

**Feeling the Pull of Gravity:
Reconnecting Recreation, Nature, and Community through
Public Outdoor Recreation Facilities in Revelstoke, British Columbia**

by

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Submitted in partial fulfilment of the requirements
for the degree of Master of Architecture

at

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DEDICATION

To my grandfather, ski pioneer

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ABSTRACT

This thesis suggests that architectural interventions can aid in reintegrating an ethos of interconnectedness between recreationists and nature, as well as between recreationists and community, by emphasizing and intertwining natural forces and cultural flows. The analogy of a skier in motion, interacting with the landscape and gravity, inspires architectural moves. Revelstoke, British Columbia, Canada, a prime example of a mountain community that has experienced a shift to corporate-based skiing, is the location for this exploration.

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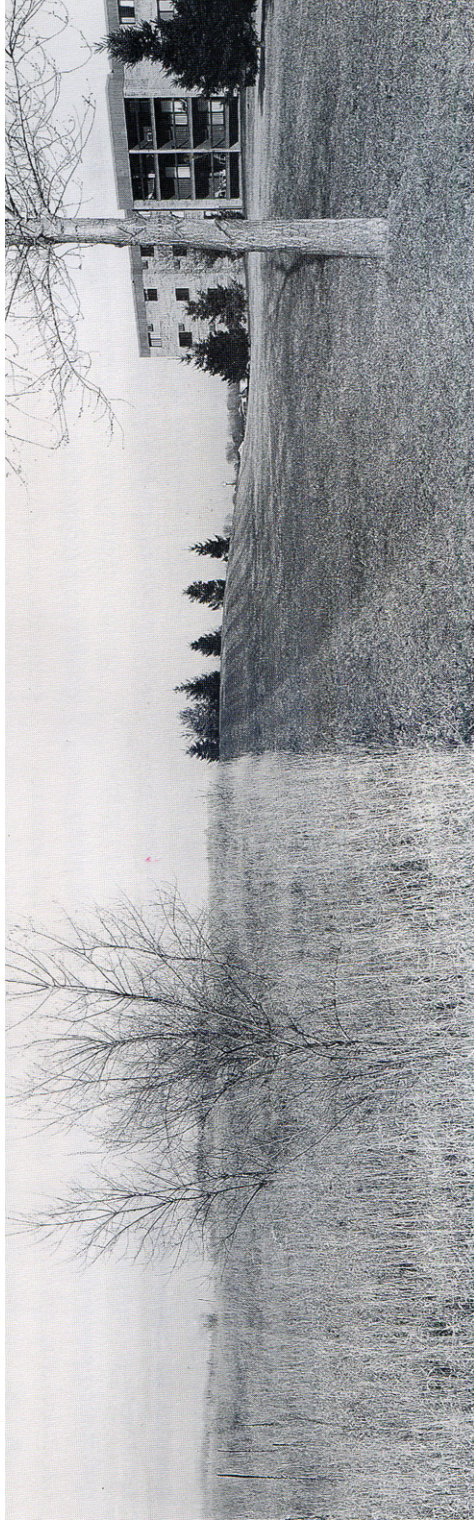
CHAPTER 1: INTRODUCTION

Humans in Nature

In the introduction to the book, *Placing Nature: Culture and Landscape Ecology*, Joan Nassauer, a landscape architect, states, “Thoughtful observers of global ecosystems cannot fail to see that we live in a world dominated by humans. We cannot stand apart from nature, and now nature as we know it cannot stand apart from us.”¹ The book goes on to describe, through a collection of essays by experts with various backgrounds, a framework of ideas for landscape ecology, which is described as “an approach to understanding landscapes that [draws] upon both cultural and ecological knowledge.”² These experts agree that interdisciplinary critical discussion is necessary to carry the ecology discourse past the ideas of habitat restoration and studies of pristine wilderness to the relationship that human settlement has with the landscape, and the culture that comes with this.

1 Joan Iverson Nassauer, ed., *Placing Nature: Culture and Landscape Ecology* (Washington: Island Press, 1997), 3.

2 *Ibid.*, 4.



The Edge, Eden Prairie, Minnesota. Photograph by Chris Faust, from Nassauer, *Placing Nature: Culture and Landscape Ecology*. 45.

The first two essays in this book, by Eville Gorham, an ecologist, and Jane Smiley, a novelist, describe a more extreme view of an urgent reality and a “need to reexamine cultural assumptions and to reject some pervasive elements of Western culture.”³ Gorham describes the necessity of separating and protecting nature from settlement, and views “wilderness as a baseline against which to assess the effects that we humans have had on the land” and as “the ultimate protector of biodiversity.”⁴ Smiley, in contrast, proposes a future reality in which nature takes the dominant role over humans. Through examining the issues of agriculture, she determines that agriculture (and therefore humans) “will undermine rather than enhance the landscape’s capacity to support itself and us.”⁵

However, the essays in the second half of the book present a more realistic view of our potential relationship with nature: one in which ecological function becomes integrated with the patterns of human settlement. Nassauer states in her introduction that “nature can be more completely integrated with settlement than zon-

3 Ibid., 5.

4 Ibid., 22.

5 Ibid., 7.

ing or a wholly new landscape pattern implies ... integrating ecological function back into the city.”⁶ In doing so, it is suggested that, with the help of visible educational cues in the landscape - which could come in the form of architecture - humans will develop a stronger relationship with natural processes. This would create an ethos of humans *in* nature, rather than being separate from it.

The essays in Nassauer’s book all share the same premise: “we must use culture to advance ecological health, or we risk removing ourselves altogether from the ecosystems we know.”⁷ The methods that are proposed vary; however, as Nassauer states in her conclusion to the book, it is agreed by this group of experts from various disciplines that “[landscapes] should be reconnected by the same artifice to allow humans to live with appropriate caution on the earth. For each of us, some landscape is our home and ultimately our living.”⁸

Macy and Bonnemaïson, in their book *Architecture and Nature: Creating the American Landscape*, also discuss this relationship between humans and nature and how events

6 Ibid., 7.

7 Ibid., 4.

8 Ibid., 168.

in modern American history have influenced changes in this relationship. They introduce this idea by stating, “Not only do nature and nation share a common Latin root, they share a common history where one has constantly been used to define the other.”⁹ They present the idea that culture and nature are intrinsically linked, and both highly influence the other, which becomes visible in the evolving architecture during the various key modern periods.

Their review moves from the 19th century’s interest in the conservation of nature, with the creation of the national parks and the commodification that came along with this as an example, as a “lament by the country’s elite for the passing of the frontier”¹⁰ to the Depression years in which the attitude shifts to nature becoming a productive tool to help “heal a landscape damaged by reckless exploitation and ... to pull the unemployed out of cities and put them back on the land and back to work.”¹¹ During the post-Second World War era, nature is again described as commercialized, as urban sprawl took hold and “the backyards of the bur-

9 Christine Macy and Sarah Bonnemaïson, *Architecture and Nature: Creating the American Landscape* (New York: Routledge, 2003), 1.

10 *Ibid.*, 3.

11 *Ibid.*, 4.

geoning middle class became spaces of leisure, furnished with barbecues from the campground or the war theater, fitted out with indoor–outdoor furniture and shady trellises.”¹² The attitude then shifts once again, with environmental damage becoming apparent with the images from the space missions and television coverage of the Vietnam War. This attitude becomes the eco-movements of the 1960s and 1970s as “a critique of institutions and large corporations and as a measurement of the moral value of the self.”¹³

Their book emphasizes this strong connection between culture and nature, and concludes with a warning of the potential danger in the current ecological movement, that it “could be commodified and marketed much in the same way that the conservation movement found its hard-won achievements commercialized in the development of tourism in the national parks.”¹⁴ They seem to draw a similar conclusion as Nassauer, encouraging an ethos of respect for the interconnectedness between humans and nature.

12 Ibid.

13 Ibid., 3.

14 Ibid., 340.

Mountains and Traditional Culture

Mountains have always been a magnetic place for human culture. Environments of extreme contrasts, the mountain regions, through their dramatic display of nature, have drawn people to them throughout history for a variety of motivations: spiritual, economic, explorative, and cultural.

The spiritual draw of the mountains was intrinsic to the existence of ancient mountain communities. An example of this strong spiritual link to nature and mountains can be found in ancient Chinese architecture. The concept of *yin* and *yang* consistently guided traditional spiritual belief as well as architectural principles, with an ever-changing and harmonizing of the relationship between *yin chi* and *yang chi* creating a great equilibrium between all things. *Yin* was represented by, for example, valleys, darkness, and coolness, while *yang* was represented by mountains, lightness, and warmth. It was believed that the vital force of *chi* condensed in the mountains and melted into water, making the rivers *yang* and the mountains *yin* of *chi*.¹⁵ *Chi*



Chinese symbols for mountain (*yin*) - top - and water (*yang*) - bottom.
Calligraphy by C.C. Wang, from Dorward, *Design for Mountain Communities*, 19.

15 Nan Shunxun and Beverly Foit-Albert, *China's Sacred Sites* (Singapore: Himalayan Institute Press, 2007), 24.

was dispersed by the flow of the rivers down the mountainside, and influenced the prosperity of a site, as high water levels brought prosperity and shallow water levels brought misfortune. This continuous interplay between the two elements of *yin* and *yang* created a communication between man and Earth and the Heavens. In the book *China's Sacred Sites*, the result of human intervention in the landscape can be described as follows:

Thus the ravine becomes the building, the building is a cave, the landscape itself takes the form of a flying dragon or a giant turtle rising from the morning mist to embrace the sacred site itself. When you look up from the courtyard of the heart and imbibe the secrets of the universe, full of light and dark, sound and silence, the light of the stars in the black fullness of space, you become as large as the universe.¹⁶

The balance of valley and mountain became a clear and tangible demonstration of this continual balance, and because of this, pilgrimage from the valley bottoms to the top of mountains became important.

An example of this can be found in China's Mount Tai, an important pilgrimage route

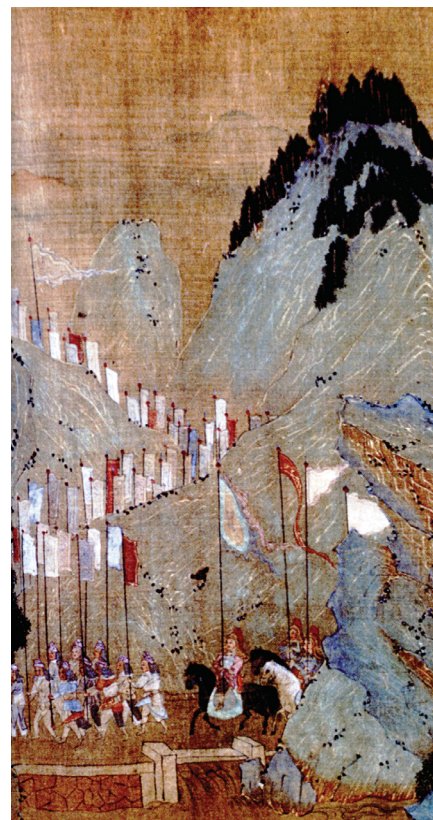


M.C. Escher, *Plane Filling II* (1957). Lithograph of a mosaic illustrating interconnectedness between all things. From Shunxon and Foit-Albert, *China's Sacred Sites*, 13.

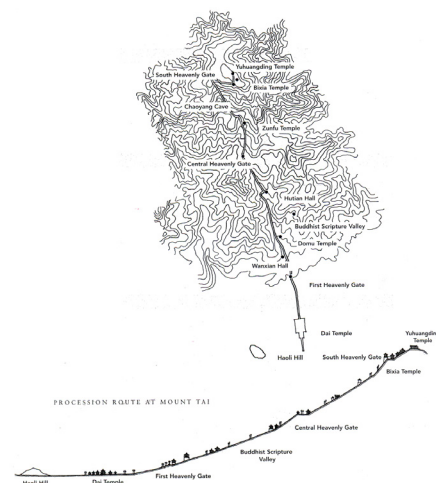
¹⁶ Ibid., 13.

and place of worship for over 3,000 years and one of the Taoists' "Five Sacred Mountains."¹⁷ Throughout history, emperors climbed the step from Haoli Hill, in the valley, where a *chan* sacrifice was made, up to the summit of Mount Tai, where a *feng* sacrifice was made. It was believed that this pilgrimage created a connection between the heavenly realm and the reign of the emperor. Along the pilgrimage route, twenty Taoist temples were built, along with decorative archways located every 2.5 kms, built to mark the way and to create a spatial sequence that "connects Heaven and Earth through man in nature."¹⁸

Another example of an ancient mountain community whose belief in this strong connection to nature was fundamental to their culture were the Pueblo Native Americans of the American Southwest. To the Pueblos, nature and man were so interconnected that they were one and the same, which is clearly illustrated in their architecture. As Vincent Scully describes in his book *Pueblo: Mountain, Village, Dance*, "Hopi towns are not exactly engaged in 'fitting in' with



Painting illustrating procession up China's mountains. From Shunxon and Foit-Albert, *China's Sacred Sites*, 19.



Pilgrimage route up Mount Tai. From Shunxon and Foit-Albert, *China's Sacred Sites*, 66.

¹⁷ Ibid., 67.

¹⁸ Ibid., 7.

nature, as so many Western romantic buildings have tried to do. They *are* nature, pure and simple.”¹⁹ Communities were built not as a variety of individual buildings, but as a frame for a public plaza in which ritual ceremonies and dances could be performed, with the buildings around acting as the places from which the audience could watch. In the Pueblo culture, because man was part of nature, it was believed that through these ritual ceremonies, they had the capability to affect the environment as well.

Their connection to nature also included a strong connection with mountains. The placement and design of villages address and complement the adjacent mountain conditions in a way that enriches the culture as well. Scully describes this complete connectivity as follows:



Walpi architecture, an example of a Pueblo village. From Scully, *Pueblo: Mountain, Village, Dance*, 323.

¹⁹ Vincent Scully, *Pueblo: Mountain, Village, Dance* (New York: The Viking Press), 9.



Hopi plaza in village. From Scully, *Pueblo: Mountain, Village, Dance*, 9.

Conspicuous from San Juan are the horned Truchase Peaks, which the Tewa call Rock Horn Mountain, and which Ortiz [a Native American poet], who calls it Stone Man Mountain also, identifies as San Juan's sacred mountain of the east, upon which the long axis of its largest plaza is exactly oriented. When the long files of dancers fill that space, the architectural pattern is complete; the natural and the man-made together frame and encourage the human ritual act. All is one.²⁰

This ethos of complete interconnectedness was clearly illustrated in all aspects of the Pueblo culture, including its clear display of vernacular and community oriented architecture.

These two ancient cultures, and other mountain cultures from the Himalayas to the Andes, developed similar patterns as a result of their environment and their strong spiritual connection to the mountains. In *Design for Mountain Communities*, Sherry Dorward, a landscape

²⁰ Ibid., 37.



Pueblo village, Taos, New Mexico. From Scully, *Pueblo: Mountain, Village, Dance*, 51.

architect, states that these mountain cultures all share an ethos of interrelatedness of nature and humans, which becomes apparent as climate and terrain were key determinants of vernacular form, rather than sociocultural influences.²¹ She states that “traditional villages drape gently over the slopes and enhance the landscape with a rich, unified layer of texture and detail.”²² Finding a method of reintroducing aspects of this ethos of balance between humans and nature, which created a wealth of cultural and spiritual traditions, should be investigated in our present-day mountain communities.

Technology and Development of a Landscape of Recreation

As previously mentioned, Macy and Bonnemaïson describe in their book *Architecture and Nature: Creating the American Landscape* the modern commodification of the landscape of the American West, which came in part as a result of the expansion of the railways and the development of tourism with the creation of the national parks. The Canadian West was directly affected by this movement, which John Shultis,

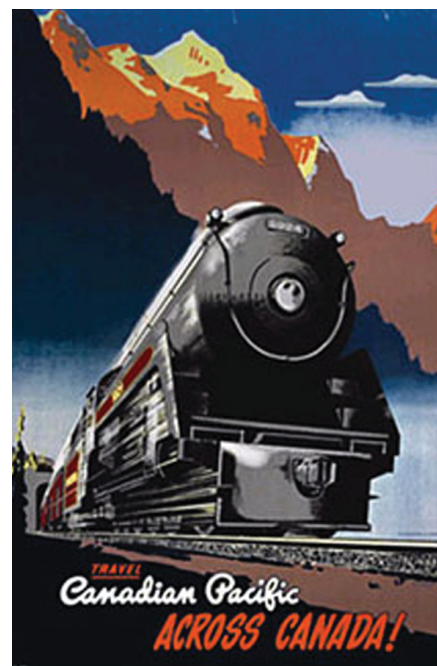
²¹ Sherry Dorward, *Design for Mountain Communities: A Landscape and Architectural Guide* (New York: Van Nostrand Reinhold, 1990), 17.

²² *Ibid.*, 21.

a specialist in outdoor recreation and tourism management at University of Northern British Columbia, describes in his article “Consuming Nature: The Uneasy Relationship Between Technology, Outdoor Recreation and Protected Areas.” He describes the double-edged sword that technology has played in the development of the Canadian national parks as “without the technological innovation of the railroad, and the critical support of the railroad barons, it is unlikely that early North American national parks such as Yellowstone and Yosemite in the USA and Banff and Glacier in Canada would have been legislated.”²³ With the development of railways and then the automobile came a greater increase in public support for parks, a boom in outdoor recreation, and the creation of additional parks. However, with this increase in traffic into the parks came many issues, including environmental impacts, commercialization, and human-animal conflicts.

One of the most popular new sports during this period was skiing. Imported by Scandinavian immigrants on the new railroads, the beginnings of the sport of skiing before the development of

²³ John Shultis, “Consuming Nature: The Uneasy Relationship Between Technology, Outdoor Recreation and Protected Areas,” *The George Wright Forum* 18, no. 1 (2001): 57.



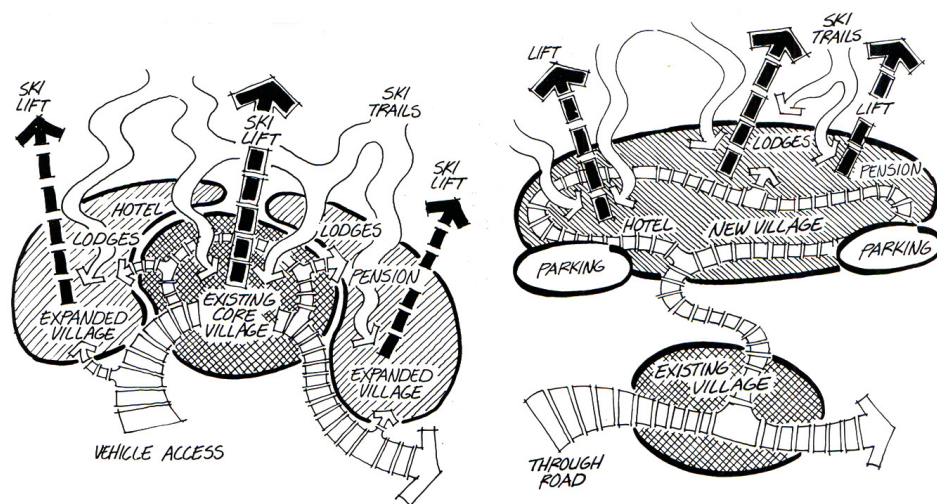
Peter Ewart, poster for Canadian Pacific Railway. *Travel CP Across Canada* (1947). From Peter Ewart [Web site]



Peter Ewart, poster for Canadian Pacific Railway. *High Powder* (1949). From Peter Ewart [Web site]

ski resorts in Canada's West is described by Hal Clifford, a journalist, as "an imported pastime that promised health, moral development, and a superior way of life."²⁴ Community ski clubs and community ski lifts were created to support this form of recreation. However, the community element of the first generation ski towns quickly changed in the post-WWII period, as developers began to see the economic potential of ski resorts. New Western Canadian mountain resorts began to be built in isolation from existing villages, or with an imported architectural style of traditional Alpine communities. Mountain villages were becoming overwhelmed with social and environmental impacts. Developing commercial resorts just outside existing communi-

²⁴ Hal Clifford, *Downhill Slide: Why the Corporate Ski Industry is Bad for Skiing, Ski Towns, and the Environment* (San Francisco: Sierra Club Books, 2002), 9.



First-generation European ski resorts (early 1900s) on left, second generation ski resorts (post-WWII) on right. From Dorward, *Design for Mountain Communities*, 31

ties, or creating a new artificial image of what the community should be, served only to draw the true cultural and nature-driven spiritual aspects of skiing out of the experience.

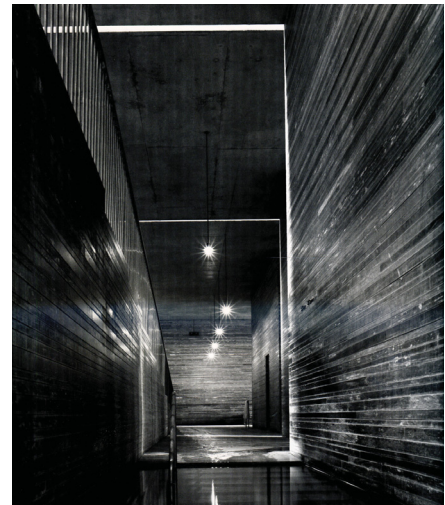
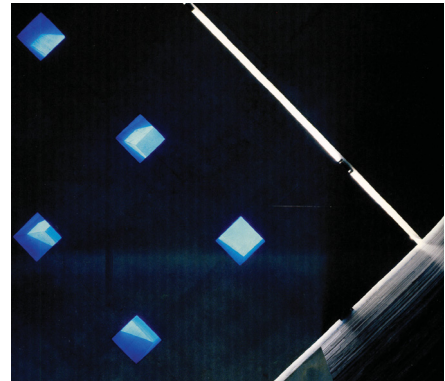
Shultis, in his article, suggests that the “psychological focus of the leisure activity actually becomes the technology itself rather than the activity.”²⁵ He argues that the “use of technology in outdoor recreation will have fundamental effects on the emotional relationship between humans and the natural environment, resulting in a lessened emotional attachment to the land, especially in local areas.”²⁶ With increasing use of technology in parks, with snowmobiles, gondolas and ATVs transporting visitors into mountain regions, the issue of the disconnect between recreationists and nature, as well as between recreationists and community, becomes increasingly apparent. The increased interest in the migration to mountain communities and in outdoor recreation in these regions has the risk of furthering the recurring belief that nature is something to be controlled and commodified. Alternatively, it could be the means to display the possibility of an increased interconnectedness of humans and nature.

²⁵ Shultis, “Consuming Nature,” 64.

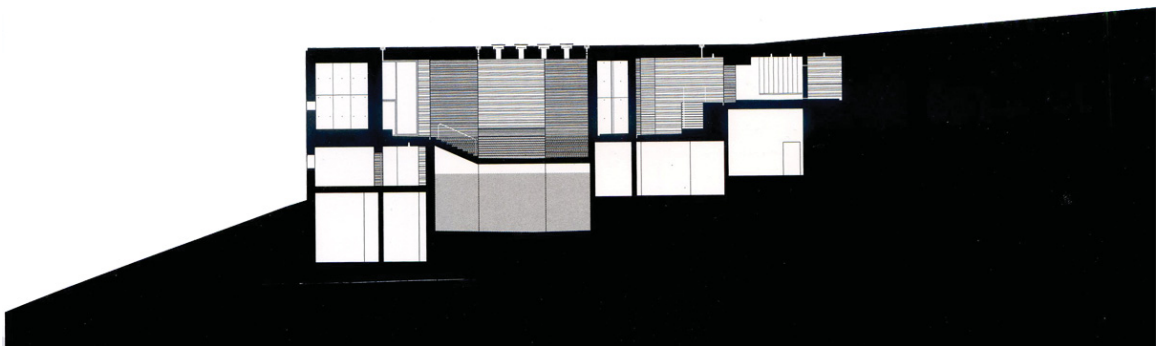
²⁶ Ibid.

Precedent: The Therme Vals, Peter Zumthor

Peter Zumthor's thermal bath project, located in the small town of Vals in the Graubunden Canton in Switzerland, provides an example of a mountain recreation attraction that intends to intensify the connection between human and nature. The dynamic human rituals of bathing are directly connected to the flows and forces of water and light in the architecture. The thermal baths are bermed into the mountainside, with earth covering a portion of the roof. The buildings highlight local stone as a primary building material of both the exterior and interior. The thermal baths, rather than developing as an addition to the landscape, become an extension of the landscape and combine with the cultural traditions of bathing.



Interior space of thermal baths. From Hauser and Zumthor. *Peter Zumthor Therme Vals*, 52 and 158.

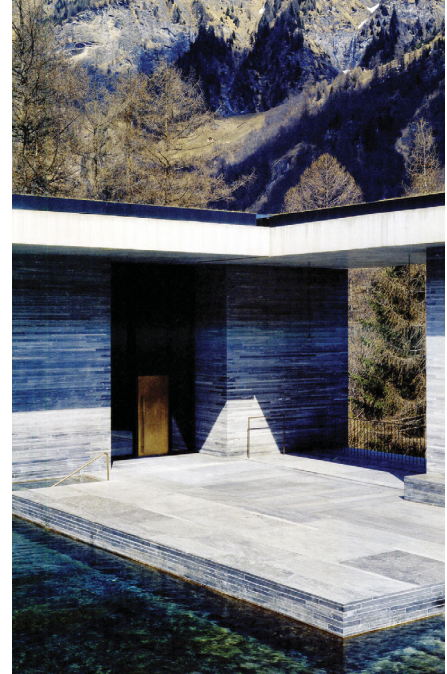


Building section. From Hauser and Zumthor, *Peter Zumthor Therme Vals*, 105.

The architect describes the architectural intent in the following question:

Mountain, stone, water – building in the stone, building with the stone, into the mountain, building out of the mountain, being inside the mountain – how can the implications and the sensuality of the association of these words be interpreted, architecturally?
27

Zumthor’s thermal bath project provides a clear example of a mountain recreation attraction that, instead of commodifying nature, provides a deeper connection to it.



Exterior space of thermal baths. From Hauser and Zumthor, *Peter Zumthor Therme Vals*, 186.

Precedent: Alpine Club of Canada

The Alpine Club of Canada cabins provide an example of how wilderness recreation can help promote a greater understanding of the place of humans in nature. This club maintains 28 wilderness cabins across Canada, with their vision statement being “Preserving, practicing and promoting Canadian mountain culture and self-propelled alpine pursuits.”²⁸ The club also publishes books and journals promoting

27 ArchDaily, *The Therme Vals / Peter Zumthor*. <http://www.archdaily.com/13358/the-therme-vals/>.

28 *The Alpine Club of Canada* [Web site], accessed Nov. 2011, available from www.alpineclubofcanada.ca.

mountain culture and mountain environmental issues. In order to use the cabins, membership is required, which includes a community aspect through education and social events. The club's belief is that by centralizing wilderness recreationists in cabins, rather than scattered in various camping locations, the environmental impact is reduced. The cabins provide a safe refuge for backcountry travellers as well as protecting them from human / animal conflicts.

The majority of the cabins are located in the Western Canadian mountains and can be accessed only by foot or ski. They vary in size, accommodating from 6 to 40 people. They provide basic shelter for backcountry recreationists, and emphasize a "carry in - carry out" philosophy. They typically provide propane stoves for cooking, and a privy toilet system which utilizes a fly-out barrel system for human waste. Sleeping areas typically consist of bunk bed accommodation. The cabins have been very successful, and the club has an increasing membership.

