

**Spectacular Attractions:
Tourism and Environmental Engagement in Niagara Falls**

by

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Abstract

This thesis begins by studying the dual reading of Niagara Falls as an awe-inspiring natural wonder and as a commodified spectacle for touristic consumption. However, the relics of its early hydroelectric exploitation are also spectacular and present opportunities to connect the visitors back to the thrill of the Falls. This thesis repurposes an abandoned hydro plant to provide visitors with a new reading of this natural wonder by re-enchanting the debris of history so that they can experience the Niagara escarpment, the Fall of water, and the power of imaginative interaction with these natural phenomena anew.

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To my family, thank you for cheering me on and for always being excited and interested in my work. I love you all.

Chapter 1: Introduction

The town of Niagara Falls is a unique mixture of an iconic landscape and a host to carnivalesque attractions. The original attraction of the Falls stands in tension with unrelated tourism activities that sustain themselves by leveraging people's emotional response to the Falls to amplify their own appeal. As a result, Niagara Falls has become a place where an incredible landscape has come to symbolize only itself, a vague figure of spectacle and sublimity. This study outlines Niagara's history of spectacle-making that led to its current condition as a diminished and trivialized landscape. The research then analyses the contemporary conditions of spectacle-making to determine how artificial spectacles compete with spectacular landscapes. Using this understanding of spectacle in Niagara, the design project works to bring attention back to the Falls by adapting the Rankine Generating Station. The adaptive reuse applies programming to re-enchanted visitors with the natural wonder, counteracting the contemporary attractions in Niagara.

1.1 Condensed Literature Review

Informed by Guy Debord's *The Society of the Spectacle*, this thesis critiques spectacle, complemented by Ginger Strand's history of Niagara's tourism and development. Debord's thinking provides the theoretical basis for an analysis of the damage caused by the commercialization of the Falls. Strand's *Inventing Niagara* provides the broad historical strokes of how this commercialization and commodification took place. Debord's work largely discusses the impact of spectacle and its methods of creation, and presents a way to "hijack" spectacle and use it against itself. His work broadly aligns with the Situationist canon, conceptual

artists in 1950s Europe interested in the conflict between media and advertising against people. Complementing this critique of advertising, Strand's work details the creation of the mediatized spectacle in Niagara, highlighting the less-discussed and darker history of spectacle-making, which leveraged the Falls for other purposes. Unlike Debord, Strand mostly avoids contextualizing this history with social critique.

The analysis of Niagara's current conditions also uses Venturi, Scott Brown and Izenour's *Learning From Las Vegas* to understand the impact of dense signage. Their work is essential reading for studying highly-signed and purpose-built tourist infrastructure. *Learning from Las Vegas* — with its similar themes of spectacle and the urban organization of the Strip — is a useful framework to understand the urban landscape surrounding Niagara Falls.

Chapter 2: History of Spectacle

As Niagara Falls became more popular as a tourist destination, there has been continuous construction of a carnival-like landscape around the Falls, which commodifies and commercializes its natural grandeur. As a result, today, the Niagara River is lined with haunted houses, funhouse attractions, and heart-shaped tubs, creating a surreal landscape of commercial attractions, which has little to do with the natural wonder. The writings of Guy Debord and Ginger Stand are helpful to understand how these attractions fuel architectural themes and how the commodification of the natural world intrinsic to modernity has led to a disenchantment with the landscape.

Today, there is an unresolved tension between the draw of the Falls as a destination and the actual activity taking place in the town. Observers can see this tension in the success of programs like the waterparks, the casinos, and Madame Tussaud's Wax Museum, which are entirely unrelated to the landscape and its opportunities. Although people come for the attraction of the Falls, what they do when they arrive is altogether unattached to why they decided to travel there in the first place. In many ways, the Falls provide credence, credibility, and authority to otherwise banal or unrelated programs. To restore the Falls as the central attraction in Niagara, one must study how Niagara Falls acquired its contemporary character. The process and history of spectacle-making form the groundwork for understanding why such commercial programs have proliferated. By using this understanding, the response strategically targets the artifice which has accumulated over the last century. Debord's *The Society of the Spectacle* provides a "Situationist"

framework for understanding the process behind the build-up of flashy attractions. Ginger Strand provides the second element of context with her critical history of the settlement and commercialization of Niagara Falls.

2.1 History of Leveraging the Falls

To explain why the Niagara region has a storied past of iconic and grandiose events, Strand begins with the racist mythos underlying the Maid of the Mist character and subsequently tracks the history and development of the region (Strand 2009, 21). This first retelling – revealing the darker history of Niagara — is a structure repeated throughout the text. The myth posited that the Senecas practiced human sacrifice, sending a young woman over the Falls in a canoe to appease a God (Strand 2009, 21). The myth is no longer represented in souvenirs or used on boat tours, but the name is still used for the attraction and appears on local advertising. The Maid of the Mist Corporation continually spread this false myth up to 1996 — providing pre-recorded announcements on boat tours and marketing it on merchandise like mugs and shot glasses, depicting an Indigenous woman (often topless) dropping over the Falls (Strand 2009, 21). Framed mainly from the American side of the Falls, her history highlights the various environmental and social failings contributing to making the Falls an industrial and tourism “success.” As Strand points out, much of the critique of Niagara Falls is concerned with laughing at its pastiche, while other sources provide a lionized retelling of events (Strand 2009, 11). By including less discussed events, she exposes the lengths to which commercial actors have associated themselves and their businesses with the Falls.



The caption reads, “Destruction of the American Steam-boat *Caroline* by the British. Who having set her on fire sent her with the killed and wounded down the Falls of Niagara on the night of Friday 29th Dec. 1838 [1837].” This depiction of events, similar to those of the schooner *Michigan*, demonstrates the Falls being used as a side-show attraction for tourists. Collection of National Maritime Museum, Greenwich (“History of Niagara Falls Daredevils - Schooner” 2017).

The first organized spectacle to involve the Falls took place in 1827, when two hoteliers, one Canadian and one American, sent the wreck of the schooner *Michigan* over the falls in early September as a way to extend the tourist season (Strand 2016, 72). The steamboat *Caroline*, shown here, repeated this event ten years later with another steamboat. A long association with the macabre followed, where spectacles associated with the threat of death were attached to the Falls. Here, the deadly force of nature set



Images of the Falls often place the view in the water in a humorous way. This drawing pokes fun at the leisurely attitude of riding up the base of the Falls to be sprayed with its water.



The Great Wolf Lodge is a nearby water park and resort that frequently uses images of Niagara in their advertising, cutting between clips of the Falls and people at their park.



Another example of commercial actors connecting their businesses to the excitement of the Falls is the Fall's View Casino.

human activity in conflict with the environment, the natural world repeatedly being posed as the antagonist in some form of human achievement.

2.2 Spectacle and Society

This antagonism extends into the social critique of spectacle-making and its impact on perception. Debord's central argument is that the saturation of imagery diminishes reality, primarily through the representation and reproduction of lived experience (Debord 2016, 1). Given the prevalence of spectacle in Niagara, in imagery and feats of human daring, Debord's social critique argues that spectacle-making isolates and distracts the people it targets. The pseudo-world described by Debord mirrors the fragmentation of the Falls, reproduced distant advertisements and memorabilia (Debord 2016, 1). This mediation, via imagery, between people and their environment is a valuable critical lens for the project because it directly addresses the tension between imagined and perceived experiences. Especially relevant to the discussion of spectacle is Debord's specific framing on tourism, a procession of

Human circulation packaged for consumption, a by-product of the circulation of commodities — is the opportunity to go and see what has been banalized. The economic organization of travel to different places already guarantees their equivalence. The modernization that has reduced the time involved in traveling has simultaneously reduced the real space through which and to which one can travel. (Debord 2016, 23).

This quality of banalization or rarefication is increasingly present as the Falls become less and less the main attraction (Ontario Ministry of Tourism 2008). Debord's work is most helpful in this instance as a tool for critique. Yet, its presentation as observational fragments makes it challenging to describe how spectacularization comes about. The numbered segments of Debord's book are discrete thoughts



Postcard parodying of the grandeur of the Falls and the advertised experiences that leverage their relationship to the landscape.

on related themes — yet these themes begin to address some aspects of spectacle outlined later in this thesis. As a response to spectacle-making, other Situationists compliment Debord's work through their methods of *detournement*, hijacking the readability of advertisements to transmit their ideology. The modified postcards provide examples of this hijacking. Reappropriating these souvenirs underscores the banalization of the Falls achieved by different attempts to associate the landscape with emotional highs. Here, we see how businesses have used the Falls as a backdrop to take advantage of the thrill of the Falls to elevate the appeal of commercial enterprises.



On this official tourism web page, Instagram images have been curated, emphasizing the themes of remoteness, imagery of the Falls as a backdrop, and distorted over-saturation emblematic of a utopia (Tourism Partnership of Niagara 2020).

Chapter 3: Contemporary Condition/Experience

3.1 Contemporary Condition/Experience

To understand the site adjacent to and surrounding the Falls, this thesis surveys the multiple layers of tourism infrastructure supporting activities other than those directly engaging with the Falls. It divides the site into three strips to reveal common themes: Stanley Avenue, which has most of the affordable accommodations; Clifton Hill with its arcades and funhouses connecting motels and hotels to the Niagara River; and the Niagara Parkway, which functions as the primary route for vehicles and tourists to view the Falls. These strips form the boundary to the tourist district, hard edges that pen in the area where visitors walk. Among these zones of activity are tall buildings, dense signage, and thresholding between street and pedestrian pathways — these create the experiential condition of the town of Niagara, Ontario. The history of spectacle has shaped the tourist's idea of what Niagara can offer. Ultimately, they are presented with a discontinuity between the advertised or imagined and real experiences of Niagara.

3.2 Advertised

Long before a visitor ever sees the Falls, images of the Falls inundate them through forms of advertising. This practice began as early as the 1820s when the Erie Canal made contact with the Falls much easier, finally providing access to the landscape so frequently represented in painting and literature (McGreevy 1994, 3). These representations combine the natural object of Niagara with an accumulation of cultural responses to the landscape. By examining

the writings of visitors and observers over centuries, McGreevy identifies four primary themes that re-appear in representations of the Niagara landscape: a quality of remoteness, the prevalence of mortality which manifests in a contemporary setting as the fetishization of daredevils, a focus on imagery of the Falls themselves, and a connection to the future of an imagined utopia (1994, 5). The prevalence of these themes creates a distorted expectation of the imagined landscape, expectations which are difficult to fulfill in reality.

3.3 Reality

As the visitors proceed towards the Falls, they traverse a gap between such imagined and imaginary landscapes to the real, actual site of the Falls. How can a natural landscape, no matter how grand, match these curated visions of sublimity when the urban form with its billboards and spectacles directly competes for the visitor's attention? The present-day context of the town of Niagara Falls makes individual communion with the actual Falls almost impossible. How can one experience the promise of remoteness, the drama of daredevils, the idyllic image of the Falls, and a utopian environment? The actual scenery cannot fulfill such promises. What should be astounding instead brings disappointment. This "bait and switch" reveals the underlying tensions between the sublime and the rarefied response to the landscape. The dramatization of Niagara undercuts the genuine majesty of the Falls.



Story board style photo series recording experience arriving in Niagara by car and navigating down to the falls and back.

Chapter 4: Elements of Spectacle

This thesis aims to develop a comprehensive understanding of the components of natural and artificial spectacle in Niagara Falls. It then applies that study to the design of a building that might resolve the underlying tension between desire and activity. Incorporating a carefully curated selection of activities in this building, visitors can more deeply experience the landscape and environment of Niagara. The building itself – a decommissioned hydroelectric plant — is a historical artifact of the Falls’ industrial history. It is a grandiose building that stretches along the Niagara River and descends the entire height to the Niagara escarpment.

Three elements of natural and artificial spectacle in Niagara Falls are relevant to this architectural thesis: scale, signage and imagery, and threshold. When combined, these elements can form a lasting impression that involves the whole body. But, which of these elements of spectacle are strategically necessary for architecture to compete with the commercialized appeal of Niagara’s tourist infrastructure? And how might architecture frame and elevate the landscape of Niagara Falls as the spectacle?

4.1 Scale

Scale is one of Niagara Falls’ most striking features. While it is not the highest falls in North America, its sheer height and the massive volume of water that thunders over the Niagara escarpment are central to the awe-inspiring character of this place. On the other hand, Niagara’s architecture interacts with this scale by either competing with the Falls directly or miniaturizing it. The many images of the Falls that populate signage and memorabilia create a fiction about a real place,

as Timothy Mitchell has shown in the miniaturized artificial landscapes of Egypt recreated in Paris during the 1820s (1991, 4). Similarly, when visitors ascend one of the many viewing towers surrounding the Falls, they can experience a birds-eye view of the scene, matching the souvenirs' pictorialized perspective. On the ground, these towers serve as points of reference, providing scale to the scenic background. In other parts of the world, where the scale of



Analytical drawing comparing the human scale to environment and various towers that distort the relative size of the Falls. Building scales to the falls in multiples of 164' (~50 meters).

an icon is essential to its reading, governments preserve these qualities by implementing legislation. The Acropolis in Athens, for example, is protected by legislation that prohibits any building in the area to exceed 78 feet, thus maintaining the scale and perspective relationships of the historic site to the rest of the city (Hickman, 2020). The viewing towers in Niagara, by contrast, are as much as three times the height of the Falls, inevitably diminishing them.

4.2 Sign and Imagery

Signage also has a significant impact on the experience of Niagara's spatial characteristics. These signs carry explicit messaging intended to attract the eye when read from different distances and at different speeds. This practice raises the question of the denotative versus connotative messaging, a push and pull between specific and general meaning (Venturi et al. 1977, 100). Signage in Niagara is largely denotative and explicit, creating dense fields of shallow meaning that poorly prepare visitors for reading



Isolation of the sign and imagery along Clifton Street. Elements are de-saturated to emphasize their prevalence and the denotative quality of the messaging.



