

**A New Nature:
Architecture as a Mitigator Between Society and Nature**

by

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ABSTRACT

Urban society perceives that in order to be exposed to the wild nature a considerable distance must be travelled, yet there is a desire for this exposure: a call of the wild. With few formal outlets for society to be educated in how to interact with the wild of the backcountry there is a substantial potential for fatal consequences. This call of the wild is resulting in a paradox: an overexposure of one will destroy the other.

According to a growing body of research, dwelling in urban centers is causing society to suffer from “Nature Deficit Disorder”, and an exposure to nature is the remedy. This thesis aims to explore architecture as a potential mitigator between the impacts of society and the wild on each other. Through considering alternative paradigms of development with parameters restricting the impact upon the wild, a radical architectural response to the paradox is developed.

ACKNOWLEDGEMENTS

This journey has been long, and is not over yet. There are many whom I would like to thank, and a few I would blame for the path I am on. This path has not been direct, but in hindsight it appears to have a consistency.

Without my family's understanding and support this would never have been possible. You have instilled my values and beliefs through loving guidance and allowing exploration, even if it resulted in arguments. I love you.

Thank you to my teachers of trade and the many lessons you have taught me; eschew verbosity: the meaning of a millimeter, tolerances in assembly, paths of least resistance, the quality of craft, how care for a process can be perceived in a final product. These lessons I have found to be constantly applicable.

Dalhousie University, without this institution this project would not exist. Thank you Emanuel Jannasch for your tireless availability and willingness to explore concepts outside of the convention, your stubborn passion has fueled my will to see this through. Thank you Leon Katsepontes for your inspirational insight and blunt rhetoric, the conviction you brought to this concept emboldened me through the defence.

Thanks to the rocks for lessons in patience.

CHAPTER 1: INTRODUCTION

In every walk with nature one receives far more than one seeks. (John Muir, 19 July 1877 Browning 2014, 6)

How can architecture bring the greatest amount of people to the wild without destruction?

The nature of this question is bilateral in essence, for an overexposure of one will destroy the other. People need a connection to nature and direct interaction with the environment is essential in connecting people with nature, however overexposure of the elements can be fatal to people just as overexposure to the built environment is fatal to the grown environment. This thesis demonstrates how dwelling with nature is possible at a contemporary scale by mitigating the impact of people on nature and nature on people through the conscientious use of architecture and technology.

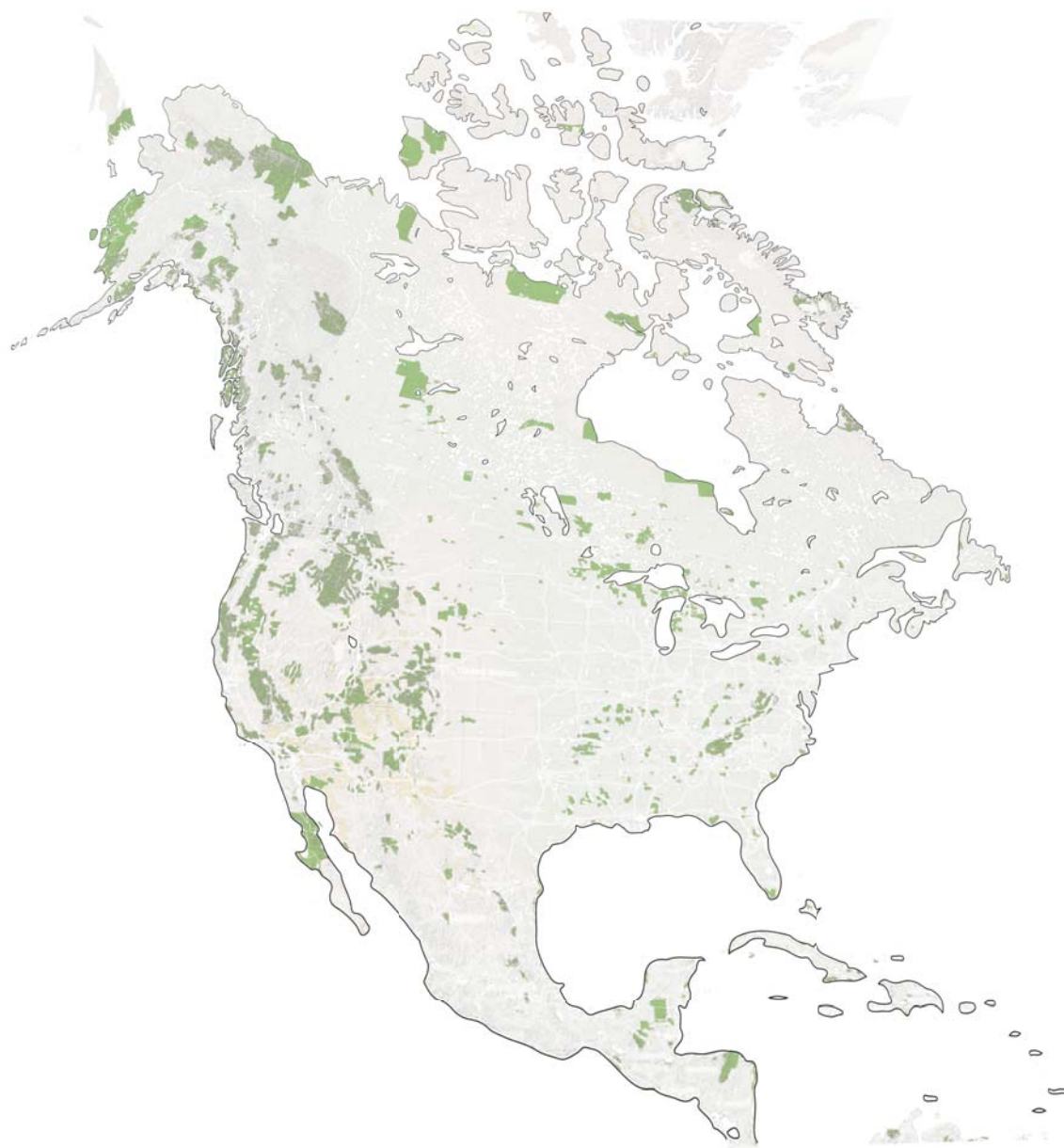


Walking on Dover Island; getting exposed to the wild.

PEOPLE ARE MOVING AWAY FROM NATURE

Less than 20% of the population in Canada lives in a rural area, and urban area populations are growing faster than that of the rural (Proudfoot 2017; Stats Canada 2017; Stats Canada 2015). This trend has been steady since confederation. As the urban environment expands the natural environment is infringed upon, and people living within the urban areas become increasingly separated from the wild (Stats Canada 2017; 2015).

As a society we have protected certain areas of remaining wild nature with the designation of parks. The national park network is extensive across North America, many with an urban population within a reasonable distance that could utilize the resource to invoke biophilic responses.



Park land of North America. Original map adapted from Google Maps.

PEOPLE WANT ACCESS TO NATURE

With more of the global population expected to be living in urban centers than ever before, we expect a greater disconnect between the urban population and what lies beyond the border of the city. Cohabitation between human and the environment is a concept that is emphasized early by Ian McHarg (1992, 53), and is a vital for the development of a holistic collaboration between society's desire to experience the thrill of exposure while allowing future generations to do the same.

This return to nature, the new call of the wild, is a direct response to the desensitization from the environment that has been created within urban and suburban developments. Nature deficit disorder (NDD) as initially defined in Richard Louv's *Last Child in the Woods* has categorized the impetus for society to heed this new call of the wild. (Louv 2008). The dissociation of society from nature is the root cause of NDD, and the initial response is to go in search of an exposure to the lacking element of nature (Louv 2008, 10; 2012, 3). The push for an exposure to nature and a biophilic response can be seen in the increase of park visitation

which is leading to issues of overcrowding (Ciolfi 2018; NPS 2018; Turkewitz 2017).

Here is where a complex paradox emerges:

- As society pushes further into the wild in search for a response to NDD with the same standardized developments a they are accustomed to, they end up destroying the very essence of what it was they were searching for, this is the piecemeal of sprawl;
- Without developing an architectural intervention to allow for an exposure to the wild then society cannot survive, for we have lost the ability to withstand the full exposure of the elements for any prolonged period of time. We simply rely on our application of technology to survive at any scale.



Countering Nature Deficit Disorder (NDD) through camping.

DEFINING NATURE

Nature, originating from the Latin word *natura* for birth, shares the root word with nation (Macy and Bonemaison 2003, 1-4). The nation from which a society defines itself is greater than merely that of the materials which exist, but how they utilize the potential energy of the environment. The relationship of citizens and the environment depends on the relationship between the two; and just as a nation born of its environment, society must also be a steward of the land. In order for a society to have an appreciation for nature there must be a relationship that comes from an exposure to the grown environment, going into the wild (Parks Canada Agency 2014).

The perception of “pristine wild” is a manufactured application to landscape, a systematic treatment of the land since colonization, by limiting the allowed development of an area. By limiting the allowed development of an area there is an essence applied technology. This understanding of the land reveals that there is a value to the naturally grown which is greater than that of the materials which exists in their raw form. Within Heidegger’s investigation of

technology comes the discussion of potential energy existing within nature.

Such challenging happens in that the energy concealed in nature is unlocked, what is unlocked is transformed, what is transformed is stored up, what is stored up is in turn distributed, and what is distributed is switched about ever anew. Unlocking, transforming, storing, distributing, and switching about are ways of revealing. But the revealing never simply comes to an end. (Heidegger 1977, 16)

THERE IS A TENSION BETWEEN PEOPLE AND NATURE

People have different tolerances to exposure of the elements. The amount of time and conditions that anyone is able to withstand depends on their personal ability as well as the provisions they bring. In order to be exposed to a pristinely wild condition one must pack the appropriate supplies. The etiquette of this is commonly referred to as “Pack in, pack out”, and the concept is relatively simple: bring what you need and leave with what your brought. This concept results in a spartan resourcefulness with human powered endeavours. Technological applications have the ability to increase the distance of travel into the wild, but the concept remains the same (Parks Canada; Trails BC).

Under appreciation of the consequences that can occur can quickly result in fatality in the backcountry: avalanches, falls off cliffs, and overexposure to temperature are all common occurrences (Parks Canada 2017). The only way of mitigating the dangers of exposure is through individual decision making, which only comes from guided exposure; therefore for more people to have an understanding of the required decision making, which includes packing, trail finding, setting camp, there must be an established scaffold of infrastructure supporting the exposure at an institutional scale.

DEFINITIONS OF NATURE ARE CAUSING TENSION

The way in which we have defined nature by our technology is problematic and lies at the root of the tension between society and the wild. The way in which we have applied technology to define where in the wild visitors are and are not permitted crafts a definition of nature that is problematic.

In this perspective, technology is being defined with it's original definition. The greek roots of the term "technology", has an early Greek word tekhnologia, combine

tekhnē for "art, craft, done with an inherent knowledge" with the suffix logy meaning "discourse, theory, or science", referring to "a systematic treatment", from combining tekhnē for "art, craft, done with an inherent knowledge" with the suffix logy meaning "discourse, theory, or science" (Gill 2008). Therefore, in its earliest meanings, technology refers to a systematic approach that continues a dialogue of a process which is carefully constructed. The realm of technology is all encompassing of contemporary human endeavours: from political bureaucracy, engineering and architecture, to the liberal and classical arts. Technology defines culture and style, for this is the essence of the technological.

Within this definition, the definition of nature has become WHAT and this is problematic because WHY. As Heidegger points out in *The Questions Concerning Technology*:

Technology is not equivalent to the essence of technology. When we are seeking the essence of "tree," we have to become aware that what pervades every tree, as tree, is not itself a tree that can be encountered among all the other trees. (Heidegger 1977, 4)



Trails and networks of the forest around Squamish, British Columbia.

Heidegger also divides technology into two distinctions of a means to an end, and a human endeavour, together forming causality. Therefore technology is the means to an end of a human endeavour that manifests itself in the revealing of intention, but this is not an answer without more questioning. Thus, as an apparent solution to the initial paradox of society and nature, we must apply technology as the means to our ultimate end of cohabiting the wild while not destroying it or being destroyed in the process.

THE APPLICATION OF TECHNOLOGY TO NATURE

What is nature within this context? Upon initial observation the potential energy existing within nature appears to be the embodied energy within the existing resources, but what about the potential of people in nature? Heidegger sidesteps the habitation of people within nature and the energy they bring by elevating humanity above nature (Heidegger 1977, 27).

Before this can be further addressed, or indeed the issue of nature, technology must be brought further into the discussion. The

assigning of purpose to an object gives it a value that can be applied to a technological process. A consciousness towards nature is required to apply the full potential of the resources available. The full potential is greater than that of just the materials that exist and how they can be extracted, an inherent value exists within the land and its organization, and this brings us again to nature.

Macy in “Architecture and Nature” states that a nation’s identity rests within the perception of the landscape. This perception of applying a system of appraisal that will reveal the inherent qualities of a nation speaks back to an essence of technology applied (Macy and Bonemaison 2003, 1-4). Therefore, the potential energy that exists is greater than that of merely the present materials but also how the land is organized. Much like how a chord of timber can be prepared to release the sun’s energy over a winter, an automobile can wait in a driveway before travelling great distances, the mountain can be prepared to elate the explorer. If nature is the birthplace of a nation, the existence of a culture, and the required reserve for technological process to flourish, should there not be some more

consideration to what is this “nature” and how we interact with it? Macy finds that the “pristine wilderness” of North America is not natural but a creation of colonization by the western world. In order to have a pristine wilderness there has to be an absence of perceived culture. This is a process of implied intent, a systematic treatment of the land, therefore a form of technological application.

If wilderness is a manufactured concept then what is its intent, and what type of value does it hold? Let’s consider that this manufactured notion of wild as uninhabited is an archaic relic and no longer hold a place within the global discourse. Without an installed value the wild becomes an obstacle to development, or perceived as an underutilized resource, and being uninhabited it is so. To simply perceive the world as a stockpile of resources would go against the intent of defining nature in the first place, the defining characteristics of a nation. The allure of the pristine that exists within nature does not have to be uninhabited, for then people have no place within it, but too many people in one spot will surely spoil the pristine. Therefore I propose a place of regeneration, where one is exposed to one’s self, outside confines of

the urban, and closer to the undeveloped, to be the new technology of nature.

Is there a way of restoring the broken unity of society and nature while avoiding the moral cost of romantic retreat? Or are we destined to oscillate forever between the poles of primitive and modern, solidarity and individuality, domination by nature and domination of nature? ... These interests point not backward but forward to nature, toward a totality consciously composed in terms of a wide range of human needs and concerns.
(Feenberg 2002, 198)

As we see reports of overcrowding at national parks (Turkewitz 2017)(Ciolfe 2017)(NPS 2018) as well as the increase of extreme sports in popular culture, there is an impetus to both preserve the pristine, which is the allure, and to develop access to a scale that can accommodate the needs of society. This new nature is needed to empower the people and reintroduce them to what has become an alien landscape. Social accessibility will allow a freedom of people to express themselves upon the landscape, and have a value of it imprinted upon them. The exposure to what is potential outside of the urban landscape is not a reckoning back to a previous way of life, but forward to a new potential.

It would therefore represent an advance to a higher level of integration between humanity and nature. (Feenberg, 2002. pg.190)



Cycles of growth displayed by the trees in the forest near Squamish, BC.

This new nature is an employment of technology, just as the creation of wild was, and through architectural intervention there is a potential for providing access beyond the urban without destroying the pristine.

PRECEDENTS OF PARADIGM FOR DEVELOPING ARCHITECTURE AND NATURE

The idea that wilderness is beautiful, and that exploits performed there - climbing mountains, running rivers, backpacking long distances - are rewarding, even inspirational, is so entrenched in our culture that casual students of history are shocked to learn that throughout most of the span of Western civilization quite the opposite view prevailed.
(Roberts 2018, 76)

Before the enlightenment and romantic revolutions the wild nature outside of society was perceived as “ugly and monstrous” (Anderson 2012, 3; Roberts 2018, 78). This all changed after the perception of the mountain changed into proof of accomplishment through the process of summiting; most notably with the first ascent of Mont Blanc on August 8, 1786 by Jacques Balmat and Michel Piccard (Roberts 2018, 79). By the mid nineteenth century tens of thousands German and Austrian people participated in alpinism (Anderson 2012, 156). This influx of people into the alpine environment began the introduction of the

alpine hut and was developed outside of the Romantic movement, it was a shift in paradigm from observing nature to resonating with it (Anderson 2012, 157). By the end of the nineteenth century a network of paths and huts were created to promote access of the Alps: old paths were updated with way finding and dangerous areas were made safe so that even the less experienced would be able to enjoy the mountains (Anderson 2012, 168). This egalitarian perception towards the concept of pristine nature puts an early value on the land that is greater than the material resources it holds.

The development of alpine trails and huts continued through to North America, and now the Alpine Club of Canada is the steward of twenty-six backcountry huts on both crown, and park land. Depending on the location, huts can be accessible only seasonally and are very limited in their services provided. All of the cabins require lengthy reservations: some have a maximum number of nights an individual is allowed to stay, others require a lottery to be drawn for reservations. Methods of approaching each cabin depends on the season as well as the individual: glacier traversing, backcountry touring in skis, light hiking trails, alpine scrambling, or



The Conrad Kain hut in Bugaboo National Park, maintained by the Alpine Club of Canada.

hiring a helicopter. The cabins act as both destinations and staging points for further human powered adventure, where much of the appeal is an immersion into the wild and outdoor living (Alpine Club of Canada 2018).

The development of mountain resorts was another paradigm shift for mountain exposure and human powered adventures, and in North America it is focused around skiing. Initially as National Park service structures in the 1930's, the mountain resort serviced the affluent middle class of North America and their desire to have access to the wild (Smith 2013, 3). A wide spectrum of architectural perception has developed since then, all catering towards western capitalism. The two polar paradigms of architectural mountain development are: the suburban sprawl which allows for individual inhabitation and a sense of singular ownership over the land, and the monolithic development of many condensed units which actually has a singular owner.

Kicking Horse Resort is located in near the town of Golden in British Columbia. With more than a six hour round trip to the closest major metropolitan area, being

Calgary in Alberta, it is considered to be a destination to stay for many days. The initial allure of the resort is the developed and controlled alpine skiing terrain, but over the years has expanded to include alpine hiking and mountain biking. This is an epicenter of human powered adventures. Architecturally planned by Oberto Oberti, and reminiscent of European Alp villages, the development sprawls through the landscape with timber houses lining rows of streets on the mountainside.

Snowbird Ski Resort is situated an hour outside of Salt Lake City Utah and was developed to have a minimal impact on the land with its monolithic brutalist architecture. Down in the base of the valley it is easy to access by car, and much of the land directly surrounding the resort is used for parking. While catering to a more lavish style of accommodation, the resort is still based around the ski enthusiast and embraces the concept of human powered adventure; Utah in general is a mecca for adventurers of all disciplines.



Dogtooth Close on Kicking Horse Mountain Resort.



A view of the Snowbird Resort in Utah, photograph by Randy Jensen. (2018)

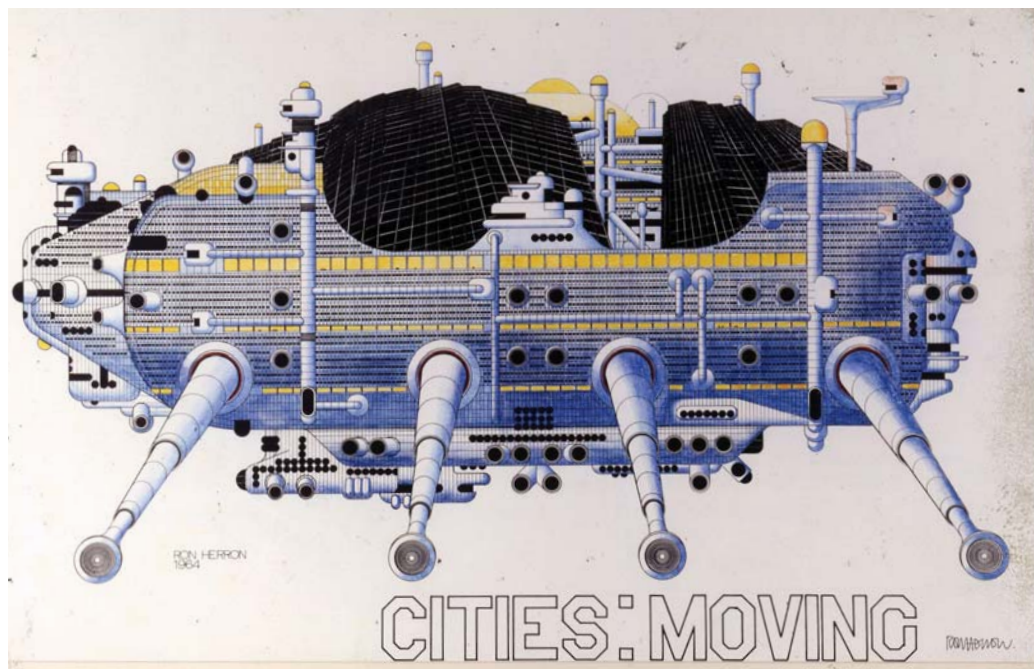
PARADIGM SHIFTING ARCHITECTURE

When considering a conscious shift in architectural paradigm the work of Archigram and Superstudio immediately comes up within the architectural discourse.

The Archigram magazine, which ran between 1961 and 1974, was uninhibited by the confines of feasibility, their work imaginatively portrayed the potential of emerging technologies.