Experience of Nature and Skiing

The evolution of skiing into a corporate based recreation is a clear demonstration of a



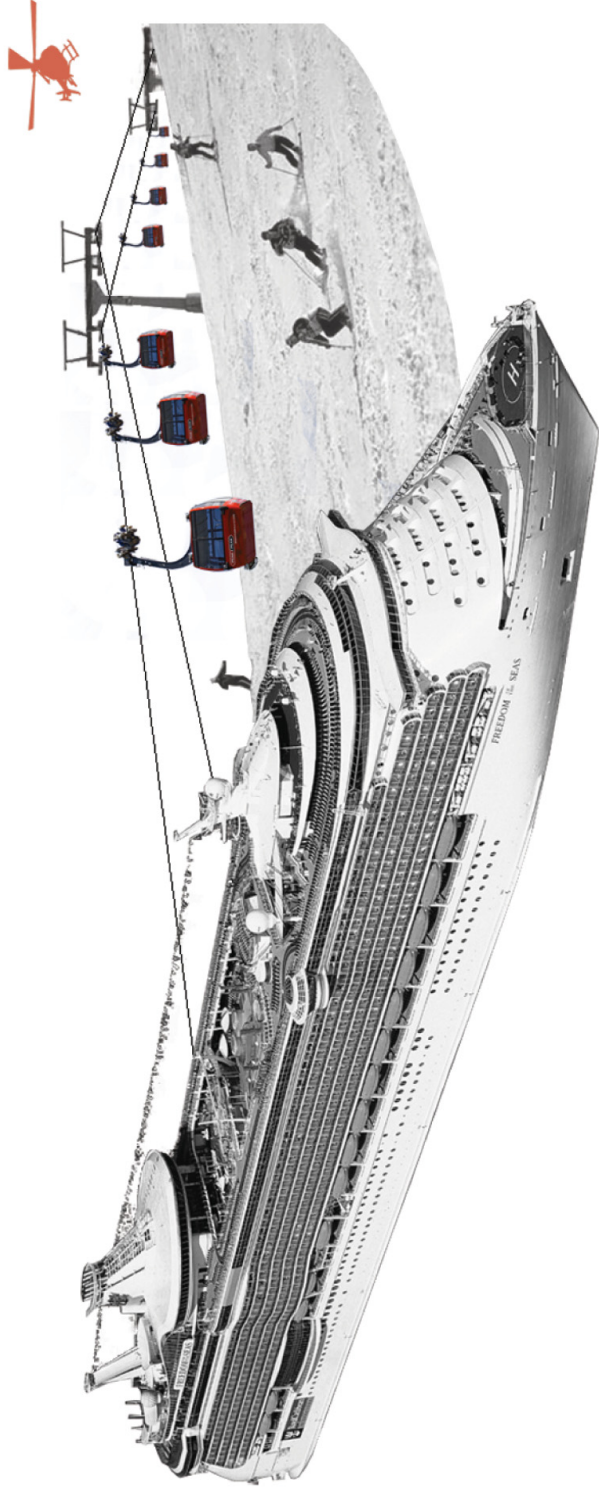
Asulkan hut, Glacier National Park.
From *Summit Post* [Web site].

disconnect between recreation and nature, as well as between recreation and community. The sport of skiing, which began as a method of transportation and community-based leisure activity with a strong connection to nature, evolved into a commercial enterprise that has overshadowed the cultural and nature-based aspects of the sport. Within the current ski community, there is an emerging desire to reconnect with the environment and with local community. In Mark Obenhaus's 2007 documentary *Steep*, one big mountain skier describes his desire to pursue the sport of skiing as wanting to "feel the pull of gravity."²⁹ As one moves up and down the mountain, the constant pull of gravity is a reminder of our connection to the earth. The true spirit of skiing battles with the commercialization of recreation areas currently dominated by "McSkiing"³⁰ resorts. These "landlocked cruise ship"³¹ developments draw focus away from the experience of skiing and towards the corporate aspect due to intense real estate and commercial development. Is it possible for the experi-

29 Mark Obenhaus, *Steep* [film]. The Documentary Group, 2007.

30 Matt Hansen, "The Death of McSkiing," *Powder Magazine* 28, no. 4 (2009): 33.

31 Coldstream Creative, *Resorting to Madness: Taking back our Mountain Communities* [film].



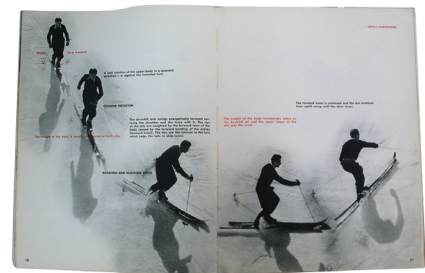
“Landlocked cruise ship” recreation resort - photocollage

ence of skiing to reconnect “man in nature”³² through a shift from commercial tourism to skiing as a connection with nature and community?

In order to create this link, it is important to consider the experience of skiing in itself, and how a skier engages in the process of moving down a mountain. It is clear that as a ski mountaineer moves up a mountain, he or she is working against gravity; the skier feels a strong sense of the natural force as it pulls back against the human force. The engagement with the force of gravity is integral to the process of moving down the mountain as well. Emile Allais’s book *How to Ski by the French Method: Emile Allais Technique* presents in a series of diagrams the forces at work during the skiing process. The balance of working with and fighting against gravity is a constant duality present in the sport. At the resting position, the downward pull is felt as one is released straight down the mountain. As the acceleration increases, the skier dips (between tension and balance), then fights against this downward pull as one turns against the slope of the mountain. This process is then repeated as one fights and works with the force, engaging with the natural flow of the mountain and feeling



Performing a turn - shifting against gravity. Graphic by Pierre Boucher, from Allais, *How to Ski by the French Method*



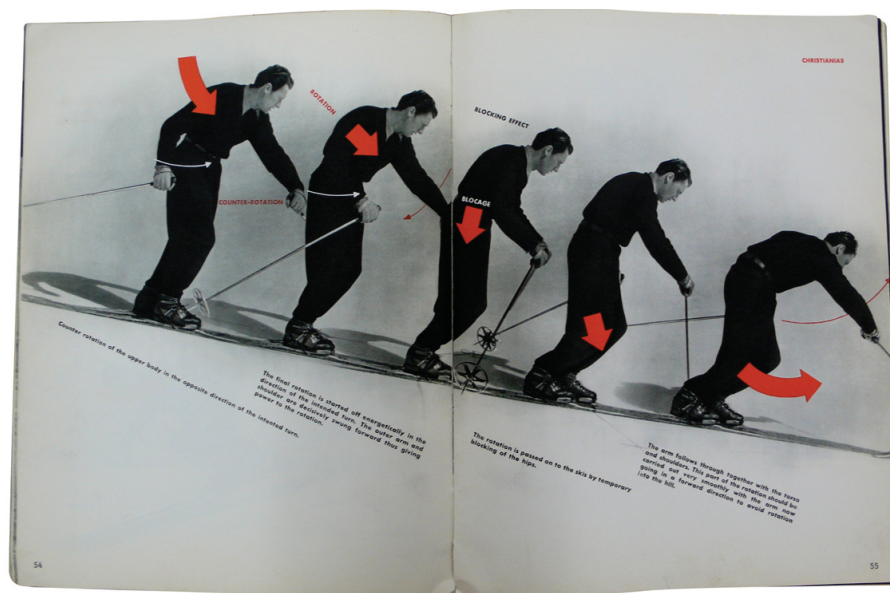
Performing a turn - shifting against gravity. Graphic by Pierre Boucher, from Allais, *How to Ski by the French Method*

³² Ian McHarg, *Design with Nature* (New York: Doubleday/Natural History Press, 1971), 1.

a strong sense of connection with the topography, the snow, and the natural forces at play. The dualities of weight and weightlessness are constantly at play, balancing and harmonizing with each other during the process. In the book *Visual Culture and Tourism*, this balance is described as a test of the participants' and nature's boundaries: "in extreme sports you are, at last, or once more, somebody with weight, balance, force, endurance and life."³³ This testing can also be seen as an increased awareness and reconnection with the forces of nature.

This duality of working with and against

33 David Crouch and Nina Lubben, *Visual Culture and Tourism* (New York: Berg, 2003), 271.

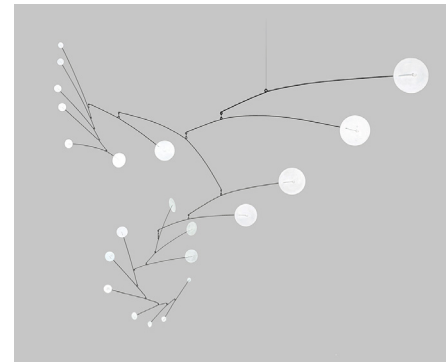


Performing a turn - shifting against gravity. Graphic by Pierre Boucher, from Allais, *How to Ski by the French Method*

gravity can also be felt in all of the natural movements of the mountains. Water feels the pull from its resting place in the glaciers down to the valleys. Maurice Merleau-Ponty refers to this process, as it relates also to temporality and motion, in Olafur Eliasson's book *The Mediated Motion*: "The water that I see rolling by was made ready a few days ago in the mountains, with the melting of the glacier; it is now in front of me and makes its way towards the sea into which it will finally discharge itself."³⁴ The accumulation of snow into an avalanche is also a display of this process. As snow finally succumbs to the pull of gravity, trees resist and direct the downward movement. Gravity accelerates the process of erosion, constantly pulling pieces of the mountain down the slope.

Uniting the culture and experience of skiing with the verticality and temporal qualities of the mountain can work together to create an ethos of man in nature. This process identifies the body within nature, subject to and working with natural functions. Juhani Pallasmaa, in his book *The Eyes of the Skin*, discusses the importance of the multi-sensory experience in finding our place in the world. He states:

³⁴ Olafur Eliasson, *The Mediated Motion* (Cologne: Verlag der Buchhandlung, 2001), 9.



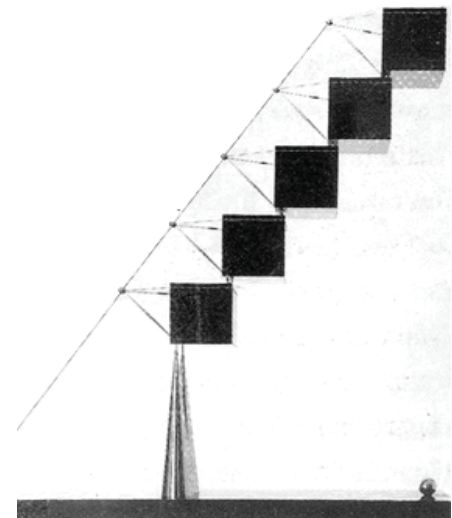
Alexander Calder, *Snow Flurry*, (1948). Mobile expressing motion and balance. From *Christie's* [Web site].

The sense of gravity is the essence of all architectonic structures and great architecture makes us aware of gravity and earth. Architecture strengthens the experience of the vertical dimension of the world. At the same time as making us aware of the depth of the earth, it makes us dream of levitation and flight.³⁵

Sensing this duality of weight and weightlessness and the inherent balance between the two forces therefore becomes integral in creating an architectural experience of the recreationist within nature. This can also be likened to the constant cycling and harmonizing of the *yin* and *yang* in Chinese culture. This process creates an eternal balance and connection with the earth. Creating an engagement of participants within the ever-changing movements of nature, and likening this to the experience of movement in skiing, could create a reconnect between recreation, nature, and community.

Precedent: Winter Gardens, Pierre Thibault

Pierre Thibault created an awareness of movement and temporality of landscape in his

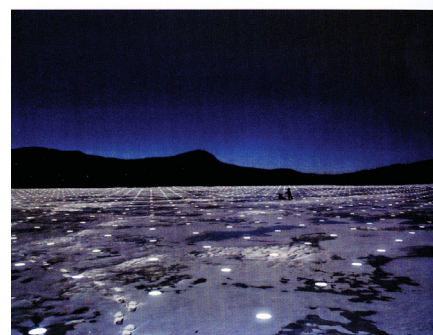


Santiago Calatrava, *Running Torso*, (1985). Exploration of gravity, balance, and structure. From Sharp, *Calatrava*, 12.

³⁵ Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (Chichester, UK: John Wiley & Sons, 2005), 67.

Winter Gardens land art installations. This temporary project was installed in 2004 in Le Parc National des Grands-Jardins in Quebec. The project, which consisted of seven installations along a trail running through the park, connects seven lakes through a mountainous region. Each of these lakes was chosen by Thibault to reveal something different about the winter landscape. The installations, which were designed to be a collective experience, were installed by fifty volunteer participants. “Caravan” consisted of a line of tents placed 20 meters apart from one another, which crossed a lake and ascended a hill into a forest. “Constellation” placed 2000 candles into a grid of shallow wells over the entire surface of a lake. “Blue Line” consisted of a line created by blocks of ice taken from the lake, extending across the lake and lit by fires at night.

All of these installations blurred the boundary between nature and culture through creating an increased awareness between participant and nature. According to Thibault, it is not enough to simply view the landscape on its own in order to understand the connection; an intervention of human culture is necessary to create a culture / nature interaction.



Winter Gardens installations. From top: Caravan, Constellation, and Blue Line (2004). Thibault Architectes renderings from Bonnemaïson and Eisenbach, *Installations by Architects*

The project is equally an encounter with time, wintertime, in which sensations are curiously dilated and contrasts become increasingly apparent. Time slows down and, in some cases, even “stands still.” Our bodies react accordingly. Sensations are more acutely observed, life becomes more intense and time spent with a heightened awareness of space becomes indelibly engraved in our minds.³⁶

Precedent: Park Güell, Antonio Gaudi

Gaudi explores the idea of creating a balance between nature and community with Park Güell (1900-1914). The project consists of a 15-hectare public park surrounding a main plaza. Gaudi intended the plaza to be used as “a kind of open-air theatre that would allow different kinds of cultural and social events.”³⁷ The perimeter is lined with an undulating bench which allows for a variety of seating for groups or individuals. The plaza also acts as a method of collecting rainwater, which is then stored in a cistern under the plaza. The plaza is located on a hillside and is partially raised on a series of columns. At the centre beneath the square,



Park Güell, main plaza, Antonio Gaudi. Photograph from Molema, *Gaudi: The Construction of Dreams*, 228.



Park Güell, main plaza seating, Antonio Gaudi. Photograph from Molema, *Gaudi: The Construction of Dreams*, 228.

³⁶ Pierre Thibault Architecte [Web site], accessed Nov. 2011, available at www.pthibault.com

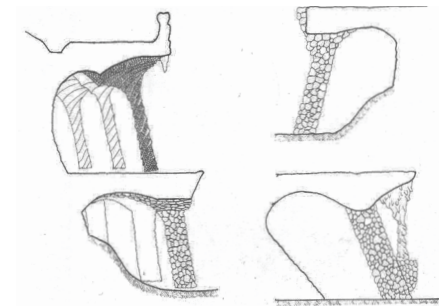
³⁷ Jan Molema, *Gaudi: The Construction of Dreams* (Rotterdam: episode publishers, 2009), 228.

the columns are vertical, while on the sides they project inwards, becoming a display of the forces acting upon them.

The galleries adjacent and extending out from the plaza also demonstrate Gaudi's interest in displaying the forces acting upon the construction. Catalan vaults, barrel vaults, and oblique columns are all intended to represent the compression forces on the galleries. The geometry of the spaces also varies in relation to the slope of the hills, the architecture responding directly to the natural forces. Also as a response to site conditions, the materials used in the construction of the main square and the galleries are primarily materials found on the site.



Park Güell, gallery columns, Antonio Gaudi. Photograph from Molema, *Gaudi: The Construction of Dreams*, 232.



Section sketches of gallery spaces in Park Güell. From Molema, *Gaudi: The Construction of Dreams*, 235.

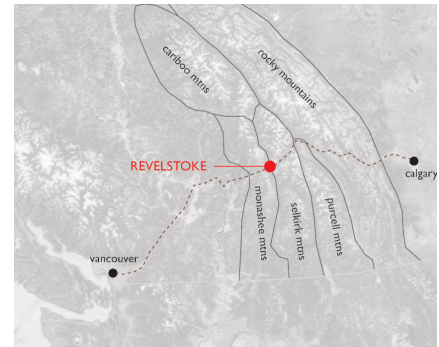
Thesis Question

How can an architectural experience of gravity reconnect recreationists, nature, and community?

CHAPTER 2: SITE STUDY

Location / Geography

The site that has been selected is Mount Revelstoke National Park. The city of Revelstoke is located in the interior of British Columbia, between the Monashee and Selkirk mountain ranges. The city has a population of approximately 7,500 people in summer, which increases with the winter tourism season. Revelstoke's economy has been tied to the Canadian Pacific Railway and the Trans-Canada Highway, which run through the city between the Roger's and Eagle mountain passes, as well as to forestry, mining and, more recently, tourism. The city is also the location of the Revelstoke Hydroelectric Dam, the second dam along the Columbia River, a highly dammed river system that runs southwest through the United States to the Pacific Ocean. Directly adjacent to the north side of the city is the entry point to Mount Revelstoke National Park. The top of Mount Revelstoke, the closest mountain within the national park to the city, can be accessed by vehicle in the summer months by the 26 km Meadows-in-the-Sky Parkway.



British Columbia mountain ranges and site location. Base image from Google Maps.



Major ski resorts in British Columbia. Base image from Google Maps.



Columbia River dam system and watershed area.

Natural Forces (Ecology / Climate)

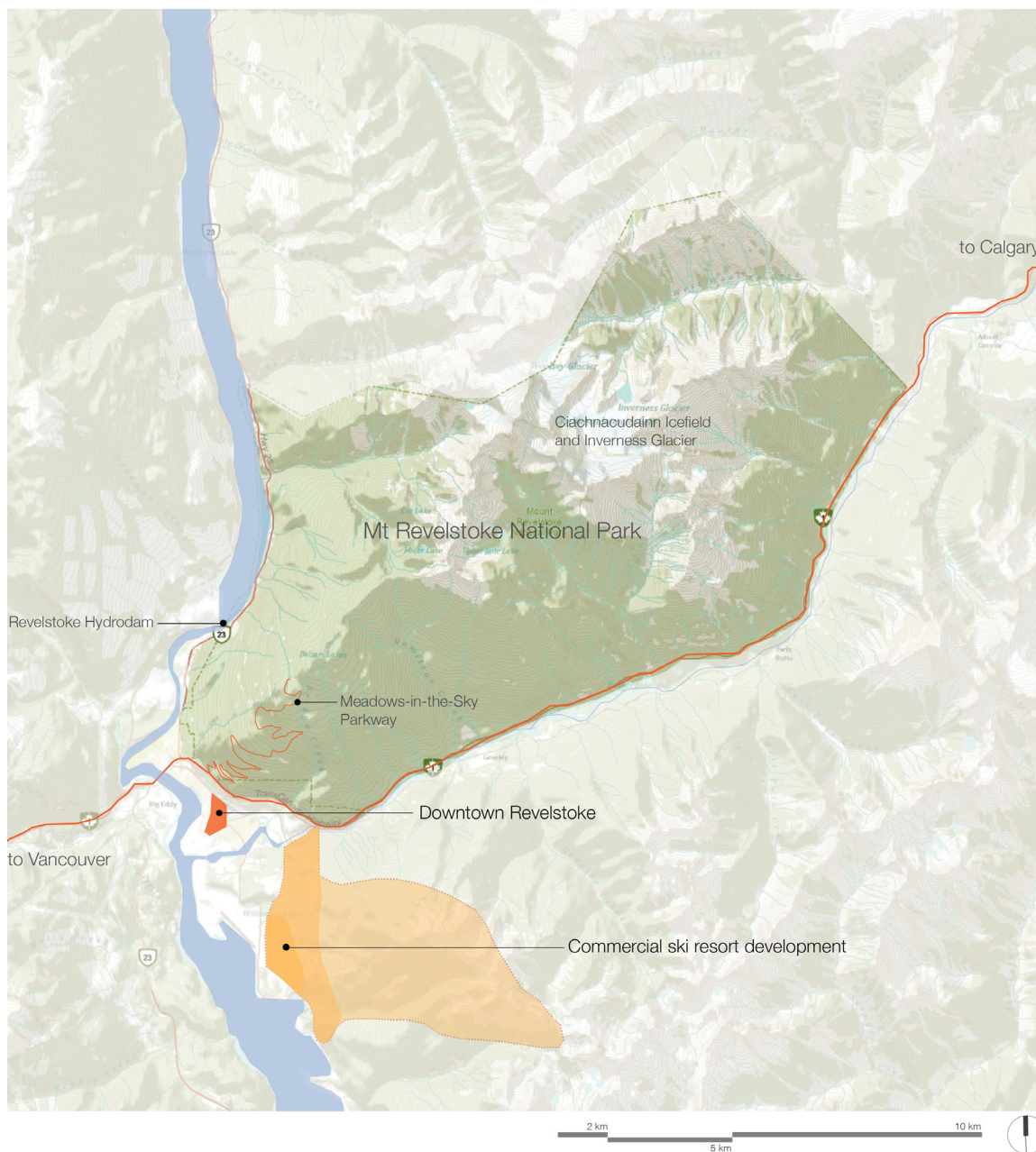
The Meadows-in-the-Sky Parkway runs through a series of distinct ecological zones as it moves upwards into the National Park and away from the city. The Parkway provides vehicle access to Mount Revelstoke during the summer; however, during the winter months, the only access to the park is by snowshoe or ski. Described as a park “where rivers are born,”³⁸ the uppermost ecological zone is a place of glaciers, ice fields, and rocky alpine terrain. The alpine zone in Revelstoke National Park is inaccessible by vehicle, but during all seasons can be accessed by manual transportation methods. Approximately 50% of the park is above the treeline, which occurs at 2,000 m above sea level, with 12% of the alpine zone, or “no forest” zone, covered permanently by snow and ice.³⁹ In the summer months, coarse glacial till and glacial lakes, created by the constant movement of glaciers, become visible. During the winter months, a thick blanket of snow covers the mountain.



Skiers on Mount Revelstoke. Earle Dickey slide (1940s) from Revelstoke Museum and Archives.

³⁸ Geological Survey of Canada, *Glacier and Mount Revelstoke National Parks: Where Rivers are Born* (Ottawa: Queen's Printer, 1965), 1.

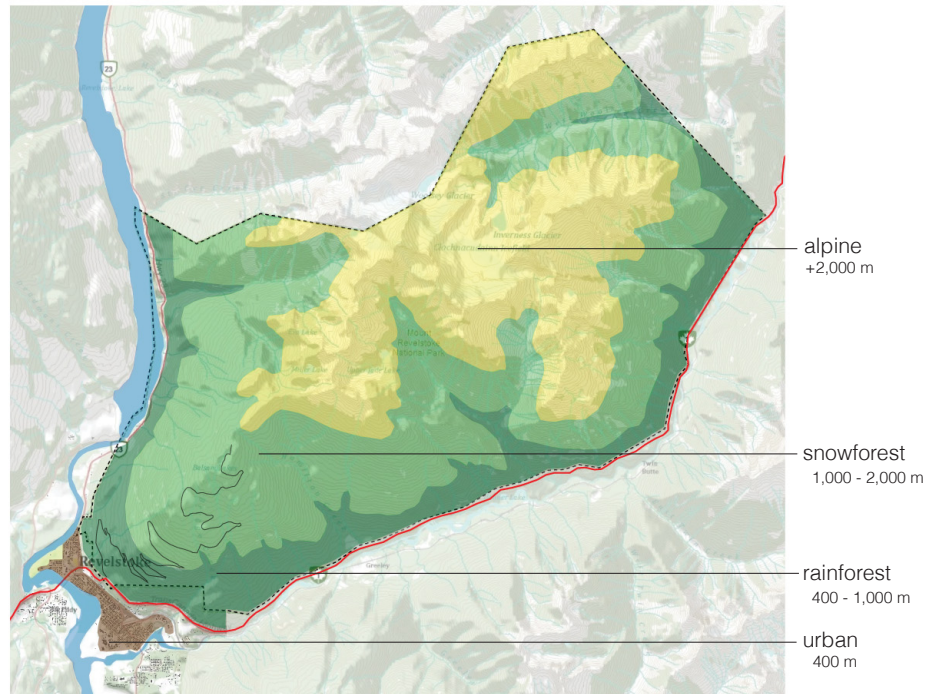
³⁹ *Parks Canada* [Web site], accessed Nov. 2011, available at <http://www.pc.gc.ca/pn-np/bc/revelstoke/natcul.aspx>



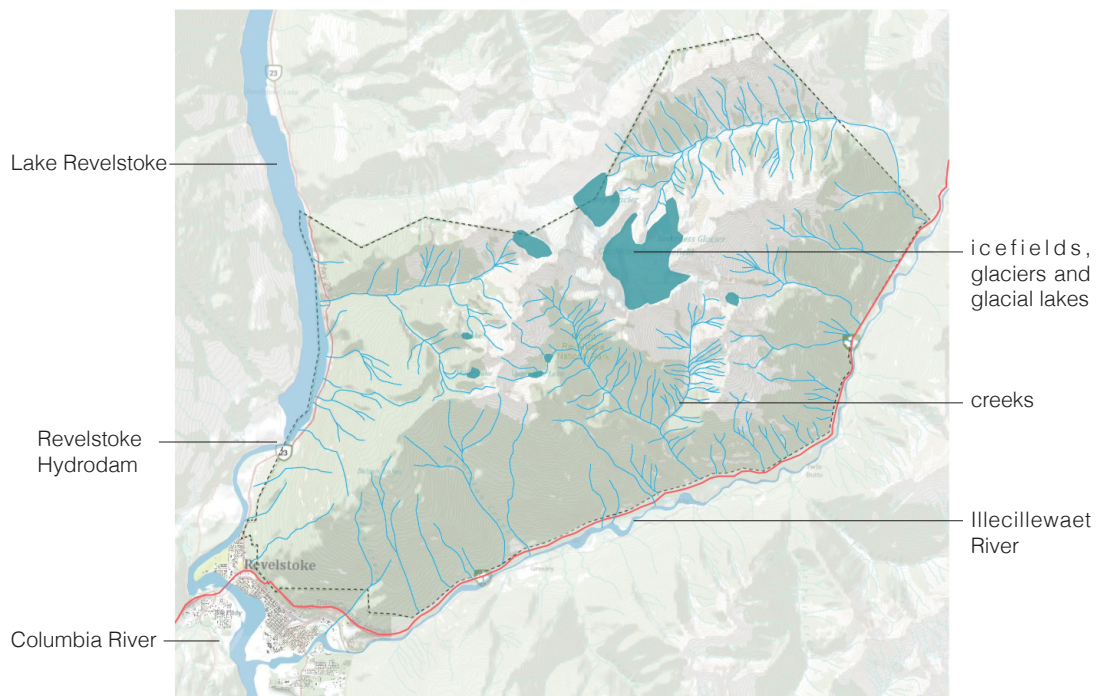
Revelstoke, Mount Revelstoke National Park, and new commercial development. Base map from Bing Maps.

Because of Revelstoke's geographic location, within mountain ranges that are only slightly lower than the Rocky Mountain range to the east, the area is unique in that it receives the highest snowfall in Canada, with an average snowpack of 2.5 m at the highest elevations. The snow that melts from the alpine zone moves down through the snow forest zone and the rainforest zone, reaching the Columbia River through the urban setting of downtown Revelstoke, eventually to reach the Pacific Ocean.

The interaction between trees and snow is a key feature of the snowforest zone. It contains mountain hemlock, Engelmann spruce, and subalpine fir as its main vegetation, with steep valleys created by the melting snow forming areas prone to avalanche. Avalanches are a major factor in both the alpine and snowforest zones. Because of the frequency and amount of snowfall, avalanches are common and extremely hazardous. The density of trees and the degree of the slope can affect where and how quickly the movement of snow may occur. The areas where snow plunges downwards, leaving areas bare of vegetation, then creates meadows in the summer months, an important summer habitat for the grizzly bears in the region.



Plan of ecological zones in Mount Revelstoke National Park. Base map from Bing Maps.



Plan of water locations in Mount Revelstoke National Park. Base map from Bing Maps.

The high level of precipitation in this region, which more often falls as rain in the lower elevations, has created a temperate rainforest at the base of the National Park. The important ecological process in the zone lies in the cyclical motion of constant growth and regrowth between the highly vegetated ground cover and the canopy above. The trees consist of western hemlock, western red cedar, and western white pine, with devil's club, mountain box, pacific yew as examples of some of the vegetation of the ground cover. The rainforest zone is also the site of the historic Nels Nelson ski jump, which is no longer in use and is slowly returning to a forested state.

Wind patterns tend to become intensified in the valley bottoms, along the river basins, and in the alpine zone. In the lower parts of the mountain, the prevailing winds during the summer are mainly from the north, then alternate between the southeast and the northwest during the winter months. In the alpine zones, the prevailing winds come mainly from the southwest in the winter, while the summer winds come mainly from the northeast.



