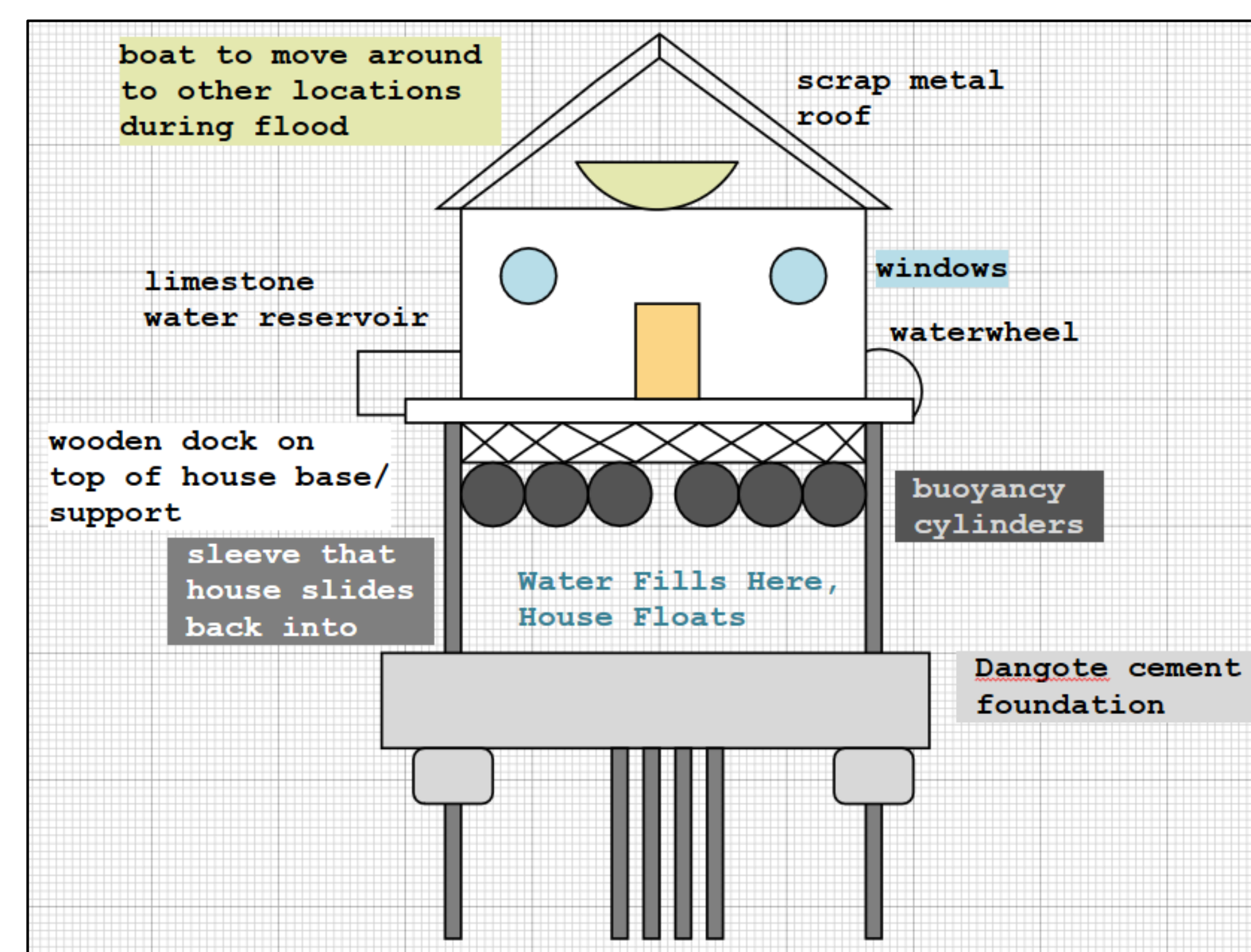


Abstract

This project seeks to rectify the issue of houses demolished by floods through the development of a home that elevates and falls with flood waters. This design will be implemented in lower socioeconomic areas of Lokoja at an affordable cost using local materials.

Objectives

- Design long-term, low cost, and flood resistant homes
- Encourage community involvement
- Improve sanitation



Amphibious Homes in Netherlands

The Netherlands are known to have floods so this design was put into place.

