

Temporary Shelter Layout and Cut Guide

Introduction:

This document is intended to serve as a quick reference for volunteer carpenters constructing International Organization for Migration (IOM) and All Hands Volunteers (AHV) temporary shelters. The following information will be taught to Volunteer Carpenters by IOM Shelter Assistants and AHV Field Coordinators prior to beginning construction on the IOM/AHV temporary shelter projects.

1. Pre-planning

a. Shelter Measurements

- i. Length 4 meters
- ii. Width 3 meters
- iii. Back height internally 1.8m
- iv. Front height internally 2.35m
- v. Floor area 4m x 3m = 12m²
- vi. Depth of holes for front and back footings .6m
- vii. Depth of holes for side footings .5m

| Materials Required to Build Temporary Shelter | | |
|---|------------------------------------|-----------------|
| Item | Description | Quantity |
| Timbers | 2" x 3" x 18ft/5.4m | 12 |
| Timbers cut to: (see step 2 for details on how to get these lengths from 12 timbers.) | 2" x 3" x 2.95m | 4 |
| | 2" x 3" x 2.4m | 3 |
| | 2" x 3" x 5.03m | 1 |
| | 2" x 3" x 4m | 2 |
| | 2" x 3" x 3.05m | 4 |
| | 2" x 3" x 2.59m | 2 |
| | 2" x 3" x 1m | 12 |
| Tarpaulins, 4m x 5m | 1 for the roof and 2 for the sides | 3 |
| Wire nails | For fixing timbers | 60 |
| Roofing nails | For fixing tarp to timbers | 75 |

b. Measure right angles for the walls.

- i. Measure the proper distance between three corners of the building, then measure the diagonal between the far corners. When the diagonal between opposite corners = 5m, the angle is square.
- ii. Measure and mark where the holes for the footings will be.
- iii. Ensure that you dig your holes for the footings so that the markers are at the **outside edge of the holes**. This will ensure that your roofing timbers are long enough to reach each corner.
- iv. Dig 7 holes .6m deep at the front and back of the shelter. 4 at the front, 3 at the back. (Note the location of the front door in the figure above.)
- v. Dig 2 holes .5m deep at the sides of the shelter.

