THE TYPOLOGY OF SURVIVAL

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THE TYPOLOGY OF SURVIVAL

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2022 - 2023
Climate change is affecting the whole world and a need for housing is emerging for climate migrants. Taking into account the current geopolitical landscape there is an indication of a need for an architectural response that must be applied to a variety of evolving sociopolitical contexts throughout the world. This also means that there are several possible solutions. Research indicates that viable design solutions fall into the following categories:

1. An immediate response that would answer the question of large slums due to inland migration.

2. A long term response that would look at global migration from one country to another. Many initial migration patterns of climate migrants are within the country due to current political regulations that make international migration across borders incredibly difficult. There is also the aspect of cultural and linguistic similarity, as well as social systems within the same country that are already familiar to these displaced peoples.

In contrast global climate migration is a trend that is only beginning to be seen in the world. Those that are currently migrating are doing so in relation to socio political standing in their home country. Many are refugees from political turmoil, religious persecution, or war. Global migration on the climatic scale is much more subtle, influencing each of these individual factors and magnifying them.

Because of the variability in time scales listed above, current research and considerations fall short of a completely holistic approach to resettlement. Cultural preservation, emotional needs and available resources are not being properly assessed to the extent of the needs of these climate refugees both internally and globally.

Using research including expert interviews, participative studies of affected communities, scientific climatic data, and existing examples of climate refugee housing an evaluation of a new typology is explored.
Current mainstream responses to climate migration are unable to holistically and wholly consider the human experience. If climate migrants are not considered holistically they are unable to thrive emotionally, socially, and economically. Design solutions must address each of these factors and require a thorough examination and inclusion of the existing communities.

The northermost parts of the world are quickly becoming “green zones” or locations that are going to be much less impacted by the negative effects of climate change.

(See Pg. 10)

The Half-Houses of Iquique, Chile are great examples of changing the status quo to create housing that not only shelters its inhabitants but also supports & helps people living in them thrive.

(See Pg. 8)

Zeroing in on individual regions helps to contextualize the needs of the individuals that are being displaced. This does not mean that this is not a global problem. It is necessary to consistently stand back to examine the global context in tandem to focusing on human-scale factors. Solutions need to be scaled for everyone.

(See Pg. 6)

Half-House exists as a practice in participative design strategies by introducing wall made infrastructure to recently displaced residents in Iquique, Chile. Half-homes, as seen in the image below, were created to allow the residents to build on and expand half of their homes as they needed while providing them with the well-engineered core for them to expand from. Considerations of the changing climatic elements in the site also affected the overall site design. This acts as a great holistic design response that considers the residents and their comfort by placing design decisions into their hands.

Further development of the site including the development of resources in the area focuses on the enrichment of the lives of the individuals by empowering them individually or in groups.

A variety of configurations for future expansion of rooms.

Trees were used as a natural and existing barrier for issues with landslides, earthquake damage protection and site protection from extreme weather.

**Fig. 2 - Exploded axon of half-houses**

**Fig. 4 - Elemental construction documents**

From the initial construction an evolution is seen. Full expansion is supported by pre existing supports. The residents can simply use the extra space as exterior storage while others fully expand and add livable space in both the first and second floors. This places trust into the people that live here.

**Fig. 6 - Newly constructed half-houses**

**Fig. 8 - Elemental construction documents**

Unfinished concrete floors are provided on the first floor, the second level and the roof. Properly installed infrastructure of plumbing and electricity are provided to residents.

If a resident wanted to expand their homes into their hands.

**Fig. 7 - User-developed half-houses**
Typically overcrowded there isn’t a lot of room for growth within the slum. Both socially and physically. Access to better water resources, education, jobs, and other upward growth elements are few and far between for the overcrowded population in Korail.

The neighboring high rises are a symbol of the wealth in the city. It also acts as a center of work for the residents of the "slums" working as support staff. Cleaning, nannying, and transporting these "higher-class" citizens although seemingly a lower class job often gives the residents of the slums more opportunities for growth and support for their families.

Rising sea levels in the Bay of Bengal are causing for the rivers that thread their way through Bangladesh to flood the temporary shelters of residents of Korail.

Typically overcrowded there isn’t a lot of room for growth within the slum. Both socially and physically. Access to better water resources, education, jobs, and other upward growth elements are few and far between for the overcrowded population in Korail.

Homes in the slum are typically from scrounged together resources and are built to be elevated above the rising river levels. These are entirely self-authored homes by the residents of Korail.

