A Listener's Guide to

Noise

in the

Anthropocenic City

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B.A., University of British Columbia, 2017

'Submitted in partial fulfillment of the requirements for the
degree of Master of Architecture'
in The Faculty of Graduate Studies,
School of Architecture and Landscape Architecture,
Architecture Program

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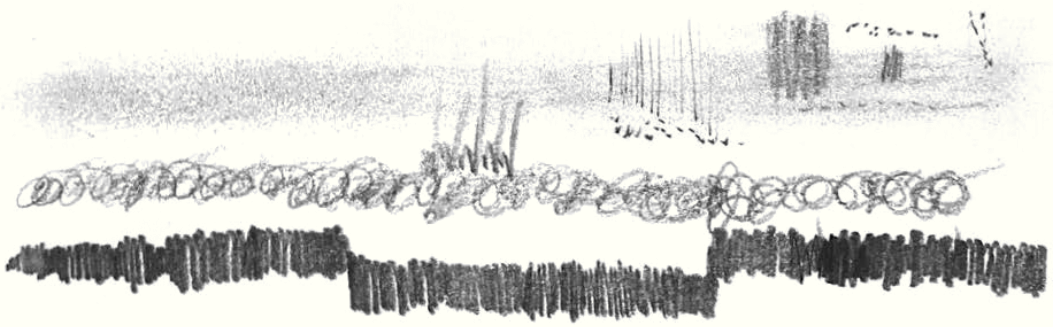
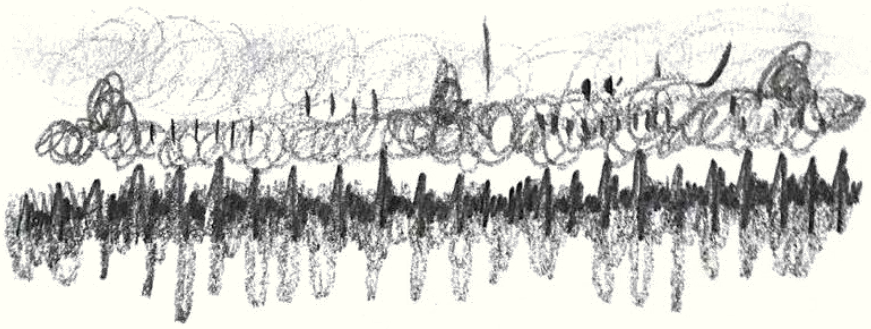


Abstract

Noise often brings to mind a loud or disturbing sound. When defined as "unwanted sound",[1] we find that noise is not inherently negative but speaks to a negative reaction to something in one's environment.

Noise is most audible at the scale of the Anthropocenic city; an urban world involving ubiquitous interconnections between human and natural forces. Since the Romantic era, aesthetics has ideologically separated humans from nature, framing the human as a "nuisance" and nature as "ideal". Henceforth, urban soundscapes have been seen as nuisances deserving of noise control, including noise by-laws, architectural acoustics, and personal headphones.

By using sonic methods of active listening, field recording and sound art, this project will take the listener on a virtual soundwalk through space and time along Vancouver's Seawall. The soundwalk will focus on noise that signifies aesthetic relationships humans have with built and natural environments.



Positionality

This graduate project involves a highly experiential examination of space. Experience of space is inherently social, and so this research and writing will be influenced by my social positionality. Therefore, it is important to acknowledge that I am a Caucasian, heterosexual-identifying man whose family has immigrated to Canada from Ukraine three generations ago. While this project will attempt to write for a universal audience, my positionality will inevitably influence my approach.

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Thesis Statement

As life in the Anthropocenic city challenges us to reimagine our connection to the natural world, this project will amplify *noise* to demonstrate how aesthetic relationships with environments are revealed through active listening.

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Acknowledgements

The following people helped shape this project:

Matthew Soules, Bill Pechet, Jennifer Schine, Heather Van Tassel, Terry Penner, Lukas Hildebrandt, Nahal Jafari, Lukas Vajda, Roxanne Penner, Zoe Penner, Landon Epp, Paul Thiessen, Jeffrey Suchynsky, Andrew Bauman, Brook Hendry, and TJ Edmison.

Terms and Definitions

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acoustic ecology

the study of the ways sounds influence our relationships with one another and our environment.

Anthropocene

the current geological epoch that is defined by the shift to humans becoming the most dominant geological force on the Earth's systems and processes. Acceptance of this new period requires an epistemological shift; one that acknowledges humans and "nature" are so inextricably interconnected, that they are no longer separate entities.

Anthropocenic city

the urban condition that signifies the interrelationships between anthropogenic and natural forces on the Earth during the Anthropocene.

environment

the circumstances, objects, or conditions by which one is surrounded.[2] This definition provides a more open-ended and universal scope. I am deliberately not using the term to refer to "the air, water, and land in or on which people, animals, and plants live".[3] This definition implies that some natural elements are necessarily part of our "environment".

human environment

a space that is not fully, but pre-dominantly made up of processes and features that come from human sources. These especially include environments that are deemed as urban environments.

nature

"natural scenery".[4] This definition refers to the visual aspect of 'nature'. I am using the term 'nature' to refer to how most people understand our natural landscapes. "Nature" has always been a human construction, a term for humans to understand "all the features, forces, and processes that happen or exist independently of people, such as the weather, the sea, [and] mountains".[5] When using "nature" in this sense, I will put it in quotations as I argue that no processes exist independently of people any longer. Through ocular-centrism and aesthetic values starting in the Romantic period, 'nature' has come to be colloquially known as particular natural landscapes or environments rather than all of 'nature's' "forces and processes".[6]

natural environment

a space that is not fully, but pre-dominantly made up of processes and features that come from non-human sources. These are especially environments that are deemed as beautiful natural landscapes.

noise

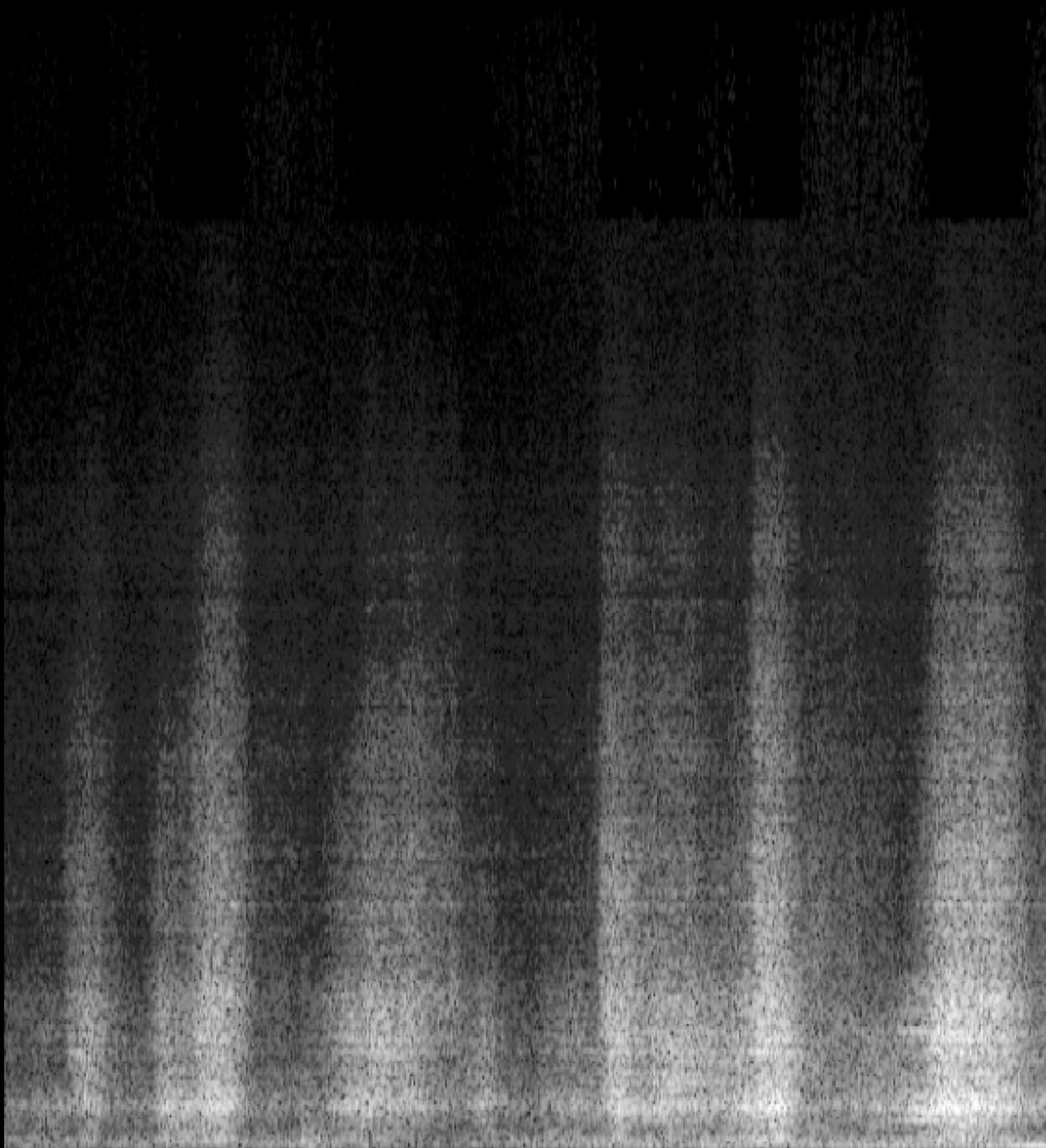
"unwanted sound".[7] This will be the most common definition of noise in this guide. It may also describe any loud sound, or disturbance. Thirdly, noise is something that interferes with a signal.

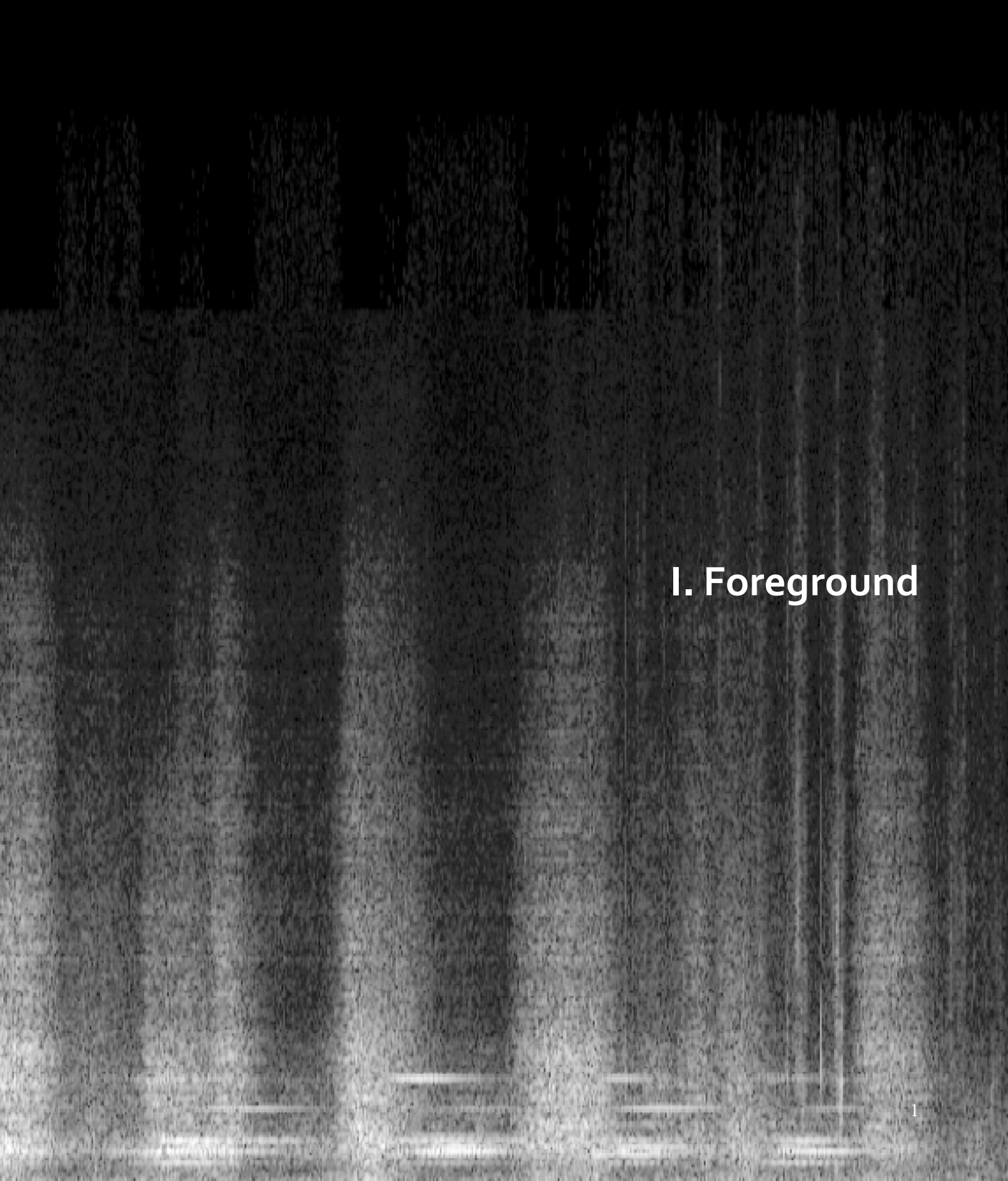
soundscape

"the sonic environment" or "any portion of the sonic environment regarded as a field of study."[8]

soundwalk

"a listening exercise that helps us become aware of our immediate acoustic environment."[9]





I. Foreground

Welcome to the Anthropocenic City.

We all live in it now, and it has major implications for how we understand the world. The Anthropocenic city will be our context for studying the various forms of noise.

Firstly, the Anthropocene is the name for the geological epoch where humans are a predominant geological force on the Earth's systems. This theory suggests that humans have such a widespread impact on the Earth's systems that we influence Earth's patterns more than the Earth itself. Human existence has now permeated into nearly all of the Earth's cycles. If "nature" is understood as environments untouched by humans, then "nature" no longer exists. Therefore, we must understand that history and the present are made "through dialectical movements of humans making environments and environments making humans."[10] Any impact humans have on the environment affects us in the Anthropocene.

The Anthropocenic city is the space that signifies the interrelationships between anthropogenic and natural forces on the Earth. The world is becoming increasingly urbanized, with recent estimates suggesting that fifty-five percent of the global population lives in cities.[11] In the Anthropocene, human processes expand over the whole surface of the Earth, which connect to our global cities; the centres of flows of materials, resources, information, and people. The city is the densest form of all of these flows, and therefore, is often the site we think of when we consider the noisiest environments on Earth. Further, the Anthropocenic city is also where we experience natural processes at play, with sea-level rise, rising temperatures, urban wildlife, and natural resources. Therefore, the Anthropocenic city will be our context for the guide to noise.

The term, "Anthropocenic City" is still roughly defined, due to its recent usage. I define the Anthropocenic city in terms of its embodiment of the various human and natural forces that influence the Earth's systems. The Anthropocenic city includes ubiquitous and simultaneous interconnections between human and natural forces that influence the Earth's systems. Human and natural forces are intertwined and occur simultaneously, rendering these two forces barely distinguishable in the Anthropocenic city. This blurring of humans and nature is the focus of the next section.

Aesthetics

While living in the Anthropocenic city, to imagine humans as separate from "nature" is particularly inappropriate. Human existence now dominates all of the Earth's cycles: carbon, water, nitrogen, and oxygen to name a few. Thus, our perspective of ourselves in relation to "nature" needs a shift. To start, we need to stop perpetuating the human/"nature" dichotomy. Humans and "nature" are inextricably intertwined, and a part of one another. The aestheticization of nature tends to work against this notion.

The aestheticization of nature strongly perpetuates the human/"nature" dichotomy in our imagination. The aestheticization of nature – or the production of idealized depictions of natural environments – began in the Romantic period of the 18th century. Immanuel Kant wrote the first significant work on the idea, entitled *Critique of Judgement* in 1790. This seminal work introduces *disinterestedness,* meaning that to appreciate a natural landscape, one must observe it with an unbiased, or objective position.[12] It meant that no memory, or emotion towards an environment was valid in one's appreciation of a natural environment. Disinterestedness claims that beauty is perceived through intuition, rather than knowledge. This non-attached approach disconnected the viewer, or human, from the environment. A strong dichotomy of viewer/viewed, human/"nature", or subject/object was formed. Morton notes that "the literature of the Romantic period...still influences the ways in which the ecological

imaginary works."[13] This approach to appreciating nature remains in places like Vancouver, as I will demonstrate in this paper.

The picturesque view was most important in developing the idealized aesthetic of nature.[14] The picturesque is the conception of visual beauty as "picture-like" scenes often seen in landscape paintings. Throughout the 19th century and into the 20th, the picturesque encouraged the viewer to see nature as a picture; like a work of art, or painting. Landscape paintings portrayed natural environments in attractive scenes; using perspective, frame, and light and shadow to exaggerate the visual aspects of nature. The painters often depicted the landscape as a backdrop, flat and distant. This meant that humans began to perceive nature as if it were two-dimensional. It also insinuated that nature was something that humans could control. Although influencing the popular experience of nature in many fields, this thinking is exemplified especially by the tourism industry; involving sight-*see*ing of the natural environment as advertised in carefully framed postcards, brochures, and guidebooks.[15] The depth of our environment was beginning to be lost.

Today, the picturesque view is especially inappropriate for understanding how we impact the Earth. By seeing nature as an object we have lost sight of what is best for us and the planet. Morton notes:

> *Putting something called Nature on a pedestal and admiring it from afar does for the environment what patriarchy does for the figure of Woman. It is a paradoxical act of sadistic admiration.*[16]

Reducing "nature" to an object and admiring it in this way, damages "nature". I will use the case of Vancouver throughout this paper to explore this idea. For example, because the city of Vancouver is so attracted to the view of the nearby mountains and sea, it has been designed in a non-sustainable manner. The mountains are located north of the city, meaning building orientations and glazing face this direction. North-facing windows are an inefficient way of letting in natural light and heat into buildings from the sun – which in the Northern hemisphere – comes from the south.[17] The design of these buildings consumes more energy, increasing resource extraction. The attraction to the "idealized" view of natural landscapes does not necessarily serve us, or the environment.

Over one hundred years after the Romantic period, aesthetics progressed with the birth of environmental aesthetics in the mid-twentieth century. This new field began to expand the appreciation of the environment and to question the problematic notion of nature aesthetics' foundation of disinterestedness. It began during the environmentalist movement and was shaped by Ronald Hepburn's essay "Contemporary Aesthetics and the Neglect of Natural Beauty". Hepburn claimed that the appreciation of nature at the time was shallow, and generally did not consider the multi-sensory experience of it. He argued involving multiple senses would better acknowledge "nature's" evolution and depth. Environmental aesthetics also expanded appreciation to human or urban environments. A more progressive approach to aesthetics was thus beginning to form.

Unfortunately, the way I see present-day Vancouver is more reminiscent of the Romantic period's picturesque, disinterested view of nature than of the newer, progressive views of appreciating beauty in all environments. I will elaborate on this argument in Chapter IV of this paper.

Why Sound?

Altering our relationship with our environment may involve shifting the senses we use to interact with it. As humans, we tend to frame our experiences through vision. This mono-sensory perspective has led to countless problems in our relation to all environments. Sound, however, is also essential to our experience of space. The amount of information it communicates is immense if we let ourselves examine it. Unfortunately, for several reasons, it remains a neglected sense. The following section will argue why the sense of sound becomes the focus of this paper.

Sound carries a strong role in our relationships with one another and the environment around us. Pallasmaa states "the dominance of the eye and the suppression of the other senses tend to push us into detachment, isolation and exteriority."[18] While we can only see what is directly in front of us, we receive sound from all directions. Kahn notes that, unlike vision, sound is all encapsulating.[19]. This dimension of sound means that there is a more direct exchange between entities in space. Baudelaire notes this type of exchange with a natural feature: "First you lend the tree your passions, your desires or your melancholy; its sighs and its oscillations become yours and soon you are the tree."[20]

This quote also gets at the physical nature of sound; its vibrational waves are as tangible as they are audible. These waves or "oscillations" can connect us with our environment more deeply than vision. This is proven by a study of hearing-impaired and seeing-impaired children in Iran. The study found that hearing-impaired children experienced significantly more "behavioral disorders and feelings of loneliness and hopelessness" than the seeing-impaired.[21] While sound only makes up thirty-eight percent of human communication, it seems as though the sonic dimension of our communication brings deeper connection than the visual.[22]

Studying ecology through solely visual phenomena will be too restricting given the variable sensory strengths in other species. Bernie Krause, an influential naturalist and acoustic ecologist, affirms this proposition. Krause has been studying soundscapes of natural environments since the 1970s. "Soundscapes, he says, are the most accurate way to understand the health of a whole habitat".[23] He explains further how each species communicates through sound, evolving their pitches and rhythms to not interfere with other species. Jackson assures:

> *The soundscape is a critically important part of the makeup of the world and is as important as climate, landscape, oceans, air, forests, and deserts for understanding our environment.*[24]

Soundscape studies have produced findings on how ocean noise pollution affects marine species, how sound influences human behaviour in cities, and how noise pollution affects urban wildlife and neighboring natural ecosystems.

As described earlier, vision "others" us from the environment, "Sight isolates, whereas sound incorporates; vision is directional, whereas sound is omni-directional".[25] It has been argued that sight is the only sense that can keep up with the speed of the rapidly evolving world around us. But in focusing on sight, we flatten time; continuously perceiving the present, and perhaps oversimplifying the past.[26] Our preference for images has flattened the spatial and temporal depth of our environment.

