THE CREEK AND THE GARDEN

An insertion of Community Garden System in a neighbourhood park along the Garrison Creek

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

'The Creek and the Garden' is about actively preparing Toronto for the surge for gardening and food production within the city and developing a strategy to ensure the future's growing need for urban food garden space. The disconnected relationship between food production in rural areas and the food consumptive urban areas has to be reconsidered and transformed into a more hybrid condition requiring innovative use of the City's urban spaces. If successfully implemented, the thesis strategies will offer the promise of urban transformation, sustainable production of a safe and diverse food supply, and the eventual repair of urban ecosystems, all this while simultaneously yielding complex habitable environments that explore the relationship of public space to our personal and collective ecological footprints.

Considering the present urban parks along Garrison Creek as these possible spaces and giving these parks a dedicated space for food production, the thesis project aims to review the overall park system with regards to food production, and to study in detail the Christie Pits site with the end in creating a framework for the food infrastructure system to support this complex park emergence. Identifying the significant topography of the buried Garrison Creek as a special characteristic, it is turned into an opportunity to reinterpret the existing condition and to offer a new spatial vision for those sites as a whole.

The thesis objective is thus broadened to the creation of a system that negotiates the valued use of park between an urban breathing space, a recreational playscape, and an active food production landscape in which food and recreational infrastructures are operative and intertwined.

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Thank you for ALWAYS being there for me. You have made this possible and I will always be grateful to you for that.

Dedicated to my parents and grandparents

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PREFACE

An experience in community gardening helps one understand the role played by urban agriculture in today's evolving communities. Working in the Waterloo Architecture community garden, I was able to identify with individuals of similar perspectives who are committed to a sustainable living and share ideas and common interests. That was one of the reasons for joining the architecture community garden. Working in the garden also helped me de-stress when required. However, the produce of the garden, the fruit of my efforts as I thought of it then, had an altogether different impact on me.

It all started when our group decided to have a picnic with our first harvest. For the first time I realized that there is so much more to cultivation than socialization and peace of mind. Consuming my own garden's produce had a profound impact on my outlook towards urban agriculture. I was so overwhelmed by the experience that I started conducting a detailed research on food production in cities. Intrigued by the thought of large scale community gardening in urban spaces, I started having discussion with colleagues and friends. The discussion led to a multitude of questions related to issues such as applicability, sustainability and ecological significance.

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Figure 0-1 (Opposite page) An image of word cloud from the responses of 100 people from across Toronto who filled out Parks Platform survey regarding what issues and ideas they want the next city council to address for Toronto's parks.

INTRODUCTION

Planning for "sustainability" and "sustainable development" eventually come down to dealing with the fundamentals of life - water, air, energy, transportation and waste.[1] Most of us take our food for granted - so much so that we often forget the role it plays in our social relationships, community building and the emphasis that food and agriculture have in shaping our economy and environment.

The majority of people in North America have lost the basic knowledge of what real food is, where it comes from, or even what to do with it.[2] It is not only basic knowledge of food that is being lost due to supermarket culture, but many of the private and public spaces that were central to the social fabric of the city, street, neighbourhood and family are changing and losing their importance. Architect and author Carolyn Steel uses food as a medium to "read" cities and understand how they work. In her book "Hungry City" she traces -- and puts into historical context -- food's journey from land to urban table and thence to sewer. Cities, like people, are what they eat."[3] The mass marketing of the consumer lifestyle has led to the disappearance of home gardens, local restaurants, neighbourhood coffee shops, and farmers' markets. It has altered the fine historically evolved grain of our cities, streets, and homes, thereby reducing the occasion for the social interactions that once created lively streets in the past.

Another issue at hand is the environmental impact of large scale industrialized food production and distribution. Carolyn Steel writes on about how the contemporary food production methods have created an artificial imbalance.[4] "Placing Food", an article about food production and distribution, states that "95 percent of cabbages, 94 percent of peas, 91 percent of field corns, and 81 percent of tomato varieties no longer exist. As we simplify our food system, we are

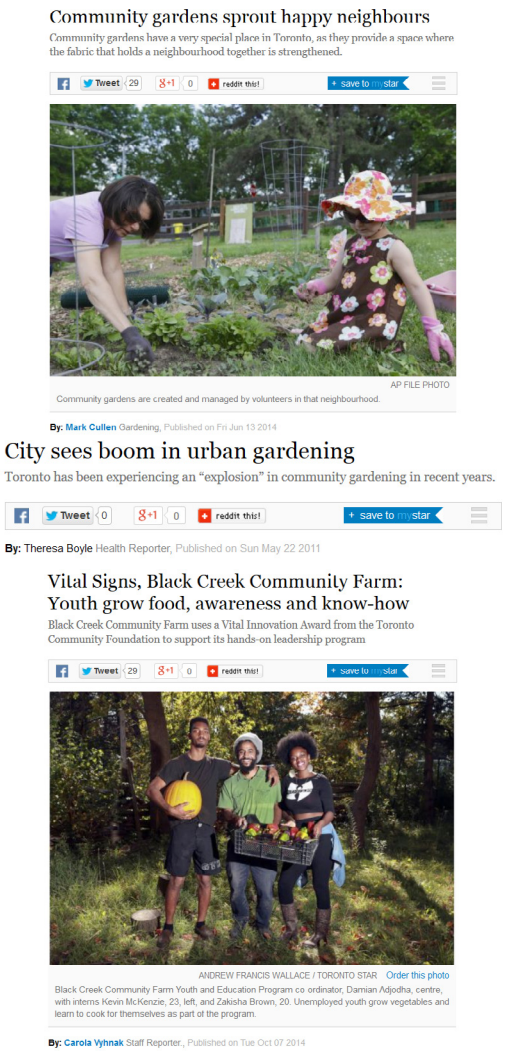
attacking the environment's capacity for evolution and adaptation to inevitable change".[5] Mass production of food products resulted in the eradication of the many of the species that were initially produced for the population's consumption.[6]

There is also much demand for organic produce within the modern emerging urban communities. Side effects from chemically induced food production has caused much of the urban population to desire more farm-bred, non-industrial, food products.[7] Michael Hough, in his book "City and Natural Processes", emphasizes the expanding desire for organic food products among the more affluent urban dweller due to health and safety concerns arising from industrialized food production. He also writes about how this need has increased the demand for urban land available for urban agriculture, a concept that was very prominent in the cities of the mid twentieth century. The rebirth of the farmers market is also a consequence of this shift in interest. Individuals are today considering in-house production of herbs and edible plants.[8] This expanding interest and trending activity is even reflected in the digital gaming industry. Farmville, a virtual farming game on Facebook boast of 75 million participants![9]

All these issues and considerations have led to the surge in demand and facilitation of what is now, under its umbrella name, Urban Agriculture. One such concrete aspect of this new urban activity is the growth of community gardens, both existing and newly created. Community gardens have become a global phenomenon in cities and their number has progressively increased over the recent decades[10]. In early 20th century community gardens were typically answers to food crises, such as financial and food insecurity during war periods. Recent newspaper headlines, however, suggest a shift in the outlook of

In 1960 most of Toronto's food came from within 350 kilometers of the city, or almost entirely from within its foodshed. Today, at least 60 percent of the fresh produce consumed in Toronto is imported from the United States, a third of this arrives during Ontario's own growing season.

Figure 0-2 An image from Nina-Marie Lister's article "Placing Food".



Community gardens sprout happy neighbours

Community gardens have a very special place in Toronto, as they provide a space where the fabric that holds a neighbourhood together is strengthened.

Tweet 29 | 8+1 0 | reddit this! | + save to mystar

AP FILE PHOTO

Community gardens are created and managed by volunteers in that neighbourhood.

By: Mark Cullen Gardening, Published on Fri Jun 13 2014

City sees boom in urban gardening

Toronto has been experiencing an "explosion" in community gardening in recent years.

Tweet 0 | 8+1 0 | reddit this! | + save to mystar

By: Theresa Boyle Health Reporter, Published on Sun May 22 2011

Vital Signs, Black Creek Community Farm: Youth grow food, awareness and know-how

Black Creek Community Farm uses a Vital Innovation Award from the Toronto Community Foundation to support its hands-on leadership program

Tweet 29 | 8+1 0 | reddit this! | + save to mystar

ANDREW FRANCIS WALLACE / TORONTO STAR Order this photo

Black Creek Community Farm Youth and Education Program co ordinator, Damian Adjodha, centre, with interns Kevin McKenzie, 23, left, and Zakisha Brown, 20. Unemployed youth grow vegetables and learn to cook for themselves as part of the program.

By: Carola Vyhnak Staff Reporter., Published on Tue Oct 07 2014

Figure 0-3 Newspaper clippings showing the emergence of community gardens in Toronto.

the urban dwellers in modern cities like Toronto towards food sources and the cultivation of food through community gardens. Despite this positive tendency, however, the design and implementation of community gardens will not be sustainable without taking the underlying ecological factors and principles into consideration.

In "Designing Urban Agriculture", landscape designer April Philips talks about the foundation of ecological principles and how the food shed is an important part of the city's food system[11]. Her ideas further outline a design process, based on systems thinking, one used to develop a regenerative-based approach. She also argues that for a practice to be sustainable it has to be cyclical, and the waste from one activity should be a resource for another.

Harvard Graduate School landscape architect and professor, Richard Forman, in his "Landscape Ecology Principles", discusses simple and holistic approaches used to tie-in the features of the site such as water, land, wildlife, and people, and their integration into a working network[12]. Preceding Forman's work, "Design with Nature", is the foundational work by 1960s landscape architect Ian McHarg, a pioneer of the concept of ecological planning. McHarg uses specific methods of landscape mapping for scale and site analysis. His principles teach how nature works as a layered system, and offers methods for designers and planners on how to forge this deep system knowledge into the existing design context of the site[13].

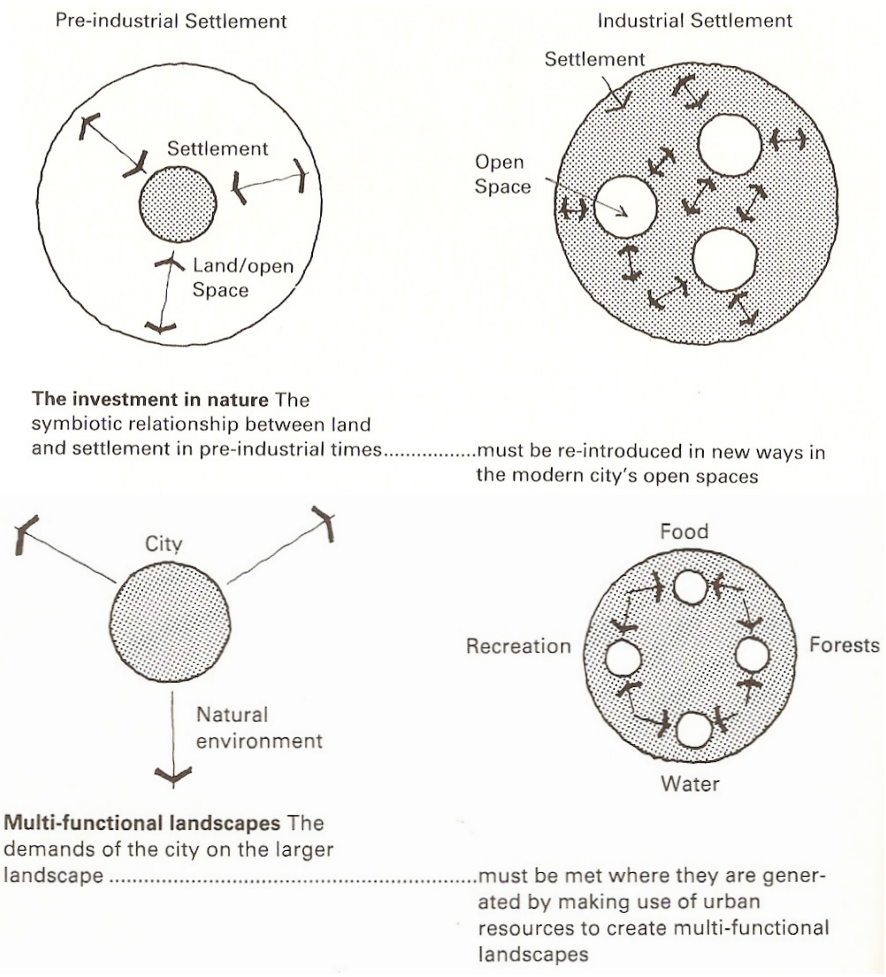
Following through on that train of thought, Michael Hough's book "City and its Natural Process" aims at conscious management of natural resources in urban landscapes as opposed to Mcharg's focus on rural landscape on the urban periphery. Hough makes an eloquent argument for a more efficient use of land inside our cities by advocating

a new approach to urban design, one based on an awareness of natural processes as they relate to urban ecology[14]. Hough also mentions how we can best utilize open landscapes, especially parks within our cities, to reflect the requirements of urban ecosystems by changing the perception of them being solely built for recreational purposes by local communities[15].

My initial interaction with community gardens helped in the understanding of the current mandates and needs of an urban community (as shown in Fig. 0-4). This understanding highlights not just the insufficiency of the present community gardens, but also the demand for more spaces for production, consumption, and the celebration of food. This personal collaboration soon enabled me to study the existing condition of Toronto's downtown neighbourhood parks along the City's creeks and rivers, and initiated the thesis objective of creating a unified identity for the parks along Garrison Creek using the emerging leisure activity in Canada: community gardening[16]**.** Community gardens in this thesis serve as a future platform for a threefold purpose in the design of a more complex view of neighbourhood parks: social exchange, pedagogical activities, and ecological benefits.

The social benefits of community gardens are many. In many cultures food is considered as a social thing. I come from a family that is strongly rooted in this belief that eating is indeed a social activity. Professor Claudia Cornejo in a research paper describes that the choices of food can often echo a person's social and personal self. The practice of sharing food and dining together also helps to create "a relatively homogeneous community, or social group[17]." Considering the ecological principles governing community gardens, and the need

Figure 0-4 Series of diagram from Michael Hough's texts.



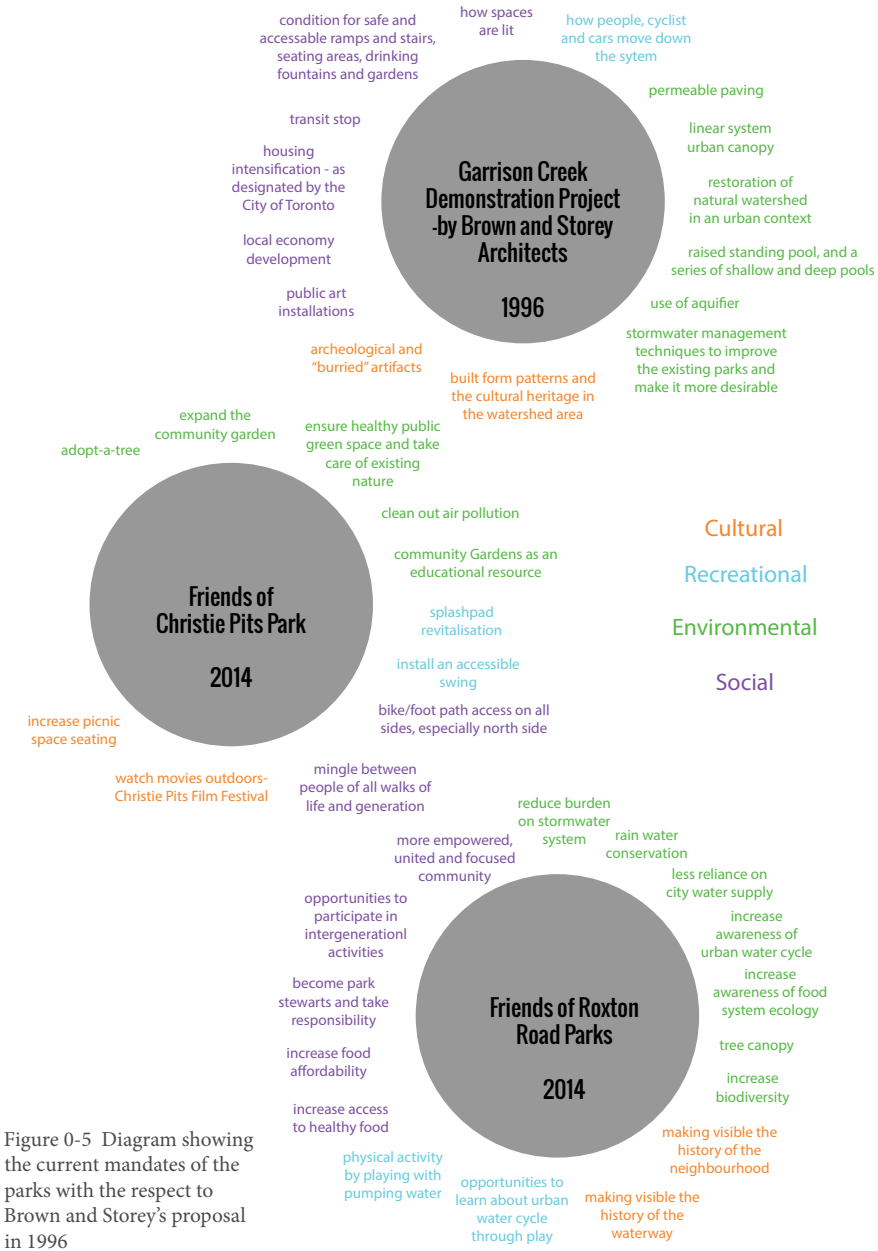


Figure 0-5 Diagram showing the current mandates of the parks with the respect to Brown and Storey's proposal in 1996

for parks to function as urban ecosystems, an obvious space within the vicinity of a typical urban dwelling that can cater to a growing thirst for individual food production is the parks themselves. Parks, which were once seen as only recreational and aesthetically beautifying spaces, are today viewed as areas that can also serve as productive lands[18]. This shift in perspective has prompted the creation of community gardening in parks in many western cities.

To understand the applicability of this trend to the City of Toronto, I started to examine Toronto's neighbourhood parks. Toronto has over 1500 parks and approximately 80 square kilometers of parkland spaces[19]. Half of the people in the city visit a park at least once a week and almost 14% visit a park every day[20]. In spite of such high interest in parks, according to the article "Fertile Ground for New Thinking", Toronto's parks are facing fiscal and resource related challenges. Deferred maintenance on the parks and recreational facilities is close to $230 million[21]. The article goes on to recommend that parks can be better maintained by including them in the city's food production system. Creation of community gardens and a medium for socialization within parks will help better usage of the extensive space allotted to parks[22].

This thesis then explores proposing a framework for production of food in Toronto's Christie Pits Park, this project being taken as the test site along the whole length of the Garrison Creek park system. The design proposal aims at restructuring the existing park to support and facilitate the activity of food production in a systemic manner with sufficient infrastructure and support for the city, the surrounding community, and the full range of its users, especially the present recreational users of its swimming pool and sports fields.

Endnotes

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22 David Harvey, *Fertile ground for new thinking improving Toronto's parks*, (Toronto: Metcalf Foundation), 2011.

The thesis is comprised of four chapters. The first chapter is a brief history of Toronto's ravines, leading to burial of Garrison Creek and formation of the surrounding neighbourhood and park system.

Followed by the history is an introduction to the present conditions of Toronto parks and Community Gardens.

The third chapters highlights some of the precedents that helped to design the framework and strategies.

The fourth chapter comprises of the study of the existing grain of the park system.

Developed from the ideas and study in the preceding chapters, the final chapter contains the design drawings for the test site (Christie pits) and an overall scheme for the park system along Garrison Creek. The manual includes a kit of parts of the components used in the design of the community garden system.

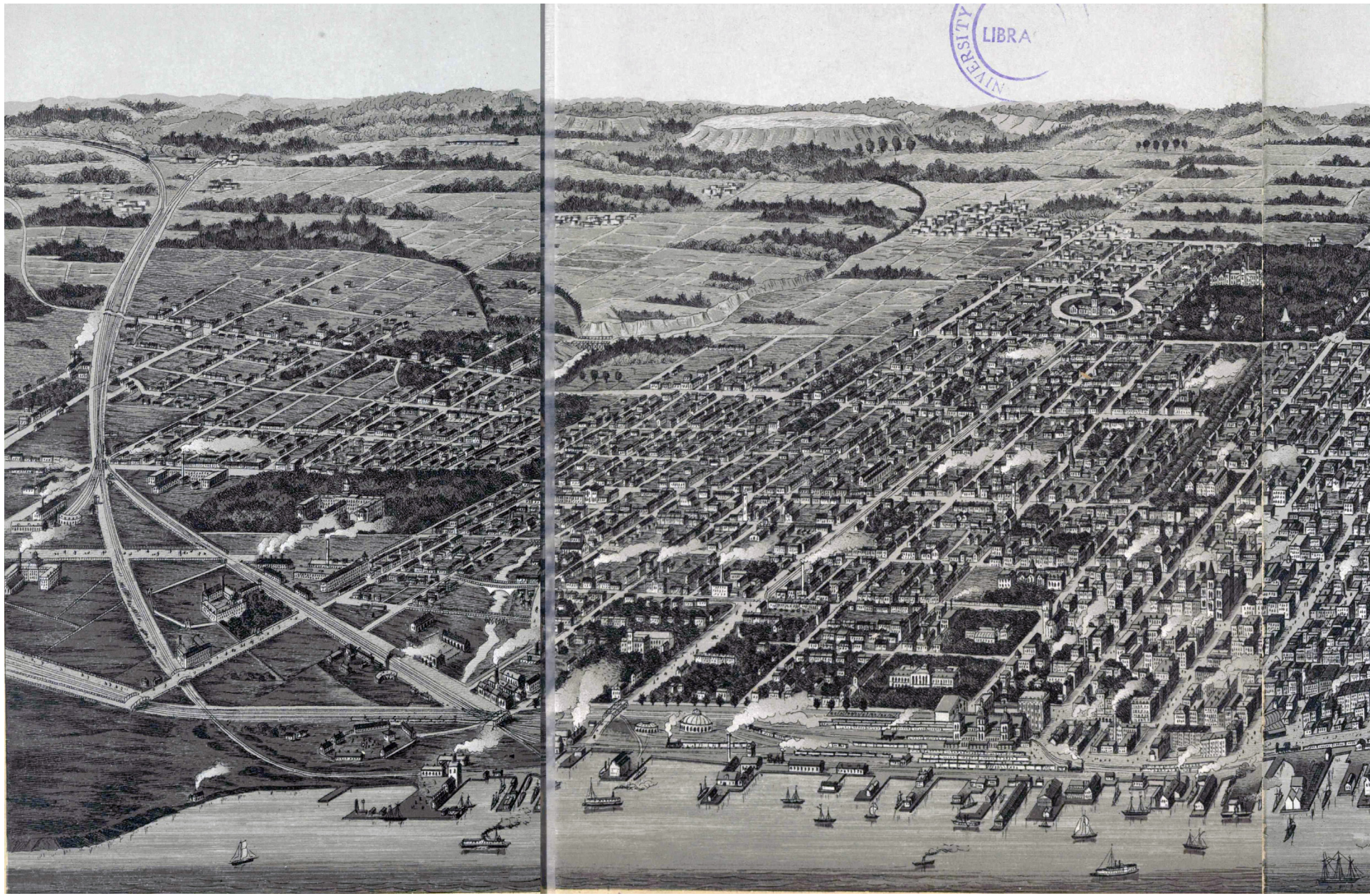


Figure 1-1 Highlights from the earliest bird's eye view of Toronto include a visible Garrison Creek (and ravine), Union Station, the Parliament Buildings (at Front and Simcoe street), the early Distillery District), and the growing University of Toronto campus amongst other things.

A BRIEF HISTORY

Starting with Ward 19, which can easily be called the heart of Toronto, lies the original watershed of Garrison Creek. The waterway played a central role to the city's development as it protected the harbor to the east, and with its steep walls of the ravine, it acted as a natural fortification for the rear of Fort York. This fort was established by the British in 1793 to protect the harbor from American attack. [1]

The path of the creek has shaped so much of what came after it — the city's street plan, the situation of early industries, the location of schools. The creek remains most apparent on the surface in the wandering line of parks that anchor the neighbourhoods of the west end from Christie Pits in the north to Stanley Park just above the fort; and from Dufferin Grove and MacGregor Park southeast to Trinity Bellwoods Park[2]. The character of these neighbourhoods today owes as much to the creek's previous existence, as to its modern absence.

By the 1880s, as the city expanded, the pollution of the creek became an increasingly pressing issue in city politics, as a result of which the creek was largely buried as a brick sewer system[3]. Today it exists as the hard infrastructure below the existing city streets. Having made the foul creek disappear, the city was now left with a ravine stretching from the varying heights of the original tableland above the ravines[4]. The city quickly moved to buy up properties along the former stream course, creating road allowances over the new sewer, and also setting aside other parcels for parkland[5].

The traces of this existing ravine are made visible in today's parks along the line of the original Garrison Creek, with Christie Pits holding the most dramatic slopes of the remnant green spaces of the now buried creek.

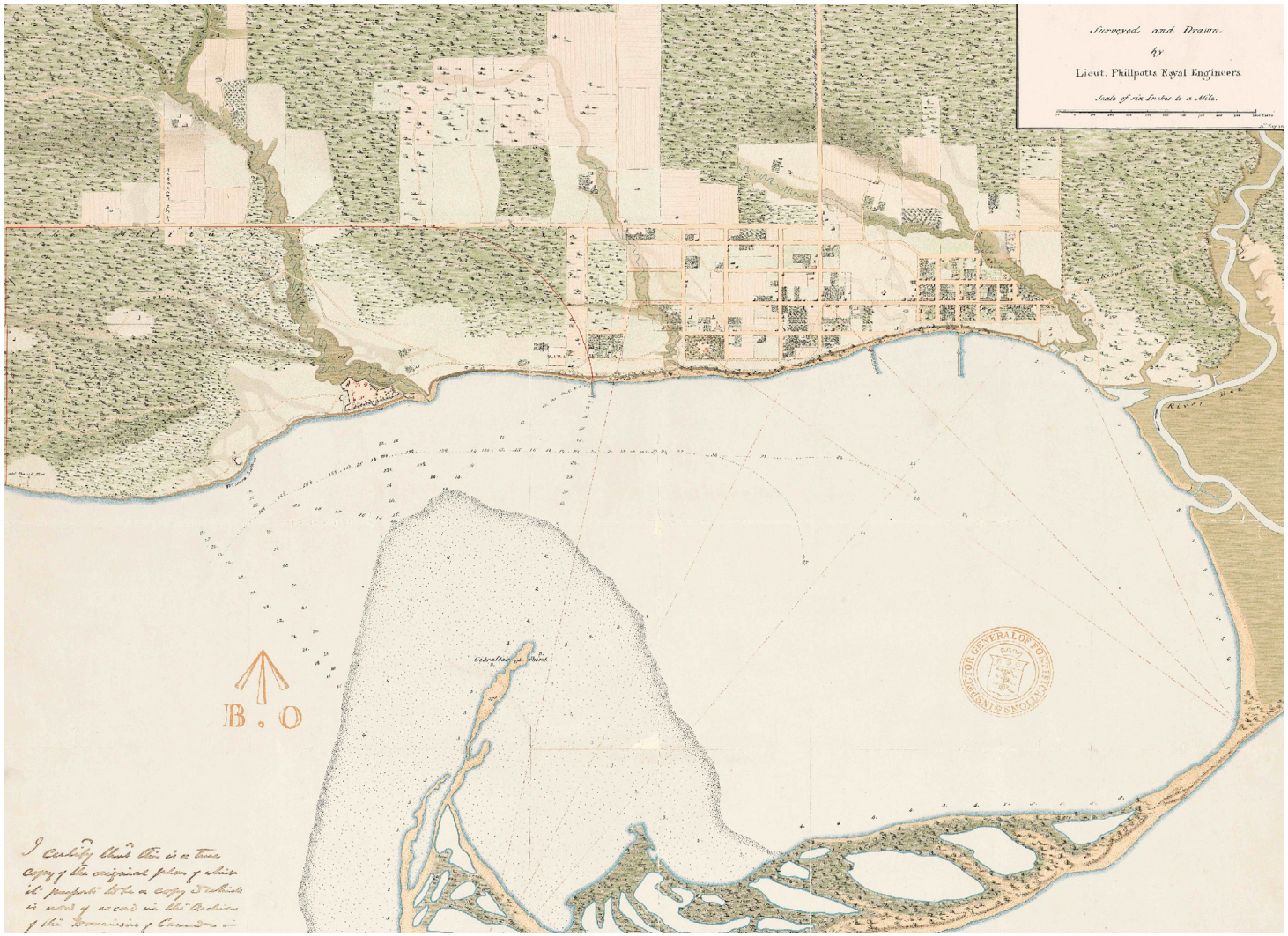


Figure 1-2 This topographic plan was made by the military to record the overall defense situation at York, it gives an idea of the amount of land that had been cleared and built-up by 1818. The Old Town was fairly densely settled, although the grounds around most houses were large enough to accommodate vegetable gardens, poultry, and livestock. Settlement in the New Town was still very sparse.

