

Eagle Scout Leadership Service Project Workbook

Scout's name:

Brian Joyner

Address:



Telephone No.:

Unit No.:

Troop 45

District:

Orange

Local Council:

Occoneechee Council

Unit leader's name:

Address:



Telephone No.:

Unit advancement committee person's name:

Address:



Telephone No.:

Project Description

Describe the project you plan to do:

This eagle project will consist of building a thirty foot long arch bridge across a creek at Camp Chestnut Ridge. The creek is located at the end of the lake opposite from the dam. This bridge will be a pedestrian bridge only, able to hold people, bikes, and horses.

What group will benefit from the project:

Camp Chestnut Ridge
4300 Camp Chestnut Ridge Rd.
Efland, NC 27243

My project will be of benefit to the group because:

The project will benefit the camp by providing a safe walkway over the creek and will improve the overall appearance of the camp. Currently there is a simple bridge crossing the creek, but it is becoming unsafe and it is not very appealing to look at. The old bridge consists of two power line poles connected by decking and is starting to rot (see attachment 1). This creek is visited very often and the new bridge will drastically improve the beauty of the area.

This project was discussed with my unit leader on: 8/28/04

The project concept was discussed with the following representative of the group that will benefit from the project:

Daryl Riggins
Assistant Director
304-3900
Meeting on: 8/04/04

Project Details

The first part of the project is to gather the materials needed for the new bridge. First, plans for the arches were located (see attachment 2) and then modified for the project. Instead of the bridge being eight feet wide, the bridge will only be five feet wide. Footings for the bridge were also designed (see attachment 3). The cradles will be made before the first day of work. Multiple lumber companies were then asked to bid on the project. The company with the lowest price will provide the material for the project.

Labor time for the project will take about five working days. Most of the work needs smaller crews (4-5 people) to finish, but some days will need a large group to help. The first days focus will be the footings. Two sets of re-enforced footings will be dug and poured. The next workday's goal is to cut as much of the lumber as possible. After the arch pieces have been cut, they will be put together to make sure they fit. The railing and decking will also be cut. The third day is the most important day and will need a large workforce. The arches will be transported to the site and set up. The fourth day will consist of finishing the deck and rail cutting and placing the decking and rails on the bridge. The last day will be used to remove the remainder of the old bridge and clean up.

Tools Needed:

- (1) Chain saw
- (4) Mattocks
- (2) Shovels
- (2) Wheelbarrows
- (1) Surveyor's Level
- (1) Miter Box
- (1) Table Saw
- (1) Drill Press, with a full set of bits
- (1) Power Drill
- (1) 15' Trailer with appropriate Vehicle
- (1) Wrench Set with Sockets
- (1) Tractor
- Gloves for all workers

Materials Needed:

- (36) Bags of Quick Cement, (each footing is 10ft³)
 - (48 ft) .5 inch rebar, 8ft lengths
 - (4) 4" Concrete Blocks
 - (8) 2"x 8"-12'
 - (18) 1/2"x 8" Carriage Bolt
 - (36) 1/2" Washers
 - (18) 1/2" Nuts
 - (8) 2"x 8"-10'
 - (26) 2"x 10"-10'
 - (24) 2"x 6"-10'
 - (6) 2"x 4"-10'
 - (23) 2"x 2"x 8"
 - (8) 1/2"x 6" Lag Bolts
 - (8) Lead Anchors
 - (4) 5lb. 16d Nails
 - (2) 5lb. 12d Nails
 - (10) 2"x 4"-8' (untreated), used for tacking bridge up
- *Unless otherwise noted, all lumber is treated

Day One: This will be a full day and will take place at the camp. Two crews of four people each will be used. The first task will be to cut and remove part of the old bridge. An adult will use a chainsaw to cut the bridge just before the area of the footings. The ends will be removed and salvaged. The remaining part of the bridge will be used to help put the new bridge up. The second part of the day will be to dig the footings. They must be at the same altitude and must correspond to each other exactly. This will be achieved by using a surveyor's level and precise measurement. After they have been dug, frames will be built and placed in the holes. Rebar will then be placed and the cement will be poured. Each footing will be constructed by one of the two four people teams.

Tools Needed:

- (1) Chain saw

- (2) Shovels
- (2) Wheelbarrows
- (1) Level

Materials Needed:

- (18 ft) 2x6 Lumber
- (16) 12d Nails
- (36) Bags of Quick Cement, (each footing is 10ft³)
- (48 ft) .5 inch rebar, 8ft lengths

Day Two: The second workday will be at my house. Adults who can operate power equipment will be needed. The goal of the day will be to finish all cutting needed for the whole project. The first part of the day will be to cut the arch pieces. After the pieces have been cut, the youth will build the arches with them. Each piece must fit exactly. After the arches are built, each piece will be labeled. The arches will be disassembled into the largest sections possible to transport. The next stage will be to cut and assemble the railing. The goal is to build the railing so that it can be transported to the bridge site in pre-assembled pieces. The decking will be the last part cut.

