upper East village condos at 939 Eglinton Ave, which is already under construction. Another mid-rise retirement residential development at 126 Laird Dr would add density to the selected site. The 'Lake Leaside' site has now been drained and would be filled up for the construction of a retail center, an expansion plan of the SmartCentres. According to Geoff Kettel, Leaside is also facing a lack of affordable housing in the area.²⁵ Being an affluent higher-income neighborhood composed predominantly of detached single-family homes, Leaside would now see major condo development.

24 Geoff Kettel, phone conversation with author, March 11, 2021.

25 Ibid.



Fig. 2.38 Eglinton LRT coming up would increase development pressure in Leaside



Fig. 2.39 Retail proposal coming up at the present site of 'Lake Leaside'



Fig. 2.40 Proposed high-rise mixed use development at the junction of Eglinton Ave and Laird Dr



Fig. 2.41 Upper East Village Condos coming up at Eglinton Ave

Therefore, it would be important to consider the role of affordable housing proposals in the development of this area.

2.10 Challenges

We see that Leaside is facing multiple challenges that contribute to the aspects of both ecological and social impermeability. The underutilized tarmac parking lots, abandoned industrial sites, flooding issues, the reappearing lake, and the buried creek add to the ecological challenges of the site. While the aspects of disconnect between Leaside and Thorncliffe Park neighborhoods, lack of accessible public spaces, absence of food security initiatives, loss of affordable housing, and lack of access to the ravine and the Don Valley form the social challenges of the site. With the area being at the brink of urban intensification, these aspects would be identified as multiple opportunities that would help me arrive at an alternate redevelopment plan for the site. The following chapter identifies five design strategies derived from the stated aspects of ecological and social impermeability.

Chapter 03: Design Strategies

Leaside Redevelopment Proposal

- 3.1 Opportunities
- 3.2 Design Strategy 1: Preserving the Industrial Memory of Leaside
- 3.3 Design Strategy 2: Rethinking the Parking lots, Increasing Material Permeability
- 3.4 Design Strategy 3: Introducing Affordable Housing on the site
- 3.5 Design Strategy 4: Catalyzing Social Permeability
- 3.6 Design Strategy 5: Re-greening, Increasing Ecological Permeability

3.1 Opportunities

With the social and ecological challenges this site faces, it also provides multiple opportunities at different scales. One opportunity could be to imagine a future of retail that is not car-centric, which focuses more on pedestrian movement and public transit. At the same time, the few spaces for car parks could promote anti-asphalt parking lots that utilize all the strategies to increase surface permeability, starting from the scale of surface design of the parking lots to the overall perception of parking lots as parks or gardens, moving away from the alienating asphalt surfaces.

The flooding challenges due to the buried creek are seen as an opportunity for ecological restoration of a part of the creek and designing for Flood Resilience, with green roof infrastructure, constructed wetlands, and retention ponds. This would also incorporate sites for local food production in the form of community agriculture and local cafes to increase food security and parallelly catalyze social permeability between the two neighborhoods. With the development pressure due to Eglinton LRT, the proposed affordable housing schemes are seen as an opportunity to balance the Real Estate development.

These opportunities and challenges identified from the site studies are used to arrive at five design strategies that would be used to arrive at a retrofit plan for this thesis. Each of these design strategies would be further detailed to understand how they could be adopted on the site. They are:

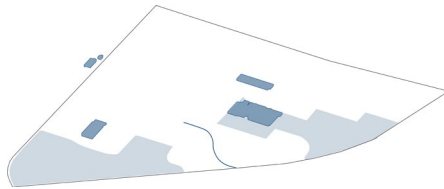
Preserving the Industrial Memory of Leaside

Rethinking the Parking lots, Increasing Material Permeability

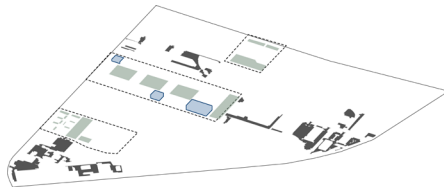
Introducing Affordable Housing on the site

Catalyzing Social Permeability

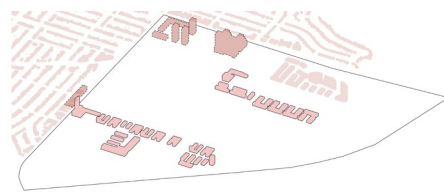
Re-greening, Increasing Ecological Permeability



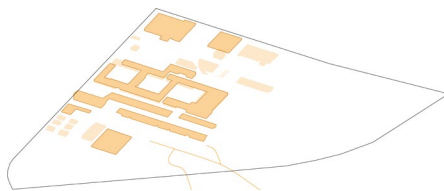
Design Strategy 1:
Preserving the Industrial Memory of Leaside



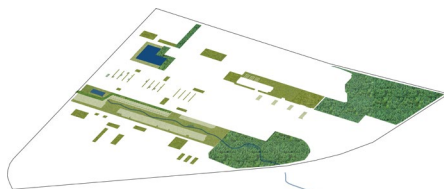
Design Strategy 2:
Rethinking the Parking lots,
Increasing Material Permeability



Design Strategy 3:
Introducing Affordable Housing on the site



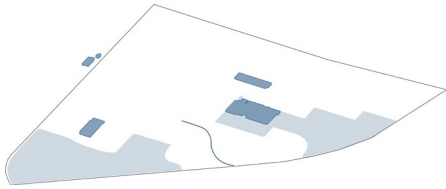
Design Strategy 4:
Catalyzing Social Permeability



Design Strategy 5:
Re-greening, Increasing Ecological Permeability

3.2 Design Strategy 1:

Preserving the Industrial Memory of Leaside



This strategy focuses on identifying the important industrial buildings on the site that has heritage value, architectural value, and are major employers in the area. These buildings are preserved/renovated to be incorporated in the new site plan and developed as catalysts for new urban development. On the other hand, the zones marked in lighter blue are industrial zones composed of storage buildings or businesses that are not thriving or are migrating from the area due to higher land value.

Some of the important industrial buildings are: the Radio Stores Research Enterprise, a railway repair building, the Imperial Bank of Canada building, the Durant Motors headquarters, and the CPR railway tracks. These buildings are preserved in the new site proposal, while the industrial areas on the south and the east corners of the site are preserved for the relocation of smaller industrial buildings.

The abandoned Radio Stores Research Enterprise Limited Building used to be a secret government-owned manufacturing facility in Leaside that supported the war effort by producing optical equipment and radar sets for the military. The building is now vacant and to be occupied by the Apple self-storage. It has also been included in the city of Toronto's heritage register because of its industrial architectural quality of beautiful linear brick facade and long ribbon windows.¹ Therefore the proposal here is for adaptive reuse of this heritage building and converting it into a cultural community hub that has live-work art studio spaces, galleries, and spaces to occasionally host indoor markets and exhibitions.

The abandoned parking lots on the exterior of the building are proposed to be converted into a community garden that caters to the existing residential zone north of Vanderhoof Ave, and the proposed affordable housing units South of the radio storage building. The beautiful brick and glass facade acts as a backdrop and also a place for indoor markets. The idea here is to weave the industrial memory of the place into its social life.

1 City of Toronto. 2014. *TORONTO REPORT FOR ACTION Inclusion on the City of Toronto's Heritage Register - Laird in Focus -90 Laird Drive, 180 Laird Drive and 20 Research Road*. Toronto.

1



Fig. 3.1 The abandoned Radio Stores Building, Research Enterprise Ltd. and its parking lots.

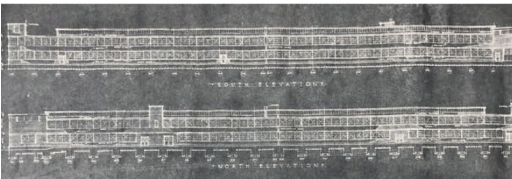


Fig. 3.2 Elevations of the Radio Stores Building drawn by Allward & Gouinlock Architects in 1942.

This building is included in the City of Toronto’s Heritage Register due to its architectural quality of beautiful linear brick facade and long ribbon windows with factory sash glazing. The building and the parking lots are now abandoned and soon to be occupied by the Apple self-storage.

2

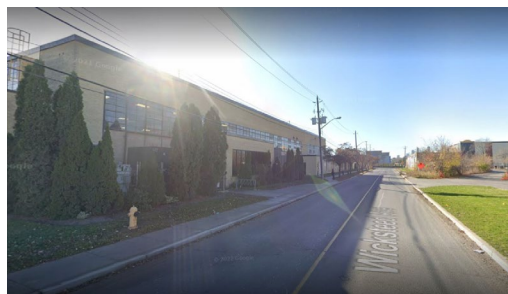
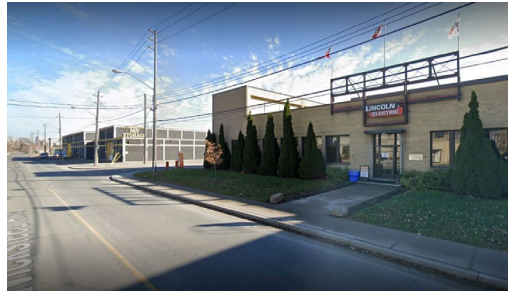


Fig. 3.3 Lincoln Electric Company of Canada

This building is the Canadian headquarters of Lincoln Electric Company. The company moved its operation to Leaside in 1940 and is one of the largest employers in Leaside.

3



Fig. 3.4 The Longo’s Food retail building



Fig. 3.5 CNoR’s railway repair building

The Longo’s food retail building used to be an important historical building that hosted the Railway Repair Building of Canadian Northern Railways.

4



Fig. 3.6 Present LOCAL public eatery



Fig. 3.7 Imperial Bank of Canada Building in 1942

The present LOCAL public eatery used to be the building of Imperial bank of Canada, which has a strong heritage and architectural value due to its brick facade and vernacular details.

5



Fig. 3.8 Former Durant Motors of Canada HQ



Fig. 3.9 Leaside Munitions Company previously occupying the Durant Motors building

The former Durant motors building is a beautiful two-story brick structure built in 1928, which was previously occupied by the Leaside Munitions Company to support the war.

6



Fig. 3.10 Present CPR railway tracks entering the site between Industrial St- Commercial St.



Fig. 3.11 The former Leaside railway station

The CPR railway lines have a strong historical significance as it had directed the growth of Leaside as a railway town in 1870s.

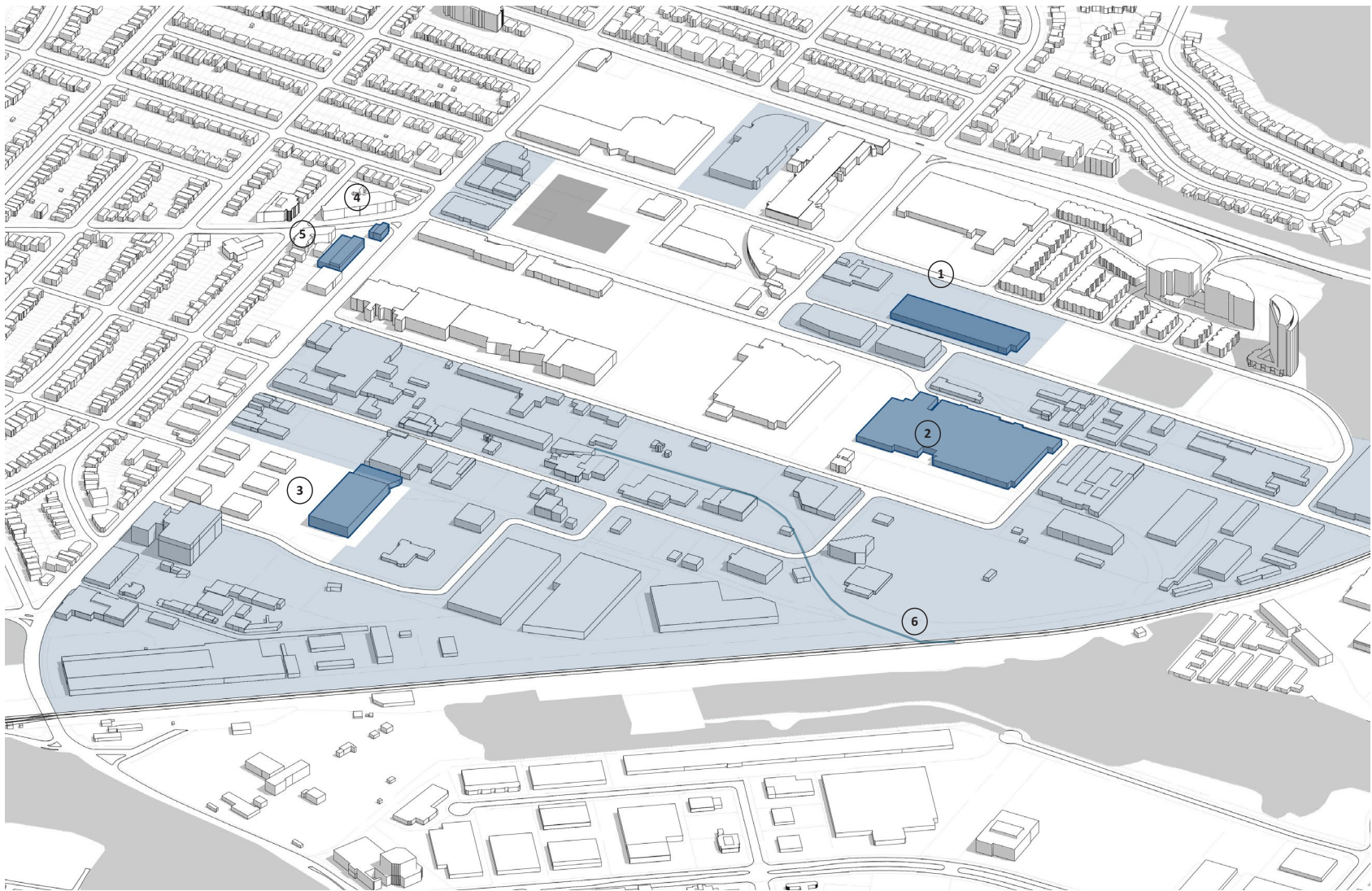


Fig. 3.12 Existing Industrial

■ Important industrial buildings with heritage or architectural value, or are major employers

■ Major Industrial zones composed of storage buildings or businesses that are not thriving or are migrating from the area due to higher land value.