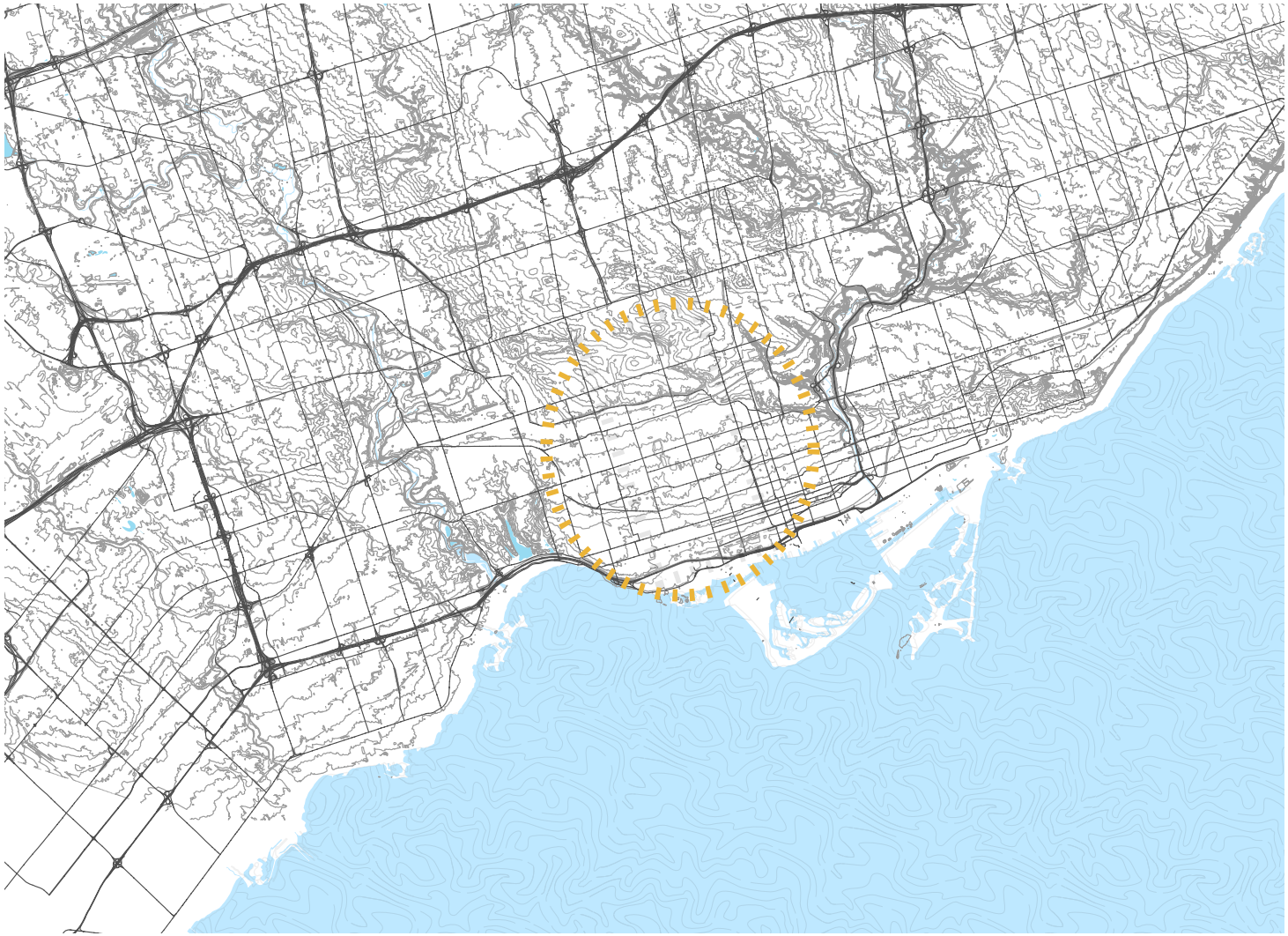


Figure 1-3 This map shows the altered topography after the burial of the Garrison Creek. The contours around the site have pretty much flat and the existence of the ravine is reminded to us by the sudden variations in the levels in the pocket parks.

Figure 1-4 (Following page) Garrison Creek Development timeline.

Twelve thousand years ago, the Wisconsin Glacier receded and melted off the St. Clair West lands, creating Garrison creek, the largest stream between Humber and Don Rivers. Creek eroded, wide valleys were filled with sand, clay and gravel from the glacier.

In 1792, the first British Governor, Lord Simcoe, arrived in Toronto (originally called York) to establish a military outpost. Simcoe and his engineers saw the creek as a secure natural water. Soon after, land was cleared for farms, villas and estates like "Earlscourt", "Humewood" and “Bartholomew Bull's Farm”.

The first villas constructed in this area were highly influenced by the landscape. They were typically sited on the highest point of the ravine, facing Lake Ontario. Later, Lord Simcoe’s engineers used “Park Lots” to divide land into large orthogonal estates, mainly to tempt prospective settlers into Toronto. They were typically sited on the highest point of the ravine, facing Lake Ontario.

BEGINNING OF GARRISON CREEK TILL 1800’S

Later, Lord Simcoe’s engineers used “Park Lots” to divide land into large orthogonal estates, mainly to tempt prospective settlers into Toronto with the Don River to the East and Garrison Creek to the West. This system marked the first shift of balance between town and ravine.

The division created by Simcoe’s engineers marked most of the major roads in Toronto and the presence of Garrison Creek can still be seen through the curving streets that run against the normal grid where the creek’s path flowed.

With the development of roads, the population spread towards the west end of Toronto. Garrison Creek attracted new settlement, along with cultural, academic, and religious institutions, greenhouse, and aggregate mining.The large increase in population polluted the creek with sewage and refuge. Rather than being used as a water resource, Garrison Creek was labelled a health hazard that emitted noxious fumes.

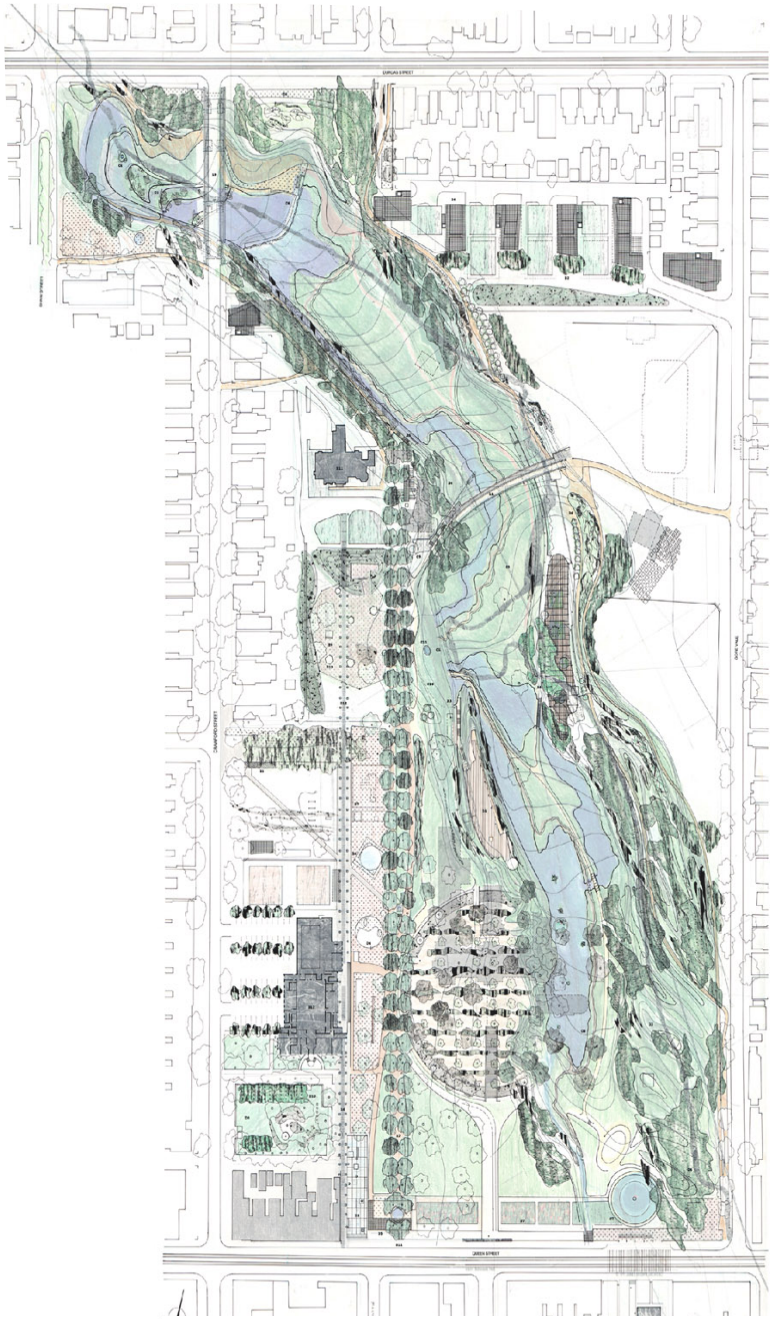
1800’S - 1890’S

By the late 1800s, the City Council decided to take action, developing a plan that included diverting natural meanders of the Garrison creek into a 7.7 kilometers long system of ten-foot diameter brick sewer tunnels. They believed this action would provide a more predictable, safe and serviceable stormwater and wastewater management system.

In spite of the burial of the Creek, the City of Toronto still had a number of bridges that connected the new settlements by crossing through the continuous open spaces created by the ravine. Such infrastructure gave equal importance to the urban system and the ravine system, allowing them to coexist in balance. However, this did no last long as the ravines turned into dumps for the residents and industries.

It was only in the 1960s where the majority of the ravines were levelled with landfills and developments were built over them. Because of this, some houses in the area experience settlement issues to this day, built as they are on landfills from the 1960s.

1890'S - 1960'S



To explore alternative ways to control such hazards, the Waterfront Regeneration Trust commissioned Brown and Storey Architects to investigate the conceptual feasibility of ponds for retaining, treating and re-using storm water in the existing open spaces. Their study traces the route of the buried creek and suggests that the Garrison Watershed can be used as sites for storm-water management pond systems. Besides serving as a local space to collect, treat and re-use storm-water, this pond system also proposed to be a series of connected open spaces that linked both urban and green infrastructure to Lake Ontario.

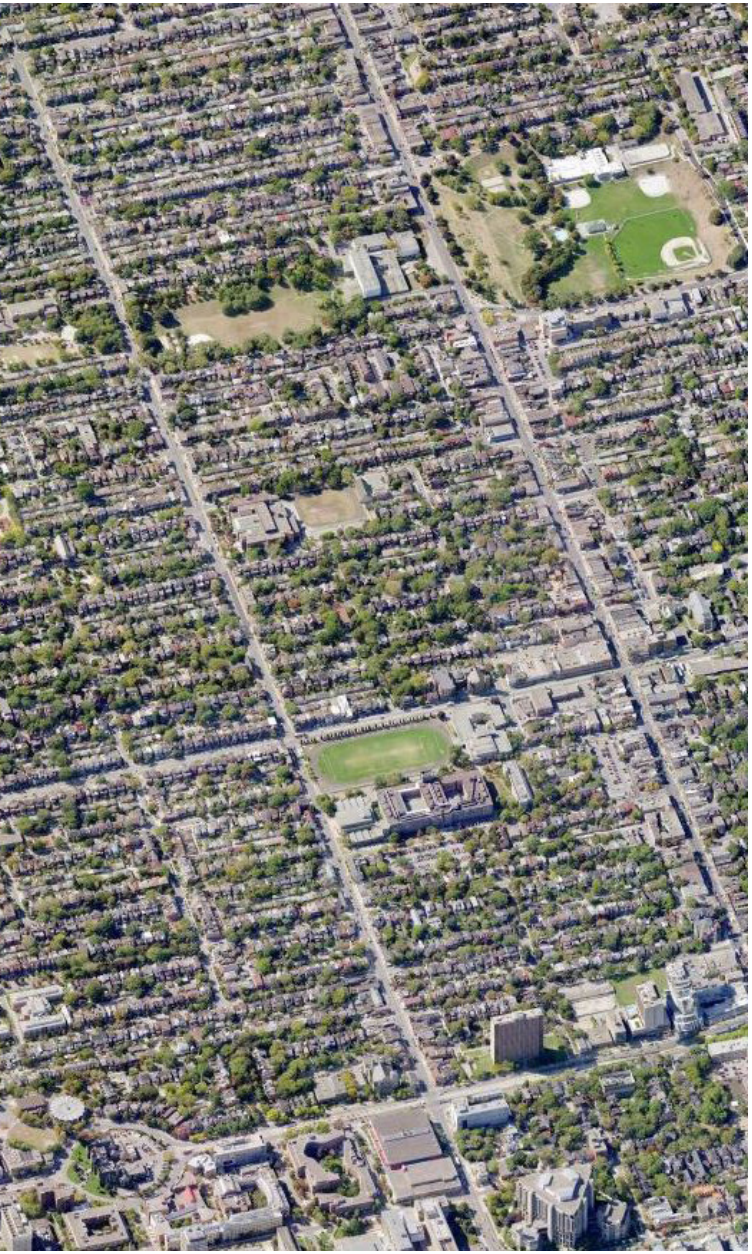


Figure 1-5 Bird's eye view of Toronto as seen today include a trace of the Garrison Creek with its parks . (right to left) Christie Pits, Bickford, Art Eggleton, Fred Hamilton, Trinity Bellwoods, Stanley and Fort York.

Endnotes

1 Michael Cook, "Burying the Garrison Creek: A History [database online]. Toronto, Accessed on 13 November, 2014 , http://www.vanishingpoint.ca/garrison-creek-sewer-history

2 Michael Cook, "Burying the Garrison Creek: A History [database online]. Toronto, Accessed on 13 November, 2014, http://www.vanishingpoint.ca/garrison-creek-sewer-history

3 Garrison creek in Lost Rivers [database online]. Toronto, Accessed on November 18 2014, http://www.lostrivers.ca/content/GarrisonCreek.html.

4 Garrison creek in Lost Rivers [database online]. Toronto, Accessed on November 18 2014, http://www.lostrivers.ca/content/GarrisonCreek.html.

5 Garrison creek demonstration project in Brown + Storey Architects [database online]. Accessed on Dec 12 2014 http://www.brownandstorey.com/projects/garrisoncreek/rainwaterintheurbanlandscapeplaces.pdf

PARKS + COMMUNITY GARDENS

Industrialization during the mid-eighteenth and nineteenth centuries led to large scale migration of people from rural to urban areas, especially in Europe, and then followed in North America. As cities grew larger, sprawled, and replaced countryside, many of the open landscapes that had originally held food cultivation were replaced by parks to cater to the recreational needs of the affluent urban dwellers[1]. Some of the first parks were formed during this era in Britain, especially in the urban areas that the rich urban dwellers located their residential properties, places like Regents Park on London's northern edge[2].

This pattern within cities later evolved into the creation of systems of public parks across most continuously expanding cities in Europe and North America, a process which greatly expanded during the nineteenth century, in the hope of bringing green spaces to urban areas of the middle class and working poor[3]. Parks, in the contemporary world, continue to be perceived as spaces for recreational and community activities alone, a legacy of their original role as a safety valve for the social pressures of crowded cities. As a result, they do not today cater to the overall environmental and productive purposes that a city's landscape should fulfill[4].

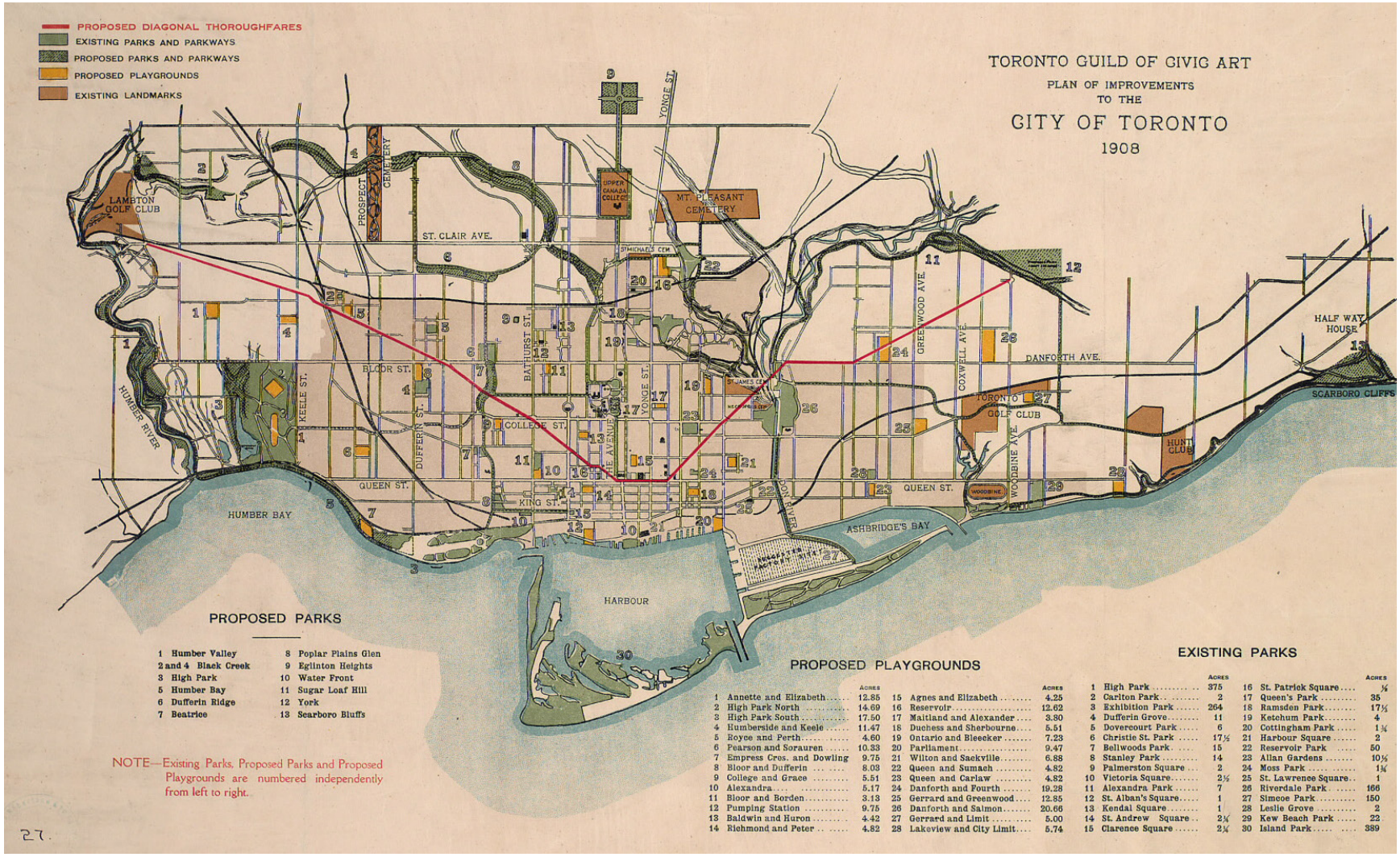
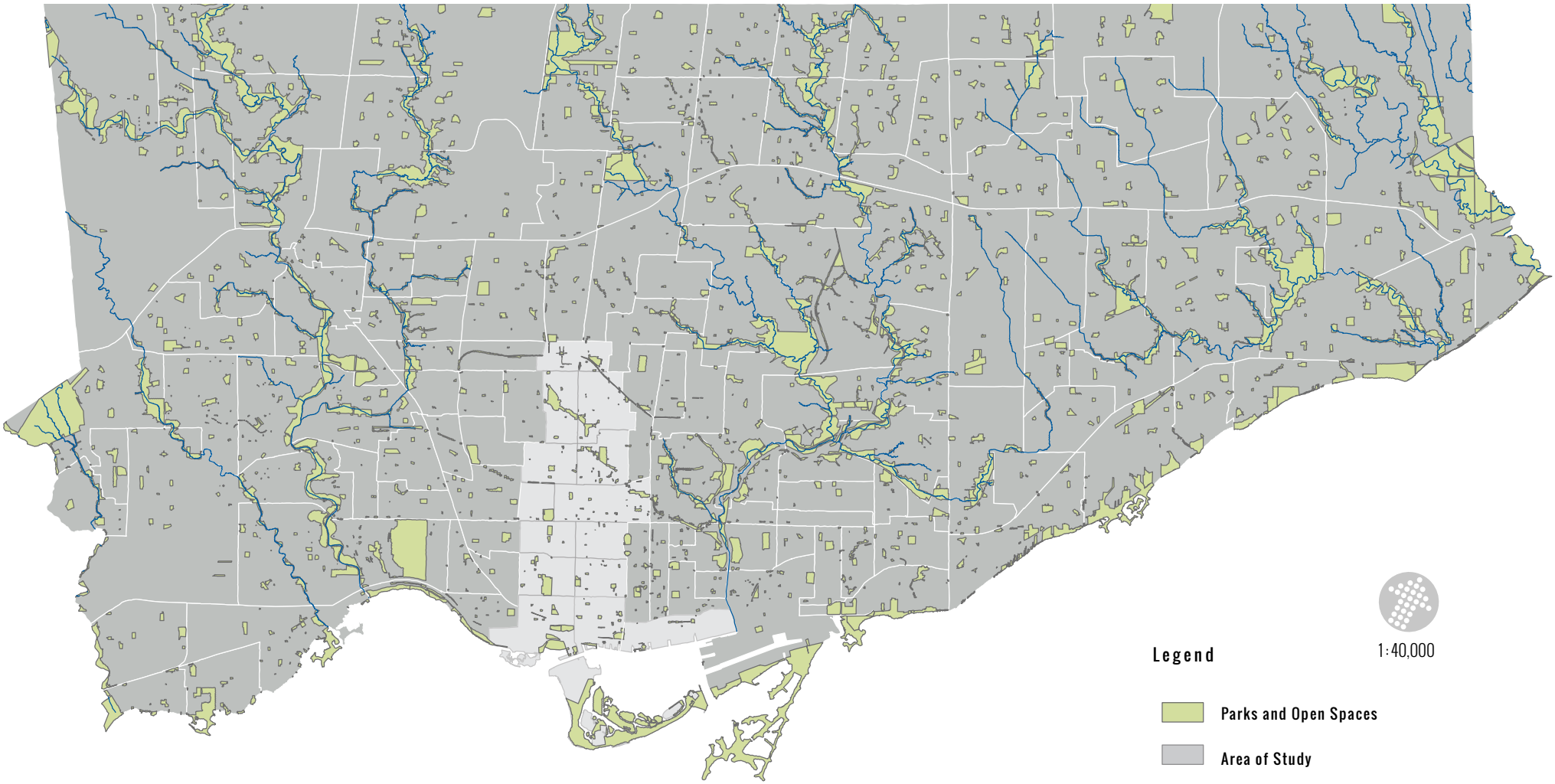


Figure 2-1 The civic improvements map in 1908 with a list of proposed parks, playgrounds and the existing parks.



- 1,600 parks in Toronto
- 84 sq. km or 20,500 acres of parkland and natural spaces in Toronto
- 13% of the city is occupied by parks and natural spaces
- 1.3 million Toronto residents visit a park at least once a week
- 365,000 visit a park every day
- 60 “Friends of” park groups across the city

Figure 2-2 Following the previous map is the existing set of parks and open spaces .

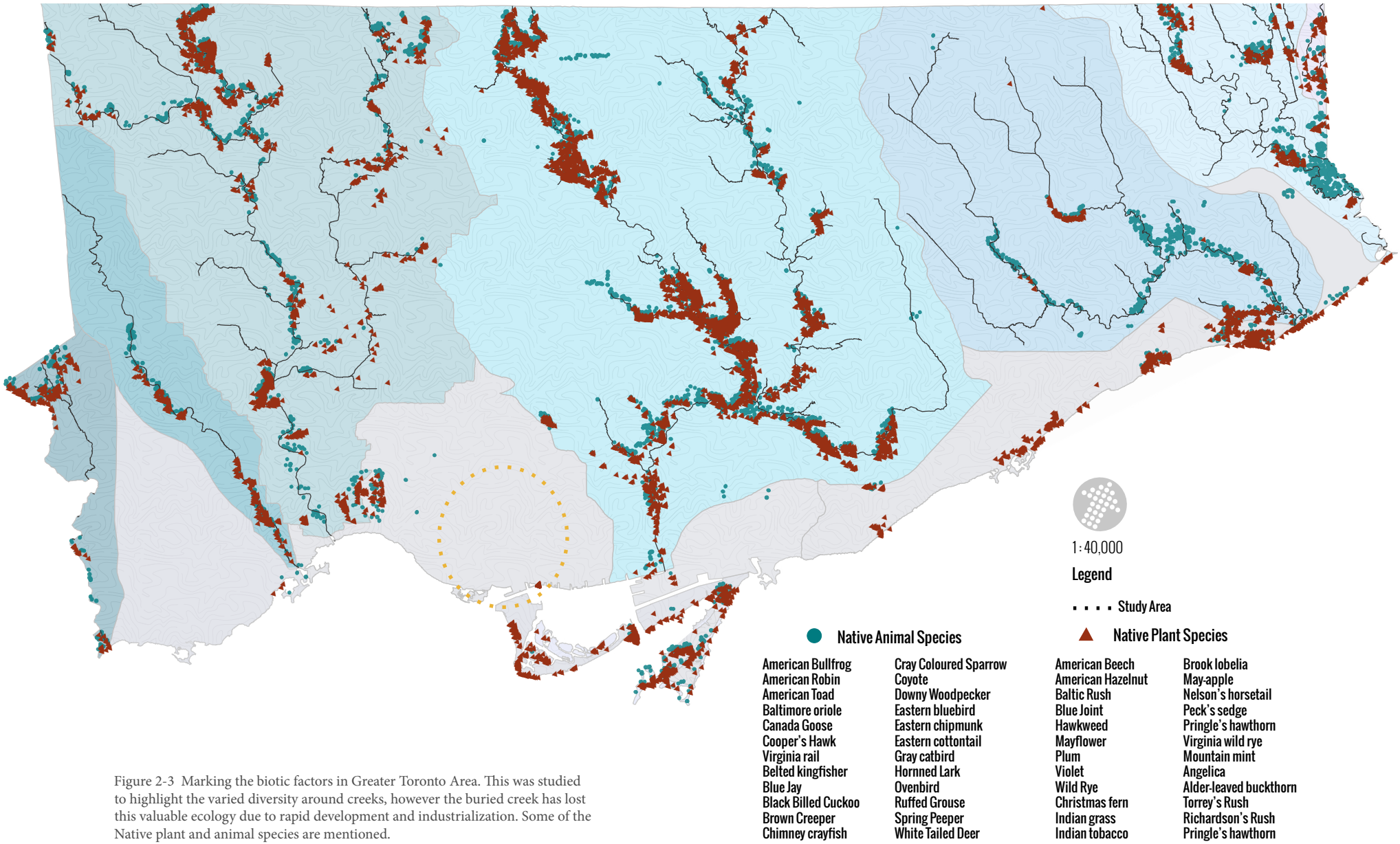


Figure 2-3 Marking the biotic factors in Greater Toronto Area. This was studied to highlight the varied diversity around creeks, however the buried creek has lost this valuable ecology due to rapid development and industrialization. Some of the Native plant and animal species are mentioned.

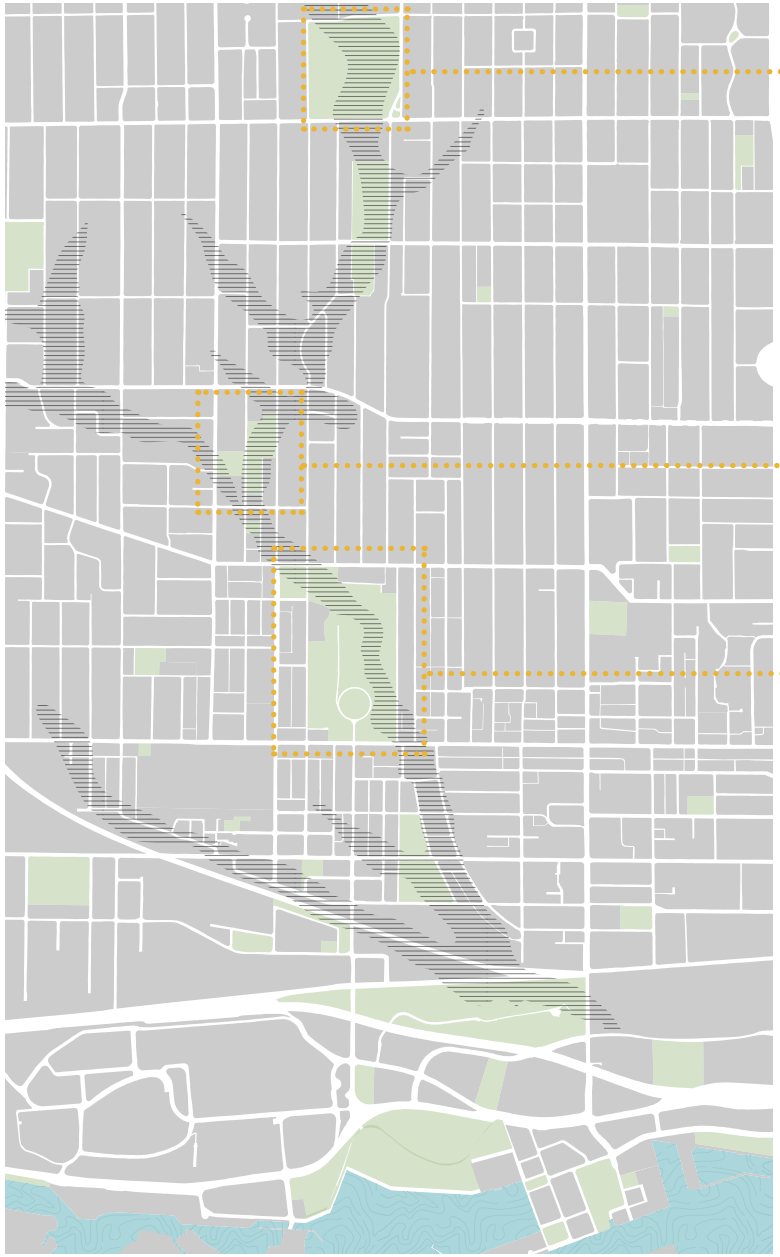


Figure 2-11 This map shows some of the native tree species found in the major parks along the creek.

CHRISTIE PITS PARK

Hackberry Tree
(Celtis occidentalis)
Kentucky Coffee Tree
(Gymnocladus dioicus)
Tulip Tree
(Liriodendron tulipifera)
London Plane Tree
(Platanus acerifolia)
Red Oak
(Quercus rubra)
Swamp White Oak
(Quercus bicolor)
Little Leaf Linden
(Tilia cordata)

FRED HAMILTON PARK

Red Oak
(Quercus rubra)
America Basswood
Freeman Maple
White Pine
Balsam Fir

TRINITY BELLWOODS

Bitternut Hickory
(Carya cordiformis)
Japanese Pagoda tree
Black Locust
(Robinia Psuedoacacia)

Figure 2-8 Red Oak

Figure 2-4 Hackberry Tree

Figure 2-5 Kentucky Coffee

Figure 2-6 Tulip Tree

Figure 2-7 London Plane

Figure 2-9 Freeman Maple

Figure 2-10 BitternutHickory

There is increasing demand for allotment gardens in most big cities. Today, the need for social and recreational park space continues unabated, but there has also been a surge in demand for food gardens, especially among the apartment dwellers in rapidly expanding cities[5]. These gardens have been found to be highly productive and the process of creating them has been applicable to any open wasteland within cities[6]. Even though these gardens were in demand originally due to high cost of living, and unemployment, they also serve the purpose of having environmentally conducive, productive landscapes in cities, an aspect which also attracts the wealthier urban residents[7]. As unused open urban wasteland space is depleted, this need for urban cultivation and the requirement for parks to function as ecologically significant spaces has resulted in the formation of community gardens within public parks.

