

ISKATEWIZAAGEGAN

Work from the Faculty of Architecture,
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Design is a Story

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"All that we are is story. From the moment we are born to the time we continue on our spirit journey; we are involved in the creation of the story of our time here. It is what we arrive with. It is all we leave behind. We are not the things we accumulate. We are not the things we deem important. We are story. All of us. What comes to matter then is the creation of the best possible story we can while we're here; you, me, us, together. When we can do that and we take the time to share those stories with each other, we get bigger inside, we see each other, we recognize our kinship – we change the world, one story at a time..." - Richard Wagames: *One Story, One Song*

When you think about it, design as a verb is a gathering of stories assembled together in a unique way ultimately becoming a place to make new stories, and a place to tell old. The design process is a conversation between people, land and our imagination and it is through these conversations that meaningful relationships are formed. The setting for this body of work is Iskatewizaagegan, an Indigenous community situated on scenic shores of Shoal Lake, located approximately 150 Kilometers east of Winnipeg. Students worked with community members to creatively develop a place that celebrates the land and shares culture within the context of the Canadian Shield.

Our visits to the community always started off by sharing a meal together. We all contributed something towards feast, but no matter what was on the table there was always hamburger soup

keeping warm on the stove. During the feast we talked and often with laughter, our conversations centred around the land, where we were from, current projects in the community, hockey and family. At the time these stories seemed just like regular old conversations, but they were much more than that. Listening and sharing stories together grounded and became the foundation for the work.

After we finished eating, we would typically head off on a tour. The most memorable for many was a ride down the winter road to a land-based education camp. Only a handful of students would have been on a winter road before, so it was remarkable to see the excitement and worry on their faces while they listened to the ice crack beneath the vehicle on our way to the camp. At the camp we gathered and listened to stories about the trapline and other land-based traditions. We recognized how important this camp was for the youth and the community, it was a place to pass down knowledge and a place to tell and make stories.

As Wagamese mentions in the quote, all we are is story, and when we take the time to share stories, we get bigger inside, we recognize our kinship. This body of work reflects the stories we listened to and the new ones that were made; design is story. Thank you, Chief Gerald Lewis, Councillor James Mandamin and Delores Day, for welcoming us into your community and sharing your story with us. We are very thankful and humbled by the hospitality and gifts we received. - SB



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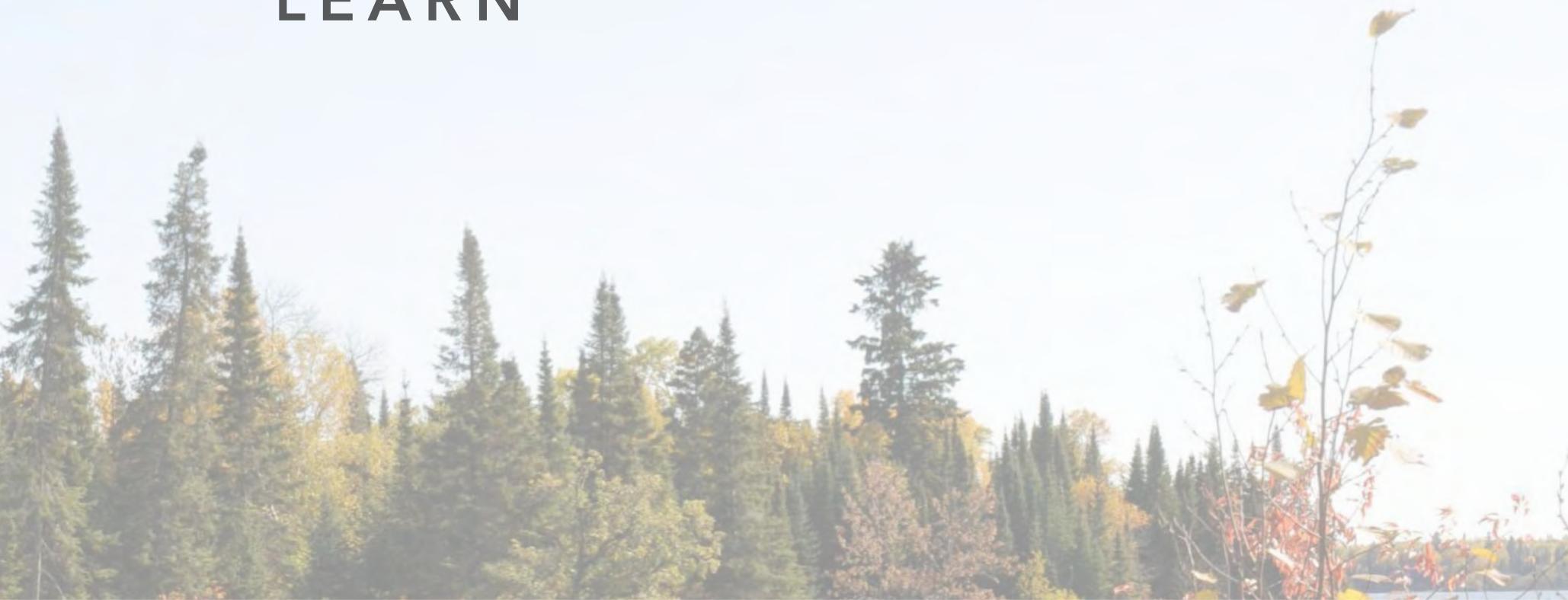
***"GIKENDAAS"* - to learn**

Answers to design problems are often about bringing together functional fit (what works in a place and systems) with sincere intentions and thoughtful considerations (doing the right thing) and human desires (being open to others and to one's self). Design learning often requires an integrated approach, an approach that is inclusive, i.e., being rigorous while bringing many kinds of inquiry to bear. This means that we are concerned with subjective/interpretive truths and objective/empirical truths.



GIKENDAAS

LEARN



When we are dealing with the subjective/interpretive, we are concerned with deep human concerns, about our connections with nature and with others, with the ways that we construct meaning and the ways that we reveal and share our individual feelings and collective understandings. The search for subjective/interpretive truth is about developing one's sense of sincerity, integrity and trustworthiness. This is about looking honestly into one's self, into how one understands their place in the world, and one's own sense of environmental aesthetics. It is also about trying to do the "right" thing, about justness and honesty. This is about being open to the ideas and desires of others, of seeking mutual understanding, of looking carefully for cultural fit, while seeking answers that are morally good and socially and ecologically acceptable.

When we are dealing with the objective/empirical, we are concerned with the physical world and its many subtle workings. To do this we often frame our inquiry by looking at specific aspects of place. To do this we devise different representations of the world (maybe models,

simulations or even ecological metaphors). In a scientific setting one would look for correspondence between representations and real-world measurable facts or events (data). But designers are less interested in "what is" and more interested in "what could be", and correspondence is often less about describing something that exists and more about predicting what something might be or how something might emerge. When we describe the world using predictive strategies, we often see the world in complex interconnected ways, as natural interconnected webs and social system meshes.

Design is about navigating and integrating different types of truth. It is about being open to different kinds of truth, about deciding which are most relevant to the problem at hand, and seriously engaging in the necessary forms of inquiry. We are not seeking the "right" answer, recognizing that there may be many, rather we are seeking the "best fit" for the carefully selected forms of inquiry. - RP

LEARNING THROUGH DRAWING

Corrine Dimaria (ED4 Landscape Architecture & Urbanism)



Design does not happen by chance. It is the process of methodically unravelling and solving a problem through a, often undetermined, number of steps. Design isn't a linear process. It is a recursive activity that involves complications, unforeseen setbacks, and confusion. There are so many possible factors and scenarios to account for, and not every single one will be brainstormed, or be taken into consideration. Thus, a solution reached is not often the end of a design process, or even fully correct given current circumstances.

Stages of designing involve learning about the contexts, understanding place, choosing paths that on the one hand pose restrictions while at the same time allow for possibilities, understanding that parameters can be used to reveal potentials, and allowing one's self to actively brainstorm (to freely explore ideas). An invaluable way to do this is through drawing. Why? It's uncomplicated. Anyone can reasonably do it. There is no special software or machinery needed, or to wait upon to load up to use. It is quick, and can be done with just about anything that leaves a mark on whatever is around: paper, napkins, last night's late ordered pizza box.

Drawing is multiversal, it allows many possibilities to coexist at the same time, which is why it's often employed in the early stages. Quick and convenient expressions of ideas and revisions make it invaluable. In landscape architecture, it also has a certain way of capturing the more natural qualities and irregularities that exist in the environment. Computer drawings and 3D renderings usually omit these in favour of unnaturally straight lines, angles, and forms, producing images that seem almost too clean and sterilized to capture the essence of the natural landscape. In hand drawings, the eye and mind capture and realize the importance of landscapes' naturally wavy, jagged, crooked and skewed forms, and then replicates it where 1's and 0's can't due to algorithms that erase imperfections in shapes. These so called imperfections are often what makes something unique, difference is what distinguishes the living landscape from other forms of design.

In terms of the project shown in the next few pages, this method of designing and recording has also shown itself to be a very practical way to learn about a landscape's context and how designs fit into it. It reveals many hidden aspects in that area or that can occur as consequences by an intervention. This project will outline learning usefulness that can occur through the art of drawing, and explain how one can also utilize it.



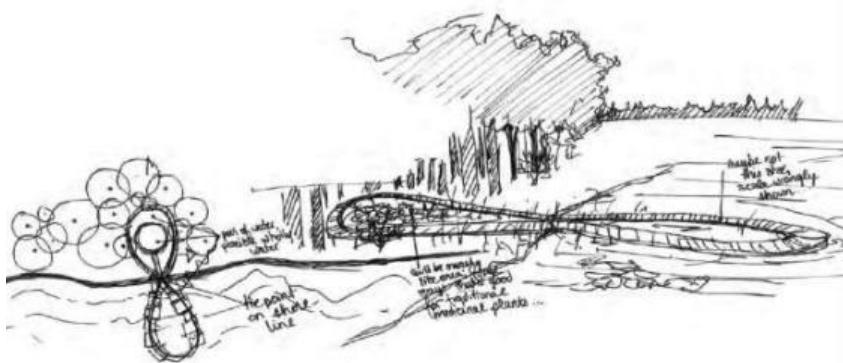
Left column: site pictures from both late fall and winter. Right column: pulling the main details out of each and beginning to brainstorm some general ideas and applying them to the area.

Initial Stages

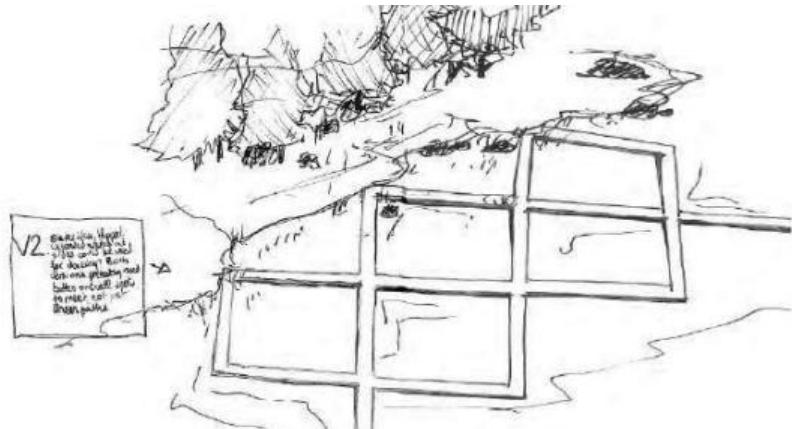
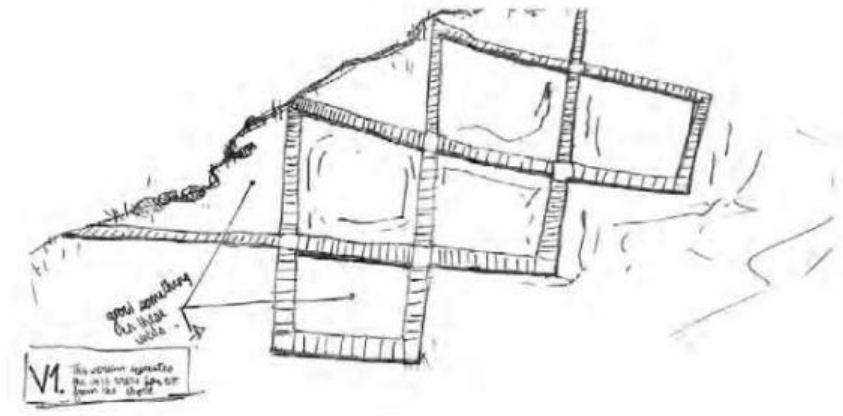
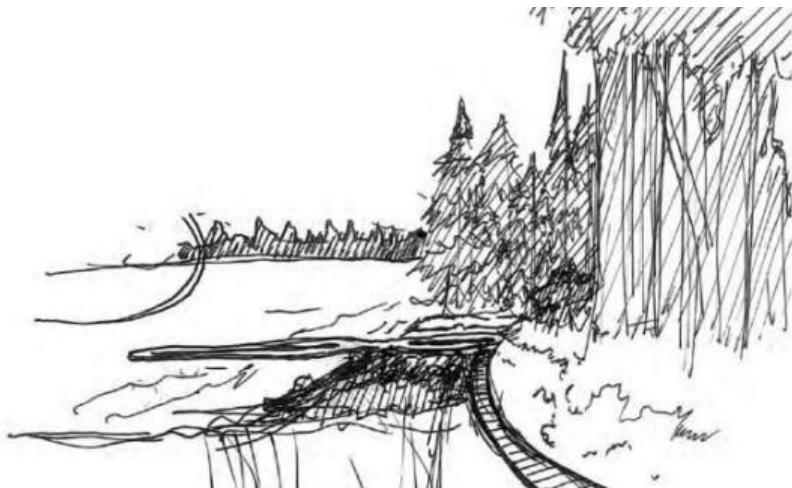
In any form of designing, and in beginning to learn through drawing in general, it is first important to define what it is you're looking to understand. In the case of the landscape architecture project of this entire chapter section, it is about wanting to understand and learn about the transition zone between land and water and its place within the natural context. This is because the ensuing design is about bridging methods or ways to lead between the two realms smoothly, in terms of sequential experiences.

After defining the scenario, the next step is to understand what the natural parameters are that underly the landscape being studied or designing for. For this, a visual analysis of your context is needed. Here, you look at the details that make it up and how they play into each other. The pictures on the left is the context that the design is working in and with, for the personal project the rocks and vegetation of the shore line area, the banks, water levels and water depths, and the trees.

Once your visual analysis is done, begin to illustrate any ideas, scenarios or details that come across your mind without over analyzing each one that becomes finished on the paper. No touch-ups. This stage is merely about trying to release these thoughts so that you do not dwell and over analyze them, as this inhibits further learning as no real progression of sorting through the scenario is made.



Trying to figure out ways to get from land to water on structure that is not simply a straight line, and can offer different views and experience throughout.



Analyzing

The first analyzing stage, is where you'll look back on all of the explorations you put down up to the point of running out of ideas, and mildly pick apart the more major details of them. You'll look for the more major things in common and in differences: themes, shapes, colours (if applicable), etc. Why are they all alike/different? Why did you do them? What conclusions does it give you so far? Thinking about the environmental contexts, what might be impacts that could happen, from a human and landscape perspective? In this early stage, nothing has to be very strictly explained, but whatever is learnt should be the next step off of which you progress your visual learning through. Conclusions that were made at this level of the design included:

grounding the bridge structures into the lake bed, realizing that platforms were very visually obtrusive, realizing a preference for natural materials like stone or wood, and that large structures could have made large and damaging impacts on the marshy transition environment between deep lake water to the shore. The project approach is meant to be more sensitive to the environment than that as it should , so later designs see using very linear and narrow boardwalk-like forms. Some renditions see them literally spanning from land over water (top), or expand to deeper waters. What is to be considered next thus involves needing to know what exactly lives in the water, and the underwater and marsh-like area.

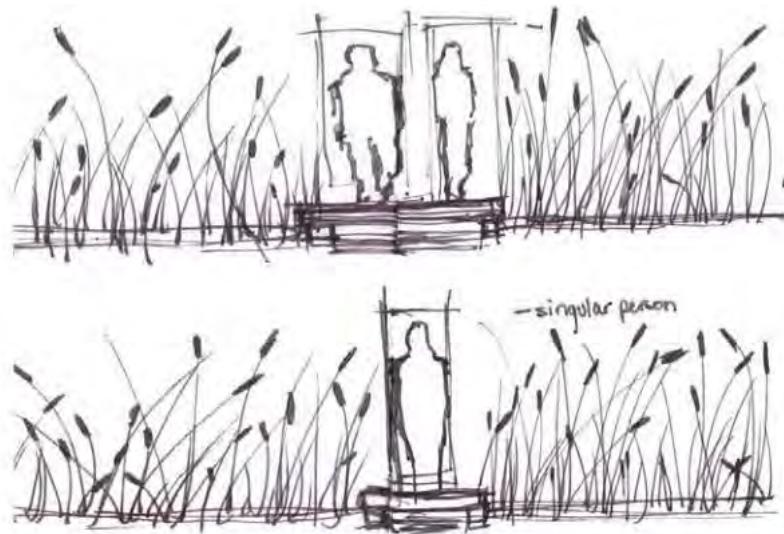
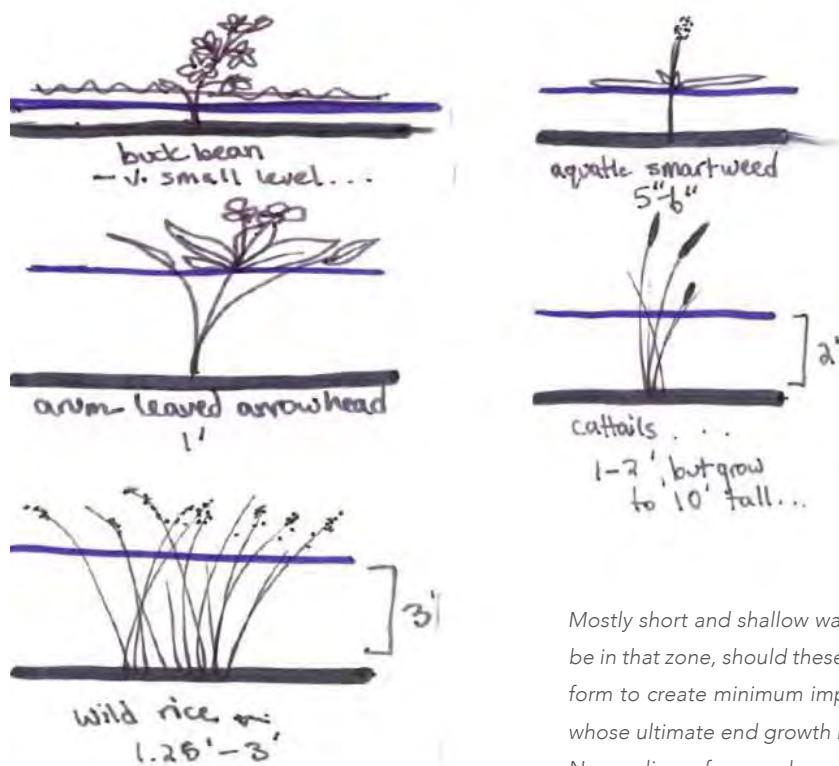
Refining and Further Explorations

Details are, at this stage, developed that are relevant to your understanding of the landscape and its ecology. What makes up a place, what lives there and how the systems work, should be looked upon and taken into consideration as closely as possible. This can help guide the direction of your understanding and consequently future explorations.

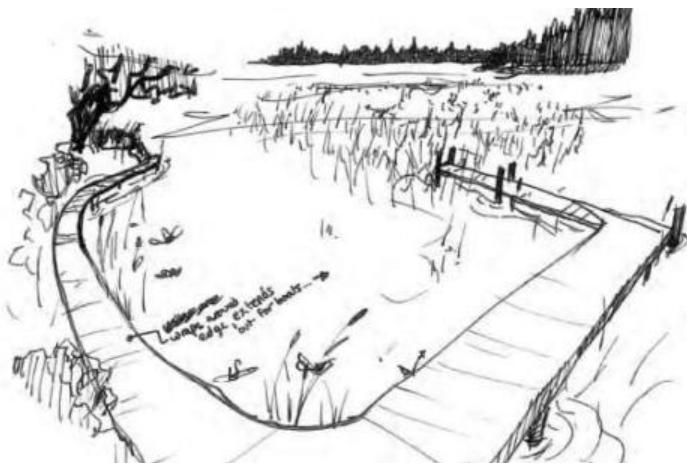
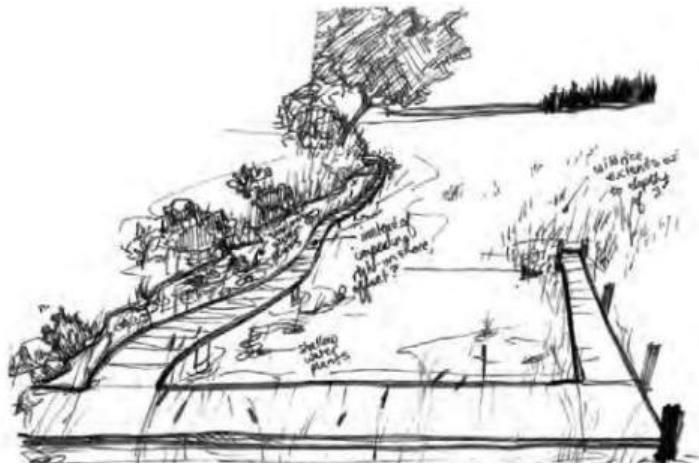
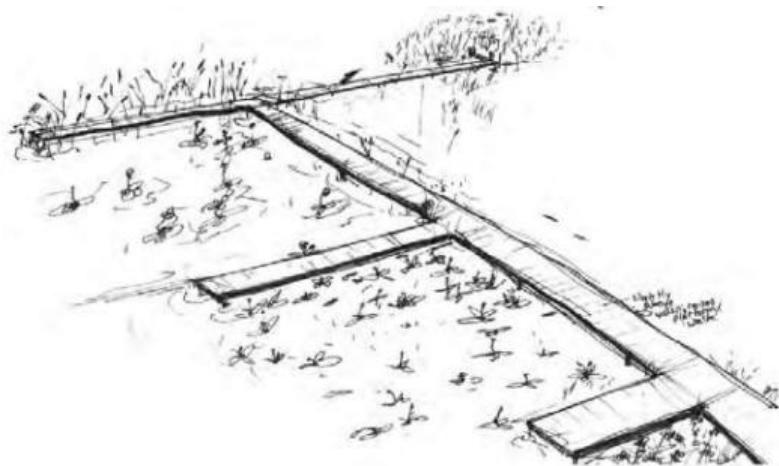
In this study this project guiding details are responding to the aquatic vegetation that can be rife in the marsh zone. It is important to take into account the marsh ecology in making that seamless experiential route from the land to water because they are part of the visual experience, and are highly sensitive to design interventions. Subsequently, the new renditions of the design have no enclosing forms (as this inhibits species movement), no broad, deck-like structures so as to continue to allow the most amount of sunlight possible to keep reaching the shallow waters

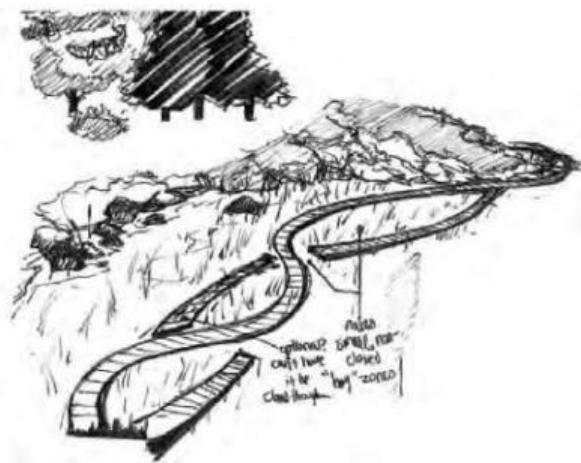
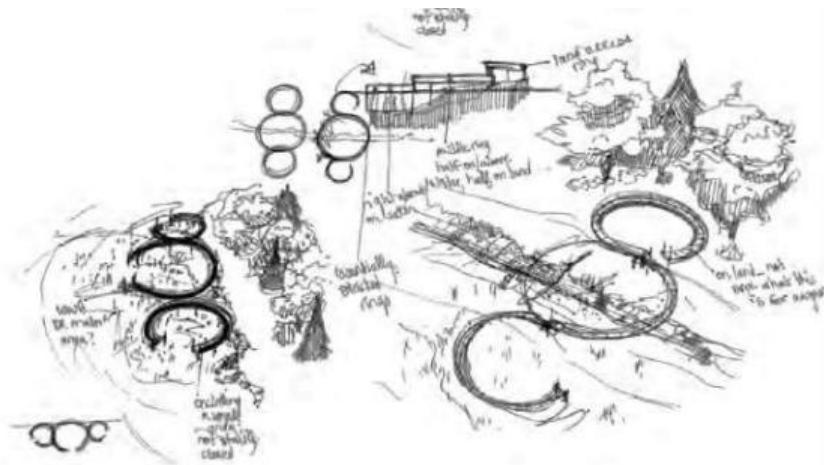
to help plants grow, narrow forms for two users at maximum (minimum human presence in the zone all at once), larger expansion of going through the marshy zone (as it holds the largest variety of aquatic plants which may also be harvested) and extensions that lead to deeper waters for plants like cattails and wild rice. More concentration is later found to be needed on the direct land-to-shoreline transition, and the marsh-to-deep-waters part of a structure needs to stay practical, as well as visually engaging within previously mentioned parameters.

At this point, draw and refine every possible scenario you can think of. Each drawing can give you a little bit more insight on your landscape and how it works or grows, where you previously may have had little before. Also look introspectively at each, and understand what is being said through it. Let this guide the next iteration. Repeat. Take breaks as well.



Mostly short and shallow water growing plants means restriction of having the majority of a plausible water structure to be in that zone, should these plants also be harvested. Extensions to deeper water (shown on right) keep a very narrow form to create minimum impact on the environment. Cattails, whose habitat is in zones of about 1' to 2.5' of water and whose ultimate end growth height can be upwards of 10' tall, creates a slight enclosing effect when going through them. Narrow linear forms enhances this effect for a quiet and peaceful experience.





Think and Reflect

Necessary learnt and self-imposed guidelines include: narrow form; offering multiple experiences of landscape; accessibility from land; to marsh-transition zone; to deep water for docks and boating; least amount of impact on environment as possible; no species restricting; enclosing shapes or forms; no more wide sun-blocking platforms; structure to be situated just slightly above water on supports that do least amount of damage to soil structures; material choice favors wood; docking area to be far enough away from newly emerging marsh zone to prevent damage from potential motorboats; choosing practicality over aesthetics; deciding to be pragmatic over conceptual; limit ramps and steps because of shoreline conditions of steep slopes and unstable soils high probability

of causing injury; winding forms should not be overdone; simple linear forms are preferred. There will come a point in your drawing quest where there is not much information left to seek or understand, or ideas to refine, inspiration left, or possibilities to take. Drawing to understand or design something always has its limit; it's not infinite, and there will eventually come a point when one has to know where and what that is, and to accept it. It will vary in each situation: maybe when proper solutions are found, whole pictures are made, ideas are spent. At this point, put down your pencil, pen, marker, tablet - take the information learnt, designs sketched, new understandings found, and reflect on them.

MEDICINAL PLANTS

Yunge Zhang (ED4 Landscape Architecture & Urbanism)



Shoal Lake N.39

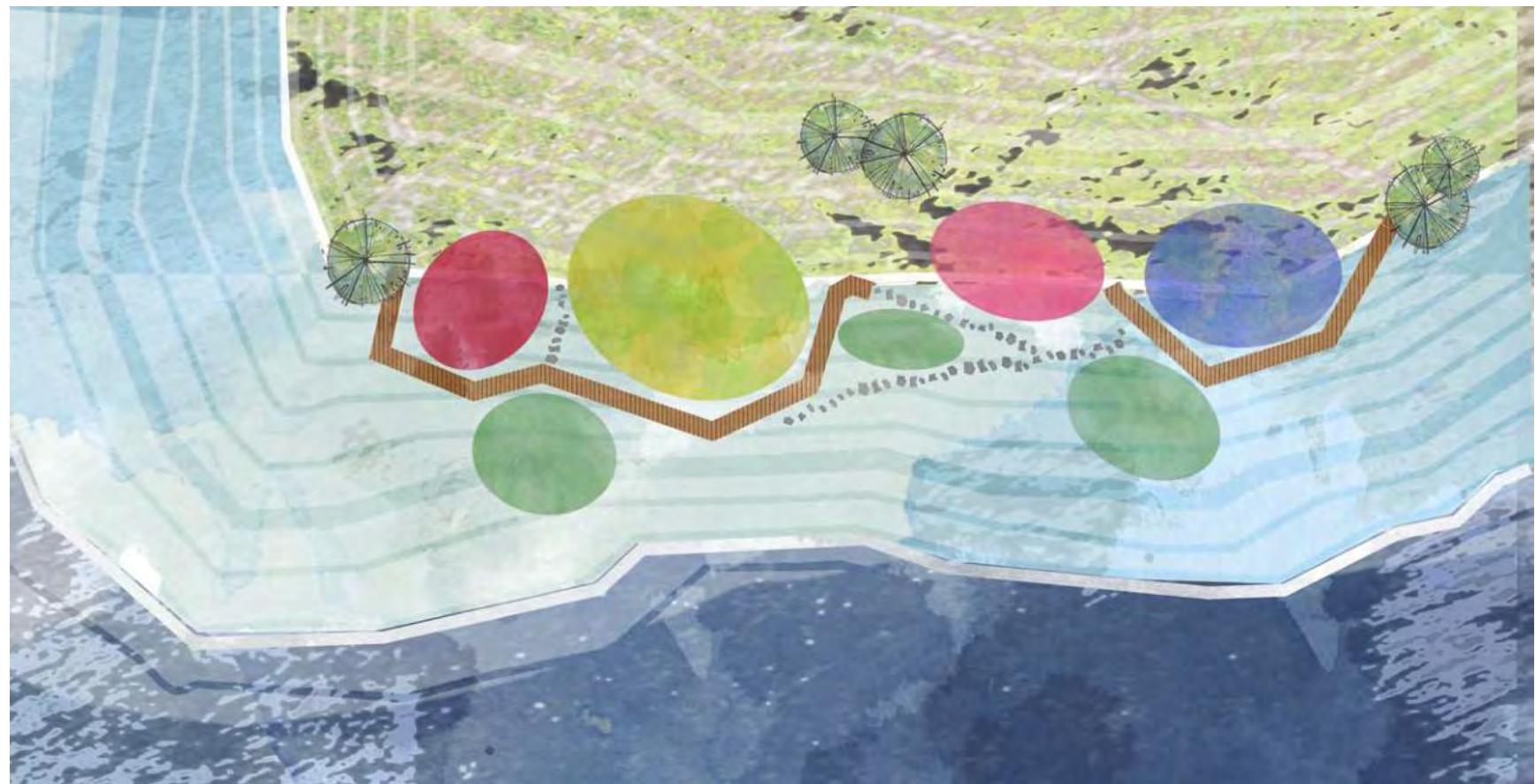
Collage of Envisioning the Future of Shoal Lake Marsh Areas

"Study nature, love nature, stay close to nature. It will never fail you" - Frank Lloyd Wright.

Color, scent, and texture are critical elements of landscapes to further understand its processes, elements that can be showcased in designs. Shoal Lake 39 provides the opportunity for visitors to walk through the space to learn and appreciate the traditional knowledge of medicinal plants. The visitors are provided with education and sensorial experience, giving them a sense of place. Designing medicinal gardens offers children and other users opportunities to recognize, understand, and use on-site plants for different healing

processes. Identifying the many types of medicinal plants along with their corresponding habitats and uses allows the community to further celebrate the treasure of nature. Interpretations of wetland systems are based on long-term observed evidence and play a significant role in the physical healing of human bodies. The relationship between people and the land is significant, it should be interconnected and mutual; both giving back to each other equally. Showcasing natural processes and traditional knowledge will leave visitors and the community with a stronger understanding of Shoal Lake's landscape and its unique identity.

Design Possibilities



Design Plan of Medicinal Plants Garden at Wetland Area of Shoal Lake N.39

Plant Zone Legend:



Section A Marsh Garden from Zone 1 to Zone 4 [] 4m



Section B Marsh Garden from Zone 5 to Zone 6 [] 4m

Medicinal Plants and Habitats¹

Rosa acicularis

1 Wild Rose

0.9m-2.1m

Bloom Color: White , Pink

Bloom Time: June , July

Use: A decoction of the root is used as a cough remedy. An infusion of the roots is used as a wash for sore eyes.

Epilobium angustifolium L.

2 Fireweed

0.3m-1.82m

Bloom Color: Pink

Bloom Time: June to September

Use: externally as a medicine against eczema, and fishing nets.

Chimaphila umbellata

3 Pipsissewa

0.1m-0.4m

Bloom Color: White , Pink

Bloom Time: June - August

Use: An infusion is used to treat the urinary system, kidney stones and gonorrhoea.

Asclepias syriaca

4 Milkweed

0.6m-0.9m

Bloom Description: pinkish-purple

Bloom Time: June to August

Use: The leaves and/or the latex are used for treating cancer and tumours. The milky latex is used in the treatment of warts.

Panax quinquefolius

5 American Ginseng

0.3m-0.7m

Bloom Color:yellowish-green to greenish-white

Bloom Time: June - July

Use: Against depression, anxiety, general fatigue and chronic fatigue syndrome for boosting the immune system.

Allium cernuum

6 Wild Onion, Nodding

0.3m-0.5m

Bloom Color:pink to lilac pink

Bloom Time: June to August

Use: In treating colds, croup, sore throats etc. A poultice of the plant is applied externally to various infections such as sore throats, sores, swellings.

Arctium minus Bernh

7 Burdock

1.5m-1.8m

Bloom Color:pink to lavender

Bloom Time: July to October

Use: In herbal medicine and are effective against skin conditions, infections, and in removing heavy metals from the body.

Ledum groenlandicum

8 Labrador Tea

Attracting butterflies.

0.3m-0.9m

Bloom Color:White

Bloom Time: May to Aug

Use: Against sore throat, chest congestion, coughs, lung infections, diarrhea, kidney problems, joint and muscle pain (rheumatism), headache, and cancer.

Achillea millefolium

9 Yarrow

0.2m-1m

Bloom Color: White , Pink

Bloom Time: April to September

Use: to break a fever by increasing perspiration, to treat hemorrhaging and as a poultice for rashes. Cure stomach disorders by steeping the leaves.

Tanacetum vulgare

10 Tansy, common

0.4m-1.5 m

Bloom Color: Yellow

Bloom Time: July to August

Use: to break a fever by increasing perspiration, to treat hemorrhaging and as a poultice for rashes. To cure stomach disorders was made by steeping the leaves.

Aralia spp.

11 Sarsaparilla

0.3m-0.6m

Bloom Color:blue-black berries

Bloom Time: late May or June

Use: Treating psoriasis and other skin diseases, rheumatoid arthritis (RA), and kidney disease; for increasing urination and sweating.

Linum Lewisii

12 Wild Blue Flax

0.3m-0.9m

Bloom Color: Blue , Purple

Bloom Time: March to September

Use: Eyewash (Kindscher) Boils, poultice of fresh crushed leaves applied to irritated eyes, wash of tobacco and blue flax to improve hair. (Weiner)



Fig.1 Wild Rose



Fig.2 Fireweed



Fig.3 Pipsissewa



Fig.4 Milkweed

Medicinal Plants and Habitats

- ● Polygonatum biflorum
13 Solomon's Seal
Attracting birds , butterflies.
0.3m-0.9m
Bloom Color: pale green to white, yellow and brown.
Bloom Time: March to June
Use: Treating lung disorders, reduce swelling (inflammation), and to dry out tissue and draw it together.
- ● Equisetum spp.
14 Horsetail
0.1m-0.9m
Bloom Color: none
Bloom Time: none
Use: treating bone fractures and tendon and ligament injuries, and may help with preventing senility
- ● Urtica dioica
15 Stinging Nettle
2m
Bloom Color:greyish green
Bloom Time: July–September
Use: Previously used to treat painful muscles and joints, eczema, arthritis, gout, and anemia. And nowadays used as treating urinary problems during the early stages of an enlarged prostate.
- ● Plantago major
16 Plantain
5-30 cm
Bloom Color:Green
Bloom Time: June - October
Use: Against anti-inflammation, analgesic, wound healing, antipyretic, antitussive, anti-infective, anti-hemorrhagic. laxative, astringent, hemostatic activity and diuretic
- ● Fragaria virginiana
17 Strawberry
0.1-0.25m
Bloom Color:White
Bloom Time: April to June
Use: A poultice made from the dried powdered leaves mixed with oil has been used to treat open sores. A tea made from the roots induces urination.
- ● Amelanchier alnifolia
18 Saskatoon Berry
1.8 to 4.5 m tall. pH:5.5-7.0.Grass.
Bloom Color:pink to lilac pink
Bloom Time: May-June
Fruit ripens: July-August.
Use: induce sweating in fevers, flu etc and chest pains and lung infections.
- ● Iris versicolor L.
19 Blue Flag
0.1m-0.8m
Bloom Color: light to deep blue
Bloom Time: May to July
Use: To treat skin disease, apparently aiding the skin by working through the liver, the main detoxifying organ of the body. It may be used in skin eruption such as acne, spot and blemishes.
- ● Acer saccharum
20 Sugar Maple
1.8m-3m
Bloom Color: Yellow , Green
Bloom Time: April
Use: The bark has been used as drops in treating blindness. The sap has been used for treating sore eyes. The inner bark is used as an expectorant and cough remedy. Maple syrup is said to be a liver tonic and kidney cleanser.
- ● Salix, Genus for various families
21 Willow
9m-15m
Bloom Color: Golden shade to greenish-yellow hue
Bloom Time: April or May
Use: The leaves are used to treat abscesses, carbuncle, fever, rheumatism, skin diseases, ulcers etc. An infusion of the bark has been used to treat diarrhea and fevers.

Habitat Legend

- Wetland
- Roadside/Highway
- Woodland/Forest

Medicinal Plants Utilizations

The boreal forest has been a nest for traditional utilization of medicinal plants in healthcare system for Aboriginal people. As the ancestors picked and used the plants, the traditional knowledge was transmitted orally and became precious stories that interweave through our lives.²



Fig.5 Solomon's Seal



Fig.6 Horsetail



Fig.7 Stinging Nettle



Fig.8 Plantain

MAAWANDOON CULTURAL CENTRE

Johanna Rae Besiata (ED4 Architecture)



This architectural story begins in the collaboration with Shoal Lake 39 Community, Iskatewizaagegan Independent First Nation #29 and learning about the people, the land, and the culture of the very site they live on. There is a huge significance in the land and the connection the people have with their culture, which inherently includes their connection with the Creator and the land. Through several site visits and opportunities to speak with community members, a project was developed with the hopes of bringing economic development and, most importantly, to bring awareness of the community's culture in Shoal Lake 39. The program of the Maawandoon Cultural Centre is heavily based upon the roots of Anishinaabe culture and how one learns within the

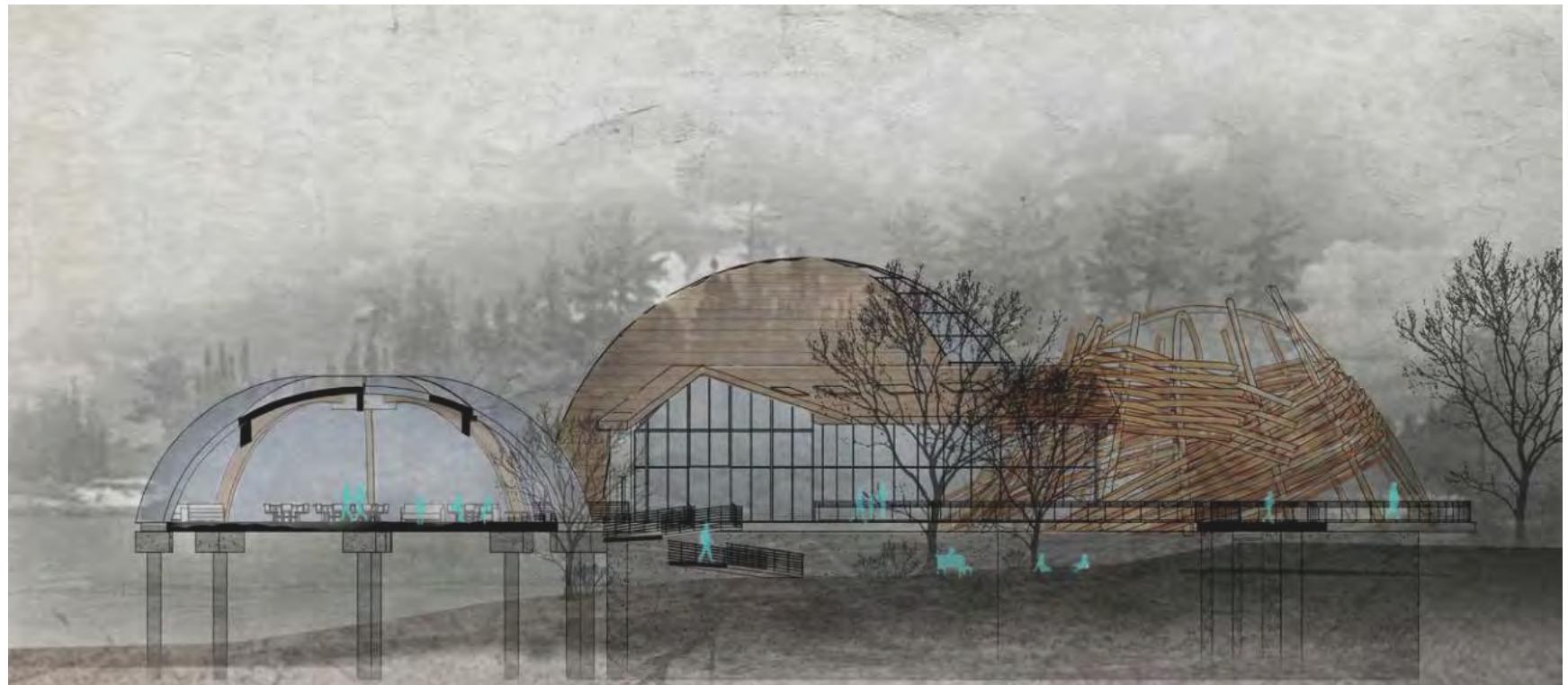
culture. It is not based on the conventional ways of learning, as many of us have experienced and have known all our lives. Learning will take place as experiences – through observing, listening, then eventually, participating. The Maawandoon Cultural Centre is designed to allow for the different indigenous ways and levels of learning; encouraging physical participation, participation through a threshold of observing, participation through listening, and together participating in learning about the Anishinaabe culture. Through the various ways that visitors participate in learning, the process of reconciliation emerges. This reconciliation, hopefully, is the one that allows indigenous and non-indigenous people to come together in harmony and understanding.

Process Models



The Maawandoon Cultural Centre gives back to the community by providing the infrastructure for the community to teach about Anishinaabe culture and traditions to non-indigenous people, who are willing to learn more about the culture. By allowing the community members to share traditional art, stories of the land, and medicinal knowledge through the cultural center, the notion of reconciliation in the gathering of spaces manifests. Maawandoon is the name for the cultural centre for several reasons. In

Ojibwe, maawadoon translates to "brings them together." Maawandoon is a significant act of bringing together portions of wood, inspirations of Black Ash Basket Weaving, that are integrated within the design of the centre. Another reason the name, Maawandoon, is significant is because I believe the building's purpose is to gather the community and other locals in order to learn more about the First Nations culture – bringing them together not only physically, but also spiritually and mentally.



Reflective Space, Courtyard, Gathering Space Section



Workshop Curtain Wall



Art Gallery



Gathering Space

The architectural program consists of a Reception Area; a Crafts Workshop where community members can share their knowledge of beading, embroidery, painting, wood sculpting, and basket weaving; and an Art Gallery in the East Wing of the building to display Indigenous artworks, from both inside and outside of the community. Moving westward, there is an outdoor Gathering Space that will hold more sacred gatherings or simply be a place where non-indigenous visitors can share stories from the local community members. There will also be a Reflective Space where visitors can take a moment to themselves or with others to reflect upon what they've learned at the centre, while

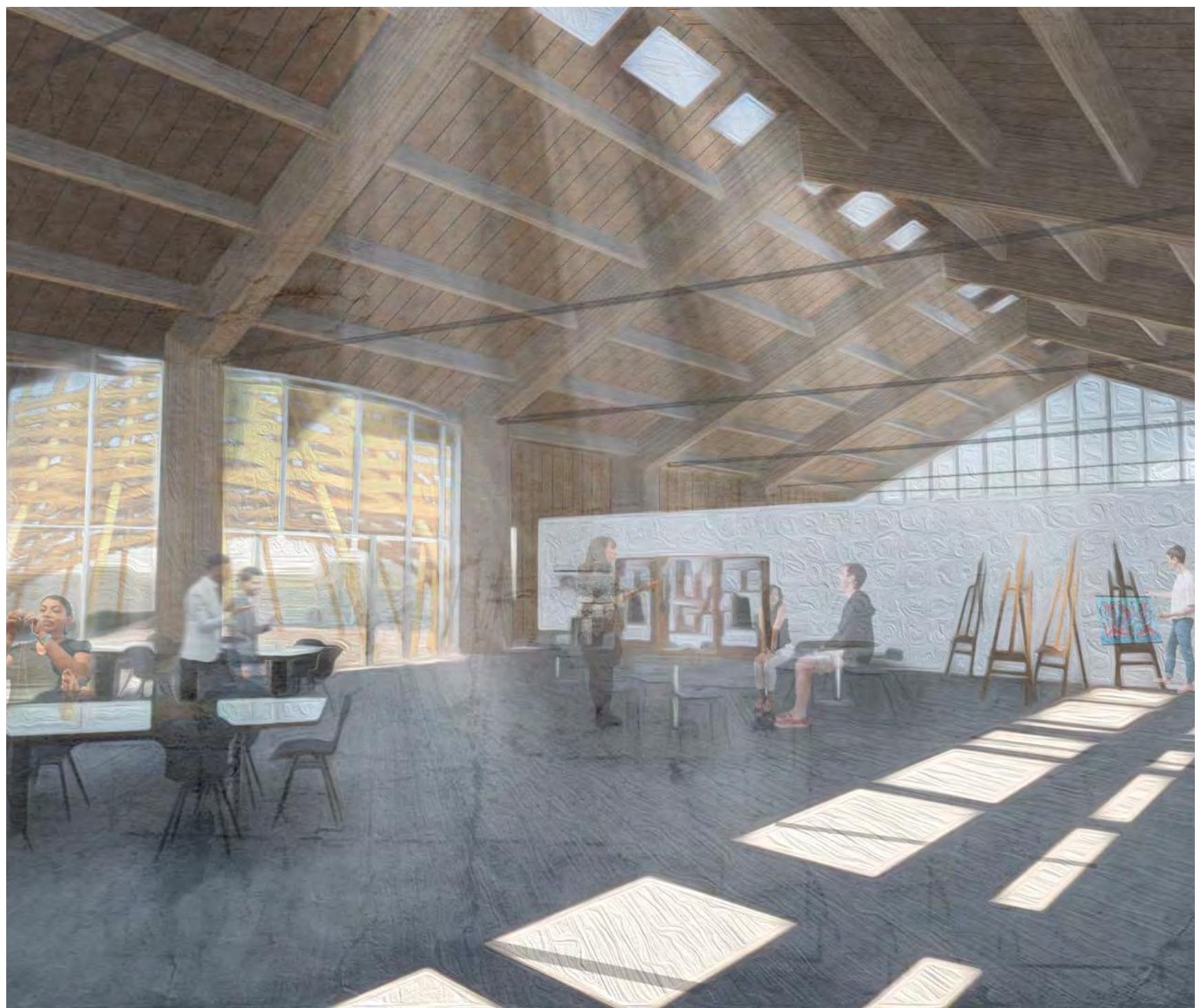
simultaneously gazing at the surrounding land. Moving farther into the west wing, there is a Lookout Hall where visitors can walk around the Gathering Circle without interrupting the programs that occur in that space, while providing glimpses of the lake side and the islands floating in the distance. The last space is the Medicinal Workshop, where community members can share their knowledge of plants of the land and how they can be used as medicine. There are spaces that allow visitors to see how plants are processed, dried, hung, and stored in the medicinal workshop.



Medicine Workshop

Through the thickened forest, the Maawandoon Cultural Centre rests on top of a small sloped ridge on Shoal Lake. Visitors approaching the building will not realize that it lies within the trees, within the land, perched gently on the lake's shoreline. Visitors will first see the entryway at the end of a soft path, greeting the east. This is similar to the way an entrance is placed on a traditional wigwam or longhouse of the Anishinaabe people. Once visitors reach the entrance, they will be greeted by relatively small canopied glass doors that opens into the large Reception Area. Once they enter, they are disconnected immediately from their surroundings, but are gently greeted with a reception area facing the north curtain wall that reveals, once again,

the green depths of the Shoal Lake forest. Facing back to the west, a glimpse of a woven structure can be seen looming over the open centre of the entire cultural centre. As visitors head south of the building, tall, wooden ribs of the structure are exposed and are consistent all the way to the end of the building. This enlarged space, which is the crafts workshop and art gallery, is meant to express openness and freedom. An intentional glimpse of the lake's reflection through the gallery's curtain wall can be seen as it faces, the lake shore. The openness of the space will allow sound to travel, but this aspect is intentional so that people in the gallery will hear the conversations of the craft workshop adjacent to the space.



Craft Workshop

PAPER BIRCH CAMPSITE

Papa Saliou (ED4 Landscape Architecture & Urbanism)



Holistic knowledge is about a complete and well rounded understanding of a specific subject. Holistic knowledge means knowing about the subjects required conditions, characteristics, role in the land, and importance to people and the land. Thus to design a place which promotes this knowledge requires us to make one feature of the land or phenomena the focus of a place. Everything from the location, topography, and microclimate, to the organisms living on the site must be considered based on the needs of the subject.³

Paper birch has been an important resource of the Anishinaabe people for centuries, and is thus celebrated in the design of Paper Birch Campground. The research began the requirements, relationships, and value of the species.

Paper birch's range spans from Canada's and the Northern United States' East coast to its West Coast. It can grow in a wide range of conditions, from those of the Canadian Shield, to those of the swampy lands and plains. As a pioneer species, paper birch benefits from regular disturbances in the forest, as they provide space for the species to propagate. In fact, the species' population has been in decline since clear cutting and controlled fires have become less common. It is amazing to realize just how wide of a variety of soil types and topographies paper birch trees can grow in, however, the species thrives best with good sun exposure, along with medium to well-drained spodosols, inceptisols, and entisols sol types (USDA soil taxonomy).⁴

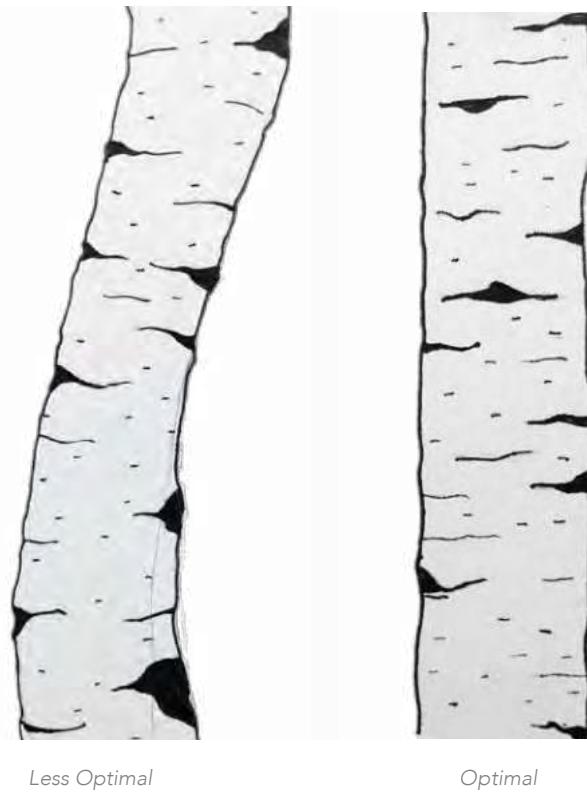


Figure 1. Trunk Curvature

Everything from the bark to the wood, twigs and leaves are useful material. The Anishinaabe have great experience with harvesting paper birch, and are careful in doing so in order to respect, and prevent damage to the tree.

The bark is the most well-known part of the tree as it has a wide variety of uses. It is important to know that not all paper birch trees have a bark good enough for harvesting. In general, the harvestable bark is located in the area of the tree between 30 cm to 300 cm off the ground. The curvature of the tree trunk will also determine how much bark can be harvested. Straighter trees are preferred as a curving bark can lead to damage and smaller pieces when harvesting (see figure 1).⁵

The texture of the bark is an important thing to consider. Rougher or smoother bark may be preferred depending on what it will be used for.

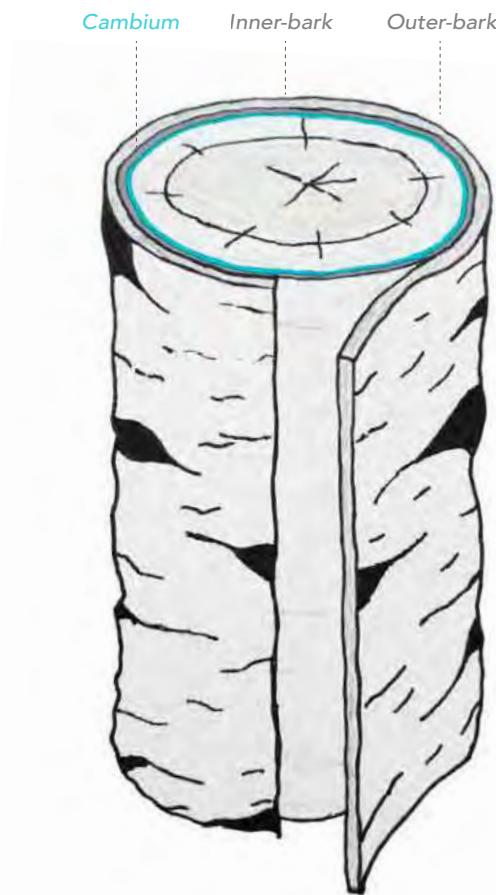


Figure 2. Layers Within a Trunk

If smooth bark is required, it is best to harvest smaller trees, while the opposite is true for rough bark.⁶

In the Anishinaabe culture, it is important to make offerings and ceremonies before harvesting the bark. After this, the harvesters begin cutting by feeling (using a knife) for the inner-bark to ensure they are not cutting into it, taking only the outer-bark (See figure 2). They then make one vertical cut, and two horizontal cuts (the circumference of the trunk) at each end of the vertical cut. The bark can then be carefully peeled off. Although the inner-bark can be a useful material, it is not recommended to cut past it. Leaving the inner-bark on the tree will provide a layer of protection against pests and diseases; the tree will be able to re-grow its outer-bark, making it a renewable resource.⁷

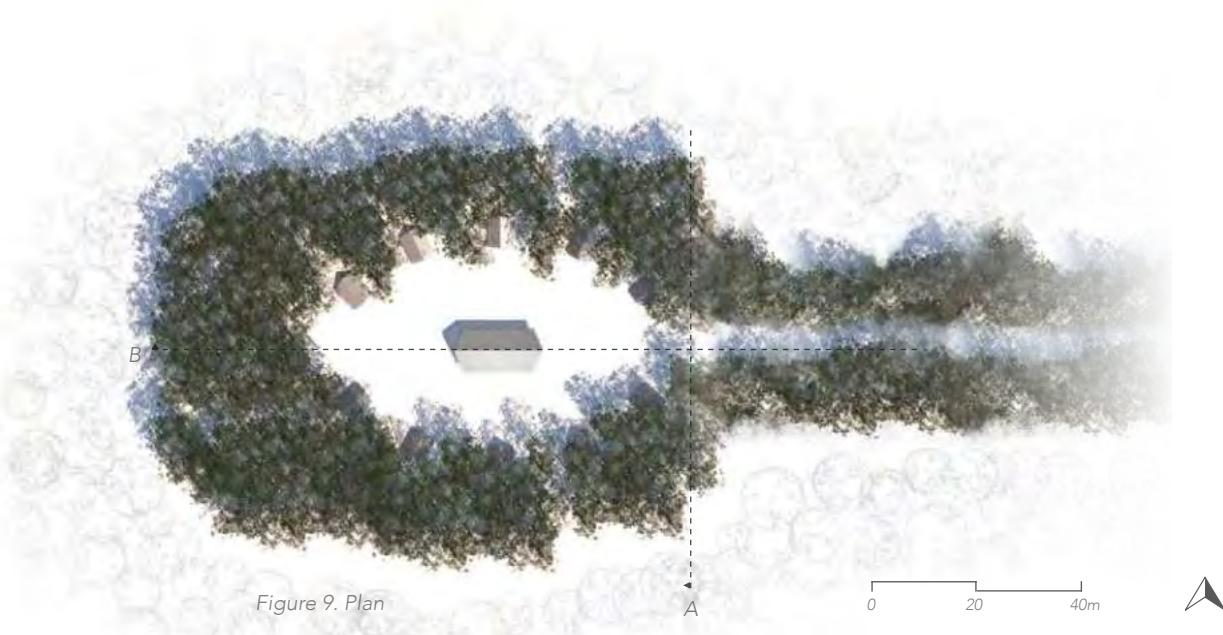


Figure 9. Plan



Section A: North-South



Section B: East-West

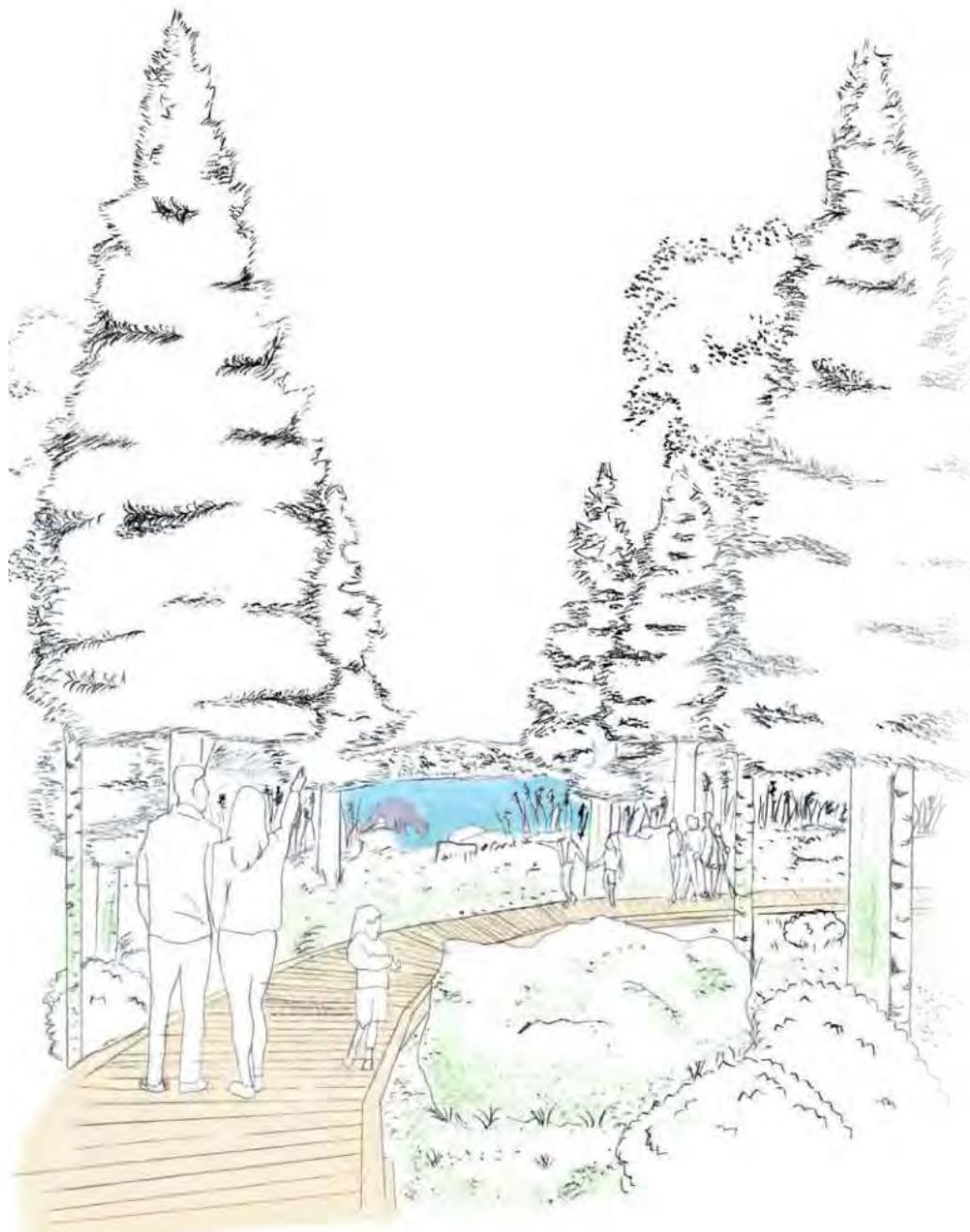
With the site complete, campers are now in a space that not only provide the joys of camping, they also get to learn about the paper birch's needs, relationships, and importance mentioned earlier. Campers also get to experience the pleasure a paper birch grove provides. They can experience the light quality as sun rays pass through the foliage and trunks, the airy shadow they cast on the ground, how the bark reflects the light, and the microclimate within the grove. The campers can observe the activity from insects and wildlife happening

on the trees and the understory. The grove also provides multiple activities for campers. They get to experience first-hand how to harvest paper birch bark, and perhaps take part in bark crafting workshops. Those who come back to the site yearly will get to see the peeling and re-growth of bark. Those who visit during different seasons get to experience how the grove changes throughout the year. Also, the bark may be used on the built structures as a façade on hard surfaces.



LEARNING FROM STORIES

Leovin Cruz (ED4 Landscape Architecture & Urbanism)

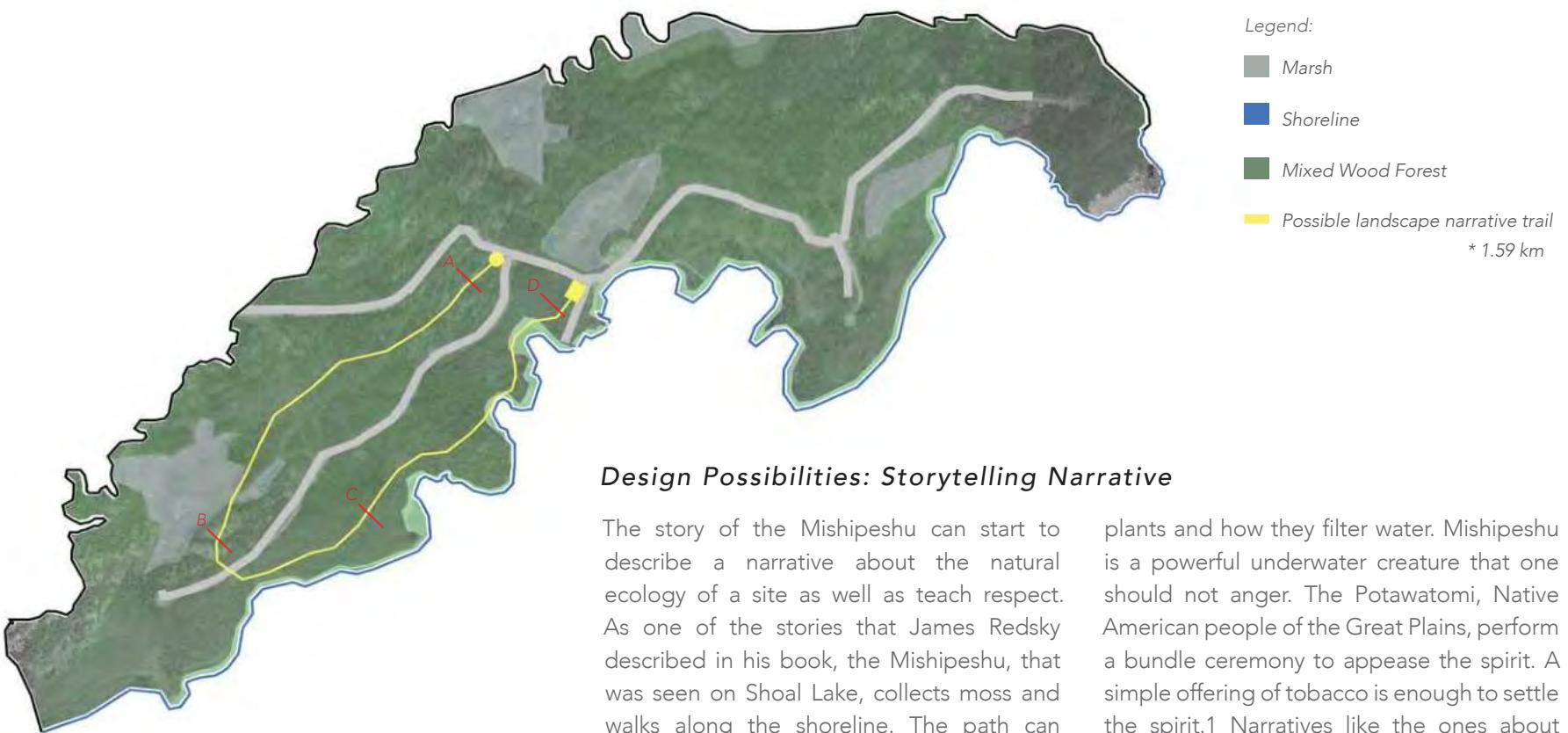


Learning to Reveal

To reveal is to make an object or an idea become easily identifiable for the viewers or the public. To reveal is an activity that provides a sense of mystery as well as a sense of excitement for the viewer or user. Revealing improves one's consciousness and understanding of what is being unveiled through the landscape or structure.

This becomes an important learning opportunity for the public and especially the children to learn about the indigenous culture in a fun and exciting way. Anishinaabe stories are mischievous, playful, fascinating, engaging and often have a positive message or a moral lesson to learn from. Thus, stories become important factors for learning the Anishinaabe culture. Revealing Anishinaabe stories through the landscape not only educate one's knowledge about the culture, it also teaches the ecology of the landscape.

Landscape Narratives are helpful for providing information to the public. The narrative narrows the type of idea and goal that is set out on the landscape.⁸



Design Possibilities: Storytelling Narrative

The story of the Mishipeshu can start to describe a narrative about the natural ecology of a site as well as teach respect. As one of the stories that James Redsky described in his book, the Mishipeshu, that was seen on Shoal Lake, collects moss and walks along the shoreline. The path can become a narrative of different types of moss and can take a route through different moss environments. Like the story, the path can go through the edge of Shoal Lake, where it can teach the public the importance of aquatic

plants and how they filter water. Mishipeshu is a powerful underwater creature that one should not anger. The Potawatomi, Native American people of the Great Plains, perform a bundle ceremony to appease the spirit. A simple offering of tobacco is enough to settle the spirit.¹ Narratives like the ones about Mishipeshu may inform the design of a trail or a path (through form, or other story telling strategies) and also subtly inform the user about the local ecology and history of a site.

