

Disaster Relief Shelter

Studio 2 - IDUS 321 - Winter 2014

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Team Falcons



Task List

Task	Emily	Teddy	Lillian
Preliminary Research			
-Disaster Research	X	X	X
-Existing Shelters		X	
-Case Studies	X		
Deep Dive Research			
-Relief Organizations	X		
-Basic Needs	X	X	
Secondary Research			
-Surveys	X		X
-Interviews	X		X
-Human Factors	X	X	X
Design Brief	X		X
Project Plan	X		X
Concept Development			
-Sketches	X	X	X
Concept Refinement			
-Mock-ups	X	X	
-User Testing	X		X
3D Model	X	X	
Prototype	X	X	X
Process Book	X	X	X

Project Schedule

Week 1:

- Begin preliminary research
- Begin deep dive research
- Create design project plan
- Begin process book

Week 2:

- Finish deep dive research
- Finish design project plan
- Create design brief
- Begin concept development
- Continue process book

Week 3:

- Finish design brief
- Finish concept development
- Begin concept refinement
- Begin creating mock ups
- Continue process book

Week 4:

- Continue concept refinement
- Continue creating mock ups
- Begin user testing
- Continue process book

Week 5:

- Finish concept refinement
- Finish mock ups
- Finish user testing
- Begin CAD model
- Continue process book

Week 6:

- Finish CAD model
- Begin creating prototype
- Continue process book

Week 7:

- Continue prototype
- Continue process book

Week 8:

- Continue prototype
- Continue process book

Week 9:

- Create display case
- Begin creating presentation
- Continue process book

Week 10:

- Finish presentation
- Finish process book

Research Plan Overview

Project Goal:

To design a product that provides for all basic human needs and has the capacity to be transported around the world efficiently to victims of natural disasters.

Phase 1 Research:

Primary Research: Begin by learning about natural disasters and natural disaster relief efforts. Look into the different types of products used to provide shelter and other basic needs to those devastated by natural disasters.

Secondary Research:

Surveys

Interviews

Personas

Case Studies

Body Storming

Affinity Diagramming

Phase 2 Concept Development:

Concept Sketches: Generate a first round of concepts that support the team's ideas for possible product designs that are both tangible and practical based on initial research findings. Evaluate all feasible concepts in class with the goal of deciding upon one final new product direction that is both unique and innovative.

Phase 3 Concept Refinement:

Use the selected concept (approved by the instructor) as the basis for further development and refinement. Continue research to ensure that the product fits the optimal design criteria. Generate refined concept sketches and detailed digital renderings to demonstrate the key marketable features of the design.

Product Testing:

Human Factors:

Phase 4 CAD Model & Prototype:

Develop a robust CAD model of the proposed product concept as well as a 3-dimensional prototype based on a scale of 1/12. Prepare presentation materials that supports your product and its marketability.

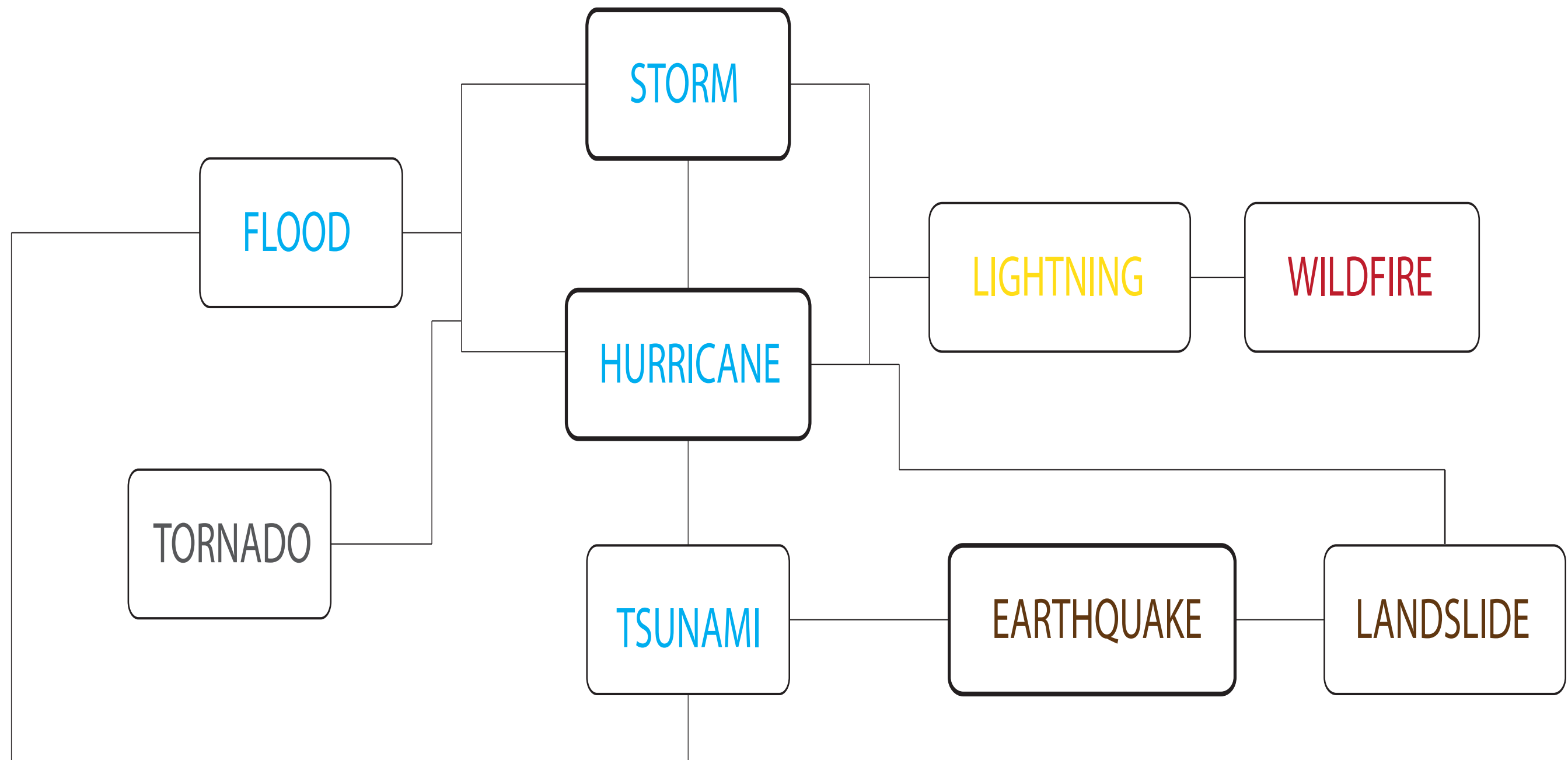
Phase 5 Final Presentation & Process Book:

PDF files only.
































Research

Disaster Research

Natural Disaster System Map



Short-Term Effects of Major Disasters

	Earthquake	Windstorms	Tsunami and Sudden Floods	Slow-onset Floods	Landslides	Hurricane
Deaths						
Severe Injuries						
Risk of Communicable Disease						
Damage of Health Facilities						
Damage of Water Supply						
Lack of Food						

 Many death occurred

 Few death occurred

 Many injuries occurred

 Few injuries occurred

 High risk of disease and infection

 Many damages to health facilities

 Few damages to health facilities

 Severe damage to water supply

 Minimum damage to water supply

 Severe lack of food

 Little damage to food supply



Hurricane

What It Is:

Also known as tropical cyclone and tsunami
Wind speed over 160 miles
2.4 trillion gallons of rain per day

Life Cycle:

- Tropical depression
- Tropical storm
- Hurricane
- Major hurricane
- Post tropical cyclone

Damage:

Result from hurricane:
Storm surges
Rip currents
Tornadoes
Torrential rains
Floods
Landslides

Safety Protocol:

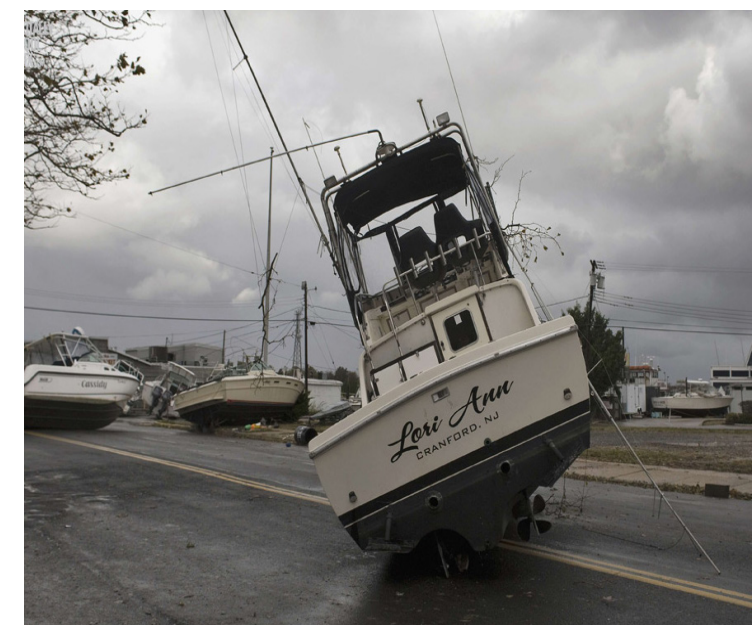
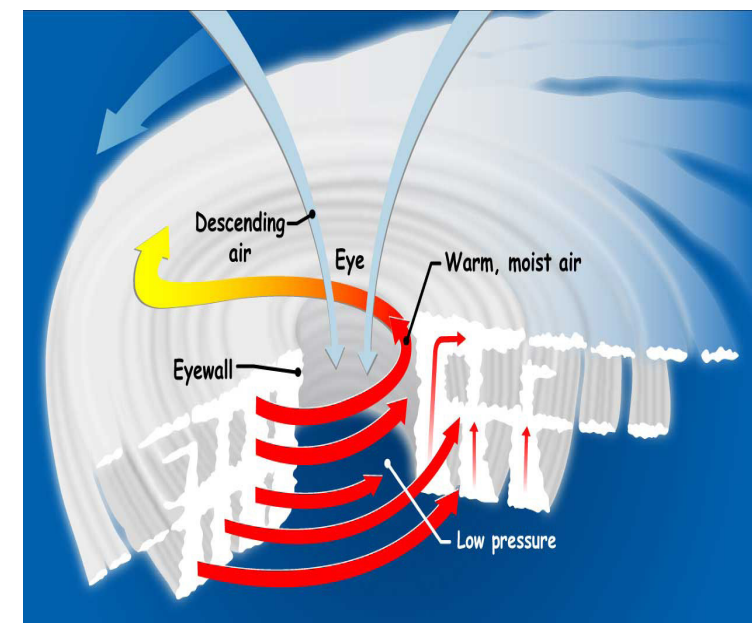
Close and avoid doors and windows
Remain in the first level, innermost room
If necessary, lie on the floor under a sturdy object
Accurate forecast that allows time for evacuation

Bring to the shelter:

- First aid kit
- Medicine
- Toiletries
- Non-perishable food
- Drinking water
- Emergency tools
- Money
- Flashlights
- Radios
- Phone
- All necessary papers

Important to:

- Trimming nearby vegetation
- Turning all appliance and utilities off
- Unplugging all small appliances
- Filling large containers with clean water for flushing and cleaning





Floods

What It Is:

When water overflows or inundates land that is normally dry
Still moving water has a great capacity for destruction

Cause:

- Excessive rain
- Ruptured dams or levees
- Rapid ice melt
- Unfortunately placed beaver dams
- Large storms or tsunamis

Damage:

Can topple and erode foundations.
Blanketed with silt and mud
Water and landscapes can be contaminated with hazardous materials
Mold blooms, power outages, drinking water shortages, and diseases are common after floods

Protection:

Home:

- Purchase flood insurance
- Building flood resistant structures

Whole Area:

- Levee system, dikes and dams



Devastation:

USA

140 flood related deaths/year

China Yellow River Valley

millions have died within the last century





Tsunami

What It Is:

Large series of waves caused by the displacement of a large volume of water

Cause:

- seismic activity
- earthquakes
- landslides
- underwater explosions
- nuclear devices
- glacier carvings
- meteorite impacts

Damage:

- Carry boats to land
- Cause flood
- Destroy waterfront structure

Safety Protocol:

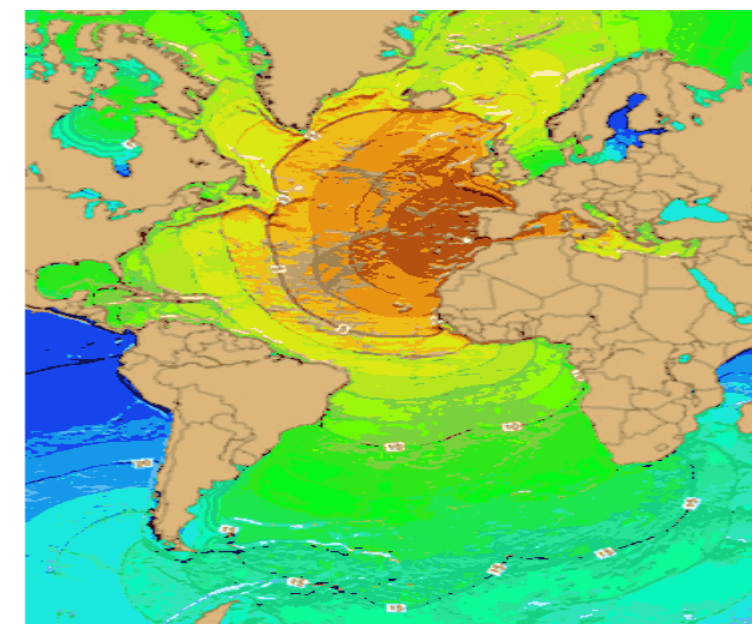
Seek high ground and be aware of the signs of a tsunami:

- strong earthquake lasting 20 seconds or more near the coast
- rapid rises and fall in coastal waters
- loud roaring noise from the ocean

Pack an emergency kit containing tools, communication, food and water

Medications in case of bacteria and disease

Wear sturdy clothes and shoes



Fact:

Largest wave in history was 1720 feet tall in Lituya Bay, Alaska in 1958





Tornadoes

What It Is:

Violently rotating columns of air that are produced by storm cells and are in contact with the earth's surface and a cumulonimbus cloud. Also known as twisters and cyclones.

Tornadoes in the northern hemisphere rotate counterclockwise and clockwise in the southern hemispheres.

Types:

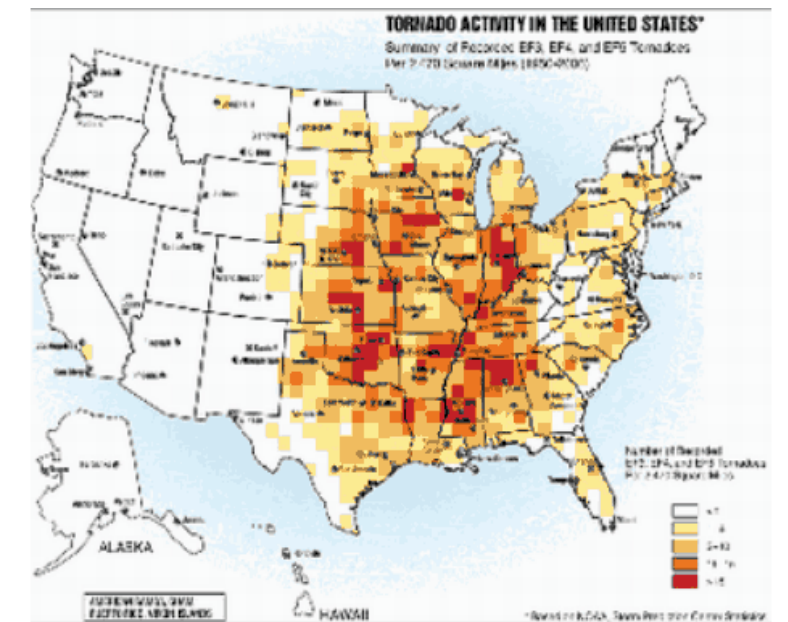
Water spouts
Dust devils
Steam devils
Fire whirls.

Classification of a tornado is based on wind speed on a F-1 to F-5 scale.

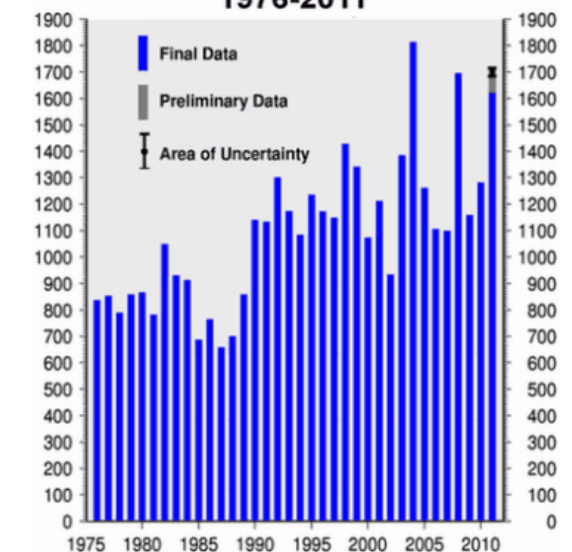
Safety Protocol:

Find shelter (preferably underground)

Keep watch for signs of danger like dark, greenish skies and large hail

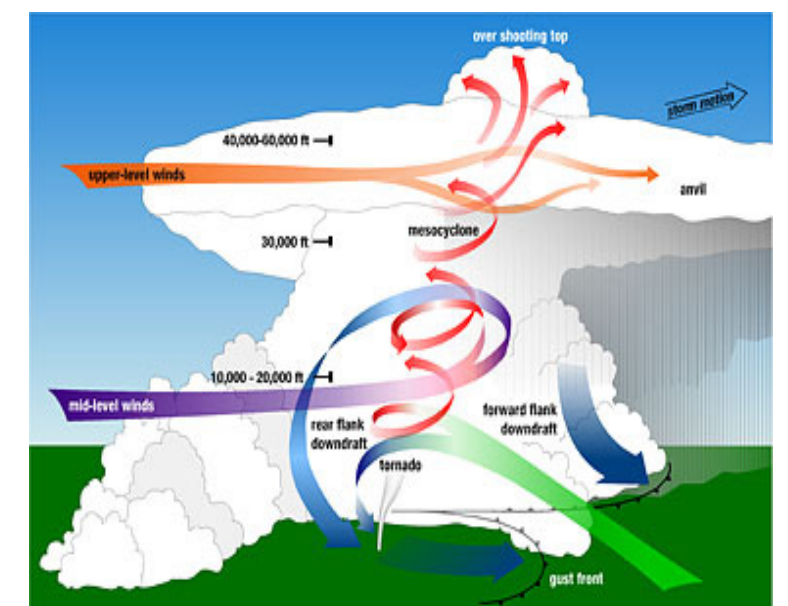


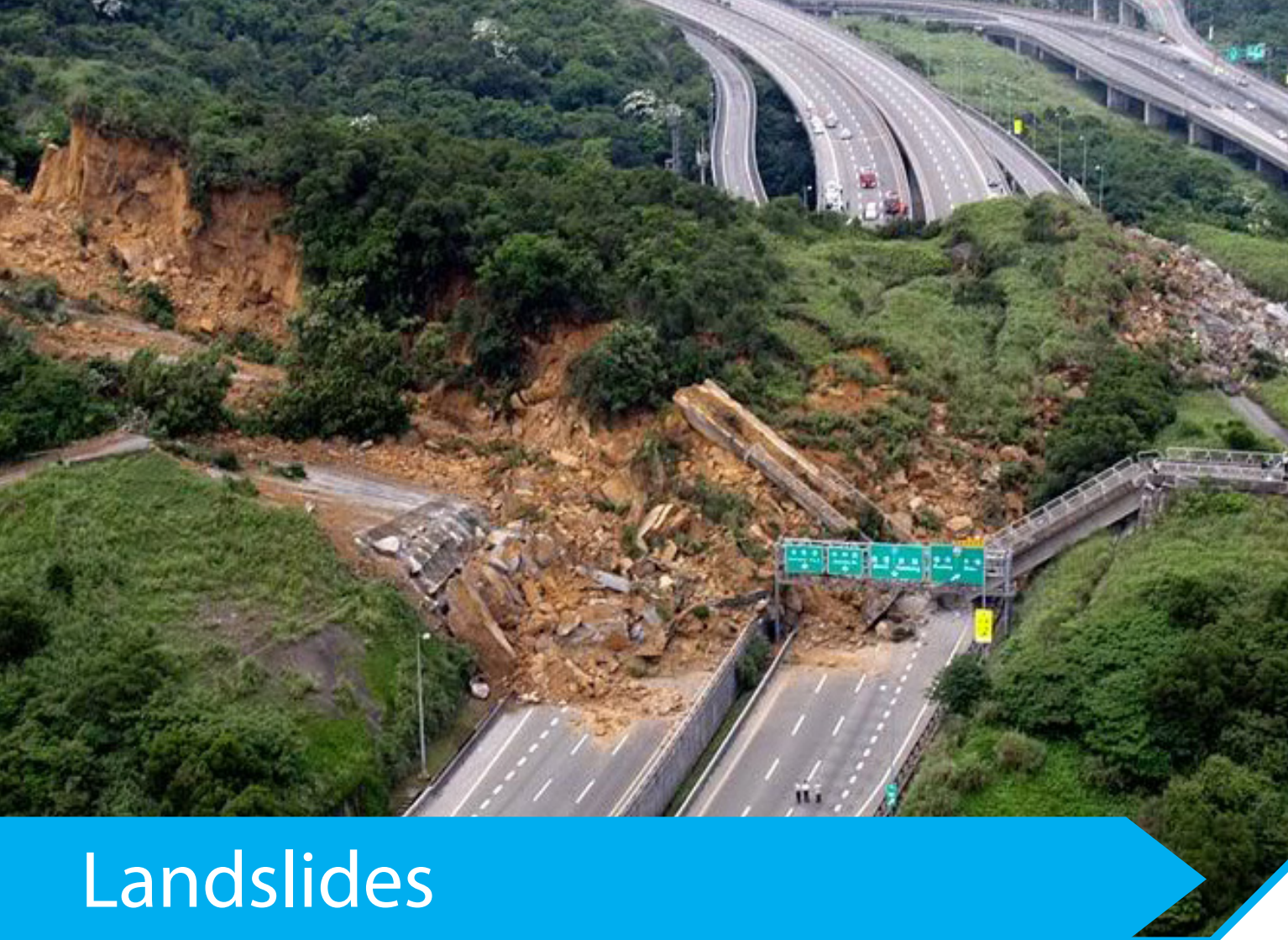
Jan-Dec Total Number of Tornadoes 1976-2011



Fact:

Most likely to occur between 3 & 9 pm, but can occur at any time.
-They can accompany tropical storms & hurricanes once on land. Rescue workers have compared the destruction left by a tornado to that of a bomb.





Landslides

What It Is:

Wide range of ground movements occurring in offshore, coastal, and onshore environments when a slope becomes unstable.

Cause:

- Groundwater
- Loss of vegetation
- Forest fires
- Ferosion
- Earthquakes
- Volcanic eruptions
- Human activities can all cause landslides.

Damage:

Destroy houses
Obstruct roads or paths
Pollute water sources with debris
Damage wildlife

Types:

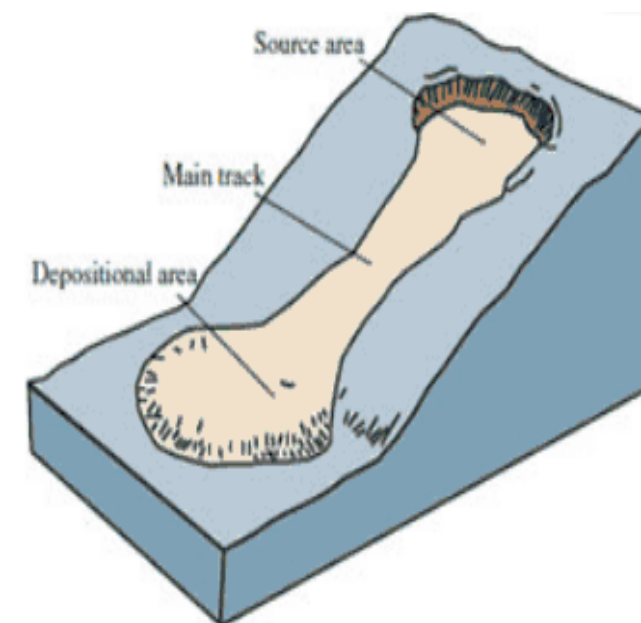
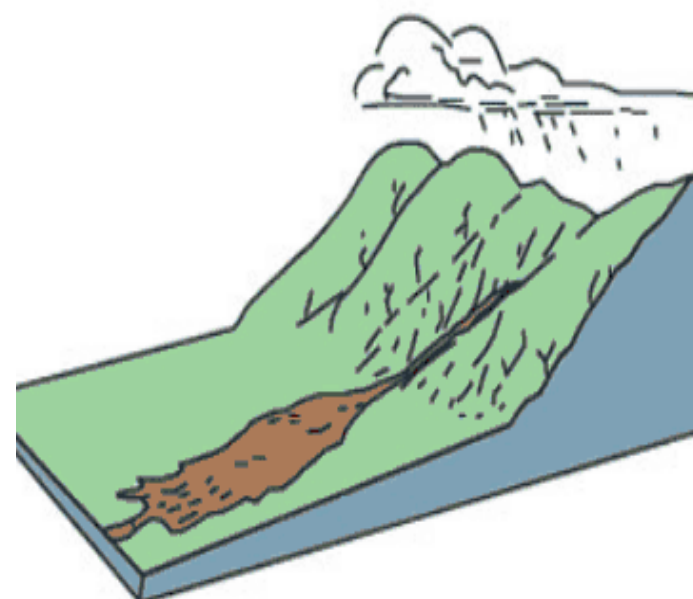
Debris flow
Debris landslides
Earth flow
Creep

Safety Protocol:

Look for warning signs and avoiding hazard areas.

Protection:

Build barriers to support slopes that allow water drainage, planting vegetation, covering slopes with impermeable surfaces, and channeling drainage away from slopes.



Fact:

The largest landslide ever recorded was the Heart Mountain Landslide that occurred in Wyoming. The debris was 1600 feet thick and spread over 400 square miles.



Storms

What It Is:

Any disturbed state of an astronomical body's atmosphere especially affecting its surface.

Produces:

- Strong winds
- Hail
- Thunder
- Lighting
- Rain or Snow
- Tornado

Types:

- Ice storms
- Blizzards
- Snow storms
- Ocean storms
- Firestorms
- Dust devils
- Squall
- Gale
- Thunderstorm
- Tropical cyclone
- Hailstorm

Safety Protocol:

Stay indoors on the innermost, first floor room, away from windows.
Make sure to keep your necessities in an emergency kit.



Danger:

Cloud to ground lightning from storms can ignite wildfires and occasionally strike people, causing death
Acid rain is also a risk posed by lightning

Case Studies



Hurricane Rita
September 2005, US Gulf of Mexico



□ Sumatra Tsunami

December 26, 2004
Sumatra, Indonesia



Overview:

- 9.1 magnitude earthquake off the coast of Sumatra with a depth of 30 km caused the 1300 km long tsunami.
- The strongest earthquake in 40 years.
- Maximum height was 50 meters.
- Reached 5 km inland near Meubolah, Sumatra.

Devastation:

- Vertically displaced the sea floor several meters along the length of the Sumatran coastline.
- 10 billion dollars in damages.
- 230,000 reported deaths.
- Half of the deaths were from Indonesia
- Sri Lanka, Thailand, & India saw many casualties.
- Affected 18 countries around the Indian Ocean
- Relief organizations around the world still continue to provide aid to affected countries



□ Hurricane Katrina

August 23-30, 2005

US Gulf Coast: New Orleans



Overview:

- Before landfall, relief organizations move people & supplies, using coastal warehouses.
- Mandatory evacuation problem:
 - Not enough transportation
 - Some preferred to stay
 - Officers used to "persuade" residents to evacuate
- Shelter (Superdome) was equipped with:
 - Security
 - Medicine
 - Food
 - Water

Devastation:

- 14 dead.
- 460 million dollars in damages.
- Several families are still displaced.
- Disaster victims in the Superdome had to be evacuated to the Houston Astrodome
- Disaster caused an outbreak in crime that was even seen in public relief shelters.
- One of the shelters held 187 people at once
- Trailers brought in for victims were contaminated with Formaldehyde.

Aid:

- FEMA & Louisiana National Guard transported & distributed water, ice, & food.



□ Hurricane Ivan

September 2004, Gulf of Mexico



□ Typhoon Fengshen

June 17-26, 2008

Hong Kong, China, Philippines



Overview:

- Made landfall in the Philippines June 18th 2008
- Affected south China & Hong Kong
- Maximum sustained winds were near 140 km/hr with gusts of 170 km/hr

Devastation:

- Philippines
 - 229 killed.
 - 143 houses damaged.
 - Thousands homeless
 - \$12.6 million in agricultural losses
- Cruise ship capsized, 800 missing.

- South China
 - Flooding & landslides.
 - 17 killed & 7 missing
 - 13,000 houses collapsed
 - Damages cost 1.2 billion yuan
- Hong Kong
 - Landslides
 - Buildings damaged
 - Few injuries, no casualties

Aid:

- Relief rice supply was spoiled before distribution.
- Tzu Chi volunteers distributed aid & provided a free clinic for 1,810 households at the Balantang indoor gymnasium.



□ Sichuan Earthquake May 2008, Sichuan, China



□ Hurricane Ike

September 1-14, 2008

US Gulf Coast: TX, MS, LA



Overview:

- Galveston Bay saw water levels fo 15-22 feet.
- Despite dire warnings of storm surge & certain death from forecasters, an estimated 40% of Galveston's residents did not evacuate.
- 3rd costliest hurricane to make landfall in the US.
- Highest winds reached 145 mph (230 km/hr)
- Reached 600 miles in diameter.
- Classified as a category 4 hurricane

Devastation:

- \$19.3 billion in damages
- 114 deaths (74 in Haiti)
- Many shoreline communities were wiped from the map.

Aid:

- FEMA positioned supplies & emergency response crews in FL & along the Gulf Coast.
- Residents evacuating ahead of Ike were received by emergency workers in the Dallas/Fort Worth Metroplex & provided shelter, medical treatment, & provisions until Ike passed.
- Special needs populations & infirm evacuees, were flown out on military planes.



