UNB EST. 1785 UNIVERSITY OF NEW BRUNSWICK | Off-site Construction Research Centre

PROJECT PROFILE

BEAULIEU PLUMBING AND MECHANICAL

Beaulieu Plumbing and Mechanical, based in Edmundston, NB, is a mechanical contractor providing plumbing, heating, ventilation, geothermal, refrigeration, and medical gas services for large-scale commercial projects across Atlantic Canada. The UNB Off-site Construction Research Centre (OCRC) has collaborated with Beaulieu Plumbing & Mechanical to explore implementation of Building Information Modelling (BIM) on MEP projects and now explore opportunities to incorporate prefabrication into their operations, particularly mechanical and plumbing to meet their growing demands.

PROJECT BACKGROUND

The primary objective of the first phase of the project focused on re-designing and optimizing their facility to support pre-manufacturing of mechanical and plumbing assemblies and components. Key activities included an analysis of the current layout and workflow within the factory through a site visit and a 3D scanned model of the facility, understanding of storage practices within the facility, and determining prefabrication priorities for assemblies and components.

METHODOLOGY

The project methodology involved:

1. Site Analysis:

• Created a 3D scanned model of the building with relevant details.
• Evaluated buildings dimensions, infrastructure, and workflow.
• Identified potential challenges related to space utilization and workflow efficiency.

2. Work Breakdown Structure (WBS) Development:

• Developed sample component manufacturing, fabrication, and assembly steps to outline through process map.
• Identified bottlenecks and obstacles within the space through workflow analysis through each stations, tasks, tools/equipment, and overall worker movement.

3. Prefabrication Layout Design:

• Transferred the WBS into practical stations within the manufacturing facility
• Placed full scale components/equipment and inserted into an accurate CAD model of the facility
• Evaluated space constraints and workflow to determine challenges and limitations
• Created different layouts/workflows to analyze tasks time and material/component movement within the facility using alternate locations/use of cranes, forklifts, and carts.

4. Inventory Layout Design:

• Analyzed current storage practices, quantity of material/components stored, and material/component flow frequency.
• Created different layouts/workflows to assess material/component movement and spatial constraints, uncovering potential challenges and limitations.

RESULTS AND RECOMMENDATIONS

1. **Factory Layout Design:** Optimized spatial arrangements and workflow paths, enhancing productivity and efficiency. **Recommendations:** Mapping sub-assembly areas, planning material storage areas, and allowing for continuous updates and improvements.

2. **Inventory Layout Design**: Identified spatial constraints and movement inefficiencies, revealing specific challenges and limitations. Optimized storage racks and shelves location based on each material/component demand frequency, enhancing operational efficiency within inventory space. **Recommendations:** Utilization of digital inventory tracking to address spatial challenges and optimize placement of materials/components based on usage, enhancing material/component movement.