Paso Robles Police Department Outdoor Training Facility Improvements - Phase 1

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This paper outlines the pre-construction and construction of the 24,300 square foot Paso Robles Police Department outdoor training facility improvements. The project focuses 12,000 square feet of the total site with improvements that include earthwork and new concrete flatwork. This project is a group project with Gavin Abraham and Nic Petri that is broken up into 3 phases, this paper will primarily focus on the phase 1 which includes grading and excavation. The purpose of this project was to provide the Paso Robles Police Department with a modern, functional facility that allows its officers to be better equipped to protect the community of Paso Robles.

Key Words: Site Improvement, Grading, Excavation, Concrete

Introduction

This project is located near the Paso Robles Municipal Airport at the Paso Robles Police Departments (PRPD) private training grounds. These grounds have been used mainly for firearm training for the PRPD. Once this project was brought to the attention of students Gavin Abraham, Nic Petri, and Zach Stellini they met with a group of IME students who developed a rough design for an indoor training facility in price range of $3.5-$5 million and they wanted to hand the project to the project team as Construction Management students to complete the preconstruction phase of the project. We then met with Commander Caleb Davis to gather a better understanding of what the police department was looking for. At this point the conclusion was made that a project of that magnitude was not going to be built anytime soon for financial reasons, and rather were looking for a in between solution under $50,000. The biggest concern was the uneven existing conditions and undefined target distances as well as ponding issues. Once we understood their needs, we needed to create a more functional training facility that will better allow them to serve the community. In the Now that we were aware of the goal and purpose for their improvements, Gavin, Nic and I started on a design that would incorporate their needs, this led us to creating a new layout of concrete walkways that would create a level ground for their training as well as infilling with degraded granite and turf. Once this design was approved by Commander Davis and Sargent Hermanson who is in charge of the training grounds, we had to decide how to break the project into phases and who would be in charge of each phase for a successful project. Our design came to 3,320 sf of concrete flatwork with 3 vertical pathways and five horizontal pathways. Once PRPD approved the design and we designated responsibilities amongst the project team we were able to get our official approval from Phil Barlow and Dan Knight as our
Subject Matter Expert. This project was funded by the PRPD and City of Paso Robles however we were able to secure equipment and tools that were graciously donated from Mike Bridgman and Dan Knight, and material/equipment discounts from Alliance Concrete, CalPortland, Paso Robles City, and Quinn Cat. This paper will outline the preconstruction, construction, conclusion, and lessons learned for Earthwork which is phase 1 of this project.

Preconstruction

Now that the project was approved as a Senior Project it was time to begin the preconstruction for the project. Fortunately the project is funded for by the PRPD so fundraising was not necessary for this project. From the very beginning we anticipated a large project given the previous designs from the IME students. However, once we talked with the PRPD and we came to understand a smaller scaled project that can actually be constructed by us was something they were looking for more rather than simply the preconstruction for a $3-$5 million project. As, previously mentioned once we had an idea of what PRPD realistically wanted for their training facility improvements we were able to develop a design that consisted of concrete walkways with turf and degraded granite infill. From this point we needed to gather material and equipment quotes for the design to ensure that it was within a workable budget for the PRPD. For our material quotes we reached out to 2-3 local suppliers for each material to ensure we were getting the best price. Now with a design and estimate we needed to have one final meeting with the Paso Robles City Building Official Freda Berman and the PRPD to ensure that our design met with city standards, was within budget, and to address liability waivers. Now that the design and budget were approved, we were ready to begin the construction phase of the project. Originally in our proposed work plan phase 1 was to include the placement and compaction of the degraded granite and the placement of the class II AB was apart of phase 2. However, once we arrived to the site and began to plan our approach to begin construction and looked at our current rough schedule and estimate, we came to the conclusion that with the cost of rental equipment it would be more beneficial to move the placement of the class II AB to phase 1 and the placement of the degraded granite to phase 2 or 3. This also allowed us to begin phase 2 work which is the formwork and concrete before the completion of phase 1. The total cost of the phase 1 work was estimated at $5,150 which included rental equipment, base rock, and layout tools.

