

2017

LIXIL INTERNATIONAL UNIVERSITY ARCHITECTURAL COMPETITION
"NEXT GENERATION SUSTAINABLE HOUSE IN TAIKI-CHO"

Spa in the Nature

Architectural Association School of Architecture (AA School) • United Kingdom
Earth Bath

China Academy of Art • China
BATH IN THE SHELL

Institute for Advanced Architecture of Catalonia (IAAC) • Spain
SUBLIMATION — CHANGING STATES OF WATER

Kyushu University • Japan
Colobockle Nest

Meiji University • Japan
FLOW

National Cheng Kung University • Taiwan
THE REFLECTIVE COSMOS

Riga Technical University • Latvia
MEMU KILN

Tokyo University of the Arts • Japan
a Spoon of Spa

Universitas Indonesia • Indonesia
A Walk to the Unknown

Universidad de Buenos Aires • Argentina
PACHAMAMA

University of Pennsylvania • United States of America
VEILED GARDEN

The University of Sydney • Australia
VERTICAL THATCH

Vienna University of Technology • Austria
Radiant Field

課題

自然の中のスパ

古代ローマの公衆浴場やモヘンジョダロの大浴場，ドイツのバーデン＝バーデン，イギリスのバース，フィンランドのサウナ，日本の温泉や中世以前から多様された蒸し風呂など，世界中にはさまざまなスタイルのお風呂があります。歴史的に見てもお風呂は汚れを落とすだけではなく，社交場として，パブリックスペースとして，リビングのようなくつろぐための場所としての機能も持ち合わせていました。では，この大樹町で自然と共にあり，リラックスできるお風呂とはどのようなものでしょうか。そこではお湯につかるだけではなく，ストレッチやマッサージをしたり，豊かな自然の中を散策したり，ゆっくりとした時間を過ごすなど，いろんなアクティビティが考えられるでしょう。また屋内や外，男女がどのように入るのかということからも，お風呂でできることが新しく考えられるかもしれません。移動可能な建築の第6回優勝校のデンマーク王立芸術アカデミーによる「INFINITE FIELD」と連動した使い方も考えられるかもしれません。また，今回の課題はこれまでとは違い，肌に直接ふれるものです。そうした使われ方から，新しい素材の使い方も提案できるかもしれません。場所はメムメドウズ内の敷地とします。お湯はこの場で沸かしても，近くの川や海の水を利用したり，温泉から運んできて結構です。人が集い，リラックスできる草原のお風呂を考えてください。

設計対象

- ・入浴時のプライバシーには配慮してください。
- ・敷地は屋外走路の一部とします。
- ・お風呂の形式・使い方を含めてご提案ください。浴室以外のスペースの提案も受け付けます。
- ・どのような素材を使うのかも含めて提案してください。
- ・お風呂のための設備や運用（給水や熱源など）も提案があれば加えてください。
- ・規模は 50m² 以内としてください。
- ・費用はお風呂の設備も含めて 15 万 USD 以内を想定してください。
- ・最優秀案は実際に北海道大樹町で建設します。ただし，実施にあたり，予算などの諸条件や日本の法令に合わせて案を変更することがあります。

Earth Bath

Architectural Association School of Architecture, Professor Shin Egashira

Raphael Alonso Caudan, Florencia Collo, Olivier Dambrou, Laurence Lunley, Carlos Peters and Aoi Phillips

Landscape

The proposal interprets the brief of a 'spa in nature' literally, rather than designing a single, picturesque structure sitting as it were, on the land. 'Earth Bath' is fragmented in the landscape and physically dug into the ground. By moving the site slightly to the east, we are able to take advantage of the only topographic feature – the steep wooded slope – of this otherwise flat area. A clear axis is created by the stairway that cuts into the hillside, reinforcing the central spine of the overall site. At the same time, the pool and courtyard volumes, and the trees, suggest a kind of outdoor room to the west, facing the main accommodation block. Thus the bathhouse works as a strong articulating element in the landscape.

Tempering

Tempering is a process of heating and rapidly cooling steel or glass to make it harder, or softer, or tougher, or more brittle. Perhaps this is a more interesting way to consider a 'well-tempered' environment, rather than seeking comfort in the even mean, to achieve a 'tempered state' in the simultaneity of ice and steam. Designed as a sequence of very different, and extreme, conditions, the bathhouse is a device for tempering the body. So, for instance, the sauna, a small, dark, very hot and dry space, buried in the earth, is located at the 'hinge' of the project, between the steam-filled canyon-like rapid/warm outdoor pool and the more open courtyard into which snow, for pumping into, can be shovelled down the slope.

Earth

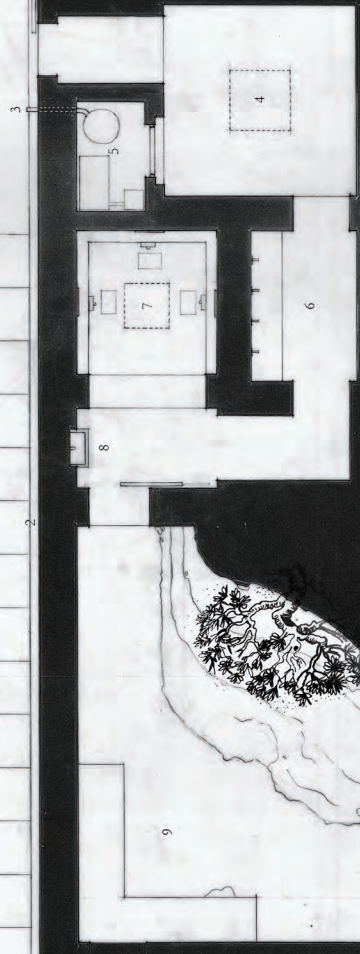
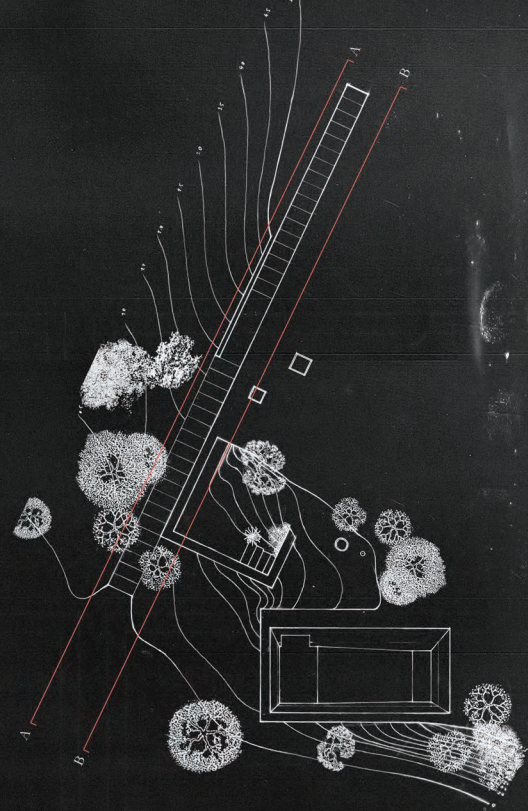
Rather than thinking of nature as a panoramic view, in this bathhouse one is in nature by being in the earth. Not only is the building buried and carved into the ground, it is also literally built out of the soil – of rammed earth. This process of construction is one of the most sustainable methods of building, and can also be very cheap as all the material simply comes from the excavation on site. It requires little skill but much labour, so it is ideal for work by volunteer teams. We propose, therefore, that a workshop could be run with people involved with Mami Meadows, students, architects, and locals, to build most of the project over one summer.

Hearth

The outdoor pool is heated by an underground hypocaust system. At one end, on top of the slope, is a chimney from which smoke will blow out across the landscape. At the other end, at the level of the bottom of the slope, is a large fire-pit, half dug into the ground and within the massive end-wall of the pool. Designed like a giant fireplace, it becomes a focal point for the outdoor 'room', and a communal hearth at the centre of Mami Meadows.

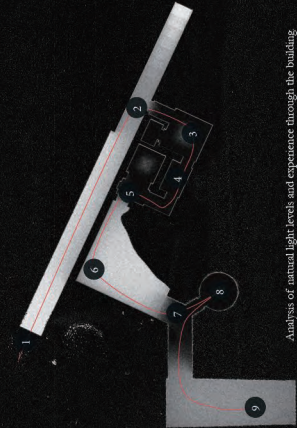
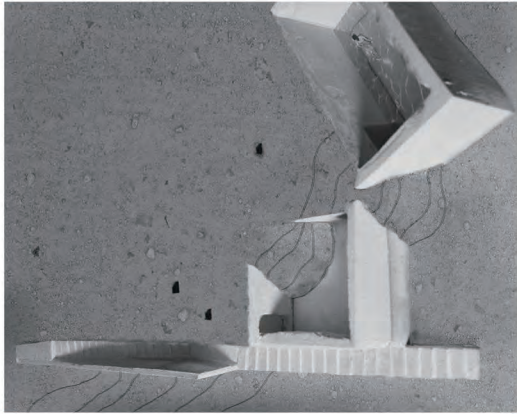


Site Plan 1:1000

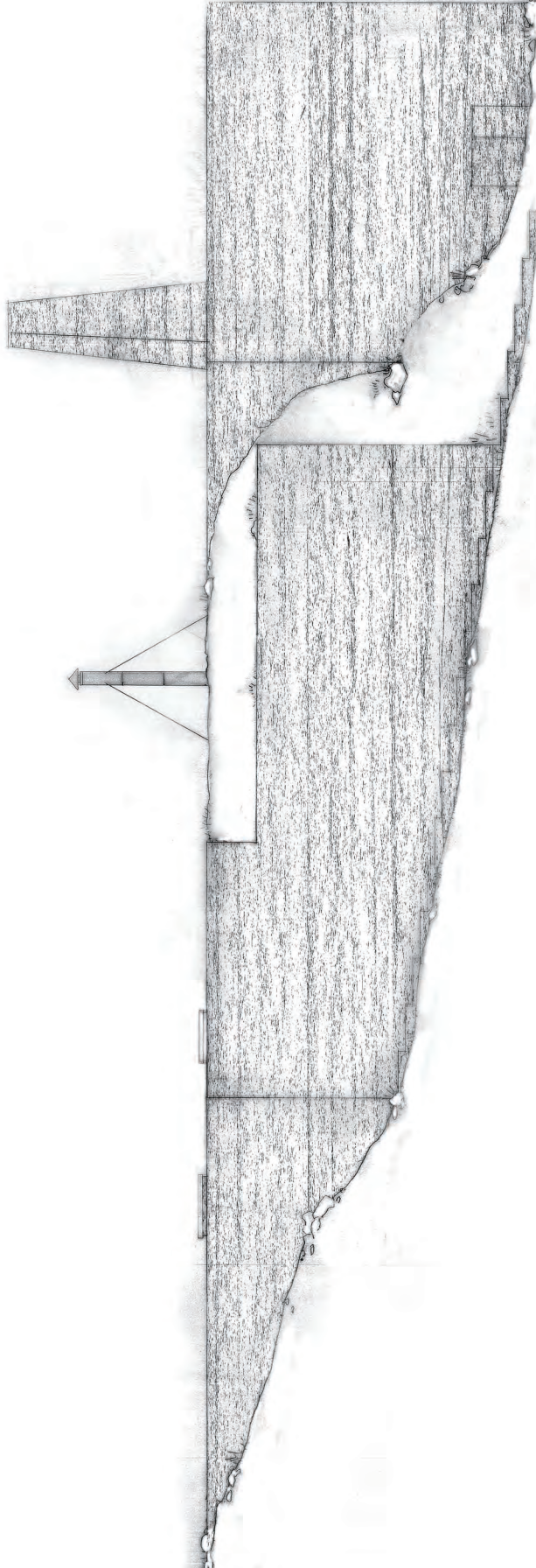


- 1 Rainwater Trough
 - 2 Rainwater Channel
 - 3 Boiler Steam Vent
 - 4 Entrance Atrium
 - 5 Boiler Room
 - 6 Changing Space
 - 7 Washing Space
 - 8 Drinking Fountain
 - 9 Snow Courtyard
 - 10 Sauna
 - 11 Warm Outdoor Pool
 - 12 Fire Pit for Hypocaust
 - 13 Hypocaust Chimney
- 雨水溝
 - 雨樋
 - ボイラー排気口
 - 入口アトリウム
 - ボイラー室
 - 更衣室
 - 洗い場
 - 水飲み場
 - 雪見コートヤード
 - サウナ
 - 露天湯/水風呂
 - 露天風呂/煙囪/煙突

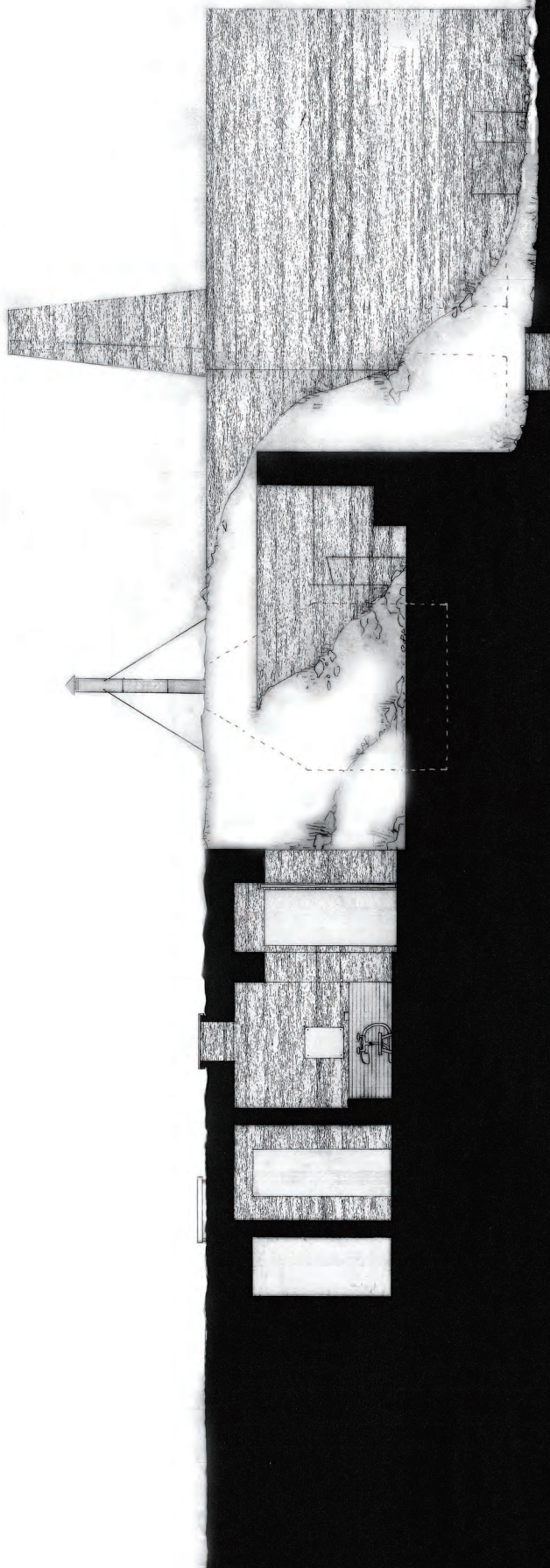




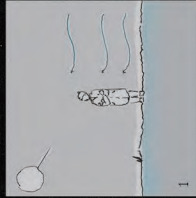
Analysis of natural light levels and experience through the building



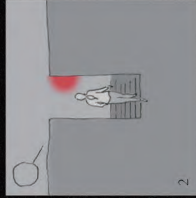
Section AA



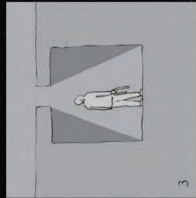
Section BB



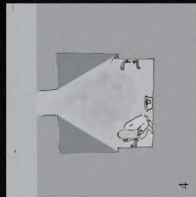
Dry Bulb T: 0.9 °C
Humidity: 25%
Wind Speed: 0.1 m/s
Mean Radiant T: 0.9 °C
Clothing Level: 2 clo
Activity: 2.3 met



Dry Bulb T: 0.9 °C
Humidity: 25%
Wind Speed: 0.1 m/s
Mean Radiant T: 1 °C
Clothing Level: 2 clo
Activity: 2.3 met



Dry Bulb T: 10 °C
Humidity: 65%
Wind Speed: 0.1 m/s
Mean Radiant T: 10 °C
Clothing Level: 2 clo
Activity: 1.2 met



Dry Bulb T: 15 °C
Humidity: 55%
Wind Speed: 0.1 m/s
Mean Radiant T: 15 °C
Clothing Level: 0 clo
Activity: 1.2 met



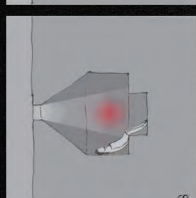
Dry Bulb T: 15 °C
Humidity: 85%
Wind Speed: 0.1 m/s
Mean Radiant T: 20 °C
Clothing Level: 0.1 clo
Activity: 1.2 met



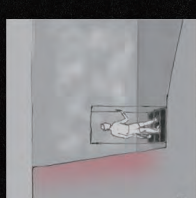
Dry Bulb T: 0.9 °C
Humidity: 55%
Wind Speed: 0.1 m/s
Mean Radiant T: 15 °C
Clothing Level: 0.1 clo
Activity: 0.8 met



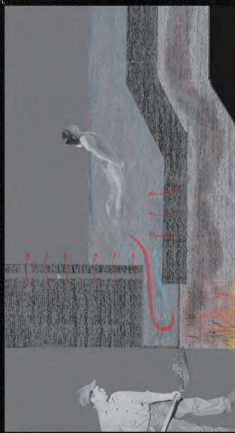
Dry Bulb T: 0.9 °C
Humidity: 65%
Wind Speed: 0.1 m/s
Mean Radiant T: 5 °C
Clothing Level: 0.1 clo
Activity: 1.2 met



Dry Bulb T: 60 °C
Humidity: 45%
Wind Speed: 0.1 m/s
Mean Radiant T: 60 °C
Clothing Level: 0 clo
Activity: 0.8 met

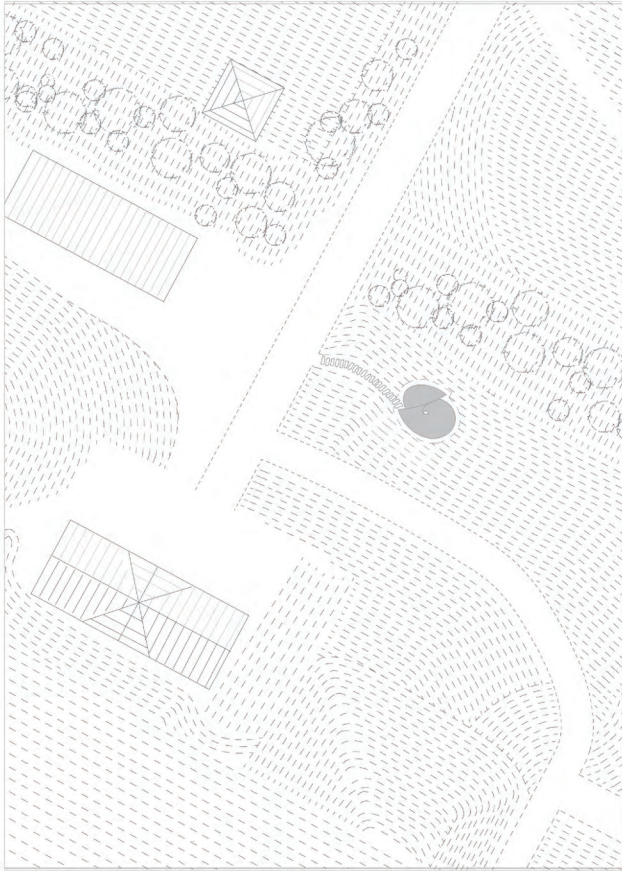


Dry Bulb T: 0.9 °C
Humidity: 75%
Wind Speed: 0.1 m/s
Mean Radiant T: 10 °C
Clothing Level: 0 clo
Activity: 1.2 met



Hypocaust Heating System for Warm Outdoor Pool and floor and walls





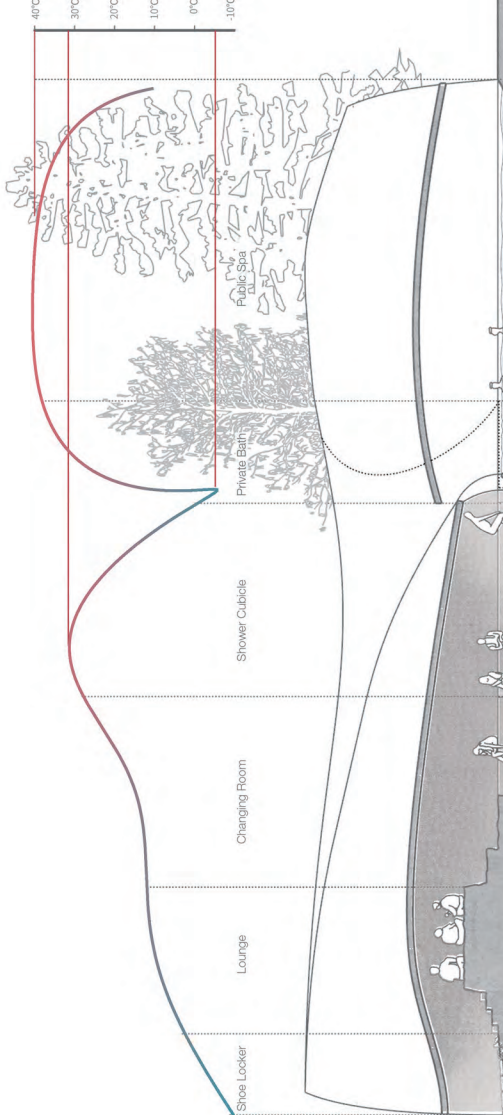
BATH IN THE SHELL

Our ancestor used to live in cave, where his heart and soul connect directly to the mother nature. But human being has disconnected with nature for a long time since we started living in boxes. Hard edges and cold corners have hindered our senses, we become clumsy in sensing the nature. The bath design therefore wishes to re-establish this long lost relationship with nature. It takes the form of sea snail shell, its internal cavity is generated through intertwining two spiral volumes into each other. The bath is where we naked ourselves, like the invulnerable snail in its shell, to let our heart and soul be as one with nature.

There is a sequence of experiences before people arrive the center of the bath, which is defined by varied floor levels. Raw stone become chairs, tables or even steps. When people approach the center bath, he must bend down to step over a low entrance, which is not only the portal connecting inside and outside natures, but also the key point for people to choose between two baths with entirely different spatial experience and atmosphere.

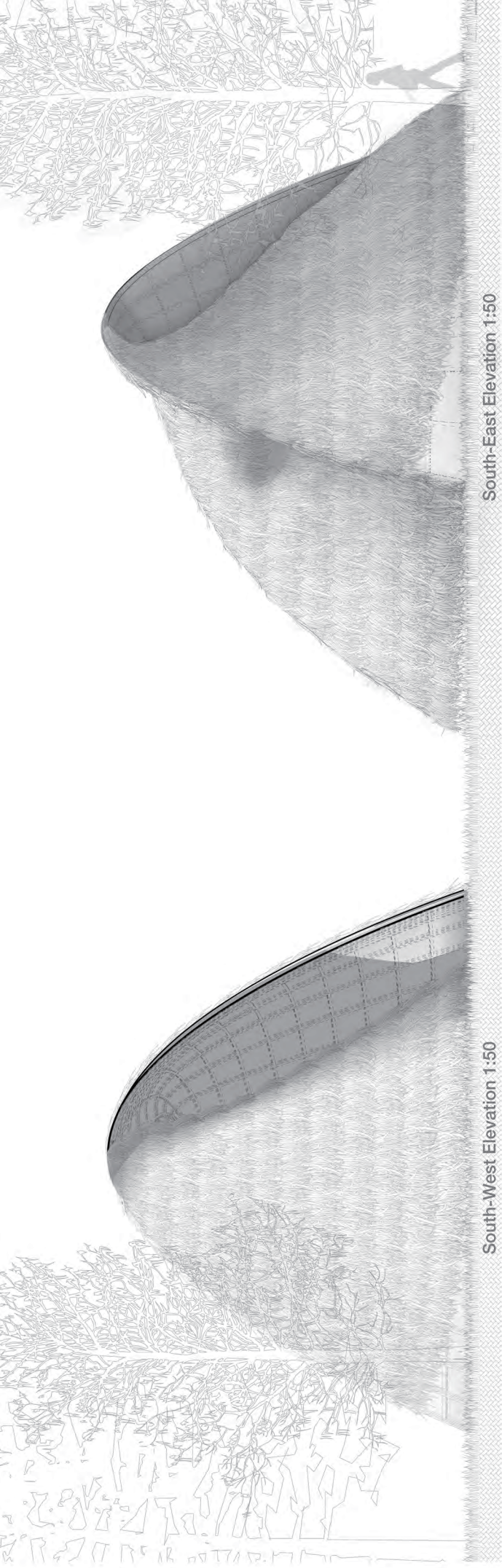
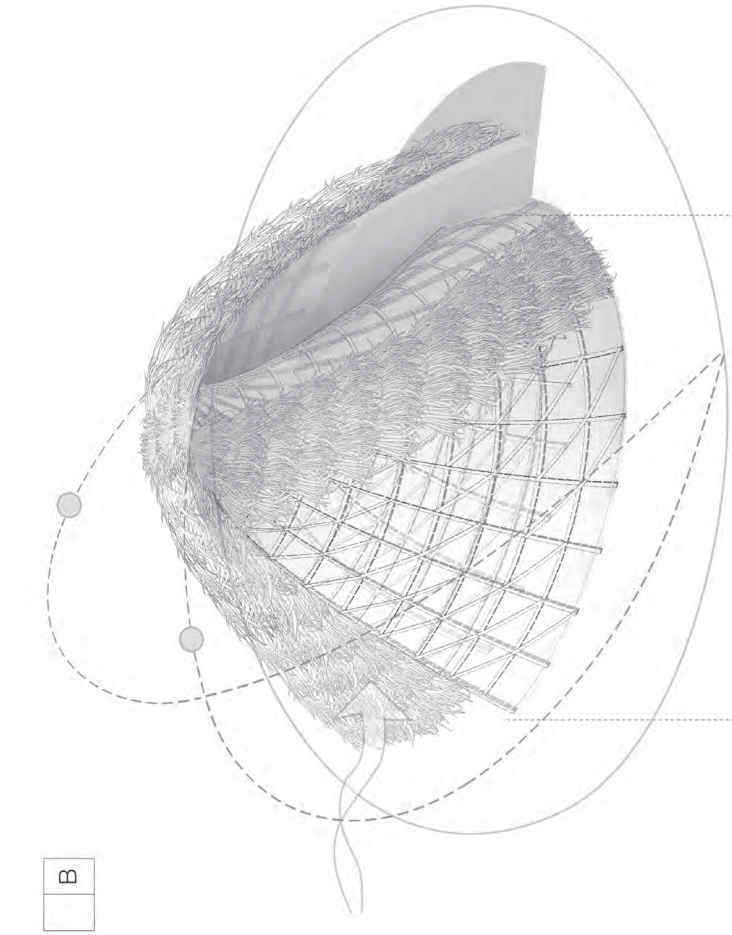
The small bath in the core can only be occupied by a single person, with sunlight diffused down along the curved walls. On the other side, a large bath can offer three or four people sharing together. People stay in a semi-open space that directly facing to the greenery and looking at the woods through a slight opening at the bottom of enclosure. As the sun moves during the day, they can catch sight of shadows moving on the curved walls.