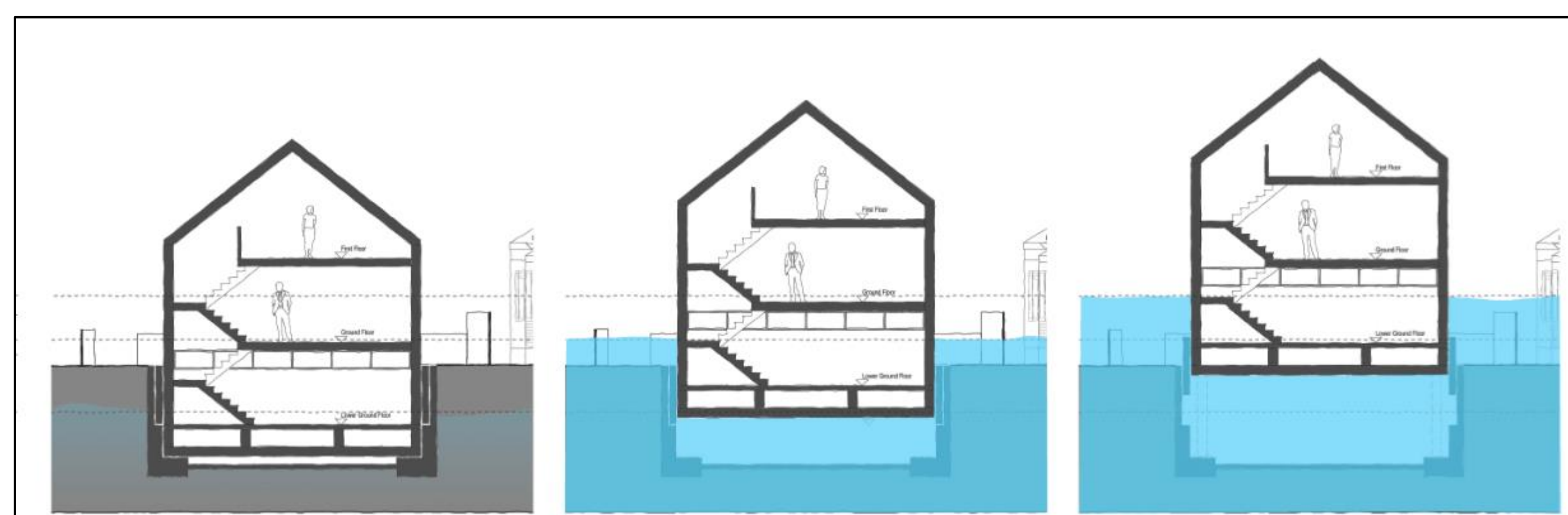
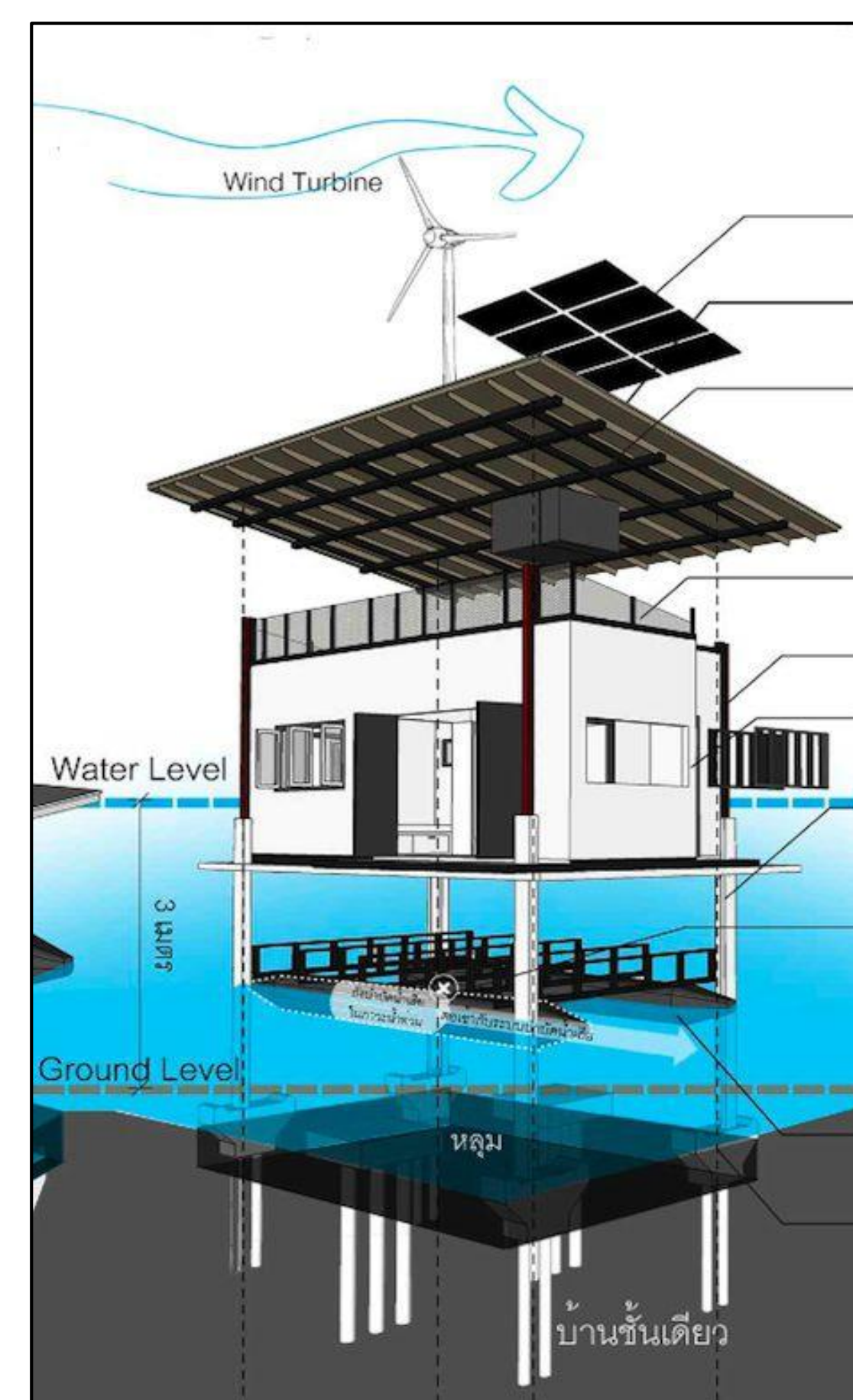
- **Under Normal Conditions:** House sits on concrete foundation, looks like a normal home
- **Flood Conditions:** House floats on buoyancy cylinders, anchored by the foundation, foundation runs deep into the ground, and sleeves that rise and fall with the water hold the home in place

