

Executive Summary

THE DENVER FEDERAL CENTER BUILDING 48 MODERNIZATION: INNOVATIVE ENGINEERING IN ADAPTIVE REUSE

Project Overview

Building 48's transformation is a powerful example of how engineering can breathe new life into aging federal assets. Once a World War II munitions plant, the 150,000-square-foot structure now serves as a fully electric, net-zero energy facility that can support over 800 federal employees, consolidating staff from three leased buildings into one high-performance, government-owned workplace projected to save \$6 million annually.

The RMH Group led the MEP design and delivered a comprehensive strategy that met the GSA's aggressive performance, budget, and timeline goals, despite pandemic disruptions and a 40% material cost escalation.

RMH designed a hybrid water source heat pump (WSHP) system with direct evaporative cooling, which draws 100% outside air during the shoulder seasons, resulting in 75% HVAC energy savings during these periods. A boiler strategy utilizing three 240kW, six-step electric boilers enabled the team to electrify the facility without exceeding the total electrical service capacity of 4,000 amps, thereby avoiding costly switchgear upgrades.

RMH and the design team reused existing infrastructure, including a bond beam identified from as-built drawings, to support 80 new 10'x14' windows, eliminating the need for added steel at a time when prices had spiked by over 200%. This approach preserves daylighting goals while reducing costs and embodied carbon.

The building's circadian lighting design was guided by UL 24480 principals, with the intent to achieve a Circadian Stimulus (CS) value greater than 0.3 for 70% of the open office space. While post-occupancy measurements averaged closer to 0.19, the design process still marks a significant step toward integrating health-centered lighting into federal workplaces. Throughout design, RMH and the team incorporated direct input from employees to shape lighting layouts, acoustic strategies, and spatial organization, resulting in workplaces tailored to support comfort, focus, and productivity, even as actual circadian light levels vary across the space.

Outside, the team transformed a desolate site into a landscaped amenity for the entire Denver Federal Center campus. The space features pollinator-friendly native plantings, shaded seating areas, and accessible pathways, all of which support biodiversity, wellness, and placemaking.

Now tracking for LEED Zero certification, Building 48 is more than a successful retrofit. It's a replicable blueprint for sustainable, human-centered transformation across the federal portfolio.