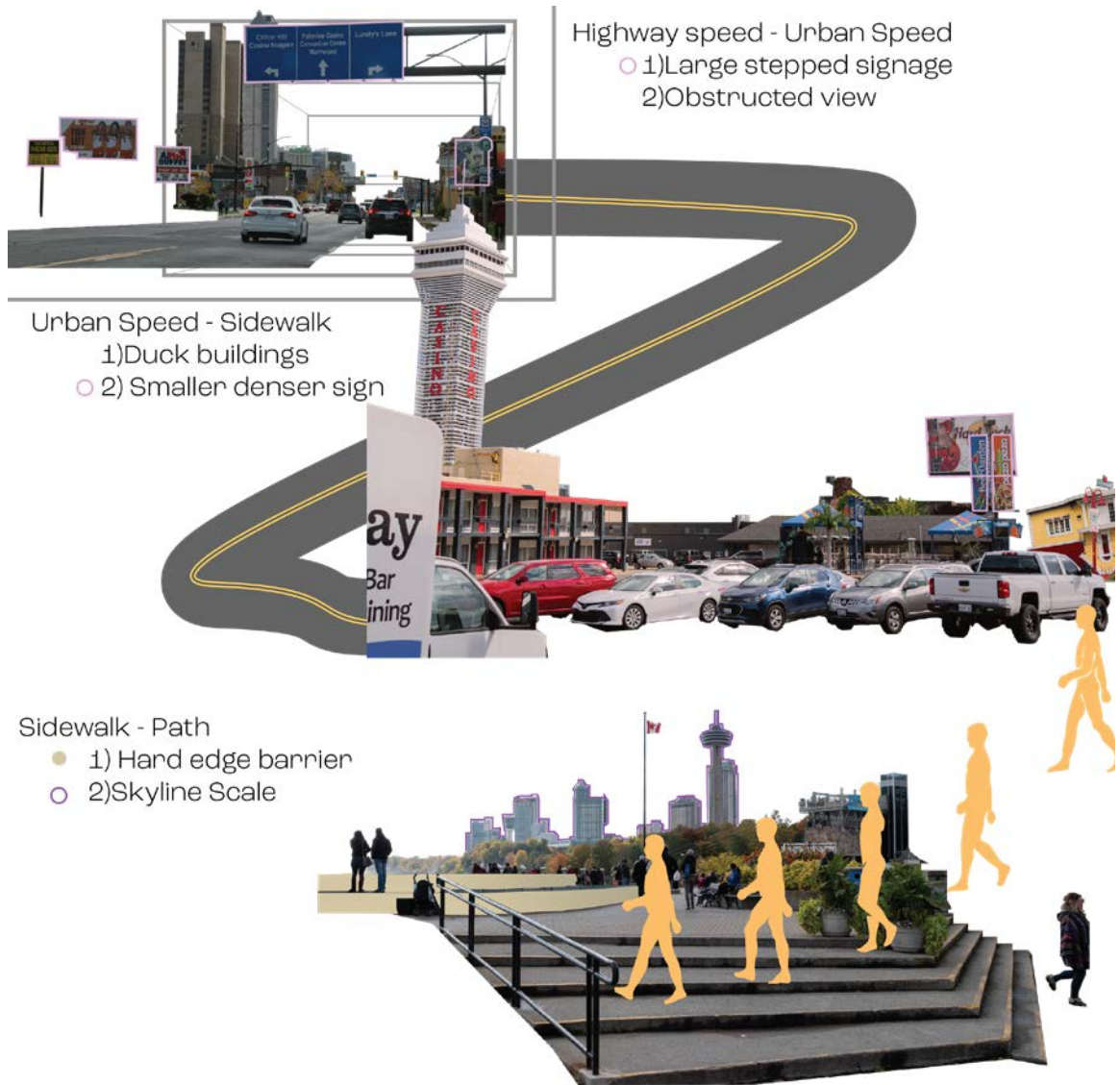
The same technique was applied to the other side of Clifton Street. Here there is especially abstract and unrelated signage.

and interpreting the landscape. That process demands a connotative interpretation of the Falls. Clifton Street bombards the tourist with signs for Harley Davidson or Ripley's Believe it Or Not Museum, leaving an afterimage that remains long after the sign is out of view. Such imagery makes the Falls a billboard of itself. Dense signage becomes equivalent in spectacle to the Falls, lowering what the landscape asks of a viewer to the most reductive and superficial reading of the Falls.

4.3 Threshold

The third element of spectacle involves the previous two elements (Scale and Sign/Imagery) as one progresses towards the Falls. The journey to and from a viewpoint prepares expectations that affect one's perception of the landscape. Once in Niagara, it is difficult to avoid the pull of the Falls, so the placement of buildings and signs serve as markers, frames, and barriers along a path. Since there are many approaches towards the Falls, examining the

signs and buildings in particular zones with similar qualities becomes more useful than studying the elements in a path. There are three main strips: Stanley Avenue, Clifton Street, and the Niagara Parkway. Moving between these strips requires changes in the method and speed of movement: from inside a car, to walking on a commercial sidewalk, to a path adjacent to the Niagara River. The threshold between these areas mark differences in the signage and buildings that fill the visual field. These sequences and connections are their own program (Schafer & Lawrence 2006, 14). The transitional areas happen unintentionally, but not without consequence. The artificial spectacle becomes continuously denser until suddenly it is gone, leaving only the natural spectacle. A procession of rising action and intensity resolves itself with a void that can only be filled by turning away from the Falls back towards Clifton Street.



Analytical drawing examining the three major methods or speeds of movement through Niagara Falls as part of a procession through thresholds to the Falls. Each is encapsulated by two major features that distinguish the segments while detracting from the Falls.

Chapter 5: Site Context

Understanding the natural process behind the shaping of the falls heightens the appreciation for the natural spectacle as part of a much larger landscape. The iconic waterfall result from four of the five Great Lakes flowing into the Niagara River and over the Niagara Escarpment. The Fall's spectacle

The Great Lakes



A drawing of the Great Lakes water system outlining the flow of the water from the headwater at Lake Superior down to the Gulf of St. Lawrence where it eventually meets the ocean. Relative scale, capacity and changes of elevation are captured alongside major settlements in the US and Canada.

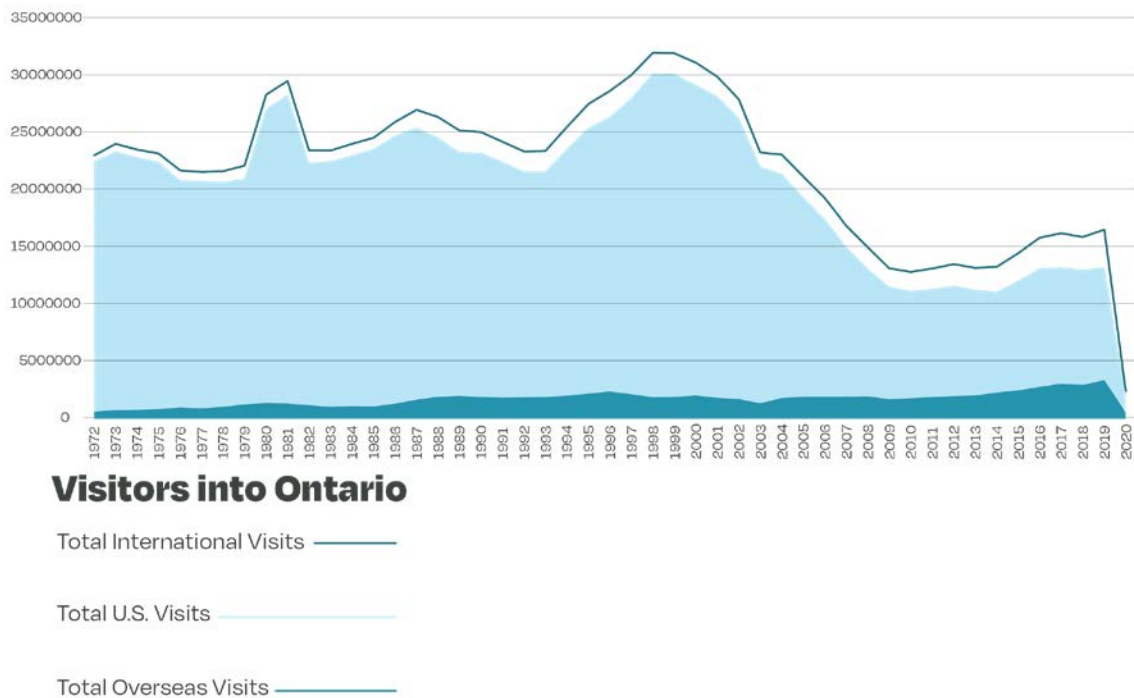
makes this area the most visible portion of the unique Niagara Escarpment, comprised of dolomitic limestone from an ancient seabed. Tracing the geological time scale back 16,000 years, when the scraping and melting of glacial ice formed and filled the Great Lakes, draining down the lowest points and eventually reaching the harder sedimentary rock of the Escarpment carving the dramatic drop (“Geology Niagara Falls” n.d.). Before the influx of tourism, this potential energy attracted manufacturing, and later, the cross-border experimentation into widespread electric distribution (Strand 2016, 74). While tourist brochures do not represent this context and history, the history offers an immense opportunity for a deeper appreciation of the Falls because of its uniqueness and readability, especially when one knows what to look for. Such an interpretation would encourage a different reading of the landscape, relying on a connotative and profound method of communicating this natural history.

5.1 Tourism Trends

The Great Lakes are a threshold between Canada and the US. American tourists comprise the vast majority of visitors into Ontario, although visitorship has been in decline since 2000 (Ontario Ministry of Tourism 2008). Casinos, not the Falls, have become the central attraction drawing Americans to Niagara (Ontario Ministry of Tourism 2008). The construction of Casino Niagara in 1996 and the Fall’s View Casino in 2004 dramatically shifted tourism activity. Niagara Ontario adopted a more aggressive approach to its business, as evidenced by the growth of advertising and the levy of a tourism improvement fee of 6.69% in 2004 (Tomlison & Vellan 2017). The scale of investment in this activity is important to recognize. Before the influx of casinos, tourism

was organized around hotels, motels, and independent attractions. Casino construction reduced Niagara Falls to a grand advertising strategy, to the point that a casino took on its proximity to the Falls as its namesake in the newest Fallsview Casino Resort.

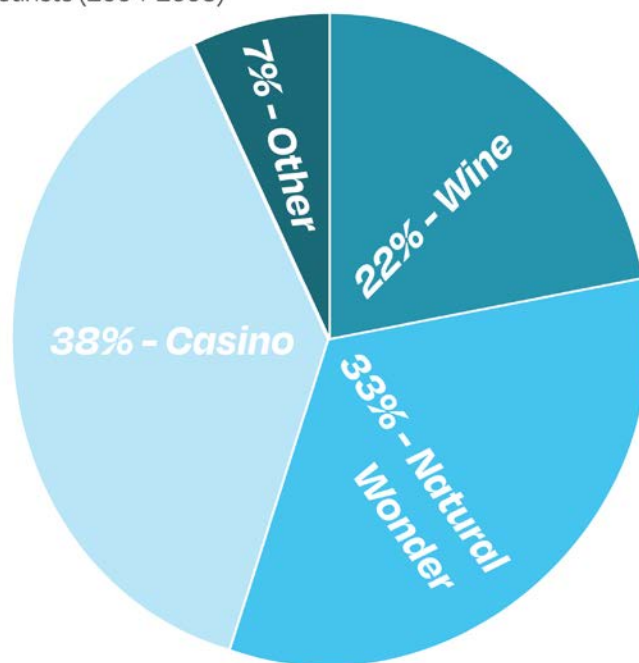
As a popular international tourism destination, Niagara Falls communicates social and environmental values to a global audience. The commercialization of the Falls is an inadequate response to the sublime nature that draws this audience. Furthermore, these tactics have become deeply embedded in the character of the urban context. At this time, an attempt to change the atmosphere of Niagara through direct engagement with the casinos would further



Visitors from the U.S. comprise the majority of incoming tourism into Ontario. These fluctuations may related to economic factors like the shifting exchange rate which at times makes Ontario a more affordable vacation destination (Ontario. Ministry of Tourism 2020).

place them in the spotlight. Additionally, trying to compete with these massive projects is an unrealistic response. Instead, programmatic strategies offer the greatest avenue to undo this damage. It is for this reason that re-programming is a strong response to these conditions. By adapting an existing building with over 100 years of history and context, this adaptive reuse project proposes creating experiences relating to the Falls that modern attractions cannot manufacture. No building holds more potential in this area than the Rankine Generating Station, which has the necessary richness and majesty to compete with other attractions by providing wholly unique experiences embedded in the historic building and its direct connection to the scale of the Falls.

Reason for visit to the Niagara Region
by American tourists (2004-2005)



The data also recorded interaction with other segments following the primary reason for visiting. Those with wine tourism as their primary interest were more likely to also engage in the natural wonder and casino segments than casino-goers who generally focused solely on casino activity (Ontario. Ministry of Tourism 2008).

Chapter 6: Rankine Generating Station



The portal of the tailrace tunnel where the water used in the Rankine Station is discharged (“The Tailrace Tunnel · Canadian Niagara Power Company” n.d.).



Inspectors inside the tailrace tunnel in 1957 investigating the wear of the tunnel, it was found to be in excellent condition (“The Tailrace Tunnel · Canadian Niagara Power Company” n.d.).

The Rankine Generating Station is one of Canada’s early hydroelectric generating stations, located close to Niagara Falls and the major tourist areas on the Canadian side. Construction began in 1901 and was completed by 1905 during the industrial boom of the Niagara region (“Planning and Construction · Canadian Niagara Power Company” n.d.). Subsequent stations directed water from the upper Niagara River through underground tunnels to powerhouses further downstream from the Falls. In contrast, the Rankine Station collects its supply water directly adjacent to its powerhouse.

The Rankine Generating Station is an ideal candidate for adaptive reuse because of its unique architecture (especially given its context). The building is enormous and prominent in the landscape but also conceived with the specific intention to complement the Queen Victoria Niagara Falls Park



The Rankine Generating Station with its masonry construction, arched windows, and electric lighting elicits more of an institutional aesthetic rather than industrial or infrastructural typology. The design of the building purposely buries the transmission lines to maintain the park-like qualities of the surrounding landscape (Ball 2005).



Interior perspective of the Rankine Generating Station showing fore-bay which feeds the penstocks. Key features include the grating that protects the turbines from large debris and the steel and masonry construction of the structure.



Interior of the Turbine Hall. The eleven dynamos are repeated along its length, with the electricity that they generate being fed into the bus breakers on the right (Conlon 2019).