Tools Needed:

- (1) Miter Box
- (1) Table Saw
- (1) Drill Press
- (1) Power Drill

Materials Needed:

- (8) 2"x 8"-10'
- (26) 2"x 10"-10'
- (24) 2"x 6"-10'
- (6) 2"x 4"-10'
- (8) 2"x 8"-12'
- (23) 2"x 2"x 8"
- (41) Deck width 2"x10"
- (12) 8.5"x.5" Carriage Bolts with nuts and washers
- (6) 7"x.5" Carriage Bolts with nuts and washers
- (4) 5lb. 16d Nails
- (2) 5lb. 12d Nails

Day Three: The arches will be transported to the bridge site this day. After they arrive, the arch pieces will be moved by workers down to the creek. Each will be put together at the bridge site. Once they are built, every worker will help transport them across the creek and into the footings. Once they are there, they will be bolted in and the bridge braces will be placed into the arches. The arches will then stand free and support themselves. This day will need as many workers as possible. Twenty people would be ideal. The arches will be very heavy and not easily moved.

Tools Needed:

- (1) 15' Trailer with appropriate Vehicle
- (2) Wrench Sets with Sockets

Materials Needed:

Arch Pieces

Day Four: The railings and decking will be transported this day. Two teams of two to four people will be used to place the decking and railings on the bridge. The decking team will start on one side and nail the decking on the bridge. After the decking has been nailed to the bridge, another team will place the railings. They will be pre-assembled and should not take a long time to place. The old bridge will again be used to access the new bridge from over the creek.

Tools Needed:

- (4) Hammers

Materials Needed:

- (4) 5lb. 16d Nails
- (2) 5lb. 12d Nails
- Decking Pieces
- Railing Pieces

Day 5: This day will consist of cleaning up the site and destroying the rest of the old bridge. A small group will be needed this day. The decking of the old bridge will be removed first. Afterwards the poles will be moved from under the new bridge and placed so they can be removed. The camp's tractor will be used to move the poles wherever the camp wants them.

Tools Needed:

- (1) Tractor
- (2) Hammers

Throughout the whole project safety will be a major issue. Power tools will be necessary for the completion of the project. No one under the age of eighteen will be allowed to operate any power tool. Anyone who shows they are a safety hazard will not be allowed to work the project again. Heavy pieces of wood will be used and until the bridge is fully constructed, it can be dangerous if workers start being irresponsible. B.S.A. policy as stated in "Guide to Safe Scouting" will be fully enforced throughout the project. A minimum of two adults will be at each workday.

Approval Signatures for the Project Plan:

Doug [Signature] 09/07/04
Camp Chestnut Ridge Date

[Signature] 9-9-04
Troop Committee Member Date

[Signature] 9-9-04
Scoutmaster Date

[Signature] 23 Sept. '04
District Eagle Board Member Date

Eagle Final Report

Daily Log and Time

Day 1:

Day 1 went as planned. We managed to dig and fill the footings in much less time than I had originally estimated. We did not dig as deep as planned, so we excavated as much as we could and built the area around the footings up. Ten of the bags of cement were not used and given to the camp. Mixing the concrete on the bridge worked well.

Day 2:

Turnout was very low. During much of day only one other person outside my family showed up. I made a few calls and managed to get one other person to show up during the afternoon. Both of the non-family workers were exceptional carpentry workers. This made up for the lack of volunteers.

The arches came together very well. The sawing was done by my father, so the same standard of measurement was kept throughout the project. The joints came together just as planned, but most needed a lot of careful attention to get them to fit. The arch span was exactly as the plans had specified.

Day 3:

This was a minor workday that was not originally planned for. We just made a few measurements and adjustments to the arch joints.

Day 4:

Day four's focus was disassembling and moving the bridge. I expected this to be much easier than it actually was. Putting the arches together is much less troublesome than taking them apart. We ended up disassembling the arch into individual pieces and placing them on a boat trailer. This worked very well. We used a secondary trailer to move the rest of the equipment needed to complete the project.

Day 5:

Reassembling the arches was more trouble than day two. Ample workers helped make this day a success. Thanks to the great workforce, both arches were put together at the same time. Unfortunately, we had a small injury that was resolved without problems. The joints required a lot of adjusting along with the pieces connecting the two arches.

