My drink station or bird trough.

How to build a movable drink station and install it in your garden.

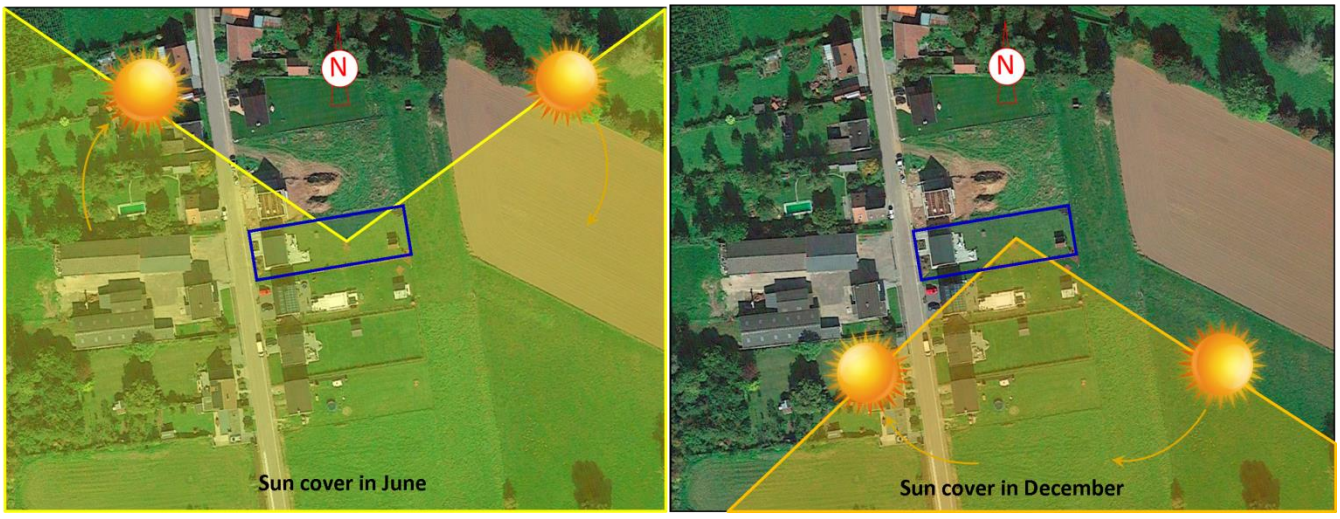
During the confinement the possibilities of travel being virtually nil for our leisure, the photo outings were reduced to their simplest expression: nothing, none... I then decided to have fun observing my garden and what was going on there with a little more attention than usual. And I found that it hosted more activity than I thought despite the proximity of the house and that of the neighbors. I then imagined myself comfortably settled in my garden away from the eyes of the birds in my hide. With the summer approaching quickly, was it still useful to consider it before autumn and winter? Why not? Birds should not be fed in the summer, but do they not need water to drink or bathe in order to clean their feathers? It's decided, I'm going to build myself a drink station or bird trough.

It will be built of wood for a total size of 2.7 meters by 1.8 meters. The water basin will be 2.3 meters by 1.5 meters in size and 13 centimeters deep.

I have determined the length based on the focal length I intend to use. The larger the focal length, the longer the drink station should be and vice versa. I turned to the good old 300 mm which will also allow me to move away from the drink station so as not to scare the birds too much. The width should also be dictated by the focal length used and the shooting distance that will determine the field covered by the photo. For example, I intend to stand about 8 meters from the back of the trough and my 300 mm will cover a horizontal field of 60 cm with an APS-C sensor and 96 cm with a full-frame sensor. There will be no more than 10 cm of water in the basin and a minimum of about 3 cm on a sloped plane built at the back of the trough. There is no need for more depth; birds must always have to be able to walk to land. The amount of water needed to fill it will be around 300 liters.

Where to install it in my garden?

I took two things into account. First of all the sun light. Indeed, think above all about the light and the position of the sun throughout the day, so you can make the most of it and get some nice shots. I wanted to avoid boring backlights at the beginning and at the end of the day as well as too bright a light when the sun is at its zenith. From then on, I opted for an orientation leaving the sun on the right at its sunrise, on the left at its sunset and allowing me to enjoy the shadow of a high willow when it is at its peak.

