

# Piha [ Finnish - Courtyard ]

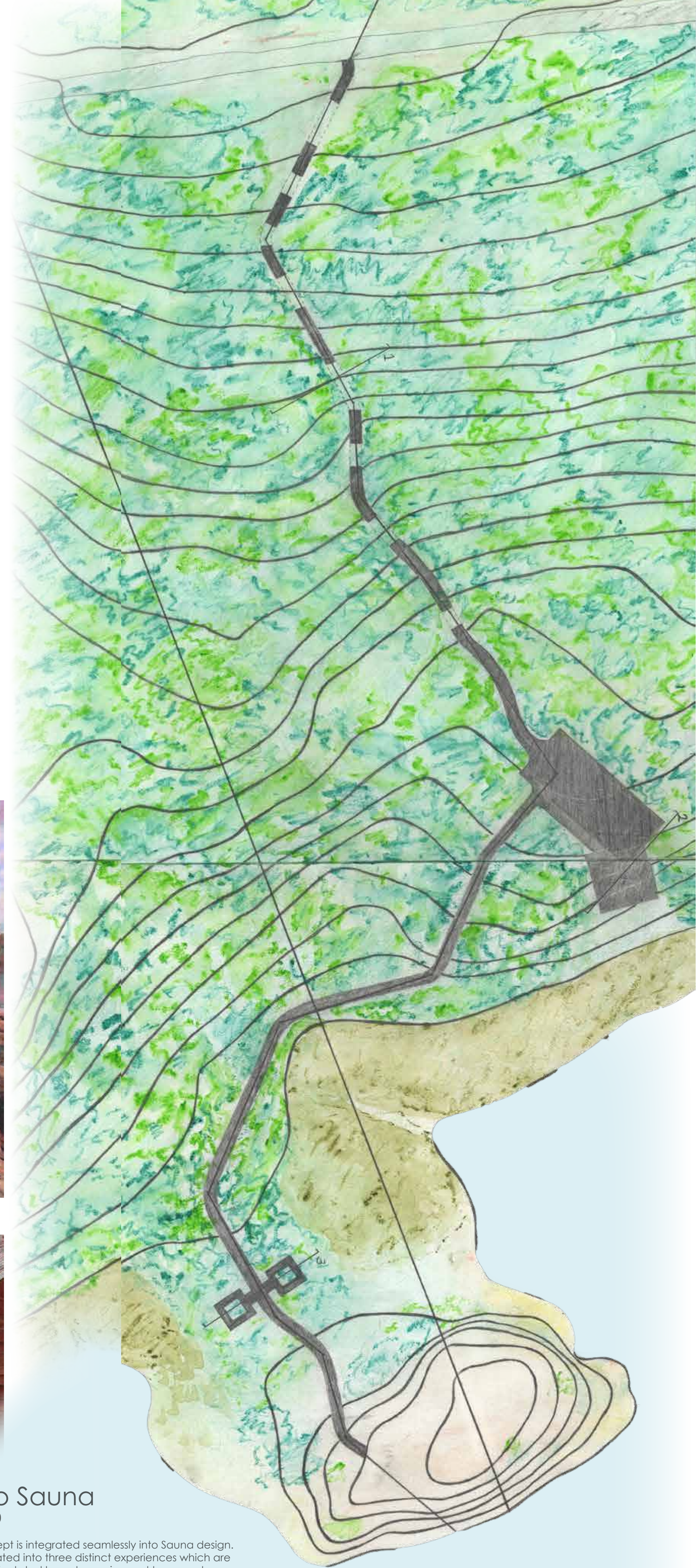
Marie Duffy

"The Bennett Lake Courtyard Sauna utilizes the concept of a centre atrium as a way to harmoniously connect a deconstructed sauna experience."

The buildings are separated based on their program, beginning with an entrance change room, leading to the sauna, and finishing with a contemplation space. The three spaces are united externally by their vertical timber cladding, but differ in form. Each building is its own experience, meant to evoke different senses and interactions based on the stage the user is at in the sauna process.

