Diving in:

The Architecture of Urban Lake Swimming

by

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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

In the nineteenth century and beginning of the twentieth century, the Lake Ontario waterfront along the Greater Toronto Area was packed with swimmers enjoying its waters. Today, on a hot summer's day, one could find the beaches, splash pads, and pools packed, but few swimmers in the lake. Fear of swimming in urban lakes, fueled by a history of pollution and social constructs related to health, have propelled us into filtered and chlorinated alternatives. By moving away from using Lake Ontario as a place for swimming, we've turned a blind eye to our negative impact on the water.

Lake Ontario is safe for swimming most of the time, and yet, there are still many people who would not dare venture in, for fear of health risks. This fear has grown in part from centuries of pollution. The nineteenth century saw deforestation, farming and commercial fishing grow, as well as an urban expansion caused by a dramatic rise in population and industry, all of which resulted in a decrease in the water quality of Lake Ontario. Competition between recreational and industrial activities along Toronto's waterfront eventually saw swimmers being pushed to the margins of the city. In the twentieth century, the use of phosphate detergents and commercial fertilizer, sewage infrastructure that dumped sewage and rainwater along the region's waterfront, and the introduction of invasive species led to a growing number of beach closures over the years. Swimmers were thereby forced out of the lake and into more dependable alternatives. However, since the 1970s, thanks to infrastructural upgrades and environmental policies put in place by all levels of government, the quality of Lake Ontario water has improved, but the return of urban swimmers to the lake has not, due to the inherited and antiquated physical environment and social constructs that continue to shape our relationship with it.

This thesis aims to bring urban swimming back to Lake Ontario. To realize this, I propose three strategies implemented at a site along the Mississauga waterfront by using architecture to educate the public regarding water quality perception, re-engage people back into the lake, and improve lake ecosystem health.

Acknowledgments

Although this document bears my name, I have been very fortunate in the help I have had from many exceptional individuals in the writing of this thesis.

I start with my wonderful thesis supervisor, Rick Andrighetti, whose in-depth knowledge, enthusiasm, and much appreciated guidance made this process as smooth and rewarding as one could hope for. Rick fully supported my goals and made sure I accomplished them well and on time. After every meeting I always felt motivated to tackle the next stage in the project. In addition, he continually showed an uncanny instinct for what was important and worth exploring. Finally, thank you for listening, and believing in my ideas.

Since the very beginning of this journey, Jane Hutton, first as my Studio professor and then as my committee member, has been an incredible source of support. Without her initial help this thesis would not have been as much fun or as fulfilling. Through intuitive questions, insightful suggestions, and constant encouragement, Jane laid the foundations for what has become a memorable experience.

I am grateful to those generous organizations and individuals who trusted me with their beautiful drawings and photographs, and those who provided invaluable information and help. Special thanks to John B. Stark and Alex Temporale, the Region of Peel Archives, the Credit Valley Conservation, Canadian Architect, the City of Toronto Archives, the Toronto Public Library, the Toronto Star, Public Health at the Region of Peel, the City of Mississauga, and Mississauga's Central Library Arts and History Department.

A long thesis project has a way of accentuating your reliance on the relationships around you. Erin, your uplifting enthusiasm, infectious sense of humour, comforting compassion, and more importantly heroic patience, allowed me to get this far. It has meant the world to me to be able to talk through with you my struggles, uncertainties, hopes, and ideas. Your constant encouragement, thoughtful perspective, and incredible sacrifices have made all the difference. Thank you.

Jimmy et Joël, tout au long de mon ardu et sinueux cheminement vous étiez toujours là pour moi. Vos encouragements et votre affection m'ont aidé à passer au travers. Merci. Mamie et Raymond, on l'a faite. Je dis 'on' puisque cette thèse est la vôtre autant que la mienne. Vous avez vécu avec moi chaque moment de joie mais aussi toutes mes frustrations. C'est grâce à vous que je peux finalement commencer une belle carrière. Je serai toujours reconnaissant. Merci.

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Introduction

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Two years ago I visited the small Italian island of Capri. As part of the Undergraduate Architecture program at the University of Waterloo, students in their final year have the unique opportunity to spend a semester in Rome. During a week long class trip roaming the rugged south western coast of Italy, we got to spend one day visiting this historic island. On that day we lucked out, the weather was hot and there wasn't a cloud in the sky, perfect conditions for a refreshing swim in the sea. Many will know that the mountainous island is home to the famous Blue Grotto, a dark sea cave whose water shines the most brilliant blue. It's one of the greatest examples of pure blue natural water found in nature, and has attracted travellers and scientists from all around the world for centuries. On that September day, we got to swim in that crystal clear, blue... and polluted water. While swimming, classmates encountered everyday garbage. And yet the water; its beautiful blue colour and its clarity, was both irresistible and refreshing.

After my return to my hometown of Mississauga, that swimming experience stayed with me, and made me think: Why would I swim in Capri's blue waters but not in Lake Ontario's emerald waters?

I have lived a short walk from Lake Ontario for most of my life and never swam in it near my hometown in Mississauga. I have gone swimming in Lake Huron dozens of times while camping at provincial park campgrounds. I also went swimming in Lake Erie, considered dead in the 1970s. However, I have never deliberately went for a swim in Lake Ontario anywhere in the GTA. Just like me, many people who grew up in Toronto, and Mississauga at the end of the twentieth century, went through life being told that Lake Ontario was not safe to swim in.

This thesis is as much a personal story as it is a public one. It is a thesis about urban lake swimming, water, and the cultural beliefs and attitudes that can separate or connect the two. What intially seemed like a straightforward design proposal quickly became layered with overlooked cultural constructs. It became clear that simply cleaning the water and providing new and exciting means of access was not going to be enough. The *actual* cleanliness of Lake Ontario water, although a key point, was no longer the most important issue keeping people out of the lake. Rather, it was the *perceived* cleanliness of the water: the water could be clean but people still believed it to be unsafe for swimming. Therefore, in order to achieve my goal to repopularize swimming in Lake Ontario, this thesis would have to address water quality, access, *and* people's attitudes and beliefs. To look at where these attitudes and beliefs stemmed from, we have to travel back to when the City of Toronto was first forming.

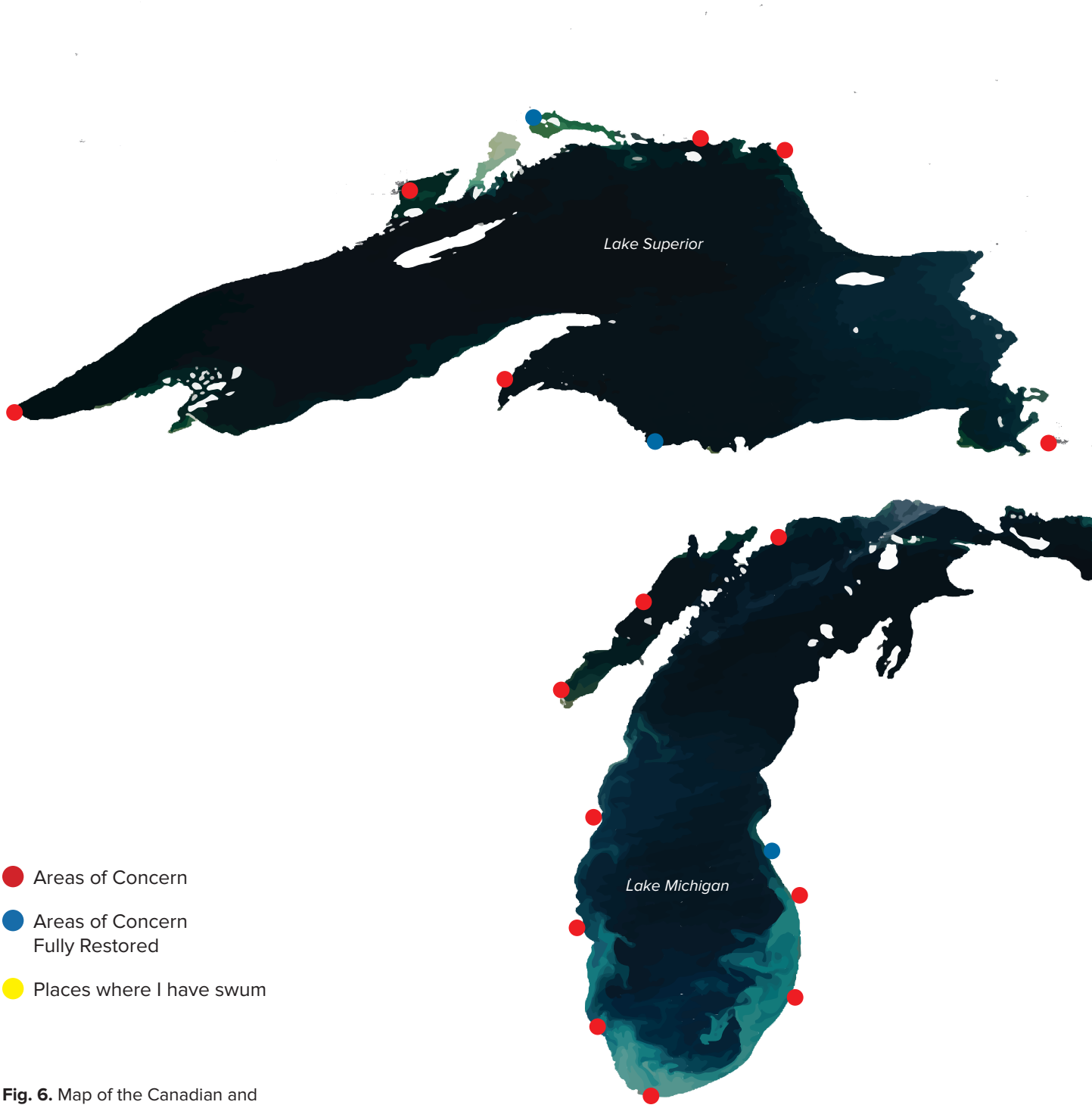
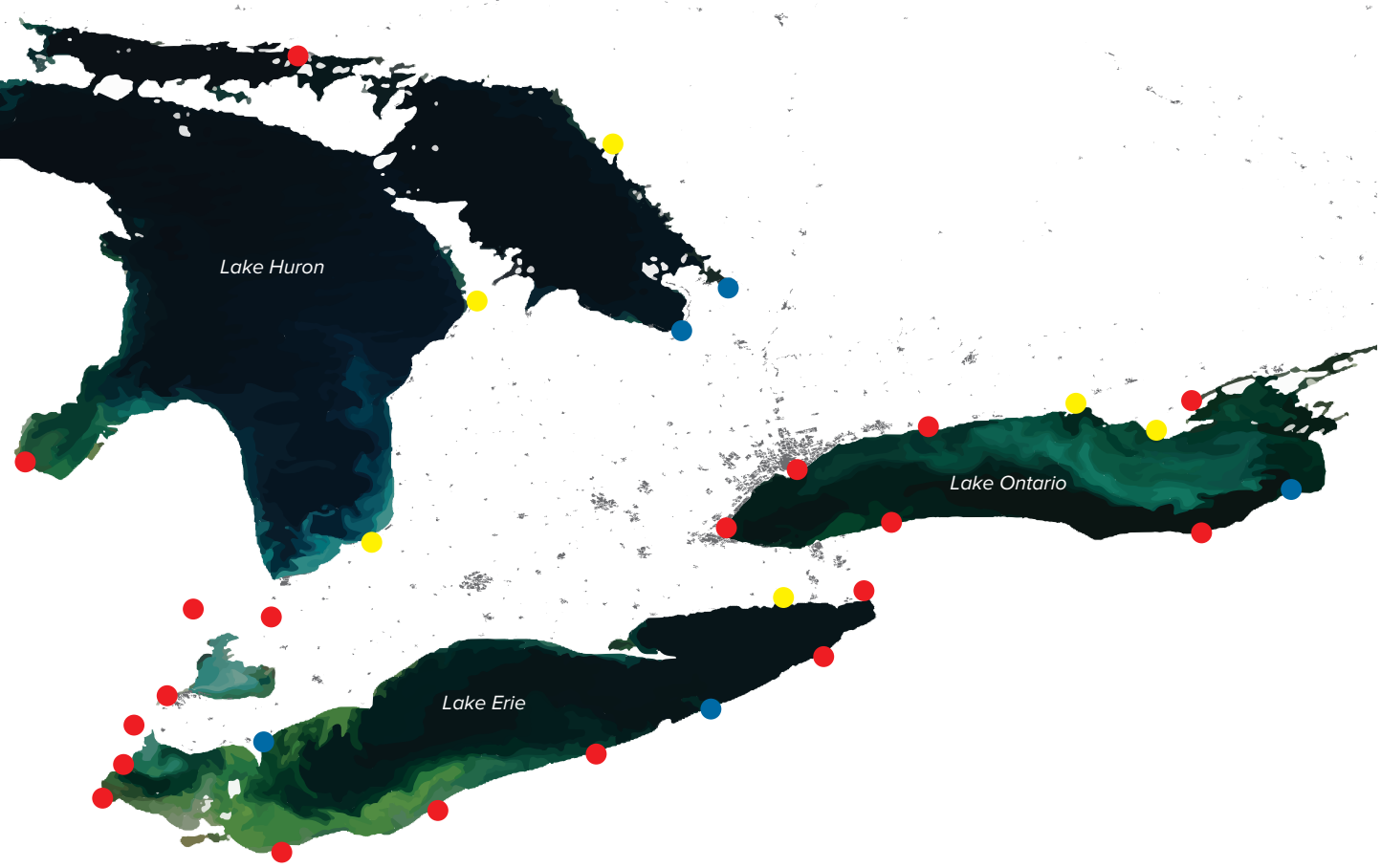
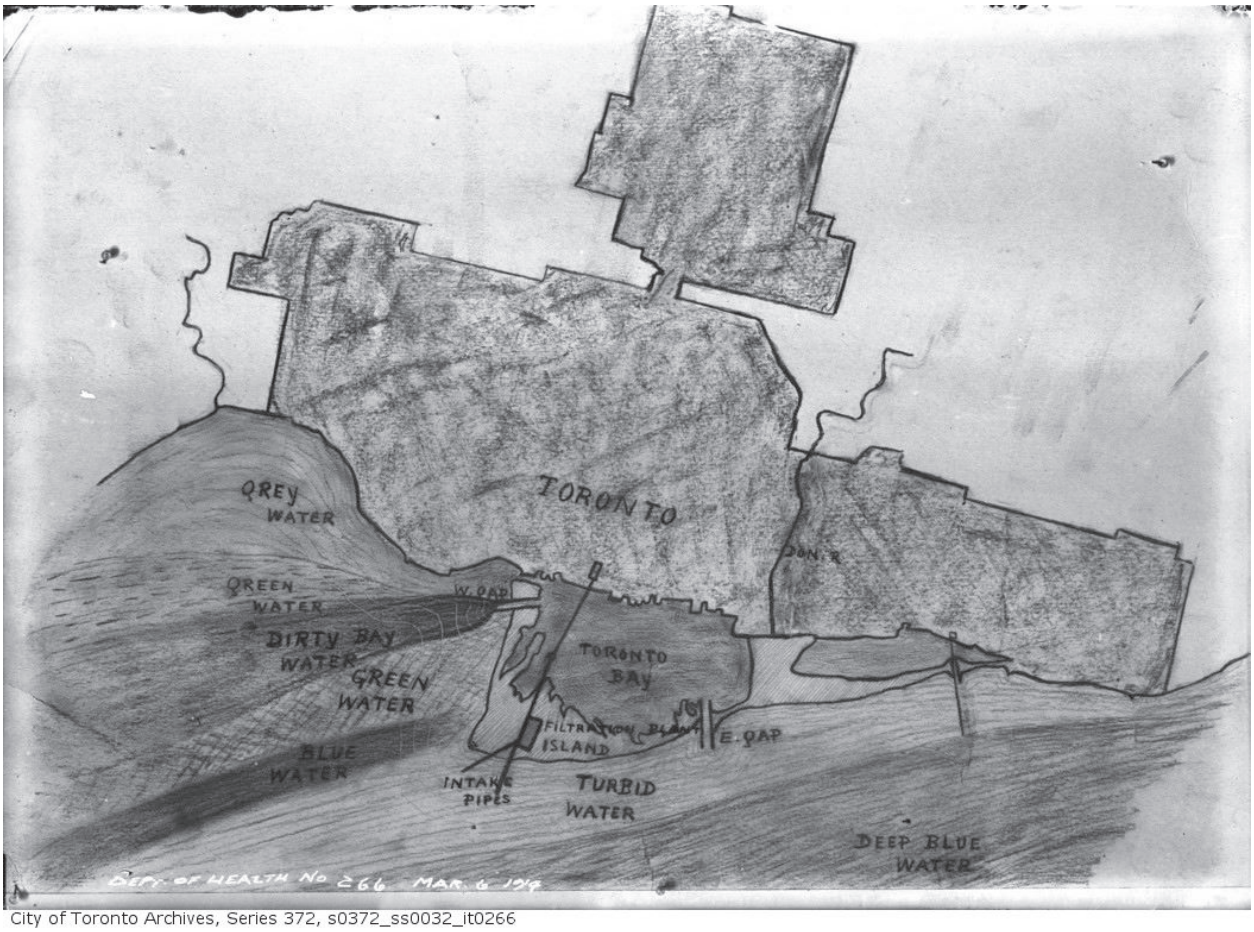


Fig. 6. Map of the Canadian and U.S. Great Lakes Areas of Concern. (by author, adapted from: Government of Canada, Map of Canadian and U.S. Areas of Concern in the Great Lakes, https://www.canada.ca/en/environment-climate-change/services/great-lakes-protection/areas-concern.html)


Lake Huron
Lake Ontario
Lake Erie
N



City of Toronto Archives, Series 372, s0372_ss0032_it0266

Fig. 7. Map indicating various types of water along the Toronto waterfront in 1914. ("Water supply and water pollution," March 6, 1914, 13x18 cm, Photograph, The City of Toronto Archives, Fonds 200, Series 372, Subseries 32, Item 266)

In the nineteenth century, deforestation, farming, commercial fishing, and an urban expansion caused by a dramatic rise in population and industry resulted in a decrease in the water quality of Lake Ontario and other Great Lakes.[1] Industrialization of Toronto resulted in the pollution of water to various degrees, which also led to the city's Department of Health naming the different types of water found in the lake. Lakewater was now seen as "grey water," "green water," "dirty Bay water," "blue water," "turbid water," and "deep blue water" (shown in figure 7). Around the same time, the Department of Health warned against swimming in polluted water. The growing awareness of the relationship between polluted water and diseases steered swimmers towards clean "blue water," and eventually led to the establishment of a new type of water: chlorinated water. This type of processed water was clear, blue, and dependably free from disease-carrying pollution; a stark contrast to the water in the lake. Chlorinated water quickly became the gold standard, and grew to become the dominant type of water for urban swimming. Fear of swimming in urban lakes, fueled by a history of pollution and social constructs related to health, have propelled us into filtered alternatives.

As chlorinated water grew in popularity, polluted water in the Great Lakes grew in frequency. This led to an international restoration program in 1987, with Canada and the United States identifying 43 Great Lakes Areas of Concern; that is, areas in and around the Great Lakes where aquatic life cannot be sustained as a result of excessive pollution. As of 2018, 4 of the 12 areas of concern in Canada have been fully restored, which unfortunately doesn't include any of the 4 identified areas in Lake Ontario.[2]

By moving away from using Lake Ontario as a place for swimming, we've turned a blind eye to our negative impact on the water. The current relationship between a segment of the population and the lake is one of distrust or disgust. This was recently confirmed by a CBC journalist who asked pedestrians walking along Toronto's waterfront if they would consider swimming in the lake. One pedestrian answered, "No, Definitely not," while another reasoned they wouldn't swim in it because, "We're in Ontario and the water's disgusting."[3] Educating the public to promote lake swimming has the potential to improve this relationship. Diving back into Lake Ontario will help foster a positive connection to the water, and help keep that 10,000 year old lake swimmable for future generations.

All Great Lake waters eventually end up in Lake Ontario. This is where my thesis takes us: along the shores of the City of Toronto, and the suburban city of Mississauga. Chapter one follows the history and evolution of swimming along the banks of Toronto and Mississauga. Chapter two, three and four, analyze the strengths and weaknesses of existing projects related to open lake swimming, water remediation, and water public education. Chapter five takes a closer look at contemporary lake swimming sites in Mississauga, and proposes a new location to reinvent the relationship between the city and the lake. Chapter six proposes a new swimming site that relies on architecture to tackle the multifaceted issue of urban lake swimming in Lake Ontario. A designed lakewater swimming site, poolwater swimming site, and riverwater swimming site demonstrate the versatility and ability of architecture to resolve the existing issues. The last chapter describes my first experience of swimming in the lake in Mississauga, and reflects on the questions and challenges raised by the thesis project.

Notes

[1]Lisa R. Estepp, and Euan D. Reavie, "The Ecological History of Lake Ontario According to Phytoplankton," *Journal of Great Lakes Research* 41, no. 3 (2015): 669-687, http://www.sciencedirect.com/science/article/pii/S0380133015001331

[2]Canada, Environment and Climate Change, "Restoring the Great Lakes Areas of Concern," last modified June 28, 2019, https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/restoring-great-lakes-areas-concern.html.

[3]Interview by Natalie Nanowski, *CBC News*, July 05, 2019.

Chapter 1

History of urban lake swimming

Fig. 8. Stylized photo of Lake Ontario and Credit River water at J.C. Saddington Park.

Swimming as cultural identity

Fig. 9. My grand-father swimming at a lake in the region of Lanaudière, Québec, 1940s.
(Private collection)

Fig. 10. My great-grandmother with family swimming in la rivière Bayonne, Saint-Thomas, Québec, 1950s. (Private collection)

Fig. 11. My mother and aunt swimming in a lake in the region of Lanaudière, Québec, 1965.
(Private collection)

Canada's unique water-marked geography plays a key role in encouraging people to learn how to swim from a young age. The country is covered by freshwater; as many as two million lakes have carved themselves a niche, big and small, into the landscape. Having such a vast amount of surface water lying around can lead to much fun, but also danger. Learning to swim in Canada therefore, has as much to do with leisure and exercise as to do with safety. Through necessity, swimming has developed into an important cultural value in this country. For many children and adults, summers are for swimming, like an article published in *The Port Credit Weekly* emphasized in 1955, "Summer and swimming go together like ham and eggs."[1] Whether it's in a suburban backyard pool, city pool, or in a lake while camping or cottaging; Canadians often find themselves near water. It's perhaps no surprise Statistics Canada confirmed swimming to be consistently in the top three most popular sports for active children aged five to fifteen in 1998, 2005, and 2010 (in 2010, more children participated in swimming than in hockey!).[2] Swimming combines two important Canadian passions: leisure, and nature. Therefore, to swim is in a way, to embody what it is to be Canadian; taking the time to appreciate and enjoy our unique rivers and lakes.

This thesis follows the Canadian swimming culture established by European descendants. During the mid to late eighteenth century Europe was artistically and philosophically swept by what is now called the Romantic movement. Romanticism stepped away from reason and science, inherited from the Enlightenment, to celebrate unrestrained passion and imagination. This movement transformed people's relationship towards their natural environments; how they experienced it and how they interacted with it. Pristine or 'wild' nature was imbued with a new appreciation, and was seen as a refuge from the grim industrial revolution rapidly imposing itself into people's lives and surrounding landscape. Author Susie Parr highlights the importance and influence of British artists in her well-documented book *The Story of Swimming: "*How they [British artists] behaved in and near water, and how they experienced seas, rivers and lakes, changed popular perception and conceptualization of these bodies of water."[3]

As opposed to seeing the landscape as a source for profit in an ever expanding capitalist world, Romantic artists considered Britain's waters "to possess their own un-tameable, awe-inspiring power, and to be capable of shaping and interacting with human identity."[4]

Fig. 12. My mother swimming in a backyard pool, Joliette, Québec, 1981. (Private collection)

Fig. 13. My brother and I swimming at Sauble beach, Lake Huron, Ontario, 1993. (Private collection)

Fig. 14. My family swimming in an outdoor public pool, Bronte Creek Park, Oakville, 1994. (Private collection)

Fig. 15. Family and friends pool party, Mississauga, 2004. (Private collection)

Thanks to Romanticism, swimming evolved from being practiced only as a medical treatment for ailments such as gout, headaches, and severe arthritis, to being an intimate, spiritual and freeing experience in the presence of a wild, and sublime nature.

An appreciation for leisure and nature was passed down from generation to generation. Just like I was encouraged to take swimming lessons at an early age by my parents, they too had been from their own parents. And although my grand-parents didn't have the opportunity of taking swimming lessons (they were not offered in most rural communities at that time), childhood summers in the 1930s and 40s in rural Québec and northern Ontario were nonetheless filled with jumping off docks and bridges into rivers, and going on day trips organized by the church to the nearest beach for a refreshing dip in the lake. Swimming's contemporary history in the Greater Toronto Area (GTA) began almost two hundred years ago along the shores of a small European settlement located within a natural harbour.

Urban lake swimming, 1830s-1890s

When the City of Toronto was still in its infancy in the early nineteenth century, the shoreline was bordered by a long, sandy beach, and the lakewater was still relatively unaffected by the few early European inhabitants. These factors made it possible for people to swim in the lake along the city's waterfront. In 1816, the city began construction of three wooden wharves at the foot of Peter, Church and Frederick Street[5] and the waterfront would make way for several more over the following decades. Swimmers would quickly adopt the new industrial wharves along Toronto's waterfront to suit their needs. For example, W. H. Pearson recalls in his book *Recollections and records of Toronto of old: with references to Brantford, Kingston and other Canadian towns*, how Small's wharf at the foot of Berkeley Street was a "favourite swimming-place for the boys."[6] And another resident of Toronto recalls how Rees' wharf was a favourite place for a swim: "Here, on a fine summer's morning, many of the leading merchants and clerks from King Street might be seen indulging in the healthy exercise."[7]

The transformation of the city's waterfront inspired entrepreneurs to provide new and exciting experiences for urban swimmers. This led to the creation of the timber "Royal Floating Baths" erected in 1836 at the foot of Bay Street. The project contained ten warm and ten cold baths, with vapour and shower baths, a gallery, a promenade deck and could accommodate two hundred people.[8] After swimming, patrons could relax in a reading room and enjoy refreshments served by attendants. Unfortunately, a storm sank the baths in 1838, which forced the owners to rebuild the structure, but instead of free-floating they were now connected by bridge to the mainland. As a result of being immobile, polluted lakewater from sewage invaded the swimming area along the waterfront and the project was eventually abandoned by 1843.[9]

Other enterprises attempted to formalize, and commercialize the cultural importance of nature and leisure - the summer resort, the precursor to the cottage, and the summer camp. As an article in *The Globe* proclaimed: "The City of Toronto cannot be surpassed by any other place in Canada for its summer resorts."[10] In the 1880s, summer resorts could be found on the Toronto Island, Balmy Beach and Kew Gardens in the east, and Long Branch and Lorne Park in the west. Returning to a wild nature was at the core of these experiences. What often propelled people to spend time at a summer resort or a summer camp was again a Romantic inspired idea; a return to nature to escape the filth of the city.

Fig. 16. Illustration of the Lorne Park Estates as part of a marketing brochure, 1889.
(Toronto and Lorne Park Summer Resort Company, *Picturesque Lorne Park : situated on Lake Ontario 14 miles west of Toronto, 24 miles east of Hamilton, 1889*. Cover page. Courtesy of Toronto Public Library. https://static.torontopubliclibrary.ca/da/pdfs/31385037276936d.pdf)


NE PARK
LLUSTRATED.

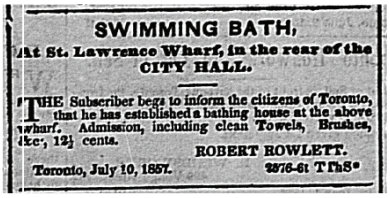

SWIMMING BATH,
At St. Lawrence Wharf, in the rear of the CITY HALL.
THE Subscriber begs to inform the citizens of Toronto, that he has established a bathing house at the above wharf. Admission, including clean Towels, Brushes, &c., 12½ cents.
ROBERT ROWLETT.
Toronto, July 10, 1857. 2876-6t TThS

Fig. 17. Advertisement of Swimming Bath along the City of Toronto's waterfront, 1858.
(*The Globe*, July 13, 1858, 3.)

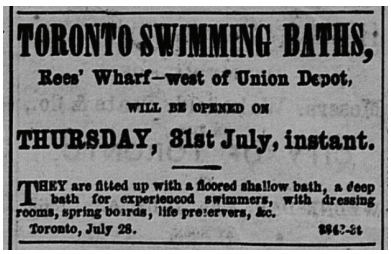

TORONTO SWIMMING BATHS,
Rees' Wharf—west of Union Depot,
WILL BE OPENED ON
THURSDAY, 31st July, instant.
THEY are fitted up with a floored shallow bath, a deep bath for experienced swimmers, with dressing rooms, spring boards, life preservers, &c.
Toronto, July 28. 3042-3t

Fig. 18. Advertisement of Toronto Swimming Baths along the city's waterfront, 1862.
(*The Globe*, July 30, 1862, 3.)

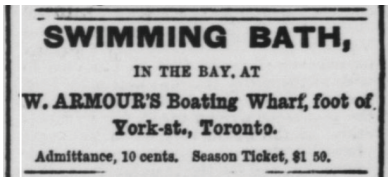

SWIMMING BATH,
IN THE BAY, AT
W. ARMOUR'S Boating Wharf, foot of York-st., Toronto.
Admittance, 10 cents. Season Ticket, $1 50.

Fig. 19. Advertisement of Swimming Bath along the City of Toronto's waterfront, 1876.
(*The Globe*, June 3, 1876, 7.)

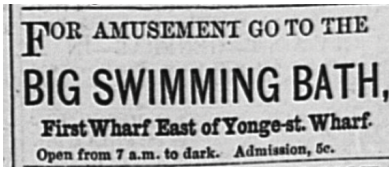

FOR AMUSEMENT GO TO THE
BIG SWIMMING BATH,
First Wharf East of Yonge-st. Wharf.
Open from 7 a.m. to dark. Admission, 5c.

Fig. 20. Advertisement of Big Swimming Bath along the City of Toronto's waterfront, 1877.
(*The Globe*, August 28, 1877, 2.)

Typical programmes at summer camps emphasized instruction in swimming, canoeing and hiking, and campers often had to jump into the water every morning in what is still called the 'morning-dip'.[11]

In 1886, the Toronto and Lorne Park Summer Resort Company established a summer holiday destination, called the Lorne Park Estates, for urbanites living in Toronto. The new resort combined nature and leisure into a new institution that took advantage of the landscape's "healthfulness and picturesque" quality, and was only a "railway, steamboat and carriage" ride away. Swimming was among many of the activities offered at the Lorne Park Summer Resort, as a 1886 pamphlet explains, "exhilarating bathing may be indulged in with safety, every facility therefor having been provided..."[12]

By the late nineteenth century and beginning of the twentieth century, the shared geography of recreational and industrial activities along the waterfront was coming to an end. The overwhelming emphasis on commercial and industrial activities along the waterfront from private and public interests left swimmers with no permanent infrastructure of their own. William Thomson, a concerned Toronto resident, lamented this fact in his 1876 Globe column: "Since the construction of our Esplanade, the youth of our city have been practically excluded from the use of the waters of the bay." Although a free public bathing option existed on Toronto Island, he complained that it was "distant" and "costly to reach."[13]

In addition, accounts of people swimming in "dirty water" can already be read in newspapers of the time. In 1877, A.A. Stewart, the secretary of the Toronto Swimming Club, wrote an editorial in the Globe criticizing the terrible water quality of the lake. He writes: "It is impossible to bathe with any degree of comfort near any of the wharves, the water being in a filthy state owing to traffic, sewerage etc."[14] Ten years later, the situation had not improved; a journalist noted that the people swimming at the Credit Valley Wharf along the city's waterfront were swimming in "dirty water...which the scum floating on the surface renders perfectly opaque."[15]

Perhaps the last formalized swimming area within Toronto's Inner Harbour were the Wiman Swimming Baths. Built in 1882, one bath was located at the foot of Frederick Street along the City's waterfront and the other was located across the harbour, along the eastern end of the Toronto Island. Despite sharing the same name, these baths were architecturally different and provided very different swimming experiences. The swimming baths along the city's waterfront were designed as a floating structure and included, "dressing-rooms surrounding a bathing tank with sides below the water line, and bottom perforated for the free admission by the current, if any, supported by pontoons."[16]

On the other hand, the Wiman Swimming Baths on the Toronto Island allowed people the freedom to swim in the lake by way of a beach. However, less then twenty years later, both swimming options would be abandoned. Due to the recent construction of the Don Breakwater in 1871, "the lake beach was spoiled for bathing purposes. The bay became so contaminated with sewage that bathing there was abandoned…"[17]

Furthermore, as sewers dumped an increasing amount of waste from a growing population directly into the harbour the water quality of lake Ontario along Toronto's waterfront worsened. By 1891 the city was discharging 18,700 cubic meters of sewage into the lake on a daily basis.[18] By the beginning of the twentieth century, urban lake swimming was forever pushed to the margins of the city, away from industry and pollution.

Swimming at the margins, 1900s-1950s

Swimming moved farther from the urban core as pollution and industrial activity increased along its waterfront. New geographical, architectural, and social constructs were developed along the waterfront in order to regulate swimming and all other recreational activities.

In 1910, with Toronto's lake swimming past and future in mind, the Globe came out with a column entitled "The Value of Humber Beach." The article laments the city's lack of "provision of public bathing facilitates", and highlights the importance of safeguarding Humber Beach's "long sweep of gently sloping sand beach" against commercial activity and unwanted infrastructure. The article concludes that "there is no reason except apathy or parsimony on the part of the Council why there should not be thousands of old and young enjoying every summer afternoon the luxury of a bath and a swim under ideal conditions."[19] Luckily, this wishful scene was to come true in the following decade thanks to the creation of the Waterfront Plan in 1912 by the newly formed Toronto Harbour Commission. The goal of the project was to allocate and plan for diverse activities along specific portions of Toronto's waterfront.[20]

Fig. 21. Map of conceptual design of proposed Waterfront Development, 1912.
(Toronto Harbour Commissioners, *The Toronto Harbor Commissioners Engineering Department Waterfront Development*, 1912, 52 x 158cm, map, Courtesy of Toronto Public Library. https://static.torontopubliclibrary.ca/da/images/LC/t1912-4msm.jpg)

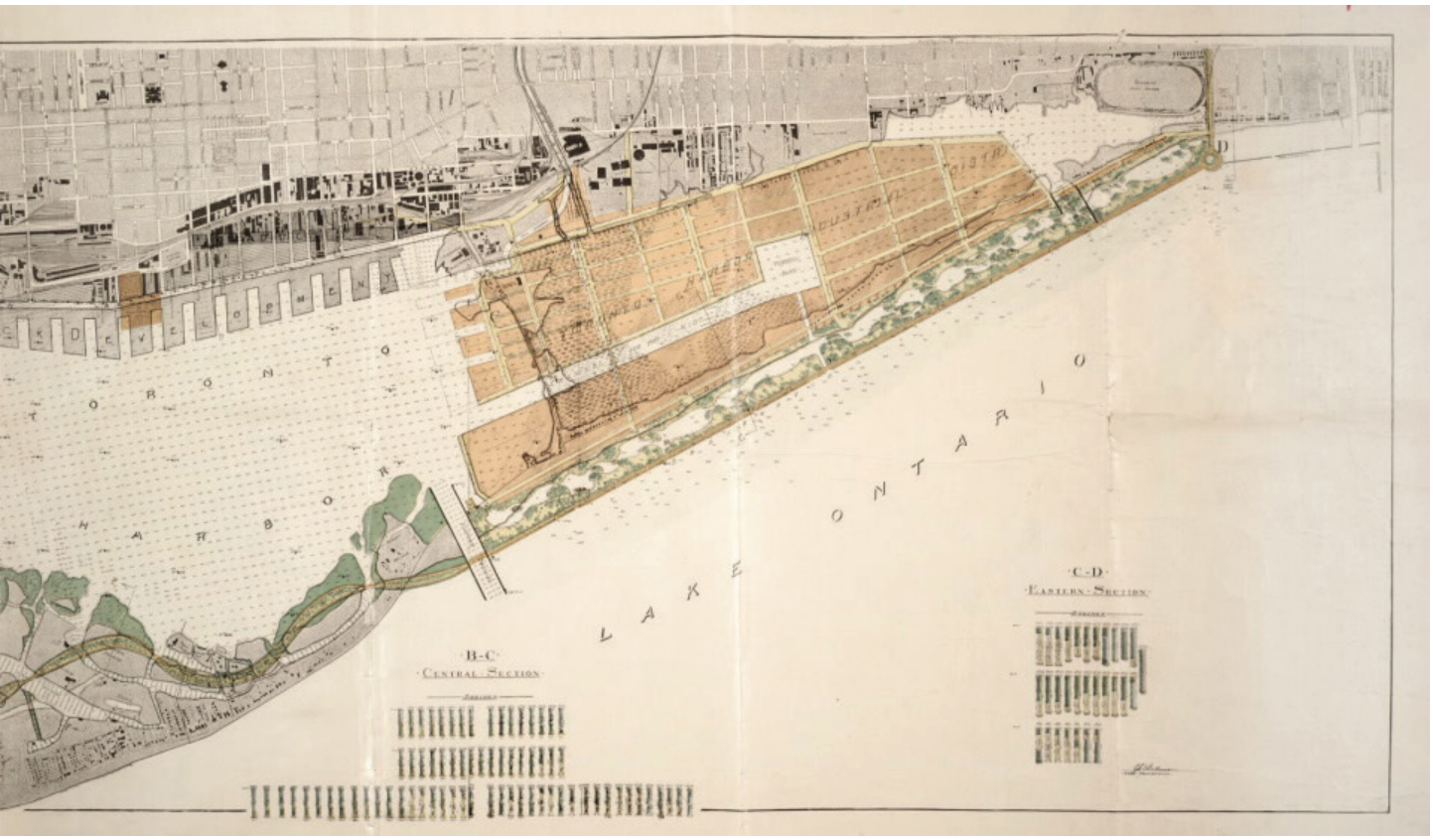

TORONTO
HARBOUR
LAKE ONTARIO
B-C
CENTRAL SECTION
C-D
EASTERN SECTION

Fig. 22. Photo of newly constructed Sunnyside Bathing Pavilion in Toronto, 1922.
(James & Son, *Toronto/Parks/ Sunnyside*, 1922, photograph, Courtesy of Toronto Public Library, https://static.torontopubliclibrary.ca/da/images/LC/pictures-r-594.jpg)

Fig. 23. Photo of a crowd of people sunbathing and swimming at Sunnyside Beach, 1924.
(*Sunnyside Beach*, 1924, photograph, The Toronto Star Archives, Courtesy of Toronto Public Library, https://www.torontopubliclibrary.ca/detail.jsp?Entt=RDMDC-TSPA_0109552F&R=DC-TSPA_0109552F)

Sunnyside Beach to the west and Kew Beach to the east were part of the new designated swimming areas designed, maintained, and promoted by the city in the early twentieth century. The geographical separation of commercial, industrial, and recreational activities permanently moved lake swimming away from the Inner Harbour. This separation has had a profound impact in regards to the relationship between the lake and the city because it changed and forced where and how people could now enjoy lake swimming, mainly at the newly designated swimming beaches.

