



Going Digital to Advance the 2030 Sustainable Development Agenda

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Bentley's mission is to provide *innovative software and services* for the enterprises and professionals who *design, build, and operate* the world's infrastructure — sustaining the global economy and environment for *improved quality of life*.



BENTLEY'S PROJECT PLAYBOOKS

CAMPUSES

- Bentley Map
- AECOSim
- Descartes
- RAM
- STAAD
- GEOPAK
- InRoads
- MXROAD
- gINT
- SITEOPS

MINING

- MineCycle
- OpenPlant
- AssetWise APM
- Amulet
- STAAD
- Promis.e
- Bentley Map
- Descartes
- Acute3D
- InRoads
- GEOPAK
- gINT

ROADS

- InRoads
- GEOPAK
- MXROAD
- LEAP Bridge
- Steel
- RM Bridge
- gINT
- InspectTech
- SUPERLOAD
- Exor
- Descartes
- SITEOPS

BUILDINGS

- AECOSim
- RAM
- STAAD
- ProStructures
- HevaComp
- speedikon
- gINT
- Subsurface Utilities
- Engineering
- SITEOPS

CONSTRUCTION

- Navigator
- ConstructSim
- PW Construction
- Work Package Server
- ProStructures
- Field Supervisor App
- AECOSim
- Descartes
- InRoads

UTILITY NETWORKS

- OpenUtilities
- Substation
- WaterGEMS
- SewerGEMS
- STAAD
- Descartes
- AssetWise APM
- Amulet
- Acute3D

WATER & WASTEWATER

- WaterGEMS
- SewerGEMS
- OpenPlant
- AutoPIPE
- STAAD
- RAM
- OpenPlant
- Support
- Engineering
- gINT
- OpenUtilities
- Subsurface
- Utilities
- Engineering

CITIES

- Bentley Map
- Descartes
- InRoads
- AECOSim
- GEOPAK
- Subsurface
- Utilities
- Engineering
- SITEOPS
- Acute3D

NUCLEAR POWER

- AutoPIPE
- OpenPlant
- STAAD
- AssetWise APM
- Acute3D

COMMUNICATIONS NETWORKS

- OpenUtilities
- Bentley Fiber
- Bentley Coax
- Bentley Map Mobile
- Bentley Inside Plant

BRIDGES

- RM Bridge
- LEAP Bridge
- Steel
- InspectTech
- SUPERLOAD
- GEOPAK
- InRoads
- MXROAD
- gINT
- ProStructures

POWER PLANTS

- OpenPlant
- AutoPLANT
- AutoPIPE
- Promis.e
- STAAD
- ProStructures
- OpenPlant
- Support
- Engineering
- AECOSim
- AssetWise APM
- gINT
- Descartes
- Acute3D
- GEOPAK
- InRoads
- Amulet

PROCESS PLANTS

- OpenPlant
- AutoPLANT
- AutoPIPE
- OpenPlant Support
- Engineering
- Promis.e
- ProStructures
- STAAD
- AssetWise APM
- Amulet
- gINT
- GEOPAK
- InRoads
- SITEOPS
- Acute3D

RAIL & TRANSIT

- Bentley Rail Track
- Optram
- GEOPAK
- InRoads
- MXROAD
- RM Bridge
- LEAP Bridge Steel
- gINT
- Promis.e

WIND FARMS


- SACS
- MOSES
- MAXSURF
- ProSteel
- OpenPlant
- gINT
- AssetWise APM
- Amulet
- Acute3D

OFFSHORE STRUCTURES

- SACS
- MOSES
- MAXSURF
- AutoPIPE
- ProSteel
- ConstructSim
- OpenPlant
- AssetWise APM
- Acute3D
- Amulet

The Construction Industry is Among the Least Digitized

- McKinsey Global Institute industry digitization index; 2015 or latest available data

Relatively low digitization  Relatively high digitization

● Digital leaders within relatively undigitized sectors

¹Based on a set of metrics to assess digitization of assets (8 metrics), usage (11 metrics), and labor (8 metrics).

²Information and communications technology.