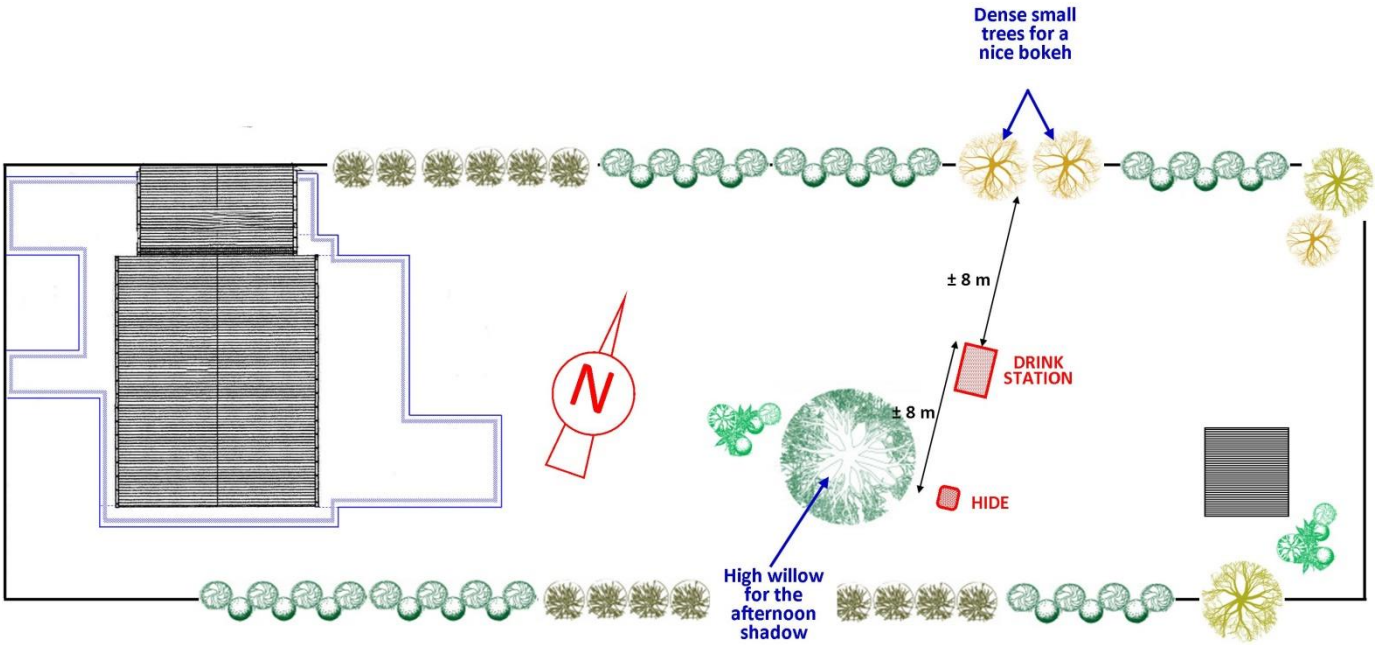


There are many apps to help you know the sun's trajectory during the day, here are two:

- **Sun Surveyor**
- **Photo Ephemeris**

Then in which direction to orient it within the garden ? An important element for the success of your images is the background or bokeh. Don't hesitate to experiment by taking several photos of the different backgrounds that you think are interesting. You can also perform them with different apertures to visualize what it looks like in terms of background blurs. You will be careful to exclude any object (house, garden shelters, unsightly fence) or shape (tree trunk, large branch) that could affect the quality of your shots.

So here is the result of this reflection.



Materials

I didn't opt for salvage material such as recycled or used wooden pallets to keep me as close as possible to the dimensions I have set myself. In fact, I should even admit that these dimensions were rather dictated by the boards, beams and panels that I found on the market. I advise you to check with several large DIY stores (via their website, it's easier) in order to find the best possible prices. You will also need hardware, i.e. different sizes of screws for the assembly of the drink station. This option will be a little more expensive than building from salvage materials. Finally, you will need to purchase liner for garden pond. You can easily find it in large decent gardening stores. I recommend you buy it by the meter; it's cheaper (42 euros for a liner of 6x3 meters versus 65 for a pre-cut of 4x4 meters).

Below is a detailed list of parts for the construction of your drink station, as well as a list of materials to buy with their prices. Wood and hardware come from large DIY stores and the liner from a garden center.

Part details

Wood Section mm	Part N°	Length in cm	Qty	Remark
58x69	1	135	6	
	2	237	2	
190x27	3	242,5	2	
	4	149	2	
	5	149	1	See cut-out
117x18	6	11,1	30	See cut-out
165x18	7	270	2	
	8	149	1	

Wood Section mm	Part N°	Length in cm	Qty	Remark
Wood panel	9a & 9b	74,5x30	2	See cut-out
244x122x18	10a & 10b	149x112	2	See cut-out
	13a & 13b	74,5x41	2	See cut-out
27x44	11	149	1	
27x44	15	176,5	2	
	14	270	2	
27x35	12	149	1	
7x44	16	182	2	
	17	242,5	2	

Wood

Boards & beams	Qty	Unit price	Total price
58x69x270	5	14,72	73,6
190x27x270	2	19,56	39,12
190x27x210	3	15,21	45,63
117x18x210	2	6,51	13,02
165x18x270	3	14,45	43,35
244x122x18	2	32,49	64,98
27x44x210	3	3,97	11,91
27x44x270	2	4,82	9,64
27x35x210	1	3,68	3,68
7x44x210	2	2,73	5,46
7x44x270	2	3,65	7,30
TOTAL WOOD			304,93

Hardware and other furnitures

Wood screws	Qty	Unit price	Total price	Remark
T25 120x6 mm 50 ea	1	10,99	10,99	Frame mounting
PZ2 60x5 mm 250 ea	1	10,59	10,59	Side walls mounting
PZ2 55x3,5 mm 200 ea	1	5,29	5,29	Edges supports mounting
PZ2 45x3,5 mm 200 ea	1	4,29	4,29	Edges and bottoms mounting
TOTATL HARDWARE			31,16	

Security felt				Optional
Bottom liner (m)	3,00	13,99	41,97	Aqualiner 0,5 mm - largeur 6 m
TOTATL OTHERS			41,97	