House's design revolves around the foundation

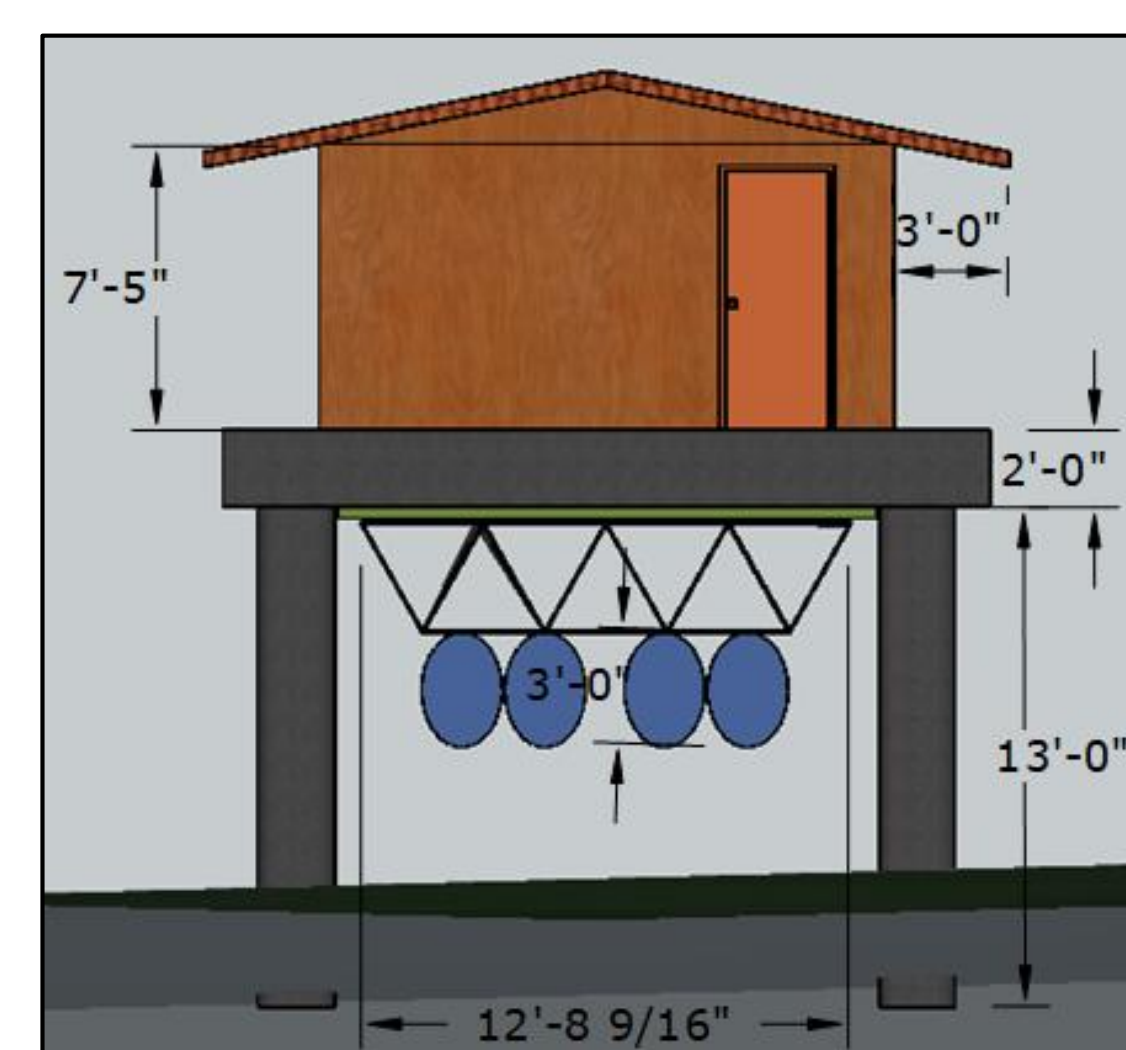
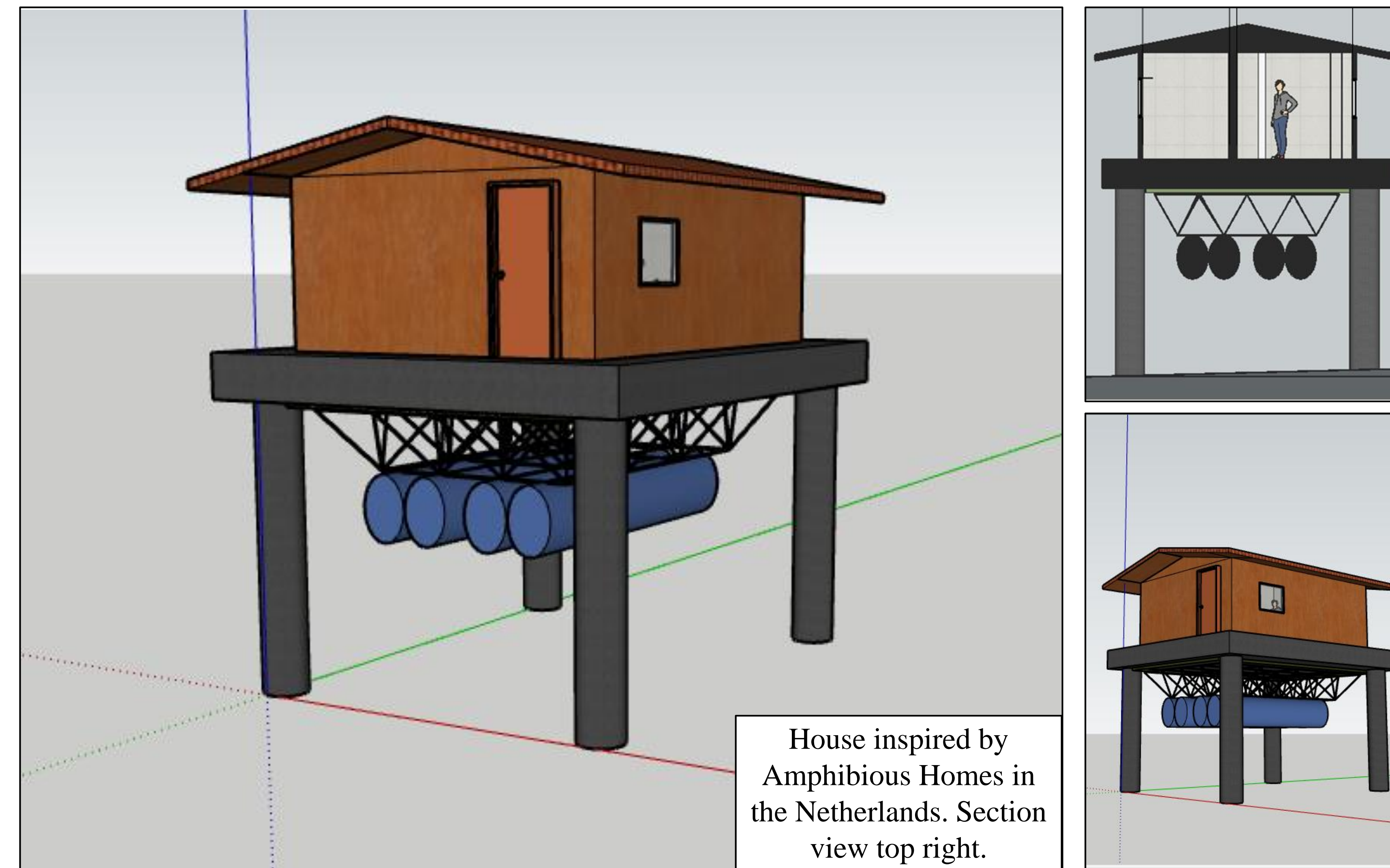
- **Pros:**
 - Long lasting
 - Resilient against flood
 - Buoyant cylinders
 - Only moves vertically