On the contrary, sound studies are essential in understanding time in the Anthropocene. I previously mentioned how sound vibrations can improve our sense of connection to "nature". Further, sonic studies have proven useful in climate change

studies, as the temporality of sound aligns well with continuously evolving geological changes. Jackson claims, "Active listening affords us the opportunity to better understand our emergent position in the world in relation to sonic space, ecology, and the movement integral to place."[27] Because sound constantly shifts over time, it acts as an appropriate measure for monitoring changes in the environment. While observing melting glaciers, the visible movement of these large entities is nearly impossible to track due to their relative slowness. Audio recordings of melting glaciers, however, show that the movements are more audible than visible, as the glaciers groan, crack and moan as they shift. Thus, "The soundscape is a pertinent example for understanding and sensing the continuous and accelerating changes that the Anthropocene has released because the soundscape as an environment undergoes a continuous and constantly audible shift".[28] Sound is an ever-evolving dimension of space. Sound is energy that can be detected and informative for geological and environmental processes.

Why Noise?

Rather than studying all sound, this paper will be tackling noise; or unwanted sound. The connotation of noise is generally negative, evidenced by the way it is spoken of in noise abatement by-laws, acoustics, and colloquial language. If noise is unwanted sound, this suggests that noise is entirely subjective. Therefore, there is nothing inherently negative about noise, it is our attitude or relation towards it that is negative. Noise speaks less to what is bad, than to people's aesthetic relationships to their environments. Our dislike of certain sounds, and inability to close our ears, encourages us to use noise-reduction technology. But this technology – in the form of noise abatement, acoustic treatment, and personal headphones – does not rid of the noise, it is still as loud and present as before. What negativity we feel towards the noise is not diminished in these noise-reduction strategies; the relation to it remains the same.

The rationale for amplifying noise within the argument of this paper will be further explained in Chapter II.

Acoustics

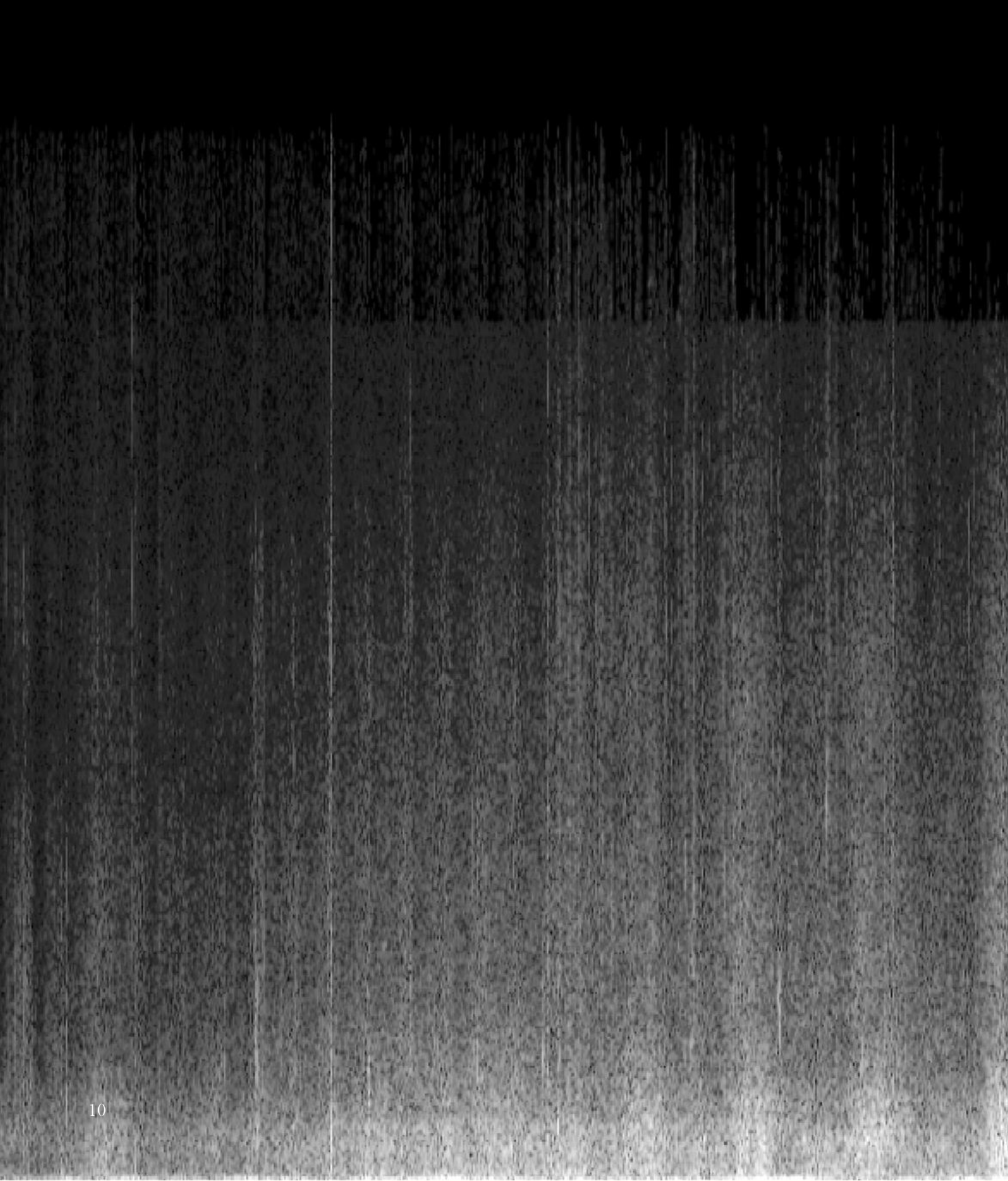
Sound is oversimplified on many levels in our society. This occurs at many scales of design. At the urban scale, noise by-laws use a mono-faceted approach to sound, focusing only on volume, rather than any other quality of sound. At the building scale, sound is controlled and monitored with architectural acoustics. On the scale of the individual's experience, sound is mostly noticed when considered a nuisance, or in other words, noise. This is indicated by the heavy use of headphones to isolate oneself sonically within the public realm. This shows a general preference for a different sonic experience than what is provided in urban designs.[29] The way sound is approached in architectural practice is oversimplified and leads to a negative reaction from users of the space.

The intersection of sound and architecture is most commonly understood as architectural acoustics. This involves using physics and materials to design spaces to reflect, reverberate, block, and absorb sounds. But the goal for nearly all of this science is to reduce sound. Acoustics involves absorbing sound with acoustic insulation, or "acoustic treatment" (like baffles and other finishes that absorb sound). Most architectural acoustics are considered as an afterthought, or very late in the design process. Acoustics are often thought to only have real significance in concert halls or music venues; these are often the only projects that take serious consideration of their acoustic consultants.

The experience of any space is strongly influenced by its sonic qualities. Implementing the speculative sounds of a future space in architectural representation is rarely done but could tell the client a much greater depth of information about the experience of the spatial designs. Crucial to any space, sound has proven to be especially important in hospital design, prison design, schools, shopping malls, domestic space, and public space.[30] [31] [32] [33] [34]

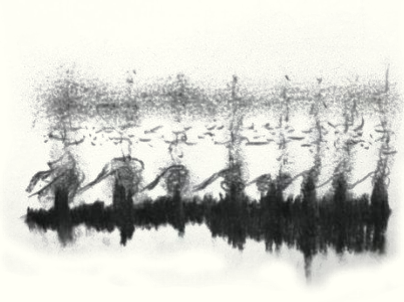
Summary

In this paper, I will be arguing how noise demonstrates how built forms sonically shape our aesthetic relationship to the environment. I will start in Chapter II by defining noise and explaining its theoretical context in terms of relations, the sea, existence, and the collective. In Chapter III, I will identify and provide background on the region of study for noise in the Anthropocenic city: Vancouver. In Chapter IV, the site will be analyzed – Vancouver's Seawall – which encompasses the themes of aesthetics, time, and sound. This will include a discussion on the functional analysis of the Seawall itself – as fortification and promenade – and then analyze the soundscape and sonic architectural typologies that exist on the site currently. Chapter V of the report will close with the description of the graduate project design: a virtual, guided soundwalk through various waterfront spaces in Vancouver.



II. Noise

Seasickness



Noise, then, does not exist in itself, but only in relation to the system within which it is inscribed: emitter, transmitter, receiver. – Jacques Attali[35]

Origin

Latin	Old French	English
nausea (seasickness)	*noise* ("din, disturbance, uproar, brawl")	*noise* ("a disturbance")[36]

Noise, as a term, has had a long, tumultuous history. But like all things in life, it begins with the sea. The Latin origin of noise, *nausea*, literally meaning "seasickness", shows how this word is connected to the sound of seafarers vomiting overboard.[37] The origin also suggests noise as a feeling or reaction to something. A way of being, a relationship to an environment.

Rather than trying to define what noise is, perhaps it is more fruitful to study its implications of relation. Noise illuminates what we desire, what we wish to ignore, what we think is beautiful, and what we are afraid of. Noise as "unwanted sound" speaks to our relationships to other beings and entities in our environment; providing insight on what is deemed unnecessary, or disliked. Attali said, "in noise can be read the codes of life, the

relations among men".[38] Hillel Schwartz also elaborates on this idea in his monumental book on noise history and theory, *Making Noise*:

> *Noise is never so much a question of the intensity of sound as the intensity of relationships: between the deep past, past, and present, imagined or experienced; between one generation and the next, gods or mortals; between country and city, urb and suburb; between one class and another; between the sexes; between Neanderthals and other humans.*[39]

This paper will examine how noise edifies the relationships between humans, nature, and space including the imagined and real connections between them.

Noise has been ill-defined throughout most of history, therefore remaining mostly unused as a term until the twentieth century. One of the key definitions of noise for this project is "unwanted sound". This definition speaks directly to notions of the relationship among entities, what is desired, or undesired. This meaning of noise goes back to the early Middle Ages but was not used by acoustical engineers until the 1920-30s.[40] In the early 1900s, the definition was still vague; Harvey Fletcher in 1928 described noise as "sound with no definite pitch", such as hand-clapping, or street noise.[41] Perhaps noise remained undefined for so long because there was no quantitative way to measure the volume of sounds until the decibel was invented in 1928.[42] Shortly after this invention, interest in noise and its reference in literature exploded. This spike also coincides strongly with the Great Acceleration (beginning after WWII), one of the debated takeoffs of the Anthropocene. Perhaps it is the Great Acceleration's increase in population, mass production, automobile transportation, tourism, industry, and consumption that brought noise into the foreground.

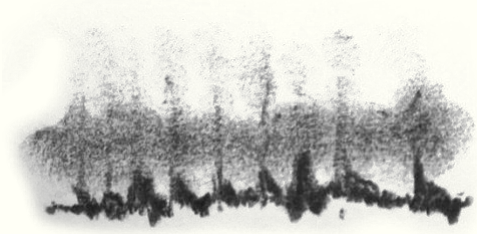
The dialogue about noise throughout the Anthropocene thus far has generally been negative, as will be shown in the section on Noise in the Anthropocenic City. It was seen as a physical or mental health hazard and thus called for reduction and control. More positive views of noise began only in the 1990s, with ideas like:

> *Noise filters our thoughts and inspirations simultaneously through each individual to create a single, holistic experience.*

Noise is our process, direction, and experimentation, our creative journey - our creativity and passion. A position. Now and the future.[43]

These more open-minded theories of noise can be instrumental in imagining what we desire, rather than what we do not want. Overcoming the "problem" of noise will be a matter of changing ourselves rather than our environments – "Distractions are often times due to your inner attitude rather than to the noises themselves".[44]

Sea



No system is an island, without relations, above the sea; but there are islands of ordered relations upon an ocean of noise. – Joseph Weissman[45]

This section describes the physical and metaphorical relationships between noise and the sea.

The sea is the original soundscape and the beginning of all life. Schafer argues that humans have always been drawn to the sea and its sounds. The noise of the sea is created as "Each drop tinkles at a different pitch; each wave sets a different filtering on an inexhaustible supply of white noise."[46] Contrary to the common aesthetic ideals of nature, excessively loud sounds are frequent in natural environments, the loudest of which can be found in the sea. Speaking of the greatest sources of noise in "nature", Schwartz states, "Of steady but not unceasing sounds, loudest was the storm-tide pounding of surf, loud as fulling hammers".[47] Emily Carr contrasts the sea with the land, "But the sea is restless. It has not the calm pushing growth of the earth."[48] Further, Norsemen often spoke of the

loudness of the sea, "waves roared against the tides of the ship, it sounded just as if boulders were being clashed together."[49] The sea can be as noisy as human environments.

Human exploration of the seas exemplifies how humans attempt to understand the randomness and vastness of "nature". The sea was always a mystifying aspect of "nature" for people. Its vastness and ever-shifting qualities were for much of history only observable for us from the shore. Because human beings were "stranded on the shore" and unable to explore the sea freely like whales and fish, our understanding of the sea was shaped for a long time through a poetic means–

> *over the centuries, with all the skill and ingenuity and reasoning powers of his mind,* [man] *has sought to explore and investigate even its most remote parts, so that he might re-enter it mentally and imaginatively.*[50]

By the time we could explore it, what we found was reinforced by our imagined poetic imaginations of it. Humans have always attempted to make sense of the vast randomness and multiplicities of the world, most notably with the sea. Our preference to systematize things we observe, and create patterns is described well by Michel Serres:

> *The multiple. Water, the sea. Perceptional bursts, inner and outer, how can they be told apart? How am I to tell, any environment I've entered, become immersed in, that this wood I'm confronted with doesn't go on forever, that I'll get to the edge of the forest some day?*[51]

Serres thus suggests that perhaps there is some apprehension to entering spaces that seem to have no limits, an aspect of the sea that early voyagers earnestly tried to find. Deleuze and Guattari (D & G) also theorize about the type of space of the sea, and how explorers related to it in early expeditions. D & G describe the sea as the ultimate "smooth space".[52] "Smooth space" is described by D & G as a space with nomadic capabilities, a space free from codes or patterns which determine behaviour.[53] When humans first attempted to voyage across the sea, they immediately attempted to "striate" it and draw patterns on it, using bearings and maps. Bearings used astronomical navigation tools, and maps used geographical tools such as longitude and latitude, meridians, and parallels to make sense of the seas. Interestingly, before any of these tools, navigation of

the sea relied on observing the noises and colours of the water.[54] D & G highlight the importance of this type of relationship between explorers and the sea:

> *It was at sea that smooth space was first subjugated and a model found for the laying-out and imposition of striated space, a model later put to use elsewhere.*[55]

In this relationship, the sea is like noise in the sense of complete randomness, and permanence. Dissatisfied with the multiplicities and randomness of the sea, humans immediately tried to control it, and systematize it for our benefit.

The noisiness of the sea has been gradually perceived by humans. The depths of the oceans were often described as silent until the invention of submarines. In 1858, Matthew Maury wrote, "Quiet reigns in the depths of the sea" after charting the sea using bathymetry. In the short poem "The Secret", Harriet Beecher Stowe wrote, "And no rude storm, how fierce so'ever it flyeth, Disturbs the Sabbath of that deeper sea."[56] Rudyard Kipling in 1917 in The Deep-Sea Cables wrote "There is no sound, no echo of sound, in the deserts of the deep".[57] These descriptions quickly shifted as human exploration of the undersea increased throughout the twentieth century. In the late 1940s, Cousteau and Dumas developed SCUBA gear which vastly improved the human perception of the underseas.[58] Noise from moving submarine vessels became an increasing issue during WWII. The location of enemy vessels was searched for using sound, with the new technology of SONAR. With the increase in submarine and ship travel in the mid-twentieth century, the noisiness of the ocean was acknowledged to have increased. Knudsen noted in a meeting of the American Physical Society that "The ocean depths sometimes are a bedlam of noise like the busiest street of a big city".[59] A reporter on the science beat stated, "Forget the notion of the silent deep...The ocean of today is a noisy place filled with the sound of human activity - an aquatic wilderness that is becoming urbanized."[60] It took humans occupying the space of the undersea to recognize the noise of the ocean.

In the sea, where humans don't dwell, noise is free to amplify without complaint. The oceans – as an environment that humans do not relate to – have thus become the most audible case of our sonic effects on the planet, our noise. Maybe it has been our lack of connection to this part of "nature" and the long inability to visually explore this realm, that has led the submarine sea to experience the most noise of any environment on the

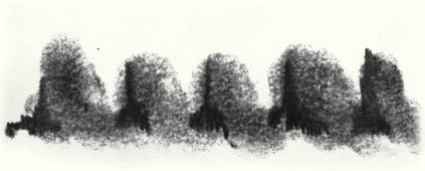
planet. For example, a typical supertanker produces 232 dB of sound, which can be heard "a full day before they appear on the horizon".[61] For comparison, a jet engine is 120 dB (which below water is 145 dB), meaning a supertanker is one-hundred-million times louder. Our poor understanding of the undersea due to our inability to occupy this space means that we have treated it with an unprecedented level of apathy.

The aforementioned qualities of the sea – vastness, randomness, and its perpetual movement – have led many philosophers to compare noise to the sea (e.g. Serres, Nietzsche, and Deleuze). Serres describes noise as "a gray sea".[62] Further, in *Genesis,* he describes noise as having sea-like qualities:

> *A murmur, seizing me, I can't master its source, its increase is out of my control. The noise, the background noise, that incessant hubbub, our signals, our messages, our speech and our words are but a fleeting high surf, over its perpetual swell.*[63]

Serres also claims the seaside is the best example of a space inundated by background noise, emitted from the noises of the sea.[64] Nietzsche adds that the world is a "monster of energy...a sea of forces flowing and rushing together".[65] Noise is a sea.

Existence



...noise tells us we are alive... – Paul Hegarty[66]

In the previous section on the sea, noise was described as a ceaseless force that humans have tried to make sense of. In this section, I would like to argue that noise can also be understood as our existence. Zwintscher describes our existence in the

Anthropocene as "being-as-noise".[67] Human existence or any form of life can be considered noise.

If life carries meaning, then noise is necessary to communicate this meaning. Jacques Attali states:

> *if an excess of life is death, then noise is life.*[68]

In order to live, we must make noise. This is true for anything that contains life. Unless a system is perfectly efficient, anything with energy will also create noise. This point can apply to the energy of the city as well. Hydaralli says "background 'noise' of the city, however loud that may be, is not typically considered noise because it is experienced as inextricable with city life and therefore more or less unnoticed".[69] This explains how the "background noise", cannot be considered unwanted, since that noise *is* the life of the city. One cannot dislike what is vital to life.

The opposite of noise then is silence. If noise is life, then silence is death. Attali posits:

> *that life is full of noise and that death alone is silent: work noise, noise of man, and noise of beast. Noise bought, sold, or prohibited. Nothing essential happens in the absence of noise.*[70]

Despite this idea about noise, many strive for a complete absence of noise in their lives. But true silence is unachievable (and also non-desirable as I will explain shortly). This was famously discovered by philosopher and composer John Cage in the mid-twentieth century. Cage, in search of silence, enclosed himself within an anechoic chamber and listened for the sound of silence.[71] Due to the lack of any external sound produced reverberating within the space, Cage began to notice the noise that his own living body produced – the sound of his lungs expanding, heart beating, and blood pumping through his veins. In a moment of epiphany, Cage concluded that "Silence is impossible, no doubt in the same way that the experience of death is impossible."[72] Therefore, true silence may not be an actual desire of many.

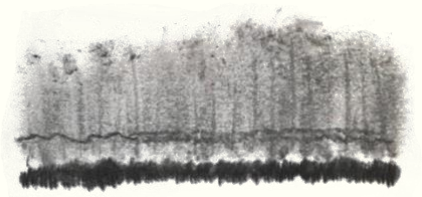
Because silence gives us an experience of death, noise is used as a comfort tool. Starting in the 1970s with office design, background noise was used to create a more desirable space to be in. A certain threshold of quietness has shown to become more uncomfortable than peaceful. Noise provides the listener with a sense of space, the lack thereof makes one feel as if they have no space around them, inducing a claustrophobic feeling. Background noise, such as air conditioning, can be used to reduce this feeling, and drown out the distracting, sudden noises of office work, such as typing and clicking.[73] Background noise remains useful in many building designs to make people feel secure.

Noise also may not be as meaningless as we often think. Attali said, "noise carries order within itself; it carries new information".[74] This speaks to the relationship between noise and signal. Every signal – or sound that carries a pertinent meaning to the listener – also contains some form of noise. No sound can occur without some sort of sonic context surrounding it. Sound cannot formulate in a vacuum; it needs matter to transmit the vibrations through space. Therefore, the signal – or message – is inextricably attached to noise, which influences the meaning of the signal. This contextual information is perhaps what Attali is getting at with his claim of noise containing "new information". Noise can thus be thought of as the ground to the signal's figure. Figure/ground maps, commonly used in architectural representation, show a strong dichotomy between a selection of objects drawn to attention, and a distinctly separate, and consistent field underlying the objects. Serres explains:

> *Background noise is the ground of our perception, absolutely uninterrupted, it is our perennial sustenance, the element of the software of all our logic...Noise is the background of information, the material of that form.*[75]

This idea implies that noise is omnipresent, which rings true when looking at the long history of noise. Since it is always there, influencing us, it shapes how we make meaning from every phenomenon we encounter. Serres states that every phenomenon once it becomes one, is distinguished from the noise, "like a beacon against the fog...So noise is not a matter of phenomenology... it is a matter of being itself".[76] Noise is everywhere, and it is inextricably tied to all things that carry meaning. Noise, therefore, signifies the meaning of the object that makes the sound.

