

**Category:** 10 – Best Building Project – General Contractor (\$40-\$70 Million)

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**Project Name:** RTD Commuter Rail Maintenance Facility, Gannett Fleming  
Architects

In the last few years, Denver has seen a substantial population growth and this trend will only continue with estimates nearly doubling the city's population by 2035. With this forecasted surge in population, effective public transportation solutions is a must. Keeping the future in mind, Denver saw an obvious need for a commuter rail system designed with energy-efficient methods and technology in order to be successful in launching and sustaining a new commuter rail transit system. The completed Commuter Rail Maintenance Facility (CRMF) project met and exceeded all of these expectations, and now stands as a template for other organizations globally to duplicate.

Denver's Regional Transportation District (RTD) developed the FasTracks program, which is an all-encompassing strategy for constructing new rail and bus lines, as well as expanding facilities and operation sites. The Commuter Rail Maintenance Facility (CRMF) was built as part of the Eagle P3 Project, which is the largest contract within the FasTracks program. The Eagle P3 Project also included the expansion of 36 miles of new rail and compiled both into one single design-build project. Denver Transit Partners (DTP) was selected as the partner for RTD to design, build, finance, and eventually operate and maintain the Eagle P3 Project. This project is truly one of a kind, and is the first transit project procured under this form of a public-private-partnership (P3) in the United States.

Serving as the only maintenance facility for the commuter rail system, the CRMF plays a crucial role in the success of the Eagle P3 Project, and ultimately the FasTracks Commuter Rail Transit System. The 230,000 square-foot facility services, inspects and maintains a fleet of up to 80 electrified multiple unite (EMU) commuter cars that are powered by a 25kV overhead catenary. Spread throughout the four levels, the building also houses the operations control center;

electrical, mechanical, carpentry, and welding workshops; administrative space; training rooms; and locker rooms. The facility supports the operation of the Gold Line, Northwest Rail alignments, East Corridor and the North Metro commuter rail lines.

### **SOLUTION OF SPECIAL CHALLENGES/PROBLEMS**

Since the project was a design-build delivery method, the team was faced with the challenge of coordinating a multitude of stakeholders on all sides of the design. The team worked with Gannett Fleming on the architectural side, and also the mechanical systems, electrical systems, all other trades, DTP and RTD. PCL held weekly meetings with all the designers to address which items needed to be integrated into the drawings and solve any trade collision.

After the design was complete and work began in the field, PCL coordinated with the excavation, utility and rail contractors early in the process to ensure that expectations were set and all parties would be prepared to execute the work when it was scheduled. In addition to the working with the different subcontractors and trades, PCL also worked with the owner and ultimately was allowed to complete the concrete apron package at CRMF in an effort to make coordination easier for the team.

After a series of record breaking storms, the site essentially became a giant mud puddle at the start of the project. This turned into quite a challenge due to the excessive water and saturated soils. These conditions brought the installation of underground ductbank to a stop, which in turn impacted the schedule and progress. By utilizing BIM and off-site prefabrication of materials, the schedule was fully recovered.

### **EXCELLENCE IN PROJECT EXECUTION AND MANAGEMENT/TEAM APPROACH**

PCL and our design-build team worked with many stakeholders within the RTD and DTP groups, who each had their own areas of focus. PCL worked with all of these groups, as well as all the trades, during the design process to ensure that the project would provide the best solution for the maintenance facility. These key parts of the team were brought on early for meetings, some of which had over 20 people in the room, and PCL managed each session to make sure that all concerns were heard and solutions were agreed upon by all parties. This approach of

including the team early and on every level was then implemented into a program to motivate the workers and reward their hard work and specifically their focus on quality. PCL recognized individual crews who were going above and beyond the minimum as the “Quality Crew of the Month.” This program reinforced teamwork and the importance of quality to individuals and resulted in added motivation to all workers on the site.

### **CONSTRUCTION INNOVATIONS/STATE-OF-THE-ART ADVANCEMENT**

Providing a sustainable building was integrated into the design from the very beginning. All members of our team understood this challenge and found ways to be innovative in the design of the facility. Our mechanical designer combined variable refrigerant flow systems, evaporative cooling, and radiant floor heating to provide an efficient mechanical system. By incorporating lighting controls and windows throughout the building to utilize the natural Colorado sunshine, our electrical designer was able to reduce the overall electrical demand. These items combined with other sustainable features allowed the facility to save the owner over 32 percent in energy cost savings. The use of water-efficient landscaping reduced potable water consumption by more than 52 percent. The success of the team’s efforts were demonstrated by the fact that CRMF is not only the first building of its kind to be LEED certified, it also exceeded the targeted certification level of Silver and instead achieved Gold level.

Through the use of BIM technology, the CRMF project was fully modeled and clash detection was ran at every phase of the project to solve any issues before they were realized in the field. Our BIM/CAD department worked hand in hand with the Prefab department to prepare workable schematic drawings for the exact measurements of each fixture. These drawings were then taken to a controlled environment off site to be built. Through these efforts and innovative thinking, approximately 1,800 hours were saved on the project.

### **ENVIRONMENTAL/SAFETY**

PCL’s safety program is more than adhering to the rigorous compliance, inspection and documentation requirements of a safety manual. It creates a culture where all workers are empowered to care for their own safety, workers look out for one-another, management is engaged in and committed to the safety of all workers, and safety is measured on behaviors, not

just statistics.

The core of the program includes conducting a Job Hazard Analysis (JHA) prior to the start of any major scope of work, completing a Pre-Job Safety Instruction (PSI) at the start of each task and after break, and conducting rigorous daily inspections. While these efforts promote pre-planning and hazard awareness, our team also focuses on worker engagement and building a culture of safety. The team implemented an “Adopt-A-Crew” safety program and focused on our readiness reviews before each scope of work started.

The “Adopt-A-Crew” program aligns PCL personnel with a targeted subcontractor to help them prepare and discuss their daily PSI with their crews. This “on the ground” level of involvement illustrates management’s commitment to safety and provides an informal setting for the workers to ask questions. This program helps bridge the gap between management and individual workers to enable effective communication.

The readiness review meetings were conducted with each subcontractor and each scope of work to ensure our subcontractor’s leaders understood the scope of work and the associated risks involved. Each subcontractor would walk PCL through their work plan and JHA to ensure they were in alignment. Any areas for improvement were addressed immediately instead of when the workers showed up ready for work, our steel contractor improving their program based off our program requiring the necessary fall protection is a perfect example of this. The culture PCL creates is what propels the team to achieving an excellent safety record as demonstrated on the CRMF project with 377,458 total man hours with zero lost time hours recorded.

#### **EXCELLENCE IN CLIENT SERVICE AND/OR CONTRIBUTION TO COMMUNITY**

Through the significant amount of initial coordination at the beginning of the project, PCL was able to understand the present and future needs of the client and their different end users groups. The facility was turned over to the client on time and under budget, in large part due to the successful design-build delivery. Justin Newton, DTS Project Director, said, “PCL has been a perfect partner in delivering our project. They have a safety first mentality that reflects our Zero Accidents culture and they are very easy to work with. Their demonstrated care, expertise, and

client focus provides a comfort level that is not often found. When we find partners like PCL, we want to work with them again.”

The existence of CRMF today will allow communities to be connected safely throughout the metropolitan area to the surrounding cities as well as the Denver International Airport. With its sustainable and forward thinking design, CRMF will stand to sustain the commuter rail transit system now and well into the future.

Another award CRMF has achieved is the 2015 ENR Mountain States Best Projects Award in the Airports/Transit Category in August 2015.