Day 6:

The Iron cradles came back built a little differently than originally planned. We finished placing the arches in the cradles with ease and extended the bridge ramps to eight feet instead of the originally planned six feet. The side rails and decking were also started this day.

Day 7:

The decking was finished and more of the side rails were built. Each rail had to be modified to fit in its respective space. Turnout was great and we were able to finish a whole day's work in an afternoon.

Day 8:

We finished the project. The railing was completed in less time than expected. Only three adults showed up this day, so much of the complex side rail work was completed by scouts.

Changes

For the most part, few changes were required to complete the project. The largest changes were limited to small modifications to the design. The footings and cradles used were also a little different than the plan had specified. Otherwise, a few nuts and bolts had to be exchanged. We also used a few more tools than I had planned for.

The plans called for lumber a half inch wider than what Mebane Lumber provided. The bridge was originally designed in metric and with Canadian standards of lumber. I decided to order the plan in the standard system, but I wish that I had not. This seemed like it would make the project easier because the tools needed for the project were in standard. Unfortunately, many of the plans specifications were odd and not practical for the bridge. The arches themselves are exactly as specified, but both the handrails and ramps are custom. The change in lumber caused the handrails to vary from the universal lengths, so the pickets were adjusted to fit properly. The ramps were also extended. In the original write-up, they had been set to extend six feet, but after building one set, we decided they were too steep. Extra wood was purchased and the ramps were built to extend eight feet. This helped decrease the slope of the incline dramatically.

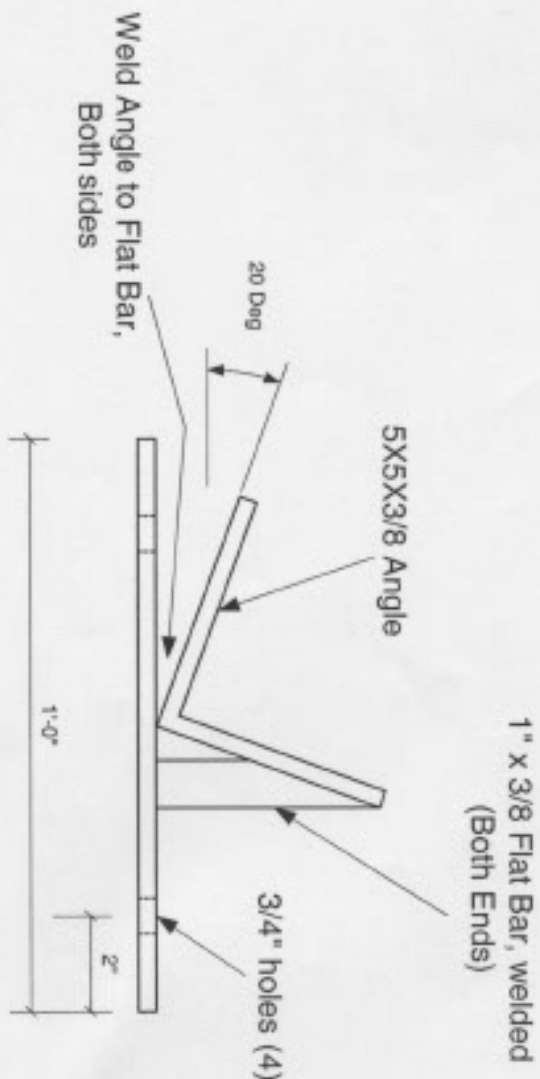
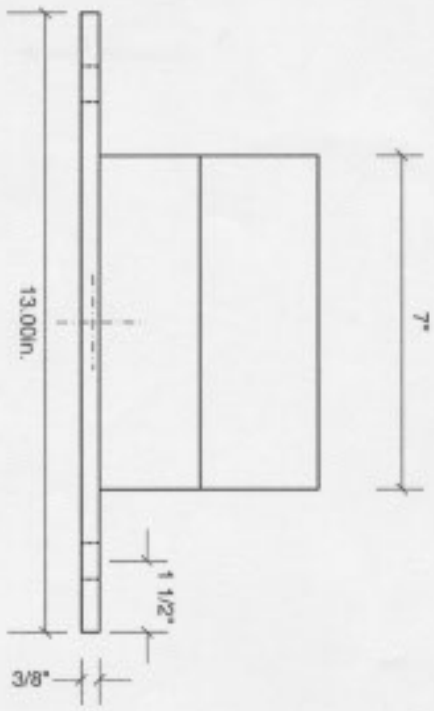
The footings were not able to be built exactly like the plans called for. We started digging on the island side and discovered very quickly that the roots were going to be a problem. The water was also higher than we expected. To solve this problem, we only excavated about three or four inches below ground. After the footings were cured, we built up the area surrounding them, so they are firmly in place. The cradles themselves were also changed. Instead of being placed on a simple square of iron, they are on a "H" of iron. This was changed because of the price of iron. Otherwise, we also used rebar cradles to place the rebar in the footings. This was added to help strengthen the footings.

