

The Discipleship Home Pergola and Firepit Area

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This report illustrates the complete process of the implementation of an outdoor space consisting of a hardscaped firepit area covered by a pergola in the backyard of the Discipleship Home in Oceano, CA. This project was carried out by two construction management students, Andreas Rasmussen and Logan Smith. Logan Smith's primary focus was the pergola while I was in charge of the hardscaping and natural gas firepit directly underneath the structure. The project was completed in December of 2020 with the use of quality materials purchased from local businesses and the help of local equipment rental store, Grover Tool & Rentals. This area now provides beautiful aesthetics and great function for an organization designed to get men in the community, that have taken a wrong turn in life, back on track. Together, Logan and I were able to improve our construction skills, teamwork, and our community in just a few months.

Key Words: Project, Firepit, Pergola, Quality, Community

Introduction

Logan Smith and I wanted to partake in a senior project that would leave a lasting impact on our community. We had been brainstorming ideas for a project-based project for months when the perfect opportunity arose. Together, we would go on to construct an outdoor space for the Discipleship Home in Oceano, Ca. This outdoor space consists of a 12'x12' pergola with hardscaping and a natural gas firepit directly underneath. While we constructed and brainstormed ideas for the complete project together, I owned the hardscaping and the firepit, and Logan took the lead on the pergola. We were able to make a difference in our community by providing a space for rehabilitation and growth for the members at the Discipleship Home all while putting our skills of construction management through their courses.

Background

As owner of Grover Tool & Rentals - a local equipment rental company in Grover Beach, CA - Esther Rasmussen, became friends with LeAire Griffin, a local landscape contractor in the area. Overtime, it became known that LeAire was also the director at a nearby sober recovery home in Oceano, CA. This home is known as the Discipleship Home and is operated by Oasis Church. Speaking with my parents about potential senior projects, my mom proposed the idea of doing some sort of improvement at the Discipleship Home as it would be for a terrific cause and they were in need of backyard improvements. Soon after, I contacted LeAire via phone to arrange a meeting and discuss ideas. He proposed that he was planning on starting the landscaping in the backyard with some sort of pergola or gazebo structure including a firepit below to serve as a gathering area for the members in their house to have discussion and bible study. I have a true passion for carpentry and loved the idea of adding a natural gas firepit below the structure. Constructing a 10-foot-tall pergola may have been possible alone, although it seemed this project had a large enough scope of work, would be much more efficiently executed, and more enjoyable with another team member. With that said, I presented the idea of approaching this project as a team to close friend and fellow construction management student, Logan Smith. He was excited with the idea as well, so we presented the potential project to Phil Barlow – Cal Poly Construction Management Senior Project Director. He explained to us that the scope was not big enough for two students to work on together and we needed to break up the pergola and the firepit into two separate projects to qualify as two senior projects. With that information we began separating the tasks for the complete project between the two of us. While we both contributed ideas and constructed each piece of the entire project together, we decided Logan would take on the design and estimating of the pergola, while I would focus my attention on the design and estimating of the firepit and the landscape below the wooden structure. Next, we spoke with Joe Cleary about being our advisor. We both had him as a professor, and amongst other skills, he is extremely knowledgeable pertaining to carpentry work. We were extremely motivated to get started as we both agreed we would learn valuable construction skills from this project, and it would better our community, along with other people's lives.

Coursework that contributed to our success on this project includes the following:

- CM 214 – Scheduling, Estimating, Carpentry
- CM 313 – Scheduling, Estimating, Concrete work
- CM 113, 115 – Selecting materials, Concrete process

Process

Funding

During our first meeting with LeAire, we discussed funding almost immediately. We presented that we would submit a request for a grant towards material through Scott Kelting and CMAC. He explained that Oasis Church had already planned on spending money on landscape improvements – including a pergola/firepit area - at The Discipleship Home and they would cover the additional cost if our funding did not cover all material costs. I then spoke to my parents who own a local equipment rental store. They gave us permission to utilize any tools or equipment we needed to complete our project free of cost in terms of equipment. This helped us out budget wise, as we needed skill-saws, ladders, grading rakes, trenching shovels, sawhorses, tampers, a block saw, concrete mixer, and more to sufficiently construct our project. From there we were able to shift our focus to the design of our individual scopes.

Design

While Logan began designing the Pergola, I began to design the landscaping that would cover the area directly below the structure and would also contain a fire pit as a center piece. We were originally planning on natural fire pit to accommodate wood, but LeAire requested we construct the fire pit to be ran from natural gas. Initially, I was concerned about the timeline of obtaining a permit for this addition but LeAire and I soon agreed he would handle the gas line and tie-in and I could focus on the construction of the firepit area. Excited for the challenge, I looked up the biggest natural gas fire ring kit I could purchase in order to accommodate up to 10 people. Through my research, I discovered a 36-inch ring was the biggest option. Collectively, we decided this would be perfect for our application. The rest of the design of the structure and surrounding landscape would be based off of our 36-inch center piece. Fire ring masonry blocks would surround the fire ring to an inside diameter of 40 inches and an outside diameter of 56 inches. Next, 12-foot x 12-foot was agreed to be the dimensions of the overhead pergola and landscaped area. Originally, we planned on surrounding the fire pit with decomposed granite to create a solid surface in which seating/benches could later be placed atop. LeAire then chose to revise that plan and go with pavers surrounding the firepit underneath the structure. From there, our design was complete. As a result, we would move forward with basic estimating, followed by construction.

