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Introduction

Problem Presentation

Northern California has undergone dramatic change in the last two hundred years; the native ecosystems which once thrived are now being altered at an unprecedented rate. California's indigenous plants cannot evolve apace with the change brought on by human encroachment. California is a place of great diversity, but today it is faced with a variety of problems; habitat destruction, invasive species, over population, pollution, and over consumption are the primary problems that have stressed and even destroyed many of California's natural ecosystems.

The Native Americans, and specifically, the Yuroks, traditionally had a symbiotic relationship with the native plants of California. Today, the Yurok peoples' bond to the land has been severed by a wide range of systemic problems associated with the modernization of California.

The Sumeg Patrick's Point/ Lagoon's Interpretative Association (SPPLIA) (see Appendix A) is a non-profit organization comprised of local Yurok elders, SPPLIA believes there is a need to educate their people as well as non-American Indian people about Yurok traditions and the land. SPPLIA is working on a number of projects that contribute to the preservation and enhancement of their cultural traditions.

Problem Statement

There is a need for a greenhouse to be constructed at Patrick's Point State Park for the propagation of native plants.

Objectives

To formulate the objectives for this project a verbal brainstorm of the project's goals was conducted. Following the brainstorm and a short period of time for further study, a list of objectives was developed to try and quantify every aspect of the project.

Construct a working greenhouse that fulfills the following list of objectives:

-Structure

- Must not be permanent
- Can be easily assembled/dissembled
 1. Assembled/dissembled in one weekend's time
- Durable
 1. Materials and structure have at least a ten year life expectancy
 2. Materials and structure can withstand 20-30 mph winds
- Maximum sun exposure
 1. Southwest facing
- Minimal impact to the surrounding environment
 1. Control runoff
 - a. No erosion
 - b. No standing water
 - c. Possible water encatchment system
 2. Constructed with environmentally safe reusable materials (recycled if possible)
 3. Aesthetically pleasing
- Cost
 1. Less than \$1000 total cost
 2. Obtain donations
- Public outreach
- Ventilation
 1. Maintain proper air flow
 - a. Maintain an average daytime temperature of 70°F
 - b. Humidity must not be a problem
 - i. Moisture does not pose a threat to the plants or structure
 2. No electricity

-Nursery

- No Bigger than 10' X 10'
- Proper drainage
 1. No erosion
 2. No standing water
- Fenced

-Recognition of all groups involved in the project

Brainstorming

The next step in the process was to brainstorm over possible solutions. To do this each group member was given the list of objectives. Keeping the overall objectives in mind, each member of the group created a few different alternative solutions.

These alternative solutions along with the pros and cons for each solution can be found in Appendix B.

Decision Making

After the brainstorming process, the group members met again to evaluate each of the alternative solutions. The group members presented each of the alternative solutions to Eric Johnson (SPPLIA Project Coordinator) and Steve Ortiz (Head of Maintenance at Patrick's Point State Park). Both Eric and Steve both had their own ideas of what the final project should look like, they explained what they envisioned, and then the group was asked to draw up another potential solution. (See Appendix C)

The group's final solution was to be 12 feet wide by 16 feet long by 12 feet high. The structure was to be a traditional barn type design because of practicality. Not only was the structure to serve as a greenhouse, it was also to serve as a classroom to teach children about the plants as well. There was to be a window at the top of the south facing wall that would be equipped with a lever that would open and close depending on the temperature of the oil inside of the lever. In the front of the structure there was to be two three foot wide doors and along the bottom of the front (North facing) side were to be two windows that were to be one foot high and one foot wide. 6mil plastic was to be used for the walls and roof of the greenhouse.

The final solution was then shown to Eric and Steve who decided to make a few more changes. They decided that corrugated fiberglass would be appropriate for the roof of the structure and that the dimensions of the structure should be slightly altered. The new dimensions were to be 16 feet wide by 24 feet long by 10 feet high. It was also decided that the greenhouse would have a passive ventilation system (see Appendix F).

Implementation Strategies

The following is a list of implementation strategies and the timeline that the group followed to complete construction of the greenhouse.

4/9-4/13

- Look for donations and volunteers (See Appendix D letter)
- Get back quotes from local businesses on materials (See quotes in Appendix D)
- Decide on where to purchase materials (The Mill Yard)
- Start putting report together

4/16-4/20

- Buy materials from most cost effective business
- Recruit carpenters (friends and professional carpenters)
- Have site leveled by Steve Ortiz to 16' X 24'
- Visit site to get a vision of where the Greenhouse will be

4/23-5/12

- Recruit tools and carpenters
- Get supplies to site
- Construct Greenhouse (See pictures in Appendix D)
- Document building Greenhouse for report purposes
- Offer a letter of thanks to local businesses that helped with donations and/or discounts

Monitoring and Evaluation

The following is a list of ideas that will be used to evaluate and monitor the greenhouse structure. The short-term list can be used as a checklist that can evaluate the greenhouse shortly after its construction. Members of the Park Service, SPPLIA, and Eric Johnson will use the long-term list to evaluate the project one-year after it is finished.

Short-term

- Is the greenhouse easily assemble
 - Did it take 1-2 days to assemble
- Is the greenhouse easily disassembled
 - Are there mostly screws to be taken out
- Is it non-permanent
- Is it 16' X24"
 - Measure to see this
- Perform test to see what the impact of water to the surrounding area will be
 - Spray hoses to see where the water goes
 - Add gravel to areas where the most runoff occurs
 - How much runoff
- Was the cost below \$1000
 - How much below \$1000
- Check if ventilation is sufficient
 - Does the greenhouse maintain a 70°F humidity
 - Is there a large amount of humidity
- What is the impact to the land
 - Is it minimal
 - How can this impact be negated

Long-term

- Will the greenhouse last for at least ten years
 - Is the wood withstanding the weather or is it starting to rot
 - Is the plastic ripped or stretched
 - Is the corrugated plastic bowing or breaking
 - Do the passive windows still work
- Check for damage by animals
 - Make sure the animals can not get in anymore
 - Cover up holes, if any
- Do the passive windows continue to work
 - Is this helping to maintain the 70°F average temperature
- Are the plants growing or are they dying

Conclusion

Currently, the greenhouse is up and functional but there are a few final touches to be completed. Once the final pieces of the project are put into place, the greenhouse will be ready to propagate native plants. Shortly after native plant propagation has begun the evaluation will begin. At that point, it will be evident whether or not the greenhouse has passed our short-term evaluation. The long-term evaluation will begin once the greenhouse has been functioning for one year ~~time~~; from that point on, the long-term evaluation will be ongoing.

Appendix A

Letter from SPPLIA

Sumêg Patrick's Point Lagoons Interpretive Association

A non-profit corporation

Serving Patrick's Point and Humboldt Lagoons State Park
P.O. Box 1118 - Trinidad, California 95570

Cultural Plant Garden: A Greenhouse Internship Project

About the Association

Sumêg Patrick's Point / Lagoon's Interpretive Association is a non-profit organization working to enhance the cultural and environmental education at Patrick's Point and the Humboldt Lagoon's State Parks. The association is comprised mainly of Yurok elders who live close to their culture and feel it is important to educate not only their people, but also non-American Indian people about Yurok traditions and the land. SPPLIA hosts and sponsors a number of cultural events held at the Sumêg Village at Patrick's Point State Park; including the annual Brush Dance, Sumêg Village Day's, and an evening at Sumêg. The association is working on a number of projects that contribute to the preservation and enhancement of their cultural traditions.

About the Cultural Garden Project

Since 1997, SPPLIA has been working with the community, Students, State Park employees, and local agencies on revitalizing the native plant garden that was initiated by the Patrick's Point Garden Club in 1969. The garden was primarily focused on native plants between the Russian River and the Oregon Border, but unfortunately was left unmanaged for many years. Currently, SPPLIA has been working to incorporate cultural education into the garden by demonstrating the traditional uses of the native plants. In efforts to reach the objectives of the garden, SPPLIA has formed a steering sub-committee comprised of local Native and non-Native community members to coordinate the specific projects related to the garden.

The association collaborated with the local community and recently published *Cultural Plants and Healing List: A Guide to Plants and Cultural Recipes Used by Northwest California Indians*. The book is a great educational tool for visitors of the garden and allows people to try Yurok recipes that have been used for centuries. Humboldt Area ★ Foundation has granted SPPLIA funds for the garden to produce a brochure, informational signs, additional plants, a greenhouse, and artwork by Native students. In addition, Seventh Generation Fund, has supported SPPLIA in acquiring Yurok performers in the development phase of an interactive CD-ROM project. The CD-ROM will portray the Yurok's perspective of the Sumêg Village and cultural garden by illustrating video clips, information on native plants and their uses, language, traditional games, local music, and a K-8th grade curriculum. The garden offers education, relaxation, aesthetics and the opportunity for the Yurok community to personally demonstrate their culture to visitors of Patrick's Point State Park at large.

About the Greenhouse Internship Project

Grant money has been allocated by SPPLIA to construct a 16X30-foot greenhouse at Patrick 's Point State Park to provide educational space, plants for the garden and village, and future funding from plant sales. The greenhouse will be used as a classroom space for teaching people about propagation techniques, seed germination, and other educational plant activities. The cost of the project along with a simple draft design of the greenhouse has been developed, but like real world situations, there are always limited funds and other factors to consider. Factors such as economics, environmental conditions, temperature regulation, and codes must be accounted for when designing the greenhouse. Student interns will have the opportunity to work with SPPLIA, local agencies, community members, and the State Park Associates in creating the most appropriate greenhouse design for the conditions present. The Interns will generate community volunteers to complete the development phase of the project. The greenhouse project is a great opportunity for students to experience a community project and learn about the Yurok culture, greenhouse design and construction, coordinating workshops, and generating volunteers.

SPPLIA Board of Directors

K. Joseph Malloy, President
Eric Johnson, Vice-President
Susie Long, Secretary
Linda Roberts, Treasurer
Joy Sundberg
Betty Jackson
Barbara Orcutt
Marvin Christner
Dale Ann Sherman
Yvonne Bones-Ibarra
Janet Eidness

Garden Steering Committee

Eric Johnson
Linda Roberts
Charlene Storr
Julianne Carillo
Brian Basor
Mary Bartholowmew
Dale Ann Sherman
Dudd and Barbara Orcutt
Steve Ortiz
Bob Anderson

For more information or questions please call Eric Johnson at 839-5449 or email at ejj5000@yahoo.com

Patrick's Point Cultural Plant Garden Species List

01-23-01

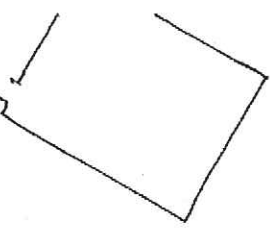
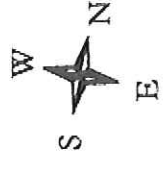
Plant #	Common Name	Species Name	# Needed	Type	Habitat Required	Use
1	Coast Redwood	<i>Sequoia sempervirens</i>	none	Tree	Moist/Sun	B, S
2	Dogwood	<i>Cornus nuttallii</i>	none	Tree	Moist	S
3	Red Alder	<i>Alnus rubra</i>	none	Tree	Moist, shade	B, S
4	Black Oak	<i>Quercus kelloggii</i>	none	Tree	Dry/Sun	S
5	Sitka Spruce	<i>Picea sitchensis</i>	none	Tree	Moist	B
6	Pepperwood	<i>Umbellularia californica</i>	none	Tree	Moist, Shade	M, S
7	Big Leaf Maple	<i>Acer macrophyllum</i>	none	Tree	Moist/Well drained	T, TW, M
8	Wax Myrtle	<i>Myrica californica</i>	none	Tree	Moist/ Sun-shade	C, T
9	Western Red Cedar	<i>Thuja plicata</i>	none	Tree	Moist	S
10	Incense Cedar	<i>Thuja</i>	none	Tree	Dry/Sun	S, B
11	Black Cottonwood	<i>Populus trichocarpa</i>	none	Tree	Moist/Riparian	B
12	Red Willow	<i>Salix laevigata</i>	none	Tree	Moist	C, S, B
13	Grey Pine	<i>Pinus sabiniana</i>	none	Tree	Gravel Soil/ Sun	TW, S, B
14	Sugar Pine	<i>Pinus lambertiana</i>	none	Tree	Dry/Sun	C, TW, S, C, M
15	Douglas-Fir	<i>Pseudotsuga menziesii</i>	none	Tree	Moist	TW, M
16	Pacific Yew	<i>Taxus brevifolia</i>	none	Tree	Shade	B
17	Western Redbud	<i>Cercis occidentalis</i>	none	Shrub/Tree	Partial Shade	S, B, TW, M
18	California Hazel	<i>Corylus cornuta</i>	none	Shrub/Tree	Moist/shade	S, T
19	Tan oak	<i>Lithocarpus densiflor</i>	none	Shrub/Tree	Dry/Sun	M
20	Cascara	<i>Rhamnus purshiana</i>	none	Shrub/Tree	Shade	B
21	Gray Willow	<i>Salix exigua</i>	none	Shrub/Tree	Mosit	T, S, C
22	Vine Maple	<i>Acer circinatum</i>	none	Shrub/Tree	Shaded/Moist	M, S
23	Bearberry	<i>Arctostaphylos Uva-Ursi</i>	none	Shrub	Dry/Sun	
24	Blue Blossom	<i>Ceanothis thyrsiflorus</i>	none	Shrub	Partial Shade	
25	Red Flowering Current	<i>Ribes sanguineum</i>	none	Shrub	Well drained/Shade	M, S
26	Wild Gooseberry	<i>Ribes menziesii</i>	none	Shrub	Well drained/Shade	M, B
27	Oregon Grape	<i>Berberis nervosa</i>	none	Shrub	Dry/Shade	B, T
28	Wild Grape	<i>Vitis californica</i>	none	Shrub	Dry/Sun	S, M, TW
29	Black Huckleberry	<i>Vaccinium ovatum</i>	none	Shrub	Shade/Sun	S, TW
30	Red Huckleberry	<i>Vaccinium parvifolium</i>	none	Shrub	Shade	T, TW
31	Wild Mock Orange	<i>Philadelphus lewisii</i>	none	Shrub	Sun	C, S
32	Salal	<i>Gaultheria shallon</i>	none	Shrub	Wet/Shade	S
33	Salmonberry	<i>Rubus spectabilis</i>	none	Shrub	Moist/Shade	
34	Twinberry	<i>Lonicera involucrata</i>	none	Shrub	Moist	
35	Thimbleberry	<i>Rubus parviflorus</i>	none	Shrub	Moist/Shade	S

73	Lady Fern	<i>Athyrium</i> spp.?	none	fern	Wet/Shade
74	Wood Fern	<i>Dryopteris expansa</i>	none	fern	Shade
75	Leatherleaf fern	<i>Polypodium scouleri</i>	none	fern	Well Drained/ Shade

Sumeg Patrick's Point/Lagoon's Interpretative Association

Cultural Plant Garden

Patrick's Point State Park
Trinidad, Ca



Sumeg Village

North
Entrance



South
Entrance

Faucet

Living Bench

Fence

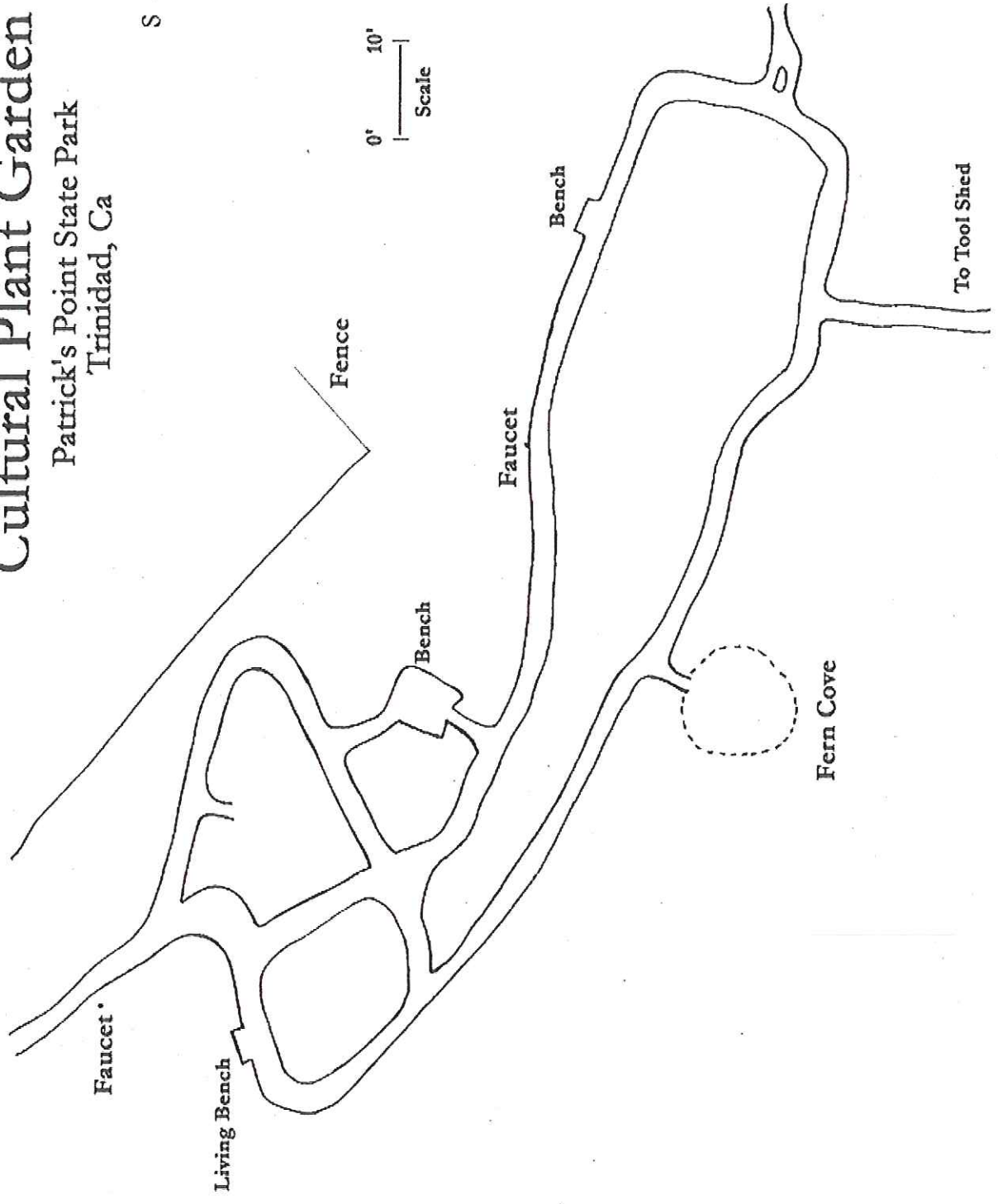
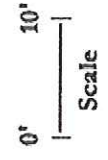
Bench