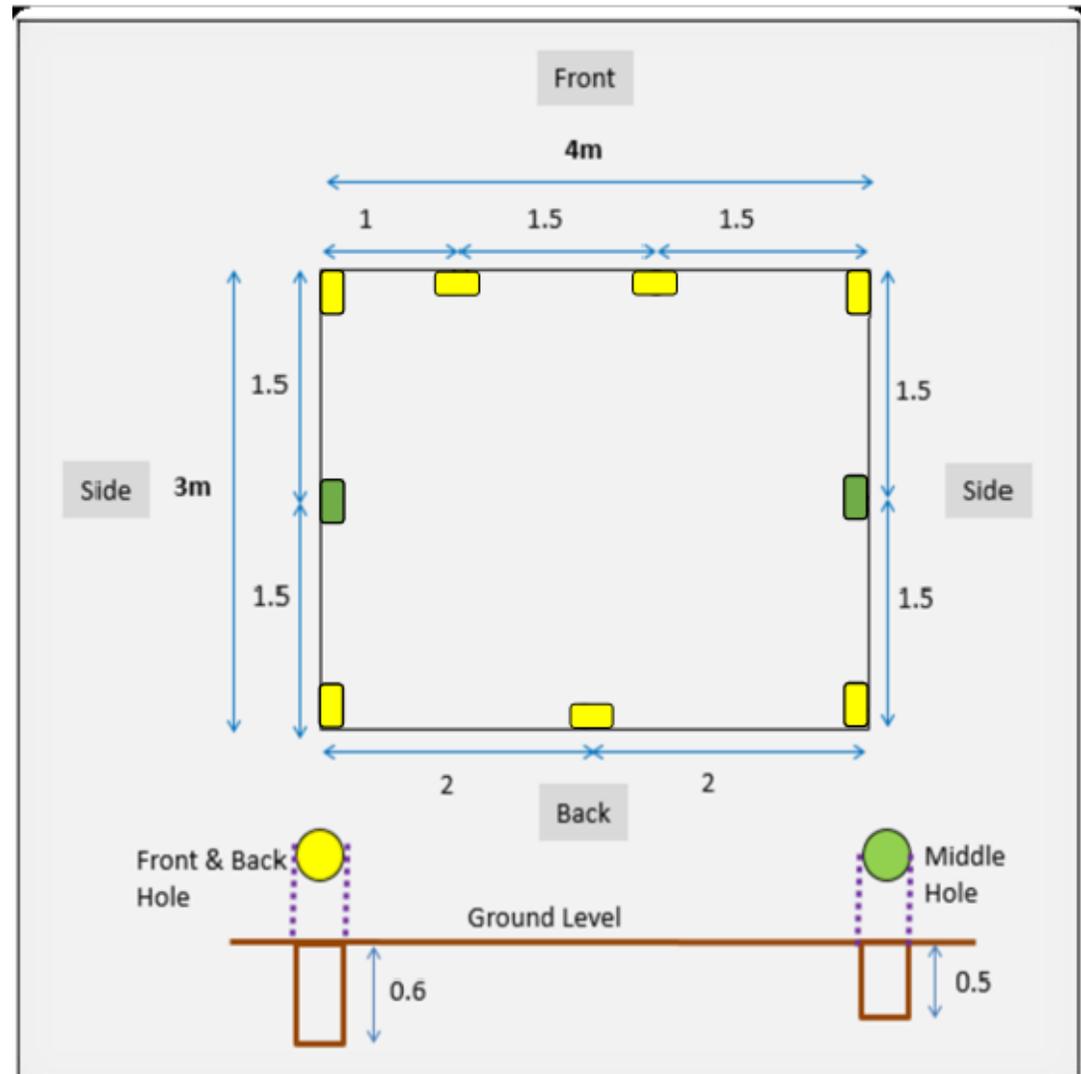


Figure 1: Placement of the holes for the frame footings. Note that the front door will be at the 1m gap at the front. .

2. Cut the timbers for the shelter

- a. Cut 4 timbers for the upright structure (4 x 2.95m for the front and 3 x 2.4m for the back upright walls)

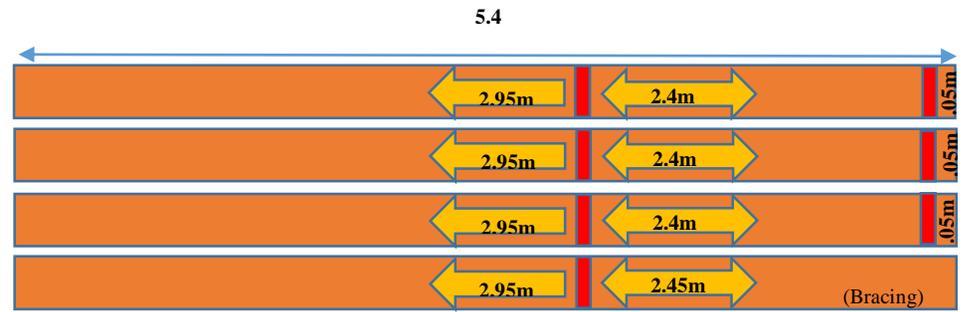


Figure 2: Select 4 timbers and cut each of them to a length of 3m. This will leave 4 lengths of 2.4m, 3 of which will be used for the back wall.

- b. Cut one timber for a diagonal cross roof beam (1 x 5.03m). Cut one side in two 45° angles so it can fit into a corner.

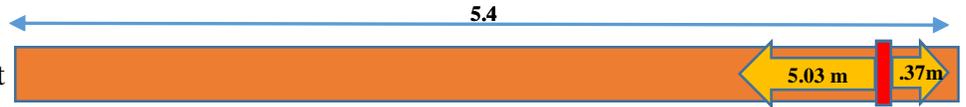


Figure 3: Cut one timber for use as structural roof bracing. Trim one side so it can fit into an angle.

- c. Cut 2 timbers for structural support (3 x 4m for front and rear horizontal supports)

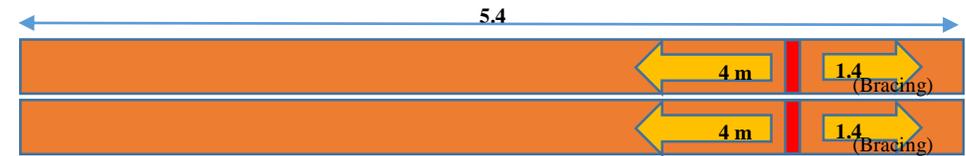


Figure 4: Cut 3 timbers to 4m lengths for front and rear cross structural support.