KORAIL’S SELF-AUTHORED TYPOLOGY

Made from corrugated metal sheets that are soudered together. Minimal space means that washing is often found hanging around the outside of homes.

Bamboo stilts and a frame are elevated above the rivers that make their way through dhaka. These stilts are able to be reconfigured to elevate above the water as water levels increase.

Minimal space means that washing is often found hanging around the outside of homes.

Corrugated steel is used for roofing.

Tall concrete, steel, and glass skyscrapers tower over the slums in stark contrast to the simply made bamboo and corrugated steel homes in the slum.

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A for-profit refugee housing model. Created by two brothers from Oslo who already owned and operated several different hotels throughout Germany, Sweden, & Norway. Using their experience with working in the hospitality field they slowly encroached on the education, nursing home, and refugee housing markets. These for-profit centers typically are able to make a quick bundle of cash by buying up existing buildings, renovating them minimally, and accepting funding from the government, a model that has been used consistently in their refugee housing.

Reception facilities are often examples of adaptive reuse of existing abandoned spaces. This one located in Rade, Norway, is an old supermarket. Refugees await their new status as immigration officials evaluate their fate. These are typically only stayed in for days to weeks at a time.

No actual housing is provided at this stage. Refugees are given tents & new clothes to wear while their belongings and clothes are locked away to be frozen. There is no sense of home for those who have been fleeing.

Typically after transferring from the reception facility refugees are given shared rooms in a more permanent space like renovated hotels. Still these spaces are not made for the comfort of the refugees. Limited space crams multiple beds for multiple families into each area.

Storage & consideration for personal items are seldom considered. There is no individual consideration.

Refugees await their next move as immigration officers evaluate their fate. These are typically only stayed in for days to weeks at a time.

Fig. 14 – supermarket refugee center
Fig. 15 – family quarters in refugee facility
Fig. 16 – Valdres, Norway
Fig. 17 – data of outmigration of foreign citizens in the Vang region
Fig. 18 – national data of Norway and immigration
The term "climate refugee" is a highly debated and contentious point among the global community. A refugee as defined by the Geneva Convention is, a person who is "owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion." This lack of definition means there is a gap in the global scale when looking at global housing for climate migrants.

Current refugee housing only caters to immediate & emergent displacement of those fleeing from these tense political situations. Because of this refugee housing is inadequate to help with long-term and permanent displacement.

REFUGEES IN THE US

The United States is founded on a melting pot theory. Wherein migration and constant fluctuation of population demographics are essential to it’s success. This means that as refugees arrive and actively acculturate to the existing sociopolitical, economic, and cultural fabric they are also actively adding to it’s makeup.

"First, if refugee agencies or policymakers intend to help new arrivals, they must try to understand what resources those new arrivals possess, including cultural resources. Second, culture does not come out of a vacuum, and it changes and develops continually." By looking at existing refugee resources and studies examining how refugees acculturate to this cultural fabric is essential in informing resources that actively will support this new influx of a new refugee type - Climate Refugees.

"Understanding this history of mobility involves considering how ethnicity adapts to and interacts with structural circumstances." The largest network of refugee help is in the Church World Service a Christian organization that helps to find locations for displaced persons and refugees throughout the United States.

This faith based collaborative works with the United States government by:

+ Rehoming refugees in cities across the country.
+ Offering legal counsel and services to incoming migrants to understand their rights.
+ Vetting children’s rehoming locations and providing casework services including integration into the local community.

"First, if refugee agencies or policymakers intend to help new arrivals, they must try to understand what resources those new arrivals possess, including cultural resources. Second, culture does not come out of a vacuum, and it changes and develops continually."
Based on the experience of current climate migrants in Bangladesh, analysis of current refugee housing, and the lack of identity of the global climate migrant, a holistic equalateral approach to these refugees is broken down into 3 categories. Basic needs represent hygienic conditions, water access, privacy for WASH needs. Safety represents structural integrity, resilient architecture, and stable social structures. Upwards growth represent community outreach programs, educational support systems, and workforce training.

"Women don’t have separate sanitation facilities in many slums and they hurdle with men in meeting their WASH needs."

"In the slums, the dwellers-to-bathroom ratio is inadequate. As a result, women are forced to limit their hygienic requirements, which may lead to long-term health problems."

Access to water, hygienic bathrooms, private locations for women who are menstruating, access to income generation, education, healthcare.

Clean & structurally sound environments, resilience to rapid changes in surrounding climate, protection from predatory organizations, protection from sudden relocation due to eviction, feeling of community.

