



Phase 1 and Phase 2 Shelter Options for Displaced Persons in Haiti:  
“open source” designs for 6-month emergency shelter and construction-grade transitional shelter  
2010 02 20

Executive Summary:

- Shelter needs and parameters have been defined by the Government of Haiti (GoH) and the Emergency Shelter Cluster (ESC) in the (draft) “Haiti Shelter Sector Response Plan v6”.
- Phases for shelter are: Emergency (6-month), Transitional (3-5 years) and Permanent.
- World Shelters offers as “open source” design, and with our own ability to deliver and build, a 6-month shelter that conforms to expressed performance needs for a contextually-adaptable frame to be covered by relief sheeting or CGI.
  - The JAS Shelter system is a low-cost universal connector system for a truss-frame 18 m2 family shelter that can utilize any available poles, lumber or sticks.
  - WS recommends split bamboo as the most economical pole material for the six-month+ target lifetime of these shelters. Initial covering is “relief sheeting”. Will support CGI.
  - Paid local labor is included in the project budget.
  - Extremely rapid and high volume construction has been planned and is achievable. The pipeline of materials supplies is confirmed. Bamboo is from phyto-certified suppliers.
  - Built cost is under \$250 per 18 m2 shelter complete for significant volume, with sheeting supplied by partner agencies.
  - Small-scale project of 200 each 18 m2 JAS Shelters has a budget of \$120K built complete.
- World Shelters has designed and sourced materials for a Phase 2 transitional shelter that includes permanent (50-100 year) construction materials, for the ESC’s price point of \$1500.
  - Permanent “hurricane proof” roof using TechoListo panels and thin cement tiles
    - Gable roof for economy and speed, not the more expensive and difficult hip roof
  - Roof beams and columns of strong dense hardwood
  - Concrete and steel footings under columns; else transportable steel-only footing, anchored
  - 18 m2 per family – “duplex” construction of 36 m2 per shelter with separate dwelling spaces for each family. Duplex is much more efficient use of materials.
  - Cost in volume of 36 m2 duplex with permanent construction materials at \$3,000, built, meets the ESC target of maximum \$1,500 per 18 m2 shelter.
  - Costs are built complete, including paid local labor, local project management, materials, transport, equipment and tools, maximizing % of cash spent in Haiti.
  - All wood products are from phyto-certified managed timber lands.
  - Timber supplier and roof panel supplier are direct partners in this proposal with margins minimized in support of this humanitarian imperative.
  - Rapid and high volume construction has been planned and is achievable. The pipeline of materials supplies is confirmed.
  - Pilot project of 50 each 36 m2 “duplex” shelters built complete has total budget of \$200K.
- World Shelters has hundreds of volunteers ready to assist with Haiti shelter projects.



## *Haiti: Relief, Rebuilding and Recovery*

### JAS Shelter for “6-month” 18 m<sup>2</sup> Emergency/Transitional Shelter

*Contextually adaptable frame connector system to meet the expressed need for a rapid, low-cost “6-month” shelter frame to cover with relief sheeting and CGI.*

#### **Benefits:**

- Very low price point
- Cost includes capital spent in the afflicted region
- Standard kit provides 18 m<sup>2</sup> of shelter for family of five
- Connector kits are universal, for use with any “sticks”, plus roofing and wall membranes, e.g. galvanized steel roofing or relief plastic sheeting material.
- JAS connectors with zip-ties and self drilling screws join the bamboo to build the structure.
- Incorporate regionally available bamboo or wood. For Haiti, we recommend using dry preserved split bamboo from Caribbean.
- Simple assembly of familiar “3-4-5” truss-roof frame; modular design allows multiple sizes.
- Engineered to withstand 75mph wind and heavy rain
- Initial roof and wall covering of relief sheeting; then support CGI roofing.
- Transitional shelter programming includes cash for paid local labor and materials, e.g. locally appropriate wall materials, contributing to revitalization of the local economy through progressive adaptations of materials used in JAS for transitional shelter and permanent house.