The facility diverts water from the nearby sento to the bath and heats it with a water heater system. To integrate the building into surrounding environment, the surface of the wood structure is covered by thatched tiles. The shadows of bathing people draw a dramatic play of light on the waterproof paper attached to the wood-frames. The foundation was made of concrete and covered with uncarved stones, which becomes an extension from the external.



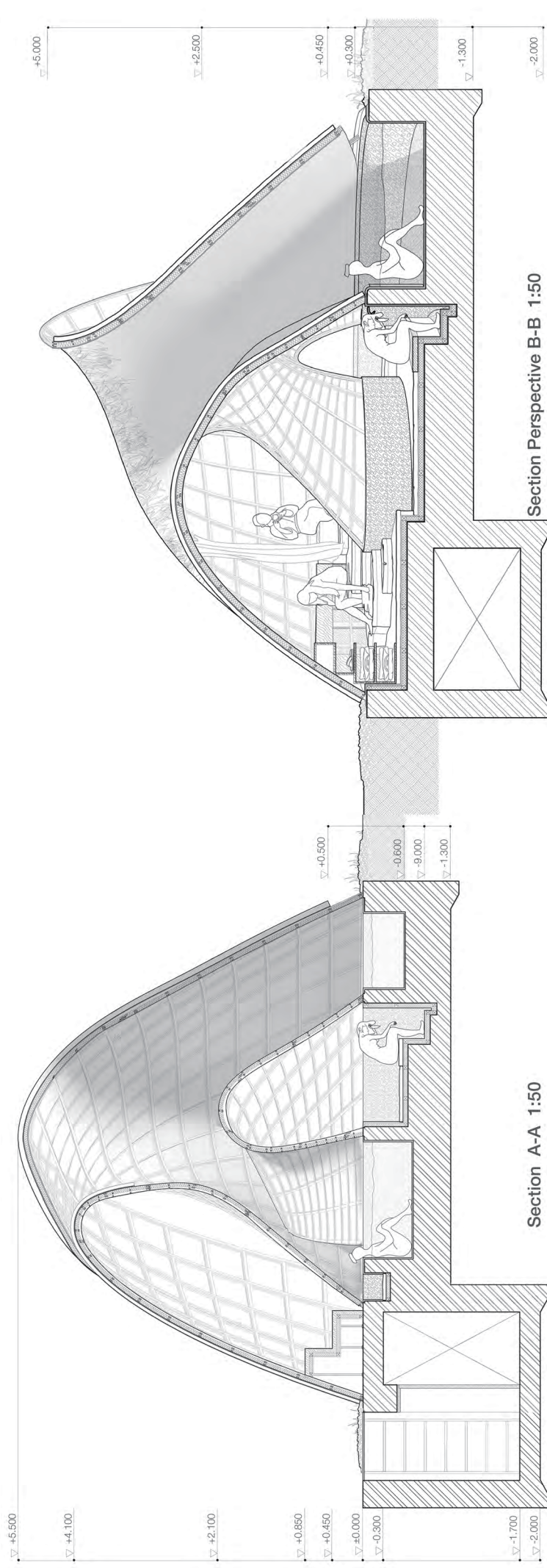
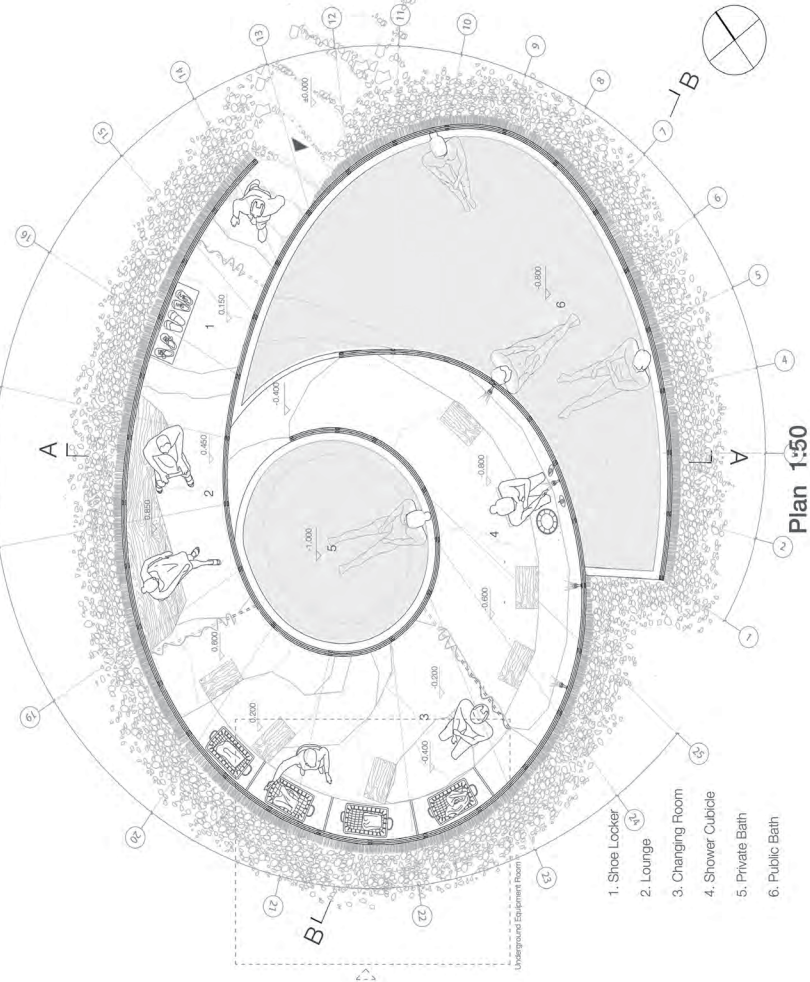
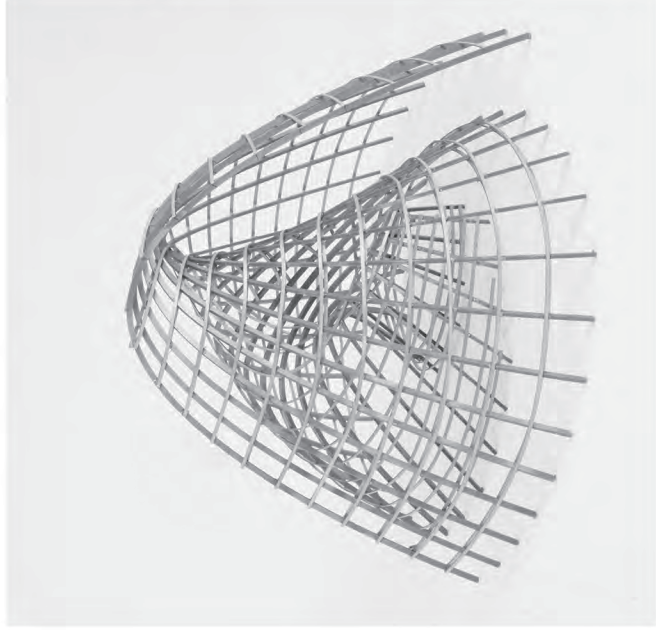
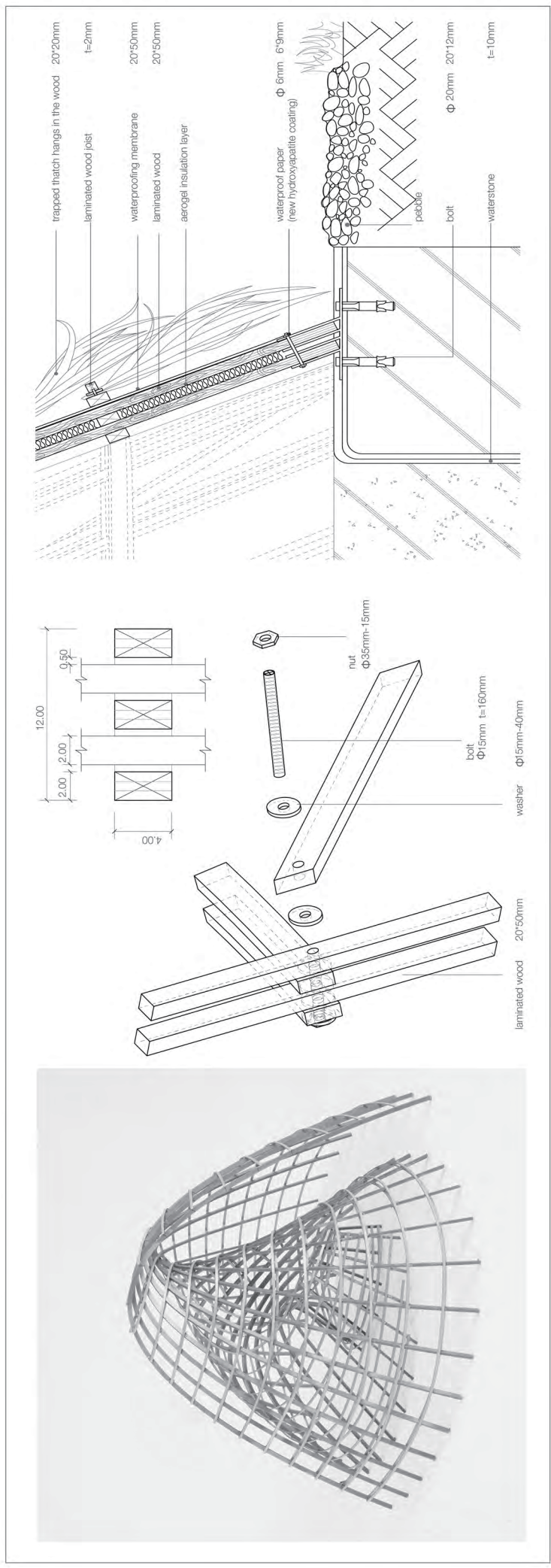
Unfolded Thermodynamic Section





South-West Elevation 1:50

South-East Elevation 1:50



SUBLIMATION

CHANGING STATES OF WATER

Sublimation proposes an architectural voyage through changing states of water. The project finds its driving force in its metabolic water cycle, from hot to cold, and from solid to liquid, to vapour.

This change in state is also translated through the architectural elements, both in their materiality, as well as in the openness or intimacy of each space: shared spaces are in open air scenarios, or the light protection of a translucent textile, and intimate alcoves are located within the solid wooden volumes.

The visitor enters the volume through an opening in the textile skin, where they can undress and store their belongings in the wooden shelves provided. The bather, after showering, is then invited into the semi-covered bath, where they can enjoy the different temperatures of water in different depths, while immersed in the natural setting of the Memu Meadows. Once relaxed, one can begin their escalation, travelling from translucent spaces to the intimate solid volumes lined with Japanese Cedar. These volumes alternate between vapour rooms, or saunas, and massage or relaxation rooms. The ascent culminates with an open air viewing platform which invites the visitor's gaze towards the Rekifune River, considered one of the most beautiful in Japan, and its surrounding landscape.

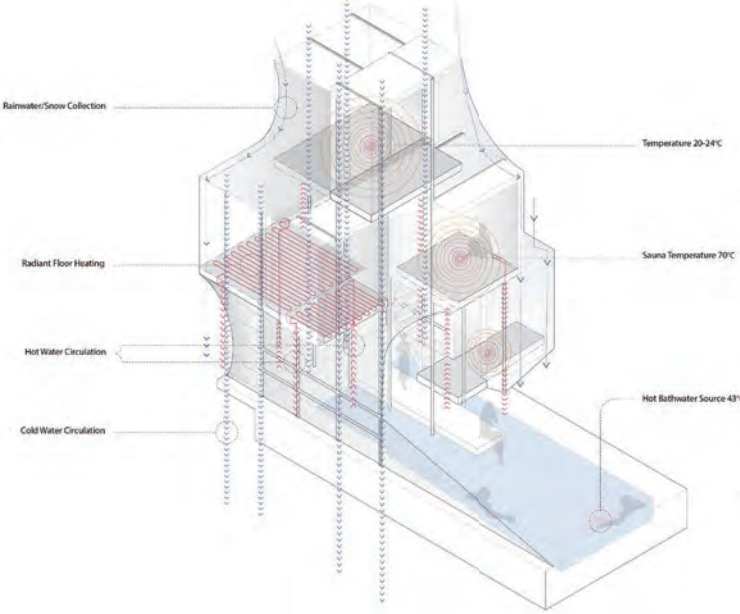
To feed the metabolic water cycle, both rainwater and snow, according to the seasons, are harvested by means of the vertical elements of the structure, as well as along the skin of the building. This water is collected below the building in a ground source hot water tank, from which the heated water is then recirculated throughout the building to feed the radiant floor system. The Radiant floor system allows to ensure an average temperature of between 24 to 26 degrees celsius within the building envelop. The bath water is provided through the grid, also passing through a ground source heat tank located below the building, allowing to ensure clean water for bathing. This water is channeled into to the main ground floor bathing area from one side so as to allow different gradients of temperature within the water body, enhancing the bathers experience.

The naturally grounded cocoon invites the visitor into a delicate journey of pleasure and sensation through water's diverse states, from tickling light droplets, to caressing warm vapour, or enveloping bodies of water, the user relaxes in Sublimation.