Diagram of key features in the four ecological zones

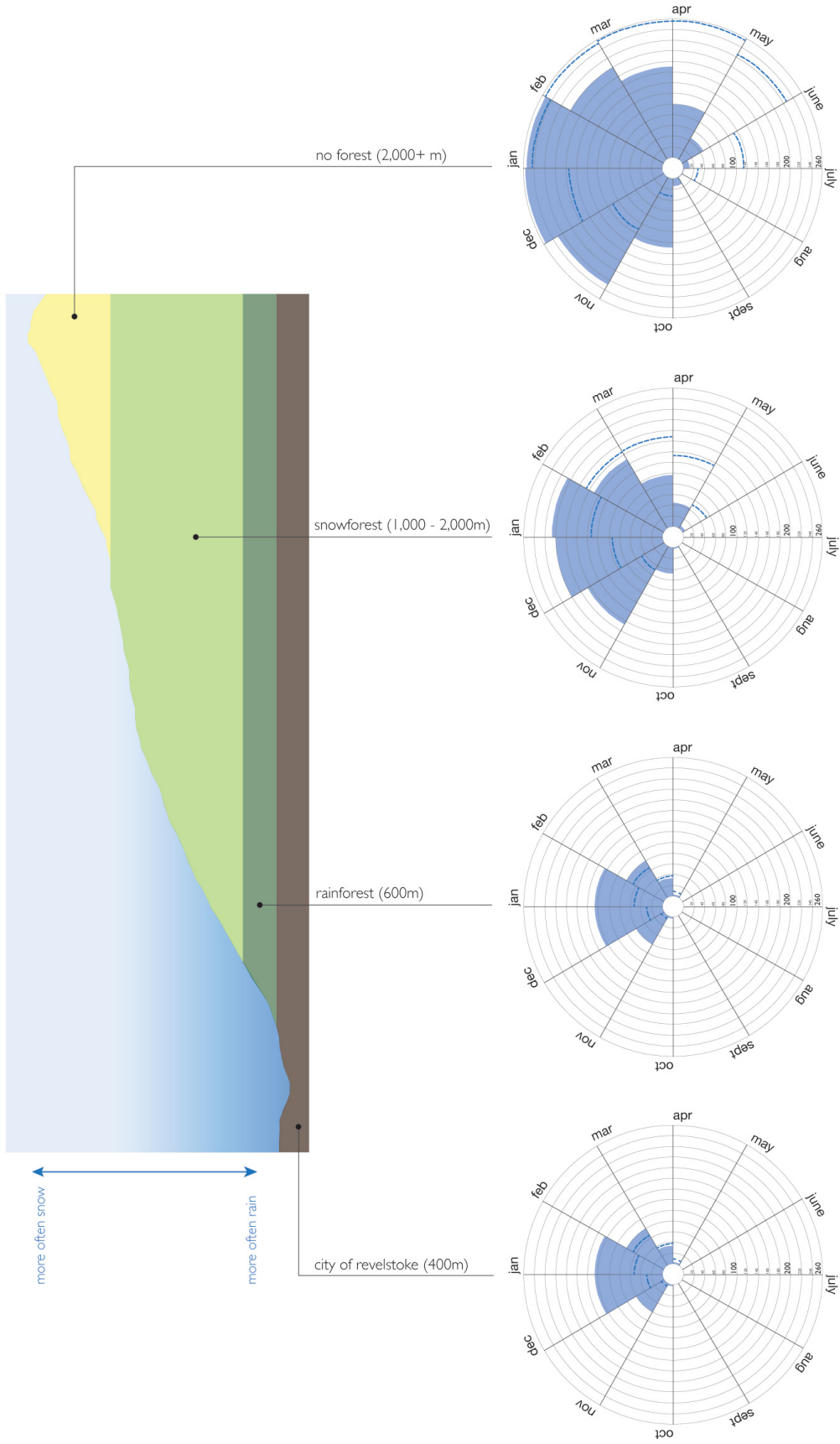


Diagram illustrating average monthly snowfall in each ecological zone (in cm). Data from *Environment Canada Climate Normals 1971-2000*, Revelstoke Airport, Roger's Pass, and Mt Fidelity stations.

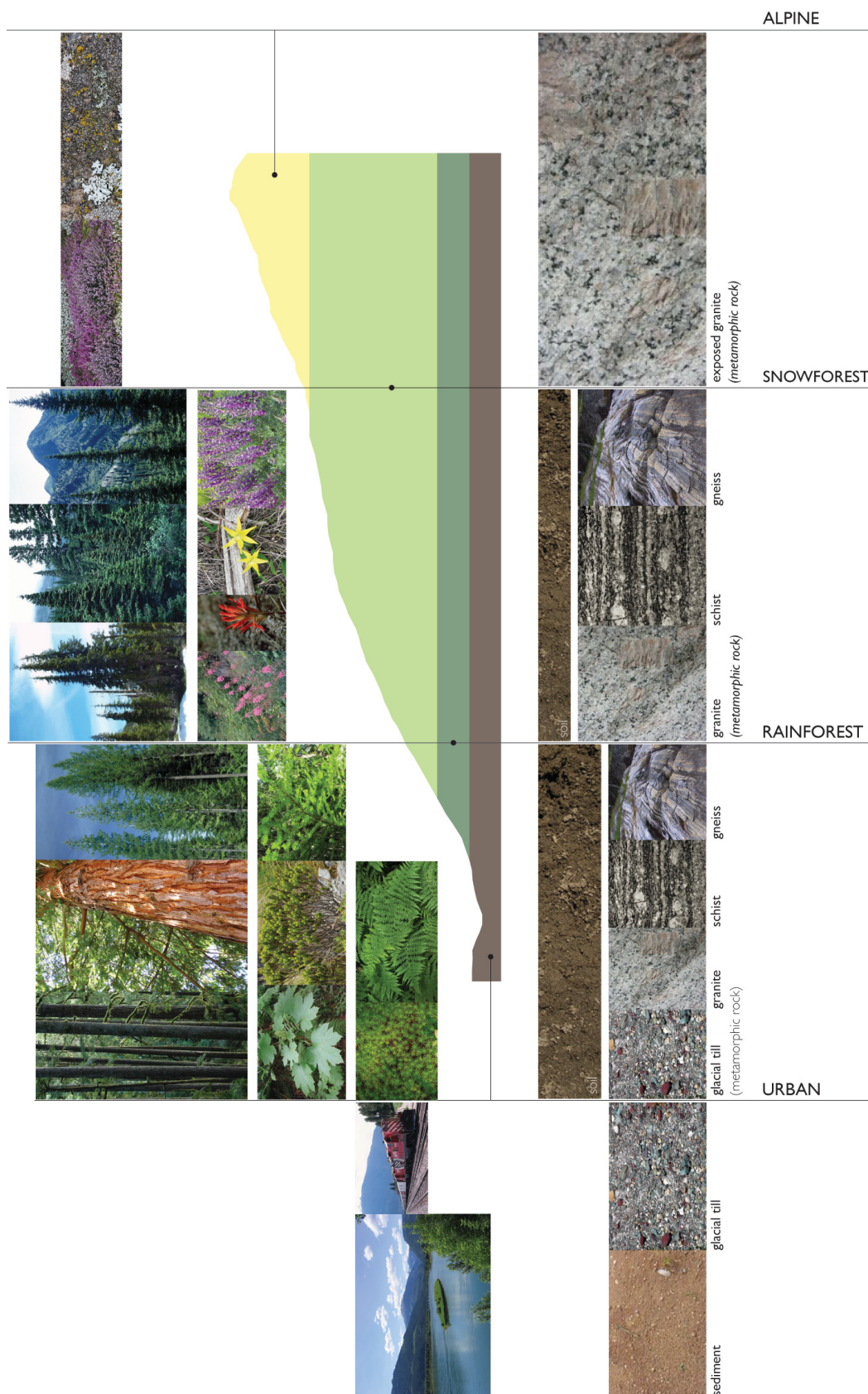


Diagram illustrating vegetation and ground conditions in each ecological zone. Data from Parks Canada, *Mount Revelstoke National Park*.

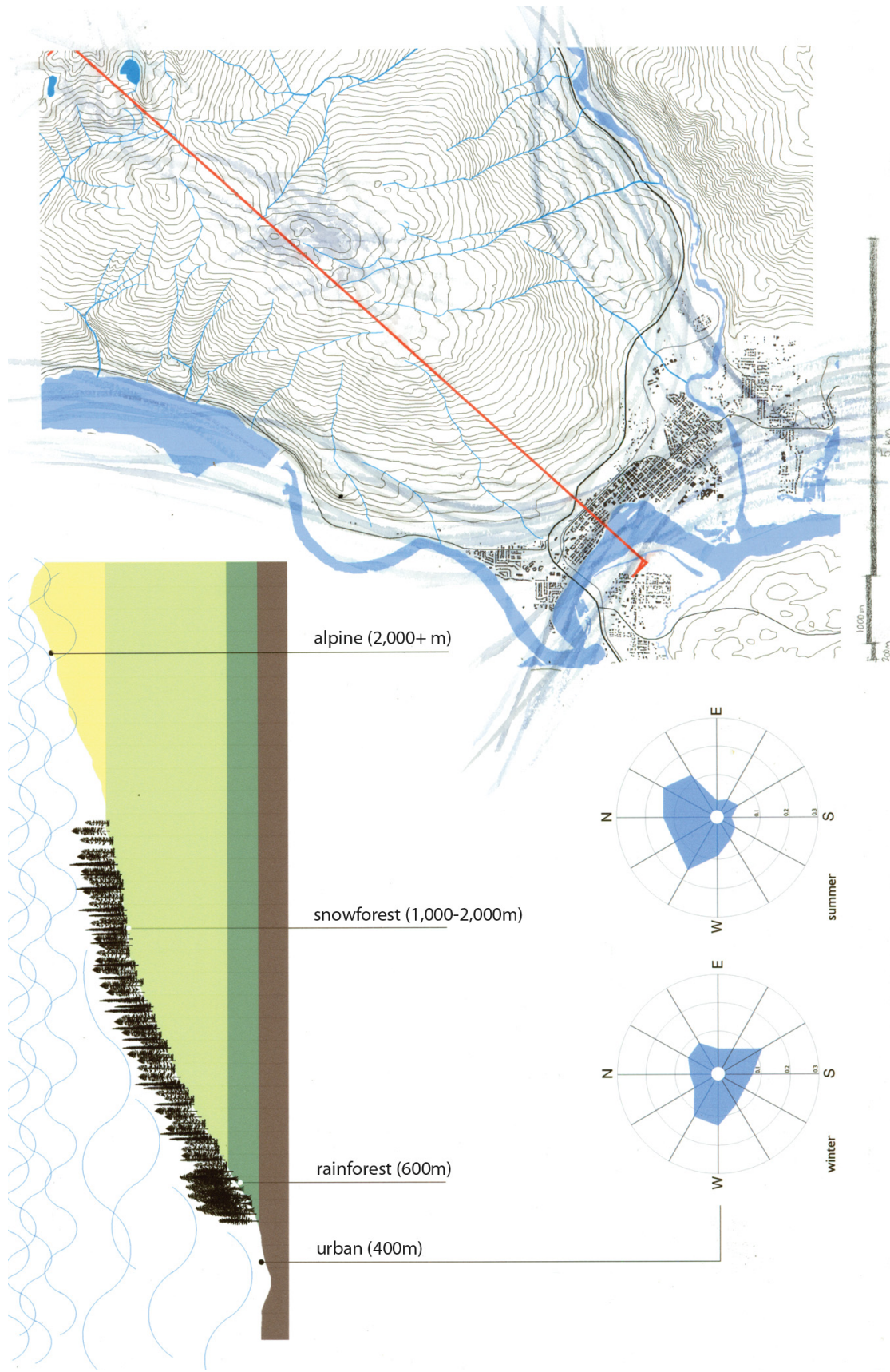


Diagram illustrating prevailing wind in winter and summer in Revelstoke. Data from Wind Atlas, latitude 50.968 longitude -118.158.

Cultural History of Skiing on Mount Revelstoke

The site has a rich history of skiing, introduced by Norwegian immigrants arriving on the newly constructed Canadian Pacific Railway in the late 1800s. These immigrants brought with them a culture of skiing as transportation and leisure during the winter months, and created a local ski club to promote the activity. This ski club has become one of Canada's oldest, with records dating from 1891.⁴⁰ The community of Revelstoke was brought together in the winter months by this common pursuit of skiing.

From 1915 through 1970, Mount Revelstoke was known as having the biggest natural ski jump hill in Canada, which attracted thousands of ski jumpers and spectators. The term “natural ski jump” means that the in-ramp, which usually requires the construction of a steep man-made structure, was actually the existing slope of the hill itself. The unique 600m-long natural jump was the site of many world records in ski jumping. The most famous local ski jumper, and also the hill's namesake, Nels Nelson, set the world record for ski jumping in 1926, then broke



Members of the Revelstoke ski club (1891). From *Canadian Ski Museum*.

⁴⁰ *Canadian Ski Museum* [Web site], accessed Nov. 2011, available at http://www.skimuseum.ca/exhibits_revelstokeskiclub.php

his own record again in 1932. Isabel Coursier, the only female ski jumper during this period to jump unassisted by a male partner, also set a world record on the Revelstoke ski jump in 1923.⁴¹

In addition to the ski jump, a small community-run rope tow had been installed on the mountain, as well as a series of cross country ski trails. There were few other constructed facilities located on the mountain, due partly to the walkable proximity to the community itself.

The popularity of ski jumping and the small ski hill came to an end on Mount Revelstoke with an increasing interest in a commer-

⁴¹ Ibid.



Existing ski jumping judges' tower and photo of Isabel Coursier (1923). A plaque at the site (quoting the Revelstoke Review in 1923) describes Isabel's jump as follows: "Fearless and graceful, like some well-poised bird, she swooped suddenly and swiftly into the air, curved to the earth, and glided speedily down the remainder of the hill to the deadline."



Nels Nelson, world record jump. From Parks Canada, *Mount Revelstoke National Park*.

cial ski hill on Mount McKenzie, 10 kms south of the city, which opened in the late 1960s. Declining interest in the sport of ski jumping, the rising costs of maintaining the community facilities and the promise of faster ascents on the new chairlift on Mount McKenzie led to the abandonment of the ski facilities on Mount Revelstoke. The Mount McKenzie commercial ski hill was purchased by a large ski resort corporation in the early 2000s, and is now in the process of being developed into a large international resort. The ski jump on Mount Revelstoke was closed in the 1970s, but the disused steel tower still remains.



Revelstoke ski jump (1916). From *Ski Jumping Hill Archive*, Mount Revelstoke.

CHAPTER 3: NATURAL FORCES AND CULTURAL FLOWS

Recreation Route and Locating Sites

In order to reconnect humans with the landscape of the mountain region, the overall program intent is to promote a public human-powered recreation route into and up Mount Revelstoke National Park with a public recreation hub connecting recreationists with the community. In contrast to commercial recreation resort developments, this public recreation hub will tie into existing natural forces and cultural flows of the site acting as the hinge point between park and community. Architectural interventions along the recreation route are intended to create an awareness of the significant natural forces of each of the ecological zones and to provide a place of rest or accommodation for the travellers.

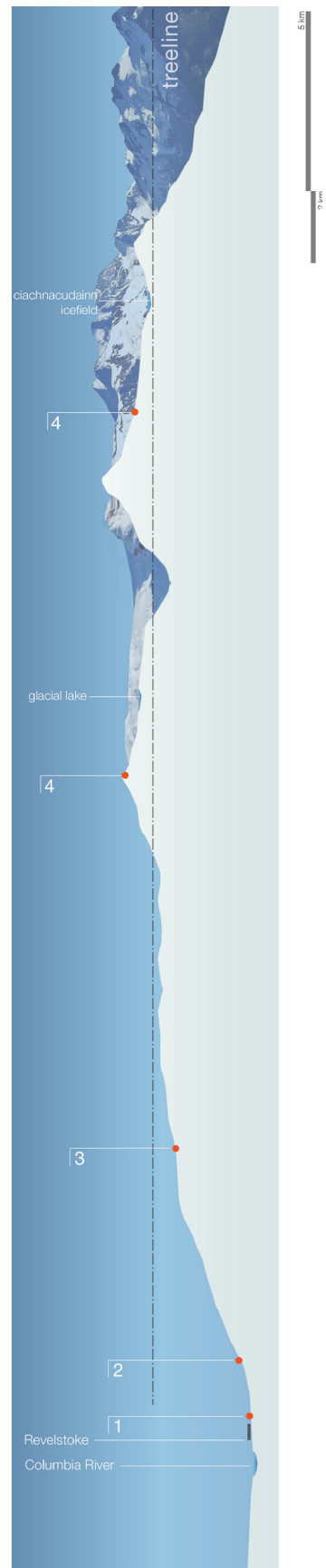
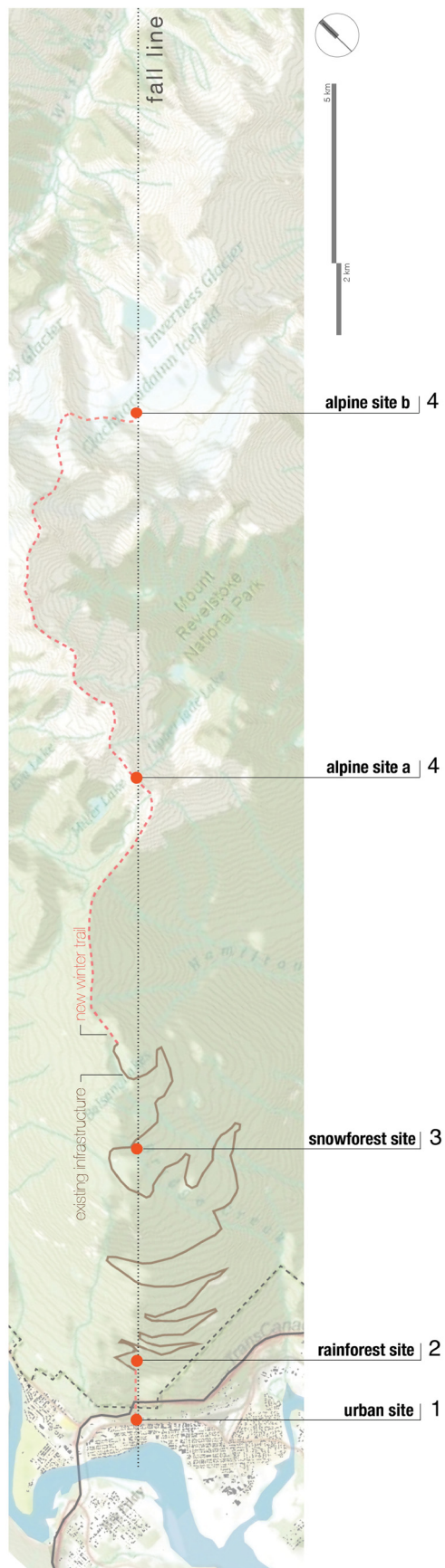
In alpine skiing, the fall line refers to a line that is most directly downhill, and perpendicular to the contour lines of the site. It illustrates the trajectory of a person or object on a slope under the pull of gravity. By creating an axis on the fall



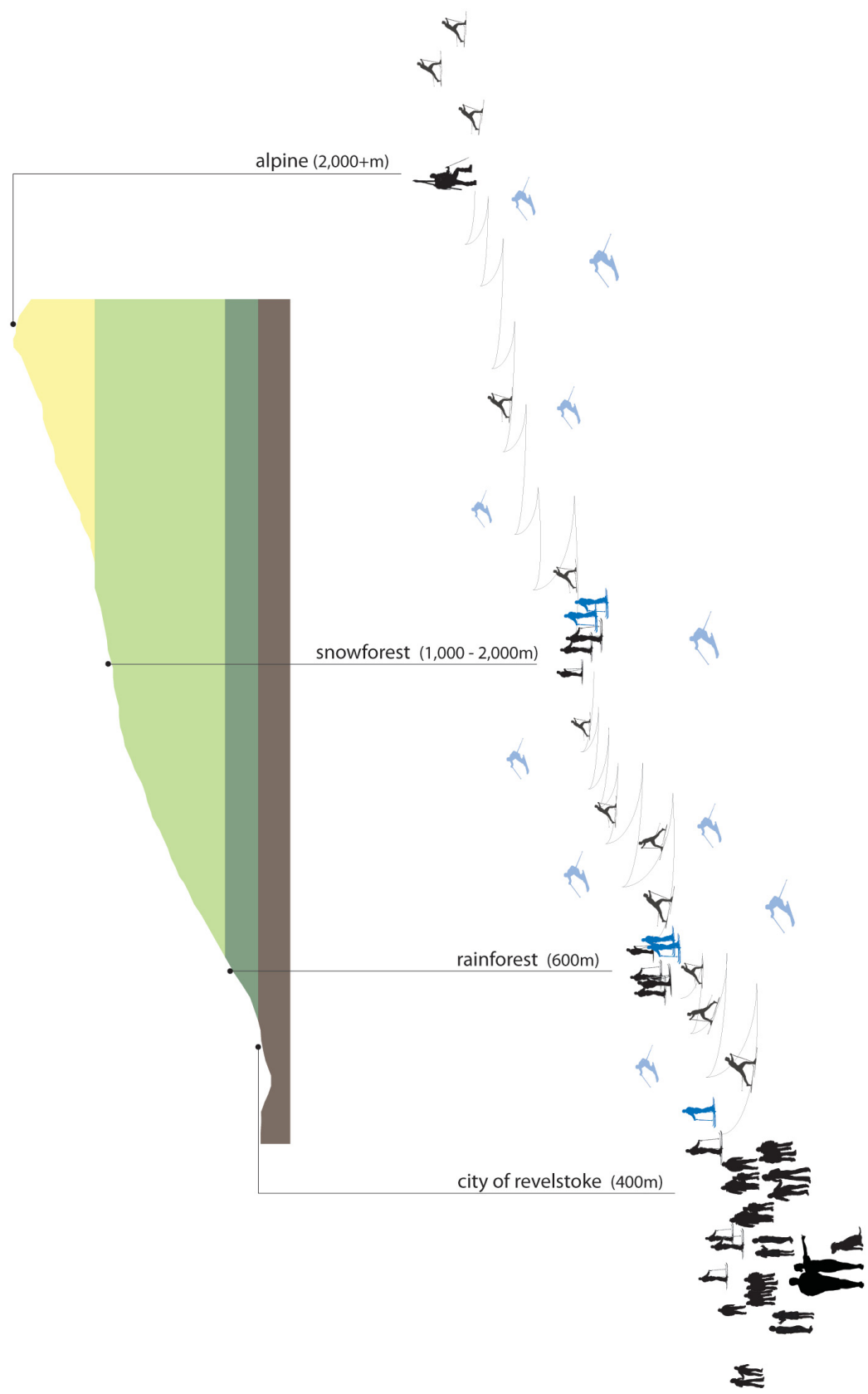
Collage of recreation route

line of the mountain and locating the sites on the recreation route at points along this line, the sites become linked through this connection to gravity.

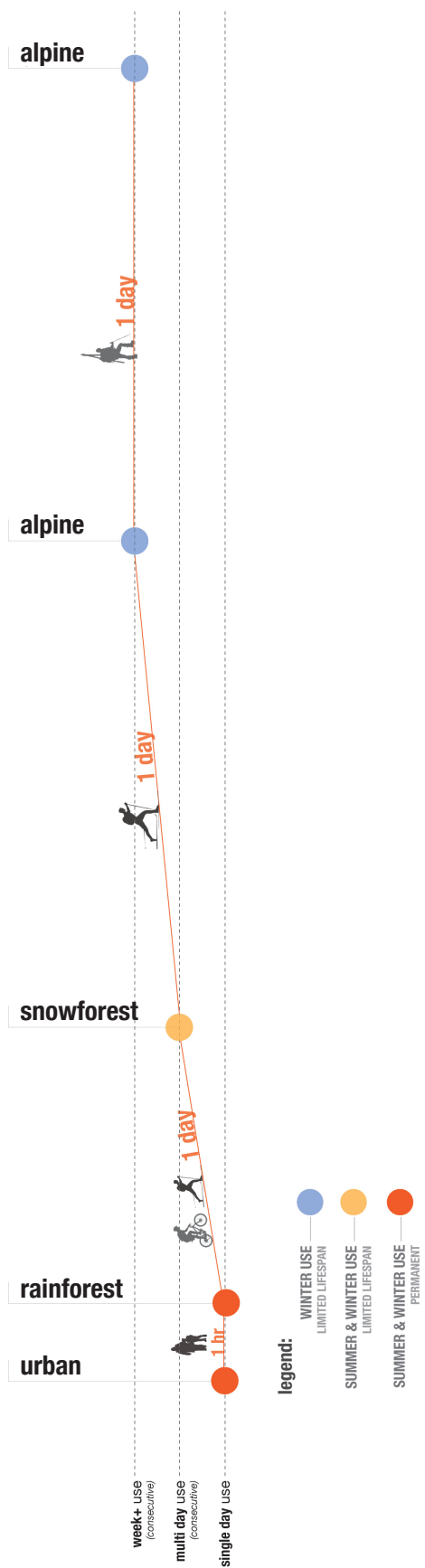
Unlike a “McSkiing” recreation resort, the intent of the overall route is not to promote a high volume of human traffic. As the route moves away from the city, the number of participants and the capacity of accommodation are reduced. The urban and the rainforest sites are intended to be accessible to all park and community users; the urban site will be located within the community itself and the rainforest site will be located an hour’s ski or walk into the National Park. The snowforest site will be located approximately a day’s ski up Mount Revelstoke along the existing infrastructure of the Meadows-in-the-Sky Parkway, thereby favouring more experienced recreationists. Where the existing infrastructure ends, the trail will continue at the alpinist’s discretion farther up to the alpine sites, located two and three days’ ski from the city.



Plan and section of site locations along fall line. Base map from Bing Maps.



Program diagram: user gradient



Program diagram: user gradients

Urban Site

Site

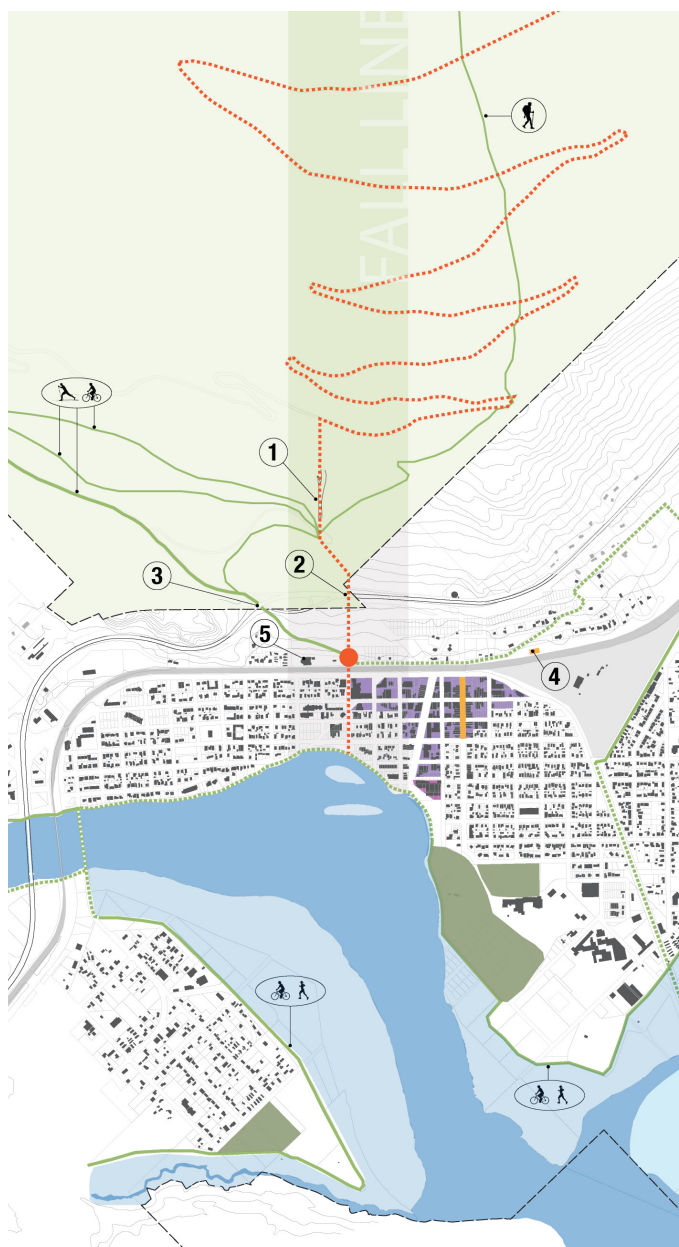
Reconnecting recreationists, community and nature in Revelstoke begins with creating a public urban connection considering both the natural forces and cultural flows.