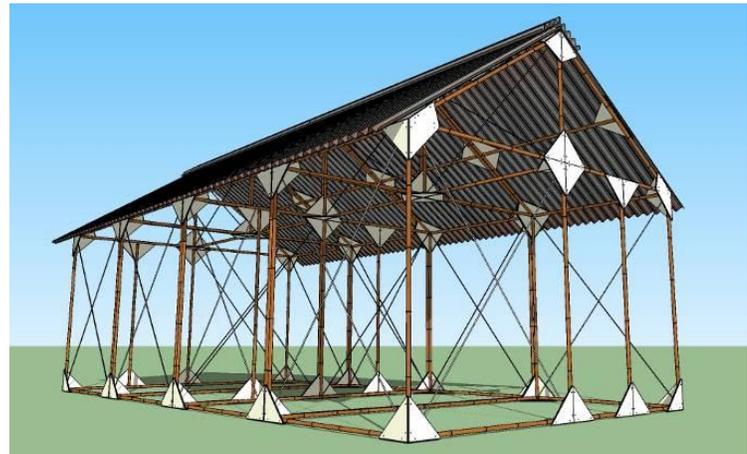
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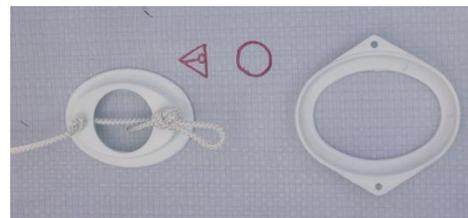
**JAS Kit Includes:**

- Set of corrugated polypropylene connectors (5 mm), with double fold on bias for reinforced strength
- Zip ties, 125# rated
- Self-drilling screws
- Polyester cord 1/8" (500 ft.)
- Clips for fixing sheeting to frame
- Graphical instructions
- Hand tools
- Ground anchors
- Shipping box .5m x .5m x .3m; shipping weight 12 kg