- d. Cut 4 timbers for roofing (4 x 3.05m for roofing)

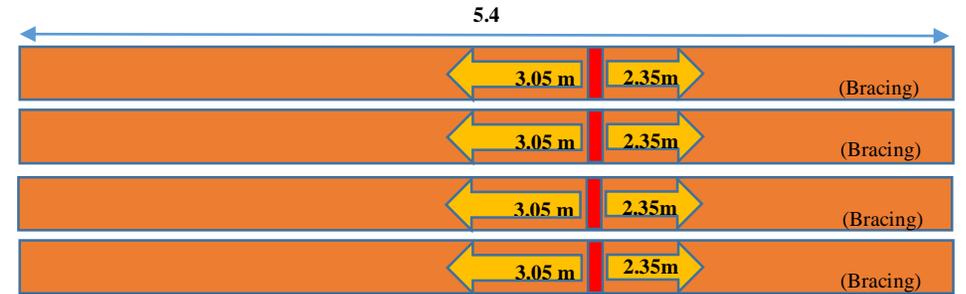


Figure 5: Cut 4 timbers for roofing.

- e. Cut **1 timber** for 2 side upright frames (2 x 2.59m for upright supports)

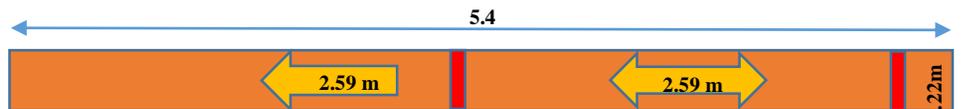


Figure 6: Cut 2 timbers to 2.59m for upright side supports.

- f. Cut the extra pieces of timber (1 x 2.4m, 4 x 1.4m, 4 x 2.34m) to 1 meter lengths to use as bracing for the upper corners of the structure to add stability.

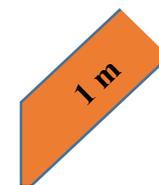


Figure 8: To use for bracing the frame of the structure.

Due to timber positions cut **one** corner of bracing to 45° and position on vertical beam, the other end uncut onto horizontal beam. See photo.

3. Erect the frame

- a. Connect a 4m roof timber from step 2.c to three 2.4m timbers from step 2.a. Ensure that the 4m timber is on the outside of the assembly when stood upright. (Refer to Figure 8.)