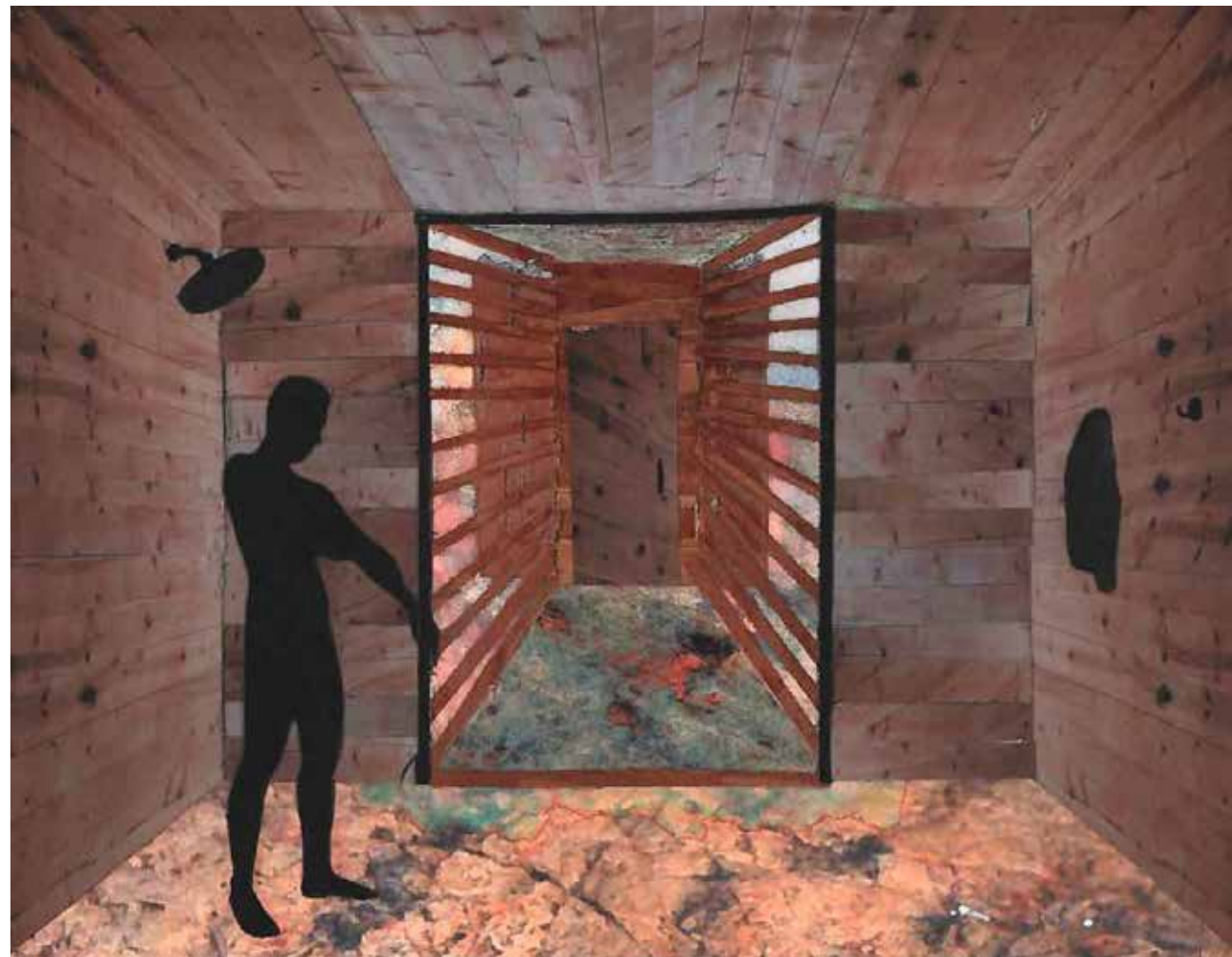
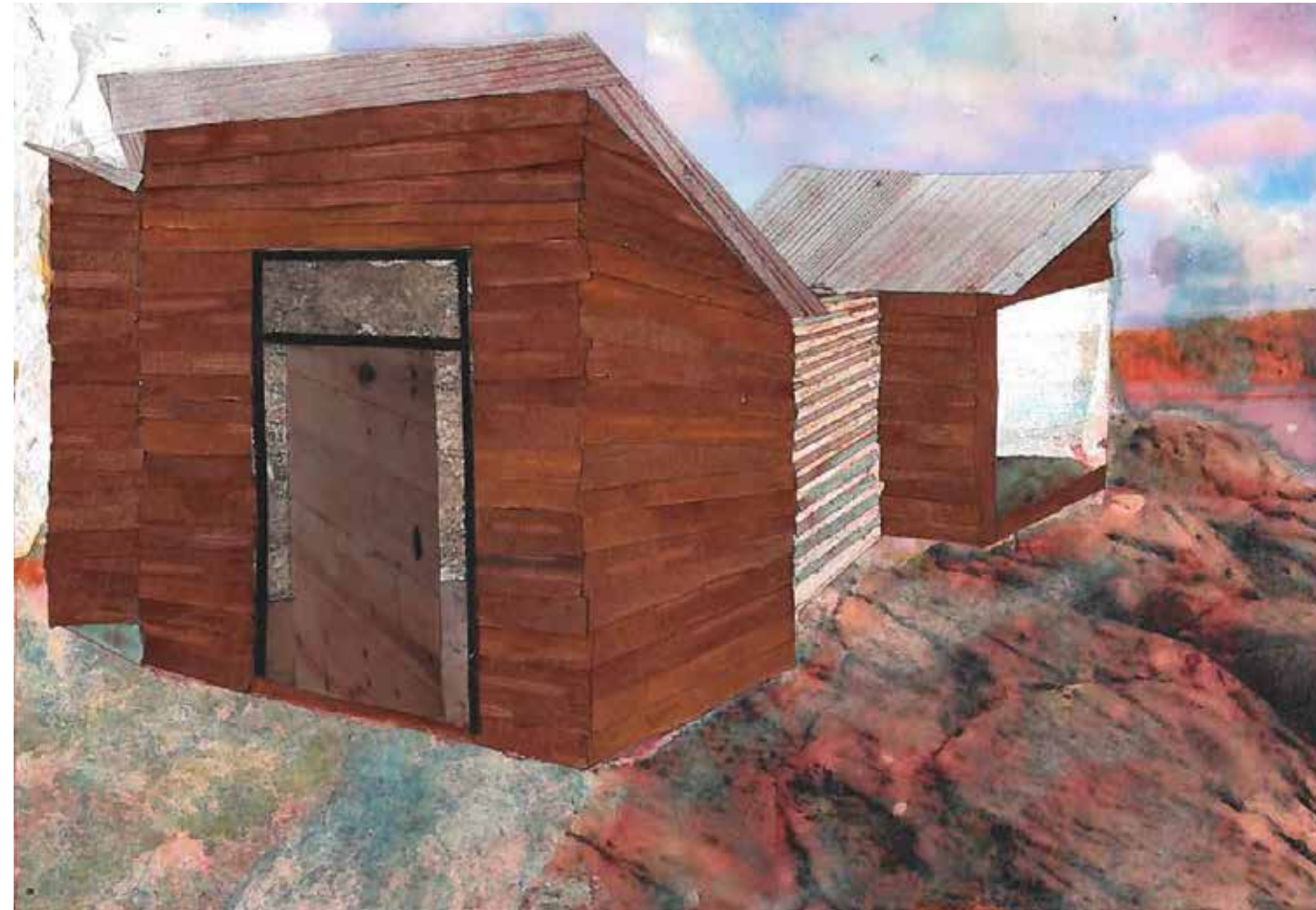
The buildings are oriented based on the views and the paths of the user. As the user is occupying or moving to a space, a view of the lake is constantly framed by the other two buildings that form the courtyard.

The traditional Finnish Sauna is an intensely communal experience. This concept encloses the users, disconnecting them from the outside world. The occupants must only focus on what they are doing and who they are with.