When considering the cultural flows, it is important to note that currently the National Park does not have a formalized pedestrian route from the city of Revelstoke. The Canadian Pacific Railway and the Trans-Canada Highway sever the connection between community and park. However, there is a community landmark located at the edge of the downtown core, just across the line of the Canadian Pacific Railway: the Revelstoke Railway Museum. This museum, constructed in 1993 with a design based on the original Revelstoke CPR backhouse and water tower, has allowed the urban core to begin to spill over the railway tracks.

A comprehensive network of existing and proposed recreation trails run along the edge of the Columbia River and along the north side of the railway tracks. An informal trail for cross country skiing also exists, running northwest



Front (top) and back (bottom) of Revelstoke Railway Museum. From *Revelstoke Railway Museum* (Web site).



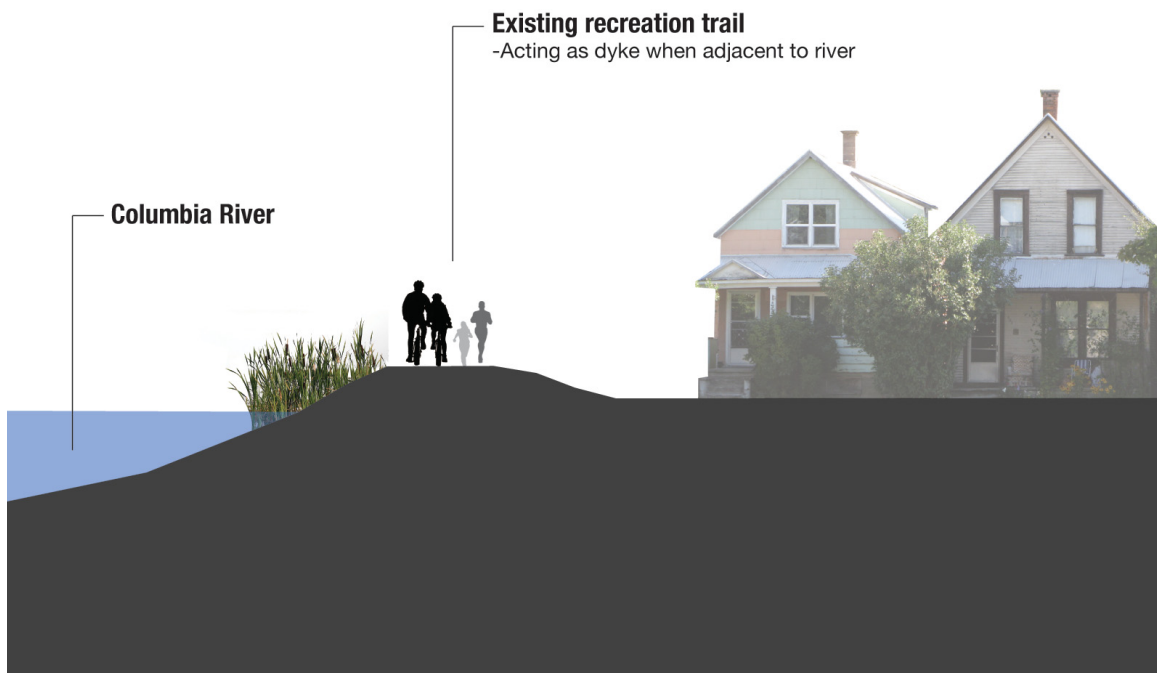
- City of Revelstoke boundary
- existing recreation trail
- ⋯ City of Revelstoke proposed recreation trail
- ⋯ proposed pedestrian link to national park
- Mount Revelstoke National Park
- City of Revelstoke recreation parks
- Mackenzie Avenue - main pedestrian / public street
- City of Revelstoke downtown revitalization zone

- ① Nels Nelson historic ski jump
- ② proposed pedestrian overpass
- ③ existing vehicle underpass used informally by pedestrians
- ④ passenger railway station
- ⑤ railway museum
- urban site location - community recreation hub

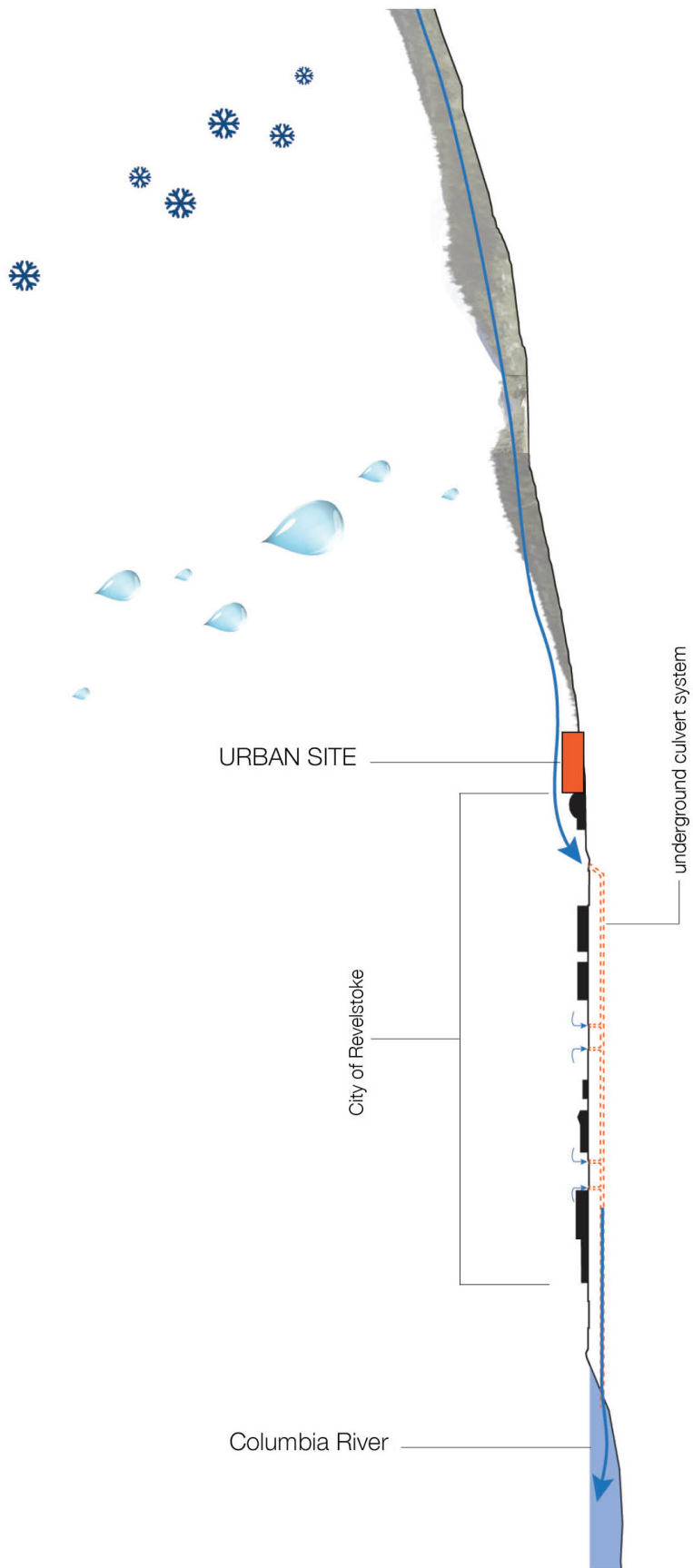
Cultural flows in Revelstoke. Base map from City of Revelstoke GIS.

along the edge of the national park. The recreation trails along the Columbia River also act as a dyke system to prevent flooding.

Natural forces that are important at this site include the flows of water and earth, as the city is sited at the base of Mount Revelstoke and the edge of the Columbia River. The water currently flows from the mountain under the city in underground culverts, then joins the southerly flow of the river.



Section of existing recreation trail system at edge of Columbia River



Site section showing current water flow under Revelstoke

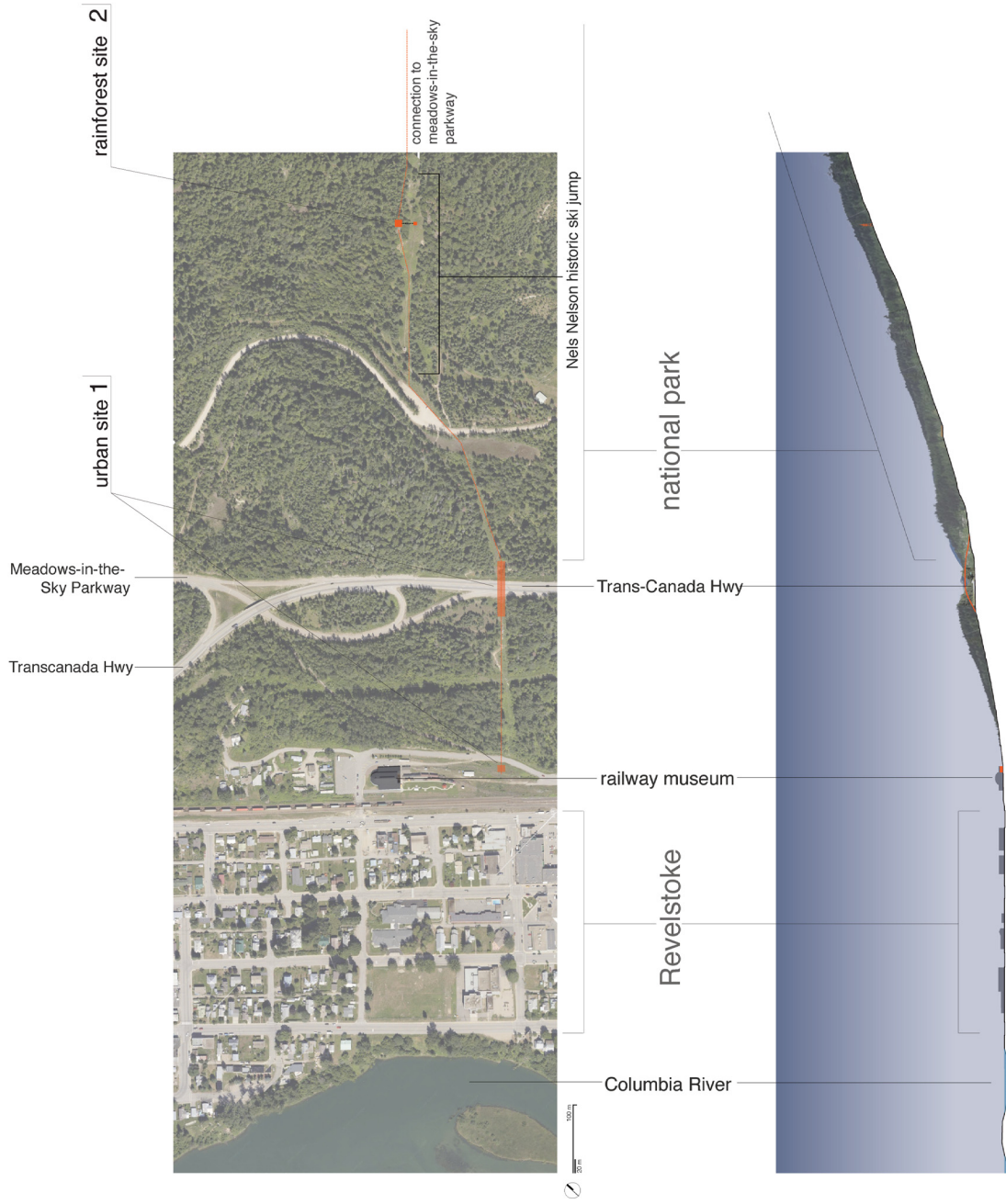
Linking the new urban recreation hub into the existing trail system, creating an adjacency with the existing Railway Museum landmark, and integrating the natural forces of water and earth become strategies to be used during design.

Program

The program for the urban site will include a public plaza adjacent to this museum, acting as a gateway and meeting point for the recreation route, as well as a place of community recreation in itself. The public plaza will become a “mixing pot” of cultural flows and natural forces as a hub for community recreation. The hub will also provide service facilities (e.g., washrooms, cafe, equipment rental/repair, and change rooms) as well as an information centre for recreationists.

Connection to Park

From the recreation hub in the city, the route crosses a bridge over the Trans-Canada Highway, which will then meet the Nels Nelson ski jump, which lies approximately an hour’s



Plan and section of urban to rainforest connection. Aerial photo from Google Maps.

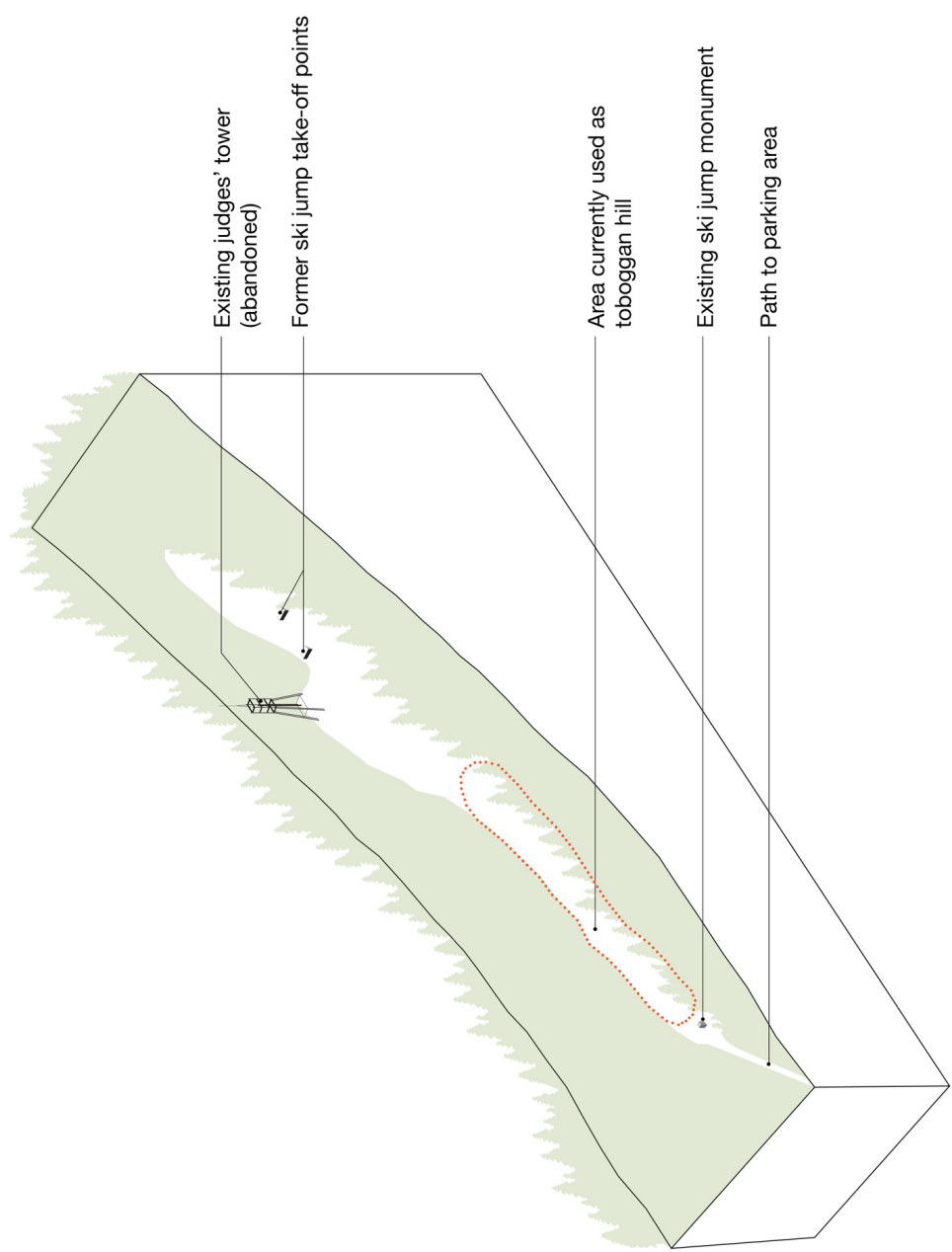
walk or ski up into the park. The bridge will span the Trans-Canada Highway between the urban area and the National Park for both winter and summer manually powered recreation use.

Rainforest Site

Site

After passing over the bridge and beginning to move up the mountain, the trail then meets the historic Nels Nelson ski jump. The cultural flows of the site to consider during design include the past and present uses. The historical significance of the site is marked by the remaining steel judges' tower which stands prominently as a landmark to the ski history of the site. It is, however, currently disused. The bottom portion of the hill is still used by the community as a tobogganing hill during the winter months.

The natural forces that are important to consider here are the cycles of growth and re-growth and the force of the earth on the steep site.



Rainforest site - existing conditions

Program

The intent of the new program of the site will be to reawaken and encourage its community recreation aspects. It must be acknowledged that the site is no longer a feasible location for a ski jump. Because of advancements in ski jump technology, ski jumps are now much larger, and suggesting the site be used as a ski jump once again would not be practical. In order to attract a new generation of recreation enthusiasts who are looking to reconnect with nature and community, the intent of the program is to suggest uses more suited to the present recreation trends. The program of the hill itself will include a ski / snowboard park and toboggan hill during the winter months, and a downhill mountain bike park during the summer. The historic judges' tower will become a beacon to the city and river valley. It will consist of an observation platform and new sauna facilities.



View from top of Nels Nelson ski jump

Snowforest Site

Users of the trail system in the national park can then make their way up the mountain to the temporary sites for overnight accommodation. The first 7 kms of the Meadows-in-the-Sky Parkway is currently groomed for cross-country skiing during the winter by Parks Canada, while the following 12 kms up the mountain to the snowforest site is an area for backcountry skiing.

During their ascension of the mountain, ski mountaineers apply removable “skins” to the bases of their skis. These skins, which were historically seal skins but are now a synthetic substitute, grip in one direction and glide in the other. This allows the ski mountaineer to ascend slopes of up to 30 degrees without slipping backwards.

The snowforest site will be for winter and summer use with a program for overnight accommodation for up to 12 recreationists. An area for communal eating will also be provided.



Photo of skier applying ski touring skins. From *Paragliding Holidays* (website).

Alpine Sites

The final sites along the procession route are two alpine locations. Located one and two days' ski up from the snowforest site, the alpine sites are for winter use only. They are accessed by routes determined by the ski tourers, as the snow conditions change and modify the route and access to the sites. At this stage, only approximately 400m in elevation is gained from the snowforest site, and the skiers mostly follow the contour lines rather than move up them. This alpine area is hazardous because of the high risk of avalanches and extreme weather conditions; therefore, the journey is recommended only for advanced backcountry skiers.

The program of each of these sites provides accommodation for up to 12 skiers. A communal area for cooking and socializing in this winter village will also be provided. Some services will be provided, such as a method of emergency contact and washroom facilities, by sustainable methods.



Alpine zone summer condition. From *Teton Gravity Forum* (web site).



Alpine zone winter condition. From *Golden Ski-Mo Team's Blog* (web site).

CHAPTER 4: DESIGN

Urban Site

Site

Architectural design moves on the urban site are intended to emphasize and intertwine natural forces and cultural flows to create a re-connect between recreationists and community, and between recreationists and nature. The urban site is the most important of the sites, as it is the connection between the National Park and the community, and the hinge point for the project.

The site location ties into an existing recreation trail system, as well as creates a new pedestrian-focused entry point to the National Park. Drawing inspiration from the form of an island along the axis to the river creates a connection from the site to the river. This form also creates a hinge point that directs a visual axis toward the downward flow of the Columbia River as well as the downtown core of the city. Creating a landmark for the plaza connects the urban site with the existing entry landmarks of the downtown core.

**LEGEND:**

- - - Flow of descending recreationists from park
- - - Recreation trail
- - - Visual axis from plaza to downtown
- Downtown
- 1 New plaza landmark
- 2 Existing downtown threshold landmark

Public plaza form and connection to downtown core

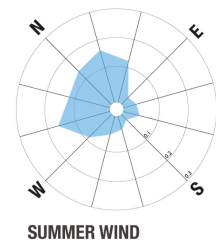
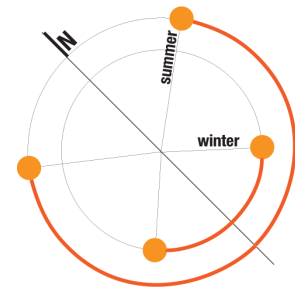


View from downtown to new recreation plaza

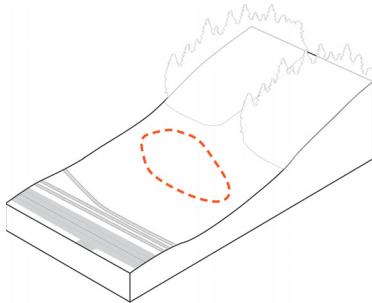
The forces and flows acting on the site are illustrated in the following diagram. The site ties into existing trail systems, and creates an intersection between them. Program space is located at the edges of the plaza to work with the forces of the earth, sun, and wind.



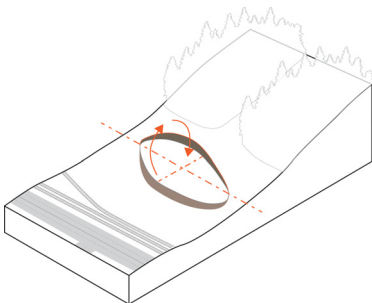
Site flows and forces



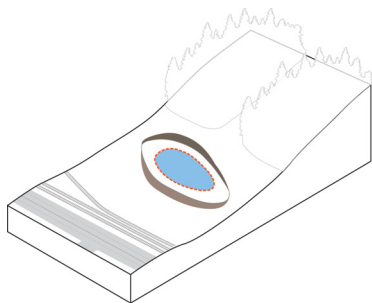
The forces and flows of the site guided the schematic design moves on the site, as illustrated in the following set of diagrams.



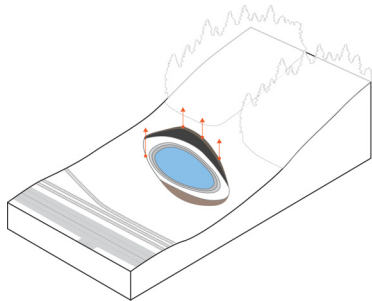
1. Identify site location



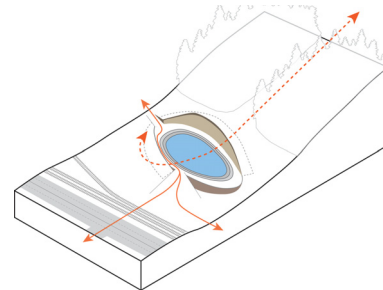
2. Use cut and fill to create horizontal surface



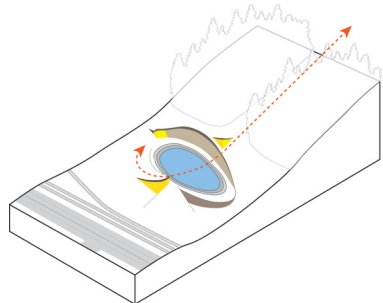
3. Identify rink location



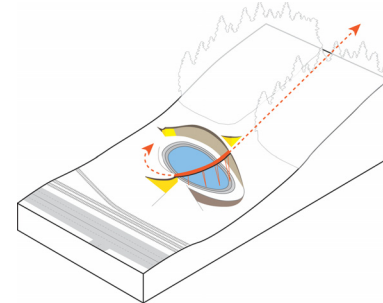
4. Pull up edges of plaza, tuck program underneath



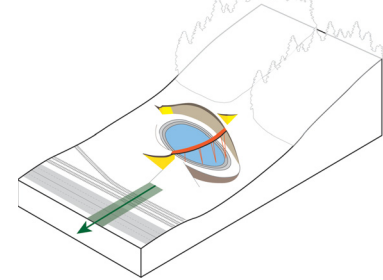
5. Identify human flows through site



6. Pull up and create beacons at entry points



7. Create bridge for descending recreationists



8. Create green infrastructure to river

Eight steps: form finding from forces and flows

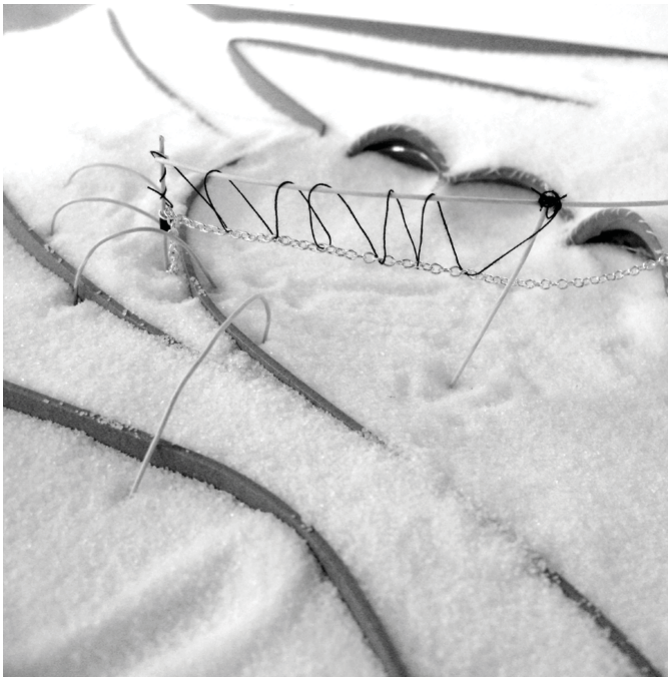
The slope of the site required consideration in order to allow for the flows of people through the site, as well as working with the forces of water and earth.

Precedent methods of sculpting the earth can be found in traditional cultures of mountain regions. Methods of terracing using stacked stone retaining walls have been used by mountain cultures for thousands of years, for various purposes.

As the forces of water and earth are both dynamic, a model with a sand base was used to understand these fluid forces during the design process.



Machu Picchu landscape terraces. From *ArtStor* [Web site], SCALA Archives photograph.



