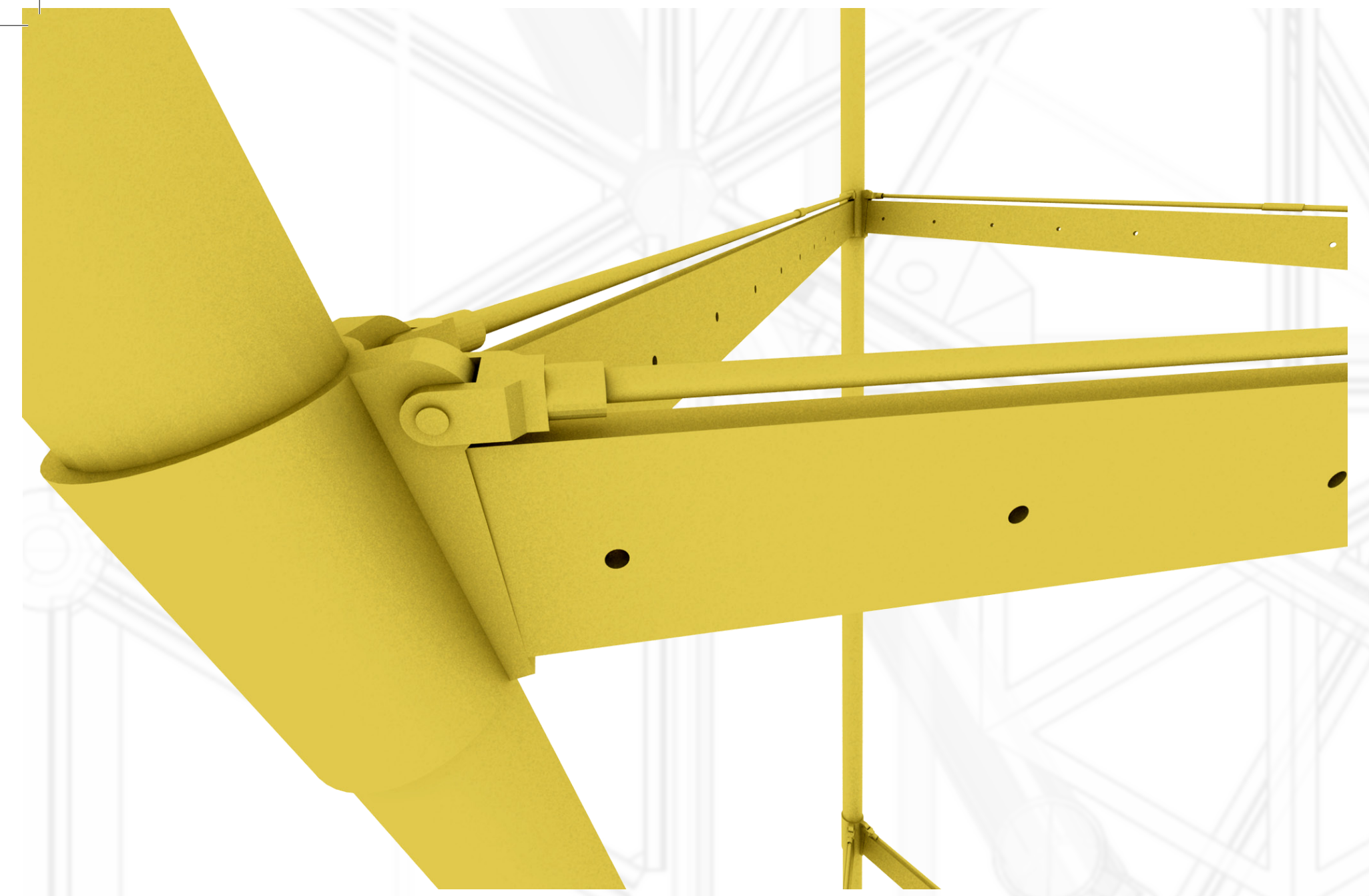
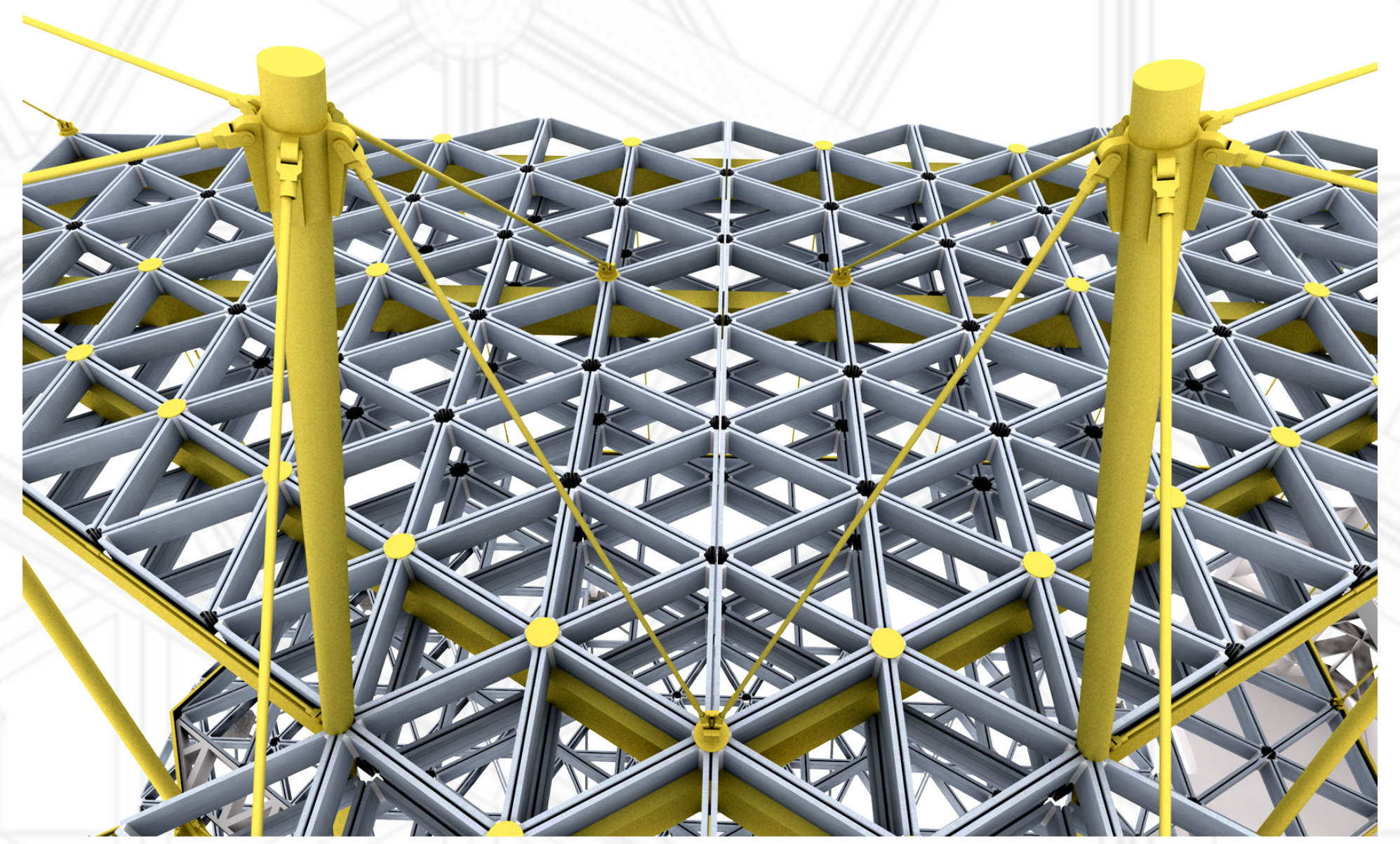