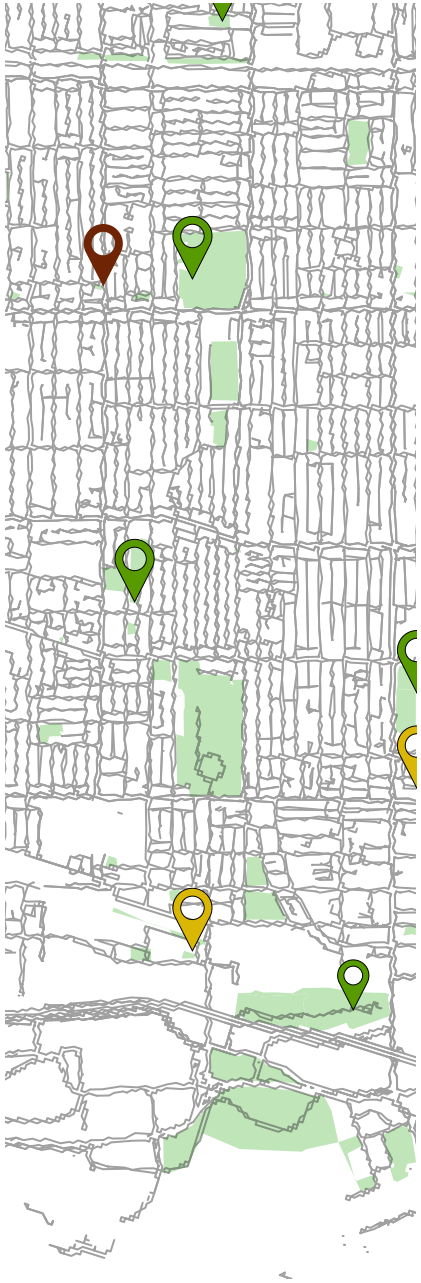
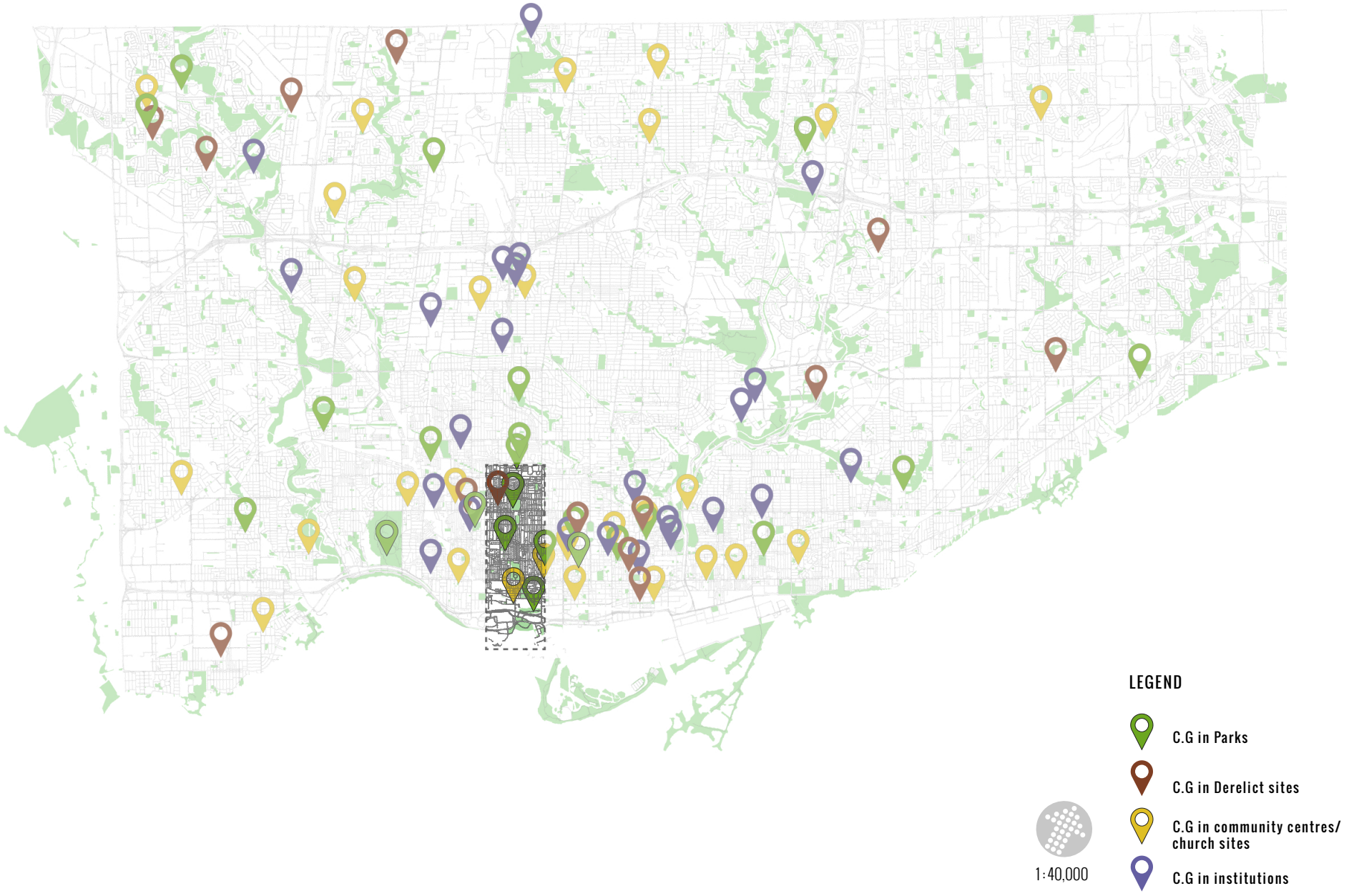


Figure 2-12 Mapping the existing location of community gardens. The gardens are categorized based on the land use of the site. This helps to understand emergence of community garden in the city with respect to the no. of parks facilitating them.


LEGEND
C.G in Parks
C.G in Derelict sites
C.G in community centres/ church sites
C.G in institutions
1:40,000

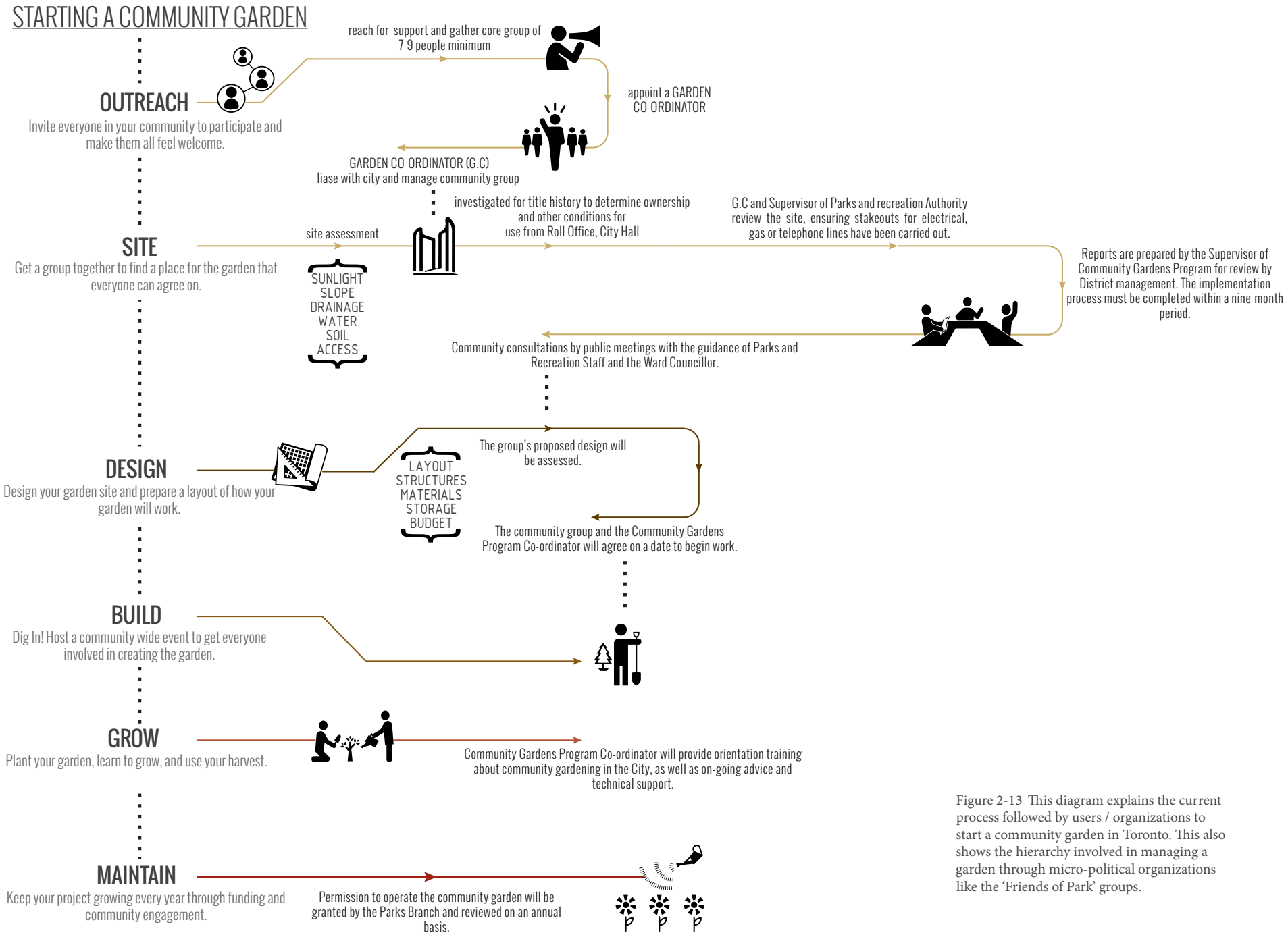


Figure 2-13 This diagram explains the current process followed by users / organizations to start a community garden in Toronto. This also shows the hierarchy involved in managing a garden through micro-political organizations like the 'Friends of Park' groups.

Endnotes

1 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 15–17.

2 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 15–17.

3 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 15–17.

4 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 15–17.

5 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 220–223.

6 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 220-223.

7 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984, 220-223.

"Designing Urban Agriculture is about the intersection of ecology, design and community. It is a dialogue on the ways to invite food back into the city and forge a path towards creating healthier communities and healthier environment."
-April Philips, Designing Urban agriculture

Figure 3-1 (Opposite page)Drawing by Angela Rizza, "Urban Agriculture Ink"

PRECEDENTS

A basic study of urban food production systems will help one understand the variety of implementation patterns devised by various designers. The selection for this thesis of applicable case studies drawn from a large pool of successful projects was based on a set of variables.

One key variable considered during the selection of the cases was the purpose of the project itself. Projects were analyzed for similar environmental, educational and social objectives. The facilities provided during the design phase and principles followed during ongoing operations within the site were key indicators of the intent of these projects. Since this thesis caters to a wide range of parks in terms of size, it was important to analyze and select projects of different scales. The projects presented below range from 1720 square metre to 35 hectares in size. Another variable to consider was the design approach adopted by the projects. The use of sustainable systems and the right implementation of the same had to be ingrained in the design approach. Most of the projects are also wasteland projects built on temporarily unused land and outside the official park system.

The main design process of this thesis, however, was inspired by the Rem Koolhaas competition design proposal for Parc de la Villette in Paris. The open-ended, layered systems and objects based, flexibility provided in the design process for this iconic never-built park was a determining factor in its selection for study and was a central motive for the thesis design itself. Like the other case precedents La Villette was built on an abandoned slaughterhouse district serving the historic access canal to Paris.[1]

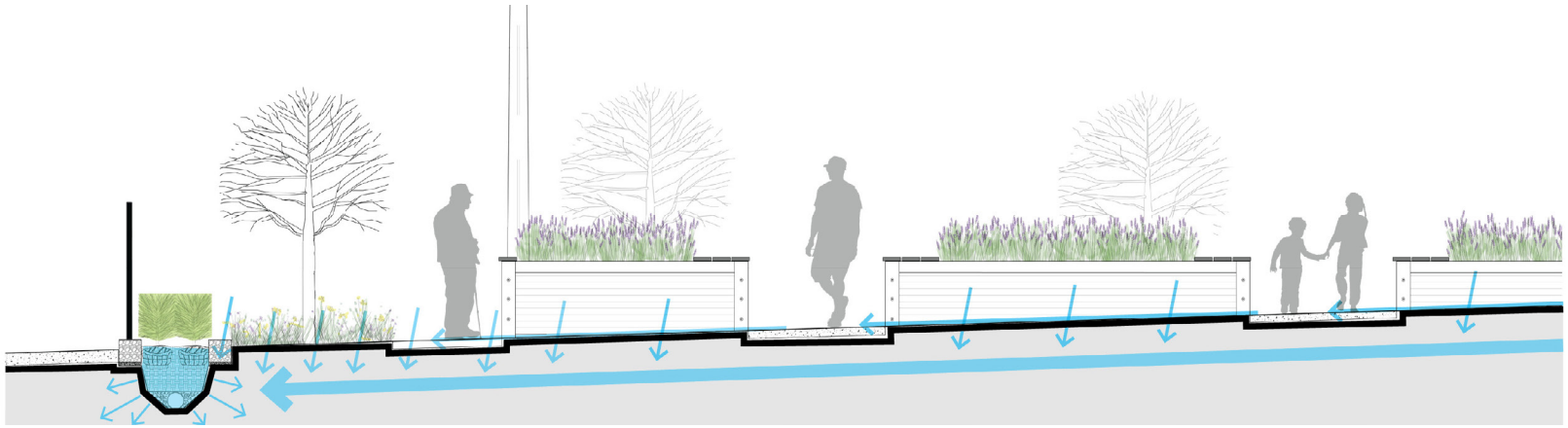
LAFAYETTE GREENS
DETROIT
KENNETH WEIKAL LANDSCAPE ARCHITECTS

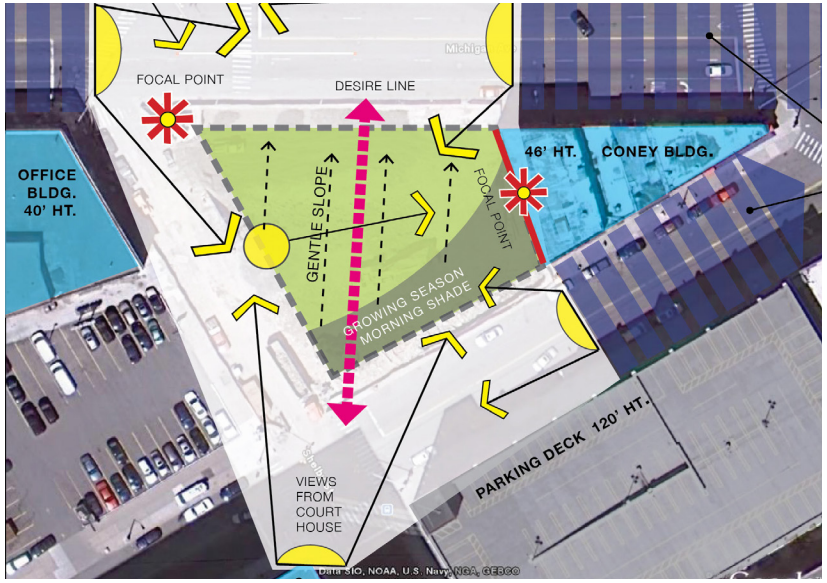
This 1720 square metre garden fills a vacant parcel after the demolition of the historic Lafayette Building in the downtown core of Detroit. However, owned by Compuware, a large software corporation headquartered in Detroit, Lafayette Greens is a cooperative effort between private and public sectors resulting in a positive and productive interim use of a vacant parcel in the city[2]. The overall design of Lafayette Greens was shaped by the site analysis and is a typical 'wasteland" project.

Raised vegetable beds were oriented for optimal sun exposure based on sun angle studies, especially critical in an environment of tall buildings. Pedestrians can move through the space quickly, rest on a bench or enter the garden and explore over 200 types of vegetables, fruits, herbs and flowers[3]. The main sustainability concepts that were used are storm water management, re-purposing old materials for re use, organic methods of growing and biodiversity with a variety of over 200 species of plants and vegetables[4].

Figure 3-2 (Top) View of the entrance and tool shed.

Figure 3-3 (Below) Section showing the storm water run off





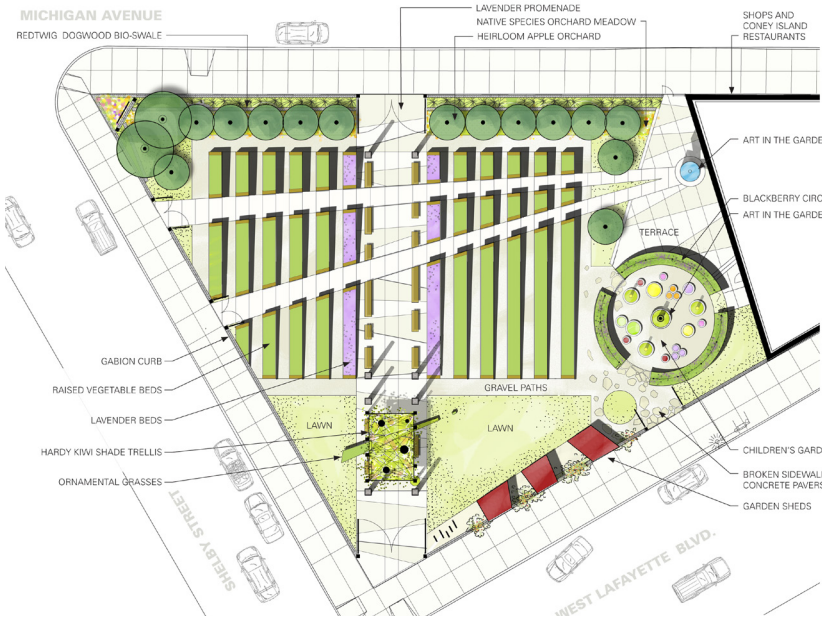


Figure 3-4 (Above) View of the community garden

Figure 3-5 (Left top) Shade diagram overlaid on the site

Figure 3-6 (Left bottom) Site plan

WEST OAKLAND URBAN FARM PARK
WEST OAKLAND
CMG LANDSCAPE ARCHITECTS

The architects collaborated with City Slicker Farms and Emerald fund through a community based design process and prepare a conceptual plan for an 8000 square metre abandoned lot to propose a urban farm/ park. The project was designed to serve as a recreational amenity and farming area for the public. With extensive consultation with area residents the project will contain lawn space (for kids to run, play, and exercise), a vegetable-growing area, a community garden, a fruit orchard, a chicken coop, a beehive, a dog run, and a tot lot. The local groups of the neighbourhood played a vital role. CMG prepared and presented site information, ran design workshops, and used community input to create a final park design proposal and application for a California Parks Grant[5].

Figure 3-7 Proposed Masterplan of the park.

STRATHCONA GARDEN PARK VANCOUVER

Figure 3-8 An aerial view of the Strathcona Garden Park

A volunteer- managed public green space on 1.35 hectares of city land in Vancouver Eastside. Local residents began transforming the site from an informal dump in 1985. Recognizing its role as a leader in community-run ecological stewardship, the Park Board signed a 25 year lease in 2005 with the Strathcona Community Gardeners Society, a non – profit charitable organization which members join each year to renew their garden plots[6]. The garden caters to three main foci that this thesis strives to offer. First, as an area where residents grow their own organic food, herbs and flowers, and at the same time, as an urban oasis to socialize and relax. Second, the garden offers an inner city habitat space for wildlife, and thirdly, it educates gardeners and the community on organic food techniques, composting, and other urban ecological skills. This park features an eco-pavilion, a building that incorporates natural systems and uses reclaimed material, a greenhouse, storage sheds, bee shed and hive, orchard, children's play areas and 200 garden plots[7].

SUMMER GROSVENOR ISLAND PARK
NEW YORK
MICHAEL DESVIGNE

This project was a competition entry. The idea of the proposal for the Masterplan was derived from the grid plan of Manhattan, which is used for the development strategy[8]. The grid is laid out to accommodate a wide variety of plant material. These grids and plots are then interjected by contrasting language of streams which supports a productive edible landscape. "The Summer Park was a proposal related rhythms of urban life with nature, a structure directly inspired vocabulary and agricultural processes. It is a mosaic of different parts, which reflects a stratified layers, meanings and rhythms still defining forest areas of variable density, adapting the solid parts and empty buildings and facilities as well as sports and leisure s 'must build'.[9]" By becoming productive, the park facilitates the continuous interaction among man, infrastructure and nature.

Figure 3-9 (Left)A view of the proposed productive landscapes on the island.

Figure 3-10 (Right) Masterplan of the island

EDIBLE SCHOOLYARD
NEW YORK
WORK AC

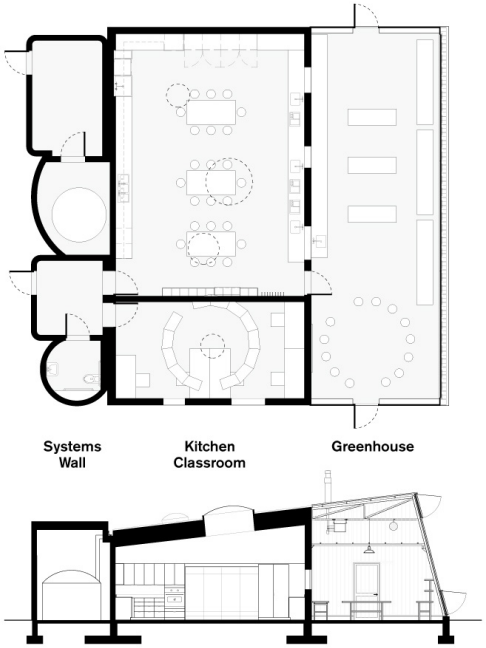


Figure 3-11 (Left) Plan and Section of the Edible Schoolyard Project.

Figure 3-12 (Bottom left) Exterior view of the Systems wall.

Figure 3-13 (Bottom middle) Exterior view of the greenhouse.

Figure 3-14 (Bottom right) Interior view of the greenhouse.

The primary focus of this project is to engage the school children, their parents and the community around about the process of food production, but also demonstrate principles of self-sufficiency. The architects had to create an environment that could cater to an interdisciplinary curriculum tied to the school board, connecting food to academic subjects taught at school. The project is centered on a kitchen classroom that is surrounded by a mobile greenhouse on one side and a "systems wall" on the other, containing various service functions that ensure the building is self-sufficient[10]. The "systems wall" integrates many technical systems like rain water harvesting tank, solar power stations, organic and farming waste segregation and tool cleaning and storage[11].

PARC DE LA VILLETTE
PARIS
OMA

This project Rem Koolhas develops a strategic method "that combines architectural specificity with programmatic indeterminacy.[12]" The representation of a new way of life or culture is the main focus of the competition's program. Koolhas represented his ideas in seven diagrams (Fig. 3-17). These layers form a set of programmatic hieroglyphics which allows any shift, modification, replacement or substitution of activities while maintaining a strong continuity and unity. This allows for "a flexible and unified organic process with active improvisation of users.[13]" This project was studied to understand the key concept of Parc de la villette; it's "ambition to create a flexible and anticipatory structure that is enriched by the unforeseeable conditions of urban life, by improvisations of users, and by its working principles.[14]"

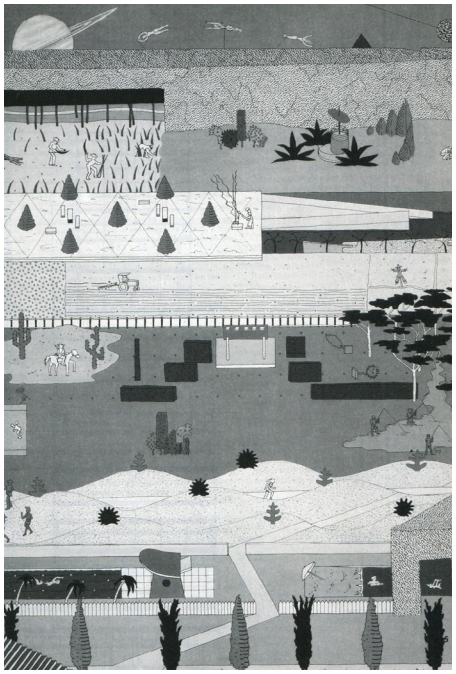
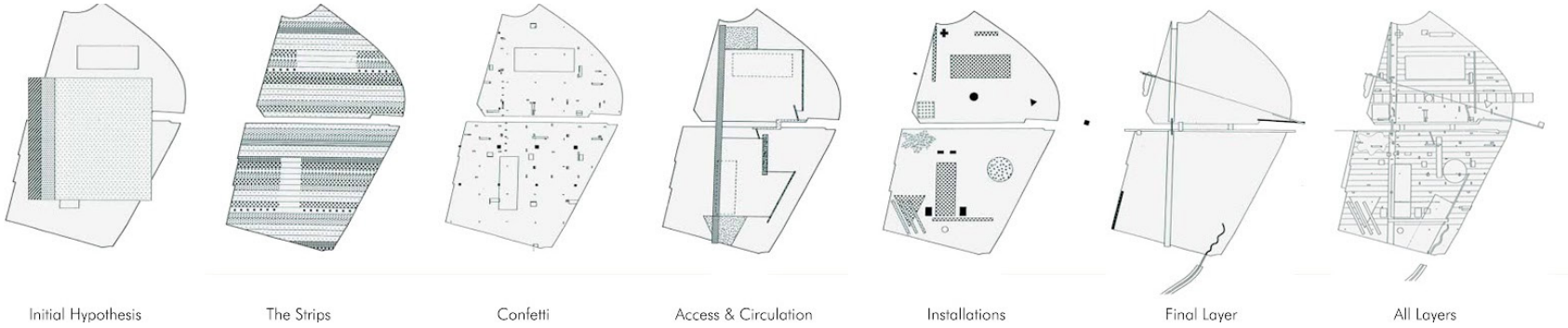
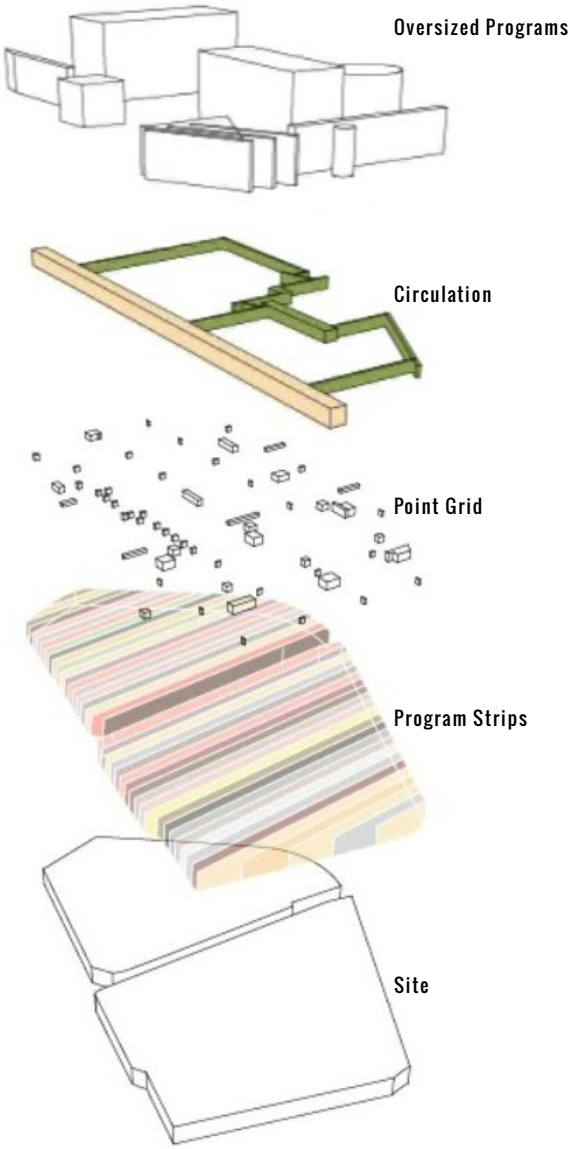


Figure 3-15 (Right) A sketch of Parc de la Villette by Rem Koolhaas.