□ Cyclone Nargis
April-May 2008, Burma



□ Japan Tsunami

North Pacific Coast, Japan
March 11, 2011



Overview:

- Began with a magnitude-9.0 earthquake off the northeastern coast on Honshu, Japan.
- Reached 800 km/hr

Devastation:

- A wave 33 feet high inundated the coast & flooded parts of the city of Sendai, including its airport & the surrounding countryside.
- Killed more than 18,000 people.
- Thousands of people were missing—including, in some cases, half or more of a locality's population.
- Cost \$235 billion in damages

Aid:

- 452,000 people were relocated to shelters.
- Some residents are still displaced.
- Rescue workers & the Japanese Self-Defense Force were called to help.
- The Japanese government requested that U.S. military personnel stationed in the country be available to help in relief efforts.
- Several countries sent search-and-rescue teams.
- Several countries & relief organizations like the Red Cross & Red Crescent pledged financial & material support.
- Bad weather often hampered relief efforts.
- More than 300,000 displaced residents lived in thousands of temporary housing units.



□ Earthquake January 2010, Haiti



□ Cyclone Phailin

October 4-14, 2013

India



Overview:

- India's strongest cyclone in 14 years (category 4).
- Made landfall with a 140 mph wind speed & India's eastern coastline.
- Upon landfall, the eye of the storm collapsed, spreading the force winds & a 20-30 ft storm surge.
- Cyclone activity lasted approximately 36 hours
- India experiences two cyclone seasons a year.
- The Indian Ocean's waters are warm, making it a hurricane hotspot.

Devastation:

- Affected 12 million people and displaced more than 500,000 people.

- Pre-storm evacuation addressed 1 million people, as a result only 14 deaths occurred (smaller 1999 cyclone killed 10,000 people)
- Housing in India is already unable to withstand a weaker hurricane.
- Gaping holes left in building, boats were overturned, and power outages occurred.

Aid:

- Officials in Orissa and Andhra Pradesh stockpiled emergency food supplies and set up shelters
- Indian military provided transport vehicles for relief operations
- 250 emergency sturdy shelters
- Food assistance was provided to severely impacted villages



□ Tornado
May 2013, OK,



□ Typhoon Haiyan

November 2-11, 2013
Philippines



Overview:

- Resulted in high winds, coastal storm surges, heavy rains, mudslides, & flooding in affected areas.
- Winds reached 195 mph (314 km/hr).
- Strength equalled a category 4 or 5 hurricane.
- Made landfall in the Guiuan on the island of Samar at 4:40 am local time on November 8.

Devastation:

- 5 million people left homeless
- Boats hurled inland
- Buildings collapsed
- Over 8,000 deaths occurred.

Aid:

- Rescue & relief efforts began immediately in the Philippines
- Destruction severely hampered relief efforts
- Major cities like Tacloban were initially almost unreachable.
- United Nations agencies, international relief organizations, and several foreign countries joined the Philippine government in providing aid.
- A U.S. Navy aircraft carrier & helicopters delivered supplies to affected areas



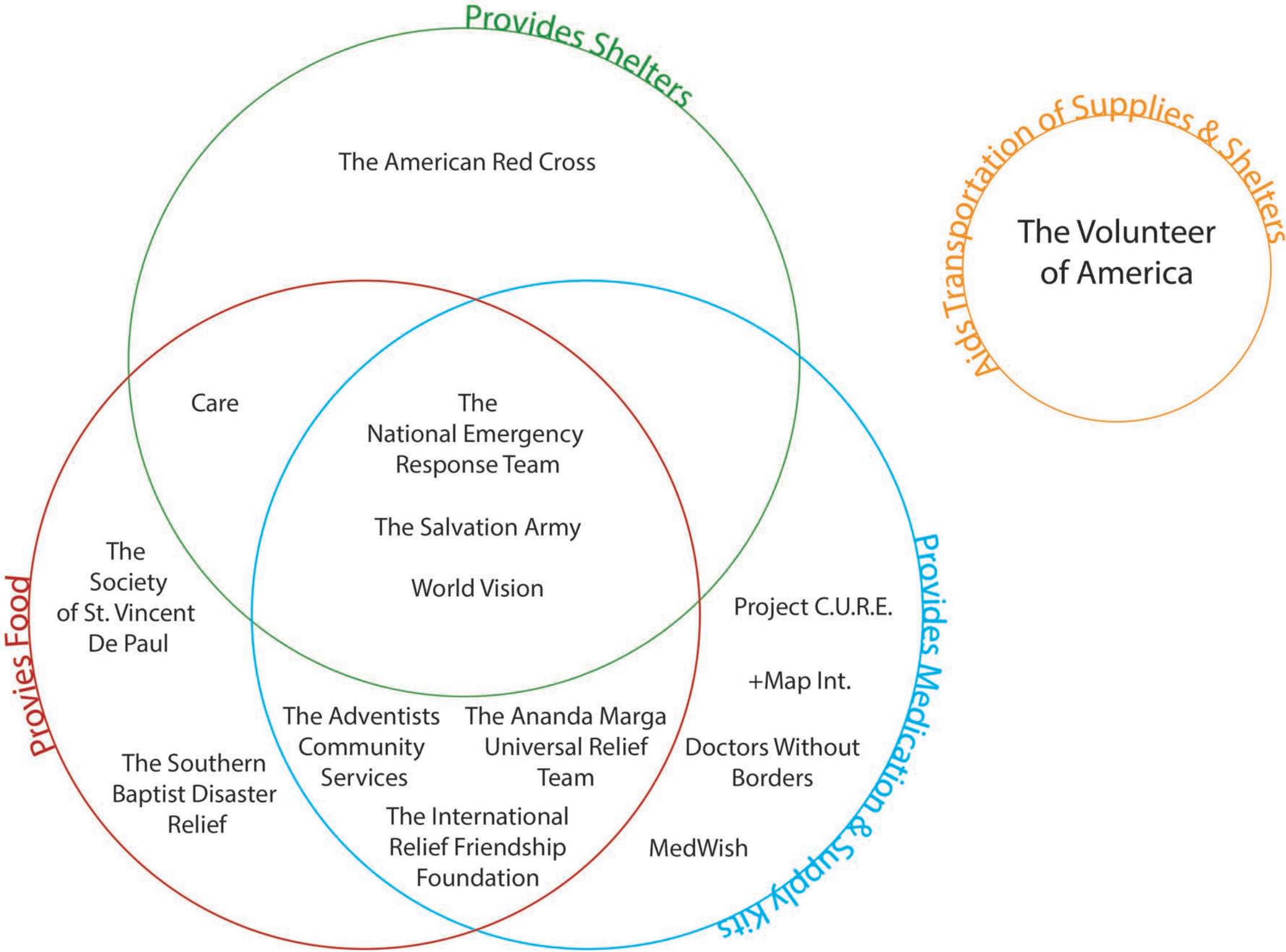
□ Hurricanes Manuel & Ingrid
September 2013, Mexico

Relief Organizations

Stakeholder Map



Relief Organizations Venn Diagram



Care

Strategy:

Special focus on working along side poor women. With the proper resources, women can help whole families & communities escape poverty.

Draws strength from global diversity, resources & decades of experience

Promotes innovative solutions.

Advocates global responsibility.

Facilitates lasting change by:

- Strengthening capacity for self help
- Providing economic opportunity
- Influencing policy decisions at all levels
- Addressing discrimination
- Delivering emergency relief

Annually responds to about 30 disasters affecting 11 million lives.

Has emergency-response experts on the ground in 69 countries.

Typhoon Haiyan

Response:

Provided more than 88,630 people with food packets

Food packets include:

- rice, canned tuna, potted meat, beans, oil & high-protein biscuits

Rice distributed: over 88,185 lbs

Distributed tarps, tents, tools, kitchen sets, mosquito nets, high quality shelter repair kits.

Distributed 20,00 shelter kits

Fastest Shelter kit assembly time 1 hour

Long-term approach:

- Training local carpenters & community members on improved building techniques to make homes sturdier
- Holding information sessions
- Having roving teams of local building experts available to offer helpful advice.



World Vision

Strategy:

- Respond first with life-saving emergency aid & stay for the long term to help families recover & rebuild.
- First hours after disaster:
 - Staff members closest to the disaster respond with reports on severity & need.
- Within 24 hours:
 - Make assessments & begin to provide relief.
- Within 72 hours:
 - Transport & distribute pre-positioned relief supplies from local & international warehouses.
- First week:
 - Continuously distribute emergency aid & relief.
- Following month:
 - Provide temporary shelter, water, hygiene, child protection, health care, & economic opportunities.

Global Rapid Response

Team:

- Relief managers
- Program officers
- Specialists in health & nutrition
- Human resources
- Finance
- Logistics
- Security
- Food aid
- Child protection
- Information technology
- Communications

Typhoon Haiyan

Response:

- Aided 311,00 people (goal: 400,000)
- Provided:
 - Food
 - Blankets
 - Mosquito nets
 - Tarps
 - Hygiene kits
 - Emergency shelter
 - Child-Friendly Spaces
 - Maternal aids
 - Livelihood restoration



Project C.U.R.E.

Founder:

Dr. James Jackson

Distribution:

Warehouses in

Arizona

Colorado

Texas

Tennessee

Local collection sites throughout
many other states

Aid extends to over 130 countries

Kits for kids:

Individual purchase bag from CURE

Filled with at least 10 of following:

Junior acetaminophen (tablets)*

Junior ibuprofen (tablets)*

Box of adhesive bandages*

Triple antibiotic ointment*

1% hydrocortisone cream*

Bar soap*

Toothbrush*

Hand sanitizer*

Elastic bandage

Comb or brush

Facial tissues

Tweezers

More options shown on site

<http://www.projectcure.org/>

Kits:

Suitcase sized = 31" x 18" x 13.5"

Weights around 48 lbs

Contains

Exam items

Gloves

Glocuse test

Wound care

Dressings

Bandages

Personal hygiene

Oral and skin care

Sterile items

Syringes

Catheters

Basic equipment

Thermometer

Stethoscope

IV supplies

Water purification



+Maps International

Founder:

J. Raymond Knighton

About:

Founded in 1954 after large donation of \$25,000 was made
Delivers medicine to more than 115 countries annually
Offices in 9 countries
Mostly supplies medical help in form of drugs

Donors:

Johnson and Johnson
Merck
Pfizer
Mylan
Actavis, Inc.

Partners:

World Vision
Partners in Health
International Medical Corps
Christian Aid Ministries

Kits:

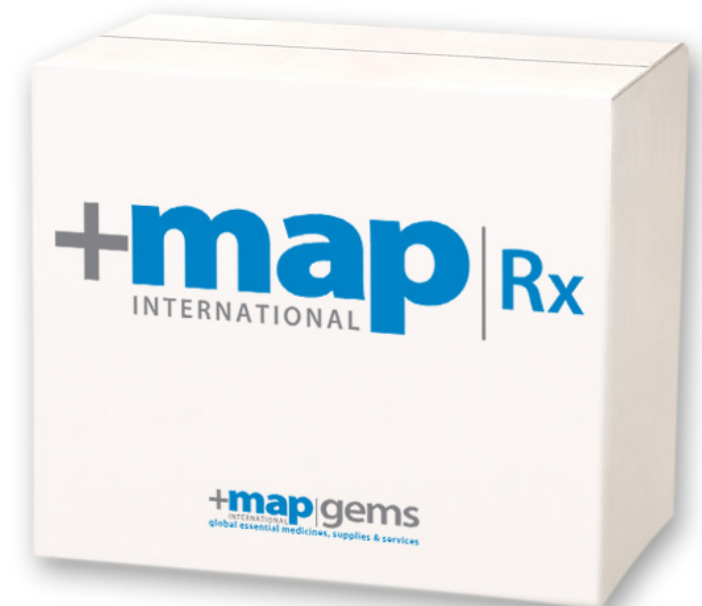
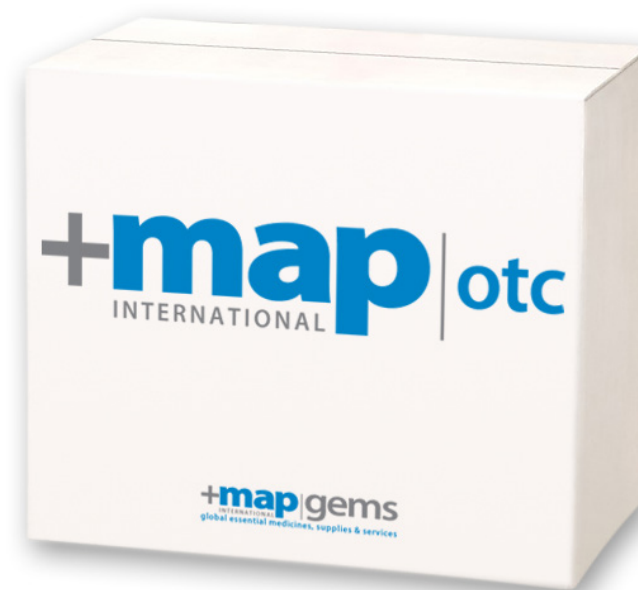
Offers packs to individuals

Medical Missions Essential Pack
350 treatments
\$6500 worth of donations
Service fee \$250
1.6 cubic foot = 17" x 11" x 14"
30 lbs

Medical Missions Essential+ Pack
Two Essential packs
Service fee \$400
50-65 lbs

Medical Missions OTC Pack
(over the counter drugs)
375 treatments
\$2,200 worth of donations
Service fee \$150
1.1 cubic foot

Medical Missions Rx Pack
(pharmasutic drugs)
300 treatments
+\$8,000 worth of donations
Service fee \$200
1.1 cubic foot



Doctors Without Borders

About:

Created in 1971 by doctors and journalists in France
Provides assistance in more than 60 countries

For those threatened by violence, neglect, or catastrophe
Received Noble Peace Prize in 1999

Treatment and Research:

Malaria
HIV/AIDS
Sleeping sickness
Kala Azar
Chagas Disease
Many others...

Funding:

Independently funded by private, non-governmental sources
3.8 million from donors in 09'
Conducts ground evaluation before opening programs

Personal:

Over 27,000 individuals
19 offices world wide

Medical Kits:

Custom-designed varies by
Situations
Geographic conditions
Climate
Medical need

May contain supply for operating room or treatment for epidemics

Operating Tent:

Shelter made by Eurovinil
Inflatable within one hour
PVC coated fabric
Three modules = 105 square meters
Easy transport = 1.5 cubic meters
Can be wired for climate control
Set up contains
2 operating theaters
100 beds



MedWish

Founder:

Dr. Lee Ponsky

Purpose:

Repurposing leftover medical supplies and equipment
Sending supplies to developing countries

Service Fees:

Freight Overseas
40' container - \$7,500
20' container - \$4,500

Freight Domestic
20' box truck - \$2,000
Pallet - \$400

Hand-carried supplies
Custom packed and shipped - \$3/lb
Self-service shopping - \$1/lb



<https://www.medwish.org/>

CERT Team Medical Kit

Supplier:

Chinook Medical Gear Inc.

Size and Cost:

Pack = 23" x 12" = 13lbs
Filled pack = \$735
Contents = \$439



<http://www.chinookmed.com/cgi-bin/item/01010PA/hb-kits/-CERT-Team-Medical-Kit->

Existing Shelters

Ex-Container Project

Designer:

Yasutaka Yoshimura Architects

Specs:

Made from stacked donated shipping containers

Term length:

Med to long term use

Can become permanent residences



Oceansafe

Designer:

Judith Kinnard, winner of New Orleans Sustainable Design Competition

Size and Cost:

1,000 square feet

All materials fit within shipping container

Roughly \$100 per sq ft

Specs:

Made from structural steel insulated panels

Completely off grid

Solar cell lined roof with wind turbine

Water collection off roof for bathing, toilets and irrigation

Made to withstand

Category 5 hurricane winds

Fires

Floods



IKEA Shelter

Specs:

Solar paneld roofing provide light source
Flat-pack pieces snap onto frame
Can be build within four hours

Term Length:

Short to med term
Shelter last up to three years

Size and Cost:

188 square feet, twice the size of standard refugee tents
Around \$1,000 per shelter



Shelter In A Day

Size and Cost:

12' x 12' = 144 square feet = \$4,990
Shipping size: 4' x 8' x 3'
12' x 16' = +48 square feet = +\$950
Shipping size: 4' x 8' x 42"

Term Length:

Med to long term

Other Parts:

Paintable membrane roof = \$100
Steel or canvas roof = \$300

Specs:

'Tool Free Joints' snap together using locking pegs
Can be build in a day with a hammer
Crafted from waterproof, recycled wood fiber material
Resistant to
Termite
Rust
Rot



<http://inhabitat.com/ikeas-solar-powered-flat-pack-shelters-approved-for-syrian-refugee-housing/>

<http://www.shelterinaday.com/>

Quick Hab

Designer:

Green Horizon Manufacturing

Size and Cost:

4 x 4 = 215 square feet = \$14600

4 x 6 = 310 square feet

4 x 8 = 410 square feet

Term Length:

Short to med term

Specs:

Flat-pack, modular housing system

4-foot-wide sections that lock together onto frame

Anti-microbial walls resistant to mold

Built along with a power and water supply hub (shown below)



Central Service Unit

Designer:

Green Horizon Manufacturing

Power Supply:

Solar panel siding

Hydrogen fuel cell

Back-up diesel generator

Up to 74 kW if running together

Water Supply:

Reverse osmosis filter

Provides 19,000 gallons per day



<http://inhabitat.com/quickhab-is-a-flat-pack-house-for-emergency-or-low-income-housing/quickhab-8/>



<http://www.greenhorizonmfg.com/products/renewable-energy-water-filtration/csu-40>

Ablenook

Designer:

Jason Ross and Sea Verdecia

Term Length:

Med to long term

May be used as:

- Prefab housing

- Modular classroom

- Office space

- Military application

Specs:

Extruded Aluminum for frame

Al structural panels clip to frame

Can be built in under two hours

Adjustable footing for leveling

Arched roof collects rainwater

Solar panel covered roof

Size:

Customization range and rooms

- Single wide

- Double wide



Accordion reCover

Designer:

Matthew Malone, Amanda Goldberg,
Jennifer Metcalf and Grant Meacham

Term Length:

Short term

Up to a month but can last longer

Used as first response structure

Specs:

Made from 100% recyclable

polypropylene

Ships in flat sheet

Single person set up

Folds allow for water collection

Local materials can be used as

insulation over shelter



ShelterBox

Founder:

Tom Henderson

Sponsors:

International Rotary clubs
School and church groups
Individuals
Businesses

Whole Foods Market
McDonald's
Lumber Liquidators
Mountain Hardwear
Urban Zen Foundation
O'Melveny & Myers LLP

Term:

Short to med term use
Designed for up to 6 months
In use for over a year in Iraq

In the Box:

Shelter

Designed by Vango

Fit up to 10 people

Thermal blankets

Insulated ground sheet

Mosquito net

PermaNet = \$30 to \$60 each

Water Purification system

Life Straw = \$90

Provides up to 18,000 liters

Enough for 3 years per family

Basic tool kit (Axe, saw, shovel...)

Metal cooking equipment

Option of two different stoves

Multi-fuel stove = \$100

Wood stove = \$250

Frontier stove

Entertainment (Coloring books...)

Package Specs:

Packaged by volunteers in Helston,
Cornwall, England

Standard box weighs 120 lbs

Fits within 49 gallon container

33" x 24" x 22"

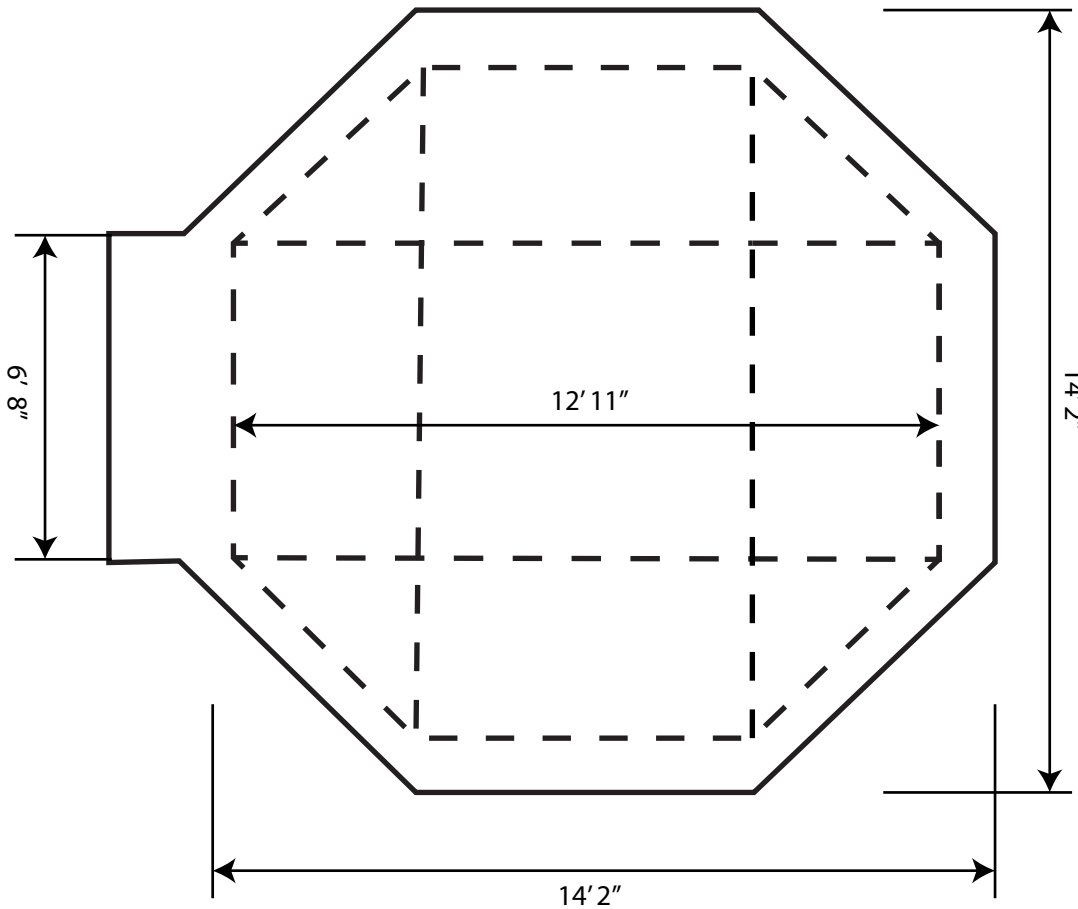
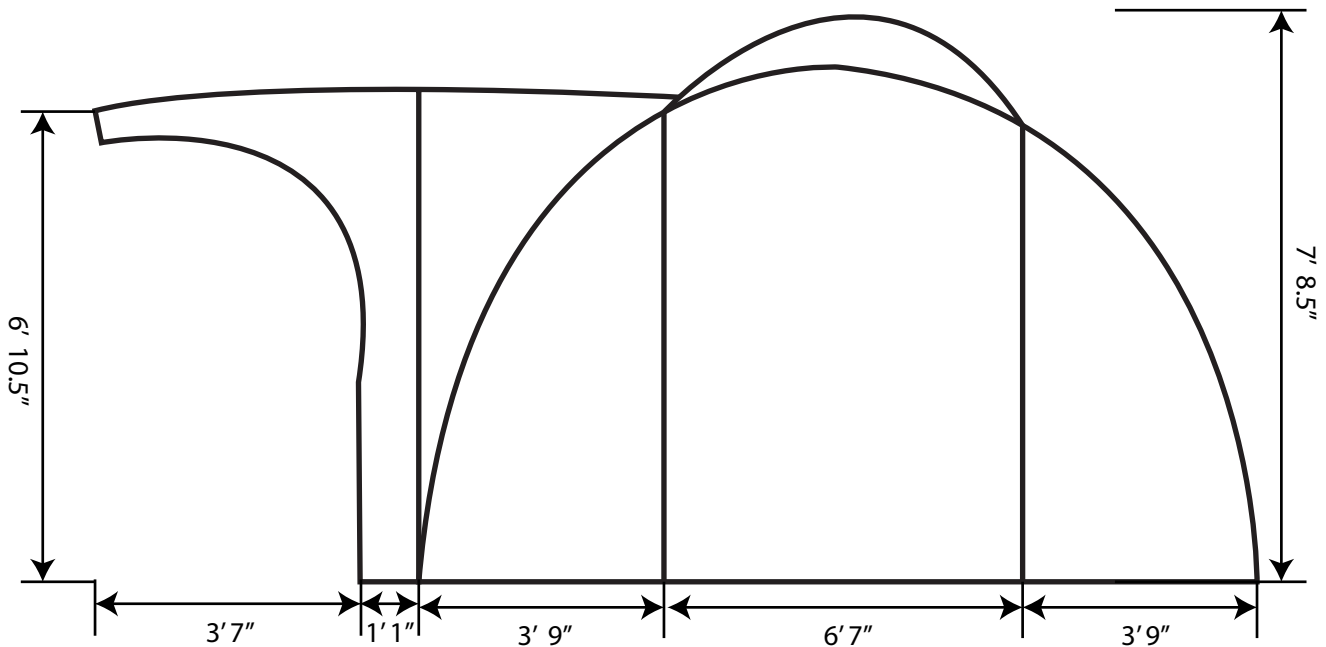


The Shelter:

Size: 14' round
People: 10 total
Weight: 32 kg

Specs:

Tent Material: Polyester
Pole Material: Fiberglass
Groundcloth: Polyethylene
UV-protective coating
Fire Resistance



Shelter Systems

Founder:

Bob Gillis

Sponsors:

Shelters bought by relief organizations

Term:

Short to med term use

Size and cost:

Pricing varies on amount

Sold only to relief organizations

14' diameter = 100 @ \$340 each

18' diameter = 100 @ \$418 each

30' diameter = 50 @ \$880 each

Set up:

Fully enclosed

Partial enclosed

Kits:

Option of 4 or 6 family kits

Includes:

20' or 30' shelter

Electrical generator

Propane Heater

Refrigerator

Propane Cook Stove

Water Heater

Shower

Basic furniture

Kitchen sink table

Folding chairs

Folding table

Lighting

Sleeping equipment

Folding cot

Sleeping bags

Toilet

Cooking equipment

Extension cord

Wind-up radio

Game Board



The Shelter:

Size: Variety of sizes

People: Varies

Specs:

Tent Material: Ripstop

Pole Material: PVC

Based off geodesic domes

Can be set up within 30 minutes
without tools

Different colors and opacity provides
shade from sun when needed

Four flap doors with skylight
windows above

Interior can be divided into rooms

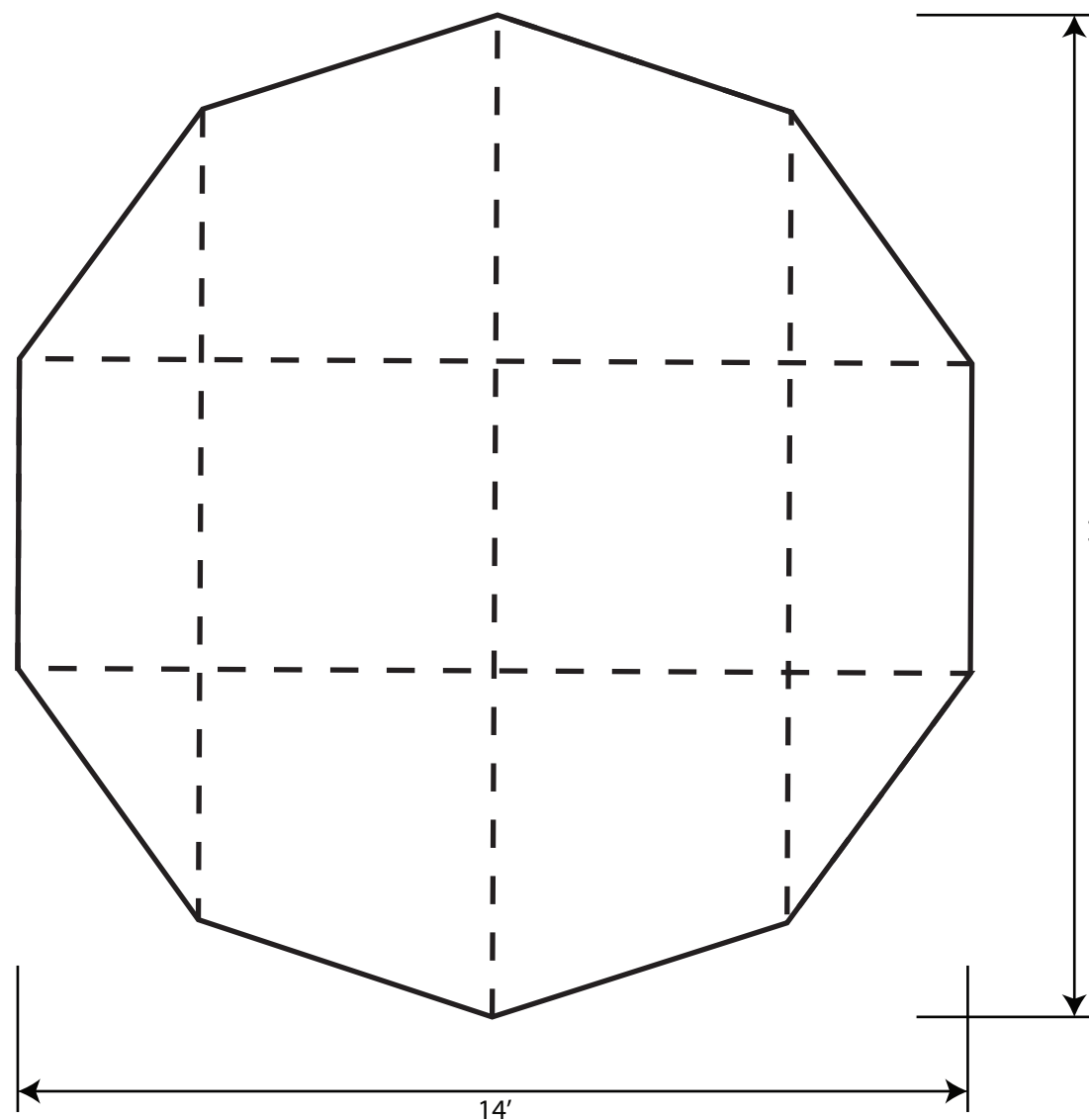
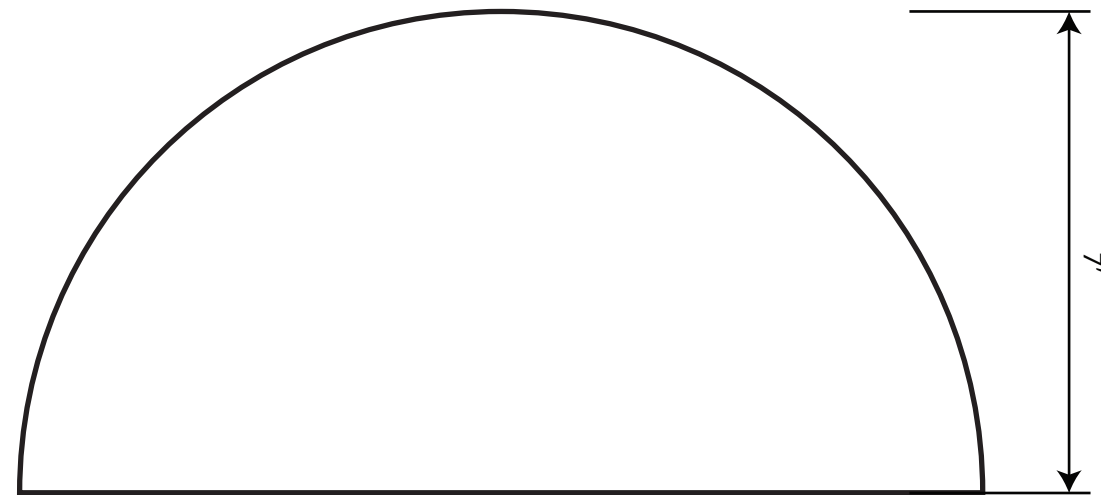
Adaptable to climate

Liner for cold

Sunshade to block sunlight

Patented grip clips hold up structure

Poles do not come into contact with
fabric reducing issues with wear



Material Research

Pole Material

Nanolight

High strength aluminum
Aerospace 7075-T9 alloy

Used in high end backpacking tents



Carbon

High-end poles in backpacking tents
Half the weight of Al
More expensive than Al
Can be used in an Al/Carbon hybrid



Aluminum

Light weight
Bends instead of breaking
Usually covered with protective coating
Integrated connectors

DAC Featherlite NSL:

Produced with fewer emissions
Made by DAC, Korea



Fiberglass

Cheaper but weaker than Al poles
Can be solid or tubular
Does not rot or corrode
Becomes fragile when cold or as it ages
Coating helps protect from shattering when stressed
Has steel connection points



Tent Fabrics

Nylon

Begins to decay in prolong exposure to sun

Requires UV coating

Other coatings:

- Silicone - most expensive

- Polyurethane

- Acrylic - cheapest

Coatings protect against UV, decay, and water, etc...