- **Cons:**
 - Costly
 - Isolated home
 - Technology used is too advanced

This precedent influenced our new design

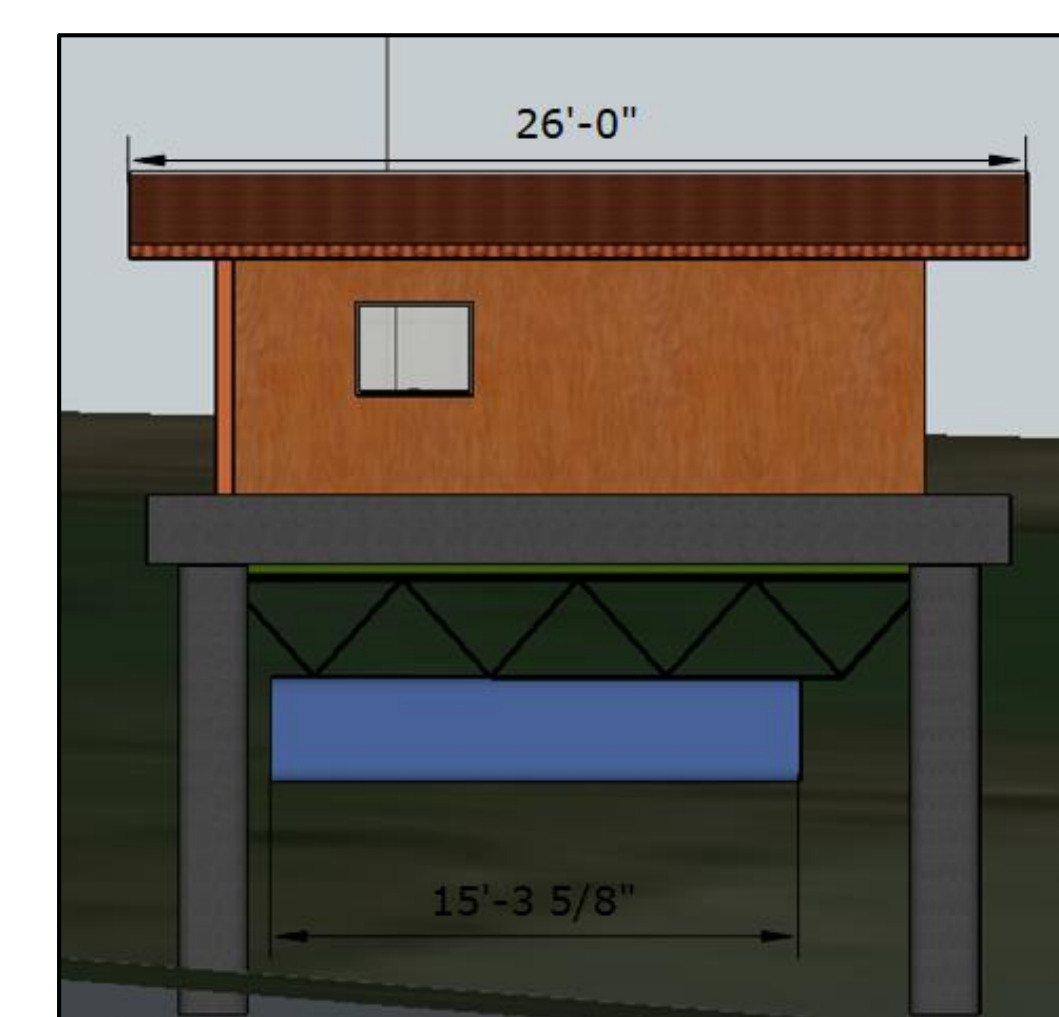


Design Concept



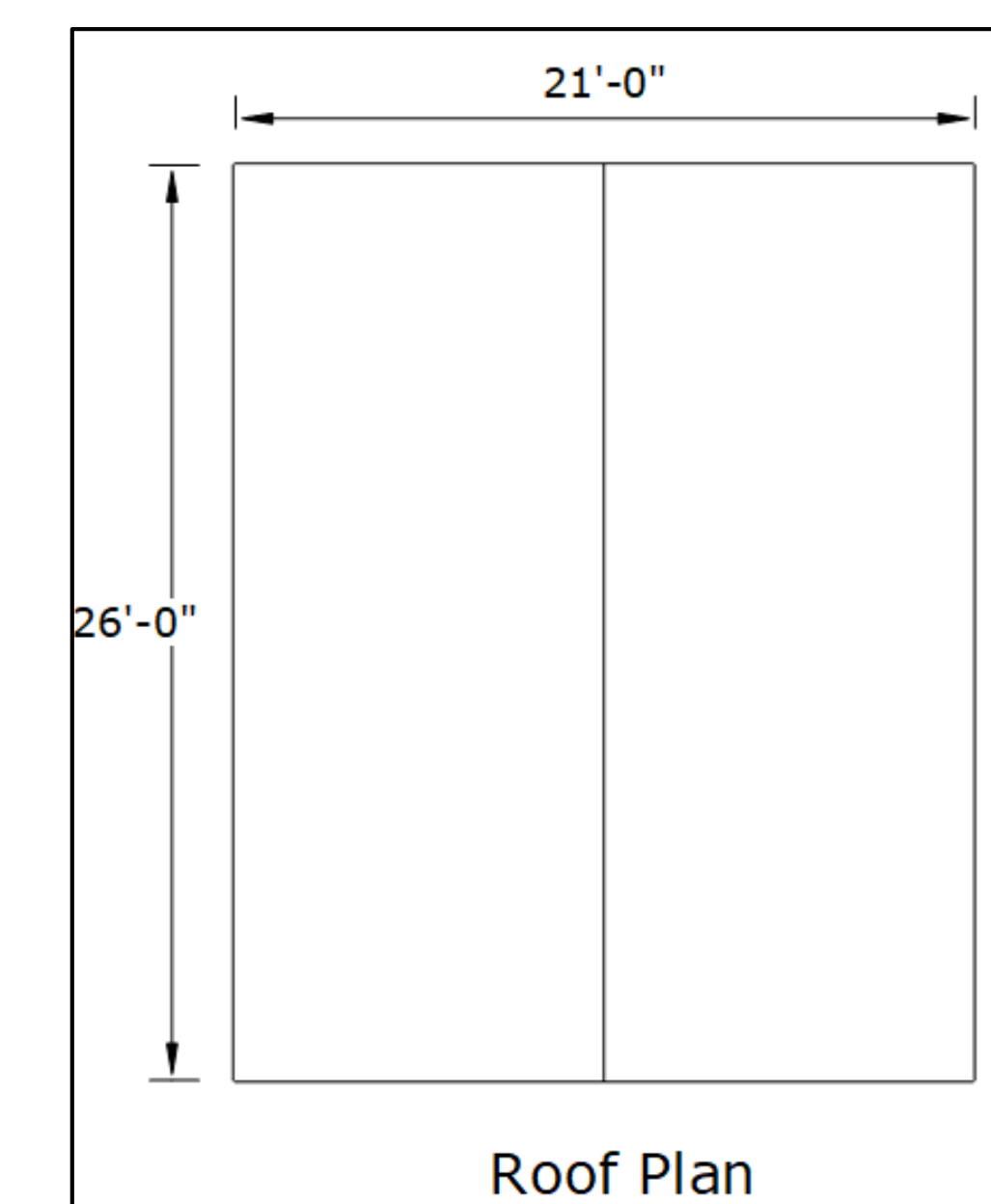
Key Elements of Design:

- Buoyant foundation to provide floatation
- Vertical guideposts to secure its location
- Structural sub-frame that ties everything together



