



Small Town with Big Electrification Goals

Project:

Dove Creek/Comfort Air Mechanical

Location

Dove Creek, CO

Comparison Date

Late 2023 - Fall 2024

The Team:

Owner

Dove Creek School District

Project Developer:

Comfort Air Mechanical Inc.

HVAC Engineer:

ME&E Engineering

HVAC Contractor:

Comfort Air Mechanical Inc.

HVAC Distributor:

Johnstone Supply - Durango, CO

In addition to the VRF systems, the rooftop system components include a large CaptiveAir DOAS unit capable of supplying 8,800 CFM of conditioned fresh air. Two RenewAire ERVs are also installed for further efficiency.



After breathing new life into the building, it was turned over to the district long before the 2024 Fall semester began.

Cooling, if it could be called that, was only provided in a few specific areas. Outdated classrooms and insufficient space hindered the implementation of advanced learning programs. The little district just didn't have the funds to update its facilities.

That changed in 2022 when a BEST grant from the Colorado Department of Education kick-started discussions about building a new school. After 70 years, Dove Creek was getting a new school.

Neenan Archistruction, out of Fort Collins, CO, was the architect and general contractor on the project. Their work includes a great deal of design-build educational projects. Neenan brought on Comfort Air Mechanical Inc. to design and install the HVAC system for the 30,000-square-foot project, though at the time, a system type hadn't been selected.

Comfort Air Mechanical was founded in 1988. Today, it's based in Cortez, CO, with 17 people that serve all southwest Colorado.

"Early on, the school board didn't know exactly what they wanted in an HVAC system," said Nic McDonald, VP and Partner at Comfort Air. "We discussed the priorities of the project, and it became obvious they wanted simultaneous heating and cooling. Southern Colorado is sunny, and Dove Creek is about 6,800 feet above sea level. There's a lot of solar gain."

This led to a conversation about energy efficiency and system longevity. In their words, the board wanted a "cutting edge" system that would bring Dove Creek's educational system into the 21st century, and a building that would serve as the de facto community center.

"I suggested a heat recovery VRF system," explained McDonald. "The school board wasn't aware they could heat and cool the structure with electric heat pumps. As soon as that option was on the table, it was as though none of the others existed. At that point, I hired ME&E Engineering under my contract. At that point, things proceeded quickly."

In the bottom lefthand corner of Colorado, about 50 miles from the Four Corners monument, is the blink-and-you'll-miss-it town of Dove Creek. The tight-knit community of about 700 residents depends heavily on the agricultural industry. Dove Creek, in fact, is known as the Pinto Bean Capitol of the World, thanks to the high-quality beans produced in the surrounding area.

While the town is small, the support residents show each other is big. For example, the last varsity basketball game created a standing-room-only situation at the gymnasium in the old K-12 school.

An over-capacity basketball game was the least of the school district's concerns before construction began on the new Dove Creek in late 2023. The old school struggled to meet the town's needs in other ways, too.

The 1950s-era building was too small in general, and the heating system was uncomfortable and inefficient.

A Deep Bench

At the 2023 AHR Expo, McDonald met with Johnstone Supply's Jay Castle and John McCarthy, along with Fujitsu General America's Dale Young and manufacturer's representatives from GSC Tempered Air Group. Together, along with the engineers at ME&E, they designed a mechanical system based on Fujitsu's new AIRSTAGE VU-V three-phase VRF equipment.

A great advantage headed into the project was the strength of the relationships McDonald has at every level of the supply chain. Comfort Air had a previous relationship with the school district, and they had also worked successfully with ME&E Engineering on similar projects in the past.

Comfort Air's relationship with Johnstone Supply and Fujitsu goes back even further.

"I've known Jay Castle, at Johnstone, for more than a decade," said McDonald. "He helps design projects, walks through jobs with our team, and he's invaluable when it comes to commissioning. We have the same core values, and I value his advice and opinions. The same goes for Dale Young, who is our regional Fujitsu sales engineer."



Comfort Air Mechanical has been a Fujitsu Elite dealer for more than six years, and Elite Plus since the program began.

Surprising Simplicity

Long before groundbreaking at the new school, McDonald had a 3D model of every mechanical component in the school. That design, which he reviewed regularly with Comfort Air Foreman, Jonathan John, kept the jobsite running ahead of schedule and with no real challenges to speak of.

"The work was surprisingly simple, despite this being one of the larger VRF jobs I've personally been involved with," said John, who spent seven months on the Dove Creek project.

"It was also the first VU-V installation we've done as a company," John continued. "The system was spec'd as a heat recovery system, though based on the grant funding for the project, there was a slight possibility that it could have been changed to a heat pump. The fact that the AIRSTAGE VU-V units can be field-configured for heat pump or heat recovery means that we wouldn't have had to change the equipment order if the design was changed to heat pump."

The system included four banks of AIRSTAGE units. Banks one and two each total 24 tons, bank three is 10 tons, and bank four is six tons. These serve a variety of low, medium, and high-static fan coils. Several office spaces are served by ceiling cassettes.

In addition to the AIRSTAGE V-Series equipment, two H-Series systems are also used: a 2.50-ton wall-mount system in the IT room and an identical unit in the electrical room.

Heat Recovery

Southern Colorado offers a great opportunity to capitalize on the benefits of heat recovery. The area enjoys roughly 240 sunny days per year, and its relatively high elevation means that solar radiation has much less atmosphere to travel through than at sea level. As a result, buildings in Dove Creek have high solar gain.

This creates widely varying loads within the building and increases the likelihood of different zones simultaneously calling for heat and cooling. Heat recovery systems essentially "recycle" heat, or extract BTUs from one space that's calling for cooling and rejecting into a zone that's calling for heat. This is especially beneficial in the shoulder seasons.



Summer temperatures in Dove Creek can exceed 90°F, and winter lows are frequently in the single digits, so makeup air was carefully considered during the design phase. In addition to the VRF systems, the rooftop system components include a large CaptiveAir DOAS unit capable of supplying 8,800 CFM of conditioned fresh air. Two RenewAire ERVs are also installed for further efficiency.

"With AIRSTAGE VU-V units, installing a heat recovery system isn't much different than installing a heat pump system," said John. "There are a few piping differences, which are well outlined in the I&O manual, and the addition of branch boxes inside, but that's about it. Our team moved quickly, and we called Jay Castle any time we had a question."

"Jonathan has been with us for six years," said McDonald. "This was the largest job I've turned him loose on as project lead, and he had an extremely solid crew working under him. I was not at all shocked that he handled it as well as he did. If I could just figure out how to clone him, I'd have it made."

While John's aptitude and work ethic are exemplary, he claims that training is the reason the job went so well.

"I've attended many heat pump training events, including those hosted by Fujitsu in New Jersey and training hosted here in Colorado by Johnstone Supply," said John. "I'm very familiar with this equipment, even though the VU-V is new to me. That helped immensely."

The VRF equipment was started in late June, with commissioning taking place immediately afterward. Castle joined McDonald and John onsite for a full day. The new building, now home of the Dove Creek Bulldogs, was turned over to the district long before the 2024 Fall semester began.

There have been serious discussions about adding a large solar photovoltaic array to the school's rooftop, bringing the district's dream of electrification full circle.

"Whether solar is added or not is yet to be determined," said McDonald. "If funding is available, solar is likely. If not, this is a tiny community and raising those funds may be difficult."

"With or without solar, the relationships we have in this industry have served this project well," said McDonald. "Our core values are shared by everyone in our supply chain. Together, we can be proud that we've made a massive improvement for this community by providing a school that will serve them well into the future."



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