

**Activating Traces:  
Reconnecting Tidal Flows and Past Landscapes  
Through the Reuse of a Post-Industrial Textile Mill**

by

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## **ABSTRACT**

This thesis investigates an adaptive reuse of a former textile mill, a post-industrial ruin built in 1884 in the town of Windsor, Nova Scotia. Natural tidal waters once acted as a means of distribution for the town and mill, fostering economic opportunities. Today, a causeway chokes the adjacent river creating a disconnect between the town, the mill, and the natural landscape.

This thesis reengages the natural and cultural histories embedded with place, while reconnecting the natural and anthropic traces of an abandoned mill and its surrounding landscape with the community it once served. New architectural interventions are woven into the existing traces, highlighting and forming a dialogue between past, present and future. The mill, a symbol of a local renaissance, brings together ecological, horticultural and creative programs that foster engagement and learning, while revealing the past and present layers of building and landscape.

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## CHAPTER 1: INTRODUCTION

### Overview

Land structure as it is found, and what is formed through topographical construction, in addition to natural occurring flows, is the foundation of most cultural practices (Leatherbarrow 2000, 171)

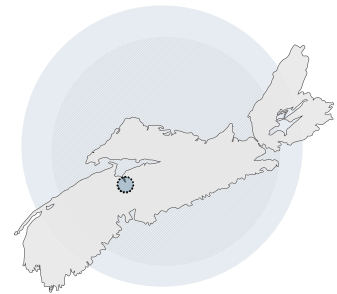
The Mi'kmaq First Nation Settlers were the first people to inhabit the area. They named it Pesaquid, meaning 'junction of waters', which describes its geographical position within the landscape.

Windsor is one of the oldest towns in Nova Scotia. It is rooted at the confluence of the Avon and St. Croix Rivers, which flow into the Southern Bight of the Minas Basin, and from there to the Bay of Fundy. At this juncture, between the North Mountain Ridge and the South Mountain Batholith, sits the fertile plain in which Windsor exists. The place is defined by its landscape. It has a temperate climate and is classified as an estuary due to the semi-enclosed nature of the Minas Basin and extreme tidal flux. The salt marshes that dominate the shoreline of the basin, and Windsor's coastal landscape are suitable to the growth of a wide variety of plant life. Extensive red mudflats in the area are full of mudshrimp populations, attracting large numbers of shorebirds each summer.

The waterway connectivity has formed the economic base for the region. Its tidal waters reach upwards of 8 meters and have brought with it economic benefits, and reasons to begin settlement. The frequency of flows have shaped both the coastal landscape and settlement patterns over time. In the past, at times of high tide, the town would exist as 3 islands, elevated above the high tide mark. This fertile and malleable land was transformed throughout cultural history, naturally and anthrop-



Nova Scotia highlighted within Canada. (Allemang 2015)



Windsor highlighted within Nova Scotia.

ically. It began with the Mi'kmaq inhabitants, as they used it for hunting and fishing with adaptable landscape structures such as fishing weirs. The French Acadian settlers cultivated the land using diking techniques and eventually the English military strong hold took control by constructing Fort Edward atop the highest elevation point. Windsor then evolved to a mercantile port, followed by a railroad hub and now as its current form as a service center acting as a gateway to the Annapolis Valley. The working waterfront that once defined the town no longer exists due in part to the decline of industry in combination with the Avon River causeway.



Low tide at Windsor Waterfront, Avon River, Windsor, NS. 1925. (Nova Scotia Archives 2018).

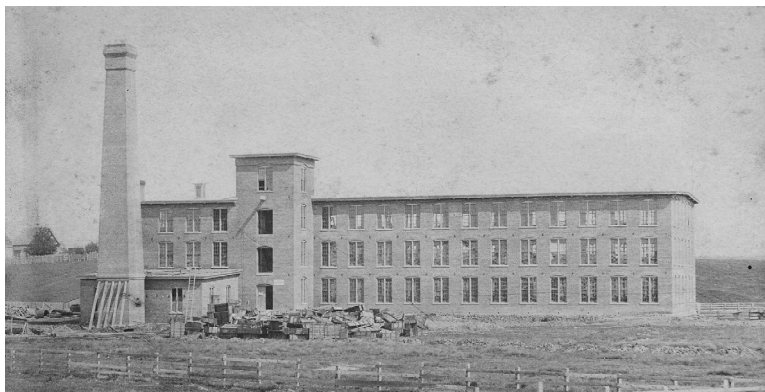
In a natural world, mudflats and saltmarshes represent systems that are delicately balanced between hydrodynamic forces and ecological responses. However, this balance has been altered as a result of anthropogenic activity. The causeway, constructed in 1970 to facilitate a highway that bypasses the town, chokes the flow of river water, pushing the estuarine condition away from the towns core, replacing it with an artificial lake. The divide between the natural and the artificial became evidently clear with the causeway, and the estuary became displaced

from the town. This unbalance has caused near extinction for many species. In addition, many of the town residents have developed opposing opinions as various groups use the water for different purposes.

As a former industrial town, traces of that period exist within the urban fabric and landscape. The former Nova Scotia Textile Mill has been standing vacant for over 135 years just outside the town core. The mill as a ruin, the town, and the landscape have all experienced transformations; periods of growth and decline. As the mill has lived through the alterations to the landscape, it has felt the natural fluctuations of the breathing river.



Aerial view of causeway showing divide between artificial lake and growing salt marsh (Devet 2017).



Nova Scotia Textile Mill 1883, one year before construction was finished (West Hants Historical Society 2018)

This thesis first analyzes the historical traces within the building and landscape as a means of identifying the driving forces behind the current state of disconnect between the town and the natural landscape. In studying the historical traces this thesis attempts to understand how they have shaped the landscape, the town, and the mill.

Weaving is used metaphorically as a means of bringing existing traces to the forefront as a way of translating and understanding. It is also used as a way of interpreting the existing structural and historic systems together and organizing them into layers.



As weaving is treated as a structural, systematic organizing of layers and pressures, the same understanding is applied when designing new structures to be woven into the old.

Currently in a state of derelict, the collective memory of how the mill and landscape have shaped an authentic sense of place in the small town of Windsor will be retained through preserving the historical layers and establishing a dialogue between the old and the new, both within the building and the landscape.

### **Thesis Question**

With the reintroduction of tidal water in the Avon River and the adaptive reuse of a former post-industrial textile mill, how can architecture play a role in reconnecting the Town of Windsor to its cultural history and natural landscape?

## **CHAPTER 2: NATURAL AND ANTHROPIC TRACES**

### **Natural Systems**

The fluidity of the landscape reflects the dynamic relationships of water, salt and sweet. The Bay of Fundy is a narrow funnel off the Gulf of Maine that lies between the provinces of Nova Scotia and New Brunswick. It is underlain by the Fundain Lowlands formation of Triassic sedimentary rocks, that form the drainage system originating in the Minas Basin (Parker 2007). The Inner Bay of Fundy is divided into Chignecto Bay to the North and the Minas Basin to the south, both of which are ecologically similar, with extreme high tidal ranges that expose large expanses of mud flats during low tide.

The Minas Channel is approximately 50km long and links the Minas Basin with the Bay of Fundy. The Central Minas Basin extends southward and eastward into two distinct subregions, the Southern Bight and Cobequid Bay. The Southern Bight is formed by the convergence of several rivers: the Kennetcook, the St. Croix and the Avon at the southern end, where the mill, the selected site of study is located.

This dynamic body of water is a powerful force that is in a constant state of flux due to its extreme tidal ranges. The world's highest recorded tides have been measured in the Minas Basin at 16.27m, with an average tide measuring 12m (Parker 2007). The repeating tides have shaped the surrounding landscape and coastal towns as 115 billion tonnes of sea water fills and empties the bay twice each day. Windsor and the former Textile Mill, the object of this investigation, are located at the confluence of the Avon and St. Croix Rivers, in which the tidal range reaches just above 8 meters.



Map showing location of Windsor within the fertile plain between the North Mountain and South Mountain Batholith of the peninsula of Nova Scotia.

This range was enough to generate a transportation network for the town, using the tidal waters to their advantage.

A tide is the periodic rise and fall of the sea, which is caused by gravitational forces from the moon and sun on the Earth. A lunar tide is caused when the gravitational force from the moon on the Earth pulls water toward itself causing a bulge on the surface of the ocean on the side of the moon. A solar tide is when the sun creates the same phenomena, although the effect is less powerful than the moon.

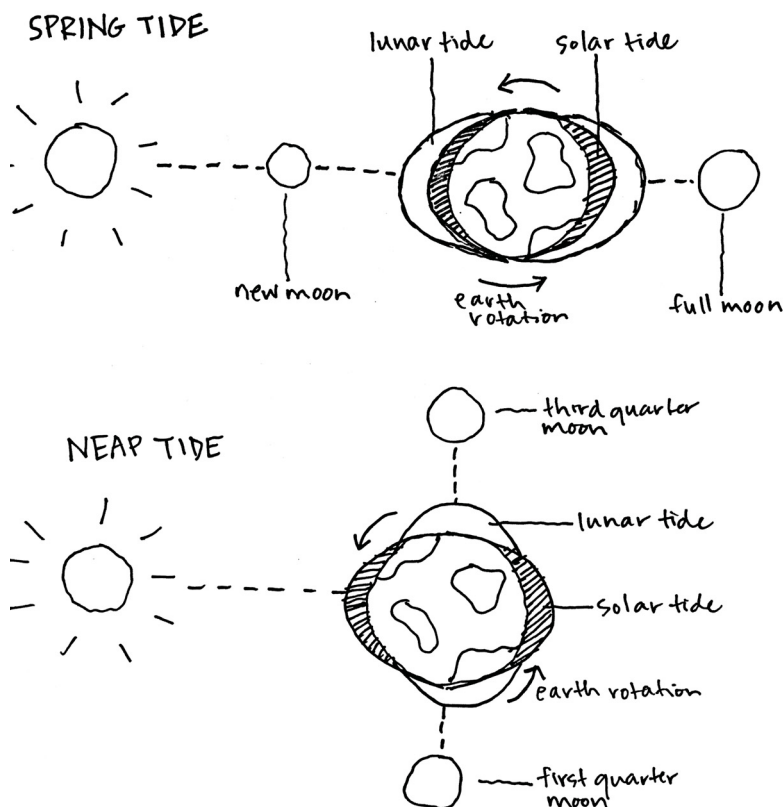


Diagram showing the difference between spring and neap tides.

## Relational Human Ecologies

To better understand the development of landscape and human history in the Minas Basin and Avon River area, it is essential to comprehend what was there when the first settlers

arrived, and what they found valuable of the place.

Deep water navigation was made possible by high tidal ranges, far inland in small rivers that would be trickling streams at times of low tide (Loomer 1996, 18). The area has a temperate climate, suitable for growth of a wide variety of plant life. This plant life, in turn, sustains the food cycle of various animals, birds and fish. The land is moist from sea breeze and susceptible to frequent fog, but also has more annual sunlight than other parts of Nova Scotia (Loomer 1996, 19). The soil is arable, enriched by minerals from spring freshet, eroding granite and decaying vegetation of the surrounding hills. When settlers first arrived to the area before 1600, the broad meadows had tall grasses, lowlands fertile, abundant with berry-producing shrubs and higher ground well timbered. The timber was used abundantly for building, including many interior elements for construction of the former mill.



Wooden columns seen on ground floor of former Nova Scotia Textile Mill.



Map of Windsor from 1817-1818 (Nova Scotia Archives 2018).

## Cultural Relationships to the Natural Landscape

The semi-nomadic Mi'kmaq people were the first inhabitants of the Hants County area, as they arrived to the land several thousand years ago (Shand 1979, 10). They hunted, fished and gathered to make their living here. In proximity to waterways, their main source of travel was by canoes made of birch bark, travelling long distances for trade and survival, with the movement of the tides. The natural environment provided them all they needed and they used their knowledge of the seasons, weather, animals, plants and hunting for survival.

They constructed their encampments alongside the rivers at the head of the tide where the fishing was easy (Shand 1979, 29). The Mi'kmaq worked with the natural landscape to accomplish what they needed in order to survive. They did not harm nature unless they needed food for survival or material for protection.

Around 1680, the Acadians arrived to the area and manipulated the landscape to facilitate nutritional value in the tidal flats. They constructed diking systems—large mounds of earth with strategic passageways, allowed the river water to flow onto the fields under their control. As farmers, they valued the fertile marshland of the area as they used it to grow their crops and grain. The Mi'kmaq and Acadian's worked together to transform the land and through the dikes, working in a harmonious relationship, with the natural ebbs and flows.

The Acadians were the only pioneer settlers to farm so extensively below sea level (Grand Pré Society 2017). Using spades, pitchforks and axes, they hollowed out tree trunks to create the aboiteaux transforming the wetlands into productive landscapes. More importantly, their knowledge of the natural drain-



Mi'kmaq spear fishing. (Nova Scotia Archives 2018).



Wooden posts of a fishing weir located in Bramber, NS. Traditional Mi'kmaq fish catching structure.

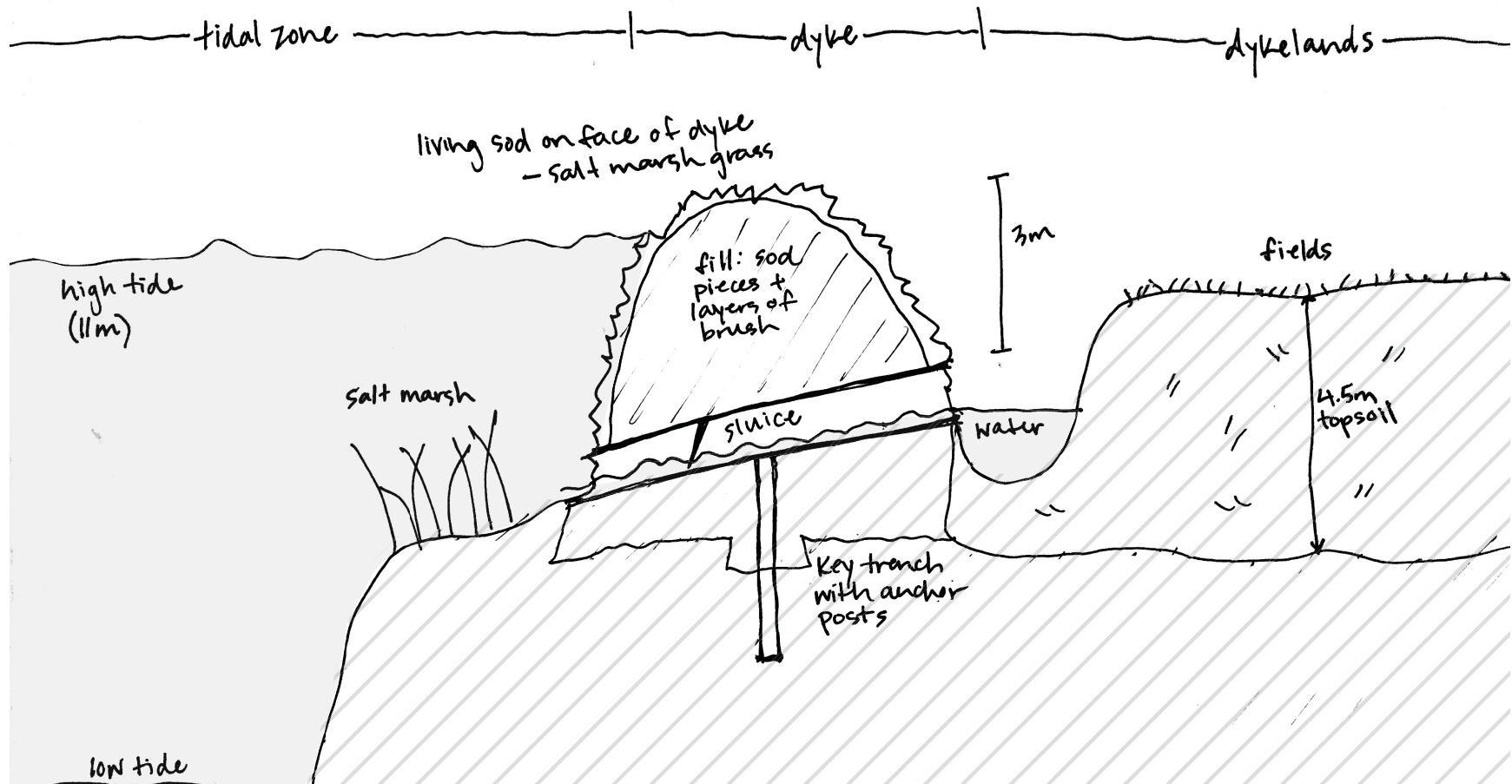


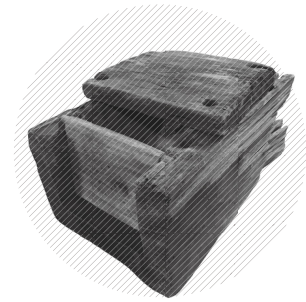
Diagram showing cross-section of a dyking system including tidal range, salt marsh, aboiteau system and fields. (Parks Canada 1991).

age systems within the landscape contributed to their dike construction to channel the flow in only one direction, out to sea. Without the diking system, the town of Windsor would exist as 3 islands at high tide.



Collaborative effort of Acadians constructing the diking system. Many of these dikes still exist in Windsor today. Artist: Lewis Parker. (Nova Scotia Archives 2018).

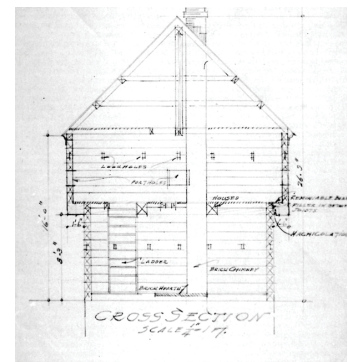
The English settlers first arrived in Hants County, the project site, in 1750, the same year they constructed Fort Edward. The blockhouse remains standing today in Windsor as a National Historic Site of Canada, for the role it played during the struggle for predominance in North America from 1750 to the War of 1812 (Parks Canada, 1991). It is one of the oldest wooden fortifications still standing in North America. Fort Edward was built by the English on most prominent land in the area atop a hill south of the junction of the Avon and St. Croix Rivers. From this point in elevation, they could survey ships approaching the area by water and sustain control over the land.



A wooden sluice gate made of square timber with valve from and old aboteau. Photo taken at Windsor Town Council meeting. October 10, 2018.

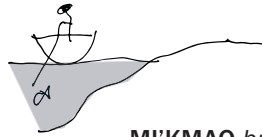


Blockhouse at Fort Edward in Windsor, still remains standing today (Parks Canada 1991).



Cross section of block house at Fort Edward (Parks Canada 1991).

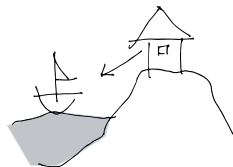




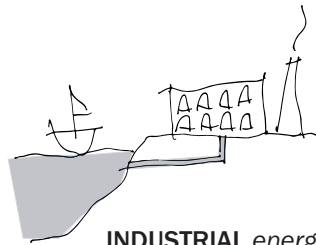
**MI'KMAQ** *hunt*



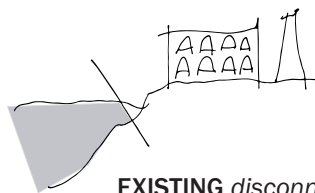
**ACADIANS** *cultivate*



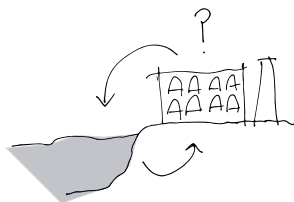
**BRITISH** *battle*



**INDUSTRIAL** *energy*



**EXISTING** *disconnect*



**FUTURE** *rebirth*

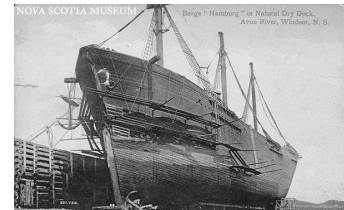
Diagrams depicting Windsor's relationship with water through history.

The fertile dykelands were extremely important to the British plans for settlement (Grand Pré Society 2017). The Township of Windsor became established in 1764 by settlers from New England colonies who began to settle the lands left vacant after the Acadian Expulsion, a pivotal moment in Windsor's history as land lots were then drawn for and the town quickly began to grow into a mercantile port and industrial hub, leading to the construction of the textile mill.

### Landscape and Industrialization

Windsor was officially incorporated as a town in 1878. Its harbour facilitated the growing community as a hub for shipping and shipbuilding during the age of sail. Windsor was the port of registry for the large-scale wooden shipbuilding industry within the Minas Basin and it was the homeport of one of the largest fleets of sailing ships in Canada (Loomer 20). The shipping was made possible by the facilitating tides and deep waterways that served the town of Windsor. There were ship building ports littered along the town's coast. Traces of a past shipping dock are present near the site of study that facilitated products to and from the mill. The wooden posts remain anchored in the landscape as memories from past industry.

In addition to an active mercantile port, Windsor was also a stopping place along the Dominion Atlantic Railway. Many goods from the former textile mill were exported via rail or ship. The railway also allowed the city of Halifax access to Bay of Fundy shipping routes, bringing more activity to the town. Windsor's central location within Nova Scotia and on the railway fostered growth of many factories in Windsor such as the Nova Scotia Textile Mill (Shand 16).



Barge "Hamburg" in Natural Dry Dock, Avon River, Windsor Waterfront, NS 1920 (Nova Scotia Archives 2018).

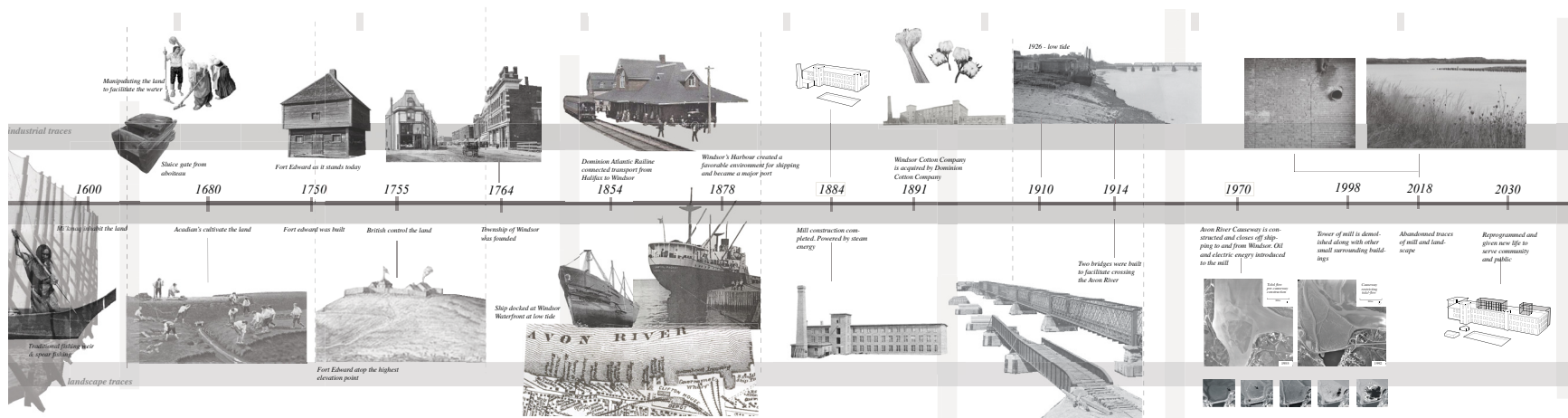


Dominion Atlantic Railway Station in Windsor, NS 1920 (Nova Scotia Archives 2018).

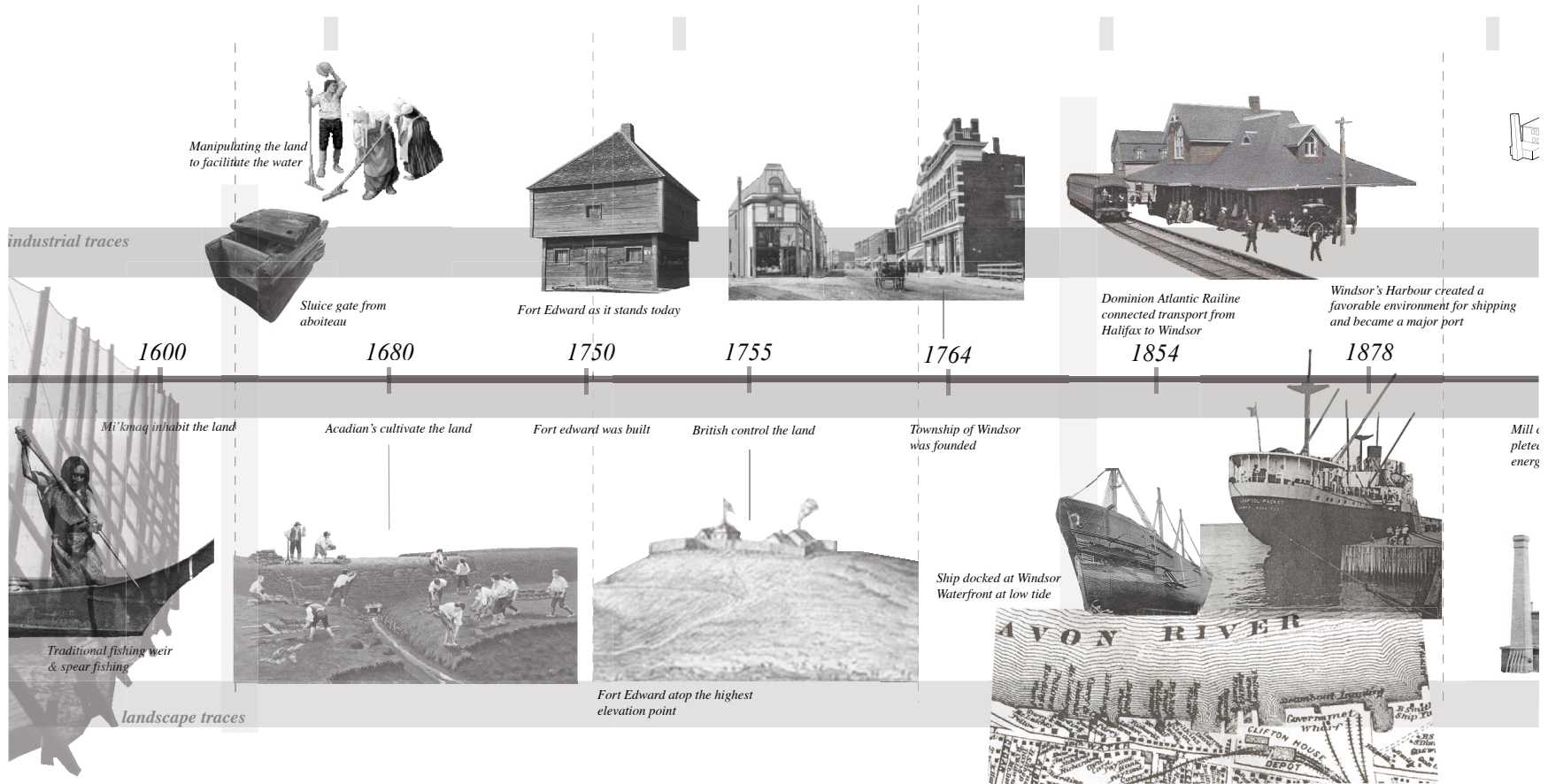
During the 1880's, merchants and entrepreneurs of the area saw an opportunity to capitalize on economic growth. The textile industry had started to migrate from New England down to the southeast. Construction began in 1881 and the mill intended to provide an opportunity to improve shipping efficiency and create what was then thought as good secondary jobs for the area. The mill served the town for many years and was an anchor for economical stability.