Forest floor Mosses

- Hook leaf fern moss
- Aquatic apple moss
- Wiry fern moss
- Knight's plume common hair cap
- Broom moss
- Sickle moss
- Big red stem moss

Wood bark Mosses

- Whip fork moss
- Stocking moss
- Common Hair cap
- Rolled leaf pigtail moss
- Woody Leafy moss
- Drummond's leafy moss
- Mountain curved back moss

Rock and soil mosses

- Fragile screw moss
- Hairy screw moss
- Juniper Hair cap
- Slender- stemmed hair moss
- Erect- Fruited iris moss
- Awned Hair
- Pipecleaner moss

Aquatic plants

- Narrow- leaved bur-reed
- common cattail
- board- leaved water plantain
- Water smarted weed
- Various- leaf pondweed
- Clasping- leaf pondweed
- Hornwort

Environment:

- Moist soil
- On Humus
- Calcium-rich sites

Environment:

- Rotting wood
- Base of trees
- Moist Habitats

Environment:

- Calcium rich rocks
- Ledges of cliffs
- Open areas

Environment:

- Marshes
- Sluggish streams
- Lakeshore



"The mishe-beshoo, the giant cat, was another animal that Indians used to offer tobacco and worship highly. * Not so very long ago the people were talking about seeing a mishe-beshoo down on south part of Shoal Lake. That was about six years ago. It was walking along the shore line,[an Indigenous person] said. Some people went down there and they saw the tracks."⁹



A Section through floor moss



"It has webbed feet for swimming and lives in great big caves or in holes in the ground. It acts as something like a bear."¹⁰



B Section through rocks



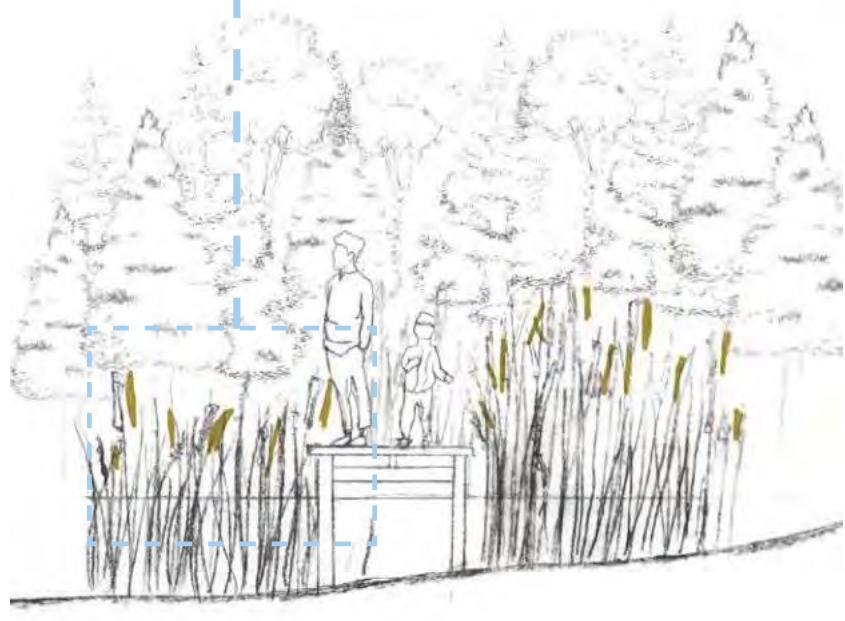
"The mishe-beshoo is a huge, brown cat... it gathers moss and grass and places it in a hole where it hibernates until spring. This animal is always seen in the water or close to it."¹²



"It was walking along the shore line,[an Indigenous person] said. Some people went down there and they saw the tracks. The mishe-beshoo is a huge, brown cat."¹¹



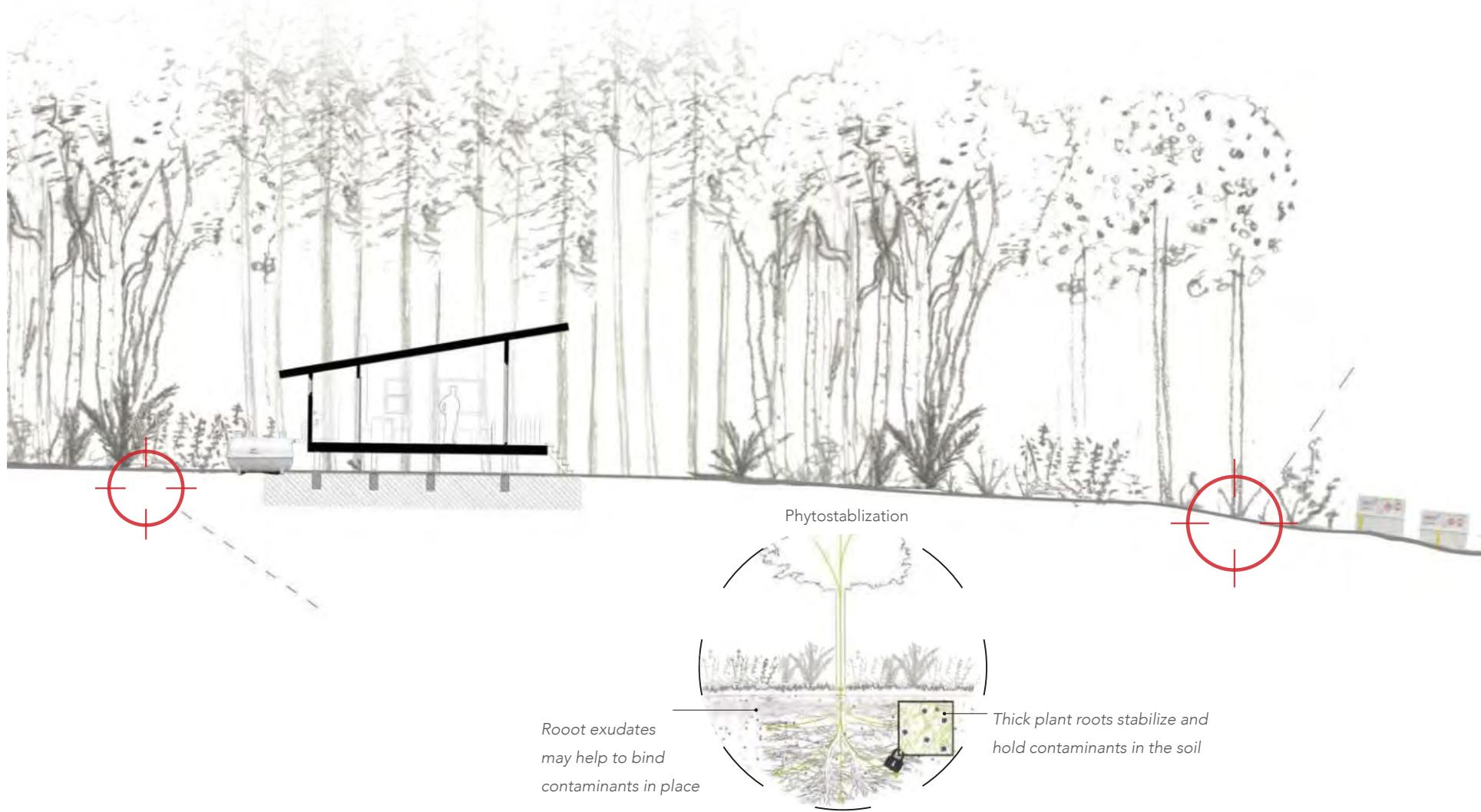
C Section through forest



D Section through shoreline

A "PHYT" FOR PLIGHT (SOIL TO REMEDIATE)

Tiffany Lun (ED4 Landscape Architecture + Urbanism)

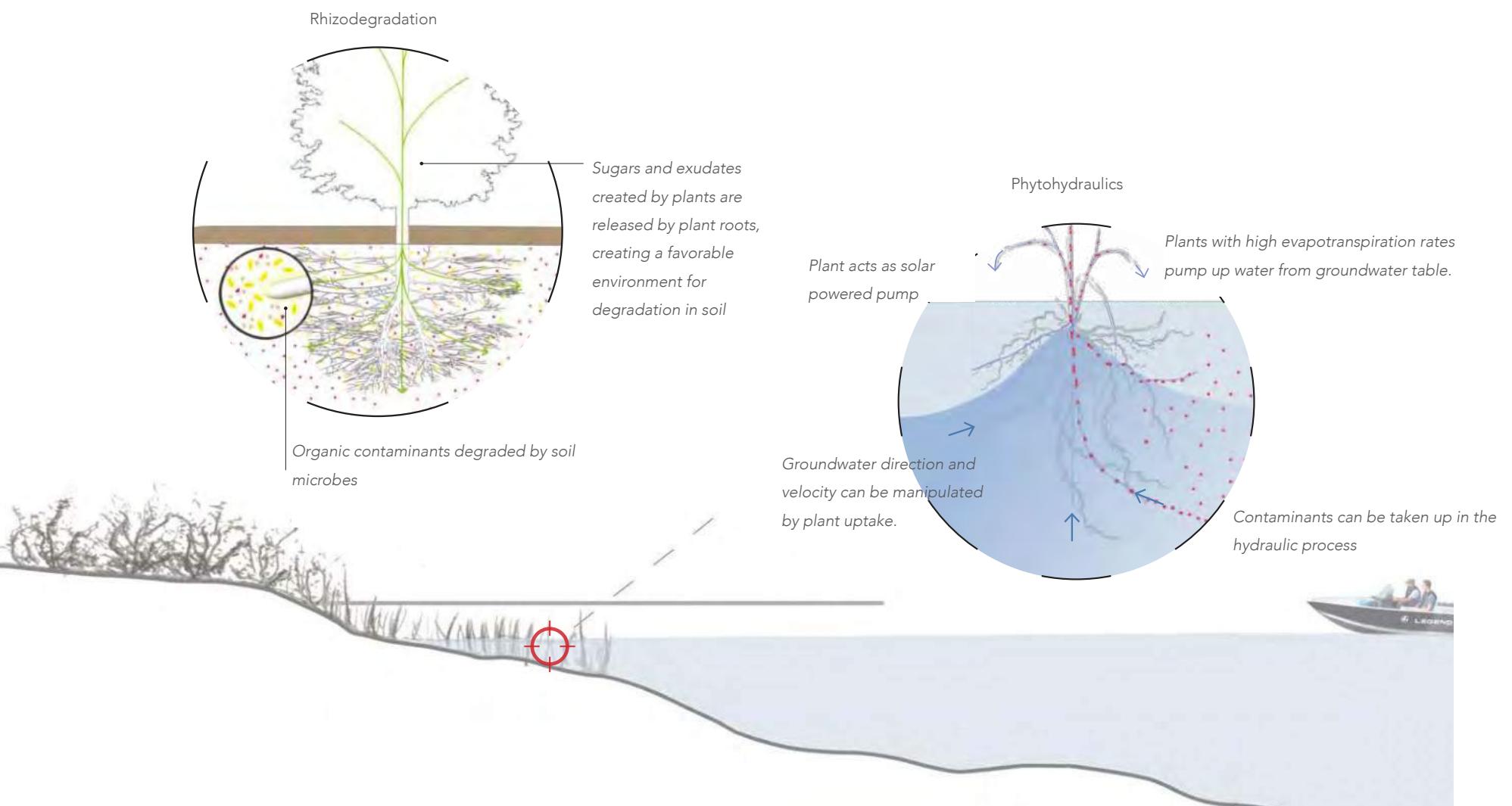


In the event of discussions on the future programmatic development on Iskatewazaagegan #39's property, an increase of pollutants can be anticipated on the chosen site. These pollutants can range from organic contaminants such as: greenhouse gases, petroleum contamination, and human waste; to the inorganics responsible for eutrophication and heavy metals.

Majority of the site consists of environmentally sensitive wetlands, swamps and lake coastal regions; areas that would have a significant impact on the underground aquifer and site sustainability if treated

improperly. Perhaps plants could become the solution to combat the issue at hand to contain or slow down the spread of pollutants. Giving time for the plants or soil microbe community to process the contaminants through three main techniques: Phytostabilization, Rhizodegradation and Phytohydraulics.

This chapter will discuss the three main programs anticipated on site: the marina and its gas station, camping grounds (otentiks) and orchard and its own relative suggested planting scheme and species.



Prepping the Soil

When planning phytoremediation projects, an initial agronomic soil test should be done to ensure the site's soil conditions are optimal for plant growth. If the soil is in poor condition, amendments can be provided. This can range from: the balance between silt, sand and clay for porosity; nutrients; to pH change.

Other factors taken into account during planning include species selection to create favorable environments for degradation, winter dormancy, time, plant spacing, contaminants location; and organic content in the soil. When working with rhizodegradation, organic

content in the soil is best kept to a minimal. The availability of organic compounds results in less ability for the contaminants to be picked up and utilized by the plants as their main source of carbon to grow; delivering less favorable results. Generally, it is said that plants with better growth rates, high biomass and fibrous root production also have greater degradation abilities.

Marina

For the Marina, the main sources of contaminants are hydrocarbons and petroleum.

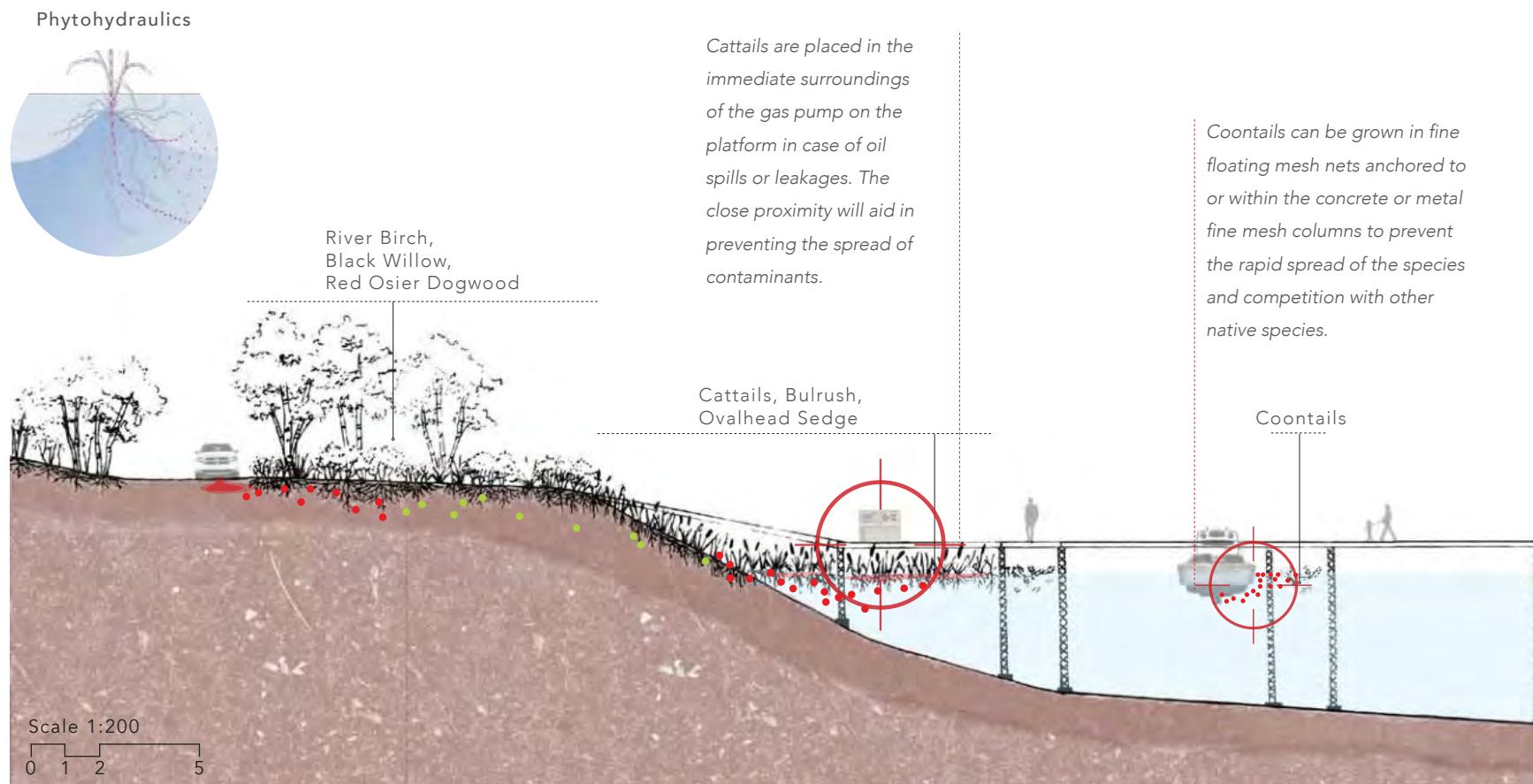
Situated on the water, the most important mechanism used in this area would be phytohydraulics. In this application, soils aren't as important as the plant's root depth and its ability to take up contaminants from sources of water. Another important factor would be the plants ability to live in moist soil environments or have its roots submerged in water for the majority of the time. Plants with high evapotranspiration rates and/or high biomass are desired for this approach to ensure a high intake of contaminants. However, with fast growing species comes the concern for competition and introduced species outgrowing native species, so a discussion of possible concerns between the community, the designers and the construction team is advised.

Species living in or on the water should be maintained through harvesting as part of the marina management plan to sustain the cycle of phytoremediation whilst keeping the boat engines safe from plant debris.

In reference to the marina, an interesting reciprocal relationship between the land and the water is developed. Species on the water's edge protect the land and the water. Edge planting and can keep the contamination coming from the water, from drifting away or being carried onto the land. While, the pollutants originating from vehicles and land based nutrient loads, may be captured, slowing or preventing toxins from reaching the lake.

To achieve this vision for the marina, other environmental factors should also be taken into account in the prediction of the flow of pollutants. This can include: the predominant wind direction at the location, direction of lake currents, introduction of breakwaters, configuration of the marina platforms and its dimensions.

Everything that hasn't been or can't be degraded will eventually reach the water-table. Therefore, the site's drainage system should be considered alongside phytoremediation strategies to aid in the filtering of contaminants.



Orchards

Unlike other main programs, the orchards' main source of contaminants are plant macronutrients. This category of contaminants can technically be resolved with the species listed below. That being said, species with high biomass, growth rates are recommended for nitrogen remediation (along with high evapotranspiration rates for groundwater remediation). For species to mitigate phosphorus, a dense, thick root systems, expansive cover, and aggressive growth is desired.

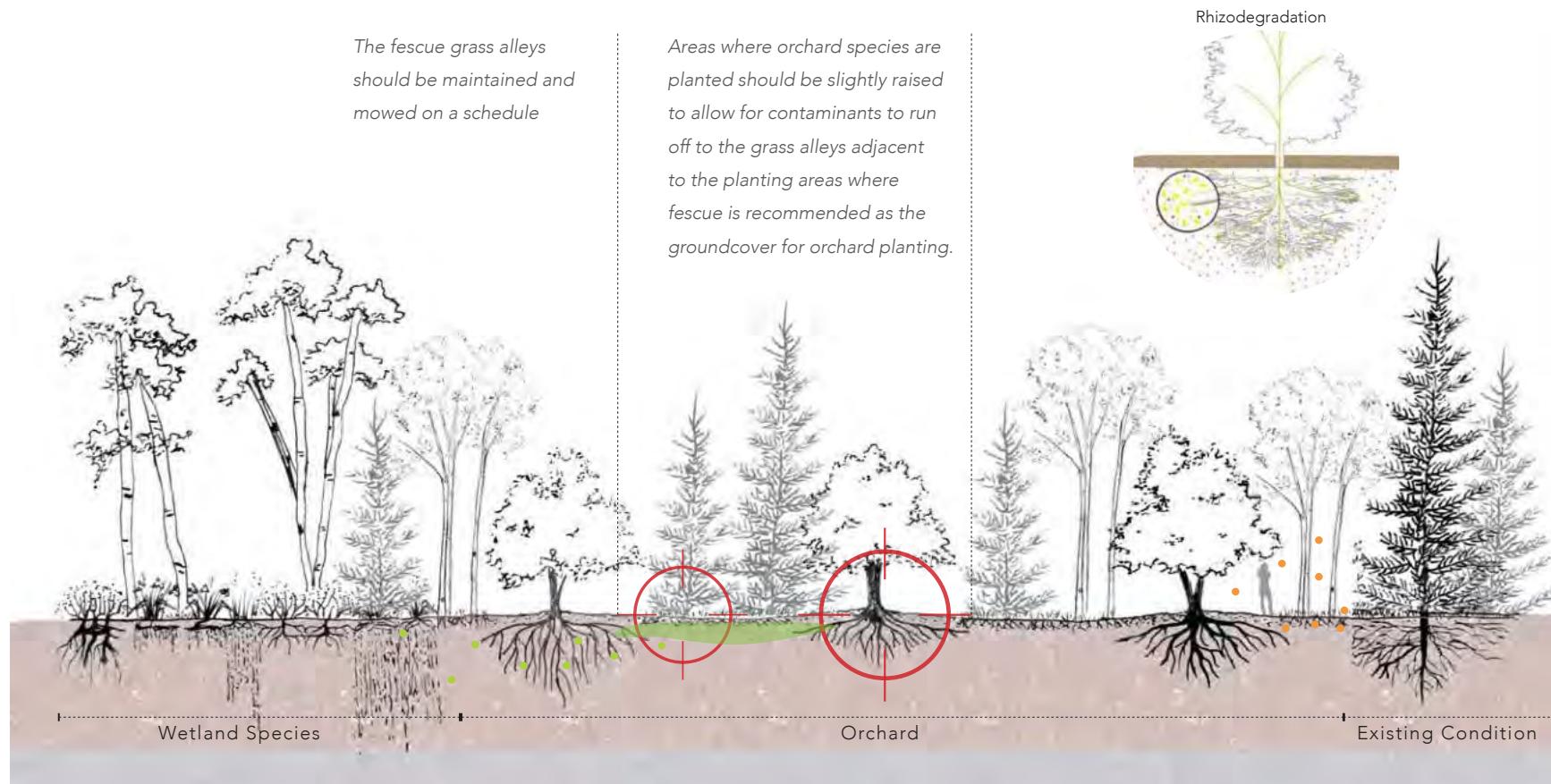
It should be noted, plant selection in this scenario isn't just important in terms of contaminant control but also in terms of species competition for nutrients, water and sunlight. As a result, it is best recommended to utilize topography changes to direct the flow of pollutants to the desired phytoremediation plants surrounding the orchard areas.

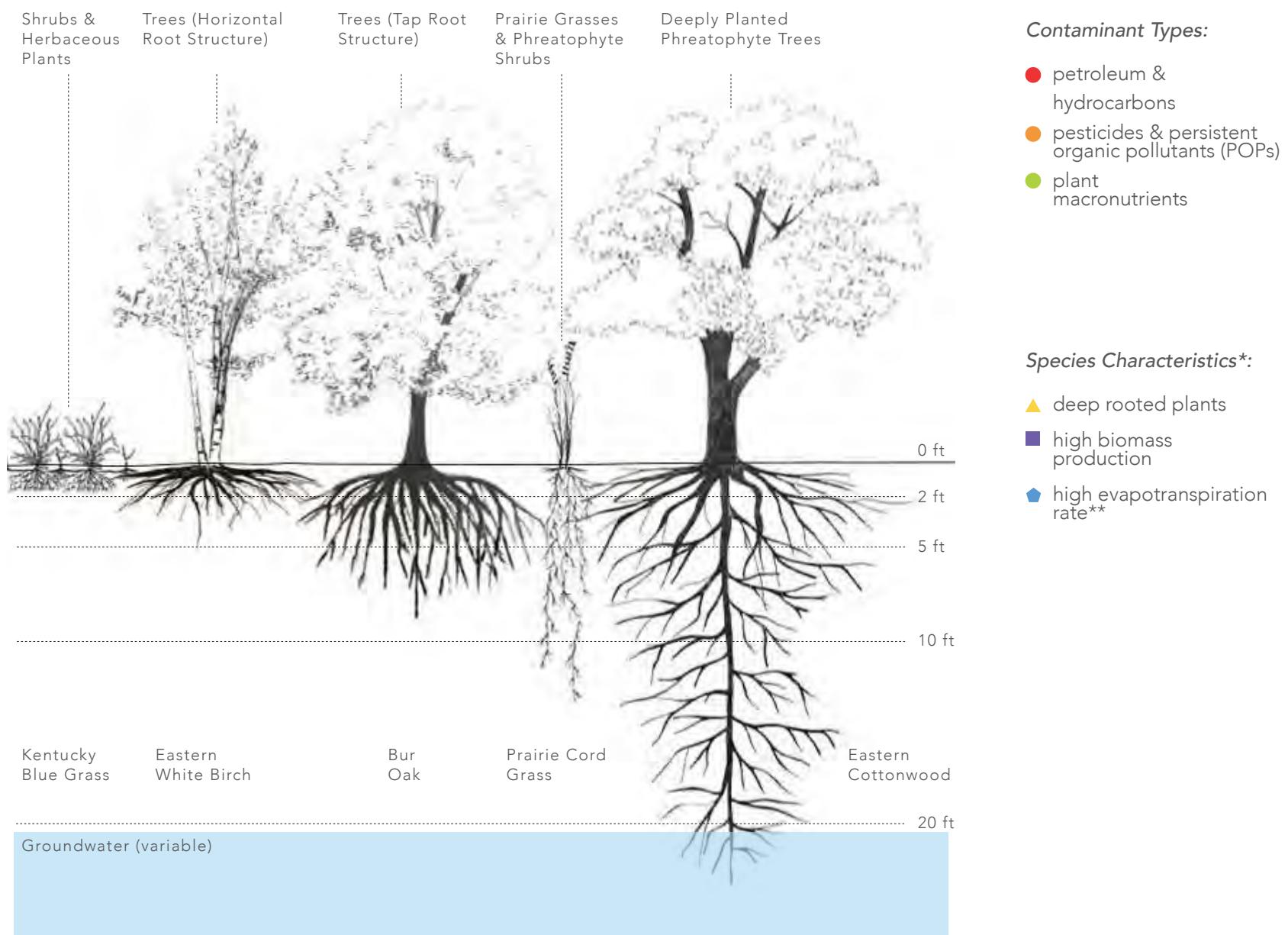
In this example, fescue was recommended as the ground cover despite its competition with the orchard species in their first few years of planting. Studies shown orchard trees eventually get used to the competition and their roots deeper into the ground for nutrients and water uptake; allowing them to grow to their full potential. Fescue as a fast growing groundcover will have to be maintained and periodically mowed in order

to ensure complete removal of the excessive macronutrient contaminants on site. Note! Although fescue may be appropriate in some locations, local garden professional should be consulted, regarding which plants would be best suited for phytoremediation in this environment.

Pesticide use isn't recommended within the orchards since it is performed at a small scale and not for industrial use. However, since the orchards are located relatively close to populated areas of stay, it would be helpful to select species with the ability to remediate pesticides and POPs as well.

Looking at the topography of the site as the area is situated on a slope, it would be best if the drainage patterns could be redirected towards the wetland north of the orchard. Despite wetlands being environmentally sensitive areas, many wetland species including the ones introduced below can help remediate the contaminants brought into the area. Redirecting the flow of contaminants into wetlands may slow the polluting process; with wetland plants capturing or breaking down pollutants into smaller fragments along the way. Wetlands acting as filters should be monitored and some plants may have to be harvested to remove captured pollutants.





When it comes to the placement of species within a phytoremedying project, factors of consideration would be a species's root depth in correlation with the flow of traffic, topography and distance from source of contamination. A general rule may be to increase the use of species with greater root depth in the direction of decline away from the source of contamination due to leaching and the travelling of pollutants. Places of heavy or frequent foot traffic should also be located in places where contaminants aren't accessible to the surface; perhaps created with the use of deep rooted plants to contain the

contamination underground. As such, native prairie species or phreatophytes may be a good place to start looking for possible plants for phytoremediation identification.

Identified plants on site are separated to: those with known high capabilities to phytoremediate versus those with possible potential but are found incorporated in other phytoremedying studies. The species with high potential should be the dominant elements in the landscape with low potential species acting as supportive or even decorative elements.

* outline of the shape (ie. ▲) = shallow roots or low in characteristic; △ = medium

**the ability of a plant to intake water from the soil and lose it through evaporation or transpiration

Identified Existing Plants Useful for Phytoremediation

High Potential

Betula papyrifera
 Paper Birch

Panicum virgatum
 Switchgrass

Pinus banksiana
 Jack Pine

Quercus macrocarpa
 Bur Oak

Typha spp.
 Cattail

Cyperaceae spp.; Carex spp.
 Sedges

Phragmites australis ssp. americanus
 American Common Reed

Pinus resinosa
 Norway Pine (Red Pine)

Salix spp.
 Willows

Verbascum thapsus
 Common Mullein

Fraxinus americana
 White Ash

Picea glauca
 White Spruce

Pinus strobus
 Eastern White Pine

Scirpus spp.
 Bulrush

Juncus effusus
 Common Rush

Picea mariana
 Black Spruce

Populus tremuloides
 Trembling Aspen

Thuja occidentalis
 Eastern White Cedar

Possible Plants Useful for Phytoremediation

Acorus calamus
 Sweet Flag

Bouteloua dactyloides
 Buffalo Grass

Carex cephalophora
 Ovalhead Sedge

Geranium viscosissimum
 Sticky Geranium

Leymus angustus
 Altai Wildrye

Poa pratensis
 Kentucky Bluegrass

Salix nigra
 Black Willow

Agropyron cristatum
 Crested Wheatgrass

Bouteloua gracilis
 Blue Grama

Celtis occidentalis
 Hackberry

Gleditsia triacanthos
 Honey Locust

Lolium spp.
 Ryegrass

Populus deltoides
 Eastern Cottonwood

Sambucus nigra
 Common Elder (Elderberry)

Alnus spp.; Alnus glutinosa
 Alders (ie. Black Alder)

Cannabis sativa
 Hemp

Elymus Canadensis
 Canada Wild Rye

Juniperus virginiana
 Eastern Red Cedar

Picea glauca var. densata
 Black Hills Spruce

Populus spp.
 Poplar species & hybrids

Schizachyrium scoparium
 Little Bluestem

Bouteloua curtipendula
 Side Oats Grass

Carex aquatica
 Sedge

Festuca spp.; Festuca pratensis
 Fescue (ie. Meadow Fescue)

Lemna minor
 Duckweed

Pinus spp.; Pinus mugo
 Pines (ie. Mugo Pine)

Salix alba L. 'Britzensis'
 Coralbark Willow

Sorghastrum nutans
 Indiangrass

Anticipated Plants Useful for Phytoremediation with Climate Change (Zone 5+)

Andropogon gerardii
 Big Bluestem

Elodea canadensis
 Canada Waterweed (Pondweed)

Juniperus procumbens
 Juniper

Scirpus atrovirens
 Green Bulrush

Viburnum lantana
 Wayfaring Tree

Betula nigra
 River Birch

Elymus hystrix
 Bottlebrush Grass

Linum usitatissimum L.
 Flax

Spartina pectinata
 Prairie Cordgrass

Ceraphyllum demersum
 Coontail

Festuca rubra
 Red Fescue

Morus rubra
 Red Mulberry

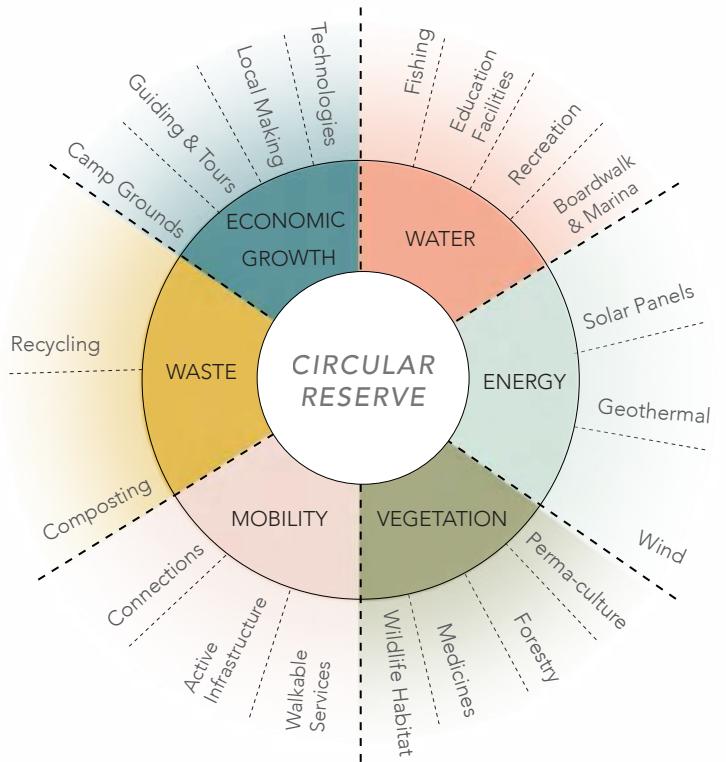
Tripsacum dactyloides
 Eastern Gamagrass

Cercis canadensis
 Eastern Redbud

Iris versicolor
 Blue Flag Iris

Paspopyrum smithii
 Western Wheatgrass

Veronica spicata
 Spiked Speedwell



IZHIDOOON MAKE



The maker movement is an artisan oriented social movement emphasizing an approach of learning-through-doing. Maker culture is often a peer-led, informal approach to shared learning. Maker culture encourages experimentation of the potential of new technologies, often based upon cooperative environments where the cost and of current and new technologies is distributed (such as wood shops, laser cutters, CNC milling machines, filmmaking, printing, etc.) and the use of these technologies is shared. The idea of maker culture within this studio also involves a recognition of the historical significance of acts of "making" within first nation traditions, and how these traditions can influence what we produce today.

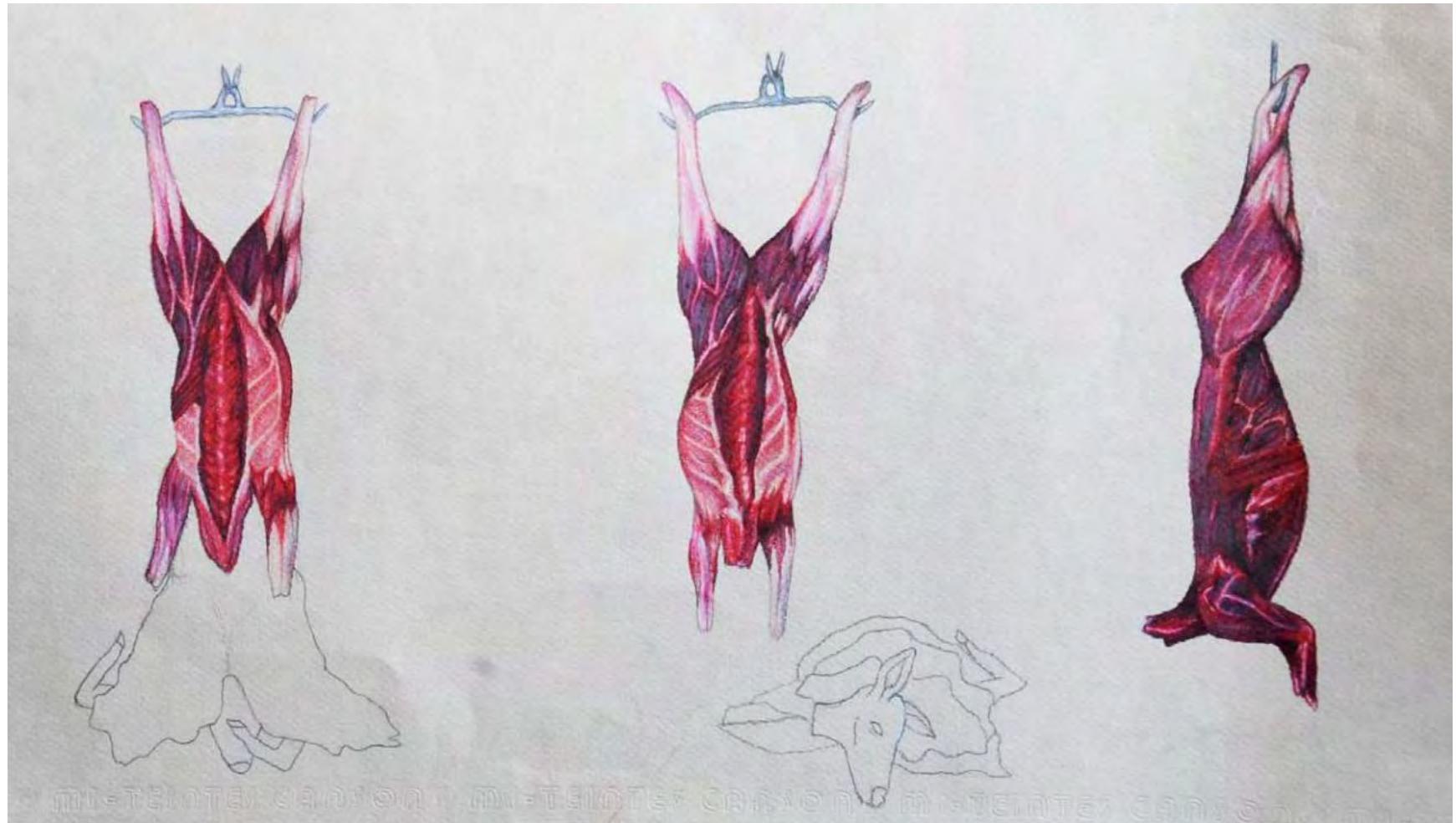
The maker movement might be included within a broader community-based approach to the First Nation's economy. Circular economies are designed to provide for human needs and improve the quality of life for residents and visitors, while also reducing social and environmental harm (Schröder et al., 2019). A circular economy is designed to create energy and material loops, preserve products, parts, material, and

maximize use (Zink & Geyer, 2017). A circular economy pays significant attention to the to reuse, recycling and recovery, three of the 4R's (reduction is the fourth, although important in the circular economy, is not the primary concern). www.candianurbanstrategies.com

The diagram on the left represents a model of a circular economy developed by the students for the Iskatewizaagegan First Nation. The community would likely expand on such a model. The development of this localized circular economy involved imagining possibilities for economic growth, that could be integrated in ways that take advantage of the 4R's at the scale of the reserve. A cycle might include the planting and harvesting of trees, the making of local products or shelters, and the recycling and reuse of materials as they begin to lose their usefulness in their originally constructed form. Energy for such projects could be derived from local sources (wind, geothermal, solar). Waste might be utilized (when possible) in other processes such as in compost for permaculture/orchards. - RP

NITAMAAGE PLACE

Hanna Hendrickson-Rebizant (ED4 Architecture)



On our second community and site visit to Iskatewizagegan, Shoal Lake 39, we came across the remains of a grouse. Most of my peers who saw the grouse were slightly disgusted, after all, its insides were outside. I could not help but notice everyone's reaction, and notice that mine was the complete opposite. I studied this grouse, I admired the way its blood was contrasted against the snowy ground where it laid, and I found beauty in the pastel colours of its organs. And then I thought to myself, is something wrong with me? Everyone is grossed out, but I find it interesting. For me, this was the moment that I truly realized that

we as humans, are so detached from where our food comes from and how it is made. If we cannot stand the sight of an animal's remains, what gives us the right to eat that animal? I believe to understand where our food comes from, specifically meat, how it is killed and processed, offers an amount of respect to the animal we consume. If you cannot handle the animal being processed, you should not eat it, it is that simple. This became the driving force behind my project. It was after this visit that I decided the programming for my space would be a place for community members to skin and process meat and fish.

COMMUNITY VISIT

During the following visit to the community and our site, I located the appropriate site to be on a small plot of land that is along the water's edge. The land is filled with decaying trees, and tangled dogwood. I had a very difficult time walking through the land as I was getting caught and pulled by the dogwood, as if hands were pulling me and guiding me along the ground. But suddenly, I came to a clearing amongst the chaos. Almost perfectly, there was a spot cleared of dogwood and only contained fallen down trees.

In the book *Braiding Sweetgrass* by Robin Kimmerer, we are taught that our role on this planet is to touch the ground lightly in where we step and settle. Keeping this in the back of my mind, I chose this area because it seemed to have cleared out naturally and would not require as much human intervention. The site is modest, but contains a great deal of death and decay from the plants and trees located on the site. This I found fitting for my program.



fish fillet with the community



MODELING AND COLLAGING

There are three main structures and a smokehouse located on the site. A processing and skinning building, a fish processing building, and a feasting shelter. The site also contains an outdoor skinning area, and hide tanning and stretching area. The buildings and structures on site encourage the outside to flow in, and are designed to be noncompeting with the landscape and nature of the place.





Skinning and Processing Building Plan



Walking into the kitchen and look out area

I began to break down the act of killing an animal and processing it. Story-telling is deeply engraved in the indigenous culture thus here's a story for you; I had spent an entire weekend going over the skinning and butchering of a deer. I had drawn a detailed anatomical drawing of it, and I thought to myself, "I bet you anything, I could hunt, kill, and skin a deer no problem." In an article I read once, the author tells a story in which a very skilled fisherman went to an unfamiliar community and boasted about how many fish he was going to catch. Because of his cockiness and being new to the area, the creator did not offer him any fish and he ended up leaving almost empty handed. This is somewhat similar to my experience. That weekend I was staying at my parent's place in Ponemah, Manitoba. Their house is located in the middle of a



Walking into the skinning area.

bluff of trees, where wild animals flock to. I left their place late Sunday night and began my long drive back to Winnipeg. I was driving down their long drive way when I came across two glowing eyes reflected from my car headlights. It was a deer, *pause for dramatic effect* a dead deer right in the middle of the drive way. It was bleeding and still warm, I concluded the accident happened moments before I left their place. I became overwhelmed with sadness and nausea; I could not even move it from my path, I had to call my dad. Clearly, I was not ready to skin and process a deer, how silly of me to think that. I really do believe this was a message or lesson from the creator, trying to humble me in preparation for my project. I tried to listen to it as best as I could.



Feasting Shelter Facade



Fishing House Elevation



Fishing House



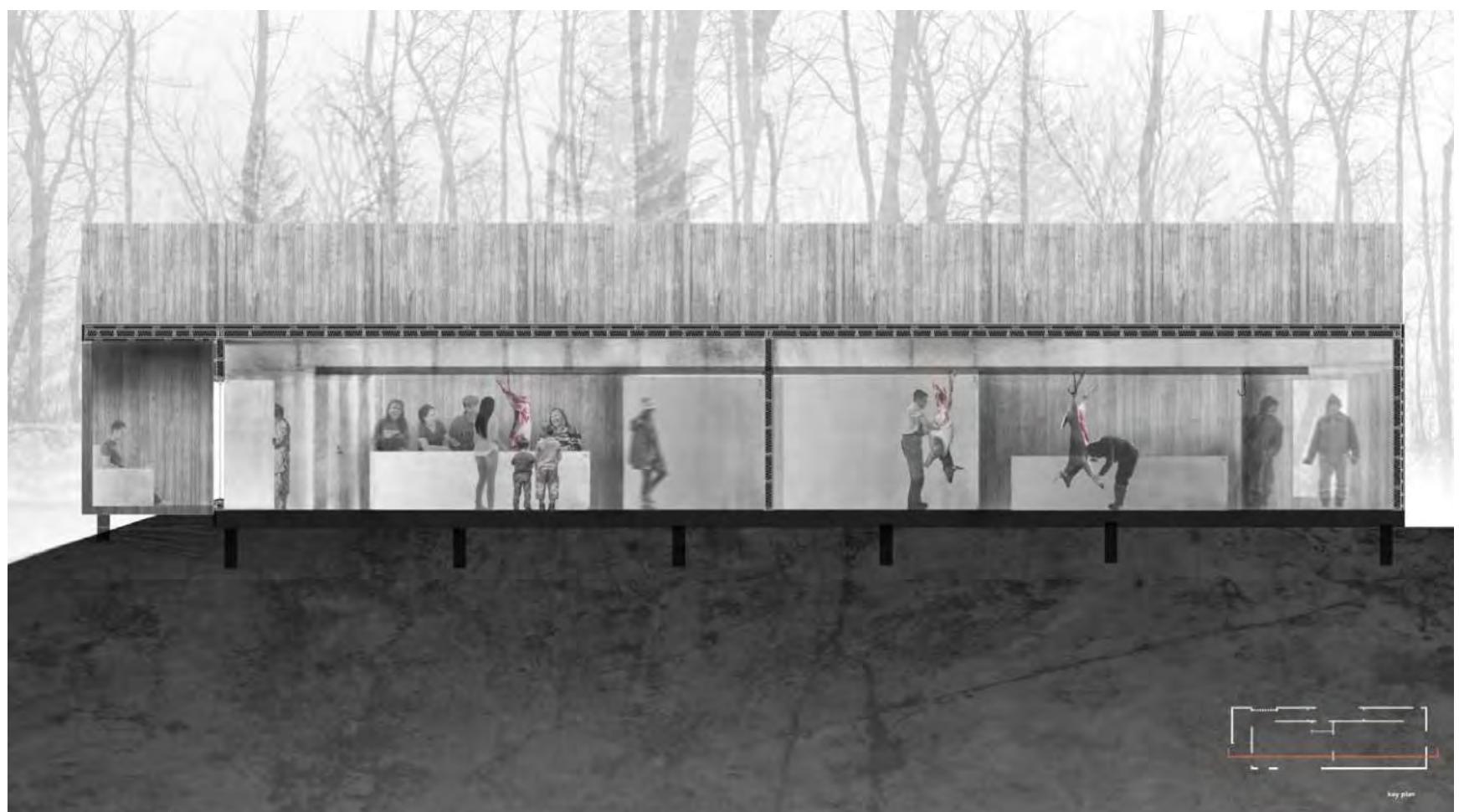
Feasting Shelter Interior

After following visits to the community and talking with the members, I had found out that the community did not have a public space to skin and process the animals they killed. I also found out that the students of the elementary school learn from the land and take part in activities such as medicine walks and hunting and trapping. With the hunting and trapping, they take part in skinning and processing the animals at their school in a workshop. The respect for an animal that is killed for food, and the respect for plants that are harvested is passed down generation to generation in the Anishinaabe culture, and is taught in school. I wondered if I could create a communal space that could foster a more intergenerational way of learning about harvesting and food processing. During this community visit I learned that the community has feasts for every seasonal harvest. So along with the food processing building, I decided to create a feasting shelter as well. The main processing and

skinning building contains an area to butcher meat, make sausages and cure meat as well as a kitchen area to cook and prepare food for the harvest feasts. The structural steel trusses of the building are inspired by the act of stretching a deer hide. They also encourage the user to hang things from them such as drying herbs, or tanned hides, or perhaps even animal carcasses. There are openings in the roof of the building which allow light to flow in, casting irregular shadows on to the surfaces below in an effort to reflect the outside tangled dogwood within. This was inspired by a scene in the movie *The Texas Chainsaw Massacre*. From the front façade, the building appears seamless and contains qualities that reveal certain small moments within the building, evoking a sense of curiosity from the viewer. Once entering the building, there is a busy commotion of people working, teaching and making. Like an animal, the building comes to life.



Fishing House Elevation



Skinning and Processing Building Section

NIBI STUDIO

Danielle Desjarlais (ED4 Architecture)



FROM THE WATER

Nibi, an Indigenous woman from the urban context, finds herself on a canoe excursion in Lake of the Woods, as she feels she needs to connect herself to the landscape she knows not so well anymore. She has been paddling for a few days, through good and bad weather.

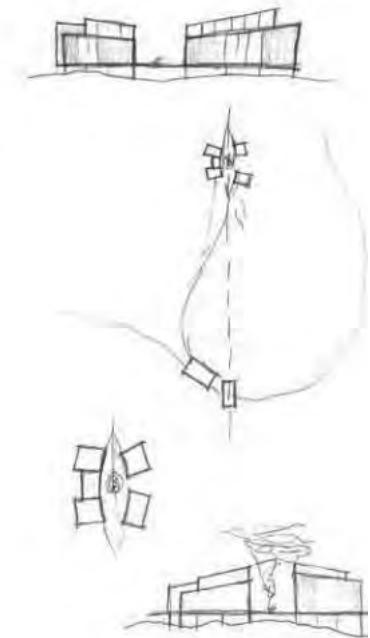
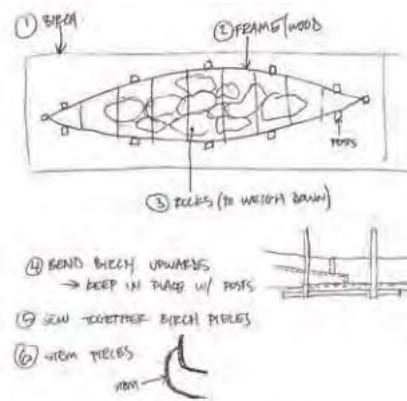
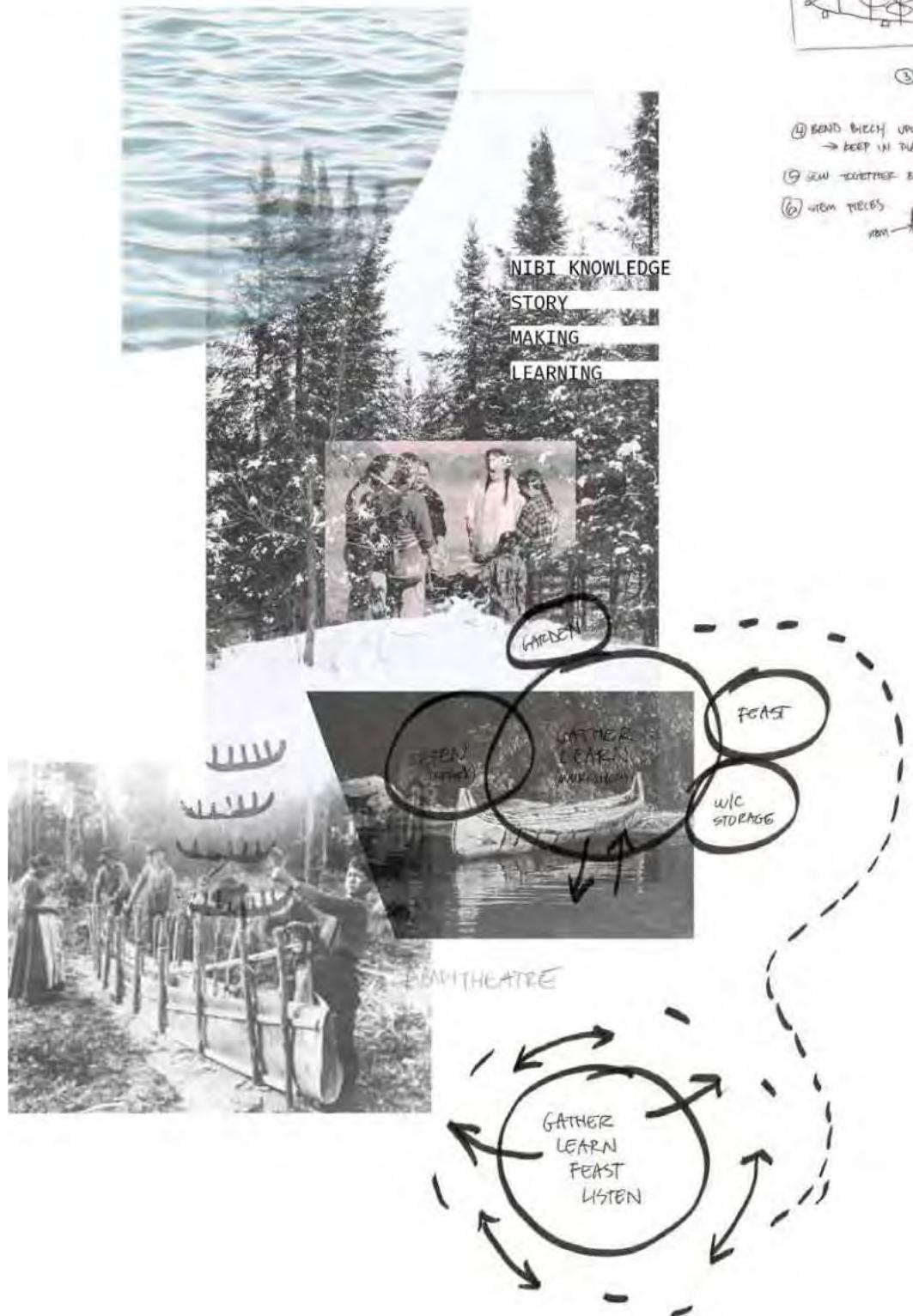
One day it is windy, rainy and cold; the water is steadily crashing against the fibreglass canoe, and suddenly she thinks and wonders, the waves are steady, but the sound of the fibreglass seems out of place. And she thinks of the time pre-contact; there was no fibreglass, so what do the waves hitting a canoe not of fibreglass but of birch bark sound like? Is it echoed? Muffled? More silent than fibreglass? Louder? How does birch bark hold all of these people? An abundance of curiosities.

Another day it is sunny, hot and sweaty. Her muscles are fatigued, and she is becoming worn. She has time to contemplate and reflects on her ancestors and how they have travelled for many years on the water. She can only imagine their strength and confidence with the water and their certainty in their wayfinding skills. They must have been wonderfully strong, and the canoes they built must have been just as so.

Her final day on the water is a good day to be on the water. Her group is arriving at a new culturally based recreation park in Iskatewizaagegan, which is included in the Lake of the Woods excursion, but she is not quite sure what this park entails. They are coming closer to the shore and only see some docks along the shore with a few boats parked. They arrive at a shore further away from these boats in an inlet and are greeted by the trees and a wood structure on the water. They settle the canoe at the dock and walk up the stairs to the structure and are welcomed by an elder working on a birch bark canoe, and beyond is a small clearing to a pathway that leads deeper into the trees. After a short walk, they approach a wood structure that emerges from the trees. They arrive at a clearing and walk up a set of stairs to enter the centre of the structure; they are being hugged by the architecture, facing toward the water reminding them as to where they are coming from, and to remind them of why they are there; to learn the teachings of the water, the material from the ground, and teachings of the birch bark canoe, and to learn the process of making the birch bark canoe.

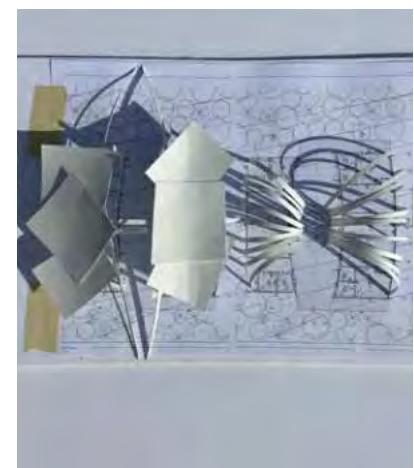
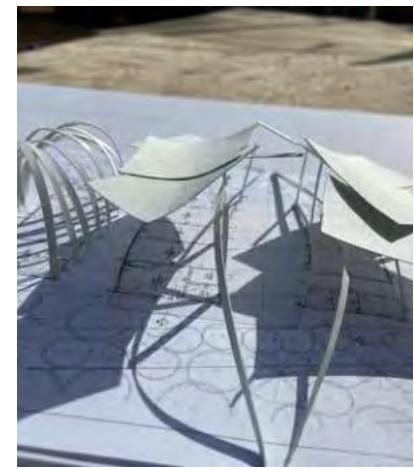
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SCHEMATIC DESIGN



Shoal Lake Textures and Details





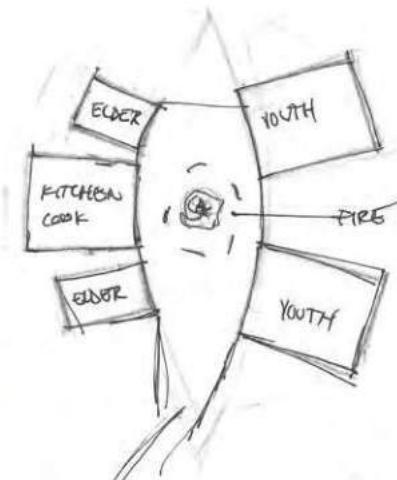
Process Models



This project began with a collaboration between architecture students and landscape architecture students, to bring a reciprocal approach to design.

In October 2019, the students met with the council of Iskatewizaagegan to discuss the overall goal of the community in regard to the feasibility study for the culturally based recreational park and met again in November with other community members to inform our designs more meaningfully. After spending time to listen and share with the community, the land and the community has helped me to recognize the importance, power and knowledge that water [nibi] holds, and the traditional knowledge that is associated with nibi; the making of the birch bark canoe. Part of the research for this studio, Braiding

Sweetgrass by Robin Wall Kimmer was read, and my understanding of the importance of our awareness and connectedness to the land was strengthened. As an Indigenous person myself, I have struggled with the lack of knowledge I have in my own culture and connecting it to architecture. This book has brought me closer to my culture; Robin Wall Kimmer articulates what I am feeling. "There was a time when I teetered precariously with an awkward foot in each of two worlds—the scientific and the indigenous." ... "It is this dance of cross-pollination that can produce a new species of knowledge, a new way of being in the world. After all, there aren't two worlds, there is just this one good green earth." (p.47) In my case, it is the architectural 'world'. This expression of the western life and traditional life has helped me ground my work in an honest and in a good way.





North Section of Nibi Accommodations Building

The architecture of Nibi Studio is meant to encourage visitors to see how the land can be blended with architecture, to be reminded to play like a child, to engage with the land, to remember the strength of our ancestors, and to listen, learn, and to make.

The process of making a birch bark canoe is intricate, time-consuming, and rooted in traditional knowledge. It consists of many layers; the wood frame, the birch bark wrapping the frame, the sewing, the interior layers of bent wood, and the finishing materials such as animal fat and tree sap to gum the seams. This element of layering can be seen within the architecture of Nibi Studio. First, there is the structure consisting of the columns and floor joists. Then comes the layer of the floor and walls. Following, are the beams just below the roof, and finally, the curved

roofs and the joists within are layered with different heights. When a visitor enters Nibi Studio from the water, they will be welcomed by a complimentary wood structure with similar layers with a backdrop of trees. Additionally, when visitors arrive at the accommodations building, they will have passed through the thick bushes to be greeted by a wooden structure with beams and columns that form a more intimate outdoor space for gathering and sharing. This space has direct views to the cardinal directions East and the West which are culturally significant in the Anishinaabe culture. Ultimately, Nibi Studio seeks to celebrate the traditions and knowledge of Iskatewizaagegan and amplify the reciprocal relationships between humans, the land and traditional knowledge through architecture.



Site Plan



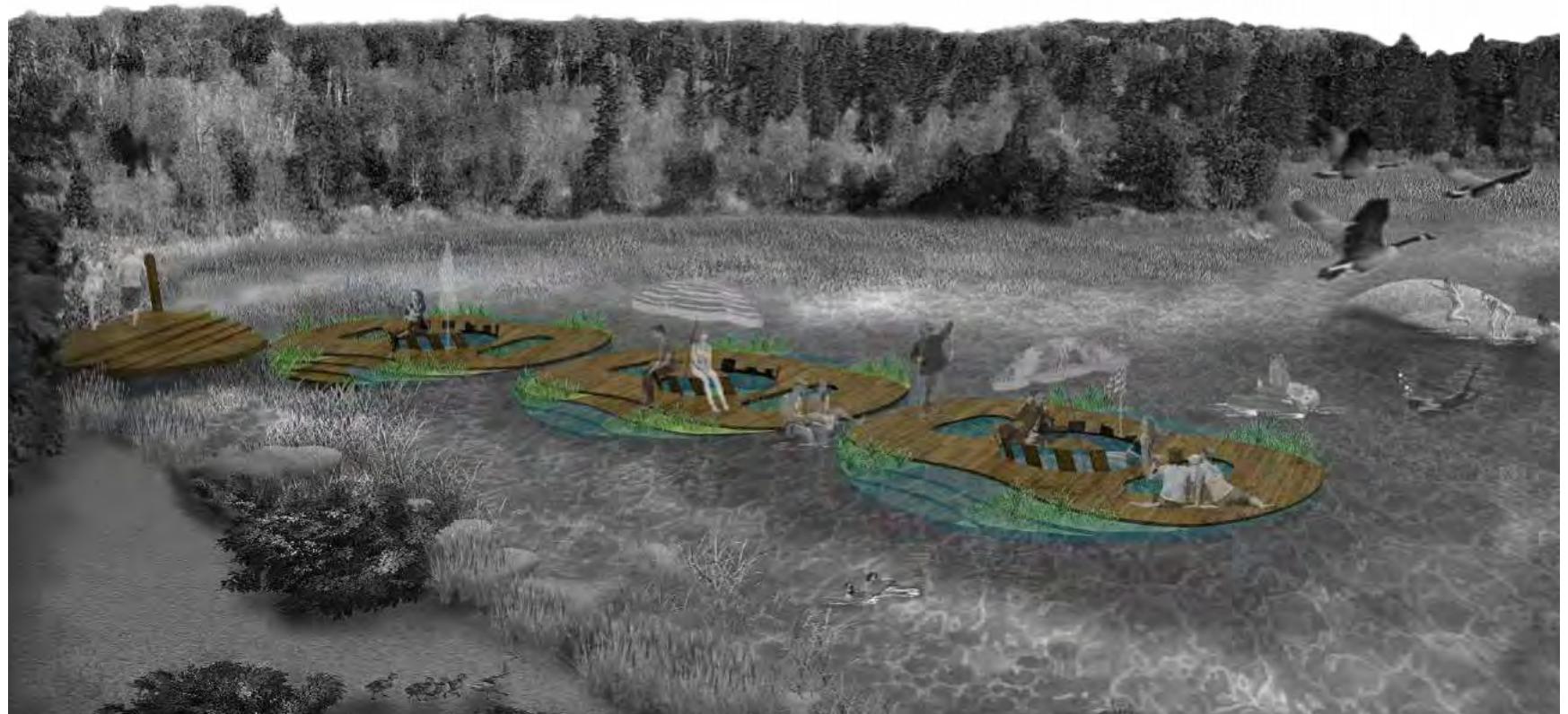
Building Entry



Feasting Area

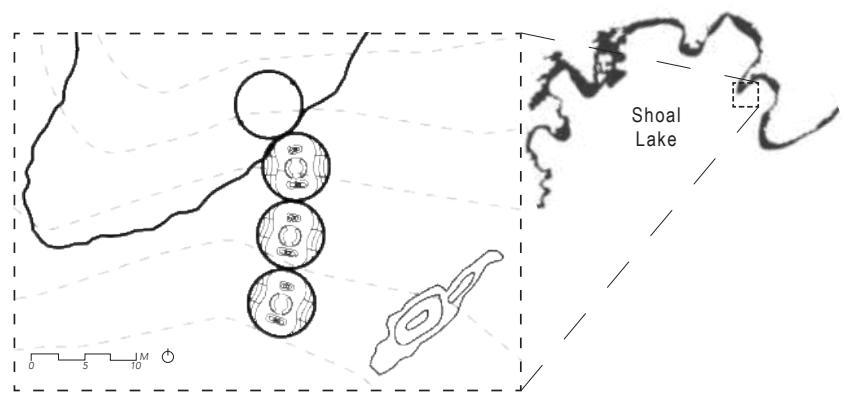
MODULAR FLOATING DOCKS

Aaron Bomback (ED4 Landscape Architecture & Urbanism)

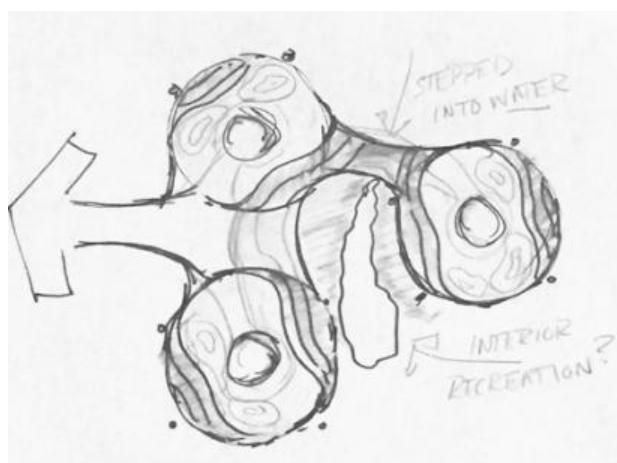
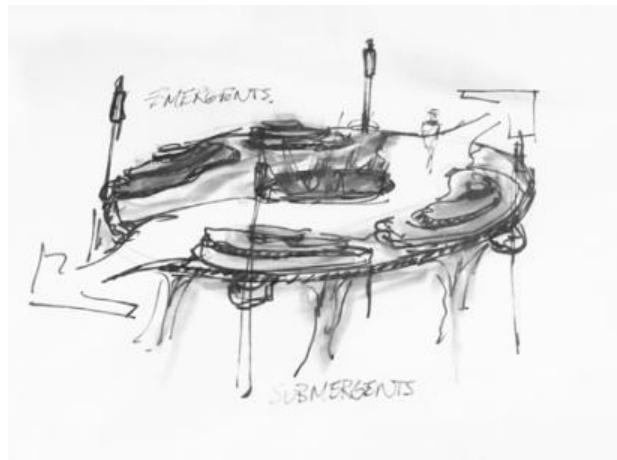


Lacustrine wetlands along Shoal Lake, Ontario, are critical ecological assets that keep the lake healthy. This project creates minimal disturbance to ecological services that occur along the water's edge and littoral zone while responding to addressing how to tread lightly to protect sensitive waterscape ecologies. By working in collaboration with the Iskatewizaagegan people of Shoal Lake Reserve 39A, the concept design for modular floating docks explored how to move the human activity away from the shoreline and into the water. Floating modular docks, as concluded through research; will cause the least ecological disturbance to the lake bottom, provide fish cover, ride out fluctuating lake levels, and does alter water currents. The concept design aims to balance human recreation with the aquatic life and ecologies within the

littoral zone of Shoal Lake.



Process Work



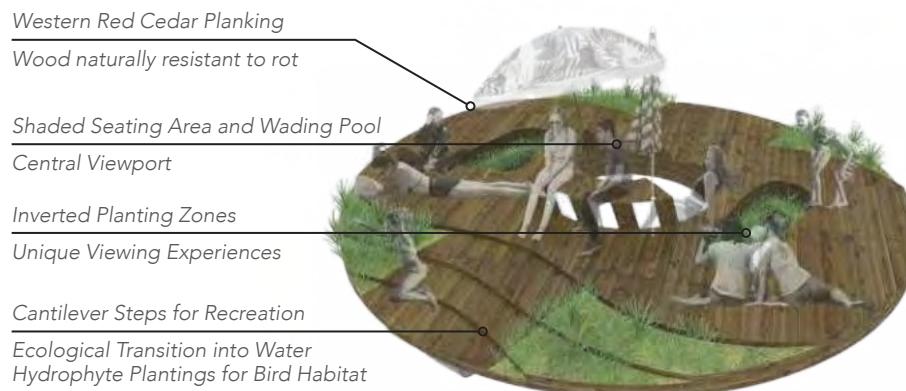
By conducting a physiographic inventory of the site, the process work explored how to utilize existing conditions and ecological processes on the water. Sketching was used as a medium to learn about the ecological relationships and identify opportunities to connect the landscape with the needs and desires of the Iskatewizaagegan people. Through this process work, the design intent was to create modular floating docks that are partially submerged with stepped edges that create a transition between spaces above and below the water, allowing unique recreational experiences that reveal these ecologies.



Modular Concept Design

For this concept design, as the shoreline has no useable beach due to the need to preserve the lacustrine wetlands, the use of floating modular docks then takes on the role of creating a beach experience. The concept design allows design components and materials to cause minimal direct disruption to submerged lands, while viewports allow sunlight to the aquatic plants and fish habitat below the water. The low and heavy profile of the modular dock enables increased stability on the lake while floating docks offer advantages that it can be removed from the water in fall and replaced in the spring.

Design Components and Materials



Recommended Wood Construction:

Western Red Cedar, Redwood, Cypress, Eastern White Cedar.

Recommended Plantings for Emergent Species:

Sedges, Cottongrasses, Wild Rice, Rushes, Bulrushes, Wool-grass, Common Reed Grass, Arrowheads.

Recommended Plantings for Submergent Species:

Coontails, waterweeds, tape-grass, stoneworts, pondweeds (no floating leaves).

Floating Barrels for Buoyancy

Hydrodynamic Stability

Hydrophyte Vascular Roots

Submergent Plants

Habitat for Fish and Plankton

Creates Protection from Predators

Stabilizing Weights

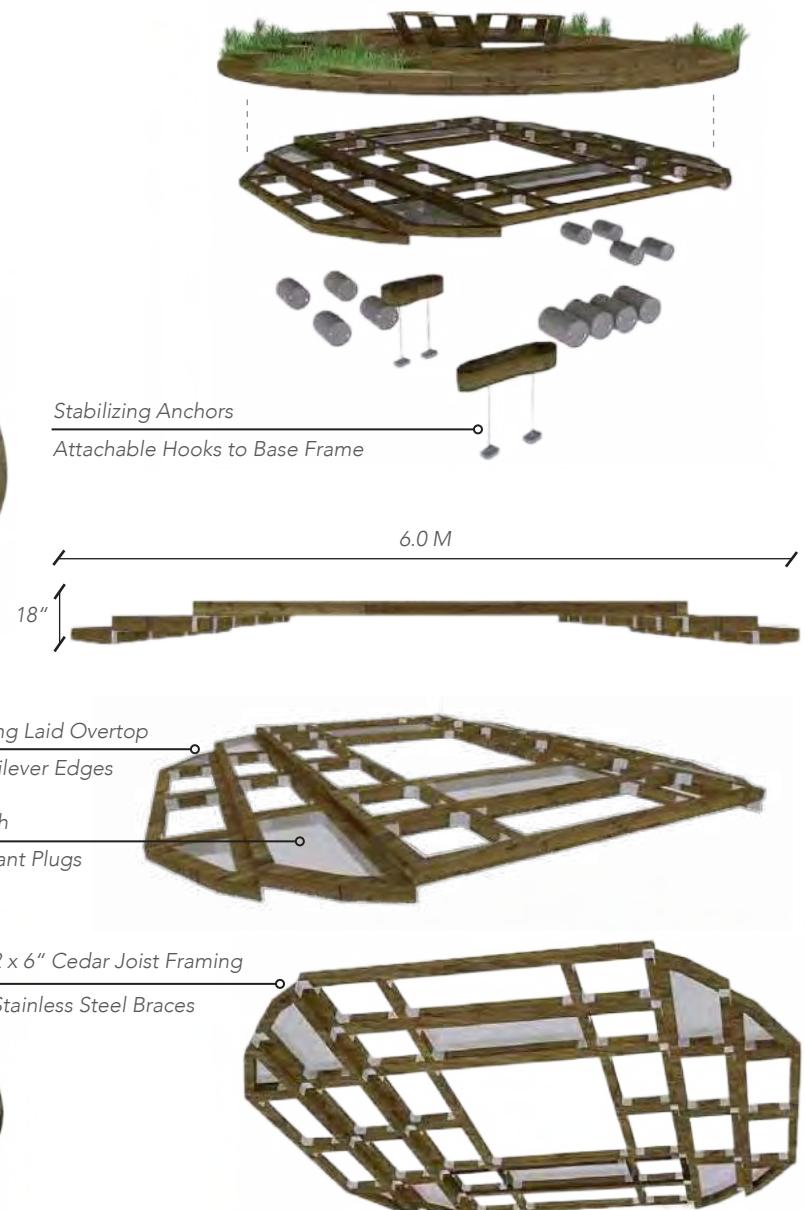
Fish Spawning Mops

Construction and Weight Capacity

Weight: +/- 4,885 pounds (structure approx. 3515 lbs; people approx. 1370 lbs)

Min. Barrels: 11-12 (approx. 450 lbs/barrel; additional 4 barrels for safety)

Capacity: 10 persons



Design Strategies and Possibilities

The concept intends to create a flexible approach to protect the existing ecological services provided by Shoal Lake while offering a variety of program phasing possibilities through its modular design.

Strategy 01 (Leisure)

Small development footprint along the shoreline. Consists of 1 modular unit that can support approx. 10 persons.

Strategy 02 (Leisure/Swim)

Medium development footprint along the shoreline. Consists of 2 modular units that can support approx. 20 persons.

