Out of Site, Out of Mind: Reading the Ground as Architectural Language in Waste Landscapes

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.

For my parents, Greg and Misuzu.

Contents

Abstract

The wastescape is a type of de-industrialized and contaminated landscape. Bound by water and unseen in urban areas, they often remain outside of our consciousness. Current remediation practices involve intensive operations to rid harmful toxins; however, they exchange improved environmental health for social disconnect and erasure of place.

These issues of remediation are approached through an ecological and social lens, observing wastescapes as working landscapes. The architecture emerges from analyzing our past and present perceptions of water infrastructure and deconstructing the ground as layers of natural and cultural stratum. Reusing the Powerhouse building site in Victoria, British Columbia and its remedial methods, the project proposes a new urban strategy, a series of pavilions and a water treatment plant. This thesis makes evident the site's natural processes while acknowledging its industrial past, ultimately aiming to develop an architecture that creates a public connection to remediation while revealing a vital ecological landscape.

Acknowledgements

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A special thanks to my family, for providing continual support and comfort that made this thesis possible. To my partner Kelsey, you have always been there every time I needed you. Thank you for sticking with me through this journey.

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Chapter 1: Introduction

A cognitive dissonance exists in how we think and what we do with our environmental efforts. We are great advocates for beautifying our cities with more lush greenery or projecting environmental statistics as a way to initiate change to our continual behaviours that contribute to global warming; however, we lack a basic level of environmental stewardship, making it difficult to walk a single city block without seeing cigarette butts, food wrappers and disposable coffee cups in the crevices of public spaces. Trivial to some, but this small-scale issue is systemic, taking shape at the urban scale. The unthoughtful disposal of de-industrialized buildings and their sites eventually lead to the harming of their surroundings, becoming dysfunctional and chemically toxic parts of city fabric. These types of urban spaces contribute to an even larger waste landscape, or 'wastescapes,' and leaves us with the daunting task of remediating entire landscapes of contaminated sites. Past sites of industry provide a critical way to examine our anthropocentric values and actions, due to this historical pattern of disregard for the built and natural environment.

These waste landscapes left by industry are both a testament to the actions we inflict on the environment and at the core of our human concern, acting as "theatres of our often cyclical will to plan, build, grow, prosper and abandon" (Gans and Weisz 2004, 5). Since when did disposal and abandonment become an accepted reality and an everyday occurrence? What do these waste landscapes tell us about ourselves?

This thesis argues that waste landscapes can be re-attributed socio-ecological value and be transformed into places of opportunity and learning rather than being characterized by

their current stigmas. It also critiques current remediation practices that ironically exacerbate two key issues of social disconnect and erasure of place that blight our cities. As a crucial aspect, this investigation explores a site that has already been remediated. It addresses these issues that prevail in sites that have had attention brought to them, that still lack the engagement efforts that further the potential of the site. Reoccupying these contaminated sites becomes the basis of this project, which aims to create a new relationship between the built and natural environment.

Moving further into the anthropocene, it is important for us to create moments that remind us of how we observe, inhabit and contribute positively in the next layers of natural and cultural stratum. Analyzing the Powerhouse site as a series of layers, the design proposes a ‘new layer.’ Irene Klaver’s concept of the “bio-cultural nexus,” where hydrological infrastructure holds the potentials of cultural and ecological development (Klaver 2013), is applied to the remediation of waste landscapes. Overlaps of both cultural and ecological edges becomes the design framework in the city scale. Klaver’s concept is carried into the building scale to relate diverse programmatic elements to the complexity of layered edges of the city. Land art precedents create various architectural tools and provide additive and subtractive ways of operating on the detail scale.

This hypothesis is tested in Rock Bay, the industrial neighbourhood of the downtown core of Victoria, British Columbia. It is considered the most polluted area in the province (CTV Vancouver Island 2018). The Powerhouse building, a relic that once produced electricity for the city by harnessing the power of both built and natural infrastructures, becomes the focus of this investigation.

The design proposes a new urban strategy, a series of pavilions and a water treatment plant. A stream of moments is created revealing various stages of water treatment that helps to remediate the site and acknowledges the potentials of cultural and ecological overlaps within each moment.

The project takes place before its remediation, where its applied methods become pivotal to the thesis. In advocating an alternative approach to conventional remediation, the project acknowledges the necessary processes of deconstruction and natural renewal. It also recognizes that erasure will prevent appropriate regeneration and prohibit the construction of a more honest narrative of the site's history.

Thesis Question

How can architecture create moments that reconcile and make more evident the temporal cultural and natural processes within waste landscapes, that ultimately strengthens our environmental stewardship?

Early collage of project

Chapter 2: Waste Landscapes

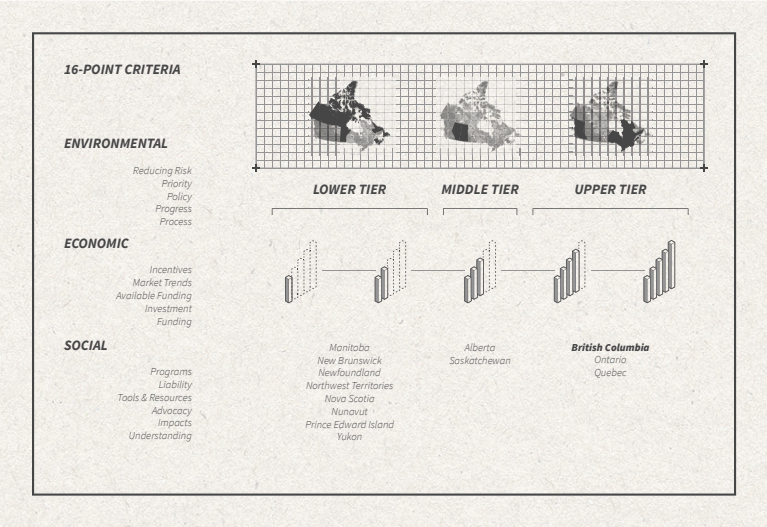
Defining Wastescape

Returning to the multi-scalar issue mentioned earlier, lack of environmental stewardship is seen increasingly with population density, creating a bystander effect. This is followed by a lack of civic responsibility to others as well as the environment, which is most noticeable in public space. Further, there exists a pervasive attitude in city dwellers for the negligence of their surroundings in highly urbanized areas, leading to notions of unsafe city spaces. There is a lack of empathy toward others and a sense of civicness or care for the urban and natural environment; as Jane Jacobs notes, not every citizen helps to take care of the streets and many residents and city workers are unaware of how city spaces are actually kept safe (Jacobs 1961, 38). When observing cities as human ecologies, “pathological togetherness” describes the exacerbation of human health deterioration and pathologies as densities and human population increase (McHarg 1995, 193).

Wastescapes can be seen as one of these pathologies that affect the health of our cities. Waste landscapes can be found in many different forms, such as industrial factories, gas stations, dry cleaners, energy plants, utility substations, rail corridors, graveyards and many others (Hollander, Kirkwood and Gold 2013, 2). By definition, they are considered contaminated sites containing exceeding levels of toxic chemicals from past industrial activity and are likely to pose an immediate or long-term hazard to human health or the environment (GoC, TBCS 2013). They are so ubiquitous in our cities that they become unseen, waiting to be re-attributed social value and potential for reuse.

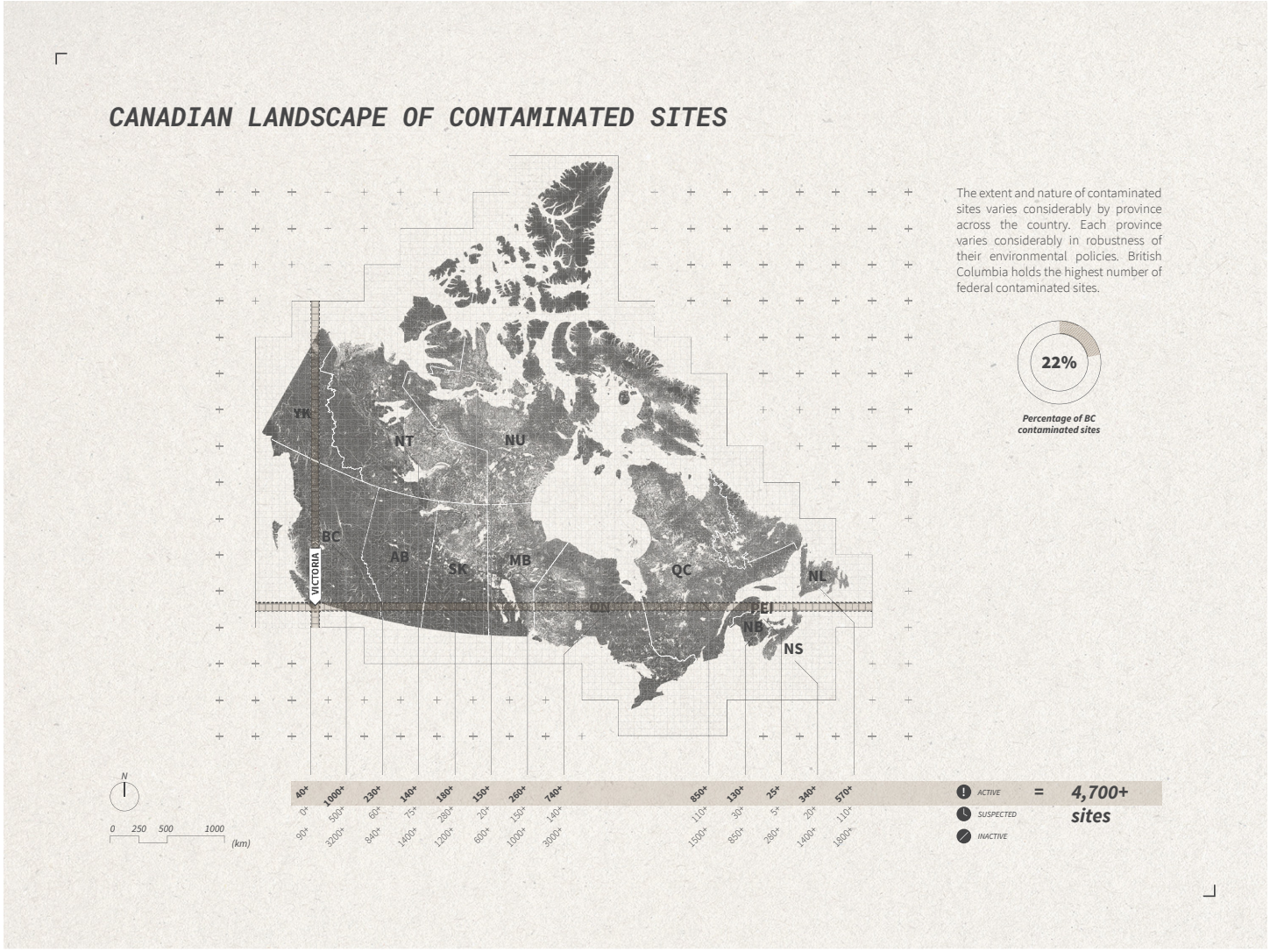
Despite their negative connotations, some of these sites are attributed as brownfields, or industrial properties that still have potential for redevelopment or economic opportunities (Government of Canada 2022). They are in dire need of physical transformation of contamination removal, psychological transformation of the stigma they carry and ultimately in need of a shift in perspective of how we act upon the very land we all reside on.

Canadian Context



Adapted from Student Assessment of National Brownfields Policy (De Sousa et al. 2018, 20)

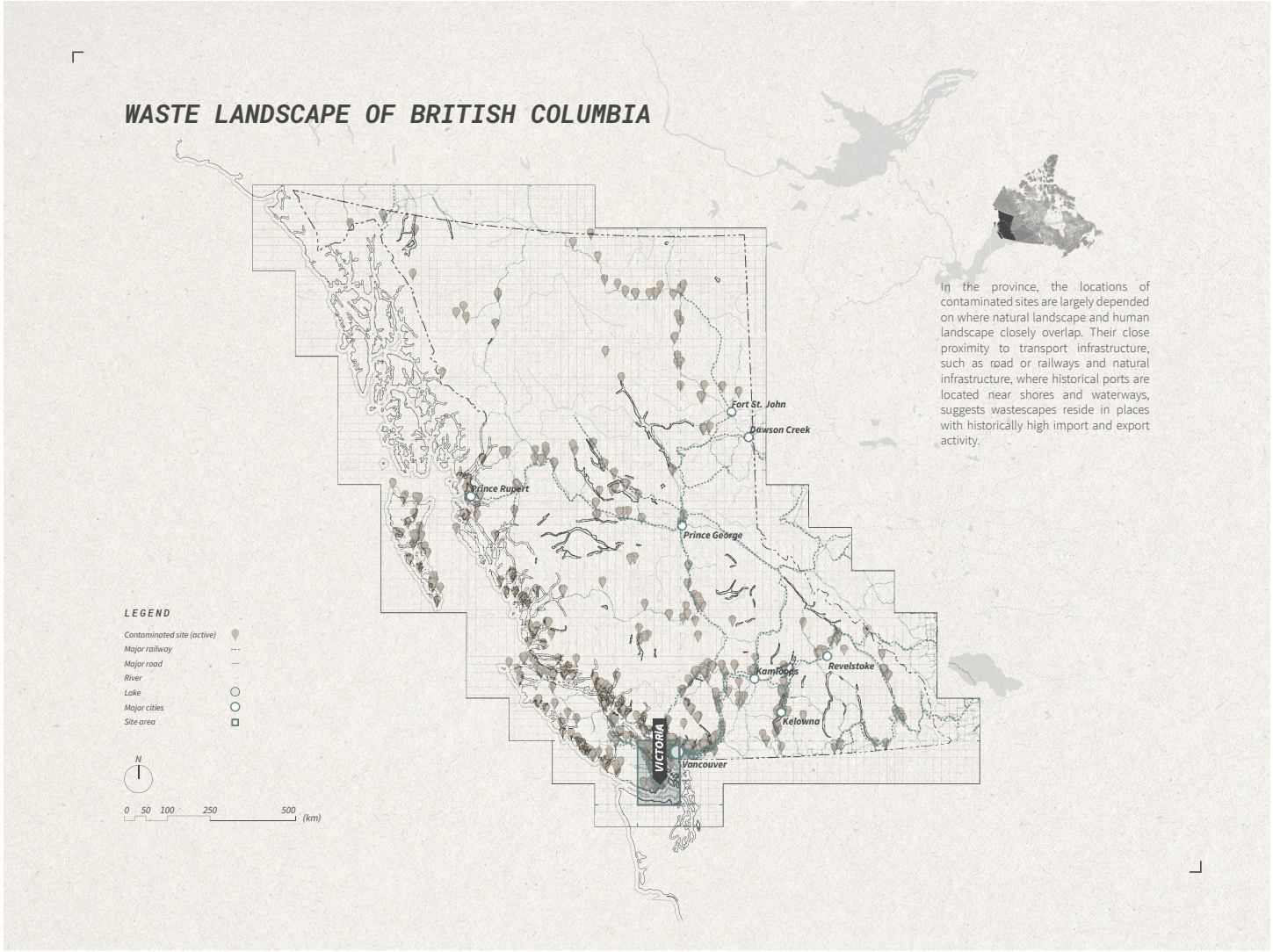
The extent and nature of contaminated sites ranges by province across the country. They vary considerably in the number of recorded sites, as well as their provincial standards and overall attitude towards remediation. A study was conducted through a sixteen-point criteria at which each province was categorized into three main tiers of remediation efforts. British Columbia scored in the highest tier of robust programs for supporting the brownfield development industry and local governmental efforts (De Sousa et al. 2018, 20).