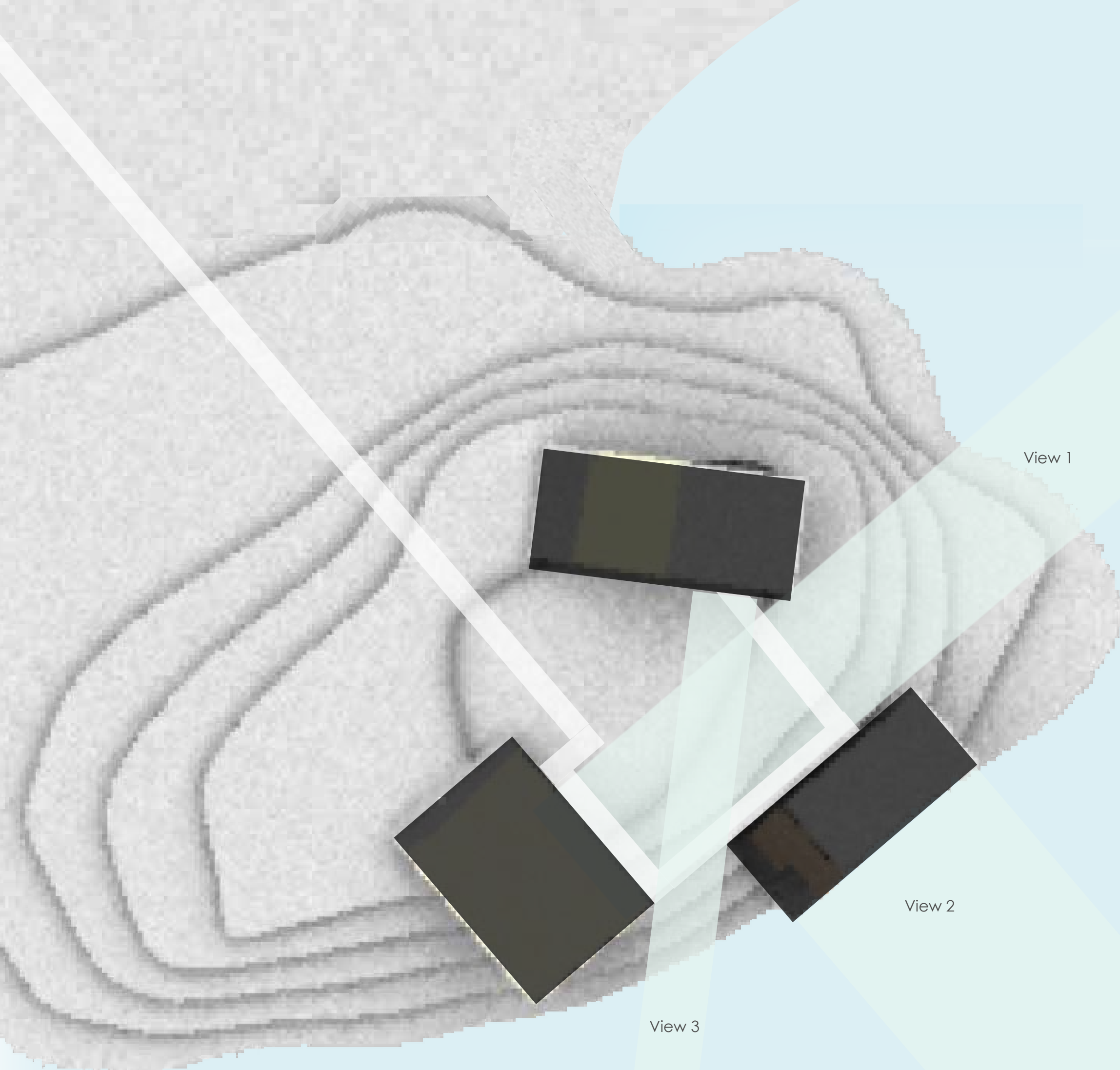
Path to Sauna  
Scale 1:200

Pathway concept is integrated seamlessly into Sauna design. Both are separated into three distinct experiences which are located and orientated based on views and topography



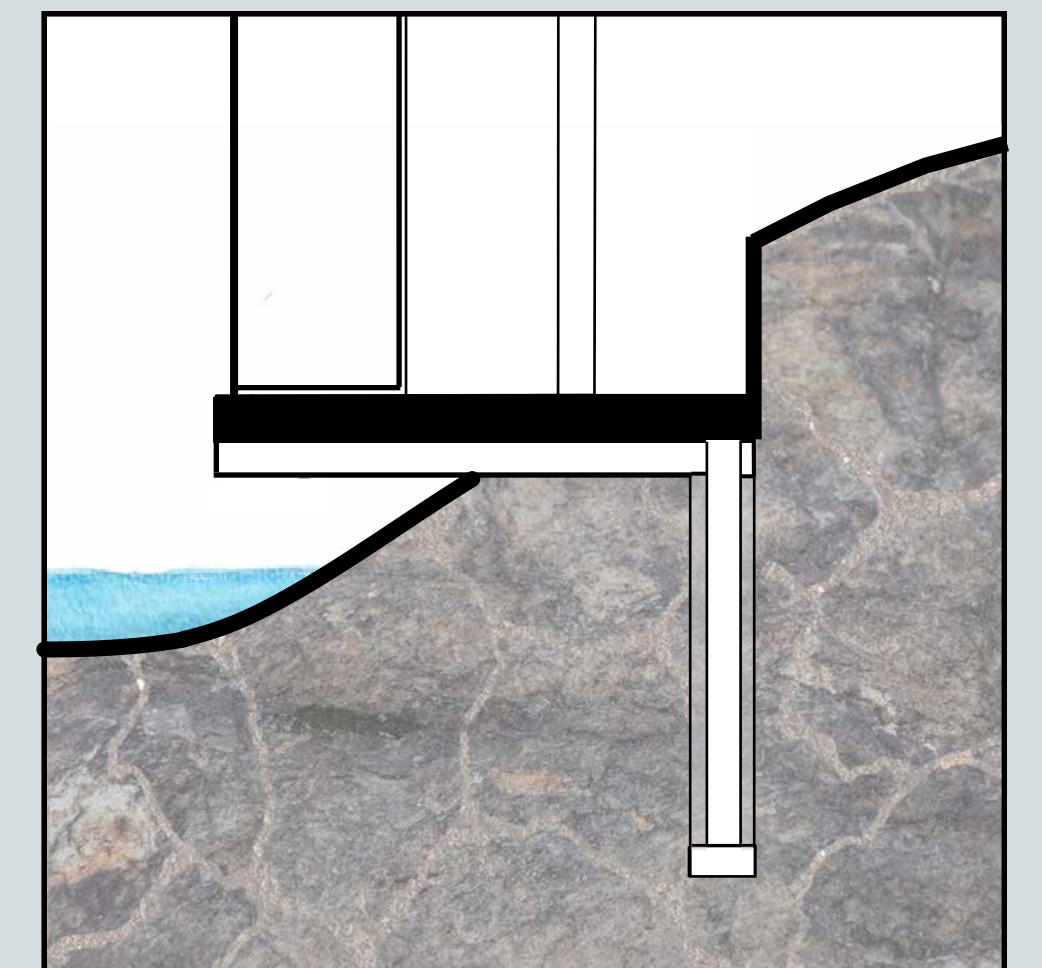
## Vignettes

First imagined moments of sauna. Special emphasis on qualities of space, material and atmosphere.