Strategy 03 (Leisure/Swim/Fishing)

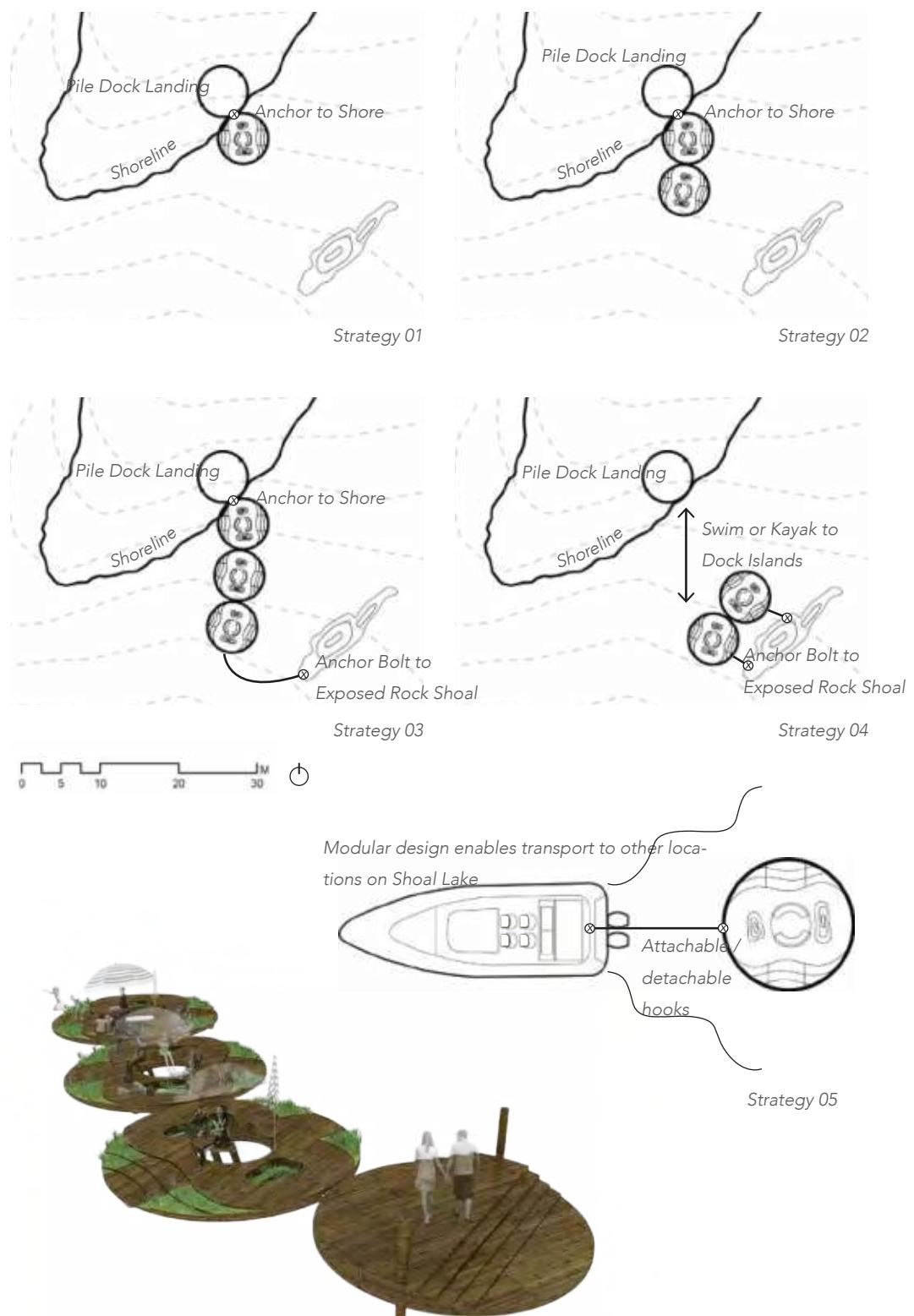
Large development footprint along the shoreline. Consists of 3 modular units that can support approx. 30 persons.

Strategy 04 (Swimming)

Least development footprint due to floating islands that take advantage of exposed rock shoals as anchor points. Consists of 2 modular units that can support approx. 20 persons.

Strategy 05 (Transport/Maintenance)

Modular units permit towing by boat to allow alternative placements along the shoreline throughout Shoal Lake and to be removed from the water in fall and replaced in the spring.





Waterscape Ecologies: Above and Below the Water



Pelagic Zone
Deep open water zone containing phytoplankton (algae) and zooplankton (animals) and larger organisms like fish species.

Benthic Zone
Lake bottom containing larger macroalgae, macroinvertebrates (e.g. insect larvae, snails, amphipods, clams, etc.) and minnows.

Littoral Zone

A	B	C	D	Planting Zone
Deep Zone	Mid Zone	Shallow Zone	Transition Zone	

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CONCEALED LIVING CABINS

Tanner Fardoe (ED4 Landscape Architecture & Urbanism)



Cabin Location Map



Cabin View Shed Map

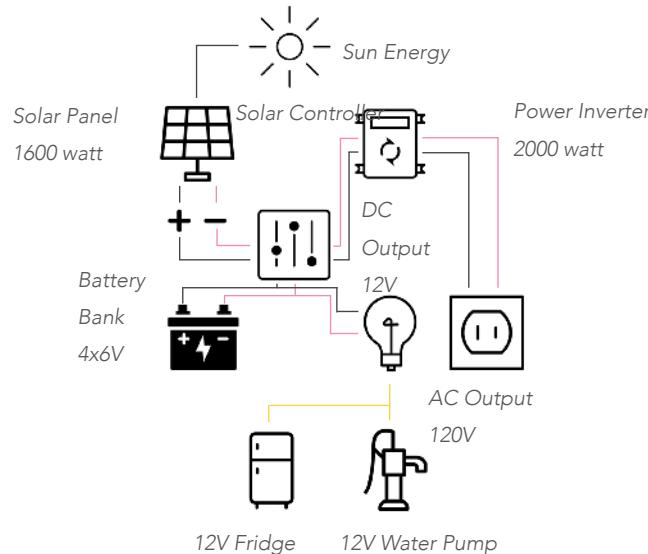


The focal point of Concealed Living is West of the main central camp site. The proposal allows for outdoor enthusiast to put aside their busy lives or a period of time. Each mono cabin is placed upon the landscape in an attempt to minimize the ecological footprint in which it develops. Each individual mono cabin is situated amongst the landscape to reduce the noise of other campers and or visitors. Situated around steep elevation changes within the landscape, and dense forest, one cabin is unable to be seen by other cabins. The experience of being secluded is achieved by developing

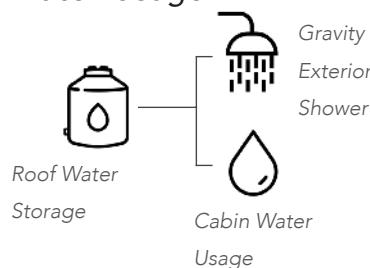
a program that doesn't allow for other human interaction. Strategic placement of the cabins enhance landscape views. Situated within prime white tail deer habitat, feeding grounds, and bedding areas, the mono cabins are placed to eliminate friction with wildlife present on site.

On the left there is a map showing the placement of possible cabin locations, walking paths, and low drainage basins within the landscape that is prime wildlife habitat..

Solar Power:



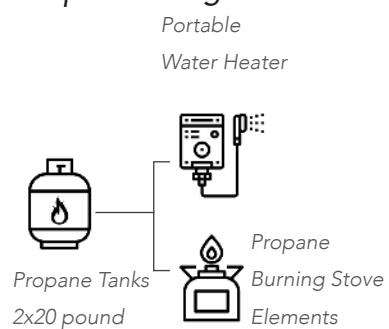
Water Usage:



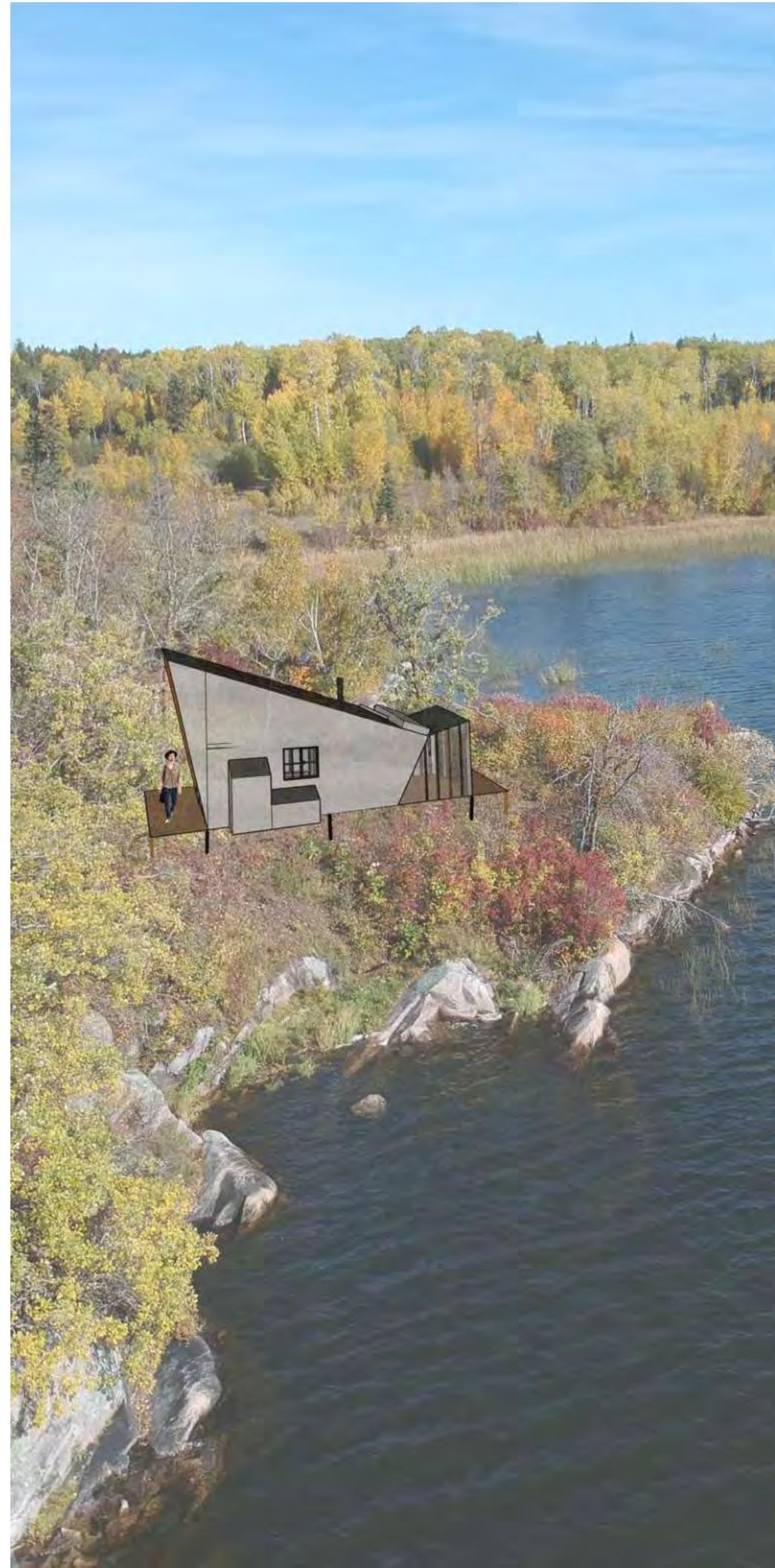
Human Waste:

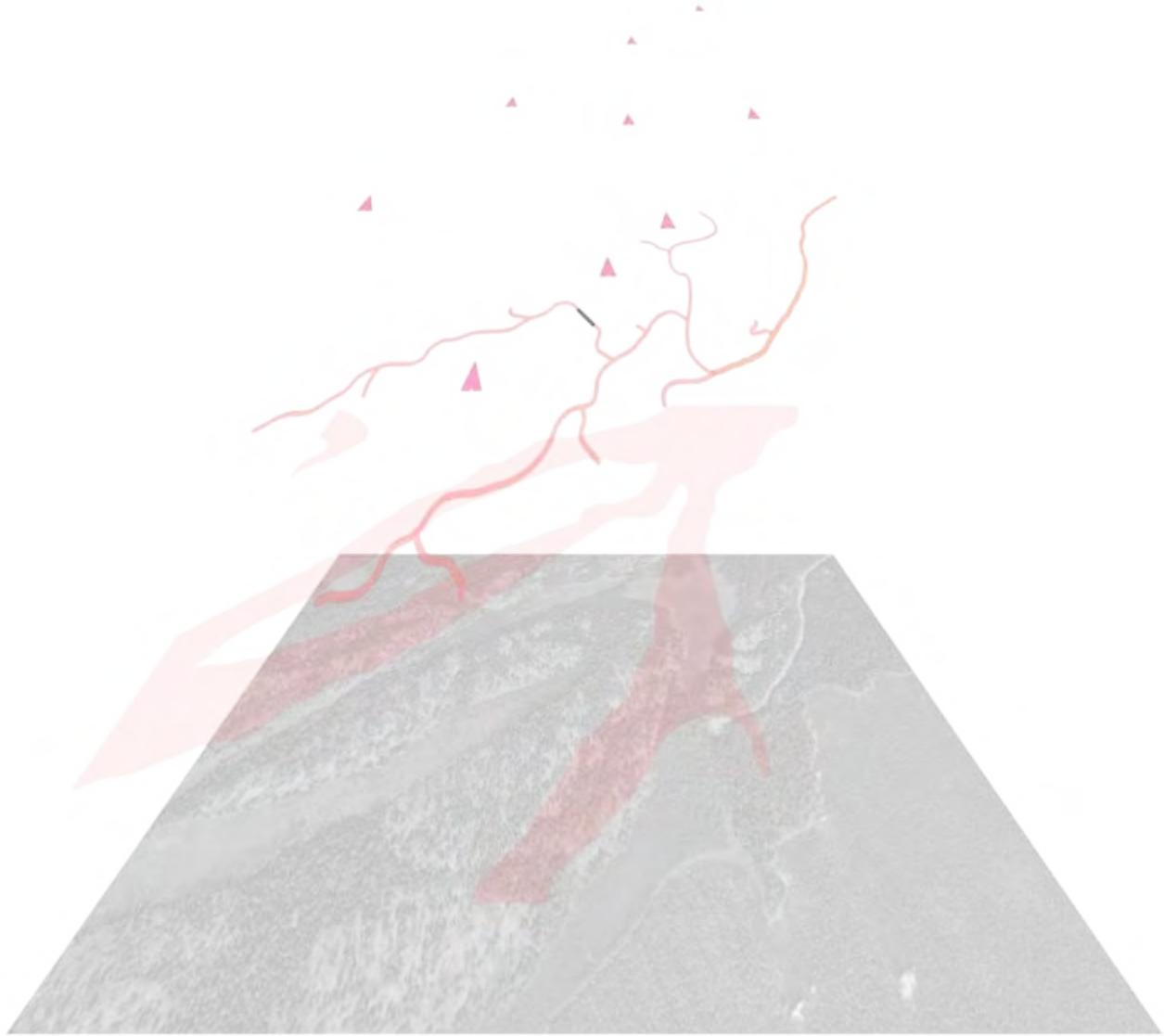


Propane Usage:



The cabins can be utilized for various activities, such as hunting, hiking, snowshoeing, and camping. The concealed living concept allows for the user to be disconnected from everyday life, and allows the utilizer to become connected to nature, their natural surroundings, and wildlife that inhabit the stunning environment.





Rental Cost: \$200.00 per night at two nights per week for spring,
summer, and fall.

April 1 - September 30: 27 weeks

2 times per week:

Total Revenue: \$10,800.00

4 times per week:

Total Revenue: 21,600.00

Solar Panels:

SunPower Solar Panels
4 x \$300.00



Fig 1

Power Inverter:

Victron Energy Blue Power
Victron Phoenix Inverter 1200VA
\$400.00



Fig 2

Battery Storage:

Rolls Surrette – S6 GC2-HC (S-290) 6 Volt
Battery (4)
4 x \$220.00



Fig 3

Water Pump:

Flojet 12V DC Water System Pump
\$100.00



Fig 4

Wood Stove:

Century S244 Small EPA Wood Stove
\$599.00



Fig 5

Water Heater:

Eccotemp L5 Portable Tankless
Water Heater
\$176.00



Fig 6

Compostable Toilet:

Sun-Mar Centrex 1000 Non-Electric
Waterless Ultra Low Flush Central
Composting Toilet System
\$1903.00



Fig 7

Propane Stove + Propane

Unique 24" Gas Cooktop
\$521.00

2 x 20 pound propane tanks.
\$40.00 + refills



Fig 8

Fridge:

Dometic DM 2652
\$2072.00



Fig 9

Stainless Steel Water Tank:

Custom tank from a local welding shop
Approx: \$400.00



Fig 10

Total Off Grid Component Cost: \$8291.00

Building Cost: \$12,000.00

Approx Total:

\$20,291.0

Versus

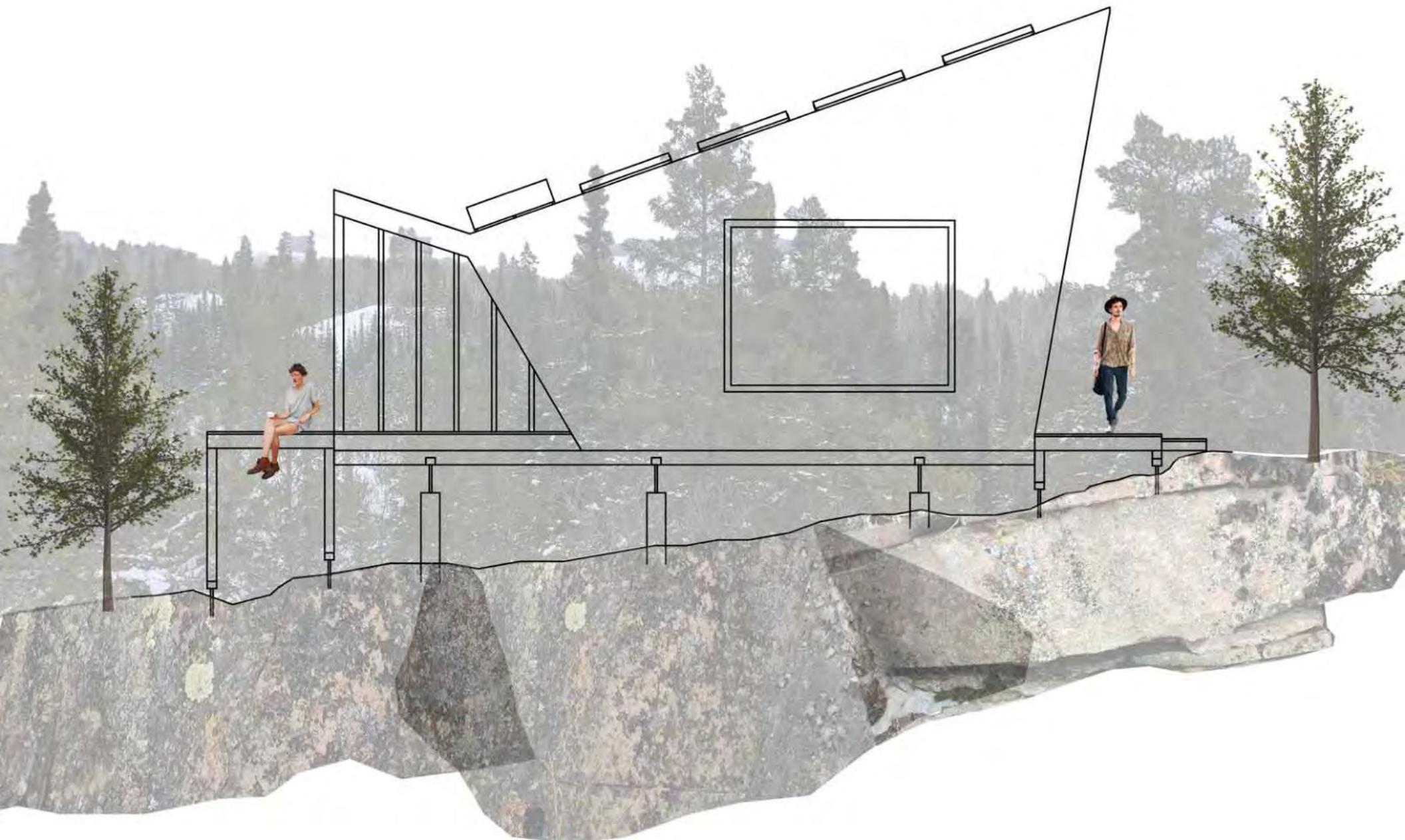
Grid Power Cost:

1/2 Mile of Grid Hydro Input Cost: \$21,000.00

Building Cost with Wiring + Plumbing: \$16,000.00

Approx Total Without Appliances:

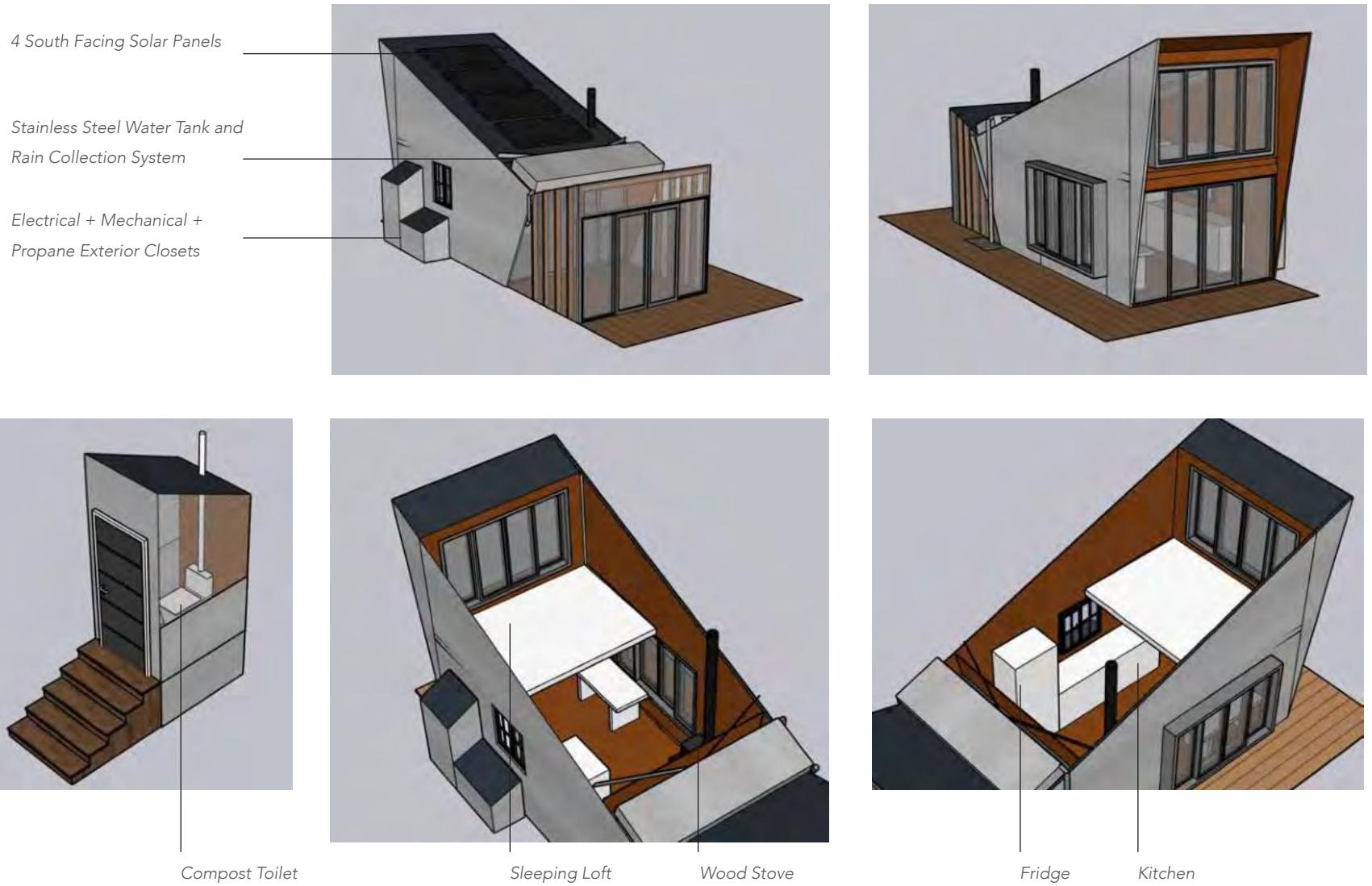
\$37,000.00



Concealed Living Cabin

The Concealed Living Cabins have the opportunity to provide a community with an economic income, while being extremely environmentally friendly. Ecologically, the cabin design produces a small footprint, the pollution and waste produced is extremely low, and the opportunity to reconnect to the landscape is available. Each Mono-Cabin will be designed with an exterior

outhouse with compostable toilets for waste. On the roofs of the outhouses, solar panels will be utilized for elimination of a connected grid power source. These mono cabins and outhouses can be built within the community with the majority of local wood products and materials to reduce cost and promote efficiency, and have a low environmental impact.



The mono cabin and outhouse facade is finished with stainless steel to illuminate and reflect the natural environment surrounding it. The stainless steel facade promotes the hidden aspect of the cabin. It makes the built form transparent within the landscape, as reflections of trees and rocks reverberate off the walls.

The interior finish is a stained cedar, promoting a aromatic environment, and longevity within the cabin.

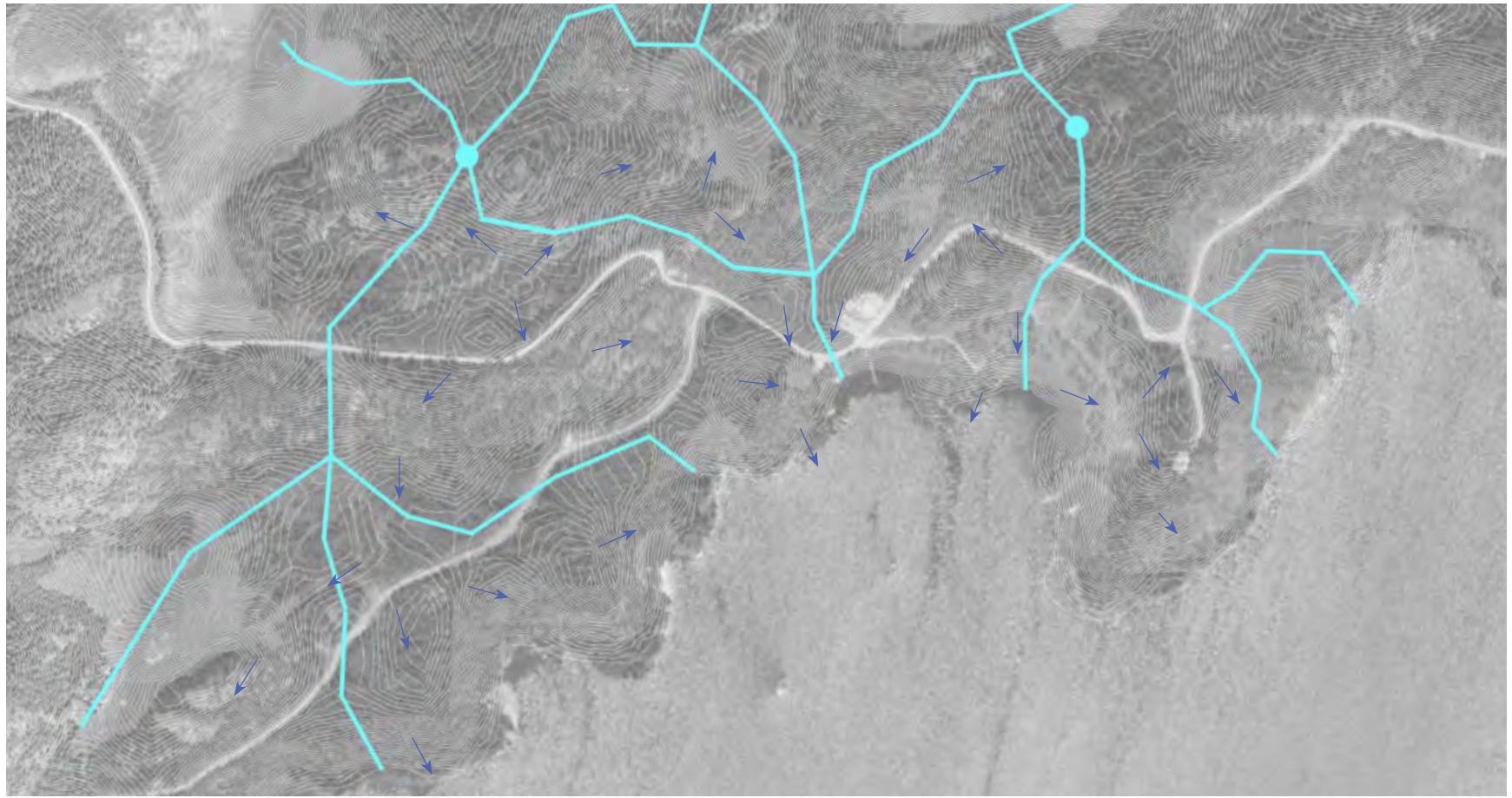
The roof is finished with a dark black tin for heat attraction, and to add a modern look to the cabin.

The south facing veranda is covered in 6" page wire and mesh to keep out animals and insects.

Sliding glass doors on the front, back, and the veranda allow for the user to open up the space entirely to the exterior elements.

SOILS AS A FILTER

Charles Calcott (ED4 Landscape Architecture & Urbanism)



Capturing and retaining water is one of soils most important jobs, this happens through the many pores and range of peds that are in the soil¹. The pores of soil determine how water moves through the soil, these pores can range in size from microscopic holes to large earthworm or even gopher tunnels².

Soil with smaller pores slows down the entry of water into the soil, this results in more runoff and even flooding. Meanwhile soil with larger pores absorbs and holds water more quickly. Ideal soil is an assortment of small and large pores, this allows water to move at a steady pace, while also retaining some of the water³. The pores within a soil are determined from the main structure and texture of the soil, these can be and are adjusted by human activity such as additives or compaction.

Soil is made of three main parts, sand, silt and clay. Sand has a coarser texture this also comes with larger pores this compared with clay which has much smaller pores, thus a mix of these three make a diverse structure of pores and these also determine the texture⁴. A soil heavy in sand will have a coarser texture, while a soil heavy in clay is smoother in texture.

Another factor that affects the flow of water through soil is the amount of land cover, plants and organic matter are the most efficient at capturing water within the landscape, while a hard surface like concrete or tarmac are impenetrable by water and thus do not allow for absorption of water⁵.

Soils act as filters when they capture water, they use physical, chemical

and biological processes to filter the water⁶. These processes are all affected by many factors, from the layers of the soil to the type of organic material present within the soil:

Physical filtration

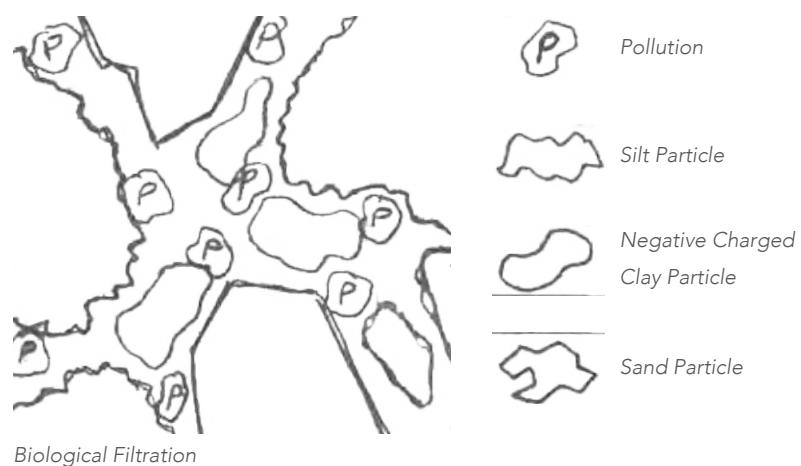
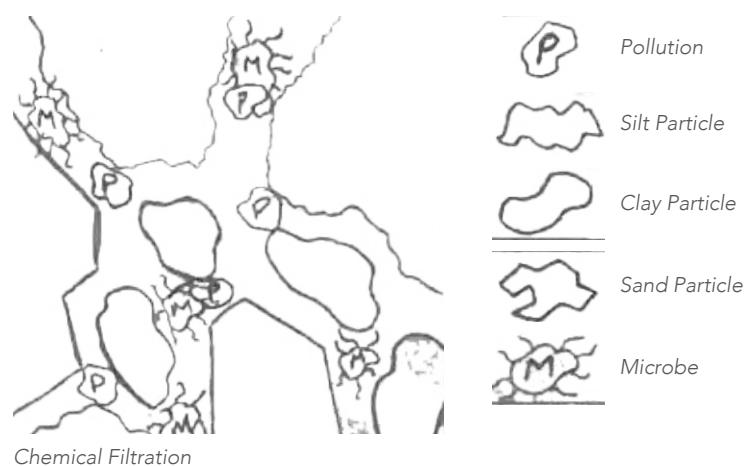
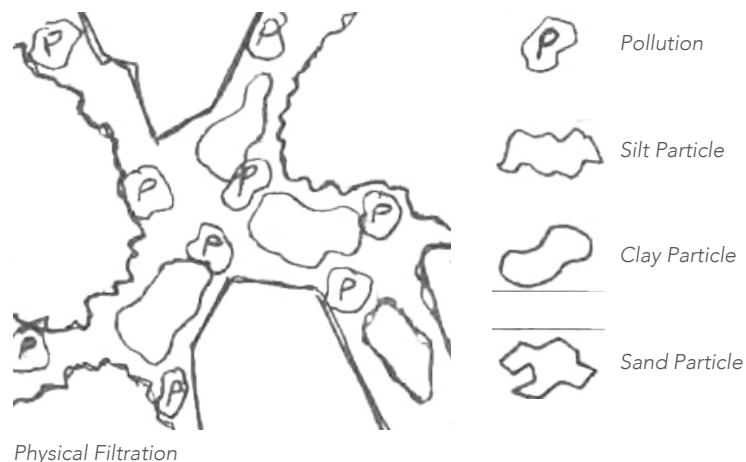
Pollutants carried by the water are caught in the small pores of the soil, the soil acts as a screen or sieve, separating the large particles from the soil as they are too big to move through the pores, this is helped by the tortuous path water takes through soil as it provides more opportunities for the capture of pollutants. This method often separates sediments caught in the water along with bacteria⁷.

Chemical filtration

Soil particles are often chemically reactive and thus provide several means by which pollutants and contaminants can be removed or absorbed. Many soils are negatively charged, (especially clayey soils) thus when positively charged pollutants pass through the soil they are attracted to the negative charge and are captured within the soil. Another method of capture through chemical reactions is the formation of covalent bonds, this is when the soil captures pollutants through sharing electrons with the pollutants, this allows many organic chemicals, pesticides and some inorganic chemicals to be removed⁸.

Biological filtration

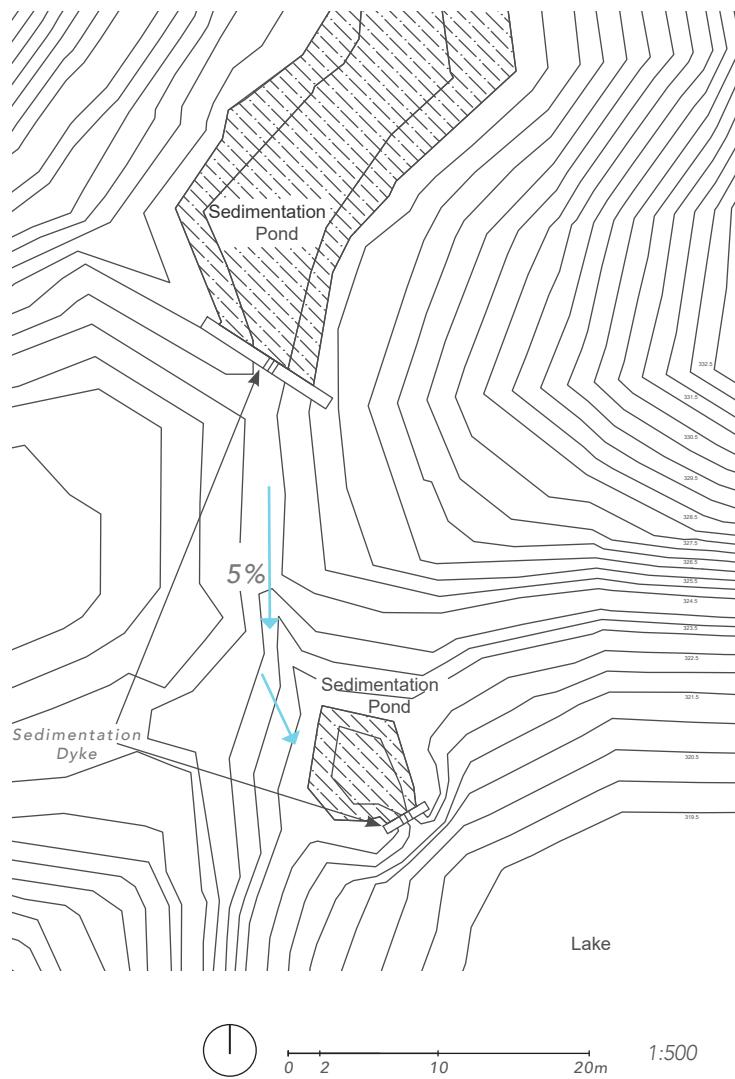
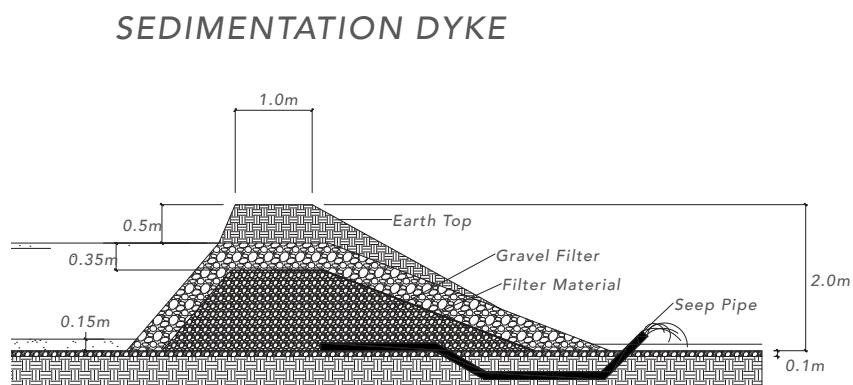
Microorganisms have the ability to breakdown and change both organic and inorganic pollutants within the soil and any water that is passing through it. Water that contains organic material from food and animal production often have high oxygen demand, thus the microorganisms break these down and remove them from the water⁹.



Marina Drainage

Drainage around a marina should focus on the removal of pollution, the marina ecology would benefit from the flow created from sedimentation pond outflows. The sedimentation pond allows any pollutants to settle to the bottom while pollutants are also filtered out through the process of the water moving through earthen dykes used to hold the water¹⁰. The water is filtered through different soil textures, the pores will range in size creating a physical filter.

As the water filters through the soil it separates physical particles that are still held within it. The water should be filtered through several sedimentation ponds before flowing into the marina, this slows the movement of water to the marina. This slowing of water movement means that more pollutants will be removed as the water seeps through the soil¹¹. This allows each type of filtration to take place, the physical, chemical, and biological filtration of water limiting the pollutants that do flow into the lake.

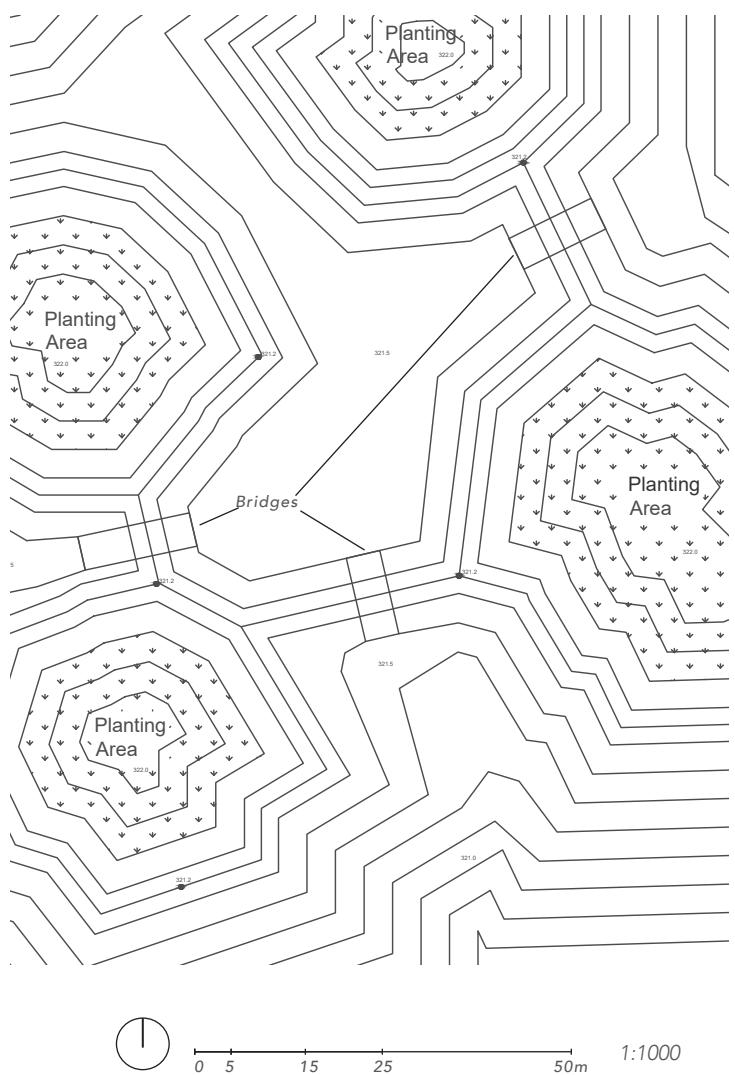
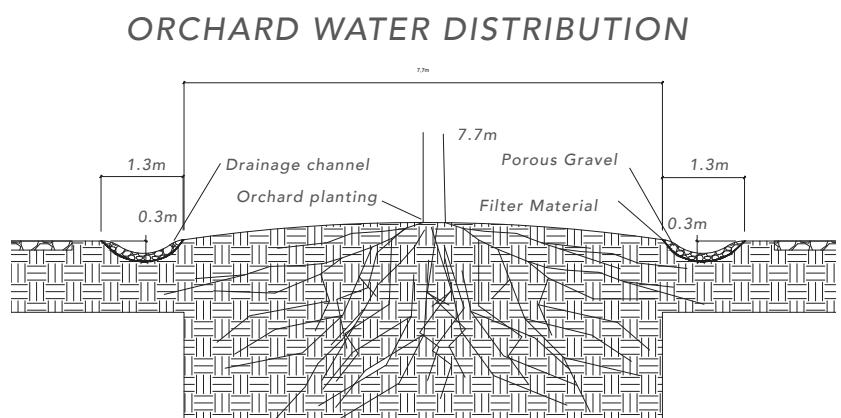


Orchard Drainage

Water within an Orchard is required to be maintained, this balance makes sure that enough water is retained to keep the soil in the conditions required of the plants grown there. Water distribution is the main factor in an orchard, as if water collects or pools it can damage the growth of the plants. This requires a multitude of drainage channels, these will spread the water over the site¹².

Drainages channels will surround small groves of trees to provide water while also allowing water to be moved away from the areas already saturated. The channels should use a mix of gravel and grip sheeting to retain but also allow for water to dissipate¹³. These channels will be located along the drip edge of the tree line, as this is where the roots are closest to the surface but also not covered by canopy. The minimum depth of these channels should allow for water collection but not create water pooling and should drain to other groves to allow for a distribution of water throughout the orchard.

The orchard groves should also be placed on built up mounds, this would allow water to run into the channels and not damage the trees in the grove.

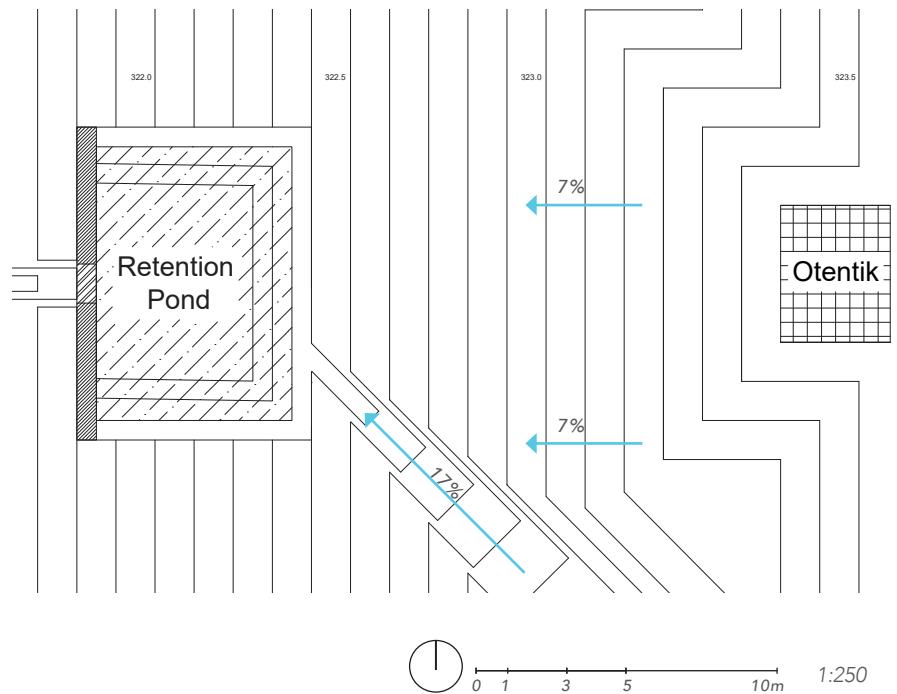


Otentiks Drainage

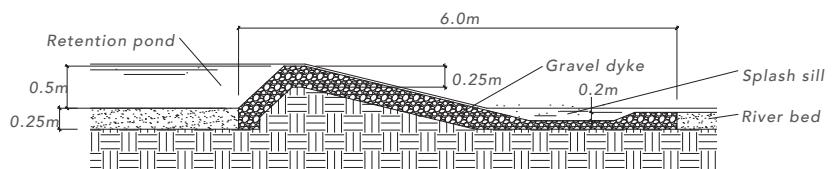
Drainage around camping and buildings areas, should be quick, as water accumulation can have several effects on the built structure as well as creating terrible conditions for activities. The otentiks that would be proposed would be one such situation. Quick drainage of water away from the main site is required, as the otentiks would need to maintain a dry area so as to allow for movement of people and the removal of any potentially harmful pollutants that may have been introduced. Drainage swales would need to be combined with the retention ponds so as water is maintained and pollutants are filtered before the water enters the lake or surrounding ecosystems¹⁴.

The swales would drain water away from the site while filtering the water through the soils and variety of plant life that are contained within them, these would allow for the controlling of water onsite as well¹⁵. These swales would act as a boundary for the site, creating a permeable division. As the water is drained it would be collected in a retention pond to allow for pollutants to be carried along the swales to be separated. Weirs may be introduced to slow the water flow allowing for increased aeration and another filtration method to happen¹⁶.

The retention pond also slows the flow of water down allowing for the control of water on site, this allows for the water to be used in many other ways. The drainage of water away from sites of human activity should focus on the filtration of pollutants, this requires several systems to be created. The water in the swales and retention ponds should be filtered through the soil before returning to the ecosystem (see next section on phytoremediation).



BOULDER WIER

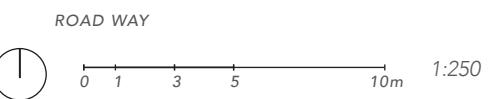
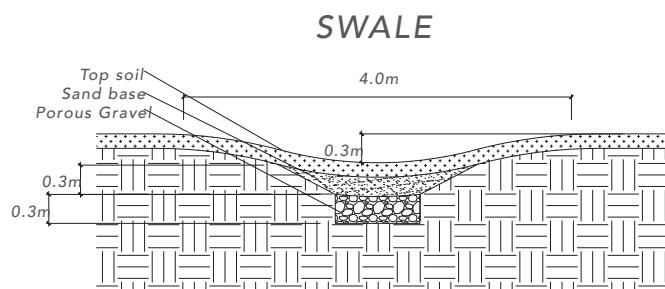
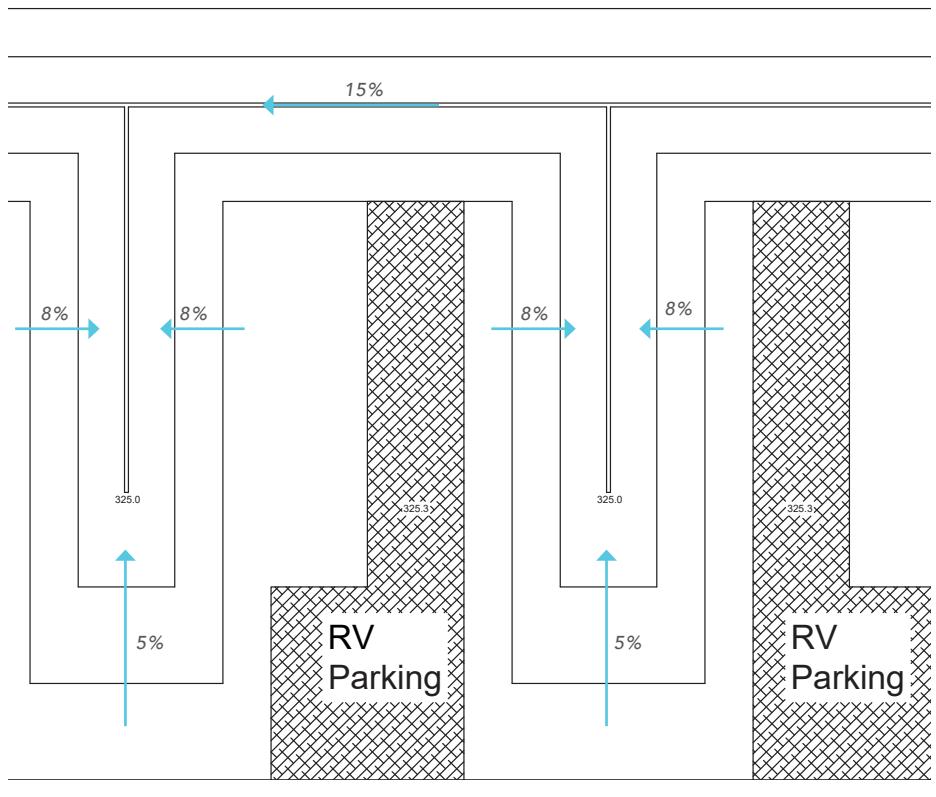


RV Park Drainage

Swales are used for drainage of water away from a site, they allow for the seepage of water and the removal of pollutants, this type of drainage system is important for such areas as RV parks and parking lots, they allow for the collection of water off hard surfaces and increase the rate of removal as they allow for the transfer of water over large areas through the porous materials that are placed within¹⁷.

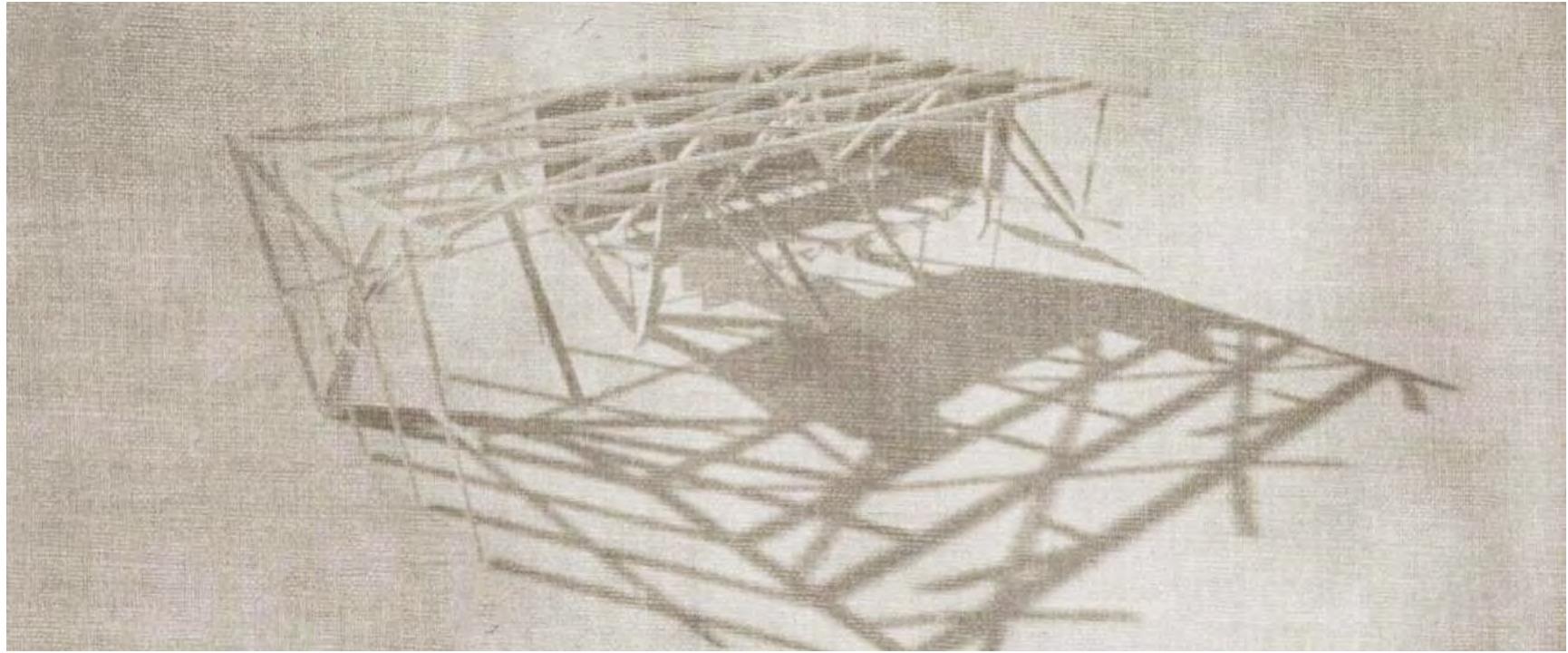
The porous materials such as gravel, seep pipe, and sand often are used as a base for swales as they allow for the removal of pollutants through the act of physical and chemical filtration but also water moves through them quickly¹⁸. Swales also filter as they move water allowing for seepage to occur over large areas.

Swales are the first in a series of filters this means that as the water flows along the swale it is being processed through the soil or porous materials present within the swale¹⁹. This means that while the swale is filtering it is also capturing some water thus maintaining the balance of water within the area.



CONSTRUCTING THE PREFABRICATED

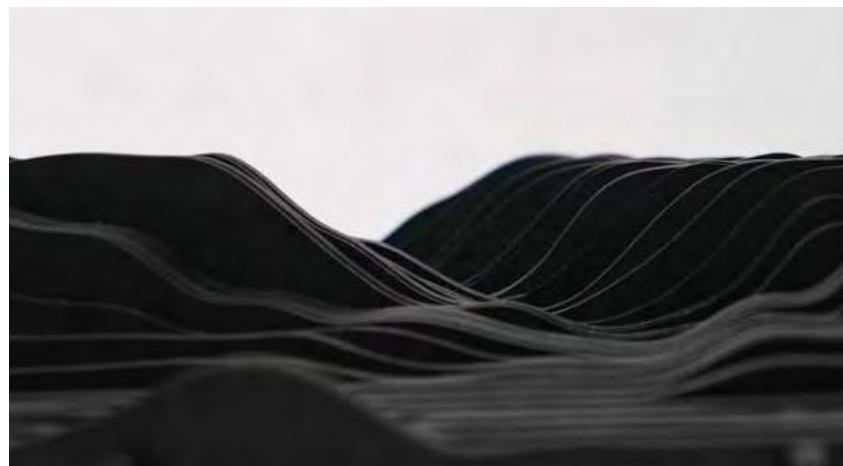
Nick Krahm (ED4 Architecture)



Shoal lake 39 is home to many people, surrounded by beautiful lakes and forests. The community contains a school, homes, a community centre and other necessary infrastructure to sustain life on the land, but one facility may be missing from the community. This missing link is what my project centralizes on, it is the ability to create and develop homes, cabins, and other buildings in an economical sense as well as being consciously environmental. To do such a thing, a facility would have to be developed that could provide the ability to teach people about construction technologies and new techniques. My approach to the design of this facility has been centred around understanding the tree, as the tree is an integral source of material for construction as well as the heart of the environment. The tree provides shelter and shade, it reaches into the sky, it holds life and it inspires. Like the tree, the shop facility holds life, it provides shelter, but more importantly it is a source of inspiration for the teaching of skills that happen within.

The facility is broken up into two distinct structures, both of which serve a purpose, creating a symbiotic relationship between the structures as well as their program. Sitting beside each other, the building to

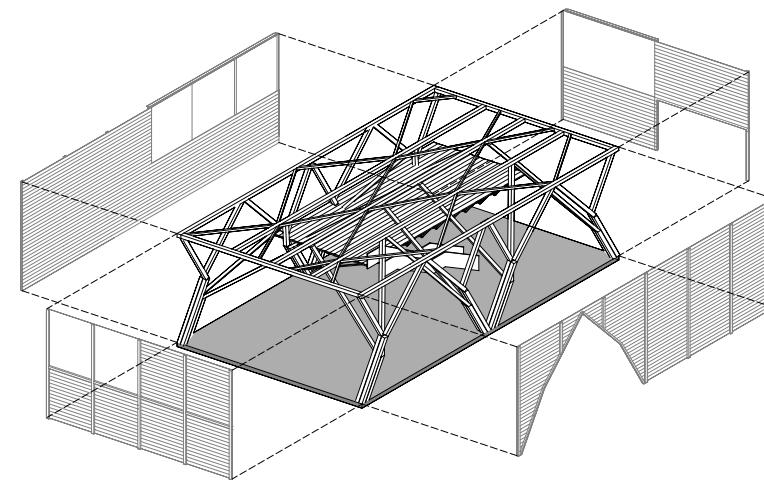
the south is home to a wood shop, metal shop, computer processing/development space, teaching spaces, as well as a robotic arm area. This structure is where students would learn from master residence's about various construction techniques, in particular pre fabrication. 30' to the north across a concrete pad is the large spacious assembly building, here construction takes place. To imagine the assembly of a small prefab cabin step by step one would have to begin at the arrival of material. From here material would be transformed and constructed into its larger parts, finally being assembled together as a whole. This process translates into a linear motion that moves throughout the two structures, beginning on the west side of the development structure and finally being fully realized within the assembly structure, then moved to their destinations. These stages of construction are much like growth, as is the nature of the buildings themselves. At the most basic, what gives the building strength is its tree like combination of beams and columns, developed to be constructed piece by piece in an upward motion, to resemble the simple aspen tree, yet at the same time an efficient construction technique.



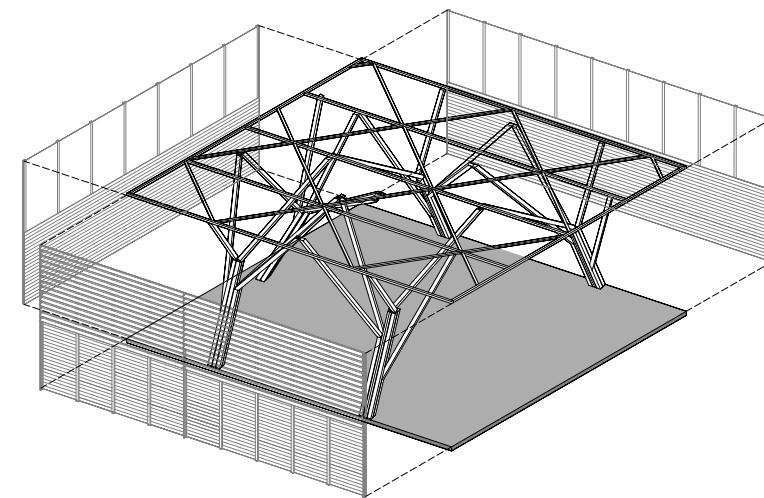
Site model illustrating topography of terrain







Research building

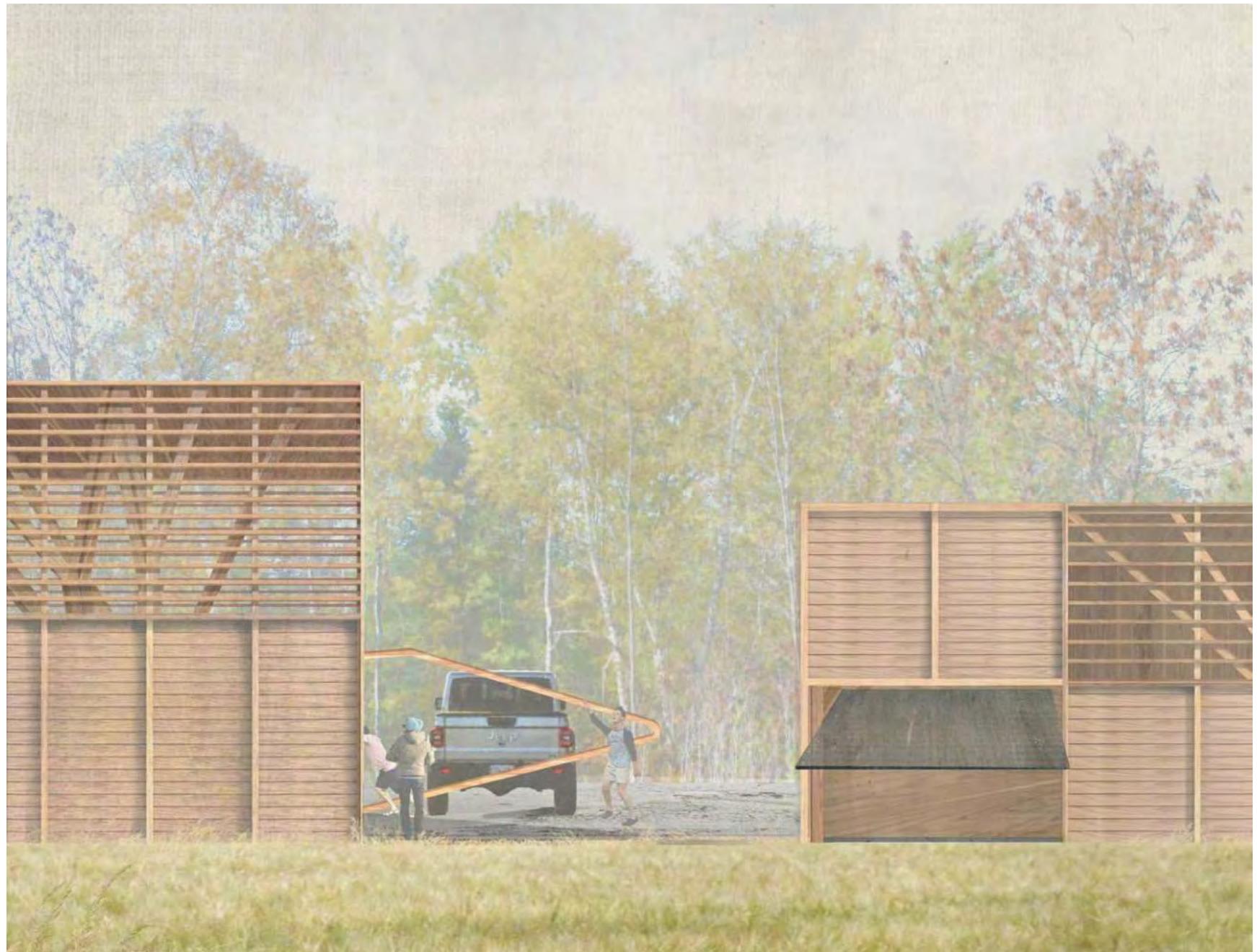


Assembly building



A possible approach to the use of these structures and what could be produced by them may look something like this; Using the skills of prefabrication a step could be made in the development of small cabins within the rocky, wooded, and beach areas in the easter portion of shoal lake providing experience's in various terrains, learning the skills required to build upon different bases. From theses cabins, a small house could be developed and constructed, using materials on site, a sustaining form of construction may be achieved. Furthermore using these skills to provide extra economical support for the community

as well as the teaching of various skills. With the assembly and development buildings in mind, I have developed a small prefab cabin called "nook" that also takes its inspiration from the tree, centralizing on the idea of harvesting architecture. Nook takes into account various construction strategies, with one possible technique that utilizes 3D printing technology, using materials found on site a bio-plastic can be created and extruded through an industrial robot arm. The 3D printing of this design can also be replaced by a wooden structure if needed, but both are supplemented by the use of on site materials.



CONSTRUCTING THE PREFABRICATED *Nick Krahm*



"MAADA'OKIIN" - to share

"It is an animate earth that we hear calling to us to feed the martens and kiss the rice. Wild leeks and wild ideas are in jeopardy. We have to transplant them both and nurture their return to the lands of their birth. We have to carry them across the wall, restoring the Honorable Harvest, bringing back the medicine."

Robin Wall Kimmerer,
Braiding Sweetgrass, p. 201





MAADA'OKIIN SHARE

By invoking the ideas of sharing in the design conversation, a number of dominant ideas emerged. We believe in the importance of curiosity, of being genuinely interested in the ideas of others, but also of questioning with a sense of humility, realizing that we must be open not only to the ways of others but curious to understand how others see the world. Being open to others requires empathy, cultivating an ability to understand the feelings of others. The others that we would try to consider include the people of the community, but also to develop a sense of place, and to act with respect for the species and living systems of the Iskatewizaagegan First Nation lands. In thinking about our relation to the land we have tried to invoke Kimmerer's thought about the Honorable Harvest. - RP

The guidelines for the Honorable Harvest are not written down, or even consistently spoken of as a whole – they are reinforced in small acts of everyday life. But if you were to list them, they might look something like this:

Know the ways of the ones who take care of you, so that you may take care of them.

Introduce yourself. Be accountable as the one who comes asking for life.

Ask permission before taking. Abide by the answer.

Never take the first. Never take the last.

Take only what you need.

Take only which is given.

Never take more than half. Leave some for others.

Harvest in a way that minimizes harm.

Use it respectfully. Never waste what you have taken.

Share.

Give thanks for what you have been given.

Give a gift, in reciprocity for what you have taken.

Sustain the ones who sustain you and the earth will last forever."

Robin Wall Kimmerer,
Braiding Sweetgrass, p. 183

MINWAAJEMO: A STORYTELLING PLACE

Romilie Calotes (ED4 Architecture)



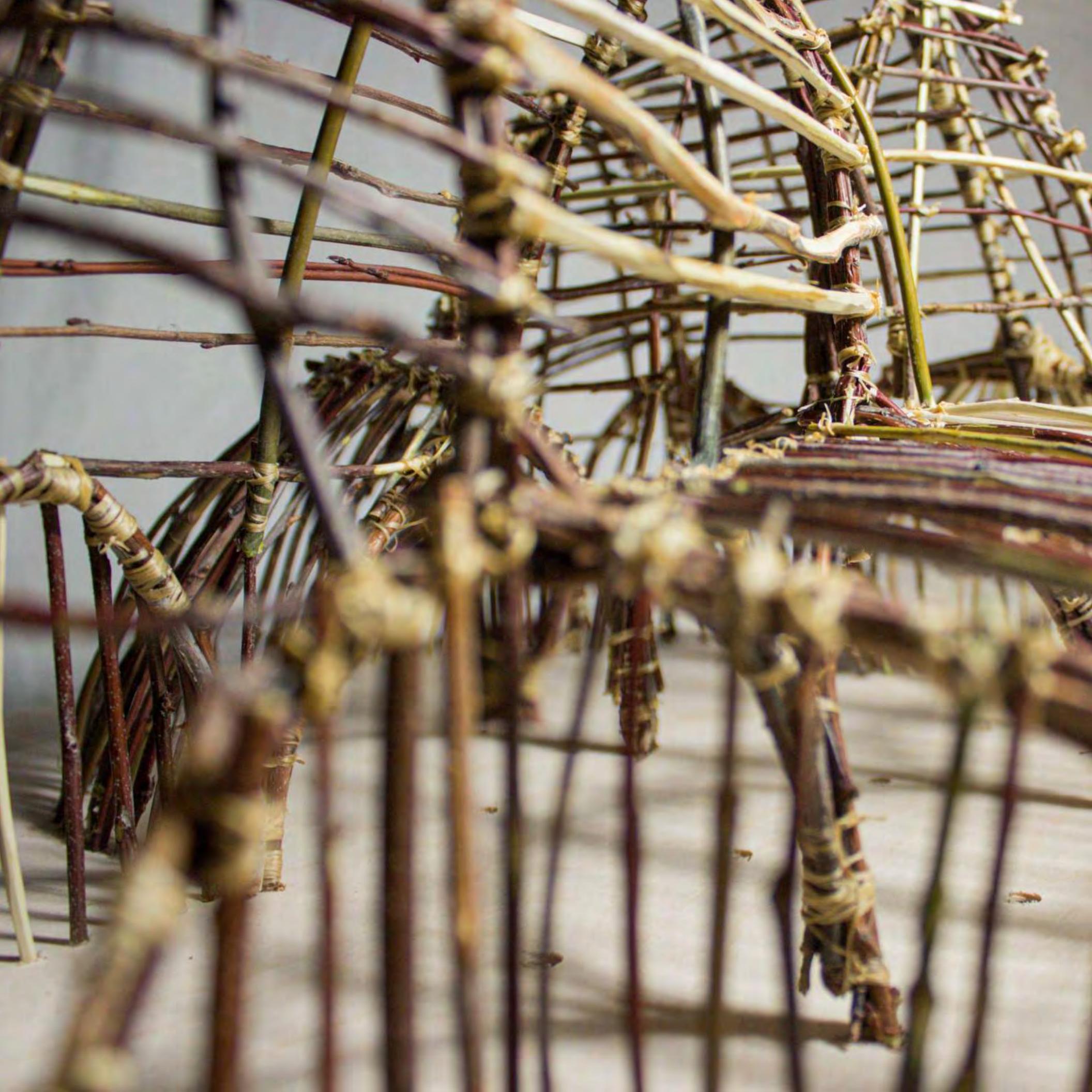
Inside Minwaajemo

"It is not enough to just grieve, we must now clean and form relationship"¹, "to love a place is not enough, but we must heal it"², Kimerer's Braiding Sweetgrass was one of the first readings given to the studio to open our minds up to the indigenous thinking. The readings were critical sources to inspire and allow our group to embrace a holistic approach to the thinking of the project. Kimmerer's careful and delicate description of the land was almost refreshing. This passion sounded from her mindful account of stories that occurred in her personal life was inspiring and consuming. She coined the term honourable harvest: whenever you approach the land, one is to never take the first one, to only take what you need, to thank the plant for its generous gift, and only take what is

given. In the modern age where we often buy our food and goods from a grocery store shelf, we have become disconnected from the impact we make on the earth's natural resources. The honourable harvest is to be kept in mind to regenerate the wounded mother earth.