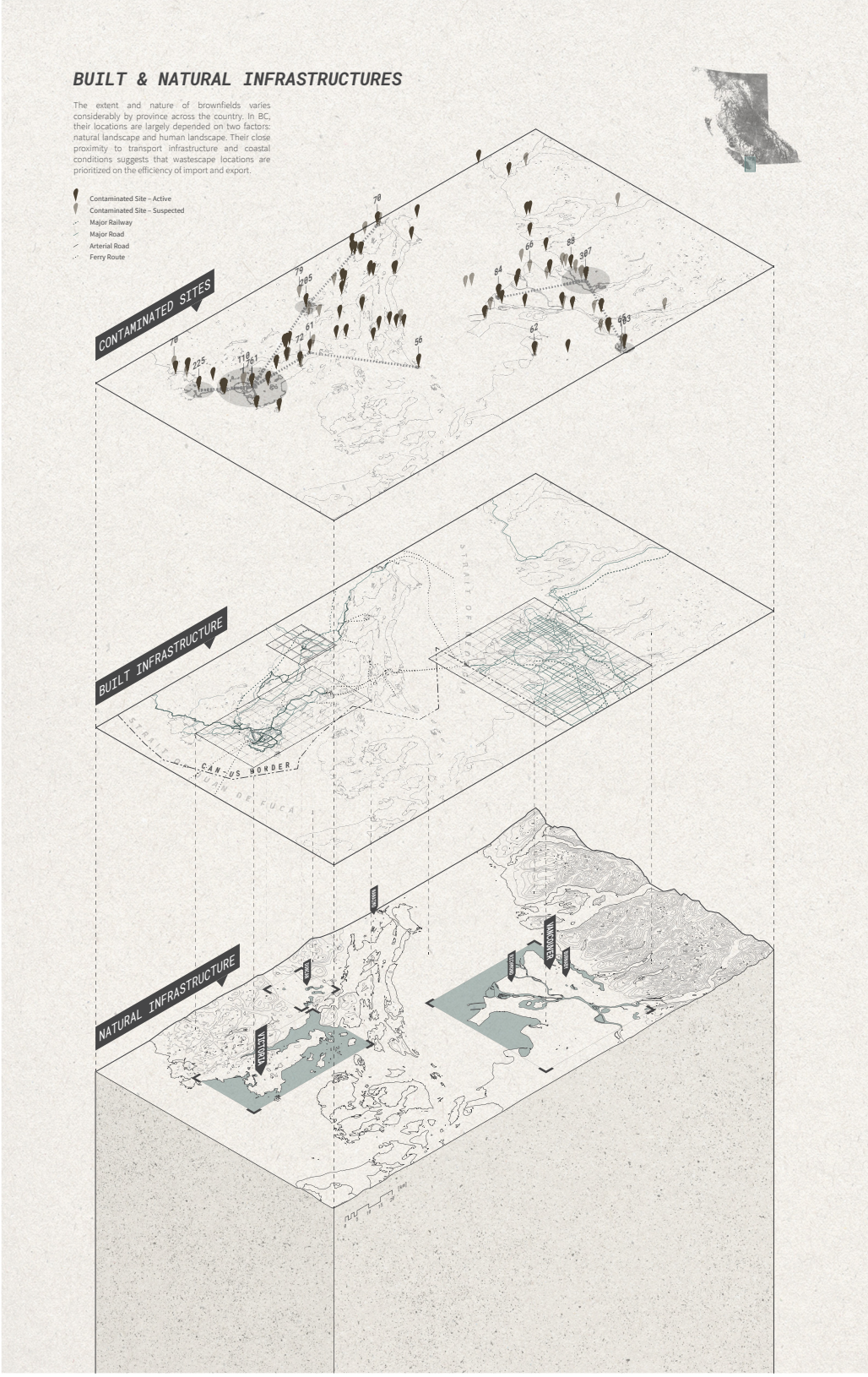
The ubiquitous Canadian landscape of contaminated sites varies in the number of sites from province to province (GoC, TBCS 2013; Charbonneau 2011).

Provincial Context

British Columbia contains the highest number of federal contaminated sites in Canada, roughly 22% of currently identified sites (GoC, TBCS 2013). In the province, the locations of contaminated sites are largely dependent where natural landscape and human landscape closely overlap. Their close proximity to roads or railways and water bodies, suggests wastescapes reside in historically urban areas with coastal conditions. The province has been a leading figure in treating contaminated sites and brownfields since the 1980s (De Sousa et al. 2018, 11); however, even as a role model within Canada's remediation practices, there exists many issues.



Waste landscape of British Columbia and sites' close relationship with both built and natural infrastructures (Charbonneau 2011; GeoBC, PBC 2005a, b, c, d, e; GoC, TBCS 2013)



Layering of built and natural infrastructures, contaminated sites of the Juan de Fuca and Georgia Strait (Charbonneau 2011; GeoBC, PBC 2002a, b, 2005c, d, e, 2017; GoC, TBCS 2013)

Identified Issues

Past sites of industry represent architectural artifacts that link us to their technologies, uses and understanding of landscape and nature at that time; presently, they reflect issues of social disconnect and erasure of place that industry brought to these sites. These key issues directly effect our ability to grow a deeper connection to our cities and the natural environment. Even when contaminants are objectively removed from these sites, these issues are ironically exacerbated through the act of remediation.

Social Disconnect

Deterring signage surrounding site

Physical Barriers

Since many of these sites reside on coastal edges, it creates a physical-visual barrier that fragments our relationship with the coast, both from the street and from the water.

Various physical mediums in the form of signage, chain-link fencing and concrete barricades surrounding these sites denote the stark separation from the rest of city fabric. This discourages public engagement and establishes itself as an unwelcoming space on the street.

Knowledge Barriers

As a consequence, these physical barriers also affect our ability to understand remedial processes of contaminated sites. According to a recent open and close-ended study, practitioners in the remediation profession shared how the lack of political will and awareness of brownfield issues were included as primary concerns affecting their ability to remediate and redevelop brownfields (De Sousa et al. 2018, 24-25). Practitioners came to a common consensus that governments on federal, provincial and municipal levels scored marginally on building community awareness of brownfield redevelopment (De Sousa et al. 2018, 30). This lack of approachable entry due to physical barriers and reclusiveness implemented by governmental processes leads to their social and physical isolation from the rest of the city and thus eventually become unseen spaces.

Erasure of Place

a. Photograph of Rock Bay Bridge (Helmcken 1912)
b. Photograph of Victoria from Church Hill (RBCM, BCA 1859)

The remediation of contaminated sites often result in the steady disappearance of city identity through the removal of both cultural and ecological layers.

Demolition of Cultural History

A ‘clean slate’ approach to remediation, involving the complete demolition of buildings on site may be a less arduous strategy; however, this leads to the erasure of a site’s unique historical characteristics. Without this, it removes the rich cultural layers of place, similarly referred as the “Genius Loci” or “spirit of place” (Norberg-Schulz 1996), in which histories of place produce a sense of truth and meaning in its architecture and vice versa. Without looking to building preservation, this can result in producing the characterless qualities inherent in many cities, where its banality

invokes a sense of ‘placelessness,’ the casual eradication of distinctive places and the creation of standardized landscapes as a result of an insensitivity to the significance of place (Relph 2016). Stringer refers to this as a regulated appearance, where the palimpsest of landscape can be difficult to decode and the slow compounding processes of developing the identity of place becomes largely overlooked (Stringer and University of Westminster 2018, 214). If ‘place’ is a fundamental aspect of human existence, security and identity, then it is critical that the ability to experience, create and maintain significant places is not lost (Relph 2016, 6).

It is without a doubt that historical building preservation is an essential building block of a functional and healthy city. Old industrial buildings are irreplaceable at will, holding great social and economic value. These buildings act as cultural repositories full of traces of our past through their building materials and original functions. Transforming them, instead of building anew, also become economic incentives for cities. These buildings are created by time. The social requisite for diversity becomes necessary that vital city neighbourhoods can only inherit, then preserve over the years (Jacobs 1961, 199).

Neglect of Local Ecology

While environmental problems are solved with technological solutions, remediation efforts largely neglect the consideration of the natural environment around us. Attitudes toward the environment represented in urban planning and design have been more focused on singular efficiencies and utopian ideals of sterility and safety rather than natural processes as sources of urban form. Form is dictated by preconceived notions of what places should be, rather

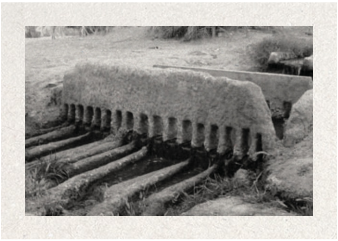
than by what they actually are (Hough 1994, 42). While this utopian vision improves human health, it comes with a cost of exacerbating the deterioration of environmental health. The progression of technology came the subsequent attitude of indifference that we now recognize as the inability and unwillingness to make connections between social and economic advantages with environmental cost (Hough 1994, 43). Investing in the protection of the context that maintains our social or environmental relevance is pivotal to human health, our bond with nature and the biological sustainability of life itself (Hough 1994, 48).

So what do we do with these landscapes that have been either severely or irreversibly altered to an extent where natural and human remnants are difficult to distinguish? How can architecture create cultural and ecological connections, increase awareness of remediation and strengthen our understandings of environmental processes? Moving forward, how do we start to operate on these waste landscapes?

One of our first analyses of mapping helped to make a connection with wastescapes and their close relationship to coastal conditions. In the next chapter, the history of water infrastructure and its current perceptions is examined and creates a framework in which the project is built.

Chapter 3: Landscape Infrastructure – A Bio-Cultural Nexus (Framework)

Natural Process as Invisible Infrastructure



Photograph of a qanat in present day Iran (Remini, Achour, and Albergel 2011, 496)

Photograph of a Roman aqueduct in present day Tunisia (Van Deman 1913)

From the fertile soils of our gardens, the fresh air pumped into our buildings and the water filtered through our cities, natural processes are essential for sustaining human life. This last example, the development of a dependable water supply, was a major determinant in the health and growth of large densely inhabited cities (Hough 2004, 33). After the trenches and wells of Mesopotamia in 3100 BC and the qanats of Persia in 700 BC (White 2023), the Romans were one of the first in recorded history to recognize the provision of water through built infrastructure. This was done by securing clean sources from mountain streams via aqueducts in 600 BC (Hough 2004, 33). Not only did safe water sources provide us with sustenance of drinking water, it effectively provided a means for helping escape disease, combat fires and raise public health standards at large. It was made possible by built infrastructure the accessibility of water as public amenity; however, abundance and security lead to the idea of free commodity and carelessness, causing its misuse, wastage and contamination (Hough 2004, 33).

With the progress of technology, infrastructure slowly became less visible to the eye. As our ability to control water with these infrastructures lead to ever complex systems of brickwork, concrete, pipes and valves, they grew to become colossal built infrastructures avoided by public attention. These buildings supposedly did not age well; while they represented great human feats of dominance over

Abbey Mills Pumping Station, London, one of the first ‘out of sight, out of mind’ public irrigation facilities (Kaika and Swyngedouw 2000, 127)

landscape, their industrial scale and utilitarian aesthetics lead to disillusionment with the patina of time. This lead to perceptions that here on out, they had to be hidden underground (Kaika and Swyngedouw 2000, 132). This trend proceeded into the twentieth century where technological solutions were the keys to solve infrastructural problems, a logic at the time that was quickly summed up as ‘out of sight, out of mind’ (Karvonen 2011, 7). This was a pivotal moment in human environmental perception, where our connection to natural process became severed, changing our visual perceptions and overall attitudes of nature and infrastructure. This was when we began to build on the idea that infrastructure in the city was disturbing, unsafe and unsightly to public life.

Domestication of Water

Indoor plumbing and the domestication of water: the ‘disconnected’ house, Richard Neutra’s 1937 Kaufman House in Los Angeles, California (Kaika and Swyngedouw 2000, 135)

With abundance and effortless access of water through this hidden infrastructure, we have taken for granted the natural processes at work. This new ‘out of sight, out of mind’ way of building superseding the complex and exposed systems of the nineteenth and twentieth century unfortunately framed our trajectory of the nature-culture dialectic into an evermore separated future. These pervasive attitudes made their way into municipal design and practice; implementations like storm sewers and catch basins made sure that people remained unaware of where water came from or where it went. How water is drained off streets, sidewalks, plazas, gardens and parks and how it gets recirculated or discharged no longer was a part of public imagination (Hough 2004, 37). This only further reinforces the illusion of human dominance and independence from nature, where cities tend to take away our awareness of our connection to nature by

replacing its once natural surroundings with artificial and built environments (Mumford 1956, 181). This consequently begs the question, how can design move forward from this rigid frame in which we find ourselves so stuck?

A Wastescape Imagination

> Society and academia both benefit from a further integrated way of working and understanding: community engagement (in various directions) influences the type of questions asked, the narratives written, the topics (and experiences) researched or taken into consideration. (Klaver 2013, 88)

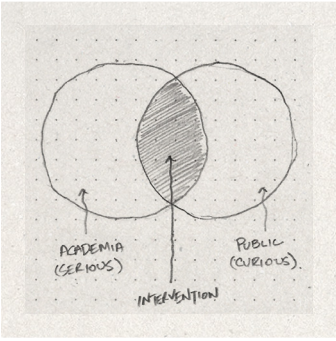
Early collage of project

In the previous chapter, social disconnect and erasure of place were established as two key issues with waste landscapes. These nebulous issues present themselves as a complex entanglement which requires the joint efforts of various disciplines from urban planning, architecture, ecology and environmental engineering, as well as many others. Irene Klaver's essay "Environment Imagination Situation" can act as an approach to how waste landscapes can become a bio-cultural nexus – a place of ecological and social development. This reveals a framework in which the thesis is built upon and influences how these two key issues can be addressed.

Klaver, coming from a philosophy and religious studies background, believes that engaging with our built and natural surroundings cultivates *environmental connections* and enables a *cultural imagination* through interdisciplinary engagement, in which this overlap is called 'environmental imagination' (Klaver 2013, 85). This environmental imagination can be experienced through parks, nature reserves and other natural infrastructures.

This thesis operates at this scale of natural infrastructures, as waste landscapes can also be designed and experienced

for developing environmental engagement. Klaver writes that the intersection between hydrological infrastructure and natural landscape has the potential to become a porous and experiential zone. This zone can become a public hybrid space, where research and public knowledge can work toward homogeneity. This she calls a bio-cultural nexus, where experiential learning dissolves interdisciplinary boundaries between humanities and sciences, public and academia (Klaver 2013, 85).



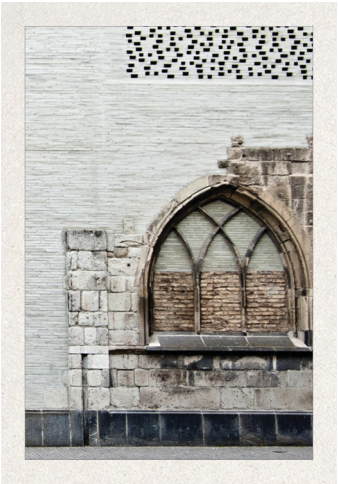
Intersection of public and academia as intervention

The social disconnect of waste landscapes can be addressed through Klaver's argument that connecting research and public knowledge fosters contemplation. Connecting and dissolving these two boundaries can be applied in a similar way in wastescapes. Physical and knowledge barriers can also dissolve through connection and engagement by creating moments where public and academia overlap. Mentioned in the quote at the beginning of the chapter, community engagement between the serious (academia) and the curious (public) influence the questions asked, narratives written and future topics of research (Klaver 2013, 88).

Erasure of place can be addressed through a new attitude and role of architecture. This architecture takes shape not only through our cultural processes of building but also in consideration of nature's own processes. In the context of natural infrastructure, architecture–both existing and proposed–can provide a space where the exchange of cultural and ecological knowledge take place. This breathes new life into industrial, single-function buildings and re-attributes socio-ecological value and purpose.

This concept of environmental imagination also helps us re-examine our place on earth in the larger picture. Klaver points out that environmental imagination creates a “syn-aesthetic understanding of the way we conceive our world” (Klaver 2013, 89). This further helps us *engage* in the world instead of *look* at the world. By engaging in waste landscapes, it helps us understand that we are purely situational beings, dependent on circumstances of our surroundings, making aware of the larger world around us.

Chapter 4: Ground Layers (Method)



Peter Zumthor, Kolumba Museum, Cologne, Germany, 2007; photograph by Luis Rodríguez (Atelier Peter Zumthor & Partner 2007)

‘Site,’ the very ground we stand on, has been formed over many millions of years and is the composite of the many wills enacted by human and natural forces. This perspective sits adjacent to Aldo Rossi’s postulate of combining history and memory as a way to conceptualize the identity of cities (Rossi 1982). Each layer of the ground can be read as a different moment in the life of the site. This way of understanding the ground and it’s inhabitation as a repository of memory and identity of place is a different way of understanding time and remediation than typical processes. The methodology takes off from Rossi’s and Klaver’s views by treating the wastescape as a sum of its parts, and the ground and its inhabitants (buildings, humans, ecologies, etc.) as a heterogeneous whole. They can be observed as layers of the site that are inseparable from each other, where one directly effects the other and one aspect is not to be treated discreetly or isolated from another. To understand spacial relationships of these layers, both mapping the surface of the site as well as what is beneath become paramount to the analysis of the site.