Source: AppBrain; Bluewolf; Computer Economics; eMarketer; Gartner; IDC Research; LiveChat; US Bureau of Economic Analysis; US Bureau of Labor Statistics; US Census Bureau; McKinsey Global Institute analysis

McKinsey&Company



GOING DIGITAL



THE MILLENNIALS



THE DIGITAL
GENERATION



THE CONNECTED
TEAM

Data comes from many sources



Some of the Challenges

- Data Overload
- Finding the right data
- Data Completeness / Quality
- Getting access is not always easy (IP, terms of use)
- Government agencies are not always the first to implement novel solutions
- Security Concerns
- 'Silo' mentality



Going Digital Use Cases

Goal 6

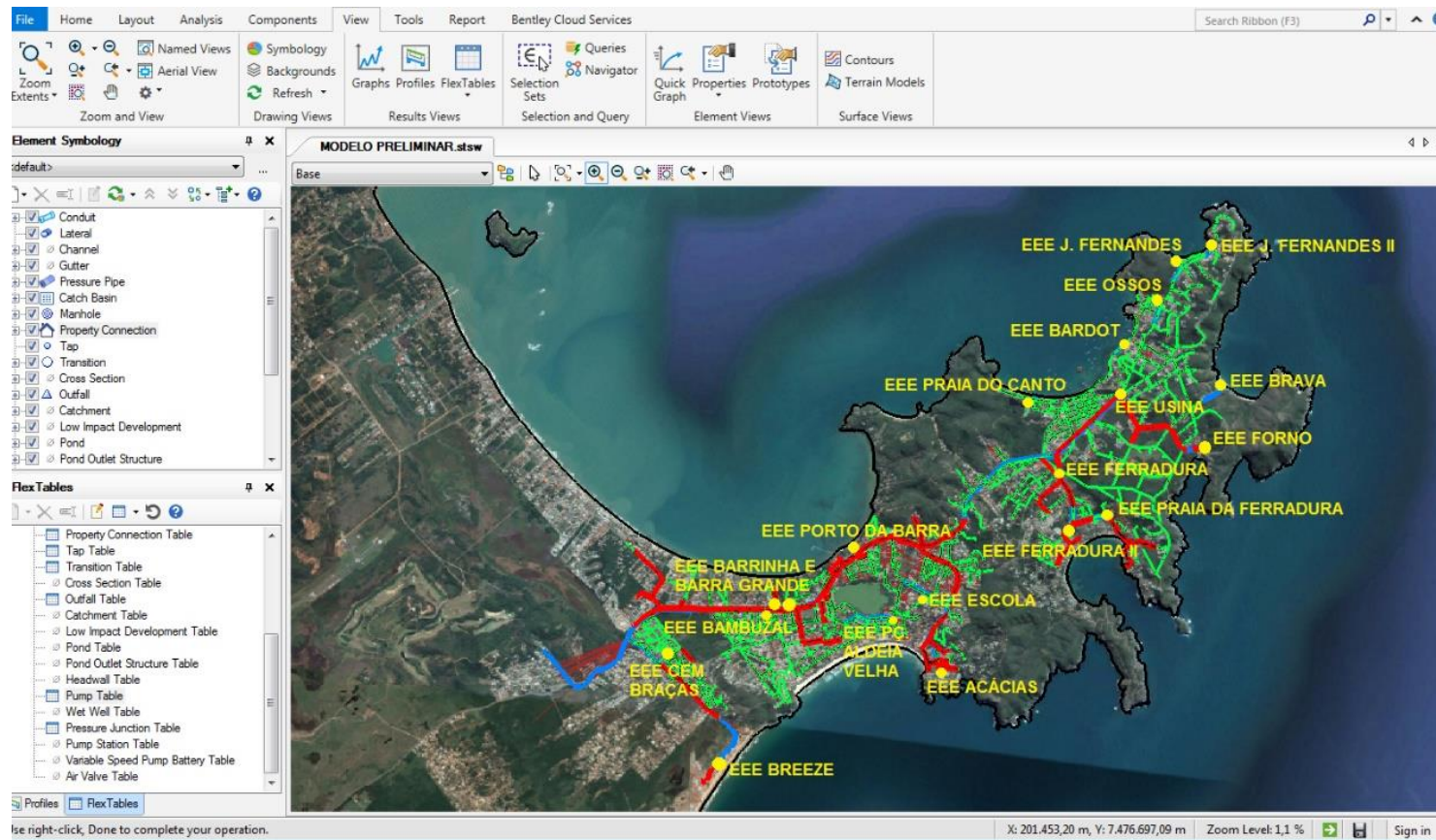
Ensure access to water and sanitation for all

Selected Targets

- By 2030, **achieve access to adequate and equitable sanitation** and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- By 2030, **improve water quality by** reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, **halving the proportion of untreated wastewater** and substantially increasing recycling and safe reuse globally