Faucet

Bench

Fern Cove

To Tool Shed



Appendix B

Alternative Solutions
Pros and Cons for each Solution

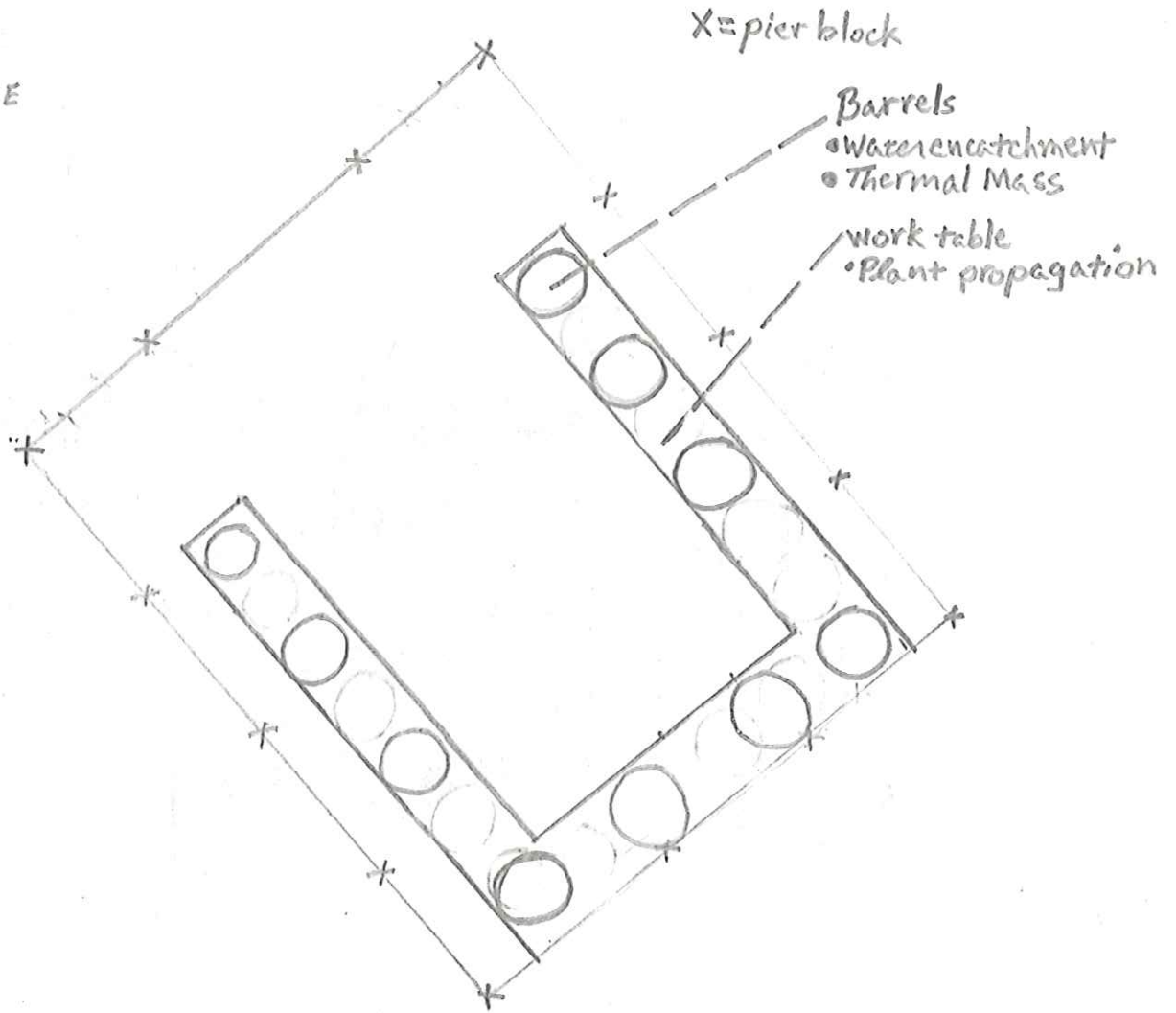
Solution A

- Pros

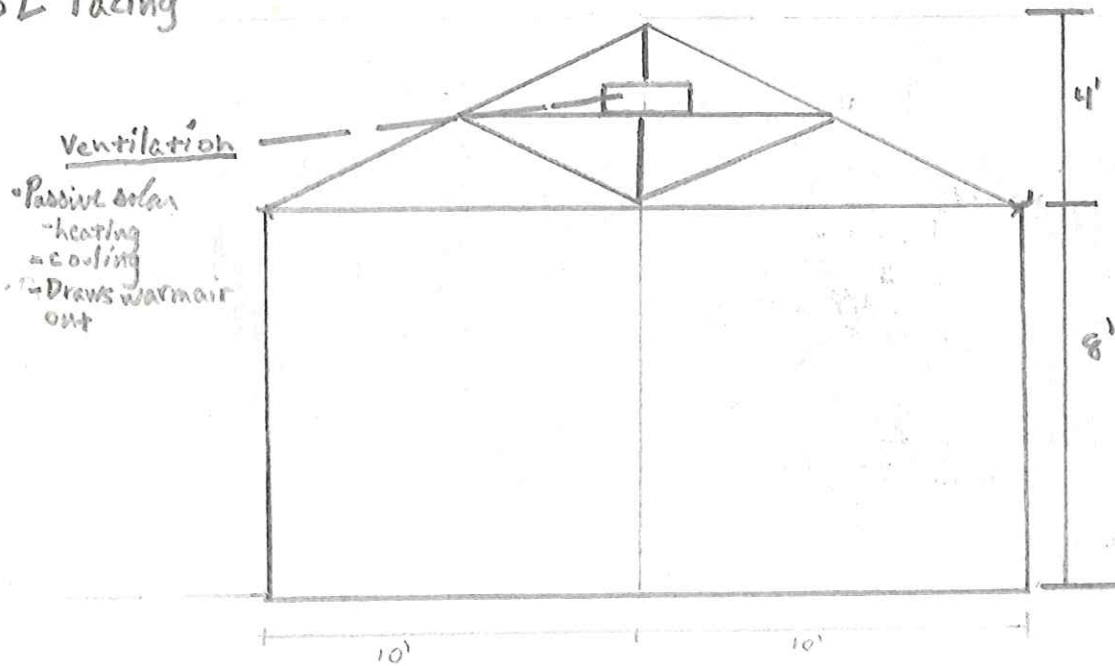
1. Structure is not permanent
2. Structure utilizes the rainfall of the area as a source of water and thermal mass
3. There is a large education/work area
4. Water drainage is accounted for
5. No electricity is necessary
6. The entire structure can be utilized as greenhouse space

- Cons

1. Structure does not fully utilize the azimuth of the sun for this particular site
2. Thermal mass may not be as fully utilized as it could be
3. May exceed budget
4. Wood may become weathered in less time than other potential materials



SE facing



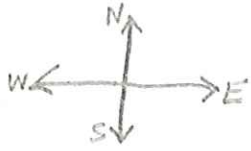
Solution B Elliptical

- Pros

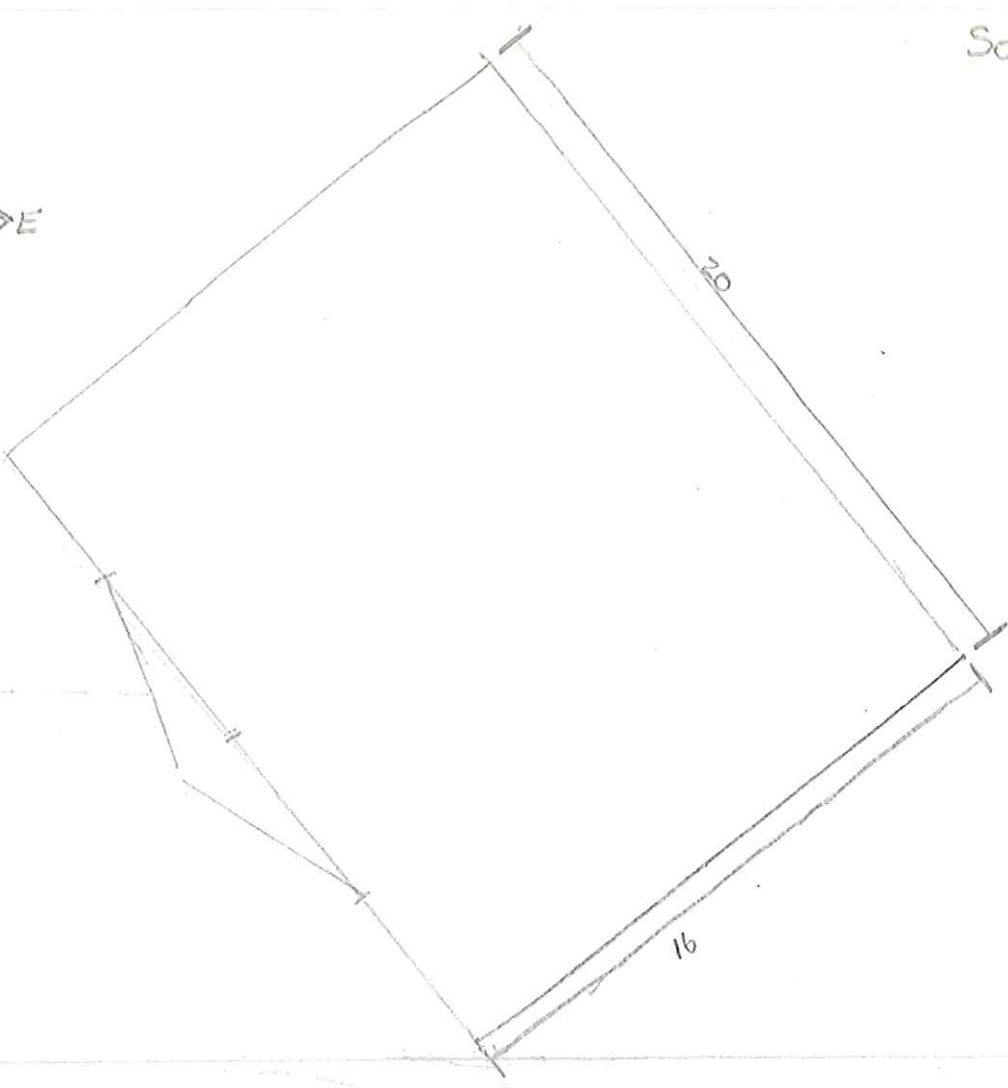
1. Structure is not permanent
2. Structure utilizes the solar azimuth that exist at the site
3. Passive ventilation system
4. Thermal mass moderates the temperatures
5. Work tables for plant propagation/work area
6. Water encatchment system
7. Large enough to provide education area

- Cons

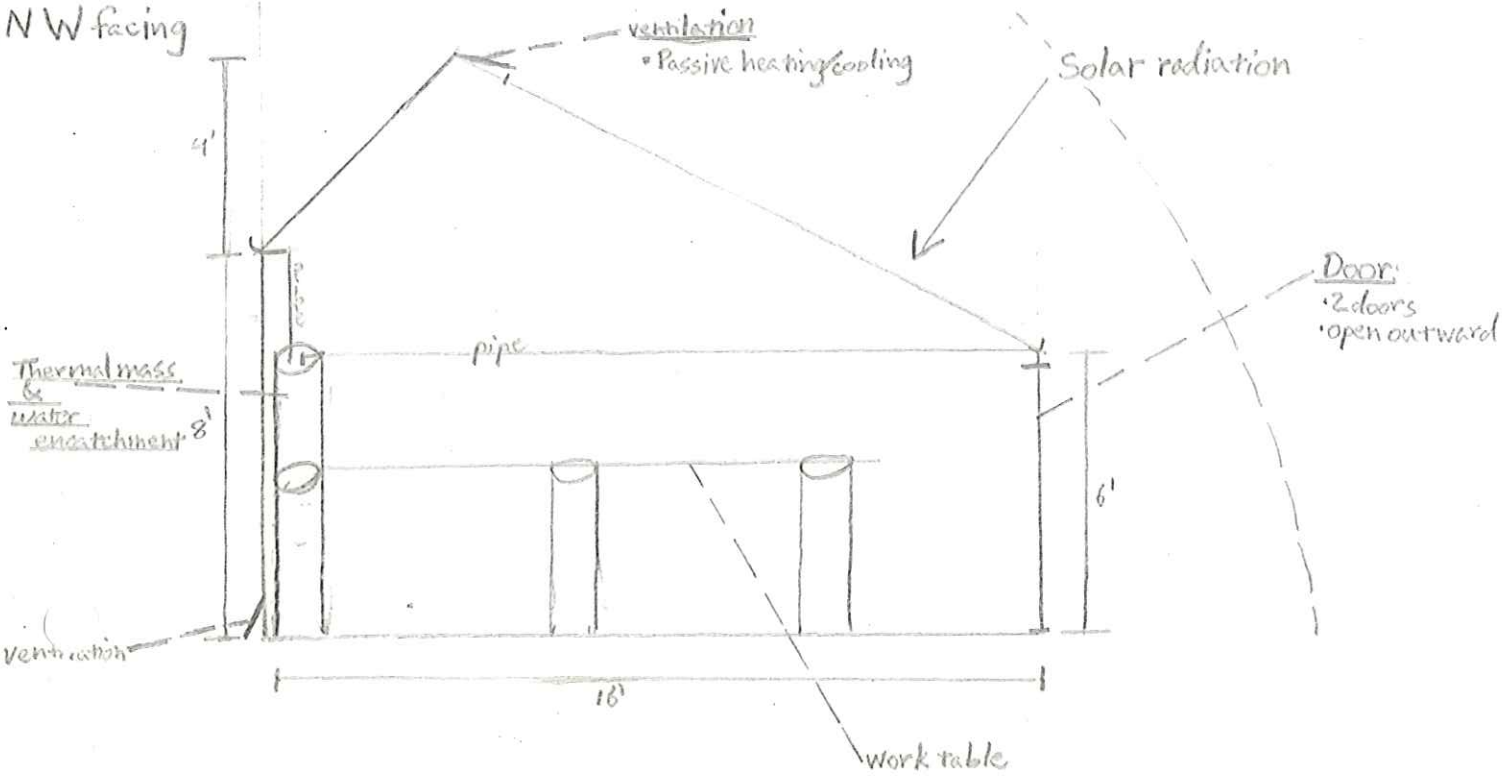
1. Doors open directly into the window of solar radiation
2. May exceed the \$1,000 budget
3. Wood may become weathered
4. Water Encatchment system may not be sufficient for times of draught
5. Ventilation may not be adequate moisture and temperature problems possible
6. Thermal mass may take up to much space within the greenhouse



Doors



NW facing



Solution #1

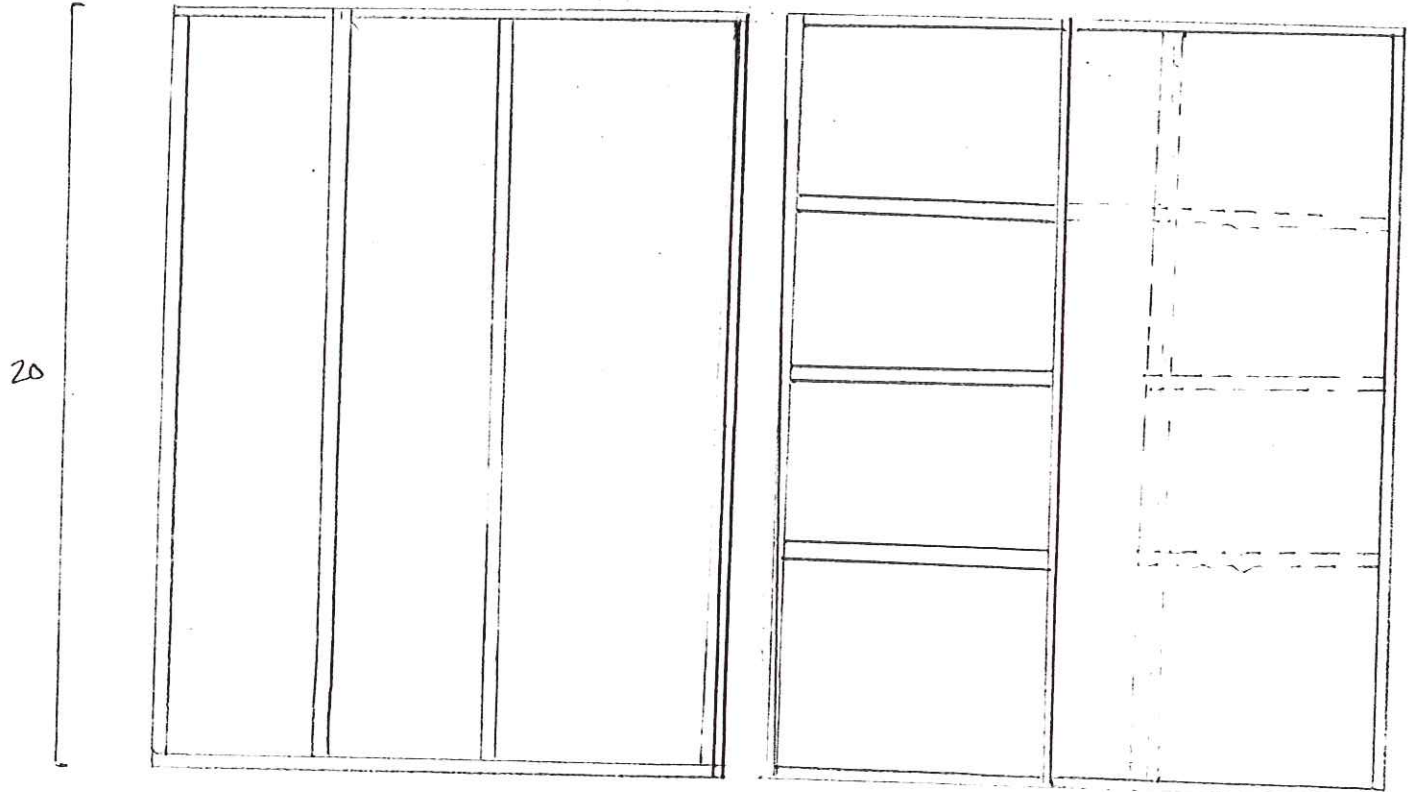
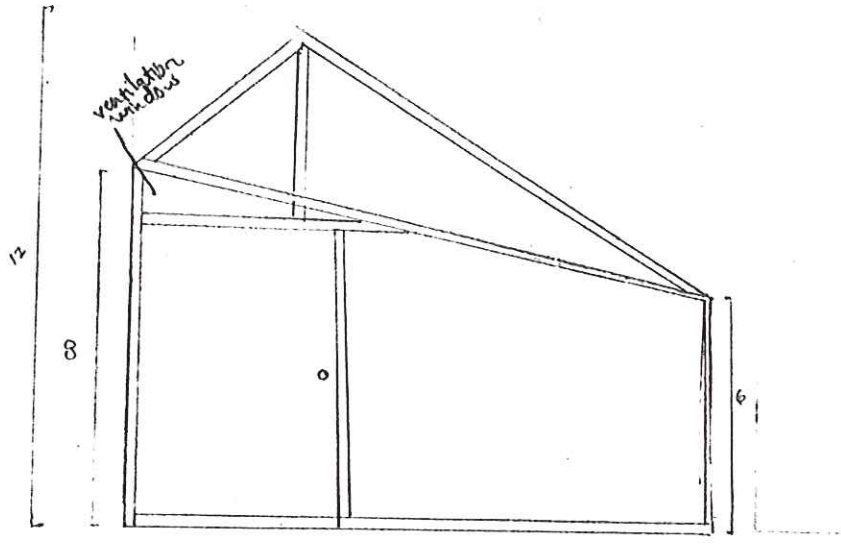
- Pros

1. Maximizes sun exposure
2. Sturdy
3. Strong
4. Wind Resistant
5. Window to provide ventilation at the front & back
6. Structure can be built in one day
7. Structure is not permanent

- Cons

1. Wood may deteriorate
2. Cost of structure
3. Heavy
4. More permanent than other alternatives
5. In depth building procedure
6. Runoff
7. Difficult to break down & move