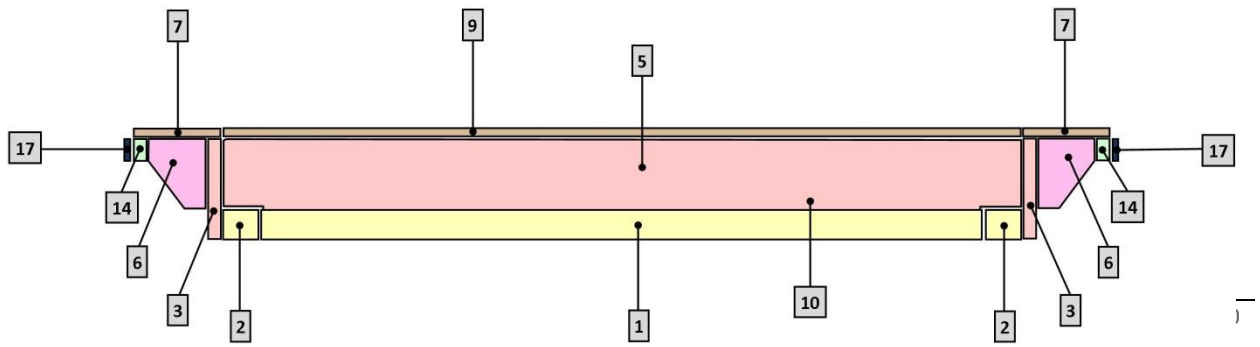
GRAND TOTAL	378,06

Material purchased in Belgium in July 2020

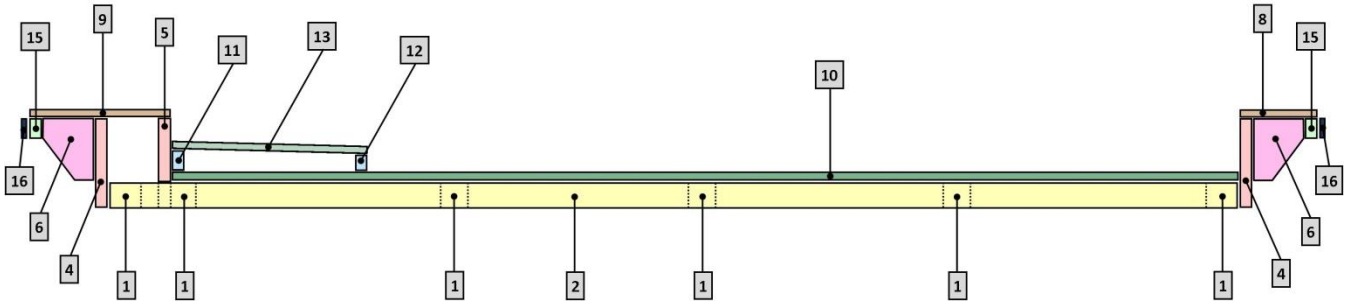
The construction

Here are two cuts of the drink station

Cross section at the level of part (5)



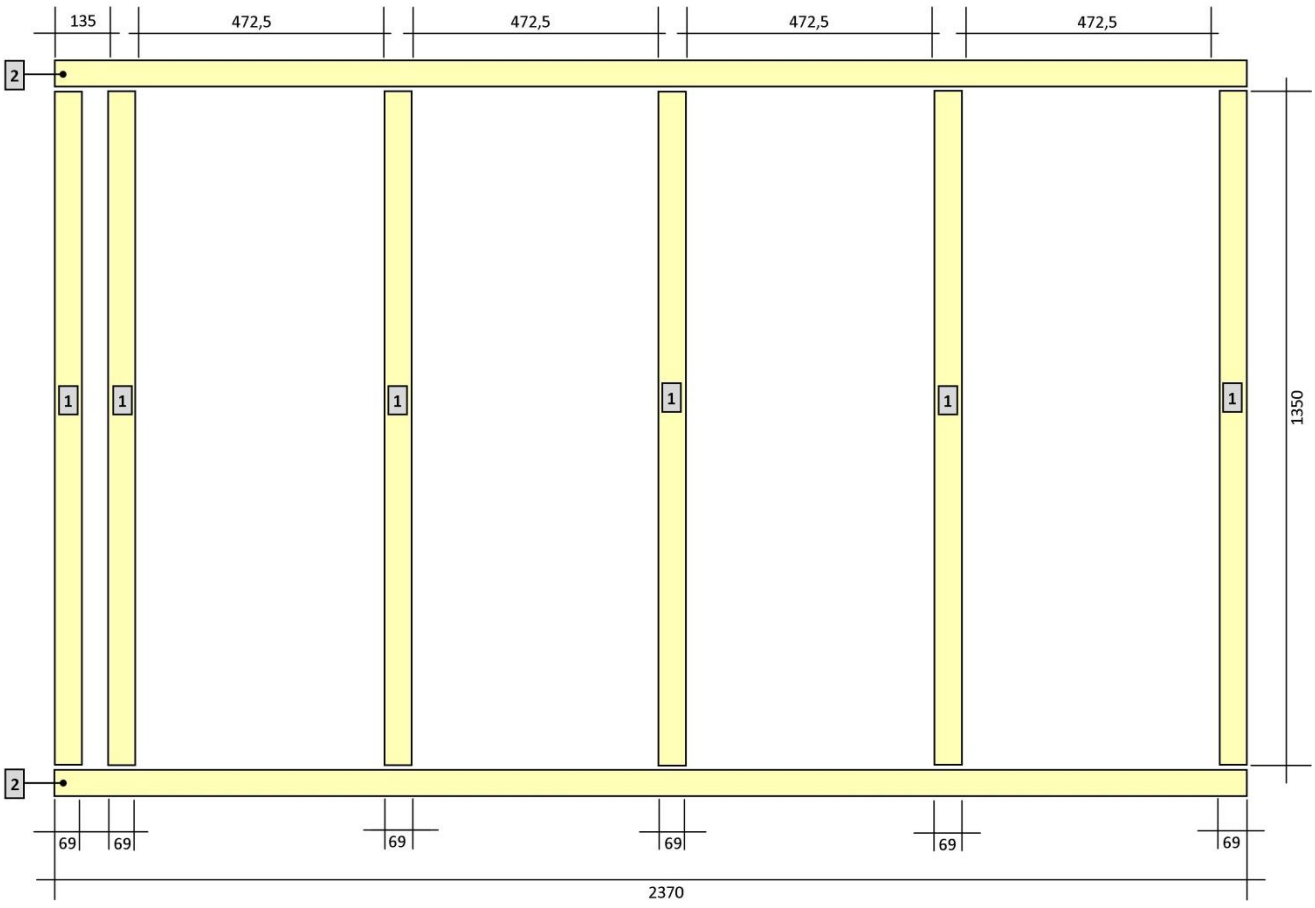
Longitudinal cut at the level of a support (6)



Be careful I strongly recommend not cutting all the parts in advance. Indeed it is better to re-ensure and possibly adapt the exact measurements as the assembly progresses in order to avoid unpleasant surprises (a piece too large can be re-cut, it is difficult to lengthen a piece which is too short).

