What is Blue Plan-it®?

Developed by Carollo to help our clients manage complex, interconnected water and wastewater infrastructure, storage, treatment, conveyance, and distribution systems, Blue Plan-it® is a fully customizable simulation and optimization model suite developed in ExtendSim®, a commercially available platform. Featured with a simple but powerful “Drag and drop” interface, Blue Plan-it® allows for rapid model configuration by dragging blocks from premade libraries into a model window, connecting the blocks, and then setting or adjusting the preset dialog parameters.

One Model, Many Solutions

Blue Plan-it® Products and Services Support Your Decision Making in All Project Phases

The Carollo Engineers’ Blue Plan-it® integrates engineering and technical services for water and wastewater storage, conveyance, treatment, distribution, collection and reuse systems with a modeling tool to work with entities and agencies to develop a model for use in a understanding and optimizing the system elements for decision making of an entity or agency. Carollo also offers Blue Plan-it® technical consulting and engineering services to address your complex water and wastewater-related challenges.
The iPFD function combines graphical process flow diagram and mass balance models (as an alternative to spreadsheet models) using the Blue Plan-it® library. The iPFD is the first step before building the full Blue Plan-it® simulation and optimization models. By dragging and linking premade building blocks (i.e., unit process, sources, end uses, etc.), the user can quickly configure a “base case” PFD and numerous scenarios for side by side comparison. The data organizer function adds powerful database features to the iPFD. The iPFD model conducts mass balance calculations automatically based on the inputs and can also calculate the effluent water quality of each process based on prepopulated and adjustable removal efficiencies of each contaminant.

The Blue Plan-it® iPFD includes:

- an integrated database for users to store and access historical and new operational data (e.g., flow, water quality, etc.);
- a powerful Time Manager (see picture below) for easy access and organization of historical data (i.e., hourly, daily, weekly, monthly, annually, etc.);
- a graphical process flow diagram interface consisting of smart icons (blocks) of each unit process (e.g., RO system, brine pond, oil-water-separator, carbon adsorbers, etc.) linked by data connectors and utility blocks (e.g., water resource summary, Excel dashboard manager, settings, etc.);
- dialogue boxes, accessible by clicking on the smart icons, presenting operational data, input parameters, and model outputs;
- a dynamic database design that allows the user to add, delete or edit water quality parameters and components on the process flow diagram with minimal manual database edits;
- an input and output interface using an Excel spreadsheet with real time linkage between ExtendSim® and Excel;
- capability of modeling steady state and extended time simulation mass balances for flow and water quality parameters;
- capability of tracking pond levels and tank volumes for selected processes;
- animated warning flags to indicate capacity deficits or other process limitations;
- capability of tracking capital and operational and maintenance (O&M) costs of individual unit process as well as the entire plant, including chemical usage, power consumption and labor.
Once an iPFD is built and data is entered, customization can begin to generate a Blue Plan-it® TA2® model that represents the user’s system. The user may configure a “base case” PFD and numerous scenarios for side by side comparison of product water quality, residual quantity, capital and O&M costs, etc. A list of icon views for various treatment processes (i.e., RO, ion exchange, coagulation, softening, etc.) can be selected to quickly rebuild a treatment alternative. Chemical additions can be selected from the built-in inventory, which will account for water quality changes (i.e., ion concentrations).

Once the set up of Blue Plan-it® TA2® is complete, the user can perform sensitivity analysis on key design and operational parameters to assess the impacts on capital, O&M and life cycle costs. Sensitivity analyses can be conducted to investigate the impact of water quality goals on the overall treatment requirements and costs. The Blue Plan-it® TA2® model can also be set up to optimize treatment schemes and costs (e.g., meeting water quality goals at minimized costs).

The Blue Plan-it® TA2® model can be used to facilitate workshops to compare one baseline scenario with multiple selected alternative treatment scenarios side-by-side. Featured with the graphical interface, quick access to available technical, and financial information, and powerful real time simulation and optimization capability, Carollo’s Blue Plan-it® Decision Support CAMP® provides a decision support environment that will actively engage all stakeholders and decision makers. The Decision Support CAMP® provides the latest and greatest technologies in collaborative, computing and display technologies for data visualization, modeling, simulation and optimization. Helping clients visualize technical solutions to complex challenges, enables them to address cross-disciplinary local and global water challenges more productively.
The Blue Plan-it® TA2® model can be further developed as an operational optimization model (OOM) by incorporating fine-tuned cost information (i.e., chemical costs, power costs, labor costs) and operational parameters into the model. The OOM utilizes a powerful genetic algorithm built in the ExtendSim® Optimizer block to perform optimization on key process parameters (e.g., chemical doses, percent of flow to be treated versus bypassed, SRT, etc.).

Blue Plan-it®
Operation Optimization Model

Blue Plan-it®
Dashboards for Integrated Water Master Plan (IWMP)

The Blue Plan-it® Dashboard for IWMP is a dynamic, decision support tool that allows utilities to develop a virtual roadmap to the future – allowing them to see the potential impacts of the decisions they make today as they deploy water resources to serve their customers. Blue Plan-it® integrates water, wastewater and reclaimed water systems in a single model to provide a complete assessment of water resource allocation strategies and associated financial impacts.

Join the growing list of municipalities and private sector clients taking their planning to the next level with Blue Plan-it®.

“Finally, an integrated master plan that resembles the 21st century! This tool will truly link, real-time, various City departmental data through a central hub and allow for scenario development and dashboard results. Thanks for getting us out of the stone ages represented by the old style static plans that become outdated 6 months after they are printed. Blue Plan-it® is revolutionizing planning that provides for maximum efficiency and the ability to always have an updated plan at your fingertips.

— Mark Holmes,
Water Resources Director,
City of Goodyear

Selected screen shots of Blue Plan-it® IWMP:
1. Intelligent Process Flow Diagram (iPFD).
2. Customizable Excel Dashboard and Outputs.
3. Demand Projector.
5. CIP Manager.
6. Financial Manager.