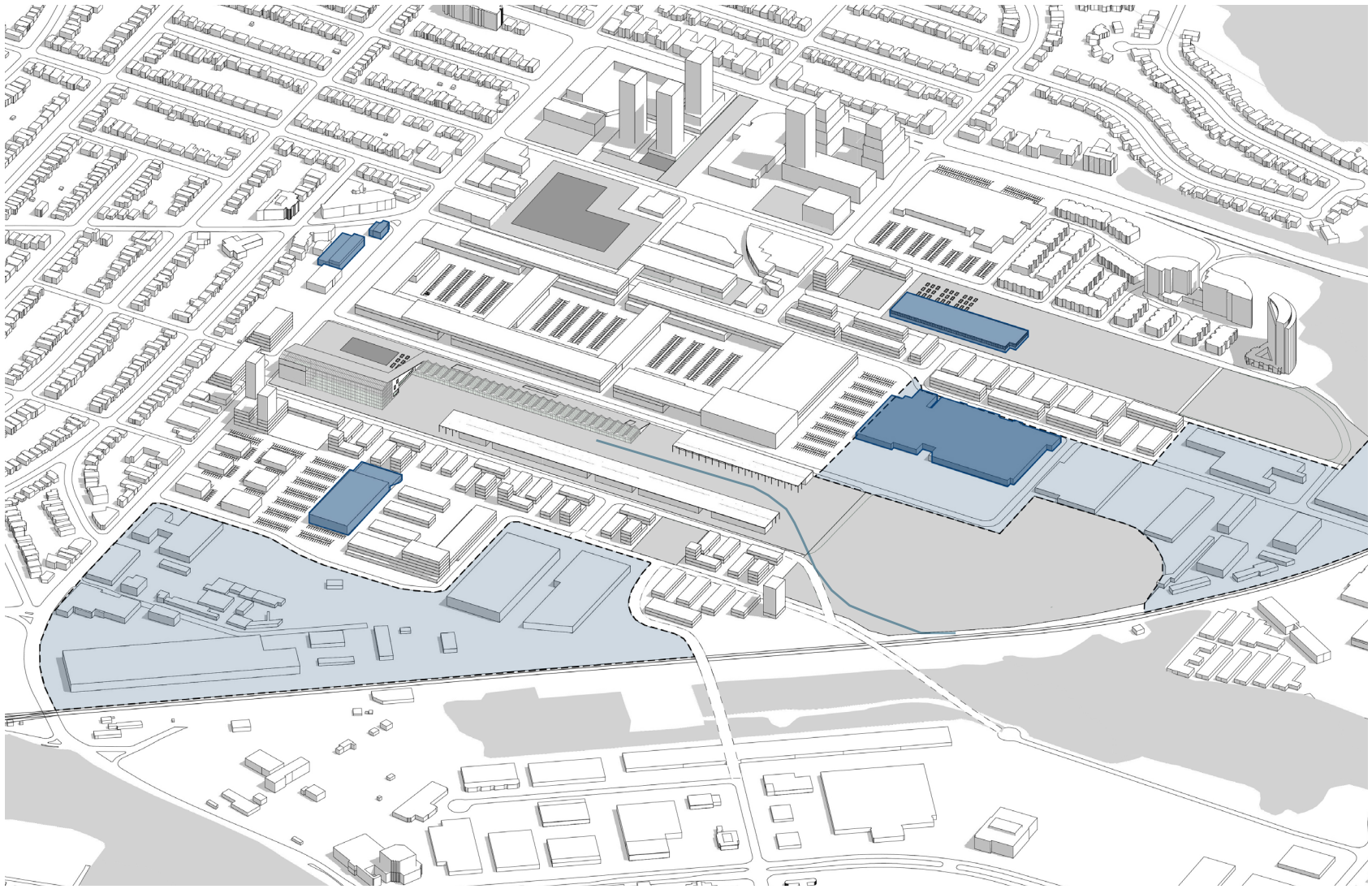


Fig. 3.13 Proposed Industrial



-  Preserved industrial buildings with heritage or architectural value, or are major employers
-  Industrial zones preserved for relocation of smaller industrial businesses from the site between Industrial St and Commercial St



Fig. 3.14 The interior view of the abandoned Radio Stores Building.

The building used to be a place where leading engineers, scientists and technicians were employed there to develop military equipment for radar trucks to support the war effort. REL produced over \$220 million of precision optical equipment, such as their well-known binoculars.



Fig. 3.15 Proposed adaptive-reuse for the abandoned Radio Stores Building.

Converting the Radio Stores building into an artists studios and office spaces that occasionally hosts indoor markets and exhibitions.



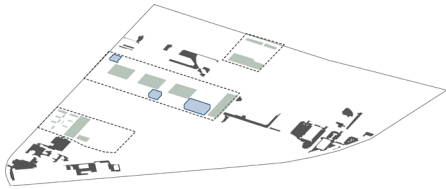
Fig. 3.16 The abandoned parking lots of the Radio Stores Research Enterprise Ltd.



Fig. 3.17 Converting the abandoned parking lot of the Radio Stores building into a community garden.

The community garden proposal caters to the existing residential zone north of Vanderhoof Avenue and the proposed affordable housing units south of the Radio stores building.

3.3 Design Strategy 2: Rethinking the Parking lots, Increasing Material Permeability



This strategy focuses on breaking down the continuous monotonous surface of the parking lots that are mostly concentrated around the big-box retailers: the SmartCentres, Longo's, and the retail complex east of Brentcliffe Road. These parking lots are converted into parking parks that have more permeable surface treatment, green pockets, and bios-wales.

For example, the proposed SmartCentres parking lots explore the permeable material palette that could be used for the parking lots of similar retail spaces. The overall design of these lots is composed such that it is integrated into the experience of the shopping center. These design strategies to promote anti asphalt parking lots include increasing surface permeability, starting from the scale of surface

design to the overall perception of these lots as parks or gardens. This can be seen in the section of the retrofitted parking lot with a composition of car park spaces, drive lanes, bio-swales, bicycle and pedestrian paths, and the occasional pockets of fertile green spaces for local flora. The storm-water infiltration and runoff management is also integrated into the design and articulated with the landscape elements.

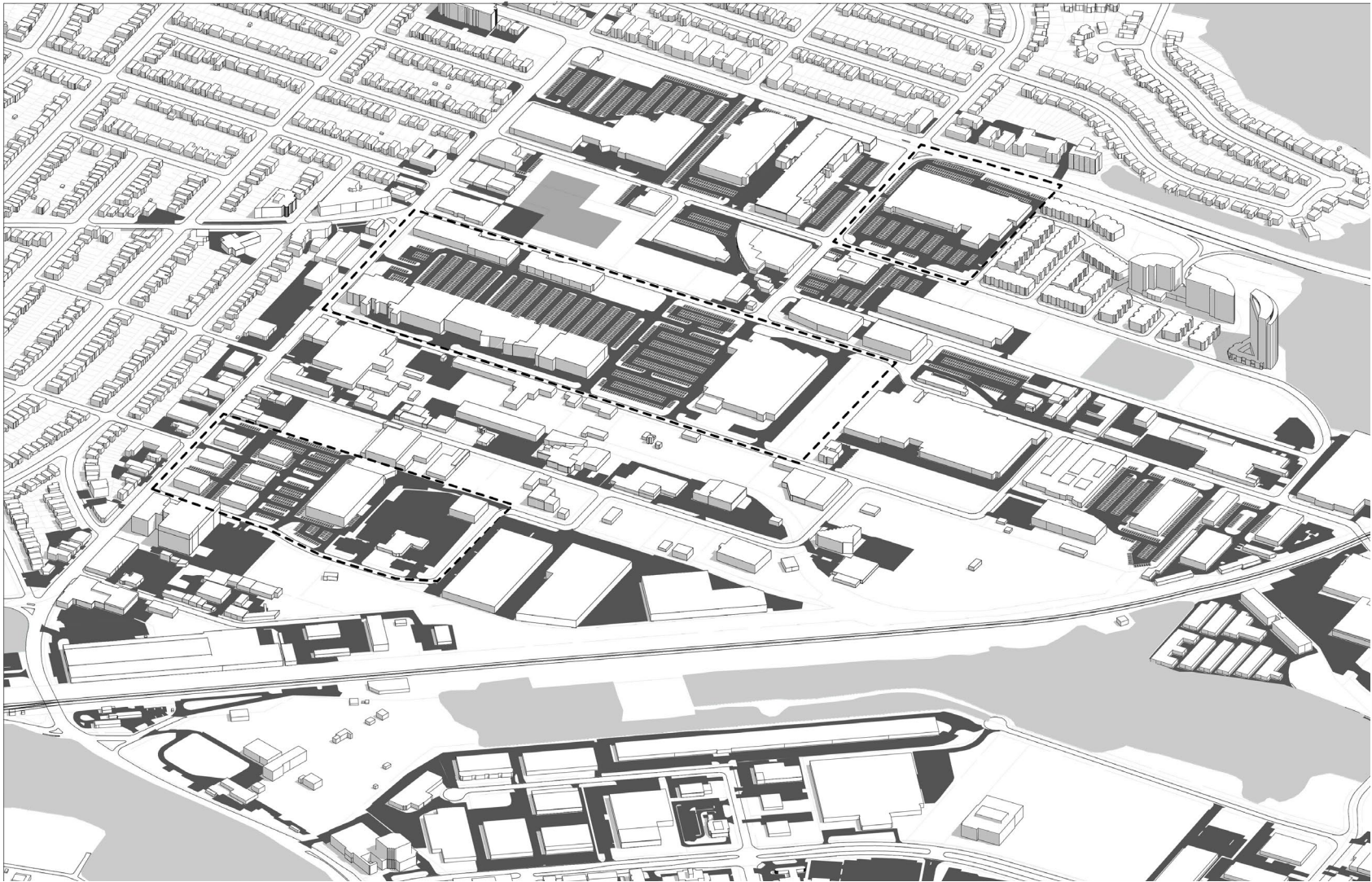


Fig. 3.18 Existing Parking lots

■ Paved surface parking lots

⋯ Three major parking lots of the big box retailers
- SmartCentres, Longo's and retail complex at
Brentcliffe Rd.



Fig. 3.19 Materiality and organization of the green surface parking lots

Exploring the permeable material palette that could be used for the parking lots of retail spaces. Promoting Anti-Asphalt Parking Lots and utilizing all the strategies to increase surface permeability, starting from the scale of surface design of the parking lots to the overall perception of parking lots.

