

Compromising of Vacuum Sewerage System in Developing Regions and the Impact on Environment

Authors : Abdelsalam Elawwad, Mostafa Ragab, Hisham Abdel-Halim

Abstract : Leakage in sewerage system can cause groundwater and soil contamination in urban areas, especially in area with a high groundwater table. This is a serious problem in small villages in developing countries that rely on ground water as a source for irrigation and drinking purposes. In the developed countries, the recent trend in areas with low population densities is vacuum sewerage system, which is environmentally safer than conventional gravity system, protecting public health, preventing exfiltration to the ground water, very easily applied in a relatively short time and can cope with a faster expansion of the urbanized areas. The aim of this work is to assess the feasibility of using vacuum sewerage in developing country, such as Egypt. Knowledge of local conditions can determine the most suitable sewer system for a specific region. Technical, environmental and financial comparisons between conventional sewerage system and vacuum sewerage system were held using statistical analysis. Different conditions, such as population densities, geometry of area, and ground water depths were evaluated. Sample comprising of 30 Egyptian villages was selected, where a complete design for conventional sewerage system and vacuum sewerage system was done. Based on this study, it is recommended from the environmental point of view to construct the vacuum sewerage system in such villages with low population densities; however, it is not economic for all cases. From financial point of view, vacuum sewerage system was a good competitor to conventional systems in flat areas and areas with high groundwater table. The local market supplying of the construction equipment especially collection chambers will greatly affect the investment cost. Capacity building and social mobilization will also play a great role in sustainability of this system. At the end, it is noteworthy that environmental sustainability and public health are more important than the financial aspects.

Keywords : ground water, conventional system, vacuum system, statistics, cost, density, terrain

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020