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SEVEN PHASES, 36 MONTHS

RENOVATING BEAUMONT HOSPITAL TROY'S SURGICAL SUITE

INFORMATION COURTESY OF RONCELLI, INC.
AND SMITHGROUPJJR

PHOTOS COURTESY OF RONCELLI, INC.

Patients place their very lives in the hands of a trusted surgical team. For the conversion of the surgical suite itself, Beaumont Hospital Troy is placing its trust in the expert hands of SmithGroupJJR, Detroit, and Roncelli, Inc., Sterling Heights. Roncelli launched construction in June 2013 and will reach completion in June 2016. Working with surgical precision, Roncelli deftly divided the 36-month project into seven construction phases, including multiple sub-phases.

The mission: Convert 14 operating rooms and support spaces in the hospital's existing and original inpatient surgical suite on the first floor into 16 new operating rooms, along with a new state-of-the-art hybrid imaging operating room, a new cystoscopy room, and two interventional radiology rooms. "All of the new rooms are housed within the renovated 55,000-square-foot space," said Roncelli Senior Project Manager Jeff Tessmer.

Some of the advanced surgical equipment in these new spaces, according to SmithGroupJJR, includes advanced imaging equipment with real-time images integrated with surgical procedures, including Graphic Imaging Stations with real-time, ultra-high definition, large format flat screen displays; surgical booms integrating equipment and utilities; robotics equipment; and a central control station in each operating room permitting control of the surgical environment, including the technology.

A healing environment also includes welcoming spaces and efficient programming. At Beaumont Hospital Troy, a sky-lit clerestory was incorporated above one of the surgical corridors to allow natural light into the space, said Tessmer.

SmithGroupJJR lists some of the efficiencies necessary for a contemporary surgical environment: A connection to all OR's from a common central surgery supply core providing efficient supply and restricted staff to and between each OR; patient and staff access to all OR's from a common outer loop corridor that is restricted to surgery traffic only; standardization of all 650-square-foot general and special OR's to allow more efficient and flexible utilization of resources; and specialization, including larger and custom room configurations where required for special inter-operative imaging equipment, including interventional radiology, minimally invasive cardiovascular procedures and hybrid OR's. For added efficiency, Roncelli is also installing a new elevator and dumbwaiter for more efficient movement of sterile supplies and soiled linen to and from the OR department, said Tessmer.

PROTECTING THE PATIENT

At Beaumont Hospital Troy, Roncelli is also constructing 16 interim in-patient recovery rooms and four new out-patient recovery rooms, as well as staff support, administrative offices, new locker rooms and lounges. "The new physician and staff lounge is being constructed by infilling an existing 1,500-square-foot courtyard, located between the Professional Office Building and the main hospital," said Tessmer. "The location of the lounge is surrounded on all sides by occupied space. In addition, a critical, active linear accelerator, utilized for patient radiation treatment, is located below the space."

The entire project is being conducted in the middle of a busy hospital and while maintaining 100 percent of the surgical department's operations. "The challenges of working in and around active surgical space included an increase from 14 to 16 licensed OR's," said Tessmer, "requiring us to maintain 16 operational OR's and one cystoscopy room throughout the entire construction phasing."

With the hospital environment impacted, patient safety had to remain the top priority. Roncelli's solution: Strict adherence to Beaumont Hospital Troy's Infection Control Processes, including Interim Life Safety Measures and epidemiology protocols. "Temporary airtight barrier partitions separated the construction environments from hospital operations," said Tessmer. "Advance planning of work adjacent to active surgical space and coordination of construction and OR Department schedules eliminated risk to patient care. Select work within operational space of the hospital was accomplished within airtight barriers during night shifts, Sundays and other non-active hours. Also, constant and direct communications between Roncelli's project management and Beaumont Troy's facility

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and patient care departments insured shared knowledge of all scheduled activities."

For infection control, the Bio-Grid Ceiling System is being installed in each of the operating rooms. In addition, a pre-engineered and fabricated "CleanSuite" ceiling system, which provides safe, laminar air flow to the space, is being installed in each operating room. "This provides for a more efficient install, as opposed to a traditional time-consuming, suspended, metal frame and drywall OR ceiling system," said Tessmer.

SmithGroupJJR's design also addresses infection control measures: Detailed coordination of the ceiling-mounted equipment is required to accommodate equipment, lighting and airflow needs. Positioning of these items is critical to ensure that the equipment is functional, but does not result in poor airflow characteristics, which could result in infection control concerns. ASHRAE 170 lists specific requirements for airflow distribution, including air velocity range and limitations on the amount of obstructions allowed. These guidelines result in a large laminar diffuser array centered over the patient with booms and columns mounted towards the perimeter.

A MOVING MATRIX

The phased project also involved renovations to several different areas throughout the hospital, including strategically utilizing the space in the nearby Beaumont Troy Area C Building for the temporary hoteling of hospital staff impacted by the renovation. Given a multitude of staffing moves, Roncelli implemented a moving matrix for each relocation. This matrix identified where the staff was being moved to, if the move was temporary, the timeframe and when the staff could expect to be in their permanent location. It was critical to keep the staff informed.

Roncelli also managed multiple, simultaneous phases of construction involving select demolition, renovations, temporary use and final use of areas. In addition, mechanical and electrical design was coordinated between the project's trade contractors, Roncelli, Inc., Beaumont Health System and SmithGroupJJR architects/engineers.

HVAC IN THE OR

Roncelli is installing upgraded MEP systems as each construction phase progresses. Limbach Company, LLC, Pontiac, is the mechanical contractor. The systems include modified fire protection piping, HVAC ductwork, medical gas piping, heating hot water piping, air flow fan boxes, domestic water piping, fire alarm system, nurse call and intercom system, power distribution panels and transformers, isolation panels in each OR, an emergency lighting inverter system and automatic transfer switch. Other members of the infrastructure team, include Center Line Electric, Inc., Center Line, is the electrical contractor; Shambaugh & Son, LP, Southfield, is the fire protection contractor.

Relocating and installing new infrastructure was a large part of the project. The relocation and installation of large water lines, HVAC main duct lines, fire protection piping and electrical buss ducts required extensive planning of segmented sections of the ceiling to be reworked. Most of this was performed during non-operational hours and in small areas, in order to eliminate risks to patient care and the functions of adjoining hospital departments.

Tessmer explains how Roncelli managed the coordination of infrastructure in preparation for subsequent phases. "When working in a phased portion of the total, proposed project footprint, large sections of ductwork and piping that would service future renovated space were installed above the present area's ceiling," said Tessmer. "Existing ductwork and piping serving existing areas needed to remain operational and in place until that future area was renovated. This protection of existing ductwork and piping, while installing new ductwork and piping required advance planning and coordination, utilizing 3-D design technology and accurate advance scouting of above-ceiling areas that would be impacted."

According to SmithGroupJJR, a surgery suite has special HVAC needs, including the fact that lower temperature air from air handling units is often required to ensure cooling requirements are met without excessive airflow rates. Control devices are needed on both the supply and return air feeds to each operating room to accommodate varying cooling loads and energy savings, all while ensuring proper pressurization is maintained. This also allows the opportunity to implement an unoccupied mode for additional energy savings when the rooms and equipment are not in use.

Clearly, the surgical suites boosting our health and well-being are as complex as the anatomy of the human body. With Beaumont Hospital Troy surgeons at the operating table and Roncelli and SmithGroupJJR building the operating room, Oakland County residents and the entire community of Southeast Michigan and beyond is clearly in good hands.