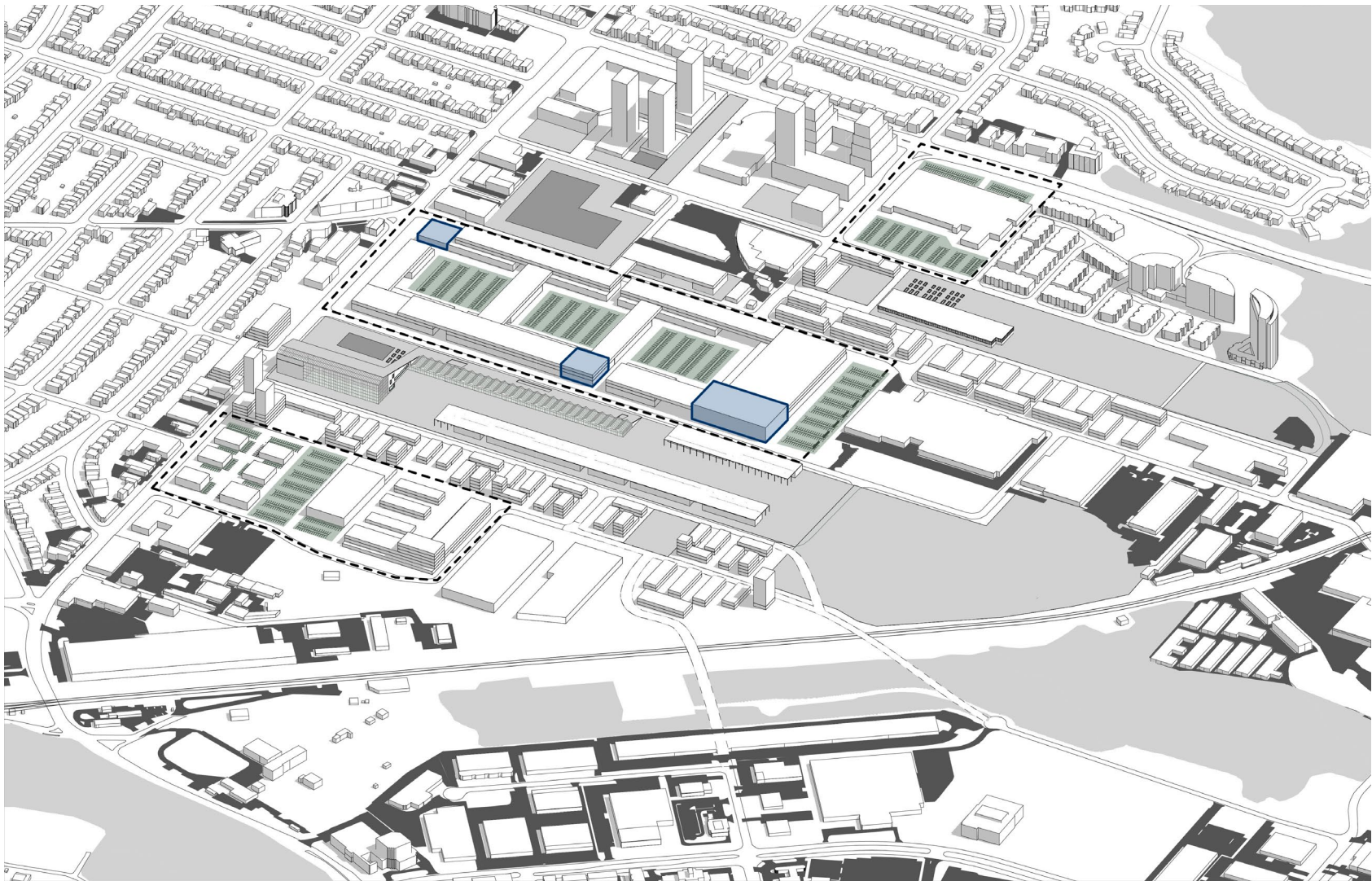
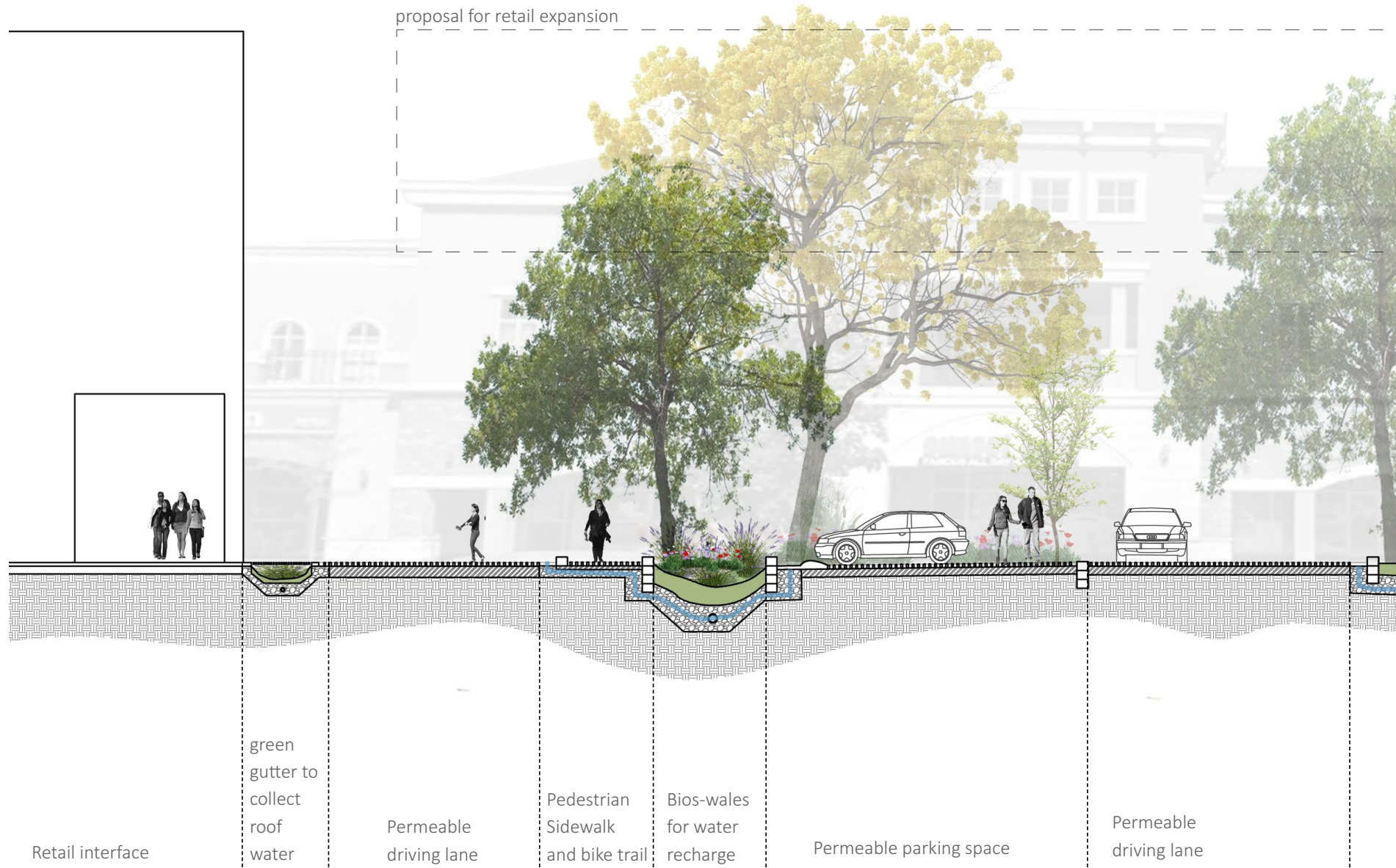
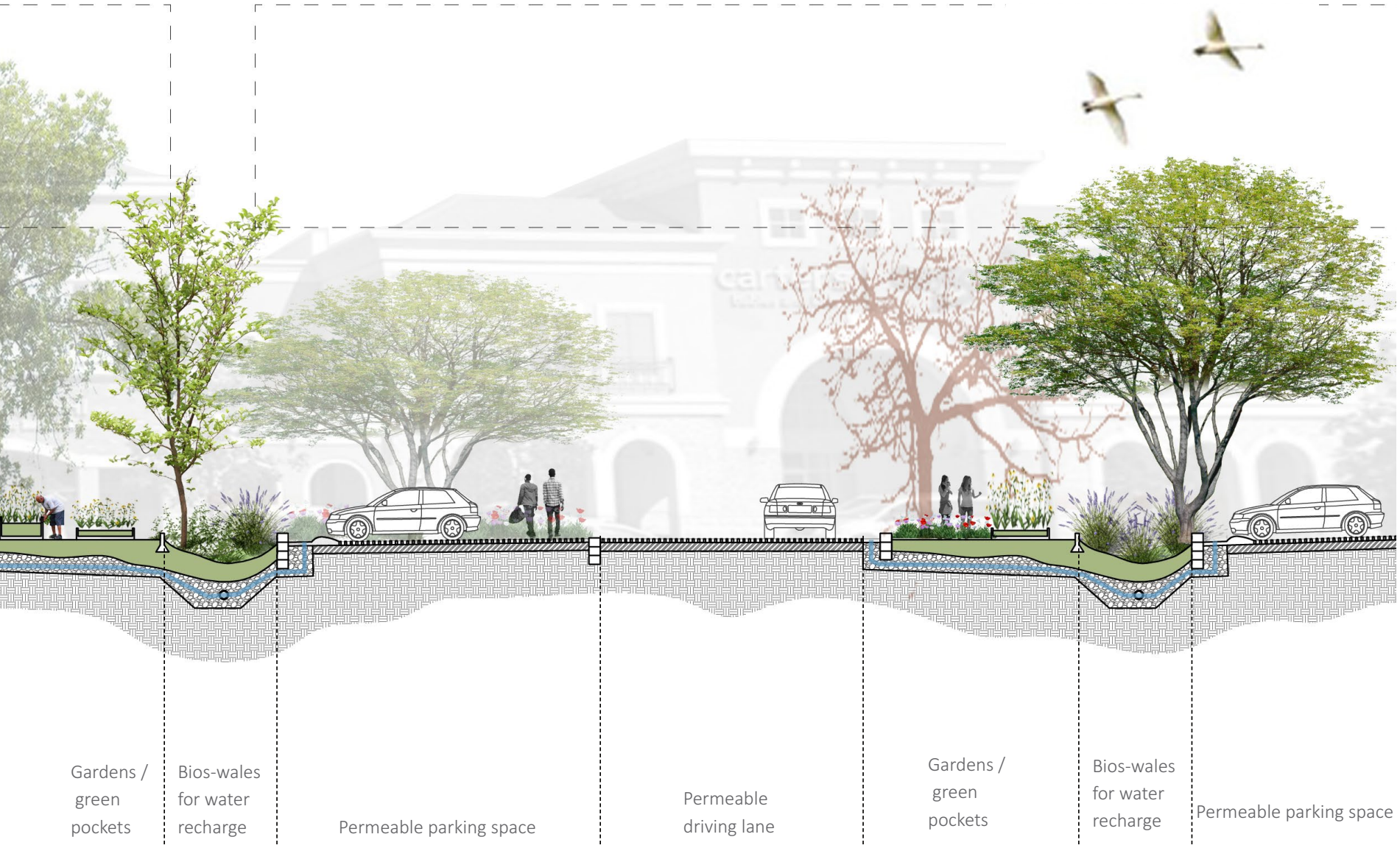


Fig. 3.20 Proposed Parking lots

Green surface parking lots Parking Garages

Fig. 3.21 Section of the proposed green parking lots of SmartCentres





3.4 Design Strategy 3:

Introducing Affordable Housing on the site



The third strategy is to balance the real estate development pressure that is happening due to Eglinton LRT with proposals for public housing and addressing the lack of affordable housing in the area. The existing residential development in Leaside consists of many single-family homes of predominantly upper-middle-class families, residing north of Eglinton Ave and West of Laird Drive. The only residential zones within the selected site boundary are of three high-rise apartment buildings and Hyde Park, which are townhouse style rental apartments offering one-, two-, and three-bedroom units.

With the development pressure due to Eglinton LRT, three new residential development are coming up. Two of them are high-rise mixed-use development along Eglinton Ave, and one mid-rise residential development is coming up at Laird drive, all adding approximately 2800 more residential units in the area.

The five sites of present industrial land use zones that are having storage areas right now, are proposed for land-use change to accommodate low- and mid-rise affordable housing adding approximately 1700 more residential units. These would follow the City of Toronto's affordable housing guidelines and allocate 40% of the units for one-bedroom, 40% to two bedroom, 15% to three-bedroom units, and 5% to four-bedroom units.²

² Toronto Affordable Housing Office. 2015. *Affordable Rental Housing Design Guidelines* City of Toronto Affordable Housing Office. Toronto: City of Toronto.

