

Executive Summary

Global Infrastructure Competition

NetCreate

Introduction

The concept for NetCreate started off with a problem; the need to generate wastewater network layouts for 150 catchments as part of a Master Plan in the Kingdom of Saudi Arabia for investment planning purposes.

This then made us think about other applications and how NetCreate could be used for accelerating sanitation planning in developing countries. Testing NetCreate on a 600,000-population catchment in Lucknow India just reinforced how it could transform traditional ways of working to help benefit the lives of millions. And therefore, as a digital solution to help solve social and economic infrastructure issues, we considered that entering the Global InfraChallenge would help to accelerate its adoption and the benefits that it could bring to developing countries.

Problem

Globally 2 billion people lack basic sanitation facilities. Planning and designing wastewater networks for say 2 million catchments each of 1,000 population, would cost billions of dollars and at the current rate of progress, take decades to complete. The World Bank links one in ten deaths in India to poor sanitation with over 300,000 deaths each year from diarrheal diseases alone¹. Inadequate discharge of untreated domestic / municipal wastewater has resulted in contamination of 75% of all surface water across India². With 56%

of the population lacking access to basic sanitation, India ranks first in the list of top 10 worst countries with basic sanitation facilities³.



Solution

Atkins NetCreate is an innovative digital process using global open source GIS datasets to automatically create an outline wastewater network on a repeatable basis. It brings together topographic data, road layouts and population distribution data to assign the route of least resistance from each property to the lowest point in the catchment along defined roads. Pipe sizes are assigned based on the number of customers; manholes are inserted at junctions and defined intervals on straight pipes. Cover levels are taken from topographic data; minimum gradients and pipe depths are based on good engineering practice. A standardised

approach makes it repeatable throughout countries or across regions, and configurable to specific needs. The output from NetCreate can be integrated into proprietary hydraulic modelling software.

Transformational

The manual planning of wastewater networks is an inefficient, time-consuming activity, requiring extensive data collection for engineers to define pipe layouts against standard specifications. It is a labour-intensive repetitive process that takes years to complete.

NetCreate will disrupt the traditional manual approach to the planning of wastewater network infrastructure by processing global open source GIS datasets through a digital platform. Using continuously updated opensource GIS datasets, NetCreate removes the need for costly time-consuming bulk data collection. Being a digital solution, it can quickly process the data against defined rules to generate a high-level network. The automation and standardisation of wastewater network planning using opensource datasets is transforming the way that networks are developed.

Tried and tested

NetCreate has been used to generate wastewater network layouts for 150 catchments on a Master Plan in the Kingdom of Saudi Arabia for investment planning. It has also been used to plan a wastewater network layout for a catchment of 600,000 population in Lucknow India. Carolina de Paula Furlan, Technology and Performance Manager at Suez commented, "Thank you again for your impressive work on this test and for the presentation."

Benefits

NetCreate offers significant time and cost benefits (80-90%) compared with the traditional, manual approach for developing high level layouts for wastewater networks. It will accelerate outline planning to allow early scope definition for schemes and programmes of work. This will allow funding to be allocated more quickly, and with greater certainty, to areas with greatest need and help to facilitate the implementation of sanitation schemes in developing countries.

The provision of resilient sanitation schemes will help to reduce the risk of infectious diseases, improve health which will in turn will attract business, create jobs and help develop the local sustainable economy. The programme acceleration of outline planning will bring schemes to site quicker, thus creating large infrastructure projects to generate direct and indirect employment opportunities in the area. A WHO study in 2012 calculated that for every US\$ 1.00 invested in sanitation, there was a return of US\$ 5.50 in lower health costs, more productivity, and fewer premature deaths.

Opportunities

To understand the opportunity, we have been talking to a Multilateral Development Bank and also exploring opportunities with known public sector clients in India through our local offices. Feedback to date suggests that 'Time is Money' and hence programme acceleration would be the biggest benefit from using NetCreate, but consistent quality from standardised processes is also important.

Sanitation in India is estimated to be worth an estimated US \$62 Billion by 2021⁴. Meeting this huge requirement will need collaboration between various stakeholders but also digital solutions to

help kick-start the provision of sanitation in a country where there are over 460 cities with more than 1 million people. As such, it is our intention to offer our high-level planning tool as a 'Freeservice' to selected Government clients initially, to test the market, obtain feedback and demonstrate the significant benefits that it can offer.

Unique solution

From an internet search and industry feedback NetCreate would appear to be unique. It is a pure concept that utilises opensource datasets to accelerate the development of wastewater network layouts, which has the potential to permanently transform traditional ways of working on a massive scale. It demonstrates that digital technology is at its most powerful when used on a mass scale, bringing efficiencies to infrastructure design which can 'turbo-boost' sanitation planning in developing countries.

Development potential

NetCreate has the potential to be modified to create other linear infrastructure networks such as stormwater, water supply, treated sewage effluent, communications (fibre optic / broadband), and energy (gas / electric), district cooling and heating systems, sewer heat recovery systems which if all designed together could ensure a fully coordinated, BIM compliant, utility layout for the catchment.

As it provides a detailed breakdown of the number of customers supplied / served it could also support the planning of non-linear assets such as treatment works, service reservoirs or transmission substations based on engineering principals.

The future of utility planning

As well as accelerating the development of global sanitation infrastructure, NetCreate will benefit the poorest 2 billion people in the world who lack access to basic sanitation, thus helping to achieve UN Sustainability Goal No. 6 (Ensure availability and sustainable management of water and sanitation for all). By offering it as a free service to selected public sector clients in India, NetCreate will help improve the lives of those where it is most needed with maximum positive impact, avoiding protracted commercial and financial agreements.

¹ Economist, 25 September 2017

² Coverage of Sanitation Issues in India, 8 November 2016

³ Wateraid, 2017

⁴ Toilet Board Coalition, 2017

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