Collective



To listen without any wandering, without ever letting oneself be distracted by "the noises of life," is that still listening? – Peter Szendy[77]

This section will detail ideas concerning the collective aspect of noise including the soundscape and the acoustic arena.

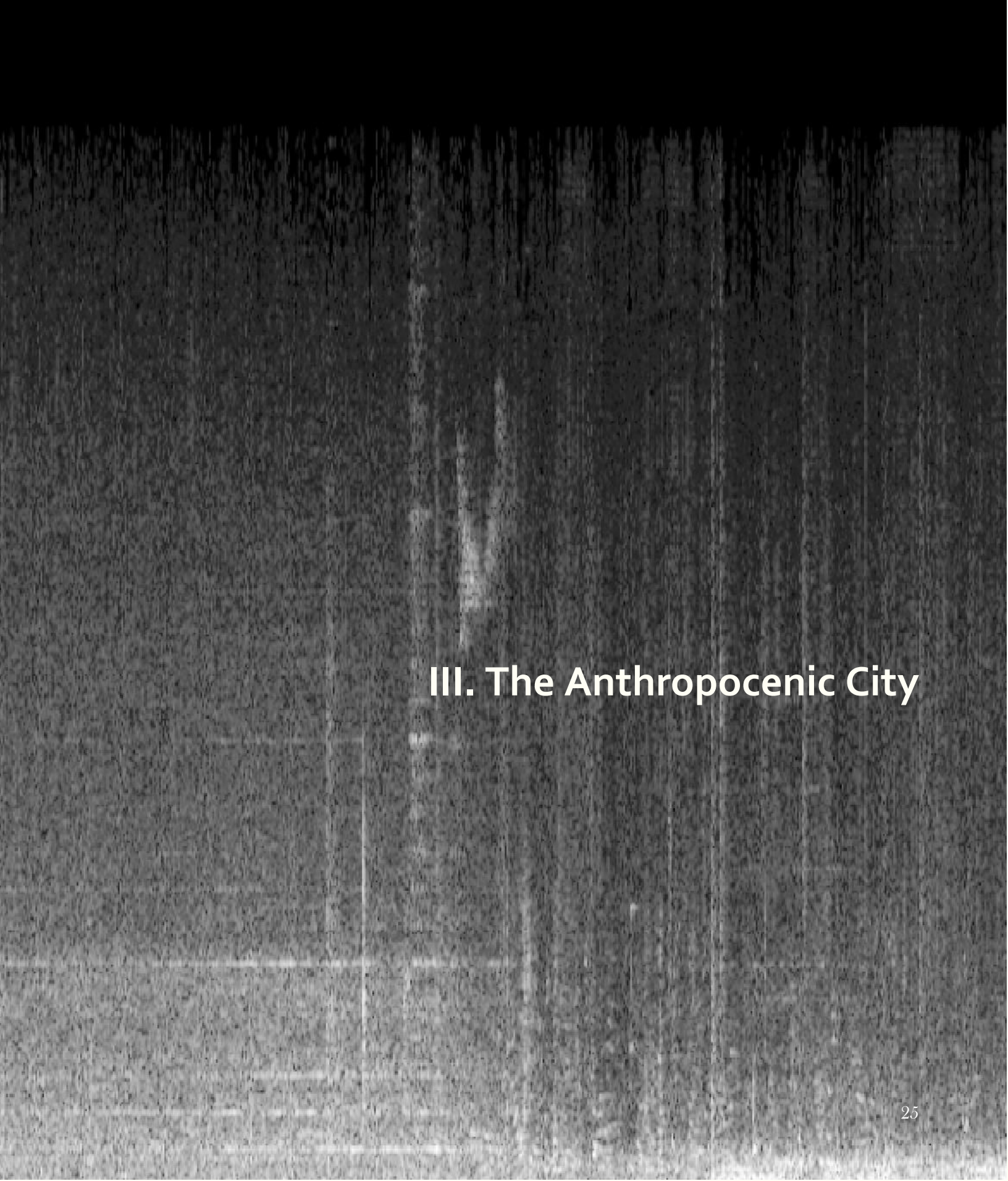
The field of acoustic ecology may begin to demonstrate how noise – or sounds we don't often associate with a meaning – could carry useable information about ecological relationships. This field of study was started in Vancouver, in the 1970s by SFU professor and composer, R Murray Schafer and was created to observe the ways sounds influence our relationships with one another and our environment. Schafer categorizes the sounds of sonic environments, or soundscapes, into three categories: keynotes, signals, and soundmarks. Keynotes are the base layer sounds in a soundscape, the ones that provide a reference point for other more acute sounds; much like the ground in a figure/ground map.[78] A keynote sound may be the ever-present humming of vehicle traffic on the freeway, the air-conditioning hum in an office, or the crashing of waves on the seashore. Signals are "foreground sounds ... [that] are listened to consciously"; sharper more acute sounds that grab the listener's attention.[79] Examples of signals are bells, sirens, horns, or shouts. Soundmarks are the sonic equivalent of a landmark, a local sound that is "unique or possesses qualities which make it specially regarded or noticed by the people in that community."[80] In Vancouver, examples of soundmarks may be the whistling of the Steam

clock in Gastown *(listen here)*, or the whirring, accelerating engine of the Skytrain (*listen here*). These ways of categorizing sounds will be used in this study of aesthetic relations.

A position on the importance of the collective shows in Schafer's terms, "hi-fi" and "lo-fi" soundscapes. Schafer defines the "hi-fi" soundscape as "one in which discrete sounds can be heard clearly because of the low ambient noise level."[81] He argues that rural, pre-modern, and natural spaces will offer more of this type of soundscape. Therefore, "lo-fi" soundscapes occur when "individual acoustic signals are obscured in an overdense population of sounds."[82] He describes this type of experience as lacking in the sense of distance between sounds and objects, and distinct character. "Lo-fi" soundscapes refer to the noisier type of soundscape; one he argues is increasing with the growth in population and urbanization. This way of categorizing soundscapes shows a strong preference for the clarity of individual sounds. This preference is critiqued by Sterne, who claims, "Schafer's definition of a 'hi-fi' soundscape conceals a distinctly authoritarian preference for the voice of the one over the noise of the many."[83] He builds an argument that in Schafer's theory, there is a general prioritization of the individual, rather than the collective whole. When it comes to urban environments, this priority will certainly deem them as noisy, and undesirable. Where there are more people, there will be more voices contributing to a larger collective noise. Sterne points out that this collective noise shall not be confused "with social disorder, or worse, inhumanity."[84] I want to focus on the quality of the collective noise as its own entity, rather than trying to distinguish and analyze individual sounds in the soundscape. I argue that the quality of the noise we create together is what is important. Rather than the individual person, the sound of all our noises combined speaks to our shared cultural values.

The concept of acoustic arenas will be useful to explore the potentially communal aspects of sounds we often consider noise. An acoustic arena is "a region where listeners are part of a community that shares an ability to hear a sonic event."[85] The acoustic arena is centred around the source of the sound. Architecture can increase the size of an acoustic arena by blocking out other noise, or through amplification by concentrating the soundwaves.[86] The boundaries of an acoustic arena though, generally do not follow normal spatial boundaries. Spatial boundaries are generally defined by visual or social indicators or a physical boundary between a social or political function. Acoustic arenas may encompass several types of spaces into a single community; enveloping public and

private, office and residential, or exterior and interior.[87] The sounds in our environment that we often disregard may in fact be creating a sense of community.



III. The Anthropocenic City

Vancouver as an Anthropocenic City

This section demonstrates how Vancouver represents an Anthropocenic city. The shifting location and shape of the shoreline of Vancouver is a great example of interconnected human/"nature" processes including land reclamation, tidal forces, and sea-level rise. Because sound is the audible signifier of a vibrational force, sound is a great indicator of physical forces at play like those along Vancouver's shoreline. The multiplicities of ocean wave sounds indicate the ebb and flow of the sea in relation to the land. Construction noise indicates conflicting forces that often create seawalls of solidity and stability amongst an environment of constant flux (such as the inter-tidal zone). The sounds of recreation that characterize the Seawall today signify the aesthetic relationship that exists between humans and the shoreline in the post-industrial age of Vancouver. This section will explore how noise is connected to the Anthropocenic city first with a general historical overview, followed by the specific history of Vancouver's shoreline during three eras: pre-industrial, industrial, and post-industrial.

Noise in the Anthropocenic City

History.

This section digs into the negative connotations of noise and the history of its control during the Anthropocene.

For much of history, noise has adopted a negative connotation. Theodore Lessing in 1872 called noise "evil" and studied it relentlessly.[88] Schafer calls it a sound "without purpose" in the 1970s.[89] While these writers may have thorough approaches to managing noise, general policy-makers over-emphasise this negative attitude and over-simplify it. Both architectural acoustics and noise abatement policies have attempted control of noise.

Architectural acoustics was invented to deal with issues of noise. The study was started in the late-nineteenth century with the work of Wallace Clement Sabine. Sabine was hired to deal with the resonant noise of the lecture hall in the Fogg Art Museum at Harvard; a space that was experiencing issues hearing lecturers clearly due to the poor design of the room's shape and materials. At the time, noise was understood as, "nonperiodic, irregular vibrations, in contrast to the periodic soundwaves of musical tones", as defined by Hermann Helmholtz in 1862.[90] Sabine diversified this understanding of noise by identifying three problems in the lecture hall at Harvard: "loudness", "distortion of complex sounds by interference and resonance", and "confusion – reverberation, echo, and extraneous sounds".[91] He then devised several reverberation formulae that would calculate how sounds would reflect around a room to better control and direct those sounds. Today, architectural acoustics has been more concerned with insulation and finishes. Acoustic insulation in walls and floors attempt to reduce noise transmission between spaces, and "acoustic treatment" – as it is often termed – uses various materials and absorbent textures on walls, ceilings, and floors to reduce the reverberance or noise within a space. Unfortunately, most of this treatment is applied in the final stages of a design or even after a building is built, rendering the approach to sound as an afterthought. Rather than designing spaces in a more appropriate acoustic shape, capital is wasted applying tacked-on absorbent materials.

Noise has been treated as a problem at the urban scale as well. This is the scale at which noise is termed environmental noise: "any unwanted sound created by human activities that is considered harmful or detrimental to human health and quality of life."[92] Because the definition refers to human-created sounds, it can be considered pollution. Environmental noise most often refers to outdoor sounds caused by "transport, industry, or recreational activities."[93] Noise abatement by-laws have been concerned with controlling this type of environmental noise for hundreds of years.

Noise complaints have been a part of nearly all recorded history.[94] Noise abatement laws have been implemented throughout history to attempt to deal with these complaints. These laws go back to the thirteenth century to control the hammer of the blacksmith, and seller yells and dog-barking in the seventeenth century.[95] It was once the Industrial Revolution had fully developed and influenced economic structures that noise abatement became a wider concern. In 1929 in New York, the health hazards of noise were finally starting to be recognized, since up to that point, "the noise of the machine-using age had been proudly perceived as the sound of progress and prosperity."[96] The noise of industrial machines is often still not regulated as these processes are deemed as "natural" or necessary.[97] In early-twentieth-century London, people experienced:

> *The roar of the traffic of motor-buses, taxi-cabs, and motor-cars is of a deeper, more thunderous, and more overpowering nature than in former days, principally because vehicles are heavier and are driven at a much greater speed.*[98]

In the twentieth century, urban noise quickly became to be identified by these types of machines. Those who fled to the countryside were not able to escape the noise. Rural areas were also experiencing noise with steam-ploughs, boilermakers, and animals.[99] Noise has never really left us throughout history, and it hasn't changed radically since the greater development of noise abatement policy.

Acknowledgment of the objective psychological effects of noise – as in loud sounds – on our bodies is worth noting. During the 1920s, industrial psychologists began to study how noise affected workers, discovering how it reduced their productivity.[100] In 1930, Laird concluded that "mechanical skills declined, reaction times lengthened, active memory weakened, cerebral functions lost their sharpness, breathing became irregular, and blood pressure rose in the presence of noise".[101] This type of research has increased throughout the century since. These types of health concerns were voiced in many of Schafer's arguments to combat the noise pollution "problem".[102]

Noise abatement by-laws are designed to reduce overall environmental noise, often by targeting specific noise sources, such as vehicles, music, leaf blowers, and chainsaws. It has been one hundred years since the more widespread use of noise abatement by-laws has been in use, and it seems to have had minimal effect on the perception of noise in cities. One of the earliest reports by the New York Health Commission in regard to noise pollution had an enlightening point about the cause of environmental noise. It stated that, "the responsibility for city din rests less on the machine than on public apathy".[103] It is ultimately how we use our machines, and how we design them that

makes for noisier environments. The less we pay attention to noise, the more noise we make, and the more noise we make, the more it overwhelms and exhausts us. This means that we need a passionate awareness of how we live, work, play, and rest, and how these activities impact those around us.

Problems with Noise Control.

Noise abatement by-laws have missed the mark in controlling noise, by treating it as a sound with a certain volume. Noise is not literally a sound, as two sounds of different volume levels could be equally "noisy". Additionally, one person may appreciate a sound, while another may consider it noise. Despite this, noise abatement policies tend to be based on volume levels rather than looking at the context:

> *...the risk is that sound energy levels become the indicator of sustainable sounds and the implied goal becomes a silent city. Where then is the space for the 'buzz' that many people say they come to the city for?*[104]

Because any sound can be considered noise, if a policy attempts to reduce noise by whether it exists or not, it will lead to a situation with no sound at all. It is a negative approach to sound, one that only attempts to remove what is undesired. What about the sounds that we want to hear?

Noise abatement approaches sound through binaries. Policies only care if a sound exists or not, ignoring sound's other qualities, including, "timbre, pitch, texture, resonance, rarity or periodicity".[105] They often only consider whether sounds are pleasurable or non-pleasurable, peaceful or non-peaceful.[106] The truth of the matter is, sounds are far more complex than this. Their effects on people change through time, space, pitch, and frequency. Perhaps this oversimplification of sound in its attempts at control is what has led to a minimal shift in the public's perception of noise.

These struggles with controlling noise are due to highly complex contexts and subjectivity of sound. Raimbault and Dubois discovered that noise sources were either negatively or positively responded to depending on the social context of the sounds. For instance, late-night parties earned a wide range of responses depending on the time of day, week, or year.[107] People of different social

groups may also respond differently to a late-night party no matter what time of day. These complex experiential qualities of sound are perhaps the reason for its mistreatment in noise abatement policies.

Vancouver's Waterfront History

Despite the way noise has been perceived for much of the Anthropocene, the rest of this report attempts to garner meaning from noise, from many of the sounds that make up the Anthropocenic city. Vancouver's waterfront forms the spatial context surrounding this study. The history of this part of the city speaks to many of the processes that characterize the Anthropocenic city. This historical overview will detail the anthropogenic and natural processes of this city from the sonic perspective. The shoreline of Vancouver has undergone several shifts in soundscapes, that roughly coincide with the pre-industrial, industrial, and post-industrial periods of the city (see Figure 1).

Pre-industrial.

In the pre-industrial age, Vancouver's noise was sourced primarily from the natural environment. The majority of Vancouver's "natural" noise is produced by water and forests. The water produces noise through waves and tides, rivers, waterfalls, and rain. The forests - which are coniferous – create, "nothing of the rustling familiar with deciduous forests, rather there is a low breathy whistle, like the sound of finely-sprayed water. In a strong wind the forest seethes and roars, for the needles twist and turn in turbine motion."[108] The pre-industrial soundscape, therefore, coincided strongly with the local climate and topography.

The pre-industrial age of the West Coast, including Vancouver, was full of noise. Captain George Vancouver observed this loudness in 1798, "Not a bird, nor living creature was to be seen,

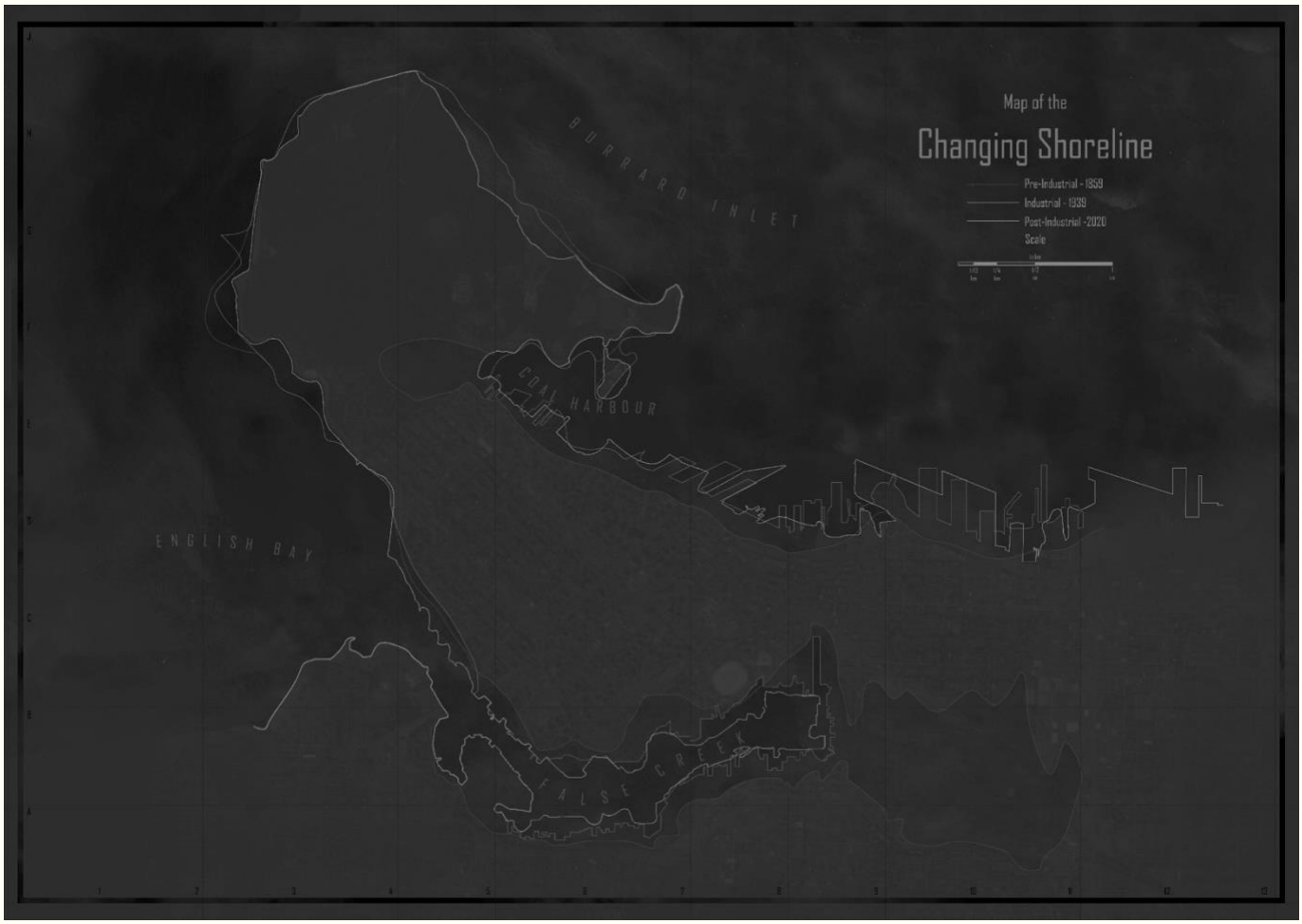


Figure 1. Map of the changing shoreline of Vancouver.

and the roaring of the falling cataracts in every direction precluded their being heard, had any been in our neighbourhood."[109] Emily Carr also noted, "The trees take the wind so differently. Some snatch at it as if glad of the opportunity to be noisy. Some squeak and groan, and some bow meekly with low murmurs."[110] Further, she speaks about the presence of shorebirds, "Gulls there had always been; they began with the sea and had always cried over it."[111] Noise was anything but absent in the pre-industrial age of the area we know today as Vancouver.

The common experience of the seaside soundscapes during this period would have been from the Coast Salish villages that stretched along most of modern-day Vancouver's waterfront. These villages were likely constructed primarily from wood, in the traditional bighouse form, that many Coast Salish bands built. These buildings were generally constructed with wooden planks for the walls and single-pitched roofs, and a dirt floor. The walls were often covered with mats made of cedar bark or grass. All of these materials are acoustically absorbent compared to the harder materials that are common in Vancouver today – concrete, stone, and steel – meaning the soundscape from within would have been rather soft with little reverberation. The style of envelope construction meant that the interiors were drafty, and permeable for sounds to enter inside more easily, like those from the sea or wind. Due to the typical activities that took place in the bighouses – making fires, oral traditions, carving wood, preparing food – meant that the dominant sounds were likely those of crackling fire, wood carving, and singing and storytelling.[112] The open plan and porous exterior walls of the Coast Salish bighouses would have likely broken down the boundaries between sources of sound.

Listen here to the pre-industrial soundscape.

Industrial.