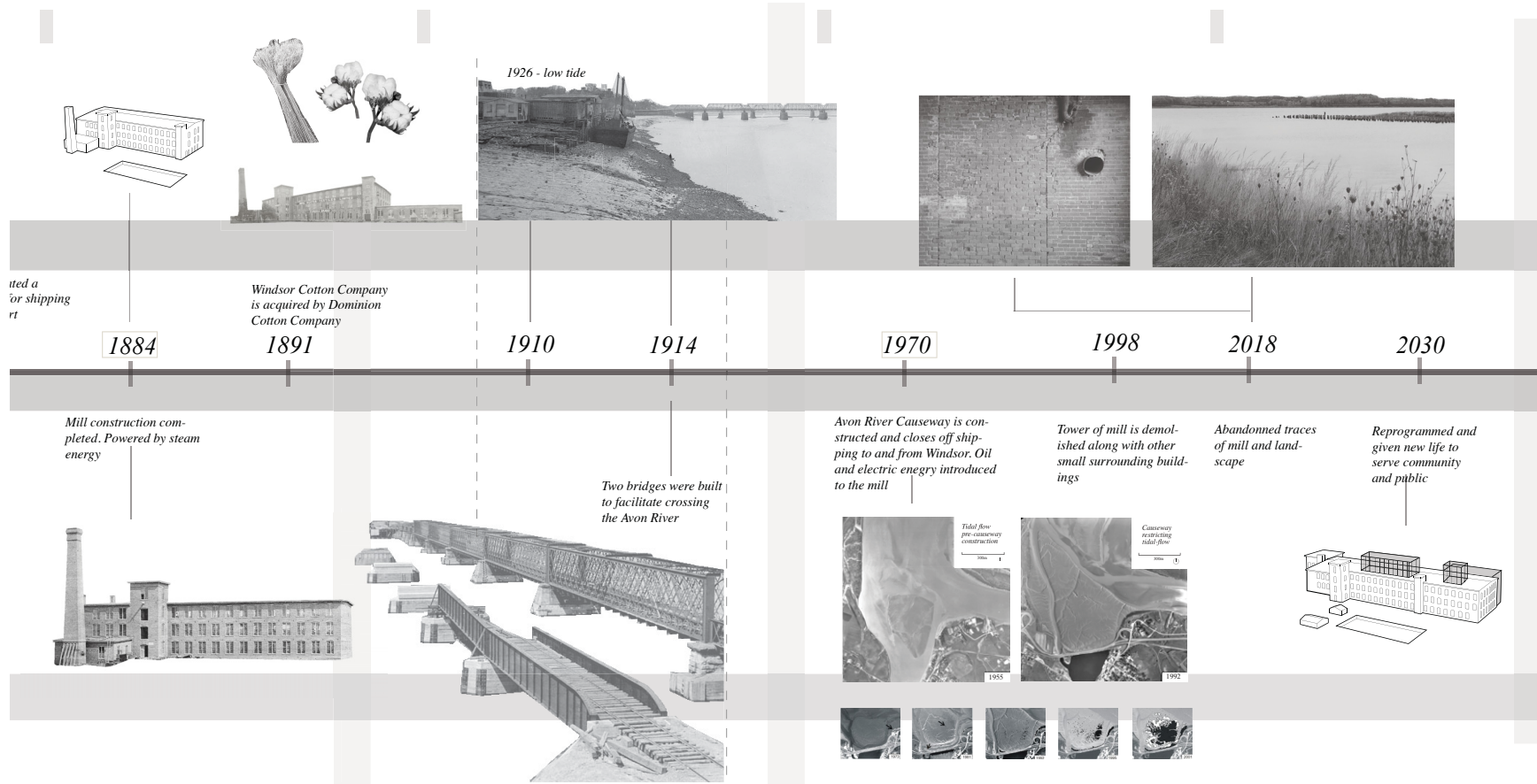
Map of the Town of Windsor in 1871. Map shows two bridges and rail line that ran through downtown, as well as the waterfront wharfs. Just prior to construction of the Nova Scotia Textile Mill (Nova Scotia Archives 2018).



Timeline showing landscape and industrial structures that have left traces within the selected site of study.



Landscape traces timeline - Part 1

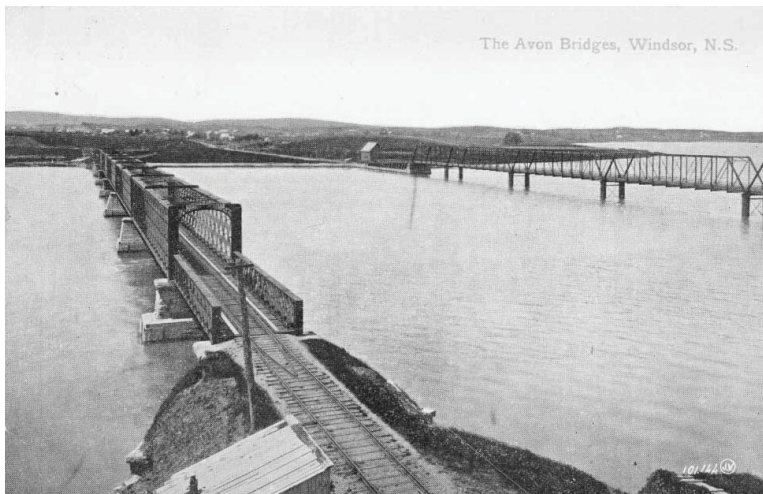


Landscape traces timeline - Part 2

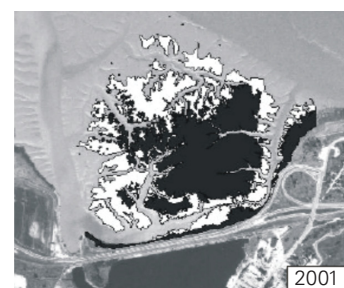
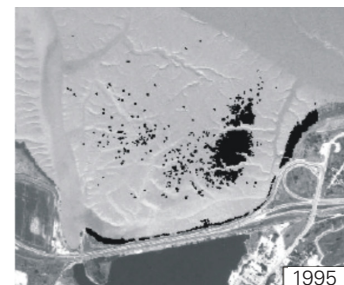
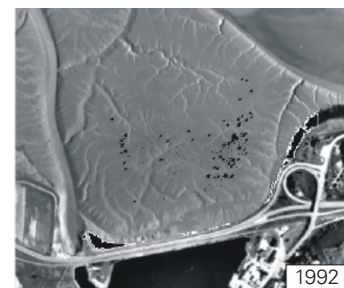
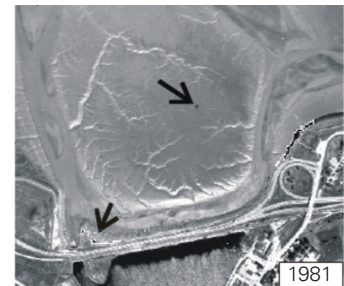
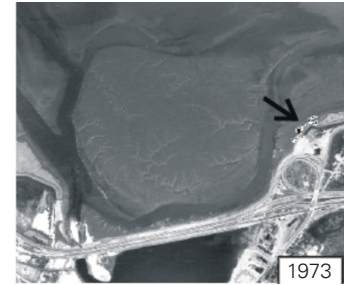
## CHAPTER 3: PRESENT DAY WINDSOR

### Avon River Causeway

During the year 1970, the Avon River became completely obstructed by a rock and earth filled causeway next to the town of Windsor at its junction with the St. Croix River, adjacent to the former Nova Scotia Textile Mill. This causeway was constructed to develop a controlled access expressway known today as Highway 101. The causeway exists mere kilometers from the site and the main highway artery that it facilitates bisects the town in two. It replaced an existing road bridge upriver from the town and also resulted in the rerouting of the Dominion Atlantic Railway's main line which had run through Windsor's downtown and crossed the river on a different bridge upstream. The causeway also closed Windsor off from shipping and affected navigation in the Avon River downstream due to excessive accumulation of sedimentation. Both bridges that facilitated transportation across the Avon River prior to the construction of the causeway no longer remain today.



The old Avon Bridges spanning across the Avon River from Windsor to Falmouth (Nova Scotia Archives 2018)



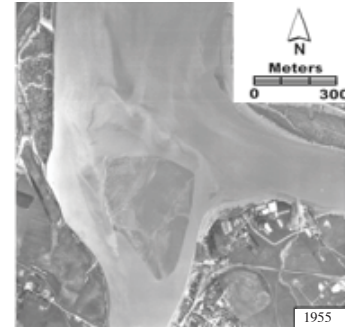
Cordgrass growth on salt marsh over time after causeway installation (Van Proosdij 2007).

The causeway controls the Avon River's discharge and the incoming tidal waters of the Minas Basin through a series of flood control gates. These gates are intended to regulate the river's flow to prevent flooding of agricultural lands upriver. This has also resulted in the section upriver of the causeway along the Windsor waterfront to develop as a 'man-made' freshwater lake known as Lake Pesaquid.

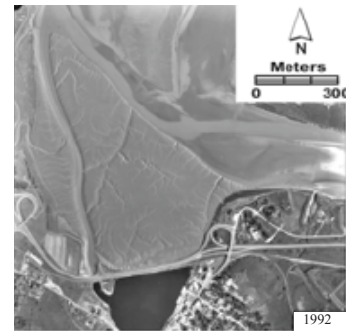
The construction of the causeway has dramatically affected the Avon River downstream from Windsor, with large parts of the once-navigable river now being obstructed by large mud flats and vegetation, due to the lack of tidal exchange and freshwater discharge.

The protection of marshlands from the tides in the Avon River and surrounding area is normally accomplished through the construction of dykes. Aboiteaux, which are tidal gate structures within the dyke system, are incorporated at the location of major stream crossings where salt water is prevented from entering and fresh water runoff is discharged. The Avon River causeway acted as a replacement for those dyking systems and was constructed in phases, beginning in 1968 with the complete closure and last phase completed in 1970. Soft sediments in the area caused numerous challenges during construction of the tidal gate channel (Van Proosdij 2007). Once the causeway was complete, freshwater continued to seep through the rockfill for approximately one year until sediment built up and prevented the leakage.

Salt marshes and mudflats represent systems that are carefully balanced between ecological responses and hydrodynamic forces. However, this balance can be thrown off as a result of engineered structures for example, causeways, culverts or



Tidal flow before causeway construction, 1955 (Van Proosdij 2007)



Causeway restricting tidal flow, 1992 (Van Proosdij 2007)



View of salt marsh looking north from coast during high tide.



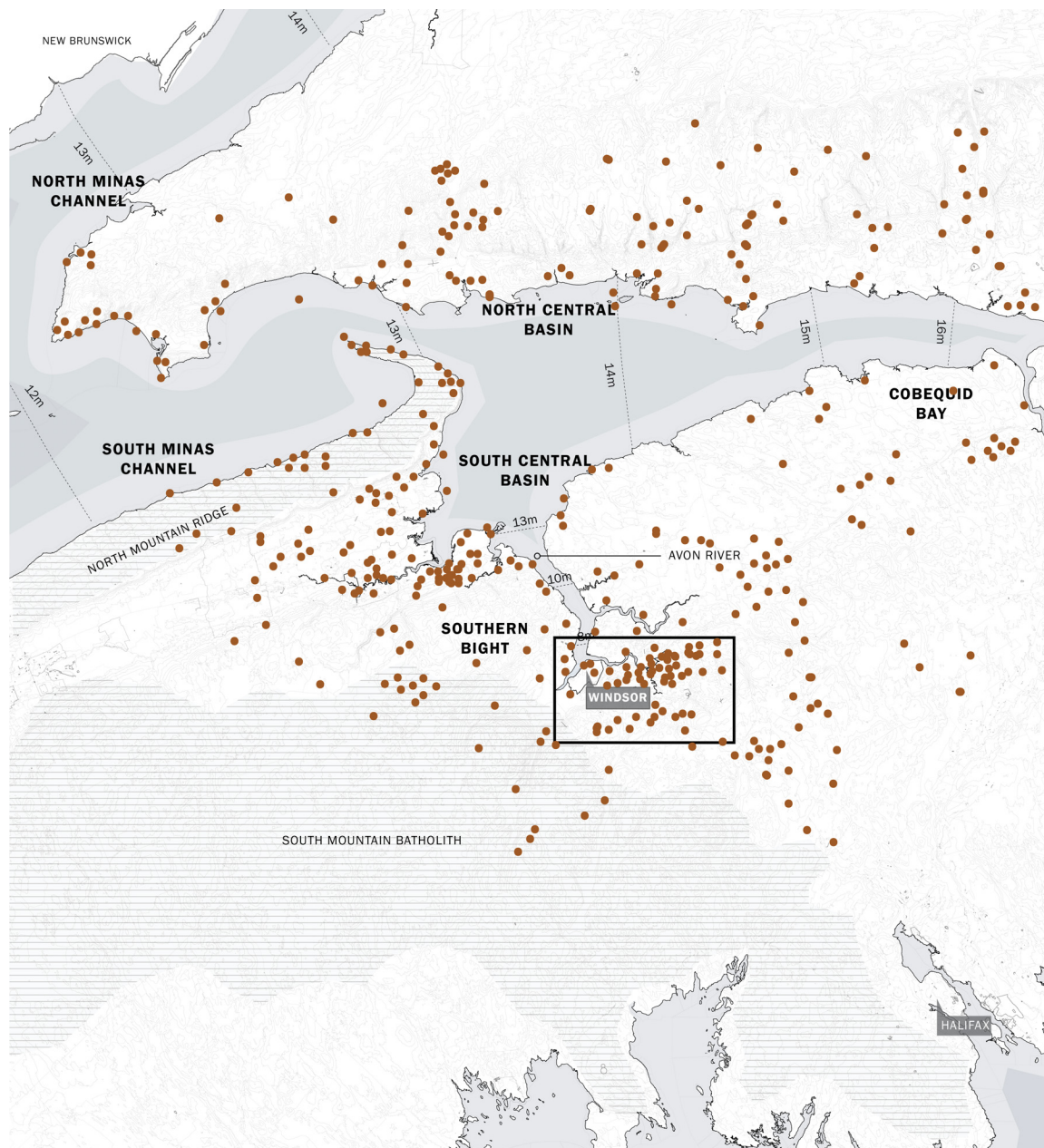
dredging. Over the last century, the majority of rivers that enter the Bay of Fundy have been altered through the construction of tidal barriers such as causeways and culverts (Van Proosdij 2007). The construction of these barriers has resulted in either partial or total obstruction of tidal flow in many areas around the Bay. Tidal barriers decrease turbulent energy in the tidal system which in turn causes sediment to drop and accumulate into mud flats of sand and silt (Van Proosdij 2007). The construction of barriers across tidal rivers and estuaries has a long history of altering the sedimentation dynamics and the ecosystem processes in the surrounding areas. Once a stress is implied on an existing system, the cycle becomes thrown off. Many local species that inhabit this landscape have felt the effects and in turn have been forced to find new habitats. The loss of the shipping port and railway also was a loss for transporting goods from the former textile mill, which was the start of its decline.

In addition to the salt marsh that developed downstream from the causeway, a fresh water lake developed upstream, due to the restriction of tidal water. Town residents have grown close to the artificial lake as it mainly serves recreational purposes. In contrast, many do not understand the severe stresses this tidal barrier has had on many surrounding ecosystems. Various local groups use the freshwater and salt water for different purposes, resulting in competing interests on re-introducing tidal flow in the river.

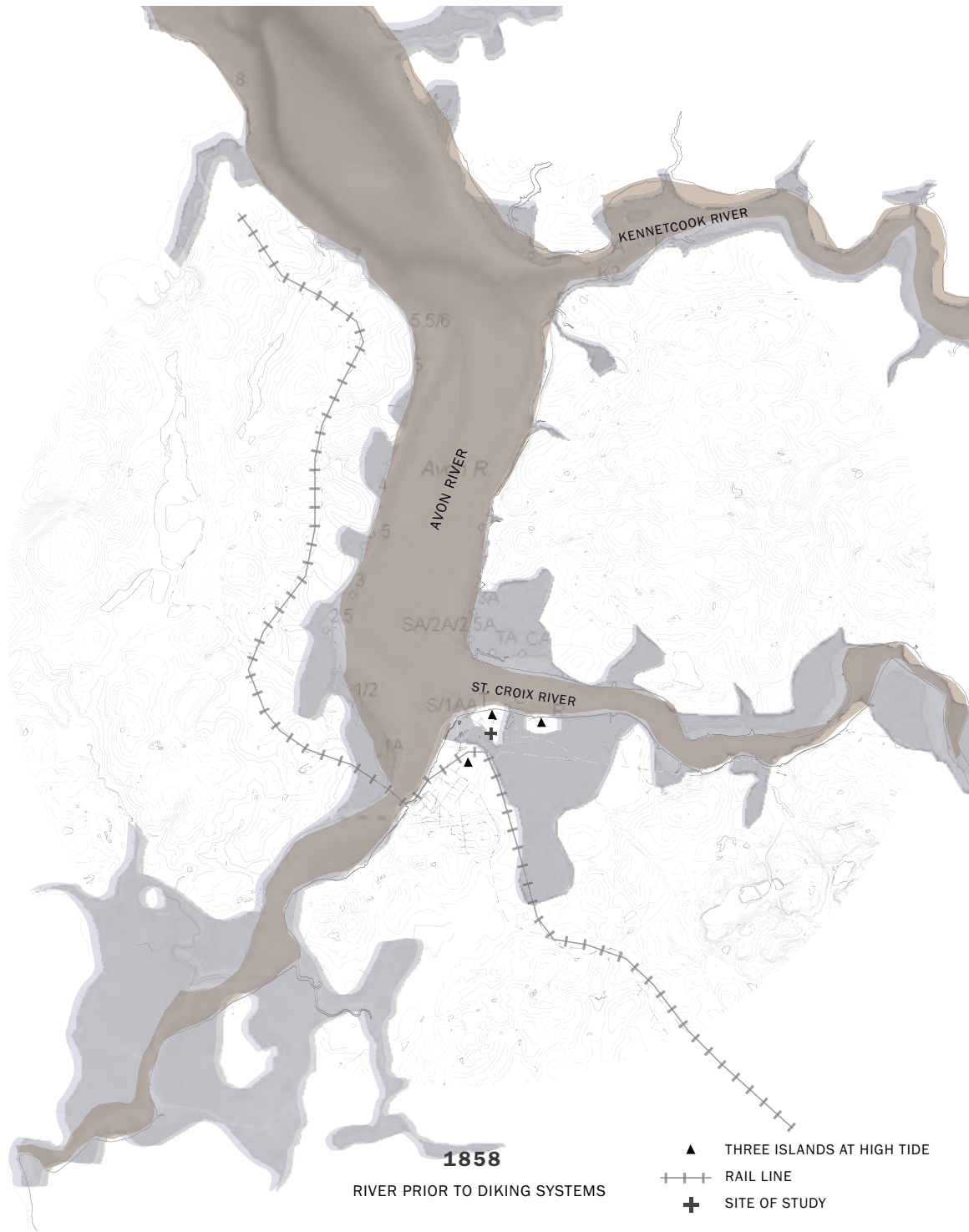
The Atlantic Salmon species are becoming extinct within the area and they suffer as a result from the Avon River causeway tidal barrier which prevents their fish migration route to its spawning grounds upstream (Friends of Avon River Society 2018). This has resulted in the Atlantic Salmon being unable

to fulfill their life cycle.

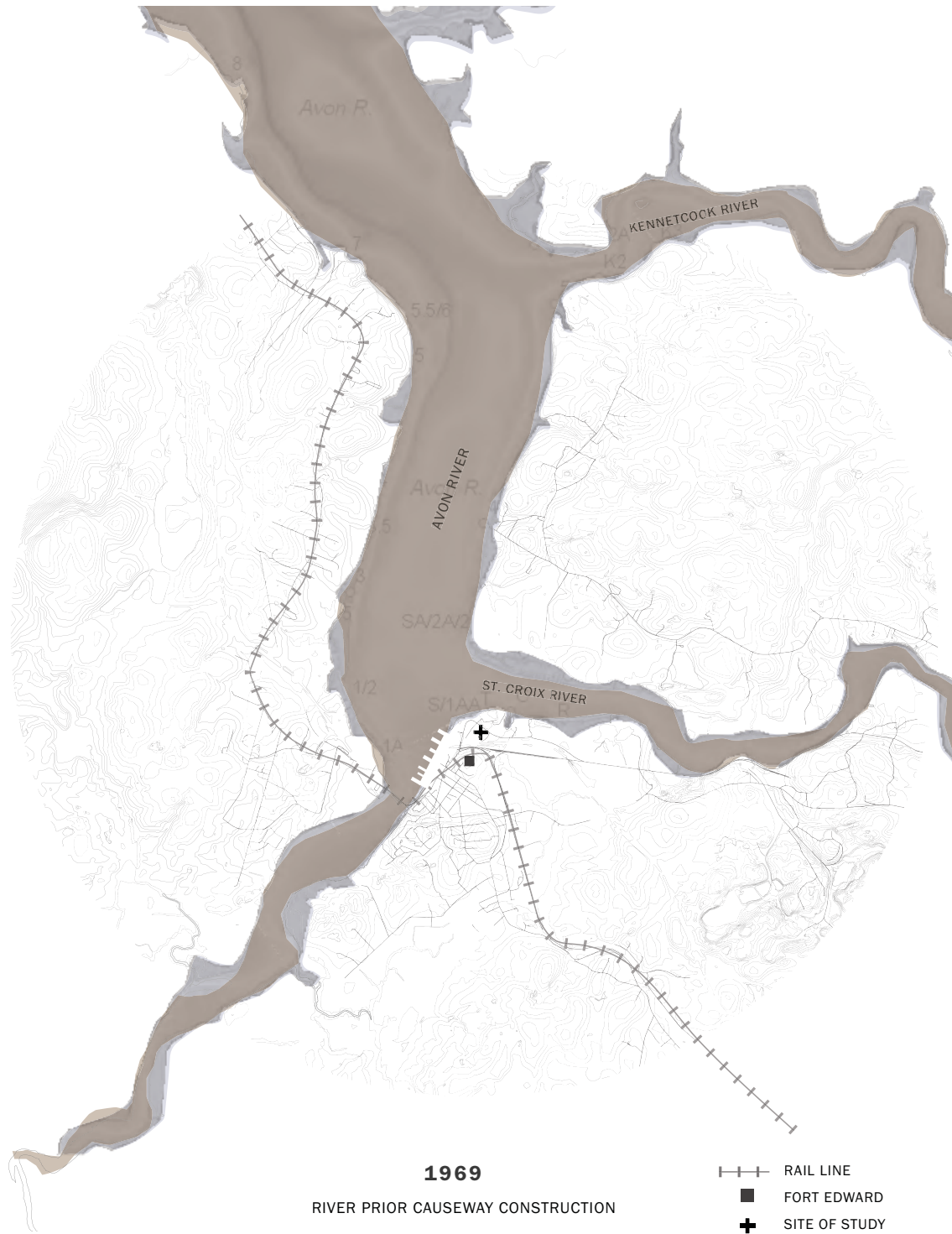
The Avon River causeway chokes off all migration and hence the propagation of the fish. The American Eel is also endangered due to the lack of oxygen in the water due to the causeway which chokes off the oxygen exchange necessary to sustain its life (Friends of Avon River Society 2018).