Front



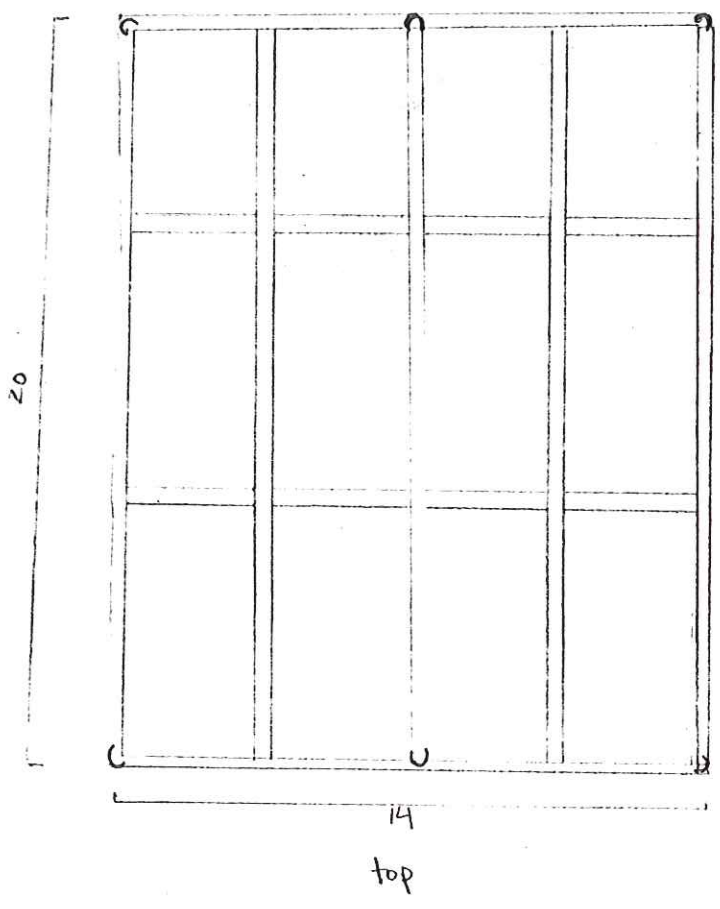
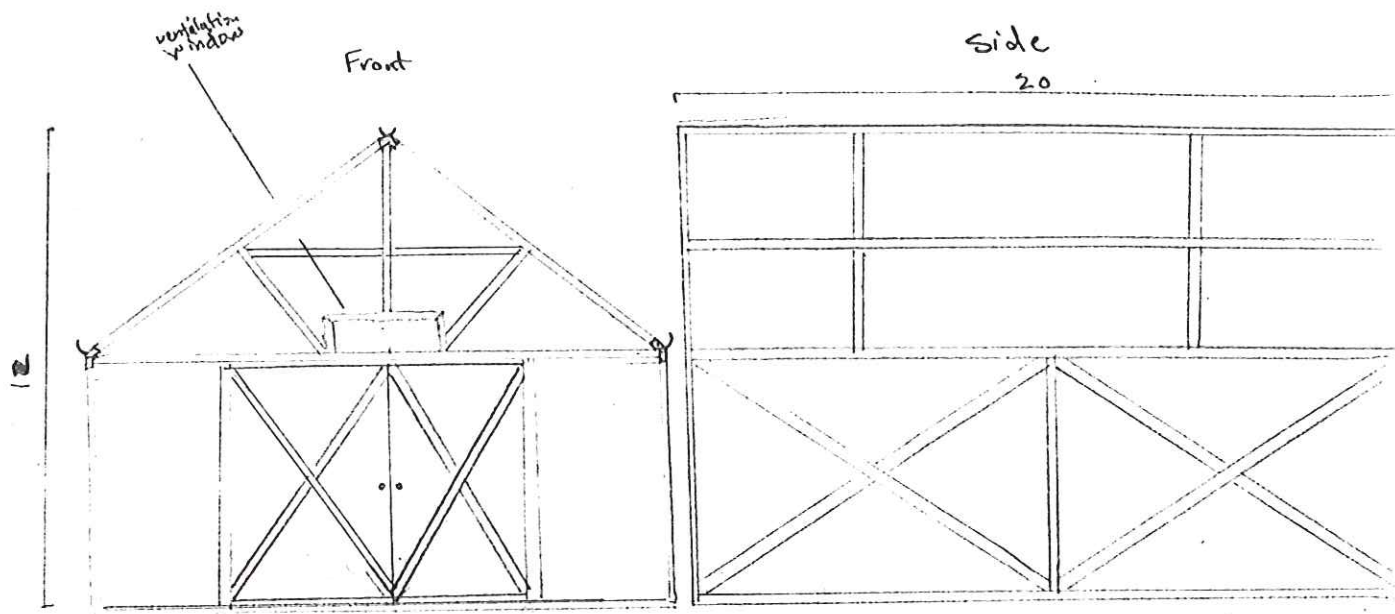
interior side

#1 Craig Conforti

Solution #2

- Pros
 1. Sturdy
 2. Strong
 3. Wind Resistant
 4. Traditional structure (easy to build)
 5. Wide double doors
 6. Window for ventilation on the front & the back
 7. Can be built in one day
 8. Not permanent

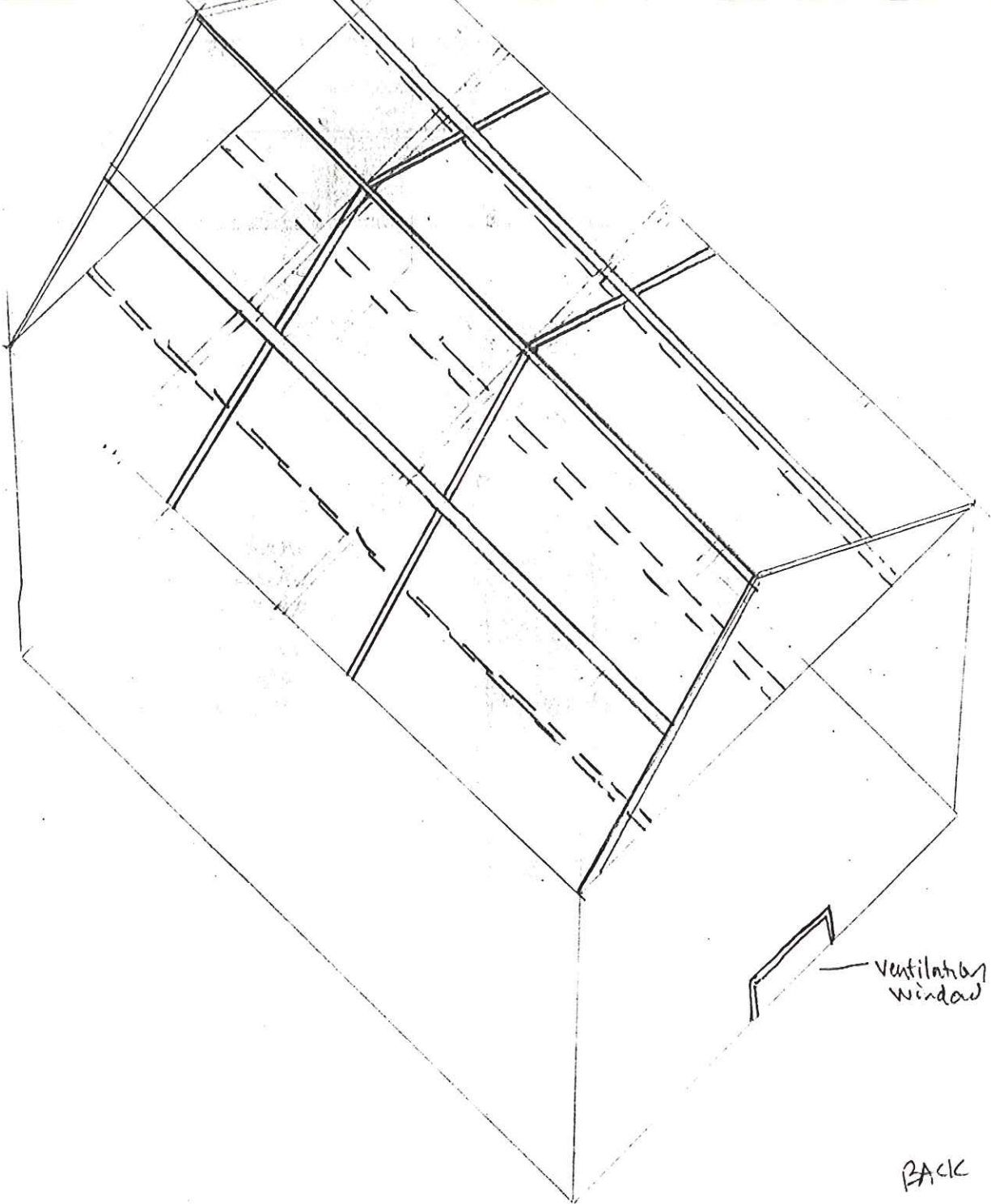
- Cons
 1. Wood may deteriorate
 2. May be more expensive than other alternatives
 3. Heavy
 4. Difficult to breakdown



All wood with brackets and wood screws at all points where one piece of wood meets another.

collection drain made of PVC pipe cut in half along the top and sides.

Ventilation window above double doors in front and in the bottom middle of back end.



ventilation window

BACK

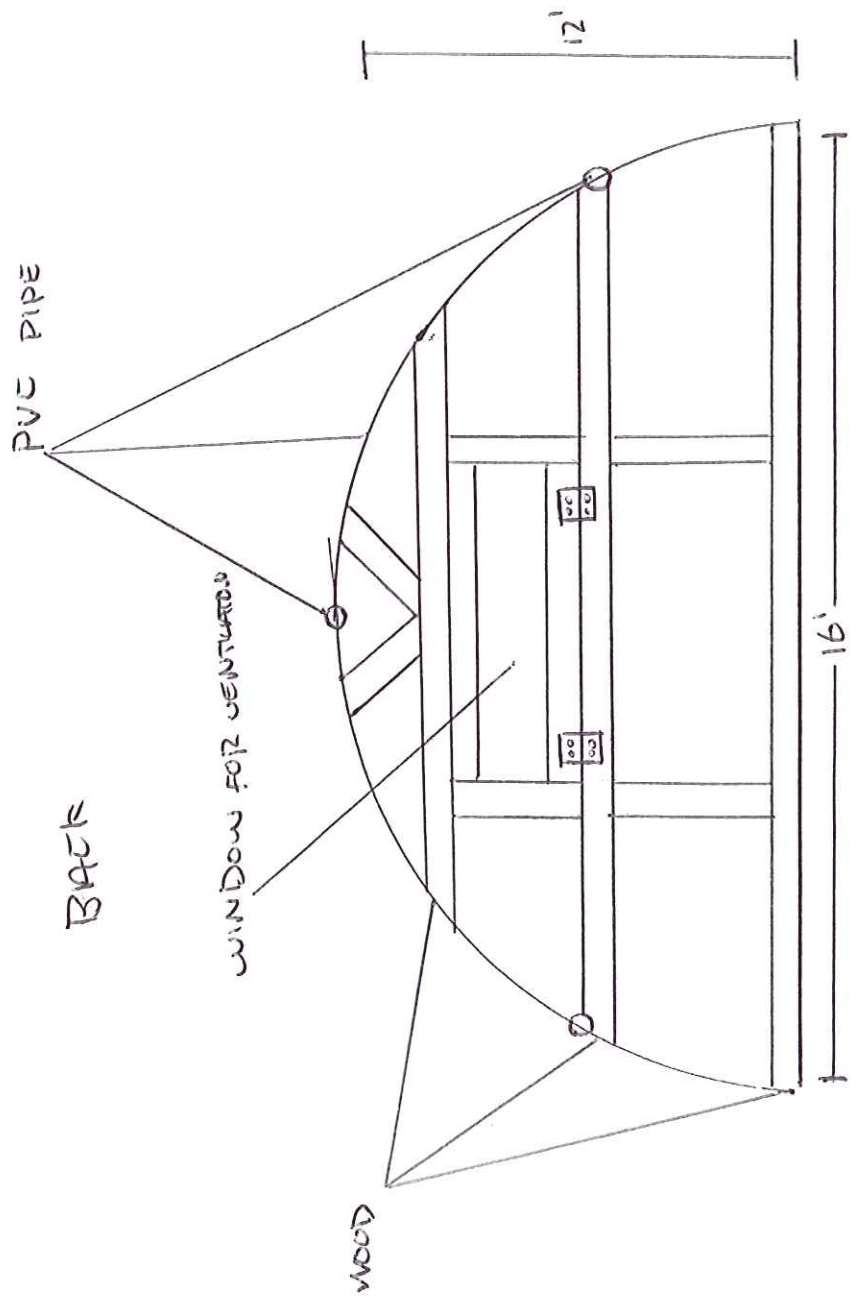
The Quonset

- Pros

1. Excellent sun exposure
2. Can withstand the rigors of the environment
3. Easily assembled and disassembled
4. Aesthetically pleasing
5. Light weight material
6. Durable yet flexible
7. Affordable
8. Not bulky
9. Can be reused
10. Does not compromise strength due to water exposure like wood

- Cons

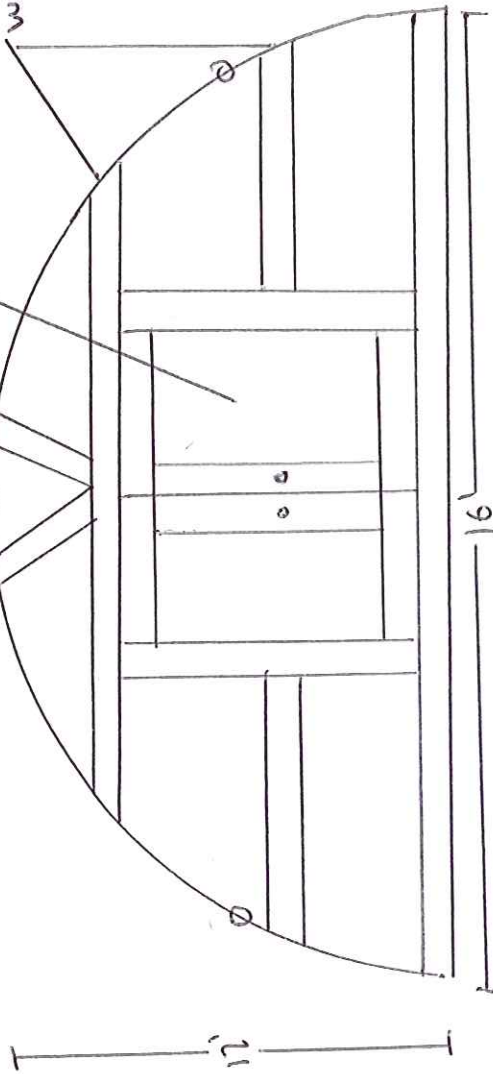
1. Sun must travel through the structure at angles that may diffuse a portion of the potential light
2. Does not provide maximum working space
3. Sun exposure may breakdown PVC over a long period of time
4. PVC may not be as durable as wood
5. May not fasten to pier blocks as well
6. May be difficult to attach outer transparent covering



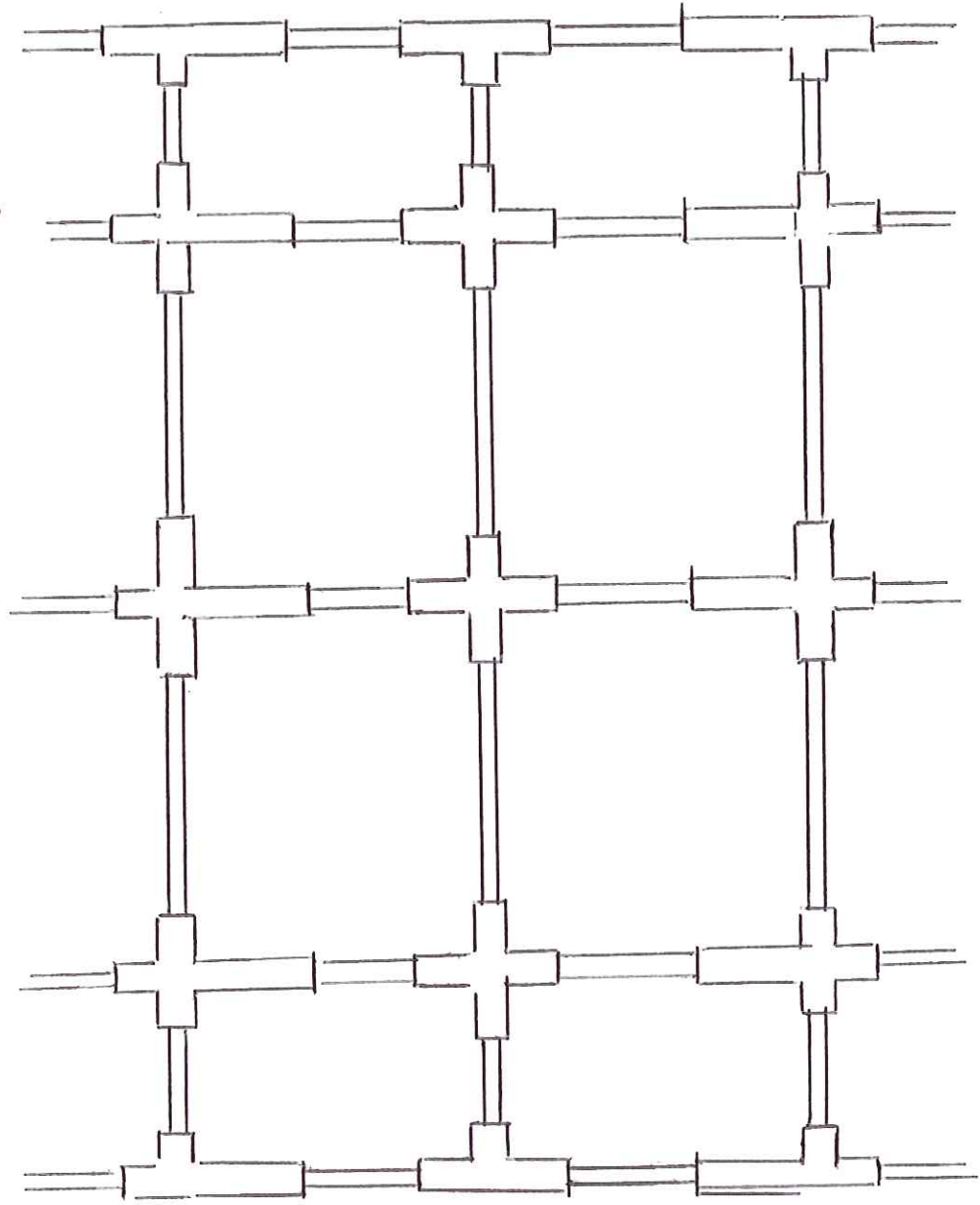
TWO OUTWARD OPENING DOORS

WOOD

FRONT



TOP FLAT VIEW OF STRUCTURE
A T'S 6 SWAY T'S



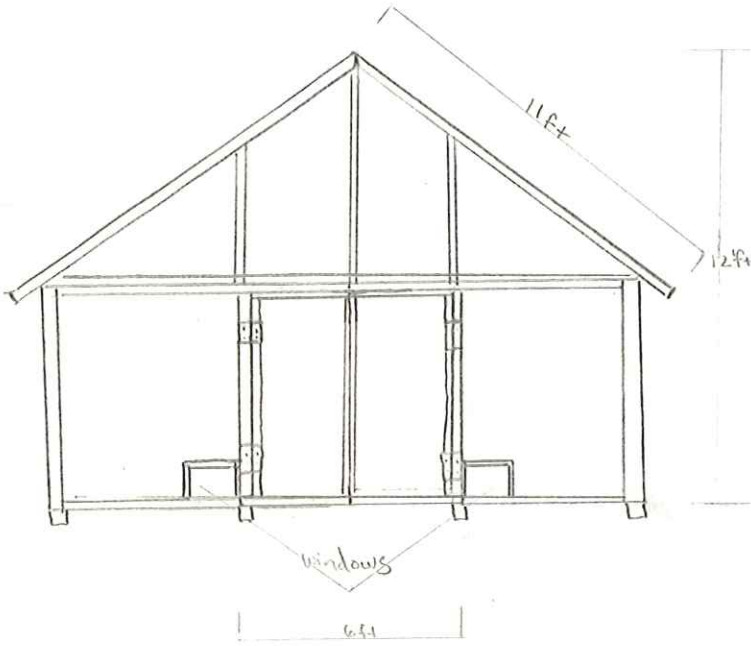
FASTENED WITH
RUE PIPE GLOBE

Appendix C

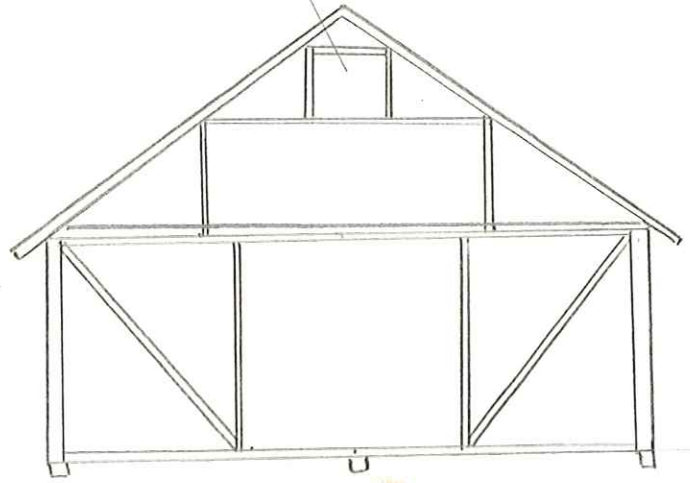
First drawing of Final Solution
Final Solution

