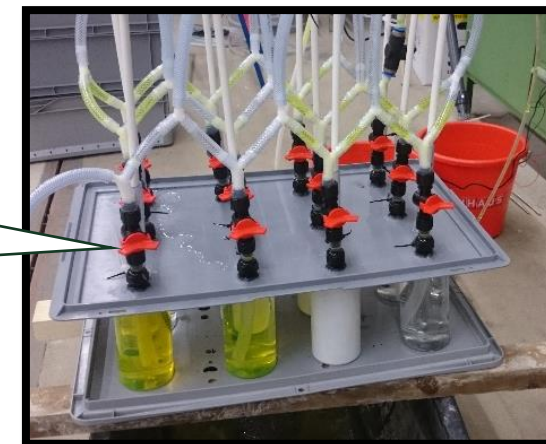
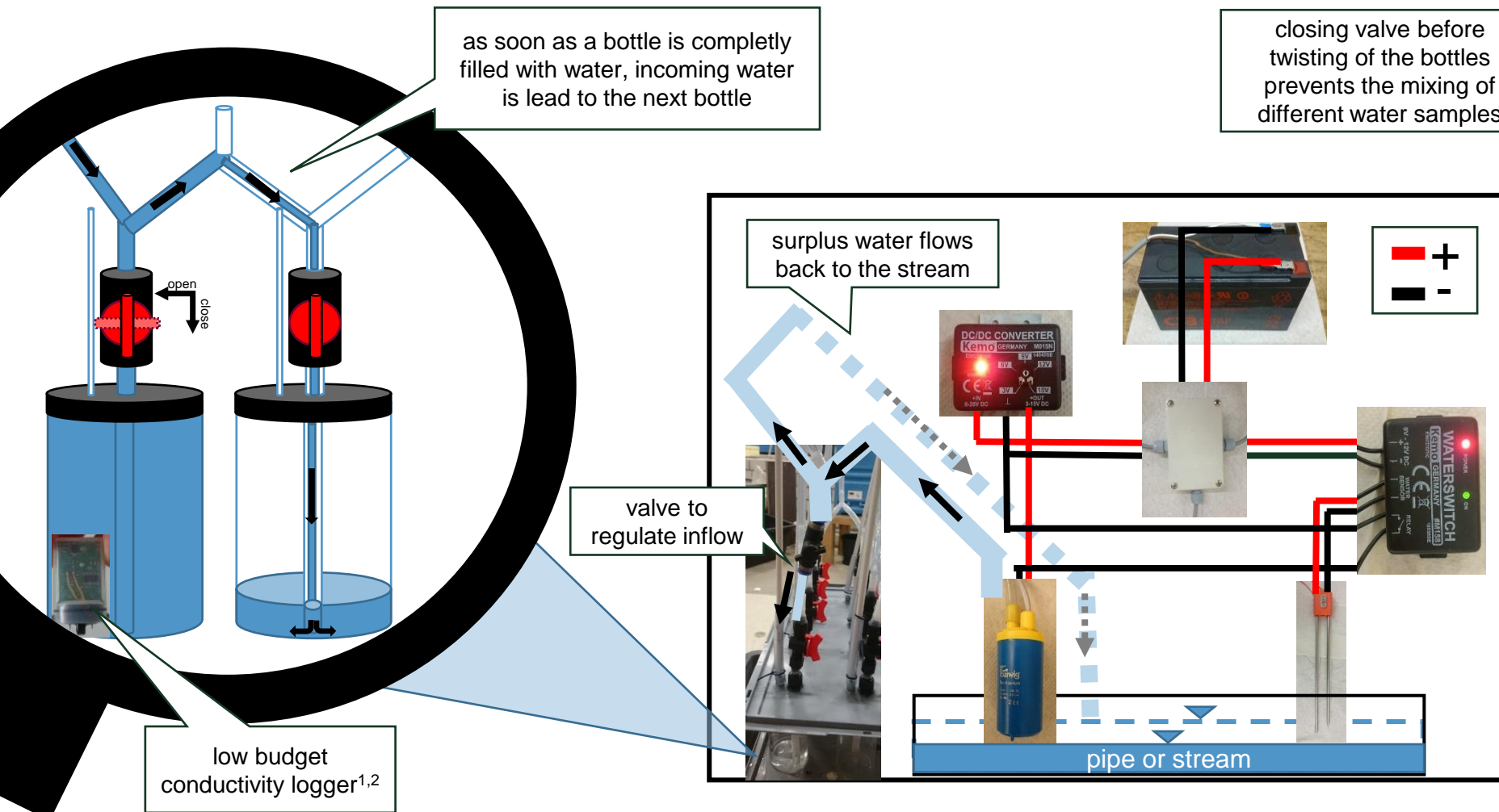


