

# **Redefining Urban Water: Land Art Pavilions Along Vancouver's Abandoned Olympic Line**

by

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Dalhousie University is located in Mi'kmaq'i,  
the ancestral and unceded territory of the Mi'kmaq.  
We are all Treaty people.

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## **Abstract**

In urban areas like Vancouver, high precipitation levels are often viewed as both excess and disposable. North American city infrastructures prioritize diverting water away from sight, presenting ongoing challenges for architects amidst the push for denser cities. Moreover, prevailing perceptions often view water solely as an ecological burden, overlooking its atmospheric and ritualistic significance.

The Abandoned Olympic line serves as a testing ground for a notional street concept diverging from conventional typologies. The Land Art Pavilions, strategically positioned along the rail line, utilize gutters and storage tanks to interact with the landscape, ultimately reshaping the terrain and existing infrastructure. This approach fosters symbiotic growth for humans and ecosystems, upholds cultural permanence, and recognizes water as a transformative medium.

Redirecting water flow towards Discovery Park near the Cambie bridge, these pavilions create ephemeral pathways, reimagining Vancouver's urban fabric and raising awareness about environmental stewardship.

# Acknowledgements

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To my studio mates - Thank you so much for your endless help and feedback. From the numerous brainstorming sessions to the countless skits filled with The Office references, I cannot express enough how memorable this journey has become.

Thank you to my parents, siblings, family, and friends for their unconditional support throughout my educational journey. I would not be here without you.

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# Chapter 1: Introduction

## Context

Water is seen and used as an excess and disposable resource in cities with high precipitation climates like Vancouver. The city infrastructure's main intention with water is to divert away from human life. This thesis critiques the industrial process that degraded the urban landscape by changing the water management systems through local agencies that expose the presence of water. Educational installation programs and local infrastructure will help the surrounding neighbourhood. This will ultimately change the way cities are built through environmental stewardship.

In Vancouver, November and December witnessed the highest precipitation levels, averaging 182mm, contrasted with the drier months of July and August, which see only 41mm on average (Weather Stats Canada, 2023). Such fluctuations underscore the urgent need for innovative water management strategies tailored to the city's requirements. This can be applied to other highly precipitated Canadian cities like Halifax and Quebec.



Photograph of precipitation in Vancouver (2023)

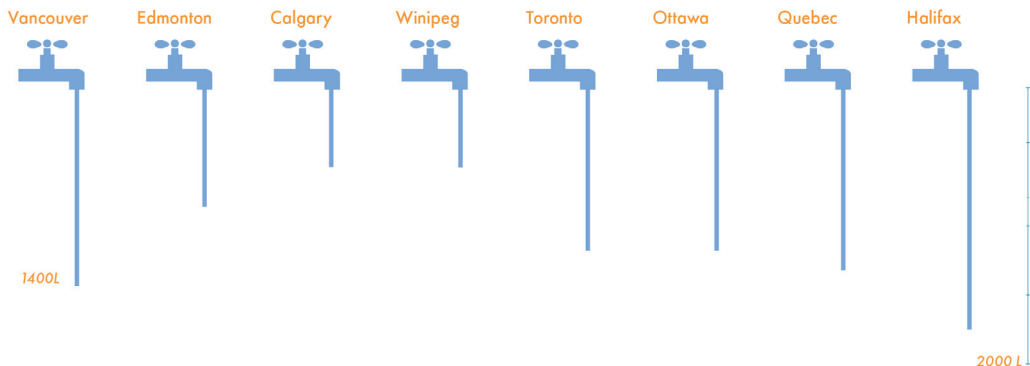
Hence, it is imperative to explore innovative water management strategies that harness the landscape's natural features and adapt to unique urban conditions, such as streets, buildings, and roads.

For instance, the indigenous plants in Vancouver, like Huckleberry, typically require 2.5cm to 4cm of water using drip irrigation. Additionally, consider the minimal water usage of 20-30ml for hand-washing. (City of Vancouver 2016) These statistics underscore the importance of efficient water use in urban settings.

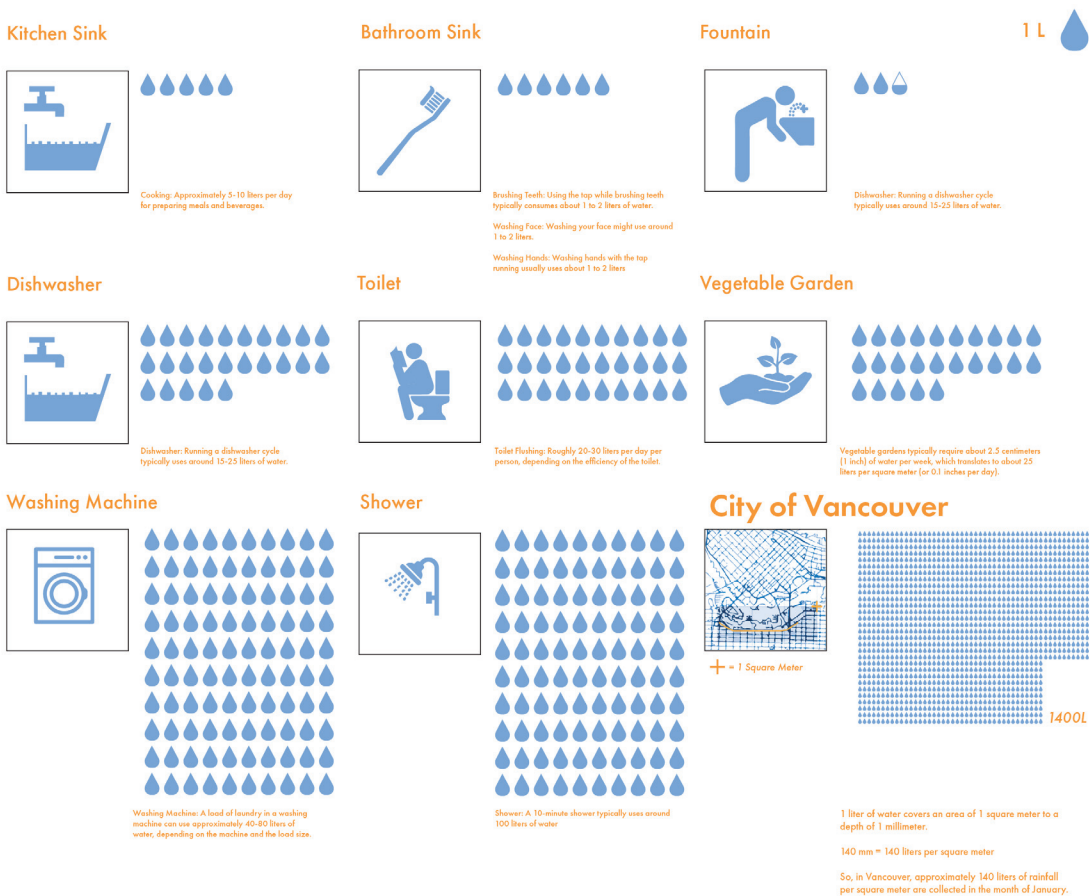
Rather than water in highly precipitated areas that merely serve as a mundane and gray background, urban water management systems can become integral components of the cityscape, reflecting the local environment and natural systems. These frameworks can function ecologically by transforming urban spaces into public areas that interact with the city's underlying landscapes—its topography, climate, rivers, and harbours, historically serving as the city's 'infrastructure.' This concept is particularly relevant in Vancouver, BC, where the city's identity is closely tied to its natural surroundings.

By 2041, Vancouver's population is projected to increase by over 150,000 residents, accompanied by the creation of nearly 90,000 jobs (City of Vancouver 2010). This substantial growth will inevitably lead to increased demands and maintenance of the existing water, sewer, and drainage infrastructure. As the city expands to accommodate the influx of residents and businesses, the strain on these essential systems will become more pronounced, highlighting the urgent need for innovative approaches to water management.

## Annual Average Rainfall of Canadian Cities



## Average Water Consumption



Visualizing the Annual Average Rainfall and Water Consumption in Canadian Cities: This diagram illustrates the rainfall volume per square foot in various Canadian cities alongside average water consumption, highlighting the potential for harnessing rainfall as a resource for meeting water needs.



## Cities with High Precipitation

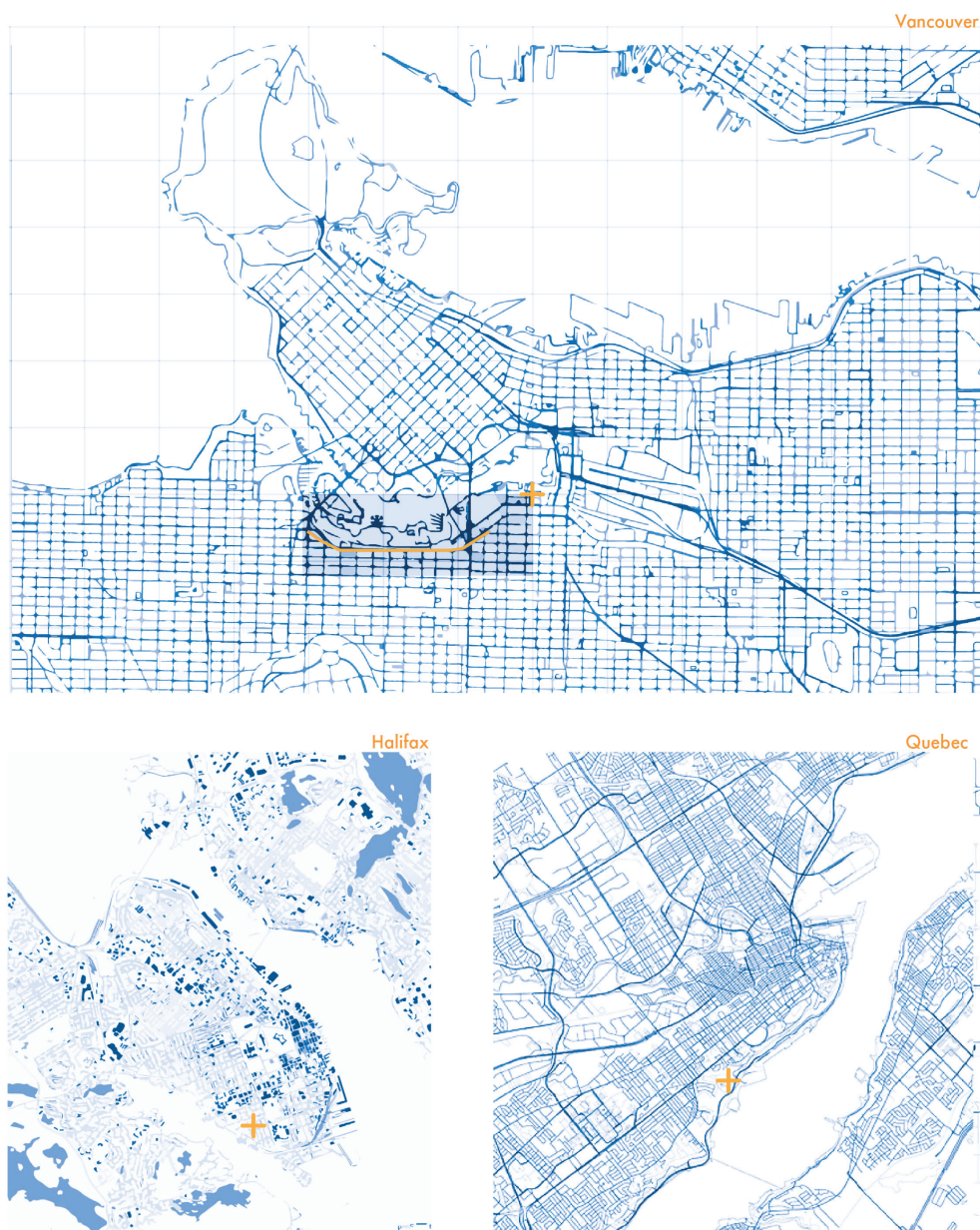


Diagram indicates Urban Water Management strategies in Vancouver can be effectively adapted to other Canadian cities experiencing high levels of precipitation, such as Halifax and Quebec.

Cities like Portland, Oregon, set a strong precedent for showcasing blue-green infrastructure elements. These elements, such as rainwater harvesting streets, eco-roofs, trees, and natural features such as urban streams, forests, and wetlands, effectively manage stormwater, preserve water quality, and improve watershed health (Muller 2022, 14). With a significant portion of its sewer pipes aging, Portland's blue-green infrastructure enhances the urban environment, supports wildlife, and offers cost-effective alternatives to traditional pipe systems.

While Vancouver's 2040 Masterplan shares similar objectives with Portland, there is potential for further innovation, particularly by incorporating blue-green infrastructure that reflects the city's past, present, and future landscapes.

### **Thesis Question**

How can architecture create ephemeral moments with water that mediate the temporal, cultural and natural aspects of urban landscape that strengthen environmental stewardship?

### **Critical Position**

dual nature of water shows is water's ability to purify as to clean. Water communicates its purity by touching or walking the substance of a thing and it cleans by washing dirt from its surface (Illich 2005, 27).

With the idea that the interaction between people and the built environment is largely sensorial, Architects can craft haptic infrastructures that harness water, leveraging its purifying and sensory qualities – the sound, visual impact, and atmospheric presence – to educate the perception of environmental stewardship, in contrast to cities' current water management that hides the presence of that solely focused on diverting water into street gutters and disclosed pumphouses. The current street typology developed missed opportunities in developing places that can be used to play, harvest, learn, leisure, meditate, cleanse and travel.

The elements of architecture are not visual units or gestalt; they are encounters, confrontations that interact with memory (Pallasmaa 2012, 8)

Learning from Pallasmaa, architecture is not just about the physical structures or visual aesthetics but about the profound experiences and memories it evokes. Architects can use precipitation as a tool to enhance its sensorial qualities, extending beyond visual aesthetics. Therefore, shifting the negative image we perceive in cities facing precipitation like Vancouver could shift a stronger sense of place in communities using mnemonic quality, influencing, and interacting with memory. According to Steve Parcell's, *Interdisciplinary Translation*(2003), architecture has the power to embed itself in our memories through the experiences we have within and around it by developing a meaning-based transformation(Parcell 2003,5).

In alignment with Pallasmaa's views, Zumthor expressed that memories can evoke emotions and create atmospheres



Diagrams indicate the missed opportunities with Urban Water Management

that resonate with the human spirit (Zumthor 2010,18). By incorporating elements of tranquillity, such as natural light, materials, and spatial configurations, Zumthor reinforces the idea that architecture can be the source of calm and reflection, contributing to a more profound connection between only users and their environment.

This thesis will enhance the lost relationship between humans, non-humans and the natural landscape by developing spatial moments along a proposed site in Vancouver. The purifying value of water, as mentioned by Illich, has been processed into a chemical reagent. Through developing these architectural interventions, they become milestones for people to interact with water and display the missed opportunities of current urban water management and street typologies.

The design intends to educate a spectacle among viewers while being functioned for urban water management and strengthening the existing ecosystem. The design will show the proposed site in Vancouver to be sculpted for land art pavilions and urban spaces.

Moving forward, the contextual information of the site and approach developed in this thesis can be adapted and applied to other urban landscapes facing similar challenges, particularly those found in highly precipitated areas. By mapping the temporal, natural, and social landscapes, future projects can develop unique possibilities presented by water exposure to various urban landscapes.

Moreover, by embracing these principles, architects and designers can assume a stewardship role, actively working to reestablish the historical narratives of the urban landscape and revive natural ecosystems that may have been displaced over time. In doing so, this thesis paves the way for a narrative-driven approach and resilient future, where urban processes like urban water management can coexist harmoniously with their natural environments. .

## Chapter 2: Identified Issues from Water Management

### Background

Architects play a pivotal role in shaping the built environment, particularly in effectively managing water resources within buildings and urban spaces. This responsibility encompasses various considerations, including stormwater runoff, wastewater treatment, and water conservation. Despite this crucial role, the historical trajectory of urban water management has often overlooked the intrinsic relationship between water and humanity, treating it merely as a forgotten purification process. To address this oversight, there is a pressing need to underscore the profound nature of water and its indispensable necessity by dissecting its concepts across different scales. This approach lays the groundwork for examining water's transformation into a chemically treated commodity, known simply as H<sub>2</sub>O (Illich 1986, 12). The industrialization of water during the twentieth century marked a significant shift, stripping it of its spiritual essence and reducing it to an odourless and refined product. This transition resulted in a social disconnect with the urban landscape and stemmed from historical disruptions to natural water systems, affecting urban water management practices. Moreover, the environmental ramifications of treating water as an excess resource have become increasingly apparent, with issues such as sewer overflow and pollution posing significant challenges. By embracing the intangible qualities of water and reimagining its role within urban landscapes, we can forge a more sustainable

and harmonious relationship between humanity and this vital resource.