Ripstop:

Cost: \$6.95-12.95/yd

Width: 62"

Weights: 1.1, 1.3, 1.9

Dimensions: 60" x 68"

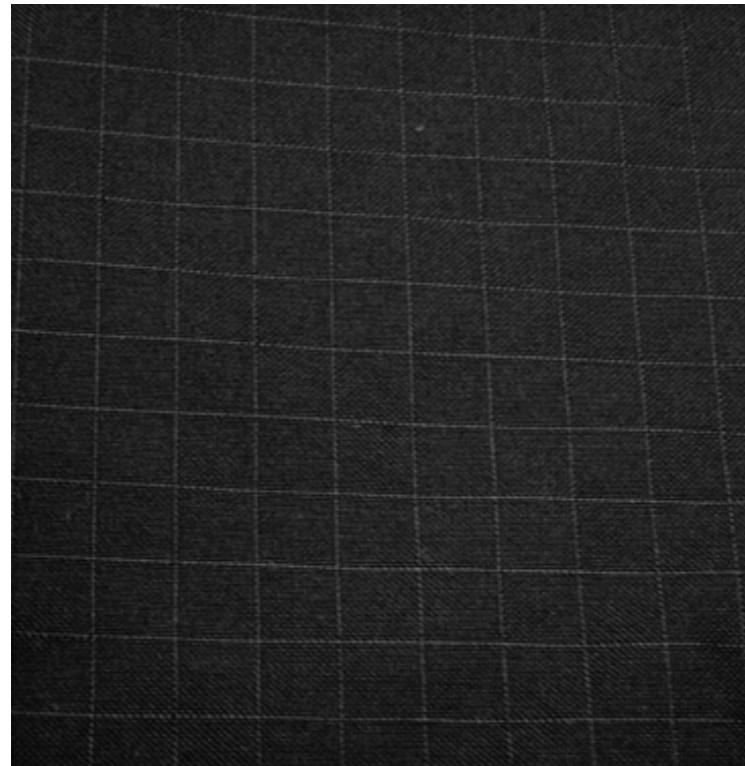
Comes in many coatings

Oxford:

Cost: \$17.95

Width: 54"

Heat sealable coating allowing it to bond together or with other heat sealables



Polyester

Not as durable as nylon

Hydrophobic in nature

Breathable

Heavily recycled

Coatings:

- Acrylic

- Vinyl

Mildew, UV, oil, & salt resistant with coating

Often blended with cotton for more color selection

Vinyl Coated Polyester:

Cost: \$13.99-21.95

Width: 60"

Weights: 10, 14, 18, 42

Tough mesh fabric

Upcycled Sailcloth:

Comes in either woven or laminated

Recieved from old racing sail boats

Variety of sizes

Gives character, making each piece unique



Vinyl

Durable
Waterproof
Resistant to dirt, mildew, oil, salt, chemicals & UV
Usually used as a coating over other materials such as polyester
Can be glued & sewned

Clear Window Vinyl:

Cost: \$6.50/yd
Width: 54"
Thickness: 12 mil
Used for windows in boats and pockets
Made by Seattle Fabrics, Inc.

Vinyl Reflective Tape:

Cost: \$2.50-3.50/yd
Width: 1.5", 2"
Available in Silver & Yellow
Made by Seattle Fabrics, Inc.



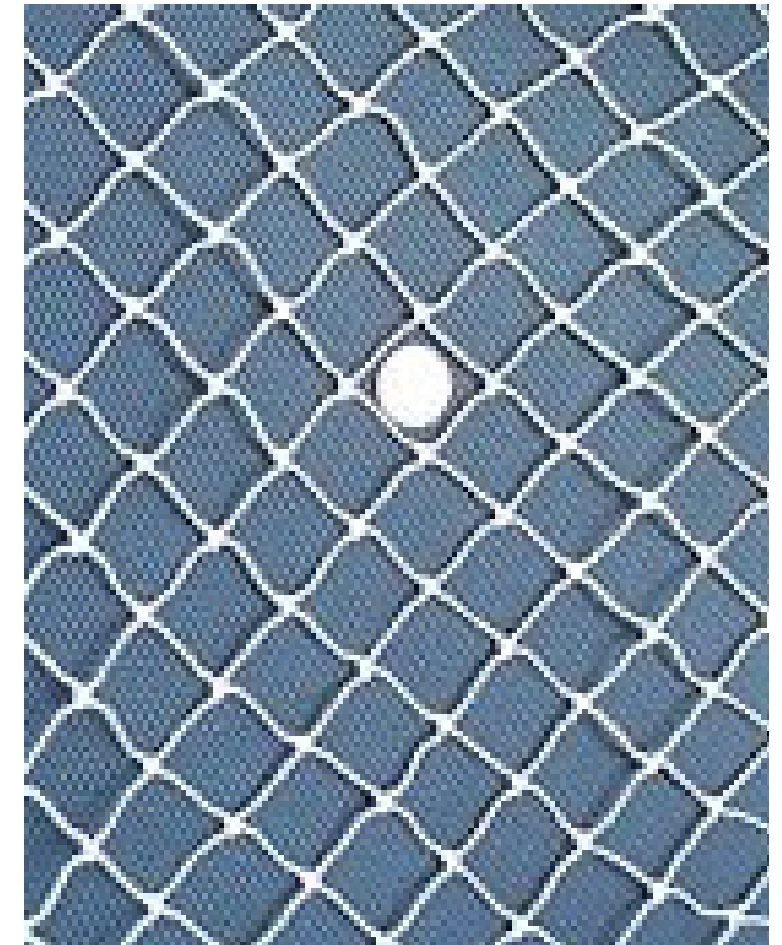
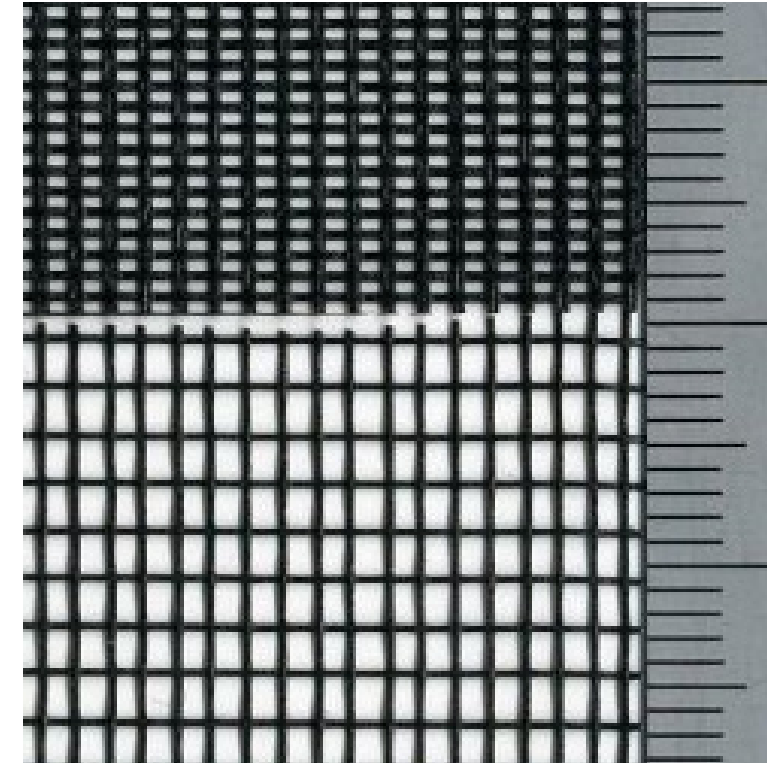
Mesh

No-See-Um Mosquito Netting:

Cost: \$2.99/yd
Width: 54"
Available in 4 colors
PVC coated Fiberglass
Made by Seattle Fabrics, Inc.

Upcycled Lacrosse Goal Netting:

Cost: \$1.19/sq ft
Mesh Size: 1"
Twine size: 2.2 mm
Knotless Nylon Netting
210 D Type-6 UV treated
100 % American Made



Polyethylene

Bulky and heavy
Hard to form back to original shape
Usually used in flooring

Upcycled truck tarps:

Taken from used truck tarps that are first washed
Decals on tarps make each piece unique
Dimensions: 54' x 12'
Other sizes available



Insulation

Possible use to provide more thickness to ground cover and to protect users from cold earth underneath

Pre-Quilted Insulation:

Cost: \$12.95/yd
Width: 60"
Polyester insulation quilted with a lightweight taffeta face
Made by Seattle Fabrics, Inc.



Webbing

Tubular Nylon Webbing:

Cost: \$1.50/yd
Width: 1", 2"
Tubular structure adds extra strength
Available in many colors, but only black in 2"
\$125 per 100 yd roll
Made by Seattle Fabrics, Inc.

7400 Nylon Webbing:

Cost: \$1.25/yd
Width: 3/4"
Heavy flat webbing



Other

Shock Cord:

Cost: \$0.49/yd
Thickness: 1/8"
Bungee cord that connects poles



Interviews & Survey

Interviews

Relief Service

1. What point during, before or after do you began your relief services?
2. What kind of relief do you supply? Does it vary based certain factors?
3. What steps do you take on providing relief?
4. Are you officially partners with / sponsor/ are sponsoring any other organization?
5. Are you a profit or non-profit? If profit, how do you get relief, supplies, and etc.

Victims

1. What kind of disaster did you experience?
2. What loses (material and personal) did you experienced?
3. What kind of aid did you receive if any?
4. What were you surprised with the aid you received?
5. What did it take for you to return to a normal state of living?

Someone who never experienced a natural disaster

1. Have any major natural disaster occur during your lifetime?
2. How did you react to the devastation it caused?
3. Did you provide relief in any way(donation etc.)?
4. Do you know anyone who have been in a natural disaster?
 - a. If so, what do you know of their experience? Did you help them aid in anyway?
5. What 3 items would you take if an emergency evacuation occurred?

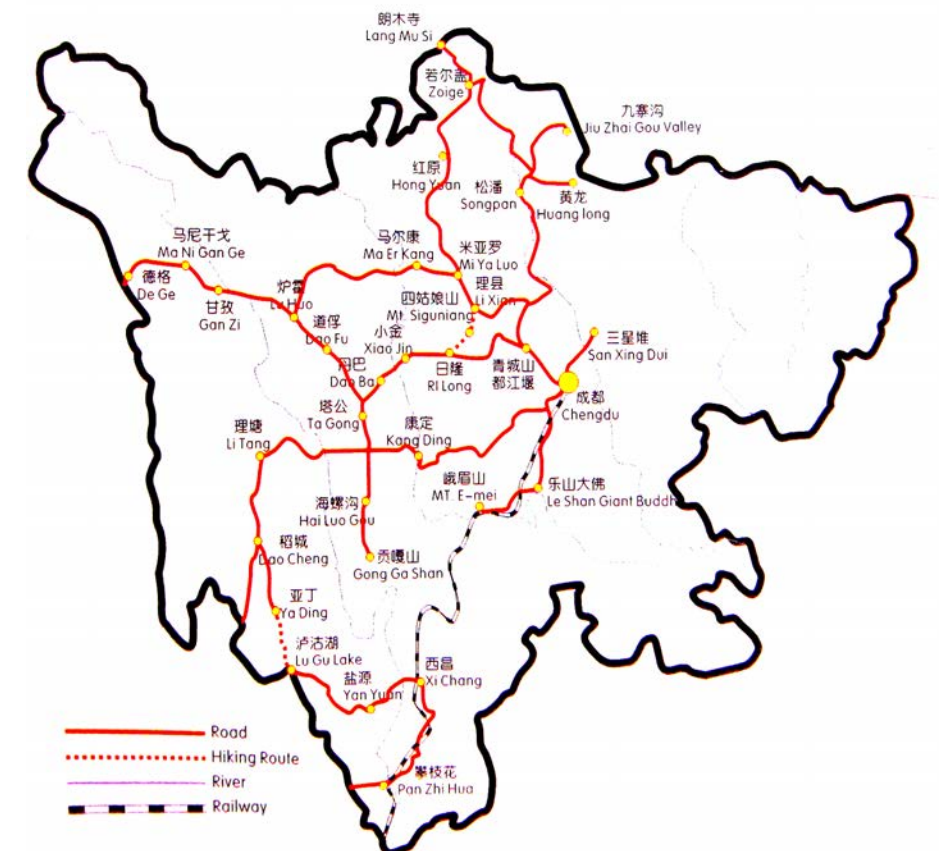
Victim Interview

Siji Chen

China, Chengdu

22 years old

1. What kind of disaster did you experienced?
-SiChuan Earthquake
2. What loses (material and personal) did you experienced?
- None of the loses were direct
- A lot of building was shaking dramatically and the school was forced to shut down so the students had to stay overnight on the fields
- A lot of the death that happened were caused because of people's unconcerned. They thought it wasn't a big deal and when they realise it is, it was too late already.
3. What kind of aid did you recieved if any?
-None, because it wasn't as devastated in my area, so instead of recieving aid, we went to the severe area and helped out others in need.
4. What did it take for you to return to normal state of living?
-A month later, student went back to school, but even until now the situation haven't completely Vwent back to what it was like before the earthquake.



Non-Victim Interview

Brittany Yang

Taipei, Taiwan
22 years old

1. Have any major natural disaster occur during your lifetime?
 - 921 Earthquake
 - Hurricane Katrina
 - 88 Flood
2. How did you react to the devastation it caused?
 - I tried to helped out. My family wasn't really affected by the disaster but we tried to help those that were. I went to visit some places taht was affected and bought them daily products.
3. Did you provide relief in any way(donation etc.)?
 - I did donations and provided daily products. In 921 earthquake, I donated clothe, books and all of my dolls
4. Do you know anyone who have been in a natural disaster?a.
If so, what do you know of their experience? Did you help them aid in anyway?
 - Yes, I have a friend from Malaysia and her places flooded and her car was half drown in the wa ter (luckily the car is fine). A lot of my other friends also being through floods, but none of those were severe that their life was greatly affected
5. What 3 items would you take if an emergency evacuation occurred?
 - Wallet (all my id's are inside)
 - Phone (not that I rely on it but just in case I need to contact others.)
 - Passport



How long do you usually backpack for?

**PARTICIPANTS
BACKPACKED FOR AN
AVERAGE OF 4 DAYS**



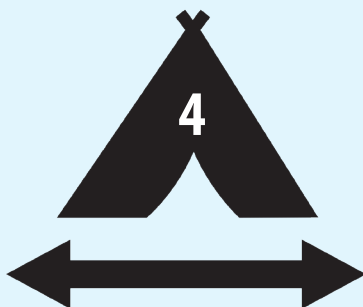
How many people do you usually backpack with?

**50%
WOULD TRAVEL IN
GROUPS OF**



How big of a tent do you usually bring?

**A MAJORITY
OF PARTICPANTS WOULD
USE A TENT FOR**



What season do you prefer to prefer to backpack in?

**67%
WOULD BACKPACK IN
THE...**



What food or rations do you take?



**GRAINS
CANNED FOODS
PROTEINS**

How do you prepare the food you packed?

**83%
OF PARTICIPANTS
WOULD**



What kind of clothing do you bring with you?

**ALL PARTICIPANTS
PACKED**



**33% ALSO PACKED
PERFORMANCE FABRICS**

Do you bring any tools with you?

**100%
PACKED...**



How do you transport all of your items?

**83%
STORE THEIR ITEMS
IN A...**



How do you sleep when backpacking?

**75%
SLEEP IN A...**



When preparing an emergency survival kit, do you pack light, moderately, or heavy?

80%
WOULD PACK



What foods do you bring with you when packing for an emergency situation?

PROTEINS
FATS
GRAINS
WATER



DRIED FRUIT
NON
-PERISH-
ABLES

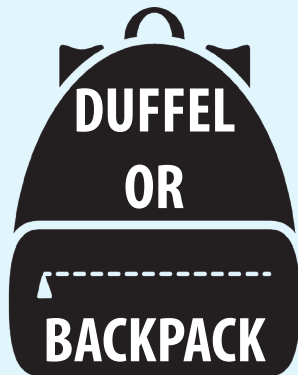
What items would you pack for sleeping purposes?

80%
PREFERRED TO
SLEEP WITH



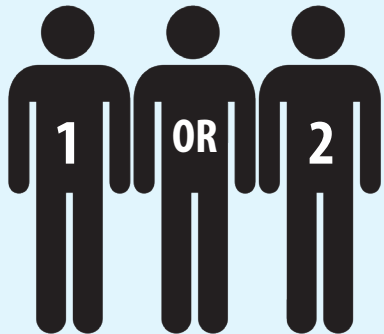
What would you pack all of your emergency survival kit items in?

80%
WOULD PACK THEIR
ITEMS IN A...



How many people will your emergency survival kit provide for?

60 %
WOULD
PROVIDE FOR
ONLY



40 %
WOULD
PROVIDE FOR
ANOTHER

How do you plan on transporting your emergency survival kit?

100 %
AGREED TO CARRY
THEIR KIT



What kind of tools or equipment would you pack in your kit?

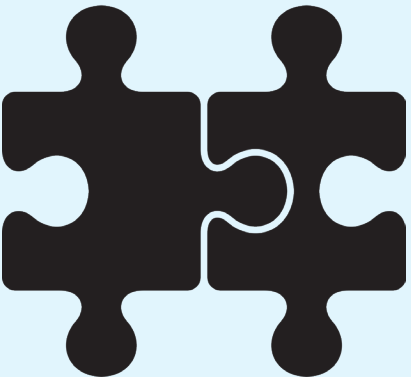
ON
AVERAGE
KITS
INCLUDED...



A KNIFE
ROPE
A FLASH-
LIGHT

What kind of entertainment would you choose to add to your emergency survival kit?

60 %
WOULD TAKE
ALONG



PUZZLES
&
BOOKS

How much clothing would you pack in your emergency survival kit?

90%
PACKED



FOR
MULTIPLE
WEATHER
CONDITIONS

Concept Development

Project Brief

Project Brief

Problem:

Victims of natural disaster have basic needs that need to be addressed immediately after disaster in the form of a shelter as well as aid that can help them rebuild their lives afterwards.



Product purpose:

Our product will address the basic needs of disaster victims and aid them in rebuilding their lives. The main focus of the product will be to provide a short-term shelter in the form of a soft material structure.

Target end user:

Victims of natural disasters.

Market application:

Hurricane & tsunami relief

Performance requirements:

Shelter lasts at least 1 year

This prevents people from inhabiting shelter past the point of their intended use as is seen with many existing solid form shelters.

Houses one family (6 people = 4 person family + 2 extended family/individuals)

Durable

Easy to transport

Shipping process:

Plane

Truck

Ship

End-of-use retrieval process:

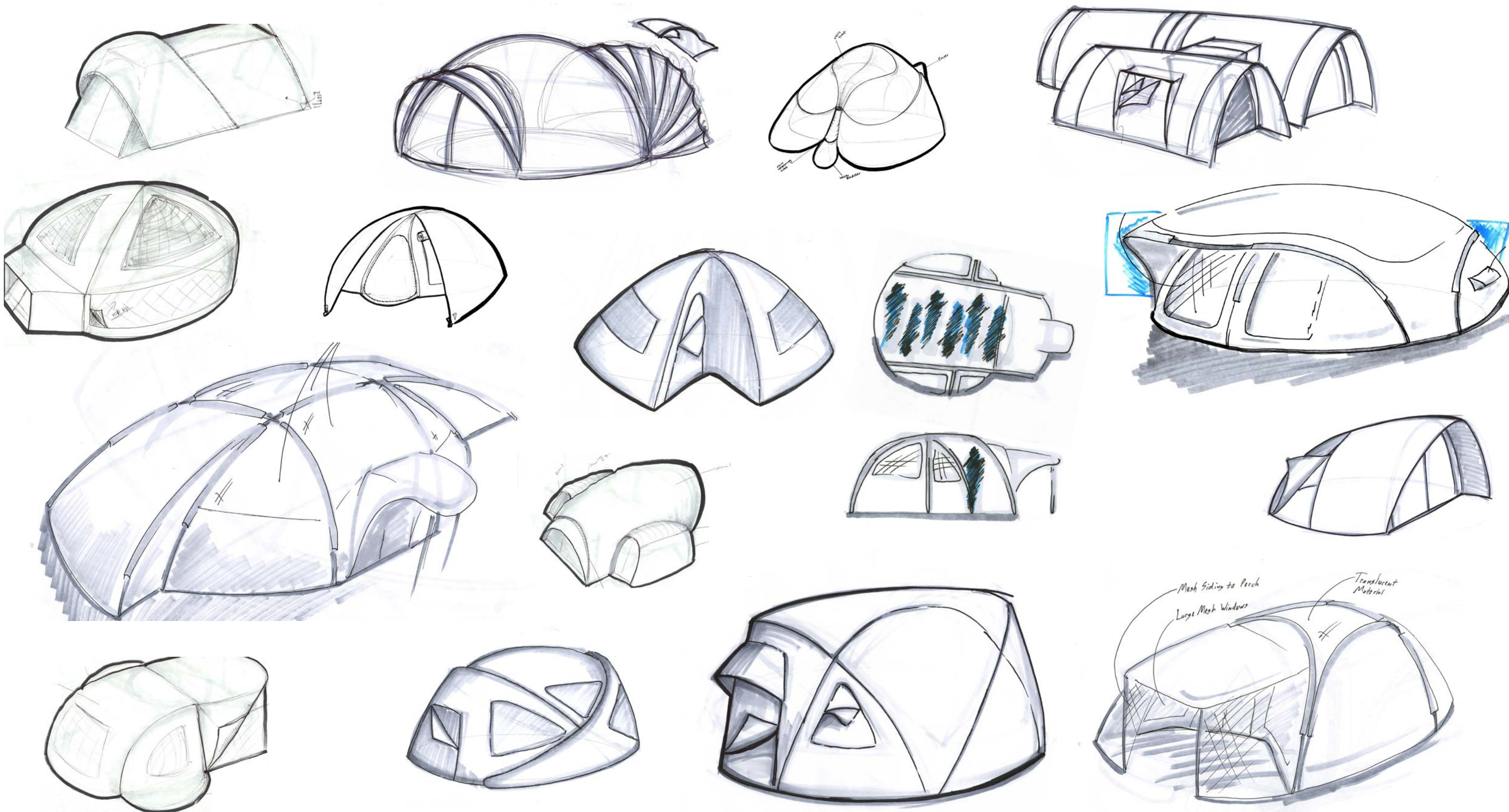
Natural Disasters victims keep the product

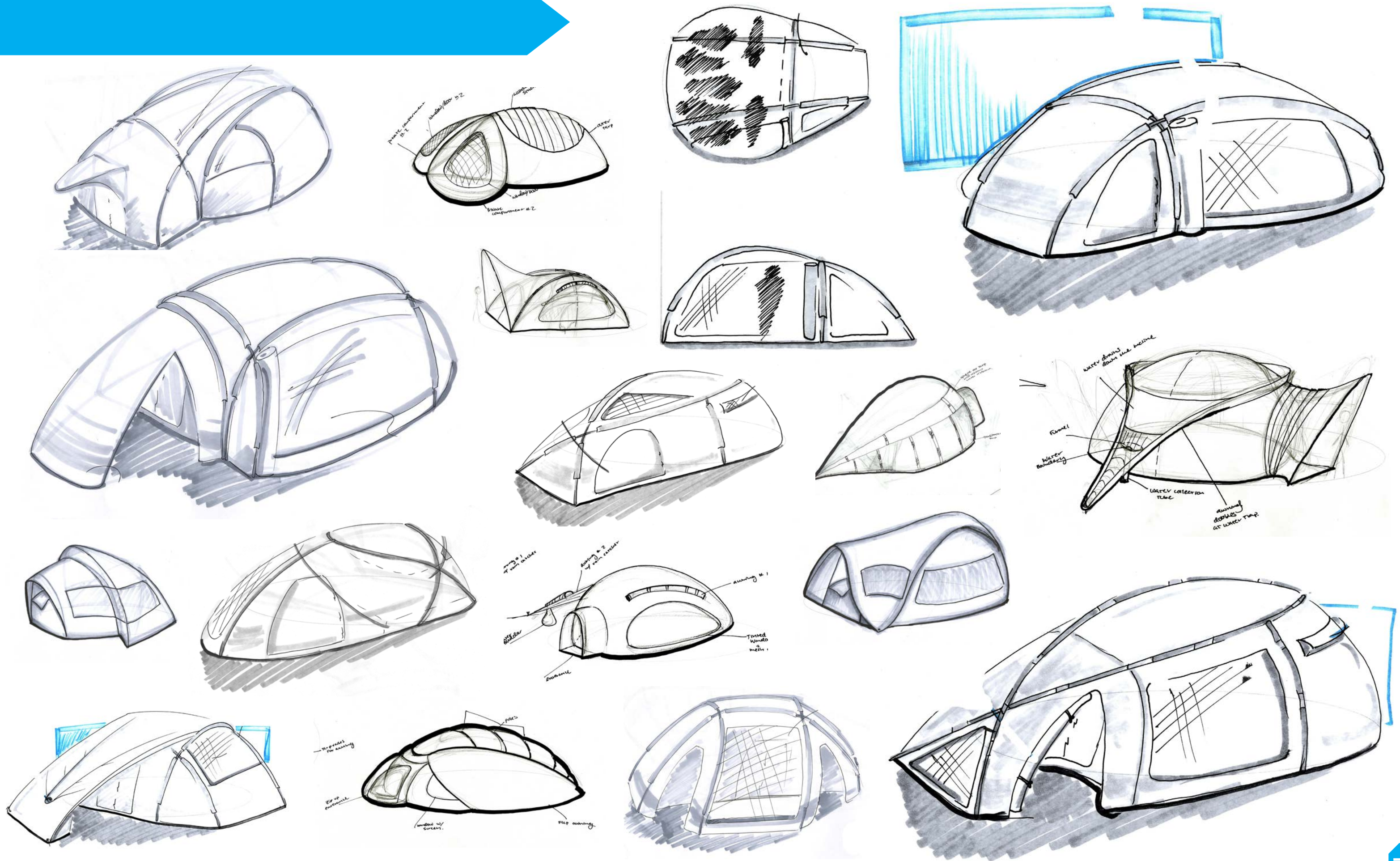
Recyclability or re-use scenario, etc:

Up-cycle into usable items if possible

Ideation

Concept Development





Modeling

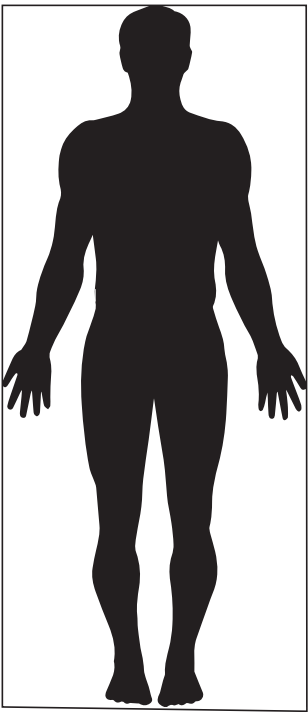
Sizing

	Height	Length	Width
Vango Azure V 600	215	670	380
Vango Avington 600	210	600	380
Vango Kinetic V 600	205	465	390
Vango Eclipse 600	220	730	390
Vango Omega 600XL	180	480	300
Vango Skype V 600	212	550	440
Shelterbox	235	430	435
REI Kingdom 6 Tent	191	284	292
Big Agnes Flying Diamond 6 Tent	168	386	244
Kelty Acadia 6 Tent	193	538	269
Big Agnes Tensleep Station 6 Tent	213	305	305
Eureka Copper Canyon 6 Tent	191	304	254
Kelty Frontier 6 Tent	191	310	244
Sportz SUV 6 Tent W/ Screen Room	193	305	254
Big Agnes Big House 6 Tent	220	304	304
Average (Round)	202.5	444	325

