Executed project report

Creation of a lamination pond and improvement of the stream of Sant Llorenç in the new urbanized zone from Ca n'Alemany in Viladecans (Barcelona)

Stakeholder of the project: Naturalea **Execution**: Naturalea

Customer and C.M: UTE Urbanization Sector Ca n'Alemany **Start/End:** July–December. 2016

INTRODUCTION

The actuation is framed in the development Project of the Partial Plan of the industrial estate PPU-01 in the sector of Ca n'Alemany in Viladecans (Barcelona). The situation of this new urbanized area created a necessity to face the problems provoked from the waterproofing of the area. The creation of this new industrial and service area increases flooding risk on Viladecans town. With this lamination pond, we solve the problem. This big area is now a wetland wildlife garden.

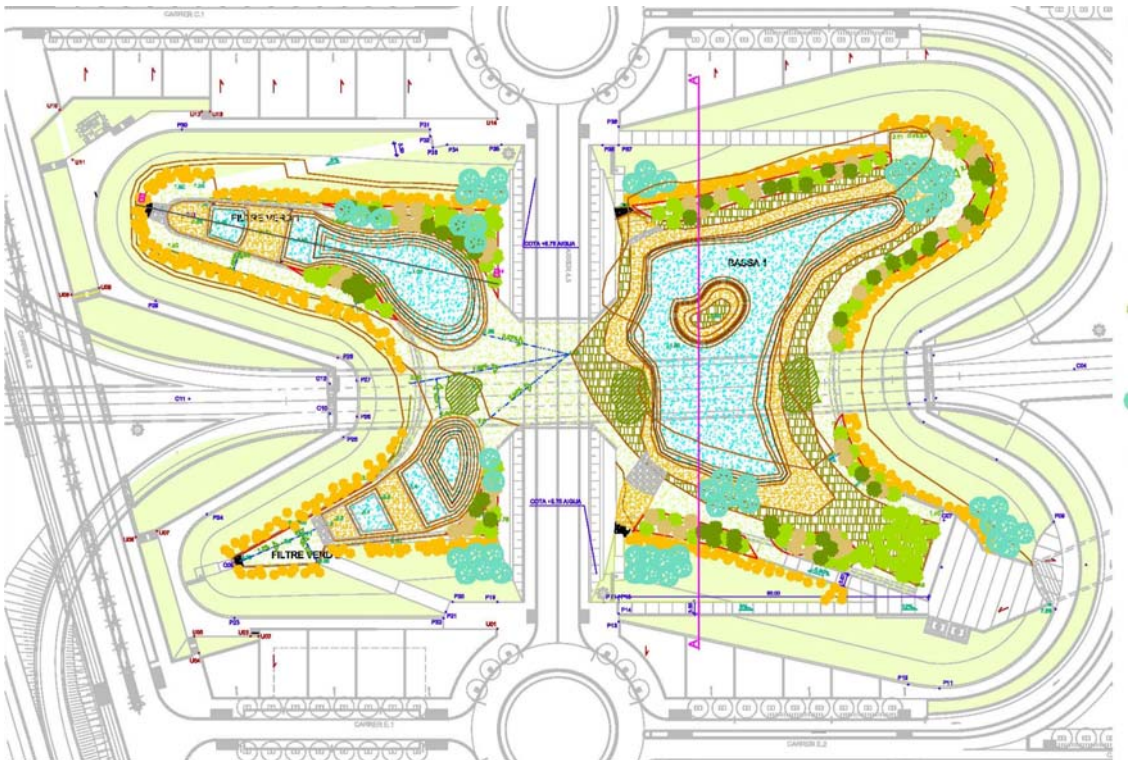
R-EXE-1/04

1. Introduction

Lamination ponds are a necessary strategy for the urbanization and the waterproofing of the new areas of the territory to avoid flood problems. The development of the Partial Plan of the industrial estate of the actuation PPU-01 in the sector of Ca n'Alemany in Viladecans (Barcelona) introduced the creation of a lamination pond.

The executive project redacted by Naturalea, defines the interior of the lamination pond recreating a wetland zone and a previous treatment of run-off. The objective is to create a naturalized habitat in the base of the lamination pond combined with a more urbanized landscape.