### ***H<sub>2</sub>O and the Waters of Forgetfulness***

Illich argues that there needs to be an emphasis on the intangible nature of water, highlighting that it cannot be directly observed in its entirety. Instead, he suggests that water can only be understood or conceptualized by reflecting on individual instances of it, such as a drop or a puddle. Illich implied that understanding complex or vast concepts often requires breaking them down into smaller, more manageable parts. By observing individual drops or puddles, one might engage in a reflective imagination to grasp the nature of water as a whole. It could also convey the idea that water, being a fundamental and ubiquitous element, is often taken for granted, and its true significance can be appreciated by contemplating smaller manifestations of it (Illich 1986,76).

### ***Industrialization – Transition to Chemical Reagent***

Historically, the domestication of water was developed to provide clean drinking water and maintain hygienic conditions in emergent cities in the early 1900s. This sanitation helped cities avoid outbreaks of diseases like Cholera.

During the twentieth century, water became a resource labelled as H<sub>2</sub>O, which is a chemically treated, odourless, and refined product. In the imagination of the twentieth century, water lost both its power to communicate through its sensorial purity and its mystical power to wash off spiritual blemishes. It has become an industrial detergent, feared



both as an untreated liquid and as an additional expense.

Water has been perceived throughout history as an entity that radiates purity. It has transformed into a scientific resource known as H<sub>2</sub>O, whose purification human survival depends on. H<sub>2</sub>O is a social creation of modern technology, a scarce resource that calls for technological management.



Bird's eye view of Burrard Inlet, an estuary flat. (Mackenzie 1792)

### **Social Disconnection**

To understand Vancouver's relationship with water, we must examine its history. Before city development, Vancouver was once an estuary flat with scenic wildlife landscapes (City of Vancouver 2013). Natural runoff in Vancouver was once valued by local indigenous communities. Since the arrival of settlers in the 1850s, urban development has disrupted the water cycle, degraded natural systems, and cut natural pathways for freshwater.

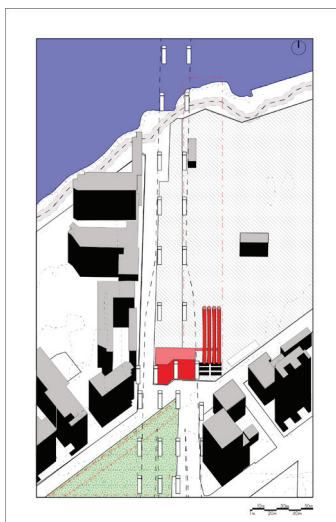
During the 1910s, the city of Vancouver decided to infill the False Creek flats shoreline for industrial production. This move not only reshaped the physical contours of the land but also disrupted the natural pathways through which water

flowed. The historical transformations significantly impacted Vancouver's water management as they redirected water into new tidal floodplains to mitigate the floodplain.

In present-day Vancouver, the existing water infrastructure serves more as a technological and practical necessity than meeting social expectations. These structures function primarily as distributed movement, encompassing storm lines, sewage lines, and city streets. However, city development has given rise to a significant challenge—impermeability. This impedes water from infiltrating the soil, redirecting it through artificial catch basins. The outcome becomes clear during heavy rainfall, when flooding arises as a prominent concern, washing away the livability in high-precipitated cities.

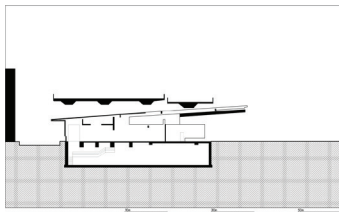
### ***N.E.U. Pumphouse***

Buildings like the N.E.U. Pumphouse beneath the Cambie Bridge exemplify an environmentally sustainable building, enhancing energy efficiency in nearby structures (City of Vancouver 2024). However, it is hidden from the public realm, which reduces its latent potential. This poses risks to the landscape and threatens the liveability of the place from being explored.



1:1000 Site Plan of the  
N.E.U. Pumphouse

Therefore, the increasing saturation of urban spaces prompts reconsider our relationship with infrastructure and water. Instead of viewing water infrastructure solely as a technical apparatus, there is an opportunity to reimagine it as a productive public space. Water can be harnessed by actively engaging with the city's underlying landscapes—



1:50 Section of the  
N.E.U. Pumphouse

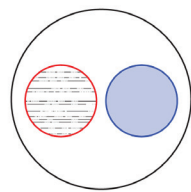
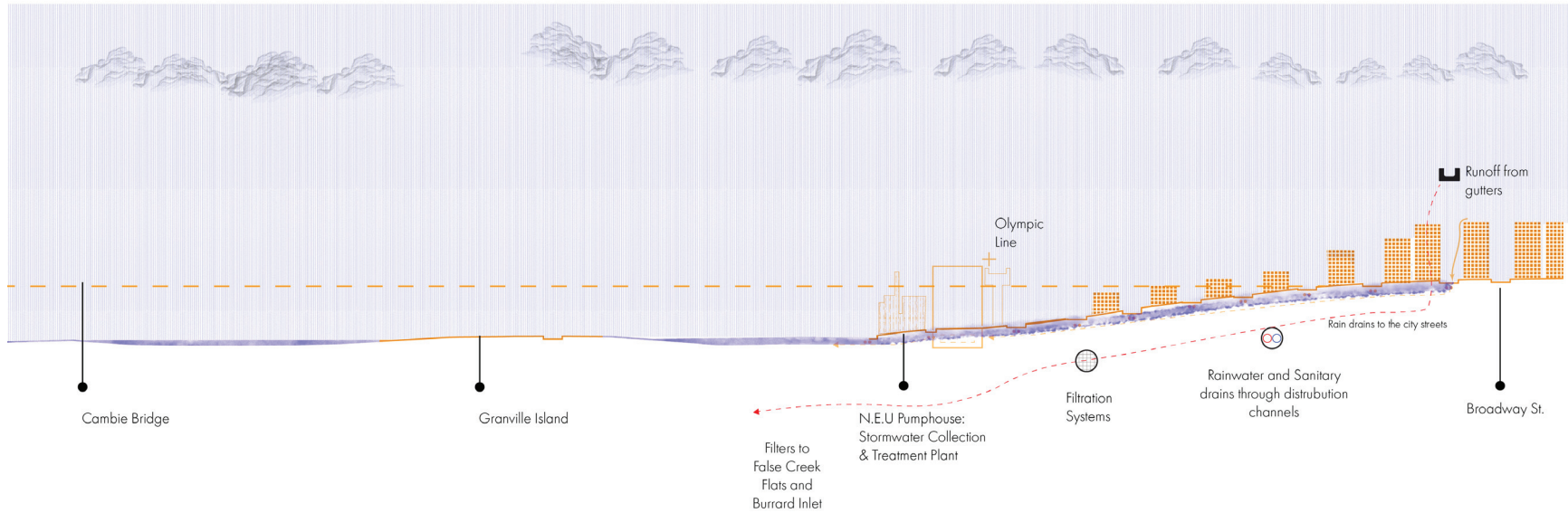
its topography, climate, rivers, and harbours—to redefine infrastructure’s role as a public element in design.

## Environmental Concerns

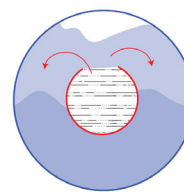
The existing water infrastructure serves more as a technological and practical necessity than meeting social expectations. These structures function primarily as distributed movement, encompassing storm lines, sewage lines, and city streets. However, city development has given rise to a significant challenge—impermeability. This impedes water from infiltrating the soil, redirecting it through artificial catch basins. The outcome becomes clear during heavy rainfall, when flooding is a prominent concern, washing away the city’s image. Sewer overflow, compounded by backups from treatment plants, discharges into False Creek and the Pacific Ocean. (City of Vancouver 2023b) This not only poses risks to the urban landscape but also to the existing ecosystem for ecology and people.

Over recent decades, urban landscapes have been increasingly susceptible to flooding with the predicted future water level; this is likely to increase with more impermeable surfaces.

Current Water Infrastructure



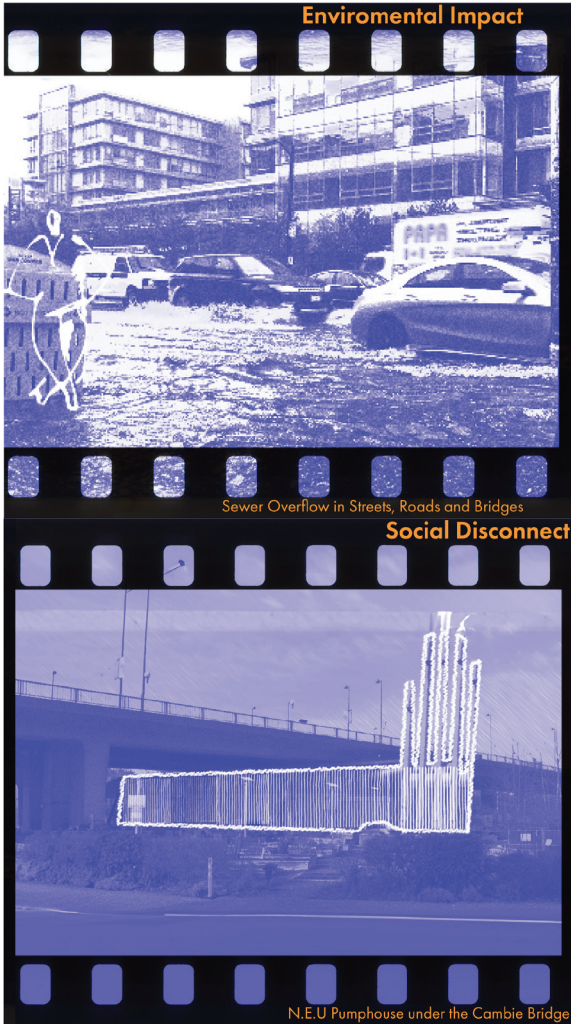
Seperated Lines for Rainwater and Sanitary Drains



2 Combined Sewer Lines located nearby the Cambie Bridge

Diagram of Sewer Overflow (Vancouver 2023b) Existing drainage systems, designed for rainwater and sewage collection, may overflow during heavy rain to prevent treatment plants from exceeding their wastewater capacity.

## Identified Issues



## Vancouver 2040 Masterplan



**Vision:** Vancouver's rainwater is embraced as a valued resource for our communities and natural ecosystems



**Goals:** Improve and protect Vancouver's water quality | Increase Vancouver's resilience through sustainable water management | Enhance Vancouver's livability by improving natural and urban ecosystems



**Objectives:** Remove pollutants from water and air | Reduce volume of rainwater entering pipe system | Increase managed impermeable area that treats urban rainwater runoff | Increase total green area that treats urban rainwater runoff | Mitigate urban heat island effect | Harvest and reuse water

Vancouver 2040 Regional Growth Strategy  
Illustration done by City of Vancouver (2010)

Diagram of Sewer Overflow (Vancouver 2023b) Existing drainage systems, designed for rainwater and sewage collection, may overflow during heavy rain to prevent treatment plants from exceeding their wastewater capacity.

## Chapter 3: Infrastructure of a Notional Street

The Street is a human movement institutionalized (Rykwert 1982,105)

To balance the need for urban density and expansions of urban water management practices, the departure from traditional urban water management to one that creates a sensorial atmosphere can promote a more informed, engaging and environmentally responsible relationship between people and water in urban landscapes. The street is something created by social connections. While an individual can create a path, it only becomes a street when others follow and accept it. Streets and roads are not just physical pathways; they gain their identity and purpose as social institutions through community acceptance and use.

### Olympic Line as a Testing Site

The abandoned Olympic Line served as a testing ground for notional streets as it is not bound by conventional street typology. Located in the urban landscapes of the False Creek Flats, its context matches temporal, natural, and cultural elements that can advocate for environmental stewardship through physical forms and systems of pathways and nodes (Lynch 1960, 46).



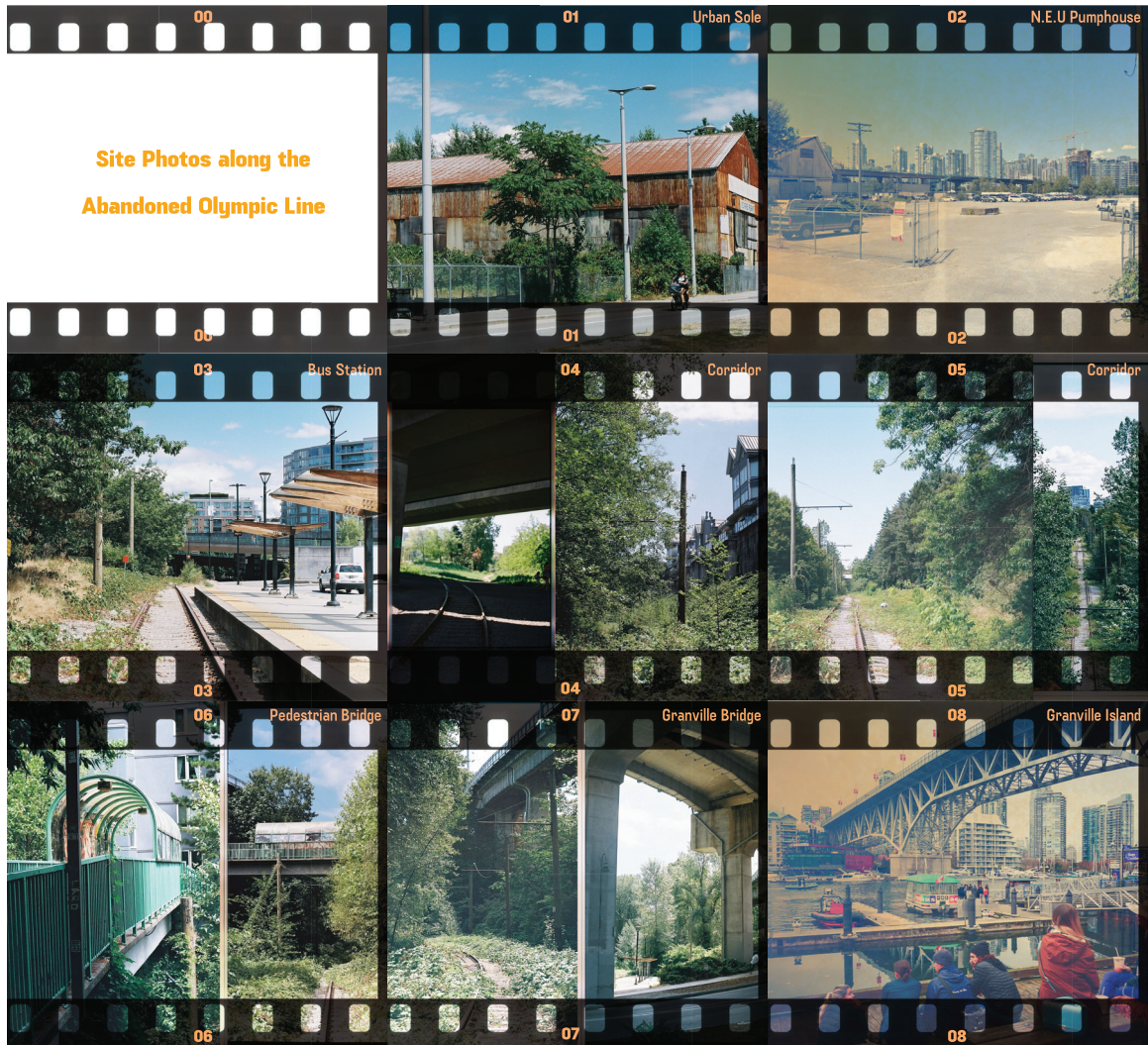
Photograph of the abandoned olympic line (Bracewell 2011)

The objective of the Olympic Line was to gain popularity

from tourism and Olympic athletes, as the 2010 Olympics were the largest event created for the city (Bracewell 2011). Vancouver planned the Olympic Line to combat the transportation challenge, supplying free, reliable and accessible public transit between Olympic Village, Canada Line station and Granville Island. The development of the Streetcar was to promote neighbourhood development and street life, improve public space and reconnect the historical past of the train lines in Vancouver.

### **Site Photos along the Abandon Olympic Line**

In this exploration, the photographs reveal a language shaped by movement, guiding users through a sequence of moments. These moments correspond to Donald Appleyard's concept of annotating landscapes, as illustrated in his work examining experiences along highways (Lynch, Appleyard, and Meyer 1964, 19). By notating roads according to the "rhythm and tempo" dictated by the landscape and intersections, this concept offers a framework for annotating sensory experiences within the photographed spaces. Through this lens, the photographs become more than just images; they serve as tangible evidence of how our surroundings influence our perception and interaction with the built environment.



Site Photos along the Abandoned Olympic Line proposes opportunities for a notional street.