New infrastructure dedicated to creating a 115-acre "lake shore playground" included a restaurant, a stadium, a bandstand, a railway station, a protective breakwall, a boardwalk, an amusement park, and finally, the Sunnyside Bathing Pavilion and the Sunnyside Beach.[21] The popular landmark along the edge of Lake Ontario designed by Toronto architecture firm Chapman, Oxley & Bishop, opened in 1922 and has been the most significant and long lasting piece of architecture built in Toronto dedicated solely to swimming in Lake Ontario. Unlike past and present public buildings intended for recreational purposes, the Toronto Harbor Commissioners envisioned not an inconspicuous, utilitarian building, but a "modern and artistic public bath-house."[22] The painted stucco Beaux-Arts pavilion dedicated to bathing has changeroom accommodations for 7,700 bathers, and a roof garden with light refreshments that could serve 400 guests.[23] So popular and important was lake swimming for children in the first half of the 20th century that the Toronto Transit Commissioner (TTC) provided a free bathing car service that went around Toronto neighbourhoods picking up children and bringing them to the new beaches.[24]

In 1925, Toronto completed its first large-scale public swimming pool, the Sunnyside Outdoor Natatorium, now called Sunnyside Gus Ryder Outdoor Pool. Advertisements at the time of the opening thought it worthy to mention that the largest outdoor pool in Canada was filled with water that was "heated, filtered and chlorinated", a first in Toronto.[25] The added mechanical process of treatment and heat to the water were essential for the attraction of crowds, since, as historian, journalist, author and long time Toronto resident Mike Filey points out, "the Toronto Harbour Commission was faced with two problems that were keeping crowds away from its Sunnyside Amusement Park. The first was the extremely cold waters of Lake Ontario…The second was the inevitable contamination from nearby storm outfalls."[26] This new and exciting piece of infrastructure along the city's waterfront gave citizens an alternative to lake swimming during the hot summer months and could accommodate 2,000 bathers.

Fig. 24. Photo of a crowd of people entering Sunnyside's newly built outdoor pool, 1925.
([Pringle & Booth?], *Sunnyside, swimming pool, looking e.*, 1925, photograph, Courtesy of Toronto Public Library, https://static.torontopubliclibrary.ca/da/images/LC/pictures-r-616.jpg)

As the city expanded outwards, new waterfront parks were built on the periphery to accommodate a growing population. Lakeview, a cottage country for Torontonians located at the edge of what is now Mississauga, opened its first waterfront park, Lakeview Park, in 1927 that offered a long sandy beach for swimming.[27]

Lake Ontario's water quality worsened between 1900 and 1945. The introduction of phosphate detergents and commercial fertilizer in the early twentieth century resulted in an increase in green algae blooms. From 1945 to 1975 the situation had not improved, and signs put up by the city's Medical Officer of Health could now be seen along Toronto's waterfront warning against swimming in the polluted lake.[28]

Pollution in Lake Ontario led to a division between citizens living along its shores: those who believed the lake was still safe to swim in, and those who did not. In an 1939 Globe column, opinions were divided: "I never heard of anybody getting sick from the water around here" was longtime resident Simon Taylor's opinion. His was backed by William Ferguson who thought it "would be a terrible thing to close up the beaches just because a few people imagine they're getting sick from the water." On the other hand, Toronto resident Meth Currie "wouldn't think of going in the water around here or letting any of my family go in. It's too big a risk. You're likely to get anything."[29] These varying opinions highlight the early development of varying perceptions, as well as a growing fear regarding the safety of swimming in Lake Ontario's waters. The problem would only get worse in the second half of the twentieth century.

Abandoning the lake, 1960s-1990s

In the second half of the twentieth century, the swimming pool gradually became the rule, and the lake the exception when it came to swimming along the waterfront. In 1950, Mississauga's Health Unit would sanction swimming *only* if it were done "in a purposely constructed swimming pool complete with filtration and chlorinated water."[30] Four years later, Mississauga would complete its first outdoor swimming pool in Port Credit, the Lions Club of Credit Valley Outdoor Pool. It was around the same time that the town of Port Credit officially banned swimming at the mouth of the Credit River, and the Medical Health Officer "declared the water off all beaches on Lake Ontario within Peel County contaminated and unfit for bathing."[31]

In the ensuing decade, the swimming pool would gain popularity in public parks and in new suburban backyards, as shown in figure 25, to the point that already in 1959, an editorial in the local newspaper concluded that "a family swimming pool was becoming commonplace."[32] A far cry from only a few years ago where the same newspaper featured the 'Ginger family' because they had the only swimming pool in the neighbourhood.[33]

Fig. 25. Advertisement of Town & Country Swimming Pools LTD. located in Toronto, 1959.
(*The Weekly*, May 7, 1959, 8. http://pub.canadiana.ca/view/omcn.TheWeekly_1/374?r=0&s=1)

In 1967, the city of Toronto came out with the Waterfront Plan for the Metropolitan Toronto Planning Area. The broad objective of this plan was to create a "handsome" waterfront "designed as a unit from end to end."[34] What is evident in the 1967 plan is its ambitious, and imaginative designs as a means to inject new energy into a stagnant waterfront: "The plan must include dramatic proposals, for it is these which fire the imagination, and stimulate the drive to proceed...the total concept must be evolutionary as well as revolutionary."[35] Even more dramatic and imaginative was the artificial lake proposed along the Etobicoke shoreline in the 1967 Waterfront Plan that was narrowly separated from Lake Ontario (see figure 28); to build an artificial lake beside a real lake was thought to be necessary for swimming along the waterfront.

The waterfront plan was established prior to the planning of Ontario Place, but Ontario Place can be seen as a manifestation of the goals, ambitions, and values set out in the 1967 master plan. It's perhaps no surprise that the design of the project was done by the architecture firm Craig, Zeidler and Strong, who also designed Harbour City, a large-scale project promoted in the 1967 plan that re-conceptualized the relationship between the city, the Toronto Islands, and the lake by organizing the new mixed-use community around "Venice-like" internal lagoons.[36]

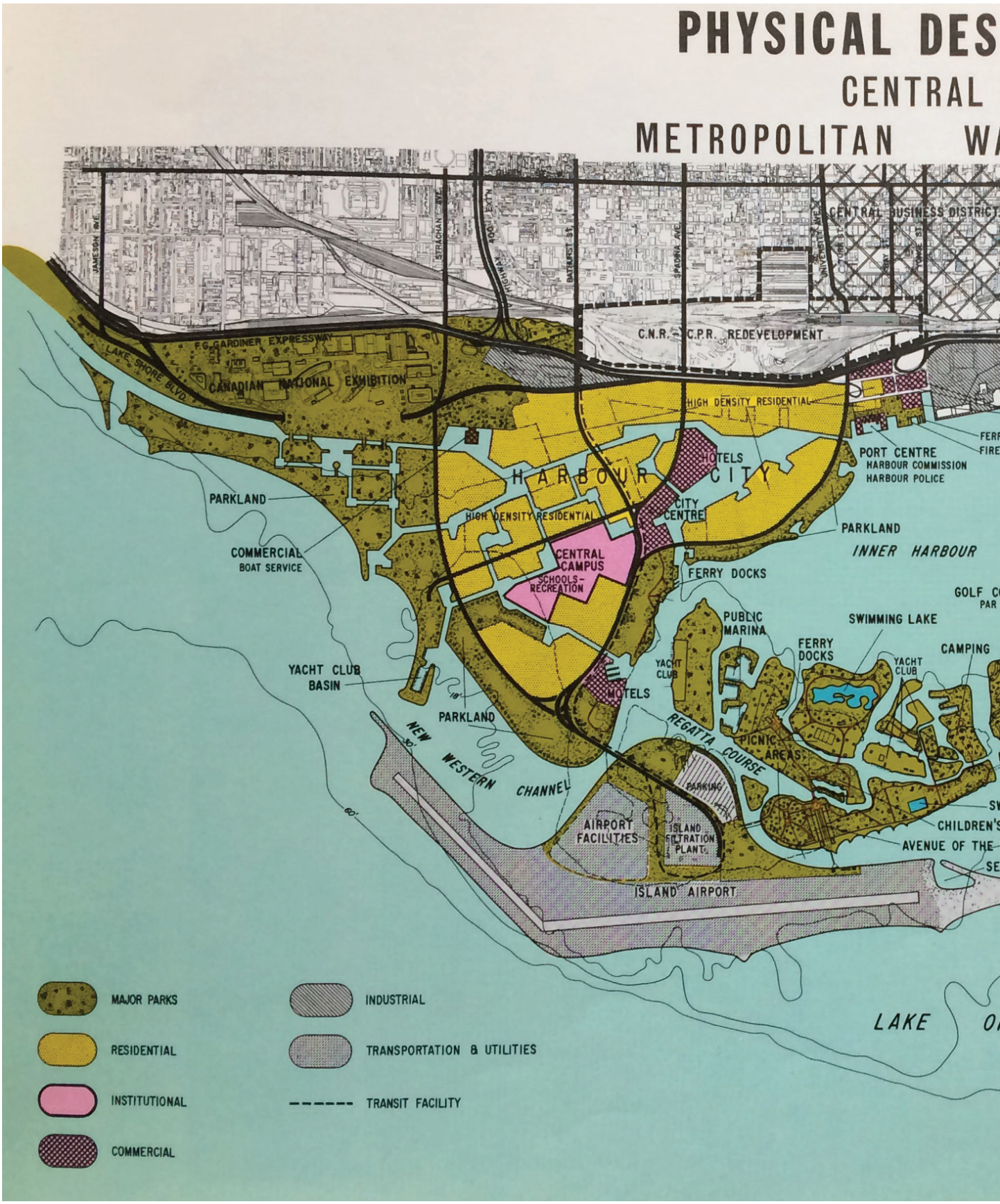
Fig. 26. Newspaper comic depicting what was once an idyllic environment to be now industrialized and polluted.
(John Collins, "The Old Swimmin' Hole," 1968, comic, *The South Peel Weekly*, July 30, 1968, 4, http://pub.canadiana.ca/view/omcn.SouthPeelWeekly_28/55?r=0&s=5)

Fig. 27. *Next page*, Map of conceptual design of 'Harbour City' in Toronto, 1967.
(*Physical Design Concept: Central Sector, Metropolitan Waterfront Plan*, map, City of Toronto Archives, Fonds 489, Series 2362, File 102, plate 12A. Reproduced by permission from the City of Toronto Archives)

Ontario Place is the 1970s version of what Sunnyside tried to accomplish in the 1920s: to create a built environment that provided an innovative way for people to engage with Lake Ontario.

The modernist project is a 155-acre public park built on landfill south of the Canadian National Exhibition and included among many features new beaches, a boardwalk, a boat landing, a theatre, exhibition galleries, lookout points, a marina, a picnic area, a regatta basin, and a restaurant. It was spearheaded by the Department of Trade and Development and was designed to make as much use of the lake as possible: "Ontario Place has effectively recognized the water's special qualities - such as the serene or tranquil surroundings, or the refractory quality of the water which enhances the architecture and celebratory mood of the park..." [37] This which was contrary to typical urban waterfront park design at the time which did "not provide such activities as swimming or even the opportunity to touch the water."[38] This was a common problem among industrialized waterfront societies like cities and towns along Lake Ontario who for decades and centuries sent untreated and unregulated industrial waste into the lake. People wanted change. Around the same time *The South Peel Weekly* came out with an article that echoed this sentiment: "pollution , both of water and air, has become one of the most pressing problems of our expanded industrial society."[39] This statement was accompanied by an equally compelling drawing, see figure 26.

The decades between the 1950s and 1990s saw Lake Ontario plagued by increasing water pollution along the shores of Mississauga and Toronto. During this time, Mississauga built seven outdoor pools (that is seven more than any other era before and after). This was at a time when swimming was in demand. In the Interim Watershed Plan Mississauga Waterfront Program, it mentions that, "the Ontario Recreation Survey (1977) lists swimming as the top ranked preferred activity in the vast majority of demographic categories."[40] Most notably three outdoor pools (Lewis Bradley, Ramsey, and Applewood Heights) by architecture firm Stark Temporale were expressively designed to imitate the lake environment. As the firm put it: "The design of these three pool facilities is based on an analogy of a family at the lake. Needs for swimming, wading, sunning, picnicking and playing are included in the design concept."[41] This inspired strategy led to an innovative design that included: a wooden tiered roof deck for sunning, an area dedicated to water play for children, and grassy and treed areas that provided shade and natural comforts.


PHYSICAL DES
CENTRAL
METROPOLITAN W
JAMESON AVE
STRACHAN AVE
BATHURST ST
SPADINA AVE
YONGE ST
CENTRAL BUSINESS DISTRICT
C.N.R. - C.P.R. REDEVELOPMENT
F.G. GARDINER EXPRESSWAY
LAKE SHORE BLVD.
CANADIAN NATIONAL EXHIBITION
HIGH DENSITY RESIDENTIAL
HOTELS
HARBOUR CITY
PORT CENTRE
HARBOUR COMMISSION
HARBOUR POLICE
PARKLAND
CITY CENTRE
HIGH DENSITY RESIDENTIAL
PARKLAND
INNER HARBOUR
COMMERCIAL
BOAT SERVICE
CENTRAL CAMPUS
SCHOOLS - RECREATION
FERRY DOCKS
PUBLIC MARINA
SWIMMING LAKE
FERRY DOCKS
CAMPING
YACHT CLUB
YACHT CLUB
YACHT CLUB BASIN
MOTELS
PARKLAND
REGATTA COURSE
PICNIC AREAS
NEW WESTERN CHANNEL
PARKING
AIRPORT FACILITIES
ISLAND FILTRATION PLANT
CHILDREN'S
AVENUE OF THE
ISLAND AIRPORT
LAKE
MAJOR PARKS
RESIDENTIAL
INSTITUTIONAL
COMMERCIAL
INDUSTRIAL
TRANSPORTATION & UTILITIES
TRANSIT FACILITY

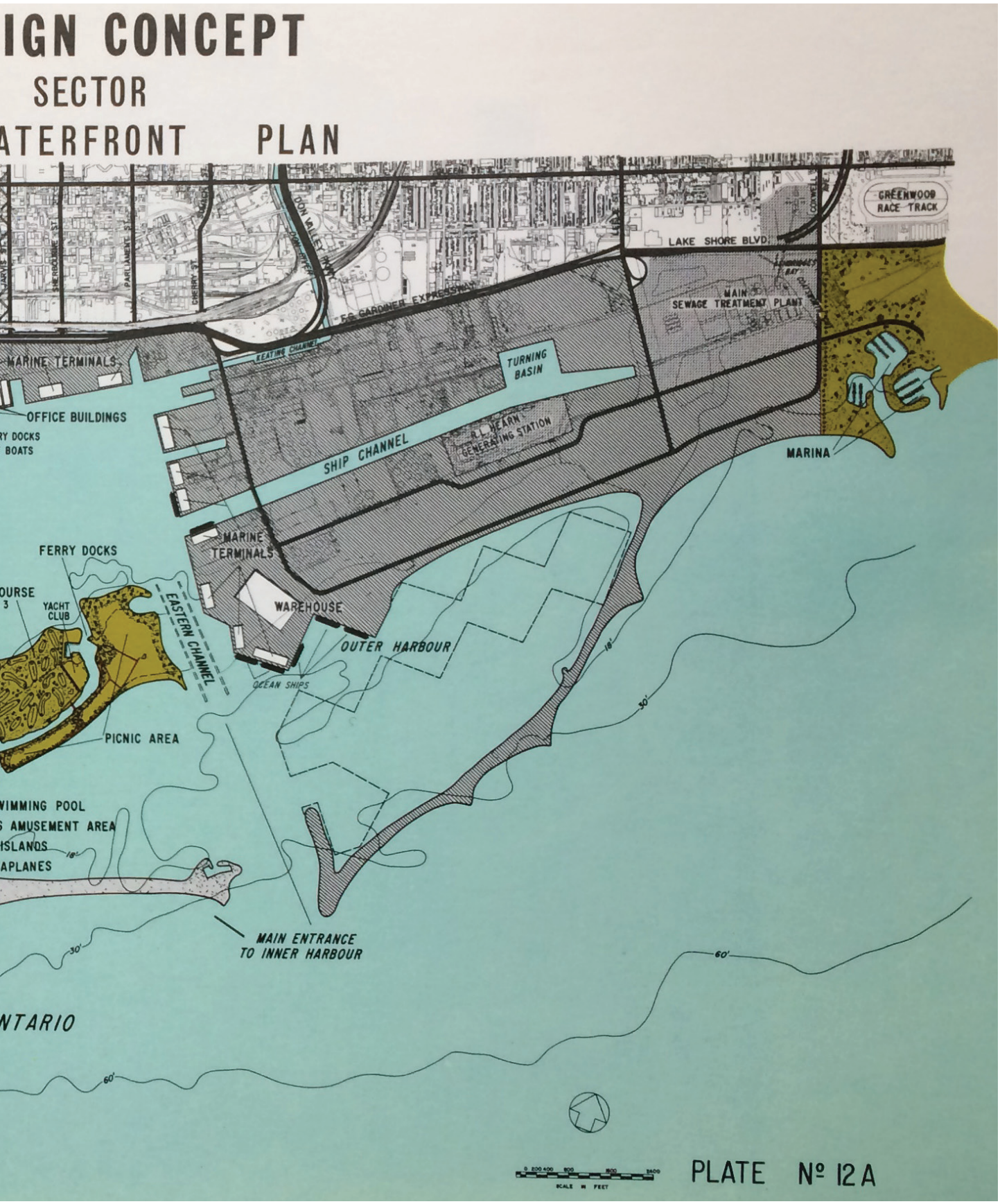

IGN CONCEPT
SECTOR
ATERFRONT PLAN
GREENWOOD RACE TRACK
LAKE SHORE BLVD.
DON VALLEY PKWY.
DON RIVER
DE GASPERI EXPRESSWAY
MAIN SEWAGE TREATMENT PLANT
MARINE TERMINALS
KEATING CHANNEL
TURNING BASIN
OFFICE BUILDINGS
RY DOCKS
BOATS
SHIP CHANNEL
R.L. HEARN GENERATING STATION
MARINA
FERRY DOCKS
MARINE TERMINALS
OURSE
3
YACHT CLUB
EASTERN CHANNEL
WAREHOUSE
OUTER HARBOUR
OCEAN SHIPS
PICNIC AREA
VIMMING POOL
S AMUSEMENT AREA
ISLANDS
APLANES
MAIN ENTRANCE TO INNER HARBOUR
NTARIO
18'
30'
60'
PLATE Nº 12A

Fig. 28. *Above*, Illustration of the conceptual design of an artificial lake along Toronto's waterfront, 1967.
(*Artificial Lake*, City of Toronto Archives, Fonds 489, Series 2362, File 102, plate 3.Reproduced by permission from the City of Toronto Archives)


CKW

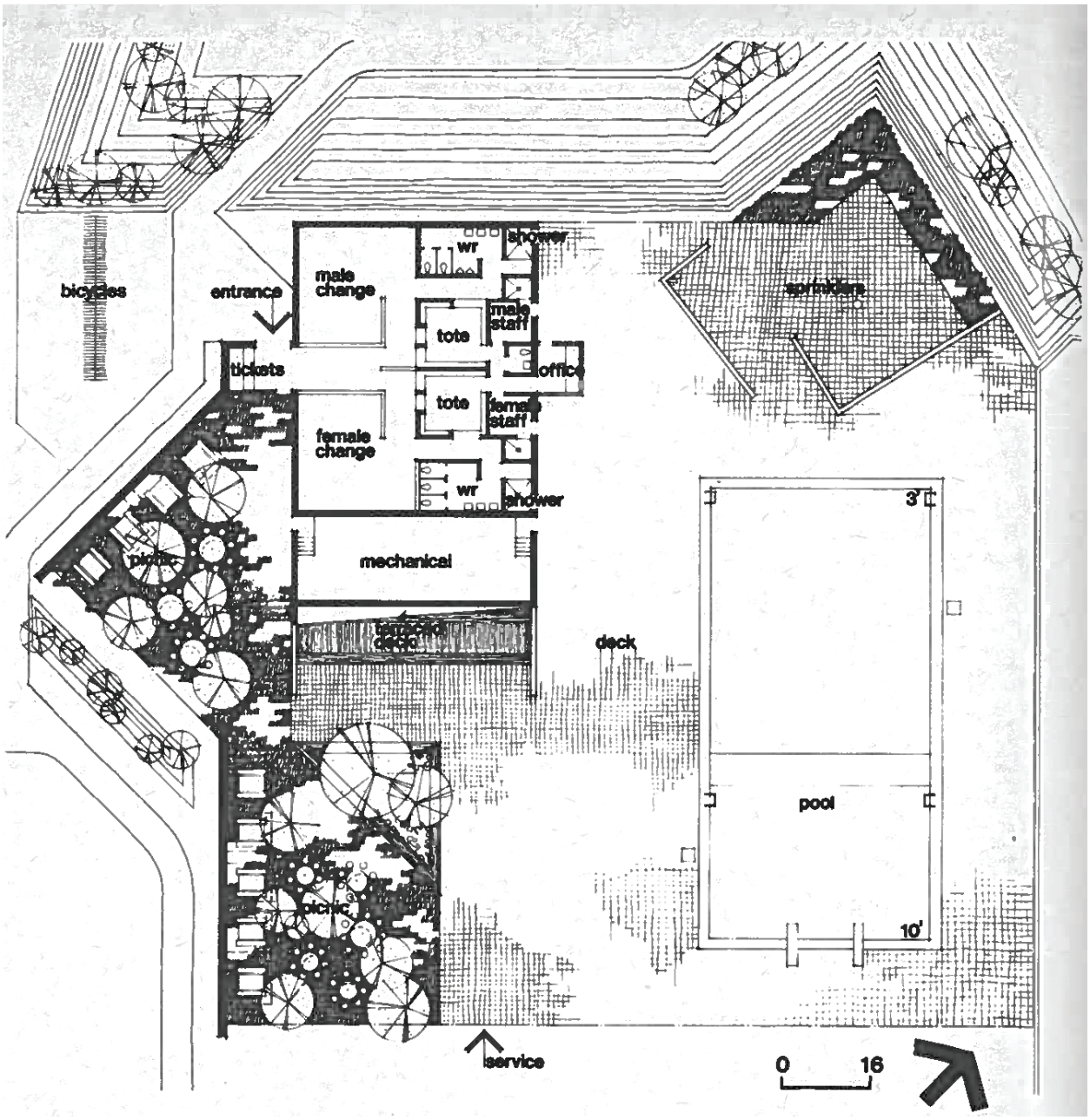


Fig. 29. *Above*, Applewood Heights Pool site plan.
(Reproduced by permission from The Canadian Architect.
"Design: Applewood Heights Pool, Mississauga, Ontario," drawing, *The Canadian Architect*, March 1978, 42.)

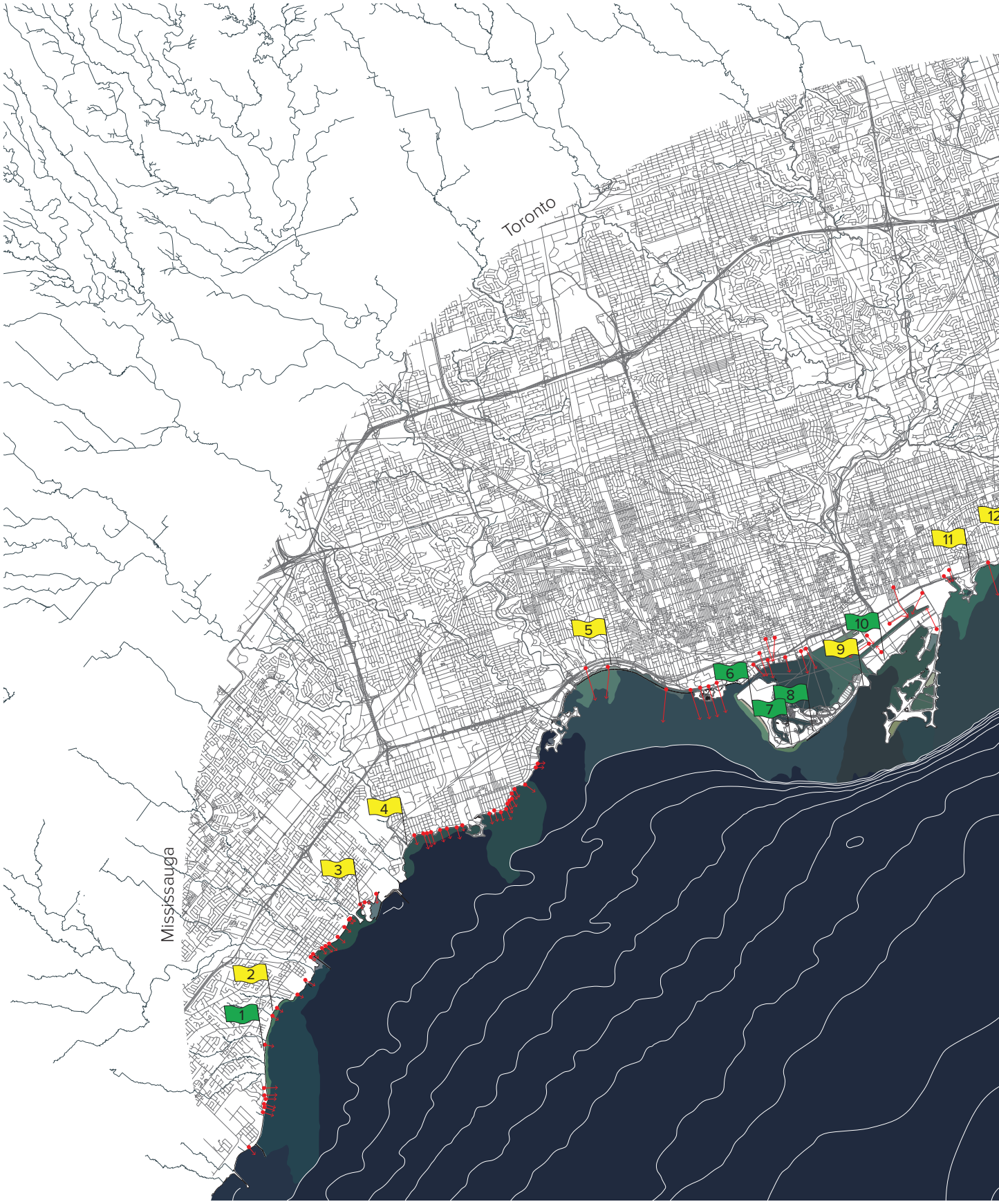
Fig. 30. Photo of exterior view of Applewood Heights Pool highlighting the building's cedar finish. (Photo courtesy of John Stark)

Fig. 31. Photo of swimming pool with the tiered roof sunning deck in the background. (Photo courtesy of Alex Temporale)

Furthermore, unlike previous pool-related architecture that emphasized and celebrated the built environment over nature, the architects deliberately employed natural materials to reduce if not remove "the institutional character of pool facilities."[42] Materials such as cedar, stone, and split-rib block were used to bring the lake, with all its cultural associations, into these new environments. The projects won an Award of Excellence in the Canadian Architect Yearbook Awards for 1975. While significant investments were being made into new outdoor swimming pools in new suburban communities, the waterfront received little new infrastructure for swimming. The 1984 Interim Watershed Plan Mississauga Waterfront Program partly blamed a "lack of existing fully developed facilities and access points on the waterfront," as well as water pollution, for the reduction of "opportunities for swimming and bathing on the Mississauga waterfront."[43] Although all the newly constructed pools allowed more people of Mississauga to swim in oases of clean water, they weren't ready to throw in the beach towel on their polluted Great Lake just yet.

Back to the lake, 2000s-present

Although pollution plagued swimmers throughout the second half of the twentieth century, and was a large contributor to the motivation behind the GTA's extensive outdoor pool building program that would ensue, it also contributed to a gradual increase in concern for society's relationship with Lake Ontario. This concern is conveyed in a letter written to the local Port Credit newspaper by a group of students in 1965: "No one would want to swim in a septic tank, the idea is repugnant to any Canadian. Yet Canadians are turning their clean lakes and rivers into fetid cesspools, devoid of any life. ...Until water pollution is effectively controlled, our priceless water is, so to speak, being flushed down the toilet."[44] Growing environmental awareness led to the creation of various government commissions, legislations, regulations, and conservation authorities to combat water pollution. For example, the Credit Valley and Metropolitan Toronto and Region Conservation Authority was established in 1954, the Ontario Water Resources Commission in 1957, the Canada Water Act in 1970, and the Department of the Environment in 1971.


Toronto
Mississauga
1
2
3
4
5
6
7
8
9
10
11
12

Designated swimming beaches from west to east:

1. Jack Darling Memorial Park
2. Richard's Memorial Park
3. Lakefront Promenade Park
4. Marie Curtis Park East Beach
5. Sunnyside Beach
6. Hanlan's Point
7. Gibraltar Point Beach
8. Center Island
9. Ward's Island
10. Cherry Beach
11. Woodbine Beach
12. Kew-Balmy Beach
13. Bluffer's Park
14. Rouge Park

Stormwater outlets →

Met water quality standards 95% of the time or more.

Met water quality standards 60-95% of the time.

Met water quality standards 60% of the time or less.

Fig. 32. Regional map of Mississauga, Toronto, and Scarborough designated swimming beaches in Lake Ontario.

Fig. 33. Photo of my brother and I playing on an unfinished groyne along Jack Darling Memorial Park's shoreline, 1993.
(Private collection)

Fig. 34. Photo of the same groyne along Jack Darling Memorial Park's shoreline a quarter of a century later, 2019.

Furthermore, a wide range of policy and infrastructural projects have also been implemented over the years along the GTA to reduce stormwater pollution. These include: the construction of detention tanks near stormsewer outlets, a mandatory downspout disconnection initiative, and several stream restoration projects. As a result, since the beginning of the new millenium Lake Ontario water has improved significantly.

Today, swimming in Lake Ontario exists along the waterfront at a number of designated swimming beaches. There are currently three designated swimming areas in Mississauga, seven in Toronto, and five on Toronto Island. Beaches are the only means by which an individual is safely allowed to swim in the water of Lake Ontario in the GTA. Many of these urban and suburban beaches were constructed, but even the ones considered 'natural' have been modified to some degree. For example, the sand beach along the shoreline of Jack Darling Memorial Park in Mississauga is native to that location, however large armourstone groynes have been constructed on either end of the beach to prevent the natural processes of beach erosion.

The water quality of Lake Ontario is good enough to allow swimming for the vast majority of the time. Despite the gradual return of clean and safe lakewater, the popularity of urban lake swimming still trails behind; a 2012 survey of visitors to waterfront parks in Mississauga revealed that "very few" respondents "identified participating in water-based activities such as fishing, swimming, kayaking or canoeing" in Lake Ontario.[45] Thus, when people decide to go swimming in Mississauga, they more often than not choose a pool over the lake at their doorstep.

The current typical suburban park design found across Mississauga's waterfront has played an important role in shaping cultural attitudes and values. Professor Emerita of Architecture at the University of California at Berkeley Galen Cranz writes in her book *The Politics of Park Design:* "today policy-makers still acknowledge the physical configuration of the park as an active culture-bearing medium in people's lives, both materially and culturally."[46] As Cranz points out, design parameters such as "park location, size, shape, composition, and equipment and landscape" are both influenced by cultural norms and help to establish new ones for the future generation of park users.[47]

Therefore, this thesis aims to tackle people's preconception about their ecological place in the world by challenging the status quo of suburban waterfront parks, and thereby inspire a new relationship between the city and the lake.

Notes

[1]"What to do: to make your summer safer," *The Port Credit Weekly*, June 2, 1955, 21.

[2]Statistics Canada, *Canadian Heritage: Sport Participation 2010, Research Paper,* February 2013, http://publications.gc.ca/collections/collection_2013/pc-ch/CH24-1-2012-eng.pdf

[3]Susie Parr, *The Story of Swimming: A Social History of Bathing in Britain* (Stockport: Dewi Lewis Media, 2011), 52.

[4]Parr, *The Story of Swimming,* 52.

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[12]The Toronto and Lorne Park Summer Resort Company, *Lorne Park: A Nineteenth Century Holiday Resort in Mississauga, Ontario*, self-pub.,1886, reprinted with preface and notes by Jason Meadows (self-pub., Amazon Digital Services, n.d.), Kindle.

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[14]A. A. Stewart, "Swimming Baths," *The Globe*, July 30, 1877. 2.

[15]"Bathing in public," The Globe, August 10, 1887. Page 5.

[16]John J. Withrow, "The Wiman Swimming Baths," *The Globe*, January 20, 1882, 5.

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[18]Michael Moir, "Planning for Change: Harbour Commissions, Civil Engineers, and Large-Scale Manipulation of Nature," in *Reshaping Toronto's Waterfront*, ed. Gene Desfor and Jennefer Laidley (Toronto: University of Toronto Press, 2011), 35.

[19]Editorial, "The Value of Humber Beach," *The Globe*, August 19, 1910, 4.

[20]Gene Desfor, Lucian Vesalon and Jennefer Laidley, "Establishing the Toronto Harbour Commission and Its 1912 Waterfront Development Plan," in *Reshaping Toronto's Waterfront*, ed. Gene Desfor and Jennefer Laidley (Toronto: University of Toronto Press, 2011), 49-74.

[21]Mike Filey, *I Remember Sunnyside: The Rise & Fall of a Magical Era* (Toronto: Dundurn Press, 1996), 50.

[22]Toronto Harbour Commissioners, *Toronto Waterfront Development, 1912-1920* (Toronto: Toronto Harbour Commissioners, 1912), 22.

[23]Filey, *I Remember Sunnyside,* 54.

[24]Mike Filey, *Toronto Sketches 7* (Toronto: Dundurn Group, 2003), 128-129; "Free Service to Sunnyside to be Stopped," *The Globe and Mail*, August 10, 1939, 4.

[25]"Harbour Commissioners New Swimming Pool Sunnyside Beach Official Opening," advertisement, *The Globe*, July 29, 1925, 2.

[26]Filey, *Toronto Sketches 7*, 178.

[27]Kathleen A. Hicks, *Lakeview: Journey From Yesterday* (Mississauga: The Friends of the Mississauga Library System, 2005), 149.

[28]Lisa R. Estepp, and Euan D. Reavie, "The Ecological History of Lake Ontario According to Phytoplankton," *Journal of Great Lakes Research* 41, no. 3 (2015): 669-687, http://www.sciencedirect.com/science/article/pii/S0380133015001331

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[30]To Swim Or Not To Swim That Is The Question, *The Port Credit Weekly*, June 29, 1950, 4.

[31]"M.O.H Declares All Lake Beaches Contaminated, Sewage on Peel Shores," *The Weekly*, July 23, 1959, 1.

[32]"Potential Danger in Home Swimming Pools," *The Weekly*, August 13, 1959, 20.

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[35]Proctor, Redfern,Bousfield & Bacon, *The Waterfront Plan for the Metropolitan Toronto Planning Area,* 6.

[36]Proctor, Redfern,Bousfield & Bacon*,* 10; Arlene Gemmil, *Ontario Place: The Origins and Planning of an Urban Waterfront Park* (Toronto: Dept. of Geography, York University, 1981), 11.

[37]Gemmil, *Ontario Place: The Origins and Planning of an Urban Waterfront Park*, 40.

[38]Gemmil, *Ontario Place*, 40.

[39]"Sour Smell of "Success,"" *The South Peel Weekly*, July 31, 1968, 4.

[40]Credit Valley Conservation Authority, *Interim Watershed Plan Mississauga Waterfront Program*, 38.

[41]"Stark Temporale: Lewis Bradley Park, Thornlodge Park, Applewood Heights Park, Mississauga, Ontario," *The Canadian Architect Yearbook 1975* 20,21, no. 12, 1 (1975-1976): 43.

[42]"Stark Temporale: Lewis Bradley Park, Thornlodge Park, Applewood Heights Park, Mississauga, Ontario," 43.

[43]Credit Valley Conservation Authority, *Interim Watershed Plan Mississauga Waterfront Program* (n.p.: Credit Valley Conservation Authority, 1984), 39.

[44]"Students Protest Water Pollution," *The Weekly*, May 27, 1965, 11.

[45]LURA, "Lake Ontario Shoreline Survey: Uses, attitudes, and perceptions of restoration options," prepared for Credit Valley Conservation, 2012.; Credit Valley Conservation, *Lake Ontario Integrated Shoreline Strategy: Characterization Report,* 2018.

[46]Galen Cranz, *The Politics of Park Design: A History of Urban Parks in America* (Cambridge, MA: Mit Press, 1982), xii.

[47]Cranz, *The Politics of Park Design*, xii.

Chapter 2

Open water swimming facilities case studies

Fig. 35. Stylized photo of Lake Ontario at J.C. Saddington Park.

Many urban areas are currently reclaiming historically polluted and industrialized lakes and rivers in order to make the most of the water. For example, swimming in the Boston's Charles River has been banned for 60 years, but since 2013, the river has played host to public swim days and a one-mile swim race.[1] Another example closer to home is the annual Grand Splash, an event that attempts to reintroduce recreational swimming and improve accessibility in the historically polluted St. Lawrence River along the shores of Montreal.[2]

The fact that people have always had access to surface water is self-evident. The original and basic physical transition from land to water was and continues to be characterized by natural edges - whether it's a sharp or gradual decline, it's bordered by fine sand, small pebbles, large boulders, or towering cliffs - these natural transitions allow or prevent people from reaching the water. What I'm interested in are the *built* structures or landscapes that act as this transition. How can the built environment facilitate and enhance this transitional experience from the dry, solid, immobile land to the fluid, and constantly changing water?

The following case studies are excellent examples, old and new, of innovating urban swimming projects that allow its users to engage with natural waters in an exciting way.

Evaluation

Each case study will be analyzed based on the following qualities of successful urban swimming parks:

Programmes

To maximize user participation throughout the year, a variety of uses in addition to swimming must be encouraged on the site.

1. **Swimming**: Does the project provide a variety of spaces for different activities, such as a wading pool, lap pool, and children's pool? *(One point per programme. Half point will be alloted to activities related to filtered and chlorinated water.)*

2. **Winter**: Does the project provide swimming during the winter? *(One point per programme.)*

3. **Non-Swimming**: Does the project provide non-swimming related activities, such as picnic tables, scenic viewing platform etc. *(Half point per programme.)*

Convenience

To maximize user participation, the project should integrate itself within the existing urban infrastructure, provide easy transportation and engage with as many ages and abilities as possible.