Surface and Subsurface Mapping

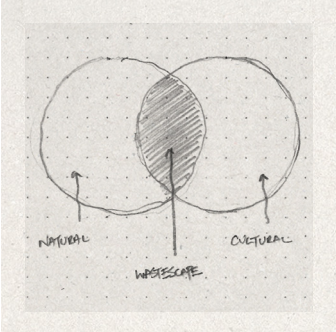
In *Recovering Landscape* by James Corner, an excerpt refers to landscape as such:

> ...[it] no longer refers to prospects of pastoral innocence but rather invokes the functioning matrix of connective tissue that organizes not only objects and spaces but also the dynamic processes and events that move through them. (Corner 1999, 233)

By analyzing the topographical surface in this perspective, the thesis can be framed in a way that acknowledges what

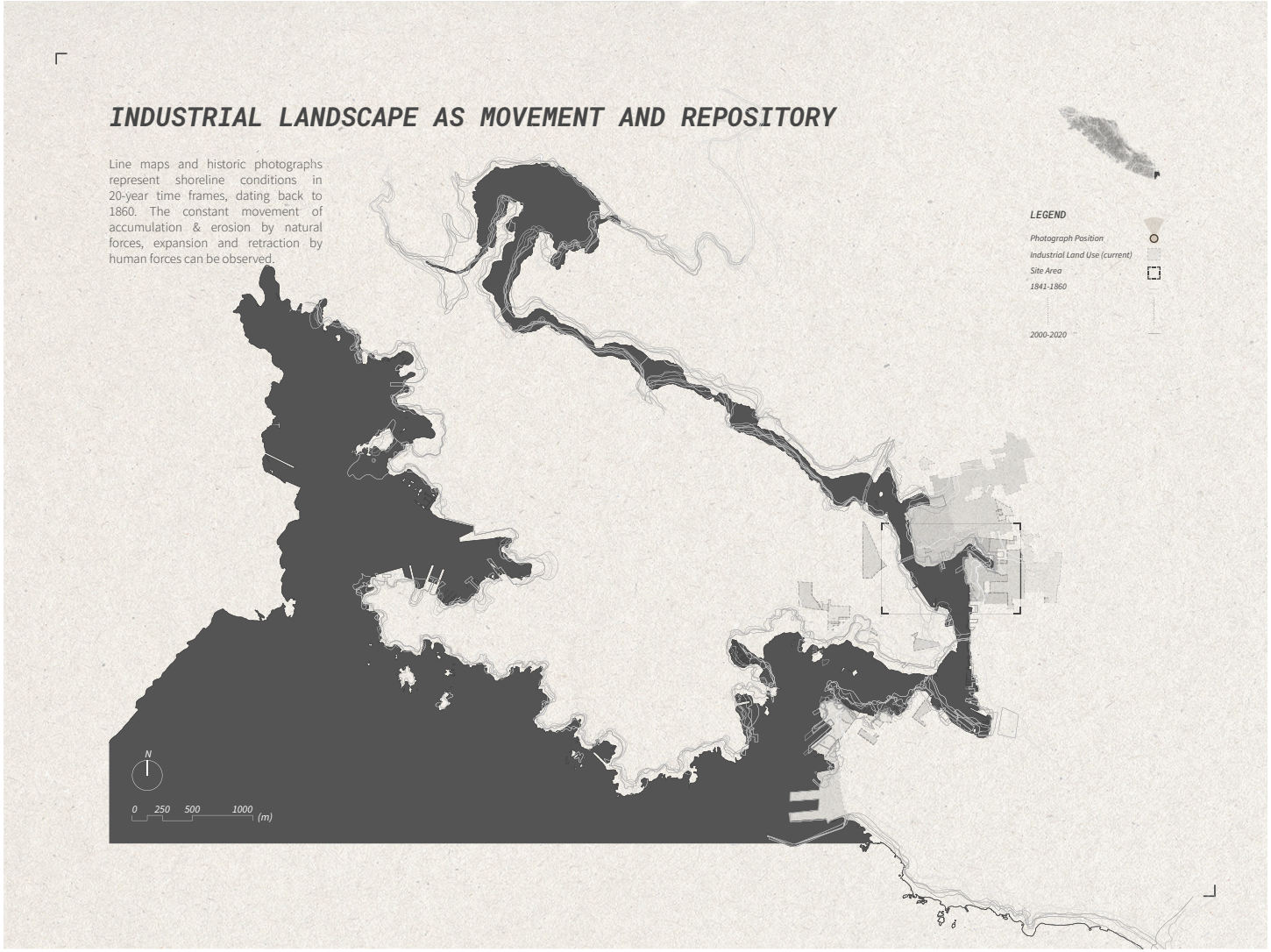
we see on the surface as a result of complex processes of ecology that respond to human action and vice versa.

In order to get a deeper understanding of wastescapes, we must also analyze what we do not see beneath the ground. Not only do contaminants exist on the surfaces of wastescapes but also largely below them. Contrary to Corner, Tim Ingold in his article “Surface Textures: The Ground and the Page” describes surfaces as superficial, where we innately distrust them as a false to the truth that lies beyond. As Ingold notes, we are to break through and peel back the layers if we were to arrive to a real significance (Ingold 2018, 137). This concept is pushed further as he describes the ground much like a rewritten page, a palimpsest in which additive and subtractive actions are inscribed as layers of information (Ingold 2018, 140). Arguably one of the most interesting points made is how Ingold describes subtractive operations of revealing the layers of ground underneath are also, ironically, additive operations, where taking away the ground adds to the history of actions on a given site.



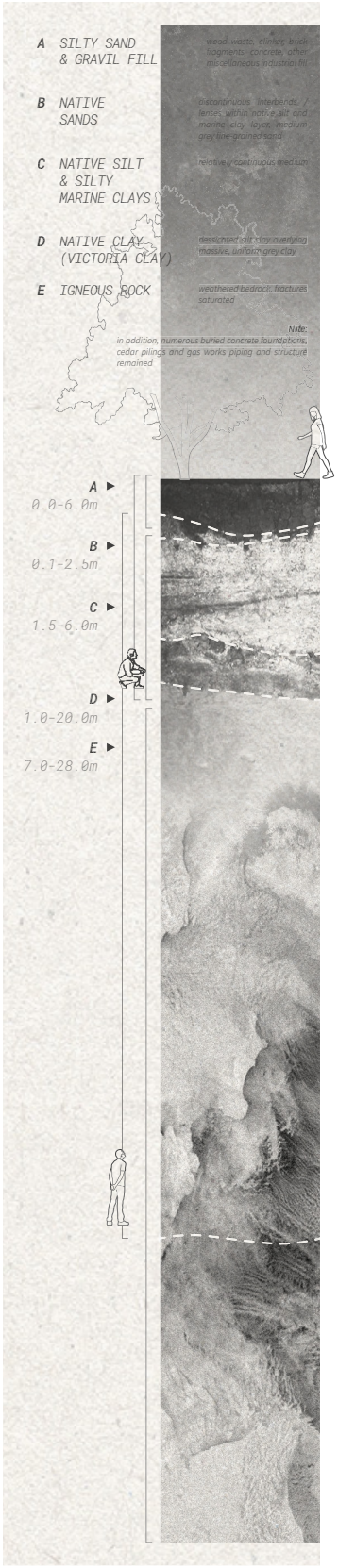
Intersection of natural and cultural as wastescape

The wastescape can be observed through a similar lens, where uncovering the layers of both natural and cultural strata can suggest the ground as the many wills enacted by both natural and human forces. These forces can be observed on the shorelines of Victoria Harbour. A constant push and pull of the coastal edge as well as the movement of industrial land use shows that these waste landscapes can be seen as a working landscape, a repository of cultural and ecological layers.



Industrial landscape as movement and repository (City of Victoria 2012; EastOfNowhereCo n.d.; GeoBC, PBC 2018). Shorelines are overlapped in twenty year increments to show expansion and retraction.

Industrial landscape as movement and repository, printed on mylar to show cultural and ecological overlaps of the coastal edge (City of Victoria 2012; GeoBC, PBC 2018)



Cultural and ecological stratum of Powerhouse site

Ground Layers

In order to create a more truthful narrative of the site, we can first observe the site as a working landscape; this leads to understanding the site as layers of natural and cultural stratum. Investigating ground layers is important because it sheds light on what kind of activities took place. Like an anthropologist, the different layers of the site, natural and cultural, can help uncover and tell a captivating story of how this site of industry came to be. Its stratum can be categorized in five layers; silty sand and gravel fill; native silt and silty marine clays; native sands; native clay (Victoria clay); and igneous bedrock. The most intriguing layer is the top most exposed one, which also contains wood waste, clinker, brick fragments, building foundations and other contaminants to depths of up to 6 meters (Hanson, Kettlewell and Torney 2009, 7). Architectural artifacts hidden in this layer tell a fascinating story of the many wills enacted by human and natural forces dating back over 200 years.

Natural Landscape

Topography

The city of Victoria is relatively flat due to its urbanization which started in the 1800s, as much of its natural topography was modified into flatter, more build-ready surfaces. Prior to colonization, the soil was remarkably fertile in the extreme (Segger and Franklin 1979, 8). Now, the topography of the site has almost completely flattened with a gravel infill creating a stark 20-foot difference from the sidewalks to the water table.

Photograph of Victoria from Church Hill (RBCM, BCA 1859)

Photograph of Finlayson Falls (of Rock Bay Creek) (RBCM, BCA 1998a)

Photograph of Victoria Harbour (RBCM, BCA 1998b)

Hydrology

Before industrialization of the neighbourhood, Rock Bay was originally named Rock Bay Creek (Field et al. n.d.). This creek facilitated as a large natural watershed at which stormwater was collected and dispersed into Victoria Harbour. Since building technology at this time was not advanced enough for wet and unstable soil conditions, the creek was culverted, burying and hiding the stream underground to make way for roads and buildings.

Ecology

The undisturbed land in which Victoria was built was once a place of enormous ecological productivity. The healthy and lush trees, excellent water with rivers, lakes and streams carrying plenty of fish (Segger & Franklin 1979, 8) made evident of a strong natural environment in the temperate rainforest climate. Rock Bay was predominantly an estuarine and was home to local flora including eelgrass, fescues, sedges and trees such as cedars, firs, oaks and poplars (Field et al. n.d.).

Topography, hydrology and ecology of Rock Bay (City of Victoria, ODP 2018; GeoBC, PBC 2011)

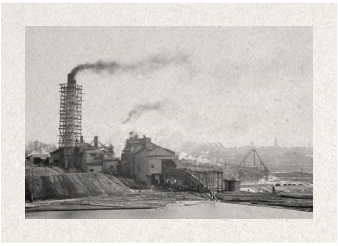
Human Landscape

Urban Development

Photograph of Rock Bay Bridge (Helmcken 1912)

As the economic boom from natural resources fueled the city, industrialization slowly transformed the waterfront of Victoria. The Harbour facilitated as the colony's financial centre with a focus on industry with saw mills, wood product factories, flour mills, soap works, gasworks, tanneries, shipyards, brickyards and foundries (McGillivray 2022). A tension grew between its prided natural landscape and the heavy modification of shoreline that industry brought to the harbour. Natural forces of erosion and accumulation and human forces of retraction and expansion now remain largely unseen. With the significant economic boom and population increase on the island, the city was looking for reliable ways to power the city that would keep up with the growing demands of development.

Land Use and Industry

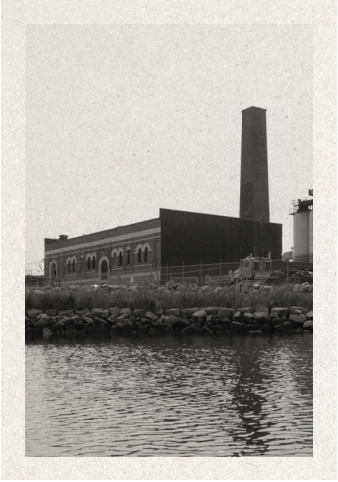


Photograph of McCarter Shake and Shingle Mill in Rock Bay (Macphail 1947)

The Rock Bay area, just north of the downtown harbour, is a vast industrial site. The disconnect between the lively downtown core and the industrial Rock Bay neighbourhood can be observed; the highly active qualities of downtown contrasts with the starkly empty streets and clearly marked boundaries of gates, fences, signage and desolate spaces. There is great potential for blending these two neighbourhoods and extending some of downtown's successful public spaces into Rock Bay.

Powerhouse History

Converting coal and steam into energy, the Victoria Powerhouse was constructed to power the city's electrical grid and its tramway network.

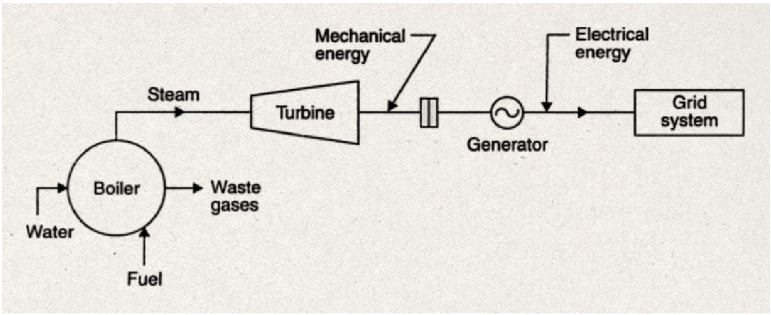


Victoria Powerhouse shot from a kayak

Considerations of remediation only began in the late 1980s, where initial investigations of contaminants began to take place. Even after its remediation through the province's leading strategies, the site still remains derelict and publicly disconnected from the rest of the city. Sizeable industrial occupancy that would typically be closed from visitors has the potential to instead be a public space that extends and enhances the harbour-front walk and can offer as a special piece of Victoria's cultural history.

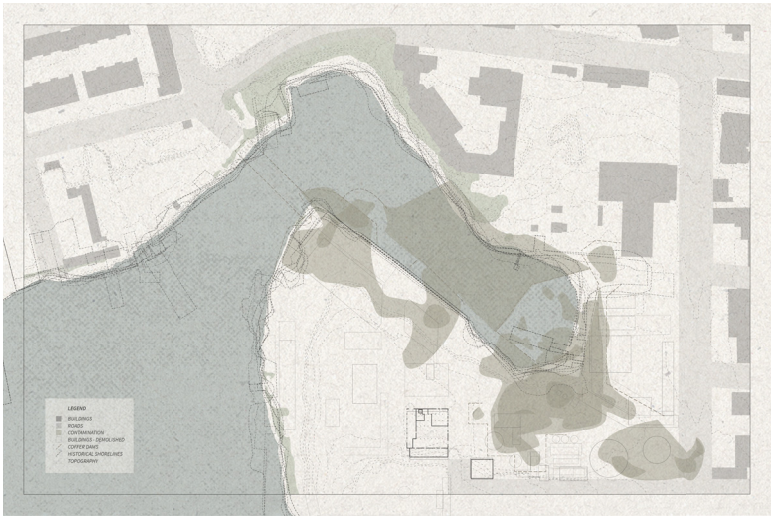
Anatomy of the Steam Power Plant

At the time of its commission, the Powerhouse and its site demonstrated as a mechanism that harnessed the power of both natural and built infrastructures. From the water, boats would unload locally-extracted coal onto the conveyor house that sits on the water's edge. Coal would then be processed, stored in the coal silos and make its way into the Powerhouse. The boiler receives coal as fuel input and generates steam through its incineration. The building pulled cold ocean water from the harbour as a way to naturally cool the building and its working components. A turbine and generator converts the chemical energy of the coal to mechanical and electrical energy respectively, eventually feeding it into the local grid system.



Production of electrical energy by steam power plant (Rajput 2006, 16)

The Powerhouse also houses a massive rectangular brick chimney that exhausted industrial debris, a large triple-height shop space supported by exposed steel trusses and a two-axis gantry crane capable of carrying heavy loads.