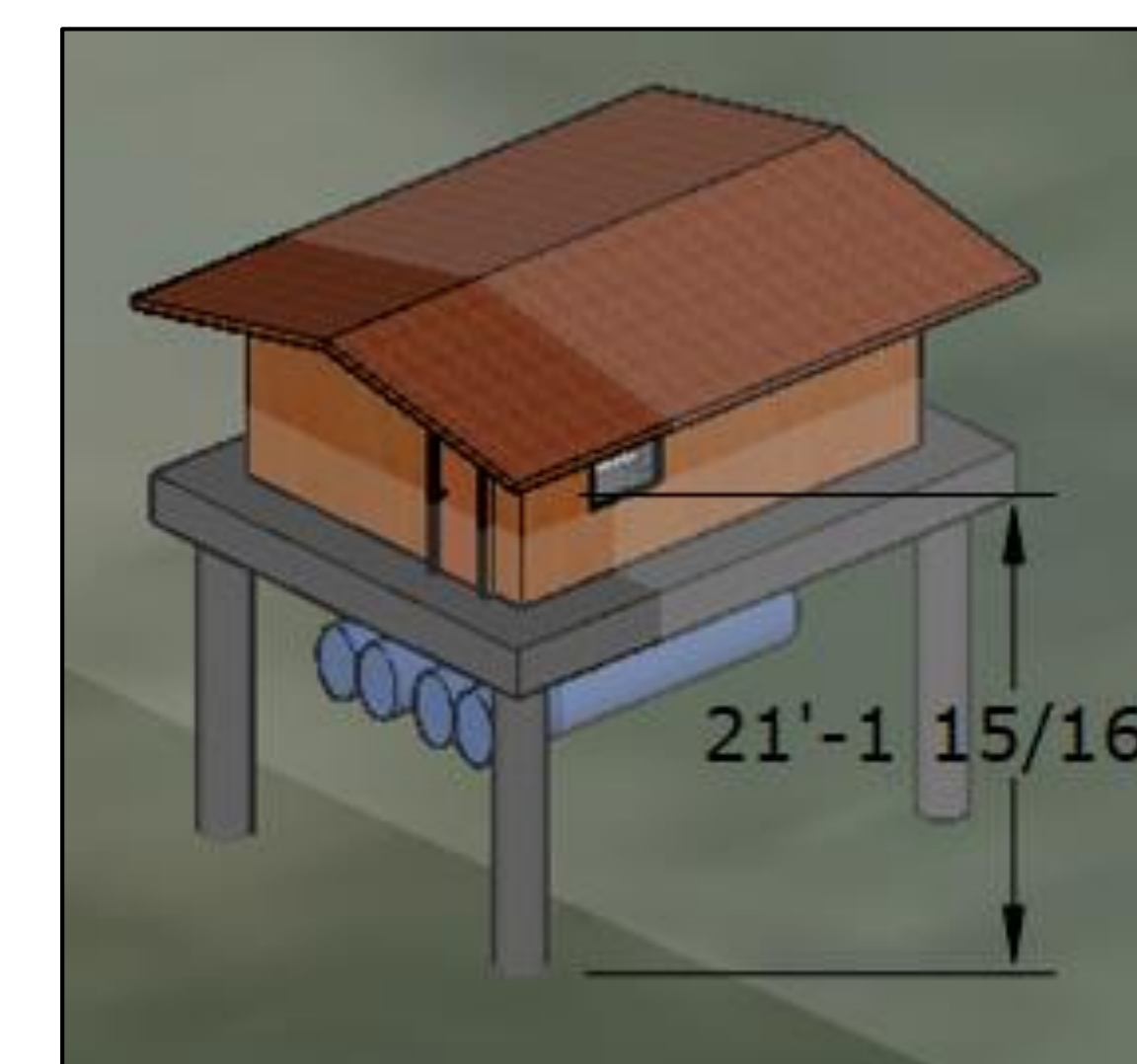
Innovations:

- Recycled plastics for buoyancy cylinders
 - Water wheel and limestone reservoir for access to clean water
 - Use of local materials such as bamboo, wood, and metals
- Total Cost: \$9,100 which works for our target group



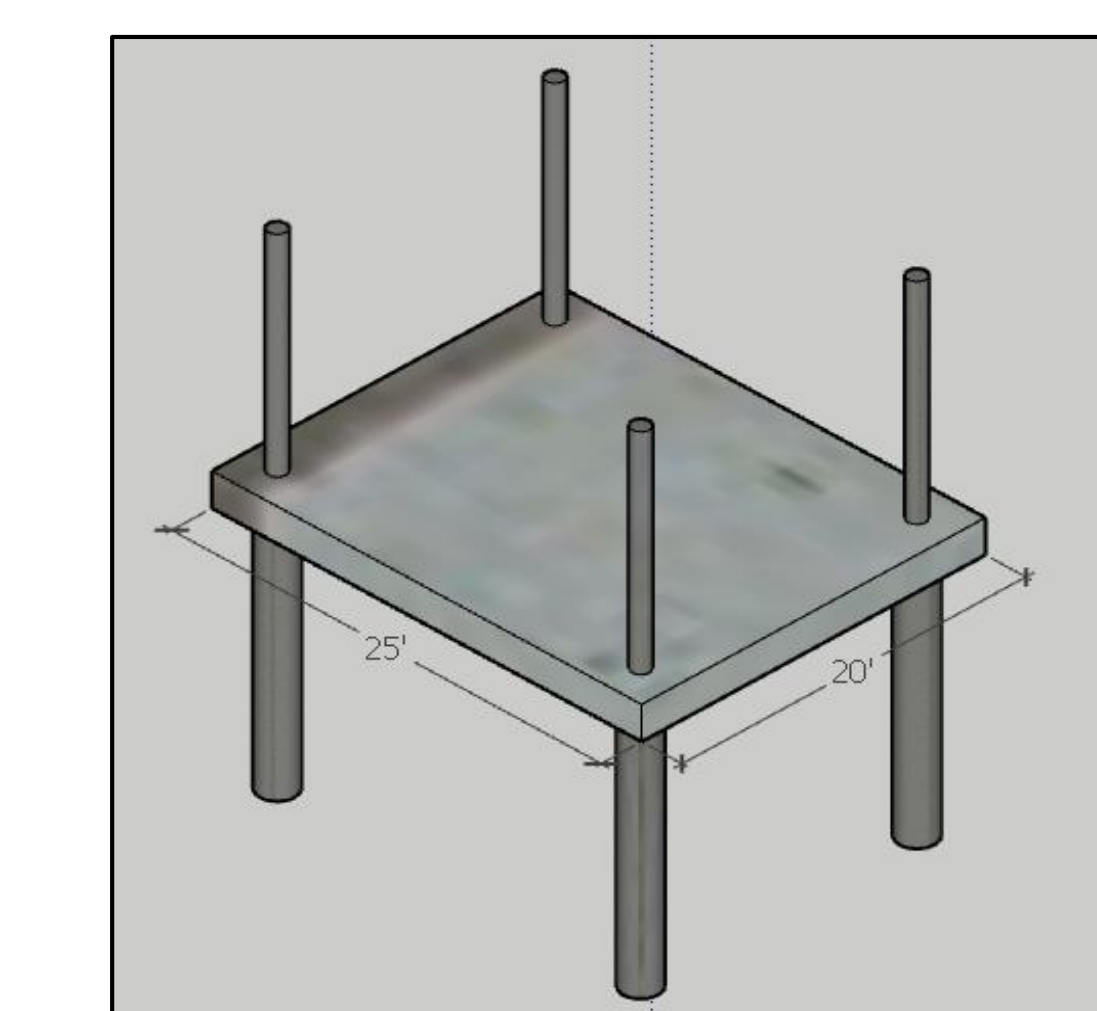
The foundation shown to the right is an essential part to our design.