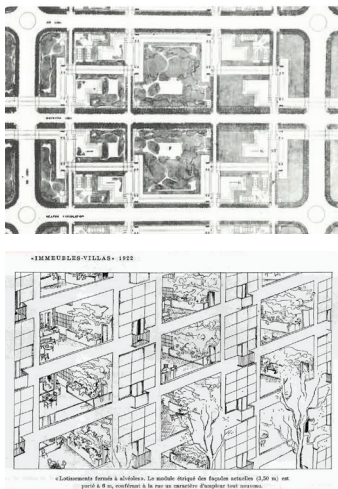


## Departure from Typical Street Typology

Streets were designed as a selective threshold, which abolished amenities of the street and increased the alienation of the inhabitants from its city, consisting of individual living units, each with its own terrace and garden space. While this design promotes privacy, it can also lead to a sense of isolation and fragmentation. The lack of a cohesive street-level experience can create a disconnected and disjointed urban fabric.

### *Immeuble Vilas*

For instance, Le Corbusier's *Immeuble Vilas* (1925) is characterized by a series of elevated columns that lift the building off the ground (Rykwert 1982, 101). This creates a void at the street level, diminishing the traditional interaction between the building and the street. The street, a crucial component of urban life, loses its vitality when the building fails to engage with it directly.



Immeuble-Villas.(Le Corbusier 1925) Entry to the apartment block s is by private access roads and garage, each with its own parking facilities.

Unlike active streets, abandoned rail lines are not constrained by conventional urban street typologies. This allows architects and urban planners to experiment with alternative design approaches that may not be feasible or practical within traditional street frameworks. The absence of vehicular traffic and pedestrian congestion allows water management strategies to be tested without disrupting urban circulation.

## Notional Street for Atmospheric and Ritual Qualities

The unique atmosphere and character of abandoned rail lines can contribute to creating distinctive urban spaces. By leveraging the site's inherent qualities, such as its industrial heritage or natural surroundings, designers can imbue a notional street with a sense of place and cultural significance. This can enhance water management interventions' experiential and symbolic value, fostering a deeper connection between residents and their urban environment.

### *Ritual Qualities of Bora Ground*

The Bora ground diagram in Moreton Bay, New South Wales, reveals pathways designed not only for public accessibility and landmarks but also as temporal elements akin to paths followed by pilgrims (Rykwert 1982, 106). This pathway approach, initially employed for peace-making, resembles grounds used in initiation ceremonies. The pathways show their significance in both cultural practices and communal engagement. Learning from the Bora grounds informs ritual with intentions like a bead along an urban fabric; they hold moments along a path that shapes values and intention with its environment.

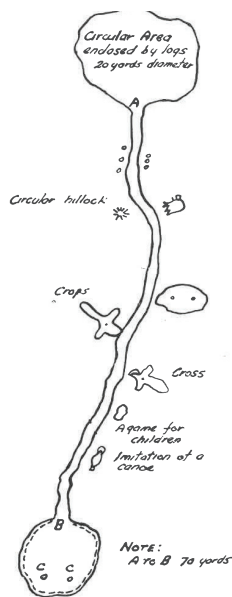
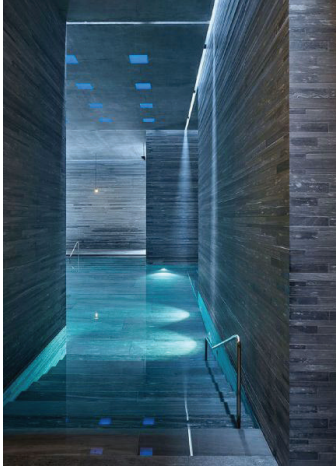


Diagram of Bora ground in Moreton Bay, New South Wales. (Oxely 1824) This area was used for peace making, but is closely analogous to grounds used for initiation ceremonies.



Photograph of Therme Vals, Switzerland (Zumthor 2007). Water's reflective and tactile properties, along with its ability to create a sense of tranquility, illustrates an ephemeral experience for users.

### ***Atmospheric Qualities from Therme Vals, Switzerland***

As mentioned in Zumthors' *Atmosphere* (2007), he argues sensorial qualities from his project, Therme Vals, to design for intimate performance between the user and the natural environment (Hauser, Zumthor, and Binet 2007, 15). The architect focused on harnessing water as its natural element and embracing the site's natural elements to inform the program. The design of Therme Vals demonstrates the manipulation of light and dark, the integration of water, and the creation of an intimate, therapeutic atmosphere. This approach develops a strong ephemeral experience that allows users to appreciate the spirit of the place. By integrating ritual and atmospheric qualities in the urban landscape, water can be used to develop urban spaces that create meaningful experiences.

### ***Waterfall Building, Vancouver***



Photograph of the Waterfall Building, (Erickson 1996.) The use of waterfall gravitates the street with its acoustic and visual qualities.

The Mixed-Used Arthur Erickson Waterfall Building case study in Vancouver, CA, shows a prime example of these techniques at work. This study exemplifies a strong sense of place by harnessing the natural phenomenon of water. While the waterfall presents an enticing atmosphere of sound, scale and texture, the development of public spaces embracing rain can steer urban areas towards a positive trajectory, reshaping the city's street image (Erickson 1996).



Photograph of Freeway Park, (Seattle 2023) The park used tectonic elements to navigate water along the site.

### ***Freeway Park, Seattle***

Lawrence Halprin highlights landscape design that integrates water into the built environment. Situated over an existing highway in Seattle, the park linked plazas previously disconnected from the highway. A strong position Halprin has developed to create a positive image with water is by incorporating terrace-level water features. The park not only serves as a recreational area but also as a buffer that minimizes the visual and auditory sounds of the freeway (Halprin 2022).

In this chapter, a sensory-based approach to urban water management is proposed through the concept of notional streets. By examining the inadequacies of typical street typologies such as Le Corbusier *Immeuble Villas* (1925), architects and urban planners can explore new opportunities for water management that prioritize sensory experiences and community engagement. By drawing inspiration from historical precedents and architectural wonders, designers can imbue urban spaces with ritual and atmospheric qualities to enhance the experiential value of water management interventions. Case studies like the Waterfall Building and Freeway Park demonstrate how integrating water into the built environment can reshape urban landscapes and foster positive community experiences. This thesis calls for a paradigm shift in urban water management towards immersive environments that evoke positive emotions in users, promote environmental stewardship, and foster community connectivity.

## Chapter 4: Mapping (Method)

Brook Muller's *Blue Architecture: Water, Design, and Environmental Futures* (2022) argues that the notion of a watershed transcends the confines of physical boundaries, urging us to view it as an intricate urban system operating on various interconnected scales (Muller 2022, 94). By embracing this perspective, the Abandoned Olympic Line can prompt the design to consider the environment's complex interplay of temporal, social, and natural elements. Such an approach underscores the importance of recognizing watershed management's nested and overlapping dimensions. Rather than viewing a watershed in isolation, it is imperative to adopt a holistic understanding that acknowledges its dynamic relationship with surrounding ecosystems and human activities is imperative.

Consequently, the investigation of a site should extend beyond its immediate physical attributes to encompass its temporal evolution, social dynamics, and ecological interactions. This broader lens enriches our understanding of the site. It empowers it to develop more robust and sustainable design interventions that resonate with the intricate web of connections within the urban landscape.

### Temporal Landscape

This area is situated on the traditional unceded territories of the Musqueam, Squamish and Tsleil-Waututh Nations,

## Olympic Line Timeline

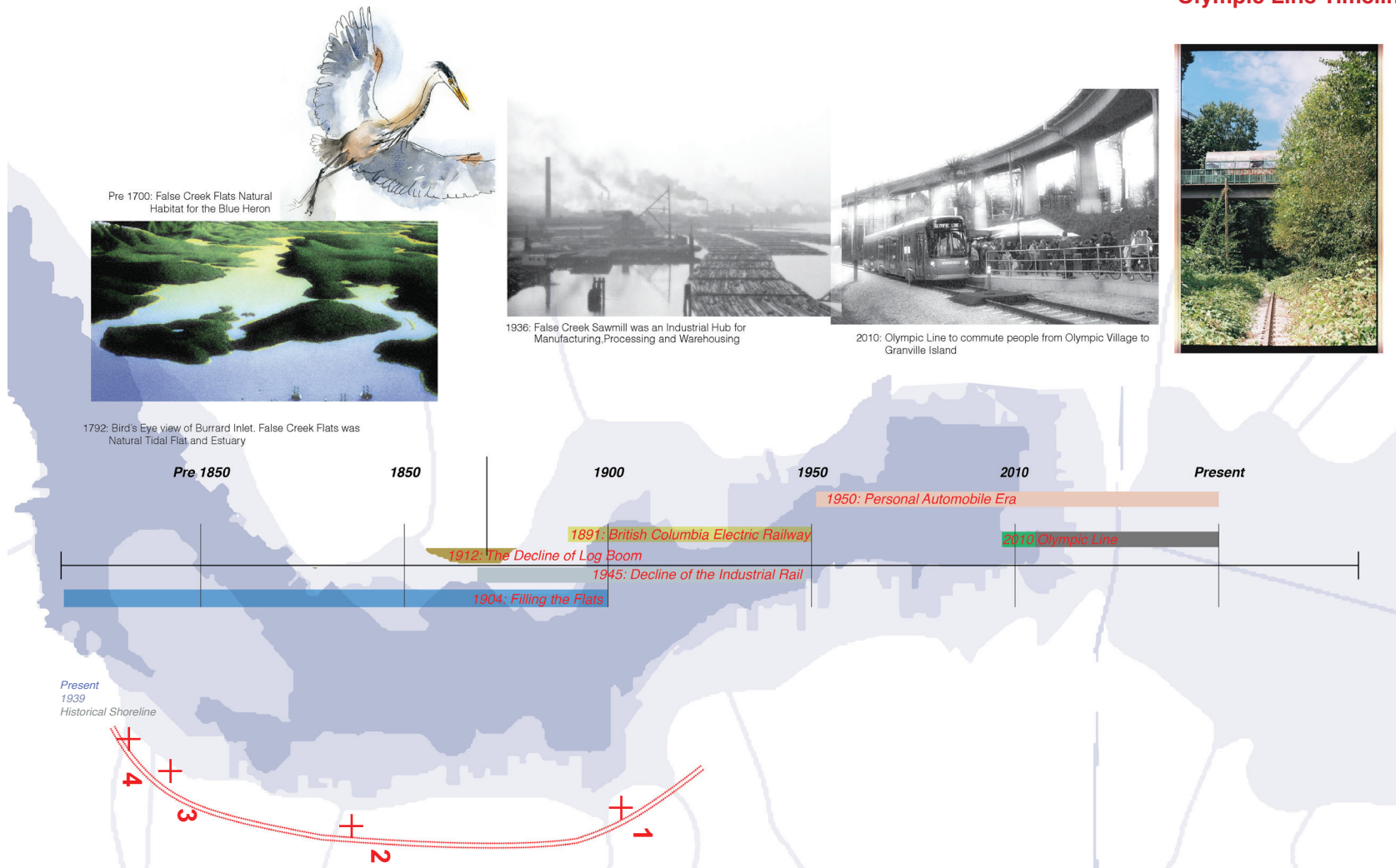


Diagram of the Olympic Line Timeline showcase multiple temporal phases, revealing opportunities for restoring original waterways and natural habitat.

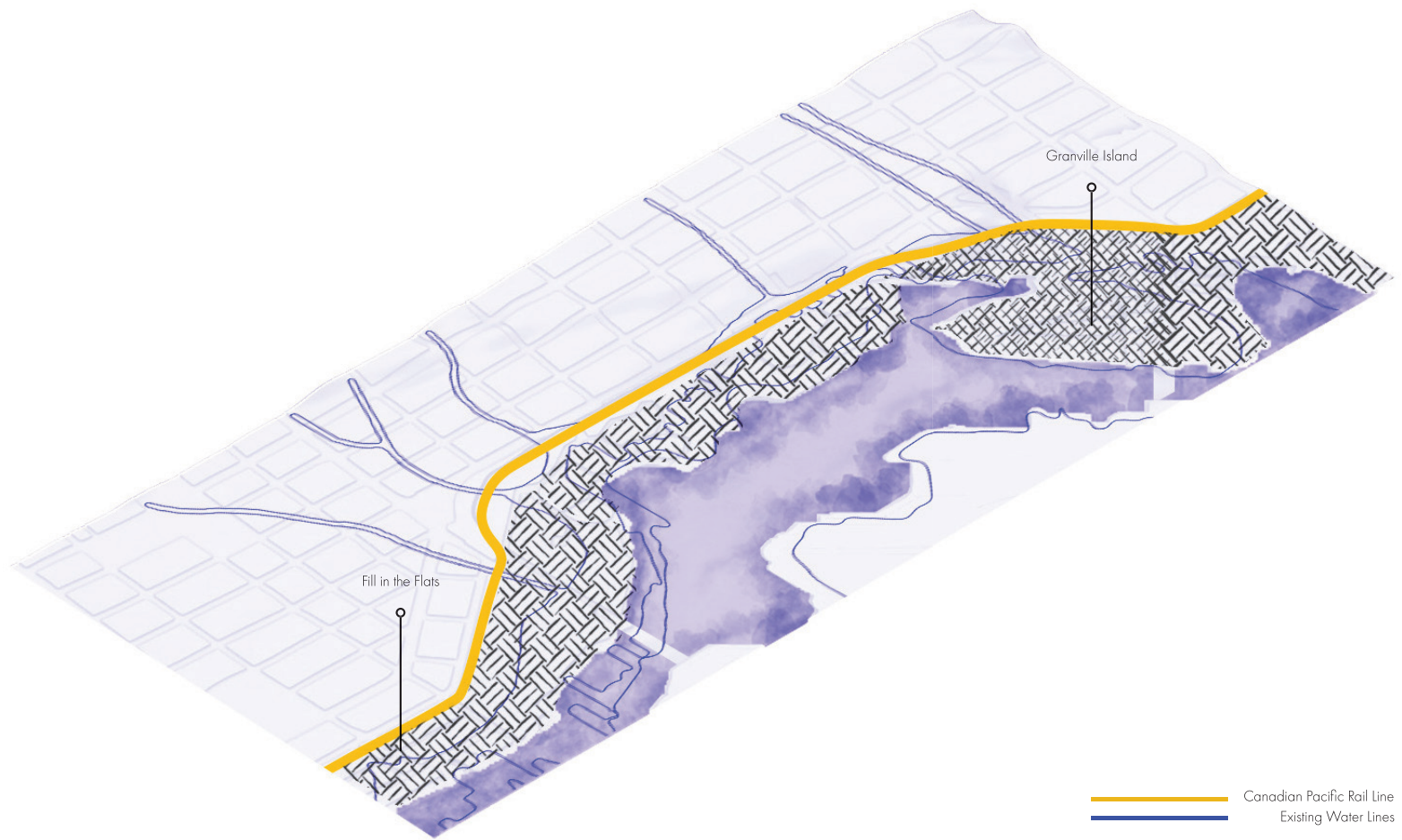


Diagram of the Olympic Line Timeline showcase multiple temporal phases, revealing opportunities for restoring original waterways and natural habitat.

once part of a larger wetland (City of Vancouver 2006). Six Indigenous communities used to fish salmon down the stream as the creek system linked to the Fraser River. In the early 1900s, the city of Vancouver filled a significant body of water for economic and industrial purposes. During this period, it emerged as a key stop for both the Canada-Pacific Railway and the Great Northern Railway. However, by the late 1950s, the industrial market at the site experienced a downturn in the Canadian economy. In response to this economic shift, the site has transformed with the development of a new master plan.

The influence of settlement colonialism and railway expansion has transitioned ecosystems to grow invasive species in the urban landscape, like the phragmites (Gandy 2022,75). This species is common along railroads and is a byproduct of the changing landscape and rerouting history into a new path.

The site's temporal evolution, shaped by economic shifts and evolving technologies, makes it a testing site that helps enhance the collective memory of the site and reshape the urban landscape. These major historical events are necessary for the urban landscape to consist of the temporal elements it is defined by.

