

# El Carmen, Tlaxcala, Mexico



constructed wetlands (foreground) with trickling filters (background)



cattails in the wetland cell



El Carmen is a small city of 12,000 people in the State of Tlaxcala, Mexico, approximately one hour from Puebla and an hour and a half from Mexico City. El Carmen is typical of many municipalities in Mexico in that the municipality cannot charge fees to operate and maintain wastewater treatment facilities. The treatment facility therefore needed to be as inexpensive as possible to operate and maintain.

Since the discharge would go into a lake that provided drinking water to surrounding communities, water quality should meet advanced wastewater treatment standards. Complicating the design was the fact that many of the homes combined living quarters with animal enclosures so that BOD levels are 5 times US levels.

The solution incorporates primary treatment with solids delivered to a reed bed (passive dewatering and on-site composting), and liquid pumped to a trickling filter. This reduced BOD to 160 mg/L. Solids that slough off the trickling filter and remaining soluble BOD then flow by gravity to a subsurface flow constructed wetlands. Final polishing and disinfection is accomplished by a sand filter. Except for the pumps, which are readily available from local sources, there are no moving parts.

Over 90% of labor and materials are from local sources. The pumps are from a US Manufacturer, assembled in Mexico.

Although the basic technology is in world-wide use, it is apparent from these pictures that the local people have made this technology uniquely theirs, from the colors of the trickling filter to the flowers planted by the local residents. Besides producing an effluent with BOD and TSS less than 10 mg/L, the treatment facility provides nesting sites for a population of several hundred Red Winged Blackbirds, as well as habitat for fish, wood ducks and wading birds.