The lamination pond has a capacity of 80,000m^3 and has a floor surface of 15,269m^2 where 4,104.8m^2 are free water and the rest is vegetated reproducing the different communities of the Llobregat delta. The fluctuation of the water level provokes alternation between situations of aridity and flooding. Initially the area was a big grass area. With this action, we prevent that people use it for leisure so they can be in danger in storm situation and we reduce maintenance to close to 0€



Picture of the free water distribution and vegetation of the lamination pond

The lamination pond drains into the stream of Sant Llorenç, fluvial course with not much slope. To enhance the diversity of the stream, deflectors with shrubs and macrophytes have been built.

2. Key elements of the project and the execution

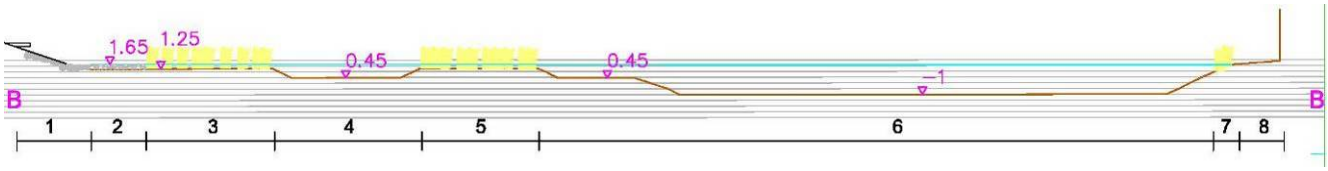
A. Space design

For the definition of the space, it has been taken into account, on the one hand, the proximity to a highly frequented area and therefore, with very specific needs closer to the management of urban green spaces, and on the other one, the will to naturalize the floor of the pond that reproduces the communities that were originally in this area located within the delta del Llobregat.

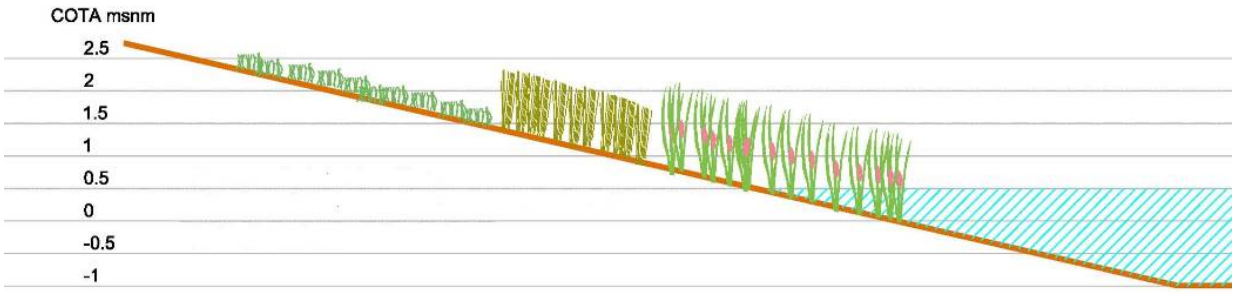
www.deltallobregat.cat

B. Enhance of the quality of input water using green filters.

As the water that enters in the lamination pond comes from a large part of the urbanized area, it can drag a high content of solid particles, oils and fuels with the first millimetres of rain. All the water entry points go to green filters that improve the quality of the water before being poured into the large pools.



C. Distribution of the plantations in function of the proximity of the groundwater and the utilization of local vegetation.



From -0.5 to 1 msnm: flooded area. Macrophytes (*Phragmites australis, Thypha sp., Iris pseudacorus, Lytrum salicaria, Carex pendula, Carex vulpina, Cladium mariscus, Spartina versicolor, Scirpus holoschoenus, Schoenus nigricans, Juncus inflexus, Scirpus lacustris, Juncus acutus, Juncus maritimus, Juncus effusus, Juncus conglomeratus*).

From 1 to 1.5 msnm: reed beds area (*Scirpus holoschoenus, Schoenus nigricans, Scirpus holoschoenus subsp. Australis, Juncus inflexus, Scirpus lacustris, Juncus acutus, Juncus maritimus, Juncus effusus, Juncus conglomeratus*).

From 1.5 to 2.5msnm: Shrubs (*Salix eleagnus, Salix purpurea, Tamarix gallica, Vitex agnus-castus*). Trees (*Fraxinus angustifolia, Populus alba*).