The industrial period of Vancouver grew quickly and made a drastic shift to the soundscape of the shoreline. False Creek experienced some of the most industrial growth, while the northern part of Vancouver's coast became preserved as Stanley Park in 1888. False Creek was likened for its "quiet sheltered waters" which were ideal for dumping and booming logs from the lumber mills.[113] As the industrial period progressed, False Creek housed lumber, salmon, mineral trade, manufacturing of tugs and barges, mine and mill tools, and basic industrial products.[114] Meanwhile, in the 1930s, the Stanley Park Seawall construction began, involving hammering and grinding of granite rock, which took thirty years to complete by stonemason James Cunningham.[115] All of these

industries began to influence the soundscape. But the new sounds were defined the most by the noisy lumber industry:

> *A quarter of a mile further on is... the Hastings Saw Mill Company, with its incessant rattle of machinery and clouds of escaping steam... Steaming on as we pass... the town of Moodyville, where again the buzz of saws, the hum of innumerable drums and pulleys and the noise of shifting lumber, as it sweeps down the inclines through the ports of the different ships, greets our ears.* – 1882 boat trip account in Williams' BC Directory[116]

> *... Graham Co.'s Pioneer Mill was complete, with "two centre-discharge waterwheels of 50 horsepower and the 22-inch planing mill." The infant scream of the mill's puny (by later standards) head saws was the birth-cry of the city.* - Alan Morley, Vancouver from Milltown to Metropolis, 1961[117]

> *Vancouver was the child of the timber beasts. The long-drawn groan and crash of the trees falling before their saws saluted the city's birth... When "The Song of Vancouver" is written, its theme will be the shriek of giant saws biting into timber, the clang and thud of the sawyer's "nigger" tossing huge logs like jackstraws, the clatter and twang of limber planks on the sorting chains.* - Alan Morley - Vancouver form Milltown to Metropolis, 1961[118]

The sounds of the trees, which before "groaned" in the wind, now "buzzed", "clunked", "crashed", "clanged", "twanged", and "screamed" as they were cut down and sawed to pieces. The noise in this period would have been dominated by more droning, and humming sounds, along with more loud, sharp sounds of saws instead of the rumbling, constant white noise of the sea waves and breezes.

As the city grew, the land began to expand into the sea, through a process called land reclamation. Most of the edges of the shore that we have today in False Creek and Coal Harbour are built on man-made land, using sand, soil, and gravel to build up the land. The largest example of this was the False Creek mudflats, the most eastern portion of the original False Creek, which was a wide expanse of very shallow water. This area was infilled in 1917, to create space for the CPR to build their terminus station.[119] What we know today as Granville Island is also reclaimed land, created in 1916. The island was built up on top of a sandbank that used to float in the middle

of the inlet.[120] In Stanley Park, the Lost Lagoon, which we know today as a landlocked water body, used to be part of the ocean. The strip of land that divides it from Coal Harbour today was also reclaimed in the late 1910s. Land reclamations were one of the most dramatic shifts to where the sea meets the shoreline in Vancouver.

Throughout the industrial age of Vancouver, there were both positive and negative reactions to noise. The noise that people complained about in the early 1900s included loud and explosive sounds. Up to 1901, residents complained about the noise of firing shotguns from waterfowl hunters in the False Creek mudflats.[121] This kind of noise was not regulated until twelve years later when the City of Vancouver created its first noise by-law. It read:

> *No person shall blast with dynamite, gun-powder or other explosives within the limits of the City of Vancouver unless specially authorized so to do in writing by the Mayor...* - By-law No. 939, Section 1, By-laws of the City of Vancouver, 1913[122]

It seemed as though this recreational noise was the only noise targeted by early regulation, while industrial noise continued to grow. Reasons for this may be due to the fact that during the Industrial Age, noise was synonymous with power. It was these industrial sounds that were in fact reacted to positively according to some accounts:

> *Steam whistles - those were sounds you used to hear... It makes a terrific racket. It's quieter now, but steam whistles weren't a noise that bothered you. They were a nice sound. Pleasant.* - Joe Simson, 1972 reminiscence[123]

Simson here is referring to the whistles of the ships anchored in the harbor. Another account reflects on the foghorns, heard from the lighthouses on the shoreline:

> *The foghorns made dismal, gloomy sounds. They all had different tones and sounded at different intervals. We heard them as we went to sleep and again first thing in the morning. But despite the fact that they were mournful, we seem to remember them as somehow comforting.* – Mr. Donald B Grant, reminiscence of the 1920s[124]

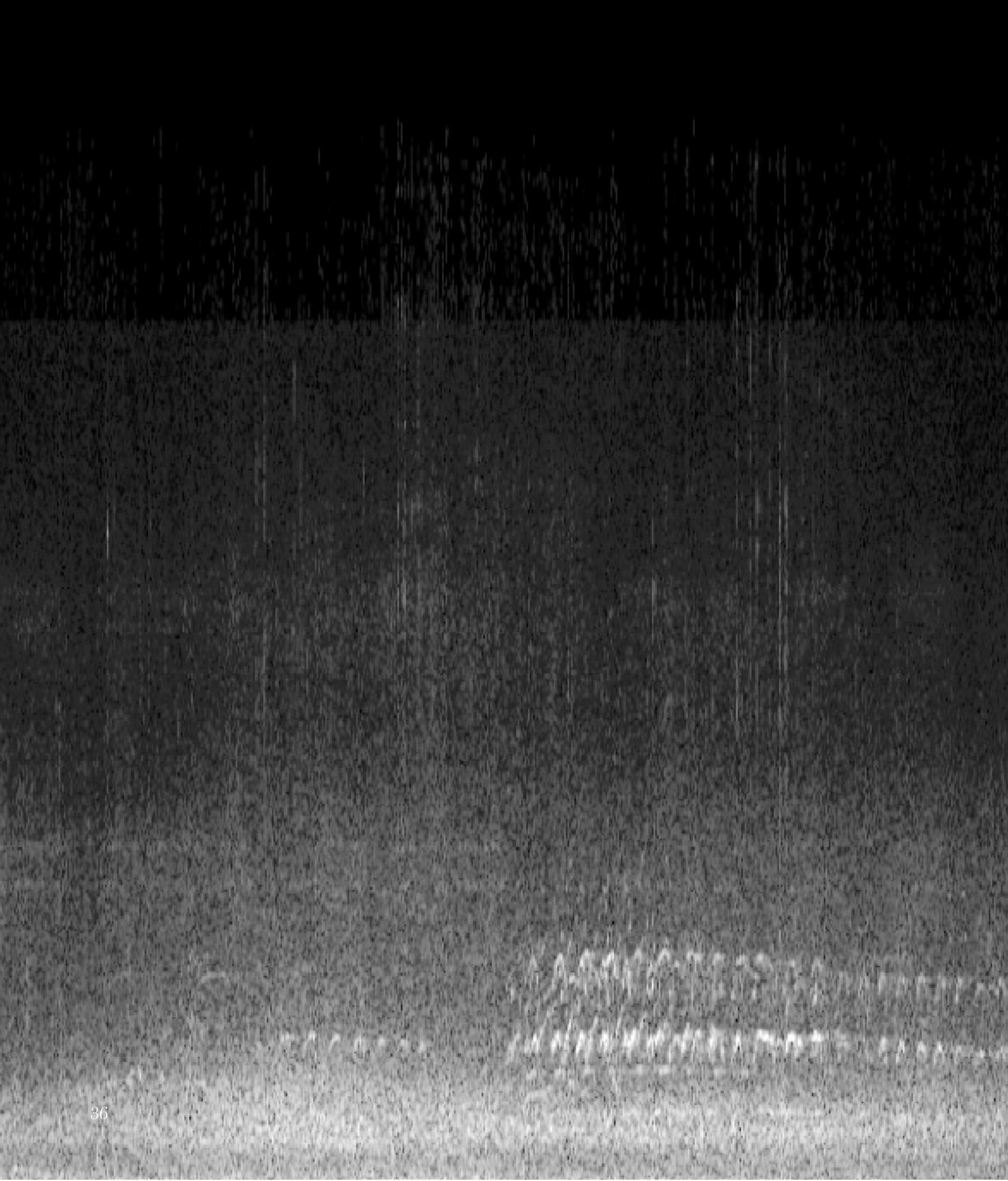
These accounts exemplify how noise signified power, right until the end of the Industrial Age. At this point, the noise was perhaps too much for people to bear. In came the post-industrial age. *Listen here* to the industrial soundscape.

Post-industrial.

In the Vancouver context, False Creek is the best example of urban regeneration, or the most visible shift from an industrial to a post-industrial city.[125] In 1968, City Council ended the industrial zoning of False Creek, once it was decided that Point Roberts would make a better secondary harbour for the Port of Vancouver.[126] The first residential/commercial developments were in South False Creek throughout the 1970s, including the revitalization of Granville Island as a local/tourist hub, which included the Granville Island Market. The False Creek portion of the Seawall began in the 1980s after the completion of the Stanley Park section.[127] The hosting of the Expo '86 marked the shift away from industrialization in False Creek, as many of the industrial buildings were cleared to build the expo pavilions and fairgrounds. Not all of it could be swept away so quickly though. Ideas for a fountain in the middle of False Creek for the Expo were shot down because of the health hazards from the thick layer of industrial pollutants in the bottom of the inlet. Aspirations to have more recreational activity in the inlet today are still sunken due to the residual pollution in the water.[128] After the Expo, the land that was cleared for it was sold in one piece to Concord Pacific, a Hong Kong-owned company. Concord Pacific has been developing this plot of North False Creek in a neo-liberal fashion for the past few decades.[129] The last remaining industrial usage in the inlet was reconstructed with residential apartments for the Winter Olympics in 2010.[130] By this time, the shoreline was now completely unrecognizable from its aesthetic only fifty years ago.

With the shift in the use of the shoreline, so too has the soundscape changed. The construction of the Seawall around the entire edge of False Creek has meant that keynote sounds involve those of recreation, tourism, and transit. The recreational sounds include strolling conversations, cyclists, joggers, dragon-boaters, and rowers. Those of tourism are Aquabuses, markets, and buskers. The new transit sounds that permeate onto the shore come from the post-industrial Skytrain. Thus, the post-industrial soundscape was not necessarily less noisy but involved a shift from industrial sounds to those of leisure, tourism, and transportation. *Listen here* to the post-industrial soundscape.

This type of Anthropocenic city – a post-industrial port city, surrounded by attractive sea and mountains – now sets the stage for the site: the Seawall.



IV. Seawall

Why the Seawall?

Vancouver's famous Seawall is the site of exploration of noise in this guide.

The Seawall symbolizes esoteric relationships between humans and the sea; those of aesthetics and economy. The Seawall is perhaps the most popular and important of all Vancouver's public spaces, and people are drawn to it for aesthetic reasons. The function of the Seawall involves an aesthetic appreciation of the sea and the North Shore Mountains, with uninterrupted views of these features along its entire length. The noise heard along the Seawall includes nearly all of the keynote sounds of Vancouver's lifeblood: choking seagulls, the hum of traffic, the whirring Skytrain, ambulance sirens, rumbling ships in the port and marina, human voices, walking, cycling, jogging, and crashing waves against the wall. As I analyse this space, I must make clear that I am referring not just to the Seawall path surrounding Stanley Park, but also the extensions of this original portion into Coal Harbour out to the Vancouver Convention Centre, and around all of False Creek as far as Kitsilano Beach (see Figure 2).

While I argue Vancouver represents an Anthropocenic city, the city still assumes an outdated connection to nature reminiscent of the Romantic era (see Figure 3). This point will be demonstrated in the first section on functional analysis, which will be followed by the soundscape and sonic architectural analyses of the site.

Figure 2. The site plan of the Seawall showing its sonic architectural conditions and soundmarks.

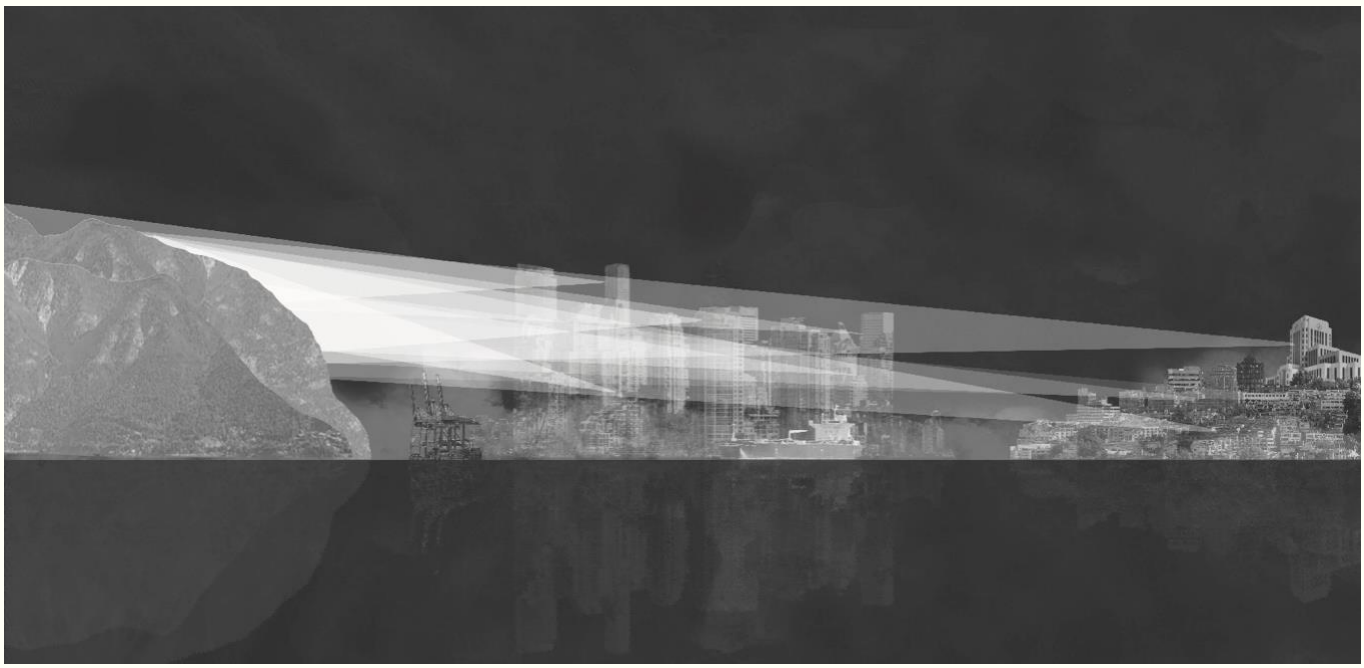


Figure 3. Vancouver's distant view frames the city's connection to "nature", a relationship reminiscent of the Romantic era.

Functional Analysis

Fortification.

The world-famous Seawall is first and foremost a wall (see Figure 4). Built to reduce erosion of the shoreline around Stanley Park, the Seawall wraps itself around its perimeter, turning Vancouver into a fortified city. Since the completion of the Stanley Park portion, the Seawall has encapsulated all of False Creek and Coal Harbour, extending the fortifications.

Thus, a hard boundary has been formed, establishing a prescribed relationship between city and sea. The following diagrams show the six types of spatial relationships between humans and the sea along Vancouver's Seawall network (see Figure 5). Nearly all of these relationships place the human above the sea (wall, headland, pile, pier). Most of the interventions create a harder boundary on the sea, making it stop more abruptly at the land. This eradicates the unique tidal pool ecosystems along the shore (except for in beach and headland). Many of these relationships keep the human separated from the sea (i.e. all except beach). This ensures that the relationship is about the distant view of the sea, rather than other sensory opportunities with the shore.

The function of most seawalls is to prevent erosion, but this only works with land contained by the walls. As waves crash against a shoreline, they move sediment along it, in a process called longshore drift. This is the process that seawalls, jetties, and groins attempt to stop. However, a seawall does not stop this process, rather, it just moves the process further out into the water, and further down the shoreline where it does not

protect. The movement of sediment is not such a big problem if sand and dirt from inland can replenish the beach zone. This natural process, however, is completely stunted by the presence of the wall. This means that the intertidal zone just below the wall sinks further and further underwater, rendering it no longer suitable for most intertidal marine life. Without a wall, sand replenishment only has to happen every ten years to maintain beaches. The presence of the Seawall does not help the replenishment requirements on the beaches at the ends of the wall.[131]

Continual repairs and maintenance on the wave-beaten wall show that this structure may not be a long-term solution. Raising the Seawall to match sea-level rise could cost between five to eight-hundred-million dollars.[132] The City of Vancouver's mandate is to adjust the Seawall and policies around it to anticipate a one-metre sea-level rise by 2100.[133] While the Seawall may have been an effective urgent response to an environmental problem, it doesn't seem like the best long-term solution for either human or natural environments. Nonetheless, the Vancouverites consider the Seawall to be its main source of pride.

Figure 4. The Seawall is a fortification.

Promenade.

As mentioned before, humans have been drawn to the seaside for centuries, meaning the waterfront promenade has an equally long history. People are drawn to the

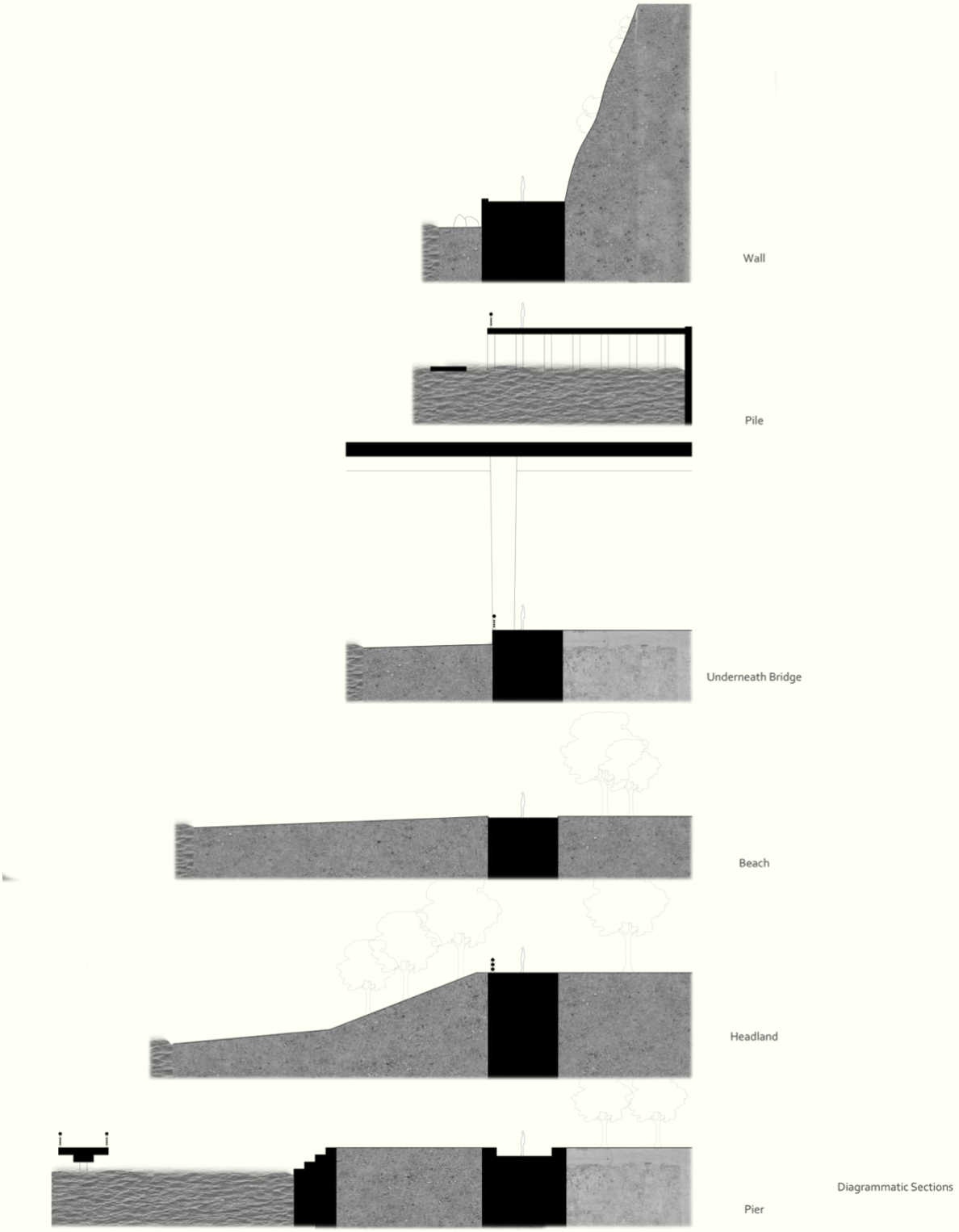


Figure 5. Six types of typical spatial relationships between humans and the sea along the Seawall.

visual stimuli of ever-shifting water, as it plays with "light and reflection".[134] The word "promenade" is derived from the French *se promener*, which means "to walk". These spaces were originally associated with the leisurely strolling of well-dressed, higher class people in society, as a place to see and be seen. Famous examples include Sea Point in Cape Town, Promenade des Anglais in Nice, France, and the Copacabana Promenade in Rio de Janeiro. Waterfront promenades have existed for many centuries but have seen a recent resurgence in the post-industrialization period.[135]

As far as public space for Vancouver, the waterfront promenade is key. Nearly sixty percent of Vancouver's coastline is lined with a promenade or walkway (see Figure 6).[136] The extensiveness of this network has created great connectivity among the different public parks of the city. While many promenades are primarily used as a walking path, some (Vancouver's especially) are used for physical activity, including jogging and cycling.[137] Studies of promenade use in Vancouver have shown that few people use earphones or talk on the phone when on the Seawall, indicating most users of the Seawall are well-connected to their immediate environments.[138]

The design of the Seawall as a promenade demonstrates another way of Vancouver's denials of "nature". Despite the often cloudy and foul weather in Vancouver's climate, the city designs itself as if it had a similar climate to southern California. Examples include outdoor tennis courts in every neighborhood, ample beaches and beach culture, and the completely uncovered Seawall promenade.[139] While most of the other precedents listed above are located in sunny, hot climates, Vancouver has adopted a similar design but for a radically milder, and rainier climate. The typical width of the Seawall around Stanley Park is twenty feet and is divided in half by a curb.[140] The narrowness of the space, and the nature of its winding length, generally prevent the possibility of gathering or just "being". The activity involves people constantly in motion, and thus re-appropriation of this type of space is difficult and very limited. This is more of an issue in Vancouver than in other cities, given that the Seawall is the entire city's most used public space. The lack of a vibrant central square means that Vancouver is left with little space to gather and participate in spontaneous or political activity.