Outreach to create more income generation within the slums, educational growth, intercommunity support, active educational programs to invigorate self-sustaining income generation.

"Slum dwellers do not have any sustainable livelihood opportunities. They do not have the capacity to work in diversified employment opportunities. Particularly women are not engaged in income generation work."

"We do not have any permanent jobs. Most of the time, in a year, we are jobless. So, we have no economic and social security."

"Due to the narrow drainage systems, we face water logging after a heavy or medium rain, and therefore inundate our lower houses."

"We could be homeless at any time if the owner asked us to vacate the land."

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PROJECT CONTEXT
Project Objectives

- Enact participative design strategies and techniques to make sure that displaced communities that are being affected are not excluded from the design narrative and solutions.
- Examine the current cultural loss and context of individuals that need to evacuate extreme weather zones.
- Create a holistic design methodology that takes into account loss of possessions, extreme weather events, traumatic life changes, and comfort of those affected.
- Create a holistic design solution that does not only provide a comfortable and dignifying experience for those displaced but also is able to help these displaced communities thrive.
- Understand the significance of using existing material to not create waste while also preserving the cultural significance and importance of the site.
- Take contextual experiences of those displaced and bridge the gap between old environment and new.

Bridging the Gap

Zeroing in on the DNA-like structure of the research and analyzing the structure of research to inform the programming is defining the genotype sequence of the project.

A genotype acts as the chemical blueprint for an organism’s physical manifestation – a phenotype. By zeroing in on the DNA-like structure of the research a genotype sequence can be found. This begins to bridge that gap between research and initial programming considerations.

Several categories were developed that include holistic considerations of a multifamilial home structure based on research.
As the literal chemical composition of a genotype helps to define the data a phenotype acts as a physical manifestation of that data. Each piece of the genotype is integral in making the phenotype work. As such the programming and bridge between research and initial space exploration act as a genotype map of the making of a phenotype – the physical manifestation of the multifamilial facility.

**PURPOSE**

**TO CREATE A TYPOLOGY THAT CAN ADAPT TO THE NEEDS OF AN EMERGING REFUGEE POPULATION**

**SIZE**

1,500 CAPACITY

Using simple sketching techniques 4 architectural typologies are explored to understand their flow from the indoor to the outdoors. Exploring the organization of the space while also understanding the effects of the architecture on the building itself is explored further in conjunction with the programming of each space.
**BEDROCK LAYER**
Precambrian Rock: Archean & Volcanic Rock
This bedrock layer is hard to penetrate and is difficult to find aquifers & build septic tanks in. This means the facility must be able to access the nearby Jacobsville sandstone aquifers as a way to support it's need for water support.

**SURFICIAL GEOLOGY**
Thin to Discontinuous Glacial TILL Over Bedrock & Coarse-Textured Glacial TILL
This means that soil texture in this region is a heterogeneous mixture of size and structure. Ranging from clay deposits to large boulders of hard granite & stone. As such there is little between the surficial geology and the bedrock as well as possible drainage issues.

A positive note of this soil texture is that it is typically located quite closely to outwash plains like the Jacobsville Sandstone aquifers and as such have close access to rich aquifer deposits. This increases access to freshwater deposits and combats issues of water support & storage.

**SOIL COMPOSITION**
Soil Composition: Kakelaas-M Ipsenning - Rock Outcrop Association
This type of soil is quite mixed as such during construction and development could cause erosion issues, equipment failure, and seedling mortality.

Ways to combat this? Building any roads on a curve, installing water bars, seeding logging roads, as well as seeding with nursery plants to combat seedling mortality.

**LOCAL ECOLOGY**
Marquette consists of over 90% coverage of trees of various species including sugar maple, yellow birch, spruce, balsam, and pine. As such careful and considerate understanding of the site itself and it’s affect on the surrounding forest is paramount.

**CLIMATE**
Global climate is quickly becoming inhospitable to several parts of the global south. Increased temperatures are causing influxes of climatic events such as flooding due to rising sea levels, earthquakes, tsunami’s and other climate events are quickly evicting people from their homes with no place to return to.

In direct contrast to this some areas of the globe are not as affected by the increases in temperature and exhaustion of natural resources. Areas in the global north - such as the identified Marquette - have lower average temperature fluctuations and are not affected by large scale climatic events such as tsunami’s and earthquakes.

Comparing the two average temperatures over different time scales helps to understand on a macro & micro level the needs of the affected user group.

**FORESTVILLE ROAD, MARQUETTE, MICHIGAN**

![Topographic map of location of Marquette](fig.34)
Marquette has a total population of 20,394 as of 2021.