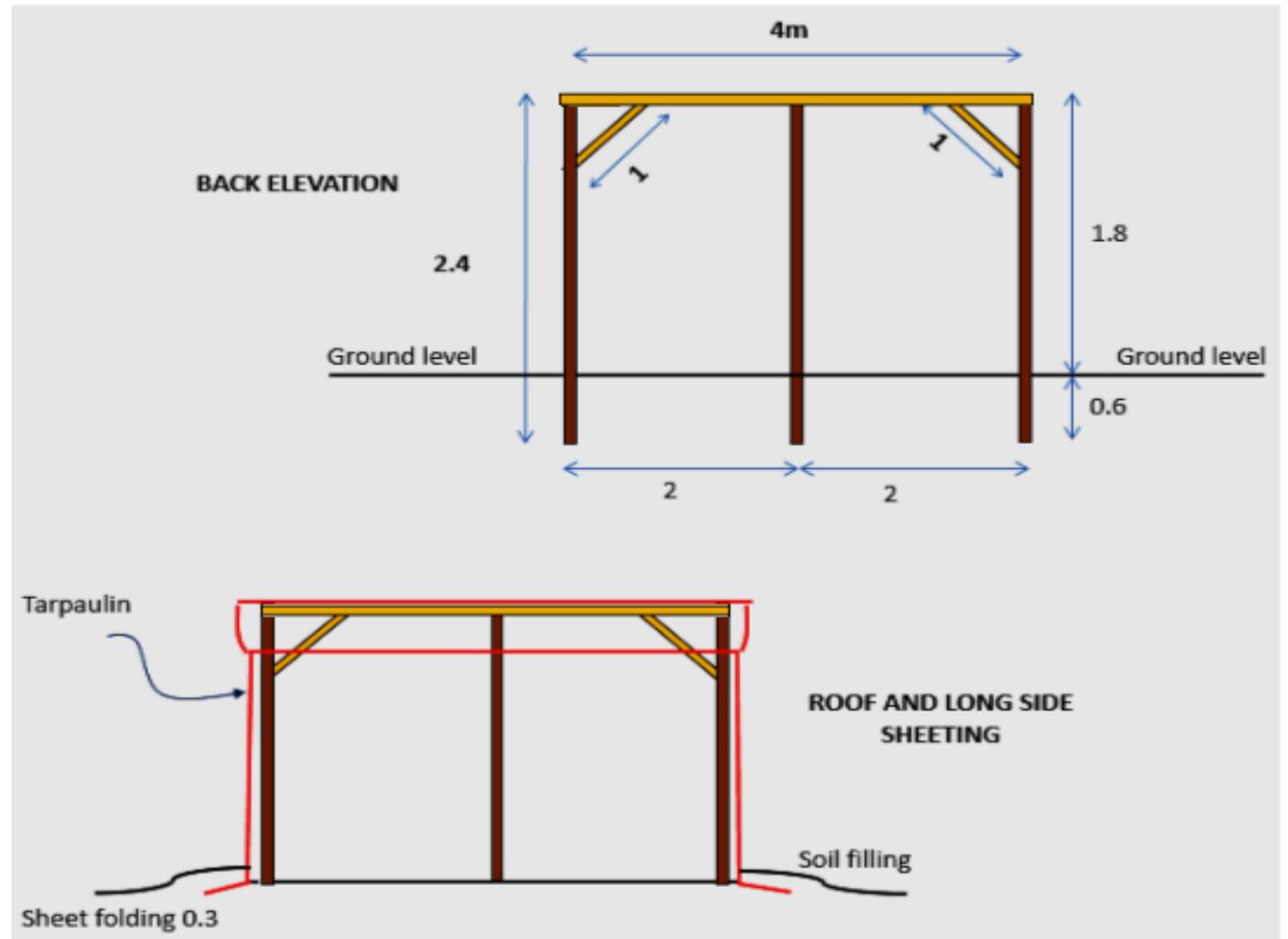


Figure 8: Affix a 4m timber to three 2.4m timbers as shown. Stand the connected timbers in the holes dug for the back of the structure.

- b. Connect the 4 x 2.95 m timbers for the front upright structure from step 2.a to a 4m roof timber from step 2.c so that the tall edge of the 4m timber will be vertical when erected. When the structure is erected, the 4m timber should be at the front of the building, not on top of the 2.95m timbers. Note the position of the door. (Refer to Figure 9.)