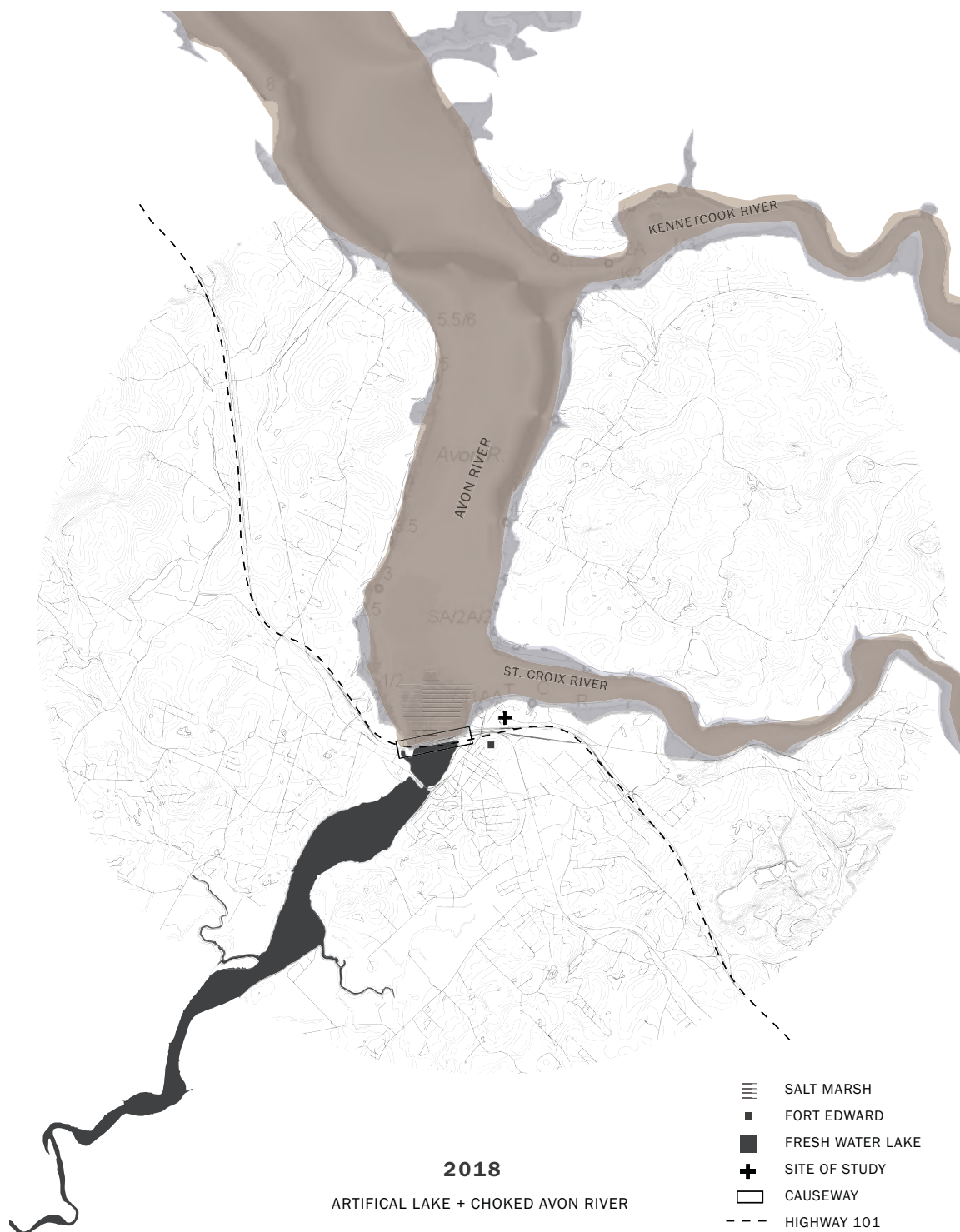
The general distribution of provincially and federally assessed species at risk observation points around the Minas Basin. A densely populated area of species at risk exists around the causeway and surrounding area. (Parker et al 2007).



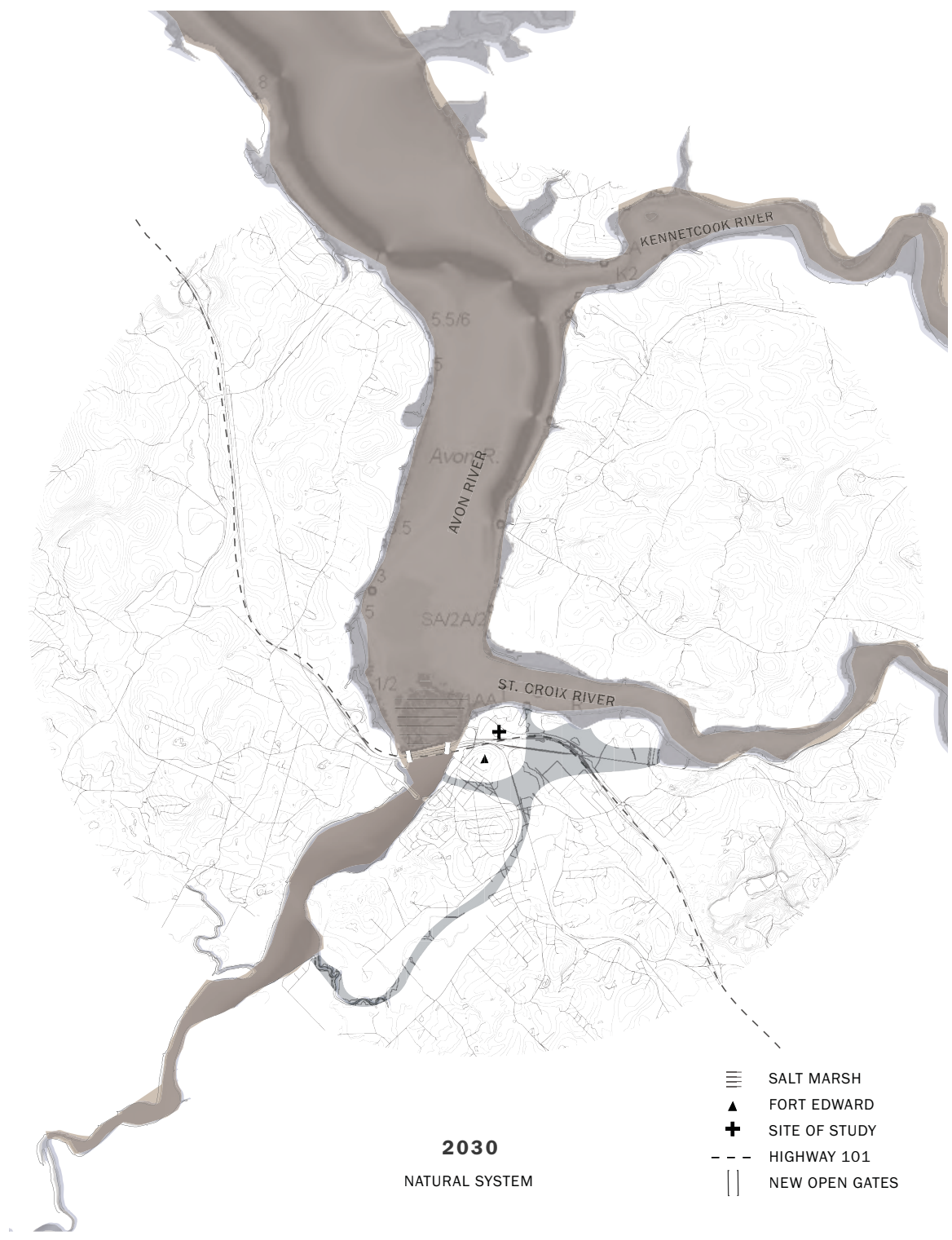
Map showing river condition prior to landscape manipulation and diking systems to facilitate the water during high tide. The railway followed the contours of the land.



Map showing river condition prior to causeway construction with diking system facilitating water at high tide to prevent flooding. Waterfront dock to facilitate ships.



Map showing river choked by causeway. Fresh water lake developed upstream, and salt marsh development downstream of causeway.



With the proposal of permanently opening the tidal gate structure within the causeway to realow tidal flow, the system will revert back to the natural river as it was before the barrier introduced.

## **Stakeholders**

The Avon River is one of Nova Scotia's most important waterways and has a significant place in the life, history and ecological environment of the Windsor area. As the river once served as an important transportation link, it continues to provide important access to the outside world for a growing community in different ways. The tides carry silt and sand into the rivers where they are deposited to form mudflats and saltmarshes. These rich environments feed the local ecosystems, including plants, fish and shorebirds. Like the tides, the Avon River is constantly changing and continues to influence the lives of those who live along its coastal banks.

There are many different groups within the Town of Windsor that currently use the fresh water and salt water sources for different purposes. The fresh water lake that has developed on the southern side of the causeway was never present prior to the construction. Therefore, some people of the town have grown close to the lake and rely on it for different recreational purposes.

There are various stakeholders that are impacted and rely on this infrastructure system within the town. Some of these include: Mi'kmaq groups, land owners, commercial and recreational fishers, agricultural businesses, local businesses, municipal services, scientific researchers, local artisans, recreational interests, and the general public. Ecological systems also exist as stakeholders within the system as they are vital components to the landscapes. They include many marine life species and wild life animals. Larger groups of species that have been impacted include Atlantic salmon, American eel, semipalmated sandpipers, mud shrimp, bald eagles, and great blue herons. Plant species include cordgrass (salt marsh

grasses), sea lavender, glasswort, seaside goldenrod. Each species contributes to the ecosystem in a different way, just as the stakeholders of the town rely on the water source for different needs.



Various stakeholders of Windsor and surrounding area. All individuals represented equally.



## **Current Local Events**

With the Town of Windsor being one of the oldest in Nova Scotia, it has transformed its identity several times throughout history. Currently, it sits adjacent to Highway 101 which is the main route to access the Annapolis Valley. Many residents are attracted to Windsor because of its easy commute to the Halifax area, which allows many residents to seek employment in the city while maintaining a small-town lifestyle in Windsor.

It is home to the oldest agricultural fair in Canada, the Hants County Exhibition, which has been celebrated every year in September since 1765 (Loomer, 15). Windsor has developed a strong identity as the 'little town of big firsts', largely due to the town hosting the first university in Canada (Kings College), being widely regarded as the birthplace of hockey, and being home to Howard Dill's giant pumpkins. The Windsor Pumpkin Regatta which takes place in October has drawn many tourists to the area every year.

The Avon River Heritage Society located in Windsor supports local artists and promotes traditional techniques special to the region. The Artisans in Action series, ran by the society, showcases Nova Scotian artists and artisans who focus on historical trades, crafts and art forms done both in tradition and contemporary manners. It allows artists and artisans the opportunity to engage an audience by demonstrating their creative process and techniques. Events such as these allow the local community to come together to grow and learn about local traditions in order for them to be carried on.

The Mermaid Theatre of Nova Scotia is another local organization located in the Town of Windsor that is highly recognized across Atlantic Canada. It has been in operation since 1972 with local

and visiting performers. The contributions it has made to the local economy of Windsor as well as the role it plays as cultural ambassadors for Nova Scotia and Canada have merited Export Excellence awards from both the Governments of Canada and Nova Scotia.

Windsor and the Bay of Fundy area lie along an important stopover route for various different species of shorebirds during their migration. In particular, this specific area is the most important post-breeding migratory stopover for the semipalmated sandpiper in the world (Gilliland, 1992). They begin migration in the early summer months and can be seen between July and October feeding on the rich supply of mud shrimp and other small species abundant in the marshland and mud flats. Such phenomena attract birdwatchers to the region to experience the sandpiper flight displays.

Additionally, the Avon River Estuary and surrounding area draws in many scientists and researchers performing studies on the area. Due to the unique landscape conditions and the thriving saltmarsh that has developed downstream, studies are conducted around the area, with much of this research conducted by students and professors of Acadia University, from the neighboring town of Wolfville. Various studies are conducted to monitor the growth and decline of species due to anthropogenic activity, as well as ecomorphodynamic studies of the land.



Semipalmated sandpiper and mudshrimp which thrive in the mud flats along the coastal banks within Windsor and surrounding area.



Map showing different regions of selected area of study (Google Maps, 2019).

## Opposing Opinions

With the Highway 101 expansion project that is currently underway, there have been raised concerns about maintaining the Avon River causeway. There are different options proposed by Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) of what will be done to the existing tidal gate structure within the causeway. The current aboiteau and causeway structures provide flood protection for agriculture and significant community infrastructure while keeping back the high Bay of Fundy tides and allowing for freshwater to drain through the aboiteau during times of low tide. Many people within the town of Windsor are impacted by this infrastructure system. The 700 meter long causeway was designed to replace 26km of dykes and 60 aboiteau structures that existed prior to its commissioning in 1970 (NSTIR, 2017).

There are currently four options on the table of what is to happen to the existing tidal gate structure in the causeway. The options have led to many conflicting opinions between the different groups of people within the town of Windsor. An environmental lobby group, Friends of the Avon River (FAR), has called upon the Federal Fisheries Ministers to instigate a Comprehensive Environmental Impact Assessment Study of the complete Avon River Watershed in order to protect the Endangered Atlantic Salmon and the American Eel and their 'critical habitats'. They have stated that the Avon River causeway as zero fish passageway, thus impeding all fish species that need to migrate upstream to freshwater habitats in order to spawn. Not only is this tidal barrier impacting the fish species, but all other species that exist in this inter-tidal region, are members of the food chain and have been forced to seek new habitats. The system at large becomes affected.

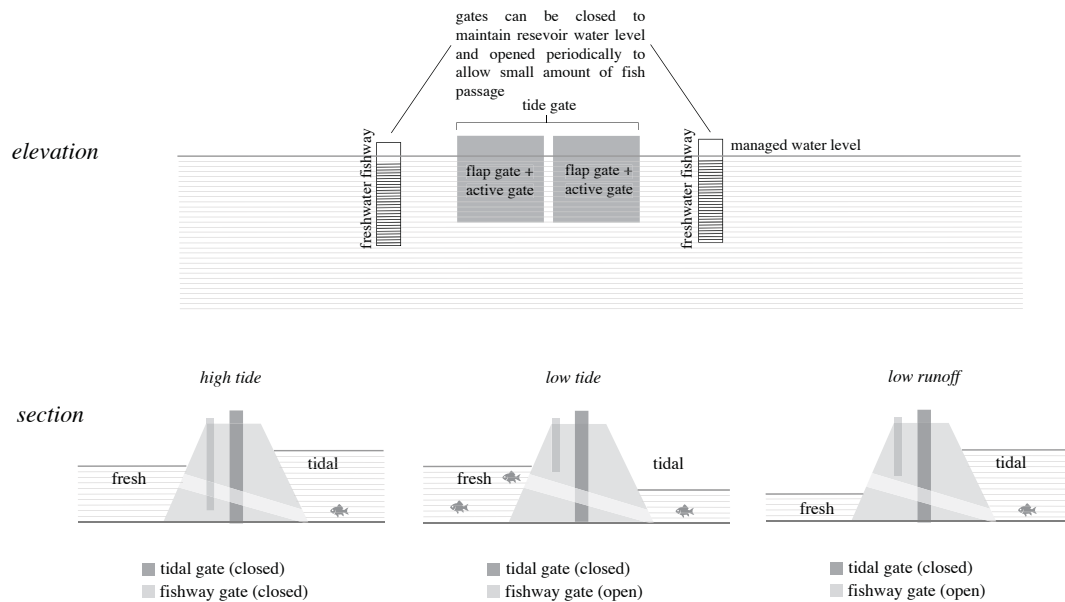


Photo taken during a Town Council Meeting held at the Windsor Legion. The meeting was intended to inform the public of the different options for the causeway. To re-allow tidal flow or to continue to restrict. October 2018.

The following four diagrams were presented as options for what is to occur with the current aboiteau in the existing causeway for the Highway 101 twinning project. Many conflicting opinions were expressed at the Windsor Town Council meeting that took place on October 10, 2018. The tension between different groups of people was a result of the varying close relationships they each have with the water.

The impacts of Scenario A include: fish passage being limited by water availability during low flow periods (during the summer) which would likely not meet the Fisheries Act; fishway passage size prevents fish of all sizes from swimming up the fishway; concerns from First Nations, CRA Fishing Groups and other Advocacy Groups; more complex gate would be needed; preferred option of recreational groups and agribusinesses.

**SCENARIO A: Maintain Freshwater Reservoir**  
**PRIORITY: Lake level**



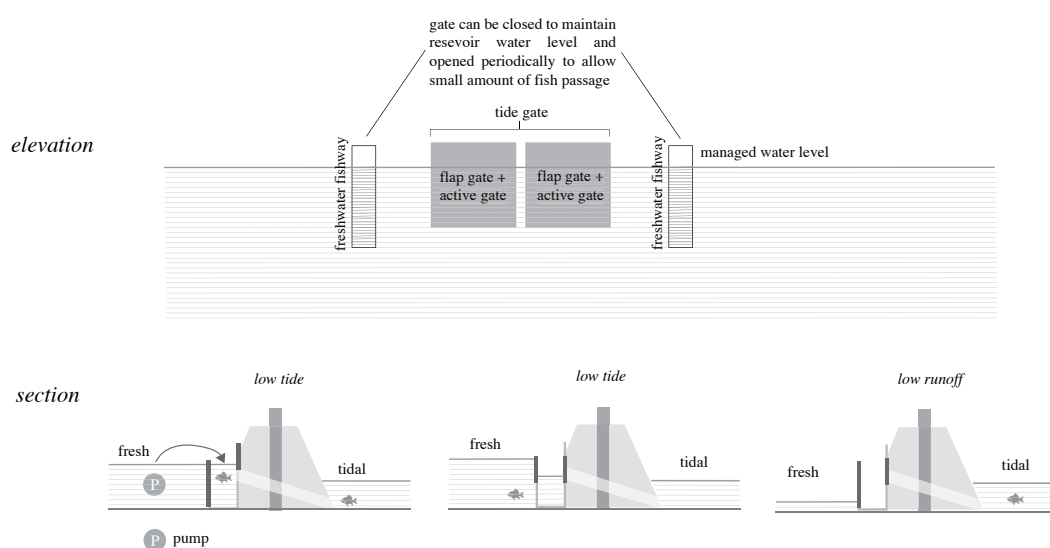
Avon River Aboiteau Replacement Design. Water Management Scenario A. Diagram interpreted from poster board seen at Windsor Town Council Meeting for the Public on the Avon River Causeway. October, 2018.

The impacts of Scenario B include: if lake water is pumped into the fishway to keep it fully active as long as possible, the lake level will be drawn down from the fishway; higher potential for flood risk (more complex gate), fishway passage is limited by water availability during low flow periods in the summer.

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**SCENARIO B:** Maintain Freshwater Reservoir  
**PRIORITY:** Keep fishway active (using Lock System)  
**and** lake as freshwater

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Avon River Aboiteau Replacement Design. Water Management Scenario B. Diagram interpreted from poster board seen at Windsor Town Council Meeting for the Public on the Avon River Causeway. October, 2018.

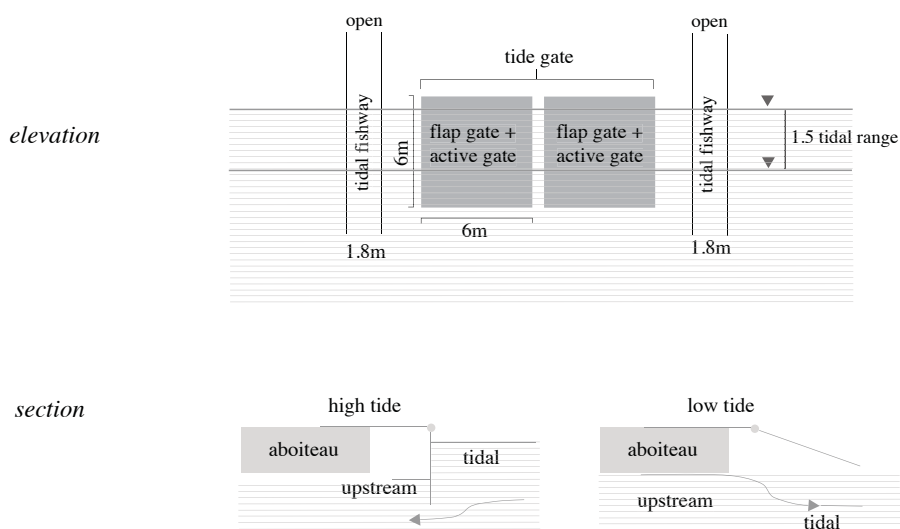
The impacts of Scenario C include: controlled partial exchange of tidal water allowing salt water intrusion; year-round fish passage for all species; adaptive design for anticipated climate-change and sea-level rise; able to function safely and effectively with minimal operation, but can be adjusted to meet various needs, such as allowing water levels to rise in the lake for specific events. The anticipated impacts based on the modelling results include: more reliable flood protection, does not require operation in advance of storms; significantly greater

fish passage and overall habitat potential; water level upstream would be 2-7ft below existing target level to protect farming ditches from saltwater intrusion; currents would change but still remain safe for canoeing/boating; tidal exchange would cool the reservoir, restore natural flushing and improve water quality; improved ecosystem health, daily tidal flushing would result in a more natural functional river system.

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**SCENARIO C: Controlled Tidal Exchange**  
**PRIORITY: Fish Passage and Restoration to More Natural Conditions**

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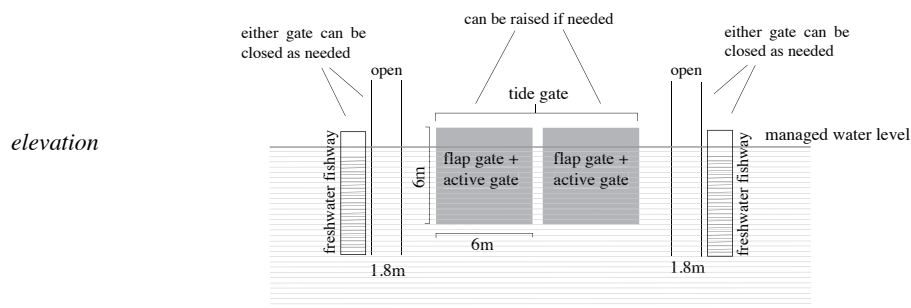
Avon River Aboiteau Replacement Design. Water Management Scenario C. Diagram interpreted from poster board seen at Windsor Town Council Meeting for the Public on the Avon River Causeway. October, 2018.

Impacts of Scenario D include: a more complex gate management system; reduced potential for flood risk; regular maintenance required to clean sediment blockages in freshwater fishway. This option is still currently under development and to be refined.

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**SCENARIO D: HYBRID OF SCENARIO A + C**  
**PRIORITY: Fish Passage and Reservoir Water Level**

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Avon River Aboiteau Replacement Design. Water Management Scenario D. Diagram interpreted from poster board seen at Windsor Town Council Meeting for the Public on the Avon River Causeway. October, 2018.

There are conflicting opinions between the stakeholders within the town because of different purposes that the freshwater and salt water each serve. For example, recreational fishermen are losing the ability to fish species that are native to the area as they are diminishing in numbers. This is due to their inability to spawn upriver as the causeway blocks their migratory route. Therefore, Scenario C would be in favour. Contrastingly, the Pisiguit Canoe Club that relies on the artificial, freshwater lake for recreational purposes does not wish for the reintroduction of tidal flow as the water level would then return to inconsistent levels. The Club would be in favour of Scenerio A. As many groups have different wishes, this has been creating an immense amount of stress within the town. The majority of the population is thinking on a micro scale, on a personal level and not thinking of the environment and community as a whole on a macro scale for the years to come.



The most likely scenario to be selected which will satisfy most environmental requirements is Scenario C, reallowing tidal exchange. With the reintroduction of tidal flow through the Avon River Causeway, the proposed design will celebrate the site's history at large, while demonstrating the importance of engaging the landscapes dynamic past, both natural and cultural. This thesis is designed with the intentions that Scenario C will take action.

### **Generating Program**

After various site visits to the town of Windsor, and sitting in on the public town council meetings regarding decisions to be made about causeway construction, it was evident there was miscommunication and tension between town residents and council members. The system at large requires better explanation in order to be fully understood by all town residents and local members. With these discussions, the most environmental, sustainable and ecological decisions will be pushed to the forefront. In saying this, local researchers and scientists experts in these fields, should be educating town members and the public so that they can understand the dynamics of the landscape at both a micro and macro scale.

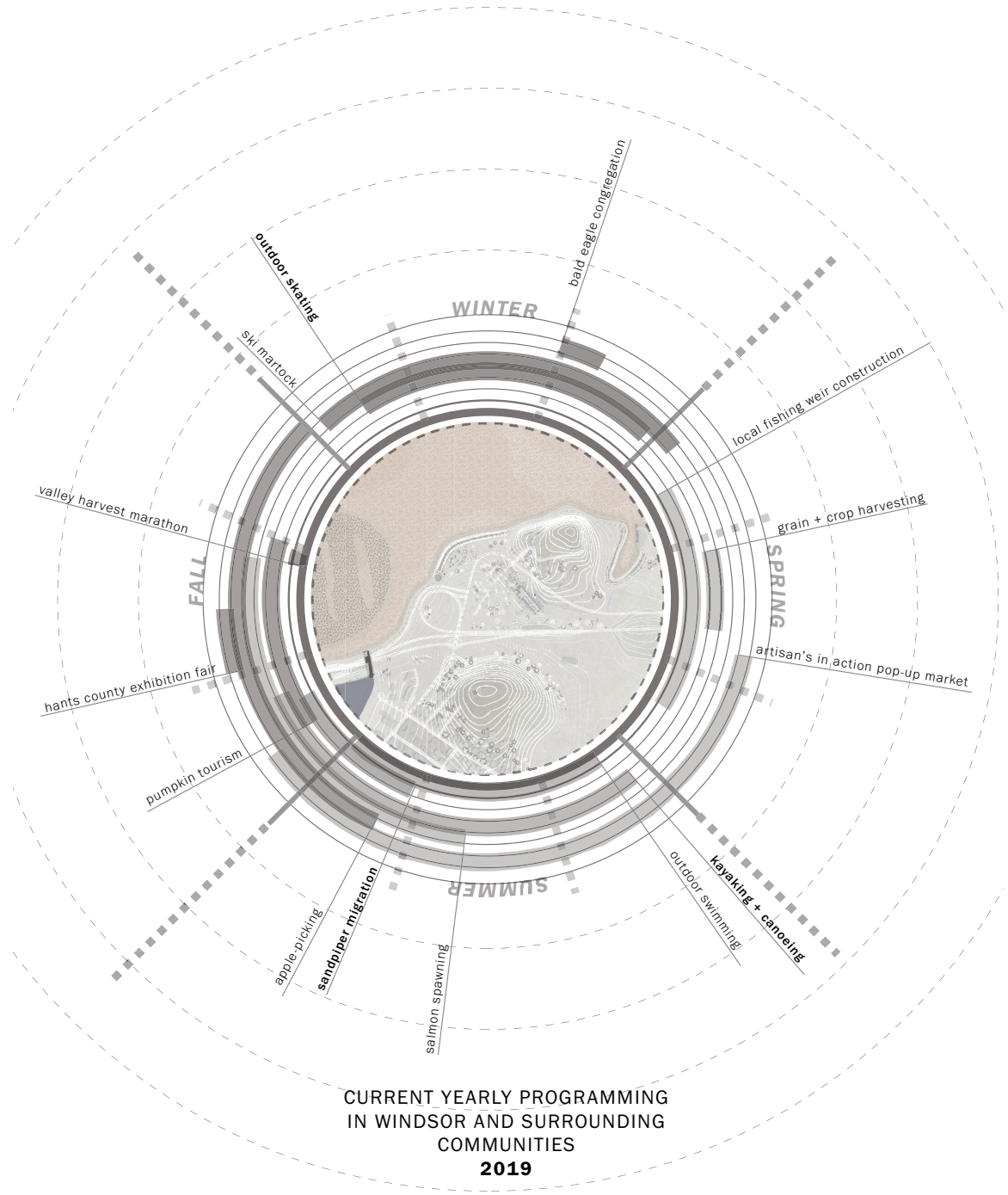
The former mill requires a program that will serve a space for learning and collaboration. Spaces designed for public engagement and interactive workshops between researchers and the public/local residents. It was established that the daily cycles and seasonal shifts affected by hydrological and ecological changes also affect the habitat of many species and micro-organisms. Depending on the time of year, researchers will be focusing on different phenomena of the area, and will be able to publically display their research of why the area is so ecologically unique. Spaces designed for collaborative

workshops and glazed thresholds for observation will encourage these interactions.