The measure of the building came to be viewed by us not so much in terms of whether it was deemed beautiful or ugly, monumental or intimate, or whether it did or did not fit in with its neighbours but in terms of the service it performed. (Cook 1999, 3)

Pulling inspiration from emerging technologies and pop culture, the pages of Archigram defied the norm and proposed alternative paradigms. Infrastructure around the space flights which put a man on the moon and what consisted towards the equivalent of skyscrapers being moved down a road before launching into space made anything seem possible. This nomadic architecture that inspired the groups development of “Walking city”, “Living pod”, and “Blow-out village” shows the departures from their contemporary peers, yet allowed them to address serious architectural questions.



Ron Herron, *Walking City*, 1964 (Sammlung Deutsches Architekturmuseum).

Superstudio, a Florentine group of architects, began exhibiting their work in the late 1960's. With radical responses towards the Modernist movement, Superstudio confronted the relationship between the person and the built environment. Through the use of diagrams, storyboards, and geometric organization, Superstudio was able to escape the confines of feasibility, materiality, and even gravity.

We need in fact to begin all over again: the data are those of myth, those of technology and consumer demand, those of repressed desires. (Lang and Menking 2003, 19)

Some of their most protagonistic work comes from 1971 with *Objects, Monuments, Cities*. The connotations associated to the objects are broken down to no longer resemble their political or social hierarchy and all that is left is a simple tool for realization of cosmic order. (Lang and Menking 2003, 122) This rediscovering of architecture as the only alternative to nature, *natura naturata* and not *natura naturans*: that is “nature nurtured” and not “nature naturally”.

Architecture becomes a closed, immobile object that leads nowhere but to itself and to the use of reason. (Lang and Menking 2003, 122)



Gian Piero Frassinelli, Cristiano Toraldo di Franca, Alessandro Magris, Roberto Magris, Adolfo Natlini, *The Continuous Monument: Alpine Lakes, project(Perspective)*, 1969, cut and pasted printed paper, coloured pencil, and oil stick on board, 45.7x47cm (MoMA, NewYork).

DEVELOPING A NEW NATURE EXPOSURE

Architectural intervention can address the dichotomy between western society and nature.(Drengson 2011; Little 2014; Louv 2008; 2011) Development of the wild is required to preserve its allure, and that such development requires an architectural consciousness. Architectural development with the required supporting infrastructure at three scales:

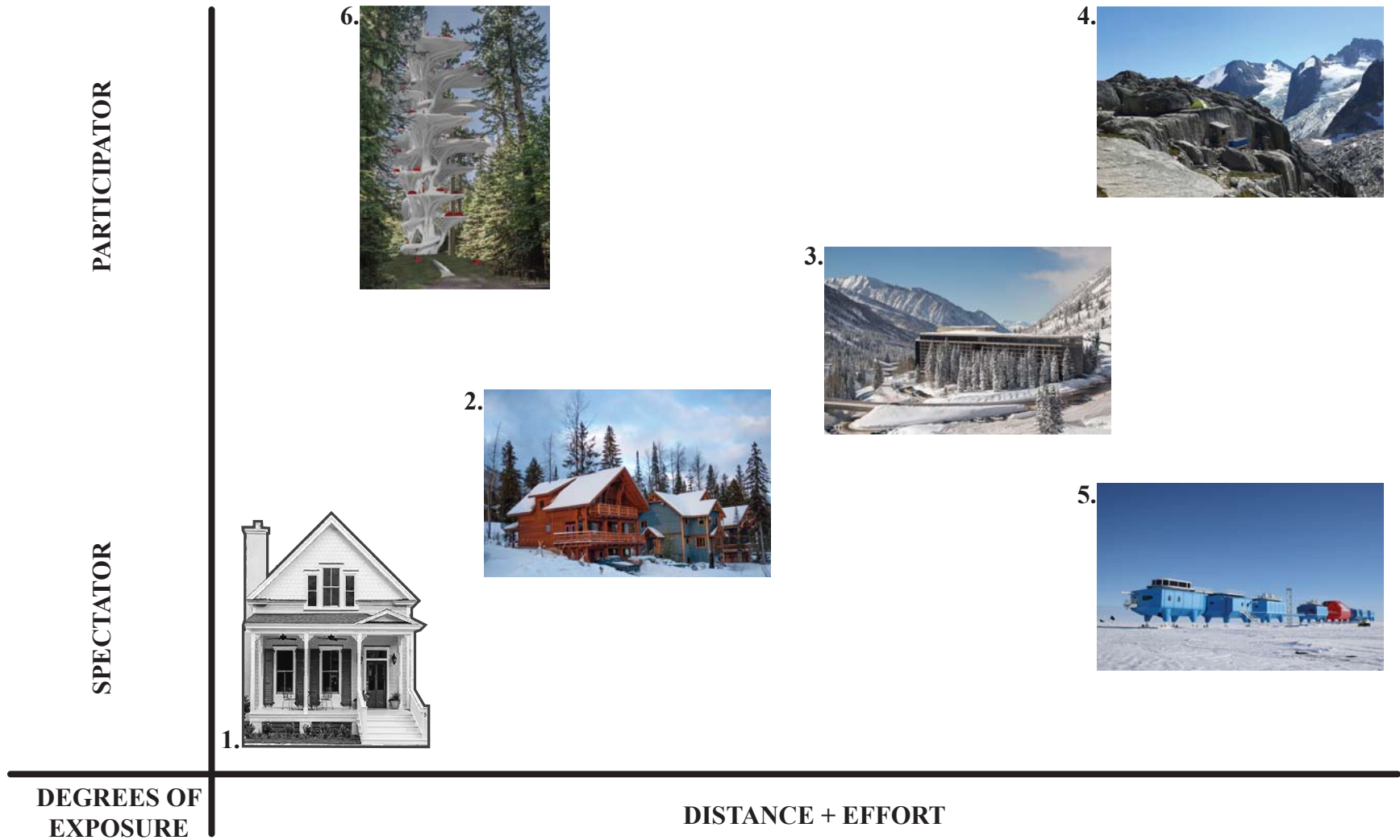
- At the scale of the site through defining intervention areas as patches with boundary conditions creating corridors within a matrix, as initially defined by Landscape Ecology (Forman, 1986) and elaborated in Landscape Ecology Principles in Landscape Architecture and Land-Use Planning (Dramstad, et al,1996), and then evaluate the results to assess if the architectural intervention has mitigated the impact of the wild and avoided destruction:
- The scale of the building will be evaluated to assess how it facilitates social interaction, aligning with Jan Gehl and his defined “Urban Quality Criteria for Public Spaces”, to assess whether a human scale is possible while

integrating nature into the program;

- In the scale of the room, the dwelling scale, a “biophilic response” will be interpreted through climatic analysis data evaluating the benefits of exposure to nature as defined as biophilic in Building For Life (Kellert 2005), and The Nature Principle (Louv, 2011)

Each of these paradigms of development have appeals and failures, and within all that exists the potential for a new paradigm of development to be explored: A new exposure to nature. This new exposure to nature will bring forward:

- The spartan appeal of human powered endeavours;
- Supporting architectural infrastructure for the demand of society to be accommodated at a contemporary scale;
- A monolithic structure so as to reduce the impact upon the ground at a site;
- Located at a site in the wild accessible by urban dwelling citizens.



Scatterplot representing degrees of exposure: 1) Idealized North American house. 2) Kicking Horse Mountain Resort, suburban sprawl development. 3) Randy Jensen, *Snowbird Resort* (2018), monolithic development. 4) Appleby Camp, Bugaboo National Park; minimal remote development. 5) British Antarctic Survey, *Halley IV* (2017); allowing scientists the most comfort in the most remote place on earth. 6) A new paradigm of development.

CONCLUSION TO THE INTRODUCTION

This investigation will look into the process and procession people in the environment through the lens of how architecture can facilitate people's need to have a connection to nature. In order to facilitate this projected growing need for exposure to nature, a form of institution will be explored that will bring people out of the urban and beyond the rural to the wild. This will be done through creating spaces with degrees of exposure to foster a greater understanding of the land. If people have a greater value of the land, through an enlightened understanding, they are more likely to preserve it for future generations.

An architectural intervention will mitigate the impact of both people on the environment as well as the environment on people. Creating spaces where people feel safe to enter the backcountry and engage with the environment through self propelled exposure will foster a greater understanding of the consequences inherent with exposure to nature. This directly confronts the initial paradox of "an over exposure of one will destroy the other". Society must have a technological intervention to overcome the

paradox.

The wielded technology of architecture that society imposes upon the land is not good or bad in itself, but rather just a tool, and the intentions of the wielder will define its outcome. As much as the ability to develop an area is a technology, so is the ability to leave it untouched, what I would like to bring to attention is the consequence of the intent.



Inspirational growth and form comes from nature; metaphorically, building on what came before. Photo taken while hiking through Alabama.

CHAPTER 2: METHODS OF STUDY

This thesis will demonstrate that dwelling with nature is possible at a contemporary scale. This poses the question: How can architecture bring the greatest amount of people to the wild without destruction?

The methods of study in which the development of an architectural intervention is successful will range from landscape ecology implications at the scale of the site (Dramstad, et al, 1996; Forman, 1986), to the scale of the dwelling with considerations of biophilic responses to show how the architecture articulates the environment for the inhabitants (Kellert 2005).

ANALYSIS AT THE SCALE OF THE SITE

With this thesis I will test the limits of this architectural intervention at a site scale as defined in the parameters of development through defining intervention areas as patches with boundary conditions and corridors creating a matrix. This system is initially defined in Landscape Ecology (Forman, 1986, 31) and laid in Landscape Ecology Principles in Landscape Architecture and Land-Use

Planning (Dramstad, et al, 1996, 20), to allow for analysis of landscape to support landscape integrity and reduce degradation of the land.

The fundamental structure of landscape ecology lies within the defining of patches, corridors, and a matrix. With this system of observation in place it is possible to identify critically significant quantitative aspects of the landscape to make a qualitative prediction.

Patches are defined through prominent physical characteristics that can be the result of a plant or animal community, or a concentration of inert material such as rock or concrete. Patches can have any boundary shape and size, but is within a matrix. (Forman and Gordon 1983. 83) (Dramstad, et al. 1996, 19). The edge conditions, as well as frequency and size, of patches influence how the patch interacts with the mosaic.

Corridors connect patches, but can also act as barriers within the matrix. A corridor can be defined along a human intervention such as a road, path, or infrastructure cut. The

most recognisable, and important corridor according to Dramstad, is that of the river or stream. From a design perspective, the corridor offers moments of threshold which can be articulated and expressed.

The matrix is the most extensively connected aspect of landscape ecology. Dynamics of the matrix is the scale at which the patches and corridors can be analysed to determine if a negative or positive feedback loop is being created, and therefore as to whether an intervention is degrading the landscape. The feedback loop requires at least two defining factors, x and y, to be analysed and can be either negative or positive. In a negative feedback loop x has a positive effect on y but y has a negative effect on x, creating a control mechanism for a stable equilibrium. Positive feedback loops are created where y has a returning positive effect on x, promoting the proliferation of x and creating exponential growth (Forman 1986, 33).

Positive feedback loops are evident in the current modes of growth that we are seeing in suburban sprawl which is prevalent in the western paradigm of capitalism. With the increasing popularity of accessing what is wild we are looking at the potential of developmental sprawl encroaching into the

wild.

ANALYSIS AT THE SCALE OF THE BUILDING

Form becomes an obsession of your profession (architects), but this is not architecture. This is sculpture. Architecture is the interplay of form and life, and only if life and form interacts in a good and successful way will this be good architecture. (Gehl 2017)

The relationship between life and form is fundamental to the development of a place for people. Designing a place for people to exist with nature, not to be subservient to or exalted over but as equal, is crucial to establishing the connection between society and the wild. By considering the relationship of the person to the space and their rate of movement it is possible to create engaging environments which encourage engagement. Designing a public space which encourages engagement with a greater environment allows for a transition to the natural environment where people can with confidence heed the call of the wild.

While encouraging movement through spaces it is also important that people have objectives to go towards, and an example of this could be an attraction. Attractions can be moments of social gathering, such as a fountain, but could also be more individual focused as in the use of fitness apparatus.

EQUAL SCALE



Kicking Horse Mountain Resort: Architectural developments in yellow and transportation infrastructure in black.

EQUAL SCALE



Snowbird Mountain Resort: Architectural developments in yellow and transportation infrastructure in black

The availability for everyone to get out and engage has the effect of a social condenser, creating the potential for cultural engagement. The child's playground is an example of this but it is important to remember that adults also require an active lifestyle (Gehl 2010, Kellert 2005, Louv 2012).

ANALYSIS AT THE SCALE OF THE ROOM

Architecture articulates the environment for the inhabitants. This can be done to extremes of complete desensitization, to absolute overexposure: within a dwelling neither is desirable. Humans evolved existing with the cycles of the earth. The circadian rhythm is embedded into biologic and social conditions, Kevin Lynch sums it up as:

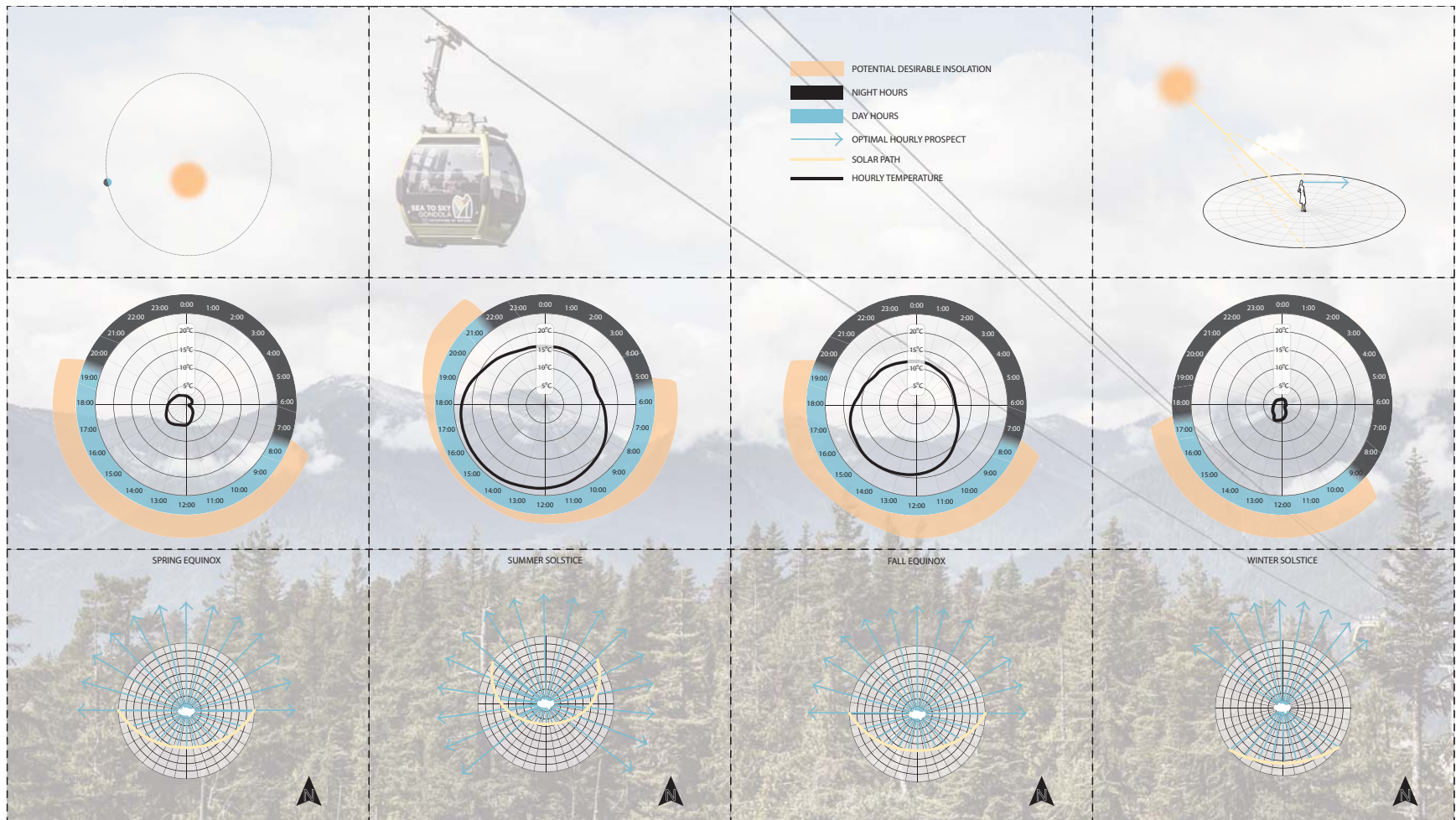
such pulsations seem to be present in all living things and appear to have two principle functions: to keep the organism coordinated with its external environment so that it acts at appropriate times, and to coordinate the internal flux of biological processes, so that the complicated machinery of the body works in harmony. A failure of synchronization in these rhythms disorganized that machinery and puts the organisms under severe stress. (Lynch 1972, 118)

It is impossible to ignore the significance that the environment has upon us.

The attenuation of the environment through

architecture to evoke a positive reaction is biophilic design in architecture (Kellert 2005, 34). This has nothing to do with the type of construction material employed but the effects that result. In order for architecture to have biophilic design it requires a departure from the standardized and constantly controlled atmosphere and a consciousness towards the environment in which it is situated. Temperature fluctuations and changing light levels can all be attuned through architectural intervention. The use of artificial light and mechanically conditioned temperature should be restrained to a minimum, relying on passive energy to inform the inhabitants on a subconscious level of the outside environment.

No two sites will have identical situations, to believe the alternative is to contribute to the placeless architecture of suburbia. Therefore, environmental considerations must be taken towards the specific site if a biophilic design is to be implemented. Creating a connection between people and nature through architectural intervention has the potential of limiting biophobic responses when coming in contact with the wild.



Circadian rhythm analysis in Squamish British Columbia. Data collected from Government of Canada historical data.

ANALYSIS OF METHOD OF STUDY

While conceiving of an alternate architectural paradigm to counter the current paradox of over exposure resulting in destruction of both society's citizens and nature, the methods of studying the site, the building and the room creates clear initiatives to take.

At the scale of the site it becomes clear that to initiate a positive feedback towards the reduction of patch intrusions into the wild, architectural developments must be condensed down to having the minimum area of ground contact. Boundary conditions of the patch intrusion must be diffuse, that is to have non linear lines and a gradual transition, thus encouraging movement across the boundary by both people and animals, creating an environment of encouraged movement between the developed area and the wild beyond. Corridors which connect patches of development are necessary to establish, and maintain as primary routes so they do not widen into patches of their own.

The development of an appropriate site in accordance with McHarg's 1971 Design

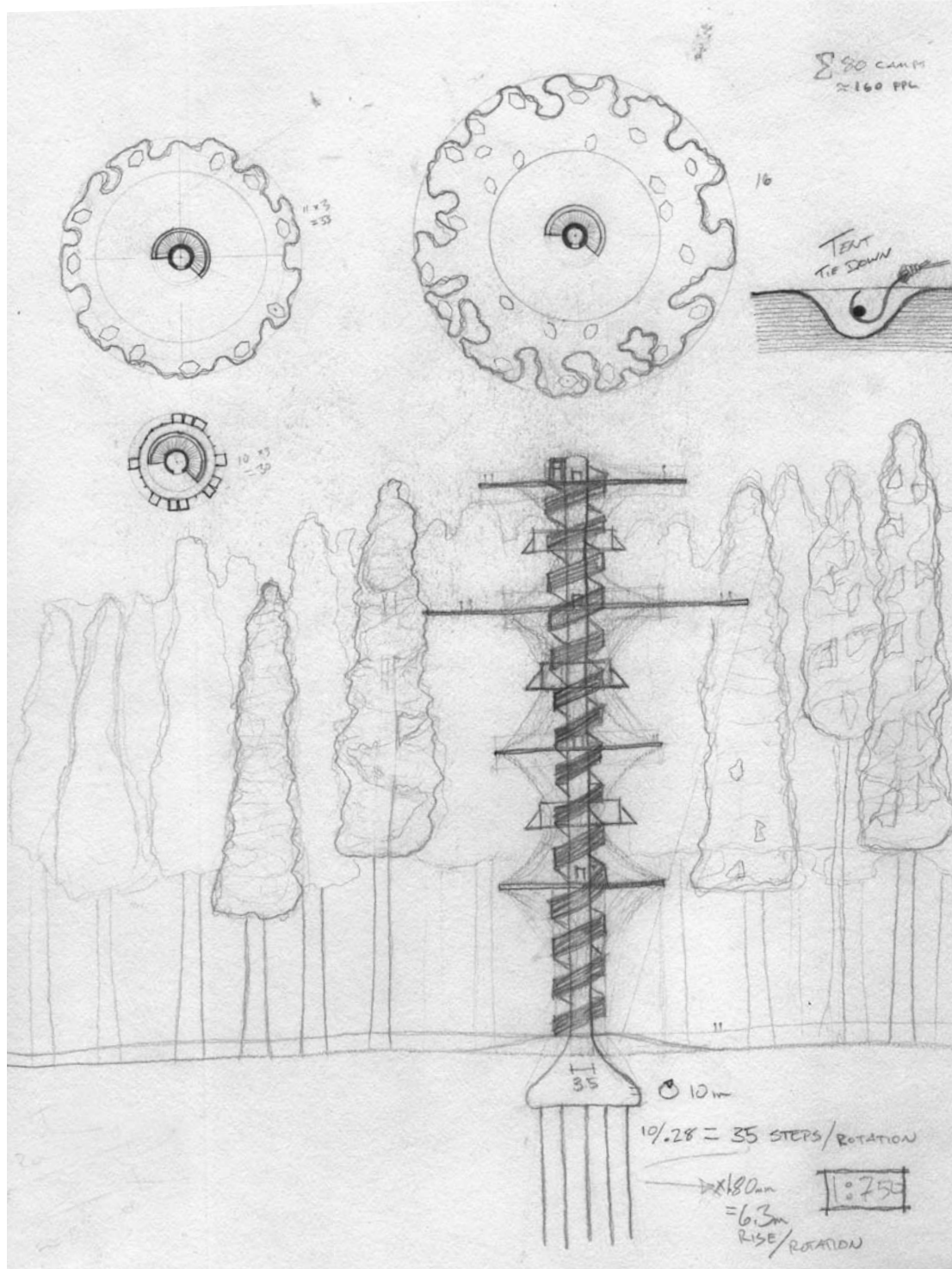
with Nature provides potential siting of an architectural intervention that takes into consideration of the physical features of the land and opportunities they offer. With the concepts of protection, comfort, and delight brought forward by Gehl's 2010 Cities for People concepts of what makes a good social space can be applied.