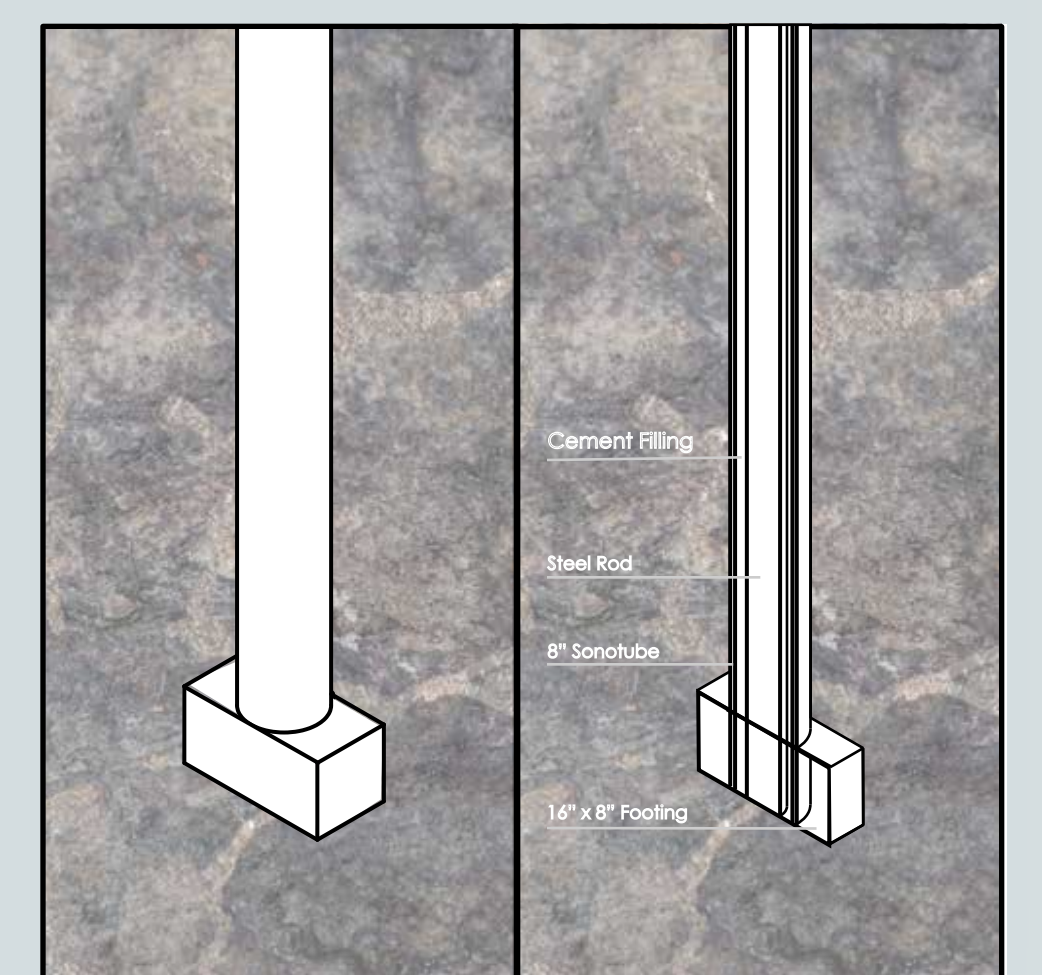


## Figure Ground

Diagram to show orientation of buildings based on views and path of occupant

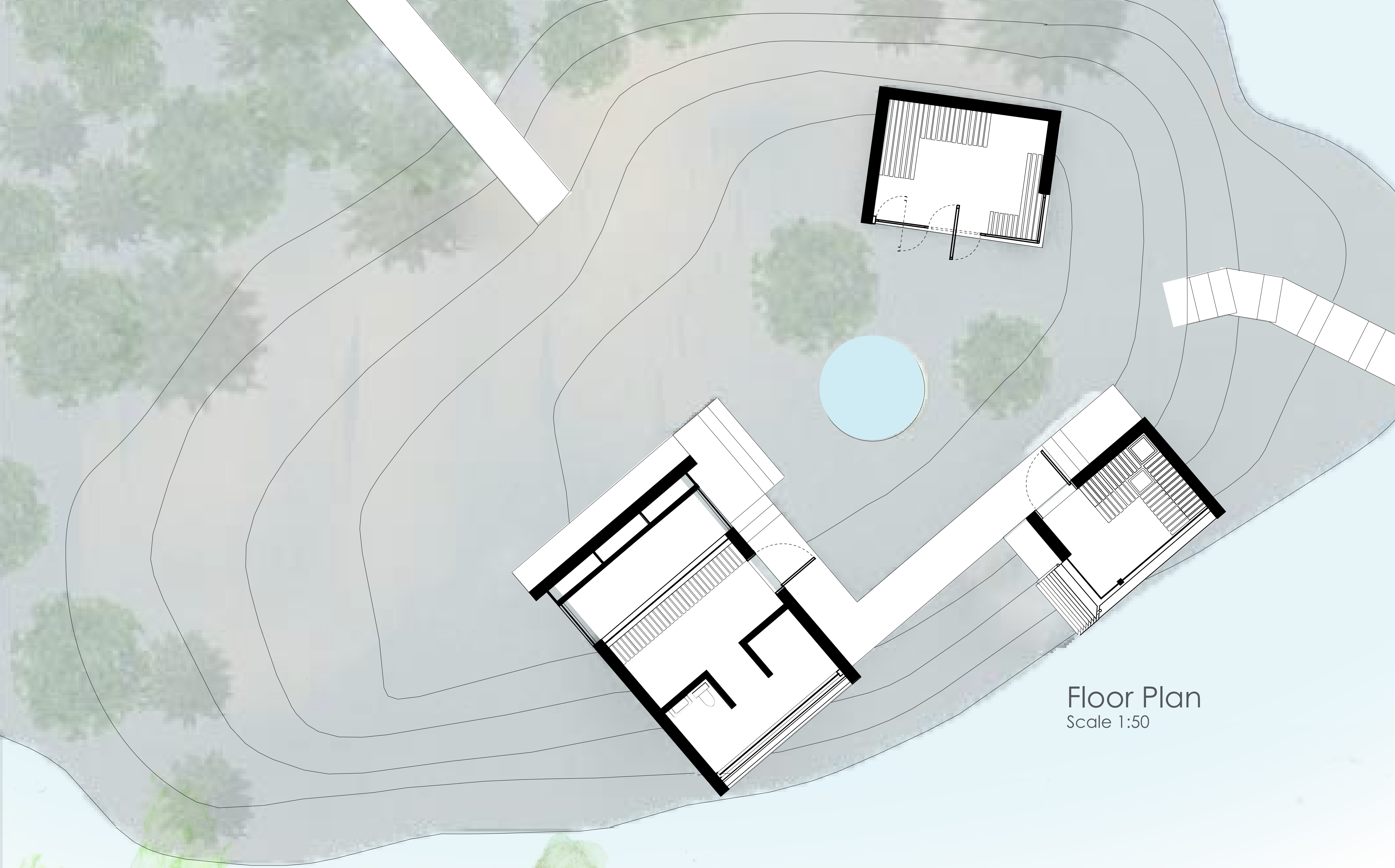


Ground Connection  
Section Through Sauna  
Scale 1:100

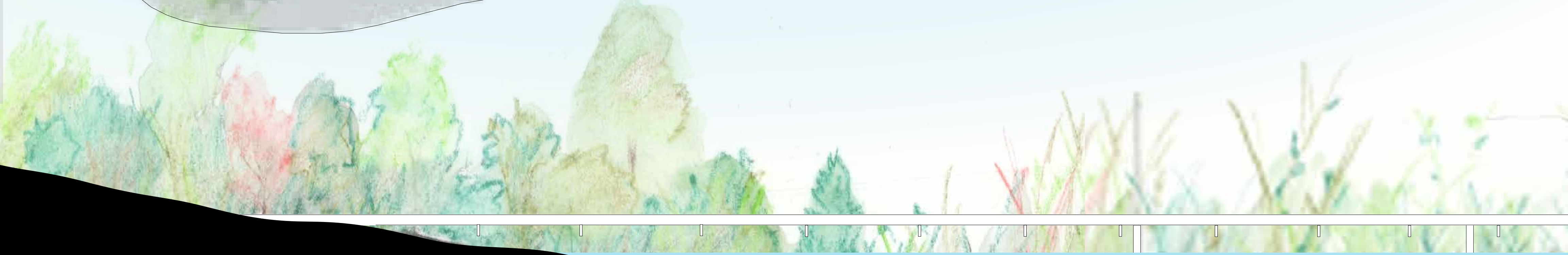


Ground Connection Detail  
Scale 1:100

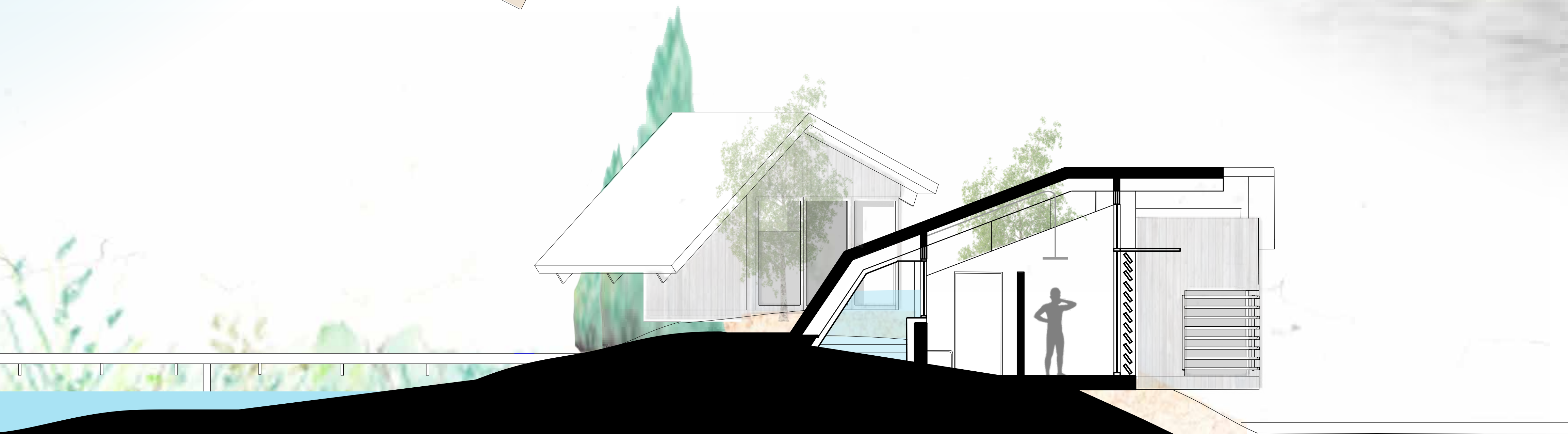




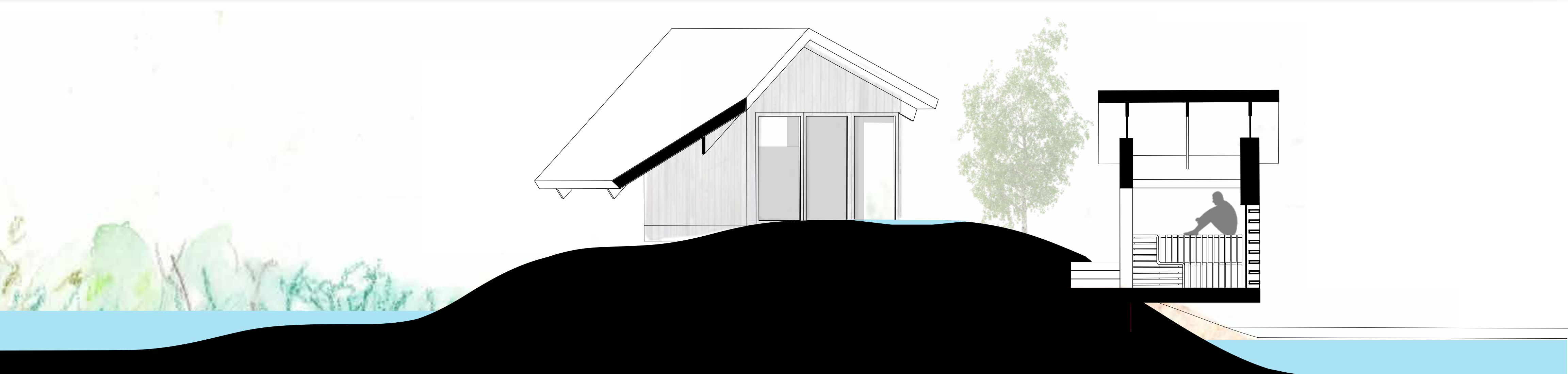
Floor Plan  
Scale 1:50







Section Through Change Room  
Scale 1:50



Section Through Sauna  
Scale 1:50



Section Through  
Contemplation Space  
Scale 1:50





Exterior Render from Water



Interior Render: Change Room



Interior Render: Sauna



# Passive Design Integration

## Bennett Lake Sauna

Teresa Duffy

Figure 1.1

- 1 0.5 Ground Increments
- 2 Winter Sun Path (Dec. 21 Solstice)
- 3 Summer Sun Path (Jun. 21 Solstice)
- 4 Blocked Sun Path
- 5 Summer Sunrise (4:31 am, Solar Time)
- 6 Summer Sunset (8:21 pm, Solar Time)
- 7 Winter Sunrise (8:04 am, Solar Time)
- 8 Winter Sunset (4:39 pm, Solar Time)
- 9 Summer Prevailing Winds (South, West)
- 10 Winter Prevailing Winds (North, East)
- 11 Wind Buffer: Trees
- 12 Wind Buffer: Topography
- 13 Enclosed View
- 14 Expansive Views
- 15 Pedestrian Movements