1. **Urban connectivity**: For the project to be convenient, the swimming infrastructure must be connected to popular destinations such as residential, recreational, cultural, or employment areas. *(One point per area within a 15-20 minute walk or within a 1 km radius.)*

2. **Transportation**: How do people access the site, by public transportation such as subway or bus, or by car, bike, or on foot? *(One point per transportation by car, boat, or bus and two point if by bike or foot.)*

3. **Accessibility**: Does the project provide accessibility for all ages and physical capabilities? *(One point per deliberate accommodation per age group and physical capability.)*

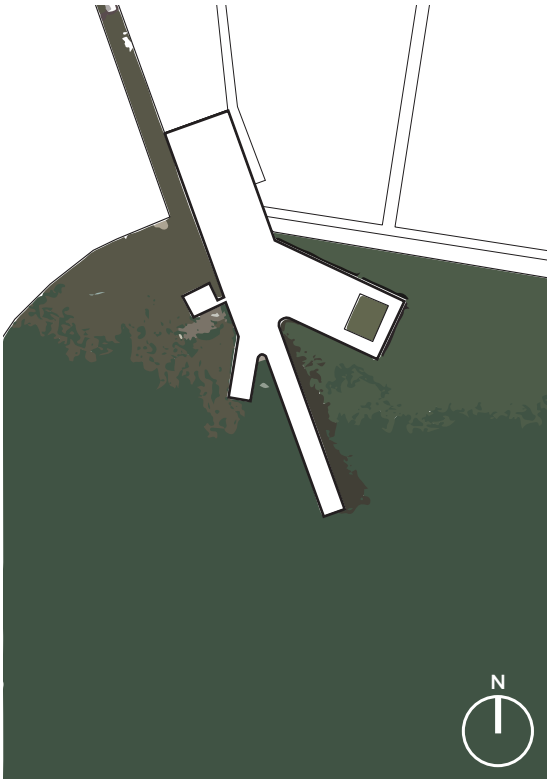
Design

To prevent monotony and status quo solutions, innovative designs must be encouraged.

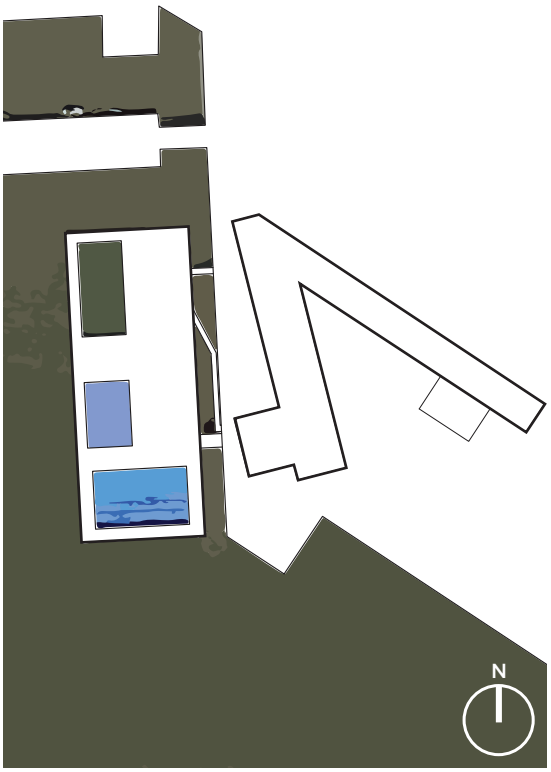
1. **Urban artifact:** Does the project relate to collective and individual memory, which highlights the relationship of the project to the place? Does the project help shape the identity and values of the city by providing a new or different perspective and experience for users? Is the overall project visually pleasing? Has the project withstood the test of time? *(One point per characteristic.)*

2. **Entry:** Does the project provide for a variety of ways to enter and engage with the water (jump in, dive in etc.)? *(One point per means of entry.)*

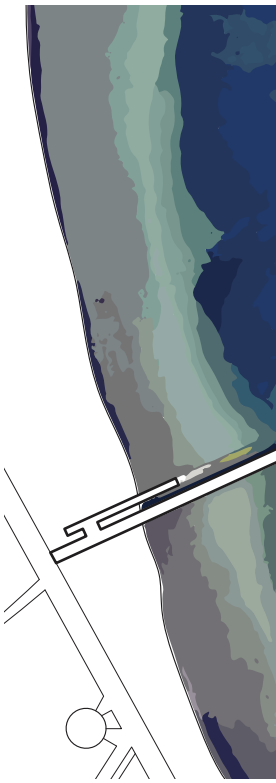
Rating ● = 1 point



01. Faarborg Harbour Bath



02. Allas Sea Pool



03. Kastrup Sea Bath

Above: Swimming case studies

Right: Thesis proposal

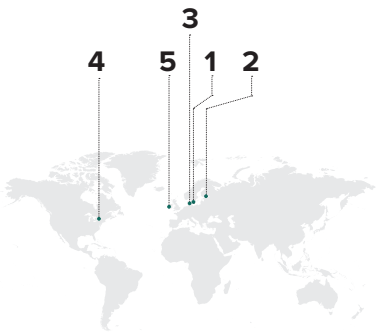
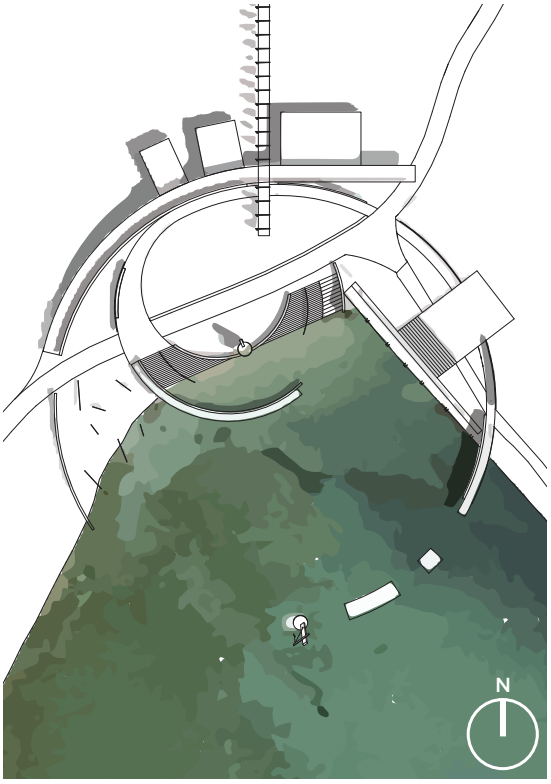
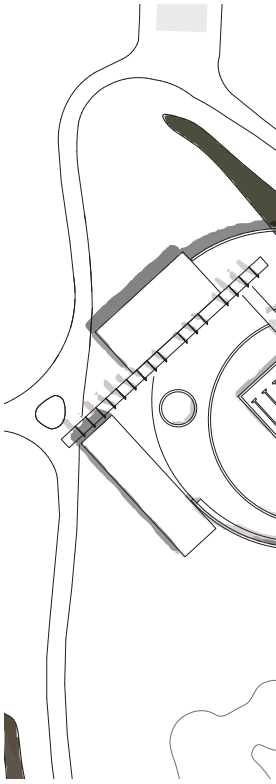


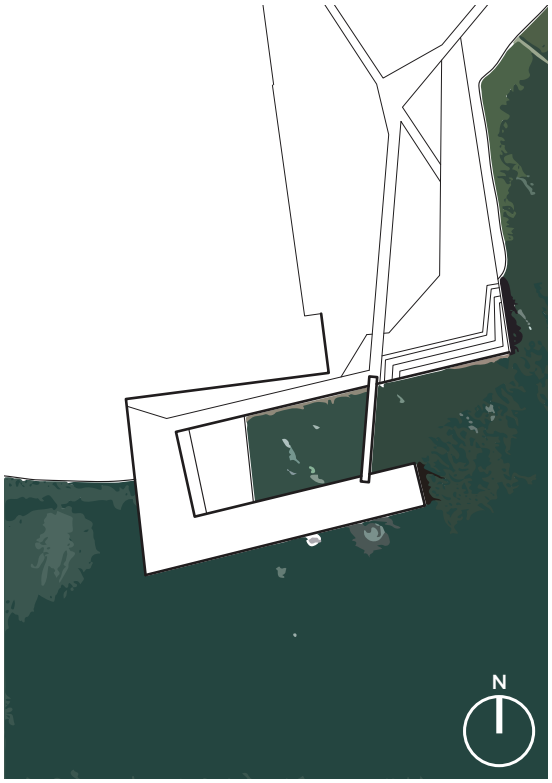
Fig. 36. Size comparison between swimming case studies and thesis proposal. All maps are at 1:2,000 scale.



Proposed lakewater swimming site

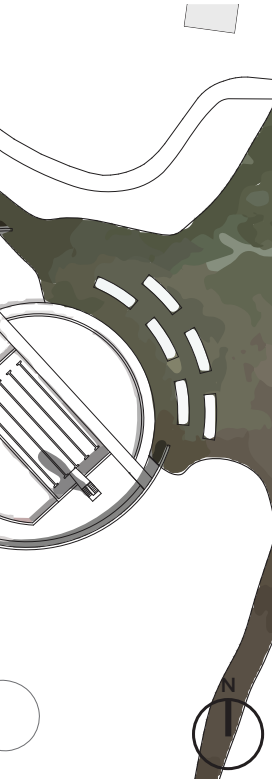


Proposed poolwater s



04. Gord Edgar Downie Pier

05. Blackrock Diving Platform



swimming site

Proposed riverwater swimming site

01. Faaborg Harbour Bath

Location: Faaborg, Denmark

Population: 7,200 people

Water body: Strait (salt water)

Water's edge: Retaining wall

Typology: Pier

Size: 2,000 m²

Team: Urban Agency, JDS

Completed: 2014

Faaborg Harbour Bath is a contemporary project that provides a variety of water-related programmes with an iconic architecture. The site is located in an old port town on the island of Funen in Denmark, 200 kilometers south-west of Copenhagen. Denmark is home to a rich history of sea bathing, and has more recently completed an unparalleled number of projects with the goal of bringing swimmers back into the Baltic sea. The Faarborg Harbour Bath consists of a large wooden pier jutting out from a concrete retaining wall shoreline. As the pier extends into the water it branches out into three programmatically distinct segments with different lengths and widths that offer a boat launch, diving platform, and children's pool. In addition, the project offers changerooms, kayak storage, a scenic viewing platform, and a sauna.[3]

Faaborg Harbour Bath is an excellent example of an innovative urban swimming project along a hardened, industrialized shoreline. It successfully introduced a new swimming culture where none existed before, and helped redefine the relationship between the Danish city and the strait.

The GTA requires similarly innovative, and bold design to inspire people back into the waters of Lake Ontario.

Fig. 37. Regional map (Google Earth) 1:20,000

Programmes

●●●● 1. **Swimming:** (1) Children's pool; (2) Diving platform; (3) Sunning terrace; (4) Changerooms

● 2. **Winter:** (1) Sauna

●● 3. **Non-swimming:** (1) Information center; (2) Kayak rental center, storage and boat launch; (3) Scenic viewing platform; (4) Seating

Convenience

●●●● 1. **Urban connectivity:** (1) Residential; (2) Employment; (3) Recreational; (4) Cultural

●●●●●●●● 2. **Transportation:** (1) Ferry; (2) Bus; (3) Bike; (4) Walk; (5) Car; (6) Boat

●● 3. **Accessibility:** (1) Children; (2) Elderly

Design

●●● 1. **Urban artifact:** (1) The project relates to collective and individual memory; (2) The project helps shape the identity and values of the city by providing a new/different perspective and experience for users; (3) The overall project is innovative and iconic.

●●●●● 2. **Entry:** (1) Climb in; (2) Jump in; (3) Dive in; (4) Walk in; (5) Slip in

29 **Total points** ●

Fig. 38 Site map (Google Earth) 1:2,000

02. Allas Sea Pool

Location: Helsinki, Finland

Population: 631,695

Water body: Harbour (salt water)

Water's edge: Retaining wall

Water treatment: Heated, filtered, UV treated

Typology: Floating dock

Size: 4,660 m^2

Team: Huttunen-Lipasti-Pakkanen Architects

Completed: 2017

Allas Sea Pool is a contemporary project that provides a variety of programmatic options to urban swimmers in the historic city of Helsinki. The site, located along a stretch of concrete retaining wall in the industrial harbour, is divided into two parts: one is dedicated to swimming, the other provides support spaces and programmes for non-swimming visitors. The swimming portion consists of a large wooden floating dock, accessed only by a set of stairs. The dock contains a heated 25m long lap pool, a 17m long children's pool, and a 25m long filtered seawater pool. The service building, located onshore, faces the floating dock and includes a variety of programmes such as saunas, changerooms, a wellness studio, a restaurant, an info center, and a scenic viewing platform.[4]

Allas Sea Pool is an excellent example of a successful urban swimming project that invites both swimmers and non-swimmers to enjoy the Finnish waterfront, allowing anybody to experience the revitalized harbour without having to go into the water.

Fig. 39. Photo of Allas Sea Pool deck. (Paasikivi, *Allas Sea Pool in Helsinki*, July 31, 2017, digital image, Wikipedia Commons, https://commons.wikimedia.org/wiki/File:Allas_Sea_Pool_Helsinki_Finland_(1).jpg)

Providing a variety of programmes will help attract swimmers and non-swimmers alike to the GTA's waterfront, bringing them closer to Lake Ontario.

Fig. 40. Photo of Allas Sea Pool from harbour. (Paasikivi, *Allas Sea Pool in Helsinki*, July 31, 2017, digital image, Wikipedia Commons, https://commons.wikimedia.org/wiki/File:Allas_Sea_Pool_Helsinki_Finland_(3).jpg)

Fig. 41. Regional map (Google Earth) 1:20,000

Programmes

1. **Swimming:** (1) Children's pool; (2) Filtered Seawater pool; (3) Heated pool; (4) Drying terrace; (5) Changerooms
2. **Winter:** (1) Sauna; (2) Heated pool
3. **Non-swimming:** (1) Information center; (2) Scenic viewing platform; (3) Seating

Convenience

1. **Urban connectivity:** (1) Residential; (2) Employment; (3) Recreational; (4) Cultural
2. **Transportation:** (1) Bus; (2) Bike; (3) Walk; (4) Car
3. **Accessibility:** (1) Children; (2) Elderly

Design

1. **Urban artifact:** (1) The project relates to collective and individual memory; (2) The project helps shape the identity and values of the city by providing a new/different perspective and experience for users; (3) The overall project is innovative and iconic.
2. **Entry:** (1) Climb in; (2) Jump in; (3) Dive in; (4) Walk in; (5) Slip in

29 **Total points**

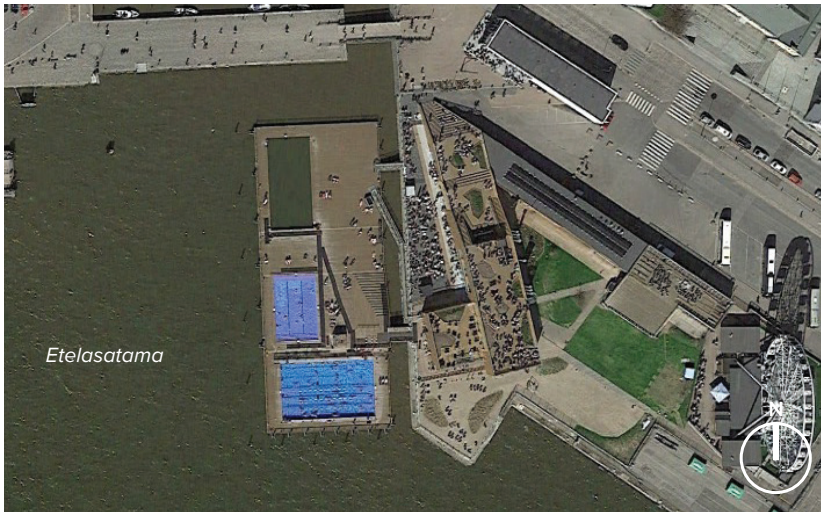


Fig. 42. Site map (Google Earth) 1:2,000

03. Kastrup Sea Bath

Location: Kastrup, Denmark

Population: 43,000

Water body: Sound (salt water)

Water's edge: Armour stone

Water treatment: None

Typology: Pier

Size: 1,100 m^2

Team: White Arkitekter

Completed: 2005

Kastrup Sea Bath is a contemporary waterfront project located in Denmark that uses innovative architecture to enhance swimmers' engagement with the water. The project consists of a wooden pier that extends 100 meters into the water, away from the industrial, and heavily polluted grounds near the shoreline. The pier terminates into a semi-enclosed, multi-leveled, circular (measuring 37 meters in diameter), wooden Azobé structure. The bath seamlessly provides a diving platform and changerooms into its design while protecting swimmers and visitors from fierce wind and waves. Interestingly, the bath structure came before the construction of a new sand beach along the shoreline.[5]

The Kastrup Sea Bath shows that beautiful swimming architecture can also be practical: the circular wooden bath is an innovative structure that supports and protects swimmers. This multi-functional approach to swimming architecture demonstrates that a beach is not the only safe and practical option for swimmers.

Fig. 43. Photo of Kastrup Sea Bath protected area. (Jonathan Rieke, *Kastrup Sea Bath - 6*, June 24, 2012, digital image, Flickr, https://www.flickr.com/photos/jonathan-rieke/8564112288/in/photostream/)

This dual purpose would be an effective strategy along the shores of the GTA. Beauty can help attract people to the waterfront, while practicality can protect them from Lake Ontario's sometimes fierce winds and waves.

Fig. 44. Photo of Kastrup Sea Bath from shoreline. (Jonathan Rieke, *Kastrup Sea Bath - 1*, June 24, 2012, digital image, Flickr, https://www.flickr.com/photos/jonathan-rieke/8563003485/in/photostream/)

Fig. 45. Regional map (Google Earth) 1:20,000

Programmes

●●●● **1. Swimming:** (1) Children's pool; (2) Diving platform; (3) Drying terrace; (4) Changerooms

● **2. Winter:** (1) Sauna

●● **3. Non-swimming:** (1) Information center; (2) Kayak rental center, storage and boat launch; (3) Scenic viewing platform; (4) Seating

Convenience

●●● **1. Urban connectivity:** (1) Residential; (2) Employment; (3) Recreational

●●●●● **2. Transportation:** (1) Bike; (2) Walk; (3) Car

●● **3. Accessibility:** (1) Children; (2) Elderly

Design

●●● **1. Urban artifact:** (1) The project relates to collective and individual memory; (2) The project helps shape the identity and values of the city by providing a new/different perspective and experience for users; (3) The overall project is innovative and iconic.

●●●●● **2. Entry:** (1) Climb in; (2) Jump in; (3) Dive in; (4) Walk in; (5) Slip in

25 **Total points** ●

Fig. 46. Site map (Google Earth) 1:2,000

04. Gord Edgar Downie Pier

Location: Kingston, Canada

Population: 123,795

Water body: Lake (fresh water)

Water's edge: Retaining wall

Water treatment: None

Typology: Pier

Size: 33,100 m^2

Team: Claude Cormier + Associés

Completed: 2018

Breakwater Park is a contemporary waterfront project in Ontario that offers various ways for people to enter the water. Prior to redevelopment, the industrial pier was home to an existing thriving swimming culture, and was especially popular with students from the nearby Queens University. New swimming infrastructure was built because people were *already* using the site for swimming, thus the design intervention in this case was used to facilitate and enhance the swimming experience by users. New additions included: a stone slab diving platform, covered shelter, an upland pebble beach, ladders, and an artificial sand beach.

Fig. 47. Aerial of swimmers using the industrial pier prior to renovations. (Google Earth)

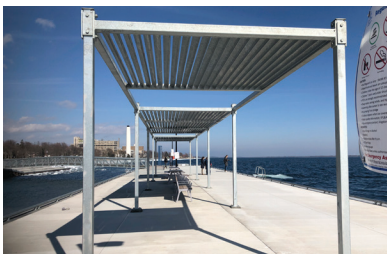


Fig. 48. Photo of pier covered shelter, 2019. (Photo courtesy of Michelle Dalcourt)

Fig. 49. Photo of upland beach, 2019. (Photo courtesy of Michelle Dalcourt)

The same revitalization process has occurred along a majority of Toronto waterfront, Mississauga however is still lagging behind. Large brownfield sites that were once home to public and private industries are only now being cleaned up for redevelopment. These historical artifacts should be transformed into catalysts of change geared towards reimagining a new relationship between the city and the lake for the twenty-first century.

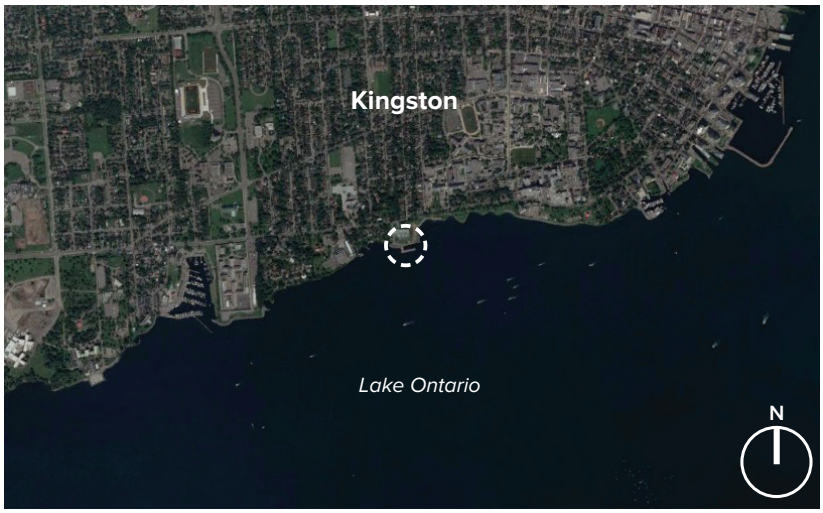


Fig. 50. Regional map (Google Earth) 1:20,000

Programmes

●●● **1. Swimming:** (1) Diving platform; (2) Protected shallow swimming area; (3) Upland beach

2. Winter: none

◗●● **3. Non-swimming:** (1) Seating; (2) Artificial beach; (3) Artwork; (4) Picnic area; (5) Shade structure

Convenience

●●●● **1. Urban connectivity:** (1) Residential; (2) Employment; (3) Recreational; (4) Cultural

●●●●●● **2. Transportation:** (1) Bus; (2) Bike; (3) Walk; (4) Car

●● **3. Accessibility:** (1) Children; (2) Elderly

Design

●● **1. Urban artifact:** (1) The project relates to collective and individual memory; (2) The project helps shape the identity and values of the city by providing a new/different perspective and experience for users

●●●●● **2. Entry:** (1) Climb in; (2) Jump in; (3) Dive in; (4) Walk in; (5) Slip in

24.5 **Total points** ●

Fig. 51. Site map (Google Earth) 1:2,000

05. Blackrock Diving Tower

Location: Galway, Ireland

Population: 79,934

Water body: Bay (salt water)

Water's edge: Bedrock

Water treatment: None

Typology: Pier

Team: E.R. Ryan

Completed: 1954

Blackrock Diving Tower is a 65 year-old waterfront project that has withstood many cold winters and extreme storms. The site has been home to a popular swimming culture and a diving platform since 1885. Therefore, the new diving platform was built to enhance the existing swimming experience. Furthermore, the project is located along coastline characterized by a bedrock edge condition, which can be as inaccessible, if not more so, as Mississauga's armourstone shoreline. The reinforced concrete diving tower allows swimmers to enter the water from three levels, the highest reaching heights of up to 5.4m above water level. Blackrock Diving Tower is so popular and important to the region that it is featured on the City of Galway's tourist website as "an iconic structure of the Salthill promenade" and "a 'must do' for most visitors to Galway."[6] Blackrock Diving Tower proves that swimming infrastructure can be built and thrive along a hostile waterfront environment.

Fig. 52. Photo of Blackrock Diving Platform looking south towards the bay. (Jonathan Bennett, *Black Rock Diving Boards*, March 4, 2004, digital image, Flickr, https://www.flickr.com/photos/j-o-n-o/252314117/)

In order to bring urban lake swimming back to the GTA's waterfront, the design project will inevitably have to thrive in similarly hostile conditions. As such, durable materials will be necessary.

Fig. 53. Regional map (Google Earth) 1:20,000

Programmes

1. **Swimming:** (1) Diving platform
2. **Winter:** none
3. **Non-swimming:** (1) Seating

Convenience

1. **Urban connectivity:** (1) Residential; (2) Employment; (3) Recreational; (4) Cultural
2. **Transportation:** (1) Bus; (2) Bike; (3) Walk; (4) Car
3. **Accessibility:** (1) Children; (2) Elderly

Design

1. **Urban artifact:** (1) The project relates to collective and individual memory; (2) The project helps shape the identity and values of the city by providing a new/different perspective and experience for users; (3) The overall project is innovative and iconic.
2. **Entry:** (1) Climb in; (2) Jump in; (3) Dive in; (4) Walk in

20.5 **Total points**

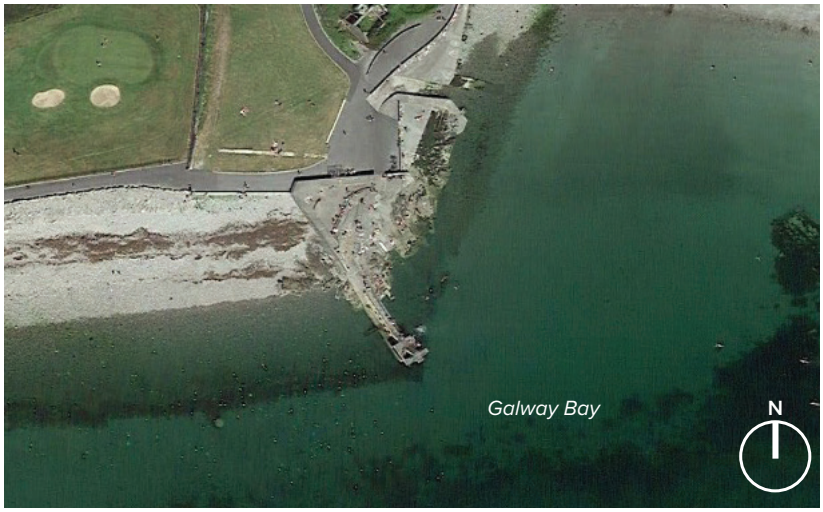


Fig. 54. Site map (Google Earth) 1:2,000

As old industrial cities are cleaning up and revitalizing their waterfronts, space for urban swimming is being introduced or often reintroduced in areas where it had been banned or considered unsafe for decades. These case studies provide insight into the variety of successful ways swimmers and architecture can engage with a natural body of water. Careful consideration should be made in regards to the materials used depending on the water type. Freshwater freezes in cold climates, creating ice that could potentially damage any waterfront structure.

From a sixty year old iconic diving platform that brings people together during celebrations, to a revitalized industrial pier that has enhanced a city's relationship with the lake at its doorstep, the architecture of urban swimming, whether in a lake, river, sea or ocean, is instrumental in shaping a person's beliefs, attitudes, and values towards water.

Notes

[1]Megan Barber, "9 Cities Making Polluted Waterways into Swimming Hotspots: Reclaiming Rivers, One Pool at a Time," *Curbed*, August 3, 2017, https://www.curbed.com/2017/8/3/16089352/city-rivers-swimming-safe

[2]"140 Baigneurs Se Jettent À L'eau Au Grand Splash 2018," Comité Citoyen Montréal Baignade, http://www.montrealbaignade.org/index.html

[3]"Faaborg Harbor Bath / URBAN AGENCY + JDS + CREO ARKITEKTER," *ArchDaily*, June 23, 2014, http://www.archdaily.com/518083/faaborg-harbor-bath-urban-agency-jds-creo-arkitekter/.

[4]"Q & A," Allas Sea Pool, https://allasseapool.fi/en/frequently-asked-questions.

[5]Mark Isitt, "Kastrup Sea Bath," in *White Green 10: Ten Projects in the Great Outdoors by White Arkitekter*, ed. White arkitekter (London: Laurence King Pub, 2011), 81-89.

[6]"Blackrock Diving Tower," VisitGalway, https://visitgalway.ie/blackrock-diving-tower/

Chapter 3

Water remediation case studies

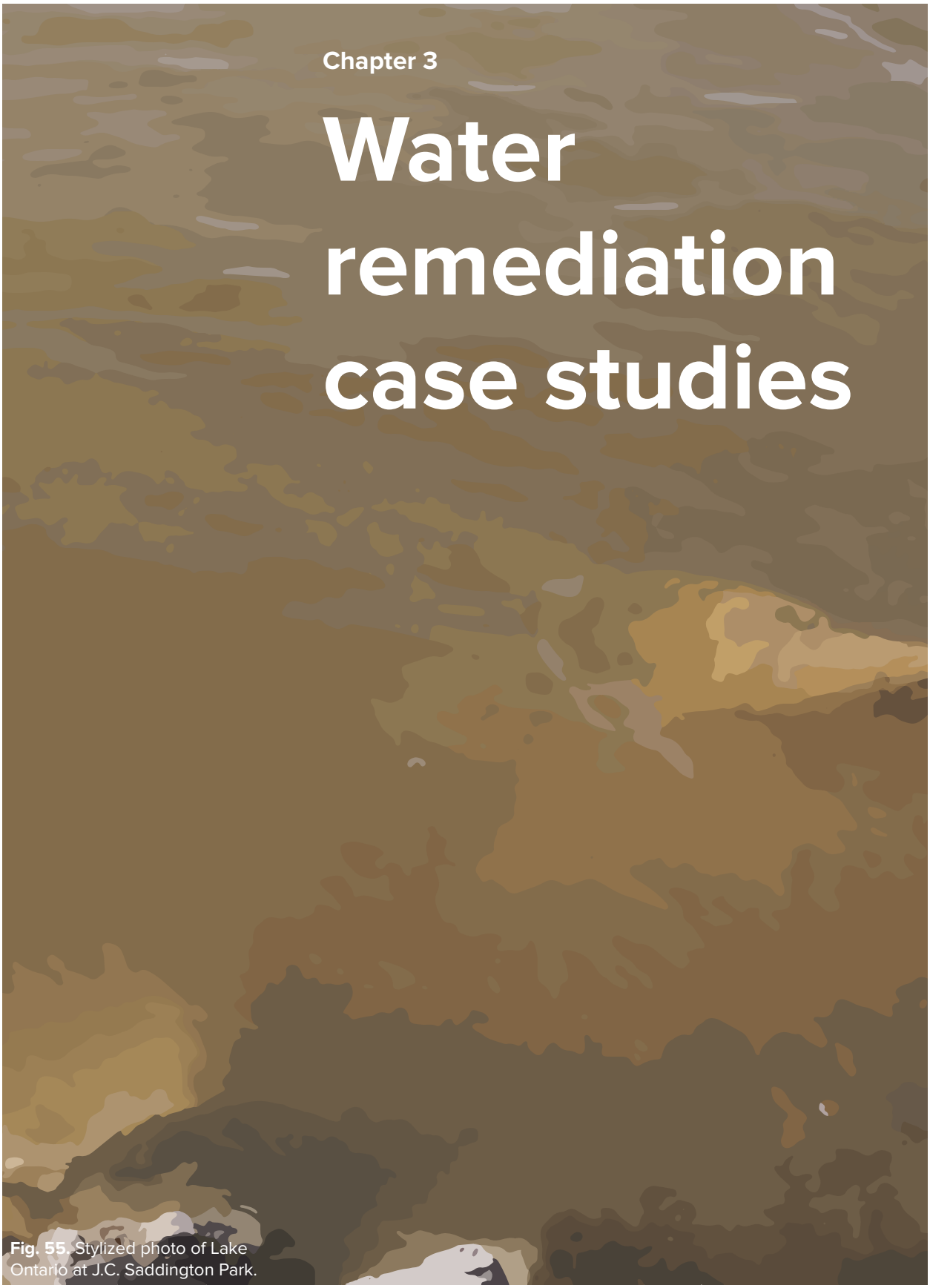


Fig. 55. Stylized photo of Lake Ontario at J.C. Saddington Park.

Fig. 56. Photo of caution sign regarding water quality for recreational use posted in front of the beach at Jack Darling Memorial Park, 2019.

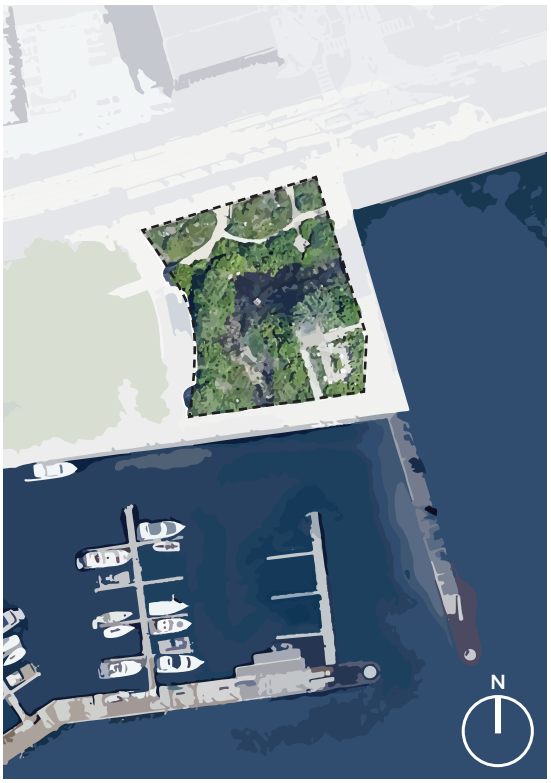
Fig. 57. Photo of debris pollution after a storm in Lake Ontario in the Port Credit Harbour, 2017.

Fig. 58. Photo of stormwater pollution in Lake Ontario at J.C. Saddington Park, 2019.

The number of waterfront cities that are redeveloping their waterfront has steadily climbed in recent decades. Typically, what was before an industrialized landscape dotted with activities related to work and production such as warehouses, factories, manufacturers and parking lots, was designed into new places of urban leisure, recreation, and vegetation. As is often the case, the first step in any urban transformation from a polluting activity to one that is more benign, is the 'cleaning up', or remediation, of the land. Remediation involves the removal of pollution or contaminants from the environment, which can include soil, groundwater, sediment, and surface water.

This chapter will focus on the remediation of surface water through a variety of strategies that can combine human technologies and nature to tackle pollution. The following unique and innovative projects located around the world work at various scales and urban conditions, as well as target an array of polluted surface waters such as stormwater, riverwater, and lakewater.

Water remediation case studies



01. Spadina Quay Wetland

02. Wild Mile Chicago - Phase 1

Thesis proposal

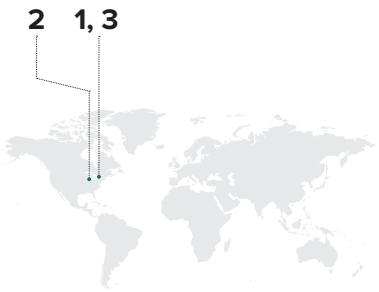
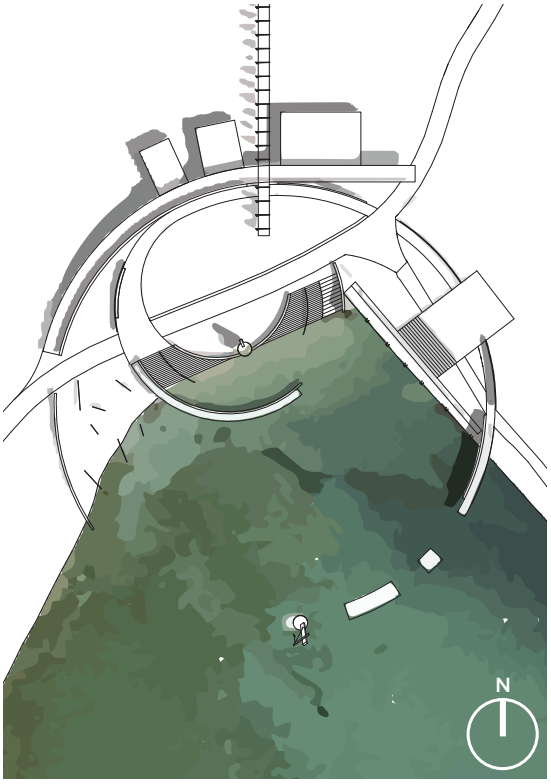
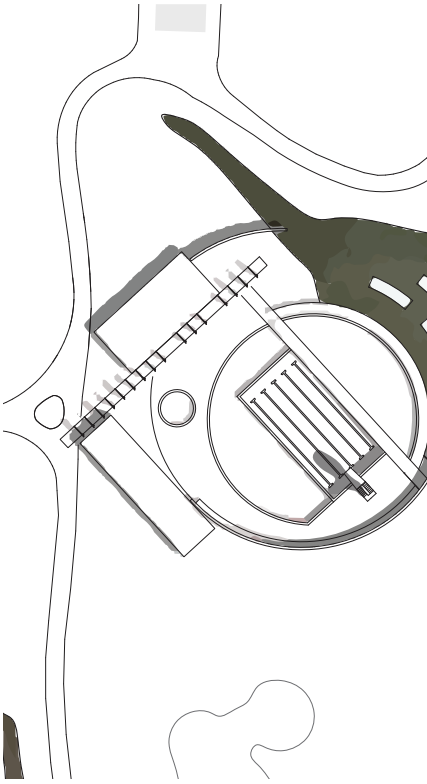


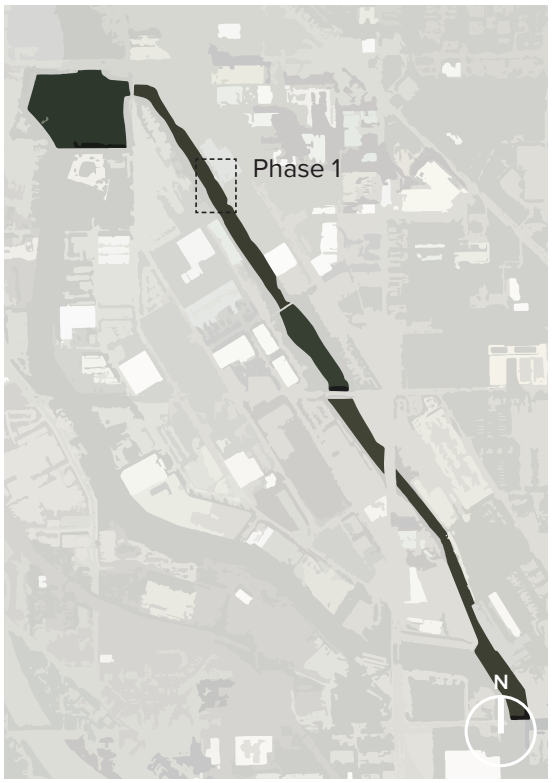
Fig. 59. Size comparison between water remediation case studies and thesis proposal. All maps are at 1:2,000 scale.