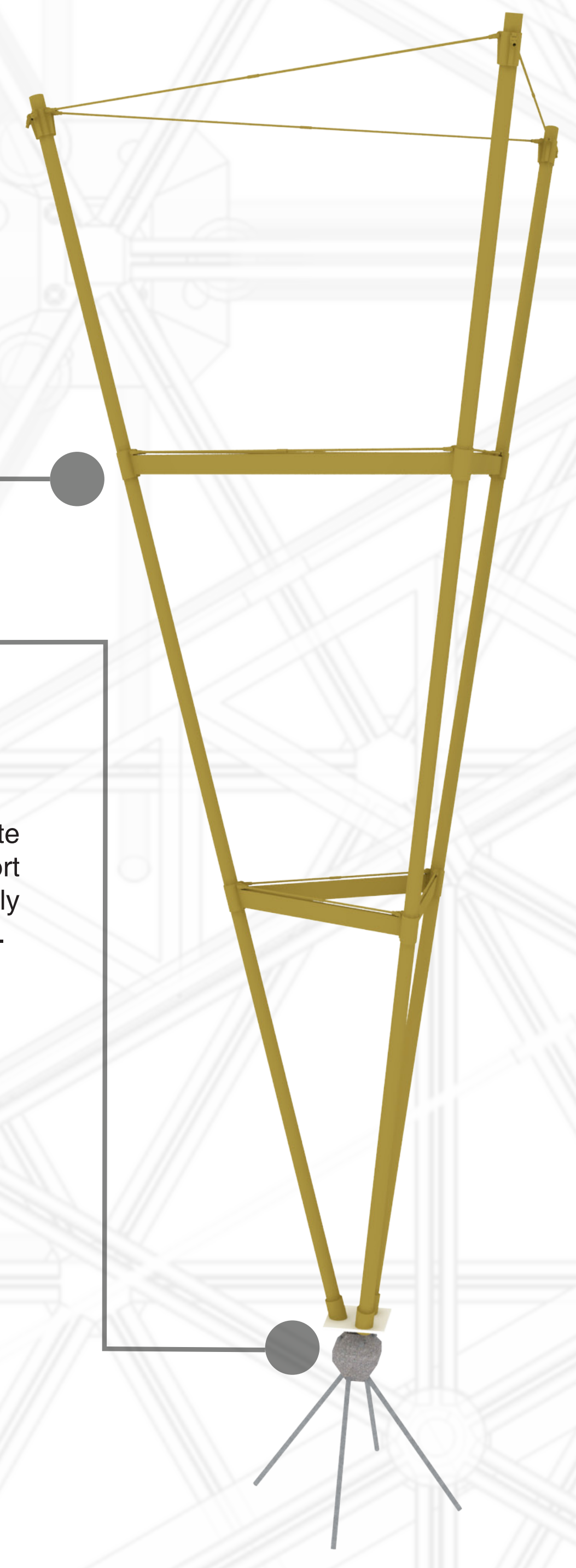