With the Coastal Mountains, temperate rainforests, and the Pacific Ocean nestling around the city, Vancouver has been "blessed" with this natural milieu. Vancouver, in capitalizing on the natural milieu, has organized much of its public spaces

around views of distant natural landscapes. For example, Vancouver has built many viewing platforms or terraces along the promenade of the Seawall (see Figure 7).[141] Further, Vancouver has some of the most revolving restaurants per capita of any city in the world. The infamous view cones of Vancouver's bylaws preserve a handful of views between downtown's high-rises, restricting the buildable area in the central business core of the city.[142] Most importantly, in these preserved and directed views, natural landscapes are not seen as complemented by human development, but rather, intruded upon.[143]

The effects of the distant view have already been explained in the introduction, as an act of isolating the viewer from the viewed. In terms of environmental relationships, this is detrimental to human connection with the environment. A distant view means that the objects in view, are so far away that details and minor movements are invisible, making the scene appear static, like a piece of art. Most sounds that would occur in that distant space, are usually out of earshot as well, reducing the ability to feel connected to that space even further. Of course, the senses of touch, smell, and taste are well outside of range. To interact with our environments predominantly through this type of interaction is detrimental to our intimate connection with the environments that need our empathy to be sustained in the Anthropocene.

For a publicly active space, the lookout terraces along the Seawall unfortunately are designed for little variety of activity, other than sitting on a park bench and viewing the surrounding landscape. Berelowitz explains how these spaces play out:

> *these static platforms reflect the centrifugal nature of public spaces in a city which activity constantly tends towards the edges. Nothing happens in these spaces; they simply exist. Public life requires collective activity, but these are platforms for private consumption.*[144]

An individualist tendency is exemplified by the design of these spaces by their optimization for small groups, with little space possible for larger, more vivacious, or boisterous activity to occur. The spaces themselves produce rather quiet activity: sedentary, and reflective gazing behaviour. Other than the terraces along the Seawall, other good examples of this lookout typology in Vancouver include the pocket parks along Point Grey Road, CRAB Park, Portal Park, and Jack Poole Plaza.[145] Despite the

dynamism of the long sinuous promenade, the engagement with the sea and the variety of activity that occurs in this space is rather static.

Figure 6. The Seawall is a promenade.

Figure 7. The typical viewing platforms and terraces built along the Seawall.

Soundscape Analysis

Soundwalk.

Soundwalking is a practice originating from the field of acoustic ecology. It is an exercise that was pioneered by Schafer's World Soundscape Project. Hildegard Westerkamp describes a soundwalk as "a listening exercise that helps us become aware of our immediate acoustic environment."[146] She also states that a soundwalk is "about

enjoying the sensual beauty and sheer surprise of sound."[147] Schafer lays out many ways to listen to soundscapes during a soundwalk in his guidebook *A Sound Education: 100 Exercises in Listening and Sound-making*. I used some of these listening techniques to guide my sound analysis of the site.

My soundscape analysis consisted of a series of soundwalks to gather observations of the typical sonic experience of the site on an average day. The majority of my data was accumulated from a single comprehensive soundwalk of the entire Seawall path. The whole walk, at over twenty-three kilometres, took five hours to complete. For the entire duration of the soundwalk, I made note of every distinct sound that I heard and later categorized them according to Schafer's *A Sound Education*. I did not, however, record every instance of each of the distinct sounds. The one hundred-sixty-two distinct sounds I recorded were categorized according to their source, motion, frequency, and proximity.

The sources of sounds were categorized either as technology, human, or nature. In this sorting, technology weighed in heavily with fifty-one percent of the individual sounds, while humans produced thirty-two percent, and nature seventeen percent. Sorting some of the sounds proved somewhat difficult, including bicycles and construction tool sounds. In these cases, the deciding factor was whether the sound was powered by human power alone, or by some other electrical (or technological) energy to create the sound. While bicycles are arguably a form of technology, the sounds only occur with human-powered energy, whereas power drills and jackhammers require electrical energy to create their sound. The process of sorting the sounds in this way showed how the boundaries between technology, humans, and nature are already blurred.

The motion of sounds was categorized as either moving or stationary. This refers to whether the source object that created the sound was moving or not. From my data collection, the vast majority were moving: eighty-six percent. This speaks to the typical passive usage of the promenade as described in the functional analysis.

The frequency of sounds was categorized as either continuous, repetitive, or unique. Most of the sounds were unique: forty-seven percent. Thirty-one percent were repetitive, twenty-two percent were continuous. This speaks to the level of background and foreground sounds. Continuous sounds typically form the background noise of a soundscape, while the unique or repetitive ones tend to form the foreground. Therefore,

the more unique sounds being heard means that the background noise level (or the number of continuous sounds) is lower.

Finally, the distance of sounds was grouped into distant or close sounds. Close sounds made up sixty-five percent of the sounds, with distant sounds making up the other thirty-five percent. This again speaks to the amount of foreground and background sounds in an environment. The more open a space is, the more likely it will be to have more background sounds, which are often considered noise. Again, a greater acoustic horizon (or distance of hearing capabilities)[148] means there are fewer masking sounds nearby; or sounds that are excessively loud and dominate all other sounds from reaching a listener's perception.[149]

Key Sounds.

From these listening exercises, I identified four key sound sources that characterize the natural and human forces at play in this space. They are the seagull, cargo ship, rain, and sea.

Seagull. One of the most commonplace sounds along the Seawall is the choking call of the glaucous-winged gull. Due to the behaviour of remaining close to the seashore for its primary sources of food, the calls of the seagull are commonly associated with the space of the seaside. The sound of the seagull's call has the power to mentally transport listeners directly to the place of the seaside, whether the listener can see the sea or not. The seagull call is a sound connected to the seaside in memory and association.

Often coming from the sky, the seagull call also can be heard over great distances, and in urban areas, by a large number of people. The group of people that are able to hear a single sound is called an acoustic community.[150] These acoustic communities are united in that they are experiencing a similar sound at roughly the same time. Some sounds can create a sense of community and place when they become iconic enough in the region. In medieval cities, the iconic community-making sound was that of the church bell. The church bell delineated time for the whole city, as no other measures of time were available. The bell became a commonly experienced and felt presence for most anyone in the city. The seagull is like the church bell of Vancouver. Since the timing of the call is not made at regular intervals, the seagull establishes a sense of place rather than

time. The distinctive sound of the seagull is capable of creating a sense of community in Vancouver.

The seagull call is – what Schafer would call – a signal (see Figure 8). The sound is distinct, short, and calls for attention amongst the more continuous sounds in the soundscape. This is indicated in the spectrogram of the sound, with the distinct line that swoops up and down. This line is a visual indication of the rise and fall of the pitch of the typical seagull call.

Aside from the sound it makes, the seagull is also a key natural element in the Anthropocenic city. Because natural food sources are depleting from intense human fishing practices, rural gulls are struggling in their natural environment. Urban seagulls (a distinct category of gulls), however, are rapidly increasing in population as their food sources – which include human waste and food – are in great supply. Urban seagulls generally use building roofs to nest, as they are effective at protecting from foxes and other ground-dwelling predators.[151] This interesting interdependence between the seagull and humans (seagulls offering place-making, and humans offering food and shelter) is indicative of the Anthropocenic city. *Listen here* to the seagull call.

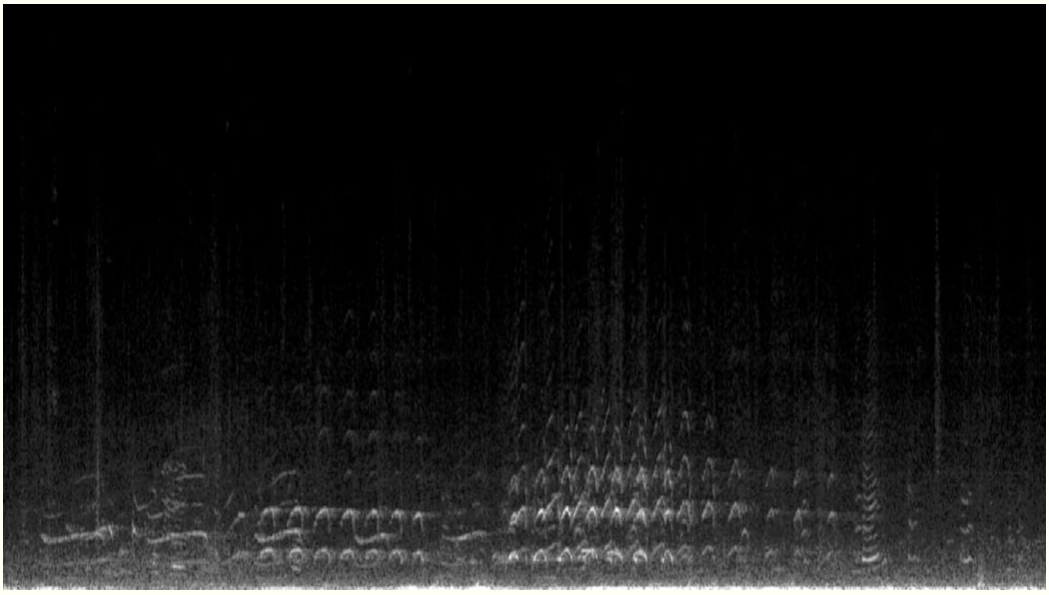


Figure 8. A spectrogram shows the seagull call as a distinct swooping line.

Cargo Ship. The key sound that characterizes human presence on the seaside of Vancouver is, in general, the sounds of the port. These sounds are best signified by the sound of the cargo ship. The sound of the cargo ship creates a drone (see Figure 9). A drone maintains a consistent pitch over time, which forms a horizontal line on a spectrogram. Schafer explains how the drone is the sound that separates humans from nature. Rarely in nature does such a type of sound occur. However, much of our technology creates drones – HVAC, home appliances, artificial lighting – as these objects have a consistent output of energy. The cargo ship, therefore, is a good example of a sound that represents human-created noise.

As described earlier, the sound level of an average cargo ship is two-hundred-thirty-two dB, therefore garnering attention to mitigating its noise levels. The influences of noise in the sea are amplified as marine species, like whales, have the widest range of hearing of any mammal – from twenty Hz to twenty-thousand Hz – earning them the name "the ears of the earth".[152] Increased research on the impacts on marine life from ship noise has led to the Vancouver Port Authority's 2017 decision of offering discounted rates to ships who reduce their noise levels; the first port in the world to provide such an incentive. That year, only thirty-four of the three thousand ships that docked here took the discount. Technological advancements are also in the process of quietening ships, involving lifting the engines away from the bottom of the ship and using propellers that reduce cavitation (or bubble creation).[153] As technology and environmental awareness shift in the future, the noise of the cargo ship will likely decrease.

By representing human movement and interconnectivity, the cargo ship is an important signifier of human processes in the Anthropocenic city. The cargo ship shows how the boundaries of the Anthropocenic city extend beyond the physical extents of the metropolis. The Anthropocenic city extends to other continents through economy and trade and sonically extends to remote natural environments including the undersea. The effects of ship noise on marine mammals and other species are well-covered, with pertinent results building each year that show the widespread effects.[154] Humans and nature are interconnected beyond the physical extents of the Anthropocenic city. *Listen here* to the cruise ship.

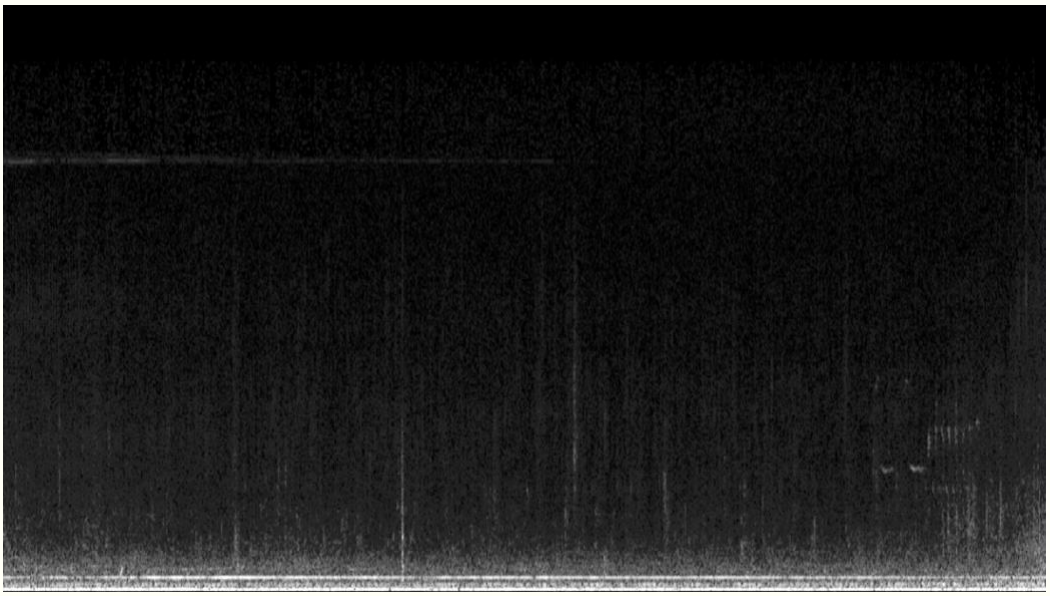


Figure 9. A spectrogram shows the sound of a cargo ship as a horizontal line near the bottom of the graph.

Rain. Another key sound of Vancouver's soundscape is that of rain. More eventful and rhythmic, the sound of rain creates a temporary white noise throughout the city (see Figure 10). A white noise character means that it produces sounds of nearly every frequency all at once. This is shown in the spectrogram as a flat coverage in white, across the entire time (x) and frequency (y) axes. This is due to rain physically interacting with every material in the city, as each drop creates a different tone. Rain accentuates every material that exists in the urban fabric by making a sharp, distinct contact with it (imagine how rain on a glass pane, tin roof, or asphalt sounds different). Rain, therefore, sounds out the city's form, creating an auditory model of the entire built form of the city.

A psycho-acoustic connection marks the interrelation between rain and humans. Several scientific studies have shown how background noise (but especially rain sounds) could increase cerebral alertness in people. It allows people to focus better, and complete more complex problems.[155] The sound of rain itself may be influencing human activity.

Rain demonstrates an interesting psychological and physical connection to human processes in the Anthropocenic city. The sound of rain is a combination of natural forces and human-built materials; a beautiful convergence of two seemingly opposing forces. The sound also improves human cognition and performance, further encouraging our

influence on the Earth's systems. Overall, rain is an intriguing example of the complex interconnectedness of humans and nature in the Anthropocene. *Listen here* to rain.

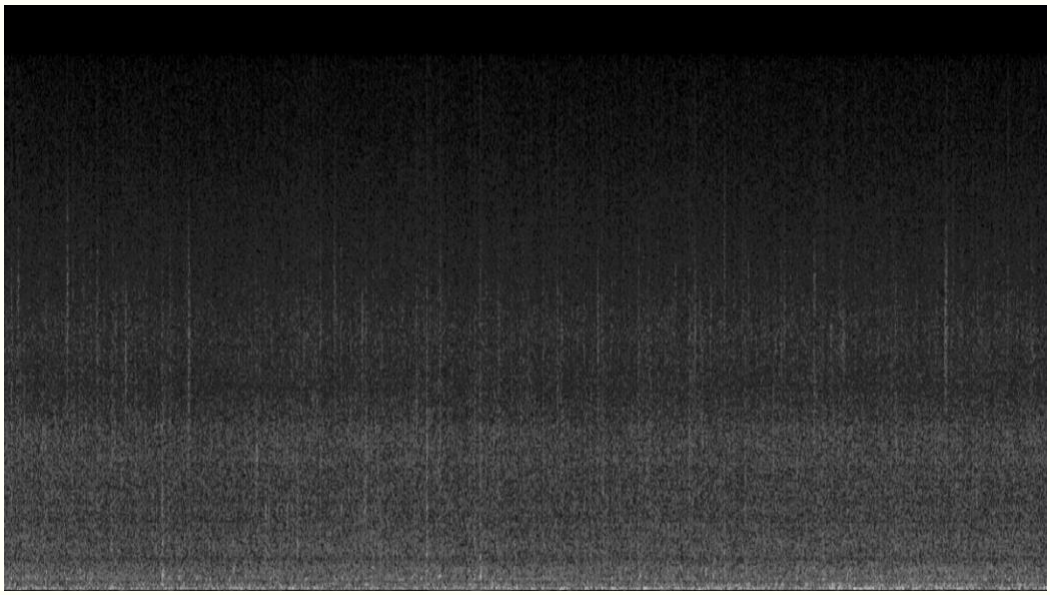


Figure 10. A spectrogram shows the sound of rain as an even shade of white across the graph.

Sea. The sound of the sea, as stated before, is the original soundscape and the quintessential background noise. It is a constant sound and thus formulates a white noise spectrogram similar to rain. When focused on the waves that occur in beach or wall conditions like along Vancouver's shoreline, the sound of the sea creates a pulsing pattern that differs it from the white noise of rain. Think of the crashing waves of the sea occurring intermittently as each swell takes time to build up and eventually crash. This forms a pulsing pattern indicated by the intermittent spikes of white noise in the spectrogram of the sea (see Figure 11). This satisfying rhythm evokes deep time.

The sound of the sea is also an important signifier of the Anthropocenic city. The sounds of waves crashing onto the land are a constant reminder of the power of nature, and the power of the sea particularly. Sea-level rise is an interconnected human/nature process in the Anthropocene, due to the global implications of climate change via shifts in the carbon cycle. These ongoing processes are signified by the persistent crashing sounds of the sea. *Listen here* to the sea.

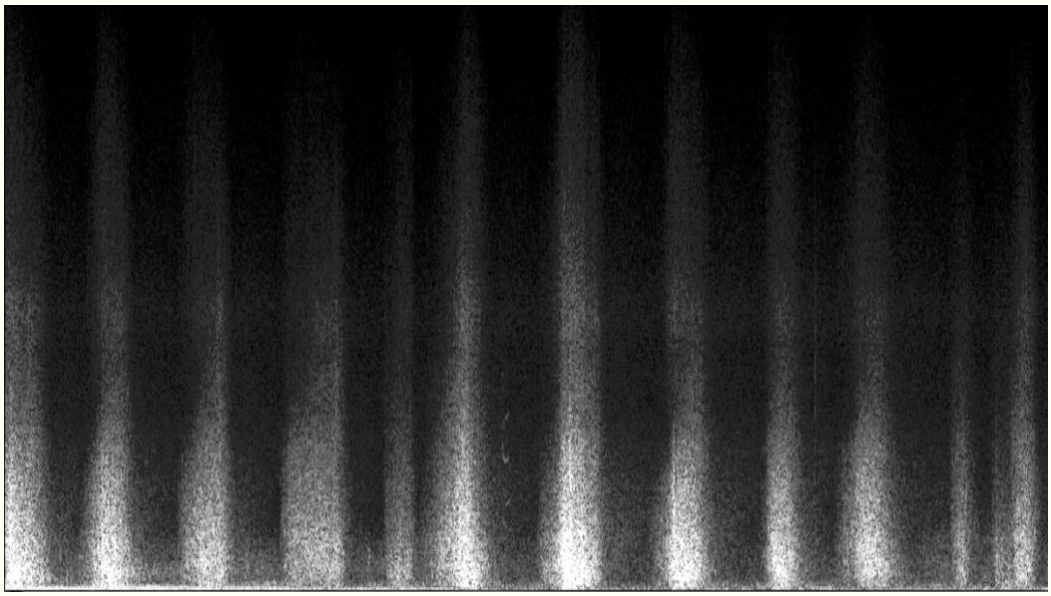


Figure 11. A spectrogram shows the sound of crashing waves of the sea as vertical spikes of white across the graph.

Soundmarks.

The sounds discussed in this section would be classified as soundmarks by Schafer. While these sounds do not signify processes in the Anthropocenic city as broadly as those in the last section, these sounds are more about place-making and creating acoustic communities, like the seagull. More than the seagull though, these sounds are more unique, likely not found anywhere else in the world, which strengthens them in creating a sense of place along the Seawall. Interestingly, these designed sounds are some of the loudest on the site, and in some cases, considered noise by the public. Despite their seemingly unnecessary loudness, these soundmarks still exist and create a sense of place to this day. Brief backgrounds on three of these soundmarks are provided in this section.

The first soundmark I noticed in my analysis was the Tower of Bauble situated near the entrance of the Telus World of Science. This soundmark creates a more constant sound than most, involving a Rube Goldberg-type machine with balls that roll around and collide with metal bells, pipes, and other musical materials. The resulting sound is a cacophony of clanks, rings, dings, and trills, which on their own are not unique, but the composition of them together creates a soundmark. The public "audio-kinetic

sculpture" was designed by New York sculptor George Rhoads.[156] *Listen here* to the Tower of Bauble.

The second soundmark along the Seawall I noticed was the loud, bellowing foghorn-sound of the Heritage Horns. The horns, originally installed on the BC Hydro Building in the 1960s, are currently installed on the roof of Canada Place, at the northern end of the Seawall. Sounding each day at noon, the Heritage Horns play the first four notes of the national anthem at ear-splitting one-hundred-eight decibels (from three blocks away). Decades ago, the horns were silenced for a full month due to noise complaints, but have been turned on again since due to complaints of their silence.[157] *Listen here* to the Heritage Horns.