6 CLEAN WATER AND SANITATION





Problem

- Only 76% of residents have access to sewage collection and treatment
- Decontamination of the Araruama lagoon

Master Plan Results

- Reduction of 60% investment from previous studies
- Reduced energy consumption due to 35% decrease in volume treated in wastewater plants and 20% efficiency gains of pumping systems
- Untreated discharges reduced by 6 million cubic meters

Technology Utilized

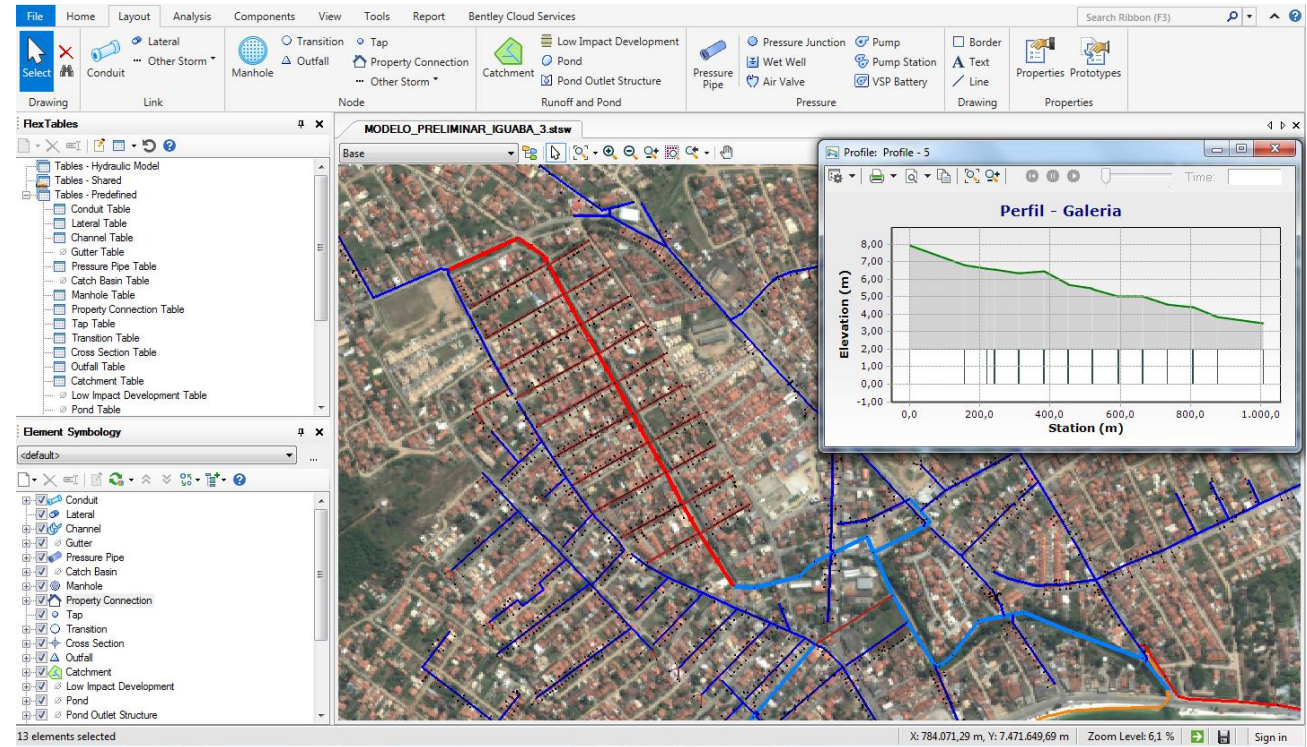
- GIS
- Water and Sewer Numerical Models

Prolagos AEGEA Sewerage Master Plan 2041

Prolagos AEGEA Sewerage Master Plan 2041

*“...[technology] can really make a difference in the **optimization of investments** bridging the existing gap in sewage infrastructure, thus promoting social inclusion and **increasing people’s living standards.**”*