Proposed lakewater swimming site



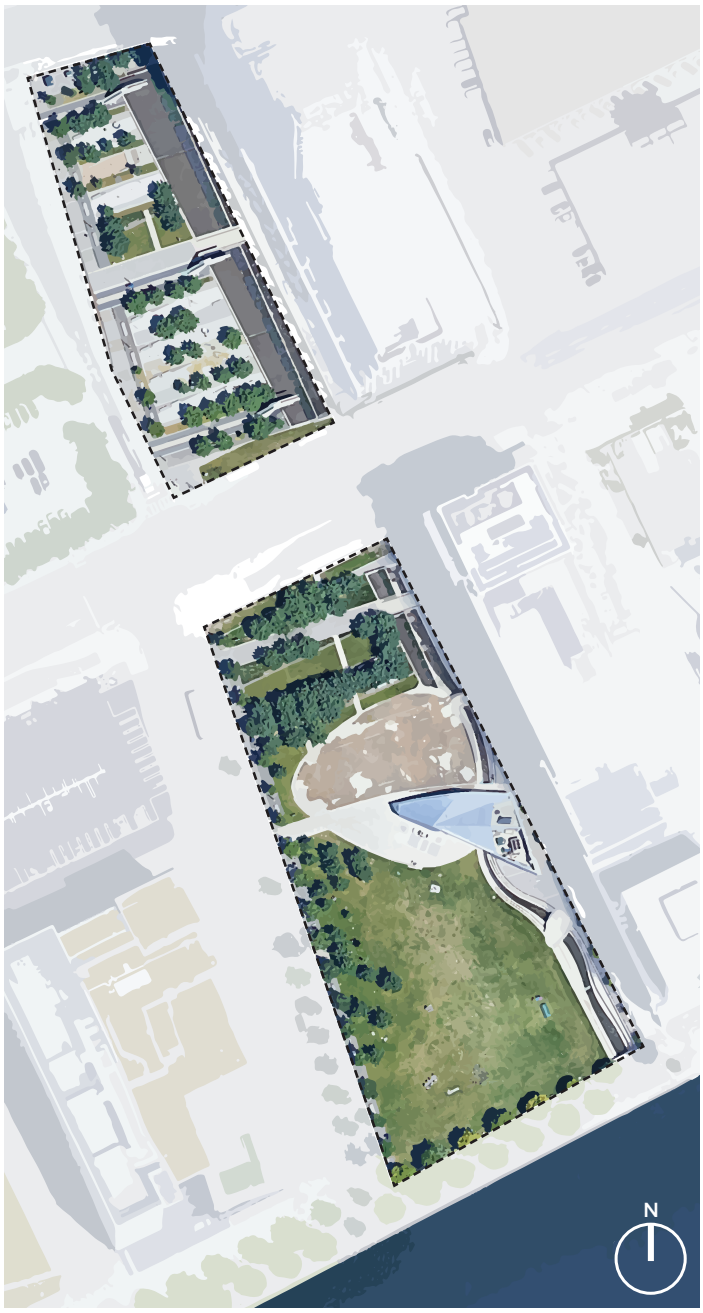
Proposed poolwater swimming sit



Wild Mile Chicago - Total Length NTS

te

Proposed riverwater swimming site



03. Sherbourne Common

01. Spadina Quay Wetland

Location: Toronto, Ontario

Water type: Lakewater

Water treatment: Wetland

Size: 2,800 m^2

Team: PMA Landscape Architect, Plant Architect Inc.

Completed: 1999

The City of Toronto's waterfront has gone through many transformations since the first wooden wharf was built along its sandy shores 200 years ago. Over the years, industry would take over the entire waterfront, replacing the once sandy and marshy shoreline with wood, stone, and concrete. Spadina Quay Wetland replaced an asphalt parking lot, one of many brownfield sites along the waterfront, with a lakewater-filtering wetland. The wetland functions as a result of the beneficial relationship between the plants that filter Lake Ontario water and the concrete retaining wall that protects the plants from damaging storms. Lakewater enters the site via two points at each end of the bordering retaining wall, resulting in a constantly fluctuating wetland.[3] What was once an uninviting parking lot is now a popular urban waterfront park for both wildlife and people.

Constructed wetlands are an effective semi-aquatic landscape strategy with multiple benefits. In addition to remediating polluted water, similar to technologically driven water treatment systems such as ultraviolet, these distinct ecosystems also bring back important flora, fauna, and algae.

Fig. 60. Photo of wetland flora, 2019. (Photo courtesy of Joël Castonguay)

Fig. 61. Photo of Spadina Quay Wetland along the waterfront trail, 2019. (Photo courtesy of Joël Castonguay)

Fig. 62. Photo of viewing platform in the middle of the wetland, 2019. (Photo courtesy of Joël Castonguay)

Renaturalizing the GTA's waterfront can help improve Lake Ontario's overall health, and encourage the repopularizing of urban lake swimming along its shores.

02. Wild Mile Chicago

Location: Chicago, Illinois

Water type: Riverwater

Water treatment: Wetlands

Size: 68,800 m^2

Completed: 2017 (Phase 1)

Polluted rivers are unfortunately all too common in urban areas. The Chicago River has been negatively impacted by the intense urbanization and industrialization along its shores. The intent of Wild Mile Chicago is to remediate the water, and revitalize the relationship between the city and its historic river by introducing diverse natural ecosystems, programming, learning stations, and multiple access points. A series of connected floating wetlands will be used to accomplish the Wild Mile Chicago revitalization project.[2] Floating wetlands are small artificial floating platforms that can support the growing of plants. The roots of these plants absorb excess nutrients found in the water, resulting in healthier river. In addition, the plants growing on top of the platform are home to a variety of important wildlife, while roots growing below the platform can attract and sustain many species of fish.

Floating wetlands are an inexpensive yet effective solution to a costly problem. They are movable and easily scalable, allowing the treatment of a stormwater pond, to a segment of a river.

Fig. 63. Aerial of Chicago river with floating wetland not yet installed, 2017. (Google Earth)

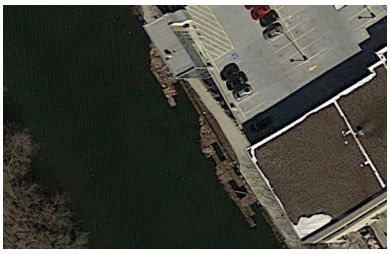


Fig. 64. Aerial of Chicago river with floating wetland recently installed, 2018. (Google Earth)

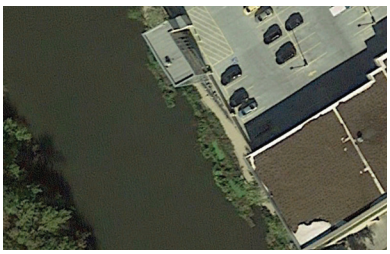


Fig. 65. Aerial of Chicago river with floating wetland in bloom, 2018. (Google Earth)

Adaptable floating wetlands on the Lake Ontario waterfront could help combat water pollution and prolong the number of swimmable days.

03. Sherbourne Common

Location: Toronto, Ontario

Water type: Stormwater

Water treatment: Ultraviolet

Size: 15,000 m^2

Team: Teeple Architects and PFS Studio

Completed: 2011

Sherbourne Common, an innovative stormwater management project, represents a new vision for water infrastructure in the GTA. The site, located in the East Bayfront district in downtown Toronto, once served industrial purposes but is now an urban waterfront park. The project treats neighbourhood stormwater using an ultraviolet treatment system located underneath the park pavilion. After treatment, the now clean water is released from three sculptures, eventually flowing into a long concrete channel before finally entering Toronto's Inner Harbour.[1] Although the treatment process is unfortunately hidden from view, visitors can engage with clean water through the park's splash pad, water fountains, and water channel.

Stormwater continues to plague many sections of the GTA's waterfront. Many cities, including Mississauga, recommend not swimming for at least 48 hours in the lake after a heavy rainfall due to water pollution caused by stormwater. The majority of the existing infrastructure put in place to collect stormwater dumps it into rivers and lakes untreated. Sherbourne Common is an excellent example of turning a problem, contaminated neighbourhood stormwater, into a solution that has re-energized and redefined the relationship between the city, its infrastructure and the lake.

Fig. 66. Photo of concrete water channel carrying clean water to Toronto's Inner Harbour beyond, 2018.

Fig. 67. Photo of park pavilion, housing the UV treatment facility in its basement, 2018.

Additional projects that target the treatment of stormwater would decrease water pollution after a rainfall and increase the potential for safe lake swimming along the waterfront of Lake Ontario.

Fig. 68. Photo of water fountain, 2018.

Water pollution has plagued urban waterfronts for generations. Cleaning up the water will take more than just a localized effort at one location. Although negative environmental effects are felt along the waterfront, pollution can often come from sources far away. Therefore, solutions will have to come from interventions of all types and at all scales that tackle a variety of polluting sources.

Notes

[1]"sherbourne common," Waterfront Toronto, https://waterfrontoronto.ca/nbe/portal/waterfront/Home/waterfronthome/projects/sherbourne+common

[2]"About," Wild Mile Chicago, https://www.wildmilechicago.org/about-us.

[3]"Spadina Quay Wetland," Canadian Society of Landscape Architects, https://www.csla-aapc.ca/awards-atlas/spadina-quay-wetland

Chapter 4

Water public education case studies

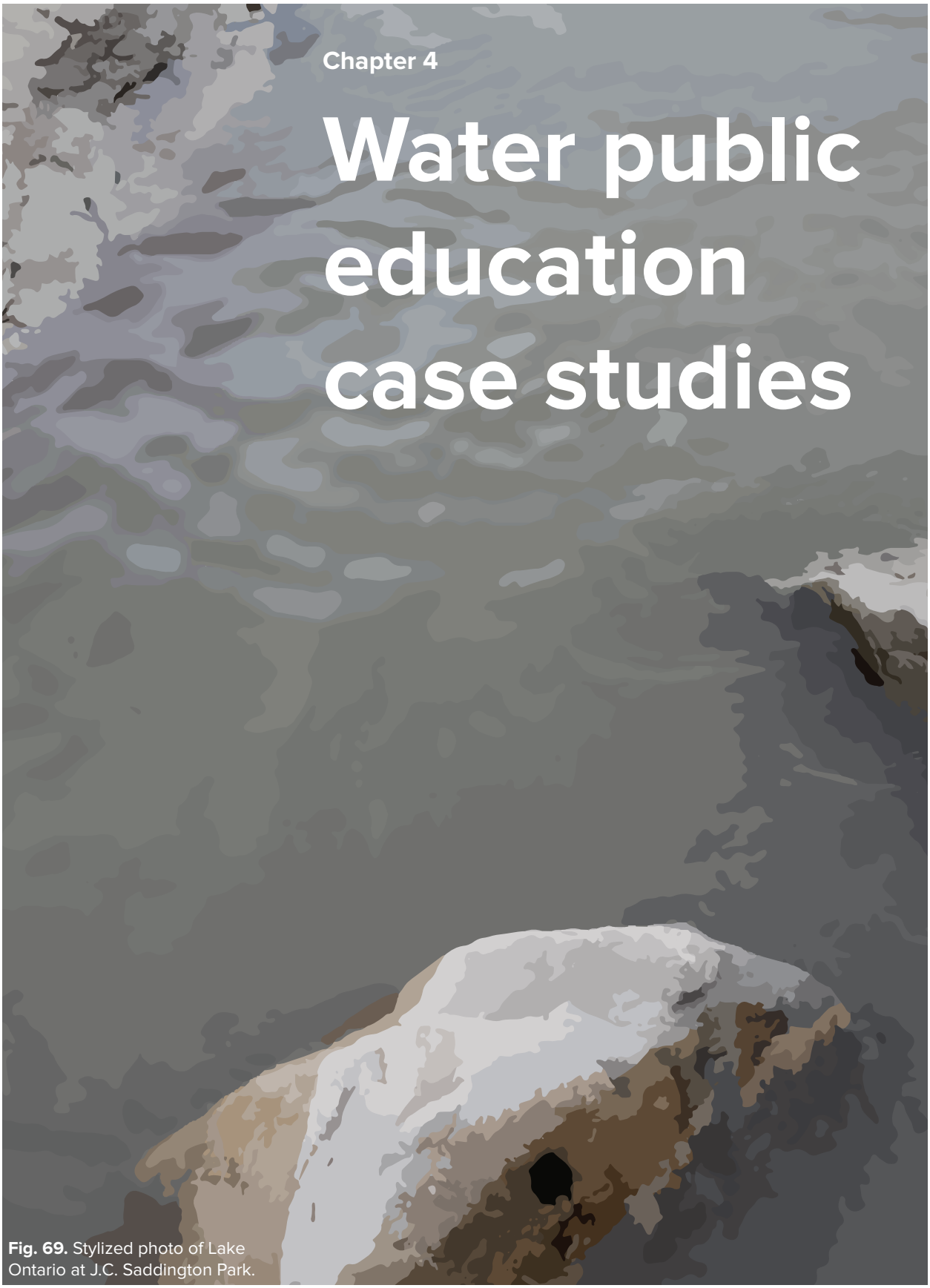


Fig. 69. Stylized photo of Lake Ontario at J.C. Saddington Park.

Since the early 2000s, repeated articles in The Globe and Mail, The Toronto Star, and CBC aim to reassure readers that Lake Ontario is safe to swim in:

2002, “Cleaned up Lake Ontario beaches still get a bum rap”[1]
2003, “Life’s a beach - unless there’s nobody there”[2]
2005, “Once more onto the beaches to bust a filthy myth”[3]
2008, “Eyes Wide Open Below The Surface: Come on in, the water’s fine…right?”[4]
2009, “The Lake at your doorstep: Come on in, the water’s closer and cleaner than you think”[5]
2011, “Contrary to Myth: I swam eight Toronto beaches in one day, and lived”[6]
2013, “Toronto Beaches are “world class”, but still avoided by locals”[7]
2019, “If you think Toronto’s beaches are filthy - think again”[8]

These headlines point to an important issue slowing the return of urban swimming Lake Ontario despite the fact that, “Toronto beaches offer beautiful swimming in clean, clear water.”[9] Current lakewater pollution attitudes and beliefs plagues the majority of people living along the shores of the GTA. Therefore, challenging people’s preconceived notions of lakewater quality through education can help catalyze the return of the urban lake swimmer.

The following case studies employ a variety of architectural and landscape strategies to specifically educate visitors about the natural environment specific to each project’s location. These successful projects add a critical layer of reflection in order to “stimulate their [visitors] curiosity and enhance their perception of nature” as landscape architect Paolo Burgi, the designer of the third case study.[10]

01. Yellow Fish Road™ Program

Location: 220 Communities across Canada (including Mississauga)

Water type: Stormwater

Organizer: Trout Unlimited Canada

Start: 1991

The Yellow Fish Road™ Program is a Canadian water education initiative that was first started in Calgary almost thirty years ago by a non-profit organization called Trout Unlimited Canada and has since spread across hundreds of communities across the country. The program is a straight-forward and inexpensive strategy that brings awareness to water pollution caused by the improper household disposal of hazardous waste such as soaps, automotive oils, and pool water into the city's storm sewers. Unbeknown to many people, stormwater flows directly into lakes and rivers without being treated by sewage treatment plants. The program concept is elegantly simple, ingenious and easily scalable: community volunteers paint permanent, foot-size yellow fish stencils onto concrete curbs adjacent to catch basins and distribute educational brochures to nearby houses.[11] Even if you haven't read a brochure, seeing a very visible symbol of a yellow fish next to a catch basin can easily lead one to conclude there is a relationship between the two; anything other than rainwater that goes into the storm sewers has the potential to negatively affect fish and other wildlife.

Fig. 70. Photo of a painted yellow fish stencil next to a typical catch basin cover in Mississauga, 2019.

Fig. 71. Photo of a new stormwater catch basin cover in Mississauga that symbolizes a fish, installed in 2014. Mississauga, 2019.

Colour and symbols are an effective and easy to implement tool to get the public's attention, or educate them about water and lake health.

02. AMD&ART Park

Location: Vintondale, Pennsylvania

Water type: Acid Mine Drainage

Water treatment: Wetlands

Size: 141,640 m^2

Founder: Dr. T Allan Comp

Completed: 1994 - 2005

Fig. 72. Map of the Litmus Garden at AMD&ART Park. (Google Earth)

Fig. 73. Photo a Litmus Garden treatment pool at AMD&ART Park. (Stacy Levy, *AMD & Art Project in Vintondale*, May 3, 2011, digital image, Wikipedia Commons, https://commons.wikimedia.org/wiki/File:Stacy_Levy_-_AMD-Art_-_Project_in_Vintondale.jpg)

Acid Mine Drainage (AMD) is extremely polluted water caused by the contamination of surface water by metal or coal mines. In Vintondale, Pennsylvania, the latter was the culprit. A passive treatment system of wetlands were designed and built to rehabilitate the environmentally degraded surface waters of an abandoned mining site. In order to bring awareness to the water treatment process, specific plant colours were used to help users identify the quality of the water at any given step along the treatment. As polluted water makes its way from the source, it gradually changes colour as the quality of the water improves, from a toxic red-orange to a clean blue-green. The "Litmus Garden", as this landscape strategy is called, is made up of a series of different tree species that were chosen for their specific and different autumn foliage colours. During the fall, as visitors travel from beginning to end (from polluted to clean water) of the water treatment system, they experience a gradually changing landscape. At the beginning, both water and tree foliage are red, followed by orange, yellow, and finally ending up in a blue-green landscape of foliage and remediated water.[12]

The use of colour to educate is an effective strategy because of it's simplicity. In the case of the Litmus Garden, the direct relationship between the fall foliage colours and the adjacent surface water reflects the remediation process of water from polluted to clean. The litmus test is a chemical test for acidity using water-soluble dyes that is performed by dipping a filter paper into the substance in question. Once removed from the substance, the filter paper will change colour depending on the acidity, and measured against a set of standard colours to determine pH level. Easy to perform, easy to understand.

Adapting the litmus test and the use of specific colours along the Lake Ontario waterfront can bring awareness to lakewater quality and help counteract water pollution misconceptions that keep people away from swimming in the lake.

03. Cardada

Location: Cardada / Cimetta, Switzerland

Size: 1,500,000 m^2

Team: Studio Bürgi

Completed: 2000

The project is a series of linked but separate design interventions along a popular hiking path on the Cardada and Cimetta mountains in the Swiss Alps. Studio Bürgi designed a viewing platform, a geological observatory, and an arrival plaza. All of these interventions adopt the concept of a folly to alert visitors to the unique significance of the place, whether historical, geological, or biological etc., as a means to create a landscape of contemplation instead of one solely based on consumption.[13] A folly is an eighteenth-century practice that uses architectural insertions to enhance or clarify the understanding and meaning of a particular place. For the viewing platform, different symbols and numbers etched into the pavement along the path to the end of the promontory teach visitors about the history of life on Earth. At the geological observatory, a circular concrete pad located at the peak of Cardada's mountain, is separated in two by a red line that outlines an important historical and cultural region. On each side of the line, small rocks are arranged in a neat row, each representing a different geological specimen taken from the European and African plates. This intervention educates visitors about the geology and vast time scale of the particular place. Finally, the central focus of the arrival plaza, a water fountain, highlights the erosional force of water.[14]

These modern follies are architectural insertions that focus on education and understanding. This strategy relies on the relationship between the insertion and the landscape, and together they "form the architectural whole."[15] One cannot be understood without the other.

Fig. 74. Photo of viewing platform. (Tschubby, *Plattform Cardada*, September 27, 2014, digital image, Wikipedia Commons, https://commons.wikimedia.org/wiki/File:Aussichtsplattform_Cardada.JPG)

Follies can be used to enhance visitors' understanding of the Mississauga waterfront landscape and Lake Ontario and educate them regarding water quality perception.

Education is an important part of re-popularizing urban lake swimming along the Mississauga waterfront because misinformation and biases currently prevent people from swimming in Lake Ontario. Without targeting people's attitudes and beliefs, my proposed design project could sit unused.

The presented case studies highlighted various strategies that help educate people about a particular issue or enhance a person's understanding of a particular place. In the case of the Yellow Fish Road™ Program, water pollution was brought to the forefront by having fish symbols painted next to catch basins in order to highlight the potentially adverse relationship between stormwater and wildlife. The remediation of Acid Mine Drainage in the case of AMD&ART Park was taught by highlighting the changing colour in the water and tree foliage as the pollution is cleaned. Finally, follies enhanced a person's understanding of the Cardada mountains in Switzerland by bringing awareness to the geology and history of the place. These projects reveal that symbols, colour, and objects can help to effectively communicate simple and specific messages to people.

Notes

[1]John Barber, “Cleaned up Lake Ontario beaches still get a bum rap,” *The Globe and Mail*, August 17, 2002, A19.

[2]Stephen Cole, “Life’s a beach - unless there’s nobody there,” *The Globe and Mail*, August 22, 2003, A17.

[3]John Barber, “Once more onto the beaches to bust a filthy myth,” *The Globe and Mail*, July 2, 2005, M2.

[4]Joseph Wilson, “Eyes Wide Open Below The Surface: Come on in, the water’s fine…right?,” *The Globe and Mail*, August 9, 2008, M5.

[5]Marcus Gee, “The Lake at your doorstep: Come on in, the water’s closer and cleaner than you think,” *The Globe and Mail*, August 18, 2009, A7.

[6]Marcus Gee, “Contrary to Myth: I swam eight Toronto beaches in one day, and lived,” *The Globe and Mail*, July 23, 2011, A14.

[7]Alex Nino Gheciu, “Toronto Beaches are “world class”, but still avoided by locals,” *The Star*, August 11, 2013, https://www.thestar.com/news/gta/2013/08/11/toronto_beaches_are_world_class_but_still_avoided_by_locals.html

[8]Natalie Nanowski, “If you think Toronto’s beaches are filthy - think again,” CBC News, July 5, 2019, https://www.cbc.ca/news/canada/toronto/waterfront-beach-sewer-blueflag-summer-1.5200875

[9]Gee, “Contrary to Myth,” A14.

[10]Raffaella Fabiani Giannetto, “Cardada,” in *Paolo Bürgi Landscape Architect: Discovering the (Swiss) Horizon: Mountain, Lake, and Forest* (New York, N.Y.: Princeton Architectural Press, 2009), 32-89.

[11]“Yellow Fish Road,” Trout Unlimited Canada, https://tucanada.org/yellow-fish-road/

[12]“The Treatment System,” AMD&ART, https://amdandart.info/tour_treatment1.html

[13]John Dixon Hunt, “Folly in the Garden,” *The Hopkins Review* 1, no. 2 (2008): 249.

[14]Raffaella Fabiani Giannetto, “Cardada,” in *Paolo Bürgi Landscape Architect*, 32-89.

[15]Vincent Scully, Jr., *The Earth, the Temple, and the Gods: Greek Sacred Architecture*, revised ed. (San Antonio: Trinity University Press, 2013), xix.

Chapter 5

Swimming in Mississauga

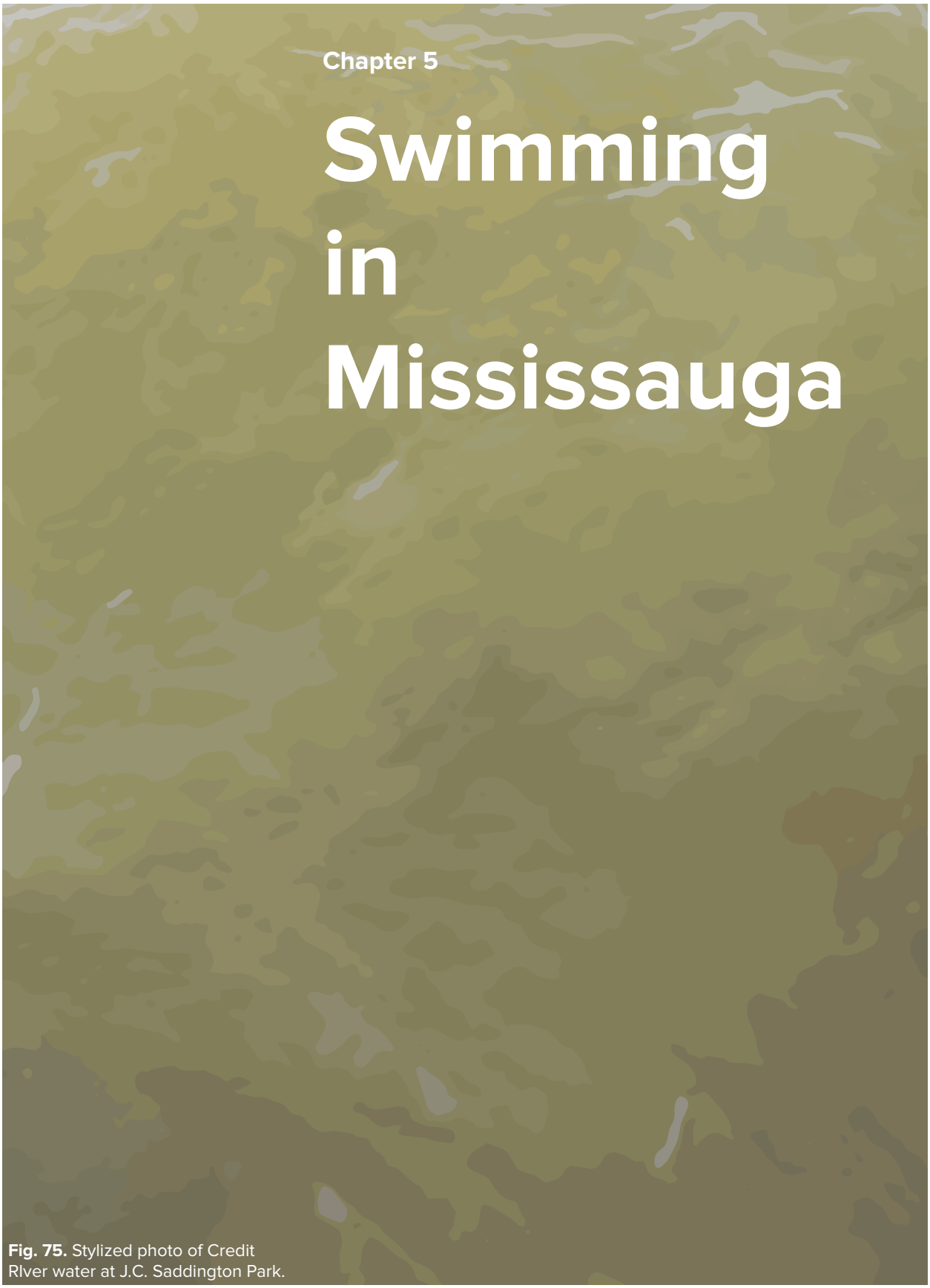


Fig. 75. Stylized photo of Credit RIver water at J.C. Saddington Park.

What is Mississauga's current swimming culture? To be clear, people living in Misssissauga do swim. They take swimming lessons, they swim for exercise, they swim for therapy, they swim to compete, they swim to cool down from the summer heat, or they simply swim for fun. Some residents have the luxury of swimming in private backyard pools, others choose between eleven indoor or seven outdoor public pools, and a minority decide to swim in Lake Ontario at one of three beaches along the waterfront.

Unlike indoor pools which are open all year round, outdoor pools are only open during the summer months, from the end of June to the beginning of September. Similarly, water quality testing for Mississauga's three beaches is only conducted during the summer months.

With three designated swimming beaches, Mississauga is above average in the GTA; the waterfront cities of Oakville, Burlington, Oshawa, and Pickering only have two designated swimming beaches, whereas Ajax, Whitby and Scarborough have one each. The designation of these waterfront locations as the only places where one can swim in Lake Ontario is enforced in Mississauga's By-Laws, people are forbidden to "swim, bathe or wade in any fountain, pond, lake, stream, or any body of water except in designated areas."[1] Furthermore, beaches are furnished with a standard set of amenities, typically found in suburban swimming beaches. These amenities often include: washrooms, a playground, a splash pad, picnic tables, and barbecues. This standard set of equipment has played an important role in shaping people's experiences and attitudes of the Mississauga waterfront.

The parks presented at the beginning of this chapter are the existing designated swimming sites along the Mississauga waterfront. Examining these sites provides valuable insight into the current lake swimming culture along with the supporting infrastructure. The last site introduced at the end of the chapter, J.C. Saddington Park, is the park selected for the thesis design intervention.

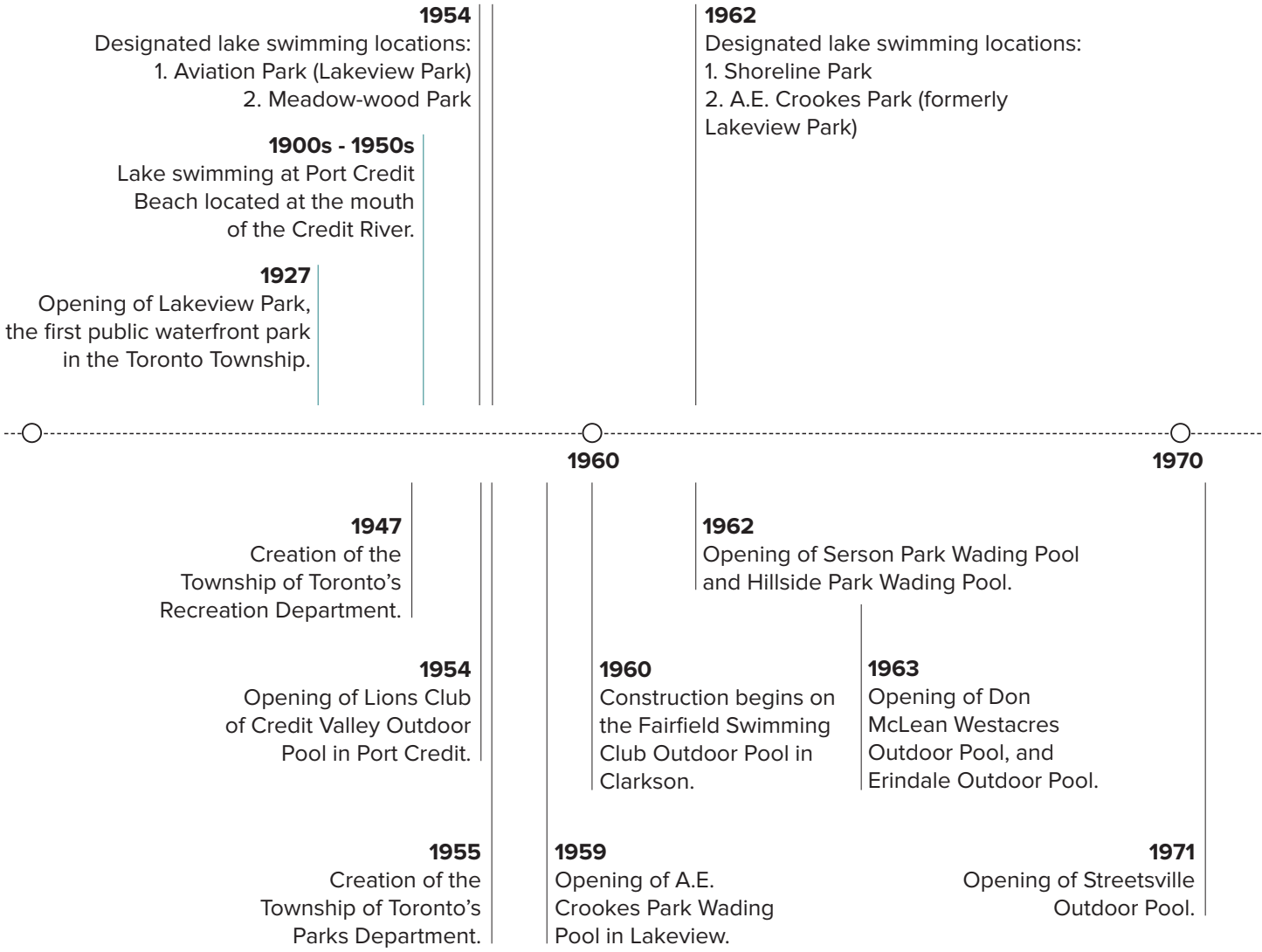


Fig. 76. Historical timeline of swimming-related events in Mississauga's history.

1989
Designated lake swimming locations:
1. Lakeside Park
2. Jack Darling Memorial Park
3. Richard's Memorial Park
4. Lakefront Promenade Park

2019
Designated lake swimming locations:
1. Jack Darling Memorial Park
2. Richard's Memorial Park
3. Lakefront Promenade Park

1990 **2000** **2010** **2020**

1976
Opening of Applewood Heights Outdoor Pool, Thorlodge Outdoor Pool, and Lewis Bradley Outdooor Pool.

1990s
Splash pads are added to Mississauga's parks, including Jack Darling Memorial Park, Lakefront Promenade Park, and A.E. Crookes Park located along the waterfront.

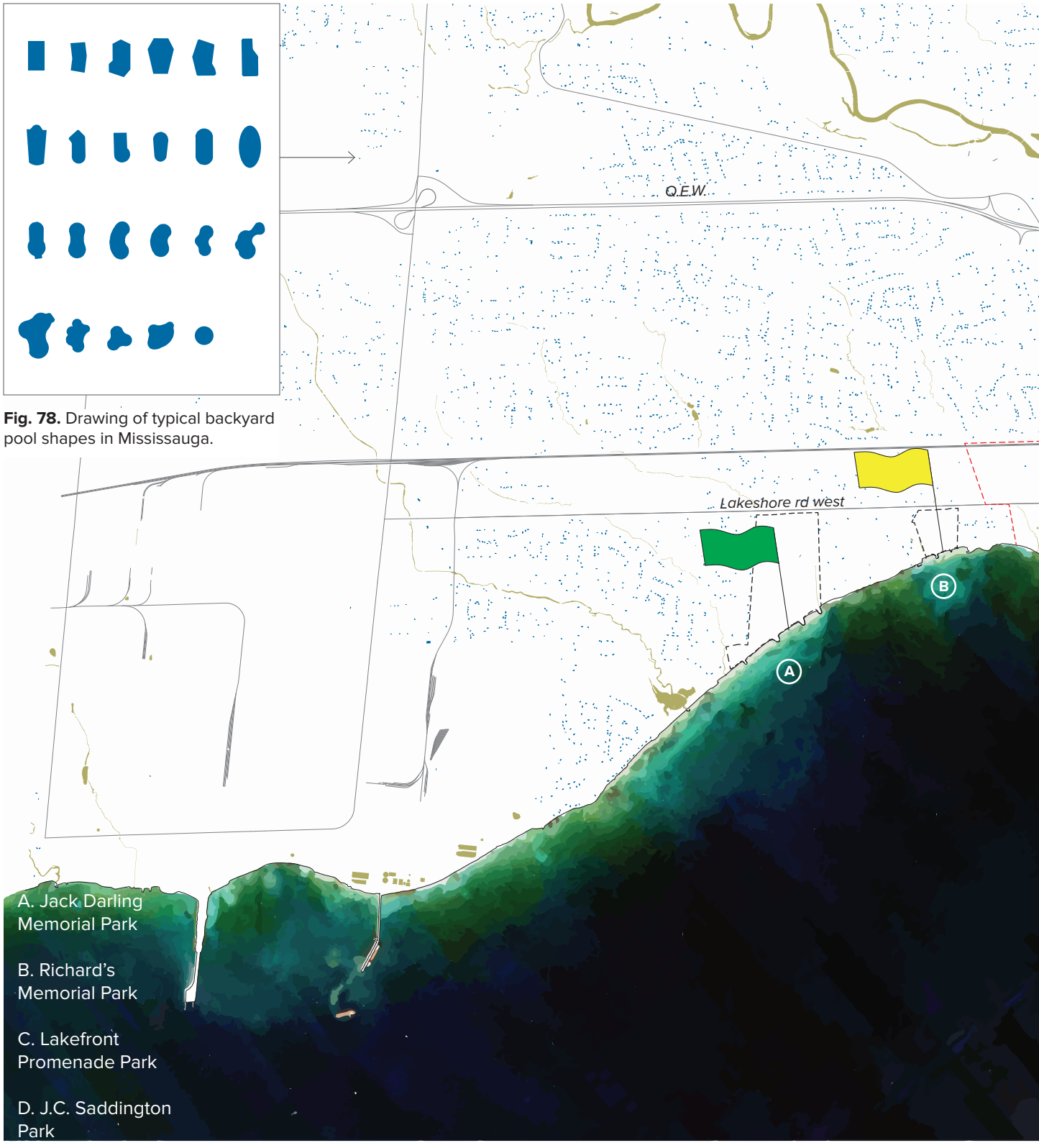
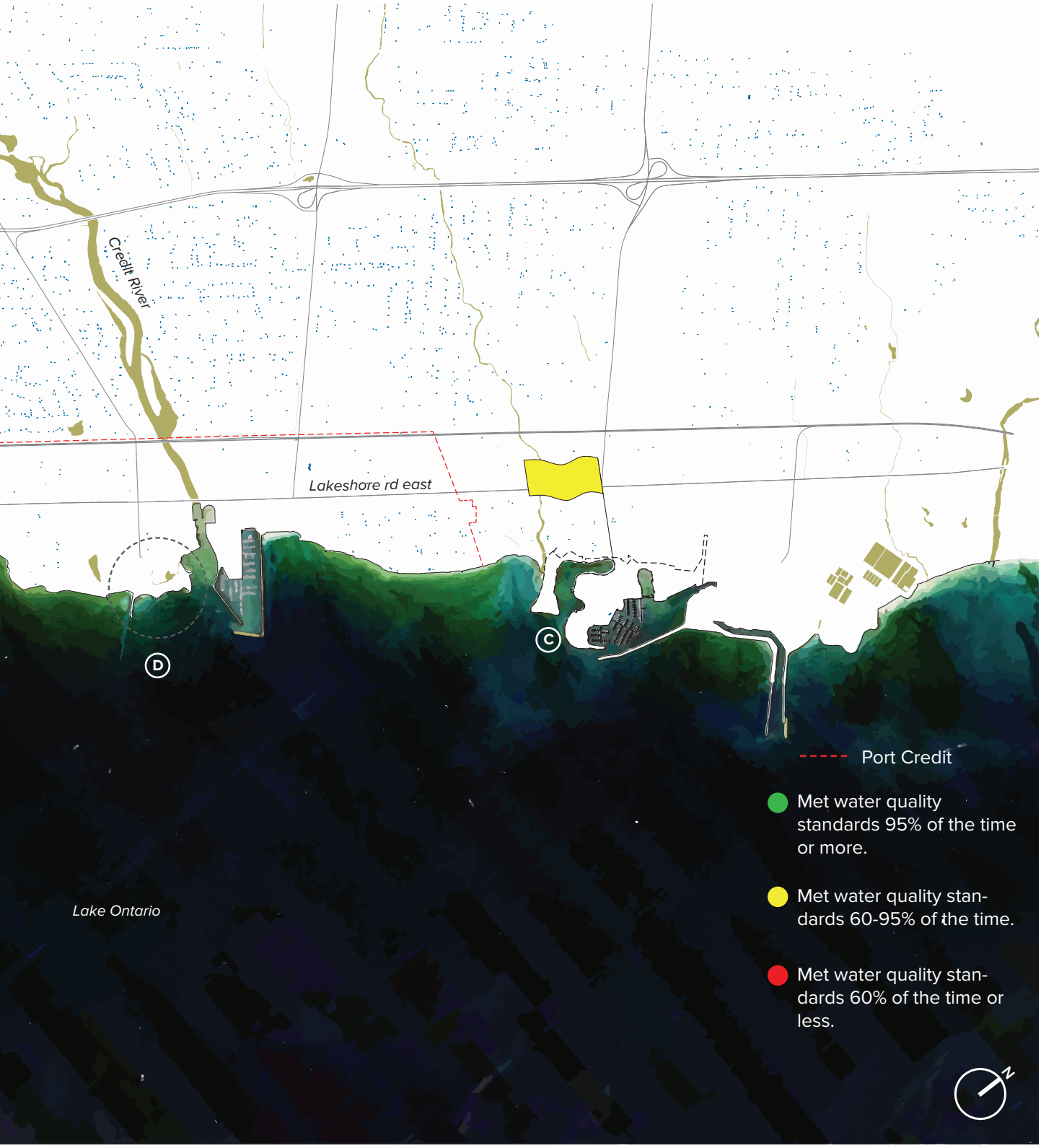


Fig. 78. Drawing of typical backyard pool shapes in Mississauga.