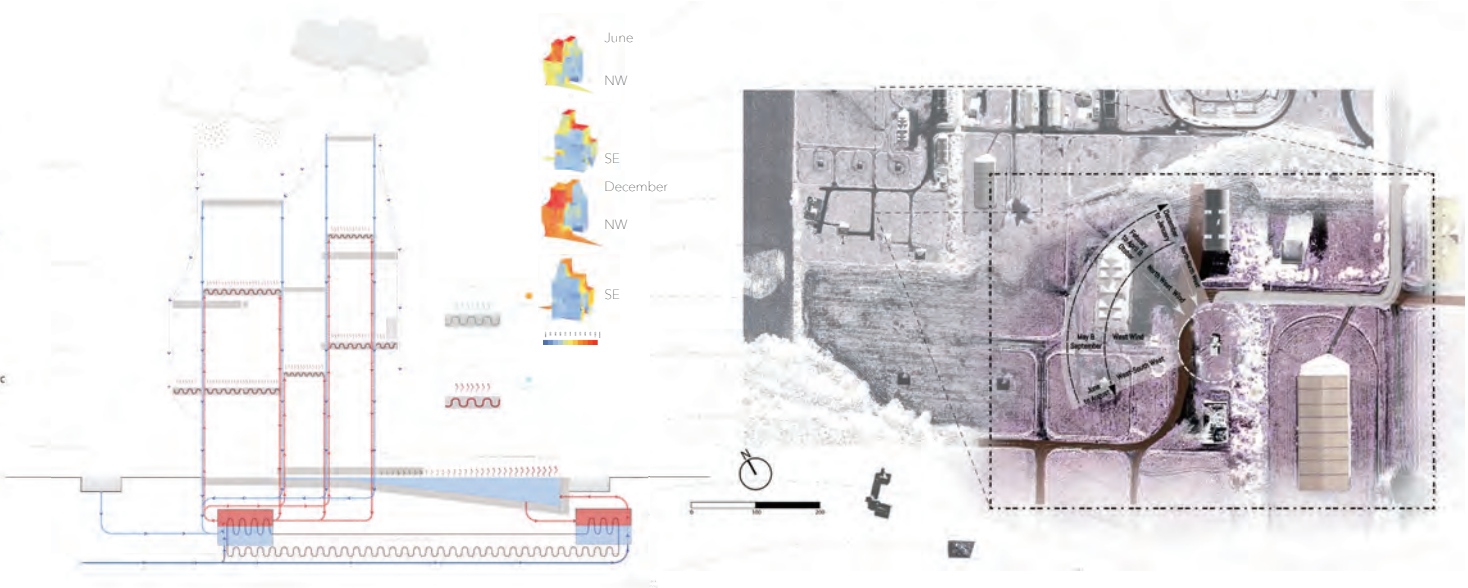
WINTER VIEW

METABOLIC WATER CYCLE

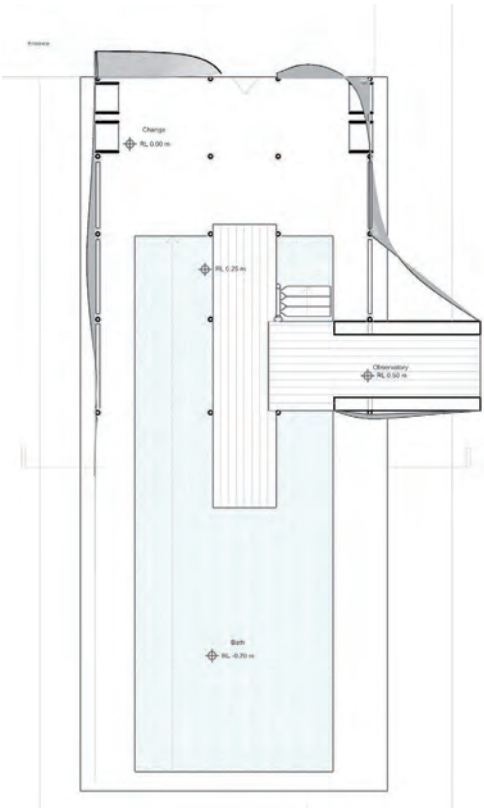


SUN RADIANCE ANALYSIS

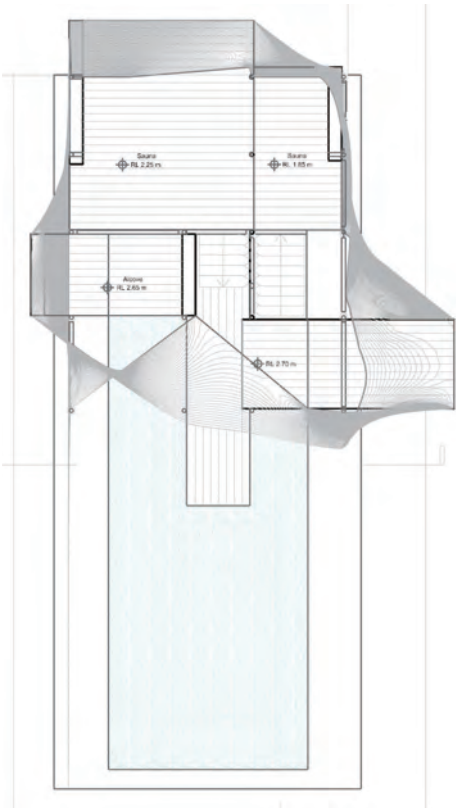
SITE PLAN | LOCATION



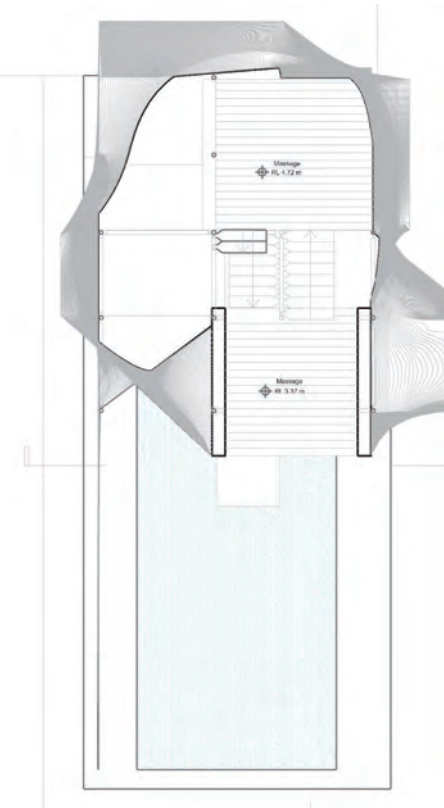
GROUND FLOOR | 150



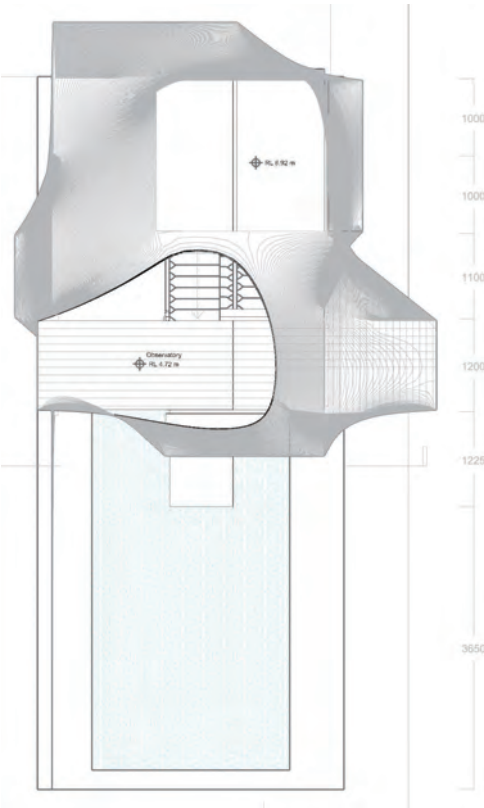
LEVEL 1 | 150



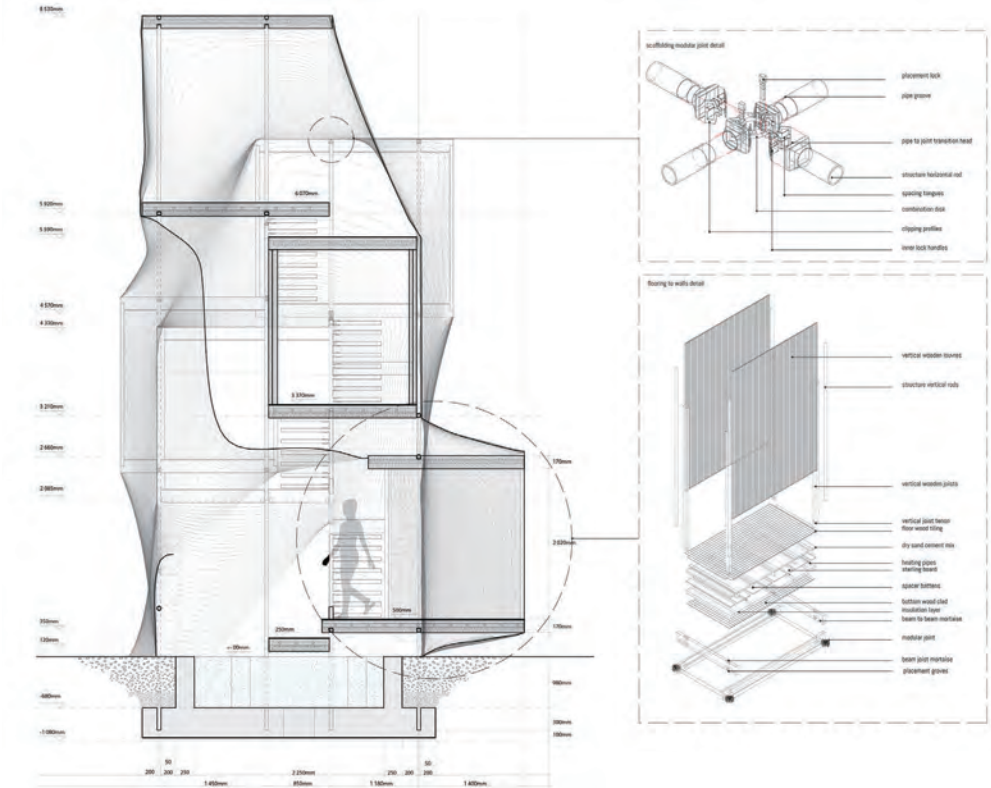
LEVEL 2 | 150



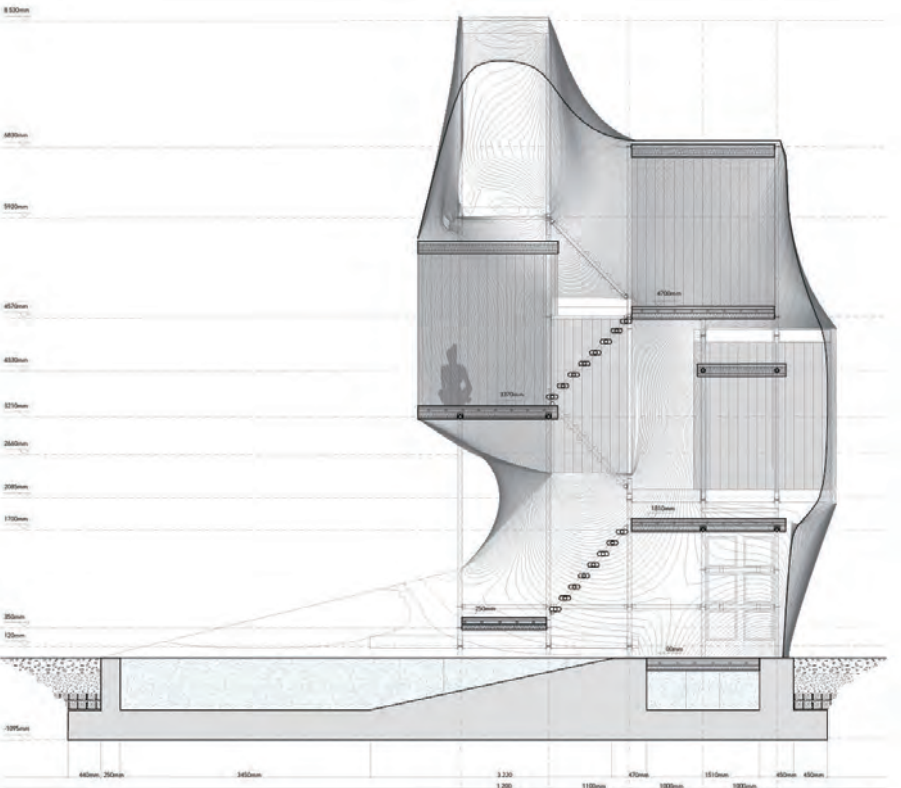
LEVEL 3 | 150



SECTION A-A' | 150

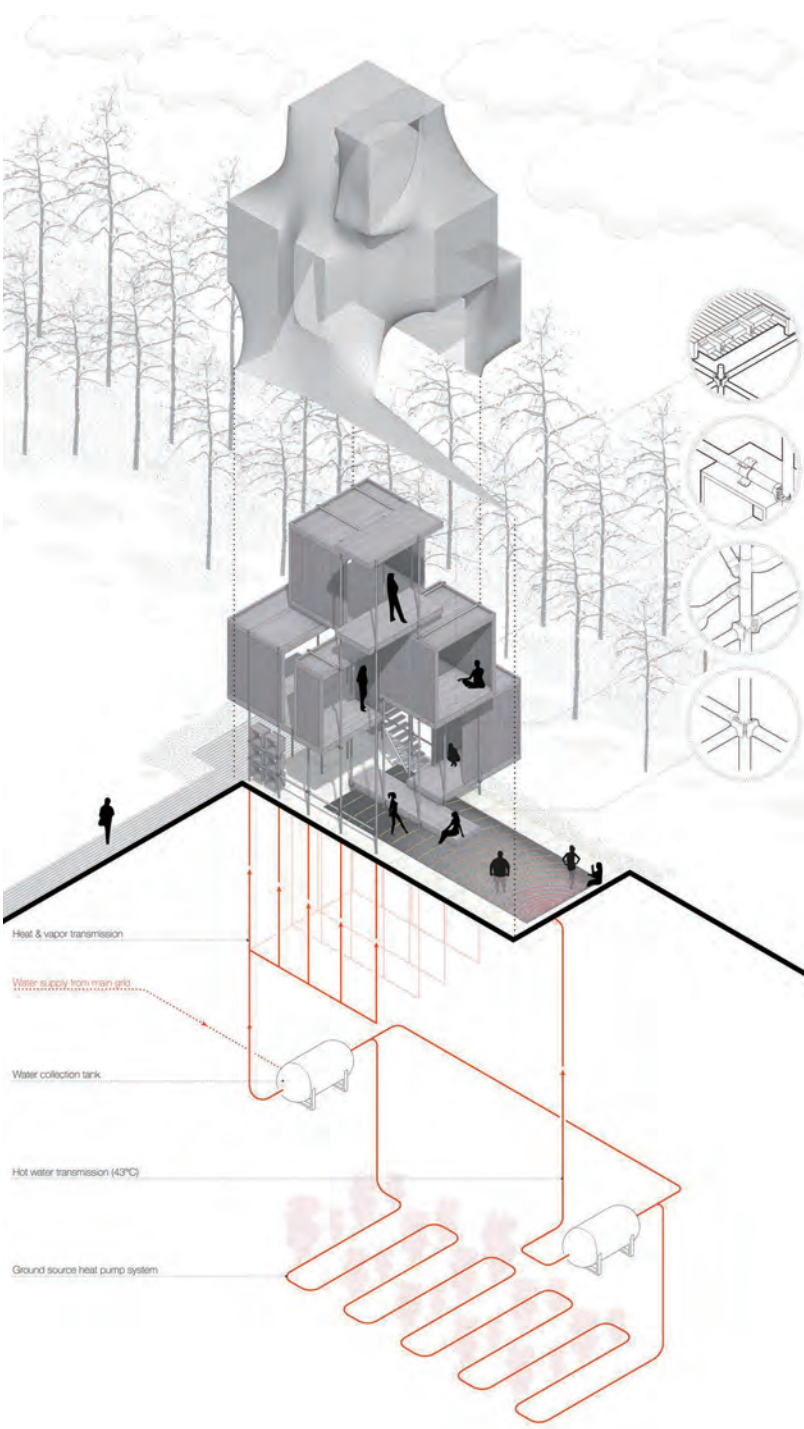


SECTION B-B' | 150





EXPLODED AXONOMETRIC | FUNCTIONAL DIAGRAM



SOUTH-WEST ELEVATION | 1:100



SOUTH-EAST ELEVATION | 1:100



INTERIOR VIEW OF VAPOUR ROOM



VIEW FROM THE EXTERIOR BATH



NORTH-EAST ELEVATION | 1:50



NORTH-WEST ELEVATION | 1:50



Colobockle Nest

コロボックル。北海道の伝承に現れる小人の名前である。彼らはフキの葉の下や壺穴式の住居に住まい、自然の中で、時にアイヌの人々と協力しながら暮らしていた。花を愛で、鳥と戯れ、風を感じ、月を眺めるような自然の中での彼らの生活には、機械化の世界で営まれる現代の生活とは異なる豊かさがあったのではないだろうか。今回は、コロボックルの伝承をモチーフとし、自然を享受する温泉を設計する。

人々はフキの葉の下に集い、葉に溜まった湯に浸かる。

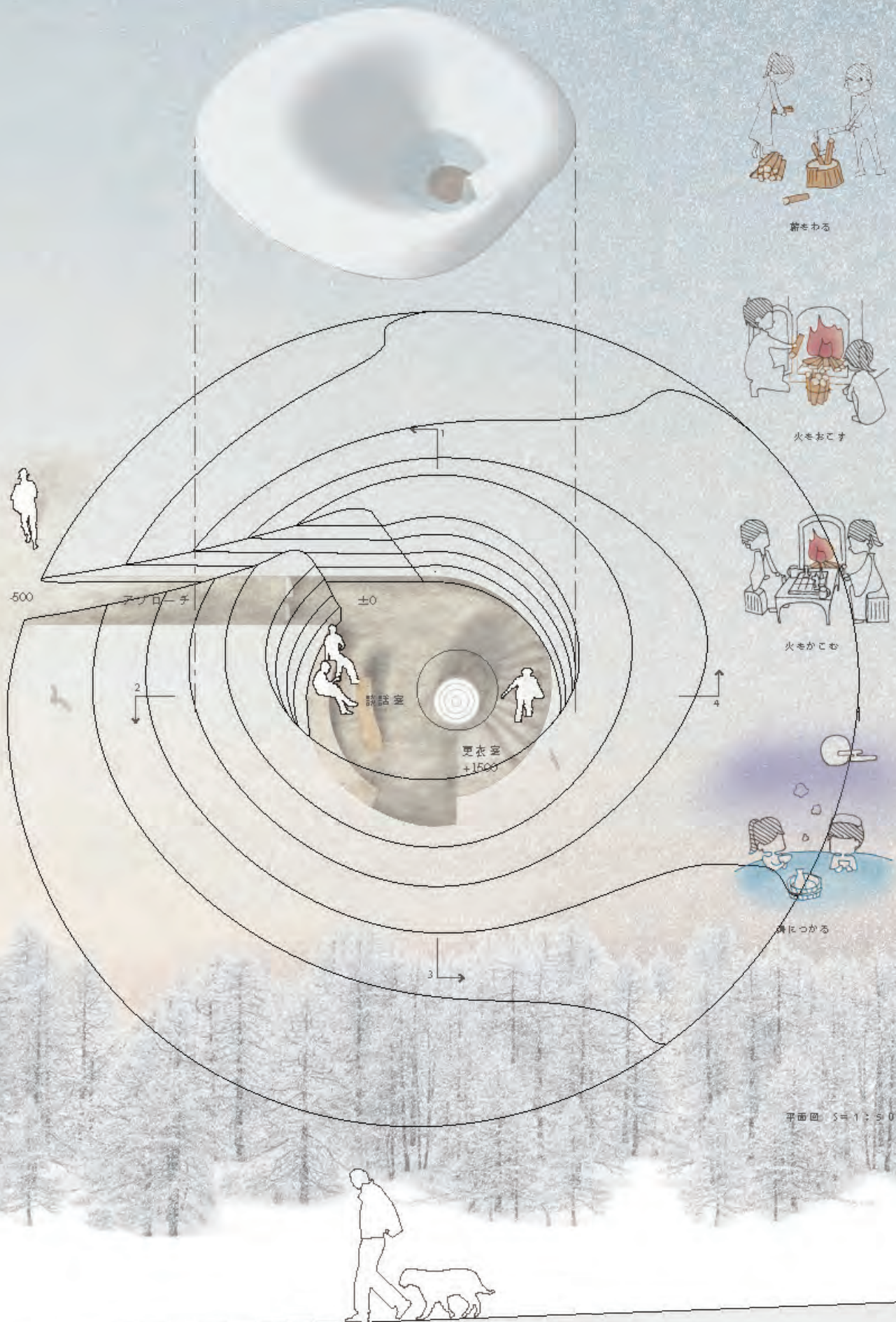
温泉の利用者は、自らの手で割った薪で火を起こして湯を沸かし、湯を待つ間や入浴後は皆で火を囲む。火をめぐる一連の行為の中で、利用者は自然とコミュニケーションをとり、談笑する。この光景は、日本における共同湯の場が、体の汚れを落とすだけでなく、社交場として機能してきたことを思い出させる。

フキの葉の下には垂直方向に地面が掘り込まれ、内部空間が作られる。土で囲まれた仄暗い空間には地面とフキの葉の隙間から光が差し込み、中央にはストーブの火が灯る。利用者を囲む地面は安定した恒温環境を担保すると同時に、落ち着いて会話を楽しむ回廊のための空間を演出する。

フキの葉を模した白い湯船は、周囲からの視線を避けるために上部に葉を伸ばし、隠けられる。湯に浸かる人の視界からは敷地周辺の建物、樹木が遮断され、上部に空だけがぼんやりと浮かぶ。刻一刻と変わる空の表情を眺めながら、人は湯に浸かる。

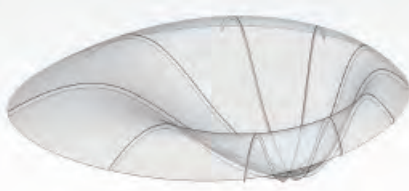
かつてこの地に暮らしたコロボックル達のように、利用者はフキの葉の下に集い、湯を楽しむ。ここでの体験を通し、人は自然の恵みを享受し、現代の生活とは異なる豊かさを手にいれる。

- 空
真っ白なフキの葉に切り取られ、視界の真上にぼんやりと浮かぶ空
- 水
フキに溜まったお湯は、湯に浸かる利用者を心身ともに包み込む。
- 火
利用者が自らの手で起こされた火は湯を沸かし、回廊の中心となって社交場を形成する。
- 土
利用者を包み込む土の空間は安定した恒温環境を担保し、落ち着いた空間を演出する。



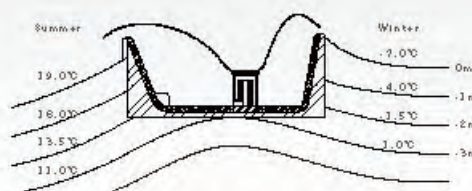
空を切り取る器

浴槽につかったときに、周囲の景色を視界から遮断し、空だけが上部にぼんやりと浮かぶように浴槽の高さ、傾きを決定する。



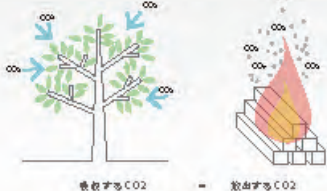
浴槽の構造

浴槽表面にリブを設けることで、耐力・剛性の確保、及び局部座屈を防ぎ、4.5mmという鋼板の薄さを実現している。



地中温度の安定性

地中温度は外気温の影響を受けにくく、年間を通して安定している。地中にボリュームを充てることで外気温より夏は涼しく冬は暖かい環境を室内環境に利用する。



カーボンニュートラル燃料としての薪

成長過程でCO₂を固定化する樹木を燃料として利用する。さらに地元で採れる木材を使うことで、運搬も含めたCO₂の排出を最小限とする。

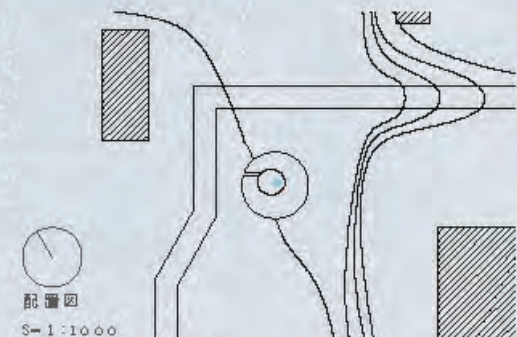
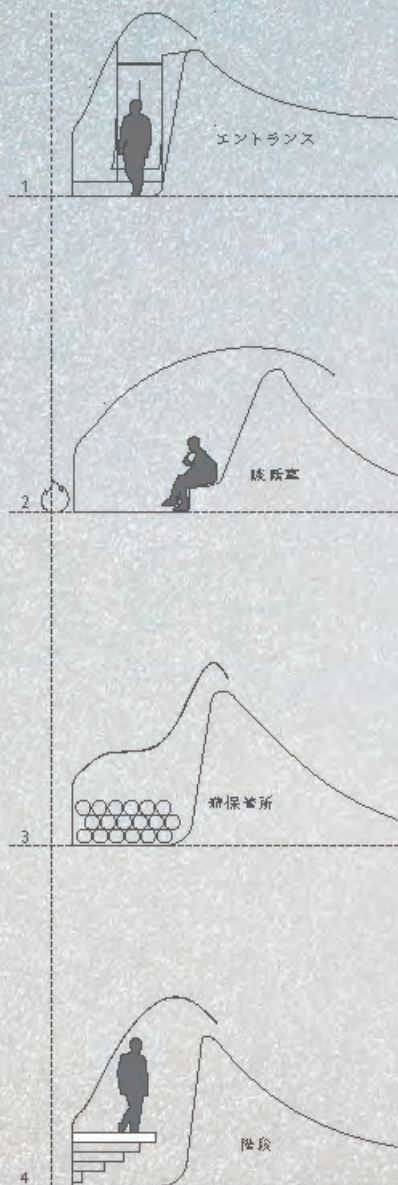


フキの葉の下の談話室
湯が沸くまでの間に火を囲んでくつろぐ土に囲まれた空間

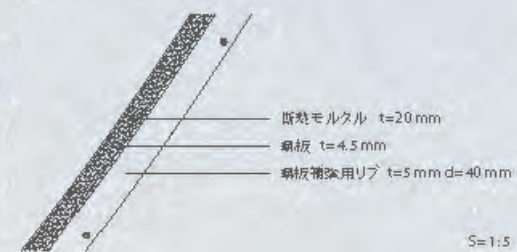


フキの葉の上の浴槽
空を日本の風景から切り取るような空間

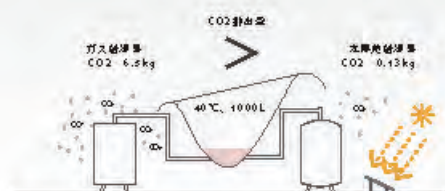
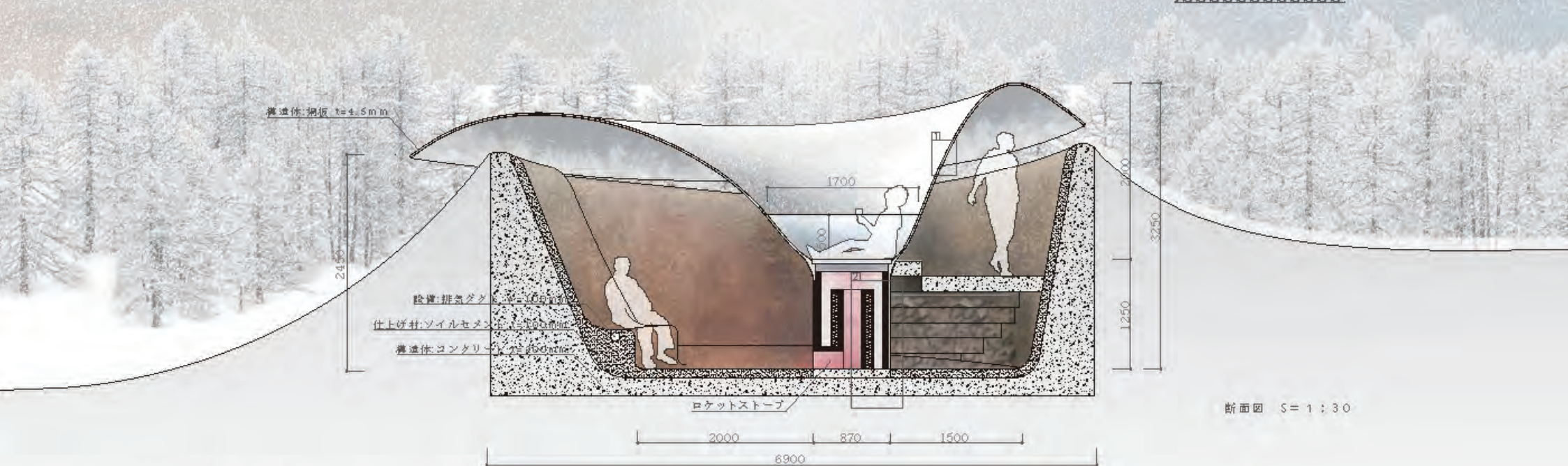
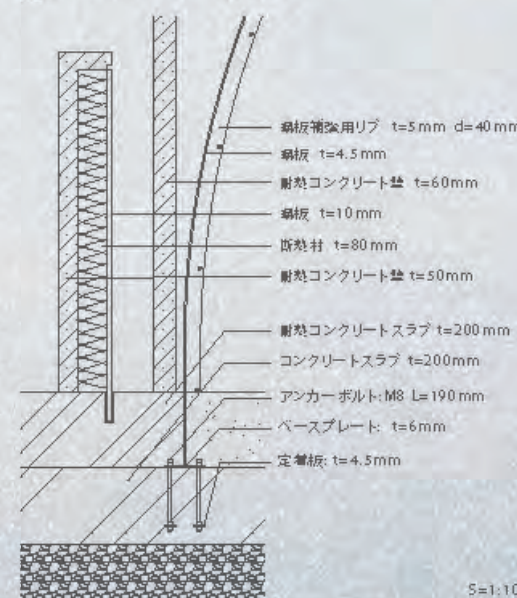
展開断面図 S=1:50



1 浴槽部分詳細



2 ロケットストーブ部分詳細



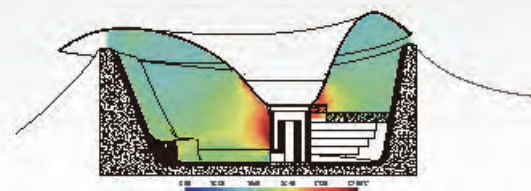
太陽の熱を屋外に設置したパネルで集めお湯をタンクに貯める。循環ポンプなどの動力以外にエネルギーを使わないため、一般的給湯機に比べ大幅なCO2削減が期待できる。



太陽熱集熱システムと補助熱源としてのロケットストーブにより、自然エネルギーを利用しながら給湯を行う。また、ロケットストーブの排熱は床下やベンチの輻射空間に用いる。



上部開口部からロケットストーブ入口に流れ込む気流により、温度境界が発生し、ストーブ付近、更衣室壁面沿いに熱だまりが生まれ、暖気の流出を抑制している。



ロケットストーブとその排気ダクト、さらにお湯の入った浴槽面からの輻射熱により、空気を循環させながらも、必要な空間の快適性を表現する局所空間方式とする。

北西立面図 S=1:100



FLOW



WEST ELEVATION 1:100

0 1 2 5 10 (m)

FLOOR PLAN 1:50

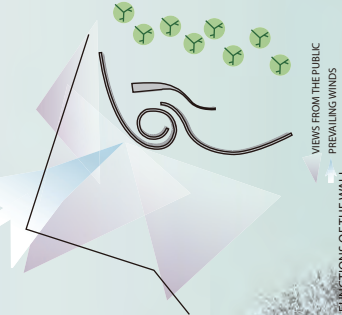
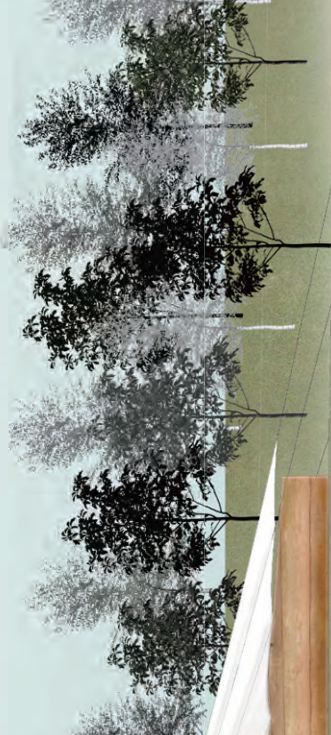


0 1 2 5 10 (m)

EAST ELEVATION 1:50

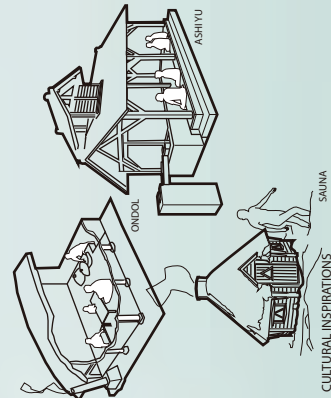
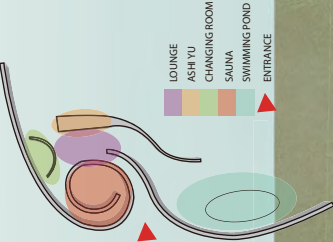
0 1 2 5 10 (m)

In modern times, nature is often viewed as distinct and separate from the activities of mankind. However, we are all a part of, and influenced by, the processes and continuous change that is nature. This constant flow is all encompassing and never ending. Surrendering to this flow soothes us as we are reminded of our connection to the physical environment and to each other.

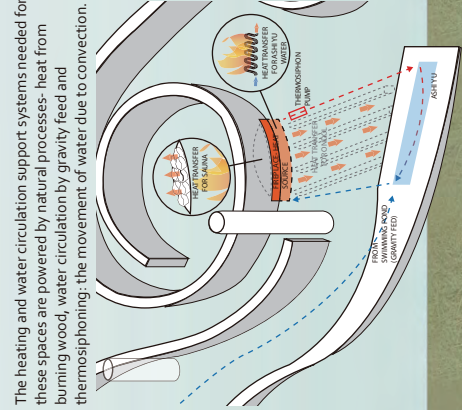


FUNCTIONS OF THE WALL
By challenging the notions of enclosure and spatial definition, this structure allows an intimate interaction between users and the surrounding environment with a flow of loosely defined spaces. This spatial ambiguity is encouraged by the inclusion of only a few walls, formed mainly for the protection of privacy from the general public and the mediation of prevailing winds. These walls wind their way along the site, creating an area of relaxation that is safe from peering eyes.

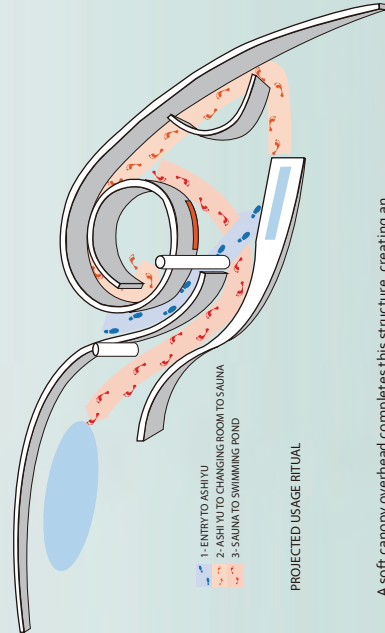
The connection to the flow of nature is maintained even when enveloped by these walls, as they are built of the site. The primary building material is earth (soil) excavated in preparation of the foundation and pool, giving this structure a unique connection to the site. The low thermal conductivity of earth also produces surfaces that are pleasing to touch in any weather.



CULTURAL INSPIRATIONS
The spaces within the design are defined by various relaxing experiences. These spaces, namely the sauna and swimming pond, the ash-yu and the ondo, are inspired by Finnish, Japanese and Korean culture respectively.



The heating and water circulation support systems needed for these spaces are powered by natural processes- heat from burning wood, water circulation by gravity feed and thermosiphoning; the movement of water due to convection.



PROJECTED USAGE RITUAL

A soft canopy overhead completes this structure, creating an area where users can enjoy reconnecting with nature. The sight and smell of earth all around, coupled with the sounds of flowing water and crackling fire, helps to lull everyone into peaceful serenity. They can now sit back, relax and remember how to go with the flow.