## **Urban Landscape**

Despite Vancouver's rich traditions and cultural heritage that have long defined its neighborhoods, a significant social gap persists within the city. While the city's master plan emphasizes character-defining places, elements, flora, and fauna, as well as materials to capture the spirit of the community (City



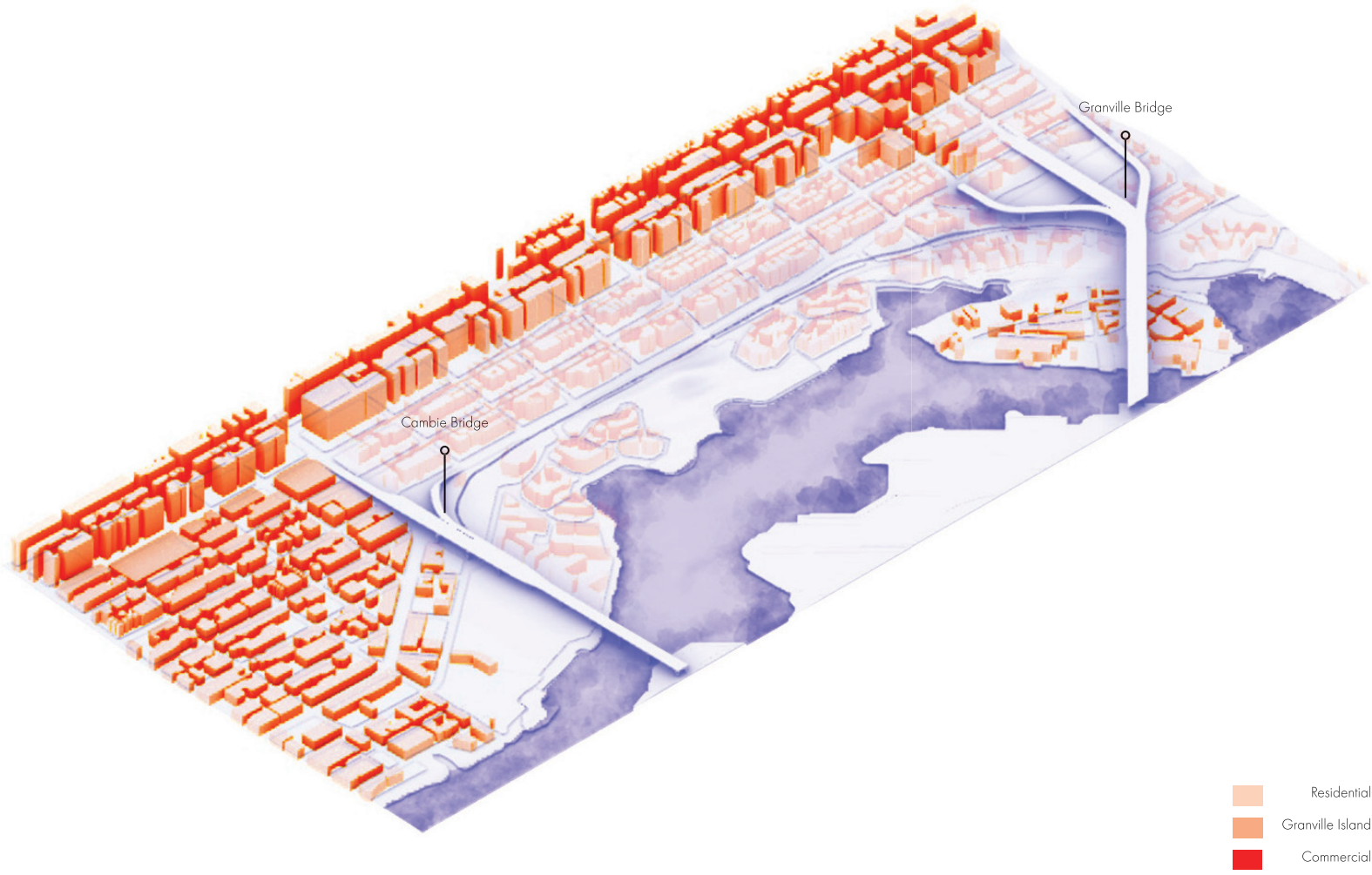


Diagram of the Urban Landscape. Site Context Map depicts the programmatic relationships within the site, illustrating connections with adjacent residential and industrial neighborhoods



Sanitary Lines  
 Stormwater Lines  
 Combined Lines

Diagram of the Hydrology Landscape. Sanitary and Stormwater Lines along the Olympic Line indicates a potential areas and the drainage of the Olympic Village Water Treatment Plant



Urban Movement Diagram pinpointing high-traffic intersections for targeted design interventions, maximizing public exposure and engagement.

of Vancouver 2013), this vision only uniformly translates across some areas. Specifically, when examining the zoning development of False Creek, which is programmatically divided into historic zones, a pronounced disparity emerges.

The shipbuilding/steel fabrication, lumber, and rail zones delineate the industrial history, while adjacent residential areas, predominantly comprised of duplexes, apartments, and mixed-use buildings, face a different reality. In the broader context of Metro Vancouver, where 8.1% of households experience overcrowding (CensusMapper n.d.), this socioeconomic divide extends beyond the industrial sites to impact the everyday lives of residents living along the Olympic Line. This glaring social gap raises questions about equitable urban development and underscores the urgent need for comprehensive strategies that bridge the divide between industrial and residential spaces in Vancouver. The site demands action to develop programs connecting industrial and residential neighborhoods with more usable public spaces.

As Kevin Lynch states, nodes are segments of a movement situated along the junction between neighbourhoods, and pathways are movements throughout the city. So, a notional street is an urban strip that facilitates movement, like a station. (Lynch 1960,16)

The site must be found alongside residential neighbourhoods and mixed-use commercial buildings. Additionally, it must have elements indicating the need for a more public image. A public image is perceived as a place that fosters positive

interaction, engagement, and a sense of community (Gehl 2010, 25).

## **Natural Landscape**

The Olympic Line offered a distinctive perspective on urban landscapes, particularly in the False Creek Flats region. Positioned at the False Creek inlet's southern terminus, this area links mainland Vancouver and the downtown core. A thorough examination of the existing contour lines reveals the profound impact of the Canada-Pacific Railway on the natural terrain, resulting in significant alterations in elevation across the urban expanse (City of Vancouver 2023a). These findings underscore the potential of leveraging existing topographical features to integrate rain infrastructure into urban environments. The urban water management design can optimize drainage systems by strategically using the high and low points identified in the topography map, effectively managing stormwater runoff and mitigating flood risks.

Furthermore, a detailed hydrology map highlights two combined sewer lines near the Cambie Bridge. This configuration raises concerns regarding the potential for cross-contamination during heavy rainfall, posing significant environmental and public health risks. As such, it becomes imperative to implement targeted design interventions along the Abandoned Olympic Line to address these pressing challenges. By prioritizing passive filtration solutions and haptic infrastructure designs, the site will safeguard against the adverse impacts of urban flooding and enhance resilience to future climate uncertainties.

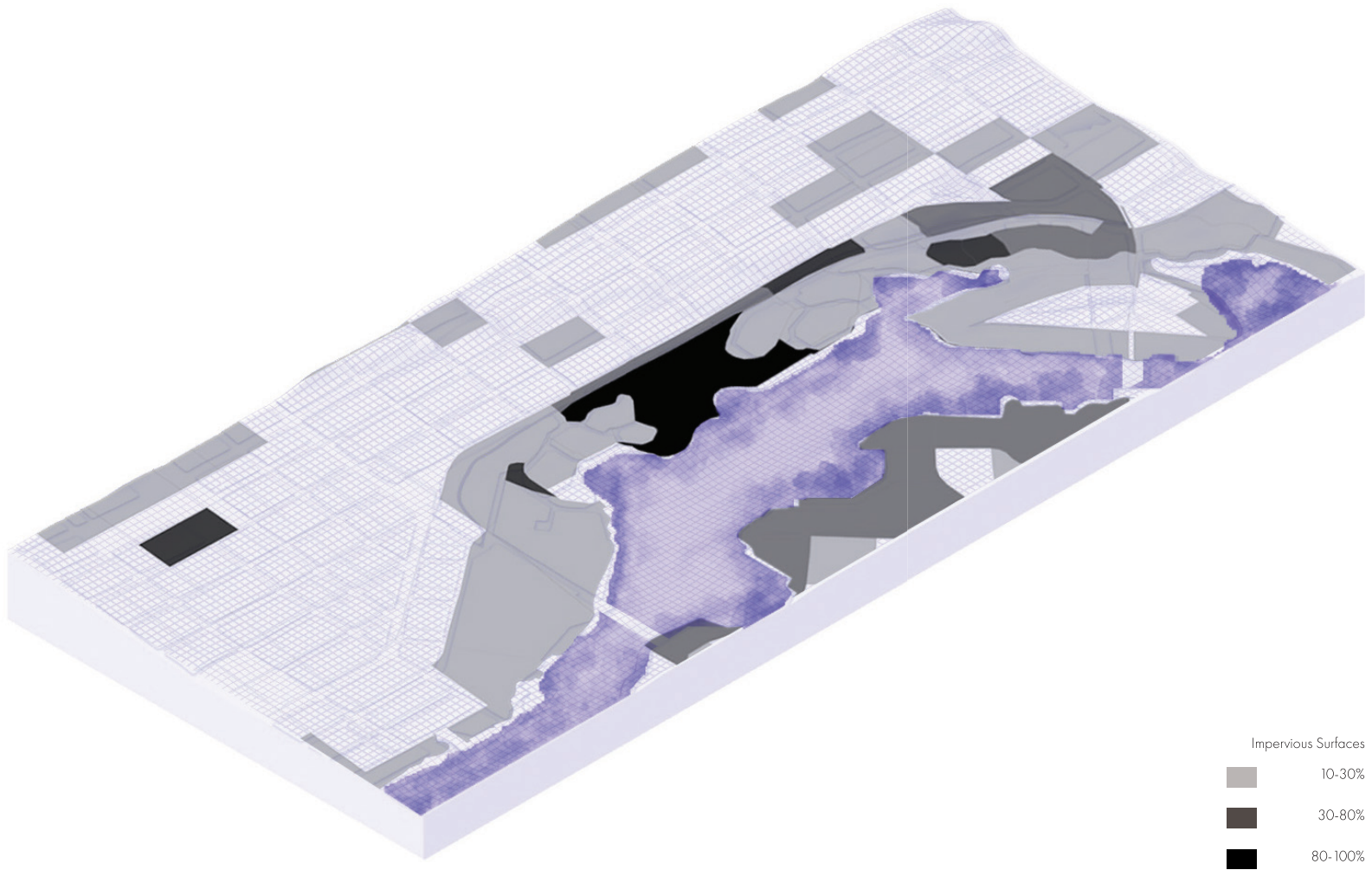
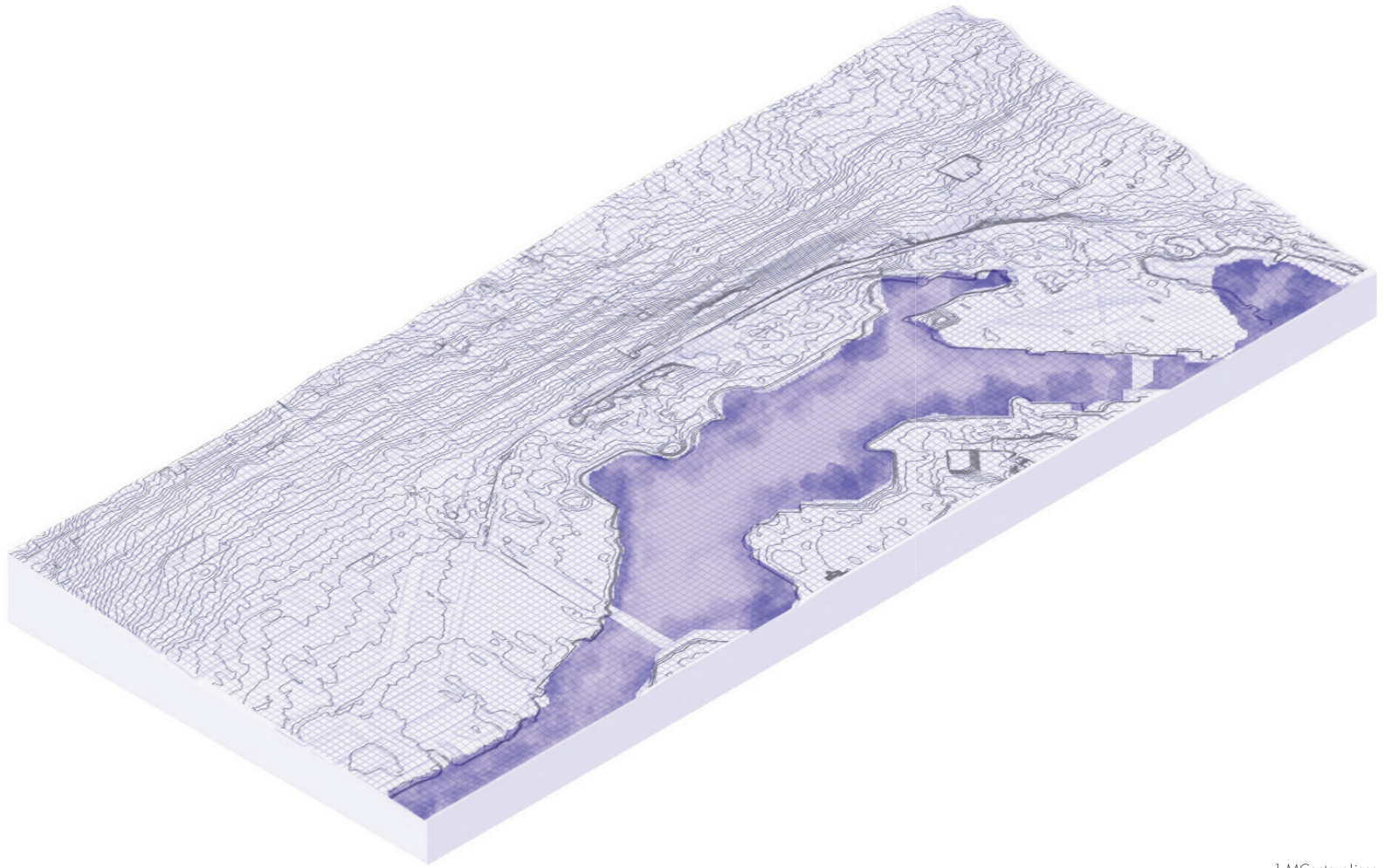


Diagram of the Natural Landscape

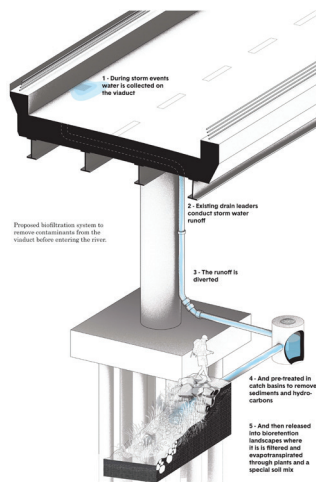


1 MContour Lines

Diagram of the Natural Landscape

Ian McHarg's *Design with Nature* (1969) proposes a mapping method that involves overlaying transparent maps representing different environmental factors to identify areas of compatibility or conflict. This overlay process allows planners to visualize how various factors intersect and influence land use decisions. By expanding the overlay process of existing conditions, stormwater management, and impervious surfaces, outliers and opportunities were identified where it was best to move water runoff, storage, and filtration for non-potable water.

### ***Charlesgate, MA***



Axo diagram of water system at Charlesgate, Boston. (Landing Studio 2023) Existing infrastructures used to create a biofiltration system to remove contaminants from the viaduct before entering the river.

Landing Studio is a practice based in Boston that reconciles industrial and infrastructural operations with the needs of the host communities. The Charlesgate project restored ecological infrastructure along Emerald Gateway (Landing Studio 2023). Positioned next to a roadway overpass, Landing Studio aims to foster the reconnection of Boston's park systems. They achieve this by implementing plant-based stormwater infrastructure improvements designed to manage runoff from the overpass, which extends above the surrounding roads. Additionally, the project involves restructuring the shoreline to enhance habitat conditions and improve water quality in the area.



## Land Art as an Ambient Medium

Therefore, it is possible to imagine that this increasing saturation may present an opportunity to reconsider the unfavorable connotations linked with infrastructure and water.

Shifting our perspective on water infrastructure from a mere technical necessity to a multifunctional public asset opens up new possibilities for urban design. By actively engaging with the city's underlying landscapes—the topography, climate, rivers, and piers that have historically shaped its infrastructure—we can transform water into a dynamic force for reshaping our built environment. This approach enhances water systems' functionality and fosters a deeper connection between people and nature, ultimately enriching the urban experience.



Photograph of Spiral Jetty, Utah. (Smithson 1970) Using basalt rock, salt crystals, water and existing landscape, Smithson crafted a mesmerizing artwork that communicates with viewers through its atmospheric presence and immersive surroundings

Land art instills a deeper environmental appreciation through direct, emotional, and symbolic experiences connecting people to nature (Weilacher 1996,08).

Robert Smithson's *Spiral Jetty* (1970) is a work of art that combines artistic expression with environmental awareness. It establishes a deep connection between humanity and the natural world (Smithson 1970). Smithson's sculptures highlight the beauty and vulnerability of the environment.

They encourage viewers to appreciate nature's wonders and spark discussions about ecology, geology, and human impact on the planet. Smithson's artwork also plays an educational role, inspiring people to become guardians of the environment.