The project demanded a manner of rethinking the architectural approach to healing, when I attended a public event at the Truth and Reconciliation Centre one of the speakers emphasized the notion of healing that is rooted from coming together and hearing the stories while people dance and live. Her point was that if we create safe spaces for the human soul, healing is naturally the effect of this.



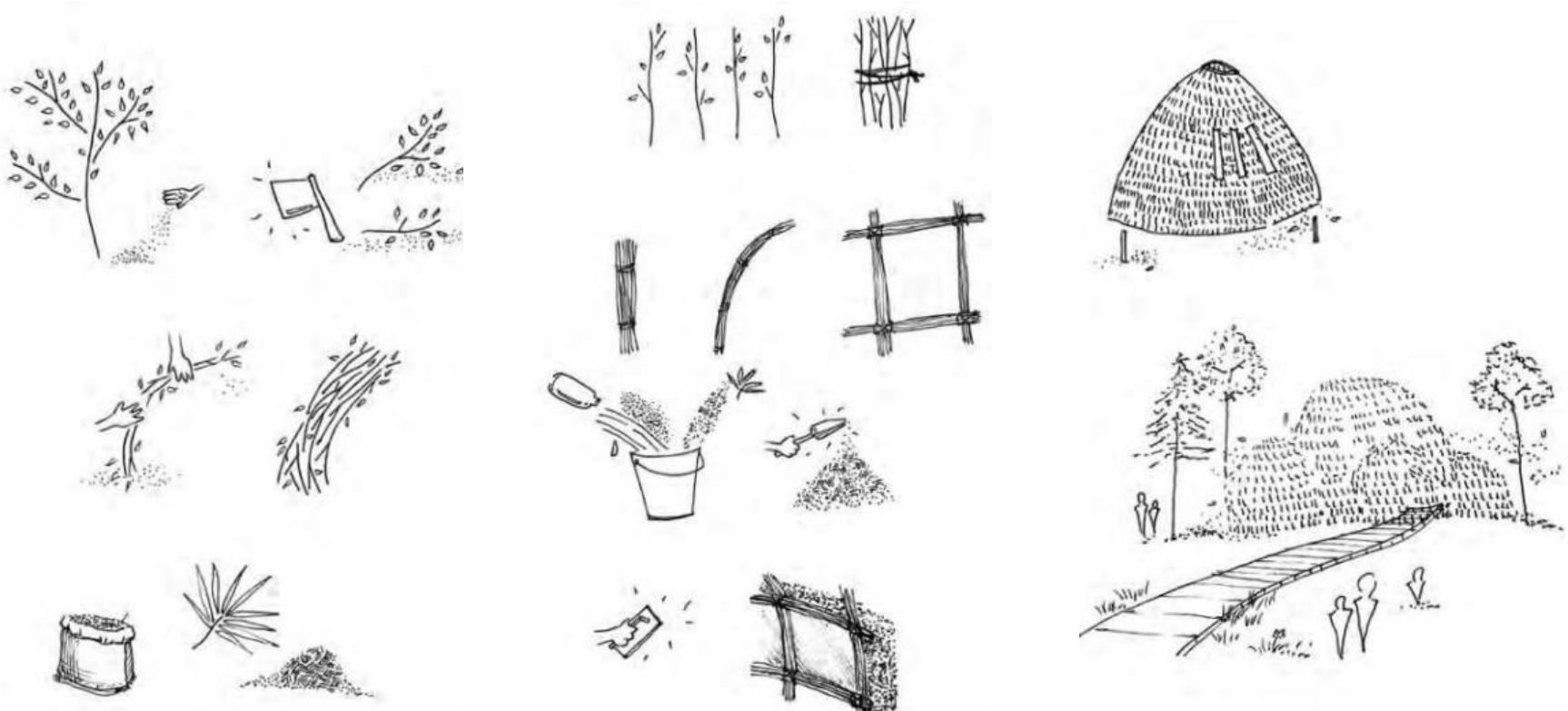




Construction Joint Detail

Much of the research and study was directed to the understanding of the proposed building structure. As I approached the project, I became interested in providing the community with a sort of atypical approach to "building", that coincides with the healing of a distressed nation.

Tanya Talaga's All Our Relations and Seven Fallen Feathers was a more difficult read, in comparison to Robin Wall Kimmerer's Braiding Sweetgrass. At the beginning of the process I often did not know what to do for the community, because I found myself backed up in a corner where I consistently halted my own progress because I felt ignorant and I found the idea of designing for a culture that was recovering from years of hurt as something rather presumptuous. I kept seeing myself as an outsider, but as one of my peers told me, architecture is something we're rather more skilled at, thus to creating good architecture it's how we will help the community, "as long as it comes from a good place in your heart, there's no wrong idea."



Construction Process Illustrations

Hempcrete Construction & Insulation

1. Offer tobacco to demonstrate respect for the elders in the community
2. Cut and gather the willow saplings
3. Bend the willow bundles to provide a strong structural member
4. Source local hemp in sacks
5. In collaboration with the community, construct the webbing willow structure on site
6. Mix 4:1:1 Hemp: Water: Lime in medium sized batches or manageable quantity
7. Add the hempcrete mix to the building with layer of burlap and exterior strapping
8. Exterior cedar shakes are added to protect the hempcrete from rapid weathering

As time went by, more conversations, visits, meals, and dreams were shared, the insecurities slowly dissipated. I gained appreciation for my own strengths and convictions which helped redirect my energy to the design of the MINWAAJEMO.

A natural alternative to typical wall insulation, with additional qualities of 1 ½ hour fireproof rating and insulative efficiency equivalent to 7.3" batt or 7" rigid insulation which are often not naturally sourced or recyclable. A Faculty of Engineering research concluded that a 12" thick wall has an R-value of 25. Though almost doubled in thickness, the sustainable benefits offset the width.

With the community member's collaboration in mind, hempcrete is an ideal material to use because it is just like a batter that can be mixed in multiple batches allowing for the human scale in the construction of the building. The hempcrete can be exposed to the natural elements, but for longevity purposes it is covered with an added layer of 1" strapping and cedar shakes in the exterior.



Willow and Hempcrete in combination give a sense of the human hands working, the scale is not too big that it becomes incumbent to use machines and high-tech approaches.

As you approach the building you are welcomed by the scent of the fresh herbs and sacred plants potted to greet you at your arrival. You may leave your shoes and coats at the foyer as you sit in the illuminated entry alcove. The allocation of activities within the building is thoroughly organized to heighten the collaboration and experienced of human senses. As you continue to the left, you smell the bannock

baking in the oven in the open kitchen area and you can hear but not see the children giggling at around the corner. As you turn you see this magnificent light above you, the north light from above reveals an intricate lacing of the roof. As you move, the light moves with you, the building is alive.

The four directions are accounted for in the placement of the activity within the building. The entrance is at the east, to acknowledge travel of Nanaboozho, legends of the great teacher and messenger. He travelled the earth from the east – south – north – then finally in the west.

STUDIO & GALLERY

Caelen Chornboy (ED4 Architecture)



The concept of permanence has perplexed the human conscious since the beginning of time. For centuries, humans have attempted to establish stability in their lives. Whether this sense of stability comes from the communities our ancestors built or from the small town we pass on our way to work, this longing for security has always perpetuated in modern society. A relationship between permanence and longevity has fostered itself, which has inspired several moments in architecture. Although we may associate permanence with the buildings we occupy, the foundations we pour, or the tattoos under our skin, it is instinctual that what plants the seeds for tomorrow are actually the relationships

and memories of yesterday we create. When we come to realize that stories of yesterday hold the knowledge of the past, our understanding of permanence shifts.

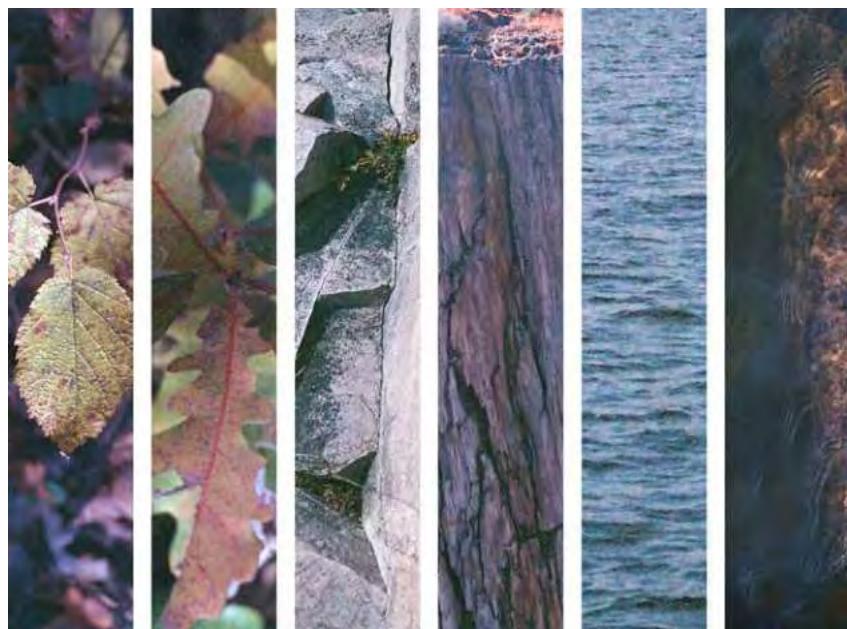
The built world and the idea of "permanence" became disparate during my time spent with Shoal Lake 39a and Boreal Studio. Buildings may have longevity, but they are not permanent: buildings decay, need repairs, and age with time, eventually allowing the earth to consume the void space it left behind.

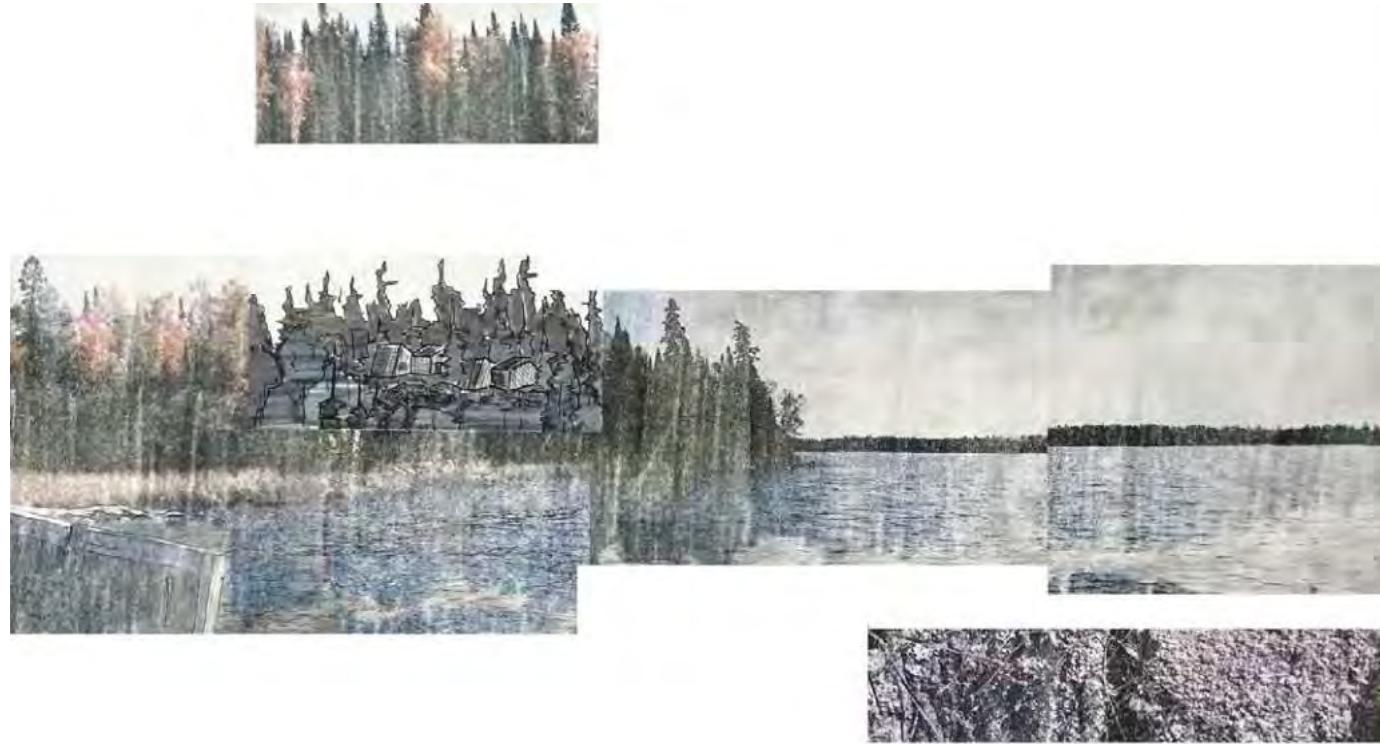
Materials

The permanence in our lives is held within the memories of friend and family, the conversations we overhear during our morning coffee, and the skills taught to us by our teachers. For myself, permanence now holds a different meaning. The fascinating quality of materials in collaboration with the eye of the skilled craftsman is the essence of my creative and non-creative life.

Materials have the ability to capture stories of the past in their cuts, holes, cracks, and stains, transforming them into beautiful novels to be shared. The entropy carved in all conceptual and material objects holds the energy that is refracted and absorbed by its surroundings. The production of art, music, and functional beauty of a handmade canoe that lasts a lifetime is wonderfully inspiring. My goal is not to create objects that get placed on shelves or in magazines for display; I strive to design works that are used daily, that are able to captivate stories of harvest, the sadness of loss, the joy of creation, and the lessons from mistakes.

I seek to create a canvas durable enough to store the memories of everyday life and the lessons from our mentors. To make with the intent to share is just the first step in this newfound understanding.

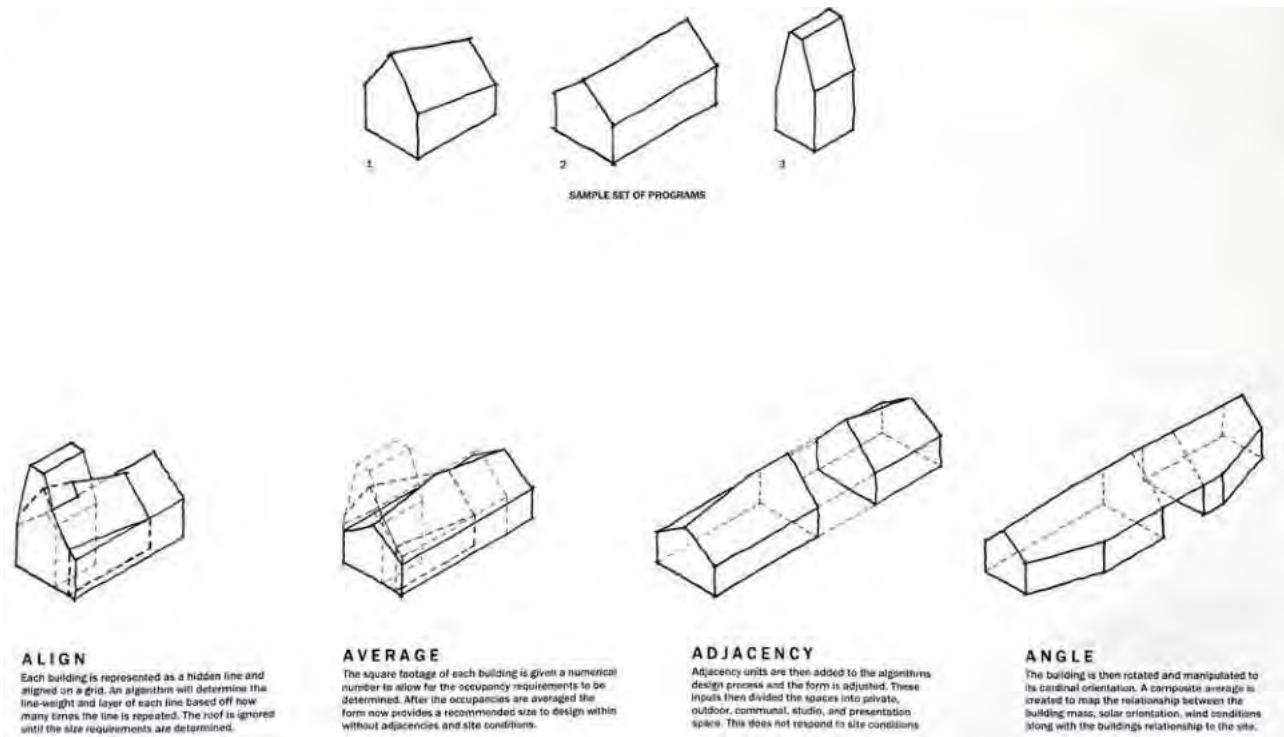




Process Collage

The architecture of the project begins here: at the intersection of learning something new while simultaneously showcasing the earth around us. When visiting the community of Shoal Lake 39a, one feels a sense history and tradition without any sign of monoethnic structures or vast infrastructure. This precise feeling of place and belongingness stems from my new understanding of what permanence symbolizes. The history of the Anishinaabe people and Shoal Lake goes is hundreds of years old. While there is a rich history between the people and the land, a dark cloud disturbs this Colonization, along with the forceful introduction

of Western standards by means of residential schools, this sense of belonging and stability has been removed from many Indigenous communities. By lending the ambition of Boreal Studio to Shoal Lake 39a, the studio embarked on a development project that focuses on bringing stability and economic value back to the community, while sharing the Anishinaabe culture with those willing to embrace it. The project proposed for the community is a series of spaces that focus on the idea of making with the intent of sharing. The project begins with a moderately sized studio space located on the easternmost edge of the site.



Programming Diagram

The living quarters allows people to spend extended periods of time learning and practicing their craft. The building contains a workshop large enough to hold canoe building classes, furniture building, or any other artistic endeavors that require a dry and secure place equipped with tools and all workshop essentials. This space aims to provide a sense of stability among the community's youth. The studio will be built in such a way that the youth are encouraged to study the art of making, all while providing a space for elders to teach traditional techniques and skills. This space may also be used to host resident Indigenous artists looking for an affordable and stable place to work. Once the studio is complete, the construction of a communal sharing space will begin. A gallery is

proposed to be a meeting place for the community and the surrounding campground, providing a space for both Indigenous and non-indigenous people to communicate and learn together. This space is intended to probe casual and group conversation while enjoying art and other works presented by artists and youth from the community. This building speaks to the idea of the "grandfather rock": a place to gather, share, and learn from others. Thus, this building acts as a place of gathering and preserving, and the studio acts as a place to grow, to create, and a space for transition. The gallery will provide vast interior and exterior spaces, including a café and washrooms to sustain the building year around.



Gallery Exterior



Gallery Entrance



Studio Living Space and Loft



Although these buildings may disturb the landscape and may cause slight shifts in the immediate micro-environments in the short term, they have been designed such that they give back to its surroundings over the long term. As the honourable harvest mentions, it is important to not take more than half, and these buildings respect this code. The sacrifice of the land for these buildings can bring places of growth and new beginnings for the site's history. As aforementioned, the stories that are shared and knowledge that is gained in these spaces are what represent security and permanence in architecture. Moments within the buildings provide places for new stories to be written for this community, and the youth that create these stories will share this knowledge to descendants that follow. The architecture responds directly to the site conditions on which they sit. Placed delicately on granite ridges that cascade along the southeast edge of the

site, the buildings act as subtle dents within the landscape. Both buildings are cladded with subtle raw cedar shingles that will respond to the lichen and other fungi, allowing them to naturally blend into the landscape while they age. The angles of the roof and floor plan respond to the wind and sun paths that are obvious on the site, since they are placed on exposed rock faces. As you enter both the gallery and studio, the view of Shoal Lake and granite ridge on which the building sits presents itself as you approach the various fenestrations. This experience has taught me how to listen, learn, and absorb my surroundings, and has allowed me to gain an appreciation of the importance of tradition and stability within the Indigenous community. The concept of permanence may not be the idea of immobility, but rather the infinite circulation and accumulation of wisdom, ordeals, and beauty.

GEODIALOGUE

Annetta Fruehauf (ED4 Landscape Architecture & Urbanism)



The great geological formations that make up a large part of the Shoal Lake landscape appear and disappear, as outcrops and under layers of soil. There is a sense of permanence to these large Precambrian formations, their hard-exterior make it feel like they've been here forever. The rocks are not stagnant things that simply appeared. They are intermingled in every ecosystem in one way or another. As a habitat, providing a steady foundation for moss and for lichen. Along the lake, the rock shares its surface with biofilm in turn feeding living beings in the water. The cracks and crevices of the outcrops provide a habitat for the

small crustaceans and fish of Shoal Lake. Beyond these few examples of its role in the living world, the rock is also a storyteller. The history of Shoal Lake can be learned through its geology. The batholiths of granite and the basalt flows tell a story of its creation. We can also read and understand the tensions the rocks went through. The very forms of rocks tell a story, how they were moved or how they came to be. Learning to see and to read the different formations and their scars, is learning the history of and understanding Shoal Lake.



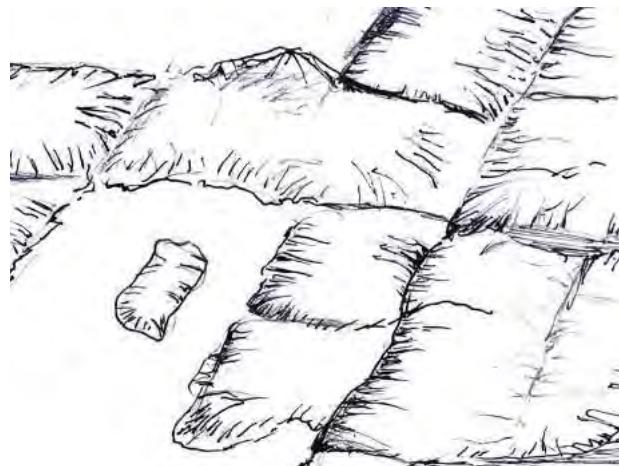
Basalt Flows



Batholiths



Dikes + Intrusions



Jointing

The Basalt Flows: deep geological formations. Their form is often soft, pillow- like, and they flow all over the landscape. These rocks are basic volcanic rocks.³

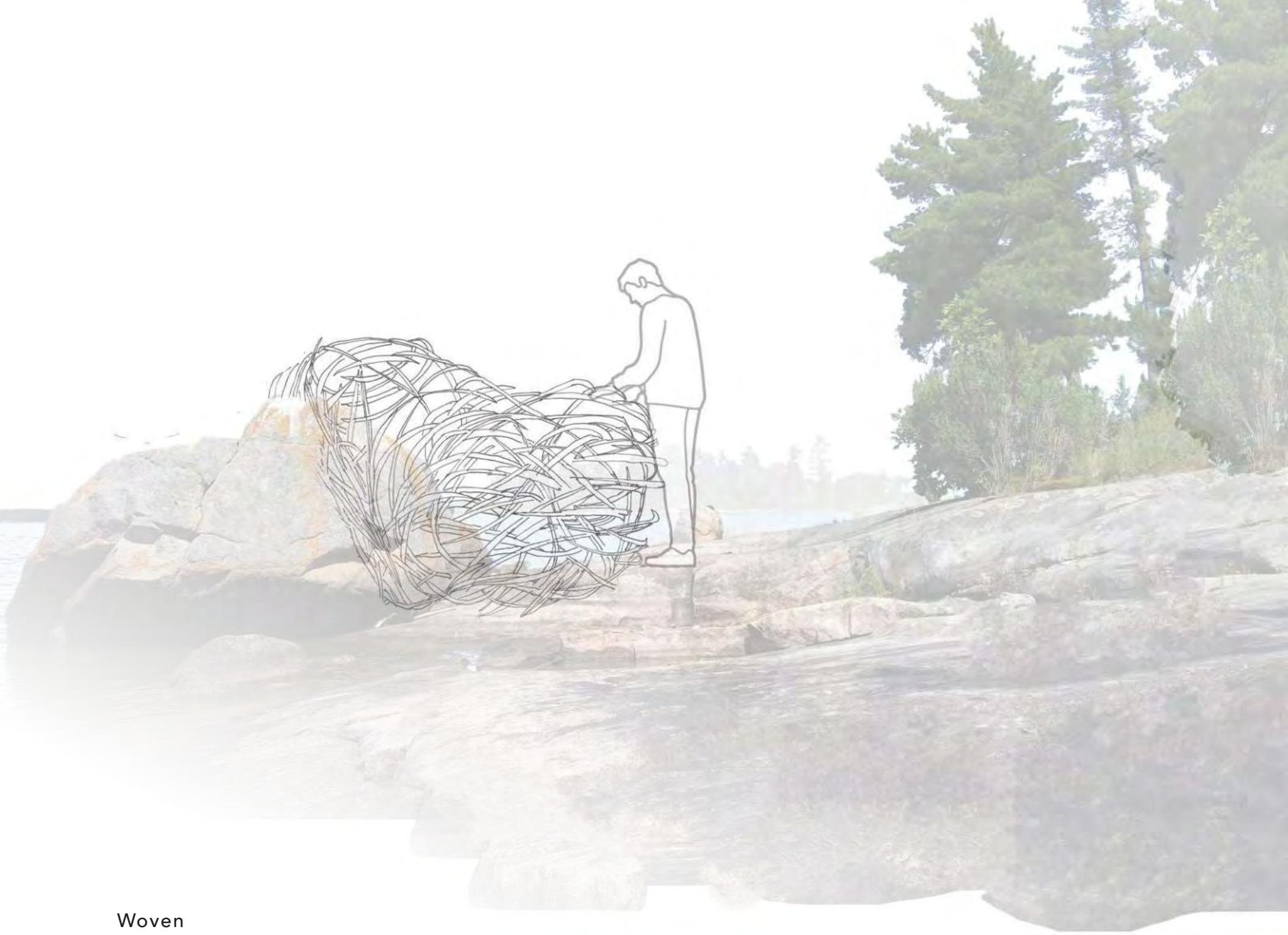
The Batholiths: deep rocks, typically granite, which are visible due to erosion of overlying rock.⁴

The Dikes + Sills: intrusions of young rocks rising up between layers of older rock. Intrusions are rocks that worked their way up in a molten condition, into surrounding formations.

Dikes are wall like masses pushing through existing cracks, which are usually made of darker, colored, more basic rocks.

Sills are formed when magma pushes its way between layers of rocks, their thickness varies between a few inches to several hundred feet.⁵

Joints of rocks are the visible edge conditions. These are made by various forces including; contraction from cooling, weathering, pressure from other intrusions, and large movements of the earth's crust.⁶



Woven

Shoal Lake has a very diverse geological anatomy, with many different types of rocks and various forms of said rocks. Woven is an installation that celebrates the forms that the rocks occupy. In order to construct these forms a careful dialogue is required between the artist and the rocks. The form of the weaving should respond to the profile of the rock in some way, either following the forms or contrasting it. Once these forms are completed, they add an additional level of interest and curiosity to the outcrops. People explore how they attach, where the rock begins and how it sits on the rocks. The installation is not intended

to be permanent, being made of cattails and light branches over time it decays and the original form of the rock is revealed once again. The form is not dictated because it should respond to the rock on which it is woven on. There are two types of forms that are suggested and intended to inspire. The first is a stream which could rise and fall creating arches and ribbons on the ground. The other form takes on that of the rock and may be placed as an extension or a separate element. These forms allow visitors to visualize the dialogue between the artist and the canvas.



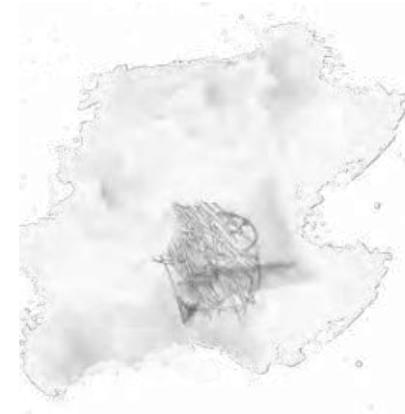
Step 1

Ground the foundational pieces by placing them in crevices and cracks or the joints of the rocks.



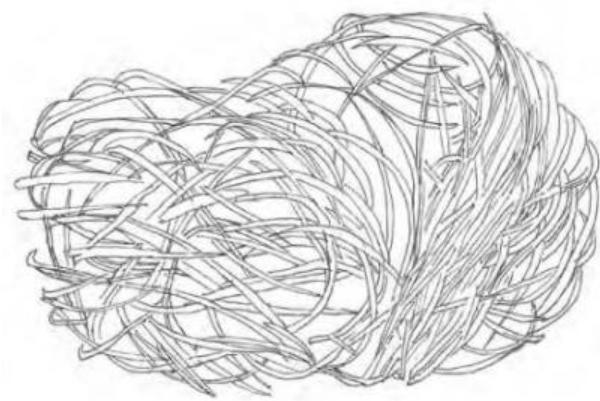
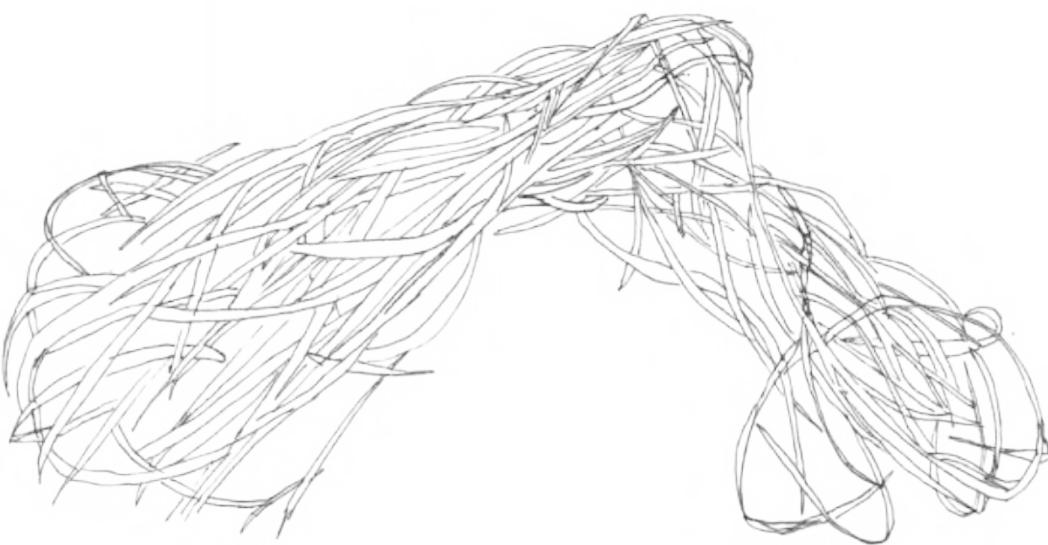
Step 2

Begin to strengthen the foundational pieces by weaving together at places of connection.



Step 3

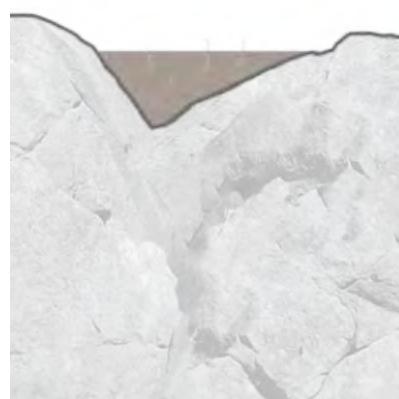
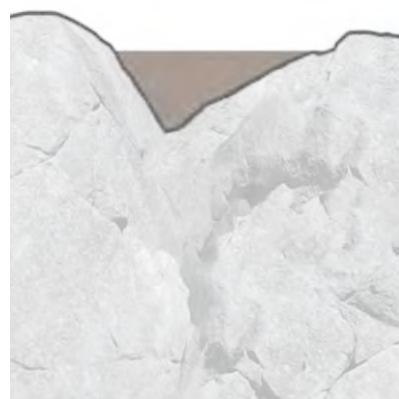
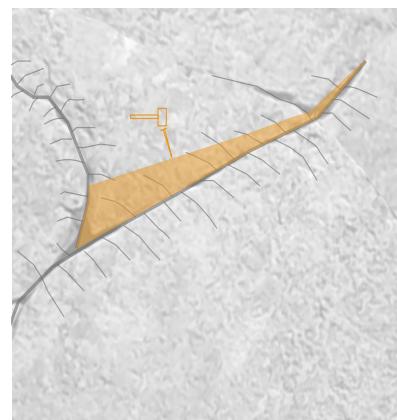
Build off the foundation pieced adding and weaving more elements, let the form of the rock guide the sculpture.

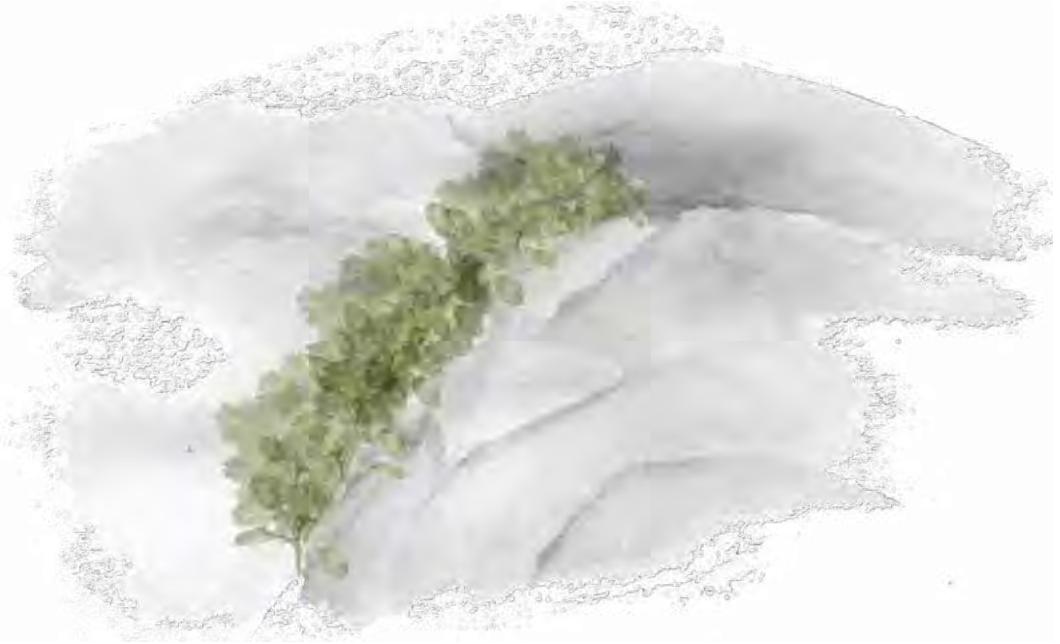


Planted

Joints, scars, and crevices define the rocks and tell the history of Shoal Lake for those who are curious. Seeing, following, and connecting these lines, one can begin to understand the formations. The joints allow people to see pressure points, spaces on the rocks that have been subject to forces. Rocks are often thought of as permanent and unchanging, however, they are transient, responding to their surroundings. As Lobeck said, "Like you and I, and all other beings, rocks are a product of their environment, when the environment is changed the rock changes."⁵ Planted is a proposal to explore this responsiveness and visualize changes, by interacting with the joints. The process of "planted" is to introduce organic material into the joints and crevices of the rocks with

seeds of low growing plants. These planted joints will ribbon throughout the outcrop varying in size and shape and provide an additional level of interest as people walk along the rocks. The transient nature of this installation emphasizes the location of these cracks and the conditions that allow them to exist. When the plants have finished their life cycle and begin to decay it will add more organic matter, growing the soil. This installation should be closely observed and is open to changes. If the artist finds that the location of the ribbon doesn't respond as well as it should, the crevices can be filled in with pebbles showing that something was once there.





LIFE ON THE LAKE

Michael Daniels (ED4 Landscape Architecture & Urbanism)

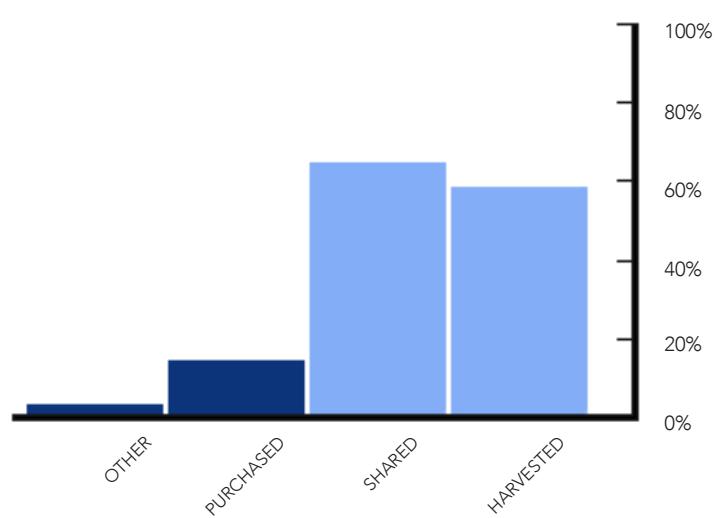


Life on the lake is a study of the water and biological systems within Shoal Lake to understand how they are vital to the community's financial, physical and spiritual health. Life on the lake aims to place a series of fishing docks at strategic locations throughout the year. These locations can be determined through the understanding of Walleye seasonal movements and bathymetry data throughout the lake. These docks are movable and can range from single square units with enough room for two people to stand and fish, or larger floating units that support a deluxe cabin for people to camp and fish

on the lake in luxury. The real magic of the docks occurs beneath the surface where protected fish habitats and food sources help sustain a plankton and fish systems that are integral to the vitality of Walleye, the favourite fish source of the community. While being an attractive human destination on top to fish and watch the sunset, these floating sanctuaries also provide a vital source of food and habitat and in turn, provide additional healthy nutrients to the community through traditional eating, teaching, and food sharing opportunities.

How do people get their fish?

The access to fresh fish appears limited within the community without a place to purchase. If you cannot harvest your own, or have it gifted to you then access becomes limited.



What kind of fish are they eating?

While there is a wide range of species to fish, Walleye are the main fish eaten from Shoal Lake by a large margin.

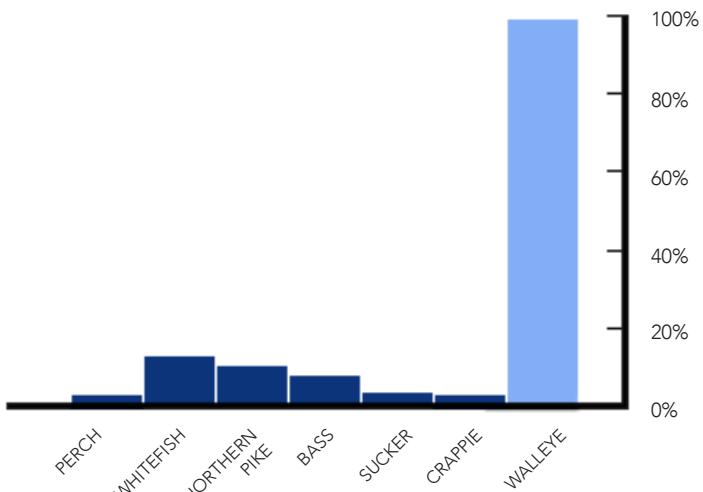


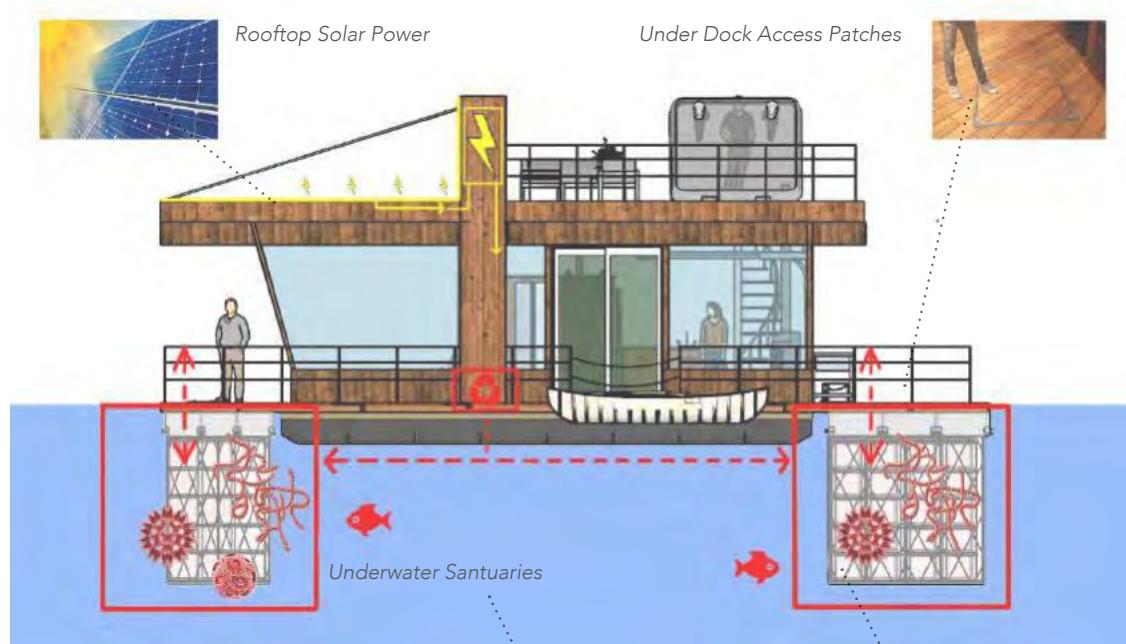
Fig 1. Richard Bolton on fishing in the community of Iskatewizaagegan.

Why should we care?

Currently, in Canada, First Nations are 3 times more likely to die of heart problems, and 4 times as likely to have diabetes. Many of these chronic health issues can be tied closely to a diet that consists more and more of processed sugar and grain, and less and less of traditional meats, berries, and fish. Overall, traditional eating has been greatly reduced within the Iskatewizaagegan community as the lack of equipment and costs are the two largest barriers to fishing. By providing a framework that brings tourists and interest in camping and fishing at Shoal Lake, we can produce economic gain while simultaneously bringing the necessary access to equipment back to the community.

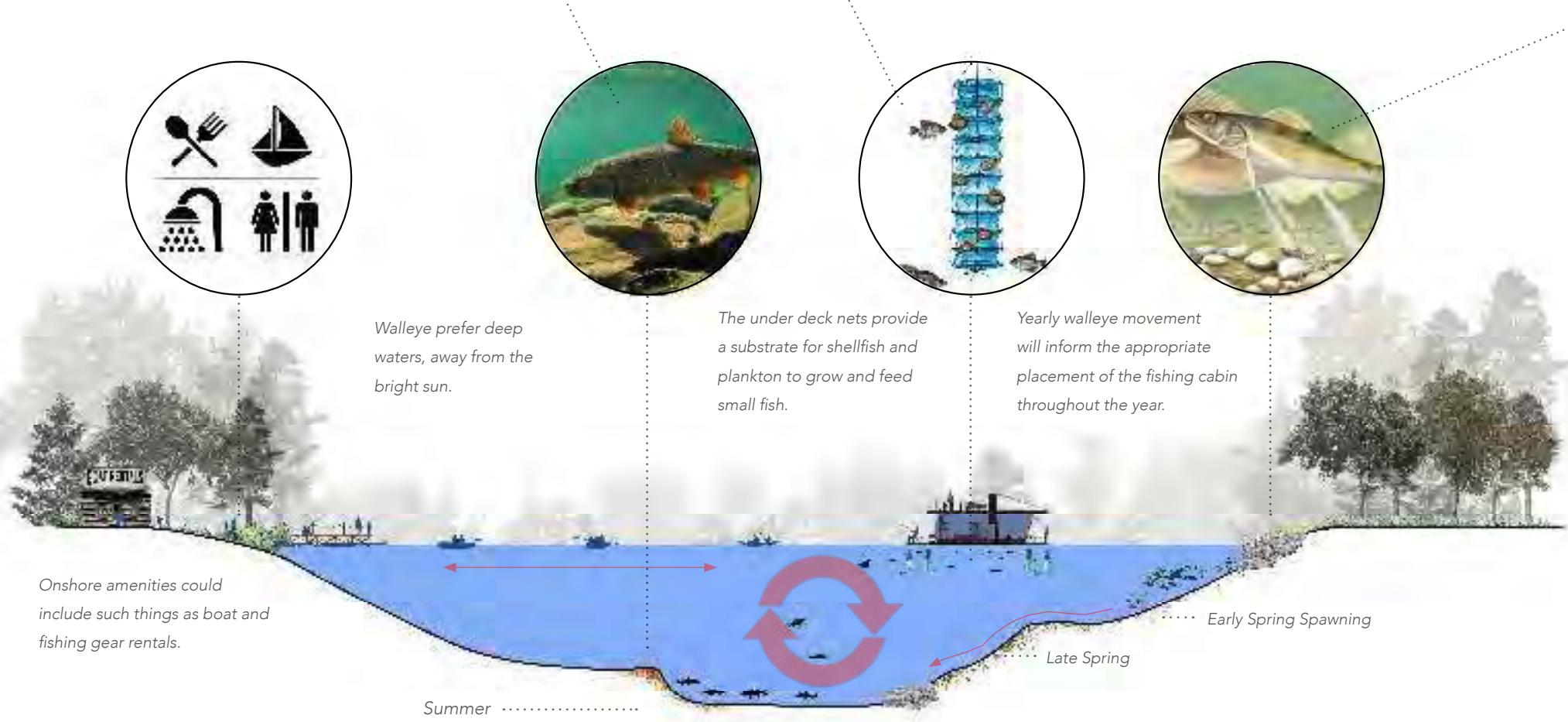
Diet, Sharing, and a Healthy Community

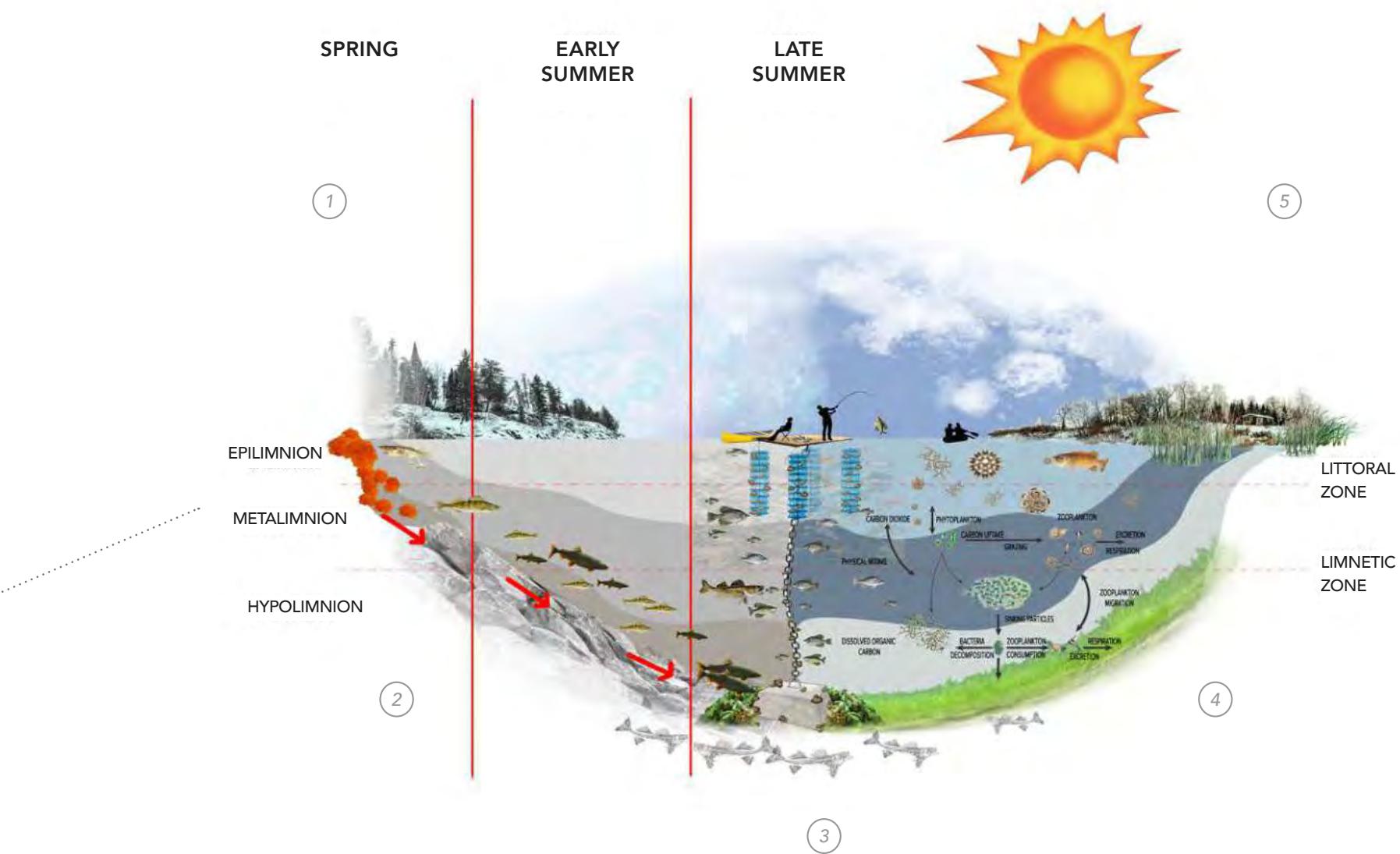
Iskatewizaagegan Indian First Nation's (IIFN) traditional fishing practices provide an avenue for conveying cultural knowledge across generations and articulating a sense of Iskatewizaagegan identity. Acts of sharing are a significant way that IIFN members obtain fish for consumption. This practice is rooted in Iskatewizaagegan's spirituality and connected to the importance of giving thanks to the Creator and the life-sustaining lake. Through traditional acts of sharing fish and teaching how to fish, social networks within the community are strengthened which contributes to the social cohesion of family groups and the broader community's physical and spiritual health.



Cabin Life Support

Rooftop solar panels power the cabin systems that are hidden within its raised 'T' wall on the roof and wired down through the frame. Processed waste nutrients can be used to help support a lively Phyto and zooplankton zone under the cabin which provides a substrate to grow shellfish within its cages. These sanctuaries help attract smaller fish to feed and hide within the cages which in turn helps attract walleye for humans to fish.





'One Big System'

The underwater terrain becomes an important factor in choosing the locations of the cabin. Walleye prefer deeper waters during the hot summer months, choosing to hide near ridges, rocks or fallen trees and only leaving these zones to hunt and eat. During the spring, walleye will travel inland through streams to lay their eggs, before following the topography back down through the summer. Human access to the cabin is tied heavily to the on-shore activities including a marina, docks and boat rentals.

1. During the spring, walleye swim up-shore and inland to lay their eggs along the rocks and rough terrain of the streams.
2. Walleye movement can be predicted through the year, as they tend to follow the terrain from their origin, progressively seeking deeper waters in

the summer to stay out of the bright sun.

3. By creating individual docks or even cabins that can be anchored or moved, we can ensure they are always placed in the optimal fishing zones.
4. The phytoplankton and zooplankton system is integral in the vitality of the lake. Nutrient mixing begins near the top of the lake, close to the warm sun and transitions to lower levels, providing nutrients for fish and also to plants which in turn are an important habitat for all species.
5. Like all of life, the entire system begins and ends with the sun. At the most basic level, plankton requires its energy to survive, if only long enough to feed small fish.



"Nitaawigin" - to grow

There is an old expression, "growing old gracefully", which often refers to how an individual can find peace and contentment with one's self as one gets older.

Perhaps this is a starting point to how we begin to think about living with the land and perhaps how to "develop gracefully". It is about having respect for the land, of giving back to that which is around you, and about connecting with place.



NITAAWIGIN GROW



Within the Iskatewizaagegan lands there are a vast diversity of species, mosses, lichens, mushrooms, sedges, trees, etc. that are growing all around us. Traditional knowledge helps us to see and to understand these living beings, to carefully live with these species, and to give back as we take.

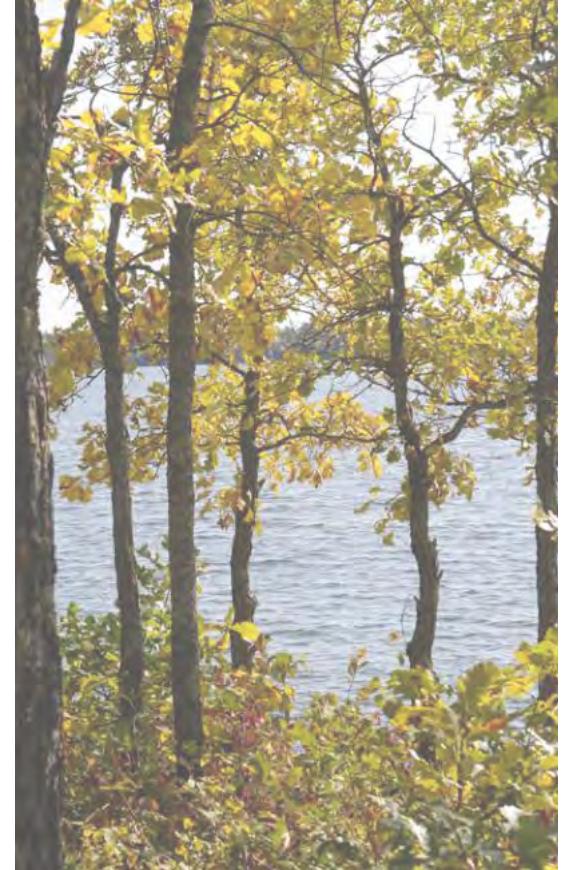
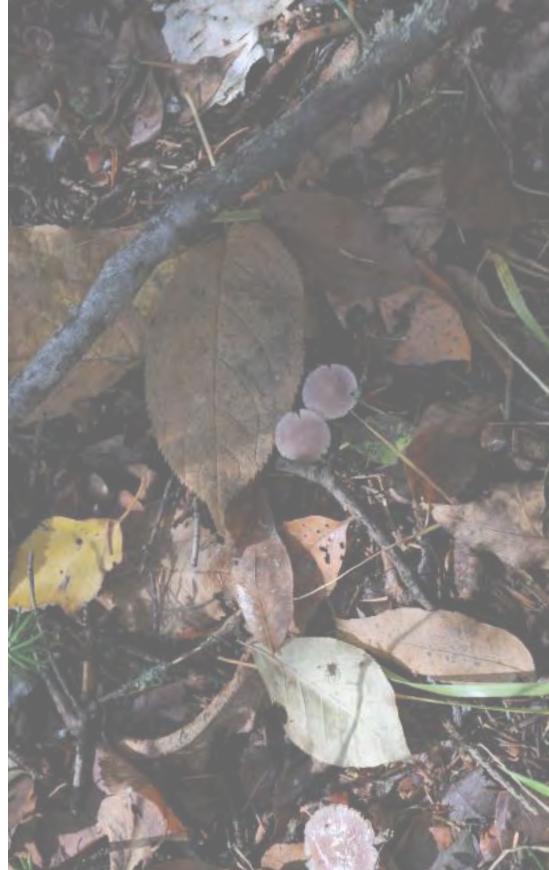
In our limited study of these lands we (the university classes) have had brief encounters with these species that have given us little more than first impressions about this place. But as one spends more time with a place, one begins to be able to read the different landscape habitats and substrates, and to begin to understand not simply the variety of things in a landscape, but also the variety of conditions that exist; the forest floor, the mixed swamp, a boggy pool, a pool with sphagnum, a wet ledge, a forested ravine, a pond in a bog, and many others. As we

begin to understand the complexity of these habitats, we start to see that "to grow" is very much about the way habitats work. To look carefully at a wet ledge, for example, one might find up to a dozen different types of moss, some growing on the steep sides (such as *Shistidium apocarpum* or *Philonotis fontana*) while others find their way into the flatter cracks (such as *Sphagnum girgensohnii* or *Bryum capillare*).

To design for growth within the landscape is to understand that we are not simply affecting the things of a place, but also affecting how places work, that to "develop gracefully" is to continue to read and think about the habitats, and their relations, and to "give back" to the ways in which habitats operate. - RP

FOOD FOREST

Calvin Atuhairwe (ED4 Landscape Architecture + Urbanism)



"...a critical factor in perpetuating knowledge overtime, and between generations is the ongoing creation of relationships through land-based activities."¹

One of the major roles played by elders within the Iskatewizaagegan community is that vital role as the wisdom keepers to pass on indigenous knowledge to the next generation. This has however been interfered with over the years. As a means of fostering an educational return to the forest, the primary focus has been placed on the creating access to active interaction with the forest. The food forest would serve as a facilitator for an interactive learning process.

A food forest comprises a series of layers among which include; a closed tree canopy, patchy under-story and a herbaceous ground cover. Investigating the site revealed patches within the already existing forest where some food forest species already occur, such as within the Oak grove. However, more plant species have been suggested to supplement the forest for a richer experience.



1. Closed tree canopy
2. Patchy understory
3. Herbaceous ground cover



Canopy Drawings



"Canopy trees are those that make up the uppermost layer of the forest planting. It should be remembered that this can vary with the species assembly and/or the type of forest. A 20ft tall mesquite tree might be the canopy tree in the Sonoran desert site, whereas a 20ft tall palm would be a middle story or understory tree in a moist tropical forest. Therefore "canopy" is used here to mean the emergent trees on this site for this species assembly."²

In this part of the forest (see aerial photo), plant species such as Bur oak, Poplar, Sugar maple and Juneberry are likely to be found. Foods among these plants were harvested or extracted using traditional means. Maple sugar, for example, served many purposes including as a seasoning for wild rice which was combined with broth made from ducks.³ The process of harvesting maple sugar made for an inclusive activity that involved both young and old with each having their own roles to play.⁴

"Understory species are those plants whose ultimate height is never as tall as the canopy species in that species assembly. Many understory species have evolved to tolerate a certain amount of shade. Some species require shade and do poorly or fail in direct sun. Understory species generally have a higher moisture requirement than pioneering edge species."⁵

In this part of the forest plant species such as Hemlock, Wild currant, Red raspberry and Wild cherry are likely to be found. Some of the plant species in this category are directly edible in the forest and are well within reach due to their moderate plant height. Species such as red raspberry would serve as a supplement to the regular diet in the community.

Groundcovers are species that have a horizontal growth and branching pattern. They form a "living mulch" over the soil surface. They can be shade or sun tolerant, and either understory or edge species. They serve as the soil's first line of defense against the drying effects of sun and wind.⁶

In this part of the forest, plant species such as Mountain mint, Labrador Tea, Bearberry, Canadian Bunchberry, Blackberry, Wintergreen, Strawberry and Wild ginger can be found. Some of the plant species in this category served as hot beverages such as Labrador Tea. Fresh leaves would be tied in a thin strip before being immersed in hot water. In the absence of fresh leaves, dried leaves would suffice.⁷

Forest Planting

Closed Tree Canopy

- Bur Oak
Quercus macrocarpa
- Poplar
Populus tremuloides
- Sugar maple
Acer saccharum
- Juneberry
Amelanchier canadensis

Patchy Understory

- Hemlock
Tsuga canadensis
- Wild currant
Ribes species
- Red raspberry
Rubus strigosus
- Wild cherry
Prunus serotina Ehrh

Herbaceous Groundcover

- Mountain mint
Koellia virginiana
- Labrador tea
Ledum groenlandicum
- Bearberry
Arctostaphylos uva-ursi
- Canadian bunchberry
Cornus canadensis
- Blackberry
Rubus frondosus
- Wintergreen
Gaultheria procumbens
- Strawberry
Fragaria virginiana Duchesne
- Wild ginger
Asarum canadensis

Legend

- | | |
|----------|-----------|
| ● Stem | ● Flowers |
| ● Fruit | ● Twigs |
| ● Root | ● Sap |
| ● Leaves | |



Fig. 1 Bur Oak



Fig. 2 Poplar



Fig. 3 Sugar Maple



Fig. 4 Juneberry



Fig. 5 Hemlock



Fig. 6 Wild Currant



Fig. 7 Red Raspberry



Fig. 8 Wild cherry



Fig. 9 Labrador Tea



Fig. 10 Bearberry



Fig. 11 Mountain Mint



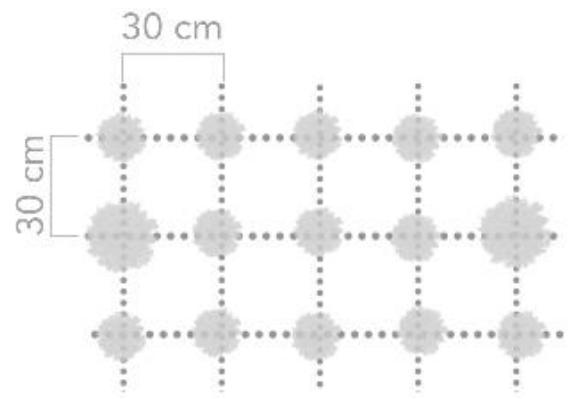
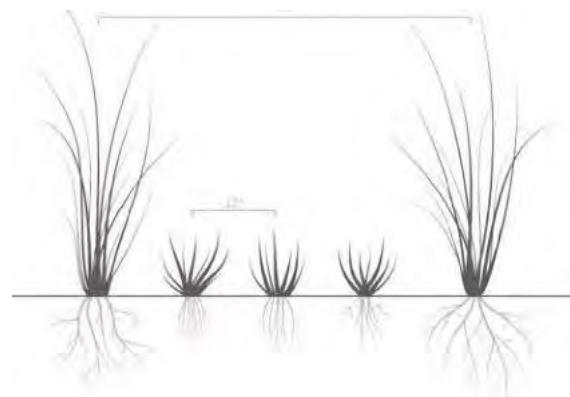
Fig. 12 Blackberry

ORCHARD

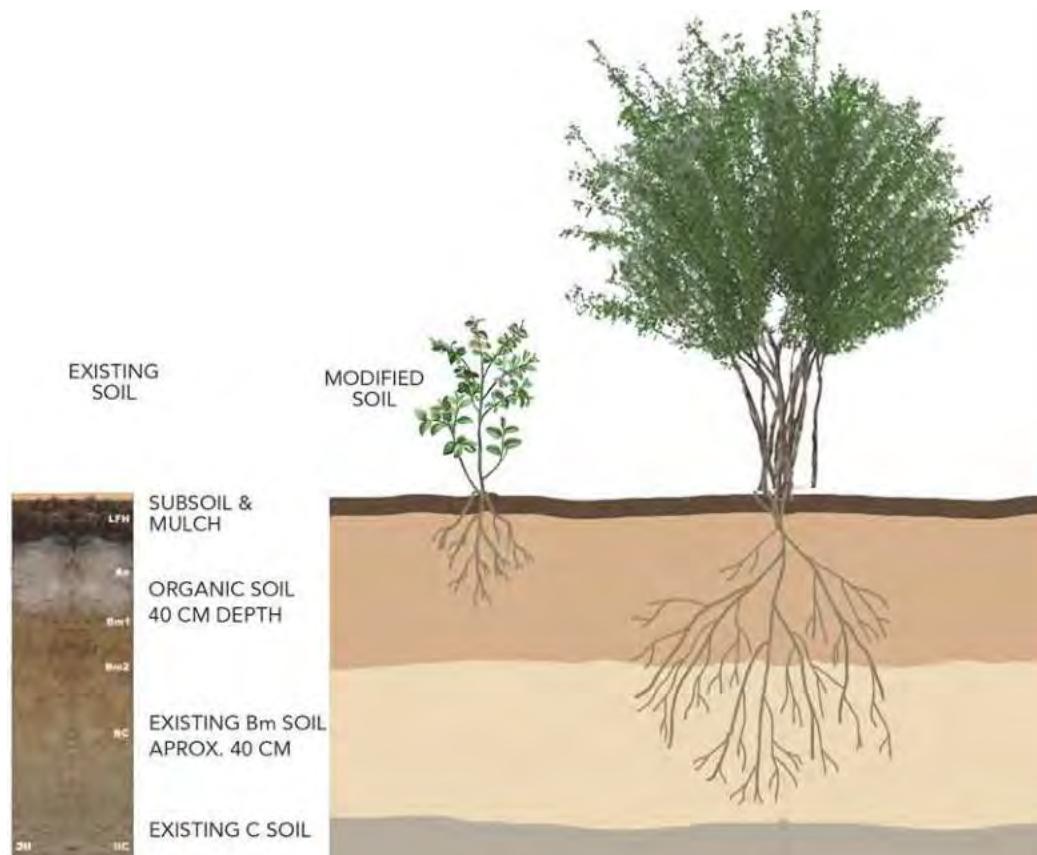
Lia Liu (ED4 Landscape Architecture + Urbanism)

The wild orchard has varieties of native species, planted through the orchard according to its habitats, such as wood edge, forest, wetland, and riverbank (water's edge). The orchard should be planted based on an understanding of the site conditions, including soil depth and soil conditions (depth, type, pH, compactness, moisture content), microclimate (particular the exposure to wind and sun); as well as plant specific factors such as their individual need for spacing, and plant

specific soil and solar preferences.⁸ Traditional knowledge shared between local gardeners and horticulturalists should be considered and developed. Significant care should be given to the "building" of suitable soils, while preventing the introduction of invasive species when importing soil.⁹ A long term community based composting strategy for building soil could be beneficial to the success of the orchard.



Entrance planting bed spacing plan and section



BLUEBERRY

- soil pH: 5.5-6.5
- root depth: 25-30cm
- sandy or rocky soil
- shade-intolerant
- half sun

SASKATOON BERRY

- soil pH: 5.5-7.0
- root depth: 60-90cm
- well-drained & coarse-textured soil
- prefer mid-elevations in foothills and mountain slopes

Entrance Planting Bed

A planting bed may be set in the entrance of the orchard, to help visitors get a sense of the character and habitat of some native species. After a quick view of native species, visitors can take an adventure and explore the plant community in the wild orchard. When these plants grow bigger, they will be moved to the specific habitat in the orchard. The planting bed will be 30m x 50m, and about 150 plants will grow there. The planting bed, plants will be managed by 30cm x 30 cm gird layout, mixed with small trees and shrubs. Each small tree (saskatoon berry and chokecherry) should be provided approximately 120 cm spacing for the spread of the root system.¹⁰ Within the planting bed, signage may be

provided for educational purpose. Signage may include descriptions of the plants, their needs preference and associations; as well as lessons about traditional knowledge associate with the plant. The planting bed could act as an outdoor classroom. The rest of the wild orchard should remain as "natural" as possible, where signage is absent and knowledge is transferred through upon experience and oral traditions.



RASPBERRY

- soil pH: 5.5-6.5
- root depth: 15-40 cm
- can tolerate a variety of soil moisture
- full sun

CURRENT

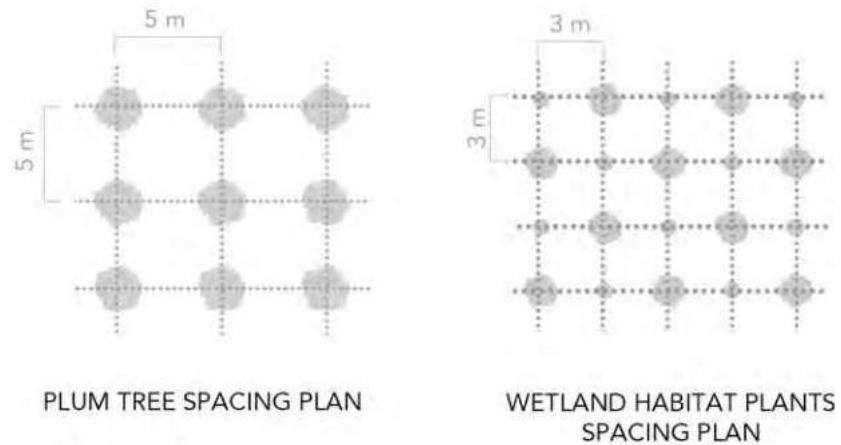
- soil pH: 6.0-6.8
- root depth: 20-40 cm
- well-drainage & organic soil
- can be found in wooded areas
- can tolerate a bit of shade
- full sun

STRAWBERRY

- soil pH: 5.5-7.0
- root depth: 20-35 cm
- well-drainage & organic soil
- sandy loam
- need windbreaks nearby
- part to full sun

CHOKECHERRY

- soil pH: 5.0-8.0
- root depth: 30-50 cm
- well-drainage & organic soil
- can be found in rocky terrain or other disturbed sites
- part to full sun

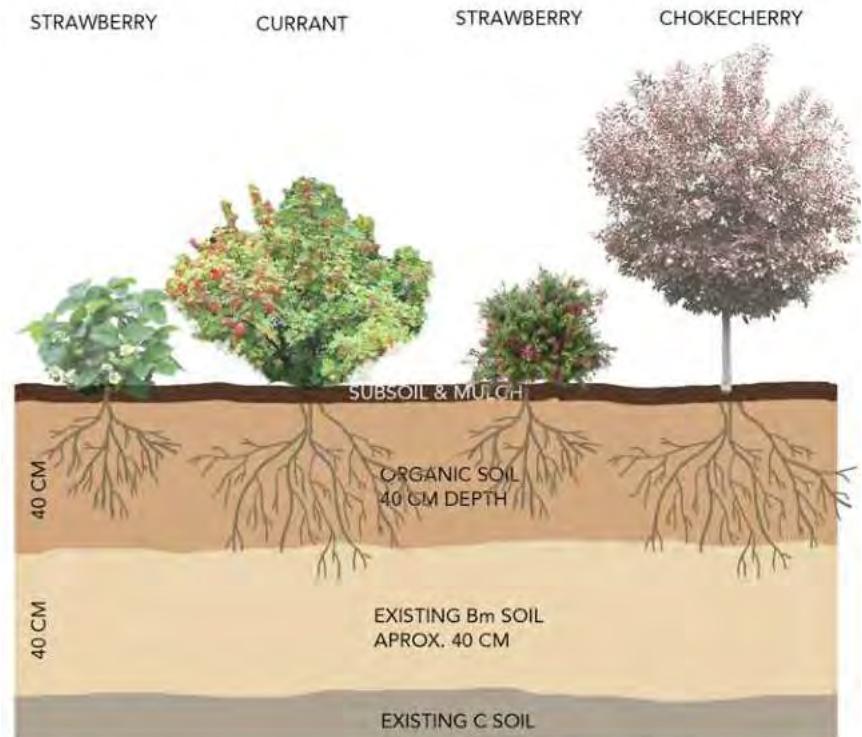


Seasonal Orchard

The seasonal orchard is developed according to plant life cycles: with focus on blooming season and harvesting season. It divided into two habitats, one is the lower land habitat which groundwater would flow through rapidly, suitable for plants that prefer higher moisture and clay-loam sand. The other habitat is a forest like habitat, where desired conditions include flat surfaces, clearings that allow for solar radiation, and well-drained soils.