At the scale of the room a biophilic response as defined by Kellert as well as Louv is the primary objective for this new paradigm of architecture. Maximizing the potential for daylighting everywhere will reestablish the inhabitants with the circadian rhythm. Minimizing the mechanically conditioned environmental spaces will connect people to the daily fluctuation of temperature and their own requirement for insulation. A spartan concept of dwelling along with a pack-in-pack-out mentality, which are primary concepts in the appeal of the human powered adventure, will be how the architectural infrastructure is inhabited.



In the presence of giants; Cathedral Grove, Vancouver Island, BC.

**CHAPTER 3: DESIGNING A
NEW PARADIGM**

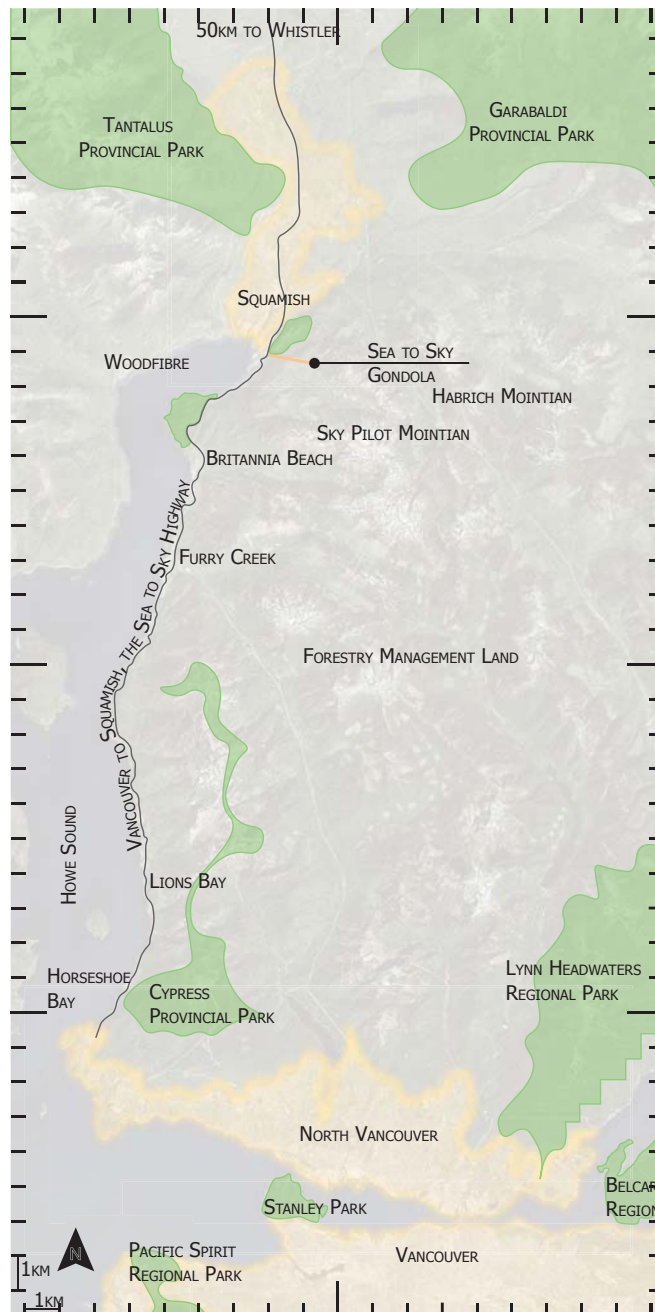


An early sketch of a vertical campground.

DESIGNING AT THE SCALE OF THE SITE

Squamish located to the north of Vancouver is self defined as “The Outdoor Recreation Capital of Canada”. Given that the transportation infrastructure of a gondola

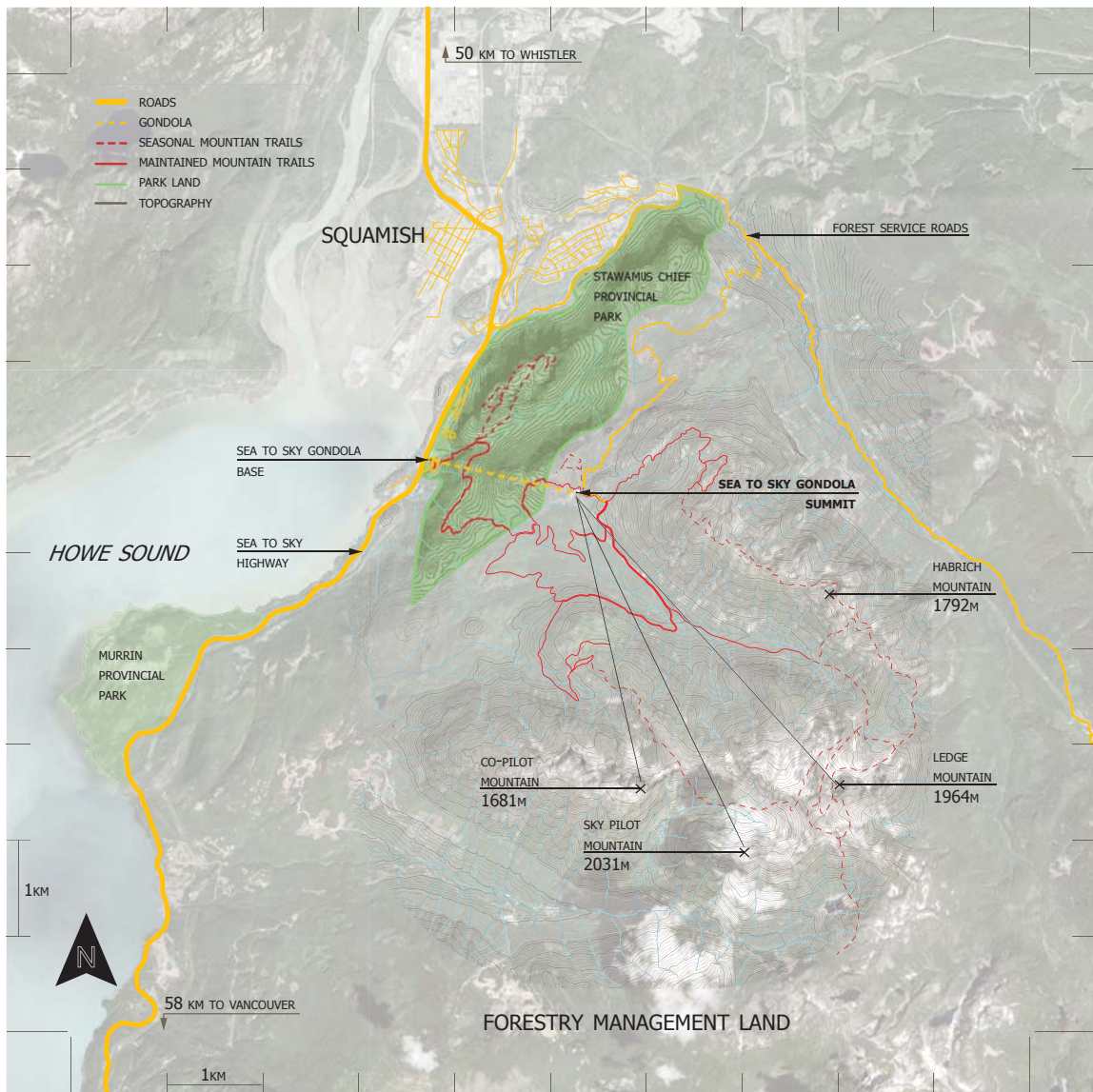
has been developed where the Sea to Sky corridor meets Squamish from Vancouver, the wild is becoming infringed upon and developed.



Fringes map; green as park land, Yellow as urban development. Original map adapted from Google Maps.

Through analysing and identifying patches in the landscape to create a method of interpretation into the technology of society's developments, moments of intervention can be established. The fringes of the patches offer transition points, moments of threshold, where an architectural intervention can signify the importance of a new distinct environment. This thesis will be focusing on the upper terminus site of the Sea to Sky gondola in Squamish British

Columbia. Given that the gondola has been developed already, and delivers people directly from the highway up into the mountains; contrary to the development of a typical western development such as Snowbird or Kicking Horse, where the car is used to bring people up to the site. Therefore, given that the gondola is separating the site from the existing norm, a new paradigm of development is begging to be introduced.



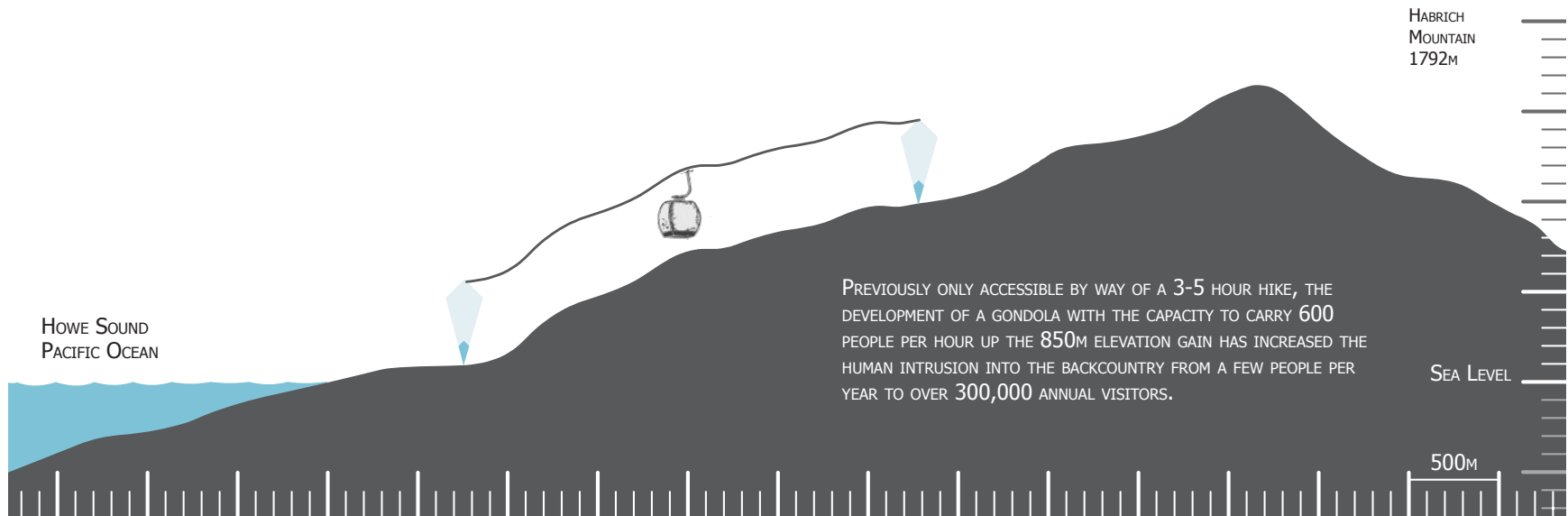
Site Horizon Map : Squamish, British Columbia.

SEA TO SKY GONDOLA
TECHNOLOGICAL INJECTION TO THE WILD

>1 PERSON PER DAY
PREVIOUSLY

1000 PEOPLE PER DAY
CURRENTLY

4200 PEOPLE PER DAY
CAPACITY

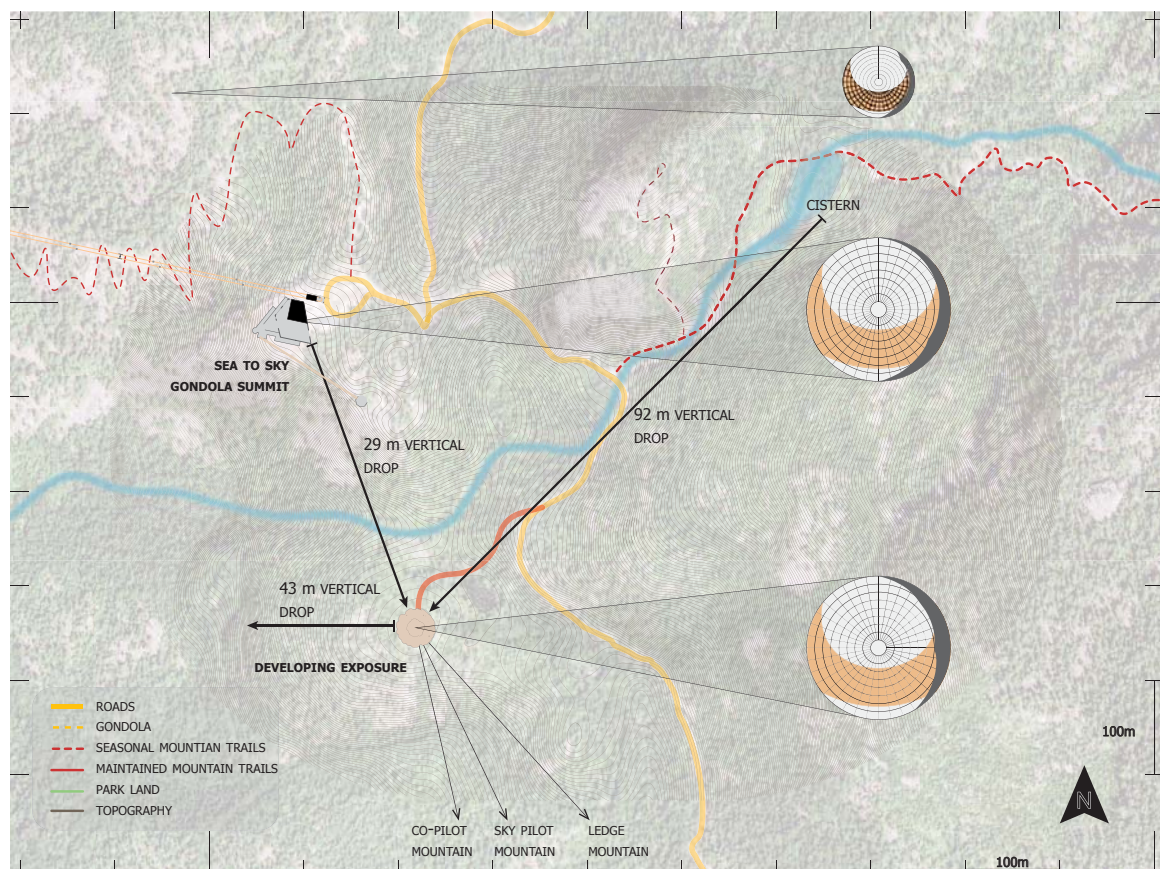


With the development of a gondola which takes people directly to the fringe of the wild, a highly accessible opportunity for an exposure to nature now exists. The development of the gondola also brings forward the paradox between society and nature: where an overexposure of one will destroy the other. This site is therefore prime to explore potentials in new paradigms of architecture.

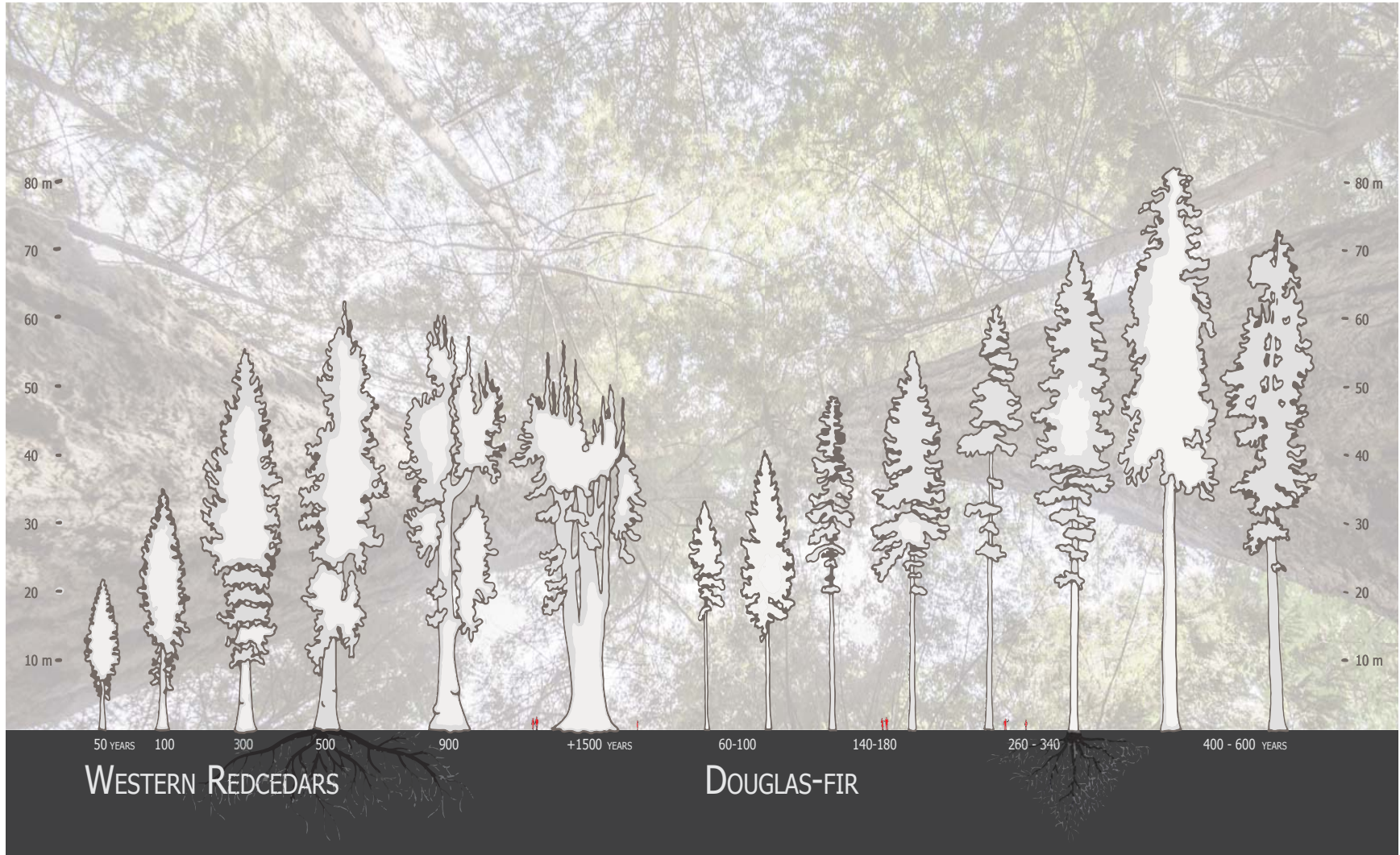
DESIGNING AT THE SCALE OF THE BUILDING

The layering method of Ian McHarg is used to analyze the potential development areas of an architectural intervention on the site of the Sea to Sky Gondola. This allows for initial parameters to be set on land use for cohabitation of the land. Areas of a grade greater than 25% are to be left for forestation and recreation. Where the grade is less than 25% is suitable for building. The concept of walkability, as defined by Jan Gehl, is defined with a station point being

the Gondola Terminus with a primary radius of 250m for a five minute walk and a ten minute walk being at 500m defines a site with a conscious social scale. Quickly analysing a solar study shows that the north side of the mountain ridge receives less sun, so to increase solar gain the must be to the south.

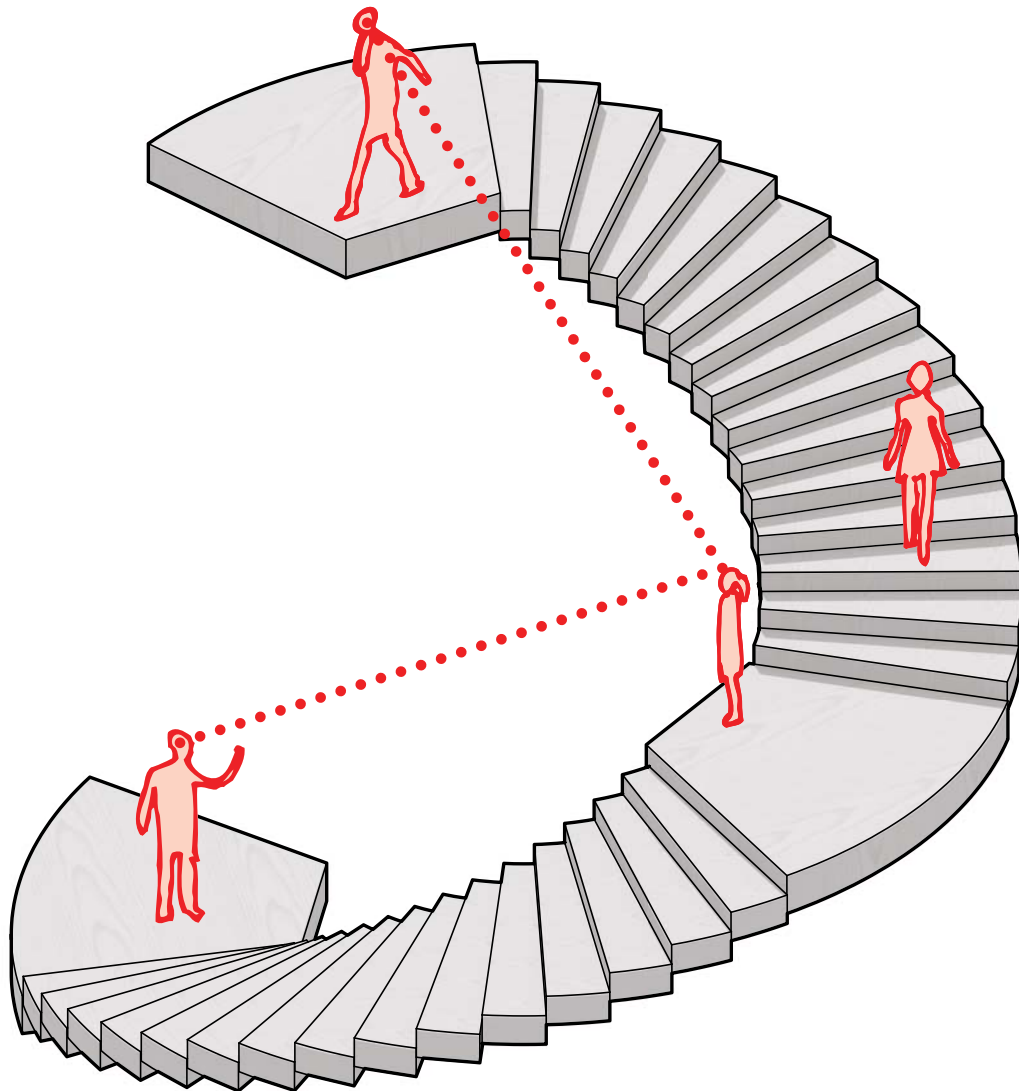


Optimizing the site for potential energy and co-habitation.