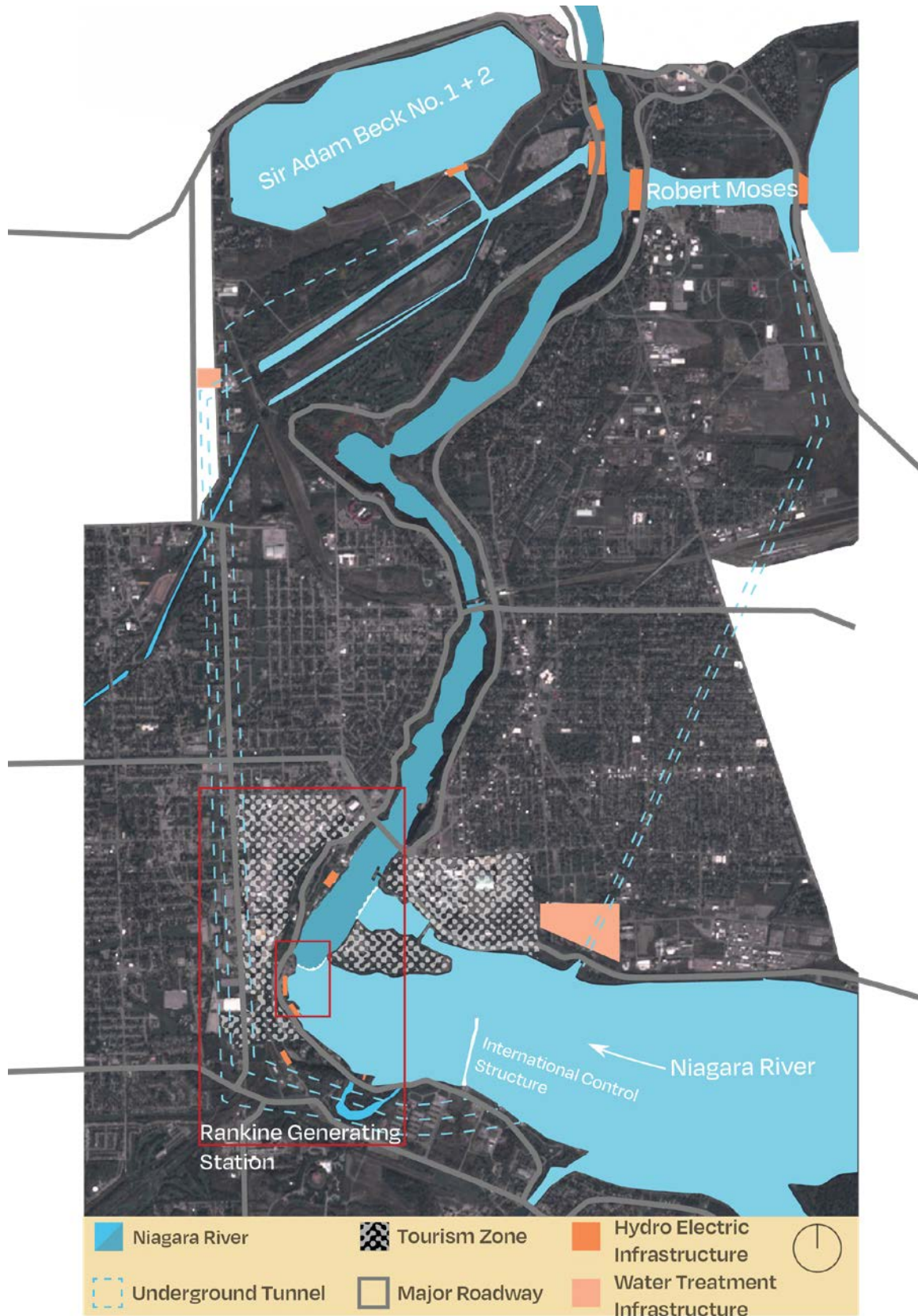


The Thrust Deck level of the station. The housings contain the thrust bearings that align the shaft between the dynamo and the turbine (Conlon 2019).

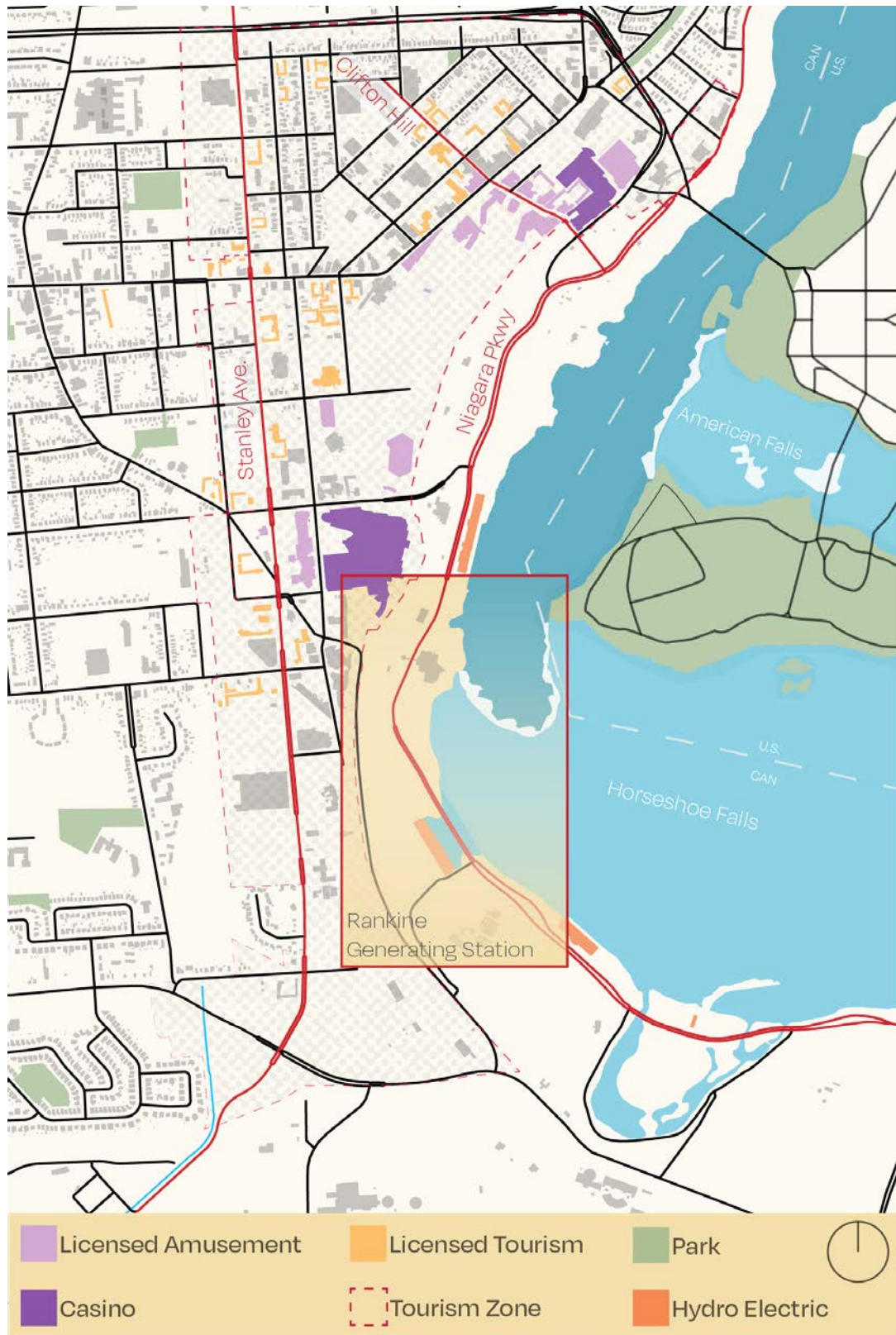
nearby. The design of every aspect of the infrastructure had to pass approval from the commissioners, from the selection of gleaming green terracotta instead of the more affordable orange tiles to the decision to bury the cables running from the Station (Ball 2005, 4). Unfortunately, the Station currently sits in an unused state, unavailable to visitors and locals alike. The reuse of the building capitalizes on its proximity to the existing tourist zones and its exposed industrial features. These qualities place the building in context with the Falls. The Rankine Station is clearly distinguishable from the main viewing platform next to the Horseshoe Falls, creating a mysterious air about the building's purpose. The question of what is going on inside attracts visitors. The building's architecture creating its own connotative signage, then once inside, the exposed mechanisms capture the visitor through their uniqueness and the enchanting programming that weaves within these mechanisms. By opening itself to the current interest that visitors have to this Station, the building creates opportunities to re-associate the scale and power of the Falls with their context.

6.1 Rankine's Operation

The forces that the Station harnessed become apparent when one sees how water was channelled through giant penstocks into the turbines, powering driveshafts, and animating dynamos. The operation of Rankine Station can be separated into two components. The first is the path of the water from the river to the turbine. The second is the mechanical linkage that connects the turbine at the bottom of the penstock with the dynamo at its top. This induction motor spins to generate the alternating current.



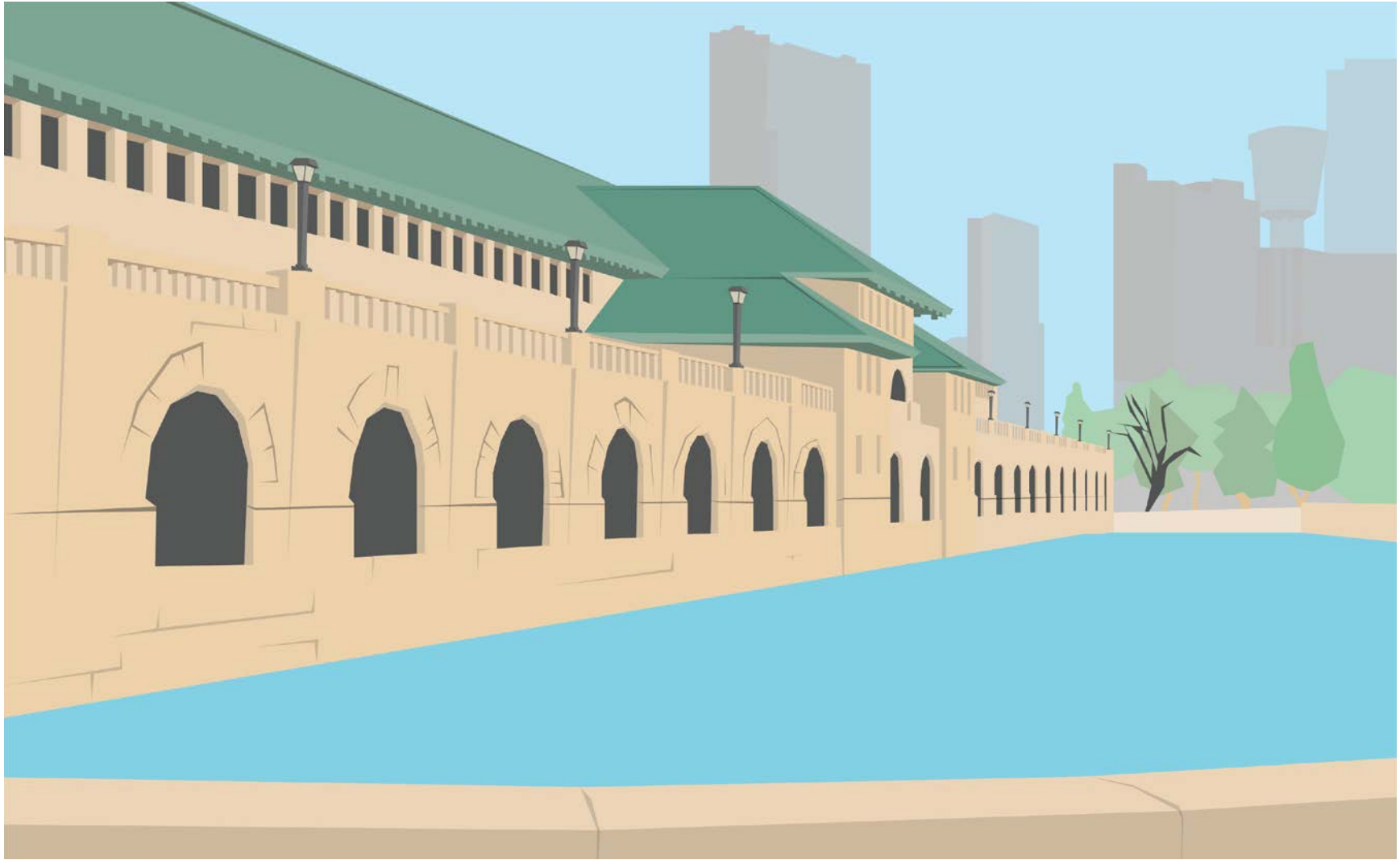
Map of the different hydro-electric infrastructure around Niagara Falls in relation to the main tourism areas (data from Rozon, et al 2014) (base map Google Maps n.d.).



Map of the tourism building and infrastructure around Niagara Falls on the Canadian side. The Rankine Generating Station is well positioned close to the official tourism zone (data from Niagara Falls Open Datasets 2012-2016a,b).



Map of the Rankine Generating Station's position relative to the Falls. The Rankine Generating Station is within the walking bounds of the Falls and is visible from the main viewing area of the Horseshoe Falls (base map Google Maps n.d.).



Exterior perspective of the Rankine Generating Station.



Photo is taken from the Turbine Deck looking up the shaft along one of the penstocks (Conlon 2019).

Above the Falls, water from the Niagara River enters a forebay fitted with grates that filter out the winter ice. It travels beneath the Turbine Hall to reach the penstock. Here it falls 130 feet, sufficient head force to drive the turbine (“Planning and Construction · Canadian Niagara Power Company” n.d.). Hydraulic linkages are connected to the turbines, allowing technicians to keep the system in sync. After the water passes the turbine, it flows into a short tunnel which discharges the water beyond the mouth of the Falls.

The spinning turbine attaches to a shaft that carries this rotational energy to the dynamos in the Turbine Hall above. The type of dynamo chosen was Tesla’s alternating current induction motor, a design licensed by Westinghouse Electric in 1888 (modern hydro-eclectic designs place this component closer to the turbine). The resulting alternating current was ideal for long-range transmission to clients in Buffalo and Niagara Falls, NY. This system is repeated 11 times along the length of the building, controlled from a central suite that monitors and tunes the Station. (“Planning and Construction · Canadian Niagara Power Company” n.d.).

6.2 Rankine’s Configuration

One of the features that make the Rankine Generating Station suited to an adaptive reuse is the repetition of its design. The Rankine Generating Station houses 11 vertical penstocks, which produce a peak output of 76 MW of electricity at 25Hz (Ball 2005, 1). A continuous cavity houses these Penstocks, running the length of the building with ladders and catwalks to access the system for maintenance and inspection.

The large drop between the Turbine Hall's dynamos and the actual turbines at the bottom of the Escarpment provides the site for much of this thesis. Various levels divide this cavernous chamber. At the top is the Turbine Hall, which houses the dynamos and their circuitry. At the next level down, the Thrust Deck with its vaulted ceilings to support the weight of the large dynamos provides access to the thrust bearings that keep the shaft between the dynamo and the turbine aligned.

Further down, the Break Deck is where the penstocks bend 90-degrees to create a vertical drop. Additional sub-decks, called Tailrace Decks, cross between the Break Deck and the Turbine Deck with their catwalks. Lastly, the Turbine Deck is where the water meets the turbine; on the Turbine Deck, hydraulic control circuitry keeps the 11 generators in phase with each other.

The vertical repetition of these levels and the horizontal repetition of the Station's components can easily be divided with a grid to create discrete spaces to be programmed.