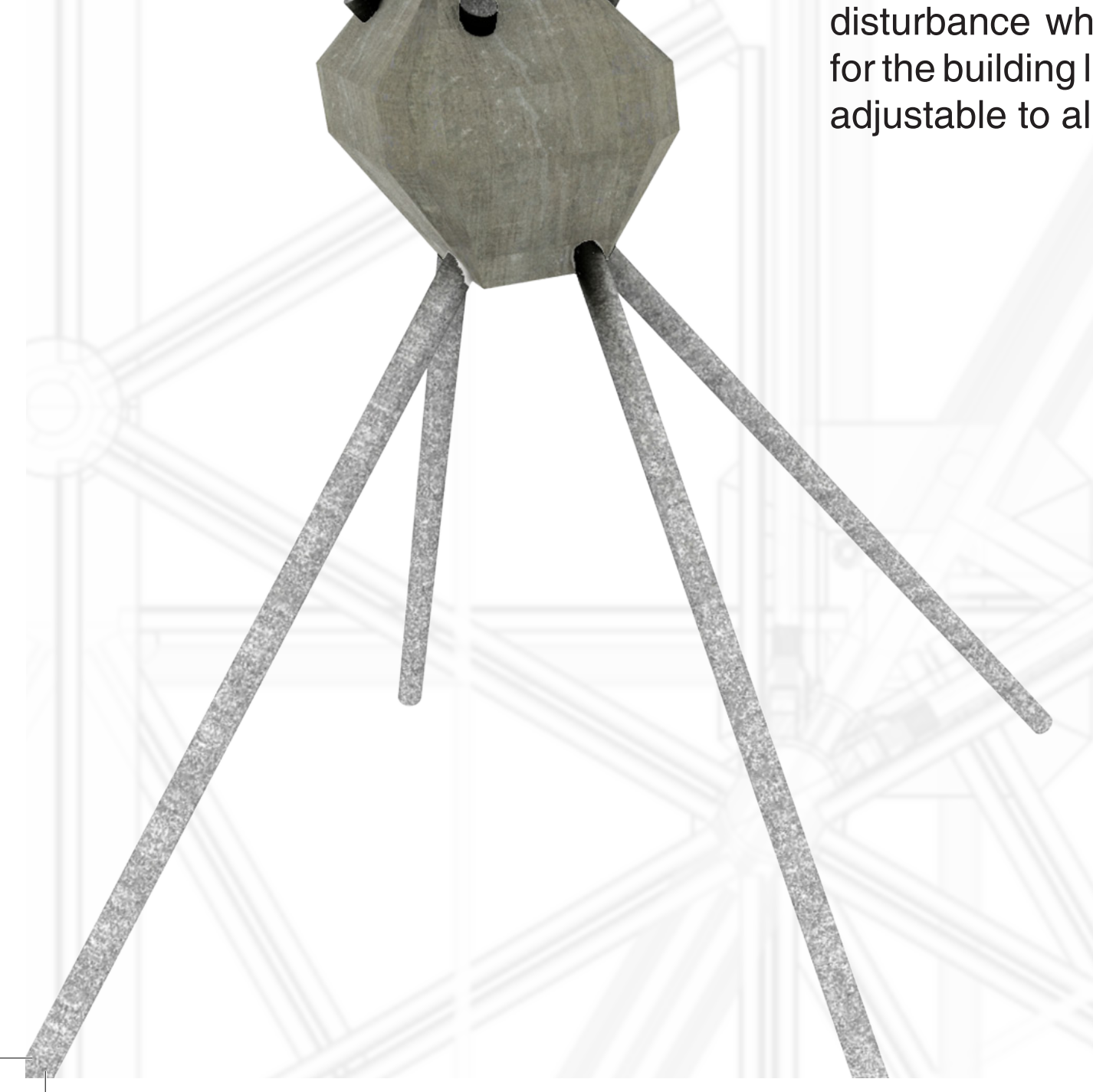
The cable is in tension and is used to keep the pylon from collapsing. The beams are used to anchor the floor and roof assemblies to the rest of the structure. The bolt pattern matches with the triangular components.