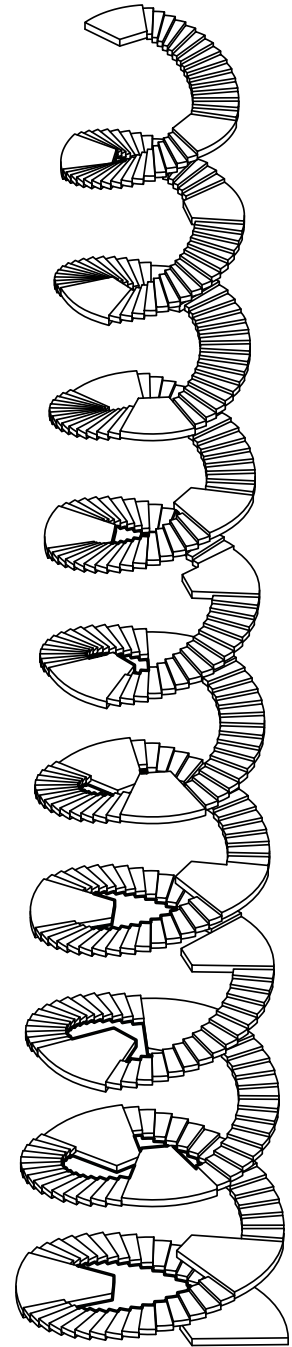
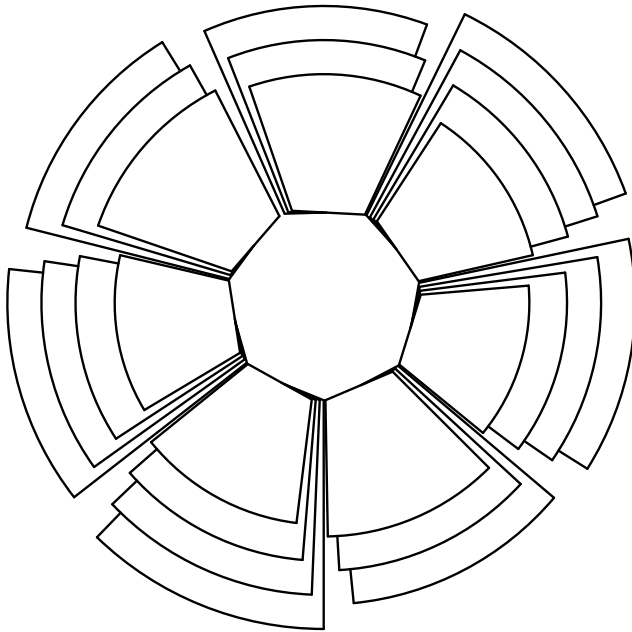
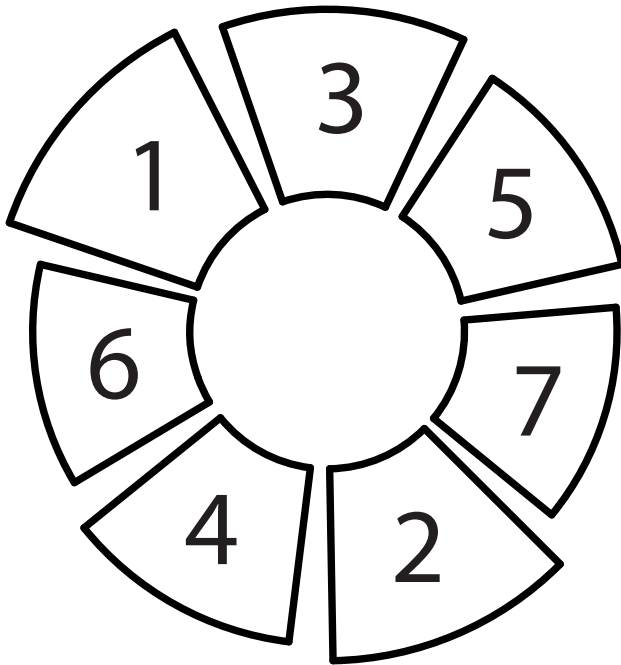
The common canopy trees around Squamish are Western Hemlock, Douglas-fir, and Western Cedars. In this coastal condition the trees grow up to 80m tall and can live to over a thousand years. Image adapted from Van Pelt, 2007, Douglas-fir, Western Red Cedar; British Columbia.

In order to reduce the amount of area disturbed by the architectural infrastructure verticality is essential. Moving vertically with architectural infrastructure. 3.2 meters between landings allows for a vertical relationship between floors.



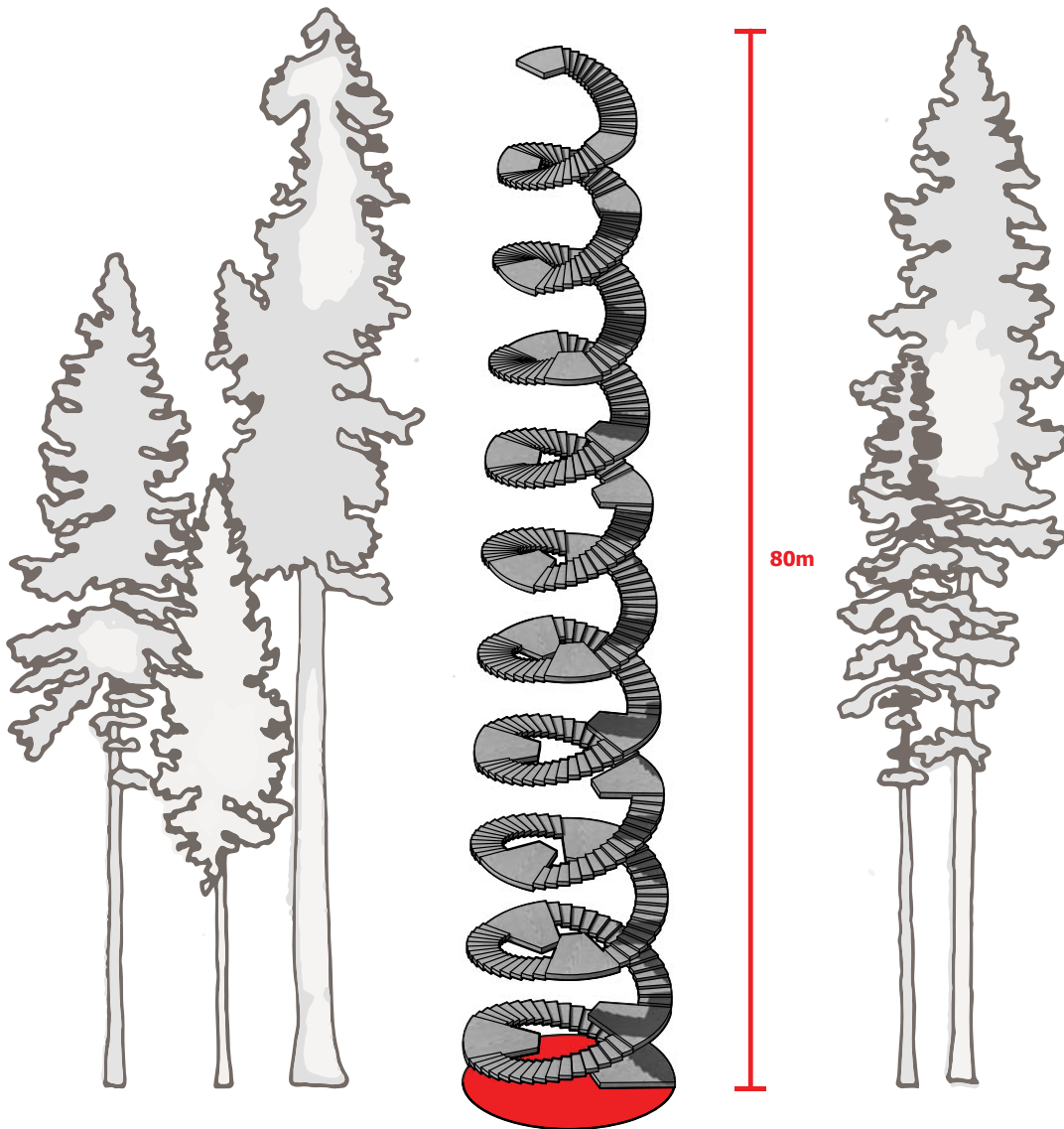
Vertical relationships based on sight lines.

The vertical relationship between floors is organized in a pattern of seven. Every floor of 3.2m has a landing rotated four sevenths around a central axis. Therefore the next landing directly above the last is seven stories higher.



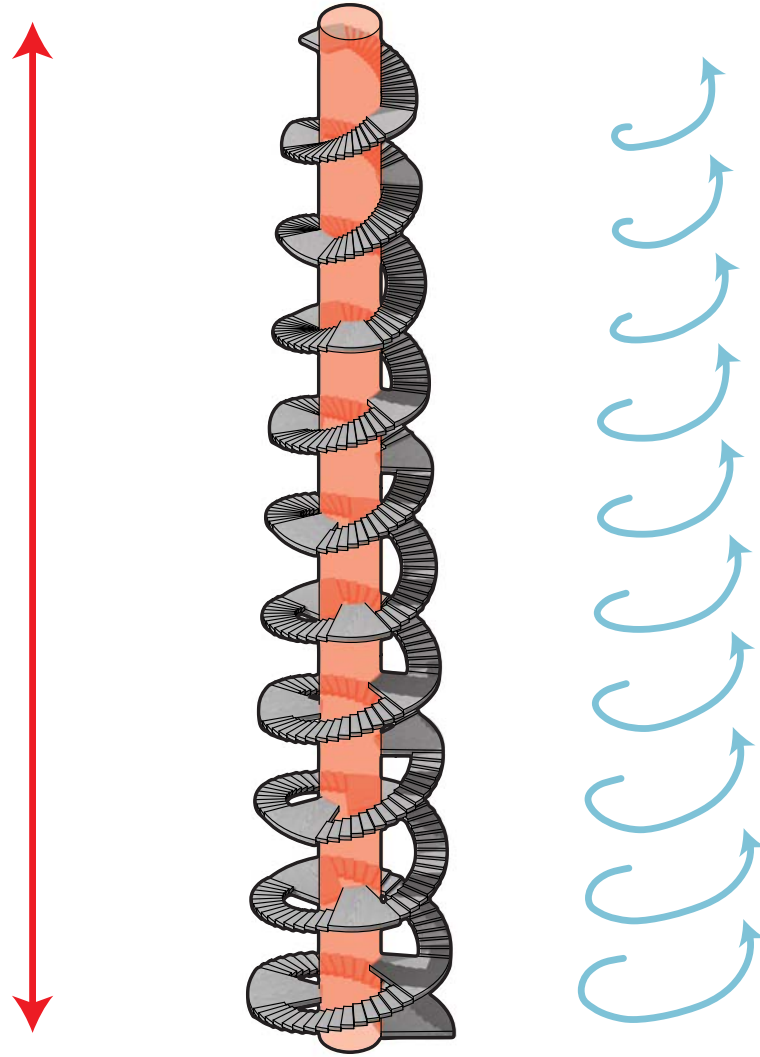
Diagramming the conical helix's pattern of seven

Using the vertical of the surrounding forest as a vertical parameter keeps the architecture from being intrusive on the skyline, and the focus of inhabitation within the canopy of the trees.



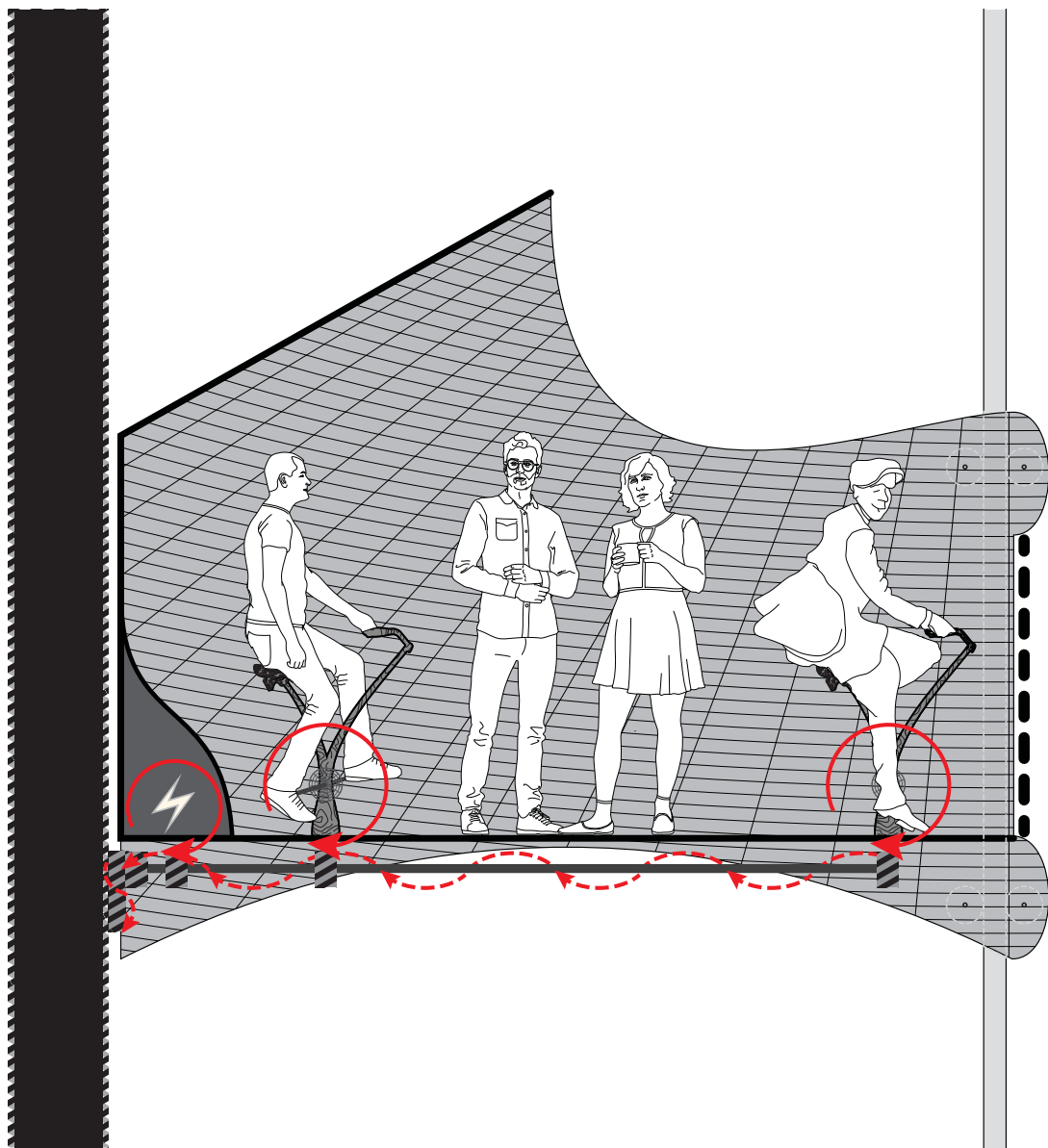
Rising to the height of the context keeps the architecture in context.

The center axis of the rotation is ideal for vertical movement, which can be at a higher speed than the procession of the staircase, yet isolated for comfort and safety of everyone.



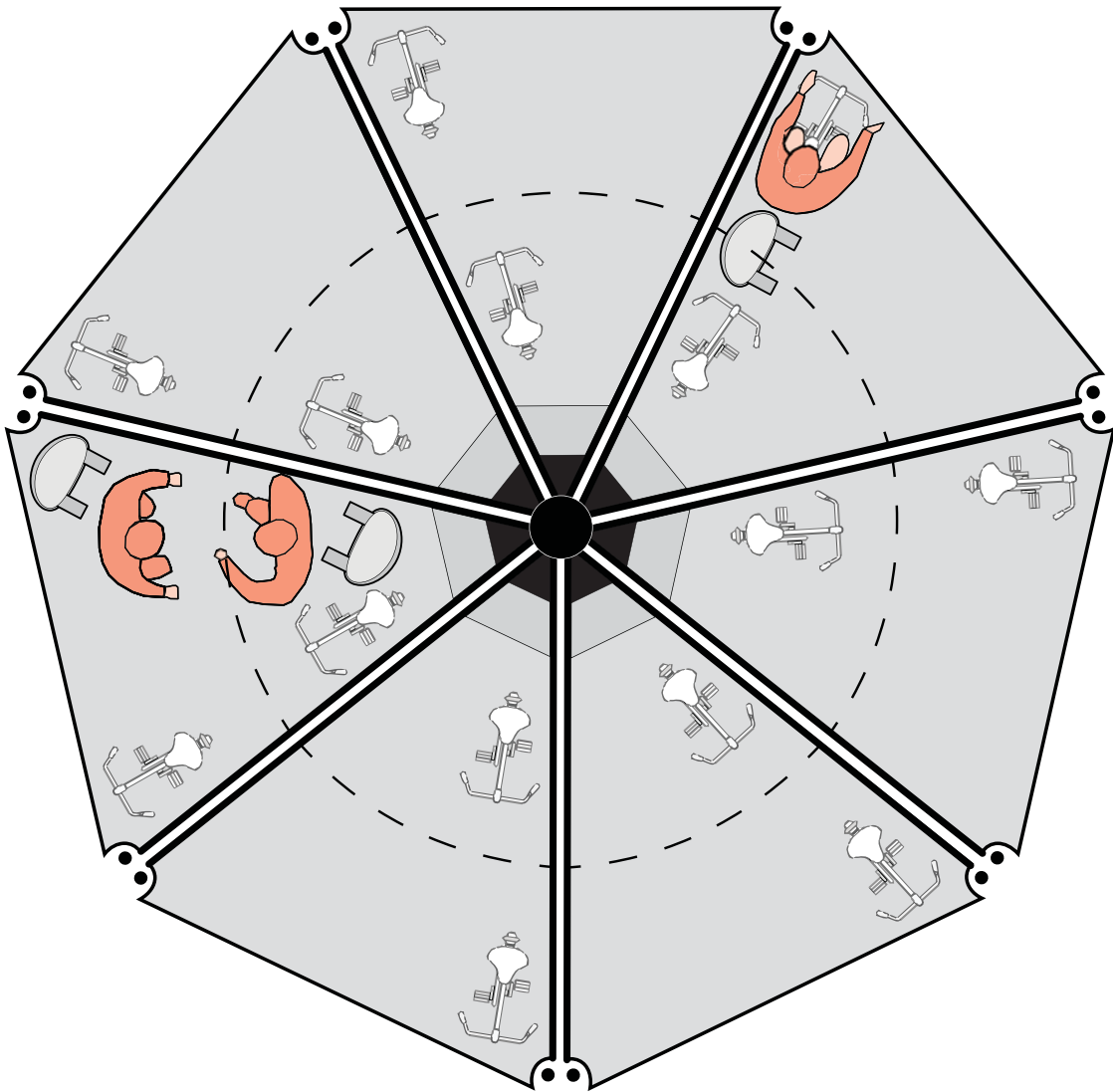
Separating speeds of travel based on rotational geometry.

Embracing the notion of human powered endeavours; the elevators can be lifted through cycle power transferred to a worm gear drive on a stationary shaft. The potential energy of descent can be stored in a capacitor to be released through an electric motor on the next ascent.



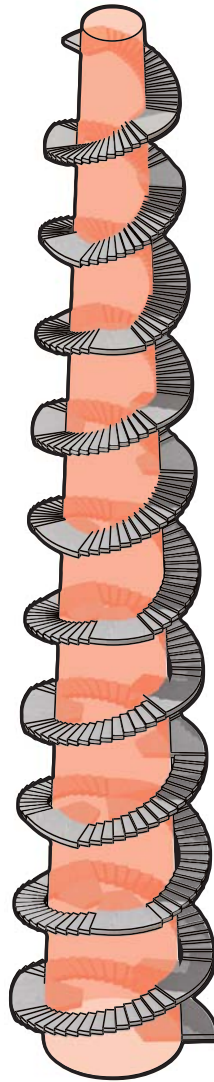
While riding the vertical elevator the potential energy of the previous descent can be reused.