The spatial organization of the seasonal orchard should take into account the possibilities of seasonal events that can take place in the orchard, for example, in the early spring, fruit trees would bloom and may be "arranged" to set up flower show. While at the end of summer, the fruit becomes mature, a festival would hold to celebrate the harvest. In the diagrams that are included the spacing plans are rough guides to the arrangement of the trees (i.e., how much room they should be given)¹¹. The arrangement of the trees doesn't have to be so rectilinear, and may be much more interesting when carefully placed within the existing landscape form (slope, openings, drainage, forest edge conditions, and appropriate soil)¹².

It may be desirable to provide as open space located in the south of the orchard, which serves as a gathering space for big events of school outings.



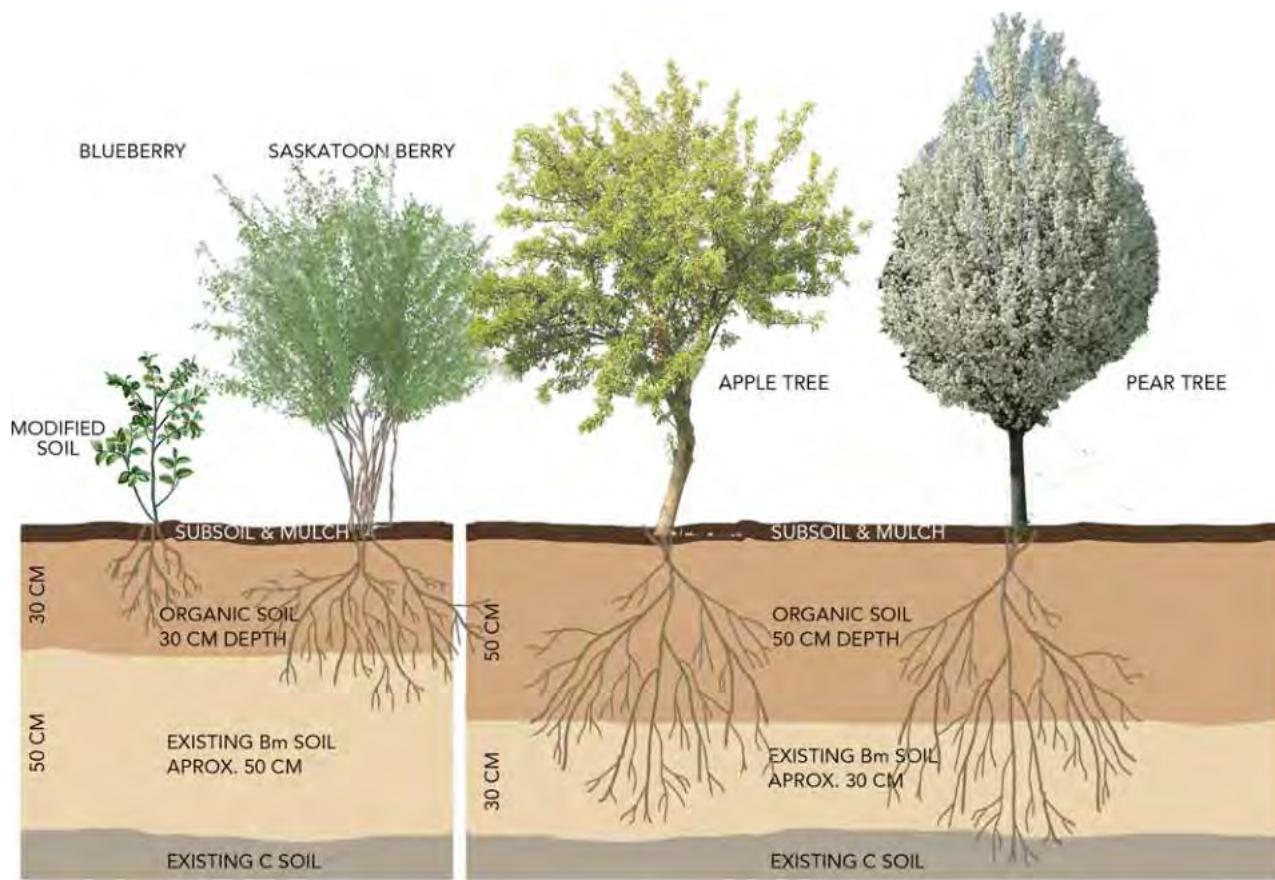
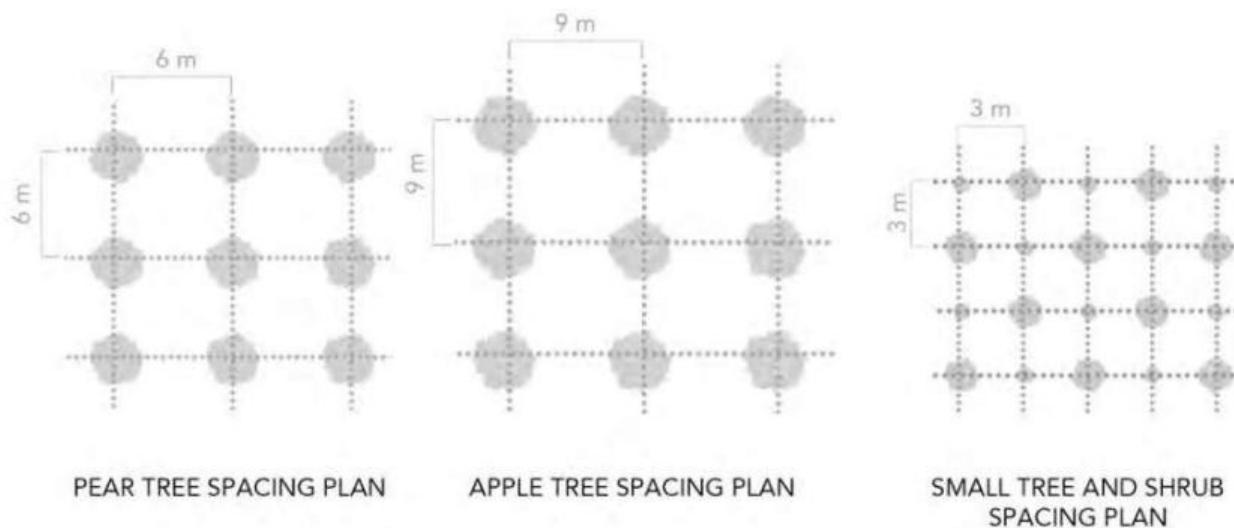
FOREST HABITAT: SMALL TREE AND SHRUB

SPECIES:

RASPBERRY, STRAWBERRY, TART CHERRY,
CURRANT, SEA BUCKTHORN

pH RANGE: 5.0-7.5

ROOT DEPTH RANGE: 20-60 CM



LOWER LAND HABITAT
SPECIES:
 BLUEBERRY, SASKATOON BERRY, CHOKECERRY
pH RANGE: 5.0-7.0
ROOT DEPTH RANGE: 30-70 CM

FOREST HABITAT: MEDIUM TREE
SPECIES:
 APPLE, PEAR, PLUM
pH RANGE: 5.0-6.5
ROOT DEPTH RANGE: 30-500 CM



Fig. 13 Apple



Fig. 14 Plum



Fig. 15 Raspberry



Fig. 16 Blueberry

Apple

- 6 Battleford
▲ SE *Malus* x 'Battleford'
- 6 Gemini
▲ AU *Malus* x 'Jefcoutts'
- 6 Goodland
▲ SE *Malus* x 'Goodland'
- 6 Honeycrisp
▲ SE *Malus* x 'Honeycrisp'
- 6 Norkenr
▲ AU *Malus* x 'Norkenr'
- 6 Odyssey
▲ SE *Malus* x 'Odyssey'
- 6 Prairie magic
▲ SE *Malus* x 'Prairie magic'
- 6 Red gemini
▲ AU *Malus* x 'Red gemini'
- 6 September Ruby
▲ SE *Malus* x 'September Ruby'
- 6 Winter Cheeks
▲ SE *Malus* x 'Winter Cheeks'

Plum

- 5 Sapalta cherry
▲ AU *Prunus* x 'Sapalta'
- 5 Brookglod Japanese
▲ AU *Prunus* x 'Brookglod'
- 5 Mount Royal European
▲ AU *Prunus* x 'Mount Royal'
- 5 Pembina Hybrid
▲ AU *Prunus* x 'Pembina'
- 5 Tecumseh Hybrid
▲ AU *Prunus* x 'Tecumseh'
- 5 Toka Hybrid
▲ AU *Prunus* x 'Toka'

Pear

- 6 Early Gold
▲ SE *Pyrus* x 'Jefgold'
- 6 Prairie welcome
▲ SE *Pyrus* x 'Jefwel'
- 6 Ure
▲ SE *Pyrus* x 'Ure'

Saskatoon Berry

- 6 Honeywood
▲ MA *Amelanchier* *ainifolia* 'Honeywood'
- 6 Martin
▲ MA *Amelanchier* *ainifolia* 'Martin'
- 6 Northline
▲ MA *Amelanchier* *ainifolia* 'Northline'
- 6 Parkhill
▲ MA *Amelanchier* *ainifolia* 'Parkhill'
- 6 Smoky
▲ MA *Amelanchier* *ainifolia* 'Smoky'

Strawberry

- 6 Tribute
▲ JN *Fragaria* 'Tribute'
- 6 Seascapes
▲ JN *Fragaria* 'Seascape'
- 6 Cavendish
▲ JN *Fragaria* 'Cavendish'
- 6 Honeoye
▲ JN *Fragaria* 'Honeoye'
- 6 Kent
▲ JN *Fragaria* 'Kent'

Raspberry

- 6 Souris
▲ JN *Rubus* x 'Souris'
- 6 Killarney
▲ JN *Rubus* x 'Killarney'
- 6 Nova
▲ JN *Rubus* x 'Nova'
- 6 Autumn Britten
▲ JN *Rubus* x 'Autumn Britten'
- 6 Double Delight
▲ JN *Rubus* x 'Double Delight'
- 6 Red River
▲ JN *Rubus* x 'Red River'

Tart Cherry

- 6 Carmine Jewel
▲ JL *P. x kerrasis* 'SK Carmine Jewel'
- 6 Crimson Passion
▲ JL *P. x kerrasis* 'Crimson Passion'
- 6 Cupid
▲ JL *Prunus* x *kerrasis* 'Cupid'
- 6 Juliet
▲ JL *Prunus* x *kerrasis* 'Juliet'
- 6 Romeo
▲ JL *Prunus* x *kerrasis* 'Romeo'
- 6 Evans
▲ JL *Prunus* x *kerrasis* 'Evans'

Nanking Cherry

- 6 Nanking Cherry
▲ JL *Prunus* *tomentosa*
- 6 Black Nanking Cherry
▲ JL *Prunus* *tomentosa* 'Nigra'

Blueberry

- 5 Chippewa
▲ AP *Vaccinium* x 'Chippewa'
- 5 Northland
▲ AP *Vaccinium* x 'Northland'
- 5 Northsky
▲ AP *Vaccinium* x 'Northsky'

Grape

- 6 Beta
▲ SE *Vitis* x 'Beta'
- 6 Bluebell
▲ SE *Vitis* x 'Bluebell'
- 6 Brianna
▲ SE *Vitis* x 'Brianna'
- 6 Frontenac
▲ SE *Vitis* x 'Frontenac'
- 6 Louise Swenson
▲ SE *Vitis* x 'Louise Swenson'
- 6 Kay Gray
▲ SE *Vitis* x 'Kay Gray'
- 6 Minnesota 78
▲ SE *Vitis* x 'Minnesota 78'
- 6 Valiant
▲ SE *Vitis* x 'Valiant'

Rhubarb

- 6 Canada Red Rhubarb
▲ AP *Rheum rhabarbarum*

Chokecherry

- 6 Viking Aronia
▲ JN *Aronia melanocarpa* 'Viking'



Fig. 17 Sea Buckthorn



Fig. 18 Currant



Fig. 19 Honeyberry



Fig. 20 Saskatoon Berry

Sea Buckthorn

- 6 Askola
▲ AU *Hippophae rhamnoides* 'Askola'
- 6 Leikora
▲ AU *Hippophae rhamnoides* 'Leikora'
- 6 Orange September
▲ AU *Hippophae rhamnoides* 'Orange September'
- 6 Pollmix
▲ AU *Hippophae rhamnoides* 'Pollmix'
- 7 Goji Berry
▲ JL *Lycium barbarum*

Currant

- 6 Ben Nevis
▲ JL *Ribes nigrum* 'Ben Nevis'
- 6 Red Lake
▲ JL *Ribes x* 'Red Lake'
- 6 Captivator
▲ JL *Ribes x* 'Captivator'
- 6 Pixwell
▲ JL *Ribes x* 'Pixwell'

Honeyberry (Haskap)

- 6 Aurora
▲ JL *Lonicera caerulea* 'Aurora'
- 6 Borealis
▲ JL *Lonicera caerulea* 'Borealis'
- 6 Boreal Blizzad
▲ JL *Lonicera caerulea* 'Boreal Blizzad'
- 6 Cinderella
▲ JL *Lonicera caerulea* 'Cinderella'
- 6 Honey Bee
▲ JL *Lonicera caerulea* 'Honey Bee'
- 6 Indigo Gem
▲ JL *Lonicera caerulea* 'Indigo Gem'
- 6 Indigo Yum
▲ JL *Lonicera caerulea* 'Indigo Yum'
- 6 Tundra
▲ JL *Lonicera caerulea* 'Tundra'

Legend

- ● ○ full sun/half sun/shade
- 5 6 7 average soil pH (5/6/7)
- ▲ ▲ ▲ sandy soil/loamy soil/clay soil
- AP MY JN earliest harvest season
JL AU SE (April/May/June/July/
August/September)

MUSHROOM FOREST

Aryn Ince-Hazelwood (ED4 Landscape Architecture + Urbanism)



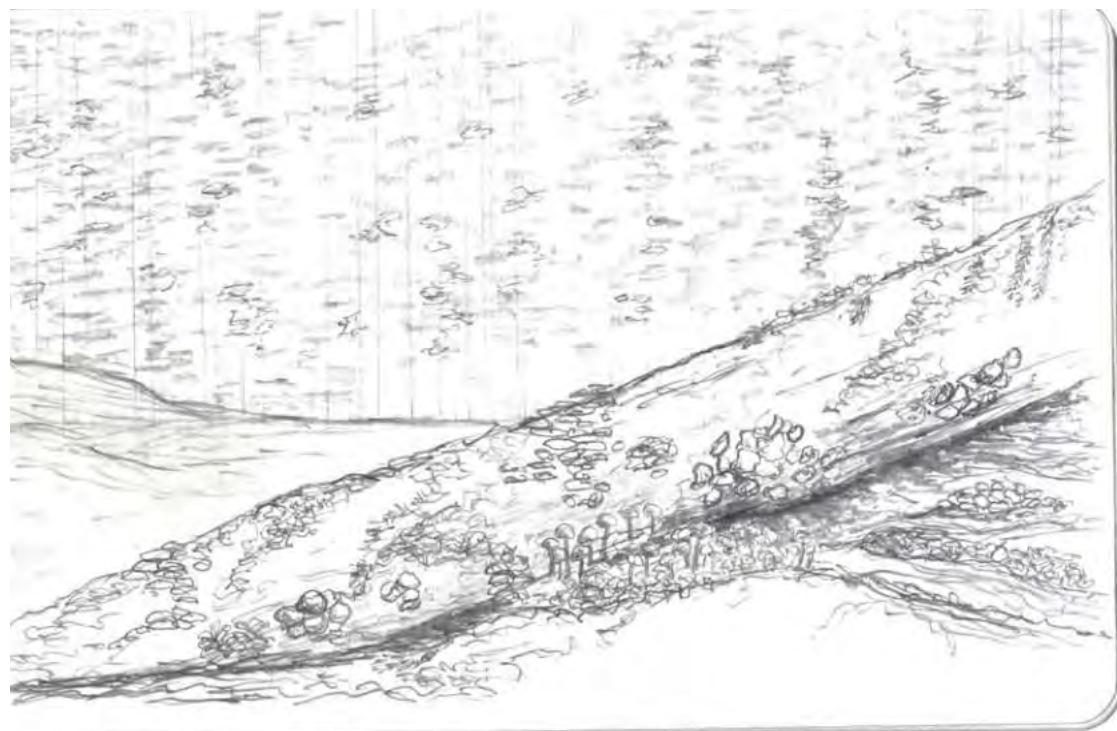
Why should we reveal mushrooms? Not only do they play a major role in maintaining natural and agricultural ecosystems, but they are also considered to be a keystone species. Mushrooms act as indicators of ecosystem health allowing people to see the degree of air pollution, forest health, soil integrity and human disturbance.¹³ They play a large role in the overall health of the forest by enhancing soil stability and breaking down dead plant and animal material. The lack of mushrooms and mycelium growth could result in an accumulation of litter, therefore altering the forest floor. Mushrooms act as important food sources for

people, animals and other organisms. But they also carry other values, such as medicinal, aesthetic or educational purposes.¹⁴

Currently, in the world, only 5% of Fungi are even known.¹⁵ Therefore, it is important to shed some light on the mysterious world of fungi we already have the pleasure of knowing. The process of learning can help us understand the potentials within the landscape and for the community. This section will show how to reveal the mushroom through different seeding techniques.

Understanding the benefits of mushrooms for people and our ecosystems can be used as an important tool for the community. As we begin to know a place, we begin to understand the threats to their diversity: chemical pollution, climate change, the introduction of new species and habitat destruction and alteration.¹⁶

Wild mushrooms continue to hold great mysteries that may be passed down through traditional teachings. Great care should be taken for people harvesting wild mushroom, due to the toxic nature of many species.



Mushroom Growth on a Rotting Log

A list of some of the mushrooms that may be found in this region has been included in the page below. Please consult the knowledge keepers before consuming wild mushrooms.

Alternatively, specific mushrooms may be cultivated for their edible potentials. With different methods, we are able to design in order to protect, celebrate and harvest mushrooms. In this section, we will explore some of the ways in which mushrooms can be cultivated and harvested in the Shoal Lake 39 landscape.



Forest Path



Habitat

Mushroom growth is dependent on specific conditions and habitat. These conditions include, soil pH, timing, temperature, nutrients available, precipitation and fluctuations in fruiting bodies.⁵ Mushrooms tend to thrive in woodland areas that have plenty of shade, with humid and moist zones. Things to consider for optimum mushroom growth is the amount of precipitation during May and June, since these months are essential for good fruiting. The biodiversity of mushrooms are also related to the temperature during the summer and autumn months.¹⁷

Natural or artificial nutrient changes can be positive, creating a greater quantity of growth. In some cases disturbance can actually cause effective fruiting, such as along pathways. Grasslands are less likely to support fungi since they lack a rich forest floor. The amount of fungal diversity is typically related to its habitat altitude. Intermediate to high rainfall is also related to host diversity. Mushrooms are typically in areas of rich humus with plenty of rotting wood to allow for fruiting on the broken area of a log. Lastly, fruiting is seen sparingly in the spring and more so prominent in the fall.¹⁸

Seeding for Place

The landscape is our main indicator of a viable location for mushroom growth. By understanding mushrooms, we can rightfully choose a location for seeding. Where to look is deeply related to traditional knowledge, which brings us to the importance of "Seeding for Place". The forest is a necessary condition for mushroom growth. Trying to find these habitats and enhance them rather than recreate them is an essential note.

An example is how to seed Chanterelles. These mushrooms thrive in humid microclimates that are well shaded, with rich organic matter and plenty of hardwood trees nearby. Next, we would scan the landscape for zones with these attributes. These areas vary in scale. Lastly, after finding these places, the mushroom can be seeded.

Growing Edible Mushrooms on Different Substrates

Wood Chips grows Wine Cap Mushrooms. Hardwood chips work well. When using wood chips it is recommended to avoid tree species such as pine, conifer and other softwoods. When constructing the beds the spawn should be layered between the wood chips. This zone should be in a shaded area that is located directly on the ground.¹⁹



Wood Chips

Organic Material grows Wood Blewit. This species of mushroom grows well in a good mixture of fresh organic materials and compost. Fresh organic material includes bark, pine needles, small branches, grass clippings and leaves.²⁰



Organic Material

Straw works well as a substrate for Wine Cap mushrooms. This process includes soaking the straw for roughly 2-3 days in water, then drain well and layer with the spawn. This should be done in a very shady zone, located directly on the ground. Lastly, add a nice layer of mulch over top. This will help to slow any moisture loss.²¹



Straw

Compost is a great substrate for mushroom growth since it can grow a variety of species. For example, the Almond Agaricus, Portobello mushroom, that will grow quickly and within a month. Compost substrate can always be incorporated with other organic materials also for other varieties.²²



Compost

Logs are used for growing multiple types of mushrooms such as, Shiitake, Oyster, Lion's Mane, Comb Tooth, Reishi, Olive Oysterling, and Nameko. The use of log inoculation is a great long-term method in mushroom production. A Shiitake log can fruit for a total of 8 years or more.²³



Logs

Mushroom Habitat (A Partial List)²⁴

● ● <i>Armillaria mellea</i> Honey Mushroom	● ● <i>Coprinus atramentarius</i> Inky Cap	● ● <i>Inonotus obliquus</i> Birch Fungus	● ● <i>Pholiota squarrosoides</i> Scaly Pholiota
● ● <i>Amanita pantherina</i> The Panther	● ● <i>Coprinus comatus</i> Lawyer's Wig	● ● <i>Lycoperdon gemmatum</i> Gemstudded Puffball	● ● <i>Pleurotus ostreatus</i> Oyster Mushroom
● ● <i>Arularia auricula</i> Wood Ear	● ● <i>Crepidotus mollis</i> Jelly Crep	● ● <i>Lycoperdon imbrinatum</i> Ochre Puffball	● ● <i>Royoporus badius</i> Black Footed Polypore
● ● <i>Boletus edulis</i> Penny Bun	● ● <i>Fomes Fomentarius</i> Horse's Hoof	● ● <i>Lycoperdon pyriforme</i> Wood Puffball	● ● <i>Russula emetica</i> The Sickener
● ● <i>Cantharellus cibarius</i> Chanterelle	● ● <i>Ganoderma applanatum</i> Artist's Conk	● ● <i>Lycoperdon marginatum</i> Peeling Puffball	● ● <i>Schizophyllum commune</i> Split-gill
● ● <i>Chlorociboria aeruginascens</i> Green Stain	● ● <i>Gastrum fimbiatum</i> Fingered Earth Star	● ● <i>Macrotyphula juncea</i> Fairy Hair	● ● <i>Urnula hiemalis</i> Black urn Fungus
● ● <i>Clavariadelphus pistillaris</i> Pestle-topped Coral	● ● <i>Gyromitra esculenta</i> Brain Mushroom	● ● <i>Meripilus giganteus</i> Black-Staining Polypore	● ● <i>Xylaria hypoxylon</i> Carbon Antlers
● ● <i>Clavariadelphus truncatus</i> Flat-topped Coral	● ● <i>Gyromita infula</i> Saddle-shaped False Morel	● ● <i>Morchella punctipes</i> Half-free Morel	● ● <i>Aleuria aurantia</i> Orange Peel
● ● <i>Clavulina amethystina</i> Violet-branched Coral	● ● <i>Helvella elastica</i> Smooth-stalked Helvella	● ● <i>Omphalotus illudens</i> Jack-O-lantern	
● ● <i>Collybia tuberosa</i> Tuberous Collybia	● ● <i>Hypomyces lactifluorum</i> Lobster Mushroom	● ● <i>Pholiota aurivella</i> Golden Pholiota	

Legend

- | | |
|------------------|--------------|
| ● Wood | ● Poisonous |
| ● Organic Matter | ● Non-Edible |
| ● Soil | ● Edible |
| ● Near Wood | |
| ● Grassland | |



Pleurotus ostreatus
Oyster Mushroom



Armillaria mellea
Honey Mushroom



Arularia auricula
Wood Ear



Clavariadelphus pistillaris
Pestle-topped Coral

Understanding Log Inoculation

A precise way of farming mushrooms includes the strategy of log inoculation. This process is performed by drilling into cut logs, the drill holes are typically spaced evenly among the log, creating diamond shapes. An example of this is shown in *Diagram 1*. After this is done, compact spore dowels are hammered into the log. Then the logs are placed within a controlled zone for fruiting. The list below indicates preferred mushroom species for log inoculation in relation to tree species and the overall effectiveness of fruiting.²⁵

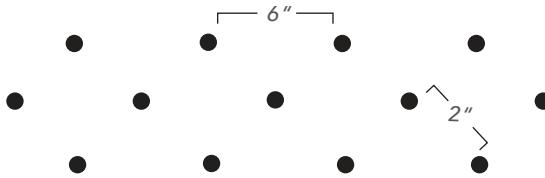


Fig. 21 Log Inoculation Measurements

<i>Tree Species</i>	<i>Mushroom Type</i>	<i>Score Recommendation</i>
Aspen	Oyster	Superior
Aspen	Nameko	Superior
Aspen	Lions Mane	Satisfactory
Aspen	Comb tooth	Satisfactory
Paper Birch	Shitake	Satisfactory
Paper Birch	Lions Mane	Satisfactory
Paper Birch	Nameko	Satisfactory
Paper Birch	Olive Oysterling	Satisfactory
Pine	Nameko	Superior
Maple	Shitake	Recommended
Maple	Oyster	Satisfactory
Maple	Lions Mane	Superior
Maple	Olive Oysterling	Superior
Maple	Reishi	Superior
Alder	Shitake	Recommended
Alder	Oyster	Satisfactory
Alder	Nameko	Satisfactory
Willow	Oyster	Superior
Willow	Lions Mane	Satisfactory
Willow	Nameko	Superior

Mushroom Suitability Chart

PAAKITA' WAYWIKAMIKOON

Caitlin Ferris (ED4 Architecture)



In English, the Anishinabe word Paakita'waywikamikoon translates to a fishing place. This project seeks to establish a meaningful relationship to land through the traditional indigenous practices surrounding fishing. Located on a small Island in Shoal Lake, three main structures compose a land-based out camp for the Iskateiwizaagegan community. A communal gathering cabin, a feasting shelter and a series of sleeping cabins transform the island into an inhabitable space where indigenous youth can learn and experience traditional ways of life. With a focus on the 'small moments' that exist between the built and the natural environment, the architecture asks us to "unlearn the act of hurrying" as Robin Wall Kimmerer pronounces in Braiding Sweetgrass. Each

structure is designed to strengthen the experience of being in the land as opposed to merely existing around it. With a focus on the way spaces feel, sound and smell, the architecture is intended to reignite a spirit that can all too often become lost within the established systems that confound indigenous life. This site is designed as a catalyst in the Iskateiwizaagegan community, providing roots for further land-based developments that can truly benefit the lives of indigenous youth. Richard Wagamese says it best in One Story, One Song, stating: "We better start with the issues concerning our youth because this is the generation we will eventually hand the future to. We need our youth strong. We need them here."

Fish Presence in Shoal Lake

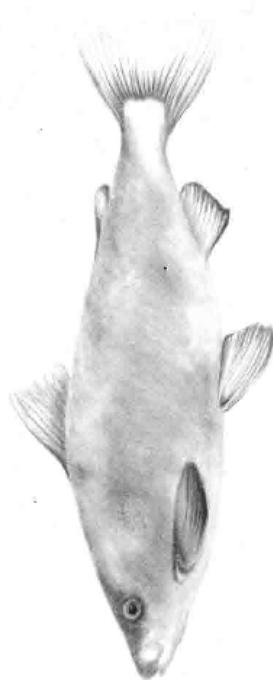
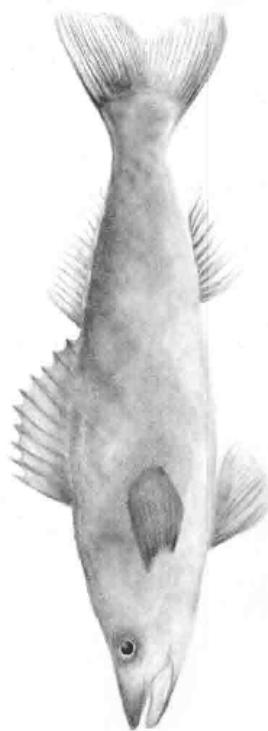
- Black Crappie
*Otoonibiins
- Brown Bullhead
*Owaasii
- Burbot
*Mizay
- Cisco
*Otoonibiins
- Emerald Shinner
*Kinoozhe
- Lake Whitefish
*Atikameg
- Minnow
*
- Muskellunge
*Ozaawasko-Kinoozhe

- Northern Pike
*Kinoozhe
- Rock Bass
*Ashigan
- Slimy Sculpin
*
- Smallmouth Bass
*Otazhegamoo

- Spottail Shiner
*
- Walleye
*Ogaa
- White Sucker
*Namebin
- Yellow Perch
*Asaawe

Legend

- Low Presence
- Medium Presence
- High Presence
- *Ojibwa Name

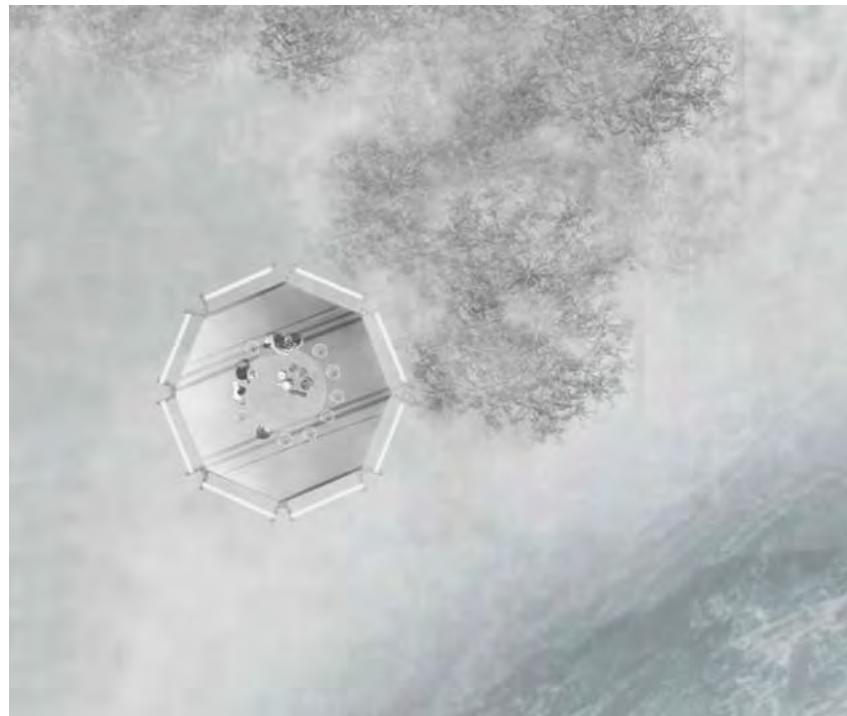






Main Cabin

The main cabin is centered around the act of learning. The open concept space allows for the sharing of knowledge between elders and youth. Operable windows on the south façade create an extension between interior and exterior environments.



Feast Shelter

The feasting shelter is a space rooted in the act of sharing. The circular structure fosters an environment for gathering and connection. The cedar and canvas construction reveal the relationship between the natural and built environment through the sense of touch and sound.

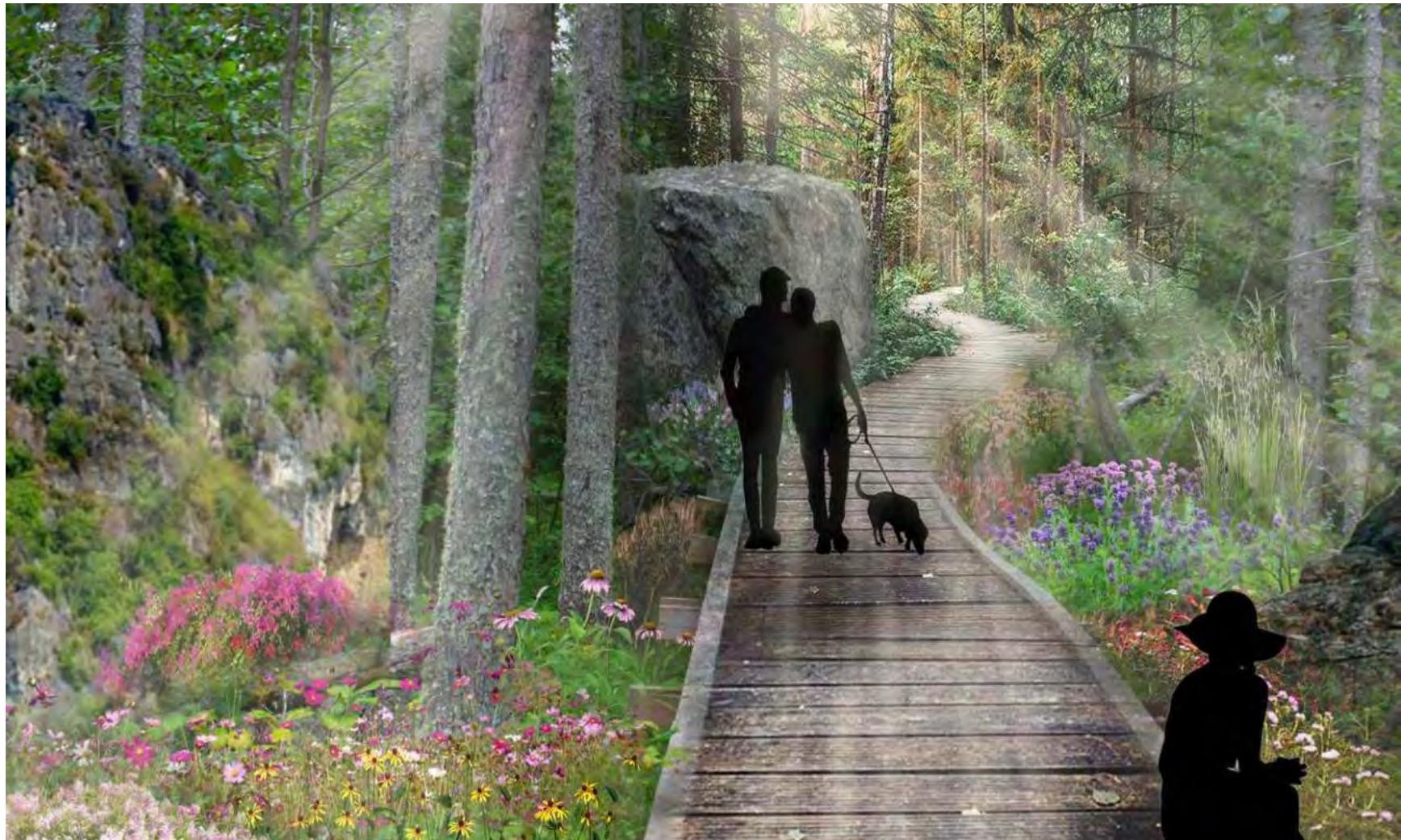


Sleeping Cabins

The sleeping cabin is a space for reflection. The small footprint and relative remoteness provide a space for youth to reconnect to the land. Built upon the periphery between land and water, these cabins offer a private environment for land-based learning.

WILD FLOWERS

Caitlyn Wolfe (ED4 Landscape Architecture + Urbanism)



Wild flowers in the Canadian landscape play a crucial role in the health and wellbeing of the environment, animals, birds, and humans. A diverse palette of flower species can provide the soil with various types of nutrients, prevent soil erosion, help control ground water, and create micro-climates to allow more species to thrive in an area.²⁶ Birds, animals, and insects are greatly impacted by plants as they can provide shelter, and also serve as an important food source. Humans also take advantage of seeds and fruit produced by plants, as well as other components such as roots, oils, and fibers which can be used as medicine, clothing fiber, and crafting material.

This section features a range of common and recognizable wild flowers found around Shoal Lake 39 and the surrounding areas in Ontario, southern Manitoba, and northern Minnesota. It explores how to utilize these plants within the landscape to create beautiful, self sustaining landscapes and gardens in various spaces that appear as if they are growing naturally without human intervention. These gardens may serve as a plant library to further educate ourselves on the types of flowers that grow around us, and how to utilize them for our own health and wellbeing.

What is Matrix Gardening?

Matrix gardening is a planting method for creating natural looking gardens and landscapes filled with perennials.²⁷ It focuses on matching plants to the space, and using a plant palette full of species that one could typically find growing together in nature. As wildflowers and grasses can grow without human intervention, matrix planting ensures that the garden will be self sustaining, as plants will continue to grow, reproduce, and if done correctly, can force out weeds on their own. Being surrounded by these types of gardens can help teach younger generations about coexisting species, and how to find and identify a wide range of wildflowers. In order to successfully achieve this type of garden planting, one must take several factors into consideration.

Take all seasons into consideration

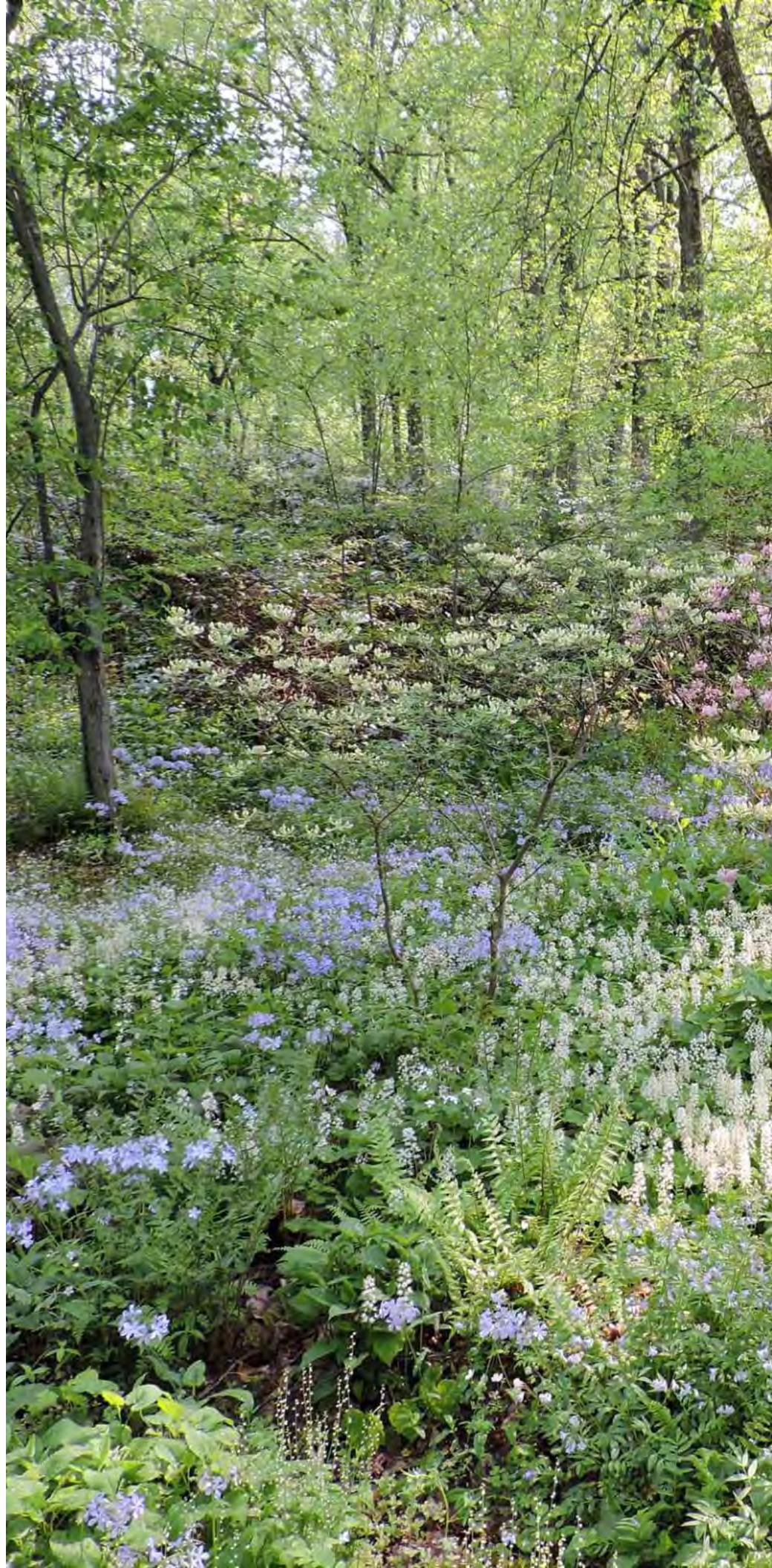
Different types of flowers will have different times of the year they come into bloom, and will produce flowers for different amounts of time. Some flowers may only be visible for 1-2 weeks in early spring, while some will bloom from summer to the first frost. Winter months can also be planned for, as plants of various heights and density will add texture and massing through the snow.

Blur Edges

Allow plants to mix with the edge of wooded areas and surrounding vegetation for a more natural look. The only visible edge should be that of a pathway or road.

Plant in Swathes

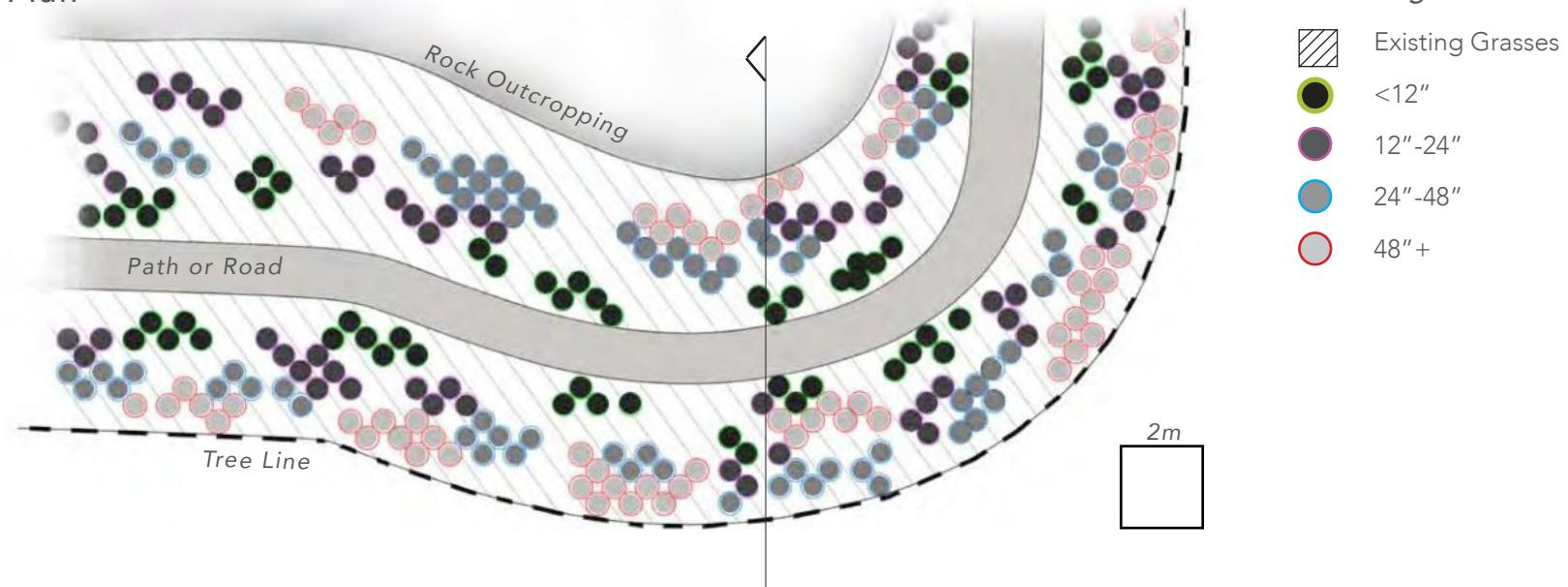
Plant species in repetitive clusters of flowing, organic shapes, and layers. It helps the eye to catch focal points, and give a sense of movement to the garden. Allow grasses to grow between the plant clusters to soften the landscape and create a soft background for flowers to stand out.²⁸



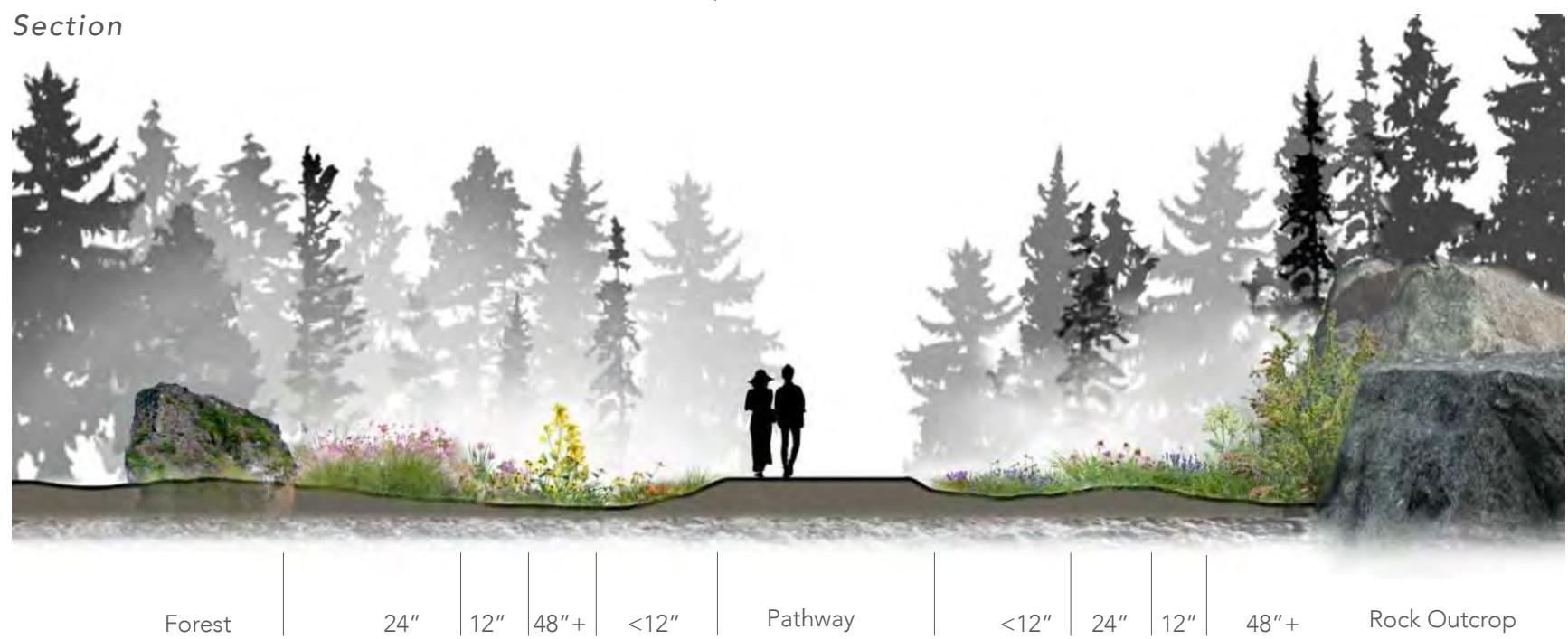
Filling In The Gaps

Garden design is very diverse and can be built at a variety of sizes and in various places. This can be beneficial for areas of land that are difficult to build on, and that seem like they're missing something. This particular design is an example of what can be done to fill in narrow space between roads and rock out cropping and forest edge.

Plan



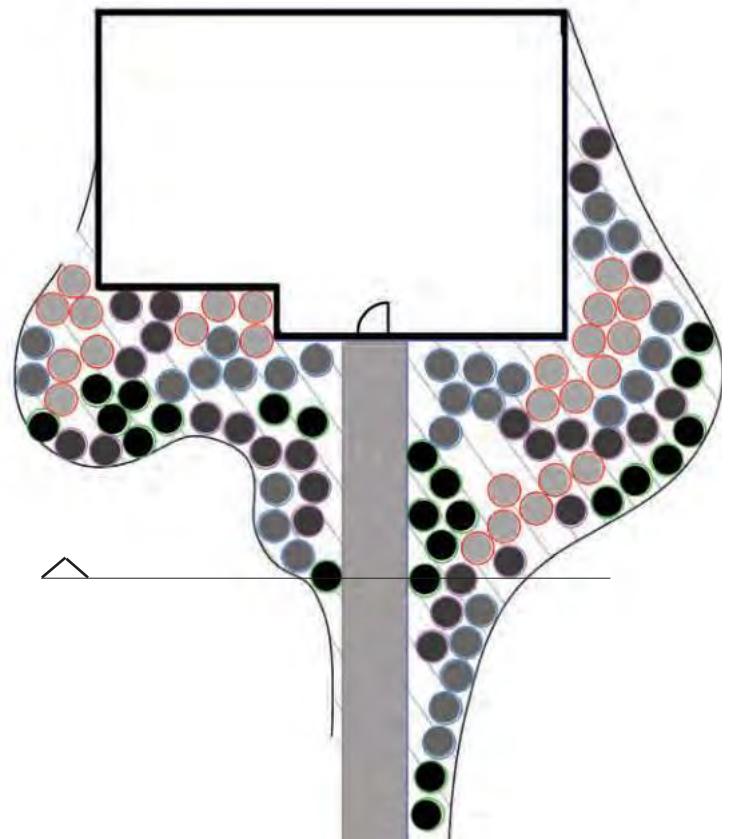
Section



Reclaiming Built Space

Surrounding a new building with plants is a great way to tie the structure to the land. By utilizing wild flowers organic planting patterns, we can make the building appear as if it belongs in the landscape and that it has been there long enough for native plants to grow freely around the new addition, and hide any scars from construction.

Plan



Section



Rock Outcrop

Wildflower gardening in relation to a new building

Forest

Wild Flowers and Habitats²⁹

1	Achillea millefolium Yarrow	11	Campanula rotundifolia Harebell	21	Gentiana andrewsii Bottle Gentian	31	Rosa acicularis Wild Rose
2	Allium canadense Meadow Garlic	12	Chamaenerion angustifolium Fireweed	22	Helianthus annuus Common Sunflower	32	Rubus occidentalis Wild Raspberry
3	Allium cernuum Nodding Onion	13	Chelone Turtlehead	23	Iris germanica Wild Iris	33	Rudbeckia hirta Black-eyed Susan
4	Amelanchier Saskatoon Berry	14	Claytonia caroliniana Carolina Springbeauty	24	Liatris Blazing Star	34	Solidago Goldenrod
5	Anemone sylvestris Snowdrop Anemone	15	Convallaria majalis Lily of the Valley	25	Lilium philadelphicum Wood Lily	35	Symphyotrichum novae-angliae New England Aster
6	Aquilegia Columbine	16	Crocus	26	Mertensia virginica Virginia Bluebell	36	Taraxacum Dandelion
7	Aralia nudicaulis Wild Sarsaparilla	17	Cypripedi orchidae Lady Slipper Orchid	27	Myosotis	37	Thalictrum Meadow Rue
8	Arctostaphylos Bearberry	18	Doellingeria umbellata Flat Topped Aster	28	Myrrhis odorata Sweet Cicely	38	Vaccinium angustifolium Lowbush Blueberry
9	Asclepias tuberosa Milkweed / Butterfly Weed	19	Echinacea Cone Flower	29	Nepenthes Pitcher Plant	39	Vicia sativa Common Vetch
10	Baptisia australis Wild Indigo	20	Fragaria vesca Woodland Strawberry	30	Rhododendron groenlandicum Labrador Tea	40	Viola Violet

Legend

- Wetland
- < 12"
- Rocky
- 12"-24"
- Meadow/Sun
- 24"-48"
- Forest/Shade
- 48"+

Note: Any member of the orchid family should never be disturbed and are protected under the Canadian Species at Risk Act.



Achillea millefolium
Yarrow



Fragaria vesca
Woodland Strawberry



Rosa acicularis
Wild Rose



Convallaria majalis
Lily of the Valley

Wild Flowers Image Key

Fig. 22-42



A BREATH OF MOSS

Emma Bock (ED4 Landscape Architecture + Urbanism)



Why design for moss? Moss is the carpet of the earth. This delicate plant is commonly mistaken for a single species spreading across an entire habitat. It may be hard to believe as you look over the sea of green moss that there are over 100 species in the Shoal Lake 39 region. Once we learn how to see these microscopic plants we can reveal their hidden beauty. Such a small plant that goes unseen has a huge impact on the environment. It does so by preventing forest fires, sequestering carbon and providing nutrient soil. With such an important role in the

ecosystem, we must ensure that this delicate plant is taken care of. Before tearing up the landscape to build campsites and facilities we can collect the moss (you may include the growing surface, like a log or rock) and transplant it to a safer location with similar site conditions (similar ecosystem). This new abundance of moss opens up the possibilities to what we can do with it. Traditionally being used as an absorbent material for babies and women, moss can also offer us a silent beauty with its lush textures and colours.



Selecting a Site

Moss will grow almost anywhere on site as long as it has shade and moisture. The map above shows where the ideal spots for a garden are based on the conditions of low lands for moisture and a thick canopy for shade. The darker the green the better the conditions are. Additionally, the site should include features referred to in the species list including; rotting logs, ponds or streams, rocks and an abundance of trees. Once construction starts on site it will be important for the site selection of the garden to be somewhere it will not be negatively impacted.

Taking Care of a Moss Garden

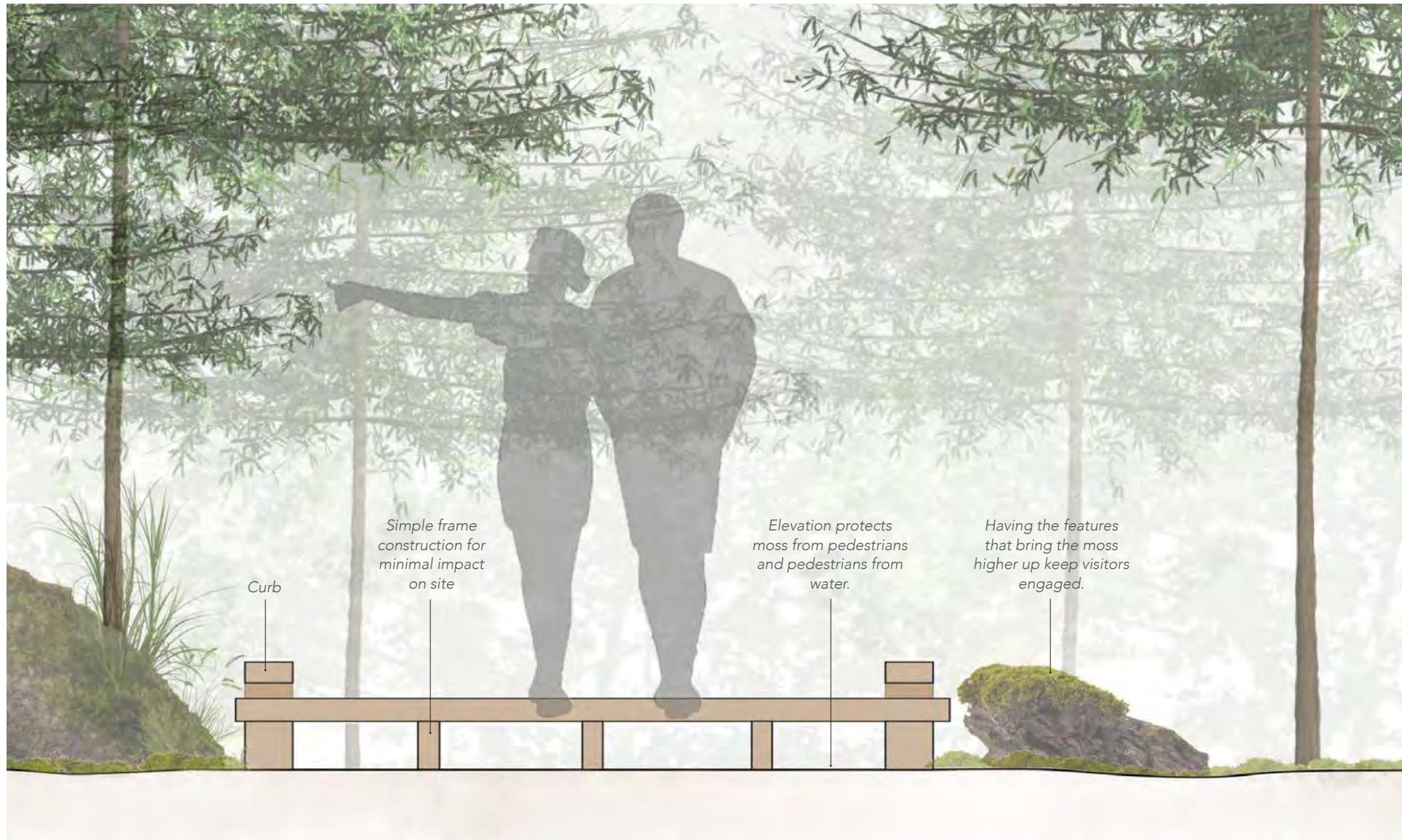
As moss is added to the site selected, a simple assemblage of mosses becomes a space. For visitors and campers to access the space there will need to be a series of paths. With the intention for a campsite nearby we can anticipate heavy pedestrian traffic at points throughout peak season. Moss is a sensitive plant not suitable for heavy pedestrian traffic, however, if we design a path that responds to the desired human and moss conditions the moss garden can become an attraction.



Transplanting Moss

Transplanting moss is the fastest, most efficient way to establish a moss community. As you walk through the landscape collect small samples of moss that catch your eye or large patches that are in danger of being lost due to construction. Use your hands to carefully pull moss off of its growing surface. It is important to take notes on the conditions you found the sample in. This way you can replicate the ecosystem in your cultivated habitat. For example, if you found your moss at the base of a pine tree base try to plant it around a pine in your new landscape.

When planting your moss samples you will need to firmly press the moss onto the desired surface, this is best done by walking on it. Make sure it receives a good watering then let it grow. Additionally, you can add features such as rocks or rotting logs with established moss communities to speed up the spread across your site. Once the moss has acclimated to its new site you must avoid walking on the newly planted moss habitat.



Boardwalk

A boardwalk will be constructed in a way where sections can be easily added and there is no need for drilling into the ground. When working with such a delicate plant the construction of the path needs to respond. The boardwalk is elevated above the ground to protect the moss from foot traffic and curbs run along the edges to prevent people from stepping off the boardwalk and into the moss.

Maintenance of the garden and trail are minimal. Unless transplanting, the moss should not require any maintenance and with the use weather resistant wood, like cedar, the trail should last at least 10 years. The construction of the curb in the boardwalk allows a small gap for simple removal of debris using a broom.





Moss Bank

Transplanting moss from the areas intended for construction will help keep the diversity of species up in the Shoal Lake 39 area. By transplanting all the moss into a designated area the collection of species will naturally turn into a moss garden. This garden can be thought of as a 'moss bank' for the shoal lake community. Such a large collection of moss species in one area will reveal to the visitors the range of textures and colours moss can provide in a landscape. With a newfound appreciation for what moss has to offer in a landscape, the garden or 'moss bank' can be used to transplant moss back into the areas that once were not suitable.

Once a construction site is done, one may observe the sites conditions and find a corresponding species in the moss bank to return it to the site. After construction new conditions can be made, therefore by having a garden such as the moss bank you can select a different species that will thrive better in the new conditions.

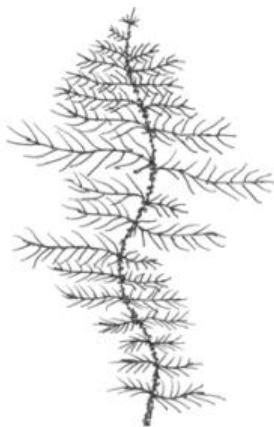
Moss is such a small piece in the Shoal Lake landscape but can have such a huge impact. Taking care of the plant and revealing its beauty to the public will hopefully ask people to slow down and appreciate all the details hidden in the landscape.

Moss and Habitats

● Anacamptodon splachnoides Knothole Moss	● Brachythecium salebrosum Golden Foxtail Moss	● Dicranum scoparium Windswept Broom Moss	● Fontinalis sphagnifolia Rolled Water Moss
● Andreaea rothii Needle-leaved Lantern Moss	● Bryhnia novae-angliae Bonsai Moss	● Dicranum viride Brittle Broom Moss	● Forsstroemia trichomitria Fan Moss
● Andreaea rupestris Broad-leaved Lantern Moss	● Bryoandersonia illecebria Worm Moss	● Diphyscium foliosum Nut Moss	● Grimmia pilifera Hoary Cannikin Moss
● ● Anomodon attenuatus Poodle Moss	● Calliladium haldanianum Sword Moss	● Drummondia prorepens Trailblazer Moss	● Hedwigia ciliata Medusa Moss
● ● Anomodon minor Rounded Tongue Moss	● Calliergon cordifolium Heart-leaved Spear Moss	● ● ● Entodon cladorrhizans Flat Glaze Moss	● Helodium paludosum Narrow-leaved Bread Moss
● ● Anomodon rostratus Yellow Yarn Moss	● Calliergon giganteum Bubble-lobed Spear Moss	● ● Entodon seductrix Cord Glaze Moss	● Herzogiella turfacea Tassel Moss
● ● Anomodon rugelii Ruffled Tongue Moss	● Campyliadelphus chrysophyllum Bristle Star Moss	● Eurhynchiastrium pulchellum Rug Moss	● Herzogiella striatella Tassel Moss
● ● Anomodon tristis Threadbare Moss	● Campylium stellatum Yellow Star Moss	● ● Fissidens adianthoides Maidenhair Pocket Moss	● Homalia trichomanoides Frog Skin Moss
● ● Arrhenopterum heterostichum Goose Egg Moss	● Climacium dendroides Palm Tree Moss	● ● Fissidens dubius Fan Pocket Moss	● ● ● Hygroamblystegium varium Tangled Thread Moss
● ● Atrichum altecristatum Wavy Starburst Moss	● Dicranum flagellare Asparagus Broom Moss	● Fissidens fontanus Limp Pocket Moss	● ● Hylocomium splendens Stair-step Moss
● ● Atrichum angustatum Slender Starburst Moss	● Dicranum fulvum Boulder Broom Moss	● Fissidens osmundioides Fern Pocket Moss	● ● Hypnum curvifolium Greater Plait Moss
● ● Atrichum crispum Oval Starburst Moss	● ● ● Dicranum fuscescens Curly Broom Moss	● Fontinalis antipyretica Keeled Water Moss	● ● ● Hypnum imponens Brocade Moss
● ● Aulacomnium palustre Ribbed Bog Moss	● ● ● Dicranum montanum Crispy Broom Moss	● Fontinalis dalecarlica Cupped Water Moss	● ● ● Hypnum pallescens Lesser Plait Moss
● ● Brachythecium rutabulum Rough Foxtail Moss	● Dicranum polysetum Wrinkled Broom Moss	● Fontinalis hypnoides Lax Water Moss	● Leptodictyum riparium Wet Thread Moss

Legend

- Rotting Wood
- Rocks
- Forest Floor
- Tree Bark
- Tree Base
- Water



- *Leskeia gracilescens*
Necklace Chain Moss
- *Leskeia polycarpa*
Curled Chain Moss
- *Leskeella nervosa*
Frayed String Moss
- *Leucobryum albidum*
White Moss
- *Leucobryum glaucum*
Pincushion Moss
- *Leucodon andrewsianus*
Frizzy Hook Moss
- *Leucodon julaceus*
Smooth Hook Moss
- ● *Mnium marginatum*
Bordered Thyme Moss
- *Mnium stellare*
Blue Thyme Moss
- *Neckera pennata*
Shingle Moss
- *Oncophorus wahlenbergii*
Goiter Moss
- *Orthotrichum sordidum*
Umbrella Bristle Moss
- *Orthotrichum stellatum*
Bald Bristle Moss
- *Oxyrrhynchium hians*
Spare Rug Moss
- ● *Paraleucobryum longifolium*
Silver Broom Moss
- ● *Plagiomnium ciliare*
Saber Tooth Moss
- *Plagiomnium cuspidatum*
Baby Tooth Moss
- *Plagiomnium medium*
Greater Tooth Moss
- *Plagiothecium cavifolium*
Round Silk Moss
- *Plagiothecium denticulatum*
Wet Silk Moss
- *Plagiothecium laetum*
Pressed Silk Moss
- ● *Platygyrium repens*
Oil Spill Moss
- *Platydictya confervoides*
Rock Algal Thread Moss
- *Pleurozium schreberi*
Phoenix Feather Moss
- *Pohlia nutans*
Copper Wire Moss
- ● *Polytrichum commune*
Common Haircap Moss
- *Ptilium crista-castrensis*
Knight's Plume Moss
- *Ptychomitrium incurvum*
Gnome's Hood Moss
- *Ptychostomum pseudo.*
Marsh Cardinal Moss
- ● *Pylaisiadelpha tenuirostris*
Gentle Moss
- *Rhizomnium punctatum*
Red Penny Moss
- *Rhodobryum ontariense*
Rose Moss
- ● *Rhynchosstegium serrulatum*
Beaked Comb Moss
- ● *Rosulabryum capillare*
Cluster Moss
- *Sanionia uncinata*
Candy Curl Moss
- *Schwetschkeopsis fabronia*
Rapunzel Moss
- *Schistidium apocarpum*
Prickly Cannikin Moss
- *Schistidium rivulare*
Brook Cannikin Moss
- ● *Sciuro-hypnum reflexum*
Woodland Foxtail Moss
- ● *Sphagnum fimbriatum*
Fringed Peat Moss
- *Sphagnum girgensohnii*
Graceful Peat Moss
- ● *Sphagnum palustre*
Blunt-leaved Peat Moss
- *Sphagnum russowii*
Starry Peat Moss
- *Sphagnum squarrosum*
Spiky Peat Moss
- *Sphagnum warnstorffii*
Red-green Peat Moss
- *Sphagnum wulfianum*
Pom-pom Peat Moss
- *Tetraphis pellucida*
Four-tooth Moss
- *Thelia asprella*
Alligator Moss
- *Thelia hirtella*
Train Tracks Moss
- ● *Thuidium delicatulum*
Delicate Fern Moss
- *Tortella humilis*
Tiny Tornado Moss
- *Ulota coarctata*
Puckered Tuft Moss
- *Ulota crispa*
Crispy Tuft Moss
- *Ulota hutchinsiae*
Rock Tuft Moss



Habitat

The species listed above are based on the growing criteria and site conditions of Shoal Lake 39. The conditions on the site consist of willow wetlands, rock outcrops and mixed-wood forests with a fairly neutral pH. These conditions helped determine the list of moss species that may be found on site. For a pictorial version of these mosses and many others, see [Mosses of the Northern Forest](#), by Jerry Jenkins.

LICHEN X LANDSCAPE

Tristan Osler (ED4 Landscape Architecture + Urbanism)



While walking through the Boreal Forest there are many things you may encounter. Whether it be the stands of majestic trees or the many animals that call it home. However, the forest is home to something so beautiful yet so small that is often overlooked. You can find them almost anywhere, growing on rocks, trees and branches. These minute parcels of beauty are lichens. What is a Lichen you may ask? A lichen is comparable to a fungus, or a plant yet at the same time very different. A lichen is a symbiotic relationship between fungus and algae. What this means is the fungus and algae work together to live. The fungus provides a shell or a scaffold for the algae to live in while the algae produces energy through photosynthesis, allowing the fungus to grow, and thus house more algae. This results in a mutual dependence and

in turn an almost wildly unique and beautiful family of organisms. These organisms can take a variety of different forms. There are three main types of lichen, categorized by the way they grow; crustose, foliose and fruticose lichens. Crustose lichens grow horizontally along a surface such as a rock or a tree and appear almost as a crust. Foliose lichens grow primarily horizontally as well, but they form smooth, layered, leaf like appendages. Fruticose lichens resemble small shrubs or corals and are structurally more complex. Being so small, lichens are some of the most unassuming and unseen members of the landscape. Learning to see the lichens for what they are has the potential to profoundly shape the way we engage a landscape.