The structure was designed in a “top-down” fashion in order to minimize the impact on the site and to appear as though the building touches the ground very gently. To expedite construction time, each component of the building is prefabricated and shipped to the site which allows for a precise on-site assembly using bolt connections exclusively. No field welds are required.

The individual triangular components which make up the roof and floor assemblies are bolted together to form a structural membrane. In the roof, an aluminium x-frame is sandwiched between two layers of triangular arrays. This allows the second floor to be held entirely by suspension, eliminating the need for bearing walls and columns, thus maximizing spatial efficiency.

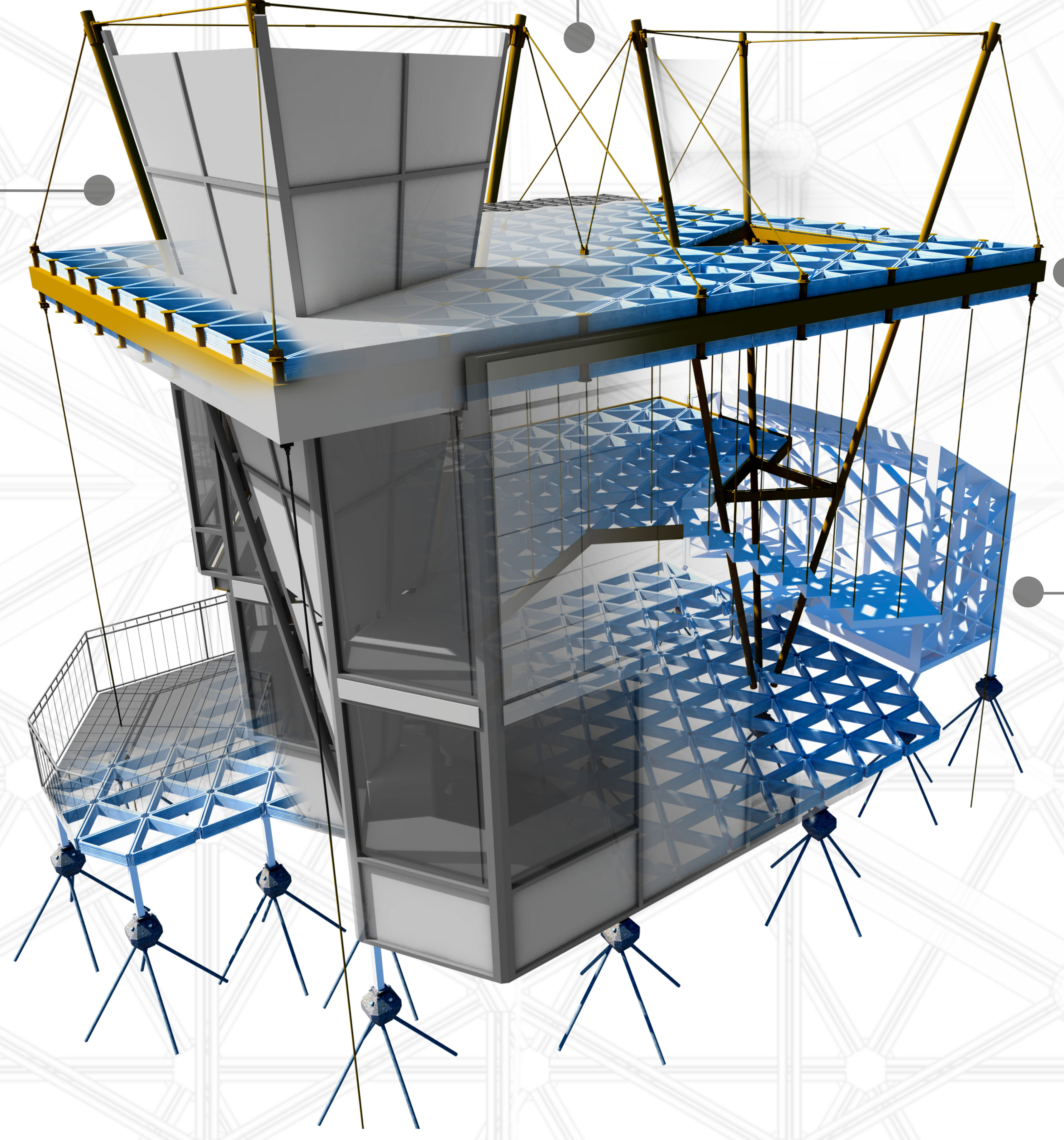




Pin foundations allow for very little site disturbance while providing sufficient support for the building loads. They are also individually adjustable to allow for differential settlement.