Construction

We constructed the pergola together to start the project while we waited on our fire-ring (our only item with lead time – 5-7 business days). The first step was determining the location in the yard and orientation in which he wanted the structure and hardscaping to face. We then worked on setting the posts of the pergola square in place using string line held by a square border in which we constructed on site using the 3-4-5 method. After consulting with LeAire, we determined what our total depth of our three-part system would be. This system would consist of decomposed granite, a thin layer of sand, and our pavers. With a total depth of 5-1/4 inches, we dug out our existing grade. It is important to note that the existing grade started out as a finish-graded, bare, and sandy landscape that already accommodated for proper drainage of the yard. With that being said, LeAire plans to meet up with the top of our pavers with 3 inches of bark surround the hardscaping. We dug out roughly 2-1/4” inches within our 12’x12’ area in order to make this possible in the future. After the construction of the pergola was complete, we focused

the entirety of our attention to the hardscaping of the area below and the firepit, while LeAire began to dig a trench to contain our gas line that would be tied into the house. LeAire took care of all permits needed to complete this tie-in and accepted all risk associated with the gas line and fire ring. We helped during this process along with volunteers living at the Discipleship Home. Once our line was set in place, we proceeded to pressure test for leaks for 24 hours. Pressure treated 2x4 boards were placed and screwed along our border from outside edge of our pergola posts to create a system to keep our material in place. We then leveled the existing soil accommodating for proper drainage and followed this by laying decomposed granite. With the use of rakes, a water hose, and a hand tamper, we were able to compact the material little by little until it was ready for a light sand layer. This sand layer would come into play when setting the pavers as it gives them some room to be compacted to the same heights of each other. Setting pavers was something the two of us had zero experience doing before this opportunity, so initially we struggled to get the pavers level. LeAire luckily called his close friend and pastor of Oasis Church. He has several years of experience with pavers and gave us some tips and pointers. While we had screeded the decomposed granite and sand prior to setting the pavers, he informed us our technique was not quite right. With his tips, we cut one of our leftover pieces of lumber into a screeding tool. We proceeded to screed our finished base once more, though this time the correct way which worked out great. Utilizing our 1-1-1 pattern of three different size pavers, we began laying pavers at a rapid pace leaving only some small gaps at the borders and pergola posts that would need to be cut with a block saw to fit. After picking up the block saw that mitigates silica dust, we cut our remaining pavers to fit these gaps. After ensuring we had obtained our desired slope and the pavers were level with one another, we proceeded by pouring and brushing Quikrete multipurpose sand across the top of the pavers to fill the gaps and secure the pavers in place. We then placed our fire ring block directly on top of the pavers stacked three rows high. In order to utilize the keyed gas valve, we made notches to four of the blocks to obtain a clean aesthetic with minimal gaps. Next, we connected our ring to our gas line and filled the center of our fire pit with Quikrete play sand 8 inches high and set the ring in place. Finally, for aesthetics, fire glass was placed on top to finish it off.

Result

The final deliverable consisted of a very nice 12'x12' pergola to provide ample shade and shelter during all times of the day, as well as a hardscaped area directly below the structure for seating around the natural gas fire pit centerpiece. All in all, we completed our project on schedule and under budget.

Lessons Learned

We gained valuable knowledge during this project and learned a few lessons the hard way. First and foremost, material runs take a significant amount of time and coordination with schedule, vehicles, etc. There were days we felt we did not get much done and it is because we spent a large deal of time getting material. Luckily, we were able to use my truck equipped with a long bed for all of our lumber runs and LeAire helped us tremendously with picking up all of the pavers, sand, and stone with his dump trailer he uses for his personal landscaping business.

Another noteworthy lesson would be that communication is key, especially with a client. We assumed LeAire would be happy with cylindrical forms for our concrete that would leave the concrete visible at the top. We purchased these forms and he had us change our plan to just setting the posts in the ground rather than using formwork and post anchors. The biggest lesson pertaining to the hardscaping for me would be to always screed and find out the correct technique before laying pavers down. This will save a grand amount of time overall. Lastly, in regard to schedule, things do not always go to plan. While you may fall behind at times which can be discouraging, it is important to stay adaptable and positive because you may make up time during the next step of the process.

Figures



Figure 1: Bare backyard – Initial measurements



Figure 2: Determining location and verifying measurements are square



Figure 3: Pergola is built. Border for hardscape and base is set. Waiting on pressure test of gas line to backfill trench and compact decomposed granite.



Figure 4: Screeding decomposed granite before and after compacting with hand tamper



Figure 5: Laying pavers in 1-1-1 pattern



Figure 6: Notching fire ring block to accommodate gas line and valve



Figure 7: Final Product

Conclusion

All in all, this was a great experience for all parties involved. We gained so much knowledge through the construction process that we can utilize on future projects we may choose to partake in. LeAire and the men at the Discipleship Home were very pleased with the final product and LeAire was even impressed by our math skills in terms of estimating material and making cuts. We were able to build an incredible backyard piece that bettered Logan and I as individuals, helps improve the community by building a mini sanctuary for the men at the Discipleship Home that can aid in getting them back on the right track, and helps those men as individuals get back to a better position in life.