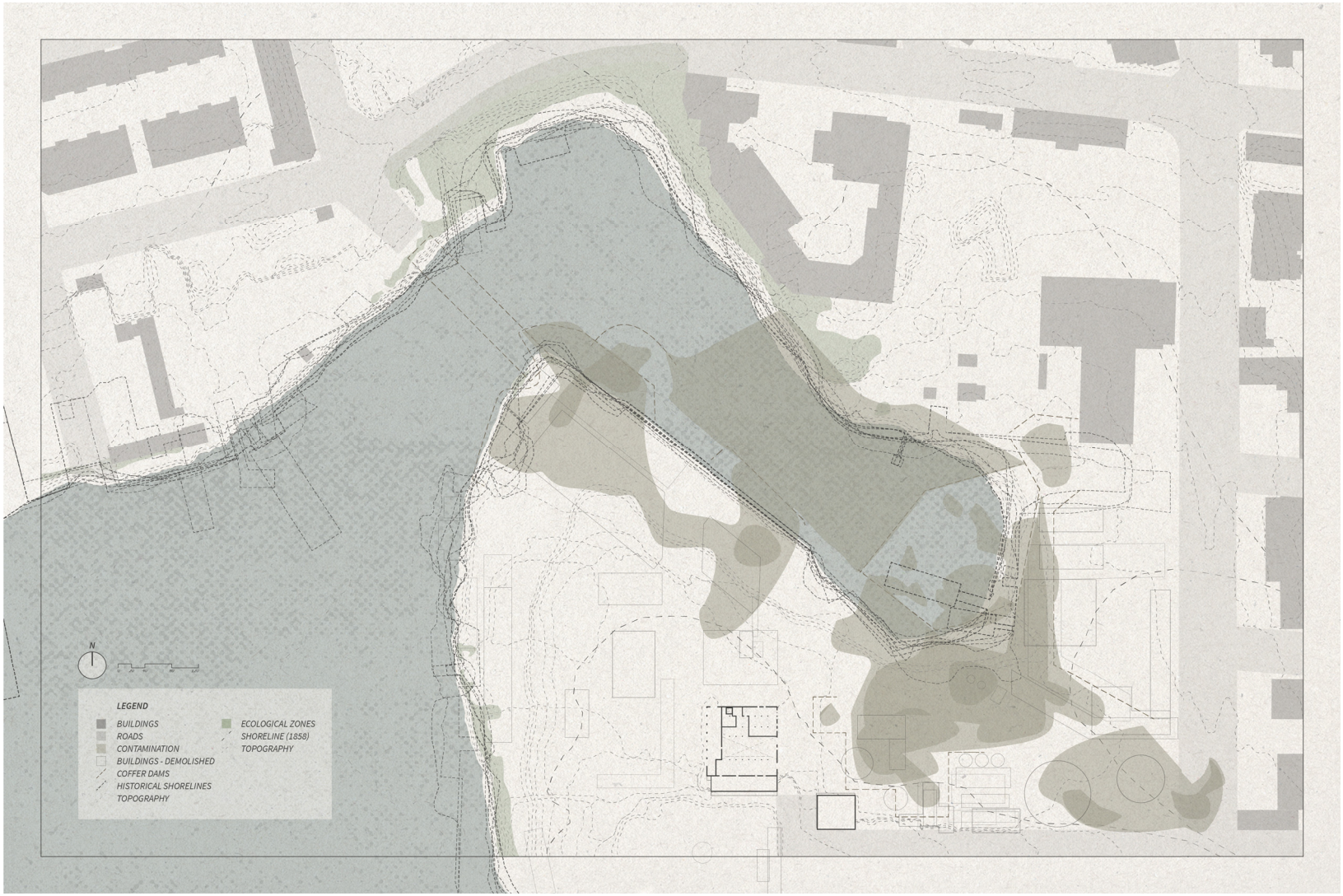


Urban development, industry and infrastructure of Rock Bay (City of Victoria, ODP 2019b, e; D'AMBROSIO architecture + urbanism and New Landmarks 2011; GeoBC, PBC 2011)

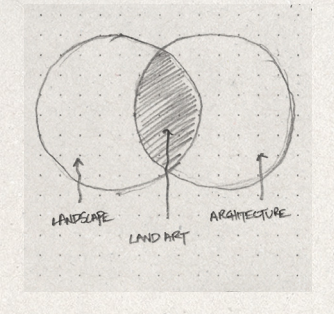
Land Art as Connection

Land art is a form of creative expression through the use of the ground and built objects. Precedents are translated as a method of connecting us to both ground and built forms, to gain a deeper understanding of waste landscapes and ourselves. Active tools like cutting, unobstructing, layering and transitioning become architectural design tools to reveal certain cultural and ecological histories of the site and attempts to create these overlaps.

As mentioned in Chapter 1: Introduction, the thesis uses applied methods from the remediation of the site as pivotal parts of the methodology. The four phases of Rock Bay's remediation–coffer dam, drainage, excavation and fill (see Appendix A)–are used to connect them to actions by



Composite map of all natural and human landscape layers of the site (City of Victoria, ODP 2018, 2019b, e; D'Ambrosio Architecture + Urbanism and New Landmarks 2011; GeoBC, PBC 2011; Pemberton, 1858). Powerhouse building prior to design proposal.

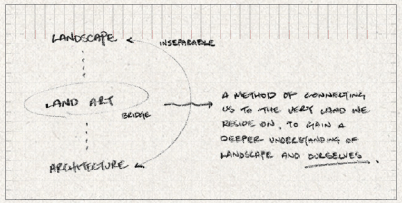


Intersection of landscape and architecture as land art

specific land artists. These active tools by artists combined with the remediation process acts as a way to reinterpret transformations made to the site. This becomes a way of operating on the site, either as additive or subtractive actions, like Ingold's concept of palimpsesting ground layers. This allows us to be brought into the site and reveal certain ecological or industrial features.

Through observing the many layers of ground, both natural and human, and the historical demolishing and constructing of buildings on the site, water appears to be a constant. From the Rock Bay Creek watershed, historical wetlands and the Powerhouse's passive cooling strategies, water has defined the site for both ecology and human inhabitants. Water provides our very reason; it is the lifeline of all living things. Using our changing perceptions of water as a framework, and observing ground layers and land art as a method, reintroducing water back into the site becomes the key to engaging people with the site. With Victoria's temperate rainforest climate and constant precipitation throughout the year, it more than justifies for the proposal of a new water treatment plant that exemplifies passive and natural strategies to treat both wastewater and stormwater, while revealing both cultural and ecological aspects of the site.

LAND ART AS CONNECTION



[phenomenology]

waking descriptive | dreaming interpretive

PROSPECTS	PHASES	ACTIONS	TOOLS	LAND ART	DESIGN
Remedial Action	Coffer Dam	Contain / Bound	Locating	Mary Miss *Flow*	Water Treatment Plant
Reveal Cultural Strata	Drainage	Reveal / Filter	Reading	Mary Miss *Double Site*	Check Dam
Historic Renewal	Excavation	Subtract	Aligning	Mary Miss *Battery Park*	Building Foundations
Passive Strategies	Fill	Resurface	Transitioning	Mary Miss *Staged Gates*	Urban Strategy
Public Engagement			Distancing	Michael Heiser *Double Negative*	
Reflection			Unobstructing	Gordon Matta-Clark *Conical Intersect*	
			Layering	Agnes Denes *Wheatfield*	

ARCHITECTURAL TRANSLATION

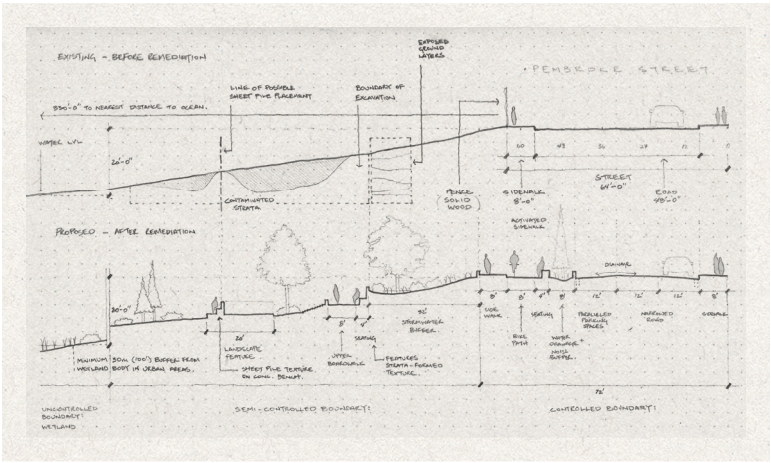
Methodology at the detail scale, using land art precedents as a way to connect architecture to landscape

Chapter 5: Design

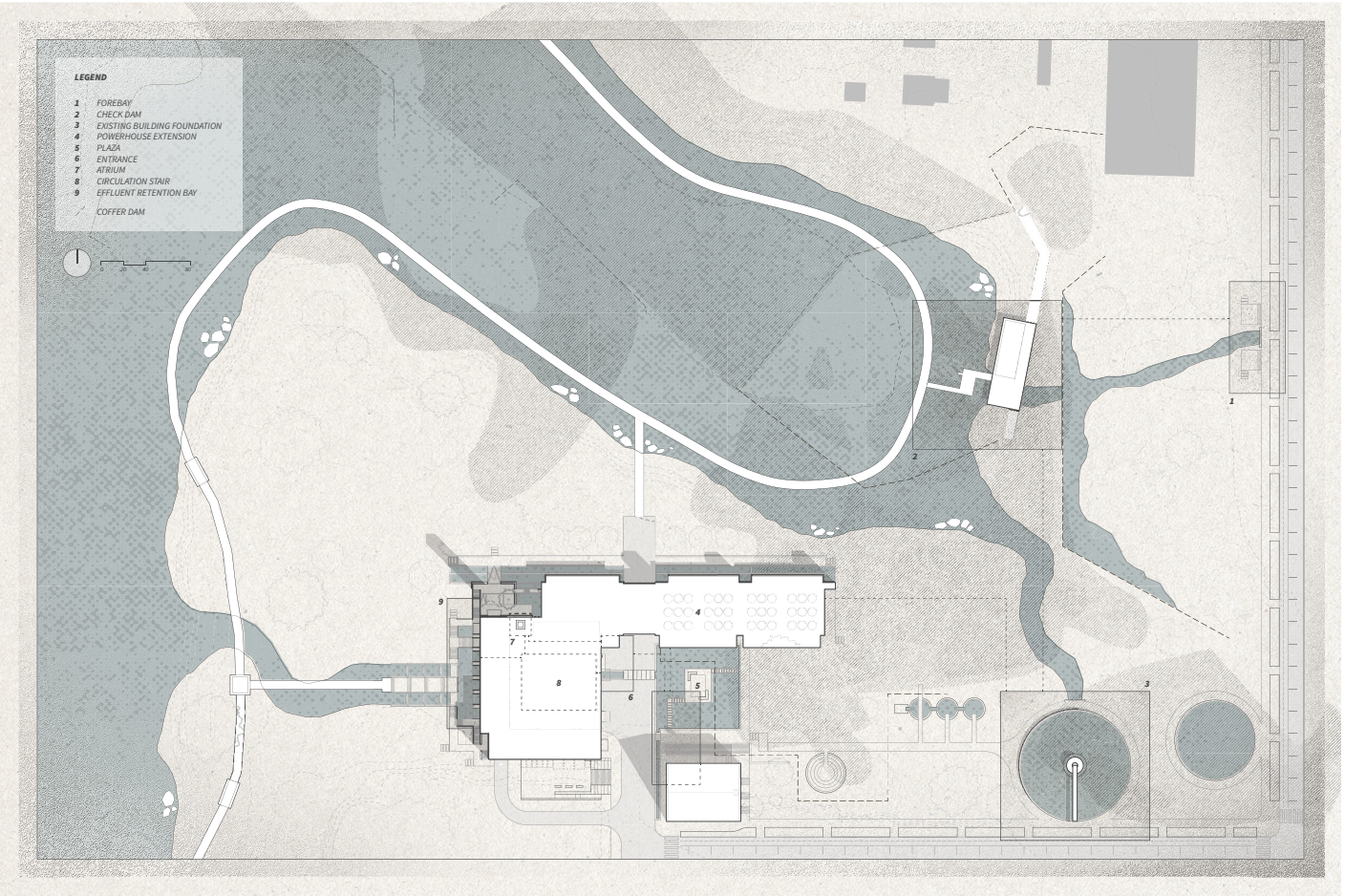
Urban Strategy

Now that the rationale for a water treatment plant is established, the urban boundaries that contribute to the treatment of water can be defined. Due to Victoria's generous precipitation, the management of water becomes important, especially during the fall and winter seasons. The urban strategy includes three distinct zones: controlled, semi-controlled and uncontrolled. Each zone is responsible for human circulation through the site; water circulation and drainage; and the ecological succession of the re-introduced wetland along the shoreline respectively. These zones intersect with one another, creating overlaps between human and water circulation.

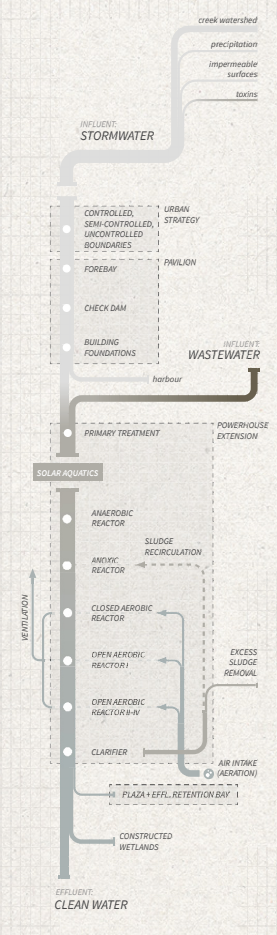
At the site scale, the design proposes a stream of moments that emphasize stages of water treatment while encouraging interaction with the industrial and ecological features inherent to the site. Moments will be explained sequentially from start to finish, from influent to effluent.



Initial urban strategy section sketch. Instances of the overlap of human and water circulation include bioswales along roads, stormwater buffers inhabited by water-tolerant plants and bench seating, as well as a boardwalk in the inserted wetland.

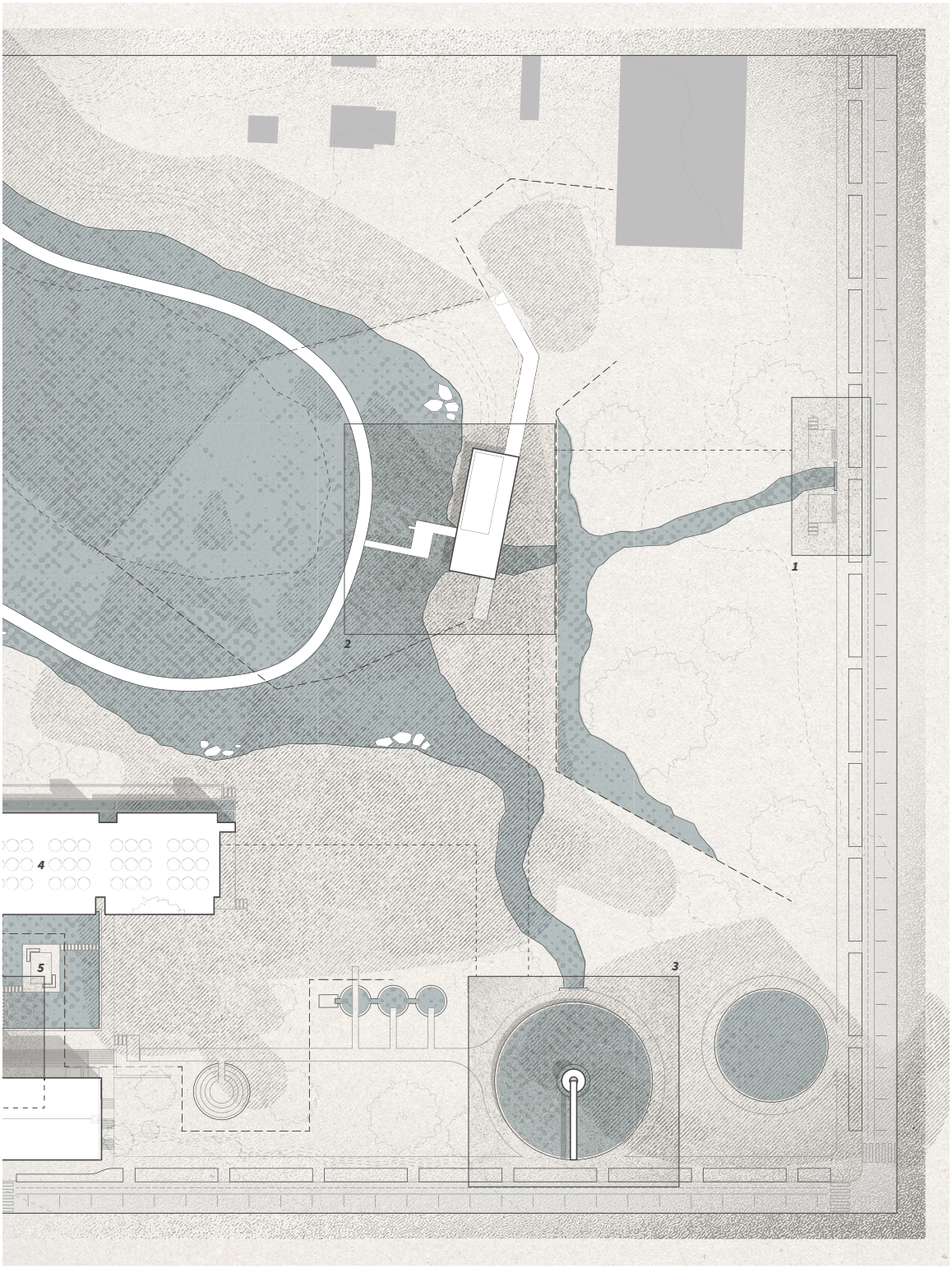


Site Plan highlighting a stream of moments throughout the site



Water flow diagram

Partial Site Plan – 1 of 2



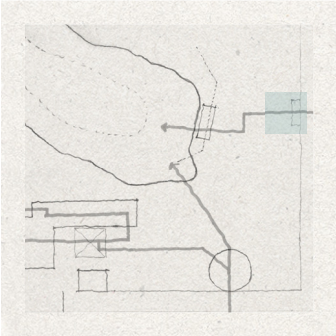
Partial Site Plan – 2 of 2

Powerhouse Site Pavilions

Moment 1 – Fore Bay

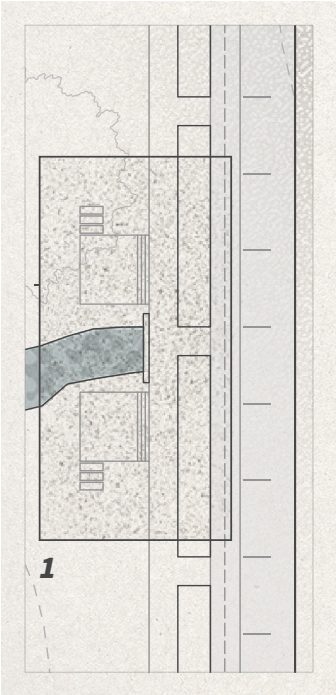
Resurging

This first intervention is intended for the revealing of the original Rock Bay Creek and the healthy resurgence of water into the site. The landscape design method of ‘daylighting’ is used to reveal the once existing Rock Bay Creek that was culverted to make way for transport infrastructure.