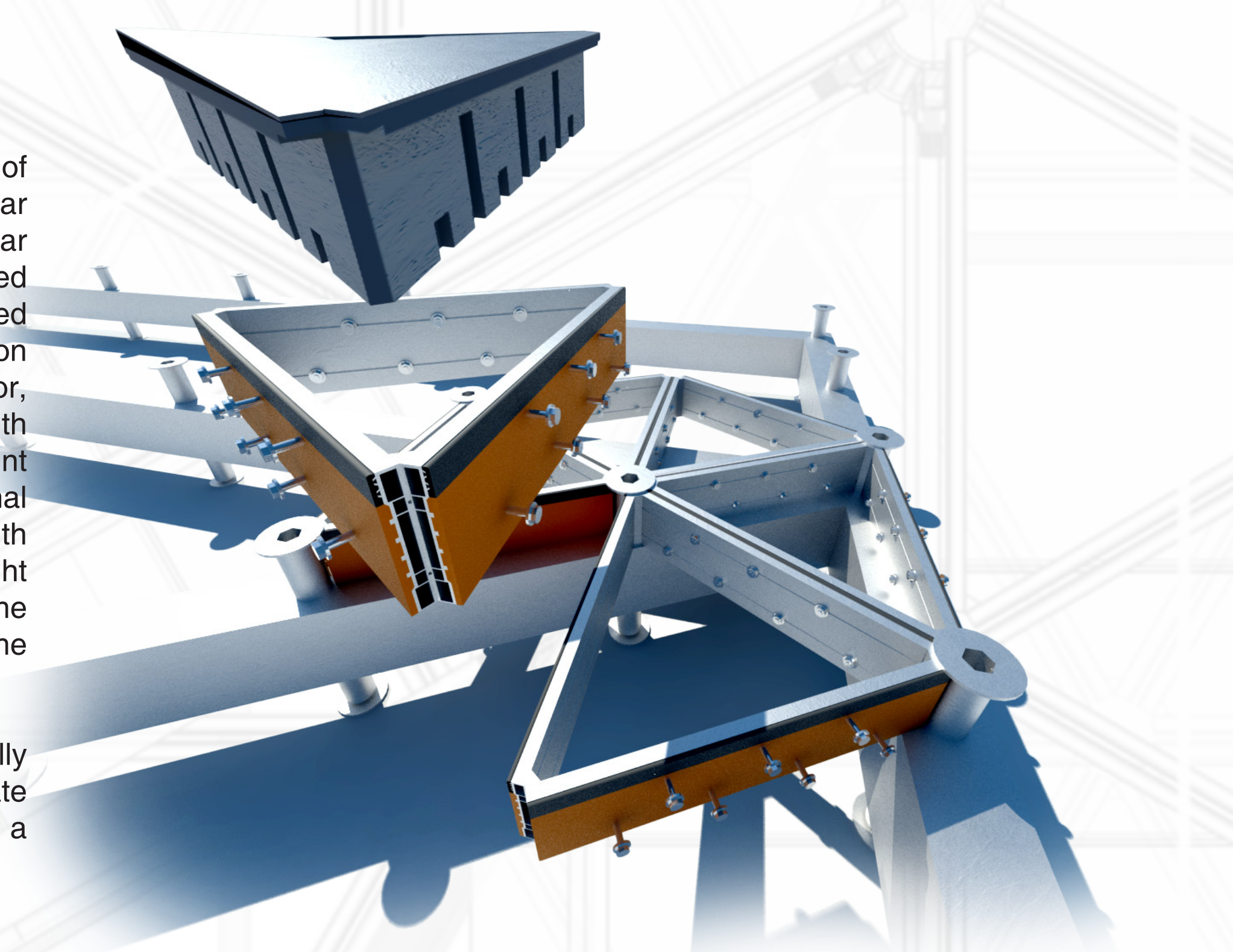
Each structural pylon consists of three aluminium tubes in an inverted pyramid arrangement. The tubes are tied to one another via braided steel cables encased in an aluminium sleeve. Additional cables attached to the ends of the tubes support the roof assembly which, in turn, supports the second floor. The roof is anchored at each corner with another set of cables in order to prevent uplift. In order for this system to function, the cables need to be tensioned in such a way as to strike a perfect balance in the structure as a whole.