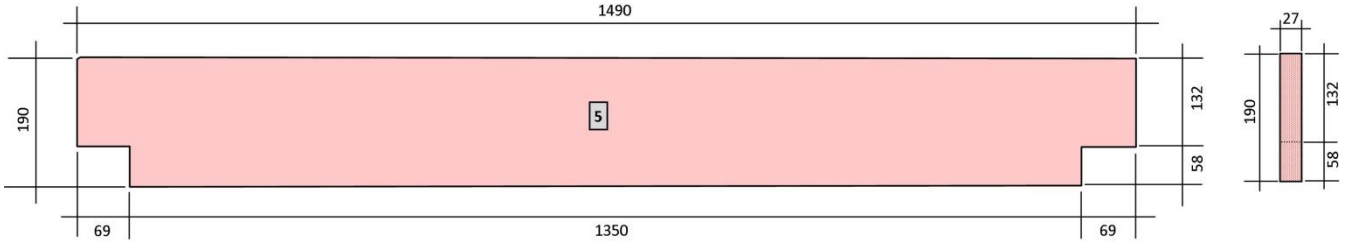
Montage du cadre et les parois du bac à eau

Start by cutting parts 1, 2 and 5. Assemble the two 2.37-metres (2) and 4 of the spars of the cross-sectional spars (1). The last of them will be fixed after mounting the middle wall (5). Here's how to do it:



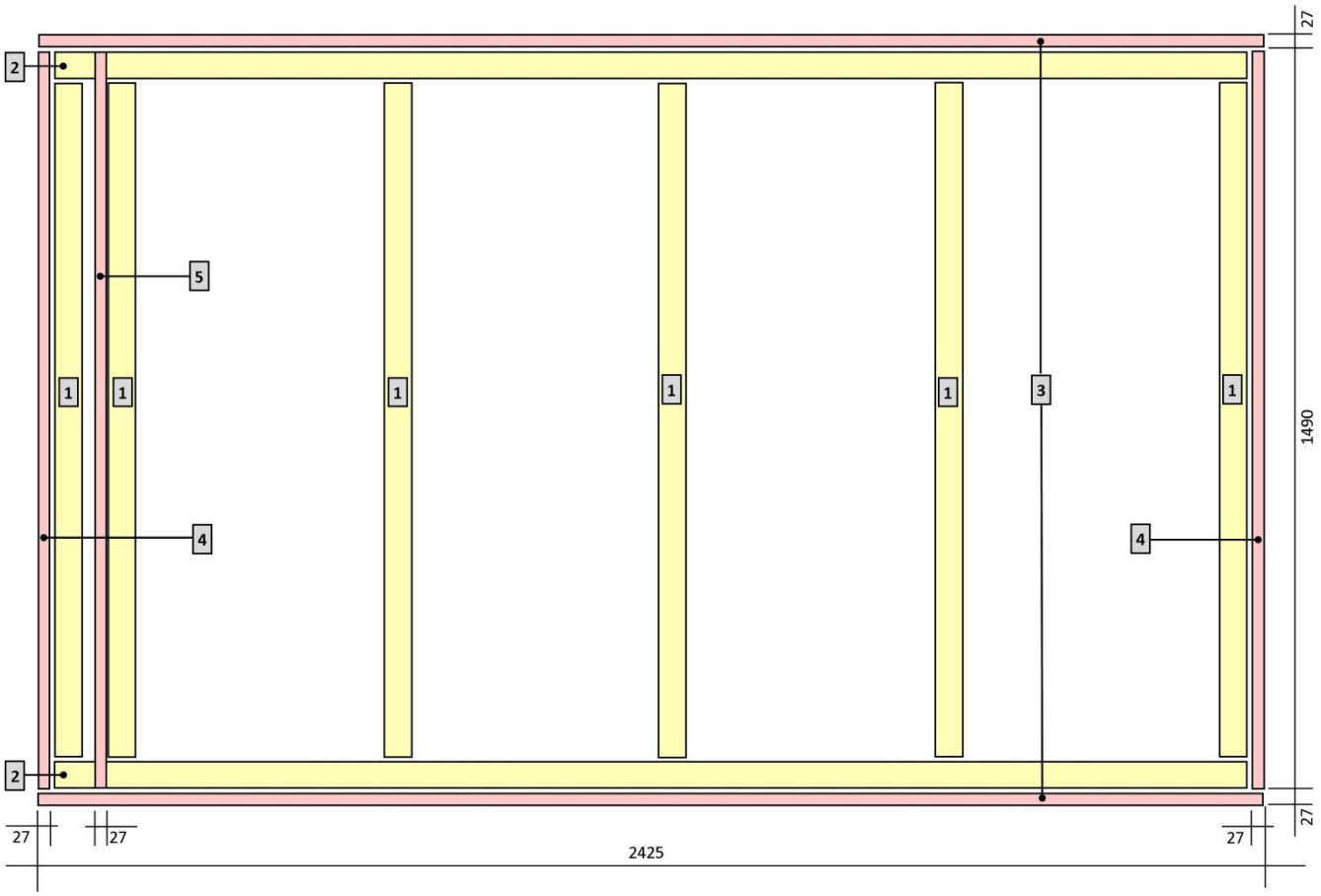
Cutting the spars of the frame (1 and 2))

Cutting the transverse side wall (5)

