



This modern, innovative and state-of-the-art CUP will serve as the backbone for MRA Group's lab and research tenants well into the foreseeable future.

Spring House Innovation Park Developer Tasks Trefz Mechanical With Modernizing Their Aged Utility Plant

Montgomery County's 133-acre Spring House Innovation Park (SHIP) campus has been called a "marvel of smart thinking." The 14-building technology park is designed to "spark innovation and elevate the work-life experience." The campus offers 600,000 square feet of lab, offices and research space.

Unreliable and Inefficient

In 2019, MRA Group, the campus developer, entrusted Trefz Mechanical Inc. with the design build contract for replacing the SHIP's entire mechanical, plumbing and electrical system in their antiquated, 1960s-era central utility plant (CUP). The new CUP would need to match the developer's overall forward-thinking model in terms of intelligent design. Issues plaguing the outdated and unreliable CUP included overall inefficiency from vintage, high-temperature hot water boilers with little-to-no turndown ability, antiquated single-stage chillers, a failing underground loop contributing to energy losses, and increased maintenance costs from inefficient equipment. All construction for this major overhaul would need to be conducted with no disruption to tenants in SHIP's critical research environment.

Expectations Exceeded

Trefz installed 1,000 tons of chilled water capacity, 20 million BTUs of hot water heating capacity and 1.4 megawatts in electrical distribution which all far exceeds code-mandated energy requirements, providing a fully reliable and energy efficient plant that will serve MRA and its tenants well into the future. Redundancies in terms of multiple chillers, boilers, pumps, and electrical feeds allow full reliability of chilled and hot water in the event of a multitude of potential failure scenarios. Each piece of equipment, from the rooftop cooling towers down to the smallest valves, supports this redundancy and reliability initiative. **The new CUP boasts a 50% reduction in electrical, natural gas, and water use for MRA as compared to the antiquated CUP.**

The plant incorporates a fully automated, innovative and energy efficient control system that allows for unmanned plant operations and maximizes energy savings. Automated energy meters monitor chilled water, hot water, electrical, natural gas, and domestic water usage. This allows the MRA Group to have defined indicators for use in tenant billing, help determine potential future energy upgrades based on consumption, accurately depict parasitic losses so these costs are not lost and provide dynamic indicators for equipment operations and efficiencies which may require maintenance. The meters trend and alarm all these systems to identify any potential hazard at early onset. Significant new turndown capability



Variable frequency drives...enable site managers to adjust the energy output of motors, pumps, fans and more to avoid running the equipment at its highest output at all times. SHIP's electricity costs are 50 percent lower while in operation than they were in 2016 when the campus was vacant and running its older energy systems. ”

- Queen Muse, Philadelphia Magazine, February 3, 2020

for the lab buildings (which utilize 100% outside air) allows approximately 12% for the chilled water system and 5% on the heating system. This provides reliable and constant supply temperatures for the delicate lab environments supporting research and development.

Attention to Detail at Every Turn

Trefz oversaw all construction site logistics, and maintained a strong focus on minimizing disruptions to current tenants. Given the type of delicate scientific research being conducted on-site, even the smallest disturbance could have significant financial and development implications. With this in mind, Trefz held regular meetings with the owners and tenants to strategically time shutdowns (often at night and on weekends) so they wouldn't conflict with any critical research. Trefz also streamlined construction by prefabricating as many components as possible, and tunneling under central campus thoroughfares to maintain easy access for tenants and pedestrians. When disruptions were unavoidable, such as the loading dock being inaccessible, Trefz team members personally handled tenant deliveries to alleviate the impact. Trefz even installed spring isolation to ensure there was no annoying vibration and noise to the floors below the CUP.

From BIM to WOW!

Trefz utilized the latest BIM technology to design and construct a modern, energy efficient CUP. The mechanical and electrical engineering designs incorporated redundant, efficient equipment and innovative control strategies. Structural engineering plans defined reinforcement of existing concrete and steel structures to support the new interior equipment and rooftop cooling towers. Precise rigging plans defined deflection, loading and other weight constraints. Piping was chiefly prefabricated offsite and then unobtrusively installed within the plant and underground as well as interfacing with existing systems. Working closely with PECO, the gas meter sets and operating pressures were replaced and adjusted to allow for reuse of underground piping and increased project savings thanks to Trefz's strategic calculations and designs.

Thanks to tactical layout during the BIM process, SHIP can incur full equipment maintenance, service, and replacement without interruption to any utility. Standardization and location of instrumentation means all elements of the new system are easily accessible and convenient for fast and convenient user interface. Intricate color coding and labeling of piping and electrical panels clearly indicate systems and necessary arc flashing boundaries. Single line flow diagrams

on the walls and strategic labeling will help streamline troubleshooting and maintenance. An actively alarmed heat trace system protects exposed piping and basin heaters, ensuring that the condenser water system is fully filled, always operational and never freezes. Even potential flooding issues were addressed with floor-positioned water bugs that are remotely monitored and alarmed.

Safety Is Always a Priority

Trefz completed the 17,000+ man-hour job with a zero lost time injury rate. Weekly toolbox talks and safety walk-throughs, as well as ongoing safety meetings prior to any major rigging or construction activities, addressed any potential hazards. Additionally, installing a new building-wide fire alarm system and a new refrigerant monitoring system ensures a totally safe environment with audible and visual warnings in case of potentially hazardous situations requiring emergency ventilation.



BEFORE



BIM



AFTER



619 Maple Avenue
Lansdale, PA 19446
215-442-0969
www.trefzmech.com