To further promote this ethos in Vancouver, series of Land Art Pavilion will be designed along the Abandoned Olympic Line. These pavilion serves as an apparatus that invites individuals to engage with the natural world while enhancing the urban landscape. It provides a space for the public to experience environmental art and learn more about sustainability and conservation.

### **Existing Land Art in Vancouver**

To further promote this ethos in Vancouver, Existing land art in the False Creek Flats in Vancouver exemplifies this ethos. For instance, the Granville Bridge and its concrete columns create a poetic landscape that speaks to the intersection of infrastructure and nature. Similarly, the Silos Giants at Granville Island ingeniously integrate the utilitarian structures of silos into whimsical art installations, blending infrastructure with artistic expression (Vancouver Biennale 2015).



Granville Island Silos



Science World



Under the Granville Bridge



Under the Cambie Bridge

Photograph of existing Land Art in False Creek Flats

## Chapter 5 : Design

### Urban Site Strategy

Mapping the False Creek Flats' temporal, natural, and urban landscape, nearby Land Art pavilions aim to enhance environmental stewardship by creating moments along the canal for ephemeral experiences and educational messages. These pavilions refer to the untapped opportunities in urban water management, offering the public a deeper understanding of the social and environmental connections with urban waters.

The concept of 'Land Art' enriches the abandoned Olympic Line with artistic expression that elevates the ambience of the notional street and develops specific experiences. These pavilions highlight designs of canals, urban gardens, and biofilters, illustrating sustainable urban water management practices across different scales and enhancing users' sensory experiences.

The strategic placement of Land Art pavilions aligns with historical waterlines and former estuarine flats, as illustrated in the Urban Design Strategy Diagram. Shaped by the temporal landscape, the abandoned Olympic Line becomes an ideal location for the canal. At the same time, the pavilions reintroduce indigenous practices such as the Fishing Weir, evoking the original ecosystem.

Natural landscapes guide the systematic placement of each

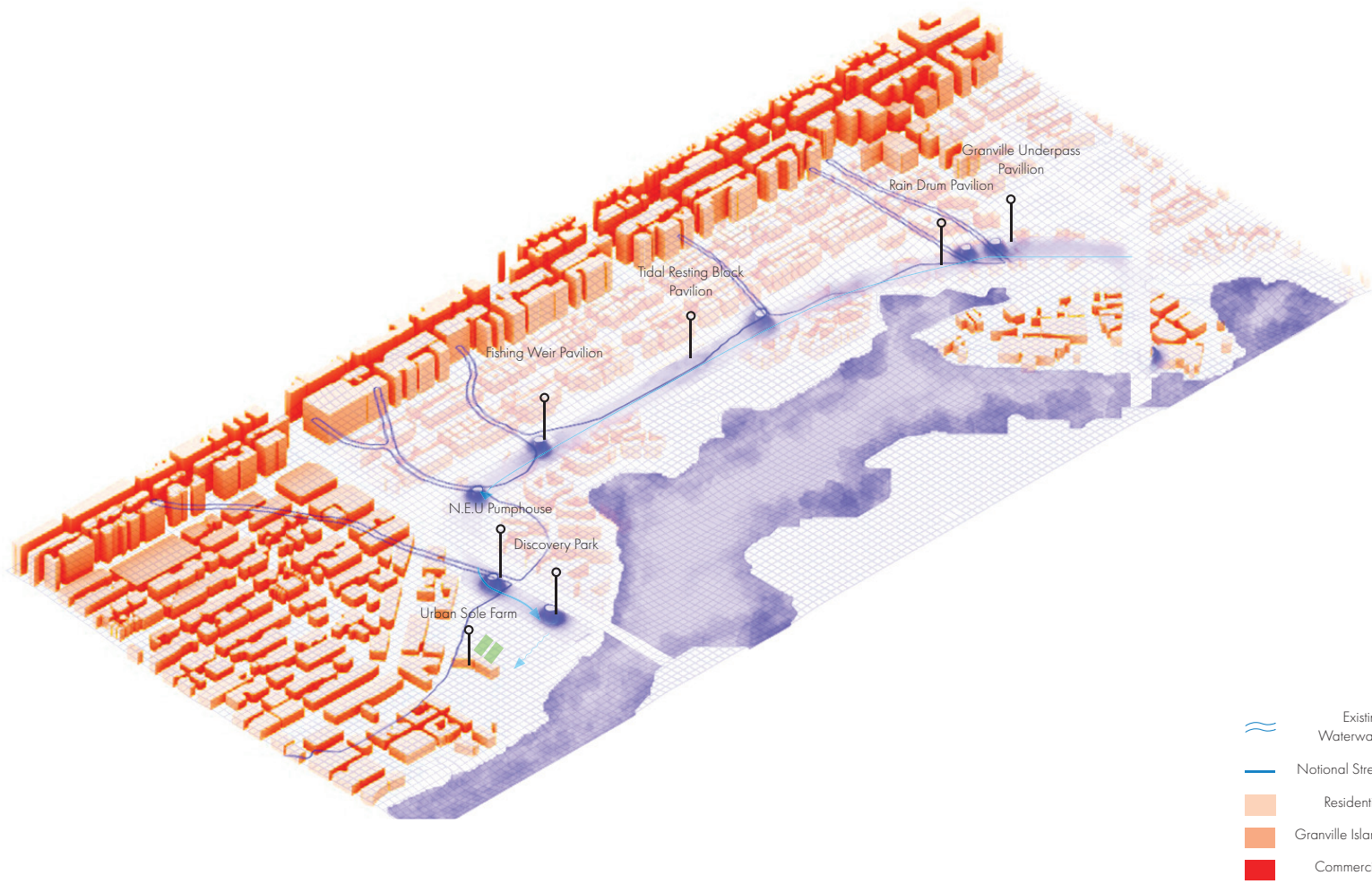


Diagram of the Urban Site Strategy

## 1:3000 Physical Site Model of Vancouver



## Didactic Strategies

### Granville Underpass Pavilion

Urban Ecology + Cascading Spectacle

### Rain Drum Pavilion

Urban Ecology + Acoustic Spectacle

### Discovery Park

Natural Wetland + Rock Drain Filtration

### Classroom and Lab

Educational Space + Visual Presence

### Tidal Resting Block Pavilion

Recreational Space + Measured Water Levels

### Fishing Weir Pavilion

Water Filtration + Historical Art Installation

### Meditation Space

Gathering Space + Cascading Spectacle

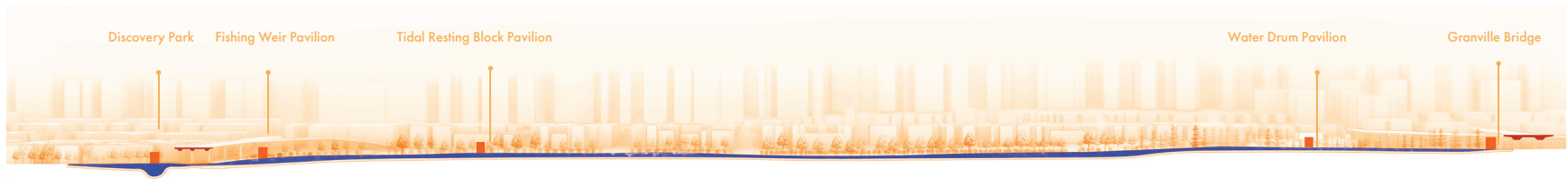
### Tidal Amphitheatre

Gathering Space + Water Tank

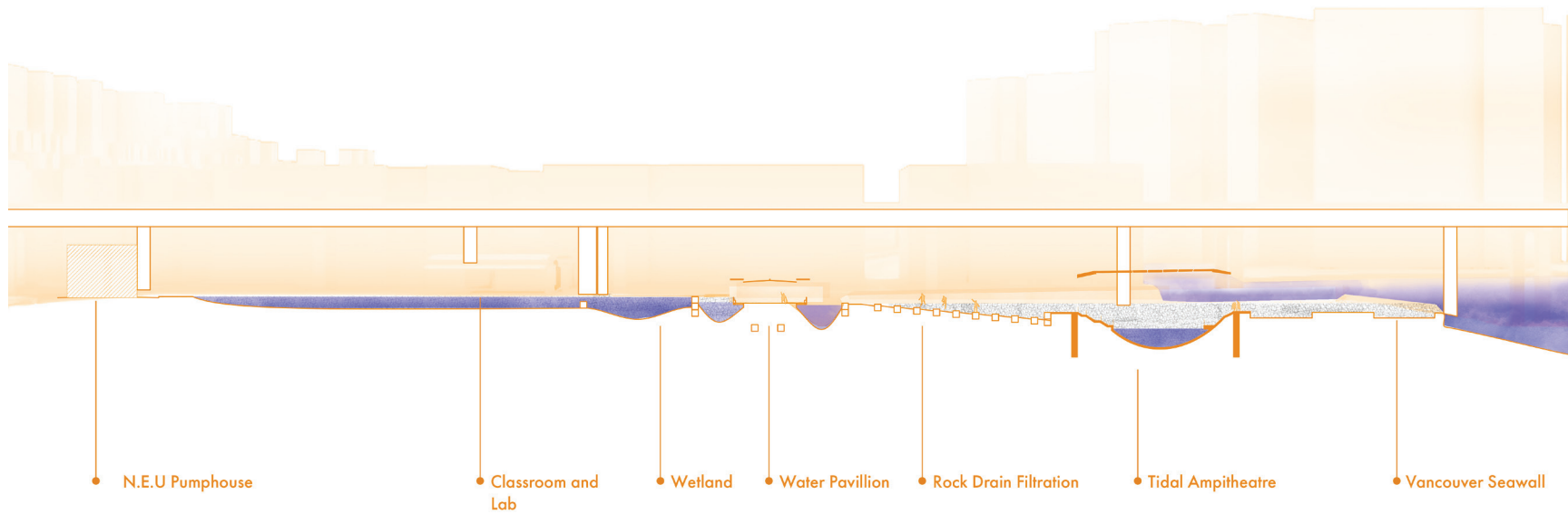
### Urban Sole Farms

Urban Farming + Gathering Space

1:3000 Site Plan of the Vancouver pinpoiting the didactic quality of each pavilion



Visualizing the flow: Detailed 1:1000 Site Section and Plan of the Olympic Line and Discovery Park illustrating the journey of water from the peak of Granville Bridge to the heart of Urban Soles Park.



1:400 Section of the Discovery Park demonstrating the Urban Site Strategy that creates a 3 step filtration process to combat sewer overflow and maintain water quality of Discover Park



Land Art Pavilion, redirecting stormwater from mainland Vancouver to the canal. These pavilions have passive filtration systems that effectively filter unsanitized rainwater and mitigate urban runoff, improving sanitation across different scales.

The context from the Urban Landscape maps informs the public intention of each pavilion, enhancing community well-being and connectivity. It also identifies passive water filtration strategies for the two combined sewer lines near the Cambie Bridge. Furthermore, the filtered water from the pavilions contributes to the proposed Discovery Park near the Cambie Bridge, providing a water source for adjacent Urban Sole Farms during dry summer periods and enhancing the ecological vitality of the area.

### **Granville Underpass Pavilion**

Located beneath the Granville Bridge, at the threshold of Granville Island, the site serves as a nexus for human and non-human interaction with water during rainfall events. A series of canopies and large-scale gutters guide water flow towards the canal, facilitating this interaction.

The first Land Art Pavilion consists of high, slender rainwater catchments made from stainless steel and perforated Corten steel panels. These catchments collect rainwater from the Granville Bridge's downspouts.

Water then cascades towards the second intervention—a steel channel lined with medium-sized rocks—guiding it into the canal. This design enhances urban landscapes

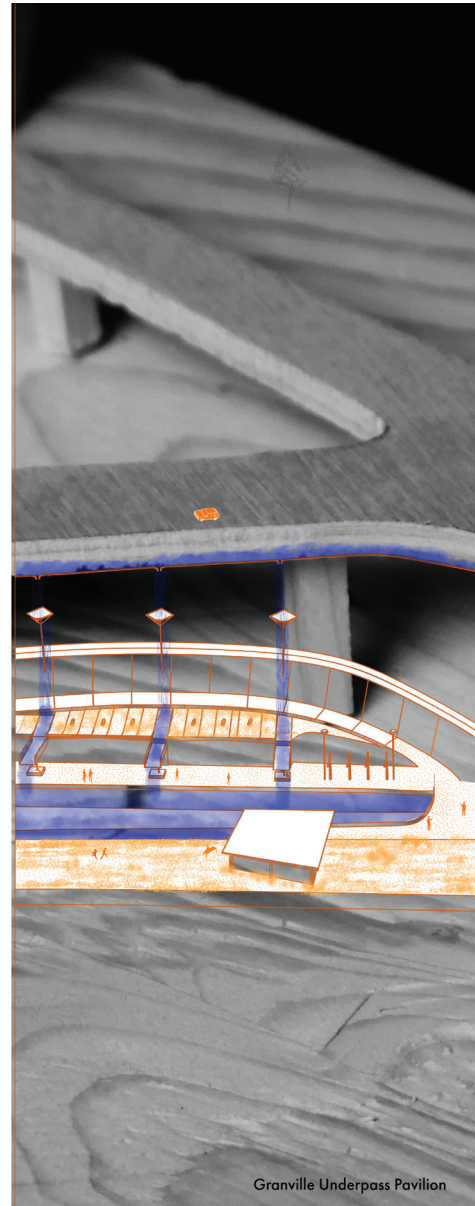
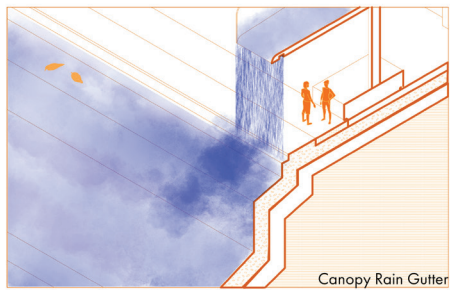
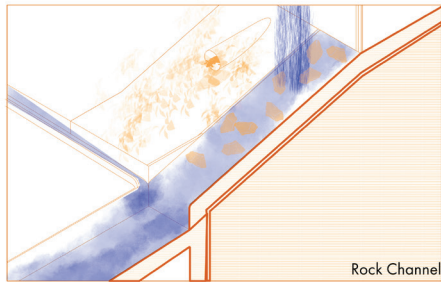
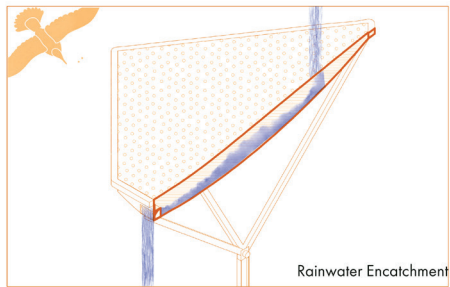
and provides habitat for small wildlife like raccoons, squirrels, and rabbits, with adjacent small burrows.

The water is collected in a canopy rain gutter, forming a protective cover where visitors can enjoy the rainfall spectacle from public benches. Opposite these benches, a public bathroom features a sink and an open backsplash facing the canal, allowing users to engage and experience the water directly and promoting awareness of water resources and human-environment interconnectedness. A large collection tank will be placed across the stream and filtered for sanitation purposes in the bathroom.