Seven elevators provide expedited vertical access throughout the tower. Each elevator can carry up a small party and their gear. With access to every seventh floor the population dispersion is increased, which contributes to the perception of an individualized exposure to the wild.



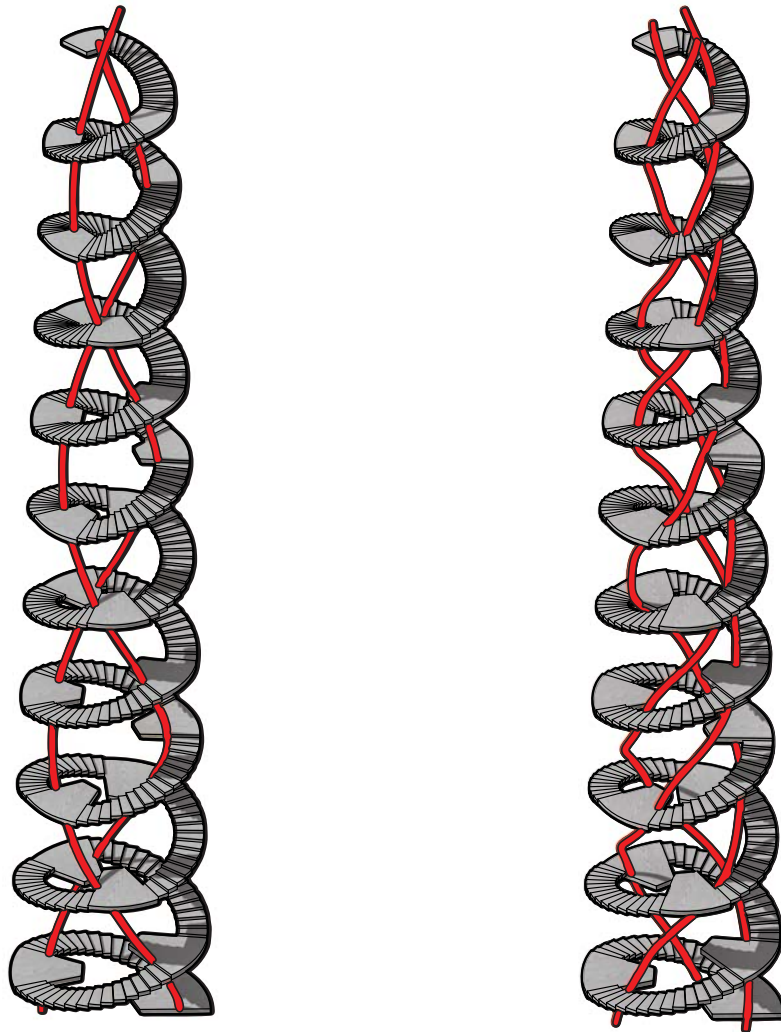
Seven elevators relating to the organizing pattern of seven.

The conical form provides stability to the rest of the structure. Moving forward with wooden tower design for windmills and introducing a polymer composite based material reinforced with wood provides the dimensions of the supporting core. (Edstrom, et al. 2010)



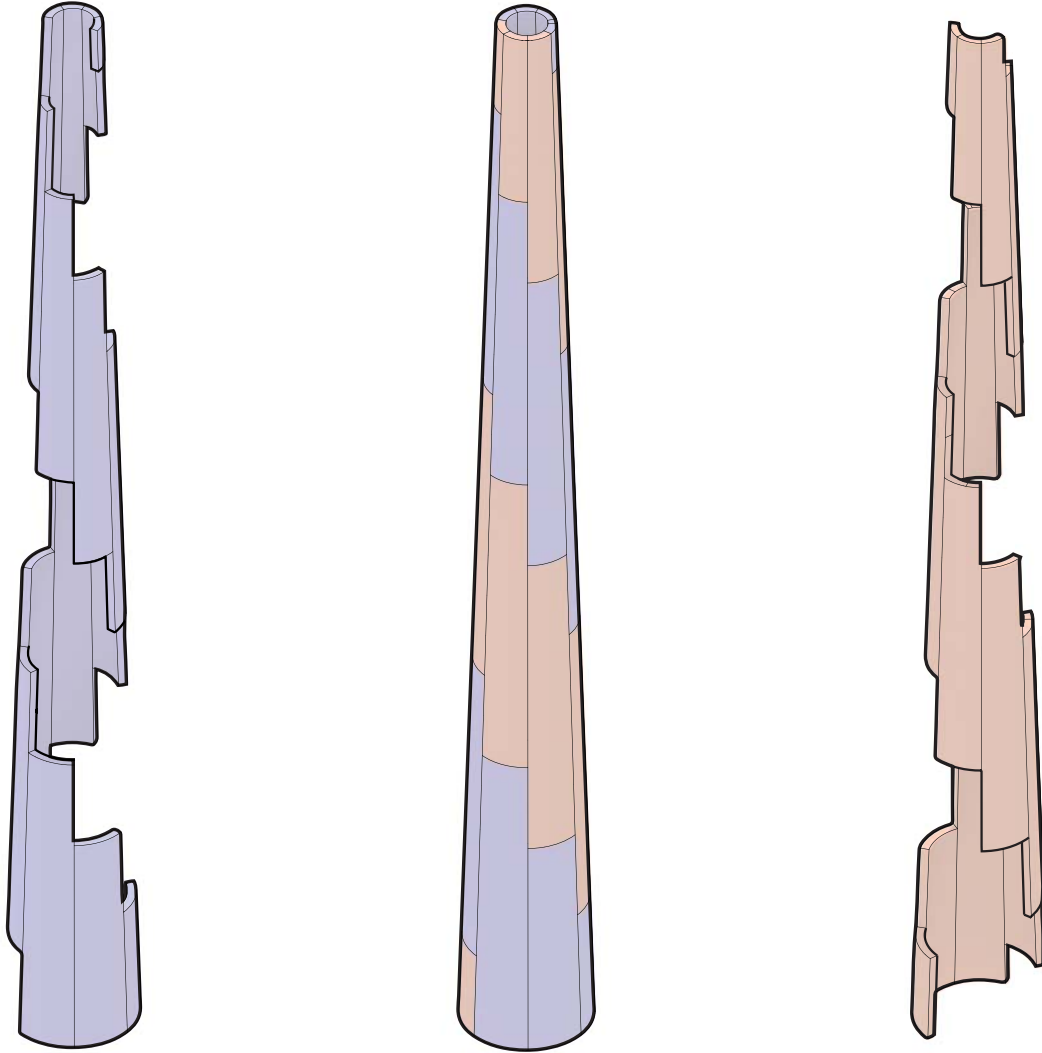
The structural geometry of modern wooden wind turbine towers gives the basis of form to the core.

Aligning the vertical relationships of the conical helix staircase in both clockwise and counterclockwise creates a structural correlation with the landings at each level. Once the relationships were revealed they were repeated to provide the required structural support.



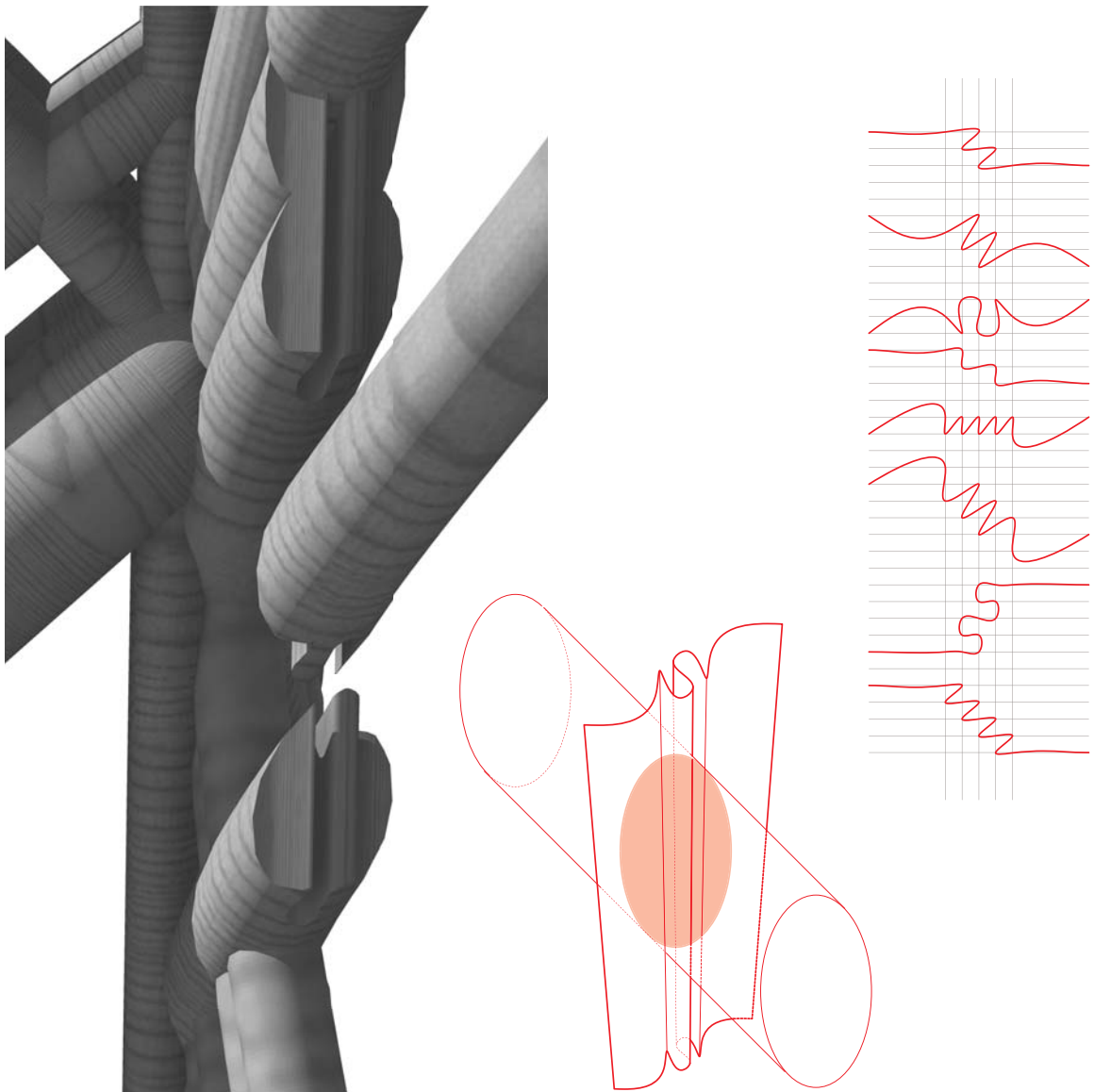
A clockwise double helix and a counter clockwise triple helix is revealed.

The complex geometry does not suit on site construction, but can be achieved through prefabrication. By dividing the geometry into panels around the clockwise double helix every floor landing section of the core can be isolated for off site construction and interlocking on site assembly.



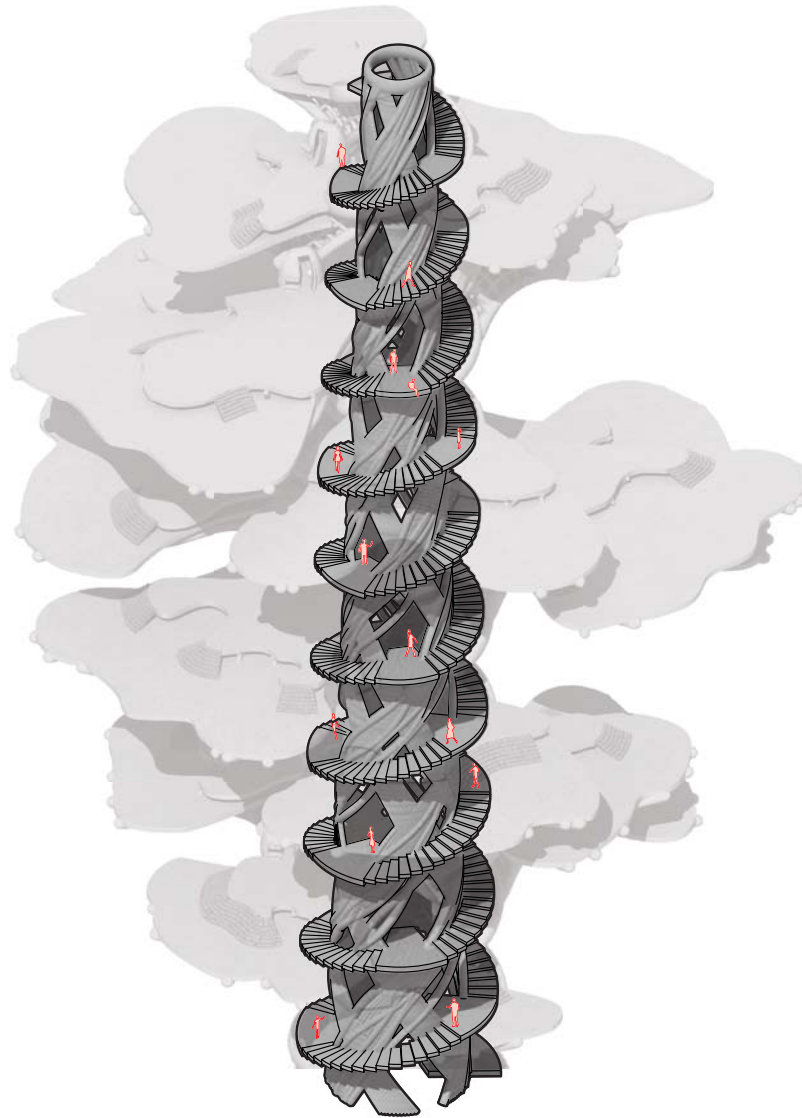
The clockwise double helix is further exploited for constructability.

Assembling the prefabricated sections through the use of joinery can reduce the need for fasteners. By analysing the forces exerted upon each connection a specific type of joint can be designed; inspired by the scarf joint in its clear response to forces.



Exploring the potential of advanced joinery can provide connections with minimal fasteners.

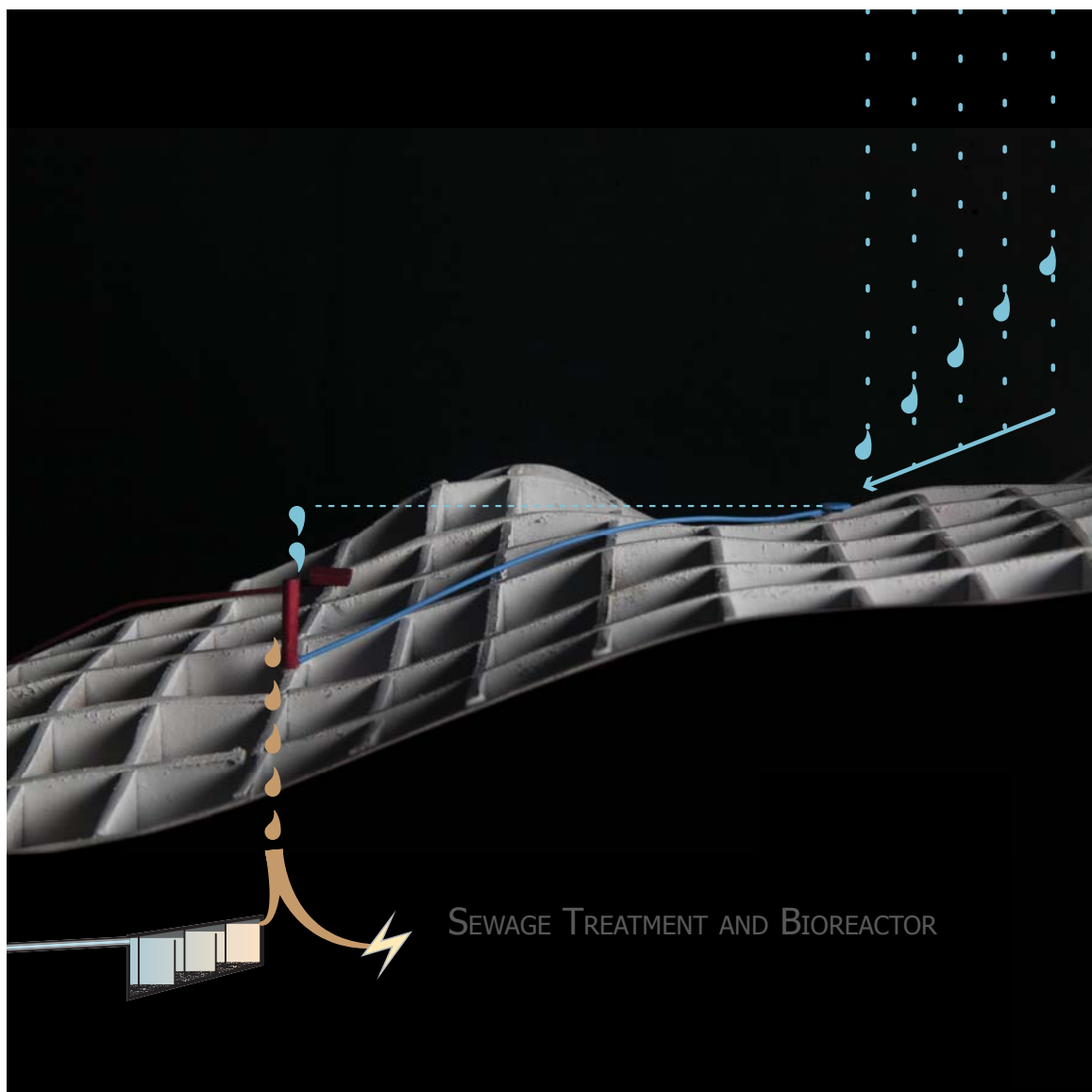
Each landing now has the potential for horizontal development, increasing surface area without impacting a ground area and allowing for a greater amount of people to develop biophilic responses without disturbing more of the forest.



With the vertical requirements achieved a horizontal element becomes available.

In order to service the vertical inhabitations with sewage and clean water, considerations of potential energy were employed. By establishing a cistern fed by tributary rivers on the mountain a constant head pressure is provided to the highest point of the tower. What comes up must come down, short of escape velocity, and anyone who

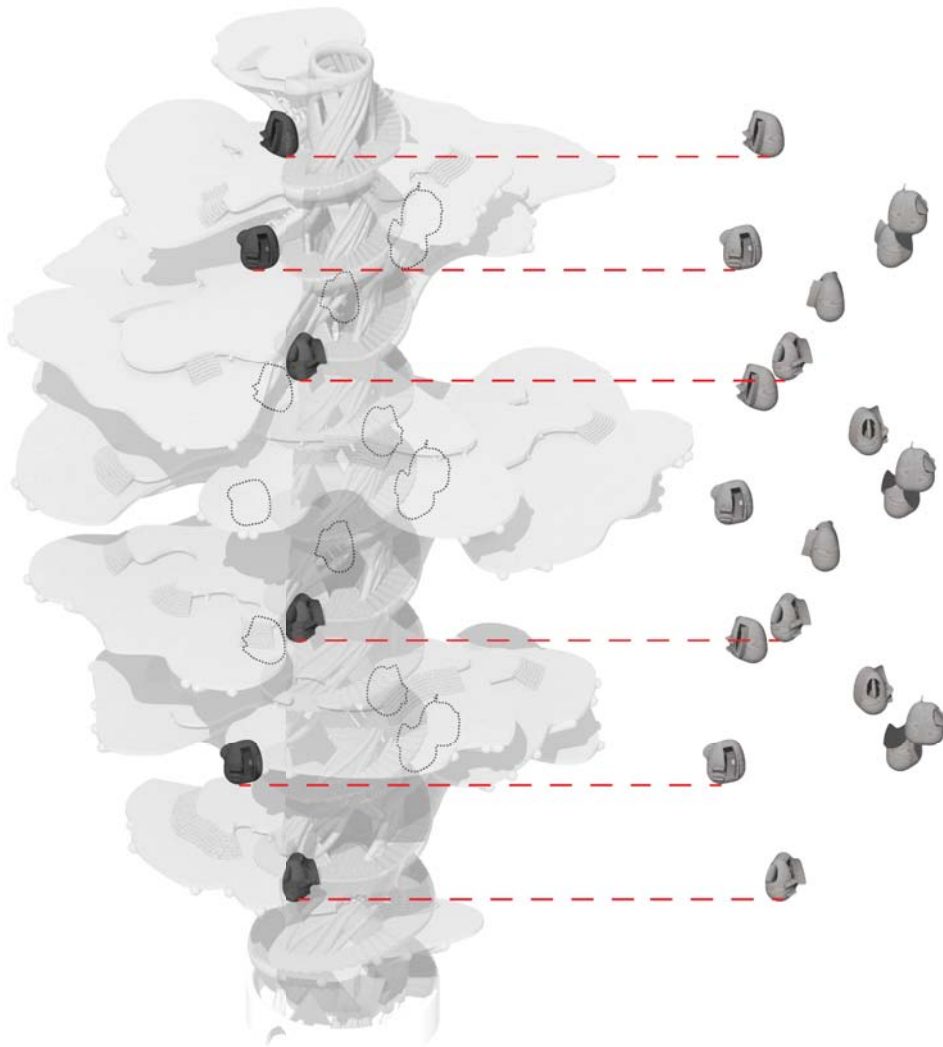
spends long enough in the forest will eventually have to poop in the woods. In order to be a conscious steward of the land, considerations of sewage must be addressed. Under the tower will be a sewage treatment and bioreactor. This will capture the potential energy of the occupants, and remove all pollutants from downstream waterways.



Harnessing potential energy, and reducing the impact of inhabitation, creates a realization of cohabitation.