More than 2.5msnm (landscaping with irrigation): Shrubs (*Viburnum tinus, Crataegus monogyna, Cornus sanguinea*). Trees (*Fraxinus angustifolia, Populus alba*).

D. Plantation of all the surface

Abandoning areas without planting or sowing may favour the growth of opportunistic species not expected that may behave as invasive species. Although it is not always possible to face the seed bank of the land provided in the works, occupying the entire surface with plantations or sowings, helps to minimize the growth of unwanted species.

E. Plantation in different ways, prioritising the previous vegetated plants

As it is a new wetland area, the entire plant is reintroduced. It is interesting to accelerate the colonization process of the space to avoid erosive processes or the growth of opportunistic species. The use of pre-vegetated material in the nursery clearly helps to achieve this goal. This vegetated material consists of communities of helophytes that are incorporated in the fully developed area, acting as a mature wetland unit that hosts many of the invertebrate species associated with this environment; and that, therefore, favours an ecosystemic balance in a space with a high potential for life.

3. Lamination pond

3.1 Big pond

The lamination pond was designed to have permanent water from the groundwater and therefore, had vegetation that can be established permanently. Depending on the proximity to the ordinary level of water, different communities have been planted (macrophytes, reed beds, wet meadow species, shrubs and trees). Moreover, to facilitate the viability of the plant in an area with sudden changes in humidity / flood a combination of small plant or units structured in coconut fiber and pre-vegetated in nursery has been used. They have a high capacity to adapt to the new situation and changes in the environment.

Pictures of the excavation process and vegetation of the pond

Pictures of the vegetation implementatation in the borders of the big pond

General pictures of the big pond

3.2 Green filters

All water inputs flows, including the previous decanting system, go through a system of green filters. These consist of a first horizontal subsurface flow filter (FSSH) that is waterproofed, the second is a lagoon that is followed by another FSSH, to finally connect with the naturalized pond.

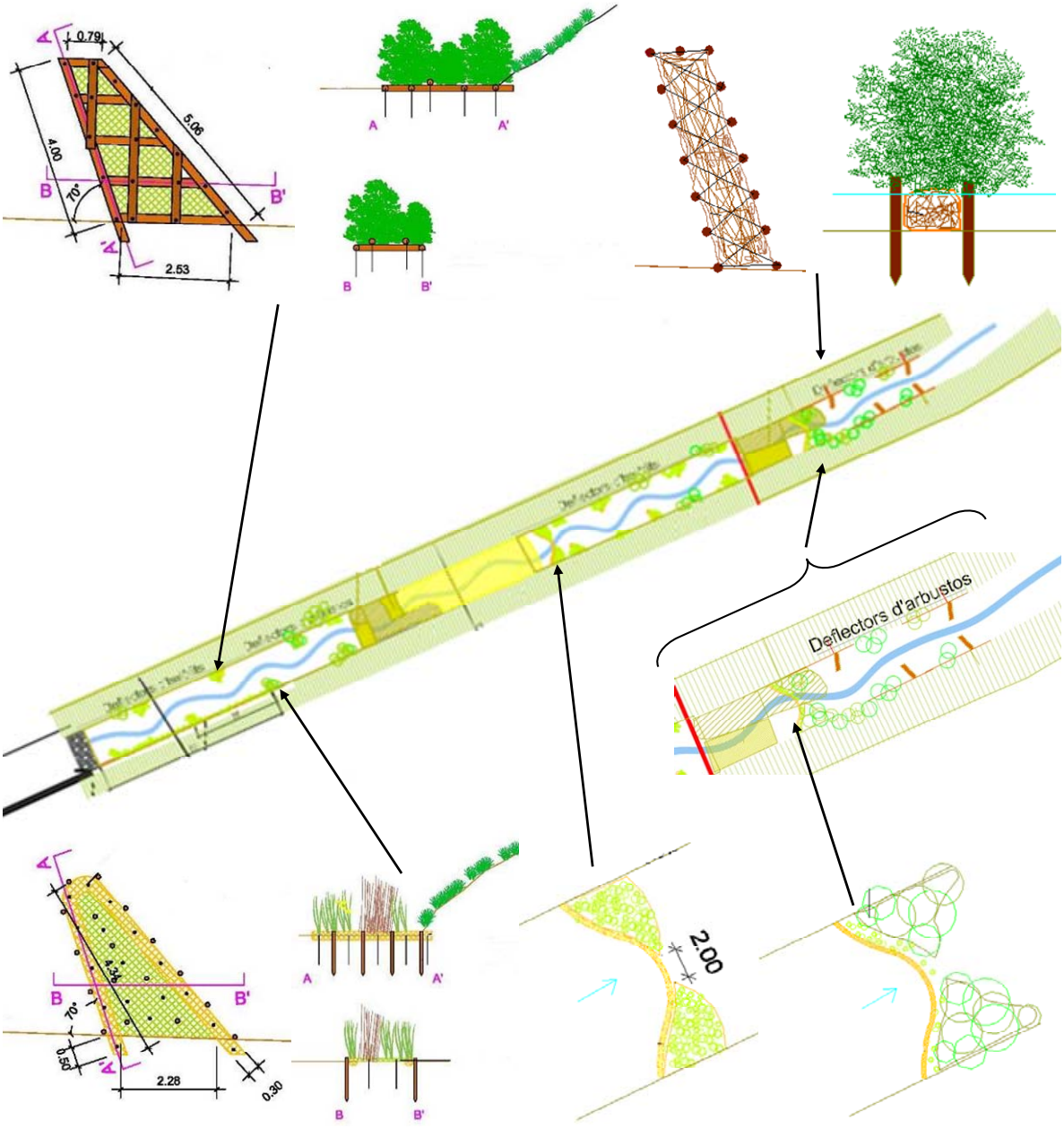
Pictures of the construction process of the green filters