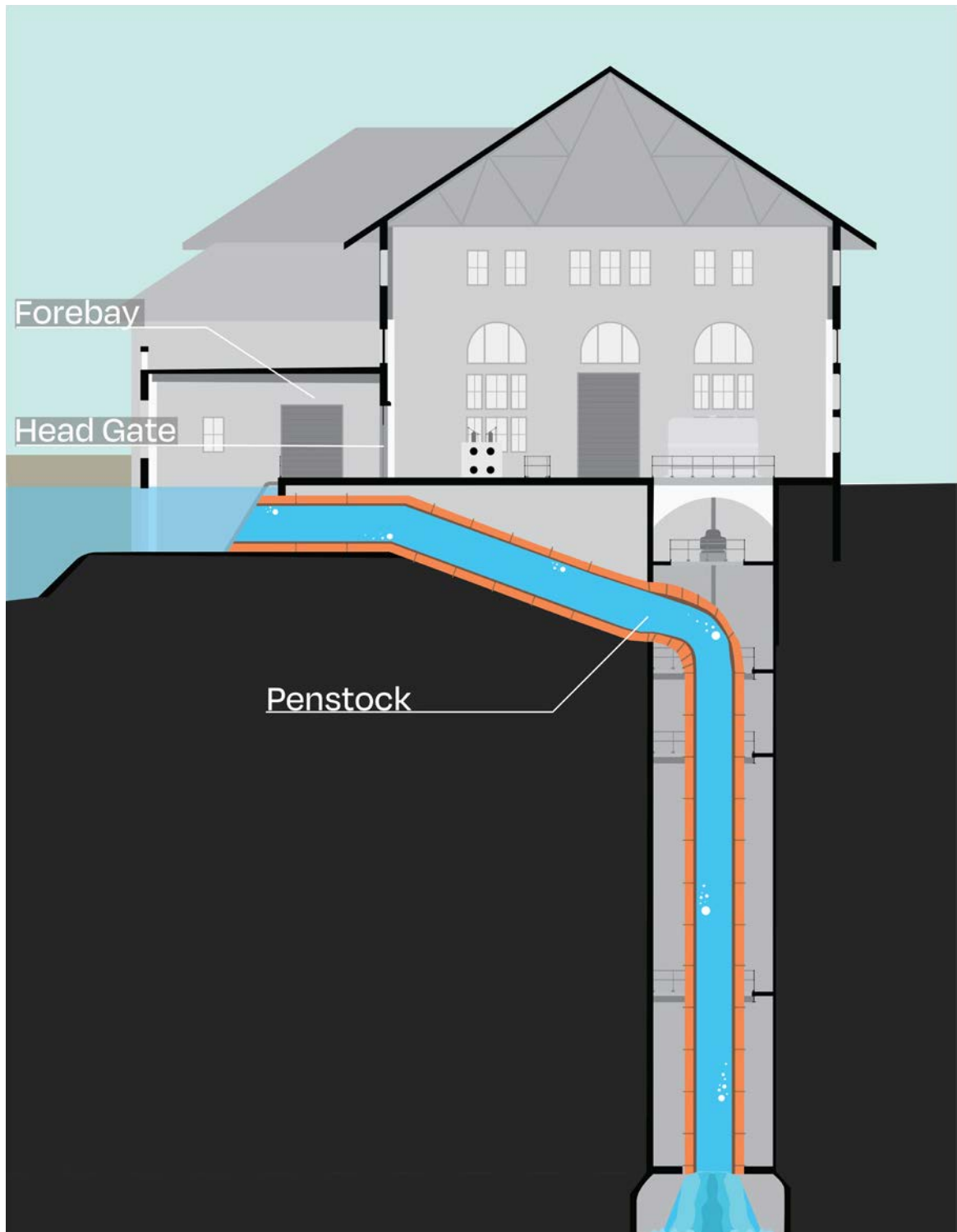


Diagram of the components of the wet side of the generating system. The head gate provides the ability to close off individual penstocks for maintenance, inspection, or other tasks.

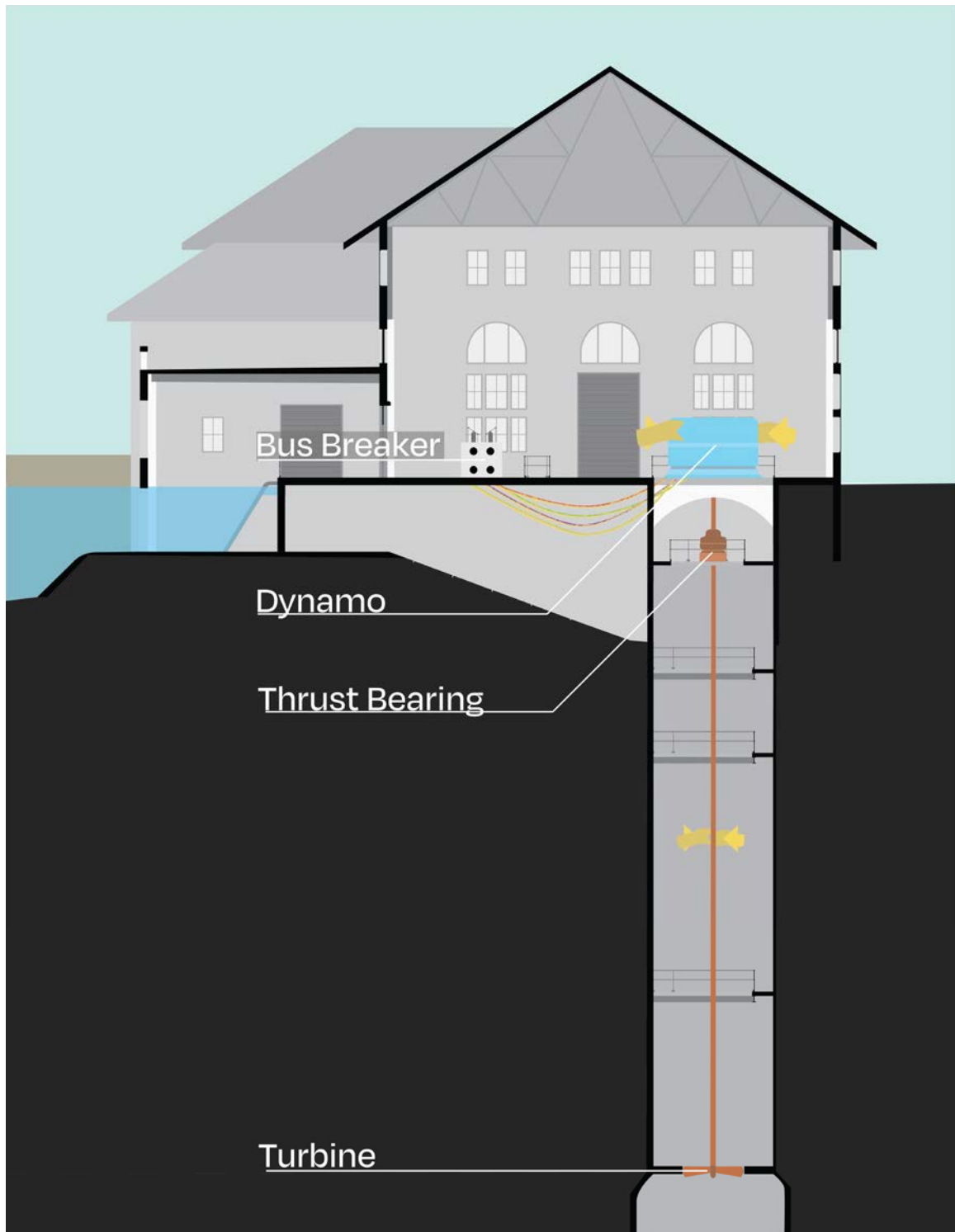
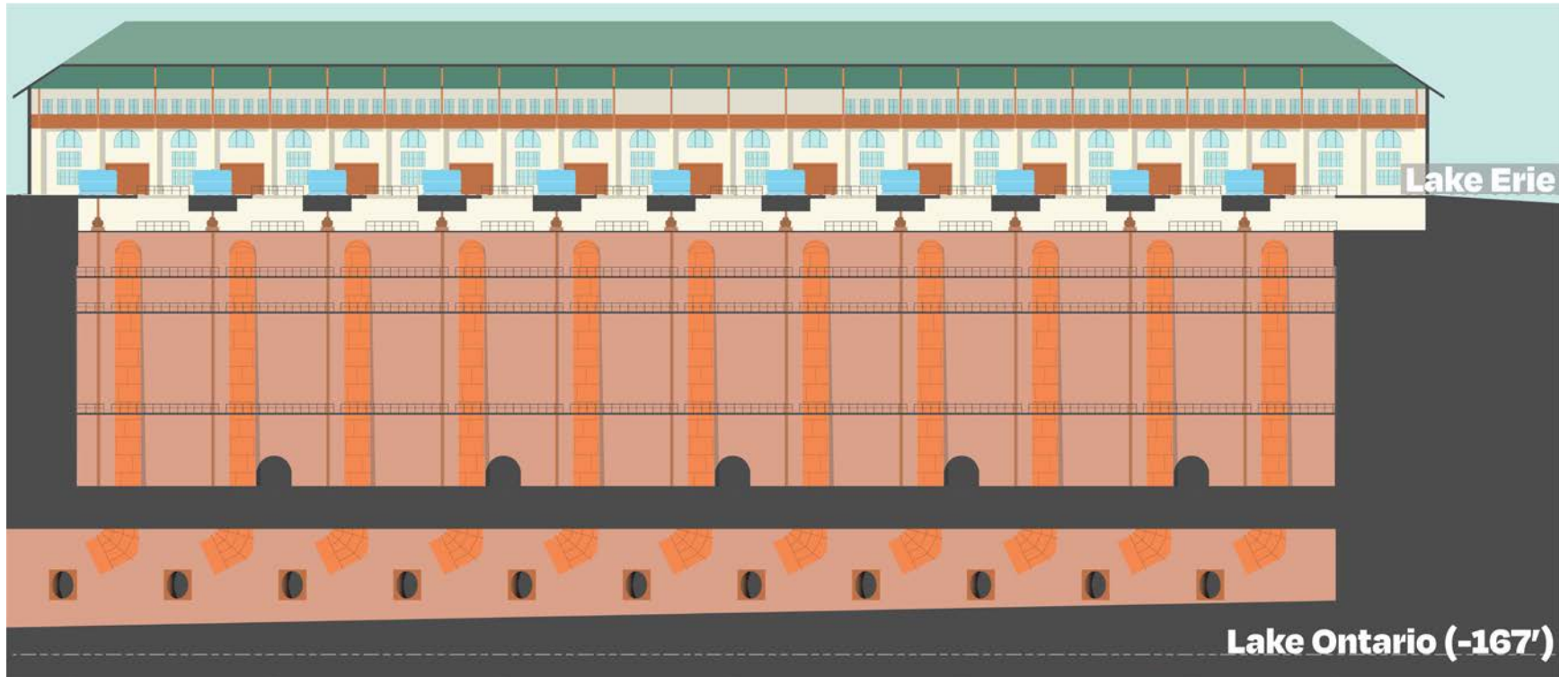
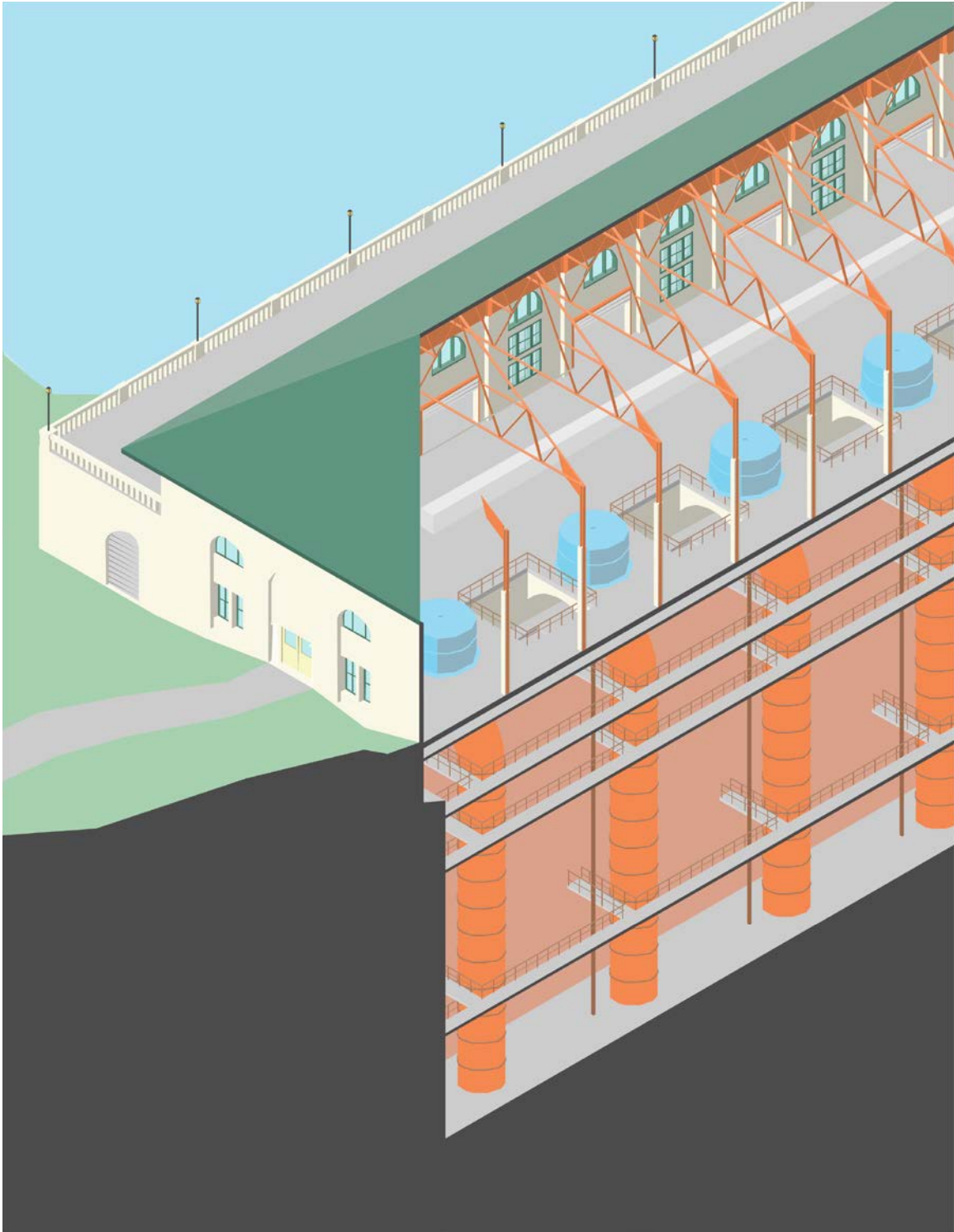


Diagram of the components of the dry side of the generating system. The Rankine Generating Station is unique from more modern hydro-electric systems due to the separation of the dynamo and the turbine across the vertical height of the shaft.



Longitudinal section through the Rankine Generating Station. This section shows the repeated elements inside the build, especially the eleven penstocks.