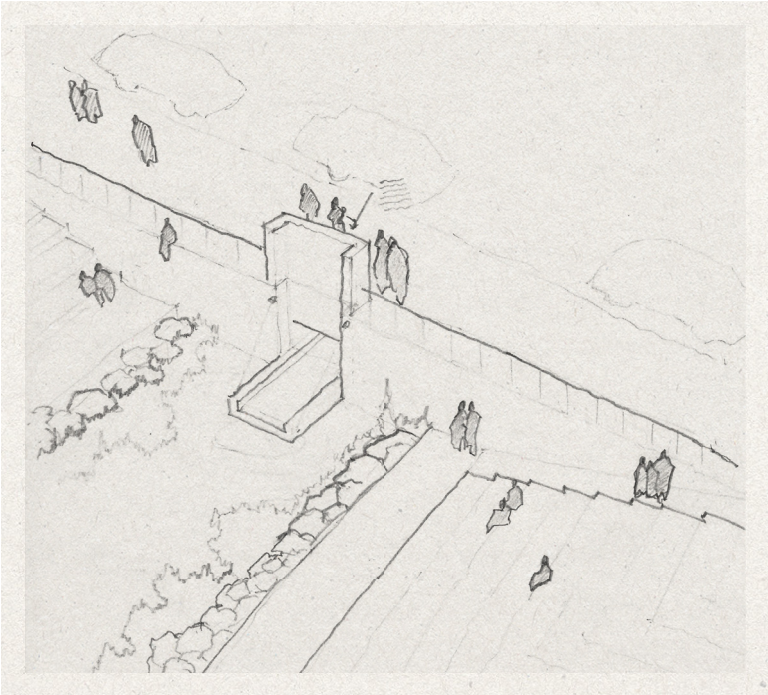


Key Plan sketch noting Fore Bay within water treatment process

The Fore Bay consists of the large body of influent and terraced seating to allow for visitors to engage with the site. It is located close to the urban edge, making it easy to connect to passersby. The creek that once flowed naturally into the landscape is reconnected to the site, as water is granted with its natural autonomy over the landscape. This allows for the oxygenating of water, encouraging the healthy growth of microbes and plants in the water.



Fore Bay area from Site Plan



Initial Fore Bay perspective sketch

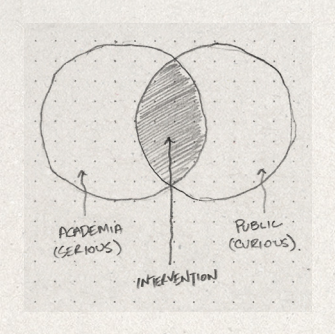
Moment 2 – Check Dam

Meandering

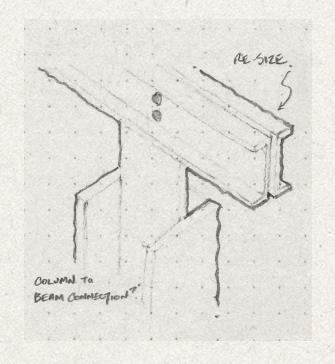
This pavilion is intended for the social overlap of passersby and those working on remediating the site. A check dam is a commonly used tool within landscape architecture to slow the movement of water while it traverses steep level changes. The site provides a 20-foot elevation difference from the city sidewalk to the ocean surface, which creates an opportunity for water to meander through the site.

Coffer dams from the remediation of the site are used as part of the concrete form work and are reused to make a sluice. The coffer dams' chamfered profile extends along the weir and is used as a structural wall for the building.

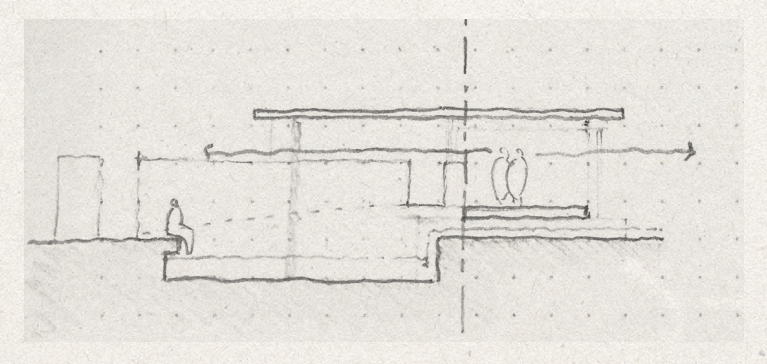
One side of the pavilion provides spaces for learning and gathering (curious) while the other houses a lab for studying and growing wetland plants (serious) as the concrete plinth allows for this social overlap. Along the weir is a large corten steel wheel that visitors may rotate to control the flow of water of the sluice. The concrete weir filters and withholds a view to the harbour, while the floating roof above sits lightly on the landscape from afar.



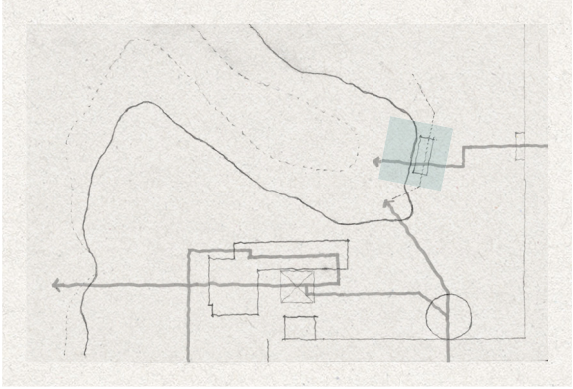
Intersection of academia and public as architectural intervention



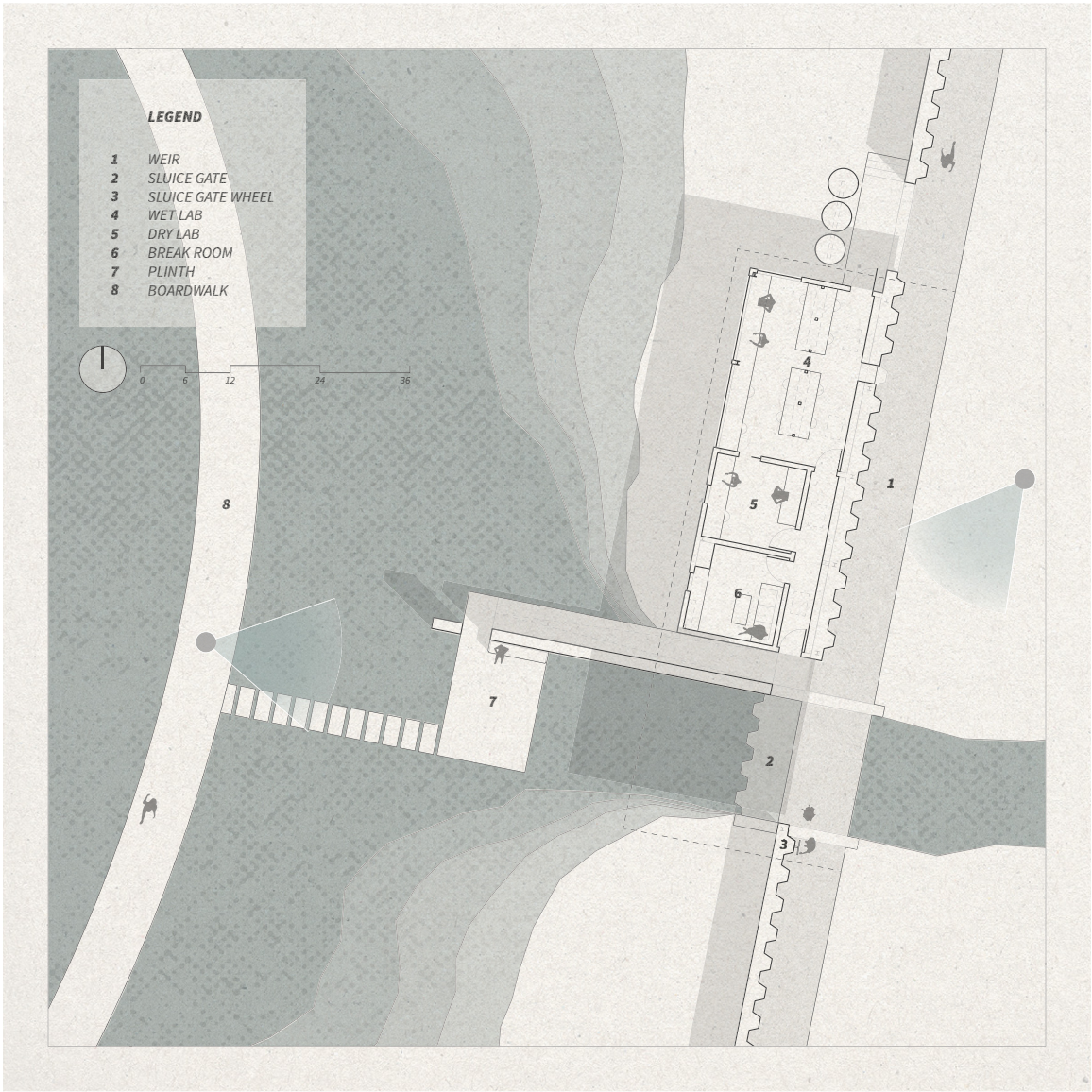
Initial Check Dam structural connection sketch



Initial Check Dam section sketch. Structural line represents line of coffer dam.



Key Plan sketch of Check Dam location within water treatment process



Check Dam pavilion plan

The stereotomic concrete weir and the thin, tectonic roof filters views to the industrial harbour. A mother and child turn the sluice wheel, releasing stormwater into the next flood plain.

Concrete plinth in front of the Check Dam. A bench against the concrete wall offers a place to sit. A series of concrete stepping stones connect the pavilion to the boardwalk.

Moment 3 – Building Foundations

Containing

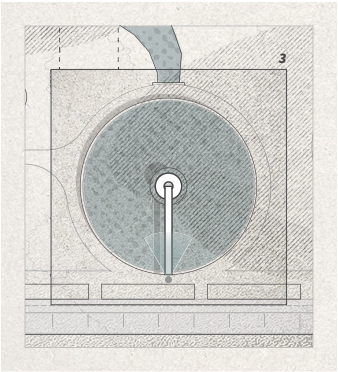
This area of the site reveals the many historical building foundations of the site. Even after the ongoing demolition of buildings on the site from the 1800s, many of their foundations still remain. One of the foundations is a circular wall, once supporting an industrial gasholder.

Before the excavation of toxic soils and special waste on the site, a new layer of concrete is added. The layers of special waste from industry and natural layers of sand, silt, clay and rock can be used as a formwork and is revealed on the new concrete.

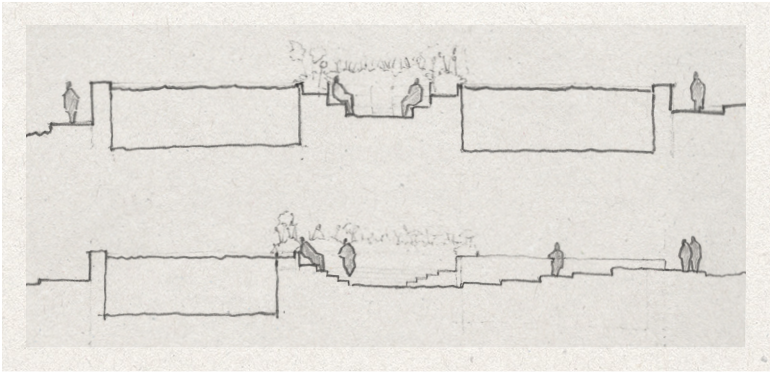
The gas holder now becomes a container of life. It contains both people, plants for cleaning toxins and stormwater collected from the controlled and semi-controlled zones. As the visitor sits in the sunken seating area they are able to look over the clean reflecting water and consider the shift in our ideologies of industrial waste towards a new future intertwined strategically with ecology.

Like land artist Rachel Whiteread, cultural pasts are molded through the negative forms of new structures.

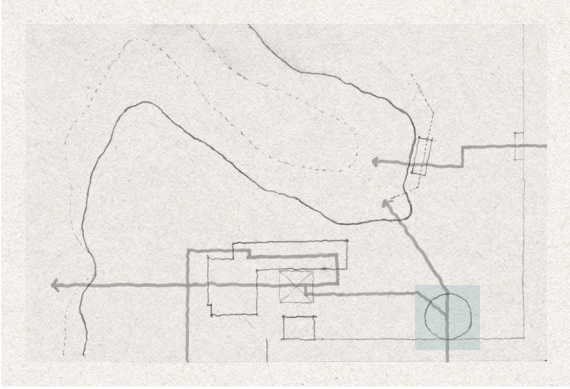
Rachel Whiteread, *Detached 1*, 2012; photograph by Mike Bruce (Gagosian 2013)



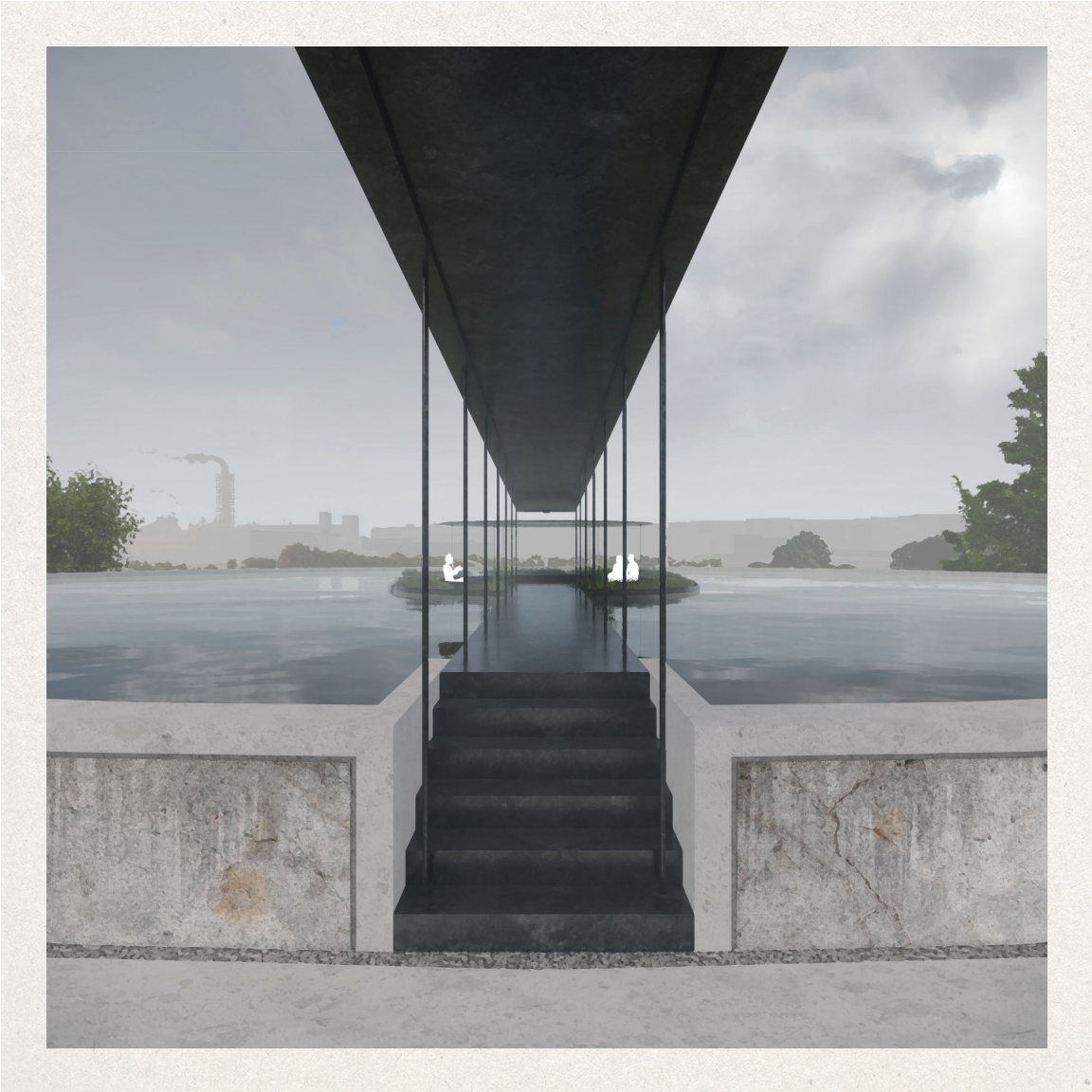
Building Foundations area from Site Plan



Initial Building Foundations section sketch



Key Plan sketch of Building Foundations location within water treatment process

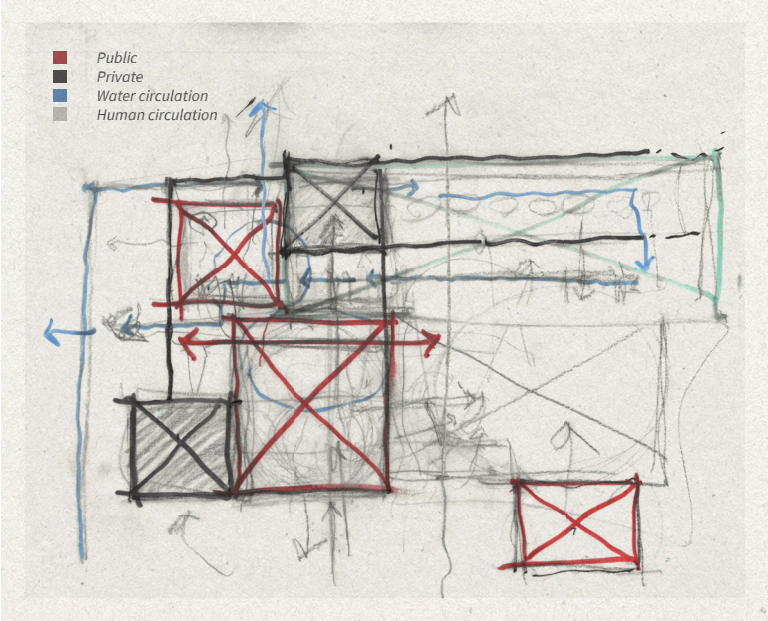


Visitors may cross the steel bridge and arrive to a covered and sunken seating area surrounded by sedges that help to remediate the water.

