Carilion Clinic Case Study: Strategic Planning for Healthcare Facilities Management

Carilion Clinic maximized its return on investment by implementing GoRPM, R&K Solution’s enterprise geospatial real property and facilities management software, as a comprehensive strategic planning solution. As a result, Carilion Clinic consolidated its facilities data in a single platform, providing valuable visualizations of data in maps and floor plans while streamlining and speeding access and analysis of data. Data analysis and key performance indicators are readily available. GoRPM enabled the large healthcare provider to better manage its facilities operations, identify cost saving opportunities and inform its decision making across the organization, providing value to all facilities stakeholders, from the technician in the field to the C-suite.
Strategic Planning for Healthcare Facilities Management

Overview

Carilion Clinic is a Roanoke based not-for-profit healthcare organization serving nearly one million residents in western Virginia. Carilion Clinic owns and operates seven hospitals, as well as numerous primary care clinics, laboratories, health clubs and specialty medical practices. Carilion Clinic promotes medical education and research through its operation of the Jefferson College of Health Sciences and partnerships with Virginia Tech and Radford University.

Since adopting the clinical model in 2006, Carilion Clinic has grown to deliver integrated healthcare at more than 200 practice sites throughout the region. Its facilities comprise 7 million square feet of floor space and approach $2 billion in current replacement value.

As with all healthcare providers, Carilion Clinic is faced with rising pressure to reduce costs while improving the quality of patient care. Efficient portfolio management is crucial to patient care and the bottom line. However, Carilion Clinic struggled to effectively use data to manage its facilities operations. Carilion Clinic sought an enterprise-level geographic information system (GIS) to consolidate and visualize its data. Carilion Clinic chose to implement GoRPM, R&K Solution’s enterprise geospatial real property and facilities management software, as a comprehensive solution to provide decision makers the key information needed to better manage its facilities, identify opportunities to improve efficiency and optimize investment decisions.

At the Crossroads

“Water, water, everywhere, nor any drop to drink.” Like Mr. Coleridge’s ancient mariner, today’s facilities managers are surrounded by a sea of data but are challenged to effectively use the data to guide decisions. This disconnect is a natural consequence of the evolution of facilities management technologies. Independent and specialized systems were developed over time to manage the various types of facilities data and to solve specific business needs. These disparate systems do not typically share information with one another, even though they often serve a common business function. The knowledge to operate and extract useful information is dispersed across departments and work groups. These challenges are magnified when coupled with rapid growth, such as that experienced by Carilion
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“Today knowledge has power. It controls access to opportunity...”
-Peter Drucker

Clinic. Compartmentalization and lack of interoperability impede managers in their quest to harness the full power of the information they possess. As a result, the best information is not always available to make decisions. Opportunities for gains in efficiency are overlooked and businesses continue to operate facilities below optimum performance.

Carilion Clinic’s data was housed in a variety of stove piped systems that included CAD, its computerized maintenance management system (CMMS), ENERGY STAR® Portfolio Manager and a variety of spreadsheets. Specialized knowledge is required to operate many of the systems, which reside in different departments. Data was not easily extracted, analyzed and shared across the organization. Carilion Clinic was unable to combine its data in a comprehensive fashion to assess key performance indicators. Executive managers did not have ready access to data bound in the CAD to effectively manage space. Carilion Clinic had begun the process of scanning its historic construction and renovation drawings as PDFs but lacked a centralized platform for sharing. Carilion Clinic did not possess all of the information desired to shape its comprehensive facilities master plan and guide capital investment decisions.

Faced with managing an expanding array of data for a growing facilities portfolio, the healthcare provider realized that the status quo was no longer acceptable. Carilion Clinic knew that making effective use of facilities management data was critical to its goal of providing affordable healthcare for the region’s residents. The healthcare provider sought a means of transforming its data to useful information that may be shared with decision makers across the organization. To maximize its return on investment, Carilion Clinic decided to employ GoRPM as a strategic planning solution to provide users throughout the organization ready access to key facilities information.

Carilion Clinic selected GoRPM because of its ability to consolidate and manage a wide variety of data sets. Leveraging Esri’s ArcGIS platform, GoRPM visualizes and relates spatial information in maps and floor plans. Nearly all facilities data relates to a spatial location, such as a site, building, floor or room. Spatial representation of data is much more powerful than tabular form. It shows valuable relationships that are otherwise not easily communicated. When presented in GIS, understanding spatial relationships becomes intuitive. GoRPM has the capacity to scale to accommodate additional facilities and data sets.