Axo through the Rankine Station showing the position to the various components and their proportions. This drawing shows the narrowness of the Tailrace area below ground and its position at the rear of the Turbine Hall.

Chapter 7: Re-enchantment Through Program

The combination of the Rankine Generating Station's position relative to Niagara Falls and its apparent connection to the Escarpment's scale makes it an ideal vessel for re-programming towards a readjusted view of the landscape. The selection of appropriate programs that capitalize on this potential and have the experiential qualities to create an impactful attraction is essential. The juxtaposition of these programs in the unfamiliar context of infrastructure demands deeper consideration of the relationship between visitors, buildings, and the Falls. Transforming the former Rankine Generating Station into an amalgam of varied experiences uses this utility infrastructure as an opportunity to connect the tourist experience more directly with the scale and force of the natural landscape. This program strategy resists the commodification of the Falls and its transformation into denotative meaning. The programming encourages reconsideration so that the connotative meaning can be restored and re-enchanted. The infrastructure becomes a translator between the human scale and the environmental scale, where the Falls as a symbol and force can reconnect to a broader context. The hydroelectric station is infrastructure regularly unavailable to the public, so visiting it sets it apart as an attraction. This programming method considers the relationships of the individual programs within, informed by a precedent of using infrastructure to communicate about the landscape.

7.1 Program Precedent: Tennessee Valley Authority

Translating between the human scale and the environmental scale is central to resolving Niagara's issues of spectacle. A relevant precedent here is the Tennessee Valley Authority (TVA) dams, which were designed not only as hydroelectric plants, but as sites for tourism and as spectacles in their own right. The decades that separate the TVA, built in the 1930s, from the Rankine Generating Station came with tremendous shifts in infrastructure in modern society. While the Rankine Generating Station was a marvel of modern technology and engineering, the TVA combined those qualities with an aspiration for uniting landscape, technology, and humans in a productive landscape (Macy and Bonnemaïson 2003, 138). This development is a helpful precedent for the present project, which intends to connect the land to the visitors through the infrastructure that serves them.

In the TVA, the aesthetic design of the dams heightened public appreciation of the landscape, as can be seen in Norris Dam, in particular, a hydroelectric dam designed to be toured (Macy and Bonnemaïson 2003, 156). The stoic exterior of the Rankine Generating Station communicates a similar civic quality. However, unlike the TVA's massive dam structures, the facade of the Rankine building does not disclose its electric generation function. This lack of aesthetic communication makes a unique civic landmark an unidentified object in the landscape. From the design of its massing to the details of its lights, the TVA loudly announced its role in a modern America, treated as a public symbol of a new age of prosperity brought about through technology and design (Macy and Bonnemaïson 2003, 161). Although the exterior of the Rankine Station lacks these intentions,

its interior maintains exposed technology that clearly communicates both its technical function and the challenges of attempting to harness waterpower. Clearly distinguished from its landscape, the Rankine Station's exterior aesthetics provide a stark contrast to the flashier buildings that populate the river's edge. The Rankine Station offers an open question



The Norris Dam powerhouse, the interior is laid out so that visitors can experience the infrastructure in action. This creates a procession through the building with opportunities to see the water pass and experience the hum of machinery in the powerhouse where the turbines are housed (Macy and Bonnemaïson, 158).

about what is inside and the purpose that delineates it from its contemporary context. Maintaining these qualities on the exterior enhances the impact of arriving inside Rankine's halls and the journey below its surface.

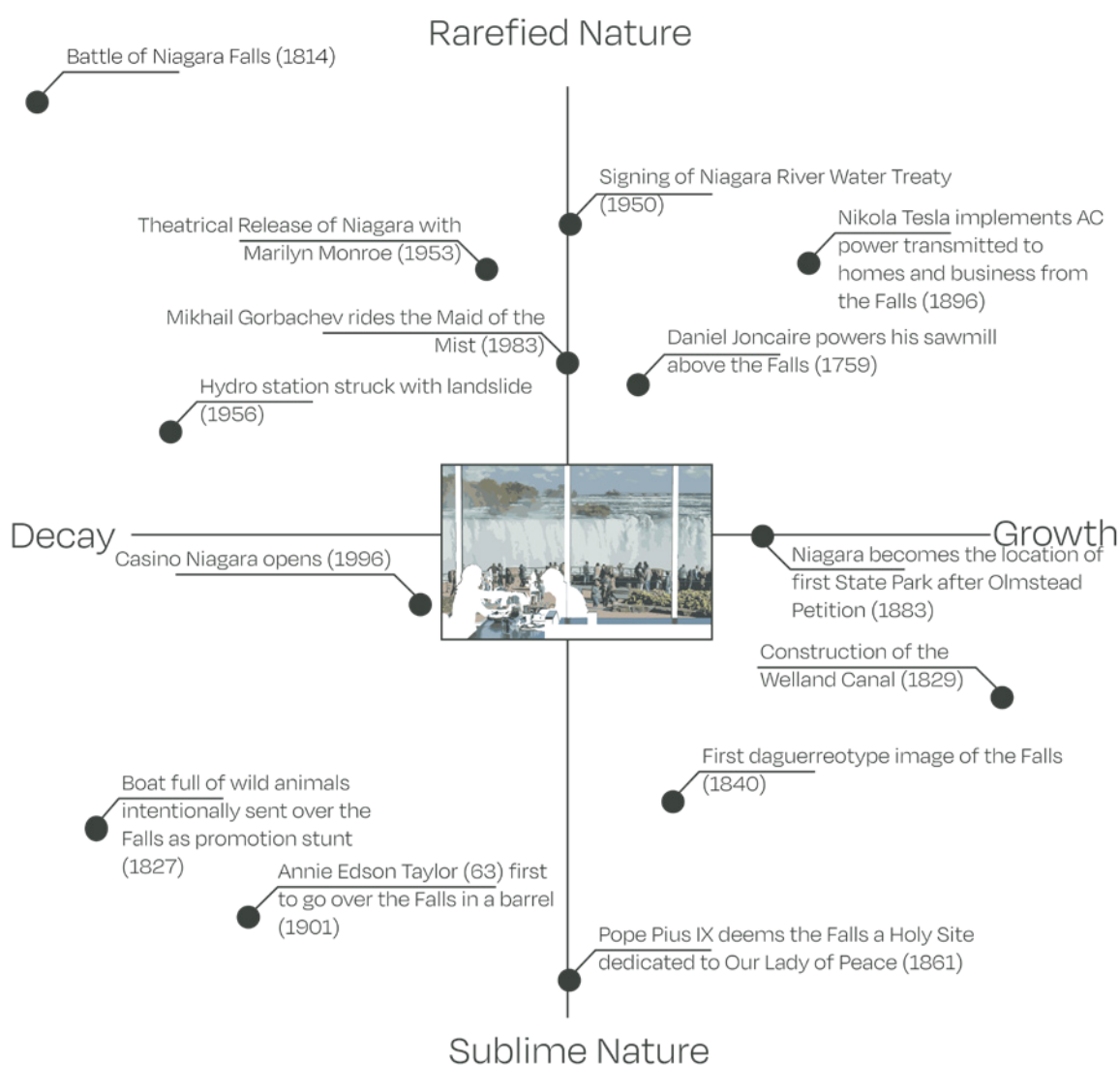
Like the Falls, the TVA is also intrinsically linked to spectacle. Lacking a distinctive landscape icon like the Falls, the TVA borrowed the myth of the American frontiersman and grafted it onto a modern infrastructure (Macy and Bonnemaïson 2003, 140). This mythic quality created a spectacle borrowed from existing narratives, allowing people to insert themselves in a heroic mastery of the landscape. The Rankine Station does this in its own way. This infrastructure is more like a civic institution than an anonymous industrial space through its masonry construction and many windows. By modifying the building's interior, the Rankine Station's history and internal function can be made more readable, building on the TVA's approach of inviting the public in to see the operation of a hydroelectric plant.

7.2 Re-enchantment

The design of this adaptive reuse project attempts to restore mystery, magic, and awe, which modern life has taken away from the experience of Niagara Falls (Bauman 1991, x-xi). The ability to witness how this infrastructure deals with the forces of nature resists the prevailing sense of boredom with the Falls. Taking the visitor below the surface of the accumulated imagery that has coloured the development of Niagara Falls since the last century, there is an opportunity to start fresh and focus the public's attention anew. In his book, Graham Ward reflects on the possibilities of such re-enchantment:

It is the re-evaluation of ambivalence, mystery, excess and aporia as they adhere to, are constituted by and disrupt the rational, that lies behind the re-enchantment of the contemporary world. A culture is appearing in the West and North America suddenly full of angels, vampires, cyborgs and aliens... The world is now multiple worlds; and worlds are created by, and shift within, nets of signs and symbols pointing beyond themselves towards other nets of signs and symbols. (Ward 2000, 161).

Such a mystic world is still present along the Strip, and artifact from the bizarre history of the region untethered



Critical events of spectacle graphed against the naturalistic forces of growth and decay and the humanistic response to those forces of sublime nature and rarefied nature. This matrix shows the forces behind the contemporary condition of Niagara and the events that have shaped it.

from the Falls itself. These unrelated attractions of the town of Niagara transpose the majesty and emotional reaction to the Falls to their benefit. Not only does that magic stem from the Falls, but it remains there, buried but still apparent in less popular attractions like the Cave of the Winds. Re-enchantment does not mean giving up or removing these unrelated activities. Instead, it leans into these combinations of experiences that would not arise anywhere else, activities that flourish in the dramatic underworld of Niagara Falls. What is essential in this process is the careful selection and relation of those activities as programmed experiences to connect and, importantly, tie back to the landscape. The programs proposed for this adaptive reuse of the power station intentionally balance otherworldly experiences and provocative juxtapositions with compatible activities.

7.3 Pairwise Study

Selecting programs to ensure that they relate to each other is vital to designing a successful building. The design achieves this by assembling 25 programs in a matrix. This system organizes the programs based on their similar themes into four groups: community, spectacle, arts, and environment, each demarcated with a colour. Thinking of programs as belonging to certain groups helped select ones that would both cater to a range of interests and ensure strong contrasts between adjacent activities. The matrix scores each combination from one to ten to determine their compatibility in terms of sound and audience. Not every program needs to have the same noise level or appeal to the same audience, but grouping them appropriately was essential to avoid different programs causing issues with each other and to establish a gradient of experience. In addition to the compatibility of the programs, the system

Synthesis Matrix (Sound Score) + (Audience Score) + (Semiotic Compatibility x 5)	Bathhouse	Skating Rink	Food Centre	Clinic	Community Meeting Space	Makerspace	Indoor Skydiving	Rock Climbing	Distillery	Waterpark	Wine Cellar	Tourism Info Centre	Cafe	Library	Stage	Museum	Movie Theatre	Canadian Cultural Exhibit	Botanical Garden	Butterfly Conservatory	Fish Ladder	Hydro Generator	Water Treatment	Aquarium	Sustainable Living Expo
Bathhouse																									
Skating Rink	6																								
Food Centre	10	14																							
Clinic	15	11	20																						
Community Meeting Space	12	14	21	19																					
Makerspace	8	14	15	10	14																				
Indoor Skydiving	3	8	7	4	5	10																			
Rock Climbing	10	17	9	9	11	12	18																		
Distillery	15	13	13	9	10	14	12	17																	
Waterpark	9	17	8	7	6	10	14	15	8																
Wine Cellar	19	14	15	9	12	10	6	10	20	4															
Tourism Info Centre	6	17	14	11	8	10	10	15	13	10	15														
Cafe	14	17	18	14	16	13	7	18	15	9	16	16													
Library	13	13	18	18	18	15	5	8	11	5	12	15	19												
Stage	14	10	9	10	10	9	9	10	16	10	10	12	12	10											
Museum	12	10	10	14	14	12	4	8	9	4	11	15	17	18	8										
Movie Theatre	12	8	8	8	9	9	6	8	15	6	9	9	12	7	11	16									
Canadian Cultural Exhibit	9	19	18	11	13	10	3	8	16	3	17	18	15	16	15	20	19								
Botanical Garden	16	7	20	19	13	8	3	13	15	4	14	15	14	13	5	15	9	19							
Butterfly Conservatory	13	6	12	16	12	5	4	12	11	4	12	14	13	10	5	11	9	13	19						
Fish Ladder	13	11	10	6	7	15	11	13	9	12	6	10	5	4	6	6	5	11	10	9					
Hydro Generator	12	11	7	4	8	16	14	10	8	10	4	9	3	4	8	13	10	13	6	4	15				
Water Treatment	17	14	13	13	8	16	11	10	9	15	8	9	8	6	5	7	4	10	12	9	18	20			
Aquarium	9	16	9	9	10	13	9	14	10	18	6	14	9	8	8	11	5	9	10	12	20	14	18		
Sustainable Living Expo	12	12	17	16	13	16	7	11	10	9	13	17	11	11	9	19	15	19	16	11	14	17	17	15	

The pairwise study of 25 individual programs compared against each other. Categories are represented by a coloured background. Community in blue, spectacle in orange, arts in purple, and environment in green.

assigns a semiotics score. When complimentary themes related to two programs, they were given additional points.

An example is the botanical garden and food centre, which relate to a theme of production and consumption. Good semiotic potential added five points, and poor potential removed five points. These values were added together and coded from red to green. Depending on how high the score was, the greener colour represents the best combinations, with the darkest green at 25 points maximum. Programming inside the building was selected from this list, then arranged to be next to another program that shared a high compatibility score.