Marquette city is also the largest epicenter of population in the whole upper peninsula as it is the center of Northern Michigan University.

This location was picked because of its larger population with a focus on development and growth, it’s proximity to the local university also offers a center of education and resources that is not available in other locations throughout the upper peninsula.

Current racial makeup of Marquette city is not diverse with a 89% makeup of White Current racial makeup of Marquette city is not diverse with a 89% makeup of White Hispanic or Latinx - 2.5% Two or more races - 4.7% Asian - 0.4% Native American - 0.4%

Current People of Color: 11.6%

Foreign Born Population: 4.0%

Persons under the age of 18: 11.2%

Persons over the age of 65: 15.8%

Persons of ages 18 - 65: 73%

Total population as of 2021: 20,394

High school graduates as of 2021: 94.5%

Employer firms as of 2017: 729

Quick Facts:

### Codes Summary

<table>
<thead>
<tr>
<th>Space</th>
<th>Square Footage</th>
<th>Occupancy Type</th>
<th>Required Separation of Occupancies</th>
<th>Occupant Load Factor</th>
<th>Plumbing Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>900 - 1,200 SF</td>
<td>Residential R-2</td>
<td>Assembly: 1 HR  Business: 1 HR</td>
<td>260 Gross  Act: 4 - 6</td>
<td>Water Closets: 1 Per Unit  Lavatories: 1 Per Unit  Kitchen: 1 Per Unit  1 Washer Connection Per Unit</td>
</tr>
<tr>
<td><strong>Community Space</strong></td>
<td>1,500 SF</td>
<td>Assembly A-3</td>
<td>Residential 1 HR  Business: 1 HR</td>
<td>15 Net  Act: 100</td>
<td>Water Closets: 1 Per 75  Lavatories: 1 Per 200  1 Service Sink</td>
</tr>
<tr>
<td><strong>Flexible Worship</strong></td>
<td>975 SF</td>
<td>Assembly C-3</td>
<td>Business 1 HR  Mercantile 1 HR</td>
<td>7 Net  Act: 13.9</td>
<td>Water Closets: 1 Per 75  Lavatories: 1 Per 200  1 Service Sink</td>
</tr>
<tr>
<td><strong>Childcare</strong></td>
<td>1,274 SF</td>
<td>Education E</td>
<td>Business 1 HR  Mercantile 1 HR</td>
<td>35 Net  Act: 37</td>
<td>Water Closets: 1 Per 50  Lavatories: 1 Per 60  1 Service Sink</td>
</tr>
<tr>
<td><strong>Social Services</strong></td>
<td>3,000 SF</td>
<td>Business B</td>
<td>Education 1 HR</td>
<td>150 Gross  Act: 20</td>
<td>Water Closets: 1 Per 25  Lavatories: 1 Per 40  1 Service Sink</td>
</tr>
<tr>
<td><strong>Community Connection</strong></td>
<td>6,000 SF</td>
<td>Mercantile M</td>
<td>Assembly 1 HR  Education 1 HR</td>
<td>50 Gross  Act: 100</td>
<td>Water Closets: 1 Per 500  Lavatories: 1 Per 760  1 Service Sink</td>
</tr>
<tr>
<td><strong>Green Space</strong></td>
<td>Variable N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Programming Summary

<table>
<thead>
<tr>
<th>Space</th>
<th>Square Footage</th>
<th>Needs</th>
<th>Adjacency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living Space</strong></td>
<td>900 - 1,200 SF</td>
<td>Bedroom Area  Dining Area  Living Area  Outdoor Access  Laundry  Bathroom</td>
<td>Direct Adjacency to Community Space  Direct Adjacency to Worship Space</td>
</tr>
<tr>
<td><strong>Community Space</strong></td>
<td>1,500 SF</td>
<td>Large Kitchen  Large Waiting Area  Service Area for Casual Connections  Lounge  Working Spaces  Social Computers (For Kids in School or Working Adults)</td>
<td>Direct Adjacency to Community Space</td>
</tr>
<tr>
<td><strong>Flexible Worship</strong></td>
<td>1,274 SF</td>
<td>Flexible Seating  Full/Part Stage Area  Gender Separation  Technology Access or Room  Bathrooms for Children vs. Adults  Play Area  Learning/Classroom/Activity Area  Break Area  Classroom  Sleep Area</td>
<td>Direct Adjacency to Worship Center  Direct Adjacency to Community Connection Space</td>
</tr>
<tr>
<td><strong>Childcare</strong></td>
<td>975 SF</td>
<td>Waiting Area  Office Spaces (x 100)  Resource Center  Group Room for Small Events  Restrooms  Kitchenette</td>
<td>Direct Adjacency to Community Connection Space</td>
</tr>
<tr>
<td><strong>Social Services</strong></td>
<td>3,000 SF</td>
<td>Areas to Sell Produce Locally Grown  Areas to Showcase Products Made by the Residents  Supply/Laboratory Space  Event Space  Farmers Market to Connect Residents of Facility and Local Community  Kitchenette (or for those who work and bring in lunch)</td>
<td>Direct Adjacency to Green Spaces  Direct Adjacency to Social Services</td>
</tr>
<tr>
<td><strong>Community Connection</strong></td>
<td>6,000 SF</td>
<td>Community Garden  Central Heart to Facility</td>
<td>Direct Adjacency to Community Connection Space</td>
</tr>
<tr>
<td><strong>Green Space</strong></td>
<td>Variable N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Understanding how each space is adjacent to one another along with each of their square footage considerations, and their privacy needs is important in making sure the flow of the campus is consistent and takes into consideration the needs of the users.