1:500 sand model - studies sculpting sloped site

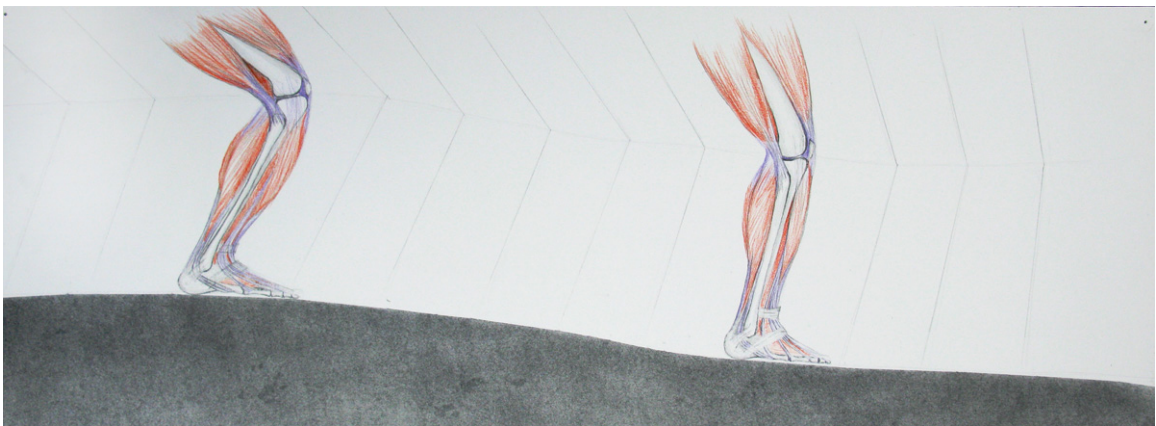


Building Scale

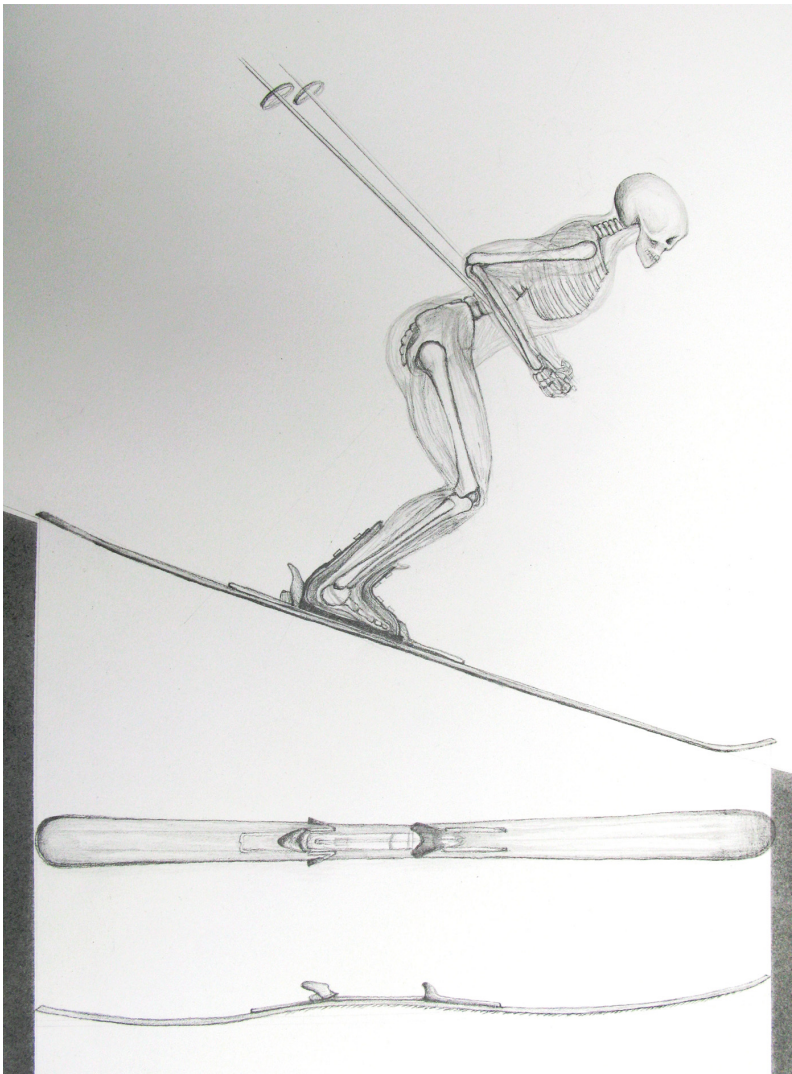
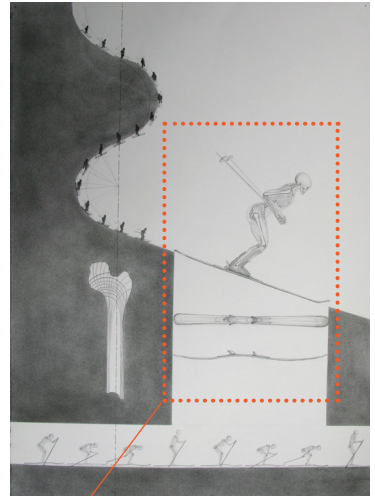
Reflecting back on the analogy of the skier in motion, interacting with the landscape and natural forces, it is important to further consider how the human body functions and reacts to its environment. Through a study of anatomy and movement, a series of “x-ray” drawings of the moving body were used to understand forces of tension and compression. Bones act in both tension and compression, while tendons connect muscles and bones, allowing for movement. The intertwining and connectivity of the forces of tension and compression inspired the development of the site at the building scale.



“Tai Chi Man” from *The Institute of Plastination* (web site).



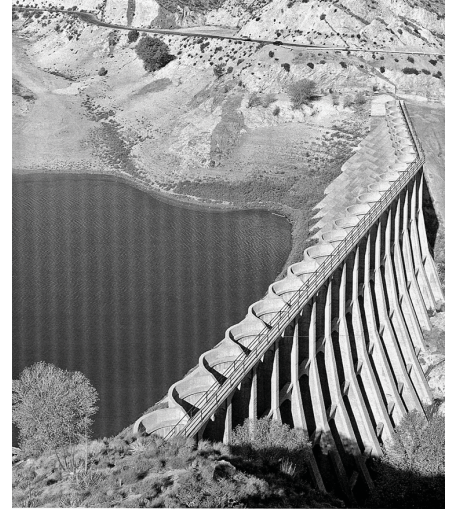
Drawing study of connectivity of muscles, tendons, and bones in human leg in motion.



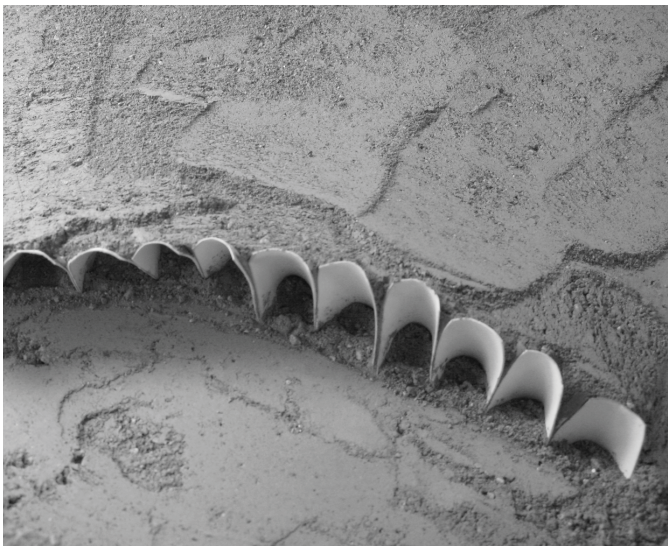
Drawing studies of anatomy of skier in motion.

When beginning to consider the program spaces on the uphill side of the plaza, the building scale requires a consideration of the forces acting upon it. This side of the plaza is integral in resisting the flow of the earth to create the horizontal surface for the rink. A clear precedent of a potentially habitable structure that can resist a strong force from an uphill slope is a dam. The need to resist a monumental force from a river requires the dam to be elaborately structured and engineered. The designs of dams clearly demonstrate the forces acting upon them.

Taking inspiration from dams, the forms were tested for this site using a sand model. It became clear that scalloped forms display the force of compression acting upon them, and begin to create habitable space for program.

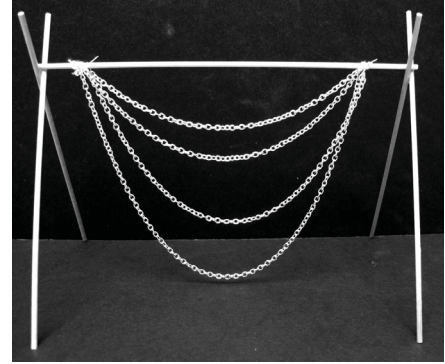


Little Rock Dam, Little Rock Creek, California, 1922-1924. Jet Lowe, photographer, 1981. From Macy, *Dams*, 406.

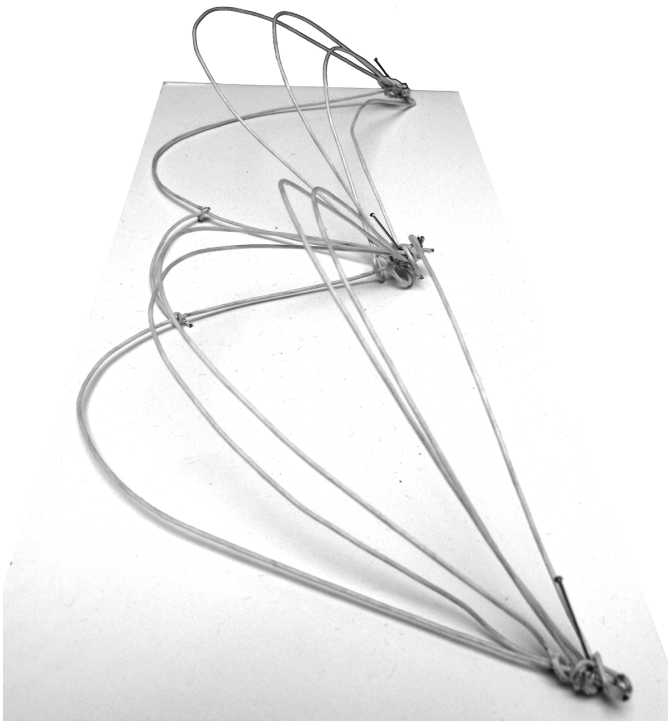


Sand model with scalloped forms creating habitable space and illustrating compressive forces.

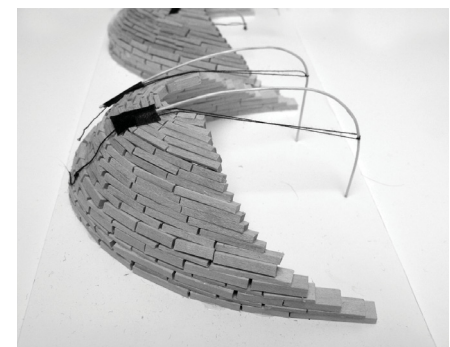
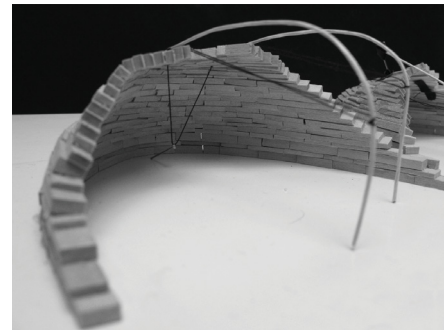
In the spirit of intertwining forces of tension and compression, an idea about using tension in the development of the shapes of the mainly compressive scalloped “dam” wall began to take shape. Gaudi often used a catenary method to determine the strongest form of an arch in compression by generating the form in tension using a suspended chain model. This method of generating the form of a catenary curve was used, then extruded around an axis to begin to create the uphill wall of the program space. This study determined the strategy to use this shell structure as a demonstration of the compressive force from the earth, then attach to a lighter roof structure above.



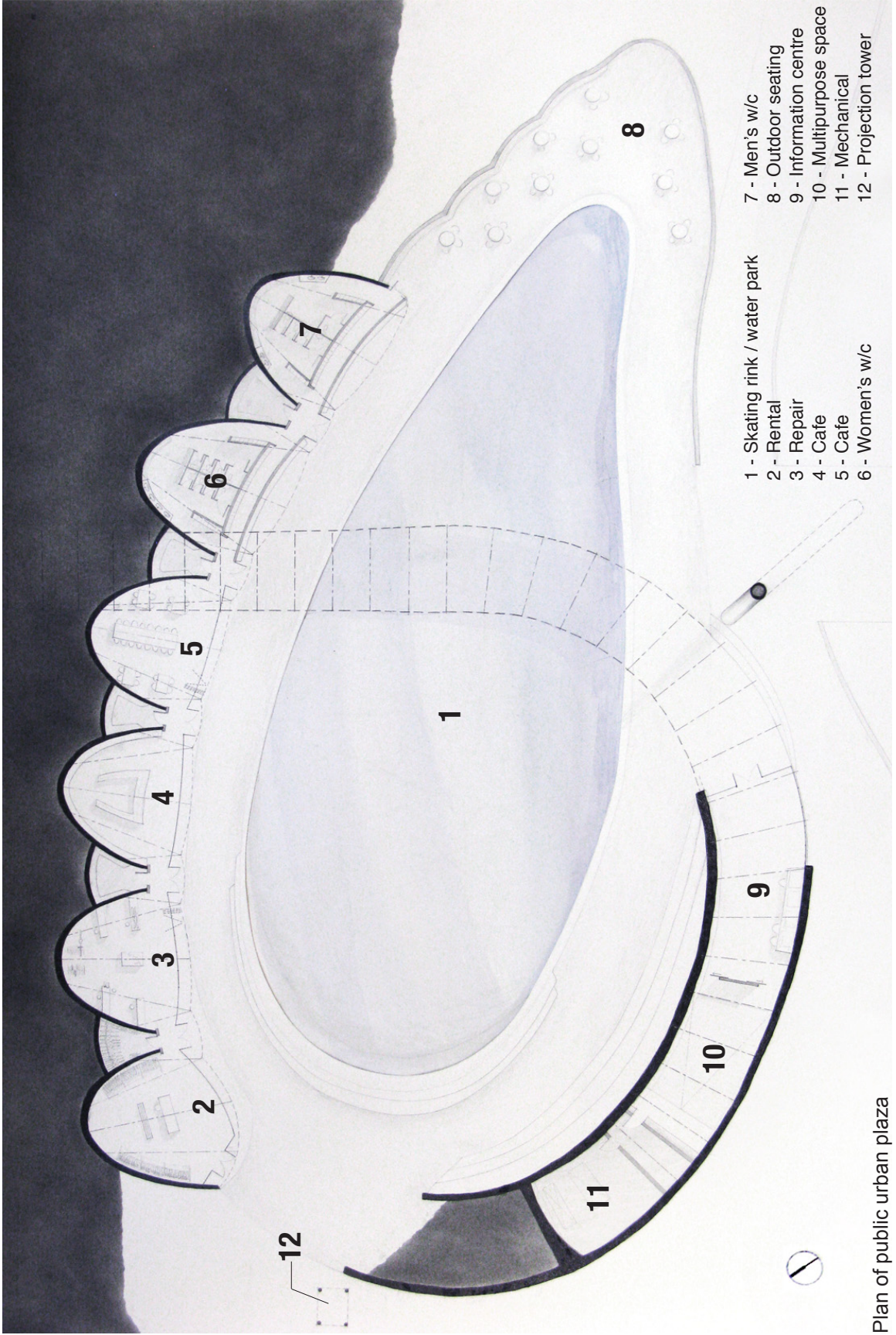
Catenary curve chain model



Model of catenary curves extruded to form vault

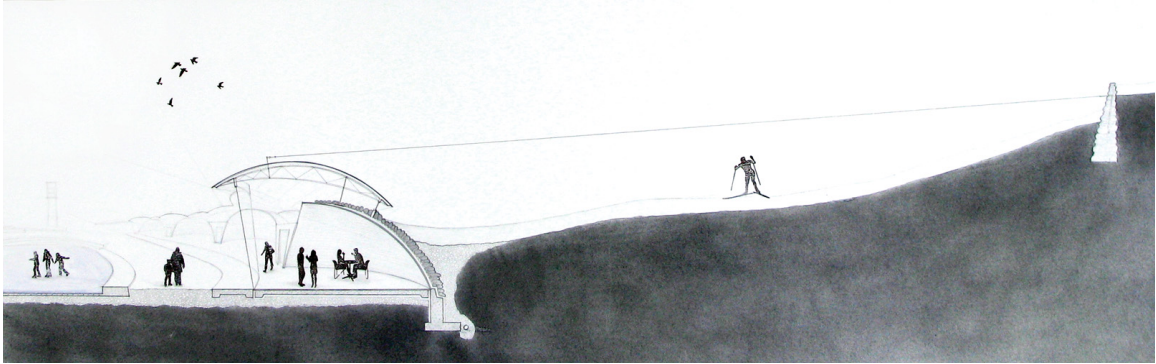


Compression + tension model

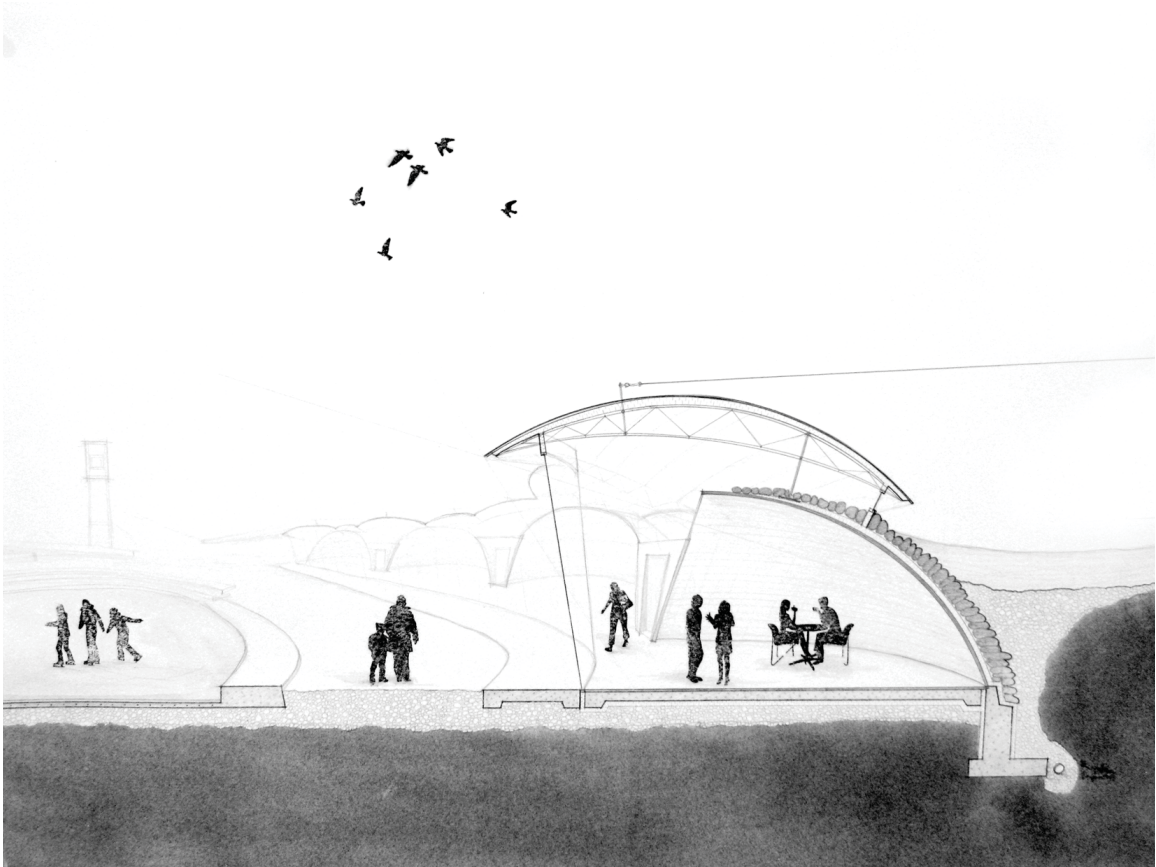


- 1 - Skating rink / water park
- 2 - Rental
- 3 - Repair
- 4 - Cafe
- 5 - Cafe
- 6 - Women's w/c
- 7 - Men's w/c
- 8 - Outdoor seating
- 9 - Information centre
- 10 - Multipurpose space
- 11 - Mechanical
- 12 - Projection tower

Plan of public urban plaza



Overall section of uphill wall

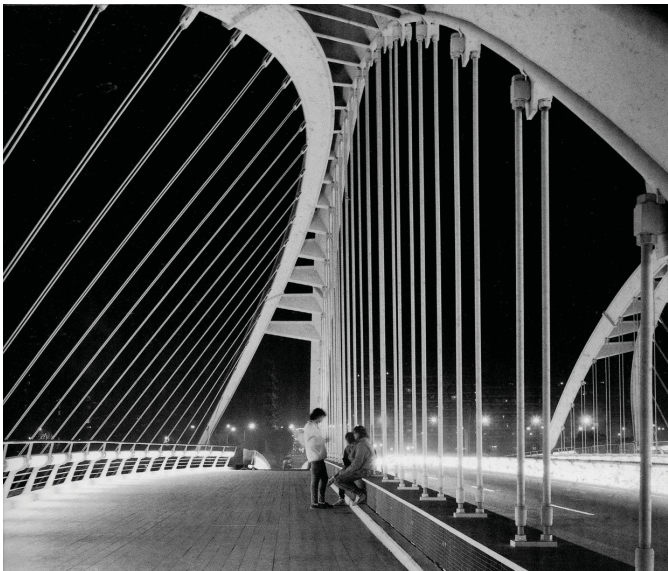


Section of uphill wall

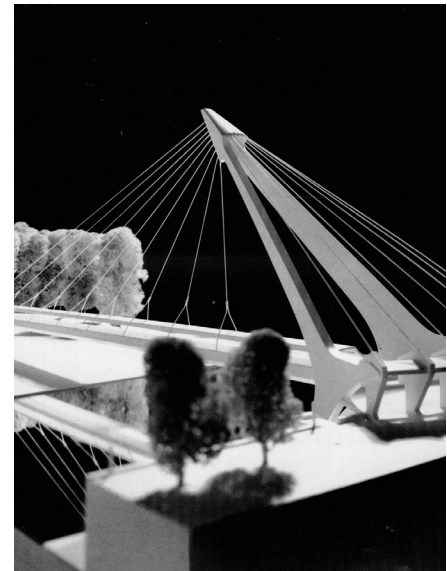
Again, ideas of intertwining tension and compression were carried through to the design of the bridge connecting descending recreationists with the recreation hub. Suspension bridges, with compressive pillars and tensile members, allow for cultural flows across a span. Santiago Calatrava explores ideas of the structure of suspension bridges in his work. Looking at precedents such as the classic Brooklyn Bridge and Calatrava's various bridge projects inspired the design of the recreationists' bridge in Revelstoke.



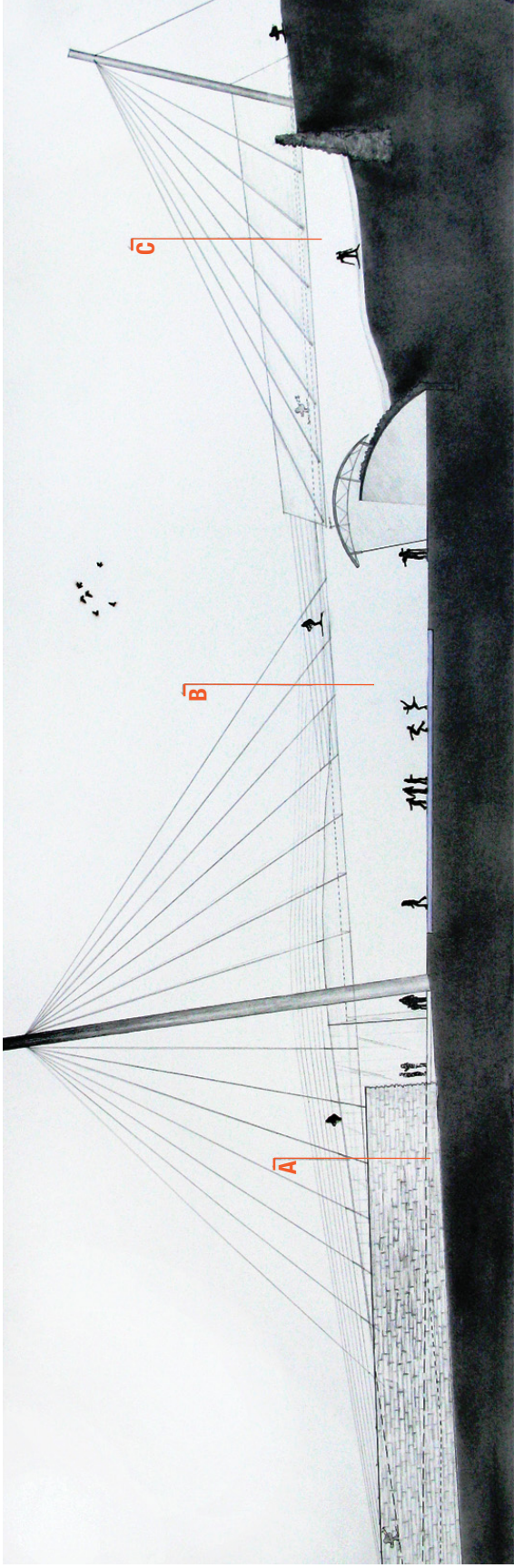
Brooklyn Bridge - suspension bridge.



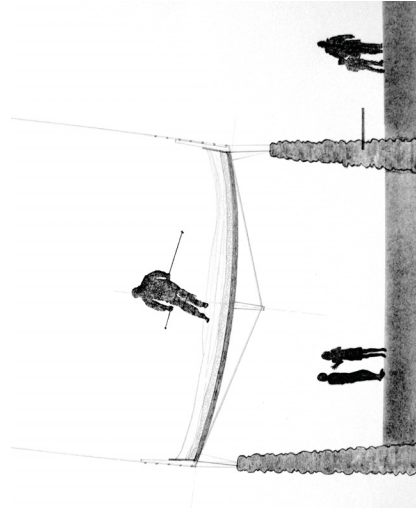
Calatrava, Bach de Roda - Felipe II bridge, Barcelona.
From Blaser, *Santiago Calatrava*, 123.



Calatrava, pedestrian bridge, Lerida.
From Blaser, *Santiago Calatrava*, 166.