Additionally, local artists are in need of a space to produce and exhibit their work on the landscape and surrounding area. New programmatic design space for local and visiting artists will help to facilitate the emerging art cultural within the town and throughout the Annapolis Valley. A residency will host artists from various fields, with an emphasis on local traditions while increasing the understanding and appreciation of arts and culture in the Avon River area. New programs are designed in hopes of creating educational and networking opportunities in support of arts and culture.

A local farmer's market is needed for the town and surrounding communities as there is an abundance of local crops and produce grown in the Avondale area with no nearby place for distribution. The large free plan on the ground floor of the existing mill is an ideal location for moveable stalls that can display a variety of goods. They can also be used for different functions, when the space is desired for different purposes, such as an exhibition or venue.

In order to draw people to the now desolate area, it is necessary to insert programs that function year-round. Cross-programming is important to incorporate in the mill and surrounding landscape in order to bring different groups of the community together. There are a variety of additional programs that will keep the mill and surrounding area busy throughout the year.



Program diagram showing the current events that exist within the town of Windsor. Site map in center shows causeway currently choking the river and causing the distinction between salt water and fresh water.

## **CHAPTER 4: THE FORMER NOVA SCOTIA TEXTILE MILL**

### **Textile Mills in Canada**

The textile industry was one of the first industries to introduce mechanized production in a factory setting, and came to symbolize Canada's development as an industrial nation as well as the difficult conditions under which men, women and children labored. The industry has left an indelible imprint on Canadian history, but the once-prominent imprint it has left on the physical landscape is far less certain. The brick, stone and glass – so much a part of the fabric of towns and cities in many parts of the country – remains under increasing threat. Many of these industrial 'monuments' associated with history have disappeared and most others face an uncertain future (McCullough 1992, 6).

The importance of the textile industry lies not only in the high numbers it employed, but also in the role it played in the growth of Canadian manufacturing. Textile mills were among the earliest large employers of Canadian labour in a factory setting. This was especially true for female labour, which at that time formed a large part of the textile industry's labour force (McCullough 1992, 5). The rich collection of textile mills that have survived from all different periods of the industry's history, provides a resource for the study of the evolution and decline of industrial architecture.

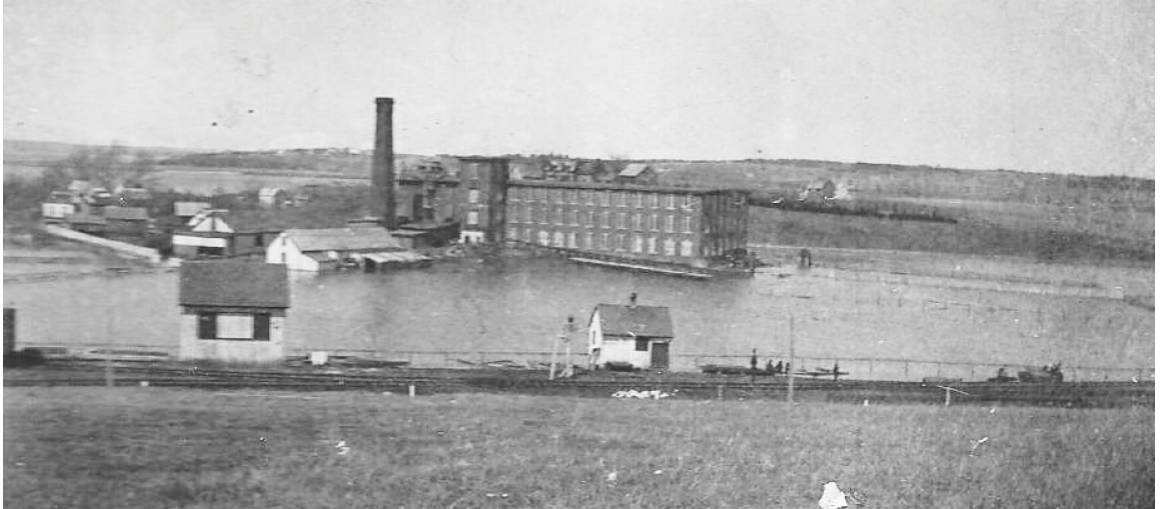
### **Mill Additions and Subtractions**

Construction of the former Nova Scotia Textile Mill began in 1882 and was completed in 1884. It went through many additions throughout its lifetime. The construction of the mill compares

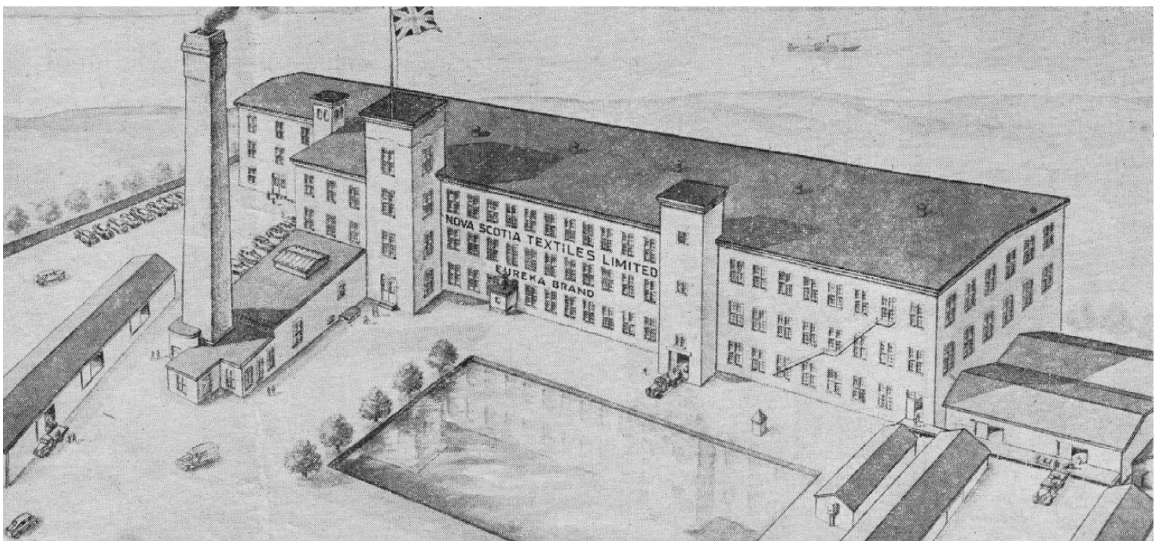
closely to those of traditional methods of mill construction. The mill saw periods of growth, exchange of ownership, and short periods of vacancy until its eventual closure in 2005.

Between 1881 and 1883, three lots were purchased just north of the town center, onto which the mill was erected. Construction was finished in 1884 and the 3 storey narrow, rectangular brick building stood tall in the scarce landscape. The towering chimney was an iconic feature that could be seen from all over town. The stair core and elevator were placed in external towers so in the case of a fire, to prevent the spread from one storey to another (McCullough 1992, 121). Mill architects also attempted to prevent the spread of fires by dividing mills into compartments where fires could be isolated and fought.

Over the years, the central core of the building remained constant with additions made to the east and west facades. Small pavilion type additions were also constructed around the building that served different purposes aiding product production. In 1970, the same year the causeway was built, the mill's productivity began to decline. The power source switched from steam to oil and electric energy, and the mill went through a few difficult years economically, with its eventual closure in 2005. The mill has remained abandoned and vacant in the town's landscape for about 14 years with a redevelopment failure in 2007.



Dominion Textile Co.'s Mills, Windsor, N.S.



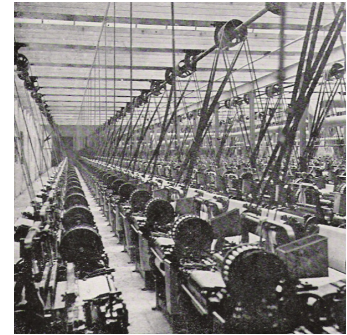
Photographs of the Mill during different stages of its life. (Nova Scotia Archives, 2018).

## Power and Porosity

The mill was powered by steam, which was ultimately generated using the river water as the primary source. The large reservoir adjacent to the mill ran parallel to the south facade and was used as a container for the water to power the building. The river water was facilitated to the reservoir and from there through underground pipes to the pumphouse and into the boilers. The boilers and steam engines created the movement needed to power the machines through a system of overhead shafts, gears, belts and pulleys.

The power source was central within the building and distributed outward on all floors to horizontal spanning shafts to which belts were attached. Belt holes were cut into load bearing walls to allow for the ropes to run through the length of the floor. This distribution of power will help to inform circulation throughout the new proposed design. The pumphouse will be redesigned with new programmatic features but a portion will remain to serve the water contained in the reservoir. The large contained waterbody in the existing reservoir, will serve as a public pool in the summer months and a skating rink in the winter. Filtered water will also serve the building in the newly programmed greenhouse and research labs.

Typical textile mills of the later 19th century were built as long, narrow 3 to 5 storey brick buildings with a flat or slightly pitched roof. Mills were large buildings for their time, with the former Nova Scotia Textile Mill measuring approximately 23m wide and 99m long. The mill is 3 storeys high and is constructed of local masonry, with the oldest portions of the building supported by heavy timber framing, a local and plentiful resource. Later additions to the mill after 1990 were supported by steel framing, due to its fireproofing properties. The mill's form was



Photograph showing belt and pulley system for power. (McCullough 1992)

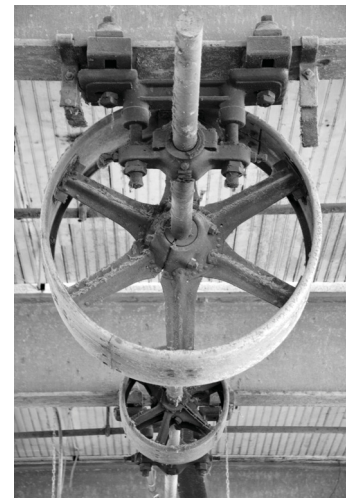
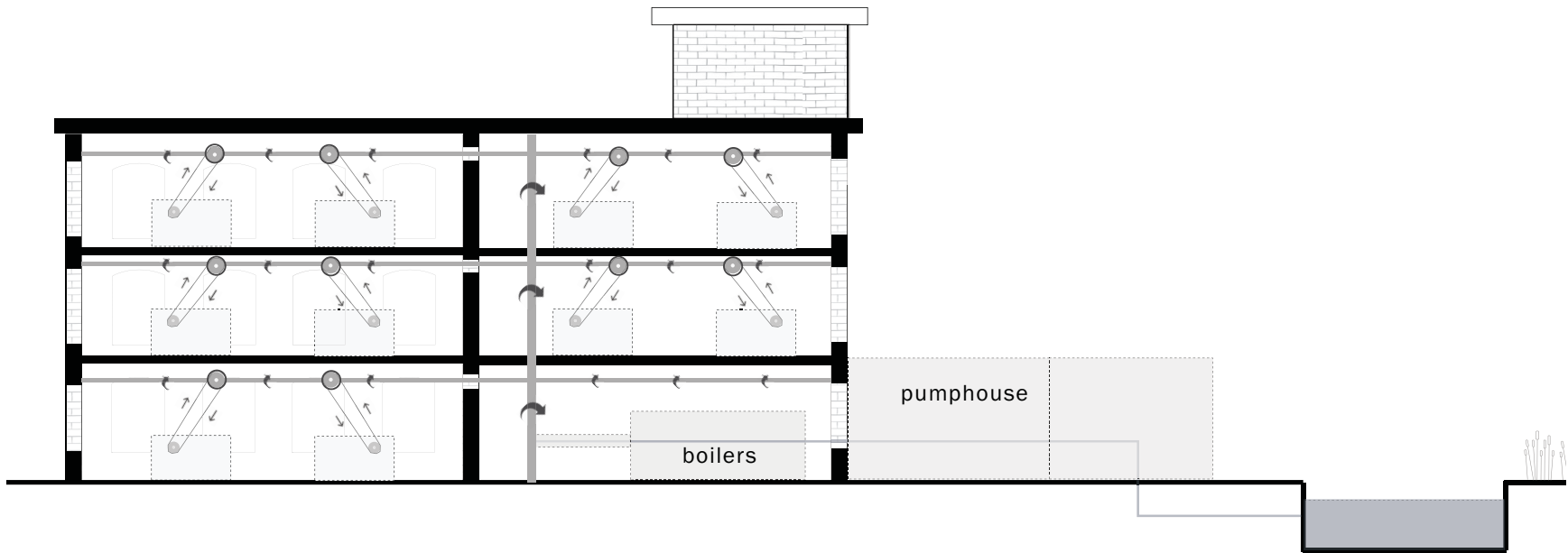


Photo taken October 2018 of pulley system in the former Nova Scotia Textile Mill.



Cross section through mill demonstrating location of pumphouse and function of lineshaft as a means of transmitting power.



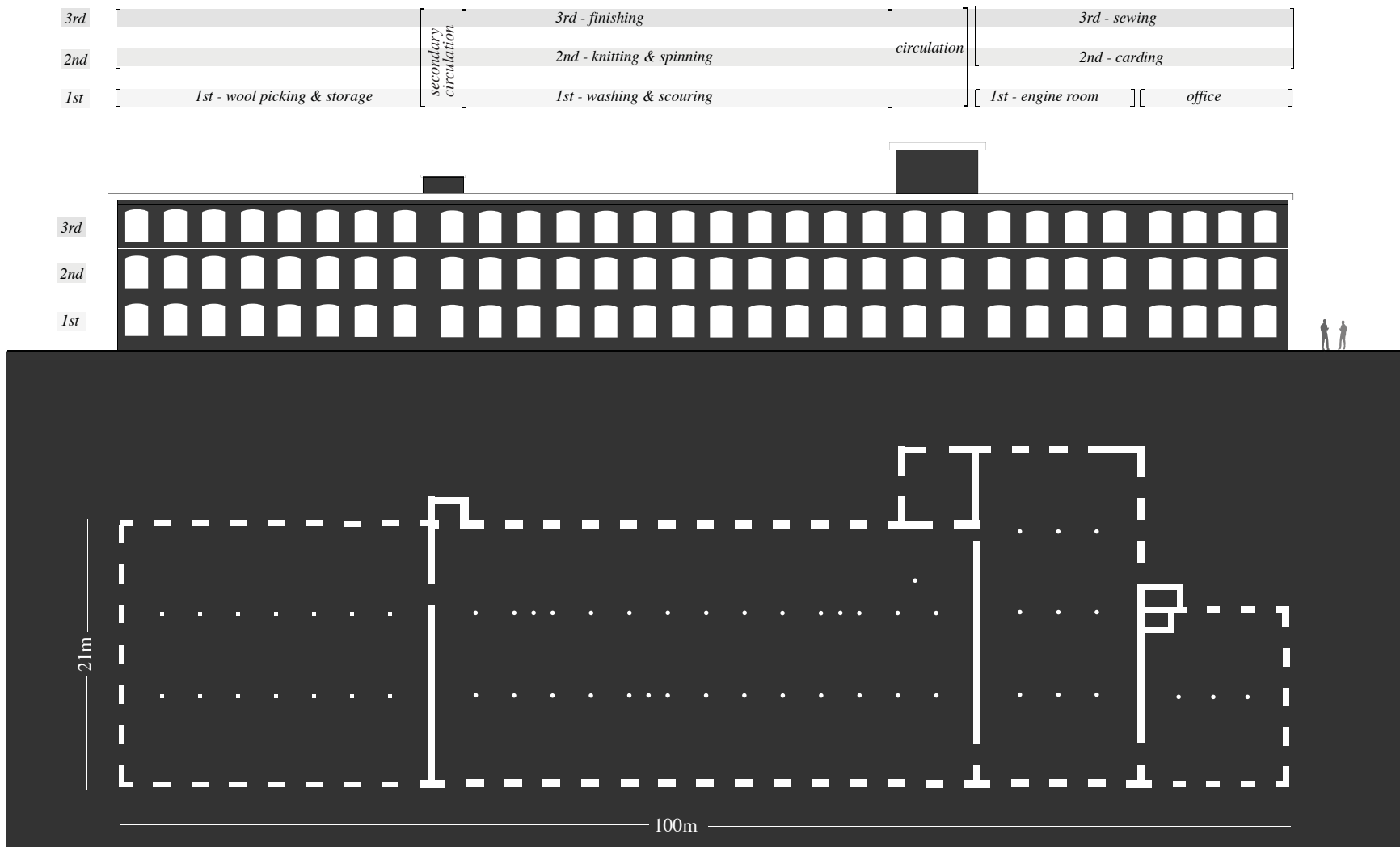
determined by cost and function as the open plan existed to house the large machinery. Each floor is a large open space divided into aisles by rows of supporting columns. They were also more compact than lower buildings; this was important because motive power had to be transmitted from a central source to the machines by shafts, belts and pulleys. Taller buildings suffered from excessive vibration and problems with fire protection (McCullough 1992, 8).

Aside from the large-scale size of the mill, the consistent rows of large windows on each floor were a mill's most distinctive exterior feature (McCullough 1992, 8). The windows provided natural light and narrow, rectangular buildings ensured no machines would be too far from a window. Taller buildings with more storeys provided more wall space for windows than lower buildings of comparable areas. The external staircase tower for circulation is positioned near the center on the south side of the mill.

Most of the early carding, fulling, and woollen mills were located on rivers. This was because abundant supplies of water were essential for washing wool and for washing, dyeing and fulling cloth. At that time, water provided the cheapest form of transportation for raw materials, fuel, and finished products. Most importantly, water provided a means of cheap power for the mills. Although, with Canadian winter's temperatures being well below zero, and seasonal variations in flow of smaller rivers, this meant that many water-powered mills could not operate year round.



Windows as seen from the exterior. White frames are older than black frames as the black frames were installed during the failed redevelopment attempt in 2007. Photos taken March 2019.



Diagrammatic plan and elevation showing existing dimensions of the former Nova Scotia Textile Mill with past programmatic divisions labelled above.

## Past Programmatic Divisions

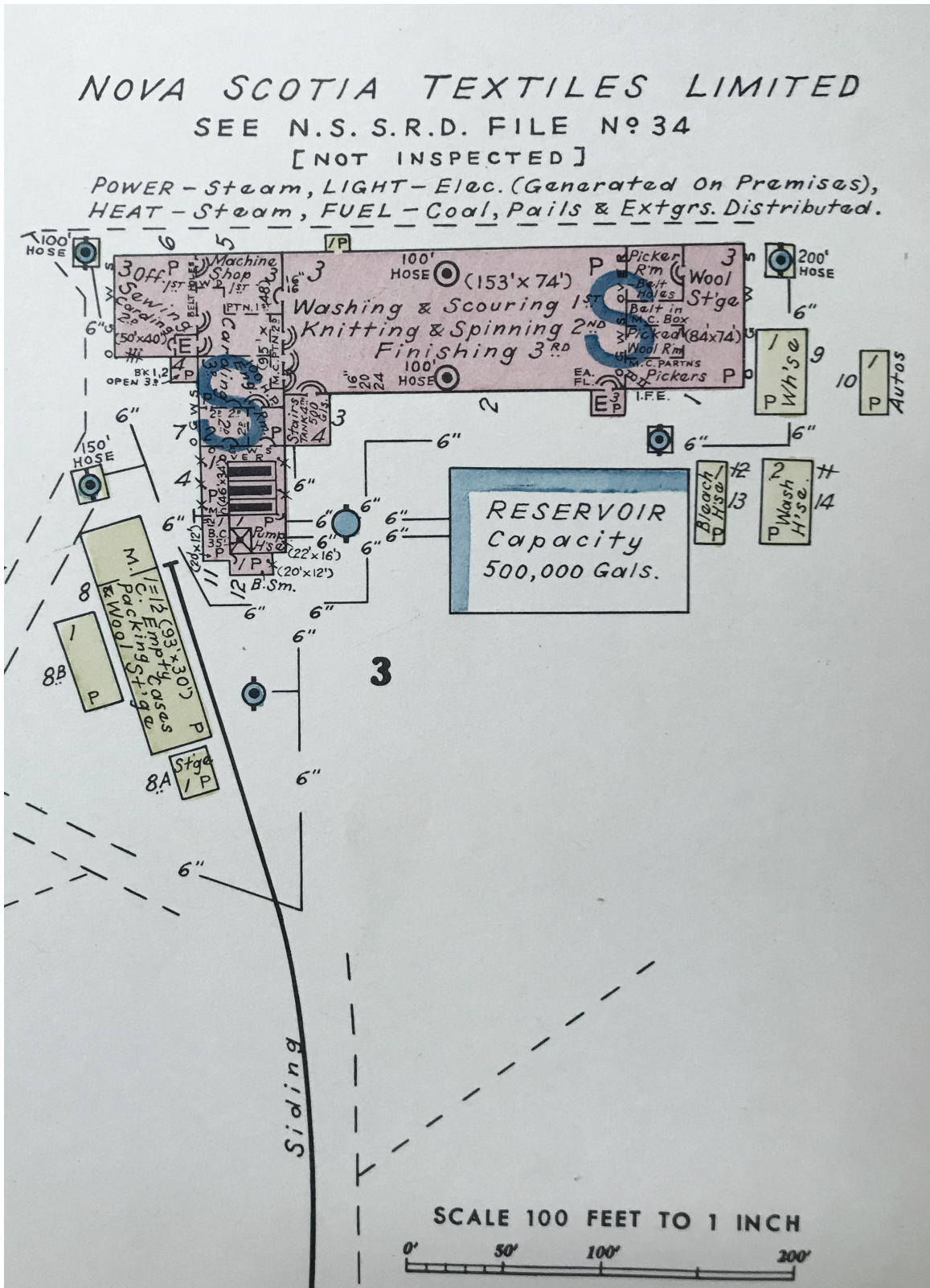
When the mill was at the peak of its production years during the mid 1900's, the programmatic divisions were organized based on practicality and ease. Once the mill received more demand, small pavilion type buildings were built surrounding the mill to serve different purposes. The growth of the mill and where additions were made will imply where new design interventions are situated.

Since the nearby water source was used for washing wool and for dyeing and fulling the cloth, these activities normally took place on the first floor. Raw materials and finished goods were kept in separate warehouses. Fires often occurred in the picker, which opened wool and cotton prior to carding, therefore the picker was located in a separate, private room or building. Scouring and dyeing departments were located in separate buildings or on lower floors because they had to be in proximity to steam, hot water and because of the fumes they produced (McCullough 1992, 9). These more private and public spaces of past program will help to inform where public and private will exist in the new design.

Circulation occurred through an external staircase tower, which was centered on the southern side of the mill. The upper storey of the tower contained a water tank of 500 gallons connected to a sprinkler system in the mill, in case of fire.



Carding brushes from the Nova Scotia Textile Mill used to comb raw or washed wool into straight fibres in preparation for spinning. (West Hants Historical Society, 2018).



Past programmatic plan division of space and floors within the Nova Scotia Textiles Limited Mill from 1959. (Nova Scotia Archives 2018).

## Current State of Degredation and Isolation

The mill is situated in a low land near the confluence of the two rivers. There is an existing dike system near the mill where the water flow is controlled by an aboiteau. There are traces of a path from the mill to this existing dike system that will be re-designed to facilitate users to and from the coast. The coastal landscape of the surrounding area is ever changing as the tides are in constant movement. The dikes that still exist help to facilitate the dynamic movement. There are lowlands and highlands. Lowlands as marshlands are susceptible to pooling with water during periods of heavy rain. New designed interventions will highlight these landscape features and consider ways to re-use water within the design.

There has to be that interval of neglect, there has to be continuity; it is religiously and artistically essential. That is what I mean when I refer to the necessity for ruins: ruins provide the incentive for restoration, and for a return to origins. (Jackson 1980, 5).

The mill is currently in a state of isolation from the town due to the highway that runs between it, and the downtown core. In addition, the small neighborhood of homes nearby the mill are resilient to the massive structure and it seems to be ignored collectively by the community. The expansive south facade of the mill is visible to many people each day that travel along Highway 101. This will be taken into consideration for design in hopes to attract the public eye from the populous transportation route.

The structure remains well intact with exterior brick walls structurally sound. All posts that remain supporting each floor are in good condition. The windows were replaced in 2007 after a failed attempt to redevelop the mill into condominiums, with most of them now having been smashed and damaged. The

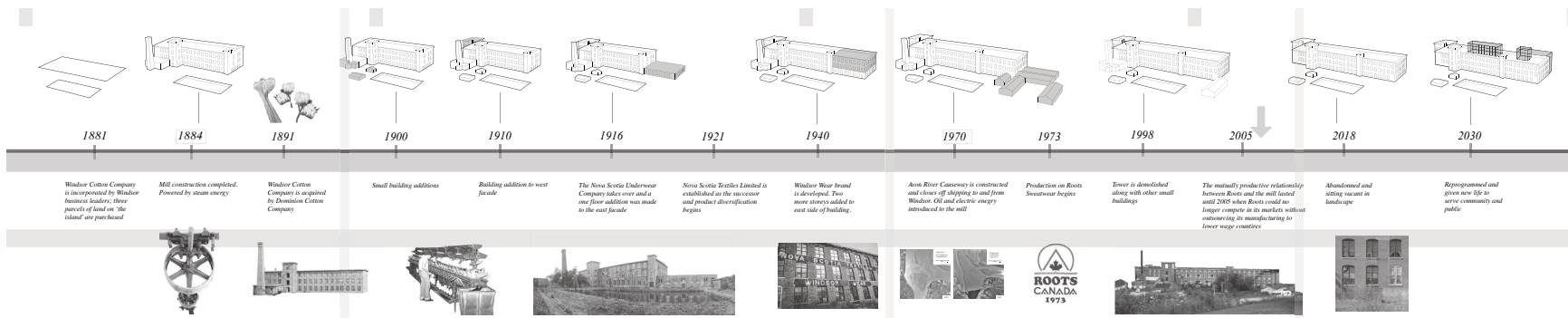


Photos taken on site. October 2018.