- Coniferous Tree
- Birch Tree
- Deciduous Tree
- Other Vegetation

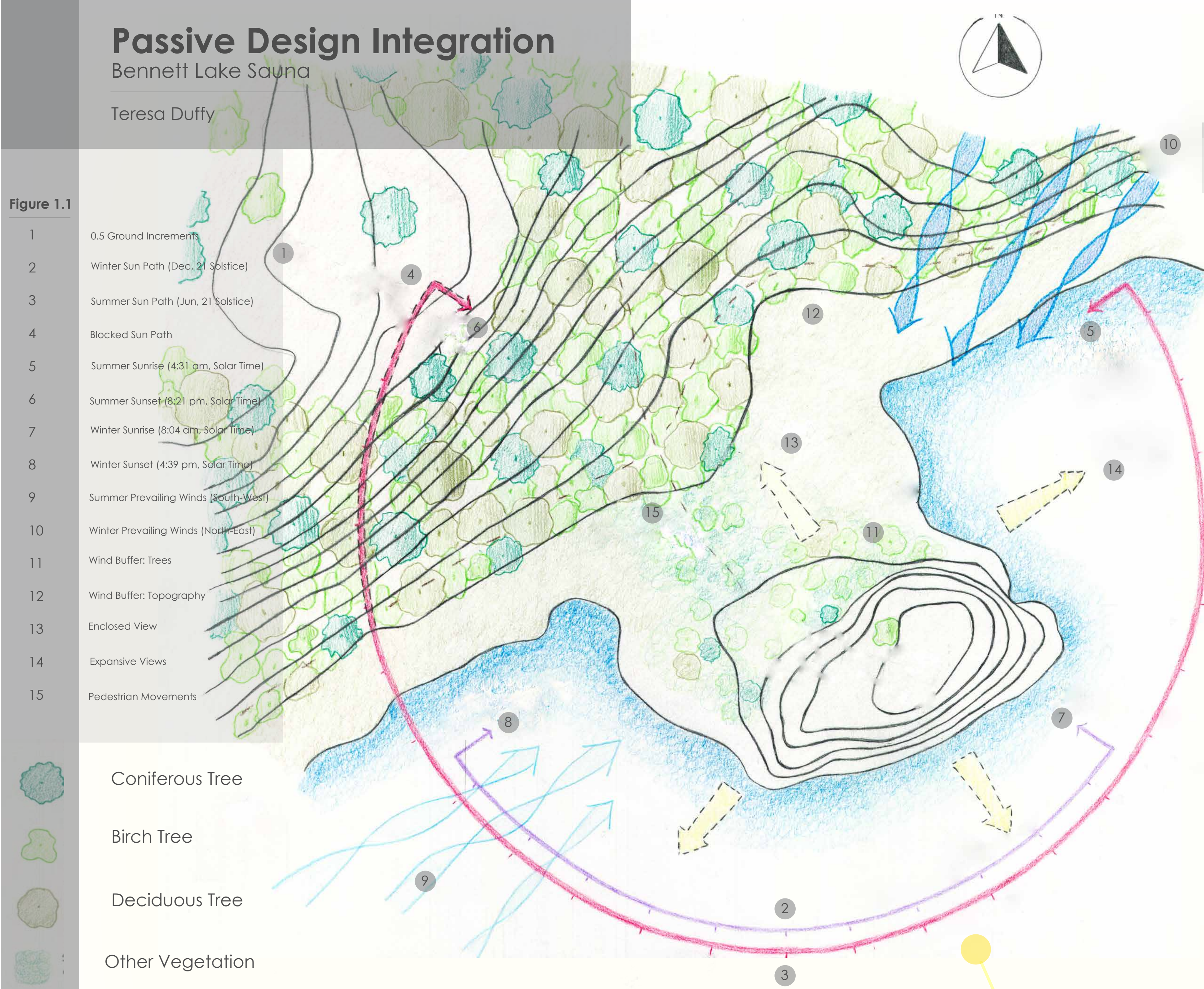


Figure 1.21

10 Year Wind Rose  
Jan 1987 - Dec 1996  
Lat: 46.46° (North)  
Lon: -80.97° (West)  
115 m level (Road Road Tower)

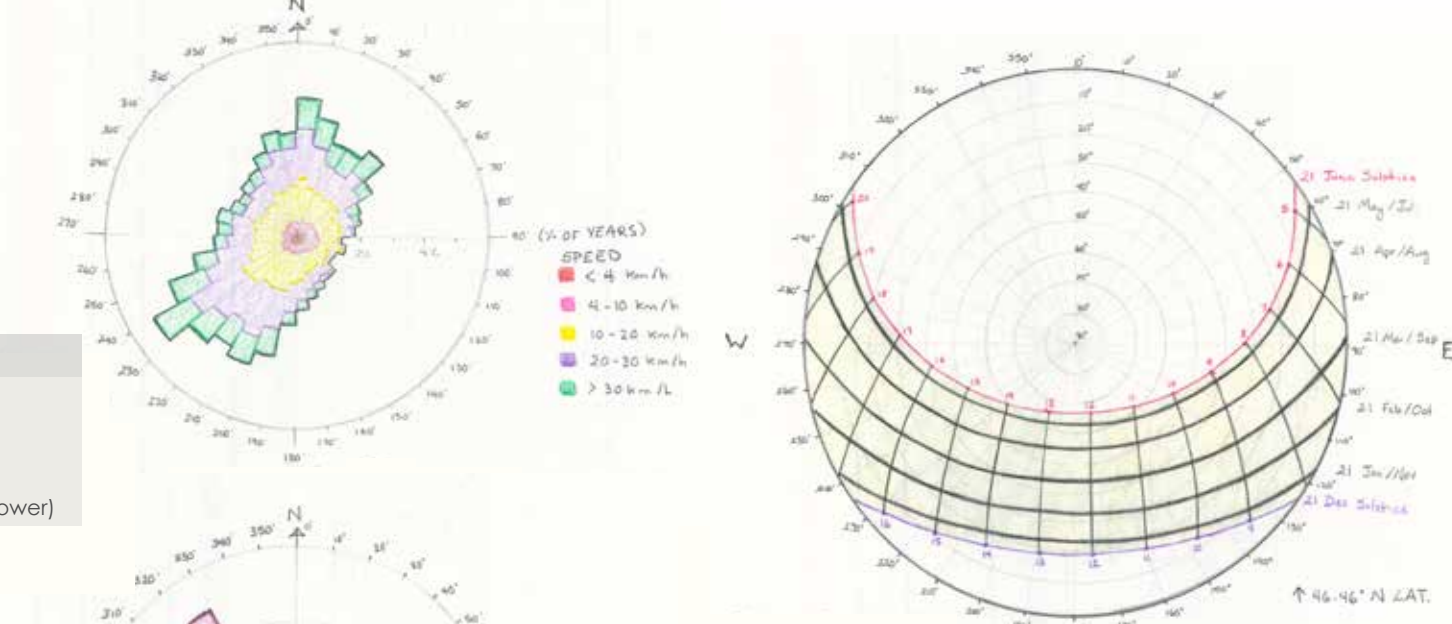


Figure 1.22

Monthly Wind Rose  
June, 2019  
Lat: 46.46° (North)  
Lon: -80.97° (West)  
Data Collected from Environment Canada