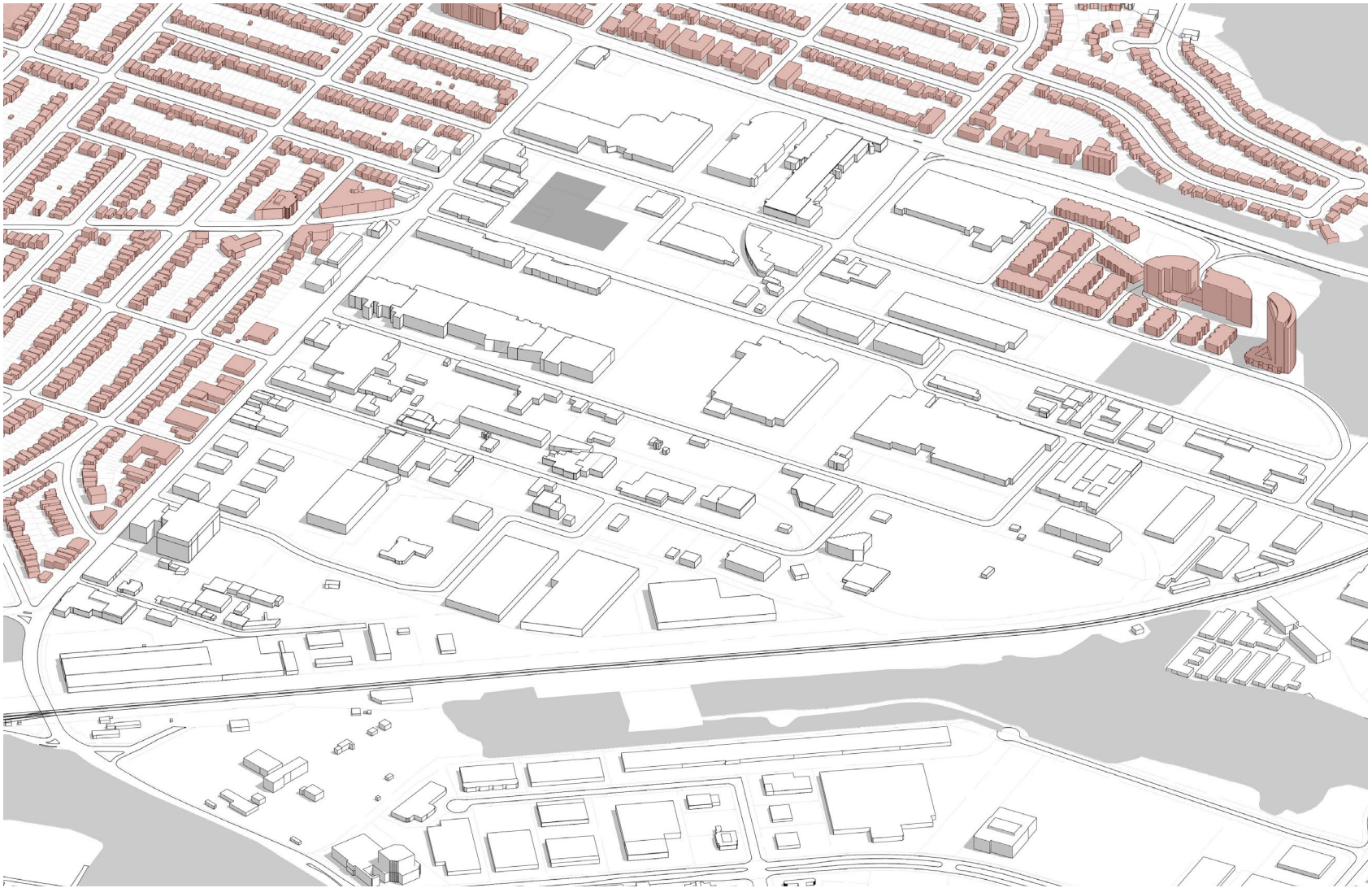
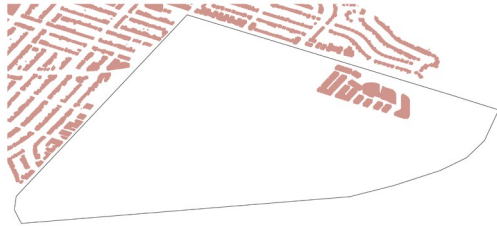


Fig. 3.22 Existing Residential

Existing residential area

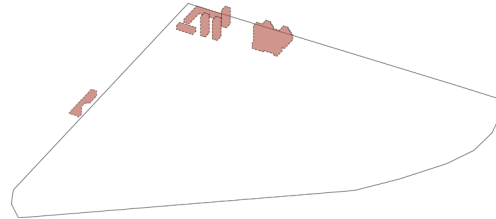
Fig. 3.23 Projected Residential development patterns



Existing Residential Development

The existing residential development in Leaside consists of many single-family homes of predominantly upper-middle-class families, residing north of Eglinton Avenue and west of Laird Drive.

The only residential zones within the selected site boundary are of three high-rise apartment buildings located on the northeast corner of the site on Vanderhoof Avenue and Hyde Park, which are townhouse-style rental apartments offering one, two, and three-bedroom units.



New Residential Towers coming up in Leaside

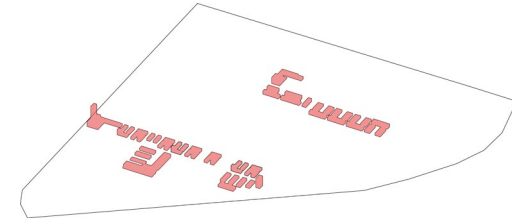
High-rise mixed-use development at 815 Eglinton Avenue is coming up with 1,673 residential units.

Upper East Village Condos at 939 Eglinton Avenue is under construction and has 985 residential units.

A mid-rise residential development is coming up at 126 and 134 Laird Drive with 143 residential units.

- 1 bedroom units - 1,622
- 2 bedroom units - 1,031
- 3+ bedroom units - 296

+ 2,800 residential units



Proposed low and mid-rise Affordable housing

The five sites of present industrial land use zones having storage areas are proposed for land-use change to accommodate low and mid-rise residential development having 1,780 residential units. This follows the City of Toronto's Affordable housing guidelines and allocates 40% of the units to one-bedroom units (55 sq.m.), 40% to two-bedroom units (60 sq.m.), 15% to three-bedroom units (84 sq.m.), and 5% to four-bedroom units (102 sq.m.).

- 1 bedroom units - 800
- 2 bedroom units - 730
- 3 bedroom units - 195
- 4 bedroom units - 55

+ 1,780 residential units

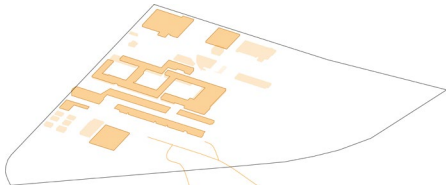


Fig. 3.24 Proposed Residential

- Existing residential area
- High density residential area coming up

- Proposed medium density affordable housing

3.5 Design Strategy 4: Catalyzing Social Permeability



The fourth strategy is introducing design elements to catalyze social permeability. This would be achieved by establishing a vehicular and pedestrian connection at two points with the Thorncliffe Park neighborhood to bridge the social and physical gap between the two neighborhoods. This would also involve strengthening the network of commercial and public spaces on the site by incorporating areas for local food production in the form of community agriculture, vertical farms, greenhouses, and local cafes to increase food security. The proposed building would also host permanent local retailers and provide space for temporary businesses like cafes and markets. This new proposed network of commercial and public spaces would target to cater to the residents of both Leaside and Thorncliffe Park.

Social permeability would also be catalyzed by introducing elements in the street section that combine the existing and proposed. For example, the community garden in front of the radio stores building strengthens the connection between the Hyde Park townhouses, the proposed affordable housing, and the retrofitted radio stores building, which is now a cultural hub hosting art studios and exhibitions. Similarly, the narrow strip of land between the mixed-use development coming up on Eglinton and the existing car dealership is converted into a green corridor that connects Eglinton Ave to the new proposed neighborhood with walkways and bicycle trails.

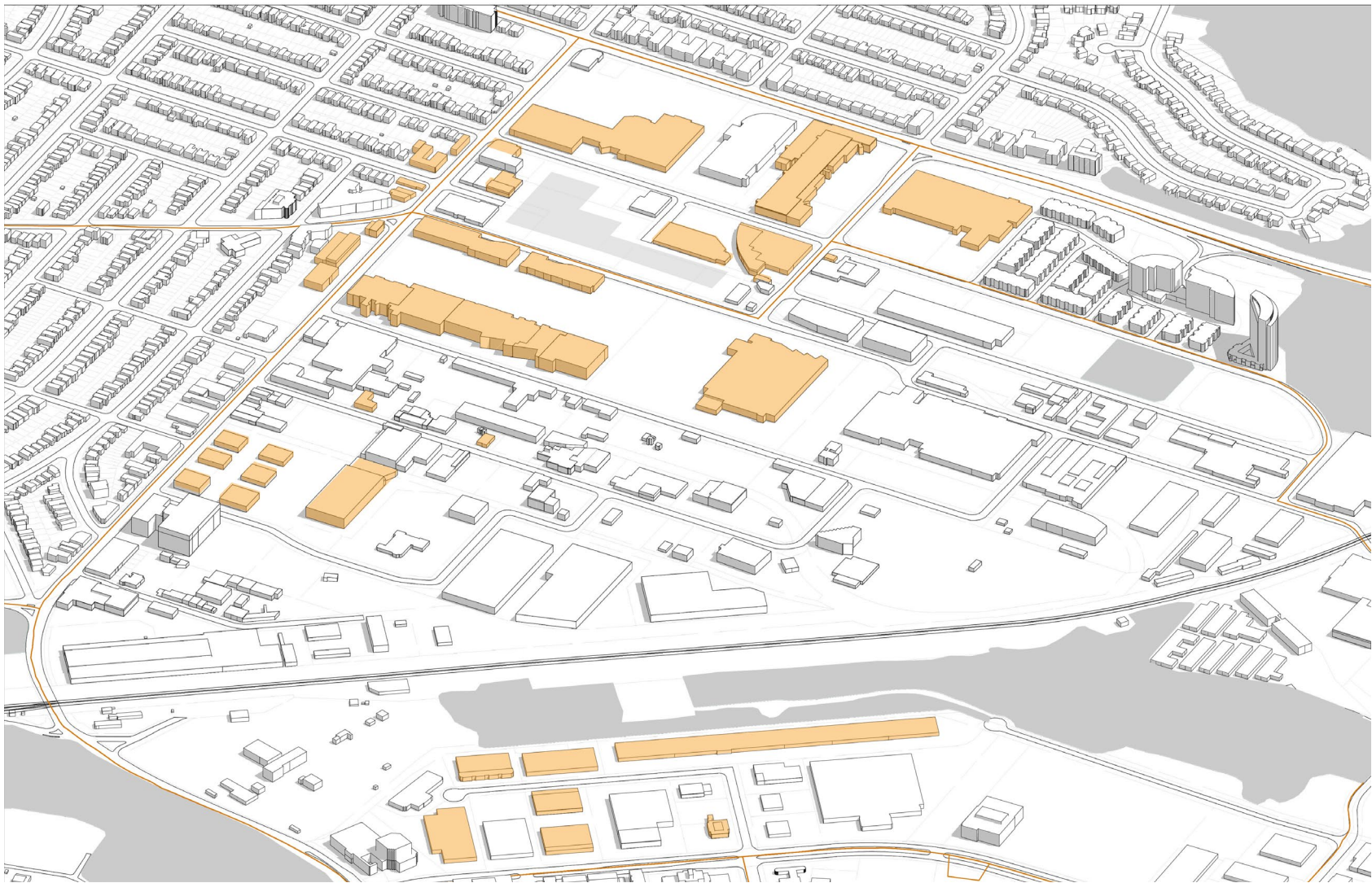


Fig. 3.25 Existing Commercial Buildings

- Existing commercial area
- Public transit routes

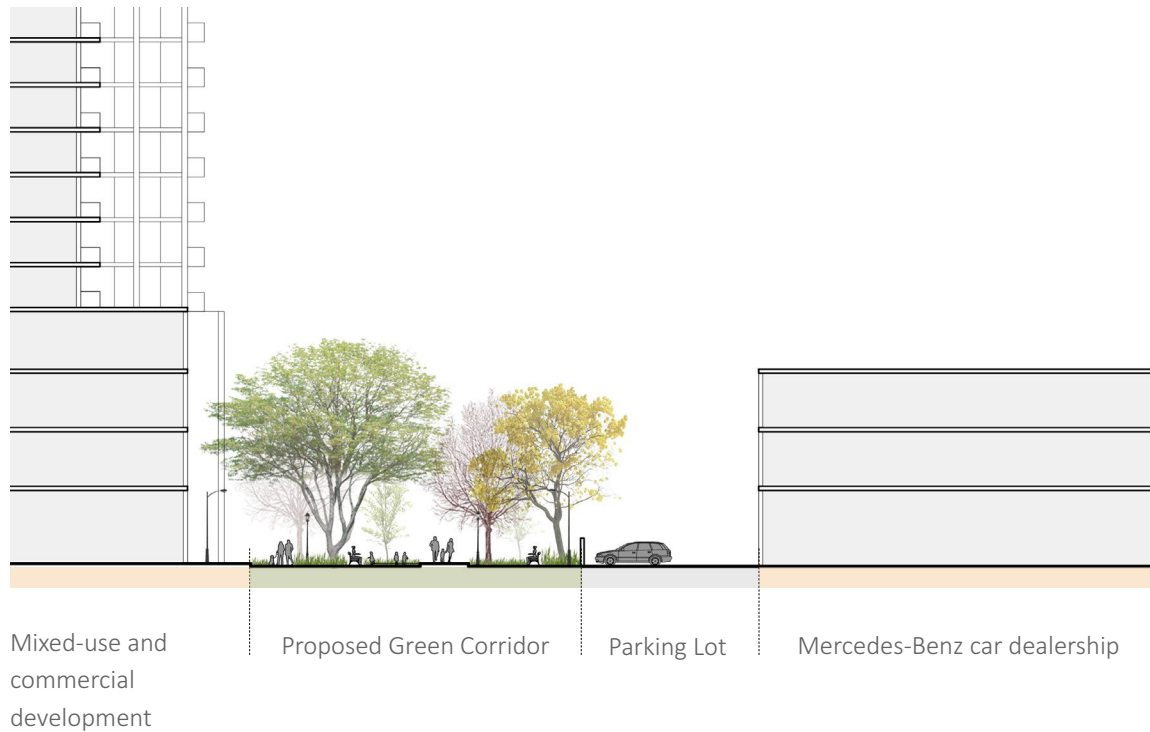


Fig. 3.26 Proposed Green Corridor

The narrow strip of land between the mixed-use development coming up on Eglinton and the existing car dealership is converted into a green corridor. This green corridor has pockets of park spaces and is heavily planted with the local trees, connecting the proposed neighborhood to Eglinton Ave with walkways, bicycle parts, and trails. It also gives a break in the otherwise heavily built facade of Eglinton Ave.