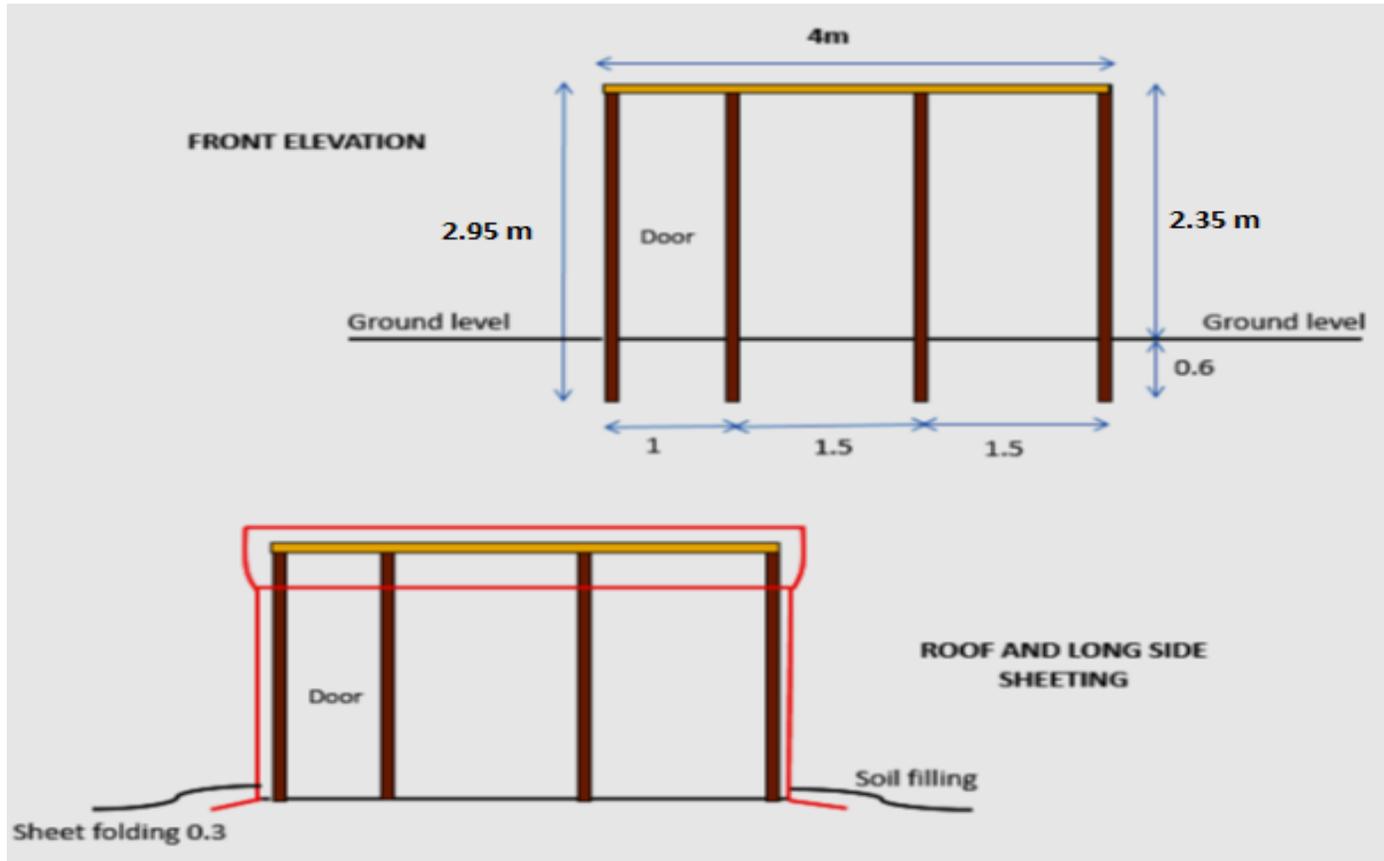


Figure 9: Affix a 4m timber to four 2.95m timbers so the thinnest side of the 4m timber will face up when the assembly is stood upright, as shown.

- c. Level the front and back of the structures by inserting small stones and backfill into the holes for the footings. Once the front and back are level, fully fill in the holes with stones and backfill, compacting/ramming the backfill into the holes.

- d. Connect the 5.03m timber from step 2.b diagonally from two top corners to ensure the roof is square and to provide added stability.
- e. Connect 4 x 3.05m roofing timbers from step 2.d running front to rear above each side of the structure and in the middle at intervals of 1.33 m and match up with the front wall timbers. Note that the two roofing timbers in the middle of the roof should be nailed in place so their 2" side is facing up to create a slight side-to-side tilt to the roof, enabling better water drainage. The side timbers should be nailed flat against the side and not on top. Use a saw to trim off any sharp or protruding corners that could cause extra wear on the tarpaulins once they are attached to the frame (especially on the roofing beams). The timbers can be nailed together at the trimmed section rather than toe-nailed.
- f. Connect the 2 x 2.59m upright side supports from step 2.e underneath the 3.05m roofing timbers. (Refer to Figure 10)

