The Urban Lab of Europe!

JOURNAL

PROJECT

GUARDIAN - Green Urban Actions for Resilient fire Defence of the Interface Area

Riba-roja de Túria, Spain

TOPIC

Climate adaptation

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GUARDIAN works are in the spotlight!

See on UIA website




GUARDIAN works are progressing at full speed this spring, as the initial commissioning of the entire hydraulic infrastructure is expected in 3 months' time. At this point no one wants to miss the opportunity to observe in the detail the construction process of all the bits and pieces of GUARDIAN! For this reason, two field tours have been organized during these last weeks: the first one took place on March 31st and gathered technical staff of all partners involved as well as the director of the Túria National Park, the main stake-holder of GUARDIAN. The second one, on April 9th, was mainly devoted to show the progress to local authorities which generated quite a bit of excitement among local media! Both tours took place fully respecting COVID-19 safety measures and met everyone's expectations. As you readers did not have the opportunity to join us, please, follow this virtual tour with me!

March 31st field tour: Technical visit to GUARDIAN works

On March 31st members of all GUARDIAN partners met promptly at 9:30h at the Waste Water Treatment Plant (WWTP) "Camp de Túria II" at Riba-Roja, for a field tour to the different sites in which GUARDIAN works are being carried out. After a whole year of virtual consortium assemblies, the meeting represented an extra-bonus of enthusiasm for us all, because, apart from having real evidence of the project progress we had the opportunity to greet us live (following all safety rules, of course!)

The first piece of infrastructure we saw already running was the Water Reclamation Plant (WRP- (check the first Zoom in for motivation and engineering details). Most of the water used in GUARDIAN will come from this WRP, considering a sustainable management model of the water cycle in the municipalities of Riba-Roja del Túria and Paterna applying circular economy concepts (web article 2). The WRP has been integrated in a High Cube container and installed in a corner of the WWTP facility (Figure1). The treatment capacity of the water regeneration station (ERA) is 10 m^3/h and its planned continuous operation is an estimated annual regenerated water production of 80,000 m^3/year. Nowadays, engineers from HIDRAQUA and CETAQUA are running the WRP under trial mode. Different operation conditions are being tested with the aim of optimizing the water reclamation process in terms of removals, energy consumption, operation cost and environmental impact.

Figure 1.a) The WRP equipment. Look how many compounds integrating a high-tech water treatment process can be put into such small container; b) The WWTP "Camp the Túria II": waste water engineering environment can be even beautiful! c) the High Cube Container (with prof. F. Hernández (Universitat de València) and myself); d) WWTP sketch in tiles (the green circle is where the WRP is located), difficult to updated it, though!

From the WWTP we moved to the focal point of the water transportation network, the Alpha water tank. As mentioned in past Journal 2, the recycled water coming out of the WRP will be conveyed to the main tank (Alpha) and then pumped to secondary tanks located close to the WUI areas of "Cañada Norte", "Cañada Sur" and "Els Pous". Alpha will be also connected to "La Vallesa" pond, so that pumping recycled water will also contribute to increase ecosystem's quality in the wetland.

Alpha has a capacity of 500 m^3 and, as you can figure out from Figure 2, it is partially buried to minimize visual impact. The building work at Alpha site is well on its way, actually it is practically completed! The structure of both the tank and the adjacent control building for energy supply are now finished and ready to be painted. After that, pumping equipment will be placed inside the tank and a diesel-fueled generator (responsible to supply energy for pumps in case of fire) with all control elements will be accommodated inside the secondary structure (I hope I can show you some more images of this process soon!).