Primary adjacencies are represented with the dark solid line. These spaces would have direct adjacency to one another and serve as main waypoints for residents throughout the different spaces.

Secondary adjacencies are represented with the dotted line. These areas a essential in providing support but are not directly physically adjacent to the other spaces.
living spaces

CODES CONSIDERATIONS

SEPARATION OF OCCUPANCIES

ASSEMBLY: 1 HR FIRE RATED WALL
BUSINESS: 1 HR FIRE RATED WALL

OCCUPANT LOAD FACTOR

200 GROSS
ACTUAL OCCUPANT LOAD
LOW-END: 4.5
HIGH-END: 6

PLUMBING REQUIREMENTS
WATER CLOSETS: 1/UNIT
LAVATORIES: 1/UNIT
KITCHEN SINK: 1/UNIT
1 WASHER CONNECTION PER 20 UNITS

BEDROOMS
BEDROOMS
BEDROOMS
BEDROOMS
RESTROOM
RESTROOM
KITCHEN
DINING AREA
GATHERING PLACE
GREEN AREA

FURNITURE CONSIDERATIONS

BEDS: MULTIPLE INCLUDING SINGLE SIZED, QUEEN SIZED
CENTRAL DINING TABLE + SEATING
FLEXIBLE AND ADJUSTABLE SEATING

communal spaces

CODES CONSIDERATIONS

SEPARATION OF OCCUPANCIES

ASSEMBLY (NONE IN SPARRKLED BUILDING)
RESIDENTIAL: 1 HR (SPARRKLED BUILDING)

OCCUPANT LOAD FACTOR

15 NET
ACTUAL OCCUPANT LOAD
100

PLUMBING REQUIREMENTS
WATER CLOSETS: 1 PER 75
LAVATORIES: 1 PER 200
1 SERVICE SINK

BEDROOMS
BEDROOMS
BEDROOMS
RESTROOM
RESTROOM
KITCHEN
LIVING SPACES

FURNITURE CONSIDERATIONS

LARGE CENTRAL DINING THAT HAS FLEXIBLE CAPACITY AND CONFIGURATIONS
LOUNGE SEATING THAT CAN BE ADJUSTED TO A VARIABILITY OF SITTING POSTURES + POSITIONS
REARRANGABLE TOUCHDOWN SPACES WITH ACOUSTICAL PRIVACY

TOUCHDOWN STATIONS
LARGE DINING
LARGE KITCHEN
### Codes Considerations

#### Separation of Occupancies

**Assembly:** None (Sprinklered)  
**Education:** None (Sprinklered)  
**Business:** 1 HR (Sprinklered)  
**Mercantile:** 1 HR (Sprinklered)

#### Occupant Load Factor

- **7 NET**  
- **Actual Occupant Load:** 139

#### Plumbing Requirements

- **Water Closets:** 1 per 75  
- **Lavatories:** 1 per 200  
- **1 Service Sink**

### Flexible Worship

- **Flexile Seating**
- **Restrooms**
- **Technology Access**
- **Pulpit/Stage Area**
- **Mezzanine for Gender Separation**
- **Handwashing Station**

### Furniture Considerations

- Variable Seating - Floor Level, Height Adjustable, Easy Moveability

---

### Childcare

- **Staff Bathroom**
- **Break Area for Caretakers**
- **Play Area**
- **Learning/Focus Area**
- **Bathroom**
- **Napping Area**