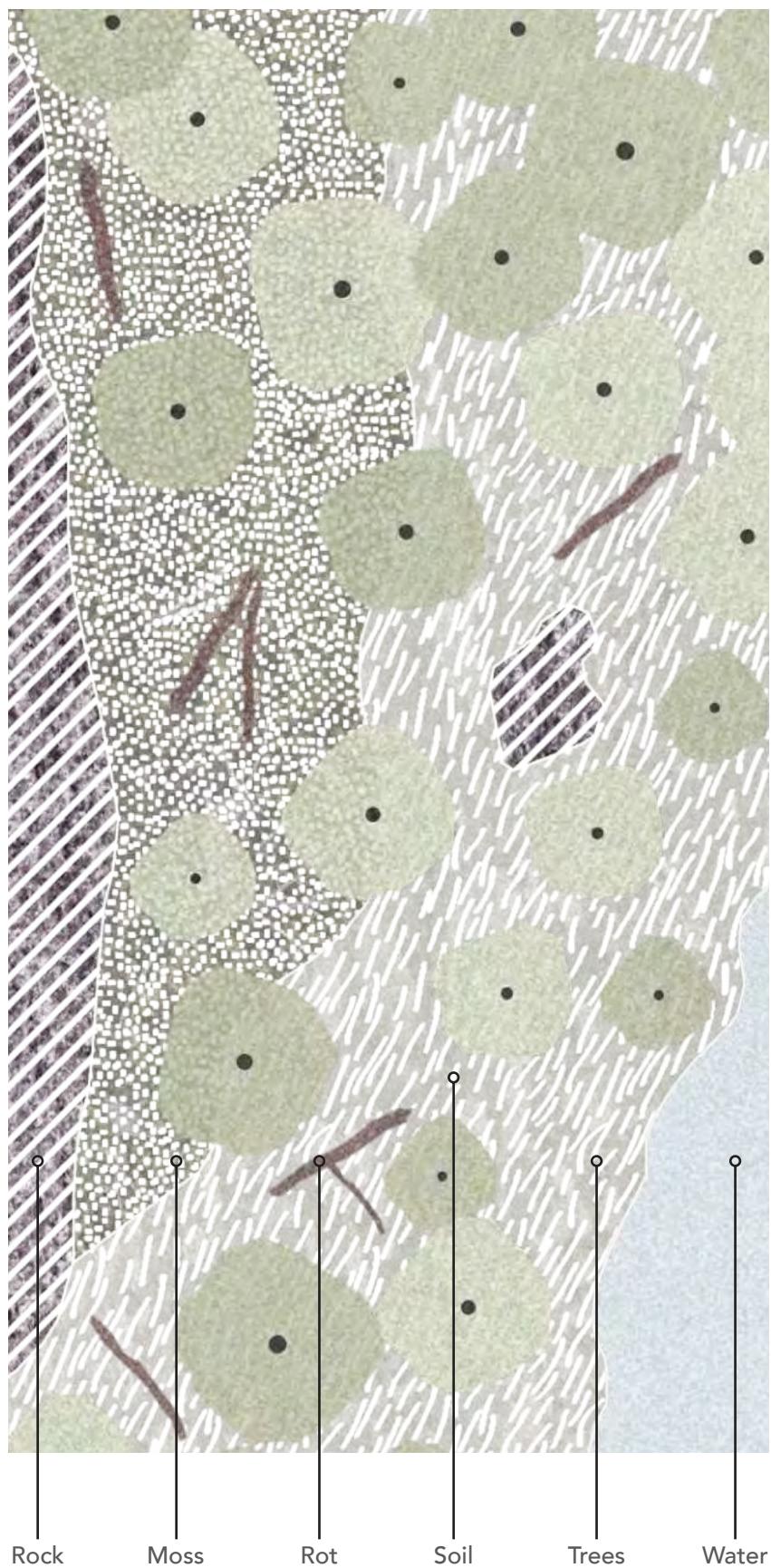
Designing with [for] Lichen

The goal to Lichen x Landscape is not to design a place solely for the lichen but is to instill an appreciation of place through the use and recognition of lichen and its beauty. Making people who visit aware that there is an unimaginable level of complex layers to a landscape. By revealing the pure beauty in something as seemingly insignificant as lichen a sense of respect and appreciation for the landscape is created. Lichen x Landscape is a shift in the approach we normally take towards the land. It is no longer about us but about the place, its subtleties, its beauty, and its temporality. Lichen is the metaphor that drives this. Landscapes are special places and altering landscapes should be done with the utmost care. This doesn't just apply to trees and animals but the lichen too. Whatever is being added or removed from the landscape must enhance it on many levels. Does this addition add value for humans? Does it add value for the flora and fauna, does it add value for the lichen?



Lichens in Shoal Lake

As mentioned before, lichens can grow on many substrates and under many conditions. But like most species, there are different varieties in different areas. The list outlined here is a comprehensive catalogue of the species that can live in the Shoal Lake area. The list is organized by the scientific names of the lichen, followed by their common names. On the list, each species is accompanied with their required substrates. Some species such as *Rhizocarpon geographicum* have only one substrate they will grow on, while others, such as *Usnea hirta* can grow on a variety of substrates. This list isn't just supposed to be a catalogue, but a palette. Lichens are inherently tied to their substrates. This means that they are never a lone specimen, but a part of a larger composition in the landscape. They contrast, blend and grow amongst each other and their substrates. When you look at a rock covered in lichen, the beauty isn't just in the rock, or the lichens on the rock, but the composition they achieve as a whole. This list is to act as a tool, for recognizing, appreciating and designing with local lichens.



1. [Siting / Observation]

The first step in any design is choosing a site. A site must be suitable for the desired function, whether that be a path, a rest area or a building. When designing with lichen in mind there is added emphasis on this step as the site will determine how well lichen will grow. This means reading the landscape and determining if a site will allow lichen growth to flourish. Although lichens can grow almost anywhere, they do have conditions in which they thrive under. These conditions can vary based on the type of lichen.

Light and temperature

Most lichen prefer a mixture of sun and shade, but with more shade. Sites with dappled light from tree canopies do this well. Temperature helps create microclimates, which means that close to the ground often proves to be cool and comfortable. This means that the right site will be cool on the ground even on the warmest days.

Moisture

Lichen also prefer moist sights as moisture is what helps drive their growth. Low lying areas that allow for the formation of fog, and areas near streams or ponds provide air moisture which is perfect for lichen growth.

Substrate

Lichens need a sturdy substrate in order to grow, this could be an exposed rock, a stand of trees, a bed of moss or a rotting log. In areas suitable for lichen, these substrates will already host lichen growth.

Site selection isn't as hard as it may seem in this case. The lichen have already done the work. When choosing a site, be observant. Is there already a variety of lichen growth? What kinds of lichen are there and what substrates are they growing on? If there is already a lot of lichen, and the site itself allows for whatever the proposed function is, then that site may be suitable. It is still key, however, to analyze the site in its totality to ensure that any intervention on the site will not diminish the growth of the lichen and that the site chosen is suitable for a variety of lichen species. Read the landscape and listen to what it is telling you.

2. [Scale / Place]

Once a site is selected the details of a design begin to take shape. The site itself will inform the design. Its subtleties such as topography, vegetation and lichen will start to create form. In fact, these are already an existing part of the design that are to be added to. So now the focus shifts to how can these pre-existing conditions be used to create a place? How may a path flow through the space? Where is the best place to create a rest area? Are there any particularly striking features on the site? The goal is to accept the gifts the site is offering and use them to heighten a design.

Scale

What is the scale of the desired design? Scale is important because it vastly changes our perception of place. If you were to introduce a large rest area or a wide path it will make people perceive the site as grand and imposing. This may be desirable in certain circumstances, but when working with lichen, larger scales diminish the interaction and immersion with it. A path or rest area of a smaller scale will make people feel close to the lichen and the site, creating a richer, more intimate experience. This applies to direction and form too. Geometric forms such as straight paths and square rest areas create a sense of prospect and distance, resulting in the perception of a larger scale. This too can be desirable at times but could diminish the level of immersion with the lichen. Smaller, more intimate spaces and weaving narrow paths create a sense of enclosure. In turn, these bring people close to the lichen, and the substrates they grow on. Routing paths among the trees, or along rock faces in a nonlinear manner will create a series of intimate spaces. The same goes for a rest area. A small rest area among the trees is intimate, calm and close to the lichen. Scale, intimacy and immersion are all linked.

Lichen growth

In order to immerse people in lichen, you will need to bring them close to the lichen and make its existence known. This means placing emphasis on sections of the site that are prime for growing lichen. This must be done carefully however, as if people are too close to the lichen there is a risk it could be damaged. How can paths be routed to best view the lichen? What substrates on site allow for lichen growth? Where can substrates be added to enhance lichen growth? How do your eyes wander as you walk a path? What draws your attention? Do you feel close to the lichen? These are questions to ask yourself when designing.

Focal points

Sometimes in the landscape, there are exceptionally beautiful objects or views. These can and should be used to the advantage of the design. For example, if there was a large rock, covered in lichen, how might this be framed to draw attention? Perhaps a rest area may surround it, or a trail may end at it. Focal points can help to ground the design, giving it a central point. An exceptionally beautiful focal point will stick with people, allowing them to have a richer memory of the site.

Every site is unique and has its own advantages. Taking the scale, lichen growth, and focal points into account will help instill meaning into a design, and ensure that it is a memorable, and intimate experience.



Granite stone paver with its Lichen species



Recycled concrete paver with its Lichen species



3. [Materials]

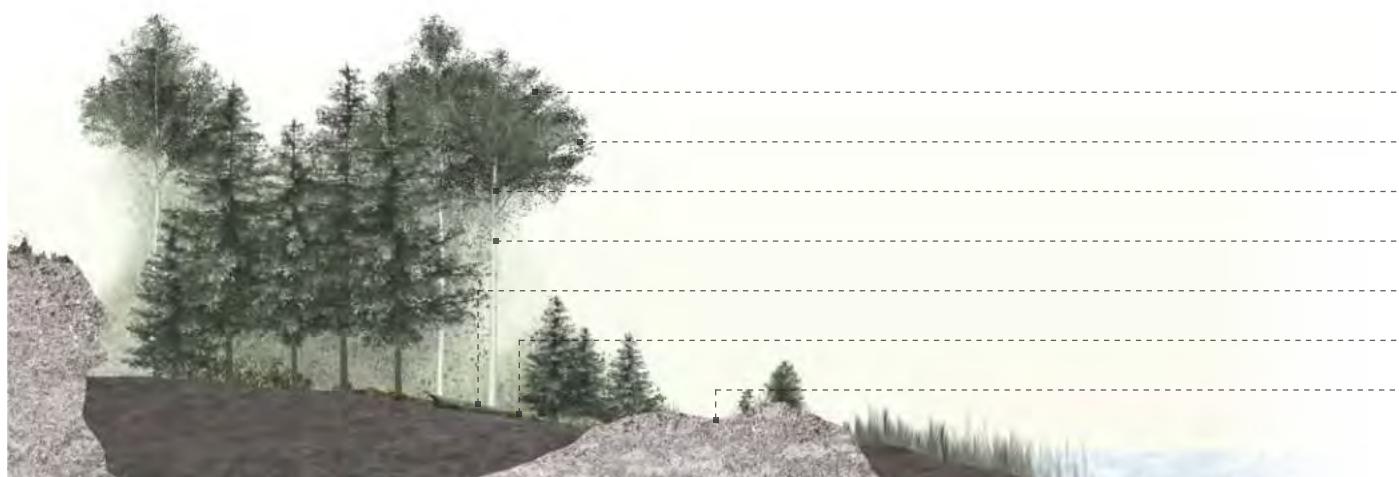
Materials can be used to strengthen the ideas of a design, and in this case, they are key to creating an experience. Some materials are already on the site, such as the lichen and their substrates. These can be strengthened by adding new varieties of lichen. New Lichen should be added in a manner that allows for lichen growth, but also in a way that strengthens the composition of the lichen with its substrate and the site. Lichen should be added wherever possible to ensure a proliferation of growth. This can be done through controlled asexual reproduction, as mentioned prior. Any materials being introduced to the site, whether they be stones for a path, or wood for a bench are a part of the larger composition. These materials should be analyzed with the lichen lost to see what lichens may grow in them and how this will further the composition of the lichen and the site.

[Potentials / Results]

Emphasizing the lichen, and its subtleties results in meaning and emotion. We are reminded that this is the lichens home, and we are just visitors. We are reminded that must be respectful, as we would in a friend's home. Long after we are gone, the lichen will persist, long after the site is of use, the lichen will persist. Design is temporary but that doesn't mean it shouldn't have meaning. What we do on the land will last far beyond our lifespans, this doesn't just apply to lichen but to all landscapes. These minute parcels of beauty remind us that there is more to design than form and function, but that design touches and effects every living thing.

Species and Habitat

● ● <i>Peltigera neopolydactyla</i> Carpet pelt	● <i>Physconia detersa</i> Bottlebrush frost lichen	● <i>Rhizoplaca melanophthalma</i> Green rock-posy	● <i>Umbilicaria deusta</i> Peppered rock tripe
● ● <i>Peltigera ponogensis</i> Pale-bellied dog-lichen	● <i>Placidium lacinulatum</i> Brown stipplescale	● ● <i>Rinodina turfacea</i> Tundra pepper-spore lichen	● <i>Umbilicaria mammulata</i> Smooth rock tripe
● ● ● <i>Peltigera praetextata</i> Born-again pelt	● <i>Placynthium nigrum</i> N/A	● <i>Sarcogyne regularis</i> Frosted grain-spored lichen	● <i>Umbilicaria muehlenbergii</i> Plated rock tripe
● ● ● <i>Peltigera scabrosa</i> Scabby pelt	● <i>Platismatia glauca</i> Ragbag	● ● <i>Scoliciosporum chlorococcum</i> City dot lichen	● ● <i>Usnea cavernosa</i> Pitted beard lichen
● <i>Pertusaria ophthalmiza</i> Ragged wart lichen	● <i>Punctelia bolliana</i> Eastern speckled shield lichen	● <i>Straurothele drummondii</i> N/A	● <i>Usnea filipendula</i> Fishbone beard lichen
● ● <i>Phaeophyscia cernohorskyi</i> Hairy shadow lichen	● ● ● <i>Punctelia subrudecta</i> Forest speckleback	● ● ● <i>Stereocaulon grande</i> Grand foam lichen	● ● ● <i>Usnea hirta</i> Old man's beard
● ● ● <i>Phaeophyscia ciliata</i> Smooth shadow lichen	● <i>Pyxine sorediata</i> Mustard lichen	● <i>Stereocaulon saxatile</i> Rock foam lichen	● ● ● <i>Vulpicida pinastri</i> Powdered sunshine lichen
● ● <i>Phaeophyscia orbicularis</i> Mealy shadow lichen	● <i>Ramalina intermedia</i> Rock ramalina	● <i>Stereocaulon tomentosum</i> Eyed foam lichen	● <i>Xanthoparmelia conspersa</i> Peppered rock shield
● ● <i>Physcia adscendens</i> Hooded rosette lichen	● ● <i>Ramalina obtusata</i> Hooded ramalina	● ● <i>Toninia sedifolia</i> Earth-wrinkles	● <i>Xanthoparmelia somloënsis</i> Shingled rock shield
● ● <i>Physcia aipolia</i> Hoary rosette lichen	● <i>Rhizocarpon disporum</i> Single-spored map lichen	● <i>Trapeliopsis flexuosa</i> Board lichen	● <i>Xanthoria elegans</i> Elegant sunburst lichen
● ● <i>Physcia caesia</i> Power-back rosette	● <i>Rhizocarpon geographicum</i> Yellow map lichen	● ● <i>Trapeliopsis granulosa</i> Mottled-disk lichen	● <i>Xanthoria fallax</i> Hooded sunburst lichen
● ● <i>Physcia dubia</i> Powder-tipped rosette lichen	● <i>Rhizocarpon hochstetteri</i> Smooth map lichen	● <i>Tuckermannopsis americana</i> Fringed wrinkle-lichen	● <i>Xanthoria hasseana</i> Poplar sunburst lichen
● <i>Physcia phaea</i> Black eyed rosette lichen	● <i>Rhizocarpon obscuratum</i> Dusky map lichen	● <i>Tuckermannopsis sepincola</i> Chestnut wrinkle -lichen	● <i>Xanthoria ulophylloides</i> Powdery sunburst lichen
● <i>Physcia stellaris</i> Star rosette lichen	● <i>Rhizoplaca chrysoleuca</i> Orange rock-posy	● <i>Umbilicaria americana</i> Frosted rock tripe	● <i>Xylographa parallela</i> Black woodscript



- Trees
- Branches
- Wood
- Bark
- Rot
- Moss
- Rock
- All substrates
intimately linked

Lichen Species and Habitat

● Acarospora fuscata Brown cobblestone lichen	● ● Caloplaca holocarpa Firedot-lichen	● ● ● Cladonia carneola Crowned pixie cup	● Cladonia parasitica Fence rail cladonia
● ● ● Amandinea punctata Tiny button lichen	● ● Candelaria concolor Lemon lichen	● Cladonia cenotea Powdered funnel lichen	● Cladonia phyllophora Felt cladonia
● Arctoparmelia centrifuga Concentric ring lichen	● ● ● Candelariella aurella Hidden goldspeck lichen	● ● ● Cladonia cervicornis Ladder lichen	● ● ● Cladonia pleurota Red-fruited pixie-cup
● Aspicilia cinerea Cinder lichen	● ● ● Candelariella vitellina Common goldspeck lichen	● ● ● Cladonia chlorophaea Mealy pixie-cup	● ● ● Cladonia pocillum Rosette pixie-cup
● ● "Bacidia" sabuletorum Six celled moss dot	● ● Chaenotheca brunneola Brown head stubble lichen	● ● ● Cladonia coniocraea Common powderhorn	● ● Cladonia pyxidata Pebbled pixie cup
● ● ● Bacidia schweinitzii Surprise lichen	● Cladina arbuscula Reindeer lichen	● ● ● Cladonia cornuta ssp. cornuta Bighorn cladonia	● ● Cladonia rei Wand lichen
● ● ● Baeomyces rufus Brown beret lichen	● ● ● Cladina mitis Green reindeer lichen	● ● ● Cladonia crispate Organ-pipe lichen	● ● ● Cladonia scabriuscula Mealy forked cladonia
● ● ● Biatora vernalis N/A	● ● ● Cladina rangiferina Gray reindeer lichen	● ● ● Cladonia cristatella British soldiers	● ● ● Cladonia squamosa Dragon funnel
● Bryoria lanestris Brittle horsehair lichen	● ● Cladina stellaris Star-tipped reindeer lichen	● ● ● Cladonia deformis Lesser sulphur-cup	● ● ● Cladonia subulata Antlered powder horn
● ● ● Buellia disciformis Boreal button lichen	● ● Cladina stygia Black-footed reindeer lichen	● ● ● Cladonia digitate Finger pixie cup	● ● Cladonia symphycarpia Split peg lichen
● ● ● Buella stillingiana Common button lichen	● ● ● Cladonia amaurocraea Quill lichen	● ● ● Cladonia fimbriata Trumpet lichen	● ● ● Cladonia turgida Crazy-scale lichen
● ● Caloplaca cerina Gray rimmed firedot lichen	● ● ● Cladonia borealis Boreal pixie cup	● ● ● Cladonia gracilis Smooth cladonia	● ● ● Cladonia uncialis Thorn cladonia
● ● Caloplaca flavorubescens Bark sulphur-firedot lichen	● ● Cladonia botrytes Wooden soldiers	● ● ● Cladonia macilenta Lipstick powder horn	● ● ● Collema pulcellum Blistered jelly lichen
● ● Caloplaca flavovirescens Sulphur-firedot lichen	● ● Cladonia cariosa Split-peg soldiers	● ● Cladonia multiformis Sieve lichen	● Dermatocarpon miniatum Leather lichen



● Dimelaena oreina Golden moonlight lichen	● Imshaugia placorodia American starburst lichen	● ● ● Lobaria pulmonaria Lungwort	● Parmelia saxatilis Salted shield lichen
● ● ● Diploschistes muscorum Cowpie lichen	● Lasallia papulosa Common toadskin	● Lobothallia alphoplaca	● ● ● Parmelia squarrosa Bottlebrush shield lichen
● Diploschistes scruposus Crater lichen	● Lecania dubitans Bean-spored rim-lichen	● Melanelia exasperata Lustrous camouflage lichen	● ● ● Parmelia sulcata Hammered shield lichen
● Evernia mesomorpha Boreal oakmoss lichen	● Lecanora allophana Brown-eyed rim-lichen	● Melanelia olivacea Spotted camouflage lichen	● ● ● Parmeliopsis ambiguua Green starburst lichen
● Flavoparmelia caperata Common greenshield lichen	● ● Lecanora cenisia Smoky rim-lichen	● Melanelia septentrionalis Northern camouflage lichen	● ● ● Parmeliopsis hyperopta Gray starburst lichen
● Flavopunctelia flaventior Speckled greenshield	● ● Lecanora circumborealis Black-eyed rim Lichen	● Melanelia sorediata Powdered camouflage lichen	● ● ● Peltigera aphthosa Common freckle pelt
● ● Flavopunctelia soredica Powder-edge speckled greenshield	● Lecanora dispersa Mortar rim-lichen	● ● Melanelia subargentifera Whiskered camouflage lichen	● ● ● Peltigera canina Dog-lichen
● Fucopannaria leucophaea Rock shingle lichen	● Lecanora muralis Stonewall rim-lichen	● ● ● Melanelia subaurifera Abraded camouflage lichen	● Peltigera didactyla Alternating dog-lichen
● ● Heterodermia speciosa Powdered centipede	● ● Lecanora piniperda Wood-spot rim-lichen	● Myelochroa galbina Smooth axil-bristle lichen	● ● ● Peltigera elisabethae Concentric pelt
● ● Hyperphyscia syncolla Smooth shadow-crust lichen	● Lecanora polytropa Granite-speck rim-lichen	● ● ● Nephroma helveticum Fringed kidney lichen	● ● ● Peltigera horizontalis Flat-fruited pelt
● ● Hypocenomyce scalaris Common clam lichen	● ● Lecanora symmicta Fused rim-lichen	● ● ● Nephroma resupinatum Pimpled kidney lichen	● Peltigera lepidophora Scaly pelt
● ● Hypogymnia physodes Puffed lichen	● Lecidella stigmatea Disk lichen	● ● Ochrolechia androgyna Powdery saucer lichen	● ● ● Peltigera leucophlebia Ruffled freckle lichen
● Icmadophilia ericetorum Candy lichen	● ● Leptogium lichenoides Tattered jellyskin	● Ochrolechia trochophore Rosy saucer lichen	● ● Peltigera malacea Veinless pelt
● ● Imshaugia aleurites Salted starburst lichen	● ● ● Leptogium saturninum Bearded jellyskin	● Omphalina umbellifera Greenpea mushroom lichen	● ● ● Peltigera neckeri Black saddle lichen



Notes

Though this list is thorough for the Shoal Lake area, a small number of species were left out, due to their habitat conditions not being met on site. It should also be noted that some lichens have specific light and moisture requirements, which I wasn't able to note here. Please see the sources to find more detailed information. For a detailed and beautifully illustrated description of lichens see *Lichens of North America*, by Irwin M. Brodo, Sylvia Duran Sharnoff and Stephen Sharnoff.

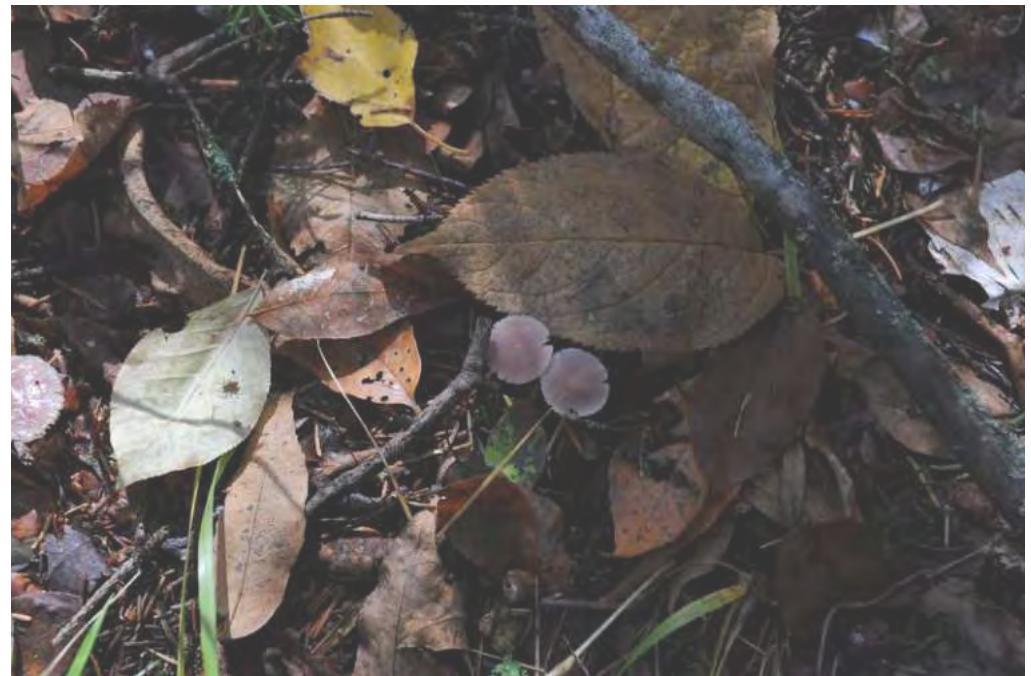
Legend

- Rock
- Branches
- Rot
- Wood
- Soil
- Moss
- Trees
- Bark

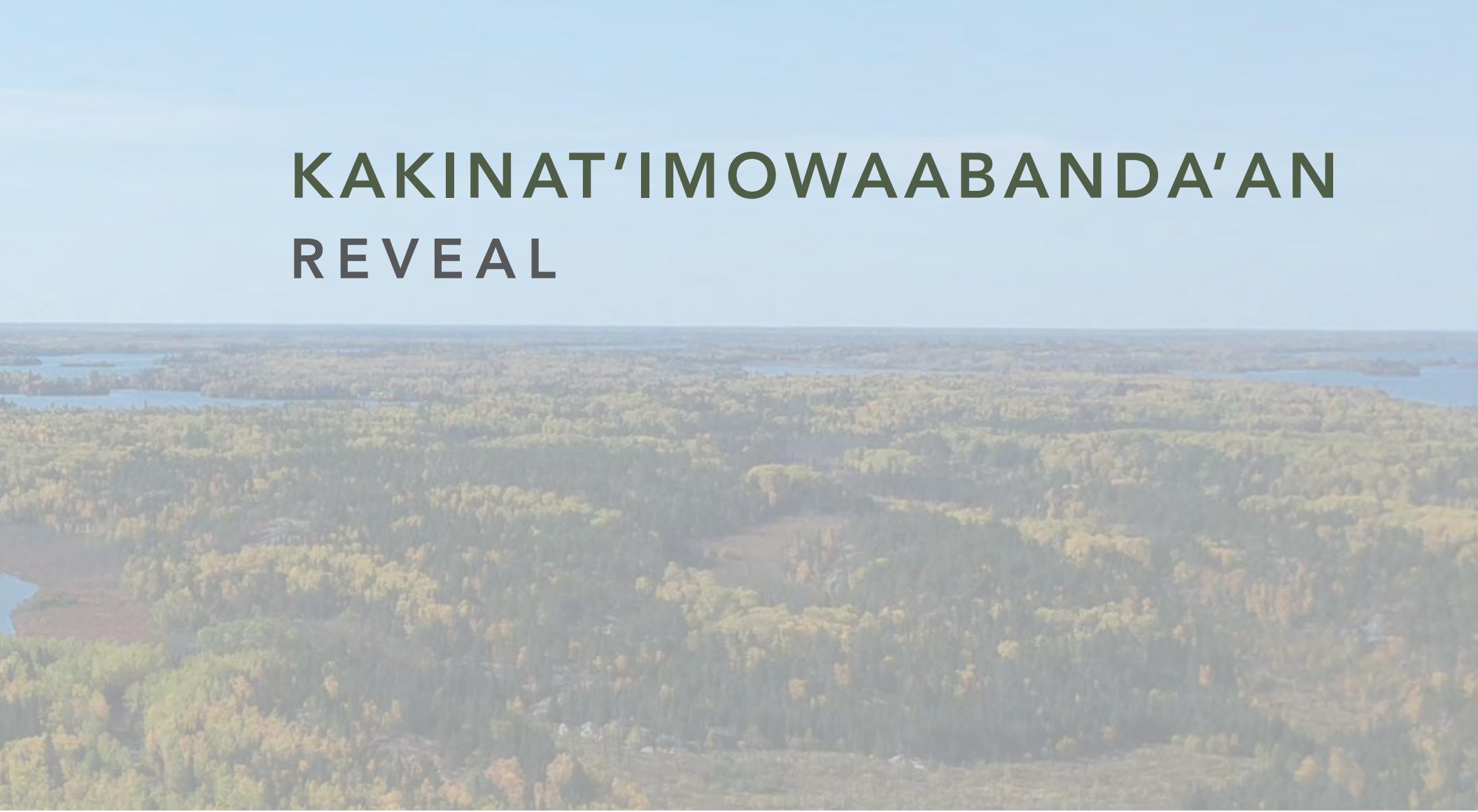


"KAKINAT'IMOWAABANDA'AN" - to reveal

To reveal means to bring something to light which has previously been unknown or overlooked. Why such things go unnoticed in the first place can be attributed to a number of things: for example, being minuscule in size or even something that cannot be physically sensed at all. How can you hear a healthy ecosystem or see one's connection to the landscape?



KAKINAT'IMOWAABANDA'AN REVEAL

An aerial photograph showing a vast expanse of forested land. The forest is a mix of green and yellowish-green colors, suggesting a transition between seasons. In the distance, several small, dark blue lakes are scattered across the horizon under a clear sky.

This chapter aims to reveal not simply the living and non-living entities in the landscape but perhaps more importantly to reveal processes, associations and relationships within the landscape —making them known, pronounced and celebrated.

We often refer to ecological design when we are talking about designing for living systems. This is often about revealing how biological systems are structured and function. Ecological design may be about helping, enhancing or protecting the structures and functions of living systems. This requires consideration about how systems operate at different spatial scales (such as at the scale of insects, to the scale territories of large roaming animals like elk and their predators). It is also about designing for different temporal scales (such as thinking about seasonal variations, or the life cycle of a species, ex. life cycle of a white pine). It is easy to forget our place in time.

We must be able to recognize that landscapes are emergent, always in a state of flux, and that design has to be able to adapt to change, design must be about resilience.

Designers often use metaphors to better grasp and convey natural processes and often complex interrelationships. Metaphors are particularly important in the conceptual visioning of design ideas, and often serve to unite natural processes to landscape forms. Although we often think of metaphors as objects (where something is like something else, i.e., a building is designed like a canoe), ecological design employs action-based metaphors. Action based metaphors try to describe the operation of a system. Narratives/stories are often used as ecological metaphors revealing the subtleties of landscape structures and processes. - RP

VISIBLE WIND

Yasaman Kashani (ED4 Landscape Architecture + Urbanism)



"Circular economies are designed to provide for human needs and improve the quality of life for residents and visitors, while also reducing social and environmental harm. A circular economy is designed to create energy and material loops, preserve products, parts, material, and maximize use (Zink & Geyer, 2017). A circular economy pays significant attention to the reuse, recycling and recovery..."¹

Generating energy is a fundamental issue in many communities. It is easy to be connected to the grid, but what if we could produce energy inside the community and live off-grid? To become truly self-sufficient, the community would need to create all of its own electrical power, food, shelter and water. There are multiple ways to produce renewable energy: solar, wind, water, etc., each one suited for different places. What are

the potentials of this specific site? What are its unique features? Water and lake breezes are features that are created due to the site's position along Shoal Lake.

Lake breezes develop when the land becomes warmer than the water. The warm air over land rises and gets replaced by the relatively cool air, which resides immediately above the lake surface. The air movement near the water's edge can become a useful source of energy by using small scale wind turbines. This project, integrates wind turbines into the design of a marina complex. Although power generation is a key component of the design, careful attention is placed on the creation of a beautiful and dynamic multi-use place.²

The turbines that we investigated should generate 600w/h, and under optimal conditions up to 5256 kWh in a year. This produced energy can be used in TWO different approaches other than providing the residents with their needed energy:

1) Clean lake:

There is a way to clean the lake: removing gas boats and replacing them with electric boats.

- Charging on a 12-volt system takes place at an average of around 14 volts, and on a 24-volt system at an average of around 28 volts, so our maximum nominal output is $[(80A \times 14v) = 1,120 \text{ watts}] + [(120A \times 28v) = 3,360 \text{ watts}]$ for a total of $4,480 \text{ watts} = 4.48 \text{ kW}$.[1]
- The standard built-in charger will need 12 hours to charge the single battery pack fully. It only requires approximately 7 hours to recharge to 75%.

This means each turbine should be able to charge two boats fully daily (24 hours) and even produces 5kw extra!

2) Microgrid:

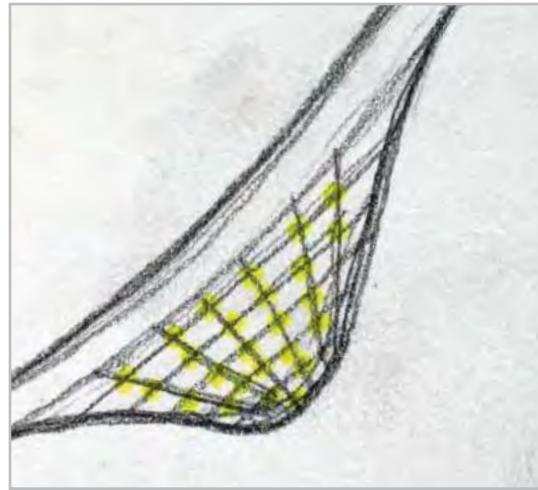
A micro-grid is a localized group of electricity sources and loads that normally operates connected to and synchronous with, the traditional wide area electrical grid, but can also disconnect to "island mode" — and function autonomously as physical or economic conditions dictate.

- By this approach, the community can produce energy and sell it to the grid to generate revenue and achieve a circular economy.
- $5256 \text{ kWh} * 10.1 \text{ cents/kWh} = 530.856 \text{ CAD\$ per year}$ (these numbers should be confirmed by the technology providers). Based upon these calculations the return of the first investment for the turbines will occur in less than two years, and then each turbine will generate \$530 CAD a year.

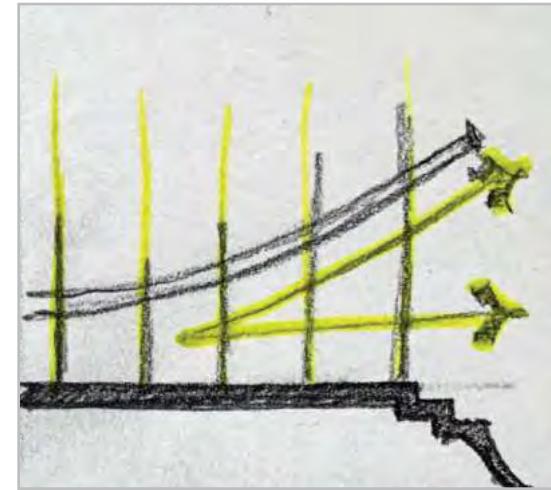
Note! It would be best if members of the community became proficient in the operation and servicing of these technologies, as part of a local circular economy strategy.



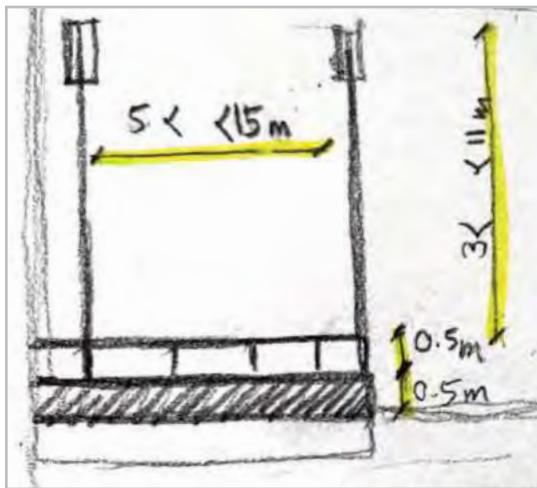
The dock is formed by the edge of the land while keeping its distance to conserve lake-shore wetlands. It is connected to the land with two trails at specific points.



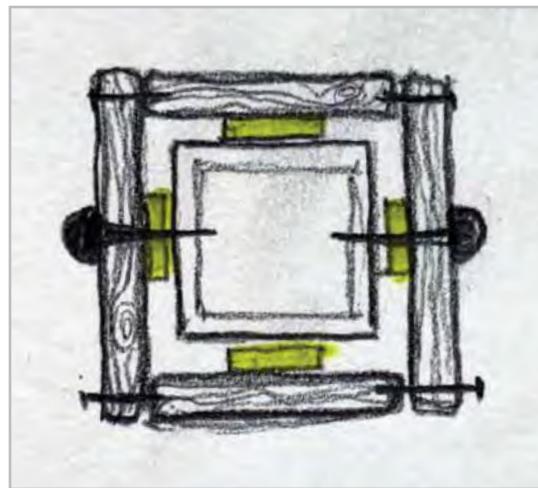
The LED lights are installed with a Waffle structure and they are connected to the structure in nodes.



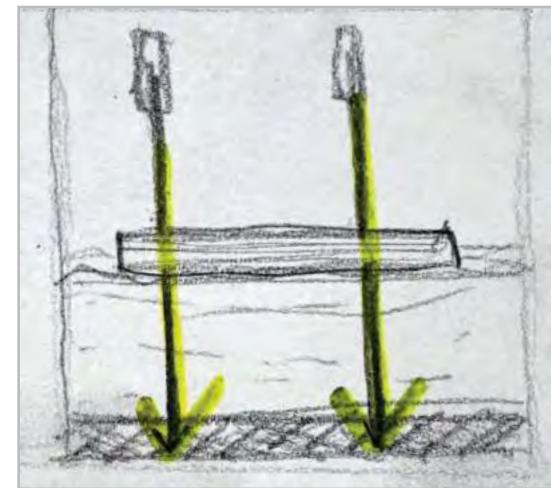
A scenic openness toward the sky evokes the imagery of the Thunderbird in collaboration with additional vertical elements of the turbines' mount.



Optimum proposed dimensions.



A waffle structure contains a metal core which is covered with wood. The elastic layer between these two materials prevents potential damage due to expansion.



The dock is a floating structure that can be bought while the turbines can be fixed by mono-piles to the ground.



The connection of the dock to the land



Dock Entrance

The design proposal contains a multi-use floating dock that offers various functions. Small wind turbines are installed all along the dock with different densities, decreasing in the number of turbines as we go west to east. There is a 40-cm-height platform all around the dock that works both as a bench and a space for installing the turbines' equipment such as the generator would be inside it. There would be a metal handrail on top of this platform to provide safety. It is connected to the shore with two ramps that are attached to the dock in two specific points that create spaces with different spatial qualities.

Between the trails, there is a marshland with marsh plants, as well as flowers and water lilies. Electric boats can be charged in the charging stations under each turbine.

The western wing of the dock contains more wind turbines to generate more energy for charging the electric boats. Closer to the eastern wing, there is a visible reduction in the number of wind turbines to create a calmer area for people to sit and enjoy the scene.



The Waffle structure holding LED lights

In the middle of the dock, there is an installation that facilitates people's interaction with nature in different ways. For example, there is a waffle structure as a shade that houses numerous cylindrical LED lamps which turn on when electricity is produced by turbines meaning that wind is blowing; the stronger the wind blows the lighter the LED's become. This will make a unique experience for those who are visiting this community.

The waffle structure has a scenic opening toward the sky which, with its combination with vertical elements of turbines, will remind us of Animkiig

(Thunderbirds): the most powerful spiritual being, the Powerful Spirit of the Sky who can create wind in Anishinaabe ('Ojibwe) cosmology. These birds maintain a unique, protective relationship to Anishinaabeg (the Anishinaabe people).

This spot also helps visitors experience a closer relationship with water allowing them to enter the water through stepped platforms. They can sit on the platforms to enjoy the scene or even swim in the lake.

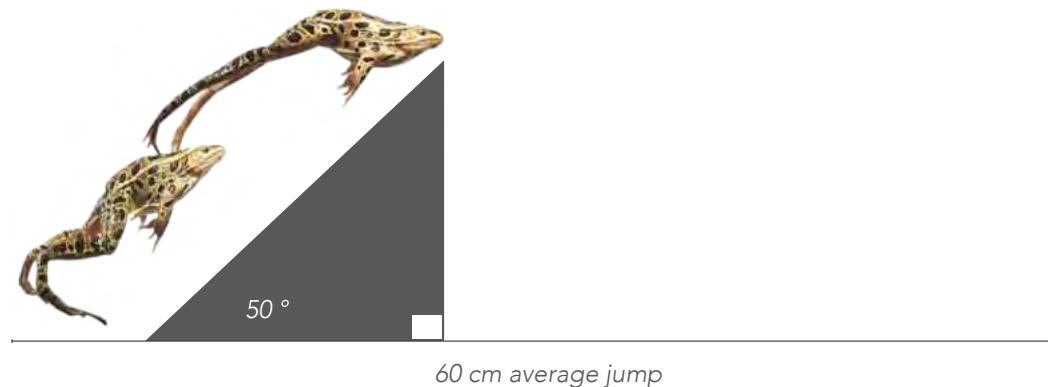


FROGGIN' SHOAL LAKE

Augusta Ho (ED4 Landscape Architecture + Urbanism)



Rana pipiens size (to scale)



Rana pipiens jump

Frogs are fascinating little creatures: in their drastic metamorphosis beginning as tadpoles, their trilling calls and croaks, and their powerful leaps up to ten times their body length. More notably to the scientific community is their role as bioindicators — this means that they aid in measuring a healthy ecosystem which is becoming increasingly rare in the face of climate change and pollution. Their habitation on land and in water reflects their sensitivity to both environments. When their population is abundant and in good health, this also means the ecosystem is thriving. This design is meant to bring us into closer contact with the frog population while revealing something about the health of the environment, the home to a

myriad of other flora and fauna. As per the requested programming from the community, a boardwalk is chosen to fulfill the exhibition of the frog in its ability to lead people to universal frog habitat: the wetland. Although frog's habitat has a large range from woodland to tall grass, all species inhabit wetlands during the breeding period to lay their eggs come spring. The infrastructure of the boardwalk provides spaces for frogs to fulfill their day-to-day activities during each season, fostering an active relationship with these little amphibians. When it comes to the human scale, the experiential qualities of the boardwalk are inspired by the behavior of the frog.

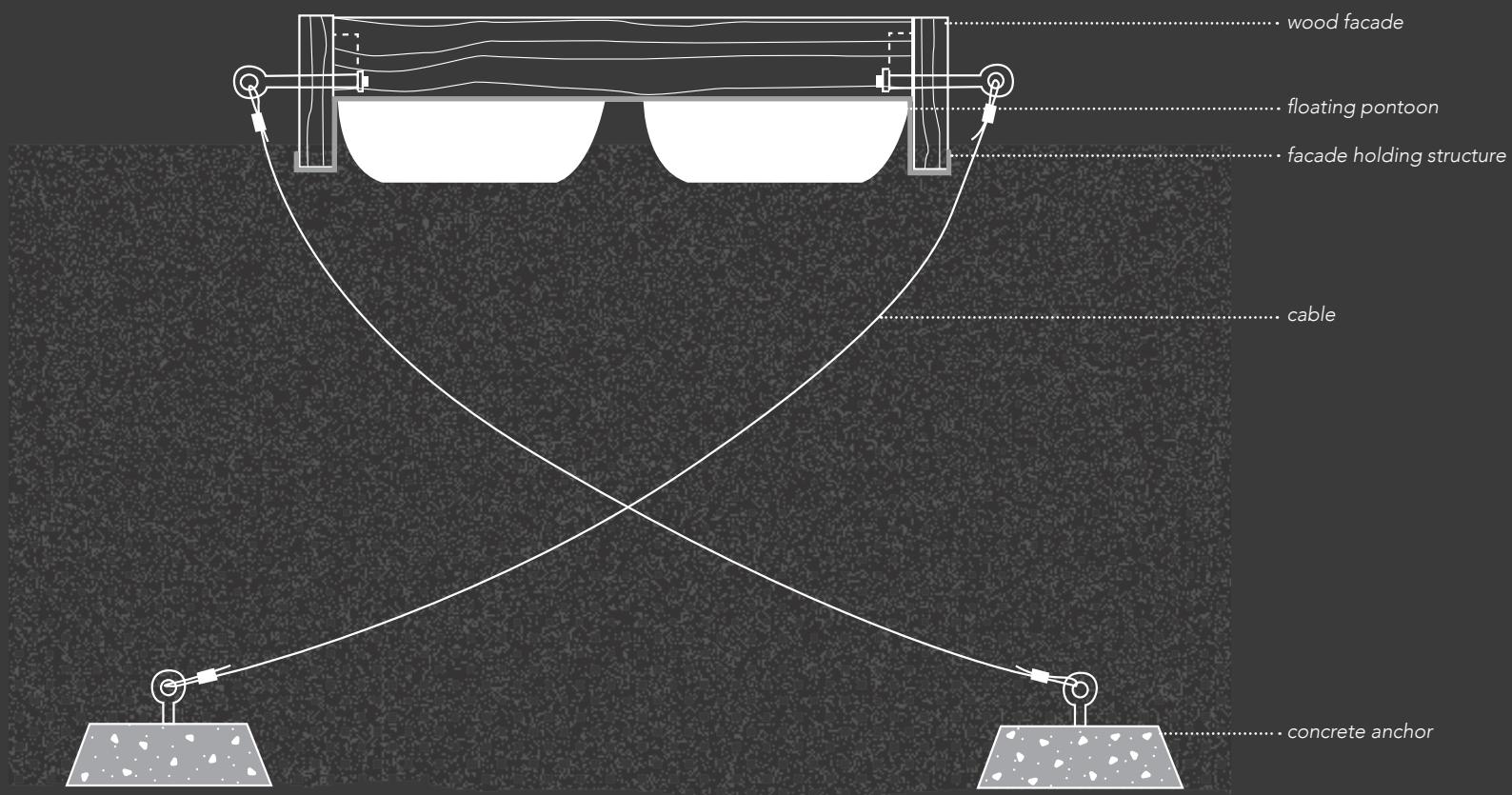


Fig 1 Submerged anchor cable system.

The Boardwalk

The structure which acts as the means of bringing people to frog habitat must have minimal impact on the land to maintain its integrity. This can be completed with floating modules, which eliminates the typical boardwalk construction method of driving piles into the ground. Instead it uses concrete blocks connected to submerged anchor cable systems and pontoons to float. It allows for minimal fluctuations in water levels. These modules typically require three feet of water or additional support if shallower.³

The boardwalk itself is constructed from thermally modified wood. This option is suitable as it is more eco-friendly in its treatment process without the use of harmful chemicals and its longevity, in resistance to pests and rot. Modified wood can use agricultural crop waste byproduct and a curation process which creates a stable and low maintenance building material.⁴ The facade treatment is to use untreated wood by-product for frog housing and spaces that is slotted into a section and can be replaced.

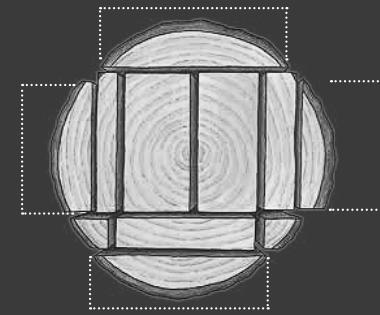
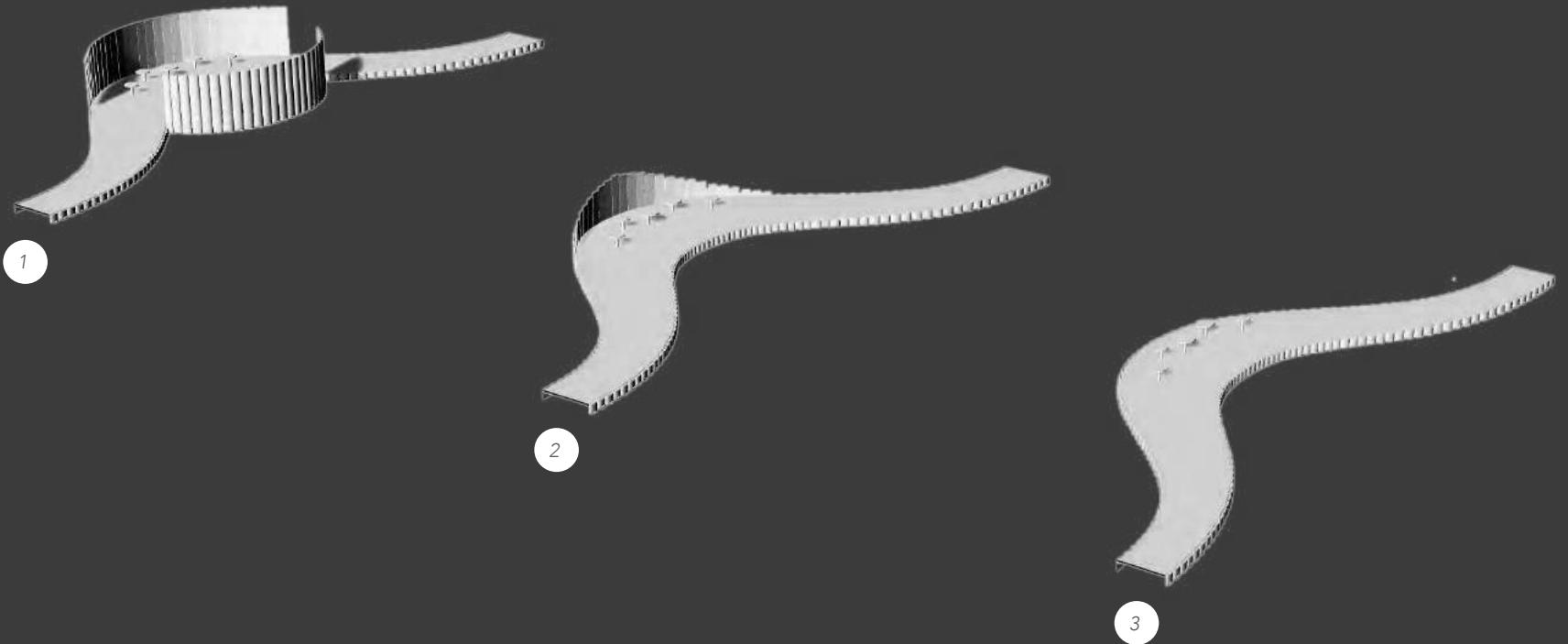


Fig 2 Typical lumber cut section



The design of the boardwalk can be emulated to offer experiential qualities similar to those of frogs and areas for frog viewing. By using the facade infrastructure, various heights of wood pieces can be used to create different spaces. Use the thermally modified wood for such structures. Seating on circular wood stools reflects the floating frog housing, and mimics the frog egg, where the user acts as the tadpole. Winding and zig-zagging pathways simulate frog behavior when they leap to avoid predators.

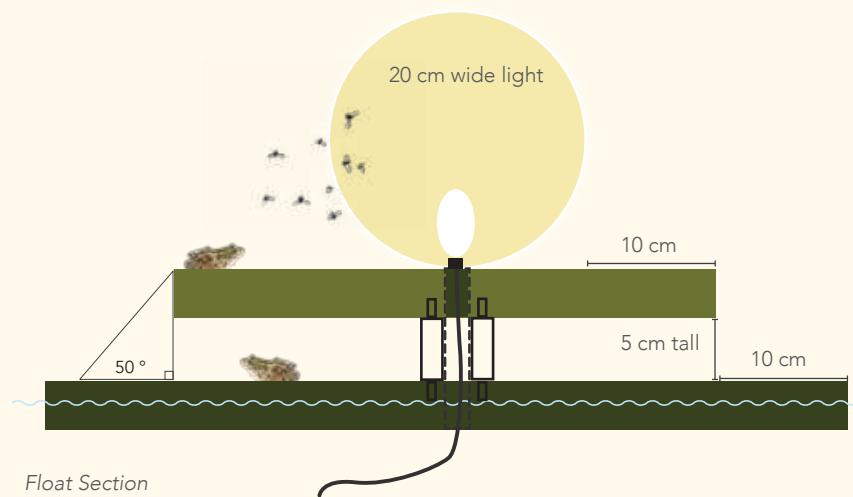
The images above show facade expressions and their experiential qualities. Fig 1 offers an enclosed resting area. The feeling of enclosure mimics frog tendencies to seek enclosed spaces for shade during hot summer days. Fig 2 uses a taller facade to direct views to a certain area, perhaps towards frog homes floating in the bend. Fig 3 is an open space to allow for views in both directions and for sunbathing like a tadpole in an egg, warming up to accelerate their hatching.



Fig 3



Facade Elevation + Section

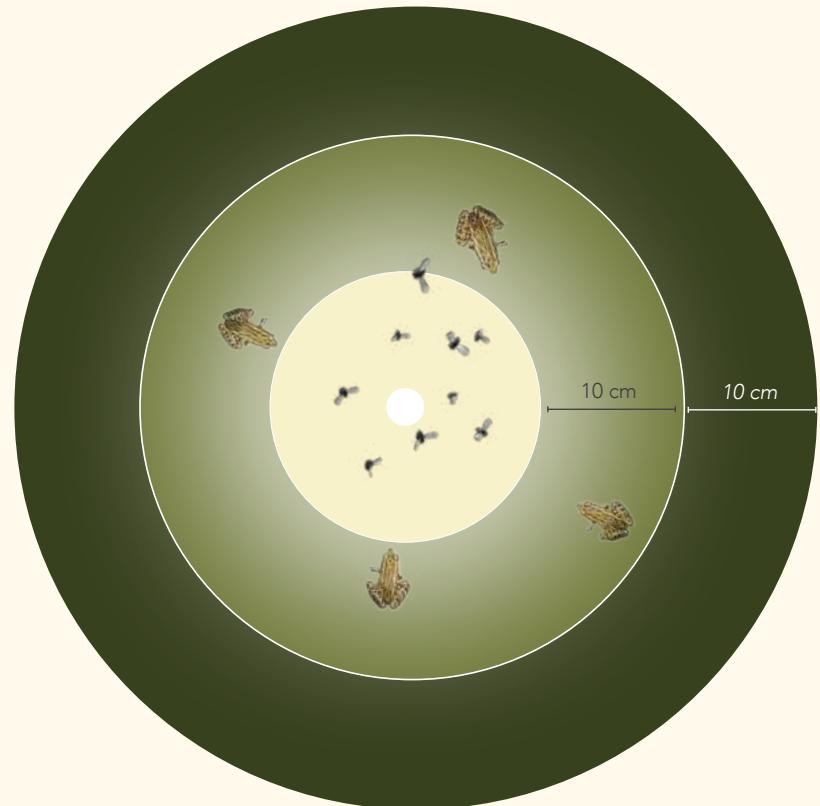


Float Section

Facade and Floats

The facade of the boardwalk is created from the bark cut-off byproduct from cutting lumber, using its waste as frog housing. Floats are constructed using tree-stump slices. Simply by stacking or adding a cut out in the wood, we can create an enclosure for frogs which they seek during hot days to stay moist. (Note that frogs are unbothered by 'unnatural' habitat and can be found in potted plants and decks.) Floats house lighting for visibility and to attract bugs for frog meals. The facade and floats are created from natural materials like wood and are designed to rot (avoid wood like birch and cedar as they are rot-resistant). The cut-out and two-level floats creates crevices from rotting wood as suitable frog housing which they seek to hibernate within and to hide under during hot days. These can also be 'planted' with moss and fungi to keep these spaces cooler and more visually appealing.

These facade cut outs can vary around five centimeters in their placement to account for fluctuating water levels and the fact that it is difficult for frogs to leap out of water — most frogs will need to swim up to the enclosure. Similarly, the floats should be no thicker than 5 cm for easy access. The crevice sizing can vary in width, but should be no more than five cm tall to keep the crevice shady and small, therefore more desirable. As the float lighting is 20 cm in diameter, a float has to add 10 cm for each level as frog seating.



Float Plan



1

The initial float structure is freshly cut and bare. This is when it is appropriate to plant mushrooms, as they require fresh wood when artificially grown. A drilled hole through the centre wires through the structure for the light fixture, and lead to solar panels mounted along the facade. The levels are held together with wooden dowels to hold it up and join them together.



2

As the wood floats in the water it becomes extremely saturated and will begin to rot. The structure is moistened and more desirable for frogs to hide in the crevices during the day, or to sunbathe during the springtime to warm up. As it moistens and algae grows, it provides more nutrients for mushroom growth.



3

Moss can be grown on the structure by transplanting small sections. Adding moss can attract more insects and therefore more resources for frogs. The combination of algae, moss, and fungi can act as a means for symbiotic relationships.⁵



4

As all the various forms of life grow, the structure provides more camouflage for the frog and therefore a safer space from predators. The structure will be weighed down and allow for even easier access for frogs to climb up! Once completely decayed, the float gradually falls apart to the wetland floor, adding nutrients and allowing for the cycle to begin again.

Decay Process

The decay process is depicted above and is applicable to both the floats and the facade in their succession and easy replacement.

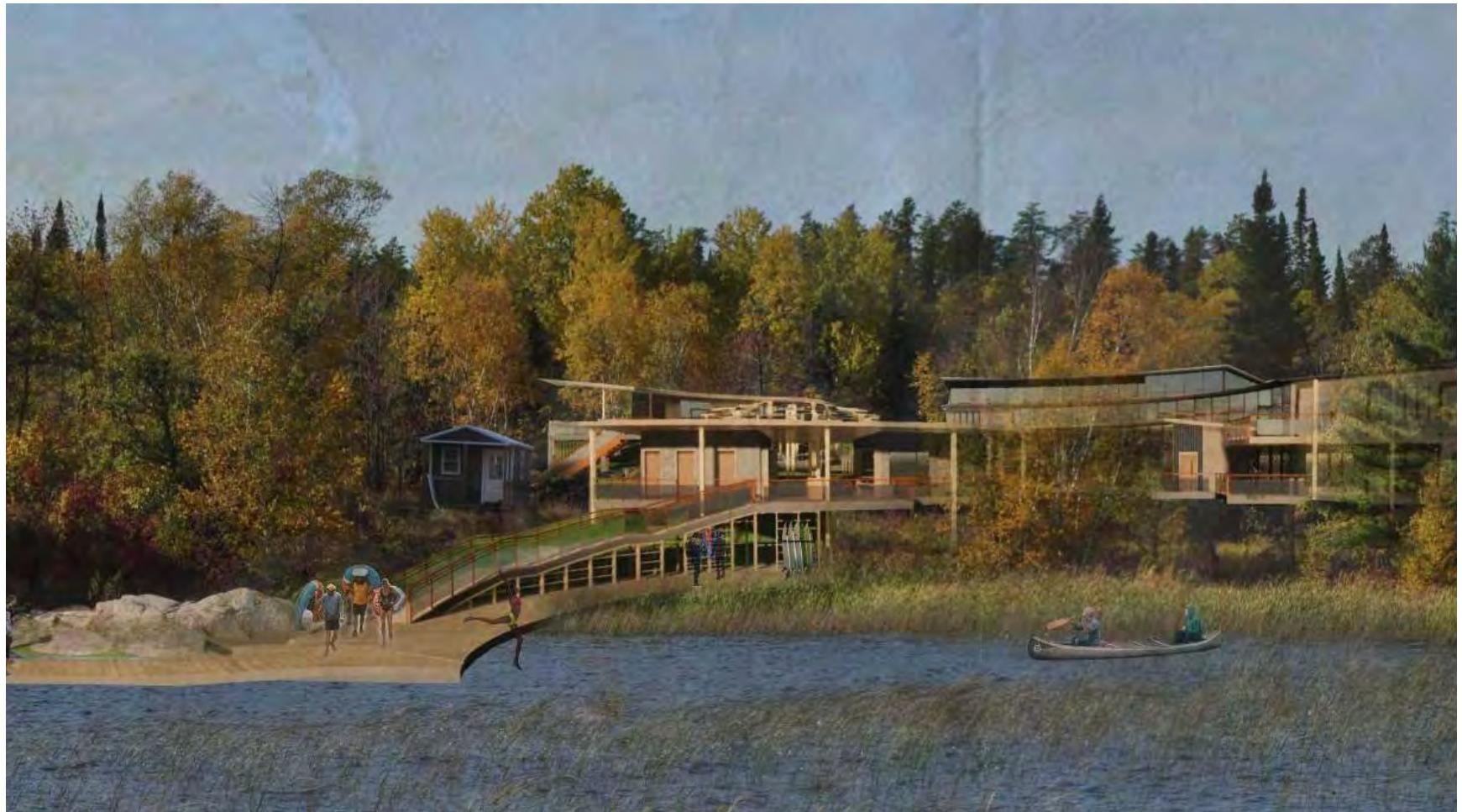
It is not far-fetched to say that boardwalks are typically the most active during the daytime — but as the air cools down and the lights turn on, this boardwalk becomes alive with frogs! As they are nocturnal creatures, they are active at night time and hunt for bugs and call for mates. Floats may be placed along the boardwalk for visibility as they light up twists and turns and can be concentrated in resting areas for people to observe the frog phenomena. Areas in which these floats are concentrated should be already noted as active with frogs, as they have extraordinary homing tendencies and annually return to their 'home' using celestial cues.⁶ This is

not to imply that new frogs will not appear, as the bounty of resources is remarkable and will most definitely attract more residents. These structures will be activated in their lighting as it attracts swarms of bugs for frogs to feast. Lighting is not to be too intense as to not detract from the night sky and stars, but rather a certain wavelength to attract bugs. An abundance of frogs will congregate here and can be seen with the light and most definitely heard. In frog's notable ability to remember environmental cues, the little critters will most certainly remember such spaces designed to meet their needs and may even return to call it their home.



NIBI WELCOME CENTRE

Danna Ambrosio (ED4 Architecture)



This project is the design of a Welcome Center of a proposed large Eco touristic site, imagined on the untouched lands of the Iskatewizaagegan Independent First Nation #39. Mainly as an information hub for visitors, both for those arriving and leaving the site, the Nibi Welcome Center features a water interpretive component, land and water-based rental facilities, a gas station, a store, a gathering circle, and a marina. Through these collective subprograms, the architectural proposal aims to give the community a space that encourages the balance between sustainability and economic gain driven by their strong culture. Each of the subprograms facilitates considerable cultural knowledge to educate both the community members and visitors of the site as they inhabit

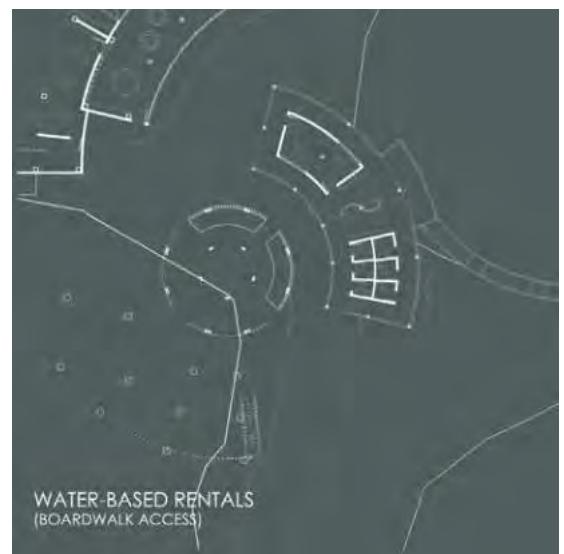
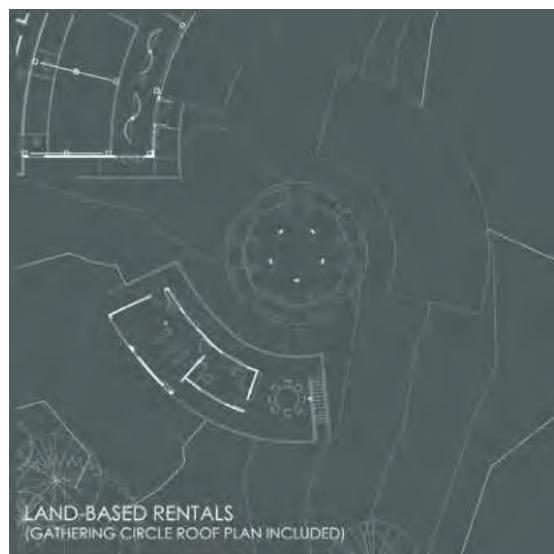
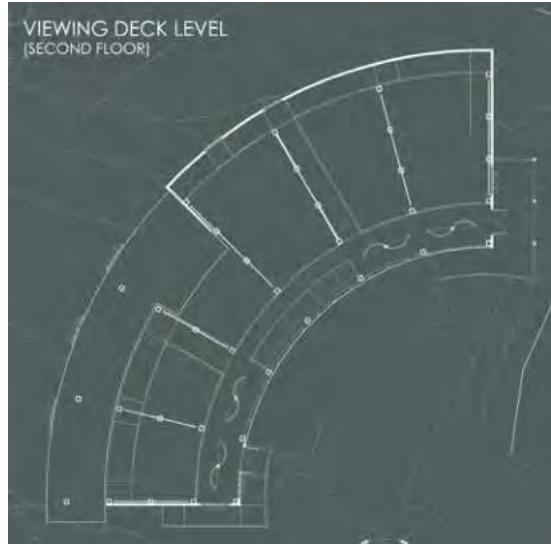
the different spaces. Stories are important in Aanishinabe as windows into different ways inhabitants can absorb knowledge, of living with land and water, of finding ways to remember, and influencing an architecture that reflects the local people and place. Like the observed qualities of the site and water, these inhabitants can STOP, GROW, and MOVE through the spaces. Subtle experiences on the site are embodied within the architecture in hopes to treasure the beautiful experience innately present within the existing site. The close attention to the water that does not only wrap but also runs through the land, both within Shoal Lake and beyond the site (all the communities within the Shoal Lake watershed), reveals the innate importance of this finite resource.

Water and Elevation Studies





SITE PLAN: NIBI WELCOME CENTER
ISKATEWIZAAGEGAN INDEPENDENT FIRST NATION #39



A Walk-Through

Receive – Reception: Inhabitants, both the employees and visitors, are provided with a wide range of activities made available by the Ecotourism site. Inhabitants are also provided with numerous routes through the architecture leading them to both the land and the water.

Absorb - Interpretive Centre: The interactive and adaptable educational spaces ground the inhabitants to the main level of the Welcome Center. The central space, accessible to all subprograms within the architecture (reception in the North, the gas station/store in the South, the atrium in the East, and the administration offices in the West) reveals the strong and positive connection to water, promoted within the site, through the

exploration of the history and culture of the Anishinaabe people.

Prepare - Atrium: Through the East, inhabitants from the land are simultaneously welcomed into the building while those departing from the interpretive centre are welcomed to the land.

Accessibility - Store: In the South, inhabitants have complete access to necessities for their varying stays from perishable and non-perishable goods, indoor and outdoor activity equipment, and to the fuel needed to stay or leave the site, while the architecture continuously hints at the lake and the landscape close by.



Entrance and Parking



Viewing Deck



Concession Store



Interpretive Centre



Gathering Circle



Boardwalk and Marina



Reception

Consider – Viewing Deck: The arc-like path follows the natural beauty of the lake and the land while providing valuable information on available tourist activities on-site for visitors.

Connect – Boardroom and Balcony: Views from the administration level combine nature and necessary program supervision therefore functioning as a space for the elders, the youth, and the band.

Viewing Deck South: Through double doors and a ramped balcony, inhabitants oversee three more components of the architecture - the water and land-based rentals, and the gathering circle.

Gather - Gathering Circle: Centrality embodied within the architecture invites inhabitants from all directions, regardless of their path, to gather

and grow relationships. Guarded from every angle, the gathering circle connects programs and inhabitants to the natural landscape.

Reveal - Water-Based Rentals: Amid the view of the lake, the architecture delays and reveals inhabitants to the dancing water of Shoal Lake. The subtle curvatures that welcome inhabitants to and from the land into and out of the lake, embody the balance between simplicity and functionality innately observed in the concept and construction of a Marina's dock.

Boardwalk and Marina: The combination of permanent piling docks and temporary floating docks form the boardwalk that directs inhabitants to and from the Marina. Inhabitants experience the marsh, the bedrock, the earth, the trees, and the water, each an integral part of Shoal Lake.

HEALING CENTRE

Jae Rivera (ED4 Architecture)



This project was mainly driven by the book *All our Relations* written by Tanya Talaga which focused on the overlying health crisis currently within Indigenous society and caused by the echoes of colonization. There is a theme that Talaga talks about where the government seems to lack the understanding of the issue's severity while there is also an absence of traditional practices that provides a greater benefit for these individuals rather than Western science and medicine. My program is governed by this understanding as I believe creating a healing centre using traditional methods would provide a needed opportunity for the community by

providing a space for distressed individuals to come in and attempt to heal from their past. This healing centre would allow for existential experience through the connection to nature while providing spaces that facilitate intimate conversations and communal activity. I believe this would give an opportunity for the individuals to be reintroduced to their culture through the conversation and traditional activities while strengthening the sense of solidarity for the entire community. By using architecture as a tool there is potential to create vitality within a growing community while staying true to their long-lasting traditions.

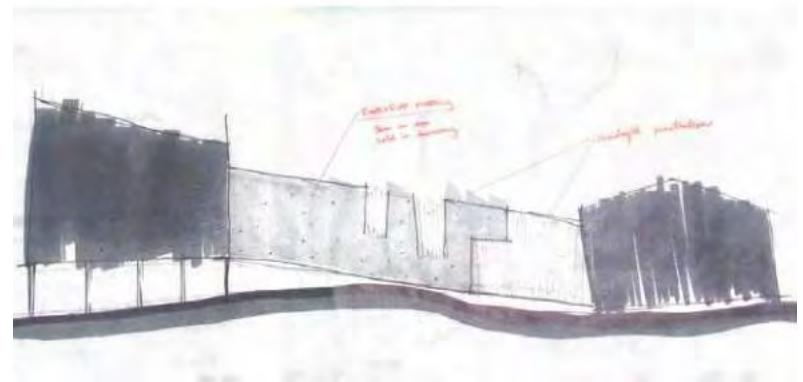
Case Study: Hooke Park

Hooke Park in London, England is a woodland site that operates as a park as well as a workshop for architecture faculty and students, providing space for more experimental design-build projects.⁷

Some contemporary approaches of building include using more primitive and less treated materials such as wood and bamboo. New ways of thinking about the use of wood have influenced the design of the Healing Centre.

