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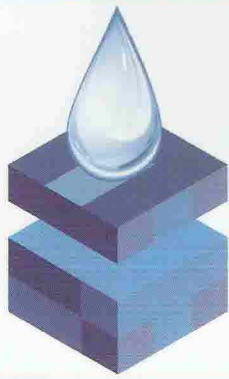


ΥΠΟΥΡΓΕΙΟ
ΠΕΡΙΒΑΛΛΟΝΤΟΣ
ΕΝΕΡΓΕΙΑΣ &
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IWA Regional Conference on Wastewater Purification & Reuse



WWPR WASTEWATER PURIFICATION AND REUSE 2012

Book of Abstracts

Organized by



MUNICIPAL ENTERPRISE FOR
WATER AND WASTEWATER
OF HERAKLION



TECHNOLOGICAL EDUCATIONAL
INSTITUTE OF CRETE



DECENTRALISED
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TECHNICAL UNIVERSITY
OF CRETE



ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ
REGION OF CRETE



Book of Abstracts

IWA Regional Conference on Wastewater Purification & Reuse 2012

**28th, 29th & 30th of March
Heraklion, Crete, Greece**

EDITED BY

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of the IWA Regional Conference on Wastewater Purification & Reuse 2012

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ISBN 978-960-99889-2-6

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**IWA REGIONAL
CONFERENCE ON WASTEWATER
PURIFICATION & REUSE 2012**

ORAL PRESENTATIONS

ANALYSIS OF RECLAIMED WATER APPLICATION FOR IRRIGATION USING MULTI-CRITERIA ANALYSIS

António ALBUQUERQUE ¹⁾, Helena MARECOS DO MONTE ²⁾, Flora SILVA ¹⁾, Victor CAVALEIRO ¹⁾

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EXECUTIVE SUMMARY

Approximately 60% of the population of the Cova da Beira region (Portugal) lives in rural communities with less than 2,000 inhabitants and the wastewater treatment systems in the region are mainly septic tanks, constructed wetlands and trickling filters. The daily reclaimed water discharged into streams could be mainly reused for landscape irrigation of public parks and lawns and golf courses, which often means offsetting potable water for nonpotable purposes. However, those applications may require a polishing treatment to remove mainly pathogens, and trace elements.

A one-year monitoring campaign was carried out in a biological aerated filter (BAF) that treats the sewage of 4,000 inhabitants. The research included the measurement of the effluent flow-rate and its characteristics in terms of pH, temperature, conductivity, BOD₅, COD, TSS, TN, NH₄-N, NO₂-N, NO₃-N, TP, Na, Mg, Ca, K, Cl, B, As, Cd, Cr, Co, Hg, Ni, Pb, Zn, total coliforms (TC), faecal coliforms (FC), E. Coli and faecal streptococcus (FS).

Results show that the effluent concentrations of BOD₅, COD, TN, TP, K, Ca and phytotoxic elements (Na and Cl) are compatible with the international guidelines for irrigation reuse (crop cultures and golf courses). Values of conductivity are not a risk to soil salinity, but TC, FC, E. Coli and FS values are not compatible with the reuse guidelines and, therefore, a final disinfection must be implemented to decrease the pathogenic content. The low nitrate concentrations (<5 mg/L) are suitable for irrigation and constitute a very low risk for groundwater contamination.

GIS-based multi-criteria analysis was performed combining land use maps, reclaimed water characteristics and economic, environmental and technical criteria. The results showed that approximately 180,000 m³ of treated wastewater annually discharged in the local stream could be reused for irrigation of all crops classified as class A or 31% of the cultures classified as class C (according to the Portuguese Standard 4434), located at a distance of about 1.8 km from the BAF.

The use of reclaimed wastewater in rural areas of the Cova da Beira region brings other advantages such as the reduction of the residual pollution load discharged in water streams and the reduction of water abstraction volumes for irrigation, which are important environmental and economics benefits, especially in periods of water shortage.