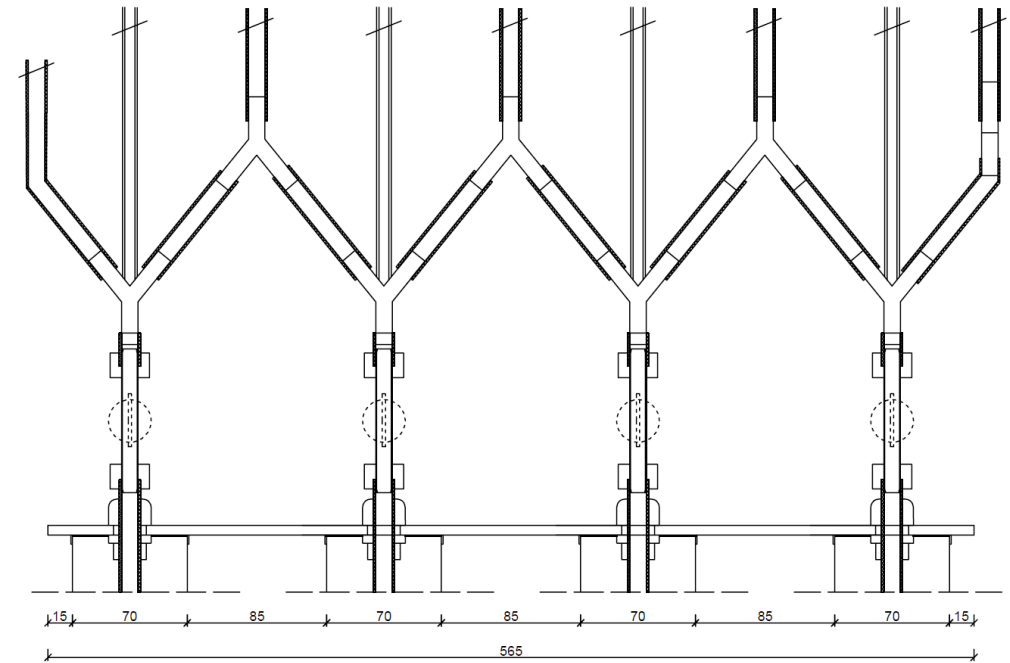
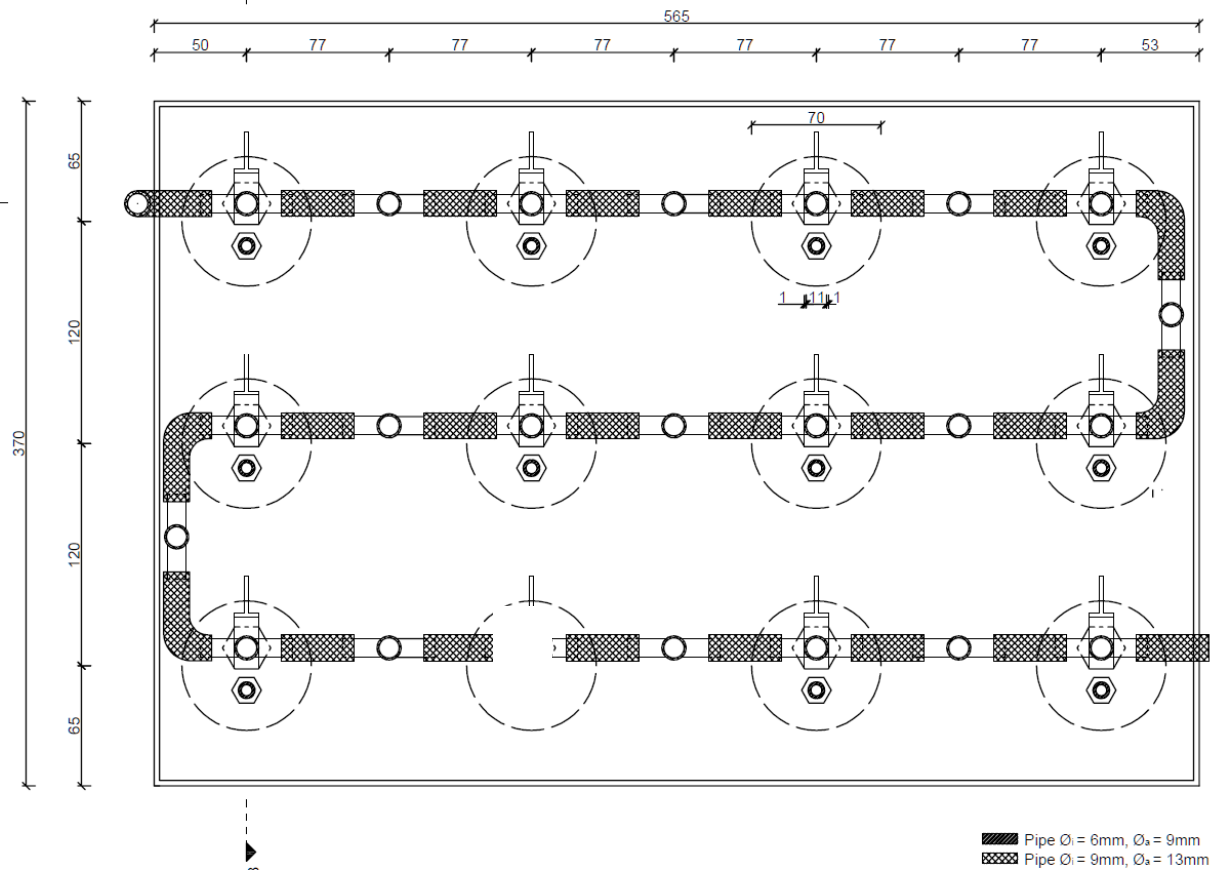
Low Budget Sewage Overflow Monitoring