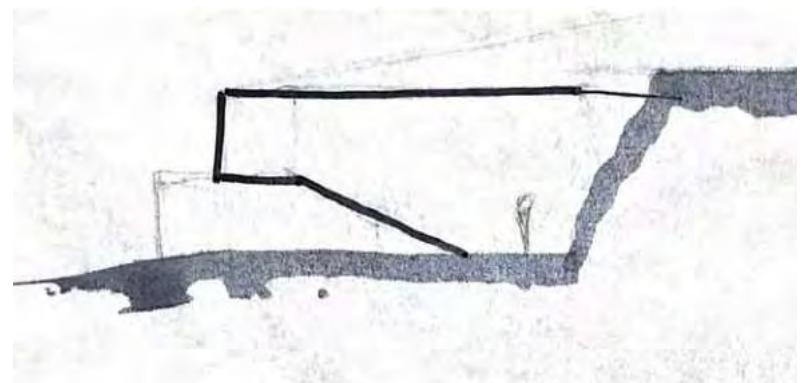
The use of wood for a building will visually lighten the "weight" of the structure, ultimately allowing the context (the natural environment) to reveal itself and shine through rather than be blocked by dense or monolithic forms.





Light and Landscape

The exploration attempts to reveal the site while allowing the environment to penetrate into the architecture heavily applied within the thresholds that transition users from interior to exterior conditions. This is intended to create transparency between differing environments, gradually introducing the user to a new space.



Engaging the Ridge

The exploration to embody the most prominent condition within the architecture was intended to reveal the natural contours of the site. The drastic change in elevation created opportunities for the environment to penetrate the interior while at the same time serving as a wall and becoming a significant part of the architecture.



Green Roof

A building impacts nature in many ways that are harmful however by acknowledging the importance of minimal destruction, humans are able to develop techniques in order to become stewards to their environment.



Structure and Exterior

The architecture has a sense of dominance that inhibited the intention to blend within its surrounding context. In order to lighten the weight of the structure, a simple move was to reveal the natural environment to the interior allowing greater transparency between the two conditions while masking its impact toward the site.





ANT GARDEN

Sijie Fan (ED4 Landscape Architecture + Urbanism)



Fig. 4 Ant Colony

Ants are not always seen by people, but still play an essential role in the ecosystem, especially in the North American forest and grassland ecosystem. In the natural world, some species of ants and plants try to bond therefore creating a mutualism relationship, plants in such a relationship are known as known as Myrmecophytes. This relationship is not just plants feeding ants and supplying colony sites; but ants also provide ecosystem services that the plants may need. For example, many plants rely on ants for their seed dispersal, like the Aphaenogaster

group, when these ants are foraging food for their larva. The plant seeds contain a matter called elaiosome, an important food for Aphaenogaster groups' larva to grow. The locations of these plants are therefore very important as they will be the places where ant colonies develop and expand. Moreover, these plants can disperse and germinate in a wider range of area with the help of ants. Some local ant species and myrmecophytic plants are listed on the right.

Ant and Plant Species



Fig. 5



Fig. 6



Fig. 7



Fig. 8

Aphaenogaster Rudis

Rudis group is often the dominant ant of the forest floor. Many spring ephemeral herbaceous plants depend on Rudis group for seed dispersal. Aphaenogaster usually build colonies in soil or under rocks, but in forest habitats they may nest in rotten logs, branches, stumps and occasionally live trees.⁸



Fig. 9

Sanguinaria Canadensis Bloodroot

A perennial, herbaceous flowering plant, 20-50 cm. Its flowers bloom from March to May. The seeds are round and black to orange-red when ripe, and have white elaiosomes, which are eaten by ants.

Camponotus Caryae

Camponotus Caryae forage on trees day and night. They can nest in soil, dead branches, pine cones, small rotten logs, and hollow plant stems.⁹



Fig. 10

Viola Pubescens Downy Yellow Violet

A soft and hairy violet, 9-12 in. tall. The bright yellow flowers, veined with purple toward the throat, grow on leafy stems above sturdy green foliage. Seeds have elaiosomes, which are eaten by ants.

Formica Aserva & Neorufibarbis

Formica is known for its abundance, it's ecological importance, and the repeated evolution of social parasitism within the group. Aserva is a host for the fungus *Laboulbenia formicarum*. The Neorufibarbis is a host for the fungus *Aegeritella tuberculata*, associated with a butterfly species *Polyommatus icarus*.¹⁰

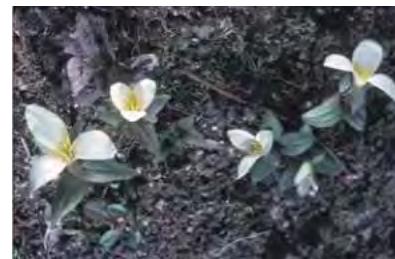


Fig. 11

Trillium Nivale Snow Trillium

Trillium nivale is smaller than many of the other species in the genus, seldom reaching a height of more than 9 cm.

Lasius Neoniger

Lasius Neoniger is a host for the fungus *Laboulbenia formicarum*. This species nests almost exclusively in open areas, either under stones or in open soil in craters.¹¹



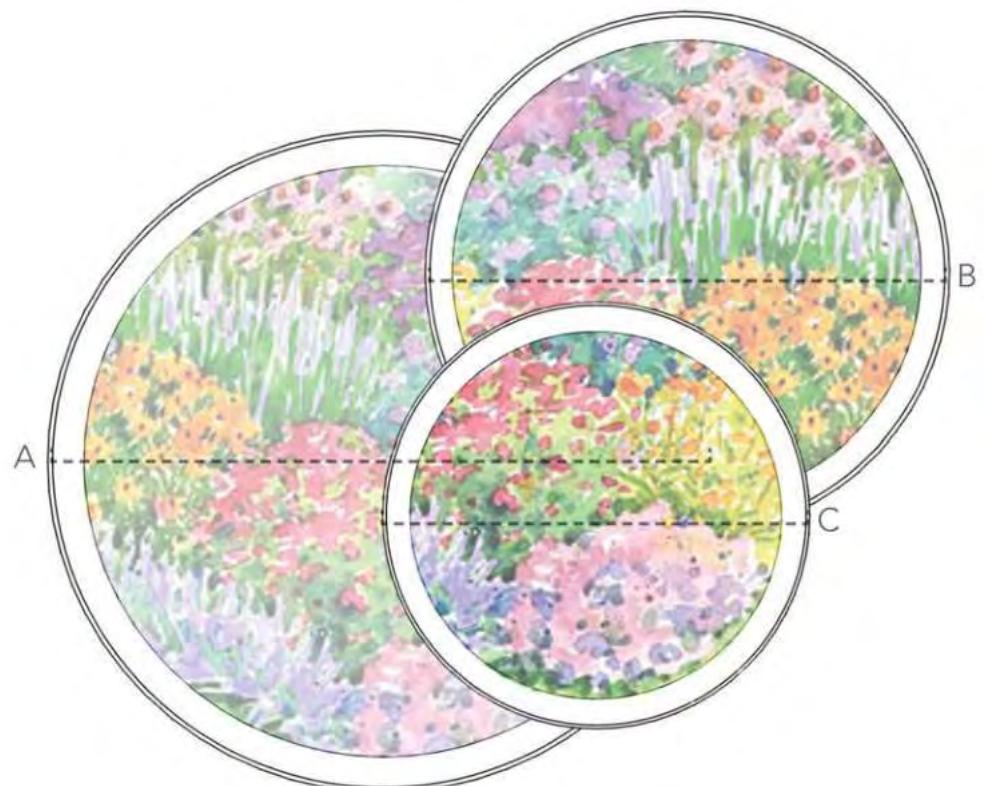
Fig. 12

Erythronium Albidum White Trout Lily

Erythronium Albidum produces short, slender stems 10-15 cm tall. The plant produces a white, lily-like flower 3-4 cm in diameter, with six yellow stamens. The flowers are bent downward, and elongate with age. It blooms in mid to late spring.

HABITAT LEGEND

- Open Space
- Meadow
- Forest



Plan View Garden Structure



Elevation Garden Structure

A 75cm C 45cm
 B 60cm D 100cm

The garden structure is inspired by ants' nest structure. Each room will be planted on one specific plant, that is emphasized for one specific ant species. People passing by can tell the ant species which are seedling around the structure directly. All of the plants are producing seeds containing elaiosome. *Aphaenogaster Rudis* will be attracted and disperse all of these plants on the way of foraging. These gardens are the base stations and in the future people will see the ants' dispersing network visually. The material of the gardens is granite.



REVEALING RELATIONSHIPS & LEARNING

Ken Ma (ED4 Landscape Architecture + Urbanism)



Fig. 13

When we design trails we should be thinking of more than just a route from point A to point B. Trails can exist to highlight important features of a site which can reveal informational qualities of the surrounding ecology for the user, or it can serve as an experiential, and scenic quality for the user to traverse through. As such, trails also serve as learning instructional tools for more experienced travelers. Knowledge can

be passed down via way finding, oral history of stories, or sometimes something even as basic as signage on the trail. Some trails can be found on site already providing shortcuts to allow for easier access from one area to another without maneuvering through steep topography changes. These existing trails will be highlighted though small design changes therefore highlighting them for future visitors.

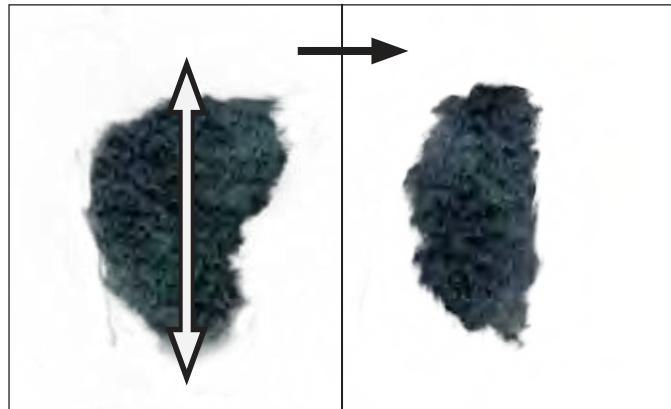


Fig. 14

Habitat loss: Removal of a patch causes habitat loss, which often reduces the population size of a species, dependent upon that habitat type, and may also reduce habitat diversity, leading to fewer species.¹²

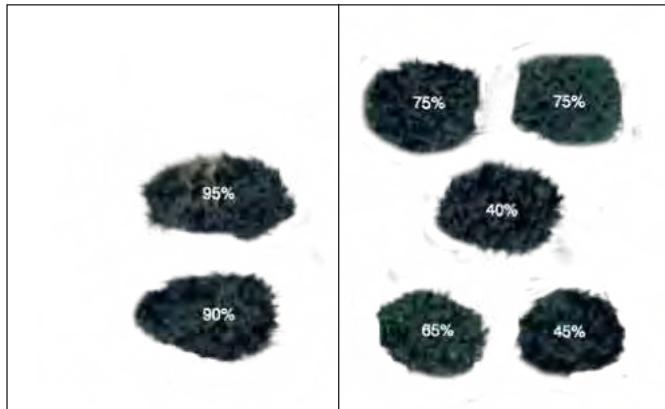


Fig. 16

Local extinction probability: A larger patch normally has a larger population size for a given species than a smaller patch making it less likely that the species will go locally extinct in the larger patch.¹⁵

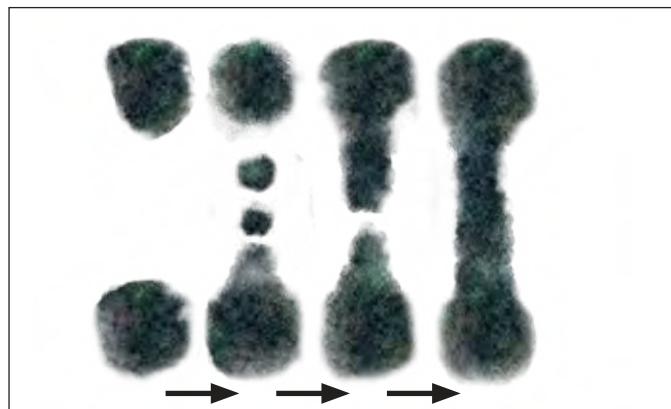


Fig. 15

Stepping stone connectivity: a row of stepping stones provides connections for movement of interior species between patches.¹⁴

Based on British Columbia Park Design Guidelines, the maze trail is an all around trail which consists partly of a loop trail, and partly of a linear trail. This pattern aims at maximizing the area utilized without disturbing the existing ecology. The maze trail allows self exploration through their own choice of routes and allows for different user experience since these different areas are expected to have vastly different terrains. As the name suggests, the maze trail should have as much signage for direction and distances where possible to ensure the

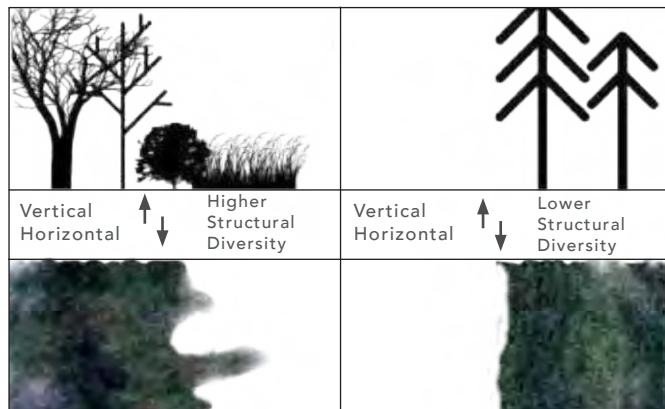


Fig. 17

Edge structural diversity: vegetative edges with a high structure diversity, vertically or horizontally, are richer in edge animal species.¹³

safety of the user, and to provide general information to the user before they start. When one uses these trails to help exemplify certain features of the landscape, it also creates disturbance no matter how little. As such, four fundamental principles of Wenche E. Dramstad (illustrated above) can help give direction for trail placement to provide a better fit, and balance between the human realm and animal realm. For a maze trail to be successful, one must take care and consider what possible outcomes might come out when one implements a trail.



Section 1: Viewing Deck

4m



Section 2: Weaving Trail

4m



Section 3: Wetland Dock

4m

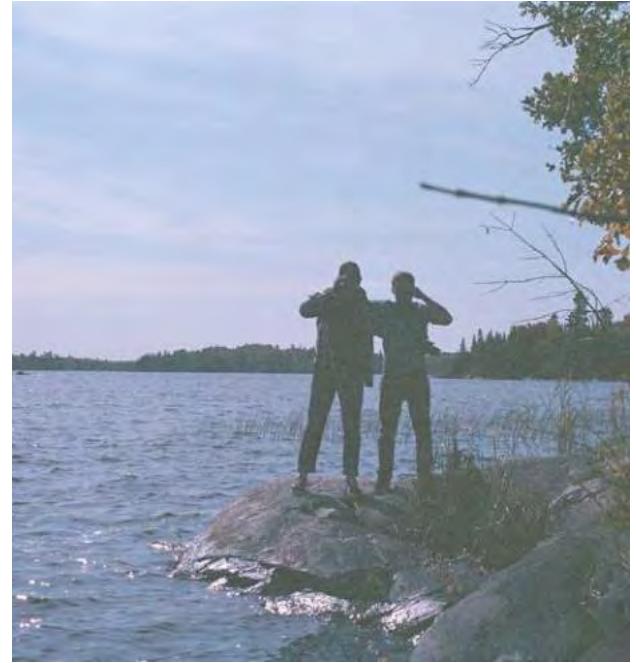


When looking for and tracking animals, we follow a specific pattern of movements which indicate the animals behaviour. Using this abstracted pattern of movements we can integrate and weave in and out our own movements to maximize our views of the animals. This allows us to walk gently within the landscape to observe and learn from the animals, and utilize the trail for land-based education purposes.

1. In the first section, one can utilize a viewing deck as a looking point for the species they wish to find. The high elevation the deck provides somewhat erases ones presence from the ground, allowing for animals to move through without threat of human presence.

2. This section of the trail allows for one to weave through the landscape, and to touch upon it gently with little to no disturbance. It has no railings as it doesn't elevate one high enough for one to danger themselves, and allows for a close up of the existing ecology in the area. This can be complimented with signage to let one know what it is they are viewing.

3. This last section shows a trail going towards the lake, to maximize the experience of Shoal Lake 39A, showing the vast and beautiful vegetation, as well as the transition zones that go from land to water.



MAAWAJITOON GATHER



"Let me stop and gather my thoughts." In such a moment we don't simply pile things up at random, but to gather means to reflect, to build associations and to find meaning.

To gather one's self involves looking inward, of allowing ourselves to be open and vulnerable.

To gather is to find calm, and allow a sense of place to reveal itself.

To gather is to come into contact, to share, to teach, to learn. It is about exchange, between people and nature, finding connection, perhaps even friendship, between species.

To gather is to collect, to bring together and to assemble. We do this out of needs, wants and desires.

We can also think about gathering as ecological processes. We might gather to clean (phytoremediation), to regulate flow, to contain and collect. This might be gathering for metabolic purposes or storing for later use. A sieve gathers by separating or filtering elements. The ecological processes of wetlands cleanse water naturally by slowing the flow. This allows sediments to drop from the water, allowing plants to absorb (gather) toxins and heavy metals into their tissues, break them down, or fix them in the soil.

We would like to thank the people of Iskatewizaagegan First Nation for allowing us to gather on their lands, and we are grateful for the time they spent with us talking about the future of this beautiful sensitive place. - RP

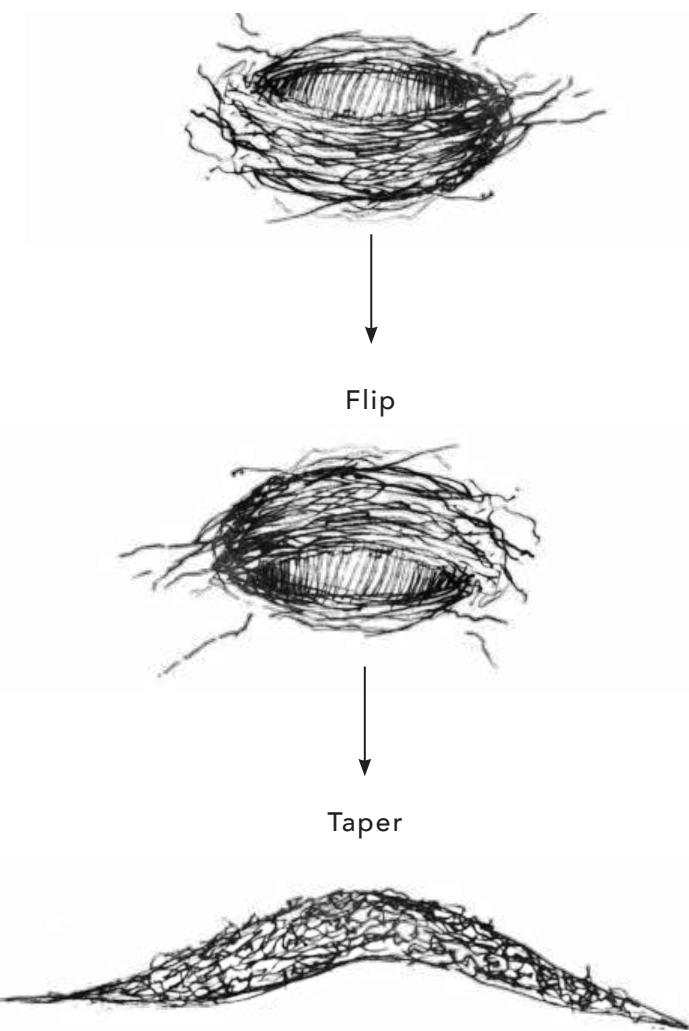
NEST

Shaheer Saad (ED4 Landscape Architecture + Urbanism)



A myth was born in the indigenous culture, believing that seeing an owl is an omen that will bring you a bad luck or even death. In reality, an owl is used by parents to scare unruly children, and is appropriated by evil doers. An owl is a messenger who can give us important warnings and is someone who could be our benefactor.

This project explores the potential of designing a gathering space. A space where the community can gather to share knowledge and heal myths and misunderstandings about the indigenous culture. The project envisions the gathering space in the form of a nest, a space where age does not matter. But a space where a mother and a child can come together to share things in common such as origin, culture, and teachings.



FORM INSPIRATION

The form is mainly inspired by an owl's nest. The nest's form, topography, and geometry is slightly modified to function as a gathering space and fit with the surrounding context. However, the space maintains the spatial qualities of a nest such as texture and light.



BIRTH

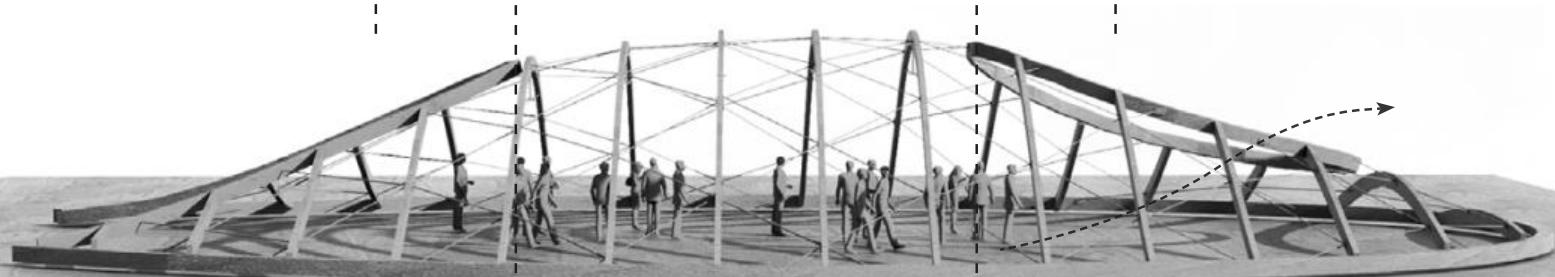
The nest is a space for the community to gather regardless the age; a space where a parent and a child can be born again into the culture by connecting to their origin and come together to share common rituals and traditions.

NEST

At the nesting stage, a child starts to connect to their culture. This is a place where the youth can develop deep roots and a solid foundation in their teachings through observing and celebrating the culture in the space. In this context the space can be used for events and major community gatherings that express the indigenous culture.

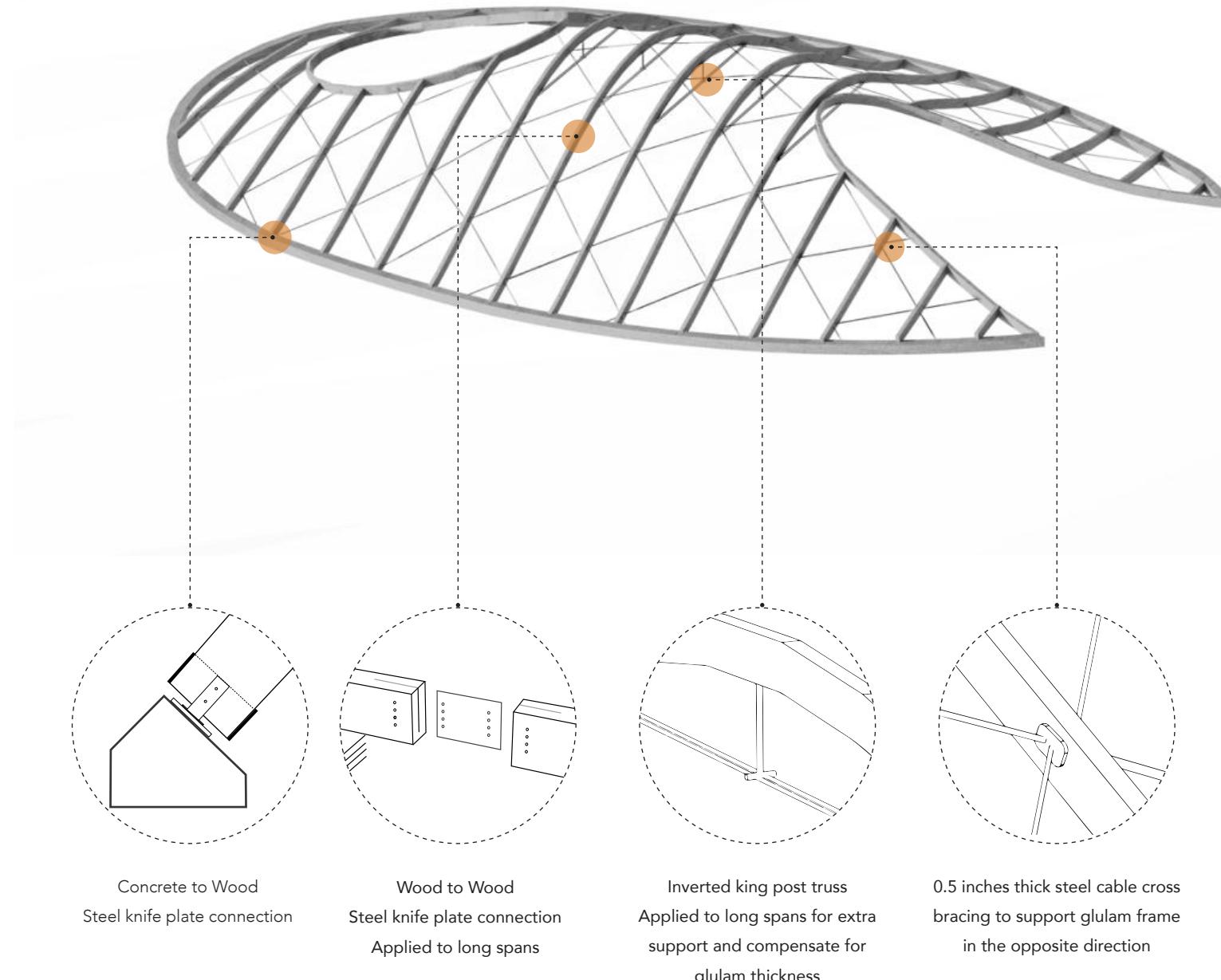
FLY

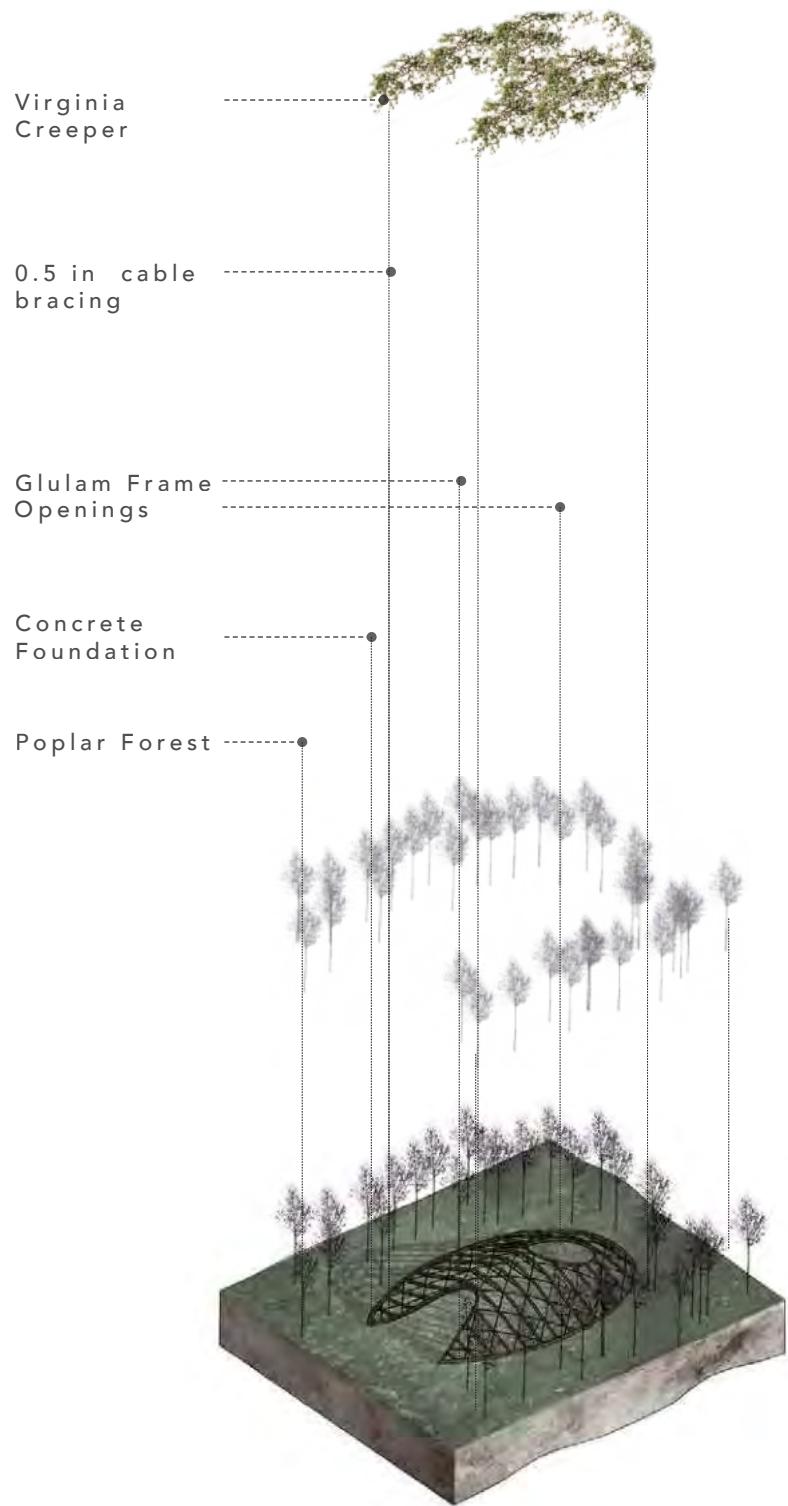
At this stage the child is well rooted in their culture and ready to flee the nest and connect to the sky and the outer world. Even though the child and the parent can be disconnected in the outer world. Their nest is always a place that will be there for them to come together and connect again to their origin.



SPATIAL STAGES CONCEPT

CONSTRUCTION DETAILS





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NEST Shaheer Saad





AKI GIKINOO'MAAGOOWIN CENTER

Ashley Polet (ED4 Architecture)

Significant Site Images

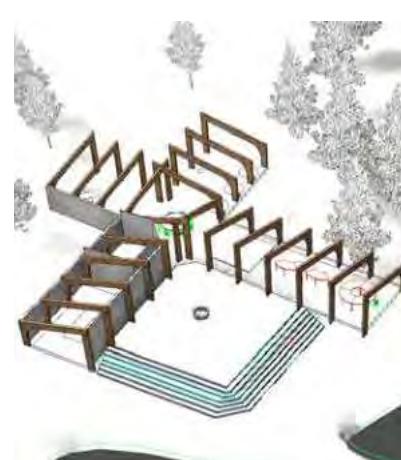
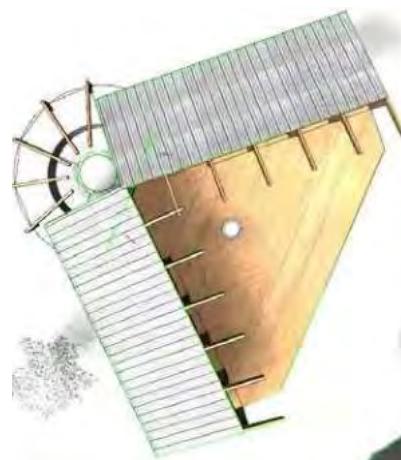
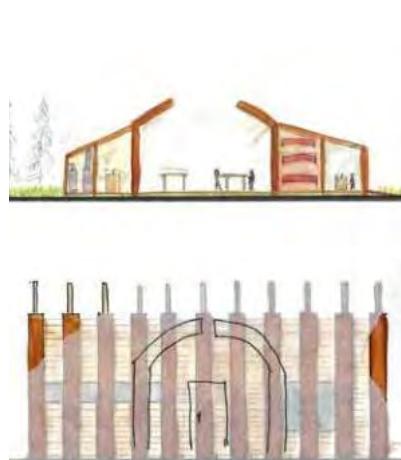
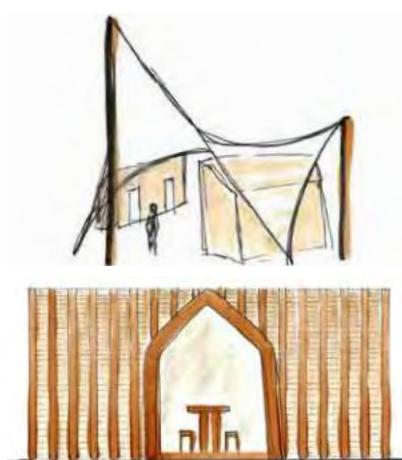


The Aki Gikinoo'amaagoowin Centre was designed with the intention to ground its students and to encourage a reconnection with the land and new connections with friends. The south east portion of the architecture opens itself up to the water and views that encompass the site. Each large window has an individual wood shutter system that can adjust the amount of light that comes into the space as needed.

The exterior of the building is spaced every eight feet apart and provides support for cantilevered sections of the building as well as holding the shutter system. Cedar shingles makeup the exterior façade material not only for its cultural significance but also its naturally changing features. Overtime the honey-brown wood will begin to grey and begin to blend

in with the natural rock colour found throughout shoal lake. This aging of material will also show to the students who visit how things are always changing and growing. One could say that the greying of the building will reflect the years of knowledge shared within the space. The architecture reveals itself to the students creating a sense of embrace by the buildings structure, and also a sense of honesty. Just as one can feel the presence of the trees while they are in the forest, one may feel the presence of the architecture while in this building. The interior walls are painted white drywall to reflect light within the space and may be used for students to hang projects. Overall, the architecture intends to ground its visitors and help them create lasting relationships with the land and with each other.

Iterative Modelling: exploration of physical and digital models





FORM AND STRUCTURE

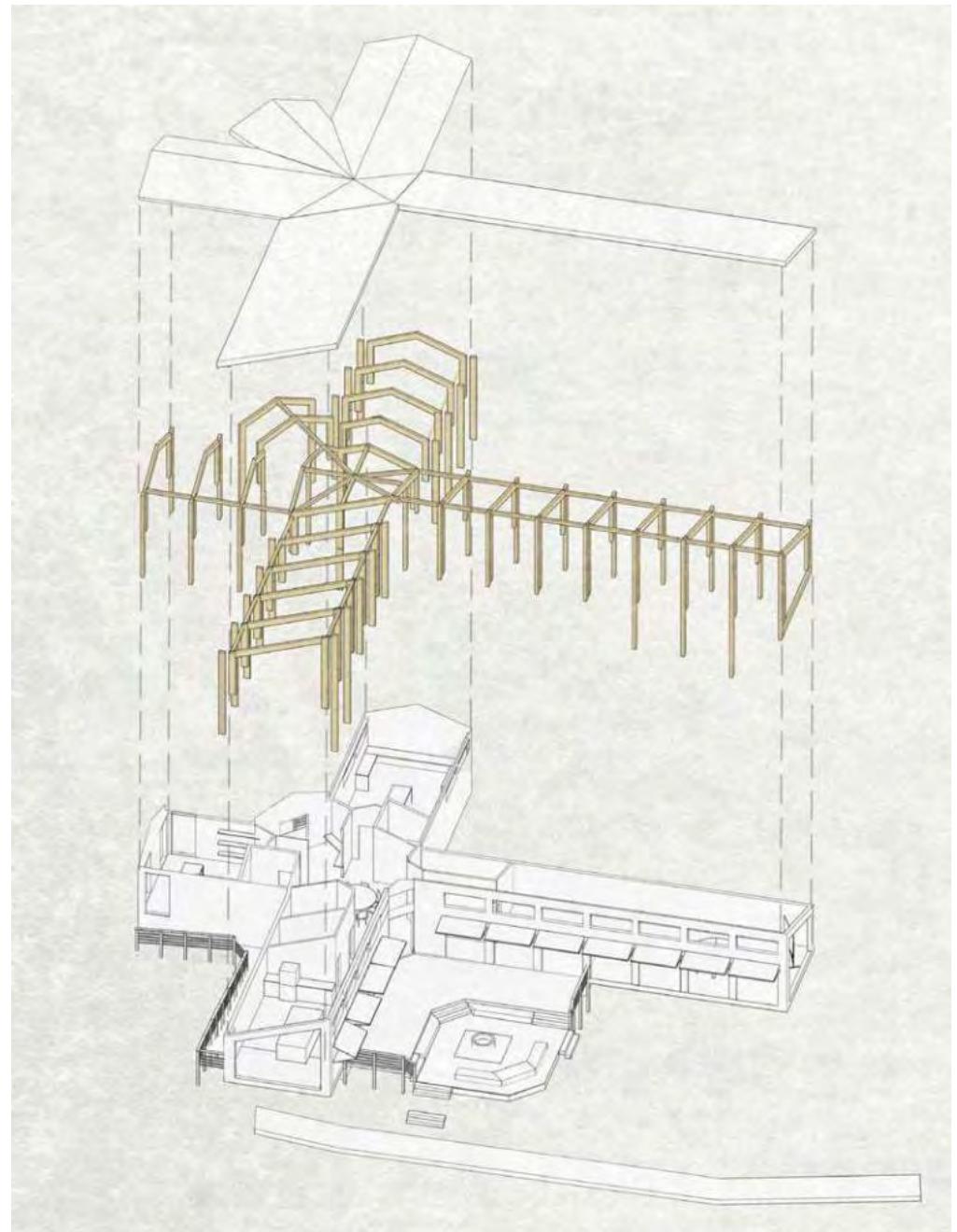
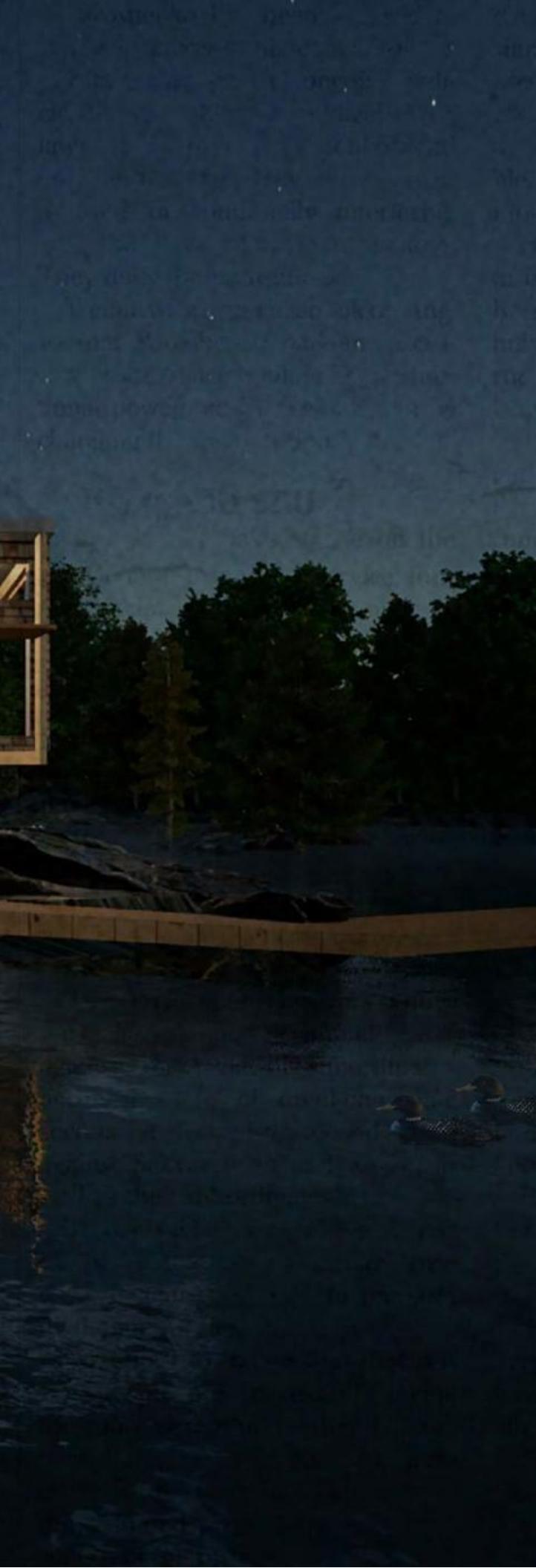
The architecture of the building is organized on a 'x'-axis grid. Each branch of the architecture serves its own function. The north branch is the Tool Room. This space holds storage for items students may use in the day including guns, fishing rods and tackle, hammers and nails, knives, etc. A group of students can learn about the equipment that they will be taking with them during the day. To the east is the classroom. The room holds space for tables and chairs for group activities, crafts, and group learning. Here they can learn about the plants and animals they might encounter during their day.

To the south is the kitchen where students may bring food and meats that they collected in the day to learn how to prepare and cook them. In the hallway leading up to the kitchen is a food storage room with a freezer and space for canned and boxed goods. To the west is the building's office that houses a large meeting table, storage, and seating for administrative purposes. A dining room is located in the heart of

the Aki Gikinoo'amaagoowin Centre, where the four branches of the architecture connects. Here, a group of students can share the meal they prepared together and share their experiences of the day. Both the classroom and the kitchen open up to a exterior deck. This allows for the flow of knowledge to pass from the different ends of the building and converge at a sharing space.

This tiered deck sharing space allows for the flow of people as well as an exterior fire space to sit and share stories. At the end of their day, students and teachers can sit around this fire to talk about their experiences of the day and to pass knowledge down to others. This architecture promotes the notion of the honorable harvest by giving space to teachers and elders to share the stories of the land and how we each have an interconnected impact on the world around us.

Structural Axonometric Render: showcasing the layers of the architecture



AKI GIKINOO' MAAAGOOWIN CENTER Ashley Polet





The Aki Gikinoo'amaagoowin centre is a land-based education building that offers space to those wishing to learn more about traditional Anishinaabe teachings and the interconnected relationship we all share with the land. All things living offer a story and a teaching to those who want to listen. This project serves as a base for learners and teachers to gather and connect with each other and connect with the land that surrounds them. This land-based education centre serves as a destination point for students and teachers to meet, learn, share, and grow.

Final Design: rendering the experience within the spaces

FERRO NETWORK

Val Kolesnik (ED4 Landscape Architecture + Urbanism)

"The purpose ... is to bring all the parts of the environment together into dramatic relationship so that the same notes are used but are arranged to form coherent chords and sequences."¹

- Gordon Cullen

The object of gathering is seen as a final destination; a place to settle and be together. To gather however, we must make our way to the same spot. A spot that unites us all. How do we get there? How do we meet from all over, in one place?

This project takes action on the space between two spaces, from the high ground to the low water level. The lake is vast and possesses many opportunities for gathering, whether it be for educational, recreational, essential or professional services. The problem often is making it accessible, and highlighting the beautiful site meanwhile. Shoal Lake possesses a beauty through the natural elements it is made up of, such as the rocks, water, greenery and wildlife. The aim is to celebrate these elements and bring together the two levels through a careful montage of the descent down to the water.

The threshold that happens during the descent is not only unique for the change in elevation but in the nature of fabrication. Rocks are more drastically shaped from the water's edge; vegetation is oddly placed, or perhaps non-existent the way it was before the descent; the sky is wide open; the sounds are different. The aim of this project is to identify these elements, to put forth the possibility that before the event, before the

gathering, there is a moment to intake what exists yet is often missed.

With clear emphasis on the descent, there are also moments which will frame views and reveal elements that were previously unseen. Through framing and revealing, the descent is dramatically more memorable, such that the journey down may have as strong an affect as the destination itself.

Overall the project is structured around a network of paths and nodes which work to bring the site together for all. These paths range from hard to easy trails, boardwalk and a seasonal bike/skating trail. The nodes are based on the type of space the activity will require, subsequently linking a corresponding trail to each one.

For this project in particular, the focus led to the design and detailing of one particular trail and node; the skating/swimming node. Since the lake is quite utilized during the winter and summer, the way to get to it needs to be reevaluated and designed on a functional level. The descent on to the lake (since the land is naturally higher) is of utmost importance for the comfort and enjoyment of everyone.



Shoal Lake - Winter



Fig. 1 Industrial Metal

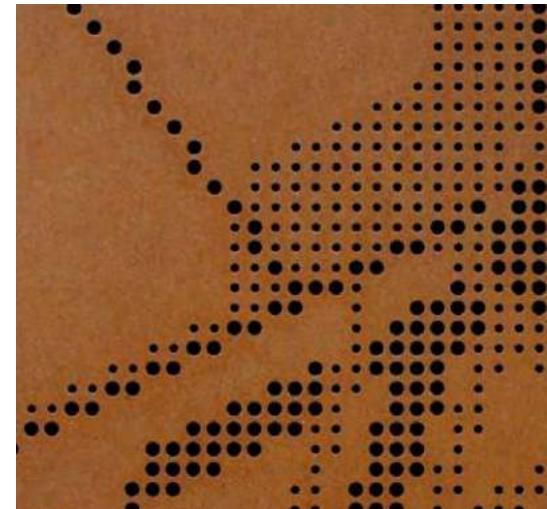
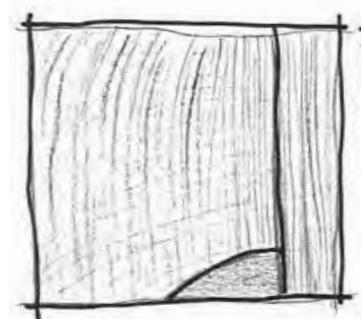
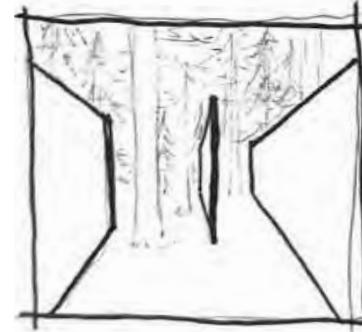


Fig. 2 Perforation

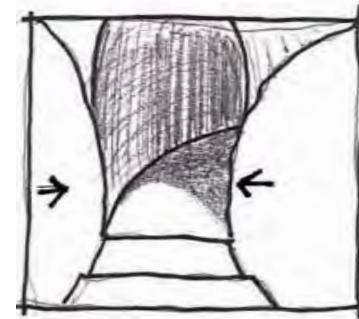
Sequence: sketching potential sequences within the site



closure



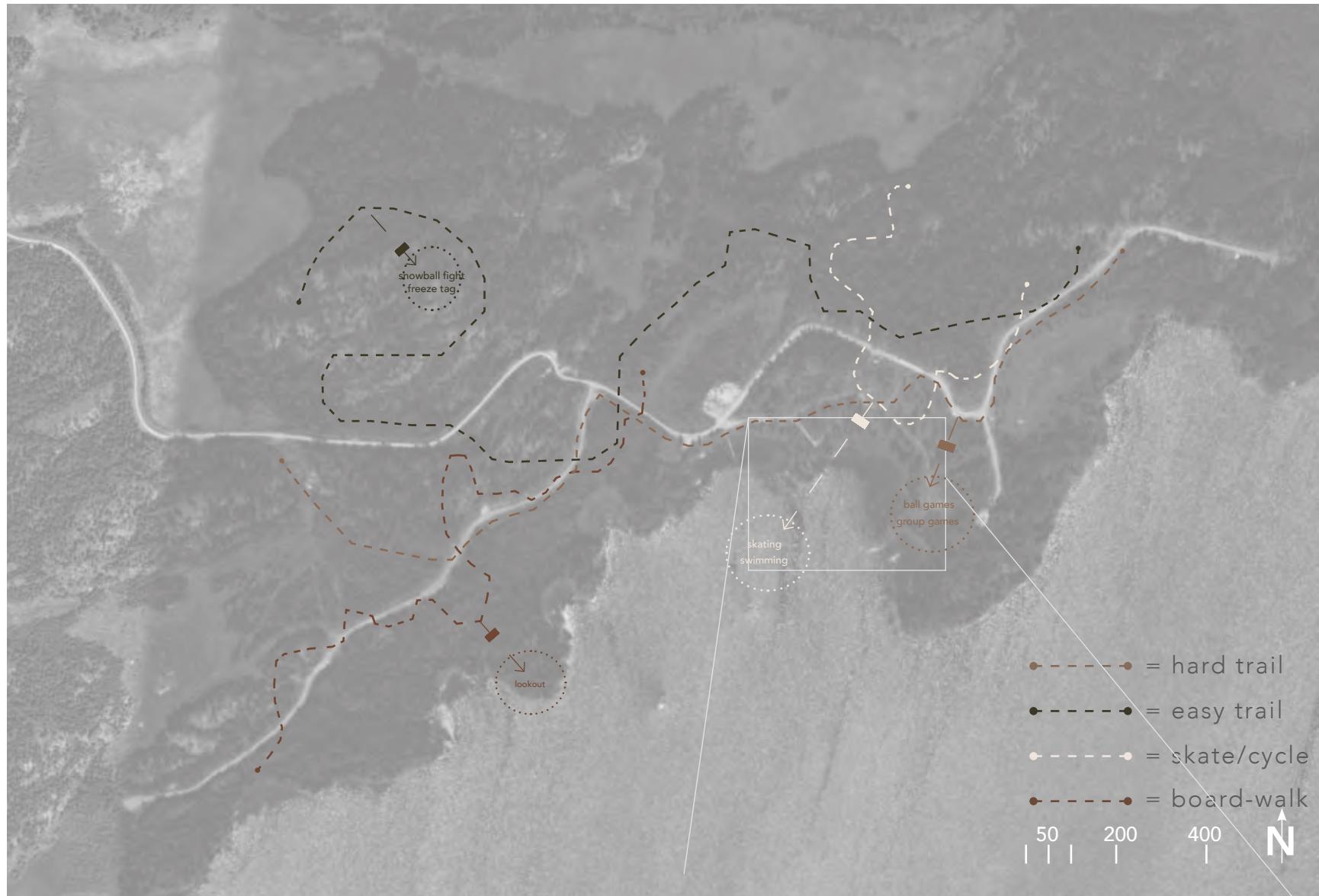
intimacy



narrows



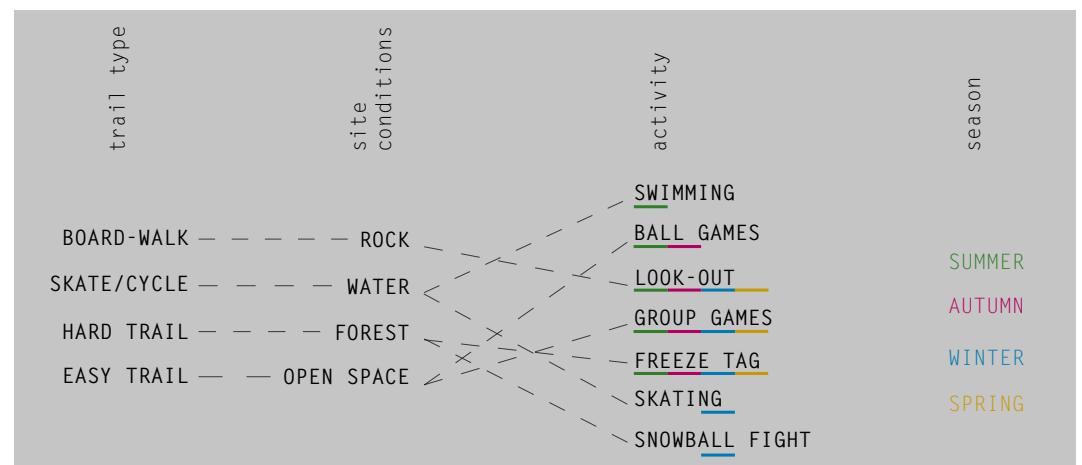
anticipation

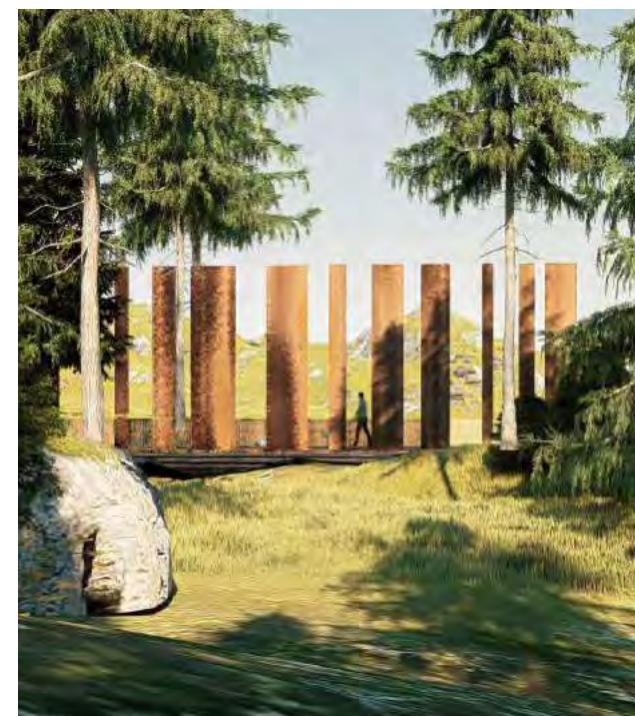
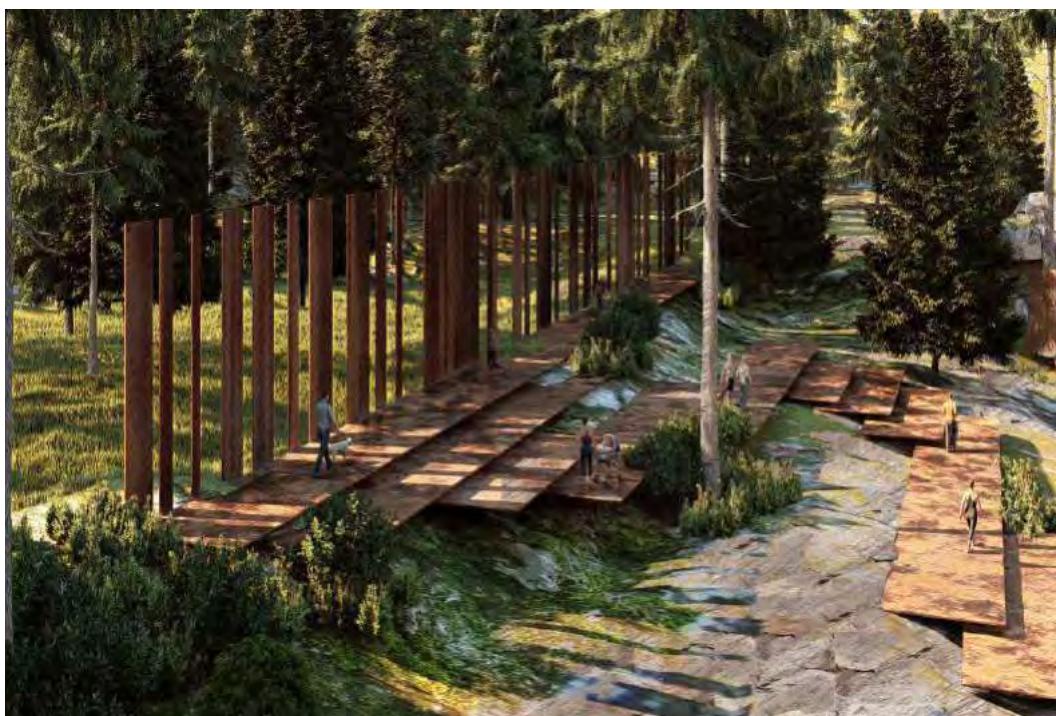


LANDSCAPE TAXONOMY

The network consists of connection from trail to node, all of which are categorized by the type of trail, site conditions and the season of the activity. Each trail is a different type, similar to that of a skiing hill, having levels of difficulty and accessibility using the contours of the site.

Just as the elevation is marked by lines on a paper, the corten steel and steel grille design follows a similar pattern. The linear form of the material directly responds to the edge condition on site, descending inhabitants to the transition between water and land.





CANOE GATHERING SPACE

Ruining Sun (ED4 Landscape Architecture + Urbanism)

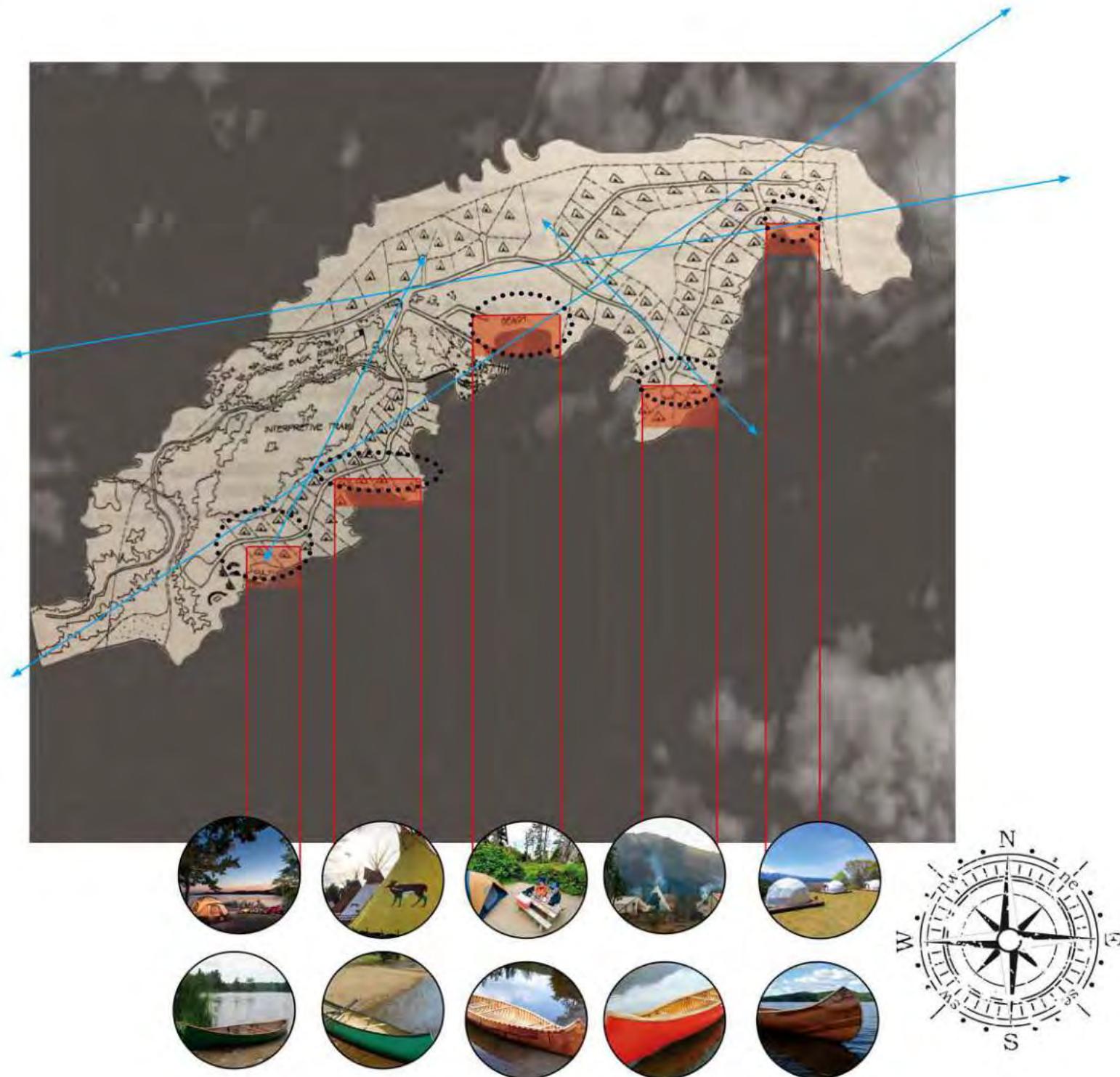


With the development of social science and technology, more and more people begin to pay attention to the impact of nature on people's life, and people begin to yearn for and experience simpler ways of connecting to the land. Canoes themselves have played vital roles in traditional indigenous cultures.

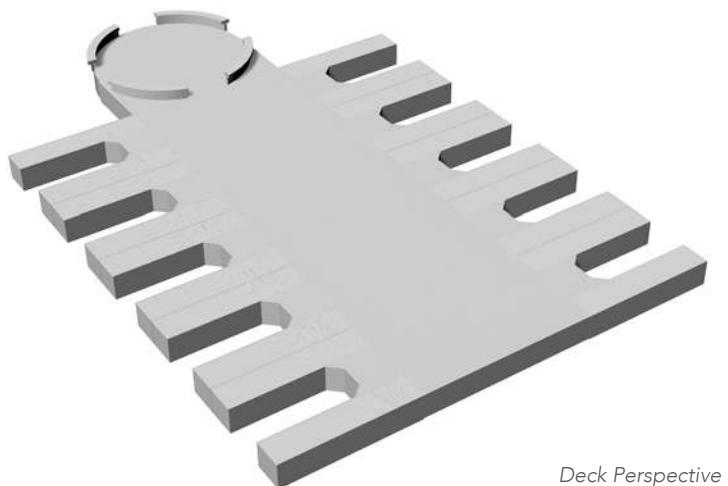
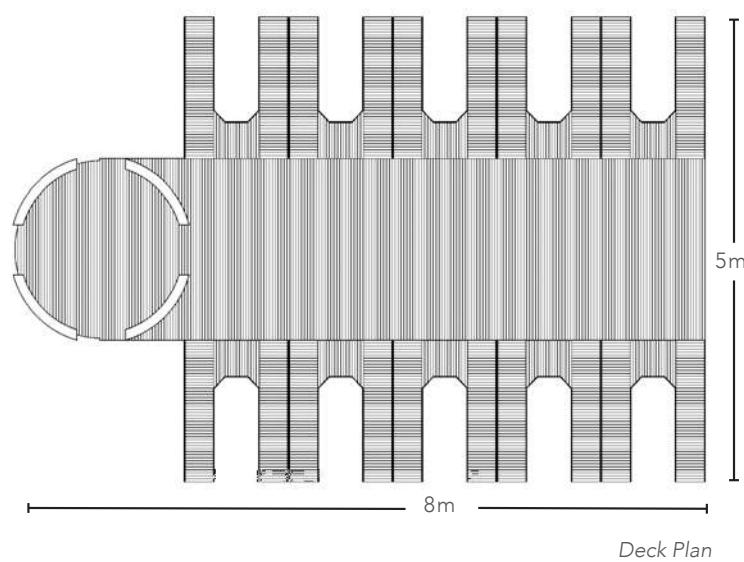
In this project, a number of gathering locations have been identified where small groups travelling by canoe would be allowed to gather. It is envisioned that these sites could accommodate visitors on camp sites, where minor services would be provided. The main gathering site itself consists of two elements, a vertical structure that would be visible from a distance for people on the lake while serving as a canoe making

shelter, the second element is a docking structure that provides enough space for people to come together by canoe or otherwise. Canoes and camping gear may also be rented at a gathering site.

The form of the vertical structure is based upon boat building knowledge. The design inspiration for this structure is based on the structure of the canoe and the process of making it. In this space, people can pursue lake-based activities while the structure functions as a landmark for boaters on the lake. The dock on the other hand, is the bridge between the lake and the land, that may also serve as a "bridge" between native culture and non-native cultures.



Site Selection Collage



Deck Design

The canoe gathering space facilitates three functions, first, to experience, within the vertical structure, traditional boatbuilding techniques and to deepen the understanding of the canoe-making process and materials. Second, to provide a sharing circle, on the dock, where small groups can come together, a space meant to serve as a community meeting place or outdoor classroom. Third, as a large open space the overall design is seen as a place for bringing different people together, deepening interpersonal and intercultural communication, while providing a relaxed place of contemplation.

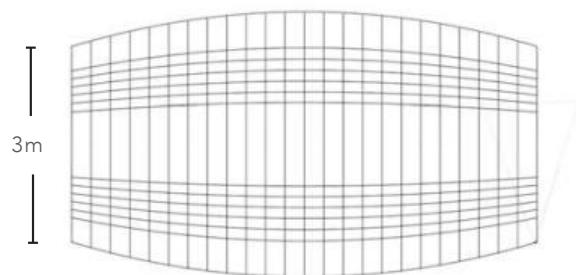
Within these final technical illustrations, along with final renderings, it can be seen that when the dock and structure are working in tandem, they provide vitality for the whole gathering space. Starting at Shoal Lake 39, it is easy to find the canoe gathering place. As a landmark gathering place, the structure reminds people that it is a place for canoes.

The design is meant to blend in with the environment. First, the materials used are all wood forming a unity and comfort in terms of color and image. Secondly, surrounded by trees, the forested site forms a natural enclosure, which provides privacy for gathering and makes people more comfortable using the area. The structure plays a guiding role, which not only satisfies the privacy of the space, but also does not affect finding the canoe space due to the surrounding trees.

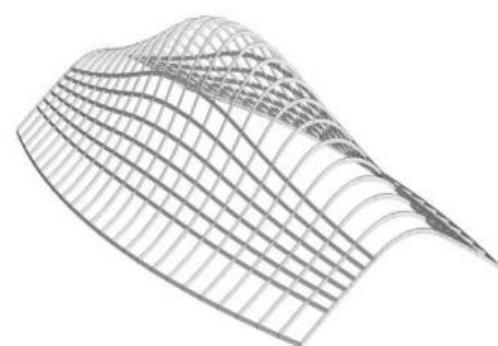


Fig. 3 - 5 Material (Wood Bending Process)

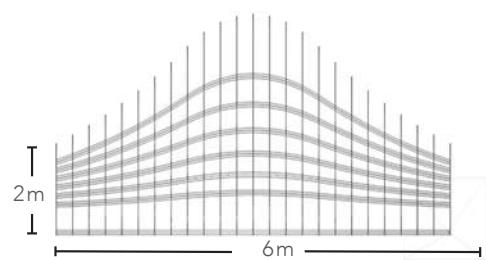
Structure Design



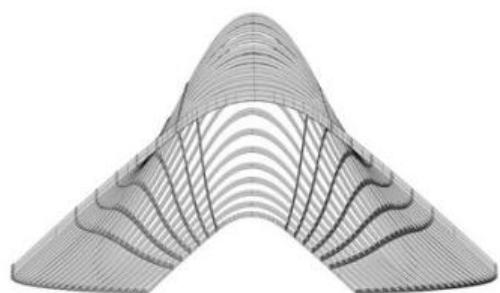
Plan



Perspective



Section

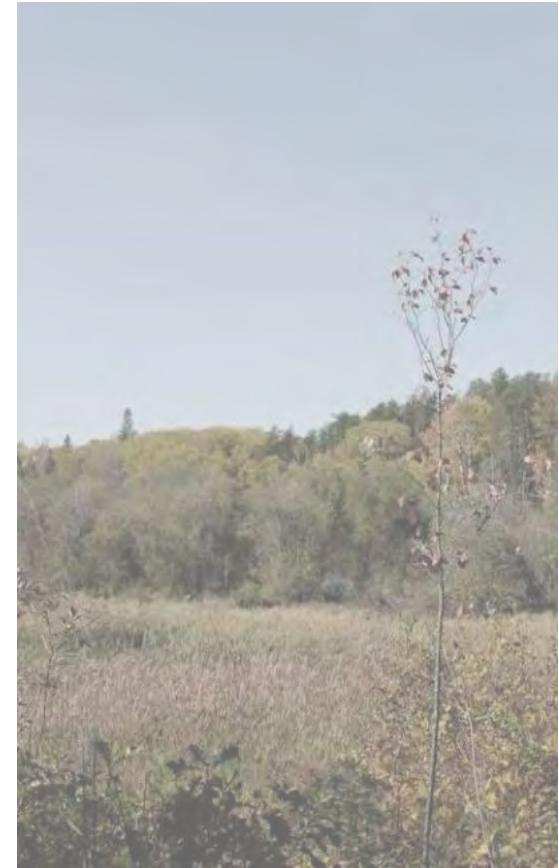


Elevation



HEALING SAUNA

Rylan Lucyk (ED4 Architecture)

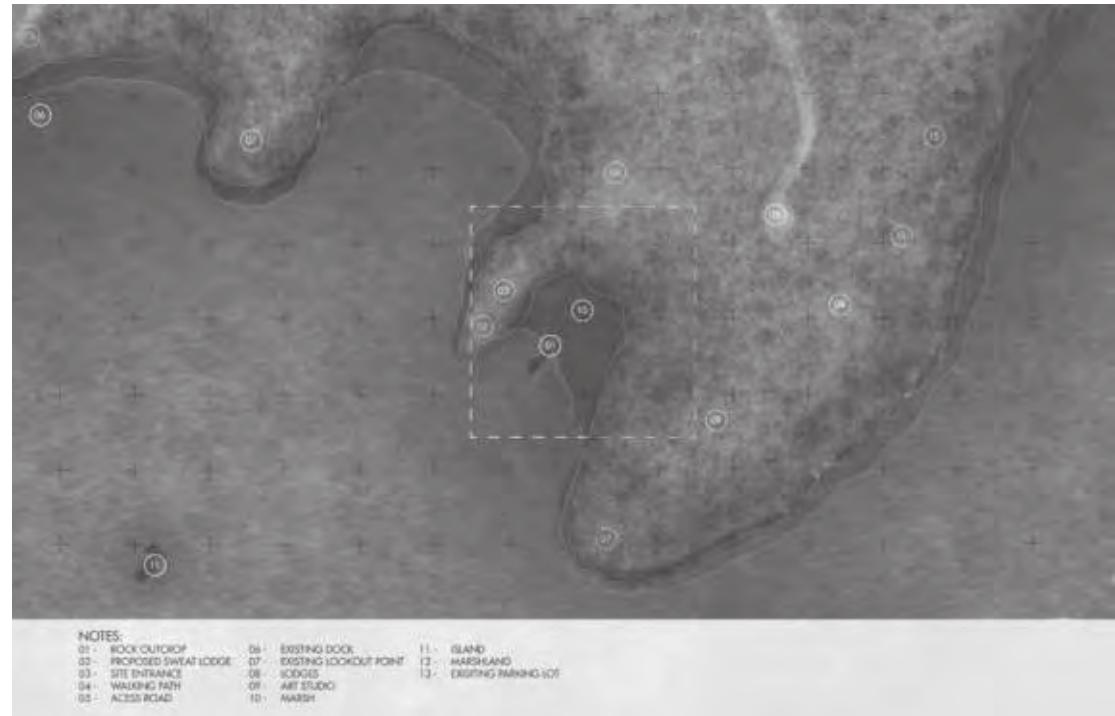


"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."¹
- Aldo Leopold

The project intends to provide a space where the community and visitors can experience and develop a stronger connection with the land. Through these unique experiences, the goal of the design is to amplify the inhabitants' respect and connection to Mother Earth. Embracing the journey of each inhabitant on the site, the intention of the project is to further develop the Iskatewizaagegan teachings of respect for the land through an act of healing.