Fig. 77. Regional map of the south portion of the City Mississauga showing public and private swimming locations.


Credit River
Lakeshore rd east
D
C
Lake Ontario
Port Credit
Met water quality standards 95% of the time or more.
Met water quality standards 60-95% of the time.
Met water quality standards 60% of the time or less.
N

Jack Darling Memorial Park

Location: Clarkson

Planning Concept: Regional Access Node

Character: Naturalistic

Intensity of use: High

Opened: 1970

Size: 455,000 m^2

Shoreline: 780 m

Owner: Province of Ontario

Jack Darling Memorial Park is one of three designated swimming beaches and is the largest and most popular park along the Mississauga waterfront. European settlers have swum in Lake Ontario near its sandy and pebbly shores since the establishment of a Summer Resort on the adjacent property in the late 1870s. Jack Darling Memorial Park is also adjacent to the last lakefront marsh left between Burlington and Toronto, the Rattray Marsh. Before it was Jack Darling Memorial Park, the area was know as Thompson's Woods, and it was described in a 1959 editorial in a local paper, *The Weekly,* as a once "lush" wooded lot, but due to the destruction of trees overtime, the area had become a "ghastly eyesore" and "windblown sandy desert."[2]

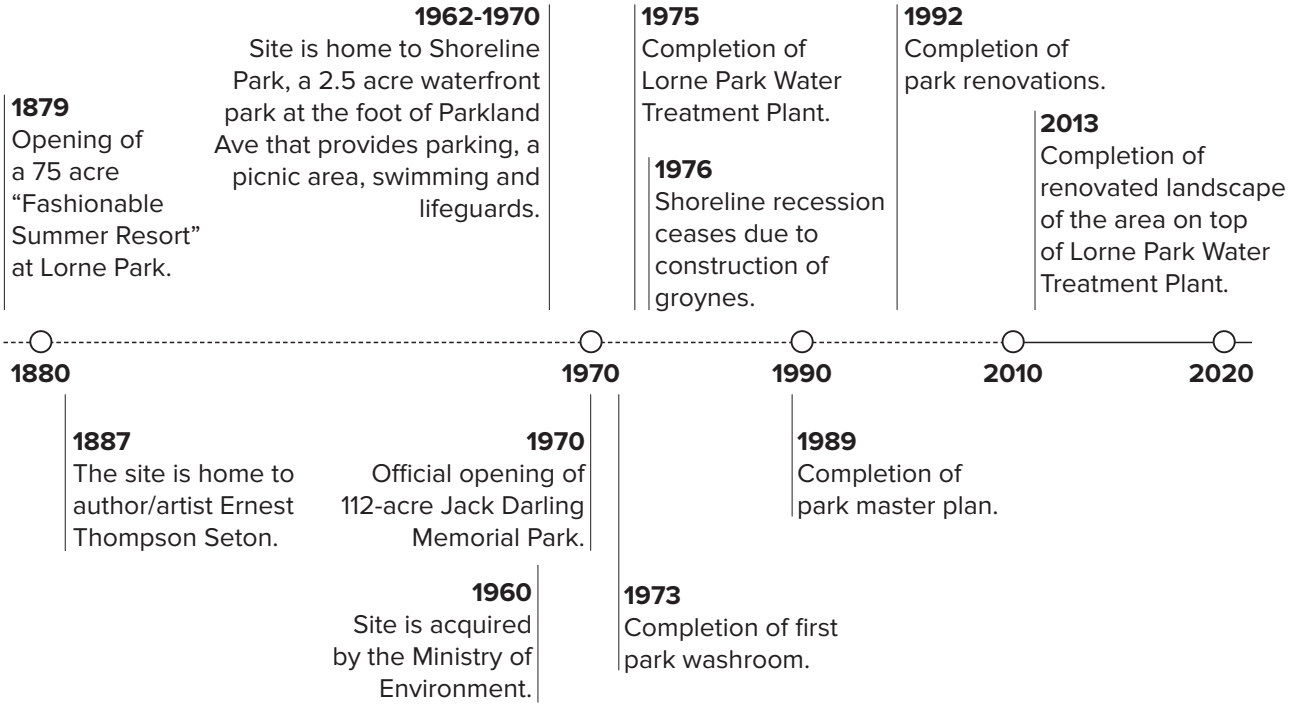


Fig. 79. Historical timeline of the site at Jack Darling Memorial Park.

Fig. 80. Photo of beach looking west, 2019.

Fig. 81. Photo of groyne looking towards the lake, 2019.

Fig. 82. Photo of washrooms, 2019.

Fig. 83. Site plan 1:6,250

Bus route

Bus stops

Waterfront Trail

Site Boundary

1km Radius

Refer to Evaluation on page 35-36 for criteria and point system description.

Programmes

●●● **Swimming:** (1) Natural sand beach; (2) Changerooms/washrooms; (3) Water quality testing

1. **Winter:** none

●●●● 2. **Non-swimming:** (1) Splash pad; (2) Seating; (3) Playgrounds; (4) Leash-free dog area; (5) Tennis courts; (6) Picnic area with barbecues; (7) Covered shelter; (8) Walking trails

Convenience

●●● 1. **Urban connectivity:** (1) Low residential; (2) Medium residential; (3) Mixed use

●●●●●●● 2. **Transportation:** (1) Bus; (2) Bike; (3) Walk; (4) Car

●● 3. **Accessibility:** (1) Children; (2) Elderly

Design

● 1. **Urban artifact:** (1) The park helps shape the identity and values of the city by providing a typical suburban perspective and experience for users

●● 2. **Entry:** (1) Walk in; (2) Run in

22 **Total points** ●

Fig. 84. Photo of washrooms, 2019.

Fig. 85. Photo of splash pad, 2019.

Fig. 86. Photo of covered picnic shelter, 2019.

Fig. 87. Programmes

1. Playground
2. Picnic area
3. Covered shelter
4. Changerooms / washrooms
5. Beach
6. Splash pad
7. Leash-free dog area
8. Tennis courts
9. Walking trails
10. Seating

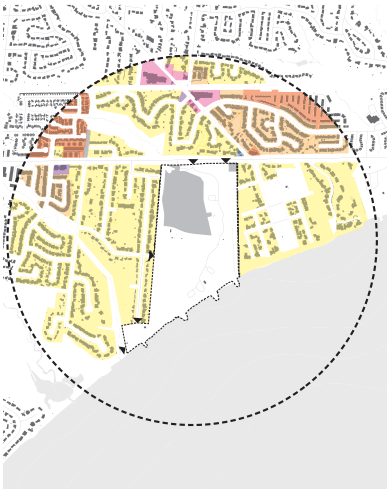


Fig. 88. Urban connectivity

- Residential Low Density I
- Residential Low Density II
- Residential Medium Density
- Mixed Use
- Convenience Commercial
- Utility
- 1km Radius

Fig. 89. Transportation

- Bus stops
- Bus route
- Car route
- Waterfront Trail
- Parking

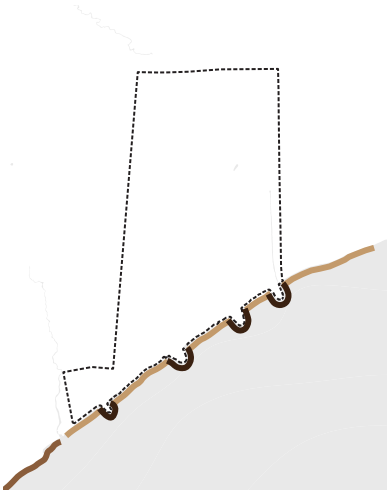


Fig. 90. Shoreline

- Sand beach
- Cobble beach
- Armourstone

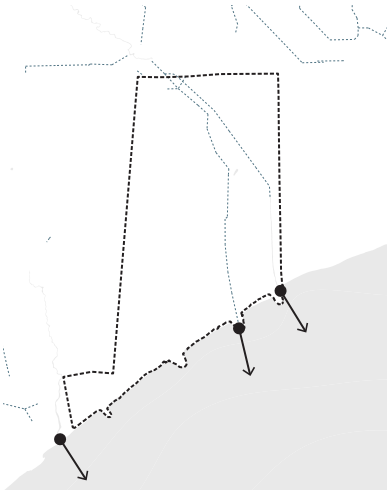


Fig. 91. Water infrastructure

- Underground storm sewer

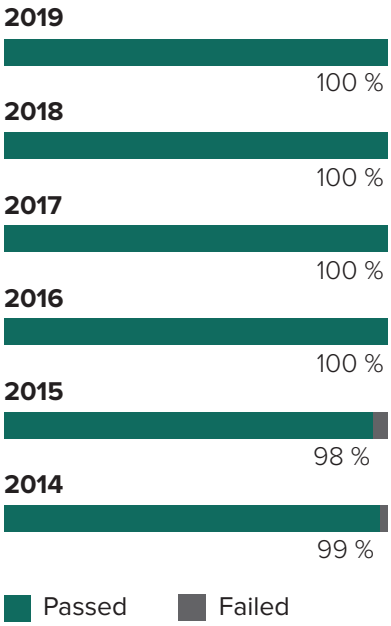


Fig. 92. Historical water quality (data taken from: "Jack Darling Memorial Park," *Swimguide*, https://www.theswimguide.org/beach/75.)

Richard's Memorial Park

Location: Clarkson

Planning Concept: Regional Access Node

Character: Naturalistic

Intensity of use: Low

Opened: 1970-71

Size: 73,000 m²

Shoreline: 220 m

Owner: City of Mississauga

Richard's Memorial Park, formerly Stoney Bay Park, is the smallest of the designated swimming beaches and one of the least popular parks along the Mississauga waterfront. Water pollution at the site exists due to a channelized creek that empties near the beaches.

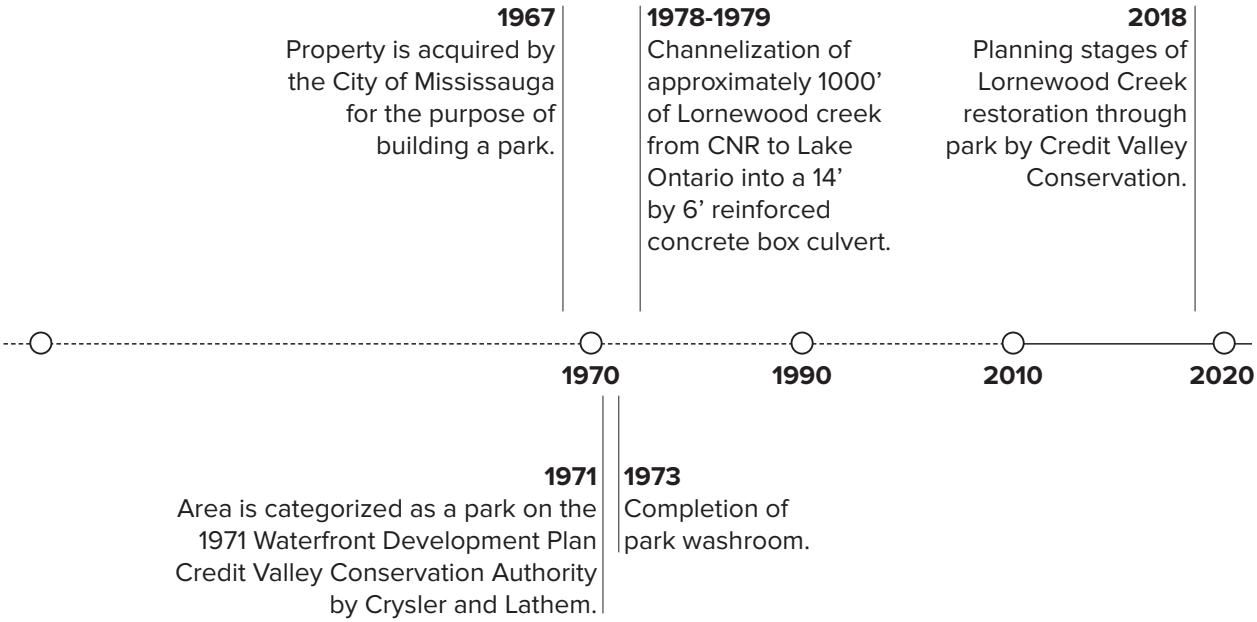


Fig. 93. Historical timeline of the site at Richard's Memorial Park.

Fig. 94. Photo of beach looking east, 2019.

Fig. 95. Photo of channelized creek outlet, 2019.

Fig. 96. Photo of hill looking east, 2019.

Fig. 97. Site plan 1:6,250

Bus route

Bus stops

Waterfront Trail

Site Boundary

1km Radius

Programmes

●●● 1. **Swimming:** (1) Natural sand beach; (2) Changerooms/ washrooms; (3) Water quality testing

2. **Winter:** none

●● 3. **Non-swimming:** (1) Seating; (2) Playground; (3) Picnic area with barbecues; (4) Covered shelter

Convenience

●●●● 1. **Urban connectivity:** (1) Low residential; (2) Medium residential; (3) High residential; (4) Mixed use

●●●●● 2. **Transportation:** (1) Bus; (2) Bike; (3) Car

●● 3. **Accessibility:** (1) Children; (2) Elderly

Designed

● 1. **Urban artifact:** (1) The park helps shape the identity and values of the city by providing a typical suburban perspective and experience for users

●● 2. **Entry:** (1) Walk in; (2) Run in

19 **Total points** ●

Fig. 98. Photo of washrooms, 2019.

Fig. 99. Photo of picnic area, 2019.

Fig. 100. Photo of covered shelter, 2019.

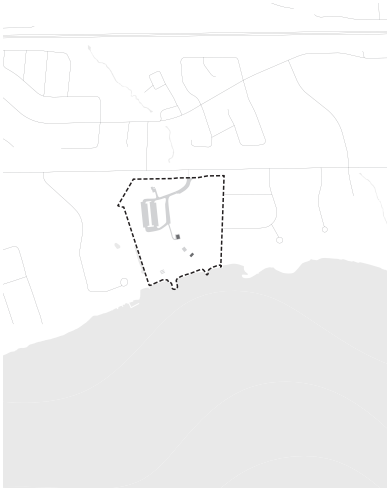


Fig. 101. Programmes

1. Playground
2. Picnic area
3. Covered shelter
4. Changerooms / washrooms
5. Beach
6. Seating

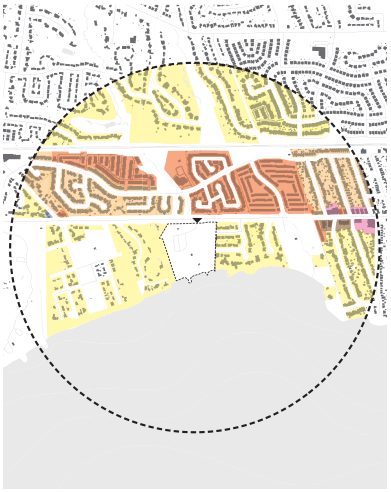


Fig. 102. Urban connectivity

- Residential Low Density I
- Residential Low Density II
- Residential Medium Density
- Residential High Density
- Mixed Use
- Utility
- 1km Radius

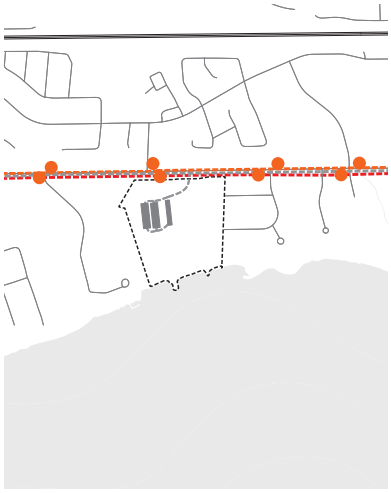


Fig. 103. Transportation

- Bus stops
- Bus route
- Car route
- Waterfront Trail
- Parking

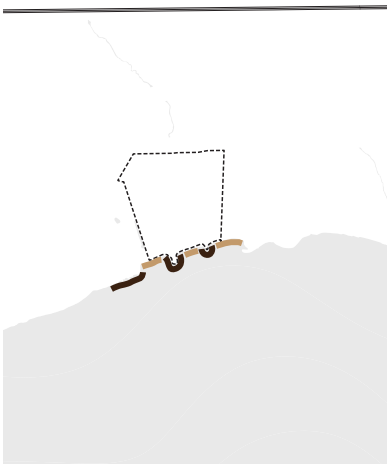


Fig. 104. Shoreline

- Sand beach
- Armourstone

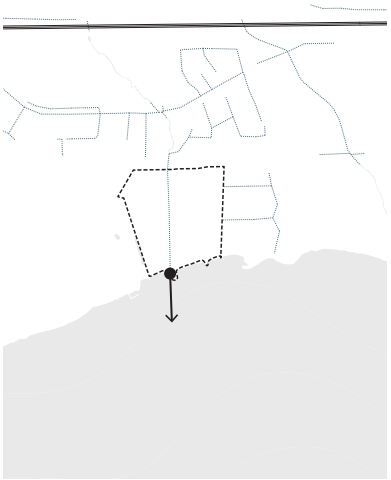


Fig. 105. Water infrastructure

- Underground storm sewer

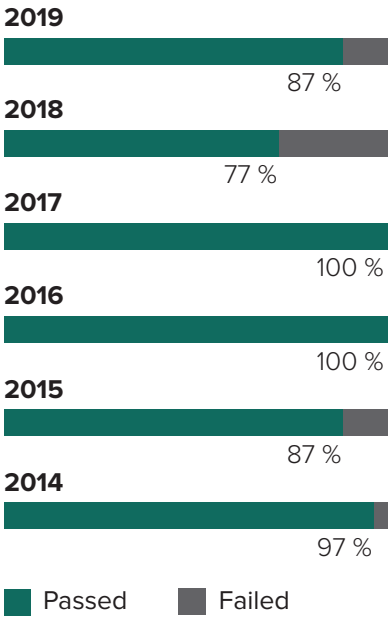


Fig. 106. Historical water quality (data taken from: "Richard's Memorial Park," *Swimguide*, https://www.theswimguide.org/beach/76.)

Lakefront Promenade Park

Location: Lakeview

Planning Concept: Activity Centre

Character: Urban/Manicured

Intensity of use: High

Completed: 1991

Size: 350,000 m^2

Shoreline: 4,100 m

Owner: CVCA

Lakefront Promenade Park is the largest and one of the most popular parks along the Mississauga waterfront. The park is the most recently designed and constructed of the three designated lake swimming areas along Mississauga's waterfront. The water off the artificial beach is on average warmer and shallower than most places along the Mississauga waterfront. As an "Activity Centre", it is a node for a variety of activities such as baseball, sailing, picnicking, biking, walking, and playing.

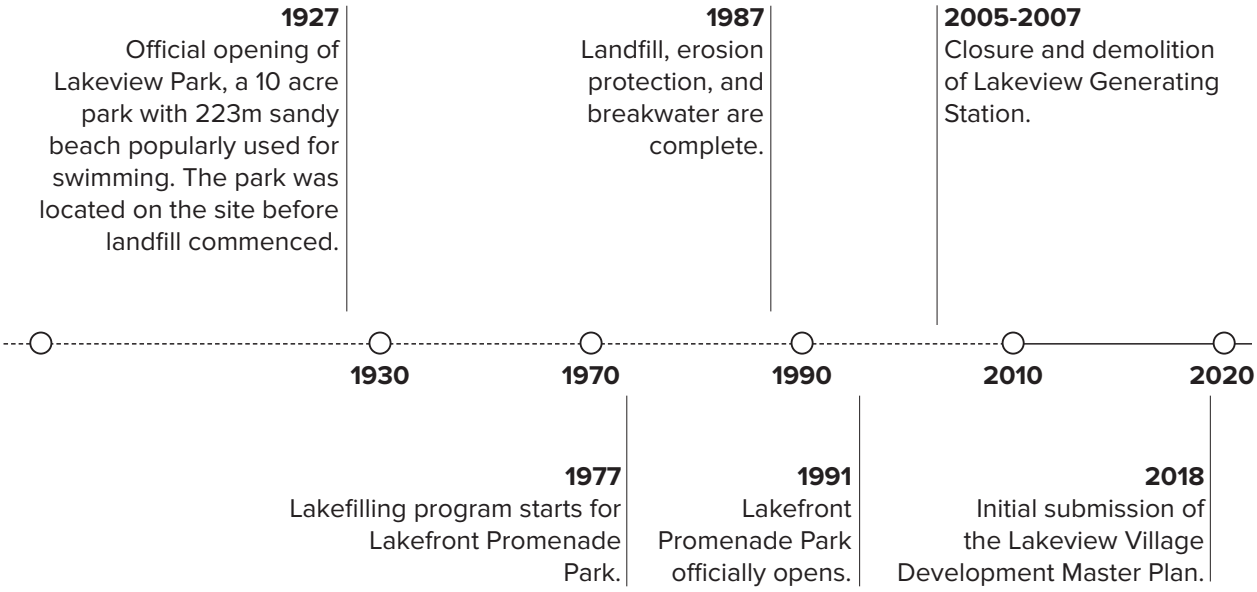


Fig. 107. Historical timeline of the site at Lakefront Promenade Park.

Fig. 108. Photo of beach looking west, 2019.

Fig. 109. Photo of marina, 2019.

Fig. 110. Closer look at the poor beach quality, 2019.

Fig. 111. Site plan 1:6,250

Bus route

Bus stops

Waterfront Trail

Site Boundary

1km Radius

Programmes

●●● **1. Swimming:** (1) Sand beach; (2) Changerooms/washrooms; (3) Water quality testing

2. Winter: none

●●●● **3. Non-swimming:** (1) Splash pad; (2) Seating; (3) Playground; (4) Picnic area; (5) Covered shelter; (6) Walking trails; (7) Marina; (8) Restaurant

Convenience

●●●● **1. Urban connectivity:** (1) Low residential; (2) Medium residential; (3) High residential; (4) Mixed use

●●●● **2. Transportation:** (1) Bus; (2) Bike; (3) Car

●● **3. Accessibility:** (1) Children; (2) Elderly

Design

● **1. Urban artifact:** (1) The park helps shape the identity and values of the city by providing a typical suburban perspective and experience for users

●● **2. Entry:** (1) Walk in; (2) Run in

20 **Total points** ●

Fig. 112. Photo of washrooms / changerooms, 2019.

Fig. 113. Photo of splash pad, 2019.

Fig. 114. Photo of park entrance, 2019.

Fig. 115. Programmes

1. Playground
2. Picnic area
3. Covered shelter
4. Changerooms / washrooms
5. Beach
6. Splash pad
7. Marina
8. Seating
9. Walking trails
10. Restaurant

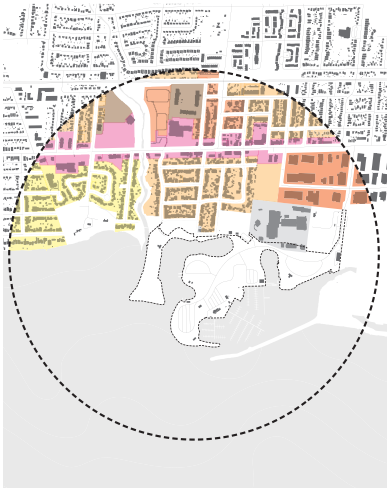


Fig. 116. Urban connectivity

- Residential Low Density I
- Residential Low Density II
- Residential Medium Density
- Residential High Density
- Mixed Use
- Utility
- 1km Radius

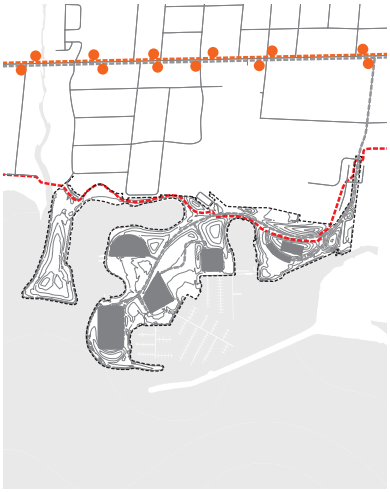


Fig. 117. Transportation

- Bus stops
- Bus route
- Car route
- Waterfront Trail
- Parking

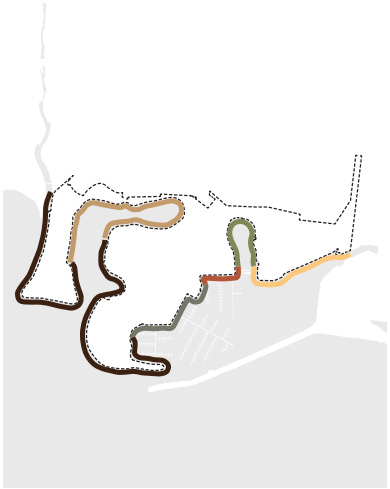


Fig. 118. Shoreline

- Sand beach
- Boulders
- Armourstone
- Sheet Pile
- Natural
- Retaining Wall

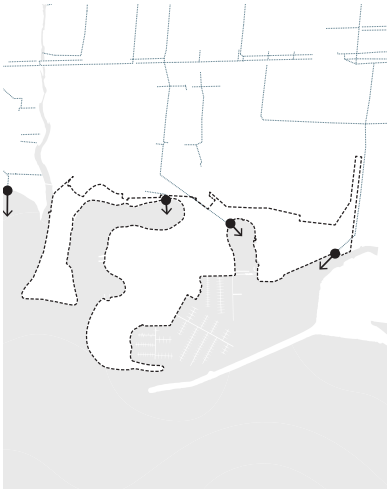


Fig. 119. Water infrastructure

- Underground storm sewer

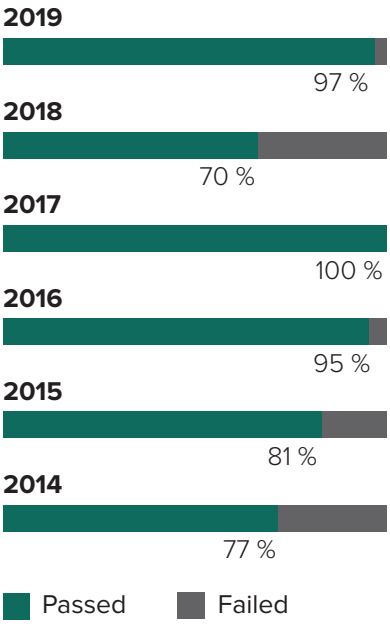


Fig. 120. Historical water quality (data taken from: "Lakefront Promenade Park," *Swimguide*, https://www.theswimguide.org/beach/77.)

A new site for urban lake swimming

Fig. 121. Photo of Port Credit Beach with the original lighthouse beyond. ("Port Credit beach and lighthouse," 1920, Photograph, The City of Toronto Archives, Fonds 1244, Item 9192)

Fig. 122. Aerial photograph of Port Credit Harbour prior to the filling of the marshes and construction of the marina, 1949.
("Port Credit Harbour, Aerial View, 1949", 1949, 63x27 cm, Photograph, MC0669, Courtesy of City of Mississauga, www.mississauga.ca)

Fig. 123. Aerial photograph of Port Credit Harbour after the filling of the marshes and construction of the marina, 1973.
("Port Credit Harbour, Aerial View, 1973", 1973, 63x27 cm, Photograph, MC0670, Courtesy of City of Mississauga, www.mississauga.ca)

Port Credit, a neighbourhood located in the south-central part of the City of Mississauga, is a great example of where a culture of swimming flourished for decades, only to be banned and relocated as a result of pollution and land filling. Port Credit's waterfront has significantly changed during the last few centuries. A European settlement was first established at the mouth of the Credit more than 200 years ago to facilitate trade with the local indigenous community. The Port Credit Harbour Company completed a harbour at the mouth of the Credit River in 1835, which became a successful shipping port. By 1857 the practice of stonehooking, which entailed the use of hooks to gather shale slabs from the lake bottom for building material, was prohibited near the shores of the town because of the significant erosion it caused. Thirty years later, two major industries move in, a brickyard to the west and a starch producer to the east. In 1927, an oil company purchased the brickyard and converted it into an oil refinery.[3] The culture of swimming disappeared in the 1950s after Port Credit filled its last remaining marsh with garbage to create a park. The 15-acre Faulkner Marsh, or "unsightly swamp" as one newspaper article called it, was filled with "garbage, refuse and soil" in order to create "one of South Peel's leading beauty spots".[4] At the same time, the mouth of the Credit River was also landfilled to make a commercial harbour.[5]

By the 1960s, gone were the days where people could head to the local beach for a refeshing dip in the lake or river. A 1961 editorial laments the fact that, "Not so long ago, it was possible to make it to our own lakefront from almost any place in the district, in about 15 minutes."[6] The article goes on to state that, "Nowadays, there is virtually no place like this left...No place where unpolluted water flows beneath tall trees and the public is welcome. So, along with the thousands of nature-seeking Torontonians, we take to the highways and head to conservation areas and watering places further afield."[7] This unfortunate practice paints a picture that every urbanite living in the GTA today would recognize.

The construction of the Port Credit waterfront over time was driven by ambitious, hopeful, imaginative, and political ideas traced on paper. Many of these ideas and plans were proposed but never built. Each plan re-imagined a new waterfront at the mouth of the Credit River. Whether it be an artificial pond adjacent to Lake Ontario, or an artificial bay as seen in figure 127, each proposal shows a different relationship between the city and water. The chosen plans that were brought into being shaped the waterfront into what it is today. The town of Port Credit eventually merged with the City of Mississauga in 1974.

Fig. 124. Map of proposed Lake-Front Park Master Plan (now J.C. Saddington Park) in Port Credit, 1971. (Credit Valley Conservation Authority, *Proposed Master Plan: The Port Credit Lakefront Park, Port Credit, Ontario*, in Master Plan Lakefront Port Credit, 1971, prepared by Crysler & Lanthem. Reproduced by permission from Credit Valley Conservation Authority)

Fig. 125. Map of Port Credit Park (i.e. Lakefront Park or J.C. Saddington Park)
(Credit Valley Conservation Authority, *Port Credit Park, 1976-1979*, in Mississauga Waterfront Development Phase Two (1977). Reproduced by permission from Credit Valley Conservation Authority)

The next and final waterfront park that will be analyzed is the site I have chosen for my proposed design. The current park was developed by a desire to create greater access to the lake in Port Credit for an increasing local population, which led to the decade-long construction of a park near the mouth of the Credit River from 1969 to 1979. I am deliberately choosing a site that does not have any existing beaches to show that an armourstone or concrete retaining wall can bring about new and exciting opportunities for re-engagement with the water. I hope that my project will bring back the swimming culture that thrived in Port Credit 70 years ago.

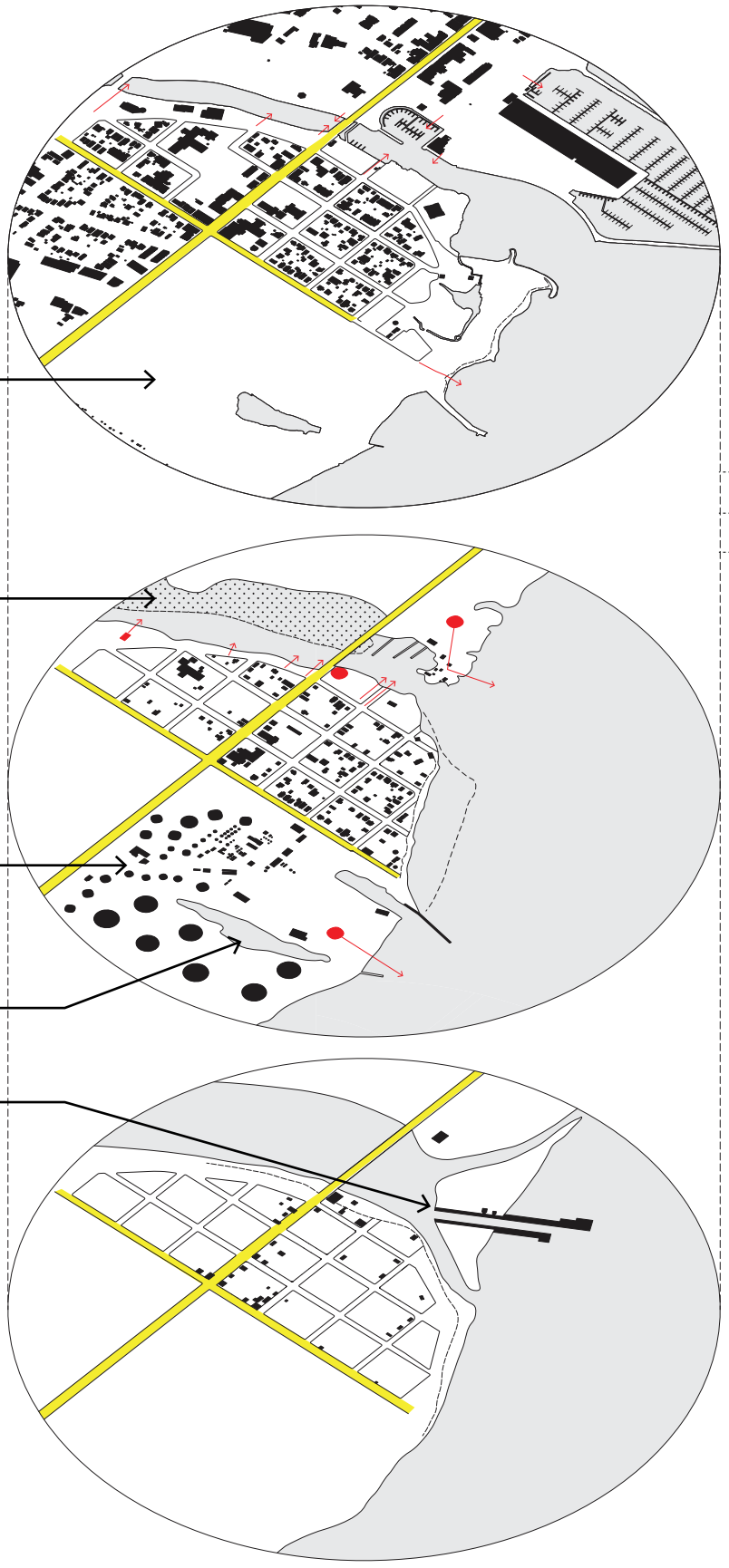
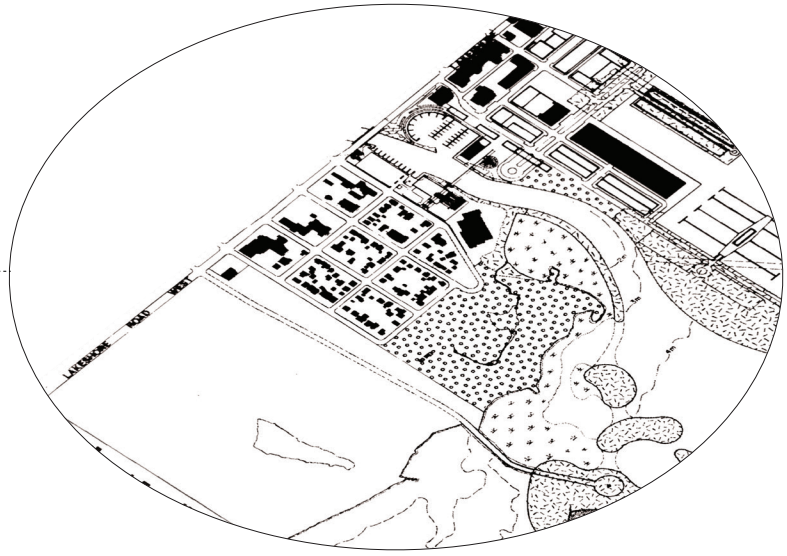
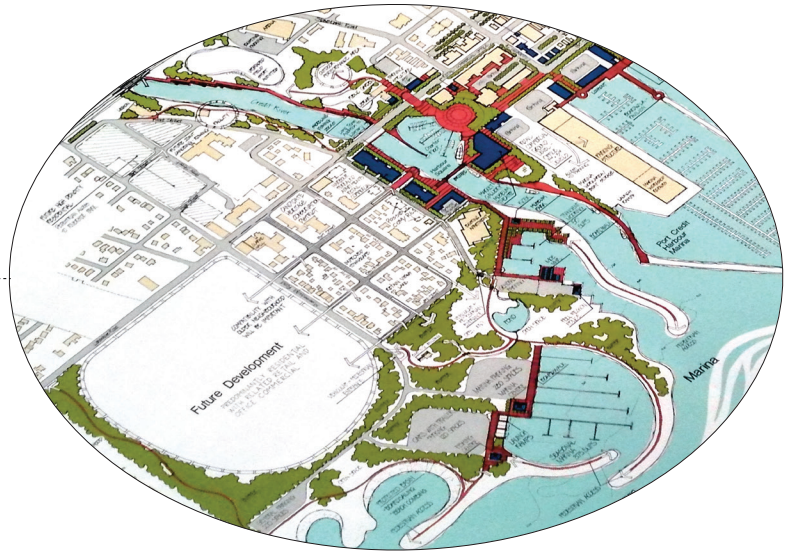


Fig. 126. Layered axonometric of Port Credit's history, from bottom to top: Port Credit in the 1840s, 1950s and 2010s.

1993
City of Mississauga Waterfront Plan, Port Credit Harbour illustration of concepts



1987
Port Credit Harbour Master Plan



1967
Waterfront Plan for the Metropolitan Toronto Planning Area, Port Credit

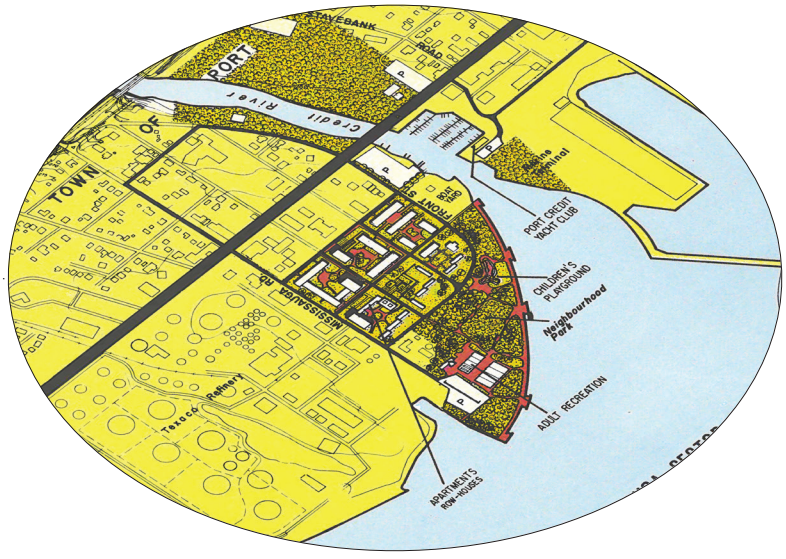


Fig. 127. Layered axonometric of Port Credit's master plans that never came to be.

J.C. Saddington Park

Location: Port Credit

Planning concept: Activity Centre

Character: Manicured

Intensity of use: High

Completed: 1979

Size: 101,000 m^2

Shoreline: 685 m

Owner: CVCA

J.C. Saddington Park is one of the most popular parks along the Mississauga waterfront. The park is one of three waterfront parks that was entirely created using landfill (the other two being Lakefront Promenade Park, and Port Credit Memorial Park East along the Credit River). The park is located at the mouth of the Credit River, and is adjacent to the heritage district of the old Port Credit village.