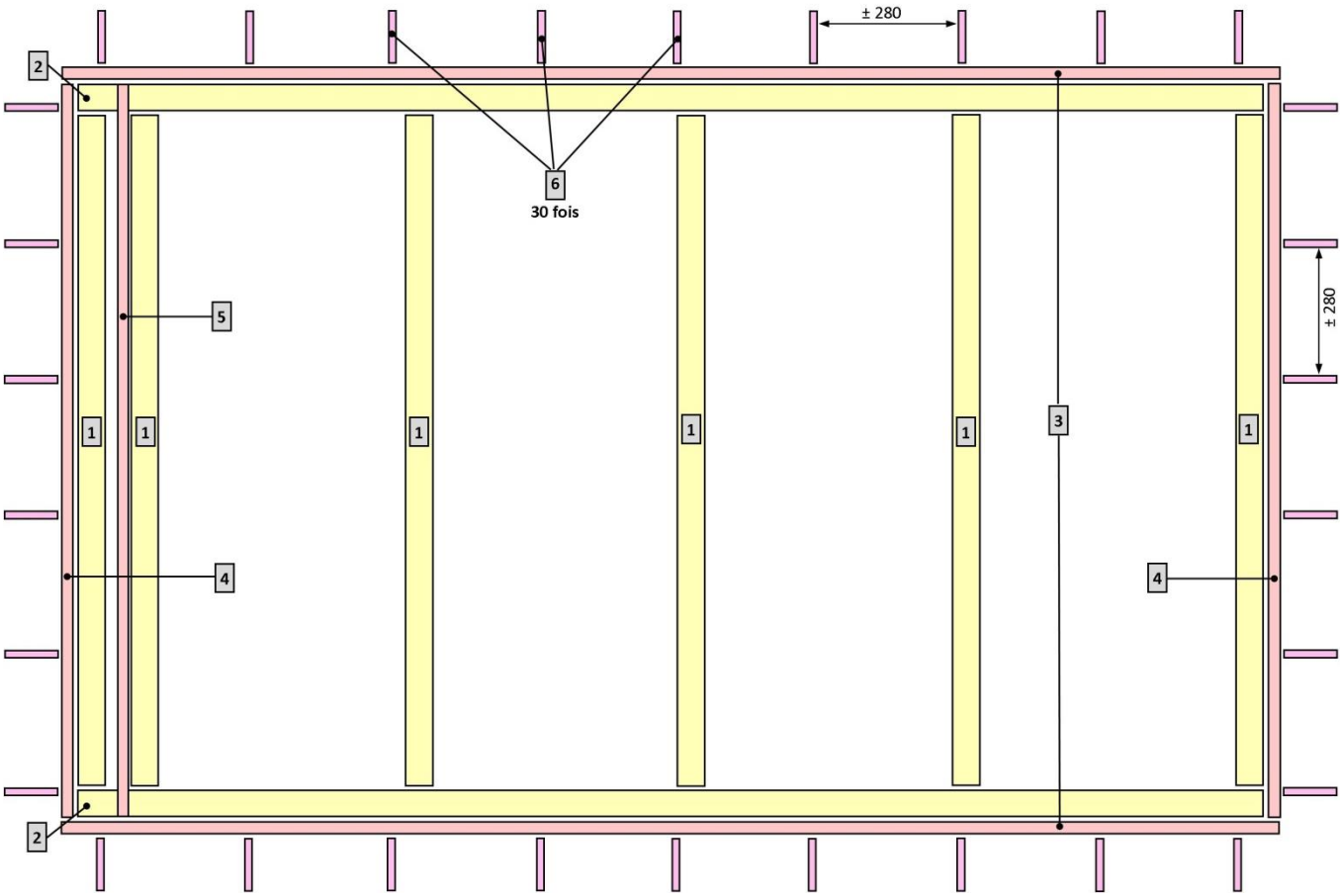


The two longitudinal spars are assembled with four of the cross-sectional spars. The intermedial side-wall is then mounted on the transverse on the open side of the frame, be careful to do so towards the outside of the so formed part, the frame thus formed will accommodate the bottom of the water tray. Then close the frame with the last cross spar.

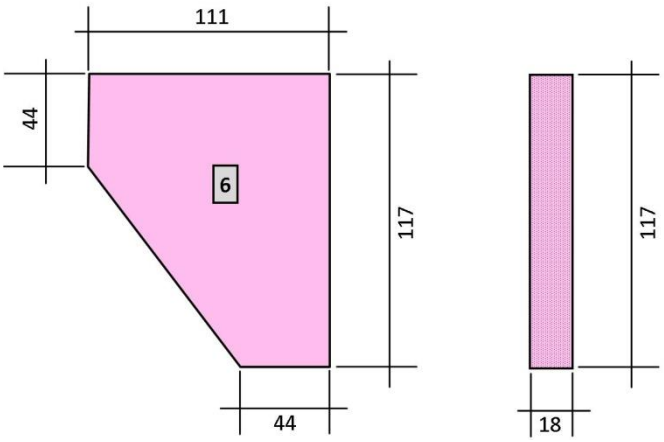
Now cut out the side-walls (3) and (4) and attach them to the frame as follows:



