Alternative Design 2 – Pool

One option we have for an alternate design would be to change the location of the lift so that it is up on top of the deck as opposed to next to it. The idea would be that it would minimize the amount of cement we would need underground which would reduce costs for not only the cement, but also for the hole that would need to be dug. Rather than a 36”X36”X42” hole filled with cement, only about an 8” diameter by 42” deep hole would be necessary to support a 4” thick pole that would act as the support for the deck and the lift.

The rest of the support would be placed up on the deck. This would consist of a 3’X3’ metal plate drilled onto the deck or held to the deck using J-hooks. The plate would have a hole allowing the pole that is in the ground to go through and extend a few inches above the deck. On top of this plate, the lift would be mated over the pole. The lift would consist of multiple parts. First would be a 3 foot tall, hollow pipe, with legs extending out of the sides and attached at the corners of the metal plate. The hollow pipe would fit over the pole that is in the ground. On top of this hollow pipe would be a nylon bearing that allows for rotation. On top of this rotating bearing would be the rest of the lift, which consists of an addition 2 feet of height, with a 5 foot boom so it can extend out over the pool. Attached to this boom would be a handle for rotation to make turning the lift easier. An electric wench would be attached to the two foot pole and would run a steel cable up over the boom through three pulley systems. The line would have a carabineer attached to the end so that a mesh seat can be used by Mr. Hiller. He can slide it over himself while still seated in his wheelchair and use an additional carabineer attached to the seat to hook himself onto the lift. This design can be seen in Figure 2 below.
This design would be advantageous because it would cut the amount of cement and digging necessary. It would also allow a better distribution of the weight bearing on it by allowing some weight to be put on the base on top of the deck while still giving the deck support from the ground. Drawbacks to this design are that in order to dig under the deck and install the pole, a contractor would need to be hired to not only take away part of the deck to be able to have room to dig, but also to rebuild the part of the deck that was torn away. This would increase our budget by hundreds of dollars, which is the primary reason it is not the optimal design.

**Alternative Design 2 – Hot tub**

For the hot tub, a possible design would be one which has the lift indoors. Since the hot tub will be directly adjacent to the sliding glass door, it would be ideal to have a lift that could sit directly inside
the doorway. This would eliminate the need for someone to have to either be outside and push the lift so that it extends indoors, or to reach out of the door and pull the lift inside. The lift would still rest on a metal plate held into the floor with J-hooks. The lift would then be attached to the plate by resting in the center of it with legs extending out to the corners of the plate to distribute the weight. The lift would first have a 3 foot tall, 4 inch in diameter, ¼” thick hollow pole, which would allow a 1 foot long, 3 ½” pole to rest inside of it with about 6 inches exposed. Around this 3 ½” pole would be a nylon bearing for rotation. Over the 6 exposed inches would rest another 4 inch diameter shaft with a slightly thinner wall, such as 3/8” to allow smooth rotation around it. This shaft would be 2 feet tall. The boom would be attached to the top of the lift, and would have an extending arm for easy rotation of the lift. The boom would only be able to be about 3 feet wide to be able to fit through the doorway. The lift would work using an electric winch system that feeds a steel cable through two pulleys over the boom. The end of the cable would have a carabineer to allow Mr. Hiller to attach his mesh seat using an additional carabineer.

The advantage to this lift would be access during the winter months without someone else having to go outside to assist, because people often enjoy the use of hot tubs during cold weather. Another advantage would be the elimination of excavating ground for a cement block underground, which would reduce our budget. Less metal would also be necessary because the lift would only have to be 5 feet tall as opposed to 8 feet. Major drawbacks to the design include the short length of the boom. Having a short enough boom to be able to move through the doorway from the inside means that the boom may not be able to extend far enough over the hot tub to allow Mr. Hiller to get in and out of the hot tub with ease. Another disadvantage would be that it would take up space and could be an eyesore inside the house. Also the entire weight of the lift would be supported by the floor, which when combined with Mr. Hiller’s 250 pounds, is considerably heavy.