SUPPORT SYSTEMS

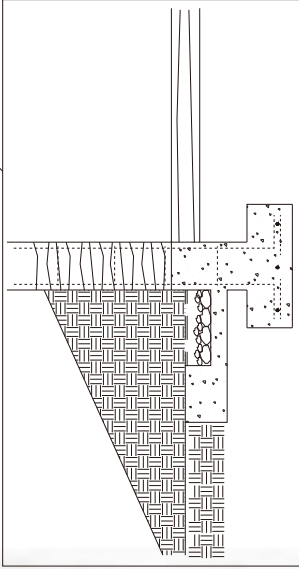


SECTION B-B 1:100



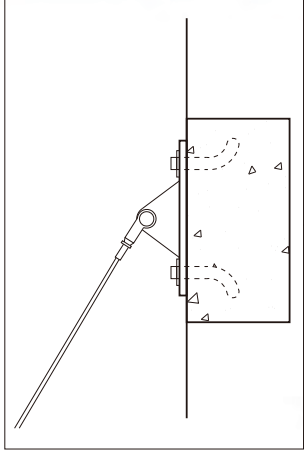
WALL DETAIL

The rammed earth wall is built upon a concrete foundation, complete with steel reinforcement. Also included is a drain to transport any water that filters through the berm against the wall.



TENSILE CANOPY- BASE DETAIL

This is a single hinge cable base used to resist the moment generated by wind. The base plate is attached to screws cast in place within a concrete strip foundation.



WINTER SPA ACTIVITIES

SUMMER SPA ACTIVITIES

SUMMER SPA ACTIVITIES

SECTION A-A 1:50





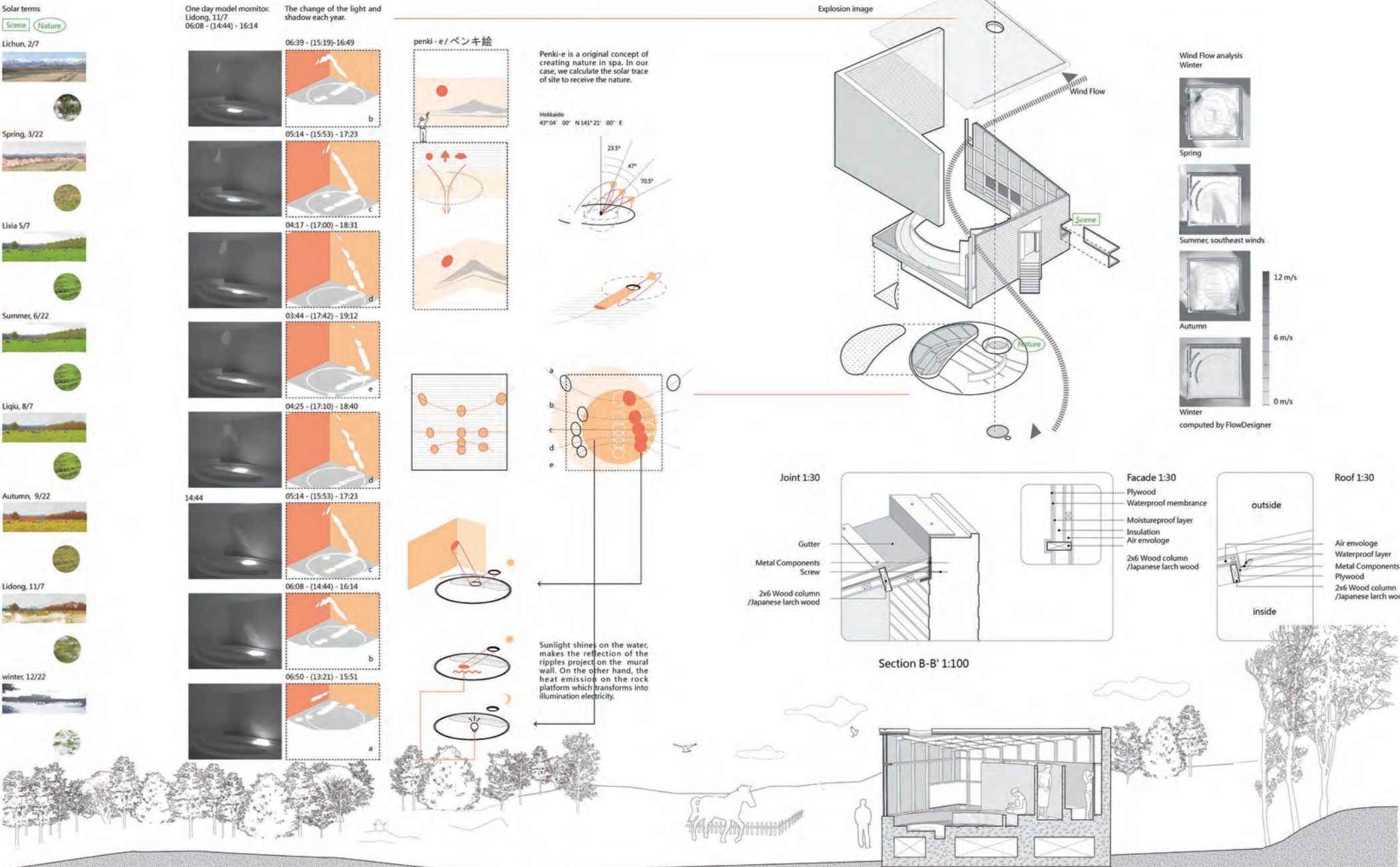
Time lapse image of the pool in Lidong.

THE REFLECTIVE COSMOS

We see "Spa in the Nature" as the epitome of the universe, a system displaying order and harmony. It is about human being and the surroundings, the Sun, the water, the wind, the fire and the moss. A Spa is not only a place to clean your body but to purify your soul by engaging yourself with the Nature. The composition of this building reflects the ancient Chinese thinking of "Heaven Round Earth Square". Since the origin of all lives comes Sun, we meticulously place a round hole on the roof to introduce the sunlight into the Spa. With the sun track in different seasons and different time of a day, the sunlight will shine through the hole and project its light on the floor of the spa. People will see the movement of the circle light, which they might otherwise neglect outside the spa, to think about the flow of the time, to sense the warmth of the sun and to reflect their value in the nature.

Only one and half hour or so before the sunset, the sunlight will shine on the water (the bathing area) and reflect to the wall behind which creates a Penki-e 盆 絵 of traditional Japanese Onsen. This is the critical moment that the sun dyes the sky when verging toward the horizon and also announce the night is coming. During the night, the fire will be set below the sky hole by the moss field. It represents the prosperous nature and the dark sky and countless stars perfectly framed by the round hole above the fire.

View from the outside



Section B-B' 1/100



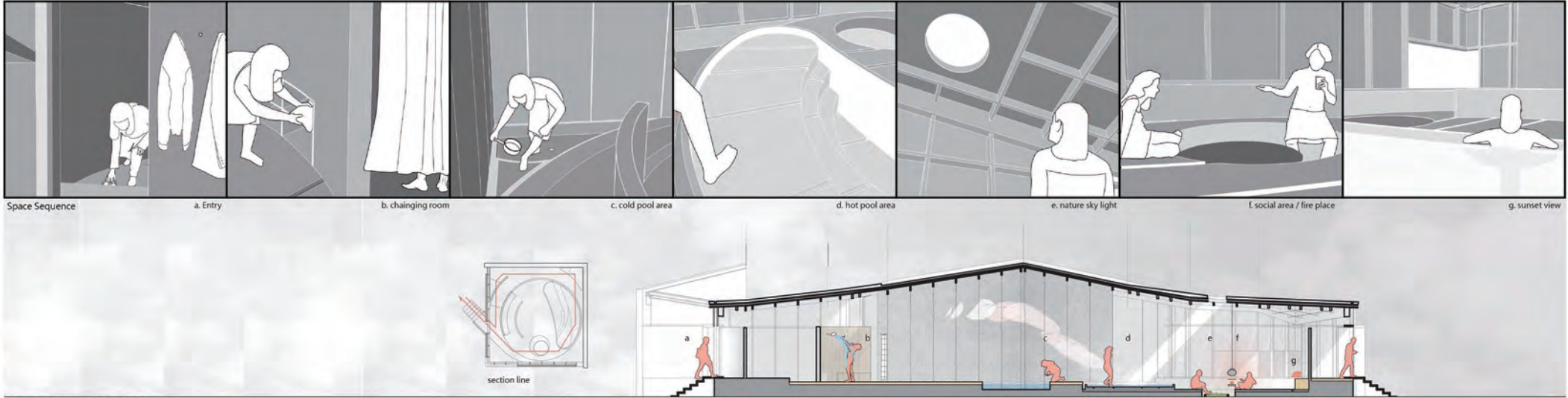
view from the hot pool at sunset



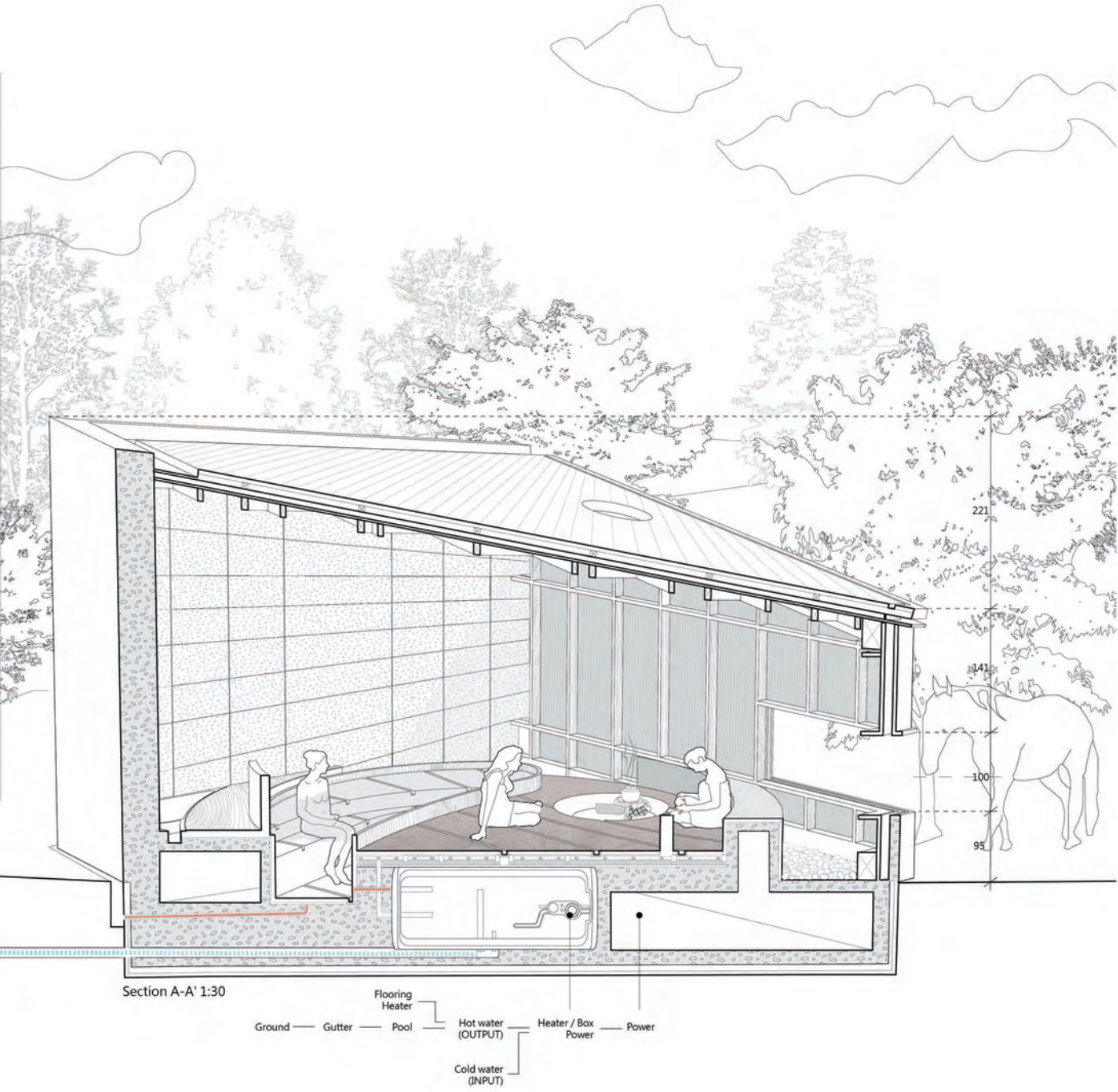
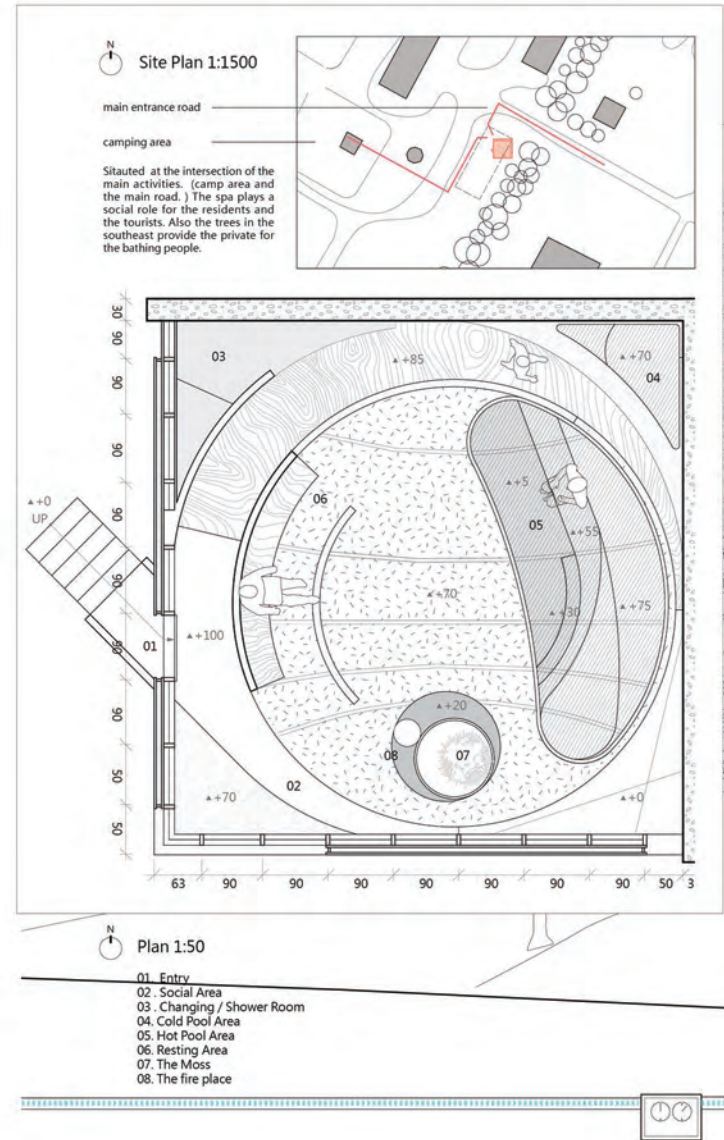
view for the stove fire at night.



view at dawn.



Unfolded Thermodynamic Section





MEMU KILN

Permanent shelter as a universal archaic image binds culture in Latvia with other cultures of settled farming societies. The very heart of a house in Latvia, built with wood and stone, has been a large walk-through chimney. It has a fascinating spatial and programmatic evolution over centuries – from being a simple smoke room and hearth to a complex system of furnaces, which are attached to a single smoke channel.

An important constituent of a traditional farmstead complex in Latvia has always been 'pirts', as a sauna is known in Latvian. The warmest and cleanest structure on a farm served not only as a washing facility and temporary smokehouse for meat and sausages, but also as a birthplace and a place for a temporary stayover.

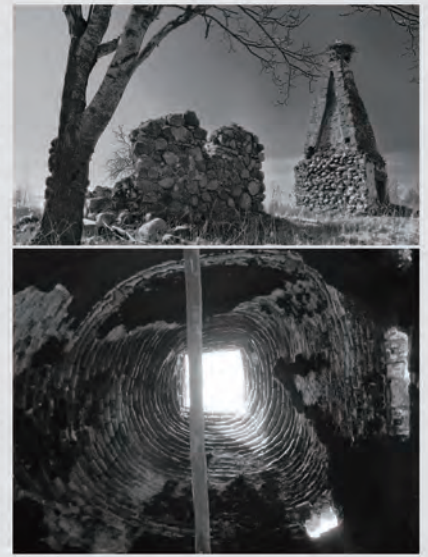
Another aspect that strongly characterizes living in the rural areas of Latvia, are processes that are related to bread making. Bread in Latvian culture has not only significance as nourishment, it also bears a symbolic meaning of bringing together a family.

The project Memu Kiln approaches the meaning of spa as recreation of basic rituals of that bring together family or community – preparing and keeping fire burning, making food, living and bathing. Spatially and programmatically Memu Kiln brings together prototypes of a walk through chimney as a center of the house, 'pirts' as purification facility, as well as three furnaces to heat 'pirts', pool and bread making oven. The project contains the seeds of traditions, thus being a reminder that the heat, water and food in the house are the consequences of investing resources and human labour.

From brick making to baking bread, the project offers to re-evaluate transformative processes of hardening, drying and heating raw materials from the earth and turning them into solid matter. Memu Kiln brings to the forefront centuries old building techniques. It offers to test brick making by building a local kiln that could be used to generate bricks as a building material. Eventually, symbol and brick making state-of-the-art would be Memu Kiln building itself – machine-like furnace system centred around the core chimney. In turn, bread making replicates the idea of baking the brick. Complex system of chimney, furnaces, joining sauna and living together would become the source of heat, light and energy for re-interpretation of a spa.

This surge of reconnection with references of the past fosters questions to be answered: how to bridge the differences between original contexts of crafts and contemporary settings? Can low tech technological approach become an alternative off the grid application to the contemporary technological and networked systems? And can series of basic accumulative social and cultural procedures – bathing, making bread and resting – be a device for a community to come together?

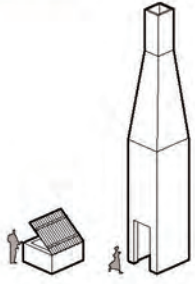
ARCHETYPICAL WALK-THROUGH CHIMNEY



EVOLUTION

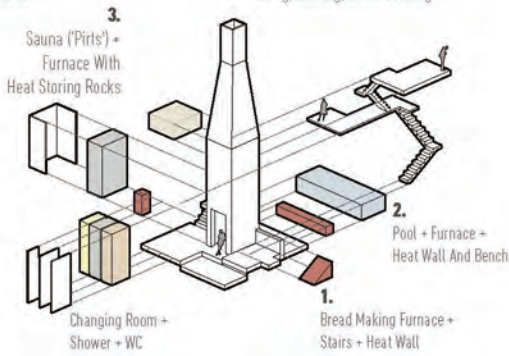
1. BRICK

Thinking on a source code; material properties



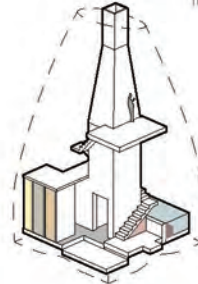
2. KILN

Completing transformative process; from raw earth to solid



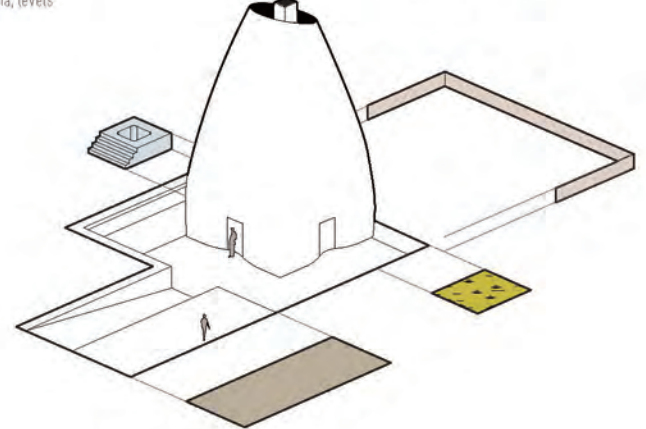
3. TECHNOLOGY & PRACTICES

Re-creating basic rituals: maintaining fire, living, bathing, bread-making



4. STRUCTURE

Layouting the system: walk through chimney, furnaces, sauna, levels

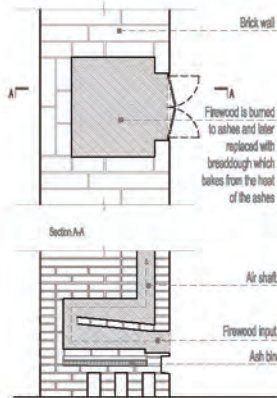


5. MEMU KILN

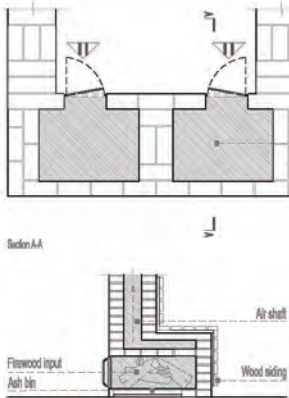
generating the vessel: brickwork archetype

FURNACE TYPES

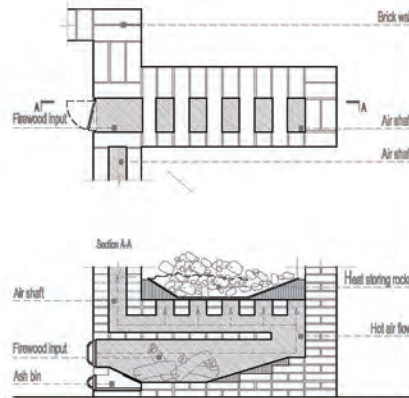
1. Bread Making Furnace + Stairs + Heat Wall
Bread making furnace technological plan



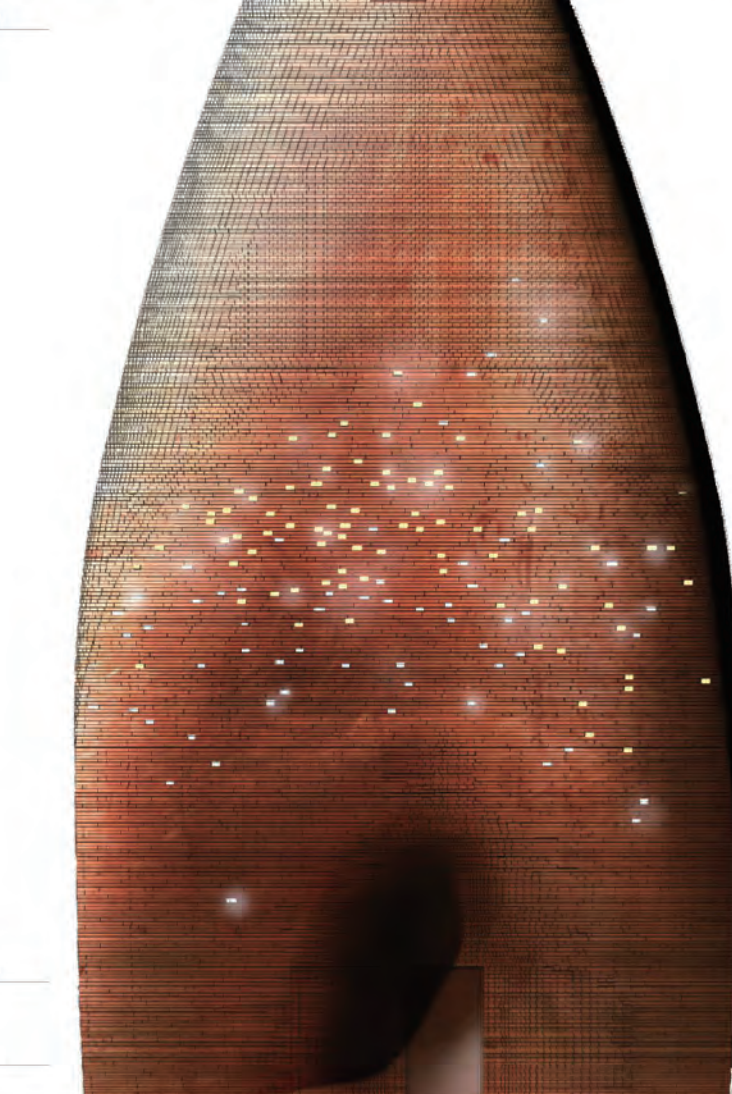
2. Pool + Furnace + Heat Wall And Bench
Pool furnace technological plan



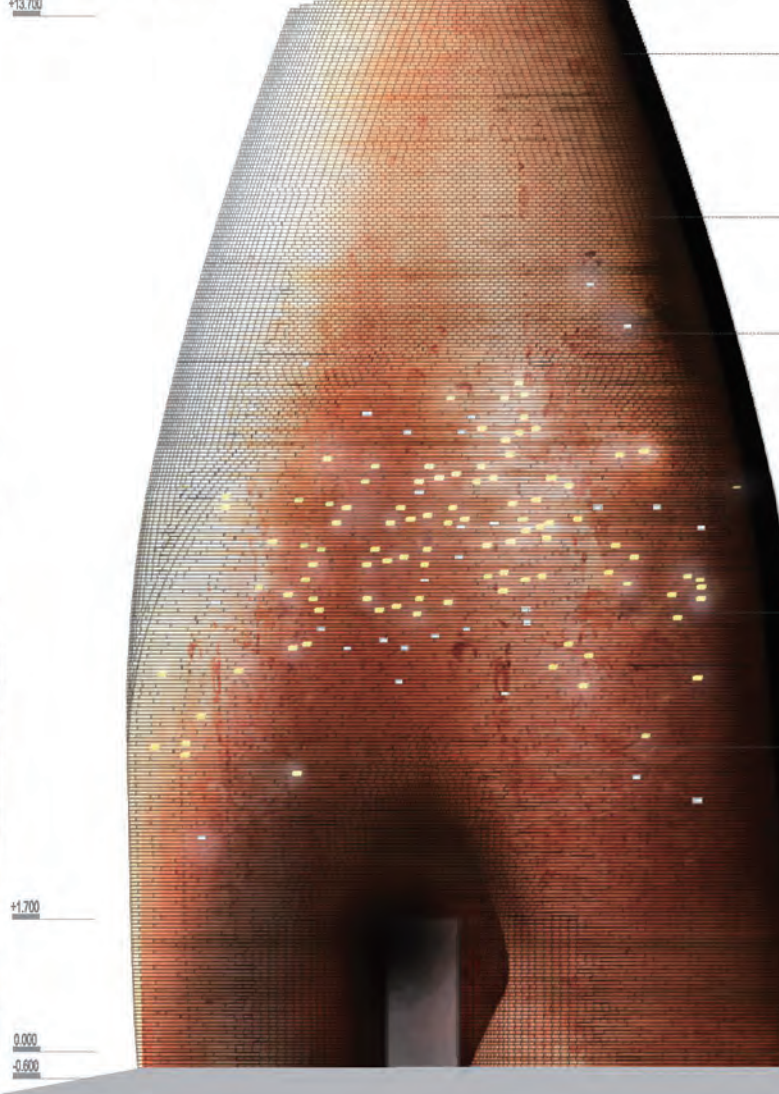
3. Sauna ('Pirts') + Furnace With Heat Storing Rocks
Sauna furnace technological plan