PATRICK'S POINT
GREENHOUSE

Front



BACK
window



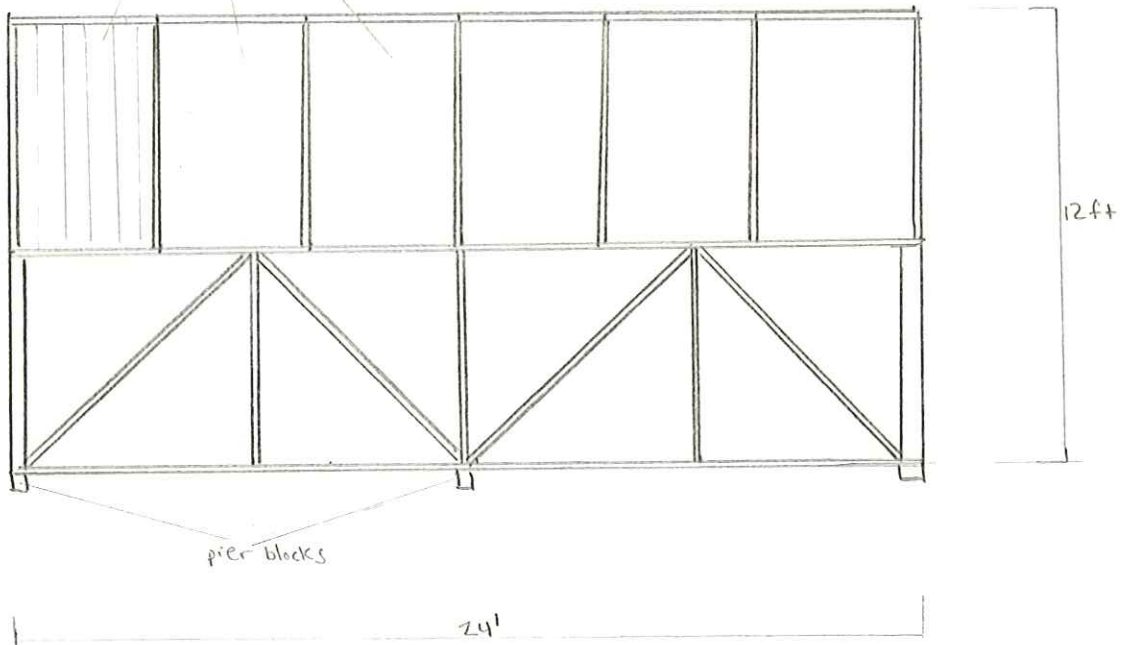
windows

6 ft

16 ft

fiberglass

SIDE



12 ft

pier blocks

24 ft

Final Greenhouse Changes

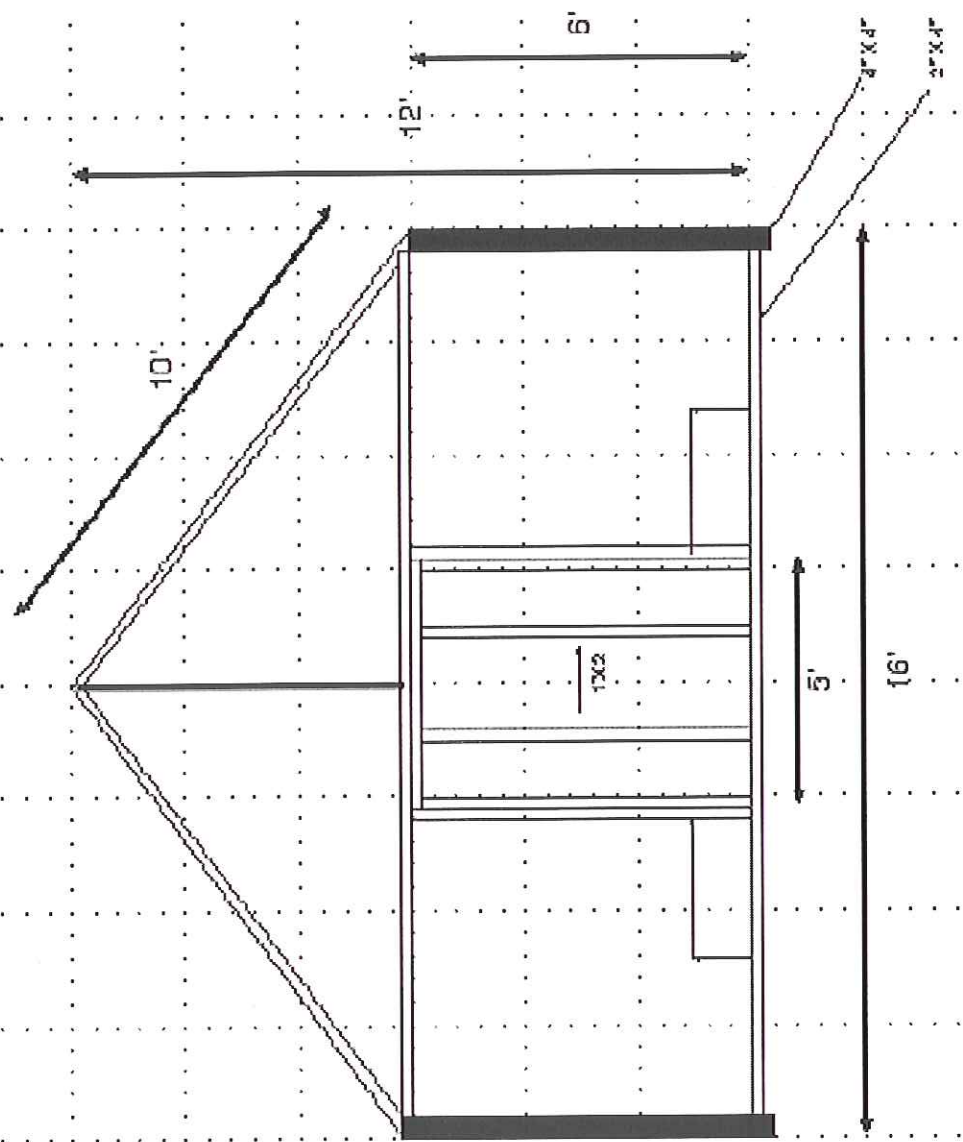
As our group started to construct the frame we found the following changes needed to be made:

1. The entire frame needed to be reinforced with 2X4 braces. These changes are indicated on the drawings using A.
2. The original design for the backside was modified to better support the entire greenhouse frame. These changes brought a single 2X4 connecting the frame roof to the top bracing beam. This change adds strength to the entire structure.
3. A window frame was relocated on the backside of the structure above the main horizontal beam, increasing the passive airflow throughout the greenhouse.
4. The height of the roof was lowered from 6 feet to 4 feet, primarily to decrease wind resistance. The roof height was also lowered because of the practical problems involved with constructing such a high roof.
5. A support system was constructed in the middle of the greenhouse, adding strength to the frame.
6. Windows located on both sides of the door were lengthened vertically to add strength to the entire structure.
7. The structures front side was modified to add strength and stability to the entire structure.
8. A small ledge was built in the bottom rear of the structure.