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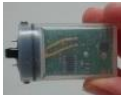



¹Chapin, T.P.; Todd, A.S.; Zeigler, M.P. (2014) Robust, low-cost data loggers for stream temperature, flow intermittency, and relative conductivity monitoring, Water Resour.Res., 50, doi:10.1002/2013WR015158.
²Lieder, E.; Weiler, M.; Blume, T. (2017) Measuring electric conductivity with modified light sensors, Geophysical Research Abstracts Vol. 19, EGU2017-13603

Construction of the Sampler



Changes From Previous Sampler^{3,4}

Change	Effect	Pictures
cable clands	reducing leakages	 
valves	less contamination of samples with remaining water in the tubes	 
input valve	- regulates the discharge rate - much slower inflow compared to rainfall sampler	 <p style="text-align: center;">~15 Min/Bottle</p>
STIC logger	Detecting time and change of conductivity	
pumping system	sampler can be installed everywhere	
bigger sample bottles	bigger samples (0.5 Liter), longer sampling time	

³Fischer, B. M. C.; Aemisegger, F.; Graf, P.; Sodemann, H.; Seibert, J. (2019), Assessing the Sampling Quality of a Low-Tech Low-Budget Volume-Based Rainfall Sampler for Stable Isotope Analysis Front. Earth Sci. 7:244. doi: 10.3389/feart.2019.00244

⁴Kennedy, V. C., Zellweger, G. W., and Avanzino, R. J. (1979). Variation of rain chemistry during storms at two sites in northern California. Water Resour. Res.15, 687–702. doi: 10.1029/WR015i003p00687