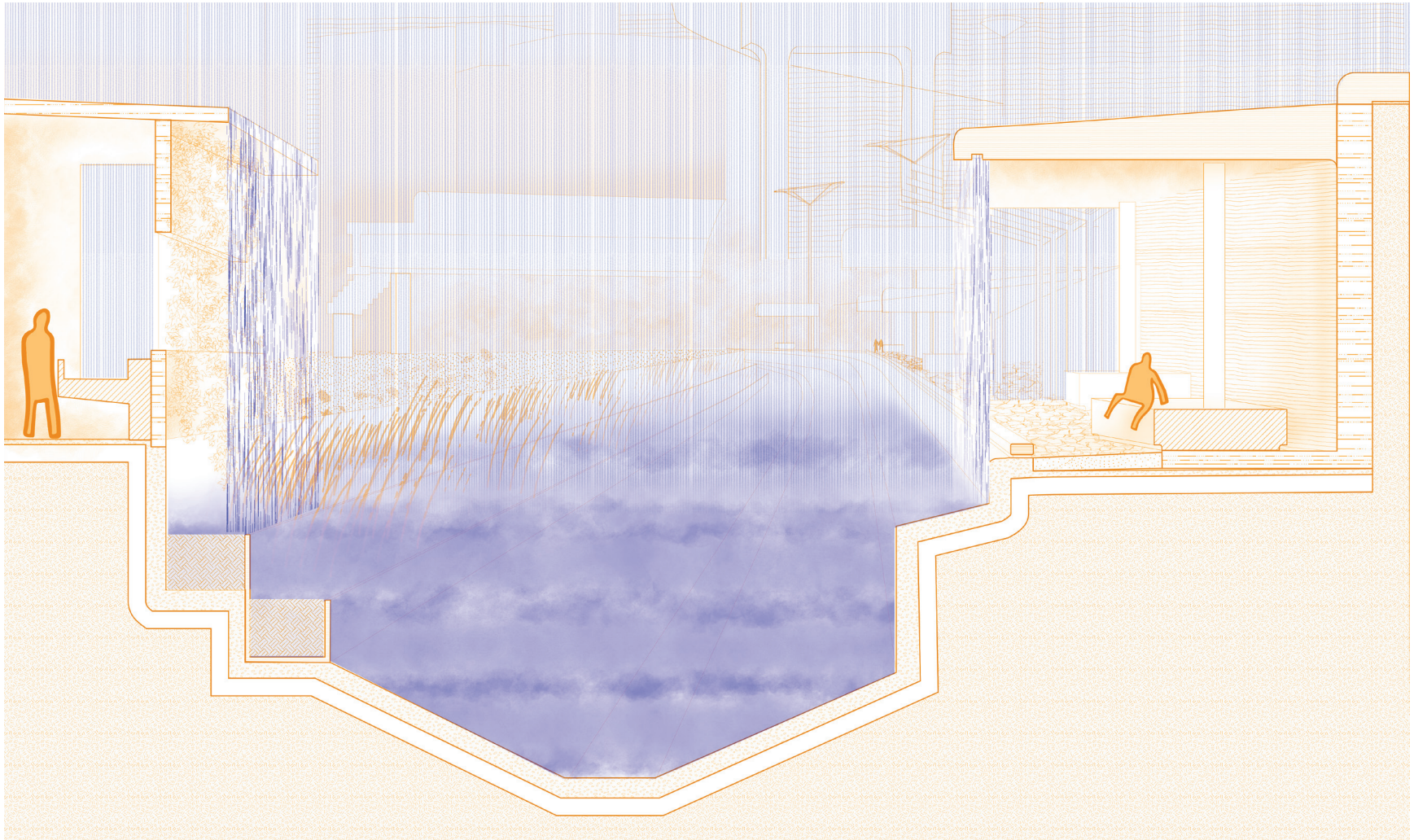
Through these design interventions, visitors are provided with spaces to experience the natural phenomenon of water and encouraged to consider their relationship with the environment and the importance of sustainable water management. Including habitats for wildlife and direct connections to water sources further enrich the educational aspect of the design, fostering a deeper understanding of ecosystems and promoting stewardship of natural resources.

## **Rain Drum Pavilion**

Two water drum pavilions are situated beneath the pedestrian bridge and along the canal. Each pavilion has a unique design, crafted to capture the essence of rainwater. While the bridge primarily serves as a path for commuters from nearby bus stops, the rain drum pavilions offer a



Axometric Section of Urban Water Management in Granville Underpass Pavilion



1:50 Section of Granville Underpass Pavilion

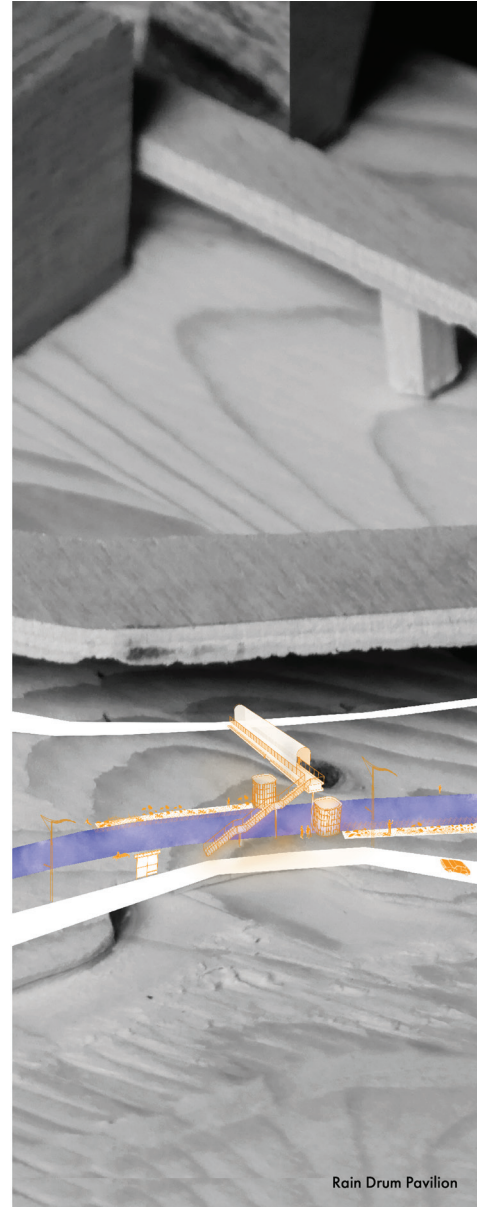
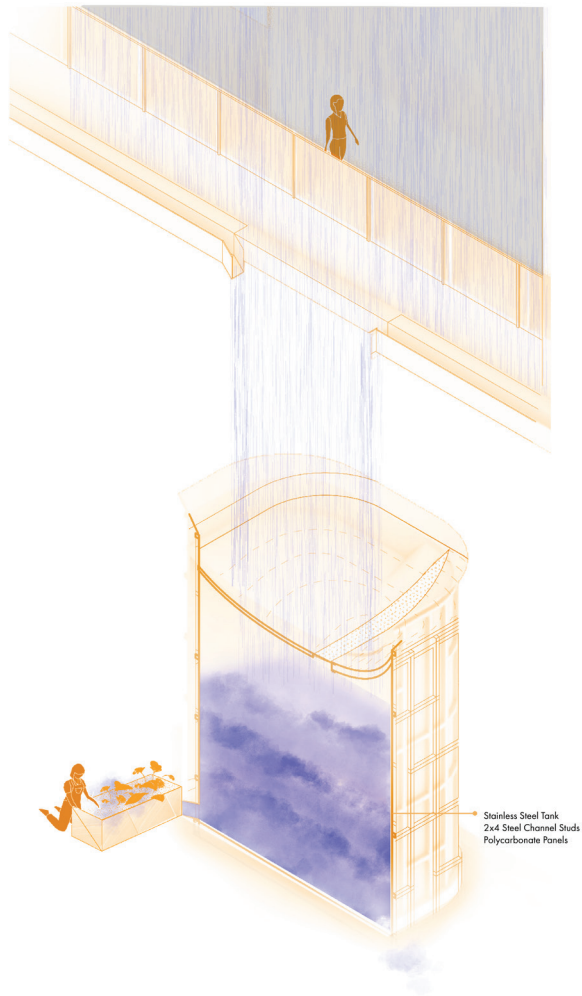
distinctive acoustic experience to passersby during rainfall. These structures not only entertain but also educate, displaying the potential of a 27 cubic meter rain drum to irrigate a 30 square meter area, perfect for cultivating a variety of crops, including leafy greens, herbs, and root vegetables, each with a modest water requirement of 1 centimetre per day (City of Vancouver 2010).

With roofs resembling oval snare drums and cymbals, these pavilions create melodic symphonies as raindrops serenade their surfaces. The collected water is then channelled to a nearby public garden, fostering sustainable water management practices. The building envelope has a 3-metre-wide stainless steel tank strapped in 2x4 steel studs with air gaps and transparent panels for the water control layer.

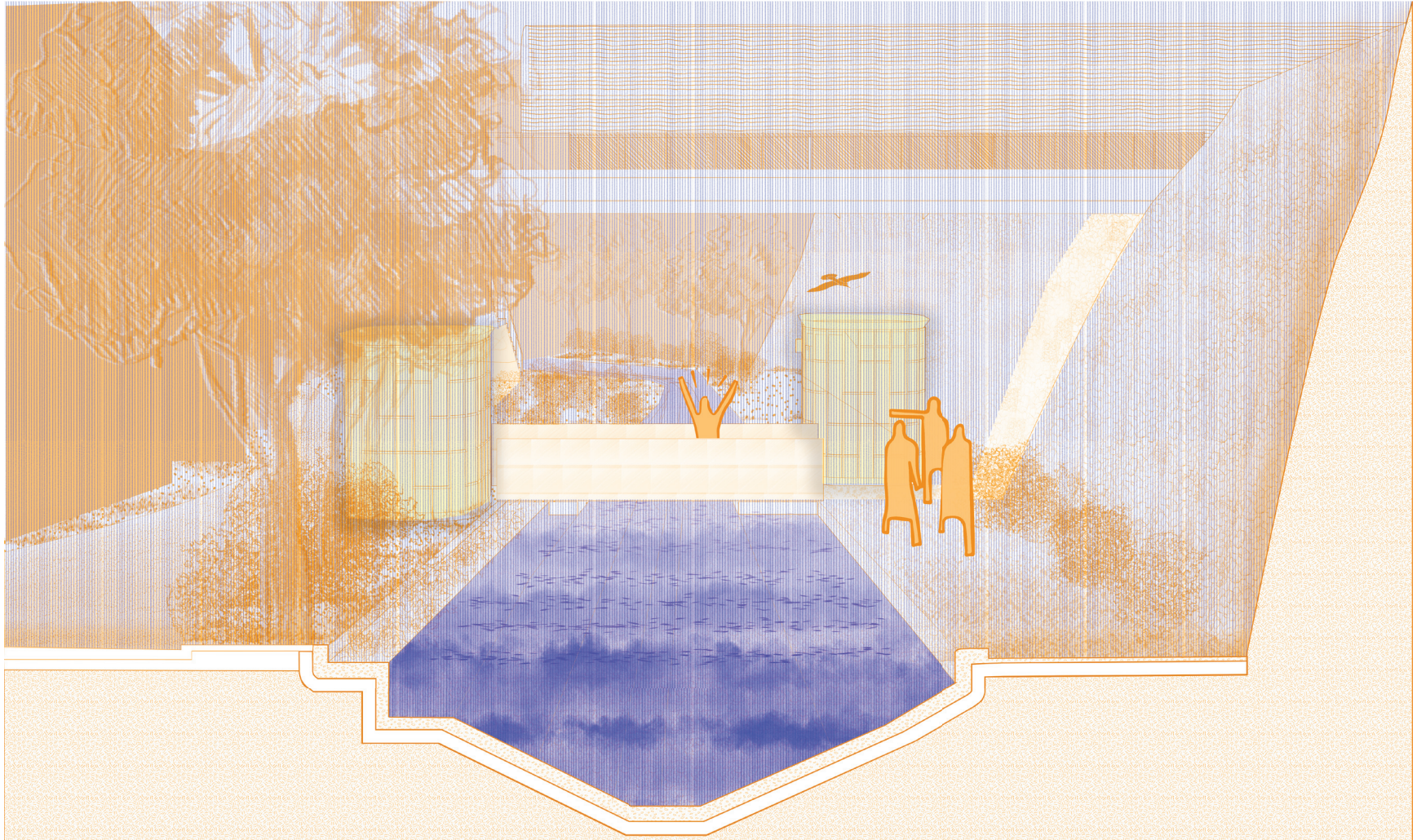
Furthermore, the spaces between the studs are wrapped with lighting fixtures, casting a gentle glow reminiscent of lanterns, illuminating the pavilions' surroundings after dusk. Additionally, small vacant pockets on the facade allow local agencies to install birdhouses, further enhancing the area's ecological diversity.

### **Tidal Resting Block Pavilion**

The pavilion is situated between two active roads and will require a space to pause and breathe from the concentrated flow of movement of people and vehicles. Land Art Pavilions will invite people for downtime and



Axometric Section of Urban Water Management in Rain Drum Pavilion



1:50 Section of Rain Drum Pavilion

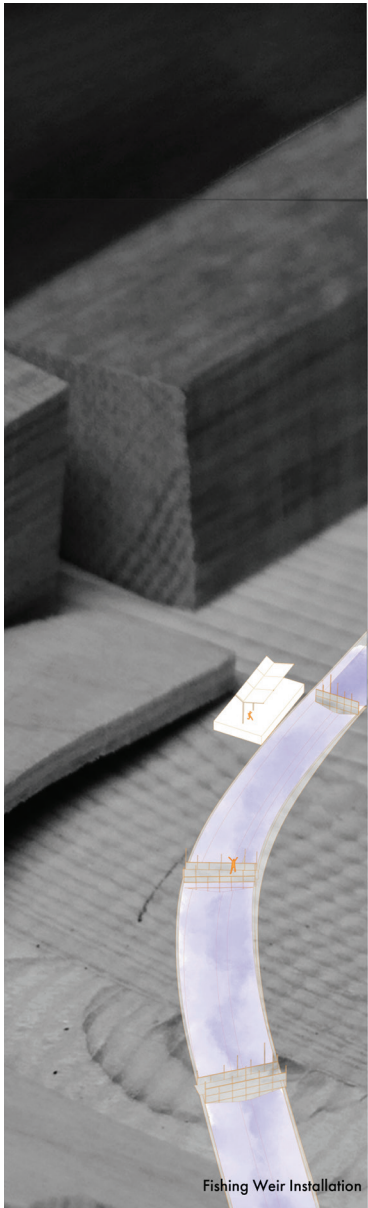
recreational activities, aiding the neighbouring communities in developing daily rituals from their everyday lives. The nearby site is the False Creek Tennis Court, which creates a design opportunity to enhance the space for Tennis players and residents to exercise and stretch.

The plinths match the exact dimensions of a yoga mat and have a 1-inch difference in height, creating a grid of negative space intended to be filled with the stream's varying water levels.

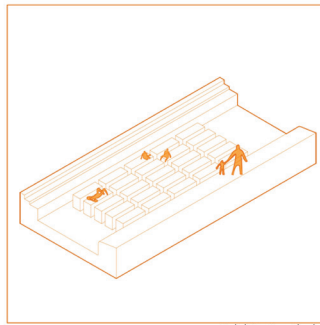
### **Fishing Weir Pavilion**

The site holds great historical significance as a fishing spot for the indigenous Squamish and Musqueam tribes. However, it currently lies deserted as an abandoned train station needing a clear purpose. To address this, Fishing Weir Pavilions have been proposed as multifunctional structures. The pavilions serve as both water filtration systems for the water entering Discovery Park and community hubs. The design comprises a stainless steel grid that supports layers of filtration materials, offering practicality and visual appeal. These pavilions also act as bridges, encouraging people to interact with nature. They come with replaceable filters, making them sustainable and accessible for Public Works employees to maintain. This proposal combines ecological conservation, cultural heritage, and community engagement, breathing new life into the site and preserving it for future generations.