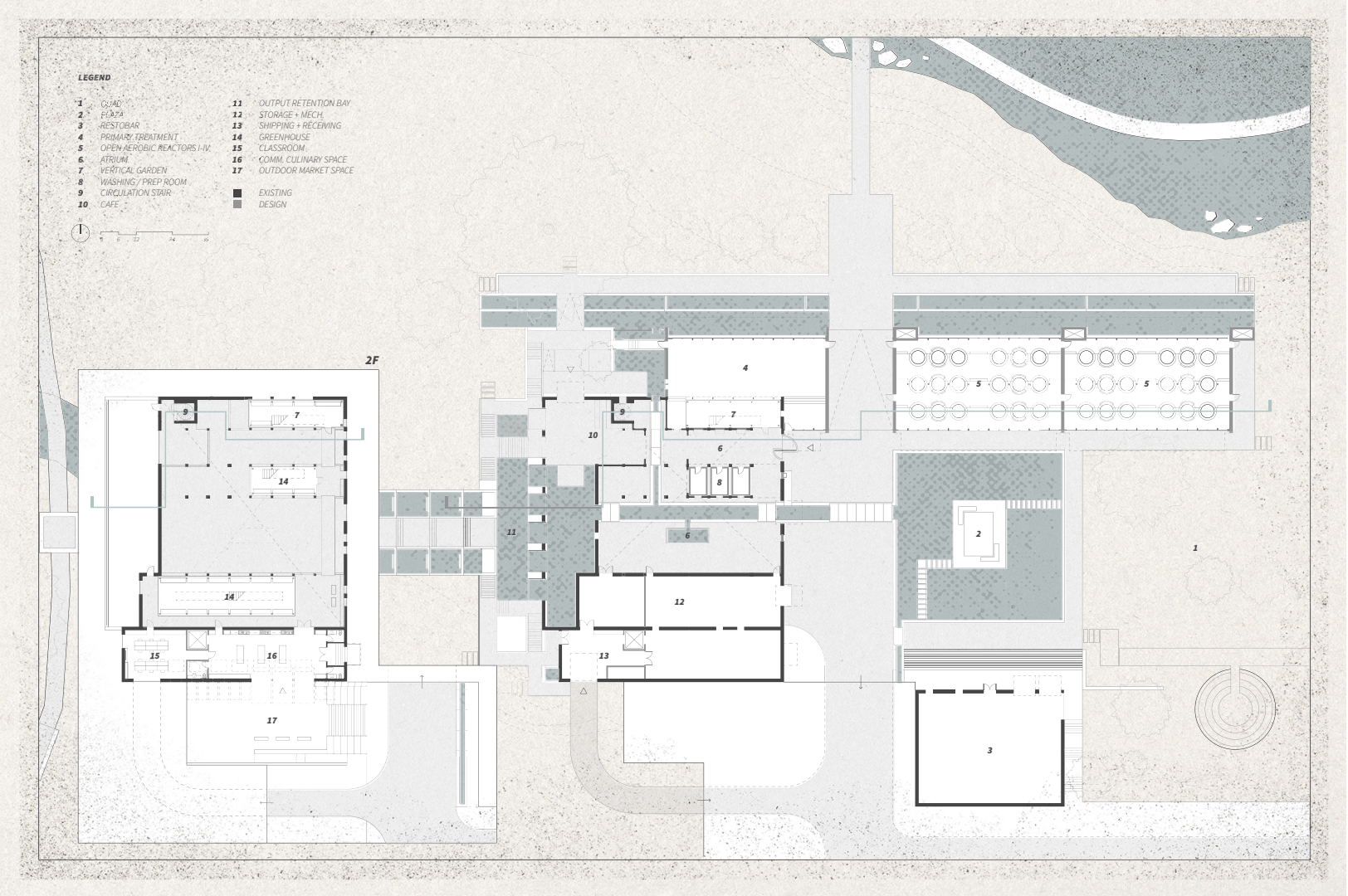
Powerhouse Building Complex

This building complex is where the core of the water treatment process lies. By integrating the buildings into the landscape, it expresses them as both a filter and a ruin. Adding new pieces to the Powerhouse building, like the solar aquatics extension, defines the complex as a filter for water. Through the removal of building elements, it creates various semi-outdoor conditions which attempts to dissolve boundaries between interior and exterior spaces. This intention lies in the concept that buildings *are a part of* landscape. Various spaces within the anatomy of the existing building is treated as a ruin, while others are more enclosed. These additive and subtractive operations reinterprets the previous function of the Powerhouse building and creates a new use.

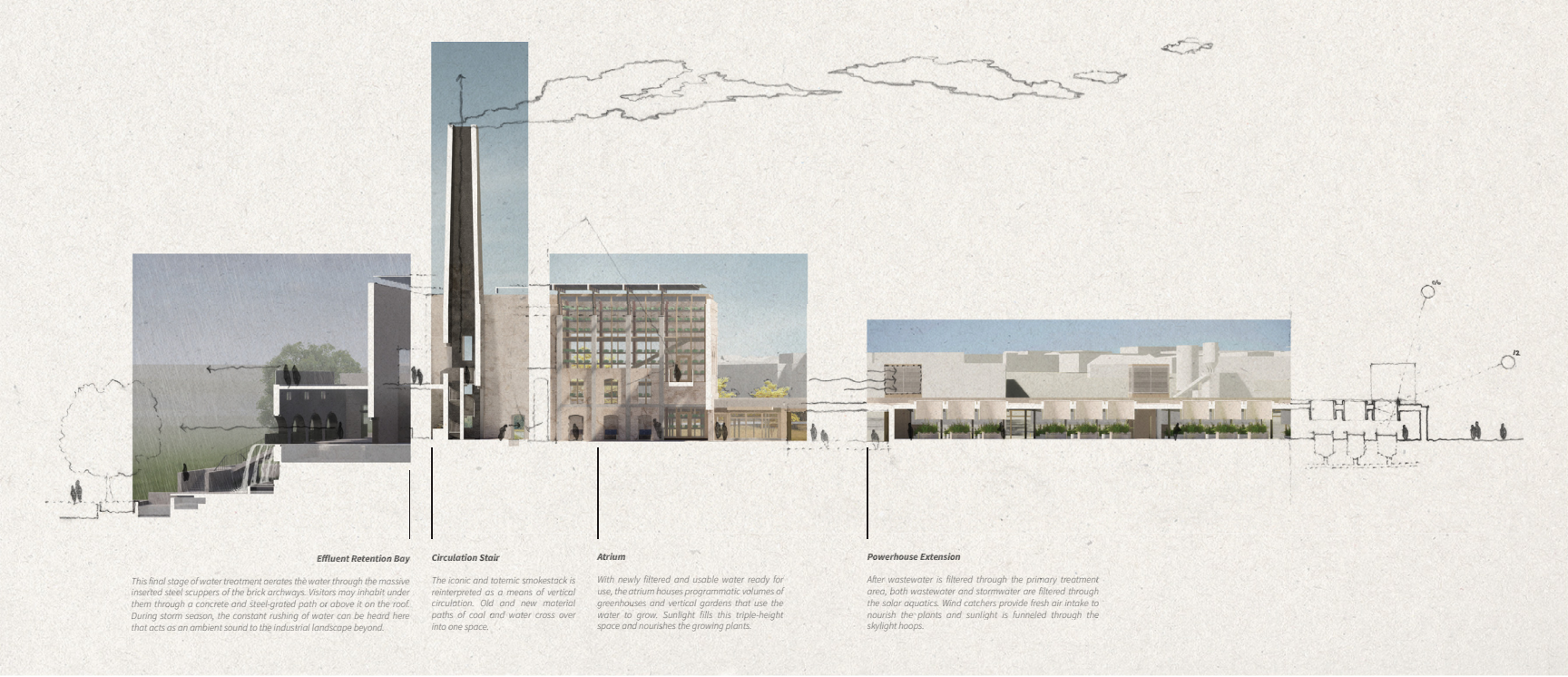
The stream of moments continues throughout the complex, creating spaces for collaboration, contemplation and reflection between visitors and workers, while exemplifying passive strategies for stormwater and wastewater treatment.



Initial Powerhouse Building Complex parti sketch. In collaboration with colleague Tyler Jansen



Building Plan of Powerhouse Building Complex. White spaces inside buildings represent treated spaces while the rest is left untreated



Section through Powerhouse and Extension

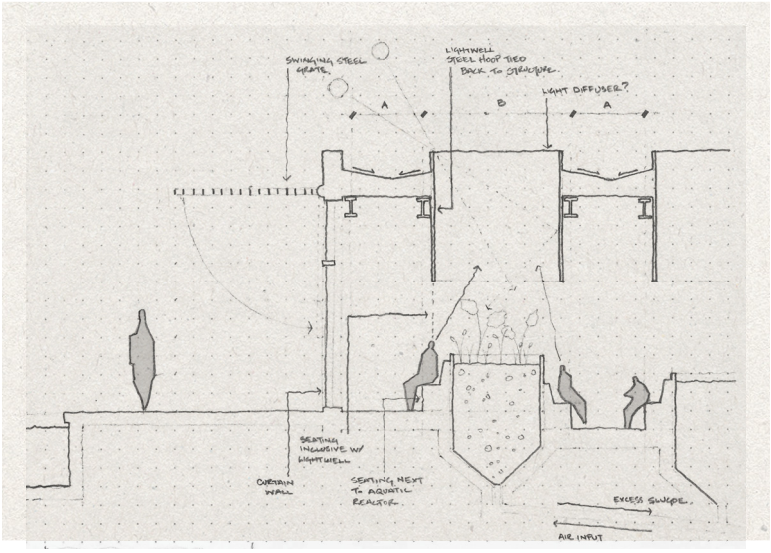
Moment 4 – Powerhouse Extension

Filtering

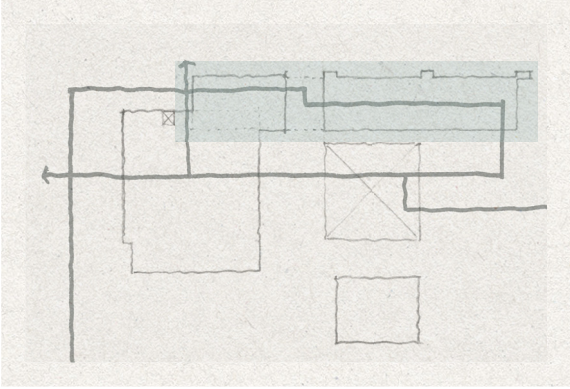
The core of the water treatment process begins in the Powerhouse Extension. Wastewater is treated in the primary treatment area and stormwater joins through the solar aquatics treatment area. Solar aquatics is a passive alternative to water treatment that uses the extraordinary capability of plants to organically break down toxins in wastewater and stormwater.

Inside the extension, large circular skylight hoops funnel light to the aquatic reactors below and offer a space to sit and gather by the plants.

Using this passive strategy to water treatment acts as a means of reconnecting our waste systems to natural systems by putting this process on display for the public. This also aims to rethink how we remediate waste landscapes not only as a one-off accomplishment but continues to remediate and acts as a highly necessary and valuable tool for the rest of the city.



Initial Powerhouse Extension section sketch



Key Plan sketch of Powerhouse Extension location within water treatment process

Solar Aquatics area of the Powerhouse Extension. Structural load-bearing walls and totemic wind catchers cladded in wood siding and metal vents act as stereotomic elements of the extension.

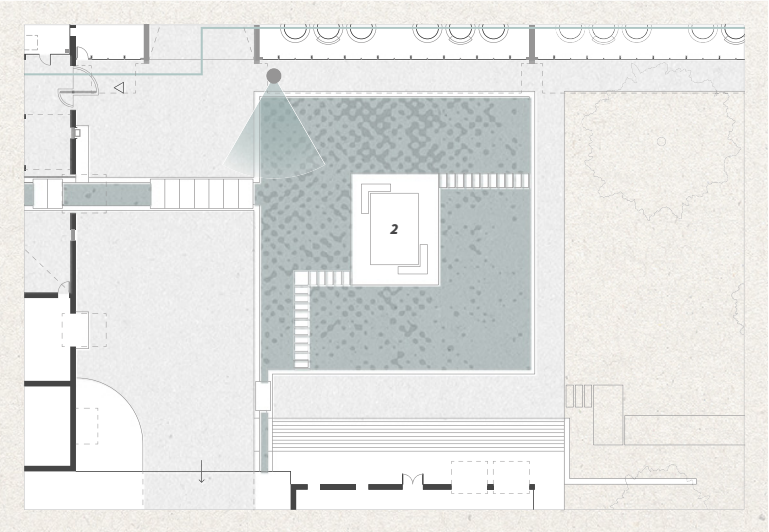
Moment 5 – Plaza

Collecting

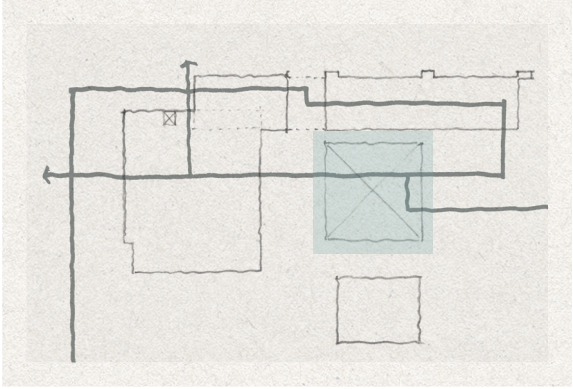
This space celebrates water as a public amenity by collecting both water and people.

Like the culvert, water was seen as a nuisance or a challenge to be overcome to fit our needs for urban growth. Now, water is positioned as a central aspect of the site, as an established civic gathering space.

The plaza takes newly treated water into this central space where the extension, powerhouse, ancillary building and open green space create a courtyard condition. This space suggests a pause in movement, a place to sit, rest and observe the water treatment process. Two parallel paths along the water treatment plant suggests one entrance for water and another for people into the Powerhouse building.



Plaza area from Building Plan. The use of curtain wall on the Powerhouse Extension expresses transparency of the solar aquatics treatment process and displays this to the Plaza.