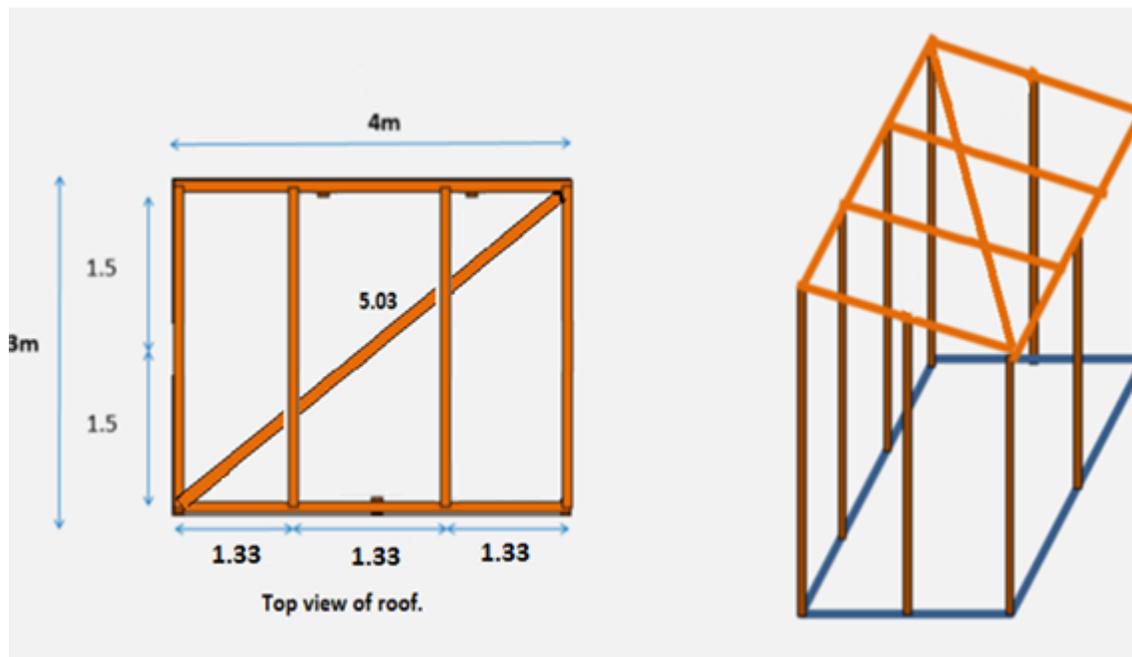


Figure 10: Spacing for the roofing timbers is 1.33m, 1.33m, and 1.33m.