Figure 1.23

Monthly Wind Rose  
Dec, 2019  
Lat: 46.46° (North)  
Lon: -80.97° (West)  
Data Collected from Environment Canada

Figure 1.31

Sun Path Diagram  
Lat: 46.46° (North)

Figure 1.32

Elevation and Azimuth on North Site Section  
Lat: 46.46° (North)

Figure 1.41

Shadow Diagram: June 21  
Lat: 46.46° (North)

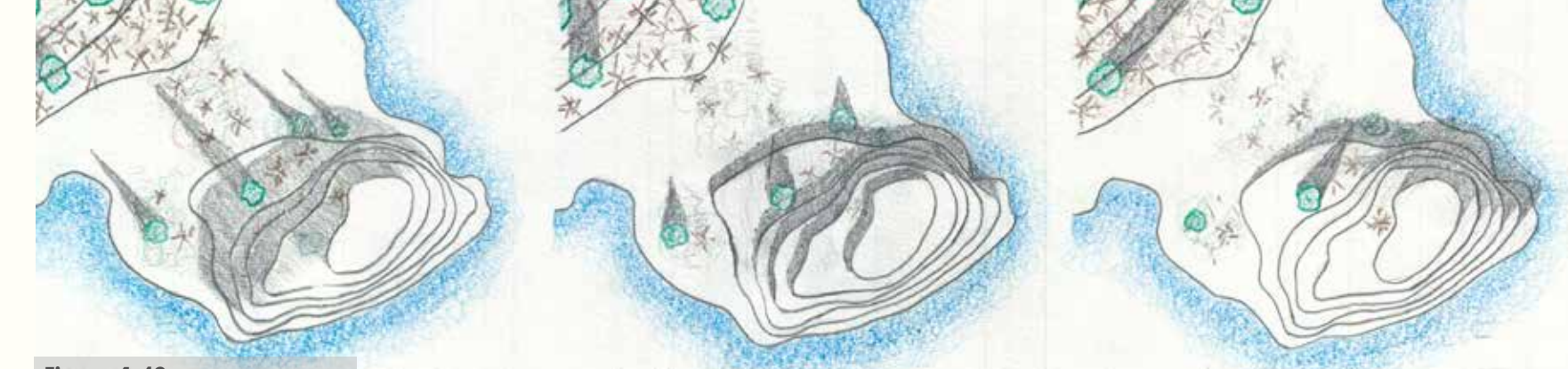


Figure 1.42

Shadow Diagram: Dec 21  
Lat: 46.46° (North)