Preliminary Greenhouse Design

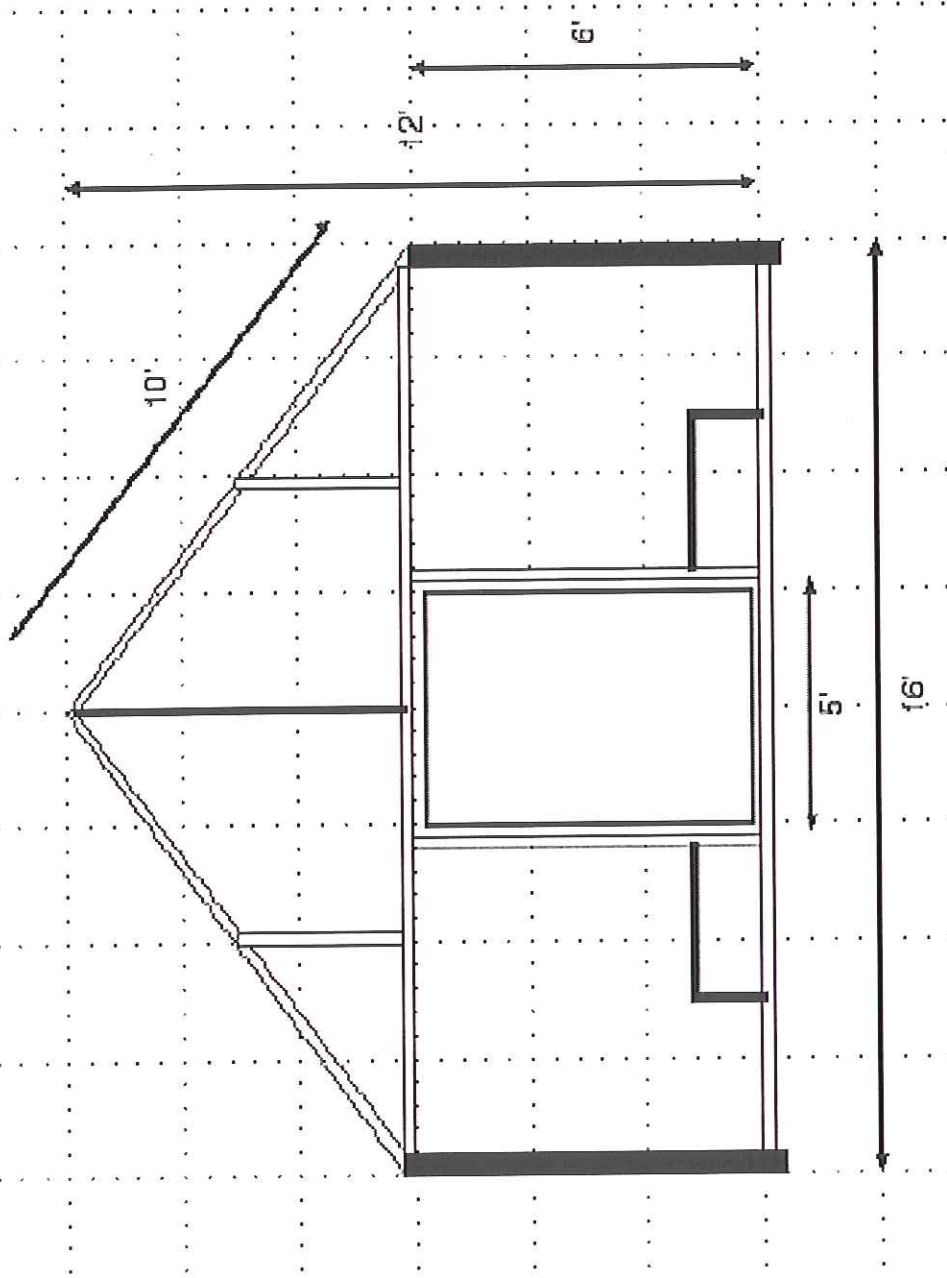
Patrick's Point Greenhouse

Front View



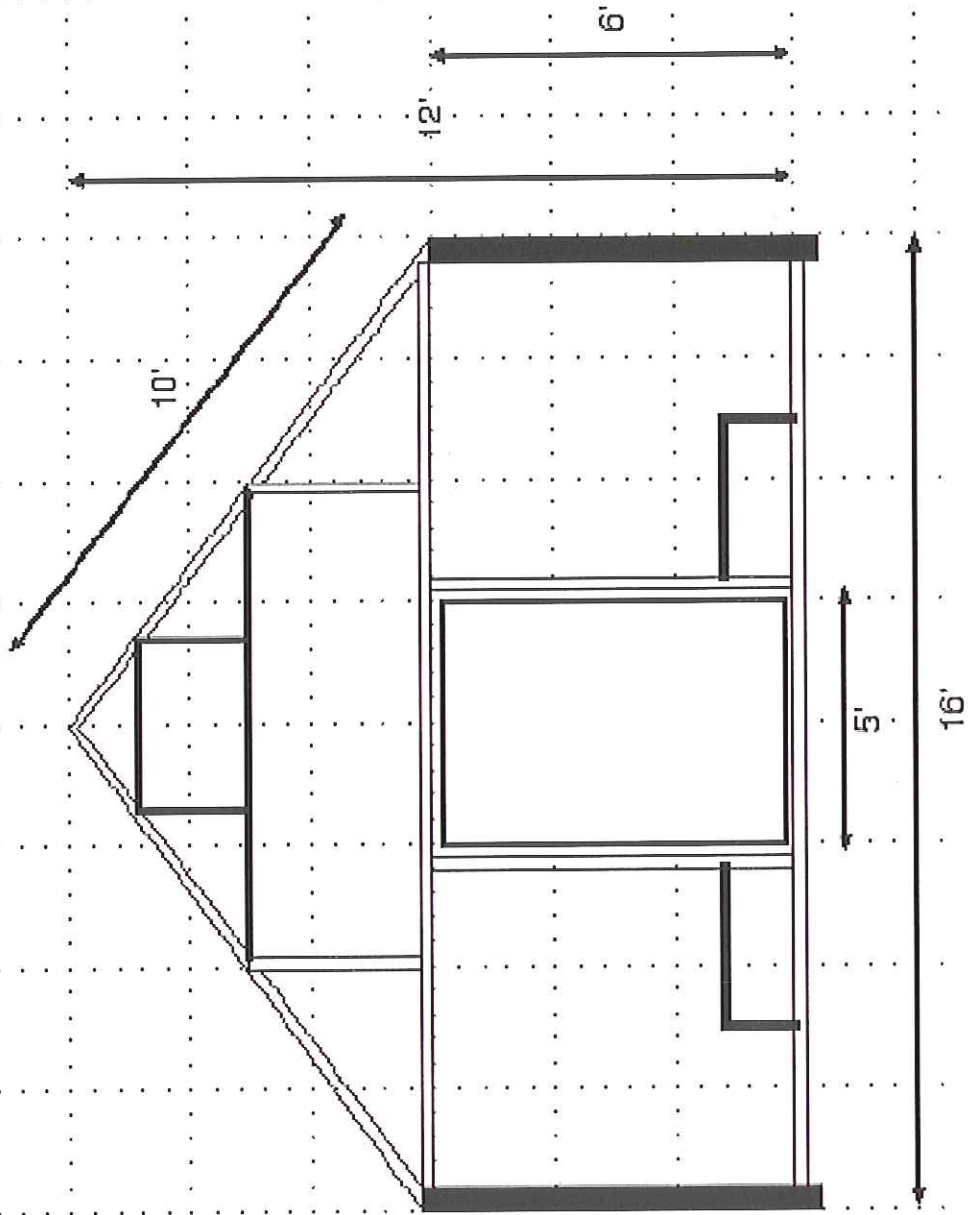
Patrick's Point Greenhouse

Front View

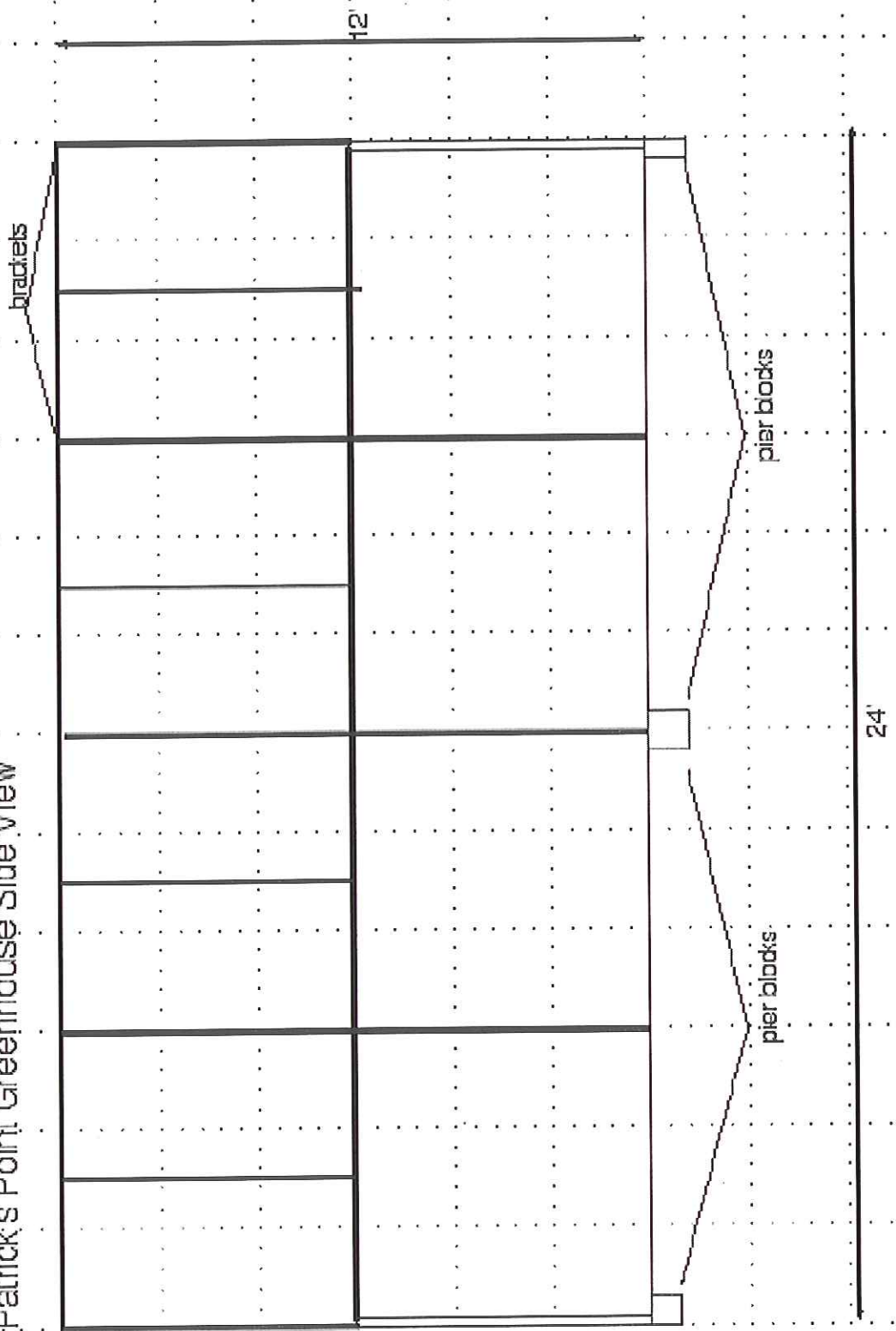


Patrick's Pciint Greenhouse

Front View

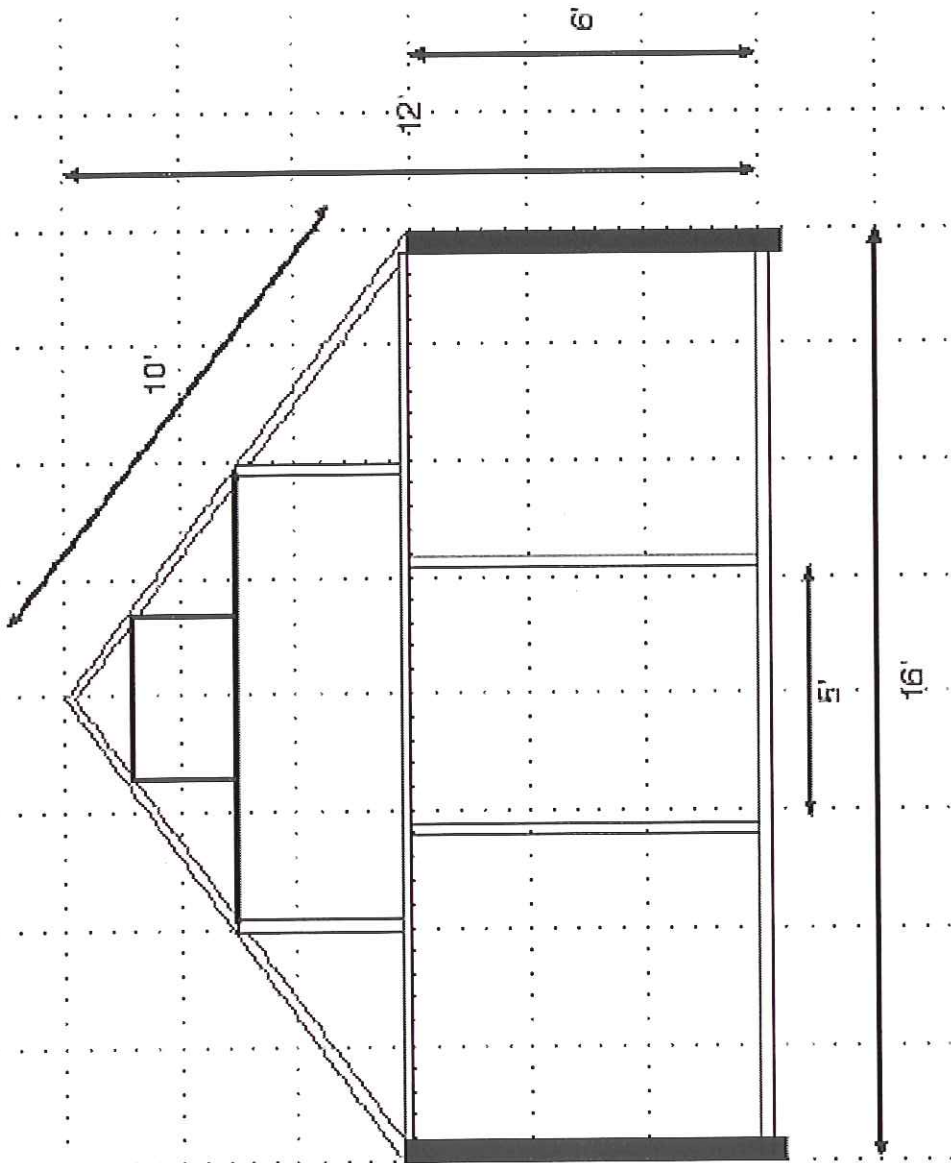


Patrick's Point Greenhouse Side View

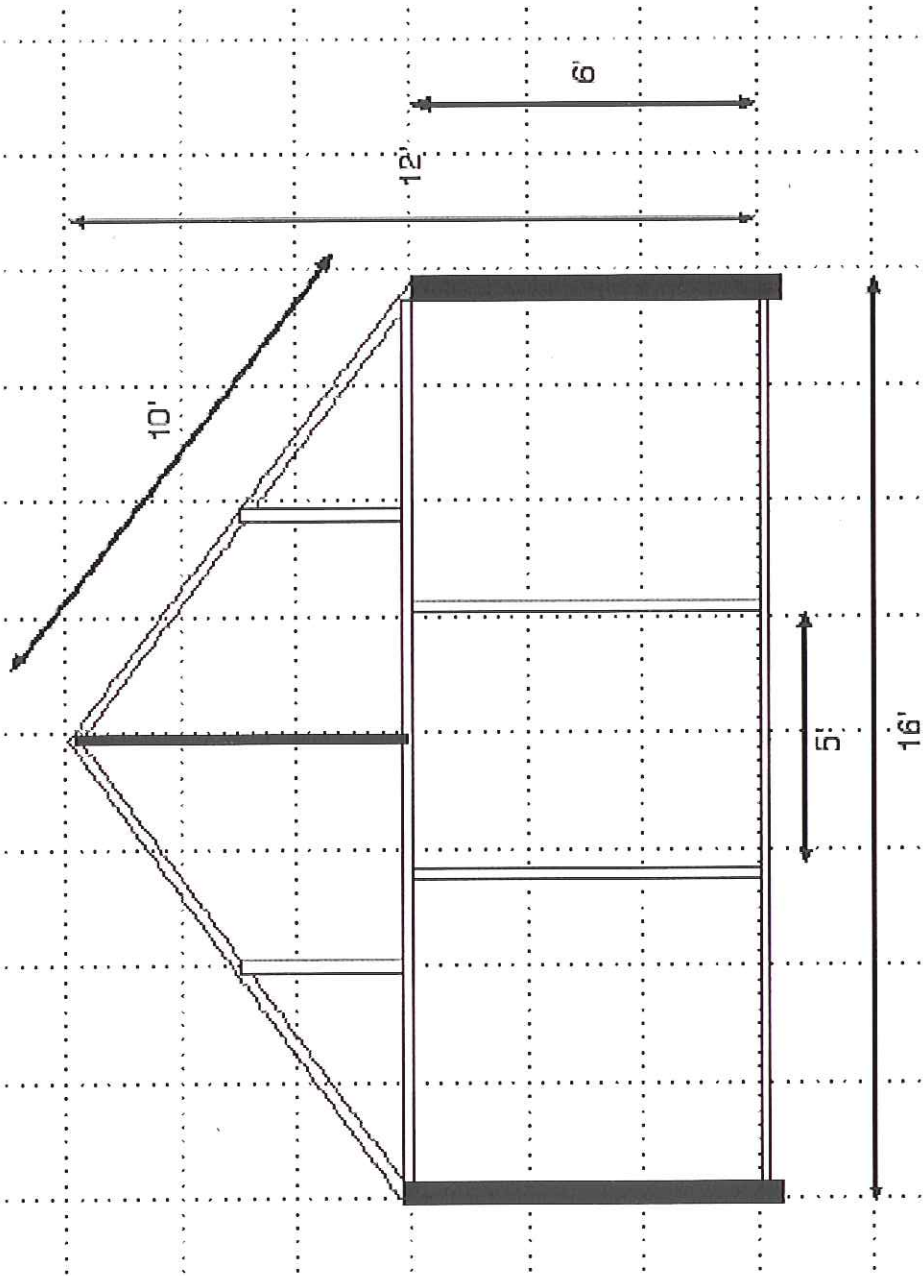


Patrick's Point Greerhouse

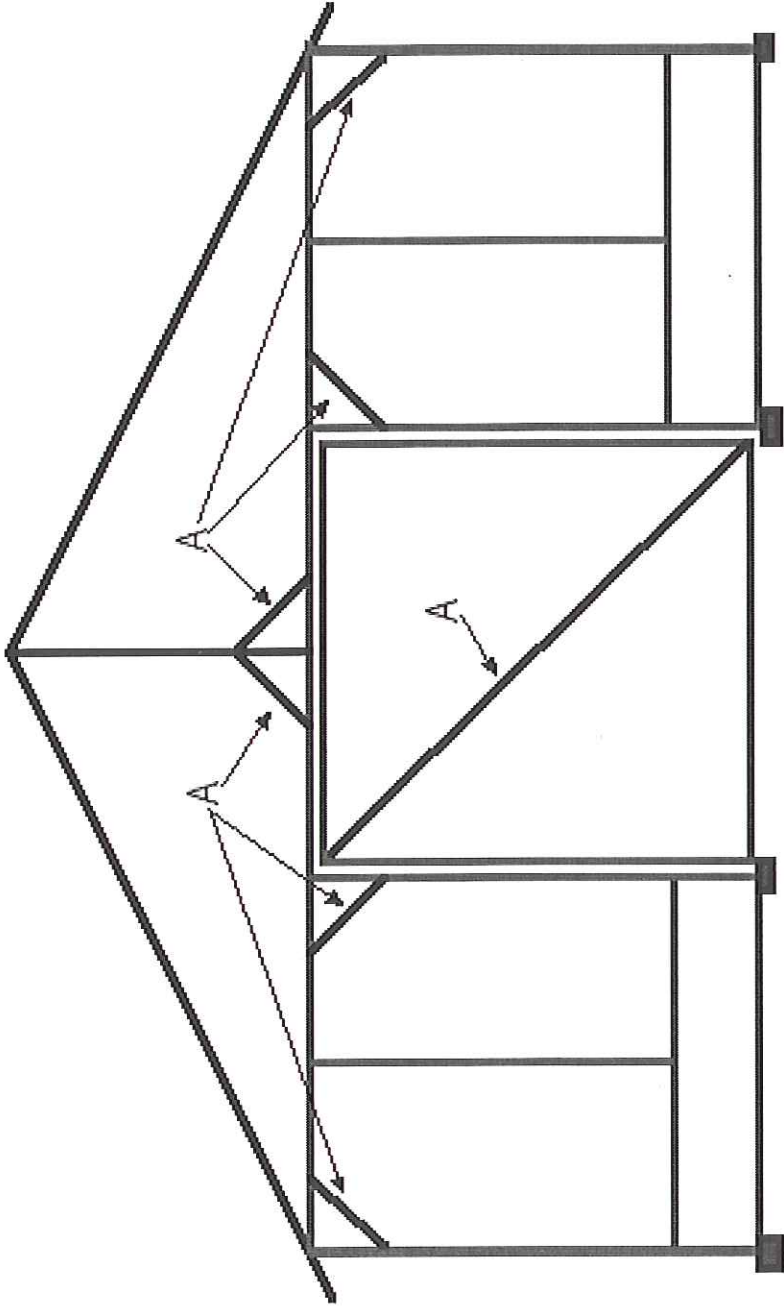
Back View



Patrick's Point Greenhouse
Back View



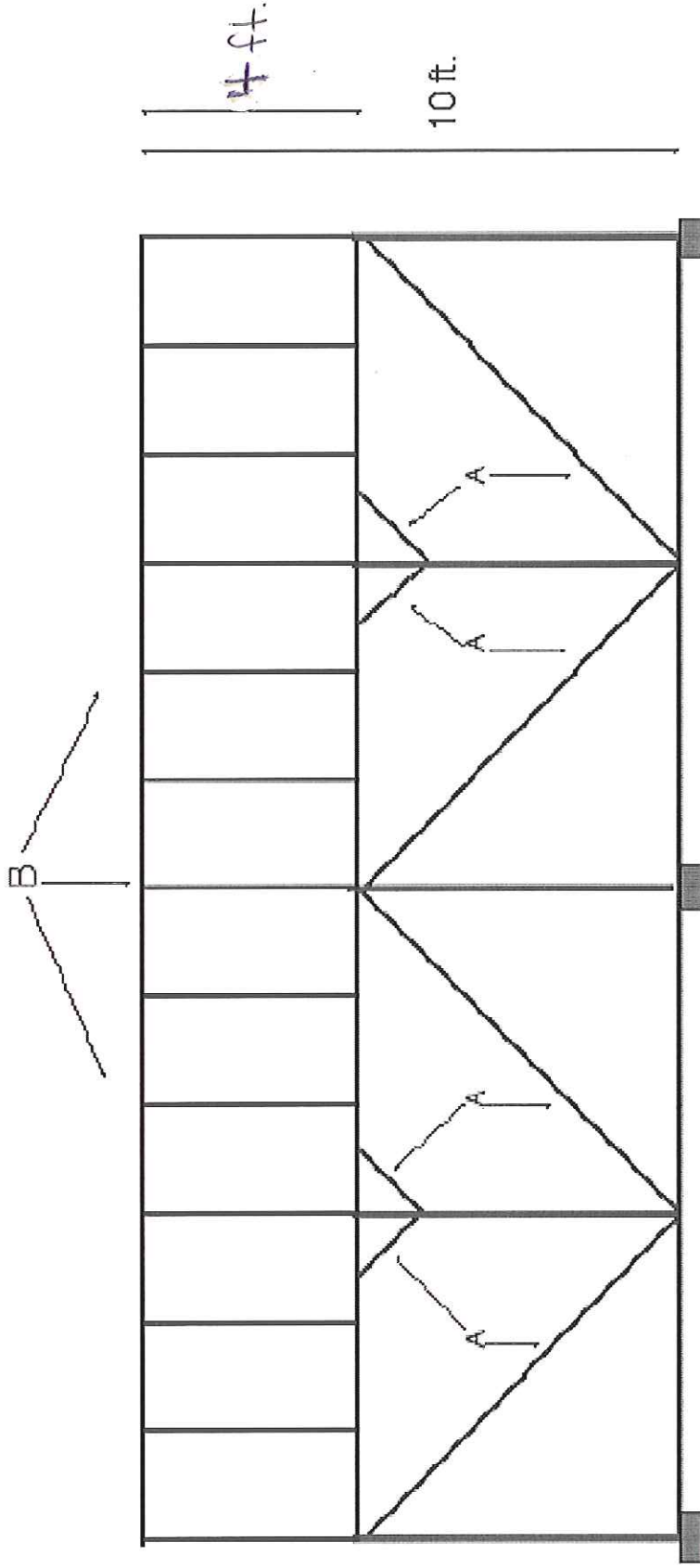
Final Greenhouse Design



24
FEET

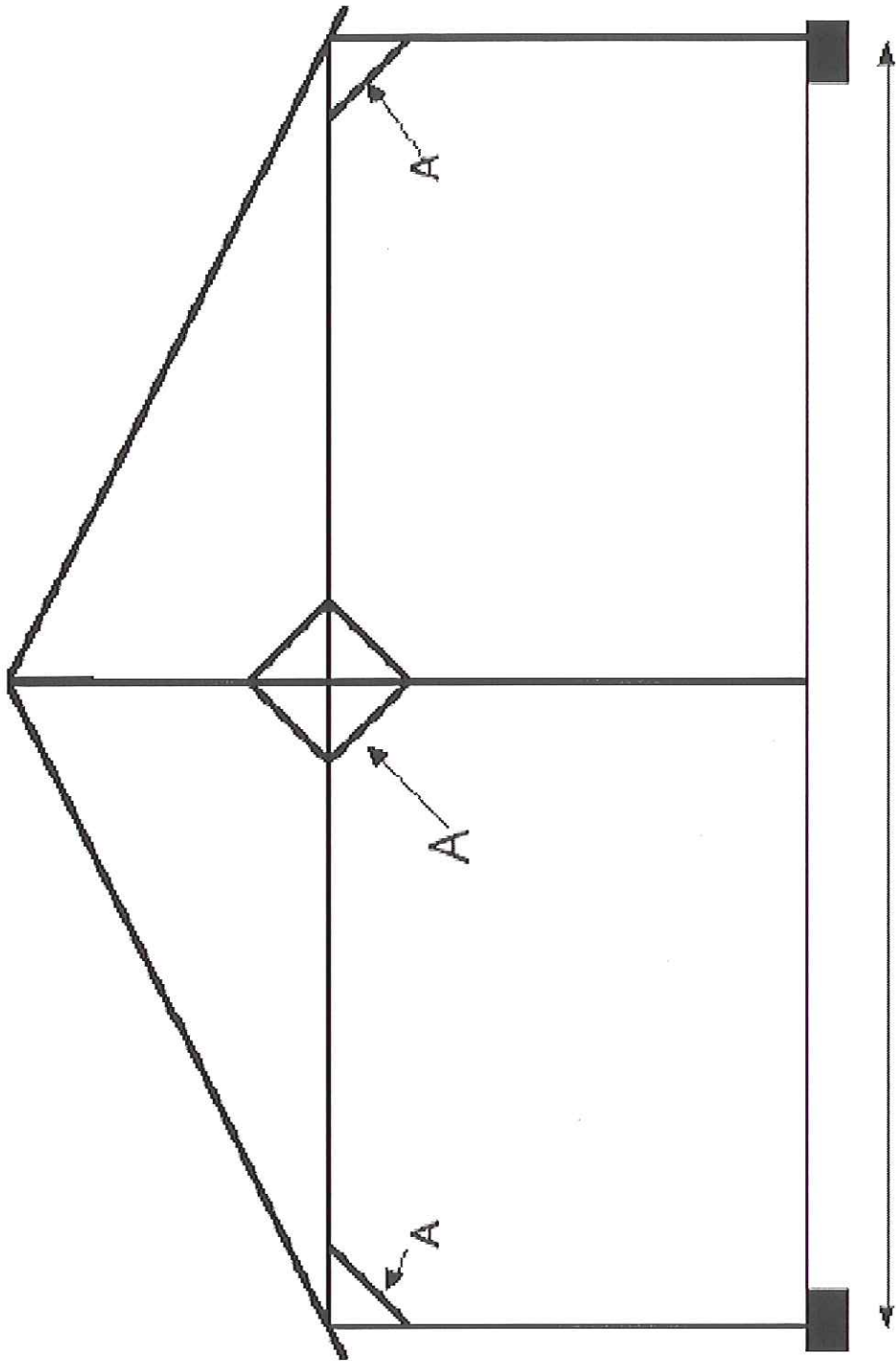
A = 2X4 bracing

Front View



24 feet

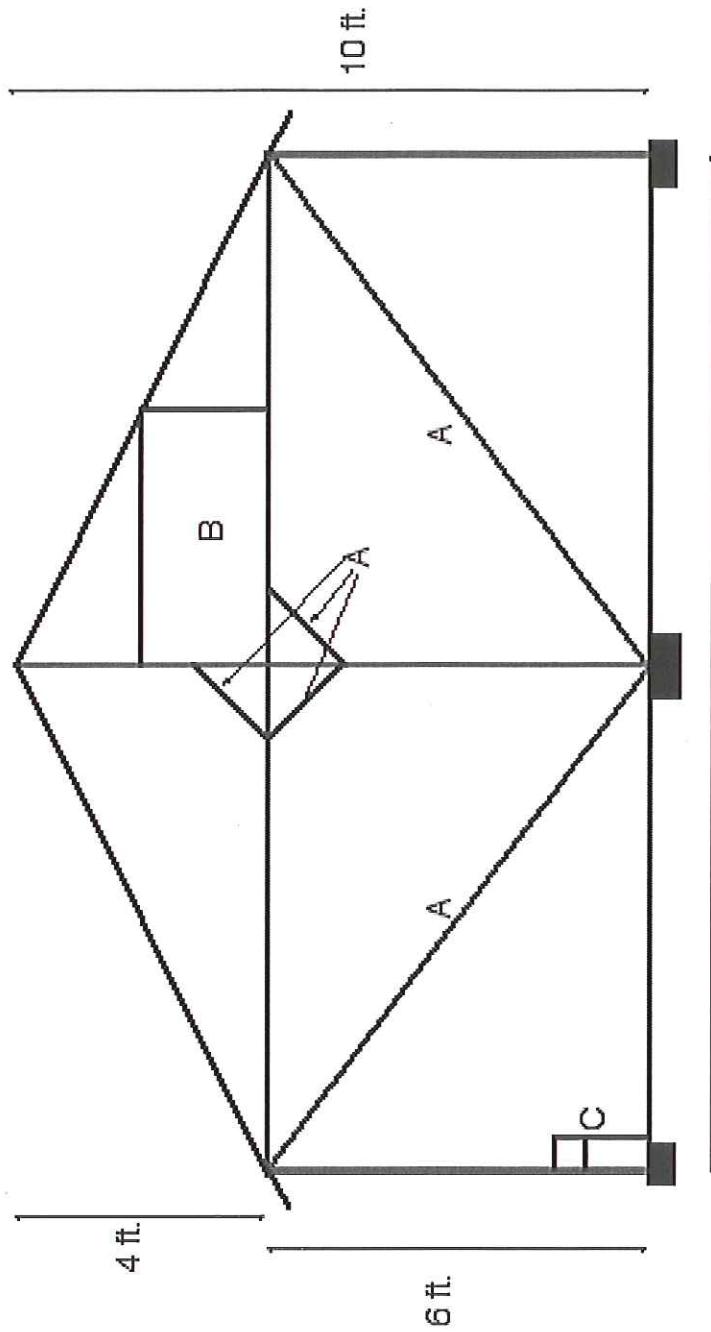
side view



16 feet

A = 2X4 bracing

middle view



- A = 2X4 bracing
- B = window frame
- C = ledge

back view

Appendix D

Letter for Potential Donors

Price Quotes

Pictures

Sumêg Patrick's Point Lagoons Interpretive Association

A non-profit corporation
Serving Patrick's Point and Humboldt Lagoons State Park
P.O. Box 1118 - Trinidad, California 95570

To whom it may concern,

The Sumêg Patrick's Point Lagoons Interpretive Association (SPPLIA) is a non-profit organization currently working with the local community on establishing a cultural native plant garden at Patrick's Point State Park in Trinidad, California. As an advisory committee comprised mainly of Yurok elders, SPPLIA is working to enhance the cultural education components within the Patrick's Point and Humboldt Lagoons region. The association feels it is vital to develop a hands-on approach to the curriculum of the garden project. In doing so, a greenhouse is required.