A secondary, non-structural, aluminium frame fits within the inverted pyramid. This frame houses translucent, insulated panels which allow diffuse light into the interior spaces on both the first and second level.



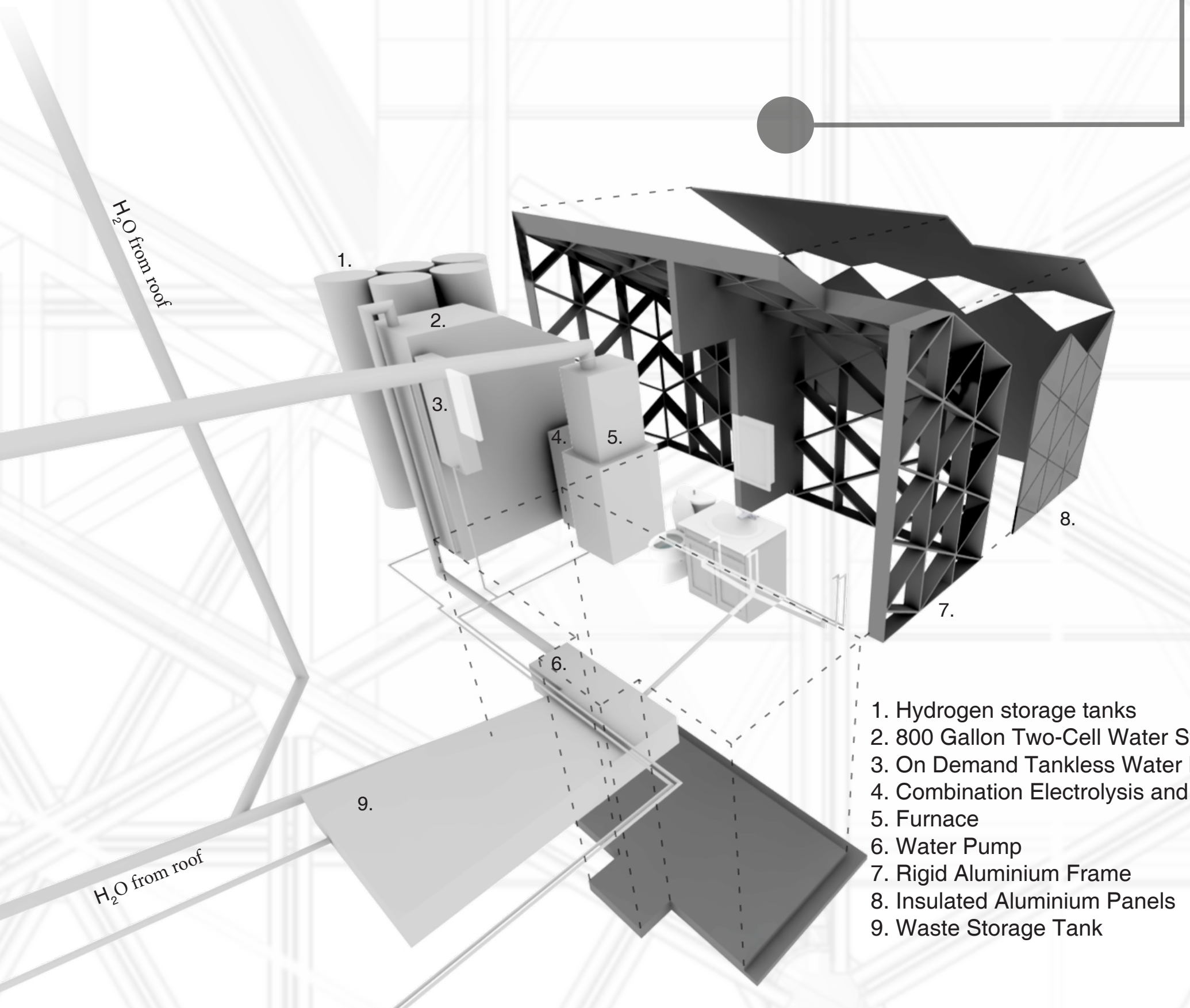
The roof and floors are constructed of manageable two foot equilateral triangular components. Each side of the triangular components are made from extruded aluminium. They are pre-drilled and welded to allow for a simple bolted connection on site. Depending on the location (roof, floor, or ceiling) different inserts are installed with the appropriate material in place. At the point where six components meet, a hexagonal opening is formed. This is either plugged with insulation, or used for things such as light fixtures, electrical outlets, or roof drains. The extrusion cavities themselves house all of the electrical wires and network cables.`

The components are designed to be thermally independent of one another in order to eliminate heat transfer, yet they still work together as a cohesive structural membrane.