N-W FACADE S 1:50

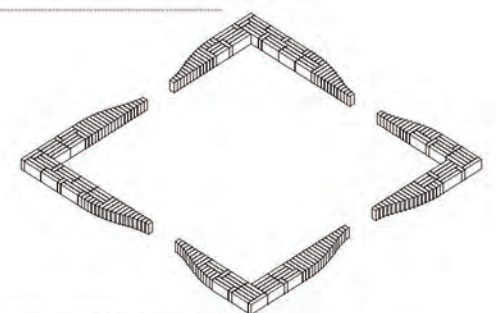
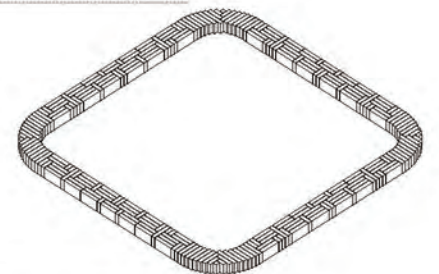
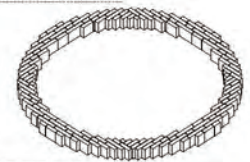


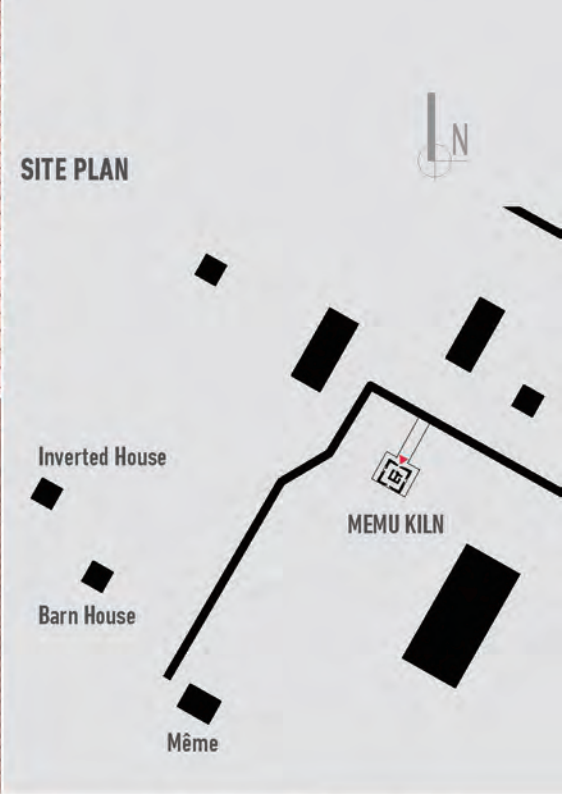
S-E FACADE S 1:50



BRICK STACKING SCHEME

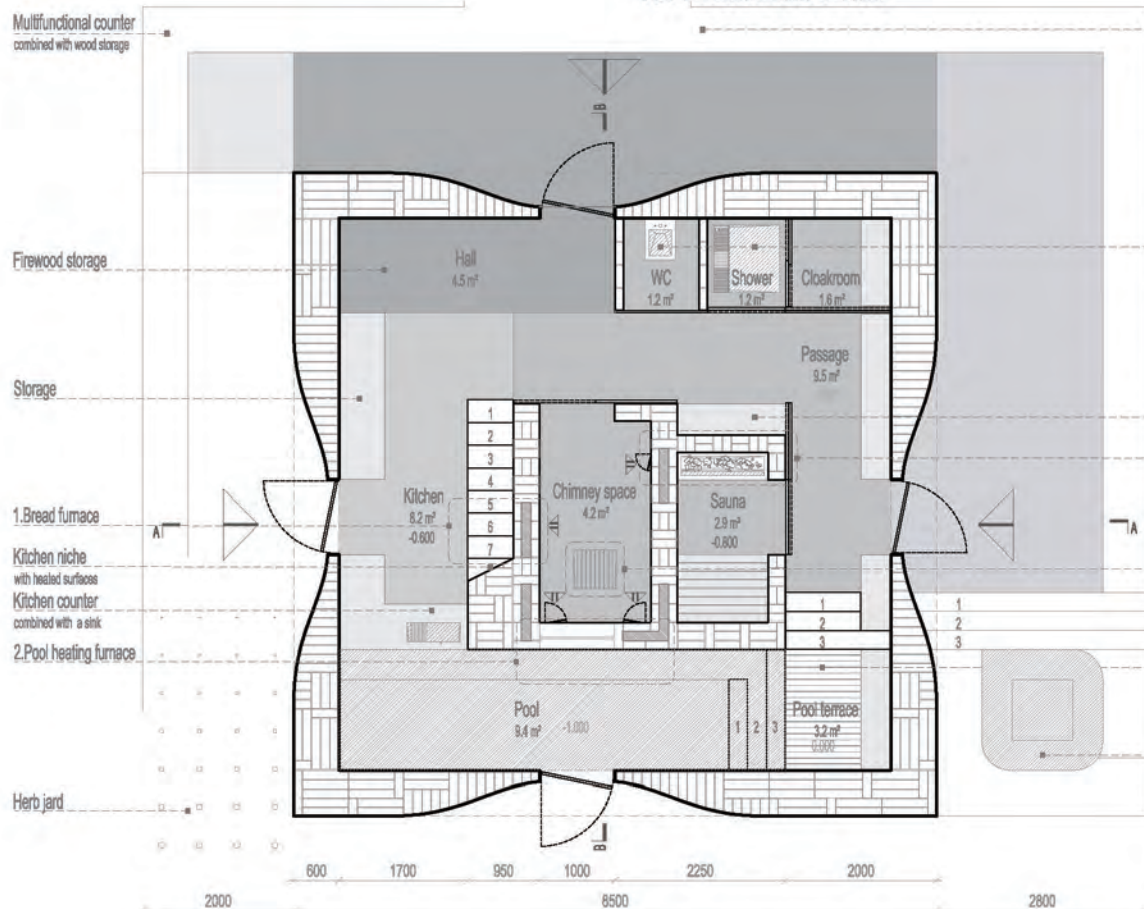
Form transforms from square plan shape to circle



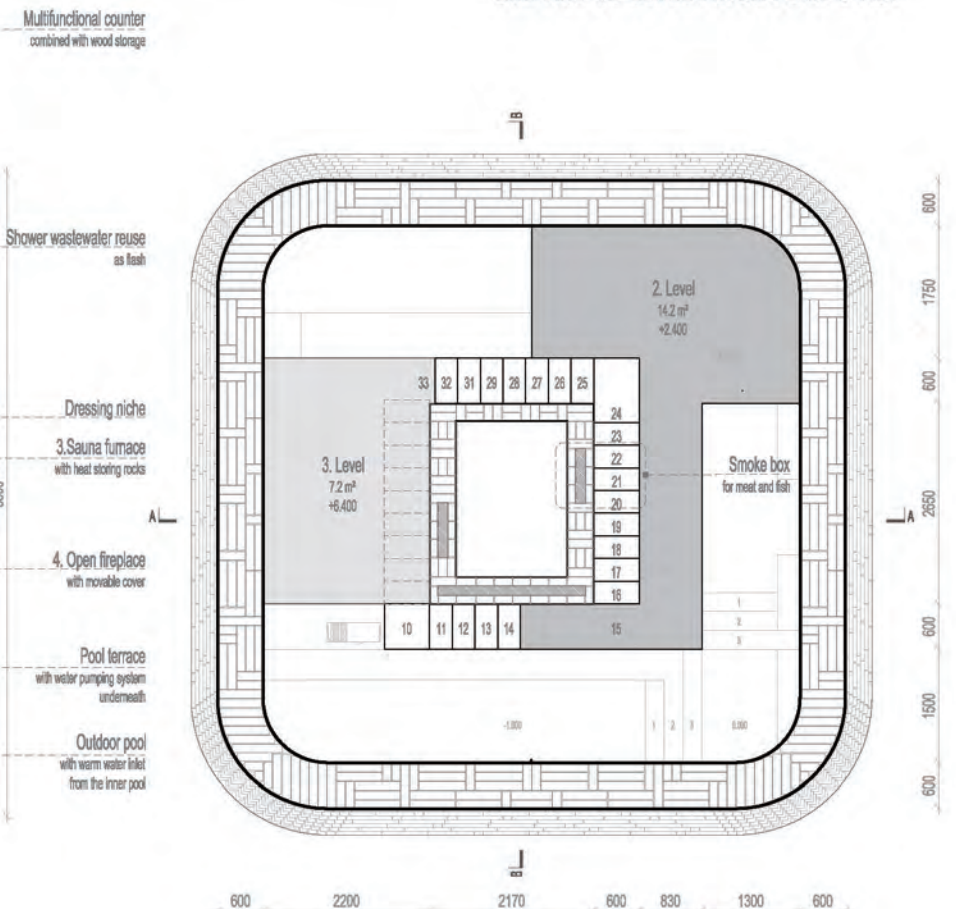


Wood processing platform
-0.000

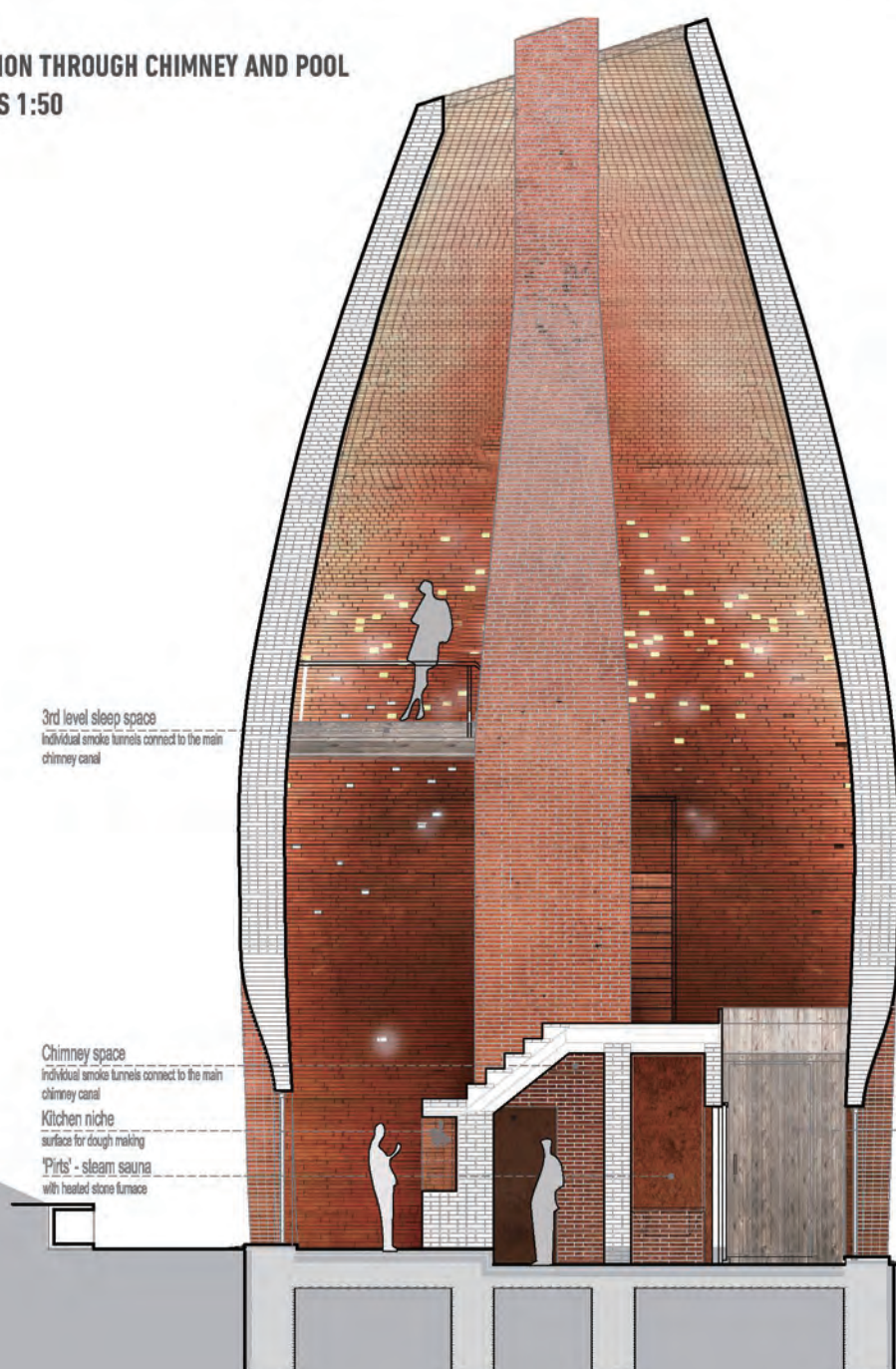
1ST FLOOR PLAN S 1:50



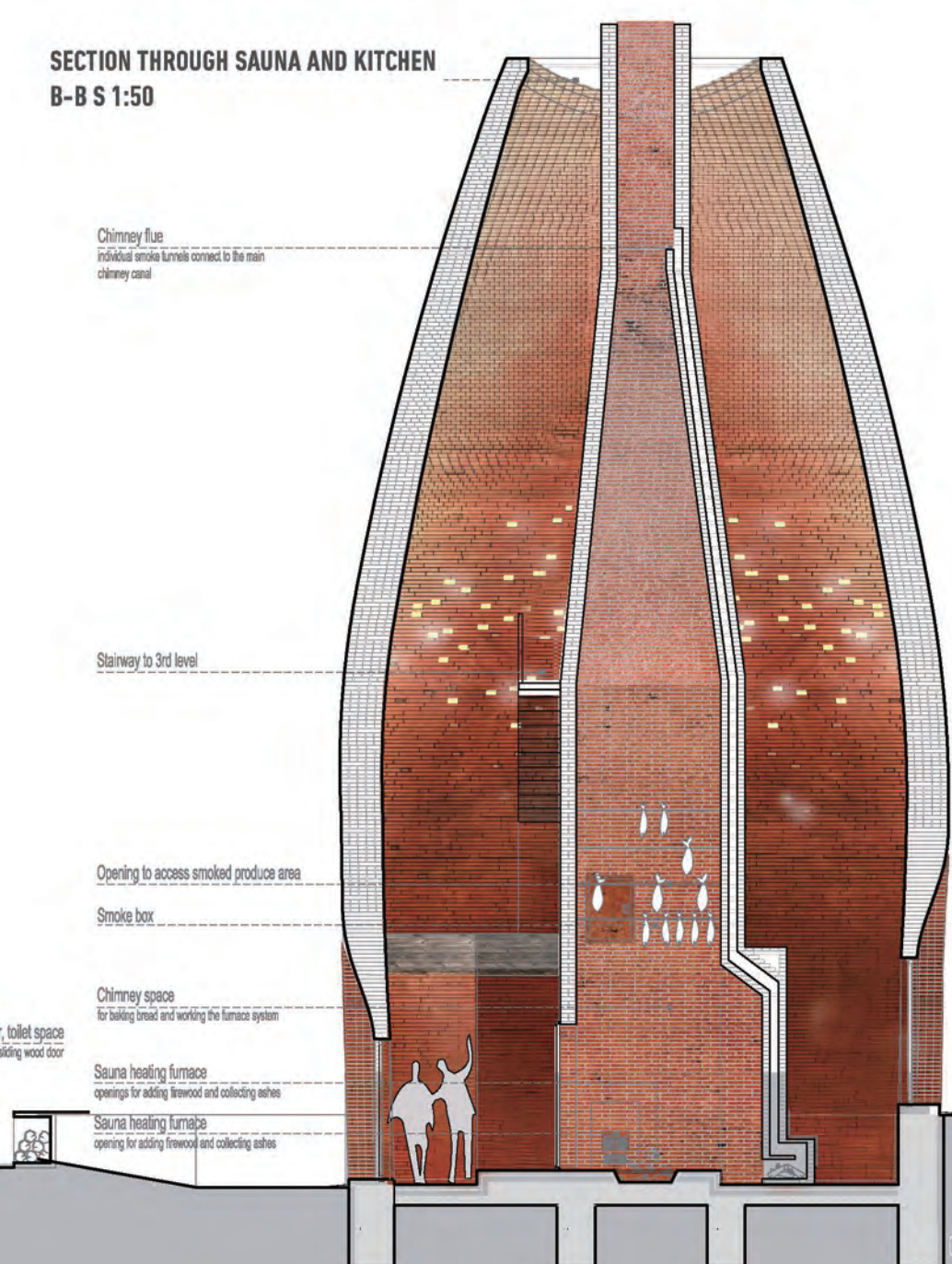
2ND AND 3D LEVEL FLOOR PLAN S 1:50



SECTION THROUGH CHIMNEY AND POOL
A-A S 1:50



SECTION THROUGH SAUNA AND KITCHEN
B-B S 1:50



a Spoon of Spa

—— the Nature in the Spa

私たちは閉ざされた空間の中に自然が凝縮されている、そんな不思議なお風呂を設計しました。このお風呂の中には自然が広がっています。

山奥や海岸、様々な自然の中に温泉や風呂があります。人々がそこに惹かれる理由は、裸になり湯を介して全身で豊かな自然を体感できるからではないでしょうか。ここ大樹町はそれら温泉や風呂を作るにはもってこいの素晴らしい大自然の地と思われでしょう。ただ大樹町の自然は、私たちがそのまま体感するにはあまりに雄大すぎて、突然としてしまうと思うのです。

そこで、**そのまの自然ではなくほんの少しの自然**を取り込むことで、私たち人間のスケールでより深く自然を感じさせてもらえるのではないかと考えました。そんな、これまでの温泉や風呂とは違ったしかたで、自然を感

じるお風呂を構築します。

そのしかたとして、第一に**雪（雨）**に浸かること、第二におずかながらの**小窓**から大自然を湯に取り込むことにしました。建築がフィルターとなって大自然をすくいあげ、お風呂の中に溶かしこむのです。

つまり本計画における建築は、大樹町の自然を直接見たり・感じたりするものではなく、“自然を招き入れる”装置としての建築です。

This is a mysterious bath that nature is condensed in a seemingly closed space without windows. The nature is spreading in this bath.

There are hot springs and baths in various nature, such as the mountains and the beaches. The reason why people are attracted to these is that you can experience the rich nature throughout the body by hot water. Taiki-cho is a wonderful place of great natural land to have hot springs and baths. However, we thought that the nature of Taiki-cho was too majestic for us to experience as it is. And the nature will be stunned us.

With that, we thought that we could feel deeper nature in human scale by incorporating a little nature. We proposed a bath that feels the nature by such a different way from the previous spas.

As its way, we decided to use **snow** (or rain) as a source of water first, and secondly take in the nature from **the small window**. This architecture will be a filter, scoop up the nature and have the nature get in the bath.

In other words, the architecture in this project is a device that "invite nature" and does not directly look or feel the nature.

00. お湯「大樹町の大気に浸かる」

大樹町は日本屈指の綺麗な大気を持っています。私たちがその大気を感じることができるのは大地に立って大きく息を吸うときだけでしょうか。

その大気に含まれ、その大気を通じた雪や雨は、この美しい大気そのものだと思うのです。そこで、私たちの提案の中心である“自然を招き入れる”しかたのひとつとして、湯の**水源を雪融水、雨水**とします。

その過程は、まず雪・雨を大屋根で集め、貯水タンクで保管していきます。次に、ろ過装置を通り、ポイラーにより温め、浴槽へ流すというものです。

浴槽には大樹町が広がっています。そう、これはまさに**大樹町そのものに浸かれる**お風呂なのです。

01. 小窓「来てもらう自然」

“自然を招き入れる”しかたのふたつめは、**小窓**から浴室へ自然を取り入れることです。

ここでのしかたは小窓から自然を見るものではありません。小窓から自然に求めてもらうのです。私たちは、音や光を拾う**丘の上の小窓**やピンホール効果を起す**針穴のような小窓**といった、直接は外部環境に触れることはない小窓を提案します。

——**針穴のような小窓**のピンホール効果により、揺れる草木や流る雲が映る湯船につかる中、**丘の上の小窓**が風に響ってくる海の音を響かせ、海が近いことを教えてくれます。夜には、暗闇に目が慣れた頃、空への**びる丘の上の小窓**から入る月明かりが本来の自然の明るさそのものに気づかせてくれます——

これら小窓は閉ざされた空間でアライバシーを守ると同時に、大きさや位置を操作することで様々な自然を凝縮し運び込んでいきます。

02. 居室「大樹町の寒さに合わせた一本空間」

居室（この計画においては脱衣所・浴室を指します）に小窓を配置し、来てくれた自然それぞれを緩やかにつなげます。これにより、居室は1本の帯となります。帯は小窓の効果に対応しながら、床の高低差を操作して浴槽を作り、断面的には広く／平面的には狭くになっていき、海と空へ向かい丘を上ります。そんな大地を歩くような経験を実現します。

この帯による一室的な空間は、大樹町の冬の寒さに対し空気の連続性により居室全体の快適な温熱環境につながると考えます。小窓の少なさと小ささ、間仕切りのない帯空間による容積確保が熱伝導をゆるやかにし、また帯末端に位置する**丘の上の小窓**は自然換気のためにも稼働します。

03. 全体構成「お湯に寄り添いお風呂に入る」

私たちは00. お湯と01. 浴室で2つの“自然を招き入れる”しかたを行い、お風呂の中に自然をいざないました。それはまるで、スプーンですくいあげたような僅かでありながら凝縮された自然です。私たちのコンセプトは「a Spoon of Spa」です。

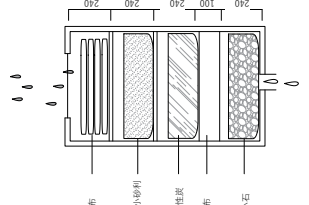
お分かりのように、ここでは寒さにばかり着目し外部に閉じる形態をとるわけではなく、積雪も全くネガティブなことありません。むしろこの地で徹底的に自然を感じていこうとした形態です。

本計画は、〈水の部分—大屋根・貯水タンク〉と〈人の部分—居室〉という2つの顔を、持ち、居室が貯水タンクに巻き付く単純な構成をとります。〈水を集め、ろ過し湯かす、湯となる〉と〈入室する、裸になる、湯に浸かる〉という、湯をつくるプロセスと人間がお風呂に入る行為が寄り添いあう建築です。そして、大屋根と丘を上る居室により大地に沿った「建ち方」を獲得しています。

04. ろ過装置「サステイナブルな水源」

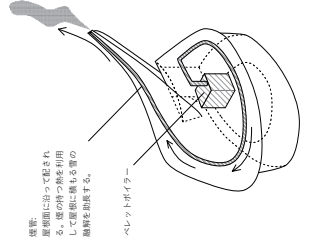
お風呂における持続可能とは何か、と考えたとき私たちはお風呂に必要なお湯、つまり水源に着目しました。

大樹町この地の雪・雨を使うことはまさしく**水の地産地消**であり、サステイナブルなことだと考えます。そして、空気が遠んでいるからこそ簡易的な**ろ過装置**で十分に使用可能なお湯が作れる、土地に適した方法であると思います。



熱源として、ベレットボイラーを採用します。ベレットは大気町近郊で入手可能です。

ここでのボイラーの役割は、湯を暖めるだけではなく、湯を暖めるだけでは排出される煙を屋根面に沿って通し、その熱を利用して冬に屋根に積もる雪の雪融けを補助する働きをします。

