

# A NEW CORNER OF



A managed environment built on Bentley solutions helps lay the groundwork for a 30-year growth plan

Looking south of the centuries-old center of Copenhagen, city planners envisioned a modern section of town built from the ground up: more than 765 acres with green parks, blue canals, homes for 20,000 people, and businesses employing 50,000.

Infrastructure for the proposed Ørestad district included 19 miles of road, six miles of canals, and 20 road bridges. For planning, design, and construction management, officials chose Danish consultants RAMBØLL.

In turn, RAMBØLL selected a set of Bentley solutions to create a managed environment for design, engineering, and construction data—letting the company share, archive, and reuse information with a wide range of partners.

A longtime MicroStation® user, RAMBØLL took on the Ørestad project in 1995. To manage, publish, and archive project data, RAMBØLL implemented Bentley's Digital Print Room®, later upgrading to its successor Digital InterPlot™.

Roadwork began in 1997, but Ørestad may not be complete until 2030. Ørestad Development Corporation, a joint venture of the Copenhagen and Denmark governments, will develop Ørestad's four sections one by one, to keep the entire district from being a huge construction site. As RAMBØLL completes a stretch of infrastructure, private investors and public institutions can buy sites and build on them.

So for years to come, RAMBØLL's managed environment will allow smooth and speedy collaboration with urban planners, infrastructure contractors, and private and public developers erecting Ørestad's homes, schools, and businesses.

"We are the company that knows everything about Ørestad," said Gita Monshizadeh, RAMBØLL technical coordinator. "We have the data for all the construction"—the layout of utilities, the shape of the terrain, the regulations covering land use and, more.

## Sharing information

To share CAD data among partners, RAMBØLL relies on MicroStation's power to view, reference, edit, and save files in AutoCAD's DWG format as easily as in its native DGN format.

"That's a must," Monshizadeh said. "The role of coordinating and managing the interchange of CAD files is a central part of our job."

For instance, developers poised to build receive a RAMBØLL "start package" CD with all the data they need to begin work on the project, including design files in the format of their choice.

## SUMMARY

### Organization

RAMBØLL

### Vertical Market

Civil

### Location

Copenhagen, Denmark

### Project Objectives

- Design infrastructure and manage construction for a new section of the city.
- Collaborate with urban planners, infrastructure contractors, and public and private developers.
- Manage archived data efficiently for a project lifecycle spanning more than 30 years.

### Fast Facts

- The new Ørestad section of Copenhagen will cover more than 765 acres, with homes for 20,000 people and businesses employing 50,000.
- A longtime MicroStation user, RAMBØLL took on the Ørestad project in 1995. To manage, publish, and archive project data, RAMBØLL uses Bentley's Digital InterPlot.

### Bentley Products Used

- MicroStation
- Digital InterPlot
- Bentley® InRoads®

But RAMBØLL's managed environment gives the company still greater flexibility in sharing information across data formats.

"Say we're finished with the detail design for a road project, and we want to send all the plans digitally to the contractor," she said. RAMBØLL road and site designers work in the Bentley® InRoads® application for MicroStation. But often, smaller contractors aren't equipped to handle InRoads files. So InRoads produces stakeout reports in text format, and RAMBØLL delivers the data files via E-mail or CD, along with drawings.



RAMBØLL expects a growing number of contractors to adopt the MicroStation® CivilPAK® configuration, which lets MicroStation users read InRoads files. Free for subscribers to the Bentley SELECT® technology support and upgrade service, CivilPAK helps RAMBØLL exchange design data directly with smaller companies.

Utility contractors working from RAMBØLL's designs often use the Danish exchange format DSFL to document the placement of pipes or telecommunication lines. RAMBØLL translates these reports into the MicroStation DGN format to check them against the original design, and then delivers a copy to utility authorities.

## Viewing latest revisions

Digital InterPlot became a critical part of RAMBØLL's managed environment, allowing wide access to the latest versions of project documents.

