

## Belle Fourche High School Phase 1A, 1B



Located in Belle Fourche SD this project replaced core mechanical and electrical systems infrastructure in this historic 132,700 SF high-school. The scope included a small three-story addition, relocation of the kitchen, renovation of the men and women locker rooms, concessions, gym lighting, cafeteria and portions of the restrooms and corridors. The major infrastructure changes included addition of a chilled water plant and a code-compliant generator. The existing heating boilers and domestic water heaters were replaced with condensing, high efficiency equipment. Variable speed pumping, portions of the hydronic piping and new fan coils were installed. Total energy recovery units allow for energy reclaim for the ventilation requirements of the facility.

### Project Data

#### Owner

Belle Fourche Community Schools

#### Location

Belle Fourche, SD

#### Building Type

Education

#### Building Area

137,200 SF Total

#### Mechanical Systems / Features

High Efficiency Condensing Boilers  
Variable Speed Pumping  
Energy Recovery Ventilators  
Demand Control Kitchen Ventilation  
High Efficiency Water Heaters

#### Electrical Systems / Features

Efficient LED & Fluorescent Lighting  
LED Corridor/Emergency Fixtures  
CAT 5E Data/Tele Connectivity  
Intercom/Phones/Class Call  
Integration  
Addressable Fire Alarm Integration  
Security/CCTV

#### Construction Cost

\$2,140,000

#### Completion Date

2013

### Mechanical Engineering

Mechanical system consisted of replacement of hot water heating plant, domestic hot water generation equipment and addition of a chilled water plant. Energy recovery ventilators were incorporated for the ventilation of the locker rooms and occupant outside air requirements. Localized two-pipe fan coils were utilized to allow for maximum space zoning. Variable primary and secondary pumping scheme was used to maximize system efficiencies. High efficiency condensing boilers provide heating water for the entire school. The boiler plant design incorporates n+1 redundancy and has an optimized 20:1 turndown to maximize part load efficiencies. Water conserving plumbing fixtures were installed in the locker areas and restrooms.

### Electrical Engineering

Existing incandescent and obsolete fixtures were replaced with efficient fluorescent and LED lighting throughout the remodel and addition areas. In addition, the existing HID lighting in the Bronco's gym was replaced with high-bay fluorescent fixtures. Emergency lighting was powered from the new generator with switching facilitated by relays. Corridors and misc spaces use occupancy sensors for lighting control.

The existing normal power service was determined adequately sized to serve the relocated/remodeled kitchen and the support the new chiller loads. Backup power for emergency lighting, etc. is served by a new code-compliant generator system. Then entire emergency system was replaced with transfer switches and panels to bring the system into compliance.

Special systems include data/tele communications, wireless ports, integration with the existing addressable fire alarm system, intercom, and communications wired for a category 5e network. The security systems consist of closed-circuit television (CCTV) and card access.