Figure 3-16 (Bottom) The Seven diagrams which constitute to the organization of the park





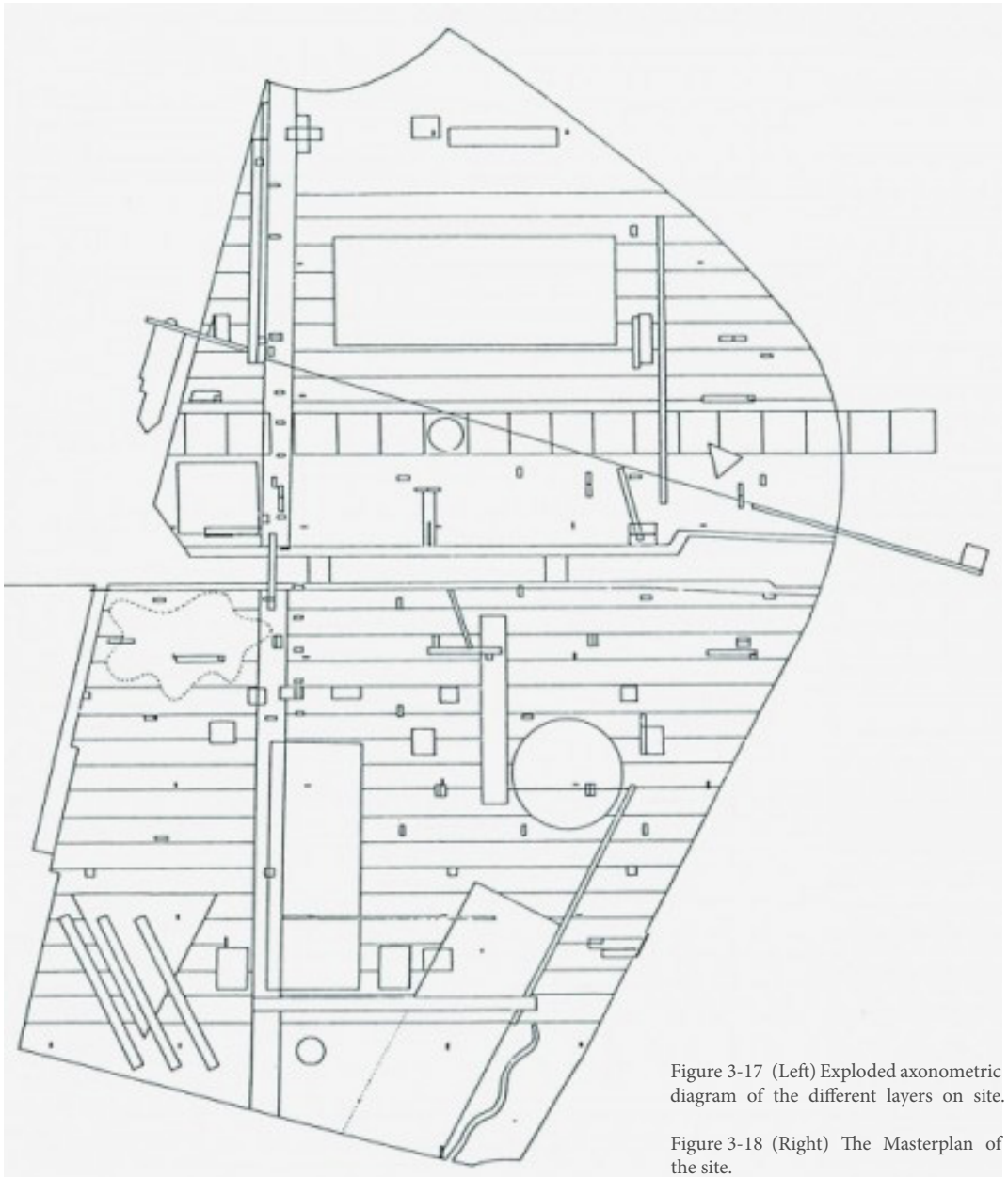


Figure 3-17 (Left) Exploded axonometric diagram of the different layers on site.

Figure 3-18 (Right) The Masterplan of the site.

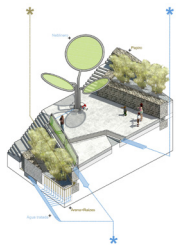
PARQUE LOMAS
LIMA
MARIUS EGE

The winning design of Marius Ege (and assisted by Antje Stokman) at the Juan Günther Doering challenge for the city of Lima, Peru is one that elaborates strategies for site-specific systems and management. Based on a comprehensive analysis of the situation on the ground, the designer proposed a strategy catalog which consisted of three basic elements, with which the park is to be stabilized as a settlement[15]:

(1) Urban agriculture for local residents,
(2) An apparatus for mist trap for water supply
(3) Involvement of local people in the design, operation and management of the park.

Based on this input from the residents and taking into consideration the landscape of the city, a route was designed, comprising mainly of a set of platforms used to facilitate various urban agricultural needs. Residents could associate to and use such formations as it was similar to the Incas[16]. These platforms also highlights the edge of the city, thereby protecting the rest of the valley from settlements. The railing for the path system is covered with a mesh that could be used to collect water, thence used for irrigation across the park[17]. The park is also facilitated with a drip irrigation system that will ensure the afforestation of the surroundings that was once green[18].

The project interprets the principle of the free space protection by an open space design in a manner that meets the specific requirements of the site justice not only in design, but also in the proposals for procedures.



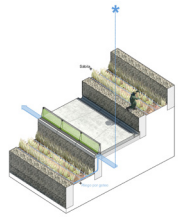


Figure 3-19 (Right) View of the proposed overall park system

Figure 3-20 (Bottom) Site section

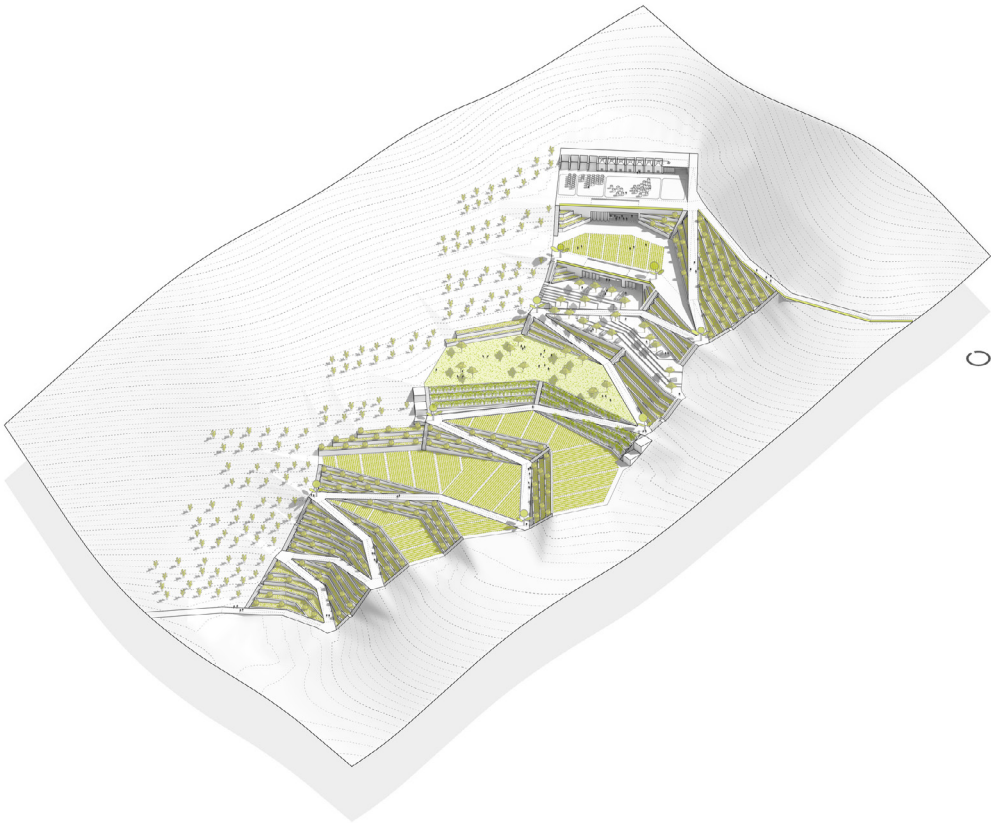
Figure 3-21 (Previous page top) Summer and Winter view of the existing site

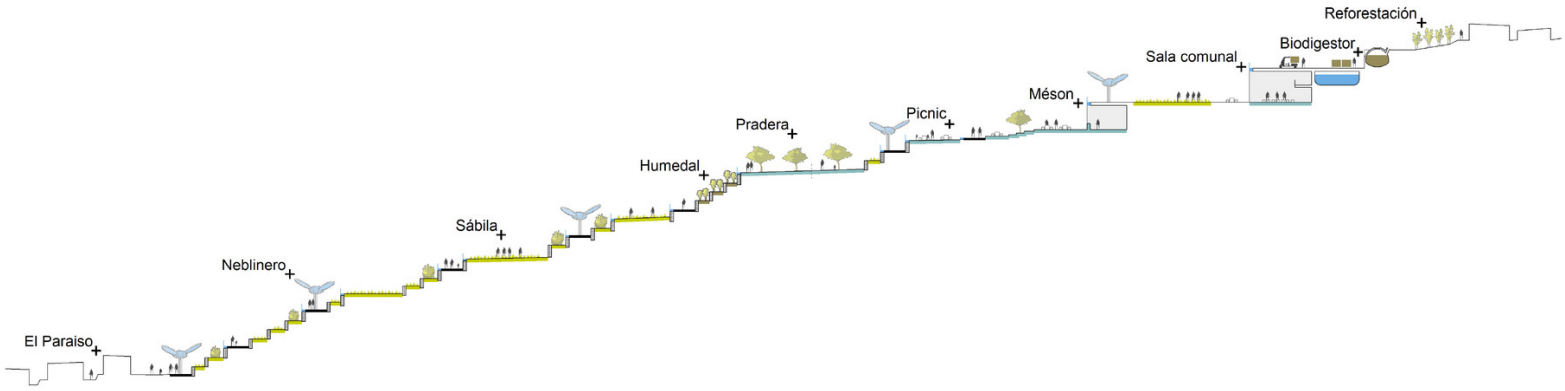
Figure 3-22 (Previous page middle) View of the park catchers

Figure 3-23 (Previous page bottom left) Detail section of the picnic area

Figure 3-24 (Previous page bottom middle) Detail Section mist catchers

Figure 3-25 (Previous page bottom right) Detail section of the storm water collection system.





Endnotes

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12 Rem Koolhaas, Bruce Mau, Jennifer Sigler, and Hans Werlemann, *Small, Medium, Large, Extra-Large (*New York, N.Y.: Monacelli Press, 1998) 921-922.

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15 Daniela Galdames. *Primer Lugar Concurso Juan Gunther En Lima, Perú. Plataforma Arquitectura*. http://www.plataformaarquitectura.cl/cl/02-338055/

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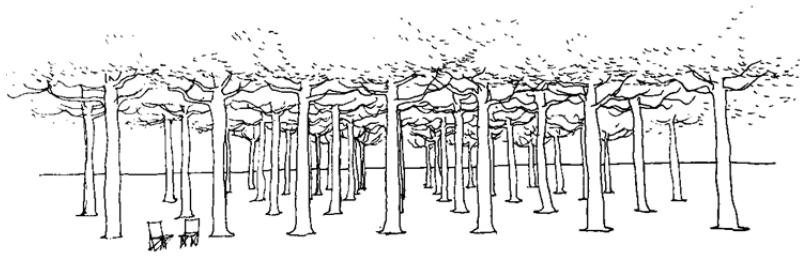


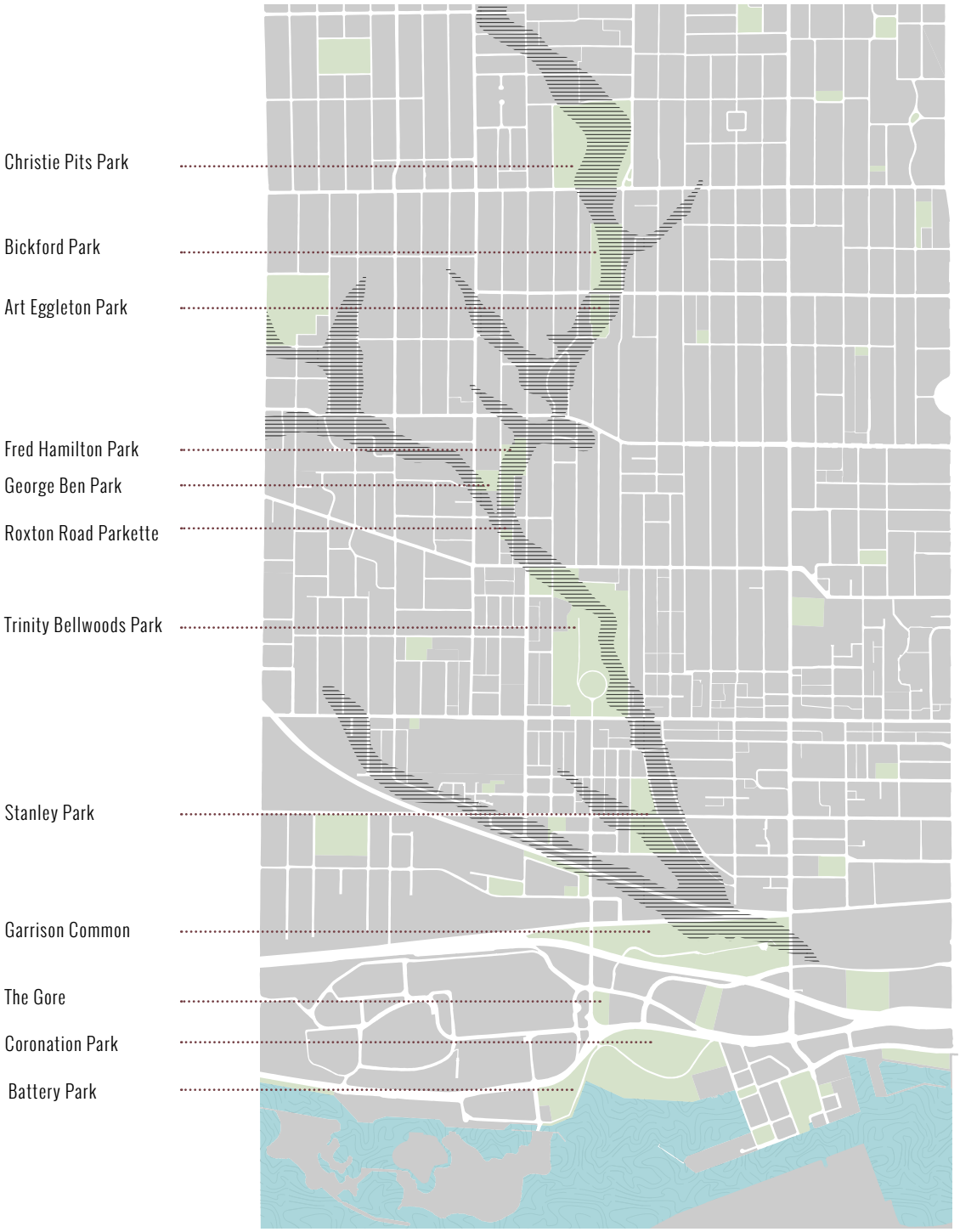
"Underlying all these metaphors and mythic constructions is a simple fact that each site has its own special qualities of stone and earth and water, of leaf and blossom, of architectural context, of sun and shade, of sounds and scents and breezes. Seek these out, and you will discover promises of formal order or artful naturalism- the beginnings of your garden."

- Charles Moore, Poetics of Garden

SITE ANALYSIS

The analysis presented in this chapter consists of mappings along the Garrison Creek System. The buried creek is overlaid on the existing conditions of the site.

Figure 4-1 A sketch done by Charles Moore for 'Poetics of Garden'.


Christie Pits Park
Bickford Park
Art Eggleton Park
Fred Hamilton Park
George Ben Park
Roxton Road Parkette
Trinity Bellwoods Park
Stanley Park
Garrison Common
The Gore
Coronation Park
Battery Park

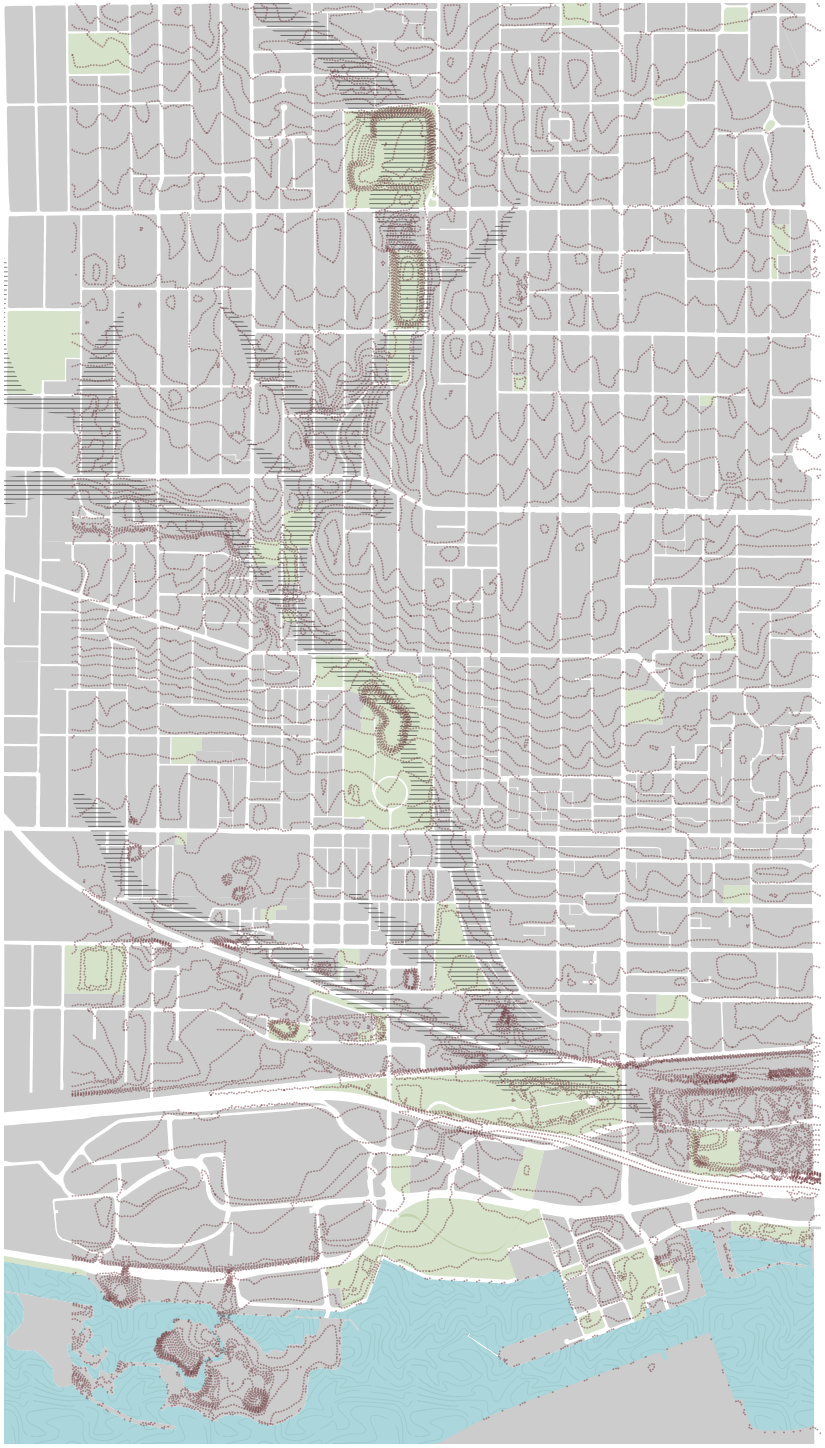
1:25,000

Figure 4-2 (Opposite page) The existing park system along the Garrison Creek

Figure 4-3 (Left) The current city grid overlaid on the buried Garrison Creek. These main streets are densely populated to make better use of infrastructure and regenerate public life.

Figure 4-4 (Right) This map shows the existing topography along the parks. The topography around the parks are mostly flat and the existence of the ravine is reminded by the sudden variations in the parks. This varied topography plays a central role in the design proposal, as it is used as a tool to blend the existing landscape with the proposed landscape.

Figure 4-5 (Opposite page) Birds eye view of the parks in the urban fabric.



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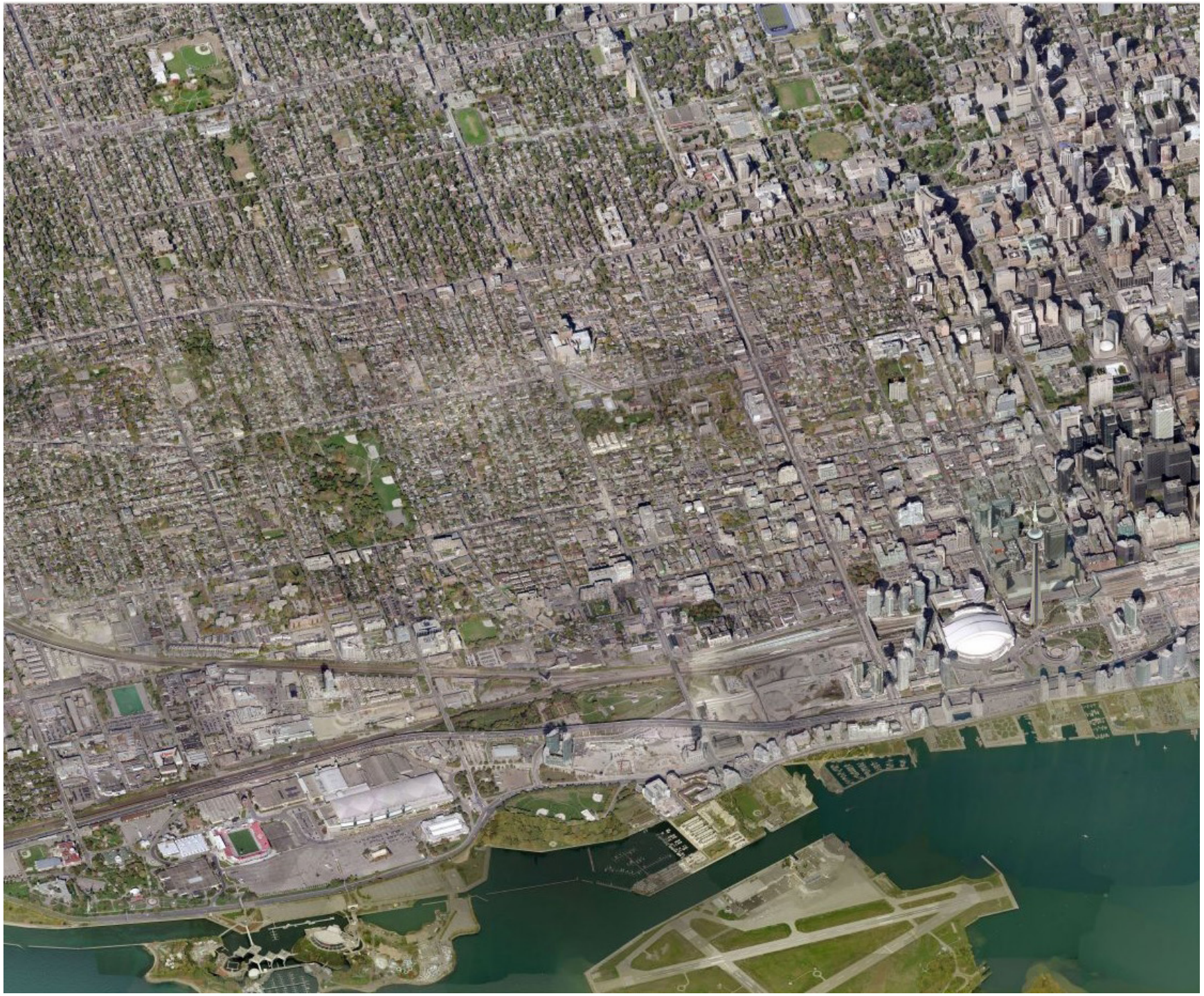


Figure 4-6 Panorama view of Bickford park

Figure 4-7 Panorama view of Art Eggleton Park

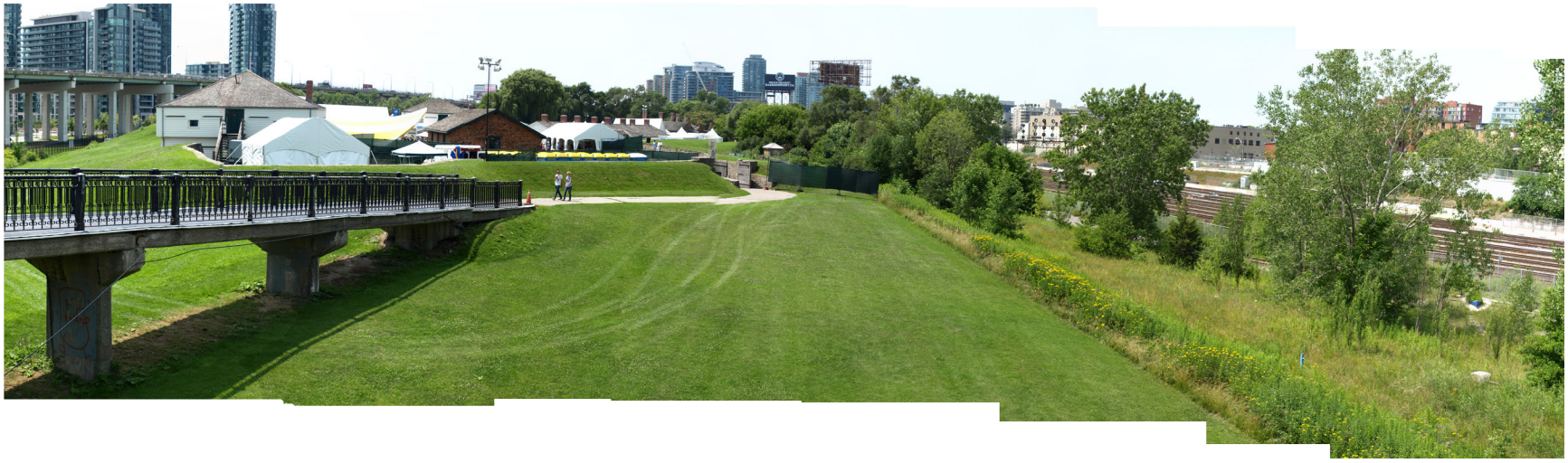


Figure 4-8 Panorama view of Garrison Commons park

Figure 4-9 Panorama view of the dog bowl in Trinity Bellwoods Park

Figure 4-10 Panorama view of Trinity Bellwoods Park

Figure 4-11 Panorama view of Stanley park north, showing the undulating topography and the children's play area.

Figure 4-12 Panorama view of Stanley park North

Figure 4-13 Panorama view of Fred Hamilton Park.

Figure 4-14 Panorama view taken from the field-house looking at the Alexander Duff Swimming pool.

Figure 4-15 Land use map around the parks along the Garrison Creek

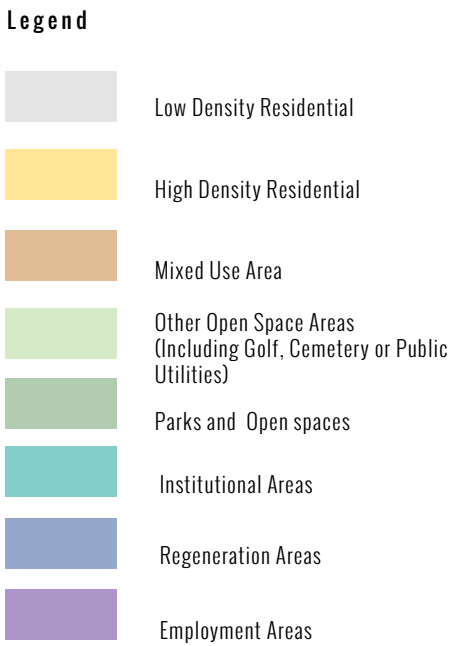
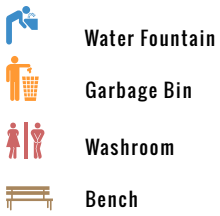
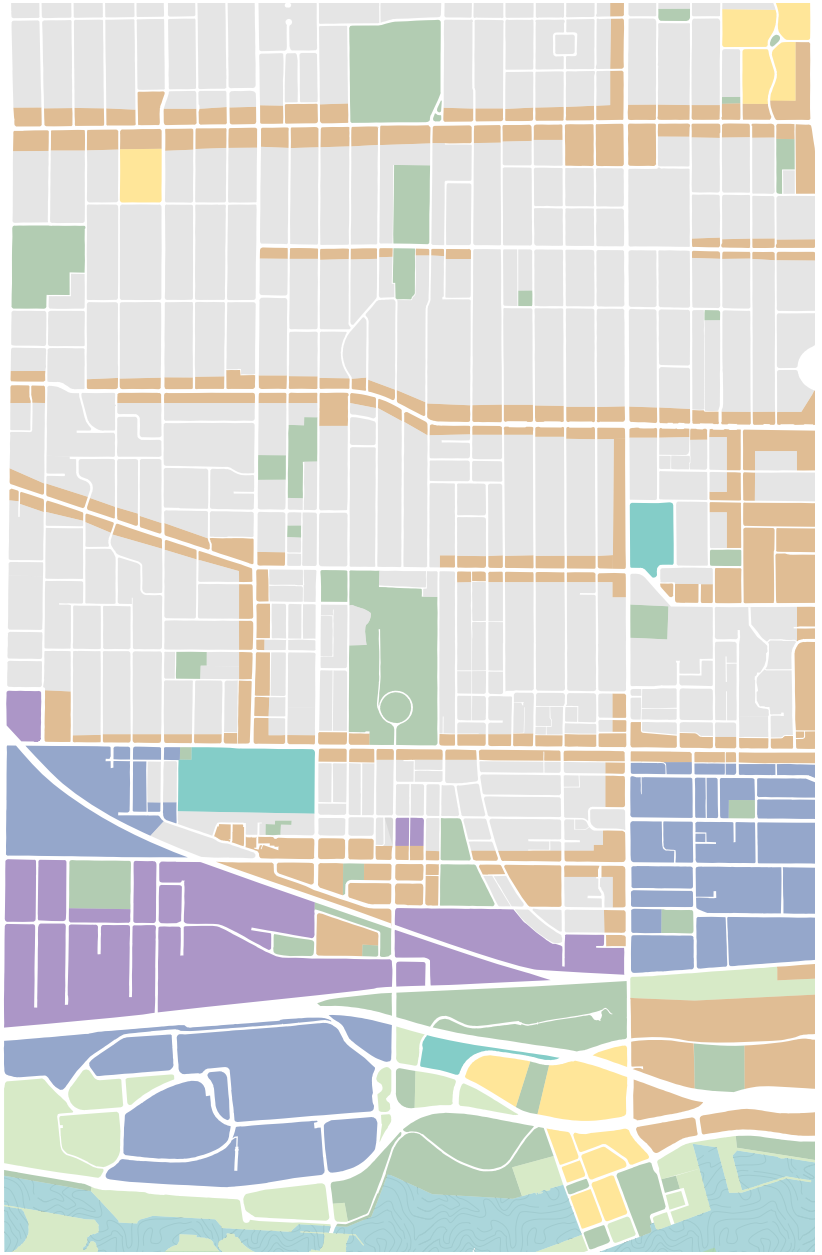
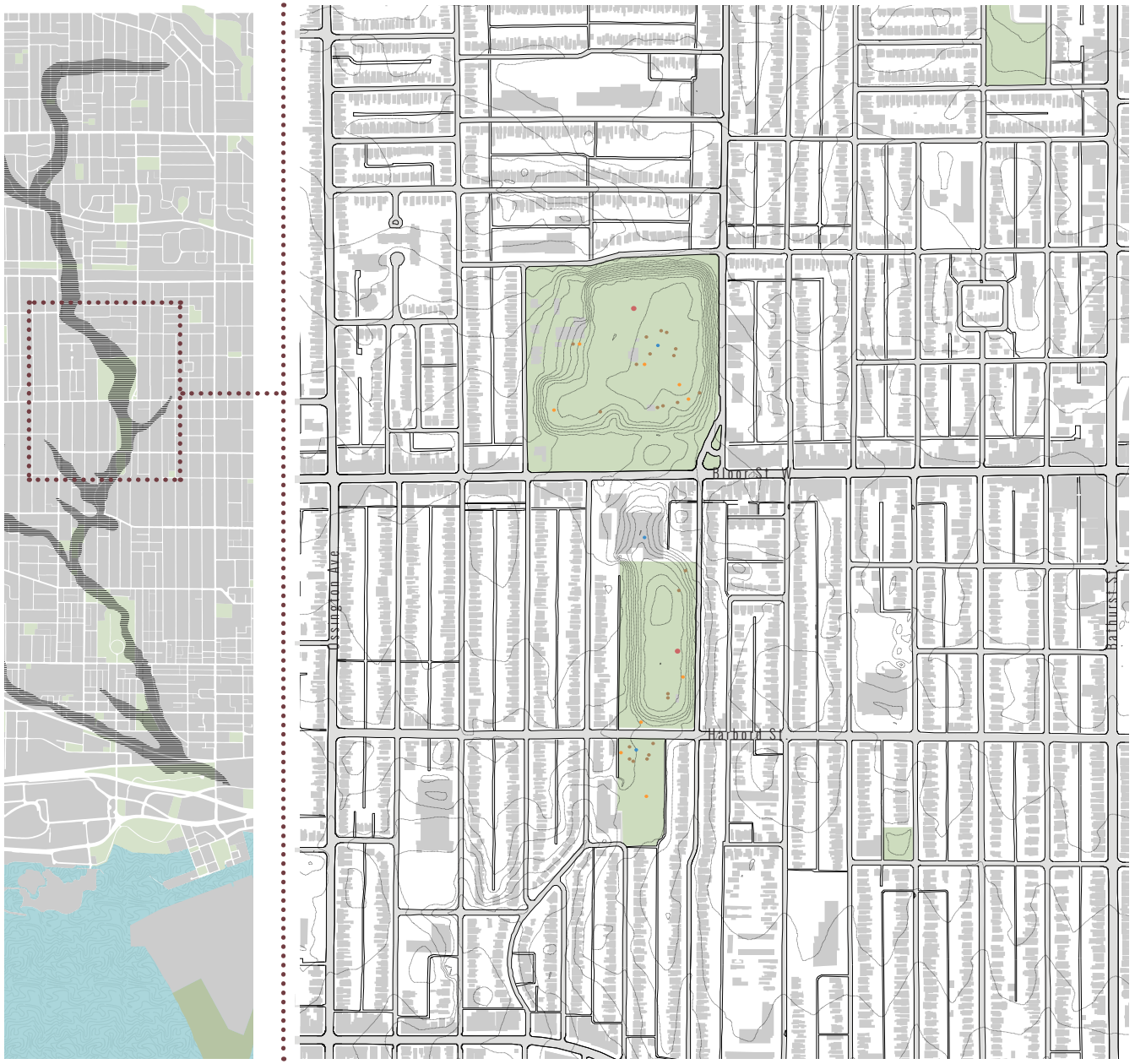


Figure 4-16 (Next page) Mapping of water fountains, washrooms, benches, and trash cans in the parks that fall along the path of the Garrison Creek. Parks in focus: Christie Pits Park, Bickford Park and Art Eggleton Park







1:10,000

Christie Pits Park

Bicford Park

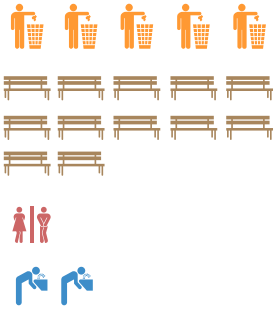
Art Eggleton Park

Figure 4-17 (Right) Mapping of water fountains, washrooms, benches, and trash cans in the parks that fall along the path of the Garrison Creek. Parks in focus: Fred Hamilton Park, Roxton Road Parkette, Trinity Bellwoods Park.