General pictre of the final lagoon of a green filter

4. Stream of Sant Llorenç

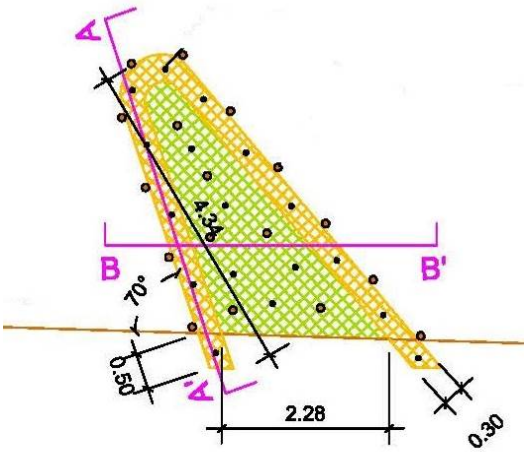
The stream of Sant Llorenç has an overflow that in moments of flood diverts water towards the lamination pond to avoid flooding downstream. At the same time, once the avenues phenomenon has passed, it is used as a drain to gradually empty the lamination pond.

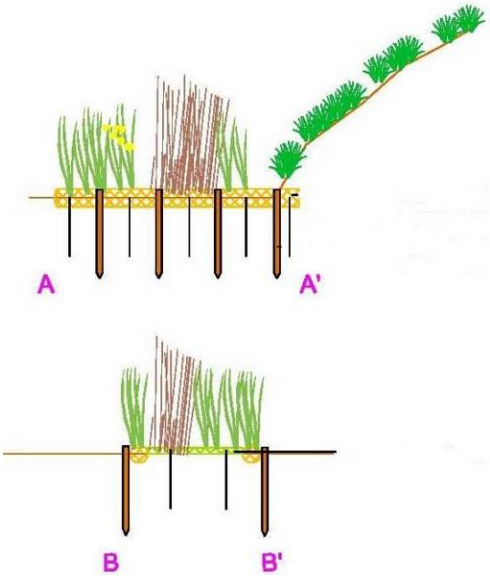
To diversify the environments within the riverbed, deflectors have been made where there are shrubs or macrophytes depending on the situation in the riverbeds.



Scheme of the techniques used

Deflectors with live branches of shrubby wilow





Deflectors of macrophytes with rolls and grassland structured in fiber

General image of the stream

KEY CONCEPTS: lamination ponds, green filters, habitats diversification, wetland areas, increase of biodiversity

APPLIED TECHNIQUES: monospecific grassland, plant pallet, plurispecific grassland, plant carpet, plant structured in fiber, structured fiber rolls, deflectors of shrubs deflectors of macrophytes.