### Furniture Considerations

- Flexible Seating + Learning Environments  
- Foam Based Low Furniture  
- Napping Mats
Based on research + case studies the most important factors of creating a successful dwelling space for climate refugees can be summarized in the following categories:

**Support Spaces**

**SAFETY**
Architecturally sound structure
Support spaces that are accessible + clean
Egress spaces that are accessible

**PRIVACY**
Private spaces for each individual in the unit
Small landing spaces that are able to convert from the public to the private to allow control over environment
Visual privacy into more intimate + safety conscious spaces (like childcare + social services)
Circulation paths of residents vs. community members clearly delineated with this

**COMMUNITY**
Communal space to come together
Communal dining and social spaces that are able to flex between uses

**CONNECTION TO NATURE**
Plenty of window on exterior facade to allow daylight in
Use of skylights + light wells to allow light to penetrate into the core the units

Based on research + case studies the most important factors of creating a successful dwelling space for climate refugees can be summarized in the following categories:

**SAFETY**
Architecturally open + accessible environments
Clean spaces
Wayfinding and egress spaces are clearly marked and accessible

**PRIVACY**
Landing spaces of privacy in main circulation
Visual privacy into more intimate + safety conscious spaces (like childcare + social services)
Circulation paths of residents vs. community members clearly delineated with this

**COMMUNITY**
Community spaces are easily accessible to both residents and community members
Community exchange spaces
Circulation that serves resident community needs
Circulation that serves local community needs

**CONNECTION TO NATURE**
Windows + views to exterior spaces
Flexible egress that allows for integration of exterior space and interior space

Using existing LEED + WELL standards as compass points of understanding a holistic approach to the built environment is important in creating realistic & attainable goals for the project. Using these as precedents should create a roadmap of sorts on the design solutions presented later on. Each standard is color coded for their use case scenarios of Living Spaces and Support Spaces.

**LEED Standards**

**NPD CREDIT: HOUSING TYPES & AFFORDABILITY**
To promote projects that have high levels of internal connectivity and are well connected to the community.

**NPD CREDIT: LOCAL FOOD PRODUCTION**
Dedicate permanent and viable growing space or related facilities within the project. Ensure solar access and provide fencing, watering systems, garden bed enhancements, secure storag space for tools, and pedestrian access for these spaces. Ensure that the spaces are owned and managed by an entity that includes occupants of the project in its decision making.

**WELL Standards**

**ACCESS**
Does this strategy provide equitable access to an organization or physical space for the populations identified?

**SUPPORT**
Does this strategy support day-to-day inclusion and representation for the populations identified?

Using existing LEED + WELL standards as compass points of understanding a holistic approach to the built environment is important in creating realistic & attainable goals for the project. Using these as precedents should create a roadmap of sorts on the design solutions presented later on. Each standard is color coded for their use case scenarios of Living Spaces and Support Spaces.
early prototyping

Through physical prototyping an understanding of spatial configuration & physicality of space was explored. These 3d printed models were at 1/10th of the scale of the actual size of each of the units that were modeled digitally. This prototyping process continued to evolve as design methodology continued to evolve with the project objectives in mind.

Using an examination of the 3D model presented an opportunity to figure out how lighting & wall systems affect the interior spaces of the living spaces.

By blocking off the interior private spaces with full walls shadows are much more pronounced & create a sense of intimate privacy. Zoning all of the windows along the south facing wall creates direct sunlight into the space during the winter to provide cooling.

Using long corridors to control traffic flow and create a sense of dynamic movement with half walls provides a sense of privacy that can continue to flex in between uses and needs. A bank of windows in main living space provides eastern sunlight that awakens with the day.

The largest living space provides ample opportunity to explore wall configurations. Half walls and meandering corners create a sense of flow that directs you from the foyer into the main living areas. Further breaking down the space with walls in the interior spaces presents another opportunity to expand as family needs + organization flexes.

This space presents the most issues with being able to create a flexible space with enough rooms for all three family members. Using half walls as a way to divide these spaces provides that flexibility. Using large expanses of windows and doors to access the exterior helps to make it feel less crowded + cramped.
continued prototyping process

Prototyping continued to evolve and change as the design concepts continued to change. 3D printing with white filament and creating large scale forms as a way to understand the scope of the building and its architectural elements was imperative to the design process. Using the previously shown living situation as an opportunity to print as well and use as a comparison to the new housing typology provides context to those who have not been involved in the design process.

The massing model that has only been shown digitally helps to show just how small and cramped a space for climate refugees has been in the past. Using this as an initial research parameter provides context and a standard from which to improve upon.