Bridge elevation



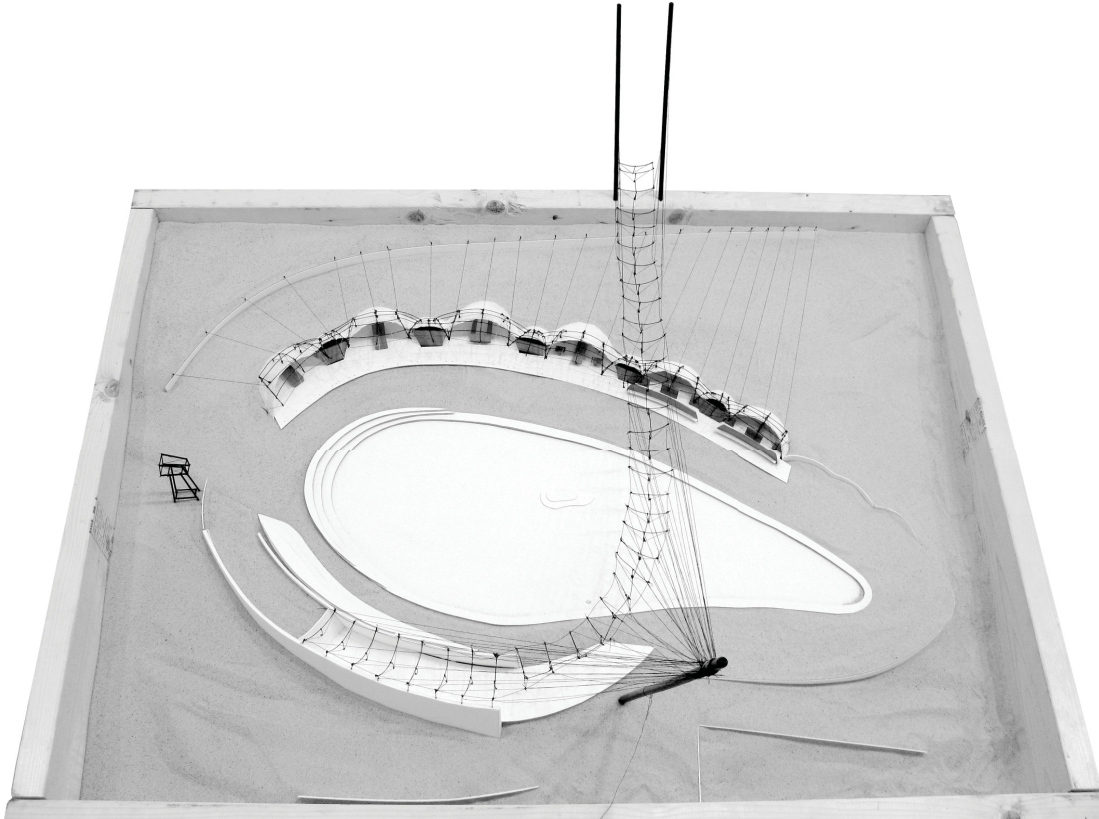
Bridge section C



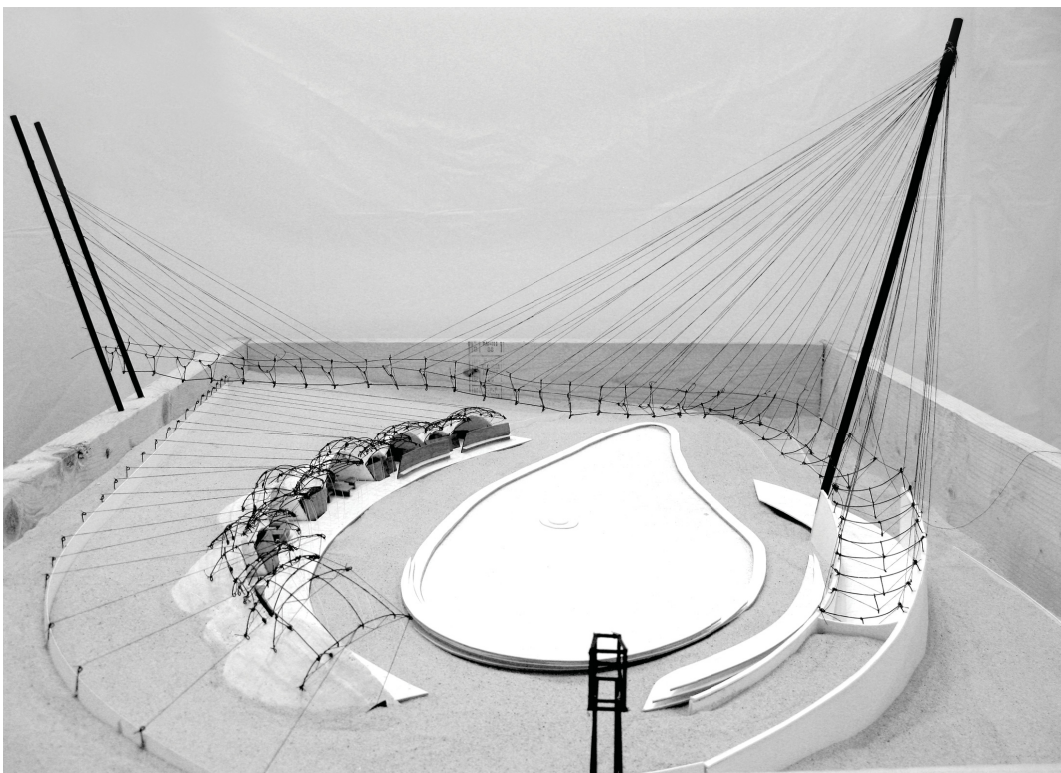
Bridge section B



Bridge section C



1:100 model of urban site



1:100 model of urban site

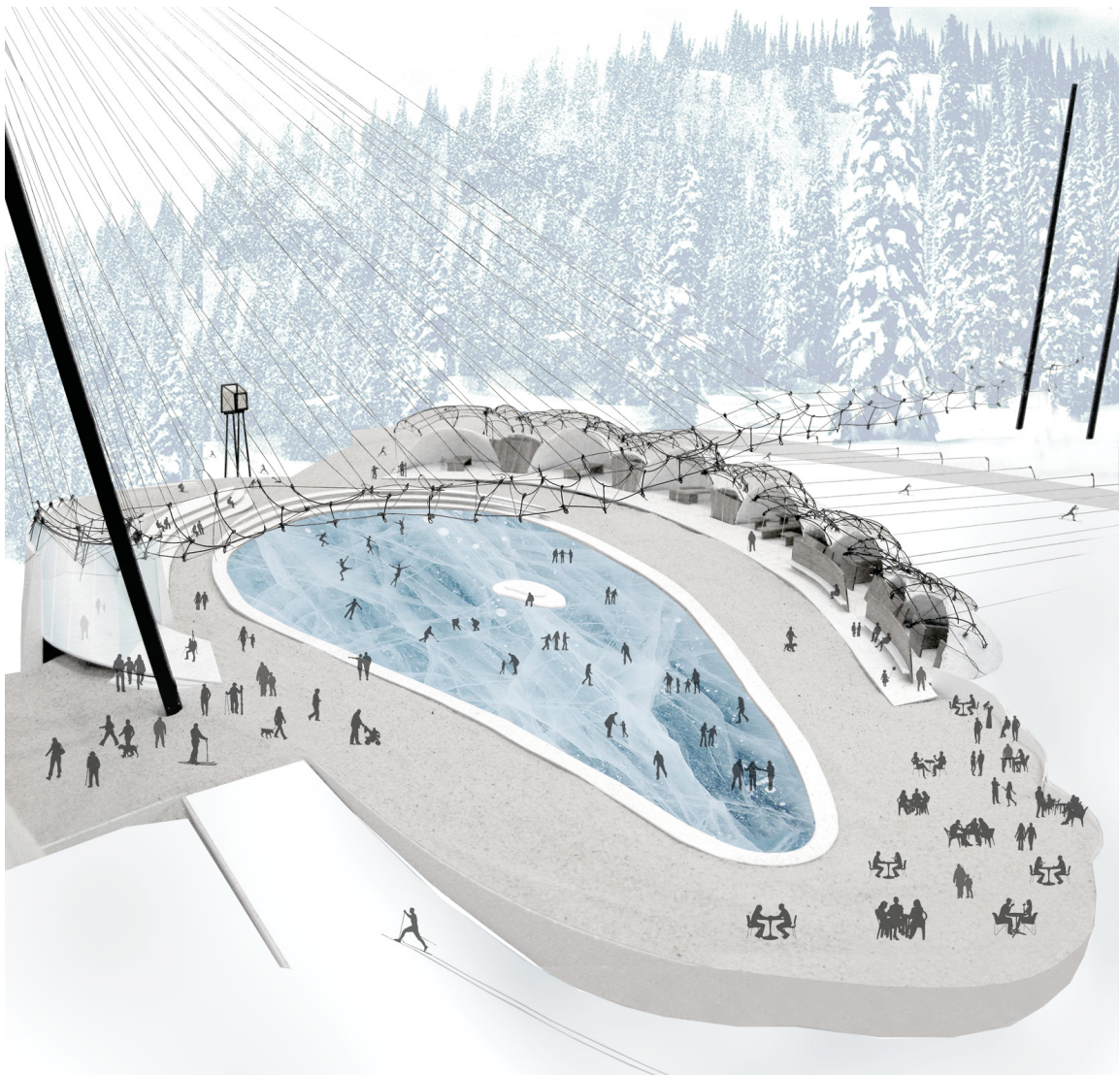


Detail of 1:100 model: bridge connection to urban plaza

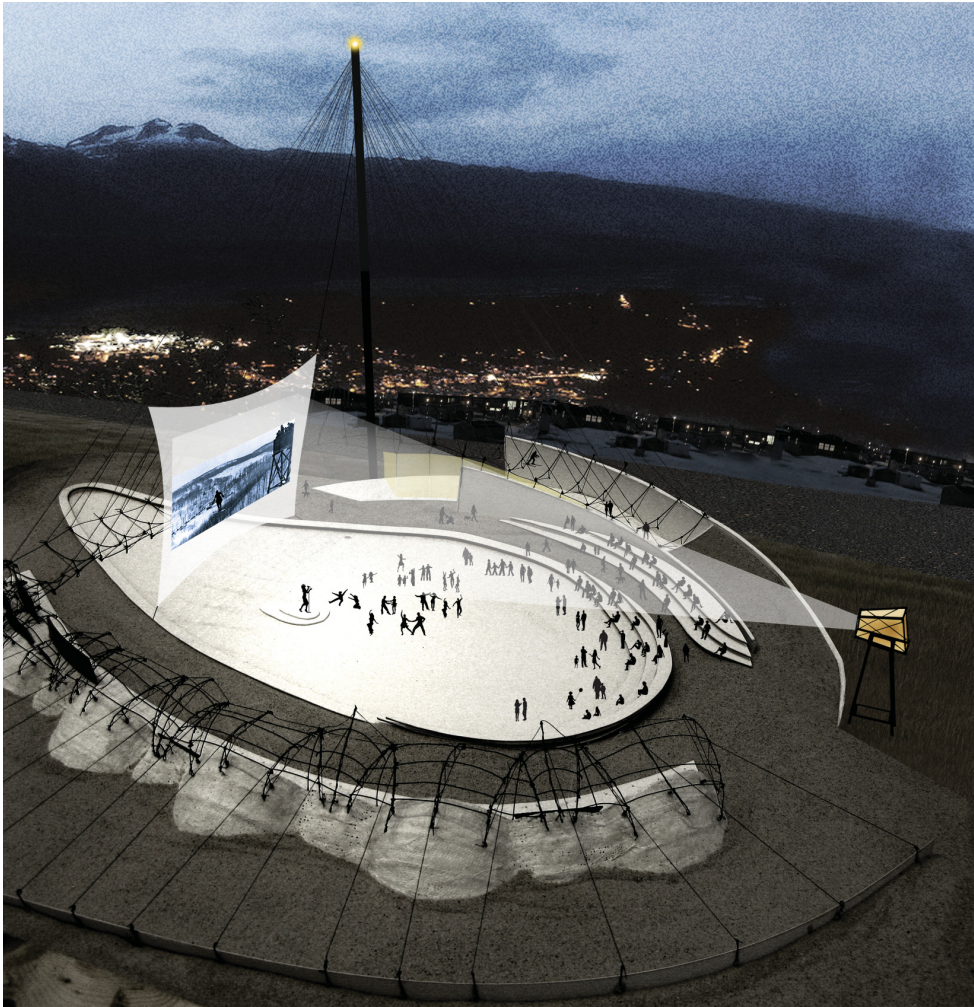


Detail of 1:100 model: uphill building structure

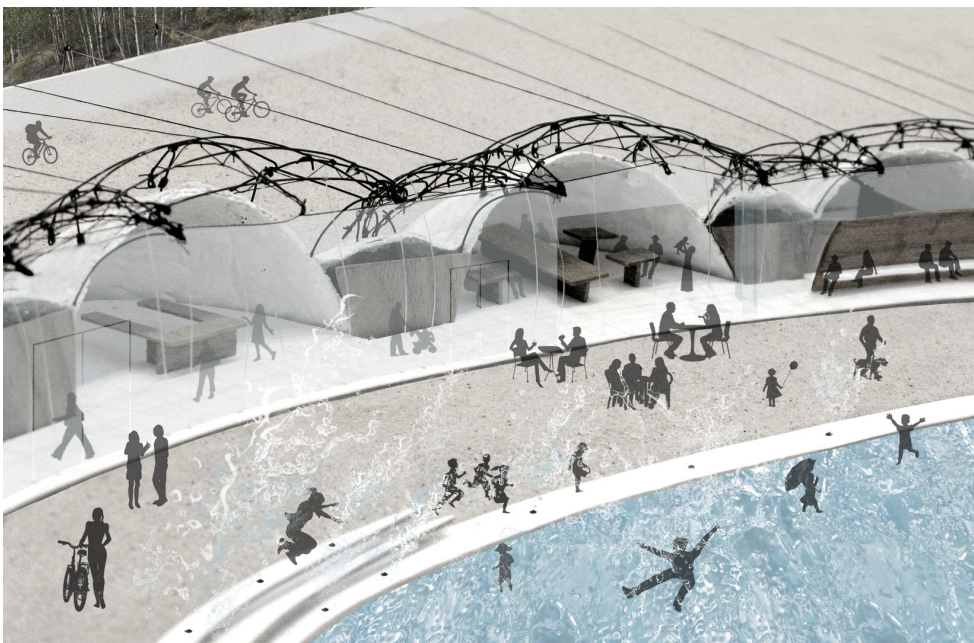
The design of the plaza recognized the potential community activities that could take place. In the winter, the space will be used primarily for ice skating. In the summer, the space could be used as either a splash park or a roller rink. In either season, the space will be used as an arrival / departure point for the national park, and could also be used for community events such as concerts and film screenings.



Rendering - winter



Rendering - community event

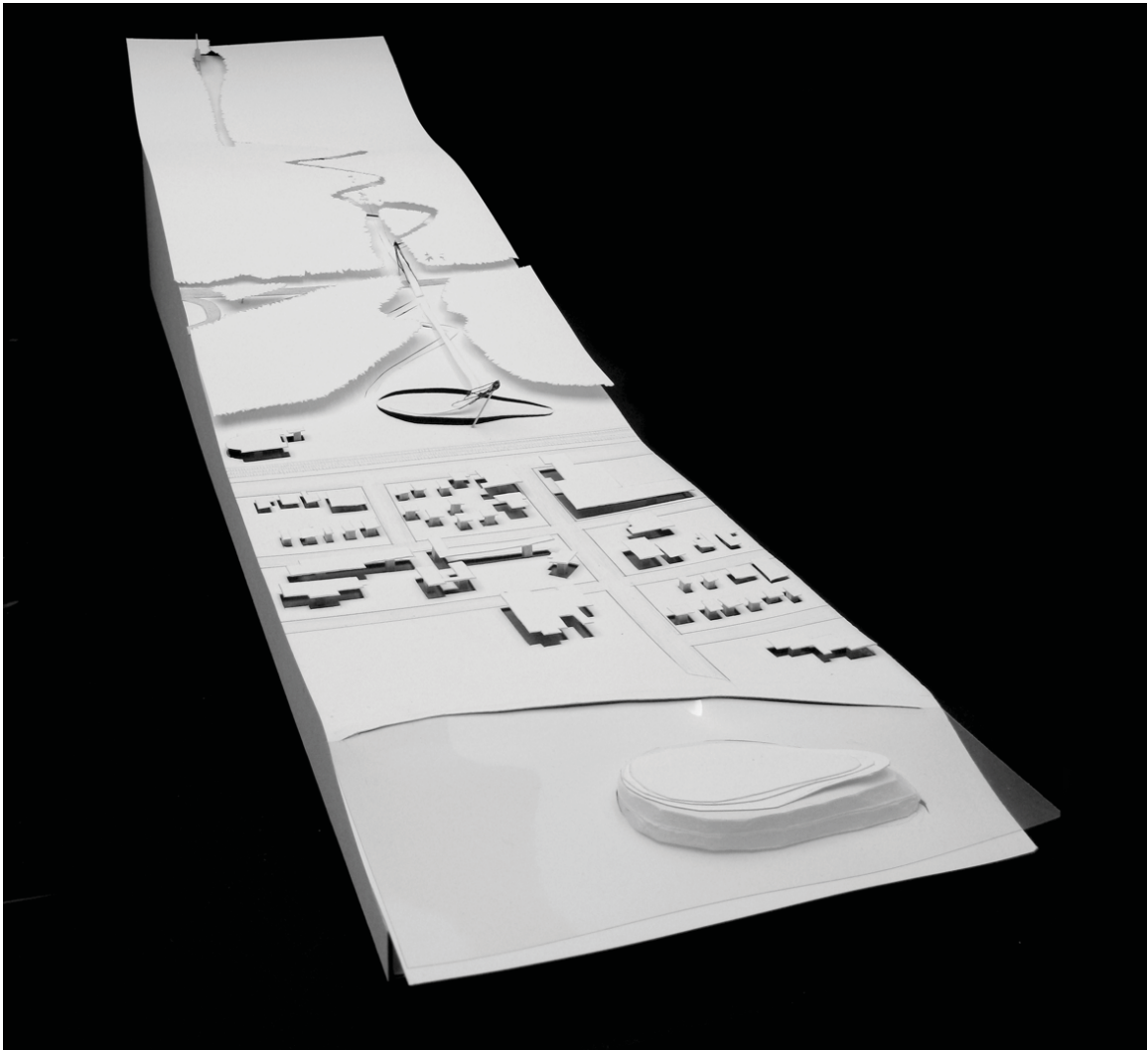


Rendering - summer

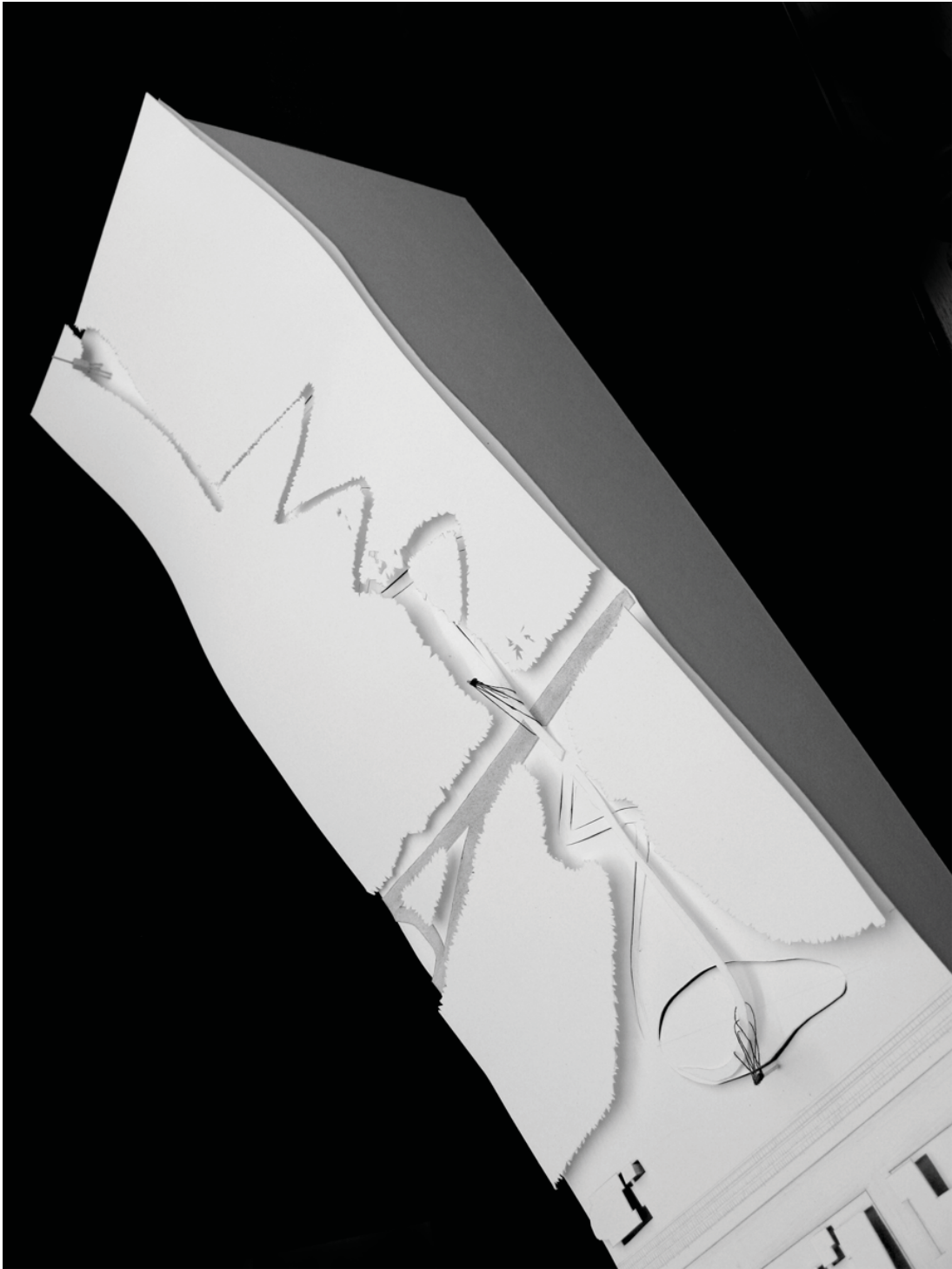
Rainforest Site

Site Scale

The public plaza is linked via an existing pedestrian trail to the Nels Nelson ski jump. Ascending recreationists switch back and forth along the steep terrain, while descending recreationists take a more direct downward route into the recreation hub.

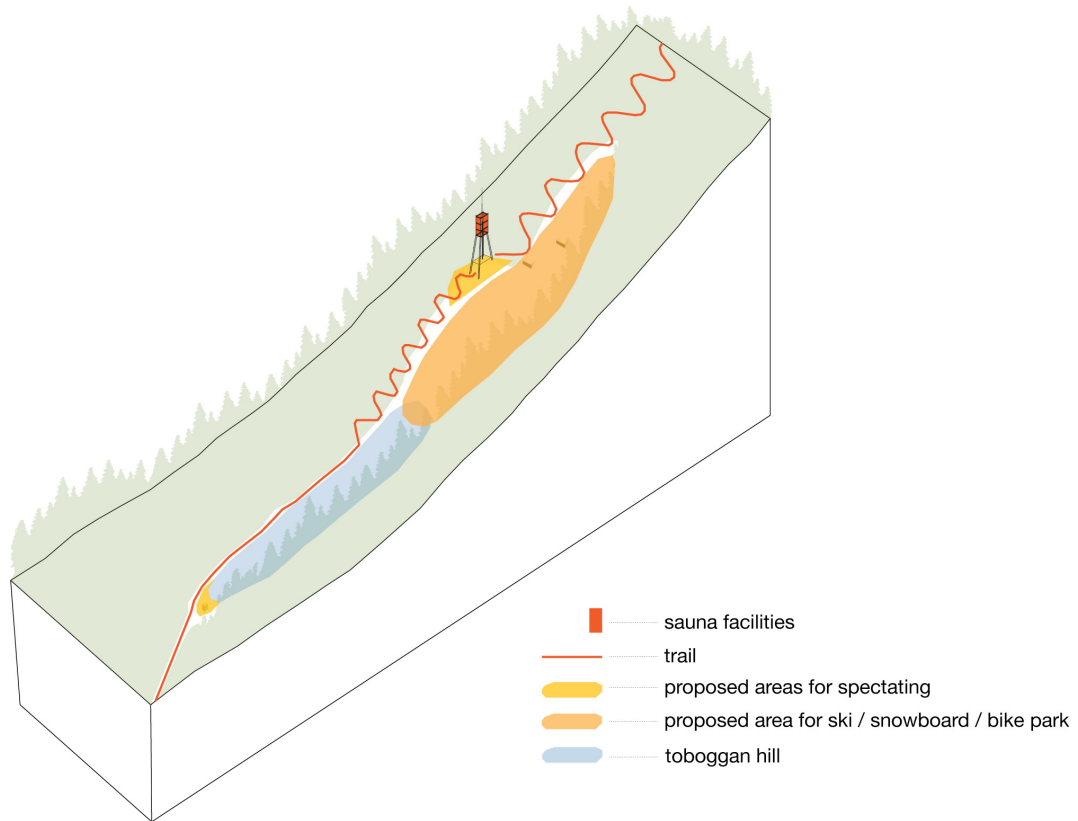


1:2000 paper model of urban to rainforest connection



1:2000 paper model of urban to rainforest connection

The former Nels Nelson ski jump site rises from a shallow slope at the bottom portion up to a considerably steeper incline at the top. The bottom portion is currently used as a community toboggan area. The top portion could be easily used as a ski / snowboard park during the winter months, and a mountain bike park during the summer. Considering this new program, adjacent support activities including areas for spectators, as well as a place of rest for recreationists, such as a sauna, are to be located in and around the steel judges' tower.



Nels Nelson hill, adjacent program space, and trail

Forces and flows around the ski judges' tower that are emphasized in the design are the flow from sky to river valley, as well as the memory of the former ski jump and new recreation program of the hill.



Collage of flows and forces at the existing ski judges' tower

The new sauna program of the tower requires heat, which could be generated using the forces found on site. The sauna pods could be heated using a combination of geothermal and solar power, with the use of a parabolic reflector.

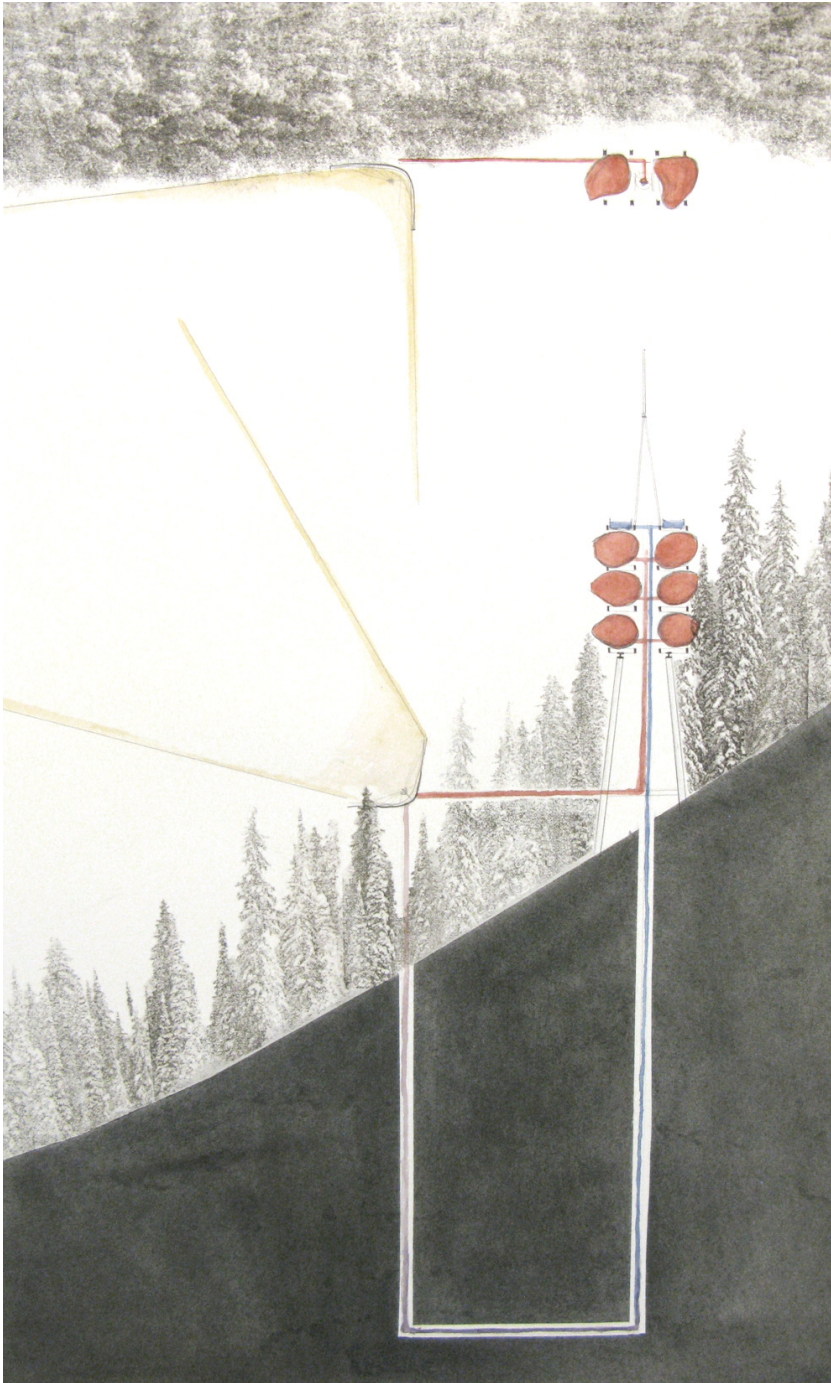
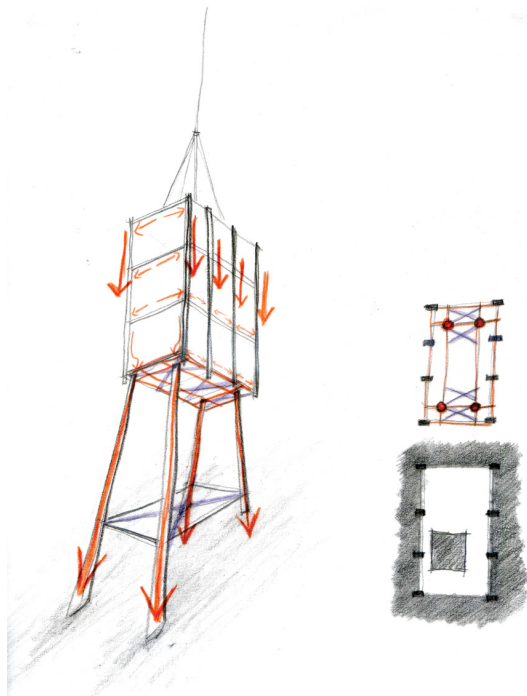


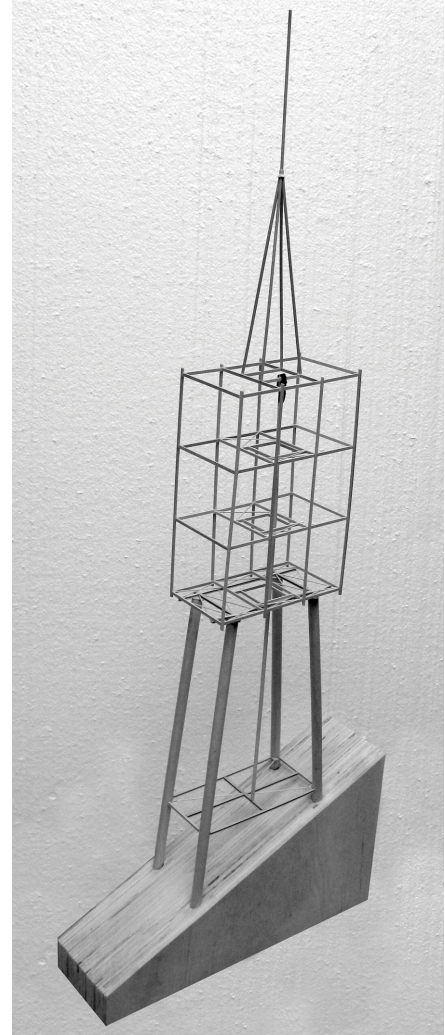
Diagram of combination geothermal / solar energy to heat sauna pods

Building Scale

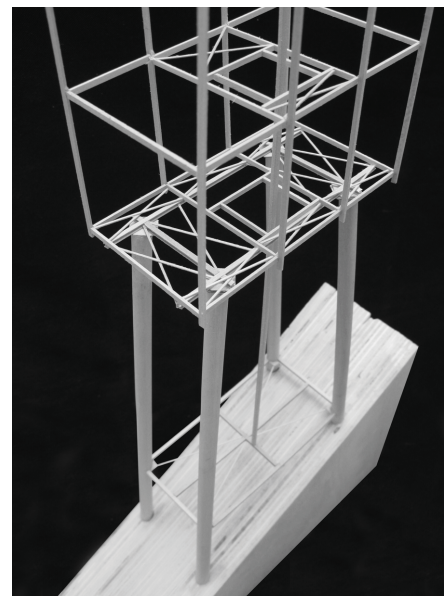
The existing forces of the building become apparent through the study of the construction drawings of the steel tower, as well as the construction of a structural model. The structure is entirely steel, with loads being transferred to the earth through columns on the exterior walls down through a support platform to the larger four main columns. This allows for the interior space to be open and free of structure (other than the structure for the spiral staircase).