= 24050cm²

= 25.9 ft²

Per Person

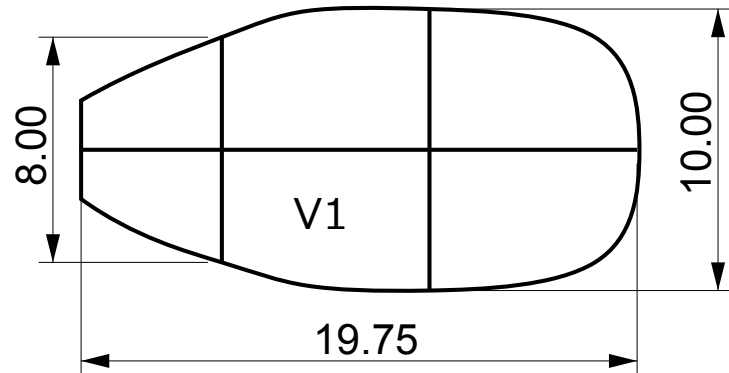
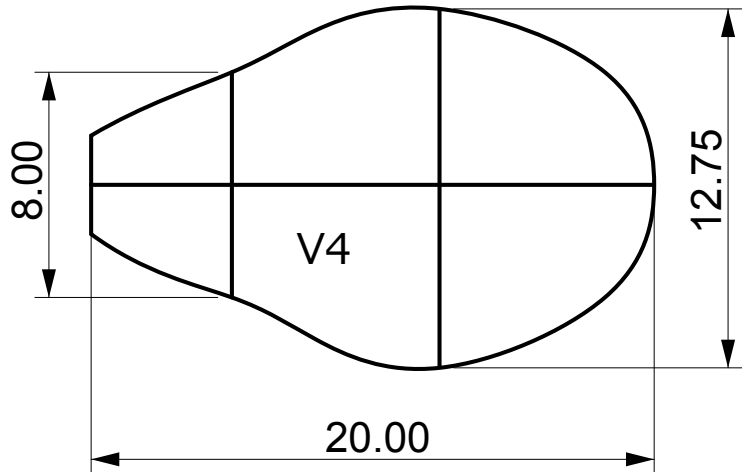
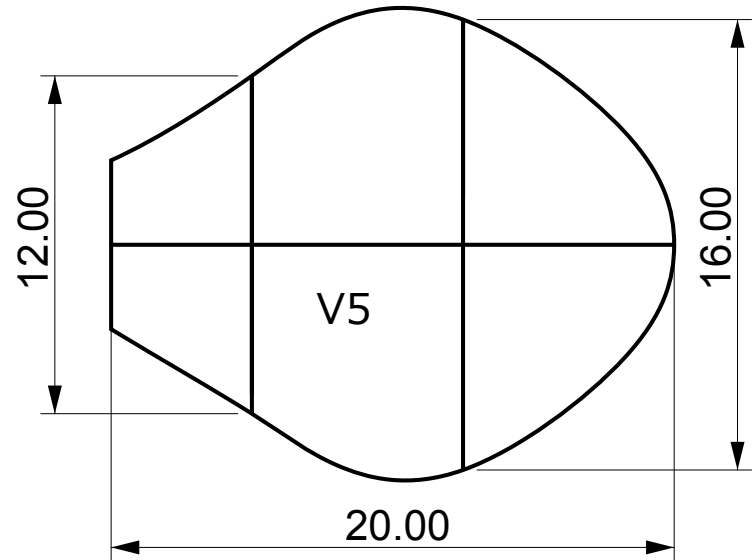
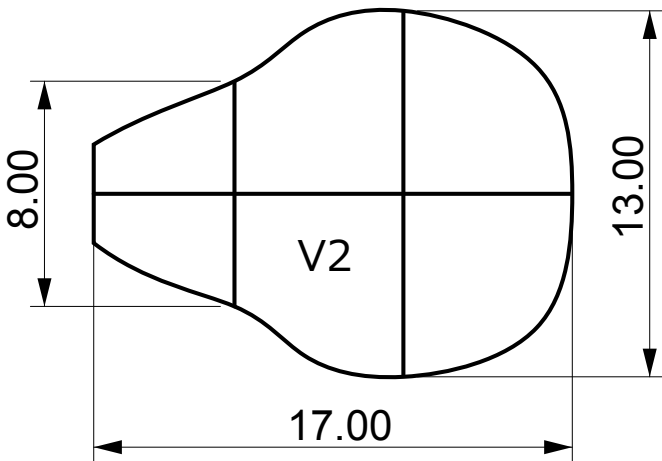
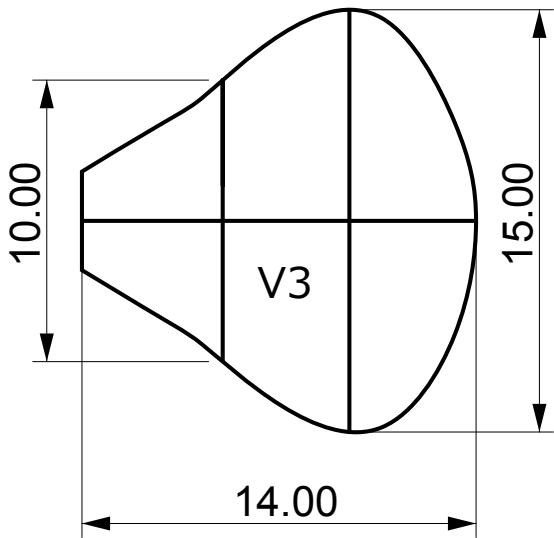
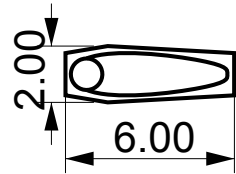
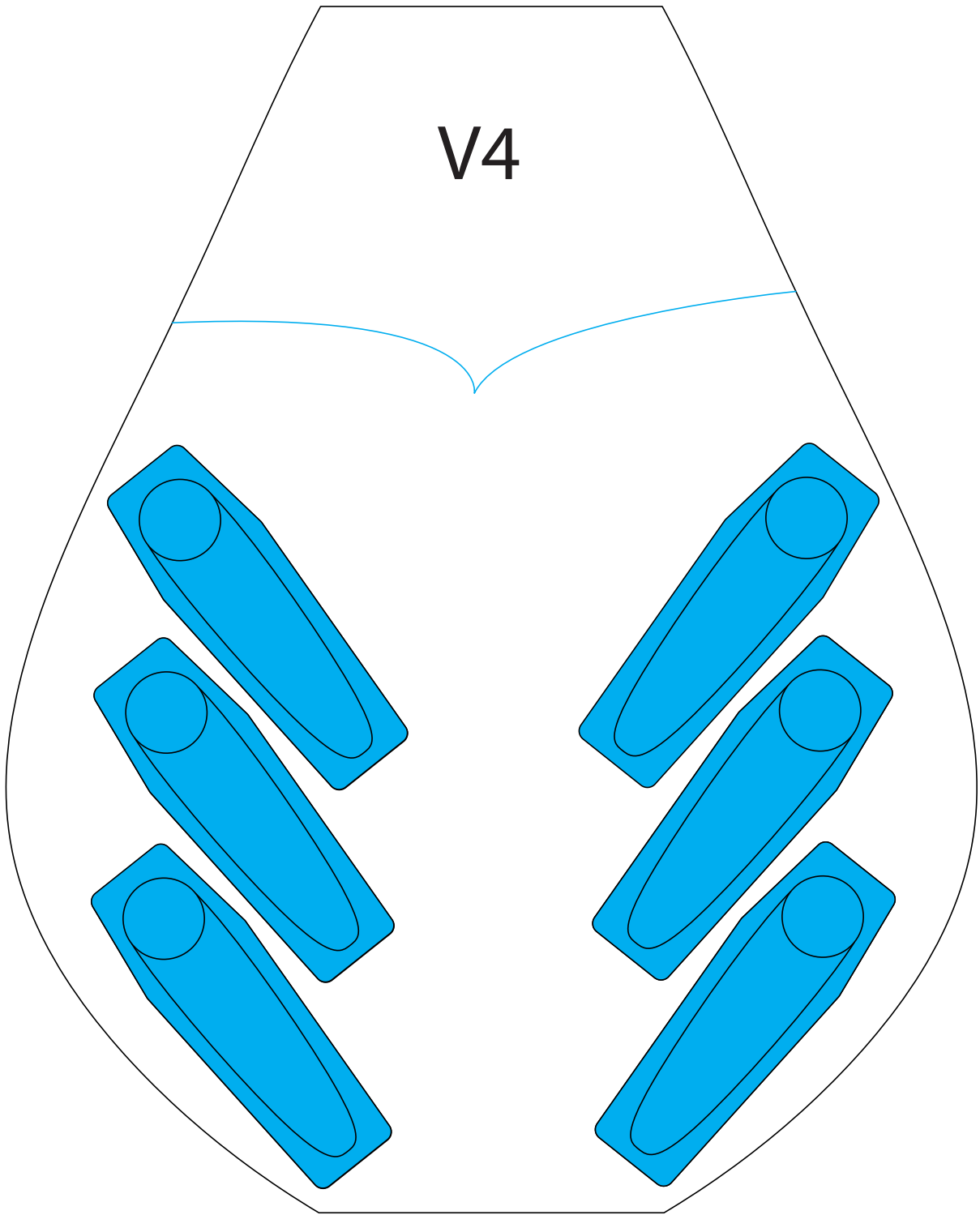


Dimensions in cm



Intial testing of shape and size to build sketch models

Final chosen form below:



Initial Sketch Models

Testing human placement within different layouts of chosen design



Tensile Models

Tensile structure shows how the fabric flows over the pole structure allowing insight into structural need and volume



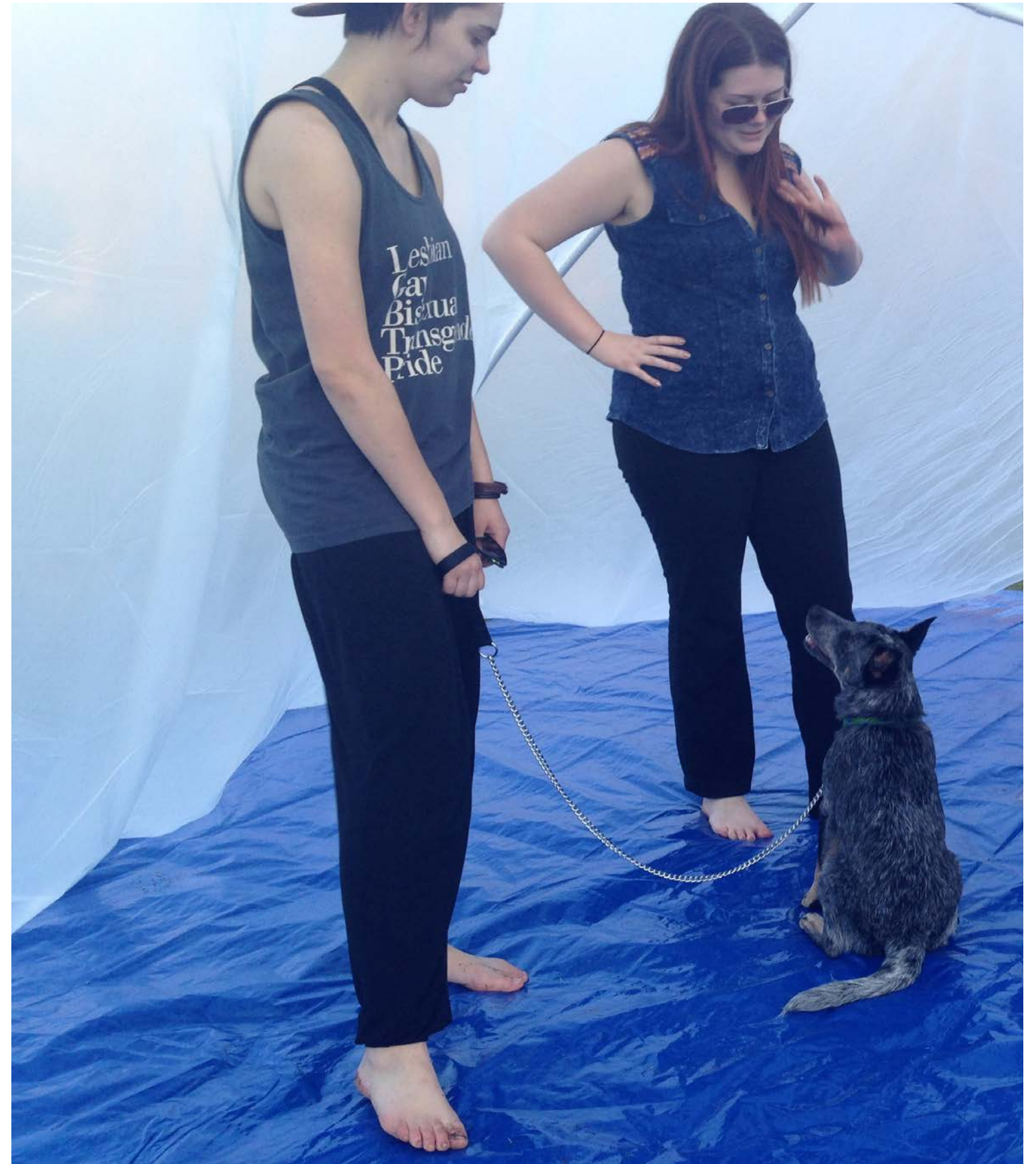
Full-Scale Moke-Up

Making a quick make-up allows to test actual volume and relative space of the structure as well as showing any issues with design



Human Factors Feedback

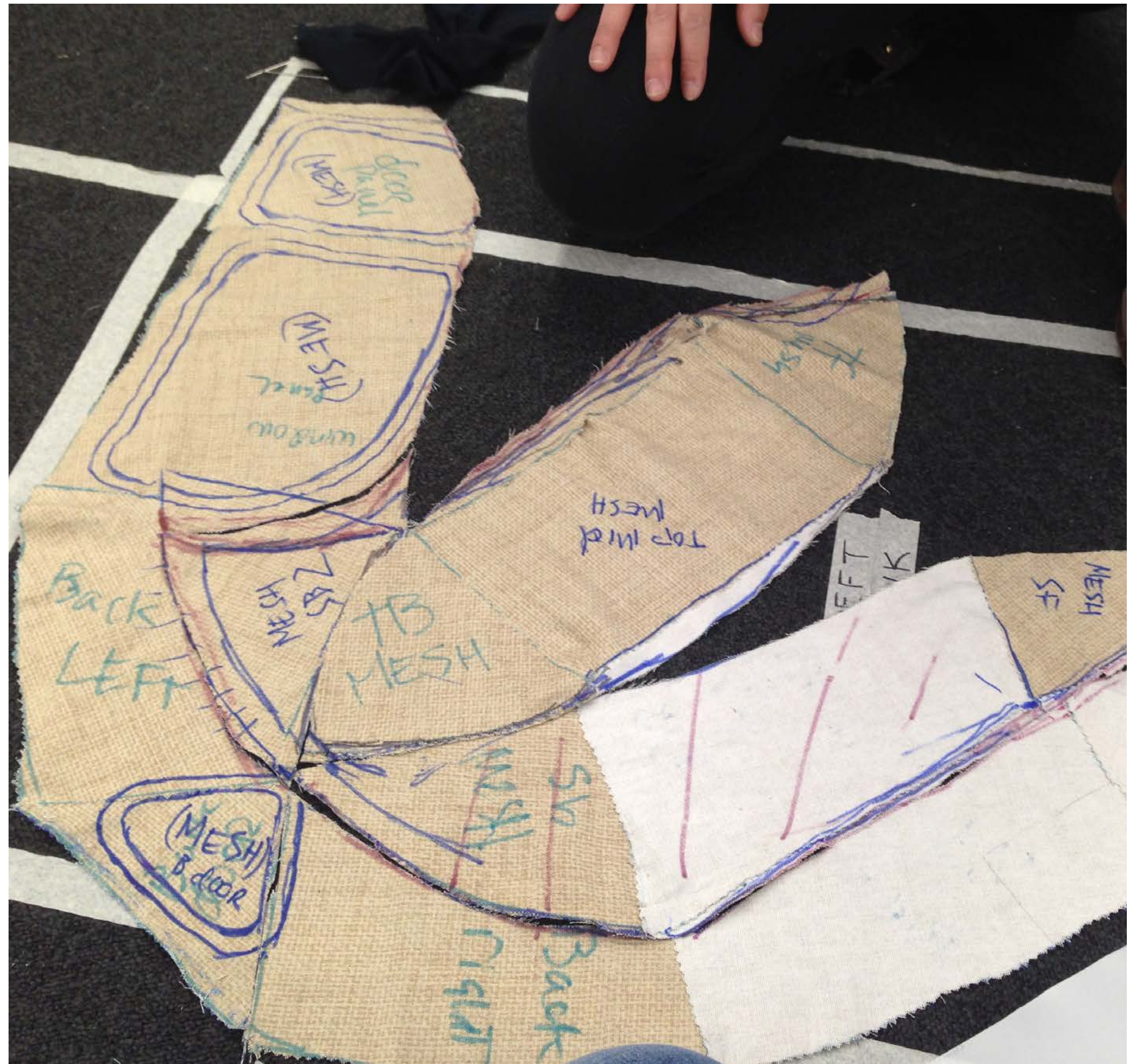
- Add a crossbar for support at entrance
- Ensure there is space between rainfly and tent for air flow
- Include a gardening kit in the shelter system
- Consider the arrangement of people's belongings inside the shelter
- Take into account both heavy winds and rain
- Have the option of moveable privacy partitions
- Adapt the shelter for use as a greenhouse
- Incorporate inflatable bed areas if possible



Scale Model

Scale Model - Process

Paper templates made from Rhino model used to figure out correct panel size for scale model



Inner tent and rainfly pieced together to using as accurate parts as possible



Scale Model





Concept Realization

Carapace Shelter



The Shelter:

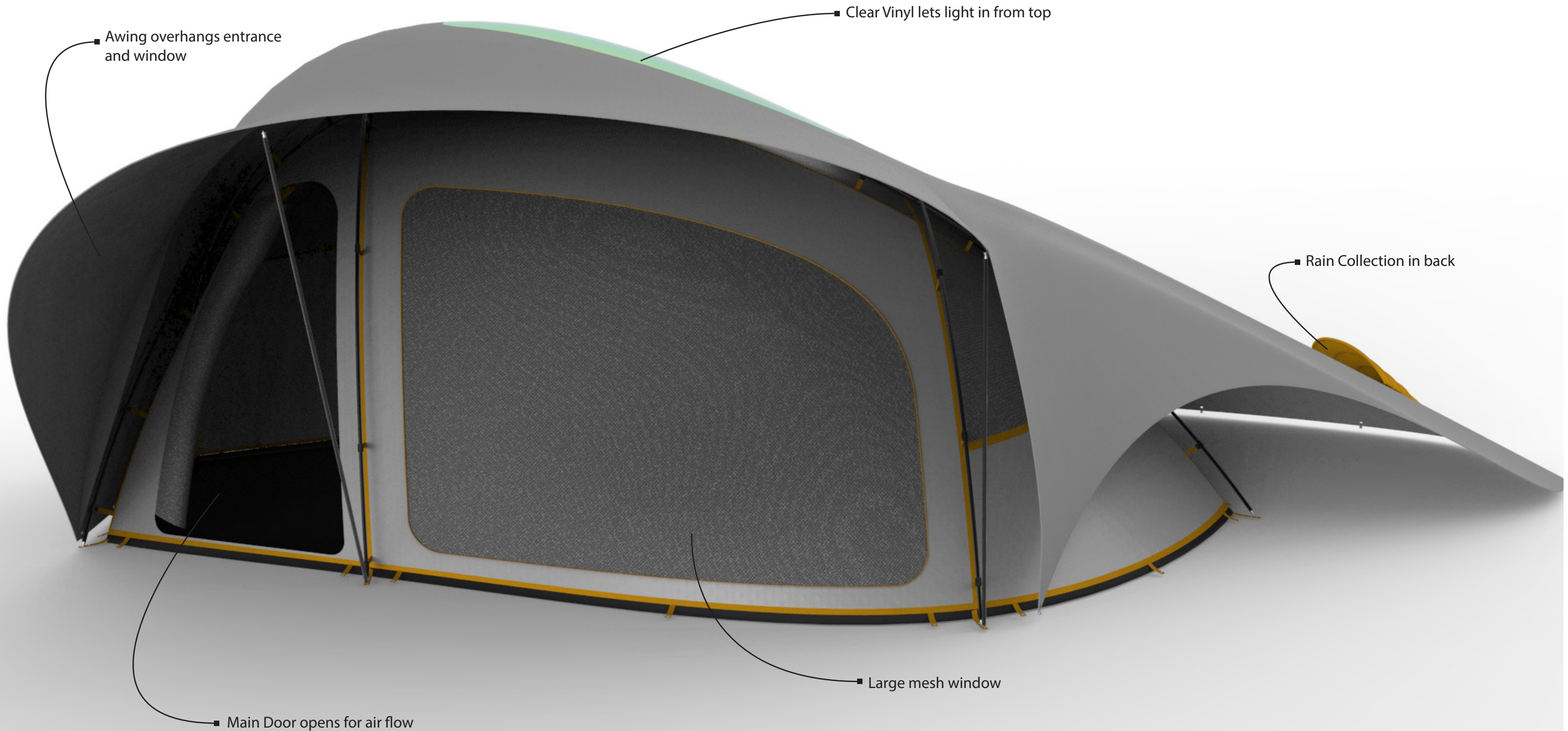
Size: 20' x 16' at widest
People: 6 total
36.5 sq ft per person
Weight: 65 lbs estimated

Specs:

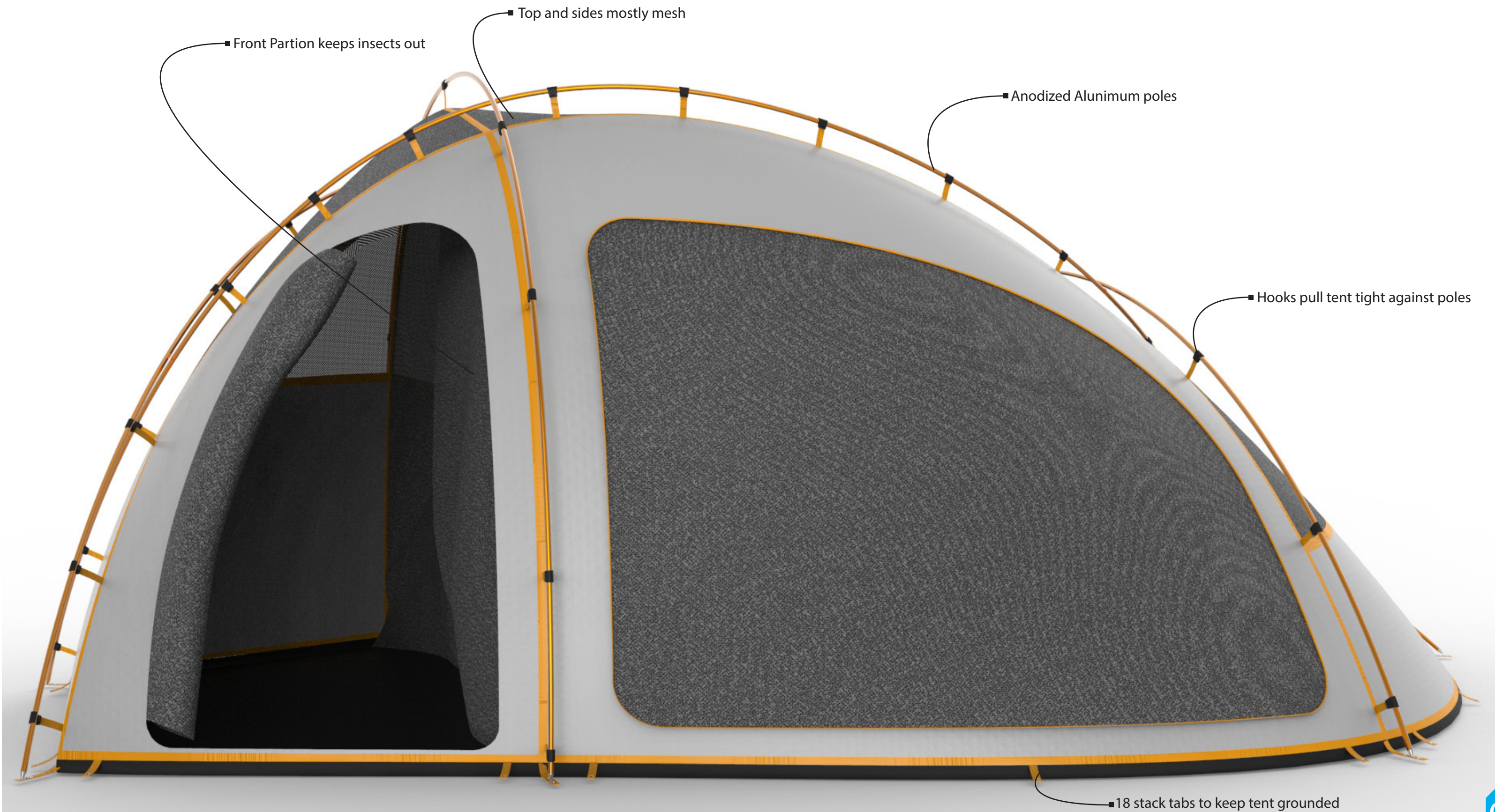
Tent Material: Polyester
Pole Material: Aluminum
Groundcloth: Polyethylene