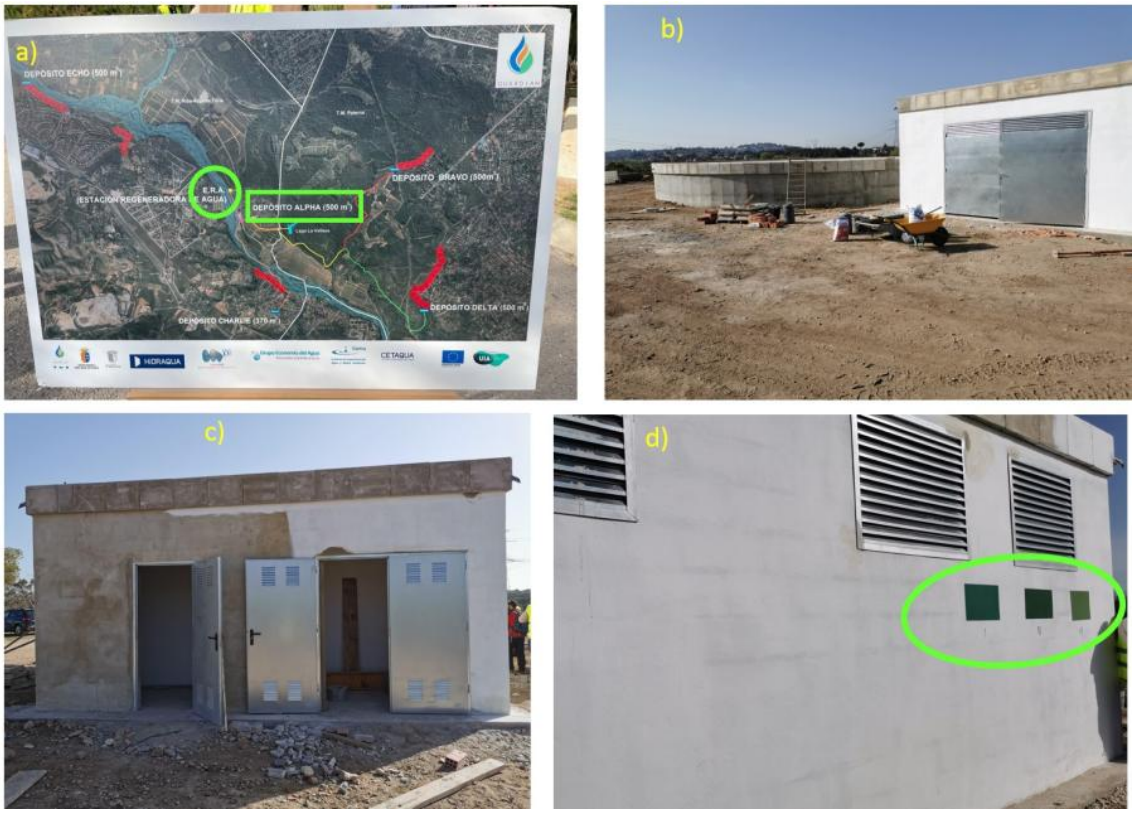

Figure 2. a) The GUARDIAN map: we moved from the WRP (ERA in Spanish) to the Alpha tank (Depósito Alpha in Spanish) only a short walk apart; b) the structures of the water tank and the secondary building are already finished; c) rear façade of the control building; d) Paint testing: for a better integration with their surroundings, the

buildings will be painted in dark green. Although there is not much difference, I voted paint #1!

After visiting Alpha water tank works, we walked to “la Vallesa” pond, a beautiful natural area in the heart of the natural park (Figure 3). As an Integrated Fire Management (IFM) project (check Journal 1 to recall the concept), GUARDIAN also includes actions to increase environmental quality (and hence fire resilience!) in certain vulnerable areas of Túria NP. One of these areas is the wetland, for sure. The actions for the adaptation of this area consist basically on *i)* removing the excess of sludge (there is a 1-2 m deep layer that has to be taken out with dedicated machinery), *ii)* delivering regenerated water to increase the quality of the pond and *iii)* repairing and conditioning the entire environment to adapt it as a recreational area for visitors.

Figure 3. a) “La Vallesa” pond; b) Technician from Paterna city council observing the green area and the bridge that gives access to the pond; c) pipeline which will deliver water from Alpha to the pond; d) sludge layer (that has to be removed from the bottom of the pond) and old trench for the water inlet.

Our next stop was the experimental plot in which our colleagues from the UPV are quantifying the ecohydrological and energetic processes between the atmosphere, the trees and the soil in “la Vallesa” forests. We talked about this amazing piece of research in past web article 3, so I will not be giving further details on that in here. Just let me give you some more snapshots (Figure 4) to recall how remarkable this scientific task is. Once finished, it will clearly represent a significant advance with respect to the state of the art!