Sketches of structure of existing tower



Structural model of existing tower

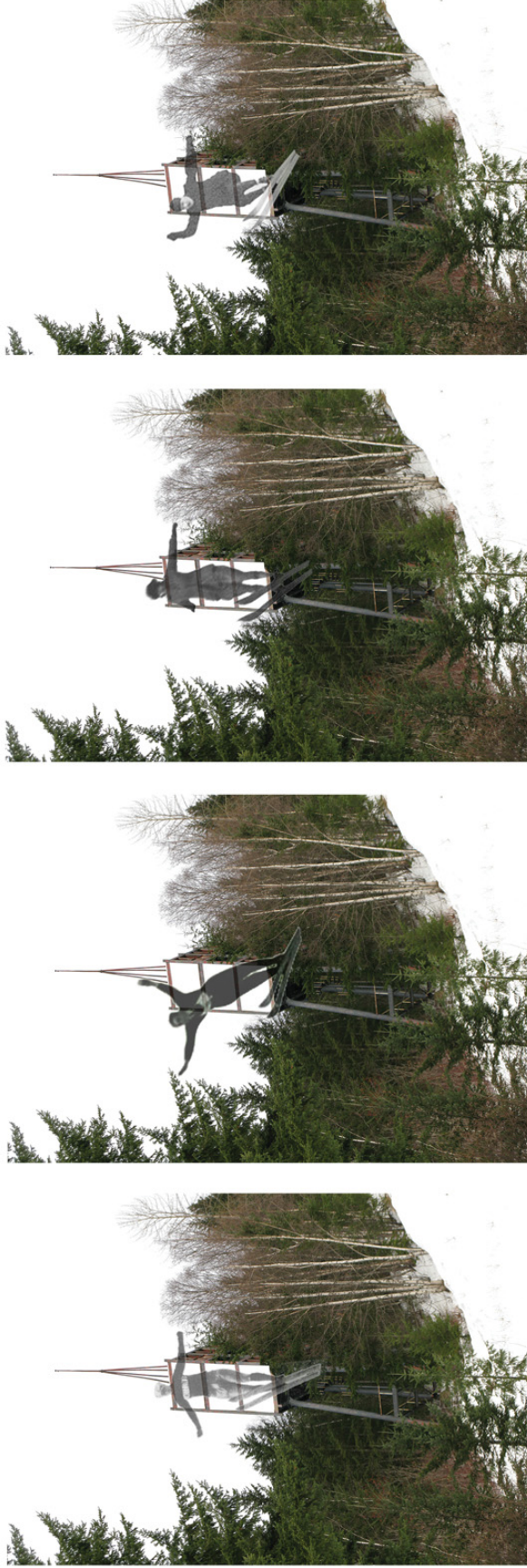


Structural model of existing tower

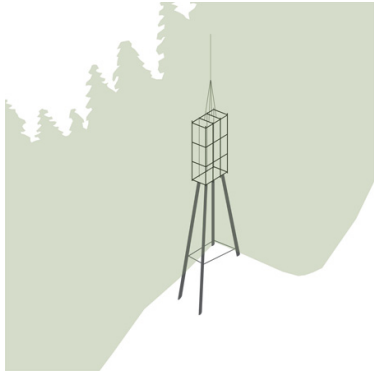
Given that the existing structure is an exo-skeleton, the design moves consider how the contents sit within this framework. Sauna pods are suspended in tension within the framework of the existing tower, with the pods expanding out of the framework to express the hot air expanding from within. The sauna pod forms are then adapted to emphasize the forces and flows present on the site.



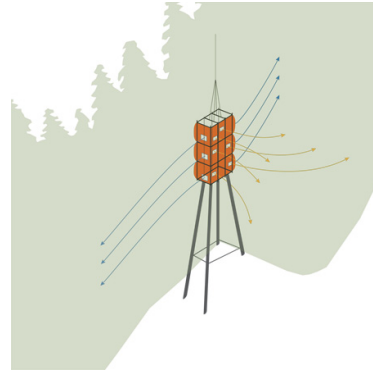
Sauna pods - forms expanding out of existing framework



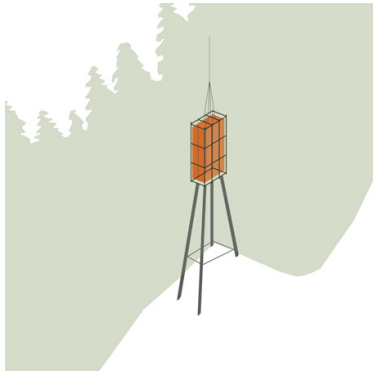
Photocollage of existing tower structure with historic ski jumpers - the body / steel structure as a framework that readjusts to allow for movement and gravity.



1. Existing tower



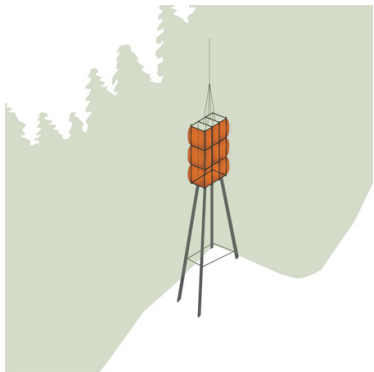
5. Frame views of forces & flows



2. Suspend program in tower



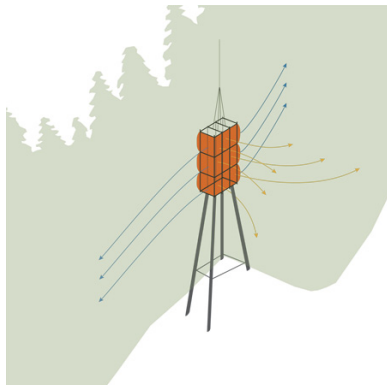
6. Stretch pods toward forces & flows



3. Program expands



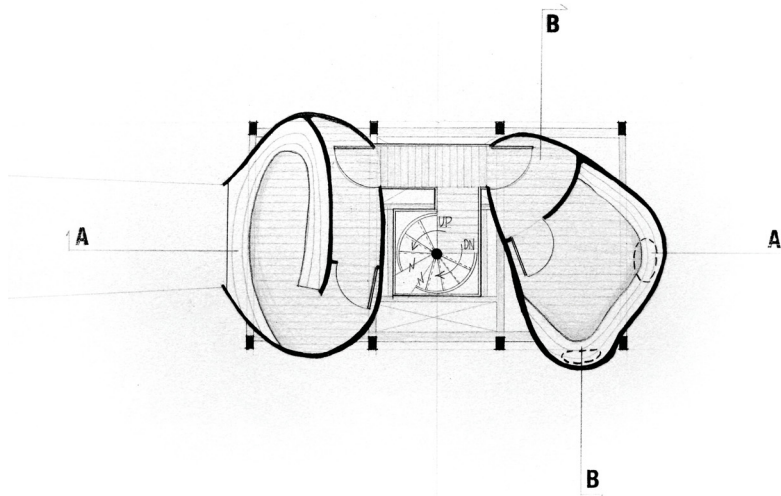
7. Cutout centre for vertical circulation



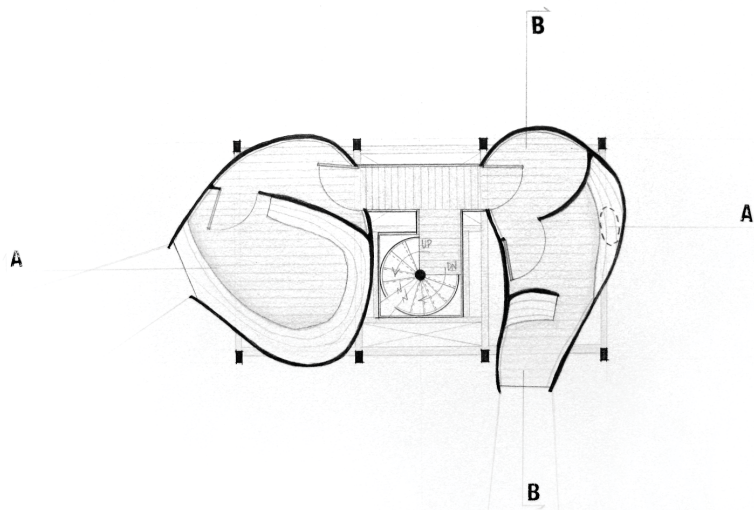
4. Identify flows & forces

8. Pull pods away from structure,
emphasizing forces

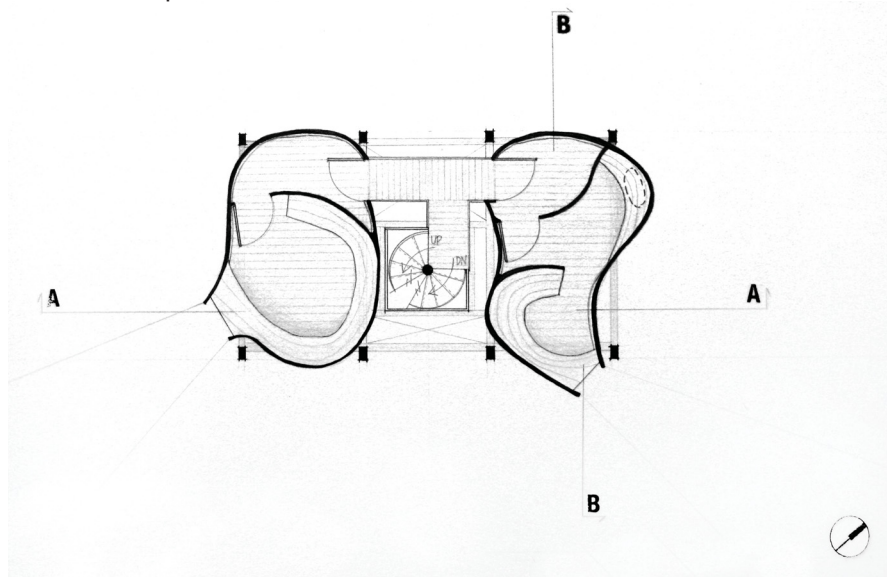
Eight steps: development of form within tower



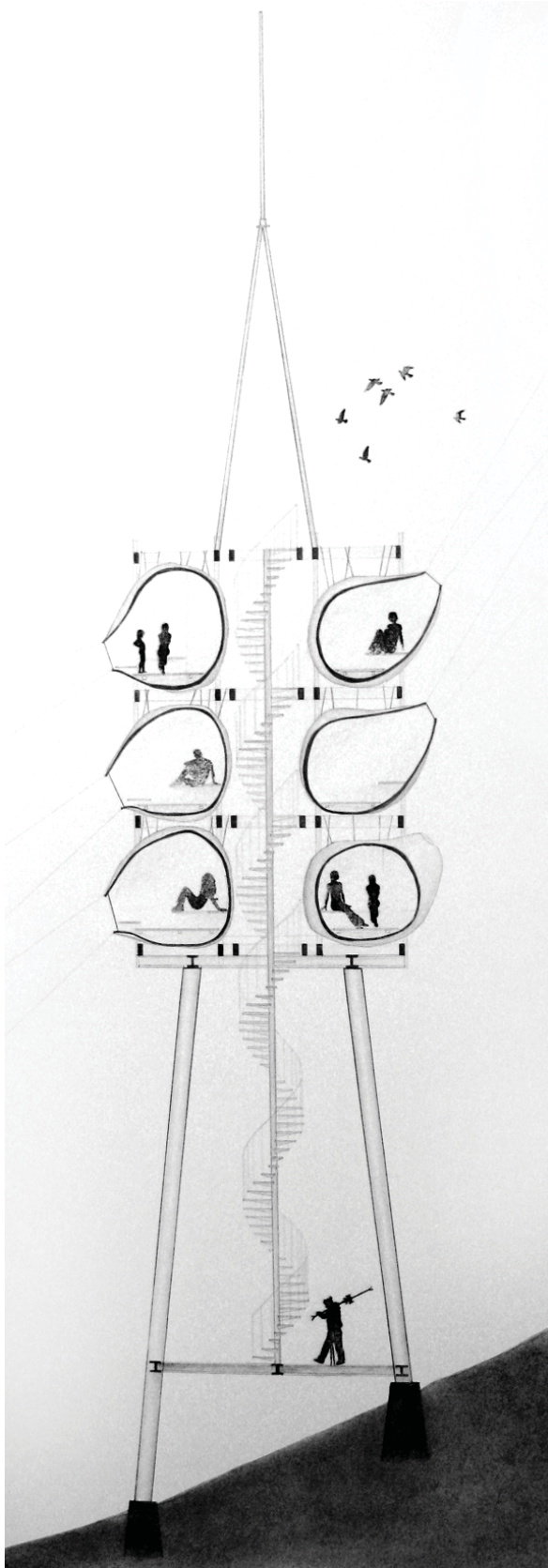
Third floor plan



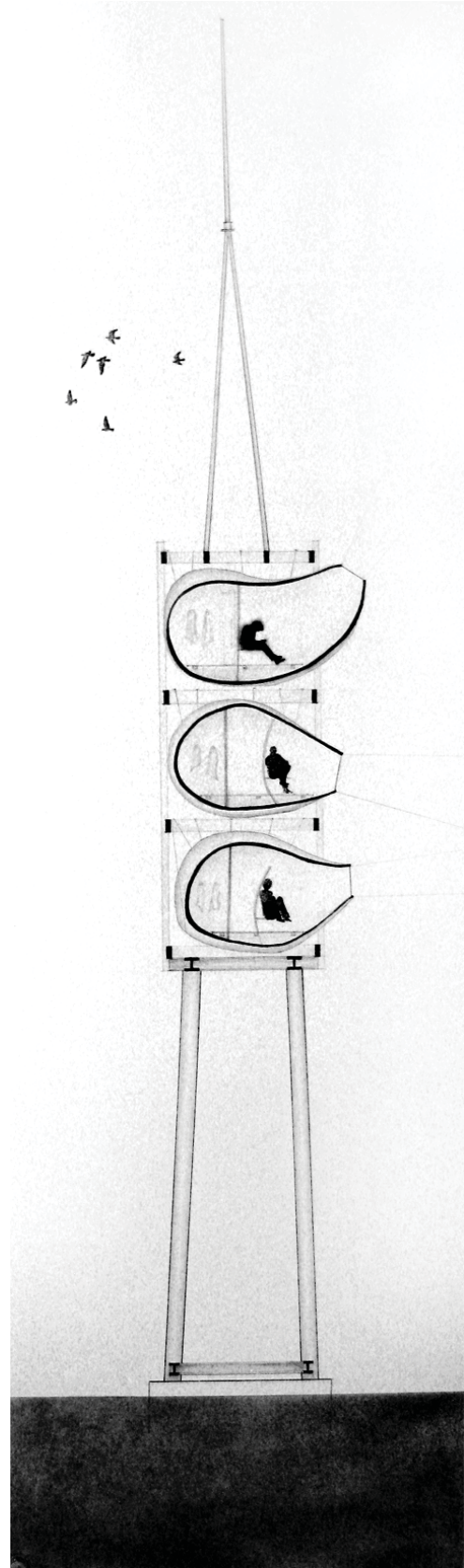
Second floor plan



First floor plan



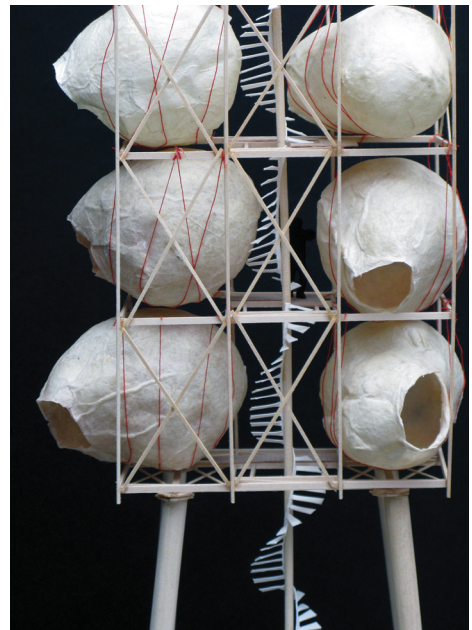
Tower section A



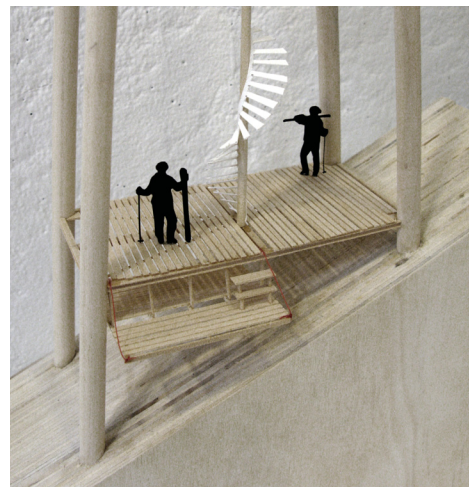
Tower section B



Tower model overall



Sauna pods



Entry platform



Interior rendering, view 1



Interior rendering, view 2

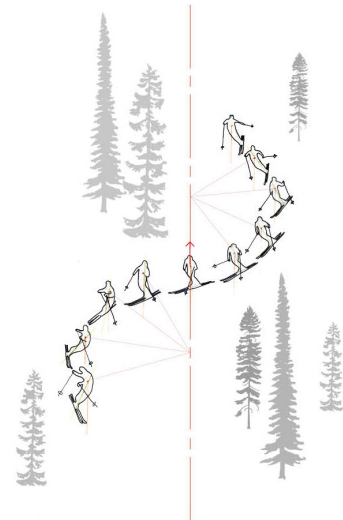
Snowforest Site

The key feature of this site is the interaction between the snow and the trees. As snow builds up and moves around a tree, a well in the snow is created around the base of the tree. This area can be hazardous for a recreationist; becoming trapped in these holes is common. However, tree wells on slopes can also serve as locations for emergency shelters. The snow formation is a natural place for a shelter on the downhill side of the tree, with snow acting as insulation. The trees also serve an important function in stopping the rapid downhill movement of snow, essentially creating barriers and resistance against the movement of avalanches.

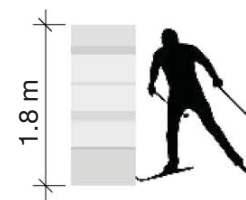
Creating an experience of how snow moves around trees on a slope was an important consideration for human intervention. Relating this movement of snow around trees to the architectural intervention creates a link between the users of the site and the landscape.



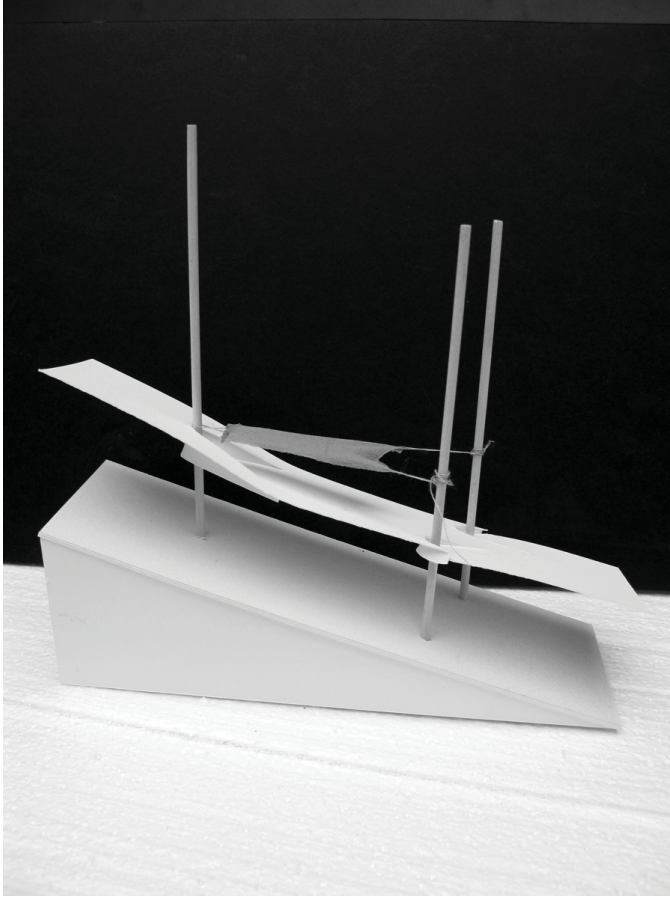
Sketch of tree well



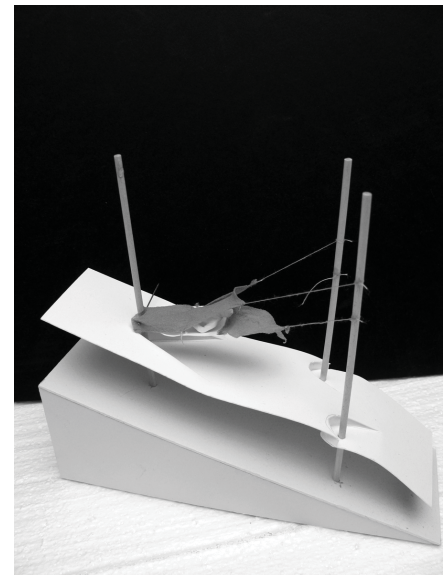
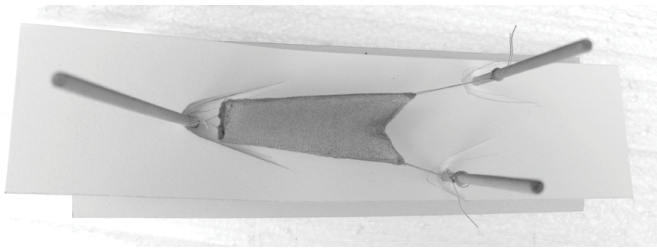
Downhill skiing - fall line and tension around a point



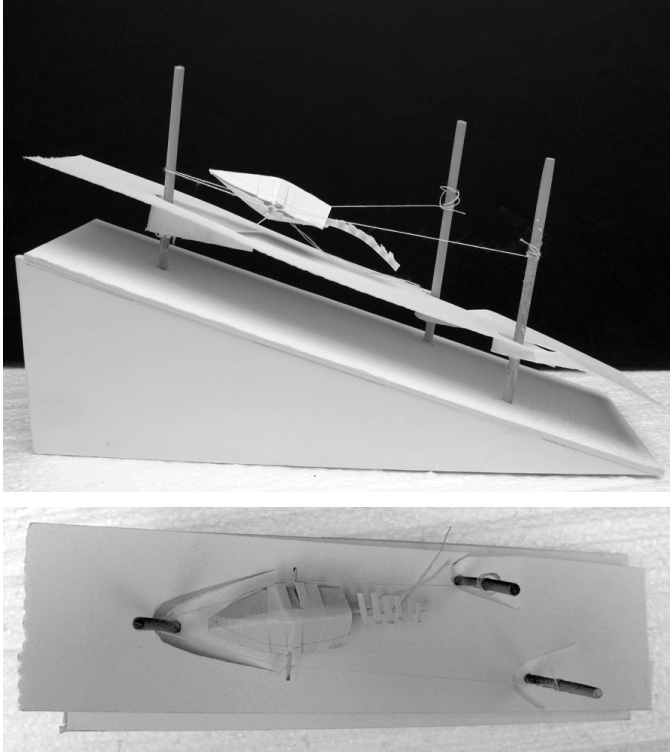
Snow depth at snowforest site



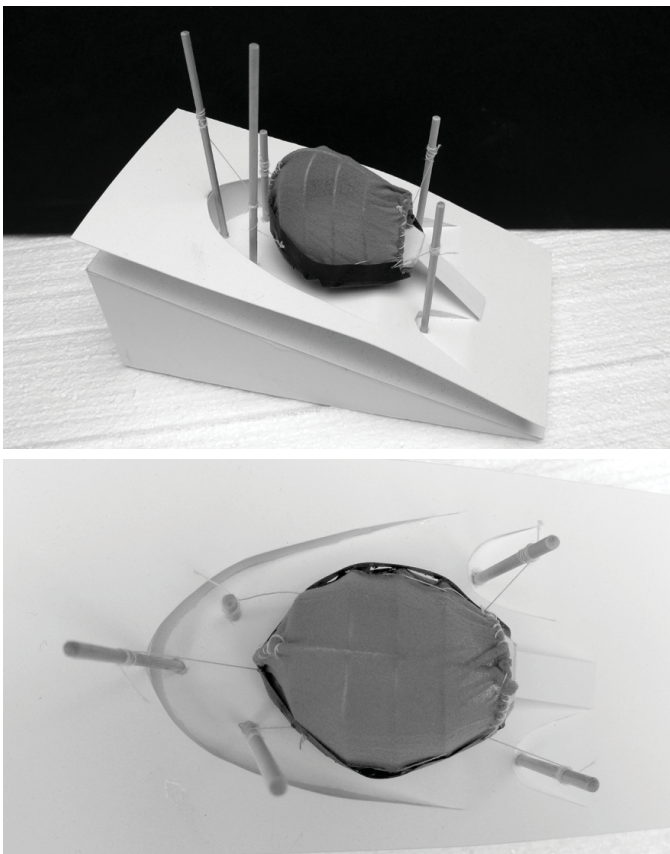
Trees, tree wells, and tension - study model