Legend

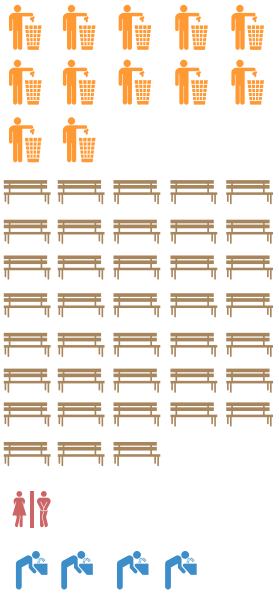
- Water Fountain
- Garbage Bin
- Washroom
- Bench

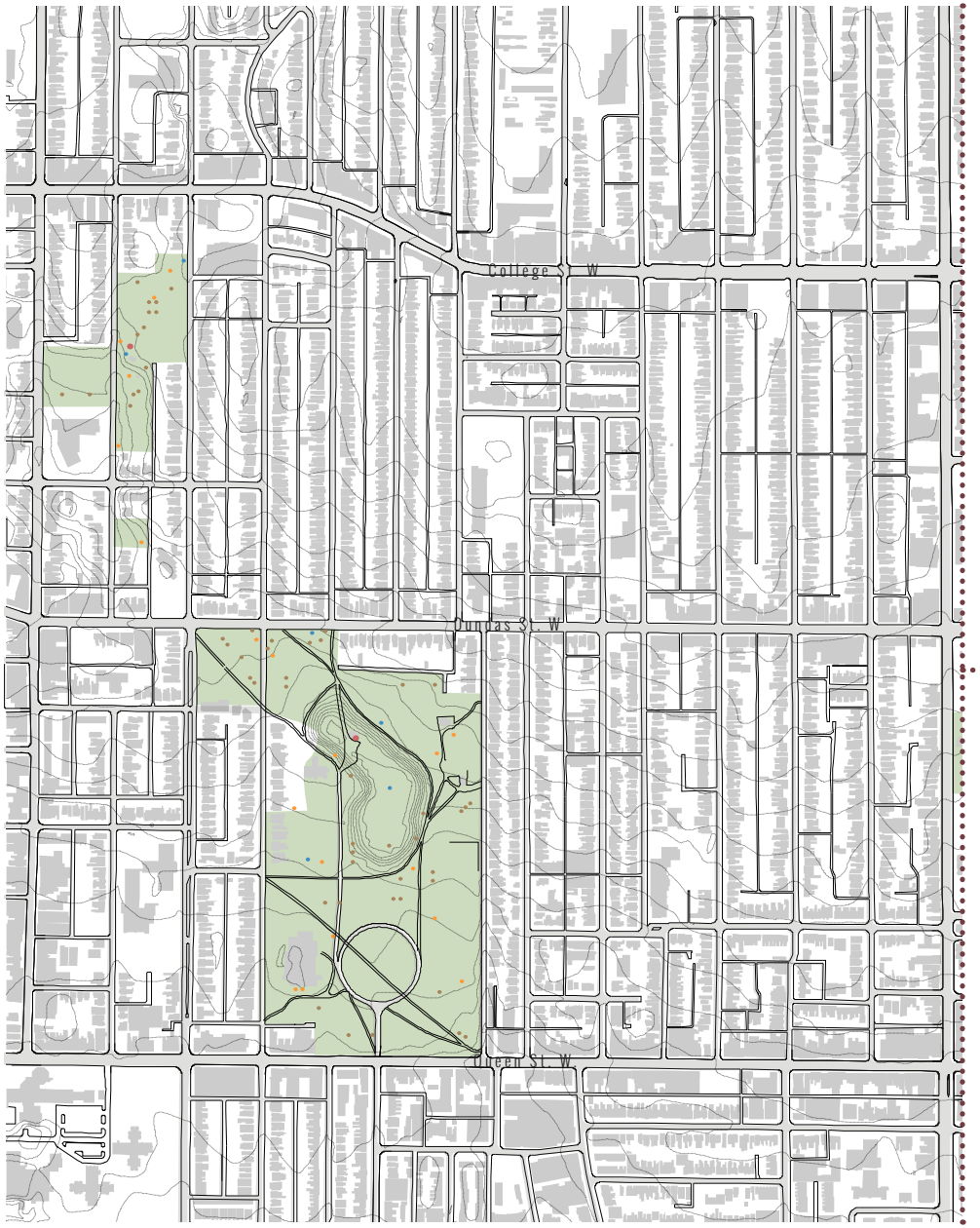
Fred Hamilton Park



Roxton Road Parkette

Trinity Bellwoods Park





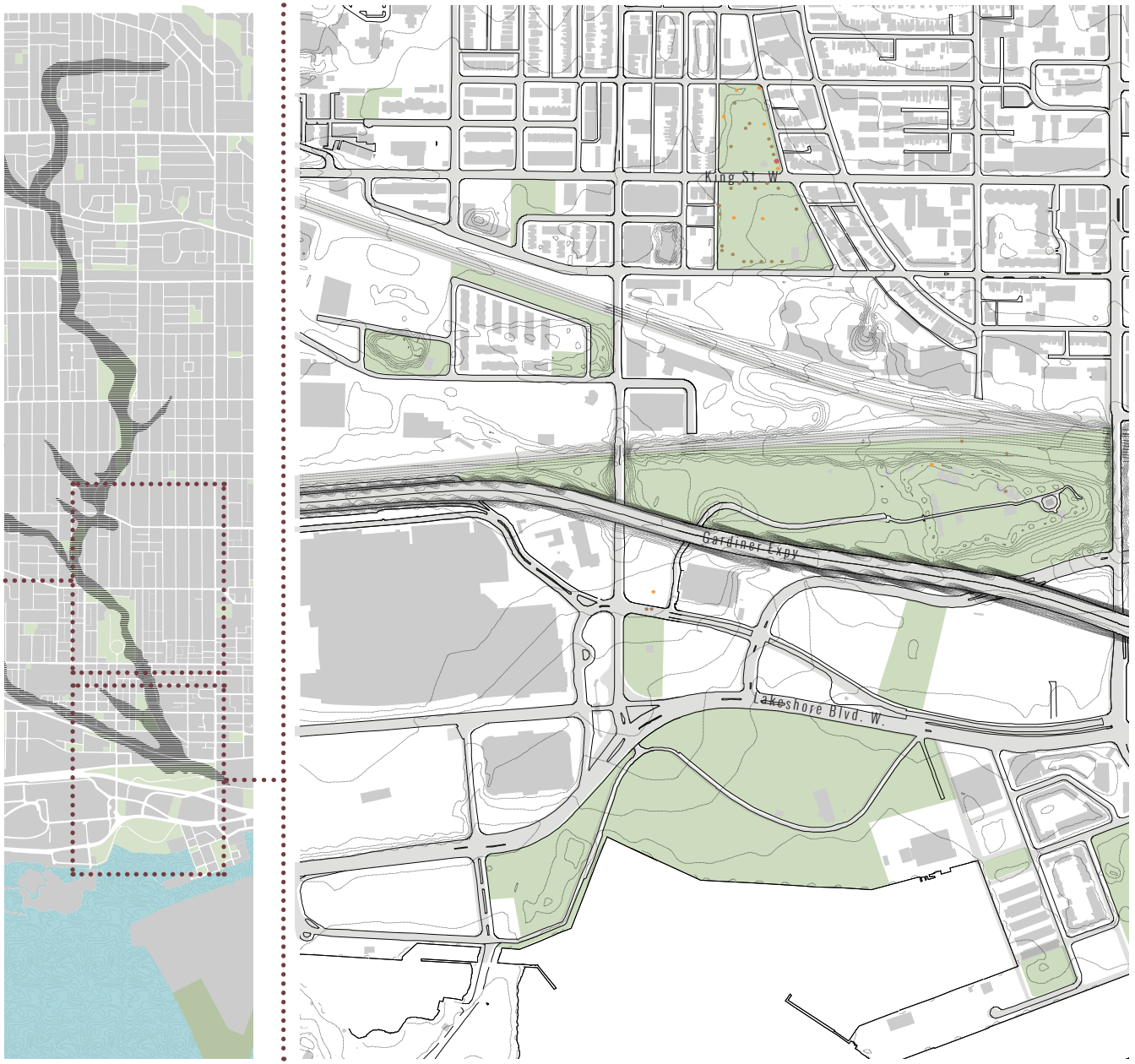
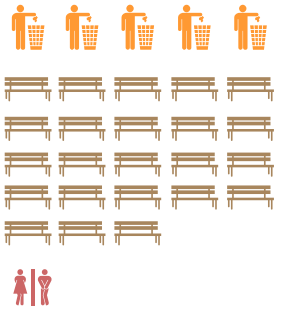
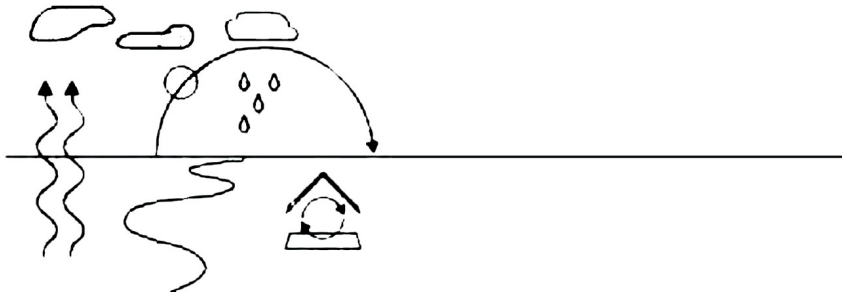


Figure 4-18 (Left) Mapping of water fountains, washrooms, benches, and trash cans in the parks that fall along the path of the Garrison Creek. Parks in focus: Stanley Park and Garrison Common.

Stanley Park



Garrison Common



"Systems Thinking in Practice
As the physical boundaries of our living environment are beginning to bounce back the consequences of our ever expanding lifestyle, the role of the designer will become less and less about making new artifacts, and more and more about re-arranging and re-organizing existing elements in more resilient and adaptable ways."*

-Paul de Graaf

RE- IMAGINING CHRISTIE PITS

The conceptual framework for the overall park system starts with the edges and boundaries of the park. The site's present conditions of traffic density, pedestrian traffic and the adjacent landuses help to achieve this framework. The framework will encourage for normal operation of more structured and activated spaces for the park system.

Figure 5-1 (Opposite page) a sketch by Paul de Graaf.

Figure 5-2 This site plan highlights the immediate land uses and thereby identifies the actors of the site. The main actors of the site are the residents, shops and restaurants, transit line and institutions.

Figure 5-3 This plan highlights the streetscape hierarchy , which is established by various factors such as, road widths, traffic density, and the adjacent land uses.

Legend

- Bloor Street West
- Christie Street
- Barton Avenue
- Crawford Street

Figure 5-4 This is the proposed site plan of the entry locations and a conceptual framework for the treatment of the edge conditions.
1. Bloor Street Side- A continuous paving system which ties the existing island in front of the Subway station to the front of the restaurant. Thereby, making the south edge the public, porous edge.
2. Christie Street & Barton Avenue- A continuous tree buffer to protect the Orchard and terrace gardens. The existing entry points will be retained at the intersections.
3. Crawford Street- The residential edge of the site, so has restricted entry points.

Legend

- Entry intersections
- Designated entry points
- Restricted Entry
- Porous entry (connected with a unified paving system)
- Tree buffer

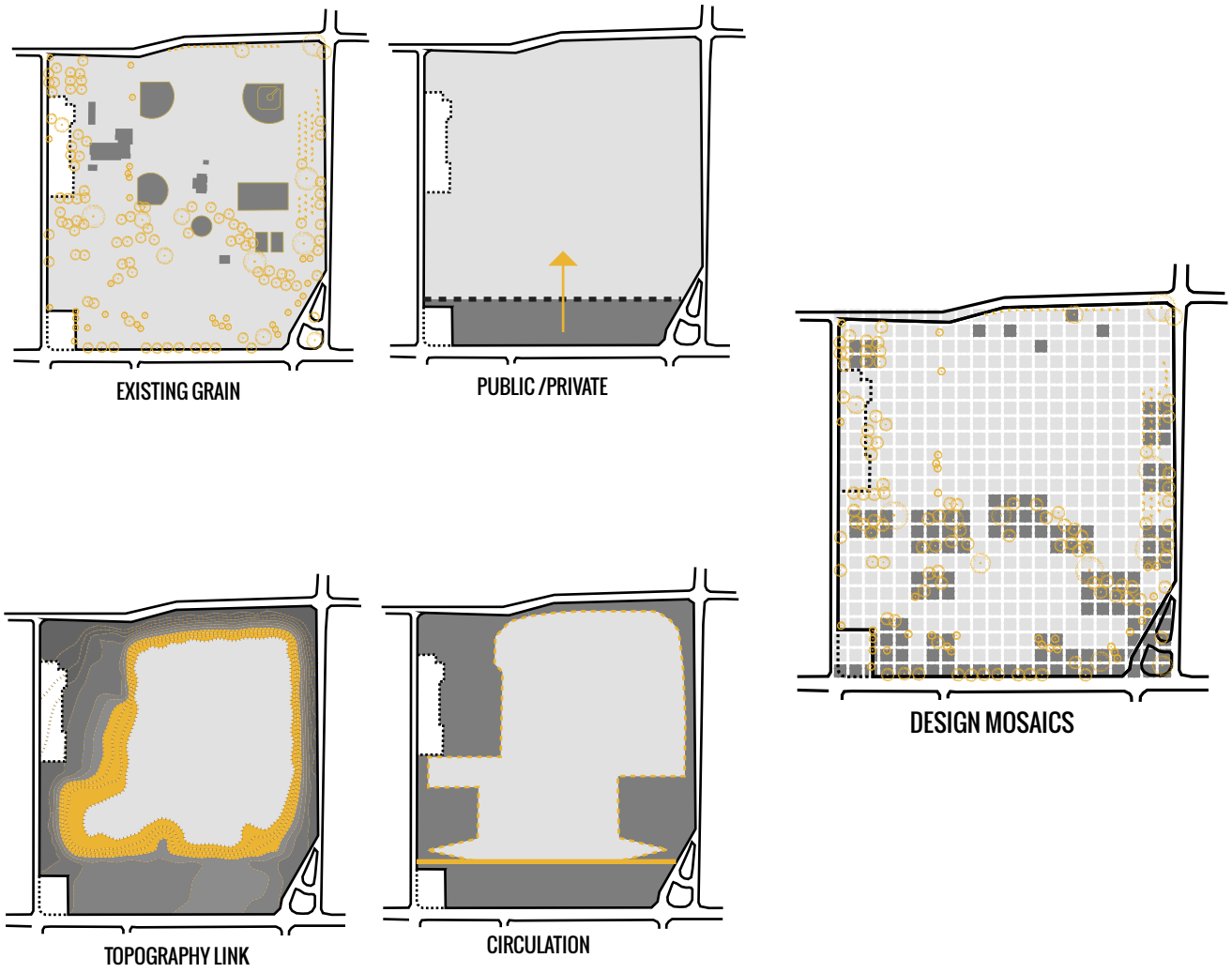
Figure 5-5 (Next page) Master Plan (scale 1:250)
This illustrated site plan indicates the different zones of the proposed park.

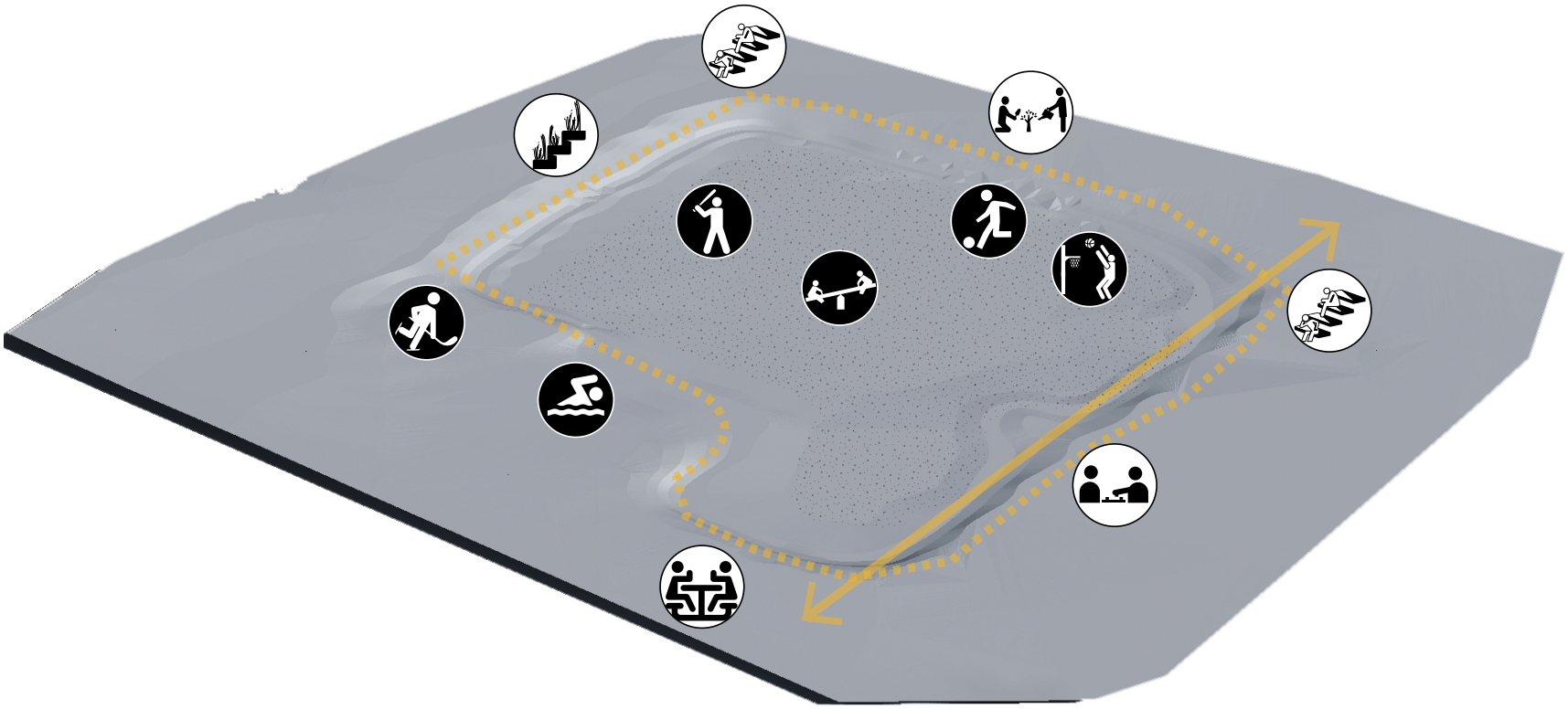
1. The activity patches dispersed in the site
2. The recreational pit
3. The urban orchard
4. An amphitheater for viewing of the baseball matches
5. The terraced community gardens.

1:500


1
1
1
1
1
2
3
4
5

Figure 5-6 This set of conceptual diagrams serve as the framework to add the layer of food production and its activities onto the existing park space.





LEGEND

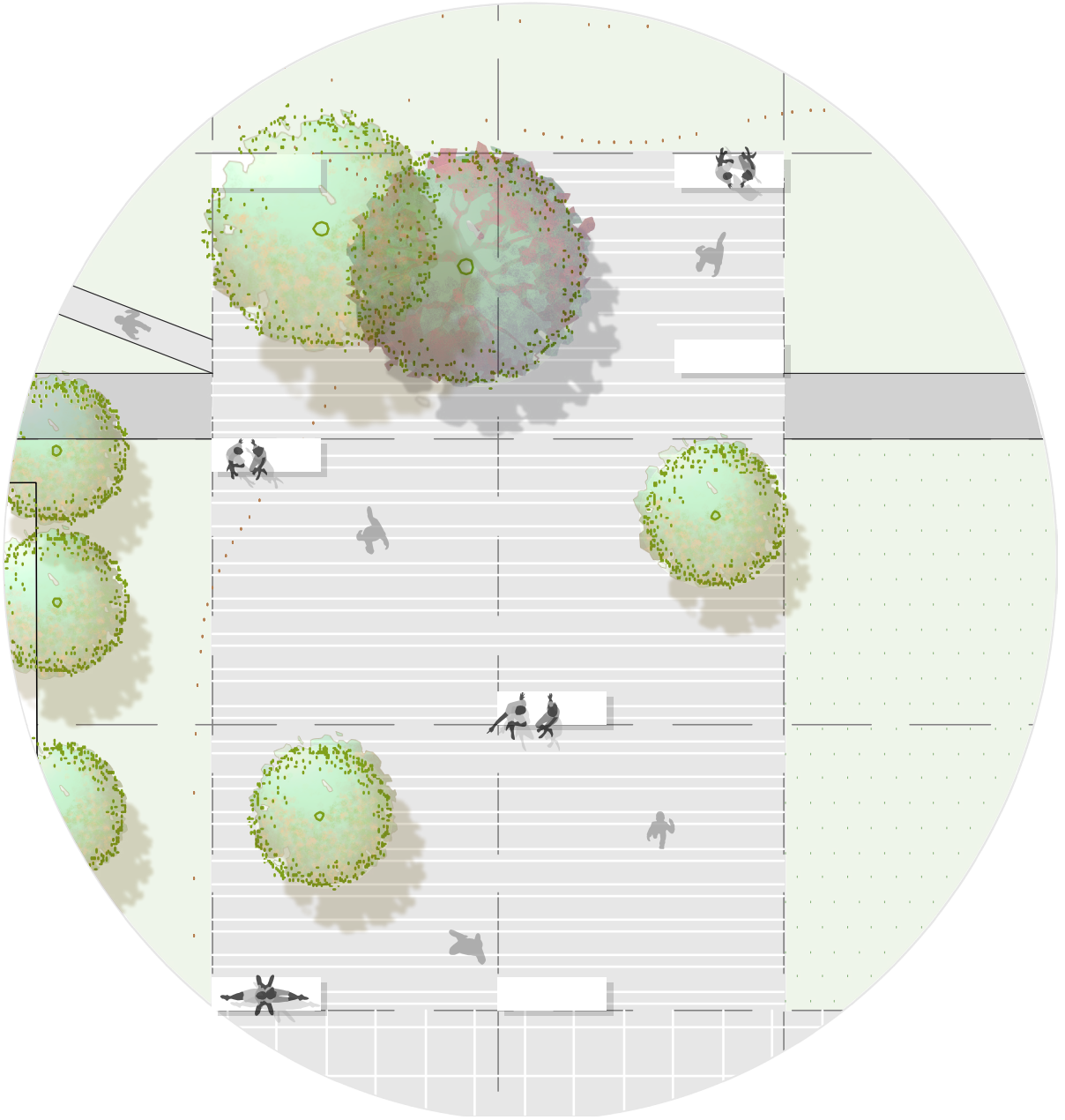
Existing Programs

Proposed Programs

Figure 5-7 Conceptual diagram showing the existing programs with the inserted programs along with the circulation.

Figure 5-8 The paved spaces on Bloor street act as a plaza and waiting space for commuters using the transit and thereby weaving these spaces into the city's fabric. The extended paving from the Christie subway station into the park weaving the existing traffic island, expands the park giving importance to the pedestrian traffic. The paving is made up permeable paver (like in the image Fig. 5-14) to incorporate a water sensitive design solution.

Figure 5-9 Detail plan of the activity patches. The patches are hardscaped spaces weaved into the existing grain to provide a platforms for everyday activities like celebrating a person's birthday or yoga classes.



Activities

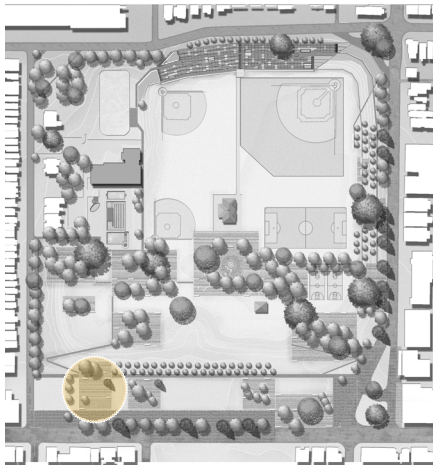
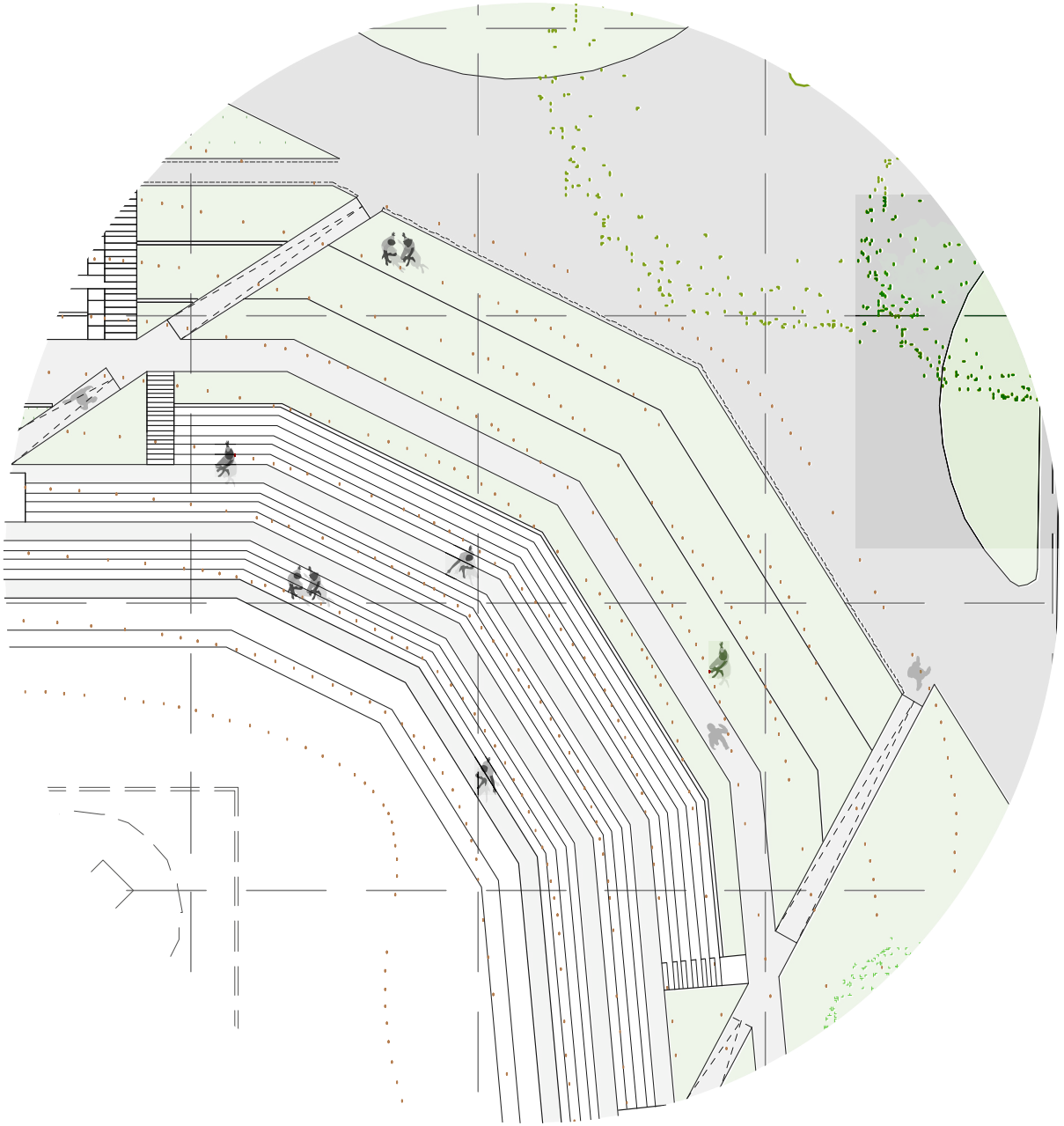


Figure 5-10 {Top left) This is an example of how the patches can work in contours and blend with the exiting topography.