Figure 4. The experimental plot at "la Vallesa" forest: a) UPV scientists have taken their lab into the field: b) Prof. del Campo briefing visitors about the tree water activity monitoring; c) soil moisture sensors; d) visitors at "la Vallesa" experimental work.

Next, we visited one of the WUI perimeter sections in which GUARDIAN is working to implement their green firebreaks, the "Cañada Norte" section, belonging to Paterna municipality (Figure 5). As you may already have noticed, the main pivot on which GUARDIAN strategy is deployed is the construction of green firebreaks, i.e. 50-60 m-wide strips located around the built perimeter containing fire-resistant vegetation which will be irrigated automatically with water cannons. This infrastructure is defined in GUARDIAN as a sustainable ecohydrological fire prevention solution in which forestry management is combined with artificial watering that in the case of "Cañada Norte" area will come from the Bravo water reservoir. The actions carried out in GUARDIAN for the implementation of green firewalls comprise classical forestry management strategies (i.e. thinning, clearing and pruning) combined with the introduction of species with high resilience to fire (e.g. species with high capacity to store moisture, with low fuel load, low levels of oils, etc.). In addition, there is a huge amount of landscape, hydraulic and civil engineering for the design, dimensioning and implementation of the water sprinkler network.

Figure 5. Building works at the Bravo water tank: a) external view; b) internal view of the tank; c) WUI perimeter at "Cañada Norte" settlement in which green fire breaks are being constructed; d) Pipelines ready to be buried to convey water to 6 cannons which will work at a flow rate up to 800 L/min.

And we finished our tour to visit a field site (still in Paterna municipality) in which forestry management operations are being carried out to reduce wildfire risk, as part of this global IFM strategy (Figure 6). By thinning young *Pinus halepensis* pines regenerated after the 1994 fire that affected the area, Medi XXI technicians estimate that the rate of spread and intensity of an eventual fire will be low enough to be easily suppressed by fire-fighters. To make such an effect, though, tree densities, which are now around 10,000 trees/ha, have to be reduced down to 1000 trees/ha!

Figure 6. By reducing tree density (thinning area in Paterna (a)) the landscape should evolve to become more fire resilient (as in the already well protected WUI perimeter in Paterna municipality, shown in b)).

April 9th field tour: Visit and demonstration with local authorities

The consortium met again 10 days after the technical visit to welcome authorities to GUARDIAN field sites. In this case, we programmed less stops (as authorities are always very busy people!) but enough to show the GUARDIAN project progress and to perform some demonstration activities. We had the pleasure to have the regional Minister for

innovation, universities, science and digital society of the autonomous government of Valencia region (Ms Carolina Pascual) and the mayors of Riba-Roja (Mr. Robert Raga) and Paterna (Mr. Juan Antonio Sagredo).

Authorities had the opportunity to observe close up the Water Reclamation Plant, the building works at Alpha tank site and the construction of green fire breaks at “Cañada Norte” WUI area. It was at the end of the visit where GUARDIAN partners could show, as demonstration, how agronomic sensors work (key pieces of the overall technology deployed in GUARDIAN!) and how (portable!) cannons can deliver water to defend WUI against fires (Figure 7).

Figure 7. a) Meeting point at the Waste Water Treatment plant “Camp de Túria II” to discuss the benefits of the regenerated water coming out of the WRP; b) Alpha tank site; c) Irrigation demonstration with portable cannons; d) final chat with authorities.

> Innovation is one of the fundamental engines to improve the quality of life of people (Carolina Pascual)
>
> Europe has opted for this project to prevent fires, which we have already exhibited in cities such as Paris or Lisbon (Robert Raga)
>
> The GUARDIAN project places us at the forefront of fire prevention through fully sustainable strategies while demonstrating the effectiveness of public-private collaboration (Juan Antonio Sagredo)

According to their statement to the media, authorities were happy to see how well things are running in GUARDIAN and, of course, so we are!

Stay tuned at future GUARDIAN posts and journals, as more pieces of the project will become real soon!