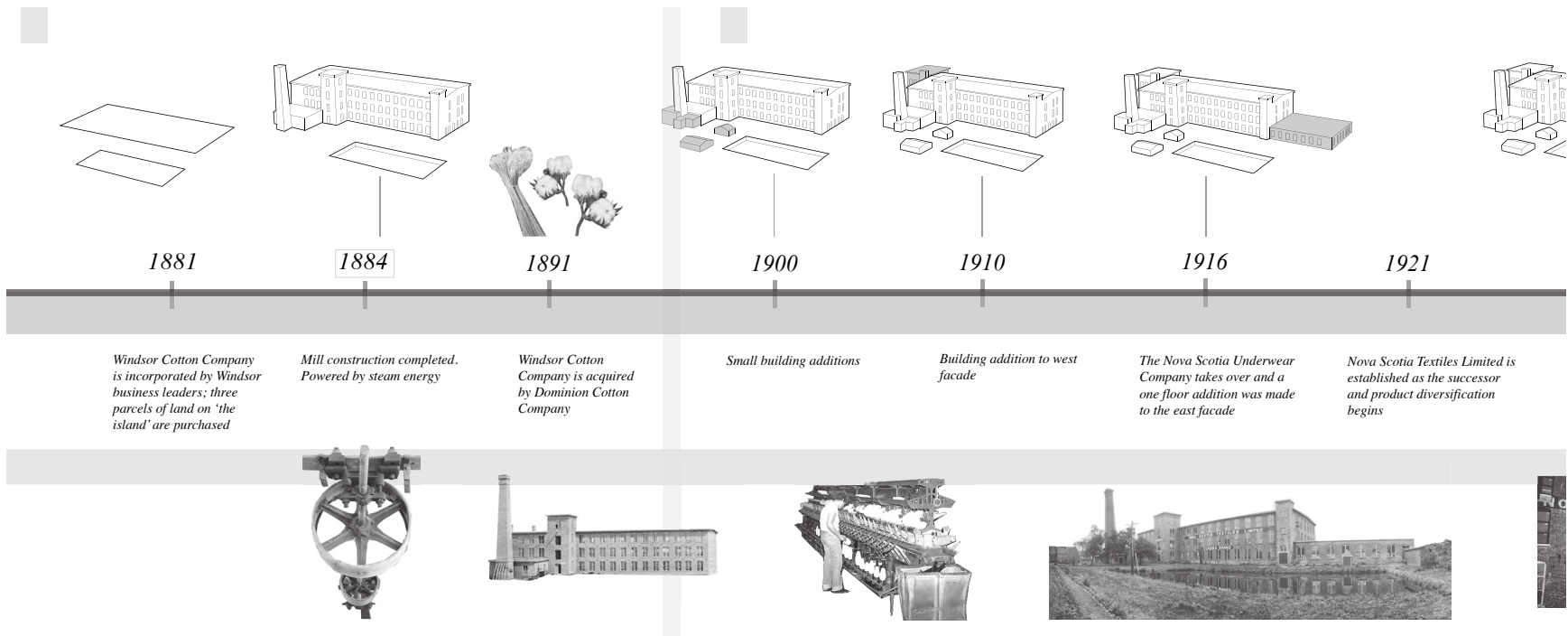
roof remains in decent condition with some areas of leakage. The structural integrity of the mill remains promising as it stands proudly on its original foundation of over 130 years.



Site map showing existing mill in relation to existing dike and the path that connects the two. (Google Maps 2019)

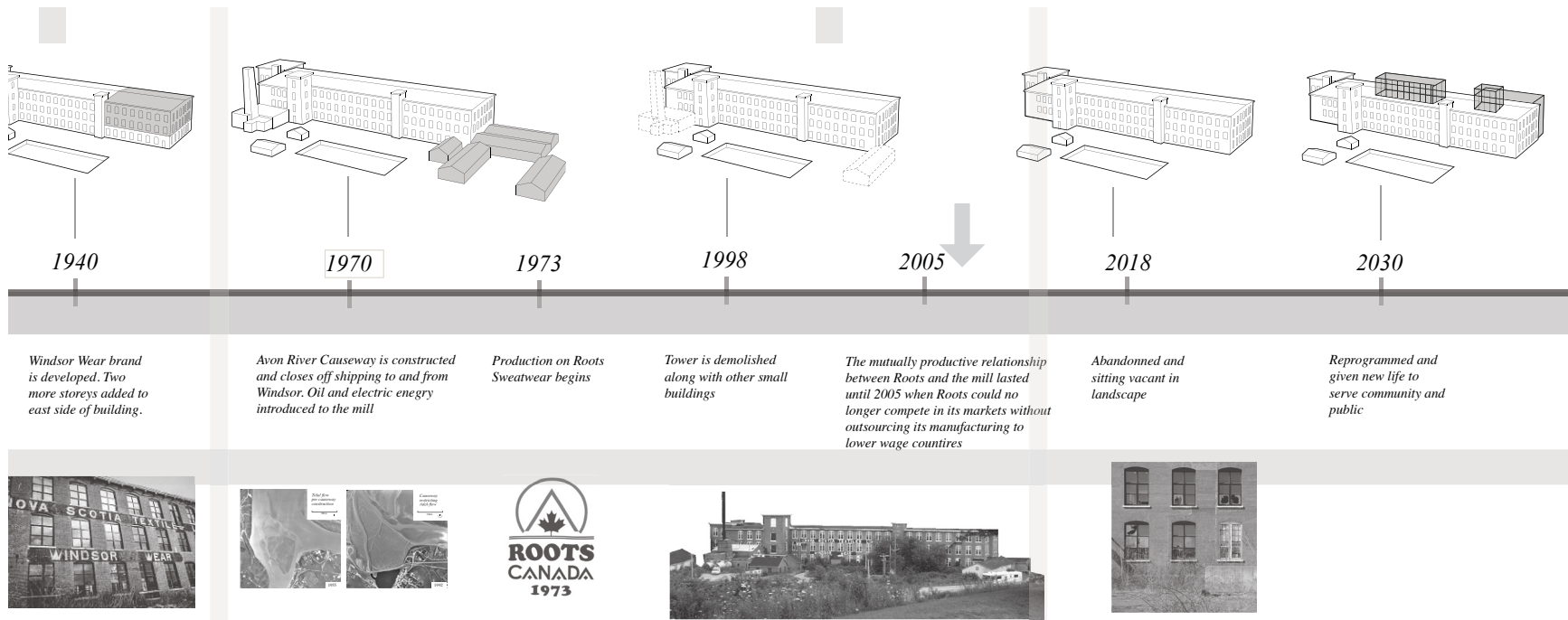


Timeline showing former Nova Scotia Textile Mill building growth and periods of decline through time.



Building Timeline - Part 1





Building Timeline - Part 2



Stitched elevation of north facade from photos taken during site visit March 2019.

**BUILDING TRACES**



STAIR



ELEVATED ENTRY



INTERNAL STRUCTURE EXPOSED



THRESHOLD

Photos taken on site of traces observed on the interior and exterior of existing mill.

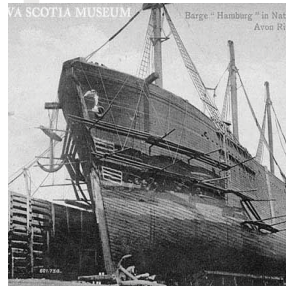
LANDSCAPE TRACES

PRESENT



WOODEN PIER OF FORMER SHIPPING PORT

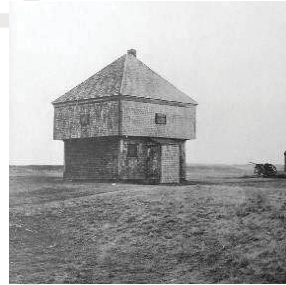
PAST



SHIP AT FORMER SHIPPING PORT 1878



FORT EDWARD TODAY



FORT EDWARD 1755



CURRENT RAIL ROAD CONDITION



TRAIN ON RAIL ROAD 1854



EXISTING DIKE SYSTEMS IN LANDSCAPE



DIKES BEING BUILT 1700

Photos taken on site of observed landscape traces (left), earlier versions of traces with corresponding years (right).



Site map at 1:3000 with traces used for design highlighted where they are located within the area of study. Photo sources (far right) Nova Scotia Archives, 2019.

## CHAPTER 5: STRATEGY AND METAPHOR

### Historic Interpretation

The building, the monument, and the city become human things par excellence; and as such, they are profoundly linked to an original occurrence, to a first sign, to composition, permanence and evolution, and to both chance and tradition. As the first inhabitants fashioned an environment for themselves, they also formed a place and established its uniqueness. (Rossi 1982, 106)

The mill and landscape exist as layers of time – time that becomes apparent through traces, within the building and also within the surrounding landscape. “Over time, the natural environment acts upon the outer surface of a building in such a way that its underlying materials are broken down. In the mathematics of the environment, weathering is a power of subtraction, a *minus*, under the sign of which newly finished corners, surfaces and colors are ‘taken away’ by rain, wind and sun” (Mostafavi 1993, 5). This is visible on the outer brick shell of the mill as it has withstood the elements for over 135 years. “In the process of subtracting the *finish* of a construction, weathering adds the *finish* of the environment.” (Mostafavi 1993, 5). To see the unending deterioration of a finish that results from weathering, the continuous metamorphosis of the building itself, as part of its beginnings and its every changing finish. Through this weathering, traces are visible on the exterior where older bricks exhibit a different color than newer. Growth of the mill through time was confirmed by the traces and weathering. Similar observations were made on the interior of the mill as well.

The abandoned structure provides a mixture of spatial perception, atmosphere, visible historical traces, evidence of past use, light and material. The interaction between these elements provides a basis to draw from when developing the



Photo taken inside existing mill. Observed trace of a previous stair before it was infilled and a building addition was added.

design for the new building intervention.

Where does the singularity reside? It resides in the single artifact, in its material, the succession of events that unfolds around it, and the minds of its makers; but also in the place that determines it- both in a physical sense and above all in the sense of the choice of this place and the indivisible unity that is established between it and the work. (Rossi 1982, 106)



Photo taken on site of existing door condition. Platform above grade suggests flood plain foundation.

It becomes all the more important, as time passes and demolition proceeds, that the best examples of architectural and historical links be retained, for the use and study of future generations. The preservation of certain landmarks does not mean establishing more museums, but rather the retaining of unique and historically valuable structures as useful objects, which again provide additional spaces for new programmatic uses or community needs (Duffus 1972, 6).

The idea of history as the structure of urban artifacts is affirmed by the continuities that exist in the deepest layers of the urban structure, where certain fundamental characteristics that are common to the entire urban dynamic can be seen. (Rossi 1982, 108)

Failure to acknowledge and connect our past histories will result in a loss of the basic fibres – our origins and memory of place.

### **Weaving as a Way of Translating and Understanding**

Weaving as a past program of the former mill, was used as part of the design method as a way of translating and understanding. The design relates to weaving in the same way that it is connected and layered. Programs and flows weave in and out of different thresholds allowing circulation throughout. Weaving is dependent on the vertical and horizontal elements, the warp and the weft. Without one, the other cannot function and the cloth as a whole cannot exist. The act consists of an organizational aligning of threads, in specific order to compose a structural fabric. Each and every thread serves its contribution to maintaining the integrity of the structure. If one becomes weak, the rest of the system suffers, as each thread is interlocked with another to create the woven textile. Metaphorically, this can be related to the idea of interdependency within a structurally sound building framework. Similarly, on a larger scale, can compare to a thriving landscape, where each element or biological community contributes to the flourishing ecosystem. Woven textiles can provide a way of understanding layers through time, while metaphorically bringing light to understanding the different layers of building or landscape growth.

The present is the continuation, the re-inactment of the past, modified of course by intervening events, but the community is constantly reminded of its original identity and its ancient pledges. The emphasis is on the continuity of history. (Jackson 1980, 98)

As an attempt to better understand the historical layers within the existing building and within the landscape of the selected site, architectural explorations through weaving were done

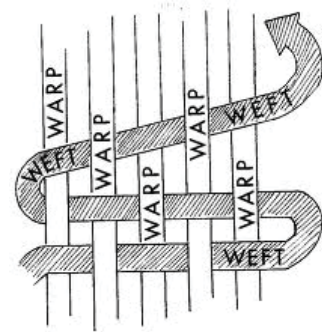


Diagram showing warp and weft thread directions. Warp is always in tension, and weft thread is woven through the warp threads.



using various materials and weaving structures. Since weaving is a material-based practice, it can take on a variety of forms depending on the material being used. Besides color and structure, texture is a dominant element in weaving as it communicates through touch, igniting the imagination. Weaving is a process that depends upon elements which repeat themselves as a continuous process. Due to this nature, a piece of woven fabric could be related to the urban fabric of a town. Since urban fabric is the physical form of towns and cities, like textiles, both come in many patterns depending on material used and repetitive structure.

The elements are patterns. There is a structure on the patterns, which describes how each pattern is itself a pattern of other smaller patterns. And there are also rules, embedded in the patterns, which describe the way that they can be created, and the way that they must be arranged with respect to other patterns. (Alexander 1979, 185)

Within a woven textile piece, traces can be seen of the maker and their intentions of the created form. The structure is expressed with each fibre working together. With this sequence, I plan to translate my explorations of the weaving structure to communicate architectural and landscape design methods.

The same principles can be applied when designing for existing buildings and landscapes. The materials chosen must speak to the existing fabric, otherwise created tension may cause disruptions, like in a woven textile. When different materials are inserted into the existing system (warp), what occurs to the existing fabric? The materials inserted create a different timeline and tension that act together to form a new narrative of the piece. This can be seen in some of the exploration samples that were woven on a floor loom.



Material exploration, inserting various materials such as raw wool, hemp, and straw derivatives into the white, cotton warp.

## Architectural Exploration Through Weaving

The idea of weaving, as applied to this project, was done as a way of representing layers through time. In addition, analyzing how each new material responded to the existing framework. Depending on the thickness or type of material inserted as weft, the warp responded different to how it wrapped itself around it.

Gottfried Semper believed that architecture comprised four rudimental elements – ceramics, carpentry, masonry and textiles – but it was the textile process that occupied most of his attention (Semper 1989, 100). Enclosures (walls) were said to have their origins in weaving, just as fences and pens were woven sticks, the most basic form of a spatial divider still seen in use in parts of the world today is the fabric screen. Only when additional functional requirements are placed on the enclosure, such as structural weight-bearing needs, does the materiality of the wall change to something beyond fabric.

For centuries, Semper believed building types retained the symbolic forms of their earlier architectural pre-decessors. The geometric patterns produced in brick and stone walls, were an active memory of the ancient weavings from which they were derived (Houze 2006, 295). The former mill displays patterns of such traces on both the interior and exterior of its brick shell. The bricks are also derived from the clay and mud of the landscape where it stands. The red color represents the origins of its place. The weathering of the older bricks is evident as the color is visibly different than the new as well as the tactility.

Weaving and architecture have a close relationship with a long history, as both forms are primary to providing protection from the elements. Like buildings, textiles are composed of many



Layers of the landscape as represented in a woven textile. Each color representing a different element of the estuarine landscape. Water, earth, mud, grass, rain, all represented together as an interconnected system.

layers, many of which are composed of certain materials from a specific place and time. This allows a textile piece to retain cultural meaning, just as a vernacular building exhibits a sense of culture and place. According to Wagner's own teachings, "a successful building does not merely evoke tradition; rather it must also reflect its own time." (Houze 2006, 297).

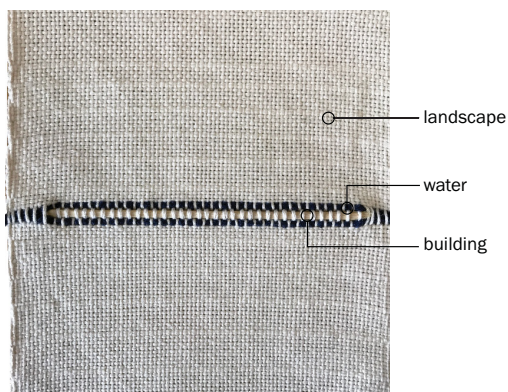
One can say that the city itself is the collective memory of its people, and like memory it is associated with objects and places. The city is the locus of the collective memory. This relationship between the locus and the citizenry then becomes the city's predominant image, both of architecture and of landscape, and as certain artifacts become part of its memory, new ones emerge. In this entirely positive sense great ideas flow through the history of the city and give shape to it. (Rossi 1982, 130)

Various objects were collected in and around the selected site of study. The objects' color, materiality, texture, size, and weathered feel all depict elements of the mill as a structure that has been changing through time. The objects speak to the place that they originate from. The objects helped to inform material choices for new design interventions.



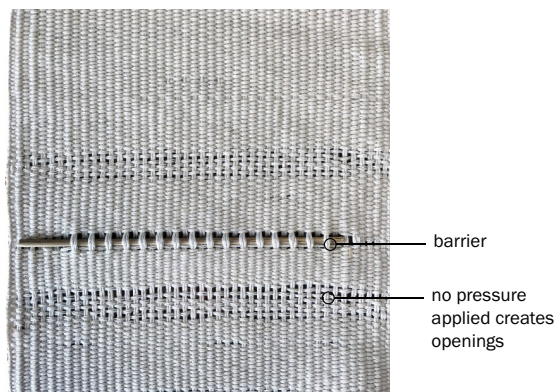
Objects found on site in October 2018 that are derivatives of the decaying building. Collected to help inform material inspiration for design.

**BUILDING**

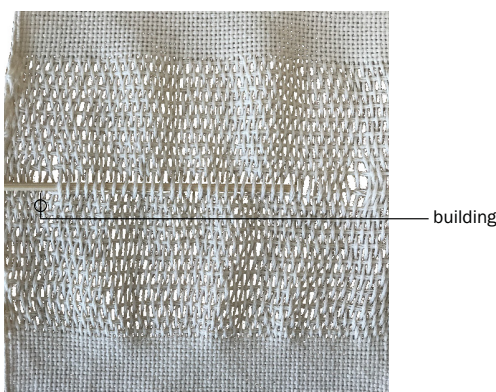


Due to the presence of the blue thread representing the water in contrast to the natural landscape, the architectural design becomes accentuated.

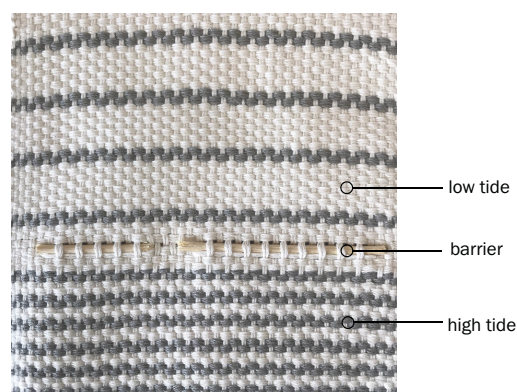
**LANDSCAPE**



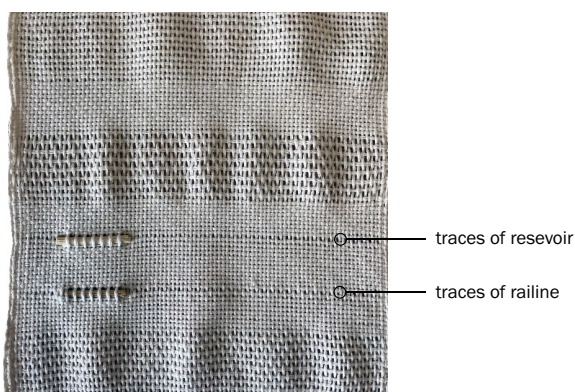
Applying different pressures, water can create different traces of the landscape over time. When fluidity is forced one way by a barrier, it creates different systems through persistence, which leads to new landscape features.



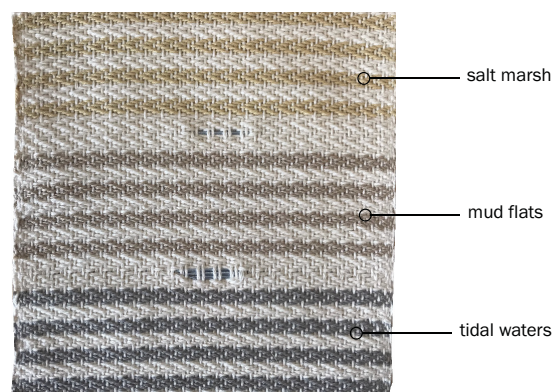
Once an object is removed, how can it be re-inserted into the warp/landscape? If the warp represents the building, how does re-insertion occur in an existing ecological system? How is it woven back in? Using a similar weaving structure or different? This also applies to design methods.



Tides are consistent even when barriers are inserted. The rhythm of the tides is never thrown off by external factors. How can this inform architecture and vice versa?



The traces that a small foreign object can leave in the woven structure represents the traces left on a natural landscape. How can these be incorporated and reclaimed into the design?



The salt marsh, the mud flats and the tidal waters all work in a symbiotic relationship. Without one, the others can not thrive. Together they are interlocked, like a woven system.

Weaving exploration. Studying different structures while inserting foreign objects into the weft. Objects leave traces in overall structure. Different pressures creating different effects and transparencies.



*Structure*



The woven textile sample explores how new structure is woven into the old. The layers become prominent depending on color, material and weathering. The inserted objects are pieces of brick found on site. They are held in by linen warp threads. The flax plant, from which linen is derived, grew in abundance in the Windsor area. It is a derivative of the landscape and used as the warp for all samples.



*Water*



The woven textile sample represents the artificial lake in comparison to the natural, flourishing salt marsh tidal water. The causeway becomes a barrier, choking the river, creating a form of natural vs unnatural. The different layers of blue represent the different layers of life within the tidal waters and salt marsh. (Photo: Devet 2017)



*Landscape*



The variance within the layers of the landscape are explored in the woven sample. Various plants found on site were inserted adding tactility and dimension. The linen warp remains constant solidifying the integrity of the piece.



*Industrial Traces*



Inserting industrial objects found on site, reflecting upon past program of the mill and its history, they contribute to the building's narrative. The cotton and wool were found inside the mill which speaks to the function and program of different spaces within the building. The soft and rigid contrast between the inserted objects is prominent against the linen. (Photo: Nova Scotia Archives 2019)

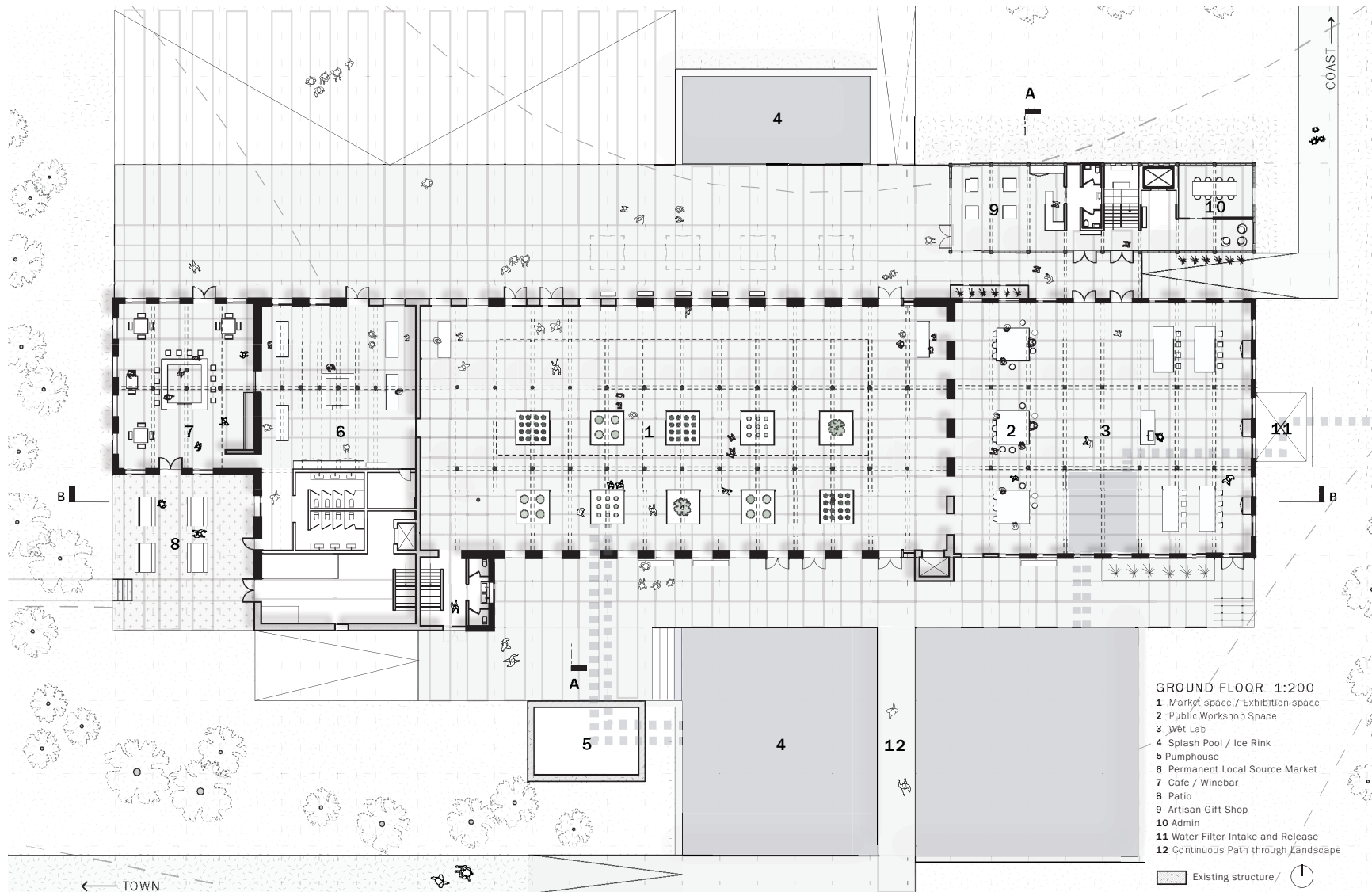
## **CHAPTER 6: DESIGN**

This project addresses the former Nova Scotia Textile Mill through an adaptive reuse while also reconnecting it to the town and the landscape. All three of these interventions are necessary to achieve a shift in the mill's current state of isolation, while allowing users to reengage with their natural landscape and layered history of place.