Carapace Rainfly

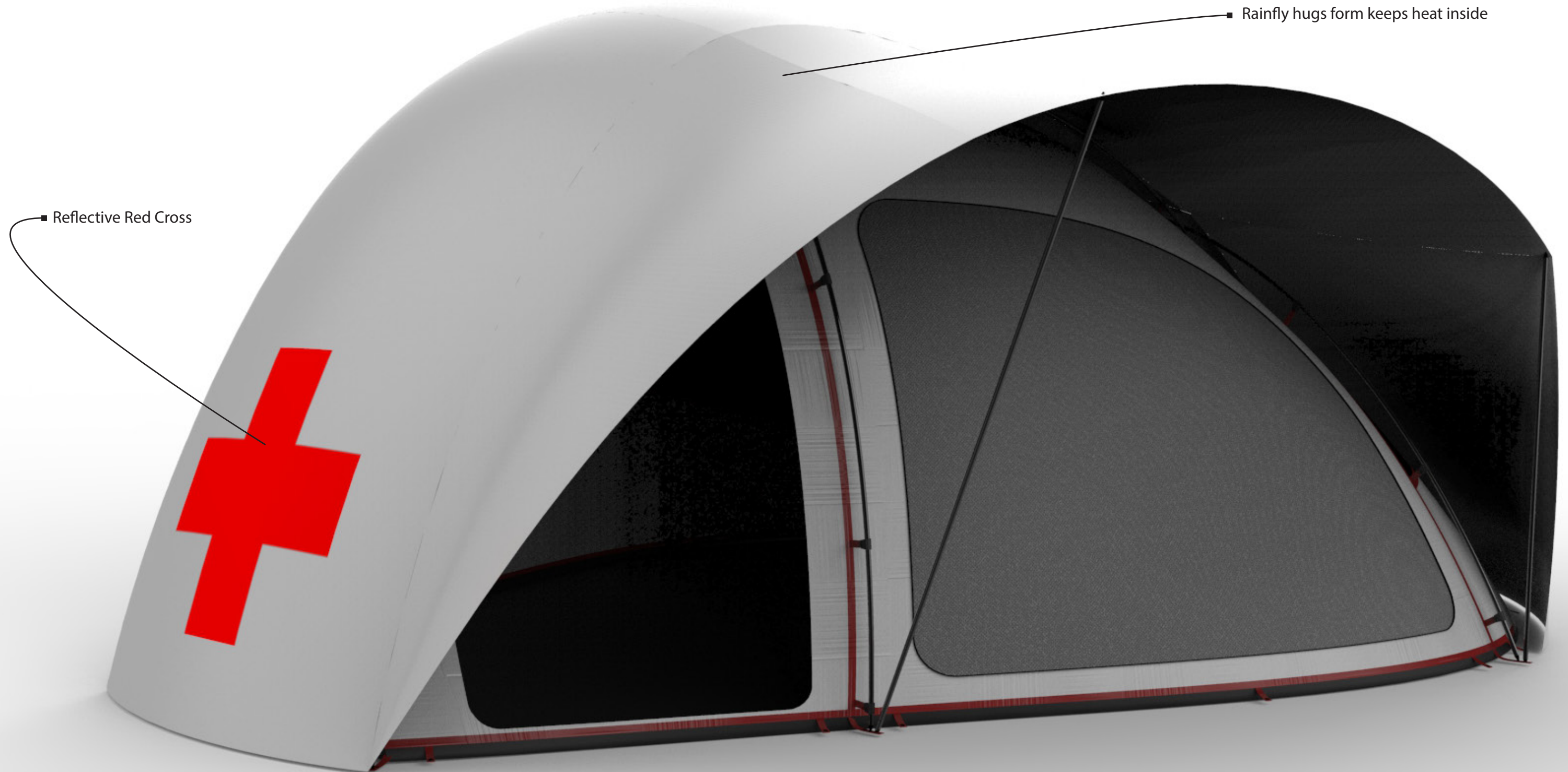


Carapace Inner Tent

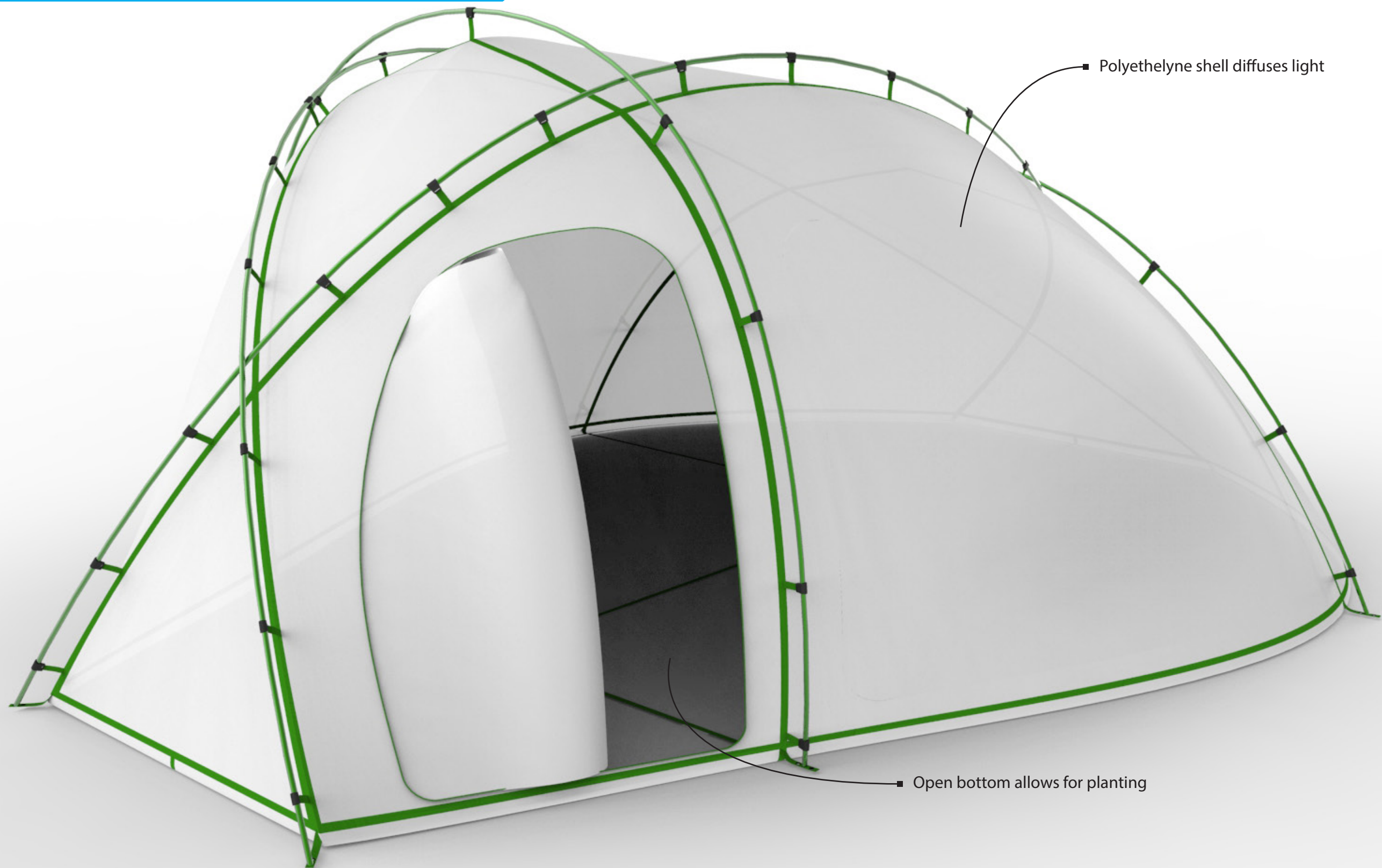


Other Carapace Forms

Medical Tent

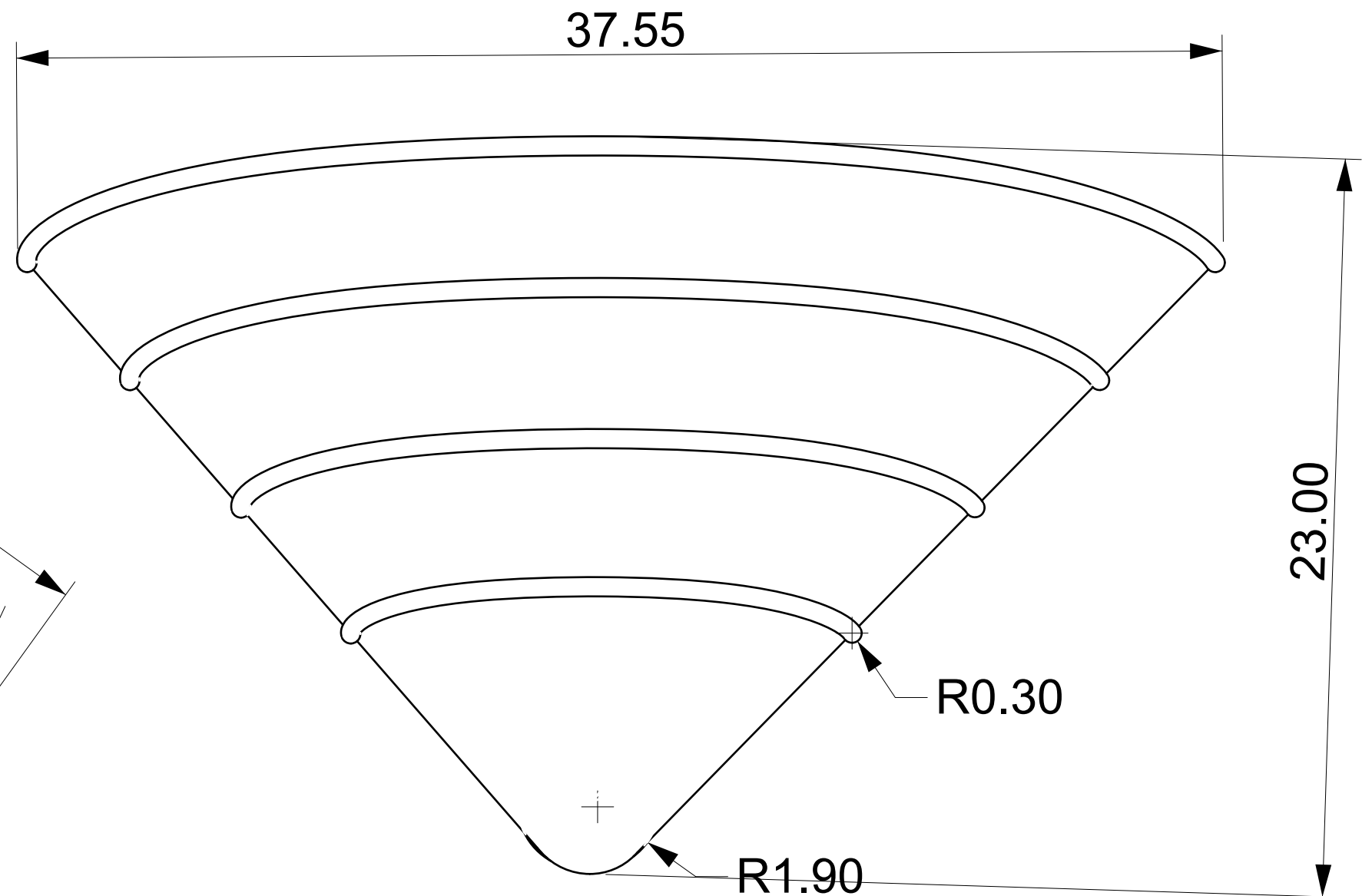
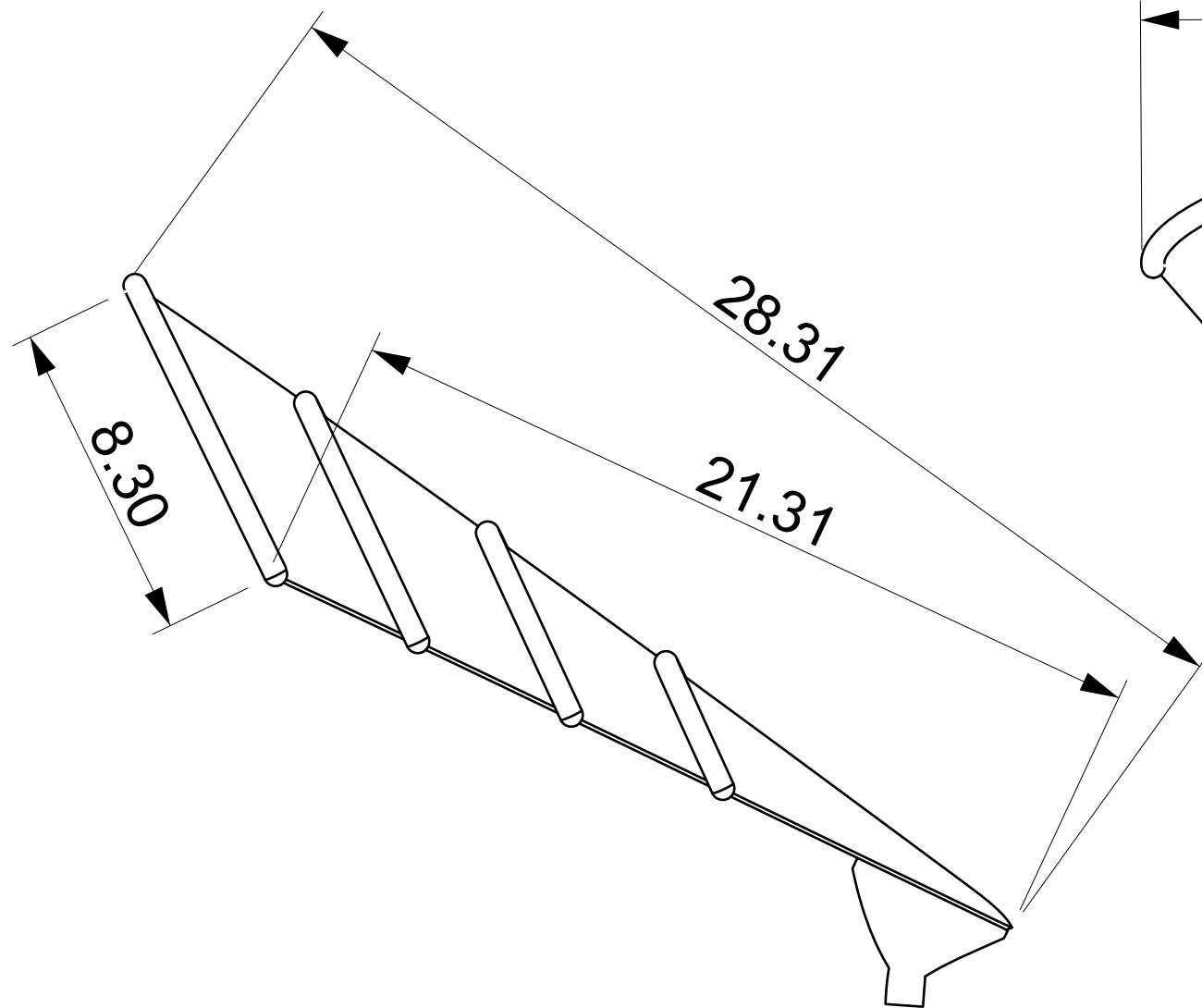


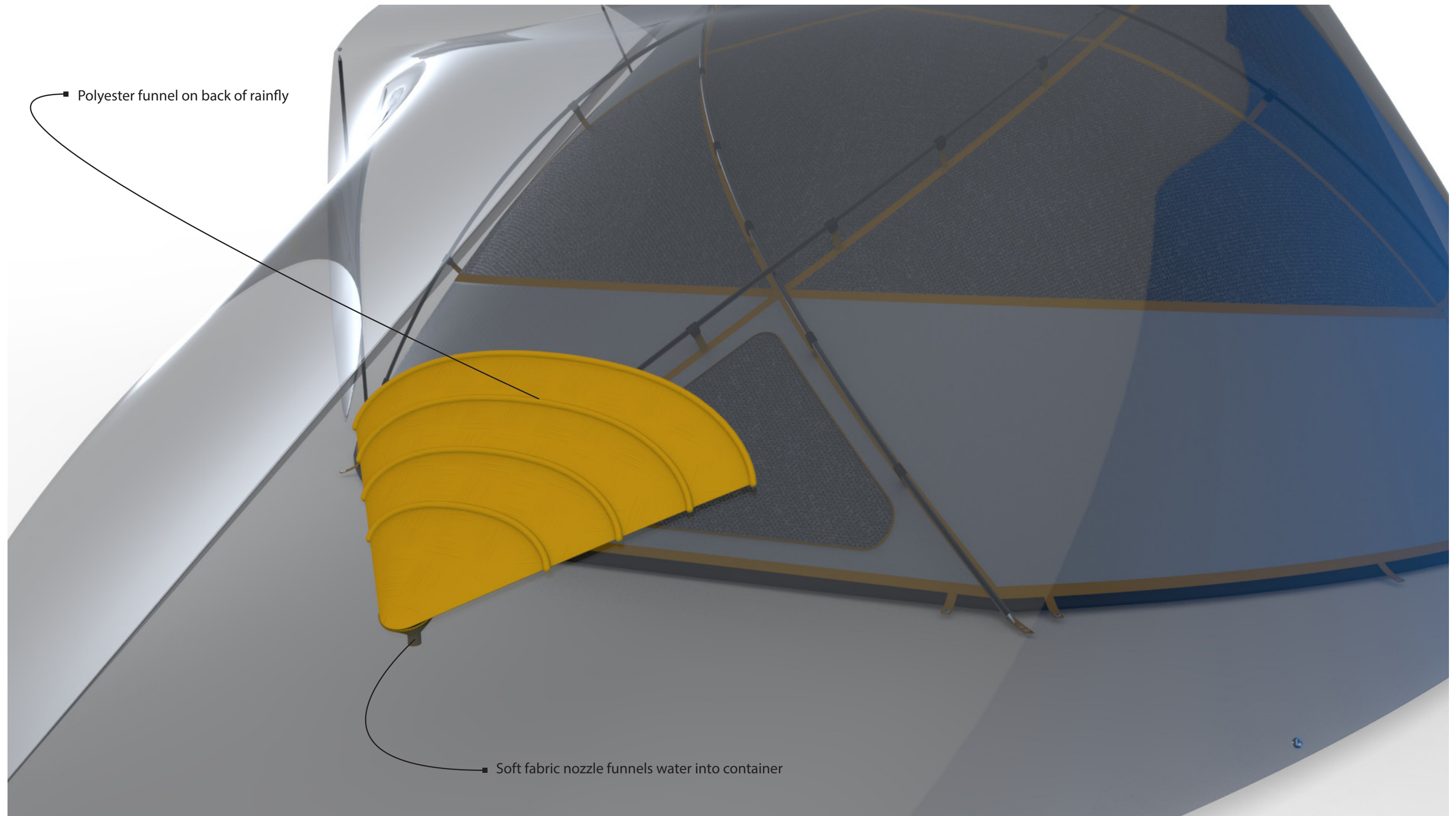
Greenhouse



Carapace Mechanisms

The water collection system was built into the rainfly of the shelter to allow the people to collect water that could be used as cooking water or could be purified to become drinking water. The funnel pours water through a soft nozzle into any container placed underneath the system.

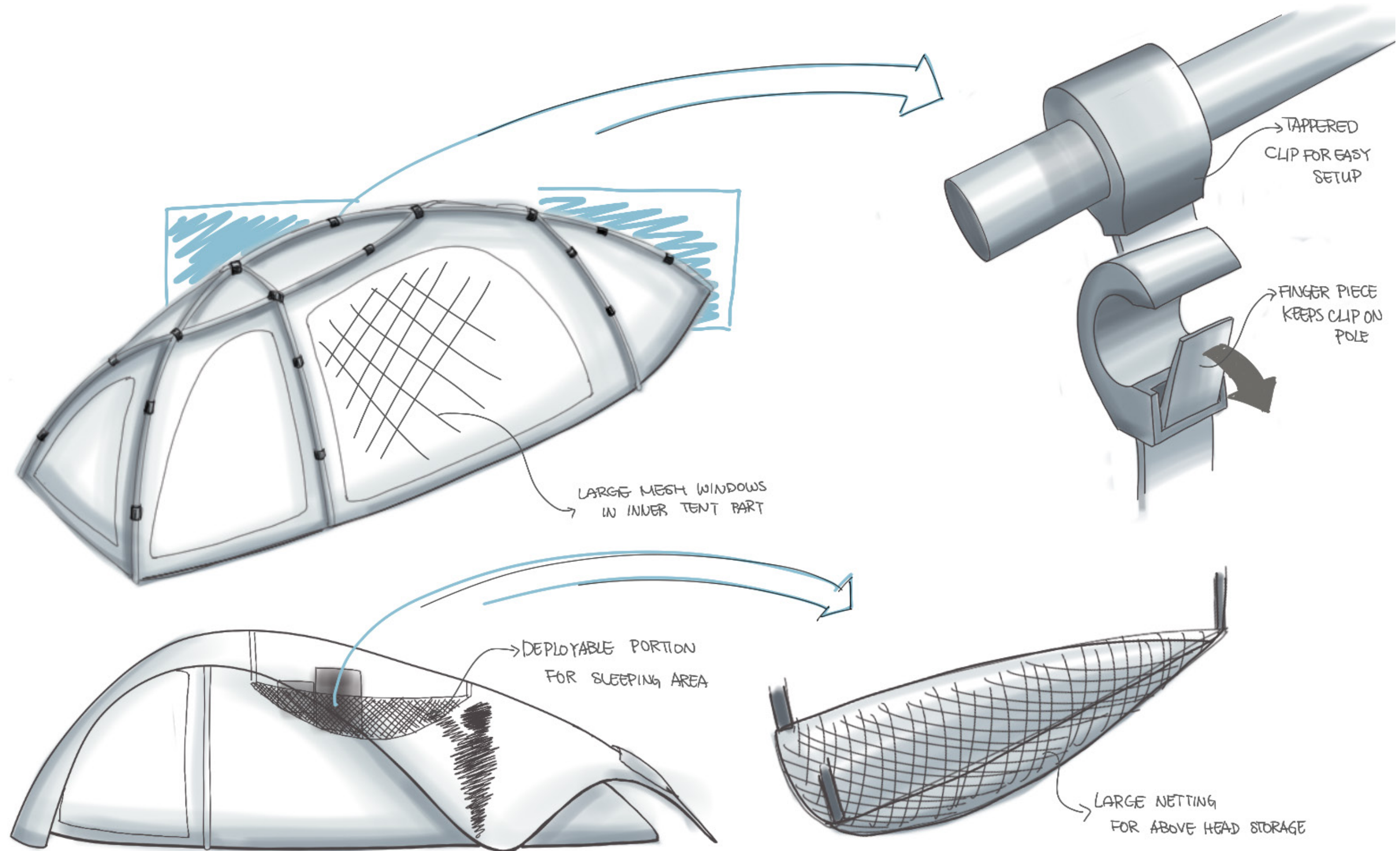




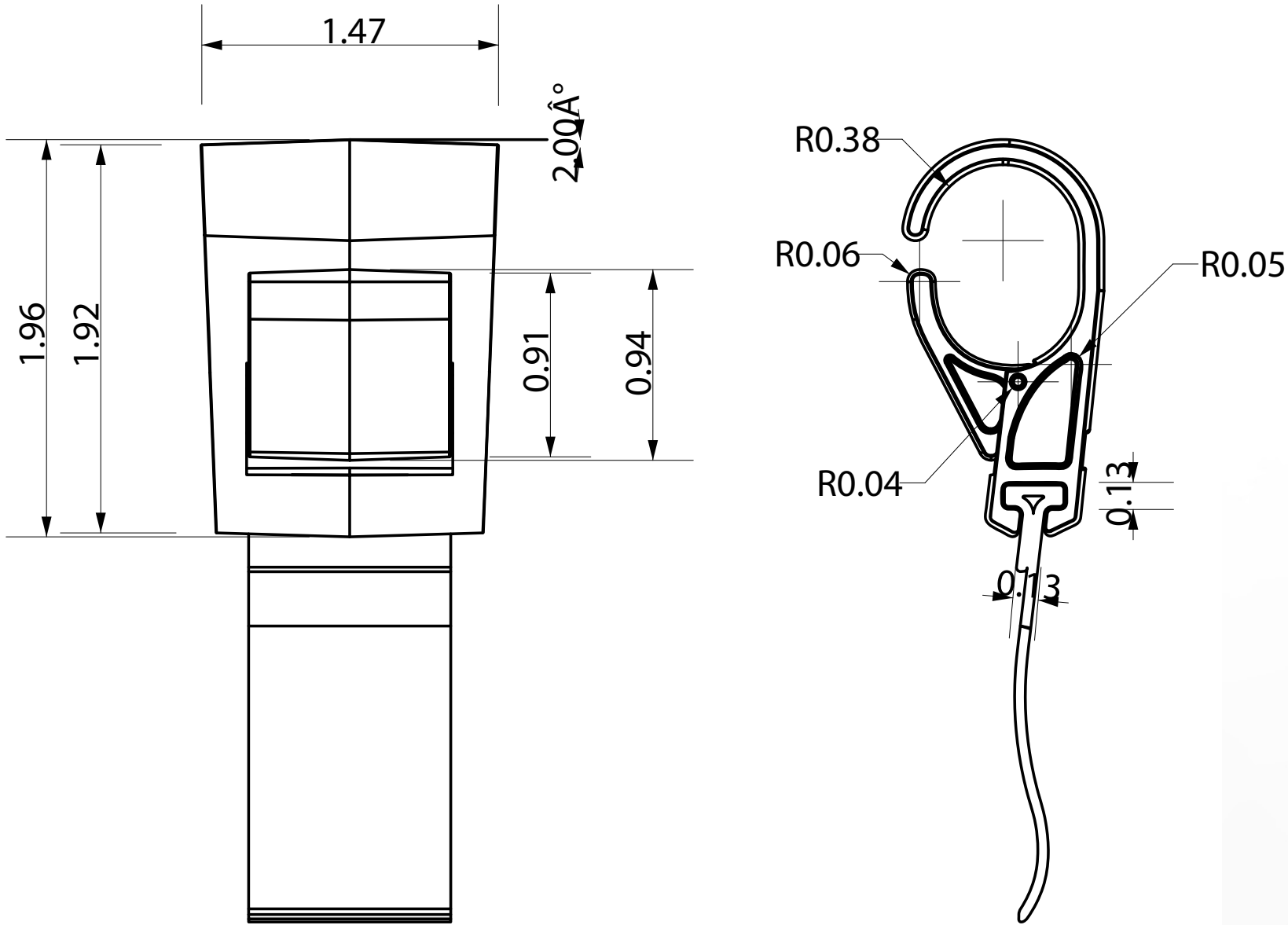
■ Polyester funnel on back of rainfly

■ Soft fabric nozzle funnels water into container

Carapace Mechanisms



Built into the tent, the hook mechanism allows the inner tent to connect to the poles. The movable part keeps the hook tight against the pole and prevents others from disconnecting the hooks along the shelter by accident.



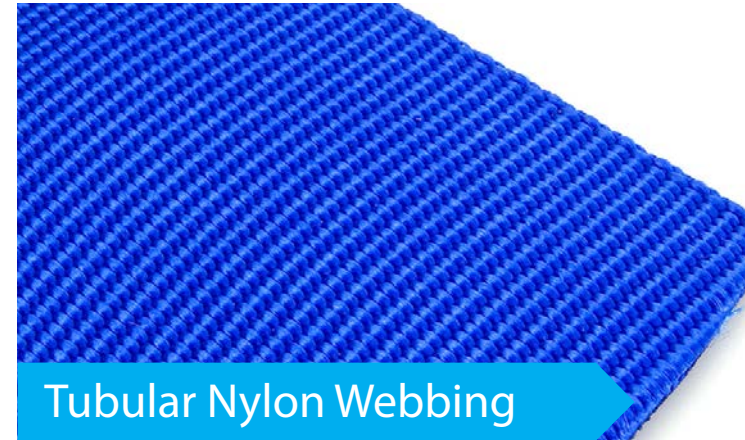
Materials and Cost



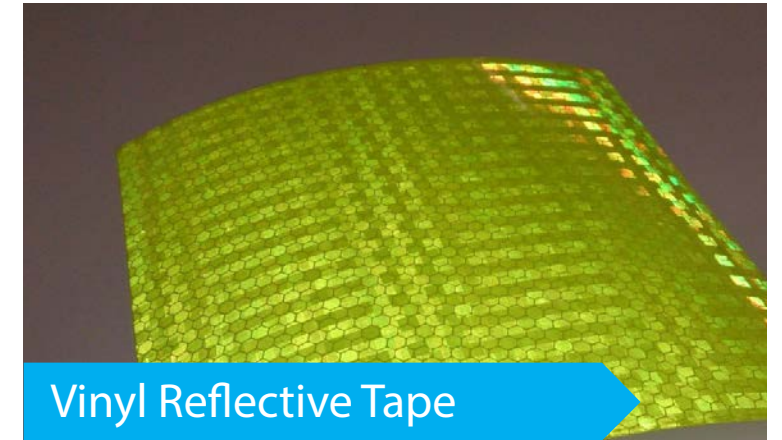
DAC NSL Aluminum



Clear Window Vinyl



Tubular Nylon Webbing



Vinyl Reflective Tape



No-See-Um Mosquito Netting



Upcycled Lacrosse Goal Netting



Upcycled Polyester Sail Cloth



Upcycled Polyethylene Truck Tarp

Pole material:

DAC NSL aluminum

Canopy fabric:

No-See-Um Mosquito Netting
Upcycled polyester sail cloth treated for waterproof properties

Rainfly fabric:

Upcycled polyester sail cloth treated for waterproof properties
12 mil clear window vinyl

Partition fabric:

No-See-Um Mosquito Netting

Ground cover fabric:

Upcycled polyethylene truck tarps

Storage Hammock:

Upcycled lacrosse goal netting

Reflective details:

Vinyl reflectice tape

Anchor Fabric:

Tubular nylon webbing

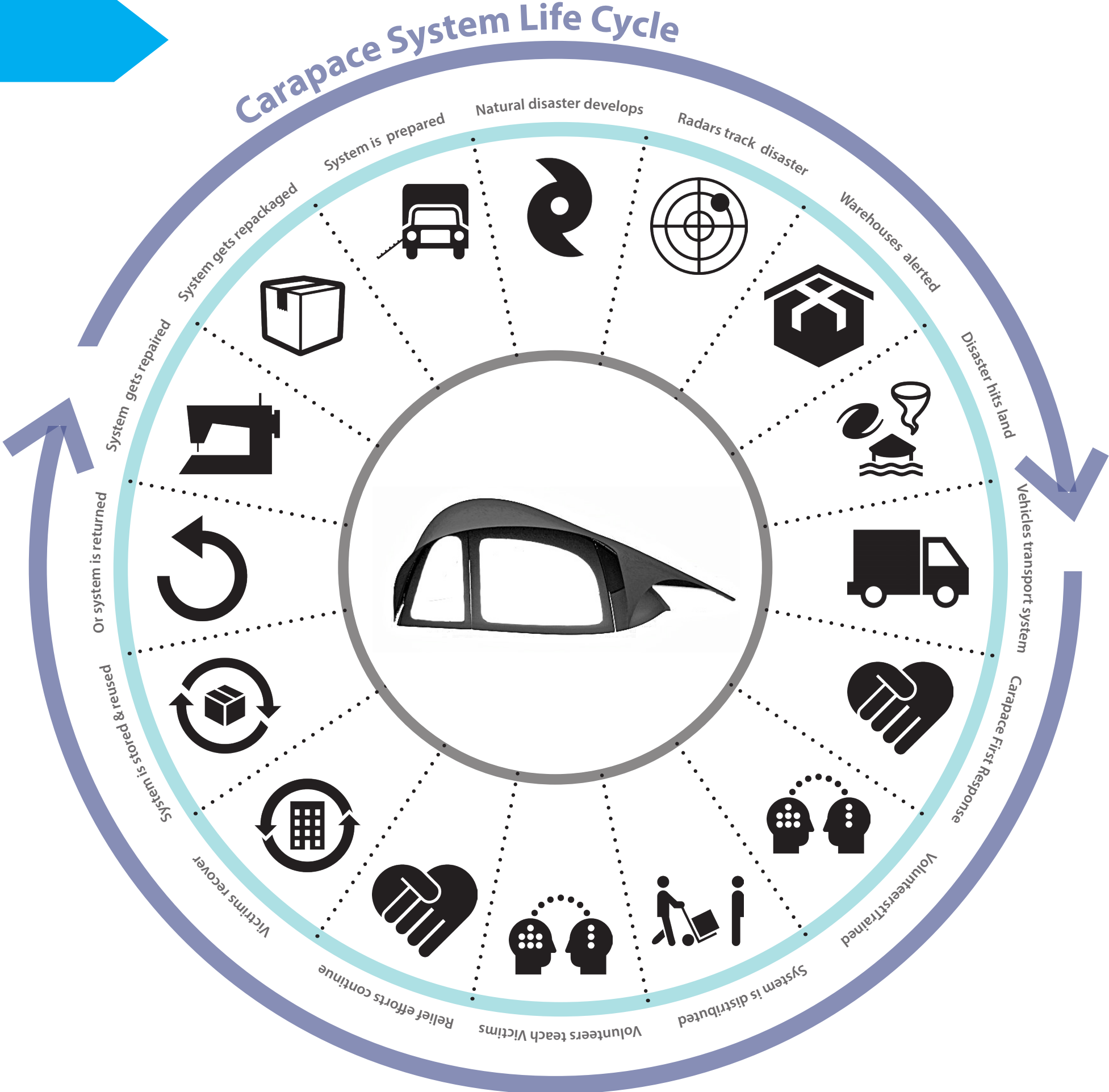
	Price Per Yard	#	Price of Part
Vinyl	\$6.50	2.39	\$15.60
Estimated Bulk Discount: 15%			\$13.26
Mesh	\$2.99	21	\$63.00
Estimated Bulk Discount: 15%			\$53.55
Webbing	\$1.50	54	\$81.00
Estimated Bulk Discount: 15%			\$68.85
Cargo Netting		6	
Reclaimed Lacrosse Netting		\$15 for shipping and handling	
Polyethylene		24.5	
Donated Truck Tarp		\$50 for shipping and handling	
Polyester		59	
Donated Sailcloth		\$50 for shipping and handling	
Poles	Price per Piece		
26" piece	\$8.00	53	\$424.00
17" piece	\$6.00	2	\$12.00
Estimated Discount: 30%			\$305.20
Total			\$555.86

Cost of Materials: \$555.86 Estimated
Cost may be affected by discount for bulk purchase or by donations