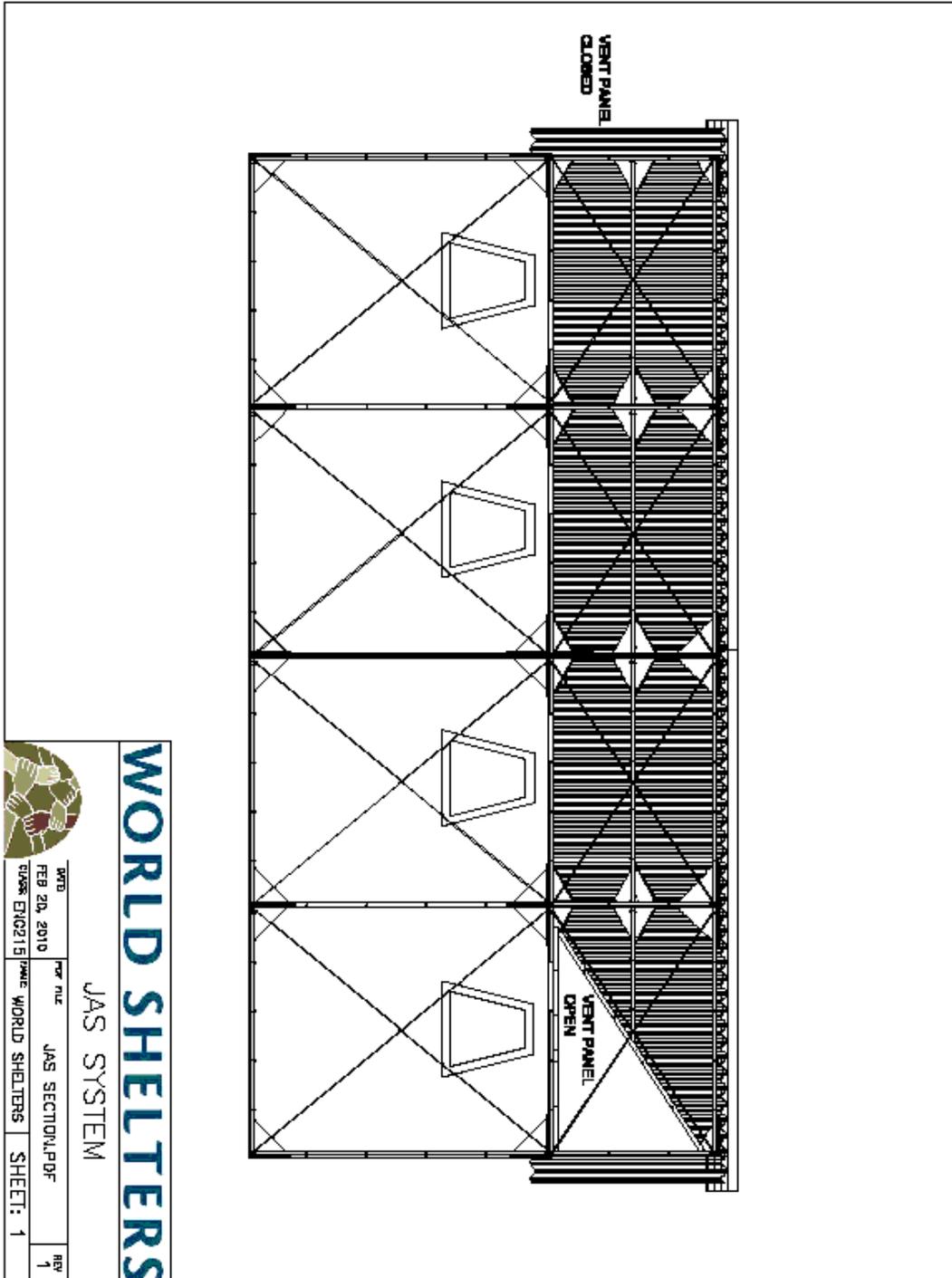


**JAS Shelter Complete (for Haiti) Also Includes:**

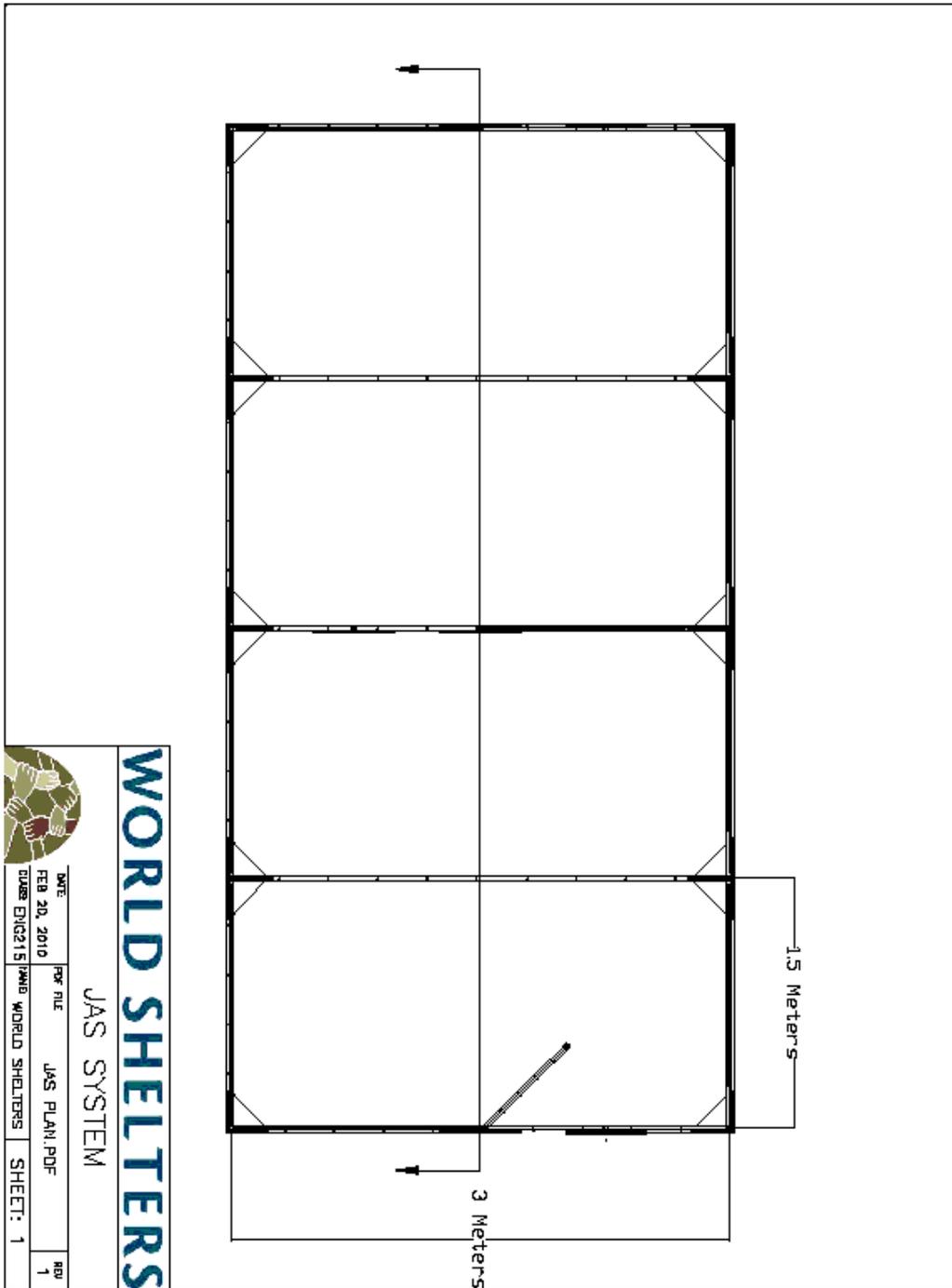
- Set of split bamboo "sticks" to build the complete shelter
- Sheeting material ("relief sheeting") for initial roof and wall membrane