Mounting the supports for the edges

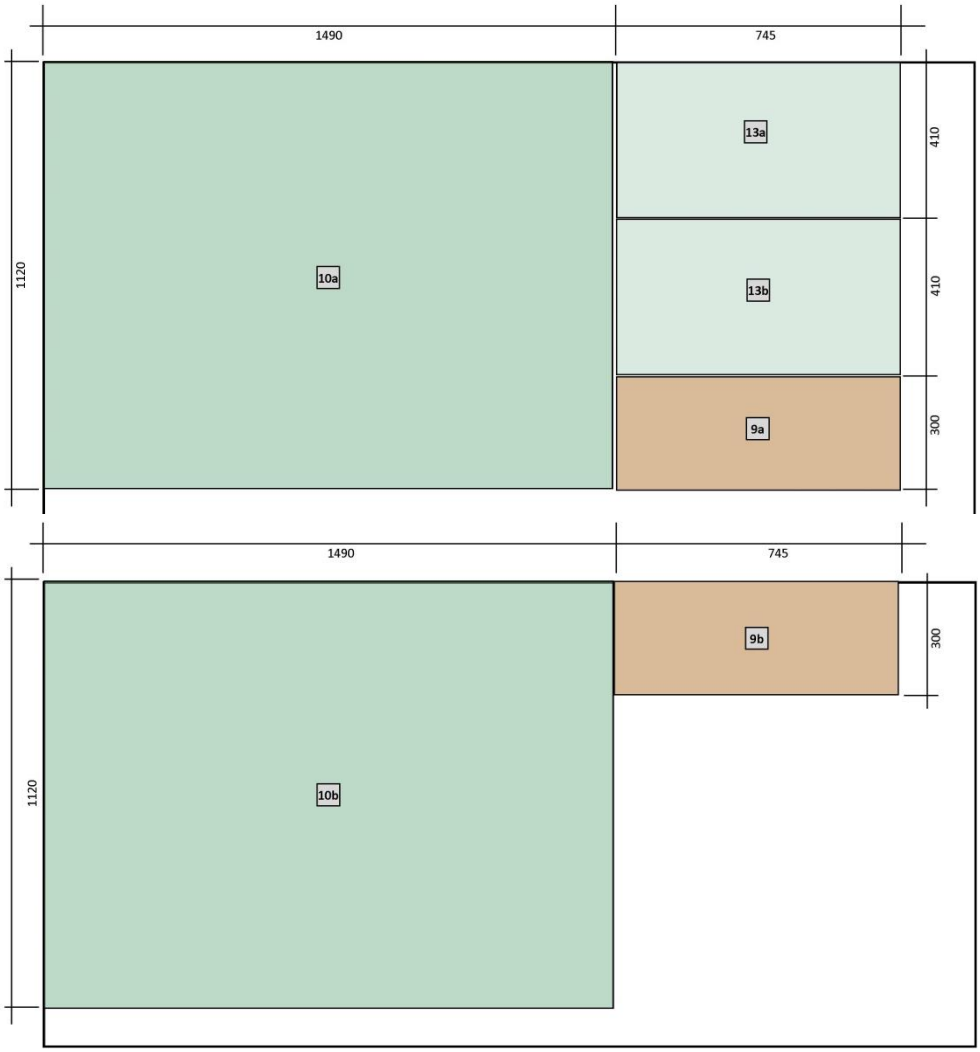


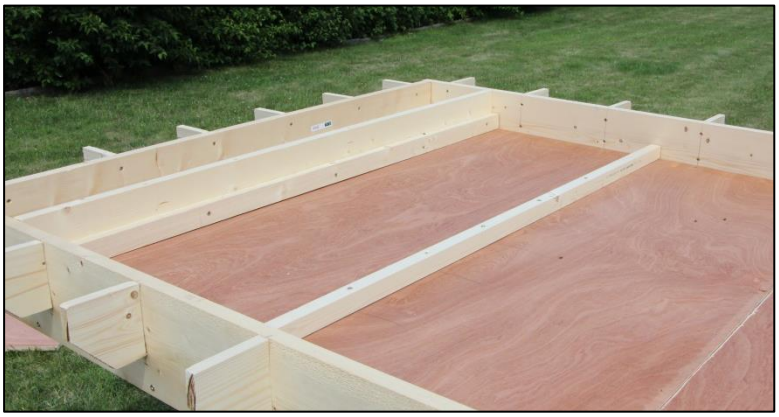
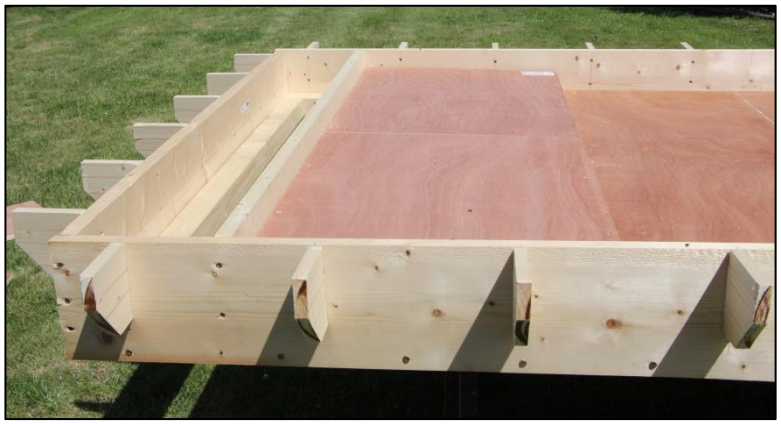
Cut out the supports (6) and attach them to the walls (3 and 4) as shown below.