Material and Costs - Sampler



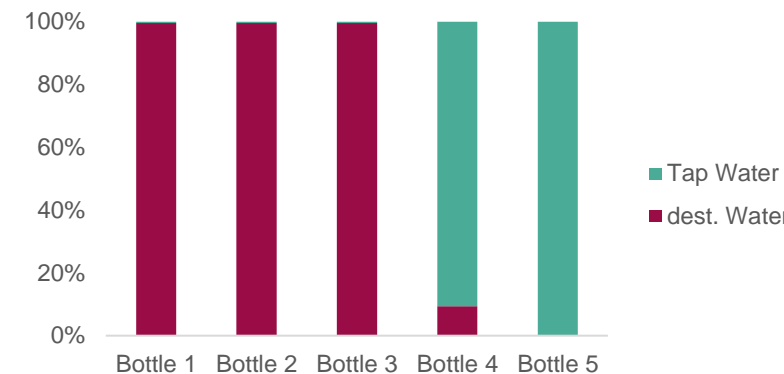
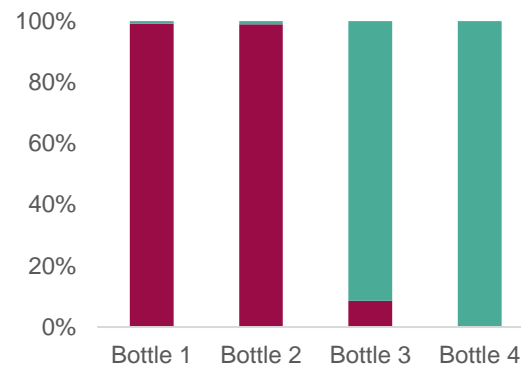
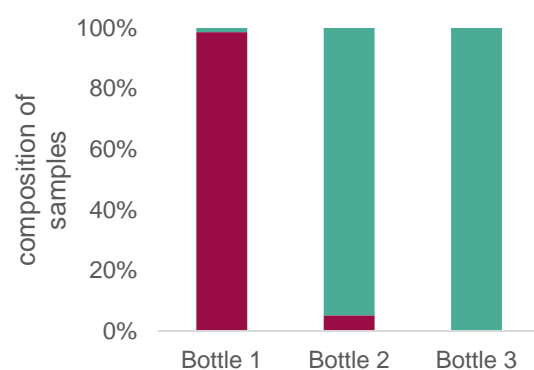
	amount	price per item	total
SAMPLER			
Box	1	8.25 €	8.25 €
Lid	1	4.50 €	4.50 €
Silicon Tube 10/14 mm [m]	2	8.00 €	15.99 €
PVC Tube 4/6 mm [m]	6	3.49 €	20.94 €
Y - Tube Connectors	24	0.96 €	23.04 €
Fabric hose 3/8 inch	5	1.64 €	8.20 €
Cable Gland M20	12	1.26 €	15.12 €
Cable Gland PG 7	12	0.96 €	11.52 €
Sample bottles	12	1.64 €	19.68 €
			127.24 €
<i>optional</i>			
Valves	12	1.63 €	19.59 €
STIC- Conductivity Logger	1	70.00 €	70.00 €
			89.59 €

PUMPING SYSTEM

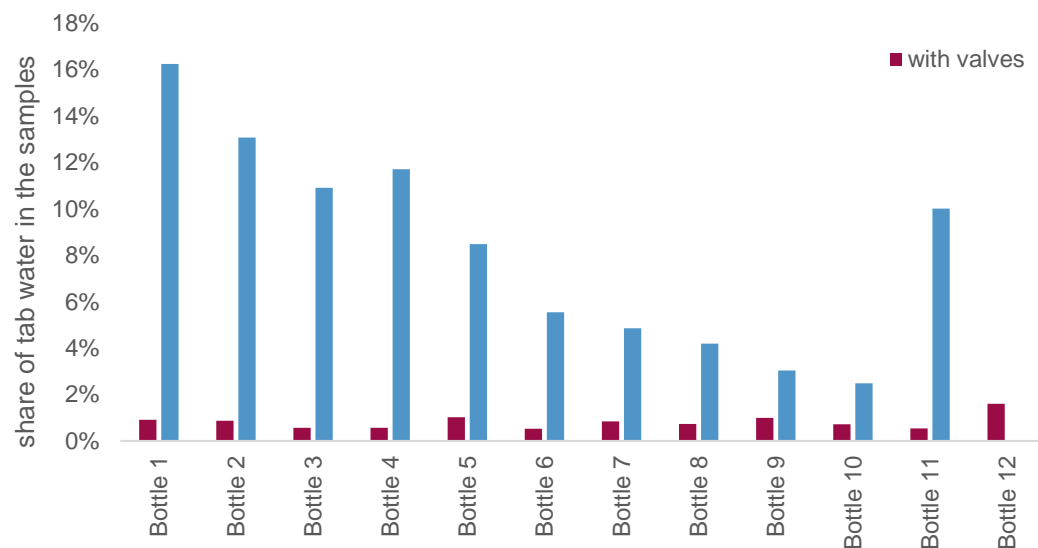
Waterswitch	1	9.24 €	9.24 €
Converter	1	10.08 €	10.08 €
Battery	1	22.68 €	22.68 €
Submersible pump	1	12.60 €	12.60 €
Conductivity detector	1	~ 5.00 €	~ 5.00 €
Y-Tube Connector	1	0.96 €	0.96 €
Valve	1	9.00 €	9.00 €
			69.56 €
Total costs:			286.39 €

Laboratory Tests

Test 1



Test 2



Experimental Setup: testing memory effect and mixing of different water samples

1. filling different number of bottles with distilled water, then change to tap water to simulate a change in the water composition
2. compare mixing of water samples of a sampler with and without valves

Results:

- mixing of different water samples can be reduced by the valves
< 1 % of sample volume
- contamination due to memory effect (remaining water of previous experiments in the tubes)