Fig. 3.27 Proposed Community Garden

The connection between the industrial building restored to accommodate Artist's community and the Hyde Park townhouse apartments is strengthened by converting the abandoned parking lot of the industrial building into a community garden that caters to existing and proposed residential areas around it. This preserves the industrial memory of the place.

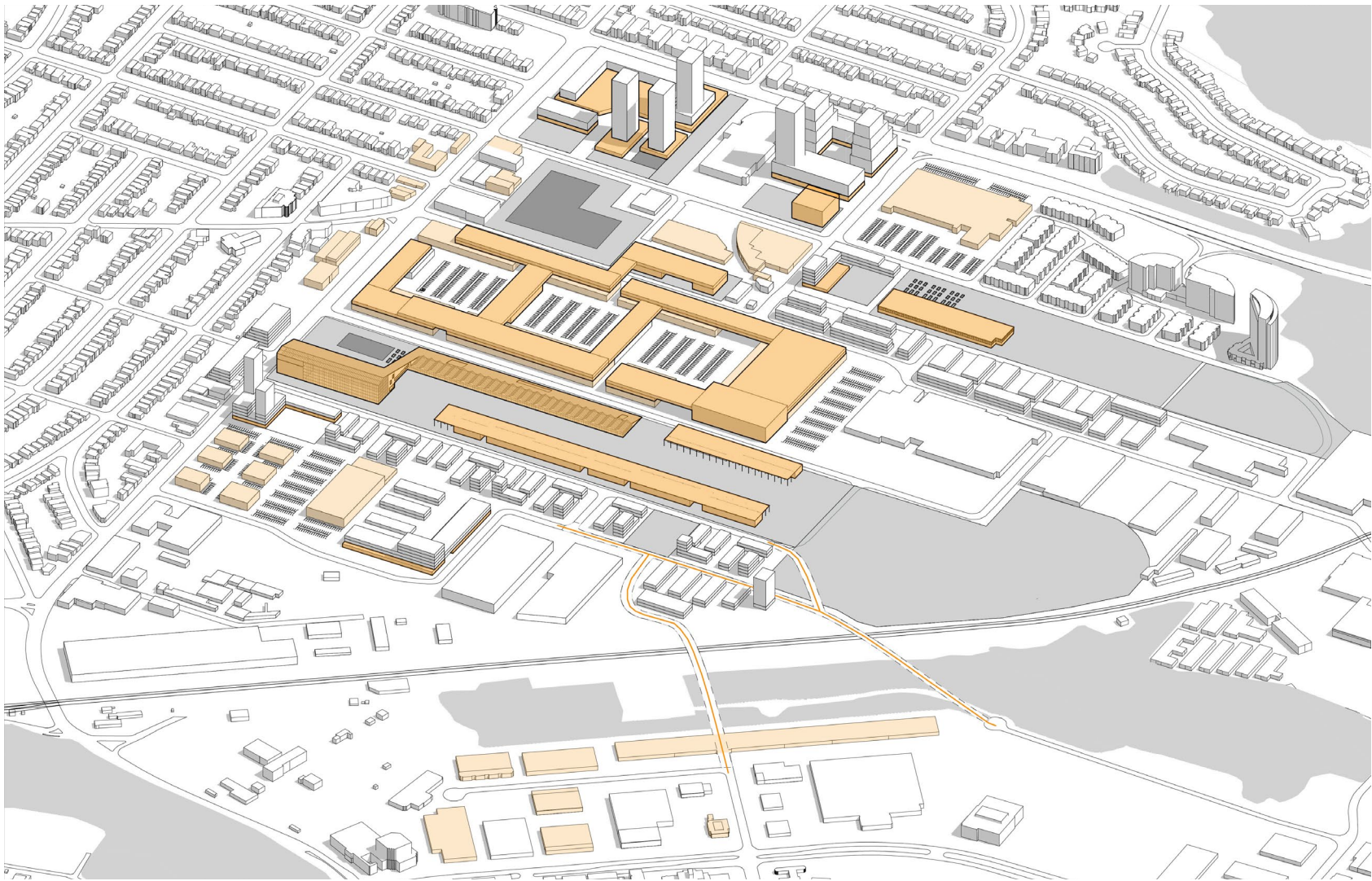
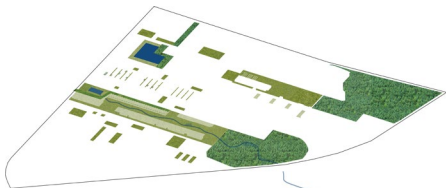


Fig. 3.28 Proposed Commercial development

- Existing commercial area
- Proposed commercial and retail
- Proposed pedestrian and vehicular connection to Thorncliffe Park neighborhood

3.6 Design Strategy 5: Re-greening, Increasing Ecological Permeability



The fifth strategy is re-greening areas of the site to increase ecological permeability. This would be achieved by redesigning three areas of the site, with smaller interventions to form a strong network of green spaces in the proposed neighborhood.

The first site is of the present Lake Leaside, which is to be filled in for the retail extension of the SmartCentres. The redevelopment proposal here is to retain a part of Lake Leaside for a storm-water retention reservoir, with recreational landscape elements, trails, and walkways around it to integrate it into the public life of the neighborhood.

The second site is of the present Votorantim Cement supplier is sitting on the path of the buried creek. This site is proposed for re-

naturalization into community Woodlands in two phases. The first phase would be to regenerate the soil by using the remediation techniques depending upon the type of pollutants discovered in the soil survey while keeping intact and re-purposing the skeleton of the existing industrial. The second phase would be converting the re-naturalized site into Community Woodlands planted with new local trees. This would also see the re-introduction of water on the site in the form of series of retention basins and floodable areas connecting the surface water to the Don Valley while parallelly integrating bicycle routes and hiking trails from the neighborhood to the valley.

The third site is the area between Industrial St and Commercial St hosting under-utilized or abandoned industrial and storage buildings.

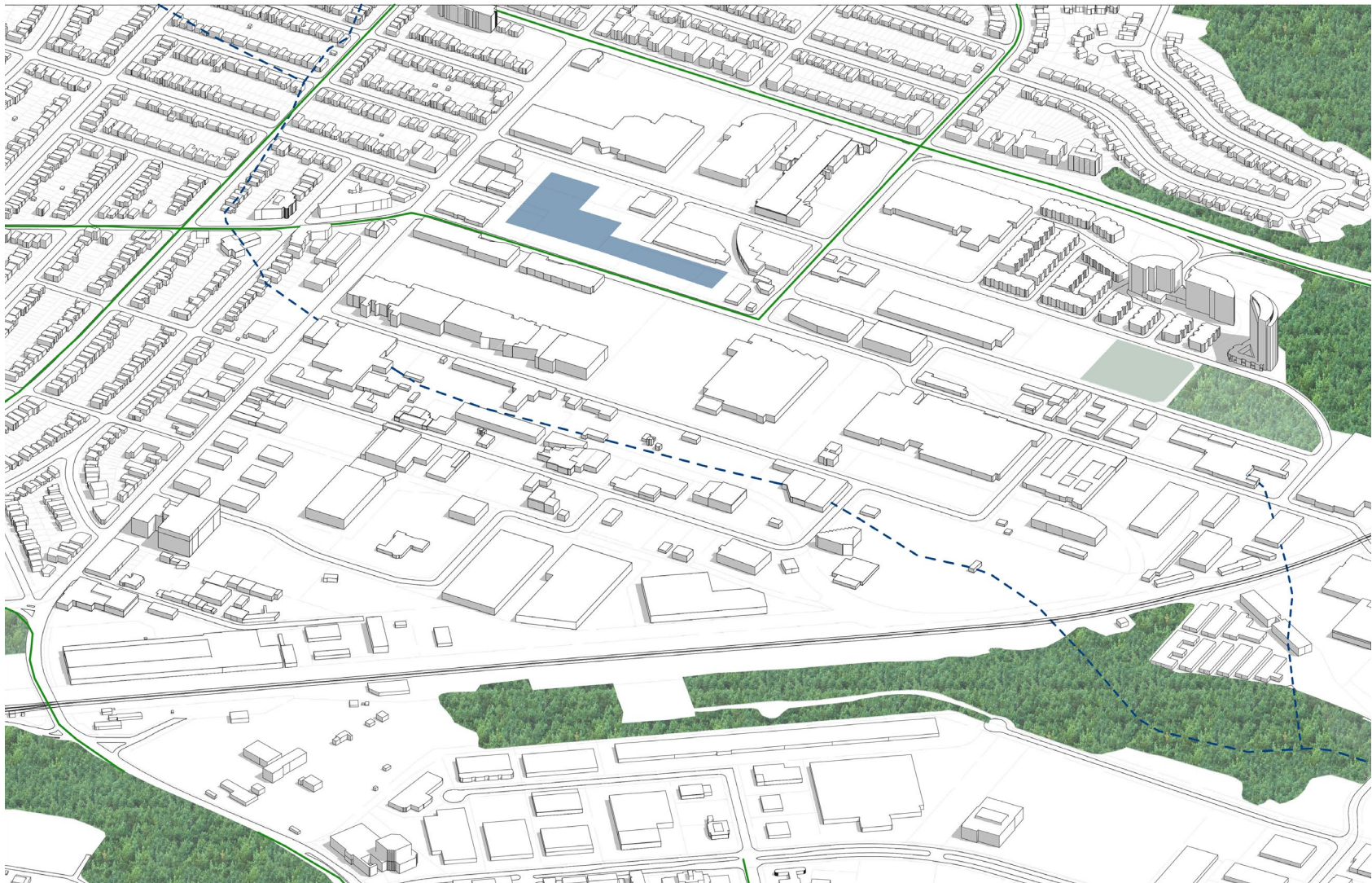


Fig. 3.29 Existing Water and Green Spaces

- | | |
|---|--|
|  Woodlands |  Lake Leaside |
|  Parks |  Bicycle Routes |

The proposal is to re-green the site by introducing floodable landscape and retention ponds along the path of the buried creek. The site would also see the Urban Garden Co-operative building proposal that would incorporate areas for local food production with a green roof infrastructure designed for flood resilience.

The conceptual diagram of the Urban Garden Co-operative building shows the program distribution. The first two levels are occupied by exhibition areas, food retail, vertical farm, and greenhouses. The structures on the southeast would accommodate the permanent local retailers that were already there on the site, like a gourmet grocery store, men's clothing store, a movie rental store, a bicycle shop, and a furniture store. These building structures also provide semi-open space for local markets and temporary or seasonal businesses like weekend markets. The activities could spill over into this landscape and connect to the bicycle routes and hiking trails connecting to the don valley. Levels three and four of the Urban Garden Cooperative building are vertical farms, workshops, galleries, and a cafe on the bridge overlooking the restored creek. This building would have a steel structure and a brick facade composed of recycled bricks recovered from the demolished industrial buildings on the site, forming a backdrop of the view of the restored creek. All of these spaces are held by a green roof hill which acts as a public space. All the public facilities of the area are accessible to both the neighborhoods of Leaside and Thorncliffe Park.