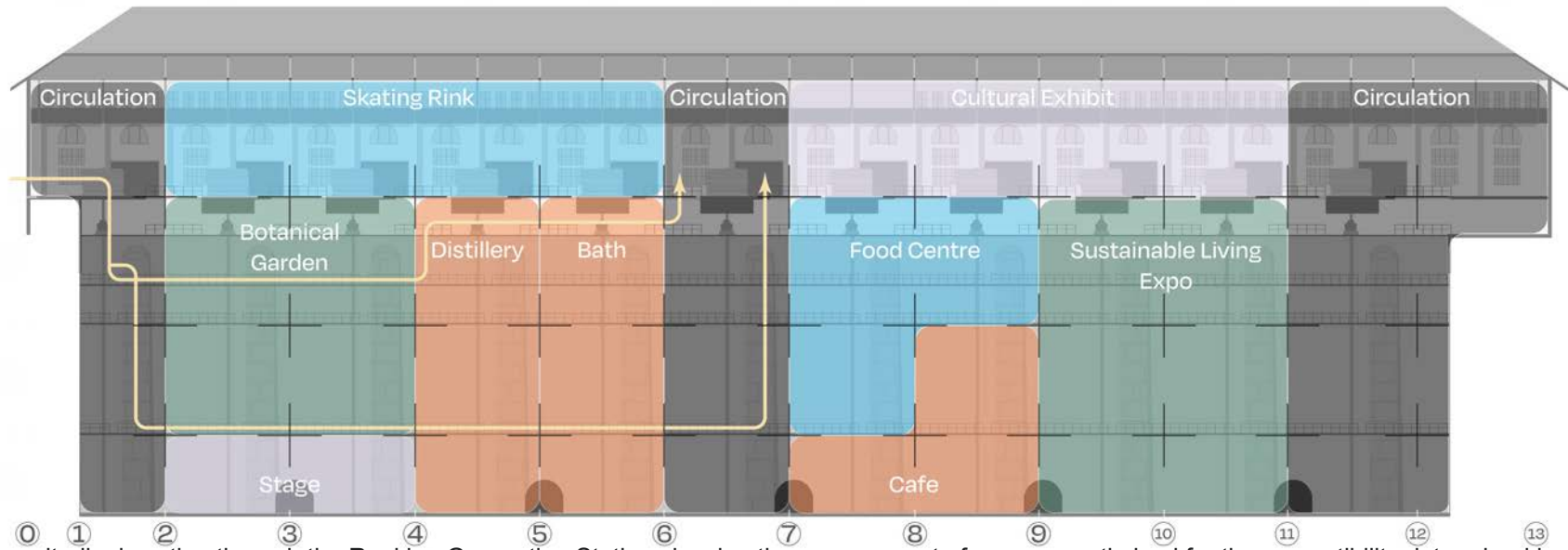
One noteworthy outcome of this process is that it encourages the creating of gradients through the scoring of sound and audience compatibility. Especially high compatibility in one area might offset lower compatibility in another. For example, if two programs relate well in terms of audience but poorly in terms of sound compatibility (meaning that one program might prefer a quieter environment while an adjacent program is loud). This combination still scores highly because that similar audience will be less disturbed by the sounds of their similar neighbours. Another program pairing might have the opposite issue: the audience is very different, but the sound is compatible. Again, this scores highly because those programs will be less noticeable due to their similar noise floor. Ultimately, these interesting transitions join two programs that might not work well together by inserting a program that shares some features with each of the other two in between.

7.4 Organization of Program

By organizing programs using the pairwise method, the reuse of the hydroelectric infrastructure creates opportunities for re-enchantment. The modern, ordered, industrial, and rational world contrasts with activities not intended by the original designers, such as the experience of showering in water dropping from 40 feet, immersion in a temperate rainforest, or tasting whiskeys in a 100-year-old brick vault. The power station becomes a “transformer,” working this time not with water to make electricity, but on people to create wholly new and unforgettable experiences of a place.

Two anchor programs populate the length of the Turbine Hall, an ice rink and a cultural exhibition space. These programs present a broader appeal, welcoming visitors into the Rankine Station and providing “sneak peeks” of the programs below through the openings in the floor. Visitors move through these programs, seeing down into all of the exciting activity going on below the surface — constantly introducing visitors to new programs that interact differently with the infrastructure and its scale. This arrangement provides the elements of variety, excitement, and novelty while being tied back to the landscape and its forces.

The remainder of this thesis will explore in greater depth half of the selected programs. This configuration is visible on the left-most side of the longitudinal section that explains the organization of the re-programmed building. The tour begins by descending a circulation tower, leading into the Botanical Garden, Distillery, and Baths, before it re-ascends into the Turbine Hall.



Longitudinal section through the Rankine Generating Station showing the arrangement of program optimized for the compatibility determined by the pairwise matrix. The yellow line shows the itinerary of the thesis, both the order and path that it follows.

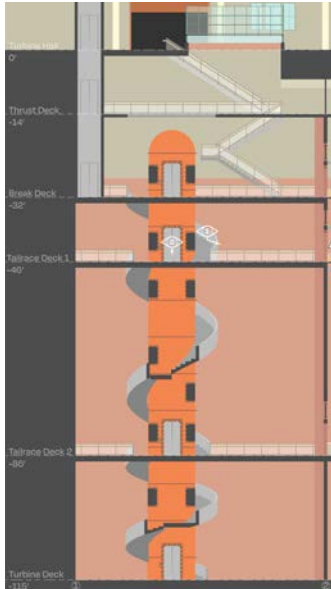
Chapter 8: A Tour Through the Transformed Rankine Generating Station

8.1 Descent

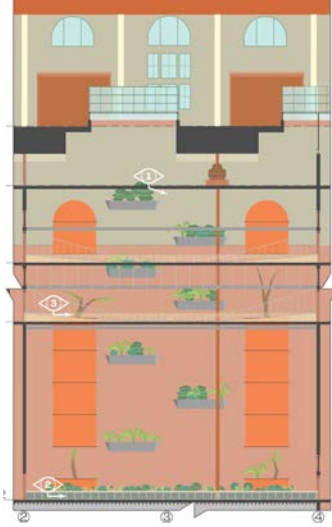
The underground portion of the Rankine Station — a giant subterranean hall of penstocks — hosts the majority of the new programs. To access these programs, visitors descend a staircase or use an elevator, both formed from the descending penstocks. The penstocks are regular repeated elements used differently depending on each new program, sometimes cut into and sometimes built around. This adaptation is first apparent when one descends — here, visitors see a spiral staircase wrapping around a decommissioned steel penstock. Circling down the penstock, the visitor encounters the scale of the building as they descend the full height that the water drops, passing through the Break Deck and the Tailrace Decks until they reach the Turbine Deck. Along the spiral stair, the design includes landings to provide areas to stop and rest and adjust the phase of the spiral so it aligns correctly. Inside the penstock is an elevator with sections of glass on the floor, walls, and ceiling. Portholes cut into the penstock introduce light that illuminates the interior of the penstock, making its depth apparent. People descending around the outside can see the elevator as it makes its journey down the shaft.

8.2 The Botanical Garden

Moving across the building, the visitor enters the Botanical Garden. This shaft hosts an array of plants and two bridges on different levels that allow one to cross the room. Light cascades down openings in the floor of the Turbine Hall,



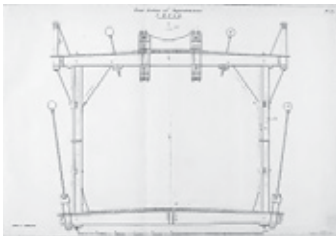
Thumbnail of the section through the circulation component of the design. Full-sized drawing on pg. 51.



Thumbnail of the section through the Botanical Garden component of the design. Full-sized drawing on pg. 54.



The Niagara River Suspension Bridge which was completed in 1855 (Griggs 2016).

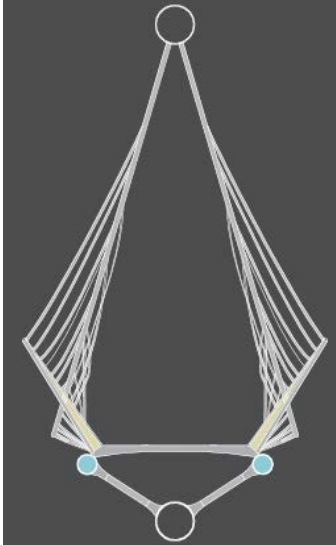


Like the two levels of the bridge inside the Rankine Botanical Garden, the Niagara River Suspension Bridge was constructed with two levels, one for rail traffic above and a roadway on the bottom (Griggs 2016).

86 feet above. Temperate rainforest plants populate this tall vertical space, providing powerful contrasts to the industrial environment. The temperate rainforest has defined levels of its flora: overstory, understory and ground plants are adapted to compete for the limited light and thrive in high humidity. A pipe network carries water to diffusers in the garden, maintaining the required atmosphere by misting the air periodically. The plants are supported at different levels, anchored to the walls, draped from the network of structure and pipes, or housed inside of areas of the modified penstocks. Some areas support shrubs and shade-loving plants, while air-nourished plants like mosses and bromeliads anchor to areas with less soil. Inside the penstocks and on the lowest level of the garden are larger plants, while the upper sections of the penstock are fitted with full-spectrum grow lamps. A bridge passing through the garden draws inspiration from the tensegrity structure of some rainforest plants and the Niagara Falls Suspension Bridge, the first of its kind designed for railway crossing.

8.2.1 Nature and Immersion

The web-like quality of the suspended bridge lends a precarious feeling as the visitor crosses the space, requiring them to sharpen their attention as they walk along the mesh-like platform. The depth of the shaft is visible below the visitors' feet as the light from above fades to shadow. Heightened awareness is an experience described by many visitors to the Falls. The hypnotizing image of water rushing over the edge has an acute sense of danger, making Niagara appealing to risk-takers. This sense of mortality repeatedly appears through Niagara's fascination with the unreal in its haunted houses and wax museums (McGreevy 1994, 58).



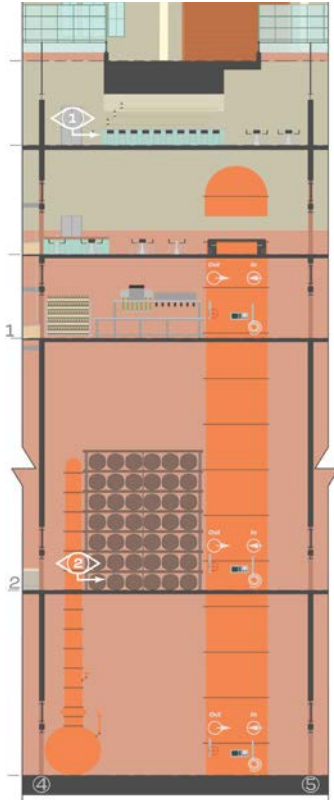
Section through the bridge that crosses the Botanical Gardens.

The visitor being attentive to the environment inside the building and its modifications is essential to a deeper reading of the infrastructure and the landscape. This heightened awareness is necessary priming for the programs that follow. Modernism asserts a distinction between nature and culture (Latour 1991, 99). In this situation, that distinction creates distance between the visitor and their reading of the Falls.

The Botanical Garden provokes the visitor to experience the natural world and historical artifact of the Rankine Station as a hybrid environment, encouraging a feeling of immersion without scrutinizing any particular aspect. This approach is necessary for restoring the denotative view of the Falls — it promotes a recognition of these systems as powerful, precarious, and interlinked. Here in the Gardens, the hybridization of natural and social worlds connects forms with their latent meanings and dreams (Zizek 2009, 3). This garden is an introduction into the world of symbolism and enchantment. The visitor enters the dream world, which provides a portal to dissolve the distinction between nature and culture, eroding semiotic and denotative barriers that have prevented a more profound reading of the land and water. The intentional blending of these phenomena, the sublimity of Niagara Falls and the dream world that surrounds it encourage each visitor to consider how these realms might be related.

8.3 The Distillery

Beyond the Botanical Garden, the visitor enters the Rankine Distillery, an even taller and narrower space. This narrow soaring space is ideal for copper distillation equipment with long columns that shoot past a Tailrace Deck. The next level is the cask area, moving up from the lowest level



Thumbnail of the section through the Distillery component of the design. Full-sized drawing on pg. 61.

where the distillation occurs. Here, casks of distilled spirit stack against the surrounding brick walls for ageing. The height provides sufficient space for storing many barrels, increasing production capacity, and keeping the area darker and cooler for the ageing liquid. On the next level above, the spirit is bottled and prepared for sale and sampling. On the two uppermost levels, visitors can sit and relax and taste the spirits, closer to the daylight filtering down from the Turbine Hall and under the dramatic vaults that support the massive dynamos. Looking downward through a glass floor, visitors can see the bottling and production process below.

The Distillery presents a different opportunity for re-enchantment, to acknowledge the shifting tendencies of Niagara and the characteristic intoxication within a time-transformed landscape. Both the distillation process and the product of the spirit are available to the visitor to taste and see. The production process fixes itself to time through the ageing of the spirit, which is apparent throughout the sampling area and the lower production areas. Fermentation aligns with movement across the growth and decay axis, acknowledging the transformation of clean water into distillate.

8.3.1 Objects of Desire

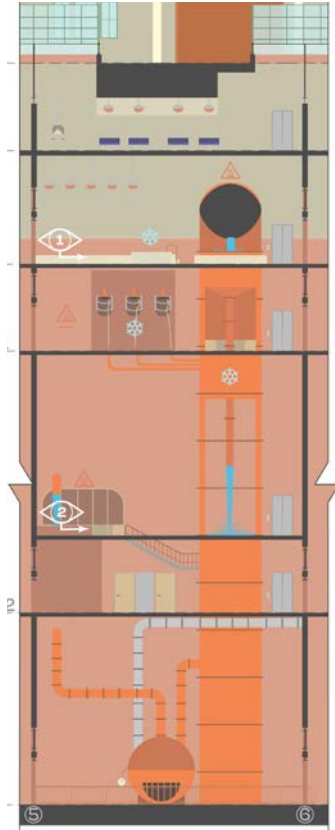
Distillation straddles the horticulture of its additives and the mineralized water of its base solution. This combination matches the programmatic arrangement of the Distillery between the Botanical Garden and the Baths. The Distillery blends these two aspects of plant and water through movement up and down the Rankine Station — first, in the ascending fermented vapour and then in the falling condensation of the distillate. From the still, it rises again,

this time inside the penstock. The spirit moves from still to cask to bottling. Pumps and tubes transport the tonic up the interior of the penstock as it nears completion, mirroring the movement of vapour up the still and the direction of the shaft connection turbine to the dynamo. The landscape provides the ingredients tempered by time into an alchemical concentration of the location and its properties.

The Botanical Gardens presented the visitor with a heightened awareness of perception, while in contrast, the Distillery directs one's attention to the scarcity of material, making the aspects of alcohol and spectacle more desirable. The distillation and ageing process mirrors how the Falls were shaped over time to transform water into spectacle. The alcohol and landscape are not rare because of their essential ingredients — these are plentiful. It is the process of time that is required to alter the base material of water. There is no substitute for the time it takes to age a whiskey or the geographical time scales that form the landscape. These are rare qualities which is a large part of their appeal. Pausing and appreciating the time and scarcity of these pleasures is part of the process of re-enchantment.

8.4 The Baths

The third program before the visitor ascends again is the Baths. The Baths are an opportunity to incorporate the flow of water back into the building, experience being inside the infrastructure, and give in to Niagara's waters' hypnotizing attraction. Each level has a different configuration of the heating, cooling, and resting cycle of a bath. On the Break Deck, the arc of the penstock cuts away to create a soaking tub. Water flows in from the upper section, as it would from a penstock in operation. A nearby cold plunge and rest area



Thumbnail of the section through the Baths component of the design. Full-sized drawing on pg. 64.

under heat lamps complete the cycle. The Turbine Deck houses the equipment to heat, treat, and pump the water through the Baths, while on the Thrust Deck, bathers can recline and exfoliate themselves with coarse salt.

The bath design is structured around the penstock — modified for each part of the bathing cycle as it descends through each of the three bathing levels. It takes the form of a warm tub, a bench, and a place to cool down using a torrent of water. Here, the penstock fills with cool water dropped from above, applying the energy of cascading water to create a cold shock driven by the head weight of the water. The miniaturization of this force so that a visitor can stand inside it contextualizes the Niagara River's real power. By standing inside the penstock and being pelted with a smaller stream of water, it becomes apparent the energy that would have moved through Rankine with all eleven penstocks brimming with water.