DESIGNING AT THE SCALE OF THE ROOM

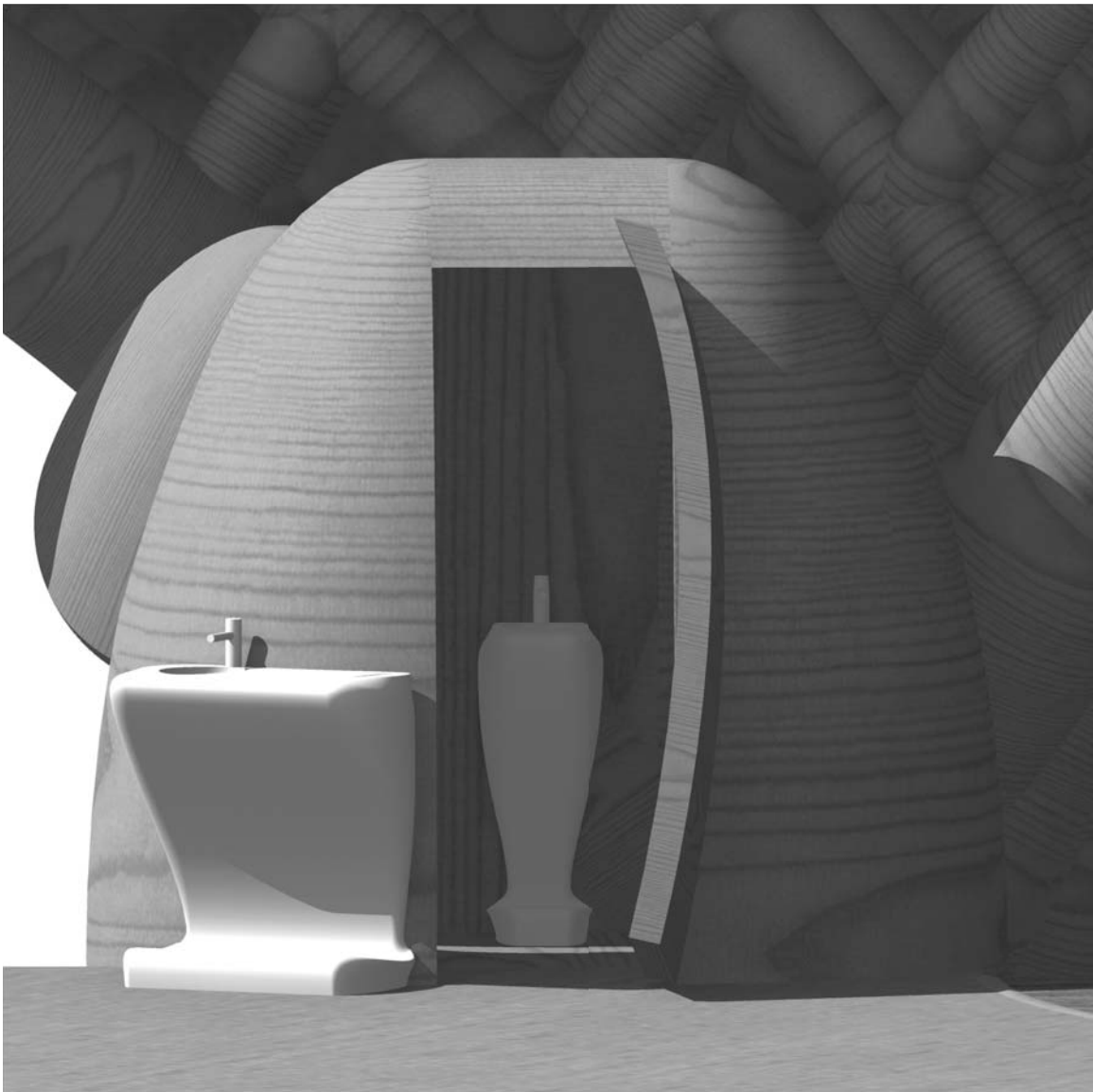
Bathroom nodes are distributed throughout the tower at each floor. The sewage and supply water lines run up under the staircase. By running the lines together they can be insulated and heated to above freezing, allowing the winter enthusiasts to camp as well.



Each platform has its own serviced node, providing sewage and clean water.

The bathroom nodes are located adjacent to the landing for each platform, keeping them close to the core. Each node has two sinks: an inside sink for personal hygiene and bathroom needs, and an outside sink for food preparation and drinking water. Inside the node is also a toilette, shower head, and window. The window allows

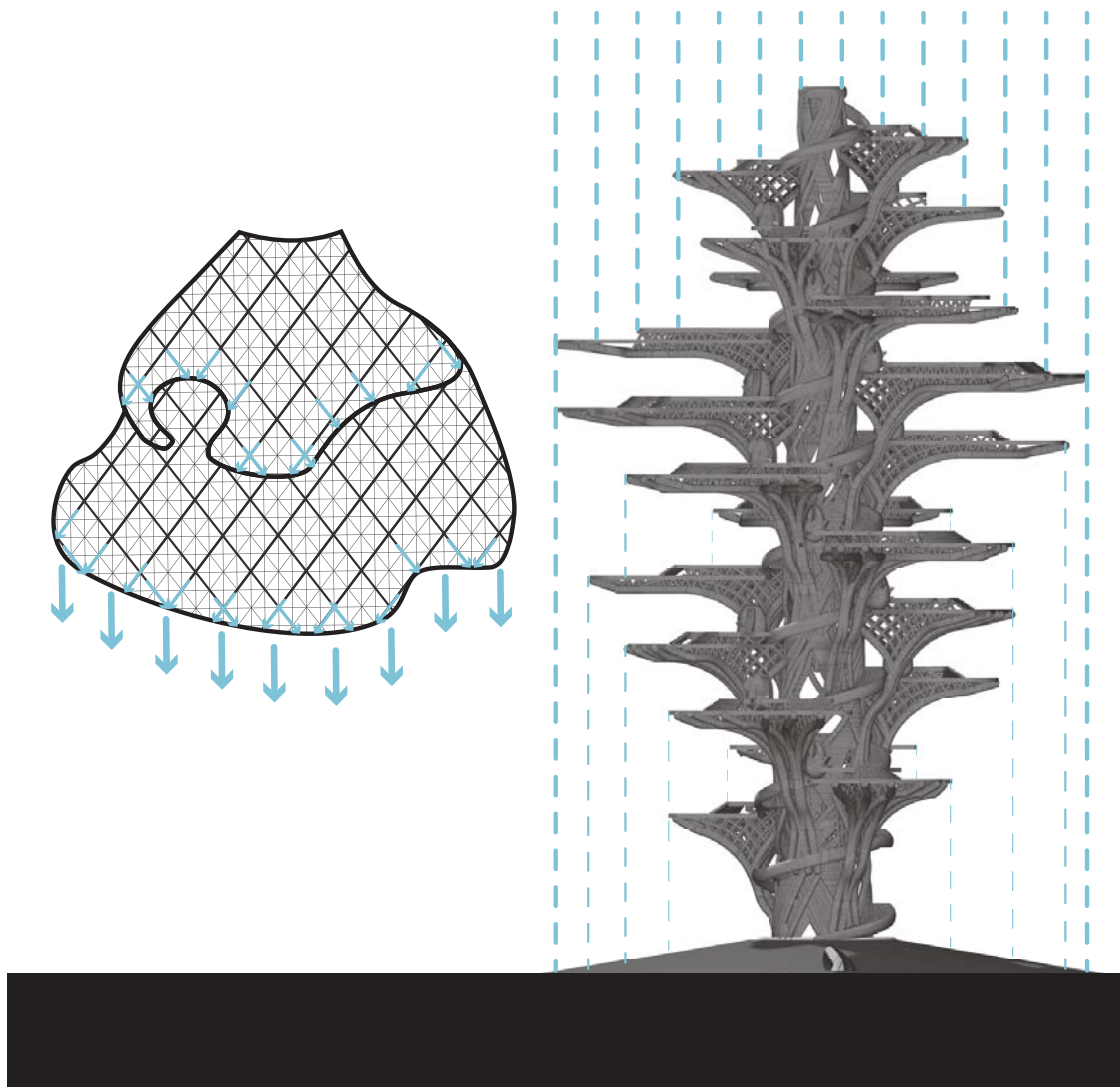
enough daylight for small tasks, as well as ventilation.



Bathroom nodes are serviced with a sink inside and outside, a toilette, and a shower. This provides the essentials for a spartian, pack in and pack out, camp site.

Each landing is progressively larger than the one below. This creates a canopy, offering a degree of protection from precipitation without desensitizing the inhabitants from the elements. The progressive protection from the overlapping platforms allows for individual degrees of exposure, where one can choose where one is comfortable. Decking on each platform raises

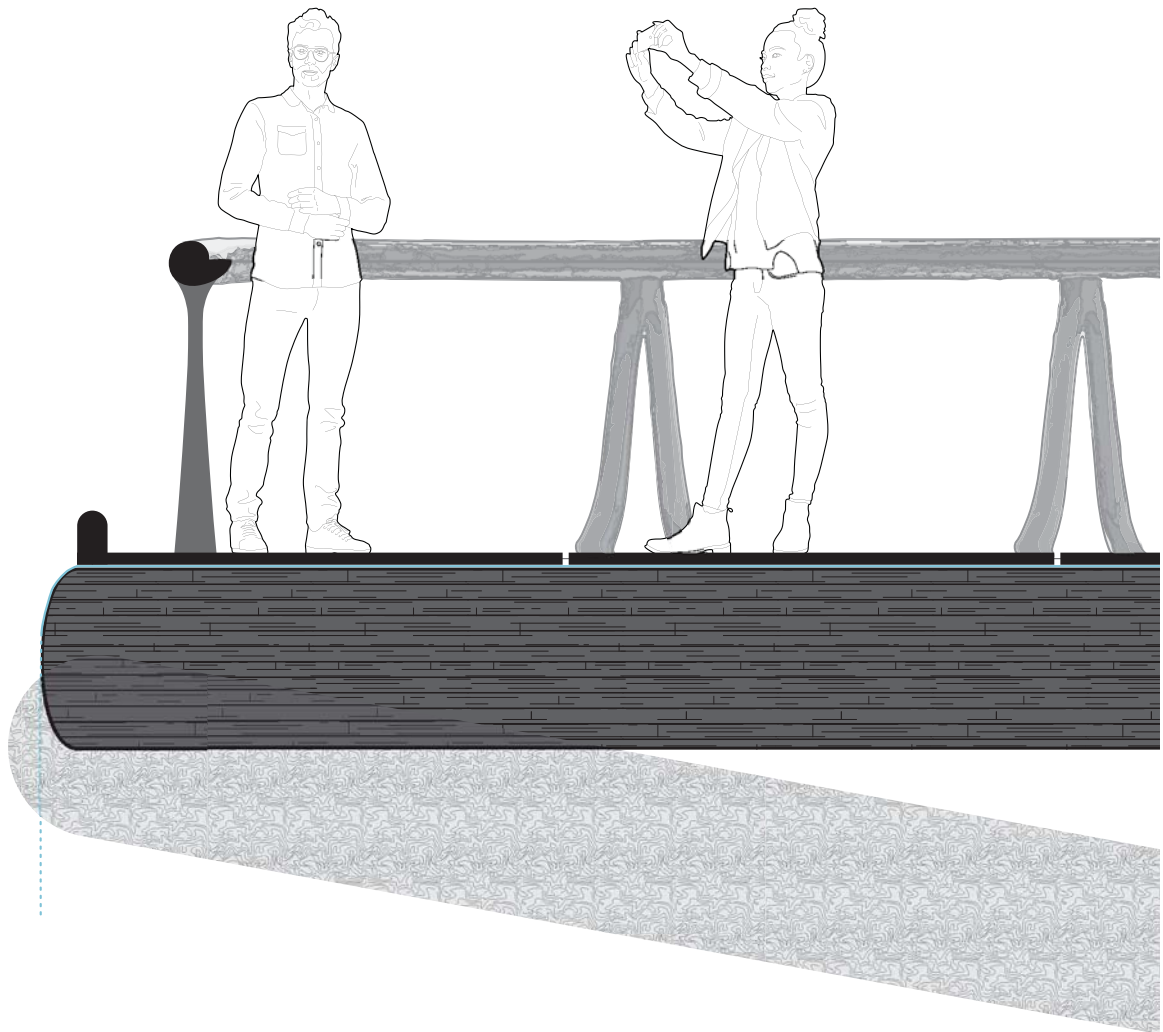
the surface and directs water to the outside edge to drain.



A drip line is created by the canopy of platforms, each protecting the one below and directing rain outwards.

Approaching the edge of the platform should be comfortable for the adventurous, while being protective enough for the less experienced. The railing and supporting posts are profiled to reduce their shadow line, so as to be minimized visually. Within the profile of the railing is a ledge to encourage leaning on, but the railing is set back from the edge for additional security

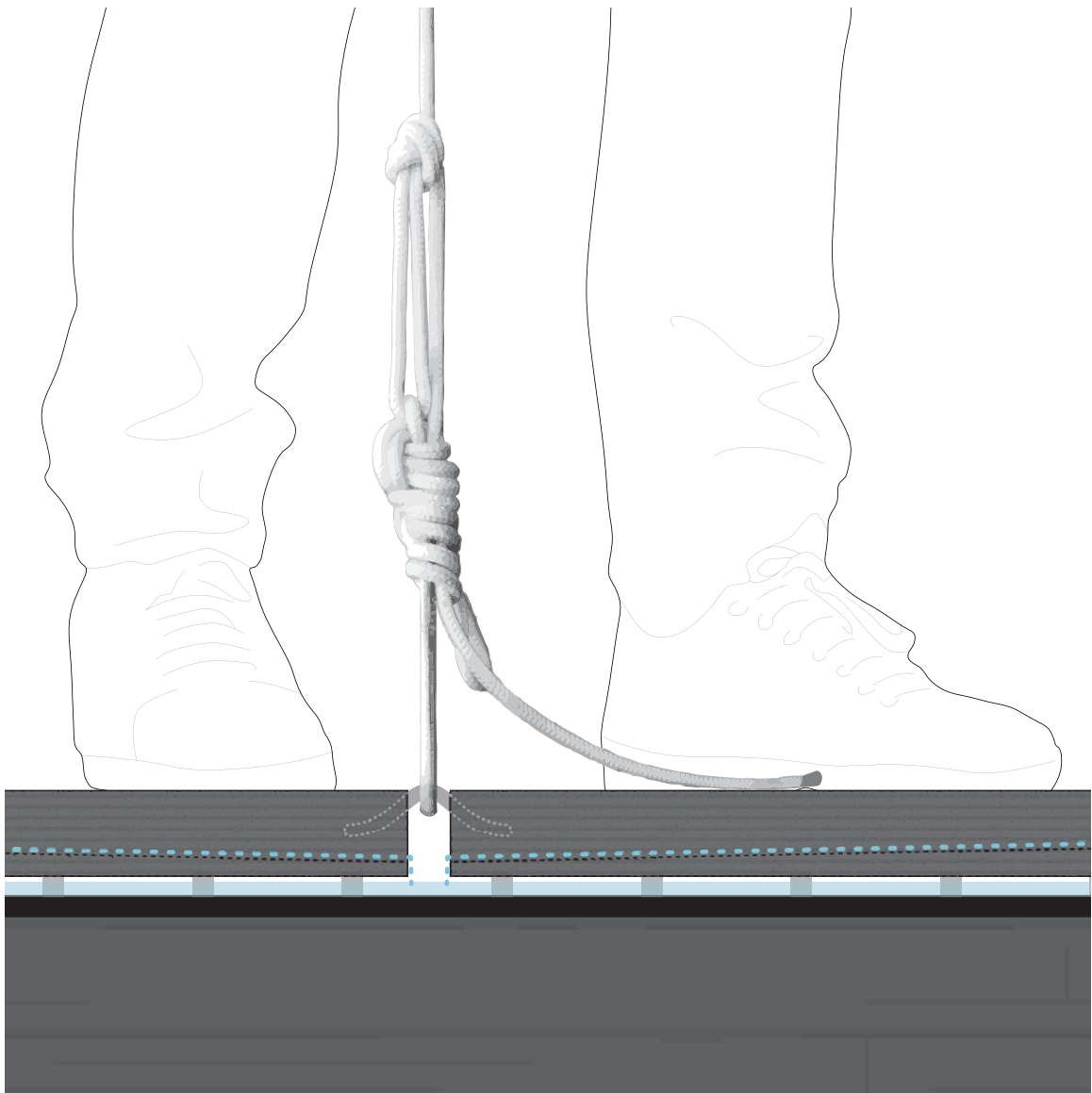
since there will be no pickets. Running along the edge of each platform is a curb to prevent objects from carelessly rolling off, but will still allow water to drain under from the decking.



Railing profiles are designed to minimize visual obstruction beyond, while being inviting to approach.

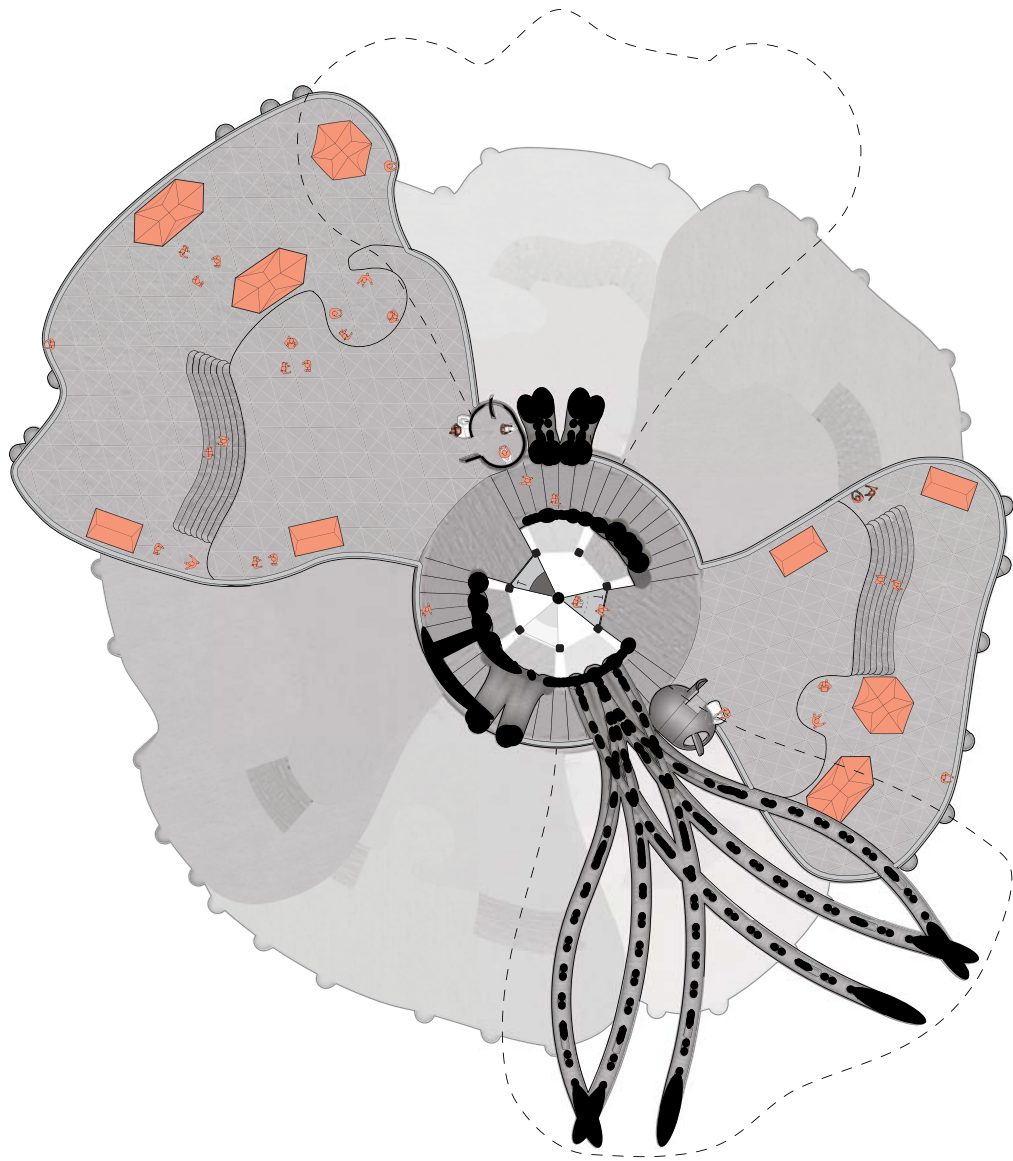
Between each decking panel are points to tie down tents, tarps, or rappel anchors. Having many points across each platform allows for individual expressions of creativity and inhabitation. By allowing each party to set their own camp they take an ownership of their site, instilling a greater sense of personal responsibility upon their environment. With the decking allowing

for drainage underneath it is possible to camp on any point of the platform. The built in anchor points for rappelling allow climbers the potential to set up a camp literally anywhere on the tower.