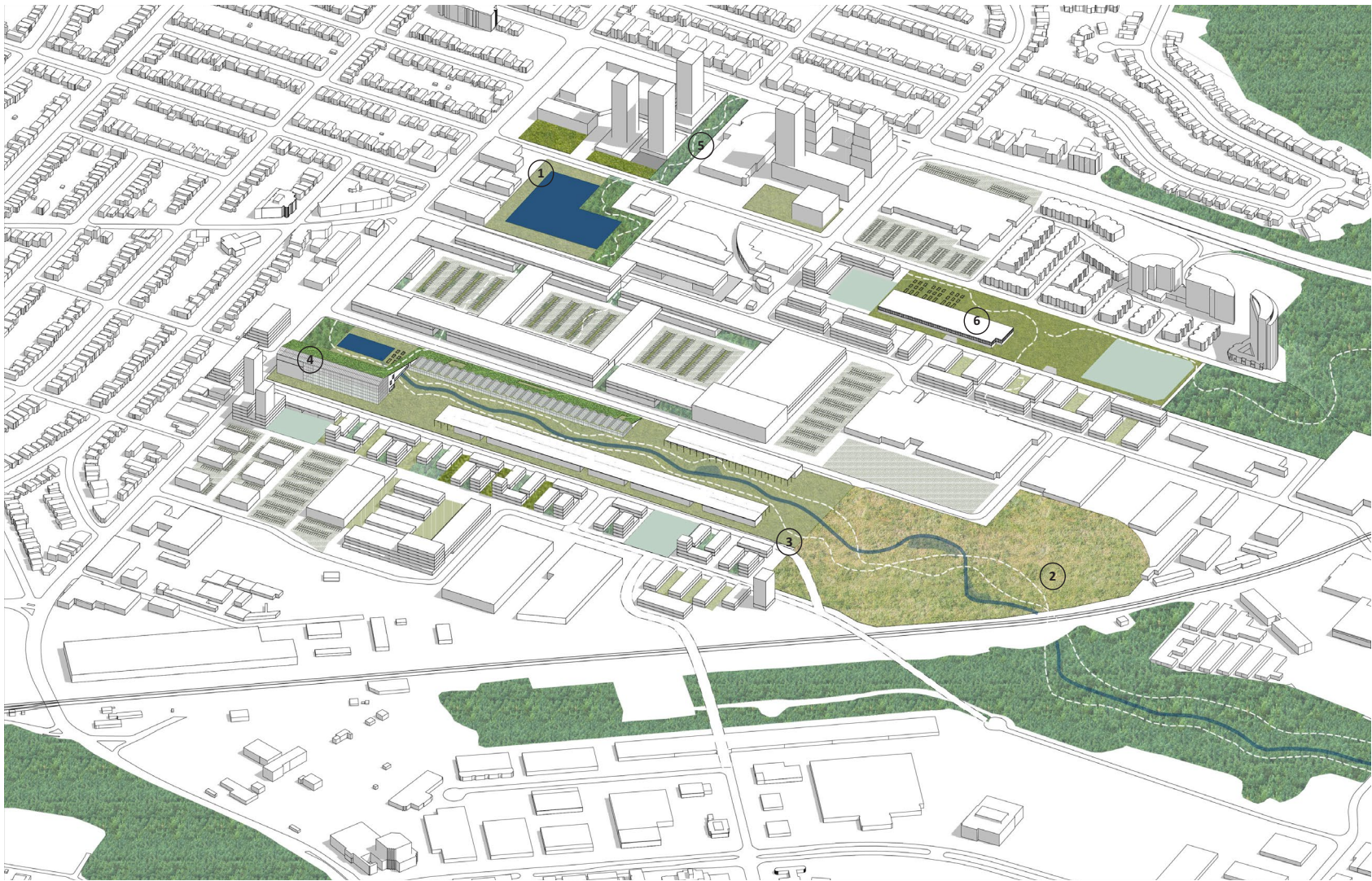


Fig. 3.30 Proposed network of Water and Green Spaces

- Woodlands
- Lake Leaside
- Parks
- Bicycle Routes

- 1 Restored Leaside lake
- 2 Floodable landscape and retention basins
- 3 Food cooperative building
- 4 Community Woodlands
- 5 Green Corridor
- 6 Community Gardens



Fig. 3.31 Existing 'Lake Leaside'

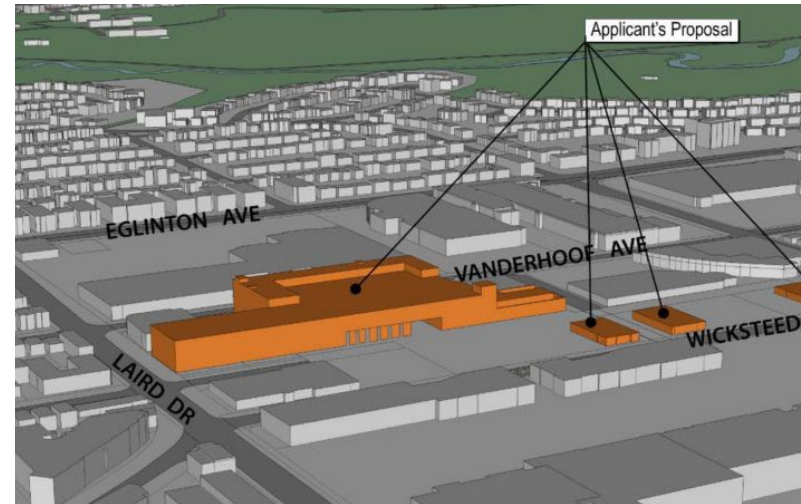


Fig. 3.32 RioCan's plan of expansion of the SmartCentres to the North on the Lake Leaside

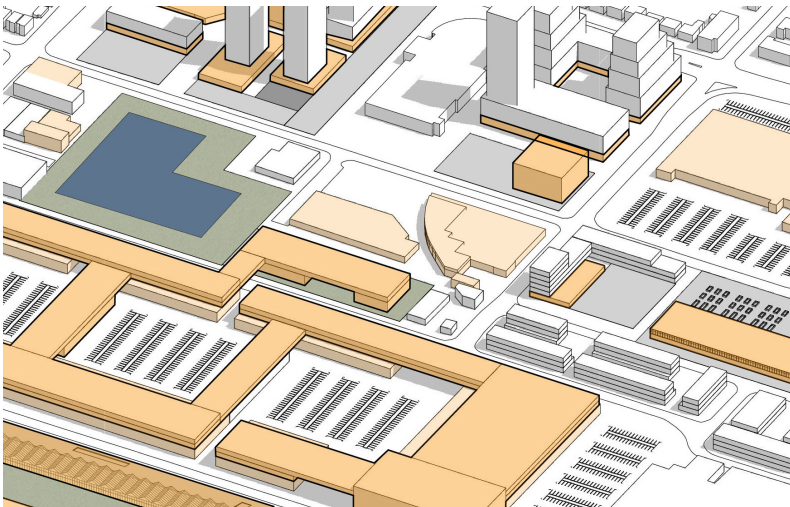


Fig. 3.33 Proposal for vertical expansion of SmartCentres while retaining a part of Lake Leaside.

The site of Lake Leaside used to be a Corn processing and research facility, which was demolished for the construction of a large format retail center. The excavation had started in 2015, but the construction site has been abandoned for five years. Therefore, it gets filled up every year during spring with water from runoff and melting snow. Concerns from the locals regarding the safety issue of an empty lakeside with rickety fences led to the decision to drain the Lake. Now there is a proposal from RioCan for the expansion of the SmartCentres to its north into the site of the Lake. The alternate proposal here is for vertical expansion of the SmartCentres with more retail and office spaces while retaining a part of the Lake for storm-water retention with landscape elements around it.

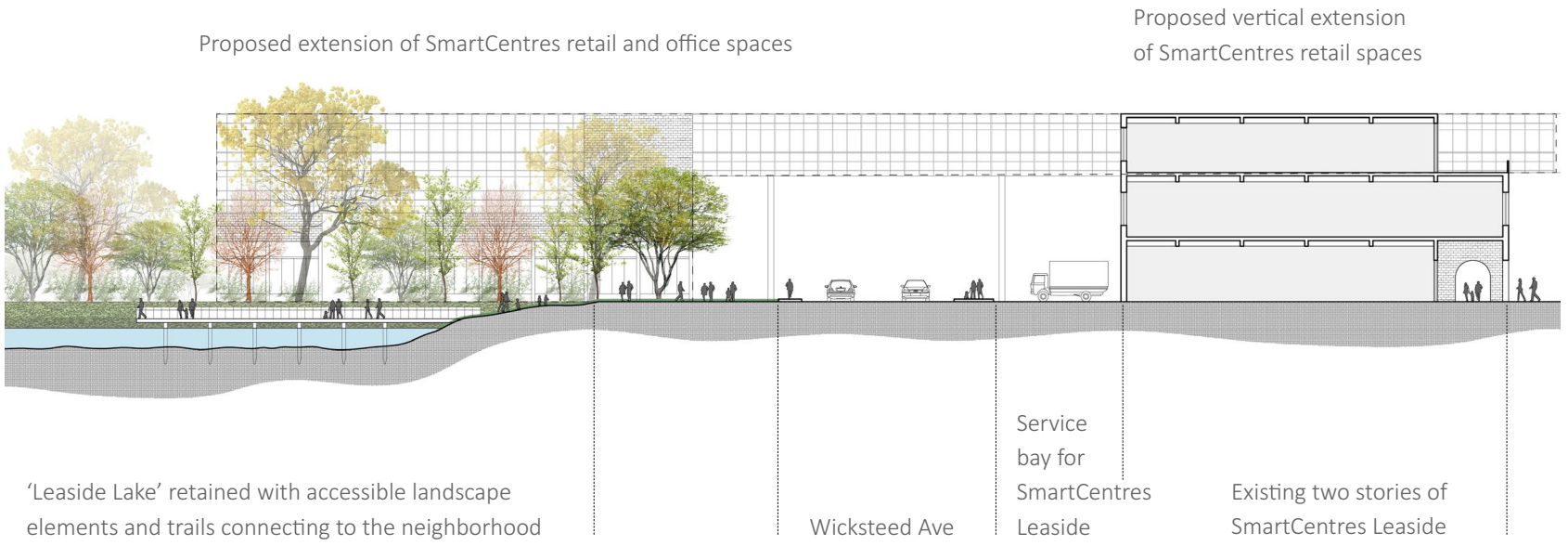
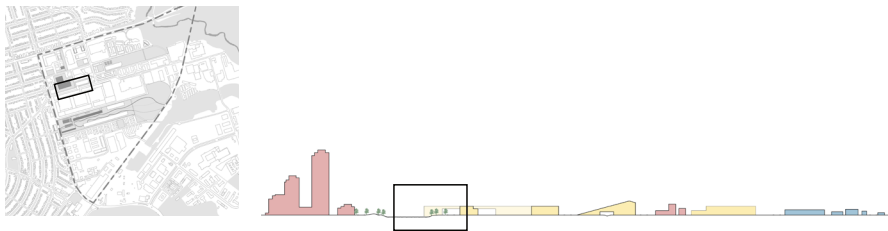


Fig. 3.34 'Leaside Lake' interface with retail

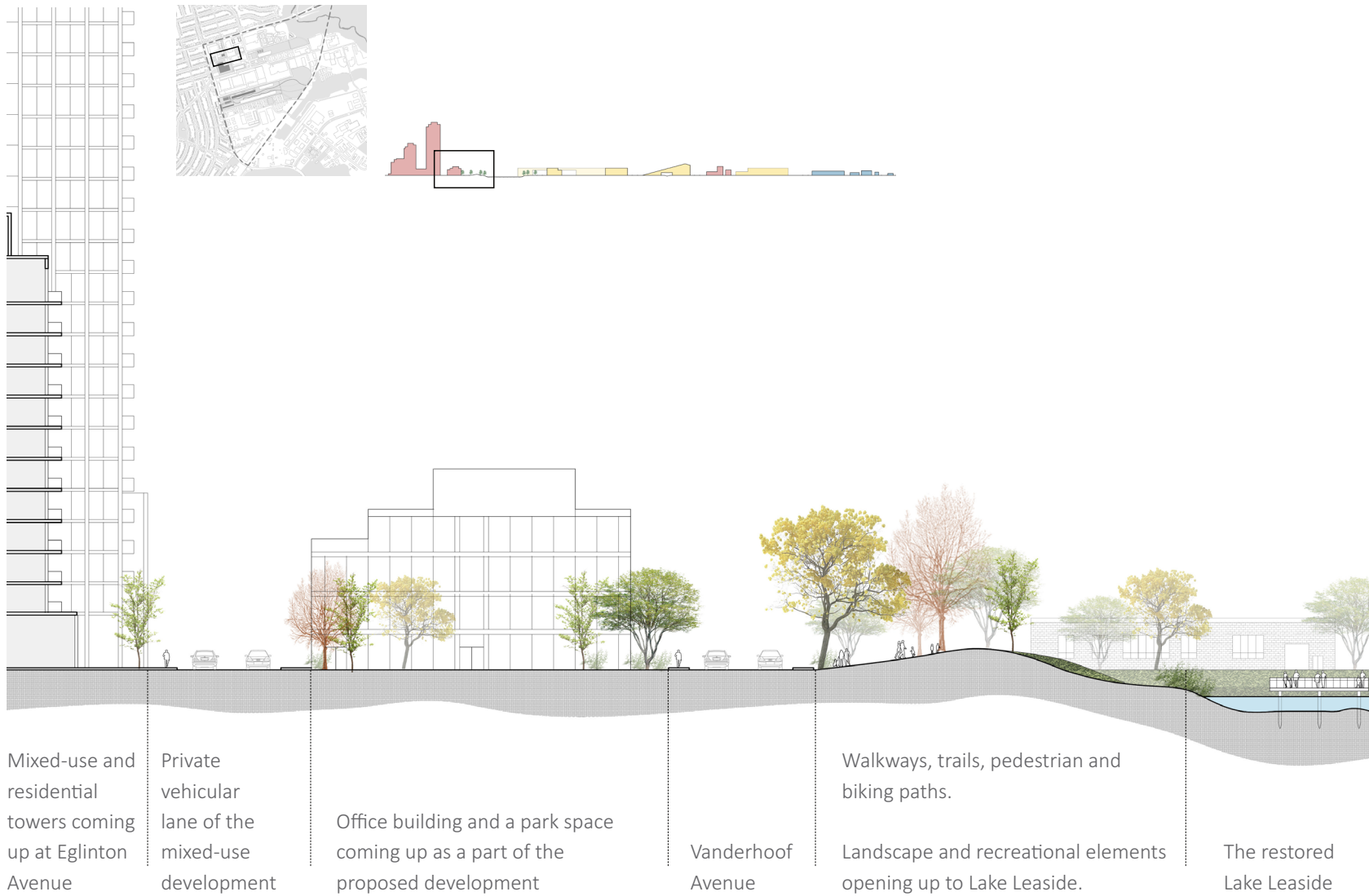


Fig. 3.35 'Leaside Lake' interface with the new development coming up on Eglinton Ave

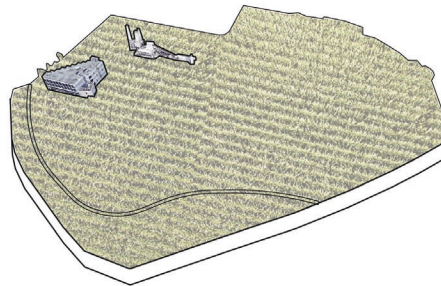


Present:
Votorantim Cement Supplier



The site has Votorantim Cimentos, a ready-mix cement plant, and CBM Aggregates, a building material store.