Bathers race between the dry-sauna, cold cascade, and the inviting warmth of the bath along the wall. The immersion inside the river's waters and its stimulating effects encourages consideration of the material that makes the Falls majestic.

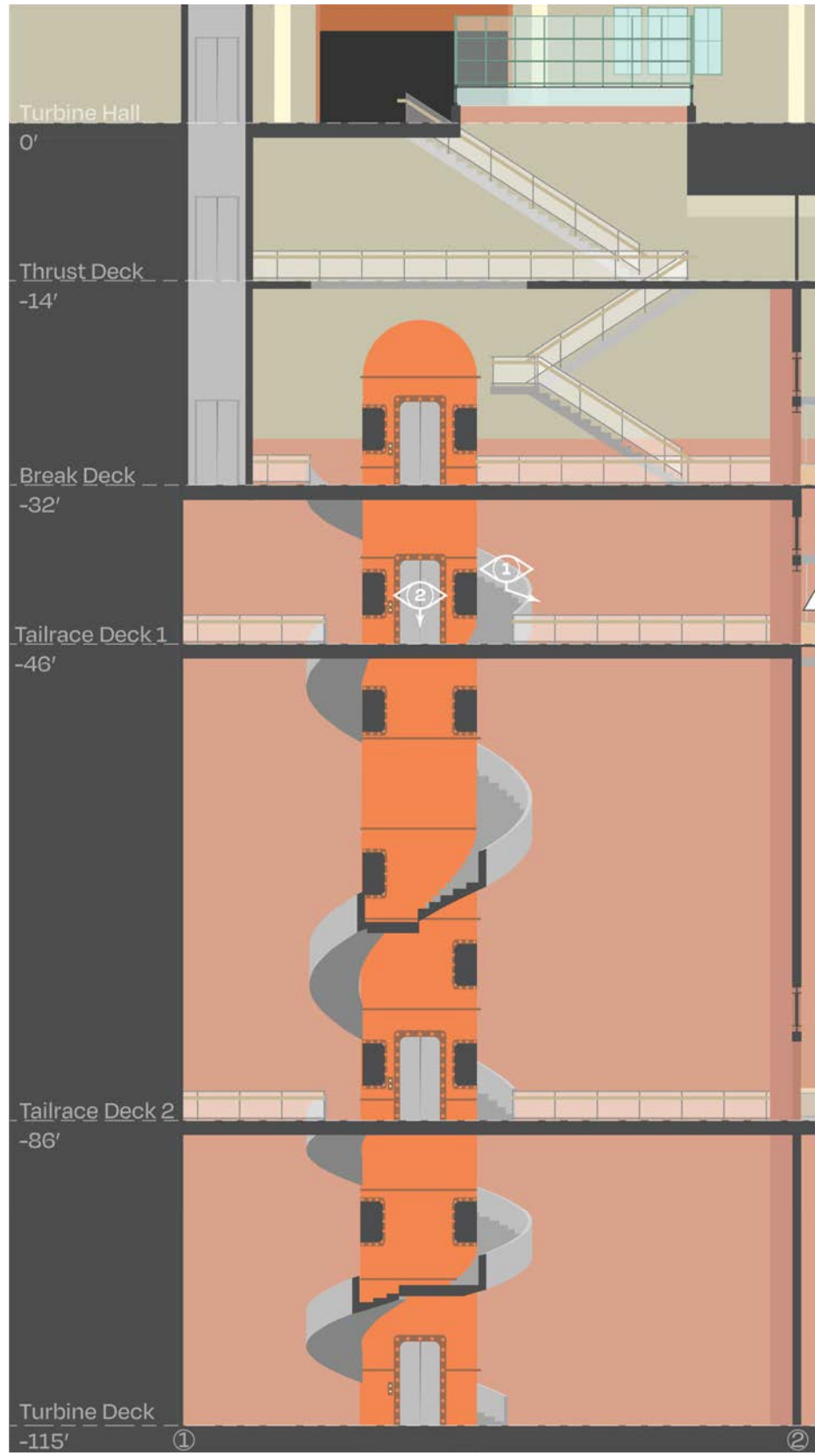
8.4.1 Sublime Waters

Bathing focuses attention on water's unique properties. The same material that can drive turbines and create mesmerizing cascades has this other figure of relaxation. Standing by the Falls and watching the water go over the edge, it is hard to avoid imagining what that water feels like to touch. That draw is partly the appeal of attractions like the Maid of the Mist and the Falls Walkways that snake by the American side of the Falls. These experiences never really deliver on

that desire though, the water is so mesmerizingly powerful, yet it is impossible to stand under it. The re-enchantment provided by the Baths is the resolution of this desire. The Baths modulate the flow of water to make it appropriate for human use, similar to how the Rankine Station in operation controlled the water going through it to produce the luxury of electricity. The rarefied frozen image of water descending the falls can also be sublime. This ability to relax within the water is the leisure quality of Niagara that has always remained so distant.

8.5 Ascending to the Turbine Hall

Beyond the Baths is another circulation core at the centre of the building. If visitors choose to ascend here, they move up the penstock, this time towards the light coming from the Turbine Hall. Above an indoor skating rink takes full advantage of the Station's enormous horizontal Turbine Hall, flooded with light. The openings in the floor that held the dynamos have been framed with brick and covered with glass skylights, and between these openings benches and cubbies provide places for skaters to take off their shoes and strap on their skates. Gliding across the ice, skaters pass portals that stream light down into the lower programs. They can similarly pass by the Gardens, the Distillery, and the Baths, or might pause to peer down glimpsing the activity below.



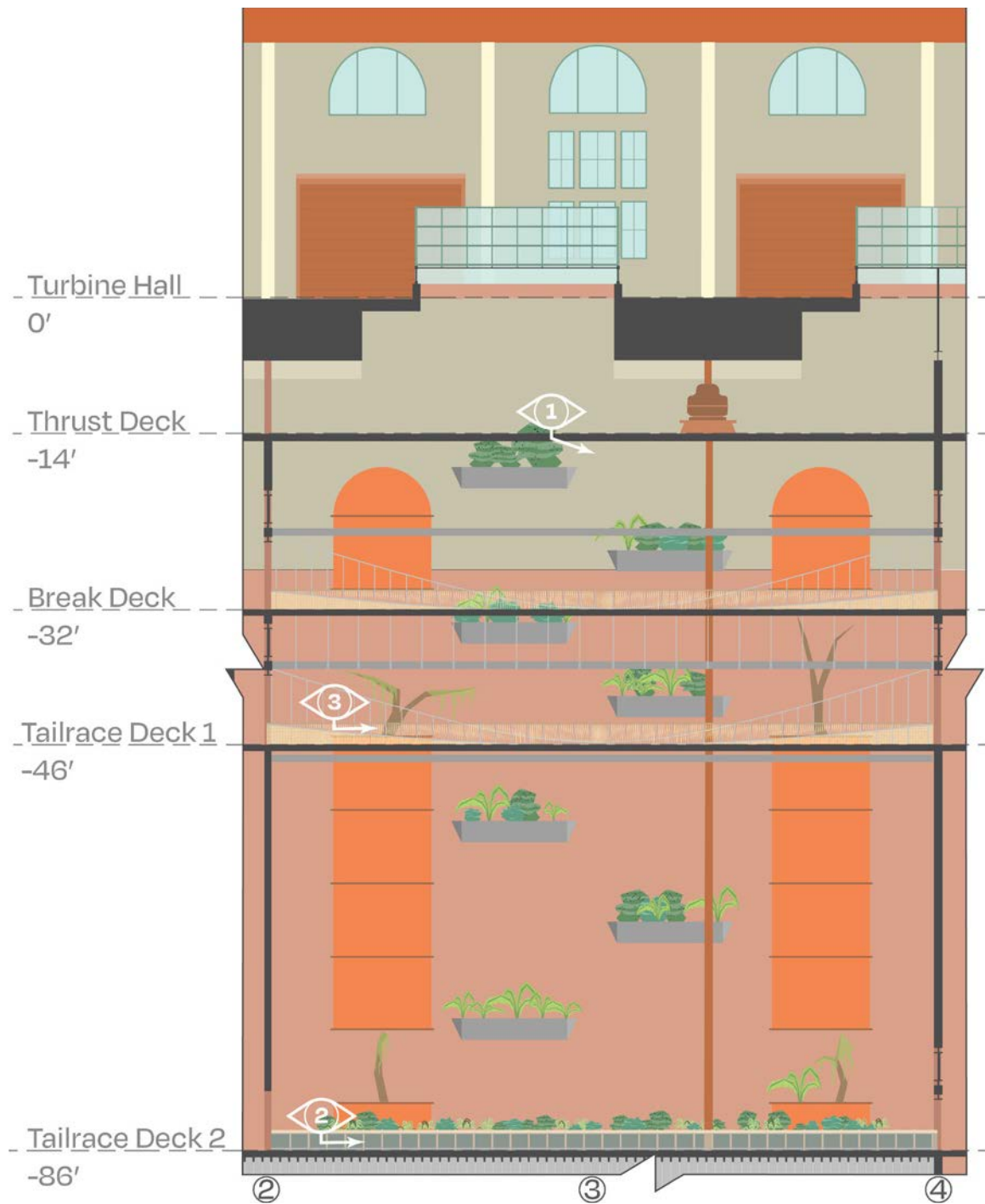
Section through the circulation component of the design. The stairs spiral around the outside of the penstock while the elevator moves within.



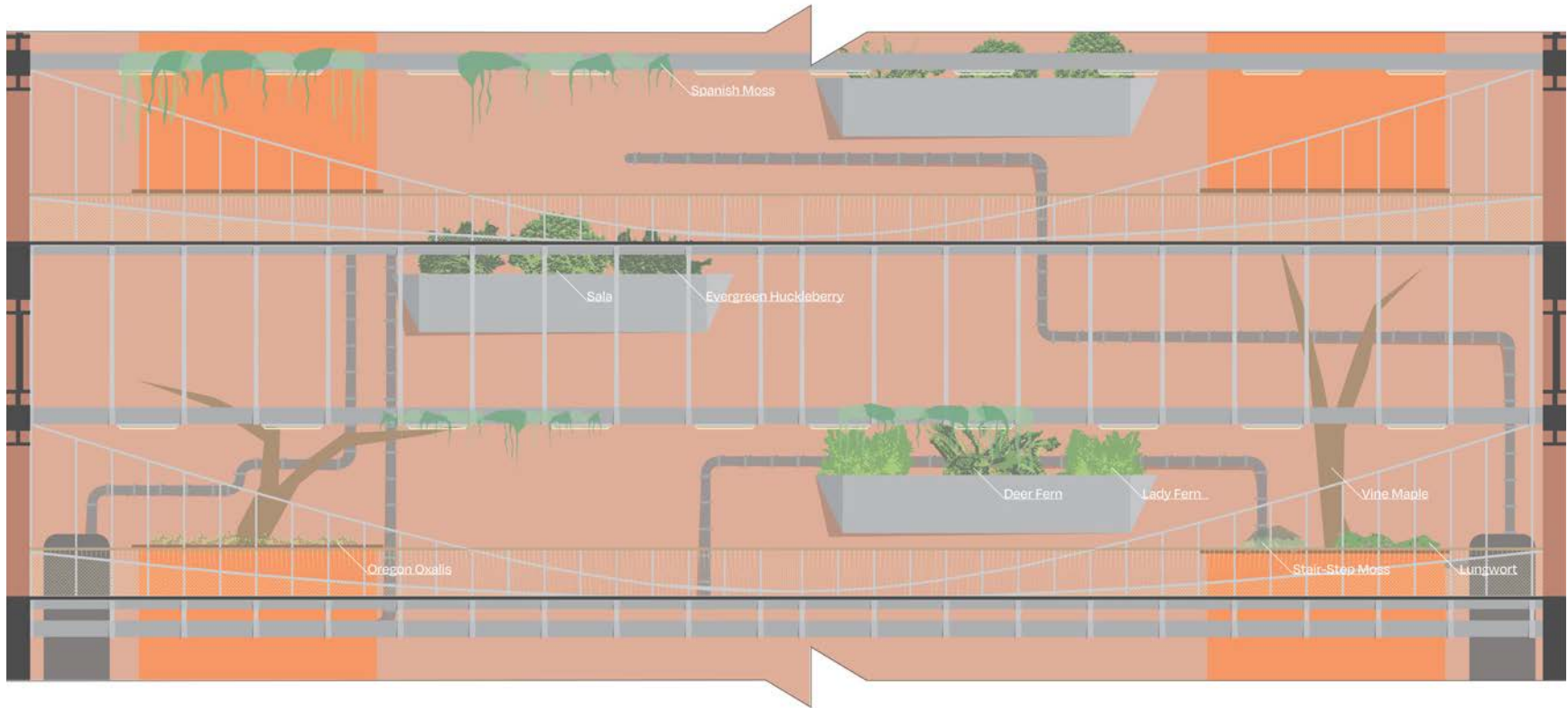
Interior perspective of the circulation stair facing towards the botanical garden program on the first Tailrace Deck.



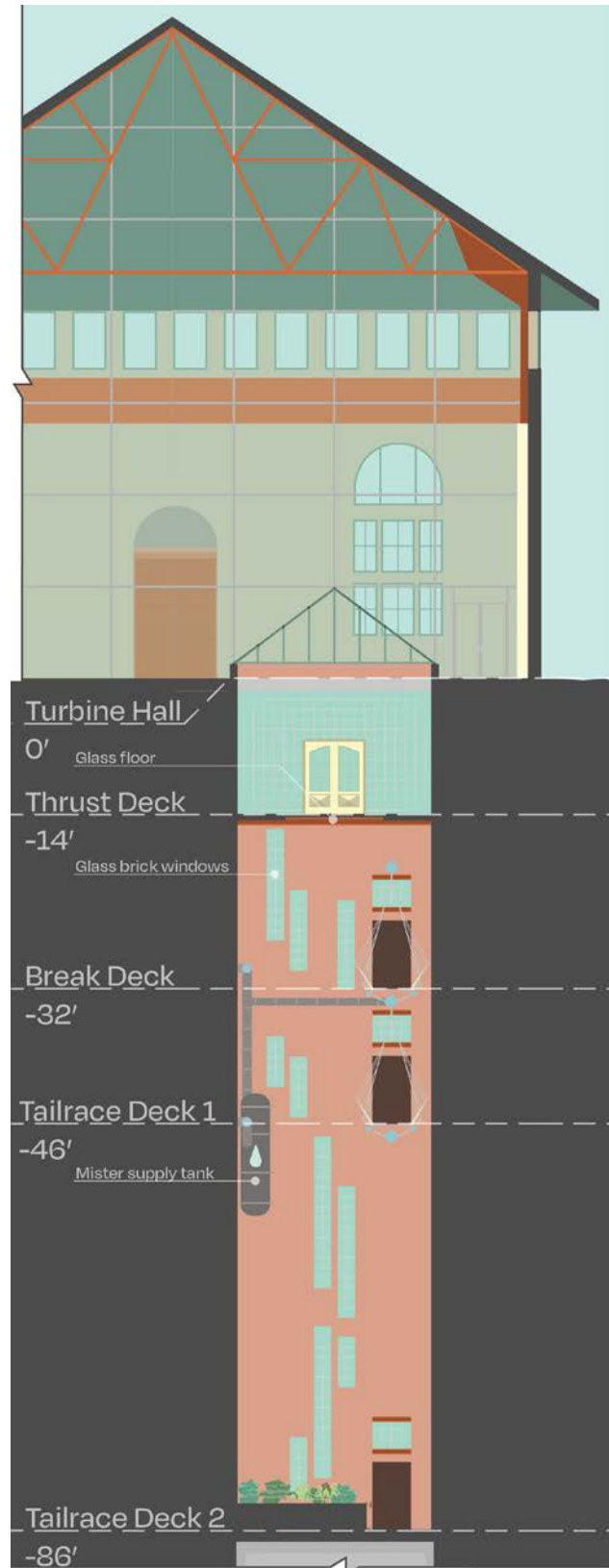
Interior perspective of the elevator inside of the penstock, looking down towards the Turbine Deck.



