



Project Summary

Project:

Water Garden City Bahrain

Project Location:

Manama, Bahrain

Organization:

Scott Wilson

Be Inspired Awards Category:

Innovation in Water, Wastewater, and Stormwater Networks

Project Objective:

Developing the sewer system for a premier mixed-use development on an island near Manama.

Product Used:

SewerGEMS

Fast Facts

- Water Garden City has a potential population of 40,000 in a commercial and residential mixed-use development
- Scott Wilson engineers used SewerGEMS to design the sewerage network in 30-40 percent less time than previous projects
- The ability of SewerGEMS to run directly within MicroStation and AutoCAD reduced drawing production time by 25 percent

Bahrain's Water Garden City to Provide Sustainable Services

Scott Wilson Engineers Cut Sewer Network Design Time up to 40 Percent Using SewerGEMS®

Development Maximizes Value of Key Asset: Water

Bahrain is a group of 40 islands in the Arabian Gulf midway between the Qatar peninsula and Saudi Arabia. On the north shore of the kingdom's capital city, Manama, a new mixed-used urban development aims to maximize the value of its key asset: water. Water Garden City incorporates luxurious marinas and beaches to create a premier seaside community in the heart of the Gulf's fast-growing financial district. Developer Albilad Real Estate is building the city on a 400-hectare site that has been reclaimed from the sea. Accommodating a potential population of 30,000 on land and another 10,000 afloat, the designers are challenged to provide ecologically sustainable infrastructure, including a gravity sewerage network. The design was cost-effectively achieved with the help of Bentley software.

"By using SewerGEMS, we achieved a savings of approximately 30 to 40 percent of the network design time compared to the previous design process using Excel spreadsheets."

Scott Wilson Creates Master Plan

Scott Wilson, a global integrated design and engineering consultancy (now part of San Francisco-based URS Corporation) and lead consultant for the project, worked with sub-consultants to develop the master plan for Water Garden City. The plan incorporates road corridors, building massing, and land-side marina facilities, as well as a large-scale marina sculpture called the Pearl, symbolic of Bahrain's heritage. Part of the land was previously reclaimed from the sea; for the remainder, Scott Wilson prepared specifications, carried out the tender evaluation, and supervised reclamation. That work is now complete.

Scott Wilson's engineers are currently progressing the preliminary infrastructure designs, including potable water, sewerage, storm water drainage, irrigation, district cooling, power, solid waste management, and telecommunications services.

Sewerage System Design

Scott Wilson's engineers used Bentley's SewerGEMS Sanitary, included in the SewerGEMS application for urban sanitary and combined sewer analysis and modeling, to design the sewerage network for this major residential-commercial project. The network design was submitted to the Ministry of Works, Sanitary Engineering Planning and Projects Directorate, and subsequently approved.

The gravity sewer network proposed for the project included three intermediate sewage lifting stations. Minimum depth of manholes was assumed to be 1 meter, with the maximum depth of manhole limited to 5.5 meters to avoid dewatering problems during the installation of the sewer network and potential inflow of saline water during operation. Permissible velocities derived from the network modeling ranged from 0.6 meters per second (m/s) to 3 m/s.



Water Garden City master plan schematic

“Because the design The ability of SewerGEMS to run directly within MicroStation and AutoCAD reduced drawing production time by 25 percent”

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“By using SewerGEMS, we achieved a savings of approximately 30 percent to 40 percent of the network design time compared to the previous design process using Excel spreadsheets,” said Scott Wilson infrastructure design engineer Prasada Rao B.V.R.K. “Considerable time was also saved in developing the profiles of the sewer network. Thanks to the ability of SewerGEMS to run directly within AutoCAD and MicroStation, we could generally achieve a 25 percent savings in time spent in drawing production.”