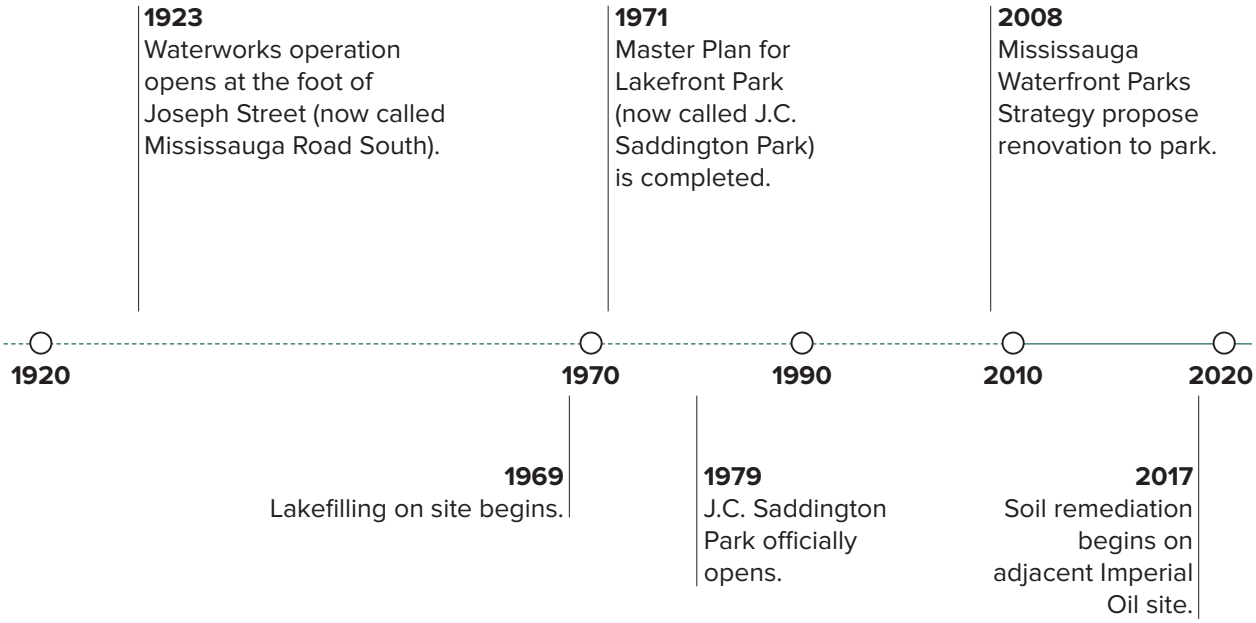


Fig. 128. Historical timeline of the site at J.C. Saddington Park.

Fig. 129. Photo of armourstone shoreline, 2019.

Fig. 130. Photo of water treatment facility, 2018.

Fig. 131. Photo of washrooms, 2018.

Fig. 132. Site plan 1:6,250

Bus route
Bus stops
Go Train route
Go Train stop
Waterfront Trail
Site Boundary
1km Radius

Programmes

1. **Swimming:** none
2. **Winter:** none
3. **Non-swimming:** (1) Playground; (2) Picnic area with barbecues; (3) Washrooms; (4) Walking trails; (5) Seating; (6) Fishing dock

Convenience

1. **Urban connectivity:** (1) Low residential; (2) Medium residential; (3) High residential; (4) Mixed use; (5) Business employment
2. **Transportation:** (1) Bus; (2) Bike; (3) Walk; (4) Car
3. **Accessibility:** not safe

Design

1. **Urban artifact:** (1) The park helps shape the identity and values of the city by providing a typical suburban perspective and experience for users
2. **Entry:** none

15 **Total points**

Fig. 133. Photo of water channel, 2019.

Fig. 134. View of picnic area, 2019.

Fig. 135. View of park square, 2019.

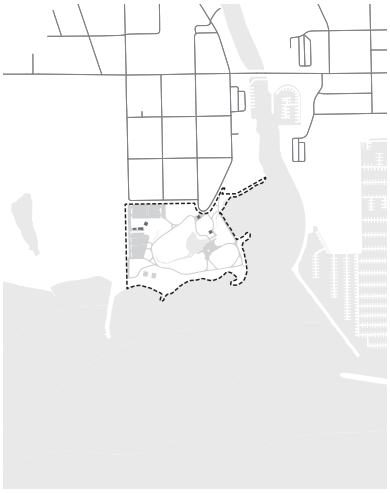


Fig. 136. Programmes

1. Playground
2. Picnic area
3. Changerooms / washrooms
4. Seating
5. Walking trails
6. Fishing dock

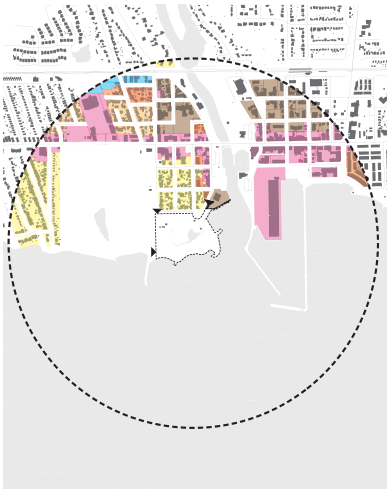


Fig. 137. Urban connectivity

- Residential Low Density I
- Residential Low Density II
- Residential Medium Density
- Residential High Density
- Mixed Use
- Business Employment
- 1km Radius

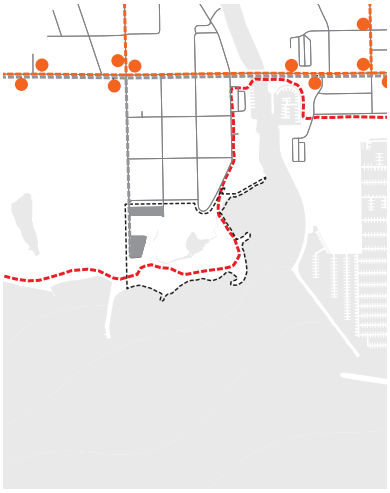


Fig. 138. Transportation

- Bus stops
- Bus route
- Car route
- Waterfront Trail
- Parking

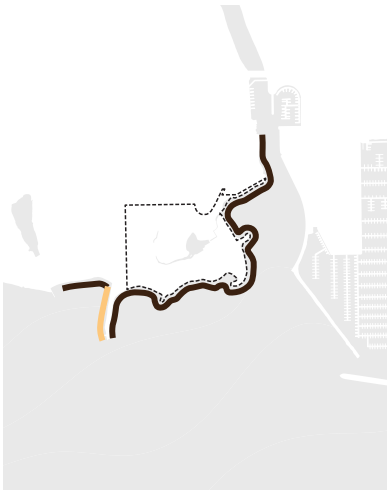


Fig. 139. Shoreline

- Armourstone
- Retaining Wall

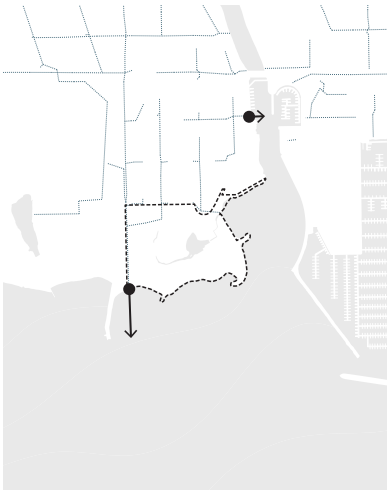


Fig. 140. Water infrastructure

- Underground storm sewer

Fig. 141. Most popular weekend activities.
(Data collected by author over a 7 month period)

Existing use

As seen in figure 145, J.C. Saddington Park is covered by expansive manicured lawns dotted with groups of trees and manmade hills. The site is bordered by Lake Ontario to the east, the Credit River to the north, and an asphalt-lined pond in the centre. The Great Lakes Waterfront Trail runs through the site, bringing with it many cyclists, runners, and walkers. The park is a popular destination for picnics, fishing, and special events. There is also a playground near the pond, making it a place for families to bring their children. Dog-walkers are often seen along the paths and in the fields as well. The park is easily accessible by car and there are two large parking lots available at the Mississauga Road South entrance.

Existing swimming opportunities

Fig. 142. Photo of the boardwalk and breakwall along Hacienda Bay, 2019.

Fig. 143. Photo of artificial pond in the middle of the park, 2019.

Fig. 144. Photo of the abandoned industrial jetty and protected lake area, 2019.

River swimming

Thanks to a breakwall that was originally built for a boat marina that was never completed, Hacienda Bay at the mouth of the Credit River is a great location for the reintroduction of river swimming. The breakwall provides a safe swimming area since it protects the Bay from the erosional and sometimes dangerous forces of Lake Ontario. The sandy beach at the foot of the breakwall allows for easy and safe access to the water. Lastly, since the protected bay is part of the Credit River, the water is typically much warmer than Lake Ontario water.

Pool swimming

Although the artificial pond that was built as part of the original master plan was purposely designed to be too shallow to allow for swimming, it does provide an excellent setting for a naturally filtered pool.

Lake swimming

The historical industrial jetty that was built in the early twentieth century has withstood the closing of the brick yard and of the oil refinery, and the lake's fierce winter storms. The jetty previously provided safe docking for ships, however it now stands unused. The protection from waves it provided for ships, can now be used for people as they swim in Lake Ontario. The dredging that occurred along the jetty has left a scar that can still be seen today. However, this portion of dredged lake bottom can also allow for safe diving platforms that require deeper waters. Furthermore, the jetty also prevents the majority of Credit River water from entering the protected area, thus leaving the water clear and blue-green.

Fig. 145. Map of existing park and surroundings. (adapted from Google Earth)

Port Credit's landscape has been shaped by centuries of industrial, commercial, and political activity. Although many of these enterprises no longer exist, their impacts on the land, river, and lake can still be felt today. Landfilling to create the Port Memorial Park East completely destroyed the mouth of the Credit River's last natural marsh, the Faulkner Marsh. Stonehooking of the town's nearshore in Lake Ontario removed important natural erosion protection and fish habitats. All traces of a once popular swimming culture in Port Credit has disappeared from the urban landscape, and now reside only in newspaper archives and the memories of older generations. Although there are sites that currently exist along the Mississauga waterfront that do provide lake swimming, they reflect the values and attitudes of a by-gone era; one that saw Lake Ontario and the Credit River as dispensable swimming landscapes that can be easily replaced by chlorinated pools and artificial lakes, and where landfilling with garbage was not seen as a problem but a solution. J.C. Saddington Park, located where Stonehooking and swimming occurred in a previous life, is a twentieth century landscape ready for a twenty-first century makeover. You can motorboat, dragon boat, canoe, kayak, and paddle board, and it is my intention that swimming will once again become a popular activity along the Port Credit waterfront.

Notes

[1]The Corporation of the City of Mississauga, By-law no. 186-05, "Swimming, Bathing," item 25, 10.

[2]Editorial, *The Weekly*, October 29, 1959, 4.

[3]Credit Valley Conservation, "Appendix A: Historical Shoreline Land Use Within the Credit River Watershed (1749-present)," in *Lake Ontario Integrated Shoreline Strategy: Background Review and Data Gap Analysis*, Appendix I, Conservation Lands Final Report prepared by Jesse deJager for the Credit Valley Conservation, September 12, 2011, 16-23, https://cvc.ca/wp-content/uploads/2012/03/LOISS-Background-Report-APP-I-Conservation-Lands.pdf

[4]"Township, Village Agree on Marsh Reclamation By Santitary Landfill System," *The Port Credit Weekly*, November 12, 1953, 1

[5]"To Test Water, May Close Beach," *The Port Credit Weekly*, June 23, 1949, 1; "Water Tests Reveal Credit River Polluted, Report Beaches Safe," *The Port Credit Weekly*, July 19, 1951, 1; "Parks Committee Oppose Closing of Erindale Park Bathers Ignore Pollution," The Port Credit Weekly, June 27, 1957, 1.

[6]Editorial, "How Long Must We Wait?," *The Weekly*, July 27,1961, 4.

[7]Editorial, "How Long Must We Wait?," *The Weekly*

Chapter 6

Design

Fig. 146. Stylized photo of Lake Ontario at J.C. Saddington Park.

The current attitudes and beliefs held by individuals regarding swimming in Lake Ontario gradually developed over centuries. These specific cultural notions of water originated in the seventeenth century and were a reactionary response to poor health and hygiene, specifically, bodily smells such as excrements, sweat, and decomposition, experienced in congested urban areas. Author Ivan Illich explains in his book *H_20 and the Waters of Forgetfulness* that as a result of gradual changes in social attitudes toward the dead and bodily wastes, odour became an important issue in cities. In the beginning, the removal of unwanted smells was accomplished using various strategies that attempted to cover up the smell with a socially acceptable scent (i.e. perfumes) or reconfigure the spatial organization of the city to remove them (i.e. the dead were excluded from the city and the slums were cleared). As Illich points out, as the use of water for the toilet was adopted by an increasing number of households, the construction of sewers became vital to maintain an odourless city.[1] Thus, water was used to both clean the body and clean the city, and as a cleansing agent, citizens eventually expected water to be odourless and colourless.

In addition to a growing sensitivity to unwanted odours, the connection between contaminated water and illness, made in the mid nineteenth century in England, led to the proliferation of the practice of treating and filtering water as a means to prevent the spread of deadly diseases such as Cholera. This eventually became a necessary and permanent step in the processing of water that physically and psychologically distanced humans from the natural source, and led to the contemporary social categorization of "good" and "bad" water. As author and professor of Urban, Regional and Environmental Planning at the University of Amsterdam Maria Kaika explains in her book *City of Flows: Modernity, Nature, and the City*, "good" water is "clean, processed, controlled and commodified" and is associated with activities that include swimming and bathing. On the other hand, "bad" water is considered "dirty, grey, metabolized, non-processed, and non-commodified," and represents among other things, urban lakes and rivers.[2] By associating clean water with good health and hygiene, and dirty water with poor health and hygiene, people developed a trust and confidence in treated water as safe for drinking and swimming, and an aversion to untreated and unfiltered water; believed to be (and perhaps sometimes proven to be) unsafe.

Water quality is largely still seen as "good" or "bad", and clean or polluted, when in reality water quality is nuanced and assessed by analyzing different characteristics. These various qualities of water can be measured, but unfortunately for everyday swimmers, it is hard to understand as it is filled with scientific jargon.

While processing all the scientific papers on Lake Ontario water quality, I had a hard time visualizing what the water looked like when it was below or above acceptable levels of pH, E. Coli, dissolved oxygen etc (i.e. polluted or clean). Overreliance on data as a means to determine the swimmability of the water poses two problems: scientific testing has yet to convince many in the GTA that the large body of water at the foot of our city is clean enough to swim, and secondly, what happens if scientific testing is not performed along your segment of the shoreline?

More importantly, people mainly base their decision to swim in natural water on what we see: the colour and clarity of the water. In 1992, a paper entitled "Perception of water clarity and colour in terms of suitability for recreational use" published in the *Journal of Environmental Management* showed that people were more inclined to swim if the water colour was blue to blue-green and less inclined if the water was yellow to yellow-red.[3]

Colour plays a central role in educating people about water quality and water perception. For the past hundred years, we've been conditioned to colour-code blue with swimmable and anything else deemed less suitable for swimming. This learned behaviour keeps the majority of urban swimmers in the ecologically dead blue-coloured water of pools instead of the living natural blue-green to green-coloured water of Lake Ontario.

Although water coloration can be affected by pollution, it also occurs naturally. In order to create a cohesive understanding between the data and the visual in regards to water quality, I developed a project that combined photodocumentation with easy to perform data collection, no scientific training required (refer to Appendices for project data). I took measurements and photographs of the water on a weekly basis, with the end goal of reconciling visual perception with scientific data and finally answering the following question: What does swimmable, and non-swimmable Lake Ontario water look like?

The answer is not blue. Using the Forel-Ule scale, which is a method that allows you to approximately determine the water colour of natural waters, I was able to determine Lake Ontario water colour to be between green and slightly blue-green, depending on the season. The Credit River is consistently brown to yellow-brown. And the artificial pond is always brown. These are the natural water colours found at J.C. Saddington Park in Port Credit. And although they aren't blue like the Blue Grotto in Capri, they can be just as swimmable.

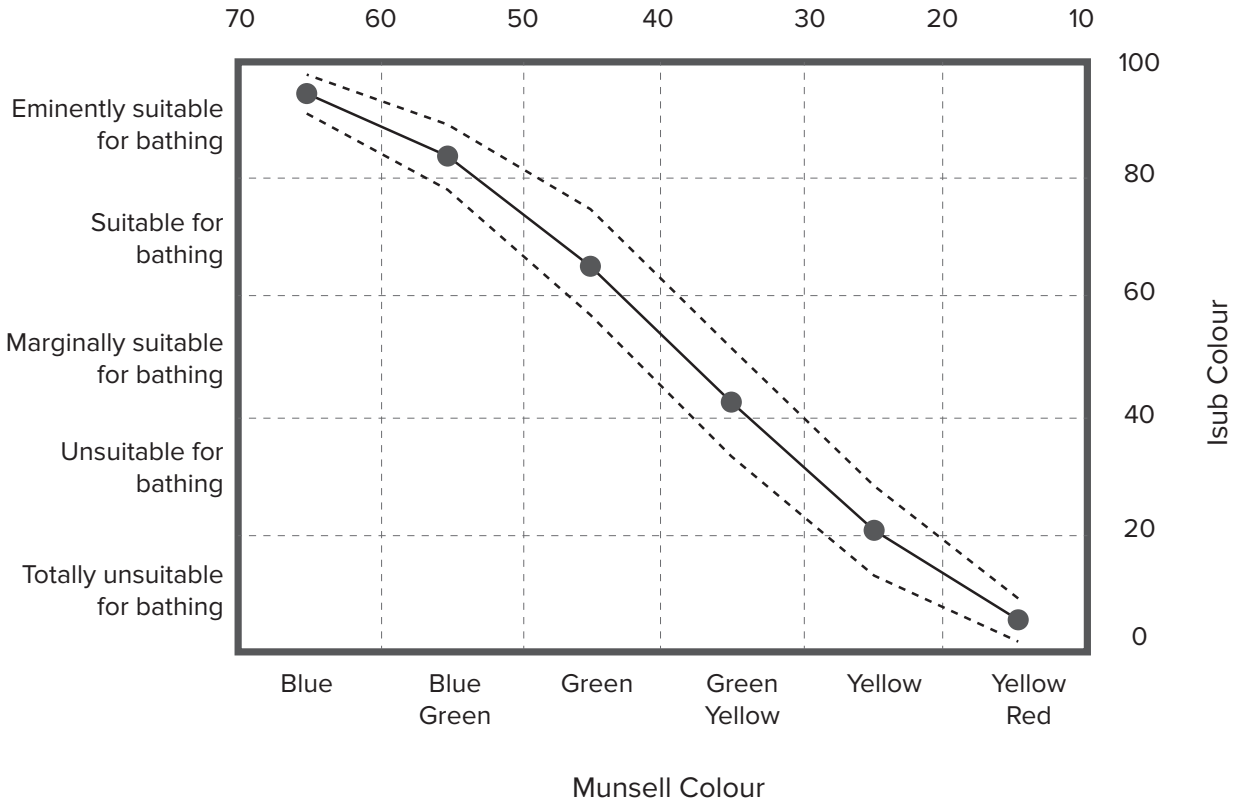


Fig. 147. *Above*, final colour response curve for aesthetic use of water.
(Reprinted from Journal of Environmental Management 36, David G. Smith and Robert J. Davies-Colley, Perception of Water Clarity and Colour in Terms of Suitability for Recreational Use, 233, 1992, with permission from Elsevier.)

Fig. 148. *Next page*, The Forel-Ule scale. FU1 to FU7 represent the ocean and coastal waters, FU8 to FU14 represent the coastal waters and lakes, and finally FU15 to FU21 represent lakes and rivers.
(data taken from: Irene Kopelman, *Indexing Water: Notes on Representation*, vol. 9, (n.p.: Roma Publications, 2018)


FU1


FU8


FU15


FU2


FU9


FU16


FU3


FU10


FU17


FU4


FU11


FU18


FU5


FU12


FU19


FU6


FU13


FU20


FU7


FU14


FU21

Fig. 149. Photo of typical swimmable Credit River water, 2019. But based on fig. 147, the Credit River's natural water colour would be perceived to be "Totally unsuitable for bathing."

FU18

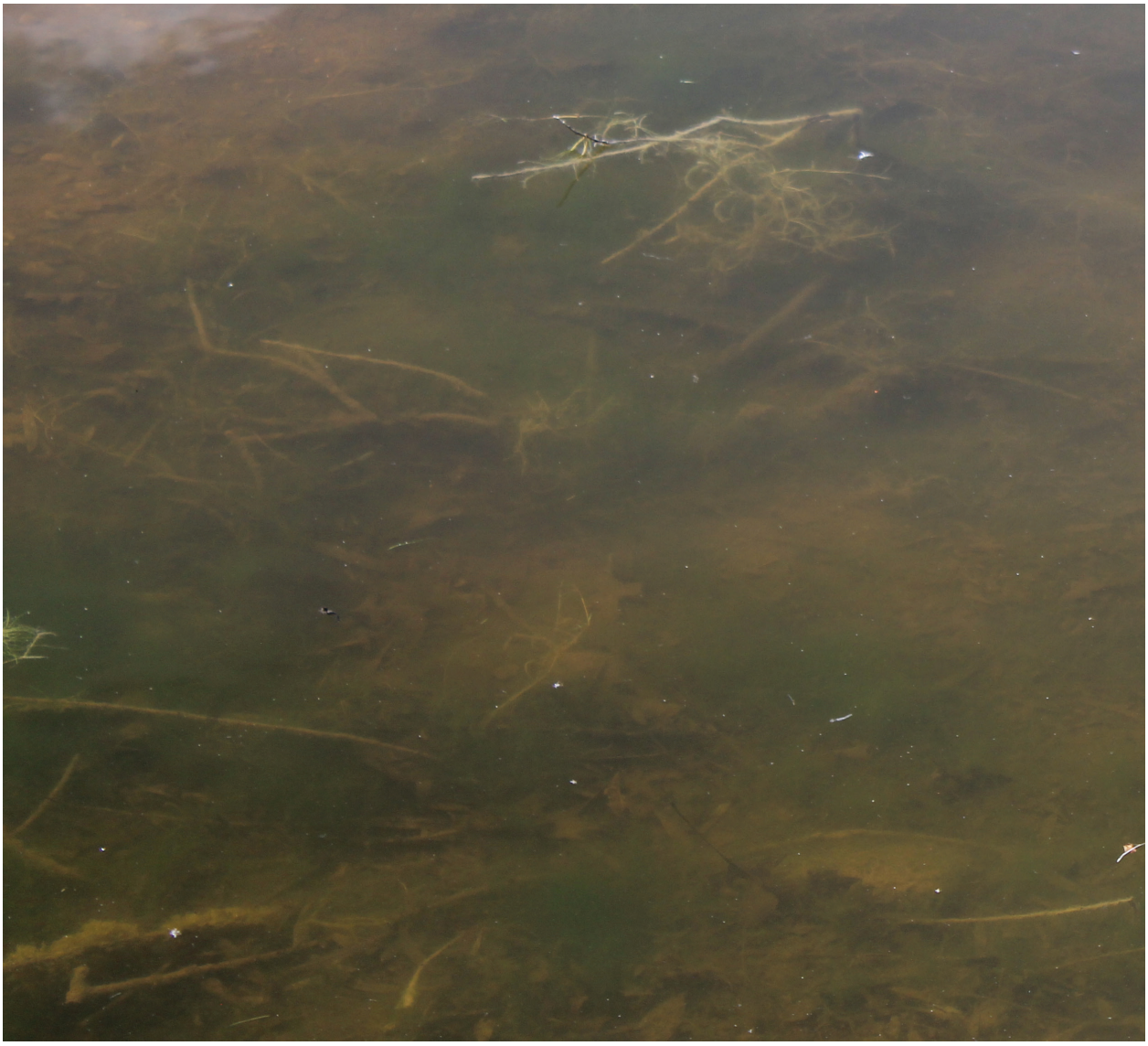


Fig. 150. Photo of typical nonswimmable (due to high pH and dissolved oxygen) Artificial Pond water, 2019. Based on fig. 147, the Artificial Pond's natural water colour would be perceived to be "Totally unsuitable for bathing."

FU20

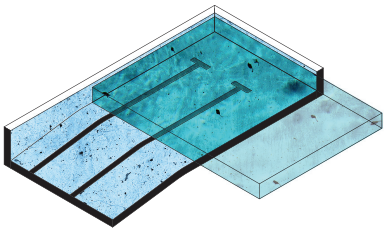
Fig. 151. Photo of typical swimmable Lake Ontario water at the Imperial Oil jetty, 2019. Based on fig. 147, Lake Ontario's natural water colour would be perceived to be "Suitable for bathing."

FU9

Educate, engage, and remediate

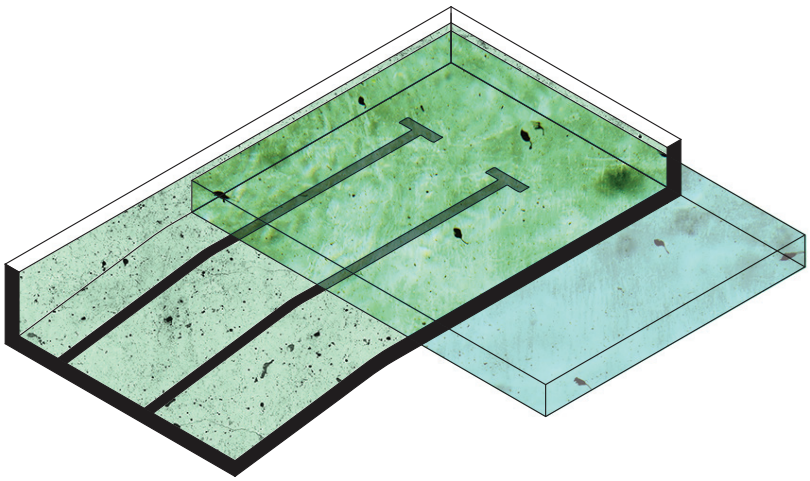
Educate

This is a thesis about the urban lake swimming, not urban pool swimming. But, in order to overcome fear and hesitation of swimming in non-blue coloured waters, a controlled environment is necessary. A pool can provide a safe, supervised, and consistently clean environment that allows swimmers to slowly adapt to new conditions. Specific colours will be used to teach users about water perception and the range of naturally occurring and safe for swimming surface water colours found in Lake Ontario and the Credit River. The designed pool will be a naturally-filtered pool that uses plants to clean the water. These types of pools create a water that is slightly green due to naturally dissolved matter from the plants. To emphasize this change in water colour, different dyes will also be selected for the wall finish of each pool, which will manipulate how people perceive water colour without affecting the quality of the water. The goal is that, overtime, users will slowly overcome their learned preference of blue waters. The naturally-filtered pool will attempt to serve as a transition between a chlorinated-pool and Lake Ontario.

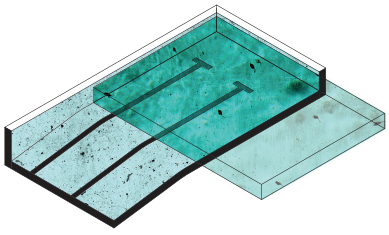


Blue

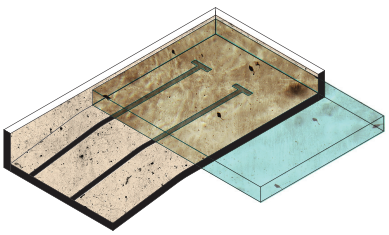
Fig. 152. Current perceived visual water colour standard for swimming.



Green

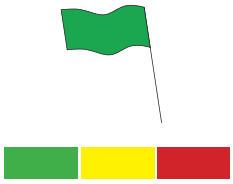


Blue - Green



Brown

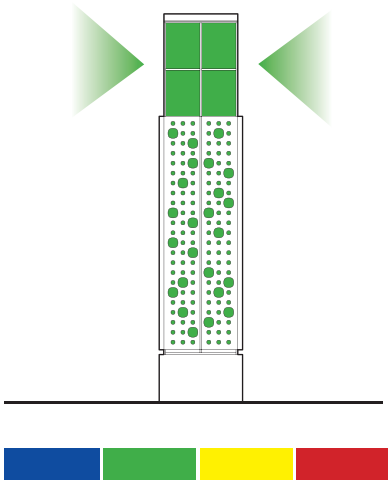
Fig. 153. Proposed perceived visual water colour standard for swimming.



Flag

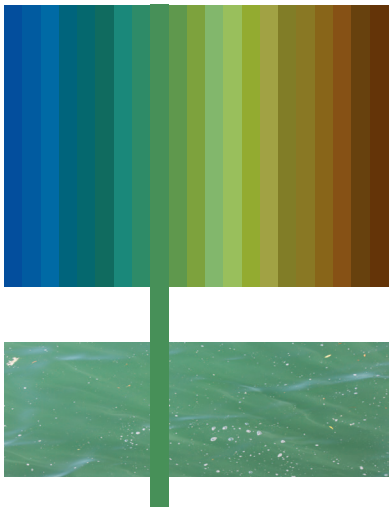
Fig. 154. Current visual quality indication for swimming.

In addition, I want to give people the opportunity to objectively measure the colour of Lake Ontario and the Credit River. I am proposing two strategies. First, a weather beacon (see figure 155) that emits a coloured-light that reflects Lake Ontario's water quality in real-time, thus notifying people if the water is safe to swim in. And second, adapting the principles of the litmus test to allow people to compare the current water colour to the Forel-Ule scale of natural surface waters dyed in the walls (see figure 156). If it matches within the normal range, it's most likely safe to swim in. This enables swimmers to personally measure the colour of the water and help counteract any pre-existing learned beliefs and attitudes.



Water Quality Beacon

Fig. 155. Conceptual digram of proposed water quality beacon.



Litmus test

Fig. 156. Conceptual diagram of proposed litmus test.

Walk in

Fig. 157. Current method of engaging with the water.

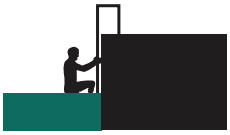
Engage

The vast majority of the Mississauga shoreline has been hardened with concrete debris, clay pipe debris, armourstone, boulders, sheet piles etc. Therefore, nice, sandy beaches are the minority, and they are costly to maintain. Why not leverage the existing hardened shoreline into a new swimming culture that steps away from the beach and onto the armourstone. I propose a variety of safe and fun ways for people to enter the water.

Dive in

Step in

Jump in



Climb in

Lower in

Swing in

Walk in

Fig. 158. Conceptual diagram of proposed methods of engaging with the water.

Engage

In order to repopularize urban lake swimming in Mississauga, certain areas of the waterfront will need to address water pollution. To filter polluted water, floating wetland islands will be implemented throughout the site. In addition, a natural pool will be installed instead of a typical chlorinated one. This ecologically-friendly technology uses wetlands to filter the water.

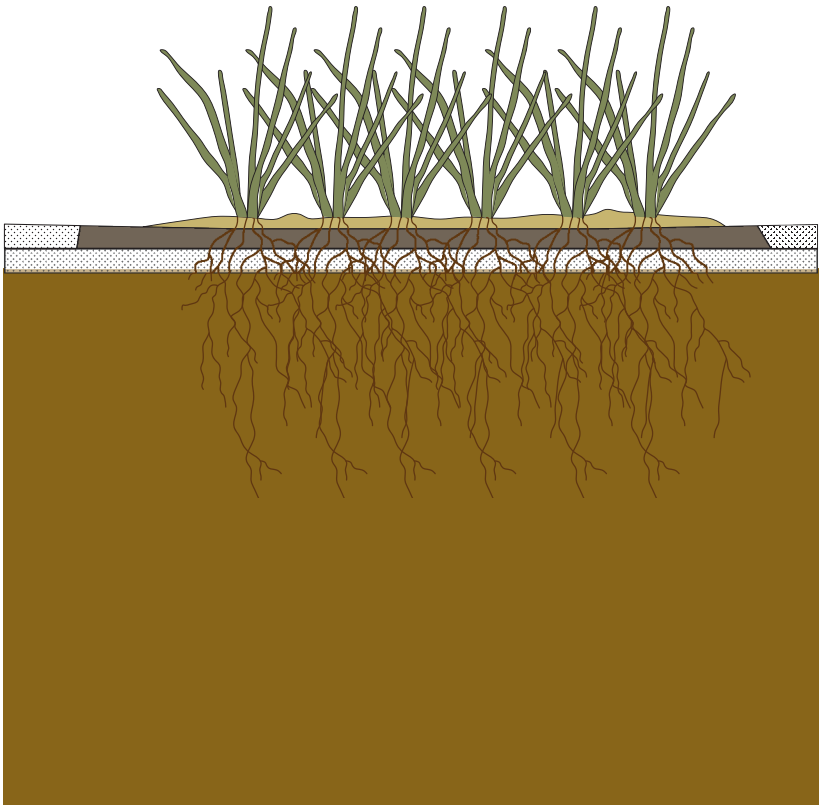


Fig. 159. Using a floating wetland island to remediate the water.

Site strategy

The locations selected for river swimming, pool swimming, and lake swimming are spread out over a sprawling and complex site. I devised a system of components that specifically targeted the river at Hacienda Bay, the lake at the abandoned Imperial Oil pier, and the artificial pond, as well as locations of less significance, while creating a unified design language throughout the site. These components were inspired by innovative design projects such as Parc de la Villette in Paris and Downsview Park in Toronto. Designers were tasked to design an "Urban Park for the Twenty-first Century," and introduce an overarching structure that would unify new diverse programmes sprawled over expansive sites.[4] Parc de la Villette, designed by Bernard Tschumi and completed in 1998, was organized by the superimposition of a grid and folly system.[5] Downsview Park, designed by Bruce Mao Design and OMA, used a structure of circular landscape clusters strategically placed throughout the site to create distinct public spaces within a vast area.[6] By combining both of these site strategies, clusters of swimming and other water-related programmes are created that capitalize on and enhance J.C. Saddington Park and the surrounding area's features. Grid, folly, threshold, and water combine and multiply to form the intial framework throughout the site, as seen in figure 160 below.

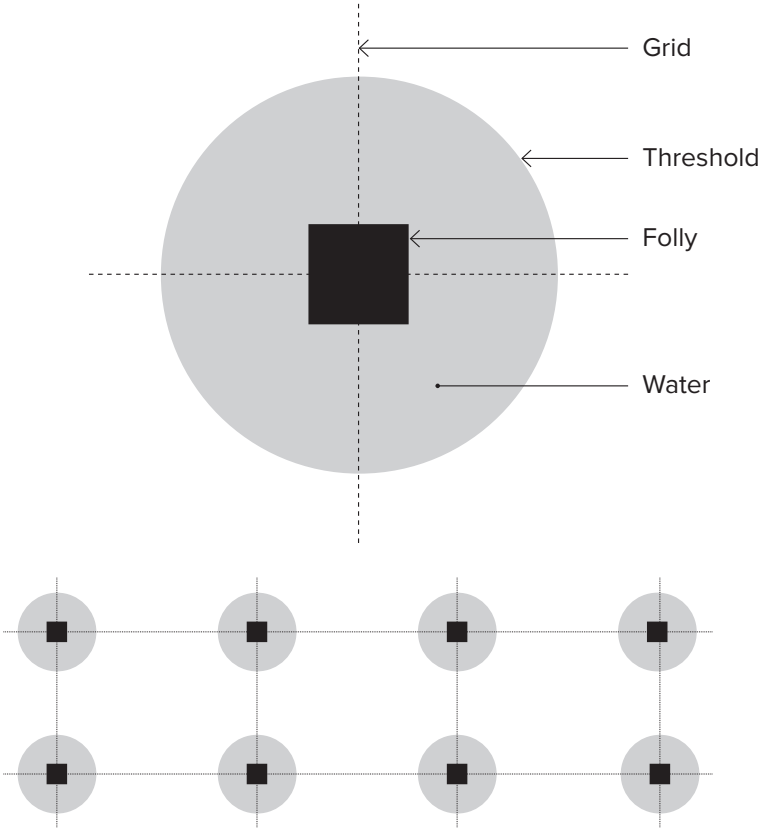


Fig. 160. Diagram of site strategy components.

Folly

Follies are architectural objects that help us understand where we are in the landscape, and the practice isn't foreign to Port Credit. The Port Credit Lighthouse, built in 1991, is a non-functioning replica of the original that burnt down in the 1930s. This Lighthouse, however, helps us to understand the history of the site, and helps to define Port Credit as a whole. Therefore, the introduction of new follies around the site is a continuation of an already well established practice. Furthermore, each folly is similar in material and form, but they are designed specifically to their unique location. New follies include, a weather beacon, diving platform, amphitheatre, swing tower, fire chimney, lifeguard tower, and drinking fountain (see figure 161).

Threshold

Threshold forms an important design component of this project because the project attempts to redefine the relationship between the city and the lake. The city is organized around static, fixed thresholds such as fences, curbs, walls, surfaces, hedges etc. The lake, on the other hand, has a threshold that is much more dynamic; its edges are constantly changing. Flooding is a prime example of the boundless properties of water. This project therefore attempts to reconcile these two opposing characteristics, dynamic and static, by creating a physical and visual threshold at each site through the use of walls, paths, docks, and floating wetlands.

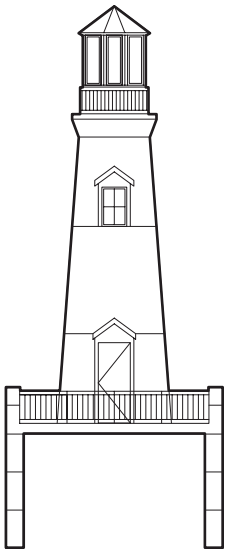
Water

Water is the defining element that influences threshold and folly. Although water already exists on the site in the form of a lake, river, and pond, the site strategy will also address stormwater and introduce poolwater and potablewater.

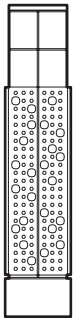
Grid

Follies and boundaries are organized around the site by way of a grid, which was initially used to breakdown a very large and complex site. The grid eventually disappears as the design takes shape.

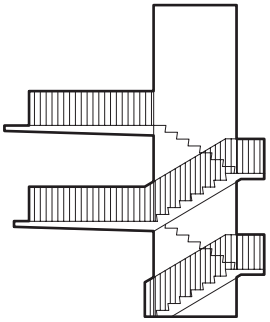
Fig. 161. *Next page*, Existing and proposed site follies.