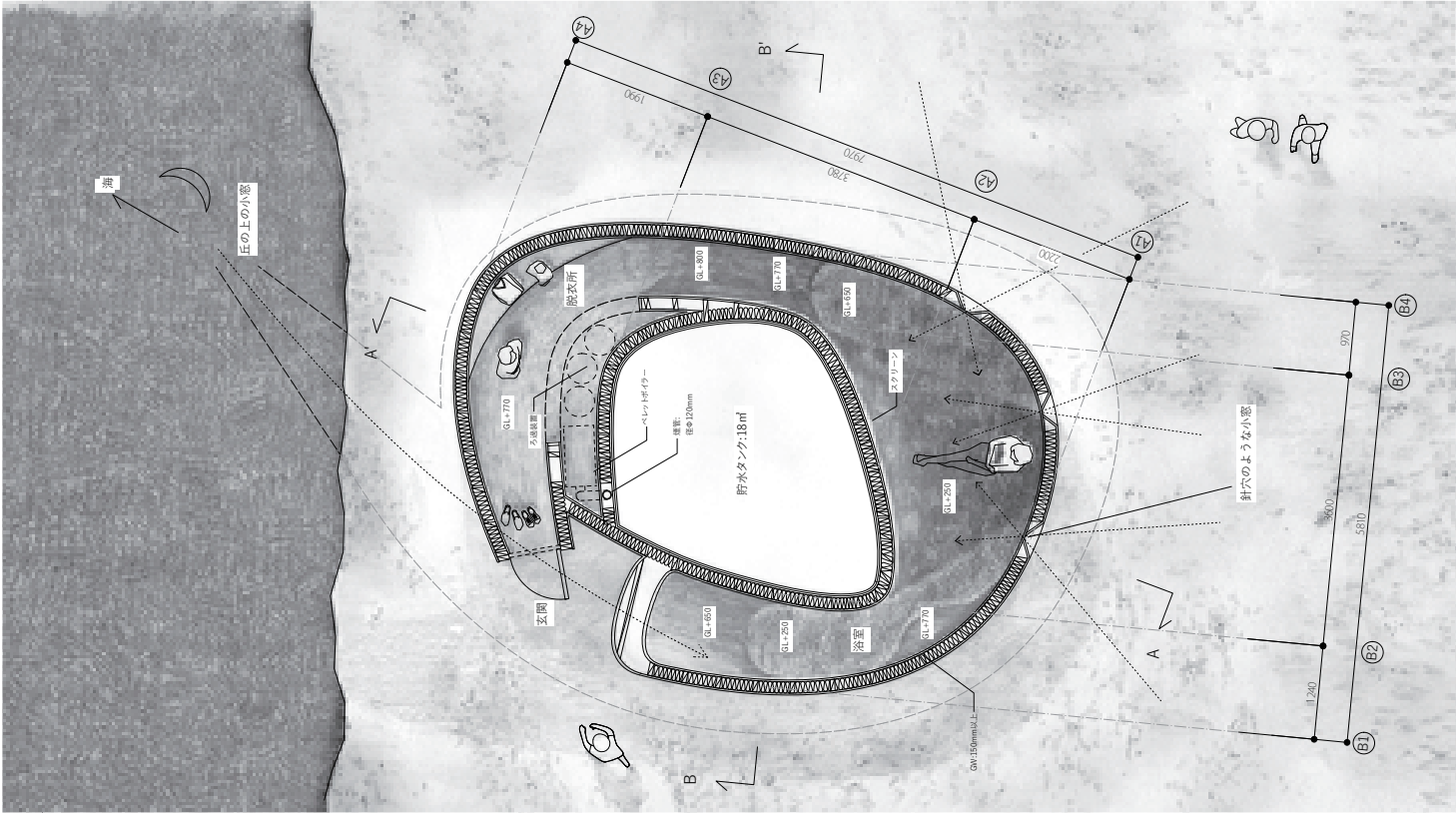
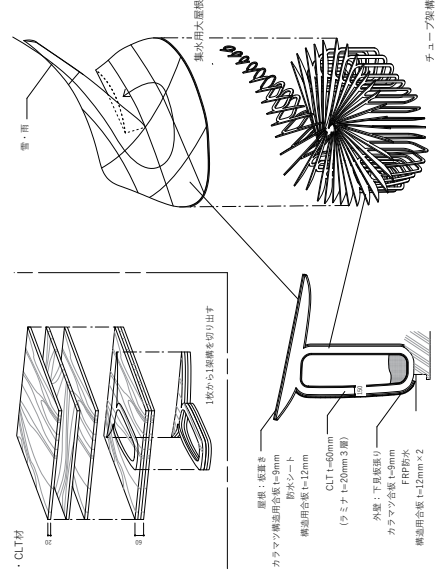


06. 構造計画「チューブ架構」

居室が貯水タンクに巻き付くという構成そのままに、居室を輪切りにした木造の**チューブ架構**をとります。輪切りの架構が居室の連続する一室空間を実現します。

架構には厚み60mmのCLT材(20mm厚のラミナを3層したものとする)を使用し、CNCマシンにより1枚ずつ切り出します。架構を1枚で切り出すことにより大屋根を支える梁部分をチューブ架構に含むこと、貯水タンクの形成も行うことができ、居室・大屋根・貯水タンクが一体となった架構形式を提案をします。壁厚は北海道の寒さに耐えうる高い断熱性能を得るために、架構のせいを150mm以上としています。

雪の凍結・融解の繰り返しによる外装材の劣化を考慮し、凍裂処理を施した北海道産カラマツ材による合板を使用します。



A Walk to the Unknown



PHASE 1

PHASE 2

PHASE 3

EARTH
(KNOWN)

LIMINAL SPACE

PARADISE
(UNKNOWN)

INVITATION

seeing the place from afar

feeling the earth beneath

listening to the sounds of the unknown

inviting to get lost in the LIMINAL SPACE

LOST IN THE LIMINAL

maximizing all senses to recognize the UNKNOWN SURROUNDINGS

NOTICING THE PARADISE

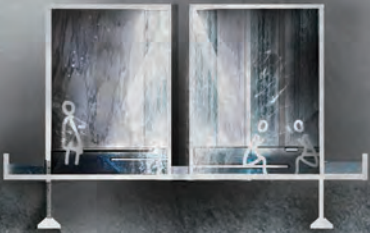
after getting lost, realizing that there is a bigger picture / PARADISE behind

The journey of the unknown consists of sensational challenges that occur in the experience of being lost. The combinations of the unknown set of visual, auditory, and haptic experience are offered to challenge and give self-confidence in the journey itself. Our idea is to mute a single mode of sensing perception (referred as the "unknown") while the others are working relevantly (referred as the "known"). So, the key to finish the journey is to carefully activate all of your senses.

Healing is a natural process of human being in encountering the undesirable condition from everyday life. Learning from the spirit of Shinrin-Yoku; the Japanese way of forest "bathing" as a natural healing ritual, our spirit heals when we challenged by the sublime experiences of the unknown. The unknown takes us from the known world of everyday life, bring our understanding into question thorough our whole senses and allows us to reflect ourselves as a complete human being. We believe that architecture could enable such kind of healing process by creating the mechanism of "unknown"; by manipulating its defining boundaries and affects our sensory experiences simultaneously.



FRONT ELEVATION



SECTION A - A'



EAST ELEVATION

The combinations of the unknown sensational experience in the forest are made possible by the presence and absence of different spatial boundaries in dynamic repetitive manner. By referring to that mechanism, we carefully select and compose different materiality into layers of perception, make the resulted boundaries difficult to be identified by single mode of perception thus demand our active engagement in spatial and temporal dimension. The whole architecture therefore experienced as a journey that is started from the "known realm" of mundane world into the "unknown realm" where the hidden paradise is waiting behind.

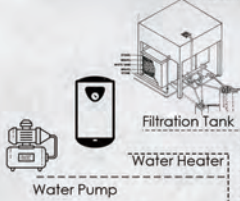


SECTION B - B'



4. The filter tank consists of stone, gravel and white sand. Filtering the waste water and into the water heater. The whole cycle repeats.

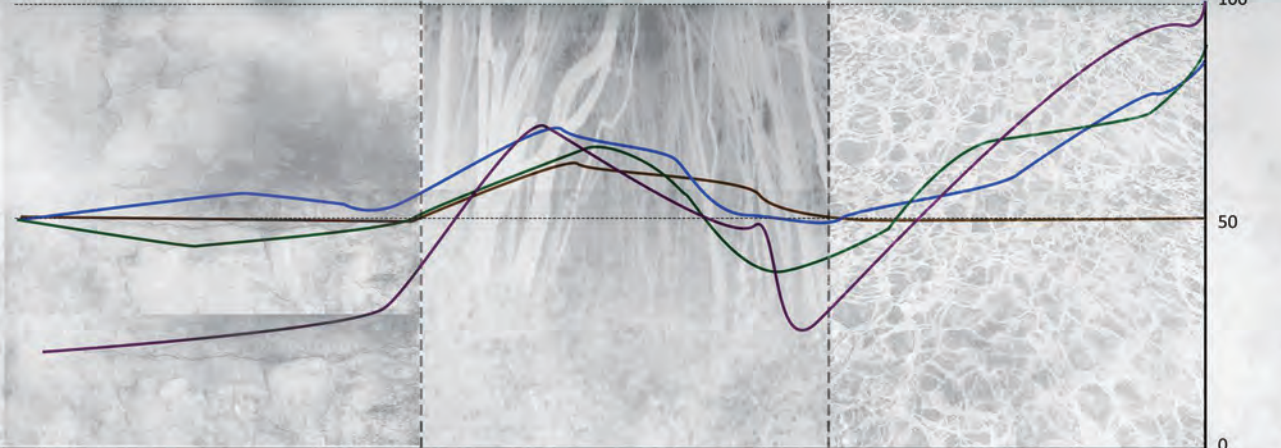
3. Used water is drained out of the architecture and into the filtration tank.



1. Water Heater heats the water and pumps it to the reservoir.

2. Hot water is distributed from the reservoir through the pipes into the needed water boundaries and the paradise.

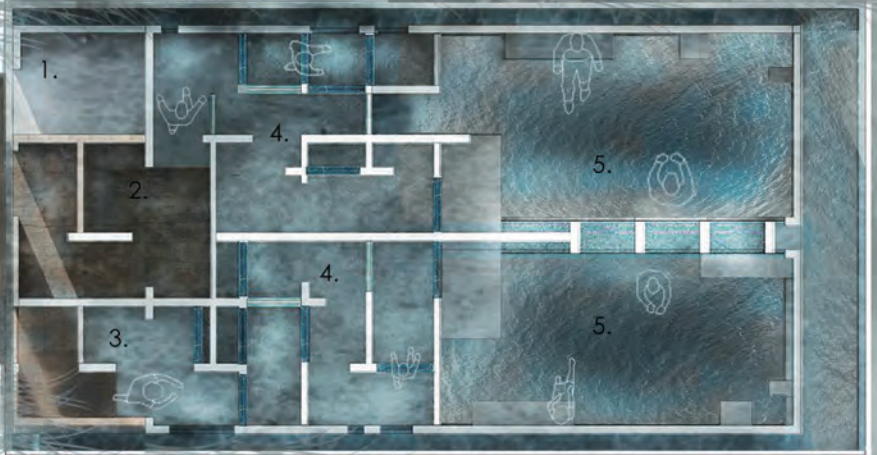
Experience of Senses



The wood and andesite welcome our journey from the "known realm". The firm appearance of andesite and soft wood give a comforting sensation before taking the journey to the unknown that hiding behind, introduced by the only slight sound of pouring water.

The journey challenges our perception into its limit. The various layers of liquid water, transparent glass, solid marble and andesite force our senses to actively identify its presences. We are dared to go through this entire enigma to reach the unknown paradise at the end of this journey.

At the end of the journey, the thick haze and abundance of water recalls our image of unknown paradise, the presence of light and absence of sight proliferate our whole senses to heal our soul, away from the mundanity of "known realm".



- 1. Pump and Filtration room
- 2. Men Changing Room
- 3. Women Changing Room
- 4. Journey to the Unknown
- 5. Paradise

PLAN
SCALE 1 : 50





Our proposal recognizes a theme from Japanese mythology: the legendary birth of the Celestial World and the Underworld. These are the two fields, mentioned in the Kojiki: the ethereal air and the heavy thick soil. These two worlds ("basins") generate the space leading to the temple of fluids

Since we believe that baths occur not only in water, but also because of being immersed in the airflow, fluids soak things even without touching them.

The basin-soil, considered as a folding in an out strategy, is certainly a sustainable point when it comes to the seismic aspect. The latter entails an integral platform, stiffened up by the folding movement, which unloads to the soil. Complex formworks are avoided since the earth itself acts as a receiving matrix.

Culturally speaking, the Incas established a relationship between water and landscape, as much as the Japanese Culture did. Hence, we think it is interesting to propose a syncretic blend here. The Ancient Huaripa valued water. The bathing experience began with the immersion into the water, in a sort of introspective "fetal position". This reminds us of the maternal womb and primordial amniotic fluid. After this stage, one was able to enter into the bowl of Pacha Mama, that's the First Goddess' Womb, for the Andean cultures. Moving along, there is a path onto the steamy rain, heated as it rebounds on the stones, which removes the mud.

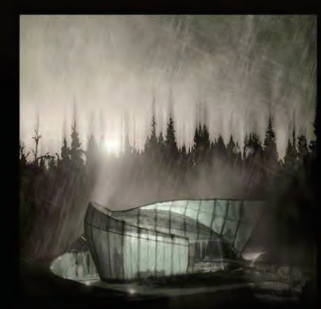
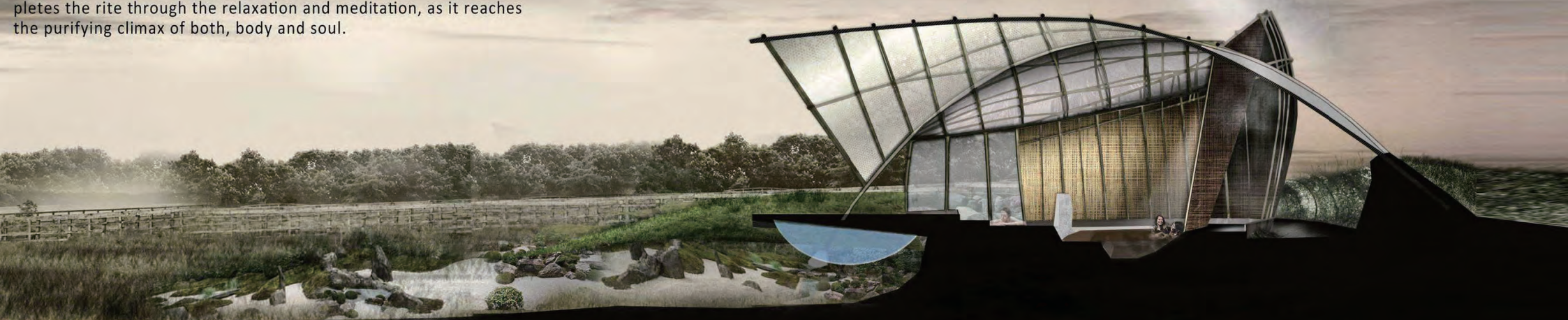
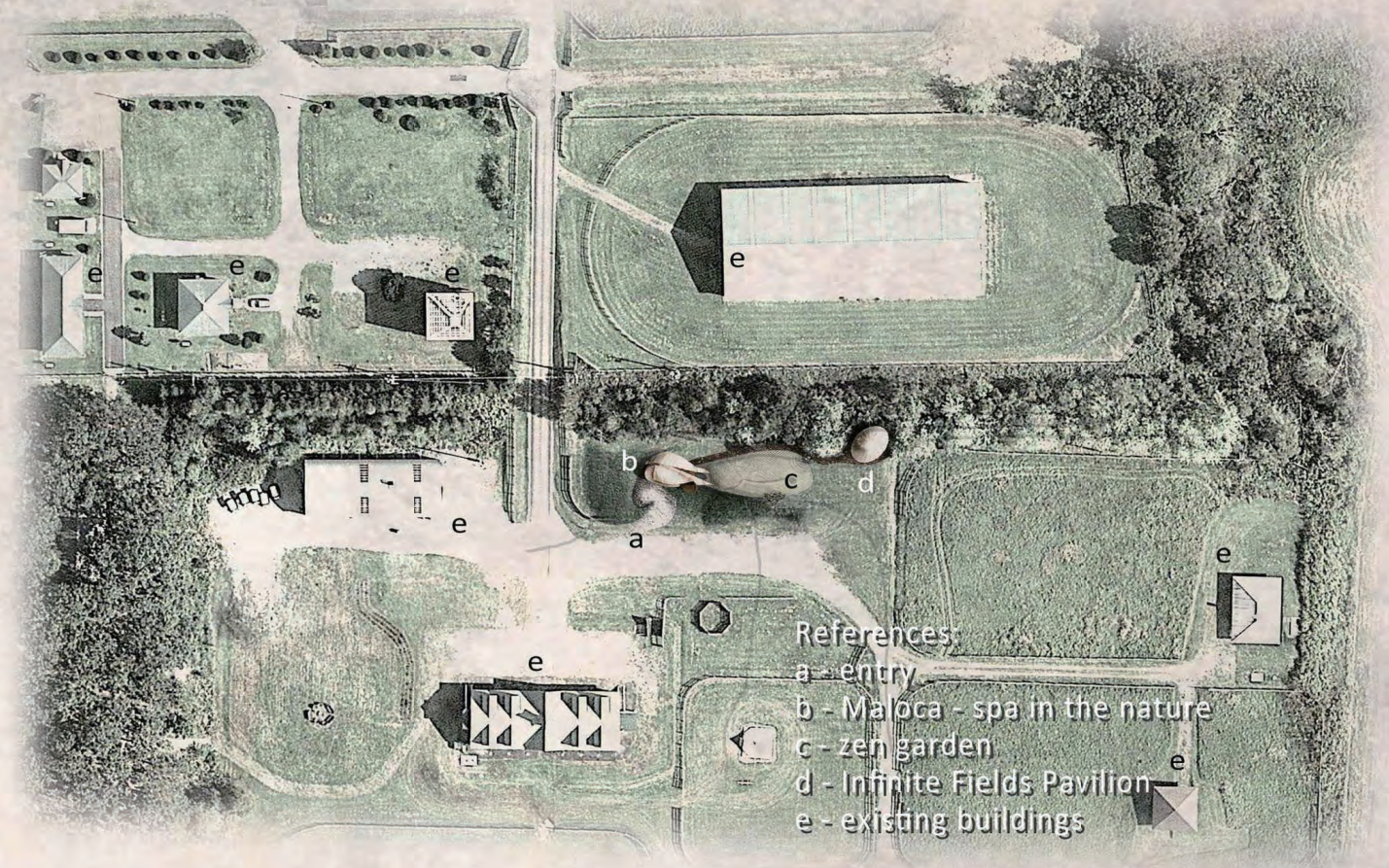
As far as energy is concerned, we come up with geothermic, mainly for its efficiency. The soil will behave as the substrate from which energy will be extracted, being the soil itself the main sustainable energetic resource.

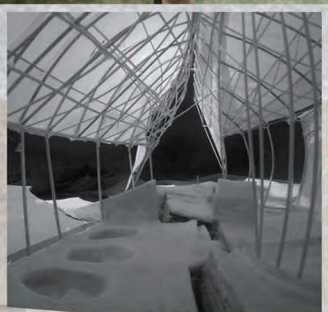
Our proposal is the following: to use the existing water, treating it with natural fortifying additives, in order to adapt it to the different basins.

The last stage is the Japanese Rotenburo, the open-air bath, which is the end of the levitating experience in the Zen garden. This journey can be appreciated through the watery bubble basin, which acts as a magnifying glass.

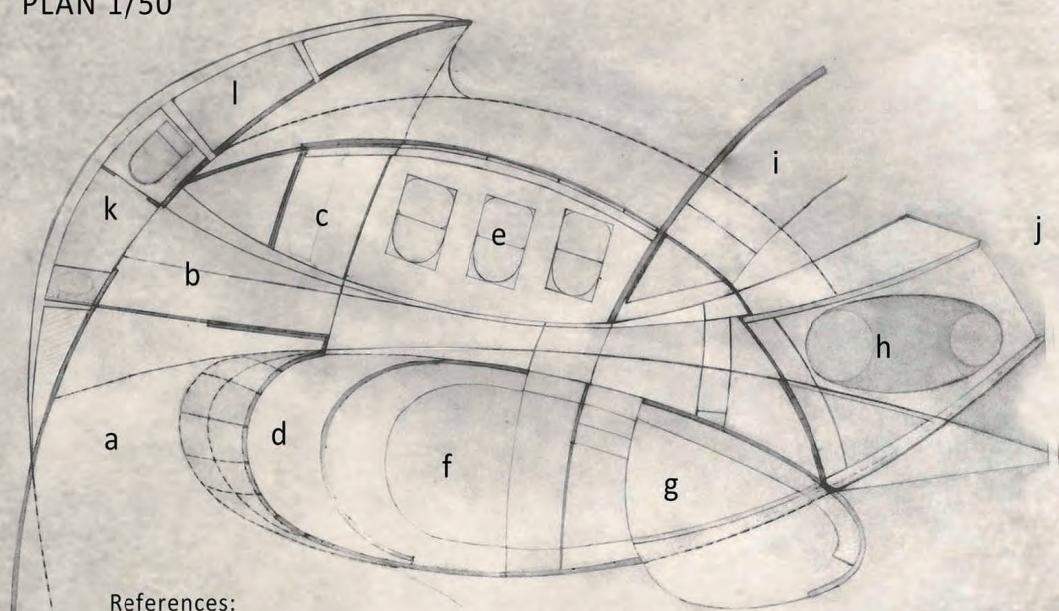
The proposed ceremonial moves from the most private and hidden space- represented by the inner soil- to the most social and public place: that is the ethereal space.

Also, it is worth noting that descending the ramp of the Rotenburo one can walk bordering the grove into the Danish Pavilion. This completes the rite through the relaxation and meditation, as it reaches the purifying climax of both, body and soul.





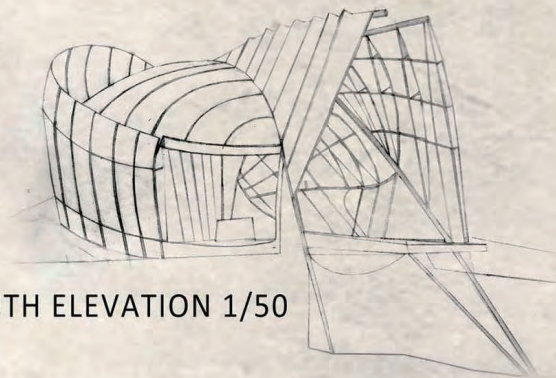
PLAN 1/50



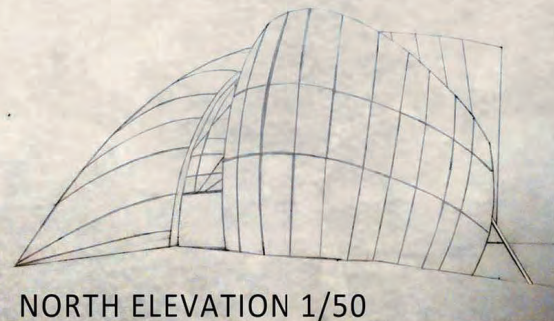
References:

- a - entry
- b - hall
- c - changing space
- d - rinse space
- e - individual immersion bath
- f - Pachamama bath
- g - steamy rain
- h - Japanese Otemburo - Outdoor Bath
- i - ramp to the Infinite Fields Pavilion
- j - zen garden
- k - bathroom
- l - boiler room

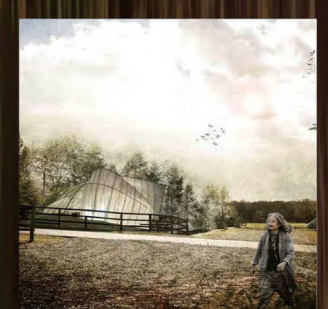
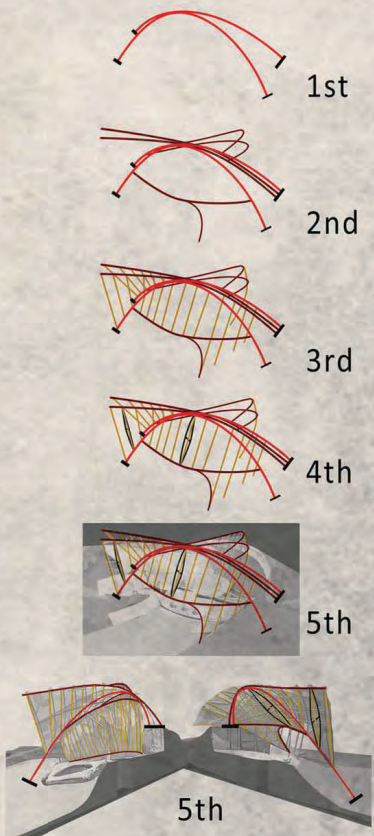
SOUTH ELEVATION 1/50



NORTH ELEVATION 1/50



CONSTRUCTION STAGES



VEILED GARDEN

Spa in Nature in Taiki-Gho, Hokkaido, Japan
7th LIXIL International Competition



VIEW FROM NORTHWEST

Path

Concrete Basins

Low Wooden Fences

Structural Wooden Screens

Polycarbonate Veils

Timber Roof Structure

Polycarbonate Roof

In imagining what “Spa in Nature” means at Memu Meadows, we considered that “Nature” is both visible as landscape, and sensed as heat, cold, humidity, sunshine, moonlight, and seasonal changes. To bring these aspects forth, we thought of the spa not as a building but as a GARDEN. Unlike pavilions built as autonomous objects, our design may be likened to an archipelago. This metaphor was employed in old Japanese garden designs by placing “islands”, stones, lanterns and gazebos in a field of greenery, water and gravel, connected by paths, bridges and decks. In our garden, visitors arriving from the main trail enter into a field, on a winding path, suggested by timber planks, fences and tall reeds, set on a rectangular grid. Aligned with the cardinal directions, the garden’s geometry marks a break between the world from which one comes and the garden realm. The path meanders through a series of veils or screens, which afford various levels of enclosure and privacy. At its southern end we propose to place the 2016 “Infinite Field” pavilion as a resting space in the garden.

Separating the main built volumes allows nature to penetrate into the spa from all directions, as views, light, air and heat. A parasol-like circular roof, partly covered in polycarbonate sheets and timber slats as a shading layer, directs precipitation back to the garden in the South. The North-South alignment optimizes the solar gain in the cold months, simplifies shading in summer, when natural cross ventilation is used. The orientation of open vs. veiled spaces results from a combination of views onto the landscape, privacy, solar gain and prevailing winds from North and West. There are only two fully enclosed spaces: one contains the changing room superposed by a rest area (2 x 7.3m²). The other contains showers (7.3m²). The hot water bath (6.2 X 1.7= 10m²) is like a natural pond embedded in the ground, and semi enclosed by a translucent roof and lateral screens. The water surface links the spa to nature visually and symbolically. When the pool is filled up to its infinity edge, it creates visual continuity with the landscape. We imagine all these spaces to be used similarly to traditional onsen, with the difference that they are connected through an open air space. Visitors to Memu Spa would thus benefit from an experience inspired by Japanese bathing culture but unique to the local fudo.