Construction

Layout

The first step of the earthwork phase is to address the layout of the sidewalk design. Due to the fact that site has not been surveyed there weren’t control points or elevations to go off of. However, at the direction PRPD, we used the target line that is secured in an existing concrete walkway as our zero line to base our layout off of. We also realized that a zero yard walk way was redundant of the existing walkway that the targets are mounted to, so with the approval of the PRPD we decided to place a curb rather than a 4 foot walkway to save material. With use a 200’ measuring tape we were able to establish our 4 control corners to base the rest of our lay out on. From here we placed several stakes and ran string lines to utilize marking paint for the excavation of the sidewalks. However, before we were able to start digging we needed to figure out how much to dig. We used a surveying sloping laser loaned us by Mike Bridgman to figure how deep we needed to excavate to allow for 4”
of base rock, 4” of concrete, and allow for a 2” of dg infill. We originally wanted to place turf in the front 3 bays (figure B) to create a nicer surface to lay on, but due to cost and longevity the PRPD decided to have dg placed in all bays.

**Excavation and Base Rock**

Now that we had our layout and rough cut and fill marked out, we were able to begin excavation. For our excavation and base rock placement we rented a skid steer and mini excavator from Quinn Cat in Paso Robles. We originally planned on utilizing the skid steer for the excavation of the sidewalks but quickly realized that it led to an over excavation due to bucket width, so we decided to use the mini excavator for the excavation of the sidewalk and the skid steer for the base rock placement. The length of the training grounds is 150’, most of the excavation was done in the first 100’, the remainder needed to be brought due to the 26” of fall from the targets to the 50 yard walk way. We accommodated this drastic slope by cutting the front half of the range and using base rock to build up low areas which was primarily the south east corner (figure H) where we needed approximately 13” of base rock. This was done primarily in two separate weekends, the first weekend we rented a water truck from Quinn Cat along with a vibra plate for compaction and the other weekend we rented another skid steer and a water buffalo trailer. We need water for compacting the base and soil. We were also fortunate to have been loaned a roller by Mike Bridgman as well which significantly expedited the compaction of base and soil.

**Cost**

Phase 1 which was originally estimated at $5,150 came in at $3,925. These savings came from loaned equipment courtesy of Mike as well as discounts given from Quinn Cat, and the PRPD utilizing their own trucking for delivery of the base rock material. The total forecasted amount to complete the project is $20,000 which is under our original estimate of $24,000.

**Schedule**

Phase 1 Completion date was tentatively targeted for 1/22/2021 but due to a delay in approvals from the city and rain we were unable to start until 1/30/2021 compared to our original planned start date of 1/4/2021. However, our hard completion date that was agreed upon for phase 1 was 3/21/2021 and fortunately we completed that scope with ample time as Phase 1 excavation and base rock placement was completed on 2/21/2021.

**Addition To**

As previously mentioned, this is a group project that is broken up into phases, with that being said we all help each other with the entire project. So, in addition to the excavation and earthwork I was also able to support Nic and Gavin with the formwork, concrete, and dg placement. In addition to our originally work, at the PRPD ‘s instruction we ran conduit and control boxes for future lighting.

**Lessons Learned**

There were several take aways from this project that we learned from. From the very beginning our biggest mistake was using string lines to figure out cut and fill. In theory you can run string lines to figure out your elevations and what needs to be excavated and filled, but it is only effective in 10’-15’ increments as the string line will stretch and sag. This ultimately throws off your cut and fill.
calculations. This led to us over excavating our first horizontal run, which ultimately took more base rock than we estimated for. We learned that we should have either been utilizing a sloping laser from the beginning or used a string line in shorter increments.

**Conclusion**

At the end of it all it was a very successful project, that allowed us as students to learn a lot about the construction process. We were able to learn and apply several aspects of construction to this project that include design, project coordination, schedule, budget, field layout, equipment operation, and owner coordination. All of these aspects can and will be applied to our future careers in the industry.

**Photos**

Figure A – Existing Conditions
Figure B – Beginning of Layout

Figure C - Design
Figure D – Excavation Underway

Figure E – Excavation Complete
Figure F – Beginning to Place Base Rock

Figure H – Building Up Southeast Corner
Figure I – Base Rock Complete

Figure J – Most Current