Another soundmark along the Seawall is the Nine O'clock Gun located at Hallelujah Point in Stanley Park. The soundmark with the longest history along the Seawall is an old naval-type cannon that has been fired daily at nine P.M. since about 1894.[158] The cannon is currently situated directly on the Seawall promenade and makes an excessive explosion when it fires. *Listen here* to the Nine O'clock Gun.

Sonic Architectural Analysis

This portion of the guide will detail the architectural acoustic effects that currently exist along the Seawall. This portion will begin by categorizing the various types of architectural features along the site and then focus on the key architectural forms along the Seawall; the parapet, and the ceiling.

Sonic Effects.

The built environment creates several sonic effects by nature of how sound moves through space and interacts with surfaces. Whether it is designed or not, architectural forms create acoustic effects of reverberation, insulation, and reflection.

These effects create different spatial illusions or psychological effects to a listener within it (see Figure 12). These psychological effects include amplification, introversive sound, extroversive sound, filtration, distance, closeness, and displacement. These types of effects occur in various conditions along the Seawall, but also in any architectural or urban space.

Whether a surface is vertical or horizontal, parallel or perpendicular, it creates different spatial conditions that will change the acoustic effect in the space. For instance, the single wall condition reflects soundwaves of a sound that otherwise would have propagated away from the listener, back to the listener. This creates an amplification effect, as more soundwaves of a source are reflected to the ear of the listener than otherwise would have, making the sound perceived by the listener louder. More soundwaves reaching the listener may also create an effect of closeness, or that the source of the sound appears closer to the listener than it is. Thirdly, the reflected soundwaves reach the listener slightly later than the direct soundwaves. This provides a reverberation effect, triggering a psychological effect I call extroversive sound. When a space is reverberant - or reflecting several instances of a sound to the listener – it gives a sense to the listener that the space is larger than oneself. If all the soundwaves approached the listener simultaneously (as in the perpendicular wall condition), the sense would be that the space around the listener is compressed to roughly the size of the listener's body, a psychological effect I call introversive sound. Therefore, a myriad of psychological effects can occur in different architectural conditions.

Parapet.

One of the most typical architectural conditions along the Seawall is the parapet condition. Parapet conditions occur at the wall, pile, and pier spatial conditions mentioned in the functional analysis, which encompass most of the Seawall.

The psychological effects of this acoustic condition include filtration and distance. Any sound source below the top of the parapet will be filtered and sound more

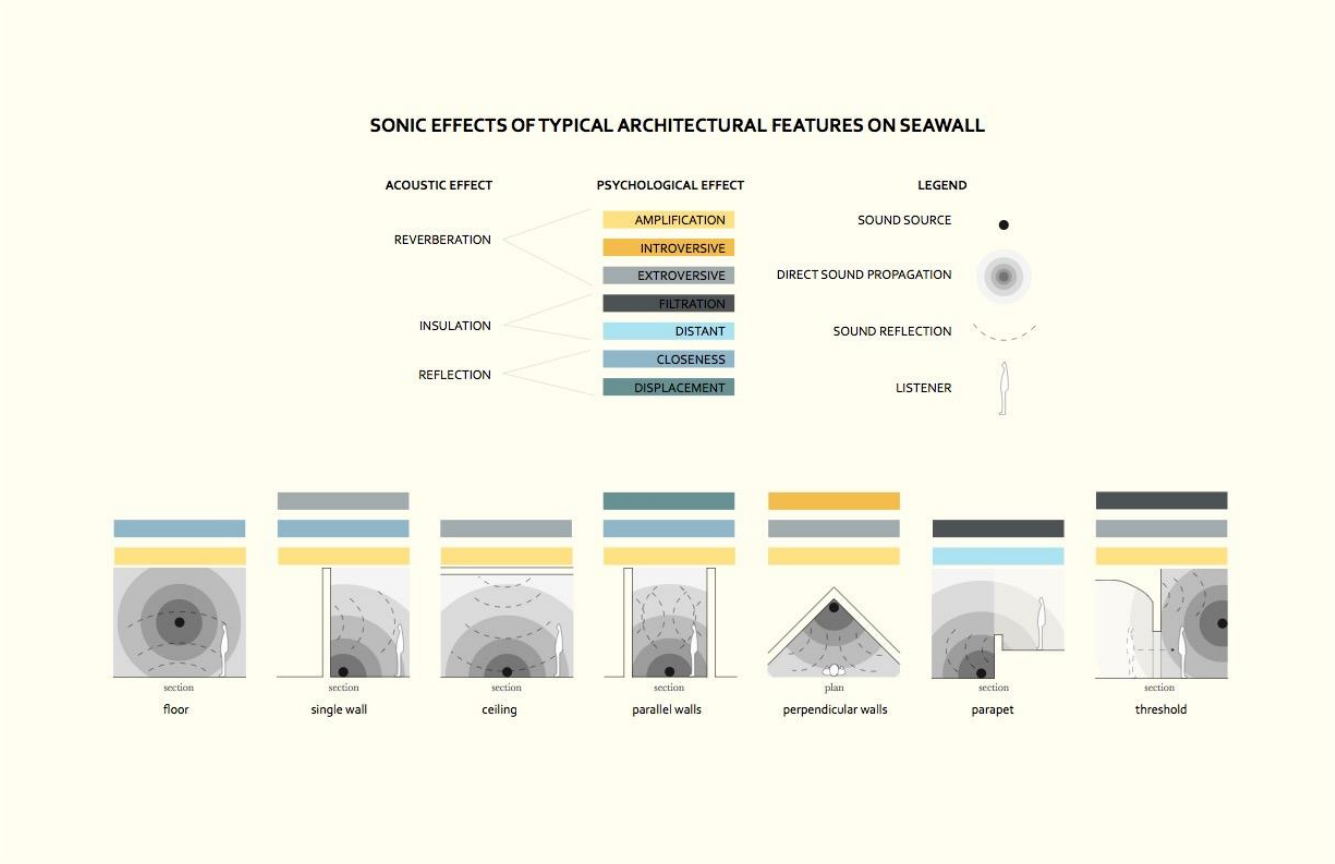


Figure 12. Typical acoustic and psychological effects on the Seawall.

distant to the listener above the parapet than the sound source actually is. In most parapet cases along the Seawall, that sound is that of crashing ocean waves. While some soundwaves refract when they meet edge conditions like the top of a parapet, not all of them do this. This is shown in Figure 12 with the faded direct sound propagation lines above the parapet's edge. The soundwaves that are less likely to refract are the higher frequencies in the sound, meaning more of the lower frequencies reach the listener's ear behind the parapet. This is the filtration effect. Because lower frequency soundwaves generally propagate further than higher frequency soundwaves, a sound that consists of mostly lower frequencies sounds like the source is more distant than one with a full range of (high and low) frequencies. This is the distant effect. Despite their filtered and distant sound, the sea waves are near to the listener. The parapet condition thus sonically distances the user of the Seawall from the sea.

The parapet condition is an excellent example of the limit effect described by Chelkoff. Architectural examples of the limit effect include parapets, thresholds, staircases, perforated walls, or any sonic environment that can involve a sonic change with a slight movement of the body or head.[159] In the parapet condition on the Seawall, this effect can be achieved by leaning over the parapet, and then receding behind the parapet to hear the difference between the sound of the waves in these two positions. When leaning over the parapet, directly above the waves sloshing along the wall below, the sounds will encompass a full range of high and low frequencies, and when leaning behind the parapet, much of the higher frequencies disappear. The effect of this condition is a strong separation of the user of the Seawall from the sea itself, not just physically, but psychologically.

Ceiling.

Several ceiling conditions occur along the outdoor public space of the Seawall. Each of the bridges that pass overhead (Burrard, Granville, Cambie, and Lions Gate), and the Brockton Point Lighthouse form these conditions along the path.

The most apparent of the ceiling conditions is formed by the underside of the Cambie Bridge. The smooth and reflective concrete underside of the bridge is at a close enough height from the ground that it creates a distinctly different acoustic environment,

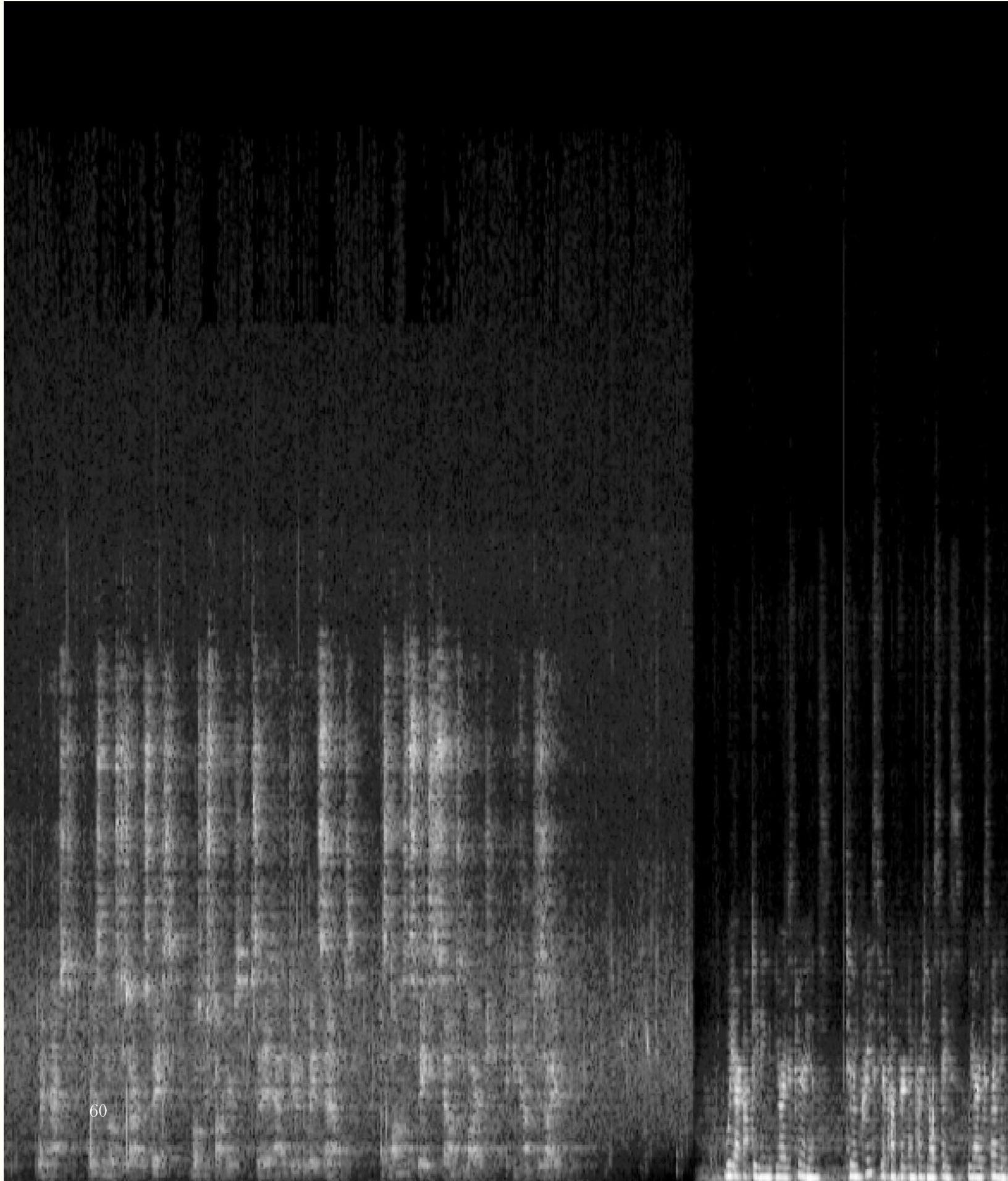
creating a perfect example of the ceiling's acoustic effects of amplification and extroversive sound. Sounds are amplified as the soundwaves heading upward bounce off of the bridge and back to the listener repeatedly. This reverberation also creates a sense of a larger space; or an extroversive sound. These sonic effects create a sonic environment that amplifies the sounds of the activities happening underneath the bridge. Because the spaces beneath the bridge include a children's playground, skateboard park, and a basketball court, a wide variety of activities become amplified, creating greater awareness of the diversity of the community.

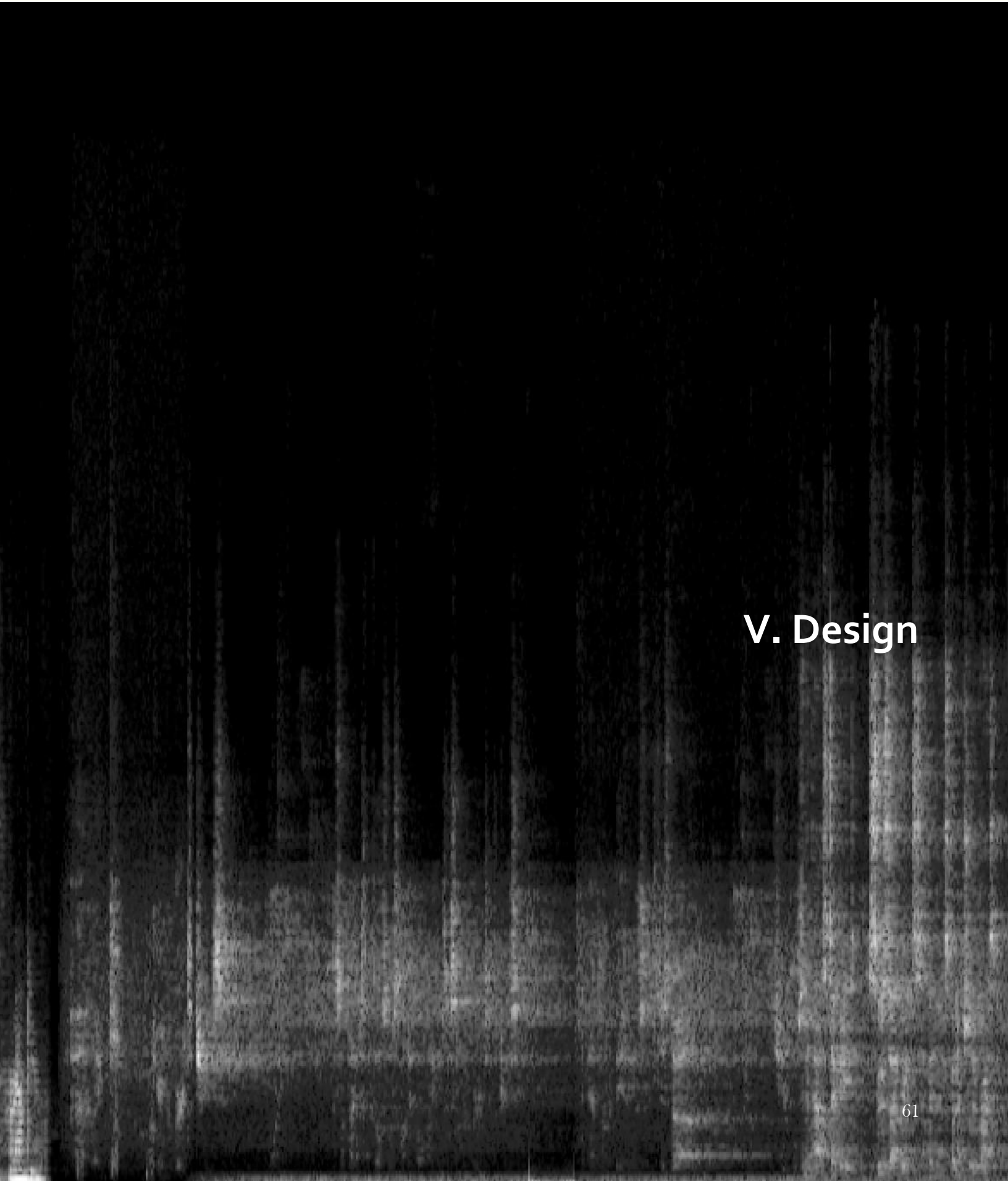
The other most dynamic ceiling condition along the Seawall is the brief moment underneath the Brockton Point Lighthouse. The ceiling is roughly three and a half metres in height, while the covered space is roughly four metres long. Due to the small scale of the space, only one or two people can occupy the space simultaneously, which means one can hear their own sounds reflected back to themselves when passing underneath the lighthouse. The effect of hearing oneself momentarily increases the awareness of one's own noise, further increasing the awareness of the sonic relationship between oneself and the space around them.

Conclusion.

As I mentioned at the start of this section, the Seawall is an open public space where sounds from a wide area of the city become audible. Therefore, the sounds heard on this site may also signify broader patterns of the entire city.

Further, this sonic data provides highly insightful information as to the reality of this city and public space, rather than how it is perceived in memory or speculation. Rather than large-scale plan views that display information mapped out in an objective position from the bird's-eye view, sonic data more closely represents individual experiences of people on the ground, occupying the lived space of the site. This type of site analysis could speak more truly to the life and frequency of activity of a given site for architects, planners, or developers alike.





V. Design

Precedents

The most important precedent for the final design is a practice within sonic geography called the "audio drift". Michael Gallagher – a seminal researcher in this field – states that "audio geography" as he calls it, involves "representing places sonically" and can "re-make landscapes".[160] A method within this study is called the "audio drift", which is a composition of field recordings and interviews from a site that is intended to be listened to while walking through the recorded site. The intent is to represent the space with sound by "putting geographical information out into the field, to be understood in the context of a location."[161] The audio drift intends to be inspired by "soundscape composition and environmental sound art".[162] An example is the Kilmahew audio drift which includes recordings of an abandoned Catholic seminary in rural Scotland (*Listen here*). The composition includes sounds of the abandoned space, overlaid with voices of people reminiscing about using the building before its abandonment. This audio drift is strongly tied to the place of the recordings' origins, intending to deepen one's understandings of that place. The composition is meant to evoke the past, present, and future of the place. Intended to be listened to while occupying the space it is alluding to, the result is more of a voice-over or accompaniment to a space rather than a virtual experience of it. Albeit, the audio drift precedent is helpful to understand how to create a sense of place through sound representation.

Another important precedent is the sound art piece, "Listening Back, Listening Ahead" by the sound artist Jacek Smolicki (*Listen here*). While most audio drifts represent a place's past and present, Smolicki simulates the future as well on this sound

piece. The "sound collage" is composed of numerous audio recordings collected by Smolicki and composed in a way that explores questions of how the role of sound in society will shift in the future. He asks questions like: "What kinds of future do the constantly transforming soundscapes of our cities, towns and country sides foretell?"[163] This particular collage creates a nice balance of a sense of space and abstraction that allows for many interpretations of the space. This example is closer to the desired virtual experience of a future world for my final design.

Methods

My methods to create the virtual soundwalk involved field recording, Foley art, sound editing, and a feedback loop experiment.

Every sound that is heard in the final design was recorded by me over the past three years. All of the recordings were done either with a Zoom H1N stereo microphone or a hand-built hydrophone (a hydrophone is a microphone that is capable of recording sounds underwater). My recording of the site involved choosing various points throughout the entire twenty-three-kilometre path (often on points that featured a park bench) and taking three-minute recordings to capture a variety of sounds at each location. As my narrative developed, my recording focused on capturing specific sounds, that were not necessarily on-site (e.g. door sounds, HVAC sounds, and voice recordings). Of the ninety-three recordings used in the final version, forty-four percent of them were recorded on or near the Seawall. The rest were off-site, mostly in my home or in my neighbourhood. By using field recordings from real spaces in Vancouver, the project will hopefully have the most realistic feel possible in sonic representations of spaces.

Some sounds used in the final design were captured using Foley art. Foley art is a practice used in creating sounds for films that involves using regular materials and objects to create desired sounds in a studio space. My Foley recordings mainly consisted of

breaking small strips of cedar to recreate the sound of a crackling fire, blowing into a glass bottle to create the wind organ sound, and listening to my floor fan blowing to create the deep rumble in the middle of the narrative. Manually creating these sounds helped capture sounds that otherwise are very difficult to attain naturally in the field.

The sound editing method involved manipulating some of the recordings in a sound editing software called Reaper to create the desired spatial effect (see Figure 13). This either involved editing the sound's qualities (including pitch, panning, volume levels, or playback speed) or adding sound effects; primarily reverb, echo, delay, equalization, gain, compression, low-pass/high-pass, bandpass, Haas, noise remover, and reverb remover. These effects allowed me to evoke things like the size of a space, the distance or nearness of a sound source, and the material qualities of the space.

One of my key sound explorations was my feedback loop experiment. It involved creating pure recordings of a room's resonant frequency. The exploration was inspired by the sound art piece by Alvin Lucier called "I Am Sitting In A Room" recorded in 1969. For this piece, Lucier recorded his voice in a room, and then played the recording back into the same room, re-recording it. He did this repeatedly until the frequencies of his voice started to coalesce into the resonant frequency of the room itself. I tried this experiment with my own voice in three different rooms to compare the resulting sounds. I chose three spaces of varying sizes: my bedroom, my garage, and a gymnasium. The resonant frequency of a room is the pitch that tends to resonate the longest in that volume of space, which is a result of the shape and dimensions of the space. The frequency can be calculated by finding the wavelength that is double the longest dimension in the room and multiplying that by the speed of sound. Generally, the larger the room, the lower its resonant frequency will be.

The sound of my voice gradually coalescing into the resonant frequencies of each room through these experiments demonstrates how we are inextricably connected to our surrounding environments. Every sound we make as individuals are shaped by the spaces around us. This exploration makes those interconnections more apparent and can help us begin to understand how the boundary between self and environment is indeed very blurred. *Listen here* to the process of this exploration.