Proposed Phase 1:
Re-naturalizing the site



Preserving the industrial memory of the place by re-purposing the skeleton of the industrial buildings and integrating the silos and the railway tracks with proposed cycling routes and trails.

Regenerating the soil from its former industrial use by using temporary soil remediating plants that would be selected depending on the types of pollutants in the soil and soil survey.

Proposed Phase 2:
Community Woodlands



Converting the re-naturalized site into a Community Woodland with pockets of recreational spaces. This would involve planting new local trees by community volunteers from both Leaside and Thorncliff Park neighborhoods. This could have the involvement of TRCA (Toronto and Region Conservation Authority) and environmental groups like Toronto Field Naturalists and FODE (Friends of the Don East).

Introducing cycling routes and hiking trails connecting to the don valley and the existing trails. Reintroducing water on the site in a series of retention basins and floodable areas connecting the surface water to the Don Valley.

Fig. 3.36 Re-naturalization proposal for existing cement supplier

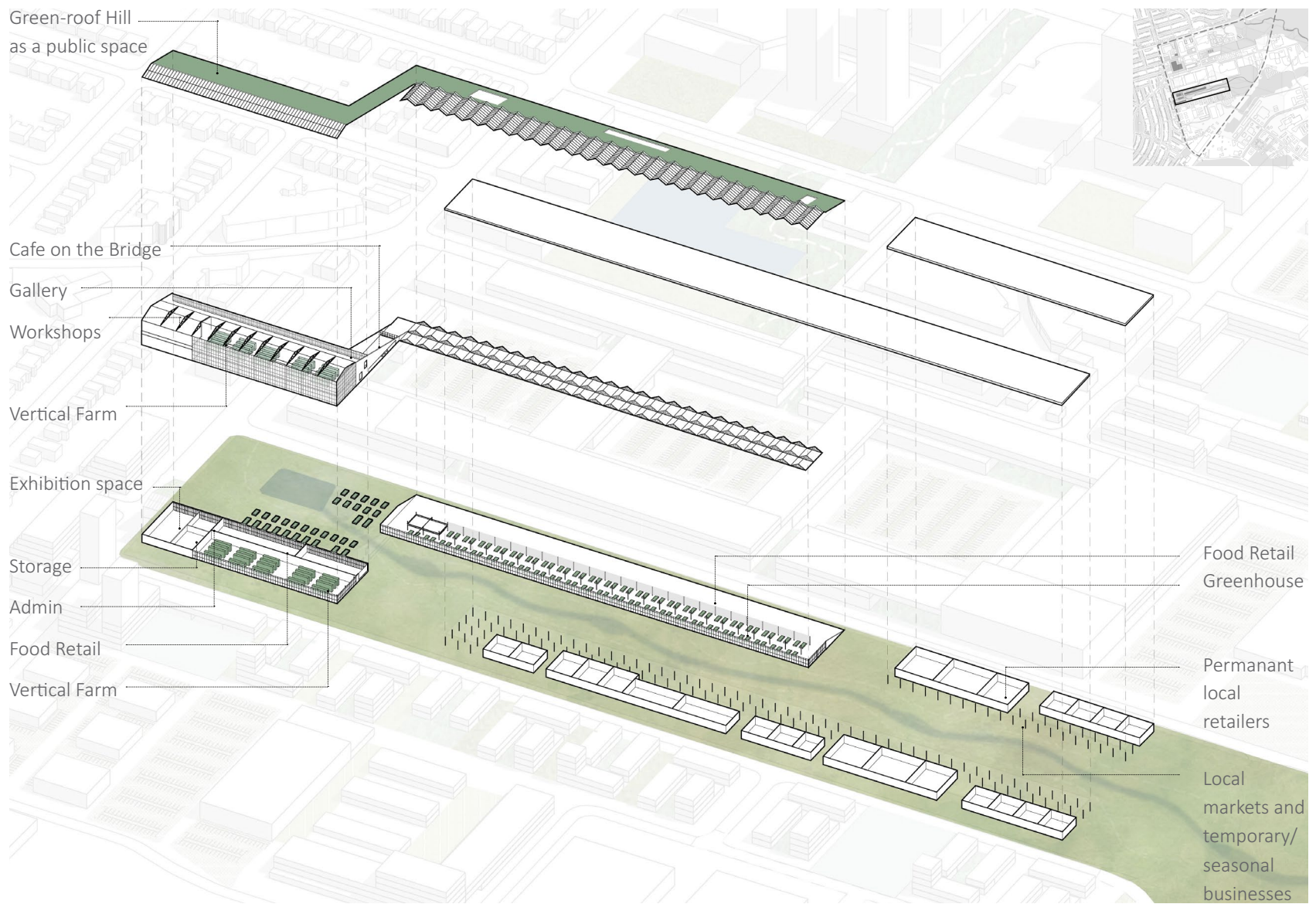


Fig. 3.37 The Urban Garden Cooperative proposal for the site between Industrial Rd and Commercial Rd.

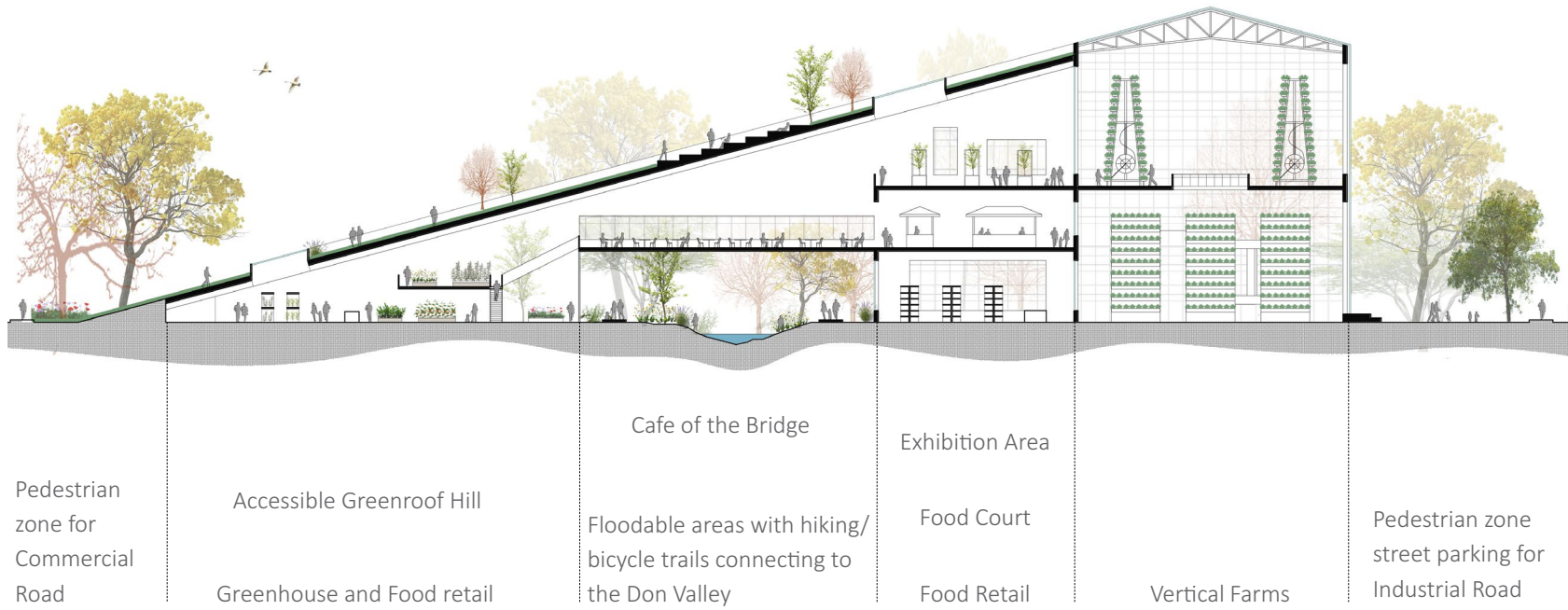
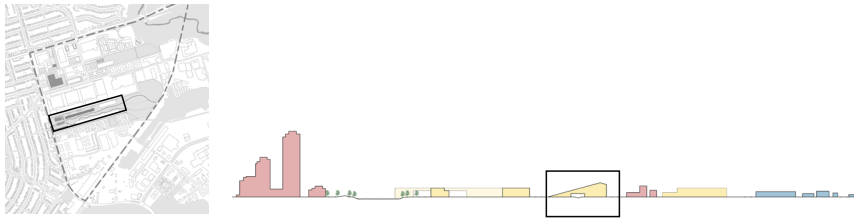
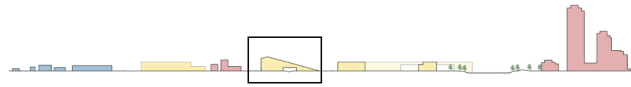


Fig. 3.38 Cross section of the Urban Garden Cooperative building



New residential buildings coming up



Pedestrian zone
street parking
for Industrial
Road

Permanent
Local Retail

Zone for local
markets, Park
Cafes, food stalls,
and seasonal
businesses

Floodable area with recreational
spaces and hiking/bicycle routes
connecting to the Don Valley

Greenhouse and Food retail

Pedestrian zone
for Commercial Rd

Fig. 3.39 Cross section of the Urban Garden Cooperative building

Native Tree and Plant Species



Black Walnut



Purple flowering
Raspberry



Staghorn
Sumac



Witch
Hazel Tree



Bur Oak



Evening Primrose



Ash Tree



Red Oak



Sugar Maple

Plants for growing in the Greenhouse



Carrots



Radish



Tomatoes



Peppers



Beets



Thyme



Rosemary



Chamomile

Plants for growing in the Vertical Farm



Lettuce



Spinach



Kale



Strawberries



Basil



Parsley

Fig. 3.40 List of Plant species to be incorporated in the proposal



Fig. 3.41 The floodable landscape on the path of the buried creek

Restoring the path of the buried creek as a series of floodable areas and small retention ponds, and designing a landscape that hosts recreational spaces, bicycle and pedestrian routes that connects it to the Don Valley. The proposed food retail building, green roofs, greenhouses, and the market hall overlooks this landscape.



Fig. 3.42 Leaside Greenhouses in the Urban Garden Cooperative building.

The Leaside Greenhouses functions as a cooperative, where the members, potentially of both Leaside and Thorncliffe park neighborhoods, can work and get the produce. This greenhouse grows tomatoes, root vegetables, and herbs and acts as an extension to the food retail, with the separation between the growing space and the retail part of the building. The greenhouse part is built up of a light steel structure standing in contrast to the heavy industrial brick facade of the rest of the building. This Leaside greenhouse cooperative would also address the question of food security in this area.



Fig. 3.43 Cafe on the Bridge

The cafe on the bridge spans across from the vertical farm and workshops part of the building to the greenhouses, overlooking the restored landscape, pedestrian and bicycle trails, and the greenhouses, providing the visitors dining and reading space with a beautiful view. This is also an extension to the food court run by local businesses.



Fig. 3.44 The Greenroof Hill

The green roof hill is a structure that combines all the activities of the building under one giant green roof and acts as one large accessible public space for the neighborhood. It hosts pavilions, trees, observation decks, bicycle trails, walkways, picnic areas, and smaller event plazas, forming an interesting relationship with the restored landscape, greenhouses, and existing neighborhood.

The proposed retrofit plan integrates all the elements of the design strategies and is shown in figure 3.45. This plan aims to add design elements that would make this neighborhood more socially and ecologically permeable. The change in ecological permeability can be seen in figures 3.46 and 3.47, where the latter shows the resultant network of green spaces and reintroduced water on the site, connecting to the Don Valley.

All the elements of the proposed design would factor in multiple variables in their implementation, like the development flux, and timeline, and phases of ecological restoration for different parts of the site. This would lead to each of them following a different timeline of development to then come together as a whole. This predicted timeline for the realization of each of these strategies is shown in figure 3.48.