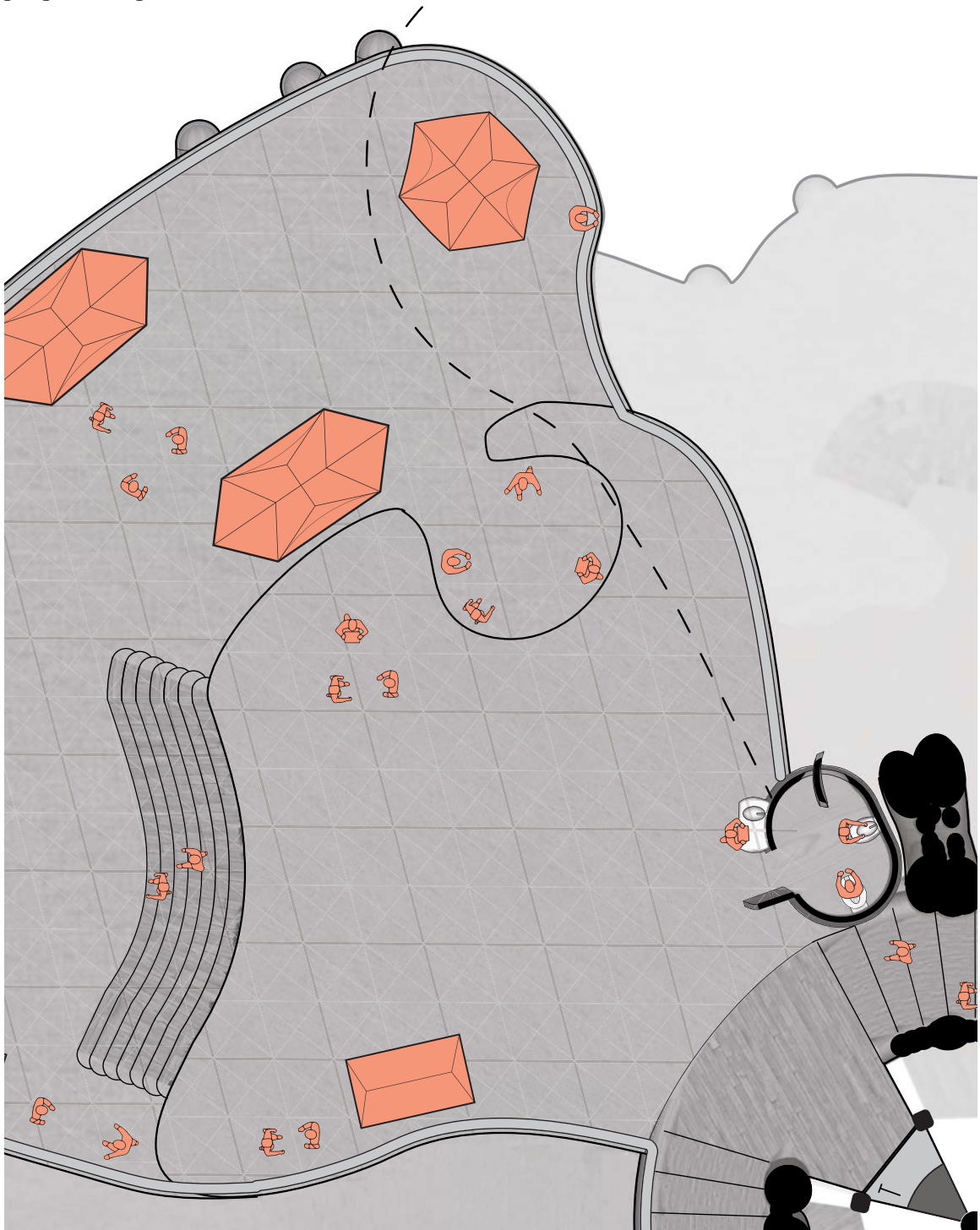
Anchor points for tying down tents and rappel lines allow for limitless freedom of exploration.

Each platform increasingly acts as a degree of shelter to the one below, while still allowing for complete daylight penetration. The setting up of individual camps allows for each party to define their own level of exposure and imply an ownership of the site they inhabit.

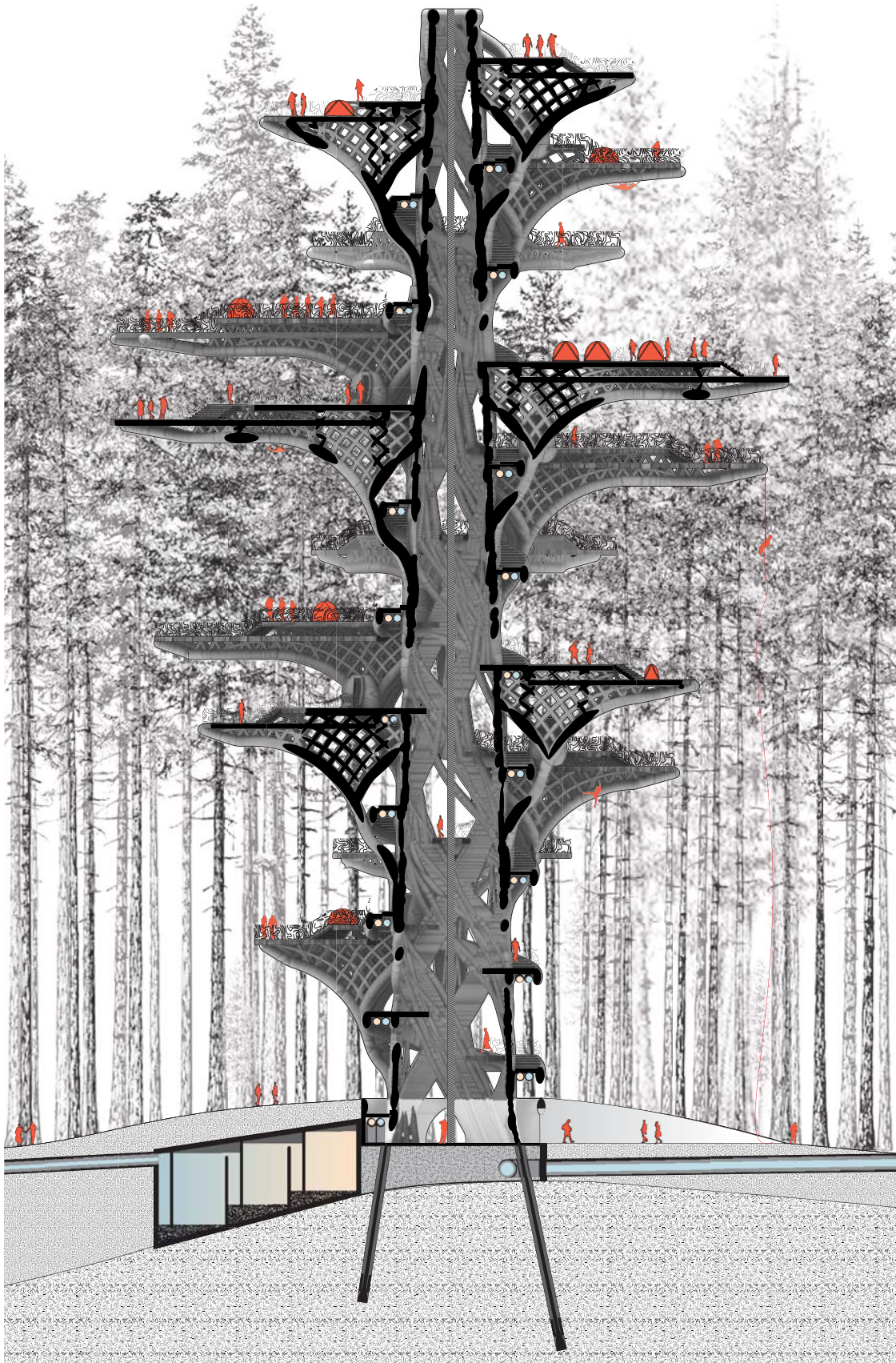


Plan drawing of a typical level.

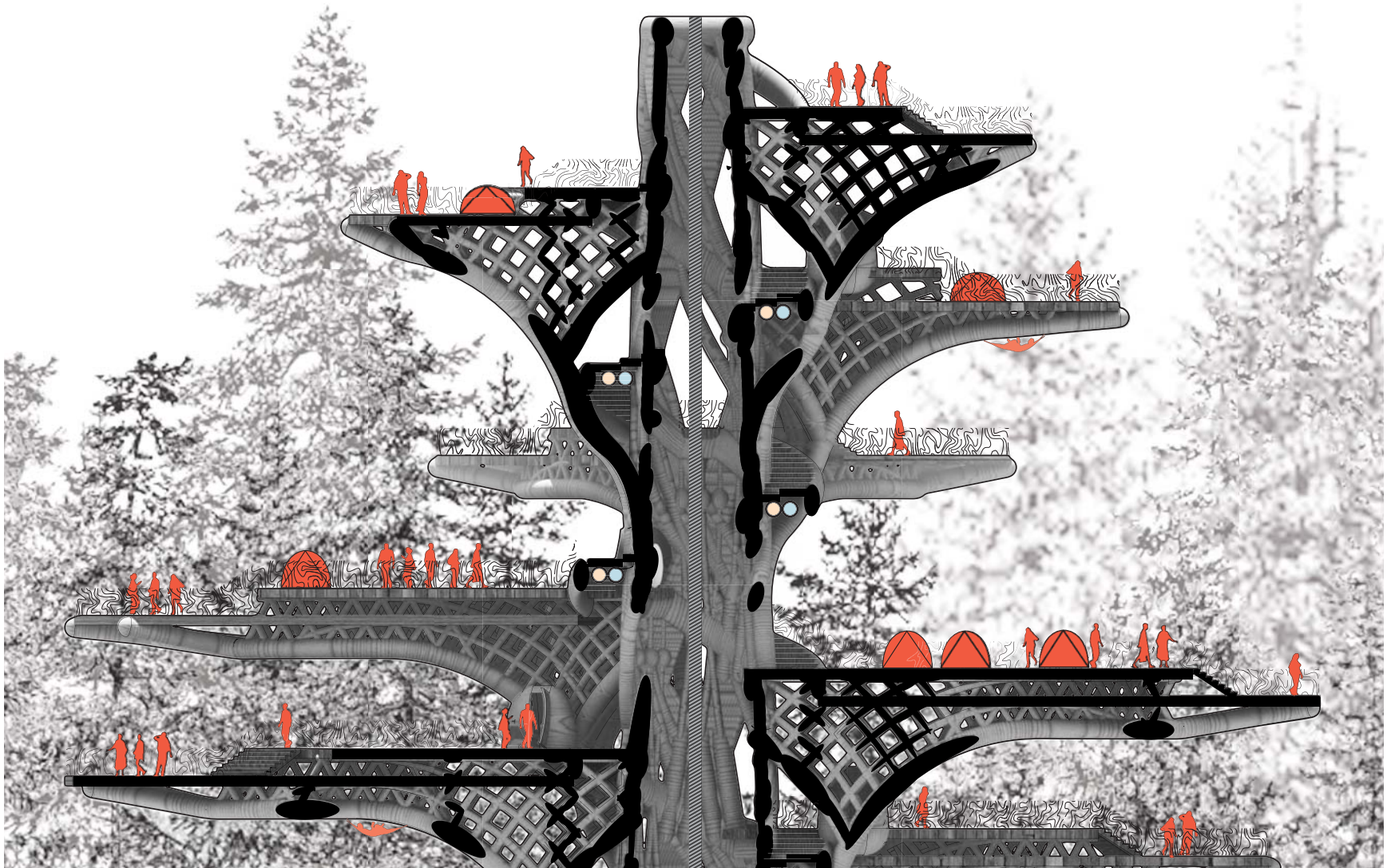
Providing aspects of prospect and refuge through the stepped layers of each platform and the undulating edge conditions for people to explore and inhabit.



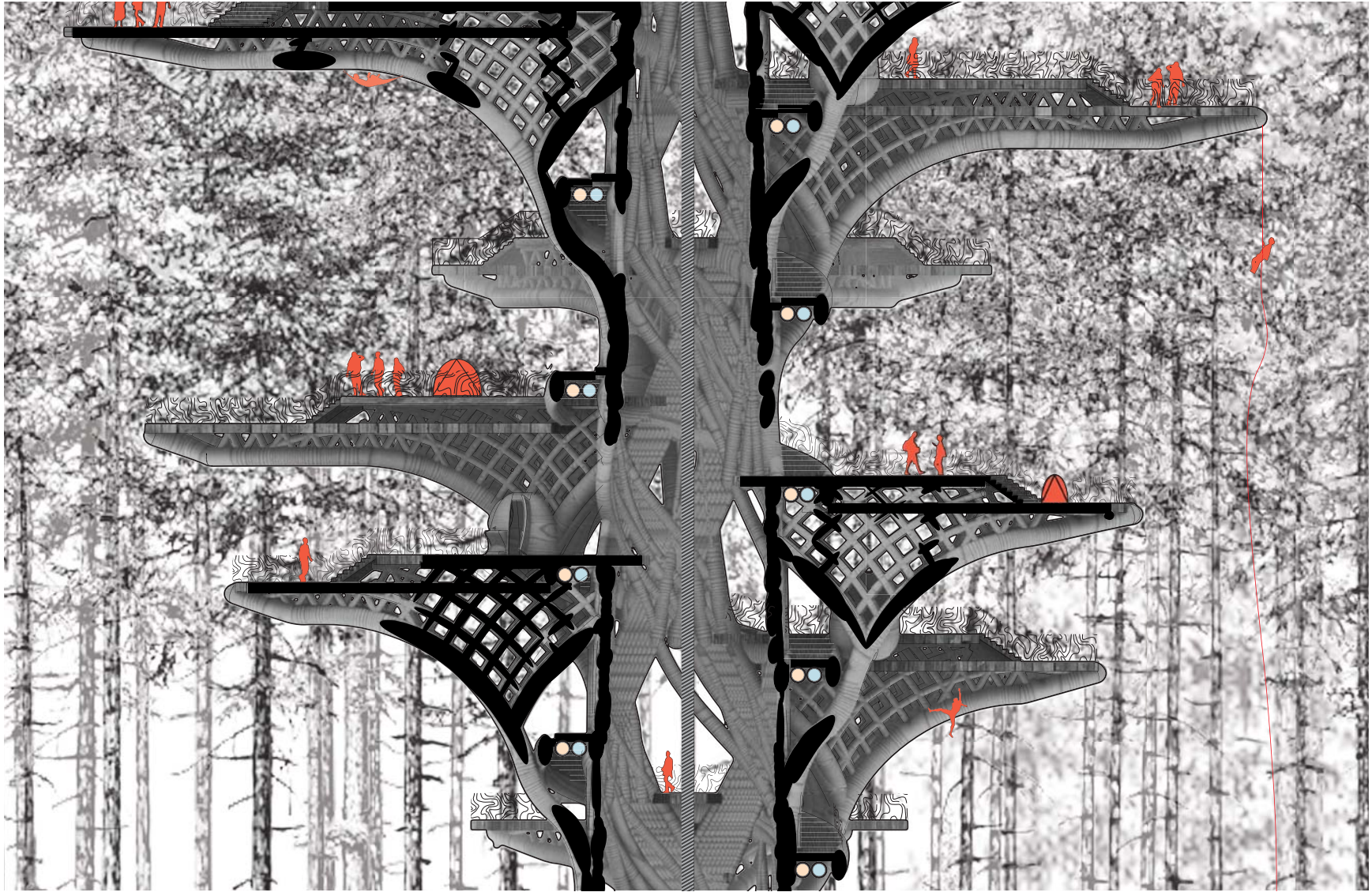
Looking in plan at the inhabitation of a platform.



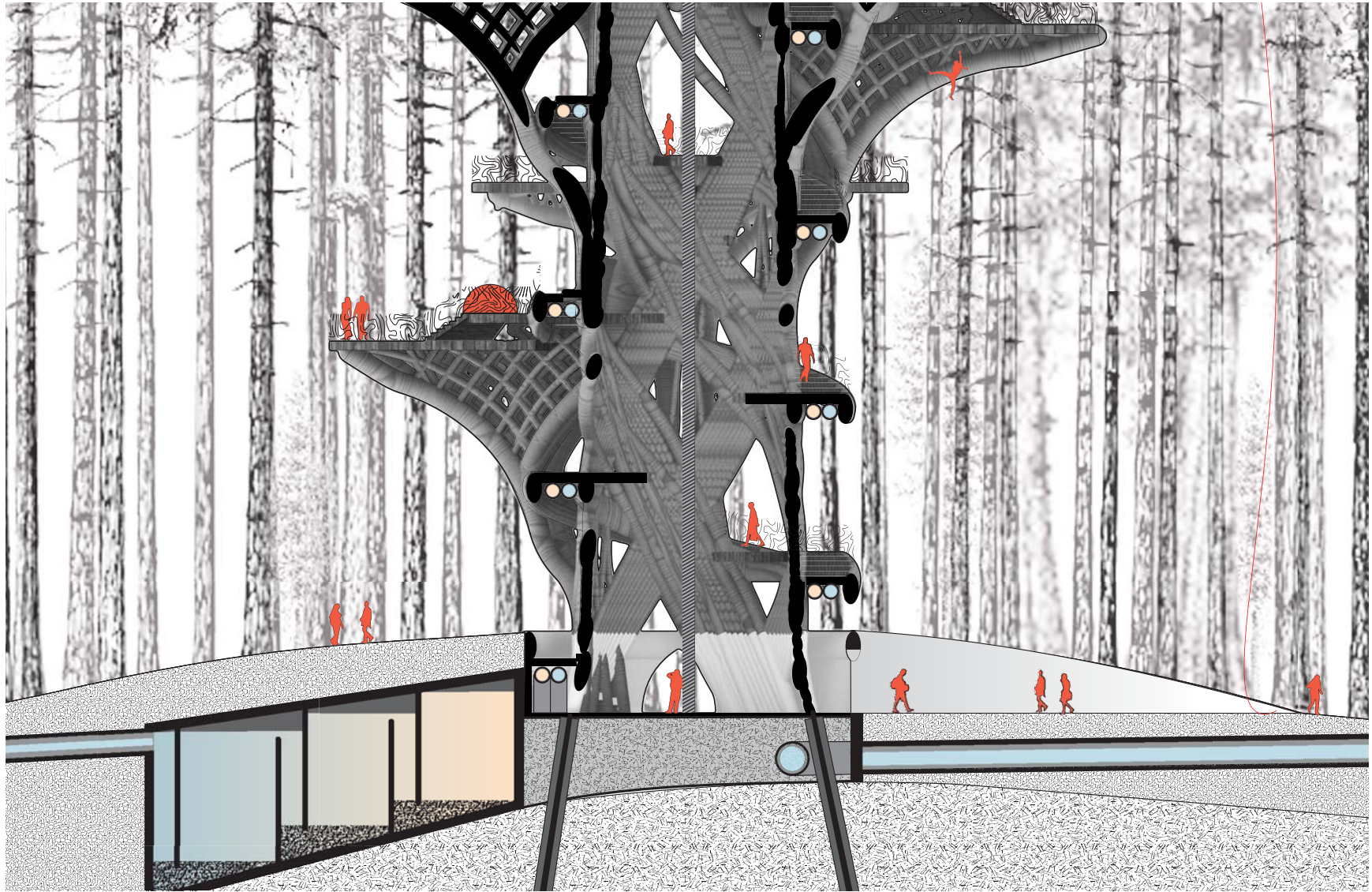
A complete section drawing of the tower.



The upper third of the tower in section. Inhabitation at the top of the canopy.



The middle third of the tower in section. Inhabiting the foliage of the forest.



The lower third of the tower in section. The tower meeting the ground, and the supporting infrastructure of the tower.

CHAPTER 4: CONCLUSION

Through an investigation of design an landmark is created. A landmark in the wild, where the requirements of society to be exposed to nature are fulfilled without destroying the pristine wild.

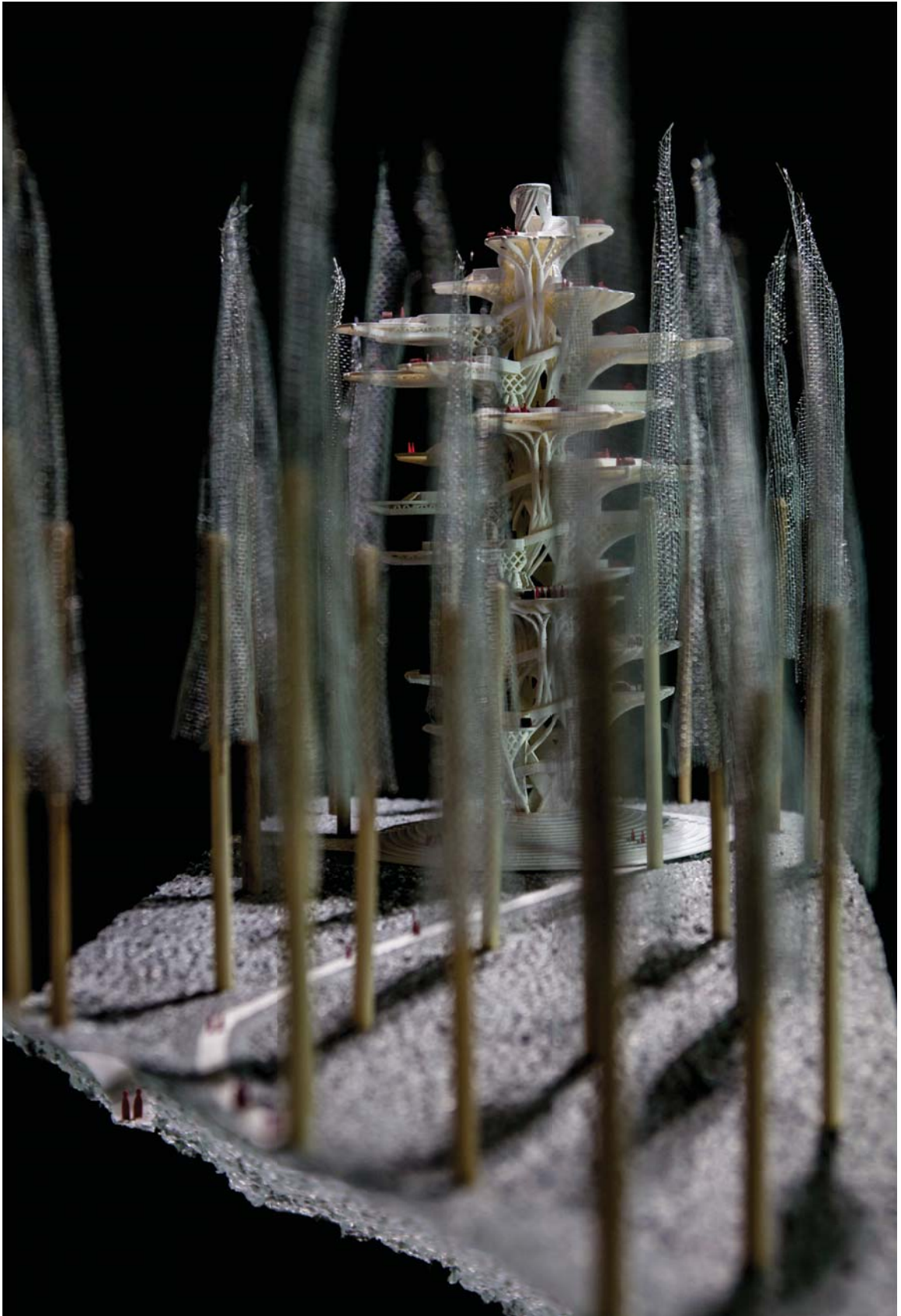
Introducing a landmark architectural intervention into the wild produces an invitation for society to become more engaged in the environment, a point of reference to navigate from. The navigation of a wild environment is not solely one of orienteering, but also of consciousness.