- Wagner Oliveira de Carvalho, Senior Project Manager, Prolagos



Goal 11

Make cities inclusive, safe, resilient and sustainable

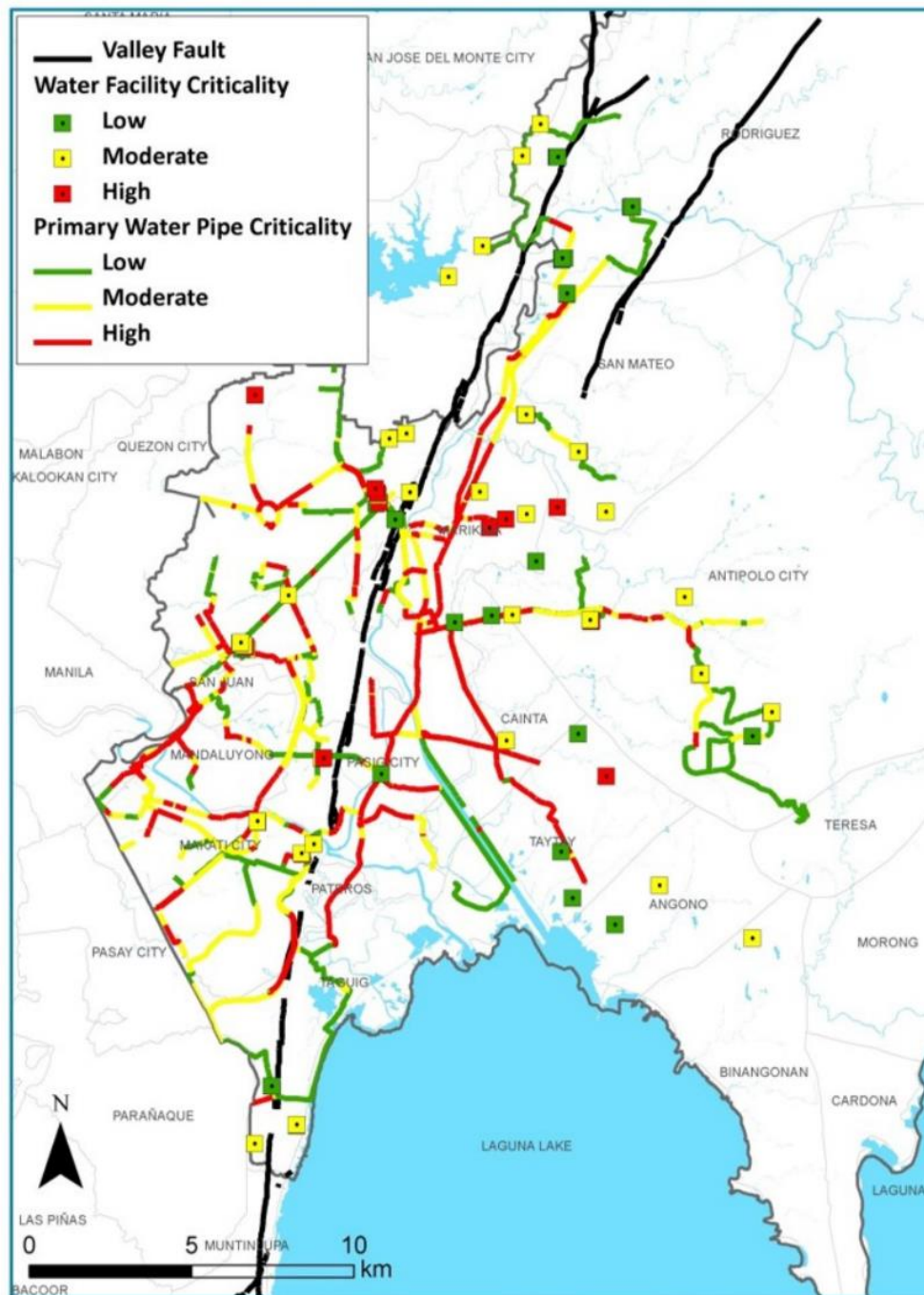
Selected Targets

- By 2030, significantly reduce the number of deaths and the number of people affected and **substantially decrease the direct economic losses** relative to global gross domestic product **caused by disasters**, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