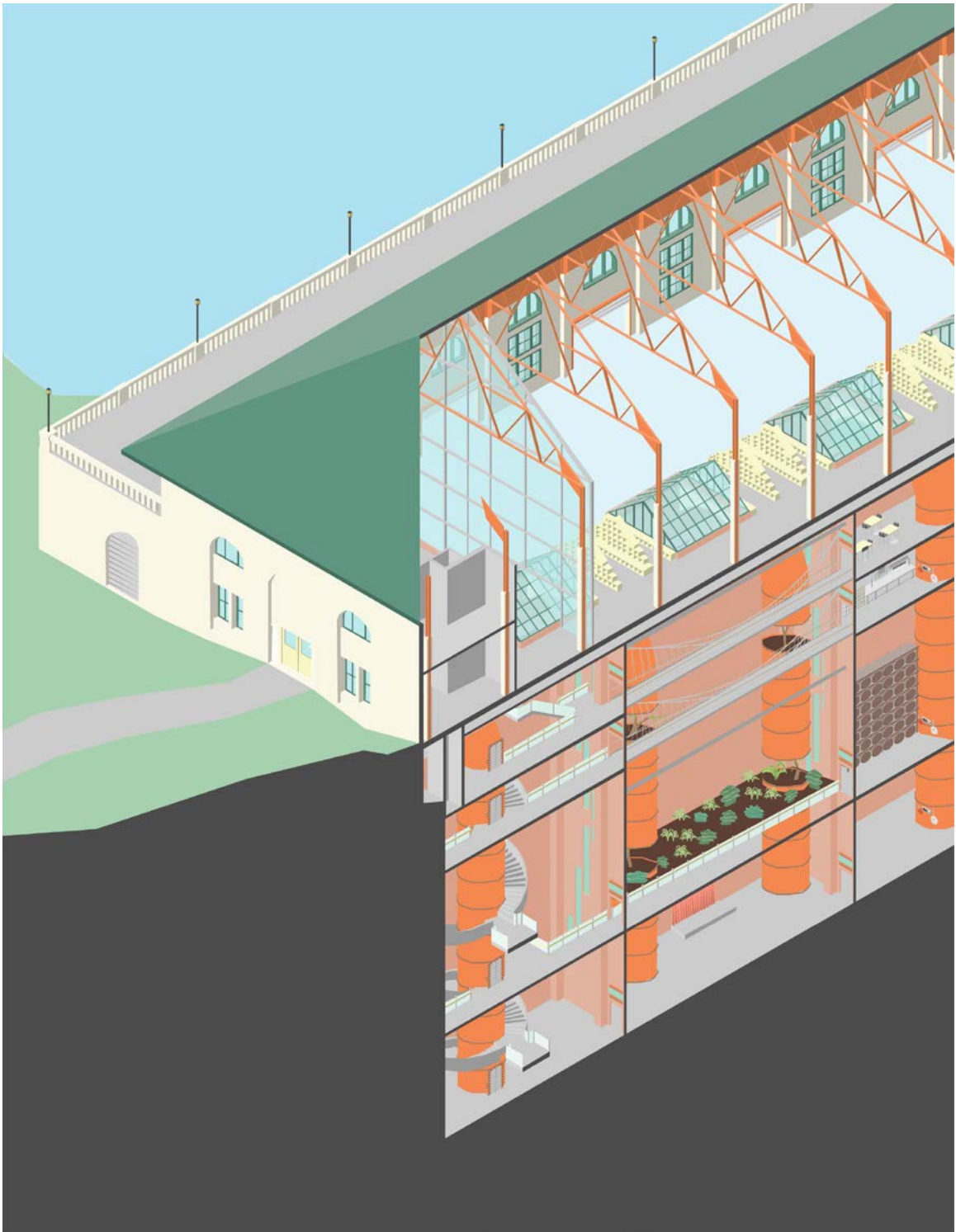
Section through the Botanical Garden. This area crosses two of the penstocks. Above, the bridge crosses on the Break Deck, and first Tailrace Deck levels.



Enlarged view of the tensegrity bridges and a description of some of the temperate rainforest plants selected for the garden.



Transverse section through the Botanical Garden showing where circulation is positioned and how visitors are able to see down into the levels below.



Axo through the adapted Rankine Station showing the addition of walls to separate the programs and the connection between programs vertically and horizontally.



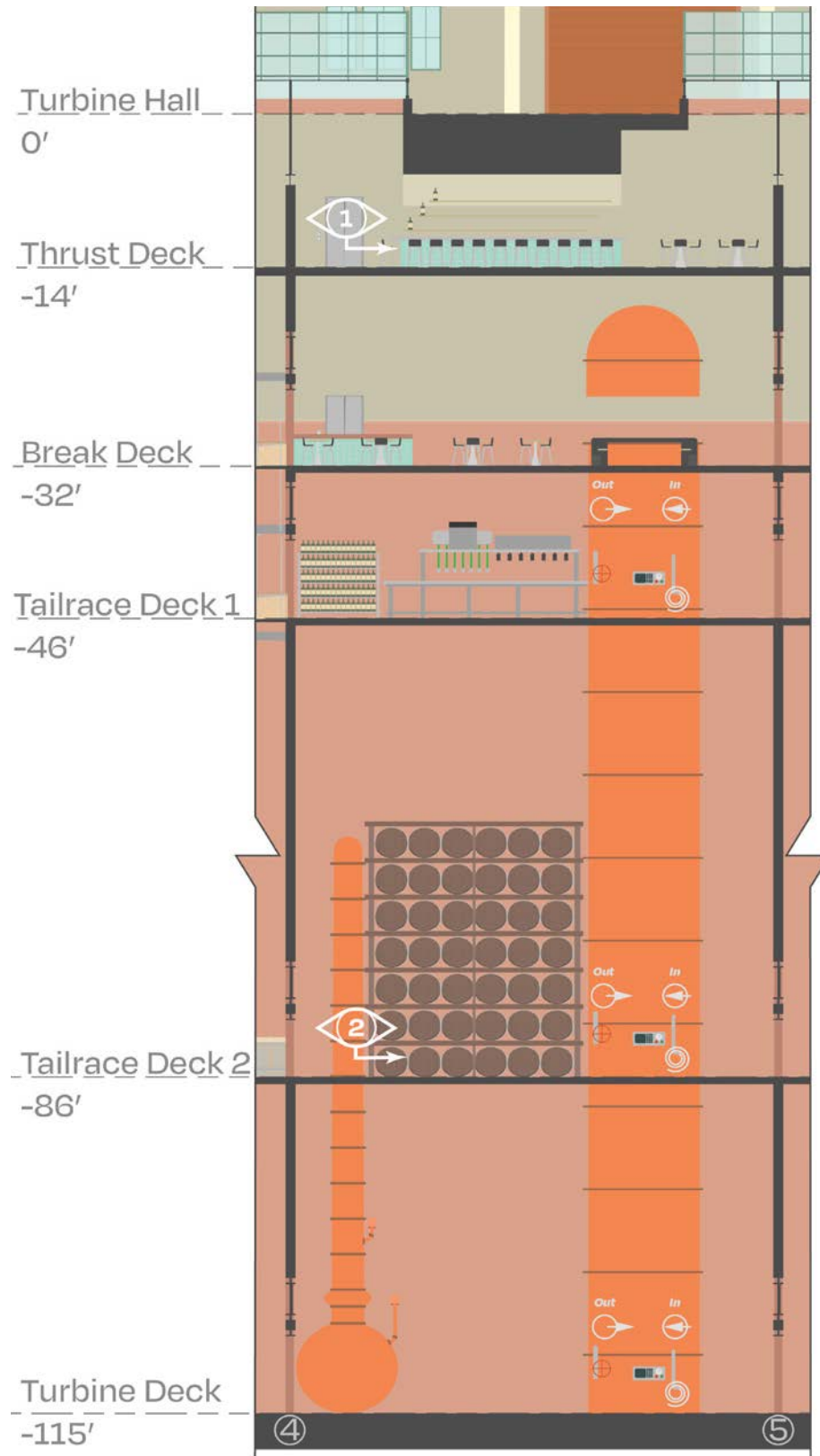
Perspective looking down into the Botanical Garden from the Thrust Deck.



Perspective looking across the lowest level of the Botanical Garden on the second Tailrace Deck.



Perspective looking across the bridge of the upper level from one end of the Break Deck to the other.



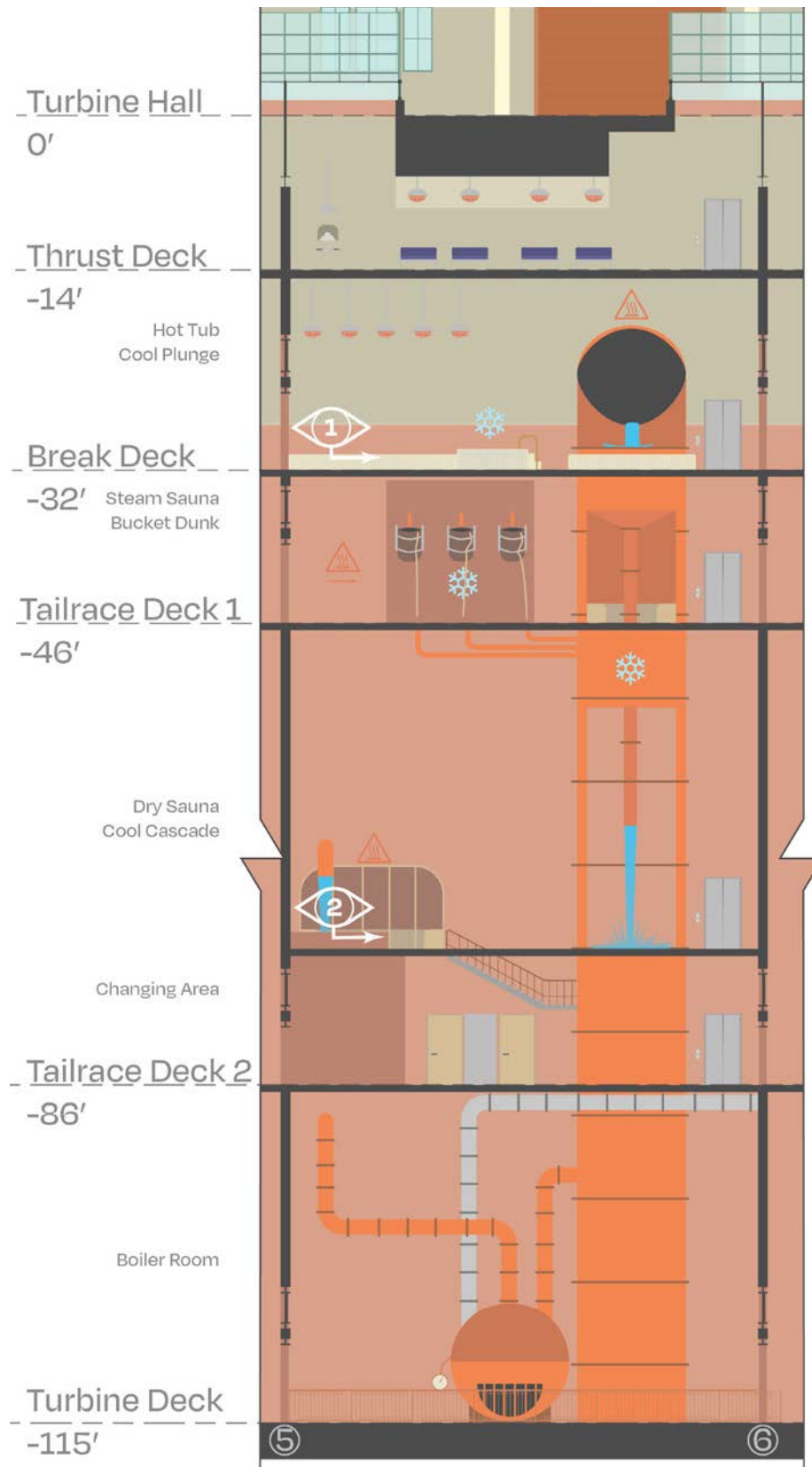
Section through the Distillery. The penstock is repurposed to transport the spirit between the different levels of production, moving up from the still at the beginning to the bottling at the end.



Perspective looking across the upper level of the sampling area on the Thrust Deck.



Perspective looking up at the cask storage area on the second Tailrace Deck.



Section through the Baths. Each level of the baths has a different configuration of the heat, cool, rest cycle.



Perspective at the penstock cut away to become a tub on the Break Deck.



Perspective at the penstock which cascades cool water onto the bather on the second Tailrace Deck.



Perspective from the Turbine Deck looking up the stairs at the Turbine Hall above.



Perspective from the Turbine Hall looking across the ice rink. The side of the rink is lined with rows of seating and glass opening that provide views down into the programs below.

Chapter 9: Conclusion

The introduction of the Botanical Garden, Distillery, and Baths into the Rankine Generating Station begins a re-enchantment of Niagara Falls. The design restores spectacle to Niagara, re-enchanting its origins in scale and power back to the denotative form of the iconic landscape feature. These programs are carefully selected, interwoven with the existing infrastructure of the Station to emphasize its relationship to the Falls. The resulting experience contrasts the contemporary form that has accumulated in the tourism region while maintaining the otherworldly qualities that make Niagara unique. Each experience encourages deeper immersion with the Niagara River, expanding the view of the Falls beyond the lone landscape icon.

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