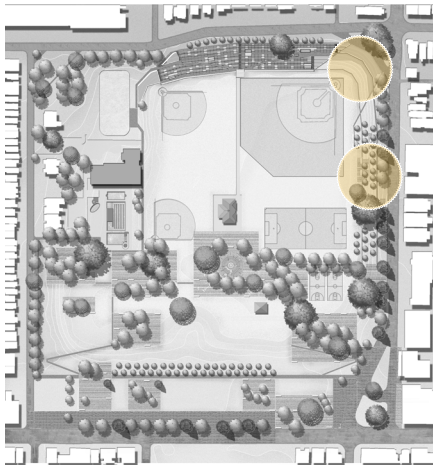
Figure 5-11 (Below left) Image from Zollhallen Plaza in Germany which uses permeable slabs, paving and planters which work together to retain water and manage storm water. This technique can be adapted for the patch systems.

Figure 5-12 (Below right) An example to demonstrate the everyday day activities that could take place.

Figure 5-13 Detail plan of the amphitheater.
This landscaped seating area serves as a viewing platform during the baseball league matches that are held in the Pits. It is connected to 2 main streets, Christie and Barton Avenue.



Activities



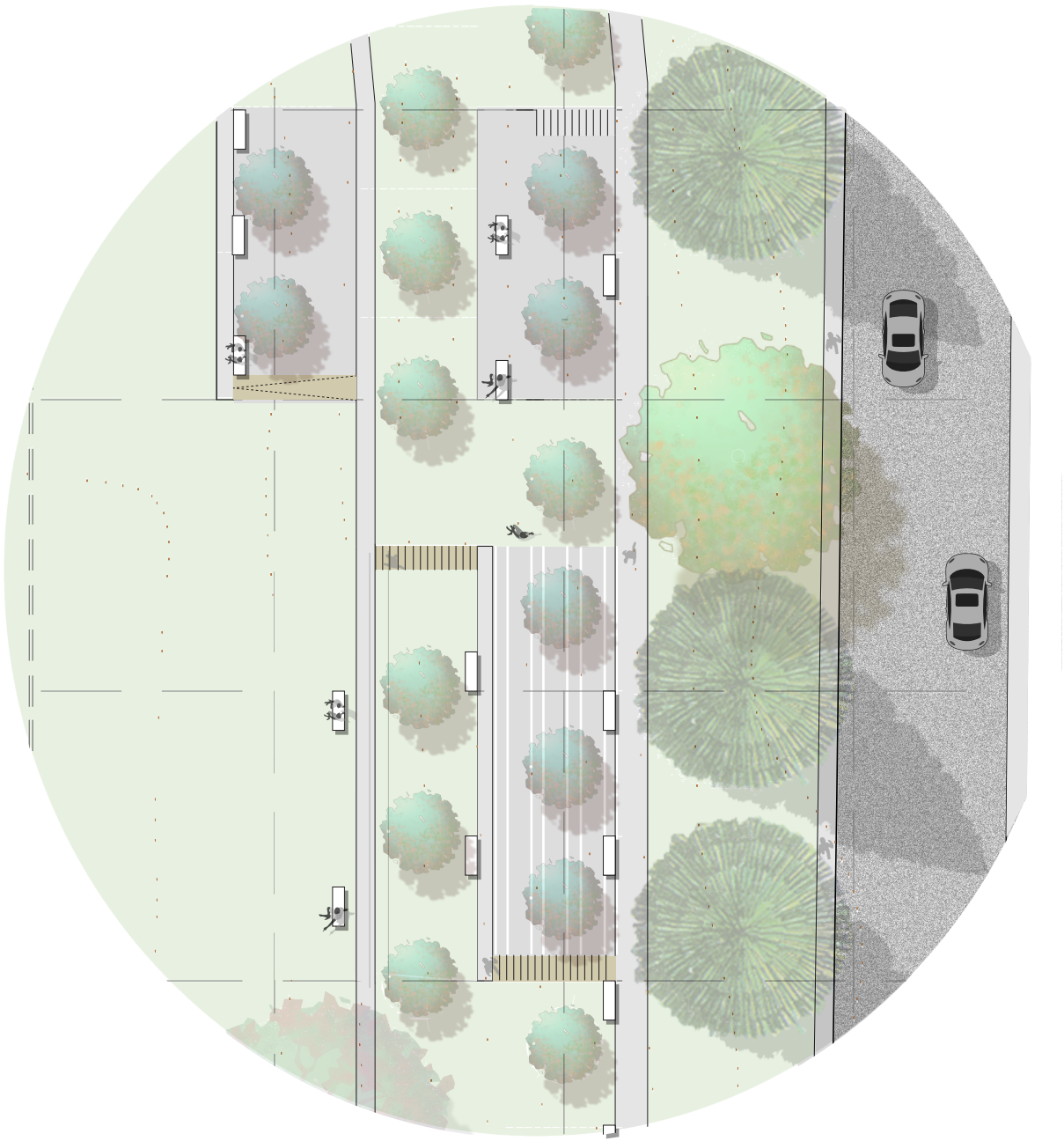
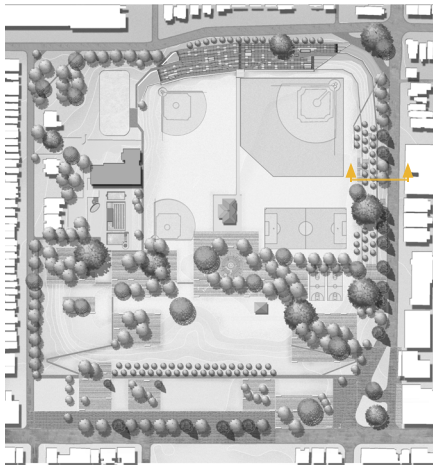
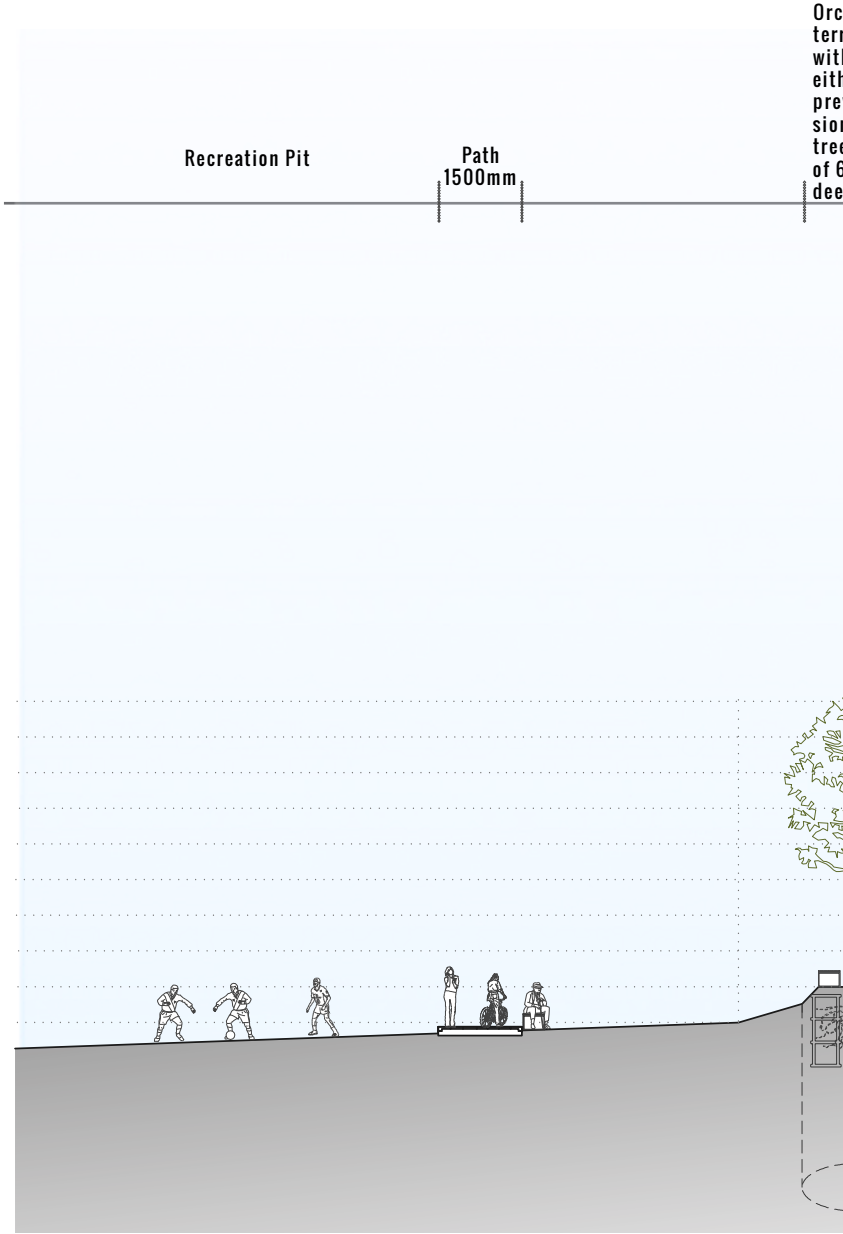


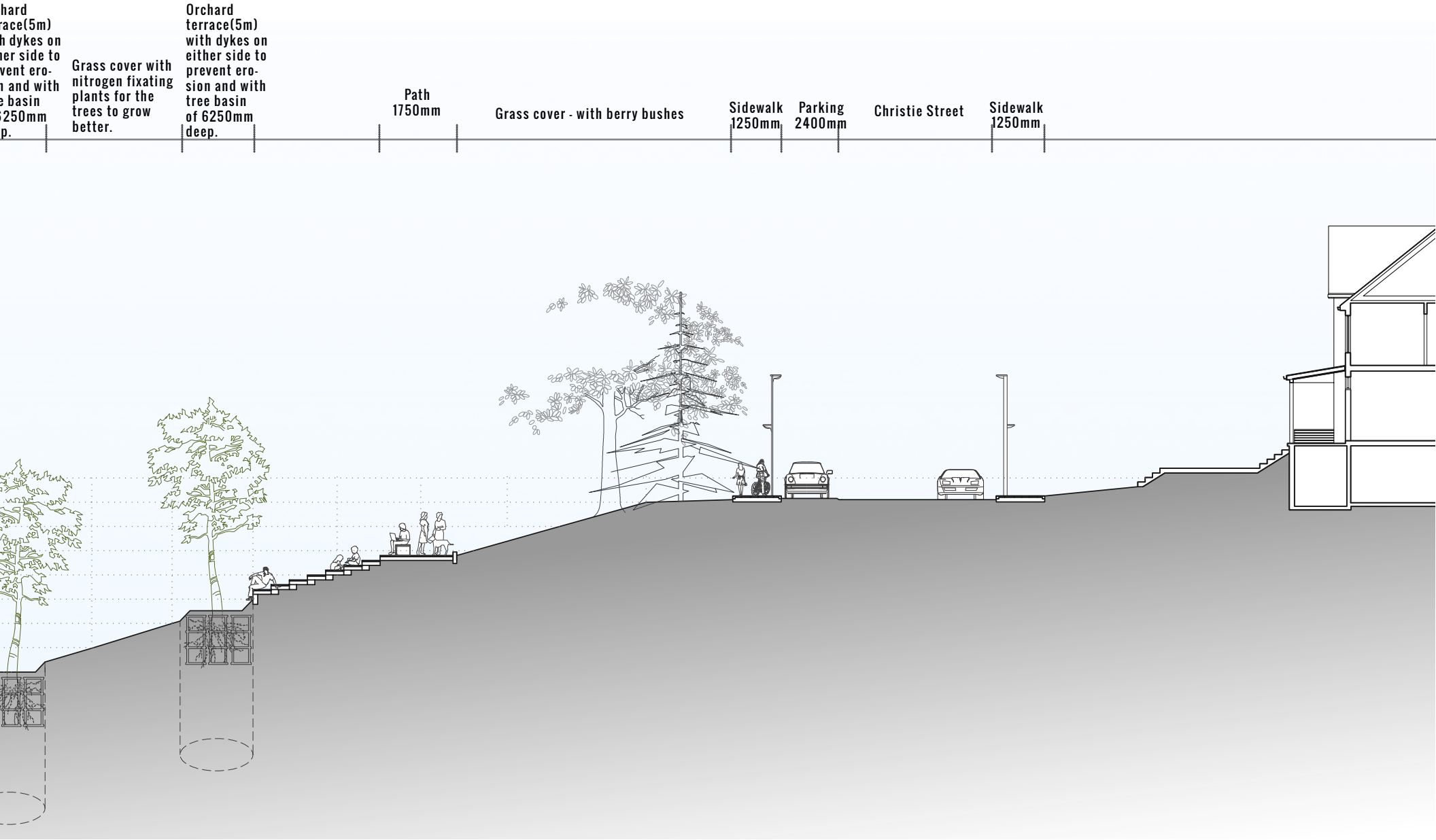
Figure 5-14 Detail plan of the orchard.

The urban orchard designed to accommodate 30 trees. The sloped patches make it ideal spaces to grab a book and enjoy the blossom in the spring. The existing evergreen trees make good wind breakers.

Figure 5-15 Section through the Orchard.
Scale 1:200



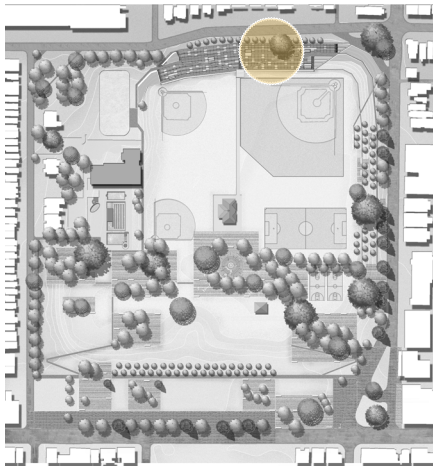


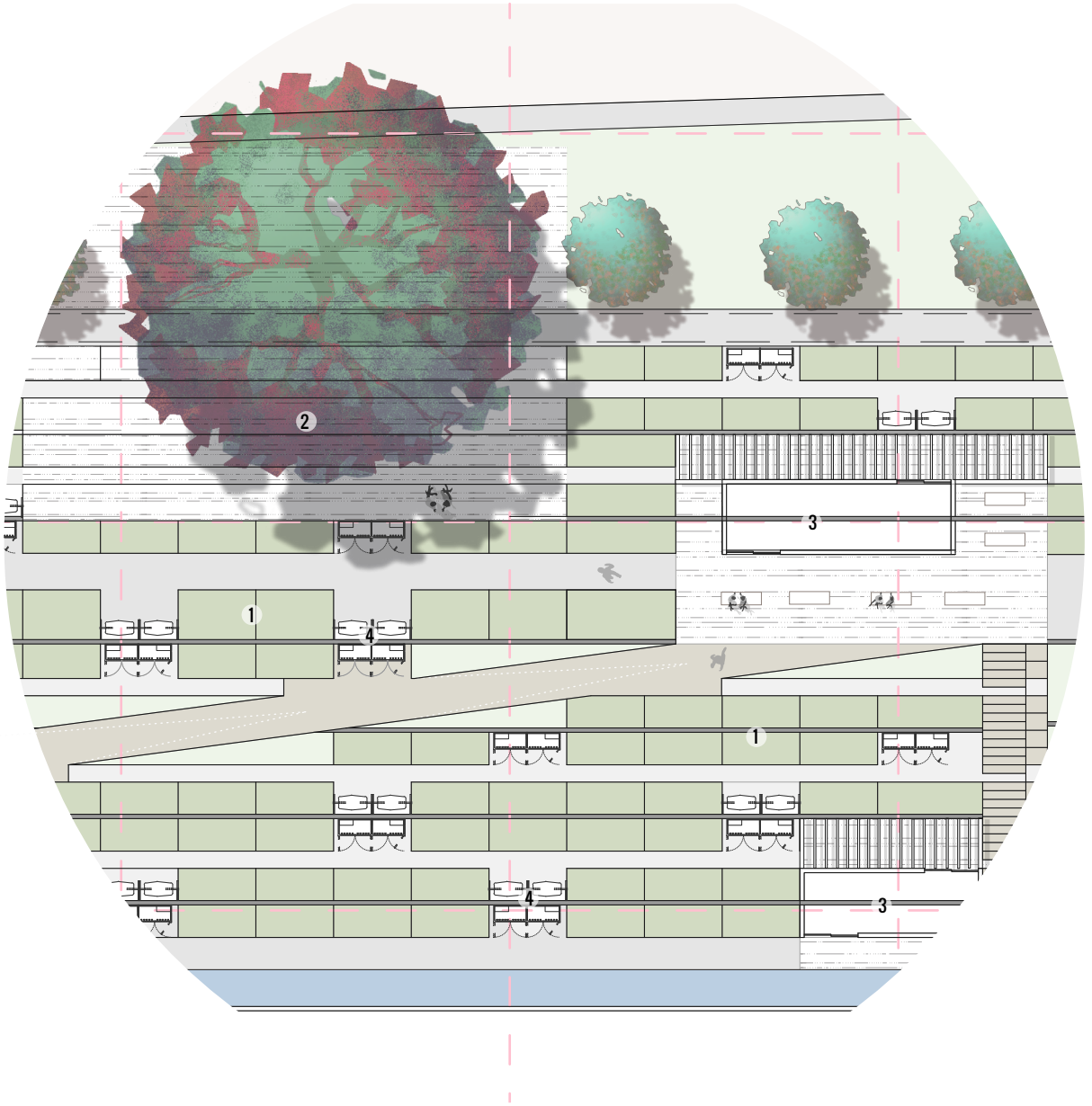

hard
race(5m)
h dykes on
ner side to
vent ero-
n and with
e basin
6250mm
p.
Grass cover with nitrogen fixating plants for the trees to grow better.
Orchard terrace(5m) with dykes on either side to prevent erosion and with tree basin of 6250mm deep.
Path 1750mm
Grass cover - with berry bushes
Sidewalk 1250mm
Parking 2400mm
Christie Street
Sidewalk 1250mm


GET YOUR HEAD IN THE GAME

Figure 5-16 Overview of the bigger baseball field with the stepped viewing area. The two level greenhouse spaces with its semi-shaded trellis seating area can also be seen. Passed the baseball diamond is the orchard, with gently terrace patches for reading a book on a nice sunny afternoon.

Activities





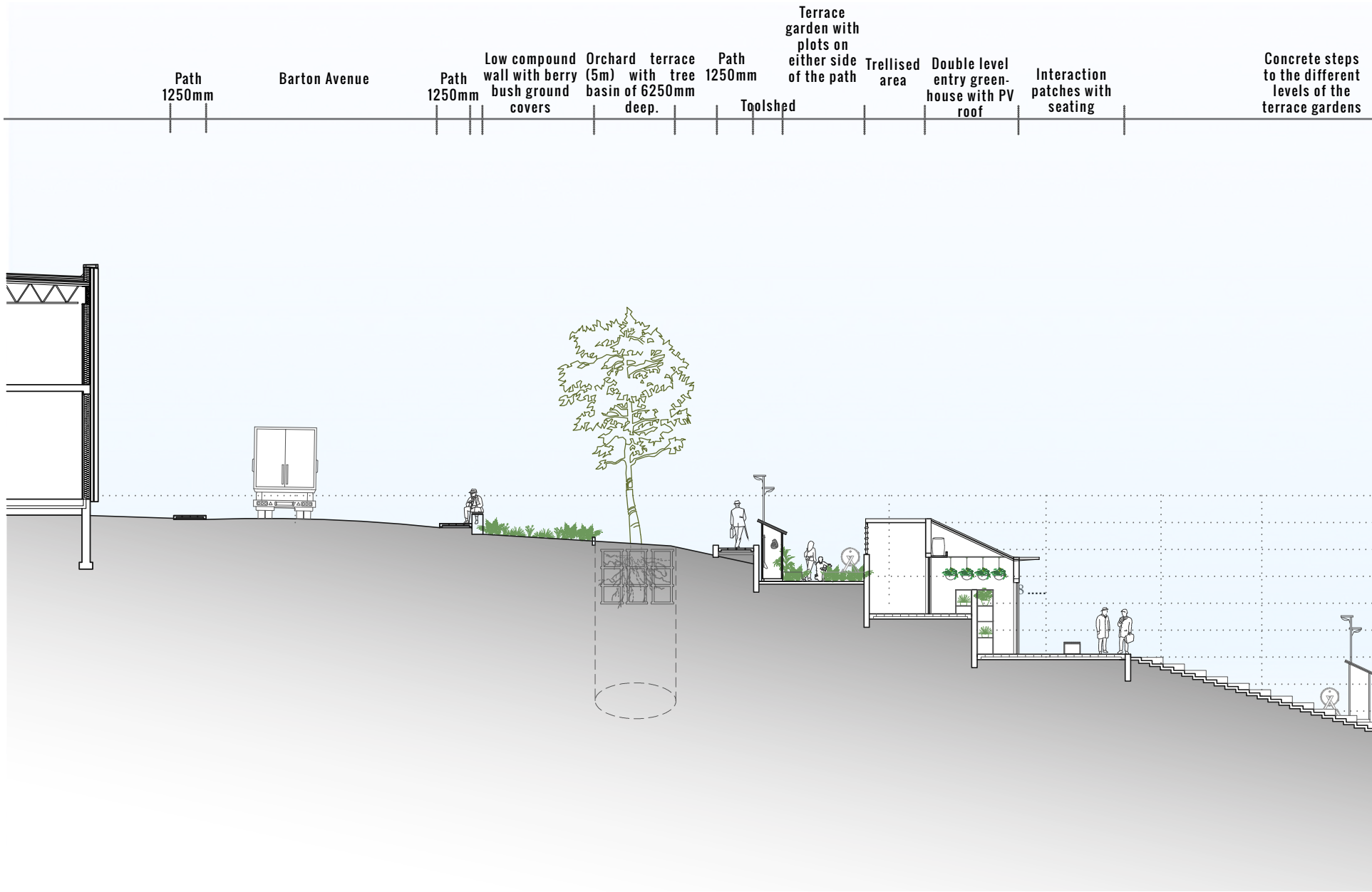
1. Garden Plots
The space used for cultivation of edible plats and herbs. The dominating plot size is 3.6m x 1.5m with variations for accessibility and children. All plots can be raised to serve as desired for the users.

2. Interactive Patch
The large existing tree in the site gave rise to a large stepped platform of size 16 x 16 m to accommodate for community events such as Seedy Saturday (gathering where community gardeners from different gardens come together to exchange seeds and seedlings from or to local farmers) , Garden Fairs and Workshop or even as a large picnic space to have potluck with fellow gardeners.

3.Greenhouse
The strip greenhouses are split in two levels(seen in Fig.5-21) to serve two terraces. They are also placed closed to the Primary circulation for better axis. The greenhouses also have a semi- shaded trellis seating area for gardeners to take rest, interact or drink a cup of tea.

4. Composters and Toolsheds
These facilities are staggered along the garden to serve all the plots. Each of them cater to approximately 9 plots.

Figure 5-17 Detail plan of the Terrace Garden
This detail shows the different components that make up the terrace gardens.


Path 1250mm
Barton Avenue
Path 1250mm
Low compound wall with berry bush ground covers
Orchard (5m) basin with terrace tree of 6250mm deep.
Path 1250mm
Toolshed
Terrace garden with plots on either side of the path
Trellised area
Double level entry green-house with PV roof
Interaction patches with seating
Concrete steps to the different levels of the terrace gardens

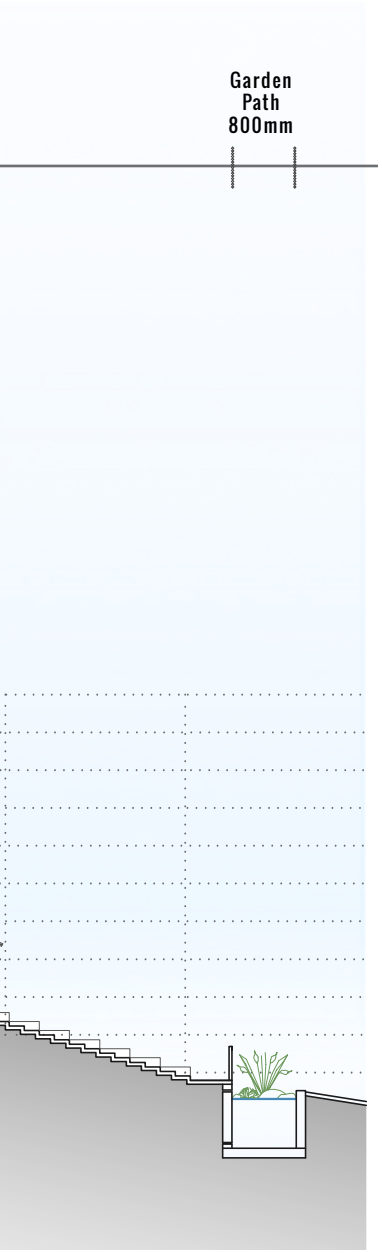
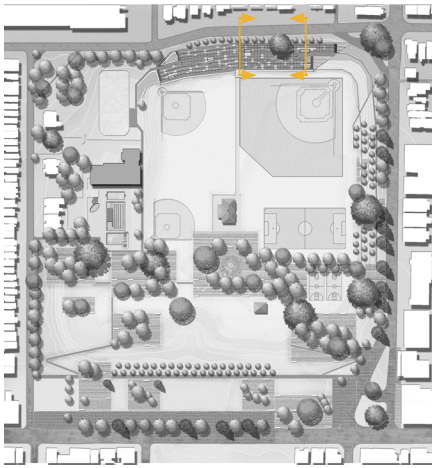
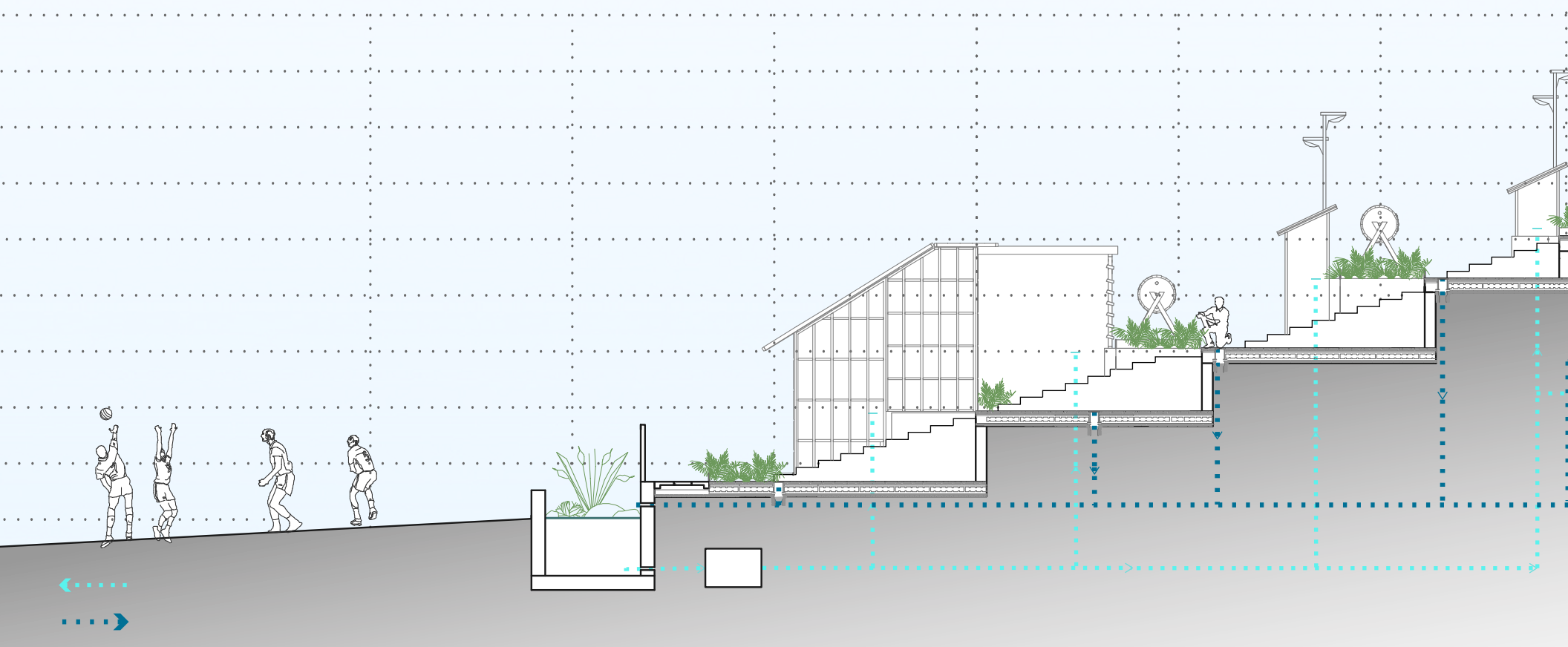
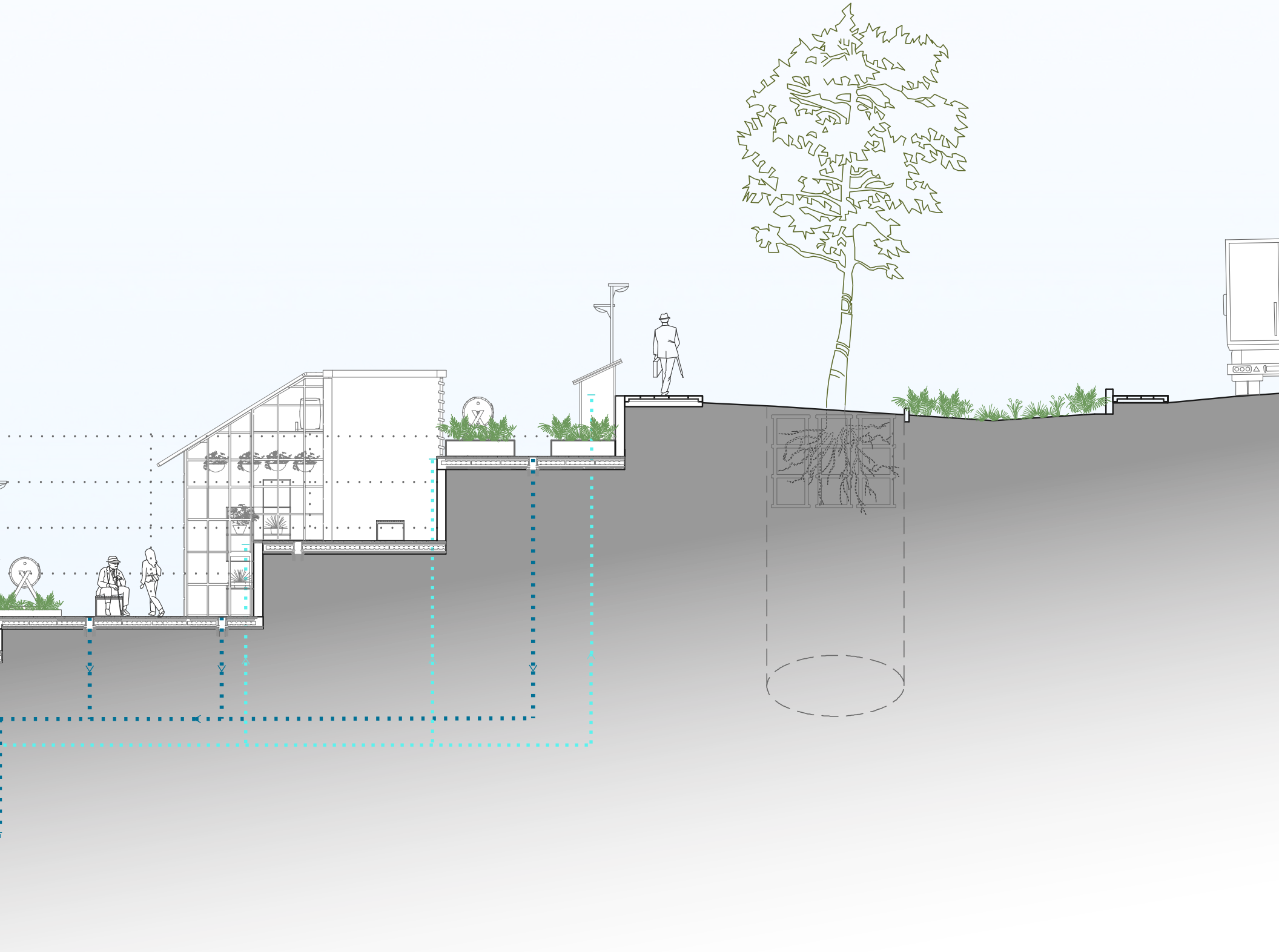


Figure 5-20 Section of the Terrace Garden
(scale 1:200)
The section cuts through the primary circulation of the central stairway showing the two-level greenhouse along with the garden plots.