Carilion Clinic chose R&K Solutions because of its depth and breadth of experience in the facilities arena and since it offers a comprehensive package of software and services. R&K supported Carilion Clinic by providing guidance in business process improvement, through delivering related data capture services, such as producing as-built floor plans and performing condition assessments, and by implementing its GoRPM software.
Implementation

Seeking to create a single repository for key real property and facilities information, Carilion Clinic opted to place a substantial amount of data in GoRPM. Carilion Clinic chose to implement GoRPM incrementally across its portfolio, beginning with a proof-of-concept project for two buildings, totaling 177,000 GSF, and then progressively adding the remainder of its facilities. Data was selected to provide information for the following areas.

- Maps and Floor Plans
- Real Property Inventory
- Fire and Life Safety
- Hazardous Materials Locations
- Parking Lots and Site Information
- Energy Use and Costs
- Operation and Maintenance Costs
- Capital Planning
- Emergency Preparedness Information
- Historic Construction and Renovation Drawings

Carilion Clinic maximized its return on investment by leveraging GoRPM to meet business needs across multiple functions.

R&K collaborated with Carilion Clinic to refine, streamline and standardize its business processes to produce consistent, reliable data. Carilion Clinic converted to object-based CAD, employed room-level data associations, assigned virtual room numbers and adopted the Open Standards Consortium for Real Estate (OSCRE) space classifications. The Building Owners and Managers Association International (BOMA) space measurements were applied to calculate net and gross areas. In addition to improving the quality of data and smoothing related processes, adoption of these standards provided Carilion Clinic with the ability to manage data at a more discrete level and enhanced its data analytic capabilities.

R&K configured GoRPM to match Carilion Clinic’s organizational hierarchy and support its unique data sets. Roles were configured to provide user groups with views and edit access for selected data sets. R&K then imported historic and newly collected data into GoRPM. This included data collected by R&K, such as as-built floor plans and site plans produced using mobile CAD and the results of condition assessments and capital renewal forecasts. The software was configured to produce automated reports of desired analysis and key performance indicators (KPIs). Dashboards were configured to enable managers to quickly gauge performance essential.
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Return on Investment

Carilion Clinic was able to integrate multiple facets of its facilities management, throughout its business process areas and data sources. With over three million square feet of its portfolio now placed in GoRPM, key facilities information is readily accessible throughout the organization. Data can be visualized in maps and floor plans. Broader access is available for data formerly bound in the specialized systems, spreadsheets and file cabinets. A host of data is now associated with the more discrete room level. This includes room names and numbers, net and gross area, departments and cost centers, OSCRE space classifications, and available services.

As shown in the following table, Carilion Clinic’s adoption of the OSCRE space classifications established a coherent structure for its room use data. The uniform space classifications may be used in searches or report roll ups. OSCRE enhanced Carilion Clinic’s data analysis and reporting capabilities, providing new ways to assess and gain useful insights for managing their space inventory.

<table>
<thead>
<tr>
<th>Hospital Room Native Names</th>
<th>OSCRE Level I</th>
<th>OSCRE Level II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Utility, Electrical Room, Equipment Room, Mechanical Room, Telephone Room, Utility Room</td>
<td>2100 - Core Building Service</td>
<td>2140 - Utility Equipment Room</td>
</tr>
<tr>
<td>Dining Room, Dishwashing Room, Kitchen, Food Prep Room</td>
<td>4200 - Personnel Service</td>
<td>4210 - Food Service</td>
</tr>
<tr>
<td>Admission, Check In, Sign In</td>
<td>5300 - Medical Practice</td>
<td>5310 - Admission</td>
</tr>
<tr>
<td>Exam Room, Treatment, Treatment Room</td>
<td>5300 - Medical Practice</td>
<td>5360 - Treatment and Examination</td>
</tr>
</tbody>
</table>

Floor plans are now available in a user friendly format across the organization. By presenting room data in the floor plans, proximity relationships are easily understood for planning department moves and consolidations. Carilion Clinic utilizes mobile data collection tools to inventory rooms, record data and place information in GoRPM. As a result, the location of telephone, data, water and other services are easily determined to further inform planning. R&K collected and placed Carilion Clinic’s GIS site and exterior emergency planning data in GoRPM.

Fire and life safety information and hazardous materials locations are accessible in GoRPM. Information is available for maintenance and construction managers to avoid disturbing asbestos and preserve fire barriers. The fire and life safety information is also at hand for regulatory authorities such as the Fire Marshall and The Joint Commission (TJC). Environment of Care/Life Safety standards are the most frequently cited deficiency from TJC inspections. GoRPM provides wide visibility of fire and life safety to promote compliance.
Formerly arduous processes have been reduced to rapid searches and automated reports. Vacant space is now quickly and easily identified. Carilion Clinic is able to produce cost center reports for its Medicare reporting through push button reports. While automation saved the time required to extract and manipulate data to acquire needed information, the greatest value is empowered decision making supported by direct access to KPIs.