Constructing a small greenhouse would provide children with the opportunity to become familiar with and grow native plants. In addition, the greenhouse will provide a sufficient inventory for plant sales and enhance the garden and Sumêg Village at Patrick's Point State Park.

As students in the Environmental Science practicum course at Humboldt State University, it is our goal to create plans, network with the community, fundraise, and develop the most appropriate greenhouse for the proposed site and budget. Our results can be used as a demonstration for the community to construct a residential size greenhouse.

We are searching for local businesses and agencies that are willing to offer donations and/or discounts on the following items:

- 1.
- 2.
- 3.
- 4.
- 5.

Your donations and suggestions will be greatly appreciated by the community. In addition, your contributions will be acknowledged on the greenhouse and in the garden brochure.

Sincerely,

Craig Conforti

If interested or have questions, please contact us at:

Craig Conforti
180 H St. #1
Arcata, CA, 95521
(707) 825-9342
cac19@axe.humboldt.edu

or

Eric Johnson
SPPLIA - Vice President/ Project coordinator
(707) 839-5449

THE MILL YARD

Your Building Materials Supply Center

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PAGE NO 1

P.O. Drawer 4779 • Arcata, CA 95518-4779
(707) 826-9860

This Receipt is REQUIRED for Return or
Exchange of Merchandise !!!

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
45				CASH/CHECK/BANK/CARD	26	3/29/01	4:44

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**** CASH ****

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TRDY PEREZ

EXP. DATE: 3/30/01

DOCN 82710

* ESTIMATE *

TAX : 001 CALIFORNIA STATE TAX EST. 82710

ALL RETURNS MUST BE ACCOMPANIED BY ORIGINAL INVOICE AND ARE SUBJECT TO A 15% RESTOCKING FEE.

SHIPPED	ORDERED	UM	SKU	DESCRIPTION	UNITS	PRICE/PER	EXTENSION
	1	PC	24DF	2X4 STD GRN DF S4S		495.00 /MF	
	1	PC	2410DF	2X4X10 STD GRN DF S4S	6.66	495.00 /MF	3.30
	1	PC	48DF	4X8 #2 & BTR GRN DF S4S		825.00 /MF	
	1	PC	4810DF	4X8X10 #2 & BTR GRN DF S4S	26.66	825.00 /MF	22.00
	1	EA	16111098	300107 S40 PVC PIPE 1X20	1	.29 /EA	.29
	1	EA	16111122	300127 S40 PVC PIPE 1.5X20	1	.46 /EA	.46
	1	PC	PB	PIER BLOCKS 55#	1	2.29 /PC	2.29 *
	1	EA	POL201006C	20X100 6 MIL CLR POLY FILM	1	54.99 /EA	54.99
	1	FT	14HC	1/4 HARDWARE CLOTH 36"	1	1.00 /FT	1.00
	1	PC	8FG	CORR FG DELUXE 8" CLEAR	1	11.95 /PC	11.95
	1	PC	10FG	CORR FG DELUXE 10" CLEAR	1	14.95 /PC	14.95
	1	PC	12FG	CORR FG DELUXE 12" CLEAR	1	17.95 /PC	17.95
	1	PC	8TTLB	TUFTEX LIGHT BLUE 8"	1	9.99 /PC	9.99
	1	PC	10TTLB	TUFTEX LIGHT BLUE 10"	1	12.99 /PC	12.99
	1	PC	12TTLB	TUFTEX LIGHT BLUE 12"	1	14.99 /PC	14.99
	1	PC	CORWIG	1-1/2X1-1/2X8 WIGGLE MOULD	1	2.50 /PC	2.50
	1	EA	N	DACROS (SILVER) PHILLIPS	1	3.49 /EA	3.49
	1	EA	N	PRIMEGUARD PLUS (GREEN) SQ.DR.	1	4.95 /EA	4.95
	1	EA	13082055	1040 NEEDLEBLOCK 3X6S	1	14.99 /EA	14.99
	1	EA	2D	2" DACRO SCREWS	1	69.99 /EA	69.99

CONT'D

Waterproofing Staff

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X

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CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
#5				CASH/CHECK/BANKCARD	26	3/29/01	4:44

<p>S O L D T O</p> <p style="text-align: center;">**** CASH ****</p>	<p>S H I P T O</p> <p style="text-align: center;">TROY PEREZ</p>
--	--

EXP. DATE: 3/30/01

DOCN 82710

* ESTIMATE *

TAX : 001 CALIFORNIA STATE TAX EST. 82710

ALL RETURNS MUST BE ACCOMPANIED BY ORIGINAL INVOICE AND ARE SUBJECT TO A 15% RESTOCKING FEE.

SHIPPED	ORDERED	UM	SKU	DESCRIPTION	UNITS	PRICE/PER	EXTENSION
	1	EA	2PP	2" COMBO HEAD PRIME GUARD PLUS	1	79.99 /EA	79.99

TAXABLE	343.86
NON-TAXABLE	0.00
SUBTOTAL	343.86

** ESTIMATE ** ESTIMATE ** ESTIMATE ** ESTIMATE **

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TOT WT: 66.00

TAX AMOUNT	24.07
TOTAL AMOUNT	367.93

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(707) 826-9860

Quote #2

This Receipt is REQUIRED for Return or
Exchange of Merchandise !!!

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
#5				CASH/CHECK/BANKCARD	26	4/20/01	12:07

S O L D **** CASH ****	S H I P T O PATRICKS PT STATE PARK LAGOON INT ASSOCIATION SPECIAL QUOTE	EXP. DATE: 4/12/01	DOCH# 84309 ***** * ESTIMATE * ***** TAX : 001 CALIFORNIA STATE TAX EST. 84309
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ALL RETURNS MUST BE ACCOMPANIED BY ORIGINAL INVOICE AND ARE SUBJECT TO A 15% RESTOCKING FEE.

SHIPPED	ORDERED	UM	SKU	DESCRIPTION	UNITS	PRICE/PER	EXTENSION
	4	PC	44DF	4X4 STD GRN DF S4S		525.00 /MF	
		PC	446DF	4X4X6 STD GRN DF S4S	32	525.00 /MF	16.80
		PC	24DF	2X4 STD GRN DF S4S		445.00 /MF	
	16	PC	246DF	2X4X6 STD GRN DF S4S	64	445.00 /MF	28.48
	1	PC	2410DF	2X4X10 STD GRN DF S4S	6.66	445.00 /MF	2.97
	1	PC	2412DF	2X4X12 STD GRN DF S4S	8	445.00 /MF	3.56
	6	PC	2420DF	2X4X20 STD GRN DF S4S	79.99	445.00 /MF	35.60
	10	PC	2410DF	2X4X10 STD GRN DF S4S	66.66	445.00 /MF	29.67
	1	PC	248DF	2X4X8 STD GRN DF S4S	5.33	445.00 /MF	2.37
	1	PC	2414DF	2X4X14 STD GRN DF S4S	9.33	445.00 /MF	4.15
				SUBTOTAL :	36.00	PC	
		PC	24DF	2X4 STD GRN DF S4S		445.00 /MF	
	2	PC	2410DF	2X4X10 STD GRN DF S4S	13.33	445.00 /MF	5.93
	12	EA	SIML70	SIMPSON L70 "L" REINF ANGL BRC	12	.96 /EA	11.52
	7	EA	SIMA35F	SIMPSON A35 FRAMING ANCHOR	7	.20 /EA	1.40
	9	PC	PB	PIER BLOCKS 55#	9	2.29 /PC	20.61 *
	6	PR	20901567	00-3100 741-4 4X4 HINGE	6	3.39 /PR	20.34
	2	EA	19101	SUPERDECK STAIN NATURAL 16AL	2	14.99 /EA	29.98
	2	EA	2D	2" DACRO SCREWS	2	69.99 /EA	139.98

CONT'D

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Exchange of Merchandise !!!

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
#5				CASH/CHECK/BANKCARD	26	4/28/01	12:07

<p>S O L D T O</p> <p style="text-align: center;">**** CASH ****</p>	<p>S H I P T O</p> <p>PATRICKS PT STATE PARK LAGOON INT ASSOCIATION SPECIAL QUOTE</p>
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EXP. DATE: 4/12/01

DOC# 84309

* ESTIMATE *

TAX : 001 CALIFORNIA STATE TAX EST. 84309

ALL RETURNS MUST BE ACCOMPANIED BY ORIGINAL INVOICE AND ARE SUBJECT TO A 15% RESTOCKING FEE.

SHIPPED	ORDERED	UM	SKU	DESCRIPTION	UNITS	PRICE/PER	EXTENSION
		PC	24DF	2X4 STD GRN DF S4S		445.00 /MF	
	1	PC	246DF	2X4X6 STD GRN DF S4S	4	445.00 /MF	1.78
	4	PC	248DF	2X4X8 STD GRN DF S4S	21.33	445.00 /MF	9.49
				SUBTOTAL :	5.00	PC	
	24	PC	12TTLB	TUFTEX LIGHT BLUE 12'	24	14.99 /PC	359.76
	1	EA	RF1	1" GALV WOOD SCREWS 250/BAG	1	19.99 /EA	19.99
		PC	148B	1/4X4 RWD BENDER BOARD		.42 /LF	
	27	PC	1410BB	1/4X4X10 RWD BENDER BOARD	27	.25 /PC	6.75
	16	PC	CDRMIG	1-1/2X1-1/2X8 WIGGLE MOULD	16	2.50 /PC	40.00
		PC	24DF	2X4 STD GRN DF S4S		445.00 /MF	
	20	PC	2410DF	2X4X10 STD GRN DF S4S	133.33	445.00 /MF	59.33
	4	PC	248DF	2X4X8 STD GRN DF S4S	21.33	445.00 /MF	9.49
	2	PC	2416DF	2X4X16 STD GRN DF S4S	21.33	445.00 /MF	9.49
	2	PC	2412DF	2X4X12 STD GRN DF S4S	16	445.00 /MF	7.12
	2	PC	2410DF	2X4X10 STD GRN DF S4S	13.33	445.00 /MF	5.93
				SUBTOTAL :	30.00	PC	

TAXABLE 882.49

NON-TAXABLE 0.00

SUBTOTAL 882.49

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TAX AMOUNT 61.77

TOTAL AMOUNT 944.26

TOT WT: 6.00

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ARCATA DO IT BEST LUMBER
 1296 ELEVENTH STREET ARCATA, CA 95521
 (707) 822-1769 FAX (707) 822-9270



CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
#6				CASH/CHECK/BANKCARD	SD	4/ 7/01	2:08

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GREENHOUSE PROJECT
(WALK-IN)

EXP. DATE: 4/ 7/01

DOC# 23127

* ESTIMATE *

TAX : 006 CALIFORNIA-ARCATA STD EST. 23127

Payment in full to be received by the 10th. A FINANCE CHARGE of 1.5% per month, which is an ANNUAL PERCENTAGE RATE of 18%, is charged on unpaid balance as of the next month after date of purchase or service.

LOADED & CHECKED BY	DELIVERED BY	DATE DELIVERED

SHIPPED	ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
	4	PC	4406PT	4x4x6 STD&BTR PT.04 INCISED S4S	740.00	32	710.00 /MF	22.72
	4	PC	2416PT	2x4x16 STD&BTR PT.04 INCISED S4S	700.00	42.66	660.00 /MF	28.16
	17	PC	2406PT	2x4x6 STD&BTR PT .04 INCISED S4S	700.00	68	660.00 /MF	44.88
	11	PC	2410PT	2x4x10 STD&BTR PT.04 INCISED S4S	700.00	73.33	660.00 /MF	48.40
	11	PC	2412PT	2x4x12 STD&BTR PT.04 INCISED S4S	700.00	88	660.00 /MF	58.08
	.50	PC	2414PT	2x4x14 STD&BTR PT.04 INCISED S4S	700.00	4.66	660.00 /MF	3.08
	1	PC	2408PT	2x4x8 STD&BTR PT .04 INCISED S4S	700.00	5.33	660.00 /MF	3.52
	26	FT	34PVC	PIPE 3/4" PVC SCH40 20'		26	.20 /FT	5.20
	12	EA	5A23	SIMPSON A23 ANGLE BRACKET	.46	12	.40 /EA	4.80
	6	EA	PBLK	PIER BLOCKS		6	2.49 /EA	14.94 5
	1	RL	620C	C0620 20X100 6MIL CLR FL	40.70	1	38.00 /RL	38.00
	4	EA	2000	STANLEY HINGES		4	2.49 /EA	9.96
	20	EA	3DACRO	3" DACRO SCREWS 25#/BOX		20	6.49 /EA	129.80
	3	EA	702742	702742 5/8X25 HOSE VIN	8.09	3	6.99 /EA	20.97
				TOTAL Dimensional Lumber:		313.98	BF	

TAXABLE	432.51
NON-TAXABLE	0.00
SUBTOTAL	432.51

** ESTIMATE ** ESTIMATE ** ESTIMATE ** ESTIMATE **

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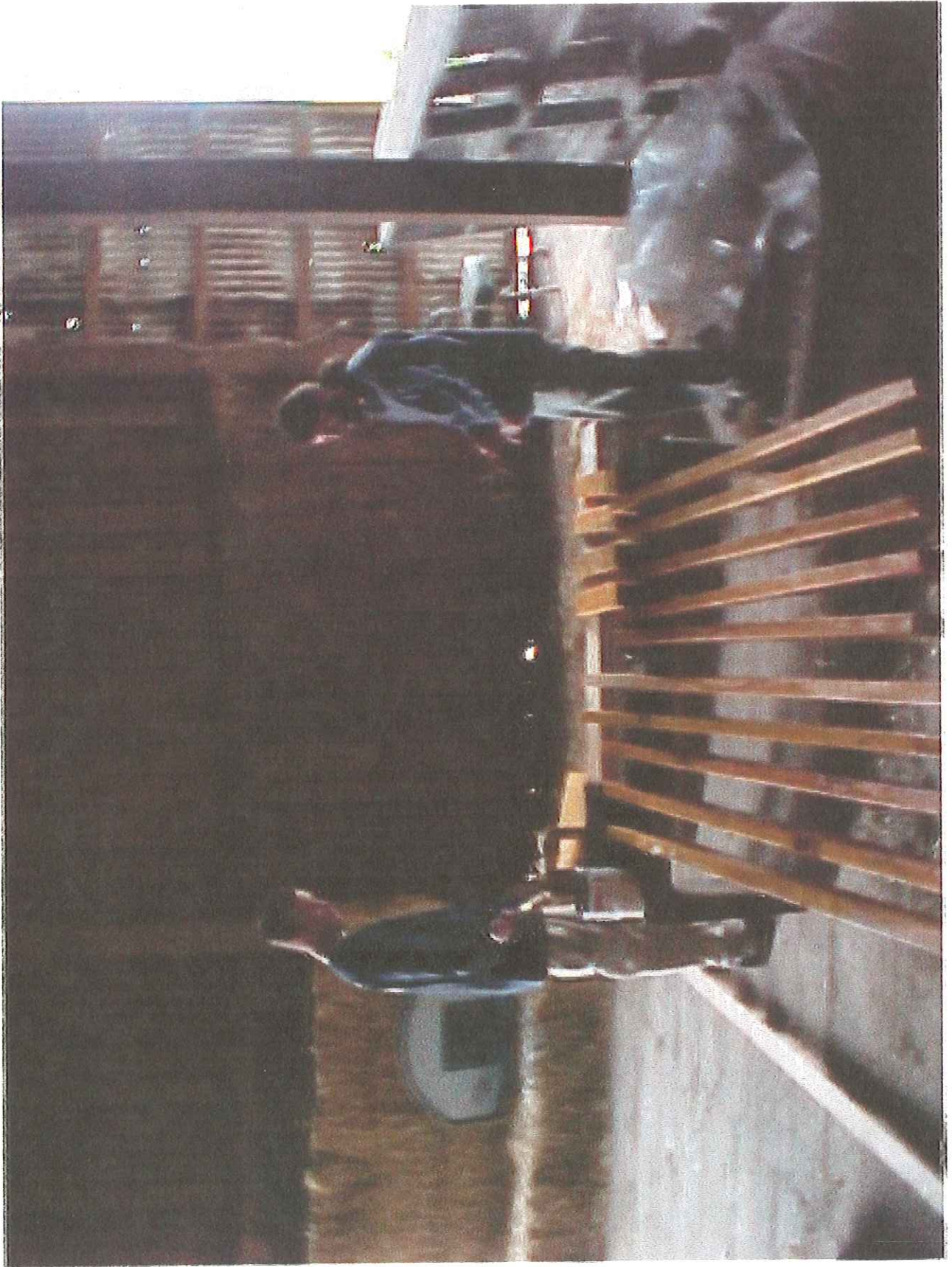
- TERMS:
- 1. NO REFUNDS ON SPECIAL ORDERS.
- 2. ALL RETURNS SUBJECT TO A HANDLING CHARGE.
- 3. THIRTY DAY LIMIT ON RETURNS.
- 4. RETURNS MUST BE ACCOMPANIED BY INVOICE.
- 5. ANY COLLECTION EXPENSES, COURT COSTS, ATTORNEY FEES, WILL BE PAID BY CUSTOMER.