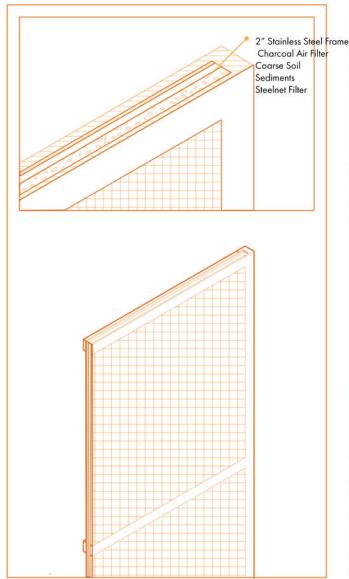




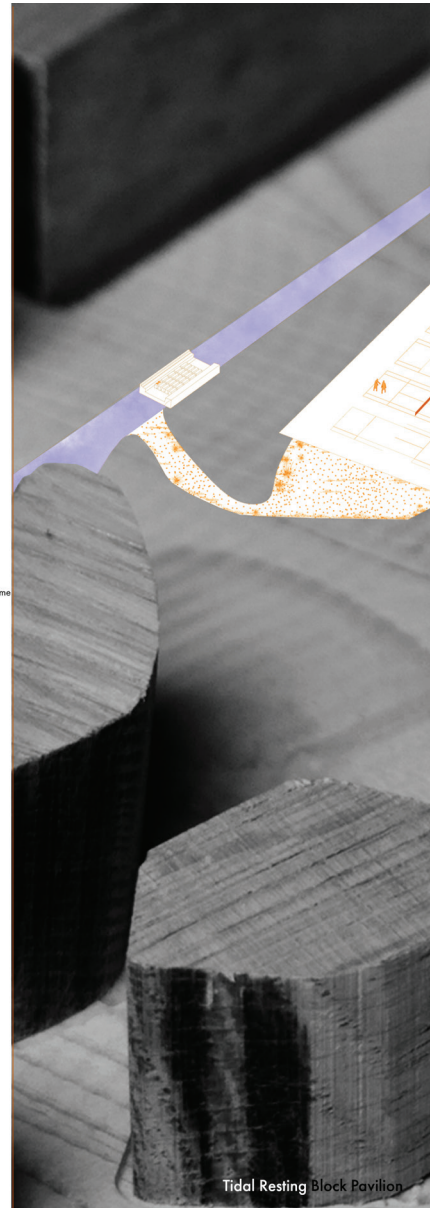
Fishing Weir Installation



Tidal Resting Blocks

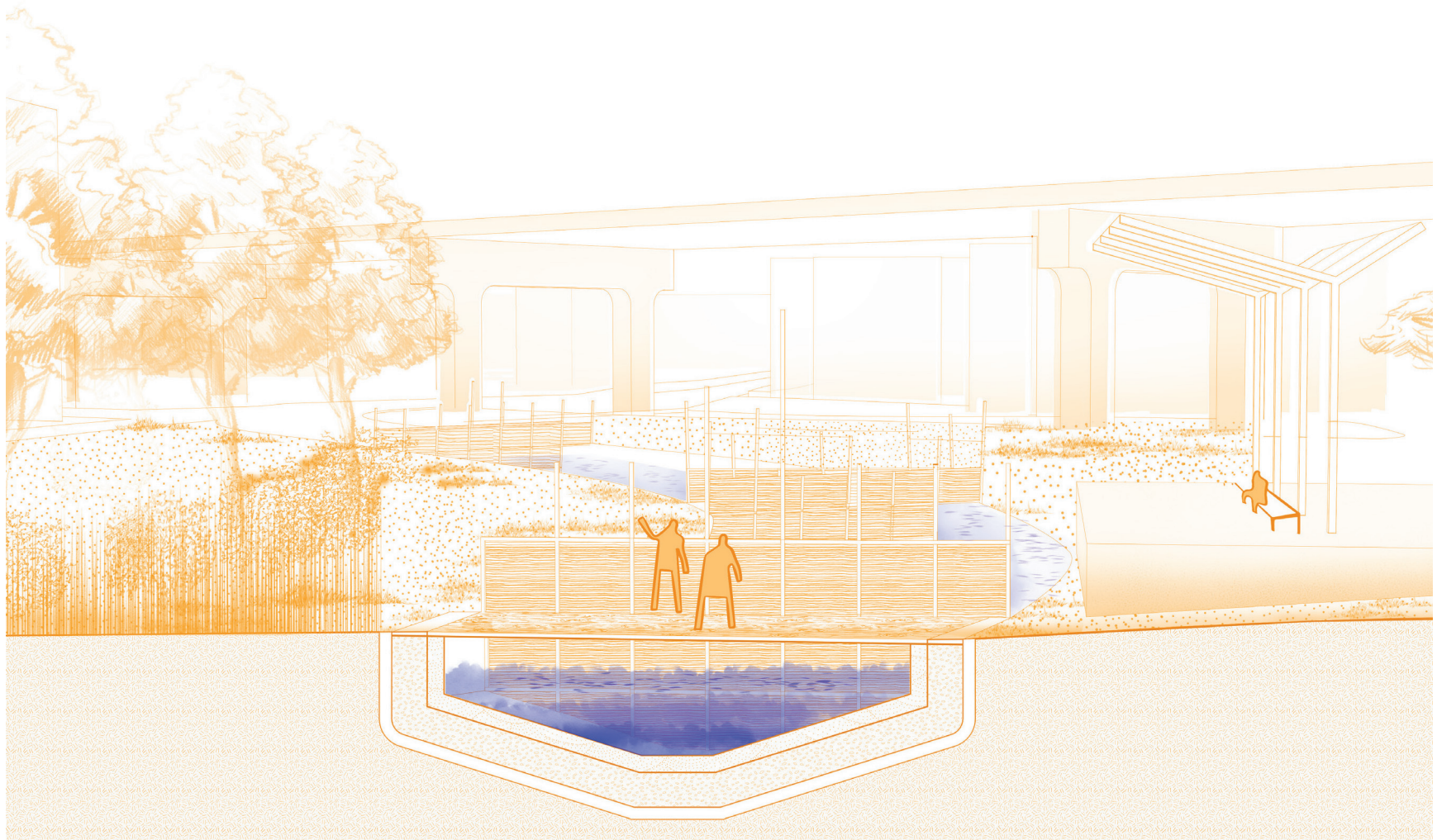


Fishing Weir Axo Detail



Tidal Resting Block Pavilion

Axometric Section of Urban Water Management in Fishing Weir and Tidal Resting Block Pavilion



1:50 Section of Fishing Weir Pavilion

## Discovery Park

When the canal flows onto the one road nearby the Cambie Bridge that connects to Discovery Park, it gets covered in a small trench and covered in a thick glass blocks enclosed in concrete prism panels. This is a common feature of many historical sidewalks in Vancouver, dating back to the 1800s. The glass blocks were used as natural skylights for basements (Hagemoen 2018).

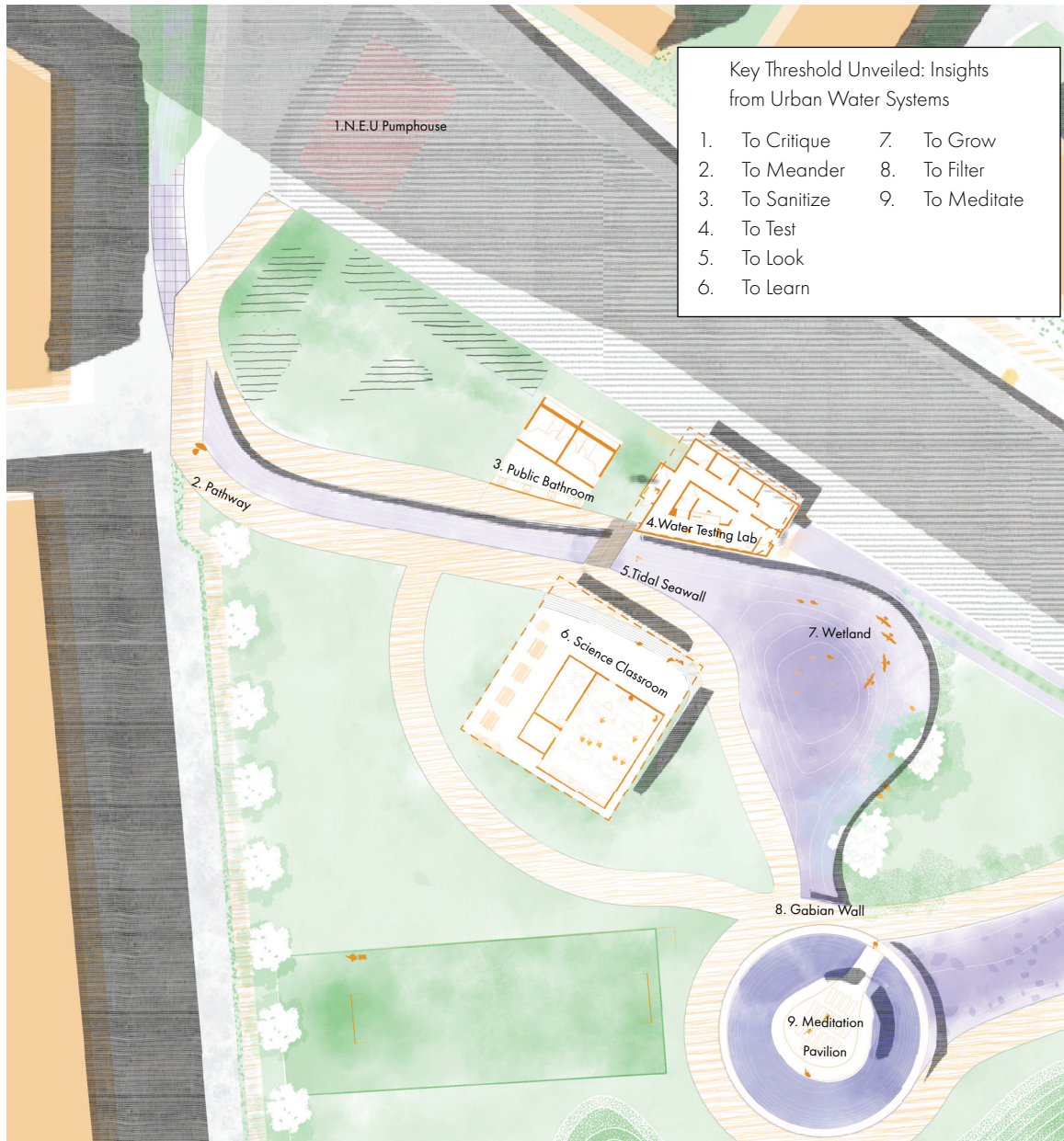
As shown in the 1-600 Discovery Site Section, urban water management will flow into a natural wetland through the classroom and lab. As water flows through a wetland, the dense vegetation, roots, and organic matter act as physical barriers, slowing the flow and allowing particles to settle. The vegetation traps larger debris and sediment, preventing them from continuing downstream. The water will flow downstream into a lower grade where it meets the gabion wall, where water is filtered further down a man-made valley. The last filtration process will be a series of large sedimentary rocks.

Water cascades through barriers placed sporadically along a pathway to reflect stones scattered along a riverbed. These barriers of granulated rocks act as the next filtration step as the water passes around and through them.

Rocks protrude above the water to engage visitors in a playful way of navigating the sight, similar to how children skip along rocks in a river. Lastly, the water will be stored in a large amphitheatre designed to flood during high water levels.



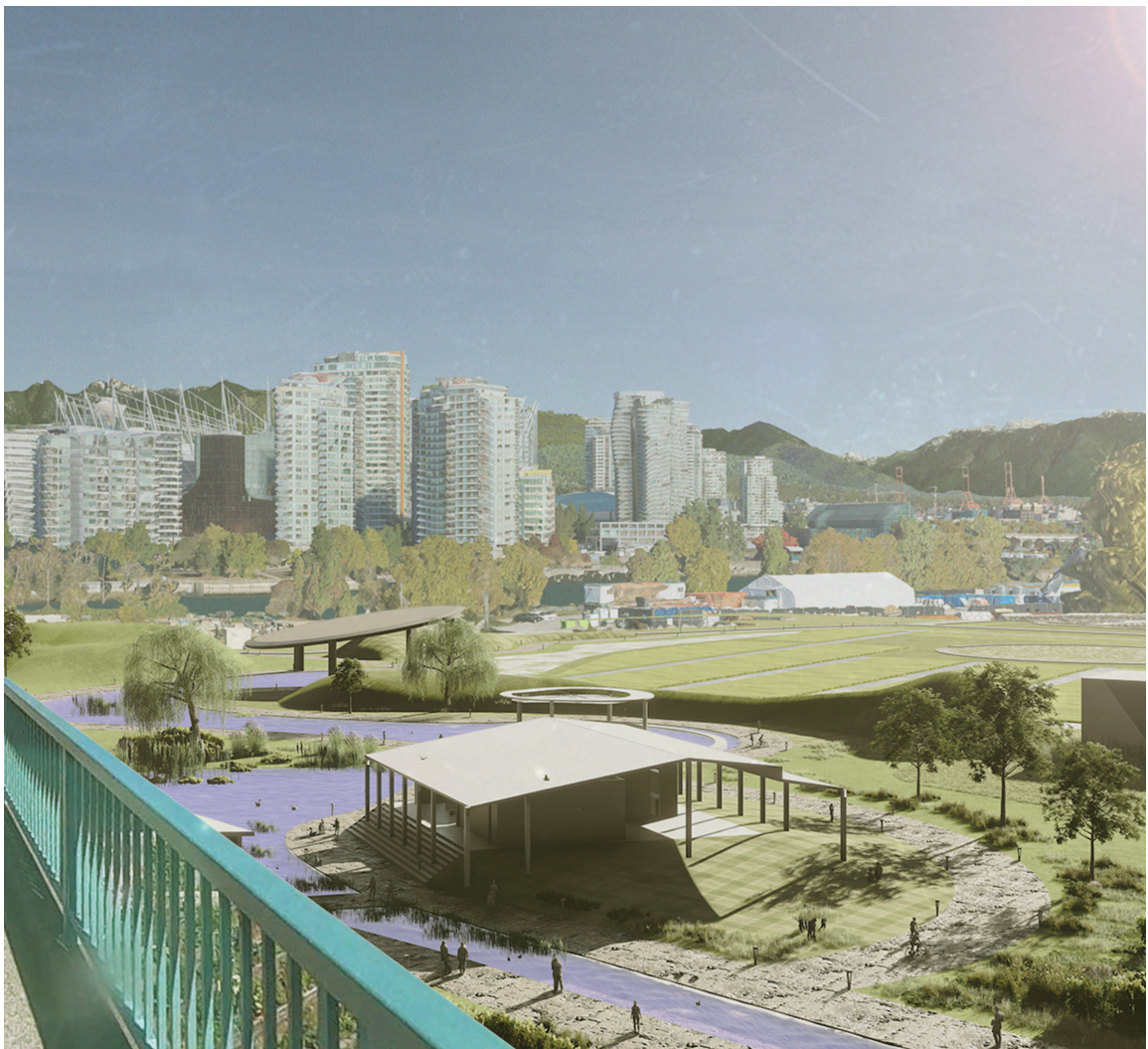
Discovery and Urban Sole 1:600 Site Plan



Partial Discovery Park Site Plan – 1 of 2



Partial Discovery Park Site Plan – 2 of 2



Perspective of Discovery Park above the Cambie Bridge

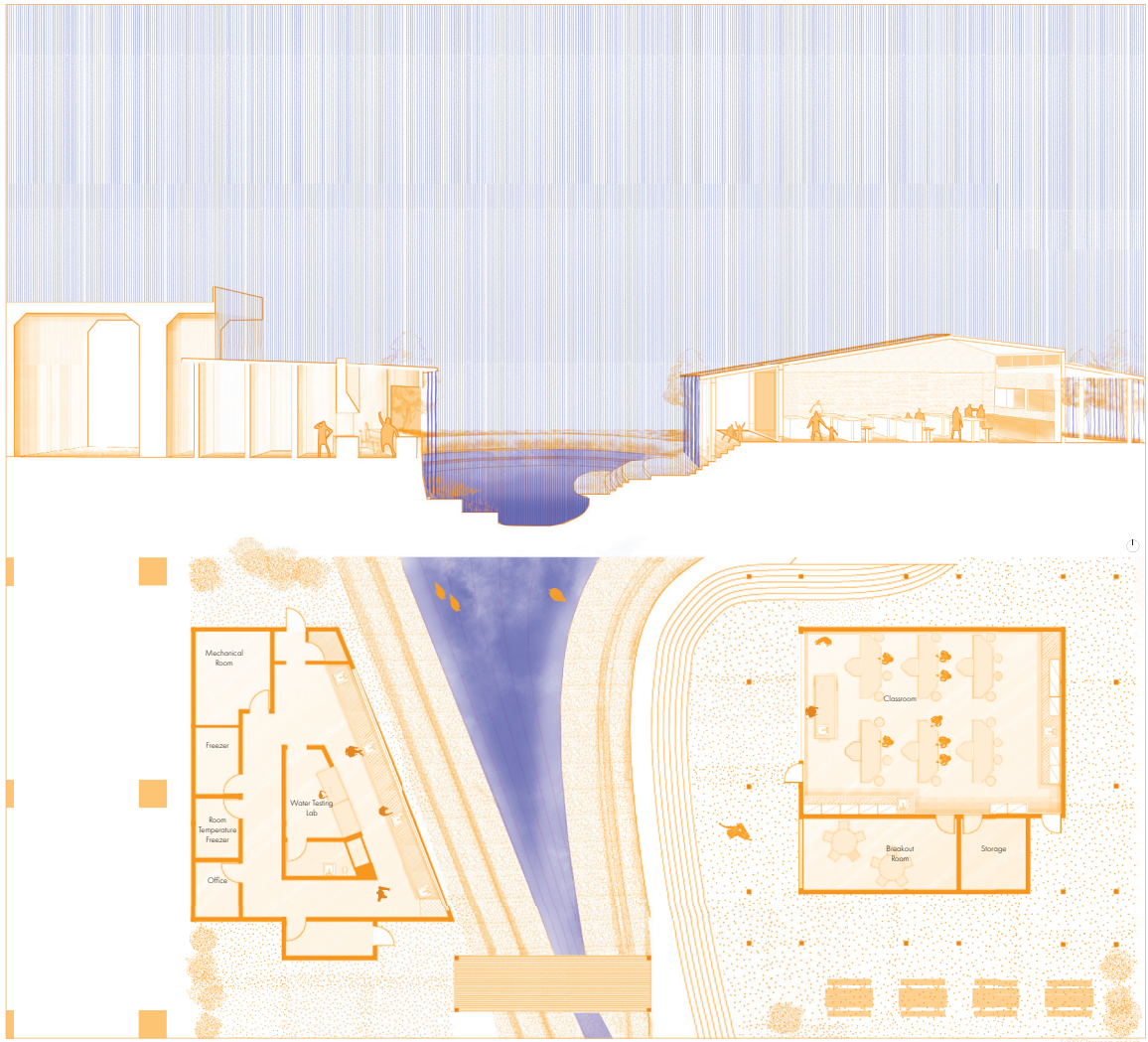
## Classroom and Lab

Water naturally flows towards a wetland, filtering itself along the way. The classroom and lab design directs water along key thresholds among common circulation points. Humans and non-humans have an interdependent relationship facilitated by the presence of water. Students can observe the water testing lab and reflect how scientists operate and test water levels in a laboratory. This is a critical take on the social disconnect from the N.E.U Pumphouse.