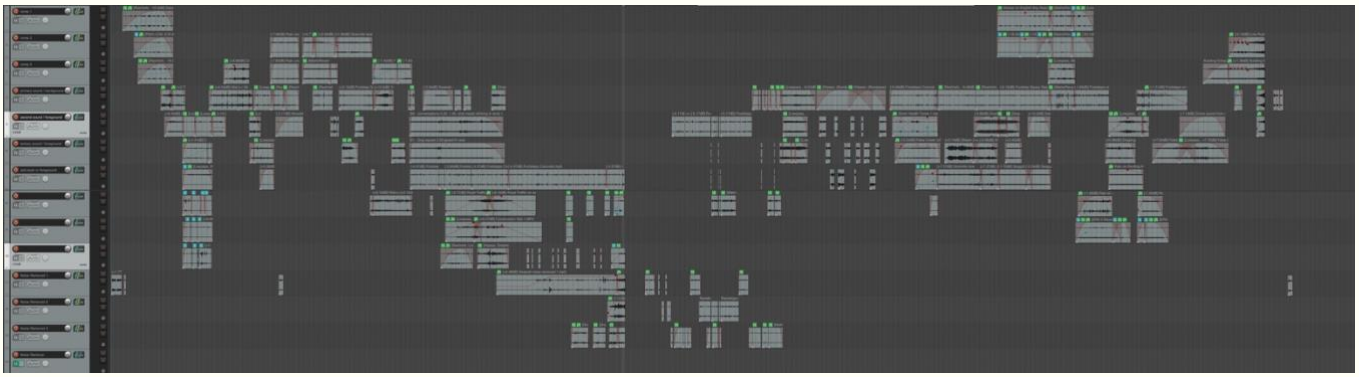


Figure 13. A screenshot of the final design in its sound editing software, Reaper.

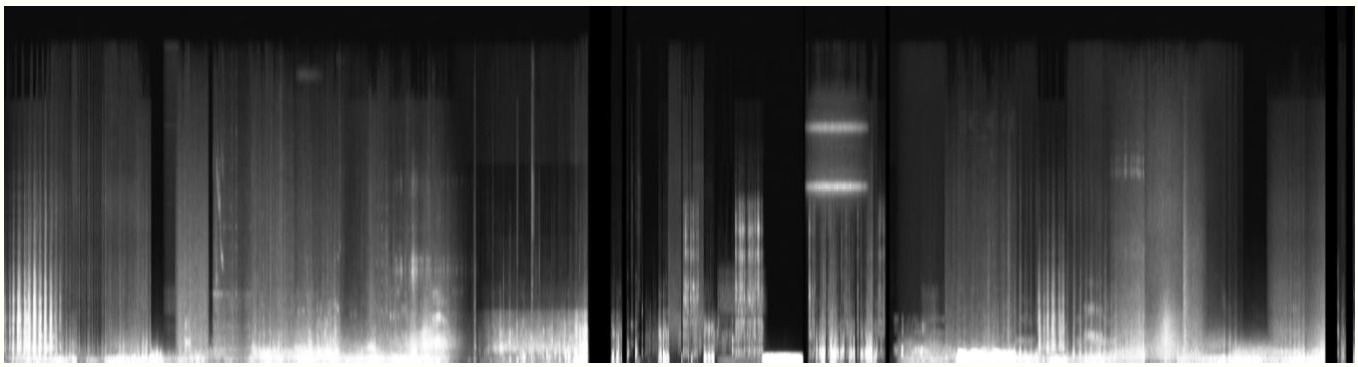


Figure 14. The spectrogram of the final design.

Final Design

The final design for this graduate project takes the form of a virtual, guided soundwalk along various waterfront spaces within Vancouver's past, present, and future (see Figure 14). The future soundscapes are composed within a narrative-driven by two designed governing bodies that influence architecture in the future.

Listen here to the final design.

Virtual Soundwalk.

The project design assumes the form of a virtual guided soundwalk. The soundwalk is guided in that the sounds are all orchestrated along a certain path and composed in a way to guide the listener from one sound to the next. The experience is virtual as it attempts to create a simulated three-dimensional space around the listener using sonic effects that evoke a sense of space; such as reverberation, reflection, and filtration.

My primary goal of this architectural project is to encourage listening attentively to the environments around us. This has led my representation to turn immediately to the aural, and thus removing emphasis from the visual representation tradition that is still dominant in architecture. As Pallasmaa states: "Architecture has been regarded as an art form of the eye."[164] The soundwalk method, however, is a highly spatial sonic experience, as it involves moving through spaces on foot. Creating a virtual version of this experience allows me to design architectural spaces through the way they sound, rather than through visual cues. Physical materials, dimensions of rooms, and the form of the room or space

all are taken into consideration when designing a sonic space, despite not visualizing these elements. The intent is to make this project an interdisciplinary one, that is relevant to both fields of architecture and acoustic ecology.

There are several reasons why the soundwalk was chosen to represent the themes I am exploring in this project. As quoted from Westerkamp in Chapter IV, the soundwalk is an important practice for appreciating sounds. Therefore, the soundwalk is an appropriate method for discussing aesthetics. Additionally, the soundwalk, which involves walking on foot, is an appropriate method for evoking the temporality of sound, as was discussed as a pertinent aspect of sound in Chapter I. The constant movement created by the sound of footsteps and shifting soundscapes is meant to evoke the sense that time and sound both constantly shift. Overall, the sonic medium used is meant to evoke a feeling of a real, lived experience of space. I argue that static, two-dimensional drawings generally do not represent the lived experience of space as well. Sound recordings can evoke much about space: the people, the activities, and non-designed elements of a space that so commonly characterize the real spaces we occupy. The soundwalk offers a rich field of expression of the key themes in this paper.

Narrative.

I have organized the virtual soundwalk with a narrative-based approach to synthesizing extensive research on Vancouver, architecture, and acoustic ecology. The virtual soundwalk is entitled: *Fidelitas*. In this section, I will describe the two designed governing bodies within the narrative of the soundwalk.

Fidelitas. The middle portion of the virtual soundwalk takes the listener through a future era defined by a noise-extermination technology, called Fidelitas. This corporation – which represents the role of technology and the tech industry within societal problems – offers a product that comes in the form of a computer chip installed above the ear which can filter out unwanted sounds before they are perceived by the brain. This means that signal sounds – such as loud crashes, bangs, and screams – that tend to startle and frighten, can be removed from registering in the listener's ear by eliminating them from their perception.

Inspiration for this conceptual technology comes from the use of personal headphones in public. The use of personal headphones removes the listener from all acoustic arenas they would otherwise occupy which creates social deafness.[165] The highly individualistic listening habit may likely evolve into the future in individualist cultures.

Ministry of Sonic Health. The crux of the narrative centres around a future government organization called the Ministry of Sonic Health (MOSH). This conceptual government body is a design critique of present-day noise abatement policies. In the narrative, MOSH releases a sequence of by-laws, over a couple of hundred years, gradually becoming more open-ended and abstract. I will briefly break down each of the by-laws and their inspirations featured in the soundwalk.

By-law No. 3.1.

Every building must enrich the sonic sphere of the public. This involves creating harmony by designing the building to produce an allowable tone. Appendix A. shows allowable tones for different sound arenas.
Amended February 9, 2151.

Inspired by the language used in Vancouver's public art by-law and heritage preservation by-law, this by-law proposes how building façades could be formed to consider the sound that the wind makes as it blows across them. When strong gusts of wind blow in between tight spaces, corridors, or parapets, it can create a whistling sound as the air becomes highly pressurized at a specific point. This by-law would govern intentional designs of these resulting wind pitches on all new buildings in the city. The allowable tones would be chosen to harmonize with ones nearby, to create naturally occurring musical chords in the air (see Figure 15).

By-law No. 3.2.

Every public space must create a distinct sonic identity, to reflect the character of the neighbourhood, and reflect the experience of that space. Appendix B. lists the sound identities.
Amended February 9, 2155.

Inspired by the language in Vancouver's public art by-law, this by-law proposes how each neighbourhood of the city should have a strongly identifiable sound that characterizes the space. This could be a single sound source or an entire soundscape. Appendix B. shows the spectrograms of sounds that would be considered iconic, or place-making (see Figure 16). This appendix is inspired by the 100 Soundscapes Of Japan that was released in 1996 by the Ministry of Environment of Japan. The sounds were voted upon and designated as official soundscapes of the nation. The list includes both natural sounds of birds and water, but also human-created sounds of traditional festivals and marketplaces. This is perhaps the most progressive government-led initiative addressing soundscapes in the world to date.

I represent this by-law in the soundwalk with a wind organ design that I envision to be installed in a marketplace or any waterfront space. The wind organ would be made up of a series of pipes that create musical notes when triggered by natural wind patterns along the breezy waterfront. The resulting "music" would be an intriguing combination of natural, random wind patterns determining the rhythms, and human- created pipes determining the pitches.

By-law No. 3.3.A.

All public spaces must be designed to enhance the listening experience to designated healthy sounds. Appendix C. lists the designated healthy sounds in Vancouver.

By-law No. 3.3.B.

New building construction must not infringe upon existing sound arenas for designated "healthy" sounds. Any new form of construction must not severely change the timbre of a designated sound by altering the qualities of its spatial context.
Effective March 17, 2170.

Inspired by the concept of Vancouver's view cone policy, this by-law intends to regulate control over the size of acoustic arenas (what I am calling sound arenas) of

designated sounds within the soundscape. Because architecture influences the size and shape of acoustic arenas, this by-law would regulate building construction to ensure that certain sounds are preserved among other sounds or noise. Appendix C shows a never-ending list of these designated sounds (see Figure 17). This eludes to how the list could be progressive in the way it encourages a wide variety of sounds to occur in public rather than the closed-minded noise control policies currently in place.

The sound that alludes to this by-law in the soundwalk is that of sea waves reverberating in a domed building. This is an architectural/public space design that I created to exemplify this by-law.

By-law No. 3.8.

Public spaces must include environments that encourage moments of stillness or temporary introspection.

Amended July 9, 2243.

This by-law – amended much further in the future than the previous three – demonstrates a more liberal policy. It eludes to a type of experience that government bodies rarely encourage today. In the modern North American city, constant movement is promoted in the design and culture of much of its public spaces. The Seawall is the quintessential example of this. As a promenade, the Seawall hardly accommodates any variety of activities other than walking, cycling, or jogging. This passive state of occupying our cities is especially concerning when the city lacks large open public spaces like in the case of Vancouver.

This by-law is demonstrated by the sound of rain falling on a canopy in the virtual soundwalk.

By-law No. 5.4.

Spaces must be designed to encourage listening to many sounds at once, i.e. the noisescape.

Amended May 8, 2269.

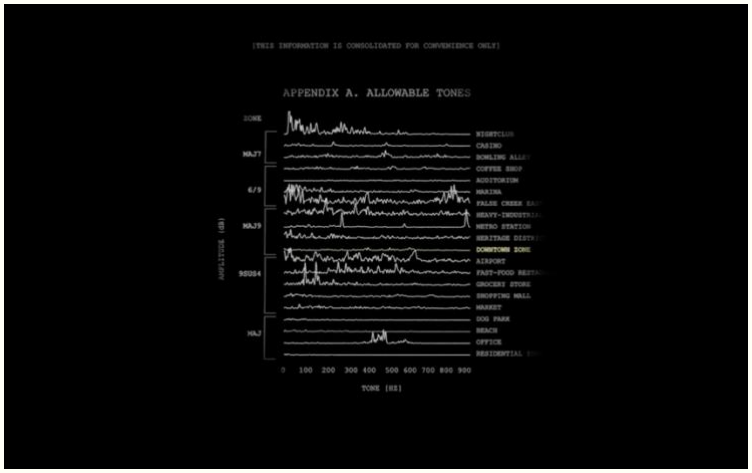


Figure 15. Appendix A. showing the allowable tones within each type of space (screenshot from the final project video).

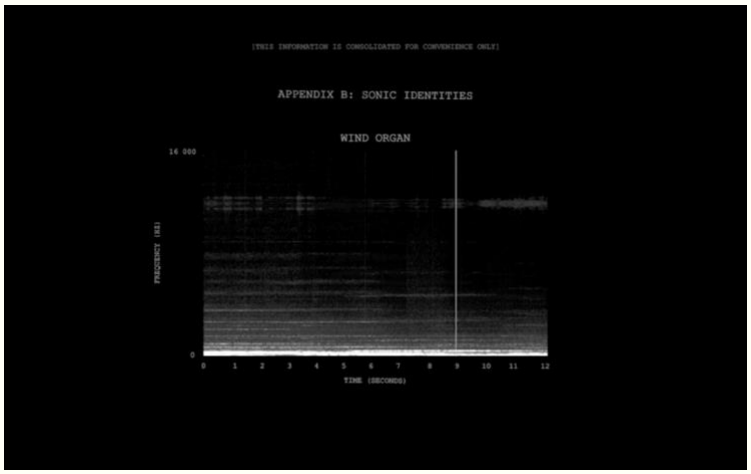


Figure 16. Appendix B. showing a spectrogram of the wind organ sonic identity (screenshot from the final project video).

Figure 17. Appendix C. showing a never-ending list of designated "healthy" sounds (screenshot from the final project video).

This by-law evokes a government that begins to encourage a more collectivist culture rather than the predominantly individualistic cultures that characterize much of the Global North. This by-law is inspired by Sterne's critique of Schafer's hi-fi and lo-fi soundscape concept. A noisescape is a concept I created that describes a soundscape that is so full of sounds that each one is indistinguishable; its overall composition becomes an enveloping white noise. The noisescape is about the collective sound rather than the individual voices or sounds within it.

By-law No. 7.5.

Spaces must be provided that help dissolve the boundary between self and environment.

Effective February 9, 2303.

This by-law refers to the crux of my argument about our new relationship with the environment in the Anthropocene. Put simply, the self/environment dichotomy that currently persists in Western culture is a damaging one for the planet. The notion of the Anthropocene suggests that humans are a part of geological systems as much as more-than-human species and natural processes. This means that we have to "look" and listen to the environment differently. The viewer/viewed dichotomy entrenched in our landscape theory since the Romantic period needs to be revised. As referenced in Chapter I, Baudelaire's statement suggests that sound may be a key component to dissolving this boundary as the omnidirectional character of sound unites the listener to the listened to.

Conclusion

Rather than reduce the unpredictability and unexpectedness of noise in our environment and, thus, emphasize the importance of controlling a non-compliant environment, we can embrace the notion that sound is unpredictable and unexpected. We can welcome the possibility and surprise of discovering the "other" in unplanned and serendipitous ways. This investigation shows that noise is a problem largely because people construct it as such, becoming stressed and agitated by a sound's violation of expected norms. Instead of trying to eliminate noise, we can focus on eliminating the need to control sound. Such re-imaginings may challenge our very conceptions of property and space through which our norms and codes have formed. – Saeed Hydaralli[166]

Today, most of our soundscapes are treated as noise that must be reduced in noise by-laws and architectural acoustics. A question these practices should begin to ask is, "What are the sounds we *do* want to hear?" Active listening and soundwalking eradicate noise, as the listener becomes open to every sound around them. By learning from the psycho-acoustic studies of this report, architecture can more adequately design the sonic environment. Noise creates apathy, and therefore it is important to reduce the volume of these unnecessary sounds, by focusing on what we *do* want to hear. This may mean relieving some of the desire to control noise.

In many cases, this involves shifting one's relationship to a sound, from rejecting it as noise, to simply accepting its presence in the environment. Shifting our relationship with environments as part of oneself blurs the boundary between humans and nature. As the feedback loop experiment demonstrated, the eradication of this boundary between self and environment can occur through listening to how our sounds are shaped by the environment (or architecture) around us. By reimagining this relationship to our environment as part of ourselves, this relationship with noise may become more livable.

This report only begins to reframe the issue of noise in the new context of the Anthropocenic city. Therefore, much of the design work of this project involved reframing the problem of acoustic design by asking a new set of questions and diving into a new way of analyzing site and space. Following the proposed alterations to site analysis and schematic design provided in this report, the next steps will be demonstrating further what that may look like in the other architectural design stages. This project – by

deliberately not providing many built-design results – concerns itself more with asking the right questions rather than providing the right answers.

Noise signifies the world that we do not want to live in, the natural one, which might not be best suited for our liking. Hegel once said that "humanity will be content only when it lives in a world of its own making".[167] Humans, as highly adaptable, could be content with a more symbiotic relationship with the environment. Actively listening to what we normally consider noise can maybe help us appreciate the environment as it is, and to adapt ourselves to it. This will entail being aware of all that noise can signify. It will entail active listening to our environments, which are a part of ourselves. It will entail recognizing that noise will never disappear until you listen to it.

Endnotes

[1] R Murray Schafer, *The Soundscape: Our Environment and the Tuning of the World* (Rochester: Destiny Books, 1994): 273.
[2] "Environment," Merriam-Webster, 2020, https://www.merriam-webster.com/dictionary/environment.
[3] "Environment," Cambridge Dictionary, Accessed December 18, 2020, https://dictionary.cambridge.org/dictionary/english/environment.
[4] "Nature," Merriam-Webster, 2020, https://www.merriam-webster.com/dictionary/nature.
[5] "Nature," Cambridge Dictionary, Accessed December 18, 2020, https://dictionary.cambridge.org/dictionary/english/nature.
[6] "Nature."
[7] Schafer, *The Soundscape: Our Environment and the Tuning of the World*, 273.
[8] Ibid., 274.
[9] "Soundwalk," Hildegard Westerkamp, Accessed May 3, 2021, https://www.hildegardwesterkamp.ca/sound/installations/Nada/soundwalk/.
[10] Jason Moore in David C. Jackson, "The Sonic Anthropocene: Dark Ecological Soundscapes in Chris Watson's 'Vatnajökull,'" *Evental Aesthetics* 6, no. 1 (2017): 51.
[11] Hannah Ritchie and Max Roser, "Urbanization," Our World in Data, November 2019, https://ourworldindata.org/urbanization.
[12] "Environmental Aesthetics," Stanford Encyclopedia of Philosophy, 2019, https://plato.stanford.edu/entries/environmental-aesthetics/.
[13] Timothy Morton*, Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge: Harvard University Press, 2007): 1.
[14] "Environmental Aesthetics."
[15] Ibid.
[16] Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, 5.
[17] Lance Berelowitz, *Dream City: Vancouver and the Global Imagination* (Vancouver: D&M Publishing, 2005), https://www-deslibris-ca.ezproxy.library.ubc.ca/ID/416982, 32.
[18] Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (West Sussex: John Wiley and Sons Ltd., 2012): 22.
[19] Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts* (Cambridge: MIT Press, 1999): 27.
[20] Charles Baudelaire in Kahn, *Noise, Water, Meat: A History of Sound in the Arts*, 27.
[21] Maryam Sabet and Ali Dioulagh, "Compare the Social Skills, Behavioral Disorders and Loneliness and Despair Feelings of Hearing-Impaired Children with Low Vision Children of Urmia City," *Annals of Tropical Medicine and Public Health* 10, no. 4 (2017),

https://doi.org/link.gale.com/apps/doc/A510900394/HRCA?u=ubcolumbia&sid=HRCA&xid=ccbf0515.

[22]Studies have shown that 38% of human communication is through tone of voice, and only 7% through the actual words spoken. The remainder (55%) is communicated through body language. Studies found in Albert Mehrabian, *Silent Messages* (Belmon: Wadsworth Publishing Co., 1971).

[23] John Vidal, "The 'Age of the Machine' Is Drowning out Natural Sound, Bernie Krause Warns," The Guardian, September 14, 2012, https://www.theguardian.com/environment/2012/sep/24/machine-natural-sound-bernie-krause.

[24] Jackson, "The Sonic Anthropocene: Dark Ecological Soundscapes in Chris Watson's 'Vatnajökull.'", 48.

[25] Pallasmaa, *The Eyes of the Skin: Architecture and the Senses,* 53.

[26] Ibid., 24.

[27] Jackson, "The Sonic Anthropocene: Dark Ecological Soundscapes in Chris Watson's 'Vatnajökull,'" 48.

[28] Ibid., 58.

[29] Frances Dyson, *The Tone of Our Times: Sound, Sense, Economy, and Ecology* (Cambridge: MIT Press, 2014), 39.

[30] Katie Hemsworth, "'Feeling the range': Emotional geographies of sound in prisons," *Emotion Space and Society* 20, (2016), doi:10.1016/j.emospa.2016.05.004.

[31] Michael Gallagher, "Sound, space and power in a primary school," Social and Cultural Geography 12, no. 1 (2011), https://doiorg.ezproxy.library.ubc.ca/10.1080/14649365.2011.542481.

[32] Bing Chen and Jian Kang, "Acoustic Comfort in Shopping Mall Atrium Spaces – A Case Study in Sheffield Meadowhall," *Architectural Science Review* 47, no. 2 (2004), https://doi-org.ezproxy.library.ubc.ca/10.1080/00038628.2004.9697033.

[33] C.J. Skinner and C.J. Grimwood, "The UK noise climate 1990–2001: population exposure and attitudes to environmental noise," *Applied Acoustics* 66, no. 2 (2005), https://doi.org/10.1016/j.apacoust.2004.07.009.

[34] Francesco Aletta, et al., "An Experimental Study on the Influence of Soundscapes on People's Behaviour in an Open Public Space," *Applied Sciences* 6, no. 10 (2016), http://dx.doi.org.ezproxy.library.ubc.ca/10.3390/app6100276.

[35] Jacques Attali, *Noise: The Political Economy of Music* (Minneapolis: University of Minnesota Press, 1985): 26.

[36] "Noise," Online Etymology Dictionary, 2020, https://www.etymonline.com/word/noise.

[37] Dyson, *The Tone of Our Times: Sound, Sense, Economy, and Ecology*, 144

[38] Attali, *Noise: The Political Economy of Music*, 6.