Each unit is equipped with a “utility” space. This prefabricated unit ships as a whole and houses the bathroom along with all other required appliances and equipment. The plumbing and duct work are stubbed out to allow the utility room to be “plugged-in” to the rest of the unit very quickly.

One of the most important elements of the space is the 800 gallon water tank. This tank has two cells. One cell is 200 gallons and holds the harvested water from the roof and pylon assemblies. This is non-potable and used for the hydrogen producing process. The other 600 gallons is potable water. This water is supplied by the proposed on-site treatment facility and brought in via truck. A filling valve is accessible from the outside.

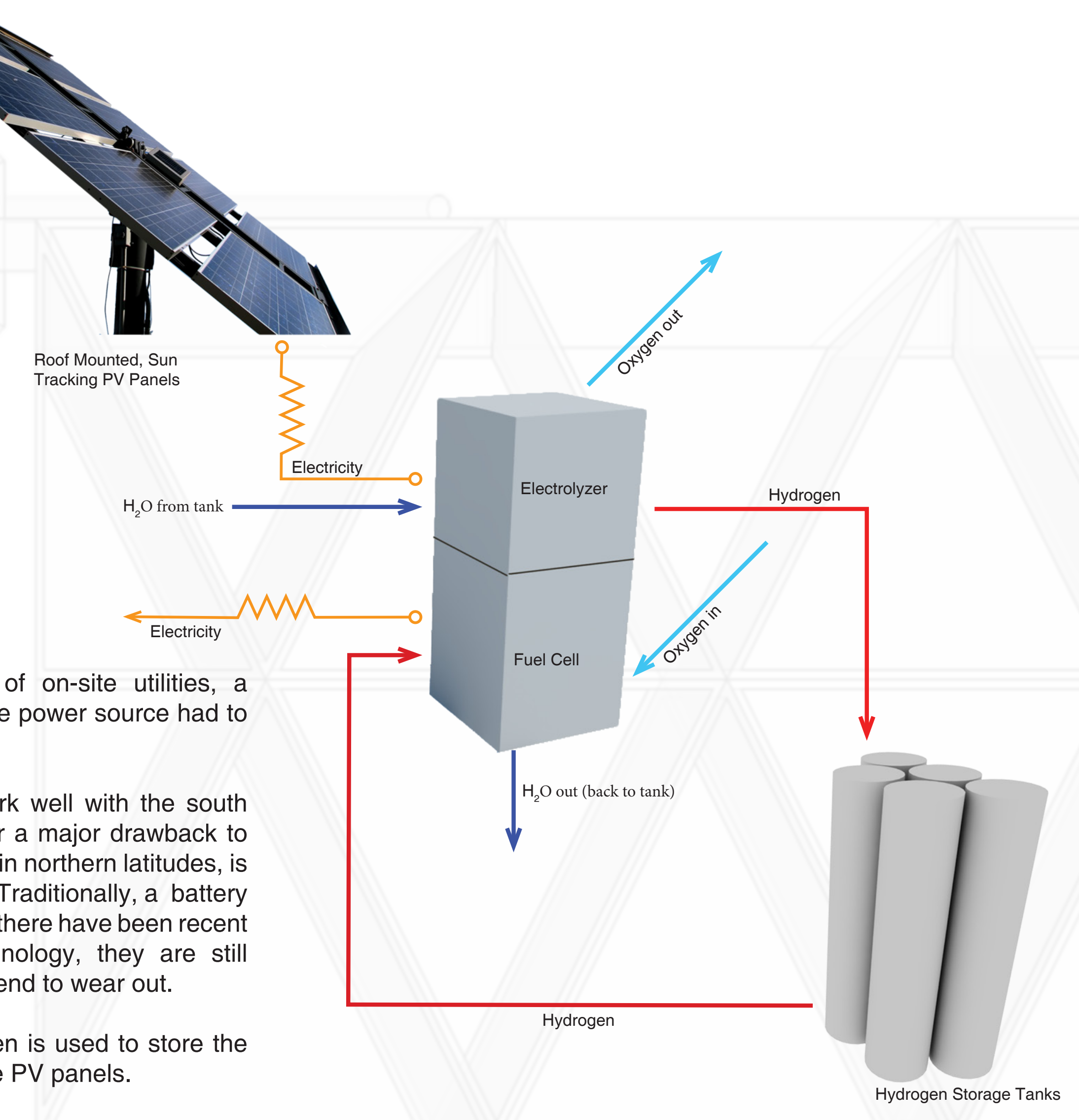


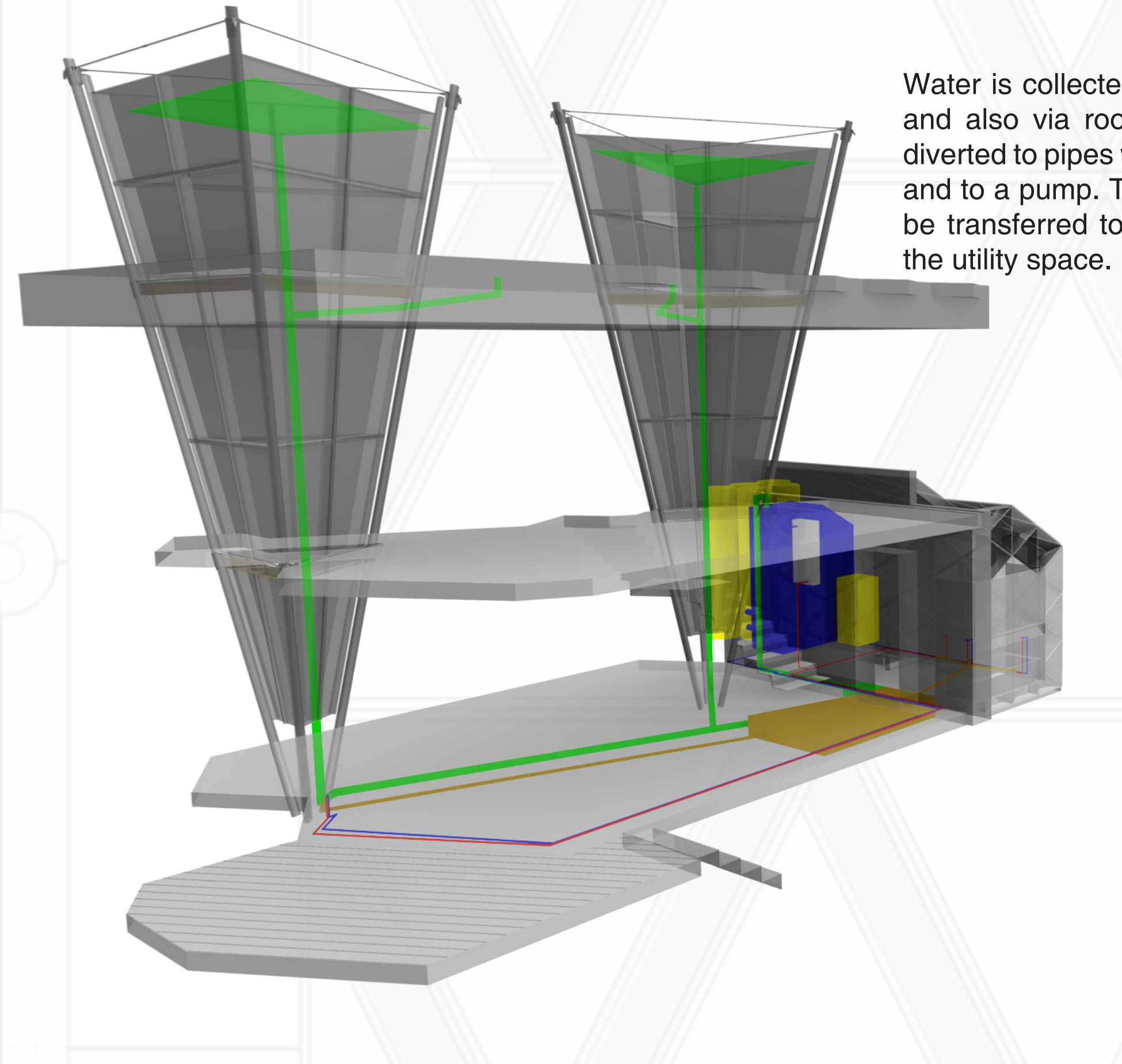
1. Hydrogen storage tanks
2. 800 Gallon Two-Cell Water Storage
3. On Demand Tankless Water Heater
4. Combination Electrolysis and Fuel Cell Unit
5. Furnace
6. Water Pump
7. Rigid Aluminium Frame
8. Insulated Aluminium Panels
9. Waste Storage Tank

Because of the lack of on-site utilities, a noninvasive stand alone power source had to be implemented.

Solar power would work well with the south facing hillside, however a major drawback to solar power, especially in northern latitudes, is the method of storage. Traditionally, a battery array is used. Although there have been recent advancements in technology, they are still inefficient, costly, and tend to wear out.

In this system, hydrogen is used to store the energy produced by the PV panels.





Water is collected both directly by the pylons and also via roof drains. All of the water is diverted to pipes which run inside of the pylons and to a pump. The pump allows the water to be transferred to the two cell holding tank in the utility space.