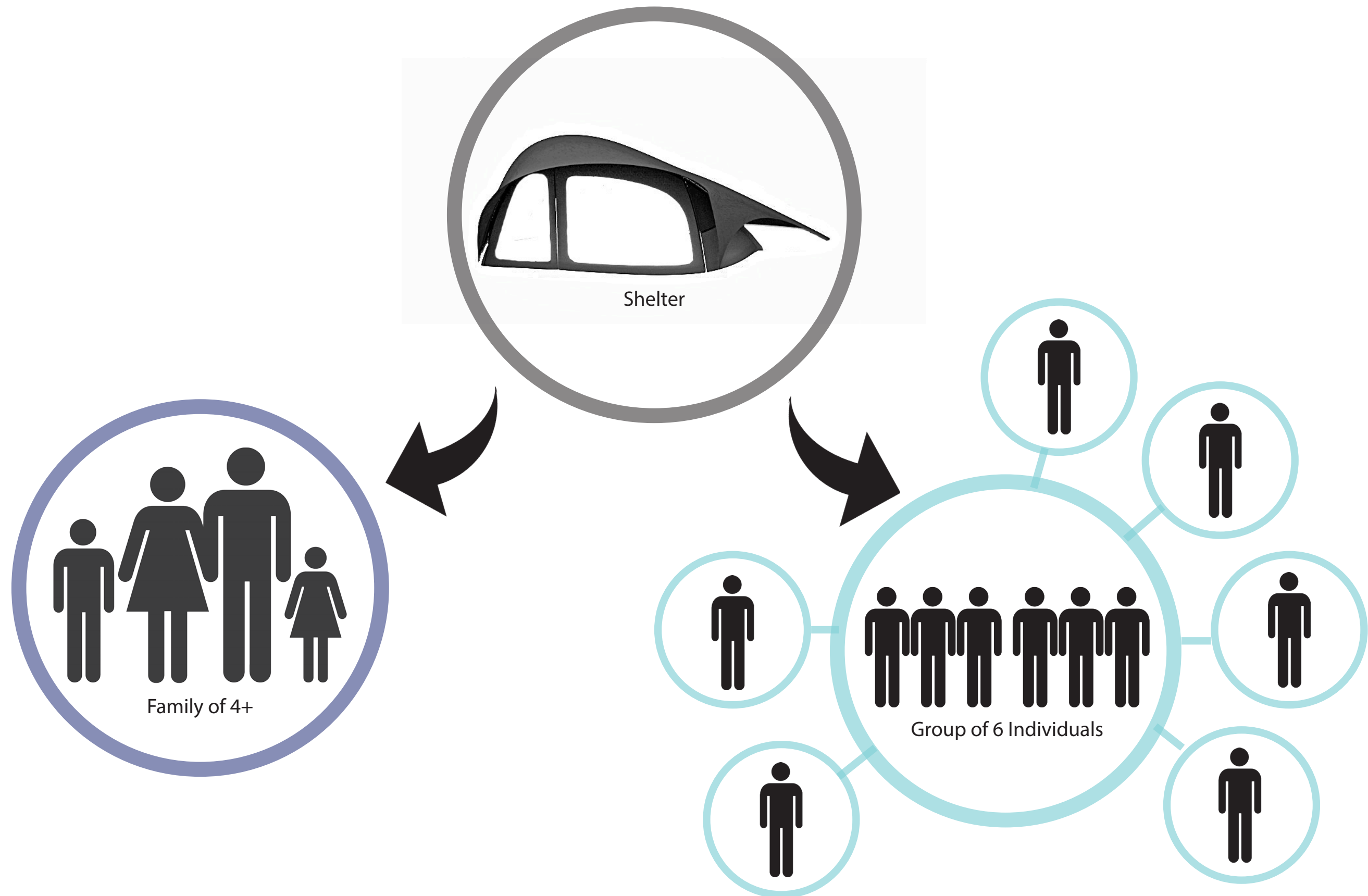
Cost of Shelter: \$655.86 Estimated
Cost of labor estimated for \$100

The System

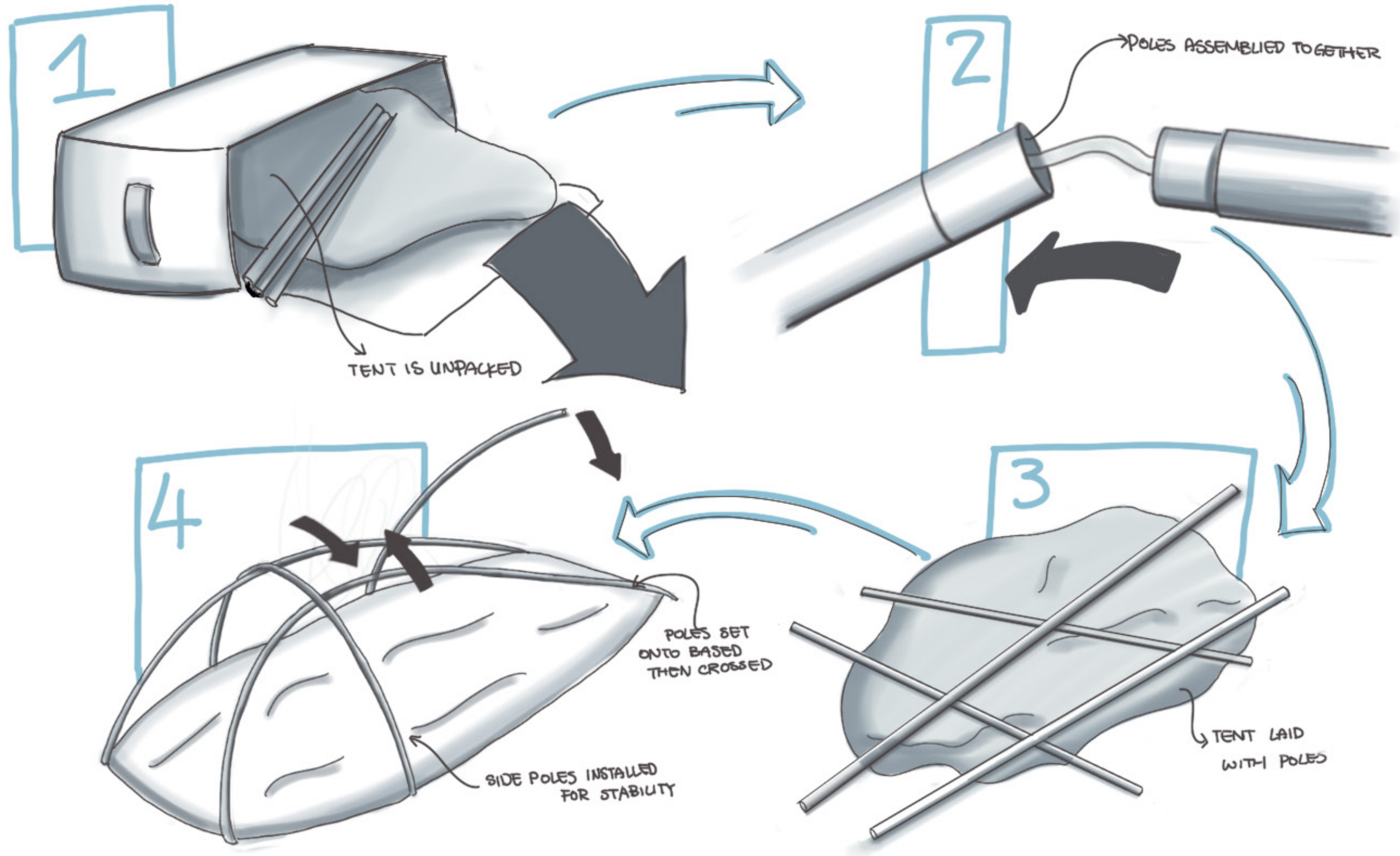
Life Cycle

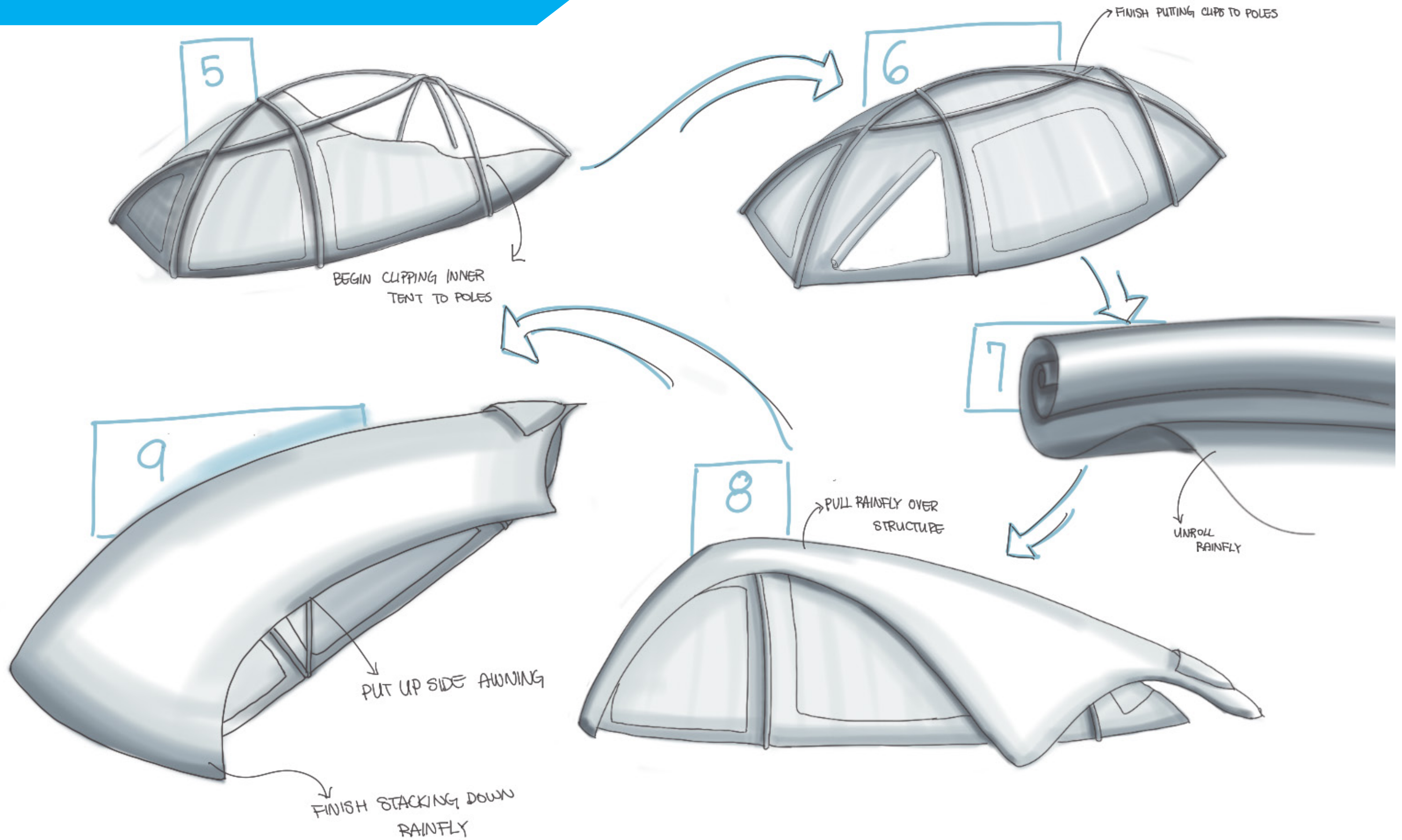


Shelter Distribution Protocol



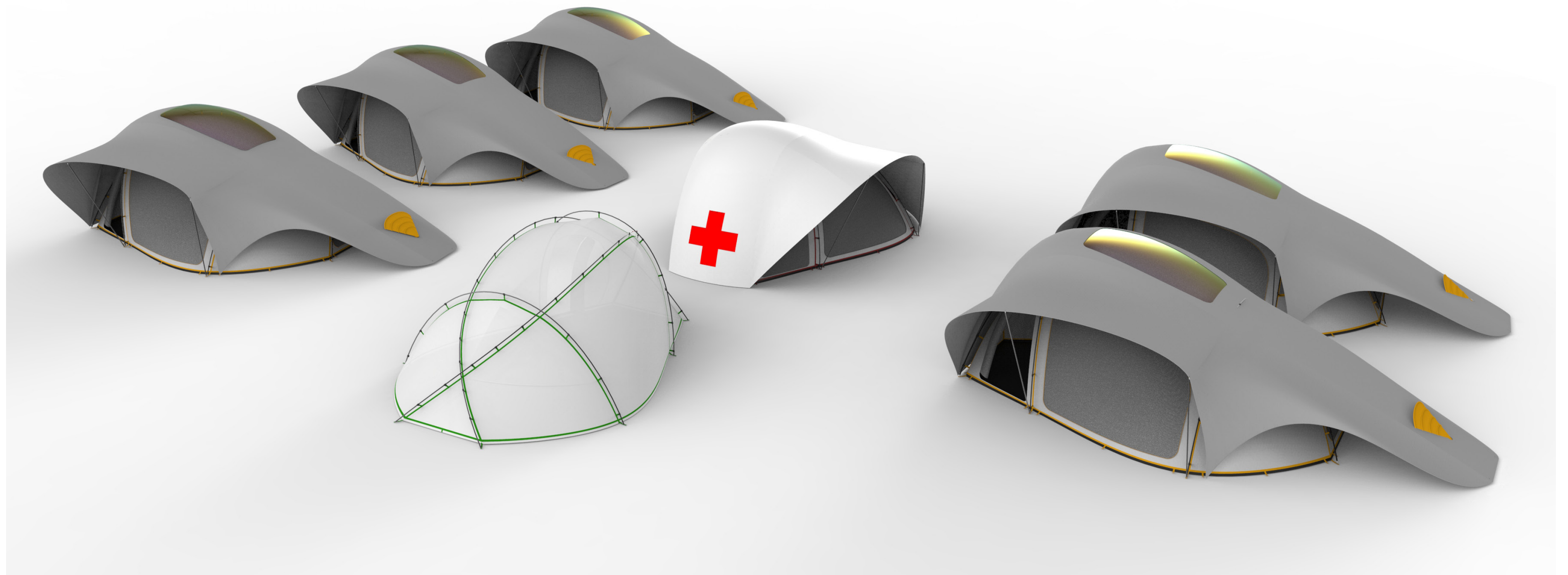
Assembly Steps





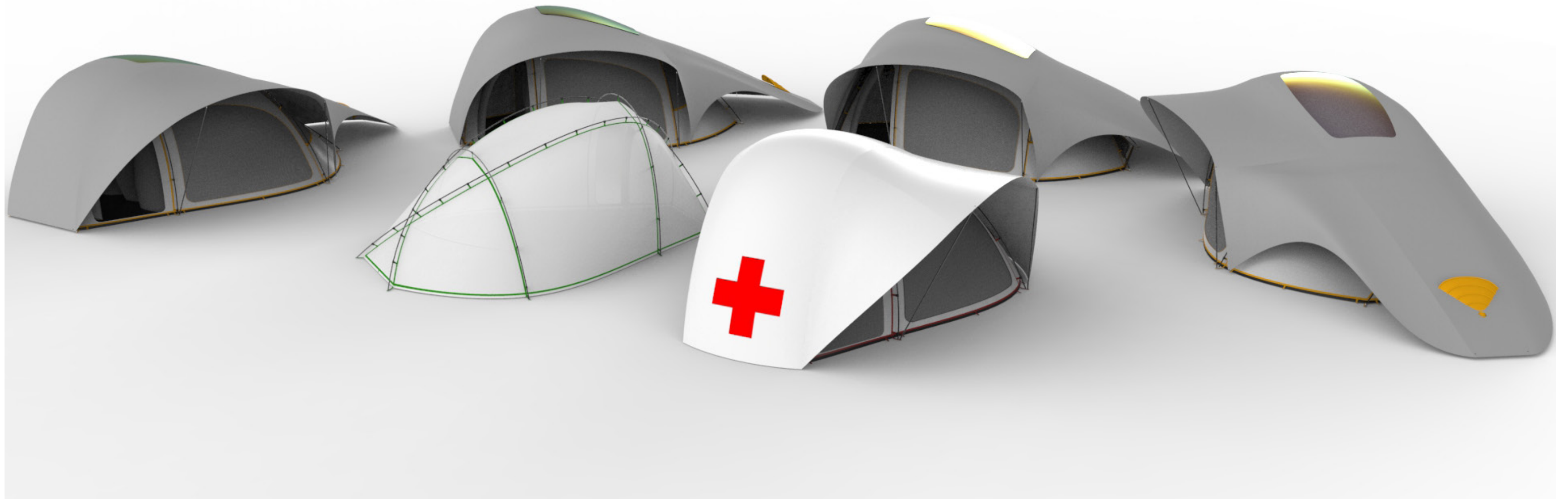
System Camp - Grid

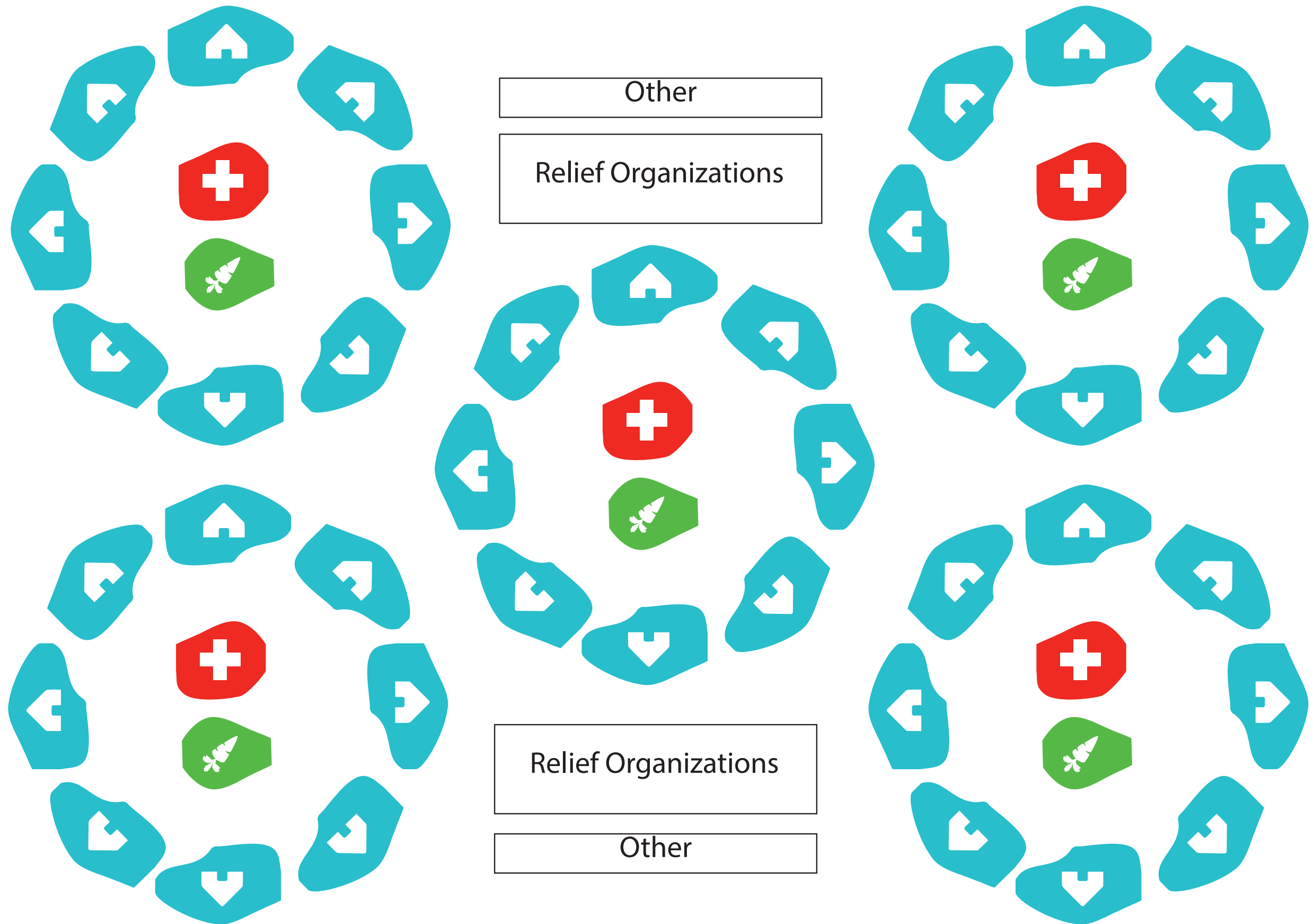
Columns of two shelters with greenhouses and medical kits between each column
1 Medical kit and greenhouse per 8 shelters



System Camp - Circle

Circles of 8 shelters with one medical and greenhouse in the center
1 Medical kit and greenhouse per 8 shelters

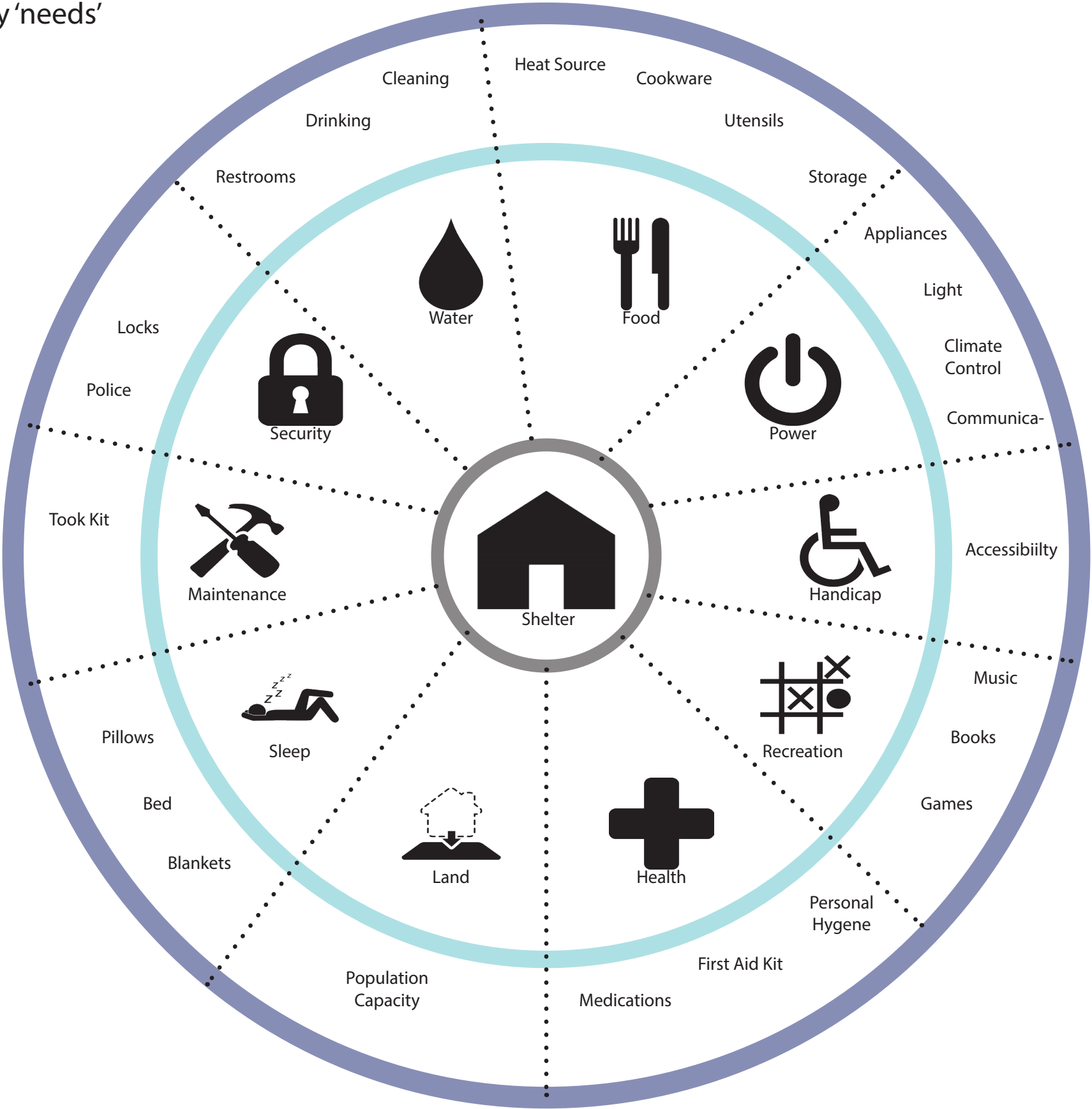




System Needs

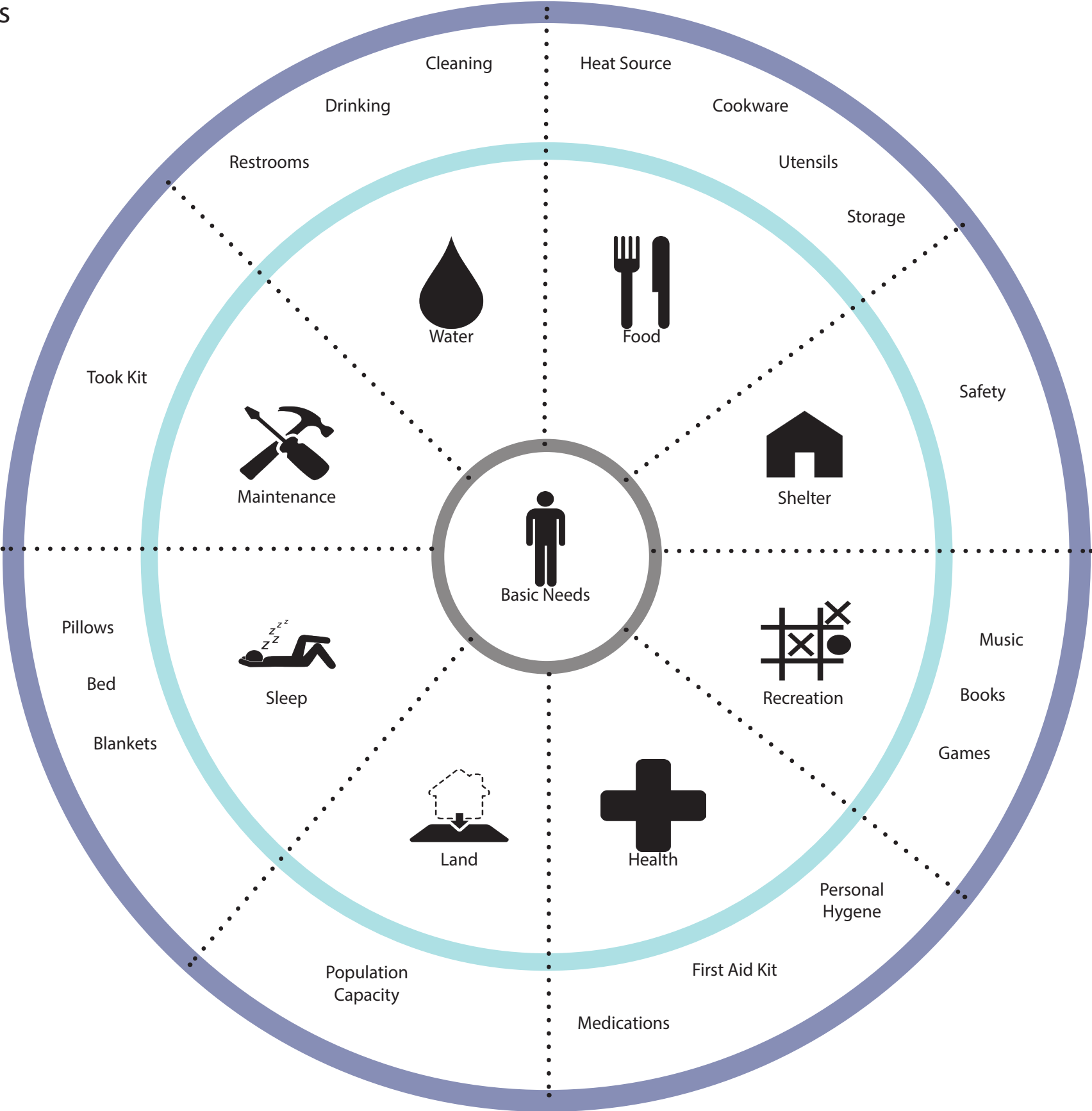
Shelter Needs Artifacts Map

Graph based off developed country 'needs'



Basic Needs Artifacts Map

Graph based on basic human needs



The Box

The Box

Three Kits

Shelter Box:

Includes:

- 1 Shelter
- Water filtration
- Cooking equipment
- Blankets
- Tool Kit
- Misc. Items

Medical Box:

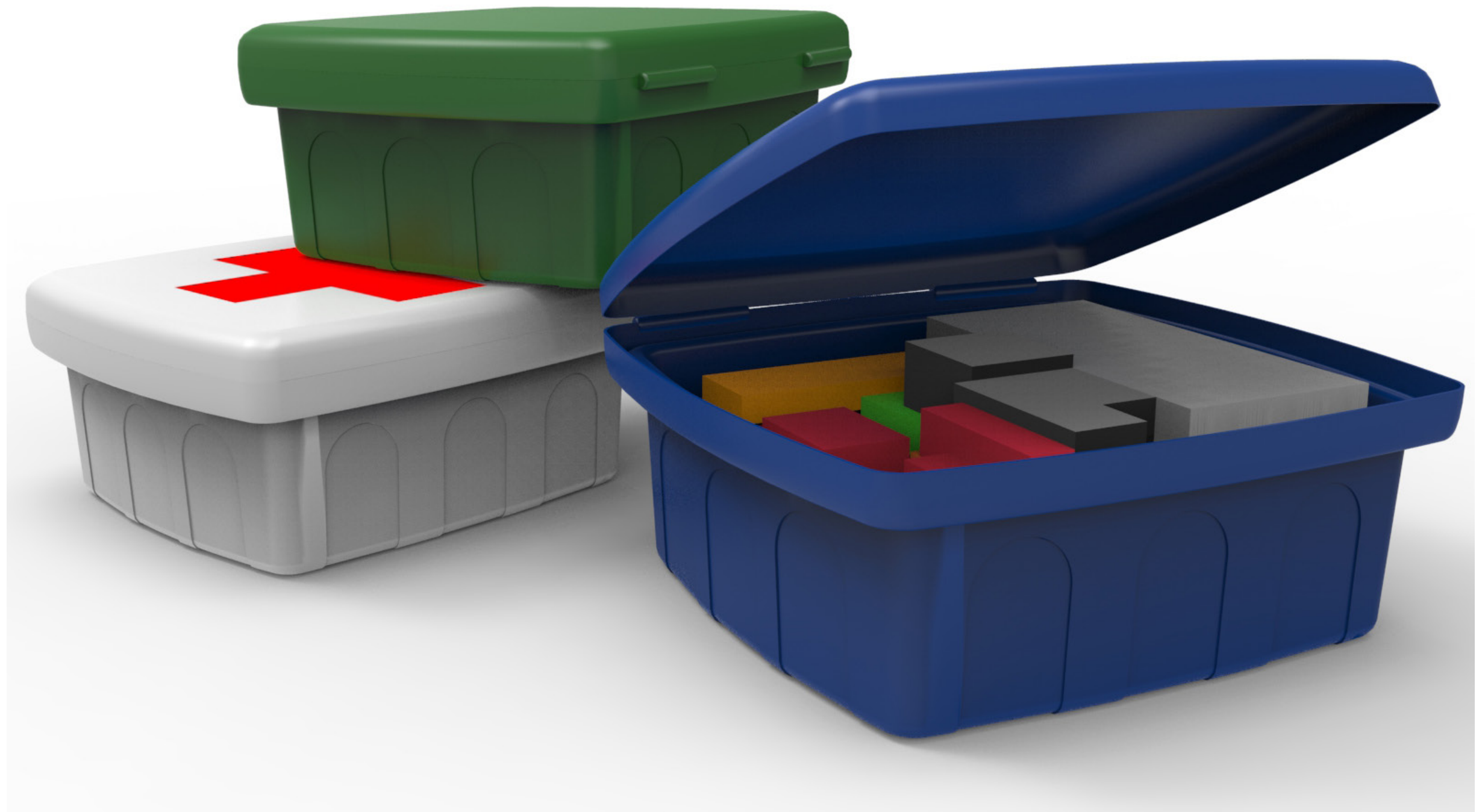
Includes:

- 1 Medical Tent
- Medicine
- Medical supplies

Greenhouse Box:

Includes:

- 2 Greenhouses
- Gardening tools
- Seeds

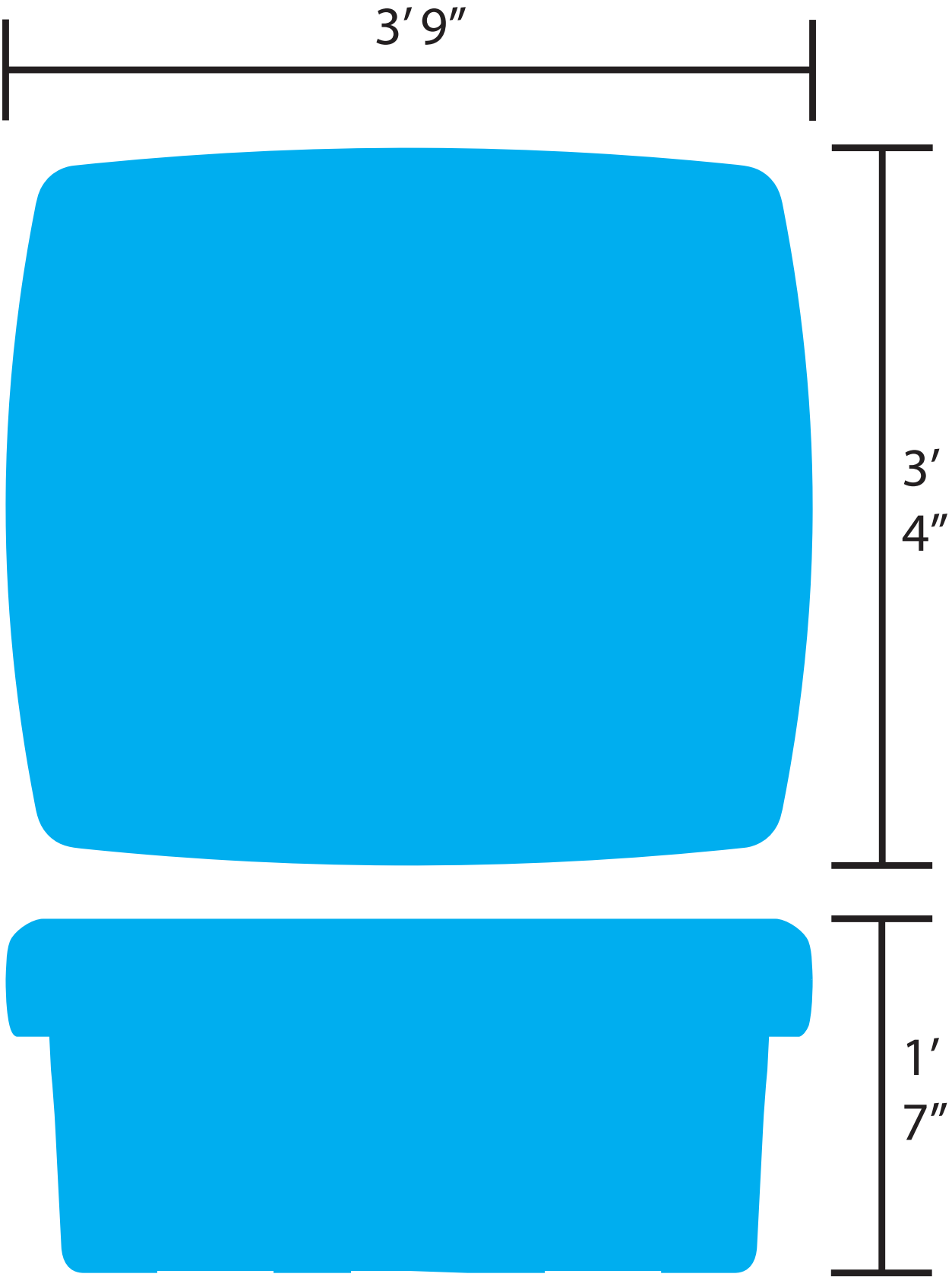
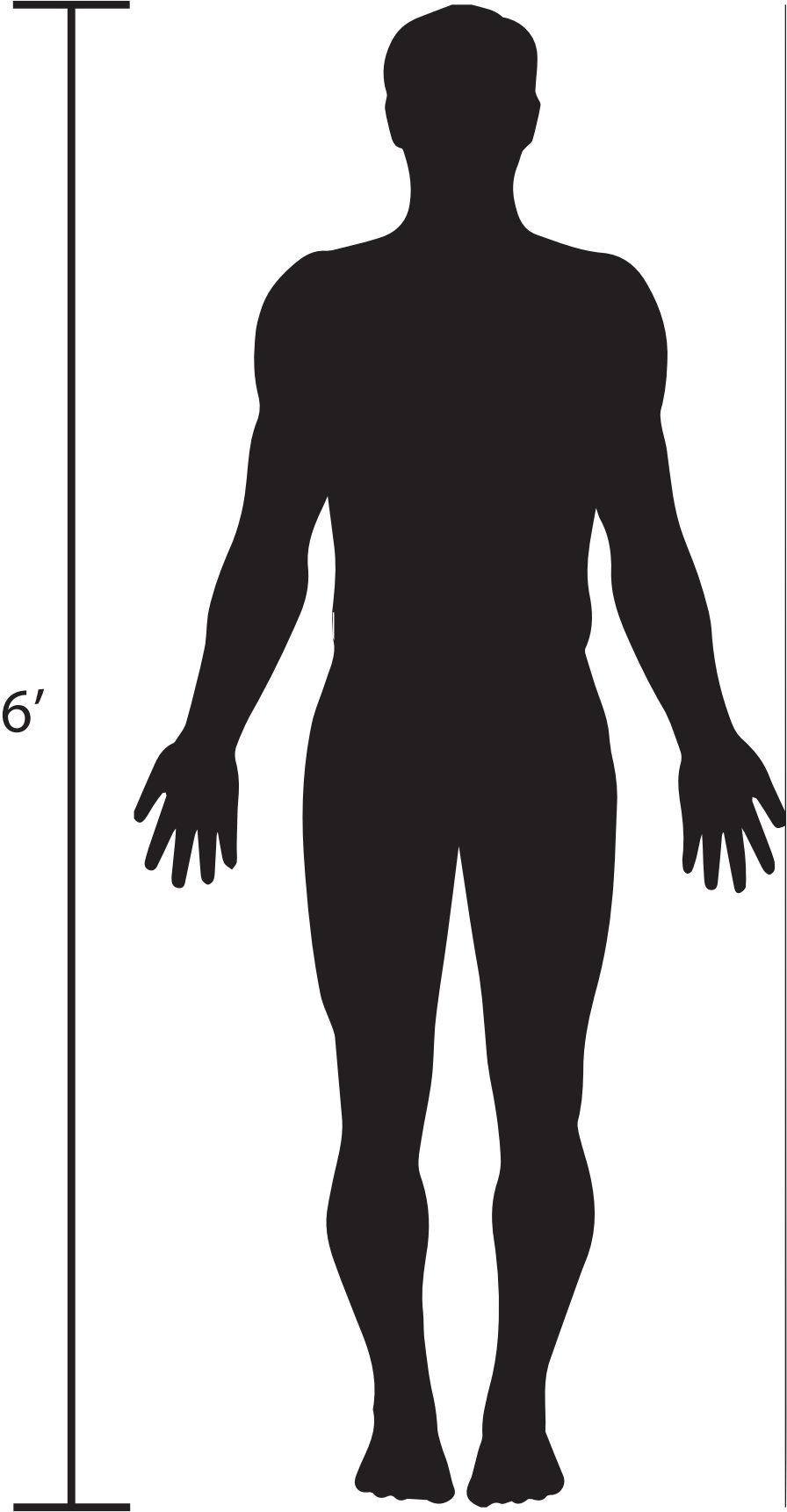


Specs:

Dimensions:
19" x 40" x 45"
>80 gallon container

Material:
Polyethelyne (PET)
Recycled plastic bottles

Weight:
Roughly 100 lb with supplies



Transportation

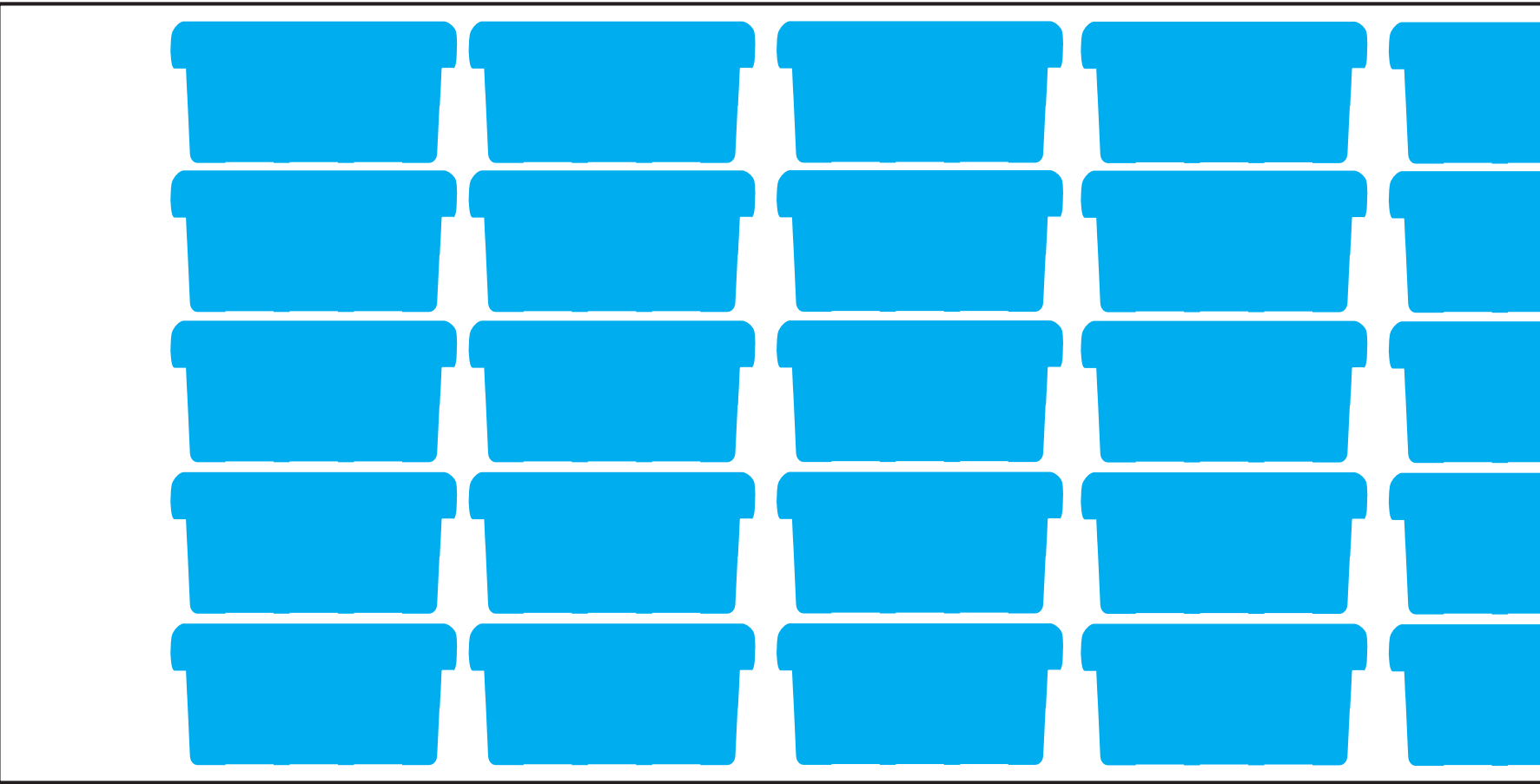
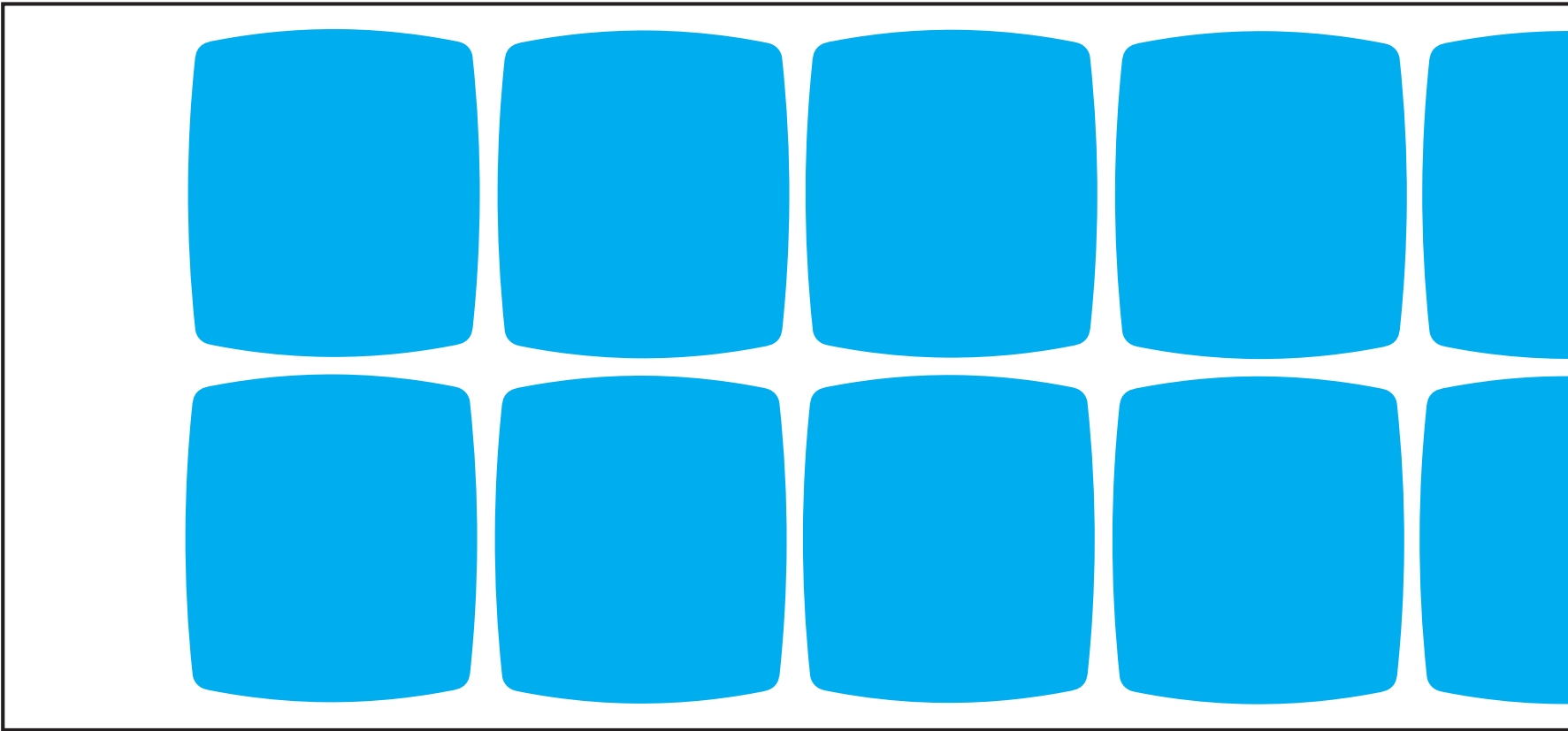
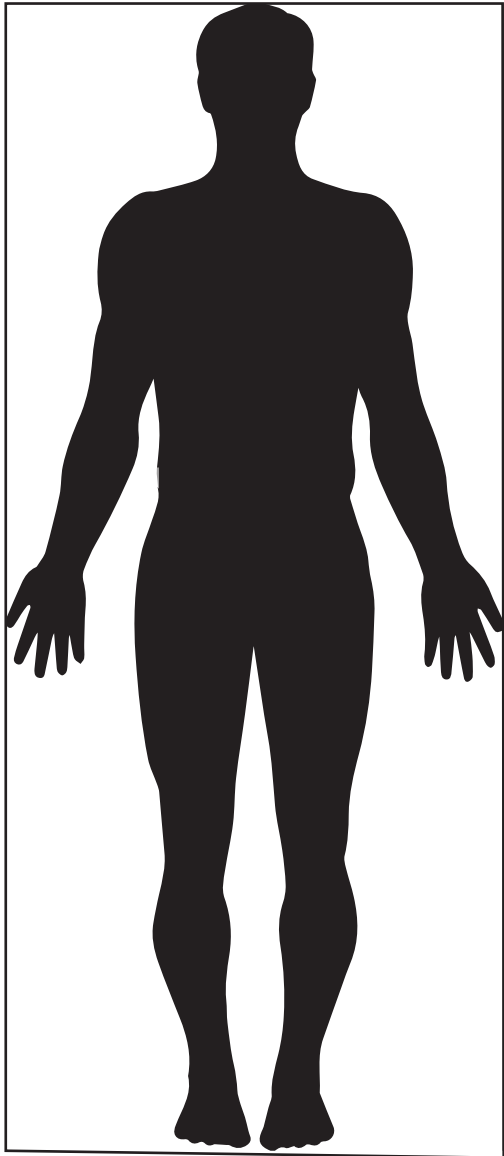
By Land

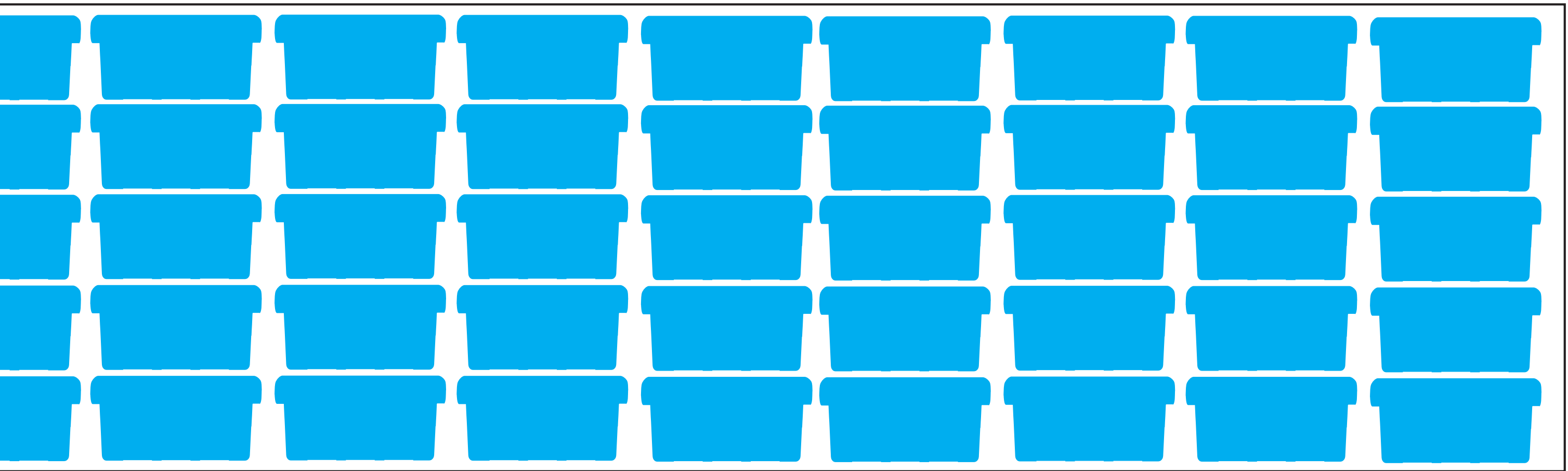
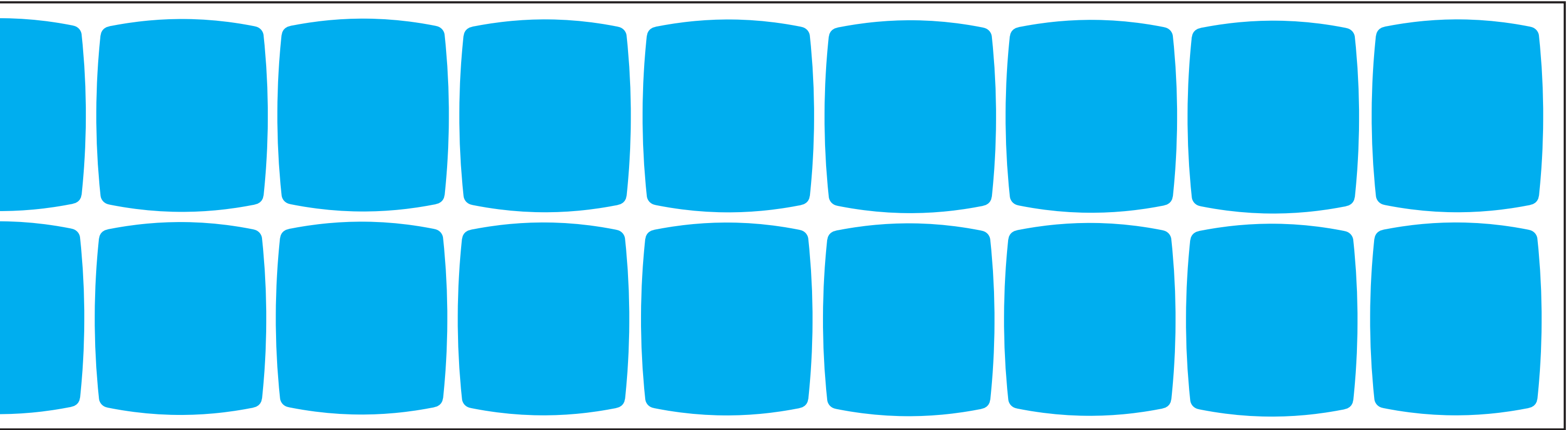
48' Semi-Trailer Box:

Inside - 47' 3" x 99" x 110 1/2"
Capacity - 3,566 cubic foot

- Holds 130 boxes
104 Shelter boxes
13 Greenhouse boxes
13 Medical boxes

Houses 624 people





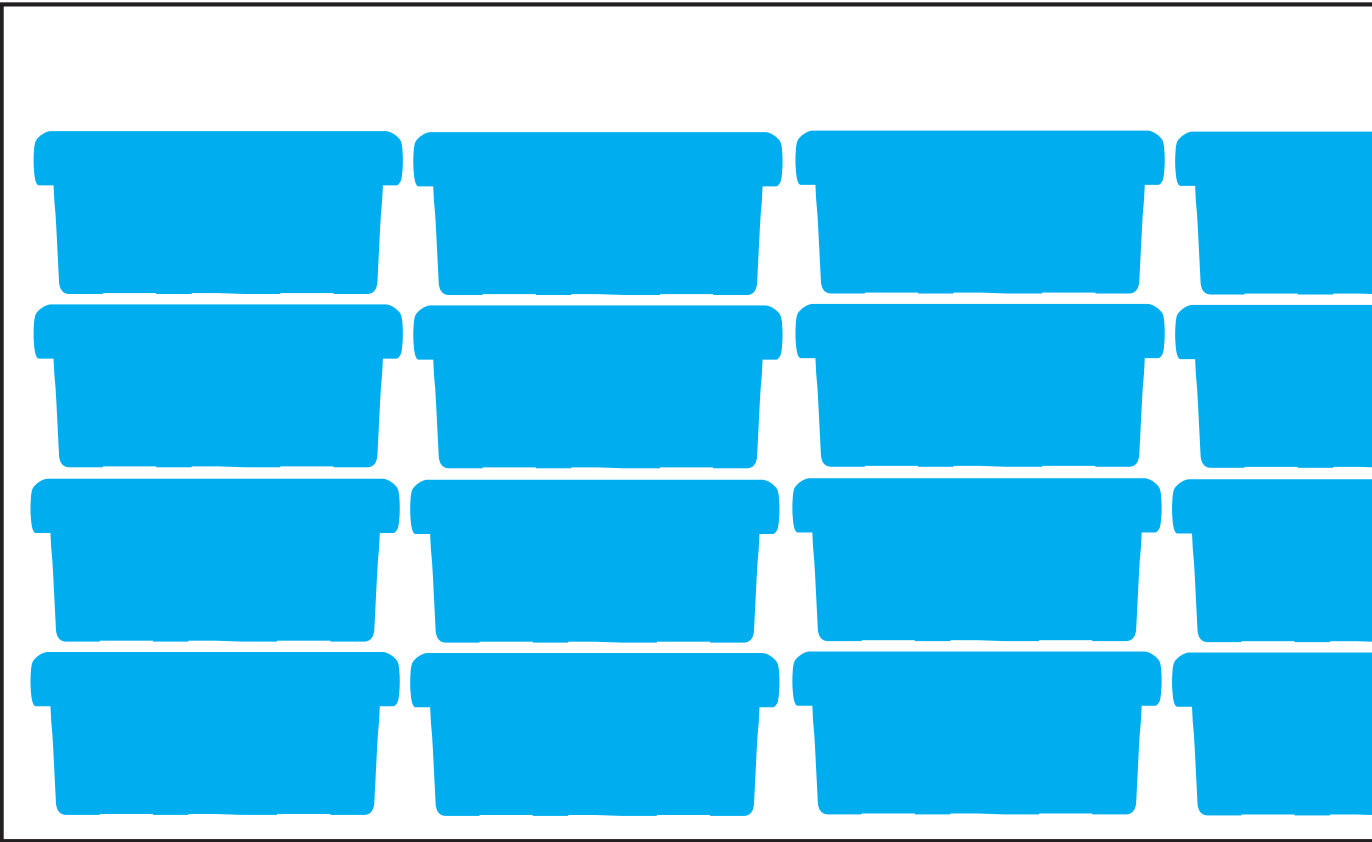
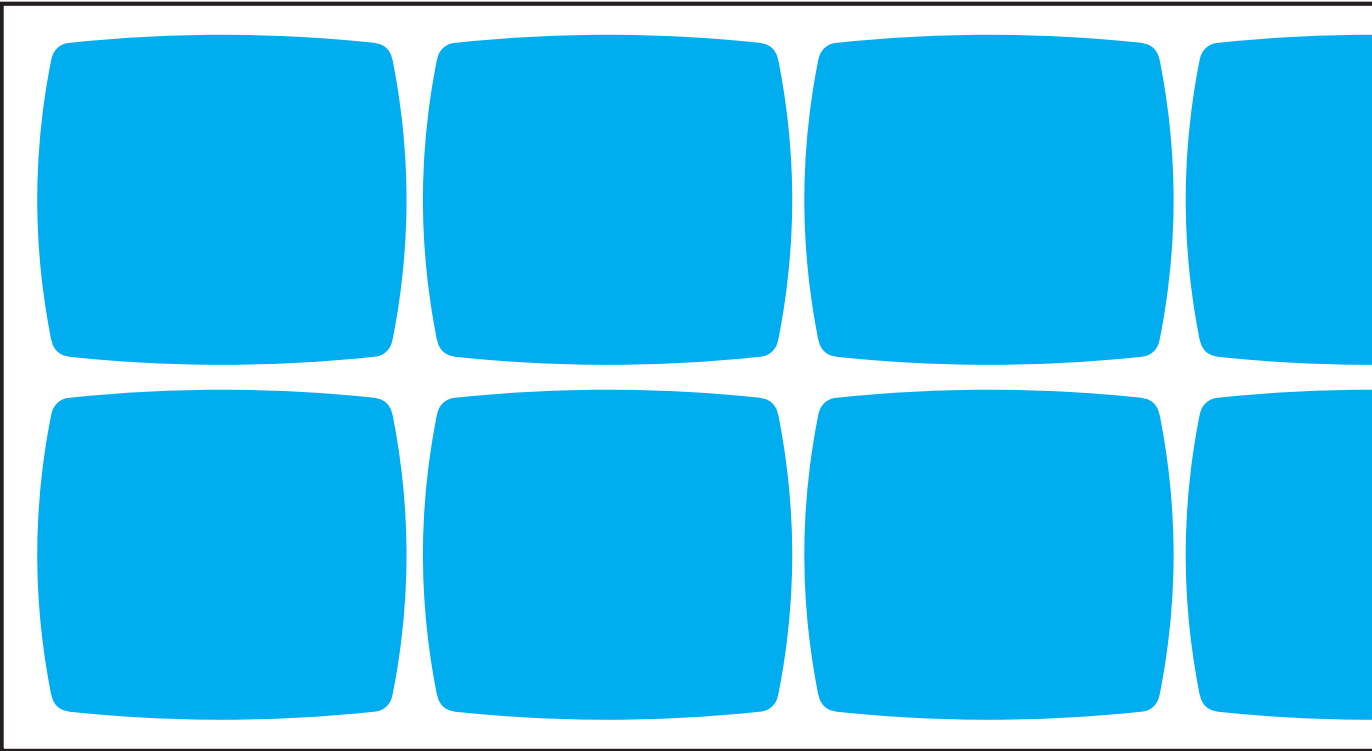
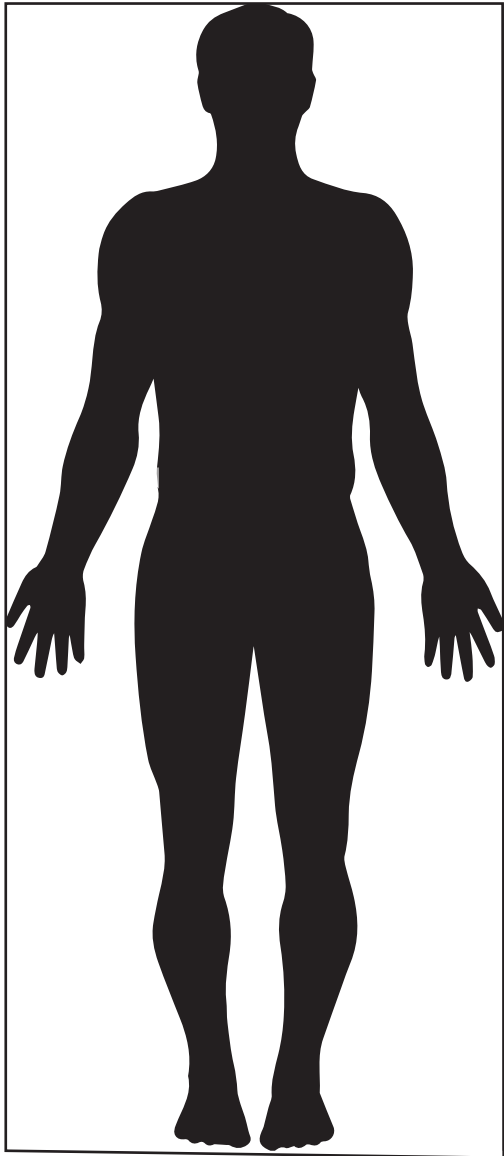
By Sea