Using the prototypical space orientations makes it so that configuration is easy. While looking at a floorplan in a 2D environment is helpful to understand the spatial organization, Using a 3D printed version of these assembled prototypical spaces helps to create a physical understanding of the flow of space in these residential units.

3D printed models act as a great opportunity to understand the architectural elements and their ability to function in the physical environment. Observing the awning and its projection from the architecture helped with making design changes and updates to match the intent.

Locations of windows, doors, awnings, and even the depth of the roof can be examined more thoroughly through the use of 3D printed models.
DESIGN RESPONSE
Creating an all encompassing site map helps to emphasize the holistic and integrated approach to creating a resilient and welcoming environment for recently displaced climate refugees.

Using a central facility as an osmosis point for both refugees on site and local community members also helps to bridge the gap between local community and new community.

**KEY**

1. **Support Center**
   - Creating a complex with supportive spaces such as childcare, community connection spaces, a flexible worship center, social services, and an international market puts all of the needed support into one easy to access center. Also acts as an infusion point for existing members of Marquette to engage with these new residents.

2. **Community Garden**
   - Connecting residents to nature and creating an extra source for supplemental income. Using the central location of the facility makes it an easy location to access for both residents and the community.

3. **Flexible Spaces**
   - Using prefabrication methods to create a flexible living space that can be adapted to the needs of those who have been displaced. This is in contrast to existing climate-resistant living spaces.

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Using a central facility as an osmosis point for both refugees on site and local community members also helps to bridge the gap between local community and new community.
Understanding the development of circulation is also important in trying to understand where community connection will be taking place and where privacy is of utmost importance. Integrating large green spaces as well as casual landing spots in the outdoor environment also helps to use the land that is being developed in a way that is respectful to the natural environment.

Creating a community exchange within that is geared toward casual connection over shared food and allows for flexible seating is important and can act as a method of bridging the gap between local community and new community. This community exchange location can also be rented out for events by all community members, thus creating another social infusion point.

A more casual and comfortable environment can be creating for yet another opportunity of community exchange within the lounge space. This creates a touchdown that can be used for extended periods of time and for more intimate connection between smaller groups of people. This also offers another space for residents and local community members to be able to connect with one another.

An international market is essential in being able to provide food that is often unable to be sourced for international and refugee populations. A connection to cultural food is integral to the identities of international people. As such being able to provide this is essential in creating a support network while also making cultural food accessible to those who may have never had the chance to work with these ingredients, yet another way to connect locals to the newer climate migrant population.
Residents are presented with square footage typicals of spaces that are essential. Private spaces offer two different configurations of square footage. These private spaces can be flexible in their configuration and in their quantity - allowing for large multi-generational families to thrive. Public spaces also give an opportunity to flex in organization and location. Each unit will have to have an inclusion of one of the public spaces and a dedicated outdoor space as well.

Using pre-fabricated SIPS panel systems to create a quick and efficient mode of building in combination with the prototypical spaces that can be configured with the residents allows for ease of configuration and includes the residents in the process of creating their new homes.

Outdoor space will flex according to configuration of homes. A connection to nature is essential in all of the modular options so it is a key component of the configuration “menu.”

3 - 4 PERSON LIVING SPACE
Creating an exterior social space to make up for the smaller interior space is key in this modular unit. Configurations can flex according to resident needs and size.

BEDROOM 1 - 120 SQ. FT.
Space for one person and storage for belongings.

BEDROOM 2 - 140 SQ. FT.
Space for two people and storage. Space for an extra lounge furniture piece.

KITCHEN - 150 SQ. FT.
Space for circulation for several people at once.

LIVING ROOM - 150 SQ. FT.
Lounge space and flexible seating for multiple uses.

DINING - 130 SQ. FT.
Smaller footprint for more intimate atmosphere.
Larger interior social spaces means a smaller exterior space that can accommodate social gatherings. All units have one thing in common, uses of a green roof and solar panels mounted to be south facing.

Most of space planning for a larger unit is dedicated to creating individual rooms for privacy. A large family can be overwhelming so creating a space for individuals is incredibly important. This large of a space would most likely house a multigenerational family, so social spaces are also very important.
residential units - a typical life

1. Creating an extension of the interior space outside connects residents to their surroundings and allows them a moment to collect their thoughts. This also presents an opportunity for at-home gardening & supplementary income.

2. Cultural preservation through food preparation is essential in creating a nurturing environment. Ample space for several people to come together and connect over food is paramount in this space.