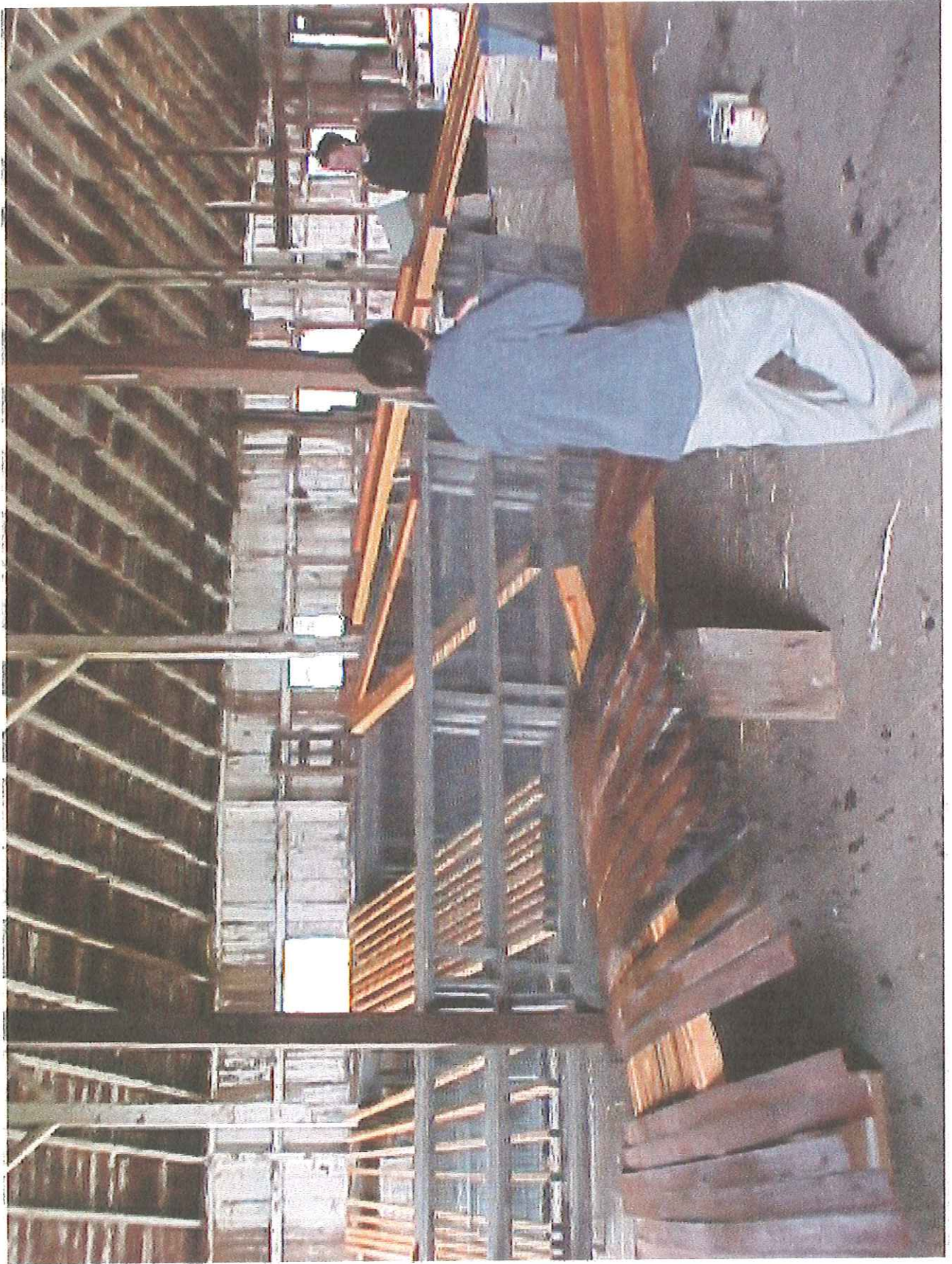
Craig Comaru
 180 H St. #1
 Arcata, CA, 95521
 (707) 825-9342
 cac19@axe.humboldt.edu