- Poles run deep into the ground.
- Poles above slide into the sleeves connected to the house dock, allowing strictly vertical movement.



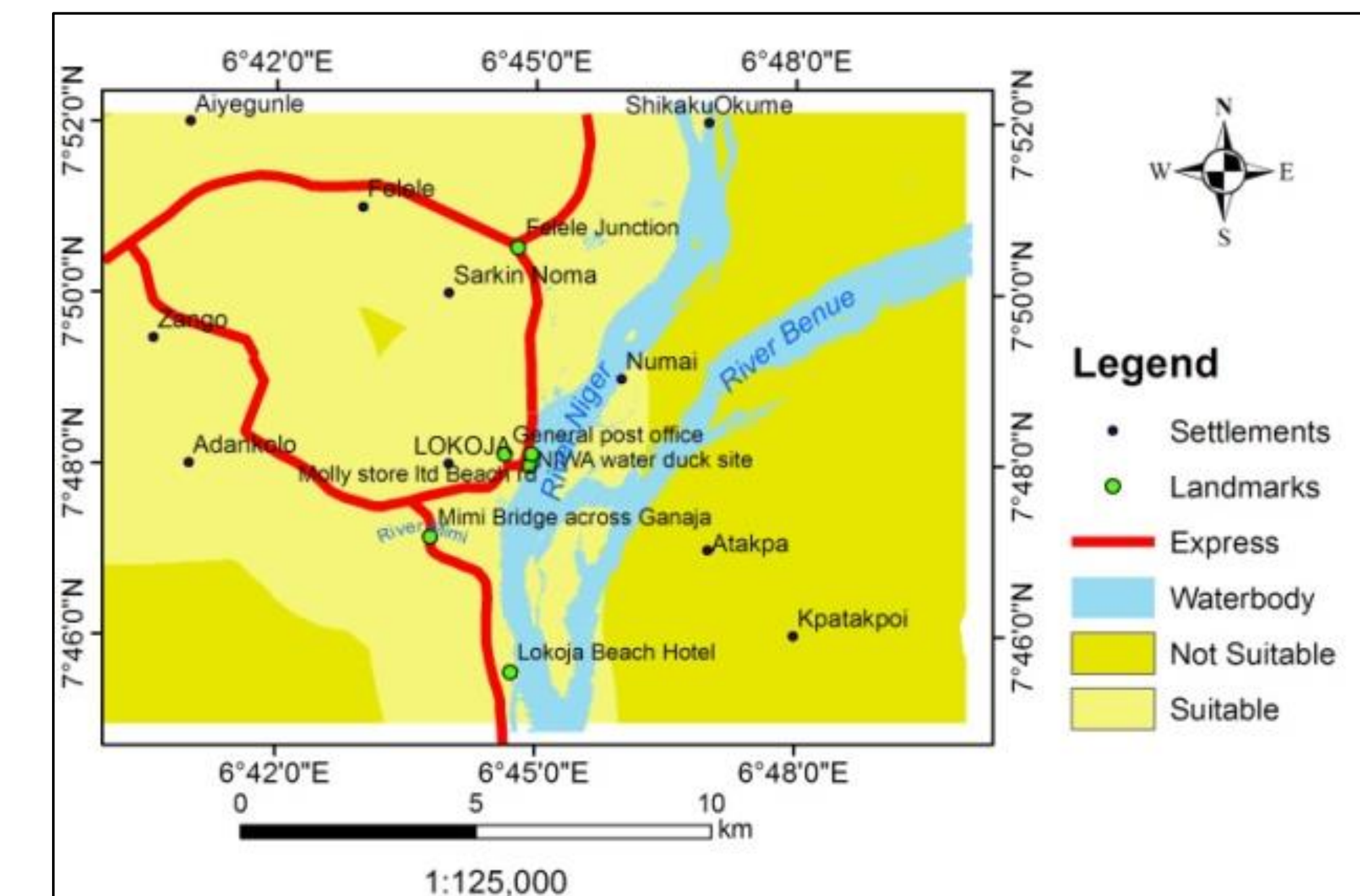
Resources:

- Local scrap metal
- Recycled pipes
- Recycled buoyant material options
 - Recycled water bottles
 - Pontoons
 - Canoes
- Dangote cement



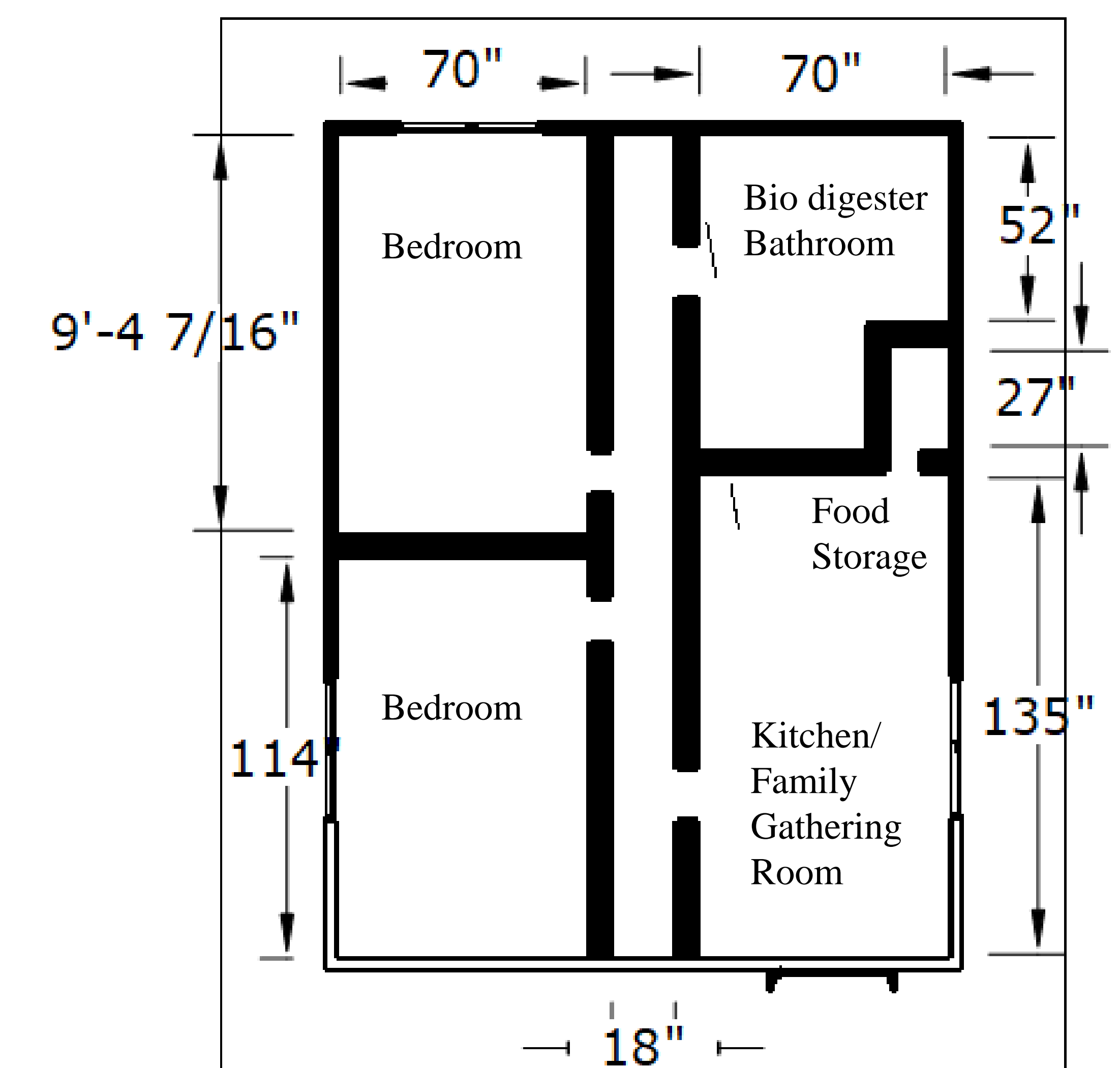
Background on the Flood

- In August 2017, Lokoja, the capital city of Kogi State, Nigeria, suffered from severe floods due to its location near the confluence of the Niger and Benue Rivers.
- Over 10,000 people were displaced, and the surrounding area was left decimated (Davis, 2017).
- Floods frequently occur in Lokoja, constantly wreaking havoc.



Interior Design:

- Two bedrooms
- One kitchen with an open stove that acts as a gathering space for the family
- One bathroom with a Bio digester
- Possibility for a second floor for larger families (with addition of more buoyancy cylinders)



Resources:
 • Alter, L. (2017, September 12). Amphibious House Design Goes with the Flow, Rises With Floods. Retrieved from <http://www.treehugger.com/sustainable-product-design/amphibious-house-goes-with-the-flow-rises-with-floods.html>
 • Davis, R. (2017). Nigeria—Thousands Displaced by Floods in Kogi State. Floodlist Retrieved from <http://floodlist.com/africa/nigeria-floods-kogi-september-2017>
 • Williams, B. (2015). The Scottish Journal of Performance. Retrieved from <http://article.sapub.org/10.5923/j.env.20150503.02.html>