SITE SELECTION FOR RECLAIMED WATER INFILTRATION USING GIS TOOLS

António ALBUQUERQUE¹⁾, Helena MARECOS DO MONTE²⁾, Flora SILVA¹⁾, Victor CAVALEIRO¹⁾

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EXECUTIVE SUMMARY

In the region of the Beira Interior some sources of water do not present characteristics suitable for some uses due to the discharge of not well treated effluents or because are over-exploited (namely aquifers). However, the water demand will grow in this region to meet socio-economic activities under development (the Cova da Beira irrigation plan, irrigation of golf courses and green areas, spas and distribution for human and industrial consumption), which will lead to the search of alternative sources of water. In this context, the treated wastewater is being seen as a source of water to be used and not a waste to be eliminated.

After a monitoring campaign of two years in the wastewater treatment plant of Vila Fernando (Guarda), which included a constructed wetland system, the characteristics of the final effluent suggest that it could be used for the recharge of aquifers, not only because it is an area that uses essentially groundwater sources, but because other uses seem to be not relevant and would require a polishing treatment for the secondary effluent, which would higher the costs of operation.

From six thematic maps and economic, environmental and technical criteria, it was selected a study area of 6687.1 ha, and, after manipulation of complex information using GIS tools, based on the overlapping areas of exclusion and inclusion in each thematic maps and using algebra of maps operations, it was obtained a Suitable Map with a favorable area for infiltration of 6.4 ha (Figure 1). An area of 1 300 m² would be enough to set up four infiltration basins (18x18 m each), that would work in alternating cycles of filling-infiltration-cleaning-filling.

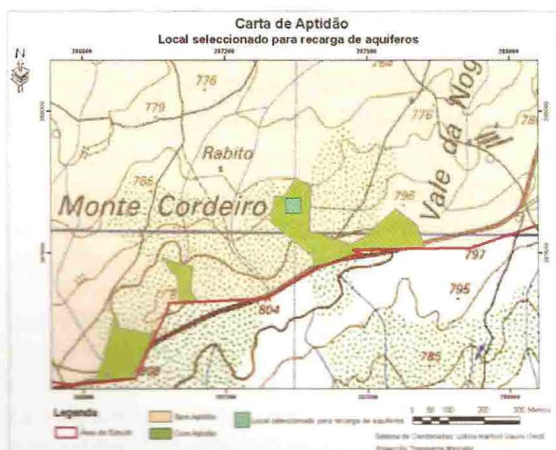
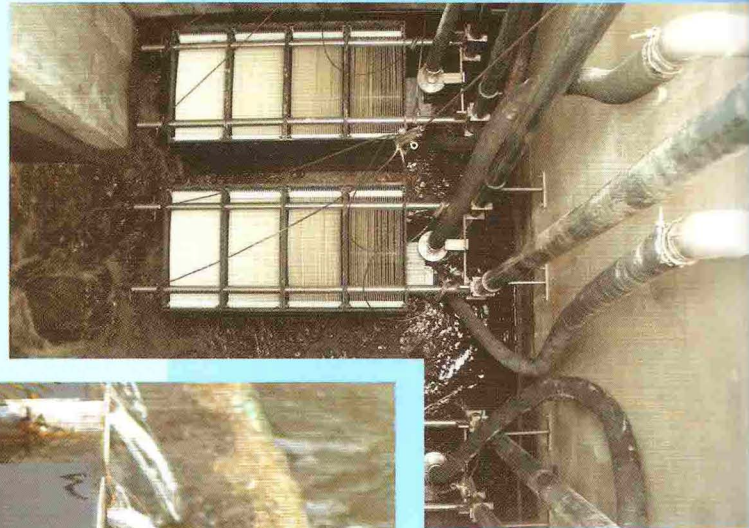


Figure 1 – Suitable map for reclaimed water infiltration



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