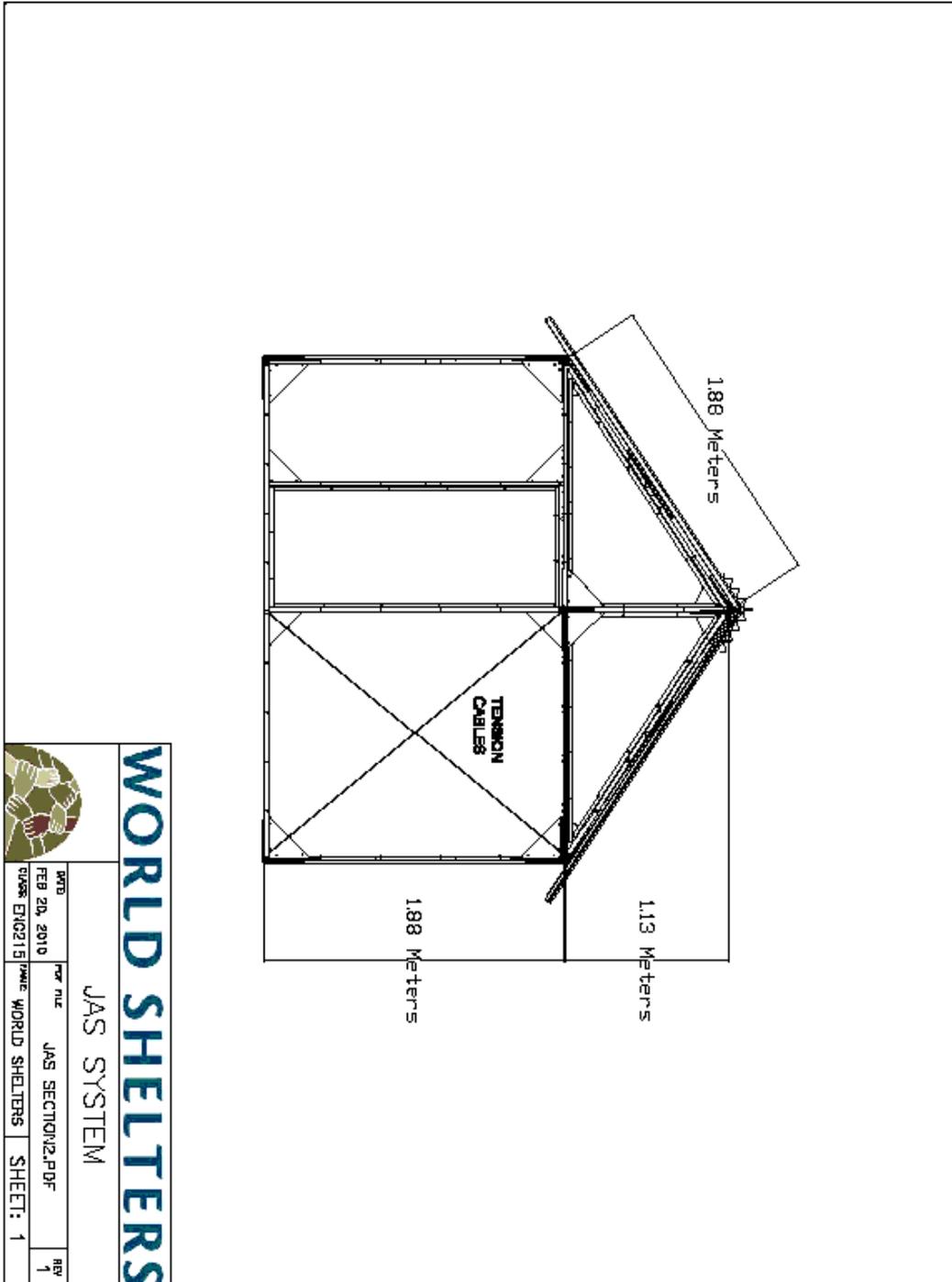


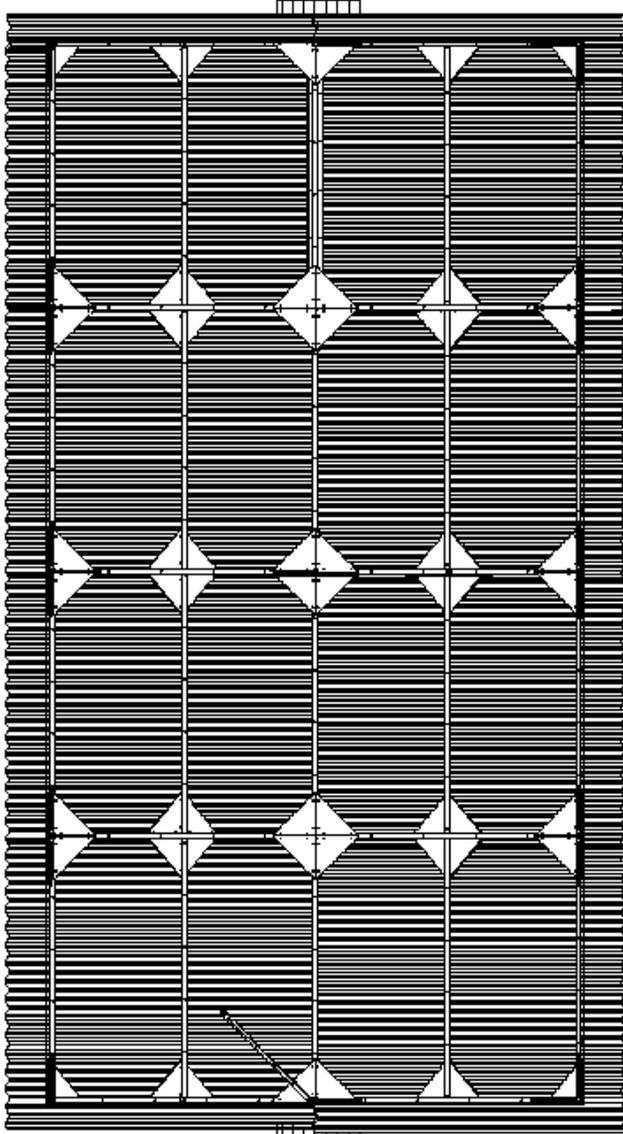
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*Haiti: Relief, Rebuilding and Recovery*



## “TechoListo” Transitional Shelter: Building Back Better

***36 m2 duplex shelters built with permanent grade construction materials. Shelter with dignity.***

World Shelters and our partners in the region and in the US can provide an improved transitional shelter, the “**TechoListo Duplex**” built using permanent (50-100 year) construction materials, for the ESC’s price point of the 3-5 year shelter. This information and designs are open source, and World Shelters and our partners can provide materials and services for built projects.

- Permanent “hurricane proof” roof using TechoListo panels and thin cement tiles
- 3 key roof beams and columns of strong dense hardwood
- Roof joists and posts of treated pine
- Concrete and steel footings under columns
- 18 m2 per family – “duplex” construction of 36 m2 per shelter with divided separate dwelling spaces for each family. Duplex is much more efficient use of materials.
- Cost of 36 m2 duplex with ***permanent construction materials*** at \$3,000 meets the ESC target of maximum \$1,500 per 18 m2 shelter.
- Costs are for the built structures, including paid local labor, local project management, materials, transport, equipment and tools, maximizing % of cash spent in the local economy in Haiti.
- All wood products are from phyto-certified managed timber lands.
- Timber supplier and roof panel supplier are direct partners in this proposal with margins minimized in support of this humanitarian imperative.
- Rapid and high volume construction has been planned and is achievable. The pipeline of materials supplies is confirmed.

The target cost for the minimum size 18 m2 transitional shelter phase is \$1,000 to \$1,500 per shelter for the transitional shelter with 3 to 5 year lifetime. World Shelters has determined that materials and project capacity available in the region can achieve transitional shelters built with permanent extended life materials, at low cost, in high volume and with multiple contextual advantages.

While a hip roof has been suggested, this is both more expensive and more difficult. Given the imperatives of economy and speed, we recommend a gable roof.





A new roofing panel is now available that was designed for the Caribbean environment. TechoListo (“ready roof”) is produced in Panama in a high-volume factory.