While on a site visit to Iskatewizaagegan #39, the community invited us to participate in a sweat ceremony. The experience developed a large

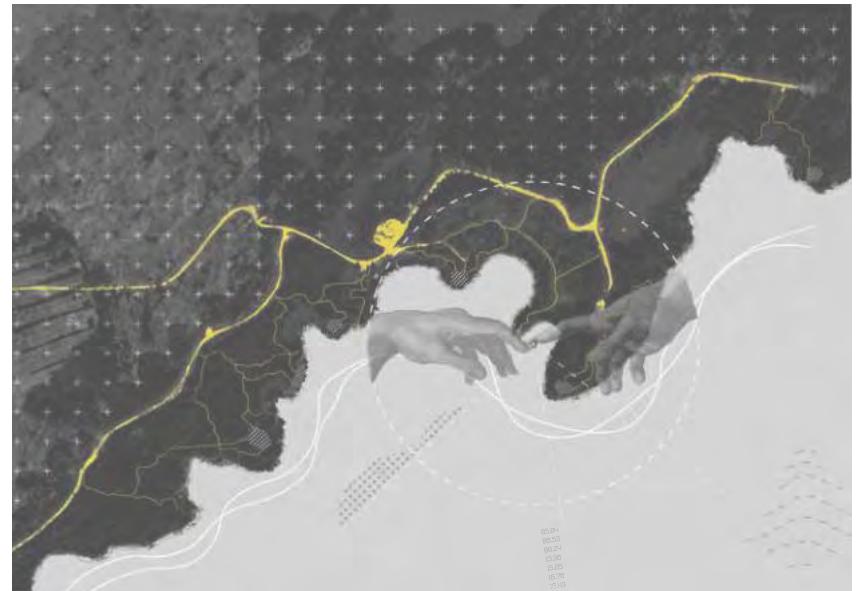
amount of self-healing through intense heat and ritual of the sweat lodge. As it was my first sweat, the experience left a lasting impression on me. The ceremony of the sweat lodge provides an experience of self-healing, reminiscent of a modern-day sauna. The ritual inspired me to develop a built environment that promotes respect and healing. The program of a sauna reflected the architectural intentions of developing an experience that encourages self-reflection and self-healing. Contrasting with the dark interior of the sweat lodge, the sauna utilizes views and aspects from the landscape.



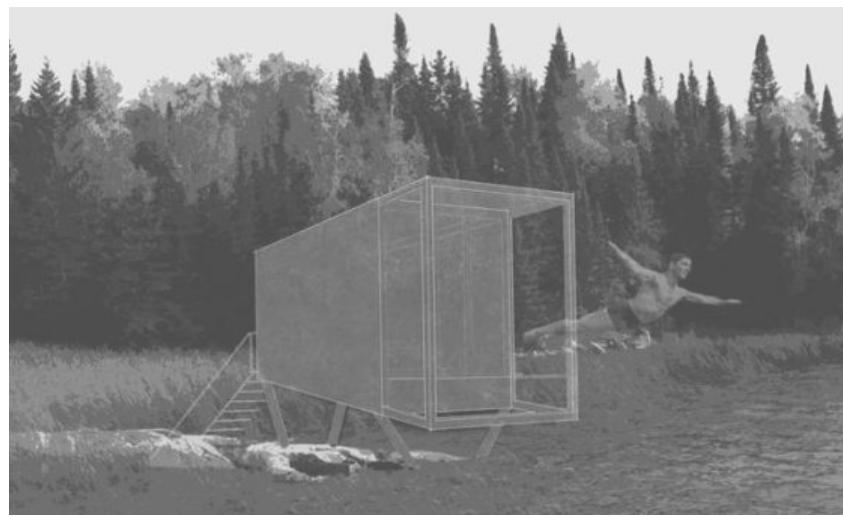
ITERATING THROUGH EXPERIENCE

How can architecture be utilized as a method to experience a deep connection to the land? One method to instill this deep meaning on inhabitants is to develop a unique experience. Foreign experiences promote self-reflection by changing an inhabitant's perception. This site was chosen to provide the architectural ability to amplify a wide variety of aspects throughout the site.

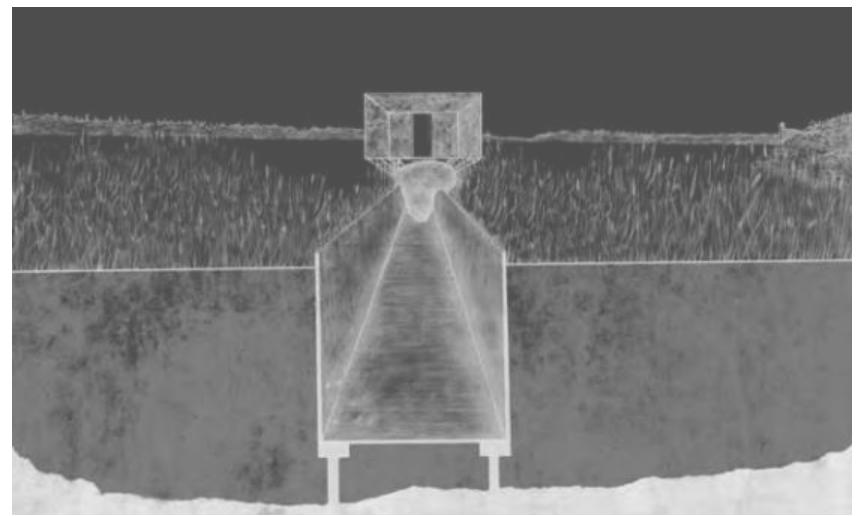
The project is situated on a rock outcrop which divides a field of cattails and water within the lake. This develops diverse experience through the potential of featuring experiences within the diverse ecosystems on-site. The project intends to utilize the building to amplify these ecosystems and is achieved through the essence of the project. The explorations of design iterations practice the harmonization of the diverse experiences of the site. These iterations influence the final design that promotes a deeper respect for the beauty of Mother Earth on the lands of Iskatewizaagegan Independent First Nation #39.



Initial Iteration: presented for Midterm critiques



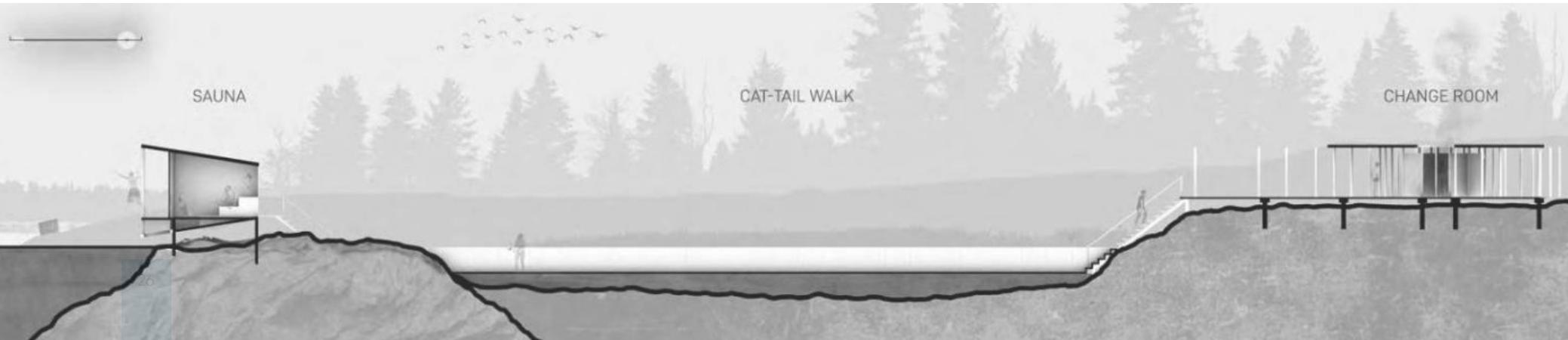
Mapping: exploring unique experiences

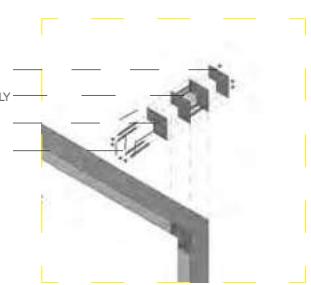
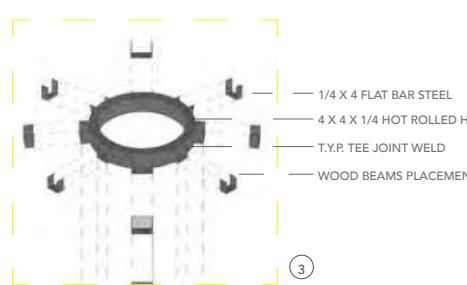
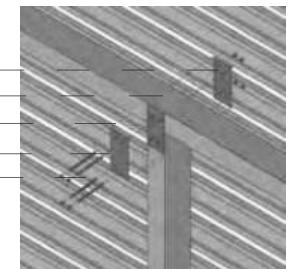
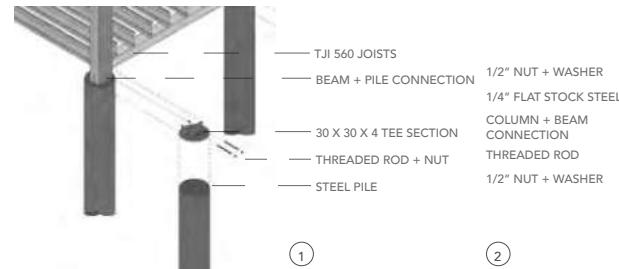
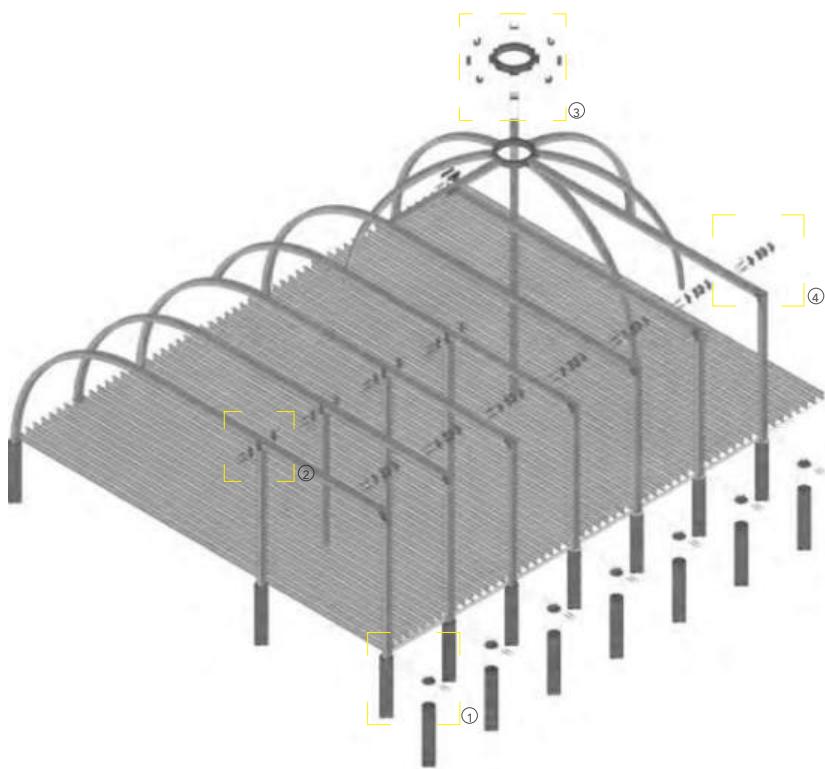


SAUNA

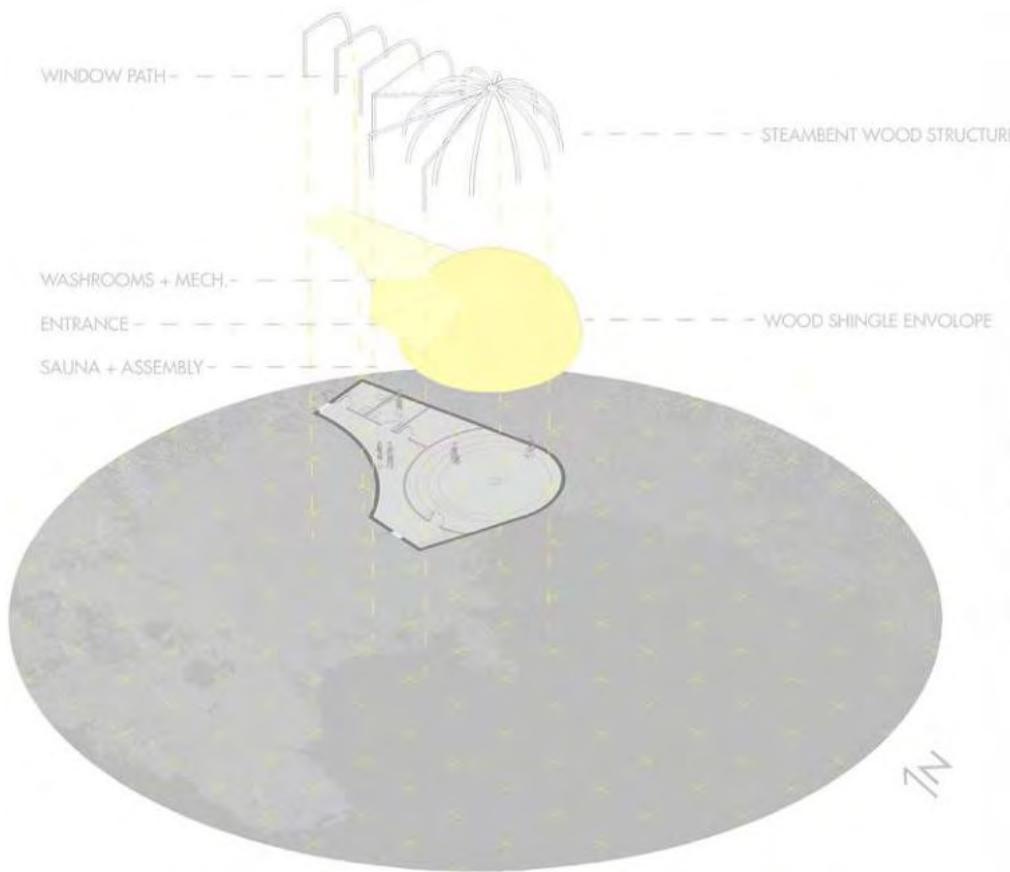
CAT-TAIL WALK

CHANGE ROOM

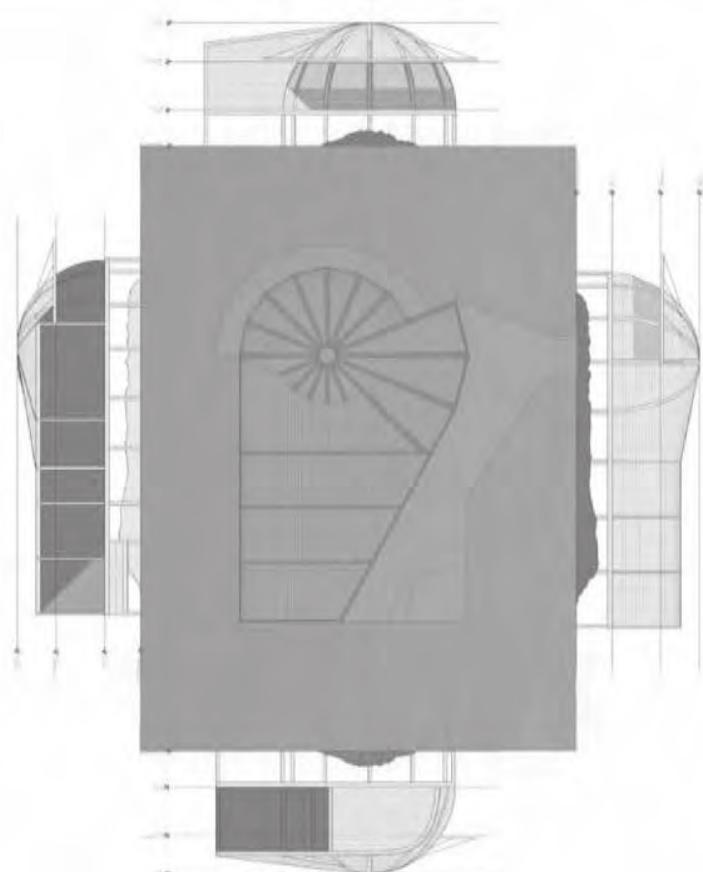




Structural Iteration: designing through construction details



Refined Iteration: accumulation of observations from previous designs



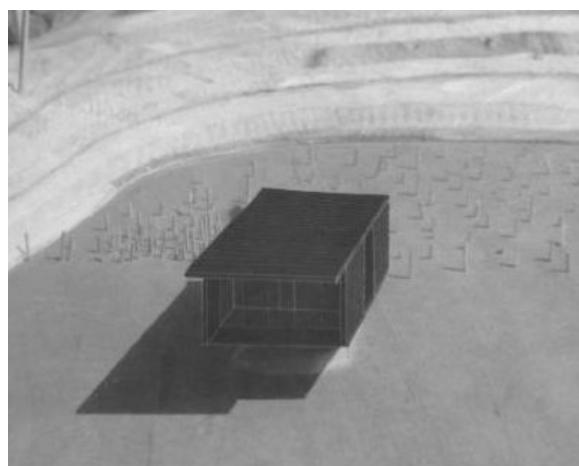
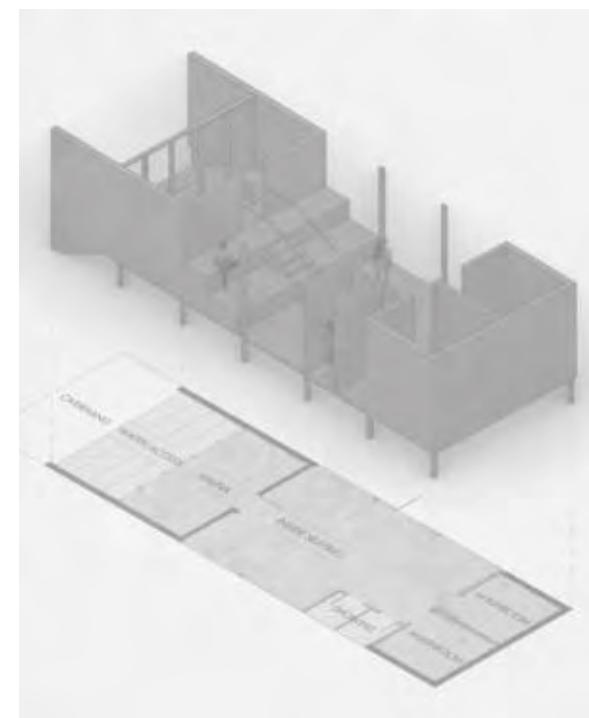
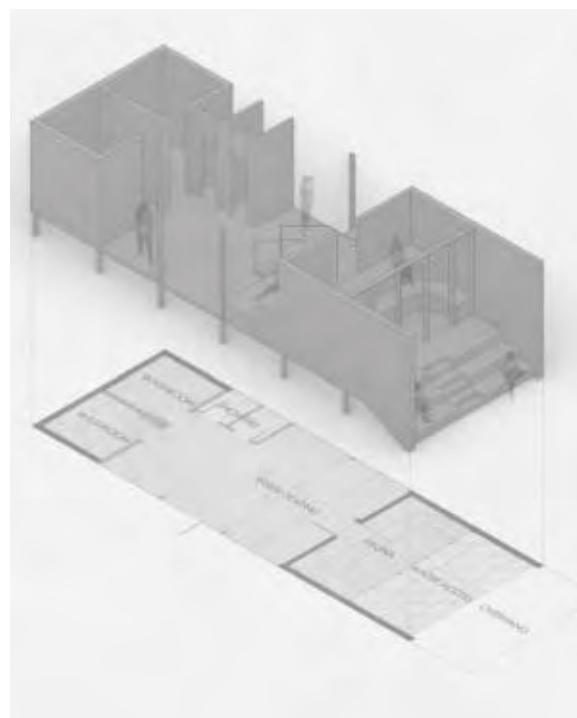
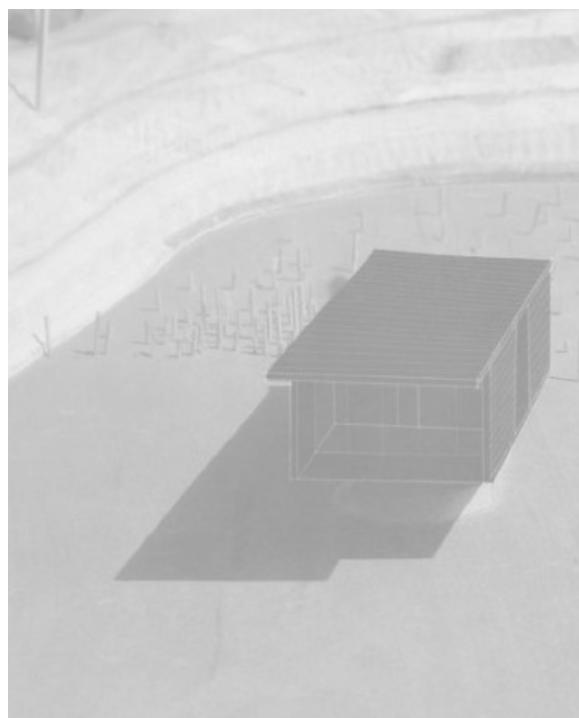
EXPERIENCES THROUGH THE SAUNA

The light structure, minimal roof planes, raw materials, and low building elevation, provide a building that does not overpower the site. The essence of the building is intended to match the existing aspects of the site. With the intentions of not disturbing the landscape, the architectural design enables a new method of experiencing the land. The minimalistic structure and building are inspired by the Indigenous teachings of the Honourable Harvest.

To conclude, the architecture of the sauna provides a unique experience of healing the inhabitant with the land. As the experience promotes the growth of the inhabitant by learning to respect the land which surrounds them. The beauty of Iskatewizaagegan Independent First Nation #39's site is unfamiliar to many people in our modern world, and modern civilization has detached inhabitants from Mother Earth. This lack of respect to the land has led to severe climate change and global environmental issues. The project intends to bring attention to the importance of having this respect for the land, which I believe roots from an individual's self-healing.

Final Iteration: rendering materiality and inhabitation into site images





RETREAT

Samantha Miller (ED4 Landscape Architecture + Urbanism)



RETREAT

When I think of gathering in this context, the first thing that comes to mind is retreat. Whether that be a family weekend out on the lake, a couple's relaxing getaway, a group of friends, wishing to reconnect and spend time together as a group, or even an employee or staff retreat. Going on a camping trip is one of the best ways to remove oneself from busy everyday life, unplug, and enjoy quality time with loved ones. This doesn't necessarily mean that camping needs to be completely 'off the grid,' and it can lean toward the more 'glamping' side. Still, there is something to be said about being immersed in nature, where you can see every single star in the nighttime sky because no city lights are interfering.

Camping can also be an opportunity to gather and meet new people. When there are many groups camping on a site at once, there are ways to connect with all of these groups by providing activities that everyone can participate in. There is something special about roasting marshmallows over the fire and hearing laughing and cheering from another group just down the shoreline. Everyone is enjoying a similar experience. However, for those people that are coming for a getaway, it can be enjoyable to feel as if you one of the only people on the lake, so you can focus on bonding and enjoying each other's company.



When thinking about the potentials for this project, a great way to monetize and benefit economically from this project is to capitalize on views, privacy, comfort, and amenities. This means that the price per night can be not only based on the number of amenities, quality of materials, and comfort, but also the location of the campsite.

Campsites that are located within bigger bays, further from other buildings and campsites, have more unobstructed views of the landscape. These campsites can be more glamorous, with more amenities and possible upgrades. The lower end of the price point can be campsites within smaller bays or that are closer to other campsites. These campsites can be more glamorous as well but can also be lower-scale with fewer amenities.



THE CAMPING TRIANGLE

The design of the campsite is based on the classic triangle strategy used when setting up campsites. Due to the population of black bears being higher in this area compared to in cities, it is critical to consider the spatial organization of the campsite to prepare for this. Using the triangle ensures that there will be a clear path to the dock from the tents, without having to cross the space where your food and garbage will be (and where the bear will most likely be). In this project, the triangle has been modified from the horizontal plane to both the horizontal and vertical planes.



PROGRAMMING



KITCHEN



DINING ROOM



DOCK



SLEEPING

The kitchen should include a stove oven, a sink with running water, as well as a garbage disposal and a food container. Garbage and food containers should be completely smell-proof. The kitchen walls should be solid to reduce the smell of food and garbage, which attracts bears.

The dining room can be as simple as a screened-in room with sliding walls for a nice escape from mosquitoes, or it can be a glass room. The dining room should be a place for a comfortable meal, break from the sun, or shelter from the rain and unpredictable weather.

The dock needs to maintain a soft relationship with the water. Its low proximity to the water is for easy docking and exiting out of canoes. Visitors should be relaxed and calm as they paddle through the gentle bulrushes and grasses, and up to the light frame dock.

The positioning of the sleeping dock on higher posts and higher ground aims to capitalize on uninterrupted views out to the lake and distant shorelines. Visitors should be able to see the sunrise and sunset on the lake peeking through the tent's opening.

WINTER



In the winter, the middle dock will have been lifted to prevent damage to the posts from the movement and freezing of the ice. The dining room and kitchen do not necessarily have to be cleared out, that depends on if the building has screen walls or glass walls. It also depends on the quality of the furniture and appliances chosen.

If desired, the kitchen and dining building can be insulated, and a cabin-like structure can replace the tent shelter in order to use the campsites in the winter.

NIGHTTIME

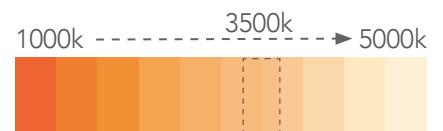


At night, the lighting fixtures can be placed within the bracing structure underneath the wood decking. This allows the light to diffuse and illuminate the water below. By placing the lights underneath the dock, it adds a subtle glow to emphasize the sky above. There also needs to be a small source of light, such

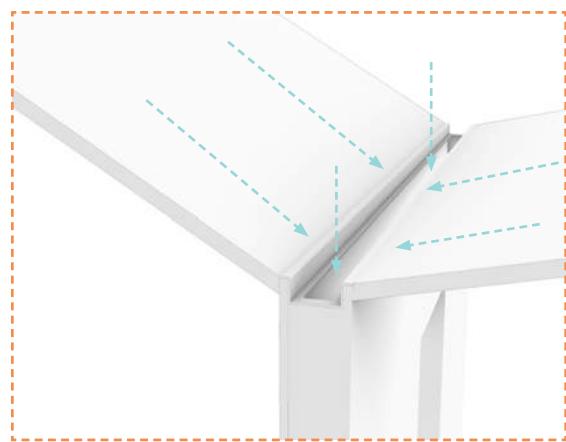
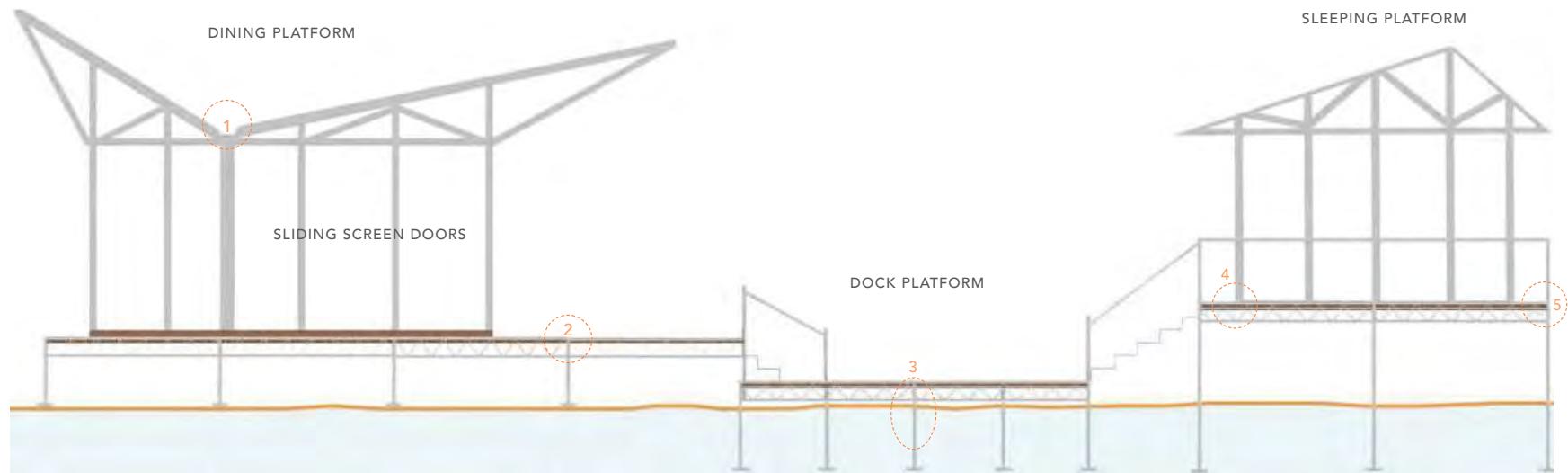
as a simple lamp for each staircase, to maintain safety standards at all times of the day. One solar panel can be placed on the roof of either the dining room or the camping shelter that charges the lighting fixtures so they can illuminate during the night. The electricity panel and inverters can be built into the kitchen.

Intensity: The brightness of the lighting used should be relatively low, to ensure that it does not distract from the night sky.

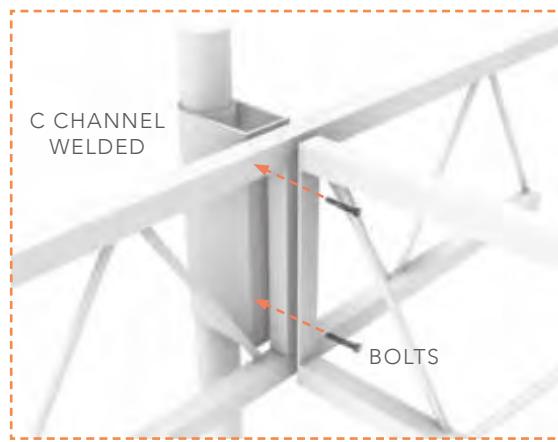
Colour: 3500k



CONSTRUCTION DETAILS



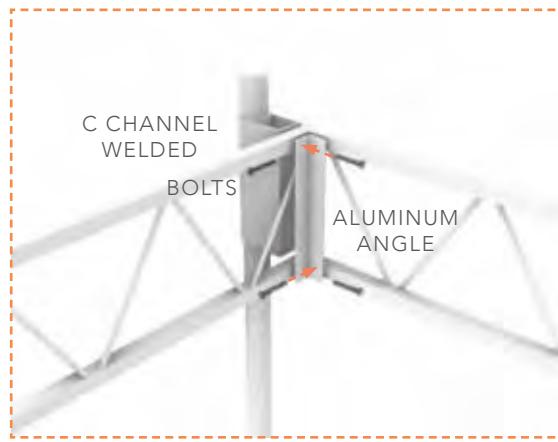
1. Roof Drain Detail



2. Three Way Intersection Detail



4. Edge Connection for Planks

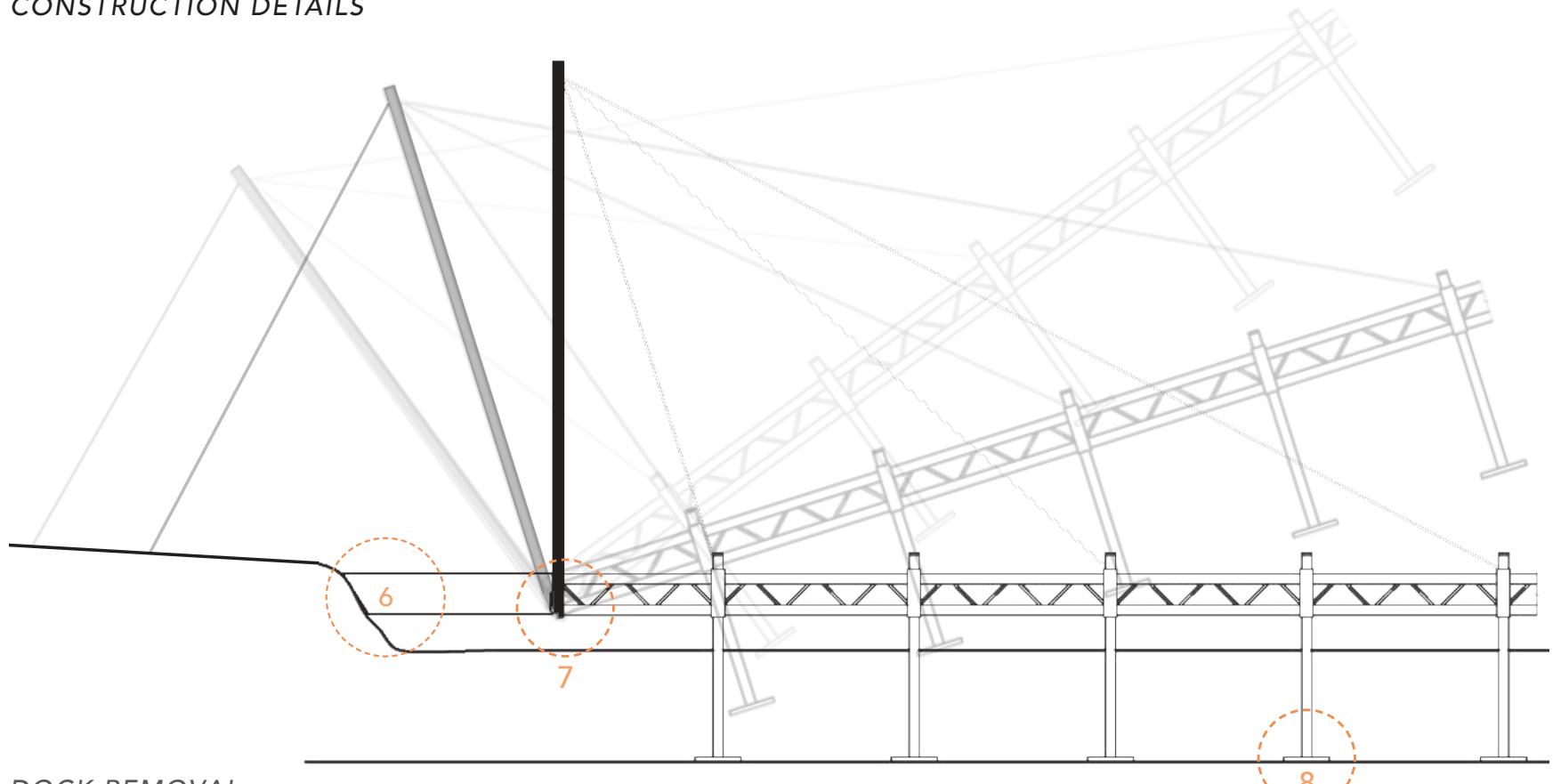


5. Corner Intersection Detail



3. Post Detail

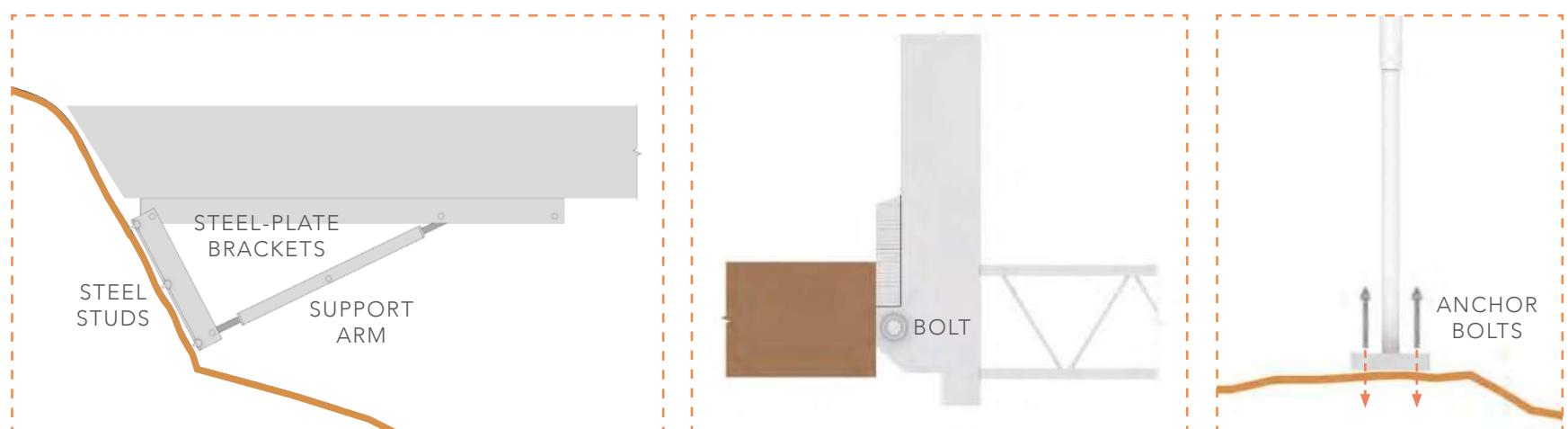
CONSTRUCTION DETAILS



DOCK REMOVAL

SCALE 1:100

0m .25m 1m



6. Dock to Rock Detail

7. Dock to Bracing Detail

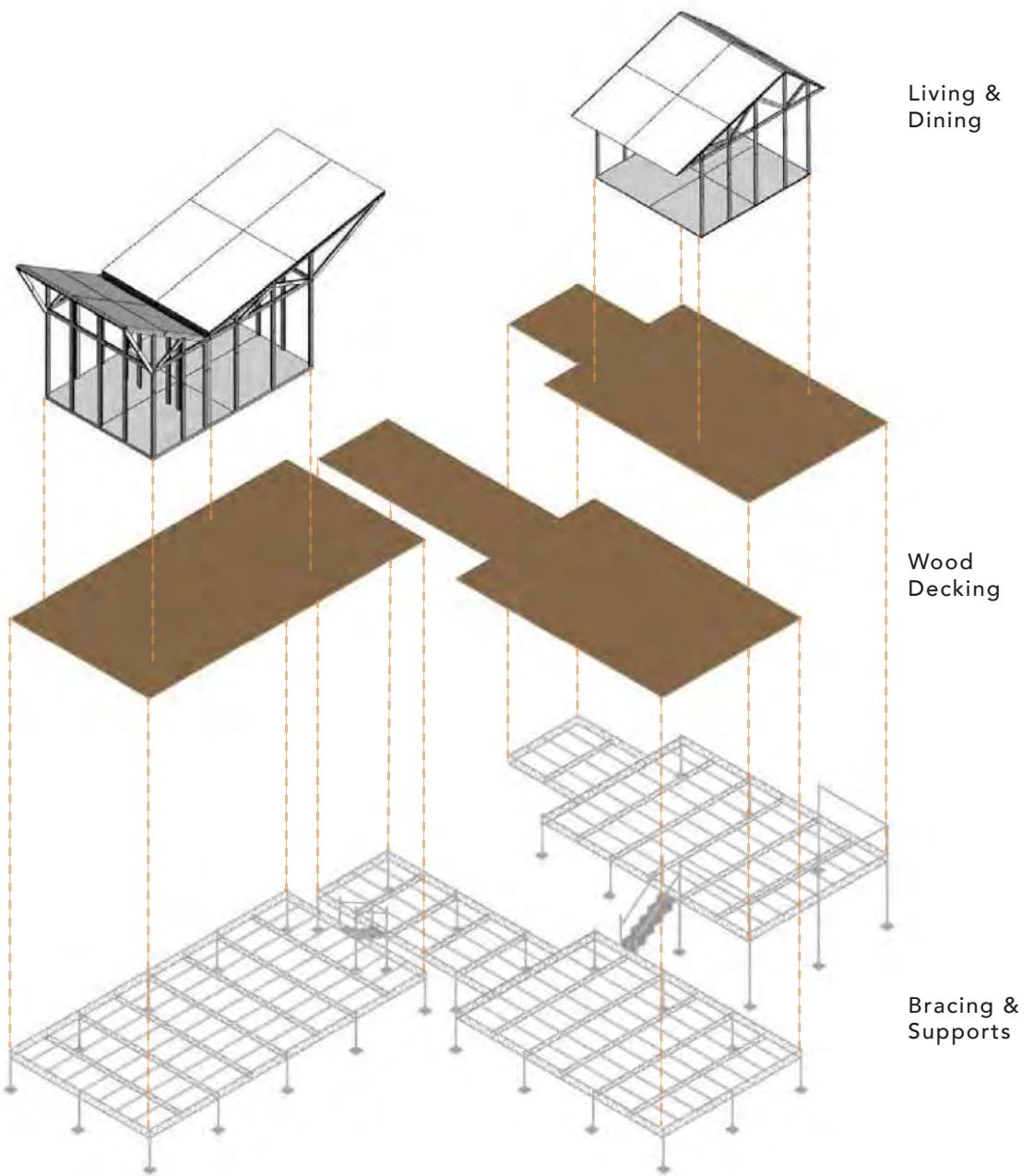
8. Posts to Rock Detail

The dock removal process is only needed for docks that have the majority of surface area situated over the water. Railings are needed for docks that are over 2 feet off the ground, and the railing must be at least 36 inches tall. Railings may not be needed for all docks, that depends on their location.

The design of the structures for the dining and kitchen shelter and the tenting shelter was inspired by both the classic shape of the pitched tent and the aluminum triangle-shaped bracing of the docks. The form of the roofs on both platforms should have harmony and balance, appearing as though they play off of each other. This design uses an inverted pitched roof, or butterfly roof, on the left side to play with the classic tent shape of the roof on the right side.

The frame of the dock and buildings provides a soft and light relationship with the water, shoreline, and forest. The close relationship to the water is meant to highlight the connected feeling that is felt when one is paddling through the lake. When visitors paddle up to the dock and campsite, they should never feel as though they've left the water.





ISOMETRIC: ASSEMBLY

LIVING WITH ZEBRA MUSSELS

Nicole Brekelmans (ED4 Landscape Architecture + Urbanism)



Zebra mussels are small aquatic organisms that are highly invasive due to their ability to cluster on any hard underwater substrate and breed at a very rapid pace.² Zebra mussels are quickly accumulating in multiple water bodies across North America resulting in multiple issues such the transformation of aquatic ecosystems and water quality due to the mussels' filtration capabilities. However, what if these organisms were perceived as a gift or an opportunity rather than a pest? Living with Zebra Mussels is a project that aims at gathering zebra mussels within affected communities through an approach modeled after aqua-farming and oyster harvesting.

The harvesting process allows communities such as Shoal Lake 39 to gain control over the invasive species by removing large quantities of these mussels through the implementation of removable mussel lines. Removing the mussels from the water will help regulate the increasing population as well as create an opportunity to profit from the zebra mussel shells through composting. This project aims at gathering the community together to participate in these processes to further understand water ecology and gain a sense of responsibility to protect Shoal Lake.

Potential locations for zebra mussel intervention

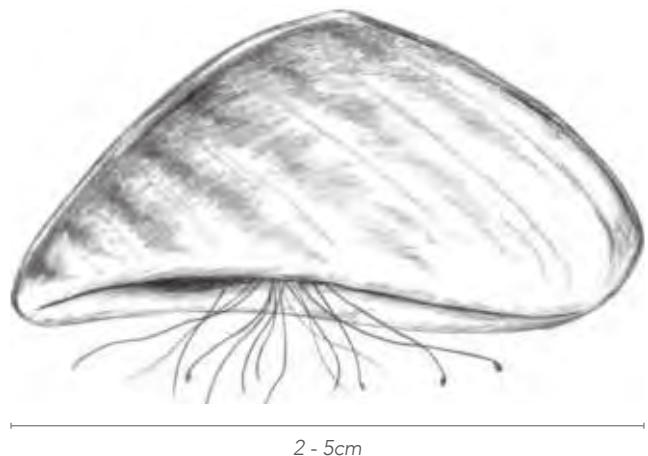
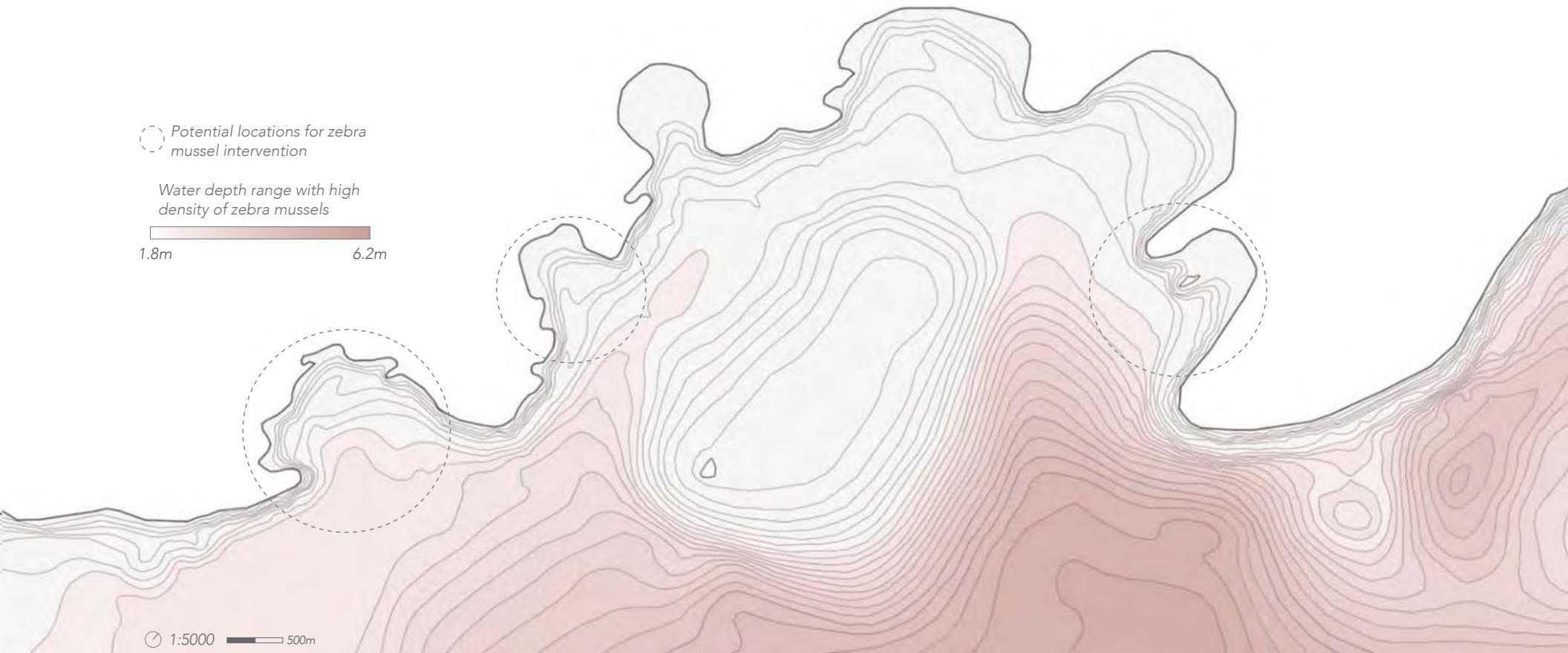
Water depth range with high density of zebra mussels

1.8m

6.2m

1:5000

500m



1 - 3cm



Fig. 6 Rocky Shores



Fig. 7 Boat Hulls



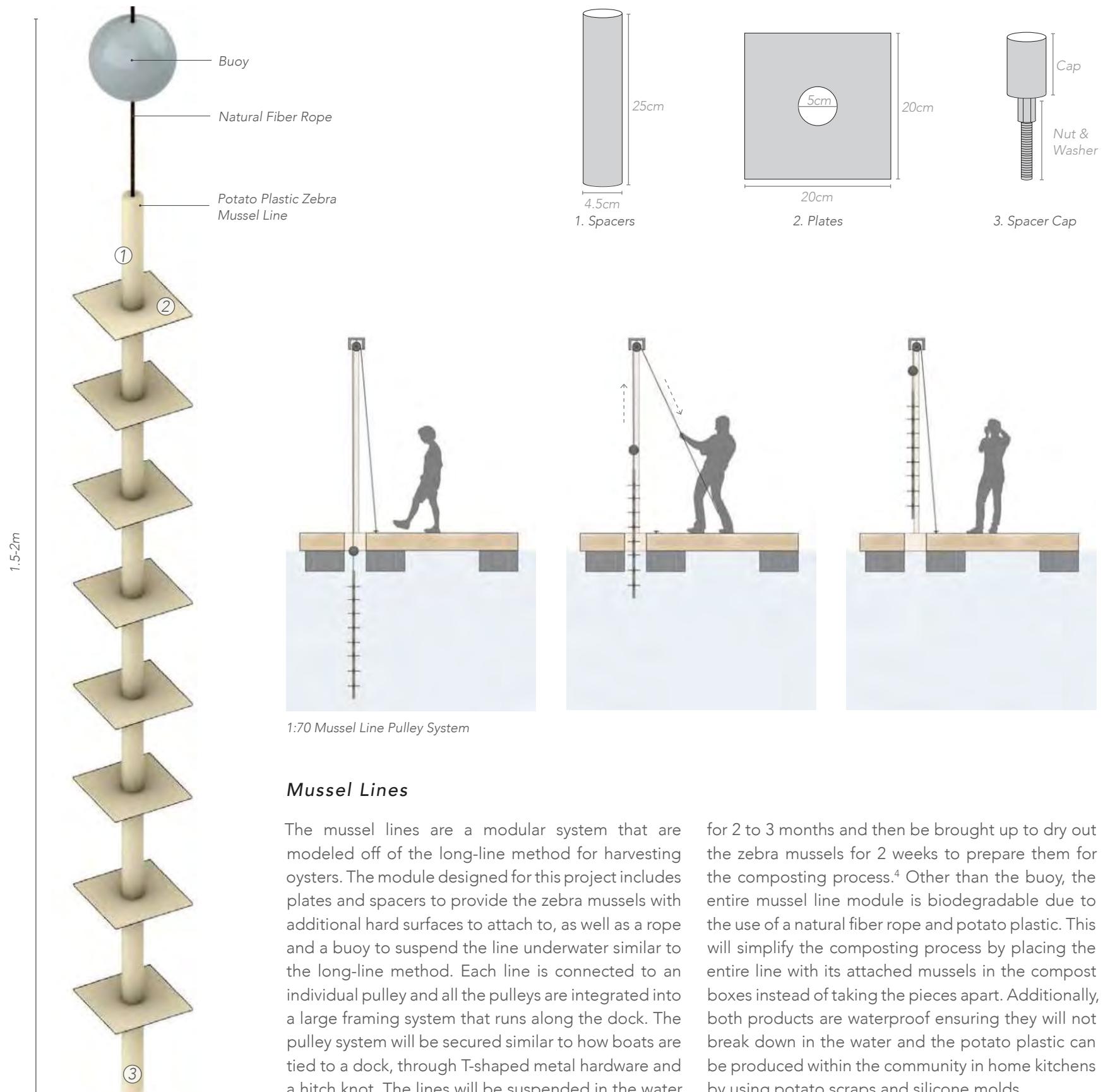
Fig. 8 Submerged Pipes



Fig. 9 Docks with Piles

Habitat & Places of Risk

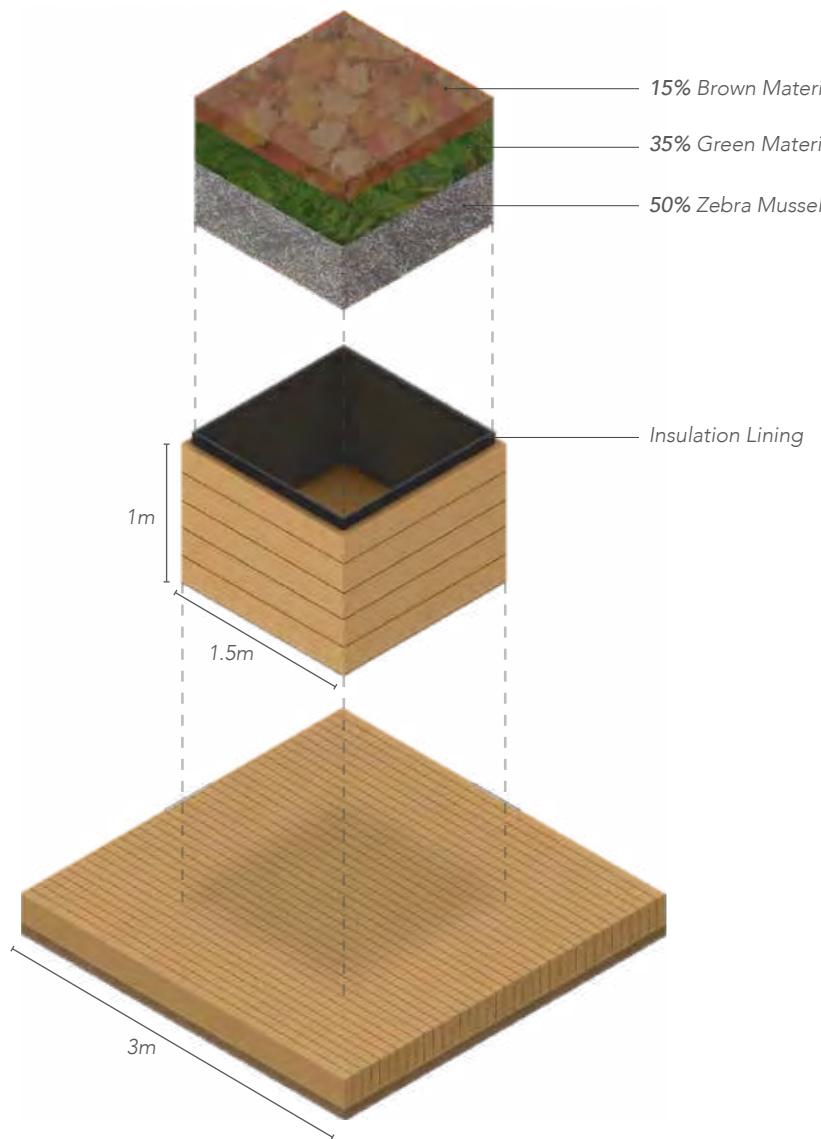
Zebra mussels are found in a specific water depth range of 1.8 to 12m based on temperature and food supply. Zebra mussels are able to attach to any hard underwater substrate such as rocky shores and boat hulls due to their basal threads which protrude out of their shells.³ Once they have attached to their preferred hard surface they remain attached for multiple years allowing them to easily breed and colonize. These areas are at risk of shifting ecosystems because the high population of zebra mussels amplifies their filtering capabilities of plankton and algae, resulting in a drastic decrease in food supply for local fish species and therefore reducing fish populations all together.



Mussel Lines

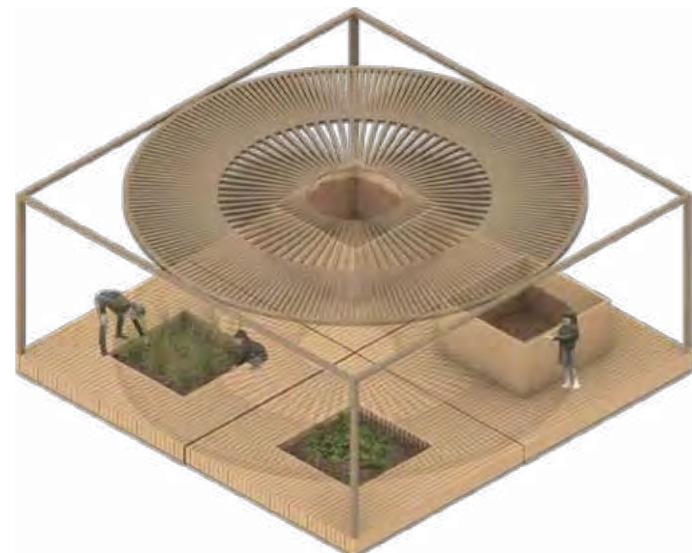
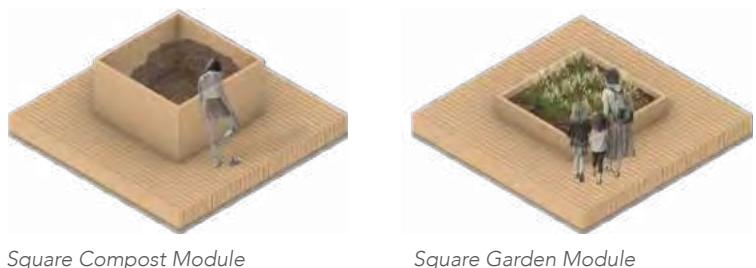
The mussel lines are a modular system that are modeled off of the long-line method for harvesting oysters. The module designed for this project includes plates and spacers to provide the zebra mussels with additional hard surfaces to attach to, as well as a rope and a buoy to suspend the line underwater similar to the long-line method. Each line is connected to an individual pulley and all the pulleys are integrated into a large framing system that runs along the dock. The pulley system will be secured similar to how boats are tied to a dock, through T-shaped metal hardware and a hitch knot. The lines will be suspended in the water

for 2 to 3 months and then be brought up to dry out the zebra mussels for 2 weeks to prepare them for the composting process.⁴ Other than the buoy, the entire mussel line module is biodegradable due to the use of a natural fiber rope and potato plastic. This will simplify the composting process by placing the entire line with its attached mussels in the compost boxes instead of taking the pieces apart. Additionally, both products are waterproof ensuring they will not break down in the water and the potato plastic can be produced within the community in home kitchens by using potato scraps and silicone molds.



Compost Modules

After the mussel lines have been dried, they are placed into the composting bins. The basis for a composting bin module is a 3m square base that can be joined to the floating dock and a bin at least 1m deep with an insulation lining to maintain a consistent temperature to initiate the break-down process. These modules can be slightly varied to produce additional functions such as gardening and seating, or they can be adjoined to create larger spaces for gathering. The compost is made up of 50% dried zebra mussel shells (which is equal to 10 mussel lines), 35% green material such as food scraps, and 15% brown material such as leaves. This combination results in an efficient break-down process with little odor. The final product will be nutrient-rich dirt that is approximately 50% of the initial compost volume after 3 to 4 months.



Hybrid Module with Pergola



Radial Dock Construction:
To reduce construction waste, long
and thin pieces of wood are radially
organized. This eliminates the need
to cut the wood into specific shapes
when constructing circular forms.



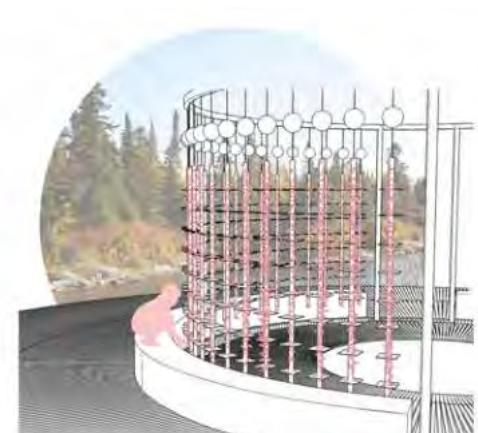
1

Zebra Mussel lines are placed in the water.



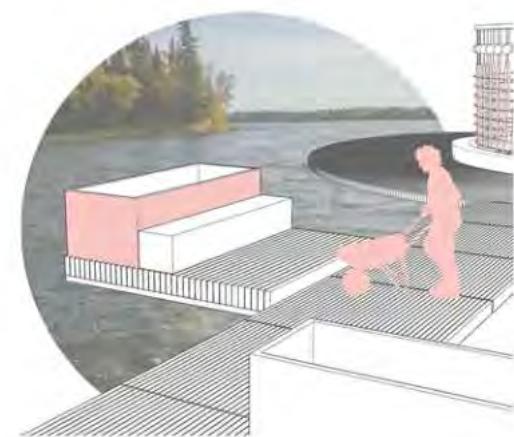
2

Mussel lines are submerged in water attracting zebra mussels to attach to its surfaces.

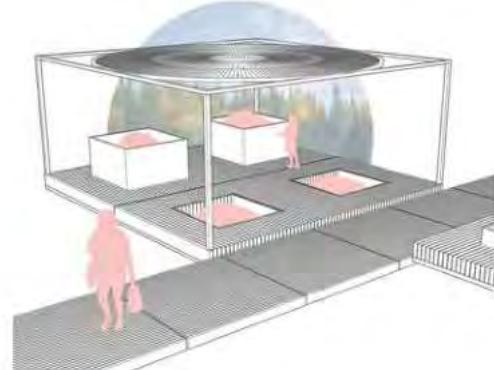


3

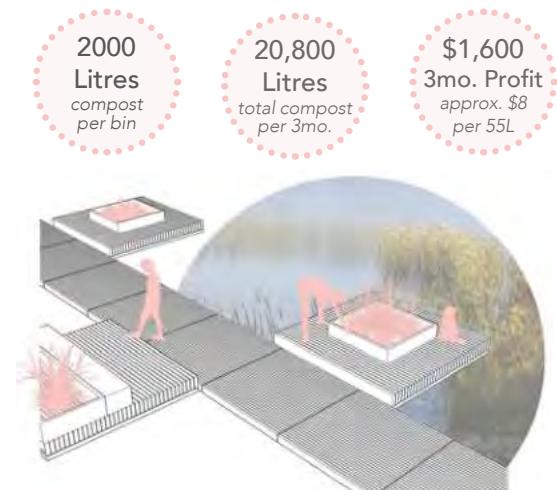
After 3 months, lines are brought up via pulleys and left out to dry for 2 weeks.



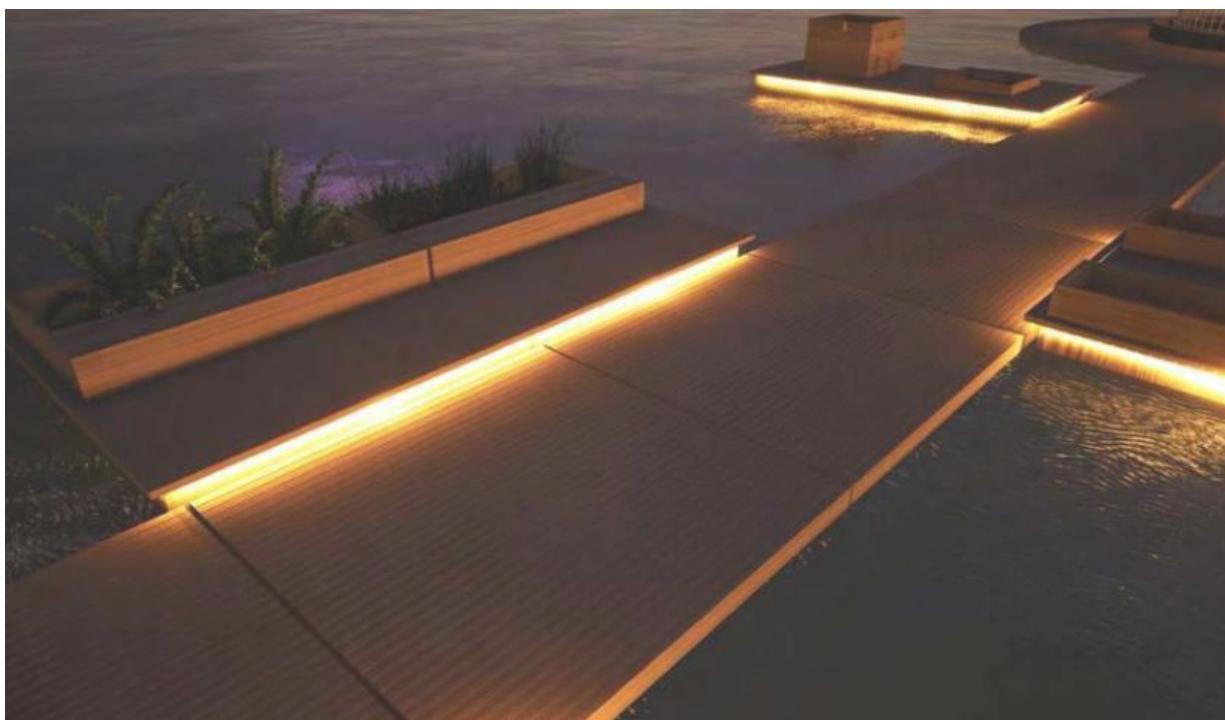
4 Lines are taken off of pulley system and put into compost containers with other organic waste.



5 The mussel shells and lines breakdown into nutrient rich dirt after 3-4 months.

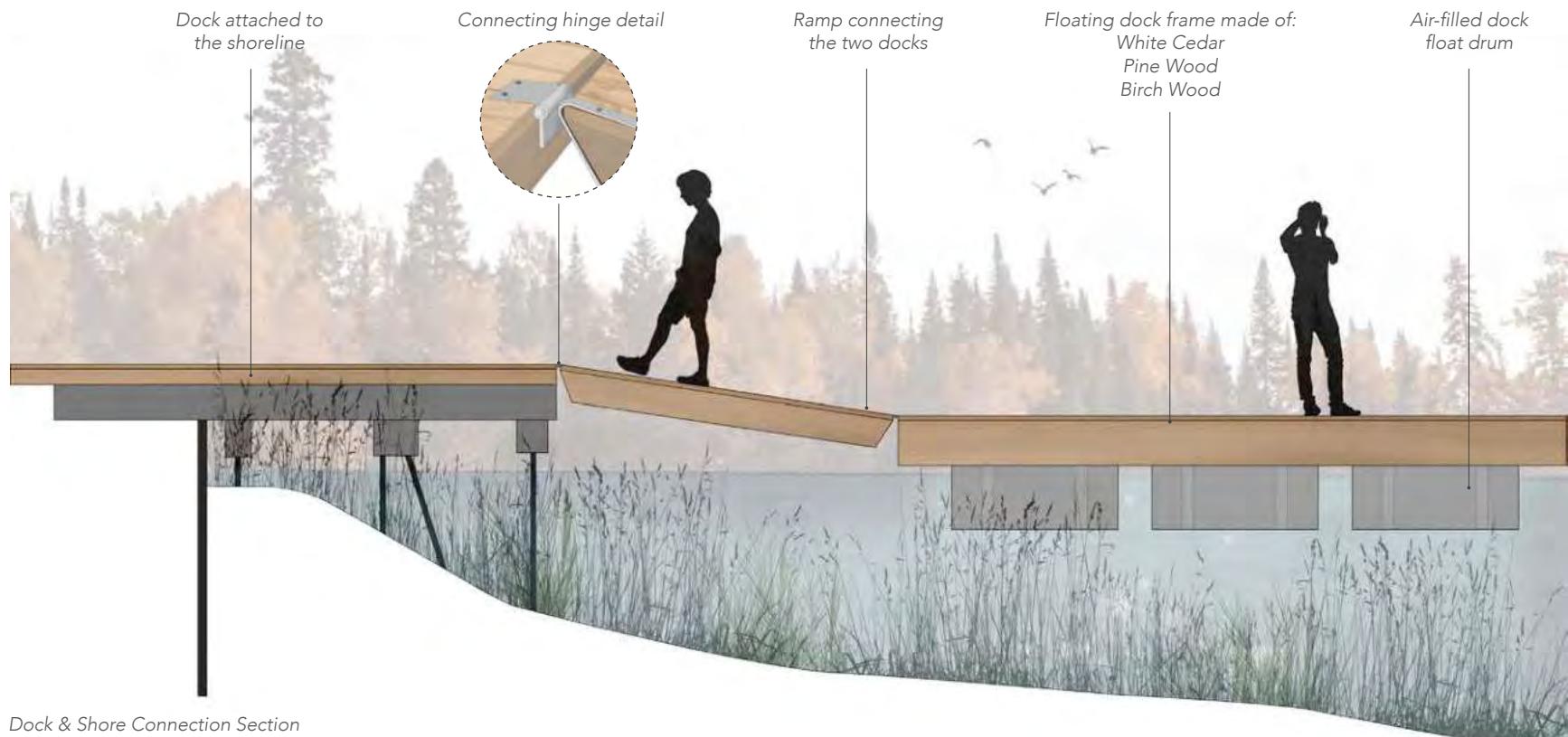
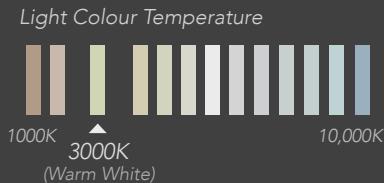


6 Dirt can be sold or used for gardens and food production on land or along the dock.



Lighting

A durable waterproof LED lighting strip will be used throughout the design to provide a warm white light and glow. The rope light is easily fixed onto the compost modules through clips and is solar powered for easy maintenance.





This volume is a presentation of research, ideas, designs, and possibilities - each a single piece of a larger vision for Shoal Lake 39A. Beyond this volume lie new opportunities, new inspirations, and new futures. It is important to remember that these projects do not represent the end.

This is only a beginning.



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