This paradigm of development has an intrinsic concern with the experience of the individual. By allowing individual exploration and inhabitation of the architectural intervention, a learning process is programmed into the experience. The experience of every visitor becomes a self directed experiment of an exposure to the wild, mediated by the architecture without desensitization.

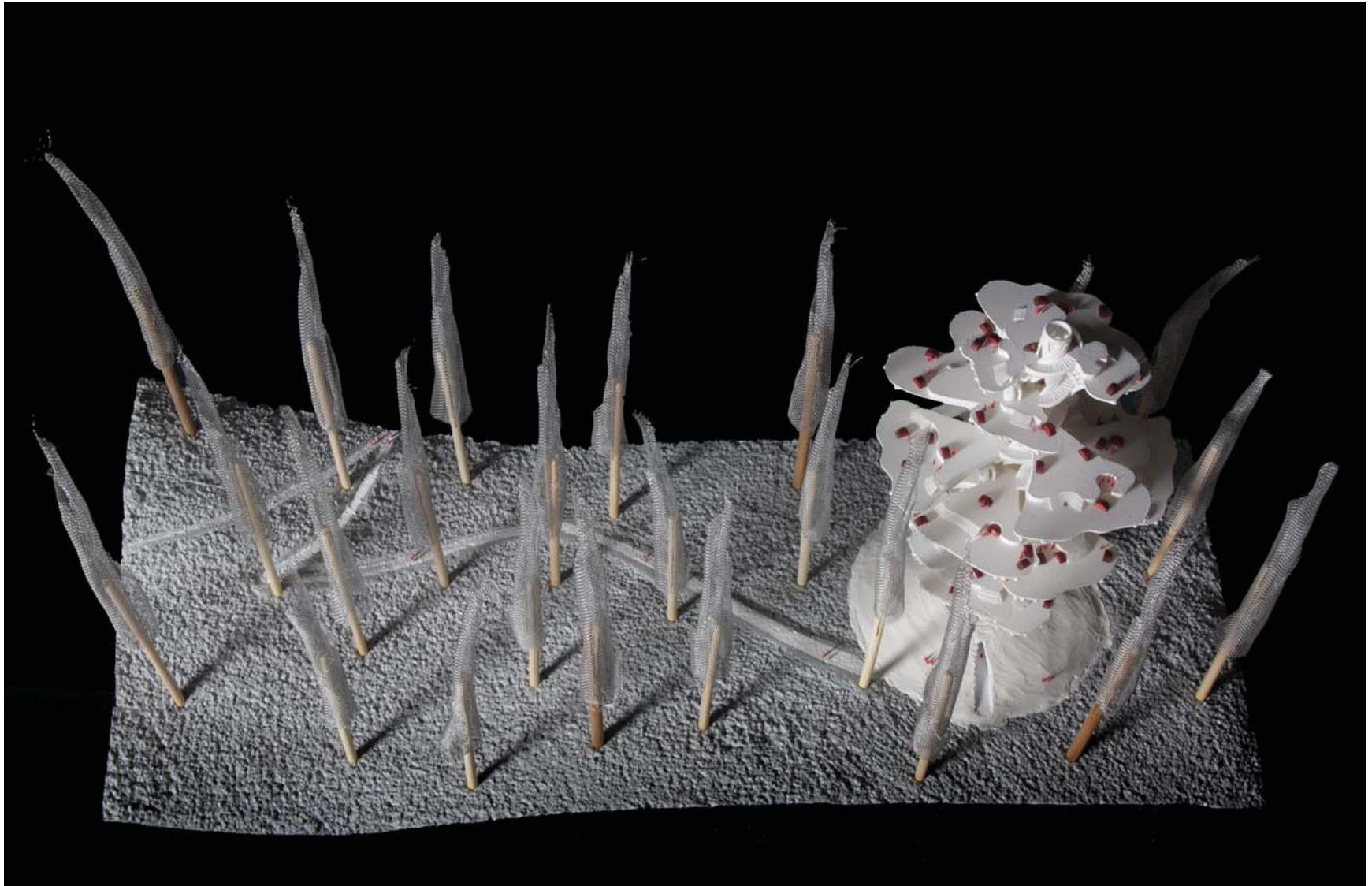
Allowing the greatest number of people into the wild without destroying it creates the potential for a paradigm shift within society: the understanding that the grown environment has a greater value than that of the primary resources which are present. Contrary to how this first appears, it is not a call to halt development in a contemporary context, but to understand that it is a technological application: a systematically applied process with predicted results. With the predicted results are collateral consequences resulting in potential positive or negative correlations. This is a call for consciousness, an understanding of the consequences for any given process, and the application of a value to the process. The potential of this paradigm shifting architecture is the result of a positive correlation between society and the value of the grown environment.



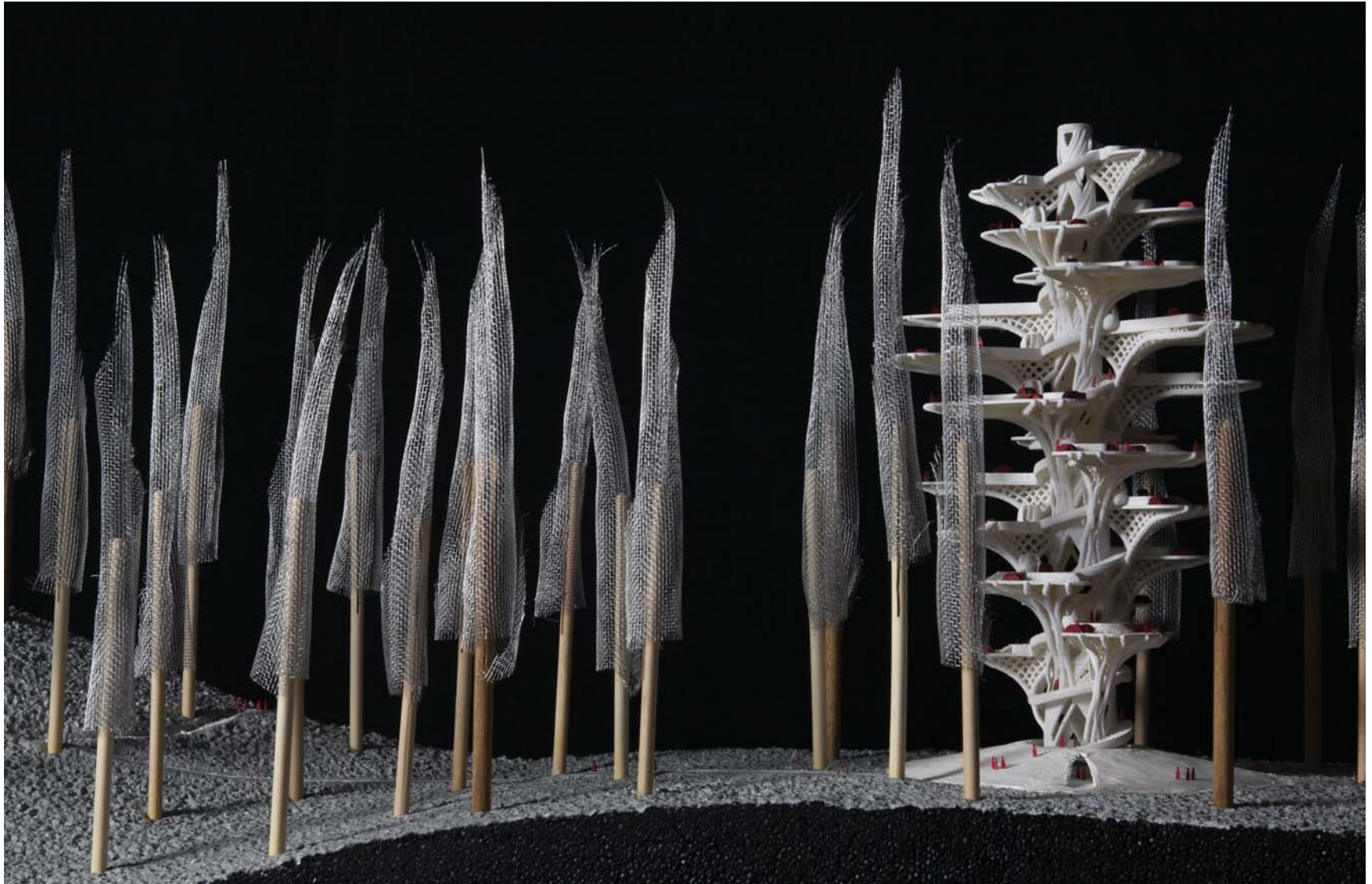
Creating a landmark in the forest.



Approaching a landmark in the forest.



The procession through the forest.



Creating a landmark in the forest.



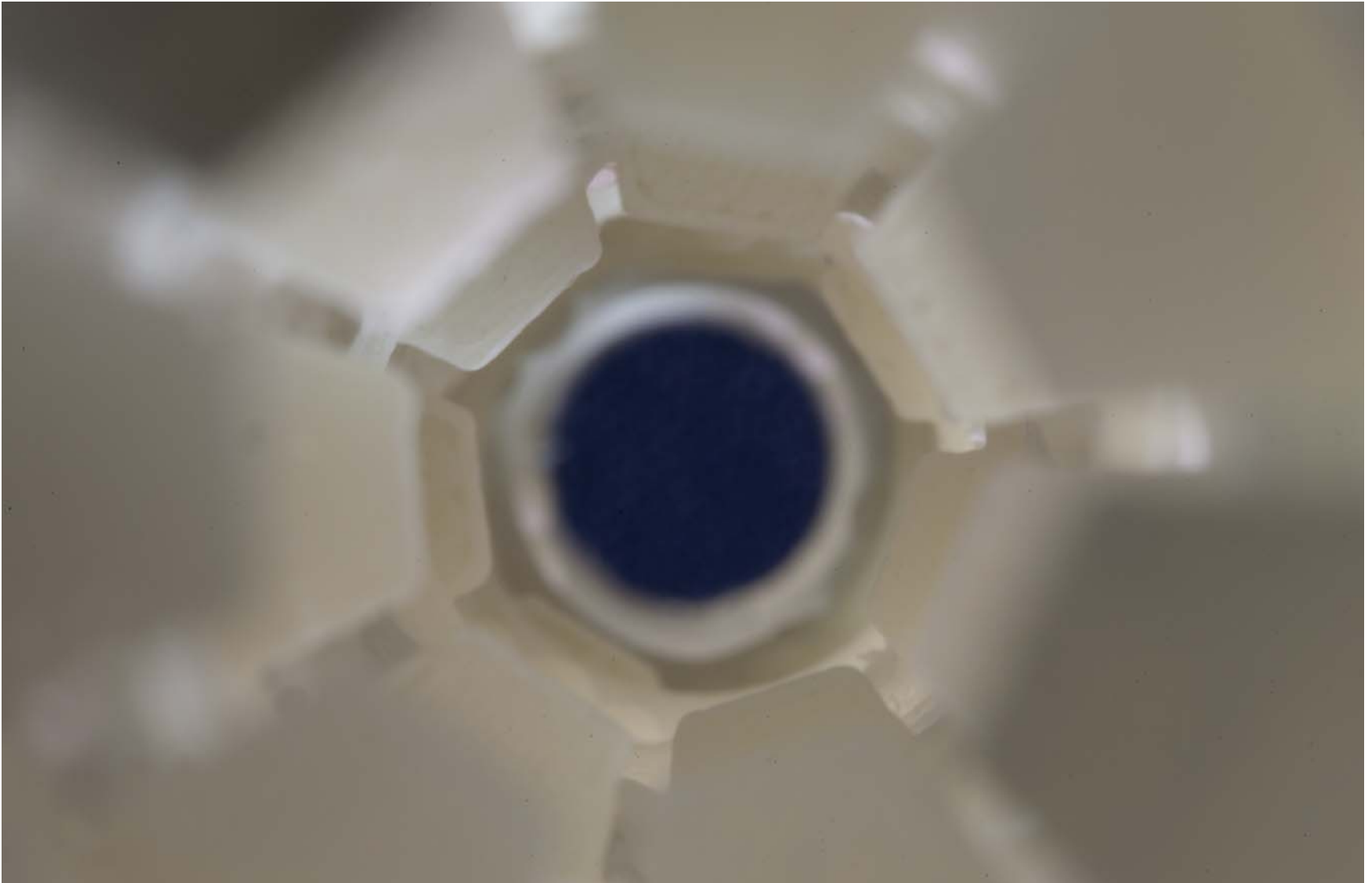
The tower meeting the ground.



Under the canopy of the tower.



Blending the boundary of the wild.



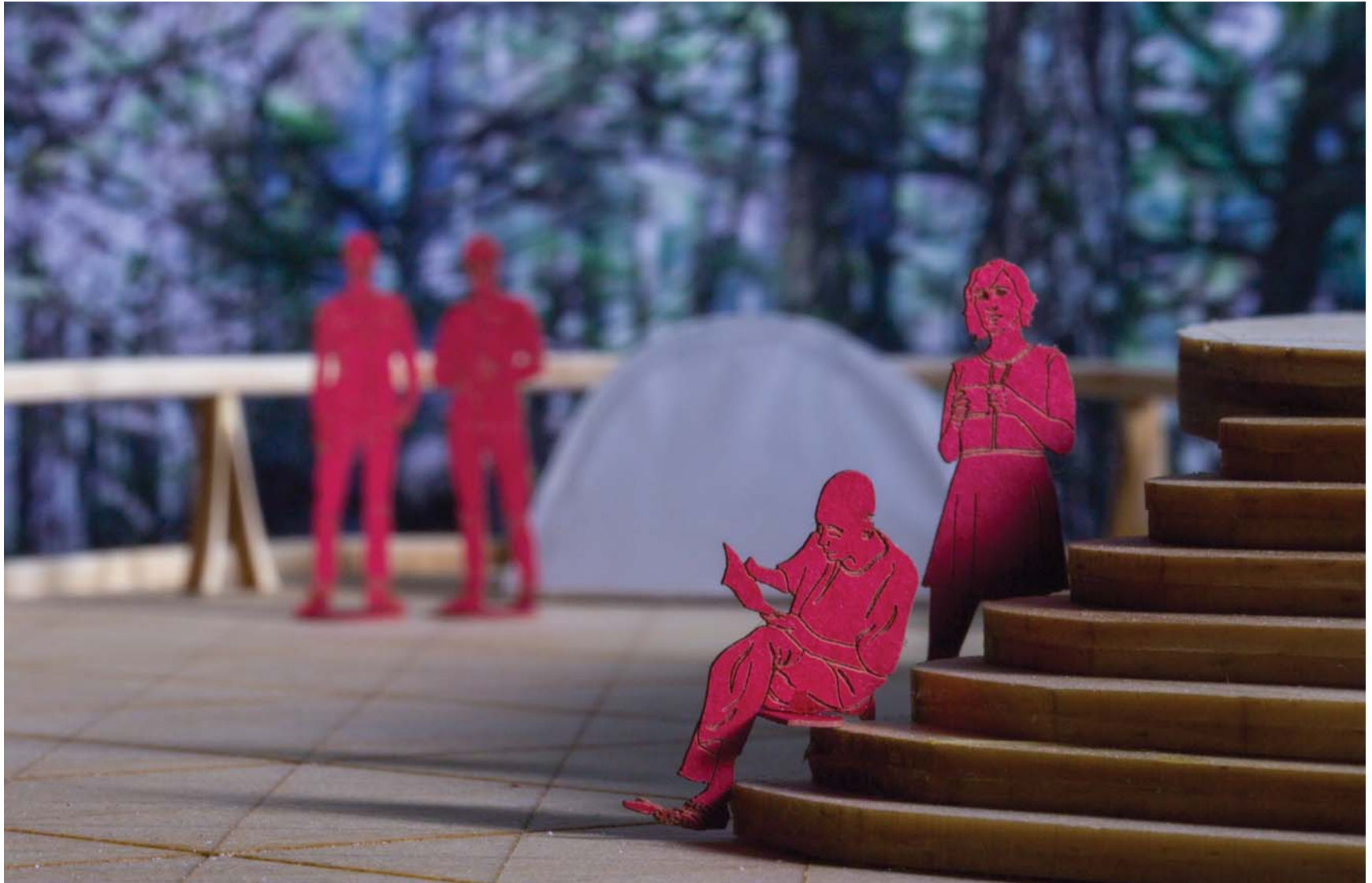
Looking up while riding the elevator.



A celebratory threshold to the wild.



A place to admire the wild.



A place to contemplate the wild.



Places for degrees of exposure to the wild.



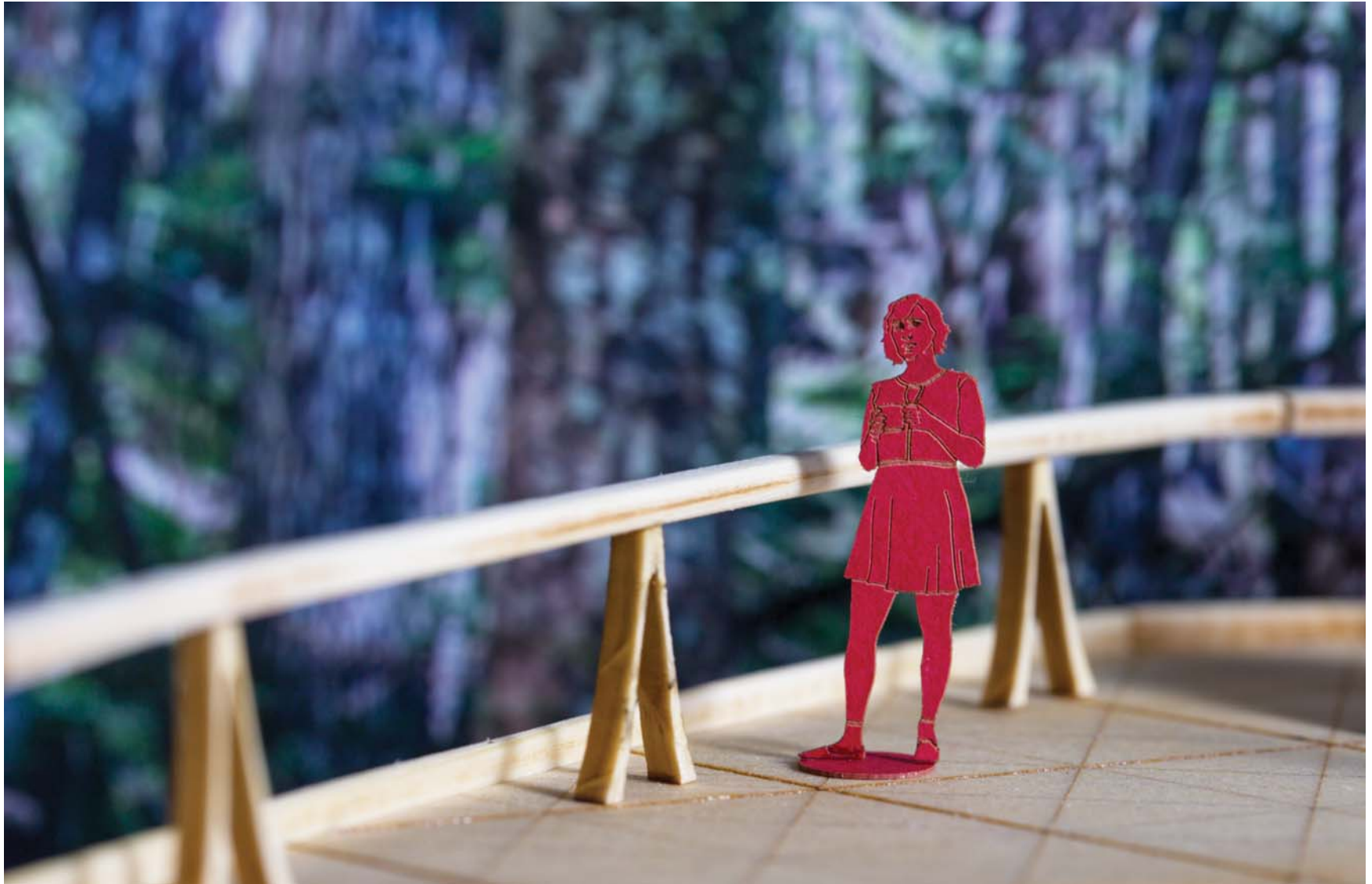
A place to rest in the wild.



A place to inhabit the wild..



A place to project your self upon the wild.



A place for the wild to be projected on to you.



A place for exposure to the wild.

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