100% wood sheets are laminated with phenolic resin, then pressure treated into a strong tongue and groove construction panel. The TechoListo panel is completely waterproof, humidity-proof, insect-proof and will not delaminate.

Capacity in the manufacturing operation is 650.000 m<sup>2</sup> per month (enough for 25,000 roofs to cover the target 18m<sup>2</sup> area)

The principal of TechoListo, Sr. Walter Costa, is committed with World Shelters to the context and requirements for transitional shelter in Haiti, and to “Shelter with dignity; built back better.” From Mr. Costa’s experience in the “Lucha Contra la Pobreza” program he is very sensitive to the cultural issues surrounding architecture in addition to the cost imperatives. Our proposal uses regionally acquired dimensional structural lumber, with TechoListo roofing covered with thin corrugated cement tinted tiles tightly attached with high-strength waterproof screws.

The resulting structure built with permanent construction-grade materials would have an extended lifetime (50-100 years). Also important is that these strong and aesthetic shelters would not have the cultural stigma of poverty that is associated with the ubiquitous corrugated galvanized “CGI” roofing sheet.

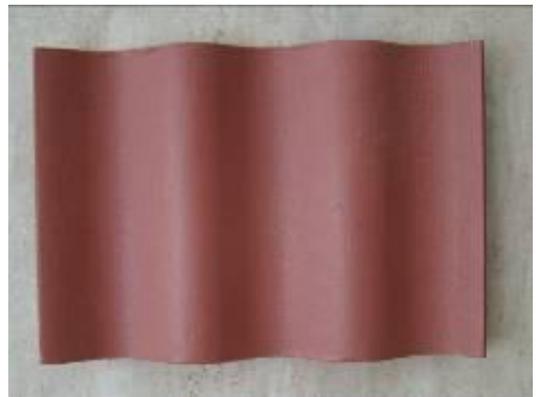
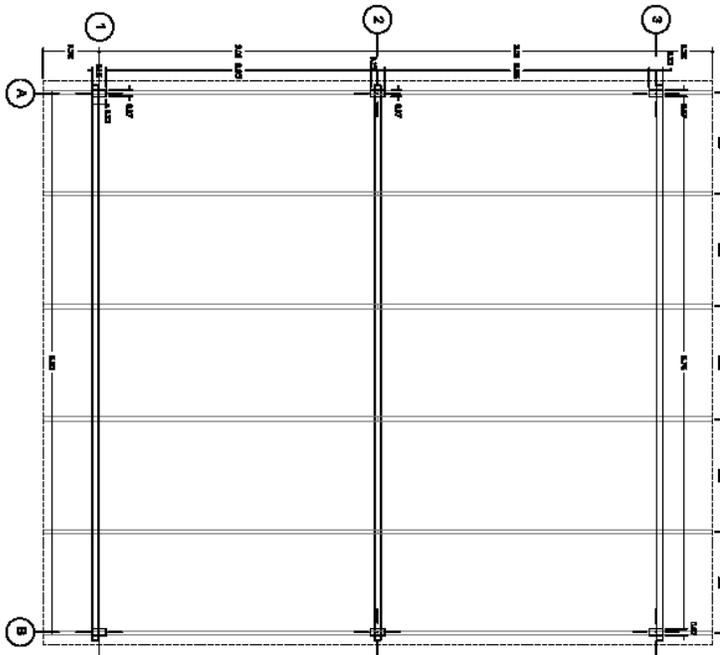




To achieve maximum cost efficiency and thereby enable use of quality materials, our proposal is for a 36m<sup>2</sup> “duplex” shelter with axial dividing wall, using less total materials for the same area per family. There is the corollary potential when there is more permanent housing built for family B to move out and family A have a 36m<sup>2</sup> dwelling as the core house for their permanent housing.