Figure 2.4

Exterior View of Sauna



Figure 2.5

Floor Plan on Sauna  
1: Change Room  
2: Sauna  
3: Contemplation Space

Figure 2.1

Vegetation as Wind Blocks

Figure 2.21

Vegetation as Sun Block  
Deciduous tree: Summer

Figure 2.22

Vegetation as Sun Block  
Deciduous tree: Winter

Figure 2.31

Summer Sun and Ventilation

Figure 2.32

Winter Sun

Figure 3.1

Sun Block Detail  
Louvers and Light Shelf

Figure 3.2

Closed Blade Detail

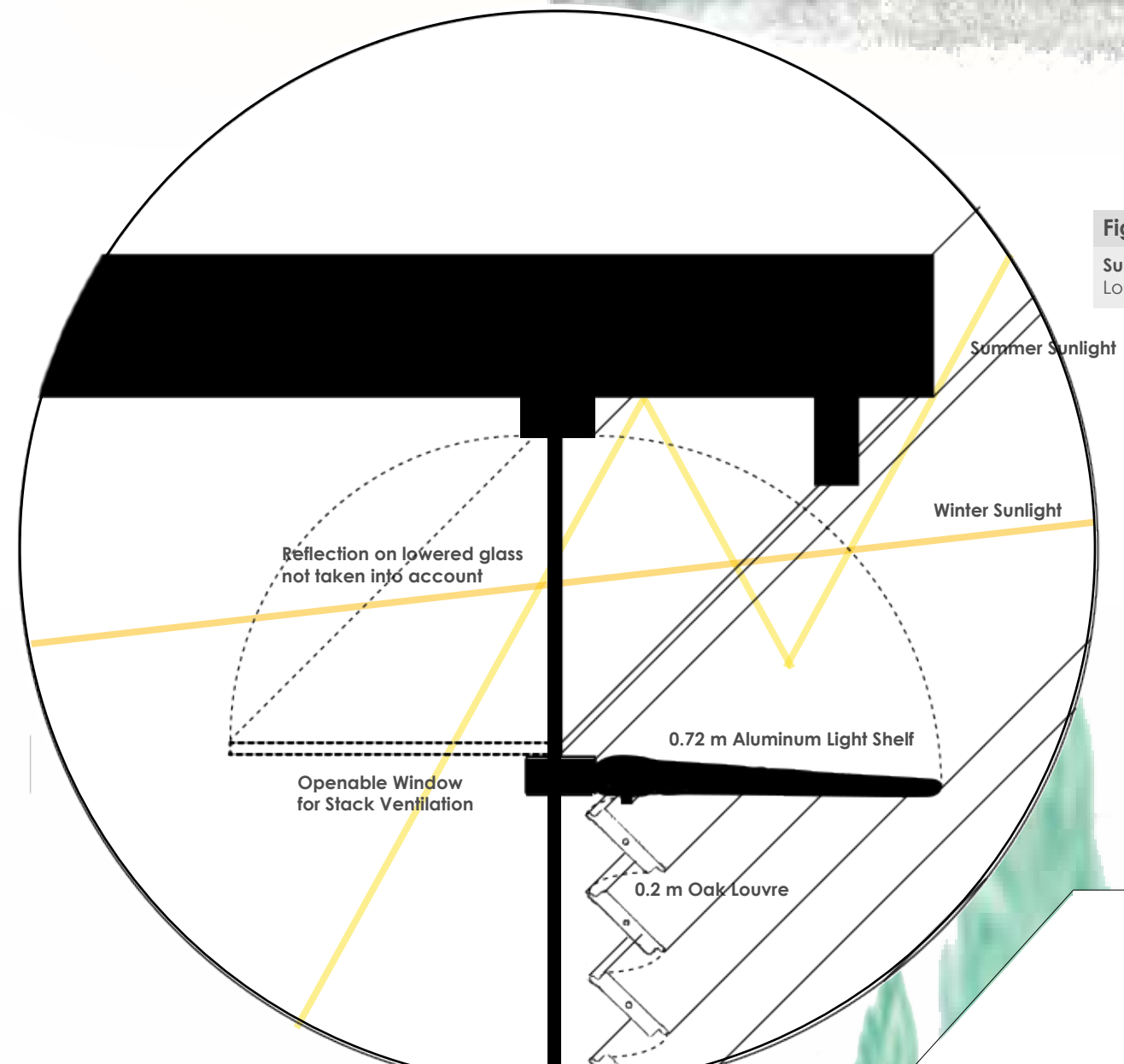


Figure 4.11

Solar Shading and Natural Ventilation due to Site and Landscape  
North-East Section: June 21, 11am

- Contemplation Space
  - Entrance/Change Room
  - Sauna
- 1 Changing Space
  - 2 Shower
  - 3 Lower Wall Vent: Used to capture cool air from courtyard
  - 4 Floor vent: Used to facilitate air cooled by the waterbody
  - 5 Air Movement: Cool air entering from floor and lower wall vent displaces warm air to the top of the space
  - 6 Sun Angle: Sun angle shown at 13° azimuth due to the building's 45° orientation. This azimuth occurs at 11am, June 21. The elevation of the sun at this time is 61.25°.
  - 7 Light Shelf: Shelf used to bounce light into space when louvers are closed. Can be adjusted to suit the sun's angle.
  - 8 Horizontal Louvers on Shower Space: Manually adjustable louvers toward the South-East to block light at all times of the day. Also used for privacy for the occupant.
  - 9 Vertical Louvers on Sauna: Manually adjustable louvers toward the South-West to block light at all times of the day.
  - 10 Horizontal Louvers on Sauna: Manually adjustable louvers toward the South-East to block light at all times of the day.

Figure 4.21

Site and Landscape: South-West Isometric View of Sauna

- 1 Wind Block: Coniferous trees
- 2 Winter Prevailing Winds: Redirected due to coniferous tree block. Reduces wind velocity up to twenty times height of windbreak.
- 3 Microclimate: Courtyard microclimate due to coniferous tree wind and evapotranspiration of vegetation
- 4 Summer Prevailing Winds: Summer winds travel through courtyard and are cooled as they pass over shaded ground and small reflective pool

Figure 4.12

Solar Shading and Natural Ventilation due to Site and Landscape  
North-East Section: Dec 21, 9am

- Contemplation Space
  - Entrance/Change Room
  - Sauna
- 1 Changing Space
  - 2 Shower
  - 3 Sun Angle: Sun angle shown at 13° azimuth due to the building's 45° orientation. This azimuth occurs at 9am, Dec 21. The elevation of the sun at this time is 6.55°.
  - 4 Light Shelf: Shelf used to bounce extra light into the space. Can be adjusted to suit the sun's angle.
  - 5 Horizontal Louvers on Shower Space: Manually adjustable louvers toward the South-East can be adjusted to the same angle to allow in as much light as possible.
  - 6 Vertical Louvers on Sauna: Manually adjustable louvers can be adjusted to let in the winter sun.
  - 7 Horizontal Louvers on Shower Sauna: Manually adjustable louvers toward the South-East can be adjusted to the same angle to allow in as much light as possible.
  - 8 Closed Floor Vent

Figure 4.22

Site and Landscape as Passive Cooling  
Summer

- 1 Vegetative Shading: Summer winds travel through courtyard and are cooled as they pass over ground by vegetation
- 2 Vegetative Shading and Evapotranspiration: Summer winds travel through courtyard and are cooled as they pass over ground by vegetation. Evapotranspiration further cools the air, creating a cool microclimate in the courtyard
- 3 Waterbodies: Reflective pool, consisting of collected rainwater, further cools the air in the courtyard
- 4 Cross Ventilation: The cool air created in the courtyard, sinks into the lower sauna. Cross ventilation pushes this cool air through.