With average hospital construction costs now at $300/SF or more, the annual opportunity cost associated with unused space amounts to $15/SF when applying a modest five percent rate of return. Non-productive use of space can easily equate to millions of dollars for owners of large portfolios. With the ability to visualize floor plans and quickly determine the location and quantity of vacant space, GoRPM provides Carilion Clinic the means to manage space more effectively and thereby maximize its return on investment.

Carilion Clinic takes advantage of GoRPM’s ENERGY STAR Portfolio Manager® integration to automatically push its utility billing information to Portfolio Manager. Carilion Clinic gained the ability to pull data and analytics from Portfolio Manager including a geospatial dashboard. Also, GoRPM offers supplemental data analytic capabilities for a more granular level of analysis.

GoRPM normalizes energy use and cost data so it may be combined to provide a comprehensive picture of a facilities’ energy consumption. In addition to producing historical reports and graphs of monthly use and costs, GoRPM calculates use and cost intensities. These intensities are KPIs, which may be used to compare one building to another to identify opportunities for energy and cost savings. By analyzing use trends for two buildings during the proof-of-concept project, R&K identified potential annual utility savings of $53,000.
Next, GoRPM combines energy costs with maintenance and repair costs to produce total operating costs for facilities. GoRPM uses this data to calculate operation and maintenance (O&M) cost intensities ($/SF), KPIs which again may be used to compare buildings and determine opportunities for cost savings.

The results of R&K’s condition assessments are consumed in GoRPM. The assessments identify and estimate the cost of deferred maintenance and capital renewal backlogs. Assessment data is also used to forecast ten year capital renewal requirements and calculate KPIs. Condition indices are used to compare facilities and guide capital planning. All condition and cost information, and KPIs are now available in GoRPM to guide multi-million dollar investment decisions.

PDF versions of Carilion Clinic’s historic construction and renovation drawings were posted in GoRPM. These drawings are accessible for use by all GoRPM users possessing the requisite permissions. R&K collected and placed site and emergency preparedness information in GoRPM. Parking managers have access to lot space counts. Facilities managers can quickly identify locations of utility shut-offs. Fire department connection locations and similar information is readily available when emergencies arise.

Since patients may be non-ambulatory or reliant on life support systems, hospitals do not evacuate like most businesses in the event of fire. Instead, initial emphasis is placed on minimizing hazards while containing the fire and relocating patients to safe areas when needed. Carilion Clinic is currently exploring opening use of GoRPM to emergency response agencies. Responders could use GoRPM to view floor plans and other key information such as fire barriers from mobile command centers outside the facility. This information could be used to contain the fire and coordinate the relocation of patients.

Summary

Carilion Clinic maximized its return on investment by implementing GoRPM as a comprehensive strategic planning solution to better manage its facilities operations and guide investment decisions across the organization. Carilion Clinic consolidated its facilities data in a single platform, providing valuable visualizations of data in maps and floor plans while streamlining and speeding access and analysis of data. Data quality and processes were improved by adopting standards. Existing data sources were leveraged through integration. Data is readily available through rapid searches and automated reports. Analysis and KPIs provide insights about Carilion Clinic’s facilities operations and aid in identifying opportunities for cost savings. Executive managers may quickly gauge performance by viewing dashboards. Information is now centralized and broadly available, providing value to a wide spectrum of users, from the technician in the field to the C-suite.

“GoRPM is an invaluable strategic planning tool providing keen insights to better manage our facilities.”

-Kelly Howard,
Senior Director of Facilities,
Carilion Clinic
About the Author
William Wingfield serves the healthcare, higher education and governmental clients as a project manager and facilities subject matter expert for R&K Solutions. He holds a Bachelor of Science degree in Mechanical Engineering and an MBA. Mr. Wingfield also completed the SACUBO College Business Management Institute, as well as programs in leadership, finance and real estate. He has more than 30 years of experience managing facilities and operations as a director or executive manager.

R&K Solutions
Established in 1984, R&K Solutions delivers professional services and software to support clients in achieving business and mission goals through improved facilities portfolio management.
For more information on GoRPM and R&K’s services, please visit www.rksolutions.com/gorpm/ or contact us:

R&K Solutions
2797 Frontage Rd. NW STE 1000
Roanoke, VA 24012
1-877-753-6486
sales@rksolutions.com

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