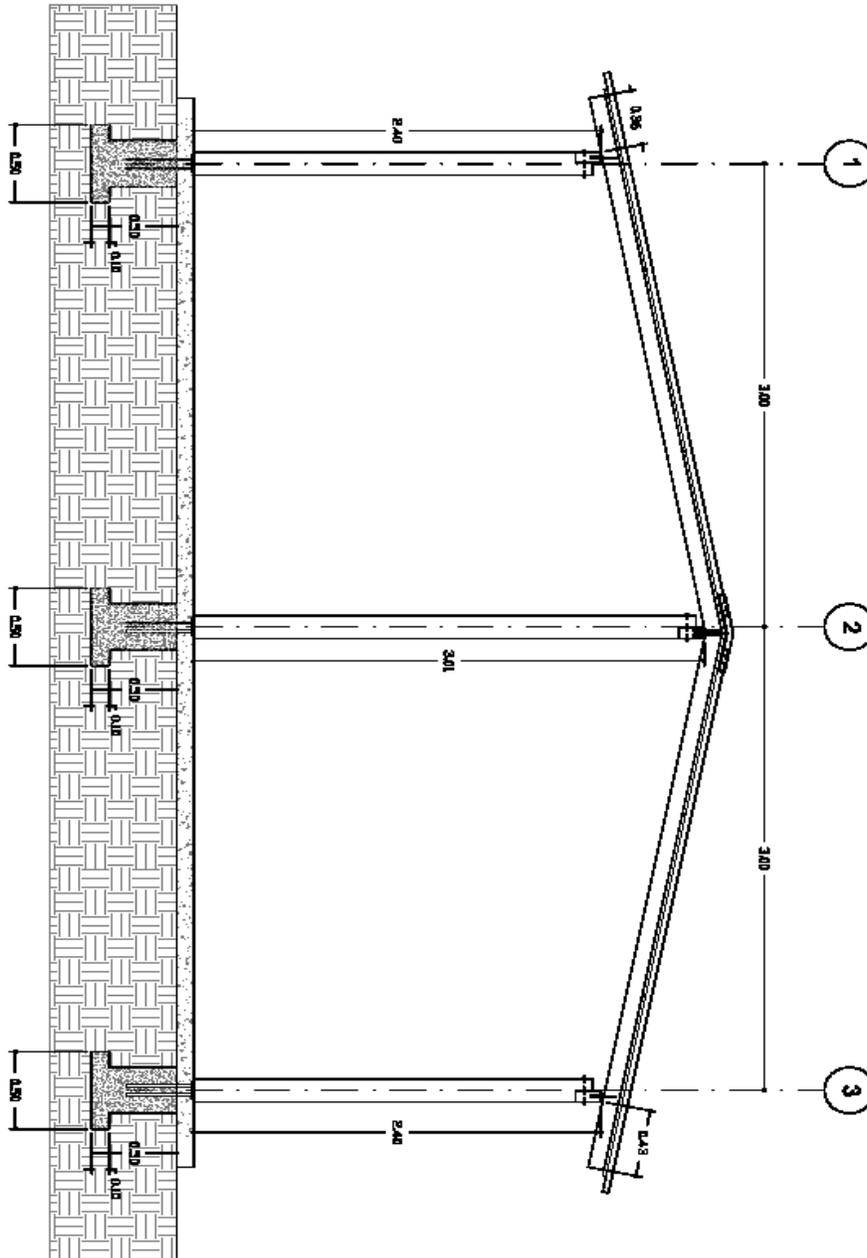
We attach initial drawings by an architect, and have additional drawing details available. We are prepared to come to Haiti with the necessary materials to build a full-scale demonstration shelter with the same structural lumber and TechoListo roofs.