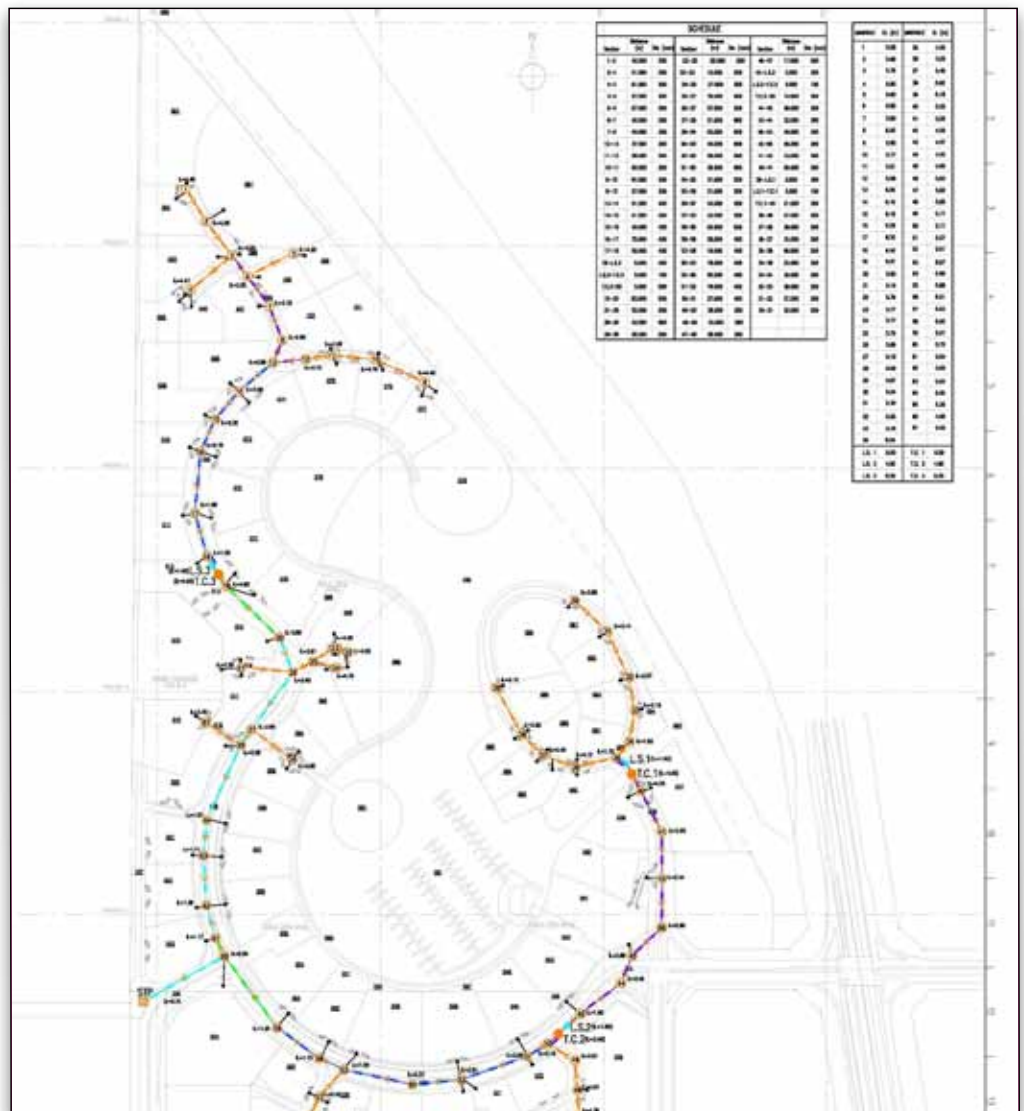
The project team found the “what-if” scenario manager to be extremely useful, because it provided a way to manage and compare different design options, such as designs for both average and peak flow situations. “Because the design process was well structured, time was saved in reviewing and checking designs,” he said.

address any environmental impacts resulting during the design, construction, and life of the project. Potential impacts considered included hydrodynamic, marine ecology, and sea water quality. In general, the development was found to have no significant residual impacts. Precautions included design provisions such as oil-interceptors on surface water drains and an irrigation system designed to re-use treated sewage effluent.

Water Garden City will provide a convenient location for people to live and work. A wide range of facilities will be incorporated into the project, including residential accommodations and retail and commercial space, together with hotels and civic developments, and a marina — all of which will provide excellent opportunities for both the people of Bahrain and visitors to work, live, and enjoy their leisure time.

Environmental and Community Impacts

Prior to commencement of works, a thorough Environmental Impact Assessment was carried out to identify, assess, and



Sewerage gravity network designed in SewerGEMS