### **Adaptable Programs and Anchor Programs**

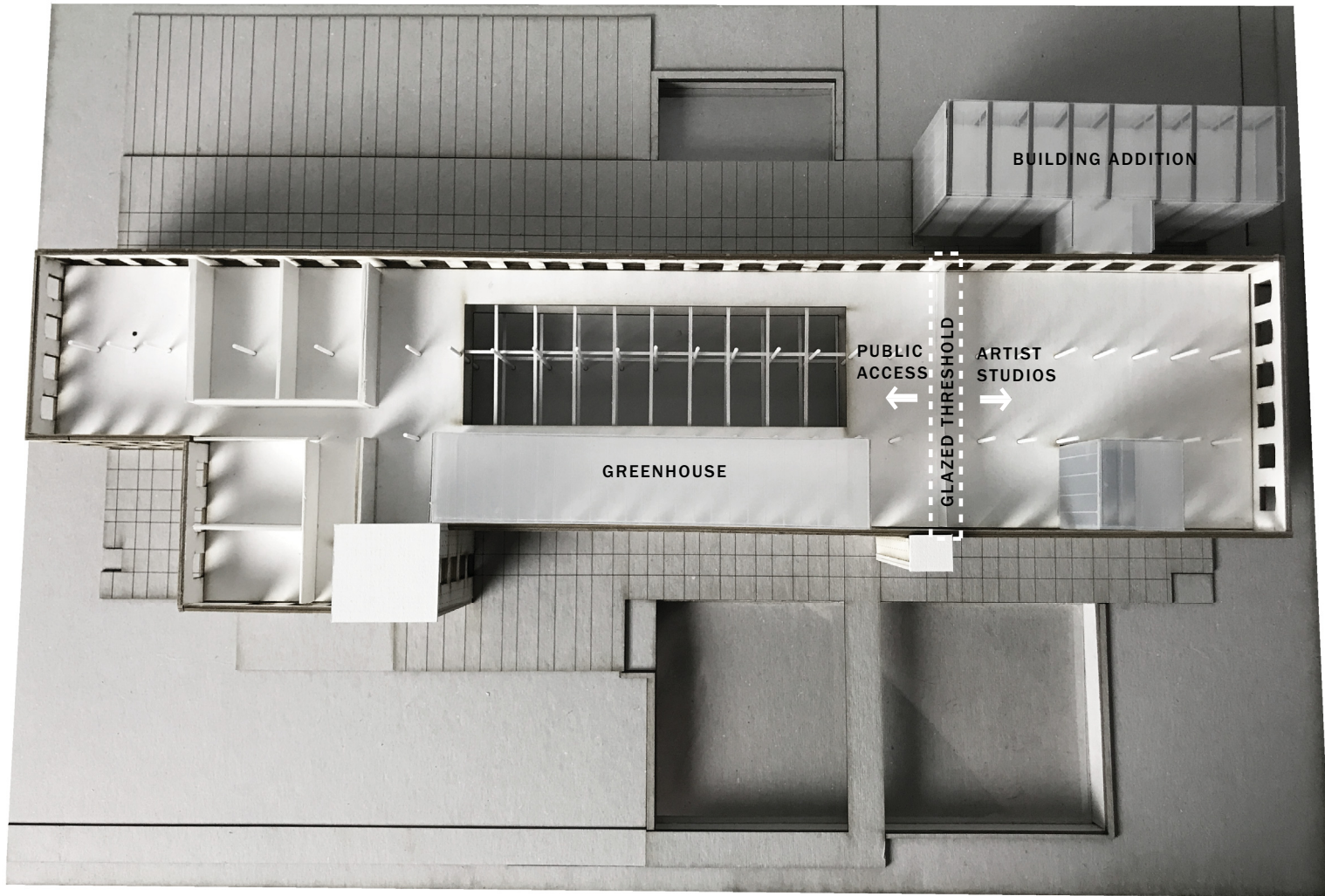
The existing mill has an open, free plan which allowed for several new programmatic interventions. The mill intends to serve a program for local researchers and artists in residence while also serving the public with a variety of programs with a focus on learning and engagement. All new interventions that exist on the ground floor and surrounding landscape are public oriented. The main central space of the building will serve as an open market with stalls of fresh produce grown in neighbouring communities as well as from new designed greenhouses that will exist on the second and third floor. The stalls are temporary and intended to be re-organized in order for the space to serve different functions such as exhibitions or event gatherings.

At the east end of the building, on the ground floor is a space for public workshops held by researchers and experts related to their field. The collaborations are aimed to inform the public with knowledge of local species and ecological research of the area to stress the importance of natural integration on a macro scale. On the second and third floors above, exist the research based labs and artists' studios. The labs and studios are exposed to the public by glazed thresholds to demonstrate their work of the local area.



Ground floor plan. Original scale, 1:100



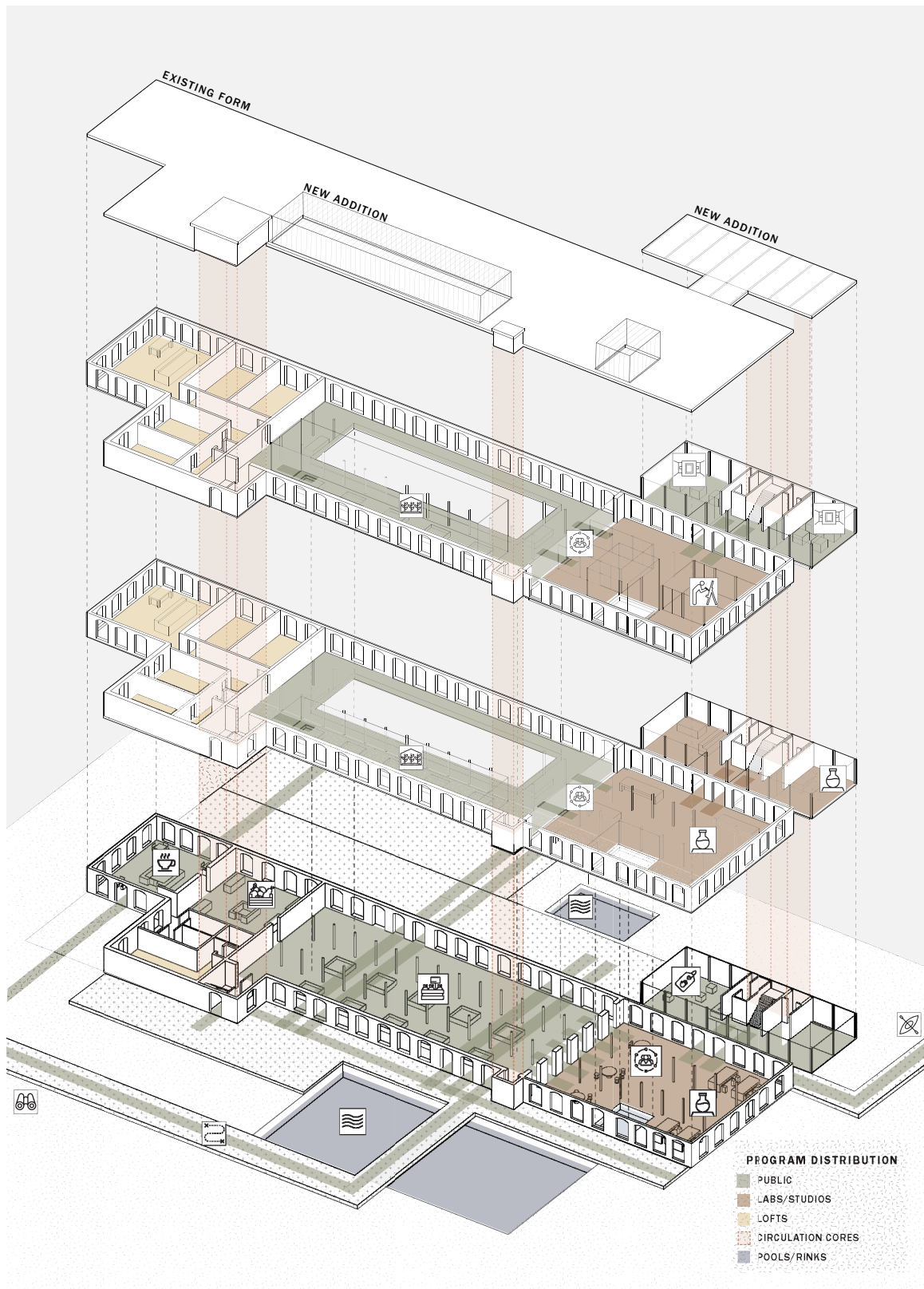


Physical model at 1:200. Roof removed to show interior.

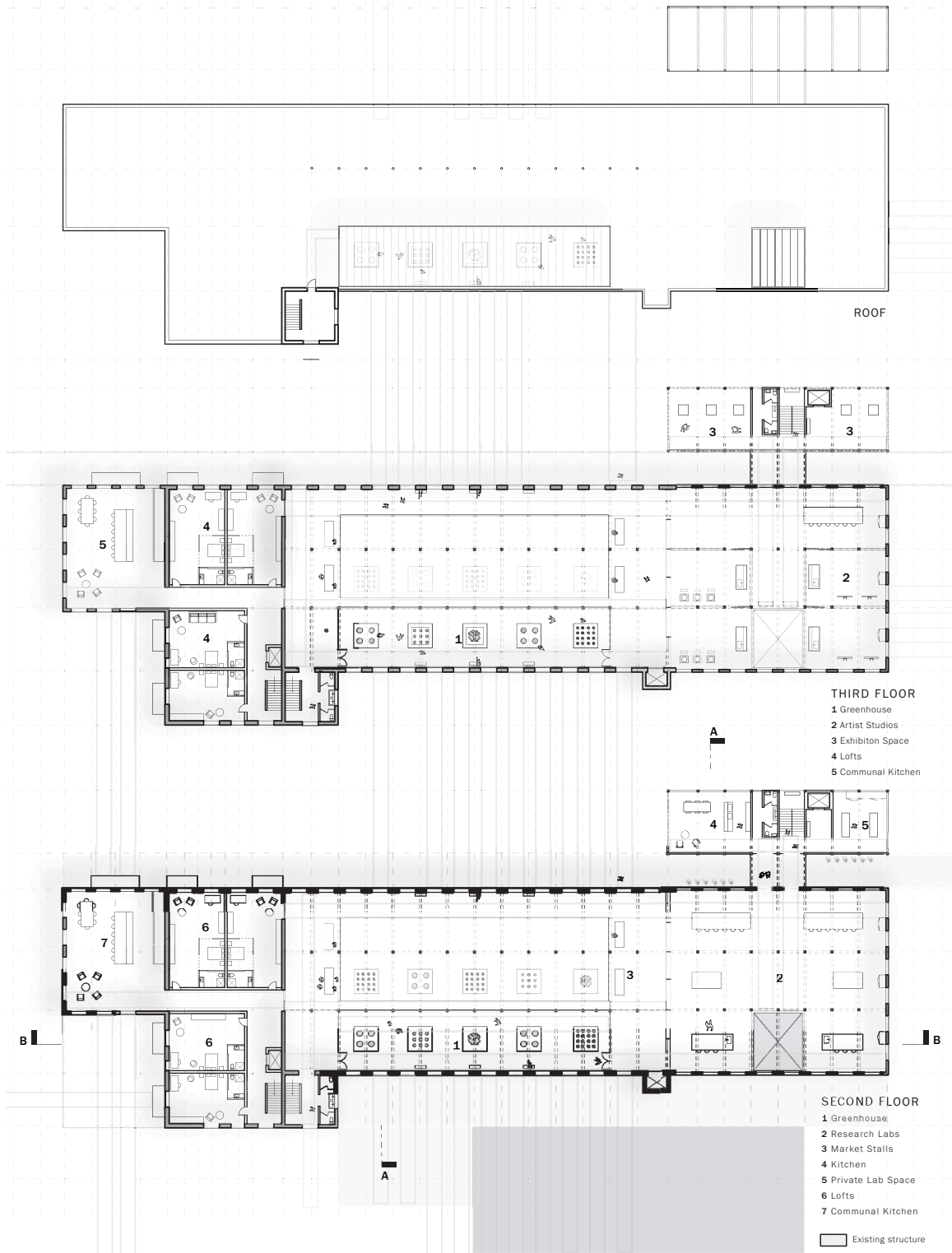
On the second and third floor in the main central space along the south façade exist two greenhouses, accessible from the main stair core or elevator. The researchers will use one of the greenhouses for their studies and to demonstrate their work to the town and the public. The other greenhouse will be maintained by the community and portions will supply the local market. The elevated pedway that circulates around the triple height space in the central part of the building allows users to weave through the greenhouse, observe artists at work, and experience the mills traces through the exposed structure.

Lofts are located on the west end of the building on the second and third floors with a communal kitchen for all units. The communal kitchen encourages interaction between researchers and artists. A public café/wine bar and permanent local source market exist below on the ground floor facilitated by town residents.

The cross programming that will exist is an integral part of the design as the threshold moments where programs overlap are designed to encourage collaboration between different groups. These collaborations are intended for transfer of knowledge in order for the town and surrounding communities to grow with rich knowledge of their surrounding natural landscape. In addition, the existing mill sits on an elevated platform that continues to its exterior and surrounding landscape. The internal structural patterns of the mill are carried out to the paving of the elevated platform to connect with the surrounding landscape suggesting movement from interior to exterior and vice versa, emerging users in extensions of building and landscape.



Exploded axo showing program distribution, vertical flows and horizontal flows. The flows suggest different circulation patterns, through building and out toward landscape.



Second floor, third floor and roof plans.

**NEW PROGRAMS**

FARMER'S MARKET



GALLERY / EXHIBITION SPACE



ARTISAN GIFT SHOP



COMMUNAL WORKSPACE



RESEARCH LABS



ARTIST STUDIOS



LOFTS



CAFE



PERMANENT LOCAL SOURCE MARKET



POOL / SKATING RINK



KAYAK PAVILION



BIRD WATCHING TOWER

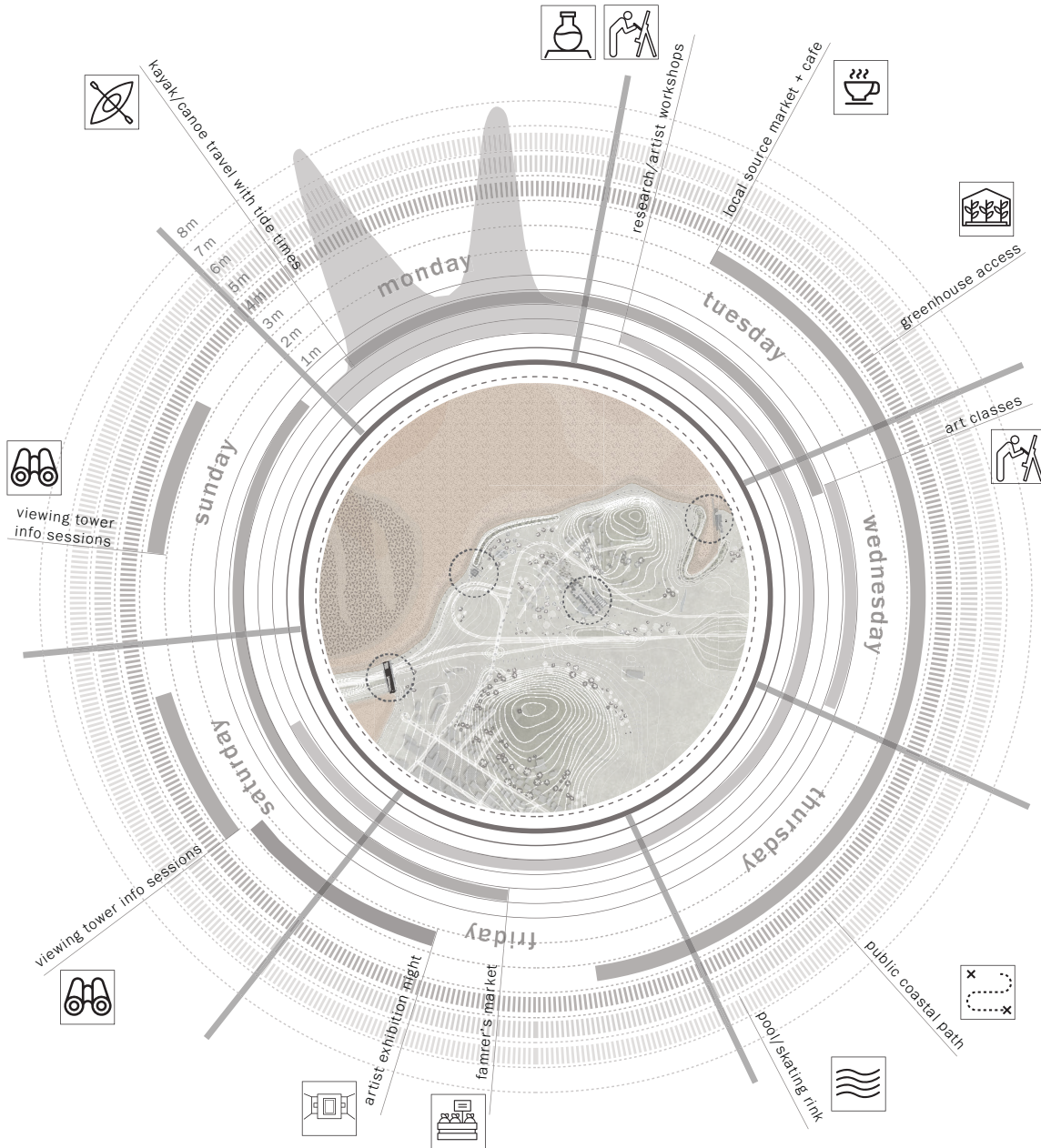


COASTAL WALKING PATH



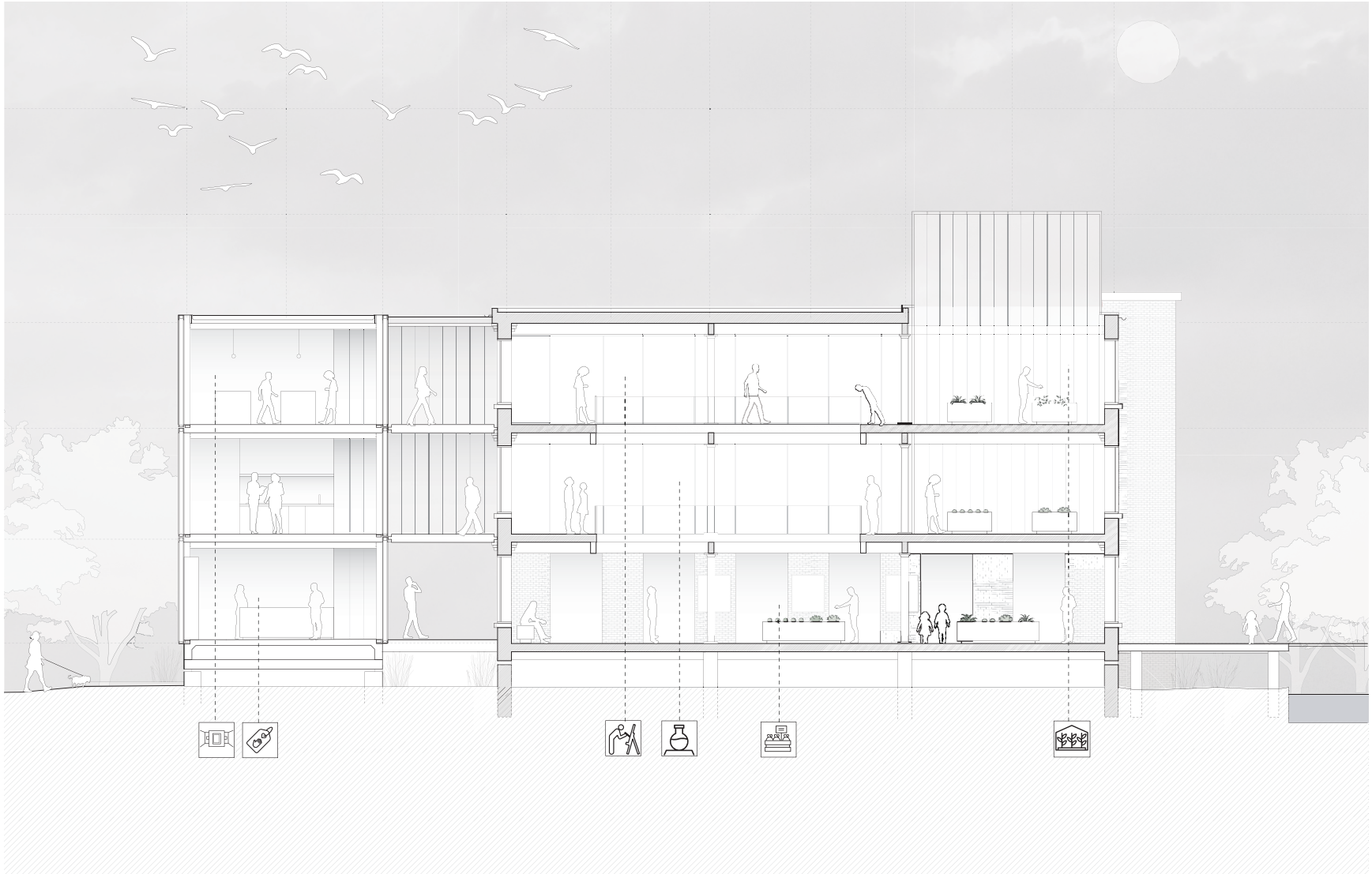
GREENHOUSE

New programs to be inserted in re-designed mill. Program icons correspond to their locations in following drawings.



WEEKLY SCHEDULE OF ADDITIONAL  
PROPOSED PROGRAMMING  
**2030**

Diagram showing the proposed events/programs that will exist with the new design on a weekly schedule.



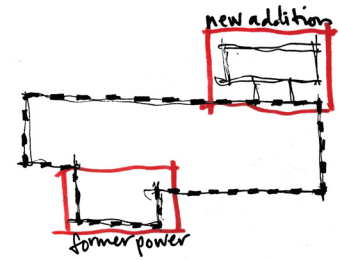
Section A-A

## Structure and Rhythm

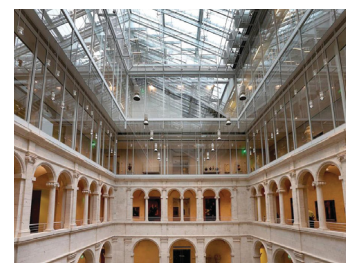
The previous histories of the mill's function and form were studied to help suggest the placement and structure of the new building addition. As technologies change with time, and materials develop, the new addition follows the pattern of the past and uses steel as the primary structure. The addition attaches to the existing building on the north-east facade. The addition in this location creates a balanced framing to the opposite side of the building where the industrial power was formerly generated.

The structural dimensions of the steel posts found in the mill's most recent addition helped to suggest the repetitive structure for the new addition. A blackened steel frame exists as the primary structure, clad in a c-channel glass façade system, with varying transparencies corresponding to program. The translucent glass façade accentuates the rigid steel structure, which reflects the same pattern as the steel posts concealed inside the mill's brick walls. There are pedways that bridge between the new and the old on the second and third floors. These bridges allow users to travel through existing openings in the mill to and from the new structure while being exposed to the existing raw structure of the mill.

The Harvard Art Museum renovation by Renzo Piano was considered for its structure as a case study. In particular, the glass division that separates the new renovation from the old existing illuminates at night, accentuating the two different buildings. A similar approach is taken with the new designed additional building and how it meets the existing textile mill. Bridges on the second and third floors connect the old and the new and is clad in channel glass, accentuating the primary structure. Additionally, the rhythm of the existing columns in the internal

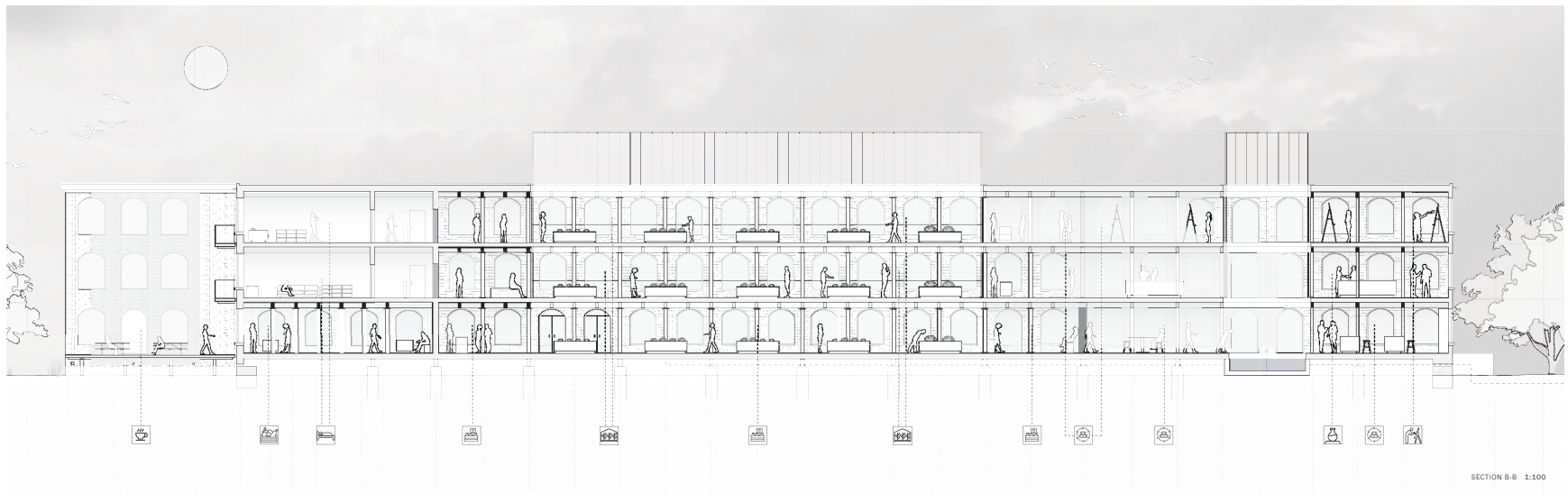


Sketch showing plan of mill. Red boxes highlight the balance between new addition and former power room. Both forms protrude from rectangular mass of the building.