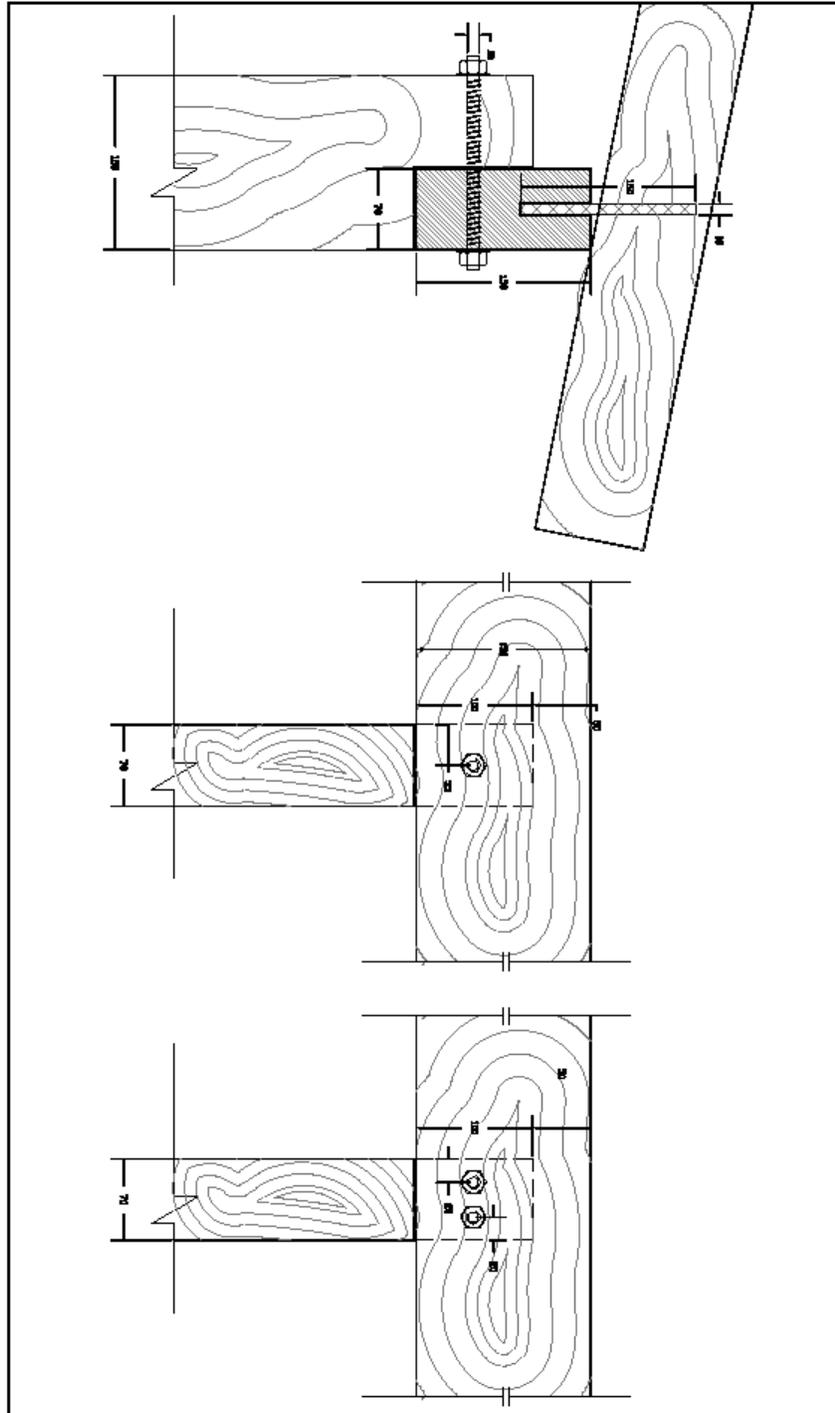
In this time of seemingly insurmountable problems, this regionally produced new roofing panel, regional (phyto-certified) lumber, and project emphasis on payments made in Haiti merit consideration towards achieving the best possible outcomes for relief, rebuilding and recovery. “Shelter with dignity; built back better.”



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[www.worldshelters.org](http://www.worldshelters.org) [info@worldshelters.org](mailto:info@worldshelters.org)



World Shelters can provide the “TechoListo Duplex” transitional shelter with the frame and roof built from construction grade permanent materials as complete built projects for the price below. Cost of the duplex shelter (two family, each in 18 m2 divided dwelling, total 36 m2 roof coverage) is \$1500 per 18 m2 family shelter, conforming with the price point of the ESC Haiti. This applies to any quantity greater than 200 duplex structures (i.e. 400 each 18 m2 shelters).

200 Duplexes Built	\$600,000.
400 Duplexes Built	\$1,200,000.

Any required volume can be planned and built for \$3,000 per 36 m2 duplex.

\* \* \*

World Shelters has over 500 volunteers prepared to assist in Haiti with our shelter projects.

\* \* \*

Thank you for your consideration of these options presented by World Shelters. We submit this information as “open source” for use and reference by ESC agencies in Haiti as may best assist the collective efforts towards provision of shelter and rebuilding communities. World Shelters is also ready, willing and able to deliver and build shelter projects for “JAS” and “TechoListo” shelters, and would welcome requests for proposals from agencies to assist with other shelter projects in Haiti.

It is our privilege to be of service.

Respectfully submitted,

Bruce LeBel

Executive Director  
World Shelters  
[www.worldshelters.org](http://www.worldshelters.org)

[bruce.lebel@worldshelters.org](mailto:bruce.lebel@worldshelters.org)  
+1 707 845 5654 mobile/direct

Jason Hervin

Program Manager, Haiti  
World Shelters  
[www.worldshelters.org](http://www.worldshelters.org)

[jason.hervin@worldshelters.org](mailto:jason.hervin@worldshelters.org)  
+1 206 250 0973 mobile/direct