[39] Hillel Schwartz, *Making Noise: From Babel to the Big Bang & Beyond* (New York: Zone Books, 2011): 21.

[40] Karin Bijsterveld, "The Diabolical Symphony of the Mechanical Age: Technology and Symbolism in European and North American Noise Abatement Campaigns, 1900-40," *Social Studies of Science* 31, no. 1 (2001): 37–70, https://www.jstor.org/stable/285817, 52.

[41] Robert T. Beyer, *Sounds of Our Times: Two Hundred Years of Acoustics* (New York: Springer, 1999): 206.

[42] Bijsterveld, "The Diabolical Symphony of the Mechanical Age: Technology and Symbolism in European and North American Noise Abatement Campaigns, 1900-40," 40.

[43] Schwartz, *Making Noise: From Babel to the Big Bang & Beyond*, 855.

[44] Ibid., 689.

[45] Joseph Weissman, "Warning, Hive Meltdown Imminent: Serres, Negarestani and Deleuze on Noise, Pestilence and Darkness," Fractal Ontology, 2007, https://fractalontology.wordpress.com/2007/10/19/warning-hive-meltdown-imminent-serres-negrestani-and-deleuze-on-noise-pestilence-and-depth/.

[46] Schafer, *The Soundscape: Our Environment and the Tuning of the World*, 16.

[47] Schwartz, *Making Noise: From Babel to the Big Bang & Beyond*, 37.

[48] Emily Carr, *Hundreds and Thousands: The Journals of Emily Carr* (Toronto: Clarke, Irwin & Company Limited, 1966): 124.
[49] Schafer, *The Soundscape: Our Environment and the Tuning of the World*, 17.
[50] Amanda Hagood, "Wonders with the Sea: Rachel Carson's Ecological Aesthetic and the Mid-Century Reader," *Environmental Humanities* 2, no. 1 (2013): 64.
[51] Michel Serres, *Genesis* (Ann Arbor: University of Michigan Press, 1995): 6.
[52] Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987), https://libcom.org/files/A%20Thousand%20Plateaus.pdf, 479.
[53] Deleuze and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 474.
[54] Ibid., 479.
[55] Ibid., 480.
[56] Schwartz, *Making Noise: From Babel to the Big Bang & Beyond*, 715.
[57] Ibid., 716.
[58] Hagood, "Wonders with the Sea: Rachel Carson's Ecological Aesthetic and the Mid-Century Reader.," 63.
[59] Schwartz, *Making Noise: From Babel to the Big Bang & Beyond*, 726.
[60] Ibid., 736.
[61] Ibid.
[62] Serres, *Genesis*, 62.
[63] Ibid., 6.
[64] Ibid., 13.
[65] Friedrich Nietzsche, *The Will to Power* (New York: Vintage Books, 1968): 1067.
[66] Paul Hegarty, "Noise Threshold: Merzbow and the End of Natural Sound," *Organised Sound: An International Journal of Music Technology* 6, no. 3 (2001): 193–200, https://doi.org/doi:10.1017/S1355771801003053, 194.
[67] Aaron Zwintscher, *Noise Thinks the Anthropocene: An Experiment in Noise Poetics* (Earth: Punctum Books, 2019): 31.
[68] Attali, *Noise: The Political Economy of Music*, 122.
[69] Saeed Hydaralli, "What is Noise? An inquiry into its formal properties," In *Reverberations: The Philosophy, Aesthetics and Politics of Noise*, by Michael Goddard, Benjamin Halligan, and Paul Hegarty (New York: Continuum Books, 2012): 227.
[70] Attali, *Noise: The Political Economy of Music*, 3.
[71] An anechoic chamber is a fully enclosed room that is optimized to absorb all sound waves produced within the space. The effect of being in such a space is the closest sensation to absolute silence that is possible in any environment. It creates the effect of both being in an infinitely large space because no sound is being reflected back to your ear, and also an infinitely small space, one that is essentially the approximate size of your body. It was in one of these spaces that John Cage attempted to find silence and instead was able to hear the vital functions of his own body.
[72] Zwintscher, *Noise Thinks the Anthropocene: An Experiment in Noise Poetics*, 96.
[73]Dyson, *The Tone of Our Times: Sound, Sense, Economy, and Ecology*, 112.
[74] Attali, *Noise: The Political Economy of Music*, 33.
[75] Serres, *Genesis*, 7.
[76] Ibid., 13.
[77] Peter Szendy in Dyson, *The Tone of Our Times: Sound, Sense, Economy, and Ecology*, 38.
[78] Schafer, *The Soundscape: Our Environment and the Tuning of the World*, 9.
[79] Ibid., 10.
[80] Ibid.
[81] Ibid., 43.
[82] Ibid.
[83] Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke University Press, 2003), https://doi-org.ezproxy.library.ubc.ca/10.1215/9780822384250, 343.
[84] Sterne, *The Audible Past: Cultural Origins of Sound Reproduction*, 342.

[85] Barry Blesser and Linda-Ruth Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture* (The MIT Press, 2006), https://doi-org.ezproxy.library.ubc.ca/10.7551/mitpress/6384.001.0001, 22.
[86] Blesser and Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture*, 23.
[87] Ibid., 26.
[88] Schwartz, *Making Noise: From Babel to the Big Bang & Beyond*, 475.
[89] R Murray Schafer, *The Book of Noise* (Vancouver: Price Milburn, 1970): 23.
[90] Bijsterveld, "The Diabolical Symphony of the Mechanical Age: Technology and Symbolism in European and North American Noise Abatement Campaigns, 1900-40," 52.
[91] Beyer, *Sounds of Our Times: Two Hundred Years of Acoustics*, 187
[92] Enda Murphy, Eoin A. King, and Elsevier All Access Books, *Environmental Noise Pollution: Noise Mapping, Public Health, and Policy,* First ed., (Amsterdam: Elsevier, 2014): 4.
[93] Ibid.
[94] Bijsterveld, "The Diabolical Symphony of the Mechanical Age: Technology and Symbolism in European and North American Noise Abatement Campaigns, 1900-40," 45.
[95] Ibid., 48.
[96] Ibid., 53.
[97] Ibid., 48.
[98] Ibid.
[99] Ibid.
[100] Schwartz, *Making Noise: From Babel to the Big Bang & Beyond*, 688.
[101] Ibid., 689.
[102] Schafer, *The Book of Noise*, 11.
[103] Bijsterveld, "The Diabolical Symphony of the Mechanical Age: Technology and Symbolism in European and North American Noise Abatement Campaigns, 1900-40," 55.
[104] Mags Adams, in Jonathan Prior, "Sonic Environmental Aesthetics and Landscape Research," *Landscape* Research 42, no. 1 (2017), https://www.tandfonline.com/doi/full/10.1080/01426397.2016.1243235.
[105] Prior, "Sonic Environmental Aesthetics and Landscape Research."
[106] Ibid.
[107] Ibid.
[108] R Murray Schafer, *The Vancouver Soundscape* (Vancouver: ARC Publications, 1978): 29.
[109] Captain George Vancouver in Schafer, *The Vancouver Soundscape*, 5.
[110] Emily Carr, in Schafer, *The Vancouver Soundscape*, 6.
[111] Ibid., 7.
[112] Christine L. Wallace, "Architecture of the Salish Sea Tribes of the Pacific Northwest," Fitch Foundation, April 2017, http://fitchfoundation.org/wp-content/uploads/2017/05/FITCH_Christina-Wallace_final_web.pdf.
[113] Robert K. Burkinshaw, *False Creek: History, Images, and Research Sources* (Vancouver: City of Vancouver Archives, 1984): 9.
[114] Ilse Helbrecht, Peter Dirksmeier, and Professor Matthew Carmona, *New Urbanism: Life, Work, and Space in the New Downtown* (Taylor & Francis Group, 2012), https://ebookcentral.proquest.com/lib/ubc/detail.action?docID=866381, 52.
[115] Berelowitz, *Dream City: Vancouver and the Global Imagination*,166.
[116] Schafer, *The Vancouver Soundscape*, 11.
[117] Ibid.
[118] Ibid., 16.
[119] Hayes, *Historical Atlas of Vancouver and the Lower Fraser Valley*, 101.
[120]Ibid., 102.
[121] Burkinshaw, *False Creek: History, Images, and Research Sources*, 25.
[122] Schafer, *The Vancouver Soundscape*, 16.
[123] Ibid., 17.
[124] Ibid., 19.

[125] Berelowitz, *Dream City: Vancouver and the Global Imagination*, 34.
[126] Burkinshaw, *False Creek: History, Images, and Research Sources*, 59.
[127] Berelowitz, *Dream City: Vancouver and the Global Imagination*, 217.
[128] Ibid., 34.
[129] Helbrecht, Dirksmeier, and Carmona, *New Urbanism: Life, Work, and Space in the New Downtown*, 53.
[130] Ibid., 59.
[131] Danielle Russell, "Soft Shoreline Alternatives For Coastal Stabilization And Habitat Enhancement," 2015, https://dx.doi.org/10.14288/1.0075689, 9.
[132] Uytae Lee, "Should we tear down the Vancouver seawall?" CBC News, April 14 2019, https://www.cbc.ca/news/canada/british-columbia/should-we-tear-down-the-vancouver-seawall-1.5094387.
[133] Elizabeth Macdonald, *Urban Waterfront Promenades* (New York: Routledge, 2017), https://doi-org.ezproxy.library.ubc.ca/10.4324/9781315740836, 21.
[134] Macdonald, *Urban Waterfront Promenades*, 1.
[135] Ibid.
[136] Ibid., 7.
[137] Ibid., 2.
[138] Ibid., 17.
[139] Berelowitz, *Dream City: Vancouver and the Global Imagination*, 23.
[140] Macdonald, *Urban Waterfront Promenades*, 16.
[141] Berelowitz, *Dream City: Vancouver and the Global Imagination*, 163.
[142] Currently, thirty protected view cones exist in Vancouver, restricting building heights to preserve arbitrary views to certain vistas. Conversations have begun that will loosen the policy for the sake of economic growth. This discussion exists here: https://dailyhive.com/vancouver/vancouver-view-cones-economic-potential.
[143] Berelowitz, *Dream City: Vancouver and the Global Imagination*, 163.
[144] Ibid., 164.
[145] Ibid.
[146] "Soundwalk."
[147] Ibid.
[148] Blesser and Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture*, 22.
[149] Jean-Francois Augoyard and Henry Torgue, *Sonic Experience: A Guide to Everyday Sounds* (Montreal & Kingston: McGill-Queen's University Press, 2005): 68.
[150] Blesser and Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture*, 25.
[151] "Who What Why: Why are there so many seagulls in cities?" BBC News, September 10, 2012, https://www.bbc.com/news/magazine-19490866.
[152] Schwarz, *Making Noise: From Babel to the Big Bang & Beyond*, 735.
[153] Nicola Jones, "Ocean uproar: saving marine life from a barrage of noise," Nature, April 10, 2019, https://www.nature.com/articles/d41586-019-01098-6.
[154] Christina Erbe, Sarah A Marley, Renée P. Schoeman, Joshua N. Smith, Leah E Trigg, and Clare Beth Embling, "The Effects of Ship Noise on Marine Mammals – A Review article," *Frontiers in Marine Science* 6 (2019).
[155] Mado Proverbio Alice, Francesco De Benedetto, Maria Vittoria Ferrari, and Giorgia Ferrarini, "When Listening to Rain Sounds Boosts Arithmetic Ability," *PLoS One* 13, no. 2 (02, 2018). http://dx.doi.org.ezproxy.library.ubc.ca/10.1371/journal.pone.0192296. https://ezproxy.library.ubc.ca/login?url=https://www-proquest-com.ezproxy.library.ubc.ca/scholarly-journals/when-listening-rain-sounds-boosts-arithmetic/docview/2007100938/se-2?accountid=14656.

[156] John Steil and Aileen Stalker, *Public Art in Vancouver: Angels Among Lions* (Victoria: Touchwood Editions, 2009): 61.
[157] Schafer, *The Vancouver Soundscape*, 38.

[158] "Nine O' Clock Gun in Stanley Park, Vancouver, BC, Canada," Stanley Park Van, Accessed May 3, 2021, https://stanleyparkvan.com/stanley-park-van-attraction-nine-oclock-gun.html.
[159] Grégoire Chelkoff, "A Phono-Kinetic Approach to an Adaptable Environment: Architectural Design Experiment of a Public Shelter," *Sound Effects: An Interdisciplinary Journal of Sound and Sound Experience* 1, no. 1 (2011): 102.
[160] Gallagher, "Sounding Ruins: Reflections on the Production of an 'Audio Drift,'" 468.
[161] Ibid., 471.
[162] Ibid., 468.
[163] Jacek Smolicki, "Listening Back, Listening Ahead," Jacek Smolicki, Accessed May 3, 2021, https://www.smolicki.com/listeningbacklisteningahead.html.
[164] Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 21.
[165] Blesser and Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture*, 25.
[166] Hydaralli, "What is Noise? An inquiry into its formal properties," 243.
[167] Hegel in John Gray, *Straw Dogs* (New York: Farrar, Straus and Giroux, 2002): xv.

Bibliography

Attali, Jacques. *Noise: The Political Economy of Music*. Minneapolis: University of Minnesota Press, 1985.

Augoyard, Jean-Francois, and Henry Torgue. *Sonic Experience: A Guide to Everyday Sounds*. Montreal & Kingston: McGill-Queen's University Press, 2005.

Belgiojoso, Ricciarda. *Constructing Urban Space with Sounds and Music*. 1st ed. London: Routledge, 2016.

Berelowitz, Lance. *Dream City: Vancouver and the Global Imagination*. Vancouver: D&M Publishing, 2005. https://www-deslibris-ca.ezproxy.library.ubc.ca/ID/416982.

Beyer, Robert T. *Sounds of Our Times: Two Hundred Years of Acoustics*. New York: Springer, 1999.

Bijsterveld, Karin. "The Diabolical Symphony of the Mechanical Age: Technology and Symbolism in European and North American Noise Abatement Campaigns, 1900-40." *Social Studies of Science* 31, no. 1 (2001): 37–70. https://www.jstor.org/stable/285817.

Blesser, Barry, and Linda-Ruth Salter. *Spaces Speak, Are You Listening?: Experiencing Aural Architecture*. Cambridge: The MIT Press, 2006. https://doi-org.ezproxy.library.ubc.ca/10.7551/mitpress/6384.001.0001.

Burkinshaw, Robert K. *False Creek: History, Images, and Research Sources*. Vancouver: City of Vancouver Archives, 1984.

Chelkoff, Grégoire. "A Phono-Kinetic Approach to an Adaptable Environment: Architectural Design Experiment of a Public Shelter." *Sound Effects: An Interdisciplinary Journal of Sound and Sound Experience* 1, no. 1 (2011): 99–116. https://www.soundeffects.dk/article/download/4079/5004/.

Council of the City of Vancouver. "Noise Control By-Law No. 6555." Vancouver, 2021. https://bylaws.vancouver.ca/6555c.PDF.

Deleuze, Gilles, and Felix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minnesota Press, 1987. https://libcom.org/files/A%20Thousand%20Plateaus.pdf.

Dyson, Frances. *The Tone of Our Times: Sound, Sense, Economy, and Ecology*. Cambridge: MIT Press, 2014.

Fisher, John Andrew. "What the Hills Are Alive with: In Defense of the Sounds of Nature." *The Journal of Aesthetics and Art Criticism* 56, no. 2 (1998): 167–79. https://doi-org.ezproxy.library.ubc.ca/10.2307/432255.

Gallagher, Michael. "Sounding Ruins: Reflections on the Production of an 'Audio Drift.'" *Cultural Geographies* 22, no. 3 (2015): 467–85. https://doi.org/10.1177/1474474014542745.

Hagood, Amanda. "Wonders with the Sea: Rachel Carson's Ecological Aesthetic and the Mid-Century Reader." *Environmental Humanities* 2, no. 1 (2013): 57–77.

Hayes, Derek. *Historical Atlas of Vancouver and the Lower Fraser Valley*. Vancouver: Douglas & McIntyre, 2005.

Hegarty, Paul. "Noise Threshold: Merzbow and the End of Natural Sound." *Organised Sound: An International Journal of Music Technology* 6, no. 3 (2001): 193–200. https://doi.org/doi:10.1017/S1355771801003053.

Hydaralli, Saeed. "What is Noise? An inquiry into its formal properties." In *Reverberations: The Philosophy, Aesthetics and Politics of Noise*, by Michael Goddard, Benjamin Halligan, and Paul Hegarty, New York: Continuum Books, 2012.

Jackson, David C. "The Sonic Anthropocene: Dark Ecological Soundscapes in Chris Watson's 'Vatnajökull.'" *Evental Aesthetics* 6, no. 1 (2017).

Kahn, Douglas. *Noise, Water, Meat: A History of Sound in the Arts*. Cambridge: MIT Press, 1999.

Kohut, Tom. "Noise Pollution and the Eco-Politics of Sound: Toxicity, Nature and Culture in the Contemporary Soundscape." *Leonardo Music Journal* 25 (2015): 5–8. https://doi.org/muse.jhu.edu/article/604788.

Lockwood, Dean. "Mongrel Vibrations: H. P. Lovecraft's Weird Ecology of Noise." In *Reverberations: The Philosophy, Aesthetics and Politics of Noise*, by Michael Goddard, Benjamin Halligan, and Paul Hegarty, New York: Continuum Books, 2012.

Macdonald, Elizabeth. *Urban Waterfront Promenades*. New York: Routledge, 2017. https://doi-org.ezproxy.library.ubc.ca/10.4324/9781315740836.

Michael, David. "Toward a Dark Nature Recording." *Organised Sound* 16, no. 3 (2011): 206-10. https://doi-org.ezproxy.library.ubc.ca/10.1017/S1355771811000203.

Morton, Timothy. *Dark Ecology: For a Logic of Future Coexistence*. New York: Columbia University Press, 2016.

Morton, Timothy. *Ecology without Nature: Rethinking Environmental Aesthetics*. Cambridge: Harvard University Press, 2007.

Pallasmaa, Juhani. *The Eyes of the Skin: Architecture and the Senses*. West Sussex: John Wiley and Sons Ltd., 2012.

Prior, Jonathan. "Sonic Environmental Aesthetics and Landscape Research." *Landscape Research* 42, no. 1 (2017). https://www.tandfonline.com/doi/full/10.1080/01426397.2016.1243235.

Sabet, Maryam, and Ali Dioulagh. "Compare the Social Skills, Behavioral Disorders and Loneliness and Despair Feelings of Hearing-Impaired Children with Low Vision Children of Urmia City." Annals of Tropical Medicine and Public Health 10, no. 4 (2017). https://doi.org/link.gale.com/apps/doc/A510900394/HRCA?u=ubcolumbia&sid=HRCA&xid=ccbf0515.

Schafer, R Murray. *A Sound Education: 100 Exercises in Listening and Sound-Making*. Indian River: Arcana Editions, 1992. http://www.goldrushed.ca/uploads/2/5/7/1/25718175/schafer_r_murray_a_sound_education_100_exercises_in_listening_and_soundmaking.pdf.

Schafer, R Murray. *The Book of Noise*. Vancouver: Price Milburn, 1970.

Schafer, R Murray. *The Soundscape: Our Environment and the Tuning of the World*. Rochester: Destiny Books, 1994.

Schafer, R Murray. *The Vancouver Soundscape*. Vancouver: ARC Publications, 1978.

Schwartz, Hillel. *Making Noise: From Babel to the Big Bang & Beyond*. New York: Zone Books, 2011.

Serres, Michel. *Genesis*. Ann Arbor: University of Michigan Press, 1995.

Smolicki, Jacek. "Listening Back, Listening Ahead." Jacek Smolicki. Accessed May 3, 2021. https://www.smolicki.com/listeningbacklisteningahead.html.

Stanford Encyclopedia of Philosophy. "Environmental Aesthetics," 2019. https://plato.stanford.edu/entries/environmental-aesthetics/.

Sterne, Jonathan. *The Audible Past: Cultural Origins of Sound Reproduction*. Durham: Duke University Press, 2003. https://doi-org.ezproxy.library.ubc.ca/10.1215/9780822384250.

Thompson, Marie. *Beyond Unwanted Sound: Noise, Affect and Aesthetic Moralism*. New York: Bloomsbury Academic & Professional, 2017. https://ebookcentral.proquest.com/lib/ubc/detail.action?docID=4770919.

Vidal, John. "The 'Age of the Machine' Is Drowning out Natural Sound, Bernie Krause Warns." *The Guardian*, September 14, 2012. https://www.theguardian.com/environment/2012/sep/24/machine-natural-sound-bernie-krause.

Wakefield Acoustics Ltd. "Sound Smart: City of Vancouver Noise Control Manual." Vancouver. https://vancouver.ca/files/cov/noise-control-manual.pdf. Accessed May 3, 2021.

Wang, Ronghua, and Jingwei Zhao. "A Good Sound in the Right Place: Exploring the Effects of Auditory-Visual Combinations on Aesthetic Preference." *Urban Forestry & Urban Greening* 43 (2019). https://doi.org/10.1016/j.ufug.2019.05.018.

Weissman, Joseph. "Warning, Hive Meltdown Imminent: Serres, Negarestani and Deleuze on Noise, Pestilence and Darkness." Fractal Ontology, 2007. https://fractalontology.wordpress.com/2007/10/19/warning-hive-meltdown-imminent-serres-negrestani-and-deleuze-on-noise-pestilence-and-depth/.

Zwintscher, Aaron. *Noise Thinks the Anthropocene: An Experiment in Noise Poetics*. Earth: Punctum Books, 2019.