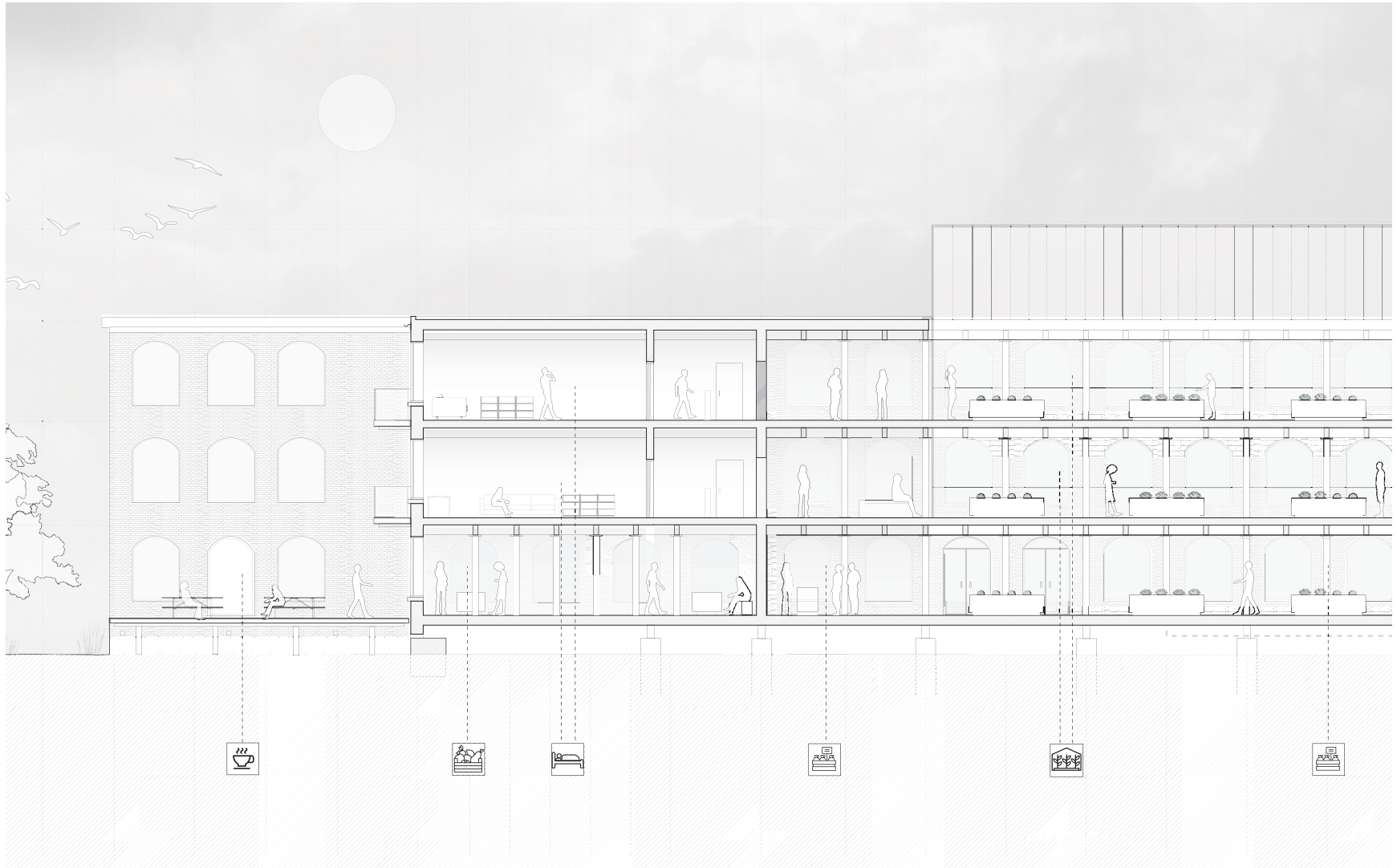


Exterior (above) and interior (below) of Harvard Art Museum renovation by Renzo Piano (Renzo Piano Building Workshop 2019)

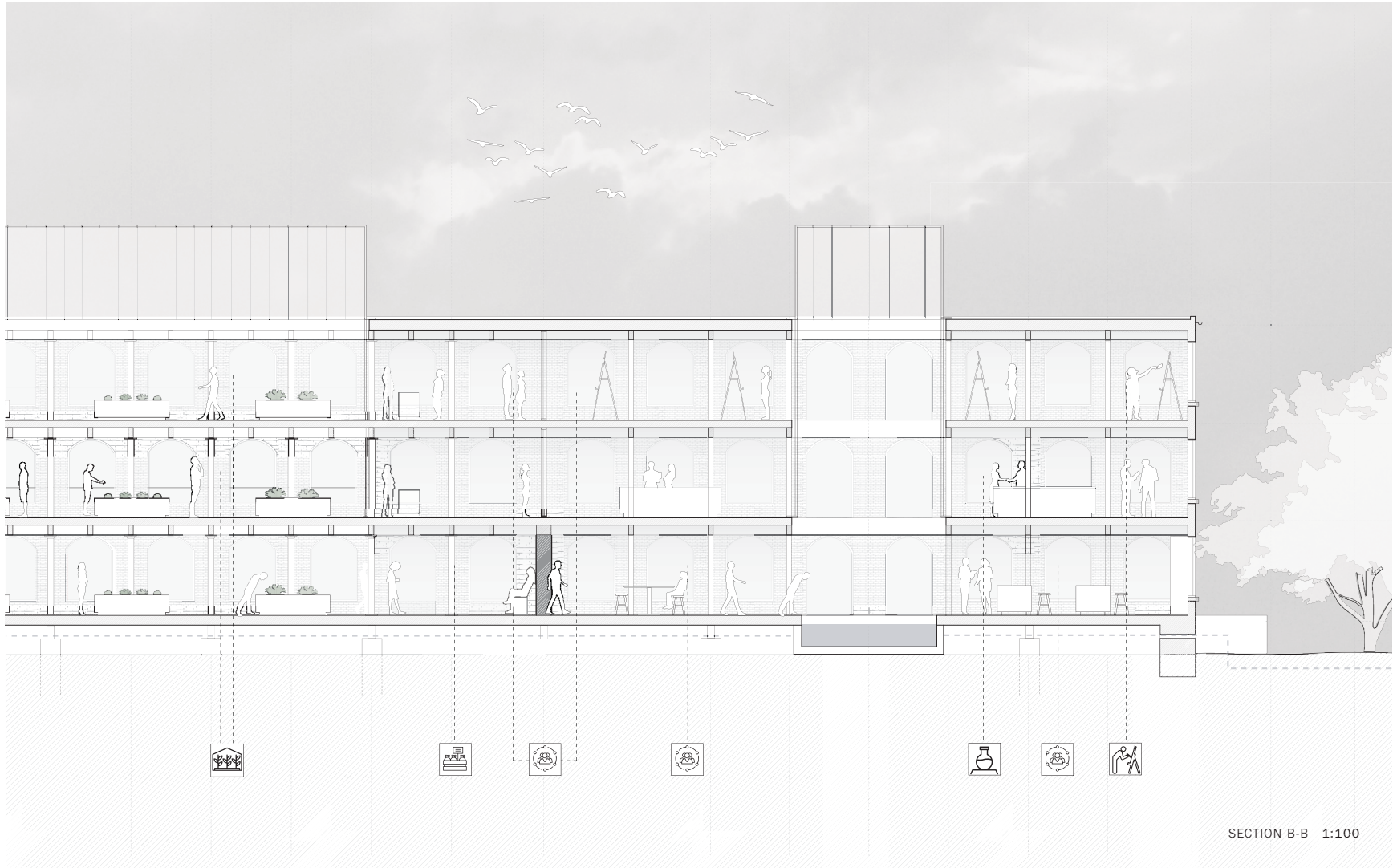




Section B-B



Section B-B, Part 1



Section B-B, Part 2



Photo of model showing distinction between existing mill and new addition.

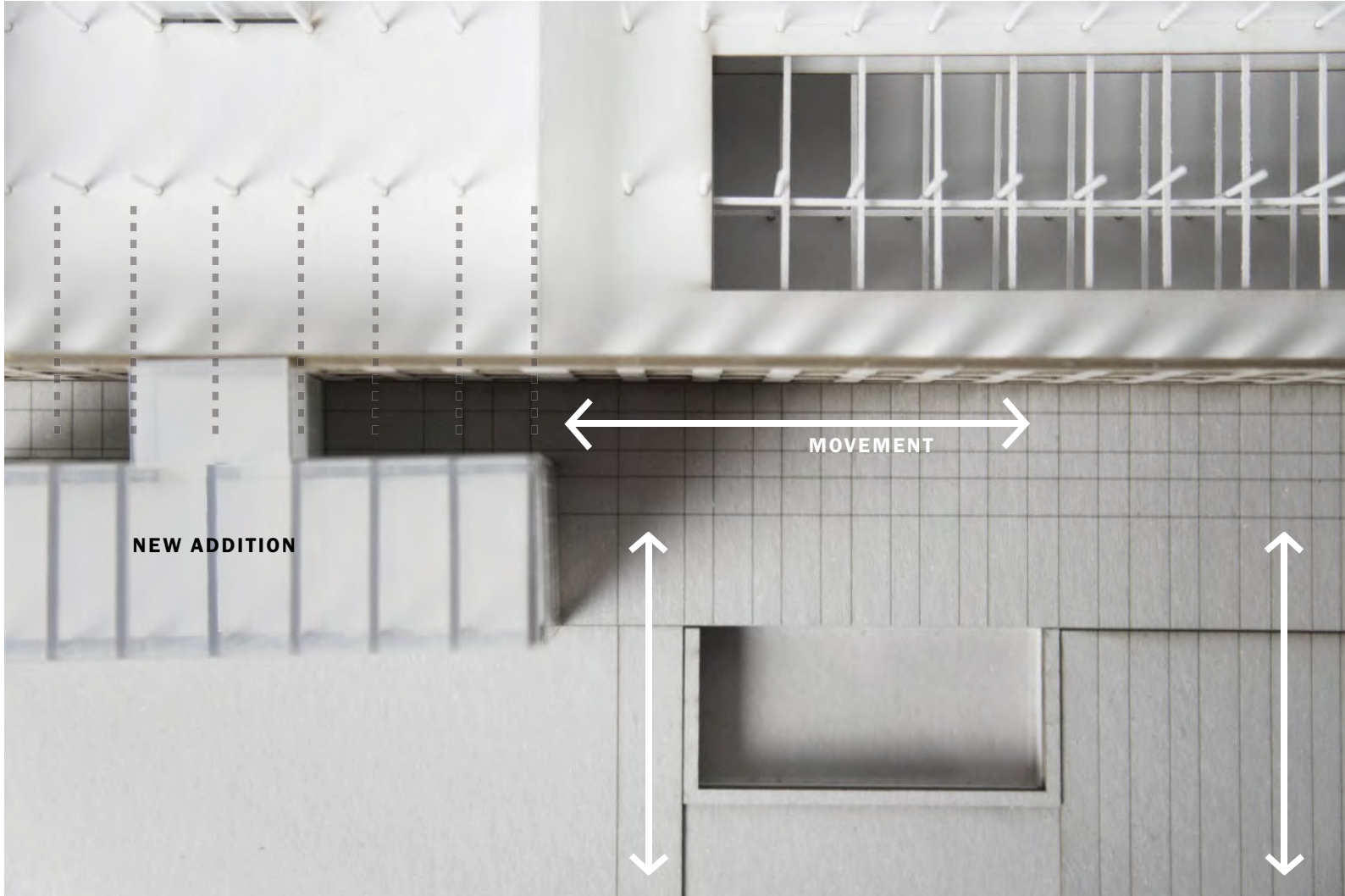


Photo of building model with roof removed, showing structural patterns within the building and surrounding landscape. Circulation movement shown with white arrows.

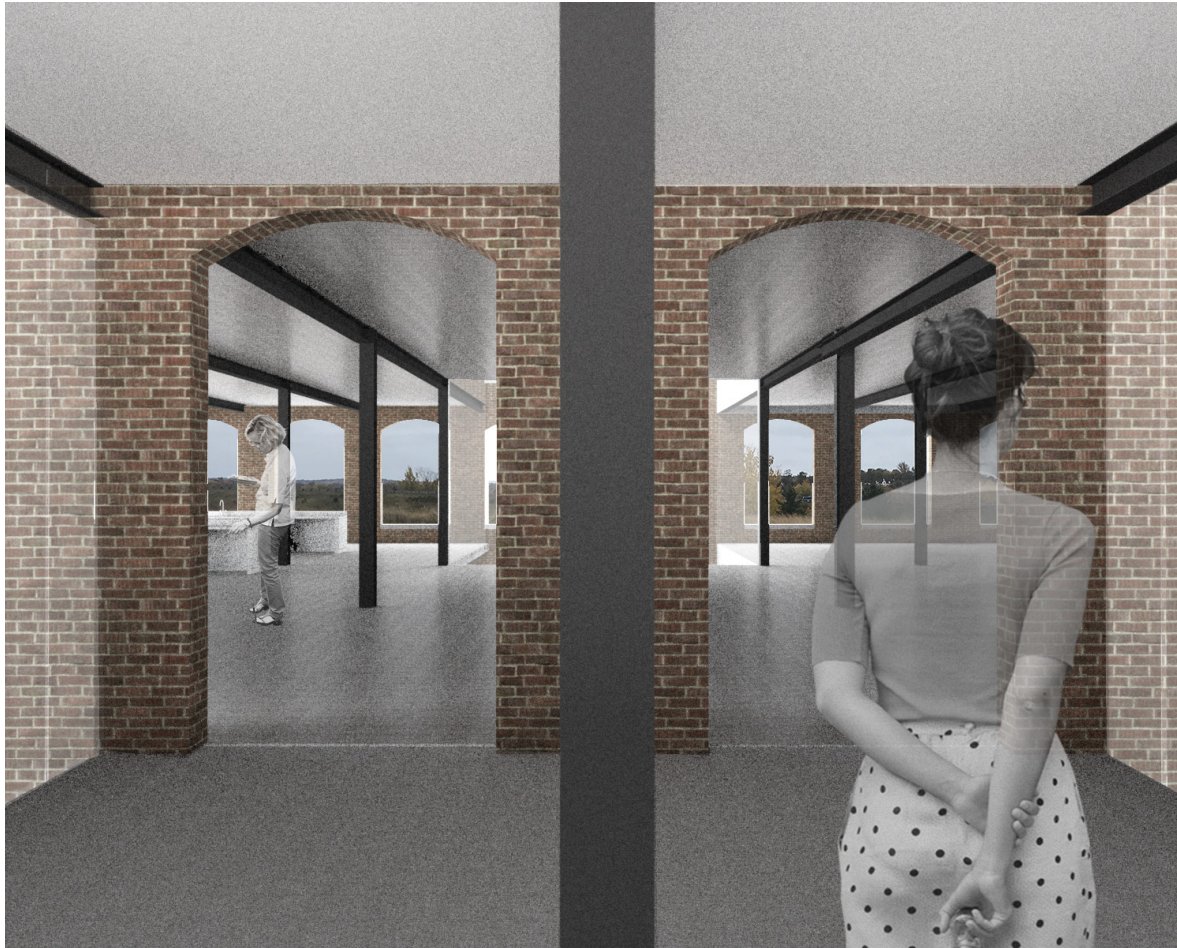
courtyard of the art museum renovation are carried through with the structure of the steel mullions of the new atrium. This idea helped to inform the design move of mimicking the structural dimensions of the interior posts and using those materials and patterns for the primary structure of the new addition.

On the ground floor of the addition exists a local artisan gift shop, the second floor has a more private lab space for the researchers and the third floor houses two exhibition/gallery spaces for art work produced by local artists.

The approach from the north off the main street originally had no path facilitating users to the entrance. The new building addition to the north east creates a square that frames an elevated plaza filtering users to the building entrances. New designed outdoor space in this area allows for seating and a platform for outdoor events.

### **Historic Flows and New Flows**

Responding to the historical traces that were observed in the existing mill, elements in the new design addition respond subtly to corresponding histories. Threshold moments where cross programming exists are accentuated by former openings in the mill from building evolution. The new building addition attaches to the existing and allows users to flow in and out of punctured holes in the brick facade. The previous windows now become part of circulation routes. Additionally, the repetitive stone sill at the base of all existing windows is reinterpreted on new windows of the addition. The trace of a stair from previous programmatic use of the mill was reinterpreted in the new addition placed behind the channel glass as silhouettes can be seen from the exterior travelling up and down as the stair elevation is placed against the glass for observation.



Rendered view (left) of pedway bridging from new addition to existing mill. Threshold moment of former mill wall before latest building addition (right) photo taken inside existing mill.



Rendered view (left) of windows on new addition. Design referencing existing stone sills seen on windows of former mill (right).





Rendered view (left) from exterior looking in to new addition building. Stair referencing trace seen in existing mill building (right).

A visual and physical connection is needed at different scales of the project. Reconnecting the mill by providing new access routes to and from the town and along the coastal landscape near the water will immerse users in all facets of design. A new public path will connect the town and the mill to its coastal landscape, facilitating users to design interventions along the way. The design of the kayak portal allows for kayak travel on a schedule with the tides. This design responds to the historical traces of the former shipping port as the wooden piers are still present along the banks. The small pavilion sits above on the former pier posts with the walking platforms existing as separate elements accommodating the changing tides.

Continuing along the path, users will arrive at the bird watching tower. The tower provides views out toward the salt marsh and frames views of the annual sand piper migratory route. The bird watching tower responds to Fort Edward, in the same view line, out toward the water.

Lastly, the path travels underneath the existing highway allowing an easy, accessible route from the town, to and from the mill. From the highway, the mill becomes a visual appeal of activity and illuminates as a lantern at night.

Considering relationships of land, water and building, helped to define threshold moments while linking users to experience all three. This thesis develops ecological, horticultural and creative based programs that are oriented toward public engagement, with the intent of allowing users to learn and experience the past and present layers of building and landscape. Additionally, this process is used to foster a creative and positive environmental and economical strategy for the community.

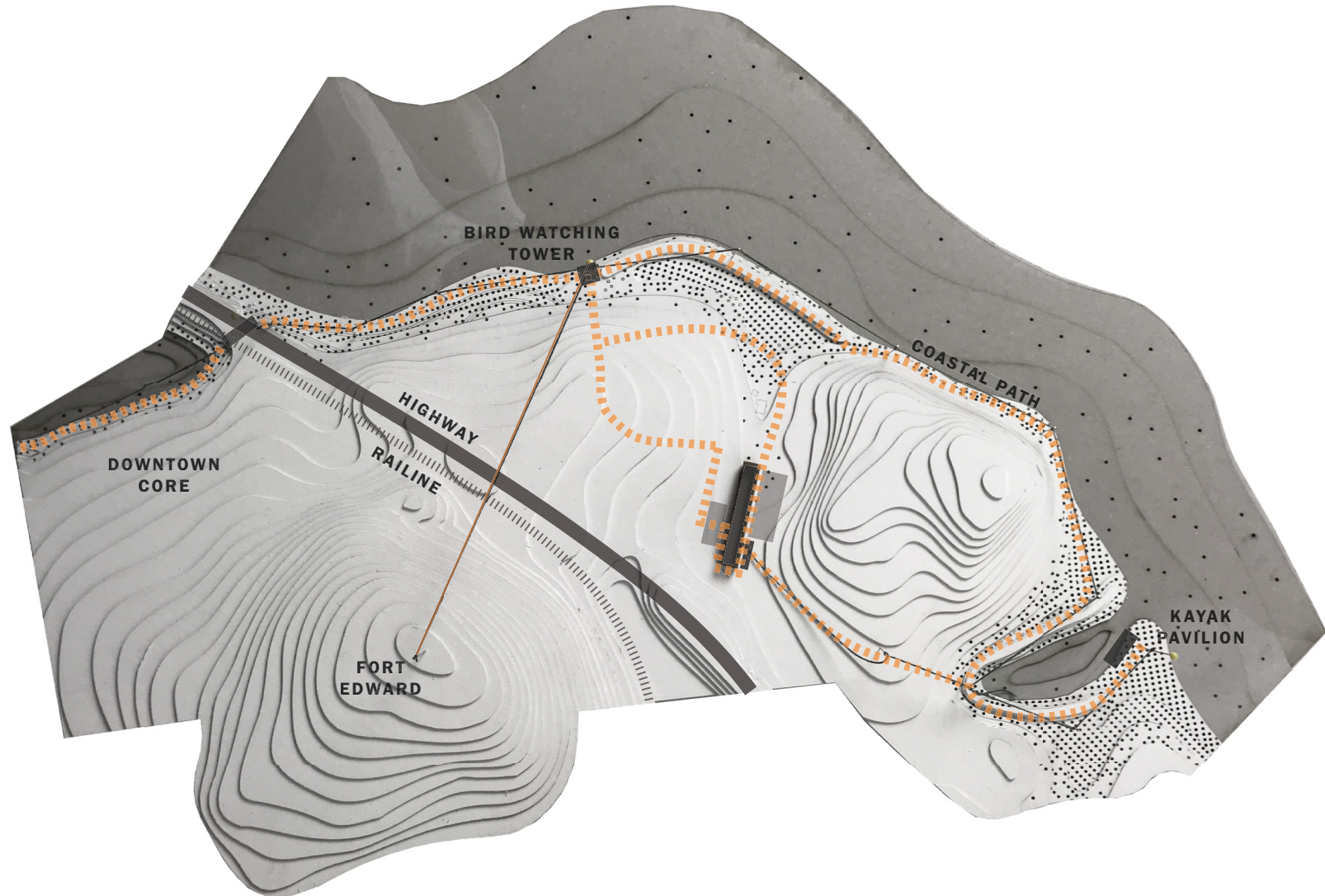


Photo of landscape model at 1:3000 showing different landscape elements used for design.



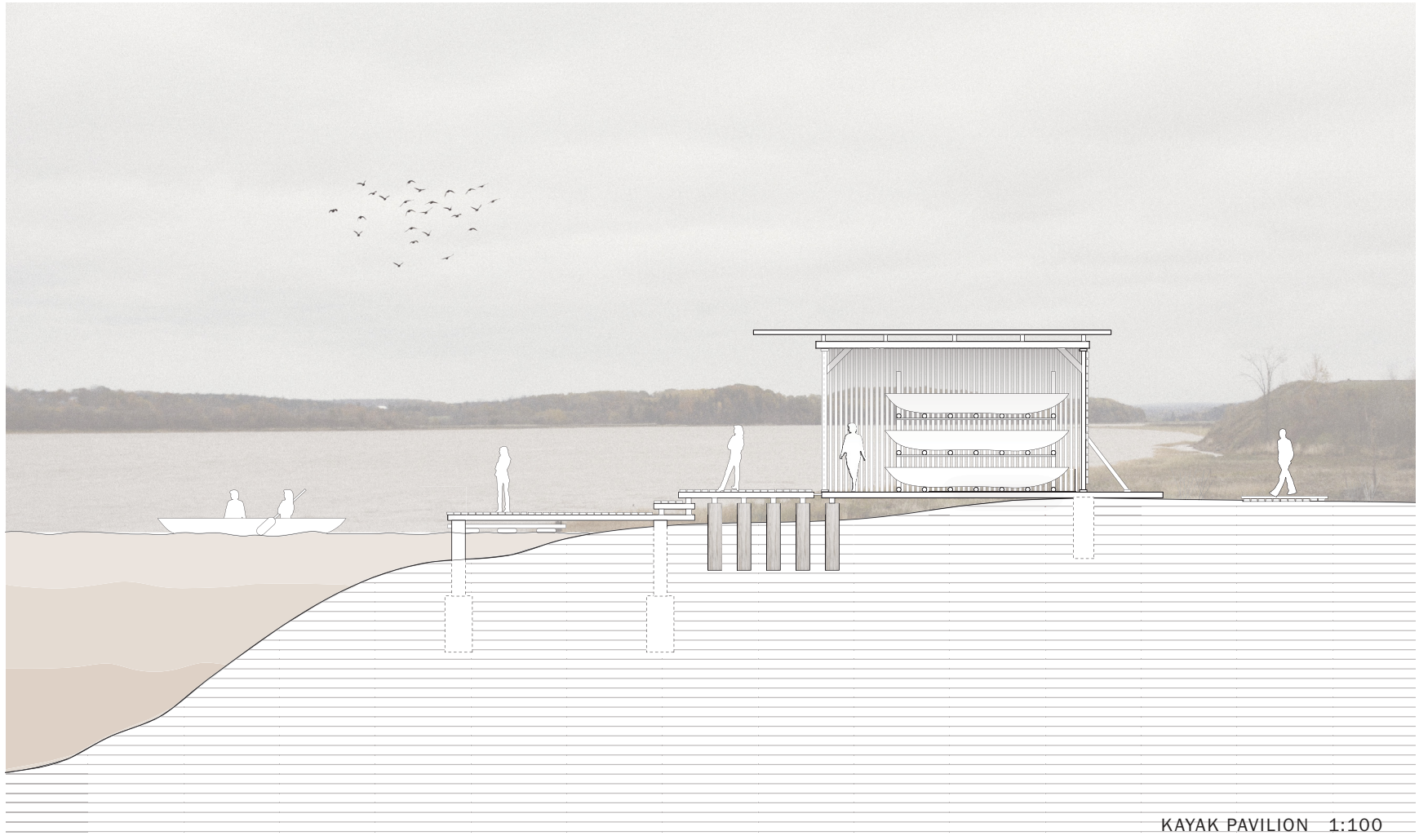
Photo of 1:200 building model looking at south facade with new bridge crossing existing resevoir in foreground.



Section of viewing tower.



Rendered view of tower and coastal path.



Section of kayak pavilion.



Rendered view of kayak pavilion.





Rendered view of kayaker in landscape at high tide.

## CHAPTER 7: CONCLUSION

This thesis uses traces of the former mill and landscape as an existing framework to draw from. This creates a dialogue between natural and anthropic traces, which are highlighted and celebrated through the adaptive reuse of the mill and surrounding landscape elements. Grounding these traces, new additions and subtractions are re-imagined as a means to re-connect the existing with new programmatic spaces, inviting new perspectives.

Thresholds play an important role in how new and old interact. Cross-programming is introduced where productive pairings between historical traces and public program allow for new interactions to occur. At these thresholds, essential public programs that engage and inform the town are integrated while also attracting passersby to foster economic growth for the community.

With the introduction of a new public path along the coastal landscape that weaves through the existing framework of the mill, users are immersed in times of the past, present and future. At the territorial scale, the connectivity of the path links the town, the mill, and landscape. It connects under a portion of the causeway to the bird watching tower and further to the kayak pavilion both situated along the coast. The tower provides new views that overlook the town, the salt marsh, and reflects upon the view plane of Fort Edward from atop the highest elevation point in the town. The kayak pavilion immerses users with the tidal waters from the departure linking them with the temporality of the landscape and allowing for unique landscape perspectives. Both interventions connect people to landscape and the natural habitat while simultaneously linking them to

existing historic traces of previous inhabitants.