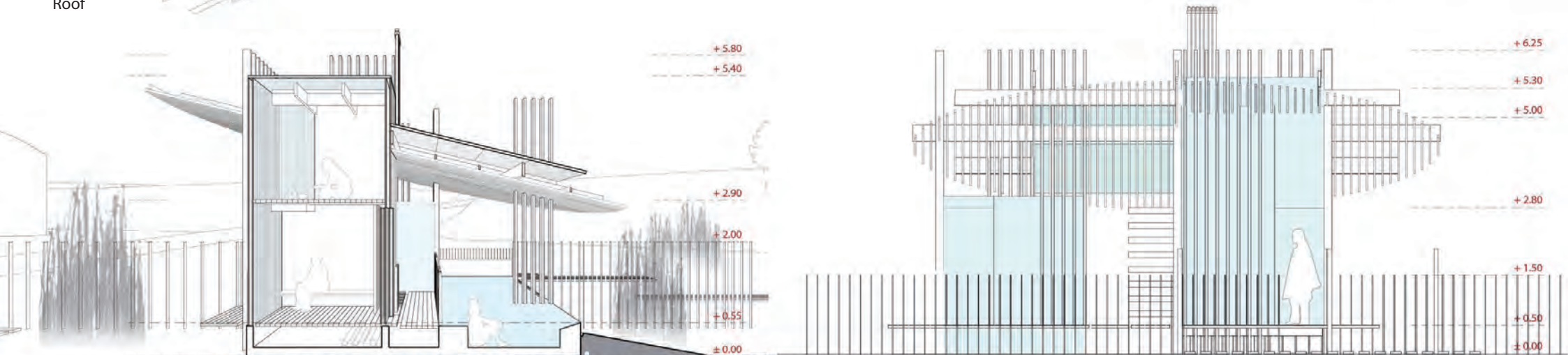
The veiled garden is an architecture of elements, whose volumes are composed of distinct planes, which in turn are constructed out of separate linear elements, all based on 900mm modules. The linear elements are made either of vertical wood slats, or of translucent polycarbonate boards. On their surface moving ghost shadows from inside are superposed on colors reflected from outside, always changing with the surroundings. Through these various line-planes the environment is intercepted, light is filtered and views from outside are obstructed or veiled. The line-plane principle is echoed in the choice of green reeds as the main living plant for the garden. They provide an external natural veiling layer that changes seasonally.

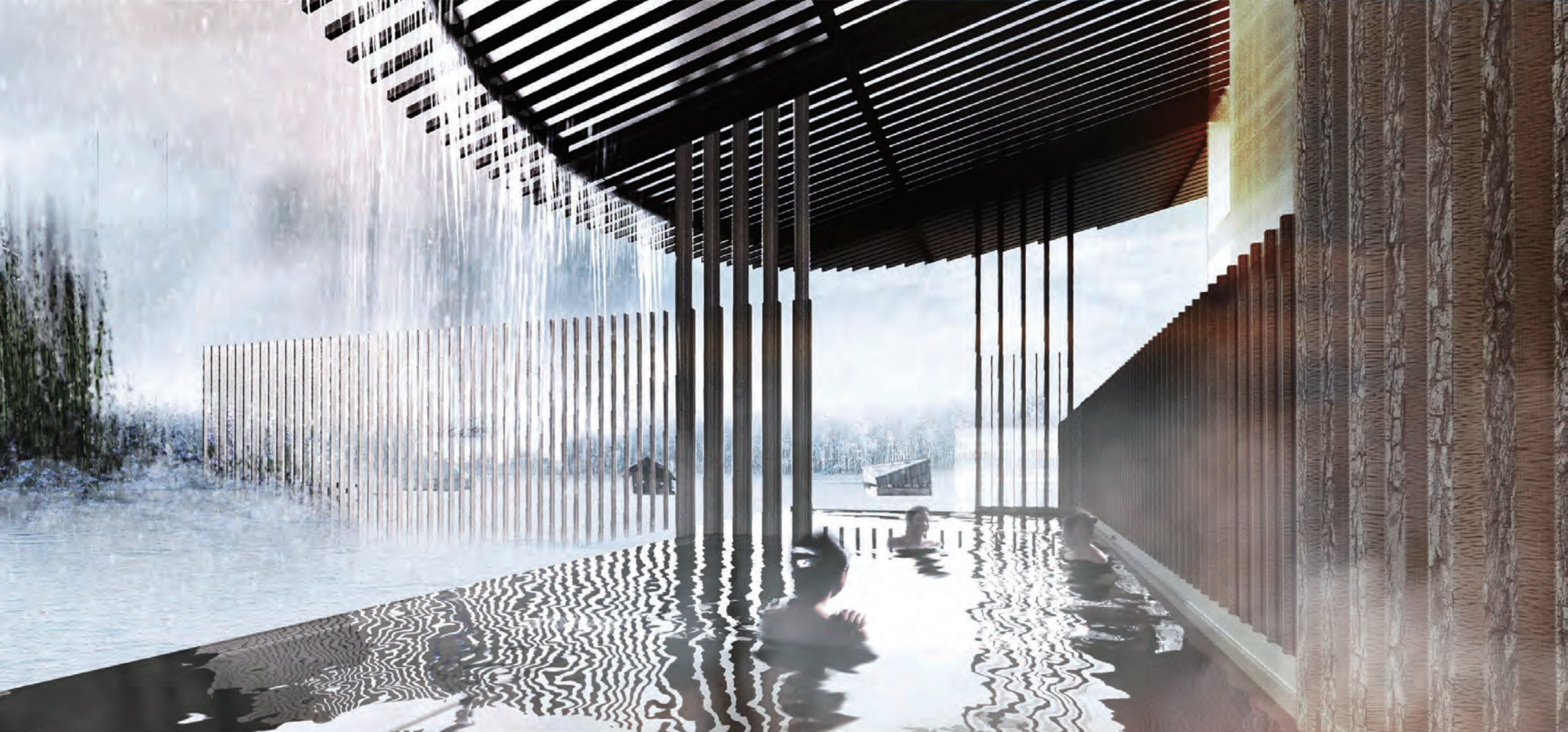
- 1. Garden
- 2. Main Entrance to Spa
- 3. Changing Room
- 4. Showers
- 5. Bath (Semi-enclosed)
- 9. Open channel collecting rainwater from the roof
- 10. “Infinite Field” Rest Pavilion

SITE PLAN 1:250

SOUTHWEST SITE ELEVATION 1:250

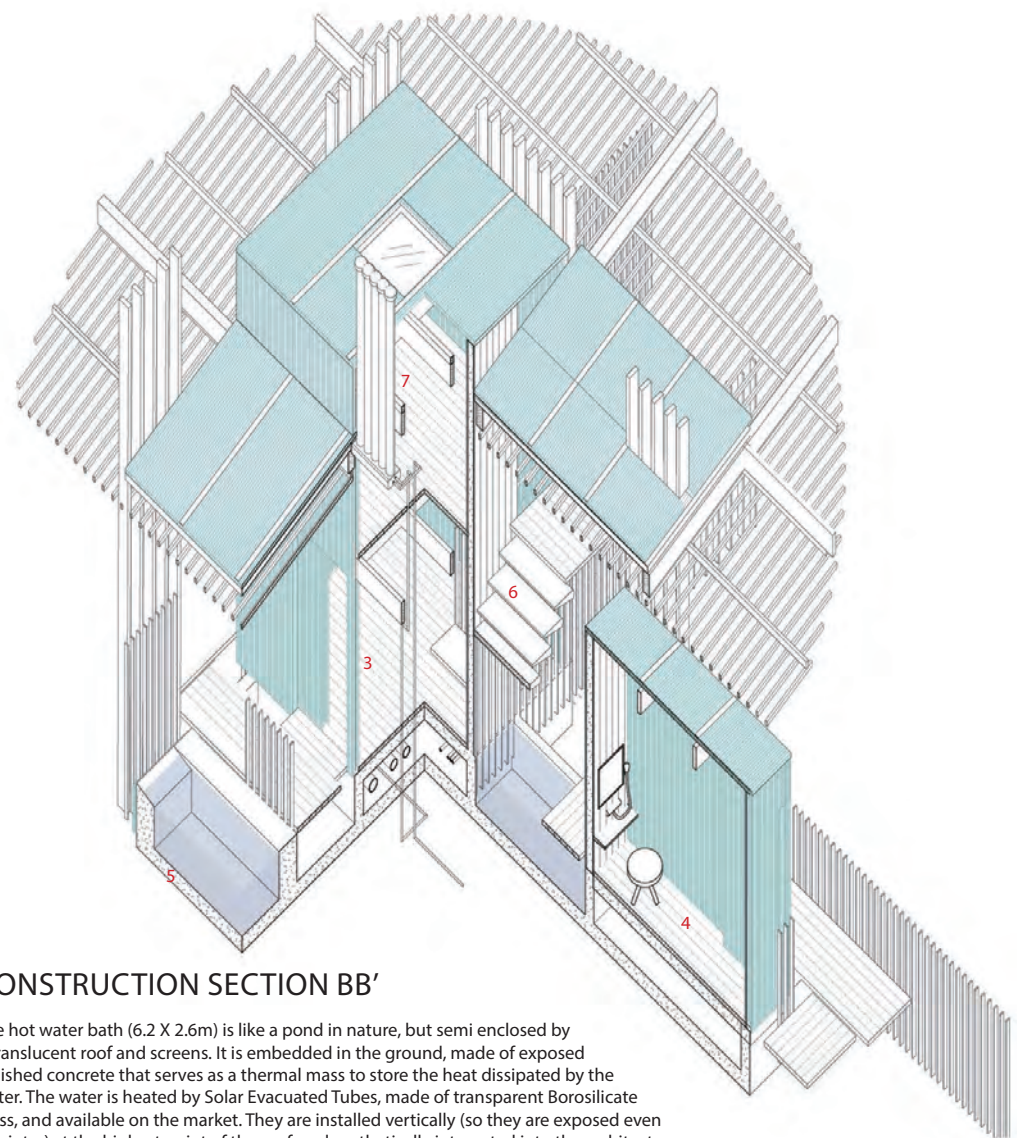
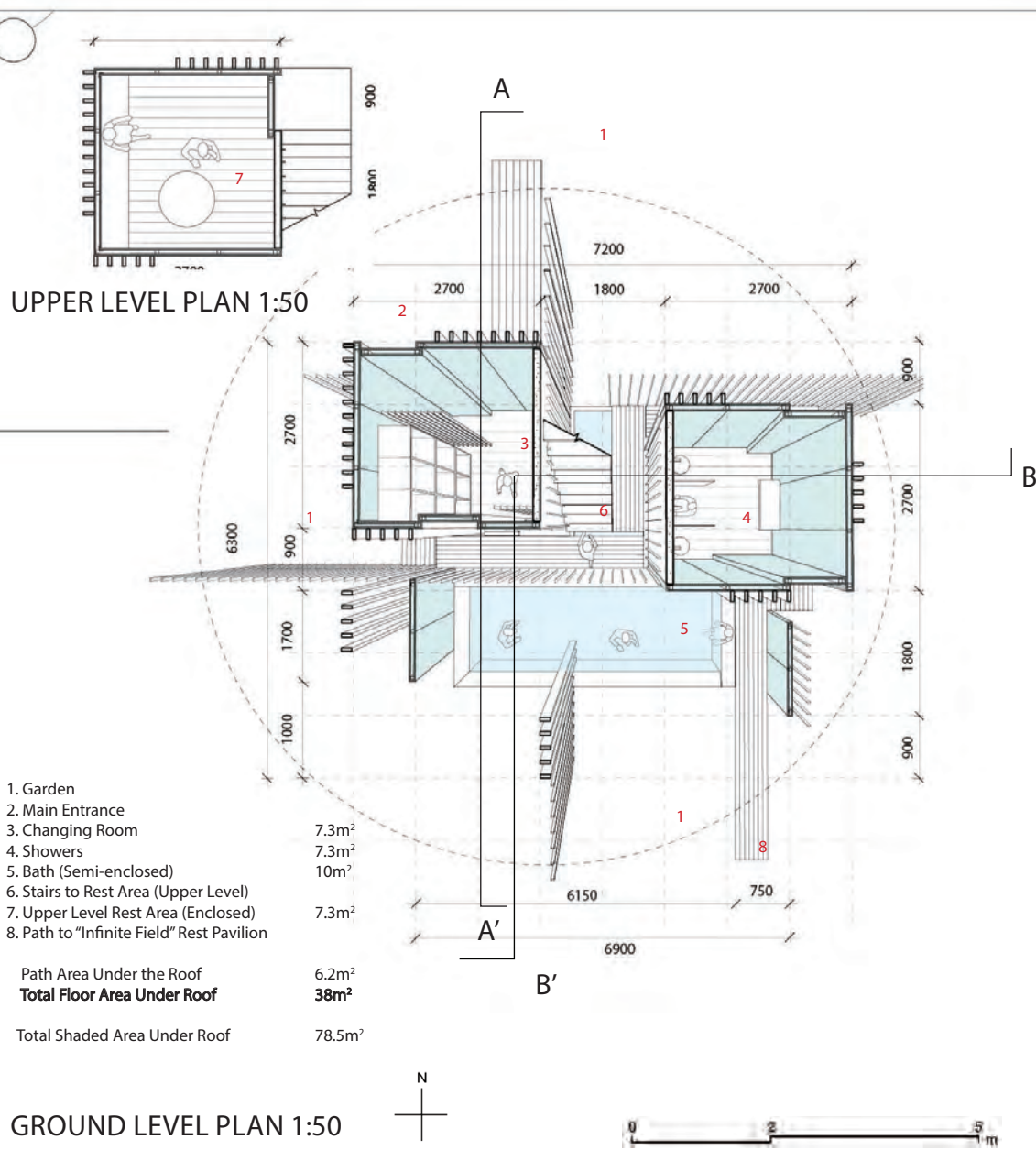
SECTION AA' 1:50





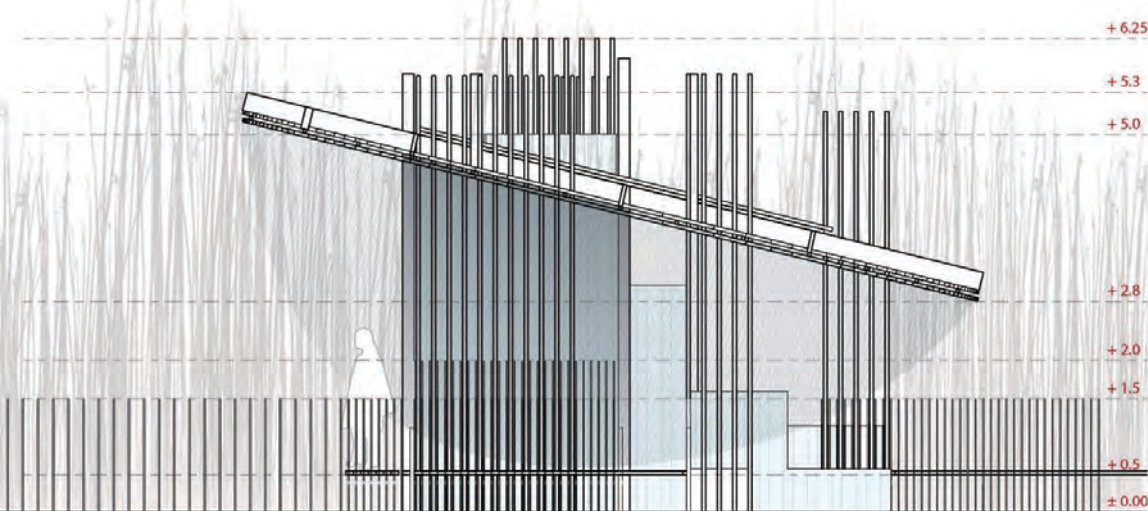
VIEW TOWARDS SOUTHWEST

The idea of building the entire garden of linear wooden elements was inspired by our familiarity with “split rail” construction in our home state of Pennsylvania. American pioneers used to split logs by hand, then intersperse them as a dry assembly when building fences and log cabins. When we noticed that the most prevalent element on the Memu site is wooden horse track fences, we thought a transposition and reinterpretation of “split rail fence” techniques would not be entirely foreign to the site. Those fences often preserve on one side the rough aspect of tree bark. It may be apposite to build some of our vertical

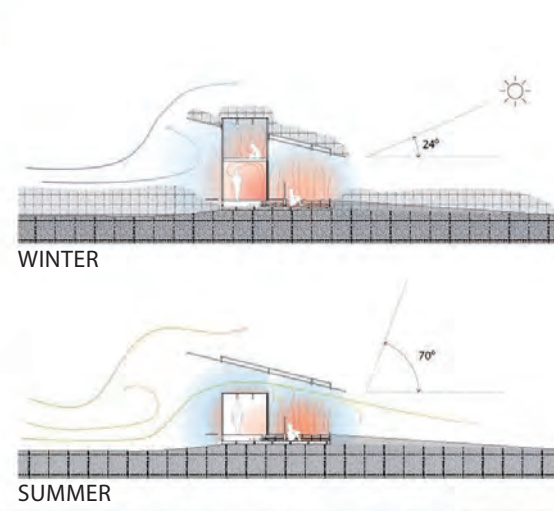


CONSTRUCTION SECTION BB'

The hot water bath (6.2 X 2.6m) is like a pond in nature, but semi enclosed by a translucent roof and screens. It is embedded in the ground, made of exposed polished concrete that serves as a thermal mass to store the heat dissipated by the water. The water is heated by Solar Evacuated Tubes, made of transparent Borosilicate glass, and available on the market. They are installed vertically (so they are exposed even in winter) at the highest point of the roof, and aesthetically integrated into the architecture. The heated water is used for bathing, but also as a heat source for the enclosed spaces. A back-up electric heating system will heat the water in the months when daylight is scarce.



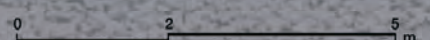
WEST ELEVATION 1:50



SEASONAL THERMAL PRINCIPLE

In winter the prevailing winds come from the North West. Therefore we enclosed the spaces to the North West and opened the bath towards the south. The enclosed spaces are heated by radiant heat from the water below. Above the inclination of the roof helps to direct and gather steam to guide it towards the rest area. Snow provides extra insulation on the roof and a shield from wind at the ground level.

In the warmer months the radiant heat system can be shut and cross ventilation ensures comfortable temperatures in the enclosed spaces and pool area. The roof inclination ensures easy shading in the summer and maximum solar gain in winter.



VERTICAL THATCH

7TH LIXIL COMPETITION | SPA IN THE NATURE | UNIVERSITY OF SYDNEY



Thatch is a waterproofing material made of reeds that bathe in natural riverbeds.



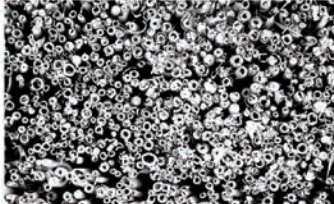
Reeds are long, tubular, and tapered. They are harvested and then bundled for thatching.



The bundles were used as the main building material in Ainu architecture.



Thatch is still used in Japanese traditional architecture for pitch roofs.

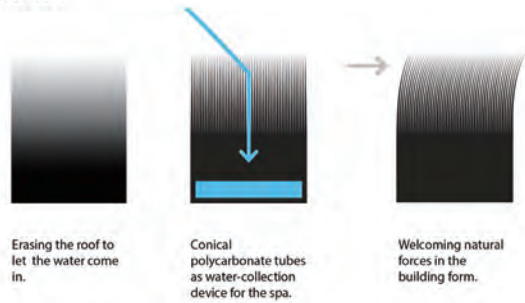


The reeds that make up natural thatch have a hollow structure. Water is carried away from roofs between these tubes.

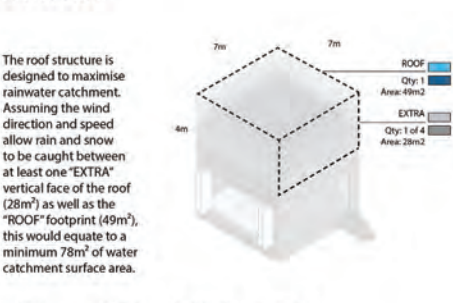


In this project, we propose to use frosted polycarbonate tubes as the 'reeds' of the project, its main building material.

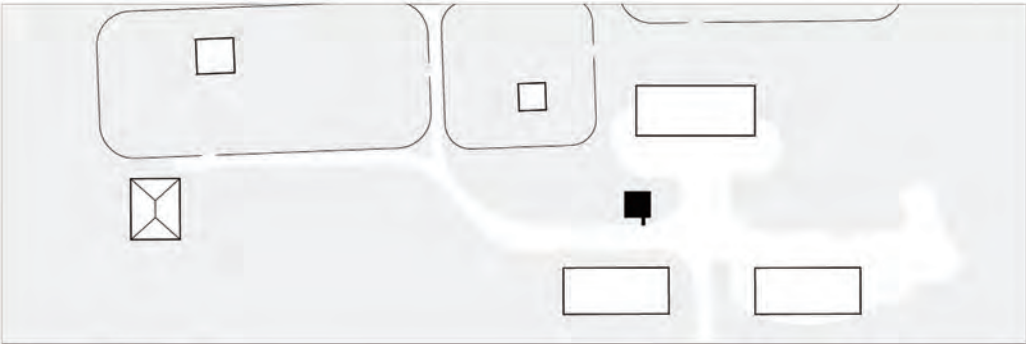
CONCEPT



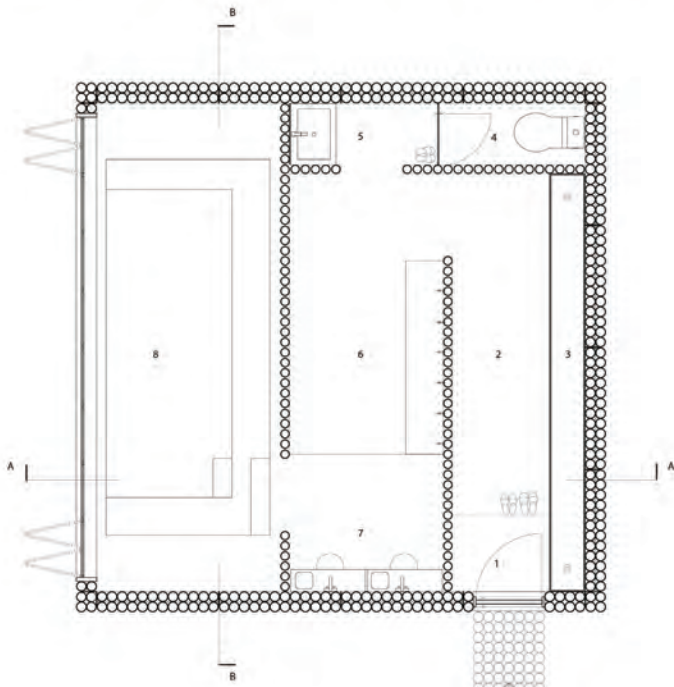
CALCULATIONS



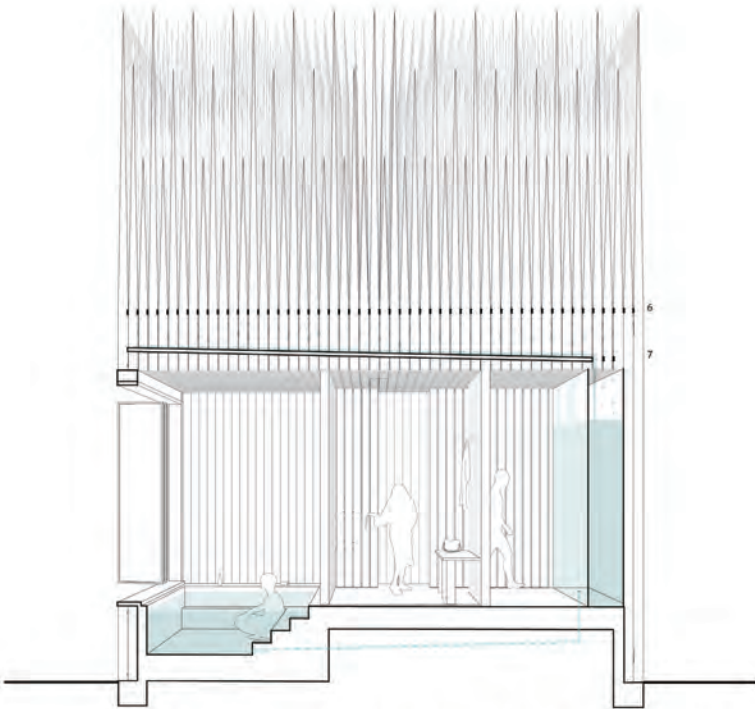
		WINTER Dec - Feb	SPRING Mar-May	SUMMER Jun-Aug	AUTUMN Sep-Nov	TOTAL
SNOWFALL	ROOF (49m²)	8,918 L	5,292 L	0 L	0 L	14,210 L
	EXTRA (28m²)	5,096 L	3,024 L	0 L	0 L	8,120 L
RAINFALL	ROOF (49m²)	4,998 L	6,664 L	24,549 L	14,039 L	50,250 L
	EXTRA (28m²)	2,855 L	3,808 L	14,028 L	8,922 L	29,613 L



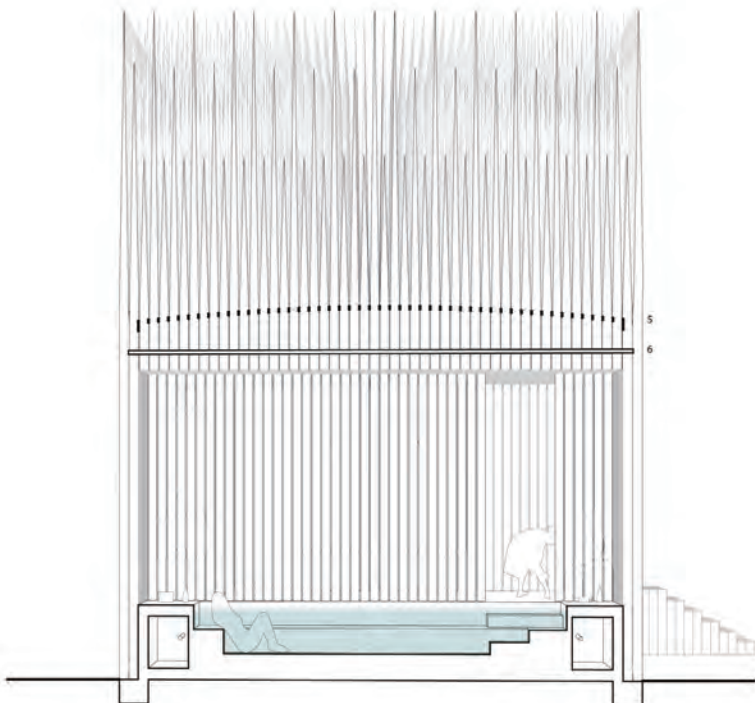
SITE PLAN 1:1000 0m 5 10 30



FLOOR PLAN 1:50 0m 0.5 1 2



SECTION AA 1 Watertank 2 Corridor 3 Changing room 4 Spa 5 Piping from the watertank to the Spa 6 Pre-stressed steel roof structural grid 7 Perforated ceiling waterproofing membrane



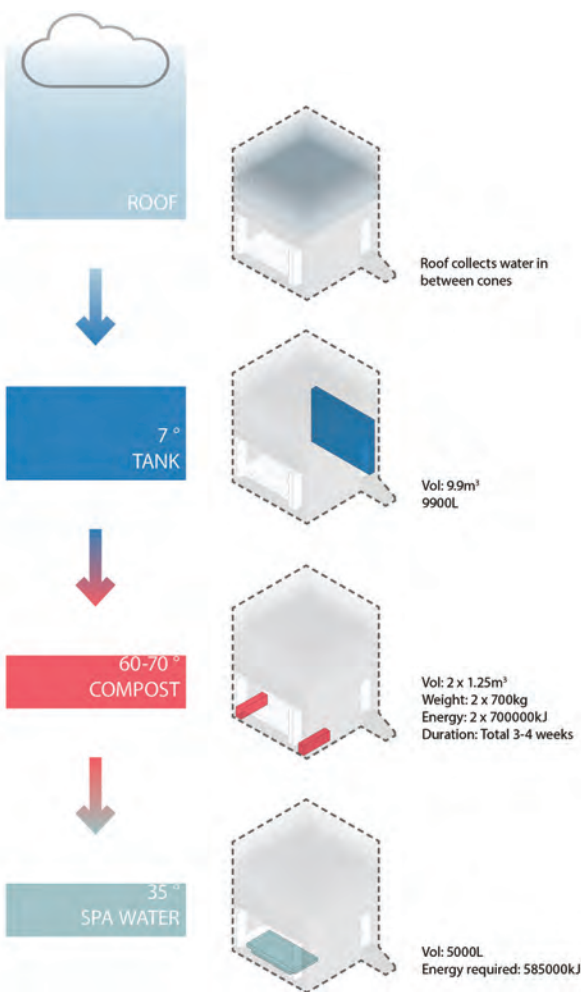
SECTION BB 1 Entrance 2 Shower 3 Spa 4 Compost heating system 5 Pre-stressed steel roof structural grid 6 Perforated ceiling waterproofing membrane

The bundling of these translucent elements is designed to maximise the collection of water from rain and snow, and results in the erasure of the roof. Strong winds are also expected to slightly bend the top cones, thus welcoming natural forces to temporarily "shape" the building form itself.