Figure 5-19 (Following page) Section of the Terrace garden
(scale 1:100)
The section cuts through the north edge of the site through the terrace gardens. The edge condition is loosely defined by benches that act as a compound and seating or dense berry bushes along the orchard to feed in nitrogen to the soil for better yield. The interaction pad in the terrace gardens are split in two levels and connected with the greenhouse. This acts as a resting point as well as meeting space to exchange ideas.







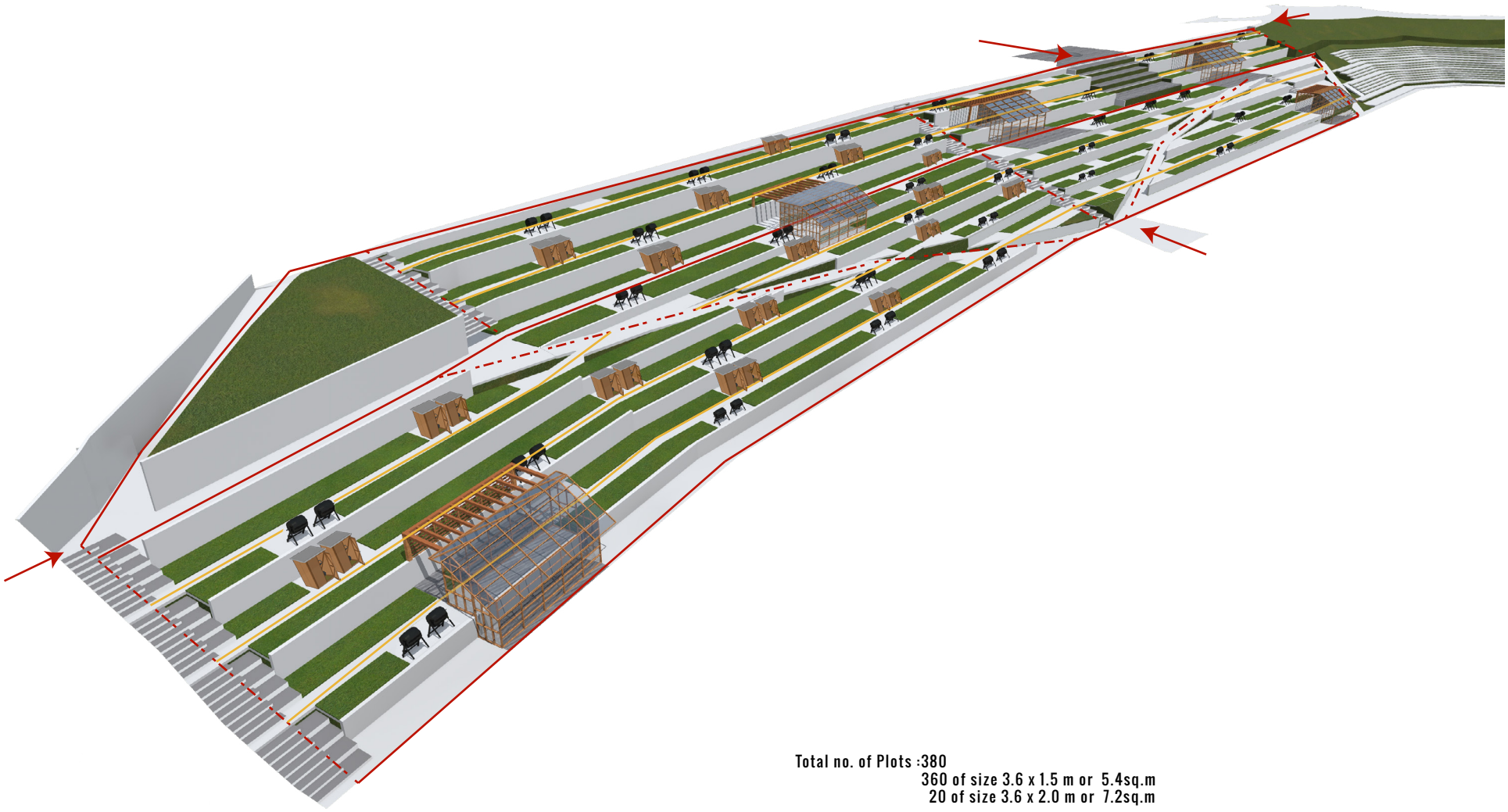
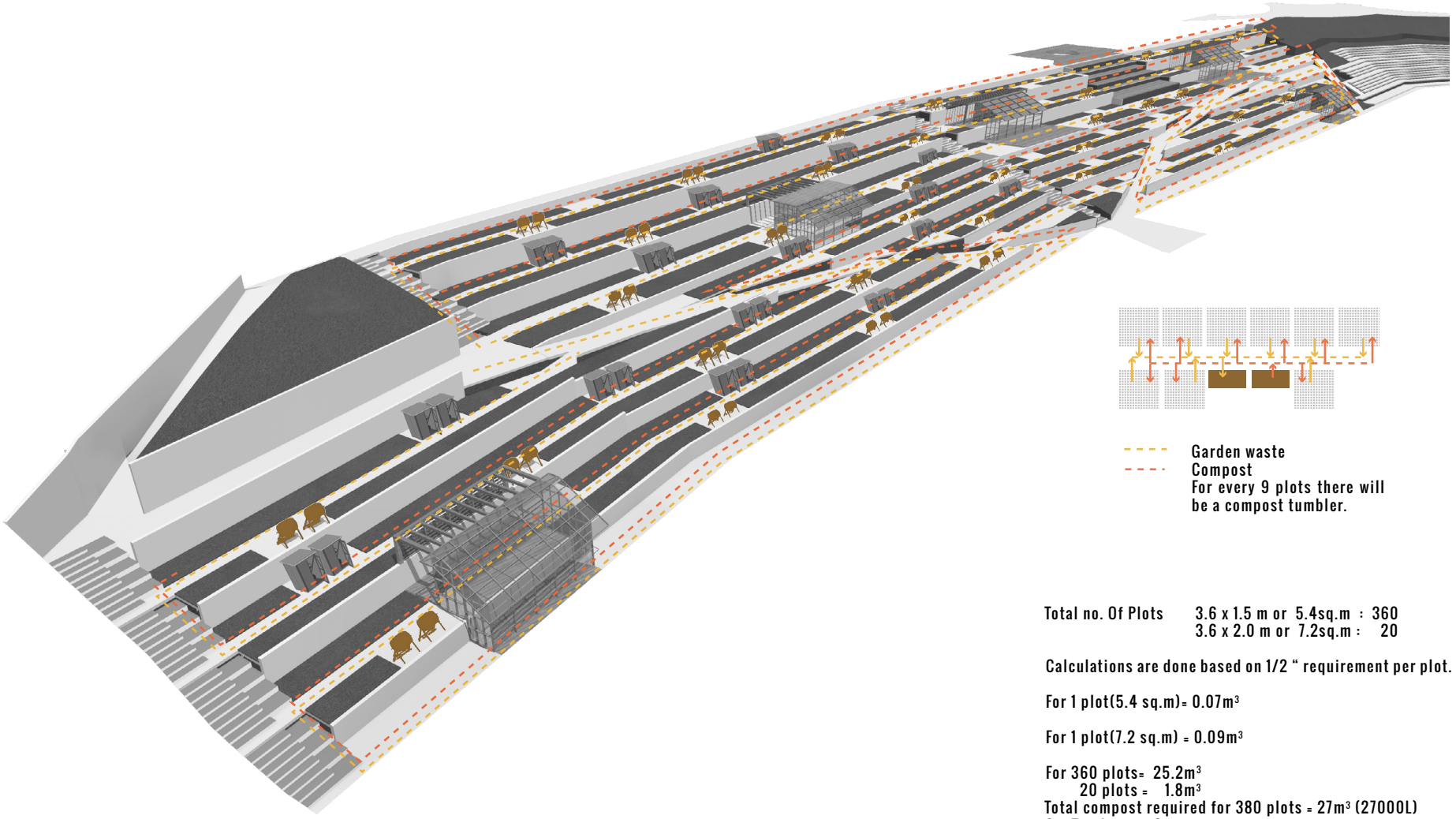


Figure 5-21 This is the circulation diagram showing the primary and secondary pathways.



Garden waste
Compost
For every 9 plots there will be a compost tumbler.

Total no. Of Plots 3.6 x 1.5 m or 5.4sq.m : 360
3.6 x 2.0 m or 7.2sq.m : 20

Calculations are done based on 1/2 " requirement per plot.

For 1 plot(5.4 sq.m)= 0.07m^3

For 1 plot(7.2 sq.m) = 0.09m^3

For 360 plots= 25.2m^3
20 plots = 1.8m^3
Total compost required for 380 plots = 27m^3 (27000L)
So, Total no. of Composters :
Single compost tumblers: 86 each with capacity 313L
(Or)
Double stacked composters: 178 each with capacity 150L
will meet the requirements.

1 m^3 = 1000 litres(L)

Figure 5-22 This diagram explains the proposed cyclical system for compost management.

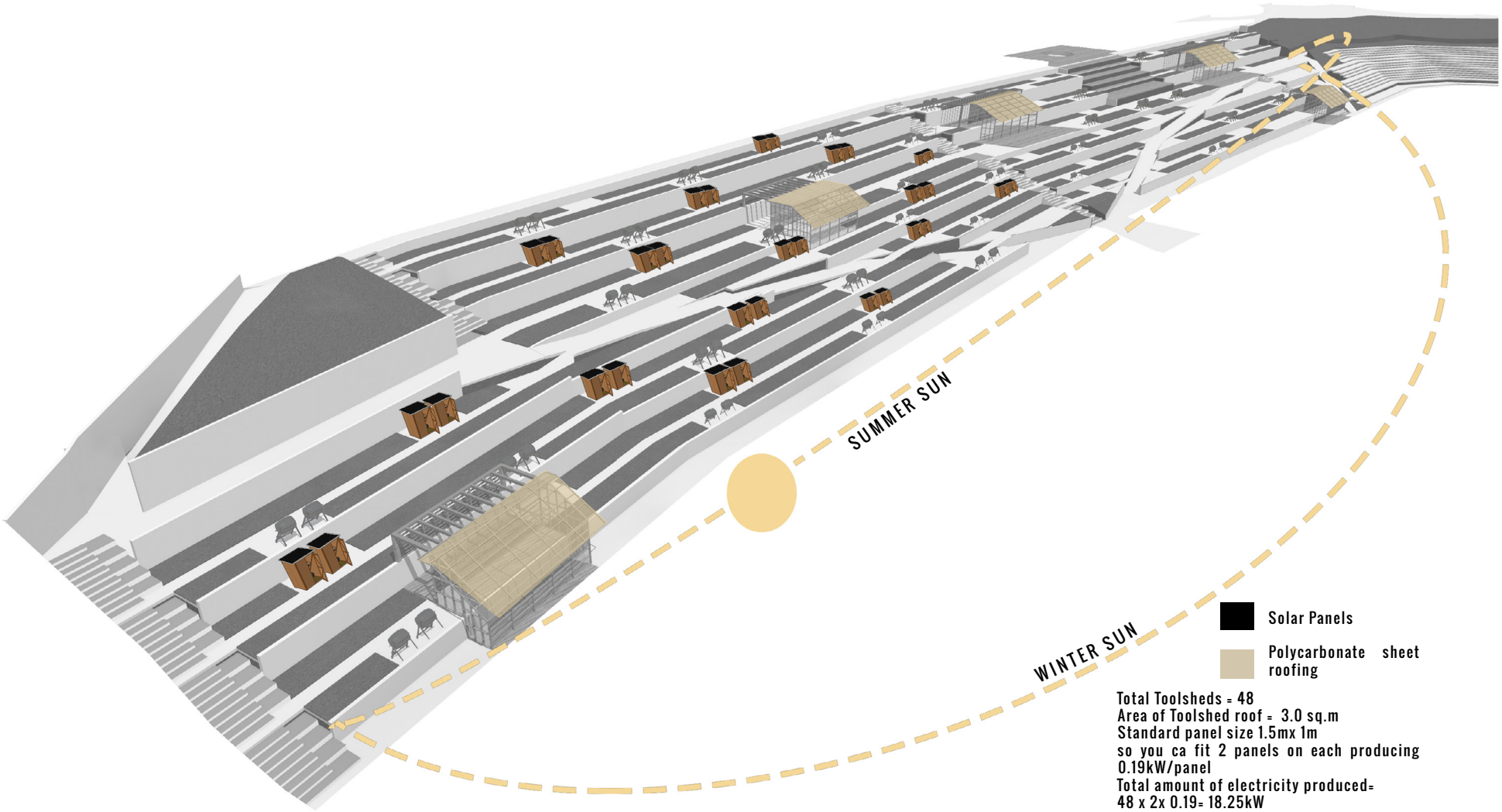


Figure 5-23 This diagram shows the maximum utilization of the sun for ideal growth, and for solar energy collection on the roofs of tool sheds which power the lights and electrical sockets in the pavilions. The greenhouse also collects the sun and stores it to radiate in the night time thereby keeping it warm all through day (more details in fig 5-28).

The greenhouse roof can be designed as a solar powered greenhouse with thickly insulated north wall to prevent loss of heat in the night and water barrels to collect the heat. The roof is polycarbonate roof, or alternatively PV roof to generate energy to power a heater for the winter time.

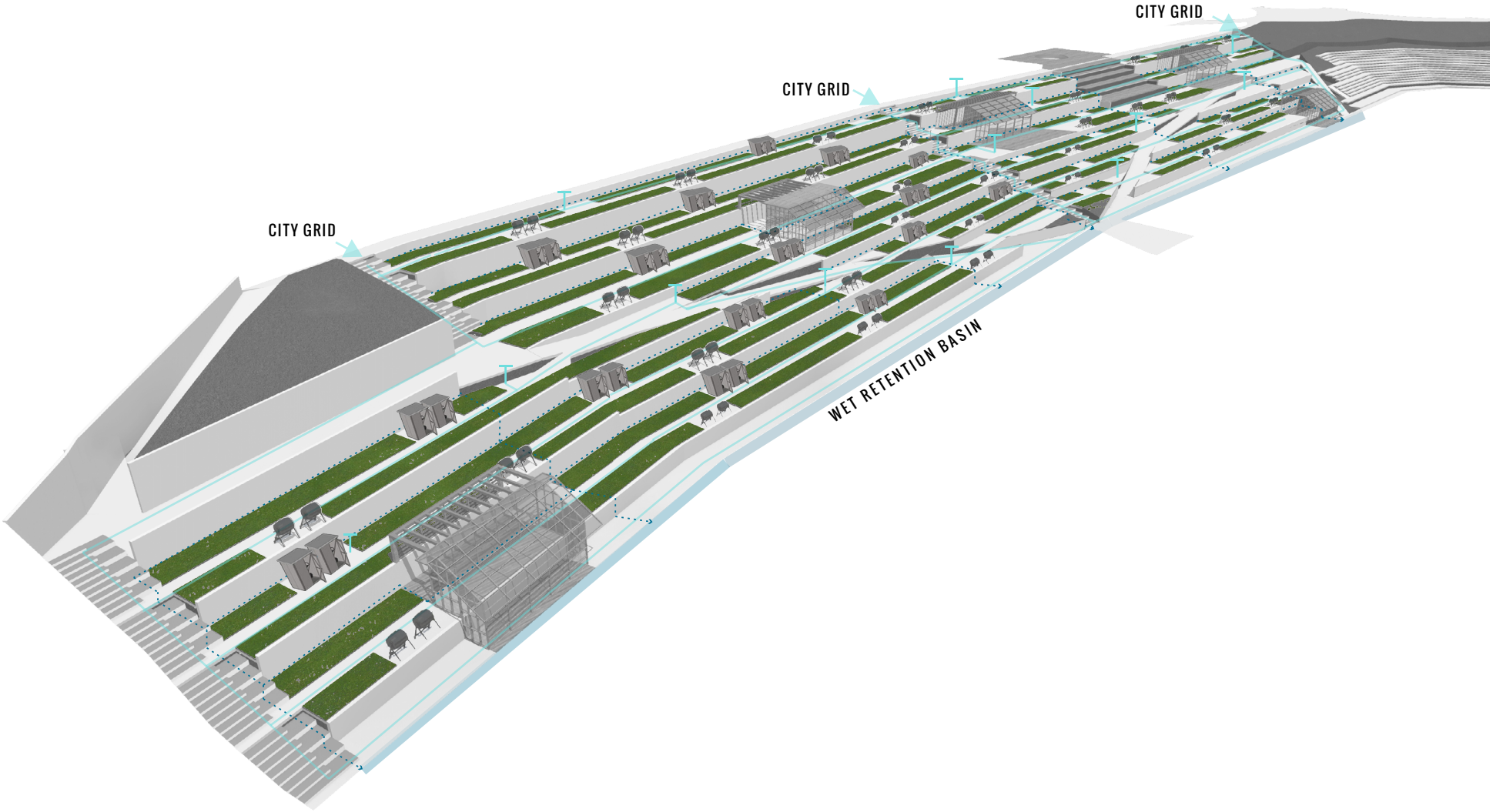


Figure 5-24 This diagram shows the water run off in the terraces. The water lines from the city grid as a secondary source and the irrigation, rain and storm water run off as the primary source.

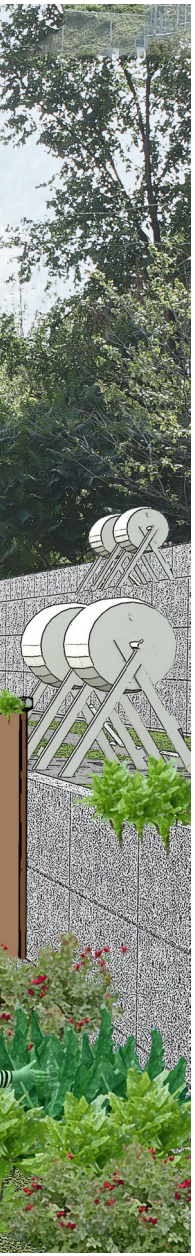
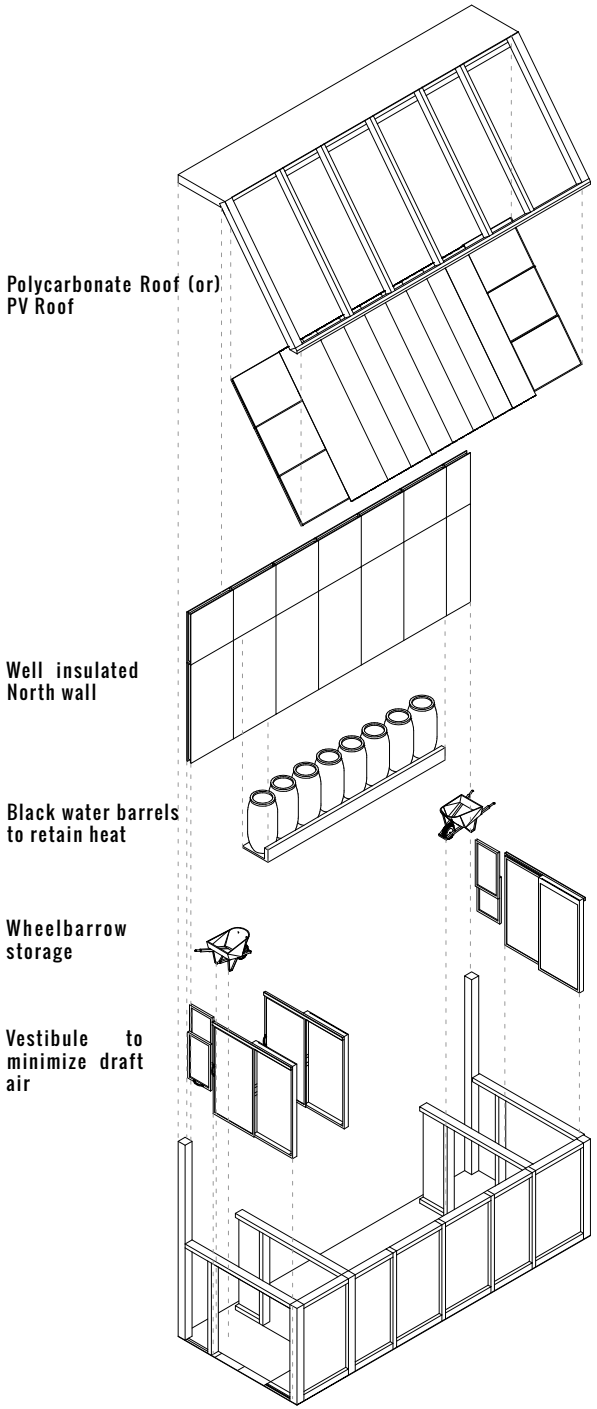


Figure 5-25 A view of the primary circulation path with garden plots on either side. Up on top of the hill is the Alex Duff swimming pool with the view onto the smaller practice baseball field.



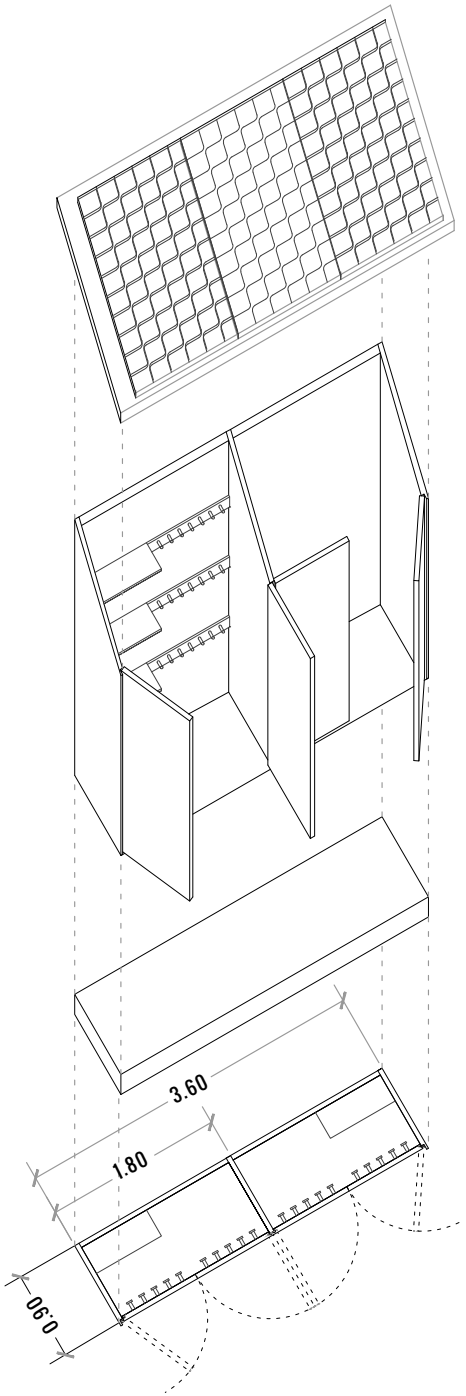


Figure 5-26 (Leftmost) Part 1: Green house
An exploded view of the initial attempt of the passive greenhouse.

Figure 5-27 (Left) Part 2:Tool Shed
An exploded view of the tool shed with solar roof.

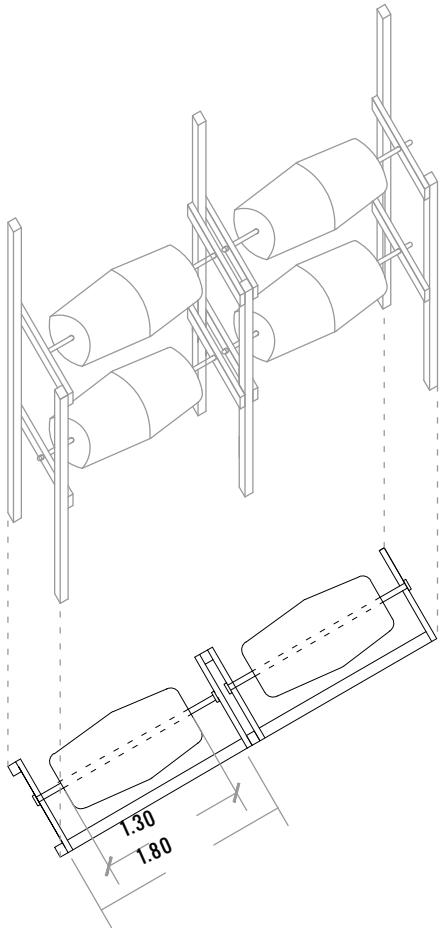


Figure 5-28 (Above) Part 3: Composter
A exploded view of a compost tumbler with flexible dimensions (max tumbler width 1.30m and max. Frame width 1.8) to suit the compost needs for the terraces. The Compost tumblers could be single stack or double stack(as shown).

Figure 5-29 (Top Right) Part 4 : Water Points
An example of a water source point which is used in a community garden in Austin.

Figure 5-30 (Bottom Right) Part 5: Retaining walls
An example of a light weight reinforced panel with galvanized steel and concrete composition to make it durable and modular nature for easy handling makes it an ideal option to consider.

Figure 6-1 The terrace garden with plots on either side, uniting together near the big baseball field to form the amphitheater. On the far end is Christie street with the apple blossom orchard.

CONCLUSION

The project strives to fulfill the current requirements for community interaction and urban food production in a sustainable manner by restructuring the existing neighbourhood parks along the Garrison creek. It fosters community interaction by providing a platform for like-minded individuals to socialize and share ideas. The spaces are designed to provide ample room for conversations and interaction. The project helps create agronomical awareness and education not only among the active participants of the community gardens, but also among the general users of the park.

The design proposes a systemic framework for a productive layer weaved into the existing recreational facilities, thereby retaining the current purpose of these spaces while also fulfilling the current trend and requirement for productive spaces. Fruit orchards and terrace gardens facilitated with tool sheds and composters for production, form the core of this design. The orchards and the gardens are strategically placed in spaces after taking into consideration the elevation of the land, sun path and the immediate surroundings of the site.