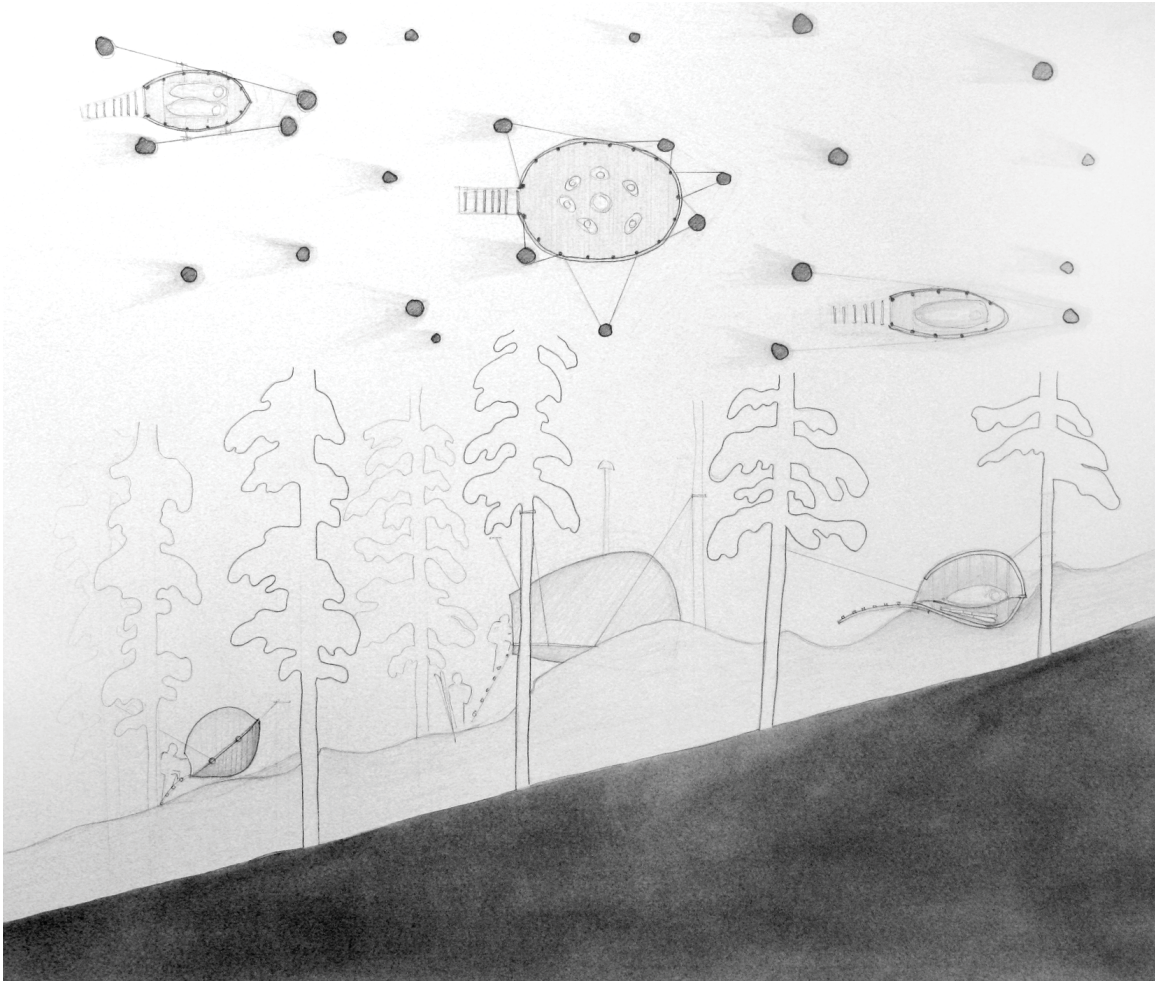
Trees, tree wells, and tension study model - snow as insulation



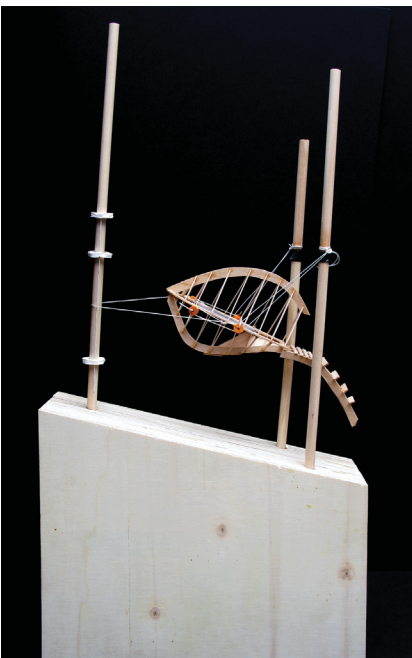
Sleeping pod in tree well - study model



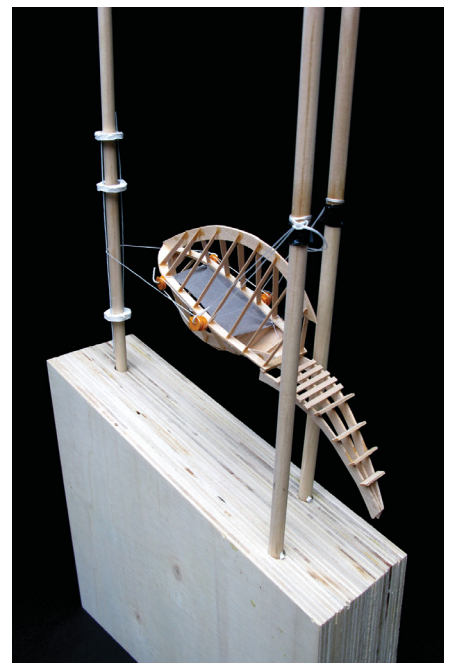
Larger communal pod in tree well - study model



Plan and section of snowforest sleeping pods



Model of sleeping pod

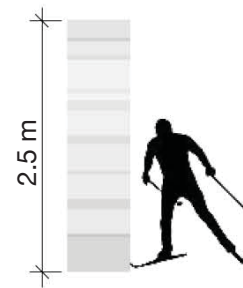


Model of single pod

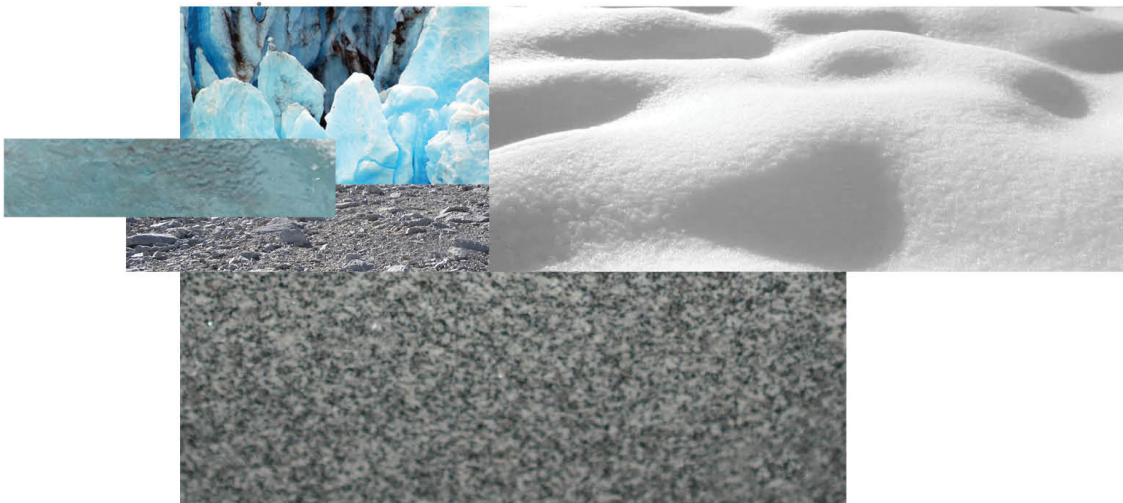
Alpine Site

The alpine zone in Mount Revelstoke National Park contains areas of icefields, with flatter terrain than the adjacent steep peaks. These areas experience a great deal of snow, ice, and water movement, which has created loose rock or glacial till.

The natural conditions of these sites were also integral to the construction and design of the architectural interventions. The very high snowfall on the site was a key feature. The architecture expresses a feeling of sinking into the landscape, and becoming intrinsically involved with the site itself. The habitable architecture develops as a temporary, seasonal construction.

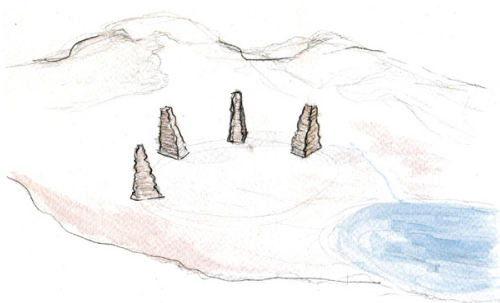


Snow depth at alpine site

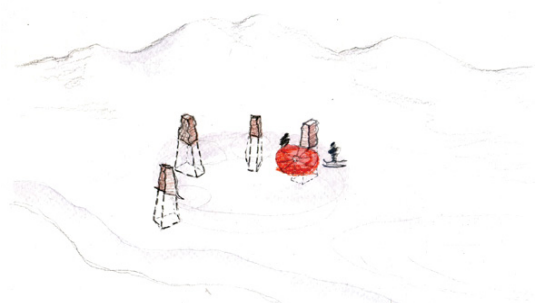


Available materials at alpine site

Using stone cairns as markers and entry points, the site location can be found during the winter, when snow depths can reach up to 2.5 m. Creating ice shelters using inflatable membranes will ensure that the occupation of the site becomes temporary, and leaves no permanent impact on the landscape. The formation of snow cornices at ridges led to an idea of using the form of the rocks to form the snow in preparation for the ice shelters.



1. Cairn construction during summer



3. Ski mountaineers find site location

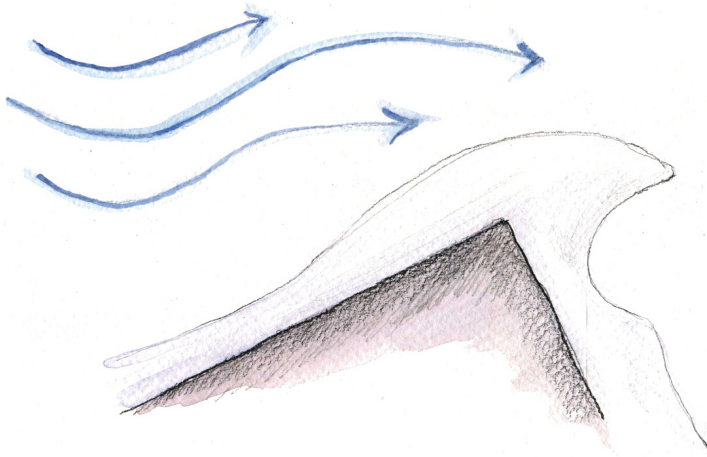


2. Cairns during winter

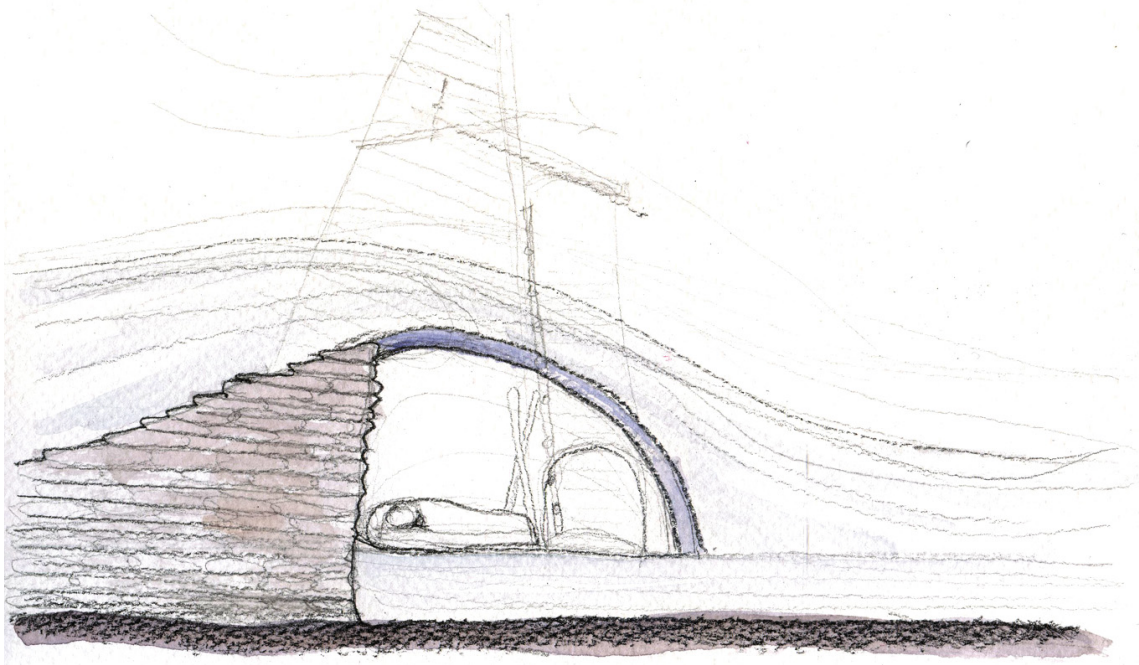


4. Ski mountaineers construct temporary shelters using removable inflatable membranes and water

Seasonal order of construction at alpine site



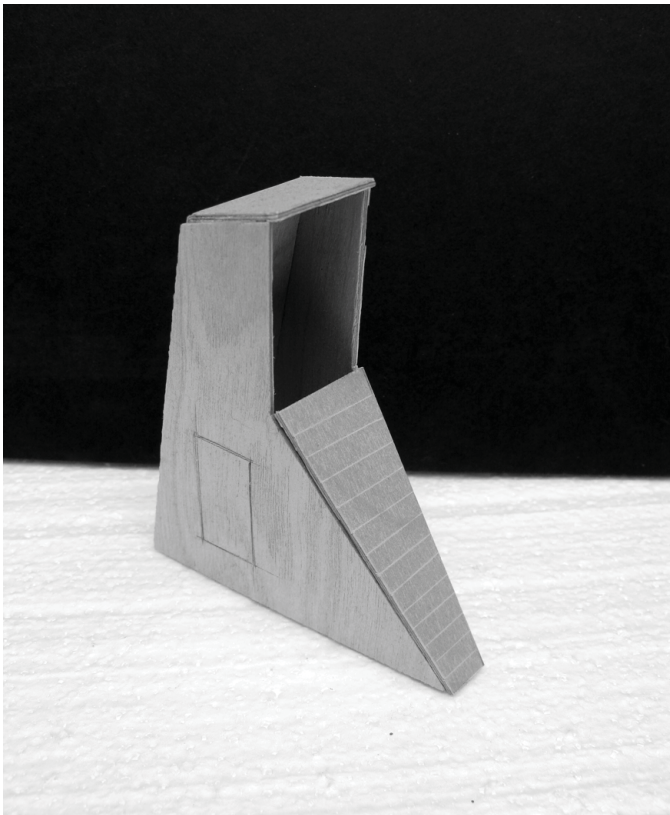
Snow cornice formation sketch



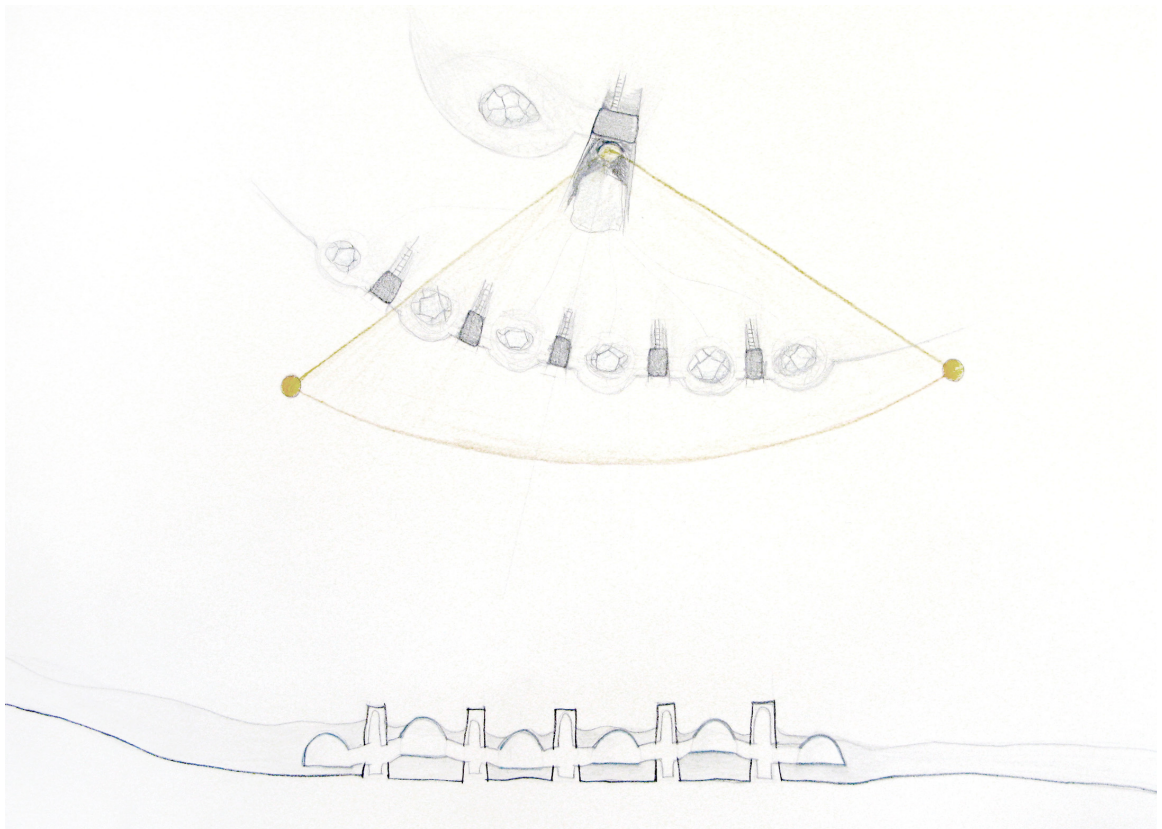
Snow cornice and ice shelter schematic sketch



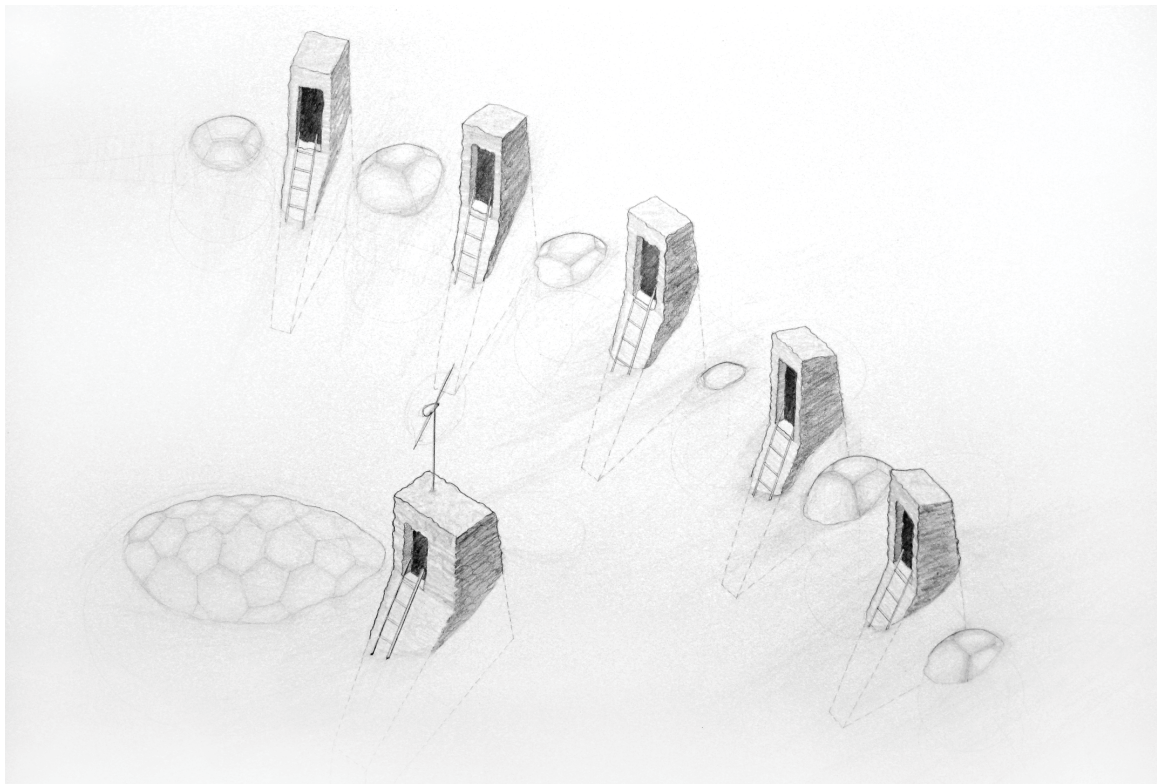
Inflatable membrane model



Study of form of stone cairn



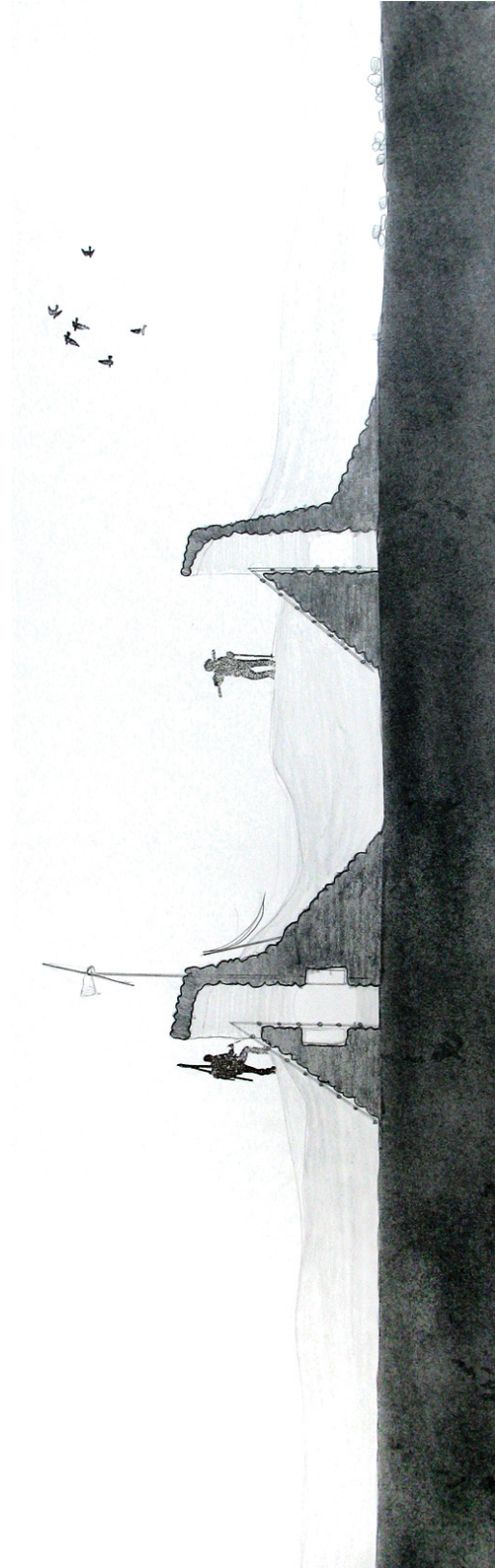
Site plan and section of alpine site



Axonometric view - winter



Section through ice shelters



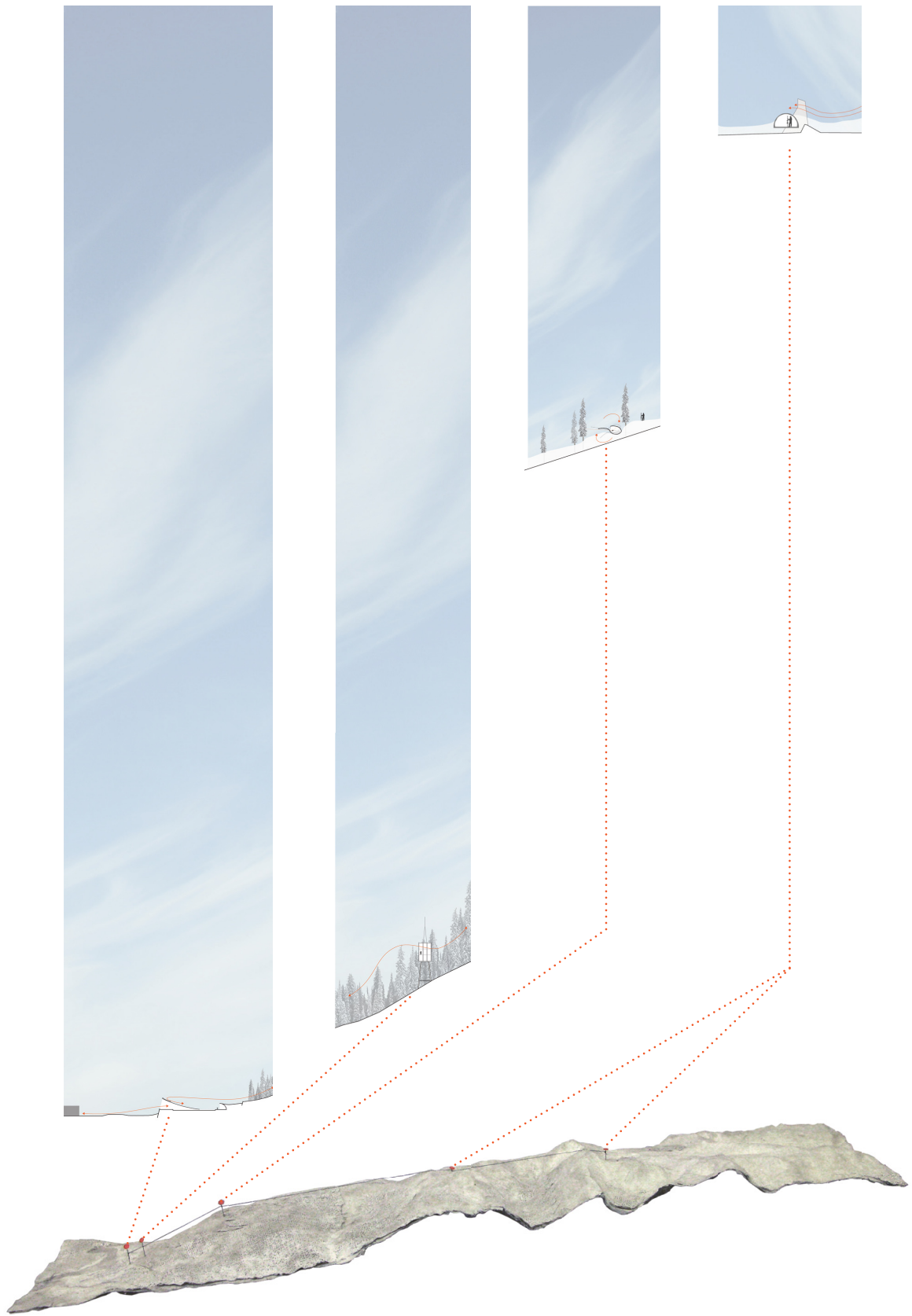
Section through stone cairns

CHAPTER 5: CONCLUSION

The relationship that human culture has with the landscape is clearly demonstrated in recreation's shifting correlation with nature and the transition toward corporate based recreation. This study began as an investigation of the connection between recreation and nature, as well as recreation and community. It intended to determine methods of creating a reconnect between recreationists, nature and community in the mountain city of Revelstoke, British Columbia.

The proposed public recreation facilities investigate methods of emphasizing natural forces and their connection with cultural flows. By considering the interaction of a skier with the landscape as a demonstration of the interconnectedness of the forces of gravity with the body's capacity for movement, a method of determining architectural moves was defined.

This understanding of the importance of creating a clear expression of structure, as well as a thorough consideration of site conditions and culture, can be carried forward in future study.



Mountain recreation route and site sections

APPENDIX: THESIS EXAMINATION PRESENTATION



Alpine site

Snowforest site

Rainforest site

Urban site

Overall recreation route

Experience of nature and skiing

Site study

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