Key Plan sketch of Plaza location within water treatment process

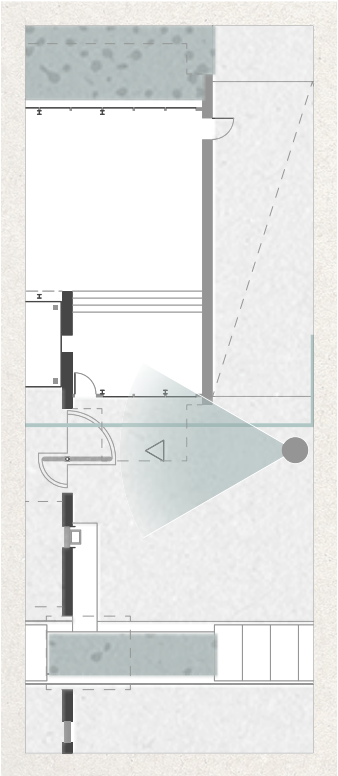
Path facing back into downtown Victoria. A series of terracing bioswales planted with sedges and catstails clean stormwater and collects it into the Plaza.

Moment 6 – Entrance

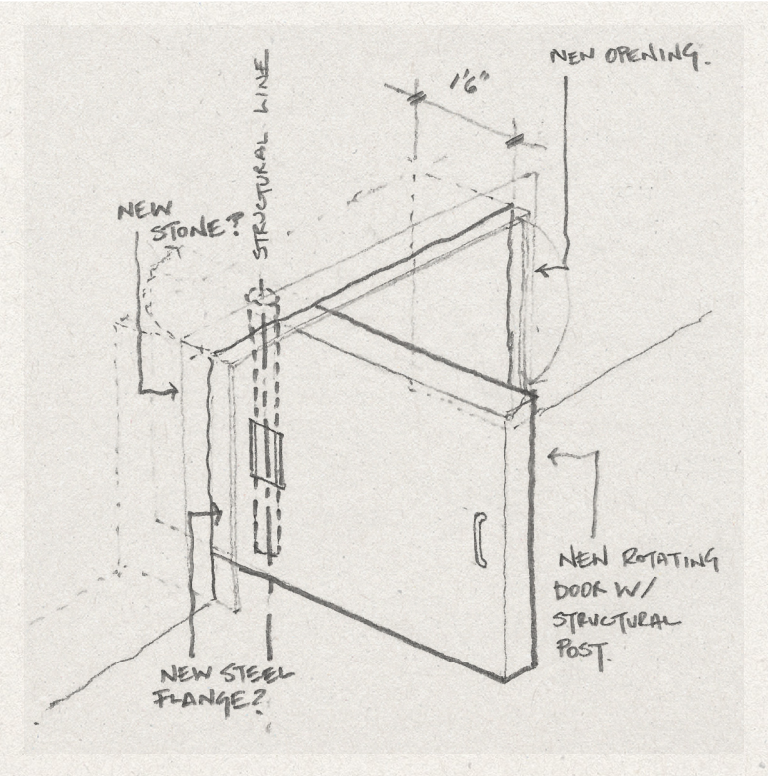
Flowing

Before entering the Powerhouse, visitors are confronted with the addition of a new door. An opening is cut into the facade under an existing load-bearing brick column. The door's pivot acts a new column, allowing for a wider opening to be created. This opening, combined with the change in material, creates a dramatic shift between old and new, putting them in dialogue. The wide doorway invites visitors in while disguising its structural needs.

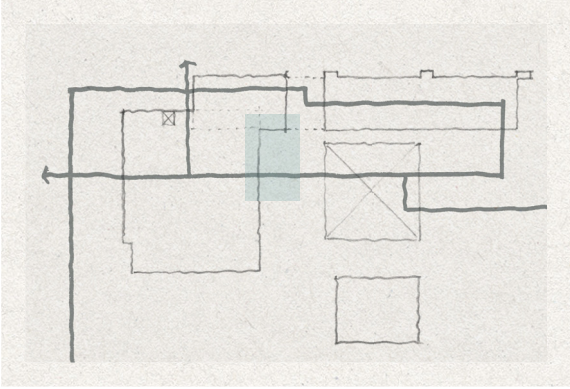
The ground material of concrete and landscaping pebbles suggests the direction of the door swing. Beyond the door is a thoroughfare that scribes straight through the entire building. Water flows beside the human entrance and invites visitors into the next space.



Entrance area from Building Plan



Initial Entrance door axonometric sketch



Key Plan sketch of Entrance location within water treatment process

Intersection of the existing Powerhouse and Extension. The bold structural pivot door marks the human entrance to the Powerhouse. A drinking fountain is inserted to replace an old door.

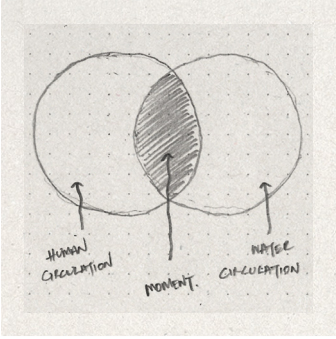
Moment 7 – Circulation Stair

Crossing

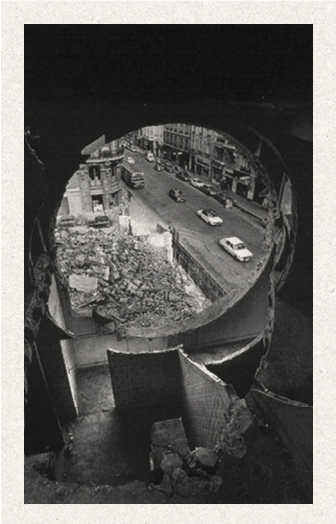
Past the walls of the Powerhouse, most spaces are treated as part of the landscape. Weathering and exposure to the elements, dirt, debris and vegetation is welcome here, dissolving the boundary between interior and exterior space.

Past the thoroughfare, a steel spiral staircase is inserted into the iconic and totemic smokestack to allow vertical circulation to the spaces above. The historical path of coal and smoke is now reinterpreted as a new path for people. Visitors can look directly up through the smokestack and see the texturing brick and soot revealed by the sunlight.

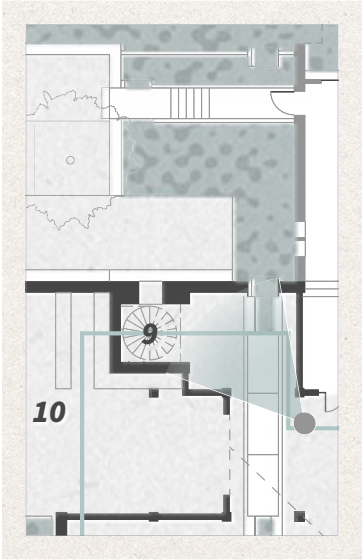
Similar to land artist Gordon Matta-Clark, intentional incisions are made to the existing building to reveal new circulation paths for water and people. Periodic views are made to the industrial downtown district. Visitors may notice that the water will eventually feed into the wetlands planted along the shoreline.



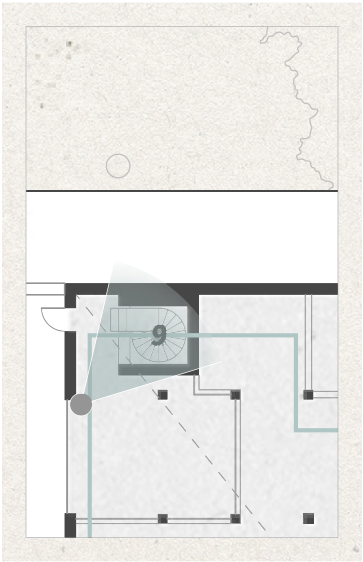
Intersection of human circulation and water circulation as moment



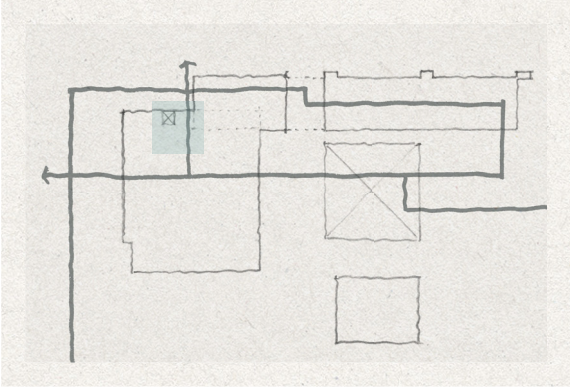
Gordon Matta-Clark, *Conical Intersect*, 1975 (Lee 1999, 182)



First floor staircase landing from Building Plan



Second floor staircase landing from Building Plan



Key Plan sketch of Circulation Stair location within water treatment process

Base of the spiral staircase. Human and water circulation here cross over and creates a space to observe peculiar imperfections in the brick. An incision lets water and a view out to the harbour.

Top of the spiral staircase. The steel stair extrudes into a path, dropping visitors off onto the second floor of the Powerhouse. A new I-beam above supports the new opening.

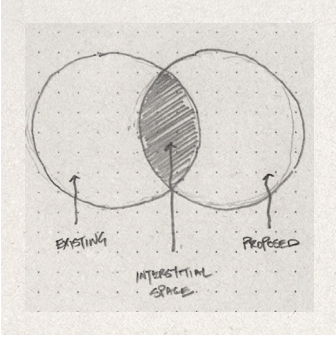
Moment 8 – Atrium

Growing

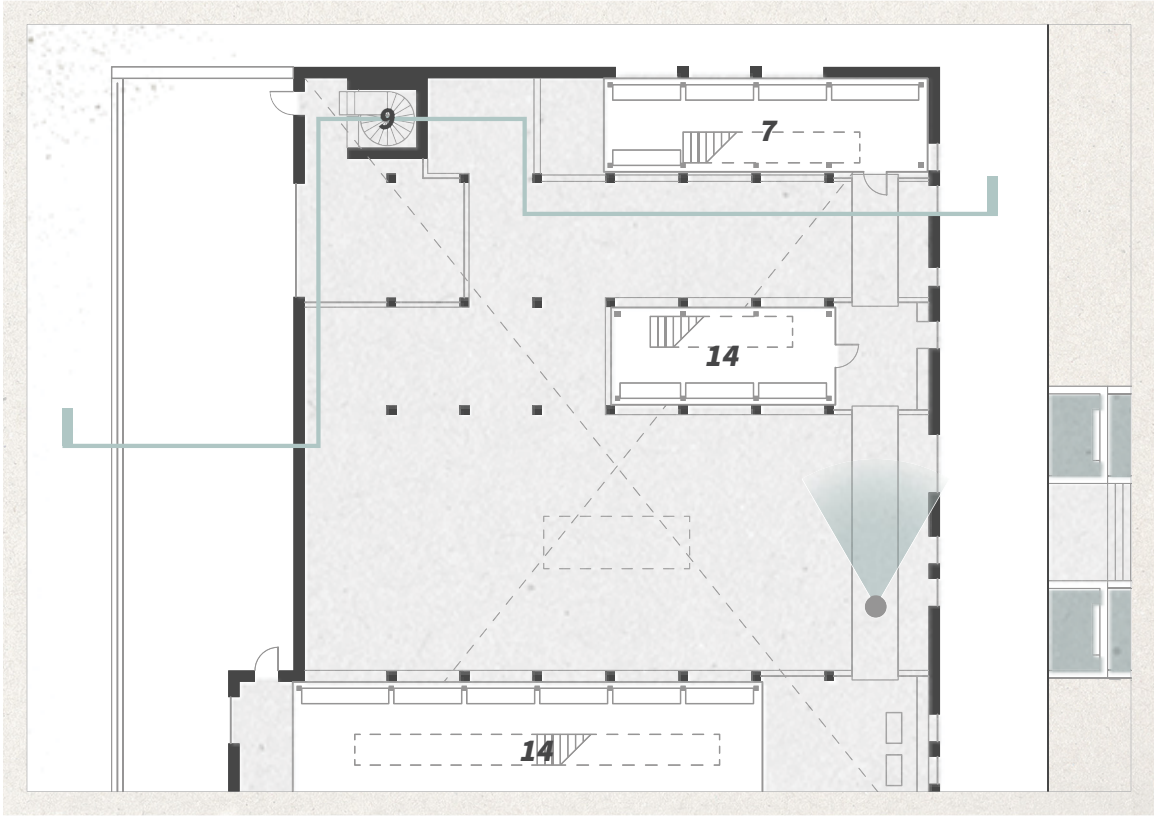
Previously, this triple-height atrium space was used as a workshop for processing coal with the help of a gantry crane.

Now, the landscape is invited into this space by removing most of the roof. The industrial building becomes a ruin in the landscape, blurring the boundary between interior and exterior, giving autonomy back to ecology for it to take over.

A new glass roof lightly touches the existing structure, allowing sunlight to fill and nourish this semi-outdoor space. Programmatic volumes of tasting pods, culinary spaces, greenhouses and vertical gardens are inserted as treated or enclosed spaces.



Intersection of existing and proposed as interstitial space



Second floor Atrium space in Building Plan

A steel path bridges interstitial spaces between the programmatic volumes and Powerhouse exterior wall. Remnants of the roof can be seen along the brick walls.

Moment 9 – Effluent Retention Bay

Re-releasing

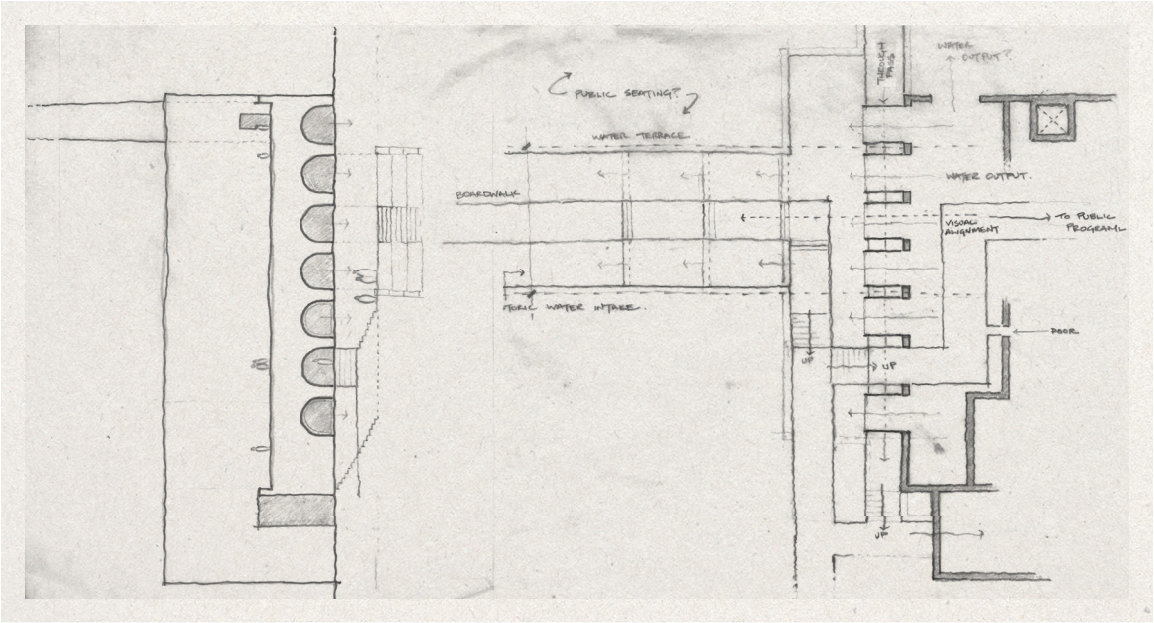
Agnes Denes, *Wheatfield* (Denes 1982). This land art project uses a highly sought after piece of land in New York City purely for agricultural purposes, making an ironic statement about land use and our perceptions of nature in urbanity.

This is the last stage of water treatment.

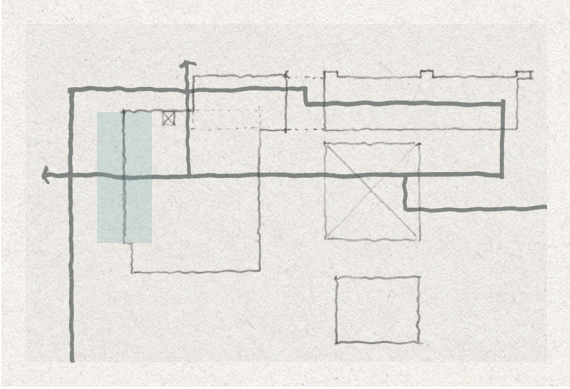
As mentioned earlier, the building historically pulled cold ocean water from the harbour as a way to cool its working components and brought in coal from the brick archways.

Like Agnes Denes' *Wheatfield,* irony is translated architecturally, where the anatomy of the Powerhouse is transformed to reveal new uses of the building.

Now, treated water flows out the archways through massive inserted steel scuppers, allowing for aeration. The sounds of splashing water can be experienced as a background to overlooking the working landscape and industrial surroundings. This creates a pivotal moment in redefining our view on remediating wastescapes by considering our cultural and ecological pasts, as well as the positive impact on the larger environmental and planetary scales.



Initial Effluent Retention Bay orthographic sketches



Key Plan sketch of Effluent Retention Bay location within water treatment process

Here, water and human circulation weave under and over each other. A reveal separates the old concrete floor of the Powerhouse and the new concrete wall with pocketed seating.