11 SUSTAINABLE CITIES AND COMMUNITIES



CRITICAL ASSETS



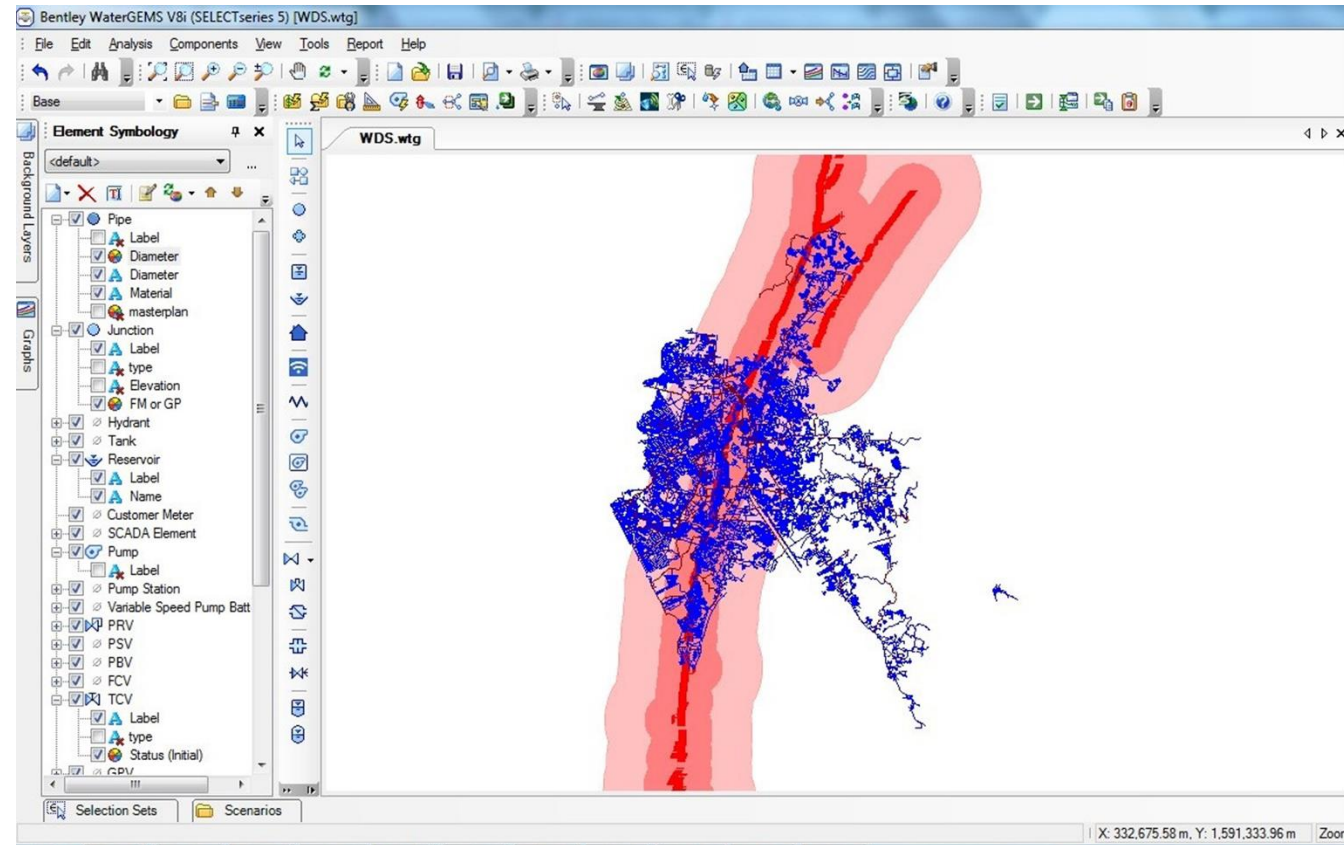
Manila Water Natural Calamity Risk Resiliency and Mitigation Master Plan

- Problem:
 - 6 million customers
 - High Risk West Valley Fault System
 - Twenty typhoons per year
- Outcomes:
 - Critical assets requiring resiliency and contingency measures identified and prioritized
 - Expected damages of USD 520 million reduced to USD 380 million the event of a calamity
 - Savings of USD 30 million on insurance
- Technology Used
 - GIS
 - Water Numerical Models

Manila Water Natural Calamity Risk Resiliency and Mitigation Master Plan

*“... [technology] **helped** Manila Water **minimize** the amount of its **investment** while **maximizing** the **resiliency** and **contingency** of its facilities, both being highly beneficial to the customers it serves.”*

*- Diogenes Adelbert Voltaire B. Evangelista,
Water System Analysis and Planning
Engineer, Manila Water Company*



Goal 13

Take urgent action to combat climate change and its impacts

Selected Targets

- **Strengthen resilience and adaptive capacity to climate-related hazards** and natural disasters in all countries
- **Improve** education, **awareness-raising** and human and institutional capacity **on climate change mitigation, adaptation, impact reduction and early warning**

13 CLIMATE ACTION



Sea Level Rise Simulation (courtesy City of Helsinki)



*Going Digital can be an enabler for achieving
the 2030 Sustainable Development Agenda
and support development for all*



**SUSTAINABLE
DEVELOPMENT GOALS**

17 GOALS TO TRANSFORM OUR WORLD



Questions?

Thank you!