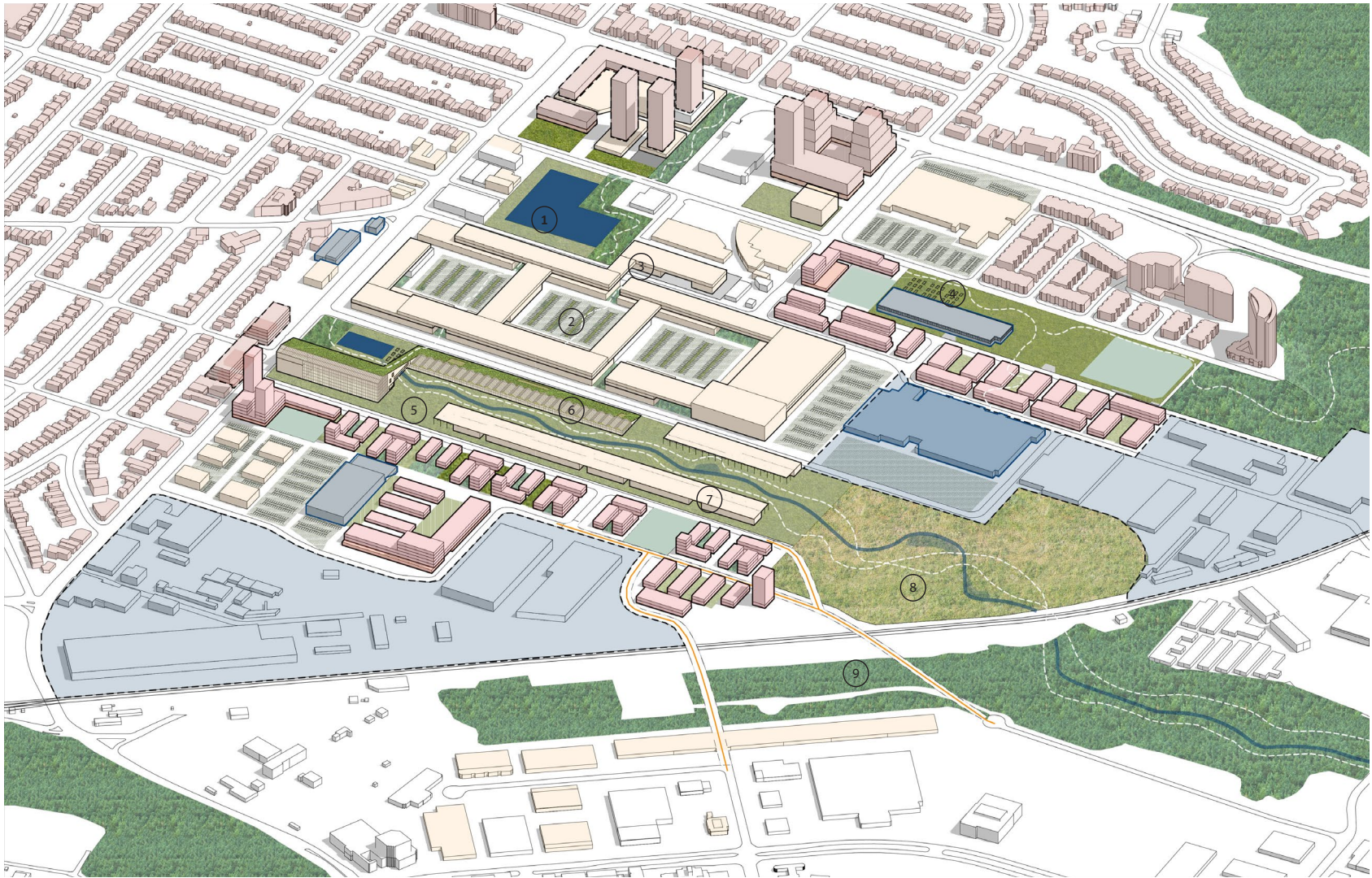


Fig. 3.45 Proposed retrofit plan

- | | | |
|--------------------------------------|---|--|
| ① Retaining a part of 'Lake Leaside' | ④ Community garden | ⑦ Permanent local retailers |
| ② Re-greening the parking lots | ⑤ Floodable landscape / retention ponds | ⑧ Community Woodlands |
| ③ Vertical expansion of SmartCentres | ⑥ Urban Garden Cooperative | ⑨ Vehicular connection to Thorncliffe Park |



Fig. 3.46 Existing network of water and green spaces



Fig. 3.47 Resultant network of Water and Green spaces with the retrofit proposal

The proposed green spaces and the re-introduced water on the site connects the neighborhood to the Don Valley and to Thorncliffe Park.

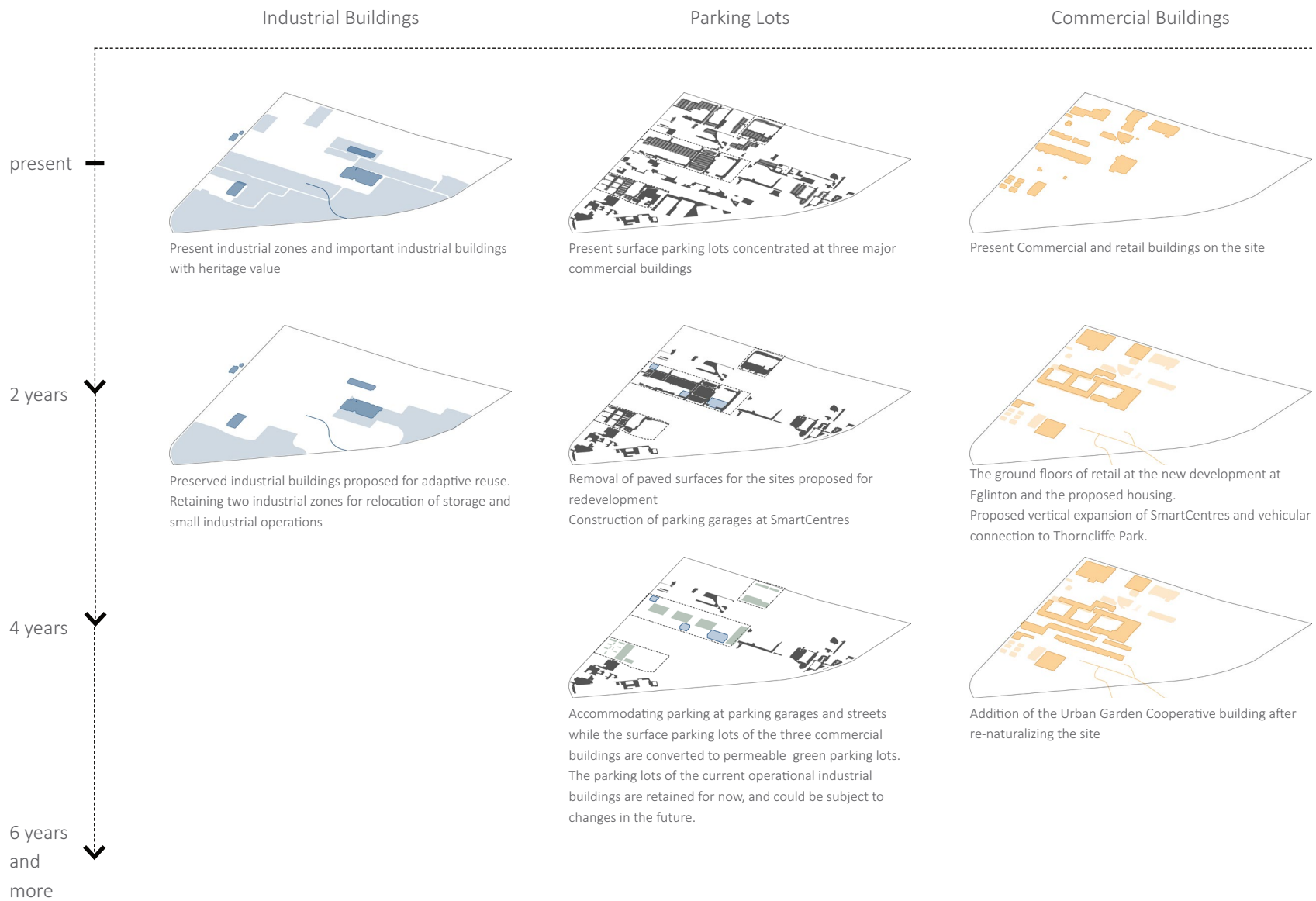


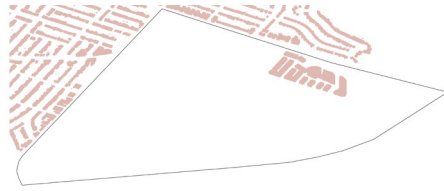
Fig. 3.48 Predicted timeline for redevelopment

Residential Buildings

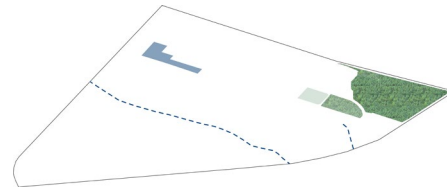
Network of Water and Green Spaces

Public Transit, Bicycle routes, Trails

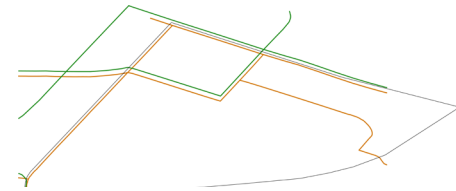
present
2 years
4 years
6 years and more



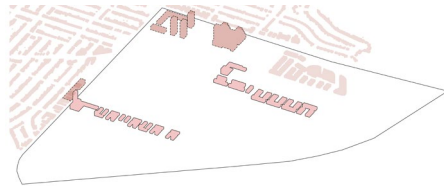
Existing residential development of many single family homes



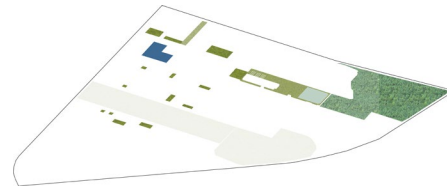
Existing Lake Leaside, buried creek, and green spaces



Existing public transit and bicycle routes



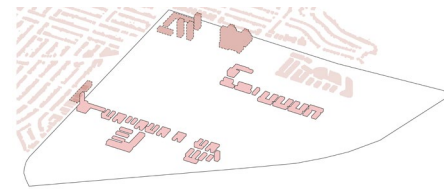
New development at Eglinton and proposed affordable housing



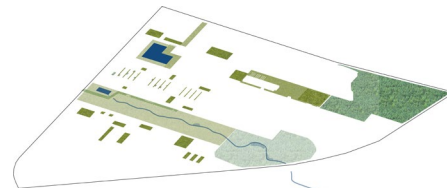
Retaining a part of Lake Leaside, proposing green spaces with new residential development and clearing lot the areas of abandoned industrial buildings and cement plant for re-naturalization



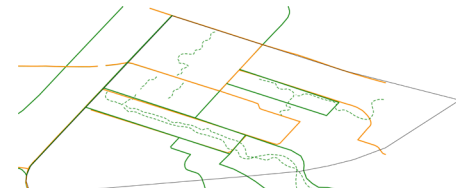
Proposed extension of public transit and bicycle routes and introduction of trails along the network of green spaces.



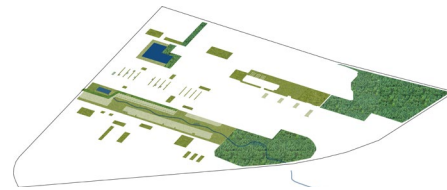
Further expansion of housing sites to accommodate the development pressure.



Introducing local plant species after re-naturalization, and reintroducing water on the site in form of floodable landscape and retention basins.



Introducing trails on the re-naturalized site along the restored creek, connecting to the trails at the Don Valley.



Proliferation of the local plant species in the Community Woodlands and around the lake.

Chapter 04:
Conclusion

With rapid urban intensification in cities like Toronto, sometimes the connection between the city and its natural heritage is lost over time. Sites with layers of history and changes in land use patterns that had led to the burial of the creeks and their ecosystem are now facing multiple challenges. This is seen in post-industrial sites like the Leaside Industrial Business Park, which are now at the brink of urban intensification and have multiple mixed-use redevelopment proposals underway to accommodate the development pressure. This thesis argues that understanding the ecological past of such sites, and adopting design strategies to restore the connection to the ecosystem in its redevelopment plan, is key to a sustainable future.

The site of Leaside Industrial Business Park is selected to test this approach. The site is understood through the sets of challenges it faces with the presence of underutilized industrial buildings, flooding issues, the social gap between the neighboring community, lack of public space, absence of connection to the Don Valley, and presence of commercial complexes with monotonous parking lots. The approach is based on understanding the aspect of permeability, both in its ecological and social context. The design strategies attempt to address questions of flood resilience, ecological restoration, adaptive reuse, food security, and retaining a connection to the site's industrial past. The proposal presented would further require feasibility and constraints studies from multiple disciplines. With the complexity of issues taken into consideration, the issues are

studied more in breadth, and the scope of this thesis limits the level of resolution.

Potential challenges that this proposal might face in its realization could be the lack of support from the city and the developers to accommodate medium and low-rise affordable housing in a site that is at the brink of intensification. A possible solution could be to provide concession to build high-rises in the site's southern portion that presently accommodates industrial storage buildings. Also, the idea of re-greening of the sites of the present industrial area and the cement plant might face resistance for a similar reason. The sites of the restored creek, the green roof hill, and the Community Woodlands would be a public park owned by the city, while the spaces in the Urban Garden Cooperative building could be leased out to food cooperatives.

The proposed urban retrofit plan is not intended to provide a concrete urban development plan for the Leaside Industrial Business Park. Rather it is intended to be one of the multiple possible iterations explored as a combination of design strategies derived from the site studies. These strategies could also potentially be adopted to different degrees in a similar context of post-industrial sites developed on buried creeks in Toronto. The one proposed approach presented in the thesis is my vision of creating a healthy city with a stronger connection between urban design and the ecosystem.

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