Chapter 6: Conclusion

Architecture is not, by any means, the key to solving systemic and contemporary issues. It requires the joint efforts of our allies; the planner, ecologist, environmental engineer, historian, anthropologist and many others. Architecture is, however, a generalist profession in which cultivates theoretical and practical knowledge across a wide range of subjects. I firmly believe that it has the capability to undertake complex and nebulous issues by bringing various efforts together.

In the same stream of thought, this thesis in not intended for solving environmental issues created by waste landscapes. It intends to create moments rich in possibilities of collaboration, contemplation and reflection across disciplines and aims to dissolve intentional and unintentional boundaries scribed by ourselves: between nature and culture, private and public, wastescape stigma and wastescape imagination.

Even after the completion of this project, it will be superseded by new structures, better working systems and shifted narratives; it will become a part of the site's many layers of natural and cultural stratum. The site will never be complete, because it will continue to be a working landscape, as long as this narrative is still alive.

It is through reading the ground–acknowledging our relationship to water from a historical perspective and engaging in the working systems of both built and natural infrastructures–that may help us architects address these pertinent issues. It is also through these moments we can connect, learn and perhaps better understand and care for our world.

Through my architectural education, one thing has become increasingly evident; architecture grants us designers the extraordinary ability to tell moving stories, design moments and careful details by reinterpreting our surroundings. We are professional storytellers of the built and natural environment. It begins here by designing spaces that capture cultural and ecological overlaps and reveal remnants of the past in order to imagine potential futures. It is this quote that resonated with me during the design process and encouraged me to further the intentions of the project:

> Together the ecologist and the philosopher, researching the *logos* of the *oikos*, our home place, a living technology of engagement, initiate new possibilities by bridging nature and culture, by creating wonder, curiosity...; this leads to further beginnings, questioning the taken-for-granted, which has often been our material realm, our infrastructure, the natural world, the background, the soil we live on, the water we drink, the water within us. (Klaver 2013, 103)

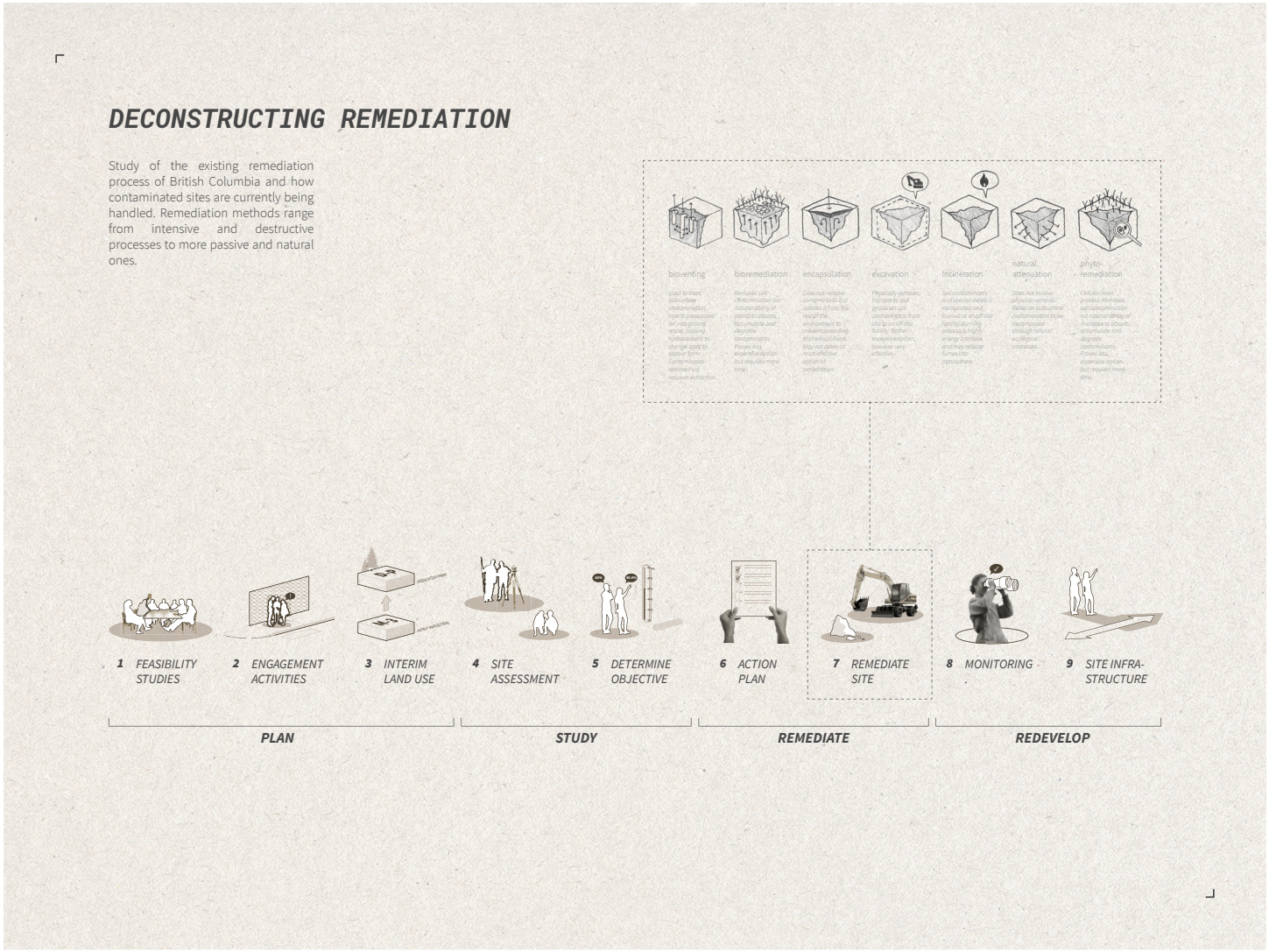
It is therefore part of our responsibility to reconcile our past, make our own significant understandings in order to imagine new narratives and ask new questions that better address our future actions and perceptions. Together, with the joint efforts of our allies, we can work side by side on how these pertinent issues can be addressed.

Appendix A: Remediation

Methods of Remediation

The removal of toxins comes in many different forms. These include air-sparging, bioremediation, bioventing, encapsulation, excavation, incineration, landfarming, natural attenuation, permeable reactive barrier, phytoremediation, pump and treat, soil washing, soil vapour extraction and thermal desorption (Hollander, Kirkwood, Gold 2013, 30-37).

British Columbia's remediation roadmap also consists of the four stages: Plan, Study, Remediate, Redevelop (Green Municipal Fund 2021).



Stages of remediation based on British Columbia’s brownfields roadmap (Green Municipal Fund 2021)

Rock Bay Remediation

Phase 1 – Coffer Dam

Before any removal of contaminants occurred, a coffer dam was put in place at the mouth of Rock Bay in order to contain any contaminants from flowing out into the rest of the harbour. 4 by 60 foot sheet piles were linked together to form a 50 by 100 by 330 foot coffer dam. The newly contained basin of Rock Bay was ready to be drained of its sea water.

Phase 2 – Drainage

The water was then drained into the harbour side of the coffer dam. A temporary water treatment system had to be implemented onsite in order to process any residual groundwater that leeched into the basin.

Phase 3 – Excavation

The removal of contaminated soils and special waste can start. Appendix A describes in detail the various contaminants removed. During this process, residual groundwater would seep into the basin, which required the water to be cleaned through the treatment system.

Phase 4 – Fill

The fully excavated site was then back filled with gravel and large boulders to match the original shoreline before the site's remediation. (Sanderson 2016, 7-12)

Contaminants and Fill

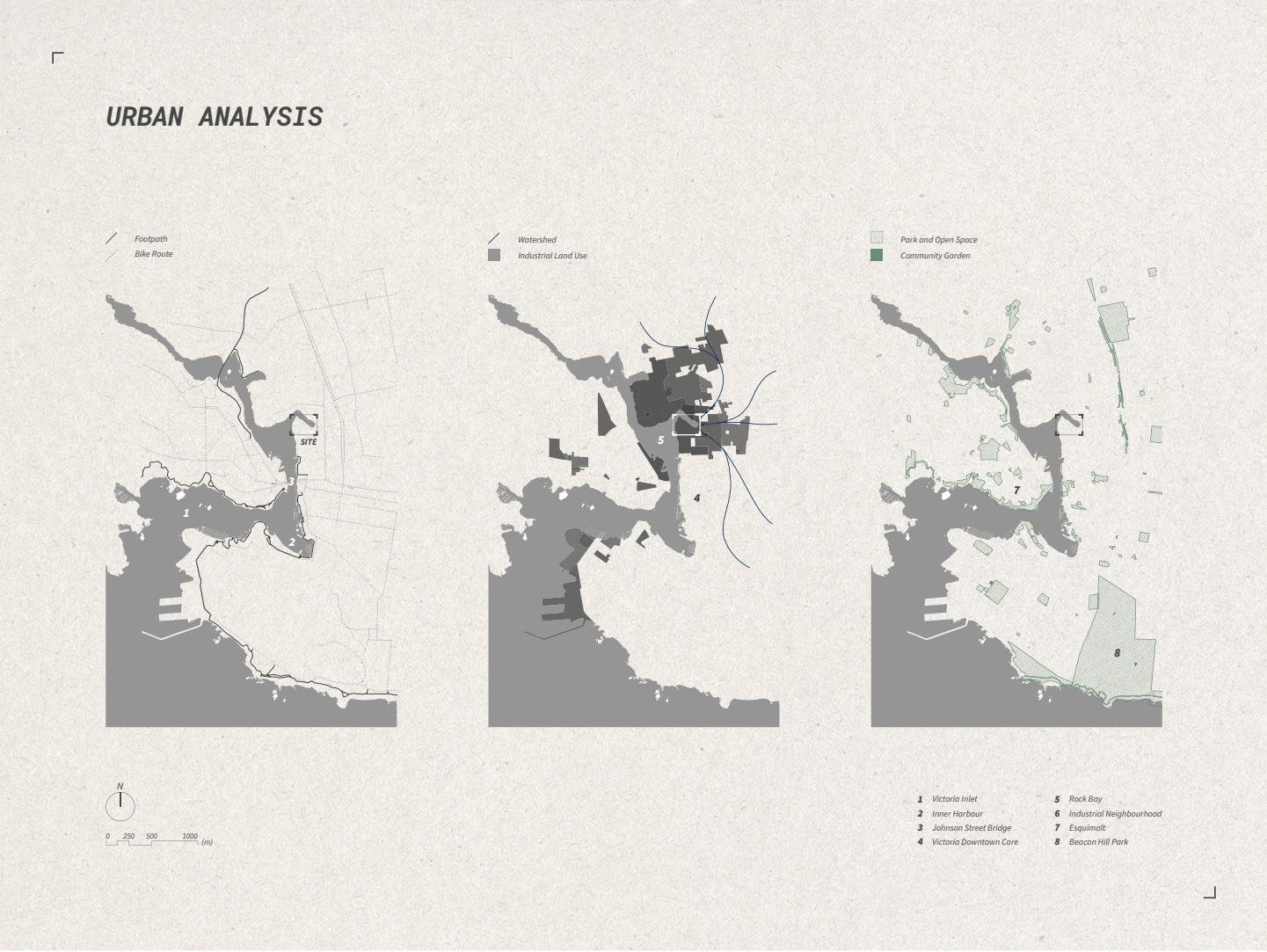
Total account of contaminants found and added materials on Rock Bay site (Sanderson 2016, 13):

- 7,000,000L of hydrocarbon and metal impacted groundwater
- 40,000 tons of special waste
- 60,000 tons of non-special waste soil and materials
- 70,000 tons of soil with various types and levels of contaminants
- 90,000 tons of contaminated sediments
- 80,000 tons of 3” rock backfill was added to the site along with birds-eye gravel and bentonite sand

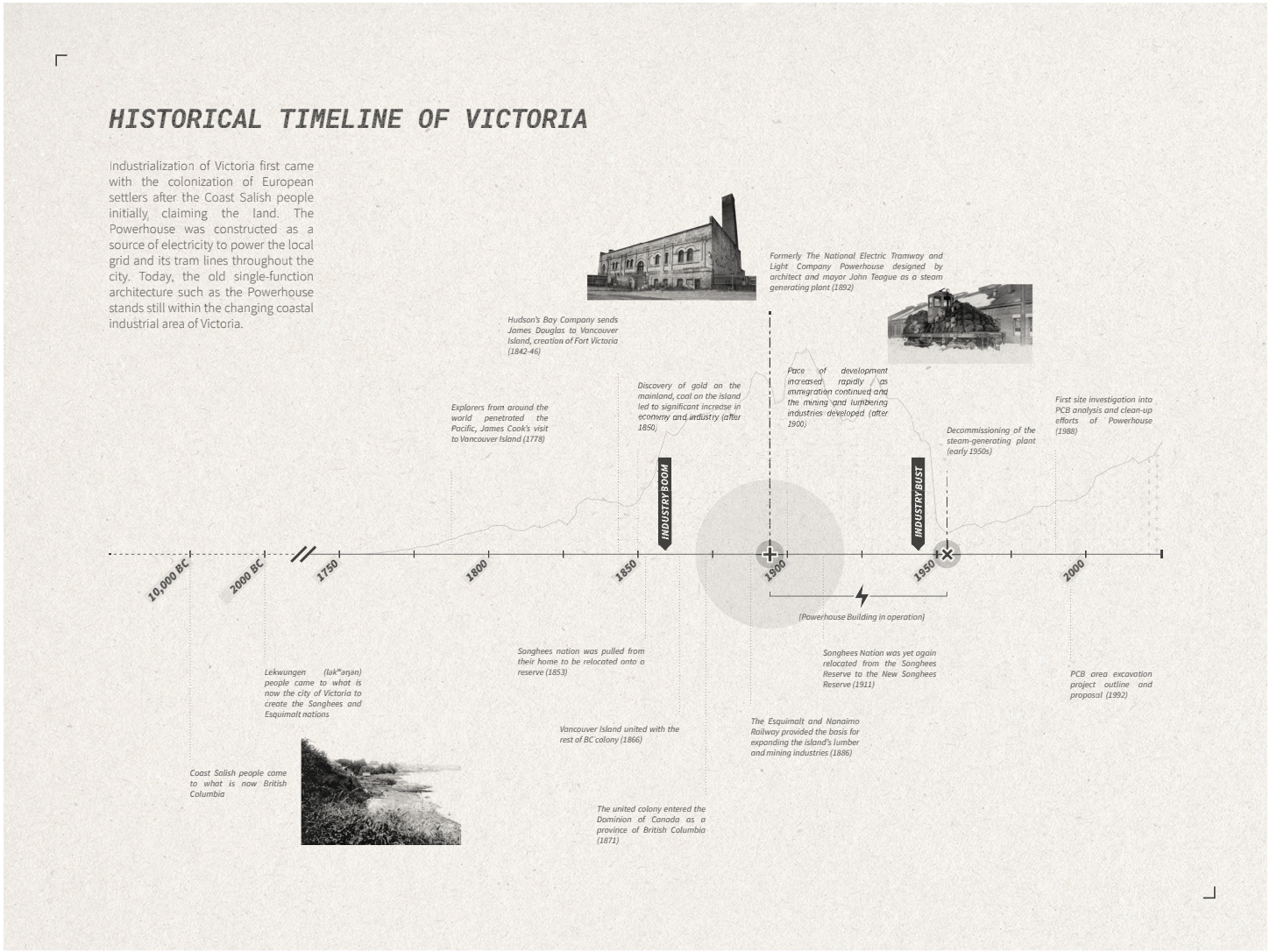
Appendix B: Urban Analysis of Victoria and Historical Analysis of the Powerhouse

Within the industrial downtown neighbourhood of Rock Bay, certain gaps can be identified through mapping. Pairing foot paths and bike paths show a lack of individual and short distance modes of travel. When industrial land use is combined with water shed flows, it so happens that Rock Bay is where the water collects, creating a pollution in the water. There is also little to no open green space and community gardens in the industrial area.

The Powerhouse was constructed as a source of electricity to power the local grid and its tram lines throughout the city. To support the city, highly toxic activity took place on this site for nearly one hundred years before the building was decommissioned after the economic bust. Remedial efforts started nearly 40 years after its decommissioning in the late 1980s.



Urban analysis of Victoria Harbour. Cultural and ecological layers are overlapped to indicate gaps and issues in the city (City of Victoria 2012; City of Victoria, ODP 2019a, c, d, 2021; GeoBC, PBC 2018)



Timeline of Industrial Victoria (Artibise 2010; Blanchet-Cohen and Louie 1999; Emberson 1924; McGillivray 2022; Victoria Harbour History n.d.). Photographs by LeFevre & Company n.d.; Muirhead 1916; RBCM, BCA 1998b

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