

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

Actual Cost: \$47,426,816.55

Contractor: Mortenson

Project Name: Chatfield Storage Reallocation Project

As a major component of water supply and demand in Colorado, Mortenson was selected to partner on the Chatfield Storage Reallocation Project to reallocate the space around Chatfield Reservoir and accommodate an additional 20,600-acre feet of water storage for water supply without compromising its flood control function which represented up to 12 additional vertical feet of water storage. The additional storage will be used by municipal and agricultural providers. Along with the increased water level, the Chatfield Reservoir has been revamped with the addition of new recreational facilities and improved infrastructure including a new marina.

A critically important program was brought onto the project time almost immediately after Mortenson started working with the team. From daily reporting and construction observation tracking to inspection memorialization to punch list reporting, this tool was a cornerstone to the success of the project. This program was Procore. Procore is an all-in-one construction management software with numerous capabilities relating to safety, quality, financial tracking and overall project management. During some of our initial discussions with the customer, it became evident the project would succeed with a system in place that could assist in document management a crossing all contractors working for this customer.

Mortenson brought Procore into the project during the initial preconstruction phase. We reviewed the positives and negatives of the program and discussed them with the customer along with conducting multiple demonstrations as to why we use the program at Mortenson and the potential values it could provide the customer. The main advantage was to get everyone to use one system for all communication related to the program. Ultimately, the customer decided to utilize the system for the project and Procore proved to allow multiple contractors use the same platform to keep project documentation centralized in construction management program. Although the main benefit was to the customer, this allowed us to use a program we were familiar with and show the customer what resources and management we could provide for the duration of the project.

As part of preconstruction efforts, Mortenson integrated cost estimation and scheduling services throughout the planning and design process to keep the project on budget and on schedule throughout its development. Scope level pricing was updated incrementally throughout the preconstruction process and into construction to keep it current and market-tested throughout evolution of the design documents. We worked closely with the design team to provide value engineering and constructability reviews on an on-going basis to help improve efficiency.

Our construction success stems from our ability to work with the design team and the customer early in the project to identify design requirements, cost estimating criteria, and the level of subcontractor and supplier bid packages needed to support the schedule. Open communication and integration of the project team allowed us to create a road map the team used to guide the project through future phases. We also firmly believe in the importance of bringing key trade contractors on board as early as possible and at the right time to ensure the most cost-effective solution. These partners provide invaluable input not only schedule, but also cost, availability, constructability, safety, and quality for the project. Mortenson had three key partners for the project, Kelly Trucking, CDI Environmental, and Inland Marine Services. Utilizing the strengths of all our partners, we were able to successfully deliver the project and provide real-time constructability feedback and ongoing value engineering services.

During the preconstruction phase, we identified a fill shortage on the project which required additional borrow source. We worked with the designer, HDR, to re-design and shift the alignment of the main roadways around the reservoir, Perimeter Road, allowing access to additional fill material within an already established borrow site. The road was moved to the outer extents of a previously identified smaller borrow area creating a much larger material sources area. Along with this redesign we proposed moving a planned watermain into the roadway easement. This proposal aided in schedule by constructing the roadway and waterline concurrently.

Another value engineering example could be found at the Swim Beach location. Mortenson mined the sand that would be used at the Swim Beach from an on-site source. The sand was discovered during another contractor's earthwork operation and after performing gradation testing it was determined to be suitable alternative to beach sand. The initial bid item

was for import material. Our team revised our beach sand price to include mining, screening, and truck haul which proved to be a substantial cost savings to the customer.

The team overcame numerous obstacles on project to deliver key components of the project on time to allow the public to enjoy the numerous recreational activities Chatfield Reservoir has to offer. Throughout the project and regardless of the obstacle the team ensured everyone on the project along with the public was safe and quality was never compromised. They assessed the situation, regrouped, developed a detailed plan, executed the plan, and finally documented the solution.