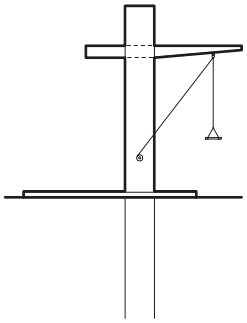
Existing Lighthouse



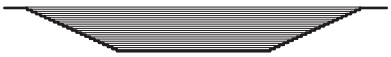
Water Quality Beacon



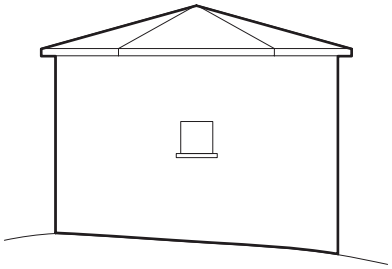
Diving Tower



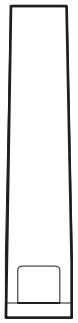
Swinging Tower



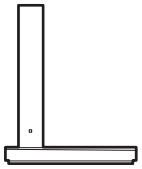
Amphitheatre



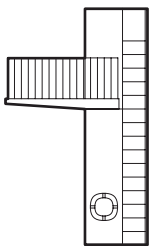
Existing Water Tower



Fire Chimney

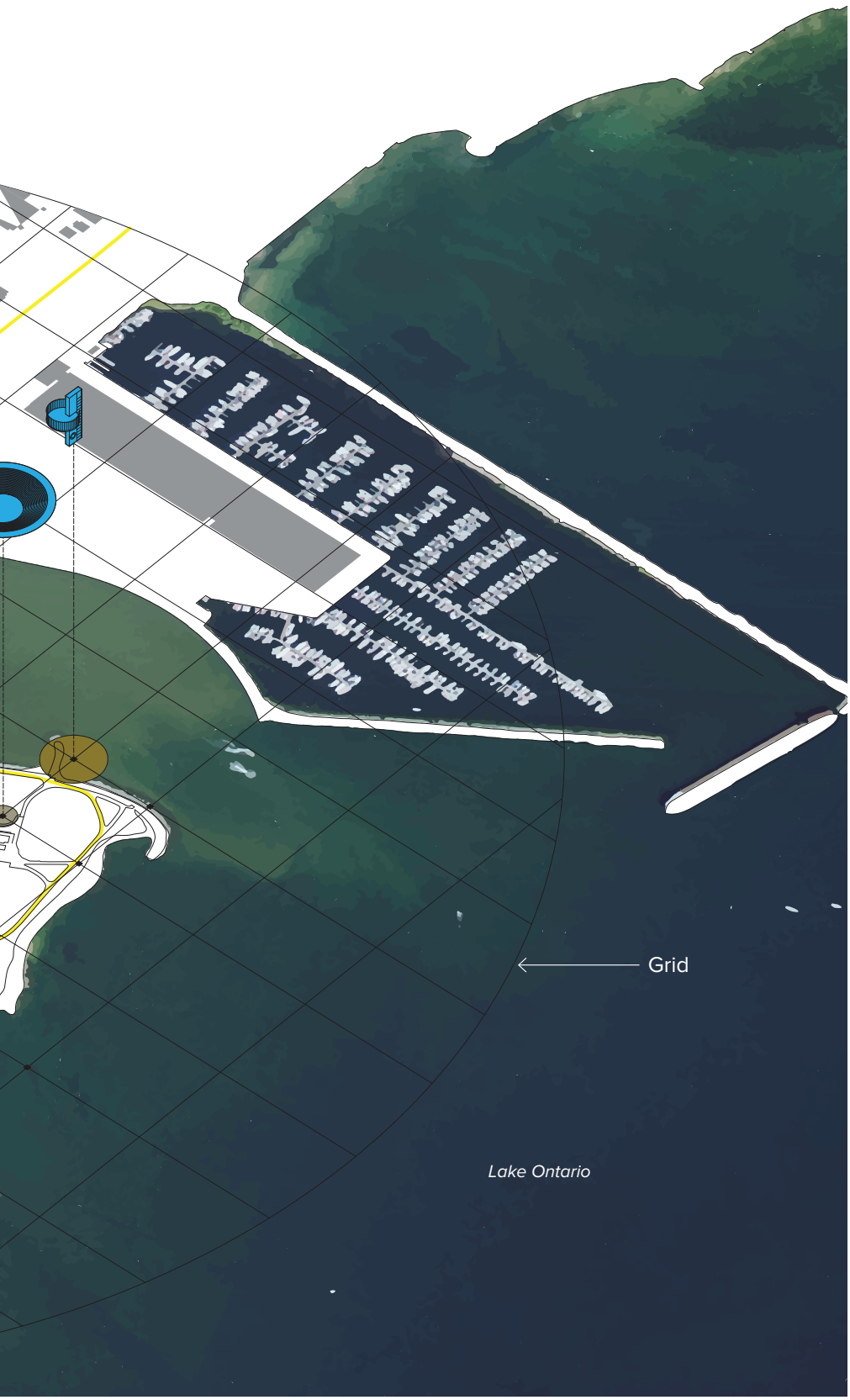


Drinking Fountain



Lifeguard Tower


Credit River
Mississauga rd south
Lakeshore rd west
Waterfront
trail



- Existing follies
- Proposed follies
- Lakewater
- Riverwater
- Pondwater
- Stormwater
- Poolwater
- Potablewater

Fig. 162. Exploded axonometric of master plan.

Fig. 163. Site plan

01. Riverwater swimming site

Educate

Litmus test

Engage

Dive in

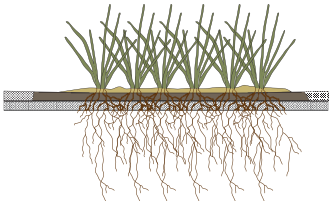
Jump in

Climb in

Lower in

Walk in

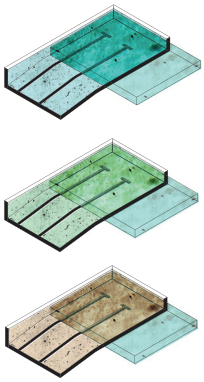
Clean



Floating wetland

02. Poolwater swimming site

Educate



Pools

Engage

Dive in

Jump in

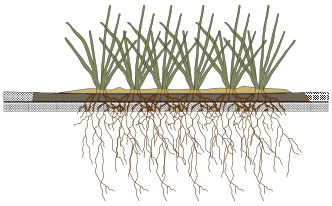
Climb in

Lower in

Walk in

Step in

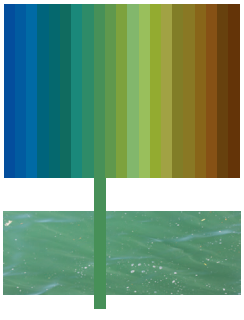
Clean



Floating wetland

03. Lakewater swimming site

Educate



Litmus test

Engage

Dive in

Jump in

Climb in

Lower in

Walk in

Step in

Swing in

Clean

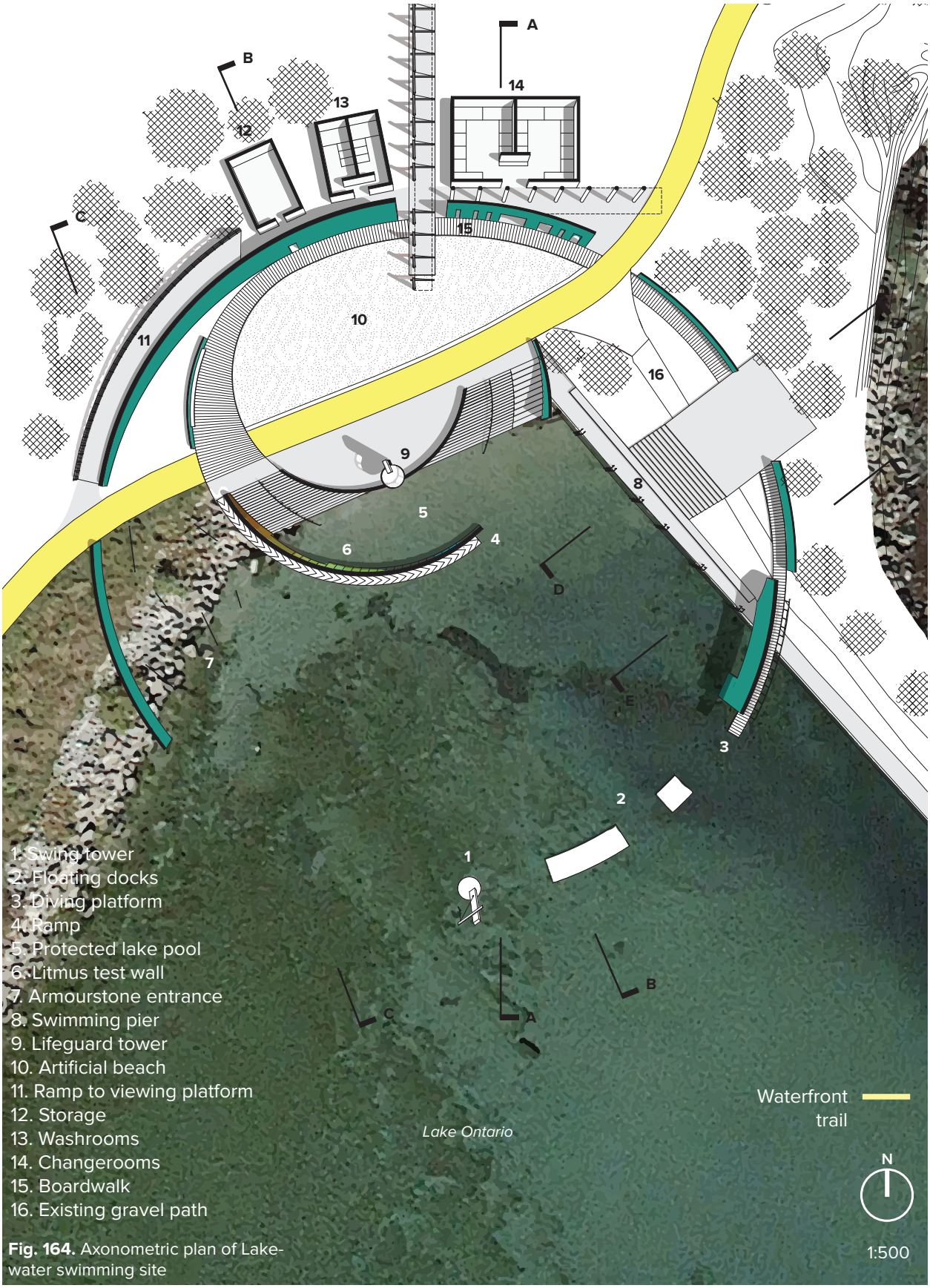


Fig. 164. Axonometric plan of Lake-water swimming site

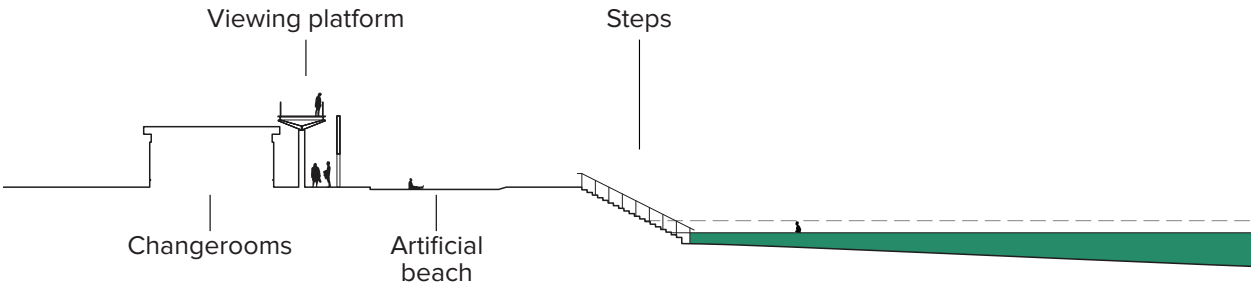


Fig. 165. Section A - Lakewater entrance by steps.

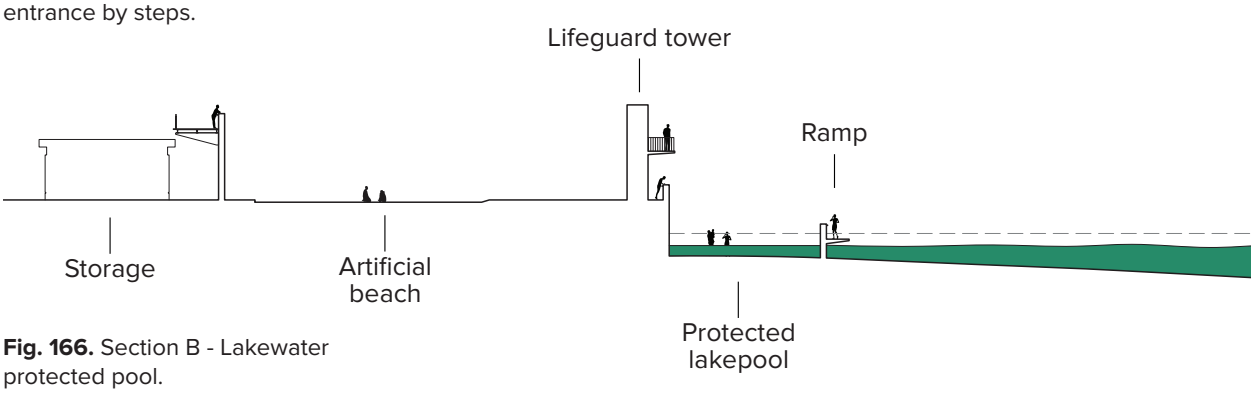


Fig. 166. Section B - Lakewater protected pool.

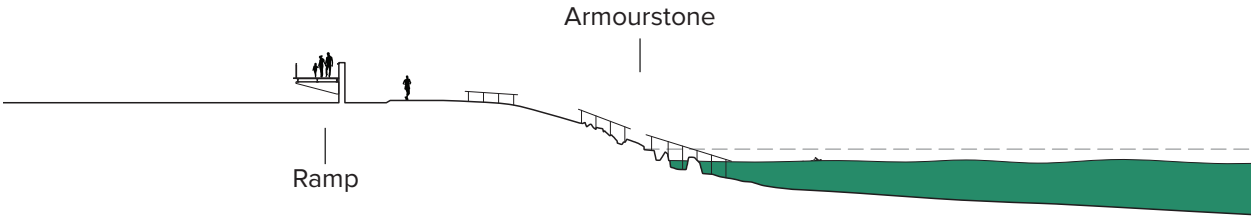


Fig. 167. Section C - Lakewater access by existing armoustone.

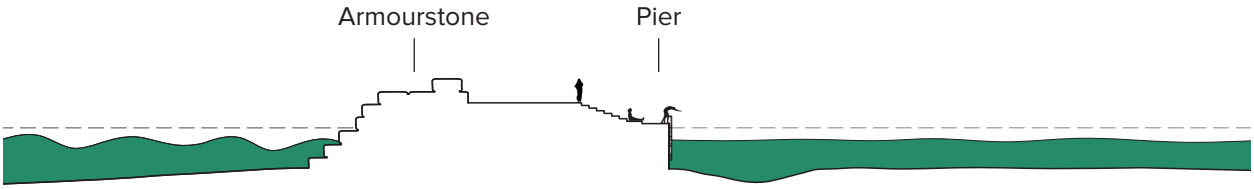


Fig. 168. Section D - Lakewater access by existing existing pier.

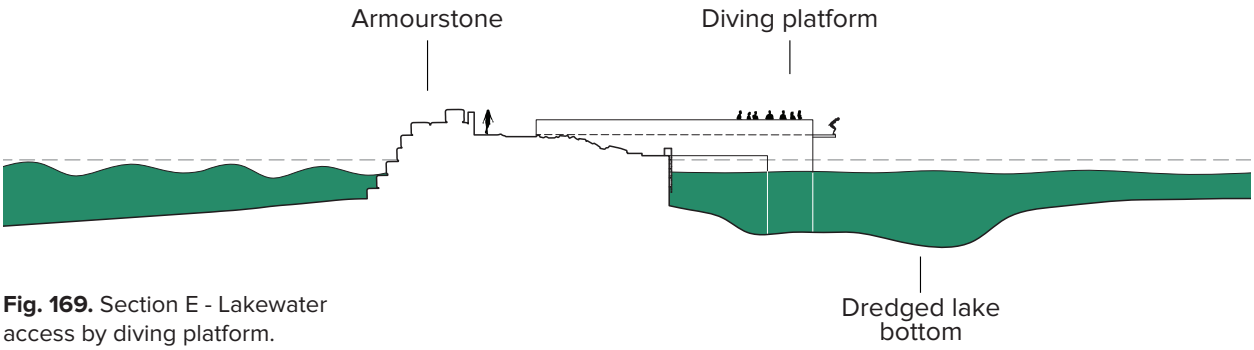


Fig. 169. Section E - Lakewater access by diving platform.

Fig. 170. Render of swimmer having fun at the swimming tower, with Mississauga's industrial waterfront as backdrop.

Fig. 171. Render of lakewater site entrance from parking lot.

Fig. 172. Render of person travelling along the waterfront trail to go for a swim at the lakewater site.

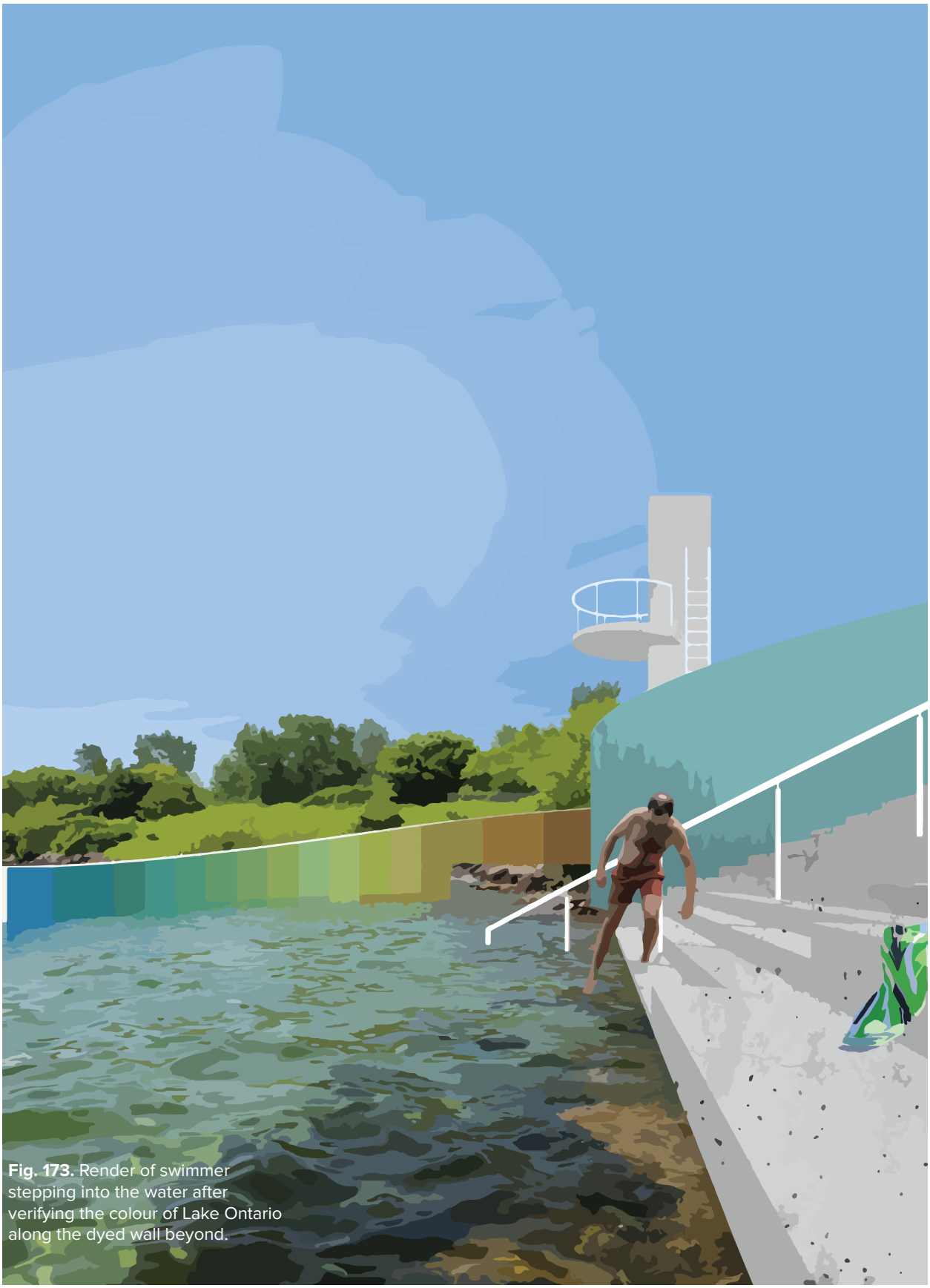


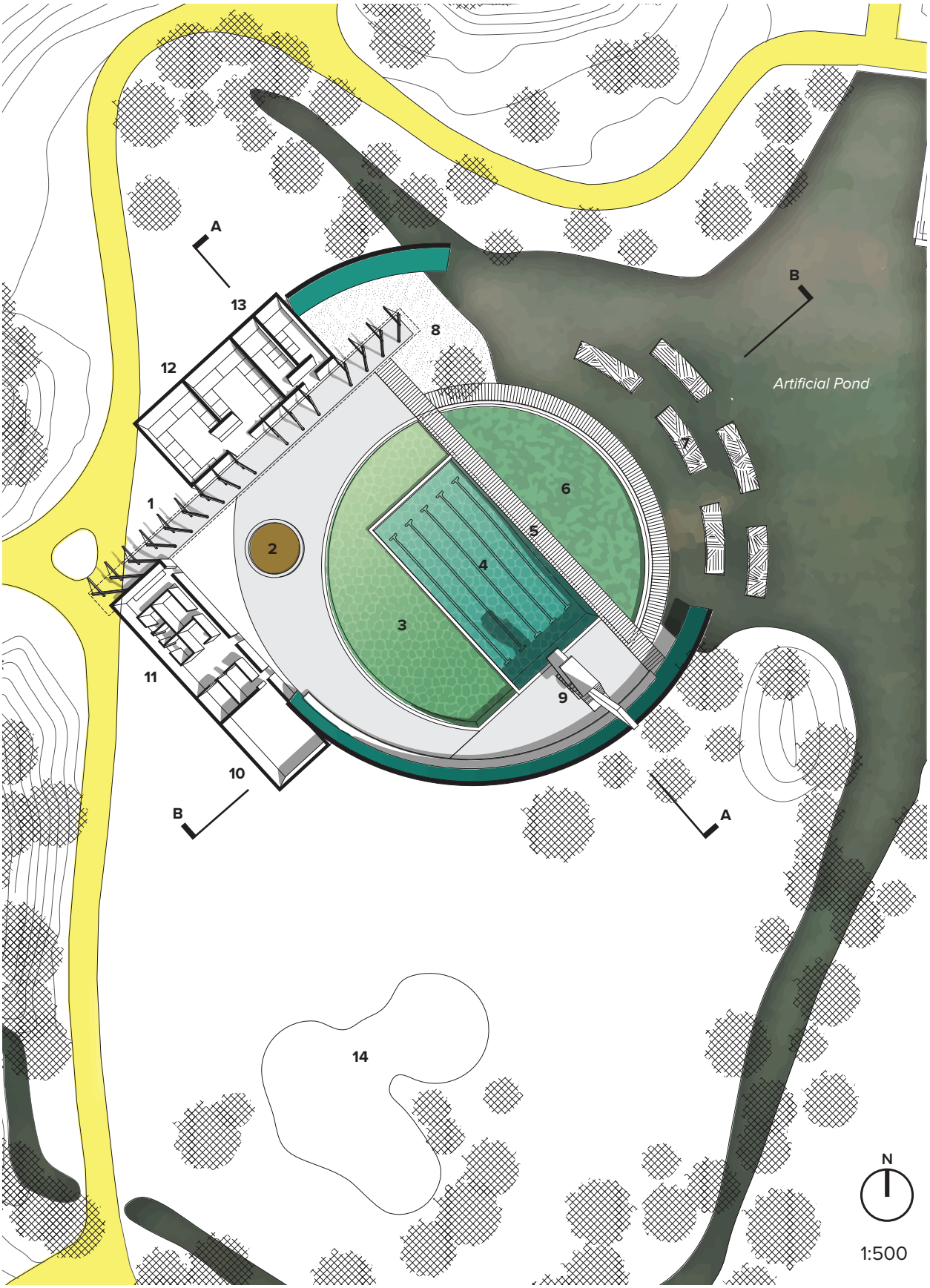
Fig. 173. Render of swimmer stepping into the water after verifying the colour of Lake Ontario along the dyed wall beyond.

Fig. 174. Render of seasoned swimmer jumping off the repurposed industrial pier to complete their daily swim in Lake Ontario.

Fig. 175. Render of the lakewater site during a calm summer night. The diving platform is in the foreground and viewing platform in the background.

Fig. 176. Render of student sunbathing along the armourstone shoreline.

Fig. 177. Render of people playing and relaxing on the artificial beach.


A
B
13
8
12
1
2
6
5
4
3
11
9
10
B
A
Artificial Pond
14
N
1:500

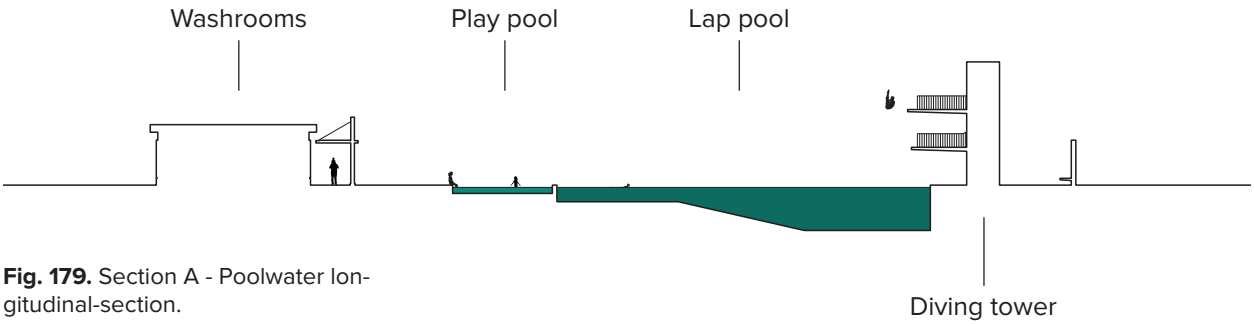


Fig. 179. Section A - Poolwater longitudinal-section.

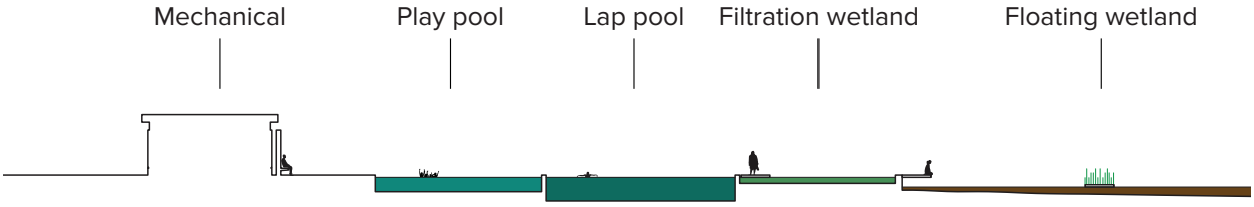


Fig. 180. Section B - Poolwater cross-section.

1. Entrance
2. Children's pool
3. Play pool
4. Lap pool
5. Boardwalk
6. Filtration wetland
7. Floating wetlands
8. Artificial beach
9. Diving tower
10. Mechanical
11. Administration
12. Changerooms
13. Washrooms
14. Existing children's playground

Waterfront trail

Fig. 178. *Previous page*, plan of poolwater swimming site

Fig. 181. Render of swimmer going for an early morning dip before heading to work.

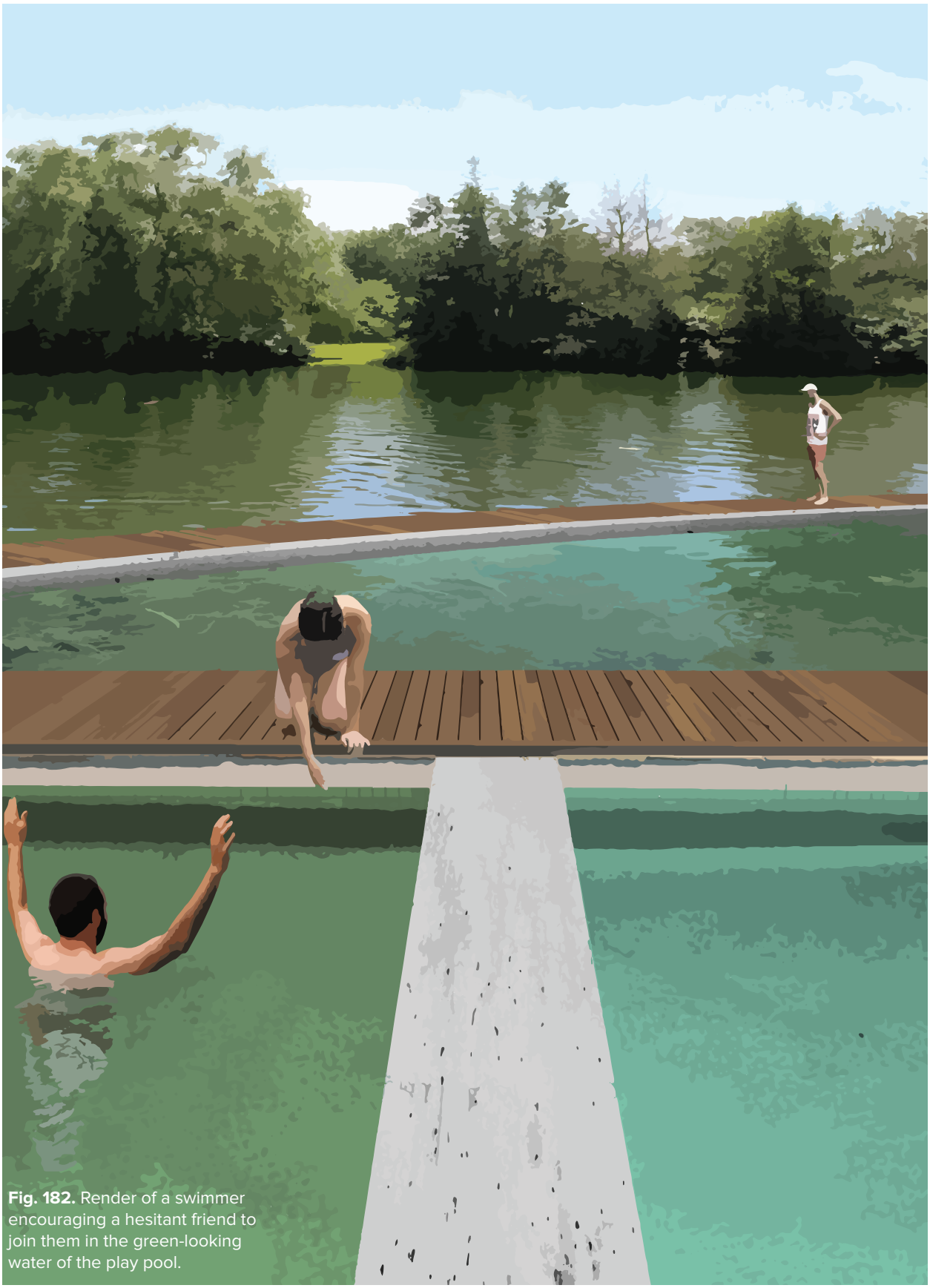


Fig. 182. Render of a swimmer encouraging a hesitant friend to join them in the green-looking water of the play pool.


Credit River
Hacienda Bay
A
B
B
A
1
2
3
4
5
6
7
8
9
N
1:500

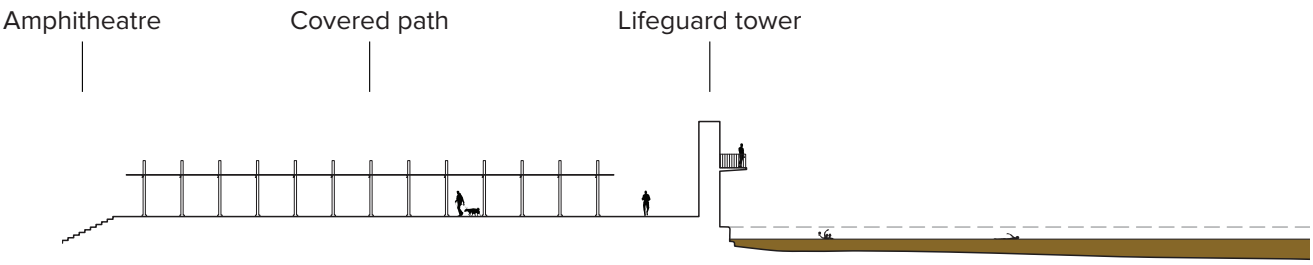


Fig. 184. Section A - Riverwater longitudinal-section.

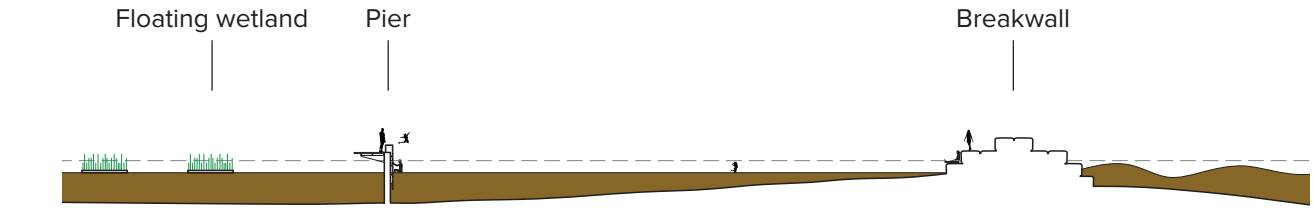


Fig. 185. Section B - Riverwater cross-section.

1. Existing boardwalk
2. Lifeguard tower
3. Swimming pier with litmus test wall
4. Floating wetlands
5. Artificial beach
6. Existing sand beach
7. Existing breakwall
8. Amphitheatre
9. Existing washroom

Waterfront trail

Fig. 183. *Previous page*, plan of riverwater swimming site

Fig. 186, Render of swimmer sunbathing on the boardwalk.

Fig. 187. Render of swimmers on breakwater.

Fig. 188. Render of swimmer snorkeling around floating wetlands.

Fig. 189. Render of the Port Credit Lighthouse (right) and proposed Water Quality Beacon (center) indicating the water is safe to swim in.

Refer to Evaluation on page 35-36 for criteria and point system description.

Programmes

1. **Swimming:** (1) Children's pool; (2) Play pool; (3) Lap pool; (4)Protected lake pool; (5) Protected river pool; (6) Diving platform; (7) Sunning terrace; (8) Changerooms; (9) Lifeguard tower; (10) Water quality beacon; (11) Artificial beach; (12) Swing tower
2. **Winter:** none
3. **Non-swimming:** (1) Scenic viewing platform; (2) Seating; (3) BBQ chimney; (4) Drinking fountain

Convenience

1. **Urban connectivity:** (1) Residential; (2) Employment; (3) Recreational; (4) Cultural
2. **Transportation:** (1) Bus; (2) Bike; (3) Walk; (4) Car
3. **Accessibility:** (1) Children; (2) Elderly

Design

1. **Urban artifact:** (1) The project relates to collective and individual memory; (2) The project helps shape the identity and values of the city by providing a new/different perspective and experience for users; (3) The overall project is innovative and iconic.
2. **Entry:** (1) Climb in; (2) Jump in; (3) Dive in; (4) Walk in; (5) Slip in; (6) Swing in; (7) Step in

36 **Total points**

Fig. 190. - *Next page*, Proposed poster showing a scene that could be confused as taking place in cottage country, if it weren't for the smoke stacks in the background.

Mississauga's waterfront as a destination

Since the nineteenth century, colourful travel posters have inspired and enticed people to venture to new places. In Canada, these new places have historically been found in provincial and national parks. From canoeing in Ontario's Algonquin Park to sight-seeing in Alberta's Glacier National Park, destinations were located outside of urban centers. In order to repopularize urban lake swimming along the shores of the GTA, I created travel posters that invite people to swim in the clear, emerald waters of Lake Ontario. My message: There's no need to travel far to truly experience one of Canada's natural wonders.

Fig. 191. Proposed poster highlighting the fact that people don't need to travel to a provincial park to experience beautiful, rugged shorelines.

Fig. 192. Proposed poster highlighting the fact that, just like the Muskokas or Algonquin Park, the Mississauga waterfront also has cliffs that provide scenic views and exhilarating cliff jumping.

Future expansions

Fig. 193. Soil remediation at 70 Mississauga Road South, 2018.

Fig. 194. A crowd of people swimming at the ruins of the old Erindale Dam along the Credit River. (Jean Hibbert, "Swimming at Erindale Dam," 1953, The Toronto Star Archives, Courtesy of Toronto Reference Library, https://www.torontopublictlibrary.ca/detail.jsp?Entt=RD-MDC-TS-2-125-GO-082&R=DC-TS-2-125-GO-082)

Fig. 195. A crowd of people swimming in the Humber River at Lambton in Toronto. ("Humber River at Lambton - swimming," June 27, 1935, photoprint, 12 x 15 cm, The City of Toronto Archives, Fonds 1548, Series 393, Item 24458A)

Port Credit and Mississauga's waterfront as a whole is experiencing tremendous change. There are currently three master plan projects that will significantly transform the old vestiges of Mississauga's twentieth century waterfront. The Lakeview Village Development Master Plan (see figure 196), in the works since 2006, will be located adjacent to Lakefront Promenade Park on a 117-acre brownfield site that was once home to a coal-fired power plant. The site is currently planned to include over 8,000 residential units, as well as a new waterfront park, marina, and boat launch (it is unclear if new lake swimming infrastructure will be introduced).[7] Two transformative master plan projects located along the Port Credit waterfront are the Brightwater Master Plan and the Inspiration Port Credit Master Plan. Brightwater Master Plan (see figure 196), located at 70 Mississauga Road South and 181 Lakeshore Road West (west of J.C. Saddington Park), will completely redevelop the former 72-acre Imperial Oil site into a modern community. In addition to almost 3,000 units, the master plan introduces a new 7.8-acre waterfront park (including a potential new beach along the shoreline).[8] The Inspiration Port Credit Master Plan is located at 1 Port Street East (see figure 196), and is currently a marina. The 67-acre plot of land will be developed into a community hub complete with new residential, commercial, retail, and recreational programmes.[9] Along with many more high-density projects and smaller scale master plans, Mississauga and its waterfront will look completely different in 10 years time.

Considering these significant changes, how will my design project fit into the proposed future development? See figure 198 for speculative sketches based on the most recent proposals to the city.

In addition to an expanding Port Credit, these proposed swimming sites at the mouth of the Credit River and their underlying design principles could easily be adapted to other parts of the GTA's extensive hardened shoreline, thus creating a network of innovative swimming sites. This would allow people across the region to engage with the lake and its tributaries in a new and exciting way. The once popular but now extinct swimming culture in Port Credit was not an isolated incident but occurred in many other areas in the GTA. For example, the Credit River in Erindale, shown in figure 194, used to host a thriving swimming culture prior to the 1950s, however pollution and lack of safe infrastructure led to a ban that continues to this day. The Humber and Don Rivers, Etobicoke and Cawthra Creeks, and many more tributaries experienced similar fates. Today, water quality and amenities have gradually improved along these rivers, but are still far from being safe for swimming.