or

Eric Johnson
 SPPLIA - Vice President/ Project coordinator
 (707) 839-5449

TAX AMOUNT	30.28
TOTAL AMOUNT	462.79









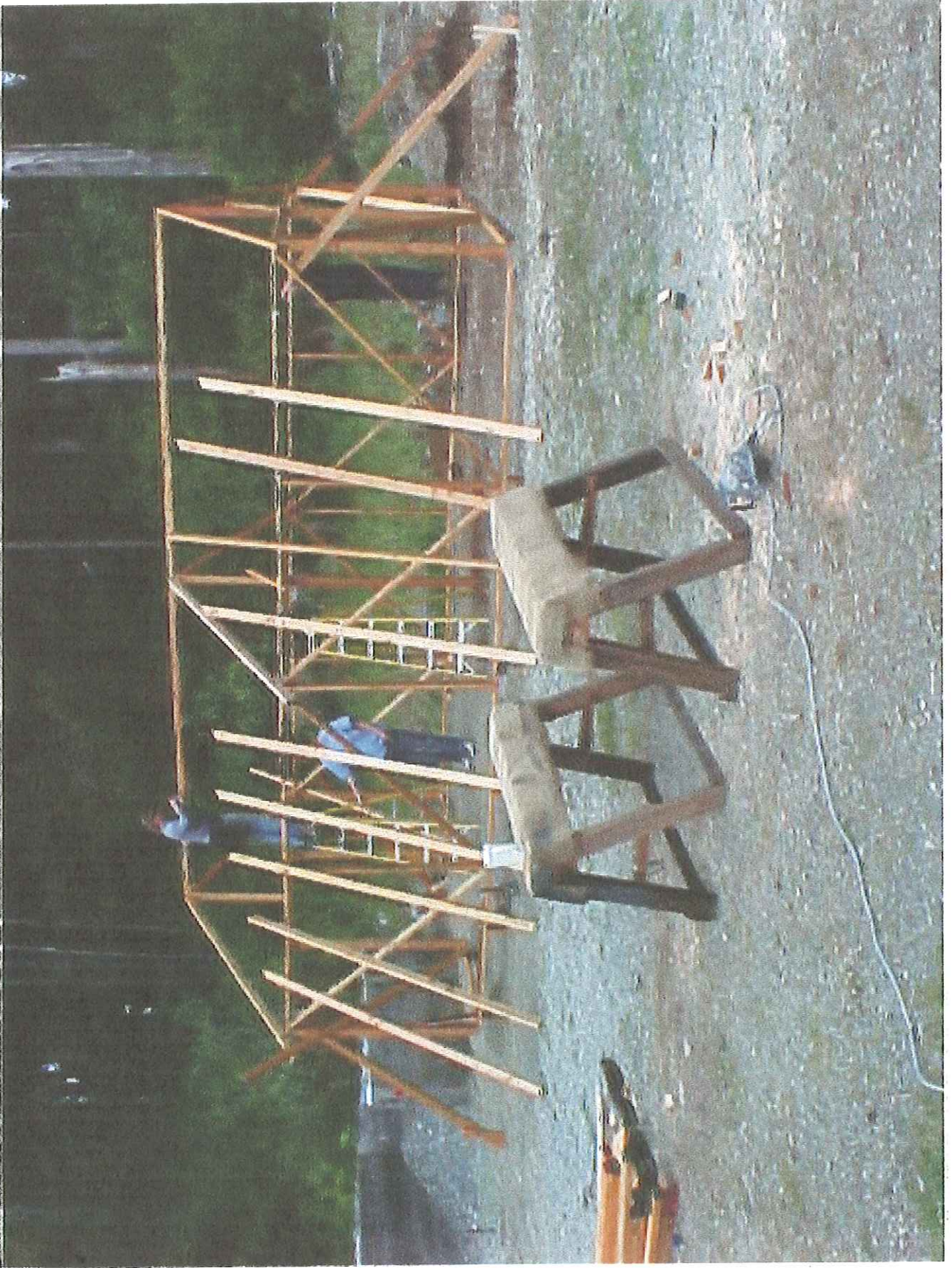


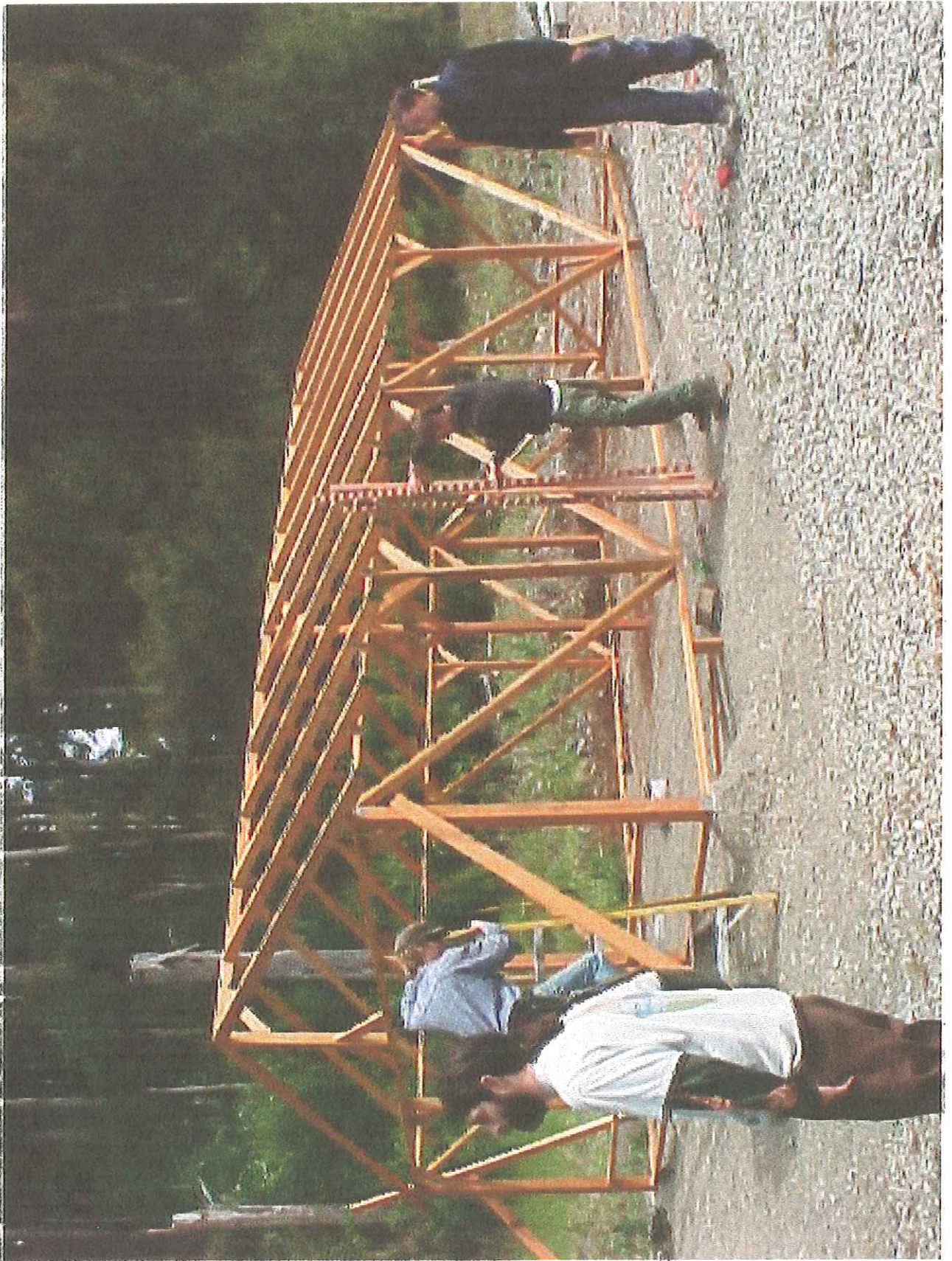




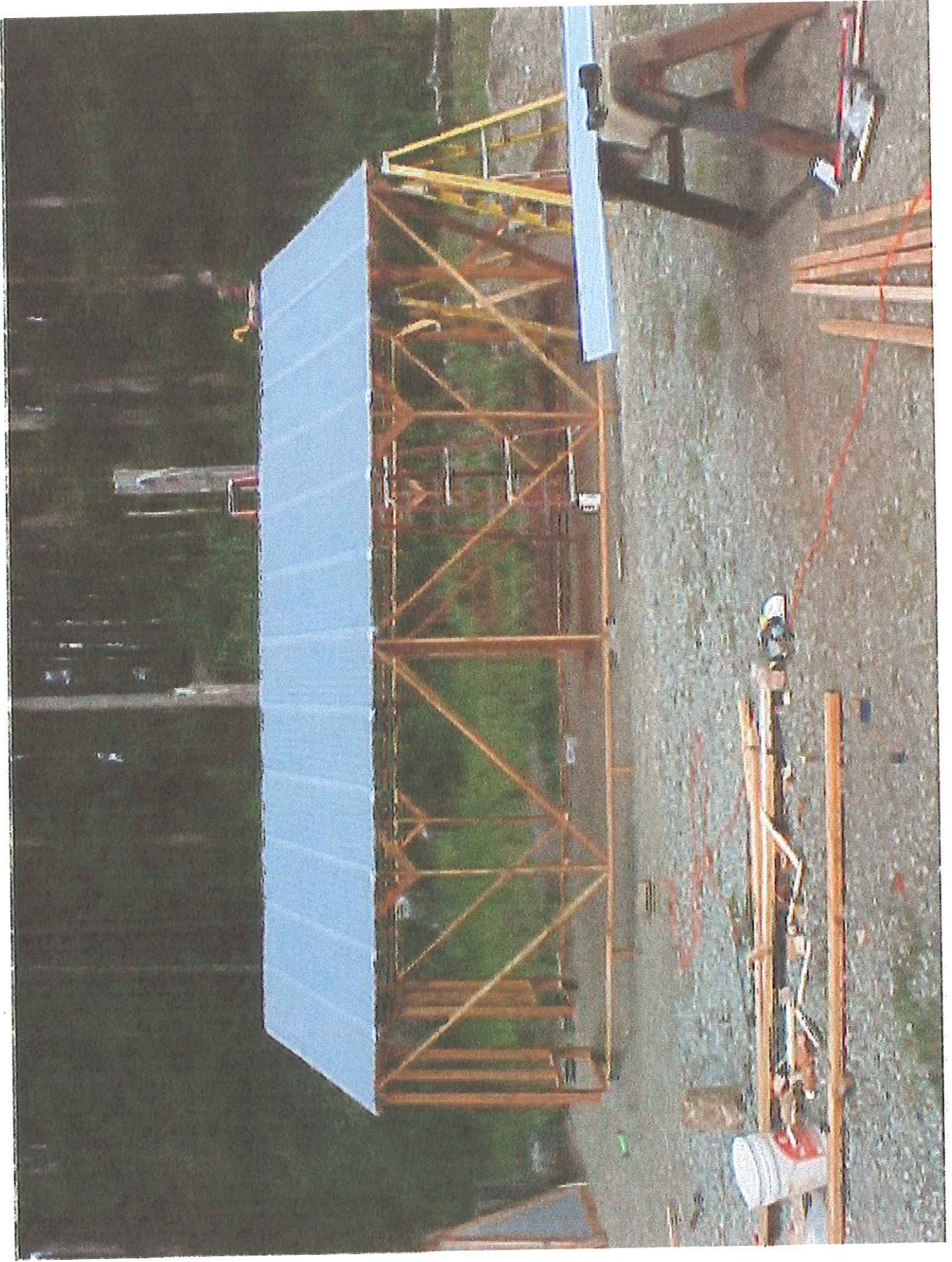




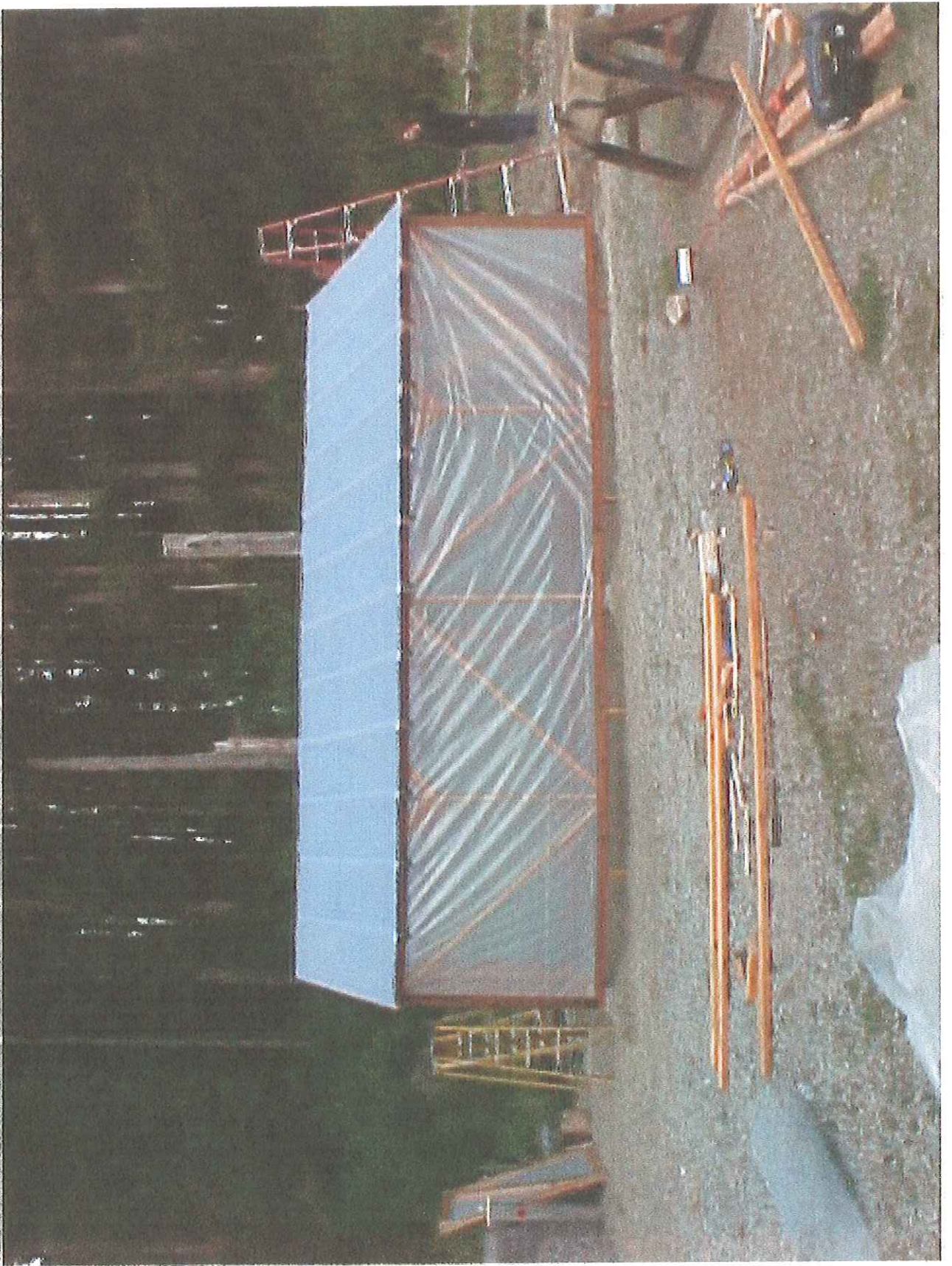




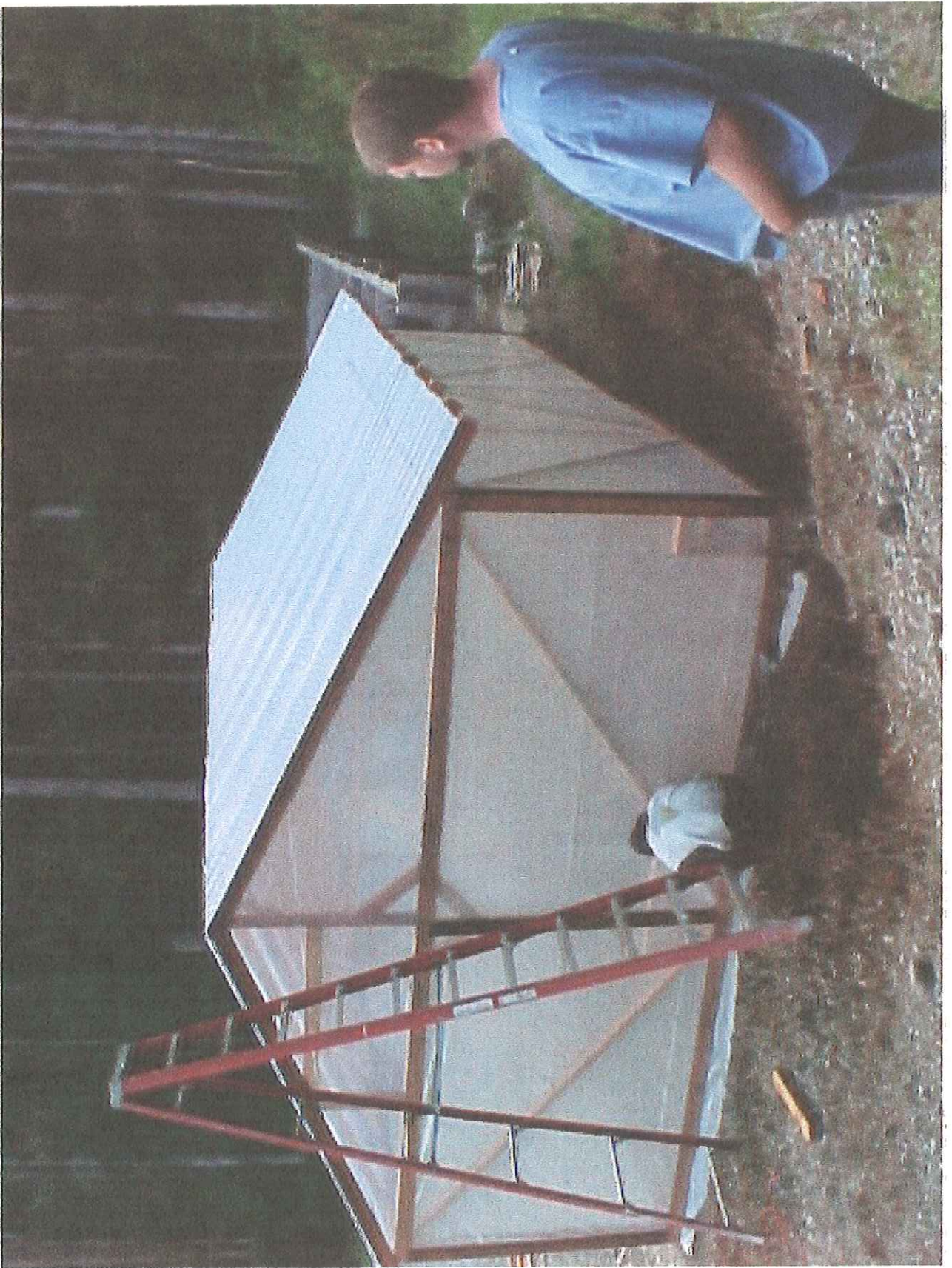




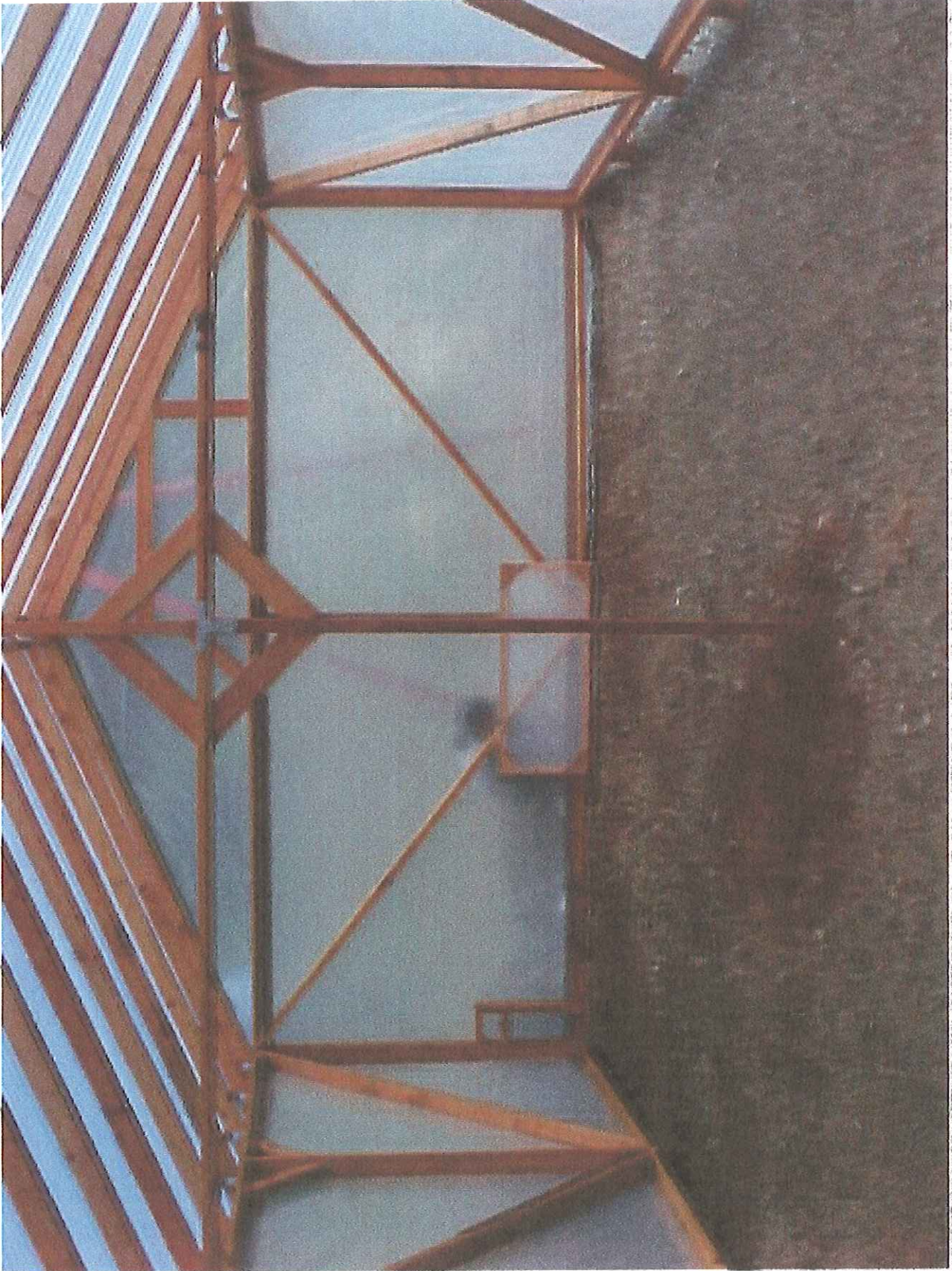






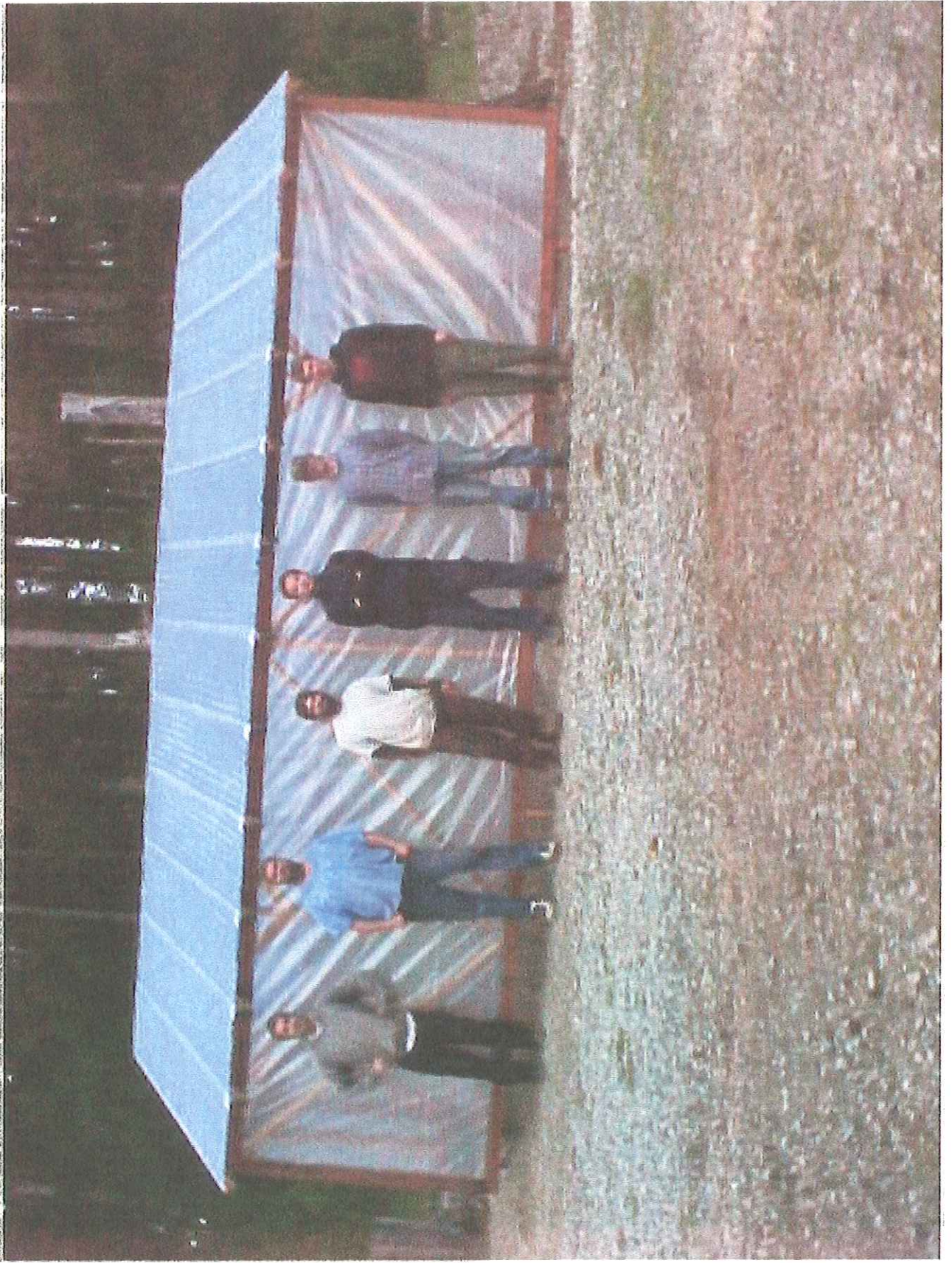








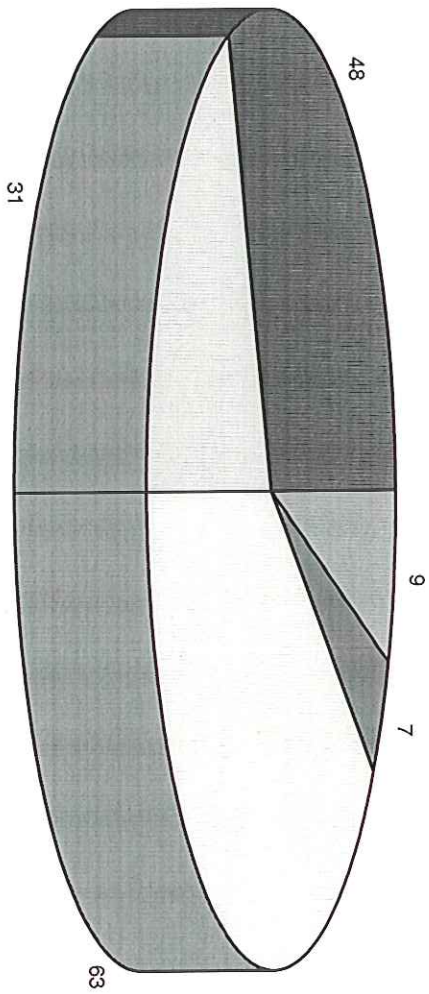




Appendix E

Group Hours

Hours Worked on Project



- Group meetings in Class
- Trips to the Mill Yard
- Meetings in Class
- Building Greenhouse
- Individual Time

Total Amount of Group Hours = 158

Class N23/01 A21/01
Plot.

20 hrs of
class on
no job.

2/2/01 Meeting 2pm - ~~2:30~~ in LAB.
3pm

greenhouse structures w/o power All present
Susan Amelous @ ITEL

- Next Friday meet w/ Eric
- Try to call Eric about meeting
- all to look up Greenhouse stuff

2/9/01 Meeting 3pm - 4pm

- All present
- went to meet w/ Eric
- saw Greenhouses.
- All to keep looking up more about Greenhouses.

2/14/01 Meeting → after class 10 min

2/16/01 Meeting going to Patrick's Point 2pm - 4:30
saw the site met Steve Ortiz
Ask Dick about a letter for Steve
Gravel will be provided by Park can be 16' x 20' something feet.
Nursery to be located above site on hill.

Week of 2/11 - 16 each spent 30 min
brainstorming problem and objectives

2/20/01 Meeting After class 1 hr.
Problem Statement

2/22/01 Meeting in class
CRAIG to write Dick an email about the letter for Steve

3/15/01 Meeting in class
brainstorm session
each to draw and right up 2 Alt. Solutions. 1.5 hrs.

3/27/01 list of Prod. ad Cons for drawing
Make a list of things to buy
1 hr on own

4/8/01 Meeting in class with Eric. 1.5 hrs.
Crazy to Draw up Final Solution and bring list of supplies.

4/15/01 Meeting in class 1.5 hrs.

Write up an intro to final looking project.

4/10/ Meeting in class 2 hrs.
went to Mill yard.

4/12/01 Meeting in class 2 hrs.
went to Patrick's Point

4/15/01 ~~meet~~ went to Mill Yard
Meet w/ Group. 2 hrs.

5/3/01 meet in class 1.5 hrs.

~~5/9/01 Build again
5 hrs.~~

5/5/01 Build again
5 hrs.

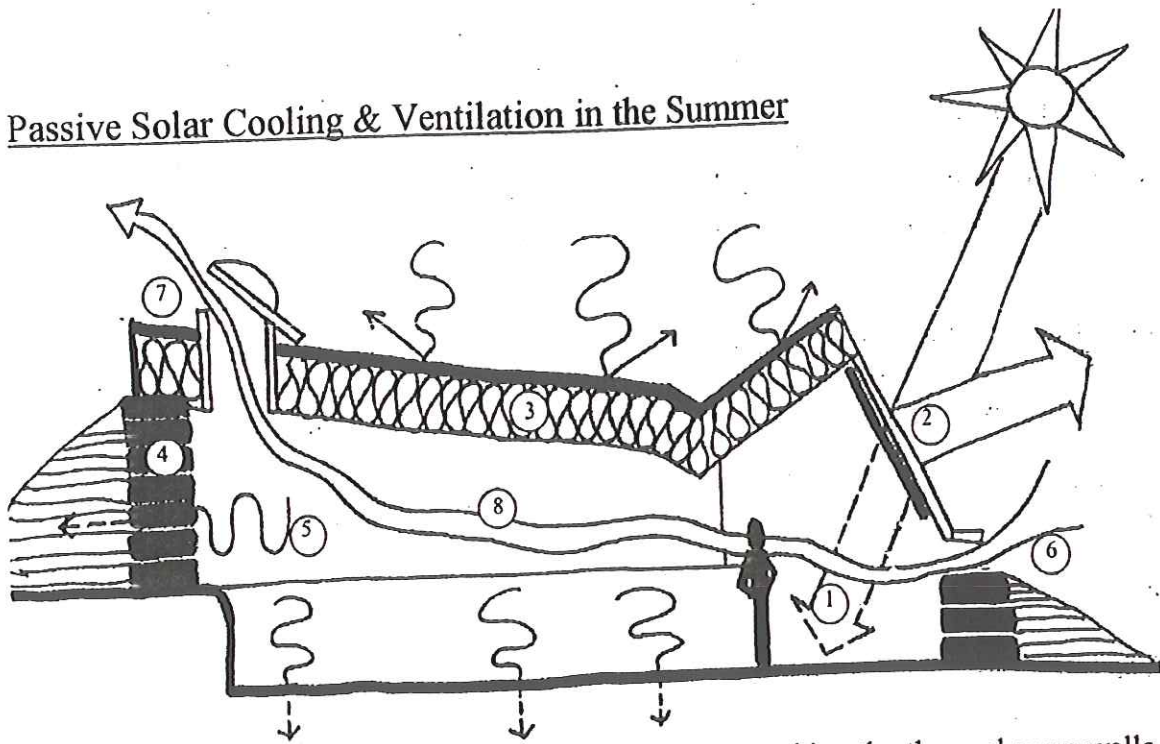
5/8/01 class 1.5

5/10/01 class 1.5 hrs.

Appendix F

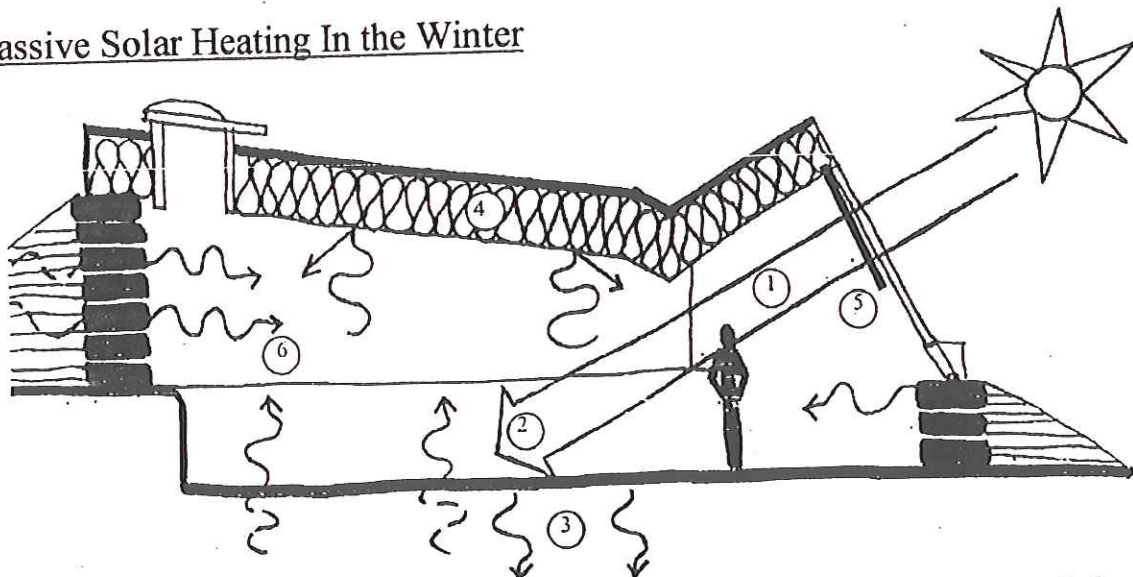
Passive Ventilation System

Passive Solar Cooling & Ventilation in the Summer



1. The sun traveling high in the sky is prevented from reaching the thermal mass walls.
2. Shades are used to block sunlight from entering.
3. Super insulation in the roof keeps the heat out.
4. Thermal mass walls maintain 55° temperature.
5. Heat in the building is absorbed into the earth walls.
6. Operable windows on the solar side of the building are located low.
7. Operable skylights on the non-solar side of the building are located high.
8. Hot air rises out through the skylights drawing cool air in through the windows.

Passive Solar Heating In the Winter



1. The sun traveling lower in the sky enters the building through the solar-oriented glass façade.
2. The sun hits the thermal mass walls and floors.
3. Thermal mass absorbs energy from the sun, storing the temperature like a battery.
4. Super insulation in the roof keeps the heat in.
5. When the sun sets, insulating shades are closed to cover the windows and keep heat in.
6. Heat stored in thermal mass walls and floors is released into the living space.

(McCullagh)

References

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