The plan called for eight and half inch bolts and other strange size bolts that were not available. Most of the time, an eight inch bolt was plenty. This was not the case at the very wide base joint. The bolts we had were much too small for this joint, so new ten inch bolts were purchased. We also added extra washers to all joints that were drilled after the arch was built. This includes the base joints.

Final Cost:

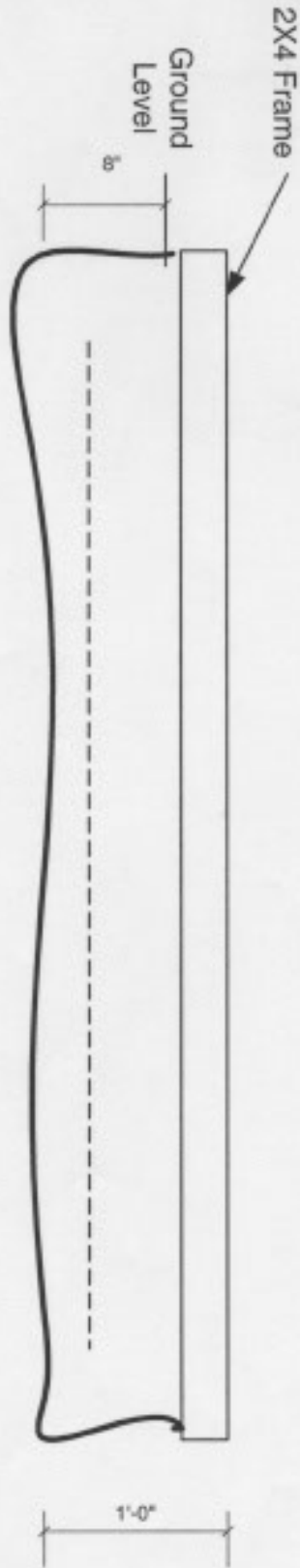
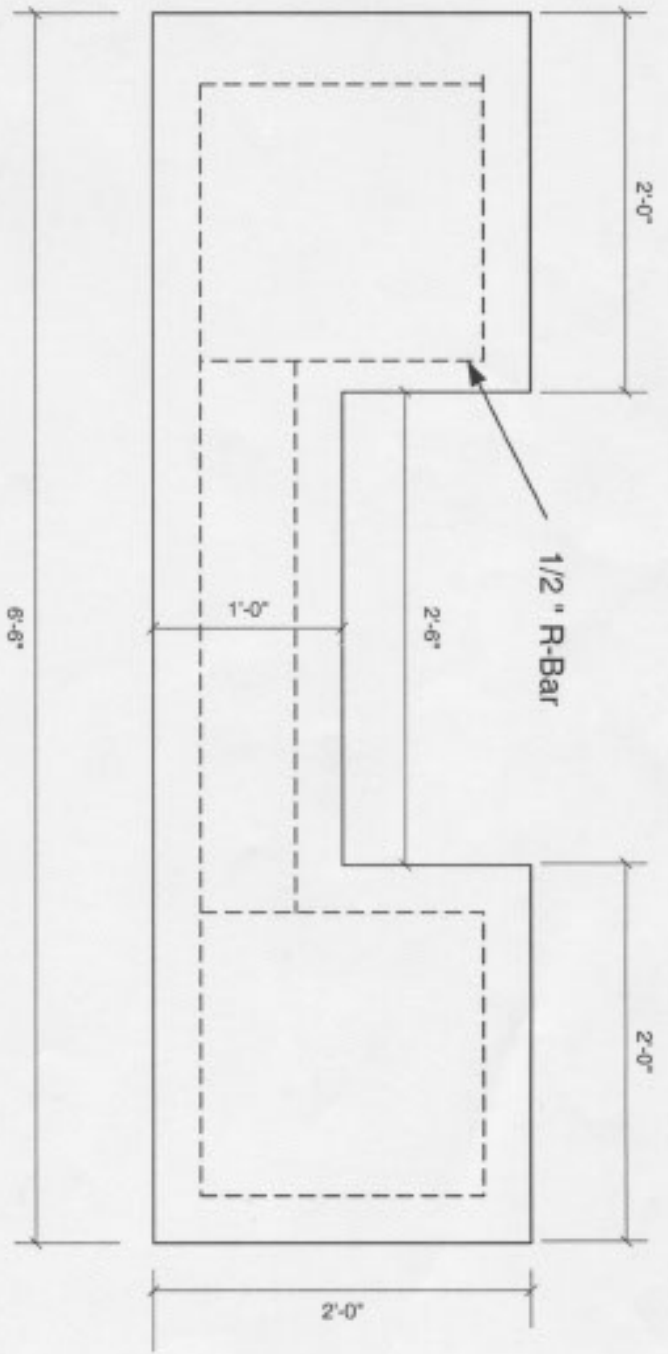
Item	Quantity	Estimate	Actual Cost	Comment
10'x1/2" Rebar	4	14.88	15.24	Lowe's
2"x8"x12'	8	90.8	70.96	
2"x8"x16'	16	254.4	192.64	
1/2"x8" Bolt	18	29.7	10.8	
1/2" Washer	36	7.56	2.52	
1/2" Nut	18	2.7	0.9	
2"x8"x10'	8	75.2	58.4	
2"x10"x10'	21	267.75	224.7	
2"x6"x10'	16	101.6	85.6	
2"x4"x10'	6	30	25.14	
2"x2"x8'	23	78.2	62.33	
2"x6"x10'	6	38.1	32.1	
Sakrete	36	144	144	
1/2"x6" Bolt	8	12	13.36	Lowe's
16d Nails	4	20.4	12.64	
12d Nails	2	10.2	6.16	
2"x4"x8' Untreated	10	30.5	29.7	
Cradles	4	80	80	
Lead Anchors	4	1	7.13	Lowe's
Concrete Block	4	1.5	4.64	Lowe's
Extra				
Paint (12 oz Can)	2	-	6.54	Need Paint
Primer (12 oz Can)	2	-	6.54	Need Paint
1/2" Washers	8	-	1.76	For Footings
2"x6"x8'	5	-	22.7	Some Disappeared
Rod Chair 3"x10"	2	-	0.58	Footings
Rod Chair 3"x10"	4	-	1.56	Footings
2"x8"x8	2	-	15.94	Original Ramps
2"x10"x10	6	-	71.82	Extra Decking
Mulch	6	-	12.96	Mulch for ramp
1/2"x9" Bolts	4	-	12.08	Deck Bolts
2"x8"x10'	2	-	19.94	New Ramps
Total		1290.49	1251.38	
			400 Donation	
			<hr/>	
			\$851.38	