3. Living rooms have ample light with several locations of windows and bi-fold doors to the courtyard. This is a main thoroughfare for social interaction and a connection to the exterior living space.

4. Creating a private environment for individuals to be able to relax and unwind is just as important as creating spaces for socialization and connection within the home.
As the daughter of an immigrant and a relative of individuals who have been affected by climate migration and civil unrest, this project hits close to home for me. Being able to provide holistic care is a monumentally difficult task, especially for those who have not been thought of before. Climate migration is a problem that is only being exacerbated by quickly declining social aid to those who need it and increased climate disaster events. This project aimed to bring forward a design response that could provide a blueprint for a hopeful future, not one of disaster. As climate conditions continue to decline it is imperative to create a design solution that has a humanistic approach, as victims face devastating losses in their lives. Creating a haven or location that can provide climate migrants with a way to preserve their cultural identities, receive adequate care, and be involved in the process of the creation of their own homes is what the project ultimately was made to do. In conclusion, this project was an effort that opened my eyes to the inequality of the climate disasters happening all over the world, and an informed understanding of what climate disaster looks like for climate disaster victims. Hopefully, this project can help provide that perspective to others and help them realize that creating spaces for those who have pushed to the side in the climate change narrative is just as important as providing sustainable design efforts.
appendix

Long-term scale examination

Present: Bangladesh, there is no global scale response

Possible: no solutions, prepared solutions

Design response: prepared, needs coordination

Total impacts: urban, socio-economic conditions

A review made from a project in Bangladesh because of changing themes that would force us not being connected to the initial community theme.
Climate refugees - no considerations

- global scale - no DEP - no solutions
- missing refugees also considered (but not accounted)
- main housing that is holistic

Social services & migration recovery

- child support
- education
- financial support
- health support
- religious support

Space consideration in community (total contents (clothing, resources) talents to food (cultural purchase/production insect)

Appropriation of gendered space

Community support - clothing, resources

- cultural understanding
- language & resources
- access financial support (agriculture)

Cultural preservation - impact of area-specific perceptions

Bridge between culture-location
WHAT HAS BEEN THE ARCHITECTURAL RESPONSE TO CLIMATE CHANGING IN THE PAST, CURRENTLY & IN THE FUTURE? - RESEARCH BY LUCIANO PICCIOTTI

Some architects believe that our buildings are not designed for climate change. We need to design buildings that are adaptable and can change with the environment.

INNOVATION IN CLIMATE CHANGE

ADAPTING TO CLIMATE CHANGE

KEY CONSIDERATION:

THE CLIMATE CHANGE INDEX

KEY FACTORS TO CONSIDER:

- ENERGY EFFICIENCY
- WATER USE
- MATERIALS
- BUILDING DESIGN

BY IVENTUR TOOLS

- DESIGN TO WITHSTAND TROPICAL CLIMATE (ADAPT TO AIRFLOW & BREATHING)
- DESIGNS ARCHITECTURE FOR HOUSING AS PART OF THE LANDSCAPE
- COMPLEMENTARY INFRASTRUCTURE, AND PUBLIC SPACE
- GROWING FOOD IN TOWNSHIP
- PAYMENT OF REUSABLE ENERGY (SUN, WIND, WAVE OR GEOTHERMAL)
- BLUER, GREENER, SUSTAINABLE & RENEWABLE SOURCES (Eco, solar, wind, geothermal & growing food)
In his book, a renowned climatologist, in an attempt to address the climate change through history, questions whether humanity is equipped to survive this crisis. He suggests that humanity has been moving across the globe since the beginning of the era, and in the past millennium, periods of little ice age, human migrations, and human gathering have been common. To address these changes, the book proposes a case study of the ballet, which has been a source of inspiration and reflection throughout history. The ballet, as a cultural artifact, reflects the human experience and the challenges faced in adapting to new environmental conditions.
to make a decision.

Initial findings indicate that income inequality in Bangladesh is a significant factor contributing to migration patterns.

Families and individuals consider migration as a means to improve their economic status and access to better opportunities.

Migration patterns in Bangladesh are affected by geographical and cultural factors.

The government is implementing policies to manage migration and support local communities.

The situation in Bangladesh is complex, with factors such as poverty, political instability, and environmental challenges affecting migration.

Understanding the drivers of migration is crucial for developing effective policies.
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CURRENT DESIGN SOLUTION ARE INADEQUATE CONSIDERING EXISTING COMMUNITIES. THE TIME TO CHANGE OUR DESIGN STRATEGIES IS PAST DUE.