Picnic and interaction patches for consumption and celebration of food is designed in an effort to fulfill the social element required by these spaces. The interaction spaces are designed such that small or large group training sessions can be conducted within the community garden section of the park, thereby enabling gardeners to nurture each other's knowledge. As celebration of food is a primary goal of these gardens, the picnic spaces have been dispersed in the site as moments for contemplation or simple gathering for a family.

The ultimate vision of this project is to apply this system to a continuous set of neighbourhood parks especially, like the kind that were located along Garrison Creek .Toronto has 1,600 parks which cover 13% of its land area and include the many ravines that thread their way through the city, creating one of Toronto's most distinct features[1]. This feature can be further explored by inserting a food production layer to the existing grain, like in the design proposal, with varying scales and programs depending on the site adjacencies and the community needs. The project can be implemented by park groups like 'Park People', an organization which works with communities, 'Friends of Park' groups in conjunction with the Parks and Recreation board to facilitate neighbourhood engagement along with infrastructural support to re-naturalize the local parks. Thereby, creating a language of design and activity that can be applied to all the parks so that there is unifying sense of public space across the whole city.

The key component that will be transferred across sites would be the interaction spaces within the gardens as they cater to the threefold intent of the project: social, pedagogical and ecological benefits.

One of the concern in terms of applicability is the cost constraints which will be imposed by the strict budget of the Parks and Recreation board, due to the extensive construction of retaining walls as the project sits on the contours. This can be handled by thinking of innovative sustainable low cost systems, one such product that was looked into for this proposal was modular lightweight concrete panels for the construction of the retaining walls.

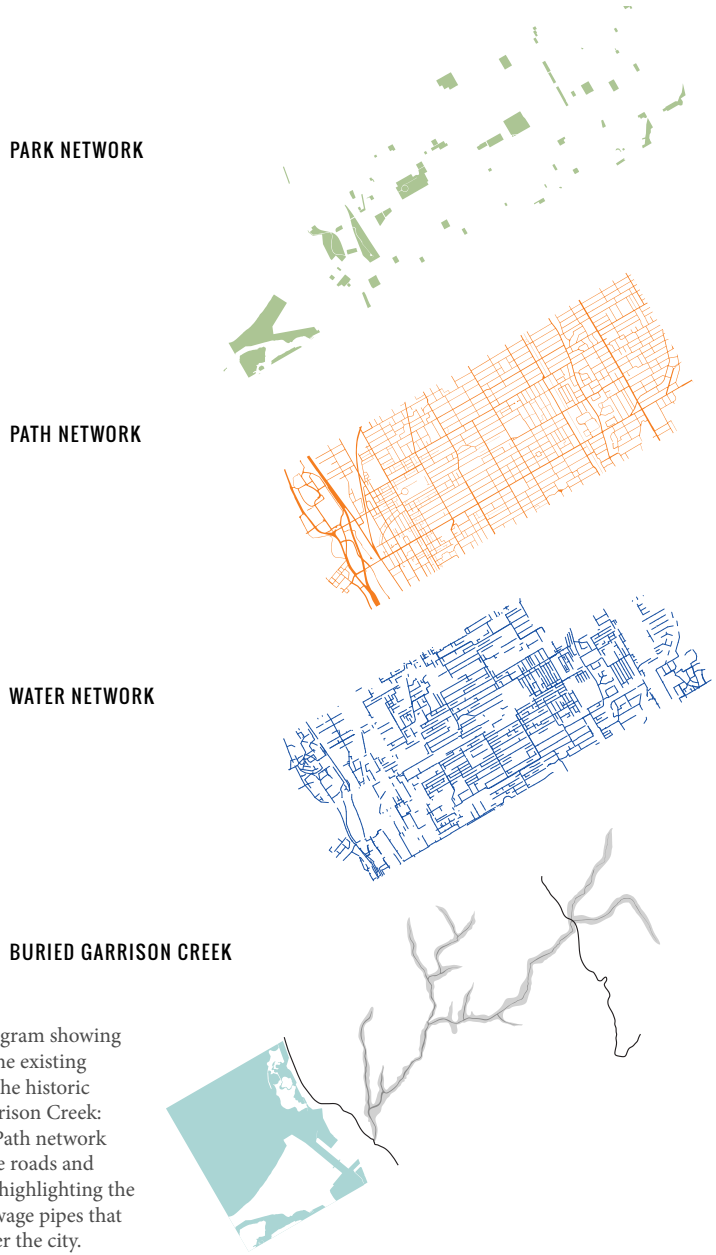


Figure 6-2 Diagram showing the overlay of the existing networks over the historic path of the Garrison Creek: Park network, Path network highlighting the roads and Water network highlighting the Stormwater Sewage pipes that are buried under the city.

By restructuring the existing landmass within parks to include food production spaces, this project takes social conscience a step ahead from just building parks to bring back countryside to cities to utilizing spaces within park for the nourishment and ecological revival of the cities.

Thus this thesis is an attempt to fulfill the vision of Michael Hough which aims to change the perception of urban plants from ornamental elements to those that enhance urban climate, create wildlife habitat and produce food[2].

Endnotes

1 City of Toronto. Parks Plan 2013 – 2017. 2013. P. 7

2 Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold) 1984

APPENDIX

More information on the site study- Demographics, native plant list and soil conditions of the Greater Toronto region.

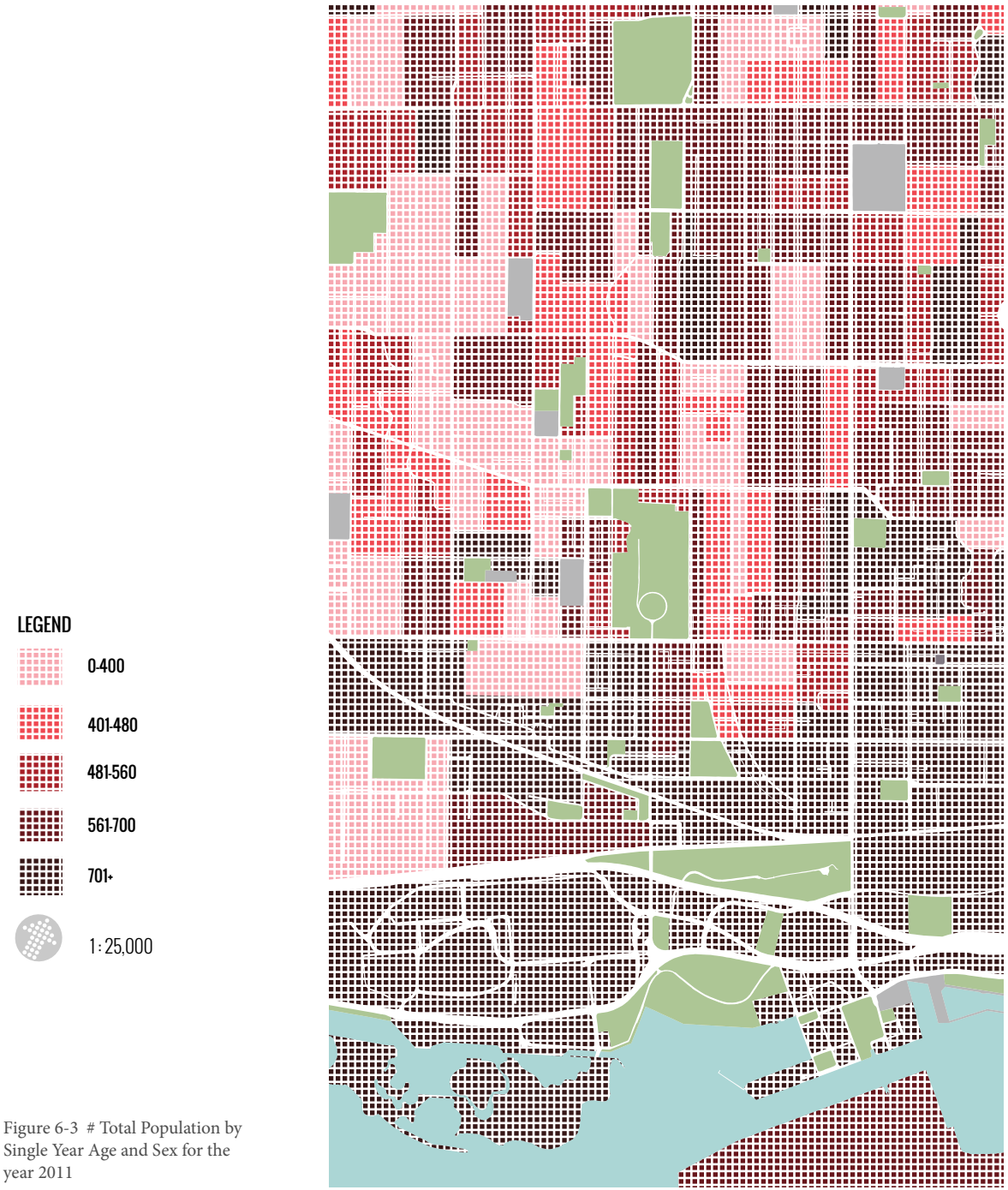


Figure 6-3 # Total Population by Single Year Age and Sex for the year 2011

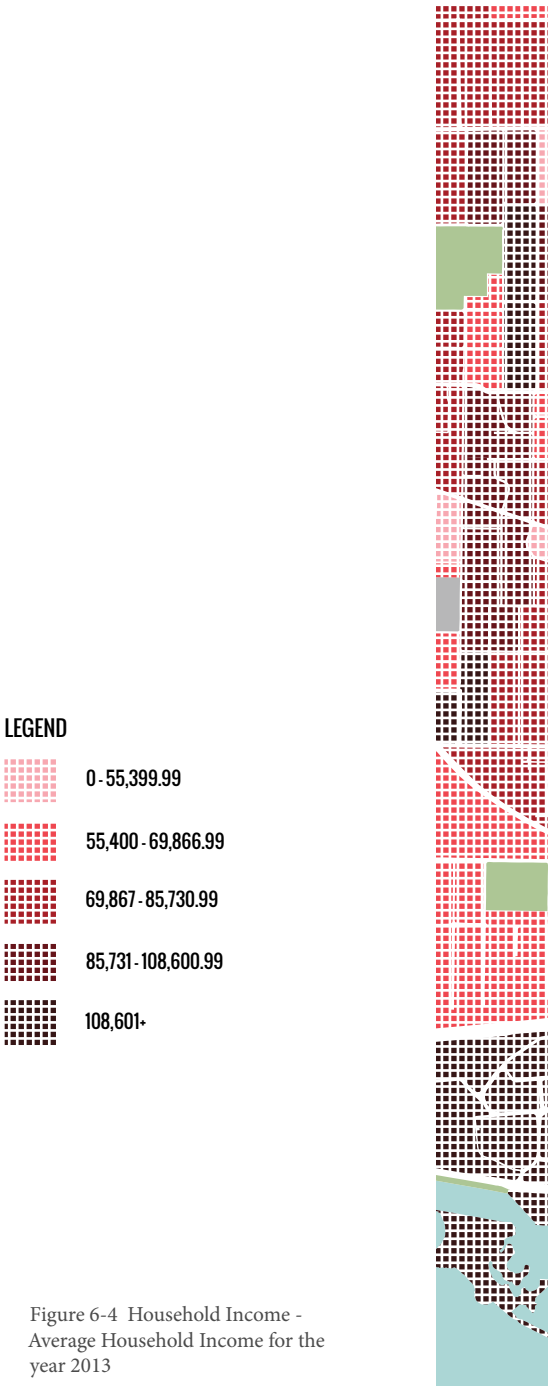
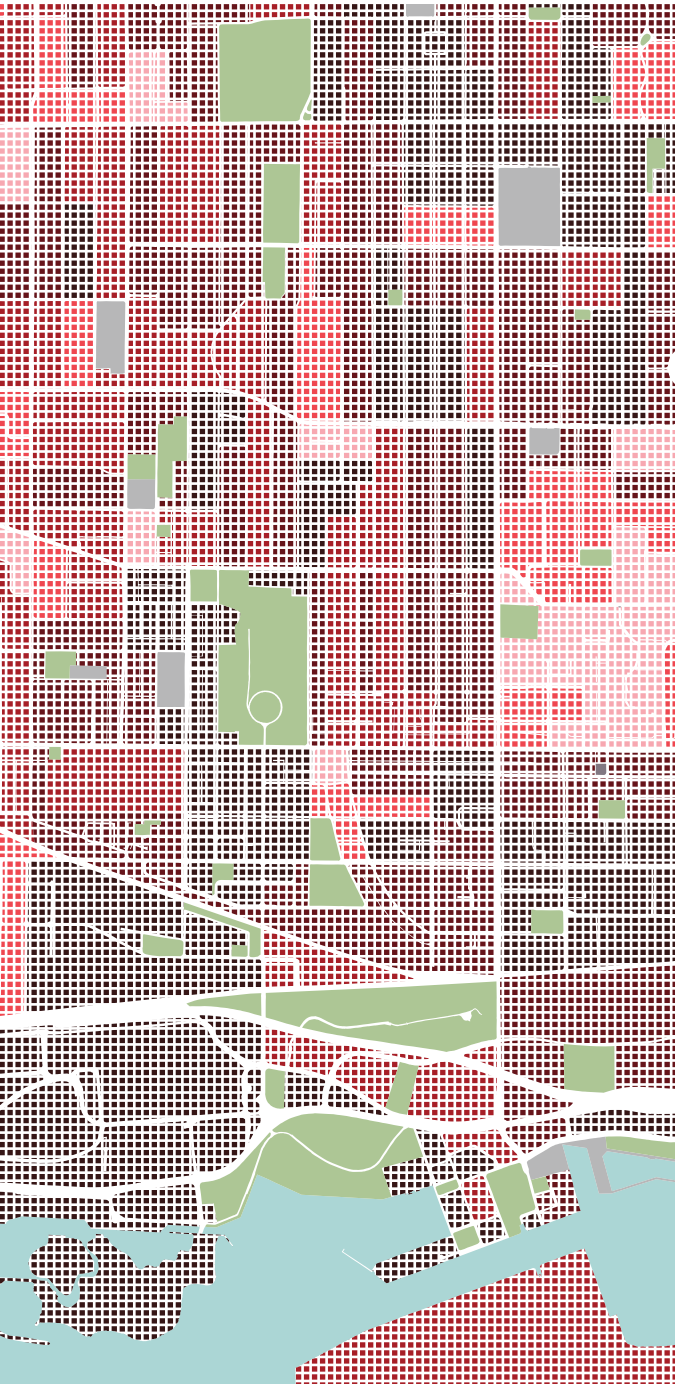


Figure 6-4 Household Income - Average Household Income for the year 2013



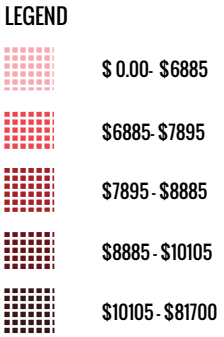
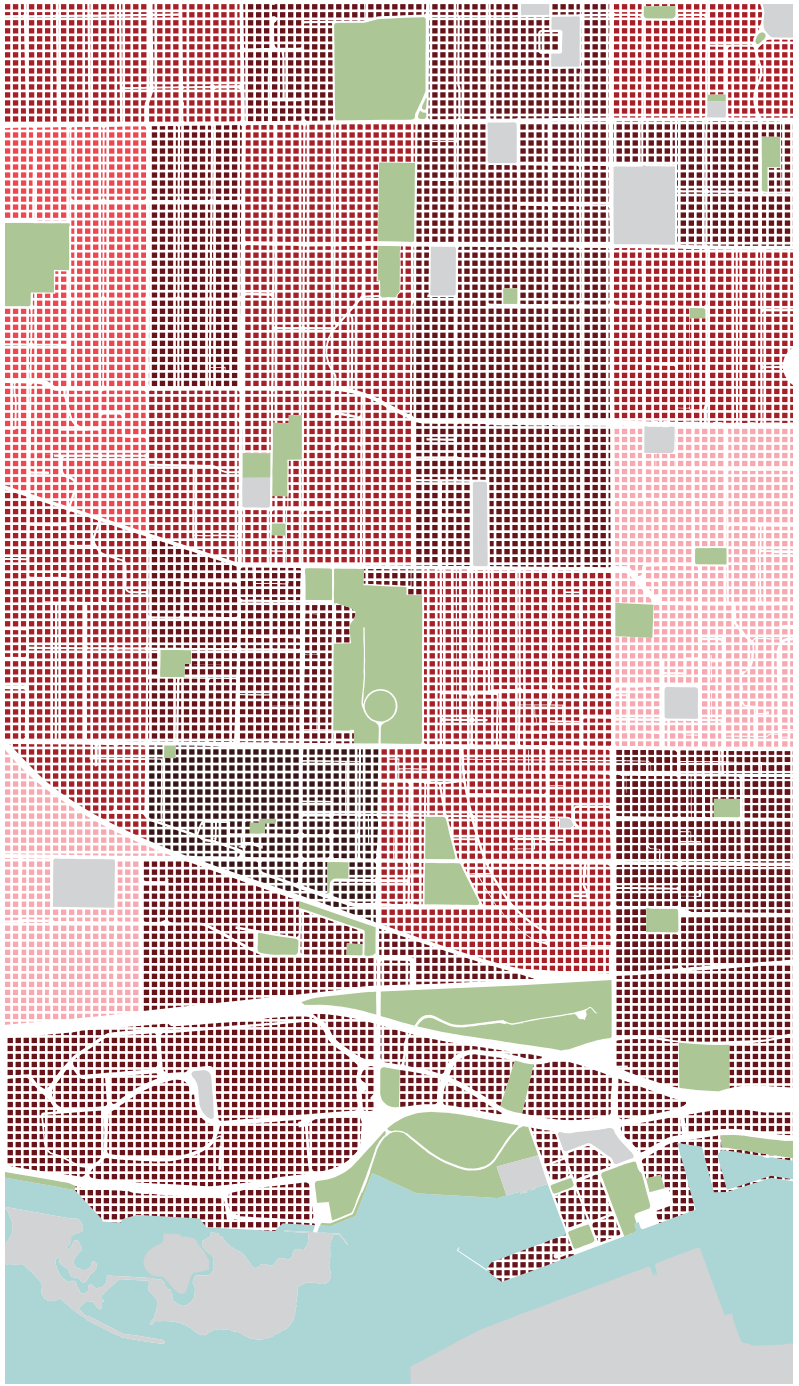


Figure 6-5 Total Expenditure on Food for the year 2011



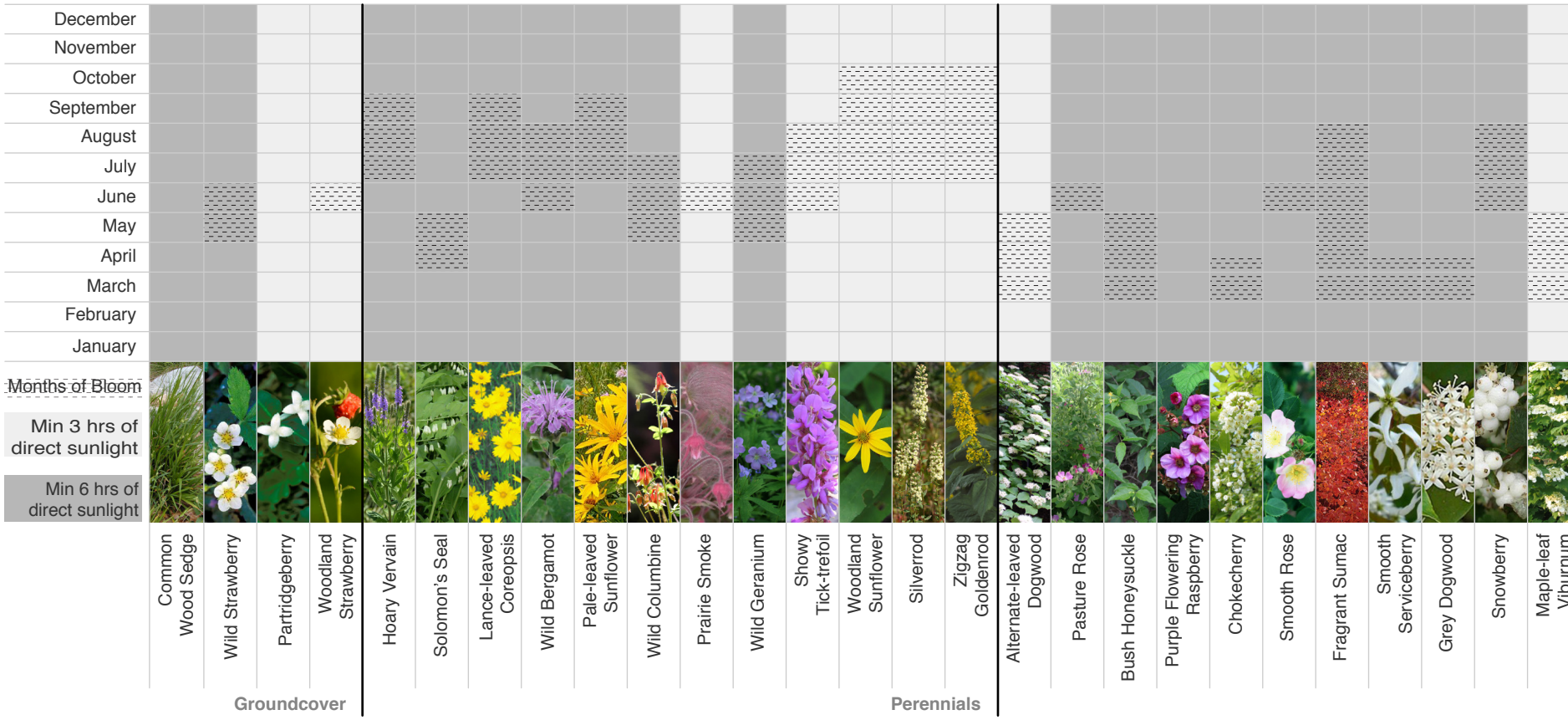
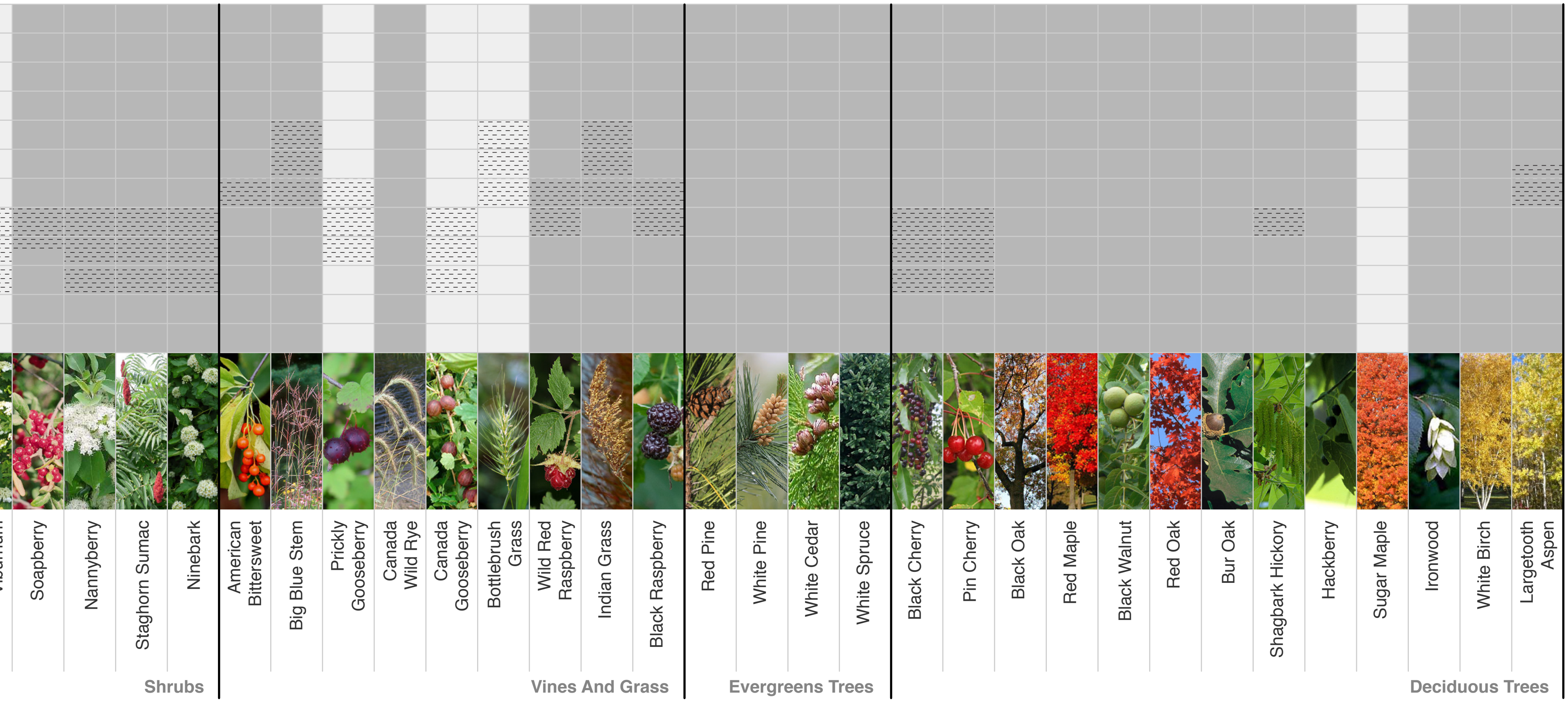


Figure 6-6 Native Plants in Toronto: The usage of Native Plants results in an increase in water efficiency and cost savings; they are already adapted to climate, pesticide use can be reduced or eliminated, and maintenance reduction associated can lead to cost savings.


Soapberry
Nannyberry
Staghorn Sumac
Ninebark
Shrubs
American Bittersweet
Big Blue Stem
Prickly Gooseberry
Canada Wild Rye
Canada Gooseberry
Bottlebrush Grass
Wild Red Raspberry
Indian Grass
Black Raspberry
Vines And Grass
Red Pine
White Pine
White Cedar
White Spruce
Evergreens Trees
Black Cherry
Pin Cherry
Black Oak
Red Maple
Black Walnut
Red Oak
Bur Oak
Shagbark Hickory
Hackberry
Sugar Maple
Ironwood
White Birch
Largetooth Aspen
Deciduous Trees

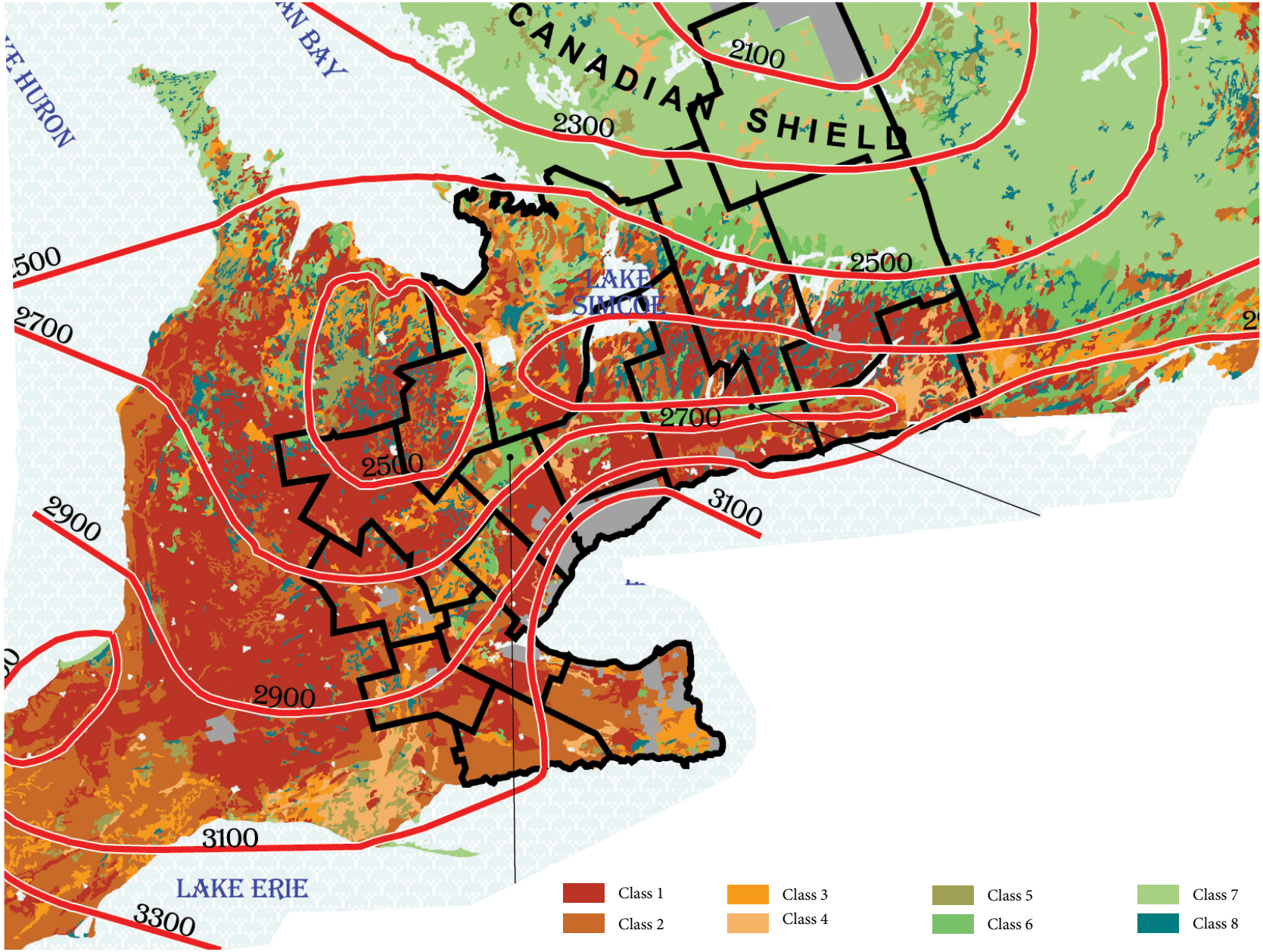


Figure 6-7 This map shows the diversity of rich soil type found around Toronto. This can also help to understand and reduce the significant reliance of food from all over the globe instead of its immediate surroundings.

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