	B	C	D	E	F	G	H	I	J
1	9.26.04	10.2.04	10.3.04	10.16.04	10.17.04	10.23.04	10.24.04	10.30.04	Total
2	8.75	10	3.5	4.5	4	7.5	4.75	5	48
3	4.25	9.5	3.5	4.5	4	7.5	4.75	5.5	43.5
4	2.75	5.25		3.75	1.5				13.25
5	2				2				4
6	2								2
7	1.75				2.5		4.25	4	12.5
8	1.75								1.75
9	3.25				2.25				5.5
10	3.25				2.25				5.5
11	4.25	8	1	4.5	3.5	7.5	4.75	5	38.5
12		5.08		4.5	3.58	4.16	4.25	5.25	18.16
13							3.25		11.91
14				2.5					2.5
15				2.5					2.5
16					3.58		4.58		8.16
17					1.08				1.08
18					3.33		4.25		7.58
19					2.5			4	6.5
20							4.58		4.58
21							4.25		4.25
22								5.5	5.5
23								3	3
24	---	---	---	---	---	---	---	---	---
25	Total	34	37.83	8	26.75	36.07	43.66	37.25	250.22
26									
27									
28									



Bridge Cradle Detail

Brian Joyner - Eagle Project



Footings shall extend approximately 6 to 8" into the existing ground, depending on difficulty of digging and extend the height of a 2X4 frame above ground.

Bridge footing Detail

Brian Joyner - Eagle Project

Attachment 3



In my original write-up, I had a list of what tools were needed. Luckily, I had many of them and access to the rest. We also had a plethora of workers who brought their own hammers and crowbars. This was not unexpected, but it was a great help in completing the project on time. The greatest addition was the use of two trailers instead of one. We used a boat trailer to haul the arch pieces and a covered trailer to haul and store our tools. This allowed us to keep our tools at the job site. We also used a few more saws than I had expected. They were used to make the joints fit properly.

James V. Ashill 11-18-04
Scoutmaster

David Regg 11/18/04
Camp Chestnut Ridge