Reconnecting the town to its natural landscape and industrial past, this thesis emphasizes future possibilities and provokes thought and discussion on how we treat our natural world and the environmental repercussions. The site will serve as a moment of the past and act again as a future focal point for the collective community.

## APPENDIX A: AVON RIVER SOCIETY BROCHURE

### **Fish species making a comeback in Petitcodiac River**

(CBC, Apr 26, 2013)11:47 AM AT)

3 years after causeway gates reopen, fish species that had disappeared are back. Some fish species that had disappeared from the Petitcodiac River are back, thanks, in part, to the reopening of the Petitcodiac River causeway gates three years ago.

**The causeway linking the City of Moncton and Town of Riverview was built in 1968 but had unforeseen consequences on the ecosystem and the fish species that have historically called the river home. Several fish species suffered as a result as the causeway blocked fish migration through the Petitcodiac River system. Although the causeway had a passageway to allow fish upstream, it was inefficient for most species, according to the Fort Folly Habitat Recovery Program website. Species such as striped bass and salmon disappeared for the most part from the river.**

But since the causeway gates were opened in 2010, numbers have been rising rapidly.

**Please ask for upgraded full  
fish passage!**

### **Be part of saving our animal species native to Nova Scotia**

Concerned about the extinction of animal species in the world? The tigers, the lions and the rhinoceros in Africa? How about your Atlantic Salmon right in your back yard? There are only 175 left and you can make a difference today by telling your town councilor to ask for a **FULL FISH PASSAGE** as has already been proposed by the experts.

Let's save what is native to us and to our region. It is true that fish is not as impressive and 'sexy' as tigers or lions in Africa but the Atlantic Salmon belongs to Nova Scotia and is part of our **SUSTAINABLE FOOD SOURCE** for generations to come.

Please, let's think outside of the box and find a solution that is good for everyone. We are creative people and can coexist with a natural and unobstructed environment where the Atlantic Salmon can reach its spawning ground and the American Eel can breathe again as they have done for hundred thousands of years. Let's look at the positive effects for the town of Windsor where one might witness once again the highest tides in the world as well as having world class fishing. There must be a solution that is good for all.

## **An Ecological Disaster**

versus

## **The Nostalgic Notion of a Town with an Artificial Lake**



## HOW MUCH IS A 100 YEARS?

It is **FOUR** future  
generations!

Whatever decision will be made regarding the twinning of the 101 Highway and the Avon River causeway, the decision will stand for a whopping 100 years. Yes, that is right! Four future generations will have to live with the consequences of what is being decided today.

100 years is a long time and a lot of responsibility to put onto generations to come! Correspondingly, whatever IS decided must be done with the utmost consideration and respect, not just for us, but also for the future children and grandchildren after us.

Will we really want to tell our great-grand children that we agreed to the Atlantic Salmon extinction, and hence what could have been their sustainable food source, because of a canoe club?

## ...AND ANOTHER SPECIES GOES EXTINCT

Atlantic Salmon (*Salmo salar*- Inner Bay of Fundy population)

The American eel (*Anguilla rostrata*)  
... AND WHY?

The Atlantic Salmon suffers as a result from the Avon River causeway which blocks off its fish migration route to its spawning grounds down from the salt water Avon River up to the fresh water rivers on the Windsor side. This means that the salmon cannot fulfill its life cycle. "The Avon River causeway CHOKES OFF all migration and hence the propagation of the fish."

The American Eel is endangered due to the lack of oxygen caused by the causeway which chokes off water flow and oxygen exchange necessary to sustain its life.

Furthermore, Dr. Michael Risk of the University of Guelph, researching the build-up of a new mud flat on the seaward side of the causeway, "estimated that the bottom-dwelling creatures at Windsor were experiencing a two-thirds mortality rate", which led him to state the new formation was a "biological desert".

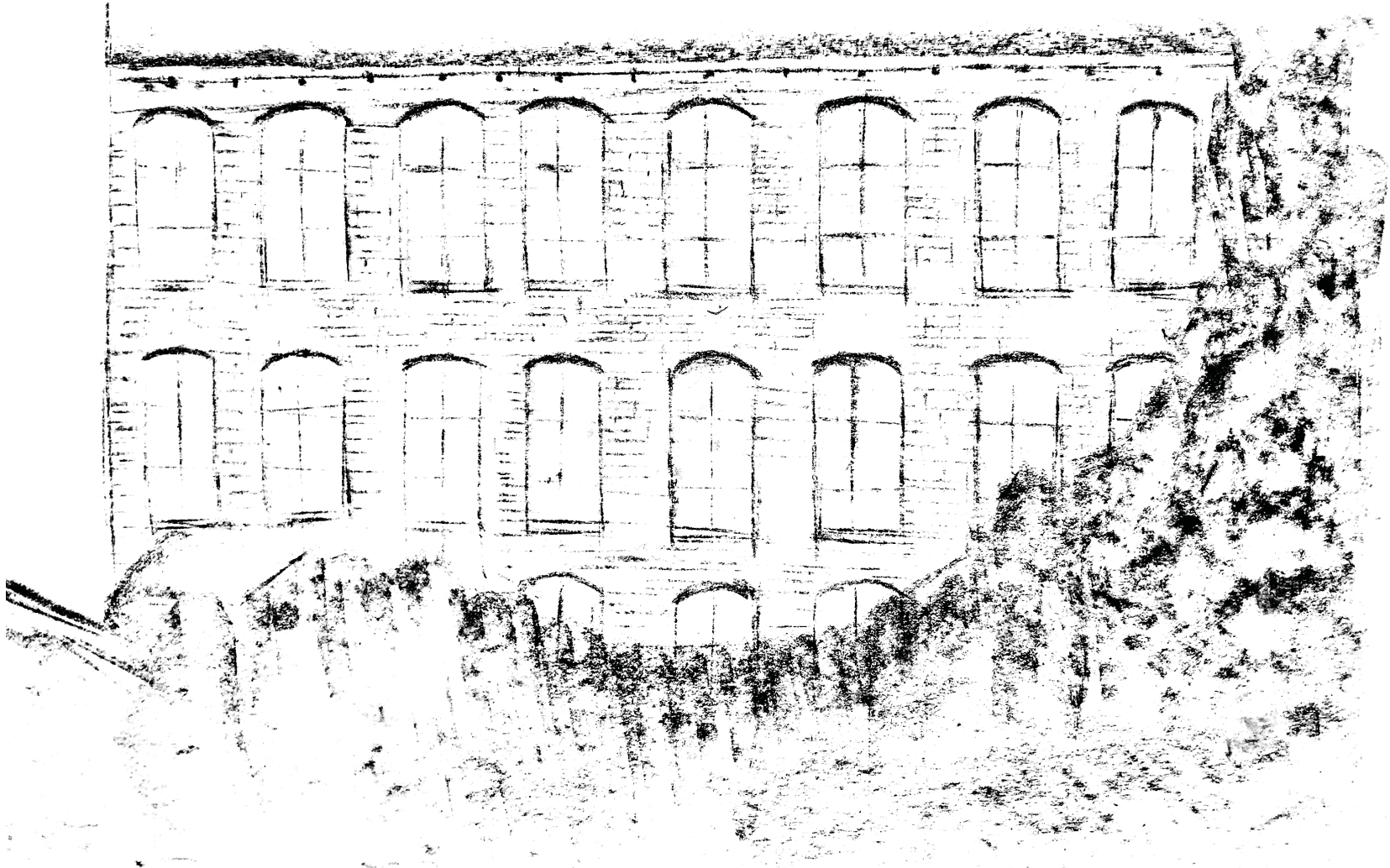
## Can we really justify the decision to continue to choke off the Avon River with all its consequences for the Atlantic Salmon and the American Eel?

According to the Department of Fisheries and Oceans (DFO) website, the Inner Bay Salmon population was AT ONE POINT 40 000. Now there are only 200 left even though the estimated number has been stated as low as 125.

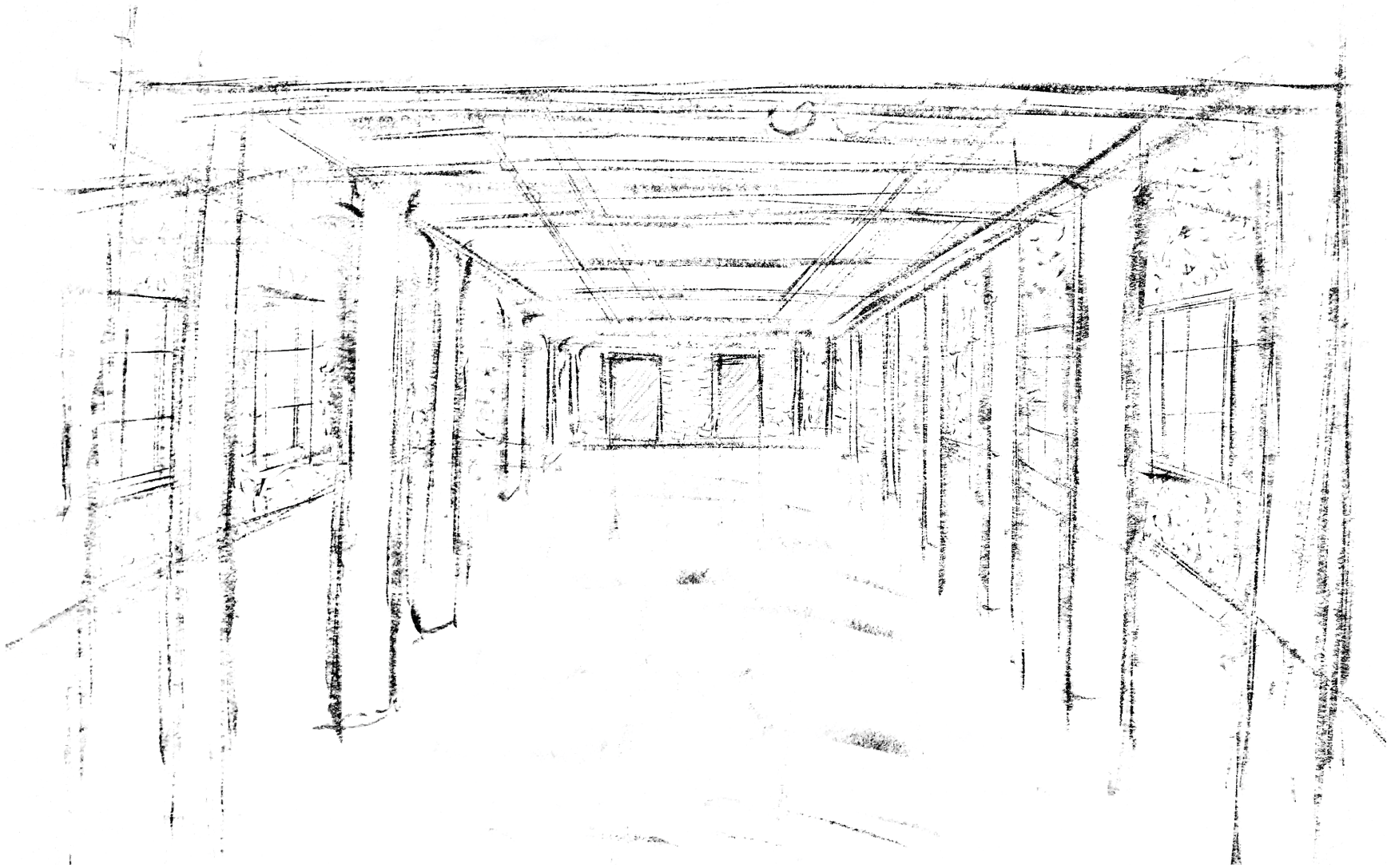
Hence, the Atlantic Salmon is listed by the Federal Government under the "Species at Risk Act (SARA) which is to prevent wildlife species in Canada from disappearing and to provide for the recovery of wildlife species.

This implies that, if the laws in Canada hold true, any decision made to continue to obstruct proper fish passage which prevent the recovery of wildlife species, like the Atlantic Salmon due to the Avon River causeway, is in violation of the Canadian law and lawsuits can ensue. It is advisable to take this fact into consideration before making any decisions.

## APPENDIX B: B1/M5 CHARETTE DRAWINGS

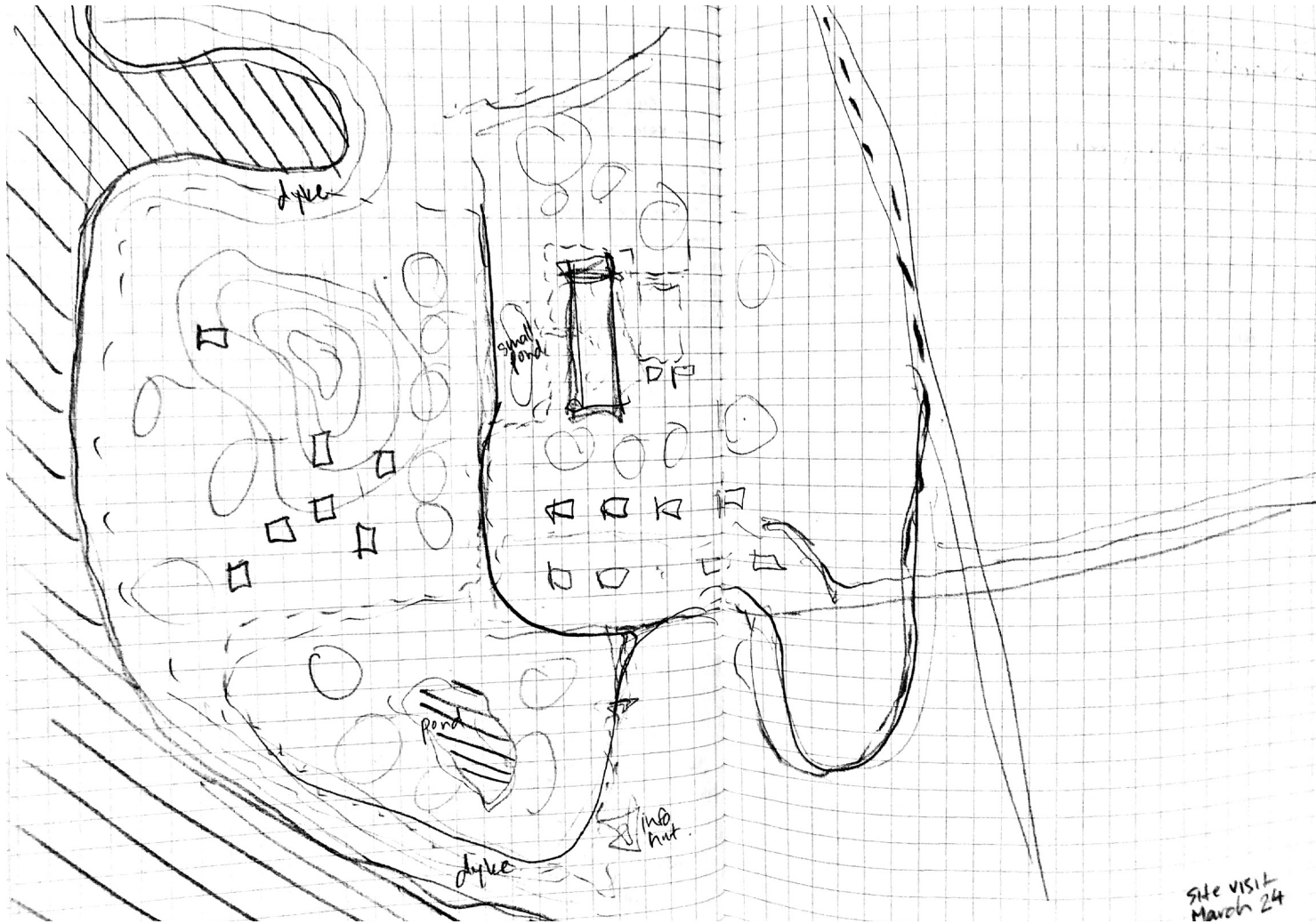


Conte drawings of existing mill done for B1/M5 charette. Focus on window pattern and repetition. October 2018.



Conte drawings of existing mill done for B1/M5 charette. Focus on open floor plan. October 2018.

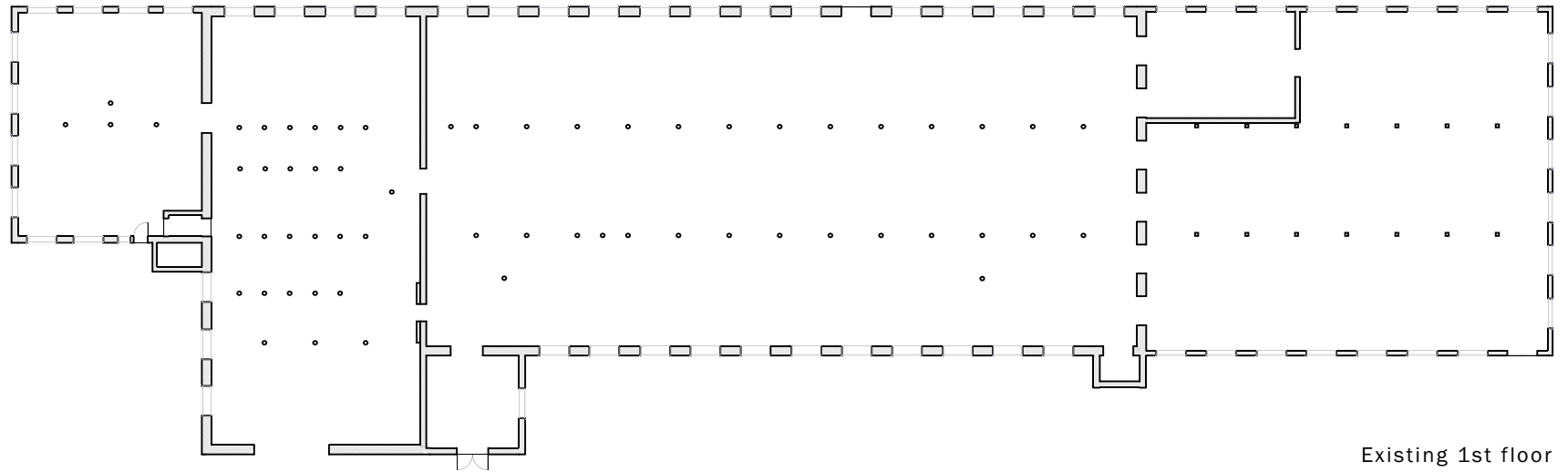
## APPENDIX C: SITE STUDIES



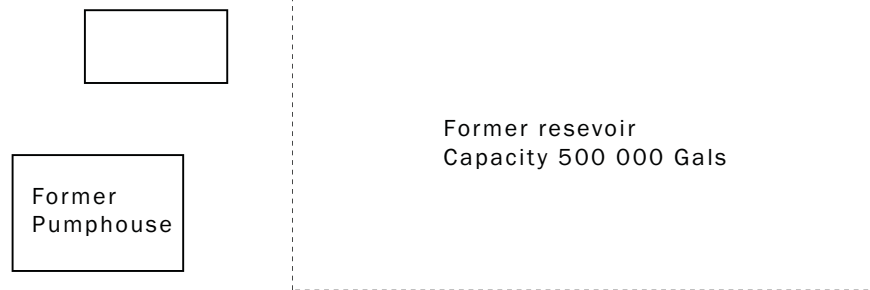
Site map drawing of route walked during site visit on March 24th, 2019. Weather was sunny and windy.



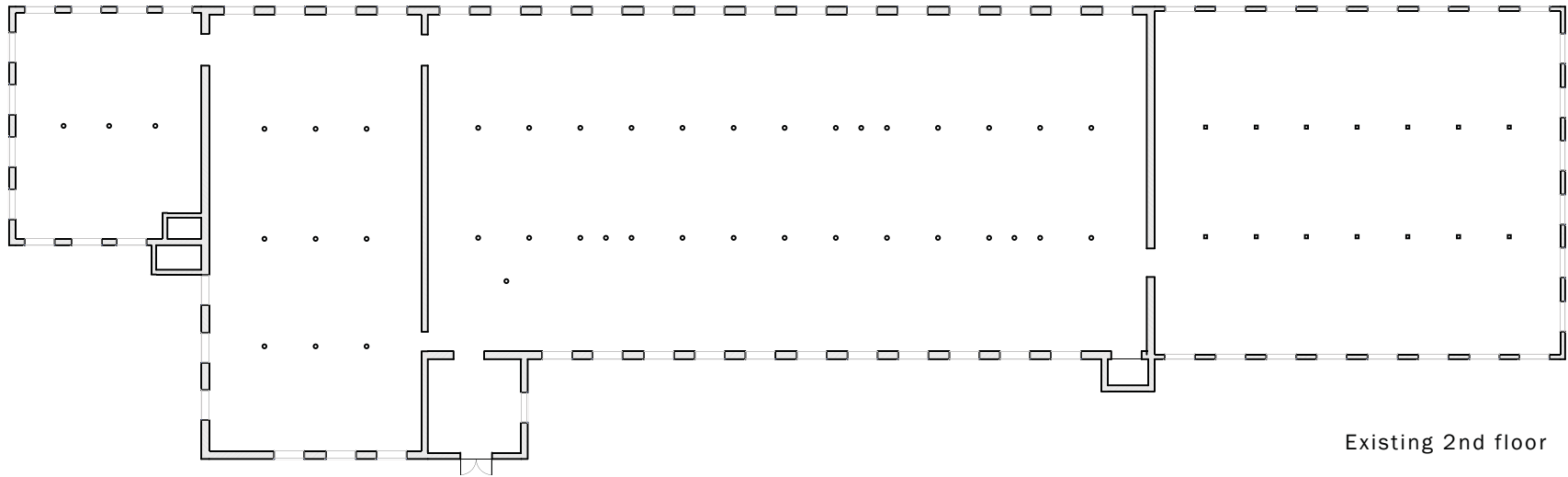
## APPENDIX D: EXISTING MILL DRAWINGS



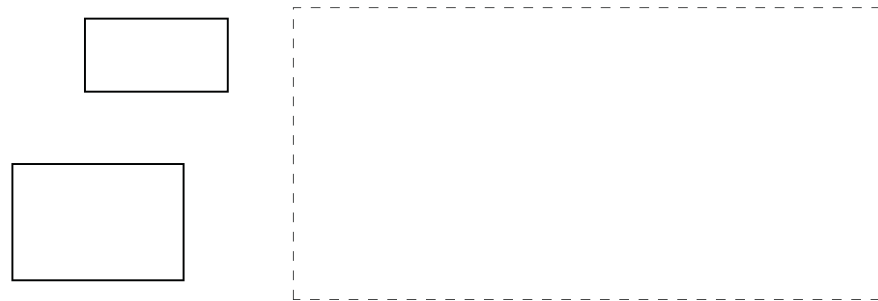
Existing 1st floor



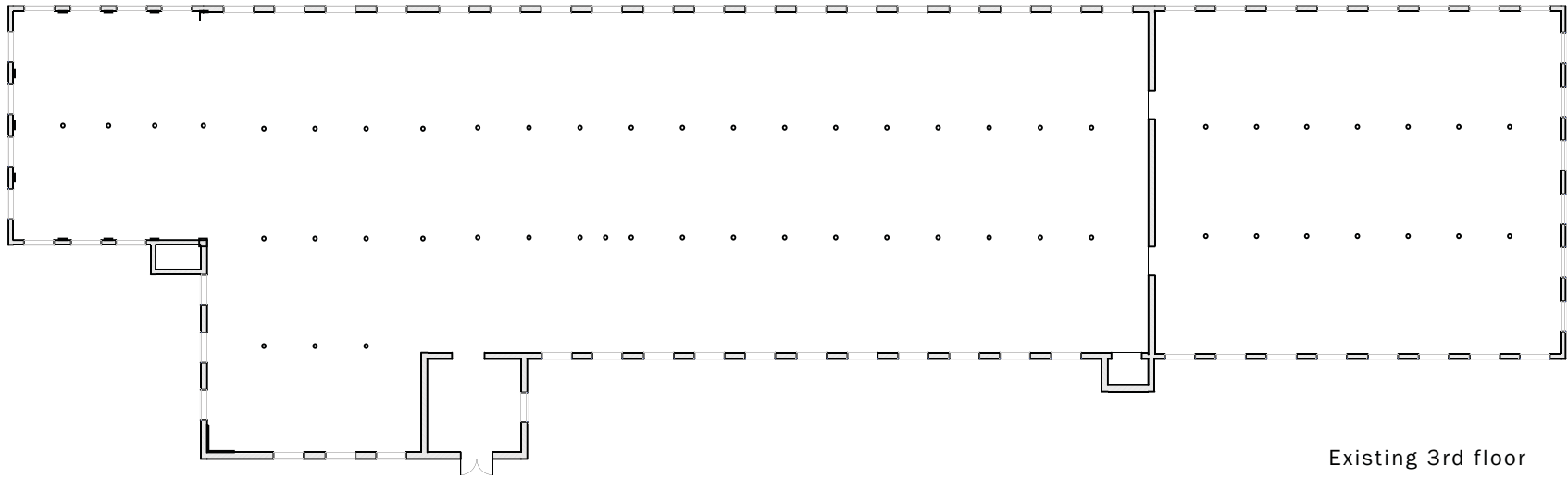
Existing mill first floor plan. Drawings received from Stephen Gaetz of Beacon Hill Design.



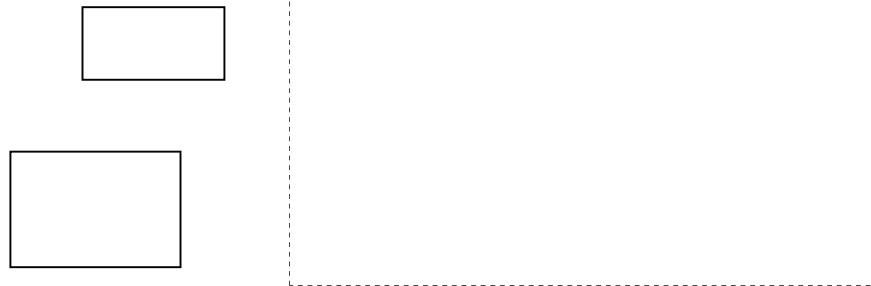
Existing 2nd floor



Existing mill second floor plan.



Existing 3rd floor



Existing mill third floor plan.

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