Implemented at a larger scale across the region, water remediation, education, and swimming infrastructure can help bring back to life these once popular urban swimming oases.

Why does the creation of a network of urban swimming sites matter? Developing new urban swimming sites along the Lake Ontario waterfront and its tributaries increases accessibility and exposure to the region's natural waters, which is key to promoting environmental stewardship. In addition, this network would broaden water remediation and education across the region. Lastly, increasing the number of swimming sites in the GTA could bring lake swimming to a larger number of urban dwellers.

This thesis project comes at a perfect time. The city of Mississauga and the City of Toronto are currently revitalizing their waterfronts. "We will be known not as Mississauga, the suburb of Toronto, but Mississauga, that city with the incredible waterfront," proclaimed Ward 1 Councilor Stephen Dasko in a recent public consultation address regarding the Inspiration Port Credit Master Plan.[10] Urban lake swimming is the catalyst that could define the new relationship between citizens and Lake Ontario, and help shape the GTA's waterfront for future generations.

Fig. 196. Map of private development proposed master plans along Mississauga's waterfront as of 2019.

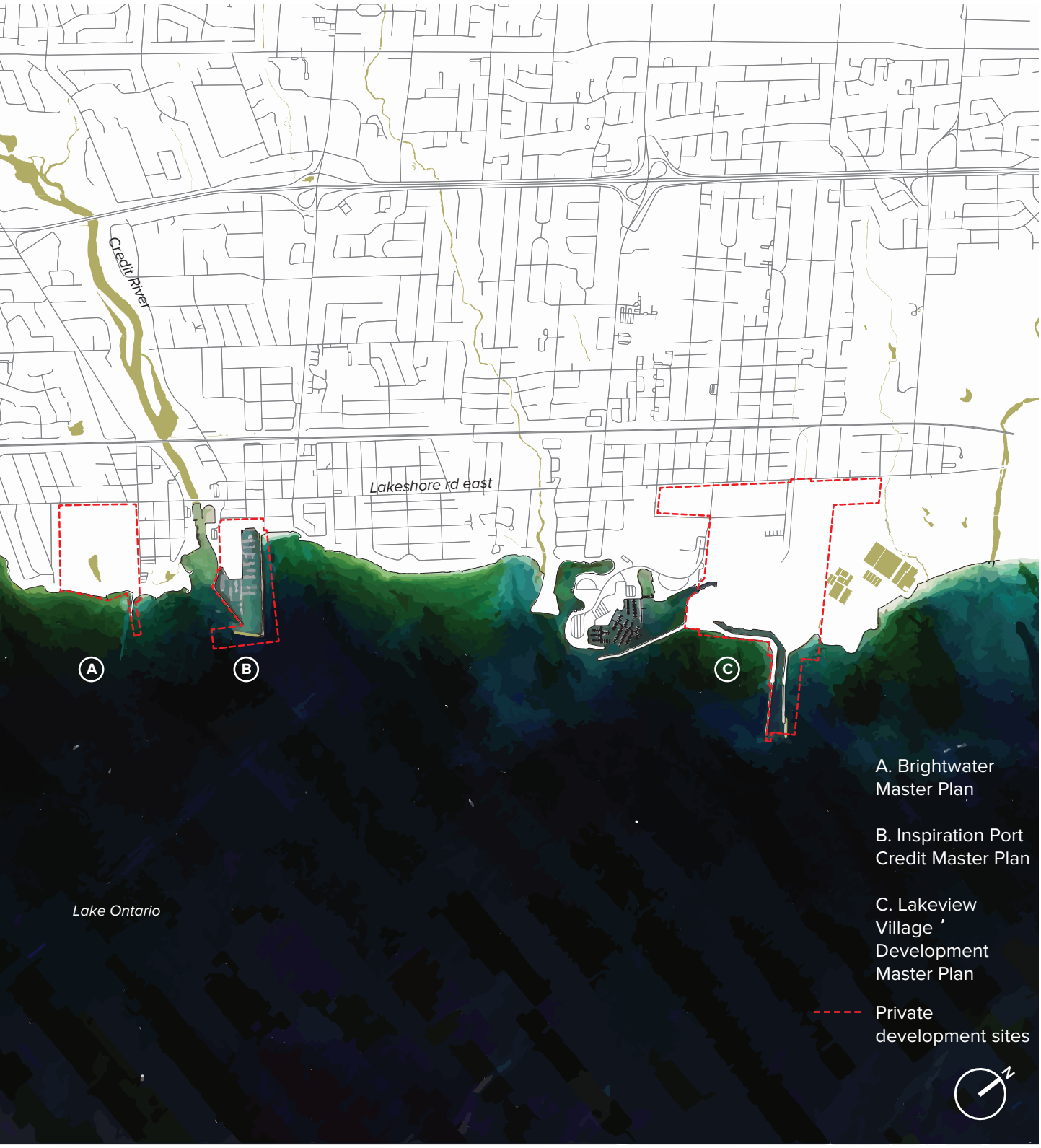
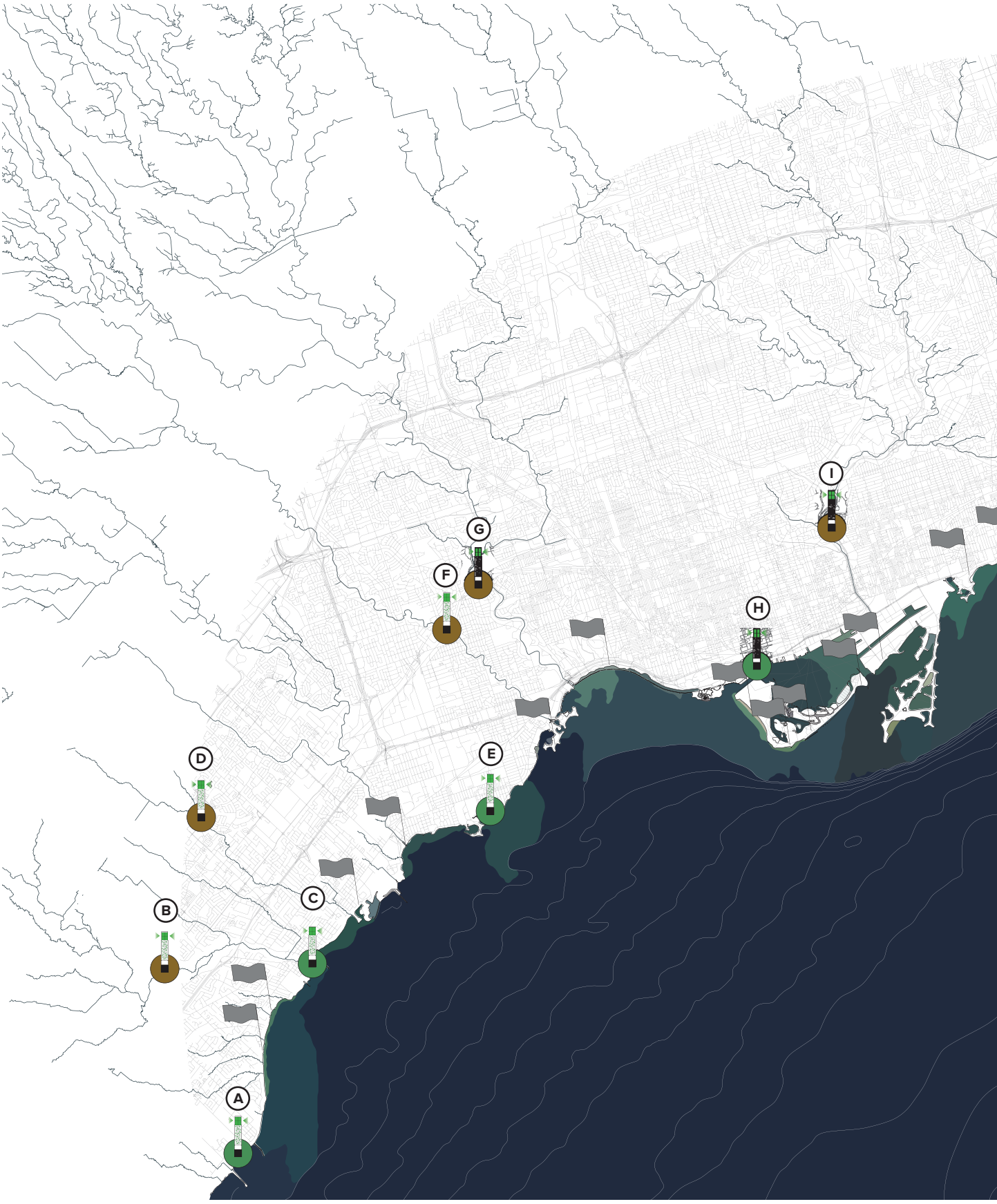

Credit River
Lakeshore rd east
A
B
C
Lake Ontario
A. Brightwater Master Plan
B. Inspiration Port Credit Master Plan
C. Lakeview Village ' Development Master Plan
Private development sites
N

Fig. 197. Map of major proposed master plans by private developers adjacent to the site at the mouth of the Credit River.
(adapted by author from: "Site Plan: July 29," Master Plan, Port Credit West Village Partners, http://www.pcwestvillagepartners.ca/masterplan#site-plan-2019; http://www.mississauga.ca/portal/residents/inspirationportcredit)

Fig. 198. Render of lakewater site with currently proposed multistorey buildings from the Brightwater project spearheaded by Port Credit Wes Village Partners.


A
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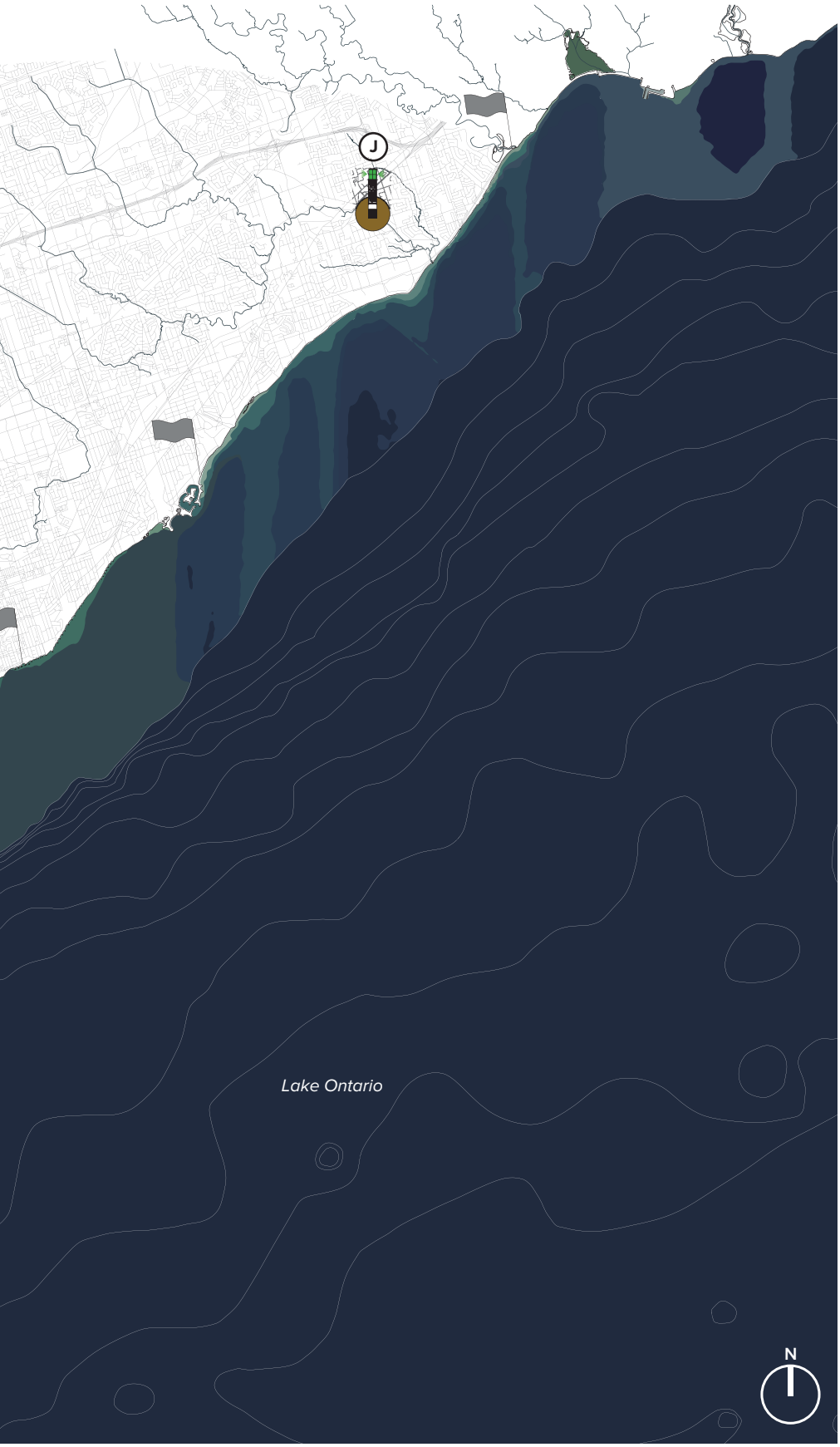
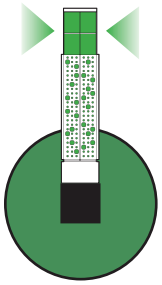
H
I

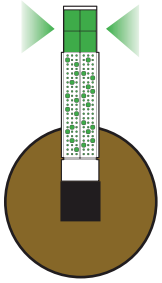


Proposed future sites:

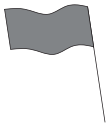
A. Fusion Park (Park 389)
B. Erindale Park
C. J.C. Saddington Park
D. Mississauga Valley Park
E. Colonel Samuel Smith Park
F. Tom Riley Park
G. Lambton Park
H. Bathurst Quay
I. Don River Valley Park
J. Colonel Danforth Park



Future lakerwater swimming site



Future riverwater swimming site



Existing lakewater swimming sites

Fig. 199. Map of potential future expansion of swimming sites along the GTA's waterfront and tributaries. These sites were selected based on their existing natural and built potential, and past social history and use.

Notes

[1]Ivan Illich, *H_2O and the Waters of Forgetfulness: Reflections on the Historicity of "Stuff"* (Berkeley: Heyday Books, 1985), 65.

[2]Maria Kaika, *City of Flows: Modernity, Nature, and the City* (Hoboken: Taylor and Francis, 2012), 53-54.

[3]David G. Smith and Robert J. Davies-Colley, "Perception of Water Clarity and Colour in Terms of Suitability for Recreational Use," *Journal of Environmental Management* 36, no. 3 (1992): 225-235. doi:10.1016/S0301-4797(05)80136-7

[4]Bernard Tschumi, *Tschumi: Parc De La Villette* (London: Artifice, 2014), 47.

[5]Tschumi, *Tschumi*, 47.

[6]Julia Czerniak, ed., *CASE: Downsview Park Toronto* (Munich: Prestel, 2001), 74-81.

[7]Lakeview Community Partners Limited, "Lakeview Village Development Master Plan Evolution," report, May 1, 2019, http://www7.mississauga.ca/Departments/Marketing/Websites/inspiration-lakeview/www2/Lakeview-Village-Development-Master-Plan.pdf

[8]Port Credit West Village Partners, "Port Credit West Village Master Plan & Urban Design Document," report prepared by Urban Strategies Inc. for Port Credit West Village Partners, November 2, 2018, 12, 18, 23, http://www.pcwestvillagepartners.ca/media/masterplan/20180211/Master%20Plan%20and%20Urban%20Design%20Document%20(2018-11-01).pdf

[9]The Planning Partnership, "Charting the Future Course: 1 Port Street East Comprehensive Master Plan," report, May 12, 2016, https://www7.mississauga.ca/documents/Communications/2016/Appendix1MasterPlan1Port.PDF

[10]Rumneek Johal, "Mississauga wants to transform its waterfront at Port Credit, but some residents have doubts," *CBC News*, July 21, 2019, https://www.cbc.ca/news/canada/toronto/mississauga-wants-to-transform-its-waterfront-at-port-credit-but-some-residents-have-doubts-1.5217809

Chapter 7

Conclusion

Fig. 200. Stylized photo of author swimming for the first time in Lake Ontario along the shores of Mississauga at Jack Darling Memorial Park with a view of downtown Toronto beyond. (Photo courtesy of Erin Reid)

Fig. 201. Photo of Lake Ontario before entering the water.

Fig. 202. Photo of author wading into the lake. (Photo courtesy of Erin Reid)

Fig. 203. Photo of author diving into the lake. (Photo courtesy of Erin Reid)

Fig. 204. Photo of author celebrating a refreshing swim. (Photo courtesy of Erin Reid)

It only took 28 years and a yearlong thesis to convince me to swim in Lake Ontario along the shores of Mississauga. After multiple attempts and failures, I finally swam in the lake on a sunny and hot summer day at Jack Darling Memorial Park. I picked a section of the beach that was isolated and empty. The water was calm, perfectly clear, and a beautiful blue-green colour. Just to be safe, I took measurements of the water and compared the results with past samples: nothing out of the ordinary. And with that, I slipped out of my sandles, took my shirt and hat off, and cautiously ventured in. Unsurprisingly it looked and felt as good as other lakes I had already swum in countless times while camping or cottaging. As I waded in further, all initial worries or hesitations that I had were washed away. By diving into the cool and refreshing water I put to rest years of being told that the lake was not safe. I am happy to report that I have not fallen ill, or grown a third eye, arm, or leg as a result of my escapade. What made the swim all the more extraordinary was the view of downtown Toronto beyond, where contemporary urban lake swimming along the shores of Lake Ontario first began two hundred years ago.

Though I did end up swimming in the water it wasn't easy to get to that moment. I spent the last month figuring out the best time for me to swim in the lake. Knowing myself, everything had to be perfect. My ideal weather was hot, sunny, little to no wind, and no rain in the last 48 hours. The lake had to be clear, blue-green with no algae, and calm. It turned out to be a tough ask. A barrier to swimming that I encountered was the current water testing regiment. Unfortunately, the Region of Peel, the authority in charge of testing the water, does not perform the tests on a daily basis. This is a problem because water quality can change dramatically day by day depending on the weather. Another issue is that it takes them at least a day to release the results to the public, by which time water quality could have changed. Furthermore, the region does not post water quality updates during the weekends, which is when most people take the time to go to the beach. In the end, I could not pick my ideal day based on the data provided by the authorities. I had to rely instead on my senses, mainly what I saw, to determine if the water would be safe. On more than one occasion, I put on my swim trunks and headed to the beach only to decide not to swim based on what I saw. Sometimes there was too much debris or algae, sometimes the water was brown and opaque, and other times the waves were so big that they flooded the beach and made entering the water unsafe. I went to the beach four times with the intention of swimming before I actually decided to dive in.

And after that first Lake Ontario swim, I still had to anxiously wait to find out from the authorities if the water had been deemed clean. It wasn't until the next day that I was able to breathe out a sigh of relief, as Jack Darling Memorial Park had passed the clean water test.

Another barrier to urban lake swimming in Mississauga is having a safe location to enter the water. The quality of the constructed beach at Lakefront Promenade Park is poor, the imported sand is not maintained, and the changerooms are not conveniently located near the beach. On the other hand, the beach at Richard's Memorial Park is natural and beautiful. However, the water quality is the most often polluted from the three designated swimming locations due to a channelized creek outlet in the middle of the beach.

Jack Darling Memorial Park's beaches are currently flooded by high lake waters, relegating people to a small stretch of sand overgrown with plants. Furthermore, the jetties built along the shoreline trap debris and algae in the waters surrounding them. Despite these minor drawbacks, Jack Darling is home to some of the cleanest lakewater along the waterfront, and is the only place I have personally seen people swimming in Lake Ontario.

Lakefront Promenade Park, Richard's Memorial Park, and Jack Darling Memorial Park offer sandy beaches and swimmable lakewater, but they are currently underused for swimming. People choose not to swim in Lake Ontario, despite the fact that it is usually safe. Even with my research it took a lot of effort and mental preparation to dive into the water. If more people are going to participate in urban lake swimming, there needs to be an accessible avenue in which this is possible. This thesis shows that architecture could be that avenue. Architecture can help bridge the physical and psychological gap between the city and the lake by educating, engaging, and cleaning. A tower that emits a colour that reflects the swimmability of the water and concrete walls that are dyed to reflect naturally occuring water colours serve as visual aids that empower swimmers. A naturally filtered pool exposes visitors to a variety of perceived water colour in a controlled environment. Providing a variety of means for a person of any age and ability to enter the water such as a diving platform, a pier, steps, ladders, a ramp, and a swing, takes advantage of an industrialized shoreline, and increases the number of ways swimmers engage with the water. Floating wetlands frame swimming areas, and filter the water flowing into them.

However, limitations exist to implementing these strategies. Although the intent of the project was to create an experimental hub of education, swimming, and water remediation in Port Credit, concentrating all of these urban swimming programmes in one park may actually weaken the effectiveness of each proposal (lakewater, riverwater, and poolwater sites). Distancing each swimming site into separate parks brings focus to their unique strengths and programming. Furthermore, the proposed strategy falls short in addressing the possible implications of gentrification. Grouping the three swimming sites in the same area mirrors the ongoing concentration of wealth and infrastructure occurring along the Mississauga waterfront. The fact that residential waterfront properties are prohibitively expensive, especially in and around Port Credit, means that the proposed project, although intended for all citizens, will be more easily accessible to local residents who can afford to live near the lake. This problem will only get worse as the city continues to revitalize waterfront parks.

The thesis proposal is also limited to a narrow cultural segment of the population; the design was influenced by my own culturally specific experiences as a twelth generation French Canadian. My relationship to the water was shaped in many respects by my heritage. However, the City of Missisauga is home to a large variety of cultures that each have their own unique relationship towards water. This was made evident to me while performing water testing one morning. As I was standing along the armourstone shoreline of Jack Darling Memorial Park taking water measurements, a family next to me, dressed in beautiful, colourful garments, were using lakewater to perform what appeared to be a religious or spiritual ceremony. It was clear that Lake Ontario was an important part of their culture, one that didn't necessarily require them to put on a bathing suit and swim in the water to truly appreciate the water. The Mississauga waterfront, including my thesis proposal, could include a greater diversity of culturally-specific infrastructure or spaces. This is important for a multicultural city since park design is both influenced by culture and helps to establish new cultural norms. Therefore, a range of cultures should be able to influence the design of a public park so that new cultural norms reflect a truly diverse society. In my project, one simple example that could have improved the inclusivity and design of my project was to study case studies other than from a narrow range of North American and European countries (mostly Scandinavian at that). In addition, different local cultural groups that visit the area could have been consulted or surveyed in the initial stages of the thesis project to gain a better understanding of the various relationships and uses between people and the water.

Water pollution has always been the reason why I personally never swam in Lake Ontario along the shores of my hometown. Over the past decades I have witnessed stormwater, excessive algae and debris, flooding, and zebra and quagga mussels bring back into question the lake's swimmability. Canadian millennials inherited a natural environment that was in many respects healthier than the previous generations. The job is far from over though.

Diving back into Lake Ontario can help the city and its people build a better relationship with the water that is mutually beneficial. The more people are in the water, playing, exercising, competing, or cooling off, the more likely they will care about the lake's health. By swimming in Canada's unique natural landscape, we take part in strengthening an inherited Canadian identity that relies on the land. It is time to return to urban lake swimming, and appreciate the beautiful Great Lake at our doorstep.

Appendix

Lake Ontario documentation

Citizen Science is the collection of scientific data performed by non-professional individuals. This data can then be used by professionals as the basis for scientific studies. I bought my complete water quality testkit from an Ottawa-based non-profit organization called Water Rangers. After every test, participants could then conveniently upload their results into an online data platform that neatly organizes and tracks all samples at all locations. Using the measuring instruments, as shown in figure 205, I tested the differents types of waters found at J.C. Saddington Park on a weekly basis.

Fig. 205. Tools used for data collection: (1) Dissolved oxygen kit; (2) Secchi Disk; (3) Field Notepad; (4) Stream Thermometre; (5) Test strips; (6) Conductivity meter

1. Site 1 - Lake Ontario
2. Site 2 - Credit River
3. Site 3 - Artificial Pond
4. Site 4 - Lake Ontario

Fig. 206. Aerial of existing park and surroundings with water testing sites indicated.
(adapted from Google Earth)

pH

Fish affected (pH 3.5-5); precipitation (pH 5-6.5); stream water (pH 6-8); sea water (pH 7.5-8.5); swimming (pH 5-9)

Many factors can influence surface water pH such as rockbed composition, and industrial waste. pH is measured from 0 to 14, and low and high results can be detrimental to fish and macroinvertebrates.[1] According to the *Guidelines for Canadian Recreational Water Quality* safe recreational waters should be within the range of 5.0 to 9.0 pH to prevent eye irritation.[2]

Alkalinity

10 mg/L (very low); 11-50 mg/L (low); 51-150 mg/L (moderate); 151-300 mg/L (high); 300+ mg/L (very high)

Alkalinity is the capacity of water to resist changes in acidity. It is important for aquatic life because the alkalinity of surface water can affect pH levels. Alkalinty is influenced by natural sources such as soil, bedrock and plants, and industrial waste.[3] The higher the levels of alkalinity the better the water is able to stabilize increases in acidity, and better protect fish. There is no guideline set by the provincial or federal government for alkalinity.

Hardness

0-20 mg/L (soft); 21-60 mg/L (moderately soft); 61-120 mg/L (moderately hard); 121-180 mg/L (hard); 180+ mg/L (very hard)

Hardness measures the levels of calcium carbonate, a common natural substance found in rocks, and other metals in surface water.[4] There is no guideline set by the provincial or federal government for hardness.

Conductivity

Melted snow (2-42 µS/cm); negatively impacts fish reproduction (500+ µS/cm); tap water (50-800 µS/cm); freshwater streams (100-1,000 µS/cm); industrial waste water (10,000 µS/cm)

Conductivity measures the ionic content, or dissolved minerals, in surface water. Therefore, the addition of nitrates and phosphorus from fertilizer and salt from winter roads can negatively increase impact surface water quality by increasing the amount of dissolves minerals beyond its baseline.[5] There is no guideline set by the provincial or federal government for conductivity.

Dissolved oxygen

Dissolved oxygen measures the levels of oxygen in the water. Many factors influence the amount of oxygen dissolved in surface water including geographic elevation (higher altitudes hold less oxygen than lower ones), conductivity, water temperature etc.[6] There is no guideline set by the provincial or federal government for temperature.

Secchi Depth

According to the *Guidelines for Canadian Recreational Water Quality,* "Water should be sufficiently clear that a Secchi disc is visible at a minimum depth of 1.2 m," in order to allow swimmers to detect any objects or swimmers, and estimate depth.[7]

Location	Date	Activities	Measurements	
Site 1	January 6, 2019	dog walking walking running biking	air temperature	**1°C**
			water temperature	**2.4°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**9.0**
			conductivity	**510 us/cm**
			visible bottom	**Yes**


Lake Ontario water.


Lake Ontario shoreline.

Site 1	January 13, 2019	dog walking walking running biking	air temperature	**-6°C**
			water temperature	**0.5°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**558 us/cm**
			visible bottom	**No**


Lake Ontario water.


Lake Ontario shoreline.

Site 1	January 20, 2019	dog walking	air temperature	**-14.2°C**
			Conditions along the shoreline were too dangerous due to ice and snow to safely measure water quality.	
			visible bottom	**No**


Lake Ontario water.


Lake Ontario shoreline.

Location	Date	Activities	Measurements
Site 1	January 27, 2019	dog walking walking	air temperature **-6°C** Conditions along the shoreline were too dangerous due to ice and snow to safely measure water quality. visible bottom **Yes**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	February 3, 2019	dog walking walking running biking	air temperature **0.4°C** Conditions along the shoreline were too dangerous due to ice and snow to safely measure water quality. visible bottom **Yes**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	February 10, 2019	dog walking walking running hockey (on the pond)	air temperature **-4°C** water temperature **0.3°C** total chlorine **0.5 mg/L** alkalinity **100 mg/L** total hardness **250 mg/L** pH **7.2** conductivity **620 us/cm** dissolved oxygen **8 mg/L** visible bottom **Yes**

Lake Ontario water.

Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	February 17, 2019	no activities observed	air temperature	**-8°C**
			water temperature	**0.1°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**80 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**445 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	February 24, 2019	walking	air temperature	**5°C**
			water temperature	**1.4°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**7.6**
			conductivity	**620 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	March 3, 2019	walking dog walking	air temperature	**-2°C**
			water temperature	**0.4°C**
			total chlorine	**1 mg/L**
			alkalinity	**100 mg/L**
			total hardness	**250 mg/L**
			pH	**6.8**
			conductivity	**426 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**Yes**

Lake Ontario water.

Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	March 10, 2019	dog walking walking	air temperature	**4°C**
			water temperature	**2.1°C**
			total chlorine	**1 mg/L**
			alkalinity	**100 mg/L**
			total hardness	**200 mg/L**
			pH	**7.2**
			conductivity	**503 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	March 17, 2019	dog walking walking running biking fishing	air temperature	**-2°C**
			water temperature	**1.4°C**
			total chlorine	**1 mg/L**
			alkalinity	**100 mg/L**
			total hardness	**200 mg/L**
			pH	**7.2**
			conductivity	**580 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	March 31, 2019	walking dog walking	air temperature	**0°C**
			water temperature	**3.5°C**
			total chlorine	**0 mg/L**
			alkalinity	**100 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**658 us/cm**
			dissolved oxygen	**6 mg/L**
			Phosphates	**5 ppm**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	April 7, 2019	dog walking	air temperature	**7°C**
			water temperature	**5.5°C**
			total chlorine	**0 mg/L**
			alkalinity	**100 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**445 us/cm**
			dissolved oxygen	**8 mg/L**
			Phosphates	**25 ppm**
			visible bottom	**Yes**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	April 14, 2019	walking dog walking biking running	air temperature	**-1°C**
			water temperature	**5.6°C**
			total chlorine	**0 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**502 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**Yes**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	April 22, 2019	walking dog walking picnic biking fishing	air temperature	**13°C**
			water temperature	**9.1°C**
			total chlorine	**0 mg/L**
			alkalinity	**100 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**497 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	April 28, 2019	dog walking walking biking running	air temperature	**4°C**
			water temperature	**6.9°C**
			total chlorine	**0 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**7.8**
			conductivity	**653 us/cm**
			dissolved oxygen	**7 mg/L**
			Phosphates	**30 ppm**
			visible bottom	**No**


Lake Ontario water.


Lake Ontario shoreline.

Site 1	May 4, 2019	walking dog walking biking	air temperature	**8°C**
			water temperature	**8.0°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**7.8**
			conductivity	**624 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**No**


Lake Ontario water.


Lake Ontario shoreline.

Site 1	May 12, 2019	walking dog walking picnic	air temperature	**7°C**
			water temperature	**10.6°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**8**
			conductivity	**772 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**No**


Lake Ontario water.


Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	May 20, 2019	walking dog walking picnic biking fishing	air temperature	**13°C**
			water temperature	**9.8°C**
			total chlorine	**1 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**150 mg/L**
			pH	**7.8**
			conductivity	**382 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**Yes**


Lake Ontario water.


Lake Ontario shoreline.

Site 1	May 26, 2019	walking dog walking biking fishing running	air temperature	**16°C**
			water temperature	**12.8°C**
			total chlorine	**1 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**8.4**
			conductivity	**571 us/cm**
			dissolved oxygen	**7 mg/L**
			visible bottom	**No**


Lake Ontario water.


Lake Ontario shoreline.

Site 1	June 2, 2019	walking dog walking playground biking fishing running event	air temperature	**16°C**
			water temperature	**11.9°C**
			total chlorine	**1 mg/L**
			alkalinity	**120 mg/L**
			total hardness	**250 mg/L**
			pH	**9.0**
			conductivity	**404 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**Yes**


Lake Ontario water.


Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	June 9, 2019	walking dog walking picnic biking fishing	air temperature	**19°C**
			water temperature	**13.5°C**
			total chlorine	**mg/L**
			alkalinity	**120 mg/L**
			total hardness	**150 mg/L**
			pH	**9.0**
			conductivity	**420 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	June 16, 2019	walking biking fishing running event	air temperature	**16°C**
			water temperature	**12.2°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**150 mg/L**
			pH	**7.8**
			conductivity	**518 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**Yes**

Lake Ontario water.

Lake Ontario shoreline.

Site 1	June 23, 2019	walking dog walking playground biking picnic	air temperature	**21°C**
			water temperature	**19.3°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**150 mg/L**
			pH	**8.4**
			conductivity	**662 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water.

Lake Ontario shoreline.

Location	Date	Activities	Measurements	
Site 1	July 18, 2019	walking dog walking picnic biking fishing	air temperature	**28°C**
			water temperature	**21.9°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**405 us/cm**
			dissolved oxygen	**8 mg/L**
			visible bottom	**No**

Lake Ontario water

Site 2	January 6, 2019	(Refer to Site 1 Activities)	air temperature	**1°C**
			water temperature	**2.2°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**450 mg/L**
			pH	**9.0**
			conductivity	**1149 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Credit River water

Site 2	January 13, 2019	(Refer to Site 1 Activities)	air temperature	**-6°C**
			water temperature	**-0.1°C**
			total chlorine	**mg/L**
			alkalinity	**140 mg/L**
			total hardness	**450 mg/L**
			pH	**8.4**
			conductivity	**910 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**No**

Credit River water

Location	Date	Activities	Measurements	
Site 2	February 10, 2019	(Refer to Site 1 Activities)	air temperature	**-4°C**
			water temperature	**0.1°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**80 mg/L**
			total hardness	**250 mg/L**
			pH	**7.2**
			conductivity	**701 us/cm**
			dissolved oxygen	**7 mg/L**
			visible bottom	**Yes**

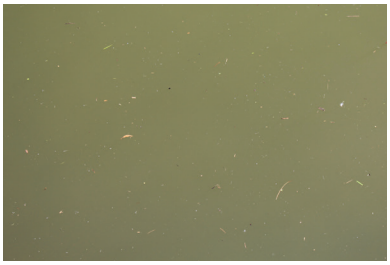
Credit River water

Site 2	May 26, 2019	(Refer to Site 1 Activities)	air temperature	**16°C**
			water temperature	**16.3°C**
			total chlorine	**1 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**8.4**
			conductivity	**594 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**No**

Credit River water

Site 2	June 2, 2019	(Refer to Site 1 Activities)	air temperature	**16°C**
			water temperature	**16.8°C**
			total chlorine	**1 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**9.0**
			conductivity	**797 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**No**

Location	Date	Activities	Measurements	
Site 2	June 9, 2019	(Refer to Site 1 Activities)	air temperature	**19°C**
			water temperature	**18.5°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**9.0**
			conductivity	**735 us/cm**
			dissolved oxygen	**mg/L**
			secchi depth	**1.4 m**
Site 2	June 16, 2019	(Refer to Site 1 Activities)	air temperature	**16°C**
			water temperature	**16°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**9.0**
			conductivity	**736 us/cm**
			dissolved oxygen	**mg/L**
			secchi depth	**1.0 m**
Site 2	June 23, 2019	(Refer to Site 1 Activities)	air temperature	**21°C**
			water temperature	**19.3°C**
			total chlorine	**1 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**8.4**
			conductivity	**714 us/cm**
			dissolved oxygen	**8 mg/L**
			secchi depth	**1.5 m**



Credit River water

Location	Date	Activities	Measurements	
Site 2	July 18, 2019	(Refer to Site 1 Activities)	air temperature	**28°C**
			water temperature	**24.6°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**610 us/cm**
			dissolved oxygen	**8 mg/L**
			secchi depth	**0.6 m**

Credit River water

Site 2	July 20, 2019		air temperature	**35°C**
			water temperature	**23°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**586 us/cm**
			dissolved oxygen	**mg/L**
			secchi depth	**1.5 m**

Credit River water

Site 2	July 27, 2019		air temperature	**29°C**
			water temperature	**21.9°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**694 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Credit River water

Location	Date	Activities	Measurements	
Site 3	January 6, 2019	(Refer to Site 1 Activities)	air temperature	**1°C**
			water temperature	**3.9°C**
			total chlorine	**0 mg/L**
			alkalinity	**140 mg/L**
			total hardness	**450 mg/L**
			pH	**7.8**
			conductivity	**732 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Artificial Pond water

Site 3	May 26, 2019	(Refer to Site 1 Activities)	air temperature	**16°C**
			water temperature	**17°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**250 mg/L**
			pH	**9.0**
			conductivity	**777 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Artificial Pond water

Site 3	July 18, 2019		air temperature	**27°C**
			water temperature	**18.5°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**9.0+**
			conductivity	**303 us/cm**
			dissolved oxygen	**10 mg/L**
			visible bottom	**Yes**

Artificial Pond water

Location	Date	Activities	Measurements	
Site 3	July 20, 2019		air temperature	**35°C**
			water temperature	**19.5°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**9.0**
			conductivity	**333 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Artificial Pond water

Site 3	July 27, 2019		air temperature	**29°C**
			water temperature	**18.9°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**9.0+**
			conductivity	**332 us/cm**
			dissolved oxygen	**mg/L**
			visible bottom	**Yes**

Artificial Pond water

Site 4	June 30, 2019		air temperature	**24°C**
			water temperature	**13.1°C**
			total chlorine	**0.5 mg/L**
			alkalinity	**80 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**331 us/cm**
			dissolved oxygen	**mg/L**
			secchi depth	**4.5 m**

Lake Ontario water

Location	Date	Activities	Measurements	
Site 4	July 18, 2019		air temperature	**28°C**
			water temperature	**21.9°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**319 us/cm**
			dissolved oxygen	**8 mg/L**
			secchi depth	**4.0 m**

Lake Ontario water

Site 4	July 20, 2019		air temperature	**35°C**
			water temperature	**19.5°C**
			total chlorine	**mg/L**
			alkalinity	**180 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**370 us/cm**
			dissolved oxygen	**mg/L**
			secchi depth	**3.2 m**

Lake Ontario water

Site 4	July 27, 2019		air temperature	**29°C**
			water temperature	**14.5°C**
			total chlorine	**mg/L**
			alkalinity	**80 mg/L**
			total hardness	**100 mg/L**
			pH	**8.4**
			conductivity	**358 us/cm**
			dissolved oxygen	**mg/L**
			secchi depth	**4.5 m**

Lake Ontario water

Notes

[1]Water Rangers, *Field Guide: Water Rangers Minikit*, version 3.2, September 2018, 20.

[2]Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, *Guidelines for Canadian Recreational Water Quality*, 3rd ed. (Ottawa: Health Canada, 2012) Catalogue No H129-15/2012E, 94, https://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/water-recreational-recreative-eau/alt/pdf/water-recreational-recreative-eau-eng.pdf

[3]Water Rangers, *Field Guide*, 18.

[4]Water Rangers, 19.

[5]Water Rangers, 23.

[6]"Why Test?: 5 Ways Citizen Science Contributes to Protecting Water," Learn, *Water Rangers*, accessed February 25, 2019, https://waterrangers.ca/learn/why-test/

[7]Water, Air and Climate Change Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, *Guidelines for Canadian Recreational Water Quality,* 99.

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