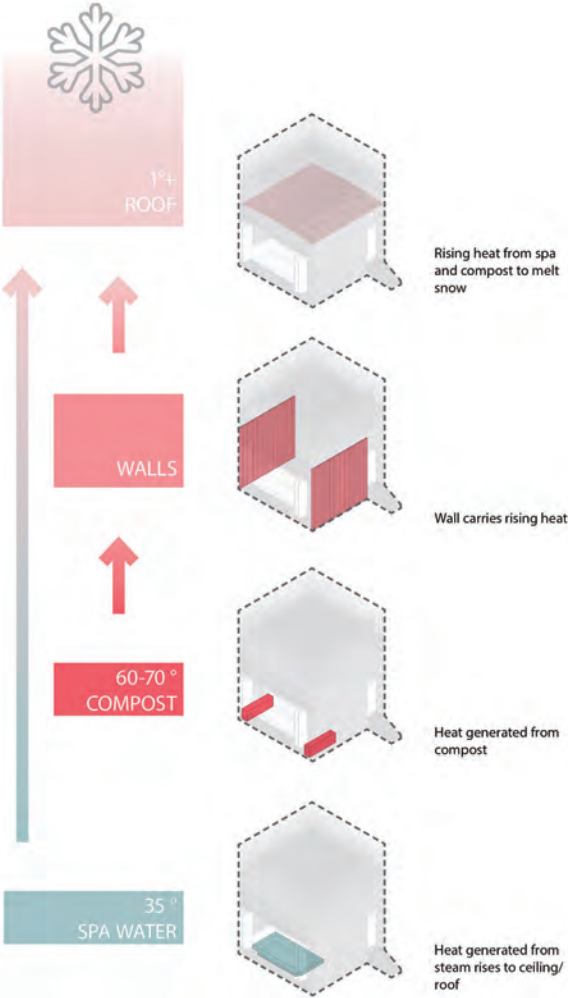
Located in Site 2, the spa closely neighbours the existing stable and hotel building. This specific location minimises the amount of infrastructure, and allows the spa to frame uninterrupted views of the mountain ranges and plains of Hokkaido. "Vertical Thatch" also contrasts the solidity of the existing building through its ethereal nature and use of material. The simple plan of the spa leads the occupant through a linear journey upon entering. The framed view is unravelled as the occupant travels past the translucent tubular walls, thus unifying both the occupant and the architecture itself with its

context through a progressive transparency. The spa's functionality is raw. The reed-like polycarbonate tubes trap the rain and thaw the snow at their base before driving the water to a tank. This tank is an insulating barrier that protects the interior from the harsh south westerly winds.

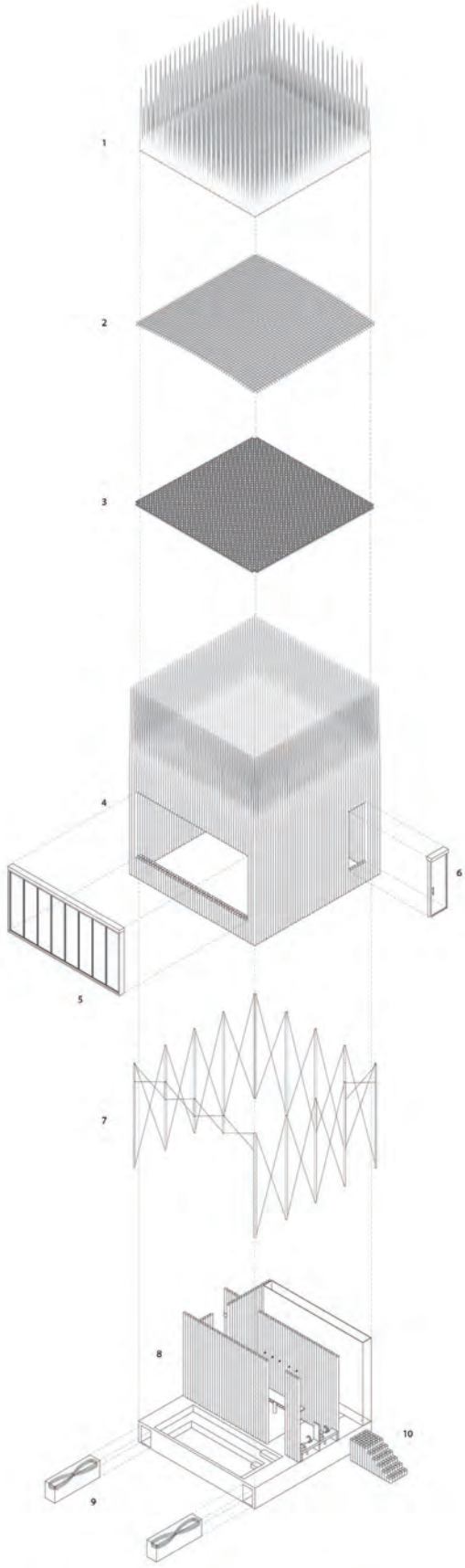
When the spa needs to be filled, the water drains through tubular coils that pass the water through compost. The compost, having being collected from the neighbouring stables and grass waste in the surrounding grounds, heats the water during its active stage. The spa is then filled and continually heated with the reactive composting process. This cycle is processed specifically with what the natural elements provide. The spa becomes a means for humans to become a part of this natural sequence. Where they were once distant, are now unified.



WATER COLLECTION AND HEATING SYSTEM



SNOW MELTING SYSTEM



- 1 Polycarbonate tapered roof tubes
- 2 Pre-stressed steel roof structural grid
- 3 Perforated ceiling waterproofing membrane
- 4 Double layered polycarbonate tube exterior wall
- 5 Operable bi-fold glazed window
- 6 Entrance
- 7 Diagonal bracing structure
- 8 Polycarbonate tube internal partitions
- 9 Compost heating system
- 10 Stair made of polycarbonate tubes

STRUCTURAL DIAGRAM

SOUTH EAST ELEVATION

SOUTH WEST ELEVATION



A gesture of displacing a landscape of volcanic rock forms the basis of the project. The landscape is modulated by heat underfloor, and an absence of clearly materialised form through mist regulates spaces and gives privacy. Bathers are exposed to nature but comfortably protected by discoverable climatic zones and spots. A fragment of volcanic rock from the Akan caldera is set into the existing landscape on-site.

The project strives to translate the notion of a borrowed landscape into an architectural space, that vanishes from the existing landscape when not in use, and only appears when inhabited. The landscape is at grade with the existing site and embeds all infrastructure and functions necessary to function as a spa.

Employing the idea that public places of bathing often recreate nature and its elements to construct a certain quality, the project is a reproduction of a natural environment.

Without a materialised separation of space, mist and heating screens create spaces of different qualities whilst still offering a

necessary degree of privacy. The mist creates an ephemeral space and the resultant architectural volumes only appear whilst the spa is in use. The mist does not clearly define forms since it reacts to natural influences (eg. breezes, sunlight etc.), but the defined positions of the outlets indicate geometrically-defined spaces.

The absence of architecture in its materialised form engenders a direct exposure to nature; enclosures, protection and comfort is instead provided by climatic zones, defined by the physical phenomena of heat radiation, convection and humidity.

Heated screens follow the sequence of a bathing ritual that regulates different temperatures, humidity and privacy, and similarly basic components like the shower, taps and racks to hang transparent clothing bags and towels, protrude from the volcanic rock connected to functional services below. Based on the idea of radiant water tubes that lie underneath and heats the landscape's surface, these functional objects subtly define how one should use the space.



Fig. 8: Model top view



Fig. 9: Image human-material close up



Fig. 1: Location of the Volcanic Rock, where it is extracted and transported to Memu Meadows.

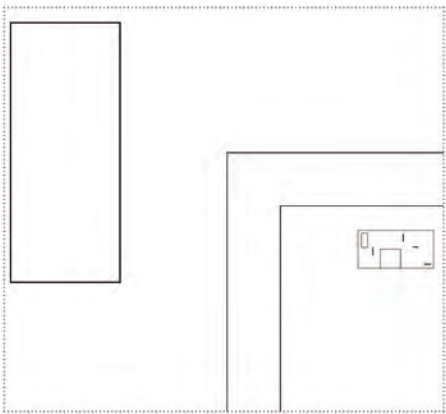


Fig. 2: Location on site. Scale 1:500. North



Fig. 10: Summer view



Fig. 3: Spaces are formed by the evaporation of the mist through heated screens.

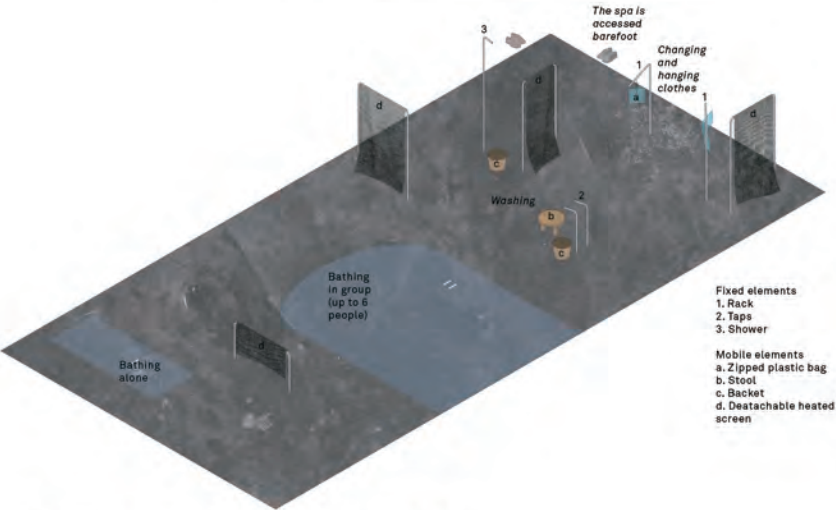


Fig. 4: Sequence: changing, washing, bathing in group or alone



Fig. 5: From left to right, objects to bring: Heated Textile; Zipped plastic bag to deposit the clothes and protect them from the humid fog; Personal towel

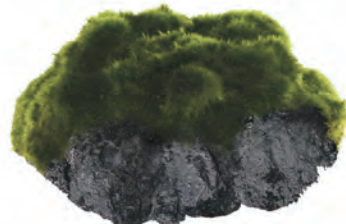


Fig. 6: Volcanic rock and moss growth



Fig. 7: Plan. Moss and small local plants grow in the coldest areas of the rock

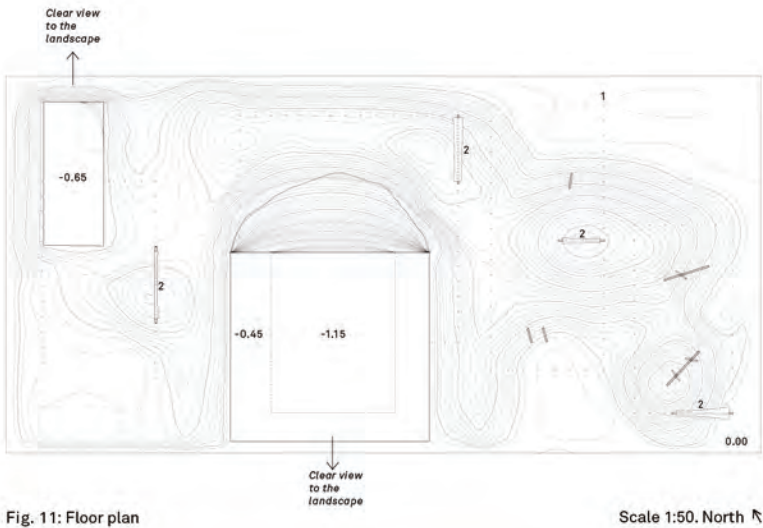


Fig. 11: Floor plan

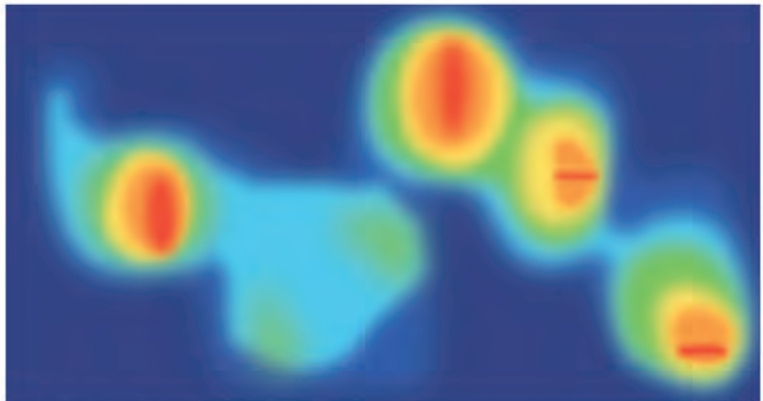


Fig. 12: Winter. Heat map +1.00 m

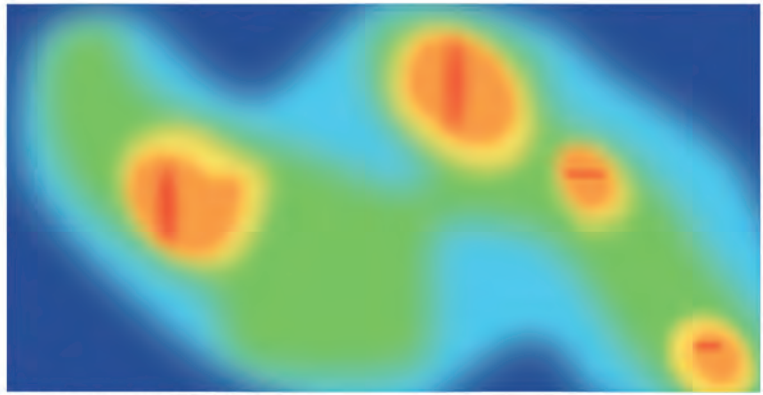
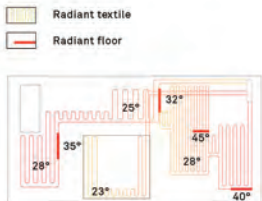


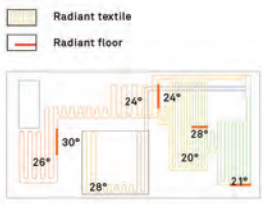
Fig. 13: Summer. Heat map +1.00 m.

- 1. Nozzles
- 2. Radiant textile

Weather (Taiki-cho)
26th November (Average)
7° / -2°C
Daytime, 13:00
6°C
Real Feel 7°C
Precipitation 14%
Intervals of clouds and sunshine
Wind W 11 km/h



Weather (Taiki-cho)
16th June (Average)
18° / 10°C
Daytime, 13:00
16°C
Real Feel 20°C
Precipitation 16%
Partial sunshine
Wind SSW 17 km/h



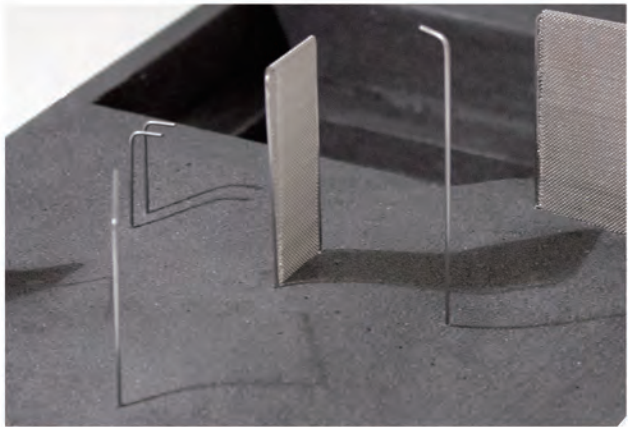


Fig. 14: Elements in the landscape providing heat, fog, and water.



Fig. 15: Close up. Screen providing heat, water tap, nozzles releasing mist



Fig. 16: Winter view. The walking path is defined by the melting snow. A smaller bathtub with higher water temperature for one or two people bathing



Fig. 17: Summer view at night

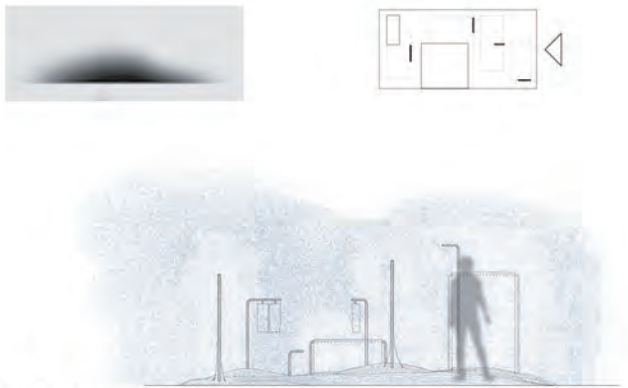


Fig. 18: Transversal Elevation



Fig. 19: Longitudinal Elevation

Scale 1:50

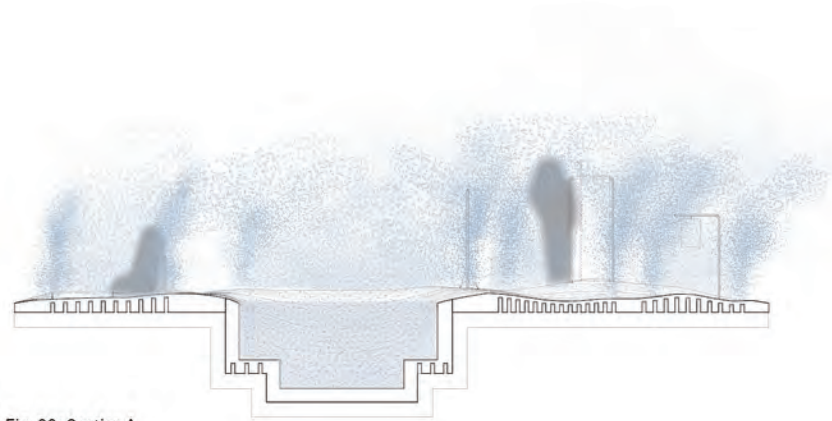


Fig. 20: Section A

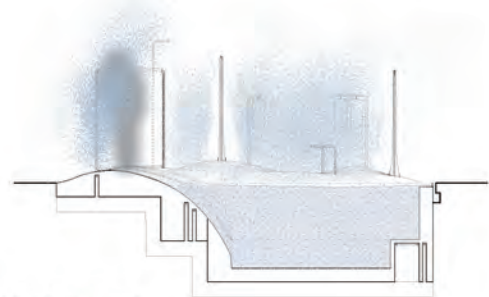


Fig. 21: Section B



Fig. 22: Section C

Scale 1:50

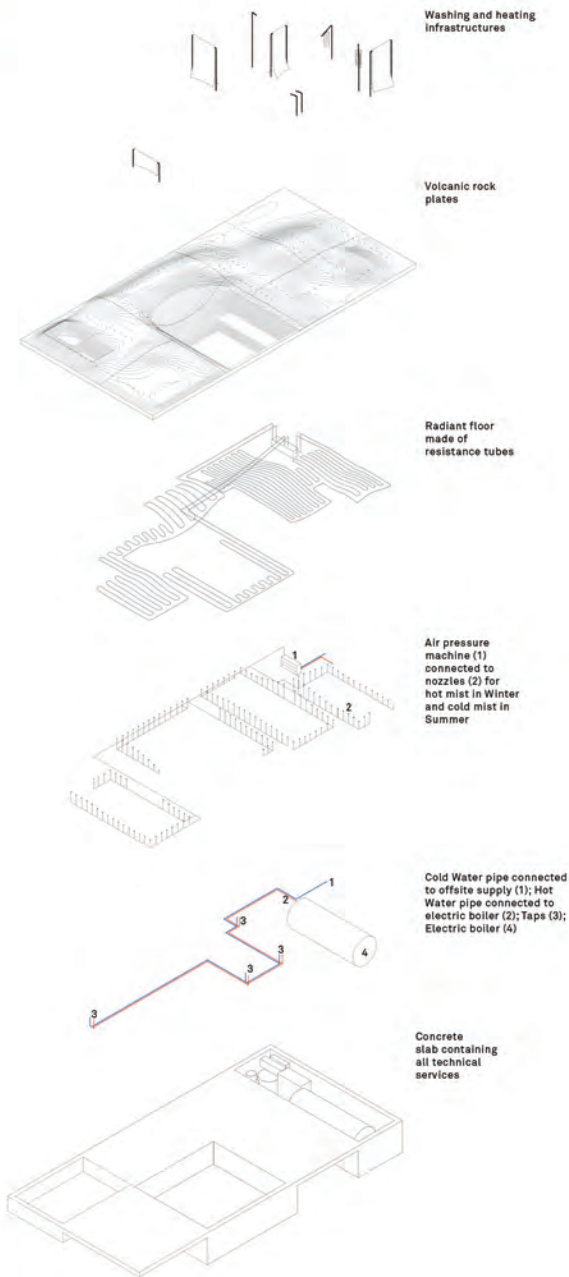
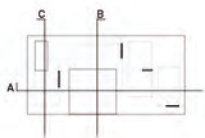


Fig. 23: Axo with all components

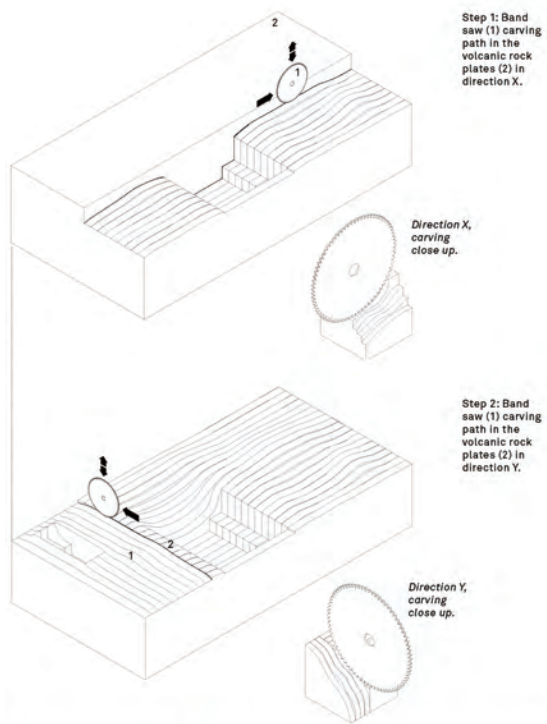


Fig. 24: Isometric view. Volcanic rock top face being carved with a band saw in both top and bottom faces

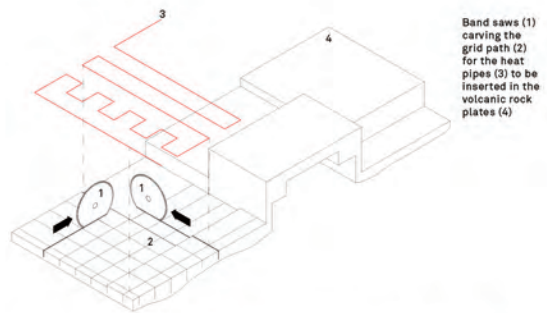


Fig. 25: Isometric view, close up. Volcanic rock underneath face being carved and ready to receive the pipes system