Final mounting of the drink station

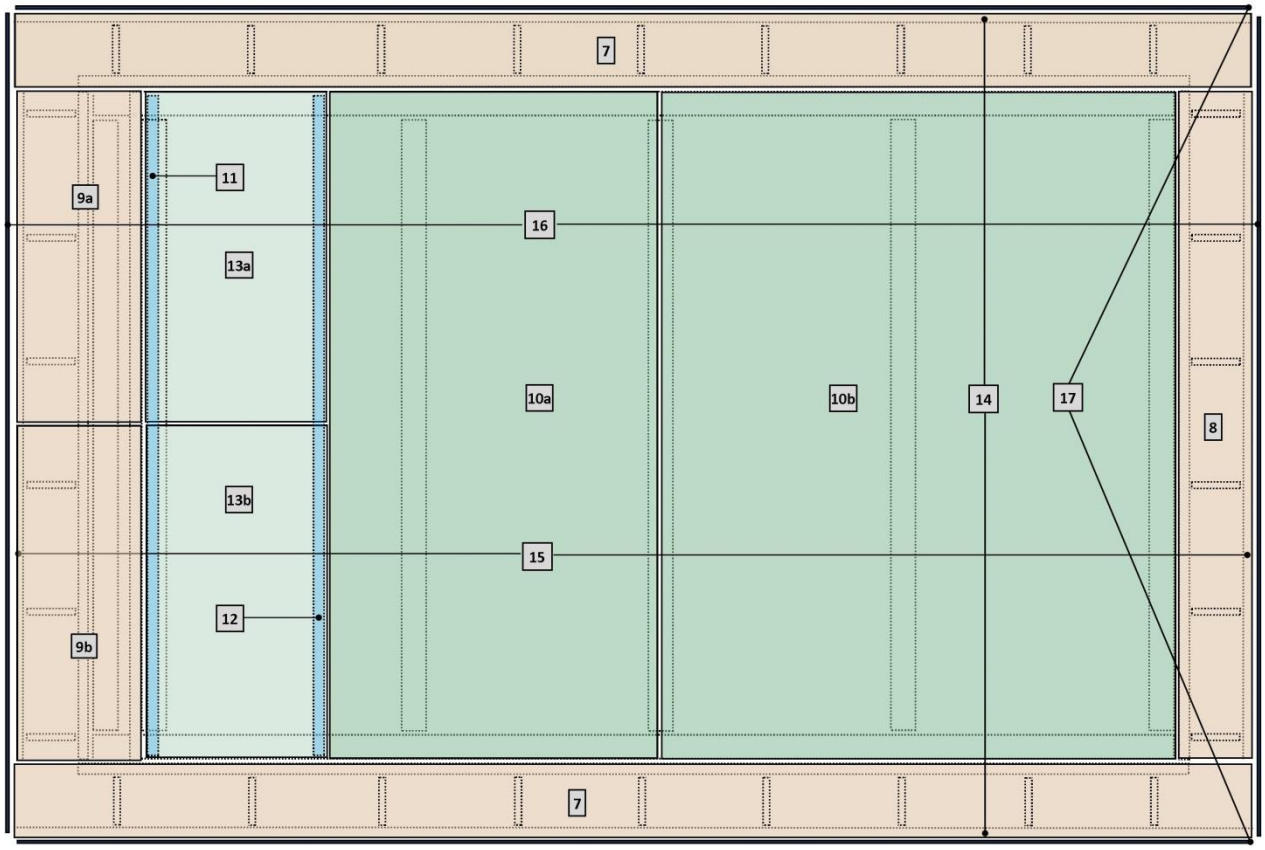
We will now lay the bottom of the basin before mounting the edges of the drink station which will receive the final decoration. We will start by fixing the bottom of the great depth (10a and 10b), then the supports for the tilted plane (11 and 12) and finally the bottom of the latter (13a and 13b). All these parts will be cut into the panels of dimension 244x122x18.



Let's continue with the laying of the edges of the basin (9a, 9b, 7 and 8). The pieces that will form the back side edge will be cut into the panels of dimension 244x122x18 (9a and 9b).


Finally, let's attach the parts 14 and 15 that we will use to fix the liner.



Laying the liner

The liner should be spread in the bottom of the basin by keeping it well in the corners with pavers or bricks. Bring it up along the walls, making sure to give it the shape of the tank, forming the corners at the bottom of it. Then you have to bring it back to the edges. This is the most difficult part of laying the liner. Indeed, you will not be able to avoid the folds at the six different corners, with each change of depth. Fold it now down and stretch it well before staple it on parts 14 and 15. The final operation will be to secure the slats 16 and 17 in order to strengthen the hanging of the liner and to make the whole more aesthetic.

At this level - that is, empty - the drink station remains transportable, moveable by two people. Now decide where you want to install it and how high it should be. This will be based on your hide, its distance from the back of the basin, and especially the height at which your camera will sit. Indeed, you will avoid the drink station being too low to take advantage of the mirror effect on the water of the sloped plane as well as being too high to avoid including the nearest edge in your framing.

As far as I'm concerned, I'm going to use a Wildlife C-30 type of hide. I will place it at a distance of about 7 meters from the back of the drink station. My camera will be 90 cm above the ground. I will install the basin so that the edges are about 50 cm from the ground. This will allow me to respect what has been said above. If this should not be the case, the solution will be to bring the hide closer to the trough or to bring it lower to the ground. Don't hesitate to do several tests before you install your construction permanently, before decorating it and filling it in order to determine the parameters that will suit you best.

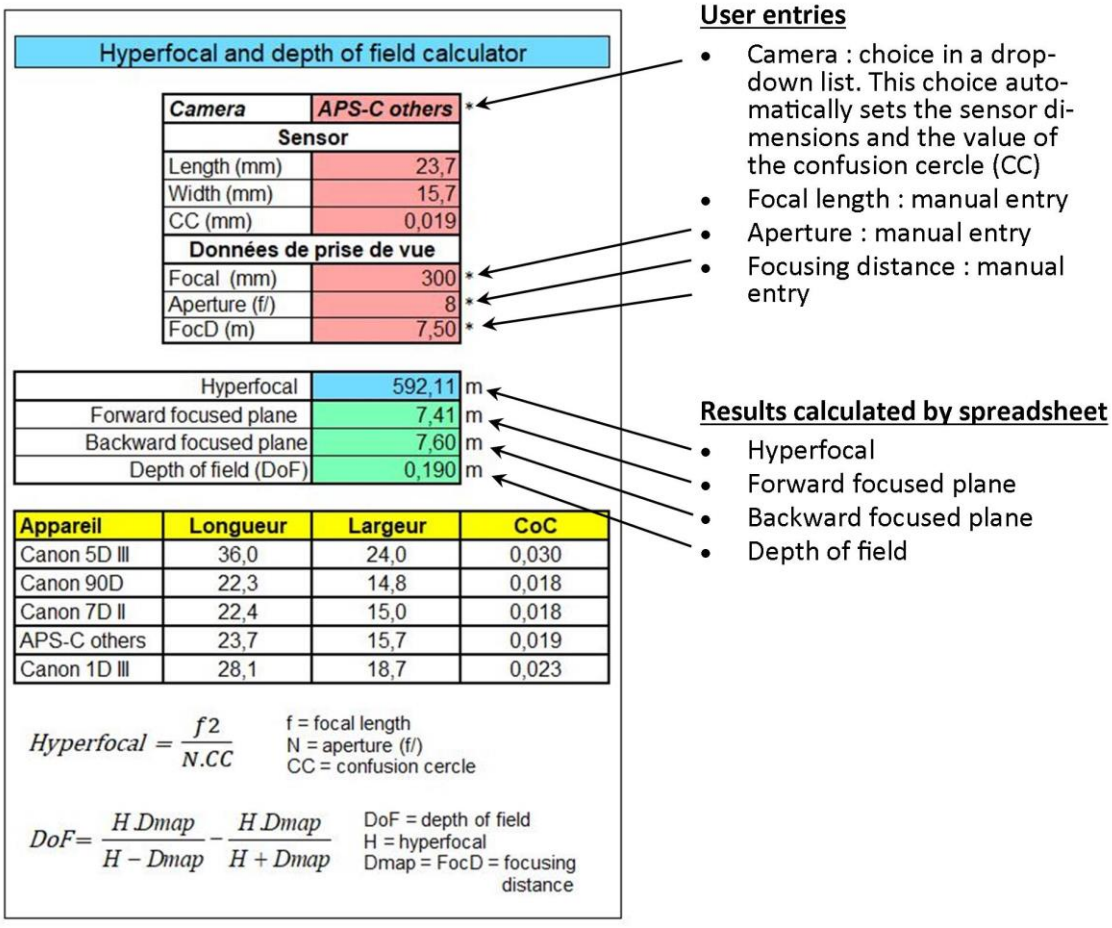
The last thing to consider is the covered field of view that will be a function of the focal length, focus distance and the type of sensor your device is equipped with, full format (FF) or APS-C. Here is a small summary of the fields covered with the FF and APS-C Canon sensors expressed in meters.