The first obstacle occurred at the start of construction. The entire project required an enormous 1.3 CY earthwork operation cutting dirt from the southern portion of the project and filling in at the northern end using a fleet of Caterpillar scrapers, the distance from cut to fill was about 2 miles. A straightforward operation overall, however, an active 8" intermediate gas main ran directly down the middle of the project from north to south only a few feet below the surface. When loaded each scraper weighed over 130 tons which would easily damage the pipeline. The team knew about the gas line however the gas line was not able to be relocated prior to construction as it was still in the design stage. The solution developed was to design and install earthen berms over intersections where the fleet of scrapers would be moving dirt over the gas line. In all, seven berms were installed through the gas line alignment. The earthwork scope of work was completed without any issues with the gas main and the line was ultimately relocated after the earthwork operation was completed.

The next obstacle occurred near the conclusion of the project. At the north end of the project, specifically called Swim Beach, two new buildings needed to be constructed. To do so, the location needed approximately 15-feet of fill, adequate compaction and finally a 90-day settlement period. Despite a later Notice to Proceed being issued, our team understood the importance of delivering this section of the project to the originally scheduled milestone. Everyone came together as a project team and decided to proceed with helical piers drilled under and tied into the foundation to assist in mitigating any future potential settlement and allowed building construction to continue. The design was adjusted and approved, and the team began working on the revised plan. In the end the helical piers were installed to a depth of 35-feet allowing the building to be constructed in a much shorter time frame and the Swim Beach area

was delivered to the customer prior to the milestone date. Overall, a great success story for our team, our trade partners, the designers, and most importantly the owner and public who could continue to enjoy the many joys Chatfield Reservoir.

With the entire marina being relocated and water being added to the reservoir a new boat ramp required to be constructed. There were two challenges with the new ramp, pour concrete at a 14% grade and several feet under water. To complete the work, the team decided to use a portable cofferdam system. Next came the challenge of pouring concrete up a steep slope. Careful planning specifically addressing safety and quality concerns was completed and ultimately executed. A deep grooved surface was required as the final finish to the concrete for travel lanes on the ramps. This required custom fabricated hand tools and practice with mockups. The team spent considerable time and effort to provide a clean, high quality finish on the grooved surface and the entire boat ramp. The new ramp was 36-feet wide and 225-feet long and required over 20,000 lbs of rebar and 350 CY of concrete.

Prior to completion of the new marina installation, utilities needed to be connected between the landside and the marina. This was originally missed in the design and therefore the planning effort needed to take place quickly. With no clear-cut cost and schedule efficient operation, our team met with a horizontal directional drilling (HDD) contractor about the possibility of performing multiple bores that would 'daylight' 17-feet below the surface of water. After reviewing the challenge and securing the HDD contractor's services we all created a plan to achieve the goal. Despite the contractor doing this work for the first time, they successfully completed four HDD bores and pulled back 2" (560LF) and 6" (520LF) HPDE pipe for wet and dry utilities. Experienced divers were used to assist in locating the drill head and attaching the pipe underneath the surface to be tripped back. Environmentally sensitive materials were used during the entire project as there way direct contact with water.



Photo 1: Mortenson_Chatfield_1
Caption: Chatfield Reservoir Mitigation marina dredge operation



Photo 2: Mortenson_Chatfield_2
Caption: Chatfield Reservoir Mitigation perimeter road



Photo 3: Mortenson_Chatfield_3
Caption: Chatfield Reservoir Mitigation South Platt bridge deck pour



Photo 4: Mortenson_Chatfield_4
Caption: Chatfield Reservoir Mitigation boat ramp



Photo 5: Mortenson_Chatfield_5
Caption: Chatfield Reservoir Mitigation bridge



Photo 6: Mortenson_Chatfield_6
Caption: Chatfield Reservoir Mitigation fishing pier



Photo 7: Mortenson_Chatfield_7
Caption: Chatfield Reservoir Mitigation swim beach signage



Photo 8: Mortenson_Chatfield_8
Caption: Chatfield Reservoir Mitigation boat ramp construction



Photo 9: Mortenson_Chatfield_9
Caption: Chatfield Reservoir Mitigation new marina area



Photo 10: Mortenson_Chatfield_10
Caption: Chatfield Reservoir Mitigation boat ramp