That's crucial for a project the size of Ørestad, in which as many as 10 drawings may be updated in a day. "We



need that information to be ready, at the office and on all sites, at the same moment the drawing is approved and plotted," Monshizadeh said.

RAMBØLL site supervisors work more efficiently using Digital InterPlot's easy Web access to updated drawings. "They don't have access to CAD facilities, but in Digital InterPlot they can open the files, zoom in on the drawing, and print it," Monshizadeh said. "As far as we know, obsolete drawings have never been used at our site offices."

It's a huge productivity gain. "Before, the only way to share drawings with the supervisor on site was to send paper plots. If we had to discuss something, we had to go to the site or they had to come to the central office," she said.

"Today, we can discuss details or changes by phone while we're looking at the same drawing—each from our own office. Or we can copy and paste parts of a drawing from the Digital InterPlot archive directly into an E-mail."

Another efficiency built into Digital InterPlot: graphical differencing, which visually highlights changes between current and earlier versions of plot files.

"It makes changes more apparent. Sometimes you're not sure yourself how much you've changed," Monshizadeh said. "Or when a contractor says, 'You've changed things so much that I need more money,' you can document the changes" to determine appropriate payment.

## Archiving information for reuse

RAMBØLL also gained speed by archiving files in Digital InterPlot, she said. "With many thousands of drawing files, it's very difficult to find a particular drawing when you just have a paper archive."

Querying Digital InterPlot locates documents instantly. Even when files are archived according to discipline, searching by the name of a contract brings up all the as-built data for that contract.

That efficiency pays off on a project with Ørestad's decades-long timeline, Monshizadeh said. "We have all these years that we can be asked to build new construction. Say we've finished a road and piping project, and 15 years later we want to make a new intersection. We need all that information, and we can just take it out of the archives."

RAMBØLL developed a custom application for Digital InterPlot that also archives the reference files associated with a plot at the time the plot was made. "So even if you've



changed all the reference files, you can go back to this date and find the files as they were then," she said.

Because Bentley remains committed to supporting even the oldest versions of its file formats, Monshizadeh counts on current files being usable for decades to come. After all, she said, "We can still use our first MicroStation files from 1986 in their original format."

## Tailoring the managed environment

RAMBØLL found it easy to develop its own applications for its managed environment: "It's an open and well-documented system," Monshizadeh said. For instance, a RAMBØLL accounting system logs the hours a MicroStation user spends on each project.



Another custom application has users check out CAD files before working on them. When another user plots a drawing, the application warns if any of the files referenced by that drawing are checked out "so you can call the person who has it out and ask them what's going on," Monshizadeh said.

RAMBØLL also developed its own "pocket archive" system, which converts project files from Digital InterPlot archives to PDF format and copies them to CD-ROM disks, along with indexing and search utilities. RAMBØLL provides pocket archives of drawings to project bidders.

## Building Ørestad's next sections

Six years after roadwork began, Ørestad's outlines are beginning to fill in.

Investors have snapped up all the parcels in the northernmost of the four sections. Already, a 20-story office tower marks the landscape in central Ørestad. Two university campuses are under construction, as is a Danish Broadcasting Corporation complex and Scandinavia's largest shopping center, with 150 shops, 20 restaurants, and an 18-story hotel.

The project occupies fewer MicroStation operators than it did a year or two ago, when design work peaked for the first phases of Ørestad's development. Under Bentley SELECT, RAMBØLL can shift MicroStation licenses to projects where they're needed most.

"We're now working with a stable number of MicroStation operators, and we expect to continue with the same crew for the next couple of years," Monshizadeh said.



Meanwhile, civic planners are writing regulations for the next phase—a residential section on Ørestad's south side, to be followed by a nature area. Said Monshizadeh: "The southern part will be our next challenge."

For more information on Bentley, please visit [www.bentley.com](http://www.bentley.com) or call 1-800-BENTLEY.



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