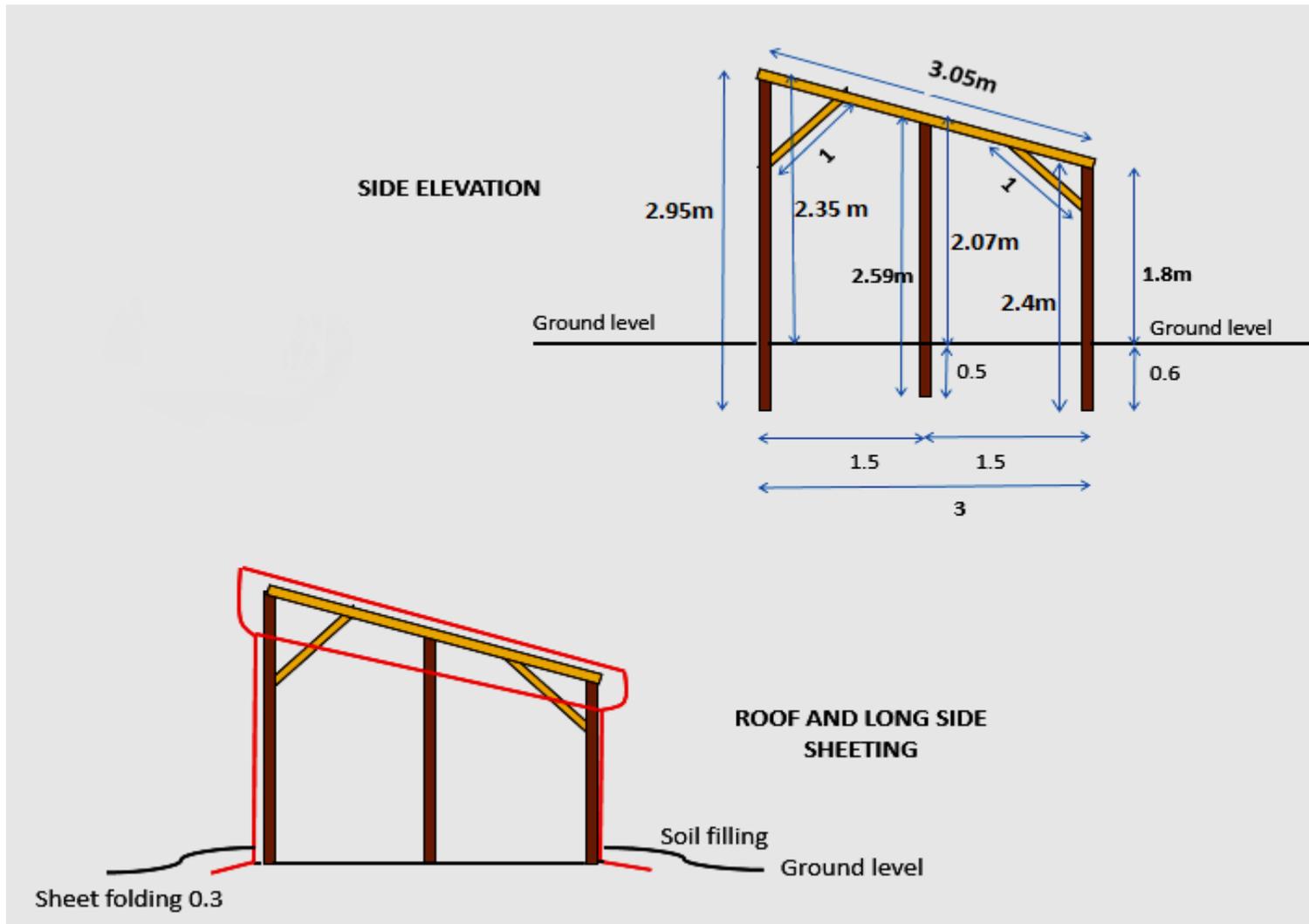


Figure 11: Connect the front and back sides to the 3.05m roofing timbers.

- g. Fix 1m bracing lengths to the inside corners of the frame as shown in Figures 8 and 11.
- h. Use a saw to trim off any sharp or protruding corners that could cause extra wear on the tarpaulins once they are attached to the frame (especially on the roofing beams.)

4. Cover the frame with the tarpaulins

- a. Cut 1 tarp in the middle, lengthwise so you have 2 pieces that are 2 x 5 m each. Fix 1 piece to the upright timbers starting with the width side close to the door and join with the second piece where the first ends. The second piece should end close to the front side corner. On the width sides there should be left a space of about 40cm between the top edge of the tarp and the roof (at the front of the structure) which will be used for ventilation.
- b. When securing the tarps to the frame, fold the edges before nailing the sides so that your nails go through a double layer of tarpaulin. Wrap the tarp around the edge of one timber before securing. This will strengthen the walls and make the nails less likely to rip through the tarps. See the figure.
- c. Use one full tarp to cover the front side and as much of one side as it will cover. Be sure to leave one side of the front door unsecured.

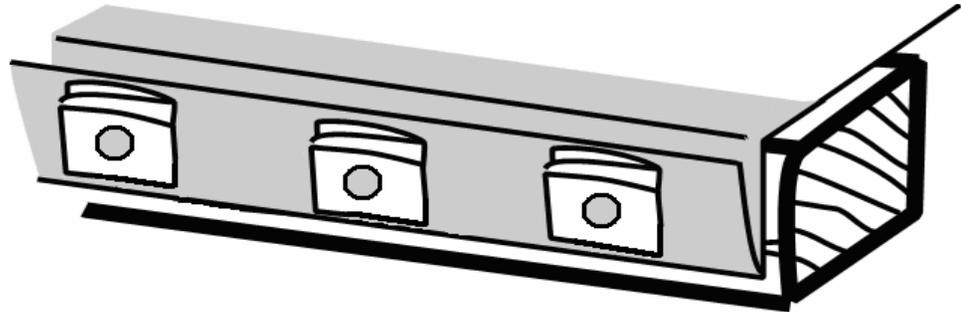


Figure 11: Use the eyelets on the tarp when available. When not available, use a roofing nail with a wide washer. Hammer the nail in fully to secure the tarp to the timber and minimize ripping.

5. Roofing

- a. Cover the roof with one full tarp which should overlap on all 4 sides. The overlaps on the width sides should be left unsecured so they are able to flap and ensure ventilation. Fix the roof tarp at the front and back (not the top) to avoid leakage.
- b. Affix a stick to the edge of the overlapping tarp on both width sides for easy flapping for ventilation. The household is required to source the sticks for this process.