Field of view along the long side of the sensor. Function of the focal length and the focusing distance

	FULL FRAME			APS-C CANON		
	6 m	7 m	8 m	6 m	7 m	8 m
200 mm	1,80	1,26	1,44	0,67	0,78	0,89
300 mm	0,72	0,84	0,96	0,45	0,52	0,59
400 mm	0,54	0,63	0,72	0,33	0,39	0,45
500 mm	0,43	0,50	0,58	0,27	0,31	0,36

You can download an Excel file from my website's blog that contains the following sheets:

Sheet1. A hyperfocal and depth-of-field calculator
Sheet2. The depth of field in the form of focal length and diaphragm tables for three different sensors (FF, APS-C Canon and APSC-Nikon)
Sheet3. A covered field of view calculator
Sheet4. The field covered as tables based on focal length and focus distance for three different sensors (FF, APS-C Canon and APSC-Nikon)



Field of view calculator

Camera	Canon 7D II	
Sensor		
Length (mm)	22,4	
Width (mm)	15,0	
Diagonal	27,0	
Données de prise de vue		
Focal (mm)	400	*
FocD (m)	6,00	*

Champ	ω en degrés	D en mètre
Length	3,2	0,34
Width	2,1	0,22
Diagonal	3,9	0,40

Appareil	Longueur	Largeur	Diagonale
Canon 5D III	36,0	24,0	43,3
Canon 90D	22,3	14,8	26,8
Canon 7D II	22,4	15,0	27,0
APS-C others	23,7	15,7	28,4
Canon 1D III	28,1	18,7	33,8

$$\omega = 2x \tan^{-1}\frac{L}{2f}$$

f = focal
ω = angle of view
L = dimension of the sensor

$$D = 2x\,(Dmap \times \tan\frac{\omega}{2})$$

D = field of the image
ω = angle of view
Dmap = FocD = Focusing distance

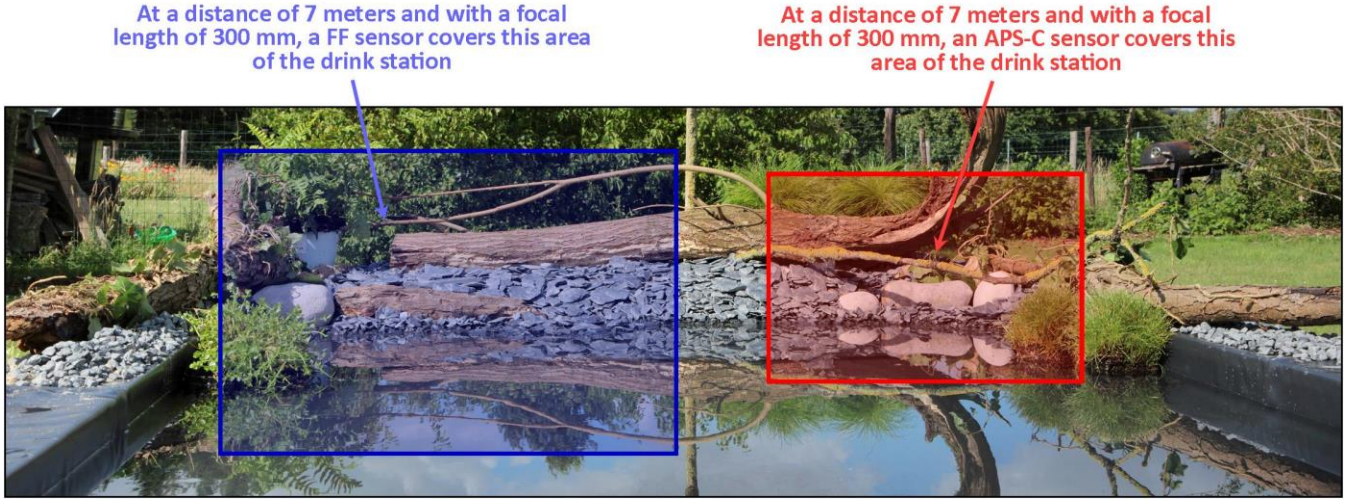
User entries

- Camera : choice in a drop-down list. This choice automatically sets the sensor dimensions and the value of the confusion cercle (CC)
- Focal length : manual entry
- Focusing distance : manual entry

Results calculated by spreadsheet

- Covered field along the bigest side of the sensor
- Covered field along the smallest side of the sensor
- Covered field along the diagonal of the sensor

Here is the result



Finally, I have two other PDFs containing the list of parts and supplies necessary as well as the detailed plan of this realization.