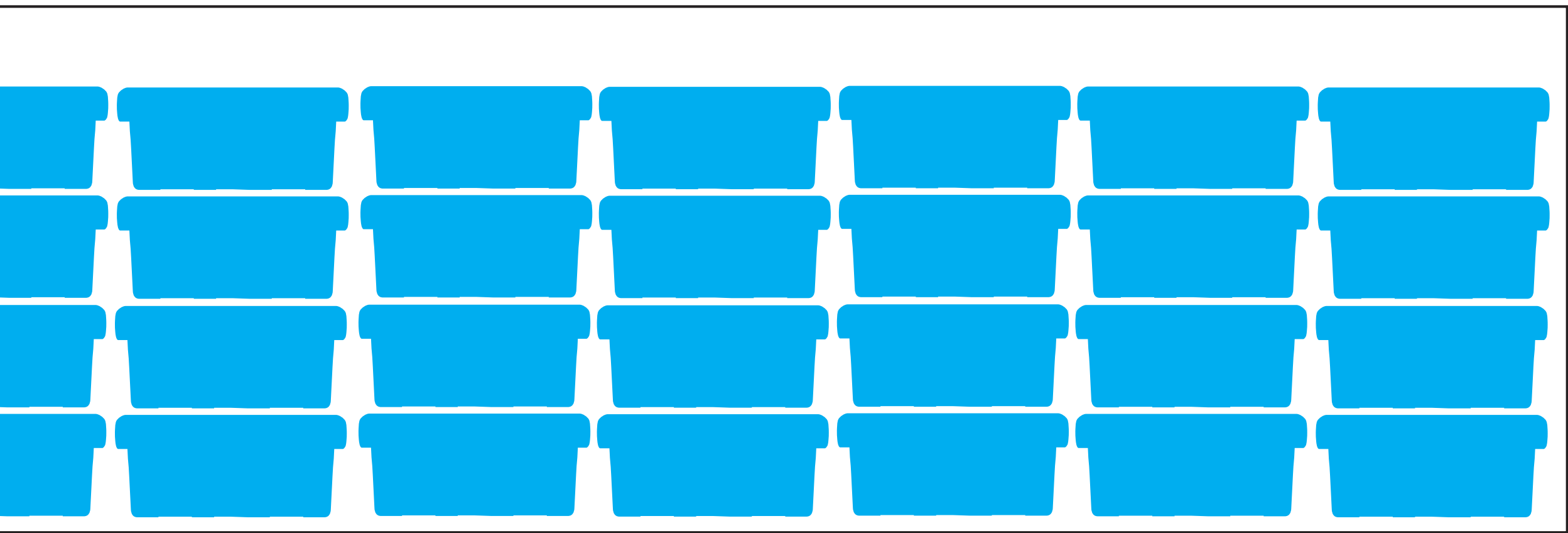
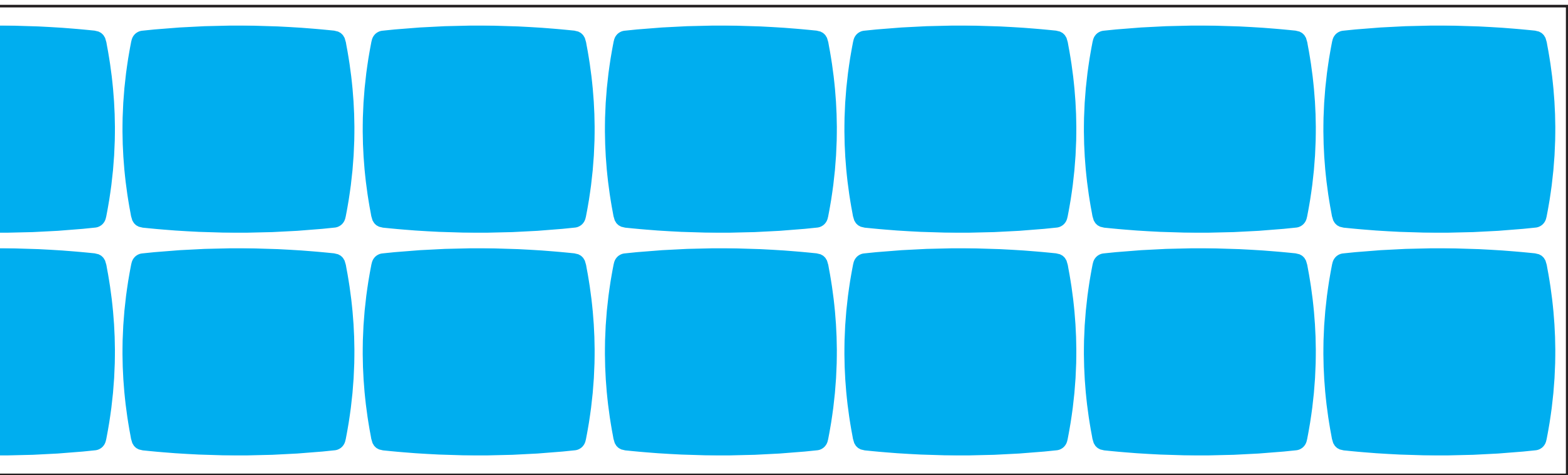
40' Shipping Containers:

Dimensions:
39' 3/8" x 7' 8 3/8" x 8' 8"
Capacity - 2,700 cubic foot

Holds 80 boxes
64 Shelter boxes
8 Greenhouse boxes
8 Medical boxes

Houses 384 people





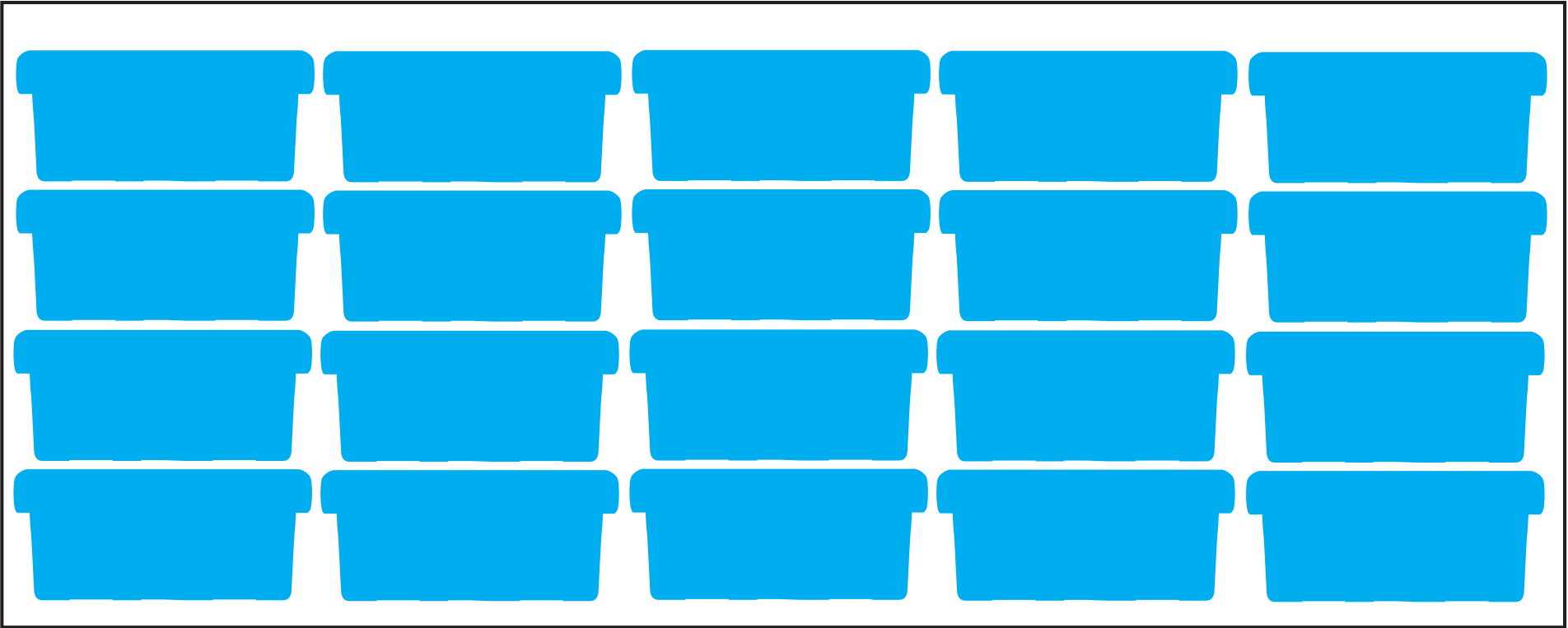
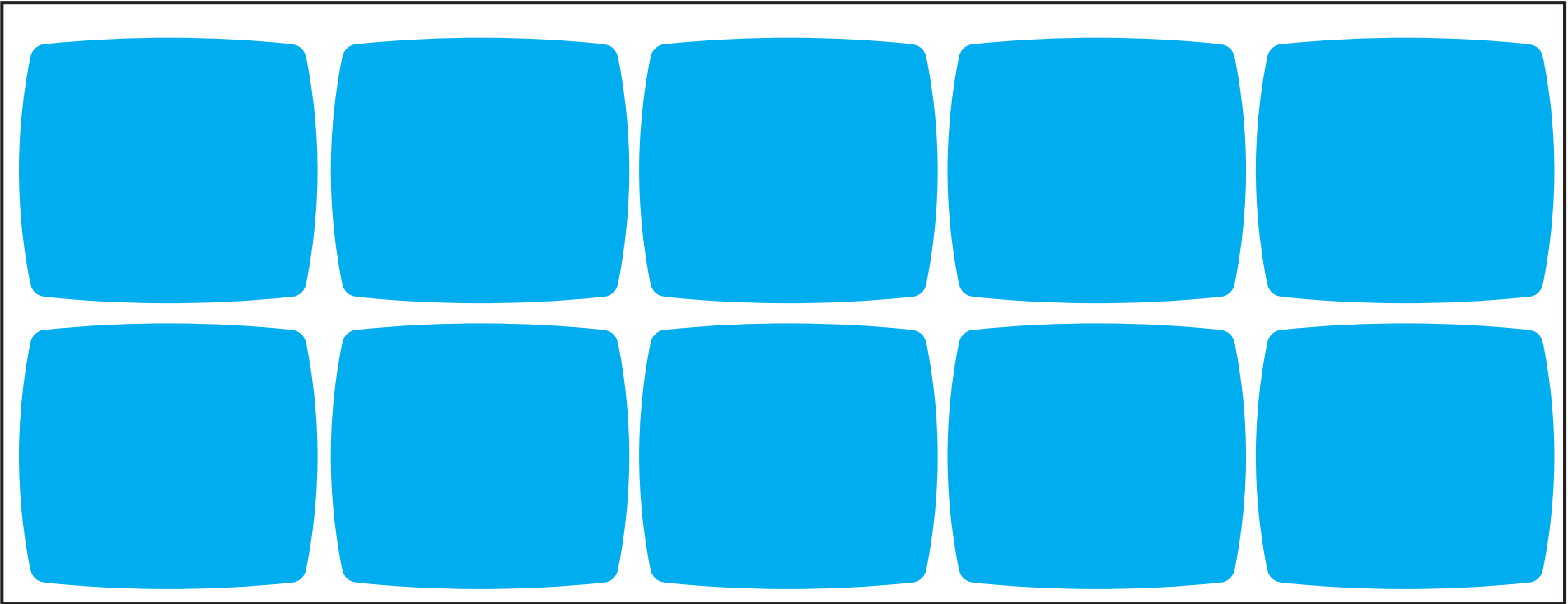
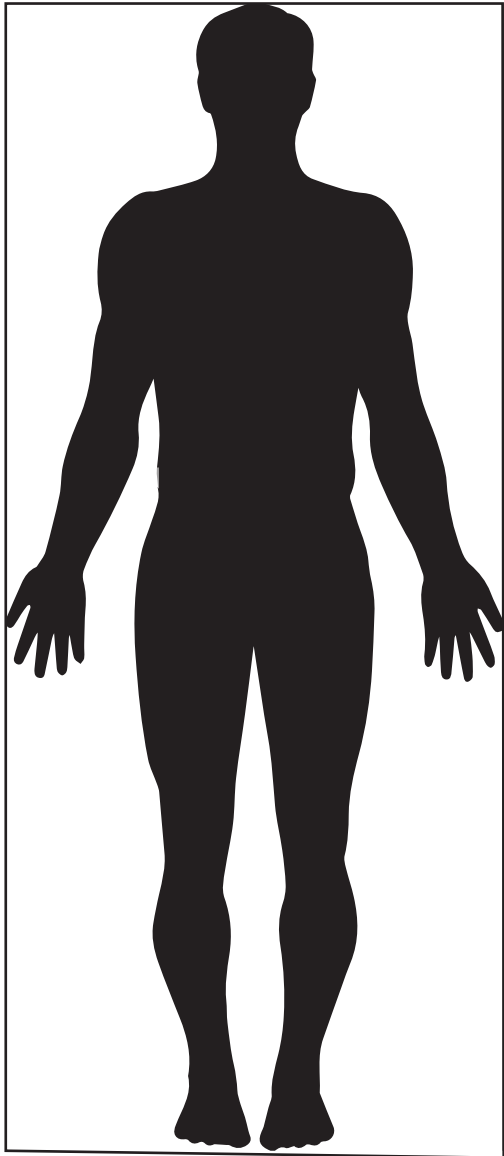
By Sea

20' Shipping Containers:

Dimensions:
19' 5" x 7' 8 3/8" x 7' 9 5/8"
Capacity - 1,164 cubic foot

Holds 40 boxes
32 Shelter boxes
4 Greenhouse boxes
4 Medical boxes

Houses 192 people



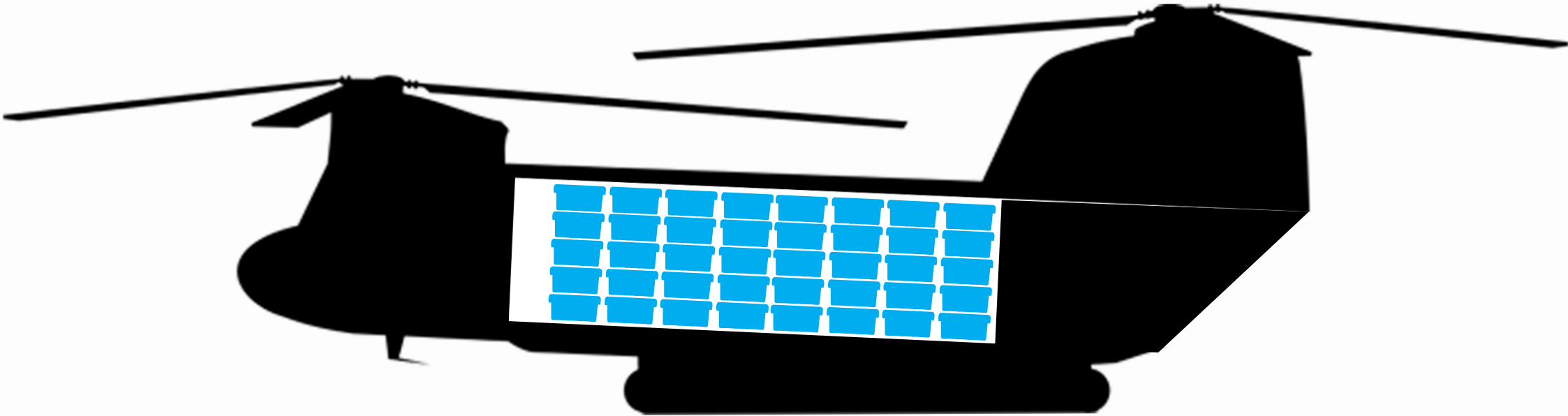
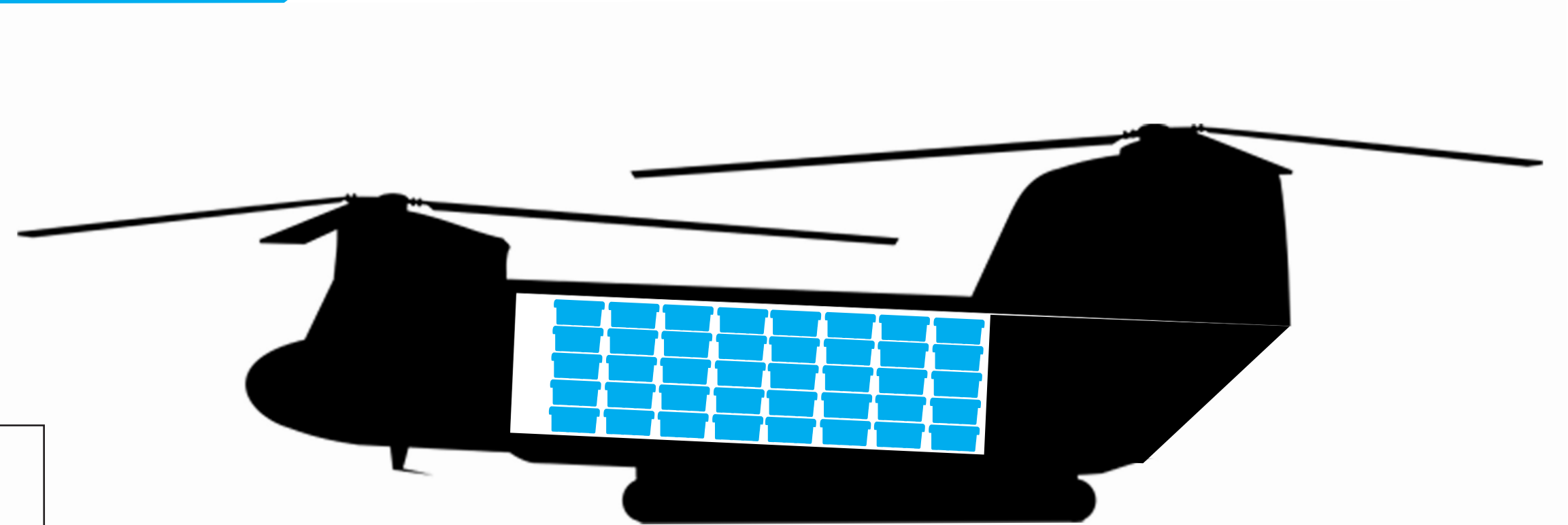
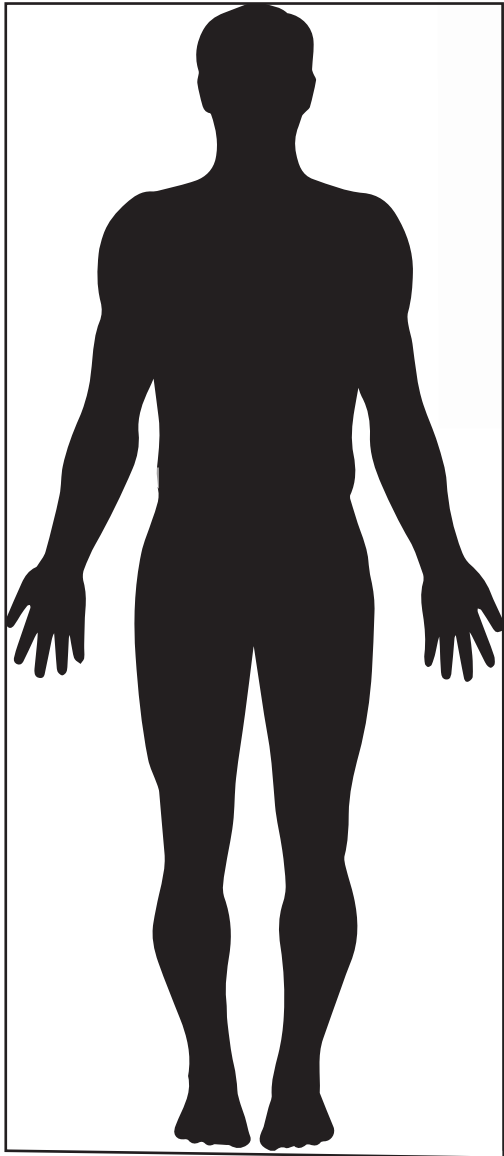
By Air

20' Shipping Containers:

Dimensions:
31' x 9' x 8'
Capacity - 2,232 cubic foot

Holds 80 boxes
64 Shelter boxes
8 Greenhouse boxes
8 Medical boxes

Houses 384 people



Inside the Shelter Box

Warmth & Water

Campmor Mid-Weight Thermal Blankets:

Cost: \$10.98
Weight: 1.5 lb
Dimensions: 60" x 68"
Smooth non-pill surface



Space All Weather Blanket:

Cost: \$12.95
Weight: 12 oz
Dimensions: 60" x 84"
Can be used as a ground cover to keep moisture from moving through floor of tent



LifeStraw Family:

Cost: \$89.99
Dimensions: 11" x 9" x 4.5"
Flow-Rate: 9-12 lt/hour
Capacity: 2 liter
Filters up to 18,000 liters
Comes in sealed bag to keep filter and pieces clean during transport



Cooking Equipment

Coleman Sportster II Dual Fuel 1-Burner Stove:

Cost: \$99.99
Dimensions: 7.38 x 7.8 x 6.55 in.
1.1 pint fuel capacity
Powerful 10,500 BTU
Boils 1 qt of water in 4 minutes
Built-in pot support & wind protection
Filter funnel included
Made in the USA



Solo Stove Titan:

Cost: \$89.99
Packed size: 5.6 x 5.1 in.
Assembled size: 7.9 x 5.1 in.
Weight: 16.5 oz
Materials: 304 stainless steel, Nichrome wire
Wood-burning stove
Boils 32 fl oz water in 4-6 mins
<http://youtu.be/oZy53MCPQ64>



Snow Peak Personal Cooker 3 Set:

Cost: \$29.95
Material: Stainless-steel
Weight: 1 lb. 4.5 oz.
Includes:
2 pots with folding handles
1 lid, 1 plate, 1 bowl, 1 fry pan
Pieces store inside each other and fit easily in the included nylon carry sack
Lightweight



Food Prep & Storage

GSI Outdoors Infinity 4 Person Compact Table Set:

Set:

Cost: \$29.98

Weight: 26.7 oz

Dimensions: 7.7" x 7.7" x 4.4"

Includes:

four 14 fl. oz. insulated mugs, four 14 fl. oz. bowls, four 7.5" plates, four Sip-It tops, & a mesh stuff sack

Material: Polypropylene

Recyclable

BPA-free

25% weight savings over polycarbonate

Additional set at \$8.70 each

Coleman's 3 Stainless Steel

Nesting Utensils:

Cost: \$4.99

Dimensions: 6.4" x 1.6" x 0.6"

Lightweight

Locks together when not in use

Includes knife, fork, and spoon



Two Reliance Fold-A-Carrier II Water Containers:

Cost: \$8.99

Weight: 12.3 oz

Dimensions: 10"x10"x12"

5G/20L capacity

On/off spigot design

Generously sized molded-in handle & bottom finger grips for simple pouring & carrying - even with gloves on.



Sea to Summit 13 Liter Dry Sack:

Cost: \$15.99

Weight: 3.7 oz.

Dimensions: 8.5" x 21"

Material:

70 denier nylon

& polyurethane laminate

Portable, compact, & light

White lining for visibility

Fully taped sealed seams

Hypalon® roll-top closure

D-ring attachment point at buckle



Tool Kit

Coast LED120 Pocket Tool:

Cost: \$19
Weight: 4.6 oz
Dimensions: 7" x 1" x .8"
Blade Length: 3"
Two LEDs, one at each end
Includes small and large size driver bits, both philips and flat

Husky 1.25lb Axe:

Cost: \$19
Weight: 1.25 lb
Dimensions: 5.3" x 14" x 1"
Handle length: 14"
Material:
Steel with Fiberglass handle

Husky 15" Saw:

Cost: \$10
Dimensions: 17.75" x 5.25" x 1"
Material:
Steel with Wood handle

Husky 16oz Hammer:

Cost: \$10
Weight: 1.25 lb
Dimensions: 15.5" x 5.75" x 18"
Material:
Steel with Fiberglass handle
Comes with 13" Pry bar



Stansport Shovel:

Cost: \$20
Weight: 2 lb
Folded Dimensions: 6.3" x 1.8" x 12.9"
Folds out to 24"
Includes small saw blade in handle

Husky Plier Set:

Cost: \$9.88
Dimensions: 12.6" x .9" x 9"
Includes:
8" Channel-lock plier
8" Adjustable Wrench
10" Groove Joint Plier

H.K. Porter Wire Cutter:

Cost: \$18
Weight: .85 lb
Dimensions: 4" x 12.25" x 1.5"

Seymour Hoe Head:

Cost: \$20
Weight: 2.75 lb
Dimensions: 5" x 12" x 7.5"
Connect any wood piece to make handle
Features 7.5" cutting end



Misc. Items

Coleman Emergency Poncho:

Cost: \$1.49
Dimensions: 50.5" x 40"
One size fits all hooded poncho
Available in Orange

Fire Starter:

Cost: \$12.95
Weight: 2.6 oz
Works after submersion
Built-in watertight storage
Lanyard with whistle

West Marine Flashlight:

Cost: \$19.99
Weight: 4 oz
Dimensions: 7" long
Provides up to 8 hours of light at full charge, solar-cell in handle
2 backup lithium batteries
Waterproof, floats

Everbilt 3/8" Rope:

Cost: \$5
Weight: 2.4 lb
Dimensions: 15.5" x 3" x 5"
100 ft of Paracord



Ziploc Bags Gallon:

Cost: \$11.88
Bag Dimension: 10 9/16" x 10 3/4"
Box contains 4 boxes of 38 bags each

Ziploc Bags Sandwich:

Cost: \$8.83
Bag Dimension: 6 1/2" x 5 7/8"
Box contains 4 boxes of 125 bags each



Puzzle books:

Cost: \$3.56

Color books:

Cost: \$2

Choice 4 Pack Crayons:

Cost: \$9.39
Box of 100 with 4 colors in each



The Shelter Kit

Cost may be affected by discount for bulk purchase or by donations

Estimated Cost: \$1000 Per Kit

Cost of Supplies: \$570 Estimated
\$731 Retail Price

Cost of Shelter: \$430 Estimated
\$656 Estimated

Actual Cost of Kit: \$1387

	#	Cost Per Each	Price for set
Thermal Blankets	6	\$10.98	\$65.88
Emergency Blankets	4	\$12.95	\$51.80
Lifestraw Family	1	\$89.99	
Coleman Dual-Fuel	1	\$99.99	
Solo Stove Titan	1	\$89.99	
Pot Set	1	\$29.95	
Pack of 4 Tableware	1	\$29.98	
Additional Tableware	2	\$8.70	\$17.40
Silverware Sets	6	\$4.99	\$29.94
Water Containers	2	\$8.99	\$17.98
Dry Bag	1	\$15.99	
Tool Kit			
Knife	1	\$19	
Axe	1	\$19	
Saw	1	\$10	
Hammer	1	\$10	
Shovel	1	\$20	
Wire Cutter	1	\$9.88	
Plier Set	1	\$18	
Hoe Head	1	\$20	
Ponchos	6	\$1.49	\$8.94
Fire Starter	1	\$12.95	
Flashlight	1	\$19.99	
Bundle of Rope	2	\$5	\$10
Ziplocs	2	\$5.18	\$10.36
Puzzle books	1	\$2	
Coloring books	1	\$2	
Total	46		\$731.01

Inside the Medical Box

Medical Items

Equipment

Essentials:

- Braces/splints
- Face masks - \$20 / box of 20
- Respirator
- Surgical mask
- Gloves - \$7 / box of 100
 - Sterile
 - Non-sterile
- Goggles - \$1.30 each
- Hot & cold packs - \$1 each
- Medical tape - \$3 / 2" x 15"
- Thermometers - \$15 / box of 100
- Stethoscopes - \$8 each
- Tongue depressors - \$4 / box of 100
- Applicators - \$4 / box of 100
- Sterilizing wipes
 - Alcohol - \$1 / box of 20
 - Antiseptic - \$3
 - Benzoin
- Jel/lubes - \$10 each
- Towels - \$25 / 24" x 36"
- Sheets - \$1 / 40" x 84"
- Cups - \$1 / 1 oz size
- Organization



Supplies

Dressings & Bandages:

- Adhesive Bandages
- Band aids
- Dressings
 - Compressed gauze - \$2 / 4.5" x 4"
- Bandage rolls - \$2
- Sponges - \$1



Sterile Items:

- Needles/syringes
 - Hypodermic needles - \$6
 - Syringes - \$10 / box of 100
- EMT shears - \$2
- Catheters - \$15
- Laceration kit
 - Razors
 - Scalpels
 - Safety pins
- IV Kits
 - Solution - \$195 / box of 96
 - Prep kits - \$2 / box of 200
- Sutures



Test items:

- Blood glucose test - \$20 / box of 50
- Water purification

Medicine

Prescription Items

Antibiotics:

- Amoxicillin
- Cefuroxime Asetil with Cefltin

Anti-Infective:

- Butenafine hydrochloride 1%
- Antifungal cream - \$10
- Triple antibiotic ointment - \$6
- Hydrocortison 1% cream - \$4



"Over the Counter"

Analgesic & Antipyretic:

- Aspirin
- Ibuprofen - \$9
- Acteminophin - \$9
- Naproxen - \$4

Antitussives:

- Dextromethorphan - \$5
- Robitussin cold/cough - \$9

Multivitamins:

- Children's vitamins - \$6
- Prenatal vitamins - \$10
- Montelukast sodium

Replacement

Preparations:

- Oral Rehydration salts

Others:

- Diamode (anti-diarrheal) - \$18
- Diphen (antihistamine) - \$9



Inside the Greenhouse Box

Quick to Grow Vegetables



Carrots



Cucumbers



Green Onions



Lettuce



Spinach



Bush Beans



Kale & Mustard Greens



Radishes



Peas



Turnips



Squash



Watercress

Basic Gardening Kit

Trademark Tools 7 in 1 Plant Care Garden Tool Set:

Cost: \$14.44

Weight: 1.33 lbs

Included:

- Leaf and flower trimmer
- Water spray bottle
- Branch and twig pruner
- Spade
- Trowel
- Cultivator
- Convenient carrying bag



Stansport Shovel:

Quantity: 2

Cost: \$20

Weight: 2 lb

Folded Dimensions:

6.3" x 1.8" x 12.9"

Folds out to 24"

Includes small saw blade in handle