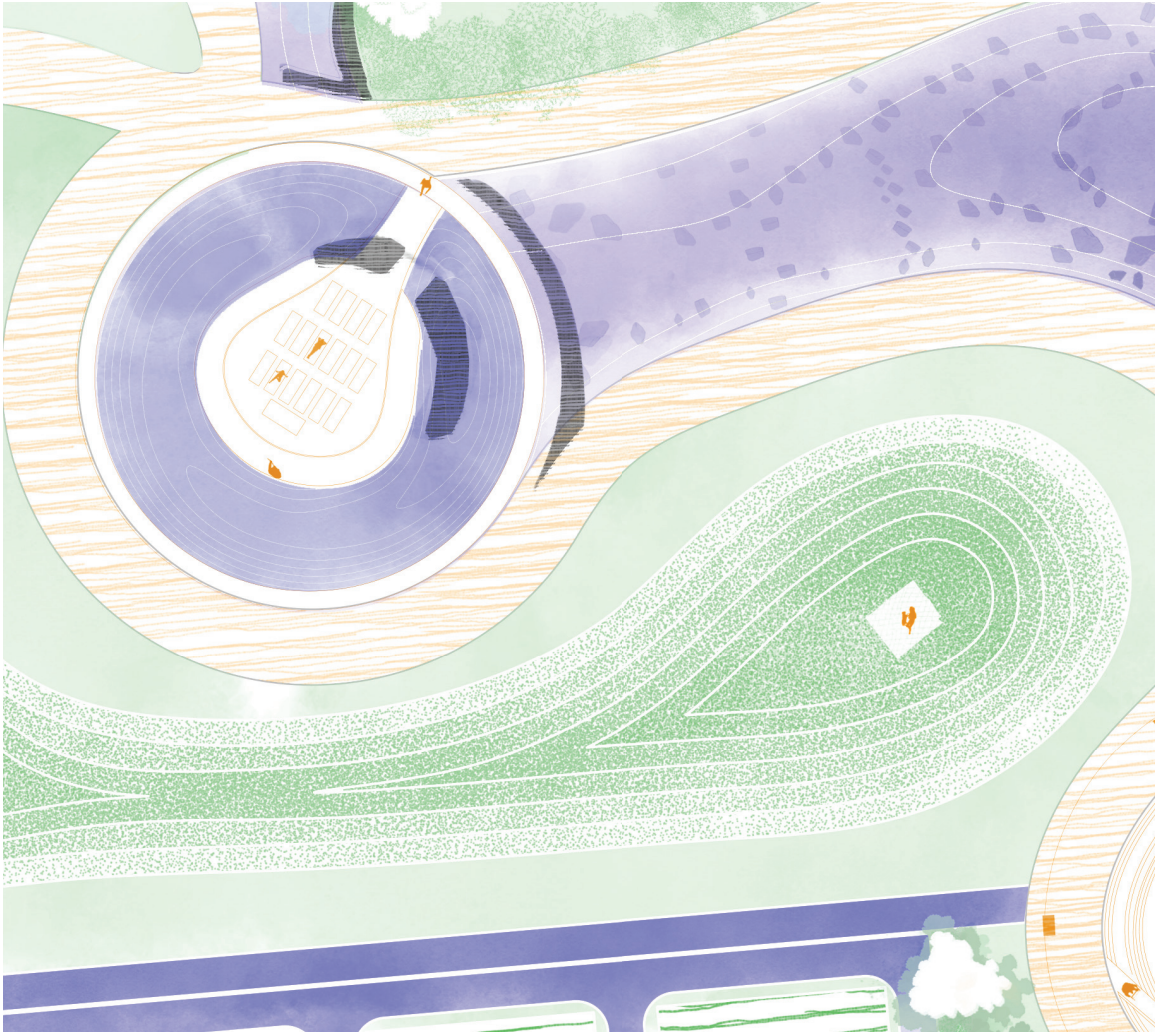


Photograph of Fort Worth Water Gardens, Texas. (Johnson 1974) Johnson designed with the topography to create a large basin that creates an interactive experience for visitors and a platforms for dynamics events, performance and concerts.





1:100 Floor Plan and Section of Water Testing Lab and Classroom



1:600 Site Plan indicating the Meditation Pavilion

## Meditation Pavilion

The design statement articulates a compelling vision for a pavilion that serves as a functional structure and an immersive educational experience centred around the filtration process of water. By integrating a 1m x 2m gambian wall, untreated rainwater is filtered into the pavilion's basin, giving visitors with a tangible demonstration of water treatment in action.



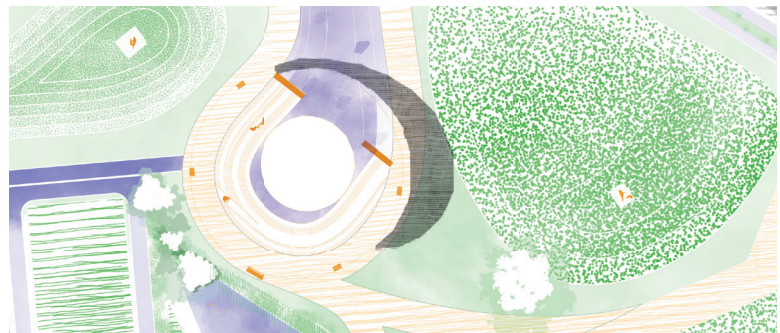
1:50 Section of the Meditation Pavilion featuring a cascading waterfall, particularly captivating during periods of precipitation

This pavilion is more than just a physical structure. It embodies the concept of interstitial, representing a transitional phase in water treatment. Visitors, as they engage with the site, experience an interstitial step within their daily routines, fostering learning and personal growth opportunities.

The architectural elements further enhance the immersive experience. Slender openings in the roof allow rainwater to trickle down, forming a circular waterfall curtain that envelops the pavilion. This dynamic feature adds aesthetic appeal and serves as a visual representation of the natural water cycle.

## Tidal Ampitheatre

In the final filtration stage, water accumulates in a basin strategically positioned at the site's lowest point, a remarkable 5 meters below sea level. This basin features a unique platform atop, enabling performers to engage



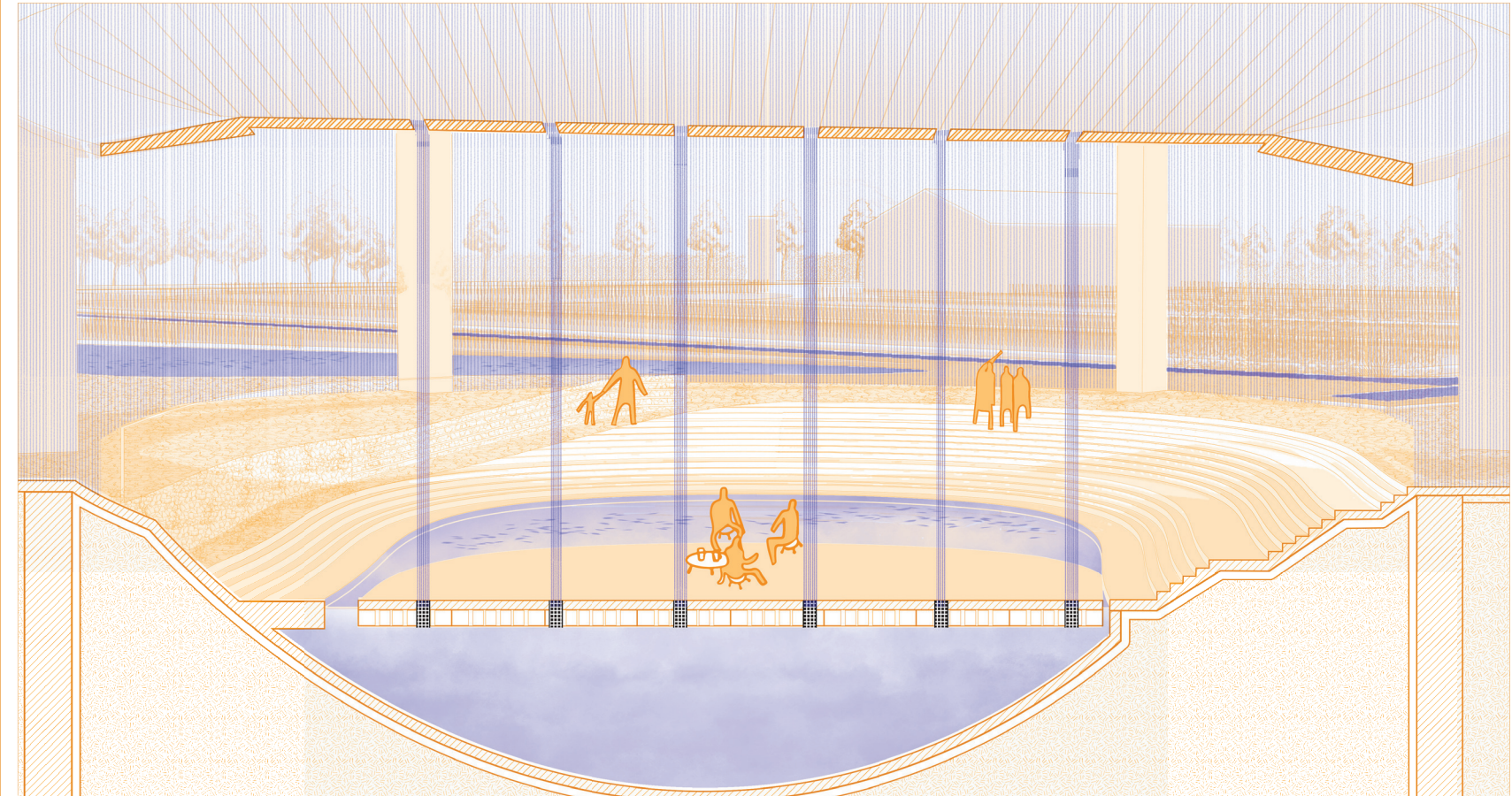
1:600 Site Plan indicating the Tidal Amphitheatre

with the audience amidst the fluctuating water levels. They stand in openings overlooking the basin's depths, offering a spectacle.

The substantial volume of water collected within the basin not only provides a tangible haptic experience for visitors but also in the final filtration stage, water collects in a basin at the site's lowest point, 5 meters below sea level. This basin features a unique platform where performers can engage with the audience amidst the fluctuating water levels. Openings in the platform overlook the depths of the basin, providing a mesmerizing spectacle for visitors.

The substantial volume of water within the basin offers a tangible haptic experience and enhances the space's acoustic properties, encouraging exploration and interaction with the environment.

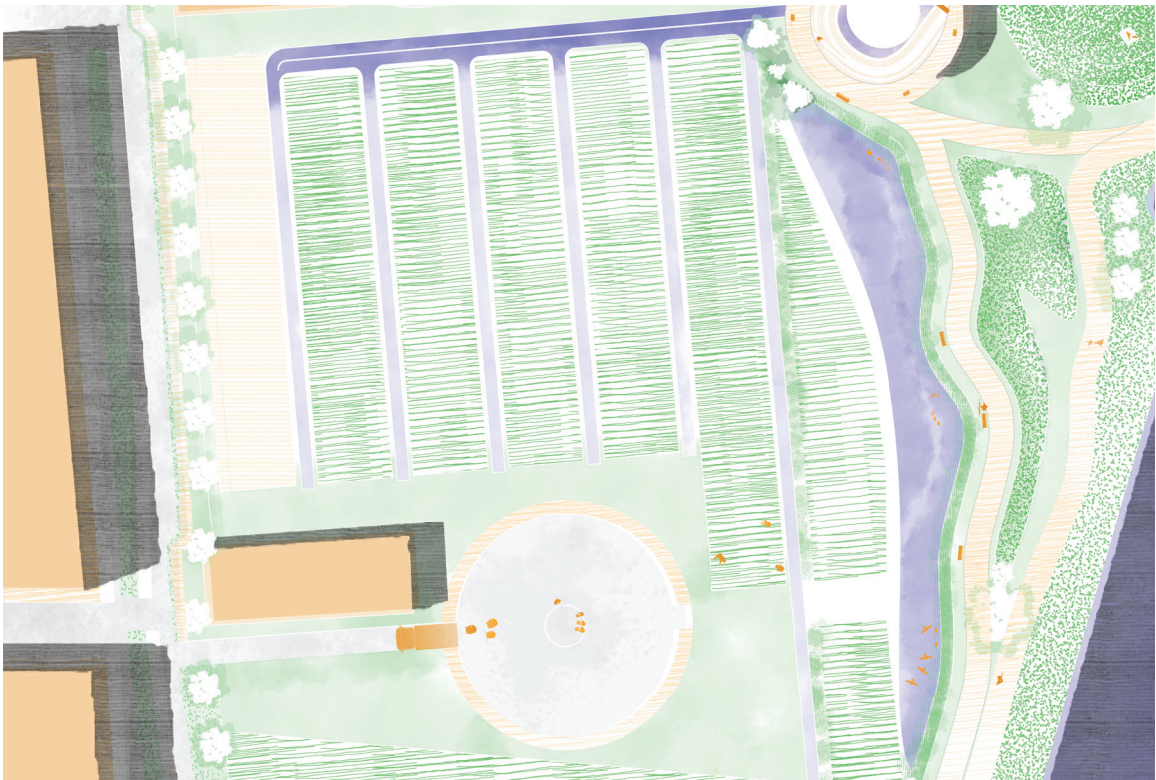
The platform's aluminum panel roof captures both morning and afternoon sunlight, while the roof tiles reflect water towards the ceiling and create a luminous display for users. Thin slit openings along the edge of the platform act as a waterfall backdrop for performances and events. The platform looks like a standard dock and has a construction of PVC modular panels resting on a tempered alloy with wooden decks.



1:50 Section of Tidal Amphitheatre looking out to the Urban Sole Farms

## Urban Sole Farms Masterplan

Lastly, the design will propose a master plan where primary and secondary source of non-potable water act as a boundary line between park and farm. The water will be pumped from the tidal amphitheatre to highest point of the site and flow any excess water into a wetland next to the Vancouver Seawall.



1:1000 Site Plan indicating the Urban Soles Farm Masterplan

## Chapter 6: Conclusion

### Design Outcome

#### *Water as a Medium*

Each station along the Olympic Line channels water towards the N.E.U Discovery Centre, a hub for programs designed to elevate the pedestrian-oriented environment. The infrastructure within this journey serves as a transformative medium, converting water from a resource to a value. Users meander and interact with this aquatic landscape, engaging in a sensorial experience that fosters a newfound appreciation for water.

#### *Educational Hub*

The N.E.U Discovery Centre educates viewers about the passive approach to stormwater filtration. This sustainable method promotes environmental stewardship by integrating it into urban infrastructure. It also extends its benefits to neighbouring urban farms, creating a symbiotic relationship between urban development and agriculture.

#### *Positive Impact on Urban's Well-Being*

Beyond its functional aspects, the design outcome prioritizes the sensorial experience. In densely populated



neighbourhoods facing housing challenges, aquatic elements contribute to a positive environment, influencing people's moods. This intentional focus on sensory upliftment is a response to stagnant urban conditions, creating spaces that resonate with the community on an emotional level.

### ***Cultural Permeance***

The urban landscapes involve designing spaces and elements that adapt to changing history and weather and resonate with cultural values and environmental conditions. Abandoned urban spaces often have a history, and their vegetation may hold cultural and historical significance. Recognizing and preserving this heritage can contribute to a richer urban ecology and a sense of continuity between the past and present.

This thesis explores the critical need for innovative approaches to urban water management in cities like Vancouver, where precipitation levels fluctuate significantly throughout the year. By reimagining water as an opportunity rather than a burden, architects and urban planners can create spaces that manage water effectively and engage with the surrounding environment and community. Drawing inspiration from the abandoned Olympic line and mapping its temporal, social and natural landscape, this thesis proposes a vision for using water as a medium for infrastructure that reflects Vancouver's past, present, and future landscapes.

Through the integration of sensory experiences, memories,



1:3000 Site Plan indicating future design intervention

and atmospheres, architecture has the potential to foster a deeper connection between humans, non-humans, and the natural landscape. By sculpting land art pavilions and urban spaces along proposed sites, this thesis seeks to educate and inspire viewers to become environmental stewards while simultaneously addressing urban water management challenges and strengthening the surrounding ecosystems and context.

The principles and approaches developed in this thesis can serve as a blueprint for creating a more resilient and interactive urban landscape for other North American cities.

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